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DISSERTATION

**A REVISION OF THE NEOTROPICAL CLICK BEETLE GENERA *SEMIOTINUS*
PJATAKOWA AND *SEMIOTUS* ESCHSCHOLTZ (COLEOPTERA: ELATERIDAE)**

Submitted by

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In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

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Fort Collins, Colorado

Fall 2002

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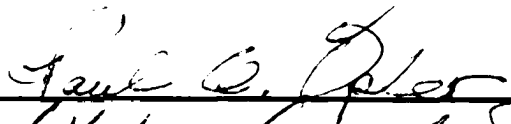
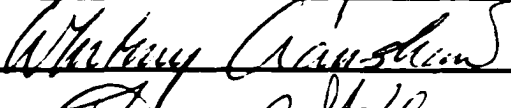
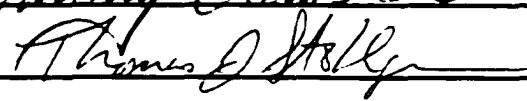
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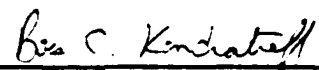
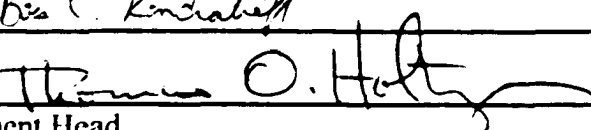
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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER
OUR SUPERVISION BY SAMUEL A. WELLS ENTITLED, "A REVISION OF THE
NEOTROPICAL CLICK BEETLE GENERA *SEMIOTINUS* PJATAKOWA AND
SEMIOTUS ESCHSCHOLTZ (COLEOPTERA: ELATERIDAE)" BE ACCEPTED AS
FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF
PHILOSOPHY.

Committee on Graduate Work


Advisor

Department Head

ABSTRACT OF DISSERTATION

A REVISION OF THE NEOTROPICAL CLICK BEETLE GENERA *SEMIOTINUS* PJATAKOWA AND *SEMIOTUS* ESCHSCHOLTZ (COLEOPTERA: ELATERIDAE)

The Neotropical click beetle genera *Semiotinus* and *Semiotus* are monophyletic groups within the subfamily Campsosterninae. *Semiotinus* is defined by the connate meso- and metasterna, presence of three membranous tarsal pads, and straight or recurved pronotal margins meeting the hypomera at an acute angle, without sulci. *Semiotus* is defined by the connate meso- and metasterna, presence of three membranous tarsal pads, and either sulcate, undulate, tuberculate, rounded or incrassate pronotal margins. A cladistic analysis of the genus was carried out using 40 characters from external morphology and male and female genitalia. Apomorphic states were identified using the genus *Oistus* Candèze as an outgroup. The 17 known species of *Semiotinus* Pjatakowa and 82 species of *Semiotus* are described and keyed. Fifteen species, formerly placed in *Semiotus* Eschscholtz are transferred to the genus *Semiotinus*, which formerly included only *S. hanghaasi* Pjatakowa. *Semiotinus maculatus* is newly described. *Semiotus straminious* Candèze is designated as a synonym of *Semiotinus brevicollis* Candèze, n. comb.; *S. dyptichus* Candèze and *S. subvirescens* Schwarz are designated as synonyms of *S. quadricollis* Kirsch, n. comb.; *S. juvenilis* Candèze and *S. horrei* Candèze are designated as synonyms of *S. fusiformis* Kirsch, n. comb.; *S. elegantulus* Candèze is

designated as a synonym of *S. trilineatus* Candèze, n. comb.; *S. pulchellus* Candèze is designated as a synonym of *S. quadrivittis* Steinheil, n. comb.; *S. staudingeri* Pjatakova is designated as a synonym of *S. aeneovittatus* Kirsch, n. comb.; *Semiotus aliciae*, *S. angustus*, *S. catei*, *S. chassaini*, *S. clarki*, *S. colombianus*, *S. cyrtomaris*, *S. gibbosus*, *S. kathleenae*, *S. kondratieffi*, *S. lacrimiformis*, *S. melleus*, *S. pallicornus*, *S. perangustus*, *S. pilosus*, *S. rileyi*, *S. rubricollis*, *S. spinosus*, *S. trinitensis*, *S. triplehorni*, and *S. woodi* are newly described. *Semiotus superbus reductus* Chassain is designated as a synonym of *S. acutus* Candèze; *S. candezei* Kirsch is designated as a synonym of *S. affinis* Guérin; *S. multifidus* Candèze is designated a synonym of *S. fascicularis* Candèze; *S. bifasciatus* Schwarz is designated a synonym of *S. fulvicollis* Blanchard; *S. melanocephalus* Schwarz is designated as a synonym of *S. antennalis* Candèze; *S. dohrni* Candèze is designated as a synonym of *S. badeni* Steinheil; *S. illigerii bifidus* Schwarz is designated a synonym of *S. illigeri* Candèze; *S. imperialis subtilis* Szombathy and *S. i. schenklingi* Szombathy are designated synonyms of *S. imperialis* Guérin; *S. horvathi* Szombathy is designated a synonym of *S. limatus* Candèze; *S. nigrolineatus* Schwarz is designated a synonym of *S. nigriceps* Candèze; *S. distinctus* Herbst is designated a synonym of *S. serraticornis* Drury; *S. superbus championi* Chassain is designated as a synonym of *S. exsolutus* Candèze; *S. punctatus* Candèze is designated as a synonym of *S. germari* Guérin; *S. nigrolineatus* Schwarz is designated a synonym of *S. nigriceps* Candèze; *S. hispidus lamotei* Chassain is designated as a synonym of *S. hispidus* Candèze; *S. langei* Schwarz is designated as a synonym of *S. schaumi* Guérin; *S. jansoni* Candèze and *S. jansoni bipunctatus* Schwarz are designated as synonyms of *S. taeniatatus* Erichson; *S. splendidus* Candèze is designated a subspecies of *S. cuspidatus* Chevrolat; and *S. sanguinolentus*

Candèze is designated as a synonym of *S. virgatus* Erichson. *Semiotus superbus kirschi* Chassain is designated a valid species and *S. exsolutus panamensis* Chassain is recognized as a valid subspecies. The five genera of the subfamily Campsosterninae are also keyed.

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DEDICATION

This dissertation is dedicated to Jacques Chassain, a long time student of *Semiotus* and an invaluable resource in this study.

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Specific appreciation is extended to Dr. Boris C. Kondratieff for encouragement, suggestions, and support (both financial and otherwise) during the three years of this project. Dr. Paul A. Opler provided helpful taxonomic insights and comments and helped acquire research material. Acknowledgment is also made of the many lending individuals and institutions that provided material. Dr. William S. Black helped with the phylogenetic analysis. Caity Delphia provided Figure 1 and Michael Kippenhan provided Figures 26 and 27. Joe Mendoza made the digital images. Charles A. Triplehorn and Kathy Wells have never tired of providing encouragement towards this effort.

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Introduction

The click beetle genus *Semiotus* Eschscholtz and its sister genus *Semiotinus* Pjatakowa are two of the most striking groups of beetles in the Americas. Specimens have been collected, named, and catalogued from the time of Linnaeus. European and American collections hold material now spanning almost four centuries. Yet, remarkably, the genus has received only three treatments that have provided any significant comparative information. Two of these treatments were produced by Candèze (1857 and 1874) and one by Champion (1894). Since Candèze's *Révision de la Monographie des Elatérides* (1874), there have been 42 names proposed. These names have been both specific and subspecific, and have been published in a variety of languages and with differing quality, making specific determinations difficult. A revision of the group has been needed to establish or verify synonymies, delimit poorly known species, clarify distribution (beyond the very general designations often used by 19th Century authors), and describe unnamed species.

This study brings together all available information on the genera *Semiotus* and *Semiotinus*. Very little is known of the biology and immature stages of these groups outside the few reports from Brazil and Chile (for *Semiotus intermedius* (Herbst), *S. ligneus* (Linnaeus), and *S. luteipennis* (Guérin)).

Many authors have recognized that the subgeneric groups established by Candèze are often more confusing than helpful. These were based primarily on frontal spines and elytral patterns and do not represent true relationships. The taxonomic section of this study, accordingly, does not recognize Candèze's groups. Phylogenetic groupings (which

include both *Semiotus* and *Semiotinus*) are discussed separately. Five monophyletic groups within *Semiotus* are noted parenthetically in the key for ease in identification. The genus *Semiotinus* is also recognized as a monophyletic group and is treated separately as a sister genus to *Semiotus*. Other natural groups could not be recognized in the key (which was made to facilitate identification only) without confusion. Illustrations are provided throughout the work to aid in identification.

In this study, approximately a third of the 82 recognized *Semiotus* are represented by only a few (or even unique) individual specimens. Approximately a third are represented by only a dozen or so individuals. The remaining third are more commonly encountered. Of the 17 species of *Semiotinus* here recognized, only a few are represented by more than a few specimens. Intraspecific variability in poorly represented *Semiotus* is not well understood and must be inferred from the more abundant species. The best approach under these circumstances is to be conservative in delimiting species.

History

Eschscholtz (1829) described the genus *Semiotus* in order to distinguish those *Elater* Linnaeus with frontal tubercles or spines and that bear tarsal pads on segments 1, 2, and 3. He included the species *E. lignarius* Fabricius, *E. distinctus* Herbst, *E. intermedius* Herbst, and *E. furcatus* Fabricius in the genus. Candèze (1857) established the tribe Chalcolepidiides that included the genera *Semiotus*, *Campsosternus* Latreille, *Chalcolepidus* Eschscholtz, and his new genus *Oistus*. The tribe was established to include those species of click beetles having the mesosternum and metasternum fused, without a defining sulcus. Within the tribe, the genus *Semiotus* was distinguished from

the other genera by the presence of lobes on the first three tarsomeres. Later authors would place the genus *Oistus* next to *Semiotus* based on this same character. Candèze (1857) considered the tarsal pads of the genus *Oistus* to be different than those of *Semiotus*, which he called lamellae. Candèze's work was also the first general treatment of the species including a key to the recognized species.

Fleutiaux (1927) erected the subfamily Campsosterninae that excluded *Semiotus*. The genus was considered sufficiently distinct from *Campsosternus* to merit placement in a separate subfamily. The characters used to justify this separation included the narrow elytra and the frontal spines. Quelle (1929) and Laurent (1961) confirmed the separate status of these two genera and included the presence of tarsal lobes in defining the genus *Semiotus* (and their absence in the genus *Campsosternus*) on segments 1, 2, and 3 as further evidence separating the genera.

Golbach (1970) established the subfamily Semiotinae to recognize the genera excluded from Fleutiaux's Campsosterninae. The genera in the new subfamily included *Semiotus*, *Oistus*, and *Semiotinus* Pjatakowa. The primary characters of the subfamily were the fused meso- and metasterna and the presence of tarsal lobes or pads on segments 1, 2, and 3. Gurjeva (1974) seems to have been unaware of Golbach's work and established the tribe Semiotini to include the same genera.

Stibick (1976) moved *Campsosternus* into Golbach's Semiotinae and recognized Campsosterninae as the senior name. He was unaware of Gurjeva's tribal designation of *Semiotus* and allied genera until after publication. Calder (1976) included the New Zealand genus *Metablax* in the subfamily Campsosterninae and separated it from the genus *Semiotus* by having a distinct fourth tarsomere (as compared to the partially

concealed fourth tarsomere of *Semiotus*) as well as its lack of abdominal foveae on sternite 5 (often present in *Semiotus*). In 1979, Stibick established the tribe Campsosternini to coincide with Gurjeva's Semiotini with the addition of the genus *Campsosternus*. This study recognizes *Semiotus* and *Semiotinus* as part of Calder's subfamily Campsosterninae. A key to the genera is provided below.

The genus *Semiotinus* was proposed by Pjatakowa (1941) to include a single species, *S. banghaasi* Pjatakowa from Colombia. It was distinguished from the related genus *Semiotus* Eschscholtz by having the pronotum wider than long, by the presence of carinae on the hind angles of the pronotum, and by its "bulkier" body (Pjatakowa, 1941).

Unfortunately, the type and only known specimen of *S. banghaasi* was destroyed in a fire in Kiev, Ukraine in the 1940's along with several hundred other Pjatakowa types (V.G. Dolin, personal communication). In the process of these revisions, it became clear that many of the smaller species assigned to *Semiotus* were similar to Pjatakowa's description of *Semiotinus*. A phylogenetic analysis of all species considered as *Semiotus* indicated a basal monophyletic clade for a group of species sharing characters with *Semiotinus* (Figs. 260-262). These species are herein assigned to *Semiotinus*. Additionally, one previously undescribed *Semiotinus* is included.

Materials and Methods

The following collections provided material for this study. The recognized four-letter coden (Arnett et al., 1993) for each collection is indicated in parentheses. These are the same codens used as institutional designators in the individual species treatments.

The Natural History Museum, London (BMNH); Bonta / Wells Collection of Coleoptera, Windsor, Colorado (BWCC); California Academy of Science, San Francisco (CASC); Canadian Museum of Nature, Ottawa (CMNC); Canadian National Collection of Insects, Ottawa (CNCI); Colorado State University, C.P. Gillette Museum of Arthropod Biodiversity, Fort Collins (CSUC); Cornell University Insect Collections, Ithaca, New York (CUIC); Deutsches Entomologisches Institut, Eberswalde (DEIC); Escuela Agricola Panamericana, Zamorano, Tegucigalpa, Honduras (EAPZ); E.G. Riley Collection (EGRC); Essig Museum, University of California, Berkeley (EMEC); Field Museum of natural History, Chicago (FMNH); Hungarian Natural History Museum, Budapest (HNHM); Instituto Nacional de Biodiversidad, Santo Domingo, Costa Rica (INBC); Institut Royal des Sciences Naturelles de Belgique, Brussels (ISNB); Museum für Naturkunde, Berlin (MNFD); Museum National d'Histoire Naturelle, Paris (MNHN); Montana Entomology Collection, Montana State University, Bozeman (MTEC); Naturhistorisches Museum, Vienna (NHMW); The Ohio State University Collection, Columbus (OSUC); University of Oxford, Hope Entomological Collections, United Kingdom (OXUM); Peter Cate Collection, Vienna (PCCV); Snow Entomological Collections, University of Kansas, Lawrence (SEMC); Staatliches Museum für Tierkunde, Dresden (SMTD); Texas A&M University, College Station (TAMU); National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM); Universitetets Zoologiske Museum, Copenhagen (ZMUC).

Male and female internal genitalia were examined after dissection and being cleared in a 1.0 molar solution of KOH at room temperature. Dissections were made from non-type material, except where available material was limited. Fragile type

material was not dissected. Color terminology was standardized by using the color charts in *A Dictionary of Color* (Maerz and Paul 1950) and then correlated with color descriptions found in William Stern's *Botanical Latin* (1983). These sources should be consulted for precise identification of the colors in this study. A general description of the main colors referred to herein include: *aeruginosus*: verdigris; *aurantiacus*: apricot orange; *badius*: dull chocolate brown; *fulvus*: dull yellow with a mixture of gray and brown; *luteus*: buttercup yellow; *piceus*: black as pitch; *rufopiceus*: reddish black (in this study more black than reddish); *sanguineus*: blood red; *testaceus*: brick red to brownish yellow (of unglazed earthenware); *viridis*: un-tinted green. These color names are herein considered anglicized and will not be italicized. Spelling corresponds with Stern (1983).

Measurements of body length were made from the anterior margin of the frons (including frontal spines when present) to the tip of the elytra (including spines, when present). Abdomena extending beyond the elytra were not measured, as this is not the normal state of any known species. Measurements of body width were made at the widest part of the body - generally on the basal third of the elytra. Pronotal length was measured along the center-line of the pronotum. Pronotal width was measured at the hind angles. Elytral length was measured along the suture. Elytral width was measured at the widest point - generally on the basal third. The relative width of the eyes was determined using the ocular index (Campbell and Marshall 1964). This is determined by measuring the narrowest distance between the eyes divided by the width of the head measured across the eyes. This quotient is then multiplied by 100.

Distributional data in the Material Examined sections are from the specimen labels. Exceptions to this include the dates, which have been standardized so as to be

read: month (in Roman numerals) - day - year. In cases where these periods are uncertain, the data have remained exactly as indicated on the labels. Larger political divisions have also been added in cases where they have not appeared on labels (and where they could be determined). Duplicate specimens of the same species bearing identical labels are only listed once. Specimens bearing labels with country data only were not listed if these countries were already represented by specimens containing a fuller label. Label data are listed alphabetically first by country and then by the political subdivision of each country. Countries are indicated in all capital bold letters. Political subdivisions are underlined.

Older literature and specimen labels often have a collection locality of New (or Nouvelle) Granada. This area is now part of the countries of Colombia, Ecuador, and Panama (occasionally even outlying areas). This name is used in individual species treatments only in cases where the current country names are unknown from other specimens.

All available or extant type specimens were examined. The Pjatakowa types were destroyed (V.G. Dolin, personal communication). Types of the species described prior to Blanchard (1843) were not located. In the cases where adequate descriptions and/or illustrations of these species were made (e.g. *Semiotus serraticornis* Drury and *S. angulatus* Drury), correct designations were made. otherwise, the designations made by Candèze (the earliest reviser) have been followed. More than 3,000 specimens of *Semiotus* / *Semiotinus* were examined.

Diagnostic Characters of Adults

Historically, the principal characters that have been used to define species of *Semiotus* (including those species herein transferred to *Semiotinus*) have been color patterns, frontal spines, pronotal shape, and elytral spines. Standardizing these characters has therefore been an important part of this study. Additionally, other characters not used in the past have proven helpful for determining relationships.

The anterolateral frontal spines are nearly always clearly defined. In a few cases where spines are absent, there is a fairly sharp angle. The difference between the angles and the spines are distinct enough that confusion should not exist. Illustrations have been included in this study to obviate any possible confusion. The medial frontal spine is different. Authors in the past have referred to sharp angles as spines. This can be confusing as there are several lengths and widths of the medial frontal spine. In cases where this might be unclear, illustrations have been prepared (Figs. 135-154).

Antennae are typically serrate for all species except for the *angulatus* group where they are pectinate to subpectinate. In few other cases can the antennae be used to differentiate groups, except for a few cases where differences exist in antennal length. Males generally have longer antennae than females. The difference can be as much as 1.5 segments or completely negligible. The size of the eyes also differs interspecifically, ranging from large (covering about half the head width) to small (covering less than a fourth the head width). Measurements have been made using the ocular index (see above).

Differences in pronotal shape show the most significant and easily recognized characters defining species groups and individual species. These characters tend to be consistent between groups with little if any overlap. The presence or absence of the marginal sulcus, the length of the sulcus, the presence or absence of the lateral tubercle, the size of the tubercle, and the presence or absence of sublateral depressions are all defining characters. On the other hand, pronotal coloration is significantly less diagnostic. The presence and absence of piceus to sanguineus bands have been used extensively in the past for defining species. This is unfortunate as these bands vary intraspecifically to a great extent. In this study, several specimens have been evaluated with obscure bands, clearly intermediate in color between two previously described species. These have been synonymized in sympatric groups where no other diagnostic characters have been found.

Subspecies have been recognized (for previously recognized species or varieties) only in cases where differences in color patterns have been geographically correlated and where existing names have been available, thus retaining taxonomic stability.

Important thoracic characters also occur ventrally. The apical portion of the prosternal process is partially divided dorso-ventrally in a few species, otherwise it is fairly evenly rounded at the tip. The posterior border of the hypomera is more significant. In the *imperialis* group, the median half of the posterior border is fairly evenly concave with a small dentition near the distal third (Fig. 180). The *furcatus* group bears two dentitions near the middle of the posterior border (Fig. 182), and in most other groups a single dentition is present near the mesal third to half of the posterior border (Figs. 178, 179, 181). The size of the dentitions is also important in separating some species.

The scutellum varies diagnostically in shape, being often nearly chordate, elongate oval, obovate, or quadrate. In some species the anterior margin dips anteriorly. The color of the scutellum ranges from completely piceus to luteus.

Elytral coloration is useful in separating many species. It is much more consistent than pronotal coloration. The major patterns include alternating light and dark bands, contrasting basal and apical coloration, and luteus basal coloration with contrasting dark sutural and marginal bands. Elytral shape is also diagnostically important. Typically, when viewed in profile, the dorsal and ventral surfaces are parallel, at least on the basal half or third. Some species, though, are more gibbous, with the dorsal surface raised basally relative to the ventral surface. Striae and strial punctures vary from completely obsolete to deep and well defined. The shape of the elytral apices are also diagnostically important ranging in shape from sharply spined to rounded. The sutural side of the apices also varies, ranging in shape from straight, to sinuous, to sharply angled (even dentate).

Male and female genitalic characters are also important. The male parameres range from narrow to broad and always bear an apical blade. This blade varies significantly in size and shape ranging from triangular with sharp angles to sinuous with rounded extremities. Posteriorly the blade is defined by a lateral spine that differs in size and angle of projection. The anterior sclerite of the female bursa copulatrix also differs significantly between species. The typical pattern includes a median piece, or spine, flanked by two lateral arms, or spines. These spines vary in relative length and can be either completely covered by smaller dentitions or smooth. In some species, the lateral arms all project posteriorly, in others they project laterally. A few species have a vestigial sclerite, in a few others, the sclerite is completely absent.

The genus *Semiotinus* is distinguished from all other genera in the Campsosterninae by the straight or recurved lateral pronotal margin (as in Figures 14 - 18) that joins the dorsal surface of the pronotum and the hypomeron at an acute angle (Fig. 12). Other characters are also typical of the genus but are not, in themselves, diagnostic for all species. These characters include: the hind angles of the pronotum that are typically carinate or subcarinate, the prosternum that is typically straight in profile, the frons that is typically lobed and without projecting spines, the pronotum that is typically wider than long, the pronotal disk that is typically evenly convex across without depressions or tubercles, and the elytra that typically terminate in an acute spine and either a sharp subapical angle or dentition. Other characters are similar to those of *Semiotus*.

Within the genus *Semiotinus* itself, the primary characters used to distinguish species are the presence or absence of frontal spines, shape of the lateral margin of the pronotum, color (of the head, pronotum, and elytra), and shape of the apical elytral spines.

Several species of *Semiotus* in the *caracasanus* group (see below) are superficially similar to the species of *Semiotinus* that bear frontal spines (*S. macer* (Candèze) and *S. aeneovittatus* (Kirsch)). Both groups lack marginal sulci. In these cases, species of *Semiotus* can be recognized by the broader pronotal border (joining the hypomera in an even curvature (as in Fig. 13) and not acutely as in *Semiotinus*) and by the very finely punctate pronotum, and elytra having faint striae. The pronotal punctures in *Semiotinus* are deeper and the striae and strial punctures are clearly defined.

Phylogeny and Biogeography

The genera *Semiotinus* and *Semiotus* are most closely allied to the genus *Oistus* Candèze (Golbach, 1970; Gurjeva, 1974). Stibick (1976) included these genera with the genus *Campsosternus* Latreille in the Campsosterninae. Calder (1976) recognized the genus *Metablax* Candèze in the Campsosterninae as well. All of these genera except *Metablax* share the connate meso- and metasterna and bear lobes or pads on tarsomeres 1, 2 and 3 (except *Campsosternus*). *Semiotus*, *Semiotinus* and *Oistus* are all American genera. *Campsosternus* is primarily Asian, whereas *Metablax* occurs in New Zealand.

The wide pronotum (wider than long), relatively straight lateral margins, and lack of lateral pronotal sulci seem to be the ancestral states manifest in the genera *Oistus* and *Semiotinus*. These genera also have less convex pronota.

The phylogenetic relationships of *Semiotus* and *Semiotinus* were evaluated using PAUP 4.0 (Beta Version (Swofford, 1998)). Forty characters were evaluated for 94 species (including both genera). A strict consensus tree of relationships is represented in Figure 260. Representative cladograms are given in Figures 261 and 262. A full list of characters used in the phylogenetic reconstructions is given in Table 2. The species / character matrix used for the phylogenetic reconstruction is given in Table 3.

The species grouped basally are herein designated part of the genus *Semiotinus*. The remainder of the species represent *Semiotus*. A few groups with evident phylogenetic affinity are readily recognizable and have been designated by the oldest name in each group. These groups have not been given generic status in order to avoid creating a paraphyletic genus of the remaining species of *Semiotus*. These clearly defined

groups are, however, monophyletic. They include: the *caracasanus* group, the *imperialis* group, the *ligneus* group, the *furcatus* group and the *angulatus* group.

The caracasanus group is recognized by the evenly convex pronotum and the lack of any undulations, sulci, or protuberances on the pronotum or pronotal margins (Figs. 13, 195-206). Species in this group are small to medium-sized (generally less than 20 mm long) insects. The species include *S. antennalis* Candeze, *S. caracasanus* de Rojas, *S. carus* Janson, *S. chontalenus* Candeze, *S. cyrtomaris* n. sp., *S. lacrimiformis* n. sp., *S. matilei* Chassain, *S. nigriceps* Candeze, *S. pallicornus* n. sp., *S. rileyi* n. sp., *S. spinosus* n. sp., *S. triplehorni* n. sp., *S. woodi* n. sp., and *S. zonatus* Candeze. This species group occurs from Nicaragua to Bolivia and east to Brazil.

The imperialis group is recognized by the single ventrally projecting frontal spine (Fig. 140) and small female foveae on sternite 5, which occupies only the apical fourth of the sternite. The species in this group are the largest species in the genus. The species include *S. cuspidatus* Chevrolat and *S. imperialis* Guérin. This species group occurs throughout Central America and into South America east to Guyana and south to northern Argentina.

The ligneus group is recognized by the lack of frontal spines (Figs. 193 - 194), lack of anterior sclerites (within the bursa copulatrix), and large ocular index. The species include *S. ligneus* Linnaeus and *S. serraticornis* Drury. This species group occurs from Mexico to southern Brazil and Paraguay.

The furcatus group is recognized by the double dentitions along the posterior border of the hypomera (Fig. 182). The species include *S. antennatus* Schwarz, *S.*

bilineatus Candeze and *S. furcatus* Fabricius. This species group occurs in South America from near the Tropic of Capricorn north.

The *angulatus* group is recognized by the subpectinate to pectinate antennae (Figs. 166-167) and the divided lateral arms of the anterior sclerite of the female bursa copulatrix (Figs. 41, 43-45). The species include *S. angulatus* Drury, *S. angusticollis* Blanchard, *S. convexicollis* Blanchard, and *S. insignis* Candeze. This species group occurs throughout Central America and into South America to southern Brazil.

The more primitive *Semiotus* species tend to lack frontal spines (or have poorly developed ones) and have typically gibbous elytra - both typical of *Oistus* and *Semiotinus*. Derived species tend to be less gibbous and bear more frontal spines. The most derived species typically bear three frontal spines. Species bearing two spines tend to be positioned on intermediate branches.

Other characters that are important diagnostically have much less phylogenetic information. Examples of these characters include the condition of the lateral margin of the pronotum, pronotal shape (including tubercles and callosities, etc.), elytral coloration, and shape of male genitalia and female foveae (or lack of foveae) on sternite 5.

The anterior sclerite of the bursa copulatrix is partially informative. The *angulatus* group is partially defined by the divided lateral arms of the anterior sclerite. This condition is not evident in any other known species. Otherwise, the shape of the lateral and central arms of the anterior sclerite and the presence or absence of sharp dentitions do not provide useful phylogenetic information. A few unrelated species have reduced anterior sclerites (*Semiotus rileyi*, *S. luteipennis*, *S. hispidus*, *S. pallicornus*, and *S. angustus*). *Semiotus ligneus* and *S. serraticornis* lack anterior sclerites altogether.

The short (3 to 4 segments short of the hind angles of the pronotum) subpectinate to pectinate antennae are unique to the *angulatus* group. Other species have antennae of varying lengths with serrate antennal segments ranging from subquadrate to elongate, rectangular. The *ligneus* group has serrate and rectangular antennal segments. The *furcatus* group has short (3 to 5 segments short of the hind angles of the pronotum) serrate antennal segments.

Distributionally, *Semiotinus* is primarily restricted to Colombia and Ecuador. Only *S. boliviensis* (in Bolivia) and *S. scitulus* (occurring in Venezuela as well as Ecuador) occur elsewhere.

The genus *Semiotus* occurs from Mexico south to central Chile and east to Eastern Brazil. The genus is most speciose in Colombia and adjacent countries. Table 1 is a listing of each country known to include species of *Semiotus* and the total number of species known.

Table 1. Number of *Semiotus* Species per Country

Mexico	4	Bolivia	15
Guatemala	4	Brazil	9
Belize	2	Venezuela	17
Honduras	3	Trinidad	2
Nicaragua	4	Guyana	6
Costa Rica	11	Surinam	3
Panama	11	French Guiana	5
Colombia	35	Paraguay	4
Ecuador	28	Argentina	2
Peru	23	Chile	1

A handful of species (e.g. *S. linnei*, *S. hispidus*, *S. illustris*, and *S. sommeri*) occur uniquely from northern South America. Two highly derived species are herein described

from this area (*S. kondratieffi* and *S. kathleenae*). *Semiotus kondratieffi* was collected from Venezuela from a pass near a wind current that was likely carrying canopy-inhabiting insects. Other species probably occur in this region.

The *Semiotus* fauna of Central America is comprised of primitive, intermediate, and derived species that are mostly unrelated phylogenetically. The only exception being within the *caracasanus* group that is represented by several species occurring nowhere else (e.g. *S. woodi*, *S. triplehorni*, *S. rileyi*, *S. chontalenus*, and *S. lacrimiformis*).

Most of the species of *Semiotus* that are well represented in collections do not have restricted ranges. A large number of species are known from very few individual specimens. About a fourth of the species (21) are known from less than three or four specimens, making an accurate assessment of distribution difficult.

Fossil *Semiotus*

Birket-Smith (1977) assigned *Elater ehrensværdi* Heer to *Semiotus*. The species was described from an Eocene *Taxodium* layer from Cap Staratschin, Spitsbergen, Norway (78° 7' N, 13° 50' E). The generic placement was made based on the long tapering elytra, 9 visible elytral striae and apical elytral spines. This designation is speculative, and lacks the critical defining information of tarsal and sternal characters. Spitsbergen is far removed from the present locality of all species of *Semiotus* or any related genus.

Key to the genera of Campsoterninae

(modified from Calder, 1976)

- 1. Tarsi simple, not lobed beneath; integument metallic; distributed in the Old World from India and China to New Guinea *Campsoternus* Latreille
- Tarsal segments 2 and 3 lobed beneath; distributed throughout the New World or New Zealand 2
- 2(1). Meso and metasterna not connate; endemic to New Zealand ... *Metablax* Candèze
- Meso and metasterna connate; endemic to Central and South America 3
- 3(2). Pronotum, viewed from above, with sides straight or recurved (Figs. 14-18); dorsal surface of pronotum meeting hypomeron at an acute marginal angle, without defining sulcus (Fig. 12) *Semiotinus* Pjatakowa
- Pronotum, viewed from above, with sides sinuate or rounded (Fig. 19); lateral pronotal margin rounded, incrassate, undulate, or sulcate, never acute (as in Fig. 13) 4
- 4(3). Tarsi with thick pubescent pads on segments 1 to 3 *Oistus* Candèze
- Tarsi with large membranous pads on segments 1 to 3 *Semiotus* Eschscholtz

Genus *Semiotinus* Pjatakowa

Semiotinus Pjatakowa 1941: 107. (Type species: *S. banghaasi*).

Length between 7 and 23 mm, colored variously with combinations of orange, yellow, green, brown and black. Frons either with two spines or lacking frontal spines

(as in Figs. 14-18). Antennae serrate extending 1 to 4 segments beyond hind angles.

First 2 segments testaceous to piceus, remaining segments fulvus to piceus. Pronotum as wide as or wider than long and evenly convex across disk; with or without setae, often glabrous, nitidus, punctation evenly scattered throughout or becoming denser and umbilicate anterolaterally; lateral margins straight or recurved, either parallel-sided or convergent anteriorly, without defining sulcus, pronotum and hypomeron joining at a sharp edge (Fig. 12), hind angles divergent or not. Hypomera elongate, posterior border sinuous and often dentate, partially enclosing procoxae. Prosternal process lobed anteriorly, prosternal process straight or curved in profile, extending between procoxae to mesosternal fossa. Scutellum longer than wide, flat or convex on disk. Legs fulvus to piceus, tarsal segments 1, 2, and 3 lobed beneath; tarsal claws broad, without basal setae.

Elytra widest anteriorly then narrowing to apex. Interstriae flat or convex; elytral base on same plane as pronotum, occasionally gibbous, rising above level of pronotum; color various, often with alternating light and dark bands; texture glabrous or covered with thin setae; abdomen fulvus to piceus, sternite 5 of females often with 2 foveae. Bursa copulatrix generally with 2 posterior plate-like sclerites, and 1 spinose anterior sclerite. Male with parameres generally bearing a lateral blade apically.

Larvae and pupae not known.

Key to the Species of *Semiotinus* Pjatakowa

- 1 Head with 2 frontal spines (as in Fig. 15) 2
- Head lacking 2 frontal spines (as in Figs. 14, 16-18) 3
- 2(1) Pronotum and elytra pale yellow to light brown with greenish blue (often

- metallic) maculae or bands; apex of each elytron with 2 subequal spines (Fig. 22)
..... ***aeneovittatus*** (Kirsch)
- Pronotum and elytra light brown, if markings present, then without greenish blue markings; apex of each elytron with a single spine and a subapical tooth or angle (Fig. 23) ***macer*** (Candèze)
- 3(1) Pronotum with 3 dark bands (sometimes confluent posteriorly)
..... ***trilineatus*** (Candèze)
- Pronotum with 0, 1, or 2 dark bands 4
- 4(3) Elytra unicolorous, at least on basal half 5
- Elytra not unicolorous, with light and dark contrasting bands or patterns (or with pale elytra contrasting with infusate striae or strial punctures) 10
- 5(4) Elytra black, or dark reddish black ***morio*** (Candèze)
- Elytra dull yellow, yellowish green, or light brown to orange 6
- 6(5) Pronotal margin (viewed from above) strongly recurved (Fig. 14)
..... ***conicollis*** (Candèze)
- Pronotal margin not strongly recurved (as in Figs. 1 and 17) 7
- 7(6) Pronotum with 2 black bands; elytra gibbous in profile
..... ***brevicollis*** (Candèze)
- Pronotum without black bands or with a single black band; elytra not gibbous in profile 8
- 8(7) Elytra (at least on basal half) orange to blood red ***maculatus*** n. sp.
- Elytra dull yellow to yellowish green 9
- 9(8) Lateral pronotal margins straight, hind angles diverging (Fig. 17); pronotum

- immaculate..... *virescens* (Candèze)
- (*S. banghaasi* Pjatakova probably keys out here, but is 4 mm wide. *Semiotinus virescens* is only known to be less than 3.6 mm wide)
- Lateral pronotal margins straight and parallel. not diverging posteriorly; pronotum maculate *quadricollis* (Kirsch), in part
 - 10(4) Elytral intervals all dull yellow, striae and/or stria punctures infusate (dark brown to black) 11
 - Elytral intervals not all of same color 12
 - 11(10) Pronotum with a single dark discal macula or band *fusiformis* (Kirsch)
 - Pronotum with 2 dark discal bands *supplicans* (Kirsch)
 - 12(10) Each elytron with 4 dark and 4 pale bands - intervals 1, 3, 5, 7, and sometimes lateral margin, brown, intervals 2, 4, 6, 8 and 9 dull yellow *scitulus* (Candèze)
 - Each elytron with fewer than 4 bands of either color 13
 - 13(12) Pronotum black, without yellow to light brown margins 16
 - Pronotum black with yellow to light brown margins, or with discal band only black 14
 - 14(13) Head black 15
 - Head orange to pale brown *quadricollis* (Kirsch), in part
 - 15(14) Elytra gibbous at base; lateral margin of elytra concave in outline near apex (Fig. 21) *quadrivittis* (Candèze)
 - Elytra not gibbous at base; lateral margin of elytra evenly convex in outline near apex (Fig. 20) *limbaticollis* (Candèze)
 - 16(13) Pronotum narrow, length of anterior pronotal margin approximately 2/3 width of

- elytral humeri (Fig. 18); apex of each elytron bispinose, area between spines emarginate (Fig. 25) ***boliviensis*** (Candèze)
- Pronotum less narrow, length of anterior pronotal margin approximately 3/4 or more width of elytral humeri (Fig. 16); apex of each elytron blunt and angulate. if small dentitions present, then without emargination (Fig. 24).....
..... ***nigricollis*** (Candèze)

***Semiotinus aeneovittatus* (Kirsch) n. comb.**

(Figs. 7, 10, 15, 22, and 264)

Semiotus aeneovittatus Kirsch 1884: 44 (lectotype (Chassain, in press), female: SMTD;

type locality: Ecuador, Patria, Huamboya).

Semiotus staudingeri Pjatakowa 1941: 106. (Type destroyed; type locality: Ecuador, Normandia). New Synonym.

Length 13 to 16 mm (length / width ratio 4.4 - 4.8). Head badius to rufopiceus on disk, fulvus to testaceus peripherally, with faint dark metallic sheen aeruginous, with two spines anterolaterally (Fig. 15); texture of fine decumbent setae scattered throughout. punctation subumbilicate and scattered throughout. Antennae reaching 2 - 3 segments beyond hind angles in males, 1 - 2 segments in females; segments 1 and 2 testaceus, segments 3 - 11 rufopiceus Pronotum 2 - 3 mm (length / width ratio 0.7 - 1.0) subtrapezoidal, hind angles slightly diverging; margin thin, clearly defined; color badius to rufopiceus with dark metallic sheen aeruginous; texture of fine scattered setae and deep punctures throughout. Scutellum fulvus to badius, strongly convex, anterior margin

declivitous and wider than rounded posterior margin. Prosternum linear in profile, tip of prosternal process not divided; color fulvus to aurantiacus with or without badius macula laterally; texture of few erect setae anteriorly, denser and decumbent setae laterally, punctation fine medially, thicker laterally. Hypomeron fulvus to aurantiacus; texture glabrous, nitidus with fine decumbent setae and deep punctures near suture.

Mesosternum declining below plane of metasternum; color fulvus to aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures.

Mesepisternum and epimeron fulvus to aurantiacus. Metasternum testaceus to aurantiacus with or without badius to piceus anterolateral areas; texture mostly glabrous with few erect setae throughout and with fine decumbent setae anterolaterally, punctation fine medially, denser anterolaterally. Femora fulvus to testaceus.

Elytra 9 - 12 mm (length / width ratio 3.1 - 3.3), gibbous, subparallel on anterior half then narrowing to tip; color ranging from a metallic aeruginous with circum-scutellar area fulvus to luteus, to nearly entirely fulvus with fine aeruginous macula on intervals 6 and 8 basally; texture glabrous, nitidus, striae faint, strial punctures clearly defined; apices each ending in a terminal spine and a large dentition along inner angle subapically (Fig. 22).

Abdomen testaceus to aurantiacus; texture of fine setae and punctation becoming thicker laterally; female without foveae on sternite 5; anterior sclerite with lateral arms enlarged apically, each bearing 2 - 3 large dentitions, lateral arms 1.2 times longer than median piece (Fig. 10). Male with parameres diverging apically, lateral blades small, roughly 20% length of parameres (Fig. 7).

Material examined. **ECUADOR:** Napo, Baeza, 2,000 m., II-25-1979, H. & A. Howden (1, CNCI); 7 km. S. Baeza, 2,000 m., II-(20-28)-1979, H. & A. Howden (1, CNCI); Province unknown, Patria, Huamboya, D. Stubel (1, SMTD).

Diagnosis. The two frontal spines (Fig. 15) and the verdigris metallic sheen distinguish *S. aeneovittatus* from all other *Semiotinus*. *Semiotinus macer* also bears frontal spines but is readily distinguished by the brown body (and lack of metallic verdigris sheen), larger size, and more elongate and parallel-sided elytra.

Semiotinus banghaasi Pjatakowa

(Fig. 264)

Semiotinus banghaasi Pjatakowa 1941: 107 (type: destroyed; type locality: Colombia: San Antonio)

No specimens of this species were available for study, but I believe it represents a valid species. The holotype was destroyed (V.G. Dolin, personal communication). The following description is taken directly from Pjatakowa (1941).

Length 14 mm, 4 mm wide (length/width ratio 3.3). Head flat, arched, fulvus to testaceous, lightly tri-impressed, lightly punctate. Antennae long, extending to hind angles, with segments 1 and 2 flavotestaceous, segments 3 - 11 fuscus. Pronotum wider than long, nearly quadrangular; color testaceous with obscure fulvus to viridis border; texture of moderate punctures, anterior angles rounded, hind angles short, little divergent, with a distinct carina. Scutellum oblong, anterior margin truncate, rounded behind, 3-angled.

slightly wider posteriorly. Venter, except epipleura and lateral areas of prosternum luteus to aurantiacus. Femora fulvus to testaceus.

Elytra convex, apex emarginate, striate, striae piceus, punctate: color fulvus to luteus with viridis tint; texture glabrous; apex of each elytron emarginate.

Material examined. None.

Semiotinus boliviensis (Candèze) n. comb.

(Figs. 4, 18, 25, and 264)

Semiotus boliviensis Candèze 1895: 16 (Type, male: ISNB; type locality: Bolivia).

Length 10 - 11 mm (length / width ratio 4.4 - 4.6). Head piceus, frontal margin with 2 angulate lobes anterolaterally, without spines; texture of long setae and umbilicate punctures throughout. Antennae serrate, reaching 3 - 4 segments beyond hind angles: color badius to piceus Pronotum 2 mm (length / width ratio 0.8 - 0.9) parallel sided on anterior half then strongly diverging to hind angles (Fig. 18), margin thin, hind angles carinate; color piceus; texture of long setae and deep punctation throughout, becoming denser peripherally. Scutellum subrectangular, longer than wide, covered with long setae. Prosternum nearly straight in profile; color piceus; texture of long setae and scattered punctures throughout. Hypomeron rufopiceus. Mesosternum rufopiceus to piceus; texture of long aureus setae and scattered punctures throughout. Mesepisternum and metasternum rufopiceus to piceus; texture of long aureus setae and scattered punctures throughout. Femora rufopiceus to piceus.

Elytra 8 mm (length / width ratio 3.2 - 3.4), subgibbous, subparallel on anterior 4/5 then narrowing to tip; color badius to piceus with intervals 2 - 4 (or 5) fulvus; texture nitidus, with short setae, intervals convex, striae and stria punctures clearly defined; apices each ending in a terminal spine and a smaller dentition along inner angle subapically (Fig. 25).

Abdomen badius to piceus; texture of long aureus setae and scattered punctures throughout. Male with parameres sinuate along apical third (Fig. 4), lateral blades subtriangular, approximately 20% length of parameres.

Material examined. **BOLIVIA:** (1, ISNB).

Diagnosis. The completely black head, lack of frontal spines and very narrow anterior aspect of the pronotum (Fig. 18) and recurved pronotal margins distinguish *S. boliviensis* from all other *Semiotinus*.

Semiotinus brevicollis (Candèze) n. comb.

(Fig. 265)

Semiotus brevicollis Candèze 1857: 332, Candèze 1874: 186. (Type: BMNH; type locality: New Granada).

Semiotus stramineus Candèze 1857: 333, Candèze 1874: 188. (Type: BMNH; type locality: Colombia). New Synonym.

Length 13 - 17 mm (length / width ratio 4.0 - 4.2). Head testaceus to aurantiacus, front without spines; texture of fine decumbent setae scattered throughout and long erect setae over eyes and anterior margin. punctation scattered throughout; ocular index 75.0 -

78.0. Antennae reaching 1 - 3 segments beyond hind angles; segments 1 and 2 testaceous, segments 3 - 11 badius. Pronotum 2 - 4 mm (length / width ratio 0.7 - 0.9) sides straight, diverging to angles, hind angles subcarinate; margin thin, clearly defined; lateral and anterior margins testaceous, wide, sublateral bands piceus, median area aurantiacus to badius; texture of dense decumbent setae throughout, punctation deep, especially deep and umbilicate on piceus bands. Scutellum fulvus to testaceous, longer than wide, hind margin rounded, anterior margin straight. Prosternum linear in profile. tip of prosternal process not divided; color testaceous to aurantiacus medially with rufo-piceus macula along suture extending onto hypomerion; texture nearly glabrous and impunctate medially, with erect setae and deep punctures anterolaterally. Hypomerion fulvus to aurantiacus laterally, with rufopiceus band along suture extending nearly to lateral margin; texture with dense decumbent setae and punctures along suture, nearly glabrous with very fine punctures laterally. Mesosternum testaceous to aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomerion testaceous to aurantiacus. Metasternum aurantiacus to sanguineous, badius to piceus anterolaterally; texture with few setae medially becoming dense anterolaterally, punctation fine medially becoming denser anterolaterally. Femora testaceous.

Elytra 10 - 12 mm (length / width ratio 2.9 - 3.1), gibbous basally, subparallel on anterior 2/3 then narrowing to tip; color fulvus, stria punctures darker; texture glabrous, nitidus, intervals convex, striae and stria punctures clearly defined; apices each ending in a terminal spine and a smaller dentition along inner angle subapically.

Abdomen testaceus to aurantiacus with nebulous infuscation sublaterally; texture of fine setae and punctation becoming denser laterally; female without foveae on sternite

5. Male not seen

Material examined. **COLOMBIA:** (1, BMNH); **NEW GRANADA:** (1, BMNH).

Diagnosis. Distinct from other *Semiotinus* in having unicolorous elytra, a yellow to orange head, gibbous elytral base, and 2 pronotal bands.

Semiotinus conicollis (Candèze) n. comb.

(Figs. 14 and 265)

Semiotus conicollis Candèze 1857: 333, Candèze 1874: 188 (Type: BMNH; type locality: Colombia)

Length 19 - 20 mm (length / width ratio 3.7 - 3.9). Head fulvus to testaceus, frontal margin often angled without spines; texture nitidus with few decumbent setae scattered throughout; ocular index 66.0 - 68.0. Antennae serrate, reaching 3 - 4 segments beyond hind angles; segments 1 and 2 testaceus, segments 3 - 11 testaceus to badius

Pronotum 3 - 4 mm (length / width ratio 0.7 - 0.8) wider than long, sides strongly recurved (viewed from above), hind angles divergent (Fig. 14); color testaceus to aurantiacus, darker on disk; texture glabrous, nitidus. Scutellum testaceus to aurantiacus, subtriangular. Prosternum linear in profile; color testaceus to aurantiacus, lobe paler; texture glabrous with fine punctation medially, denser setae and punctation laterally. Hypomeron fulvus; texture covered with fine setae and punctures throughout. Mesosternum fulvus to testaceus, fossa glabrous and impunctate, lateral areas with dense

setae and fine punctures. Mesepisternum and meshypomeron testaceus to badius.

Metasternum testaceus to badius; texture of sparse erect setae medially, denser decumbent setae laterally on dark area. Femora aurantiacus to testaceus.

Elytra 14 - 16 mm (length / width ratio 2.8 - 3.0) gibbous; unicolorous fulvus with faint viridis tint; texture glabrous, nitidus, striae faint to obsolete, striae punctures clearly defined; apices each bearing 2 small spines or dentitions.

Abdomen testaceus; texture of scattered erect setae medially, dense decumbent setae laterally, punctation fine becoming dense laterally. Genitalia not examined.

Material examined. **COLOMBIA:** (1, BMNH).

Diagnosis. The unicolorous elytra, recurved pronotal margin (Fig. 14) and yellow to light brown head readily distinguish *S. conicollis* from all other *Semiotinus*.

Semiotinus fusciformis (Kirsch) n. comb.

(Figs. 3 and 265)

Semiotus fusiformis Kirsch 1866: 181, Steinheil 1875: 113, Candèze 1874: 185

(Lectotype, female (Chassain, in press): SMTD; type locality: Colombia: Cundinamarca, Bogotá).

Semiotus juvenilis Candèze 1874: 187 (Type: BMNH; type locality: Colombia). New
Synonym.

Semiotus borrei Candèze 1878: 9 (Type: not found. specimen with Candèze
determination label: ISNB; type locality: Ecuador). New Synonym.

Length 12 - 13 mm (length / width ratio 4.8 - 4.9). Head piceus, front without spines; texture of fine decumbent setae and shallow subumbilicate punctures throughout. Antennae reaching 3 - 4 segments beyond hind angles in males; segments 1 and 2 testaceous, segments 3 - 11 rufopiceus to piceus, Pronotum 2 - 3 mm (length / width ratio 0.8 - 0.9) subtrapezoidal, hind angles diverging; margin thin, clearly defined; color fulvus to aurantiacus, with elliptical piceus macula medially; texture glabrous. Scutellum badius to piceus, longer than wide, posterior border rounded, anterior margin straight. Prosternum linear in profile, tip of prosternal process not divided; color piceus, prosternal lobe and prosternal process fulvus to aurantiacus; texture of few erect setae anteriorly, decumbent setae laterally, punctation fine medially, thicker laterally. Hypomeron fulvus to luteus, piceus laterally along suture; texture nitidus with or without few scattered setae throughout, punctation of few shallow subumbilicate punctures throughout. Mesosternum fulvus to testaceous medially, piceus laterally, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus. Metasternum badius to piceus throughout or with fulvus to testaceous median coloration; texture glabrous with fine punctation medially, with fine decumbent setae and denser punctation anterolaterally. Femora fulvus to testaceous.

Elytra 8 - 10 mm (length / width ratio 3.5 - 3.7), subparallel on anterior half then narrowing to tip; color fulvus to luteus with striae punctures badius to rufopiceus; texture glabrous, nitidus, striae and striae punctures clearly defined, intervals convex: apices each ending in a terminal spine and a smaller dentition along inner angle subapically.

Abdomen badius to rufopiceus, sternite 5. lateral areas of sternites 3 and 4 and medial area of sternite 1 lighter; texture of fine setae and punctation becoming thicker

laterally; female not seen. Male with parameres subtriangular apically, lateral margins convex, aedeagus extending beyond apical tips of blades (Fig. 3).

Material examined. COLOMBIA: Cundinamarca, Bogotá, Kirsch (1, SMTD); **ECUADOR:** Pichincha, 35 km. E Tandapi, 8,000 - 9,000 ft., IV-24-1975, S. & J. Peck (1, CNCI); Province unknown, E. de ville, 71 (1, ISNB).

Diagnosis. The single pronotal band and fulvus elytra with infusate punctures separate *S. fusciformis* from all other *Semiotinus*.

Semiotinus limbaticollis (Candèze) n. comb.

(Figs. 6, 20 and 265)

Semiotus limbaticollis Candèze 1857: 336, Candèze 1874: 188 (type: BMNH; type locality: Colombia).

Length 9 - 10 mm (length / width ratio 4.1 - 4.3). **Head** piceus throughout without spines; texture of few long setae and scattered shorter setae, punctation subumbilicate. **Antennae** serrate, reaching 3 - 4 segments beyond hind angles; color piceus. **Pronotum** 2 mm (length / width ratio 0.8 - 1.0) subquadrate, margins straight, gradually widening posteriorly, hind angles subcarinate; color piceus, with thin fulvus to aurantiacus margin becoming wider near angles. Scutellum badius to rufopiceus, parallel-sided, angles rounded, longer than wide. Prosternum linear in profile; color piceus, lobe and prosternal process fulvus to testaceus; texture of long pale setae, punctation becoming umbilicate laterally. Hypomeron piceus, with lateral margin fulvus to aurantiacus; texture of long pale setae, punctation close and umbilicate throughout. Mesosternum aurantiacus

medially, piceus laterally, covered with long pale setae. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture glabrous medially, with dense decumbent setae laterally, punctation fine becoming dense laterally. Femora fulvus to testaceus.

Elytra 6 - 8 mm (length / width ratio 3.0 - 3.1), subparallel on anterior 2/3 then narrowing to tip; color badius to rufopiceus with intervals 1-4, 9, and margin fulvus to luteus on basal 2/3; texture glabrous, nitidus, with fine setae laterally, stria punctures well defined, striae fine to obsolete; apices each ending in 1 spine apically and a smaller dentition subapically (Fig. 20).

Abdomen piceus, with lateral margin badius, sternite 5 testaceus; texture of pale setae and fine punctation throughout. Male with parameres sinuate, apical blades with lateral margins strongly convex (Fig. 6).

Material examined. **COLOMBIA:** Norte de Santander, 30 km S. Chinacota, N. de S., 2600 m., V-14-1974, H. & A. Howden (1, CNCI); Saladito Valle, 6500 m., VII-20-1970, H. & A. Howden (2, CNCI); (1, BMNH); **ECUADOR:** Morona - Santiago, Chigüinda, Buckley (3, BMNH).

Diagnosis. The black head lacking frontal spines, contrasting elytral bands or patterns (fewer than 4 of each color per elytron) and evenly convex elytral margins distinguish *S. limbaticollis* from all other *Semiotinus*.

Semiotinus macer (Candèze) n. comb.

(Figs. 11, 23 and 266)

Semiotus macer Candèze 1889: 80 (type, female: ISNB; type locality: Colombia).

Length 20 - 22 mm (length / width ratio 4.5 - 4.7). Head testaceus to aurantiacus, with two spines anterolaterally; texture of fine decumbent setae and deep punctation throughout with longer setae over spines; ocular index 64.0 - 66.0. Antennae reaching 2 - 3 segments beyond hind angles; color testaceus to piceus Pronotum 3 - 5 mm (length / width ratio 1.0) sides straight, narrowly diverging posteriorly; margin thin, clearly defined; color testaceus to aurantiacus, with piceus band extending from base to near apex; texture glabrous, nitidus with punctures widely separated. Scutellum strongly declivitous anteriorly, without defining anterior margin, lateral margins convex; color testaceus to badius. Prosternum concave in profile, not divided at apex; color testaceus to aurantiacus with or without badius to piceus maculae along suture; texture glabrous, nitidus medially with fine setae and deep punctures laterally. Hypomeron fulvus to aurantiacus; texture glabrous laterally with fine setae and deep punctures along suture. Mesosternum color aurantiacus to badius, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron badius to piceus. Metasternum testaceus to rufopiceus. Femora aurantiacus to badius.

Elytra 14 - 16 mm (length / width ratio 3.2 - 3.4), long and narrow, subparallel on anterior 3/4 then rounded to tip; color testaceus, striae punctures infusate; texture mostly glabrous, nitidus with occasional setiferous punctures, intervals nearly flat, striae obscure to obsolete, striae punctures pronounced; apices each ending in a terminal small spine and a smaller dentition or sharp angle along suture subapically (Fig. 23).

Abdomen testaceus to aurantiacus; texture of fine setae and dense punctation throughout; female with 2 elliptical and very shallow piliferous foveae in center of

sternite 5; anterior sclerite with lateral arms enlarged apically, each bearing 2 - 3 large dentitions, lateral arms 1.2 times longer than median piece (Fig. 11). Male not seen.

Material examined. **COLOMBIA**: (1, ISNB). Known from a single female specimen.

Diagnosis. The very elongate and parallel-sided body (at least 4.5 times longer than wide) in combination with the two frontal spines distinguish *S. macer* from all other *Semiotinus*. *Semiotus aeneovittatus* also bears frontal spines but has a metallic bluish macula on the pronotum and elytra which contrasts with the fulvus to testaceous base color. *Semiotus macer* is darker testaceous and lacks metallic blue maculae. Currently *S. aeneovittatus* is known only from Ecuador.

Semiotinus maculatus n. sp.

(Figs. 1, 8 and 266)

Length 15 mm (length/width ratio 4.1 - 4.2). Head aurantiacus with basal piceus macula, without spines; texture glabrous, nitidus with few erect setae above eyes and anterior margin, punctation deep and scattered throughout. Antennae extending 3 segments beyond hind angles in males; segments 1 and 2 testaceous, segments 3 - 11 piceus. Pronotum 3 - 4 mm (length/width ratio 1.0 - 1.1); subtrapezoidal, sides straight, posterior margin wider than anterior margin, hind angles hardly divergent; margin narrowly incrassate without sulcus; color aurantiacus to testaceous with narrow piceus band medially; texture glabrous, nitidus with deep punctation scattered throughout; scutellum piceus, narrowly ovate, nearly twice as long as wide; prosternum nearly

straight in profile; color aurantiacus to testaceus medially, piceus laterally; texture glabrous with fine punctation medially and with decumbent and erect setae and deep punctation laterally. Hypomeron aurantiacus to testaceus with piceus band along suture; texture glabrous, nitidus laterally with fine setae and deep punctation medially. Mesosternum finely punctate with fine setae, fossa glabrous and impunctate; color aurantiacus to testaceus medially, piceus laterally. Mesepisternum and meshypomeron piceus. Metasternum aurantiacus to testaceus medially, piceus laterally; texture glabrous with fine punctation medially, with decumbent setae and denser punctation laterally; femora fulvus to testaceus.

Elytra 10 - 11 mm (length/width ratio 2.9 - 3.0) subparallel on anterior half then narrowing to tip; color testaceus to aurantiacus with interval 1 infusate on posterior half; texture glabrous, nitidus, striae and strial punctures deep to moderately deep; apices of each elytron bearing 1 spine.

Abdomen aurantiacus to testaceus medially, badius laterally; texture nearly glabrous with fine punctation medially, with decumbent setae and denser punctation laterally; female not seen. Male with parameres narrow medially, lateral blades 0.3 length of parameres (Fig. 8).

Material Examined. Holotype (male): **ECUADOR**: Napo. Baeza, 2000 m., II-25-1979, H. & A. Howden (CNCI). Paratype: **ECUADOR**: Morona - Santiago, Chigüinda. Buckley (1, BMNH).

Diagnosis. *Semiotus maculatus* can be separated from all other species of *Semiotinus* by the uniform orange to light brown dorsal color (excepting the piceus scutellum and pronotal and frontal band; and the darker infuscation on the apical half of

the elytra in some specimens) and the concave outline of the elytral margin near the apex (Fig. 1). *Semiotinus quadrivittis* similarly has a concave outline of the elytral apices (Fig. 21) but has light and dark contrasting patterns on the elytra.

Note. *Semiotinus maculatus* is named for the pronotal macula.

Semiotinus morio (Candèze) n. comb.

(Fig. 266)

Semiotus morio Candèze 1857: 336, Candèze 1874: 189 (type: BMNH; type locality: Colombia).

Length 10 - 11 mm (length / width ratio 3.5 - 3.6). Head piceus throughout without spines; texture of few long setae and subumbilicate punctures. Antennae serrate, reaching 3 - 4 segments beyond hind angles; color piceus. Pronotum 1 - 3 mm (length / width ratio 0.8 - 0.9) subcomplanate, lateral margin curving inwards to almost straight; margin thin, without sulcus, hind angles carinate; color piceus; texture nitidus, with long pale setae laterally. Scutellum piceus, subtriangular, anterior margin not defined. Prosternum linear in profile; color piceus; vestiture double, punctation becoming umbilicate laterally. Hypomeron piceus; texture of long pale setae, punctation close and umbilicate throughout. Mesosternum piceus, vestiture double. Mesepisternum and meshypomeron piceus. Metasternum piceus; vestiture double, punctation fine throughout. Femora testaceus to rufopiceus.

Elytra 8 - 9 mm (length / width ratio 2.3 - 2.5), subparallel on anterior 1/2 then narrowing to tip; color deep sanguineus to rufopiceus throughout; texture glabrous.

nitidus, with fine setae laterally, striae and stria punctures well defined; apices each ending in 2 dentitions apically.

Abdomen piceus, without lateral pale areas, sternite 5 with or without testaceous to sanguineous patches; vestiture double, punctation fine throughout. Genitalia not examined.

Material examined. **COLOMBIA:** (1, BMNH). Known only from a single specimen.

Diagnosis. The small size and completely black to reddish black coloration separate *S. morio* from all other *Semiotinus*.

Semiotinus nigricollis (Candèze) n. comb.

(Figs. 16 and 24)

Semiotus nigricollis Candèze 1857: 335, Candèze 1874: 188 (type: BMNH; type locality: New Granada).

Length 12 - 14 mm (length / width ratio 3.7 - 3.9). Head piceus throughout without spines; texture of few long setae and subumbilicate punctures; ocular index 67.0 - 69.0. Antennae serrate, reaching 3 - 4 segments beyond hind angles; color piceus.

Pronotum 2 - 3 mm (length / width ratio 0.7 - 0.9) subcomplanate, lateral margin curving inwards to almost straight (Fig. 16); margin thin, without sulcus, hind angles carinate; color piceus; texture nitidus, with long pale setae laterally. Scutellum piceus, longer than wide, subrectangular. Prosternum linear in profile; color piceus; texture of long pale setae, punctation becoming umbilicate laterally. Hypomeron piceus; texture of

long pale setae, punctation close and umbilicate throughout. Mesosternum piceus, covered with long pale setae. Mesepisternum and mesepimeron piceus. Metasternum piceus; texture glabrous medially, with long setae laterally, punctation fine throughout. Femora piceus.

Elytra 10 - 11 mm (length / width ratio 2.9 - 3.1), subgibbous anteriorly; interval 1 rufopiceus; intervals 2 - 5 (and part of 6 basally) fulvus to luteus, intervals 7 - 9 rufopiceus; texture glabrous, nitidus, with fine setae laterally, stria punctures well defined, striae fine to obsolete: apices each ending in 2 dentitions apically (Fig. 24).

Abdomen piceus, with lateral margin and all of sternite 5 testaceus to sanguineous; texture of pale setae and fine punctation throughout. Genitalia not examined

Material examined. **NEW GRANADA:** (1, BMNH). This could be anywhere within the present boundaries of Panama, Colombia, Venezuela, and Ecuador.

Diagnosis. The blunt elytral apices (Fig. 24) and completely black pronotum distinguish *S. nigricollis* from all other *Semiotinus*.

Semiotinus quadricollis (Kirsch) n. comb.

(Figs. 2 and 266)

Semiotus quadricollis Kirsch 1866: 181 (lectotype (Chassain, in press), female: SMTD; type locality: Colombia, Bogotá); Candèze 1874: 187 (type not found, specimen with Candèze determination label: BMNH; type locality: Colombia).

Semiotus diptychus Candèze 1874: 188. (type: BMNH; type locality: Ecuador). New

Synonym

Semiotus subvirescens Schwarz 1904: 49 (Syntype, female: DEIC; type locality: Ecuador, Bolívar, Balzapamba). New Synonym.

Length 12 - 15 mm (length / width ratio 4.2 - 4.3). Head testaceus to aurantiacus, front without spines; texture of fine decumbent setae scattered throughout and long erect setae over eyes and anterior margin, punctation scattered throughout; ocular index 69.0 - 72.0. Antennae reaching 0 - 2 segments beyond hind angles in females; segment 1 testaceus, segments 2 - 11 piceus, Pronotum 2 - 3 mm (length / width ratio 0.9 - 1.0) subtrapezoidal, nearly straight, hind angles hardly diverging, carinate; margin thin, clearly defined; color aurantiacus with lateral margins paler, with median macula piceus; texture of dense decumbent setae throughout, punctation deep becoming nearly contiguous along lateral margin. Scutellum testaceus, longer than wide, posterior border rounded, anterior margin straight. Prosternum linear in profile to slightly concave, tip of prosternal process not divided; color testaceus to aurantiacus medially with or without a rufo-piceus macula along suture extending onto hypomeron; texture nearly glabrous and impunctate medially, with erect setae and deep punctures anterolaterally. Hypomeron fulvus to aurantiacus laterally, occasionally rufopiceus along suture; texture with dense decumbent setae and punctures along suture, nearly glabrous with very fine punctures laterally. Mesosternum testaceus to aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron testaceus to aurantiacus. Metasternum testaceus to aurantiacus medially, occasionally badius to piceus anterolaterally; texture with few setae medially becoming dense anterolaterally.

punctuation fine medially becoming denser anterolaterally. Femora testaceous, tibiae and tarsi darker.

Elytra 8 - 11 mm (length / width ratio 2.9 to 3.1), subparallel on anterior 2/3 then narrowing to tip; color fulvus, stria punctures darker, with or without darker humeral bands; texture glabrous, nitidus, intervals convex, striae and stria punctures clearly defined; apices each ending in a terminal spine and a smaller dentition along inner angle subapically.

Abdomen testaceous to aurantiacus with nebulous infuscation sublaterally; texture of fine setae and punctuation throughout; female without foveae on sternite 5. Male with apical blade of parameres subtriangular, lateral margins convex (Fig. 2).

Material examined. **COLOMBIA:** (1, BMNH); Norte de Santander, 2600 m., 30 km. S Chinacota, V-14-1974, H. & A. Howden (1, CNCI); **ECUADOR:** Bolívar, Balzapamba, R. Haensch S. (1, DEIC); Morona - Santiago, Chigüinda, Buckley (2, BMNH).

Diagnosis. Distinct from other *Semiotinus* in having a subquadrate pronotum with a yellow to orange head, and a single pronotal band. *Semiotinus conicollis* and *S. brevicollis* also have yellow to light brown heads but either have two dark pronotal bands (*S. brevicollis*) or have a strongly recurved pronotum (*S. conicollis* (Fig. 14)).

Note. As with most other species of *Semiotinus*, *S. quadricollis* is known from very few specimens. Only 7 specimens were seen in this study - two of which are the types of the synonyms *S. subvirescens* and *S. diptychus*. The venter of the type of *S. diptychus* is paler and the frontal macula is darker than the type of *S. quadricollis*. These

differences, however, have not proven to be of diagnostic value when comparing variability of other species of *Semiotinus* nor in the sister genus *Semiotus*.

Semiotinus quadrivittis (Steinheil) n. comb.

(Figs. 21 and 267)

Semiotus quadrivittis Steinheil 1875: 113 (lectotype, male: MNHN; type

locality: Colombia Occidentalis).

Semiotus pulchellus Candèze 1889: 81. (type: ISNB; type locality: Colombia). New

Synonym.

Length 12 - 16 mm (length / width ratio 3.9 - 4.0). Head piceus throughout, front without spines; texture of fine decumbent setae scattered throughout; ocular index 64.0 - 66.0. Antennae serrate, reaching 2 - 3 segments beyond hind angles; segments 1 and 2 testaceous, segments 3 - 11 rufopiceus to piceus, Pronotum 2 - 4 mm (length / width ratio 0.9 - 1.1) margins straight, subparallel, hind angles hardly diverging; margin thin, clearly defined; color fulvus to aurantiacus laterally with large maculae on disk extending from base to (or near to) anterior margin; texture glabrous or with very fine setae scattered throughout. Scutellum testaceous to piceus, longer than wide. Prosternum nearly linear in profile; color piceus, prosternal process and lobe testaceous to aurantiacus. Hypomeron badius to piceus along suture, fulvus to luteus laterally. Mesosternum testaceous to aurantiacus medially, piceus laterally, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus.

Metasternum testaceus to aurantiacus medially, piceus laterally (or completely piceus).

Femora testaceus to piceus.

Elytra 8 - 12 mm (length / width ratio 2.8 - 2.9), slightly gibbous; color fulvus to aurantiacus with 3 piceus bands (one along interval 1, one around interval 8, and another band between) or with elytra mostly piceus with sutural and marginal pale bands; texture glabrous, nitidus; apices each ending in a terminal spine and a smaller dentition along inner angle subapically (Fig. 21).

Abdomen testaceus to aurantiacus with scattered piceus maculae. Genitalia not examined.

Material examined. **COLOMBIA:** Antioquia, Medellín, 1915-38 (1, BMNH); Occidentalis (MNHN); **New Granada** (1, ISNB; 1, MNHN (This could be anywhere within the present boundaries of Panama, Colombia, Venezuela, and Ecuador.))

Diagnosis. The dark brown to black pronotal band with yellow to light brown margins, fewer than 4 alternating light and dark elytral bands, gibbous elytra and narrow (concave in outline) elytral apices distinguish *S. quadrivittis* from all other *Semiotinus*.

Semiotinus scitulus (Candèze) n. comb.

(Figs. 9, 12 and 267)

Semiotus scitulus Candèze 1874: 186 (type: BMNH; type locality: Ecuador).

Length 12 - 13 mm (length / width ratio 4.0 - 4.4). Head piceus throughout or with anterolateral angles aurantiacus, front without spines; texture of fine decumbent setae scattered throughout, punctation subumbilicate and scattered throughout; ocular

index 64.0 - 67.0. Antennae serrate, reaching 2 - 3 segments beyond hind angles in males; segments 1 and 2 testaceus, segments 3 - 11 rufopiceus to piceus, Pronotum 2 - 4 mm (length / width ratio 0.8 - 1.1) subtrapezoidal, hind angles hardly diverging; margin thin, clearly defined (Fig. 12); color fulvus to aurantiacus with large suborbicular to subquadrate piceus macula on disk (often pointed apically); texture glabrous or with fine setae scattered throughout. Scutellum badius to piceus, longer than wide, posterior border rounded, anterior margin straight. Prosternum linear in profile, tip of prosternal process not divided; color piceus, prosternal process and lobe fulvus to testaceus; texture of few erect setae throughout becoming denser and decumbent laterally, punctation fine medially, thicker laterally. Hypomeron badius to piceus along suture, fulvus to luteus laterally; texture glabrous, nitidus or with few scattered setae, punctation of few shallow subumbilicate punctures throughout. Mesosternum fulvus to testaceus medially, piceus laterally, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and mesepimeron piceus. Metasternum badius to piceus throughout or with fulvus to testaceus median coloration; texture glabrous with fine punctation medially, with fine decumbent setae and denser punctation anterolaterally. Femora aurantiacus to testaceus.

Elytra 9 - 10 mm (length / width ratio 2.9 - 3.1), subparallel on anterior half then narrowing to tip; color fulvus to luteus with intervals 1, 3, 5, 7, and lateral margin badius to piceus; texture glabrous, nitidus, striae faint, stria punctures clearly defined; apices each ending in a terminal spine and a smaller dentition along inner angle subapically.

Abdomen aurantiacus to rufopiceus with fulvus areas on sternites 1 and 5; texture of fine setae and punctation becoming thicker laterally; female not seen. Male with

parameres narrowing apically before blades, apices divergent, lateral blades small, less than 20% length of parameres (Fig. 9).

Material examined. **ECUADOR:** (1, BMNH); **VENEZUELA:** Mérida, Tabay, Mucuy, Send. Lag. Suero cloud forest, 225 m., (VI-VIII)-1989, S & J Peck (1, CMNC); S. Briceno (1, USNM); Táchira, 3000 m., 50 km NE San Cristobal, V-(17-18)-1974, H. & A. Howden (CNCI).

Diagnosis. The presence of alternating light and dark elytral bands (4 each per elytron) distinguishes *S. scitulus* from all other *Semiotinus*.

Semiotinus supplicans (Kirsch) n. comb.

(Fig. 267)

Semiotus supplicans Kirsch 1884: 45 (lectotype (Chassain, in press) male: SMTD; type locality: Colombia, Pasto, 2800 m).

Length 18 mm (length / width ratio 2.9 - 3.1). **Head** fulvus to testaceus, without piceus maculae; frons with anterolateral areas rounded to angled, without spines; texture of scattered setae throughout. **Antennae** serrate, reaching 2 - 3 segments beyond hind angles; segments 1 and 2 testaceus, segments 3 - 11 piceus. **Pronotum** with margins straight, hind angles not, or hardly, diverging; color fulvus to testaceus with 2 sinuate piceus bands sublaterally; texture with dense setae, especially over piceus bands. Scutellum subtriangular, fulvus to testaceus. Femora testaceus.

Elytra subparallel on anterior 2/3 then narrowing to tip; color fulvus to testaceus with stria punctures infusate; texture glabrous, nitidus, striae and stria punctures distinct; elytral apices each bearing 2 subequal spines. Male genitalia not examined.

Material Examined. **COLOMBIA:** Nariño, Pasto, 2800 m., D. Stubel (1, SMTD).

Diagnosis. The uniform pale elytral color interrupted by infusate stria punctures, the 2 pronotal bands and the 2 subequal spines on each elytron separate *S. supplicans* from all other *Semiotinus*.

Semiotinus trilineatus (Candèze) n. comb.

(Fig. 267)

Semiotus trilineatus Candèze 1857: 324, Steinheil 1875: 112, Candèze 1874: 182

(syntypes, female: BMNH; type locality: Colombia).

Semiotus elegantulus Candèze 1857: 325, Candèze 1874: 182. (syntypes: BMNH; type locality: Colombia). New Synonym.

Length 11 - 15 mm (length / width ratio 4.2 - 4.6). Head fulvus to testaceus, frontal margin often angled without spines; texture nitidus with few decumbent setae scattered throughout; ocular index 72.0 - 75.0. Antennae serrate, reaching 0 - 1 segments beyond hind angles in females; segments 1 and 2 testaceus, segments 3 - 11 testaceus to badius Pronotum 2 - 4 mm (length / width ratio 0.9 - 1.2) subquadrate, lateral margins straight, hind angles diverging; color fulvus to aurantiacus with long thin median band (extending length of pronotum) and 2 sublateral shorter and sinuate bands badius to rufopiceus. hind angles often obscure; texture glabrous, nitidus. Scutellum fulvus to

testaceus, longer than wide, posterior border rounded. Prosternum linear in profile; color testaceus to aurantiacus, lobe paler, with or without piceus marking along suture; texture glabrous with fine punctation medially, denser setae and punctation laterally.

Hypomeron fulvus, hind angles with or without piceus macula; texture glabrous, nitidus, punctation very fine throughout. Mesosternum testaceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron testaceus. Metasternum testaceus, often piceus anterolaterally; texture of sparse erect setae medially, denser decumbent setae laterally on dark area. Femora aurantiacus to testaceus.

Elytra 8 - 12 mm (length / width ratio 2.9 - 3.6), subparallel on anterior 2/3 then narrowing to tip; intervals 2, 4, 6, and 8 fulvus, intervals 1, 3, 5, and 7 either fulvus vitreus or badius vitreus; texture glabrous, nitidus, striae faint to obsolete, stria punctures clearly defined; apices each ending in a terminal spine and a smaller dentition along inner angle subapically.

Abdomen testaceus medially, badius laterally; texture of scattered erect setae medially, dense decumbent setae laterally, punctation fine becoming dense laterally; female without foveae. Male genitalia not examined.

Material examined. COLOMBIA: (3, BMNH).

Diagnosis. The presence of 3 distinct pronotal bands (sometimes confluent basally) distinguishes *S. trilineatus* from all other *Semiotinus*.

Semiotinus virescens (Candèze) n. comb.

(Figs. 5, 17 and 264)

Semiotus virescens Candèze 1857: 331, Candèze 1874: 185 (type, female: BMNH; type locality: Colombia).

Length 13 mm (length/width ratio 3.9 - 4.0). Head fulvus to aurantiacus, front without spines; texture glabrous, nitidus with few erect setae over eyes and anterior margin, punctation deep and scattered throughout; ocular index 72.0 - 75.0. Antennae serrate, extending 1 - 2 segments beyond hind angles in males; segments 1 and 2 testaceous, segments 3 - 11 piceus. Pronotum 2 - 3 mm (length/width ratio 0.7 - 0.8) with sides nearly straight, hind angles divergent (Fig. 17), margin thin, faintly sulcate (especially posteriorly); color fulvus with faint viridis sheen; texture glabrous, nitidus with fine punctation throughout. Scutellum fulvus, parallel-sided, anterior and posterior margins convex. Prosternum nearly straight in profile; color fulvus to testaceous; texture glabrous with fine punctures medially, with fine erect setae and deep punctation laterally. Hypomeron fulvus to viridis; texture glabrous, nitidus with punctures becoming obsolete posteriorly. Mesosternum fulvus to testaceous, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron fulvus to testaceous. Metasternum fulvus to testaceous; texture glabrous with very fine punctation medially, decumbent setae and denser setae anterolaterally. Femora fulvus to testaceous.

Elytra 10 mm (length/width ratio 3.0 - 3.1) subparallel on anterior half then narrowing to tip; color fulvus to viridis; texture glabrous, nitidus, striae well marked

medially, fainter laterally, striae punctures moderately deep; each elytron with apical spine and subapical tooth.

Abdomen aurantiacus to testaceus; texture glabrous with very fine punctation medially, decumbent setae and denser setae anterolaterally; female not seen. Male with parameres narrow medially, arcuate in profile, lateral blades narrower than parameres at base, 21 - 23% length of parameres (Fig. 5).

Material examined. **COLOMBIA:** (1, BMNH); nr. Saludito Valle, 6500 ft., VII-20-1970, H. & A. Howden (1, CNCI).

Diagnosis. The small size (length, 13 mm) and immaculate pale fulvus to viridis dorsal coloration separate *S. virescens* from all other *Semiotinus*.

Genus *Semiotus* Eschscholtz

Semiotus Eschscholtz 1829 (type species: *S. ligneus* Linnaeus), Candèze 1857, Candèze 1874, Champion 1894.

Eucamptus Chevrolat 1834.

Pericallus Lepeletier and Serville 1825: 594.

Length between 7 and 50 mm, variously colored with combinations of red, orange, yellow, green, brown, and black. Head often spinose, bearing 0, 1, 2, or 3 anterior spines. Antennae serrate to pectinate, generally one to four segments short of hind angles. Occasionally extending beyond hind angles. First two segments testaceous to piceus, remaining segments fulvus to piceus, last three to four segments occasionally lighter in color than medial segments. Pronotum longer than wide (occasionally as wide

as long), evenly convex or with sublateral concavities; with or without setae, often glabrous, nitidus, punctation evenly scattered throughout or becoming denser and umbilicate anterolaterally; anterolateral margin with or without elevated callosities; margins convergent anteriorly, with or without defining sulcus, hind angles generally divergent. Epimera elongate, posterior border sinuous and often dentate, partially enclosing procoxae. Prosternal process lobed to subtruncate anteriorly, prosternal process straight or curved in profile, extending between procoxae to mesosternal fossa. Scutellum variously shaped; flat, convex laterally, or declivous anteriorly. Legs fulvus to piceus, tarsal segments 1, 2, and 3 lobed beneath; tarsal claws broad, without basal setae.

Elytra widest anteriorly then narrowing to apex. Interstriae flat or convex, occasionally unequally elevated; elytral base on same plane as pronotum, occasionally gibbous, rising above level of pronotum; color various, often with alternating light and dark bands; texture glabrous or covered with thin setae; abdomen fulvus to piceus, sternite 5 of females often with 2 foveae or densely setose areas. Bursa copulatrix generally with 2 posterior plate-like sclerites, and 1 spinose anterior sclerite. Male with parameres generally bearing a lateral blade apically.

Larvae (full grown larvae) flattened dorso-ventrally, sclerotized and often pilose, mandibles dark, situated on anterior region of head capsule. Antennae 3-segmented, often bearing small apical sensorial appendages; prothorax trapezoidal, longer than mesothorax; prosternum triangular; legs short, 5-segmented, coxa wide and short, trochanter triangular, femur longer than tibia; abdominal segments variously pilose. Abdomen 9-segmented, often bearing tufts of setae laterally, segment 9 with projections distally.

Pupa adectitious, exarate, wing pads extending beneath body; prothorax with a pair of small projections; spiracles annular; last abdominal segment with a pair of small bifid spiniform projections distally.

Larvae have been found in semi-rotten wood feeding on fly larvae (Costa, 1988).

Key to the Species of *Semiotus*

- 1 Head and pronotum entirely black 2
- Head and pronotum not entirely black 4
- 2(1) Elytra blood red *capucinus* Candèze
- Elytra not blood red, either light brown, black, or black with pale bands
..... 3
- 3(2) Elytra either entirely black or black with pale bands (Figs. 254, 255)
..... *hispidus* Candèze (in part)
- Elytra light brown *carinicollis* Kirsch
- 4(1) Head, pronotum, and entire venter of body unicolorous orange to light brown,
elytra unicolorous black (Fig. 259) *aliciae* n. sp.
- Head, pronotum, venter, and elytra variously colored, often with maculae or
bands, not fitting above description 5
- 5(4) Pronotum evenly convex across entire width (Fig. 32, best viewed from anterior
aspect), without foveae, tubercles, longitudinal concavities or sublateral
depressions, pronotum, on anterior 2/3 merging into hypomerion without acute
margin or sulcus, or if faint sulcus present, then restricted to anterior seventh or
less of lateral margin (*caracasanus* group) 25

-	Pronotum not evenly convex, either with anterolateral foveae (as in Fig. 147), tubercles (as in Figs 136, 143-145, 148, and 154), longitudinal concavities or sublateral depressions; pronotal margin variable, often separated from hypomeron by an acute margin or sulcus over anterior third or more (as in Figs. 30, 31, and 33)	6
6(5)	Anterior margin of frons with a single long spine or point at center curving down towards mandibles (Fig. 140), ending below level of anterolateral frontal margins (viewed laterally), anterolateral frontal margin rounded or angled, without spines	16
-	Anterior margin of frons with 0, 1, 2, or three spines (as in Figs. 135-139, 141-154)- single spine or point, if present, small and projecting forward, on same plane as frons (as in Fig. 139)	7
7(6)	Antennae subpectinate to pectinate and short, 3 or more segments shy of hind angles (Figs. 26, 166, 167); anterior sclerite of bursa copulatrix with lateral arms divided distally (Figs. 41, 43-45 (angulatus group))	18
-	Antennae serrate (Figs. 27, 163-165), length variable, if strongly serrate (appearing subpectinate) then antennae reach to or beyond hind angles: anterior sclerite of bursa copulatrix without lateral arms divided distally, or with sclerite vestigial or absent (Figs. 34-40, 42, 46-90)	8
8(7)	Elytra green or yellowish green throughout	24
-	Elytra without green or yellowish green coloration or patterns	9
9(8)	Head lobed or angled along anterior margin, without spines (Figs. 136, 139, 149, 150)	10

-	Head with frontal spines (Figs. 135, 137, 138, 141-148, 151-153)	11
10(9)	Hypomera with outer fifth of posterior border pointed and extending well beyond level of the inner border (Fig. 179)	21
-	Hypomera with outer fifth of posterior border not pointed or extending beyond level of the inner border (Fig. 178)	78
11(9)	Hypomeron with 2 teeth along mesal half of posterior border (Fig. 182); antennae short, 3 or more segments shy of hind angles (<i>furcatus</i> group)	14
-	Hypomeron without 2 teeth along mesal half of posterior border (as in Figs. 178 and 181), a single tooth may be present on inner third ; antennae variable	12
12(11)	Head with 2 frontal spines (viewed directly from above with body held level), area between spines without angle, or with very faint angle (Fig. 138), in questionable cases, length of lateral spines will be 1/3 or more than the distance between eyes (as in Figs. 141 and 151)	65
-	Head with 3 frontal spines, or with two spines and area between spines strongly angled (Figs. 142-148), in questionable cases, length of lateral spines will be 1/4 or less than the distance between eyes (as in Figs. 133 and 143)	13
13(12)	Elytra yellow to light brown; each elytron with 2 dark red to black bands, one sutural and one marginal, confluent apically, often forming a V-shaped pattern (Figs. 219-221, 223, 224)	38
-	Elytra either unicolorous, mostly blood red, without dark bands, or with alternating light and dark bands (not restricted to suture and margin) across each elytron	42
14(11)	Antennae orange or yellow throughout	15

- Antennal segments 1 and 2 light brown, middle segments nearly black, apical 3 or 4 segment pale yellow (Fig. 252) ***antennatus*** Schwarz
- 15(14) Each elytron with 2 dark bands (Fig. 250) ***bilineatus*** Candèze
- Each elytron with 3 dark bands (Fig. 251) ***furcatus*** (Fabricius)
- 16(6) Posterior border of hypomeron with tooth or angle on lateral third , concave on inner half (Fig. 180); female with foveae on sternite 5 small and restricted to apical fourth only; each elytron with two spines apically (***imperialis*** group) ... 17
- Posterior border of hypomeron with tooth or angle on medial third , lateral half convex (as in Fig. 178); female with foveae larger, covering over half of sternite 5 and shallow; each elytron bearing a single spine apically (Fig. 238) ***chassaini*** n. sp.
- 17(16) Pronotum with 2 dark marginal maculae in addition to discal bands (Fig. 187) ***imperialis*** Guérin
- Pronotum with discal band or bands, without marginal maculae (Figs. 185 and 186) ***cuspidatus*** Chevrolat
- 18(7) Pronotal tubercles each covered with a black macula in addition to discal bands or maculae (Fig. 191) ***angusticollis*** Blanchard
- Pronotum variously patterned but tubercles same color as pronotal margin 19
- 19(18) Pronotum with single (often cruciform) dark band on disk (Figs. 188-190) ***angulatus*** (Drury)
- Pronotum either with several small maculae, without bands or with 2 sublateral dark bands 20
- 20(19) Antennae pectinate (Fig. 26); scutellum longer than wide (Fig. 161)

- ***convexicollis*** Blanchard
- Antennae subpectinate (Fig. 166); scutellum as wide as or wider than long (as in Fig. 160) ***insignis*** Candèze
- 21(10) Pronotum black with orange (or orange brown) to blood red band along each lateral margin (Fig. 248); elytral apices each bearing 2 small spines or dentitions (as in Fig. 168) ***luteipennis*** Guèrin
- Pronotum variously colored, 1 or 2 dark bands may be present on disk, but these are broken up with dull yellow to light brown areas between; elytral apices each bearing a single spine (as in Fig. 168) 22
- 22(21) Pronotum with 2 black bands (Fig. 249); frontal margin angled and jutting well beyond anterior margin of eyes (Fig. 136) ***kondratieffi*** n. sp.
- Pronotum with 1 or more light to dark brown bands, without black bands; frontal margin lobed anteriorly (Fig. 149, ***ligneus*** group) 23
- 23(22) Pronotum with a single dark band on center of disk, distinctly darker than lateral areas or bands; elytra with alternating light and dark bands, interval 4 pale (Fig. 194) ***serraticornis*** (Drury)
- Pronotum with pale infusate bands on pronotum, middle band or bands not distinctly darker than lateral infusate areas; elytra with alternating light and dark bands, interval 4 dark (Fig. 193) ***ligneus*** (Linnaeus)
- 24(8) Black pronotal bands narrow, area between bands as wide as or wider than bands, color between bands green (Fig. 257); each elytron bearing a short spine apically (Fig. 176) ***ligatus*** Candèze

- Black pronotal bands wide, area between bands narrower than bands, color between bands yellow to brownish orange to black (Fig. 256); each elytron rounded or angled at apex, without spines (Fig. 177) ***seladonius*** Guérin
- 25(5) Basal half of elytra yellow to orange, apical half black (Figs. 195-200) narrow black band may or may not be present along suture on basal half) 26
- Elytra with sutural and marginal bands brown to black, otherwise bright yellow between bands from base to near apex (Figs. 201-206) 33
- 26(25) Pronotum unicolorous orange to blood red, hind angles may be paler (Fig. 200) ***rileyi*** n. sp.
- Pronotum bright yellow laterally, with median band dark (Figs. 195-199) 27
- 27(26) Yellow marginal band of pronotum narrow, 2/3 width of scutellum or less ***zonatus*** Candèze
- Yellow marginal band of pronotum wide (at least near center), as wide as or wider than scutellum 28
- 28(27) Last 4 segments of antennae pale yellow 29
- Last 1, 2, or 3 segments of antennae pale yellow, or antennae entirely black . 30
- 29(28) Elytral suture with black band on basal half (Fig. 197) in addition to entire apical half of elytra)) ***woodi*** n. sp.
- Elytral suture without black band on basal half ***chontalenus*** Candèze
- 30(28) Antennae with segments 4 to 11 dark red brown to black 31
- Antennae with segments 4 to 11 not entirely dark, at least one apical segment pale yellow 32

- 31(30) Parameres with apical blades 1/5 length of parameres (Fig. 114); Venezuela
..... *caracasanus* Rojas
- Parameres with apical blades more than 1/4 length of parameres (Fig. 113); Costa
Rica, Panama, Colombia, Ecuador *spinosus* n. sp.
- 32(30) Black pronotal band nearly 2 times wider at base than near anterior margin (Fig.
198); apical black portion of elytra not extending onto basal half along margin,
line between elytral colors nearly straight; lateral area of pronotum orange
anteriorly, dull to bright yellow basally *triplehorni* n. sp.
- Black pronotal band less than 1.6 times wider at base than on anterior margin
(Fig. 199) ; apical black portion of elytra extending onto basal half along margin,
line between elytral colors deeply concave on apical half; lateral area of pronotum
uniformly dull to bright yellow *lacrimiformis* n. sp.
- 33(25) Antennae pale yellow throughout *pallicornus* n. sp.
- Antennae with at least middle segments reddish black to black 34
- 34(33) Scutellum subquadrate, anterior margin wider than 1/2 greatest width (Fig. 158)
..... *matilei* Chassain
- Scutellum subtriangular, anterior margin 1/2 or less greatest width (Fig. 156)
..... 35
- 35(34) Male with aedeagus strongly arched dorsoventrally (Fig. 105); elytra with dark
marginal band extending entire length of elytra (though thin on anterior fourth)
when viewed from above (Fig. 201) *cyrtomaris* n. sp.

- Male with aedeagus not strongly arched dorsoventrally; elytra with dark marginal band on posterior 3/4 of lateral margin only, not reaching humeral angles (Figs. 202, 203, 206)	36
36(35) Pronotum with median dark band (Fig. 203)	<i>nigriceps</i> Candèze
- pronotum without median dark band	37
37(36) Marginal elytral band 2 to 3 intervals wide near mid-section (Fig. 202)	<i>carus</i> Janson
- Marginal elytral band 4 to 6 intervals wide near mid-section (Fig. 206)	<i>antennalis</i> Candèze
38(13) Venter unicolorous yellow to light brown (except for possible dark macula on hypomeron)	39
- Venter yellow to light brown with at least abdominal bands, metepisternum, and part of prosternal suture dark brown to black	40
39(38) Pronotum with 2 dark bands (Fig. 221); antennae yellow to orange throughout	<i>illustris</i> Candèze
- Pronotum with one median dark band (Fig. 224); antennal segments 1 and 2 light brown, segments 3 to 11 black	<i>decoratus</i> Candèze
40(38) Scutellum vitreous, light brown, less than 1.2 times wider than long, anterior margin slightly recurved (Figs. 157 and 223)	<i>intermedius</i> (Herbst)
- Scutellum opaque, black, or with hind angles only light brown, more than 1.3 times wider than long, anterior margin incised (Fig. 159)	41
41(40) Elytra with dark band along suture short, not reaching scutellum (at least 1 mm	

- short of scutellum (Fig. 219)); lateral pronotal margin without sulcus on anterior fourth *lafertei* Candèze
- Elytra with piceus band along suture long, reaching scutellum (Fig. 220); lateral pronotal margin with sulcus on anterior fourth *affinis* Guérin
- 42(13) Pronotum strongly arched forward (in lateral view (Fig. 30)); elytral intervals convex, intervals 3, 5, and 7 more so, and rising above level of other intervals, intervals 3 and 5 joining near apex *fryi* Candèze
- Pronotum not strongly arched forward (as in Figs 28, 29, 33); elytral intervals variable but intervals 3, 5, and 7 not as above 43
- 43(42) Each elytron with 3 black to red black bands: one marginal, one sutural, and one between (though bands might not always extend from base (Fig. 226); tooth on posterior border of hypomeron very large (Fig. 181) *taeniatus* Erichson
- Each elytron either unicolorous, blood red with 2 pale bands, or with less than 3 or more than 3 black bands; tooth on posterior border of hypomeron smaller (as in Fig. 178) 44
- 44(43) Elytral coloration changing from pale brown to yellow basally to black apically, lacking longitudinal bands or maculae *singularis* Kirsch
- Elytra without a yellow to black gradient from base to apex, longitudinal bands or maculae present 45
- 45(44) Elytral intervals similarly colored (with the possible exception of the outer two intervals that may be darker) contrasting with darker, infusate to black striae or strial bands ((Figs. 231-234, 236, 237) darker bands may not all be of equal width) 46

-	Elytral intervals either same color as striae; not unicolorous, alternating in color with other intervals and not with striae; or base and apex of elytra of different colors	56
46(45)	Pronotum glabrous throughout	47
-	Pronotum covered with decumbent setae, if setae not over entire surface, then at least on sublateral bands	49
47(46)	Pronotal margin without sulcus; elytral striae light brown	48
-	Pronotal margin sulcate; elytral striae black (Fig. 230) <i>buckleyi</i> Candèze	
48(47)	Pronotum with medial dark band (occasionally with red band between) and reddish black maculae near anterolateral angles; punctures on pronotal disk denser and bigger than those on head	<i>reaumuri</i> Candèze
-	Pronotum with medial dark bands (red and/or black) only, without anterolateral maculae; punctures on pronotal disk less dense and smaller than those on head	<i>glabricollis</i> Candèze
49(46)	Lateral margin of pronotum not sulcate on anterior third , or sulcus very faint	50
-	Lateral margin of pronotum sulcate, at least on anterior third (Fig. 33)	51
50(49)	Pronotum with brown to reddish brown disk appearing as a single broad band (margins yellowish (Fig. 245))	<i>pilosus</i> n. sp.
-	Pronotum bright yellow with 2 black bands on disk	<i>vicinus</i> Fleutiaux
51(49)	Lateral frontal spines short and wide, not longer than medial frontal spine (Figs. 144 and 231)	<i>cristatus</i> Candèze

- Lateral frontal spines longer, extending anteriorly as far as or beyond medial spine (as in Figs. 233, 234, 236) 52
- 52(49) Interstriae convex (sub-hemispherical when viewed from posterior aspect), striae deeply impressed *auripilis* Candèze
- Interstriae flat or nearly so (clearly not sub-hemispherical when viewed from posterior aspect), striae often faint or absent, restricted to stria punctures 53
- 53(52) Hypomeron without dark band along suture, or if present, less than 1/7 width of hypomeron *linnei* Guérin
- Hypomeron with dark band along suture wide, width of band more than 1/5 width of hypomeron 54
- 54(53) Anterolateral frontal spines long, at least 1.5 times longer than width of eye (viewed from above (Fig. 233) in questionable cases length less than 22 mm) *perangustus* n. sp.
- Anterolateral frontal spines shorter, less than 1.2 times longer than width of eye (in questionable cases length more than 22 mm) 55
- 55(54) Antennae one segment short of hind angles in females, extending up to one segment beyond hind angles in males; female with 2 large foveae on sternite 5; length over 22 mm (Fig. 232) *colombianus* n. sp.
- Antennae extending at least one segment beyond hind angles in females, extending 1 to 2 segments beyond hind angles in males; female without foveae on sternite 5; length less than 22 mm (Fig. 234) *angustus* n. sp.
- 56(45) Elytral intervals 1 and 2 unicolorous, either red or black 57

- Elytral intervals 1 and 2 of two contrasting colors, generally black and yellow or orange 58
- 57(56) Black pronotal bands wide, each much wider than area between bands (or bands confluent medially); elytral intervals 1 and 2 black (Fig. 222)
..... *regalis* Guérin (in part)
- Black pronotal bands narrow, area between bands wider than bands; elytra, including intervals 1 and 2 dark red (Fig. 225) *rubricollis* n. sp.
- 58(56) Lateral margin of pronotum sulcate nearly entire length (always more than half the pronotal length) 59
- Lateral margin if sulcate at all, sulcate on anterior half only 60
- 59(58) Elytral intervals 8 and 9 unicolorous black (Fig. 244) *kirschi* Chassain
- Elytral interval 8 black, interval 9 yellow to orange (Fig. 242)
..... *virgatus* Erichson
- 60(58) Lateral margin of pronotum without sulcus, or with sulcus very fine and never explanate 61
- Lateral margin of pronotum sulcate on anterior third to anterior half, sulcate margin becoming explanate, at least on anterior fifth (as in Fig. 33) 62
- 61(60) Pronotum with 2 broad black bands, each at least 2 times wider than area between bands (Fig. 243) *acutus* Candèze
- Pronotum either with a single wide band or with 2 narrow black bands interrupted by a red band, if with 2 black bands then area between bands is as wide as or wider than each band (Figs. 239 and 240) *exsolutus* Candèze
- 62(60) Elytral intervals 8 and 9 unicolorous *superbus* Kirsch

- Elytral interval 8 black, 9 yellow to orange 63
- 63(62) Pronotum with 2 broad black bands surrounded by yellow to orange border,
pale margin narrow, less than half the width of each black band, black bands
subparallel (Fig. 235) *germari* Guérin
- Pronotum with one or 2 black bands, if 2, then pale margin (at least on posterior
half) is as wide as or wider than each black band, black bands may be very
irregular 64
- 64(63) Pronotum with 2 black bands that are each narrow and sinuate, not cruciform
(Figs. 27 and 241) *sommeri* Candèze
- Pronotum with one or 2 black bands, if 2, then bands appearing cruciform (Figs.
227-229) *illigeri* Guérin
- 65(12) Each elytron with 2 dark bands only, one sutural and one marginal (dark bands
may or may not extend basally to humeri) 66
- Color of each elytron variable either unicolorous (or nearly so), with more than 2
dark bands, or with elytra blood red with pale bands 67
- 66(65) Pronotum orange to light brown, with a single dark macula or band medially
(often faint (Fig. 208)) *limatus* Candèze
- Pronotum dull yellow to light brown laterally, orange medially, with 2 dark
bands separating colors (Fig. 212) *trinîtensis* n. sp.
- 67(65) Elytra blood red basally, reddish black apically, with intervals 3 and 7 pale (Fig.
211) *fleutiauxi* Szombathy
- Elytra dull yellow to light brown with contrasting dark bands 68
- 68(67) Elytra gibbous basally, body widest (dorsoventrally) at anterior fifth (Fig. 29)

.....	69
- Elytra not gibbous basally, body widest across anterior third or beyond (Fig. 28)	
.....	72
69(68) Pronotum glabrous, entirely without setae or with few (less than 10 scattered setae throughout) very fine and inconspicuous setae	71
- Pronotum covered with distinct pale setae (at least several dozen), at least on dark lateral areas	70
70(69) Pronotal margin evenly convex to anterolateral angles (viewed from above; Fig. 151); head with black macula (Fig. 237)	<i>punctatostriatus</i> Candèze
- Pronotal margin constricted just before anterolateral angles (Fig. 140); head without black macula	<i>girardi</i> Chassain
71(69) Scutellum and legs black (with occasional reddish maculae); dark pronotal bands irregular, with arm or extension near center projecting laterally or as an outlying macula (Fig. 216)	<i>catei</i> n. sp.
- Scutellum and legs orange to light brown; dark pronotal bands straight to slightly sinuate, without lateral extension near center (Fig. 246)	<i>gibbosus</i> n. sp.
72(68) Pronotum with a dark macula along each lateral margin (near center) in addition to dark bands ((Figs. 215 and 218) lateral macula may extend medially to dark bands)	73
- Pronotum without dark maculae along lateral margin of pronotum; dark pronotal bands variable	74
73(72) Elytral disk with contrasting pale and dark colors, intervals of different colors (Fig. 215)	<i>clarki</i> n. sp.

Elytral intervals (at least on disk) pale, contrasting in color with darker striae (Fig. 218)	<i>flavangulus</i> Candèze
74(72) Elytral intervals 4 and 6 dark on apical half (margins and suture also dark), confluent (or nearly so) on apical third, forming a V-shaped pattern; elytral bands becoming obscure on basal half (Fig. 214)	<i>fascicularis</i> Candèze
- Elytra with or without discal bands, if bands present, intervals 4 and 6 not forming a V-shaped pattern; elytral bands if obscure, obscure only on basal fourth or less	75
75(74) Pronotal margin not sulcate on anterior third (Fig. 213)	<i>melleus</i> n. sp.
- Pronotal margin sulcate, and often explanate, on anterior third (as in Fig. 33)	76
76(75) Prosternum with black macula or band along suture	77
- Prosternum without a black macula or band along suture (though suture may be dark red in places (Fig. 210))	<i>fulvicollis</i> Blanchard
77(76) Elytral intervals 2, 4, 6, and 8 slightly infusate to completely black on disc (though dark bands may be obscure basally (Fig. 209))	<i>bispinus</i> Candèze
- Elytral intervals 1, 4, 6, and 9 infusate to black (Fig. 207)	<i>badeni</i> Steinheil
78(10) Pronotum with yellow to orange markings, without blood red coloration (or if present, restricted to discal band or macula)	81
- Pronotum blood red throughout, with black discal band(s) or macula(e), yellow coloration, if present, restricted to hind angles (Figs. 217, 258)	79
79(78) Elytral interval 3 wider and rising above level of other intervals; hind angles of pronotum yellow (Fig. 258)	<i>kathleenae</i> n. sp.

- Elytral interval 3 not wider and rising above level of other intervals; hind angles of pronotum variously colored 80
- 80(79) Pronotum with 2 black bands or maculae on disk; elytral intervals strongly convex (Fig. 217) *pectitus* Candèze
- Pronotum with a single black band on disk (often faint); elytral intervals flat or nearly so *schaumi* Guérin
- 81(78) Apex of each elytron ending in a sharp spine, angle or dentition (Figs. 169 or sharper) 82
- Apex of each elytron rounded (Fig. 173) 83
- 82(81) Elytra unicolorous yellow to light brown, intervals often darker (Fig. 247)
..... *striatus* Guérin
- Elytral base mostly yellow, apex black (Fig. 253) *formosus* Janson
- 83(81) Prosternum and abdomen with contrasting red and black coloration (Fig. 222)
..... *regalis* Guérin (in part)
- Prosternum and abdomen black throughout (Fig. 254 and 255)
..... *hispidus* Candèze (in part)

angulatus Species Group

The *angulatus* species group is comprised of four known species that have short pectinate to subpectinate antennae. The pronotum bears a tubercle or strong convexity on the anterior third of the lateral margin. Additionally, the anterior sclerite within the bursa copulatrix is covered with small spines and the lateral arms are divided (Figs. 41, 43-45).

Semiotus angulatus (Drury)

(Figs. 41, 122, 154, 160, 167, 179, 188-190 and 271)

Elater angulatus Drury 1782: 69, Fleutiaux 1925: 109, Chassain, in press a. (Type(s) unlocated; Type locality: Brazil).

Elater suturalis Fabricius 1792: 224, Herbst 1806: 334, Chassain in press a. (Type(s) unlocated; Type locality: ?).

Pericallus suturalis DeJean 1836: 96.

Pericalle suturalis, Latreille 1834: 141.

Semiotus sanguinicollis Blanchard 1843: 128. Candèze 1857: 304, Candèze 1874: 173. Chassain in press A. (Lectotype, male: MNHN; type locality: Santa Cruz de la Sierra).

Semiotus speciosus Erichson 1847: 75, Candèze 1857: 337. (Type: MNFD; type locality: Peru, Mt. Phillippi).

Semiotus suturalis, Candèze 1857: 303, Candèze 1874: 173, Szombathy 1909a: 121, Fleutiaux 1925: 109.

Semiotus cardinalis Belval 1861: 101. (Type(s) unlocated; Type locality: ?)

Length 31 to 38 mm (length / width ratio 4.9 to 5.2). Head piceus, bearing two spines apically, venter strongly concave between spines; frontal texture glabrous with moderately deep punctures throughout; ocular index 57.0 to 59.0. Antennae pectinate to subpectinate, with segments 1 and 2 badius to piceus, segments 3 to 11 piceus; length four or more segments shy of hind angles. Pronotum 8 to 11 mm (length / width ratio 1.3

to 1.5), narrowly sinuate with pronounced tubercle anterolaterally on anterior third of each margin, margin sulcate except on hind angles, anterior third explanate; color fulvus to sanguineus with large piceus macula extending from base to anterior border (this macula may be only a narrow band or extended laterally nearly to margin, appearing cruciform); texture glabrous with moderately deep punctures scattered throughout.

Scutellum piceus, broadly ovate. Prosternum strongly concave in profile; texture glabrous with erect setae on anterior fourth, punctation fine medially becoming thick and umbilicate laterally; color testaceus to sanguineous, lobe often piceus anteriorly.

Hypomeron fulvus to sanguineus with or without elongate piceus macula along suture; texture glabrous with fine punctures throughout. Mesosternum, mesepisternum and meshypomeron fulvus to aurantiacus with or without obscure maculae. Metasternum fulvus to aurantiacus with piceus lateral bands; texture glabrous with fine punctation throughout. Metepimeron piceus. Femora testaceus to aurantiacus.

Elytra 20 to 26 mm (length / width ratio 3.1 to 3.3), subparallel on basal third, then narrowing evenly to tip; strial intervals 1 and 2 (on apical 2/3) and various portions of intervals 4 through 9 piceus, base color fulvus to testaceus (often luteus) forming a cuneiform extension on interval 3 to near apex; texture glabrous with striae and strial punctures fine to obsolete; apices each bearing one spine.

Abdomen fulvus to aurantiacus with two piceus bands sublaterally; texture glabrous with fine scattered setae on sternite 1, punctation fine throughout; female foveae absent; anterior sclerite wider than long, multiramose, lateral arms divided, one arm extending apically nearly as far as median piece, one extending laterally. Male not seen.

Material Examined. **BOLIVIA:** Chocabamba, Villa Tunari, Parque Machias, 300 m., 16°58'20" S, 65°24'42" W, II-12-1999, R. Anderson, lowland rain forest (CMNC): P. Germain, 1883 (MNHN); Santa Cruz, Prov. Sara, Santa Cruz de la Sierra, 500 m., (I-IV)-1904, J. Steinbach (MNFD); **BRAZIL:** Amazonas, Manaus, Boa Vista Rd, 110 km., (IX-X)-1989, P. Hrabovský (PCCV); Rio Madeira, Mann & Baker (USNM); Minas Gerais, Passa Quatro, Faz. Dos Campos, J. F. Zikan (FMNH); Santa Catarina, Joinville, Steind. (NHMW); **COLOMBIA:** Caquetá, Morelia, Río Bodoquero, 430 m., I-(19-20)-1969. Duckworth and Dietz (USNM); Putumayo, Florida, Sup., G. Klug, 1931 (MNHN); Department unknown, Guines Fluss, Umbria (USNM); **ECUADOR:** Napo, Limoncocha, VI-15-1977, W.E. Steiner (USNM); Limoncocha, VI-10-1977, P.J. Spangler & D.R. Givens (USNM); Limoncocha, VI-10-1977, P.J. Spangler & D.R. Givens (USNM); Río Pacuyaco, V-8-1937, Schultz-Rhonhof S.G. (MNHN); Pastaza, Cusuimi, Río Cusuimi, 150 km SE Puyo, 300 m., VII-(18-23)-1971, B. Malkin (FMNH); IBID V-(15-31)-1971; **FRENCH GUIANA:** La Mana, Melinon, 1864 (MNHN); **NICARAGUA:** Managua, VII-1958, M. Smith (CASC); **PARAGUAY:** (USNM); **PERU:** Huánuco, Huallaga Dist., Tingo María, 680 m. (MNFD); Junín, Chanchamayo, II-1933, E.G. Smyth (SEMC); La Mercéd, 1922 (USNM); Satipo, IX-3-1989, (HNHM); Río Oxobamba, La Mercéd, Chanchamayo (MNFD); Soudoveni Ridges, 900 m., Soudoveni / Huantadriri Vall., ca. 100 km. N Satipo (PCCV); Loreto, Madre de Dios, Río Tambopata Res., 30 km (air) SW Puerto Maldonado, 290 m., 12°50' S, 69°20' W (BMNH); Pucallpa, II-9-1971, J. Schunke (CNCI); Requena, 150 m., III-91 (PCCV); Yagua Indian Villiage, headwaters of Loreto-Yacu, IV-(24-26)-1970, B. Malkin (FMNH); Río Toro (MNFD); Pebas, de Mathan, 1907 (MNHN).

Diagnosis. *Semiotus angulatus* is most closely allied to *S. insignis*, *S. angusticollis*, and *S. convexicollis*. The four species represent the most distinct species group (the *angulatus* group) within the genus *Semiotus*. This group is defined by the short pectinate to subpectinate antennae (Figs. 166-167) which are usually 3 to 4 segments short of the hind angles of the pronotum, tubercles on the anterolateral areas of the pronotum, pointed posterolateral angles of the hypomeron, and by the strongly spined anterior sclerite of the bursa copulatrix which also bear lateral arms that are divided distally. All of these species also have two strongly projecting frontal spines. *Semiotus angulatus* is the most variable of the four species. Specimens range from dark red to light orange with the black sutural strip on the elytra varying in length. *Semiotus angusticollis* and *S. convexicollis* can be distinguished from *S. angulatus* by the pronotal maculae. *Semiotus angusticollis* bears black maculae on the pronotal tubercle (Fig. 191), *S. angulatus* does not (Figs. 188-190). *Semiotus convexicollis* bears either two linear bands, or no bands at all, on the pronotum, *S. angulatus* bears a single band that is usually cruciform. *Semiotus insignis* differs from the other three species in having the antennae less pectinate (Fig. 166), though still having the outer angles of each segment longer than other species of *Semiotus* that are not included in the *angulatus* group. The anterior sclerite of the bursa copulatrix is much less dentate in *S. angulatus* (Fig. 41) than in the other three species (Figs 43-45) and the division of the lateral arms is much more arched and separate from the posterior piece. The three species overlap through most of their range (from Bolivia and southern Brazil north to Colombia and Venezuela, see Figs. 272-272, and 279) except *S. insignis* which is mostly restricted to Central America.

Note. The differing color patterns evident in *S. angulatus* are not consistent geographically enough to justify subspecific status. Specimens manifesting yellow to dark red elytra have been collected from the same area. The extent of the dark bands on the elytra also varies within specimens collected in the same geographic area. This was the only difference between *S. angulatus* and *S. suturalis*. The synonyms follow those of Chassain (in press A).

Semiotus angusticollis (Blanchard)

(Figs. 44, 107, 191 and 272)

Semiotus angusticollis Blanchard 1843: 127, Candèze 1857: 317, Candèze 1874: 178.

(Lectotype, female: MNHN; type locality: Río de Janeiro).

Length 25 to 29 mm (length / width ratio 4.3 to 5.0). Head sanguineus on spines and laterally, piceus medially; bearing two spines apically, area between strongly concave; frontal texture glabrous. spines nearly impunctate, base of head moderately punctate; ocular index 62.0 to 65.0; frontal spines approximately 33% length of frons. Antennae pectinate, piceus, 3 to 4 segments shy of hind angles. Pronotum 7 to 9 mm (length / width ratio 1.3 to 1.4), testaceus to badius laterally, darker anteriorly, with two piceus bands on disk (often joined apically), sanguineus band medially, anterolateral tubercles piceus; shape parallel-sided with angles gradually expanding on anterior sixth. anterolateral angles tuberculate; texture glabrous with punctures on anterior third up to 10 times the size of punctures on posterior third; margin sulcate medially and preapically, thickly rounded from hind angles to tubercles. Scutellum widely ovate. Prosternum

fulvus to aurantiacus with piceus macula extending from hypomeron along suture; concave in profile; texture with fine scattered setae, nearly impunctate medially, with large punctures laterally. Hypomeron fulvus to testaceus with piceus maculae along suture extending onto prosternum; texture glabrous with fine punctures throughout. Mesosternum fulvus to aurantiacus medially with piceus lateral maculae; texture glabrous and impunctate medially with fine setae and dense punctation laterally. Mesepisternum and meshypomeron fulvus to aurantiacus. Metasternum fulvus to testaceus with piceus lateral bands; texture glabrous with fine punctation throughout. Femora testaceus to aurantiacus throughout.

Elytra 16 to 19 mm (length / width ratio 2.9 to 3.2), widest on anterior fourth then evenly tapering to tip; color fulvus to testaceus with piceus lateral and sutural band extending from apex to anterior fifth; interstriae nearly flat, with very fine punctures; apices each bearing one spine.

Abdomen fulvus to testaceus with two piceus bands sublaterally; texture glabrous with fine punctation throughout; female foveae absent; anterior sclerite covered with dense dentitions, lateral arms divided distally, at nearly right angles to median piece. Male with parameres narrowing to near apex, lateral blades small, subtriangular, approximately 17 to 19% length of parameres (Fig. 107).

Material examined. **BRAZIL:** Río de Janeiro, Corcovado, XI-1968, S.A. Fragoso (EMEC); Guanabara, X-1961, Alvarenga Seabra (BMNH); 1935, P. Sandig (USNM); São Paulo, Cantareira, II-13-1962, Halik (USNM); Ilha Santa Amaro, nr. Santos, IV-1-1912, G.E. Bryant (BMNH); IBID III-28-1912; IBID III-29-1912.

Diagnosis. *Semiotus angusticollis* is most closely related to *S. insignis*, *S. convexicollis*, and *S. angulatus*. This group is defined by the short pectinate to subpectinate antennae (usually 3 to 4 segments short of the hind angles of the pronotum), tubercles on the anterolateral areas of the pronotum, pointed posterolateral angles of the hypomeron, and by the strongly spined anterior sclerite of the bursa copulatrix which also bear lateral arms that are divided distally. All of these species also have two strongly projecting frontal spines. *Semiotus angusticollis* and *S. convexicollis* can be distinguished from *S. angulatus* by the pronotal maculae. *Semiotus angusticollis* bears black maculae on the pronotal tubercle. *Semiotus convexicollis* bears either two linear bands, or no bands at all, on the pronotum. *Semiotus angulatus* bears a single band that is usually cruciform. *Semiotus insignis* differs from the other 3 species in having the antennae less pectinate (Fig. 166). The anterior sclerite of the bursa copulatrix in *S. angusticollis* (Fig. 44) is somewhat T-shaped, similar to that of *S. convexicollis* (Fig. 45), but with the lateral arms deflexed distally. In *S. insignis*, the anterior margin lacks sinuations (Fig. 43), and in *S. angulatus* the anterior margin is much more strongly convex (Fig. 41).

Semiotus convexicollis Blanchard

(Figs. 26, 45, 161, 192 and 279)

Semiotus convexicollis Blanchard 1843: 128, Candèze 1857: 318, Candèze 1874: 178.

Szombathy 1909a: 121. (Lectotype, female: MNHN; type locality: Guarayos).

Semiotus convexicollis signatus Schwarz 1902a: 208. (Holotype, female: DEIC;

type locality: Paraguay, Villa Rica).

Length 21 to 26 mm (length / width ratio 4.3 to 4.6). Head piceus, with or without pale spines, bearing two spines apically; frontal texture glabrous, nitidus, punctation moderately deep. Antennae subpectinate, with segments 1 and 2 testaceus, segments 3 through 11 piceus; length roughly 4 segments shy of hind angles (in females); ocular index 66.0 to 69.0. Pronotum 6 to 8 mm (length / width ratio 1.2 to 1.5), elongate, cylindrical, hind angles diverging, with two anterolateral tubercles, margin sulcate near middle only; color fulvus to aurantiacus with two piceus bands conjoined along anterior border, or bands faint to absent; texture glabrous, nitidus, punctation fine basally becoming thicker and umbilicate anteriorly; Scutellum piceus, subtrapezoidal. Prosternum concave in profile; color testaceus to aurantiacus with suture piceus; texture glabrous with few erect setae on anterior fourth, punctation fine medially becoming thick and umbilicate laterally. Hypomeron fulvus to testaceus with piceus maculae along suture; texture glabrous, nitidus, with very fine punctures throughout. Mesosternum fulvus to aurantiacus; texture glabrous and impunctate medially on fossa, with fine setae and dense punctation laterally. Mesepisternum and meshypomeron fulvus to aurantiacus. Metasternum luteus to aurantiacus with two lateral piceus bands; texture glabrous, nitidus with fine punctation throughout. Metepimeron fulvus to aurantiacus. Femora testaceus to aurantiacus.

Elytra 13 to 17 mm (length / width ratio 2.7 to 2.9), widest on anterior fourth then evenly tapering to tip; color luteus with posterior 3/4 of suture and lateral margin piceus; texture glabrous, nitidus, with striae (except stria 1) fine to obsolete. stria punctures fine to very fine; apices each bearing one spine.

Abdomen luteus to aurantiacus with two sublateral piceus bands; texture glabrous, nitidus with fine punctation throughout; female foveae absent; anterior sclerite wider than long, covered with sharp dentitions throughout, lateral arms at right angles to median piece, partially divided at tips. Male not seen.

Diagnosis. *Semiotus convexicollis* is most closely allied to *S. insignis*, *S. angusticollis*, and *S. angulatus*. The four species represent the most distinct species group (the *angulatus* group) within the genus *Semiotus*. This group is defined by the short pectinate to subpectinate antennae (usually 3 to 4 segments short of the hind angles of the pronotum), tubercles on the anterolateral areas of the pronotum, pointed posterolateral angles of the hypomeron, and by the strongly spined anterior sclerite of the bursa copulatrix which also bear lateral arms that are divided distally. All of these species also have two strongly projecting frontal spines. *Semiotus angusticollis* and *S. convexicollis* can be distinguished from *S. angulatus* by the pronotal maculae. *Semiotus angusticollis* bears black maculae on the pronotal tubercle, *S. angulatus* does not. *Semiotus convexicollis* bears either two linear bands, or no bands at all, on the pronotum. *S. angulatus* bears a single band that is usually cruciform. *Semiotus insignis* differs from the other three species in having the antennae less pectinate (Fig. 166). The anterior sclerite of the bursa copulatrix is more narrowly sinuate in *S. convexicollis* than in the other species (Fig. 45). The lateral arms extend nearly at right angles to the medial piece with a sinuate anterior margin. In *S. insignis*, the anterior margin lacks sinuations (Fig. 43), in *S. angusticollis* the anterior margin is curved distally on the lateral half (Fig. 44), and in *S. angulatus* the anterior margin is much more strongly convex (Fig. 41). The four species overlap through most of their range (from Bolivia and southern Brazil north to

Colombia and Venezuela) except *S. insignis* which is mostly restricted to Central America.

Material Examined. **BOLIVIA:** La Paz, Tumupasa, XII, Lopez (USNM); **COLOMBIA:** Capital District, Bogotá (BMNH); Candèze (ISNB); **ECUADOR:** Morona - Santiago, Chigüinda, Buckley (BMNH); Napo, 10 km SW Mishanalli, 600 m., 1° 5' 3" S, 77° 42' 9" W, L. Náday (HNHM); Pastaza, Santa Clara, VII-4-1976, P.M. Turner (USNM); **GUYANA:** Mazaruni - Potaro, Bartica District, Kartabo, VIII-28-1920 (CASC); **PARAGUAY:** Villa Rica (MNFD); **PERU:** Huánuco, Tingo María, Monson Valley, XII-18-1954 (CASC); Loreto, 80 km NE Iquitos, Explorama Lodge, on Amazon River, (VI-24) - (VII- 20) - 1990, Menke & Awertschenko (USNM); Explorama Lodge, 80 km NE Iquitos on Amazon River, (VI-24)-(VII-20)-1990, Menke & Awertschenko (USNM); Paleazu (ISNB).

Note. *Semiotus c. signatus* was described as a subspecies of *S. c. convexcicollis* based on the absence of piceus pronotal bands. This form appears to be the most common form in the southern part of its range. The subspecies is not here recognized as vague bands are evident on occasional specimens clearly intermediate between the two forms.

Semiotus insignis Candèze

(Figs. 43, 166, 183, 184 and 288)

Semiotus insignis Candèze 1857:311. Steinheil 1875: 111, Candèze 1874: 176, Champion 1896: 289. (Type: BMNH; type locality: Mexico).

Semiotus longus Candèze 1857: 315, Candèze 1874: 178. (Type: BMNH; type locality:

Mexico).

Semiotus insignis longus, Champion 1896: 289. New Synonym.

Length 32 to 44 mm (length/width ratio 4.5 to 5.0). Head aurantiacus to sanguineous, with piceus macula on basal half medially; anterior margin of frons bearing two spines; texture glabrous with moderately sized punctures evenly spaced throughout; ocular index 59.0 to 61.0; frontal spines approximately 16% length of frons. Antennae strongly serrate to subpectinate, extending 3 or 4 segments shy of hind angles; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 8 to 12 mm (length/width ratio 1.2 to 1.4), fulvus to luteus basally, becoming aurantiacus medially; five piceus maculae situated from base to apex (one medially near anterior margin, two on disk, and two near base), occasionally four maculae (at base and on disk) partially confluent forming two arcuate piceus lines; lateral margin sulcate for entire length of pronotum, visible (when viewed from above) only on anterior third, hidden on posterior 2/3 by thickly rounded supramarginal convexity, ending in a tubercle near anterior third; shape gradually widening posteriorly; texture glabrous with fine punctures scattered throughout, becoming larger on anterior third. Prosternum evenly concave on anterior 2/3, lobe subtruncate anteriorly then tapering to margin; color aurantiacus to sanguineous with or without elongate piceus maculae near suture medially; texture glabrous with a few fine setae on lobe, punctation very fine medially becoming larger and often contiguous laterally. Hypomeron and mesosternum fulvus to aurantiacus, glabrous, with fine punctation scattered throughout. Mesepisternum and meshypomeron fulvus to

aurantiacus. Metasternum testaceus with piceus lateral maculae (sometimes absent); texture glabrous with very fine punctures scattered throughout. Femora testaceus.

Elytra 21 to 29 mm (length/width ratio 2.9 to 3.4), fulvus to testaceus, with margin and suture piceus (sometimes badius) on posterior half; parallel-sided on anterior half before tapering to apex; texture glabrous with setae and striae very fine to absent; apices each bearing one spine.

Abdomen fulvus to testaceus with two piceus (sometimes badius) maculae on each segment sublaterally; texture glabrous or with very fine setae on anterior margin of some sternites, punctures very fine and scattered throughout; female foveae absent; anterior sclerite covered with dense dentitions, lateral arms partially divided distally, nearly at right angles to short median piece. Male not seen.

Material Examined. **BELIZE:** Toledo, Columbia Forest, 5 km N. San Antonio, VI-24-1981, W.E. Steiner (USNM); **COLOMBIA:** Valle del Cauca, Anchicaya Dam, 70 km E Buenaventura, 1200', VII-22-1970, H. & A. Howden (CNCI); Anchicaya, 1000', VII-27-1970, J.M. Campbell (CNCI); Darien, 1909, H. Hodge, (BMNH); W Cordillera, IX-1988, Lake Colima nr. Buga, Río Bravo Valley, 1180-1200 m (PCCV); IBID, 700-1100 m.; **COSTA RICA:** Alajuela, Río San Lorencito, 900 m., R.F. San Ramón, 5 km N Colonia, VI-1993 (INBC); San Coplos, VII-12-1964, R. Canet (INBC); San Ramón de Dos Ríos, 620 m., (IV-27)-(V-11)-1995, C. Cano (INBC); Guanacaste, Est. Cacao, lado SO Volcán Cacao, P.N. Guanacaste, 800-1600 m., VII-1993, J.F. Quesada (INBC); Est. Pitilla, 9 km S Santa Cecilia, P.N. Guanacaste, 700 m., VII-1994, P. Ríos (INBC); Limón, Amubri, Talamanca, A.C. Amistád, 70 m., VI-(6-28)-1994, G. Gallardo (INBC); Hamburg farm, Reventazon, V-8-25, *im gebüsch*, F. Nevermann (USNM); IBID IX-27-

24; R.B. Hitoy Cerere, Valle La Estrella, 100-200 m., IV-(4-20)-1994, G. Carballo (INBC); Ramal, Río Parismina, Santa Clara, VI-2-25, *auf trockenen Holz* (USNM); Ramal, Río, Parismina, Santa Clara, IX-26 (USNM); IBID V-8-28, *auf Frischgefallenem Holz*; Puntarenas, Est. Biol. Las Alturas, 1500 m., Coto Brus., Aguilar, Greeney, Zumbado (INBC); Finca Cafrossa, 1300 m., Est. Las Mellizas, P. Internacional La Amistad, V-1991, A.M. Ramirez (INBC); Rancho Quemado, 200 m., Peninsula der Osa, IV-1992, K. Flores (INBC); **GUATEMALA**: Petén, Sayaxche, El Petén, XII-21-1963, E.C. Welling (CNCI); Sayaxche, X-8-1963, E.C. Welling (FMNH); **HONDURAS**: Altántida, P. N. Pico Bonito, El Manchón, 350 m., 15°29'18" N, 87°07'39" W, X-12-2000, A. Lopez (EAPZ); **MEXICO**: Oaxaca, Tehuantepec (USNM); Puebla, Xicotepec de Juarez, 1200 m., IX-1987, T. Porion (PCCV); Veracruz, Catamarco, VII-13-1992, S. Bily (PCCV); Jalapa (FMNH); Presidio, R. Müller (USNM); **NICARAGUA**: (BMNH); **PANAMA**: Canal Zone, Barro Colorado Island, 9° 10' N, 79° 50' W, V-(15-27)-1972, T.L. & L.J. Erwin (USNM); Barro Colorado Island, 9° 10' N, 79° 50' W, VII-(2 -7)-1973, Erwin & Hevel Central American Expedition (USNM); Barro Colorado Island, 23-VIII-1978, E.M. Fisher (CASC); Barro Colorado Island, VII-24-1963, D.Q. Cavagnaro & M.E. Erwin (CASC); Cano Saddle, Cloe's Plantation, M. Close (USNM); Chiriquí, Potrerillos, V-25-1935 (CASC); (NHMW); Vulcan de Chiriquí 25-4000 m., Champion (NHMW); (OXUM); (USNM) **VENEZUELA**: Aragua, Parque Nacional Henri Pittier, 4 km N El Limon, 700 m., VI-19-1987, M.A. Ivie, on dead tree (MTEC); Zulia, Maracaibo (ZMUC).

Diagnosis. *Semiotus insignis* is most closely allied to *S. angusticollis*, *S. convexicollis*, and *S. angulatus*. The four species represent the most distinct species

group (the *angulatus* group) within the genus *Semiotus*. This group is defined by the short pectinate to subpectinate antennae (usually 3 to 4 segments short of the hind angles of the pronotum), tubercles on the anterolateral areas of the pronotum, pointed posterolateral angles of the hypomerion, and by the strongly spined anterior sclerite of the bursa copulatrix which also bear lateral arms that are divided distally. All of these species also have two strongly projecting frontal spines. *Semiotus insignis* is readily separated from these other species in the pattern of pronotal maculae, by the shape of the antennae and genitalia, and in distribution. The pronotum normally bears five maculae including four discal maculae (two anterior and two posterior) and an anterior macula positioned medially along the anterior margin (Fig. 184). Occasionally the anterior discal maculae are confluent with the posterior maculae forming two longitudinal bands (Fig. 183). In these cases there is still an anterior macula (separate from the discal bands) which is absent in specimens of *S. convexicollis* (Fig. 192) and *S. angusticollis* (Fig. 191) that also bear two pronotal maculae. *Semiotus convexicollis* bears either two linear bands, or no bands at all, on the pronotum. *Semiotus angulatus* bears a single band that is usually cruciform (Figs 188-190). *Semiotus angusticollis* also bears pronotal bands but additionally bears black maculae over the anterolateral tubercles. The tubercles (or strong convexities) in *S. insignis* bear no maculae. *Semiotus insignis* differs from the other three species in having the antennae less pectinate (Fig. 166). The anterior sclerite of the bursa copulatrix in *S. insignis* (Fig. 44) is unique of the four species in that the anterior margin is nearly straight (Fig. 43). In the other species it is more sinuate (Figs. 41, 44, 45). The distribution of *S. insignis* overlaps very little with the other four species, occurring primarily in Central America, although its range does extend into northern

South America where it overlaps somewhat with the other species (all of which are restricted to South America).

Note. Champion (1896) recognized *S. insignis longus* Candèze as a subspecies where the four discal maculae of the pronotum became confluent into two parallel bands. Specimens with this pattern are not geographically limited and the form is not recognized.

caracasanus Species Group

The *caracasanus* species group is defined by the evenly convex and elongate dorsal surface of the pronotum. Dorsal concavities or tubercles are absent on the pronotum, and the disk joins the hypomera without sulci. These species also all bear two well defined frontal spines. Species in the *caracasanus* group have the elytra colored one of two general ways. The pale basal color (extending nearly to the elytral apices) is separated by a dark sutural and a dark marginal band (Figs. 201-206) or the pale basal color does not extend onto the apical third of the elytra (Figs. 195-200).

Semiotus antennalis Candèze

(Figs. 83, 115, 206 and 274)

Semiotus antennalis Candèze 1895: 16. (type: not found; type locality: Véragua)

Semiotus melanocephalus Schwarz 1902b: 130. (Type: DEIC; type locality: Peru,

Huanuco and Ecuador, Napo, Archidona) New Synonym

Length 11 to 20 mm (length/width ratio 4.7 to 4.8). **Head** piceus, front with two spines anterolaterally; texture glabrous with few erect setae over eyes, punctation moderately deep; ocular index 69.0 to 72.0. **Antennae** serrate, 2 to 3 segments shy of hind angles; segments 1 through 3 testaceus, segments 4 to 7 piceus, segment 8 badius, and segments 9 to 11 fulvus to stramineous. **Pronotum** 5 to 6 mm (length/width ratio 1.2 to 1.3), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus to sanguineous, hind angles lighter; texture, nitidus, finely punctate throughout becoming thicker and umbilicate anteromedially. Scutellum testaceus to rufopiceus, broadly ovate, as wide as long. Prosternum evenly concave in profile, tip of prosternal process not divided; color testaceus to sanguineous throughout; texture glabrous with erect setae on anterior fourth, punctation fine medially, contiguous and umbilicate laterally. Hypomeron aurantiacus, lighter posteriorly; texture glabrous with fine punctation throughout. Mesosternum aurantiacus to testaceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron aurantiacus to testaceus. Metasternum aurantiacus to testaceus; texture nearly glabrous with few scattered setae anterolaterally, punctation very fine throughout. Femora aurantiacus to testaceus.

Elytra 12 to 13 mm (length/width ratio 3.1 to 3.2), subparallel on anterior fourth then narrowing to tip; color luteus with interval 1 (and part of interval 2 posteriorly) and posterior 2/3 of margin piceus; texture glabrous, nitidus, striae (except stria 1) fine to obsolete, stria punctures fine, interstriae wrinkled and lightly punctate; apices each ending in a single spine.

Abdomen fulvus to luteus with medial cuneiform band extending length of abdomen piceus; texture glabrous, nitidus, punctation fine and scattered throughout; female with two nearly contiguous elongate elliptical foveae on posterior 3/5 of sternite 5; lateral arms of anterior sclerite extending distally 1/2 length of median piece, each bearing 3 to 4 dentitions. Male with parameres narrow, lateral blade about 1/5 length of parameres.

Material examined. **BOLIVIA:** La Paz, Tumupasa, IX-1925, G. Harrington (USNM); Santa Cruz, Buena Vista, Ichilo, (XI-XII)-1948, L. Peña (CASC); **BRAZIL:** Goiás, Jatahay, (IX-XI)-1897 (DEIC); **ECUADOR:** Napo, Archidona, R. Haensch (DEIC); Limoncocha, VI-9-1977, W.E. Steiner (USNM); Tena vicinity, 500 m., VII-(5-10)-1976, S & J Peck (CNCI); **PERU:** Huánuco, D. Speyer (DEIC); Madre de Dios, Manú, confluence of Río Alto Madre de Dios & Río Ganitana, XI-1980, N. Zakharoff (CASC); Manu, Erika (near Salvacion), 550 m., IX-(4-6)-1988, O. Flint & N. Adams (USNM); Political division unknown, Marcapata (DEIC).

Diagnosis. *Semiotus antennalis* is most closely related to *S. carus*, *S. spinosus*, *S. rileyi*. The dark elytral markings are restricted to the suture and lateral margin (Fig. 206). The last three antennal segments are pale yellow in *S. antennalis*. This is also the case for most of the species in the *caracasanus* group. Only *S. spinosus*, *S. nigriceps* and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. The last four segments of the antennae are pale yellow in *S. woodi*, *S. chontaleus*, and *S. matilei*. In *S. pallicornus* and *S. rileyi*, all the segments are pale. *Semiotus antennalis* can also be separated from *S. nigriceps* by the lack of a pronotal band (present in *S. nigriceps* and *S. matilei*, see Figs. 203 and 204). It can be separated from *S. cyrtomaris* by the shorter

dark band along the elytral margin and by the laterally straight aedeagus. In *S. cyrtomaris*, the dark elytral band extends marginally to the humeri and the aedeagus is strongly arched dorso-ventrally (Fig. 105). *Semiotus antennalis* can be separated from *S. carus* by the reduced number of spines (approximately four) on the anterior sclerite of the bursa copulatrix (Fig. 83). *Semiotus carus* bears roughly nine such spines (Fig. 61). The piceus marginal elytral band in *S. carus* extends medially across 2 or 3 intervals only. In *S. antennalis* it extends medially 4 to 6 intervals.

Note. The type of *S. antennalis* has not been found. A specimen identified by Candèze (ISNB) is similar to the original description of *S. antennalis* and is conspecific with *S. melanocephalus*.

Semiotus caracasanus Rojas

(Figs. 53, 114, 137, 195 and 278)

Semiotus caracasanus Rojas 1855: 160, Candèze 1857:311, Steinheil 1875: 111,

Candèze 1874: 176, Fleutiaux 1891: 275. (Lectotype (Chassain): MNHN; type locality: Venezuela, Caracas).

Semiotus caracasanus Fleutiaux 1925: 109. Unjustified Emendation

Length 12 to 19 mm (length / width ratio 3.9 to 4.6). Head piceus, front with two spines anterolaterally; texture glabrous with few setae above eyes and spines, punctation moderately deep and scattered throughout; ocular index 70.0 to 73.0. Antennae serrate, reaching hind angles in males; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 3.0 to 5.0 mm (length / width ratio 1.1 to 1.3), narrowly sinuate, margin

broadly rounded without definition; color fulvus with broad piceus band extending from base to anterior margin; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus band. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile on anterior half; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus laterally, piceus along suture; texture glabrous and nearly impunctate on lateral fulvus area, finely punctate on piceus medial area. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceus.

Elytra 7 to 12 mm (length / width ratio 2.5 to 3.0), glabrous and subparallel on anterior half then narrowing to tip; color fulvus to luteus on basal half, piceus on apical half; stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each bearing one spine with sutural side angled and often minutely dentate subapically.

Abdomen pale fulvus laterally with broad medial piceus band; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with two elliptical foveae on posterior 2/3 of sternite 5 confluent apically; anterior sclerite longer than wide, lateral arms short, 1/3 length of median piece. Male with parameres narrow, lateral blades pointed, less than 1/5 length of parameres.

Material Examined. GUYANA: Landsberg (ZMUC); VENEZUELA: Aragua, Portachuelo Pass, 20 km N Maracay, 1160 m., VI-18-1972, C.R. Collins (CASC); IBID.

1100 m.; Rancho Grande Biol. Stn., Portachuelo Pass, 10°21'0" N, 67°41'0" W, 1100 m., VI-4-1998, J. Ashe, R. Brooks, R. Hanley, insects moving through pass against wind-migration (SEMC); Federal District, Caracas (ZMUC); State unknown, Caracas Valley, VII-1897 (CASC).

Diagnosis. *Semiotus caracasanus* is most closely allied to *S. nigriceps*. The dark elytral markings are restricted to the apical half (Fig. 195). *Semiotus caracasanus* can be readily separated from *S. rileyi* by the presence of a pronotal band. *Semiotus rileyi* lacks a pronotal band (Fig. 200). The pronotal band in *S. caracasanus* is broad and approximately as wide anteriorly as posteriorly and occupies roughly as much area as the lateral pale yellow bands. This is also the condition in *S. spinosus*, *S. woodi*, and *S. caracasanus*. In *S. triplehorni*, the pronotal band is strongly constricted towards the anterior margin (Fig. 198). In *S. zonatus*, the pronotal band is much wider, occupying roughly 75% or more of the dorsal pronotal area. *Semiotus caracasanus* can be separated from *S. woodi* by the entirely pale basal color of the elytra. In *S. woodi*, a dark band extends from the black apical color to the scutellum (Fig. 197). *Semiotus lacrimiformis* is distinguished from *S. caracasanus* by the tear-shaped extension of the basal elytral color onto the black apical color (Fig. 199). In *S. caracasanus* the juncture of the two colors is only slightly sinuate. Nearly all of the species in the *caracasanus* group have at least the apical segment of the antennae pale yellow. Only *S. spinosus*, *S. nigriceps* and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. *Semiotus caracasanus* but can be separated from *S. spinosus* by the length of the lateral blades of the parameres. In *S. spinosus* the lateral blades are longer, more than 1/4th length of the parameres (Fig. 113). In *S. caracasanus* the lateral blades are less than 1/5th the length of the parameres

(Fig. 114). *Semiotus spinosus* has been collected in Ecuador and Peru. *Semiotus caracasanus* is only known from Venezuela.

Semiotus carus Janson

(Figs. 61, 112, 202 and 278)

Semiotus carus Janson 1882: 34, Champion 1896: 553. (Syntypes (7): BMNH; type locality: Ecuador, Chiguinda)

Length 15 to 20 mm (length/width ratio 4.5 to 5.2). Head piceus, front with two spines anterolaterally; texture glabrous with moderately deep punctation. Antennae 2 to 3 segments shy of hind angles; segments 1 through 3 testaceous, segments 4 to 8 (or 9) testaceous to badius, segments (9,) 10 and 11 fulvus. Pronotum 3 to 6 mm (length/width ratio 1.1 to 1.5), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus; texture, nitidus, finely punctate throughout becoming thicker and umbilicate anteromedially. Scutellum testaceous to rufopiceus, broadly ovate, wider than long. Prosternum evenly concave in profile, tip of prosternal process not divided; color testaceous to sanguineous, lobe piceus to testaceous; texture glabrous with erect setae on anterior fourth, punctation fine medially, contiguous and umbilicate laterally. Hypomeron aurantiacus; texture glabrous with fine punctation throughout. Mesosternum fulvus to testaceous, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron fulvus to testaceous. Metasternum testaceous to aurantiacus; texture nearly glabrous with few scattered setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceous.

Elytra 10 to 13 mm (length/width ratio 3.0 to 3.4), subparallel on anterior fourth then narrowing to tip; color luteus with interval 1 and posterior 2/3 of margin piceus; texture glabrous, nitidus, striae (except stria 1) fine to obsolete, stria punctures fine, interstriae wrinkled and lightly punctate; apices each ending in poorly defined spines.

Abdomen fulvus to luteus with medial cuneiform band extending length of abdomen piceus; texture mostly glabrous with few scattered setae on sternites 1 and 5, punctation fine, becoming denser on sternite 1; female with two nearly contiguous elongate elliptical foveae on posterior 2/3 of sternite 5, anterior sclerite with approximately eight dentitions on dextral surface, four on sinistral surface, arms extending distally approximately 4/5 length of median piece. Male with narrow parameres, lateral blades approximately 1/5 length of parameres, acute apically.

Material Examined. **ECUADOR:** Morona - Santiago, Chigüinda, Buckley (BMNH); **PERU:** Huánuco, Tingo María, Monson Valley, XII-11-1954, E.I. Schlinger and E.S. Ross (CASC); IBID XII-2-1954; IBID XI-10-1954; IBID X-12-1954; 20 km SW Tingo María, VI-20-1982, E&I Munroe (CMNC); Madre de Dios, Manú, confluence of Río Alto de Madre de Dios and Río Ganitano, XI-1980, N. Zakharoff (CASC).

Diagnosis. *Semiotus carus* is most closely related to *S. antennalis*, *S. spinosus*, *S. rileyi*. The dark elytral markings are restricted to the suture and lateral margin (Fig. 202). The last three antennal segments are pale yellow in *S. carus*. This is also the case for most of the species in the *caracasanus* group. Only *S. spinosus*, *S. nigriceps* and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. The last four segments of the antennae are pale yellow in *S. woodi*, *S. chontalensis*, and *S. matilei*. In *S. pallicornus* and *S. rileyi*, all the segments are pale. *Semiotus carus* can also be separated

from *S. nigriceps* by the lack of a pronotal band (present in *S. nigriceps*, and *S. matilei*, see Figs. 203 and 204). It can be separated from *S. cyrtomaris* by the shorter and narrower dark band along the elytral margin and by the laterally straight aedeagus. In *S. cyrtomaris*, the dark elytral band extends marginally to the humeri and medially across 4 to 6 elytral intervals (in *S. carus* it extends medially only across 2 or 3 intervals), and the aedeagus is strongly arched dorso-ventrally (Fig. 105). *Semiotus carus* can be separated from *S. antennalis* by the extra number of spines (roughly 9) on the anterior sclerite of the bursa copulatrix (Fig. 61). *Semiotus antennalis* bears approximately four such spines (Fig. 83). The piceous marginal elytral band in *S. carus* extends medially across 2 or 3 intervals only. In *S. antennalis* it extends medially 4 to 6 intervals.

Semiotus chontalenus Candèze

(Fig. 275)

Semiotus chontalenus Candèze 1874: 177, Champion 1896: 291. (Holotype, female:

BMNH; type locality: Nicaragua, Chontales).

Length 15 to 16 mm (length/width ratio 4.6 to 4.7). Head piceus, front with two spines anterolaterally; texture glabrous with few setae above eyes and spines, punctation moderately deep and scattered throughout; ocular index 64.0 to 66.0; frontal spines approximately 28% length of frons. Antennae serrate, reaching hind angles in males; segments 1 and 2 testaceous, segments 3 to 7 piceous to rufo-piceous, segments 8 to 11 fulvus to stramineous. Pronotum 4 to 5 mm (length/width ratio 1.2 to 1.3), narrowly sinuate, margin broadly rounded without sulci; color fulvus with broad piceous band

extending from base to anterior margin; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus band. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus laterally, piceus along suture; texture glabrous and nearly impunctate on lateral fulvus area, finely punctate on piceus medial area. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctation very fine throughout. Femora fulvus.

Elytra 10 to 11 mm (length/width ratio 2.9 to 3.0), glabrous and subparallel on anterior half then narrowing to tip; color fulvus on basal half, piceus on apical half, contrasting colors separate along sinuous line; stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each bearing one spine with sutural side angled and often minutely dentate.

Abdomen pale fulvus laterally with broad medial piceus band; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with two elliptical foveae on posterior 2/3 of sternite 5 confluent apically.

Material examined. **NICARAGUA:** Chontales, Chontales gold mines (OXUM); Chontales (NHMW).

Diagnosis. *Semiotus chontalenus* is part of the *caracasanus* group. *Semiotus chontalenus* belongs to those species of the *caracasanus* group where the pale basal color of the elytra does not extend onto the apical third (Figs. 195-200), as apposed to those

species where the pale basal color (extending nearly to the elytral apices) is separated by a dark sutural and a dark marginal band (Figs. 201-206). The pronotal band in *S. chontalenus* is broad and roughly as wide anteriorly as posteriorly and occupies roughly as much area as the lateral pale yellow bands. This is also the condition in *S. caracasanus*, *S. spinosus*, *S. woodi*, and *S. caracasanus*. In *S. triplehorni*, the pronotal band is strongly constricted towards the anterior margin (Fig. 198). In *S. zonatus*, the pronotal band is much wider, occupying roughly 75% or more of the dorsal pronotal area. *Semiotus chontalenus* can be separated from *S. woodi* by the entirely pale basal color of the elytra. In *S. woodi*, a dark band extends from the black apical color to the scutellum (Fig. 197). *Semiotus lacrimiformis* is different from *S. chontalenus* in the tear-shaped extension of the basal elytral color onto the black apical color (Fig. 199). In *S. chontalenus* the juncture of the two colors is only slightly sinuate. *Semiotus chontalenus* occurs in Nicaragua (fig. 275) and perhaps into Costa Rica as well where several other species in the *caracasanus* group occur. These species include *S. woodi*, *S. spinosus*, *S. triplehorni*, *S. pallicornus*, and *S. lacrimiformis*. The antennae in *S. lacrimiformis* and *S. triplehorni* terminate with three pale yellow to orange segments. *Semiotus woodi* and *S. chontalenus* have four pale yellow to straw-colored distal antennal segments. The antennae in *S. pallicornus* are completely yellow to orange, and the antennae of *S. spinosus* are entirely black.

Semiotus cyrtomaris n. sp.

(Figs. 59, 104, 105, 201 and 274)

Length 14 to 17 mm (length/width ratio 4.4 to 4.9). Head piceus, front with two spines anterolaterally; texture glabrous with moderately deep punctation. Antennae 2 to 3 segments shy of hind angles; segments 1 through 3 testaceus, segments 4 to 8 (or 9) testaceus to badius, segments (9) 10 and 11 fulvus. Pronotum 3 to 5 mm (length/width ratio 1.1 to 1.4), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus with or without piceus band anteromedially; texture, nitidus, finely punctate throughout becoming thicker and umbilicate anteromedially. Scutellum testaceus to rufopiceus, ovate, longer than wide. Prosternum evenly concave in profile, tip of prosternal process not divided; color testaceus to sanguineous, lobe piceus or not different in color from rest of prosternum; texture glabrous with erect setae on anterior fourth, punctation fine medially, contiguous and umbilicate laterally. Hypomeron aurantiacus; texture glabrous with fine punctation throughout. Mesosternum fulvus to testaceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron fulvus to testaceus. Metasternum testaceus to aurantiacus; texture nearly glabrous with or without few scattered setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceus.

Elytra 9 to 12 mm (length/width ratio 2.7 to 3.3), subparallel on anterior fourth then narrowing to tip; color luteus with interval 1, posterior half of interval 2, and lateral margin piceus; texture glabrous, nitidus, striae (except stria 1) fine to obsolete, stria

punctures fine, interstriae wrinkled and lightly punctate; apices each ending in a single spine.

Abdomen fulvus to luteus with medial cuneiform band extending length of abdomen piceus; texture mostly glabrous with few scattered setae on sternites 1 and 5, punctation fine, becoming denser on sternite 1; female with two nearly contiguous elongate elliptical foveae on posterior half of sternite 5; anterior sclerite with lateral arms long, as long as median piece, and bearing roughly four dentitions apically. Male with penis and parameres strongly arcuate, lateral blades short, roughly 1/8 length of parameres.

Material Examined. Holotype (male): **PERU**: Huánuco, Tingo María, Monson Valley, XII-11-1954, E.I. Schlinger and E.S. Ross (CASC); Paratypes: **PERU**: Huánuco, Tingo María, Monson Valley, XI-1-1954, E.I. Schlinger and E.S. Ross (1, CASC); Tingo María, Monson Valley, IX-23-1954, E.I. Schlinger and E.S. Ross (1, CASC); Junín, 900 m., Soudoveni Ridges, Soudoveni / Huantadriri Vall., 1987, ca 100 km NO Satipo (1, PCCV).

Diagnosis. The elytral markings of *S. cyrtomaris* are restricted to the suture and lateral margin (Fig. 201). The last three antennal segments are pale yellow. This is also the case for most of the species in the *caracasanus* group. Only *S. spinosus*, *S. nigriceps* and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. The last four segments of the antennae are pale yellow in *S. woodi*, *S. chontalenus*, and *S. matilei*. In *S. pallicornus* and *S. rileyi*, all the segments are pale. *Semiotus cyrtomaris* can also be separated from *S. nigriceps* by the lack of a pronotal band (present in *S. nigriceps*, and *S. matilei*, see Figs. 203 and 204). *Semiotus cyrtomaris* can be separated from *S. carus* by

having the scutellum longer than wide. It can be separated from *S. antennalis* and *S. nigriceps* by the piceus elytral marginal band extending anteriorly past the posterior border of the scutellum (often to the anterior humeral angles). The male parameres of *S. cyrtomaris* are strongly arcuate, nearly hemispherical, in profile (Fig. 105). This is a unique characteristic of the genus *Semiotus*.

Semiotus lacrimiformis n. sp.

(Figs. 69, 111, 199 and 289)

Length 11 to 19 mm (length / width ratio 4.0 to 5.1). Head piceus, front with two spines anterolaterally; texture glabrous with few supraorbital setae, punctation moderately deep and scattered throughout. Antennae serrate. 1 to 2 segments shy of hind angles; segments 1 and 2 badius, segments 3 to 7 piceus, segment 8 badius to testaceus, segments 9 - 11 straminious. Pronotum 2 to 5 mm (length / width ratio 1.1 to 1.5), narrowly sinuate, margin broadly rounded without sulcus; color fulvus to luteus, with broad piceus band extending from base to anterior margin; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus band. Scutellum piceus, broadly ovate, broader than long. Prosternum evenly concave in profile on anterior half; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus laterally, piceus along suture; texture glabrous, nitidus, punctation very fine to obsolete. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture

nearly glabrous with clump of fine decumbent setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceus, tarsi piceus.

Elytra 7 to 12 mm (length / width ratio 2.5 to 3.4), glabrous and subparallel on anterior half then narrowing to tip; color piceus apically, luteus basal coloration projecting on each elytron in broad hemispherical extensions onto apical third ; texture glabrous, nitidus, stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each with two points extending apically at different lengths, difference in length (or apical extension) of both points less than lateral distance between points.

Abdomen pale fulvus laterally with broad medial piceus band; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with two elliptical foveae on posterior 2/3 to 3/4 of sternite 5 confluent apically; anterior sclerite with numerous spinose dentitions, lateral arms short, extending apically less than 1/2 length of median piece. Male with parameres narrow, lateral blades narrow, flexed and subtriangular, approximately 35 to 40% length of parameres.

Material examined. Holotype (male): **COSTA RICA**: Puntarenas, Buen Amigo, San Luis Monteverde, 1000-1300 m., III-1995, Z. Fuentes (INBC); Paratypes: **COSTA RICA**: Guanacaste, Estación Mengo, SW side Volcán Cacao, 1100 m., II-1989 (1, INBC); Est. Cacao, 1000-1400 m., S of Vol. Cacao P.N., V-(21-29)-1992, A. Gutierrez (1, INBC); Est. Cacao, 1000-1400 m., SW of Vol. Cacao, III-1990 (1, INBC); Est. Cacao, 800-1600 m., S of Vol. Cacao P.N., VII-1993, J.F. Quesada (1, INBC); Estac. Cacao, SE side Volcan Cacao, 1000 - 1400 m., V-VI-1990, (1, INBC); IBID, B. Guadamuz y familia (1, INBC); Estación Cacao, SW side Volcán Cacao, 1000 - 1400 m., VI-1990 (2,

INBC); Río San Lorenzo, Tierras Morenas, Z.P. Tenorio, 1050 m., IV-1992, C. Alvarado (1, INBC); Puntarenas, Buen Amigo, San Luis Monteverde, A.C. Arenal, 1000-1350 m., V-1994, Z. Fuentes (6, INBC); Buen Amigo, Monteverde 4 km S de la reserva, 1000-1350 m., V-1997, Z. Fuentes (2, INBC); Est. G Brenes, Reserva Biologica Monteverde, 1300 m., VI-1991, E. Bello (1, INBC); San Luis, Fca. Buen Amigo Monteverde, 4 km S de la Reserva, 1350 m., VII-1997, Z. Fuentes (1, INBC); IBID, III-1997 (1, INBC); San Luis Monteverde, 1000-1350 m., IV-1995, Z. Fuentes (2, INBC); IBID, III-1995 (1, INBC); San Luis Monteverde, 1000-1350 m., IV-1994, Z. Fuentes (1, INBC); IBID, III-1994 (6, INBC); IBID, II-1994 (2, INBC); San Luis Monteverde, 1040 m., IX-1992, Z. Fuentes (2, INBC); IBID, (VIII-24)-(IX-15)-1992, F.A. Quesada (2, INBC).

Diagnosis. The color pattern of the elytra is different in *S. lacrimiformis* than in related species. The pale basal color extends as a tear-shaped extension onto the black apical color (Fig. 199). In related species, the pale basal color (extending nearly to the elytral apices) is separated by a dark sutural and a dark marginal band (Figs. 201-206) or the pale basal color does not extend onto the apical third of the elytra (Figs. 195-198, 200). The basal pale elytral coloration of *S. woodi*, though not lacrimiform, is sinuate. It can be separated from *S. lacrimiformis* by the dark sutural band that extends to the scutellum (Fig. 197). In *S. lacrimiformis* the suture is pale on the basal half of the elytra. *Semiotus caracasanus* and *S. zonatus* differ from *S. lacrimiformis* in having black antennae. *Semiotus lacrimiformis* occurs in Costa Rica with several other species in the *caracasanus* group. These species include *S. woodi*, *S. spinosus*, *S. triplehorni*, *S. pallicornus*, and probably *S. chontalenus*. The antennae in *S. lacrimiformis* end with three pale yellow to orange segments. *Semiotus woodi* and *S. chontalenus* have four pale

distal antennal segments. The antennae in *S. pallicornus* are entirely yellow to orange, and the antennae of *S. spinosus* are entirely black. Both *S. triplehorni* and *S. woodi* have the lateral paramere blades 30 to 35% of the overall paramere length. In *S. lacrimiformis* the blades are longer, 35 to 40% the overall paramere length.

Semiotus matilei Chassain

(Figs. 158, 204 and 278)

Semiotus matilei Chassain 2001: 31. (Holotype, male: MNHN; type locality: Ecuador, Paramba, 3500 ft).

Length 13 to 14 mm (length/width ratio 4.3 to 4.4). Head piceus, front with two spines anterolaterally; texture glabrous with moderately deep punctation. Antennae serrate, 2 to 3 segments shy of hind angles; segments 1 through 3 testaceous, segments 4 to 7 (or 8) piceus, segments 8 to 11 fulvus to stramineous. Pronotum 3 to 4 mm (length/width ratio 1.2 to 1.3), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus, hind angles lighter, disc with median piceus band sinuous, extending from posterior border to anterior border; texture, nitidus, finely punctate throughout becoming thicker anteromedially. Scutellum subtrapezoidal, small, distant from anterior elytral margin by own length; color testaceous to rufopiceus. Prosternum evenly concave in profile, tip of prosternal process not divided; color fulvus to aurantiacus, lobe piceus; texture glabrous with erect setae on anterior fourth, punctation fine medially, denser and deeper laterally. Hypomeron fulvus to aurantiacus; texture glabrous, nitidus with fine punctation throughout. Mesosternum fulvus to testaceous, fossa glabrous and impunctate.

lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron fulvus to testaceus. Metasternum testaceus to aurantiacus; texture nearly glabrous with few scattered setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceus.

Elytra 8 to 9 mm (length/width ratio 2.8 to 2.9), widest on anterior fourth then narrowing to anterior border and to posterior tip; color fulvus to luteus with interval 1 and broad lateral band (covering intervals 5 to 9) extending to humeral angles testaceus to badius; texture glabrous, nitidus, striae (except stria 1) and stria punctures fine to obsolete; apices each ending in a single spine.

Abdomen fulvus to testaceus; texture glabrous with few scattered decumbent setae anterolaterally and few erect setae posteriorly; female not seen. Male with parameres narrow medially, lateral blades rounded on lateral margin apically, sharply angled anteriorly, approximately 1/4 length of parameres.

Material examined. **ECUADOR:** Pichincha, 500 m., 16 km SE Santo Domingo, VI-(4-14)-1976, S&J Peck (CNCI); Province unknown, Cachabé, low c. XI-'96, Rosenberg (MNHN); Paramba, 3500 ft., III-'97, Rosenberg (MNHN).

Diagnosis. *Semiotus matilei* is most closely related to *S. pallicornus*. The dark elytral markings are restricted to the suture and lateral margin (Fig. 204). The last four antennal segments are pale yellow in *S. matilei*, *S. woodi* (see Fig. 197), and *S. chontalensis*. Only the last three segments are pale in most species in the *caracasanus* group. In *S. spinosus*, *S. nigriceps* and *S. caracasanus* the last 8 or 9 antennal segments are entirely black. In *S. pallicornus* and *S. rileyi*, all the segments are pale. *Semiotus*

matielei is unique among all the species in the *caracasanus* group in having a small subquadrate scutellum. In the other species the scutellum is subobovate to triangular.

Note. The last two localities indicated are assumed to be in Ecuador (Chassain, 2001) though not found on available atlases.

Semiotus nigriceps Candèze

(Figs. 55, 156, 203 and 281)

Semiotus nigriceps Candèze 1857:310, Candèze 1874: 175, Fleutiaux 1925: 109.

(Syntypes (4): BMNH; type locality: Brazil).

Semiotus nigrolineatus Schwarz 1900: 306. (Type series: DEIC; type locality: Brazil, Goyas, Jatahy) New Synonym.

Length 20 to 21 mm (length/width ratio 4.8 to 4.9) Head piceus, front with two spines anterolaterally with sharply angled area between; texture glabrous with or without few erect setae over eyes and spines, with small deep punctures scattered throughout; ocular index 71.0 to 73.0; frontal spines approximately 38% length of frons. Antennae serrate, four segments shy of hind angles in females; segments 1 and 2 (and sometimes 3) testaceous, segments 3 (or 4) to 11 rufopiceus. Pronotum 5 to 6 mm (length/width ratio 1.3 to 1.5), narrowly sinuate, margin broadly rounded without sulcus; color fulvus to testaceous with broad median band piceus, angles often paler; texture glabrous with fine deep punctures scattered throughout. Scutellum piceus, broadly ovate. Prosternum slightly and evenly concave in profile; color testaceous to sanguineous; texture glabrous with few decumbent setae laterally, punctation fine and shallow medially becoming thick

and umbilicate laterally. Hypomeron fulvus to testaceus with fine punctures scattered throughout. Mesosternum fulvus to aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron fulvus to aurantiacus. Metasternum testaceus to aurantiacus medially with badius to rufopiceus lateral areas; texture glabrous with very fine scattered punctures scattered throughout. Femora fulvus to testaceus.

Elytra 12 to 14 mm (length/width ratio 3.1 to 3.2), subparallel on anterior third then narrowing to tip; interval 1 (and posterior half of interval 2) and posterior half (to 3/4) of intervals 5 to 9 piceus, remainder of elytra forming a wedge-shaped fulvus basal extension to near tip; texture glabrous, stria 1 well defined, remaining striae and stria punctures shallow to obsolete; apices each bearing one spine.

Abdomen fulvus to luteus laterally with broad medial piceus band extending from sternite 1 to sternite 5; texture with very fine decumbent setae scattered throughout, punctation fine and scattered throughout; female with two elongate foveae on posterior 3/4 of sternite 5; anterior sclerite with lateral arms covered with several dentitions extending posteriorly 2/3 length of median piece. Male not seen.

Material examined. **BRAZIL:** Goiás, Jatahy (DEIC); Río de Janeiro (ZMUC); Río de Janeiro, I-1977, M. Alvarenga (CNCI); **ECUADOR:** Napo, Res. Ethnica Waorani, 1 km S Onkone Gare Camp, Trans. Ent., 220 m., 0° 39' 10" S, 76° 26' W, VI-30-1995, T.L. Erwin et al., insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest, at Trans. 8, sta. 4 Project MAXUS, lot 1074 (USNM); **PERU:** (DEIC).

Diagnosis. *Semiotus nigriceps* is most closely related to *S. caracasanus*, *S. antennalis*, *S. spinosus*. The dark elytral markings are restricted to the suture and lateral margin (Fig. 203). Among these species within the *caracasanus* group, only *S. nigriceps* and *S. matilei* have a dark pronotal band. The pronota are immaculate in the other species. *Semiotus nigriceps* can be separated from *S. matilei* by the completely dark antennae. In *S. matilei* the last four segments are pale yellow. *Semiotus matilei* is unique among all the species in the *caracasanus* group in having a small subquadrate scutellum. The scutellum is subtriangular in *S. nigriceps* (and many other species in the *caracasanus* group).

Note. The pattern of the elytral and pronotal bands do not differ in the type series of *S. nigrolineatus* and *S. nigriceps*.

Semiotus pallicornus n. sp.

(Figs. 60, 103, 205 and 296)

Length 14 to 19 mm (length/width ratio 4.6 to 5.4). Head piceus, front with two spines anterolaterally; texture glabrous with moderately deep punctation. Antennae serrate, 1 to 2 segments shy of hind angles; color fulvus to testaceus throughout. Pronotum 3 to 5 mm (length/width ratio 1.2 to 1.4), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus; texture, nitidus, finely punctate throughout becoming thicker and umbilicate anteromedially. Scutellum piceus, subtrapezoidal. Prosternum evenly concave in profile, tip of prosternal process not divided; color testaceus to sanguineus medially, lobe and prosternal process piceus; texture glabrous

with erect setae on anterior fourth, punctation fine medially, contiguous and umbilicate laterally. Hypomeron fulvus to aurantiacus with posterior border piceus; texture glabrous with fine punctation throughout. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture nearly glabrous with few scattered setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceus.

Elytra 9 to 12 mm (length/width ratio 2.9 to 3.4), subparallel on anterior fourth then narrowing to tip; color luteus with apical 3/4 of interval 1 and posterior 2/3 of margin piceus; texture glabrous, nitidus, striae (except stria 1) fine to obsolete, striae punctures fine, interstriae wrinkled and lightly punctate; apices each ending in a point or poorly defined spine.

Abdomen fulvus to luteus with medial cuneiform band extending length of abdomen piceus; texture mostly glabrous with few scattered setae on sternites 1 and 5, punctation fine, becoming denser on sternite 1; female with two nearly contiguous elongate elliptical foveae on posterior 3/4 of sternite 5; anterior sclerite vestigial, lateral arms reduced to points. Male with parameres narrow, lateral blades subtriangular, 1/3 length of parameres.

Material Examined. Holotype (male): **COSTA RICA**: Guancaste, Río San Lorenzo, 1050 m., Tierras Morenas, Z.P. Tenorio, IV-1993, G. Rodríguez (INBC); Paratypes: **COSTA RICA**: Alajuela, Peñas Blancas, II-2-1987, E. Cruz (1, CMNC); Peñas Blancas, XII-1986, E. Cruz M.T. (1, CMNC); Cartago, Quebrada Segunda, Tapantí, 1150 m., XI-1994, R. Delgado (1, INBC); Ref. Nac. Fauna Silv., Tapantí, 1250 m., VIII-1991, F.A. Quesada (1, INBC); Suiza Tur'lba, P. Schild (1, USNM).

Diagnosis. In *S. pallicornus*, the dark elytral markings are restricted to the suture and lateral margin (Fig. 205). In the *caracasanus* group, only *S. pallicornus* and *S. rileyi* have entirely pale antennae. The last four antennal segments only are pale in *S. matilei*, *S. woodi*, and *S. chontalenus*. Only the last three segments are pale in most species in the *caracasanus* group. In *S. spinosus*, *S. nigriceps* and *S. caracasanus* the last 8 or 9 antennal segments are entirely black. *Semiotus pallicornus* has a reduced anterior sclerite of the bursa copulatrix (Fig. 60) that appears subtriangular. This sclerite is even more reduced in *S. rileyi* (Fig. 67) where it is subelliptical. *Semiotus pallicornus* is known only from Costa Rica, *S. rileyi* is only known from Panama.

Note. *Semiotus pallicornus* is named for the pale antennae.

Semiotus rileyi n. sp.

(Figs. 67, 200 and 274)

Length 16 to 18 mm (length/width ratio 4.6 to 5.7). Head piceus, front with two spines anterolaterally; texture glabrous with few erect setae over eyes punctation fine and scattered throughout. Antennae serrate, 2 to 3 segments shy of hind angles; fulvus throughout. Pronotum 4 to 5 mm (length/width ratio 1.2 to 1.5), elongate, cylindrical, hind angles diverging; margin incrassate, without sulcus; color aurantiacus, without maculae; texture glabrous, nitidus, with fine punctures throughout. Scutellum piceus, ovate to subtriangular. Prosternum evenly concave in profile; color aurantiacus medially, lobe and prosternal process piceus; texture glabrous medially with decumbent setae laterally and few erect setae on lobe, punctation fine medially, denser and umbilicate

laterally and on lobe. Hypomeron aurantiacus, posterior border piceus, angles fulvus; texture glabrous, nitidus with or without fine punctation throughout. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture glabrous, nitidus with fine punctures throughout. Femora fulvus to aurantiacus.

Elytra 9 to 10 mm (length/width ratio 2.7 to 3.2), subparallel on anterior third then narrowing to tip; color luteus to aurantiacus on basal half, piceus on apical half; texture glabrous, nitidus, strial punctures fine, striae fine to obsolete; apices each ending in a spine and with sutural margin sinuous to slightly angled subapically.

Abdomen piceus medially, fulvus to luteus laterally; texture glabrous, nitidus with fine punctures throughout; female with two elongate obovate foveae on posterior 4/5 of sternite 5; anterior sclerite vestigial, reduced to small sclerite 1/3 size of antenomere 2. Male not seen.

Material examined. Holotype (female): **PANAMA**: Chiriquí, Reserva la Fortuna, Divide Trail, V-26-1993, E.G. Riley (EGRC/TAMU); Paratype: **PANAMA**: Cerro Jefe, VI-(1-2)-1985, E.G. & M.A. Riley (1, EGRC/TAMU).

Diagnosis. *Semiotus rileyi* is most closely allied to *S. carus*, *S. spinosus*, and *S. antennalis*. In *S. rileyi* the dark elytral markings are restricted to the apical half (Fig. 200). Among other species in the *caracsanus* group with this elytral pattern, it is unique in having an immaculate pronotum. The pronotal color is a deeper tan to orange than the pale color of the other species that ranges from pale to dark yellow. The anterior sclerite of the bursa copulatrix is very reduced in *S. rileyi* (Fig. 67), being not more than an elliptical piece less than a fifth the size of related species (as in Figs. 68-69).

Geographically, *S. rileyi* is known only from Panama. Of the species in the *caracasanus* group, only *S. spinosus* is known to also occur in Panama.

Note. *Semiotus rileyi* is named in honor of Edward G. Riley, Texas A & M University.

Semiotus spinosus n. sp.

(Figs. 52, 113, 196 and 278)

Length 14 to 17 mm (length/width ratio 4.2 to 4.5). Head piceus, front with two spines anterolaterally; texture glabrous with few setae above eyes and spines, punctation moderately deep and scattered throughout; Ocular index 72.0 to 75.0. Antennae serrate, reaching hind angles in males; segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 3 to 4 mm (length/width ratio 1.0 to 1.3), narrowly sinuate, margin broadly rounded without sulcus; color fulvus to luteus, with broad piceus band extending from base to anterior margin; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus band. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile on anterior half; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus laterally, piceus along suture; texture glabrous and nearly impunctate on lateral fulvus area, finely punctate on piceus medial area. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture nearly glabrous

with clump of fine decumbent setae anterolaterally, punctation very fine throughout.

Femora fulvus to testaceus.

Elytra 9 to 11 mm (length/width ratio 2.8 to 2.9), glabrous and subparallel on anterior half then narrowing to tip; color fulvus to luteus on basal half, piceus on apical half; stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each bearing one spine with sutural side angled to dentate subapically.

Abdomen pale fulvus laterally with broad medial piceus band; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with 2 elliptical foveae on posterior 2/3 of sternite 5 confluent apically; anterior sclerite longer than wide, lateral arms short, 1/3 length of median piece. Male with parameres narrow, lateral blades pointed, more than 1/4 the of parameres.

Material Examined. Holotype (male): **COSTA RICA:** Puntarenas, Estación Biológica Las Alturas, 1500 m., Coto Bruns., IX-1991, M. Ramirez, L-S-822500,591800 (INBC); Paratypes: **COSTA RICA:** Puntarenas, Avenida El Pizote, 1.4 km. NE de la Tigra, 1300 m., VI-(10-29)-1996, E. Navarro (1, INBC); **ECUADOR:** Galápagos, Galápagos Islands, Charles Island, VI-1929, Pinchot Exp. (1, USNM); **PANAMA:** Canal Zone, Barro Colorado Island, VII-9-1961, J.M. Campbell, at light (2, CNCI); Barro Colorado Island, VI-(11-13)-1976, E.M. Fisher (1, CASC); Barro Colorado Island, VI-(17-20)-1976, E.M. Fisher (1, CASC); Barro Colorado Island, V-1-1980, R. Silberg, A. Aiello, Snyder, Molino (1, USNM); Barro Colorado Island, II-1-45, J. Zetek (1, USNM); Barro Colorado Island, VIII-7-1933, J.D. Hood (1, USNM); Fort Sherman, IV-26-1980, D. Engleman (1, EGRC); Fort Sherman, 9°20' N, 79°58' W, VII-31-1974, D. Engleman (1, CNCI); Summit Gardens, V-27-1969, E.G. Riley (1, EGRC); Panama, Cerro

Campana, 850 m., 8°40' N, 79°56' W, VI-3-1972, Stockwell (1, CNCI); Cerro Campana, III-18-1973, Stanch (1, BWCC); Pan American Highway, 30 km E Cañita, VI-(15-29)-1992. J. & K. Ribardo (1, CASC).

Diagnosis. *Semiotus spinosus* is most closely allied to *S. carus*, *S. rileyi*, and *S. antennalis*. In *S. spinosus* the dark elytral markings are restricted to the apical half (Fig. 196). It can be readily separated from *S. rileyi* by the presence of a pronotal band. *Semiotus rileyi* lacks a pronotal band (Fig. 200). The pronotal band in *S. spinosus* is broad and roughly as wide anteriorly as posteriorly and occupies roughly as much area as the lateral pale yellow bands. This is also the condition in *S. caracasanus*, *S. chontalenus*, *S. woodi*, and *S. caracasanus*. In *S. triplehorni*, the pronotal band is strongly constricted towards the anterior margin (Fig. 198). In *S. zonatus*, the pronotal band is much wider, occupying roughly 75% or more of the dorsal pronotal area. *Semiotus spinosus* can be separated from *S. woodi* by the entirely pale basal color of the elytra. In *S. woodi*, a dark band extends from the black apical color to the scutellum (Fig. 197). *Semiotus lacrimiformis* is different from *S. spinosus* in the tear-shaped extension of the basal elytral color onto the black apical color (Fig. 199). In *S. spinosus* the juncture of the two colors is only slightly sinuate. Nearly all of the species in the *caracasanus* group have at least the apical segment of the antennae pale yellow. Only *S. spinosus*, *S. nigriceps* and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. *Semiotus caracasanus* but can be separated from *S. spinosus* by the length of the lateral blades of the parameres. In *S. spinosus* the lateral blades are longer, more than 1/4th length of the parameres (Fig. 113). In *S. caracasanus* the lateral blades are less than 1/5th

the length of the parameres (Fig. 114). *Semiotus spinosus* is known from Ecuador and Peru. *Semiotus caracasanus* is only known from Venezuela.

Note. *Semiotus spinosus* is named for the spinose frons.

Semiotus triplehorni n. sp.

(Figs. 68, 110, 198 and 289)

Length 13 to 18 mm (length / width ratio 4.1 to 4.5). Head piceus, front with two spines anterolaterally; texture glabrous with few supraorbital setae, punctation moderately deep and scattered throughout. Antennae serrate, 1 to 3 segments shy of hind angles; segments 1 and 2 badius, segments 3 to 7 piceus, segment 8 badius to testaceus, segments 9 - 11 stramineous. Pronotum 3 to 5 mm (length / width ratio 1.2 to 1.4), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus with hind angles fulvus to luteus, piceus band medially constricted anteriorly, width of constriction area half or less width of band at pronotal base (Fig. 198); texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus band. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile on anterior half; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus to aurantiacus, posterior border piceus; texture glabrous, nitidus, punctation very fine to obsolete. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture nearly glabrous

with clump of fine decumbent setae anterolaterally, punctation very fine throughout.

Femora fulvus to testaceus, tarsi piceus.

Elytra 8 to 12 mm (length / width ratio 2.5 to 2.9), glabrous and subparallel on anterior half then narrowing to tip; color fulvus on basal half, piceus on apical half. colors clearly separated by narrow transverse sinuation (Fig. 198); stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each with two points extending apically at different lengths, difference in length (or apical extension) of both points greater than lateral distance between points.

Abdomen pale fulvus to luteus laterally with broad medial piceus band; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with two elliptical foveae on posterior 2/3 to 3/4 of sternite 5 confluent apically; anterior sclerite with numerous spinose dentitions, lateral arms short, extending apically less than 1/2 length of median piece. Male with parameres narrow, lateral blades narrow, flexed and subtriangular, approximately 30 to 35% length of parameres.

Material examined. Holotype (male): **COSTA RICA**: Puntarenas, Est. Sirena, 0 - 100 m., P.N. Corcovado, (III-21)-(IV-21)-1992, Z. Fuentes (INBC); Paratypes: **COSTA RICA**: (1, MNHN): Alajuela, San Mateo, 400 ', A. Heyne, Berlin-Wilm. (3, MNHN): San Mateo, 300 ', A. Heyne, Berlin-Wilm. (1, MNHN): Puntarenas, Est. Quebrada Bonita, 50 m., IX-1993, J. Saborio (1, INBC); Est. Quebrada Bonita, Res. Biol. Carara, 50 m., X-1994, J.C. Sabario (1, INBC); Est. Quebrada Bonita, 50 m., XI-1994, R. Guzman (1, INBC); Est. Quebrada Bonita, Res. Biol. Carara, 50 m., VIII-(10-28)-1992, R. Guzman (1, INBC); IBID VIII-11-1991, A. Solis (1, INBC); Rancho Quemado,

Peninsula de Osa, IV-1992, D. Brenes (1, INBC); Est. Sirena, 0 - 100 m., P.N.
Corcovado, VI -1992, G. Fonseca (1, INBC); IBID IV -1992 G. Rodríguez (1, INBC);
IBID VI-1990, F. Quesada (1, INBC); IBID, N. Obando (1, INBC); San José, Alto Tigra,
750 m., V-15-1997, F.A. Quesada (1, INBC); Mora, Hacienda el Rodeo, 800 m., V-10-
1997, I.A. Chacon (1, INBC); **PANAMA**: Chiriquí (4, MNHN).

Diagnosis. In *S. triplehorni* the dark elytral markings are restricted to the apical half (Fig. 198). It can be readily separated from *S. rileyi* by the presence of a pronotal band. *Semiotus rileyi* lacks a pronotal band (Fig. 200). The pronotal band in *S. spinosus*, *S. lacrimiformis*, *S. woodi*, *S. caracasanus*, and *S. zonatus* is broad and roughly as wide anteriorly as posteriorly. In *S. triplehorni* the pronotal band is strongly constricted towards the anterior margin (Fig. 198). The last 3 to 4 segments of the antennae are pale in *S. triplehorni*. This is the typical condition in the *caracasanus* group. Exceptions are *S. rileyi* and *S. pallicornus* where all the terminal segments are pale; and *S. spinosus*, *S. caracasanus*, and *S. zonatus* where they are completely black.

Note. *Semiotus triplehorni* is named in honor of Charles A. Triplehorn, The Ohio State University.

Semiotus woodi n. sp.

(Figs. 32, 66, 109, 197 and 296)

Length 12 to 16 mm (length / width ratio 4.2 to 4.7). Head piceus, front with two spines anterolaterally; texture glabrous with few supraorbital setae, punctation moderately deep and scattered throughout. Antennae serrate, just short of hind angles in

females, reaching hind angles in males; segments 1 and 2 testaceus, segments 3 to 7 piceus, segments 8 - 11 stramineous. Pronotum 3 to 4 mm (length / width ratio 1.1 to 1.3), narrowly sinuate, margin broadly rounded without sulcus; color fulvus to luteus with broad piceus band extending from base to anterior margin; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus band. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus laterally, piceus along suture; texture glabrous and nearly impunctate on lateral fulvus area, finely punctate on piceus medial area. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctation very fine throughout. Femora fulvus, tarsi piceus.

Elytra 8 to 11 mm (length / width ratio 2.6 to 3.1), glabrous and subparallel on anterior half then narrowing to tip; color fulvus on basal half, piceus on apical half, with intervals 1 and part of 2 piceus to scutellum; stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each with two points extending apically at different lengths, difference in length (or apical extension) of both points less than lateral distance between points.

Abdomen pale fulvus laterally with broad medial piceus band; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with two elliptical foveae on posterior 2/3 of sternite 5 confluent apically; anterior sclerite with numerous spinose dentitions, lateral arms short, extending apically less than

1/2 length of median piece. Male with parameres narrow, lateral blades narrow, flexed and subtriangular, approximately 30 to 35% length of parameres.

Material examined. Holotype (male): **COSTA RICA:** Alajuela, Est. San Ramón Oeste, 620 m., IV-(3-19)-1994, F. Quesada (INBC); Paratypes: **COSTA RICA:** Alajuela, San Cristobal, 600 - 620 m., (VI-16)-(VII-1)-1997, F.A. Quesada (1, INBC); Sect. San Ramón de Dos Ríos, 620 m., (I-16)-(II-3)-1995, C. Cano (1, INBC).

Diagnosis. In *S. woodi* the dark elytral markings are restricted to the apical half (Fig. 197). It is unique in having a dark sutural band on the anterior half of the elytra extending to the scutellum (Fig. 197). The last four segments of the antennae of *S. woodi* are pale yellow (as they are in *S. matilei*, and *S. chontalensis*). In the majority of species in the *caracasanus* group the last three segments of antennae are pale yellow. Only *S. spinosus*, *S. nigriceps* and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. In *S. pallicornus* and *S. rileyi*, all the segments are pale. *Semiotus woodi* is apparently endemic to the northern Guanacaste Cordillera.

Note. *Semiotus woodi* is named in honor of Stephen L. Wood, Brigham Young University.

Semiotus zonatus Candèze

(Fig. 275)

Semiotus zonatus Candèze 1874: 176. (Syntypes (2): BMNH; type locality: Ecuador).

Length 13 to 14 mm (length / width ratio 4.3 to 4.6). **Head** piceus, front with two spines anterolaterally; texture glabrous with few setae above eyes and spines, punctuation

moderately deep and scattered throughout. Antennae serrate, reaching hind angles in males; segments 1 and 2 piceus or with pale patterns, segments 3 to 8 piceus, segments 9 to 11 stramineous. Pronotum 3 to 4 mm (length / width ratio 1.2 to 1.3), narrowly sinuate, margin broadly rounded without definition; color piceus with narrow fulvus margin, broad piceus band occupying 90% width of pronotum; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus band. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile on anterior half; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron piceus with very narrow luteus band along lateral border; texture glabrous and nearly impunctate on lateral fulvus area, finely punctate on piceus medial area. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctation very fine throughout. Femora piceus.

Elytra 8 to 10 mm (length / width ratio 3.0 to 3.1), glabrous and subparallel on anterior half then narrowing to tip; color fulvus to luteus on basal half, piceus on apical half; stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each bearing one spine with sutural side angled and often minutely dentate subapically.

Abdomen pale fulvus laterally with broad medial piceus band; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with two elliptical foveae on posterior 2/3 of sternite 5 confluent apically;

anterior sclerite longer than wide, lateral arms short, 1/3 length of median piece. Male with parameres narrow, lateral blades pointed, less than 1/5 length of parameres.

Material Examined. **ECUADOR:** (BMNH).

Diagnosis. In *S. zonatus* the dark elytral markings are restricted to the apical half (as in Figs. 195-200). All of these species (except *S. rileyi*) have a dark band extending from the anterior margin of the pronotum to the posterior margin. This band is much broader in *S. zonatus* than in the other species and occupies all but a narrow width near the margins. The yellow marginal bands occupying less than 2/3 the width of the scutellum. In the other species, the yellow band is much wider, nearly always wider than the width of the scutellum. The last three segments of antennae are pale yellow in *S. zonatus*. This is also the case for most of the species in the *caracasanus* group. Only *S. spinosus*, *S. nigriceps* and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. The last four segments of the antennae are pale yellow in *S. woodi*, *S. chontalenus*, and *S. matilei*. In *S. pallicornus* and *S. rileyi*, all the segments are pale. *Semiotus zonatus* is known only from Ecuador, overlapping in distribution with *S. spinosus*, *S. antennalis*, *S. matilei*, *S. nigriceps*, and *S. carus* (of the species that also belong to the *caracasanus* group).

furcatus Species Group

All three species in the *furcatus* species group bear two well defined anterolateral frontal spines with an angled area between. They are distinct from all other *Semiotus* in having the double dentition on the posterior border of the hypomeron (Fig. 182).

Semiotus antennatus Schwarz

(Figs. 58, 101, 252 and 276)

Semiotus antennatus Schwarz 1900: 306. (Type: DEIC; type locality: Colombia, Río Dágua).

Length 25 to 26 mm (length / width ratio 4.2 to 4.4). Head piceus, front with two spines anterolaterally; texture glabrous, nitidus with or without erect supraorbital setae, punctation deep and scattered throughout, subumbilicate basally; ocular index 67.0 to 70.0. Antennae serrate, more than three segments short of hind angles in females; segments 1 and 2 testaceous, segments 3 to 7 piceus, segments 8 to 11 stramineous. Pronotum 6 to 8 mm (length / width ratio 1.2 to 1.3), subtrapezoidal, hind angles only slightly diverging; color piceus medially, fulvus to aurantiacus laterally; lateral margin sulcate along entire length, explanate anteriorly; texture glabrous, nitidus with punctures becoming larger and often umbilicate anteriorly. Scutellum piceus, wider than long, incised on anterior border. Prosternum concave in profile, prosternal process not divided apically; color piceus with prosternal process often sanguineous; texture glabrous with few scattered setae laterally and on lobe, punctation very fine to obsolete medially, deep and umbilicate laterally. Hypomeron piceus along suture, fulvus to aurantiacus laterally; texture glabrous, nitidus with scattered punctures becoming denser medially. Mesosternum testaceous to aurantiacus medially, piceus laterally, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron testaceous to piceus. Metasternum fulvus to aurantiacus medially, piceus

laterally; texture glabrous, nitidus with fine punctures throughout becoming umbilicate anteriorly. Femora testaceus to aurantiacus.

Elytra 16 to 17 mm (length / width ratio 2.7 to 2.9), subparallel on anterior third then narrowing to tip; color piceus with anterior lateral margin of elytra and cuneiform band extending from base and tapering to near apex fulvus to luteus; texture glabrous, nitidus with striae and stria punctures fine to obsolete; apices each ending in a point with or without a small dentition subapically.

Abdomen piceus medially fulvus to luteus laterally often with testaceus to sanguineus macula near metacoxae; texture glabrous, nitidus with fine punctation becoming denser and lacrimiform laterally; female with two large obovate foveae extending from near apex to near anterior border of sternite 5; anterior sclerite with median piece and lateral arms subequal in length, arms and base covered with sharp serrations. Male with parameres narrow medially, lateral blades subtriangular, approximately 30% length of parameres.

Material examined. **COLOMBIA:** Bolívar, Buena Vista, Rosenberg (BMNH); Valle del Cauca, Río Dagua (DEIC); W-Cordillera, Lake Calima, Río Bravo Valley near Buga, 1180-1200 m., (VIII-IX)-1988 (PCCV); 1898 (MNH); **ECUADOR:** Province unknown, Lila, 1906, Fry Coll. (BMNH).

Diagnosis. *Semiotus antennatus* is the only species in the *furcatus* species group with dark antennal segments 3 to 7 (segments 8 to 11 being pale). In *S. furcatus* and *S. bilineatus*, all antennal segments are pale (generally aurantiacus). *Semiotus furcatus* bears three elytral bands (per elytron), whereas *S. antennatus* and *S. bilineatus* have only two. The male and female genitalia are diagnostic in the three species. In *S. bilineatus*

and *S. furcatus*, the anterior sclerite of the bursa copulatrix is less curled than in *S. antennatus* (Fig. 58) and the medial arm bears several dentitions near the base. These dentitions are absent in *S. bilineatus* and *S. furcatus* and the lateral arms are more strongly curled forward (Figs. 39 and 84 respectively). The apical blades of the male parameres are more strongly triangulate in *S. antennatus* (Fig. 101) than in the other two species (Figs. 92 and 97). Of the three species, *S. antennatus* appears to be the most restricted geographically (Figs. 276 and 283).

Semiotus bilineatus Candèze

(Figs. 39, 97, 155, 174, 250 and 276)

Semiotus bilineatus Candèze 1857:308, Candèze 1874: 175. (Type, female: BMNH; type locality: Colombia).

Length. 18 to 24 mm (length / width ratio 4.5 to 4.8). Head fulvus to aurantiacus with piceus median macula basally, front with two spines anterolaterally with angled area between; texture glabrous with or without supraorbital setae, punctation deep and evenly scattered throughout; ocular index 6.7 to 7.0. Antennae serrate, 1 to 2 segments shy of hind angles in males, four segments shy of hind angles in females; color fulvus throughout. Pronotum 4 to 6 mm (length / width ratio 1.2 to 1.4), narrowly expanding posteriorly with anterior half convergent and hind angles divergent, margin sulcate except for area just behind middle, explanate on anterior third; color fulvus to testaceus with elongate (often elliptical) piceus band extending from base to (or just shy of) anterior border; texture glabrous, punctation deep and mostly separated, becoming smaller and

denser along posterior border. Scutellum piceus, wider than long, anterior margin recurved. Prosternum strongly concave in profile; color fulvus to aurantiacus; texture with scattered erect setae on anterior third, decumbent setae on posterior half, punctation fine medially becoming deep and umbilicate laterally. Hypomeron fulvus, glabrous with fine punctures scattered throughout. Mesosternum fulvus to aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron fulvus. Metasternum fulvus to aurantiacus with fine setae mostly restricted to posterolateral area, fine shallow punctures scattered throughout. Femora fulvus.

Elytra 11 to 16 mm (length / width ratio 2.8 to 3.1), subparallel on anterior fourth then narrowing to tip; intervals 1, 2, posterior half (to 3/4) of 5, and 6 through 9 (and lateral margin) piceus, intervals 3, 4, and anterior half (to 1/4) of 5 fulvus; texture glabrous, striae (except stria 1) and strial punctures shallow to obsolete; apices each bearing one spine with apical sutural border angled and often faintly dentate.

Abdomen fulvus with fine scattered decumbent setae scattered throughout, punctation fine and evenly scattered throughout; female with two large suboval foveae on posterior 3/4 of sternite 5; anterior sclerite with lateral arms two times length of median piece and with several large serrations along inner margin. Males with parameres narrow medially, not sinuate, lateral blades subtriangular, approximately 77 to 79% length of parameres.

Material Examined. **COLOMBIA:** Putumayo, Mocoa, II-1921, W. Hopp (USNM); Mocoa, 530 m., Putumayogebiet, II-1921, W. Hopp (USNM); **ECUADOR:** Napo, Coca, XI-1982, G. Onore (PCCV); Limoncocha, 250 m., VI-(15-28)-1976, S & J

Peck (CNCI); Limoncocha, VI-9-1977, Spangler & Givens (USNM); IBID, VI-14-1977; Limoncocha, VI-15-1977, W.E. Steiner (USNM); Limoncocha, III-30-1934, D. Engleman (CNCI); 2 km N Limoncocha, VI-14-1977, P.J. Spangler & D.R. Givens (USNM); 25 km E Puerto Napo, Selva Aliñahuí, 450 m., XII-1992, E.S. Ross (CASC); 20 km E Puerto Napo, Aliñahuí, 450 m., 1°0'S, 77°25'W, XI-XII-1995, E.S. Ross (CASC); IBID, VI-6-1977; Res. Ethnica Waorani, 1 km S. Onkone gare Camp, Trans. Ent., 0° 39' 10" S, 76° 26', VI-30-1995, W, T.L. Erwin et al., insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest, at Trans. 8, Sta. 10 project MAXUS lot 1080 (USNM); **PERU: Loreto,** Explorama Lodge, 80 km NE Iquitos, on Amazon River, (VI-24)-(VII-20)-1990, Menke & Awertschenko (USNM); Explornapo Camp on Río Sucusari, 2 km upstream from Río Napo, 160 km NE Iquitos, (VI-24)-(VII-20)-1990, Menke & Awertschenko (USNM); camp. Manco Capac, 74° 18' W, 4° 43' S, VI-24-1990, palm swamp/ Aguajal insecticidal fog, dry hanging leaves *Maurita flexuosa*, Erwin et al. (USNM); Napo River, 80 mi. NE of Iquitos, XII-11-1980, T. King (FMNH); Río Napo, Explornapo Camp, Cocha Shimagai, 100 m., 3° 15' S, 72° 55', VI-5-1992, W, T.L. Erwin, E & F Pfuno S (USNM).

Diagnosis. *Semiotus bilineatus* and *S. furcatus* both have completely pale (yellow to orange) antennae. *Semiotus antennatus* has segments 3 to 7 dark (segments 8 to 11 being pale). *Semiotus furcatus* bears three elytral bands (per elytron), whereas *S. antennatus* and *S. bilineatus* have only two. The male and female genitalia are distinct in the three species. The anterior sclerite of the bursa copulatrix is less curled in *S. antennatus* (Fig. 58) and the medial arm bears several dentitions near the base. These dentitions are absent in *S. bilineatus* and *S. furcatus* and the lateral arms are more

strongly curled forward (Figs. 39 and 84 respectively). The apical blades of the male parameres are triangulate but less elongate in *S. bilineatus* (Fig. 97) than in *S. antennatus* (Fig. 101). In *S. furcatus* the apical blades are pointed (Fig. 92). *Semiotus bilineatus* has been collected from Colombia, Ecuador and Peru (Fig. 276). *Semiotus antennatus* is known from Colombia (Fig. 276). *Semiotus furcatus* occurs throughout South America from Bolivia and Brazil to Colombia and Surinam (Fig. 283).

Semiotus furcatus (Fabricius)

(Figs. 84, 92, 164, 172, 182, 251 and 283)

Elater furcatus Fabricius 1792: 224, Herbst 1806: 335. (Type: not found; type locality: ?)

Pericalle furcatus, Latreille 1834: 141.

Pericallus furcatus, DeJean 1836: 96.

Semiotus furcatus, Candèze 1874: 174, Szombathy 1909a: 121, Fleutiaux 1925: 109.

Semiotus fuscatus, Candèze 1874: 171. Unjustified emendation.

Length 17 to 25 mm (length/width ratio 4.2 to 4.5), Head testaceous to aurantiacus, front with two spines anterolaterally with angled area between; texture with a few erect supraorbital setae, punctation moderately deep and scattered throughout; ocular index 6.7 to 7.0. Antennae three or more segments shy of hind angles in both sexes; color fulvus to testaceous throughout. Pronotum 5 to 7 mm (length / width ratio 1.2 to 1.4), narrowly sinuate, hind angles diverging, margin sulcate and explanate on anterior third to half, without sulcus posteriorly; color fulvus to testaceous with thin piceus band extending from base to near anterior border; texture glabrous with moderate punctures becoming thicker

and umbilicate anterolaterally. Scutellum sanguineus to rufopiceus, greater than 1.3 times wider than long, posterior border rounded, anterior border incised. Prosternum evenly concave in profile; color testaceus to aurantiacus; texture glabrous with few erect setae on lobe, punctures fine medially becoming umbilicate and nearly contiguous laterally, prosternal process not divided at tip. Hypomeron fulvus to testaceus; texture glabrous with few fine punctures scattered throughout. Mesosternum fulvus to testaceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron fulvus to testaceus. Metasternum fulvus to testaceus, glabrous, with fine punctation becoming thicker anteriorly. Femora fulvus to testaceus.

Elytra 11 to 16 mm (length / width ratio 2.6 to 3.1), subparallel on anterior third then narrowing to tip; base color luteus to testaceus with intervals (behind base) 1, 2, 5, 6 (posterior third of intervals 7 and 8), and 9 piceus, intervals 3, 4, and narrowing wedge along 7 and 8 fulvus; texture glabrous with striae (except stria 1) faint to obsolete, stria punctures moderately deep to obsolete; apices each bearing one spine.

Abdomen fulvus to testaceus; texture glabrous or with few scattered setae, punctation fine and dense and evenly scattered throughout; female with 2 shallow obovate foveae on posterior 2/3 of sternite 5; anterior sclerite with lateral arms long, approximately 1.3 times as long as middle piece, mesal side covered with approximately 10 to 15 sharp serrations. Male with parameres narrow medially, lateral blades acute apically, approximately 20% to 25% length of parameres.

Material Examined. **BOLIVIA:** Beni, Ivoa, II, W.M. Mann (USNM); La Paz, Tumupasa, XII, W.M. Mann (USNM); **BRAZIL:** Amapá, Serra de Navio, XII-60, R. Bicelli (CASC); Amazonas, Estirao do Ecuador, Río Jaurai, X-1979, M. Alvarenga

(CNCI); Manaus, X-1936, Worontzow (USNM); Tefé, I-2-1920, Parisli (CASC); Río Madeira, Abuna, Mann & Baker (USNM); Taperinha b. Santarem, VII-(11-20)-1927, Zerny (NHMW); Tefé, XII-23-19, H. Parish (FMNH); Tefé, III-20-32, W. Hopp (USNM); 15 km E Manaus, VIII-4-1993, A.M. & N.D. Penny, primary forest (CASC); Espírito Santo, J.F. Zikan (FMNH); Mato Grosso, Sinop., X-1975, M. Alvarenga (CNCI); 12°31' S, 55°37' W, X-1974, M. Alvarenga (CNCI); Pará, Obidos (FMNH); IX-1967, J.K. (FMNH); (CUIC); Obidos, 1953 (CNCI); 1905, W. Hoffmann (BMNH); Tucuruí, I-1979, M. Alvarenga (CNCI); Uruimcha, Nr. Obidos, VIII-1935, G.V. Vredenburg (BMNH); Rondônia, 60 km SW Ariquemes, VII-20-1993, N. Penny, secondary forest (CASC); 62 km S Ariquemes, Fazenda Rancho Grande, (XI-X)-1992 D.G. Marqua (TAMU); IBID XI-(13-26)-1993; **COLOMBIA**: Amazonas, Leticia, 700', VII-10-1970, H. & A. Howden (CNCI); IBID, (19-25)-1972; Leticia, 10 km N in jungle, III-30-1975, on tree stripped of bark, D. Summers (FMNH); **FRENCH GUIANA**: Cayenne (USNM); Cayenne (OXUM); Maroni River (USNM); Maroni River (USNM); St. Jean de Maroni (USNM); **GUYANA**: Mazaruni - Potaro, Bartica, Katabo, IV-21-1919 (CASC); IBID III-28-1922; Bartica (CASC); Bartica, Demerara (USNM); Political division unknown, Essequibo River, Moraballi Creek, VIII-27-1929, Oxford Un. Exp. (BMNH); Rupununi, Upper Corentyne River, King Frederick William IV Falls, XI-1935, G.A. Hudson (BMNH); Rupununi, Upper Kutari River, (XI-XII)-1935, G.A. Hudson (BMNH); **PERU**: Huánuco / Pasco, Pachitea (CUIC); Río Pachitea, elev. 300 m., X-15-1964, J.S. (MTEC); Madre de Dios, Pebas (USNM); Río Tambopata res., 30 km (air) Maldonado, 290 m., 12° 50' S, 69° 20' W (BMNH); Río Tambopata res., 30 air km. SW Puerto Maldonado, 290 m., XI-(21-25)-1979, J.B. Heppner, subtropical moist forest

(USNM); Río Tambopata Reserve, 30 air km SW Puerto Maldonado, 290 m., XI-(1-26)-1982, E.S. Rosa (CASC); Río Tambopata Res., 30 air km SW Pto. Maldonado, 290 m., XI-(11-15)-1979, J.B. Heppner, subtropical moist forest (USNM); Tambopata, 15 km NE Puerto Maldonado Reserva, Cuzco Amazónico, 12°33' S, 69°03' W, 200 m., VI-24-1989, J.S. Ashe, R.A. Leschen, D. Silva, on malassas traps (SEMC); Tambopata Res. Zone, Explorer's Inn, 290 m., XI-(10-11)-1982, 12° 50' S, 69° 17' W, T.L. Erwin, On fallen tree along Río la Torre trail (USNM); Ucayali, Pucallpa, X-2-1954 (CASC); Ucayali, Neshuya, I-18-1974, J. Schunke (CNCI); SURINAM: Tibiti River, R.S.M. Camp, I-(21-24)-1972, F. Scott (CNCI).

Diagnosis. *Semiotus bilineatus* and *S. furcatus* both have completely pale (yellow to orange) antennae. *Semiotus antennatus* has segments 3 to 7 dark (segments 8 to 11 being pale). *Semiotus furcatus* bears three elytral bands (per elytron), whereas *S. antennatus* and *S. bilineatus* have only two. Superficially, *S. furcatus* resembles *S. fulvicollis* but can be easily separated by the antennal color (in *S. fulvicollis* segments 3 to 11 are piceus) and length (which in *S. fulvicollis* nearly reach the hind angles). The male and female genitalia are also distinct. The anterior sclerite of the bursa copulatrix is angulate near the anterolateral angles in *S. fulvicollis* and the lateral arms are less curled (Fig. 50). In *S. furcatus* the anterior margin is evenly curved and curled forward (Fig. 84). The apical blades of the male parameres are short and convex laterally in *S. furcatus* (Fig. 92). In *S. fulvicollis* they are larger and concave in outline (Fig. 93). *Semiotus furcatus* occurs throughout South America from Bolivia and Brazil to Colombia and Surinam, overlapping in range with nearly all related species.

imperialis Species Group

The two species in the *imperialis* species group are distinguished by having a single long frontal spine that curves ventrally towards the mandibles. Additionally, the elytral apices each bear two spines. Both species are among the largest species of *Semiotus* (often exceeding 40 mm in length).

Semiotus cuspidatus Chevrolat

(Figs. 46, 121, 140, 185, 186 and 280)

Eucamptus cuspidatus Chevrolat 1834: 35, Guérin-Meneville 1855: 579, Germar.

(Lectotype, male: MNHN; type locality: ?).

Pericallus dupontii DeJean 1836: 96, Candèze 1857:299.

Semiotus cuspidatus Candèze 1857: 299, Candèze 1874: 173, Champion 1896: 288, Fleutiaux 1925: 109.

Length 32 to 45 mm (length/width ratio 3.7 to 4.0). Head aurantiacus to testaceus with basal (and occasionally anterior) macula piceus; bearing one medial frontal spine; ocular index 73.0 to 75.0. Antennae serrate, three to four segments short of hind angles; segments 1 and 2 testaceus, segments 3 to 11 rufo-piceus to piceus. Front glabrous with few erect setae above eyes and anterior margin, punctures moderately deep throughout. Pronotum 7 to 13 mm (length/width ratio 1.0 to 1.2); subtrapezoidal, hind angles hardly diverging, margin incrassate without sulcus; texture glabrous with dense moderately deep punctures scattered throughout; scutellum piceus, broadly ovate; prosternum evenly

concave in profile, prosternal process undivided; color aurantiacus to sanguineus with piceus band along suture; texture glabrous or with few scattered setae, punctures fine medially becoming thick, umbilicate, and often contiguous laterally. Hypomeron fulvus to testaceus laterally, piceus medially; texture glabrous with dense contiguous punctures on piceus area, less dense laterally. Mesosternum curving ventrally, on different plane than metasternum, finely punctate with fine setae laterally, fossa glabrous and impunctate; fossa sanguineous, piceus laterally. Mesepisternum and meshypomeron piceus. Metasternum sanguineus medially, piceus laterally; glabrous with fine decumbent setae anterolaterally; femora rufo-piceus to piceus.

Elytra 21 to 32 mm (length/width ratio 2.6 to 3.0) gibbous, subparallel on anterior third then narrowing to tip; color fulvus to testaceus with infusate tessellated pattern along striae, cuneiform macula around scutellum piceus; texture glabrous, striae distinct posteriorly, fine to obscure anteriorly, stria punctures very fine to obsolete, intervals with faint wrinkles; apices each bearing two subequal spines.

Abdomen sanguineus medially, fulvus to luteus laterally with piceus band sublaterally (piceus bands may be reduced in some specimens to triangular maculae on each segment); surface glabrous except for fine setae over most of first segment and laterally and a few scattered setae on sternite 5, punctation fine and scattered throughout becoming denser on sternite 1; female foveae elliptical to sub-obovate on apical fourth of sternite 5 conjoined apically forming a chordiform fovea in some specimens.

Diagnosis. *Semiotus cuspidatus* is most closely allied to *S. imperialis* with similarities to *S. gibbosus*, *S. chassaini*, *S. fryi*, *S. girardi* and *S. punctatostriatus*. All these species are gibbous in profile (as in Fig. 29) and have convex interstriae. *Semiotus*

imperialis, *S. cuspidatus* and *S. chassaini* all bear a single spine (Fig. 140) at the center of the frontal margin that extends forward and down. The anterolateral areas of the frons are rounded, without spines. The other primitive gibbous species (*S. gibbosus*, *S. fryi*, *S. girardi*, and *S. punctatostriatus*) bear two spines along the anterolateral margin of the frons, and lack a medial frontal spine. Of these three species bearing a single frontal spine, only *S. chassaini* bears a single spine at the end of each elytron. Both *S. imperialis* and *S. cuspidatus* bear two small spines apically per elytron (Fig. 171). The female foveae of *S. chassaini* occupy over half of sternite 5, the other two species have the foveae restricted to the apical fourth. *Semiotus chassaini* has three elytral intervals raised above the level of the other intervals, this is not the case in *S. imperialis* and *S. cuspidatus*. The posterior border of the hypomeron bears a single tooth along the inner half in *S. chassaini* (as in Fig. 179) In *S. imperialis* and *S. cuspidatus* a single tooth is present along the outer half (Fig. 180). *Semiotus cuspidatus* can be readily separated from *S. imperialis* by the lateral pronotal margin which is completely yellow (Figs. 185-186). The pronotum bears a black macula on each side (in addition to the medial bands) in *S. imperialis* (Fig. 187). The anterior sclerite of the bursa copulatrix is not as heavily armed near the base of the medial and lateral arms in *S. cuspidatus* (Fig. 46) as it is in *S. imperialis* (Fig. 48). Geographically *S. cuspidatus* and *S. imperialis* overlap only in Colombia and Peru. *Semiotus cuspidatus* occurs throughout Central America, with few specimens available as far south as Peru. *Semiotus imperialis* occurs in South America from Argentina and Brazil north to Venezuela and Colombia. Two subspecies are recognized.

Note. The type of *Pericallus dupontii* DeJean has not been located. The synonymy of Candeze (1857) is here accepted.

Semiotus cuspidatus cuspidatus.

(Fig. 185)

Material Examined. **COSTA RICA:** F. Neverman (USNM); **GUATEMALA:** Alta Verapaz, Panzós (NHMW); Baha Verapaz, Purulhá, Champion (BMNH); Izabal, SE Capatillo, Rodriguez (BMNH); Morales, near Negro Norte, 1000 m., 15°22'67" N, 88°41'68" W, X-20-1998, Col. A.C. Bailey, J. Monzon; Jutiapa, Zapote, Champion (BMNH); **HONDURAS:** Cortés, Lago Yojoa, A.J. Flores (USNM); **MEXICO:** Chiapas, Finca 'La Isla' (FMNH); Finca Refugio, 3000-10000 ft. (CASC); Ocosingo, 1200 m., primitive forest VI-IX- 1913 (CNCI); Rancho Santa Rosa, near las Delicias, IX-3-1972, R. Wind (CASC); Río Santa Rosa, IV-1975, P. Hubbell (USNM); Topachula (CASC); T. Mabre, 1913 (MNHN); Jalisco (OXUM); Veracruz, Catemaco, VIII-1990 (PCCV); Coatepec, Hodge (BMNH); Atoyac, A. Dugos (BMNH); Catemaco, La Victoria, VIII-1-1971 (USNM); Cordoba, VII-21-1936, on tree (FMNH); Dos Amates, I-15-1972, Jubbell (USNM); Jalapa (FMNH); Lake Catemaco, V-(24-25)-1969, J.E.H. Martin (CNCI); Orizaba, A. Genin, 1921 (MNHN); Motzorongo (CASC); State unknown, Milemek, 1871, Mirada (NHMW).

Diagnosis. This subspecies is readily recognized by the uninterrupted piceus band on the prothorax.

Semiotus cuspidatus splendidus

(Fig. 186)

Semiotus splendidus Candèze 1881: 23, Champion 1896: 289. (Type: not found; type locality: Ecuador) New Status

Material Examined. **BRAZIL:** São Paulo, Piracicaba, C.E. Tottenham (BMNH) [dubious locality]; **COSTA RICA:** Alajuela, Coriblanco, XII-18-1983, 750 m., R. Canet (INBC); Estacion Biologica Elberto Brenes, 10° 13' 02' N, 84° 35' 51" W, (VI-VII)-1999, M.A. Ivie (MTEC); Río San Lorencito, 900 m., Res For. San Ramón, 5 km N Col. Palmarena, III-1996 (INBC); Zapote Upala, near Bijagua, X-20-1973, F. Cordera (EMEC); Cartago, Aserradero el Seis, Grano de Oro, Turrialba, I-(18-24)-1993, P. Campos (INBC); Chitaria, XII-20-1928, M. Valerio, alt. 700 m (USNM); Grano de Oro, Chiripó, 1120 m., IX-1993, P. Campos (INBC); Suiza Tur'lba, P. Schild (USNM); Guanacaste, Est. Pitilla, 700 m., 9 km S Santa Cecilia, XI-1988, C. Chaves & M. Espinoza (INBC); Limón, Blanca, 8 km SE, 8-V-1987, D.F. Corrales (INBC); Puntarenas, Buen Amigo, San Luis, Monteverde, 1000-1350 m., III-1995, Z. Fuentes (INBC); Cotoncito, 3.5 km N Lucha, 1600 m., V-(13-16)-1997, A. Picado & A. Solis (INBC); Est. Pitier, Sendero Altamira, 1740 m., VII-2-1995, M. Madrigal (INBC); Finca Cafrosa, Est. Las Mellizas, P.N. Amistád, 1300 m., XI-1989, M. Ramírez & G. Mora (INBC); La Amistad Nat. Park, Fila Cedro, 1800 m., II-25-1991, M. Halterman (CASC); Monteverde, 1500 m., V-4-1972, C. Guindon (CASC); IBID, VI-3-1972; Navarro, V-24-36, F. Neverman (USNM); San Luis, Monteverde, A.C. Arenal, 1040-1350 m., VII-1993, Z. Fuentes (INBC); Send. El Ripario, 3 km NE Progreso, 1300 m., XI-6-1997, A. Picado

(INBC); 6 km S San Vito, 08° 42' N, 83° 00' W, III-(19-21)-1967, D.M. Janzen (USNM); San José, P. B. Carrillo, Est. La Montura, V-22-1981, 1100 m., R. Canet (INBC); **HONDURAS**: Yoro, Linda Vista, 1,000 m., 15°09'59" N, 87°38'18" W, IX-10-1999, R. Cave, J. Torres, R. Diaz (EAPZ); Parque Nacional Pico Pijol, V-25-1998, R.D. Cave (EAPZ); Parque Nacional Pico Pijol, Linda Vista, 1,450 m., 15°09' N, 87°37' W, V-7-2000, R.D. Cave (EAPZ); **PANAMA**: Chiriquí, Cerro Colorado cmp., VI-13-1980, J. Wagner (FMNH); Petrerillos, I-1934 (CASC); **IBID**, III-8-1934; **IBID**, I-25-1935; Volcán de Chiriquí, 25-4000', Champion (NHMW); Volcán de Chiriquí, Champion (BMNH); Darién, Río Tacarcuna, 1900 ft., VI-1963, M.P. Murdoch (USNM); Panama, Cerro Campana, 820 m., 8° 40' N, 79° 56' W, VIII-12-1977, T.J. Riley (EGRC); **PERU**: Junín, I-46, P.P. Satipo (FMNH).

Diagnosis. *Semiotus c. splendidus* is readily recognized by the piceus pronotal band being interrupted medially by a sanguineus band. Several specimens have only a vague indication of the lighter medial band and a clear distinction between the two forms is not always possible.

Note. The only apparent difference between *S. c. cuspidatus* and *S. c. splendidus* is the presence or absence of the sanguineus pronotal band. (No differences are evident in the male or female genitalia.) This character state is geographically limiting, with only little overlap, justifying subspecific status only (Fig. 279). One specimen of *S. c. cuspidatus* has been taken from Costa Rica, within the range of *S. c. splendidus*, otherwise the boundary between the two subspecies is in Honduras.

Semiotus imperialis (Guérin-Meneville)

(Figs. 48, 127, 171, 180, 187 and 272)

Eucamptus imperialis Guérin-Meneville 1844:15, Guérin-Meneville 1855: 579. (Type: not found; Type locality: New Granada)

Semiotus imperialis Candèze 1857: 298, Steinheil 1875: 111, Candèze 1874: 173, Szombathy 1909a: 121, Fleutiaux 1891: 275.

Semiotus imperialis subtilis Szombathy 1909: 23. (Type: not found (not in HNHM); type locality: ?) New synonym.

Semiotus imperialis schenklingi Szombathy 1909: 23 (Paratype, female: HNHM; type locality: Peru, Patria). New synonym.

Length. 28 to 44 mm (length/width ratio 3.8 to 4.1). Head aurantiacus to sanguineus with one piceus macula in center of posterior border. A second macula often present in center of anterior border (in some specimens the two maculae are connected to form a continuous stripe); with one medial frontal spine curved ventrally; ocular index 71.0 to 74.0. Antennae serrate, three to four segments short of hind angles; segments 1 and 2 badius, segments 3 to 11 rufo-piceus to piceus. Front glabrous, punctures becoming larger posteriorly, separated by more than own width, concave on anterior 2/3. Pronotum 7 to 11 mm (length/width ratio 1.0 to 1.1); with median longitudinal stripe sanguineous, bordered by two irregular piceus longitudinal bands (which are expanded at base), lateral margin fulvus with one piceus macula on each side medially (which is often expanded laterally to near margin. On a few specimens the median bands extend to the lateral margin or are interrupted forming small maculae). pronotum glabrous with fine

row of setae on anterior border extending onto head; margins nearly straight, expanding gradually posteriorly; hind angles expanded only slightly; anterolateral angles foveate; margins thickly rounded without sulci; scutellum sanguineous to testaceous, nearly flat to slightly concave, widely ovate; prosternum sanguineous, piceus along suture; glabrous and impunctate medially with fine setae and deep punctures laterally; evenly concave over entire length, lobe hemispherical. Hypomeron fulvus with piceus dorsal maculae extending ventrally at middle, piceus along suture; glabrous with very fine shallow umbilicate punctures. Mesosternum finely punctate with fine setae; fossa sanguineous, piceus laterally. Mesepisternum and meshypomeron piceus. Metasternum sanguineous medially, piceus laterally; glabrous and nearly impunctate medially with fine setae and fine punctation laterally; femora fuscus, tibiae and tarsi rufo-piceus.

Elytra 19 to 30 mm (length/width ratio 2.6 to 2.8), gibbous; color fulvus to luteus with each stria shaded by broken infusate band; area around scutellum piceus; margin widest on anterior third, then narrowing to tip; surface glabrous with very fine interstitial punctures, except on apical half; each elytron ending in 2 spines.

Abdomen aurantiacus to sanguineous medially, fulvus laterally with piceus band separating colors (piceus bands may be reduced in some specimens to triangular maculae on each segment), surface glabrous except for fine setae over most of first segment and laterally, punctation shallow except on segments 1 and 5; female foveae elliptical to sub-ovate on apical fourth of segment 5; anterior sclerite covered with dense dentitions, lateral arms extending distally 1/2 length of median piece. Male with parameres wide basally, narrow apically, lateral blades small, less than 1/10th length of parameres.

Material Examined. ARGENTINA: Jujuy, El Quemado, IV-1926, G.L. Harrington (USNM); **BOLIVIA:** Beni, VI-3-1947, A.P. Reed (CASC); Cochabamba, Yanachis, Yungas, M. Cardenas (USNM); Yungas Coroico, Fassl, 1908 (NHMW); 124 km E Yungas, Cochabamba-Villa Tuneri Rd., 730 m., 17°3'54" S, 63°38'43" W, II-(8-12)-1999, R. Hanley (SEMC); La Paz, Nord-Yungas, 400-1800 m., Region um Caranavi, ca. 50 km N Coroico, Tello (PCCV); Department unknown, Tacaurandi, to Buena Vista, W. Rand (USNM); **BRAZIL:** (CUIC); **COLOMBIA:** Antioquia, Medellín (NHMW); Capital District, Bogotá (USNM); Cundinamarca, Finca Bella Vista, nr. Sasaima, V-25-1965, P.R. Craig (CASC); IBID, VI-1-1965; IBID, IV-13-1965, P.R. & D.L. Craig; Guaduas, XII-17-38, F.L. Gallego, on Coffee (USNM); Nariño, Pasto, Götz. (NHMW); Valle del Cauca (ZMUC); Colima Valley, Buga, V-1989 (PCCV); Department unknown, Aguatal (CUIC); **ECUADOR:** Bolívar, Balzapamba, 650 m, F. Campos (USNM); Balzapamba, VI-21-1960, C. Garcia (USNM); Cotopaxi, Las Pampas, IV-1983, Onore (OSUC); Guayas, Guayaquil (CASC); Los Ríos, Santo Domingo, Allurigami, I-7-1997 (HNHM); Santo Domingo, XII-1982, G. Onore (PCCV); Santo Domingo, X-1983, Onore (OSUC); Santo Domingo, XII-1982, G. Onore (ZMUC); Morona-Santiago, Macas, 1050 m., F. Campos (USNM); Macas, IV-5-1957 (EMEC); Río Cuangos, nr. Cuevas de los Tayos, VII-(7-21)-1976, A.M. Hutson, (BMNH); Napo, Oriente, Río Napo - Pinto, II-1956 (CNCI); Puerto Misahualli Jungle Hotel, IX-(6-18)-1998, D.G. Marqua (TAMU); Pastaza, Llandia, 1,000 m., (17 km N Puyo, VII-16-1994, F. Genier, remnant rain forest (CMNC); Napo, 2-8 mi N Puyo, 953 m., II-9-1955 (CASC); Santa Clara, VII-4-1976, P.M. Turner (USNM); Tarqui, II-10-1976, Spangler et al. (USNM); Puyo, 900 m., VII-(13-17)-1976, S & J Peck (CNCI); Pichincha, Tandapi, 1460 m., VII-(14-28)-1967, J.D.

Lynch (SEMC); 500 m., Tinalandia, 4 km SE Santo Domingo, VI-(4-14)-1976, S. & J.
 Peck (CNCI); Province unknown, Naranjapata, F. Campos (USNM); Normandia (CUIC);
 El Partidero, X-8-1935, W. Macintyre (USNM); IBID XI-27-1935; Zulay, 1000 m., VII-
 1936, W. Macintyre (USNM); **GUYANA**: Landsberg (ZMUC); **PERU**: Arequipa,
 Mollendo coast XI-1935 (CASC); Cajamarca, Río Charape, IX-15-11, C.H.T. Townsend
 (USNM); Cuzco, Cosnipata River, Hacienda María, Saucetambo Cusco, III-3-1952, F.
 Woytowski (CNCI); Huánuco, Huallaga, 750 m., III-1960 (CNCI); Tingo María, Monson
 Valley, XII-23-1954 (CASC); IBID, XI-2-1954; Junín, Chanchamayo (ZMUC);
 Chanchamayo, III-1933, E.G. Smyth (SEMC); La Mercéd, 1922 (USNM); Political
subdivision unknown, Río Inambari, II-7-10, el. 1800 ft., C.H. Townsend (USNM);
 Sinchona, II-25-44, J.G. Sander (USNM); 2000 - 3000 ft., Piches & Perene Vs. (USNM);
 Ehrbacher, 1905 (NHMW); **VENEZUELA**: Aragua, Portachuelo Pass, 20 km N.
 Maracay, 1160 m., VI-27-1972, C.R. Collins (CASC); Rancho Grande Biol. Stn.,
 Portachuelo Pass, 10°21'0" N, 67°41'0" W, 1100 m., VI-4-1998, J. Ashe, R. Brooks, R.
 Hanley (SEMC); IBID, V-13-1998; Rancho Grande Biol. Stn., Portachuelo Pass, 1100-
 1300 m., 10°20'32" N, 67°41'46" W, 1100 m., V-13-1998, J. Ashe, R. Brooks, R. Hanley
 (SEMC); Rancho Grande, VIII-5-1968, J. Maldonado (USNM); Rancho Grande, 800 m.,
 II-(24-25)-1971, H. & A. Howden (CNCI); Rancho Grande, V-7-1973, 1100 m, Ginyer
 Ekis (USNM); Rancho grande, (VII-VIII)-1976, A. Watson, (BMNH); Rancho Grande,
 VI-(8-14)-1967, 1100 m, R.W. Poole (USNM); Rancho Grande, II-(10-21)-69,
 Duckworth & Dietz (USNM); Rancho Grande, 1100 m, V-1988, UV light, M. Epstein
 (USNM); Federal District, Caracas (ZMUC); Caracas, 1921 (USNM); Mérida, S. Briceno

(USNM); Zulia, Maracaibo (USNM); Maracaibo, Witzke (ZMUC); State unknown, D. Moritz, 1858 (NHMW).

Diagnosis. *Semiotus imperialis* is a primitive species of *Semiotus* most closely allied to *S. cuspidatus* with similarities to *S. gibbosus*, *S. chassaini*, *S. fryi*, *S. girardi* and *S. punctatostriatus*. All these species are gibbous in profile and have convex interstriae. *Semiotus imperialis*, *S. cuspidatus* and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down. The anterolateral areas of the frons are rounded, without spines. The other primitive gibbous species (*S. gibbosus*, *S. fryi*, *S. girardi*, and *S. punctatostriatus*) bear two spines along the anterolateral margin of the frons, and lack a medial frontal spine. Of these three species bearing a single frontal spine, only *S. chassaini* bears a single spine at the end of each elytron. Both *S. imperialis* and *S. cuspidatus* bear two small spines apically per elytron. The female foveae of *S. chassaini* occupy over half of sternite 5, the other two species have the foveae restricted to the apical fourth. *Semiotus chassaini* has three elytral intervals raised above the level of the other intervals, this is not the case in *S. imperialis* and *S. cuspidatus*. The posterior border of the hypomeron bears a single tooth along the inner half in *S. chassaini*. In *S. imperialis* and *S. cuspidatus* a single tooth is present along the outer half. *Semiotus cuspidatus* can be readily separated from *S. imperialis* by the lateral pronotal margin which is completely yellow. The pronotum bears a black macula on each side (in addition to the medial bands) in *S. imperialis*. The anterior sclerite of the bursa copulatrix is not as heavily armed near the base of the medial and lateral arms in *S. cuspidatus* (Fig. 46) as it is in *S. imperialis* (Fig. 48). Geographically *S. cuspidatus* and *S. imperialis* overlap only in Colombia and Peru. *Semiotus cuspidatus* occurs throughout Central

America, with only occasional specimens being taken as far south as Peru. *Semiotus imperialis* occurs in South America from Argentina and Brazil north to Venezuela and Colombia. The combination of a single frontal spine, gibbous profile and double spines at the apex of each elytron distinguish *S. imperialis* from all other *Semiotus*.

Note. The subspecies of Szombathy were based on variation in the pronotal bands. This variability is not geographically limited.

ligneus Species Group

The *ligneus* species group is comprised of two fairly common species. These species have a strongly concave frons without spines. The eyes are also quite large, together exceeding half the width of the head. The females in both species lack an anterior sclerite within the bursa copulatrix.

Semiotus ligneus (Linnaeus)

(Figs. 124, 149, 163, 193 and 291)

Elater ligneus Linnaeus 1767:652, Drury 1782: 82, Fabricius 1801: 224. (Type: not found; Type locality: Surinam)

Elater conicus Voet 1806: 83. (Type: not found; Type locality: ?)

Pericalle ligneus, Latreille 1834: 141.

Pericallus ligneus DeJean 1836: 96.

Semiotus ligneus, Guérin-Meneville 1855: 578, Candèze 1857: 302, Steinheil 1875: 111, Candèze 1874: 185, Champion 1896: 291, Fleutiaux 1925: 109, Costa 1988.

Length 19 to 34 mm (length / width ratio 3.7 to 4.2). **Head** fulvus to badius without frontal spines; ocular index 50.0 to 52.0. **Antennae** serrate, reaching beyond hind angles by one or more segments in males, just reaching hind angles in females; segments 1 and 2 badius, segments 3 to 11 rufo-piceus to piceus. Front deeply (though poorly defined) impressed with V-shaped depression on vertex extending length of head; texture glabrous or with few scattered setae above eyes and along anterior margin; punctures separated by space greater than own width on posterior half, punctures on anterior half often separated by less than own width. **Pronotum** 5 to 9 mm (length / width ratio 1.0 to 1.2), with three longitudinal bands (ranging in color from badius to ferruginous) running entire length (the middle band often divided longitudinally into smaller halves) and surrounded by paler base color (ranging from stramineous to aurantiacus); texture glabrous with longitudinal impression distinct medially, outer bands strongly umbilicately punctured, scattered punctures on middle band not umbilicate and often separated by less than width of punctures; lateral margin gradually widening on posterior 2/3, with hind-angle divergence more pronounced (on apical fourth), anterior third either parallel-sided or expanded and rounded, margination absent on thickly rounded anterior third, present on posterior 2/3 but not reaching tip of hind angles; scutellum fulvus to badius, strongly declivous anteriorly with declining concavity extending to anterior edge, lateral margin convex; scattered setigerous punctures throughout. **Prosternum** unicolorous, fulvus to aurantiacus, evenly arcuate over length; lobe hemispherical with anterior margin less rounded; setigerous punctures much larger on lateral areas of mesal third. **Hypomeron** same color as prosternum to slightly paler, glabrous, with umbilicate

punctures throughout; margin often impunctate. Mesosternum same color as prosternum with fine setae and scattered fine punctation. Mesepisternum and meshypomeron fulvus to aurantiacus. Metasternum fulvus to aurantiacus; texture glabrous or with fine scattered setae, punctation fine and rarely closer than own width medially, becoming more distant laterally. Femora fulvus to aurantiacus.

Elytra 13 to 23 mm (length / width ratio 2.5 to 2.8), generally badius to ferruginous with interstria 3 and lateral margin paler (in some specimens intervals 3,4,5 and 7,8,9 are also pale), apical eighth entirely pale; width greatest on anterior fourth then narrowing evenly to tip; texture glabrous, stria punctures distinct, each with a row of finer punctures on each side, interstriae variously textured from smooth to wrinkled, interstriae 1 with scattered setae; apices each bearing one spine.

Abdomen same color as prosternum with very fine scattered setae, punctures fine and generally separated by greater than own width medially, becoming denser laterally; first visible segment with punctures larger than remaining segments; female foveae on segment 5 round and restricted to apical 3/5; anterior sclerite absent. Male with parameres sinuate laterally, lateral blades subtriangular, approximately 1/5th length of parameres.

Larvae (summarized from Costa *et al.*, 1988) 27 mm long, elateriform, flattened dorso-ventrally, sclerotized, brownish red dorsally with dark brown mandibles; body lighter ventrally; lightly pilose; head prognathus, heavily sclerotized and pigmented. Antennae three-segmented, segments 1 and 2 glabrous, with segment two bearing small apical sensorial appendages, segment 3 smaller and bearing small sensorial appendages; prothorax subtrapezoidal, longer than mesothorax, with eight pair of lateral setae inserted

in four points; prosternum triangular; legs short, five-segmented, coxa wide and short, trochanter triangular; abdominal segments 1 to 8 with a bundle of lateral setae and a pair of dorsal setae at base; abdominal segment 9 subquadrangular, covered with dense punctation, apex with two pair of semiconvergent tubercles.

Material Examined. BOLIVIA: Beni, VI-3-1947, A.P. Reed (CASC); Rurrenabaque, Río Beni, XI-1921, W.M. Mann (USNM); 40 km E San Borja, Estac. Biol. Beni, Palm Camp, IX-13-1987, W.E. Steiner (USNM); Cochabamba, Villa Tunari, Parque Machias, 300 m., 16°58'20" S, 65°24'42" W, II-12-1999, R. Anderson, lowland rain forest (CMNC); Yungas, Coroico, Fassl, 1908 (NHMW); Cristal Mayu, VIII-15-1949, L. Peña (FMNH); **IBID** IX-7-1949; La Paz, Isiamas, XII-1921, W.M. Mann (USNM); Santa Cruz, Saavedra Exp. St., 6-I-1960, R. Cumming (OSUC); II-1956, G. Pinckert (USNM); **BRAZIL:** Amazonas, Benjamin Constant, XI-1962, A. Silva (CASC); Est. do Equador, Río Javari, X-1979, M. Alvarenga (CNCI); Porto Velho, Río Madeira (USNM); Res. Ducke . 26 km. E. Manaus, II-1-1979, O.S. Flint Jr.; Río Madeira, Madeira mamore, R.R. Co. Camp 39, Mann & Baker (USNM); Taperinha, b. Santarem, (II-20)-(VIII-27), Zerny (NHMW); Upper Amazon, V-1904 (CASC); Minas Gerais, Passo Quatro, Faz. Dos Campos (CASC); Passa Quatro, Faz. Dos campos (FMNH); Pará, Belem, (II-27)-(V-27), Zerny (NHMW); Rondônia, Cachoera Nazare Río Jiperana, (X-XI)-1966 (FMNH); 62 km S Ariquemas, Fazenda Rancho Grande, XI-(13-26)-1993 D.G. Marqua (TAMU); **IBID** (VIII-IX)-1994; São Paulo, Capital, XII-2-1962, F. Halik (USNM); Est. Biol. Boracela, 850 m., Near Salespolis, X-20-1971, E.G., I., E.A. Munroe (CNCI); **COLOMBIA:** Bolívar, Buena Vista, S.C. Patchett (USNM); Capital District, Bogotá (ZMUC); César, El Roncón, 10-12 km. E of Becerril, foothills of Sierra de Perija.

elev. 220-260 m., IX-18-1969, B. Malkin (FMNH); Meta, Villavicencio, VII-18-1938 (FMNH); Villavicencio, 1927 (USNM); Putumayo, Santa Rosa, Kofan Indian Villiage, headwaters of Río San Miguel, X-(4-6)-1970, B. Malkin & P Burchard (FMNH);

COSTA RICA: Cartago, Catie, 3 km SE Turrialba, 600 m., VI-(9-10)-1988, Brown & Powell (EMEC); Turrialba, 600 m., VI-9-1972, P.A. Opler (EMEC); Turrialba, II-(22-28)-1965, S.S. & W.D. Duckworth (USNM); IBID III-(13-17)-1965; IBID III-(1-6)-1965; Guanacaste, Agua Buena, P.N. Guanacaste, 200 m., II-(7-12)-1994, E. López (INBC); Dos de Tilaran, San Ramón, 1100 m., VII-1995, G. Rodríguez (INBC); Estación Experimental Enrique Jimenez Nuñez, 20 km SW Cañas, XI-(5-17)-1991, A.S. Menke (USNM); Est. Las Pailas, P.N. Rincón de la Vieja, A.C. Guanacaste, 800 m., V-(8-26)-1994, K.E. Taylor (INBC); Estación las Pailas, P.N. Rincón de la Vieja, 800 m., V-(8-26)-1994, K.E. Taylor (INBC); Est. Lomas Barbudal, 30 m., A.C.T., VII-1991, D. Acevado (INBC); Est. Palo Verde, 10 m., Ref. Nac. Fauna Silva, VI-1991, D. Acevado (INBC); Finca Jenny, 30 km N de Liberia, 240 m., (IV-30)-(V-11)-1995, E. Araya, at light (INBC); Los Almendros, P.N. Guanacaste, V-(12-31)-1993, E. Lopez (INBC); Los Mesones, P.N. Barra Honda, 100 m., V-1995, M. Reyes (INBC); Palo Verde OTS, Comelco, Bagaces, VII-(5-20)-1971, D.H. Janzen (USNM); P.N. Barra Honda, 100 m., VII-1994, M. Reyes (INBC); Río Gongora, 600 m., P.N. Guanacaste, VI-1992 (INBC); Santa Rosa N.P., V-2-1985, Doyen & Powell (EMEC); Santa Rosa N.P., X-(16-31)-1983, G.C. Stevens, at light (INBC); Sector El Hacha, P.N. Guanacaste, (XI-XII)-1991, E. Lopez (INBC); 3 km N Nacaome, 100 m., P.N. Barra Honda, V-(3-30)-1993, M. Reyes (INBC); 3 km E Caujiniquil, 300 m., VI-25-1992 (INBC); 6 km. NE Quebrada Grande de Liberia, 700 m., II-1992, R. Gongora (INBC); 21 km south Canas, VII-27-90, at light

(TAMU); Heredía, Est. Biol. La Selva, VII-(1-5)-1994, at light (EMEC); Finca Naranja Valenciana, 2 km S Pueblo Nuevo, Sarapiquí, 90 m., I-(4-31)-1993, M. Ortiz (INBC); La Selva ca. 100m, VIII-(14-15)-1991, M.A. Ivie (MTEC); La Selva Field St. nr Puerto Viejo, III-(21-28)-1988, Steiner et al. (USNM); Limón, Amubri, A.C. Amistád, 70 m., I-(2-26)-1994, G.M. Gallardo (INBC); Bananito, X-24, F. Neverman (USNM); Estación Aguas Frías, 10-20 m., VIII-1997, E. Rojas, at light (INBC); Est Quatro Esquinas, P.N. Tortuguero, 0 m., XII-1990, R. Delgado (INBC); Hamburg Farm, Reventazon, Meginiss, VII-2-29, F. Neverman (USNM); Hamburg Farm, Reventazon, Anglebeisch, III-15-24, F. Neverman (USNM); IBID III-11-26; Hamburg Farm, Reventazon, on Frisch gefolle, Ficus sp., VIII-12-25 (USNM); Hitoy Cerere, A.C. Amistád, 100-200 m., (V-20)-(VI-6)-1993, G. Carballo (INBC); La Flórida, 500 ft. C.H. Lankester (USNM); Lomas de Sierpe, Orillas del Río Tortuguero, 10 m., VI-9-1997, E. Rojas, at light (INBC); Manzanillo, 0-100 m., RNFS Gandoca y Manzanillo, XI-(20-30)-1992, F. Quesada (INBC); Río Banano, Asunción, 240 m., VIII-21-1995. A. Solis (INBC); Río Sardinas, R.N.F.S. Barra del Colorado, 10 m., IX-(12-20)-1993, F. Araya (INBC); Sector Cerro Cocori, Finca de E. Rojas, 150 m., (VI-26)-(VII-16)-1992, E. Rojas (INBC); Valle le Estrella, R.B. Hitoy Cerere, A.C.A.C. Amistad, 100 m., VII-1994, G. Carballo (INBC); Puntarenas, Alberque Cerro de Oro, 150 m., (V-27)-(VI-1)-1995, E. Fletes (INBC); IBID, VIII-30-1995; IBID IV-(10-16)-1996, at light; Rancho Quemado, Peninsula Osa, 200 m., VI-(4-28)-1994, A. Marín (INBC); Est. Agujas, Send. Purruja, 300 m., XI-(1-4)-1997, A. Azofeifa, at light (INBC); Est. Esquinas, 0 m., Peninsula de Osa, I-1993, M. Segura (INBC); Est. Quebrada Bonita, 50 m., Res. Biol. Carara, V-1992, J.C. saborio (INBC); Sirena, Corcovado N.P., Osa Peninsula, I-(5-11)-1981, Janzen & Hallwachs (INBC); Vuelta Campana, R. Térraba,

100-500 m., Rey Curré, III-1993, S. Rojas (INBC); Manuel Antonio, III-(13-23)-1996, D. Dauber (PCCV); 3 km NE Golfito, 100 m., V-(22-23)-1987, D. Ubick & B. Hiler, tropical wet forest, UV light (CASC); San José, Braulio-Carillo N. P., V-24-1991, Brenes (CASC); Est. Bijagual, 500 m., Reserva Biológica Carara, IX-1990, G. Varela (INBC); Guapiles, Sta. Clara, 250-300m, X-6-25, F. Neverman, at light (USNM); Province unknown, San Carlos (USNM); V. Central, Ciudad Colon El Rodeo, Finca Hamadryas, III-1998, D. Dauber (PCCV); **ECUADOR**: Napo, Garzacocha, 68 air km E Coca, 210m., III-16-1986, McKamey (EMEC); Lago Agrio, 2 km N, IX-26-1975, A. Langley (USNM); Limoncocha, VI-15-1977, W.E. Steiner (USNM); IBID, VI-10-1977; Limoncocha, VI-15-1977, D.L. Vincent (USNM); Limoncocha, VI-13-1977, P.J. Spangler, D.R. Givens (USNM); Loreto, (II-17)-(III-14)-1996, J. Stmad (PCCV); Napo and Aquarico Rivers, alt. 250m, lett., X-20-42, K.A. Rijeterborgh (USNM); Puerto Misahualli Jungle Hotel, IX-(6-18)-1998, D.G. Marqua (TAMU); Río Napo, Biol. St. Jatun Satcha, 380 - 400 m., 1° 03' S, 77° 35' 09 W, IV-(12-16)-1990, S.J. Weller (USNM); Santa Cecilia, 340 m., (VI-8)-(VIII-1)-1968, W.G. Saul (SEMC); Tena, V-24-1977, P.J. Spangler & D.R. Givens #72 (USNM); Tena, 400 m., VII-(6-13)-1994, E. Genier, pastureland, light trap (CMNC); 25 km E Puerto Napo, Selva Aliñahuí, 450 m., XII-1992, E. Ross (CASC); 400 m., Jatun Sacha, Biol. St., 21 km E Puerto Napo, VII-(8-11)-1994, F. Genier, virgin rain forest, hand collected (CMNC); Pastaza, Ashuara, Río Macuma, 10 km from Río Morona, 300 m., VII-(7-16)-1971, B. Malkin (FMNH); Cusuimi, Río Cusuimi, 150 km SE of Puyo, V-(15-31)-1971, B. Malkin (FMNH); IBID VII-(18-29)-1971; Tzapino, 400 m., V-22-1976, J. Cohen, blacklight (USNM); Pichincha, Quito, K.A. Rijeterborgh (USNM); Sucumbíos, Sacha lodge, 270 m., 0°28'14"

S, 76°27'35" W, III-23-1999, R. Brooks (SEMC); **FRENCH GUIANA:** Esseq., 6 mi SW Wineperu Picrewana Is., III-(8-16)-69, Duckworth & Dietz (USNM); Esseq. Wineperu, III-(18-24)-69, Duckworth & Dietz (USNM); Hwy D6 to Kaw, 34 km SE of Roura, VI-(5-6)-1986, E.G. Riley & D.A. Rider (EGRC); Saut Athanase at Rapids, III-8-1995, J.A. Lewis (USNM); St. Jean (USNM); **GUATEMALA:** Petén, Ruinas Tikal, 245 m., VII-(7-10)-1977, E.M. & J.L. Fisher (CASC); 1915 (USNM); Department unknown, Cayuga, VIII (USNM); **GUYANA:** Mazaruni - Potaro, Bartica, Kartabo, IX-2-1922 (CASC); Landsberg (ZMUC); **HONDURAS:** Altántida, P. N. Pico Bonito, Cerro Miramar, 650 m., 15°34'01" N, 87°03'57" W, VIII-(14-15)-2001, A. Lopez (EAPZ); Cortés, Lago Yojoa, XII-6-81 (USNM); El Paraíso, 8.3 km SE Capire 675 m., 13°58'54" N, 85°49'25" W, VIII-13-1999, J Torres & R. Diaz (EAPZ); Yoro, Cuevitas, 15°11'14" N, 87°38'53" W, VI-17-1999, R.D. Cave & J. Torres (EAPZ); Department unknown, Middlesex, Stann Creek Dist., V-7-1963, E.C. Welling (CNCD); **MEXICO:** Chiapas, Aguacera, 16 km W Ocoz. VII-(1-7)-1986, J.E. Wappes, 2500 ft. (TAMU); Aguaceros 40 km W Tuxcla Gutierrez, VI-21-1987, W.F. Chamberlain, at light (TAMU); Bonampak, ca. 12km W of ruins, VIII-(21-22)-1990, M.H. Evans, UV & MV light (CUIC); Cerro Tres Picos, 1500-1800 m. alt., III-30-1973, D.E. Breedlove (CASC); Chorreodero, 8 km E Chiapa de Corzo, VI-17-1989, H. Howden (CMNC); Cinco Cerros, 860 m., V-31-1990, H. & A. Howden (CMNC); El Aguacero, 16 km. W Ocozocoautla, VI-5-1990, B. Gill (CMNC); Pq. El Aguacero, 16 km. W Ocozocoautla, 9-VI-1989, H. Howden (CMNC); 30 km W Tuxctla, Gutierrez, VI-4-1990, B. Gill (CMNC); 7 km S Chicoasen, VI-10-1989, H. Howden (CMNC); 4 mi E Cintalapa, VII-11-1991, W. Jones, at light (TAMU); Colima, Comala, X-25-1967, R. Wind (USNM); Wind, VII-19-1968 (USNM); Guerrero, 3.7 mi E

Marquelia, VII-10-1974, Clark, Murray, Ashe, Schaffner, taken at light (TAMU); Jalisco,
 Champela, vic UNAM, VII-(9-11)-1983, J.E. Wappes (TAMU); Est. Biol. Chamela, VII-
 (13-22)-1992, J. Chemsak, at light (EMEC); Mpio. La Huerta, Chamela Biological
 Station, VII-27-1996, W.M. Godwin, UV light (TAMU); nr. Puerto Vallarta, II-28-1966,
 J.M. Spencer (CASC); 21 km N Melaque, Fiesta Americana sign, VII-13-1987, E.G. &
 J.M. Linsey, at light (EMEC); Morelos, 4.4 mi. e Cuernavaca, VI-(6-7)-1974, Clark,
 Murray, Ashe, Schaffner, taken at light (TAMU); Nayarít, San Blas, VII-14-1960, R.B.
 Loomis & J. Maris (CASC); Tepic, VII-20-1955, R.B. & J.M. Selander, at light (FMNH);
 8.7 mi E San Blas, Sleeper (CASC); 20.3 mi. W Compostela, VI-19-1967, A.R. Hardy
 (CASC); 18 km SW Compostela, VII-20-1974, M.E. & P.D. Perkins, black light
 (USNM); Oaxaca, 17.5 km ENE Magdalena Tequisistlan, 1600 m., VII-1979, tropical
 deciduous forest, E.L. & K.W. Sleeper, at light (CASC); 72 mi E La Ventosa, VII-21-
 1963 J. Doyen (EMEC); Sinaloa, Mazatlán, VII-7-1962, Sleeper (CASC); Venedio, VI-
 10-1918 (CASC); 5 mi N Mazatlán, VII-28-1973, J. Chemsak, at light (EMEC); 26 mi
 NE Villa Unión, 1000', Sleeper (CASC); Veracruz, Catemaco, P. Hubbell, VI-1975;
 Cordoba, 2700 ft., VI-20-1963, A.B. Lau (USNM); Dos Amates, VIII-15-1971 (USNM);
 Playa Escondida, P. Hubbell, VI-1975 (USNM); Dos Amates, (IV-V)-1969, A. Ramirez
 (CNCI); Estacion Biologica, Los Tuxlas, ca 15 km N Catemaco, IX-(15-17)-1987, A.L.
 Norrbom (USNM); Lake Catemaco, V-24-1969, H.F. Howden (CNCI); State unknown,
 Zacazonapan, VI-1992, F. Pokorny (PCCV); **NICARAGUA**: Masaya, VII-14-72, J.V.
 Mankins (USNM); **PANAMA**: Canal Zone, Barro Colorado Island, VII-24-1963, D.Q.
 Cavagnaro & M.E. Irwin (CASC); Barro Colorado Island, VII-9-1978, E.M. Fisher
 (CASC); Barro Colorado Island II-12-64 (TAMU); Barro Colorado Island I-(7-9)-41

(USNM); Barro Colorado Island, VII-15-1933, J.D. & H. Hood (USNM); Barro Colorado Island, V-(1-9)-1964, W.D. & S.S. Duckworth (USNM); IBID IV-(10-20)-1965; IBID V-(10-17)-1964; IBID IV-(28-30)-1964; IBID IV-(18-28)-1964 IBID; IBID V-(10-17)-1964; IBID V-(1-9)-1964; III-(25-28)-1965; IBID V-(10-17)-1964; IBID IV-(10-20)-1965; Barro Colorado Island XII-25-1941, K.W. Cooper (USNM); IBID I-(19-22)-1941; Barro Colorado Island, 9° 10' N 79° 50' W, VII-9-1974, Whitehead (USNM); Barro Colorado Island (IX-X)-1940, Jas Zetek, at light (USNM); Barro Colorado Island III-1983, J.H. Martin (BMNH); Barro Colorado Island, V-19-1967, Delong & Triplehorn (OSUC); Barro Colorado Island, IV-22 to V-4 - 1961, S.D. Warren (BWCC); Barro Colorado Island, IX-X-1940, Jas Zetek, at light (USNM); Barro Colorado Island, Nov. 1941 (USNM); Barro Colorado Island, VII- 1944, Jas Zetek (USNM); Barro Colorado Island, Curundu, VII-5-1972, Stanch (BWCC); Barro Colorado Isl., IV-(7-13)-1959, R. Barth (FMNH); Canno Saddle, Gatun lake, V-12-23, R.C. Shannon (USNM); Close's Cano, Saddle, VII-1923, M.F. Close (USNM); Fort Clayton, F.S. Blanton (USNM); Fort Clayton, VII-4-1957, P.W. Johnson (CASC); Fort Gulick, Qtrs. 40-A, (V-VII)-1981, H.J. Harian, at light (MTEC); Gamboa, NW VIII-(10-12)-1975, E.M. & J.L. Fisher (CASC); Gatun lake, Cano Saddle, V-3-1923, R.C. Shannon (USNM); Madden Dam, X-3-1972, Stanch (USNM); Madden Dam, XII-22-1972, Stanch (BWCC); Madden Dam, VIII-13-1969, E.G. Riley (EGRC); IBID VI-12-1969; IBID VI-16-1976; Madden Dam, VI-19-1965, H.G. Real (CASC); Pan American Highway, 30 km E Cañita, VI-(15-29)-1992, J.&K. Ribardo (CASC); Río India, VIII-6-1933, L. Cook (CASC); 9 km NW Gamboa, VIII-(10-12)-1975, E.M. & J.L. Fisher (CASC); 5 mi. W Balboa, VI-17-1972, Stanch (BWCC); Chiriquí (USNM); Coclé, Aguadulce, II-17-1912 (USNM); Darién, Estación

Ambiental Cana, 7°45' 32" N, 77°41'07" W, VI-(3-10)-1996, R.S. Anderson (CMNC);
 Santa Fé, VI-2-1967, DeLong & Triplehorn (OSUC); Panama, Cerro Campana, V-(11-15)-1980, E.G. Riley & D. LeDoux (EGRC); **PARAGUAY**: Kolonia Sudetia, Anders, C. Pfanni (PCCV); **PERU**: Ayacucho, La Mar, Santa Rosa, 640 m., IX-(8-15)-1976, R. Gordon (USNM); Cuzco, Cosnipata River, Hacienda María, Saucetambo Cusco, II-26-1952, F. Woytkowski (CNCI); Huánuco, Tingo María, H.A. Allard (USNM); **IBID** (XII-II)-(1949-1950); **IBID** (XI-XII)-1950; Tingo María, IV-23-1983, F.W. Fisk, at light (MTEC); Tingo María, XI-1946, W.K. Wegrauch, WKW-481, 670m, at light (USNM); Tingo María, Monson Valley, XI-2-1954 (CASC); **IBID**, 16-XI-1954; Tingo María, XI-6-1979 (FMNH); nr. Afilador, V-15-1937, F. Woytkowski (CASC); Tingo María, VIII-(21-24)-1971, C. & M. Vardy, (BMNH); Tingo María, Monson Valley, X-27-1954, E.I.Schlinger & E.S. Ross (CASC); **IBID** XI-2-1954; **IBID** XI-16-1954; Yurac, 67 mi. E Tingo María, XI-16-1954, E.I. Schlinger & E.S. Ross (CASC); Yurac, 67 mi. E Tingo María, XI-16-1954, Schlinger & Ross (CASC); Junín, Satipo, XI-1948, P. Paprzycki (CASC); Chanchamayo, II-1933 (SEMC); Loreto, Estiron. Río Ampí-yacu, (III-IV)-1970, B. Malkin (FMNH); Explorama Inn, 40 km NE Iquitos on Amazon River, (IV-24)-(VII-20)-1990, Menke & Awertschenko (USNM); Ucayali R., Yarina Cocha, XII-23-1953, P. Hocking (FMNH); Mishuyacu, III-18-30, O. Klug (USNM); Yagua Indian Villiage, headwaters of Loreto-Yacu, B. Malkin (FMNH); Madre de Dios, Río Tambopata Res., 30 air km SW Puerto Maldonado, 290m, XI-(6-10)-1979, J.B. Heppner, subtropical moist forest (USNM); Río Tambopata, 30 km SW Puerto Maldonado, 290 m., 12° 50' S, 69° 20' W, III-9-1984, Smithsonian canopy fogging project, T.L. Erwin (USNM); Río Tambopata Res., 30 air km SW Puerto Maldonado, 290 m, XI-(6-10)-

1979, J.B. Heppner, subtropical moist forest (USNM); Political subdivision unknown, Avispas, X-1962, L.E. Pena (CNCI); Huallaga, Aquaytin, 400 m., IX-1961 (CNCI); Sanj Beni, Yunin, VI-5-1935, Woytkowski (CUIC); IBID XI-23-1935; Yahuar Mayo, II-12-10, Tanopoto (CUIC); **SURINAM**: Kartabo, Bartica, X-1920 (CUIC); **TRINIDAD**: Arima Valley, IX-4-1971, L.A. Mound (BMNH); Balandra Bay, W.I. VIII-(12-17)-1969, F. Bennett (CNCI); Maraval, BWI, W. Buth N (USNM); St Augustine, W.I., VII-(1-15)-1964, J.M. Capriles (USNM); Port of Spain, IX-25-1901, H. Curruola (USNM); Simla, II-(5-10)-1966 (USNM); Simla, 5 m. N Arima, W.I., VIII-10-1969, H. & A. Howden (CNCI); Simla, II-(24-28)-66 (USNM); Tunapuna, Mt. St. Benedict, VI-(4-30)-1995, 200-250 m., forest, S&J Peck (CMNC); 8 km N Arima, Simla Res. St., 250 m., lower mountain rain forest, VI-14-1993, UV light, S&J Peck (CMNC); 7 mi N Arima, W.I. Mome Bleu St., I-8-1979, 2300 ft. (MTEC); **VENEZUELA**: Amazonas, Cerro de la Neblina Basecamp, 140 m., 0° 50' N, 66° 10' W, II-1-1985, W.E. Steiner et al., black light (USNM); IBID, II-24-1985; IBID, II-5-1985; Cerro de la Neblina, Base Camp, 0° 50' N, 66° 9' 44" W, 140 m, II-4-12-1984, D. Davis and T. McCabe (USNM); IBID III-1-10-1984; IBID II-21-29-1984; Aragua, Maracay, X-11-1933, L.F. Martofell (USNM); P. N. Henri Pittier, 4 km N El Limón, 700m, VI-19-1987, M.A. Ivie, on dead tree (MTEC); Rancho Grande, (VII-VIII)-1976, A. Watson (BMNH); Barinas, Barinitas, II-(22-26)-1969, Duckworth & Dietz (USNM); Pte. Parangula, 8 km S Barinitas, II-18-1976, C.M. & O.S. Flint (USNM); Bolívar, 10 km E Icabaru, VII-(4-7)-1987, 700 m., humid forest, UV light, S&J Peck (CMNC); Carabobo, San Esteban near Puerto Cabello, XI-1939, P.J. Anduze (USNM); Valencia, Schibbye (ZMUC); Federal District, Caracas, 1921, A.J.C. Rojas (USNM); Caracas, Styrup (ZMUC); Las Trincheras, VI-21-22, L.R. Reynold

(FMNH); Miranda, Santa Lucía, V-1922, L.R. Reynold (FMNH); Trujillo, Valera, 1800 ft., E.P. de Bellard (USNM); Zulia, El Tucuco, 45 km SW Machiques, VI-(5-6)-1976, A.S. Menke & D. Vincent (USNM); El Tucuco, Sierra de Perija, I-(28-29)-1978, J.B. Heppner, montane forest, (USNM); State unknown, Caracas Valley, III-24-22, L.R. Reynold (FMNH); Chacon, V-22, L.R. Reynold (FMNH); Cumaragua (USNM); El Valle, XI-13-39, C.H. Ballou (USNM); Las Quiguas, Esteban Valley, XI-III (USNM); Las Quiguas, Esteban Valley, N. Venvola, (XI-III).

Diagnosis. *Semiotus ligneus* is most closely allied to *S. serraticornis* but differs in having 2 or 3 dark pronotal bands and having elytral interval 4 infusate. *Semiotus serraticornis* bears only a single dark pronotal band and the fourth elytral interval is pale. In *S. ligneus* the elytral apex is fulvus for more than $1/8^{\text{th}}$ the total length of the elytra and forms a nearly straight border with the darker anterior band. The pronotal bands in *S. ligneus* are nearly the same color. The fulvus elytral tip in *S. serraticornis* is only an extension of the fulvus elytral margin and occupies less than $1/10^{\text{th}}$ the total length of the elytra. The pronotal bands in *S. serraticornis* consist of one very dark median band and two pale lateral bands. The declivous scutellum with convex sides, large ocular index, absence of anterior sclerites (of the bursa copulatrix), broad infusate elytral bands, lack of frontal spines, and the extended posterolateral angles of the hypomeron separate both of these species from other *Semiotus*. Geographically, *S. ligneus* and *S. serraticornis* overlap throughout much of their range, though *S. ligneus* extends into Central America whereas *S. serraticornis* occurs north no further than Colombia. In the south, *S. ligneus* occurs through southern Brazil and Paraguay. *Semiotus serraticornis* also occurs in these countries but extends additionally into Argentina.

Discussion. *Semiotus ligneus* is the most commonly collected species of *Semiotus*. It is present in long series from many collections. In the north of its range (in Mexico) it is darker and smaller with relatively smaller elytral spines. Towards the south of its range it is generally larger, paler, and bears longer elytral spines. Larvae have been collected from semi-rotten cassava together with large numbers of stratiomyid flies that they were feeding on. The pupal period is around 21 days. The larva are similar to that of *S. intermedius*, differing primarily by the pilose tubercles at the apex of the ninth abdominal segment (Costa *et al.*, 1988).

Semiotus serraticornis (Drury)

(Figs. 128, 169, 194 and 272)

Elater serraticornis Drury 1782: 69. (Type: not found (illustrated, Drury, 1782); type locality: Brazil, Rio de Janeiro).

Elater distinctus Herbst 1806: 5. (Type: not found; type locality: Brazil) New synonym.

Elater inermis Kirby 1818:383. (Type: BMNH; type locality: Brazil).

Pericallus inermis, Latreille 1834: 141.

Pericallus acuminatus DeJean 1836: 96. (Type: not found; type locality: ?)

Pericallus aestimatus DeJean 1836: 96. (Type: not found; type locality: ?)

Semiotus distinctus, Germar 1839: 210, Steinheil 1875: 112, Candèze 1857: 301, Candèze 1874: 185.

Length. 23 to 42 mm (length/width ratio 4.0 to 4.3). Head aurantiacus to testaceus without frontal spines; ocular index 52.0 to 55.0. Antennae reaching less than one

segment beyond hind angles in females, reaching 1 to 2 segments beyond hind angles in males; segments 1 and 2 testaceous, segments 3 to 11 testaceous to badius. Front deeply (though poorly defined) impressed with V-shaped depression on vertex extending length of head; texture of few erect peripheral setae, deep scattered punctures throughout.

Pronotum length 6.0 to 11.5 mm. (length/width ratio 1.1 to 1.2). Lateral margins evenly concave except for anterolateral angles, hind angles expanding, margin clearly defined medially becoming less defined anteriorly and posteriorly, area along margin thickly rounded above; color fulvus to testaceous with badius medial band extending from near base to near border, with two paler infusate bands laterally; texture glabrous with deep punctures scattered throughout becoming contiguous and umbilicate laterally; scutellum fulvus to testaceous, declivous anteriorly, rounded except for straight anterior margin, lateral margin convex. Prosternum slightly and evenly concave in profile, prosternal process subdivided apically into ventral and dorsal points; color testaceous to aurantiacus with or without sanguineus to badius median band; texture glabrous with scattered erect setae on or near lobe, punctation fine medially becoming larger and umbilicate laterally. Hypomeron fulvus to testaceous; texture glabrous with punctation becoming thicker, deeper and contiguous medially. Mesosternum fulvus to testaceous; fossa glabrous with lateral areas finely and densely punctate. Mesepisternum and meshypomeron fulvus to testaceous. Metasternum fulvus to testaceous; texture glabrous with fine punctures becoming thicker and deeper anterolaterally. Femora fulvus to testaceous.

Elytral length 16.0 to 29.0 mm. (length/width ratio 2.8 to 3.0); sides subparallel on anterior fourth then narrowing to tip; intervals 1, 2, part of 5 and 7, and 6 testaceous (interval 2 often becoming badius), intervals 3, 4, 5, 8, and 9 mostly fulvus; texture

glabrous, striae poorly impressed to obsolete, striae punctures fine to moderately impressed; apices each bearing one spine. Abdomen fulvus to testaceous with few scattered setae and fine punctures scattered throughout; female with 2 obovate foveae on posterior half of sternite 5; anterior sclerite absent. Male with parameres sinuate, lateral blades subtriangular approximately 1/5th length of parameres.

Material Examined. **ARGENTINA:** Córdoba, Stempelm. (NHMW); Misiones, Campo Grande, I-1973, R. Foerster (CNCI); Iguazu, (XI-20)-(XII-5)-1987, R. Forster (PCCV); Panamb, XII-1957 (CNCI); Puerto Bemberg, II-1942 (CASC); P.N. Iguazu, Empalme 101, (VII-8-1990) - (I-6-1991), palm forest FIT, 206 m., S&J Peck (CMNC); **BRAZIL:** Bahia, D. Davis (CASC); Espírito Santo, Linhares Reserve, nr Entrance, MV light, 19° 04' 58" S, 39° 52' 57", II-3-1998, W. M.E. Epstein, sta. 26 (USNM); Porto Alegre (NHMW); (USNM); Conceicao de Barra, X-1972, M. Alvarenga (CNCI); Río Itabapoana, J.F. Zikan (FMNH); Federal District, Estacao Florestal, Cabeça do Veado, 1100 m., XI-(1-2)-1971, E.G. I., E.A. Munroe (CNCI); Mato Grosso, Maracaju, VII-1937, Servicio Fobre, Amarela (USNM); Minas Gerais, Passa Quatro, Faz. Dos Campos (FMNH); Río de Janeiro, Corcovado, XI-1968, S.A. Fragoso (EMEC); Guanabara, X-1963 (USNM); (3-4)-1935, P. Saudig (USNM); Río Grande do Sul, X-13-1933 (EMEC); Santa Catarina, Anilopolis (NHMW); Corupa, X-1965 (FMNH); Hansa Humbolt, X-1932, A. Maller (USNM); IBID I-1934; IBID IV-1933; IBID XI-1933; I-1978 (PCCV); Joinville, Steind. don. (NHMW); Nova Teutonia, XI-8-34 (CASC); IBID XI-5-48; IBID X-13-48; F. Plaumann (CASC); Nova Teutonia, 27° 11' S, 52° 23' W, 300-500 m., I-2-1954, F. Pigumann (CNCI); Santa Catarina Isl., Massarandula, Blumenau, 1934, A. Muller (CASC); São Paulo, Casa Grande, I-1936, Guer. (USNM); Est. Biol. Boracelia.

Salesopolis, IV-(13-18)-1961 (CASC); Pae Mathias, II-1936, (USNM); **IBID** II-1936; Pae Mathias, I-1936, J. Halik (USNM); **IBID** V-3-1935; Sampaio, XI-1977, M. Alvarenga (CNCI); XI-1977, M. Alvarenga (CNCI); Santos (ZMUC); State unknown, E. Alto de Serra, Stanzel-lachnit (FMNH); Corupa, S.C., II-1988 (PCCV); Guapi, III-3-1936, P. Saudig (USNM); VIII-3-65, G. Crow (USNM); **COLOMBIA**: Caquetá, Yari (PCCV); **PARAGUAY**: Paraguari Cerro Acahay, 25° 53' S, 57° 08' W, III-(13-14)-1986, M. Pogue & M. Solis (USNM); 25km SE Ybycui, in Ybycui Nat. Pk., IV-(19-24)-1980, P.J. Spangler et al. (USNM); 26.2 km SE Ybycui, P.N. Ybycui, 26° 7' S, 56° 47' W, III-(15-18)-1986, M. Pogue & M. Solis (USNM); Department unknown, Caaguazu, XI-1957 (CNCI); Río del Plata, X-5-63 (FMNH); S. Bernardino, K. Fiebrig (USNM); Villarica, 1932 (FMNH); I-10-1966 (FMNH).

Diagnosis. *Semiotus serraticornis* is most closely allied to *S. ligneus* but differs in having a single dark pronotal band and having the fourth elytral interval pale. *Semiotus ligneus* bears 2 or 3 dark pronotal bands and the fourth elytral interval is infusate. In *S. ligneus* the elytral apex is fulvus for more than 1/8th the total length of the elytra and forms a nearly straight border with the darker anterior band. The pronotal bands in *S. ligneus* are nearly the same color. The fulvus elytral tip in *S. serraticornis* is only an extension of the fulvus elytral margin and occupies less than 1/10th the total length of the elytra. The pronotal bands in *S. serraticornis* consist of one very dark median band and two pale lateral bands. The declivous scutellum with convex sides, large ocular index, absence of anterior sclerites (of the bursa copulatrix), broad infusate elytral bands, lack of frontal spines, and the extended posterolateral angles of the hypomeron separate both of these species from other *Semiotus*. Geographically, *S.*

ligneus and *S. serraticornis* overlap throughout much of their range, though *S. ligneus* extends into Central America whereas *S. serraticornis* occurs north no further than Colombia. In the south, *S. ligneus* occurs through southern Brazil and Paraguay. *Semiotus serraticornis* also occurs in these countries but extends additionally into Argentina.

Note. The description of *S. serraticornis* by Drury (1782) is clearly that of the commonly collected species from Brazil (that also occurs in Argentina and Colombia (Fig. 272)) previously considered *S. distinctus*. Unfortunately, Drury's illustration is not definitive (and probably has not been readily available to previous authors). His name (*serraticornis*) has been ignored since its publication. The illustration is clear, however, in lacking frontal spines and in the pattern of the elytral and pronotal bands. These combined characters could not refer to any other species that occupy the same area. The lack of definite lateral pronotal bands in the illustration may be the reason for previous confusion, as most specimens do have light lateral bands. Many light forms, however, are known that do not demonstrate clearly defined lateral bands. Drury's illustration and accompanying description could not refer to any other species.

Ungrouped *Semiotus* Species

Semiotus acutus Candèze

(Figs. 70, 168, 243 and 268)

Semiotus acutus Candèze 1874: 180, Szombathy 1909a: 121. (Syntype, female: BMNH

(1); type locality: Ecuador, Macas).

Semiotus superbus reductus Chassain 1998:77. (Holotype, female: MNHN; type locality: Bolivia, Riv. Songo) New Synonym.

Length 24 to 29 mm (length/width ratio 4.3 to 4.7). Head piceus to sanguineus with anterolateral areas fulvus to testaceus; bearing three spines anteriorly; texture glabrous with few erect setae over eyes and anterolateral spines, punctation moderately deep and scattered throughout. Antennae serrate, 0 to 1 segment short of hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 rufo-piceus to piceus. Pronotum 6 to 7 mm (length/width ratio 1.2 to 1.4), narrowly sinuate, hind angles diverging; margin narrowly incrassate with or without faint sulcus on anterior third to half; texture glabrous, nitidus, with fine to moderately deep punctures scattered throughout. Scutellum subquadrate, wider than long, posterior border rounded and anterior border recurved. Prosternum concave in profile, prosternal process not divided apically; texture of long erect setae and fine punctation medially, decumbent setae and thicker punctation laterally. Hypomeron glabrous, nitidus, with fine dense punctures throughout becoming more dense medially. Mesosternum with fossa glabrous and impunctate, lateral areas densely setose and punctate. Metasternum with few scattered setae and punctures throughout.

Elytra 16 to 19 mm (length/width ratio 2.8 to 3.2), narrowing nearly from base with alternating luteus and piceus (or sanguineous) bands; texture glabrous, nitidus, striae and stria punctures obsolete; apices each bearing a single spine.

Abdomen of fine scattered setae and punctures throughout becoming denser on sternite 1; female with two elliptical to subovate foveae on apical half of sternite 5;

anterior sclerite with lateral arms densely dentate, extending posteriorly nearly half length of median piece.

Note. A specimen (USNM) from "Colombia" bears a sanguineous color for areas otherwise predominantly piceus.

Material examined. **BOLIVIA:** Cochabamba, Cristal Mayu, IV-1873 (MNHN); 1889, P. Germain (MNHN); Department unknown, Acabamba, Garlepp (MNHN); River Songo, A.H. Fassi (MNHN); **COLOMBIA:** Antioquia, Medellín VII-1874 (NHMW); Capital District, Santa Fé de Bogotá (MNHN); **ECUADOR:** Napo, Vía Santa Barbara - La Bonita, IV-(7-9)-1986, S. McKamey (EMEC); 2000 m., 7 km S Baeza, II-(20-28)-1979, H. & A. Howden (CNCI); Moronas - Santiago, Macas, Región oriental, de Banos a Canelos, (IX-X)-1894, M. de Mathan (MNHN); **PERU:** Cuzco, 30 km SW Pilcopata, I-20-1979, W. E. Steiner (USNM); Junín, Tarma, Huscapistana, 1800 m., II-12-1940, F. Woytkowski (SEMC); Loreto, Iquitos, Samlet auf Indianere, Birthe Thau, III-22-1961 (ZMUC); Political subdivision unknown, Region Centrale, Perene, 1923, Vergne (MNHN); 2000 to 3000 ft., Piches & Perone (USNM).

Diagnosis. *Semiotus acutus* is most closely allied to *S. taeniatius*, *S. kirschi*, and *S. germari*. It can be separated from these species by the lack of sulci along the lateral margin of the pronotum. In *S. kirschi* the sulci extend nearly the entire length of the pronotum. In *S. germari* and *S. taeniatius* the sulci are reduced to the anterior third to half only (as in Fig. 33). Several species have alternating light and dark elytral bands and glabrous pronota similar to *S. acutus*. Of these, *S. regalis* is readily separated by having intervals 1 and 2 black (Fig. 222). In *S. acutus*, the elytral bands cover alternating intervals with intervals 1 and 2 being of two contrasting colors. This same pattern is

evident in *S. exsolutus*, *S. superbus*, *S. germari*, *S. kirschi*, and *S. illigeri*. *Semiotus acutus* and *S. exsolutus* are most easily separated from these by the absence of lateral pronotal sulci. *Semiotus superbus*, *S. sommeri*, *S. germari*, and *S. illigeri* all have a short marginal sulcus (not extending onto the posterior half). *Semiotus exsolutus* can be separated from *S. acutus* by the presence of stria punctures (which are nearly obsolete in *S. acutus*) and by the thinner (occasionally single) pronotal bands (Fig. 240). In *S. acutus*, the pronotal bands are wider (Fig. 243). The anterior sclerite of the bursa copulatrix differ in these species. In *S. acutus*, the series of dentitions along the posterior border extend nearly to the tip of the lateral arms (Fig. 70). In *S. exsolutus*, the dentitions are clustered around the median piece (Fig. 89).

Note. Chassain recognized this species as *S. superbus reductus*. In the first couplet of Chassain's (1998) key to subspecies of *S. superbus*, he uses the character of the marginal sulcus of the pronotum to separate *S. s. superbus* and *S. s. kirschi* from *S. s. panamensis*, *S. s. reductus*, and *S. s. championi*. This study recognizes the marginal sulcus as delimiting species. *S. s. reductus* is the same as the type of *S. acutus*. *Semiotus s. panamensis* and *S. s. championi* are both the same as the type of *S. exsolutus*.

Semiotus affinis (Guérin-Meneville)

(Figs. 220 and 269)

Semiotus affinis Guérin-Meneville 1855: 578, Candèze 1857: 316, Candèze 1874: 178.

(Type: not found; type locality: Napo, Ecuador)

Semiotus candèzei Kirsch 1866: 180, Steinheil 1875: 111, Candèze 1874: 178.

(Lectotype: SMTD; type locality: Bogotá, Colombia). New Synonym.

Length 25 to 35 mm (length / width ratio 4.0 to 4.7). Head testaceous to sanguineous with piceous maculae basally; texture glabrous with occasional setae above eyes and frontal spines, punctation deep and scattered evenly throughout; front with two spines anterolaterally, with area between sharply angled. Antennae three segments shy of hind angles (in both sexes), with segments 1 and 2 testaceous, segments 3 to 11 rufopiceous to piceous. Pronotum 6 to 9 mm (length / width ratio 1.1 to 1.2), gradually expanding posteriorly; margin broadly rounded with sulcus on anterior fourth; color fulvous to testaceous laterally, testaceous to aurantiacus medially with two arcuate bands on disk piceous; texture glabrous with punctation fine and evenly scattered throughout, often with a few fine umbilicate punctures along anterior margin. Scutellum broadly ovate with indentation along anterior border. Prosternum concave in profile; color testaceous to sanguineous; texture with fine scattered setae laterally and on lobe, punctation fine medially becoming deeper and larger laterally. Hypomeron fulvous to testaceous with long piceous band along suture and small piceous macula on lateral border; texture glabrous (or with few erect setae laterally) with fine scattered punctures throughout, becoming denser anteriorly. Mesosternum fulvous to testaceous and glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum and meshypomeron fulvous to testaceous. Metasternum fulvous to testaceous; texture glabrous with very fine punctures scattered throughout; metepimeron piceous. Femora testaceous to aurantiacus.

Elytra 17 to 23 mm (length / width ratio 2.6 to 3.2), subparallel on anterior fourth, then narrowing to apex; color fulvous with basial to piceous markings along suture and

lateral margin becoming wider apically, sutural band reaching scutellum anteriorly; striae and stria punctures finely impressed, interstriae wrinkled; apices each bearing one spine.

Abdomen fulvus to testaceous laterally testaceous medially with sublateral piceus band on each sternite; texture glabrous or with fine setae scattered throughout, punctation dense, fine and scattered throughout, becoming larger and nearly contiguous on first visible sternite; female with two oblong foveae on posterior 2/3, lateral arms of anterior sclerite narrow, 4/5 length of median piece, arms and median piece covered with dentitions. Male with parameres constricted near middle between angulate and subquadrate basal half and lateral blades, lateral blades approximately 1/4th length of parameres, penis extending beyond tip of parameres.

Material Examined. **BOLIVIA:** Cochabamba, Cristal Mayu, X-7-1949, L.E. Peña (FMNH); La Paz, Isiamas, XII-1921, O.J. Costello (USNM); Tumupasa, XII-1921, W.M. Mann (USNM); **BRAZIL:** Mato Grosso, 12°31'S, 55°37'W, X-1974, M. Alvarenga (CNCI); **COLOMBIA:** Caqueta, Yari (PCCV); Putomayo, Santa Rosa, Kofan indian Villiage, headwaters of Río San Miguel, X-(10-23)-1970, B. Malkin & P. Burchard (FMNH); Valle del Cauca, W-Cordillera, Lake Colima, Río Bravo Valley, nr Buga, 1180-1200 m., (VIII-IX)-1988 (PCCV); Department unknown, Landazuri, I-8-38, F.J. Otoyá (USNM); **ECUADOR:** Los Ríos, Río Palenque, 47 km S Santo Domingo, II-27-1976, H. & A. Howden (CNCI); Napo, Limoncocha, VI-10-1977, W.E. Steiner (USNM); 25 km E Puerto Napo, Selva Aliñahuí, 450 m., XII-1992, E.S. Ross (CASC); 10 km SW Mishanalli, 600 m., 1° 5' 3" S, 77° 42' 9" W, I-26-1998, L. Náday (HNHM); Pastaza, Ashuara, Río macuma, 10 km from Río Morona, 300 m., VII-(7-16)-1971, B. Malkin (FMNH); Cusuimi, Río Cusuimi, 150 km. SE of Puyo, V-(15-31)-1971, B. Malkin

(FMNH); Pichincha, Santo Domingo, Allurigami, I-7-1997 (HNHM); 10 km SE Santo Domingo de los Colorados, V-2-1978, O'Brien & Marshall (USNM); Sucumbíos, Sacha Lodge, 270 m., 0°28'14" S, 76°27'35" W, III-24-1999, R. Brooks, on fungus covered log (SEMC); **PERU**: Arequipa, Mollendo Coast, XI-1935 (CASC); Cuzco, Hacienda María, Cosnipata River, Saucaetimbo Cuzco, III-3-1952, F. Woytowski (CNCI); Huánuco, Río Monzón, 798 m., nr. Tingo María, III-17-1964, J. Schunke (CASC); Tingo María, Monson Valley, X-15-1954, (CASC); IBID, IX-29-1954; IBID, XI-10-1954; IBID, X-26-1954; IBID, XI-1-1954; IBID, XII-11-1954; Junín, Chachamayo, II-1933 (SEMC); Satipo, XI-1948, P. Paprzycki (CASC); Junín, Satipo, IV-15-1941, P. Paprzycki (CASC); Soudoveni Ridges, 900 m., Soudoveni / Huantadriri Vall., 1987, ca 100 km N Satipo (PCCV); Loreto, Estiron., Río Amplyacu, (X-XI)-1961, B. Malkin (FMNH); Madre de Dios / Puno, Río Inambari, II-7-10, alt. 1800 ft., C.H. Townsend (USNM); Madre de Dios, 30 km SW Pto. Maldonado, P.J. Anderson (USNM); Madre de Dios, Res. Zone, Explorer's Inn, 290 m., 12° 50' S, 69° 17'. II-25-1982, W, T.L. Erwin, on vegetation along trail (USNM); Madre de Dios, Río Tambopata Reserve, 30 air km. SW Puerto Maldonado, 290 m., XI-(1-26)-1982, E.S. Ross (CASC); Yagua Indian Village, headwaters of Loreto-Yacu, IV-29-1970, B. Malkin (FMNH); Political subdivision unknown, Huallaga, Aquaytin, 400 m., IX-1961 (CNCI); Río Huallagas, II-1986, L.C. Peña (PCCV).

Diagnosis. *Semiotus affinis* is most closely allied to *S. lafertei*, *S. intermedius* and *S. decoratus*. *Semiotus illustris*, though not closely related, is superficially similar. All of these species have two dark bands on the elytra (one sutural and one marginal) that converge near the apex (as in Figs. 219-221, 223-224). These species also have two stout

lateral frontal spines and an angled area between, forming a position phylogenetically roughly between those species with two frontal spines and those with three. *Semiotus decoratus* is readily distinguished from *S. affinis* by the single pronotal band and black lateral pronotal maculae (Fig. 224). *Semiotus affinis*, *S. lafertei*, *S. intermedius*, and *S. illustris* all have two pronotal bands (Figs. 219-221, and 223). *Semiotus affinis* can be separated from *S. intermedius* by the darker patterns and shape of the scutellum. The dark elytral and pronotal patterns in *S. affinis* are black, whereas in *S. intermedius* they are dark brown to red. Also, in *S. intermedius* the lateral pronotal maculae are much more evident dorsally. In *S. affinis* they are often restricted entirely to the hypomera. The scutellum of *S. intermedius* is approximately as wide as long (Fig. 157). It is much wider than long in *S. affinis* (as in Fig. 159). *Semiotus affinis* differs from *S. lafertei* in the piceus sutural stripe that reaches the scutellum and in the sulcus on the anterior third of the lateral pronotal margin. In *S. lafertei* the elytral suture is not piceus all the way to the scutellum and the anterior third of the lateral pronotal margin is not sulcate. *Semiotus affinis* is superficially similar to *S. illustris* but can be separated by the dark bands on the abdomen and metasternum. In *S. illustris* (and *S. decoratus*) the venter is entirely pale yellowish brown to orange with occasional black markings on the hypomera. *Semiotus affinis* can be separated from all other *Semiotus* by the two converging piceus bands on each elytron, the stout frontal angles with the broadly angulate median area between, and the broad incised scutellum.

Note. The type of *S. affinis* is lost; although, a specimen similar to the original description and labeled by Candeze as "*Semiotus affinis*" is deposited in the MNHN (on

loan from the BMNH) with a Candèze identification label. This specimen is conspecific with *S. candezei* and is herein considered to represent a single species.

Semiotus aliciae n. sp.

(Figs. 259 and 270)

Length 20 to 26 mm (length/width ratio 4.6 to 4.7). Head aurantiacus to testaceus throughout; anterolateral area of frons protuberant and angled, without spines; texture glabrous, nitidus, with few erect setae over eyes, punctation shallow, becoming umbilicate basally; ocular index 68.0 to 70.0. Antennae 1 to 2 segments short of hind angles; segments 1 and 2 (and part of 3) aurantiacus, segments 4 to 11 rufopiceus to piceus. Pronotum 4 to 8 mm (length/width ratio 1.1 to 1.3); widest on anterior 2/5, then converging anteriorly and posteriorly to divergent hind angles, anterior 2/5 narrowing and declivous to anterior angles, margin moderately incrassate without sulcus; color aurantiacus to testaceus; texture glabrous, nitidus, with fine punctures throughout becoming thicker anteriorly; scutellum testaceus medially, piceus peripherally, subchordate, anterior margin declivous; prosternum concave in profile, prosternal process not divided; color aurantiacus to testaceus; texture glabrous medially, with large umbilicate punctures and erect setae along suture. Hypomeron aurantiacus to testaceus; texture glabrous, nitidus, punctation very fine to obsolete. Mesosternum finely punctate with fine setae, fossa glabrous and impunctate; color aurantiacus to testaceus. Mesepisternum and meshypomeron aurantiacus to testaceus. Metasternum fulvus to

testaceus; texture glabrous, nitidus, with punctation fine to obsolete; femora aurantiacus to testaceus.

Elytra 12 to 16 mm (length/width ratio 2.8 to 3.0) narrowing from near base to apex; color piceus throughout; texture glabrous, nitidus, without striae (except stria 1) or stria punctures; apices of each elytron bearing one spine.

Abdomen fulvus to testaceus; texture glabrous, nitidus, with punctation fine to obsolete. Female without foveae on sternite 5.

Material Examined. Holotype: **PANAMA: Chiriquí** (BMNH); Paratypes: **PANAMA: Panama**, 10 km n El Llano, 1400', VI-(3-8)-1986, E. Giesbert (1, FSCA); Cerro Campana, 2700', VI-(3-5)-1981, E. Giesbert (1, FSCA); Cerro Campana, 2700', V-(17-19)-1987, E. Giesbert (3, FSCA).

Diagnosis. *Semiotus aliciae* is a unique species with an angled frontal margin. Phylogenetically it is placed between those species with distinct frontal spines and those lacking spines. Among the species with spines, it is most closely allied to *S. catei*, from which it is easily separated. *Semiotus catei* bears several pronotal and elytral markings (Fig. 216), whereas, the pronotum (orange) and elytra (black) of *S. aliciae* are unicolorous (Fig. 259). Among the species lacking frontal spines, *S. aliciae* is most closely allied to *S. luteipennis*, *S. serraticornis* and *S. ligneus*. All of these species have bicolored pronota. Geographically, *S. aliciae* occurs in Panama - separated from most related species (Fig. 270). *Semiotus luteipennis* occurs much further south in Argentina and Chile, *S. serraticornis* occurs from Colombia to Argentina, and *S. catei* occurs in Colombia. The unicolorous orange body with contrasting black elytra, along with the

absence of elytral striae (except stria 1) readily distinguish this species from all other *Semiotus*.

Note. *Semiotus aliciae* is named in honor of Alicia Wells.

Semiotus angustus n. sp.

(Figs. 71, 99, 234 and 273)

Length 18 to 21 mm (length / width ratio 4.2 to 4.7). Head testaceous to aurantiacus with piceus median macula; with 3 frontal spines; texture of long erect setae over eyes, finer decumbent setae on frons, punctation deep and scattered throughout; ocular index 74.0 to 77.0. Antennae serrate, reaching beyond hind angles by 1 to 2 segments in females, two or more segments in males; segments 1 to 11 testaceous. Pronotum 4 to 5 mm (length / width ratio 1.1 to 1.3), sinuate, hind angles divergent; margin incrassate becoming explanate on anterior fifth, clearly defined only on anterior fourth; color fulvus to aurantiacus laterally and anteriorly with median band aurantiacus to sanguineus (hind angles and anterior border paler), with two broad sublateral piceus bands extending from base to near anterior border; texture glabrous medially with dense luteus decumbent setae laterally, punctation fine medially becoming dense laterally; scutellum subquadrate, posterior border rounded, fulvus with obscure borders. Prosternum slightly concave in profile, prosternal process not divided at tip; color testaceous to aurantiacus medially, piceus along suture; texture of long erect setae scattered throughout with fine dense decumbent setae laterally, punctation fine medially, dense laterally. Hypomeron testaceous to aurantiacus, fulvus basally, with piceus band

along suture; texture of fine decumbent setae and fine punctation becoming denser along suture. Mesosternum fulvus to testaceus with piceus macula, fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum and meshypomeron fulvus to testaceus with piceus macula. Metasternum glabrous with fine punctation medially and with fine dense setae and fine punctures anterolaterally; color aurantiacus to testaceus medially, piceus anterolaterally. Femora testaceus to badius.

Elytra 13 to 14 mm (length / width ratio 2.9 to 3.3), subparallel on anterior third to half before narrowing to tip; color fulvus with badius to piceus irregular bands along each stria; texture glabrous, nitidus, striae faint, stria punctures moderately deep; apices each bearing one spine.

Abdomen aurantiacus to testaceus with sanguineus to badius sublateral coloration; texture glabrous, nearly impunctate medially, dense punctures and dense decumbent setae laterally; female without foveae; anterior sclerite vestigial, lacking lateral arms, median piece pointed apically. Male with parameres subparallel basally and apically, lateral blades narrow, 33 to 35% length of parameres (Fig. 99).

Material examined. Holotype (female): **BOLIVIA**: La Paz, 7 mi SE Unduavi, IV-7-1978, C.W. & L.B. O'Brien (1, CNCI); Paratypes: **BOLIVIA**: Santa Cruz, Br. Ichilo R. Rain Forest, X-(15-16)-1966, B. & K. Burks (1, USNM); **PERU**: Cuzco, Lucma, 7000 m., VIII-25-1911 (1, USNM); Junín, Prov. Tarma, Huacapistana, S.A., 1940, F. Woytkowski (1, SEMC).

Diagnosis. *Semiotus angustus* is most closely allied to *S. perangustus* and other species with three frontal spines, dense pronotal setae, and pale elytra with infusate striae (*S. cristatus*, *S. linnei*, *S. colombianus*, and *S. auripilis*). *Semiotus auripilis* is

distinct from *S. angustus* by the strongly convex elytral intervals. The intervals in *S. angustus* are flat, or nearly so. The lateral frontal spines of *S. cristatus* are shorter than those of *S. perangustus* and *angustus*, not extending forward beyond the length of the medial spine. In *S. angustus* the lateral spines are much longer than the medial spine. The pronotal bands in *S. linnei* are arcuate (especially along the medial side), those of *S. angustus* are subparallel. *Semiotus colombianus* is larger (over 22 mm long) than *S. angustus* (less than 22 mm long). *Semiotus perangustus* and *S. angustus* can be distinguished from these related species by their narrow body and smaller size. These 2 species are similar, but can be separated by several characters. *Semiotus perangustus* has darker antennae (segments 3 to 11 are nearly piceus). In *S. angustus* segments 3 to 11 are only slightly darker than segments 1 and 2. The female of *S. perangustus* bears two deep foveae on sternite 5. The female of *S. angustus* lacks foveae. The anterior sclerite of the bursa copulatrix is much larger in *S. perangustus*, where lateral arms are present (Fig. 72) than in *S. angustus*, where lateral arms are lacking (Fig. 71).

Semiotus auripilis Candèze

(Fig. 268)

Semiotus auripilis Candèze 1874: 184. (Type: BMNH; type locality: Bolivia).

Length 22 to 24 mm (length / width ratio 4.3 to 4.5). Head piceus with piceus to aurantiacus spines; with three frontal spines medial spine not as long as lateral spines; texture of fine pale decumbent setae and long erect setae over eyes and spines, punctation deep with punctures separated by about width of punctures. Antennae serrate, reaching

beyond hind angles by 0 to 1 segment; segments 1 and 2 badius, segments 3 to 11 rufo-piceus to piceus. Pronotum 5 to 6 mm (length / width ratio 1.1 to 1.2), narrowly sinuate; margin sulcate on anterior third to half, thickly rounded posteriorly, with elevated thickening above margin on anterior half; disk with two large arcuate piceus maculae, interrupted medially by sanguineus longitudinal band, anterior border and margins aurantiacus to sanguineous; texture of dense pile laterally, becoming thicker and aureus on piceus bands, median area between bands with fewer setae, punctation fine and moderately dense medially, deep and often contiguous laterally; scutellum testaceus, quadrangular to subchordate, and glabrous or with few scattered punctures. Prosternum nearly straight with lobe descending ventrally; color sanguineus to piceus medially, lobe aurantiacus, with or without lateral area piceus; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron piceus, with lateral margin aurantiacus to badius, posterior border fulvus to testaceus; texture of dense decumbent and golden setae throughout becoming less dense in peripheral areas. Mesosternum piceus laterally, fossa sanguineous; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum and meshypomeron testaceus to piceus. Metasternum sanguineus to badius with anterolateral areas piceus, glabrous medially with dense setae anterolaterally, punctation fine medially becoming denser laterally. Femora testaceus to aurantiacus.

Elytra 15 to 17 mm (length / width ratio 2.9 to 3.1), nearly parallel-sided on anterior 2/3 then narrowing evenly to apex; striae and stria punctures well defined, intervals strongly convex; color fulvus with infusate striae (also surrounding scutellum); apices sub-spinose.

Abdomen sanguineus to badius medially, becoming rufo-piceus, margin lighter; setae scattered throughout except median area, punctation fine medially, deeper laterally.

Material examined. **BOLIVIA:** (BMNH). *S. auripilis* is known from only a single specimen.

Diagnosis. *Semiotus auripilis* is most closely allied to *S. hispidus*, *S. seladonius*, and *S. pectitus*. *Semiotus auripilis* and *S. pectitus* both have strongly convex (nearly hemispherical when viewed from behind) elytral interstriae. The interstriae of *S. seladonius* are more nearly flat or only slightly convex. The elytral color of *S. pectitus* is deep red. The elytral color of *S. hispidus* is completely black, or black with pale bands. The elytral color of *S. seladonius* is green. The elytra of *S. auripilis* is pale yellow with infusate striae, similar to *S. linnei*, *S. cristatus*, and *S. colombianus*. These last three species can be easily distinguished from *S. auripilis* by the flat or slightly convex interstriae. Also, the pronotal setae of these species is thin. In *S. auripilis* the pronotal setae is thick golden brown. Geographically, *S. auripilis* seems to be separated from most related species (Fig. 268). The single specimen known is from Bolivia. *Semiotus hispidus*, *S. linnei* and *S. cristatus* occur in Venezuela. *Semiotus pectitus* and *S. colombianus* occur in Colombia. *Semiotus seladonius* occurs in Colombia and Bolivia. The dense golden pronotal setae, three frontal spines, sulcate pronotal margin, unicolorous strongly convex elytral intervals with dark striae separate *S. auripilis* from all other *Semiotus*.

***Semiotus badeni* Steinheil**

(Figs. 75, 94, 138, 207 and 275)

Semiotus badeni Steinheil 1875: 111. (Lectotype, male: MNHN; type locality: Colombia).

Semiotus dohrni Candèze 1889: 80, Champion 1896:290. (Lectotype, female: BMNH; type locality: Cerro Zunil, 4,000 ft.). New Synonym.

Length 18 to 26 mm. (length/width ratio 4.6 to 4.9). **Head** aurantiacus to sanguineus with or without piceus basal macula, front with two spines anterolaterally; texture with a few erect setae above eyes and spines, punctation moderately deep and evenly scattered throughout. **Antennae** serrate, 0 to 1 segments shy of hind angles in females, 0 to 1 segments beyond hind angles in males; segments 1 and 2 testaceous, segments 3 to 11 rufopiceus to piceus. **Pronotum** 4 to 7 mm (length/width ratio 1.2 to 1.4), narrowly sinuate with margins converging on anterior fourth to anterior fourth, hind angles diverging, disk convex with lateral depressions sublaterally on posterior 2/3 to 3/4, margin sulcate and explanate on anterior third to fourth, broadly rounded without definition on posterior half; color fulvus to aurantiacus (becoming darker anteriorly) with irregular piceus band extending from base to before anterior border (or in some specimens extending onto head); texture glabrous with moderately deep punctures scattered throughout. Scutellum testaceous to piceus, subquadrate with anterior margin incised or recurved medially. Prosternum concave in profile, prosternal process not divided at apex; color aurantiacus to sanguineus with piceus band along suture; texture glabrous with few erect setae on lobe, impunctate or with very fine punctures medially becoming thicker and umbilicate laterally. Hypomeron fulvus to luteus with piceus band

along suture; texture glabrous with very fine punctures scattered throughout.

Mesosternum fulvus to testaceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron fulvus to testaceus.

Metasternum fulvus to testaceus with or without piceus band along lateral margin; texture glabrous, with very fine punctation throughout. Metepimeron piceus. Femora fulvus to testaceus.

Elytra 12 to 17 mm (length/width ratio 2.8 to 3.1), subparallel on anterior third then narrowing to tip; color fulvus to luteus with intervals 1, 4, 6, and 9 mostly piceus ((Fig. 207) specimens from the Province of Puntarenas, Costa Rica, have the discal bands very pale)); texture glabrous with striae (except stria 1) faint to obsolete, strial punctures fine to obsolete; apices each bearing one spine.

Abdomen fulvus laterally, testaceus to aurantiacus medially, with two sublateral obscure bands extending from sternite 2 (sometimes also on sternite 1) to sternite 4; texture glabrous or with few scattered setae basally and apically, moderately deep punctures scattered throughout; female with two very fine, small, and shallowly ill-defined foveae restricted to anterior third of sternite 5, or with foveae absent; anterior sclerite with lateral arms subangulate extending apically 2/3 length of median piece, with few dentitions basally. Male with parameres narrowing medially, lateral blades approximately 1/4 length of parameres.

Material Examined. **COLOMBIA:** (MNH); **COSTA RICA:** Alajuela, Est. San Ramón Oeste, 620 m., IV-(3-19)-1994, C. Cano (INBC); Río San Irenito, 900 m., 5 km N. Col. Palmarena, III-1990 (INBC); Cartago, Grano de Oro, Chirripó, Turrialba, 1120 m., IX-1993, P. Campos (INBC); Grano de Oro, Turrialba, I-(18-24)-1993, P. Campos

(INBC); Monumento Nacional Guayabo, 1100 m., VII-1994, G. Fonseca (INBC); IBID (IX-1994); Suiza Turrialba, P. Schild (USNM); Turrialba, VII-19-1965, Ötvöa (HNHM); Turrialba, VI-26-1965, C. Slobodchikoff (EMEC); Guanacaste, Estación Pitilla, 9 km S. Santa Cecilia, 700 m., IV-1994, C. Moraga (INBC); IBID, V-1992, Z. Fuentes; Est. Mengo, IV-15-1988, M. Espinoza (INBC); Heredía, Estación Magasay, P.N. Braulio Carrillo, 200m., IV-1991, R. Aguilar (INBC); Limón, Cerro Tortuguero, 1-120 m., VII-1993, R. Delgado (INBC); IBID (IV-1989); IBID (VIII-1992); Estación Miramar, 500m., Reserva Biológica Hitoy Cerere, VIII-(21-30)-1992, G. Carballo (INBC); Hamburg Farm, Reventazon, III-1-1924, F. Neverman (USNM); IBID VIII-1-1924; IBID VIII-21-1936; IBID II-27-1933; IBID X-14-1927; IBID II-27-1925, *an Gebüsch* (USNM); Sector Cerro Cocori, Finca de E. Rojas, 150 m., (I-31)-(II-21)-1992, E. Rojas (INBC); 100m., Hitoy Cerere, (IV-24)-(V-5)-1998, E. Rojas (INBC); Sector Coccori, 30 km N. Cariari, 100 m., II-1994, E. Rojas & A.A. Solis (INBC); Sector Cocori, Finca de E. Rojas, 150 m., IX-1993, E. Rojas (INBC); Puntarenas, Cerro Anguciana, Llano Bonito, Piedras Blancas, Península Osa, 100-110 m., V-1994, J.F. Quesada (INBC); Estación La Casona, 1520 m., Reserva Biológica Monteverde, X-1991, N. Obando (INBC); San José, Las Mercedes, Santa Clara, 200-300 m., V-11-1922 (USNM); Parque B. Carrillo, Estación la Montuqa, 1-100 m., V-22-1981, R. Canet (INBC); **GUATEMALA**: Santa María, XI, W. Schauss (USNM); **PANAMA**: Canal Zone, Escobal Road, VII-30-1974, D. Engleman (CNCI); Fort Davis, VII-1980, H.J. Harlan (OSUC); Chiriquí, Fortuna, 82°15'W, 8°44' N, V-17-1978, O'Brien & Marshall (CNCI); Panama, Cerro Campana, 850 m., 8° 40' N, 9° 56' W, VIII-21-1971, W. Bivia (USNM).

Diagnosis. *Semiotus badeni* is most closely allied to *S. fleutiauxi*, *S. fulvicollis*, and *S. clarki*. It is also similar to *S. fascicularis* and the other species with two frontal spines and 4 or 5 dark elytral bands (*S. bispinus* and *S. melleus*). *Semiotus fleutiauxi* is unique among these species by the orange to deep red elytra with a pale yellow band on the disk (Fig. 211). The elytra in the other species are pale brown to yellow with dark bands. *Semiotus badeni* and *S. fascicularis* each bear a sutural, a marginal, and two discal bands per elytron. The discal bands occupy intervals 4 and 6. Interval 2 is pale. These discal bands occupy nearly the entire length of the elytra in *S. badeni* (Fig. 207). They are abbreviated anteriorly in *S. fascicularis* (Fig. 214). In *S. clarki* (Fig. 215), *S. melleus* (Fig. 213), and *S. bispinus* (Fig. 209), the second interval is dark (as are intervals 4 and 6). In *S. fulvicollis* each elytron bears a marginal, a sutural, and a single discal dark band (extending from the humeral angles to near the elytral apices). The anterior sclerite of the bursa copulatrix in *S. badeni* is convex along the anterior border and the lateral arms are short, extending less than half as far distally as the median piece (Fig. 75). In *S. fleutiauxi* (Fig. 77), *S. fulvicollis* (Fig. 50) and *S. melleus* (Fig. 73) the anterior margin is angled at the point where the lateral arms are directed posteriorly. *Semiotus badeni* is known primarily from Central America (Fig. 275). The other related species, as far as is known, occur in South America.

Note. The intensity of the elytral bands varies among individuals and between populations. The colors contrast from deep reddish brown to black. These differences are minor and blend in to each other in larger series. The differences in the type of *S. dohrni* and *S. badeni* are only of this nature and do not merit separate specific recognition.

Semiotus bispinus Candèze

(Figs. 54, 96, 209 and 273)

Semiotus bispinus Candèze 1874: 180. (Type: BMNH; type locality: Ecuador).

Length 24-25 mm (length/width ratio 4.6 to 4.7). Head aurantiacus to testaceus with basal and anteapical maculae piceus; bearing two spines anterolaterally; texture glabrous, nitidus with few scattered setae above eyes, punctation fine and scattered throughout; ocular index 73.0 to 75.0; frontal spines 45.0 to 47.0 % length of head. Antennae serrate, three or more segments short of hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 6-7 mm (length/width ratio 1.2), subparallel medially, converging on anterior fourth, hind angles diverging; margin incrassate with anterior fourth only clearly defined; color fulvus to luteus with broad piceus band extending from base to near anterior margin (sometimes with sanguineus band within piceus band); texture glabrous, nitidus, with fine punctation throughout, appearing impunctate laterally. Scutellum piceus, suborbicular, anterior margin recurved. Prosternum concave in profile; color sanguineus to testaceus with thin piceus band along suture; texture glabrous with long erect setae on lobe, punctation very fine medially, thicker and umbilicate laterally. Hypomeron fulvus to luteus; texture glabrous, nitidus with very fine punctation scattered throughout. Mesosternum testaceus to badius; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron testaceus to badius. Metasternum testaceus to badius; texture glabrous, nitidus with very fine punctures scattered throughout. Femora testaceus to badius.

Elytra 15 to 16 mm (length/width ratio 3.0), subparallel on anterior third to half, then narrowing to tip; color fulvus to luteus with alternating intervals lightly infusate; texture glabrous, nitidus, striae and stria punctures fine to obsolete; apices each bearing one spine.

Abdomen sanguineus to badius medially, fulvus to testaceous laterally; texture glabrous with fine decumbent setae on sternite 1, punctation fine throughout; female with two shallow to obscure foveae along lateral margin of sternite 5; anterior sclerite wider than long, lateral arms extending 2/3 length of median piece, median piece subtriangular basally, with several dentitions along lateral margin on basal half. Male with lateral blades of parameres wide, with acute apices and lateral spines, approximately 25 to 28% length of parameres.

Material examined. **ECUADOR:** Bolívar, Balzapamba, F. Campos (USNM); Los Ríos, Río Palenque, 47 km S Santo Domingo, 700' II-(22-27)-1976, H. & A. Howden (CNCI); **PERU:** Junín, 900 m., Soudoveni Ridges, Soudoveni / Huantadriri Vall., ca 100 km N Satipo, 1987 (PCCV).

Diagnosis. *Semiotus bispinus* is most closely allied to *S. flavangulus*. It is also similar to the species with two frontal spines and four or five dark elytral bands, *S. badeni*, *S. melleus*, *S. fascicularis*, and *S. clarki*. *Semiotus flavangulus* bears 8 to 9 dark elytral bands. Each band occupies a stria (Fig. 218). The intervals are pale. In *S. bispinus* (and other related species), alternating elytral intervals are dark. *Semiotus badeni* and *S. fascicularis* each bear a sutural, a marginal, and two discal bands per elytron. The discal bands occupy intervals 4 and 6. Interval 2 is pale. In *S. clarki* (Fig. 215), *S. melleus* (Fig. 213), and *S. bispinus* (Fig. 209), the second interval is dark (as are

intervals 4 and 6). *Semiotus bispinus* bears a single pronotal band and the the anterior third of the lateral pronotal margin is sulcate. In *S. melleus* and *S. clarki* the pronotum bears two discal bands and the lateral pronotal margin lacks sulci. The anterior sclerite of the bursa copulatrix in *S. badeni* is convex along the anterior border and the lateral arms are short, extending less than half as far distally as the median piece (Fig. 75). In *S. melleus* (Fig. 73) the anterior margin is angled at the point where the lateral arms are directed posteriorly. The anterior sclerite in *S. bispinus* is subangulate along the anterior border and the median piece is thick and covered with several dentitions (Fig. 54).

Semiotus buckleyi Candèze

(Figs. 35, 116, 230 and 277)

Semiotus buckleyi Candèze 1874: 183. (Type: BMNH; type locality: Ecuador).

Length. 25 to 27 mm (length/width ratio 4.2 to 4.4). Head with three frontal spines (two long anterolateral spines and one smaller median spine); color piceus basally, testaceous to sanguineous around spines; texture glabrous, punctures moderately deep and separated by distance greater than own width, becoming fainter and farther apart apically; ocular index 70.0 to 72.0; frontal spines approximately 29% length of frons. Antennae serrate, shy of hind angles by one segment in females, reaching to hind angles in males; segments 1 and 2 testaceous to badius, segments 3 to 11 piceous to rufopiceous. Pronotum 6 to 8 mm (length/width ratio 1.2 to 1.3), slightly converging on anterior half, hind angles diverging on posterior fourth, margin sulcate on anterior third to half, thickly rounded posteriorly, forming an elevated thickening above margin; disk piceous, anterior and

lateral margins fulvus to sanguineous; texture glabrous with punctation moderately deep and separate throughout; scutellum subchordate, testaceus medially with piceus border. Prosternum slightly concave in profile, medially glabrous with fine punctation becoming larger and deeper laterally with fine setae; lobe testaceus to sanguineous, remainder of prosternum sanguineous to piceus or with spine sanguineous (in some specimens most of prosternum is sanguineous). Hypomeron piceus along suture, testaceus to sanguineous laterally; texture glabrous with fine punctures laterally with thick fulvus setae, denser punctation medially. Mesosternum testaceus to piceus; texture glabrous medially with fine punctation and light setae laterally. Mesepisternum and meshypomeron testaceus to piceus. Metasternum testaceus to piceus; texture glabrous medially with fulvus setae laterally, fine punctures throughout becoming thicker laterally. Femora testaceus to badius.

Elytra 16 to 18 mm (length/width ratio 2.7 to 2.8), subparallel on anterior third then narrowing to tip, color fulvus with piceus bands along striae (often converging on humeri and near apices); texture glabrous, strial punctures lightly impressed apically, obscure to obsolete basally; apices each bearing one spine.

Abdomen ranging from rufopiceus throughout to sanguineous with pale margins; texture glabrous medially with thick setae laterally, punctures fine, becoming thicker laterally; female with two elliptical foveae in center of sternite 5; anterior sclerite with lateral arms long, multiserrate, projecting apically 3/4 length of median piece. Male with parameres wide basally, wider than lateral spine; lateral blades long, 32 to 35% length of parameres.

Material Examined. ECUADOR: Bolívar, Balzapamba, 650 m, F. Campos (USNM); Pichincha, S. Domingo, XII-1982, G. Onore (PCCV).

Diagnosis. *Semiotus buckleyi* is most closely allied to *S. illustris*, *S. kathleenae*, *S. virgatus* and *S. sommeri* with similarities to *S. reaumuri*, *S. glabricollis*, and other species with infusate striae. The elytra in *S. buckleyi* are pale brown to yellow with each stria dark brown to black, the striae themselves being very faintly, if at all, impressed. In *S. kathleenae*, the striae are impressed and the elytra are deep red, lacking dark bands. In *S. illustris* the elytra are pale brown to yellow but only have two dark bands (per elytron - one sutural and one marginal). *Semiotus virgatus* and *S. sommeri* have alternating elytral intervals with contrasting light and dark bands (Figs 241-242). In *S. buckleyi*, the elytral bands are restricted to the striae, the intervals are all pale (Fig. 230). Several other species have pale elytra with infusate striae and a dense covering of setae on the pronotum (*S. pilosus*, *S. cristatus*, *S. auripilis*, *S. linnei*, *S. perangustus*, *S. colombianus*, *S. vicinus*, and *S. angustus*). *Semiotus buckleyi*, *S. reaumuri*, and *S. glabricollis* have similar elytra but lack setae on the pronotum (or have very faint and inconspicuous setae). These species can be separated by the color of the elytral striae and by the pronotum. In *S. buckleyi*, the dark stria bands are black and extend out from the striae onto the elytral intervals (Fig. 230), and the lateral pronotal margins bear sulci on the anterior third to half. In *S. reaumuri* and *S. glabricollis*, the stria bands are light brown and the pronotum lacks sulci. The anterior sclerite of the bursa copulatrix in *S. buckleyi* bears an anterior convexity (Fig. 35) similar to that of *S. virgatus* (Fig. 76) and *S. sommeri* (Fig. 87), though the lateral arms are longer, extending nearly as far posteriorly as the median piece. In *S. virgatus* and *S. sommeri* the lateral arms are shorter, extending

approximately 1/2 and 1/4 the length of the median piece respectively. *Semiotus buckleyi* is known from Ecuador (Fig. 277), whereas *S. reaumuri* and *S. glabricollis* are known, although from few specimens, from Colombia (Figs. 293 and 285). The combination of dark bands along each elytral stria, glabrous pronotum, pronotal sulcus along the anterolateral margin, three frontal spines, along with the absence of a marginal macula on the pronotum readily separate *S. buckleyi* from all other known *Semiotus*.

Semiotus capucinus Candèze

Semiotus capucinus Candèze 1857: 334, Candèze 1874: 188, Kirsch 1884: 45. (Type: BMNH; type locality: New Granada).

Length 16 mm (length/width ratio 3.0 to 3.1). Head completely piceus; frons with anterolateral areas angled without spines; texture glabrous with few scattered setae above eyes, punctation fine throughout; ocular index 75.0 to 77.0. Antennae serrate, reaching 1 to 2 segments beyond hind angles; color piceus throughout. Pronotum 3 to 4 mm (length/width ratio 0.7 to 0.8), subcomplanate, much wider than long, hind angles diverging, disk strongly convex; margin thin, without sulcus; color completely piceus; texture glabrous, nitidus with fine punctation on disk becoming much denser laterally. Scutellum completely piceus, subquadrate, hind border rounded, anterior border recurved. Prosternum strongly convex in profile; color piceus; texture nitidus with long erect setae and fine punctation throughout. Hypomeron completely piceus; texture nitidus with long erect setae and fine punctation throughout. Mesosternum piceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and

meshypomeron piceus. Metasternum piceus; texture nitidus with long erect setae and fine punctation throughout. Femora piceus.

Elytra 13 mm (length/width ratio 2.5), strongly gibbous; color sanguineus throughout, without markings; texture nitidus with very few scattered setae, intervals convex, striae and stria punctures distinct; elytral apices angled, without spines.

Abdomen piceus; texture nitidus with long erect setae and fine punctation throughout.

Material Examined. **New Granada** (BMNH). This could be anywhere within the present boundaries of Panama, Colombia, Venezuela, and Ecuador. *Semiotus capucinus* is known only from the type.

Diagnosis. *Semiotus capucinus* is most closely allied to *S. ligatus* and *S. striatus*, exhibiting primitive characters of the genus. It can be easily distinguished from these species by the blood red elytra. *Semiotus ligatus* has green elytra and *S. striatus* has pale elytra with infusate striae. In general habitus and phylogenetic placement, *S. capucinus* is similar to the genera *Oistus* and *Semiotinus* by having a wide and gibbous body; however, *S. capucinus* is considered part of the genus *Semiotus* by having membranous tarsal pads and lacking the patterned tufts of setae. In the genus *Oistus*, the tarsal pads are comprised of stout setae and the elytra often bear colored patterns of setae. The strongly convex outline of the pronotum separates *S. capucinus* from species of *Semiotinus*, which have either recurved or straight lateral pronotal margins. The strongly gibbous elytra, very broad and convex pronotum, and completely piceus color (with sanguineus elytra) readily distinguish *S. capucinus* from all other *Semiotus*. Superficial similarities (in color) exist between *S. capucinus* and *S. carinicollis*; however, the later

has a much narrower pronotum (being about as long as wide) and lighter elytral coloration (more testaceus than sanguineous).

Semiotus carinicornis Kirsch

(Fig. 269)

Semiotus carinicornis Kirsch 1884: 46. (Type (male): SMTD; type locality: Colombia, Paramo de Huila, 3,500 - 4,000 m.).

Head completely piceus; frons with anterolateral areas rounded to angled, without spines; texture of scattered setae throughout. Antennae serrate, reaching 2 to 3 segments beyond hind angles; color piceus throughout. Pronotum as wide as long, narrowly sinuate, converging on anterior third; color completely piceus; texture with scattered setae throughout. Femora piceus.

Elytra subparallel on anterior 2/3 then narrowing to tip; color testaceus to aurantiacus, piceus at base; texture glabrous, nitidus, intervals convex, striae and stria punctures distinct; elytral apices without spines.

Material Examined. **COLOMBIA:** Huila / Tolima, Paramo de Huila, 3500-4000 m., D. Stübel (SMTD). *Semiotus carinicornis* is known only from the type.

Diagnosis. The piceus head and pronotum with testaceus elytra and lack of frontal and elytral spines distinguish *S. carinicornis* from all other *Semiotus*. Superficial similarities (in color) exist between *S. capucinus* and *S. carinicornis*; however, the latter has a much narrower pronotum (being about as long as wide) and lighter elytra, being more testaceus than sanguineus.

Semiotus catei n. sp.

(Figs. 134, 216 and 277)

Length 25 to 31 mm (length / width ratio 4.1 to 4.6). Head testaceus to aurantiacus with piceus maculae basally; texture glabrous with few erect setae above eyes and spines, punctation fine and scattered throughout; front with two spines anterolaterally. Antennae serrate, 2 to 3 segments shy of hind angles (in males). segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 5 to 8 mm (length / width ratio 0.9 to 1.2), with sides subarcuate, hind angles diverging; incrassate without sulcus; color fulvus to testaceus with median band aurantiacus to sanguineous, with two irregular sublateral bands piceus with lateral extension medially); texture glabrous, nitidus with fine shallow punctures scattered throughout. Scutellum piceus, broadly subchordate, convex laterally. Prosternum very slightly concave in profile on anterior 2/3; color aurantiacus to sanguineous, piceus along suture; texture glabrous, nitidus with few scattered setae throughout becoming denser on lobe, punctation very fine medially, denser and deeper laterally. Hypomeron fulvus to aurantiacus, suture piceus; texture glabrous, punctation fine to obsolete. Mesosternum sanguineous medially, piceus laterally, texture glabrous medially with fine dense setae laterally, fossa nearly impunctate, lateral areas containing fine setigerous punctures. Mesepisternum and meshypomeron piceus. Metasternum sanguineous medially, piceus laterally; texture glabrous with fine decumbent setae anterolaterally, punctation fine throughout. Femora rufopiceus to piceus.

Elytra 17 to 21mm (length / width ratio 2.7 to 3.1), subparallel on basal half then narrowing to tip; color fulvus to luteus, intervals 2, 4, 6, and 8 infusate; texture glabrous, nitidus intervals convex, striae clearly defined, punctures obsolete; apices each bearing one spine.

Abdomen aurantiacus to sanguineus medially, fulvus to luteus laterally with sublateral piceus bands; texture glabrous, nitidus with fine decumbent setae sublaterally on sternite 1, punctation fine throughout. Male with parameres short, approximately 1.5 times length of basal piece, lateral blades subtriangular, 25% to 30% length of parameres.

Material examined. Holotype (male): **COLOMBIA**: Valle del Cauca, W. Cordillera, Lake Colima, Río Bravo Valley nr. Buga, 1,180 to 2,000 m., IX-1988 (PCCV); Paratypes: **COLOMBIA**: Valle del Cauca, Colima Valley, Buga, IV-1989 (2, PCCV).

Diagnosis. *Semiotus catei* is most closely allied to *S. aliciae*, *S. trinitensis*. It is most notably different from these species in having a gibbous profile. It is also similar to the generally gibbous *S. gibbosus*. *Semiotus catei* can be readily distinguished from *S. aliciae* by the patterned pronotum and elytra (with contrasting light and dark bands). In *S. aliciae* the pronotum and elytra are unicolorous orange and black respectively (Fig. 259). Additionally, the frontal spines in *S. catei* are stout and well defined. In *S. aliciae*, the frontal margin is angled only, without spines. *Semiotus trinitensis* has a procurved (rounded anteriorly) scutellum. The scutellum in *S. catei* is broad and flat throughout. This is similar to the scutella of *S. imperialis* and *S. cuspidatus* (both these species lack the two anterolateral frontal spines, evident in *S. catei*; and, bear a median frontal spine, which is absent in *S. catei*). *Semiotus trinitensis* can also be distinguished from *S. catei*

by the presence of two dark bands per elytron. *Semiotus catei* bears dark bands over each stria. This pattern is similar to that evident in *S. gibbosus*. These two species can be separated by the color of the scutella and legs. In *S. catei* they are black (with occasional light areas). In *S. gibbosus* they are orange to light brown. Also, the lateral margins of the pronotum are more strongly divergent in *S. gibbosus* (Fig. 246) than in *S. catei* (Fig. 216).

Note. *Semiotus catei* is named in honor of Peter Cate of Vienna, who has assisted in this research.

Semiotus chassaini n. sp.

(Figs. 65, 238 and 277)

Length 22 to 23 mm (length / width ratio 4.0 to 4.1). Head testaceous to aurantiacus with basal macula piceus; anterolateral areas rounded to slightly angled without spines, median anterior margin angled to slightly spinose; texture with fine setae and deep punctation scattered throughout. Antennae approximately one segment short of hind angles in females, with segments 1 and 2 testaceous, segments 3 to 11 piceus.

Pronotum 5 to 6 mm (length / width ratio 1.0 to 1.1), widest at base becoming evenly narrower anteriorly, hind angles gradually enlarged, hardly divergent; margin incrassate, without distinct definition; color testaceous to aurantiacus medially, fulvus to luteus laterally, with two piceus bands between colors; texture glabrous with scattered setae, piceus bands with dense decumbent setae. Scutellum suborbicular, fulvus to testaceous. Hypomeron fulvus to luteus laterally, piceus along suture; texture glabrous with fine

punctures laterally, fine setae and dense punctation medially. Prosternum slightly concave in profile, prosternal process not divided apically; color sanguineus to aurantiacus with suture piceus; texture glabrous with fine punctures medially, fine setae and dense punctation laterally. Mesosternum declivous, color testaceus medially, piceus laterally with fossa glabrous and impunctate, lateral areas with dense setae and punctation. Mesepisternum and meshypomeron piceus. Metasternum piceus with medial macula testaceus; texture glabrous with fine punctures medially, fine setae and dense punctation laterally. Femora testaceus to aurantiacus.

Elytra 16 to 17 mm (length / width ratio 2.8 to 2.9), subparallel on anterior third, then narrowing gradually to tip; color fulvus to testaceus with infusate striae; texture glabrous nitidus, striae and strial punctures shallow, intervals convex, intervals 3 (more than others), 5, and 7 more strongly convex and elevated; apices each bearing one spine.

Abdomen testaceus to aurantiacus with sublateral piceus bands; texture glabrous with fine punctures medially, fine setae and dense punctation laterally. Female with two narrowly obovate foveae on posterior 2/3 of segment 5, lateral arms of anterior sclerite extending apically very little, median piece subequal in length to width of base. Male not seen.

Material Examined. Holotype (female): **COLOMBIA**: Magdalena, San Lorenzo, 41 km S. Santa Marta, 700', V-10-1973, Campbell & Howden (CNCI).

Diagnosis. *Semiotus chassaini* is allied to *S. imperialis*, *S. cuspidatus*, *S. gibbosus*, *S. fryi*, *S. girardi* and *S. punctatostriatus*. All these species are gibbous in profile and have convex interstriae. *Semiotus imperialis*, *S. cuspidatus* and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down.

The anterolateral areas of the frons are rounded, without spines. Of these three species, only *S. chassaini* bears a single spine at the end of each elytron. Both *S. imperialis* and *S. cuspidatus* bear two small spines apically per elytron. The female foveae of *S. chassaini* occupy over half of sternite 5, the other two species have the foveae restricted to the apical fourth. *Semiotus chassaini* has three elytral intervals raised above the level of the other intervals, this is not the case in *S. imperialis* and *S. cuspidatus*. The other primitive gibbous species (*S. gibbosus*, *S. fryi*, *S. girardi*, and *S. punctatostriatus*) all bear two spines along the anterolateral margin of the frons and lack a medial frontal spine. The anterior sclerite of the bursa copulatrix is unarmed in *S. chassaini* (Fig. 65) as it is in *S. gibbosus*, though the later species has longer lateral arms that curve further posteriorly (Fig. 62). The anterior sclerite in *S. punctatostriatus*, *S. imperialis* and *S. cuspidatus* are all armed with several small dentitions (Figs. 38, 46, and 48). *Semiotus chassaini* is presently known only from Colombia (Fig. 277). Of the related species, only *S. imperialis* and *S. punctatostriatus* are also known from Colombia (Figs. 272 and 285). The combination of raised elytral interval 3, gibbous profile and a single frontal spine distinguish *Semiotus chassaini* from all other *Semiotus*.

Note. *Semiotus chassaini* is named in honor of Jacques Chassain.

Semiotus clarki n. sp.

(Figs. 64, 215 and 268)

Length 27 to 28 mm (length / width ratio 4.5 to 4.6). Head testaceous to aurantiacus with piceus maculae basally; texture glabrous with few long setae above eyes

and spines, punctation scattered throughout becoming subumbilicate basally; front with two spines anterolaterally. Antennae serrate, 1 to 2 segments shy of hind angles (in females), segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 6 to 7 mm (length / width ratio 1.2 to 1.3), narrowly sinuate, narrowing on anterior fifth, hind angles diverging; margin incrassate without sulcus, anterior fifth very faintly explanate; color fulvus to luteus laterally, aurantiacus to testaceus medially, with two piceus sublateral bands connected to margin by irregular piceus maculae near center of lateral margin; texture glabrous, nitidus with fine medium punctures scattered throughout becoming umbilicate anteriorly. Scutellum rufopiceus, subquadrate, anterior margin recurved. Prosternum very slightly concave in profile, prosternal process not divided at tip; color aurantiacus to sanguineous, piceus along suture; texture glabrous, nitidus medially with fine setae laterally and on lobe, punctation fine medially, much larger and umbilicate laterally. Hypomeron piceus along suture, luteus laterally; texture glabrous, nitidus with fine punctation becoming obsolete laterally. Mesosternum aurantiacus to sanguineous medially, piceus laterally; texture glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum and meshypomeron piceus. Metasternum aurantiacus to testaceus medially, piceus laterally; texture glabrous, nitidus with fine decumbent setae anterolaterally, punctation fine throughout. Femora testaceus to badius.

Elytra 17 to 18 mm (length / width ratio 2.9 to 3.0), subparallel on basal half then narrowing to tip; color luteus with intervals 1 (only along suture), 2, 4, 6, 8, and part of lateral margin piceus; texture glabrous, nitidus, striae and stria punctures moderately to well defined; apices each bearing one spine.

Abdomen testaceus to aurantiacus medially, fulvus to luteus laterally with sublateral bands badius; texture glabrous, nitidus with fine decumbent setae on sternite 1, punctation dense and scattered throughout; female without foveae on sternite 5; anterior sclerite with lateral arms recurved apically, 2/3 length of median piece, serrate dentitions throughout. Male not seen.

Material examined. Holotype (female): **COLOMBIA**: Valle del Cauca, W. Cordillera, Lake Colima, Río Bravo Valley nr. Buga, 1,180 to 2,000 m., XII-1988 (PCCV).

Diagnosis. *Semiotus clarki* is most closely allied to *S. limatus*, *S. badeni*, and the species in the *angulatus* group. It can be separated from these species by the pattern of the elytral bands and by the shape of the antennae. *Semiotus limatus* bears two dark bands per elytron (one sutural and one marginal). *Semiotus badeni* bears four dark bands, one sutural, one marginal and one each on intervals 4 and 6 (Fig. 207). *Semiotus clarki* bears dark bands on intervals 2, 4, 6, 8 and part of the lateral margin (Fig. 215). The antennae in *S. clarki* are serrate (as in Fig. 165). In the *angulatus* group they are pectinate to subpectinate (Fig. 166-167). The median piece of the anterior sclerite of the bursa copulatrix is thick and completely covered by dentitions in *S. limatus* and the lateral arms curve posteriorly (undivided) nearly as far as the median piece (Fig. 78). In *S. clarki*, the median piece bears only a pair of dentitions (Fig. 64). In *S. badeni* the median piece is unarmed apically and the lateral arms extend posteriorly less than half the length of the median piece (Fig. 75). The lateral arms of the anterior sclerite in the *angulatus* group are divided distally (Figs. 41, 43-45). Similarity occurs between *S. clarki* and *S. melleus* and *S. bispinus*, which also have two frontal spines and 4 or 5 dark

elytral bands. These species lack the dark lateral pronotal macula of *S. clarki* that extends from the discal bands (Fig. 215). *Semiotus bispinus* is presently known from Ecuador, whereas, *S. melleus* is known from Venezuela. *Semiotus clarki* is known only from Colombia (Fig. 268).

Note. *Semiotus clarki* is named in honor of Shawn M. Clark, Brigham Young University.

Semiotus colombianus n. sp.

(Figs. 81, 232 and 273)

Length 23 to 26 mm (length / width ratio 4.3 to 4.6). Head piceus basally, spines luteus to aurantiacus; with 3 frontal spines; texture of long erect setae over eyes, finer decumbent setae on frons, punctation deep and scattered throughout; ocular index 71.0 to 74.0. Antennae serrate, reaching hind angles in females; segments 1 to 2 fulvus, segments 3 to 11 piceus. Pronotum 5 to 6 mm (length / width ratio 1.2 to 1.3), sinuate, hind angles moderately divergent; margin incrassate becoming explanate on anterior fifth, sulcate only on anterior fourth; color fulvus to aurantiacus laterally and anteriorly with median band aurantiacus to sanguineous, with two broad sublateral piceus bands extending from base to near anterior border; texture glabrous medially with dense luteus decumbent setae laterally, punctation fine medially becoming dense laterally; scutellum suborbicular, anterior margin recurved, fulvus with obscure borders. Prosternum slightly concave in profile, prosternal process not divided at tip; color fulvus to testaceus medially with piceus band along suture; texture with few long erect setae scattered throughout with

fine dense decumbent setae laterally, punctation fine medially, dense laterally.

Hypomeron fulvus with piceus band along suture; texture of fine decumbent setae and fine punctation becoming denser along suture. Mesosternum fulvus to testaceus, fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum and meshypomeron fulvus to testaceus. Metasternum glabrous with fine punctation medially and with fine dense setae and fine punctures anterolaterally; color aurantiacus to testaceus medially, with piceus medial stripe and anterolateral areas. Femora fulvus to testaceus.

Elytra 16 to 18 mm (length / width ratio 3.0 to 3.2), subparallel on anterior third to half before narrowing to tip; color fulvus to luteus with badius to piceus irregular bands along each stria; texture glabrous, nitidus, striae and strial punctures obscure to obsolete; apices each bearing one spine.

Abdomen aurantiacus to testaceus with sanguineus to badius sublateral bands; texture glabrous, nearly impunctate medially, dense punctures and dense decumbent setae laterally; female with two elliptical foveae on posterior 3/5 of sternite 5; anterior sclerite with lateral arms convex basally extending posteriorly 1/2 to 1/3 length of median piece, and bearing several dentitions along inner surface. Male unknown.

Material examined. Holotype (female): **COLOMBIA**: Cundinamarca, Choachi, 1943, F.R. Fosberg (USNM); Paratypes: **COLOMBIA**: Antioqua, Medellín, VII-1879 (1, NHMW); Cundinamarca, Fusagasuga, alt. 1746, II-18-40, F. Jotoya (1, USNM); illegible label (1, CNCI); No Data (1, OXUM); **ECUADOR**: Napo, 2 km S Oritoyacu, 20 km S Baeza, 1500 m., III-(4-5)-1976, J.M. Campbell (1, NHMW).

Diagnosis. *Semiotus colombianus* is most closely allied to *S. angustus* and *S. perangustus* and the other species with three frontal spines, pale elytra and infusate

striae (including *S. cristatus*, *S. auripilis*, *S. linnei*, *S. perangustus*, and *S. angustus*). *Semiotus buckleyi*, *S. reaumuri*, and *S. glabricollis* similarly have pale elytra with infusate striae but have glabrous pronota. The pronota in the other species are covered with dense setae. *Semiotus auripilis* is unique among these species in having strongly convex elytral intervals. The intervals are flat or nearly flat in the other related species. *Semiotus cristatus* and *S. linnei* are similar to *S. colombianus* but can be separated by the relatively darker striae and by the smaller female foveae. In *S. cristatus* and *S. linnei* the striae generally range in color from sanguineus to badius and contrast somewhat with testaceus to aurantiacus interstriae. In *S. colombianus* the striae are generally piceus and contrast strongly with the fulvus to luteus interstriae. The female foveae are restricted to the apical half of sternite 5 in *S. cristatus* and *S. linnei*. In *S. colombianus* they extend anteriorly onto the basal half. *Semiotus colombianus* is larger (over 22 mm long) than *S. angustus* and *S. perangustus* (both under 21 mm long). The anterior sclerite of the bursa copulatrix bears a convex extension along the anterior margin in *S. colombianus* (and *S. cristatus* and *S. linnei* (Figs. 80-82)). In *S. angustus* and *S. perangustus* the anterior margin is evenly convex (Figs. 71-72). The median arm of the anterior sclerite is shorter in *S. colombianus* (less than two times the length of the lateral arms) than in *S. cristatus* and *S. linnei* (both over two times longer than the lateral arms). *Semiotus colombianus* is known only from Colombia. *Semiotus angustus* is known from Bolivia and Peru. *Semiotus perangustus* is known from Ecuador.

Note. *Semiotus colombianus* is named after Colombia, the country of primary provenance.

Semiotus cristatus Candèze

(Figs. 80, 129, 144, 231 and 269)

Semiotus cristatus Candèze 1874: 182, Szombathy 1909a: 121, Fleutiaux 1891: 275.

(Type: BMNH; type locality: Venezuela; Lectotype: MNHN (on loan from BMNH); type locality: Colombia).

Length 22 to 31 mm (length / width ratio 4.0 to 4.5). Head piceus with or without testaceous to aurantiacus spines; with 3 frontal spines subequal in length; texture of fine pale decumbent setae and long erect setae over eyes and spines, punctation deep with punctures separated by about width of punctures; ocular index 70.0 to 73.0. Antennae serrate, reaching beyond hind angles by 0 to 1 segment; segments 1 and 2 badius, segments 3 to 11 rufo-piceus to piceus. Pronotum 4 to 8 mm (length / width ratio 1.0 to 1.2), narrowly sinuate; margin sulcate on anterior third to half, thickly rounded posteriorly, with elevated thickening above margin on anterior half; disk with two large piceus sub-rectangular maculae, interrupted medially by sanguineus longitudinal band, anterior border and margins aurantiacus to sanguineous; texture glabrous medially with thick pile laterally, punctation fine and moderately dense medially, deep and often contiguous laterally; scutellum testaceous, chordate, and glabrous or with few scattered punctures. Prosternum nearly straight with lobe descending ventrally; color sanguineous to piceus medially, lobe aurantiacus, with or without lateral area piceus; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron aurantiacus, lateral areas glabrous with moderately dense pile along suture. Mesosternum piceus laterally, fossa sanguineous; fossa texture glabrous, lateral areas covered with fine

setae and punctures. Mesepisternum and meshypomeron testaceus. Metasternum piceus with or without badius bands on each side of median piceus area, glabrous medially with dense setae anterolaterally, punctation fine medially becoming denser laterally. Femora testaceus to aurantiacus.

Elytra 15 to 22 mm (length / width ratio 2.7 to 3.1), nearly parallel-sided on anterior 2/3 then narrowing evenly to apex; color fulvus with infusate striae (also surrounding scutellum); apices sub-spinose.

Abdomen sanguineus to badius medially, becoming rufo-piceus, margin lighter; setae scattered throughout except median area, punctation fine medially, deeper laterally; female foveae on segment 5 elliptical on apical half; anterior sclerite with lateral arms convex basally extending posteriorly 1/2 to 1/3 length of median piece, and bearing several dentitions along inner surface. Male with parameres broad, 2.5 times longer than wide, lateral blades 35 to 38% length of parameres.

Material examined. **COLOMBIA:** (MNHN); **VENEZUELA:** Federal District, Las Trincheras, VI-6-22, L.R. Reynold (FMNH); Mérida, Anden, Umg. Hotel de los Frailes, 2600 m., Franz (PCCV); Mérida, S. Briceno (USNM); Mérida, 18.5 km NE Páramo la Culata, 8°44'34" N, 1°3'44" W, 2950 m., V-25-1998, J. Ashe, R. Brooks, R. Hanley (SEMC); P.N. Sierra Nevada, trail between L. Mucubaji & L. Negra, 3500 m., VI-4-1988, A.L. Norrbom & G.J. Steck (USNM); Nueva Esparta, La Asunción (USNM); Zulia, Maracaibo (ZMUC); State unknown, Caracas Valley, V-6-22, L.R. Reynold (FMNH).

Diagnosis. *Semiotus cristatus* is most closely allied to *S. perangustus*, *S. linnei*, *S. colombianus*, and *S. angustus*. Overall similarities also exist with *S. auripilis*. These

species have three frontal spines and pale elytra with infusate striae. *Semiotus auripilis* is readily separated from *S. cristatus* by the strongly convex elytral intervals. The intervals in *S. cristatus* are flat, or nearly so. The lateral frontal spines of *S. cristatus* are shorter than those of the other related species, not extending forward beyond the length of the medial spine (Fig. 144). The lateral spines in the other species are much longer than the medial spine (as in Fig. 142). The two piceus pronotal bands in *S. cristatus* are nearly linear and approximate, the area between being narrow and parallel-sided. In *S. linnei* and *S. colombianus*, these bands are arcuate medially. The anterior sclerite of the bursa copulatrix is more heavily armed in *S. cristatus* than in *S. linnei* and *S. colombianus*. *Semiotus cristatus* has dentitions all along the posterior margin of the lateral arms extending onto the median piece (Fig. 80). In *S. colombianus* the dentitions do not extend to the apex of the lateral arms (Fig. 81). In *S. linnei* the median piece is without dentitions (Fig. 82). The aedeagus is narrow in *S. linnei* (Fig. 130) with the base of the parameres approximately as wide as the parameres across the apical blades. In *S. cristatus* the base of the parameres is wider than the aedeagus at the widest point of the apical blades (Fig. 129).

Semiotus decoratus (DeJean)

(Figs. 74, 143, 175, 224 and 281)

Pericallus decoratus DeJean 1836: 96. (Type: not found; type locality: ?)

Semiotus decoratus Candèze 1857:306, Candèze 1874: 174. (Syntypes (3), female: BMNH; type locality: Cayenne).

Semiotus approximatus Candèze 1857: 305, Candèze 1874: 174, Chassain *in press B*.

(Holotype, male: BMNH; type locality: Cayenne).

Length 25 to 27 mm (length / width ratio 5.0 to 5.2). **Head** testaceous to aurantiacus with piceus maculae basally; texture glabrous with occasional setae above eyes and spines, punctation fine and scattered throughout becoming umbilicate basally; front with two spines anterolaterally, with area between sharply angled. **Antennae** serrate, three segments shy of hind angles (in females), with segments 1 and 2 testaceous, segments 3 to 11 rufo-piceus to piceus. **Pronotum** 6 to 7 mm (length / width ratio 1.5 to 1.6), narrowly sinuate, narrowing anteriorly, hind angles divergent; margin incrassate on posterior 2/3, declivous sulcate and explanate on anterior third; color fulvus to testaceous with median band and lateral maculae piceus; texture glabrous with punctation fine and evenly scattered throughout except for a few fine, often umbilicate, punctures along anterior margin. Scutellum piceus, broadly subchordate. Prosternum concave in profile; color fulvus to testaceous; texture with fine scattered setae laterally and on lobe, punctation fine medially becoming deeper and larger laterally. Hypomeron fulvus to testaceous with small piceus macula on lateral border extending from dorsum; texture glabrous with fine scattered punctures throughout, becoming denser anteriorly. Mesosternum fulvus to testaceous and glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum and meshypomeron fulvus to testaceous. Metasternum fulvus to testaceous; texture glabrous with very fine punctures scattered throughout; metepimeron fulvus to piceus. Femora fulvus to testaceous throughout.

Elytra 16 to 18 mm (length / width ratio 3.3 to 3.4), subparallel on anterior third, evenly narrowing to tip; color fulvus to testaceus with badius to piceus markings along suture and lateral margin becoming wider apically; texture glabrous with striae and strial punctures fine to obsolete, interstriae wrinkled; apices each bearing one spine.

Abdomen fulvus to testaceus; texture glabrous with dense fine punctures scattered throughout, becoming larger and nearly contiguous on first visible sternite; female with two obovate foveae on posterior 2/3 of sternite 5; anterior sclerite with lateral arms curved mesally, bearing fine dentitions apically, extending distally approximately 3/4 length of median piece. Male not seen.

· **Material examined.** **BRAZIL:** Amazonas, Estirao do Ecuador, Río Jaurai, X-1979, M. Alvarenga (CNCI); **COLOMBIA:** Department unknown, Umbria, Guines Fluss (CUIC); **FRENCH GUIANA:** Bas Maroni, Le Moul (MNHN); Maroni (MNHN); St. Laurent, Maroni, Audouit, 1862 (MNHN); **GUYANA:** Mazaruni-Potaro, Takutu Mountains, 6° 15' N, 58° 55' W, XII-8-1983, W.E. Steiner (USNM); **SURINAM:** District Brokopondo, Brownsberg Nature Reserve, Mazaroni plateau, 500 m., III-4-1986 (CASC); **VENEZUELA:** Orinoco River, LeMoul (MNHN).

Diagnosis. *Semiotus decoratus* is most closely allied to *S. affinis*, *S. intermedius* and *S. lafertei*. *Semiotus illustris*, though not phylogenetically related, is superficially similar. All of these species have two dark bands on the elytra (one sutural and one marginal) that converge near the apex. These species also have two stout lateral frontal spines and an angled area between, forming a position phylogenetically roughly between those species with two frontal spines and those with three. *Semiotus decoratus* is readily distinguished from the other relates species by the single pronotal band (Fig. 224). The

other related species have two pronotal bands (Figs. 219-221, and 223). In *S. decoratus* (and *S. illustris*) the venter is entirely pale yellowish brown to orange with occasional black markings on the hypomera. The other related species have pronounced black bands on the abdomen and metepimera. In addition to the pronotal bands, *S. decoratus* can be separated from *S. illustris* by the darker antennae and the shape of the anterior sclerite of the bursa copulatrix. In *S. illustris* the antennae are all testaceous to aurantiacus. They (excepting the first 2 or 3 segments) are dark brown to black in *S. decoratus*. The anterior sclerite in *S. decoratus* bears two stout dentitions near the base of the lateral arms, the lateral arms themselves bearing sharp dentitions only near the apex (Fig. 74). In *S. illustris*, the lateral arms do not bear dentitions apically, but rather medially, and the base is unarmed (Fig. 85). *Semiotus decoratus* can be separated from all other *Semiotus* by the two converging piceous bands on each elytron, the stout frontal angles with the broadly angulate median area between, and the completely pale venter.

Note. The holotype of *S. approximatus* is the same species as the types of *S. decoratus*. This synonymy has been recognized by Chassain (*in Press, B*).

Semiotus exsolutus Candèze

(Figs. 89, 131, 178, 239, 240 and 270)

Semiotus exsolutus Candèze 1900: 82. (Type: ISNB; type locality: Colombia).

Semiotus superbus championi Chassain. (Holotype: MNHN; type locality: Panama). New

Synonym

Semiotus superbus panamensis Chassain 1998: 77 (Holotype: MNHN; type locality:

Panama). New Synonym

Length 19 to 26 mm (length/width ratio 4.4 to 4.9). **Head** testaceus to aurantiacus with piceus macula broad at base, narrowing anteriorly; bearing three spines apically; texture glabrous with few scattered setae above eyes and spines, punctation fine and well separated, becoming thicker basally; ocular index 73.0 to 75.0; spines 30% length of frons. **Antennae** serrate, reaching hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. **Pronotum** 4 to 7 mm (length/width ratio 1.2 to 1.4), with sides arched, hind angles divergent, anterolateral angles impressed, margin thinly rounded, without sulcus; color fulvus laterally with broad piceus band extending from base to apex (or with two narrower bands sublaterally, or with sanguineus band separating two piceus bands); texture glabrous with fine punctures scattered throughout. Scutellum rufo-piceus to piceus, subchordate. Prosternum slightly concave in profile; color aurantiacus to sanguineus with lobe and lateral area testaceus to aurantiacus, suture with piceus band; texture glabrous medially with fine scattered setae laterally, punctation fine medially becoming denser and deeper laterally. Hypomeron fulvus with suture piceus; texture glabrous with fine punctation scattered throughout, becoming denser toward suture. Mesosternum fulvus to testaceus with obscure margins; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron fulvus to testaceus with obscure margins. Metasternum testaceus to aurantiacus with piceus line medially and along lateral margin; texture with very fine setae scattered medially, becoming denser laterally, punctation very fine medially, denser laterally; metepimeron piceus. Femora testaceus to badius.

Elytra 13 to 18 mm (length/width ratio 2.9 to 3.3), subparallel on anterior third, then narrowing to tip; color fulvus with five (including sutural band) piceus bands; striae fine to obsolete, stria punctures shallow to poorly defined, interstriae wrinkled; apices each bearing one spine.

Abdomen fulvus to testaceus laterally, testaceus to aurantiacus medially with piceus sublateral bands extending from sternite 1 to sternite 2 to 5; texture with few fine erect setae scattered medially, sternite 1 with dense decumbent setae behind metacoxae, punctation fine and scattered throughout becoming denser on sternite 1; female with 2 elliptical foveae on apical half of sternite 5; anterior sclerite strongly convex across lateral arms, median piece two times as long as lateral arms. Male with parameres narrow medially, lateral blades narrow, 32 to 34% length of parameres.

Diagnosis. *Semiotus exsolutus* is most closely allied to *S. superbus*, *S. taeniatus*, and *S. intermedius*. It can be separated from these species by the lack of sulci along the lateral margin of the pronotum and by the elytral color patterns. *Semiotus exsolutus* lacks lateral pronotal sulci, the other three species have short sulci in the anterior third of the lateral pronotal margin. *Semiotus intermedius* has two dark bands per elytron (one marginal and one sutural) and *S. taeniatus* has three bands per elytron. Both *S. exsolutus* and *S. superbus* have at least four dark bands per elytron. Several species have alternating light and dark elytral bands and glabrous pronota similar to *S. exsolutus* and *S. superbus*. Of these, *S. regalis* is readily separated by having intervals 1 and 2 black (Fig. 222). In *S. exsolutus*, the elytral bands cover alternating intervals with intervals 1 and 2 being of two contrasting colors. This same pattern is evident in *S. acutus*, *S. germari*, *S. kirschi*, and *S. illigeri*. The last three of these species have a short marginal sulcus (not

extending onto the posterior half). *Semiotus exsolutus* can be separated from *S. acutus* (both lacking pronotal sulci) by the presence of stria punctures (which are nearly obsolete in *S. acutus*) and by the thinner (occasionally single) pronotal bands (Fig. 240). In *S. acutus*, the pronotal bands are wider (Fig. 243). The anterior sclerite of the bursa copulatrix differ in these species. In *S. acutus*, the series of dentitions along the posterior border extend nearly to the tip of the lateral arms (Fig. 70). In *S. exsolutus*, the dentitions are clustered around the median piece (Fig. 89).

Material Examined. COSTA RICA: Alajuela, Poás, Vara Blanca 1700, III-15-1932, H. Schmidt, F. Neverman (USNM); Cartago, Chitaria, VI-19-1967, Flint & Ortiz (USNM); Grano de Oro, Chirripó, 1120 m., IX-1993, P. Campos (INBC); Guayalbillos, SW Aohang, Vulkan Irazu, 1500-2000 m, (USNM); Q. Segunda, P.N. Tapantí, 1300 m., X-1993, G. Mora (INBC); Río Aquiares near Santa Cruz, 1500 m., 9 km NW Turrialba, V-15-1985 (EMEC); Río Dos Amigos, P.N. Tapantí, 1500 m., XI-1994, R. Delgado (INBC); Río Navarro, V-1937 (USNM); Sector La Represa beginning of Sendero to Rancho Negro, 1700 m., III-1997, R. Delgado (INBC); Vulcan Turrialba, 3000 m, A. Smith, XI-32, on tree stump, F. Neverman (USNM); Westabhang, Vulkan Irazu, 1800-2000 m, IV-30-26, T. Assmann, F. Neverman (USNM); IBID III-11-28; IBID (I-III)-35; IBID V-9-26; Guanacaste, Derrumbe, Est. Mengo, 1400 m., W side Volcán Cacao, VII-11-1988, Janzen & Hallwachs (INBC); Río San Lorenzo, 1050 m., Tierras Morenas, Z.P. Tenorio, (III-23)-(IV-21)-1992, A. Marin (INBC); Heredía, Braulio Carrillo, San Rafael, VIII-12-1984 (INBC); Limón, Valle del Silencio, 2200 m., IX-10-1984, A. Solis (INBC); Puntarenas, Buen Amigo, San Luís, Monteverde, 1000-135- m., III-1995, Z. Fuentes (INBC); Buenos Aires, La Amistád, Sector Altamira, XI-1993, R. Delgado (INBC);

Catarata, 4.5 km NE Cerro Pittier, 1300-1360 m., VII-13-1996, M. Moraga (INBC);
 Cerro Amigos, 1820 m., III-23-1998, Z. Fuentes & F. Alvarado (INBC); Cerro Biolley,
 Buenos Aires, 1766 m., III-(5-9)-1996, R. Villalobos (INBC); Cerro Frantzius, 2134 m.,
 (IV-24)-(VI-8)-1997, R. Villalobos, Malaise trap (INBC); Cloud Forest Reserve
 Monteverde, 1450 m., V-(18-19)-1985, J. Doyen (EMEC);Cotoncito, 3.5 km N Lucha,
 1600 m., V-(13-16)-1997, A. Picado & A. Solis (INBC); Est. Biol. Las Alturas, 1500 m.,
 Coto Brus. (III-23)-(V-2)-1992, F. Araya (INBC); Est. La Casona, R.B. Monteverde,
 1500 m., VI-1991, N. Obando (INBC); Est. Pittier, Sendero a Río Canasta, 1750-1850
 m., IV-(5-10)-1997, M. Moraga, beating sheet (INBC); Fila Cruces, Laguna Gamboa,
 1400 m., V-20-1996, I.A. Chacón (INBC); Finca Cafrosa, Est. Las Mellizas, P.N.
 Amistád, 1300 m., (VI-19)-(VII-26)-1990, R. Delgado (INBC); Monteverde, Camino a
 San Luís, 900 m., VI-1991, M.A. Zumbado (INBC); Monteverde, 1500 m., VI-3-1972, C.
 Guindon (CASC); Monteverde Res., 1500 m., VIII-(17-18)-1987, H&A Howden
 (CMNC); Monteverde Res., 1400 m., VIII-21-1987, H&A Howden (CMNC);
 Monteverde area, VI-6-1973, 1400 - 1700 m., Erwin & Hevel Central American
 Expedition, 1973 (USNM); Monteverde, 1600 m., V-2-1974, P. Opler (EMEC);
 Monteverde Reserve 1500 m., V-29-1979 H. & A. Howden (CNCI); Monte Verde de
 Guanacaste, Powell's Place, 1560 m elev, IV-16-76, A.H. Powell (MTEC); San Luís,
 Monteverde, 1000-1350 m., I-1995, Z. Fuentes (INBC); Sitio Coto Brus. 2.6 km ENE
 Cerro Bellavista, 1800-1900 m., III-22-1996, E. Navarro (INBC); San José, Est. Cueici,
 Sendero al Mirador, 4.6 km E Villa Mills, 2640 m., III-(17-22)-1996, B. Gamboa, at light
 (INBC); Est. Las Nubes de Santa Elena, Sendero el Llano, 1900 m., X-2-1995, E. Alfaro
 (INBC); F. Cementario de la Máquina, 2100-2500 m., P.N. Chirripó, III-2-1993, M.

Zumbado (INBC); Finca Zacatales, 2100 m., VIII-(8-10)-1995, M.A. Zumbado (INBC); Pico Blanco, 1500 m., III-6-1991, H&A Howden (CMNC); San Gerardo de Dota, 2000-2500 m., II-(22-26)-1992 (INBC); 15 km N San Ysidro, V-24-1985 (EMEC); Province unknown, Coronado, 1400-1500 m, X-15-23, F. Neverman (USNM); La Palma, 1500 m, II-7-24, F. Neverman (USNM); La Palma, 4800 ft., E. Fernandez (USNM); Matina, Waldeck Farm (NHMW); **PANAMA:** Chiriquí, Cerro Punta, IV-1940 (OSUC); Cerro Punta, 8000', VII-(18-24)-1961, J.W. Campbell (CNCI); Cerro Punta, 5300', V-1961, C.E. Yunker (CNCI); Cerro Rando, 1535 m., V-24-1973, G. Ekis (USNM); Fortuna, 82°15'W, 8°44'N, V-18-1978, O'Brien & Marshall (CNCI); Las Lagunas, 1360 m., 4 km W Hato del Volcán, V-(22-23)-1977, H & A Howden (CNCI); Potrerillos, (IV-28)-(V-8)-1933 (CASC); IBID, I-25-1935; Volcán de Chiriquí (NHMW); 2.5 km W Cerro Punta, 8°51'N, 82°36'W, 1720 m., III-28-1975, H. Stockwell (CNCI); 2 km W Cerro Punta, 1700 m., (V-19)-(VI-8)-1977, S. & J. Peck & H. Howden (CNCI); 12 km NE Santa Clara, Cerro Pando, 8°54'73" N, 82°43'29" W, 1850 m., VI-18-1996. R. Anderson, oak forest (CMNC).

Note. *Semiotus s. panamensis* and *S. s. championi* are both the same as the type of *S. exsolutus*. Chassain (1998) recognized *S. panamensis* and *S. championi* as varieties of *S. superbis*. In the first couplet of Chassain's (1998) key to subspecies of *S. superbis*, he uses the character of the marginal sulcus of the pronotum to separate *S. s. superbis* and *S. s. kirschi* from *S. s. panamensis*, *S. s. reductus*, and *S. s. championi*. This study recognizes the importance of the marginal sulcus as delimiting species. The two varieties of Chassain were based on color patterns on the pronotum. *Semiotus superbis panamensis* consisted of a pronotum with two black bands separated by a red to yellow

pattern. *Semiotus superbus championi* consisted of a single broad black band on the pronotum. Of the several dozens of specimens evaluated in this study, no defining geographical boundaries could be determined to separate these two forms. Both could be found in the same or proximate localities.

Semiotus fascicularis Candèze

(Figs. 214 and 282)

Semiotus fascicularis Candèze 1857:309, Candèze 1874: 175. (Type: not found; type locality: Colombia)

Semiotus multifidus Candèze 1874: 181, Steinheil 1875: 112, Candèze 1874: 181.

(Syntype (1): BMNH; type locality: Colombia). New Synonym

Length 19 mm (length/width ratio 4.5). Head aurantiacus to testaceus, front with two spines anterolaterally; texture mostly glabrous with a few erect setae above eyes and spines, punctation broad, shallow, and often umbilicate; ocular index 72.0 to 74.0; frontal spines approximately 39% length of frons. Antennae serrate, extending to or just shy of (less than one segment) hind angles; segments 1 and 2 testaceus, segments 3 to 11 rufopiceus to piceus. Pronotum 5 mm (length/width ratio 1.2), narrowly sinuate with margins converging on anterior fourth to anterior third, hind angles diverging, disk concave with lateral depressions sublaterally on posterior 2/3 to 3/4, margin becoming increasingly incrassate posteriorly, without sulcus; color aurantiacus to testaceus (becoming lighter near hind angles); texture glabrous, nitidus, with few shallow punctures throughout, becoming umbilicate anteriorly. Scutellum subquadrate with

rounded posterior border, anterior border incised; color testaceus to piceus. Prosternum concave in profile, prosternal process rounded at apex; color aurantiacus to testaceus; texture glabrous with few erect setae on lobe, impunctate or with very fine punctures medially becoming thicker laterally. Hypomeron fulvus to testaceus; texture glabrous with very fine punctures scattered throughout, or punctures obsolete. Mesosternum fulvus to testaceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron fulvus to testaceus. Metasternum fulvus to testaceus, glabrous, with very fine punctation throughout. Femora testaceus to aurantiacus.

Elytra 12 mm (length/width ratio 2.9), subparallel on anterior fourth then narrowing to tip; base color fulvus to luteus with intervals (on posterior half to 2/3) 1, 2, 4 (and 5 posteriorly), 6, 8, and 9 piceus; texture glabrous, nitidus with striae and strial punctures faint to obsolete, intervals 4 and 6 confluent apically forming a V-shaped pattern; apices each bearing one spine.

Abdomen fulvus laterally, testaceus to aurantiacus medially, with two sublateral obscure bands; texture glabrous or with few scattered setae basally and apically, sternite 1 with or without patch of fine decumbent setae anteriorly, punctation very fine and scattered throughout; female without foveae or with two very fine, small, and shallowly ill-defined foveae restricted to anterior third of sternite 5; anterior sclerite with lateral arms subangulate extending apically 2/3 length of median piece, with few dentitions basally. Male with parameres narrowing medially, lateral blades approximately 1/4 length of parameres.

Material Examined. **BOLIVIA:** La Paz (BMNH); **COLOMBIA:** Capital District, Bogotá (ISNB); Valle del Cauca, Darien, H. Hodge, 1909 (BMNH); **VENEZUELA:** Los Camales, G. Vivas (USNM).

Diagnosis. *Semiotus fascicularis* is most closely allied to *S. melleus*, *S. trinitensis*, and *S. kondratieffi*. It is also similar to *S. badeni*, *S. bispinus* and *S. clarki*. The elytra of *S. badeni* and *S. fascicularis* each bear a sutural, a marginal, and two discal bands per elytron. The discal bands occupy intervals 4 and 6. Interval 2 is pale. These discal bands occupy nearly the entire length of the elytra in *S. badeni* (Fig. 207). They are abbreviated anteriorly in *S. fascicularis* (Fig. 214). In *S. clarki* (Fig. 215), *S. melleus* (Fig. 213), and *S. bispinus* (Fig. 209), the second interval is dark (as are intervals 4 and 6). In *S. fulvicollis* and *S. kondratieffi* each elytron bears a marginal, a sutural, and a single dark discal band (extending from the humeral angles to near the elytral apices). *Semiotus trinitensis* bears only two dark bands per elytron (one sutural and one marginal). The frontal margin in *S. kondratieffi* bears two angles anterolaterally. Spines are absent. The frontal margin in *S. fascicularis* is bispinose.

Note. The type of *S. fascicularis* has not been found, but Candèze's description is clear on important characteristics including: two frontal spines, the bifid (divided) discal band of the elytra, and the absence of female foveae. Candèze later described *S. multifidus* and distinguished it from *S. fascicularis*, and other species, by the larger division of the discal band (appearing as two bands instead of the single Y-shaped band of *S. fascicularis*). This distinction is not consistent. Several intermediate forms of these patterns were examined.

Semiotus flavangulus Candèze

(Figs. 218 and 282)

Semiotus flavangulus Candèze 1900: 82. (Type: ISNB; type locality: Colombia).

Length 24 to 26 mm (length / width ratio 4.5 to 4.6). Head aurantiacus to sanguineus apically, piceus basally; texture glabrous, nitidus with few setae over eyes and spines, punctation scattered throughout, larger basally; front with two spines anterolaterally; ocular index 62.0 to 64.0 Antennae serrate, 0 to 1 segment shy of hind angles, segments 1 and 2 testaceus, segments 3 to 11 rufopiceus to piceus. Pronotum 5 to 6 mm (length / width ratio 1.0 to 1.2), narrowly sinuate, hind angles diverging; margin narrowly incrassate, faintly sulcate on anterior third; color sanguineous, front angles testaceus to aurantiacus, hind angles luteus, with two median bands and medial area of lateral margin piceus; texture glabrous, nitidus with fine medium punctures scattered throughout. Scutellum piceus, anterior margin recurved and dropping below level of scutellar disk. Prosternum very slightly concave in profile, prosternal process not divided at tip; color sanguineous, testaceus to aurantiacus anteriorly, suture piceus; texture with scattered setae and punctures becoming denser laterally. Hypomerion fulvus to testaceus laterally, piceus along suture, with piceus dorsal maculae extending onto hypomerion from above; texture glabrous, nitidus laterally with fine setae and punctation along suture. Mesosternum badius to sanguineus medially, piceus laterally; texture glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum piceus. Metasternum piceus with or without

occasional paler maculae; texture glabrous, nitidus medially, with long setae and very fine punctation laterally. Femora testaceus to aurantiacus.

Elytra 16 to 18 mm (length / width ratio 3.0 to 3.2), subparallel on basal third then narrowing to tip; color fulvus to luteus with striae and lateral margin piceus; texture glabrous, nitidus; apices each bearing one spine.

Abdomen piceus medially, luteus laterally; texture glabrous, nitidus medially with long setae and very fine punctation laterally. Male with parameres thickened on basal half, blades small, approximately 20% length of parameres.

Material examined. **COLOMBIA:** (ISNB). *Semiotus flavangulus* is known only from the type.

Diagnosis. *Semiotus flavangulus* is most closely allied to *S. bispinus*. It is also similar to the species with pale elytra and infusate striae. *Semiotus flavangulus* bears 8 to 9 dark elytral bands. Each band occupies a stria (Fig. 218). The intervals are pale. In *S. bispinus*, alternating elytral intervals are dark (Fig. 219). Several species have pale elytra and infusate striae similar to *S. flavangulus*, including *S. linnei*, *S. cristatus*, *S. buckleyi*, *S. reaumuri*, *S. glabricollis*, *S. angustus*, *S. colombianus*, *S. perangustus*, *S. punctatostratus*, and *S. girardi*. All but the last two of these similar species have three frontal spines. *Semiotus flavangulus*, *S. punctatostratus*, and *S. girardi* all have two. The profile of *S. flavangulus* is linear, with the widest portion of the body occurring across (or at) the anterior third of the elytra (as in Fig. 28). In *S. punctatostratus* and *S. girardi*, the profile is gibbous, with the widest portion on the body occupying the anterior fifth of the elytra (as in Fig. 29).

Semiotus fleutiauxi Szombathy

(Figs. 77, 211 and 282)

Semiotus fleutiauxi Szombathy 1909: 24. (Holotype, female: HNHM; type locality: Peru, Marcapata).

Length 18 to 22 mm (length/width ratio 4.8 to 4.9). Head aurantiacus, front with two spines anterolaterally; texture mostly glabrous with a few erect setae above eyes and spines, punctation moderately deep and evenly scattered throughout; ocular index 69.0 to 72.0. Antennae serrate, roughly 1 segment shy of hind angles in females; segments 1 and 2 aurantiacus, segments 3 to 11 piceus. Pronotum 4 to 6 mm (length/width ratio 1.1 to 1.2), narrowly sinuate with margins converging on anterior fourth to anterior third, hind angles expanding, disk concave with lateral depressions sublaterally on posterior 2/3 to 3/4, margin sulcate on anterior third to fourth, becoming explanate, broadly rounded without sulcus on posterior half; color aurantiacus to sanguineous, with narrow piceus band extending from base to near anterior border; texture glabrous, nitidus with moderately deep punctures scattered throughout becoming deeper anteriorly. Scutellum aurantiacus to piceus, wider than long, curved ventrally on anterior fourth, anterior margin recurved medially. Prosternum concave in profile, prosternal process rounded at apex; color aurantiacus to sanguineous; texture glabrous, nitidus with few erect setae on lobe, impunctate or with very fine punctures medially becoming thicker and umbilicate laterally. Hypomeron aurantiacus; texture glabrous, nitidus with very fine punctures or with punctures obsolete. Mesosternum aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron

badius to piceus. Metasternum aurantiacus medially, testaceus to badius laterally; texture glabrous, nitidus with very fine punctation throughout. Metepimeron testaceus to badius. Femora testaceus to aurantiacus.

Elytra 12 to 15 mm (length/width ratio 3.3 to 3.4), subparallel on anterior third then narrowing to tip; color aurantiacus to sanguineus basally, apical half of interval 7 and all of interval 3 luteus to aurantiacus, intervals 1, 2, 4, 5, 6, 8, and 9 sanguineus to rufopiceus on apical half, blending into aurantiacus coloration of basal half; texture glabrous, nitidus with striae and strial punctures fine to obsolete; apices each with one point.

Abdomen aurantiacus medially, fulvus laterally, with two sublateral obscure bands; texture glabrous, nitidus with very fine punctures throughout, sternite 1 with fine setae and dense punctation; female without foveae on sternite 5; anterior sclerite with lateral arms angled basally, extending apically 3/4 as far as median piece, bearing 3 to 4 dentitions along inner surface of each arm. Male not seen.

Material examined. **PERU:** Cuzco, Marcapata (HMNH); Junín, Chanchamaya, I-2-1969, J. Schunke (CNCI).

Diagnosis. *Semiotus fleutiauxi* is most closely allied to *S. badeni*, *S. fulvicollis*, *S. bispinus*, and *S. flavangulus*. It is unique from these species by the orange to deep red elytra with a pale yellow band on the disk (Fig. 211). The elytra in the other species are pale brown to yellow with dark bands. The anterior sclerite of the bursa copulatrix in *S. fleutiauxi* (Fig. 77) is similar to that of *S. fulvicollis* (Fig. 50) and *S. melleus* (Fig. 73). In all of these species, the anterior margin is angled at the point where the lateral arms are directed posteriorly. In *S. fleutiauxi* the median piece is unarmed and only slightly longer

than the lateral arms. In *S. melleus*, the median piece is likewise unarmed but is nearly twice as long as the lateral arms. The anterior sclerite in *S. fulvicollis* has the median piece strongly dentate to spinose. *Semiotus schaumii* and *S. pectitus* have deep red elytra similar to that of *S. fleutiauxi* but lack frontal spines. Also, the elytral intervals in *S. pectitus* are strongly convex. In *S. fleutiauxi* and *S. schaumii*, the intervals are flat, or nearly so.

Semiotus formosus Janson

(Figs. 51, 95, 150, 165, 170, 253 and 282)

Semiotus formosus Janson 1882: 34, Fleutiaux 1925: 109. (Syntypes (2): BMNH; type locality: Ecuador, Chiguinda).

Length 25 mm (length/width ratio 4.1 to 4.2). Head piceus with sanguineus macula on anterior border; anterolateral areas angled, without spines; texture with few scattered setae, punctures fine becoming larger and denser basally. Antennae serrate, piceus, just short of hind angles in females, extending to or just beyond hind angles in males. Pronotum 6 mm (length/width ratio 1.0), with lateral margin rounded with hind angles diverging on basal sixth, disk convex, merging into lateral foveae mesad of lateral margin; margin thickly rounded without sulcus; color piceus with aurantiacus maculae on anterior angles and on basal half of margin, disk with sanguineus fusiform macula; texture with fine scattered setae throughout with fine punctures evenly spaced throughout. Scutellum subchordate, piceus with scattered punctures on anterior half. Prosternum evenly concave in profile, lobe hemispherical; color piceus, lobe with

sanguineus macula; texture glabrous medially with long scattered setae laterally, punctures fine and widely scattered medially becoming much larger and denser laterally. Hypomeron piceus with aurantiacus maculae of pronotum extending ventrally; texture with fine punctures scattered throughout, fine setae mostly restricted to lateral margin. Mesosternum piceus with long thin setae and scattered punctures on lateral area. Mesepisternum and meshypomeron piceus. Metasternum piceus and glabrous with fine punctures medially with scattered setae and punctures becoming denser anterolaterally. Legs rufopiceus to piceus.

Elytra 17 mm (length/width ratio 2.8 to 2.9), subparallel on basal half, curving evenly to apex; color fulvus on anterior half (except for piceus base) extending to apices on margin, basal half piceus with dark coloration extending to anterior third laterally; texture glabrous throughout with interstriae slightly wrinkled, stria punctures clearly defined on disk, becoming obscure laterally and apically; apices ending in a sharp angle, spine absent or poorly defined.

Abdomen piceus with a sanguineus macula on sternites 2, 3, and 4; texture with fine setae and punctures throughout, lateral areas wrinkled; female with two long elliptical foveae on apical 2/3 of segment 5; anterior sclerite with lateral arms short, half as long as median piece, without sharp dentitions except on median piece.

Material Examined. **ECUADOR:** Loja, 3000 m., S. Ohaus (USNM); Abbe Gaujon (BMNH); Morona - Santiago, Chigüinda (BMNH); O.F. Baron (CASC).

Diagnosis. *Semiotus formosus* is a morphologically unique species with phylogenetic affinities to *S. schaumi*, *S. pectitus*, *S. luteipennis*, *S. ligneus*, and *S. serraticornis*, though differing significantly morphologically from these species. All of

these species are primitive species lacking frontal spines. The elytra in *S. schaumii*, *S. pectitus*, and *S. luteipennis* are deep red. In *S. ligneus* and *S. serraticornis* they are pale brown to yellow with dark bands. In *S. formosus* the elytra are pale brown to yellow basally and black apically (with a pale margin apically as well). Additionally the pronotum of related species bear one or more dark bands. In *S. formosus*, the pronotum is black with yellow areas on or near the anterior and posterior angles (Fig. 253). A pattern unique in *Semiotus*.

Semiotus fryi Candèze

(Figs. 30, 135 and 281)

Semiotus fryi Candèze 1874: 175. (Holotype, female: BMNH; type locality: Ecuador).

Length 27 to 29 mm (length/width ratio 3.9 to 4.0). Head testaceus to aurantiacus with piceus macula at base; bearing two mammiform spines anterolaterally; texture glabrous with few setae over eyes and frontal margin between spines, punctation scattered throughout; ocular index 70.0 to 72.0. Antennae 3 to 4 segments short of hind angles; segments 1 and 2 testaceus to aurantiacus, segments 3 to 11 piceus. Pronotum 6 to 7 mm (length/width ratio 1.0 to 1.2), sub-companulate, blunt ridge extending along lateral margin entire length of pronotum, margin sulcate on anterior 3/4, disk strongly arched, anterior portion of pronotum and head projecting nearly ventrally; color fulvus to testaceus laterally, aurantiacus to sanguineus near anterior border, with broad piceus macula medially extending from base to near anterior margin; texture glabrous, nitidus, punctures very fine on disk becoming umbilicate anteriorly. Scutellum piceus.

subquadrate, small sulcus medially, anterior margin below plane of disk. Prosternum strongly arched in profile; color sanguineus to aurantiacus with piceus band along suture; texture glabrous, nitidus with setae along lateral margin and on lobe. Hypomeron fulvus to aurantiacus with broad piceus band along suture; texture glabrous, nitidus, punctation fine to obsolete. Mesosternum sanguineus with piceus maculae; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron piceus. Metasternum aurantiacus to sanguineus medially, piceus laterally; texture glabrous, nitidus with setae anterolaterally. Femora aurantiacus to testaceus, tarsi badius.

Elytra 19 to 21 mm (length/width ratio 2.7 to 2.9), subparallel on anterior half then narrowing to tip, intervals strongly convex, interval 3 (and intervals 5 and 7 to a lesser degree) rising above level of other intervals; intervals 1, 2, 4, 5, 6, and 8 piceus, intervals 3 (and base of 4 and 5), 7, and 9 fulvus to luteus; texture glabrous, nitidus; apices each angled with sutural margin, without spines.

Abdomen aurantiacus to sanguineus medially, luteus laterally with dark bands and maculae between; texture glabrous, nitidus with fine setae on sternum 1, punctures fine and scattered throughout; female with two shallow oval foveae on apical half of sternite 5. Male not seen.

Material examined. **ECUADOR:** (BMNH). *Semiotus fryi* is known only from the type.

Diagnosis. *Semiotus fryi* is a primitive species of *Semiotus* allied to *S. imperialis*, *S. cuspidatus*, *S. gibbosus*, *S. chassaini*, *S. girardi* and *S. punctatostriatus*. All these species are gibbous in profile and have convex interstriae. *Semiotus imperialis*, *S.*

cuspidatus and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down. The other primitive gibbous species (*S. gibbosus*, *S. chassaini*, *S. girardi*, and *S. punctatostriatus*) all bear two spines along the anterolateral margin of the frons and lack a medial frontal spine. These spines tend to be acute (as in Fig. 141) in all of these species except *S. fryi* where they are more mammiform (Fig. 135). *Semiotus fryi* is known only from Ecuador (Fig. 281). Of the related species, only *S. imperialis* and *S. punctatostriatus* are known from the same area (Figs. 272 and 285). The strongly procurved pronotum, gibbous profile and mammiform frontal spines distinguish *S. fryi* from all other *Semiotus*.

Semiotus fulvicollis Blanchard

(Figs. 50, 93, 210 and 284)

Semiotus fulvicollis Blanchard 1843: 129, Kirsch 1866: 179, Candèze 1874: 174,

Szombathy 1909a: 121. (Lectotype: MNHN; type locality: ?).

Semiotus bifasciatus Schwarz 1902b: 29. (Syntype (1 located), male: DEIC; type locality: S. Catarina). New Synonym.

Length 17 to 21 mm (length/width ratio 4.3 to 4.9). Head aurantiacus to sanguineus with or without piceus basal macula, front with two spines anterolaterally; texture with a few erect setae above eyes and spines, punctation moderately deep and evenly scattered throughout; ocular index 74.0 to 77.0. Antennae serrate, 1 to 2 segments shy of hind angles in; segments 1 and 2 testaceus, segments 3 to 11 rufopiceus to piceus. Pronotum 4 to 6 mm (length/width ratio 1.1 to 1.4), narrowly sinuate with margins

converging on anterior fourth to anterior third , hind angles diverging, disk convex with lateral depressions sublaterally on posterior 2/3 to 3/4, margin sulcate on anterior third to fourth moderately explanate; color fulvus to aurantiacus (becoming darker anteriorly) with irregular piceus band extending from base to before anterior border (or in some specimens extending onto head); texture glabrous with moderately deep punctures scattered throughout. Scutellum testaceus to piceus with anterior margin incised medially. Prosternum concave in profile, prosternal process rounded at apex; color aurantiacus to testaceus; texture glabrous with few erect setae on lobe, impunctate or with very fine punctures medially becoming thicker laterally. Hypomeron fulvus to testaceus; texture glabrous with very fine punctures scattered throughout. Mesosternum fulvus to testaceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum and meshypomeron fulvus to testaceus. Metasternum fulvus to testaceus, glabrous, with very fine punctation throughout, becoming obsolete anterolaterally. Metepimeron piceus. Femora fulvus to testaceus.

Elytra 12 to 14 mm (length/width ratio 2.7 to 3.3), subparallel on anterior half then narrowing to tip; color fulvus with intervals 1 (and posterior half of 2), 5 (on posterior half), 6, 8 (on posterior third) and 9 piceus; texture glabrous with striae (except stria 1) faint to obsolete, stria punctures fine to obsolete, intervals flat and slightly wrinkled; apices each bearing one spine.

Abdomen fulvus laterally, testaceus to aurantiacus medially, with two sublateral obscure bands extending from sternite 2 (sometimes also on sternite 1) to sternite 4; texture glabrous or with few scattered setae basally and apically, moderately deep punctures scattered throughout; female with two very fine, small, and shallowly ill-

defined foveae restricted to anterior third of sternite 5 or foveae absent; anterior sclerite with lateral arms subangulate extending apically 2/3 length of median piece, with few dentitions basally. Male with parameres narrowing medially, lateral blades approximately 1/4 length of parameres.

Material Examined. **BOLIVIA:** Beni, Rurrenabaque, Río Beni, XI-1921, W.M. Mann (USNM); **IBID** XII-1922; La Paz, Tumupasa, IX-5-1925, G.L. Harrington (USNM); **BRAZIL:** São Paulo (FMNH); Cantareira, F. Halik (USNM); Barbiellini (USNM); (FMNH); **ECUADOR:** Morona - Santiago, Chigüinda, Buckley (BMNH); **FRENCH GUIANA:** Hwy D6 to Kaw, 15 km SE Roura, VI-6-1986, E.G. Riley & D.A. Rider (EGRC); **PERU:** Huánuco, Madre de Dios, Tambopata Res. Zone, Explorer's Inn, 290 m., 12° 50' S, 69° 17', XI-(10-11)-1982, W, T.L. Erwin, On fallen tree along Río la Torre trail (USNM); Tingo María, Monson Valley, XII-23-1954 (CASC); **IBID**, X-12-1954.

Diagnosis. *Semiotus fulvicollis* (Fig. 210) is most closely allied to *S. fleutiauxi*, *S. badeni*, *S. bispinus* and *S. flavangulus*. It is also similar to *S. fascicularis* and *S. melleus*. The elytra of *S. badeni* and *S. fascicularis* each bear a sutural, a marginal, and two discal bands per elytron. The discal bands occupy intervals 4 and 6. Interval 2 is pale. These discal bands occupy nearly the entire length of the elytra in *S. badeni* (Fig. 207). They are abbreviated anteriorly in *S. fascicularis* (Fig. 214). In *S. clarki* (Fig. 215), *S. melleus* (Fig. 213), and *S. bispinus* (Fig. 209), the second interval is dark (as are intervals 4 and 6). In *S. fulvicollis* each elytron bears a marginal, a sutural, and a single dark discal band (extending from the humeral angles to near the elytral apices). The anterior sclerite of the bursa copulatrix in *S. fleutiauxi* (Fig. 77), *S. fulvicollis* (Fig. 50) and *S. melleus* (Fig. 73)

is angled at the point where the lateral arms are directed posteriorly. In *S. badeni* the anterior sclerite is convex along the anterior border and the lateral arms are short, extending less than half as far distally as the median piece (Fig. 75). The anterior sclerite in *S. bispinus* is subangulate along the anterior border (Fig. 54) and the median piece is thicker and bears several dentitions.

Note. The color of the elytral bands in *S. fulvicollis* are variable, ranging from dark reddish brown to black. Also, the width of the middle elytral band varies in width on intervals 5 and 6. These variable characters that have been used to distinguish *S. fulvicollis* from *S. bifasciatus* do not justify specific status. A type in BMNH is marked with a "?" without further data and is dubious. The lectotype designated by Chassain in MNHN is herein accepted. No geographical information is given for this specimen.

Semiotus germari Guérin-Meneville

(Figs. 49, 91, 235 and 284)

Semiotus germarii Guérin-Meneville 1844: 17, Candèze 1857: 322. (Type: not found; type locality: New Granada).

Semiotus punctatus Candèze 1857: 322, Candèze 1874: 179. (Type: BMNH; type locality: Venezuela). New Synonym.

Semiotus germari, Candèze 1874: 179, Steinheil 1875: 111.

Length 21 to 28 mm (length / width ratio 4.3 to 5.0). Head sanguineus to piceus on basal half, fulvus apically, basal color often extending apically in center; ocular index 68.0 to 70.0; lateral frontal spines approximately 17% length of frons. Antennae serrate.

with segments 1 and 2, and with center of remaining segments, badius, outer portion of segments 3 to 11 luridus; in males, last segment extending beyond hind angles, female antennae range from one segment shy of hind angles to extending one segment beyond. Front with three spines, vertex impressed on anterior third ; texture glabrous or with few scattered setae above eyes and along anterior margin; punctures becoming larger posteriorly, nearly contiguous at base. Pronotum 5 to 8 mm (length / width ratio 1.3 to 1.4), with long clearly defined rectangular piceus macula on each side of disc, often with sanguineus mesal coloration, maculae bordered on all sides by fulvus to aurantiacus basal color, also separating maculae medially; margin sinuate, sulcate anteriorly, rounded posteriorly, widest at middle then narrowing apically and basally before diverging at hind angles, disc convex with lateral areas concave from base to apex, anterior fifth declining to level below eyes; texture glabrous with scattered setae along margin, punctation fine medially becoming coarse and contiguous laterally. Scutellum subchordate, sides rounded. Prosternum evenly concave in profile, lobe rectangular; color sanguineus medially, lobe becoming aurantiacus, lateral areas piceus; texture glabrous and finely punctate medially, sides heavily punctate and covered with dense setae. Hypomeron fulvus with punctation and pubescence fine. Mesosternum fulvus to badius with scattered punctures and setae. Mesepisternum and meshypomeron badius to piceus. Metasternum aurantiacus medially, piceus laterally, often with piceus median line; texture glabrous medially with scattered setae laterally. Femora unicolorous fulvus to badius.

Elytra 15 to 19 mm (length / width ratio 3.0 to 3.3), with interstriae 1, 3, 5, 7, and 9 fulvus, interstriae 2, 4, 6, and 8 badius; widest on anterior third then narrowing to tip; texture glabrous, reticulate with fine punctation; apices each bearing one spine.

Abdomen badius with lateral margin fulvus; texture glabrous medially with fine scattered setae laterally; fine dense punctures throughout becoming nearly contiguous laterally; female foveae on segment elliptical on apical half; anterior sclerite broad basally, lateral arms short, extending distally approximately 1/3rd length of median piece. Male with parameres narrowing from base to lateral blades, lateral blades long, approximately 35 to 37% length of parameres.

Material examined. COLOMBIA: (BMNH); VENEZUELA: Mérida, 1929, M. Robinson (USNM); 1864 (NHMW); (BMNH).

Diagnosis. *Semiotus germari* is most closely allied to *S. illigeri*, *S. acutus*, and *S. kirschi*, with similarities to other species with 4 or more bands per elytron (including *S. virgatus*, *S. regalis*, *S. exsolutus*, *S. superbus*, and *S. sommeri*). *Semiotus regalis* is readily separated from these species by the black first and second elytral intervals (Fig. 222). The other species with 4 or more dark elytral bands have the first 2 intervals comprised of contrasting light and dark colors. *Semiotus kirschi* and *S. virgatus* are distinct in having the lateral pronotal margin sulcate nearly the entire length. In *S. exsolutus* and *S. acutus*, the lateral margin lacks sulci entirely. *Semiotus germari* (and *S. superbus*, *S. sommeri*, and *S. illigeri*) have abbreviated sulci evident only on the anterior third to half of the pronotal margin. These last species are best separated by the pattern of elytral and pronotal bands as follows. In *S. superbus*, the eighth and ninth elytral intervals are unicolorous. They are of 2 different colors (interval 8 black and interval 9

yellow to orange) in *S. germari*, *S. sommeri*, and *S. illigeri*. The pronotal band in *S. germari* (Fig. 235) is larger and more parallel-sided than in *S. sommeri* (Fig. 241) and *S. illigeri* (Figs. 227-229). The lateral arms of the anterior sclerite of the bursa copulatrix are abbreviated in *S. germari* (Fig. 49) and *S. sommeri* (Fig. 87), extending less than 1/3 the length of the median piece. In *S. illigeri* (Fig. 79) the lateral arms are longer, extending more than 1/3 the length of the median piece.

Note. Candèze (1857) distinguished *S. punctatus* from *S. germari* based on the heavier pronotal punctation in *S. punctatus*. This condition is variable as indicated in a series in the USNM.

Semiotus gibbosus n. sp.

(Figs. 62, 246 and 284)

Length. 30 to 31 mm (length/width ratio 4.4 to 4.5). Head aurantiacus to sanguineus with basal macula piceus; anterior border of frons bearing two spines; texture glabrous with few erect setae over eyes and spines, punctation fine becoming thicker and umbilicate basally. Antennae 1 to 2 segment short of hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 6 to 8 mm (length/width ratio 1.0 to 1.1); subtrapezoidal, hind angles diverging; margin incrassate not clearly defined; color aurantiacus to testaceus laterally with broad sanguineus band medially and two narrow sublateral piceus bands; texture glabrous, nitidus with fine punctation throughout becoming thicker and umbilicate anteriorly; scutellum sanguineous, widely obovate, anterior margin slightly incised. Prosternum slightly concave in profile; color sanguineus

with piceus band along suture; texture with few erect setae throughout becoming more dense on lobe, punctation fine medially, thicker and umbilicate laterally. Hypomeron fulvus to testaceus with piceus band along suture; texture glabrous, nitidus with fine shallow punctures throughout. Mesosternum finely punctate with fine setae, fossa glabrous with fine punctures; color sanguineus to testaceus. Mesepisternum and meshypomeron testaceus with badius to piceus maculae. Metasternum testaceus to sanguineus with piceus band laterally; texture glabrous, nitidus with fine punctation medially, decumbent setae and denser punctation anterolaterally; metepimeron piceus; femora sanguineus to testaceus.

Elytra 20 to 22 mm (length/width ratio 3.0 to 3.1) gibbous, subparallel on anterior third, then narrowing to tip; color varying with intervals ranging from aurantiacus to badius, striae infusate; texture glabrous, nitidus, intervals convex, striae well defined, stria punctures fine to obsolete; apices of each elytron terminating in a point.

Abdomen sanguineus to testaceus medially, fulvus to luteus laterally with two sublateral bands piceus; texture glabrous, nitidus with fine punctures throughout, sternite 1 with fine decumbent setae and denser punctures; female with two foveae on apical 3/5 of sternite 5 well defined anteriorly, becoming obscure apically; lateral arms of anterior sclerite short, approximately 1/2 length of median piece. Male unknown.

Material examined. Holotype (female): **PERU**: Amazonas, 5 km. N Pomacocha on road to Ríoja, 2000 m., X-(7-8)-1964, P.C. Hutchison & J.K. Wright (CASC).

Diagnosis. *Semiotus gibbosus* is most closely allied to *S. fryi*, *S. chassaini*, *S. cuspidatus*, and *S. imperialis*. It is also similar to *S. catei*, *S. punctatostriatus*, and *S. girardi*. All of these species have a gibbous profile. *Semiotus imperialis*, *S. cuspidatus*

and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down. *Semiotus gibbosus* bears two anterolateral spines along the anterior margin of the frons. *Semiotus gibbosus* (and *S. punctatostriatus*, *S. girardi*, *S. catei*, and *S. chassaini*) bears a single spine at the end of each elytron. Both *S. imperialis* and *S. cuspidatus* bear two small spines apically per elytron. The anterior sclerite of the bursa copulatrix is unarmed in *S. chassaini* (Fig. 65) as it is in *S. gibbosus*, though the later species has longer lateral arms that curve further posteriorly (Fig. 62). The anterior sclerite in *S. punctatostriatus*, *S. imperialis* and *S. cuspidatus* are all armed with several small dentitions (Figs. 38, 46, and 48). *Semiotus fryi* and *S. chassaini* have the third elytral interval raised above the level of the other intervals. In *S. gibbosus* (and *S. punctatostriatus*, *S. girardi*, and *S. catei*) the third interval is not raised above the level of the other intervals. *Semiotus punctatostriatus* and *S. girardi* have strongly setose pronota. *Semiotus gibbosus* (and *S. catei*) have glabrous pronota. *Semiotus gibbosus* has narrower piceus bands on the pronotum (each band less than 1/6 width of pronotum) than *S. punctatostriatus* and *S. girardi*. In *S. punctatostriatus* and *S. girardi* the piceus bands are wider (each over 1/3 width of pronotum). *Semiotus catei* and *S. gibbosus* can be separated by the color of the scutellum and legs. In *S. catei* they are black (with occasional light areas). In *S. gibbosus* they are orange to light brown. Also, the lateral margins of the pronotum are more strongly divergent in *S. gibbosus* (Fig. 246) than in *S. catei* (Fig. 216).

Semiotus girardi Chassain

(Figs. 133, 141 and 285)

Semiotus girardi Chassain 2001: in press. (Holotype, male: MNHN; type locality:

Equador, Napo, Cordillera Huacamayo, 1800 m. Rta. Baiz a Tena).

Length 27 to 29 mm. (length / width ratio 4.4 to 5.0). Head sanguineous; bearing two anterolateral spines, with area between spines distinctly angled; frons with fine setae scattered throughout becoming denser and thicker in median depression. Antennae approximately one segment short to 1 segment beyond hind angles, with segments 1 and 2 sanguineous, segments 3 to 11 piceus. Pronotum 6 to 8 mm (length / width ratio 1.1 to 1.3), widest at base becoming evenly narrower anteriorly then curving laterally to anterior angles, hind angles gradually enlarged; margin broadly rounded, without sulcus; color aurantiacus to sanguineus with two piceus bands extending from base to just before anterior margin, hind angles fulvus; texture glabrous medially with fine dense setae laterally, punctation fine and distinctly separated on disk, becoming approximate, dense, and umbilicate anterolaterally. Scutellum subrectangular, anterior margin wider, posterior margin rounded. Hypomeron piceus medially becoming sanguineus along outer margin, basal area fulvus; texture glabrous laterally with fine dense setae medially along suture, punctures small and contiguous medially becoming larger and less contiguous laterally. Prosternum slightly concave in profile; color testaceus to aurantiacus, lobe becoming testaceus, suture piceus; texture nearly glabrous medially with fine dense setae laterally, punctation very fine medially becoming larger and denser laterally. Mesosternum sanguineus with fossa glabrous and impunctate, lateral areas

with dense setae and punctation. Mesepisternum and meshypomeron piceus, with or without infusate margins. Metasternum sanguineus with piceus triangular macula along lateral margin extending nearly to mesocoxae anteriorly; texture glabrous medially with dense setae anterolaterally, punctation fine and moderately dense throughout. Femora testaceus to aurantiacus.

Elytra 17 to 20 mm (length / width ratio 2.8 to 3.1), subparallel on anterior half then narrowing gradually to tip; color testaceous with infusate striae, or alternating intervals infusate; texture glabrous, nitidus, interstriae impunctate and convex, striae evident with broad punctures; apices each bearing one obtuse spine.

Abdomen testaceous to aurantiacus; texture mostly glabrous with clumps of setae sublaterally, especially on segment I and around foveae, punctation fine medially becoming denser and contiguous laterally. Female unknown.

Material Examined. **ECUADOR:** Napo, Route de Baeza a Tena, Cordillera Huacamayo, 1800 m., XI-20-1978, T. Porion (Holotype and 5 paratypes, MNHN).

Diagnosis. *Semiotus girardi* is most closely allied to *S. punctatostriatus* and related to *S. imperialis*, *S. cuspidatus*, *S. chassaini*, *S. gibbosus*, and *S. fryi*. All these species are gibbous in profile and have convex interstriae. *Semiotus imperialis*, *S. cuspidatus* and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down (Fig. 140). The anterolateral areas of the frons are rounded, without spines. Other related gibbous species (*S. punctatostriatus*, *S. gibbosus*, *S. fryi*, *S. girardi*, and *S. chassaini*) all bear two spines along the anterolateral margin of the frons and lack a medial frontal spine. The pronotum of *S. gibbosus*, *S. fryi*, and *S. chassaini* are glabrous or bear only fine and inconspicuous setae. The pronotum of *S. punctatostriatus*

and *S. girardi* are covered with thick pale to golden setae. *Semiotus punctatostriatus* can be separated from *S. girardi* by the shape of the pronotum. In *S. girardi* the lateral margin is constricted just posterior to the anterolateral angles. In *S. punctatostriatus* the lateral margin is evenly convex all the way to the anterolateral angles. Superficial similarities exist between specimens of *S. girardi* and many of the species with pale elytra and infusate striae (such as *S. linnei*, *S. cristatus*, and *S. colombianus*). These species have three frontal spines and lack a gibbous profile. The combination of dense pronotal setae, gibbous profile and double frontal spines distinguish *Semiotus girardi* from all other *Semiotus*.

Semiotus glabricollis Candèze

(Fig. 285)

Semiotus glabricollis Candèze 1857: 326, Candèze 1874: 182. (Type: BMNH; type locality: Colombia).

Length 23 to 24 mm (length / width ratio 4.5 to 4.8). Head fulvus to luteus with median piceus macula extending anteriorly to near anterior margin; bearing three frontal spines; texture glabrous, with few erect setae above eyes and over spines, punctation becoming umbilicate and larger basally; ocular index 75.0 to 76.0. Antennae serrate, 0 to 1 segment short of hind angles; segments 1 and 2 fulvus to testaceous, segments 3 to 11 testaceous to badius. Pronotum 5 to 6 mm (length / width ratio 1.2 to 1.4), narrowly sinuate, anterior lateral margins converging and declining, anterior angles foveate; margin incrassate, with an elevated thickening above margin, without sulcus; color luteus

with broad piceus band medially, often with sanguineus coloration between piceus bands; texture glabrous, nitidus, with fine punctation throughout becoming larger and subumbilicate near anterior margin; scutellum testaceus, broadly subchordate. Prosternum concave in profile; color aurantiacus to testaceus medially, with piceus band along suture; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron fulvus to luteus; texture glabrous, nitidus with thin row of setae near suture. Mesosternum aurantiacus to testaceus; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum and meshypomeron aurantiacus to testaceus. Metasternum aurantiacus to testaceus medially, badius to piceus laterally; texture glabrous medially with dense setae anterolaterally, punctation fine throughout. Femora aurantiacus to testaceus.

Elytra 15 to 17 mm (length / width ratio 3.0 to 3.2), subparallel on anterior third then narrowing to tip; color fulvus to luteus, striae aurantiacus to testaceus; texture glabrous, nitidus, intervals flat, striae faint to obsolete, strial punctures clearly defined and infusate; apices each bearing one broad spine or dentition.

Abdomen aurantiacus medially, fulvus laterally with badius band between; texture glabrous, with fine punctation medially, fine setae and dense punctation laterally; female with two elliptical foveae on posterior half of sternite 5.

Material examined. **COLOMBIA:** (BMNH). *Semiotus glabricollis* is known only from the type.

Diagnosis. *Semiotus glabricollis* is most closely allied to *S. reaumuri* with similarities to *S. buckleyi* and other species with three frontal spines and infusate striae. Several species have pale elytra with infusate striae and a dense covering of setae on the

pronotum (*S. pilosus*, *S. cristatus*, *S. auripilis*, *S. linnei*, *S. perangustus*, *S. colombianus*, *S. vicinus*, and *S. angustus*). *Semiotus buckleyi*, *S. reaumuri*, and *S. glabricollis* have similar elytra but lack setae on the pronotum (or have very faint and inconspicuous setae). These three species can be separated by the color of the elytral striae and by the pronotum. In *S. buckleyi*, the dark striae bands are black and extend out from the striae onto the elytral intervals, and the lateral pronotal margins bear sulci on the anterior third to half. In *S. reaumuri* and *S. glabricollis*, the striae bands are light brown and the pronotum lacks sulci. The pronotal punctation in *S. reaumuri* is dense, subumbilicate, and often contiguous. In *S. glabricollis*, the punctation is finer and less dense. *Semiotus reaumuri* has two anterolateral black maculae on the pronotum (in addition to the discal band(s)). *Semiotus glabricollis* lacks anterolateral black maculae. *Semiotus buckleyi* is known from Ecuador, *S. reaumuri* and *S. glabricollis* are known from Colombia. The combination of dark bands along each elytral stria, glabrous pronotum, lack of a pronotal sulcus along the anterolateral margin, along with three frontal spines separate *S. glabricollis* from all other *Semiotus*.

Semiotus hispidus Candèze

(Figs. 57, 100, 139, 173, 254, 255 and 287)

Semiotus hispidus Candèze 1889: 81, Fleutiaux 1891: 275, Chassain 1991:132.

(Holotype: ISNB; type locality: Venezuela).

Semiotus alternatus Schwarz 1904: 50, Chassain 1991:133. (Holotype, male: DEIC; type locality: Venezuela).

Semiotus anthracinus Szombathy 1909: 25, Chassain 1991:133. (Holotype, male:

HNHM; type locality: Venezuela, Navedad, Briceño).

***Semiotus anthracinus lamotei* Chassain 1991:135. New Synonym.**

Length 16 to 22 mm (length/width ratio 3.7 to 4.1). **Head** completely piceus, or with anterolateral areas aurantiacus to luteus; frons with three angled projections on anterior border, not spinose; texture glabrous with deep umbilicate punctures throughout; ocular index 69.0 to 72.0. **Antennae** serrate, reaching hind angles in females, extending 1 to 2 segments beyond hind angles in males; segment 1 testaceus to sanguineous, segments 2 to 11 piceus. **Pronotum** 3 to 5 mm (length/width ratio 0.9 to 1.1), broadly sinuate, hind angles diverging; margin incrassate without sulcus; color completely piceus or with narrow lateral bands along margins and medially aurantiacus to testaceus; texture with dense decumbent setae laterally and dense deep punctation becoming umbilicate anterolaterally. Scutellum completely piceus, or with testaceus macula, subchordate. Prosternum concave in profile; color piceus; texture of long erect setae and fine punctation medially, decumbent setae and thicker punctation laterally. Hypomeron completely piceus or with lateral border aurantiacus; texture of fine setae throughout. punctures scattered throughout becoming deeper laterally. Mesosternum piceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron piceus. Metasternum piceus; texture of fine decumbent setae and deep punctures (often nearly contiguous) throughout. Femora testaceus to sanguineous with tarsi and joints piceus.

Elytra 10 to 15 mm (length/width ratio 2.5 to 2.8), subparallel on anterior half then narrowing to tip; color completely piceus or with parts of intervals 1, 3, 5, 7, 9 and

lateral border luteus; texture glabrous, nitidus, striae and stria punctures clearly defined; apices rounded without spines.

Abdomen piceus; texture of fine scattered setae and double punctation throughout; female with two oblique elliptical foveae on apical 2/3 of sternite 5; anterior sclerite reduced, without projecting lateral arms, basal piece subtriangular, with projecting median piece. Male with parameres sinuous medially, lateral blades subacute apically, spinose laterally, 25% to 30% length of parameres.

Material examined. VENEZUELA: Mérida, Anderr, Umg. Hotel de los Frailes, 2600 m., Franz (PCCV); Mucubaji, VI-1973, on *Escheholtzia* (USNM); Mucubaji, VI-2-1973, D.H. Janzen, commonly found feeding on damaged *Escholtzi* buds (CNCI); IBID V-26-1998; Mucubaji, VI-1973, on *Eschscholtzia* (USNM); Paso Pico Aguila, Paramo de Mucuchies, 3710 m., 8° 51' 5" N, 70° 48' 34" W, V-21-1998, Ashe, Brooks, Hanley (SEMC); IBID V-26-1998; Paso Pico Aguila, Paramo de Mucuchies, 3710 m., 8° 51' 5" N, 70° 48' 34" W, V-21-1998, Ashe, Brooks, Hanley (SEMC); S. Bricenol (USNM); S. Bricenol (USNM); State unknown, Navedad, Briceño (HNHM); Sierra Nevada de Merida, 4000 m., Franz (PCCV).

Diagnosis. *Semiotus hispidus* is a primitive species of *Semiotus* most closely allied to *S. auripilis*, *S. seladonius*, and *S. pectitus*. It can be easily distinguished from these species by the completely black elytra, or with the black elytra interrupted by pale bands. The elytra of *S. auripilis* and *S. pectitus* are dark red to reddish brown, those of *S. seladonius* are green. *Semiotus hispidus* is similar to *S. regalis* in general shape but differs in having a less developed frontal margin. In *S. regalis* sharp angles becoming subspinose are present along the anterior border, these are only angled in *S. hispidus*. The

paramere blades of *S. hispidus* are only 1/4th the length of the parameres, whereas in *S. regalis* they are 1/3rd the length. The parameres are sinuate basally in *S. hispidus* (Fig. 100) and more nearly straight in *S. regalis* (Fig 117). The rounded elytral apices, long setae on the head and pronotum, and lack of definite frontal spines distinguish *S. hispidus* from other *Semiotus*. *Semiotus hispidus* occurs in Venezuela and is isolated from related species. *Semiotus auripilis* occurs in Bolivia, *S. pectitus* and *S. regalis* occur in Colombia, and *S. seladonius* occurs in Bolivia and Colombia.

Note. *Semiotus hispidus* is comprised of several different color morphs that differ in the number and extent of the luteus elytral bands. The color patterns range from the paler *S. alternatus* form with several luteus elytral bands and bicolored pronotum to the completely piceus form. Chassain (1991) correctly recognized the conspecific nature of these forms in his synonymies of the three species under *S. hispidus*. Chassain's *S. hispidus lamotei* should only be recognized as a color morph (as he specifies) and not as a valid subspecies, as it is not geographically isolated from the other forms.

Semiotus illigeri Guérin-Meneville

(Figs. 79, 147, 227-229 and 286)

Semiotus illigerii Guérin-Meneville 1844: 16, Candèze 1857: 321, Steinheil 1875: 111.

(Type: not found; type locality: ?)

Semiotus illigeri, Candèze 1874: 179.

Semiotus illigerii bifidus Schwarz 1902a: 209. (Syntype (1), female: DEIC; type locality: Venezuela). New Synonym.

Length 26 to 32 mm (length/width ratio 4.3 to 4.9). **Head** luteus to aurantiacus with basal macula piceus; bearing three spines anteriorly; texture glabrous, nitidus with few scattered setae above eyes, punctation fine anteriorly, shallow and umbilicate basally; ocular index 71.0 to 74.0. **Antennae** serrate, 1 to 2 segments shy of hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. **Pronotum** 7 to 8 mm (length/width ratio 1.2 to 1.3), sinuate with hind angles diverging, margin incrassate sulcate, becoming explanate, on anterior third, anterolateral angles declivous and foveate; color luteus to testaceus with elongate piceus band extending from base to (or nearly to) anterior margin (in some specimens the piceus band is interrupted medially with a sanguineus band), piceus band elliptical on posterior half with or without lateral extension on anterior third appearing cruciform; texture glabrous, nitidus, with fine punctation throughout. Scutellum testaceus to piceus, suborbicular laterally and posteriorly with anterior margin recurved. Prosternum concave in profile, prosternal process not divided apically; color sanguineus to aurantiacus with or without piceus lateral bands; texture with few erect setae anteriorly, few decumbent setae laterally, punctation fine to obsolete medially becoming denser and umbilicate posterolaterally. Hypomeron luteus to testaceus laterally with piceus band along suture; texture glabrous, nitidus, punctation fine and shallow laterally, thicker and subrugose medially. Mesosternum sanguineus to piceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron piceus. Metasternum sanguineus to testaceus medially, piceus laterally; texture glabrous, nitidus with few decumbent setae anterolaterally. Femora aurantiacus to piceus.

Elytra 18 to 22 mm (length/width ratio 3.0 to 3.2), subparallel on anterior fourth , then narrowing to tip; color luteus to testaceus with mesal portion of interval 1 along with intervals 2, 4, 6, 8, (and sometimes outer portion of 9) testaceus to piceus; texture glabrous, nitidus, striae and stria punctures very fine to obsolete; apices each bearing one spine.

Abdomen aurantiacus to sanguineus medially, luteus to testaceus laterally with piceus sublateral maculae or bands; texture glabrous with few scattered erect setae, nitidus, with decumbent setae on sternite 1, punctation fine and scattered throughout; female with two elliptical piliferous foveae on apical half of sternite 5; anterior sclerite with lateral arms extending posteriorly 1/2 length of median piece, each bearing several serrations. Male not seen.

Material Examined. **COLOMBIA:** Antioquia, Medellín, 1939, H. Daniel (USNM); Valle del Cauca, Cali Valley, IV-27-39, B. Losada (USNM); Río Colima, VI-13-1989 (HNHM); W-Cordillera, IX-1988, Lake Colima, nr. Buga, Río Bravo Valley, 1180-1200 m. (PCCV); **COSTA RICA:** Alajuela, Río San Lorencito, 900 m., R.F. San Ramón, 5 km N Colonia, VI-(13-18)-1993 (INBC); Río San Lorencito, 800 m., V-31-1997, I.A. Chacón (INBC); Cartago, M.N. Guayabo, Turrialba, 100 m., VI-21-1994, J.F. Corrales (INBC); Heredía, Transecto Braulio Carrillo, N.P., X-1989, 1100-1500 m., R. Aguilar & M. Zumbado (INBC); **ECUADOR:** Bolívar, Balzapamba, 650 m., F. Campos (USNM); Cotopaxi, Los Pampas, 20 km S La Union de Toachi, 1400 m., I-12-1992, C. Carlton & R. Leschen (SEMC); Los Ríos, Santo Domingo, XII-1982, G. Onore (PCCV); Province unknown, Lita (BMNH); **PANAMA:** Darién, Cerro Mali, Tacarcuna Range, 4800 ft., VII-1963, W.P. Murdoch (USNM).

Diagnosis. *Semiotus illigeri* is most closely allied to *S. germari* with similarities to other species with 4 or 5 bands per elytron (including *S. virgatus*, *S. regalis*, *S. exsolutus*, *S. kirschi*, *S. superbus*, and *S. sommeri*). *Semiotus regalis* is readily separated from these species by the black first and second elytral intervals (Fig. 222). The other species with 4 or 5 dark elytral bands have the first two intervals comprised of contrasting light and dark colors. *Semiotus kirschi* and *S. virgatus* are distinct in having the lateral pronotal margin sulcate nearly the entire length. In *S. exsolutus* and *S. acutus*, the lateral margin lacks sulci entirely. *Semiotus illigeri* (and *S. superbus*, *S. sommeri*, and *S. germari*) has an abbreviated sulcus evident only on the anterior third to half of the pronotal margin. These last species are best separated by the pattern of elytral and pronotal bands. In *S. superbus*, the eighth and ninth elytral intervals are unicolorous. They are of two different colors (interval 8 black and interval 9 yellow to orange) in *S. germari*, *S. sommeri*, and *S. illigeri*. The pronotal band in *S. germari* (Fig. 235) is larger and more parallel-sided than in *S. illigeri* where the bands range from being single (Figs. 229, of individuals from Costa Rica) to double and slightly (Fig. 227) to strongly (Fig. 228) cruciform. The lateral arms of the anterior sclerite of the bursa copulatrix are abbreviated in *S. germari* (Fig. 49) and *S. sommeri* (Fig. 87), extending less than 1/3 the length of the median piece. In *S. illigeri* (Fig. 79) the lateral arms are longer, extending more than 1/3 the length of the median piece.

Note. The pronotal markings of *S. illigeri* exhibit much variability ranging from the extension of the lateral arms to the lateral pronotal margins as in *S. bifidus* to the even elliptical band apparent in Central American populations. Intermediate forms of varying

degree also differ in the amount of sanguineous coloration on the disk between piceus bands.

Semiotus illustris (DeJean)

(Figs. 85, 145, 221 and 287)

Pericallus illustris DeJean 1836: 96. (Type: not found; type locality: ?)

Semiotus illustris Candèze 1857: 313, Candèze 1874: 177. (Syntypes (3), female: BMNH; type locality: Cayenne).

Length 26 to 28 mm (length / width ratio 4.3 to 4.5). Head testaceous to aurantiacus with piceus maculae basally; texture glabrous, nitidus with few setae above eyes and spines, punctation fine apically becoming umbilicate basally; ocular index 71.0 to 73.0. Antennae serrate, 2-3 segments shy of hind angles (in females), with all segments testaceous to aurantiacus. Pronotum 6 to 7 mm (length / width ratio 1.1 to 1.2), with sides subparallel on posterior 2/3, converging anteriorly, hind angles divergent; margin incrassate on posterior 2/3, narrow, declivous, sulcate and explanate on anterior third; color aurantiacus to testaceous with two medial bands piceus, with or without marginal piceus maculae; texture glabrous with punctation fine and evenly scattered throughout, bearing long setae basally. Scutellum piceus, broadly chordate. Prosternum very slightly concave on anterior 2/3; color testaceous to aurantiacus; texture with fine scattered setae laterally and on lobe, punctation fine medially becoming deeper and larger laterally. Hypomeron testaceous to aurantiacus; texture glabrous with fine scattered punctures throughout, becoming denser anteriorly. Mesosternum testaceous to aurantiacus.

glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum and meshypomeron testaceous to aurantiacus. Metasternum testaceous to aurantiacus; texture glabrous with very fine punctures scattered throughout. Femora testaceous to aurantiacus throughout.

Elytra 17 to 19 mm (length / width ratio 2.8 to 3.1), subparallel on anterior third, then evenly narrowing to tip; color fulvus to luteus with suture and lateral margin piceus nearly to base; texture glabrous, nitidus, striae and stria punctures fine to obsolete; apices each bearing one spine.

Abdomen testaceous to aurantiacus; texture glabrous with dense fine punctures scattered throughout, becoming larger and nearly contiguous on 1st visible sternite; female with two oblong foveae on posterior half; anterior sclerite with lateral arms curved mesally, extending nearly as far distally as median piece. Male not seen.

Material examined. VENEZUELA: Bolívar, 10 km N Luepa Gransabana, (VI-25)-(VIII-11)-1987, S&J Peck, cloud forest malaise FIT, 1500 m. (CMNC); Surukum Basin, Upper Caroni, XII-1941, P. Anduze (USNM).

Diagnosis. *Semiotus illustris* is most closely allied phylogenetically to *S. kathleenae*. It is superficially similar to *S. affinis*, *S. intermedius*, *S. decoratus* and *S. lafertei*. All of these species, except *S. kathleenae*, have two dark bands on the elytra (one sutural and one marginal) that converge near the apex. These species also have two stout lateral frontal spines and an angled area between. *Semiotus illustris* is readily distinguished from these species, except *S. decoratus*, by the entirely pale venter that is yellowish brown to orange with occasional black markings on the hypomera. The other similar species have pronounced black bands on the abdomen and metepimera. *Semiotus*

decoratus can be separated from *S. illustris* by the darker antennae and the shape of the anterior sclerite of the bursa copulatrix. In *S. illustris* the antennae are all testaceous to aurantiacus. They (excepting the first 2 or 3 segments) are dark brown to black in *S. decoratus*. The anterior sclerite in *S. decoratus* bears two stout dentitions near the base of the lateral arms, the lateral arms themselves bearing sharp dentitions only near the apex (Fig. 74). In *S. illustris*, the lateral arms do not bear dentitions apically, but rather medially, and the base is unarmed (Fig. 85). *Semiotus kathleenae*, though a related species, is quite distinct from *S. illustris*. It is a dark red and black and is covered with long golden setae. *Semiotus illustris* is pale yellowish brown to orange and is nearly glabrous. *Semiotus illustris* can be separated from all other *Semiotus* by the 2 converging piceous bands on each elytron, the stout frontal angles with the broadly angulate median area between, and the completely pale venter.

Note. None of the DeJean types have been found. Candèze appears to have designated his own types while recognizing DeJean's name.

Semiotus intermedius (Herbst)

(Figs. 40, 146, 157, 223)

Elater intermedius Herbst 1806: 8. (Type: not found; Type locality: Brazil)

Elater cornutus Kirby 1818: 383. (Type: not found; Type locality: Brazil)

Pericalle cornutus, Latreille 1834: 141.

Semiotus intermedius, Guérin-Meneville 1855: 578, Candèze 1857: 314, Steinheil 1875: 112, Candèze 1874: 178, Costa *et al.* 1988.

Semiotus intermedius delineatus Candèze 1900: 82. (Type: ISNB; type locality: Brazil,

Río de Janeiro).

Length 23 to 29 mm (length / width ratio 4.1 to 4.3). **Head** testaceous to sanguineous, with piceus maculae basally; texture glabrous with occasional setae above eyes and spines, punctation fine and scattered evenly throughout; front with two spines anterolaterally, with area between sharply angled; ocular index 73.0 to 75.0; frontal spines approximately 25% length of frons. **Antennae** serrate, three segments shy of hind angles (in females), with segments 1 and 2 testaceous, segments 3 to 11 rufo-piceous to piceous. **Pronotum** 6 to 8 mm (length / width ratio 1.0 to 1.3), gradually expanding posteriorly; margin broadly rounded without sulcus except for explanate area on anterior fourth ; color fulvous to testaceous, testaceous to sanguineous medially, with 6 piceous maculae (two basally, two arcuate lines on disk, and two laterally just anterior to middle) or with discal maculae confluent forming two irregular bands on disk; texture glabrous with punctation fine and evenly scattered throughout except for a few fine, often umbilicate, punctures along anterior margin. Scutellum broadly ovate with indentation along anterior border. Prosternum concave in profile; color testaceous to sanguineous; texture with fine scattered setae laterally and on lobe, punctation fine medially becoming deeper and larger laterally. Hypomeron fulvous to testaceous with long piceous macula along suture and small piceous macula on lateral border; texture glabrous with fine scattered punctures throughout, becoming denser anteriorly. Mesosternum fulvous to testaceous and glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum and meshypomeron fulvous to testaceous. Metasternum fulvous to testaceous; texture glabrous

with very fine punctures scattered throughout; metepimeron piceus. Femora testaceus throughout.

Elytra 16 to 20 mm (length / width ratio 2.6 to 2.9), subparallel on anterior fourth, evenly narrowing to apex; color fulvus with badius to sanguineus markings along suture and lateral margin becoming wider apically (markings occasionally piceus); striae and stria punctures finely impressed, interstriae wrinkled; apices each bearing one spine.

Abdomen fulvus to testaceus laterally testaceus to badius medially with sublateral piceus band on each sternite; texture glabrous with dense fine punctures scattered throughout, becoming larger and nearly contiguous on first visible sternite; female with two oblong foveae on posterior 2/3; lateral arms of anterior sclerite narrow, 4/5 length of median piece, arms and median piece covered with dentitions. Male with parameres constricted near middle between angulate and subquadrate basal half and lateral blades; lateral blades approximately 1/4th length of parameres.

Material Examined. **ARGENTINA:** Misiones, Camp Grande, I-1973, R. Föerster (CNCI); Dos de Mayo, X-15-1969, J. Föerster (CNCI); Iguazu, XI-12-1987 (PCCV); Province unknown, Puerto Bemberg, Alto Parana, XII-1933 (BMNH); **BRAZIL:** Espírito Santo, Alegre, A. Huacke (FMNH); Castelo, XI-1976, M. Alvarenga (CNCI); Faz. Jerusalem, XI-23-1913, J.F. Zikan (FMNH); IBID I-16-1914; XII-13-1915 J.F. Zikan (FMNH); (CASC); Porto Alegri (ZMUC); Porto Alegri (NHMW); Villa de Alegre, XII-16-12 (FMNH); XII-13-1915 (CASC); Goiás, Jatahy, Ch. Pujal, 1895-1896 (MNH); Minas Gerais, Passa Quatro, I-31-1916 (FMNH); Passa Quatro, Faz. Dos Campos, J.F. Zikan (FMNH); Passa Quatro, Faz. Dos Campos (CASC); Poços de Caldas, I-1968, O. Leoncini (CNCI); Vila Monte Verde, III-13-1966 (USNM); Vila Monte Verde, III-(12-

18)-1966 (USNM); Paraná, Castro, E. D. Jones, 1919 (BMNH); Posto Alpino, 65 km NE Curitiba, IV-14-1964, C.E. & E.S Ross (CASC); Río de Janeiro, Itatiaya, 850m., E. Gounelle, II-'99 (MNHN); Organ Mountain MG, IV-35 (USNM); Parton, 1883 (MNHN); San Fidelis, Santo Antomnio dos Bratos, 1876-1882, A.V. de Lyon (MNHN); II-3-1963 (USNM); XI (USNM); 1938 (USNM); XI (USNM); XII-3-1919, E.G. Holt (USNM); Río Grande do Sul, XII-2-1932 (EMEC); C. 1880 Dimes, 1966 (BMNH); 1927 (USNM); Santa Catarina, Hansa Humbolt, Ant. Maller, 1933 (MNHN); Hansa Humbolt, XI-1933, A. Maller (USNM); IBID X-1932; Hansa Humbolt, XII-1933, A. Maller (USNM); Joinville, Steind. (NHMW); Lages, J. Michaelis, 1887 (MNHN); Mafra, III-1933, A. Maller (USNM); Nova Teutonia, XI-8-1934 (CASC); IBID IV-1966; Nova Teutonia, 27° 11' S, 52° 23' W, 300-500 m., XII-27-1954, F. Plaumann (CNCI); Nova Teutonia, V-5-1948, F.S. Pereira (CASC); Salto do Pirahy, Pres. Jaragua, E. Gounelle, 1915 (MNHN); São Bosto, IV-1936 (PCCV); I-1959, R. Varmellio (FMNH); São Paulo, Campos de Jordao, II-1958, K. Lenko (CNCI); Cantareira, III-1-1936, F. Halik (USNM); Cantareira, XI-2-1935 (USNM); Val. De Río Pardo, E. Gounelle, XII-'98 (MNHN); I-18-1940 (USNM); (USNM); State unknown, Alto de Serra, Stanzel-Lachnit (FMNH); Caraça, P. Germain, last half of 1884 (MNHN); Cipo, S.P., XII-18-1966, V.N. Alin (CNCI); IBID II-2-1935; IBID I-1936; Corupas C., IX-1961 (USNM); Est. Biol. Boraceia, Salesopolis S.P., IV-(16-18)-1962, Reichardt (CASC); **PARAGUAY**: Hohenau, Alto Parana, H. Jacob, 1954 (BMNH); Kolonia Sudetia, Anders, C. Pfanni (PCCV); Sapugay, XII-19-1902 (MNHN).

Larvae (summarized from Costa *et al.*, 1988) 26 mm long, elateriform, flattened dorso-ventrally, scleritized and pilose, brownish red dorsally with dark brown mandibles

on anterior region of head capsule; head, prothorax, meso and metanotum brownish red, darker than remainder of body; meso and meta sterna and sternites 1 to 8 yellow with reddish brown spots, sternites 9 and 10 completely reddish brown. Antennae 3-segmented, segments 1 and 2 glabrous, with segment two bearing small apical sensorial appendages, segment three smaller and bearing small sensorial appendages; prothorax trapezoidal, slightly larger than head, longer than mesothorax, with two dorsal depressions and two groups of lateral setae; prosternum triangular; mesothorax with a pair of large bifid spiracles laterally; legs short, five-segmented, coxa wide and short, trochanter triangular, femur longer than tibia; abdominal segments 1 to 8 with round lateral margins and with bundle of setae and 1 to 2 pair of dorsal setae near base, each segment bearing a pair of bifid spiracles on anterior lateral margin, segments 2 to 8 sculptured, segment 9 with thick punctation.

Pupa (summarized from Costa *et al.*, 1988) adectitious, exarate, yellowish and glabrous; prothorax with a pair of small projections angled posteriorly; spiracles annular; last abdominal segment with a pair of small bifid spiniform projections distally.

Diagnosis. *Semiotus intermedius* is most closely allied to *S. affinis*, *S. lafertei* and *S. decoratus*. *Semiotus illustris*, though not phylogenetically related, is superficially similar. All of these species have two dark bands on the elytra (one sutural and one marginal) that converge near the apex. These species also have two stout lateral frontal spines and an angled area between, forming a position phylogenetically roughly between those species with two frontal spines and those with three. *Semiotus decoratus* is readily distinguished from *S. intermedius* by the single pronotal band and black lateral pronotal maculae (Fig. 224). The other related species have two pronotal bands (Figs. 219-221,

and 223). *Semiotus intermedius* can be separated from *S. lafertei* and *S. affinis* by the lighter patterns and shape of the scutellum. The elytral and pronotal bands in *S. lafertei* (and *S. affinis*) are black. In *S. intermedius* they are dark brown to red. Also, in *S. intermedius* the lateral pronotal maculae are much more evident dorsally. In *S. lafertei* and *S. affinis* they are often restricted entirely to the hypomera. The scutellum of *S. intermedius* is roughly as wide as long (Fig. 157). It is much wider than long in *S. lafertei* and *S. affinis* (Fig. 159). *Semiotus intermedius* is superficially similar to *S. illustris* but can be separated by the dark bands on the abdomen and metepimera. In *S. illustris* (and *S. decoratus*) the venter is entirely pale yellowish brown to orange with occasional black markings on the hypomera. *Semiotus intermedius* can be separated from all other *Semiotus* by the two converging piceus bands on each elytron, the stout frontal angles with the broadly angulate median area between, and the broad incised scutellum.

Notes. Larvae have been collected from underneath semi-rotten tree trunks. They have been reared in the laboratory on termite workers. The pupal period is around 13 days (Costa *et al.*, 1988). The type of *Elater cornutus* Kirby was not found. The synonymy of Candéze is herein accepted.

Semiotus kathleenae n. sp.

(Figs. 106, 258 and 288)

Length 23 mm (length/width ratio 3.0 to 4.0). Head piceus basally and medially, sanguineus anterolaterally; anterior border of frons subangulate medially, without spines; texture of long erect setae and shorter decumbent setae throughout, punctation

moderately deep and scattered throughout. Antennae one segment short of hind angles in males; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 5 mm (length/width ratio 1.0 to 1.1); slightly sinuate, companulate, hind angles divergent; margin defined only on anterior third to half, incrassate posteriorly, with thickening above marginal line on portion of anterior half; color sanguineous, hind angles becoming fulvus, disk with two wide piceus bands extending from base to near anterior border; texture of dense aureus setae and dense punctation throughout becoming denser laterally; scutellum sanguineous to aurantiacus suborbicular with anterior margin slightly recurved. Prosternum slightly concave in profile, prosternal process not divided apically; color sanguineous to aurantiacus medially (with faint fulvus coloring on dorsum of prosternal process) piceus laterally; texture nearly glabrous with very fine punctures medially, with deep punctures and double aureus vestiture (of long erect and shorter decumbent setae) laterally. Hypomeron piceus with lateral margin sanguineous and posterior border fulvus to luteus; texture of dense punctures throughout with double aureus vestiture throughout (of long erect and shorter decumbent setae). Mesosternum finely punctate with fine setae, fossa nearly glabrous and impunctate; color sanguineous to testaceous medially, piceus laterally. Mesepisternum and meshypomeron piceus. Metasternum piceus with patches of sanguineous to testaceous patterns; texture with double vestiture (of long erect and shorter decumbent setae) becoming denser anterolaterally, punctation fine medially, deeper and denser anterolaterally; femora sanguineous to testaceous.

Elytra 16 to 17 mm (length/width ratio 2.7 to 2.8) gibbous, subparallel on anterior half then narrowing to tip; color sanguineous throughout; texture of dense aureus setae scattered throughout, striae and strial punctures shallow, intervals 3 (more so than

others), 5, and 7 convex, rising above other intervals; apices of each elytron bearing one small spine.

Abdomen sanguineus medially, fulvus to testaceus laterally with piceus cuneiform macula sublaterally on anterior sternites; texture with double vestiture (of long erect and shorter decumbent setae) becoming denser laterally, punctation fine medially, deeper and denser anterolaterally. Male with basal piece large, 3/4 length of parameres, parameres sinuate laterally, apical blades (including lateral spines) 30% length of parameres, bearing several setae laterally, penis narrow, barely extending beyond tips of parameres. Female not seen.

Material Examined. Holotype (male): VENEZUELA: Mérida, La Grita, 46.2 km NE Paramo La Negra, 8° 14' 54" N, 71° 52' 31" W, 2900 m., V-27-1998, Ashe, Brooks, Hanley (SEMC).

Diagnosis. *Semiotus kathleenae* is a unique species of *Semiotus* most closely allied phylogenetically to *S. illustris* and *S. buckleyi*, but differing significantly morphologically. It bears some similarities to *S. schaumi* and *S. pectitus*. The elytra in *S. kathleenae*, *S. schaumi*, and *S. pectitus* are deep red (sometimes changing to black). The elytra in *S. illustris* and *S. buckleyi* are pale brown to yellow with two or several dark bands respectively. *Semiotus kathleenae* is covered by dense golden setae. *Semiotus pectitus* and *S. schaumi* are glabrous, or nearly so. The pronotum in *S. schaumi* bears a single black band (often faint), those of *S. pectitus* and *S. kathleenae* bear two black bands. The elytral intervals in *S. schaumi* are nearly flat. In *S. pectitus* they are strongly convex but roughly equal in size. In *S. kathleenae* the intervals are also convex but the third interval is raised above the level of the others.

Note. *S. kathleenae* is named in honor of Kathleen V. Wells.

Semiotus kirschi Chassain, new status

(Figs. 90, 244 and 283)

Semiotus superbus kirschi Chassain 1998:77 (Type: MNHN; type locality: Santa Fé de Bogotá). New Status

Length 25 mm (length/width ratio 4.5 to 5.5). Head testaceus to aurantiacus with or without piceus macula base; bearing three spines apically; texture glabrous with few scattered setae above eyes and spines, punctation fine and well separated, becoming thicker basally; ocular index 65.0 to 68.0. Antennae serrate, reaching hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 6 mm (length/width ratio 1.4 to 1.5), with sides narrowly sinuate, hind angles divergent, anterolateral angles impressed, margin thinly rounded, sulcate through most of length; color aurantiacus to testaceus with two longitudinal piceus bands on disk; texture glabrous with fine punctures scattered throughout. Scutellum testaceus (often infuscate) suborbicular with anterior margin incised. Prosternum slightly concave in profile; color sanguineus to testaceus; texture glabrous medially with fine scattered setae laterally, punctation fine medially becoming denser and deeper laterally. Hypomeron aurantiacus to testaceus with infuscation along posterior border; texture glabrous with fine punctation scattered throughout, becoming denser along suture. Mesosternum aurantiacus to testaceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron aurantiacus to testaceus. Metasternum aurantiacus to

testaceus; texture glabrous medially becoming denser laterally, punctation very fine medially, denser laterally; metepimeron piceus. Femora aurantiacus to testaceus.

Elytra 16 to 17 mm (length/width ratio 3.2 to 3.3), subparallel on anterior third, then narrowing to tip; color fulvus to luteus with intervals 2, 4, 6, 8, and 9 piceus; striae fine to obsolete, stria punctures shallow to poorly defined; apices each bearing one spine.

Abdomen fulvus to testaceus laterally, testaceus to aurantiacus medially with piceus sublateral bands extending from sternite 1 to sternite 2 to 5; texture with or without few fine erect setae scattered medially, sternite 1 with dense decumbent setae behind metacoxae, punctation fine and scattered throughout becoming denser on sternite 1; female with two elliptical foveae on apical half of sternite 5; anterior sclerite with lateral arms broad, with several serrations along inner margin, median piece short and acute. Male not seen.

Material examined. **BOLIVIA:** Cochabamba, Carinavi, 1500 m., N Yungas, XI-1992, P. Bleuzen (MNHN); Cristal Mayu, IV-1979 (MNHN); P. Germain, 1889 (MNHN); Department unknown, River Songo, A.H. Fassel (MNHN); **COLOMBIA:** Capital District, Bogotá (MNHN); Bogotá (SMTD); **PERU:** Junín, Chanchamayo, Dr. Bässler (SMTD); Tarma, Huacapistana, 1800 m., III-24-1940, F. Woytkowski (SEMC); Lima (MNHN); Political subdivision unknown, Région Centrale, Péréné, Dr. Vergne (MNHN).

Diagnosis. *Semiotus kirschi* is most closely allied to *S. acutus* and *S. germari*. It can be separated from these species by the sulcus along the lateral margin of the pronotum. In *S. kirschi*, the sulcus extends nearly the entire length of the pronotum. In *S. germari*, the sulcus is reduced to the anterior third to half only, and in *S. acutus* it is

entirely lacking. Several species have alternating light and dark elytral bands and glabrous pronota similar to *S. kirschi*. Of these, *S. regalis* is readily separated by having intervals 1 and 2 black (Fig. 222). In *S. kirschi*, the elytral bands cover alternating intervals with intervals 1 and 2 being of two contrasting colors. This same pattern is evident in *S. exsolutus*, *S. superbus*, *S. germari*, *S. acutus*, and *S. illigeri*. *Semiotus kirschi* is most easily separated from these by the long lateral pronotal sulci. *Semiotus exsolutus* and *S. acutus* have no pronotal sulci. *Semiotus superbus*, *S. sommeri*, *S. germari*, and *S. illigeri* all have a short marginal sulcus (not extending onto the posterior half). *Semiotus virgatus* has a single narrow pronotal band (Fig. 242). *Semiotus kirschi* has two pronotal bands (Fig. 244). The lateral arms of the anterior sclerite of the bursa copulatrix extend posteriorly at least half the length of the median piece in *S. virgatus* (Fig. 76). In *S. kirschi* (Fig. 90) the lateral arms do not extend posteriorly.

Note. *Semiotus kirschi* was recognized by Chassain (1998) as a subspecies of *S. superbus* based primarily on the color pattern of the pronotum. No specific significance was placed by Chassain on the lateral margin, that in *S. kirschi*, extends nearly the entire length of the pronotum, which is here recognized as a specific difference.

Semiotus kondratieffi n. sp.

(Figs. 86, 136, 249 and 283)

Length 27 to 28 mm (length/width ratio 4.0 to 4.1). Head aurantiacus to sanguineous; anterolateral area of frons protuberant and angled, without spines; texture with few erect setae over eyes and anterior margin. punctures moderately deep and

evenly scattered throughout, becoming umbilicate basally. Antennae 0 to 1 segment short of hind angles in females; segments 1 and 2 aurantiacus, segments 3 to 11 rufopiceus to piceus. Pronotum 7 to 8 mm (length/width ratio 1.0 to 1.1); widest on anterior fourth then converging anteriorly and posteriorly to hind angles that that strongly diverge, margin incrassate (less so on anterior fourth) without clear definition; color fulvus to aurantiacus laterally, sanguineus medially with 2 lateral piceus bands extending from base to anterior fourth ; texture glabrous with fine punctation throughout, becoming thicker and subumbilicate anteriorly; scutellum piceus, anterior half declivous and excavate, anterior border incised, prosternum concave in profile with base of lobe incrassate, prosternal process not divided; color aurantiacus to sanguineus with piceus band along suture; texture glabrous with fine erect setae on lobe, punctation fine medially becoming thickened and umbilicate laterally. Hypomeron luteus to aurantiacus laterally with piceus band along suture; texture glabrous with fine punctures scattered throughout. Mesosternum finely punctate with fine setae, fossa glabrous and impunctate; color luteus to aurantiacus with piceus lateral border. Mesepisternum and meshypomeron testaceus to piceus. Metasternum aurantiacus to sanguineus with piceus band laterally; texture glabrous with scattered setae anteriorly, punctation very fine throughout; metepimeron piceus; femora fulvus to testaceus.

Elytra 18 to 19 mm (length/width ratio 2.6 to 2.7) narrowing from near base to apex; color luteus to testaceus with intervals 1, 5, 6, and parts of 8 and 9 piceus; texture glabrous, striae (except stria 1) fine to obsolete, strial punctures fine to obsolete; apices of each elytron bearing one spine.

Abdomen testaceous medially, fulvus laterally with piceus band sublaterally; texture glabrous or with few erect setae, fine decumbent setae on sternite 1, punctation fine and scattered throughout becoming denser on sternite 1; female with dense decumbent and erect setae on sternite 5, without foveae; lateral arms of anterior sclerite short, approximately 1/2 length of median piece, lateral arms bearing scattered denticulations, median piece wide in profile on basal 2/3, narrowing apically. Male unknown.

Material Examined. Holotype (female): **VENEZUELA:** Aragua, Rancho Grande Biological Station, Portachuelo Pass, 10° 21' 0" N, 67° 41' 0" W, 1,100 m., VI-4-1998, Ashe, Brooks, Harley, VENIABH98, moving through pass against wind migration (SEMC).

Diagnosis. *Semiotus kondratieffi* is a unique species quite distinct from any other *Semiotus*. Phylogenetically it is most closely allied to *S. fascicularis* and *S. clarki* and other species with two prominent frontal spines. It can be readily separated from these species by lacking frontal spines, the anterolateral portion of the frons being strongly angled only. The anterior sclerite of the bursa copulatrix and the hind angles of the pronotum of *S. kondratieffi* are distinct from other known species of *Semiotus*. The anterior sclerite lacks spines on the medial or lateral arms, bearing spines or denticulations only near the base of the lateral arms (Fig. 86). The hind angles of the pronotum are much more strongly diverging in *S. kondratieffi* than in any other *Semiotus* (Fig. 136). The declivous and concave scutellum is similar to that of *S. trinitensis*, however this species bears two prominent frontal spines.

Note. *Semiotus kondratieffi* is named in honor of Boris C. Kondratieff, Colorado State University.

Semiotus lafertei Candèze

(Figs. 120, 159, 219 and 290)

Semiotus lafertei Candèze 1857:313, Candèze 1874: 177, Champion 1896: 290.

(Syntypes (2), female: BMNH; type locality: Mexico).

Length 25 to 35 mm (length / width ratio 4.0 to 4.7). Head testaceous to sanguineous with piceous maculae basally; texture glabrous with occasional setae above eyes and frontal spines, punctation deep and scattered evenly throughout; front with two spines anterolaterally, with area between sharply angled. Antennae three segments shy of hind angles (in both sexes), with segments 1 and 2 testaceous, segments 3 to 11 rufopiceous to piceous. Pronotum 6 to 9 mm (length / width ratio 1.1 to 1.2), gradually expanding posteriorly; margin broadly rounded without sulcus except for vague concavity on anterior fourth; color fulvous to testaceous laterally, testaceous to aurantiacus medially with two arcuate bands on disk piceous; texture glabrous with punctation fine and evenly scattered throughout, often with a few fine umbilicate punctures along anterior margin. Scutellum broadly ovate with indentation along anterior border. Prosternum concave in profile; color testaceous to sanguineous; texture with fine scattered setae laterally and on lobe, punctation fine medially becoming deeper and larger laterally. Hypomeron fulvous to testaceous with long piceous band along suture and small piceous macula on lateral border; texture glabrous (or with few erect setae laterally) with fine scattered punctures throughout, becoming denser anteriorly. Mesosternum fulvous to testaceous and glabrous medially with fine dense setae laterally, fossa nearly impunctate

with lateral areas containing fine setigerous punctures. Mesepisternum and meshypomeron fulvus to testaceus. Metasternum fulvus to testaceus; texture glabrous with very fine punctures scattered throughout; metepimeron piceus. Femora testaceus to aurantiacus.

Elytra 17 to 23 mm (length / width ratio 2.6 to 3.2), subparallel on anterior fourth, then narrowing to apex; color fulvus with badius to piceus markings along suture and lateral margin becoming wider apically, sutural band not reaching scutellum anteriorly; striae and strial punctures finely impressed, interstriae wrinkled; apices each bearing one spine.

Abdomen fulvus to testaceus laterally testaceus medially with sublateral piceus band on each sternite; texture glabrous or with fine setae scattered throughout, punctation dense, fine and scattered throughout, becoming larger and nearly contiguous on first visible sternite; female with two oblong foveae on posterior 2/3, lateral arms of anterior sclerite narrow, 4/5 length of median piece, arms and median piece covered with dentitions. Male with parameres constricted near middle between angulate and subquadrate basal half and lateral blades, lateral blades approximately 1/4th length of parameres, penis extending beyond tip of parameres.

Material Examined. **COLOMBIA:** Valle del Cauca, Cali, I-2-67 (FMNH); **COSTA RICA:** Alajuela, Est. San Ramón, P.N. Guanacaste, 620 m., IV-(3-19)-1994, Familia H. García (INBC); Finca San Gabriel, 2 km SW Dos Ríos, 600 m., V-1989 (INBC); San Cristobal, 600-620 m., V-(9-30)-1998, F.A. Quesada (INBC); Sect. San Ramon de Dos Ríos, 620 m., (IV-V)-1995, F.A. Quesada (MTEC); Sector San Ramón de Dos Ríos, 620 m., IV-(3-24)-1995, M. Chinchilla (INBC); Zapote de Upala, VIII-2-1971.

E. Sraveja (EMEC); Zapote Upala, nr. Bijagua, XI-1-1972, F. Cordero (EMEC); IBID, IV-(20-26)-1972; Zapote Upala, nr. Bijagua, XII-8-1972, R. Ortiz (EMEC); Zapote de Upala vic. Bijagua, XI-1-1972, F. Cordero (CNCI); IBID, V-19-1972; Zapote de Upala, vic. Bijagua, XII-8-1972, R. Ortiz (CNCI); 2.5 km W Dos Ríos, V-22-1985 (EMEC); Cartago, Turrialba, Schild & Burgdorf (USNM); Guanacaste, Est. Cacao, 1000-1400 m., SW side Volcán Cacao, X-1989, R. Blanco & C. Chavez (INBC); Est. Maritza, 600 m., W of Volcán Orosi, V-1990, R. Blanco (INBC); Est. Pitilla, 700 m., 9 km S Santa Cecilia, P.N. Guanacaste, (V-19)-(VI-3)-1993, P. Ríos (INBC); Heredía, Est. El Ceibo, Braulio Carrillo, P.N. 400-600 m., IV-1990, C. Chaves (INBC); est. Magassay, 200 m., P.N. Braulio Carrillo, VII-1991, A. Fernandez (INBC); Finca la Selva, 3 km S Puerto Viejo, VII-(23-25)-1976, E.M. Fisher (CASC); Tirimbirca, c. 200 m., V-1971, G.R. Proctor (CASC); Limón, Cerro Tortuguero, 1-120 m., VII-1993, R. delgado (INBC); Est. Hitoy Cerere, 100 m., R. Cerere, res. Biol. Hitoy Cerere, II-(15-27)-1993, G. Carballo (INBC); IBID, (VI-30)-(VII-20)-1992, F.A. Quesada; Hamburg Farm, Reventazon, VI-26-22, F. Neverman (USNM); IBID VI-25-22; La Colonia, 23 km NE Guapiles, VIII-21-1966, R.D. Sope (USNM); Manzanillo, 0-100- m., RNFS, Gandoca y Manzanillo, (6-27)-1993, F.A. Quesada (INBC); Río Sardinas, RNFS Barra del Colorado, 10 m., VII-(16-24)-1993, F. Araya (INBC); Ramal, Río Parismina, Santa Clara, *an Gebusch*, F. Neverman (USNM); IBID IV-28-25; Sector Cerro Cocori, Finca E. Rojas, 150 m., (IX-10)-(X-14)-1992, malaise trap (INBC); Tingue lot, 6 m, Río Reventazon, IV-27-37, F. Neverman (USNM); Puntarenas, Alberque Cerro de Oro, Sendero La Tarde, 5.3 km NW Cerro Rincón, 280 m., II-8-1996, L. Angulo (INBC); Avenida El Pizote, 1.4 km NE La Tigra, 1300 m., V-(1-8)-1996, E. Navarro (INBC); Cantón Coto Brus., Agua Caliente.

VIII-1986, N. Zakharoff (CASC); División, VI-9-1991, Brenes (CASC); División, VI-9-1991, Brenes (CASC); Est. Agujas, Río Agujas, 300 m., (11-20)- Puntarenas, Cantón Coto Brus., Agua Caliente, VIII-1986, N. Zakharoff (CASC); Est. Sirena, P.N. Corcovado, 0-100 m., VI-1990, F. Quesada (INBC); Fila Cruces, Finca Llama, 1200 m., V-13-1996, I.A. Chacón (INBC); Finca Cafrosa, Est. Las Mellizas, P.N. Amistad, 1300 m., (VI-VII)-1990, J.C. Saborio (INBC); Jardín Botánico Wilson, 1100 m., III-29-1996, A. Chacón (INBC); Palmira, Guitierrez Bravo, Fila Tigre, 1200 m., IV-12-1996, I.A. Chacón (INBC); Rancho Quemado, Peninsula de Osa, III-1991, J.C. Saborio (INBC); San Vito, Las Cruces, IV-29-1988, A. Sohs (INBC); 5 mi S San Vito, V-25-1983, D.J. Heffern (TAMU); Province unknown, San Carlos, Schild & Burgdorf (USNM);

GUATEMALA: Alta Verapaz, Panzós (NHMW); Izabal, San Antonio, IV-12-1990, J. Monzón (TAMU); Petén, Sayaxche, El Petén, X-18-1963, E.C. Welling (CNCI); IBID, X-24-1963; IBID, X-8-1963; **HONDURAS:** Cortés, Lago Yojoa, VII-5-77, J.V. Mankins (USNM); Yoro, P. N. Pico Bonito, El Portillo, 640 m., 15°26'27" N, 87°08'09" W, VIII-13-2000, R. Reyes (EAPZ); **MEXICO:** Chiapas, San Quintín, 1971, Wind (USNM); Veracruz, Est. Biol. Las Tuxtlas, 250 m., VII-27-1990, J. Doyen (EMEC); Lake Catemaco, V.C., VI-(16-20)-1969, D.E. Bright (CNCI); 33 km NE Catemaco, 160 m., Los Tuxtlas Biol. St., (VII-1)-(VIII-1)-1983, FIT ravine, rain forest, S&J Peck (CMNC); 8 mi N Santiago Tuxtla (FMNH); State unknown, Dos Anares, IX-1980, P. Bleuzen (PCCV); **NICARAGUA:** Chontales, Richardson (OXUM); Chontales, Richardsen (NHMW); Chontales, Janson (USNM); **PANAMA:** Canal Zone, Barro Colorado Island, VI-28-1978, N. Woodley. on log (USNM); Chiriquí (ZMUC); Volcan de Chiriquí, Champion, 25-1000 ft, (OXUM); (CUIC); (FMNH); Volcán de Chiriquí, 25-4000 m.,

Champion (NHMW); Darién, Estación Ambiental Cana, 7°45'32" N, 77°41'07" W, 500 m., VI-(7-10)-1996, R.S. Anderson (CMNC); Río Tacarcuna, 1900 ft., VII-1963, W.P. Murdoch (USNM); Panama, Cerro Azul, 700 m., 9°10' N, 79°25' W, VI-30-1971, Bivia (USNM); Cerro Campana, VII-27-1978, E.M. Fisher (CASC); Cerro Campana, V-(11-15)-1980, E.G. Riley & D. LeDoux (EGRC); Cerro Campana, 820 m., 8° 40' N, 79° 56' W, VIII-12-1977, T.J. Riley (EGRC).

Diagnosis. *Semiotus lafertei* is most closely allied to *S. affinis*, *S. intermedius* and *S. decoratus*. *Semiotus illustris*, though not phylogenetically related, is superficially similar. All of these species have two dark bands on the elytra (one sutural and one marginal) that converge near the apex. These species also have two stout lateral frontal spines and an angled area between, forming a position phylogenetically roughly between those species with two frontal spines and those with three. *Semiotus decoratus* is readily distinguished from *S. lafertei* by the single pronotal band and black lateral pronotal maculae (Fig. 224). The other related species have two pronotal bands (Figs. 219-221, and 223). *Semiotus lafertei* can be separated from *S. intermedius* by the darker patterns and shape of the scutellum. The dark elytral and pronotal patterns in *S. lafertei* (and *S. affinis*) are black. In *S. intermedius* they are dark brown to red. Also, in *S. intermedius* the lateral pronotal maculae are much more evident dorsally. In *S. lafertei* and *S. affinis* they are often restricted entirely to the hypomera. The scutellum of *S. intermedius* is roughly as wide as long (Fig. 157). It is much wider than long in *S. lafertei* and *S. affinis* (Fig. 159). *Semiotus lafertei* differs from *S. affinis* in the piceous sutural stripe that does not reach the scutellum and in the lack of a sulcus on the anterior third of the lateral pronotal margin. In *S. affinis* the elytral suture is piceous to the scutellum and the anterior

third of the lateral pronotal margin is sulcate. *Semiotus lafertei* is superficially similar to *S. illustris* but can be separated by the dark bands on the abdomen and metepimera. In *S. illustris* (and *S. decoratus*) the venter is entirely pale yellowish brown to orange with occasional black markings on the hypomera. *Semiotus lafertei* can be separated from all other *Semiotus* by the two converging piceus bands on each elytron, the stout frontal angles with the broadly angulate median area between, and the broad incised scutellum.

Note. *Semiotus lafertei* and *S. affinis* are not easily separated in certain areas in Colombia where their ranges overlap. In this area individuals have the elytral sutural band extending to the scutellum but only narrowly. The marginal pronotal sulcus in these individuals is also lacking or very reduced. It is not certain that these are distinct species, though separable throughout most of their range.

Semiotus ligatus Candèze

(Figs. 37, 118, 176, 257 and 288)

Semiotus ligatus Candèze 1889: 81. (Type: ISNB; type locality: Colombia).

Length 22 to 26 mm (length / width ratio 3.9 to 4.3). Head piceus with anterolateral areas testaceus to aurantiacus; anterolateral margin angled, frons lacking spines; texture of dense setae and punctures throughout; ocular index 75.0 to 78.0.

Antennae serrate, just reaching hind angles in females, 0 to 1 segment beyond hind angles in males; segments 1 and 2 testaceus to aurantiacus, segments 3 to 11 piceus. Pronotum 5 to 6 mm. (length / width ratio 0.9 to 1.1), sinuate with hind angles diverging, margin undulate, thinly rounded without sulcus; color viridis, lateral and anterior margin fulvus

to viridis with two piceus bands extending from base to anterior fourth ; fulvus and viridis areas glabrous, nitidus, piceus bands with dense decumbent setae and punctation deeper than medial and lateral areas. Scutellum fulvus to testaceus, broadly rounded posteriorly, anterior margin straight. Prosternum nearly straight in profile, curving ventrally on lobe; color piceus with prosternal process sanguineous, lobe aurantiacus; texture glabrous with very fine punctation medially, deeply and densely punctate with dense decumbent setae laterally. Hypomeron fulvus to luteus, with broad piceus macula along suture; texture of dense setae and punctation on medial piceus area, lateral area glabrous, nitidus. Mesosternum testaceus to sanguineus medially, piceus laterally; texture glabrous with fine punctures medially, with denser punctures and dense setae laterally. Mesepisternum and meshypomeron piceus. Metasternum sanguineus medially, piceus laterally; texture glabrous with fine punctation medially, with long dense setae and deep punctures laterally. Femora testaceus to aurantiacus.

Elytra 16 to 19 mm (length / width ratio 2.8 to 3.2), subparallel on anterior third , then tapering to tip; color viridis to subviridis, margin and suture faintly (if at all) fulvus; striae finely impressed, stria punctures shallow, interstriae nearly flat and smooth on disk, becoming more convex and wrinkled posterolaterally; apices each bearing a single spine.

Abdomen sanguineus medially, fulvus to piceus laterally; texture glabrous with fine punctation medially, with long dense setae and deep punctures laterally; female without foveae on sternite 5; anterior sclerite smooth, lacking dentitions except for apex of lateral arms, lateral arms narrow, extending apically 2/3 length of median piece. Male

with parameres wide basally, wider than apical half, lateral blades small, approximately 20% length of parameres, rounded at tip, spines acute.

Material Examined. **COLOMBIA:** Cauca, 16 km E Silvia, 9000', II-22-1970, H. Howden (CNCI); 14 km E Silvia, 12,000', VII-15-1970, H. & A. Howden (CNCI); **ECUADOR:** Napo, 5 km E Popallacta, 3,000' m., III-24-1979, H. & A. Howden (CNCI).

Diagnosis. *Semiotus ligatus* is a primitive species of *Semiotus*. It is most closely allied to *S. capucinus* and *S. striatus*, both of which share with *S. ligatus* a gibbous elytral base and lack frontal spines. The frontal spines in *S. ligatus* are very reduced. These species are readily distinguished from *S. ligatus* by the elytral color. In *S. ligatus* the elytra are green, in *S. capucinus* the elytra are deep red, and in *S. striatus* they are pale yellowish brown with infusate striae. The green elytra of *S. seladonius* is similar to those of *S. ligatus*. These species can be particularly distinguished by the setae (especially the prothoracic setae). In *S. seladonius* they are much longer and more erect than those of *S. ligatus* (where the setae are decumbent). The pronotal base color is fulvus around the piceus bands in *S. seladonius*. In *S. ligatus* the base color is viridis with only the angles being fulvus. The frontal margin in *S. ligatus* is angled to subspinose. In *S. seladonius* the frontal margin is arcuate, without angles or spines. The elytral apices are pointed or spined in *S. ligatus*, whereas in *S. seladonius* they are rounded or occasionally angled. The elytral base is more gibbous in *S. seladonius* than in *S. ligatus*. The aedeagal plates are much shorter in *S. ligatus* (Fig. 118) than in *S. seladonius* (Fig. 119).

Semiotus limatus Candèze

(Figs. 78, 208 and 276)

Semiotus limatus Candèze 1889: 81. (Lectotype: ISNB; type locality: Brazil, Amazonas).

Semiotus horvathi Szombathy 1909: 23. (Holotype, female: HNHM; type locality: Peru, Chanchamayo, Briceño). New Synonym.

Length 22 to 25 mm (length/width ratio 4.9 to 5.0). Head aurantiacus to sanguineous, front with two spines anterolaterally; texture mostly glabrous, nitidus with a few erect setae above eyes and spines, punctation moderately deep and evenly scattered throughout; ocular index 71.0 to 74.0; frontal spines approximately 36% length of frons. Antennae serrate, 2 to 3 segments shy of hind angles in females; segments 1 and 2 aurantiacus, segments 3 to 11 rufopiceus. Pronotum 5 to 7 mm (length/width ratio 1.2 to 1.4), narrowly sinuate with margins converging on anterior fourth to anterior third, hind angles diverging, disk convex with lateral depressions sublaterally on posterior 2/3 to 3/4, margin sulcate on anterior third to fourth explanate laterally, broadly rounded without sulcus on posterior half; color aurantiacus to sanguineous; texture glabrous, nitidus with moderately deep punctures scattered throughout becoming sub-umbilicate anteriorly. Scutellum aurantiacus, suborbicular, anterior margin incised medially. Prosternum concave in profile, prosternal process not divided at apex; color testaceus to aurantiacus; texture glabrous, nitidus with few erect setae on lobe, with fine punctures medially becoming thicker and umbilicate laterally. Hypomeron testaceus to aurantiacus; texture glabrous, nitidus with very fine punctures or with punctures obsolete. Mesosternum testaceus to aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and

fine punctures. Mesepisternum and meshypomeron testaceus to aurantiacus.

Metasternum testaceus to aurantiacus; texture glabrous, nitidus with punctation fine to obsolete. Femora testaceus to aurantiacus.

Elytra 14 to 15 mm (length/width ratio 3.0 to 3.1), subparallel on anterior third then narrowing to tip; color aurantiacus basally, intervals 3 and 4 luteus posteriorly, intervals 1, 2, and parts of 5, and 6 through 9 piceus on posterior half; texture glabrous, nitidus with striae and stria punctures fine to obsolete; apices each bearing one spine.

Abdomen testaceus to aurantiacus medially, fulvus laterally, with sublateral piceus bands; texture glabrous, nitidus with very fine punctures throughout, sternite 1 with fine setae and dense punctation; female with densely punctate area on basal half of sternite 5, foveae absent; anterior sclerite wide basally, lateral arms strongly convex, projecting medially, median piece subtriangular, bearing several serrations laterally, as long as (or slightly longer than) lateral arms. Male unknown.

Material examined. **BRAZIL:** Amazonas (ISNB); **PERU:** Junín, Chanchamayo, Briceño (HNHM); Chanchamayo, I-2-1969, J. Schunke (CNCI); Satipo, XI-1987 (PCCV).

Diagnosis. *Semiotus limatus* is most closely allied to *S. clarki*, *S. badeni*, and the species in the *angulatus* group. It can be separated from these species by the pattern of the elytral bands and by the shape of the antennae. *Semiotus limatus* bears two dark bands per elytron (one sutural and one marginal). *Semiotus badeni* and *S. clarki* each bear 4 or 5. The antennae in *S. limatus* are serrate (as in Fig. 165). In the *angulatus* group they are pectinate to subpectinate (Fig. 166-167). The median piece of the anterior sclerite of the bursa copulatrix is thick and completely covered by dentitions in *S. limatus*

and the lateral arms curve posteriorly (undivided) nearly as far as the median piece (Fig. 78). In *S. clarki*, the median piece bears only a pair of dentitions (Fig. 64). In *S. badeni* the median piece is unarmed apically and the lateral arms extend posteriorly less than half the length of the median piece (Fig. 75). The lateral arms of the anterior sclerite in the *angulatus* group are divided distally (Figs. 41, 43-45). Resemblances also exist between *S. limatus* and other species with only sutural and marginal dark elytral bands (*S. trinitensis*, *S. lafertei*, *S. affinis*, *S. intermedius*, *S. decoratus*, *S. illustris*, *S. carus*, *S. nigriceps*, *S. cyrtomaris*, *S. matilei*, *S. pallicornus*, and *S. antennalis*). The last six species (*S. carus* - *S. antennalis*) are part of the *caracasanus* group and are distinguished by the absence of sulci on the lateral margins of the elytra and by the completely convex pronota. The pronotum in *S. limatus* is concave along sublateral areas and the lateral margin is sulcate anteriorly. *Semiotus lafertei*, *S. affinis*, *S. intermedius*, *S. decoratus*, and *S. illustris* all bear three frontal spines (or the medial area between the lateral spines is strongly angled). The median piece of the anterior sclerite of the bursa copulatrix is unarmed in *S. trinitensis* (Fig. 42). Also *S. trinitensis* bears two pronotal bands and is known only from Trinidad. *Semiotus limatus* bears a single pronotal band and is known from Brazil and Peru.

Note. The type of Szombathy's *S. horvathi* is clearly conspecific with *S. limatus*. It is questionable if he even saw the type of *S. limatus*.

Semiotus linnei Guérin-Meneville

(Figs. 82, 130, 142, 236 and 271)

Semiotus linnei Guérin-Meneville 1844: 17, Candèze 1857: 325, Steinheil 1875: 112,

Candèze 1874: 182, Kirsch 1884: 43, Szombathy 1909a: 121. (Type: not found; type locality: New Granada).

Length 21 to 26 mm (length / width ratio 4.5 to 4.9). Head with anterior half fulvus to aurantiacus, posterior half (and median band) piceus; bearing three frontal spines; texture of erect setae over eyes and spines, punctation deep with punctures separated by about width of punctures; ocular index 73.0 to 75.0. Antennae serrate, 0 to 1 segment short of hind angles; segments 1 and 2 testaceus, segments 3 to 11 testaceus to rufopiceus. Pronotum 5 to 6 mm (length / width ratio 1.2 to 1.4), narrowly sinuate; marginal sulcus obscure to well defined on anterior half, thickly rounded posteriorly, with an elevated thickening above margin; disk with two large piceus sub-rectangular maculae, interrupted medially by sanguineus longitudinal band, anterior border and margins fulvus to sanguineous; texture glabrous medially with thick pile laterally, punctation fine and moderately dense medially, deep and often contiguous laterally; scutellum testaceus, sub-orbicular posteriorly, anterior margin recurved; texture glabrous or with few scattered punctures. Prosternum concave in profile; color aurantiacus medially, lobe fulvus to aurantiacus, lateral area piceus; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron fulvus with or without narrow piceus band along suture, lateral areas glabrous with moderately dense pile along suture. Mesosternum fulvus to testaceus; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum and meshypomeron fulvus to testaceus. Metasternum testaceus to aurantiacus medially, badius to piceus laterally;

texture glabrous medially with dense setae anterolaterally, punctation fine medially becoming denser laterally. Femora aurantiacus to testaceus throughout.

Elytra 14 to 17 mm (length / width ratio 2.9 to 3.2), subparallel on anterior third then narrowing to tip; color fulvus, striae infusate; texture glabrous, nitidus, striae fine to obsolete striae punctures deep and well defined; apices each bearing one spine.

Abdomen testaceus medially, fulvus laterally with sublateral maculae (or bands) badius to sanguineous; setae scattered throughout except median area, punctation fine medially, deeper laterally; female with two elliptical foveae on posterior half of sternite 5; anterior sclerite with lateral arms convex basally extending posteriorly 1/2 to 1/3 length of median piece, and bearing several dentitions along inner surface. Male with parameres three times longer than wide, lateral blades 30 to 34% length of parameres.

Material examined. **COLOMBIA:** Capital District, Bogotá (OXUM); nr. Bogotá, 1848-1857, E.W. Mark. (OXUM); Nariño, Pasto, Götz (NHMW); **VENEZUELA:** Mérida, Tabay, 7 km E La Mucuy Station, Sierra Nevada Nt. Pk., 8°37'44" N, 71°2'26" W, 2300-2700 m., V-24-1998, J. Ashe, R. Brooks, R. Hanley (SEMC).

Diagnosis. *Semiotus linnei* is most closely allied to *S. perangustus*, *S. cristatus*, *S. colombianus*, and *S. angustus*. Overall similarities also exist with *S. auripilis*. These species have three frontal spines and pale elytra with infusate striae. *Semiotus auripilis* is readily separated from *S. linnei* by the strongly convex elytral intervals. The intervals in *S. linnei* are flat, or nearly so. The lateral frontal spines of *S. cristatus* are shorter than those of the other related species, not extending forward beyond the length of the medial spine (Fig. 144). The lateral spines in *S. linnei* (and the other related species) are much longer than the medial spine (as in Fig. 142). *Semiotus linnei* can be separated from *S.*

cristatus and *S. columbianus* by the frontal vestiture and length of the antennae. In these species the setae are double, with decumbent setae discally and erect setae over the eyes and spines. In *S. linnei* the frontal decumbent setae are absent or very few in number. The antennae in *S. cristatus* and *S. colombianus* extend beyond the hind angles in both sexes. The antennae of *S. linnei* do not quite reach the hind angles. Also, the two piceus pronotal bands in *S. cristatus* are nearly linear and approximate, the area between being narrow and parallel-sided. In *S. linnei* and *S. colombianus*, these bands are arcuate medially. The anterior sclerite of the bursa copulatrix is more heavily armed in *S. cristatus* than in *S. linnei* and *S. colombianus*. *Semiotus cristatus* has dentitions all along the posterior margin of the lateral arms extending onto the median piece (Fig. 80). In *S. colombianus* (Fig. 81) and *S. perangustus* (Fig. 72) the dentitions do not extend the entire length of the lateral arms. In *S. linnei* the median piece is without dentitions (Fig. 82). *Semiotus angustus* lacks lateral arms entirely (Fig. 71). The aedeagus is narrow in *S. linnei* (Fig. 130) with the base of the parameres approximately as wide as the parameres across the apical blades. In *S. cristatus* the base of the parameres is wider than the aedeagus at the widest point of the apical blades (Fig. 129).

Semiotus luteipennis (Guérin-Meneville)

(Figs. 47, 123, 248 and 292)

Elater luteipennis Guérin-Meneville 1839: 20. (Type: not found; Type locality: Chile)

Eucamptus luteipennis Solier 1851: 9.

Chalcolepidius luteipennis F. Philippi 1887: 84.

Semiotus luteipennis Candèze 1857: 300, Candèze 1874: 186. Bartlet-Calvert 1898: 798.

Fleutiaux 1907: 173, Bruch 1911: 244.

Length 21 to 35 mm (length / width ratio 3.6 to 3.9). Head piceus without frontal spines; ocular index 81.0 to 84.0. Antennae serrate, entirely piceus, extending 0.5 to 1.5 segments beyond hind angles; texture with long fine brown setae throughout, punctation umbilicate and generally separated by less than own diameter except in isolated areas on disk. Pronotum 5 to 9 mm (length / width ratio 0.9 to 1.0), gradually expanding posteriorly with hind angles expanding only a little further laterally, margin thickly rounded with sulcus extending entire length except on posterior fifth and anterior fourth ; color piceus with lateral margin sanguineous; texture with scattered fine setae on disk becoming slightly longer and denser anterolaterally; scutellum with anterior margin nearly straight, widest on anterior third then narrowing to rounded apex. Prosternum piceus, evenly concave in profile, lobe hemispherical; texture consisting of fine scattered setae, moderately punctate medially with punctures becoming larger laterally. Hypomeron sanguineus laterally, piceus along suture, with fine appressed setae shorter than prosternal setae, punctation becoming larger along suture, punctures generally separated by distance greater than own width. Mesosternum piceus and moderately punctate with fine setae throughout. Mesepisternum and meshypomeron piceus. Metasternum piceus with setae and punctures well separated medially, becoming dense laterally. Femora piceus.

Elytra 15 to 25 mm (length / width ratio 22.5 to 2.9), widest at middle before narrowing to tip; color aurantiacus to sanguineous; texture glabrous, interstriae wrinkled; apices each bearing two spines of subequal length..

Abdomen piceus with fine setae and fine scattered punctures throughout, with impunctate cavities and wrinkles along lateral margin; female foveae large, shallow and elliptical, covering most of central area of sternum 5; anterior sclerite with lateral arms vestigial, median piece extending to point distally, surrounded in bursa copulatrix by numerous accessory sclerites. Male with parameres sinuous, lateral blades convex laterally, approximately 20% length of parameres.

Pupa "ninfa" (translated from Bartlet-Calvert, 1898) dirty yellowish white, with two spines on the anterior border of the prothorax with points directed inward, antennae free, wings and elytra folded below, completely covering the meso-metasternum, abdominal segment 1 with 2 long sharp spines above, with other smaller and shorter spines below.

Material Examined. **ARGENTINA:** Chubut, Los Alerces, II-1973, R. Föerster (CNCI); P.N. Los Alerces, Lago Futalaufquen, 500 m., 14-XII-1997, forest track, C. & M. Vardy (BMNH); (FMNH); Neuquén, Junin de los Andes, Laguna Verde, 1000 m., 11-III-1979 (ZMUC); Río Bonito SE, Va. La Angostura, II-21-1978, C.M. & O.S. Flint Jr. (USNM); C. Bruch (ZMUC); Río Negro, Lago Nahuel Huapi, Puerto Blest, 770 m., XII-16-1978 (ZMUC); Puerto Blest, XII-2-1926, R.C. Shannon (USNM); Province unknown, Correntoso, L. NahHuapi, XI-20-26, R.C. Shannon (USNM); **CHILE:** Bío Bío, Araucanía, 1907, R.M. Middleton (BMNH); Arauco, Contulmo, II-10-1967, Sanfeliu (CNCI); Concepción (ZMUC); Concepción (CASC); Las Trancas, III-1977, T. Cekalovic (CNCI); Recinto, XII-1989 (PCCV); Curico, Cord. Curico, Palos Negros, XII-60, L.E. Peña (USNM); El Coigo, XI-1960, L.E. Peña (CNCI); IBID, X-(10-20)-1960; El Coigo Cord. Curico, XI-1961, L. Peña (CNCI); Palos Negros, XI-1960, L.E. Peña (CNCI); La

Araucanía, Cabreria 1100 m., I-1977, L.E. Peña (FMNH); Collipulli, VI-20-1964, H. Diaz (CNCI); Coral, Valdivia, X-25-1913, R.H. Beck (CASC); Cord. Las Raices, XII-1976, L.E. Peña (FMNH); Cudico, I-1978, T. Cekalovic (CNCI); Cunco I, 1937, Dr. Reed (USNM); Pichinahuel, Cord. Nahuelbuta, XII-(23-31)-1958, L.E. Peña (USNM); Río Blanco, III-27-1951, L.E. Peña (FMNH); Temuco, 1912, A.C. Soldana (USNM); Termas de Tolguaca, 1000 m., II-(19-20)-1991, D. MacNeill (CASC); W Angol, Crest of Sierra Nahuelbuta, 1200 m., I-3-1951, Ross & Michelbacher (CASC); 22 km E Temuco, I-1951, M.G. Smith (CASC); 20 km E Temuco (USNM); Los Lagos, Ancud, IV-1941, P.A. Berry (USNM); Chiloe Island, Da'cahue, 1962, D. Usinger (EMEC); Chiloe, Chonchi, I-21-1962, L. Peña (CNCI); Chiloe Isl., ca. 100 m, 1 km E Lago Tepuhueco, ca. 40 air km SW Castro, XII-(23-25)-1981, D.R. Davis (USNM); Chiloe, San Pedro, H. Christensen, III-27-1914 (ZMUC); Enco, Valdivia, II-(20-23)-1978, T. Cekalovic (CNCI); Isla Chiloe, Dalcahue, I-(17-31)-1962, L. Peña (CNC); Llanguihue, III-84, L.E. Peña (FMNH); Osorno, Puyehua Nat. Pk., Anticura, II-4-1978, 350 m., P.J. Spangler (USNM); Osorno, 10 km E Puyehue, I-24-1951 (CASC); Palena, Río Futaleufu, 37 km SW Futaleufu, I-27-1987, C.M. & O.S. Flint Jr. (USNM); Puerto Octay, XI-30-46, P.A. Berry (USNM); Puyehue, III-1-45, E.A. Chapin (USNM); Valdivia, X-26-1980, E. Krahmer (ZMUC); 8 mi W Puerto Varas, I-16-1951, Ross & Michelbacher (CASC); Maule, Alto de Vilches, 70 km E Talca, (XII-5-1984)-(II-20-1985), Nothophagus forest, S&J Peck, FIT 1,300 m. (CMNC); Talca, Alto Vilches, XII-1977, T. Cekalovic (CNCI); Santiago (CUIC); Melipilla (CASC); Region unknown, Cord. Parral, Fundo Malcho, I-1958, L.E. Peña (USNM); El Manso, 1960, A. Kovaks (BMNH); Fundo Malcho, Cord. Parral, X-1956, L. Peña (CNCI); Kocharno, 1960, A. Kovaks (BMNH).

Diagnosis. *Semiotus luteipennis* is most closely allied to *S. ligneus* and *S. serraticornis*. It can be readily separated from these species by the deep red elytra and pronotal margins and the black head and pronotal disk. The dorsum of both *S. ligneus* and *S. serraticornis* is a pale yellowish brown interrupted by darker bands, lacking either deep red or completely black patterns (although the medial pronotal band of *S. serraticornis* is often a dark brown). The apex of each elytron is doubly spined in *S. luteipennis*. In *S. ligneus* and *S. serraticornis* each elytron ends in a single spine. *Semiotus imperialis* and *S. cuspidatus* are the only other two species that bear these double spines (of equal length) but can be readily separated from *S. luteipennis* by the medial frontal spine. The frons in *S. luteipennis* bears no spines or angles. The anterior sclerite of the bursa copulatrix is vestigial in *S. luteipennis*, with the lateral arms not extending much at all beyond the medial arm (Fig. 47). The lateral arms in *S. imperialis* (Fig. 48) and *S. cuspidatus* (Fig. 46) are much longer. The anterior sclerites of *S. ligneus* and *S. serraticornis* are absent entirely. The male parameres, anterior to the apical blades are evenly convex in *S. luteipennis* (Fig. 123) and the apical blades are approximately a fifth the length of the parameres. In *S. ligneus* (Fig. 124) and *S. serraticornis* (Fig. 128) the parameres are sinuate along the outer margin. In *S. cuspidatus* and *S. imperialis* the apical blades are less than an eighth the length of the parameres. Geographically *S. luteipennis* occurs further south than any other *Semiotus*, occurring in Argentina and Chile. Its range overlaps that of *S. imperialis* and *S. serraticornis* in northern Argentina. The piceus venter (excluding the sanguineous borders of the hypomera), the sanguineous elytra and pronotal margins, piceus head and pronotal disk and antennae, lack of frontal

spines, and double apical spines of each elytron separate *S. luteipennis* from all other *Semiotus*.

Note. *Semiotus luteipennis* has been collected on *Araucaria imbricata* and the larva have been found in worm-eaten wood of the same species (Bartlet-Calvert, 1898). Orellana (1938) provided additional material as follows: Isla del Huafo, Panguipulli, Temuco, Concepcion, Bulnés y San Carlos, Valdivia, Calbuco, Pichibureo, Curacautin, Termas de Chillan. Specimens in this study were not seen for these localities.

Semiotus melleus n. sp.

(Figs. 73, 108, 213 and 279)

Length 20 to 23 mm (length/width ratio 4.1 to 4.6). Head luteus to testaceus with basal macula piceus; bearing two spines anterolaterally; texture glabrous, nitidus with few scattered setae above eyes, punctation moderately deep; ocular index 68.0 to 71.0. Antennae serrate, reaching hind angles in females, or just beyond hind angles in males; segments 1 and 2 fulvus to testaceus, segments 3 to 11 piceus. Pronotum 4 to 6 mm (length/width ratio 1.1 to 1.3), narrowly sinuate with hind angles diverging, margin incrassate without sulcus; color luteus to testaceus with two piceus sinuate bands extending from base to near anterior border; texture glabrous, nitidus, with fine punctation throughout. Scutellum parallel-sided, posterior border rounded, anterior margin straight to moderately incised. Prosternum concave in profile; color testaceus to sanguineus with piceus lateral bands; texture glabrous with very fine punctures medially, fine setae and thick to umbilicate punctures laterally. Hypomeron fulvus to aurantiacus

with piceus bands along suture; texture glabrous with few erect setae along lateral margin, punctures fine and scattered throughout. Mesosternum fulvus to aurantiacus with obscure margins; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron fulvus to testaceus with obscure margins. Metasternum testaceus with lateral bands piceus; texture with fine decumbent setae throughout becoming denser anterolaterally, fine punctures scattered throughout. Femora testaceus to badius.

Elytra 14 to 16 mm (length/width ratio 2.8 to 3.1), subparallel on anterior half, then narrowing to tip; color luteus with intervals 2, 4, 6, 8, and often outer edge of 9 testaceus to badius; texture glabrous, nitidus, striae and strial punctures fine to obsolete; apices each ending in a point.

Abdomen aurantiacus to sanguineus medially, fulvus to luteus laterally with or without piceus sublateral maculae or bands; texture of fine decumbent setae throughout, with fine punctures scattered throughout; female with fine impression (often very faint) on anterior third of sternite 5; anterior sclerite wider than long, lateral arms not extending posteriorly as far as median piece. Male with parameres narrow medially, lateral blades subtriangular, approximately 1/4 length of parameres.

Material Examined. Holotype (male): **VENEZUELA**: Aragua, Rancho Grande Biological Station, Portachuelo Pass 10° 21' 00" N, 67° 41' 00" W, elev. 1100 m., VI-4-1998, Ashe, Brooks, Harley, insects moving through pass against wind migration; (SEMC); Paratypes: **VENEZUELA**: Aragua, Alto de Rancho Grande, X-12-1927, H. Pittier (1, USNM); Portachuelo Pass, 20 km. N Maracay, elev. 1160 m., IV-13-1972,

C.R. Collins (1, CASC); Portachuelo Pass, 20 km. N Maracay, elev. 1100 m., IV-6-1972,
C.T. Collins (1, CASC).

Diagnosis. *Semiotus melleus* is most closely allied to *S. trinitensis* and *S. fascicularis* with similarities to *S. bispinus* and *S. clarki*. Of these species, *Semiotus trinitensis* is unique in having a strongly procurved and incised (along the anterior margin) scutellum (Fig. 212), that curves evenly from the disk to the front without a dorsal angle or margin. In the other related species a frontal angle or margin is present. The elytra in *S. melleus* (Fig. 213), *S. clarki* (Fig. 215), and *S. bispinus* (Fig. 209) bear 4 to 5 dark bands (per elytron) than extend from the elytral base to (or near the apex). Each elytron bears only two dark bands in *S. trinitensis*. The dark elytral bands in *S. fascicularis* are generally restricted to the apical 2/3 of the elytra and consist of a sutural, a marginal, and 2 medial bands (confluent distally (Fig. 214)). *Semiotus melleus* is known from Venezuela, *S. trinitensis* is known only from Trinidad. The anterior margin of the anterior sclerite of the bursa copulatrix is evenly convex in *S. trinitensis* (Fig. 42). In *S. melleus* (Fig. 73) and *S. clarki* (Fig. 64) the anterior margin is angulate at the point where the lateral arms project posteriorly.

Note. Candèze recognized *S. melleus* as a distinct species though this was never published. A specimen in the BMNH is identified with a Candèze label as *Semiotus melleus*. The name was identified by C.M.F. Von Hayek as a manuscript name. The name is here retained as originally proposed by Candèze. The name "melleus" means honey or pollen.

Semiotus pectitus Candèze

(Figs. 217 and 271)

Semiotus pectitus Candèze 1889: 81. (Type: ISNB; type locality: Colombia).

Length 20 to 22 mm (length/width ratio 3.7 to 3.8). Head with faint angles along anterior border, without spines; color sanguineus with median basal macula piceus; ocular index 69.0 to 71.0. Antennae serrate, 0 to 2 segments short of hind angles; segments 1 and 2 sanguineous, segments 3 to 11 rufopiceus to piceus. Pronotum 4 to 6 mm (length/width ratio 0.9 to 1.1); narrowly sinuate, hind angles diverging; margin narrowly incrassate, declivous on anterior third, without sulcus; color sanguineus with two narrow piceus bands extending from base 2/3 distance to anterior margin; texture glabrous, nitidus with long setae in piceus bands; scutellum sanguineous, subchordate with anterior margin recurved; prosternum concave in profile, prosternal process not divided at tip; color aurantiacus to sanguineous, with sutural band piceus; texture nitidus, glabrous medially with long setae and umbilicate punctures along suture. Hypomeron aurantiacus to sanguineous, piceus along suture; texture glabrous, nitidus laterally with setae and punctation more pronounced along suture. Mesosternum finely punctate with fine setae, fossa glabrous and impunctate; color aurantiacus to piceus. Mesepisternum and meshypomeron aurantiacus to piceus. Metasternum sanguineous, piceus laterally; texture nearly glabrous with fine punctures medially, denser setae and punctation laterally; femora aurantiacus to sanguineous often with piceus joints.

Elytra 14 to 15 mm (length/width ratio 2.5 to 2.6) subparallel on anterior third then narrowing to base; color sanguineous to piceus throughout; texture glabrous, nitidus,

intervals strongly convex, striae deeply impressed, interval 3 more convex and rising above level of other intervals on apical half; each elytron bearing a single spine apically with a dentition or definite angle on sutural margin subapically.

Abdomen badius to piceus, with sublateral areas darker; texture nearly glabrous with fine punctures medially, denser setae and punctation laterally; female with two elliptical foveae on apical 3/5 of sternite 5.

Material Examined. **COLOMBIA:** (ISNB).

Diagnosis. *Semiotus pectitus* is a primitive species of *Semiotus* most closely allied to *S. auripilis*, *S. seladonius*, and *S. hispidus*. It can be readily distinguished from these species by the deep red elytra with strongly convex interstriae (nearly hemispherical when viewed from behind). *Semiotus auripilis* also has strongly convex interstriae but the elytral color is pale yellow to light brown. The elytral color of *S. hispidus* is black, or black with pale bands, and that of *S. seladonius* is green. Both of these species have flat or only slightly convex interstriae. *Semiotus pectitus* is superficially similar to *S. schaumii*. Both species are deep red and lack frontal spines. The pronotum in *S. schaumii* bears a single black band (often faint), that of *S. pectitus* bears two black bands. Also, the elytral interstriae in *S. schaumii* are flat, or nearly so. *Semiotus pectitus* occurs in Colombia. Most related species occur elsewhere. *Semiotus hispidus* occurs in Venezuela, *S. auripilis* occurs in Bolivia, *S. seladonius* occurs in Bolivia and Colombia, and *S. schaumii* occurs in Ecuador and Peru. The deep red body color, lack of frontal spines, double piceus pronotal bands and convex interstriae distinguish *S. pectitus* from all other *Semiotus*.

Semiotus perangustus n. sp.

(Figs. 56, 98, 233 and 283)

Length 19 to 21 mm (length / width ratio 4.8 to 5.0). Head testaceous to aurantiacus with piceus median and basal macula (or with base completely piceus); with 3 frontal spines; texture of long erect setae over eyes, finer decumbent setae throughout, punctation deep and scattered throughout; ocular index 75.0 to 78.0. Antennae serrate, reaching hind angles in females, extending 1 to 2 segments beyond hind angles in males; segments 1 to 2 testaceous, 3 to 11 rufo-piceus to piceus. Pronotum 4 to 5 mm (length / width ratio 1.2 to 1.4), sinuate, hind angles moderately divergent; margin incrassate becoming explanate on anterior 5th, sulcate only on anterior fourth; color fulvus to aurantiacus laterally and anteriorly with median band aurantiacus to sanguineous, with two broad sublateral piceus bands extending from base to near anterior border; texture glabrous medially with dense luteus decumbent setae laterally, punctation fine medially becoming dense laterally; scutellum fulvus to testaceous, suborbicular, anterior margin slightly recurved. Prosternum slightly concave in profile, prosternal process not divided at tip; color fulvus to testaceous medially with or without piceus band along suture; texture of long erect setae scattered throughout with fine dense decumbent setae laterally, punctation fine medially, dense laterally. Hypomeron fulvus to testaceous with piceus band along suture; texture of fine decumbent setae and fine punctation becoming denser medially. Mesosternum fulvus to testaceous with or without piceus macula, fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum and meshypomeron fulvus to testaceous with piceus macula. Metasternum glabrous with fine

punctuation medially and with fine dense setae and fine punctures anterolaterally; color aurantiacus to testaceus medially, badius to piceus anterolaterally. Femora testaceus to badius.

Elytra 13 to 14 mm (length / width ratio 3.0 to 3.3), subparallel on anterior third then narrowing to tip; color fulvus with badius to piceus irregular bands along each stria; texture glabrous, nitidus, striae faint, strial punctures moderately deep; apices each bearing one spine.

Abdomen fulvus to testaceus with or without darker lateral bands; texture glabrous, nearly impunctate medially, dense punctures and dense decumbent setae laterally; female with two elliptical foveae on apical half of sternite 5; anterior sclerite with lateral arms evenly convex externally, extending apically 1/3 length of median piece. Male with parameres constricted before blades, lateral blades obtuse apically, spines projecting posterolaterally, 28 to 30% length of parameres.

Material examined. Holotype (male): **ECUADOR**: Baños, VI-15-1936 (PCCV); Paratypes: **ECUADOR**: Morona - Santiago, Sangay, II-3-1966, R.D.L. (1, FMNH); Napo, Baeza, 2000 m., III-5-1979, S, Marshall (1, CNCI).

Diagnosis. *Semiotus perangustus* is most closely allied to *S. angustus* and other species with three frontal spines, dense pronotal setae, and pale elytra with infusate striae (*S. cristatus*, *S. linnei*, *S. colombianus*, and *S. auripilis*). *Semiotus auripilis* is distinct from *S. perangustus* by the strongly convex elytral intervals. The intervals in *S. perangustus* are flat, or nearly so. The lateral frontal spines of *S. cristatus* are shorter than those of *S. perangustus*, not extending forward beyond the length of the medial spine. In *S. perangustus* the lateral spines are much longer than the medial spine. The

pronotal bands in *S. linnei* are arcuate (especially along the medial side), those of *S. perangustus* are subparallel. *Semiotus colombianus* is larger (over 22 mm long) than *S. perangustus* (less than 22 mm long). *Semiotus perangustus* and *S. angustus* can be distinguished from these related species by their narrow body and smaller size. These two species are similar, but can be separated by several characters. *Semiotus perangustus* has darker antennae (segments 3 to 11 are nearly piceus). In *S. angustus* segments 3 to 11 are only slightly darker than segments 1 and 2. The female of *S. perangustus* bears two deep foveae on sternite 5. The female of *S. angustus* lacks foveae. The anterior sclerite of the bursa copulatrix is much larger in *S. perangustus*, where lateral arms are present (Fig. 72) than in *S. angustus*, where lateral arms are lacking (Fig. 71).

Semiotus pilosus n. sp.

(Figs. 102, 245 and 290)

Length 24 mm (length / width ratio 4.5 to 4.6). Head badius to piceus, fulvus to testaceous anteriorly; with 3 frontal spines; texture of fine decumbent aureus setae throughout, with long erect setae over eyes and spines, punctation deep and scattered throughout. Antennae serrate, reaching hind angles or extending just beyond (by less than 1 segment); segments 1 and 2 testaceous, segments 3 to 11 rufo-piceus. Pronotum 5 to 6 mm (length / width ratio 1.1), narrowly sinuate, hind angles diverging, margin incrassate without sulcus (or with sulcus very faint); color badius, lateral margin fulvus; texture of fine aureus setae, punctation deep and scattered throughout; scutellum testaceous, suborbicular, anterior margin recurved. Prosternum concave in profile, not

divided apically; color sanguineous, lobe aurantiacus; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron badius to piceus with lateral and posterior border fulvus; texture of dense punctures and dense aureus setae. Mesosternum testaceus; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum and meshypomeron testaceus. Metasternum testaceus; texture of dense punctures and dense aureus setae. Femora testaceus to badius.

Elytra 16 to 17 mm (length / width ratio 3.1 to 3.2), nearly parallel-sided on anterior third then narrowing evenly to apex; color fulvus, striae 1, 2, 3, 7, and 8 narrowly infusate, striae 4, 5, and 6 broadly infusate; apices each bearing one spine.

Abdomen badius; texture glabrous with fine punctures medially, of dense punctures and dense aureus setae laterally; female not seen. Male with lateral paramere blades subparallel, 30 to 35% length of parameres, lateral spines nearly at right angles to parameres.

Material examined. Holotype (male): **ECUADOR**: Loja, NW Panagul de Podocarpus, III-6-1987, P. Johnsen (ZMUC).

Diagnosis. *Semiotus pilosus* is most closely allied to *S. vicinus* and other species with three frontal spines, and infusate striae (including *S. cristatus*, *S. linnei*, *S. perangustus*, *S. angustus*, and *S. colombianus*). Superficial similarities also exist with *S. auripilis*. All of these species have pale elytra with dark striae and a dense covering of setae on the pronotum. *Semiotus auripilis* is separated from *S. pilosus* by the strongly convex elytral intervals. The intervals are nearly flat in *S. pilosus*. *Semiotus buckleyi*, *S. reaumuri*, and *S. glabricollis* have similarly patterned elytra but have glabrous, or nearly glabrous, pronota. Of the related species (with pronotal setae), *S. pilosus* and *S. vicinus*

are unique in lacking lateral sulci on the pronotum (or it is very faint if present). The two species can be separated by the color of the pronotum. *Semiotus pilosus* has a completely brown to reddish brown disk, with only the peripheral areas pale. *Semiotus vicinus* bears two black bands on the pronotal disk. The unicolorous elytral intervals with infusate striae, lack of (or very faint) lateral pronotal sulci, and nearly uniform badius pronotum (with fulvus margins) with dense decumbent setae separate *S. pilosus* from all other *Semiotus*.

Semiotus punctatostriatus Candèze

(Figs. 38, 132, 151, 237 and 285)

Semiotus punctatostriatus Candèze 1857: 328, Steinheil 1875: 113, Candèze 1874: 184, Kirsch 1884: 43. (Lectotype, male: MNHN; type locality: New Granada).

Length 25 to 27 mm (length / width ratio 3.8 to 4.3). Head sanguineous, with or without basal piceus macula; bearing two anterolateral spines, with area between spines distinctly angled; frons with fine setae scattered throughout becoming denser and thicker in median depression. Antennae approximately one segment short of hind angles, with segments 1 and 2 badius, segments 3 to 11 rufopiceus to piceus. Pronotum 6 to 8 mm (length / width ratio 1.1 to 1.2), widest at base becoming evenly narrower anteriorly, hind angles gradually enlarged; margin broadly rounded, without sulcus; color sanguineous with two piceus bands extending from base to just before anterior margin; texture glabrous medially with fine dense setae laterally, punctation fine and distinctly separated on disk, becoming approximate, dense, and umbilicate anterolaterally. Scutellum

subrectangular, anterior margin wider, posterior margin rounded. Hypomeron piceus medially becoming sanguineus along outer margin, basal area fulvus; texture glabrous laterally with fine dense setae medially along suture, punctures small and contiguous medially becoming larger and less contiguous laterally. Prosternum slightly concave in profile; color sanguineous, lobe becoming testaceus, suture piceus; texture nearly glabrous medially with fine dense setae laterally, punctation very fine medially becoming larger and denser laterally. Mesosternum sanguineus with fossa glabrous and impunctate, lateral areas with dense setae and punctation. Mesepisternum and meshypomeron piceus, with or without infusate margins. Metasternum sanguineus with piceus triangular macula along lateral margin extending nearly to mesocoxae anteriorly; texture glabrous medially with dense setae anterolaterally, punctation fine and moderately dense throughout. Femora testaceus to badius.

Elytra 17 to 19 mm (length / width ratio 2.6 to 2.8), subparallel only on anterior 1/4, then narrowing gradually to tip; color testaceus with infusate striae, or with elytra badius with intervals 3 (sometimes 5) and 7 fulvus; texture glabrous, interstriae impunctate and convex, striae evident with broad punctures; apices each bearing one obtuse spine.

Abdomen sanguineus with rufo-piceus to piceus maculae on sublateral areas of first 3 to 4 segments, lateral margin with subhemispherical maculae testaceus to luteus; texture mostly glabrous with clumps of setae sublaterally, especially on segment 1 and around foveae, punctation fine medially becoming denser and contiguous laterally. Female with two obovate foveae on posterior half of segment 5; lateral arms of anterior sclerite narrow, 4/5 length of median piece, median piece armed with dense subserrate

dentitions. Male with parameres sinuate, blades roughly 1/4th length of parameres, penis extending beyond paramere apices.

Material Examined. **COLOMBIA:** Cauca (CUIC); Nariño, 25 mi SW Mocoa, 2080 m., III-3-1955, E.I. Schlinger and E.S. Ross (CASC); **ECUADOR:** (PCCV); **VENEZUELA:** Apure, San Fernando de Apure, L. Laglaize (ISNB).

Diagnosis. *Semiotus punctatostriatus* is a primitive species of *Semiotus* most closely allied to *S. girardi* and related to *S. imperialis*, *S. cuspidatus*, *S. chassaini*, *S. gibbosus*, and *S. fryi*. All these species are gibbous in profile and have convex interstriae. *Semiotus imperialis*, *S. cuspidatus* and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down. The anterolateral areas of the frons are rounded, without spines. The other primitive gibbous species (*S. punctatostriatus*, *S. gibbosus*, *S. fryi*, *S. girardi*, and *S. chassaini*) all bear two spines along the anterolateral margin of the frons and lack a medial frontal spine. The pronotum of *S. gibbosus*, *S. fryi*, and *S. Chassaini* are glabrous or bear only fine and inconspicuous setae. The pronotum of *S. punctatostriatus* and *S. girardi* are covered with thick pale to golden setae. *Semiotus punctatostriatus* can be separated from *S. girardi* by the shape of the pronotum. In *S. girardi* the lateral margin is constricted just posterior to the anterolateral angles. In *S. punctatostriatus* the lateral margin is evenly convex all the way to the anterolateral angles. Superficial similarities exist between specimens of *S. punctatostriatus* with pale elytra and infusate striae (which includes most of the specimens examined) and many of the derived species with similar elytral coloration (such as *S. linnei*, *S. cristatus*, and *S. colombianus*). These species have three frontal spines and lack a gibbous profile. The

combination of dense pronotal setae, gibbous profile and double frontal spines distinguish *Semiotus punctatostriatus* from all other *Semiotus*.

Note. Three syntypes located in the BMNH indicate a locality "Mexico" with a line through it. No specimens have otherwise been seen from Mexico and the locality is most likely incorrect.

Semiotus reaumuri Candèze

(Fig. 293)

Semiotus reaumurii Candèze 1857: 327. (Type: BMNH; type locality: Colombia).

Semiotus reaumuri, Steinheil 1875: 113, Candèze 1874: 182.

Length 26 to 28 mm (length / width ratio 4.6 to 4.8). Head fulvus to aurantiacus with median piceus macula extending anteriorly to near anterior margin; bearing three frontal spines; texture glabrous, with few erect setae above eyes and over spines, punctation becoming umbilicate and larger basally. Antennae serrate, 0 to 1 segment short of hind angles; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 6 to 7 mm (length / width ratio 1.3 to 1.4), with sides nearly straight, hind angles diverging, lateral margin broadly rounded, undulate, without sulcus, converging anteriorly to foveate angles; color fulvus to aurantiacus laterally, with broad piceus bands separated by sanguineous coloration between, anterior angles with piceus maculae on basal third extending from near foveae; texture glabrous, nitidus, with few erect setae on lateral margin, punctation dense, subumbilicate and often contiguous; scutellum testaceous, broadly subchordate. Prosternum nearly straight; color testaceous to sanguineous, lobe

palmer, with or without dark band along suture; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron fulvus to badius laterally, with broad piceus band medially; texture glabrous along lateral margin, with dense setae and fine punctation throughout. Mesosternum aurantiacus to testaceus; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum and meshypomeron aurantiacus to testaceus. Metasternum aurantiacus to badius with dark band medially; texture glabrous with fine punctation medially with dense setae and punctation laterally. Femora aurantiacus to testaceus, joints piceus.

Elytra 17 to 19 mm (length / width ratio 3.0 to 3.2), subparallel on anterior third then narrowing to tip; color fulvus to luteus, striae aurantiacus to testaceus; texture glabrous, nitidus, intervals flat, striae faint to obsolete, striae punctures clearly defined and infuscate; apices each bearing one spine.

Abdomen badius to sanguineus medially, aurantiacus to testaceus laterally; texture glabrous, with fine punctation medially, fine setae and dense punctation laterally; female with two elliptical foveae on posterior half of sternite 5.

Material examined. **COLOMBIA:** Capital District, Bogotá (ISNB); Tolima, Honda, Le Moul (ISNB).

Diagnosis. *Semiotus reaumuri* is most closely allied to *S. glabricollis* with similarities to *S. buckleyi* and other species with three frontal spines and infuscate striae. It is unique from these species in having anterolateral black maculae on the pronotum (in addition to the discal band(s)). Several species have pale elytra with infuscate striae and a dense covering of setae on the pronotum (*S. pilosus*, *S. cristatus*, *S. auripilis*, *S. linnei*, *S. perangustus*, *S. colombianus*, *S. vicinus*, and *S. angustus*). *Semiotus buckleyi*, *S.*

reaumuri, and *S. glabricollis* have similar elytra but lack setae on the pronotum (or have very faint and inconspicuous setae). These three species can be separated by the color of the elytral striae and by the pronotum. In *S. buckleyi*, the dark strial bands are black and extend out from the striae onto the elytral intervals, and the lateral pronotal margins bear sulci on the anterior third to half. In *S. reaumuri* and *S. glabricollis*, the strial bands are light brown and the pronotum lacks sulci. The pronotal punctation in *S. reaumuri* is dense, subumbilicate, and often contiguous. In *S. glabricollis*, the punctation is finer and less dense. *Semiotus buckleyi* is known from Ecuador (Fig. 277), *S. reaumuri* and *S. glabricollis* are known from Colombia (Figs. 293 and 285). The combination of dark bands along each elytral stria, glabrous pronotum, lack of a pronotal sulcus along the anterolateral margin, three frontal spines, along with the presence marginal maculae on the pronotum separate *S. reaumuri* from all other *Semiotus*.

Semiotus regalis Guérin-Meneville

(Figs. 36, 117, 148, 222 and 293)

Semiotus regalis Guérin-Meneville 1844: 16, Candèze 1857: 319, Steinheil 1875: 111, Candèze 1874: 179. (Lectotype, female: MNHN; type locality: Colombia).

Length 25 to 27 mm (length/width ratio 4.0 to 5.0). Head piceus with anterolateral areas aurantiacus to sanguineous; bearing two short obtuse lateral spines and angled median area between spines; texture of long erect setae over eyes, shorter fine decumbent setae throughout. punctation moderately deep and scattered throughout; ocular index 80.0 to 83.0; frontal spines (angles) approximately 12% length of frons.

Antennae serrate, 1 to 2 segments short of hind angles in females, reaching hind angles (or perhaps a bit beyond) in males; segments 1 and 2 testaceus, segments 3 to 11 piceus.

Pronotum 5 to 6 mm (length/width ratio 1.0 to 1.1), broadly sinuate, hind angles diverging; margin incrassate, undulate; color testaceus to sanguineus along lateral and anterior margins, median line aurantiacus to sanguineous, with two broad rectangular bands extending from base to near anterior margin; texture of fine setae scattered throughout or absent, punctation double. Scutellum testaceus to piceus, wider than long, anterior margin recurved. Prosternum slightly concave in profile, prosternal process not divided apically; color aurantiacus to sanguineus medially, piceus along suture; texture of long erect setae and fine punctation medially, decumbent setae and thicker punctation laterally. Hypomeron piceus with lateral border aurantiacus to sanguineous; texture glabrous or with few scattered setae, punctation shallow to obsolete throughout.

Mesosternum aurantiacus to sanguineus medially, piceus laterally; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron piceus. Metasternum aurantiacus to sanguineus medially, piceus laterally; texture of fine setae and deep punctures (often nearly contiguous) throughout.

Femora testaceus to aurantiacus with tarsi and joints piceus.

Elytra 17 to 19 mm (length/width ratio 2.0 to 3.0), subparallel on anterior half to 2/3 then narrowing to tip; color piceus with intervals 3, 5, 7, and lateral border luteus and equal to or more convex than other intervals; texture glabrous, nitidus, striae shallow, strial punctures clearly defined; apices rounded without spines.

Abdomen aurantiacus to sanguineus with two sublateral piceus bands; texture of fine scattered setae and punctures throughout; female with two broadly elliptical foveae

on apical half of sternite 5; anterior sclerite with lateral arms short, nearly at right angles to median piece, with few serrations along apical surface. Male with parameres narrowing medially, lateral blades approximately 30 to 33% length of parameres.

Material examined. **COLOMBIA:** Boyacá, Tunja, Boy, V-30-1946, E.A. Chapin (USNM); Cundinamarca, 3400 m., III-20-1940 (CNCI); Department unknown, Páramo de Monserrate, 3200 m., IV-26-1969, on *Espeletia grandiflora* (CNCI); Páramo de Monserrate, 3250 m., IV-4-1969, on dead leaves of *Espeletia grandiflora* (CNCI).

Diagnosis. *Semiotus regalis* is most closely allied to *S. sommeri*, *S. rubricollis*, *S. virgatus*, and *S. buckleyi*. It is most readily separated from these (and all other *Semiotus*) by the alternating light and dark elytral intervals, with both intervals 1 and 2 being completely black (Fig. 222). *Semiotus virgatus* and *S. buckleyi* (along with other less-related species) have alternating light and dark elytral intervals, but intervals 1 and 2 consist of two contrasting colors. *Semiotus rubricollis* has unicolorous intervals 1 and 2 but these are deep red in color. Occasionally *S. regalis* has reduced frontal spines. These individuals key out near *S. hispidus* which often has alternating light and dark elytral bands. *Semiotus hispidus* can be readily recognized by the completely black abdomen and prosternum. *Semiotus regalis* will have contrasting red and black abdominal and prosternal patterns. The lateral arms of the anterior sclerite of the bursa copulatrix are short and do not extend posteriorly in *S. regalis* (Fig. 36) or in *S. sommeri* (Fig. 87). In *S. buckleyi* (Fig. 35) and *S. virgatus* (Fig. 76) the lateral arms extend posteriorly over half the length of the median piece.

***Semiotus ruber* Pjatakowa**

(From Pjatakowa, 1941)

Semiotus ruber Pjatakowa 1941: 106 (Type, lost; type locality: Ecuador).

Length 25 mm (length/width ratio 4.1 to 4.2). Head red with apical black macula, strongly punctate, bearing two frontal spines. Antennae short, reaching or nearly reaching half way to the pronotal angles; color black, segments 1 and 2 reddish basally. Pronotum more than 1.5 times longer than wide, nearly flat with angular widening laterally, front angles blunt with declivous pit; color half red with two black bands. Scutellum subchordate, medially impressed; color red medially darker peripherally. Sternum yellow to reddish yellow. Abdominal segments 2 - 4 with dark punctures. Femora testaceus.

Elytra sanguineous to dark blue red, becoming darker apically, suture darker; texture without impressions except for sutural and lateral striae; apices each bearing a spine.

Material examined. None.

Note. The type and only known specimen of *S. ruber* was destroyed (V. Dolin, personal communication). No specimens fitting the specific description have been seen during the course of this study.

Semiotus rubricollis n. sp.

(Figs. 63, 225 and 293)

Length 24 to 25 mm (length/width ratio 4.1 to 4.2). Head aurantiacus to sanguineus with basal macula piceus; bearing three frontal spines; texture of few erect setae over eyes and spines, punctation scattered throughout. Antennae 1 to 2 segments short of hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 5 to 7 mm (length/width ratio 1.2 to 1.3), narrowly sinuate with hind angles diverging, margin incrassate, with sulcus on anterior half; color aurantiacus to sanguineus with two sinuate piceus bands on disk, hind angles fulvus; texture glabrous, nitidus, moderately deep punctation becoming denser and umbilicate anterolaterally. Scutellum aurantiacus, subquadrate, wider than long. Prosternum concave in profile; color sanguineus to aurantiacus with piceus band along suture; texture glabrous medially with erect setae laterally and on lobe, punctation fine medially thicker and umbilicate laterally. Hypomeron aurantiacus anteriorly, fulvus posteriorly with piceus band along suture; texture glabrous, nitidus, punctation fine laterally, dense medially. Mesosternum sanguineus to testaceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum piceus, meshypomeron fulvus to testaceus with obscure margins. Metasternum aurantiacus to sanguineus with median band piceus; texture with short erect setae and fine punctation scattered throughout. Femora aurantiacus to testaceus.

Elytra 17 to 18 mm (length/width ratio 2.9 to 3.1), subparallel on anterior third to fourth, then narrowing to tip; color sanguineus with interval three and portion of base

aurantiacus; texture glabrous, nitidus, striae and stria punctures fine to obsolete; apices each bearing one spine.

Abdomen sanguineus to testaceous with fulvus hemispherical lateral maculae; texture glabrous, nitidus with fine setae on sternum 1, punctures fine and scattered throughout; female with two elongate subelliptical foveae on apical 3/5 of sternum 5; anterior sclerite with small dentitions on lateral arms, median piece 1.2 times as long as lateral arms. Male unknown.

Material examined. Holotype (female): **ECUADOR**: Dist. Churubamba, Dept. Huanuco, Hacienda Bjita, IX-'36, 2000 m., V. Mexla (CASC).

Diagnosis. *Semiotus rubricollis* is most closely allied to *S. sommeri*, *S. regalis*, *S. virgatus*, and *S. buckleyi*. It is most readily separated from these by the deep red elytra (with pale yellow band on interval 3). The above related species all have pale brown to yellow elytra with dark brown to black alternating bands. *Semiotus schaumi* and *S. pectitus* also have deep red elytra (occasionally with yellow bands), though darker than *S. rubricollis*. These two species lack frontal spines, *S. rubricollis* bears three. *Semiotus pectitus* has very convex elytral intervals. The intervals in *S. rubricollis* are flat, or nearly so.

Note. *Semiotus rubricollis* is named for the reddish coloration of the elytra.

Semiotus schaumi Guérin-Meneville

(Fig. 293)

Semiotus schaumii Guérin-Meneville 1844: 16, Candèze 1857: 330. (Type: lost; type locality: New Granada).

Semiotus schaumii, Candèze 1874: 185.

Semiotus langei Schwarz 1902b: 132. (Holotype, male: DEIC; type locality: Peru, Chanchamaya). New Synonym

Length 14 to 15 mm (length/width ratio 4.1 to 4.3). **Head** with faint angles along anterior border, without spines; color testaceus to sanguineus with median basal macula sanguineus to badius; texture glabrous, nitidus with few erect setae above eyes and anterior margin, punctation sparse and scattered throughout; ocular index 71.0 to 78.0. **Antennae** serrate, extending 1 segment short of hind angles to 1 to 2 segments beyond hind angles in males; segments 1 and 2 testaceus, segments 3 to 11 rufopiceus to piceus. **Pronotum** 3 to 4 mm (length/width ratio 1.1 to 1.2); narrowly sinuate, hind angles diverging, with two foveae anterolaterally, one apically and one on anterior third; margin narrowly incrassate without sulcus, with supermarginal thickening subcarinate on hind angles; color testaceus to sanguineus with or without thin median band sanguineus to badius; texture glabrous, nitidus with fine punctation scattered throughout; scutellum testaceus to aurantiacus, subchordate; prosternum concave in profile; color aurantiacus to sanguineous, lobe testaceus with sutural band piceus; texture glabrous medially with fine erect setae on lobe, punctation very fine medially, dense and deep laterally. Hypomeron testaceus to aurantiacus; texture very finely granulate. Mesosternum finely punctate with fine setae, fossa glabrous and impunctate; color aurantiacus with piceus maculae laterally. Mesepisternum and meshypomeron aurantiacus to sanguineous, with piceus maculae. Metasternum aurantiacus to testaceus medially, badius laterally; texture glabrous medially with dense decumbent setae laterally; femora testaceus.

Elytra 9 to 11 mm (length/width ratio 2.8 to 2.9) narrowing nearly from base; color testaceous to aurantiacus basally, becoming progressively darker apically, apex nearly piceus, each elytron bearing a single spine.

Abdomen testaceous to sanguineous, lateral margin lighter; texture with dense aureus decumbent setae laterally, scattered erect setae medially, punctation fine medially, denser and deeper laterally; female with two broadly oval foveae on sternite 5.

Material Examined. **ECUADOR:** Morona - Santiago, Chigüinda, Buckley (BMNH); **PERU:** Junín, Chanchamaya, D. Lange (DEIC); Chanchamayo, A. Heyne (MNHN).

Diagnosis. *Semiotus schaumii* is most closely allied to *S. pectitus* and *S. formosus*. It also bears similarities to *S. fleutiauxi* and *S. kathleenae*. All of these species have deep red patterns dorsally. *Semiotus pectitus*, *S. kathleenae*, *S. formosus* and *S. schaumii* lack frontal spines. *Semiotus fleutiauxi* bears two stout frontal spines. The pronotum in *S. schaumii* bears a single black band (often faint), that of *S. pectitus* bears two black bands. The pronotum in *S. formosus* is mostly black with yellow to light brown areas on or near the anterior and posterior angles. The pronotum of *S. kathleenae* is deep red with two broad black bands covered by dense setae. The pronota of *S. schaumii*, *S. pectitus*, and *S. formosus* are glabrous, or nearly so. The elytral interstriae in *S. schaumii* are flat. In *S. pectitus* they are strongly convex.

Note. Specimens in the BMNH have a bright yellow band that occupies the apical 2/3 of interval 3. These specimens were taken from Ecuador and may represent a valid subspecies. Further material is required to verify this. The type of *Semiotus langei* is paler than that of *S. schaumii*. All other characters are similar. Intensity of color is

variable interspecifically in most groups of *Semiotus* and does not justify separate specific treatment.

Semiotus seladonius Guérin-Meneville

(Figs. 119, 177, 256 and 294)

Semiotus seladonius Guérin-Meneville 1844: 16, Guérin-Meneville 1855: 578, Candèze 1857: 330, Steinheil 1875: 113, Candèze 1874: 185, Fleutiaux 1925: 109. (Type: not found; type locality: New Granada).

Length 21 to 22 mm (length / width ratio 3.6 to 4.0). Head piceus; anterolateral margin angled, lacking spines; texture of dense setae and punctures throughout; ocular index 75.0 to 78.0. Antennae serrate, two segments short of hind angles in males; segments 1 and 2 testaceus to aurantiacus, segments 3 to 11 piceus. Pronotum 4.5 to 5.5 mm. (length / width ratio 0.9 to 1.2), sinuate with hind angles diverging, subcomplanate, margin thinly rounded without sulcus; color piceus (sometimes interrupted medially by badius to sanguineus band extending from base to anterior border) with fulvus to testaceus anterior border and margin; texture densely setose throughout except medially, punctation deep and often contiguous, becoming finer and less dense anteromedially. Scutellum piceus throughout or with pale posterior border, widely elliptical, anterior margin straight. Prosternum nearly straight in profile, curving ventrally on lobe; color piceus or with sanguineus band medially; texture of dense setae throughout, punctation moderately dense medially becoming deeper and denser laterally. Hypomeron piceus with lateral margin fulvus to testaceus; texture of dense setae and punctures throughout.

Mesosternum piceus or with fossa sanguineous, with dense setae and punctures laterally. Mesepisternum and meshypomeron piceus. Metasternum piceus with long dense setae and deep punctures throughout. Femora testaceus to aurantiacus.

Elytra 16 mm. (length / width ratio 2.7 to 2.9), subparallel on anterior third to half, then tapering to tip; color viridis to subviridis, margin and suture fulvus; striae finely impressed, strial punctures shallow, interstriae nearly flat and smooth on disk, becoming more convex and wrinkled posterolaterally; apices angled or rounded, without spines.

Abdomen piceus with testaceus posterior border to sternites 4 and 5 (some specimens with median area sanguineous); texture of dense setae and punctures laterally becoming nearly glabrous and impunctate medially; female foveae not seen. Male with parameres narrowing medially, tips rounded, lateral blades approximately 30% length of parameres.

Material Examined. **BOLIVIA:** (OXUM); **COLOMBIA:** Capital District, Bogotá (MNHN); Goudor (ZMUC); Cundinamarca, 3300 m., Guasca, III-10-1942, Chapin (USNM).

Diagnosis. *Semiotus seladonius* is a primitive species of *Semiotus* most closely allied to *S. auripilis*, *S. hispidus*, and *S. pectitus*. It can be easily distinguished from these species by the green or greenish elytra. The elytra of *S. auripilis* and *S. pectitus* are dark red to reddish brown, those of *S. hispidus* are black, or black with pale bands. The green elytra of *S. seladonius* is similar to those of *S. ligatus*. These species can be particularly distinguished by the setae (especially the prothoracic setae). In *S. seladonius* they are much longer and more erect than those of *S. ligatus* (where the setae are decumbent). The pronotal base color is fulvus around the piceus bands in *S. seladonius*. In *S. ligatus*

the base color is viridis with only the angles being fulvus. The frontal margin in *S. ligatus* is angled to subspinose. In *S. seladonius* the frontal margin is arcuate, without angles or spines. The elytral apices are pointed or spined in *S. ligatus*, whereas in *S. seladonius* they are rounded or occasionally angled. The elytral base is more gibbous in *S. seladonius* than in *S. ligatus*. The aedeagal plates are much shorter in *S. ligatus* (Fig. 118) than in *S. seladonius* (Fig. 119). Geographically, *S. seladonius* occurs in Bolivia and Colombia, whereas *S. hispidus* occurs in Venezuela. Its range in Colombia and Bolivia overlap the ranges of *S. pectitus* (Colombia), *S. ligatus* (Colombia and Ecuador), and *S. auripilis* (Bolivia). The green elytra, lack of frontal spines, and rounded elytral apices separate *S. seladonius* from all other *Semiotus*.

Semiotus singularis Kirsch

(Fig. 294)

Semiotus singularis Kirsch 1884: 44. (Lectotype: SMTD; type locality: Ecuador).

Length 21 mm (length/width ratio 3.8 to 3.9). Head piceus basally, fulvus to testaceous over spines; anterior border of frons with three angles, lateral two angles subspinose. Antennae serrate, reaching 0 to 1 segment beyond hind angles; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum with wide lateral convexities on anterior 1/3, then declining to anterior angles, hind angles divergent; color fulvus to testaceous with two sinuate piceus bands extending from base to near apex, margin undulate; texture glabrous, nitidus. Scutellum suborbicular, piceus, anterior margin recurved.

Elytra narrowing nearly from base; color fulvus to testaceous basally, becoming piceus apically; texture glabrous, nitidus, intervals flat, striae and stria punctures faint to obsolete; elytral apices each bearing a single spine.

Material Examined. **ECUADOR:** 1500 m., D. Stübel (SMTD).

Diagnosis. *Semiotus singularis* is similar to *S. taeniatus*, *S. buckleyi* and other species with three frontal spines. It can be readily separated from these species by the pattern of the elytra which is yellow to pale brown basally changing into black apically. Other species with three frontal spines have alternating light and dark bands running the length of the elytra. The distinct color pattern of the elytra is similar to that of *S. schaumii* (which lacks frontal spines); although, the later is much more sanguineous basally. The fine lateral pronotal margin evident in *S. singularis* is entirely absent in *S. schaumii*.

Semiotus sommeri Candèze

(Figs. 27, 87, 152, 241 and 294)

Semiotus sommeri Candèze 1857: 323, Kirsch 1866: 180. (Syntype, female: MNHN (on loan from BMNH); type locality: Venezuela).

Semiotus sommeri, Steinheil 1875: 113, Candèze 1874: 179, Fleutiaux 1891: 275.

Length 22 to 28 mm (length/width ratio 4.3 to 4.8). Head luteus to aurantiacus with basal macula piceus; bearing three spines apically; texture mostly glabrous with few scattered setae above eyes and spines, punctation fine and well separated, becoming thicker basally; ocular index 71.0 to 74.0. Antennae serrate, reaching at least two segments short of hind angles in females; segments 1 and 2 testaceous, segments 3 to 11

piceus. Pronotum 5 to 7 mm (length/width ratio 1.2 to 1.4), narrowly sinuate, hind angles diverging, margin incrassate, sulcate on anterior third only, with supramarginal thickening extending nearly entire length, anterolateral areas foveate; color fulvus to aurantiacus with two longitudinal sinuate bands (and often sanguineous bands medially adjacent to piceus bands) on disk; texture glabrous, nitidus, punctation fine, becoming umbilicate along anterior border. Scutellum fulvus to testaceus, suborbicular with anterior margin recurved. Prosternum evenly concave in profile; color sanguineous, lobe aurantiacus, with piceus bands along suture; texture glabrous and nearly impunctate medially with deep contiguous punctures and dense decumbent setae laterally, and with scattered erect setae laterally on lobe. Hypomeron fulvus to luteus with piceus band along suture; texture glabrous, nitidus with fine punctation throughout becoming denser along suture. Mesosternum fulvus to sanguineous; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron fulvus to sanguineous. Metasternum testaceus to sanguineous; texture glabrous and nearly impunctate medially with dense setae and punctures laterally. Femora aurantiacus to testaceus.

Elytra 15 to 19 mm (length/width ratio 2.9 to 3.3), subparallel on anterior third to fourth, then narrowing to tip; color fulvus to luteus with intervals 2, 4, 6, and 8 (and along suture) aurantiacus to testaceus; texture glabrous, nitidus, with striae fine and striae punctures fine to deep; apices each bearing one spine.

Abdomen testaceus to sanguineous medially, fulvus to aurantiacus laterally with or without two infusate sublateral bands; texture glabrous with fine punctation medially, with dense decumbent setae and dense contiguous punctures anterolaterally; female with

two obovate foveae on apical half to 3/5 of sternite 5; anterior sclerite with lateral arms reduced, hardly extending apically beyond basal piece, sharp dentitions along inner margin. Male with lateral blades of parameres greater than 25% length of parameres.

Material examined. **COLOMBIA:** (USNM); **GUYANA:** Landsberg (ZMUC); **VENEZUELA:** Amazonas (PCCV); Aragua, Rancho Grande, VII-(15-21)-1967, R.W. Poole, 1100 m. (USNM); Tovar, 5300 ft., I-24-1978, J.B. Heppner (USNM); Federal District, Avila, II-28-1971, H.F. Howden (CNCI); Caracas (ZMUC); Lara, Sanaré, 17.4 km SE Yacambú N.P. 1510 m., 9° 42' 26" N, 69° 34' 34" W, (V-18)-(VI-1)-1998, Ashe, Brooks, Hanley (SEMC); Táchira, San Cristóbal, 10 km SE P.N. Chorro El Indio, 1320 m., 7°44'3" N, 72°13'1" W, V-29-1998, J. Ashe, R. Brooks, R. Hanley (SEMC); Zulia, Maracaibo (USNM); State unknown, Caracas Valley, VII-1897 (CASC); D. Moritz, 1858 (NHMW); 1939 G. Vivas (USNM).

Diagnosis. *Semiotus sommeri* is most closely allied to *S. virgatus*, *S. buckleyi*, *S. regalis* and *S. rubricollis*, with similarities to other species with 4 or 5 bands per elytron (including *S. exsolutus*, *S. kirschi*, *S. superbus*, and *S. germari*). *Semiotus regalis* and *S. rubricollis* are readily separated from these species by the unicolorous first and second elytral intervals (being black in *S. regalis* and deep red in *S. rubricollis*). The other related species with 4 or 5 dark elytral bands have the first two intervals comprised of contrasting light and dark colors. *Semiotus buckleyi* is separated from *S. sommeri* by the similar colors of the elytral intervals (with the dark elytral bands located on the striae). *Semiotus kirschi* and *S. virgatus* are distinct in having the lateral pronotal margin sulcate nearly the entire length. In *S. exsolutus* and *S. acutus*, the lateral margins lacks sulci entirely. *Semiotus sommeri* (and *S. superbus*, *S. germari*, and *S. illigeri*) has an

abbreviated sulcus evident only on the anterior third to half of the pronotal margin.

These last species are best separated by the pattern of elytral and pronotal bands. In *S. superbus*, the eighth and ninth elytral intervals are unicolorous. They are of two different colors (interval 8 black and interval 9 yellow to orange) in *S. germari*, *S. sommeri*, and *S. illigeri*. The pronotal band in *S. germari* (Fig. 235) is larger and more parallel-sided than in *S. sommeri* (Fig. 241) and *S. illigeri* (Figs. 227-229). The pronotal bands in *S. sommeri* are sinuate (never cruciform) and separated by a narrow pale band (Fig. 241). Some individuals of *S. illigeri* have similar pronotal bands (Fig. 227) that are more cruciform. The lateral arms of the anterior sclerite of the bursa copulatrix are abbreviated in *S. sommeri* (Fig. 87), extending less than 1/3 the length of the median piece. In *S. illigeri* (Fig. 79) the lateral arms are longer, extending more than 1/3 the length of the median piece.

Semiotus striatus Guérin-Meneville

(Figs. 88, 247 and 286)

Semiotus striatus Guérin-Meneville 1855: 579, Candèze 1857: 337, Candèze 1874: 185.

(Type: lost; type locality: Ecuador, Napo).

Length 17 to 18 mm (length / width ratio 4.2 to 4.3). Head testaceous to aurantiacus with basal macula piceus; frons without spines or angled anterolateral margins, bearing erect setae over eyes and anterior margin, smaller decumbent setae and dense punctation throughout; ocular index 72.0 to 75.0. Antennae serrate, extending to or just beyond hind angles in females, with segments 1 and 2 testaceous, segments 3 to 11

testaceus medially, rufopiceus laterally. Pronotum 3.5 to 4.5 mm (length / width ratio 0.9 to 1.0), subcomplanate, hind angles divergent; margin incrassate without sulcus; color sanguineus to aurantiacus, margin fulvus to luteus with two lateral piceus bands extending from near base to anterior fourth ; texture with fine setae medially with denser setae laterally, punctation moderately deep and scattered throughout. Scutellum fulvus to aurantiacus, longer than wide, expanding anteriorly, anterior margin not recurved. Prosternum fulvus to testaceus medially, piceus laterally; slightly concave in profile, prosternal process not divided apically; texture glabrous, nitidus with fine punctures medially, with dense setae and punctation laterally. Hypomeron fulvus to testaceus laterally, piceus along suture; texture glabrous, nitidus with fine punctures laterally, with dense setae and punctation medially. Mesosternum fulvus to testaceus medially piceus laterally, with fossa glabrous and impunctate, lateral areas with dense setae and punctation. Mesepisternum and meshypomeron piceus. Metasternum fulvus to testaceus medially, piceus laterally; texture glabrous and impunctate medially, with decumbent setae and fine punctation laterally. Femora testaceus to badius throughout.

Elytra 12 to 13 mm (length / width ratio 2.9 to 3.1), gibbous, subparallel on anterior half then narrowing gradually to tip; color fulvus to testaceus, darker coloring along striae; texture glabrous, nitidus, striae and strial punctures deep and well defined; apices each bearing one spine.

Abdomen testaceus to badius medially, fulvus laterally with sublateral badius bands; texture glabrous with fine punctation medially, decumbent setae and denser punctation laterally. Female with two oblique elliptical foveae on posterior half of sternite 5; anterior sclerite with basal piece strongly convex across base, bearing several

serrations along median piece, and approximately 1/2 length of basal piece. Male unknown.

Material Examined. COLOMBIA: Norte de Santander, 2600 m., 30 km S. Chinacota, V-14-1974, H. & A. Howden (CNCI).

Diagnosis. *Semiotus striatus* is a primitive species of *Semiotus*. It is most closely allied to *S. capucinus* and *S. ligatus*, both of which have a gibbous elytral base and lack frontal spines (the frontal spines in *S. ligatus* are very reduced). These species are readily distinguished from *S. striatus* by the elytral color. In *S. ligatus* the elytra are green, in *S. capucinus* the elytra are deep red. In *S. striatus* the elytra are pale yellowish brown with infusate striae. *Semiotus striatus* superficially resembles the other *Semiotus* species with pale elytra and infusate striae, such as *S. cristatus*, *S. linnei*, *S. colombianus*, *S. angustus*, and *S. perangustus*. All of these species bear distinct frontal spines. *Semiotus striatus* bears no frontal spines. The anterior sclerite of the bursa copulatrix is also distinct from these species. In *S. striatus* the anterior margin of the sclerite is evenly convex (Fig. 88). The other species either have an anterior swelling (Figs. 80 - 82), a thin anterior margin (Fig. 72), or a much reduced sclerite (Fig. 71). The lack of frontal spines, gibbous elytra and unicolorous elytral intervals (with infusate striae) separate *S. striatus* from all other *Semiotus*.

Semiotus superbus Kirsch

(Fig. 295)

Semiotus superbus Kirsch 1866: 181, Candèze 1874: 179, Fleutiaux 1925: 109. (Type: not found; type locality: Colombia: Bogotá).

Length 19 to 26 mm (length/width ratio 4.4 to 4.9). Head testaceus to aurantiacus with piceus macula broad at base, narrowing anteriorly; bearing three spines apically; texture glabrous with few scattered setae above eyes and spines, punctation fine and well separated, becoming thicker basally. Antennae serrate, reaching hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 4 to 7 mm (length/width ratio 1.2 to 1.4), with sides sinuate, hind angles divergent, anterolateral angles impressed, margin thinly rounded, sulcate on anterior third to half; color fulvus laterally with two broad piceus bands extending from base to apex; texture glabrous with fine punctures scattered throughout. Scutellum rufo-piceus to piceus, subchordate. Prosternum slightly concave in profile; color aurantiacus to sanguineus with lobe and lateral area testaceus to aurantiacus, suture with piceus band; texture glabrous medially with fine scattered setae laterally, punctation fine medially becoming denser and deeper laterally. Hypomeron fulvus with suture piceus; texture glabrous with fine punctation scattered throughout, becoming denser toward suture. Mesosternum fulvus to testaceus with obscure margins; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron fulvus to testaceus with obscure margins. Metasternum testaceus to aurantiacus with piceus line medially and along lateral margin; texture with very fine setae scattered medially, becoming denser laterally, punctation very fine medially, denser laterally. Femora testaceus to badius.

Elytra 13 to 18 mm (length/width ratio 2.9 to 3.3), subparallel on anterior third, then narrowing to tip; color fulvus with 5 (including sutural band) piceus bands, striae 8

and 9 piceus; striae fine to obsolete, stria punctures shallow to poorly defined, interstriae wrinkled; apices each bearing one spine.

Abdomen fulvus to testaceus laterally, testaceus to aurantiacus medially with piceus sublateral bands; texture with few fine erect setae scattered medially, sternite 1 with dense decumbent setae behind metacoxae, punctation fine and scattered throughout becoming denser on sternite 1; female with two elliptical foveae on apical half of sternite 5; anterior sclerite strongly convex across lateral arms.

Material Examined. **COLOMBIA:** Capital District, Bogotá; **ECUADOR:** Morona -Santiago, Macas, Région Oriental (MNHN); Napo, Río Hollin, XII-(3-5)-1999, Dauber (PCCV); Pastaza, 11 km NE Puyo, IV-28-1978, CW & LB O'Brien & Marshall (CNCI); 1,000 m., Llandia, 17 km N Puyo, VII-16-1994, F. Genier, remnant rain forest (CMNC); Province unknown, Gualaquiza (MNHN); de Baños à Canelos, région orientale, IX-X-1894 (MNHN); route de Cosanga à Vena, 2000 m., VIII-1990 (MNHN); **PERU:** Junín, La Mercéd (USNM); Political subdivision unknown, Jarugui (NHMW); Mayabamba, M. de Mathan, 1888 (MNHN); Mera (NHMW).

Diagnosis. *Semiotus superbus* is most closely allied to *S. exsolutus*, *S. intermedius* and *S. taeniatus*, with similarities to other species with 4 or 5 bands per elytron (including *S. virgatus*, *S. kirschi*, *S. acutus*, *S. illigeri*, *S. regalis*, *S. exsolutus*, *S. superbus*, and *S. sommeri*). *Semiotus intermedius* is separated from *S. superbus* by the lack of dark bands on the elytral disk (the bands being restricted to the elytral suture and margin). In *S. superbus*, each elytron bears 4 to 5 dark bands. *Semiotus taeniatus* bears only three dark bands per elytron and has an enlarged angle along the posterior border of the hypomera (Fig. 181). This angle is much smaller in *S. superbus* (as in Fig. 178).

Semiotus regalis is readily separated from these species by the black first and second elytral intervals (Fig. 222). The other species with four or more dark elytral bands have the first two intervals comprised of contrasting light and dark colors. *Semiotus kirschi* and *S. virgatus* are distinct in having the lateral pronotal margin sulcate nearly the entire length. In *S. exsolutus* and *S. acutus*, the lateral margin lacks sulci entirely. *Semiotus superbus* (and *S. germari*, *S. sommeri*, and *S. illigeri*) has an abbreviated sulcus evident only on the anterior third to half of the pronotal margin. *Semiotus superbus* can be separated from these species by the eighth and ninth elytral intervals being unicolorous. They are of two different colors (interval 8 black and interval 9 yellow to orange) in *S. germari*, *S. sommeri*, and *S. illigeri*.

Semiotus taeniatus Erichson

(Figs. 34, 125, 181, 226 and 295)

Semiotus taeniatus Erichson 1847: 73, Candèze 1857:312, Candèze 1874: 177. (Type: MNFD; type locality: Peru).

Semiotus jansoni Candèze 1874: 174. (Lectotype: MNHN (on loan from BMNH); type locality: Ecuador). New Synonym.

Semiotus jansoni bipunctatus Schwarz 1902b: 130. (Type: not found; type locality: Peru, Marcapata) New Synonym.

Length 21 to 26 mm (length/width ratio 4.2 to 5.2). Head fulvus to aurantiacus, with central macula piceus; bearing three spines apically; texture glabrous medially with long setae above eyes and spines, punctation fine and scattered anteriorly, larger and

umbilicate basally; ocular index 72.0 to 74.0; lateral frontal spines approximately 31% length of frons. Antennae serrate, 1 to 2 segments short of hind angles in females; segments 1 and 2 badius, segments 3 to 11 rufo-piceus. Pronotum 5 to 6 mm (length/width ratio 1.2 to 1.5), fulvus to aurantiacus, with sanguineous medial band flanked by piceus bands, margin with small piceus maculae (sanguineous band and marginal maculae absent in many specimens); shape sinuate, widest at hind angles, then at middle, anterior margin dropping to lower plane; margin sulcate on anterior half becoming thicker and less defined posteriorly, a thick carina also present from posterior margin to just before anterior angle; texture glabrous with fine scattered punctures throughout, with lateral areas becoming nearly impunctate. Scutellum subchordate, testaceus to badius. Prosternum evenly concave in profile, aurantiacus to testaceus, with elongate maculae laterally badius to piceus; texture with few fine setae scattered throughout, punctures very fine medially, becoming larger and courser laterally. Hypomeron fulvus to testaceus, piceus along suture, with or without piceus macula on lateral margin; texture glabrous with very fine punctures scattered throughout. Mesosternum testaceus with venter of fossa glabrous and impunctate, lateral areas with fine and dense setae and punctation. Mesepisternum and meshypomeron testaceus to piceus. Metasternum fulvus to aurantiacus with piceus line medially (and sometimes laterally); texture nearly glabrous with very few scattered setae, punctation very fine and scattered throughout. Metepimeron badius.

Elytra 14 to 17 mm (length/width ratio 2.8 to 3.4), widest on anterior fourth then gradually tapering posteriorly; interstriae 1, 2, 4 (except at base), 5, 6, 8, and 9 badius to rufopiceus, interstriae 3 and 7 fulvus; texture glabrous, striae 1 definitely impressed,

other striae faintly punctate striate, interstriae 3 and 7 more convex than other interstriae; apices each bearing one spine.

Abdomen fulvus to testaceus, with sublateral line testaceus to badius extending length of abdomen; texture with short dense setae scattered throughout, punctation fine and dense throughout; female with two elliptical foveae on apical half of sternite 5 conjoined apically; anterior sclerite mostly unarmed, laterally arms smooth, extending distally approximately 1/2 length of median piece. Male with parameres wide at base, narrowing to blades; lateral blades approximately 35 to 40% length of parameres.

Material Examined. **BOLIVIA:** Cochabamba, Yungas, Coroico, Fassl, 1908 (NHMW); Yungas de la Paz, Heyne V. (MNFD); 117 km E Yungas, Cochabamba - Villa Tuneri Rd., 1040 m., 17°6'32" S, 65°41'12" W, II-(1-6)-1999, R. Hanley, flight intercept trap (SEMC); La Paz, Nord-Yungas, 400-1800 m., Region um Caranavi, ca 50 km N Coroica, Tello (PCCV); **ECUADOR:** Morona - Santiago, Chigüinda, Buckley, 1903 (BMNH); Pastaza, Río Puyo, Cotococha, 1000 m., 1° 32' 4" S, 77° 53' 6" W, I-24-1998, L. Náday (HNHM); Pichincha, Quito (ZMUC); District unknown, Mangosisa R., 650 m., L. Gomez, B.M., 1940 (BMNH); **PARAGUAY:** Colonia Sudetia, Anders, C. Pfanni (PCCV); **PERU:** Cuzco, Paucatambo, Kosnipata, Bosque Nublada res., Coll. MVL Barclay, Cock-of-the-Rock, montane wet forest, 1400 m., in flight during day, 13°03'21" S, 71°31'44" W, IV-1999 (BMNH); Santa Isabel, Cosnipata Valley, XII-6-1951, F. Woytkowski (USNM); Santa Isabel, Cosnipata Valley, XI-27-1951, F. Woytkowski (CNCI); IBID, XI-15-1951; IBID, XI-30-1951; Santa Isabel, Cosnipata Valley, XII-6-1951, F. Woytkowski (FMNH); km 165 on Cosnipata Hwy., elev. 1200m., Cosnipata Valley (X-XI)-1981, tropical forest, J.F. Fitzpatrick & D. Willard (FMNH); km 165, on

Cosnipata hwy, el. 1200 m. Cosnipata Valley, (X-XI)-1981, J. Fitzpatrick & D. Willard, tropical forest, (USNM); Huánuco, Tingo María, Monson Valley, X-27-1954 (CASC); Tingo María, Monson Valley, X-12-1954 (CASC);); Junín, Chanchamayo (USNM); Chanchamayo, M. Freyman G. (MNFD); Chanchamayo, II-1933, E.G. Smythe (SEMC); Quiroz, Río Paucartambo (CNCI); Quiroz, Río Paucartamba, I-1934, Bot. G. Nelson (SEMC); Río Oxobamba, La Mercéd, Chanchamayo (MNGD); Political subdivision unknown, Río Huallagas. II-1986, L. Peña (PCCV0; Río Toro (MNFD).

Diagnosis. *Semiotus taeniatus* is most closely allied to *S. acutus*, *S. kirschi*, *S. superbus*, *S. exsolutus*, and *S. intermedius*. All of these species have three frontal spines (although the medial spine in *S. intermedius* is subspinose, to angulate). *Semiotus taeniatus* is unique from these (and all other known *Semiotus*) by the large subquadrate angle or point near the center of the posterior border of the hypomeron (Fig. 181). This angle is much more reduced in other *Semiotus* (Figs. 178-180). In addition, *S. taeniatus* can be separated from the above related species by the color pattern of the elytra. In *S. taeniatus*, each elytron bears three dark bands. In the other species, each elytron bears 4 or more dark bands (except *S. intermedius* which has only two - one sutural and one marginal). The anterior sclerite of the bursa copulatrix is unarmed in *S. taeniatus* (Fig. 34). In *S. exsolutus* and *S. kirschi*, the posterior portion of the lateral arms bear several dentitions (Fig. 89-90). *Semiotus taeniatus* bears some similarities to *S. singularis* but can be readily separated by the elytral color, which in the latter species is yellow to pale brown basally turning gradually to black apically.

Note. The pronotal markings are quite variable, ranging from a single wide piceus band to double piceus bands interrupted by a sanguineus band. Both varieties

exist with or without lateral piceus maculae. These forms overlap geographically and are otherwise the same, obviating the specific or subspecific status of *S. jansoni* and *S. j. bipunctatus*.

Semiotus trinitensis n. sp.

(Figs. 42, 126, 162, 212 and 287)

Length 19 to 22 mm (length / width ratio 4.4 to 4.8). Head aurantiacus to testaceus with basal macula piceus; texture glabrous with occasional setae above eyes and spines, punctation fine and scattered evenly throughout; front with two spines anterolaterally, without medial angulation; ocular index 73.0 to 75.0; frontal spines approximately 28% length of frons. Antennae serrate, one segment shy of hind angles, segments 1 and 2 testaceus, segments 3 to 11 rufo-piceus to piceus. Pronotum 4 to 6 mm (length / width ratio 1.2 to 1.3), narrowly sinuate, hind angles diverging; margin incrassate, sulcate on anterior third only; color fulvus to luteus with median sanguineus band flanked by two long piceus bands; texture glabrous, nitidus with fine punctures, becoming thicker and umbilicate anteriorly. Scutellum piceus, moderately declivous and incised anteriorly with median sulcus. Prosternum concave in profile; color sanguineus to aurantiacus with piceus band along suture; texture glabrous with erect setae on lobe, punctation fine medially, thicker and umbilicate laterally. Hypomeron luteus with or without sanguineus band along suture; texture glabrous, nitidus with fine punctures throughout. Mesosternum testaceus to badius and glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures.

Mesepisternum and meshypomeron testaceus to piceus. Metasternum testaceus with lateral bands badius to piceus; texture glabrous, nitidus with very fine punctures throughout. Femora fulvus to testaceus.

Elytra 12 to 15 mm (length / width ratio 2.9 to 3.2), narrowing nearly from base, becoming thicker posteriorly; color luteus with interval 1, part of 2, and lateral margin piceus; texture glabrous, nitidus with striae and strial punctures fine to obsolete; apices each bearing one spine.

Abdomen aurantiacus to testaceus medially fulvus to luteus laterally, with 2 sublateral bands badius to piceus; texture glabrous with fine decumbent setae on sternite 1, punctation fine throughout; female with two shallow elliptical foveae in center of sternite 5; anterior sclerite wider than long, lateral arms strongly convex, bearing 2 to 4 serrations apically, approximately 2/3 length of median piece. Male with parameres subparallel basally, lateral blades approximately 30% length of parameres.

Material examined. Holotype (male): **TRINIDAD**: Mome Bleu, 2,700', W.I., VIII-8-1969, H. & A. Howden (CNCI); Paratypes: **TRINIDAD**: Aripo, BWI, VII-2-1944, F. Fernandez (1, USNM); Mome Bleu, 2,700', W.I., VIII-4-1969, H. & A. Howden (1, CNCI); Mt. Tamana, S. of Coryal, W.I., VIII-16-1969, H. & A. Howden (1, CNCI).

Diagnosis. *Semiotus trinitensis* is most closely allied to *S. melleus*, *S. fascicularis*, and the species in the *caracasanus* group. It is also similar to *S. bispinus* and *S. clarki*. *Semiotus trinitensis* is unique from all these species by the strongly procurved and incised (along the anterior margin) scutellum (Fig. 212), that curves evenly from the disk to the front without a dorsal angle or margin. In the other related

species a frontal angle or margin is present. The *caracasanus* group is distinct from *S. trinitensis* in the doubly-spined frons and a completely convex pronotum that lacks lateral sulci. *Semiotus trinitensis*, bears two frontal spines, but has sublateral depressions on the pronotum (Fig. 213) and the lateral margin is sulcate anteriorly. The elytra in *S. melleus* (Fig. 213), *S. clarki* (Fig. 215), and *S. bispinus* (Fig. 209) bear 4 to 5 dark bands (per elytron). Each elytron bears only two dark bands in *S. trinitensis*. The dark bands in *S. fascicularis* are generally restricted to the apical 2/3 of the elytra and consist of a sutural, a marginal, and two medial bands (confluent distally (Fig. 214)). *Semiotus limatus* also bears two dark bands per elytron, similar to *S. trinitensis*. These species can be separated by the pronotal bands and by geography. *Semiotus trinitensis* bears two pronotal bands, *S. limatus* bears only a single band (Fig. 208). *Semiotus limatus* is known from Brazil and Peru, *S. trinitensis* is known only from Trinidad. The median piece of the anterior sclerite of the bursa copulatrix is thick and completely covered by dentitions in *S. limatus* (Fig. 78). In *S. trinitensis*, the median piece is unarmed (Fig. 42). Resemblances also exist between *S. trinitensis* and other species with only sutural and marginal dark elytral bands (*S. lafertei*, *S. affinis*, *S. intermedius*, *S. decoratus*, *S. illustris*, *S. carus*, *S. nigriceps*, *S. cyrtomaris*, *S. matilei*, *S. pallicornus*, and *S. antennalis*). The last six species (*S. carus* - *S. antennalis*) are part of the *caracasanus* group. *Semiotus lafertei*, *S. affinis*, *S. intermedius*, *S. decoratus*, and *S. illustris* all bear three frontal spines (or the medial area between the lateral spines is strongly angled). The area between the two frontal spines in *S. trinitensis* is entirely without spines or angles.

Note. *Semiotus trinitensis* is named after Trinidad where it is only known to occurs.

Semiotus vicinus Fleutiaux

Semiotus vicinus Fleutiaux 1920: 300. (Lectotype, female: MNHN; type locality:

Ecuador, Montagne du Nanegal, Río Guallabamba).

Length. 24 to 27 mm (length/width ratio 4.8 to 5.2). Head with three frontal spines (two long anterolateral spines and one smaller median spine); color piceus basally, testaceous to luteus around spines; texture nitidus with few erect setae and mixed punctures throughout, less so medially. Antennae serrate, shy of hind angles by 1 to 3 segments; segments 1 and 2 testaceous to badius, segments 3 to 11 piceus to rufopiceus. Pronotum 5 to 7 mm (length/width ratio 1.3 to 1.5), slightly converging on anterior half, hind angles diverging on posterior fourth, margin without sulcus, thickly rounded posteriorly, forming an elevated thickening above margin; color luteus with two broad piceus bands extending from base to near apex; texture of golden setae and well defined punctures, especially on black bands; scutellum subtriangular, fulvus to testaceous medially with obscure border. Prosternum nearly straight in profile, medially glabrous with fine punctation becoming larger and deeper laterally with fine setae; color sanguineus medially, piceus laterally, lobe fulvus to luteus. Hypomeron piceus along suture, fulvus to luteus laterally; texture glabrous with fine punctures and fine golden setae laterally. Mesosternum piceus; texture glabrous medially with fine punctation and golden setae laterally. Mesepisternum piceus. Metasternum piceus; texture glabrous medially with fine punctation and golden setae laterally. Femora fulvus to testaceous.

Elytra 16 to 18 mm (length/width ratio 3.2 to 3.6), subparallel on basal half then narrowing to tip, color fulvus to luteus with piceus bands along striae; texture glabrous, striae punctures lightly impressed apically, obscure to obsolete basally; apices each bearing one spine.

Abdomen aurantiacus to badius medially, fulvus laterally with dark sublateral areas; texture glabrous medially with fine punctation and golden setae laterally; female with two elliptical foveae on apical half of sternite 5.

Material Examined. **ECUADOR:** Montagne du Nanegal, Río Guallabamba, P. Rivet (MNHN). *Semiotus vicinus* is known from a single specimen.

Diagnosis. *Semiotus vicinus* is most closely allied to *S. pilosus* and other species with three frontal spines, and infusate striae (including *S. cristatus*, *S. linnei*, *S. perangustus*, *S. angustus*, and *S. colombianus*). Superficial similarities also exist with *S. auripilis*. All of these species have pale elytra with dark striae and a dense covering of setae on the pronotum. *Semiotus auripilis* is separated from *S. vicinus* by the strongly convex elytral intervals. The intervals are nearly flat in *S. vicinus*. *Semiotus buckleyi*, *S. reaumuri*, and *S. glabricollis* have similarly patterned elytra but have glabrous, or nearly glabrous, pronota. Of the related species, with pronotal setae, *S. pilosus* and *S. vicinus* are unique in lacking lateral sulci on the pronotum (or it is very faint if present). The two species can be separated from each other by the color of the pronotum. *Semiotus pilosus* has a completely brown to reddish brown disk, with only the peripheral areas pale. *Semiotus vicinus* bears two black bands on the pronotal disk. The unicolorous elytral intervals with infusate striae, lack of (or very faint) lateral pronotal sulci, and nearly

uniform badius pronotum (with fulvus margins) with dense decumbent setae separate *S. vicinus* from all other *Semiotus*.

Semiotus virgatus Erichson

(Figs. 76, 153, 242 and 286)

Semiotus virgatus Erichson 1847: 76, Candèze 1857: 320, Candèze 1874: 179. (Type: MNFD; type locality: Peru).

Semiotus sanguinolentus Candèze 1900: 82, Szombathy 1909a: 121. (Type: ISNB; type locality: Bolivia) New Synonym.

Length 28 to 29 mm (length/width ratio 4.1 to 4.7). Head luteus to aurantiacus with basal macula piceus; bearing three spines anteriorly; texture glabrous, nitidus with few scattered setae above eyes and spines, punctation fine anteriorly, shallow and umbilicate basally; ocular index 76.0 to 79.0. Antennae serrate, 1 to 2 segments shy of hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 7 to 8 mm (length/width ratio 1.1 to 1.3), sinuate with hind angles diverging, margin sulcate, extending nearly entire length of pronotum, with supramarginal ridge extending from hind angles to near anterolateral foveae; color testaceus to sanguineus with elongate elliptical piceus band medially extending from base (or near base) to (or nearly to) anterior margin; texture glabrous, nitidus, with fine punctation throughout becoming thicker anteriorly and along supramarginal ridge. Scutellum fulvus to sanguineous, suborbicular laterally and posteriorly with anterior margin recurved. Prosternum concave in profile, prosternal process not divided apically; color sanguineus to testaceus; texture

with few erect setae anteriorly, few decumbent setae laterally, punctation fine to obsolete medially becoming denser and umbilicate posterolaterally. Hypomeron sanguineus to testaceus; texture glabrous, nitidus, punctation fine and shallow laterally, thicker and subrugose medially. Mesosternum sanguineus to piceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum and meshypomeron testaceus to piceus. Metasternum sanguineus to testaceus medially (often with piceus medial band), with or without piceus areas laterally; texture glabrous, nitidus with decumbent setae anterolaterally. Femora aurantiacus to testaceus.

Elytra 18 to 20 mm (length/width ratio 2.8 to 3.0), subparallel on anterior third, then narrowing to tip; color luteus to testaceus with mesal portion of interval 1 along with intervals 2, 4, 6, 8, (and sometimes outer portion of 9) piceus; texture glabrous, nitidus, striae and strial punctures very fine to obsolete; apices each bearing one spine.

Abdomen sanguineus to testaceus throughout; texture glabrous with few scattered erect setae, nitidus, with decumbent setae on sternite 1, punctation fine and scattered throughout with fewer deeper setigerous punctures scattered throughout; female with two elliptical piliferous foveae on apical half of sternite 5; anterior sclerite with anterior arms curved mesally, extending posteriorly 1/2 length of median piece, each bearing 5 to 10 sharp dentitions. Male not seen.

Material Examined. **ECUADOR:** Morona - Santiago, Macas, alt. 1050 m., F. Campos (USNM); Pastaza, Puyo, 900 m., VII-(13-17)-1976, S.&J. Peck (CNCI); Province unknown, Mero Pastase, II-1982 (PCCV); **PERU:** Junín, Chanchomayo, M. Freyman G. (MNFD); La Mercéd, 1921 (USNM); Political subdivision unknown, Gozoro (MNFD).

Diagnosis. *Semiotus virgatus* is most closely allied to *S. sommeri*, *S. rubricollis*, *S. regalis*, and *S. buckleyi*. *Semiotus regalis* and *S. rubricollis* have unicolorous elytral intervals 1 and 2 (these are black in *S. regalis* (Fig. 222) and deep red in *S. rubricollis* (Fig. 225)). In *S. buckleyi* the elytral bands all overlap the elytral striae (with the elytral intervals being unicolorous). In *S. virgatus* and *S. sommeri*, the elytral bands cover alternating intervals with intervals 1 and 2 being of 2 contrasting colors. This same pattern is evident in *S. exsolutus*, *S. superbus*, *S. germari*, *S. kirschi*, *S. acutus*, and *S. illigeri*. *Semiotus virgatus* is most readily separated from these species by the narrow pronotal band (Fig. 242) and long lateral pronotal sulci (that extend nearly the entire length of the pronotum). *Semiotus exsolutus* and *S. acutus* have no pronotal sulci and 2 pronotal bands (*S. exsolutus championi* (Fig. 239) has only a single pronotal band but this is twice as wide as that of *S. virgatus*). *Semiotus superbus* (with two pronotal bands), *S. sommeri* (with two pronotal bands), *S. germari* (with two pronotal bands), and *S. illigeri* all have a short marginal sulcus (not extending onto the posterior half). Most individuals of *S. illigeri* have two pronotal bands, although the population in Central America (with a single band) has the band larger than the pale lateral areas (Fig. 229). In *S. virgatus* the pronotal band is much narrower. *Semiotus kirschi* has 2 pronotal bands. The lateral arms of the anterior sclerite of the bursa copulatrix extend posteriorly at least half the length of the median piece in *S. virgatus* (Fig. 76). In *S. kirschi* (Fig. 90), *S. regalis* (Fig. 36), and *S. sommeri* (Fig. 87) the lateral arms do not extend posteriorly.

Note. The color of the pronotum is a deeper yellow in the type of *S. sanguinolentus*. Most specimens of *S. virgatus* (including the type) are paler yellow. This, however, is not justification for specific recognition.

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Table 2. Characters and Character States Used for Phylogenetic Reconstructions

1. Antennae: 0) serrate, 1) pectinate or subpectinate
2. Antennae: 0) 3 segments (or more) short of hind angles, 1) between 0 to 3 segments short of hind angles, 2) reaching beyond hind angles
3. Anteromedial margin of frons: 0) without spine curved ventrally, 1) with ventrally curved spine
4. Anteromedial margin of frons: 0) without freely projecting spine, 1) with freely projecting spine, or with area strongly angled
5. Anterolateral angles of frons 0) not spinose, 1) spinose
6. Frons: 0) strongly concave between eyes, 1) not strongly concave between eyes
7. Eye width (both together): 0) greater than 1/3 width of head, 1) less than 1/3 width of head
8. Pronotal tubercle: 0) absent, 1) on same plane as posterior margin, 2) rising above level of posterior margin
9. Pronotal margin: 0) not sulcate, 1) sulcate on anterior third only, 2) sulcate on at least half of margin
10. Pronotum: 0) glabrous or mostly glabrous, with fewer than 20 setae, 1) with more than 20 setae
11. Pronotal punctures: 0) deep and often umbilicate, 1) fine or absent
12. Pronotum (viewed in anterior aspect): 0) evenly convex, 1) not evenly convex
13. Pronotal margin (excluding posterior and anterior fourth : 0) sinuate, 1) straight (though perhaps not parallel)

14. Pronotum: 0) with supramarginal enlargement along posterior half, 1) with vague supramarginal enlargement, 2) with clearly evident enlargement
15. Pronotum: 0) maculate, 1) not maculate
16. Pronotum: 0) not foveate anterolaterally, 1) foveate anterolaterally
17. Hind angles of pronotum: 0) divergent, 1) not divergent
18. Prosternum (in profile): 0) not arched, 1) moderately arched, 2) strongly arched
19. Posterior border of hypomeron: 0) with tooth on outer third , 1) without tooth on outer third
20. Posterior border of hypomeron: 0) with double teeth submedially, 1) without double teeth submedially
21. Posterior border of hypomeron: 0) with single tooth on medial third , 1) without single tooth on medial third
22. Outer angle of posterior border of hypomeron: 0) extending beyond posterior border, 1) not extending beyond posterior border
23. Prosternal spine: 0) not divided at tip, 1) divided at tip
24. Mesosternum: 0) planar, 1) arched downward anteriorly
25. Scutellum: 0) with convex lateral margins, 1) without lateral convexities
26. Scutellum: 0) wider than long, 1) not wider than long
27. Scutellum: 0) widest anteriorly, 1) widest posteriorly
28. Elytral base: 0) gibbous, 1) not gibbous
29. Elytral intervals at base: 0) nearly all of same height, 1) of differing elevations
30. Elytral intervals: 0) convex, 1) mostly flat
31. Striae: 0) clearly defined, 1) obsolete in many places, if not all

- 32. Strial punctures: 0) clearly defined, 1) obsolete in many places, if not all
- 33. Elytral apices: 0) with 1 spine, 1) without 1 spine
- 34. Elytral apices: 0) with 2 subequal spines, 1) without 2 subequal spines
- 35. Anteapical sutural margin of elytra: 0) angled, 1) not angled (straight or sinuate)
- 36. Foveae on sternite 5 of female: 0) present, 1) vague, 2) absent
- 37. Foveae on sternite 5 of female: 0) small, restricted to apical fourth , 1) not restricted to apical fourth (or absent)
- 38. Lateral blades of aedeagus: 0) greater than 1/4 length of parameres, 1) less than 1/4 length of parameres
- 39. Female anterior sclerite: 0) absent, 1) vestigial (without lateral arms), 2) not vestigial
- 40. Female anterior sclerite: 0) without lateral arms divided (or absent), 1) with lateral arms divided

Table 3. Species / Character matrix used in phylogenetic reconstructions.

	111111111222222222233333333334																																									
Species (genus)	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4								
(Oistus)	0	2	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	2	1	1	1	?	0	1	1	0	0	1	0	1	1	2	1	?	?	?						
acutus	0	1	0	1	1	1	1	2	0	0	1	0	2	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	1	1	1	0	1	1	?	2	0					
aeneovittatus	0	2	0	0	1	1	1	0	0	0	0	1	1	0	0	1	0	0	1	1	0	1	0	1	1	1	0	0	0	0	0	0	1	0	2	1	2	0				
aliciae	0	1	0	0	0	1	1	1	0	0	0	0	1	0	1	1	0	0	0	1	1	1	0	0	0	0	1	0	1	1	1	0	1	1	?	?	?	?	?			
angulatus	1	0	0	0	1	0	0	2	2	0	0	1	1	1	0	0	0	2	1	1	0	0	1	0	1	1	1	1	0	1	1	1	0	1	1	2	1	?	2	1		
angustus	0	2	0	1	1	1	1	1	1	0	1	0	2	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	1	1	0	0	1	1	2	1	0	1	0			
angusticollis	1	0	0	0	1	0	0	2	2	0	0	1	1	2	0	0	0	1	1	1	0	0	1	0	1	1	1	1	0	1	1	1	0	1	0	2	1	1	2	1		
antennalis	0	1	0	0	1	1	1	0	0	0	0	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	0	1	1	1	0	1	0	0	1	1	2	0			
auripilis	0	2	0	1	0	1	1	0	1	1	0	1	1	1	1	0	1	1	1	0	1	0	0	1	0	1	1	0	0	0	0	0	1	1	?	?	?	?	?			
antennatus	0	0	0	0	1	1	1	0	2	0	0	1	1	1	0	1	0	1	1	0	1	1	0	0	1	0	1	1	0	0	1	0	0	1	0	0	1	0	2	0		
badeni	0	1	0	0	1	1	1	1	0	0	1	1	1	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	1	1	1	0	1	1	1	0	1	2	1	2	0	
bilineatus	0	0	0	1	1	1	0	0	2	0	0	1	1	1	0	1	0	2	1	0	1	1	0	0	1	0	1	1	0	1	0	0	0	1	0	0	1	0	0	1	2	0
bispinus	0	1	0	0	1	1	1	1	0	1	1	0	1	0	1	0	1	1	1	0	1	0	0	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	0	2	0	
boliviensis	0	2	0	0	0	1	1	0	0	1	0	1	0	1	0	1	1	1	0	1	0	0	0	1	1	0	1	0	0	0	0	1	0	?	?	?	?	?	?	?		
buckleyi	0	1	0	1	1	1	1	1	0	0	1	0	2	0	1	0	1	1	1	0	1	0	0	1	0	1	1	1	1	1	0	1	1	0	1	0	1	0	2	0		
caracasanus	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	1	1	1	0	1	0	0	1	1	1	0	1	1	1	0	1	0	0	1	1	2	0			
capucinus	0	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	?	1	1	1	?	0	0	0	0	0	0	1	1	1	?	?	?	?	?	?		
carus	0	1	0	0	1	1	1	0	0	0	0	1	0	1	0	0	1	1	1	0	1	0	0	1	0	1	1	0	1	1	1	0	1	0	0	1	1	2	0			
catei	0	1	0	0	1	1	1	0	0	0	1	1	0	0	0	0	0	1	1	1	0	?	0	0	0	0	1	0	0	0	1	0	1	1	?	?	?	?				
chassaini	0	1	0	1	0	1	1	0	0	0	1	1	1	0	0	1	1	1	0	1	0	1	1	1	0	0	1	0	0	0	0	1	1	0	1	?	?	?	?			
chontalensis	0	1	0	0	1	1	1	0	0	0	0	1	0	0	0	0	1	1	1	0	1	0	0	1	1	1	1	0	1	1	1	0	1	0	0	1	0	2	0			
clarki	0	1	0	0	1	0	1	1	1	0	0	1	0	1	0	0	0	1	1	1	0	1	?	0	1	0	1	1	0	0	0	0	0	1	1	2	1	?	?	?		
colombianus	0	2	0	1	1	1	1	1	0	1	0	2	0	1	0	1	1	1	1	0	1	0	0	1	0	1	1	1	1	1	1	0	1	1	0	1	?	?	?	?		
conicollis	0	2	0	0	0	1	1	0	0	0	0	1	1	0	0	1	0	0	0	0	1	?	0	0	0	0	0	1	0	0	?	?	?	?	?	?	?	?	?			
convexicollis	1	0	0	0	1	0	0	2	2	0	0	1	1	2	0	0	0	1	1	1	0	0	1	0	1	1	1	1	0	1	1	1	0	1	1	2	1	?	?	?	?	
cristatus	0	2	0	1	1	1	1	1	0	1	0	2	0	1	0	1	1	1	0	1	0	0	1	0	1	1	1	1	1	0	0	1	1	0	1	0	1	0	2	0		
cuspidatus	0	0	1	0	0	1	1	0	0	0	0	1	1	0	0	1	1	1	0	1	0	0	1	1	1	1	0	1	0	0	1	1	0	1	0	0	1	2	0			
cyrtomaris	0	1	0	0	1	1	1	0	0	0	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	0	1	1	1	0	1	0	0	1	1	2	0				
decoratus	0	1	0	1	1	1	1	1	0	0	1	0	1	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	1	1	1	0	1	1	0	1	?	?	?	?		
exsolutus	0	1	0	1	1	1	1	0	0	0	1	1	2	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	1	1	1	0	1	1	0	1	0	2	0			
fascicularis	0	1	0	0	1	1	1	1	0	0	0	1	1	1	1	0	0	1	1	1	0	1	0	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	2	0		
flavangulus	0	1	0	0	1	1	1	1	0	0	1	0	1	0	1	0	1	1	1	0	1	0	0	0	1	0	1	1	1	0	1	1	?	?	?	?	?	?	?			
fleutiauxi	0	1	0	0	1	1	1	1	0	0	1	1	2	0	1	0	1	1	1	0	1	0	0	1	1	1	1	1	1	1	0	1	1	1	2	1	?	?	?	?		
formosus	0	1	0	0	0	1	1	0	0	0	0	1	0	1	0	0	0	1	1	1	0	1	0	0	1	0	0	1	1	1	1	0	1	1	0	0	1	?	?	?	?	
fryi	0	0	0	0	1	0	1	1	2	0	0	1	1	2	0	0	2	1	1	0	1	?	1	0	1	0	0	0	0	0	0	1	1	1	1	0	1	?	?	?		
fulvicollis	0	1	0	0	1	1	1	1	0	0	1	1	1	0	1	0	1	1	1	0	1	0	0	1	1	1	1	1	1	1	0	0	1	1	2	1	0	2	0			
furcatus	0	0	0	0	1	1	0	0	1	0	0	1	1	1	0	1	0	2	1	0	1	1	1	0	1	0	1	1	0	0	0	1	0	0	1	1	?	?	?	?		
fusciformis	0	2	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	1	1	1	0	1	0	0	1	1	1	1	0	0	0	0	1	0	?	?	1	?	?	?		

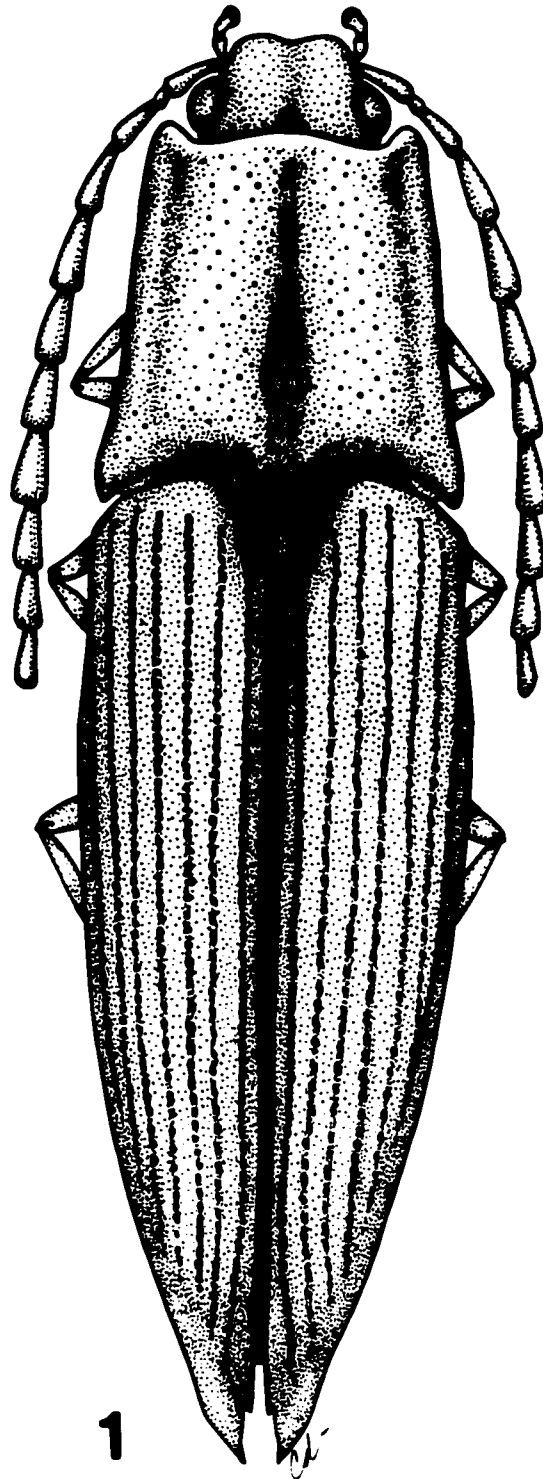
Table 3. Continued.

	1111111112222222223333333334
Species (genus)	1234567890123456789012345678901234567890
germarii	0101111121010201011101001011011001101020
gibbosus	0100101100011100011101111100100101101?20
girardi	0201111001011101011101111100100001101020
glabricollis	0101111100010201011101?11001011001101???
hispidus	02010111010101010111010011010000111??1??
illigerii	0101111110010201011101001011011001101?20
illustris	0101111111010201011101001001011101011?20
imperialis	00100110000111011101101111110100110100120
insignis	1000100120010200021100101011011101121?21
intermedius	1101101110011201011101001011011101101020
kathleenae	01000111110102000111010010001011010??0??
kirschi	0101111120010201011101001111011101101?20
kondratieffi	0100111100011100010110000011111101121?20
lacrimiformis	0100111000001000011101001111011101001020
lafertei	0101111110011101011101001011011101101020
ligatus	0100111101010201001101011100100001121120
ligneus	020000002001000002110010000111100110110?
limatus	0100111101010201001101011100100001121120
limbaticollis	0200011001011000101101?011110110010?????
linnei	0101111111010201011101001011111001101020
luteipennis	0100001020011100111100001101100010111110
macer	020011100001100011110?000111000001011?20
maculatus	02000110000110011011010011100000010??0??
matilei	010011100000000000111010011110111011??0??
melleus	0200111100010100011101001111111001111120
morio	0200011001011010101101?011110100100?????
nigriceps	0000111000001000011101001111011101001?20
nigricollis	0200011001011010101101?011110110100?????
pallicornus	0100111000001010011101001111011101101020
pectitus	0100011000010101011101001101100001001?20
perangustus	0201111111010201011101001011111001001020
pilosus	02011011010102010111010011111110011??0??
punctatostriatus	0201111001011101011101111100100001101020
quadricollis	02000110000110001011010011100000010??0??
quadrivittis	02000110000110001011010011010000010??1??
reaumurii	0101111100010101001101?1100101100110????
rileyi	0100111000001010011101001011011101001?10
regalis	0101111100010201011101001011100111101020

Table 3. Continued.

	111111111122222222223333333334																																			
<u>Species (genus)</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>		
rubricollis	0	1	0	1	1	0	1	0	2	0	0	1	0	2	0	1	0	1	1	1	0	1	0	0	1	0	1	1	1	1	0	0	1	0	1	?20
schaumii	0	2	0	0	0	1	1	0	0	0	1	1	0	0	1	1	0	1	0	1	1	1	0	1	?0	1	0	1	1	1	1	0	0	1	1	????
scitulus	0	2	0	0	0	1	1	0	2	0	0	1	1	0	0	0	1	0	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	?1??
seladonius	0	2	0	0	0	1	1	0	0	1	0	1	0	2	0	1	0	1	1	1	0	1	?0	1	1	1	1	1	0	0	0	1	1	1	?0??	
serraticornis	0	2	0	0	0	0	0	0	2	0	0	1	0	0	0	1	0	2	1	1	0	0	1	0	0	0	0	1	1	1	0	0	1	0	1	100
sommeri	0	1	0	1	1	1	1	1	0	0	1	0	2	0	1	0	1	1	1	0	1	0	0	1	0	1	1	1	1	1	1	0	1	0	1	020
spinosus	0	1	0	0	1	1	1	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	1	1	1	0	1	1	1	0	1	0	0	1	020	
striatus	0	2	0	0	0	1	1	1	0	1	0	1	0	1	0	0	0	1	1	0	1	0	1	1	1	0	0	1	0	0	0	0	1	0	1	?20
subvirescens	0	2	0	0	0	1	1	0	2	1	0	1	1	0	0	0	1	0	1	1	0	1	0	0	1	1	1	1	0	0	0	0	1	0	2	1???
superbus	0	1	0	1	1	1	1	0	0	0	1	2	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	1	1	1	0	1	0	1	020	
taeniatus	0	1	0	1	1	1	1	2	0	0	1	2	0	1	0	1	1	1	0	1	0	0	1	0	1	1	0	1	1	1	0	1	0	1	020	
trilineatus	0	2	0	0	0	1	1	0	2	0	0	1	1	0	0	0	1	0	1	1	0	?0	0	1	1	1	0	0	1	0	0	1	0	2	????	
trinitensis	0	1	0	0	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	1	0	0	1	0	1	1	0	1	1	1	0	1	1	1	1	020
triplehorni	0	1	0	0	1	1	1	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	1	1	1	0	1	1	1	0	1	0	0	1	020	
vicinus	0	1	0	1	1	1	1	0	1	0	1	0	2	0	1	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1	0	0	1	0	1	???
virescens	0	2	0	0	0	1	1	0	2	0	0	1	1	0	1	0	0	0	1	1	0	1	0	0	1	1	0	0	1	0	1	0	1	0	?1??	
virgatus	0	1	0	1	1	1	1	2	0	0	1	0	2	0	1	0	1	1	1	0	1	0	0	1	0	1	1	1	1	1	0	1	0	1	?20	
woodi	0	1	0	0	1	1	1	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	1	1	1	0	1	1	1	0	1	0	0	1	020	
zonatus	0	1	0	0	1	1	1	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	1	1	1	0	1	1	1	0	1	0	0	1	020	

Figure 1. *Semiotinus maculatus* n. sp.



Figures 2 - 25. *Semiotinus* and *Semiotus* species. 2 - 9. Male genitalia. 2 *Semiotinus quadricollis*; 3. *Semiotinus fusciformis*; 4. *Semiotinus boliviensis*; 5. *Semiotinus virescens*; 6. *Semiotinus limbaticollis*; 7. *Semiotinus aeneovittatus*; 8. *Semiotinus maculatus*; 9. *Semiotinus scitulus*; 10 - 11. Female anterior sclerite. 10. *Semiotinus aeneovittatus*; 11. *Semiotinus macer*; 12 - 13. Lateral aspect of pronotum. 12. *Semiotinus scitulus*; 13. *Semiotus zonatus*; 14 - 19. Head and pronotum. 14. *Semiotinus conicollis*; 15. *Semiotinus aeneovittatus*; 16. *Semiotinus nigricollis*; 17. *Semiotinus virescens*; 18. *Semiotinus boliviensis*; 19. *Semiotus nigriceps*; 20 - 25. Elytral apices. 20. *Semiotinus limbaticollis*; 21. *Semiotinus quadrivittis*; 22. *Semiotinus aeneovittatus*; 23. *Semiotinus macer*; 24. *Semiotinus nigricollis*; 25. *Semiotinus boliviensis*.

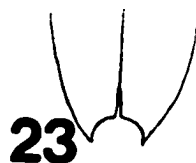
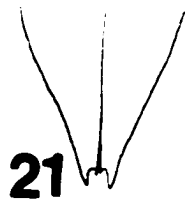
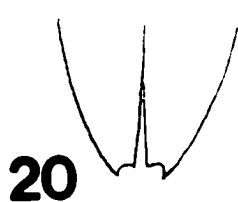
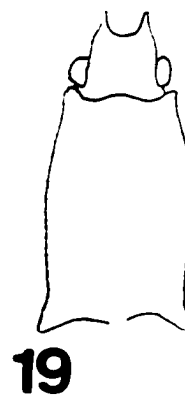
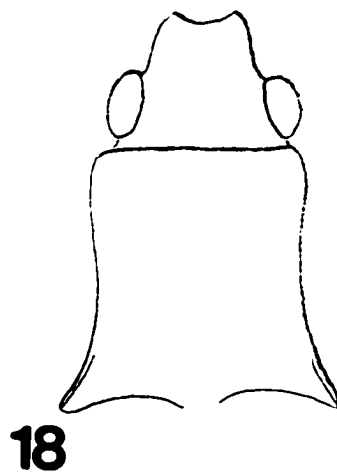
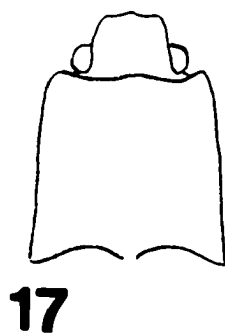
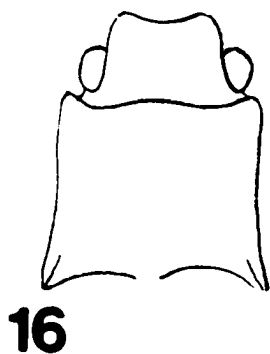
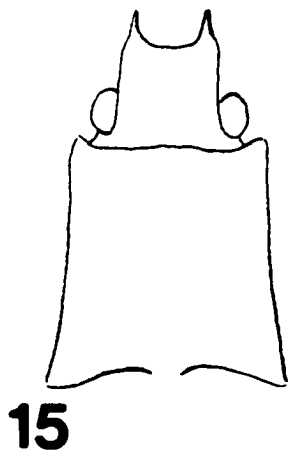
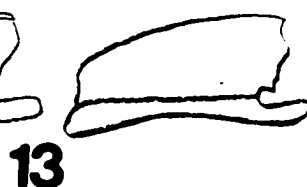
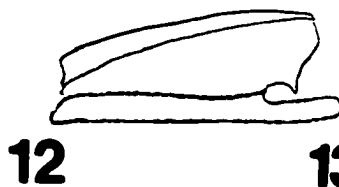
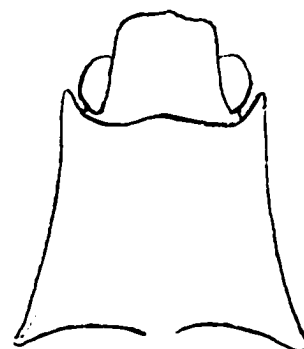
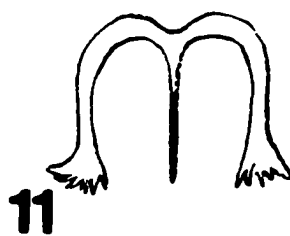
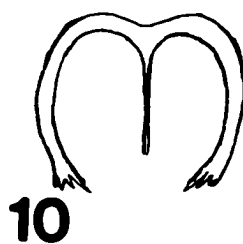
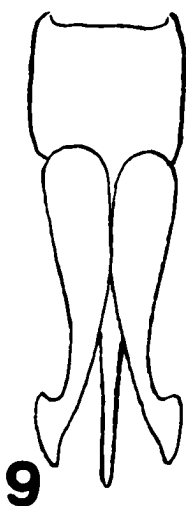
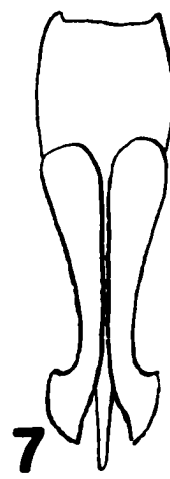
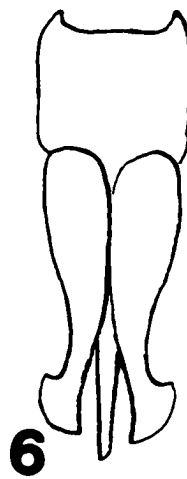
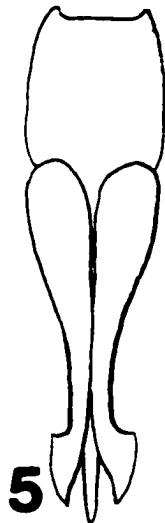
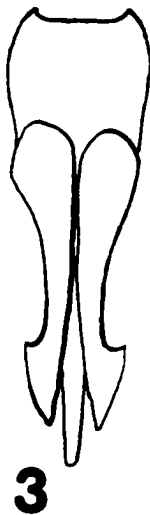
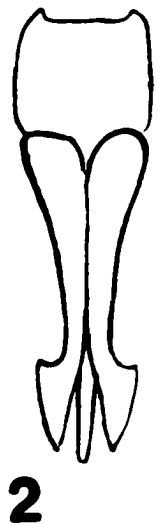
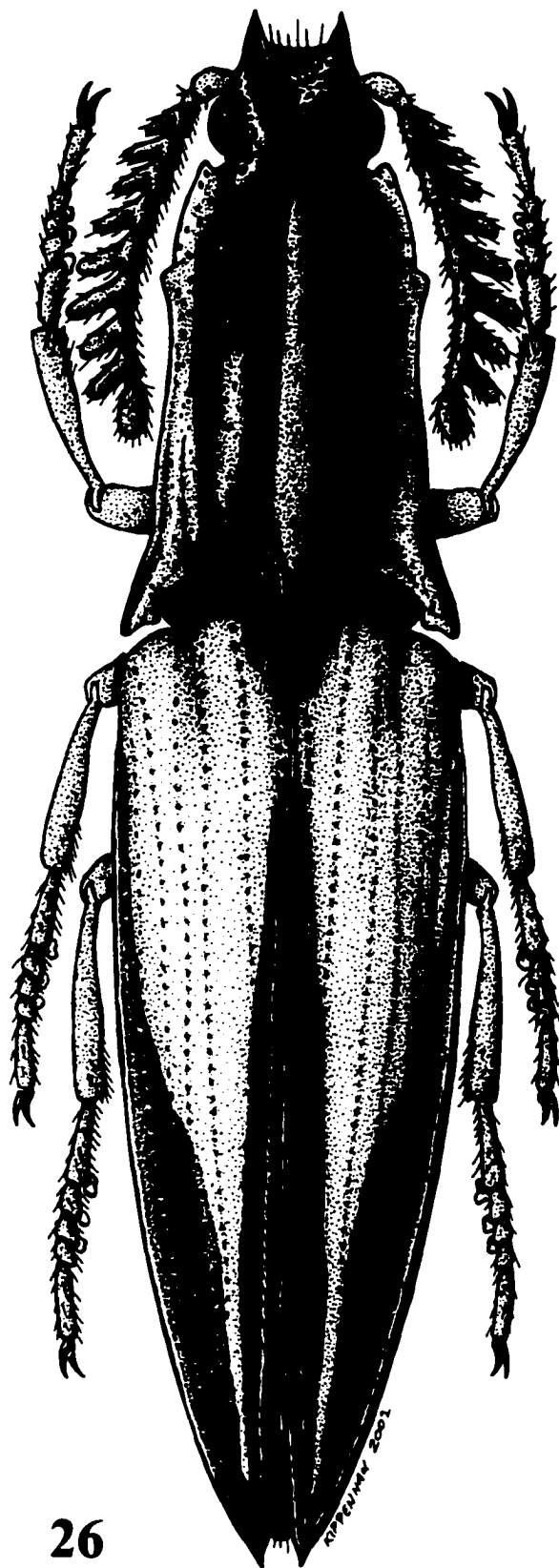


Figure 26. *Semiotus convexicollis*.



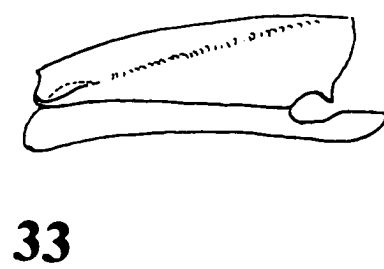
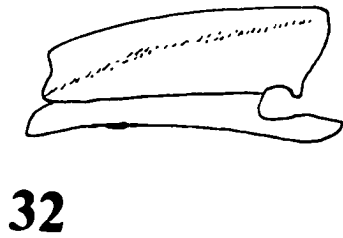
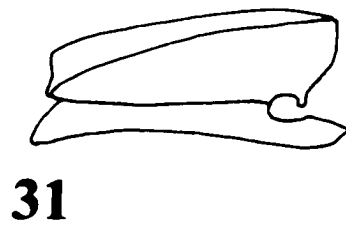
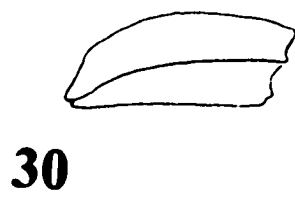
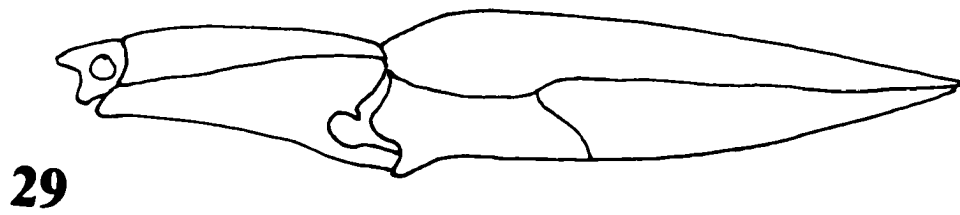
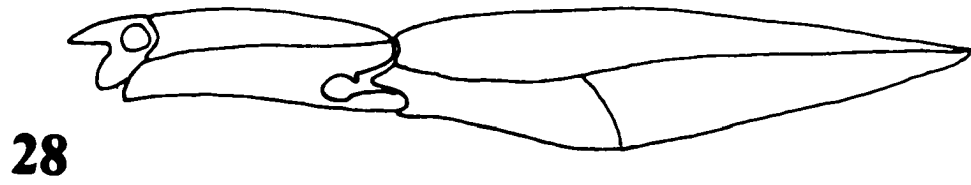
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Figure 27. *Semiotus sommeri*.

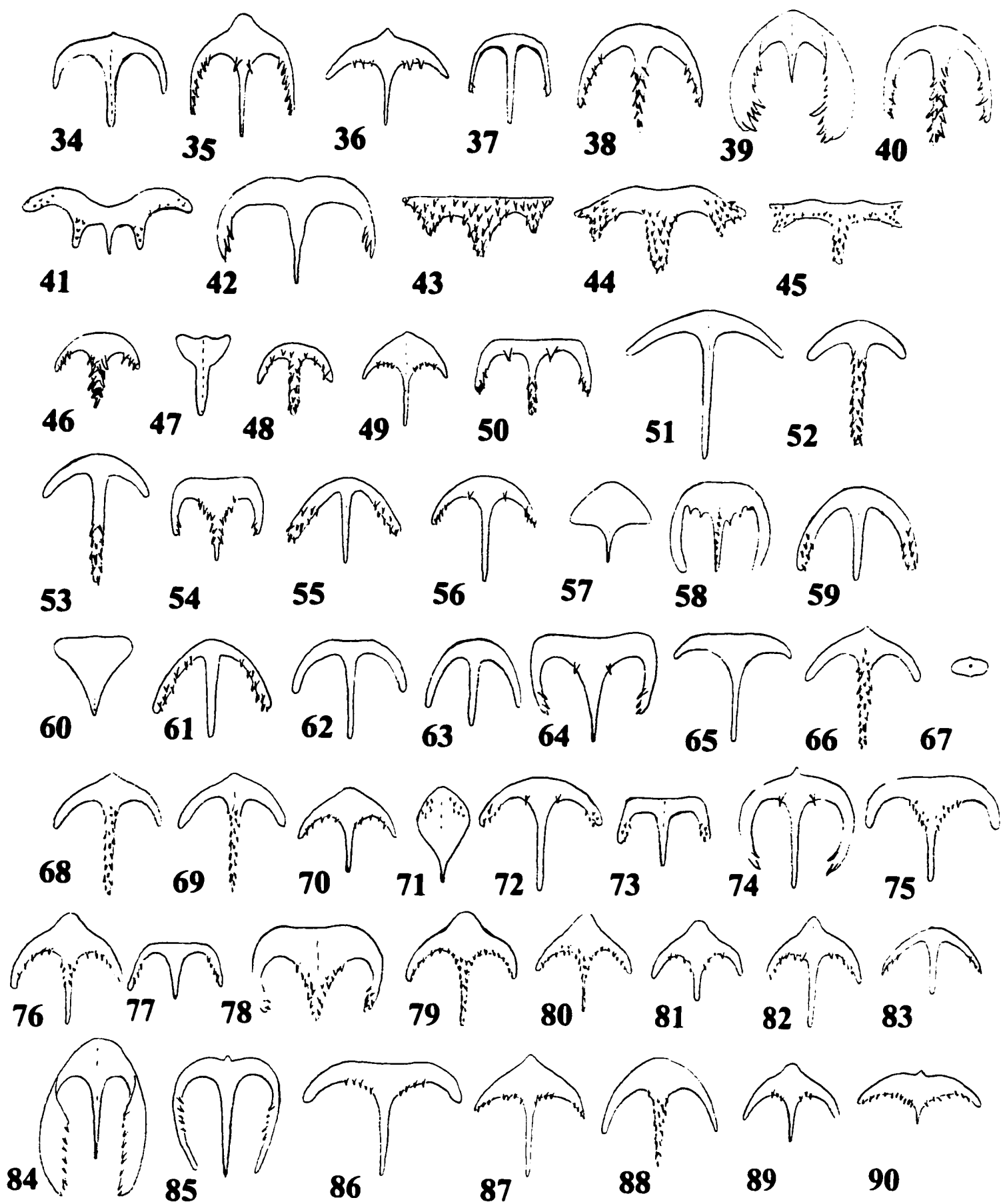


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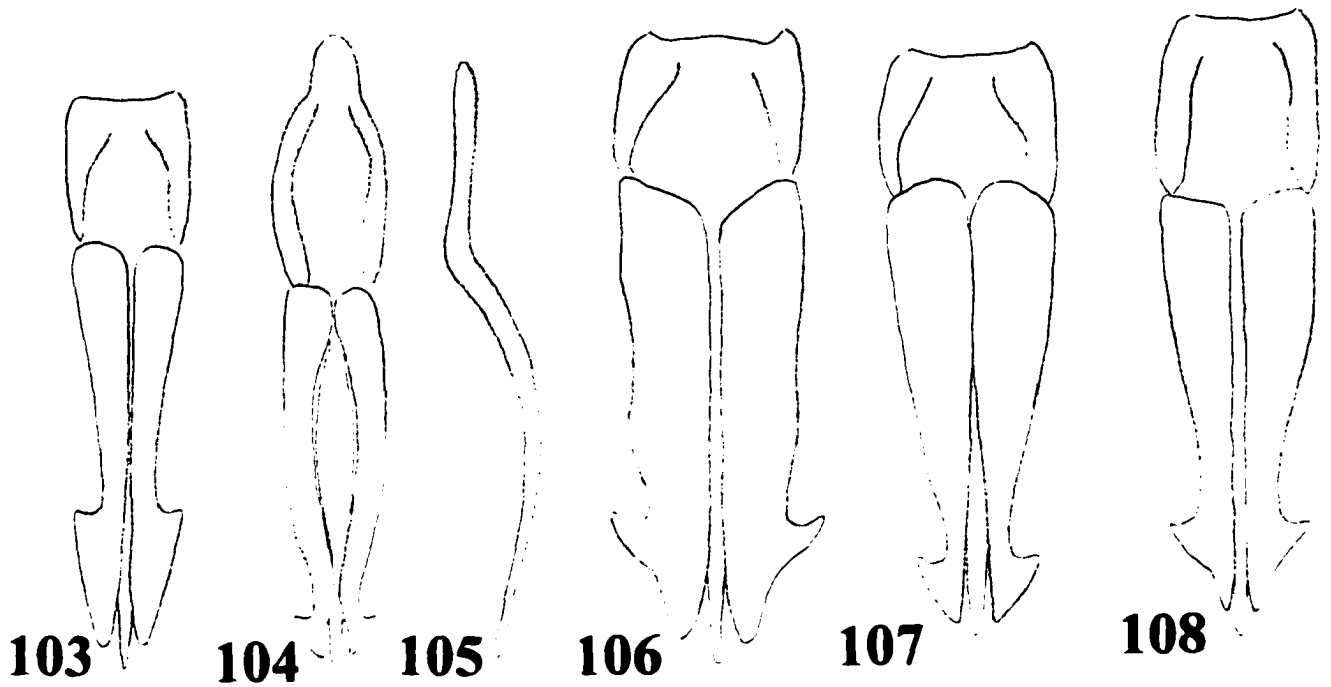
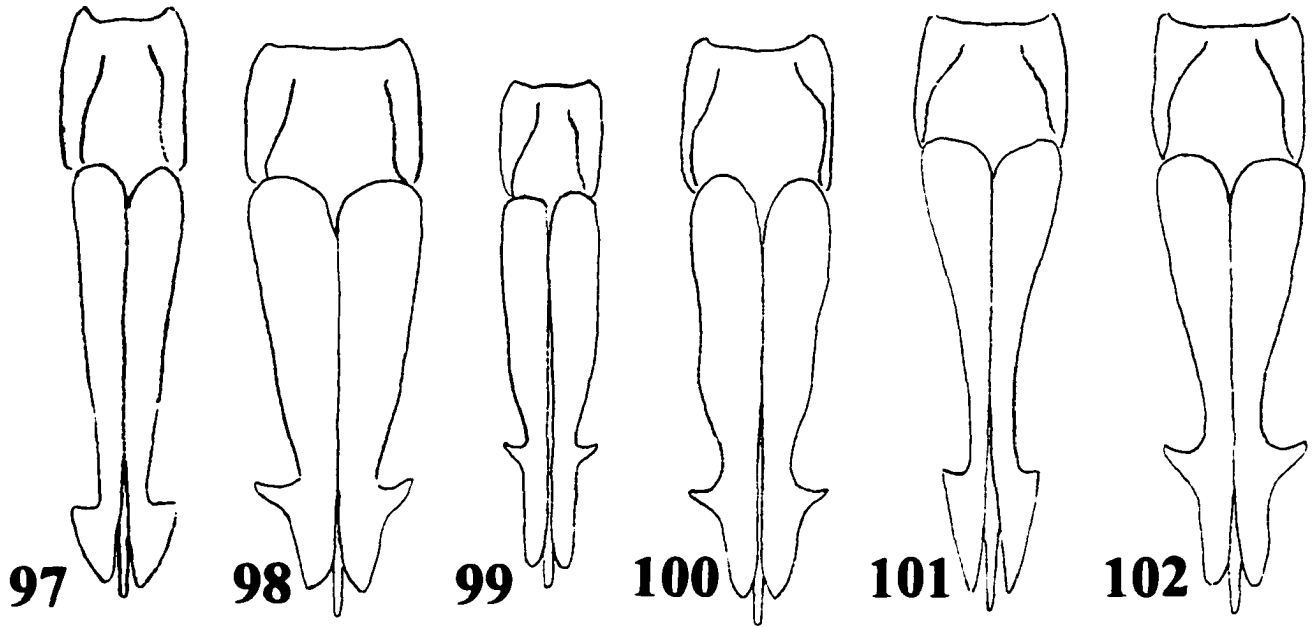
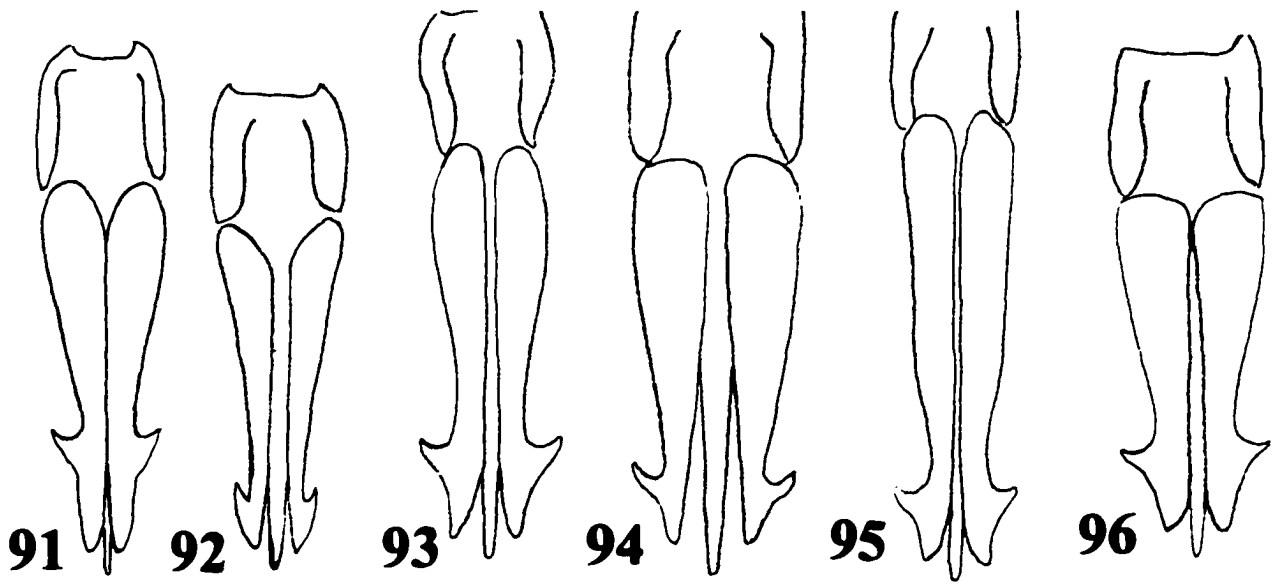
Figures 28 - 33. *Semiotinus* and *Semiotus* species. 28. Non-gibbous profile; 29. Gibbous profile; 30 - 33. Pronotal profiles. 30. *Semiotus fryi*; 31. *Semiotinus* sp.; 32. *Semiotus woodi*; 33. *Semiotus superbus*.



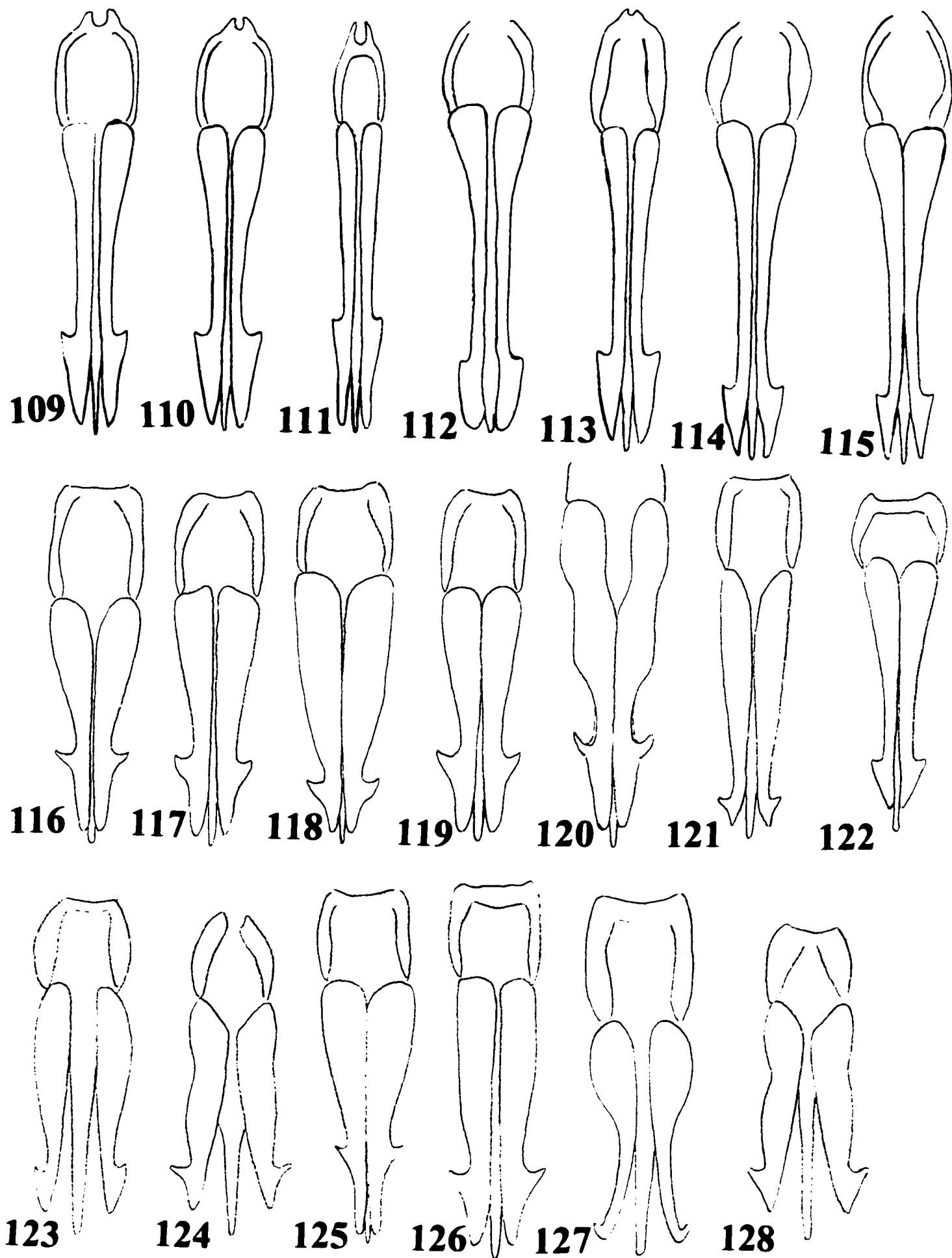
Figures 34 - 90. Anterior sclerites (of bursa copulatrix) of *Semiotus* species. 34. *S. taeniatus*; 35. *S. buckleyi*; 36. *S. regalis*; 37. *S. ligatus*; 38. *S. punctatostriatus*; 39. *S. bilineatus*; 40. *S. intermedius*; 41. *S. angulatus*; 42. *S. trinitensis*; 43. *S. insignis*; 44. *S. angusticollis*; 45. *S. convexiticollis*; 46. *S. cuspidatus*; 47. *S. luteipennis*; 48. *S. imperialis*; 49. *S. germarii*; 50. *S. fulvicollis*; 51. *S. formosus*; 52. *S. spinosus*; 53. *S. caracasanus*; 54. *S. bispinus*; 55. *S. nigriceps*; 56. *S. perangustus*; 57. *S. hispidus*; 58. *S. antennatus*; 59. *S. cyrtomaris*; 60. *S. pallicornus*; 61. *S. carus*; 62. *S. gibbosus*; 63. *S. rubricollis*; 64. *S. clarki*; 65. *S. chassaini*; 66. *S. woodi*; 67. *S. rileyi*; 68. *S. triplehorni*; 69. *S. lacrimiformis*; 70. *S. acutus*; 71. *S. angustus*; 72. *S. perangustus*; 73. *S. melleus*; 74. *S. decoratus*; 75. *S. badeni*; 76. *S. virgatus*; 77. *S. fleutiauxi*; 78. *S. limatus*; 79. *S. illigerii*; 80. *S. cristatus*; 81. *S. colombianus*; 82. *S. linnei*; 83. *S. antennalis*; 84. *S. furcatus*; 85. *S. illustris*; 86. *S. kondratieffi*; 87. *S. sommeri*; 88. *S. striatus*; 89. *S. exsolutus*; 90. *S. kirschi*.



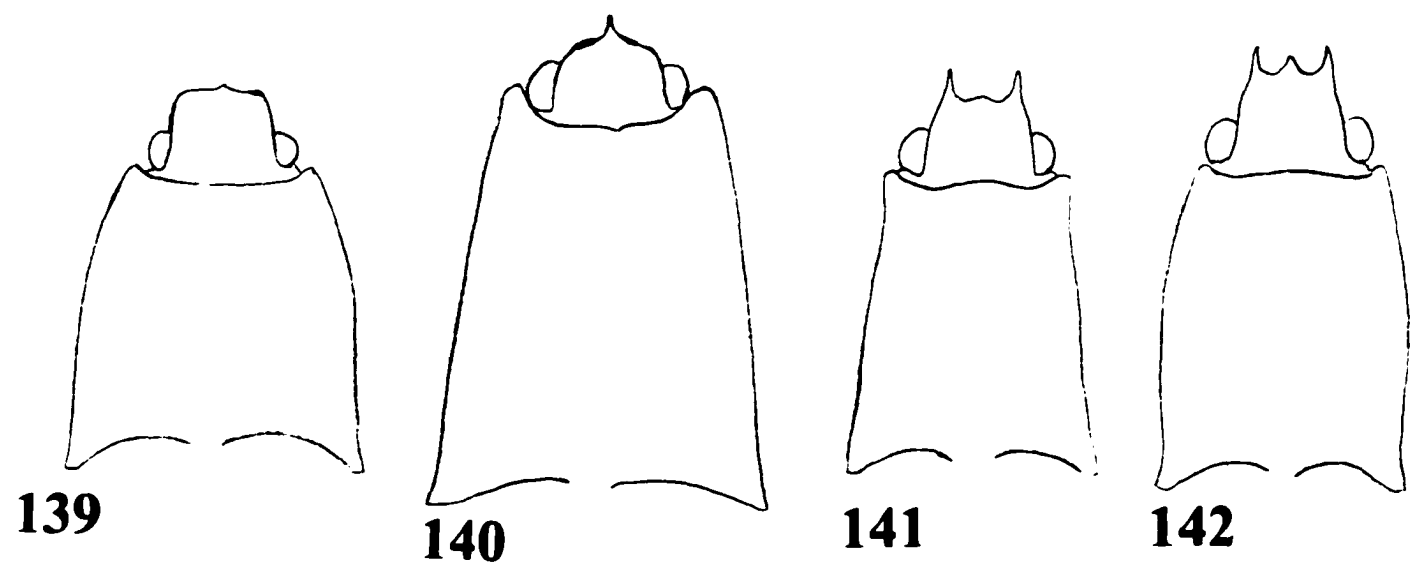
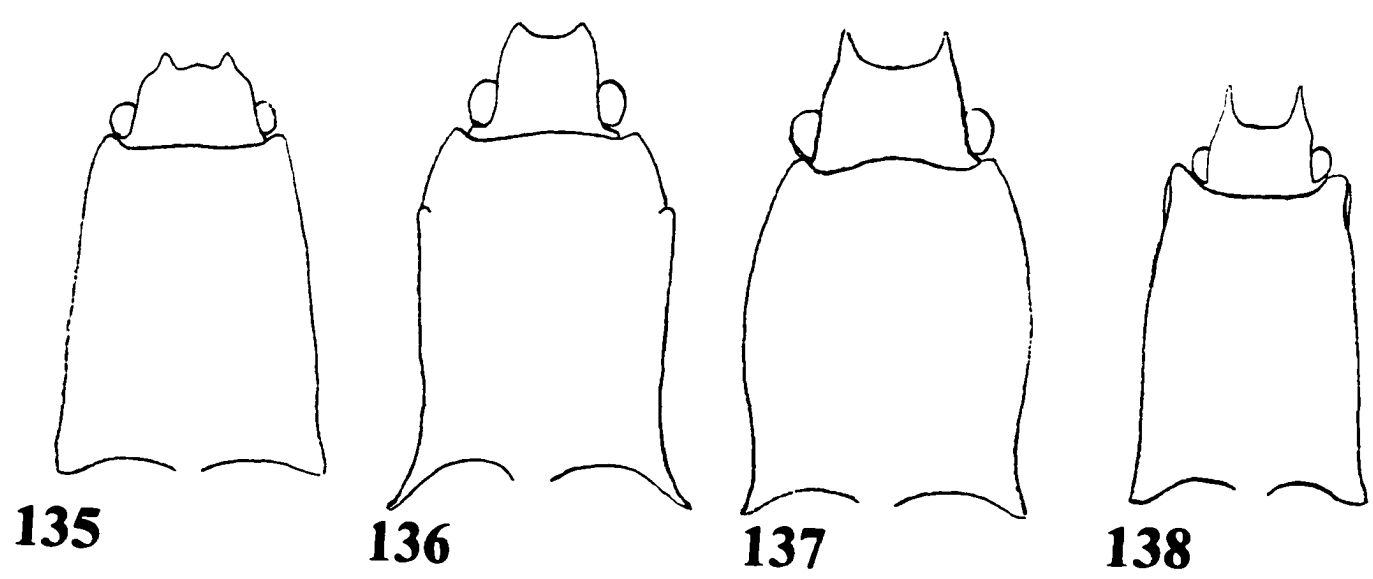
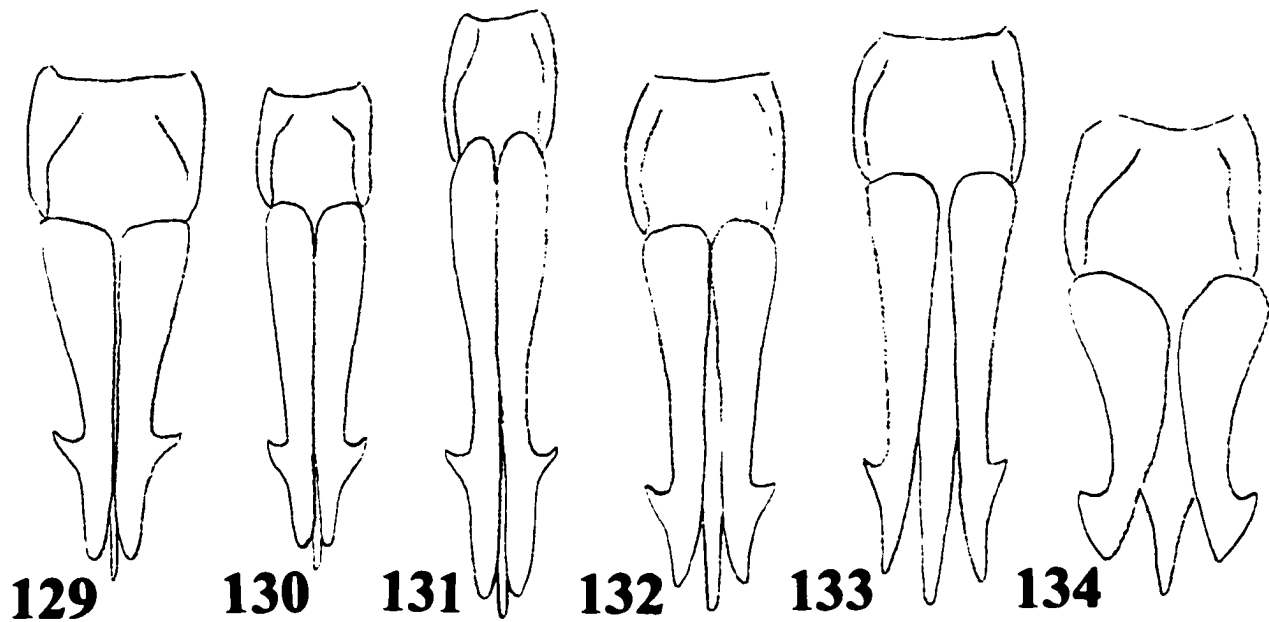
Figures 91 - 108. Male genitalia of *Semiotus* species. 91. *S. germarii*; 92. *S. furcatus*; 93. *S. fulvicollis*; 94. *S. badeni*; 95. *S. formosus*; 96. *S. bispinus*; 97. *S. bilineatus*; 98. *S. perangustus*; 99. *S. angustus*; 100. *S. hispidus*; 101. *S. antennatus*; 102. *S. pilosus*; 103. *S. pallicornus*; 104. *S. cyrtomaris*; 105. *S. cyrtomaris* (lateral view); 106. *S. kathleenae*; 107. *S. angusticollis*; 108. *S. melleus*.



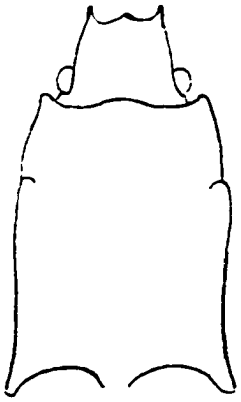
Figures 109 - 128. Male genitalia of *Semiotus* species. 109. *S. woodi*; 110. *S. triplehorni*; 111. *S. lacrimiformis*; 112. *S. carus*; 113. *S. spinosus*; 114. *S. caracasanus*; 115. *S. antennalis*; 116. *S. buckleyi*; 117. *S. regalis*; 118. *S. ligatus*; 119. *S. seladonius*; 120. *S. lafertei*; 121. *S. cuspidatus*; 122. *S. angulatus*; 123. *S. luteipennis*; 124. *S. ligneus*; 125. *S. taeniatus*; 126. *S. trinitensis*; 127. *S. imperialis*; 128. *S. serraticornis*.



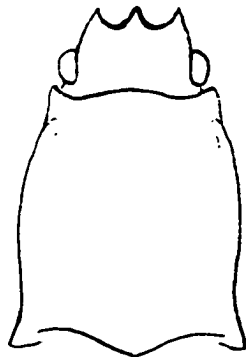
Figures 129 - 142. *Semiotus* species. 129 - 134. Male genitalia. 129. *S. cristatus*; 130. *S. linnei*; 131. *S. exsolutus*; 132. *S. punctatostriatus*; 133. *S. girardi*; 134. *S. catei*. 135 - 142. Head and pronotum. 135. *S. fryi*; 136. *S. kondratieffi*; 137. *S. caracasanus*; 138. *S. badeni*; 139. *S. hispidus*; 140. *S. cuspidatus*; 141. *S. girardi*; 142. *S. linnei*.



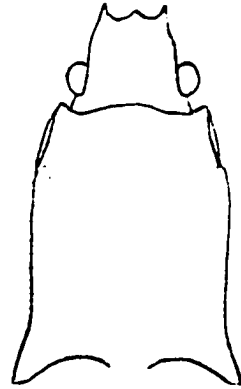
Figures 143 - 154. Head and pronotum of *Semiotus* species. 143. *S. decoratus*; 144. *S. cristatus*; 145. *S. illustris*; 146. *S. intermedius*; 147. *S. illigerii*; 148. *S. regalis*; 149. *S. ligneus*; 150. *S. formosus*; 151. *S. punctatostriatus*; 152. *S. sommeri*; 153. *S. virgatus*; 154. *S. angulatus*.



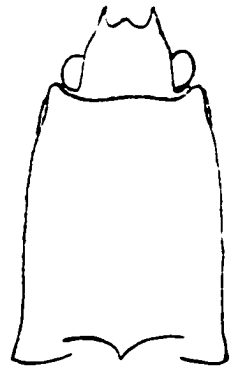
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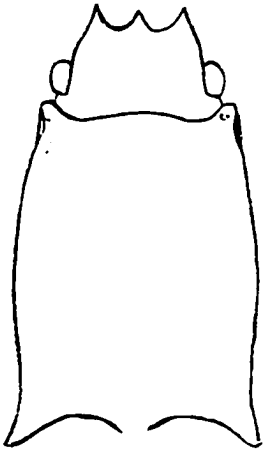
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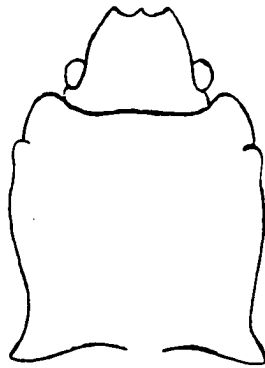
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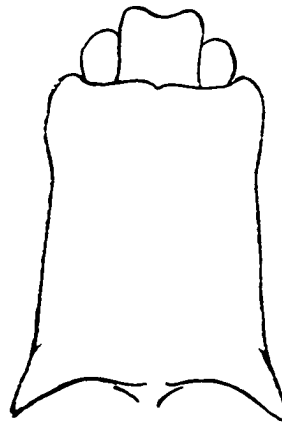
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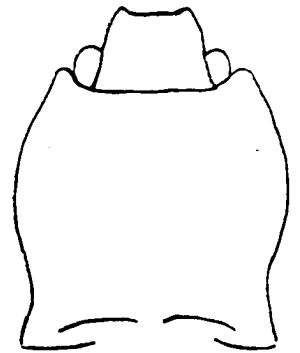
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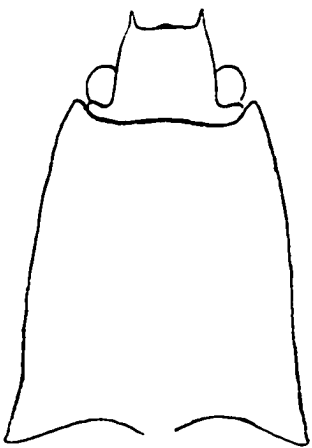
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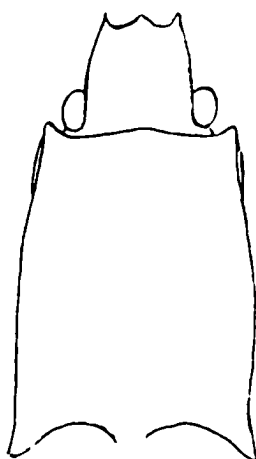
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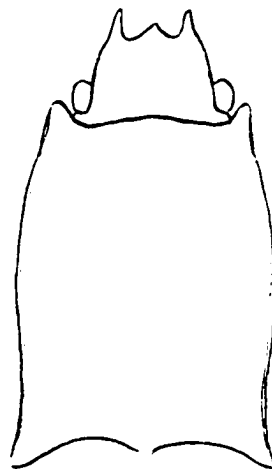
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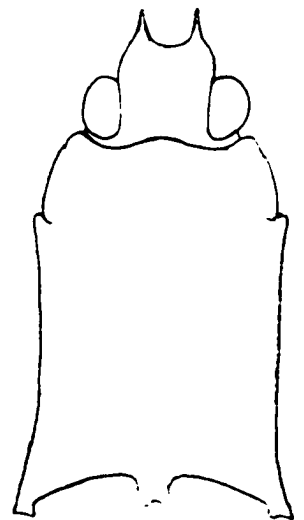
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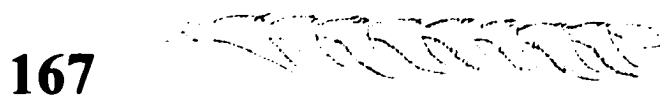
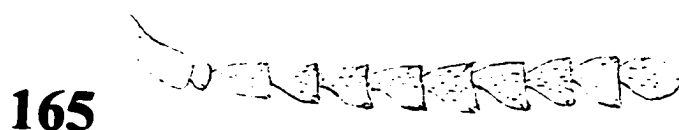
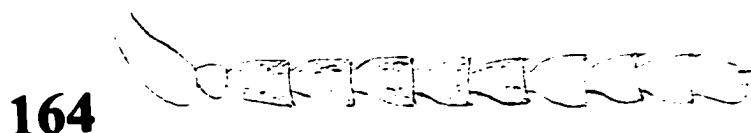
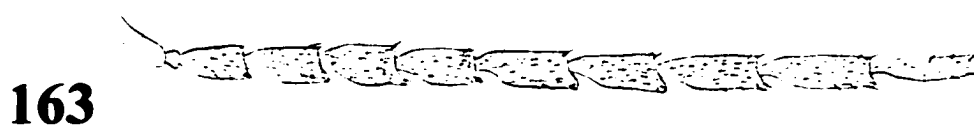
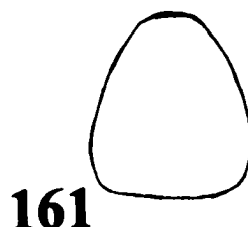
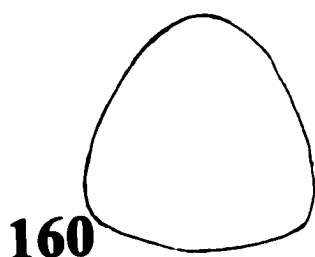
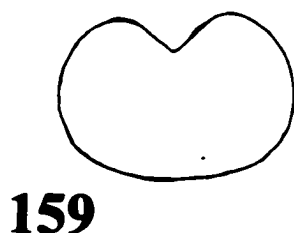
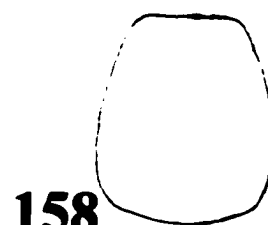
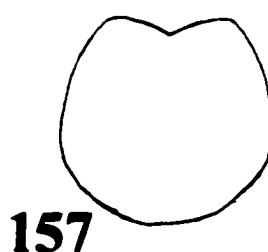
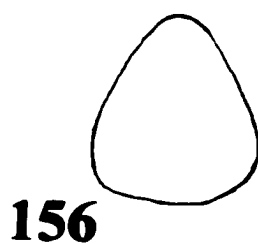
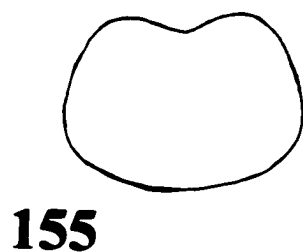


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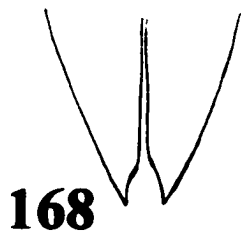


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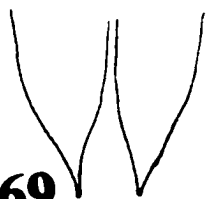
Figures 155 - 167. *Semiotus* species. 155 - 162. Scutella. 155. *S. bilineatus*; 156. *S. nigriceps*; 157. *S. intermedius*; 158. *S. matilei*; 159. *S. lafertei*; 160. *S. angulatus*; 161. *S. convexicollis*; 162. *S. trinitensis*. 163 - 167. Antennae. 163. *S. ligneus*; 164. *S. furcatus*; 165. *S. formosus*; 166. *S. insignis*; 167. *S. angulatus*.



Figures 168 - 182. *Semiotus* species. 168 - 177. Elytral apices. 168. *S. acutus*; 169. *S. serraticornis*; 170. *S. formosus*; 171. *S. imperialis*; 172. *S. furcatus*; 173. *S. hispidus*; 174. *S. bilineatus*; 175. *S. decoratus*; 176. *S. ligatus*; 177. *S. seladonius*. 178 - 182. Hypomera. 178. *S. exsolutus*; 179. *S. angulatus*; 180. *S. imperialis*; 181. *S. taeniatus*; 182. *S. furcatus*.



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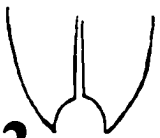
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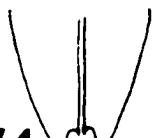
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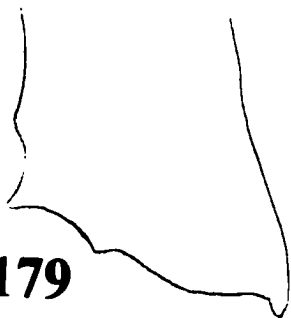
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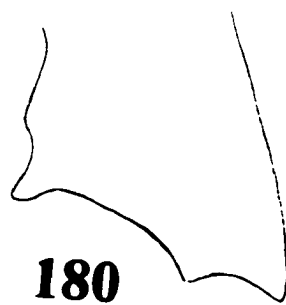
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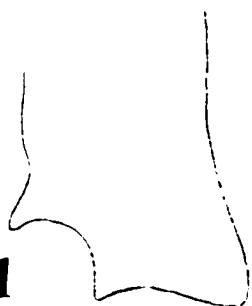
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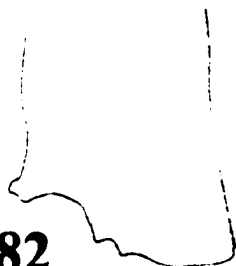
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Figures 183 - 194. *Semiotus* species. 183. *S. insignis*; 184. *S. insignis*; 185. *S. cuspidatus*
cuspidatus; 186. *S. cuspidatus splendidus*; 187. *S. imperialis*; 188. *S. angulatus*; 189. *S.*
angulatus; 190. *S. angulatus*; 191. *S. angusticollis*; 192. *S. convexicollis*; 193. *S. ligneus*;
194. *S. serraticornis*.



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Figures 195 - 206. *Semiotus* species. 195. *S. caracasanus*; 196. *S. spinosus*; 197. *S. woodi*; 198. *S. triplehorni*; 199. *S. lacrimiformis*; 200. *S. rileyi*; 201. *S. cyrtomaris*; 202. *S. carus*; 203. *S. nigriceps*; 204. *S. matilei*; 205. *S. pallicornus*; 206. *S. antennalis*.

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Figures 207 - 218. *Semiotus* species. 207. *S. badeni*; 208. *S. limatus*; 209. *S. bispinus*;
210. *S. fulvicollis*; 211. *S. fleutiauxi*; 212. *S. trinitensis*; 213. *S. melleus*; 214. *S.*
fascicularis; 215. *S. clarki*; 216. *S. catei*; 217. *S. pectitus*; 218. *S. flavangulus*.



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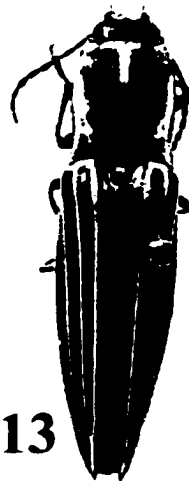
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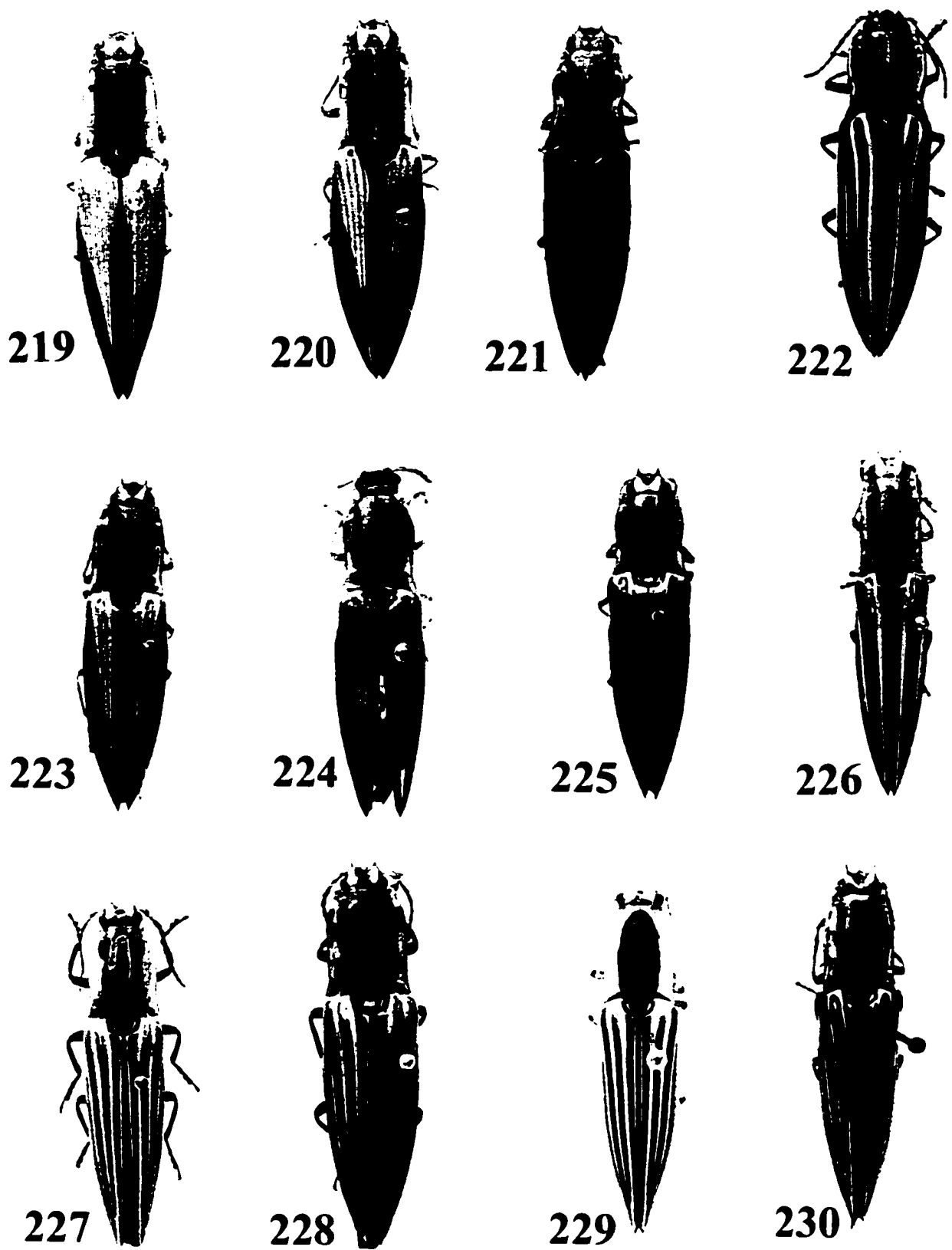


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Figures 219 - 230. *Semiotus* species. 219. *S. lafertei*; 220. *S. affinis*; 221. *S. illustris*;
222. *S. regalis*; 223. *S. intermedius*; 224. *S. decoratus*; 225. *S. rubricollis*; 226. *S.*
taeniatus; 227. *S. illigerii*; 228. *S. illigerii*; 229. *S. illigerii*; 230. *S. buckleyi*.



Figures 231 - 242. *Semiotus* species. 231. *S. cristatus*; 232. *S. colombianus*; 233. *S. perangustus*; 234. *S. angustus*; 235. *S. germarii*; 236. *S. linnei*; 237. *S. punctatostriatus*; 238. *S. chassaini*; 239. *S. exsolutus championi*; 240. *S. exsolutus panamensis*; 241. *S. sommeri*; 242. *S. virgatus*.



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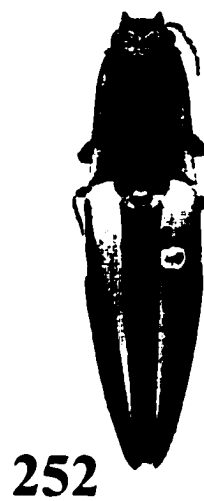
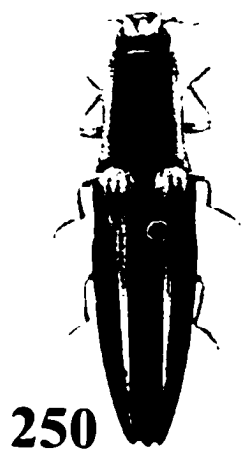
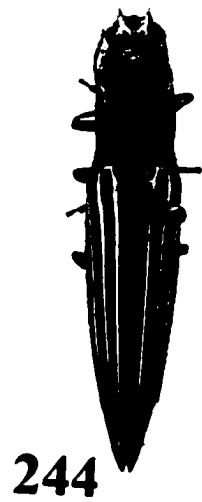


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Figures 243 - 253. *Semiotus* species. 243. *S. acutus*; 244. *S. kirschi*; 245. *S. pilosus*; 246. *S. gibbosus*; 247. *S. striatus*; 248. *S. luteipennis*; 249. *S. kondratieffi*; 250. *S. bilineatus*; 251. *S. furcatus*; 252. *S. antennatus*; 253. *S. formosus*.



Figures 254 - 259. *Semiotus* species. 254. *S. hispidus*; 255. *S. hispidus*; 256. *S. seladonius*; 257. *S. ligatus*; 258. *S. kathleenae*; 259. *S. aliciae*.

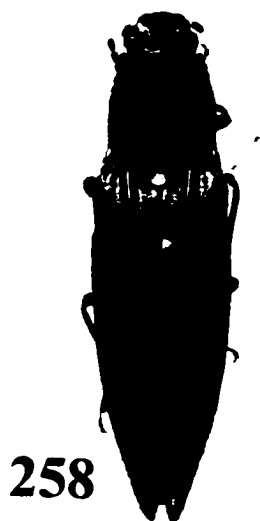
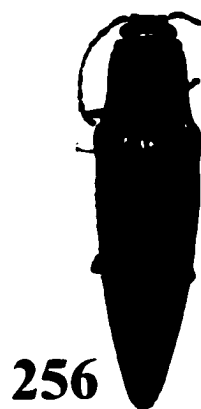
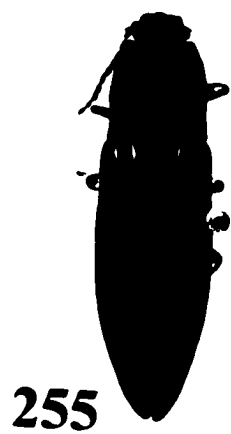


Figure. 260. Strict consensus cladogram.

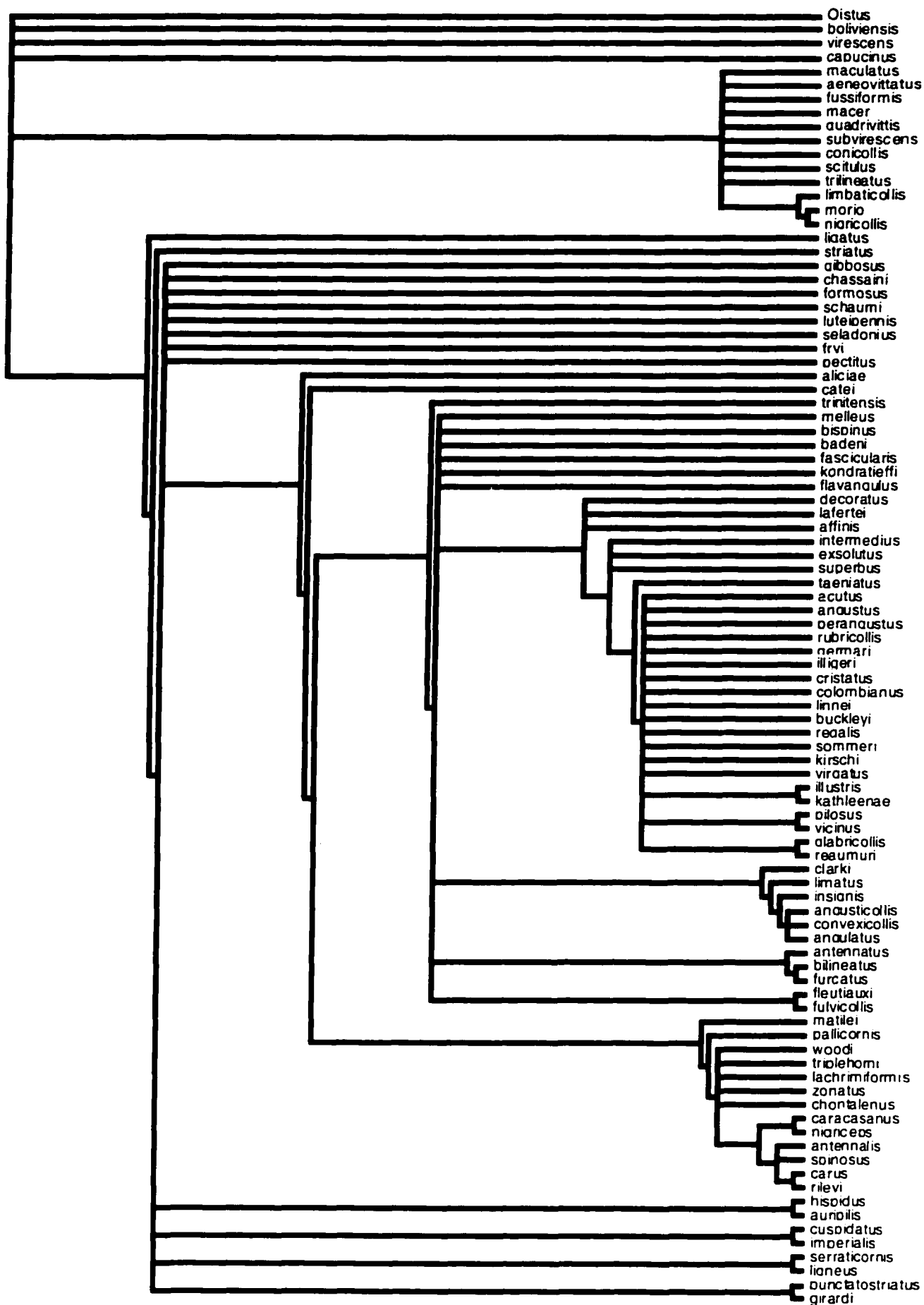


Figure 261. Representative cladogram of several most parsimonious cladograms.

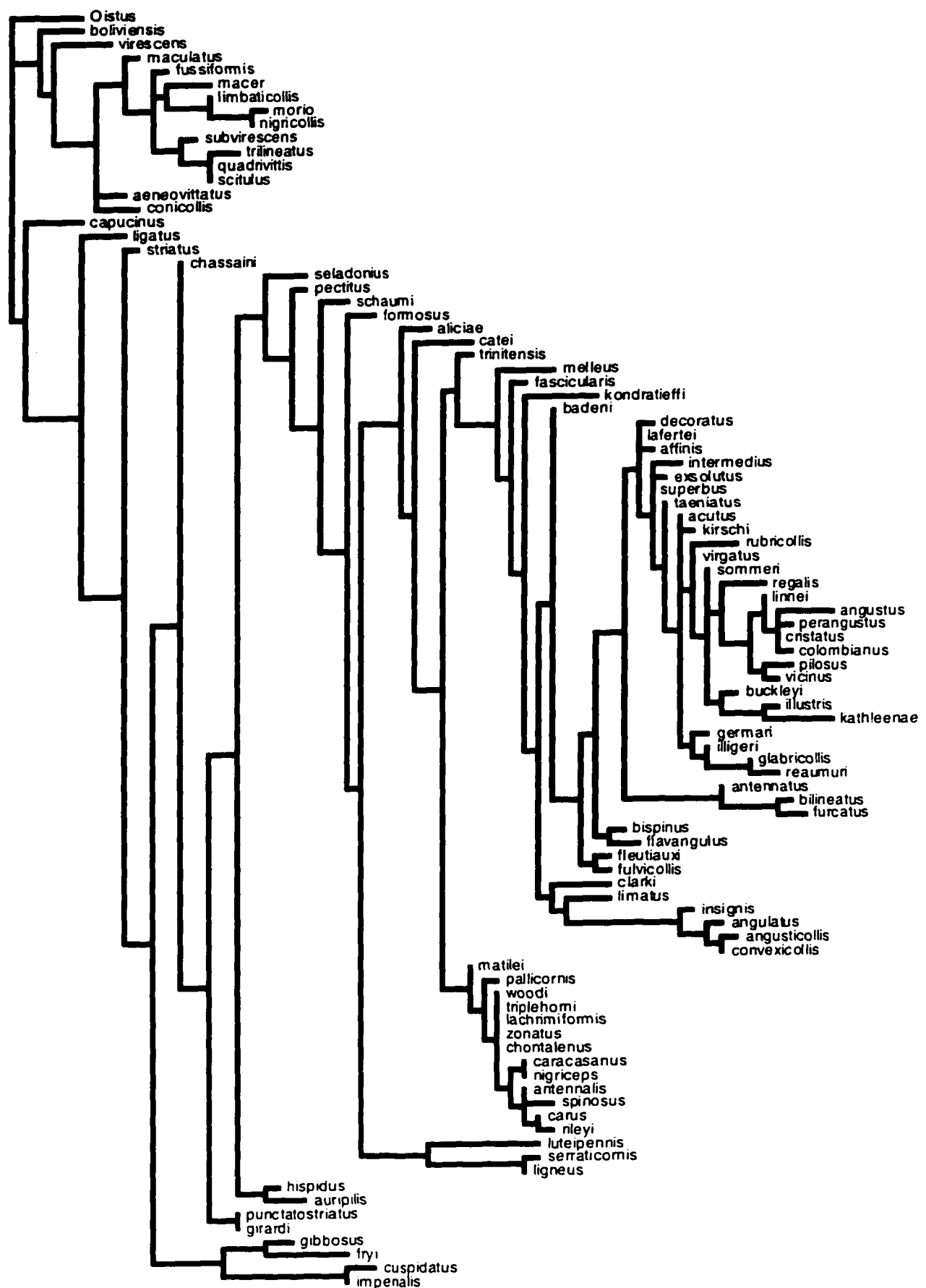


Figure 262. Representative cladogram of several most parsimonious cladograms.

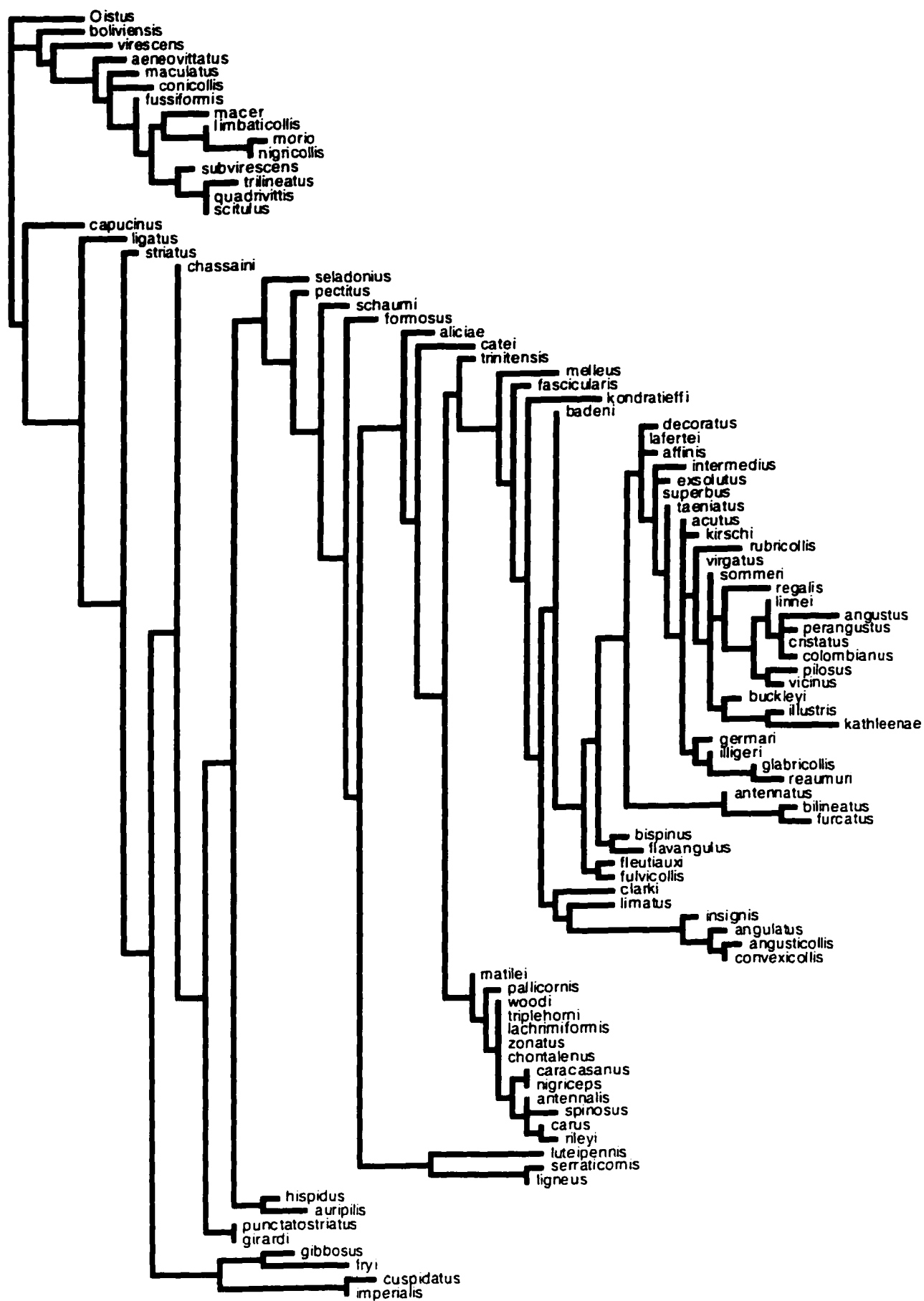
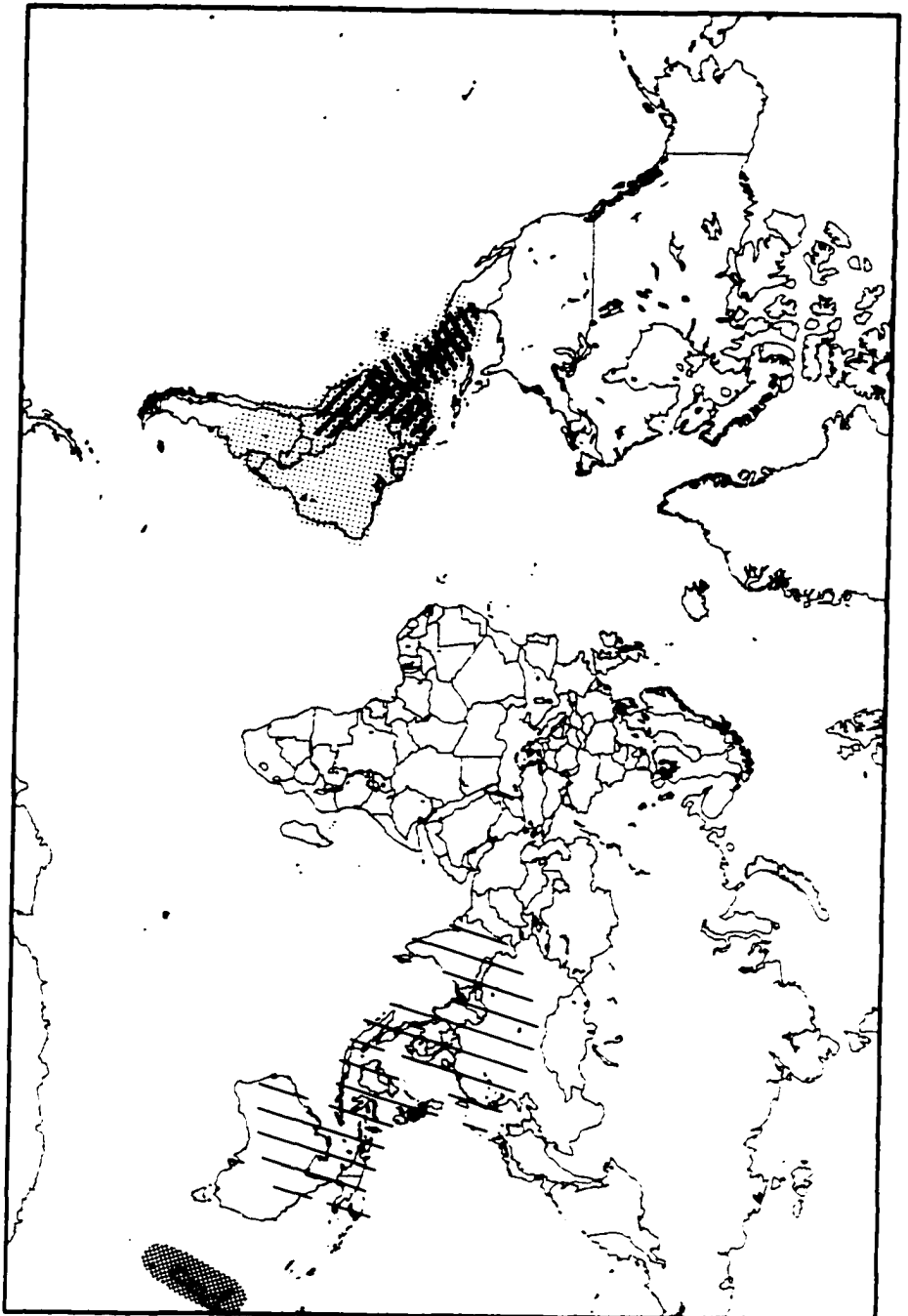
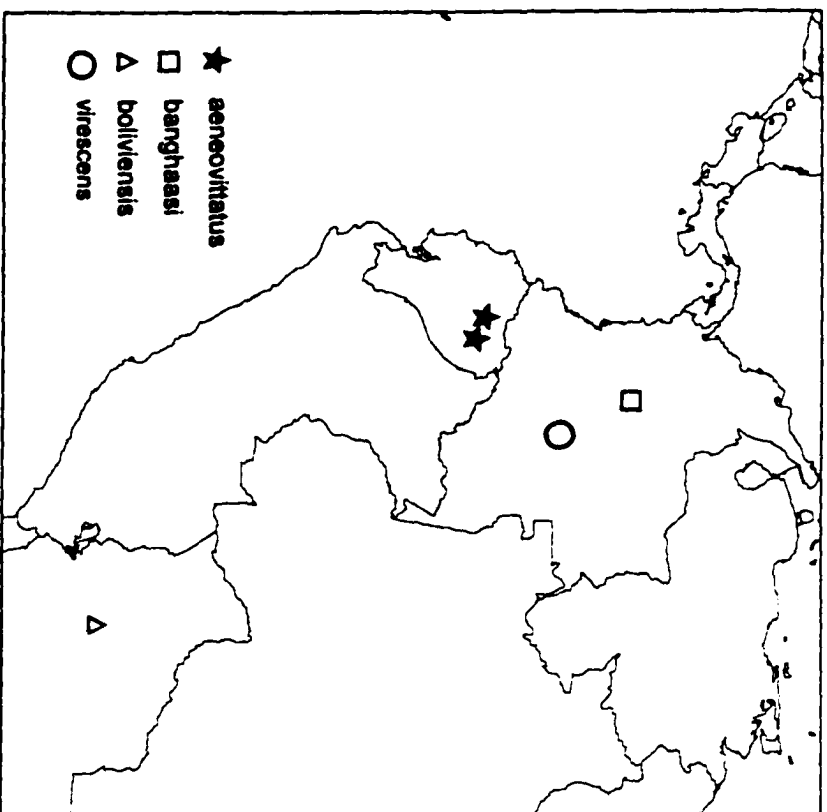


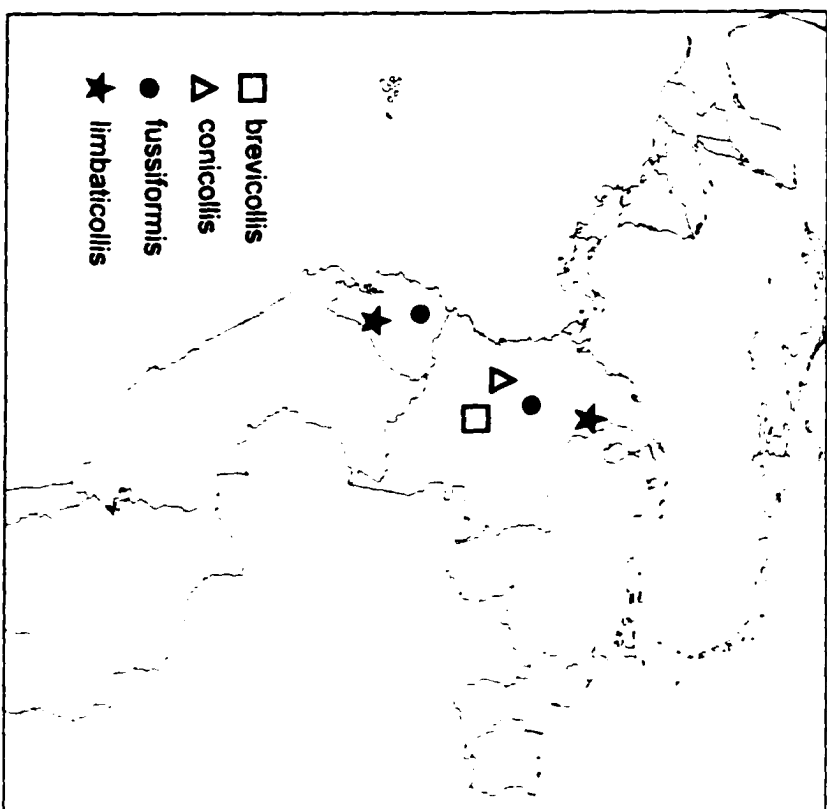
Figure 263. Distribution of the genera *Oistus*, *Semiotinus*, *Semiotus*, *Campsosternus*, and *Metablax*.



Figures 264 - 267. Distribution of *Semiotinus* species. Solid shapes represent specific localities, open shapes represent general localities within countries or other political subdivision (see individual species treatments for complete data). 264. *Semiotinus aeneovittatus*, *S. banghaasi*, *S. boliviensis*, *S. virescens*. 265. *Semiotinus brevicollis*, *S. conicollis*, *S. fusciformis*, *S. limbaticollis*. 266. *Semiotinus macer*, *S. morio*, *S. quadricollis*, *S. maculatus*. 267. *Semiotinus scitulus*, *S. trilineatus*, *S. quadrivittis*, *S. supplicans*.

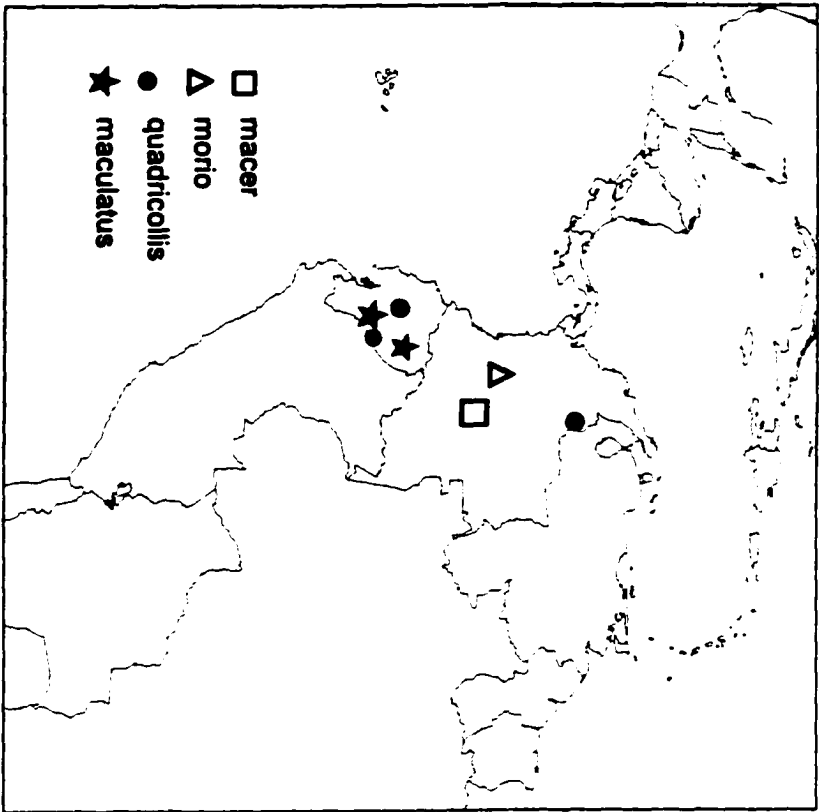


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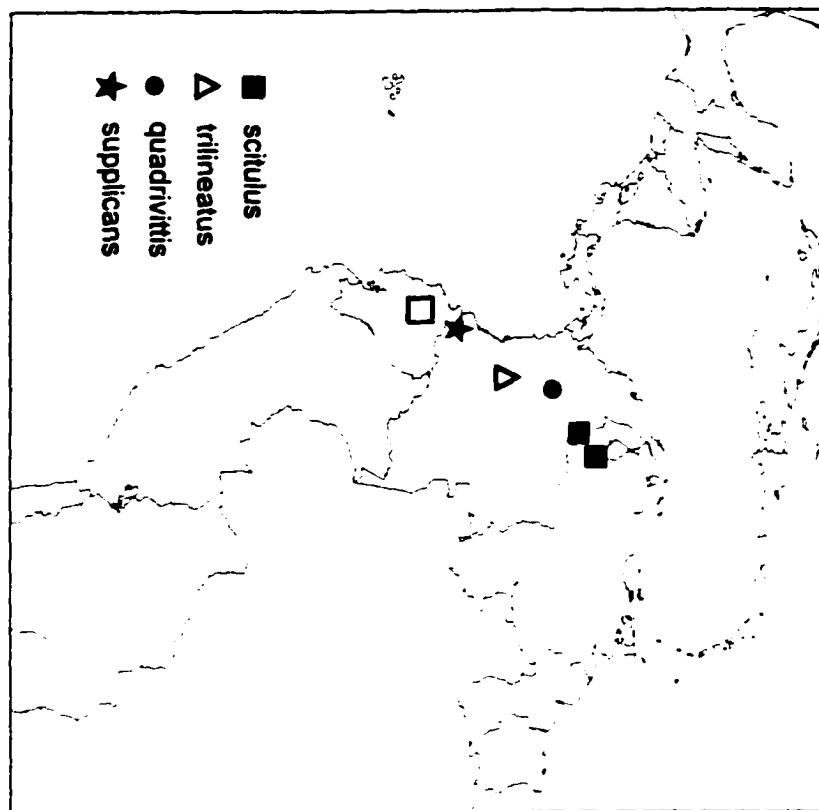


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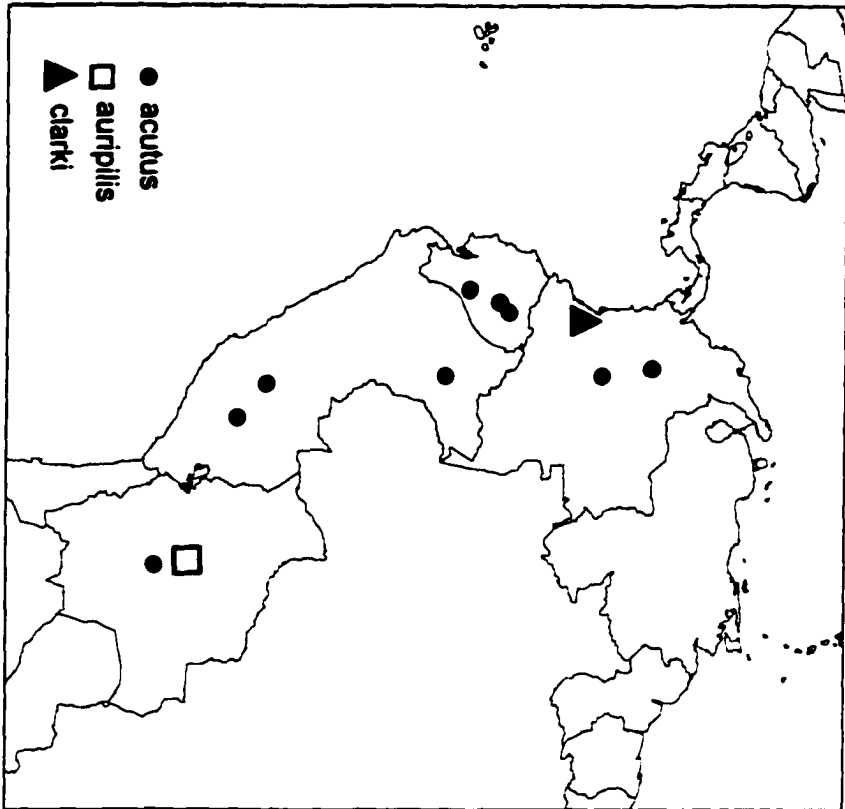
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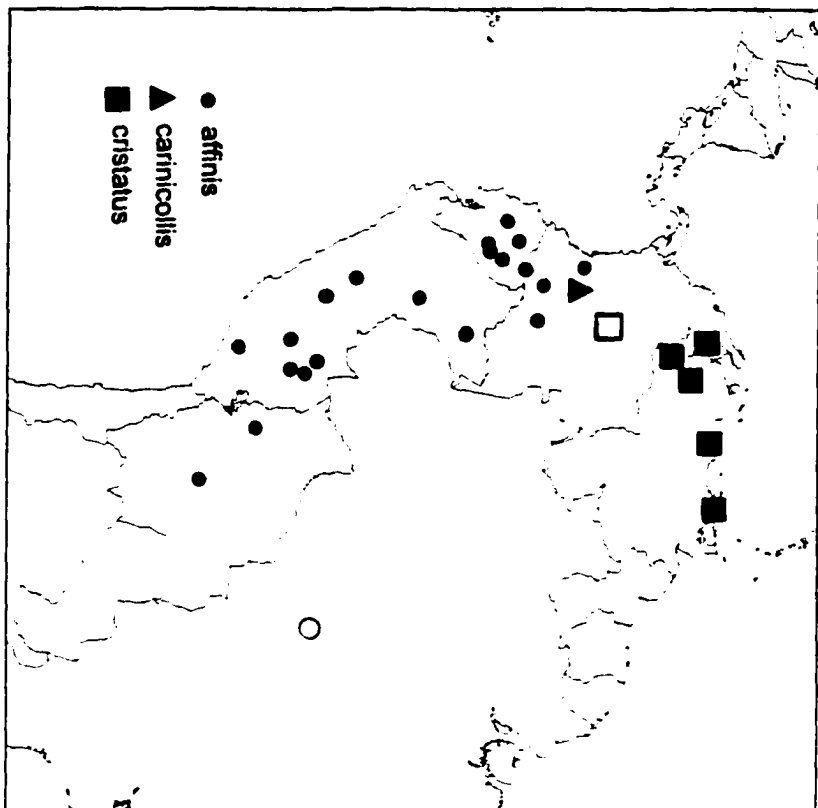
Figures 268 - 296. Distribution of *Semiotus* species. Solid shapes represent specific localities, open shapes represent general localities within countries or other political subdivision (see individual species treatments for complete data).

268. *Semiotus acutus*, *S. auripilis*, *S. clarki*. 269. *Semiotus affinis*, *S. carinicollis*, *S. cristatus*. 270. *Semiotus aliciae*, *S. exsolutus*. 271. *Semiotus angulatus*, *S. linnei*, *S. pectitus*. 272. *Semiotus angusticollis*, *S. imperialis*, *S. serraticornis*. 273. *Semiotus angustus*, *bispinus*, *S. colombianus*. 274. *Semiotus antennalis*, *S. cyrtomaris*, *S. rileyi*. 275. *Semiotus badeni*, *S. chontalenus*, *S. zonatus*. 276. *Semiotus bilineatus*, *S. antennatus*, *S. limatus*. 277. *Semiotus buckleyi*, *S. catei*, *S. chassaini*. 278. *Semiotus carus*, *S. caracasanus*, *S. spinosus*, *S. matilei*. 279. *Semiotus convexicollis convexicollis*, *S. c. signatus*, *S. melleus*. 280. *Semiotus cuspidatus cuspidatus*, *S. c. splendidus*. 281. *Semiotus decoratus*, *S. fryi*, *S. nigriceps*. 282. *Semiotus fascicularis*, *S. flavangulus*, *S. fleutiauxi*, *S. formosus*. 283. *Semiotus furcatus*, *S. kirschi*, *S. kondratieffi*, *S. perangustus*. 284. *Semiotus fulvicollis*, *S. germari*, *S. gibbosus*. 285. *Semiotus girardi*, *S. punctatostriatus*, *S. glabricollis*. 286. *Semiotus illigeri*, *S. striatus*, *S. virgatus*. 287. *Semiotus hispidus*, *illustris*, *trinitensis*. 288. *Semiotus insignis*, *S. kathleenae*, *S. ligatus*. 289. *Semiotus lacrimiformis*, *S. triplehorni*. 290. *Semiotus lafertei*, *S. pilosus*. 291. *Semiotus ligneus*. 292. *Semiotus luteipennis*. 293. *Semiotus reaumuri*, *S. rubricollis*, *S. schaumi*, *S. regalis*. 294. *Semiotus seladonius*, *S. singularis*, *S. sommeri*. 295. *Semiotus superbus*, *S. taeniatus*. 296. *Semiotus woodi*, *S. pallicornus*.

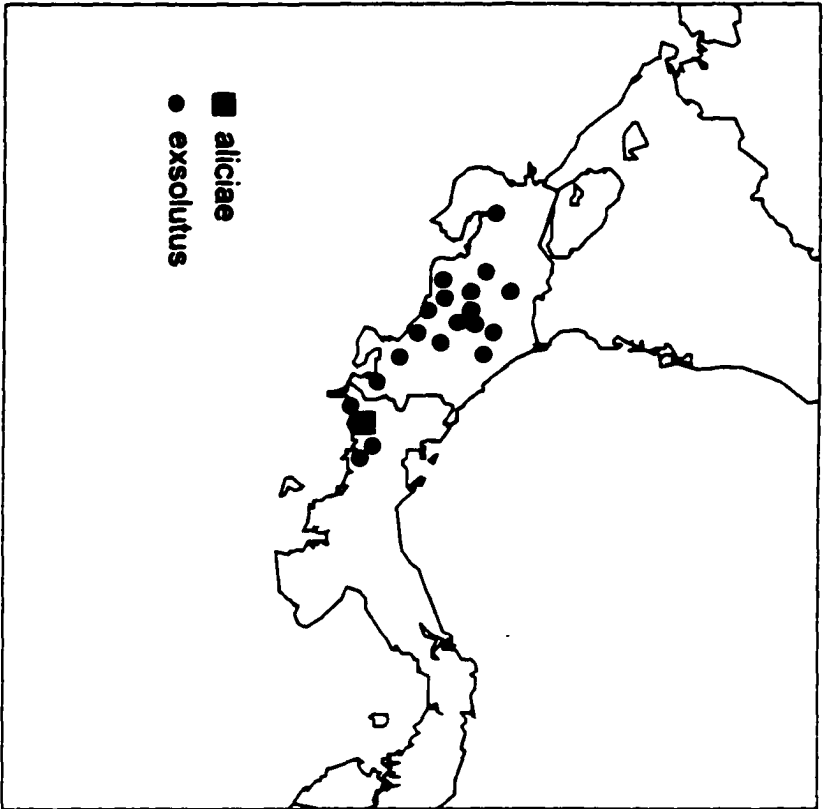
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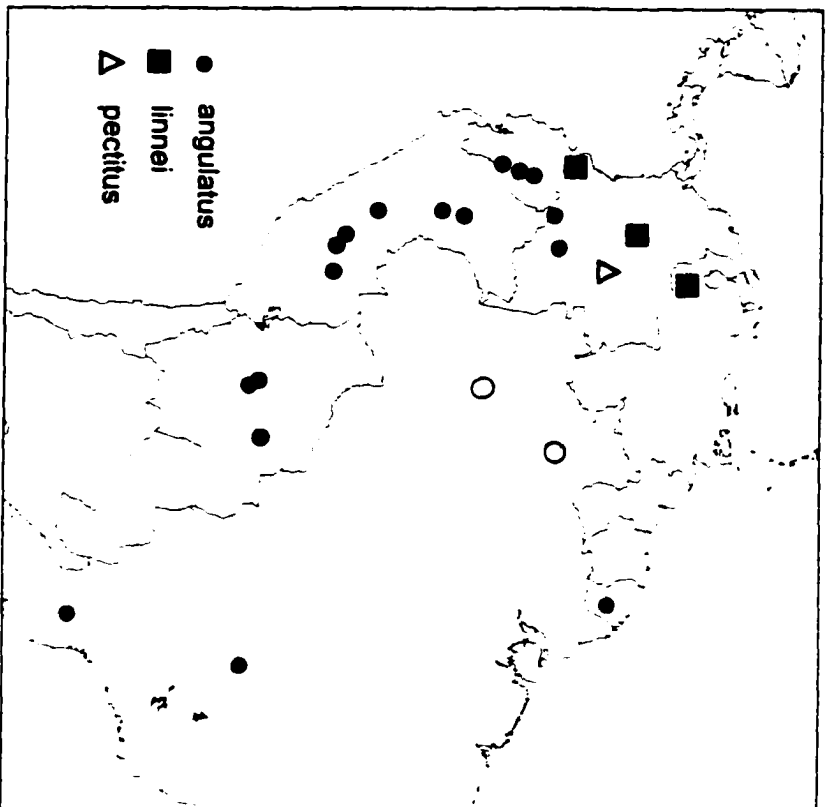
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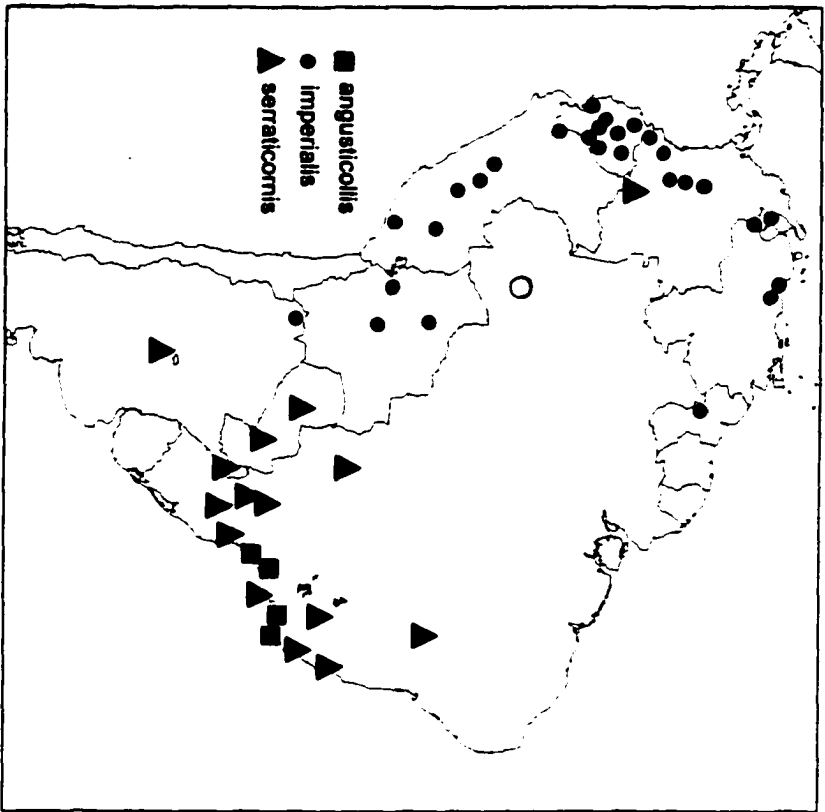


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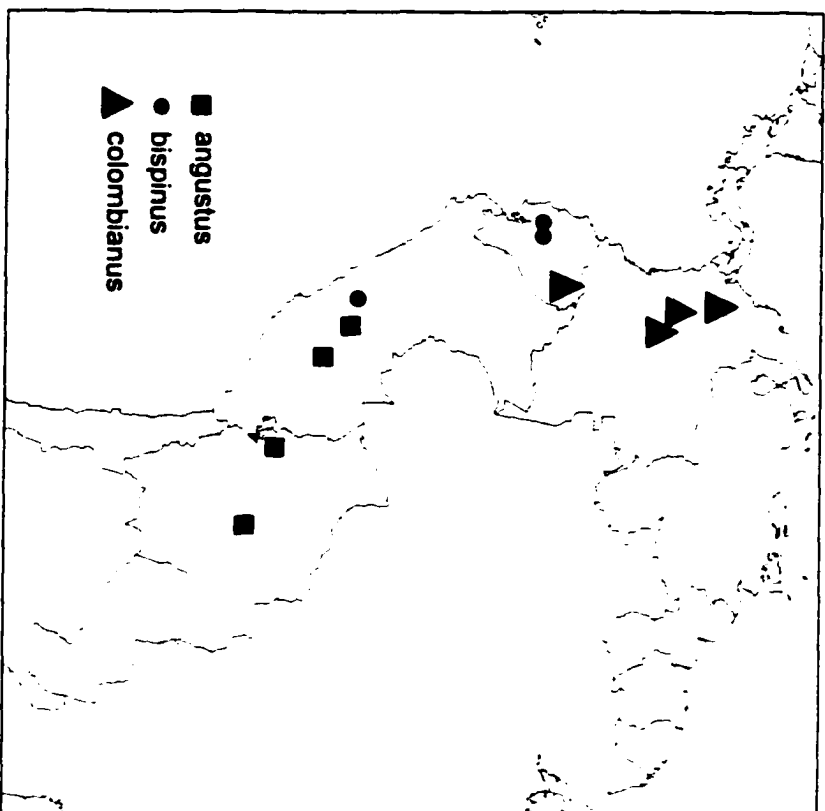


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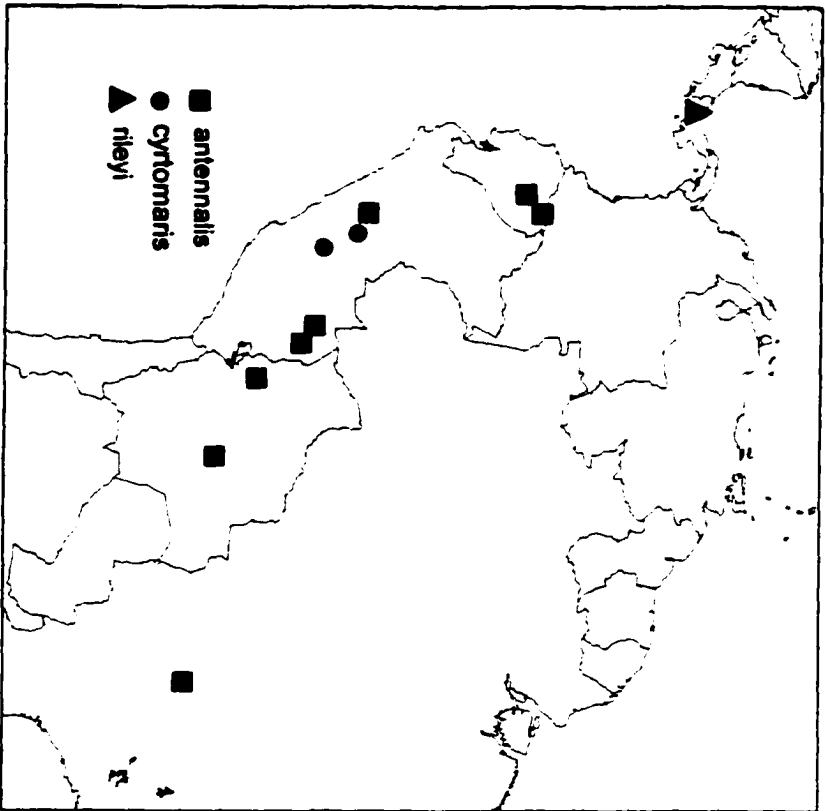




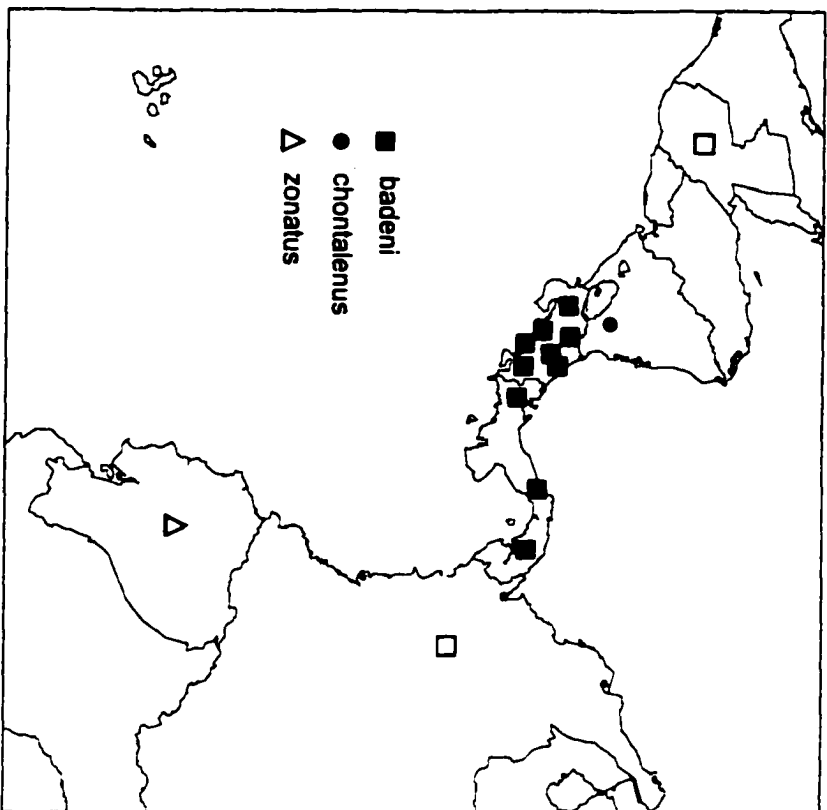
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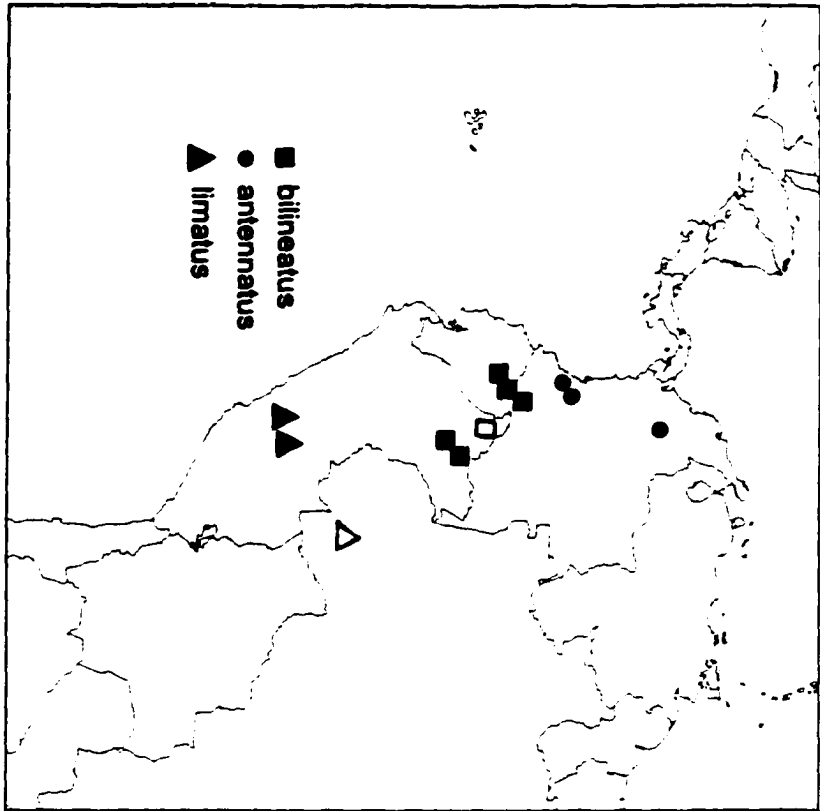


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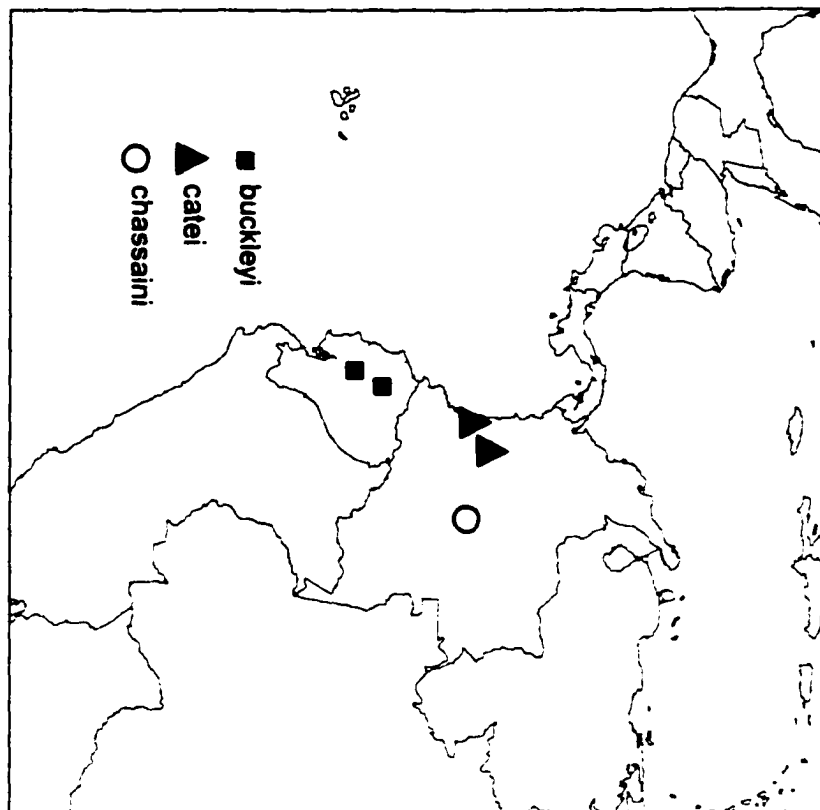


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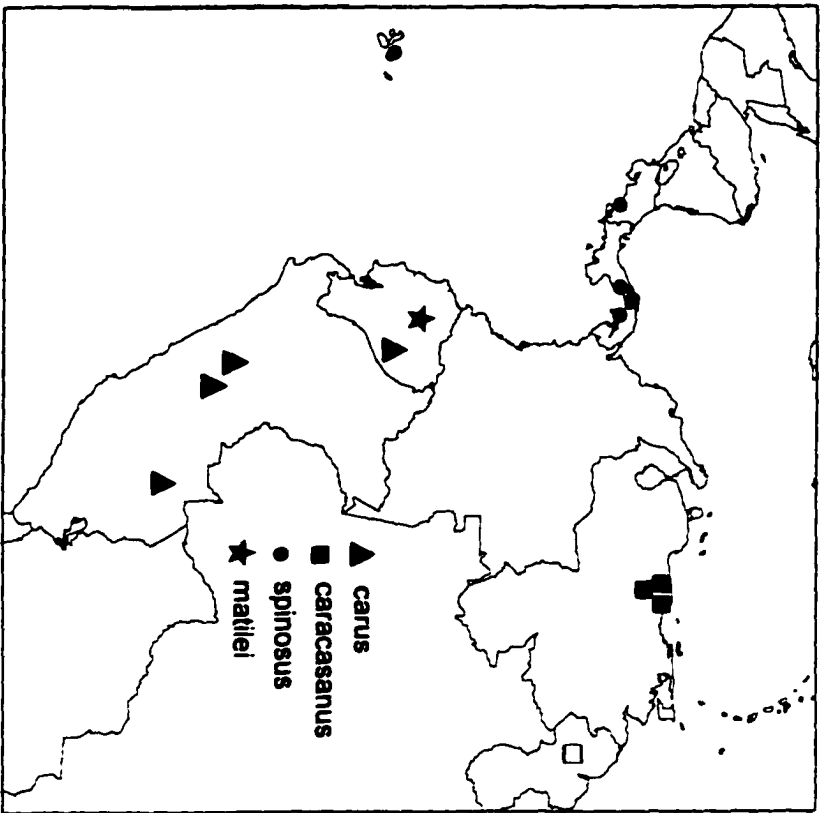
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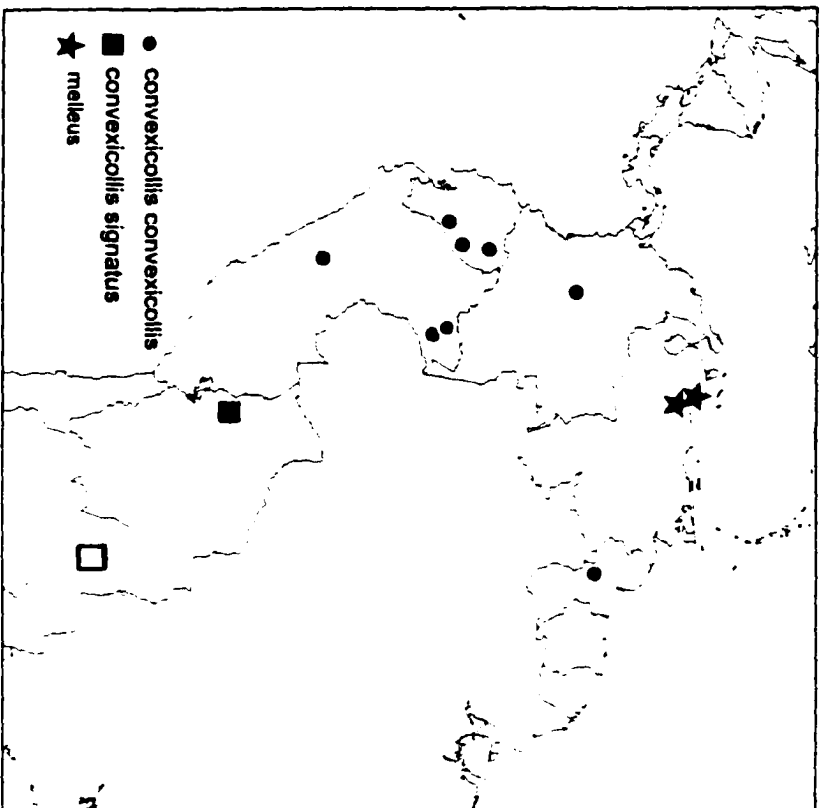
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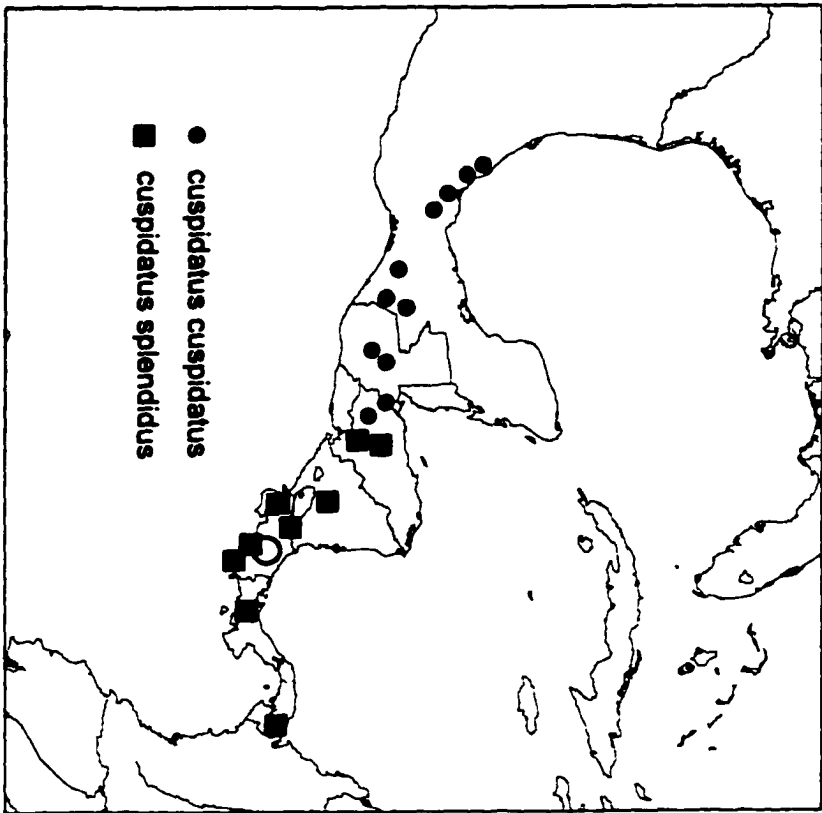
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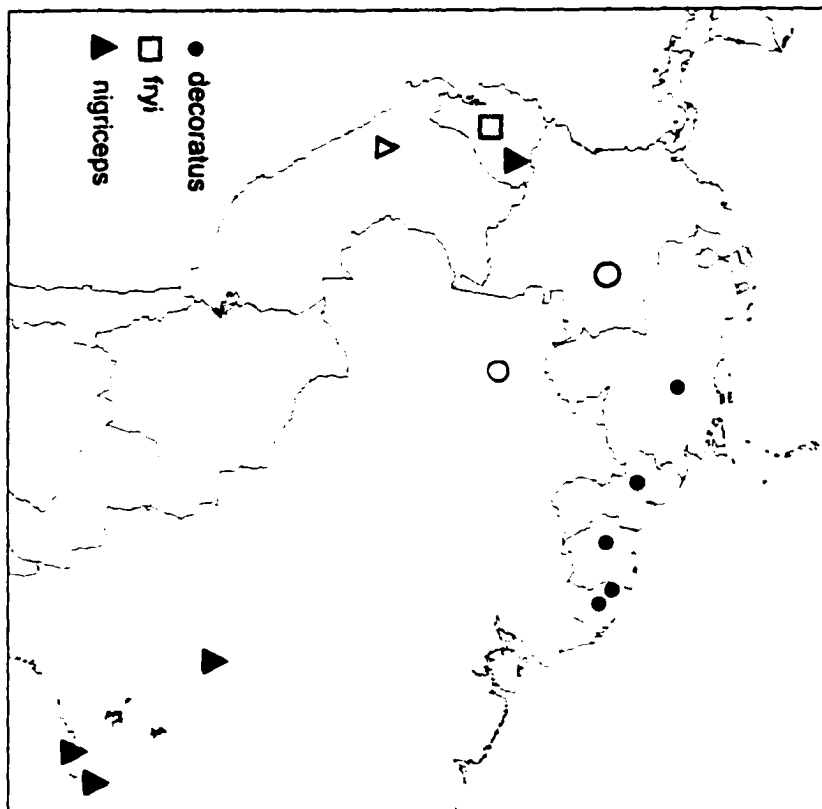
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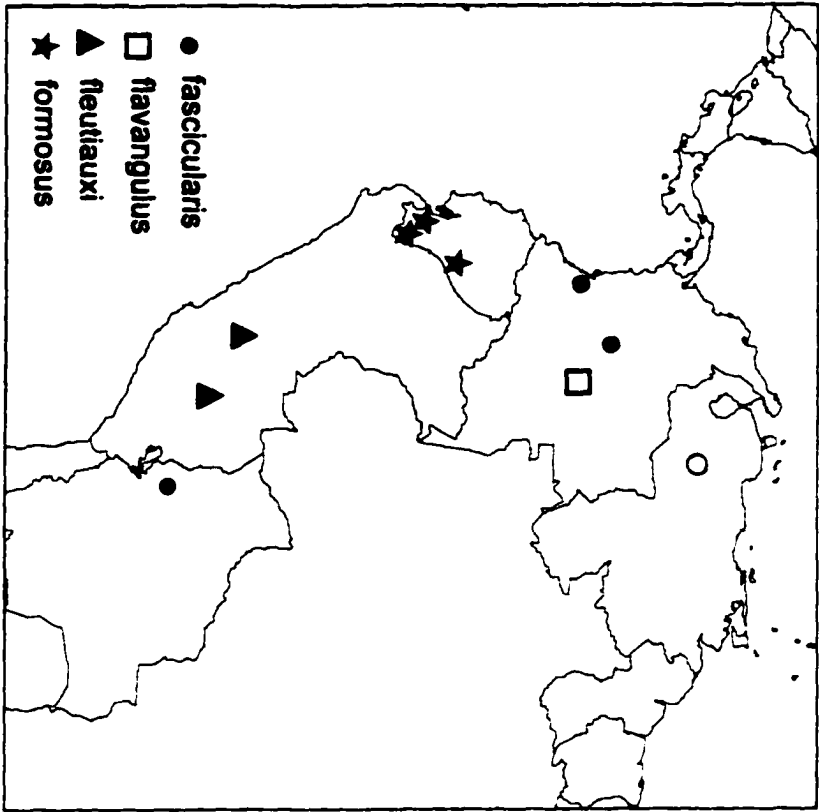
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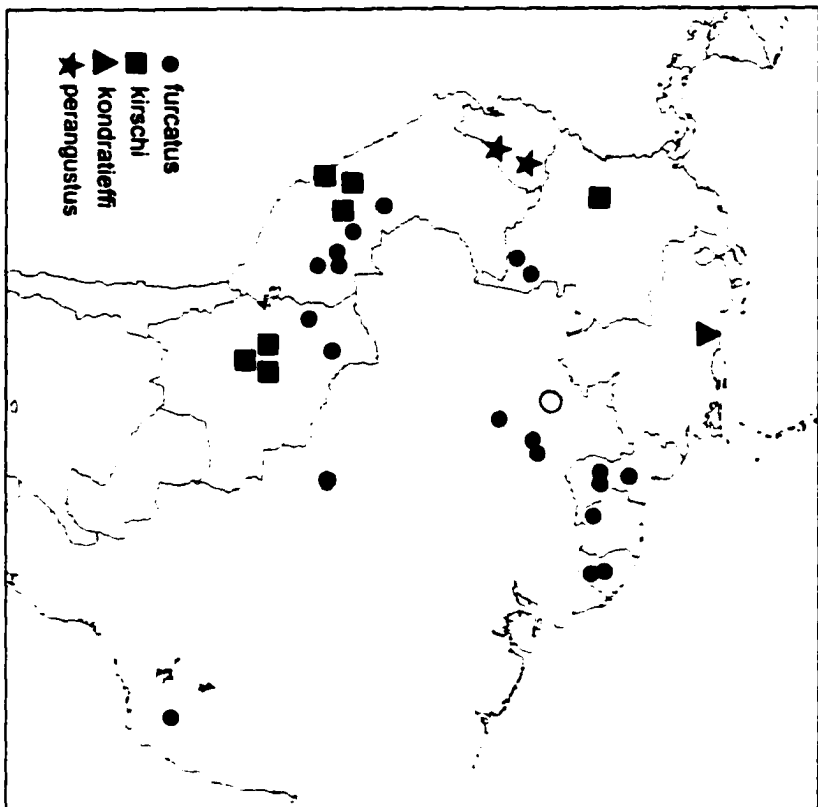
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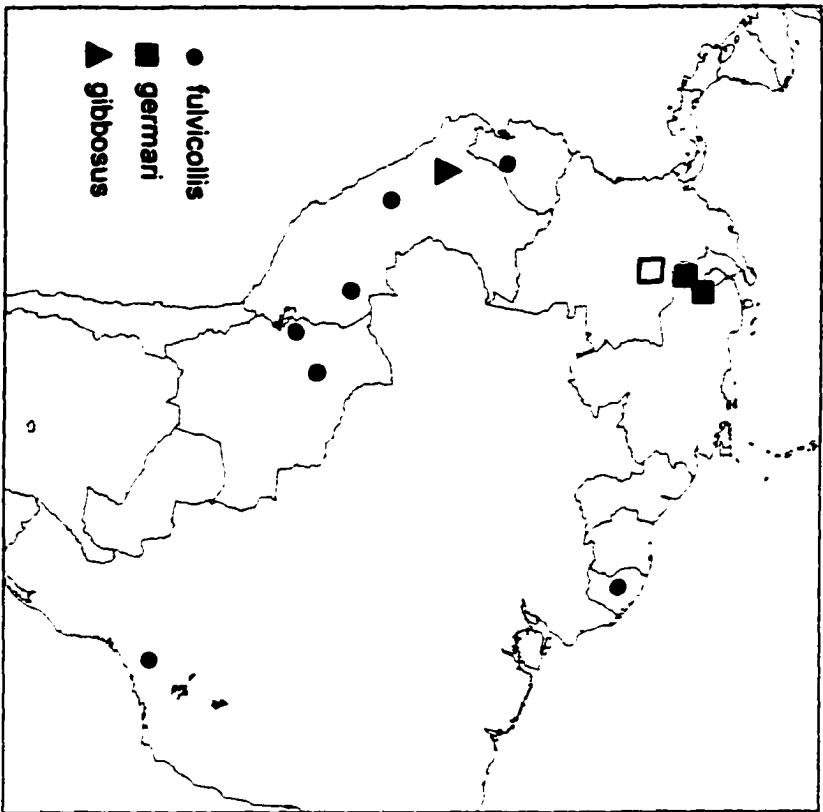
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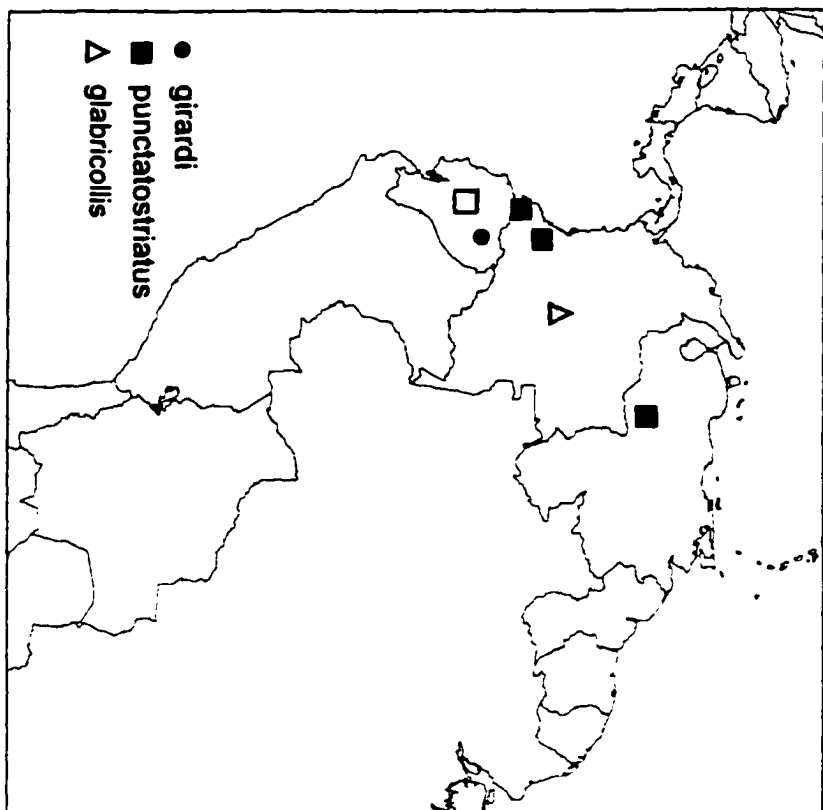
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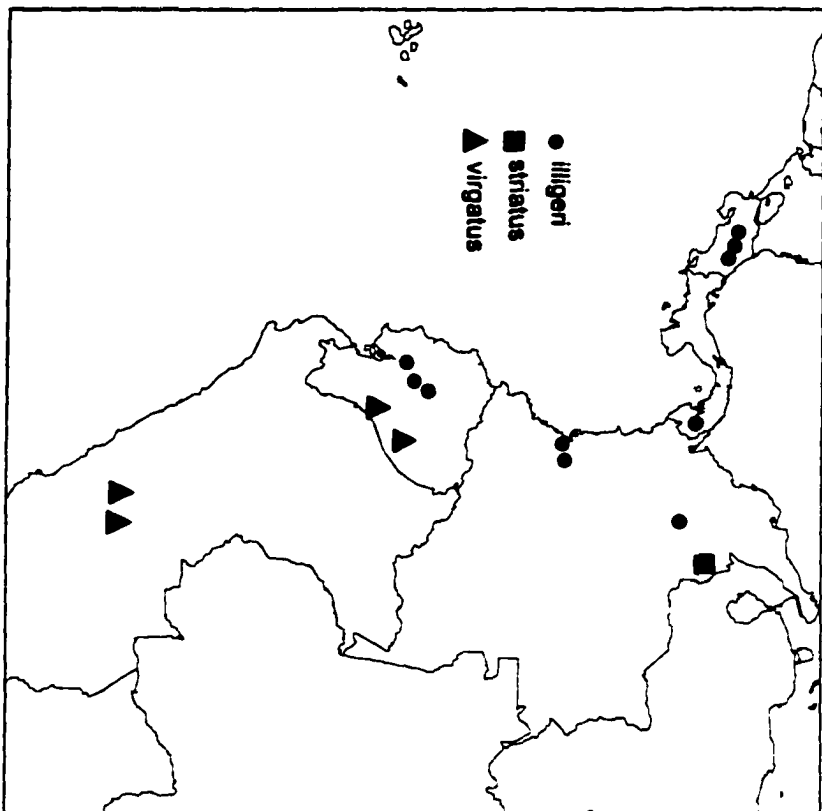
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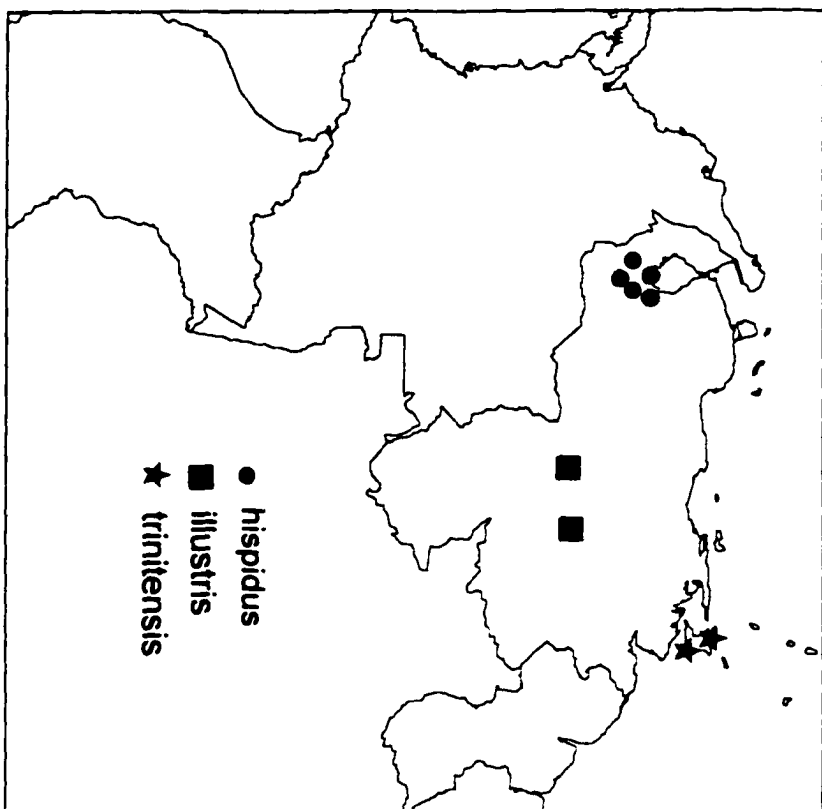
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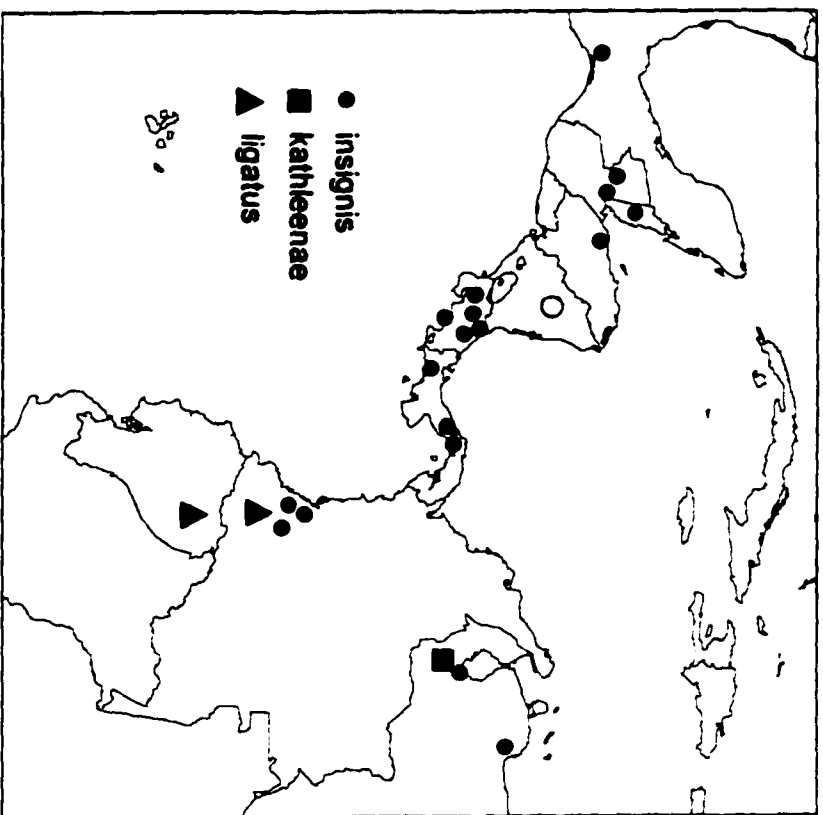
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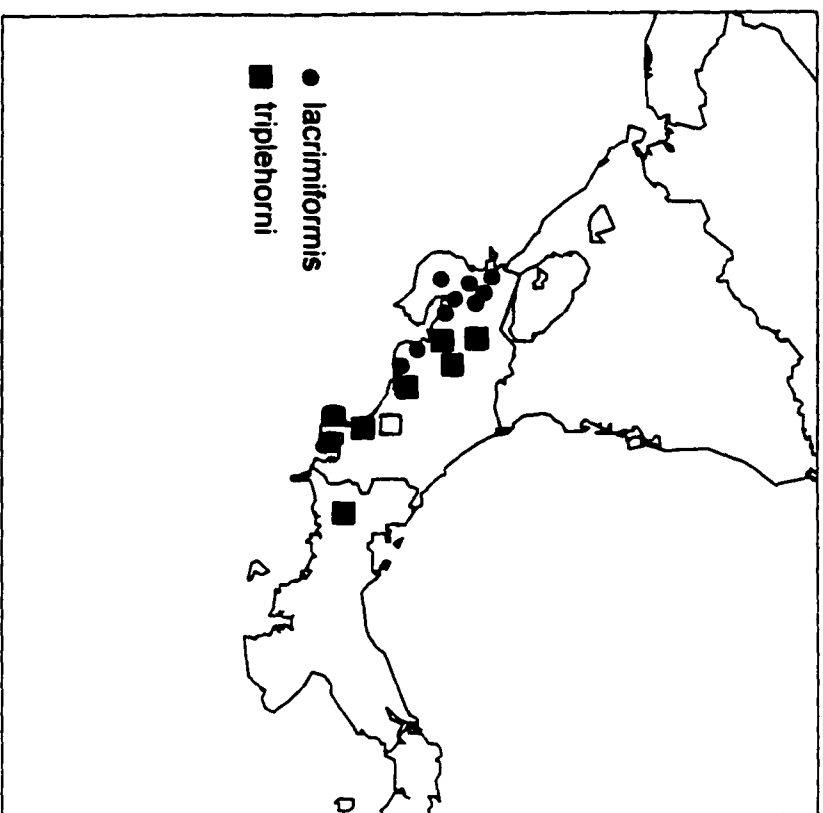
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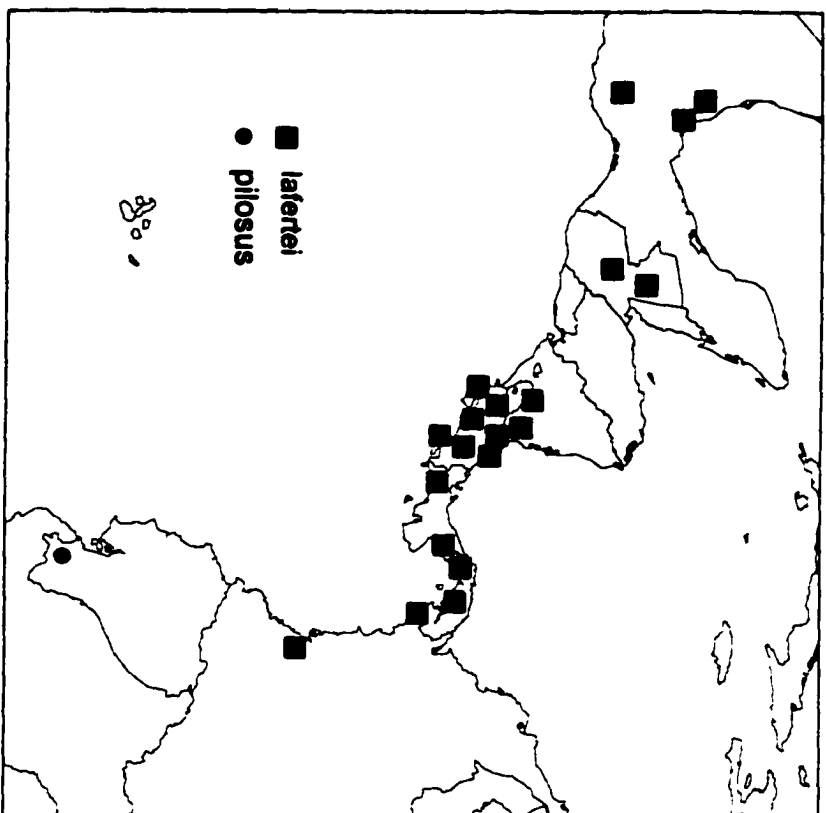
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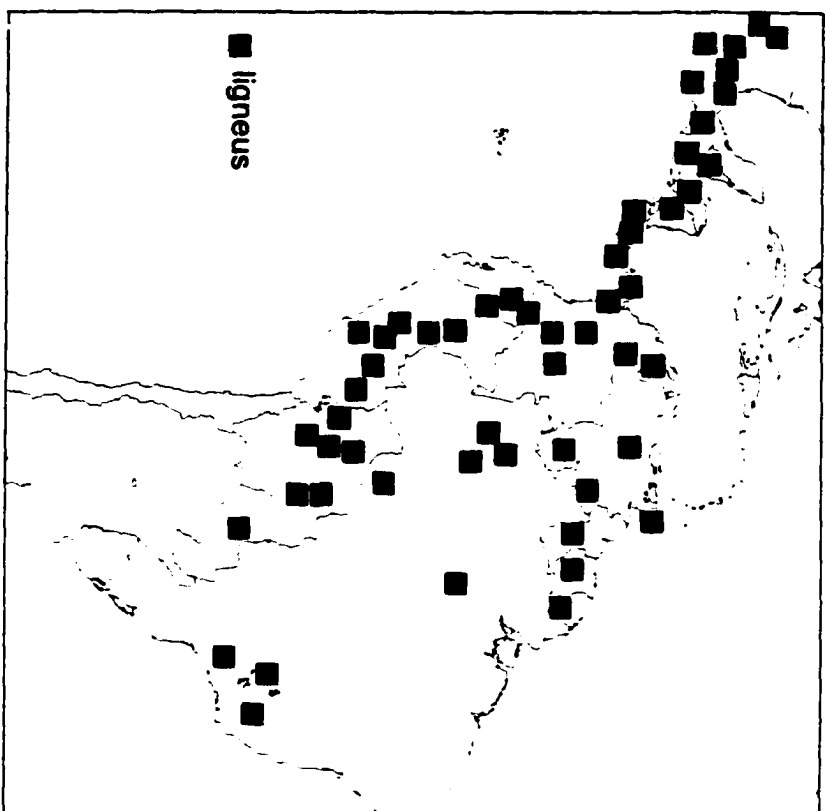
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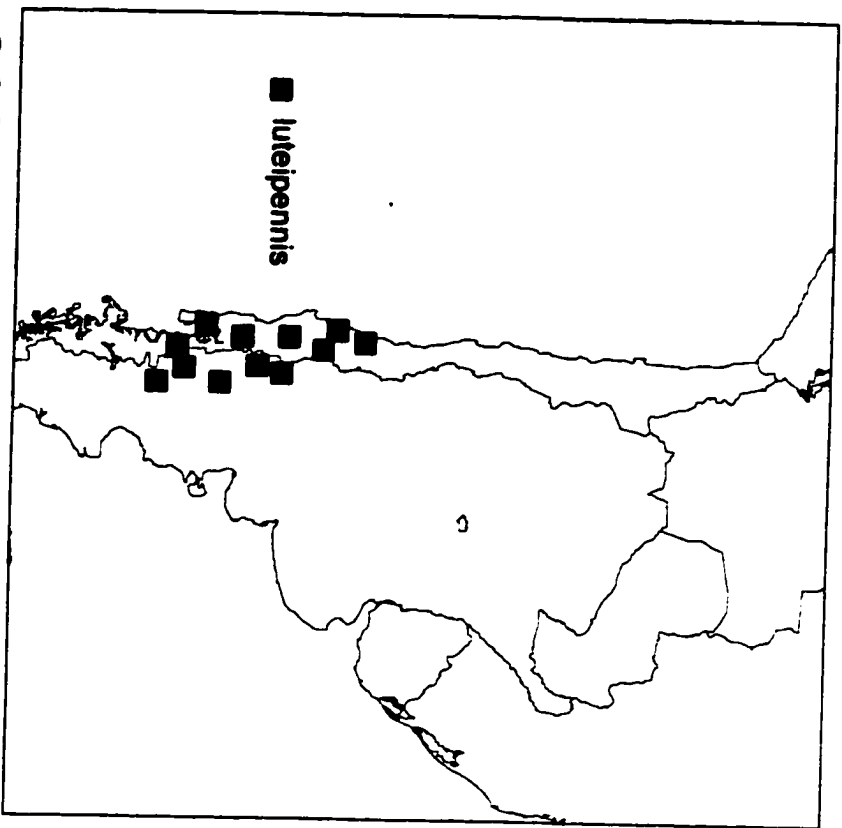
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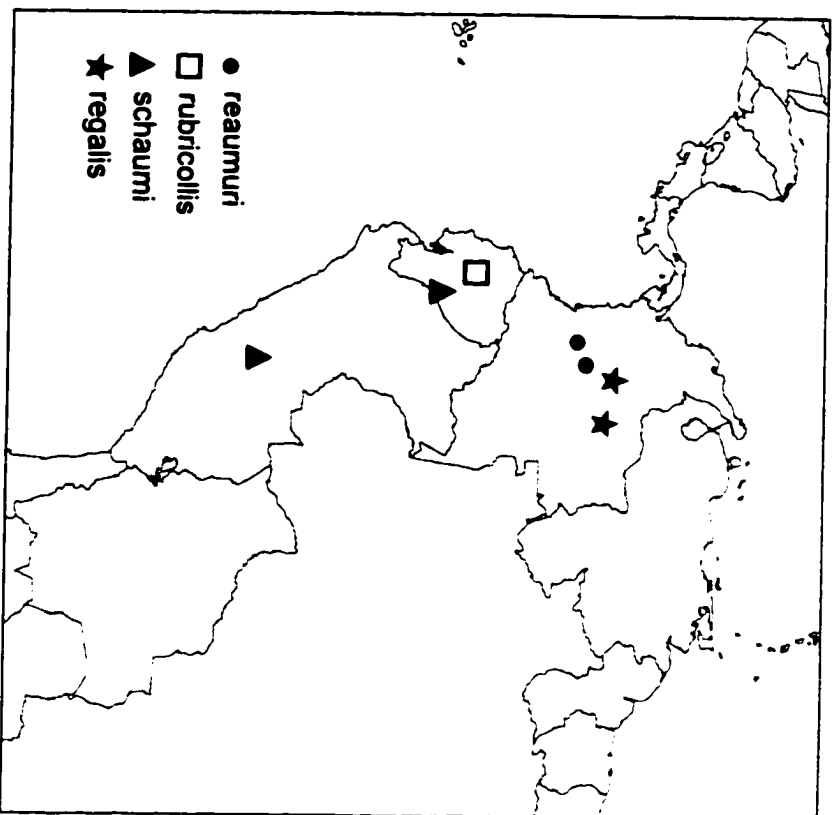
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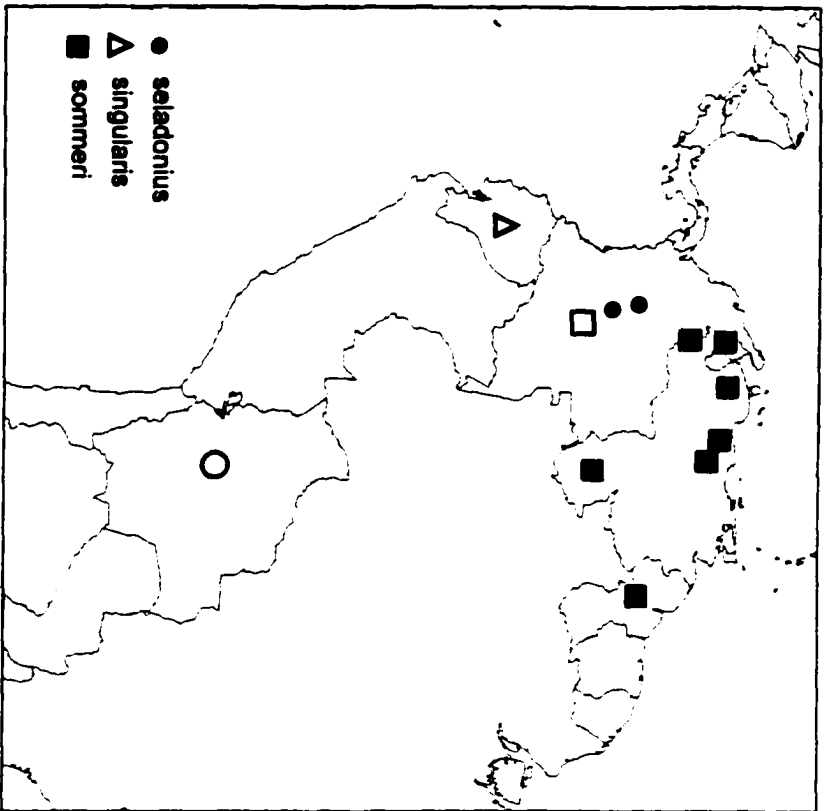


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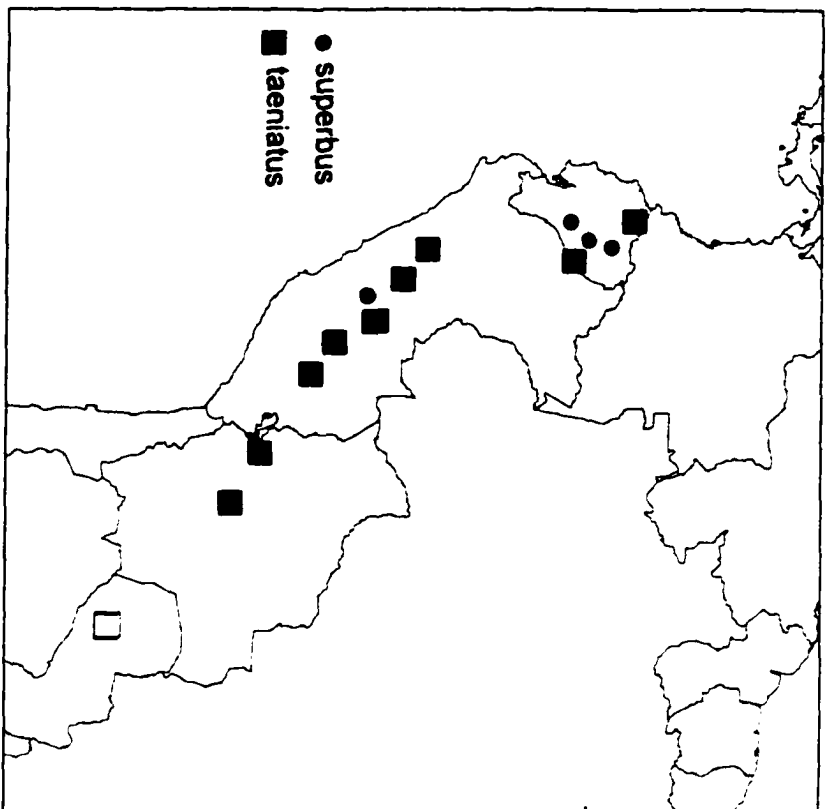


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