

DISSERTATION

REVISION OF THE NORTH AMERICAN SPECIES OF *LIMONIUS*  
(COLEOPTERA: ELATERIDAE)

Submitted by

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In partial fulfillment of the requirements

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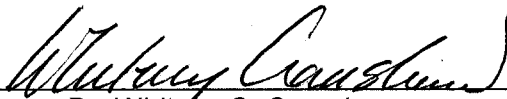
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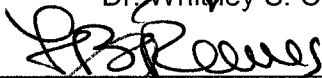
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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY HATHAL M. AL DHAIFER ENTITLED, "REVISION OF THE NORTH AMERICAN SPECIES OF *LIMONIUS* (COLEOPTERA: ELATERIDAE)" BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Committee on Graduate Work



Dr. Whitney S. Cranshaw



Dr. F Brent Reeves

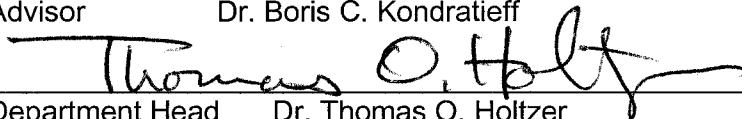


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## ABSTRACT OF DISSERTATION

### REVISION OF THE NORTH AMERICAN SPECIES OF *LIMONIUS* (COLEOPTERA: ELATERIDAE)

The genus *Limonius* is revised for North America. Forty-seven species are recognized: *L. aeger* LeConte, *L. aurifer* LeConte, *L. auripilis* (Say), *L. basilaris* (Say), *L. beutenmuelleri* Van Dyke, *L. bicolor* Van Dyke, *L. californicus* (Mannerheim), *L. canus* LeConte, *L. clypeatus* Motschulsky, *L. confusus* LeConte, *L. consimilis* Walker, *L. cribriceps* Van Dyke, *L. crotchii* Horn, *L. definitus* Ziegler, *L. ectypus* (Say), *L. flavomarginatus* Knull, *L. fulvipilis* Candeze, *L. griseus* (Beauvois), *L. huguenini* Van Dyke, *L. humidus* Lane, *L. jonesi* Lane, *L. lanchesteri* Lane, *L. lanei* Van Dyke, *L. meridianus* Knull, *L. mirus* LeConte, *L. nebulosus* Van Dyke, *L. nimbatus* (Say), *L. nitidulus* Horn, *L. olentangyi* Knull, *L. ornatulus* LeConte, *L. pappi* Becker, *L. pectoralis* LeConte, *L. pictus* Van Dyke, *L. plebejus* (Say), *L. quercinus* (Say), *L. rectangularis* Fall, *L. sinuifrons* Fall, *L. stigma* (Herbst), *L. subauratus* LeConte, *L. ursinus* Van Dyke, *L. venablesi* Wickham, two new species are described, *L. kondratieffi* n.sp., *L. norahae* n.sp., and nine new synonyms are recognized. *Limonius insperatus* Brown is designated as a synonym of *L. aeger* LeConte, *L. dubitans* LeConte is designated as a synonym of *L. agonus* (Say), *L. shircki* Lane and *L. snakensis* Lane are designated as synonyms of *L. crotchii* Horn, *L. infuscatus* Motschulsky is designated as a synonym of *L. ectypus* (Say), *L. seminudus* Van Dyke is designated as a synonym of *L. fulvipilis* Candeze, *L. maculicollis* Motschulsky is designated as a synonym of *L. ornatulus* LeConte, *L. arizonicus* Van Dyke is designated as a synonym of *L. sinuifrons* Fall, *L. anceps*

LeConte is designated as a synonym of *Limonius subauratus* LeConte, and *L. agonus* (Say) is recognized as a valid species. Neotypes were designated for *L. agonus* and *L. ectypus*. *Limonius debilis* is Dejean considered a *Nomen dubium*.

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My wife, Norah AlMotlaq, and oldest daughter, Bushra Al Dhafer have never tired of providing encouragement towards this effort. I could not have completed this task without their love and encouragement.

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## Introduction

The click beetle genus *Limonius* was established by Eschscholtz in 1829 to distinguish a group of species of *Elater* Linnaeus that have a carinate frons and small second and third antennal segments. In North America at that time, *Limonius* included *griseus* (Beauvois), *stigma* (Herbst), *auripilis* (Say), *basilaris* (Say), *nimbatus* (Say), *quercinus* (Say), *plebejus* (Say), and *ectypus* (Say) (Leng 1920). Later, Candeze (1860) transferred *Cardiophorus californicus* Mannerheim to *Limonius*. Van Dyke (1932) included the genus *Pheletes* Kiesenwetter 1858 as a subgenus of *Limonius*, representing the species with the prosternal sutures more or less excavated in front. Van Dyke (1932) did not consider the character of the prosternal suture as a generic character. LeConte (1853) established the genus *Gambrinus* for species where the last segment of the antennae is “considerably larger than the others”, and the “first segment of the tarsi is longer than the second” from one specimen of *Elater armus* Say. This genus was synonymized by Lacordaire (1851). *Limonius* has been assigned to the tribe Athoini by Van Dyke (1932) and Johnson (2002). *Limonius* is Holarctic in distribution with about 24 species occurring in Europe and Asia (Schenkling 1927 and Lohse 1979), and 59 species in North America (Backer 1976, Brown 1933, Fall 1933, Knull 1934; 1938; 1947, Fall 1934; 1941; 1965, Van Dyke 1932; 1943). Moreover, Van Dyke in his review listed two additional species, *L. debilis* Dejean and *L. infernus* LeConte, and two subspecies, *L. basilaris semianeus* LeConte and *L. californicus occidentalis* Candeze, but he did not treat them in his key.

Van Dyke (1932) presented the first key to the North American species. A comparison between his arrangement and the one followed herein is made below; the valid species according to Van Dyke are marked with a “\*”.

This revision	Van Dyke (1932) <sup>1</sup>
1- <i>aeger</i> LeConte, 1853. <i>knulli</i> Fall, 1933. <i>insperatus</i> Brown, 1933 (n. syn.).	* <i>aeger</i> LeConte, 1853. * <i>anceps</i> LeConte 1853. * <i>aurifer</i> LeConte, 1853.
2- <i>agonus</i> (Say), 1839. <i>dubitans</i> LeConte, 1853 (n. syn.).	* <i>auripilis</i> (Say), 1823. * <i>basilaris</i> (Say), 1823.
3- <i>aurifer</i> LeConte, 1853.	<i>basilaris semianeus</i> LeConte, 1853.
4- <i>auripilis</i> (Say), 1823. <i>pubicollis</i> LeConte 1853.	* <i>beutenmuelleri</i> Van Dyke, 1932. * <i>bicolor</i> Van Dyke, 1932.
5- <i>basilaris</i> (Say), 1823. <i>semianeus</i> LeConte, 1853.	* <i>californicus</i> (Mannerheim), 1843. <i>hispidus</i> LeConte, 1853.
6- <i>beutenmuelleri</i> Van Dyke, 1932.	<i>occidentalis</i> Candeze, 1860.
7- <i>bicolor</i> Van Dyke, 1932.	* <i>canus</i> LeConte, 1853.
8- <i>californicus</i> (Mannerheim), 1843. <i>hispidus</i> LeConte, 1853. <i>occidentalis</i> Candeze, 1860.	<i>subcostatus</i> Motschulsky, 1859. * <i>canus discoideus</i> LeConte, 1861. * <i>clypeatus</i> Motschulsky, 1859.
9- <i>canus</i> LeConte, 1853. <i>subcostatus</i> Motschulsky, 1859. <i>discoideus</i> LeConte, 1861.	* <i>confusus</i> LeConte, 1853. <i>anescens</i> LeConte, 1853. * <i>consimilis</i> Walker, 1866.
10- <i>clypeatus</i> Motschulsky, 1859.	<i>nitidicollis</i> LeConte, 1869.
11- <i>confusus</i> LeConte, 1853. <i>anescens</i> LeConte, 1853.	* <i>crotchii</i> Horn, 1872. * <i>definitus</i> Ziegler, 1845.
12- <i>consimilis</i> Walker, 1866. <i>nitidicollis</i> LeConte, 1869.	* <i>dubitans</i> LeConte, 1853. * <i>ectypus</i> (Say), 1839.
13- <i>cribriceps</i> Van Dyke, 1943.	<i>agonus</i> (Say), 1839.

- 14- *crotchii* Horn, 1872. *pilosus* LeConte, 1853.  
*shircki* Lane, 1965. (n. syn.). \**infuscatus* Motschulsky, 1859.  
*snakensis* Lane, 1965. (n. syn.). *vernalis* Fall, 1910.
- 15- *definitus* Ziegler, 1845. \**fulvipilis* Candeze, 1860.
- 16- *ectypus* (Say), 1839. \**fulvipilis seminudus* Van Dyke, 1932  
*pilosus* LeConte, 1853. \**griseus* (Beauvois), 1805.  
*infuscatus* Motschulsky, 1859. (n.syn) *cylindriformis* (Say), 1823.  
*pilosulus* Candeze, 1891. *hirticollis* Melsheimer, 1845.  
*vernalis* Fall, 1910. \**interstitialis* Melsheimer, 1845.
- 17- *flavomarginatus* Knull, 1938. *propexus* Candeze, 1860.
- 18- *fulvipilis* Candeze, 1860. \**huguenini* Van Dyke, 1932.  
*fulvipilis seminudus* Van Dyke, 1932 (n. syn.). \**kuschei* Van Dyke, 1932.  
\**lanei* Van Dyke, 1932.
- 19- *griseus* (Beauvois), 1805. \**mirus* LeConte, 1853.  
*cylindriformis* (Say), 1823. \**ulkei* Horn, 1871.  
*hirticollis* Melsheimer, 1845. \**nebulosus* Van Dyke, 1932.  
*interstitialis* Melsheimer, 1845. \**nimbatus* (Say), 1825.  
*propexus* Candeze, 1860. *infernus* LeConte, 1853.
- 20- *huguenini* Van Dyke, 1932. \**nitidulus* Horn, 1871.
- 21- *humidus* Lane, 1941. \**ornatulus* LeConte, 1857.
- 22- *jonesi* Lane, 1965. \* *ornatulus humeralis* Candeze, 1860.
- 23- *kondratieffi* new species \**maculicollis* Motschulsky 1859,
- 24- *kuschei* Van Dyke, 1932. \**pectoralis* LeConte, 1866.
- 25- *lanchesteri* Lane, 1941. \**pictus* Van Dyke, 1932.
- 26- *lanei* Van Dyke, 1932. \**plebejus* (Say), 1825.
- 27- *meridianus* Knull, 1947. *metallescens* Melsheimer, 1844.



45- *subauratus* LeConte 1853.

*anceps* LeConte 1853. (n. syn).

46- *ursinus* Van Dyke, 1932.

47- *venablesi* Wickham, 1913

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<sup>1</sup> Not including species described or synonymized after 1932.

Within the tribe Athoini the adults of *Limonius* are characterized by having the clypeus distinctly and completely margined in front and elevated above the labrum, the prosternal sutures nearly straight, double and but shallowly or deeply excavated in front, the hind coxal plates narrowed outwardly and gradually dilated inwardly, the tarsi subcylindrical with the first segment the longest and the following tarsomeres gradually shorter and without lobes beneath (Fig. 17), the tarsal claws simple (Van Dyke 1932), and the front coxal cavity almost closed behind (Fig. 15) (Brooks 1960).

*Limonius* can be separated from the most closely related genus *Athous* Eschscholtz by the double prosternal sutures, having both antennal segments 2 and 3 smaller than segment 4, the tarsomeres are simple, and the front coxal cavity almost closed behind. In the genus *Athous* the prosternal sutures are simple, the antennal segment 2 is smaller than either segments 3 and 4, the tarsomeres 2-4 each with a membranous lobe beneath, and the front coxal cavity is open behind (Van Dyke 1932, Brooks 1960). *Limonius* can also be separated from the related genus *Hemicrepidius* Germar by the tarsomeres which are simple without membranous pads or lobes. Whereas, in the genus *Hemicrepidius* the tarsomeres 1-4 have membranous projecting lobes (Johnson 2002). These two genera are the most likely sister taxa of *Limonius*.

Van Dyke (1932) published a key and catalogue of the *Limonius* species of North America and recognized two subgenera. Firstly, *Limonius* (*Pheletes*) which has the

prosternal suture not distinctively excavate in front, and secondly, *Limoni* (*s.s.*) which has the suture distinctly excavate.

At least 59 species are currently recognized in North America, and a major component of these species are distinctly western North American in distribution. A phylogenetic study was not undertaken because the Eurasian species were not studied. The author intends to revise these species in the future.

No up-to-date comprehensive revision of the North American species has been available. Many of the species descriptions and diagnoses presented by Van Dyke (1932) are vague, resulting in poor or impossible identifications. Additionally, since the larvae of *Limoni* are considered major pests of several agroecosystems, a revision of this genus would assist economic entomologists in the identification of associated or reared adults. Lanchester (1946) has provided a key to the larvae of the economic species of *Limoni*.

## 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 that are used as institutional designators in the individual species treatments.

American Museum of Natural History (AMNH); California Academy of Science (CASC); Canadian Museum of Nature (CMNC); Colorado State University, C.P. Gillette Museum of Arthropod Biodiversity (CSUC); Cornell University Insect Collection (CUIC); Chicago, Field Museum of Natural History (FMNH); Florida State Collection of Arthropods (FSCA); Massachusetts, Cambridge, Museum of Comparative Zoology (MCZC); Mississippi State University, Entomological Museum (MEMU); Ohio State

University Collection of Insects and Spiders (OSUC); Texas A&M University, Department of Entomology Insect Collection (TAMU); University of Arizona, Department of Entomology Collection (UAIC); University of California, The Bohart Museum of Entomology (UCDC); University of Missouri, W.R. Enns Entomology Museum (UMRM); Washington, DC, National Museum of Natural History, Smithsonian Institution (USNM); University of Idaho, W.F. Barr Entomological Collection (WFBM); and Washington State University, James Entomological Collection (WSUC).

Male and female internal genitalia were examined after dissection. The female terminalia were cleared in a 15-20% of KOH at room temperature. Dissections were made on specimens from non-type material, except where available material was limited. Fragile type material was not dissected. Photographs were taken by a digital camera with microscope adapter kit to fit a Compound AO microscope.

Measurements of body length were made from the anterior margin of the frons to the tip of the elytra. Measurements of body width were made at the widest part of the body. Pronotal length was measured along the center 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. Antennal segment lengths were measured laterally. All measurements were done using an ocular micrometer.

Distribution maps were made using the ArcGIS, the distribution were made at the county level, it appear in the maps by the county shape, and Canada by the city shape.

Distributional data are listed in the Material Examined section of each species. If there were more than one specimen from the same locality, with the same locality label information, the number of the specimens was written after the collector, and if the locality labels had the same information except the date of collection, the different dates were written between parenthesis.

All readily available type specimens were examined. The Say types were destroyed except apparently for a specimen of *Elater plebejus* deposited in the MCZC (Mawdsley 1993), but probably does not represent original type material (personal communication, Dr. P.J. Johnson, South Dakota State University). Types of *L. cribricollis* Horn, and *L. definitus* Ziegler were not located at the supposed type repositories. The Mannerheim types and Motschulsky types are apparently deposited in the Zoological Museum, Moscow State University, Russian Federation, and were not made available to the author despite requests.

### Diagnostic Characters of Adults

Historically, the principal characters that have been used to define species of *Limonius* have been the prosternal sutures, color patterns, clypeal margin, punctures, length of antennal segments 2 and 3 compared with segment 4. In the more recent descriptions of new species by Lane (1941, 1965) or Becker (1976), male genitalia were used as a primary diagnostic character. Additionally, the female bursa copulatrix, though not used in the past, has proven useful for species diagnoses.

The clypeal margin has four forms—(1) entire (Fig. 8), (2) slightly emarginate (Fig. 9), (3) moderately emarginate medially (Fig. 10), and (4) deeply emarginate medially (Fig. 11). These four types of clypeal margin are consistent within species. Additionally, the frons with a prominent depression with the frontal carina elevated above the clypeus in the *nebulosus* group, this character closely allies this group with *Athous*. In contrast, the other groups of *Limonius* have the frons without a prominent depression. In cases where this may be unclear, illustrations have been prepared (Figs. 12-14).

The length of antennal segments 2 and 3 is compared with the length of segment 4, also whether the antennal segments reach or extend beyond the hind angles of the pronotum are useful to differentiate species groups and individual species.

Differences in the pronotal shape and punctures provide characters defining species groups and individual species. The shape of pronotal margins, the length/width ratio, and the punctures tend to be consistent especially between individual species. Additionally, in some cases the pronotal coloration can be used to recognize individual species. The frontal groove of the prosternal sutures was used successfully to defining species groups.

The elytral coloration pattern was used to defining individual species, some species such as *L. pictus*, and *L. venablesi* have a unique elytral coloration pattern.

Genitalic structures, especially the male parameres, were used in this study as primary species characters (Fig. 18). The male parameres range from convex basally to parallel and from narrow to broad. They usually bear an apical blade except for a few species. The presence or absence of this blade is very useful for defining species groups. The apical blade varies in size and shape ranging from triangular with sharp angles to sinuous with rounded extremities. Posteriorad, the blades are defined by a lateral spine that differs in size and angle of projection. The bursa copulatrix of most species of *Limonius* is not sclerotized; however, an anterior sclerite is present that differs between species. The typical pattern includes a medial sclerite (Figs. 64-67, 69, 72, 73), or combs within some spines, the spines differ in number and length (Figs. 68, 70, 71).

### The Species Groups

The following species groups are recognized by the similarity of their morphological characters. Two subgenera are recognized for North American *Limonius* species, *Limonius s.s* and *Pheletes* (Van Dyke 1932). The *Limonius s.s* species are

recognized by the prosternal sutures which are grooved in front; this subgenus can be divided into three groups-- the *nebulosus* group, the *basilaris* group, and the *griseus* group.

**The *nebulosus* group** is characterized by the frons having a prominent depression with the frontal carina elevated above the clypeus (Fig. 12). This character closely allies this group with *Athous* (Becker 1974). Within this group, *L. nebulosus*, *L. huguenini*, and *L. kondratieffi* n.sp. have the male genitalia short and robust with the aedeagus broad (Figs. 37, 40, 45). *Limonius rectangularis*, known only from the holotype male, has the more typical male genitalia type of *Limonius*.

**The *basilaris* group** This group is characterized by a clypeal margin with a moderate to deep medial emargination (Figs. 10, 11). The species include *L. auripilis* (Say), *L. basilaris* (Say), *L. clypeatus* Motschulsky, *L. fulvipilis* Candeze, *L. kuschei* Van Dyke, and *L. quercinus* (Say).

**The *griseus* group** Despite being a heterogeneous group in other characters, all of the species included have an entire to slightly emarginated medial margin of the clypeus (Figs. 8, 9, 13, 14). The species include *L. aeger* LeConte, *L. aurifer* LeConte, *L. beutenmuelleri* Van Dyke, *L. bicolor* Van Dyke, *L. confusus* LeConte, *L. cribriceps* Van Dyke, *L. crotchii* Horn, *L. flavomarginatus* Knull, *L. griseus* Beauvois, *L. humidus* Lane, *L. jonesi* Lane, *L. lanchesteri* Lane, *L. lanei* Van Dyke, *L. meridianus* Knull, *L. mirus* LeConte, *L. nitidulus* Horn, *L. norahae* n. sp, *L. olentangyi* Knull, *L. pappi* Becker, *L. pectoralis* LeConte, *L. pictus* Van Dyke, *L. plebejus* (Say), *L. rudis* Brown, *L. rufihumeralis* Lane, *L. sinuifrons* Fall, *L. ursinus* Van Dyke, and *L. venablesi* Wickham.

The subgenus *Pheletes* is distinguished from *Limonius* s.s by having the prosternal sutures ungrooved in front. This subgenus includes the following species, *L. agonus* (Say), *L. californicus* Mannerheim, *L. canus* LeConte, *L. consimilis* Walker, *L. definitus* Ziegler, *L. ectypus* (Say), *L. nimbatus* (Say), *L. ornatulus* LeConte, *L. stigma*

(Herbst), and *L. subauratus* LeConte. Van Dyke (1932) further divided the above species into two groups, based on relative body lengths, *L. consimilis*, *L. definitus*, *L. nimbatus*, and *L. ornatulus* --less than 7.5 mm, and *L. agonus*, *L. californicus*, *L. canus*, *L. ectypus*, *L. stigma*, *L. subauratus*-- ranging from 8-11 mm.

### Key to the Species

- 1- Prosternal sutures distinctly grooved in front, subgenus *Limonius*..... 2
- 1'- Prosternal sutures not distinctly grooved in front, subgenus *Pheletes* ..... 38
- 2(1)- Elytra bicolored or rufous, or yellowish brown.....3
- 2'- Elytra black or dark brown..... 16
- 3(2)- Elytra black with basal half or less orange to reddish .....4
- 3'- Elytra rufous, or yellow, or orange with black vittae, vittae, if present, not occupying more than apical third.....7
- 4(3)- Apical blades of parameres spear-like, with hook-like projections laterally (Fig. 41); pronotum deeply punctate, lateral margins of pronotum parallel on basal half converging on apical half, planate along anteriorad; antennae extending 2 to 3 segments beyond hind angles ..... *L. humidus*
- 4'- Parameres subparallel at least apically, the apical blades not spear-like ..... 5
- 5(4')- Antennae extending beyond hind angle by 2 to 3 segments; lateral margins of pronotum parallel on posterior third, narrowing slightly to anterior angles, pronotal punctures umbilicate; males with parameres (Fig. 58) having the apical half subparallel before apical blades ..... *L. rufihumeralis*
- 5'- Antennae extending beyond hind angle by one segment or less ..... 6

- 6(5')- Parameres (Fig. 31) with lateral margins sub-parallel and enlarged gradually toward apical blades, with slight curve in the middle; pronotal margins moderately arcuate and converging anteriorad, ..... *L. crotchii*
- 6'- Parameres (Fig. 43) with lateral margins parallel, keeping the same width from base to apical blades; pronotal margins broadly rounded, .....*L. meridianus*.
- 7(3')- Frons in lateral view, without depression (Fig. 8-11, 13, 14) .....8
- 7'- Frons in lateral view, with depression (Fig. 12) ..... 13
- 8(7)- Elytra rufous or yellowish brown to brown with the apical third black, or at least with some black in the apical third, or yellowish to reddish with black vittae .....9
- 8'- Elytra yellowish brown to brown .....12
- 9(8)- Elytra yellowish brown to brown with two black vittae per elytron, one basally and one distally; parameres (Fig. 63) with lateral margin convex basally, becoming parallel toward apical blades, apical blades lanceolate, 2 to 2.5 times longer than broad, pointed apically..... *L. venablesi*
- 9'- Elytra rufous or yellowish brown to brown with the apical third black, or at least with some black in the apical third..... 10
- 10(9')- Elytra yellowish brown with apical third black and one black vitta per elytron basally; parameres (Fig. 53) with lateral margin convex basally subparallel toward apical blades, apical blades almost as long as wide, rounded apically .....*L. pictus*
- 10'- Elytra rufous or yellowish brown to brown with apical third black or with some blackish in the apical third.....11
- 11(10')- Elytra rufous or yellowish brown to brown with apical third black; clypeal margin entire; the parameres (Fig. 44) swollen, subparallel, and the apical blades with hook-like projections laterally..... *L. mirus*

- 11'- Elytra brown with apical third black or at least with some blackish in the apical third; clypeal margin entire and slightly recurved medially, parameres (Fig. 48) with lateral margins convex basally, curved gradually before apical blades on apical half, apical blades as wide as long ..... *L. norahae* n. sp.
- 12(8')- Elytra yellowish brown to brown; pronotum deeply punctate, pronotal margins broadly rounded; parameres (Fig. 24) gradually narrowing towards the apical blades, California, Nevada, Oregon, Washington ..... *L. bicolor*
- 12'- Elytra yellowish brown to brown; pronotum with umbilicate punctures, pronotal margins sub-parallel; parameres (Fig. 41) with parallel margins, becoming convex basally, Idaho..... *L. lanchesteri*
- 13(7')- Pronotal margins parallel; antennae extending beyond hind angle by about 4 segments ..... *L. rectangularis*
- 13'- Pronotal margins broadly rounded; antennae extending beyond hind angles by 2 segments or less .....14
- 14(13')- Antennal segments not reaching the hind angles of pronotum; parameres (Fig. 40) without apical blades, and not curving under aedeagus distally, the aedeagus wide, keeping the same width with pointed tip, known only from Ohio .....  
..... *L. kondratieffi* n. sp.
- 14'- Antennal segments extending beyond hind angle of pronotum by not more than 2 segments; not occurring in Ohio..... 15
- 15(14')- Antennal segments extending beyond hind angle of pronotum by one segment or less; parameres (Fig. 45) without apical blades, curving under aedeagus distally, and the aedeagus broad, abruptly acuminate on apical fifth..*L. nebulosus*
- 15'- Antennal segments extending beyond hind angle of pronotum by one or two segments; parameres (Fig. 37) with apical blades longer than wide, triangular, aedeagus wide and rounded apically..... *L. huguenini*

16(2')- Clypeal margin strongly undulate and recurved medially, or deeply incised medially .....	17
16'- Clypeal margin entire not recurved medially, or slightly recurved medially .....	22
17(16)- Clypeal margin strongly undulate and recurved medially .....	18
17'- Clypeal margin deeply incised medially Fig. 10) .....	19
18(17)- Pronotum longer than broad; antennae extending beyond hind angle of pronotum by 2 to 3 segments, segment 2 and 3 together as long as segment 4. ....	<i>L. clypeatus</i>
18'- Pronotum wider than long; antennae extending beyond hind angle of pronotum by one segment or less, segments 2 and 3 together longer than segment 4, .....	<i>L. kuschei</i>
19(17')- Clypeal margin deeply incised medially, semicircular (Fig. 11); antennal segment 2 smaller than segment 3, segment 3 almost as long as segment 4; pronotum as long as broad .....	<i>L. auripilis</i>
19'- Clypeal margin deeply incised medially but not semicircular; antennae variable, often with segments 2 and 3 subequal; pronotum longer than broad .....	20
20(19')- Larger species, length 8.5 mm or more; pronotum slightly longer than broad (length/width ratio 1.18-1.2) .....	<i>L. fulvipilis</i>
20'- Smaller species, length 7.5 mm or less; pronotum longer than broad (length/width ratio 1.6-1.8).....	21
21(20')- Pronotum black with hind angles and hypomerical margins yellow; antennal segment 2 and 3 together about 2/3 length of segment 4; parameres with lateral margin subparallel, apical blades triangular, longer than wide, aedeagus thick with rounded tip, extending beyond parameres by less than half length of apical blades.....	<i>L. basilaris</i>

- 21'- Pronotum black; antennal segments 2 and 3 together longer than segment 4;  
Parameres (Fig. 55) with lateral margin convex basally, concave along apical  
third, apical blades as long as wide with lateral peak, rounded apically, aedeagus  
gradually narrowing to tip, not extending beyond parameres.....*L. quercinus*.
- 22(16')- Pronotum longer than broad ..... 23
- 22'- Pronotum as wide as or wider than long ..... 31
- 23(22)- Pronotum brilliant metallic ruby color; parameres (Fig. 20) narrow, parallel on  
apical half, apical blades as wide as long, rounded apically, ..... *L. aurifer*
- 23'- Pronotum not metallic ruby often shining; parameres variable but not as above  
..... 24
- 24(23')- Elytra brown or reddish brown .....25
- 24'- elytra black ..... 28
- 25(24)- Pronotal margins broadly rounded; antennal segment 2 and 3 equal in length..26
- 25'- Pronotal margin sub-parallel in the middle, or with hind angle parallel-sided;  
antennal segment 3 longer than segment 2 ..... 27
- 26(25)- Antennae not reaching the hind angles, or extending beyond hind angles by less  
than 1 segment; parameres (Fig. 54) with lateral margin convex basally, curved  
before blades on apical fourth, apical blades longer than wide, rounded apically,  
aedeagus gradually narrowing to tip, extending beyond parameres by less than  
half the length of apical blades, ..... *L. plebejus*
- 26'- Antennae extending beyond hind angles by 2 to 3 segments; parameres (Fig. 28)  
with lateral margin subparallel, apical blades longer than width by 2X, triangular,  
aedeagus wide becoming narrow on the apical fourth, with pointed tip, and  
extending beyond parameres by 1/3 length of apical blades..... *L. confusus*.
- 27(25')- Pronotal margin sub-parallel in the middle; parameres (Fig. 59) have the lateral  
margin convex basally, apical blades wide longer than broad gradually pointed

- apically, aedeagus extending beyond parameres by  $\frac{1}{4}$  to  $\frac{1}{2}$  the length of apical blade. .... *L. sinuifrons*
- 27'- Pronotal margins broadly rounded, hind angles parallel-sided, lateral margin distinctly beaded; prosternum reddish; parameres (Fig. 36) with lateral margin convex basally constricted before blades in apical fourth, apical blades as wide as long, rounded apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than  $\frac{1}{4}$  length of apical blades; the female bursa copulatrix not sclerotized ..... *L. griseus*
- 28(24')- Larger species 8.5 mm or more .....29
- 28'- Smaller species 7.8 mm or less .....30
- 29(28)- Antennal segment 2 small, segment 3 just shorter than segment 4; elytra somewhat bronzed, hind angles divergent, lateral margin thinly beaded; prosternum piceus; parameres (Fig. 57) with lateral margin convex basally constricted before blades in apical fourth, apical blades longer than broad, rounded apically, aedeagus wide then tapering to a pointed tip on apical  $\frac{1}{4}$ , extending beyond parameres by less than  $\frac{1}{3}$  length of apical blades; female with bursa copulatrix (Fig. 72) comprised of spines arranged in poorly defined rows in circular or semicircular pattern around bursal walls .....*L. rudis*
- 29'- Antennal segment 2 small, segment 3 intermediate in length between segment 2 and 4; body cover with densely sub-appressed setae (Fig. 3); parameres (Fig. 62) with lateral margin wide basally, and gradually narrowing toward apical blades; female bursa copulatrix not sclerotized ..... *L. ursinus*
- 30(28')- Legs and basal segment of antennae yellow to pale brown; pronotal margins broadly rounded; parameres (Fig. 18) converge toward apical blade, and apical blade is wider than long and rounded apically..... *L. aeger*

- 30'- Legs and antennae black; pronotal margin sub-parallel to parallel; parameres (Fig. 42) subparallel, apical blade as long as wide, triangular apically.....*L. lanei*
- 31(22')- Elytra reddish brown to brown; usually 8 mm or more.....32
- 31'- Elytra black; usually less than 8 mm ..... 35
- 32(31)- Antennal segment 2 shorter than segment 3 and segment 3 almost as long as segment 4; posterior border of hypomeron without teeth .....33
- 32'- Antennal segment 2 and 3 equal together just as long as segment 4 or slightly longer, posterior border of hypomeron dentate ..... 34
- 33(32)- Pronotum densely umbilicate punctures; parameres (Fig. 30) with lateral margins parallel basally, constricted in the apical 1/3 toward apical blades, apical blades wider than long, rounded apically, aedeagus almost as long as parameres ..... *L. cribriceps*
- 33'- Pronotum sparse deeply punctate; parameres (Fig. 52) gradually narrowing toward apical blades, apical blades triangular, aedeagus wide with narrow tip, extending beyond parameres by more than one length of apical blades ..... *L. pectoralis*
- 34(32')- Pronotum black throughout; pronotal margins broadly rounded; parameres (Fig. 49) with lateral margin parallel, apical blades triangular, with hook-like laterally, and the aedeagus thick, robust, dropper like, .....*L. olentangyi*
- 34'- Pronotum black with anterior border of hind angles of hypomeron yellow to orange; widest at base becoming evenly narrower anteriorad, hind angles gradually enlarged; parameres (Fig. 34) with lateral margins sinuate, apical blades about 1.5 as long as broad, pointed apically, aedeagus extending beyond parameres by less than 1/5 the length of apical blades..... *L. flavomarginatus*
- 35(31')- Clypeal margin entire, recurved medially; pronotum wider than long, carina of hind angles short less than 1/5 length of lateral margin; parameres (Fig. 39) with

- lateral margin parallel, apical blades wider than long, rounded apically, aedeagus gradually narrowing to tip almost as long as parameres, .....*L. jonesi*
- 35'- Clypeal margin entire, not recurved medially; pronotum as long as broad; carina of hind angles converge, about 1/3 length of lateral margin; parameres variable ..... 36
- 36(35')- Hypomeron costate anteriorad forming small antennal groove; parameres (Fig. 47) with lateral margin parallel basally, constricted before blades on apical half, apical blades wider than long curved apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/3 length of apical blades, ....  
..... *L. nitidulus*
- 36'- Hypomeron strongly costate on anterior third, forming antennal groove; parameres variable ..... 37
- 37(36')- Hind angle of pronotum not converge; body robust; parameres (Fig. 23) with lateral margin convex basally, gradually narrowing toward apical blades, apical blades as long as broad, rounded apically; aedeagus wide with narrow tip, extending beyond parameres by less than ¼ length of apical blades; known from North Carolina .....*L. beutenmuelleri*
- 37'- Hind angle of pronotum converge; species with less robust body than the previous species; parameres (Fig. 51) have lateral margins parallel basally, curved a little toward apical blades, apical blades wider than long, rounded apically, aedeagus gradually narrowing to tip, as long as parameres or less; known from California ..... *L. pappi*
- 38(1')- Larger species 8 mm or more .....39
- 38'- Smaller species 7.5 mm or less ..... 44

- 39(38)- Elytra bicolored, black with basal third orange; apical blades (Fig. 60) spear-like, without hook-like laterally, aedeagus extending beyond parameres by less than half length of apical blades..... *L. stigma*
- 39'- Elytra black or brown to reddish brown; apical blades variable ..... 40
- 40(39')- Pronotum with densely umbilicate punctures, covered with dense, finely long setae ..... 41
- 40'- Pronotum with sparse deeply punctures, or become densely and subumbilicate laterally, covered with short sparse setae ..... 42
- 41(40)- clypeal margin not distinctly notched and depressed at middle; parameres (Fig. 25) with lateral margins gradually narrowing from apical 1/5 toward apical blades, apical blades triangular with lateral angle pointed apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/5 length of apical blade; female bursa copulatrix (Fig. 65) with spines clustered at one side of bursa walls. ....*L. californicus*
- 41'- Clypeal margin distinctly notched and depressed at middle; parameres (Fig. 26) gradually narrowing toward apical blades, apical blades triangular, aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/3 length of apical blades; female bursa copulatrix (Fig 66) with spines clustered at one side of bursa walls..... *L. canus*
- 42(40')- Clypeal margin well separated from labrum; segments 2 and 3 moderately long each one longer than 1/2 length of segment 4; parameres (Fig. 33) bulbous basally, constricted before blades on apical fourth, apical blades triangular, aedeagus wide with rounded tip, extending beyond parameres by more than half length of apical blades; female bursa copulatrix (Fig. 69) with spines arranged in poorly defined rows in a circular or semicircular pattern around bursal walls ...  
.....*L. ectypus*

- 42'- Clypeal margin weak separated from labrum; segment 2 small, less than  $\frac{1}{2}$  length of segment 4; parameres variable ..... 43
- 43(42')- Antennal segments 2 and 3 small, together about as long as segment 4; parameres (Fig. 19) with lateral margin gradually narrowing from apical  $\frac{1}{2}$  toward apical blades, apical blades wider than long, aedeagus narrow, keeping same width from the middle to tip, and extending beyond parameres by less than half length of apical blades; female bursa copulatrix (Fig 64) with small spines arranged in vaguely defined pattern on bursa walls. ....*L. agonus*
- 43'- Antennal segment 2 small about  $\frac{1}{2}$  segment 3, segment 3 longer than half of segment 4; parameres (Fig. 61) with lateral margin subparallel, basally gradually narrowing before blades on apical fourth, aedeagus gradually narrowing to tip, extending beyond parameres by one length of apical blades; female bursa copulatrix (Fig 73) with spines arranged in poorly defined rows in a circular or semicircular pattern around bursal walls ..... *L. subauratus*
- 44(38')- Pronotum black throughout; parameres (Fig. 29) with apical blades; female bursa copulatrix (Fig 67) with spines arranged in poorly defined rows in a circular or semicircular pattern around bursal walls ..... *L. consimilis*
- 44'- Pronotum yellow, rufous, testaceous, or black with basal angles or entire base yellow; parameres with apical blades not visible; females bursa copulatrix with two sclerotized combs .....45
- 45(44')- Pronotum usually testaceous; parameres (Fig. 46) forceps-like, with same width from base to tip, aedeagus almost with same width from base to tip; female bursa copulatrix (Fig. 70) has two combs each one has 7 spines; eastern United States .....*L. nimbatus*
- 45'- Pronotum not testaceous; parameres variable ..... 46

- 46(45')- Pronotum black with basal angles yellow to yellow with big black spot in the middle, elytra from pale brown throughout to black except basal third of elytra orange; parameres (Fig. 50) curved in middle, slender and knobbed at tip, apical blades not visible, aedeagus with same width from base to tip, with rounded tip; female bursa copulatrix (Fig. 71) has two combs each one has 4 spines; far western North America, especially common in California ..... *L. ornatulus*
- 46'- Pronotum black with basal margin yellow; elytra brown to dark brown; parameres (Fig. 32) forceps-like, gradually narrowing to tip, aedeagus gradually narrowing to tip; female bursa copulatrix (Fig. 68) has two combs each one has 4 spines, eastern United States, as far south as Georgia..... *L. definitus*

#### Treatment of North America Species

##### *Limonius aeger* LeConte

*Limonius aeger* LeConte 1853: 431, Candeze, 1860: 396, Van Dyke, 1932: 339, Dietrich, 1945: 14, Brooks, 1960: 29, Lane, 1971: 24. Type # 2531 (MCZC), type locality: "Lake Superior".

*Limonius knulli* Fall 1933: 229 Fall, 1934: 172, Dietrich, 1945: 14. Holotype # 24357 (MCZC), type locality: Forksville, Pennsylvania. Synonymized, Fall 1934: 172.

*Limonius insperatus* Brown 1933: 175. Holotype # 3445 (CNIC). Type locality: Echo Lake, Tahoe, California. New Synonym.

Length: 5.44-6.8 mm (length/width ratio 2.5-2.75). Head black throughout, clypeal margin entire, frontal punctures umbilicate separated by less than width of punctures, with appressed golden setae. Antennae reaching 1-2 segments beyond hind angles; segments 2 and 3 moderately long each one more about 2/3 length of segment 4;

antennal color black except the first three segments yellowish brown. Pronotum black throughout to dark brown; 1.28-1.76 mm (length/width ratio as long as broad) margin broadly rounded, carina about 1/3 the length of margin, converge, pronotal texture, deeply punctate, separated by less than width of punctures, covered with erect to suberect golden setae. Scutellum black, pentagonal, deeply punctate, with appressed brown setae. Hypomerion, costate anteriorad forming antennal groove; posterior border of hypomerion without teeth; prosternum, black throughout, umbilicate punctures, separated by less than width of punctures, with small appressed black setae; hypomerion black throughout with umbilicate punctures, separated by less than width of punctures, with small appressed black setae; metasternum black throughout, deeply punctate, with fine appressed black setae, leg color yellow to dark yellow.

Elytra 3.92- 4.8 mm (length/width ratio 2.5-3) black throughout, inter-strial deeply punctate, separated by less than width of punctures; striae punctures moderately punctate.

Abdomen black throughout, deeply small punctate with fine appressed black setae.

Male Genitalia: Parameres with lateral margin convex basally, and gradually converge toward apical blade, apical blade wider than long, rounded apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than ¼ the length of apical blades, parameres long 1.5 to 1.7 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype, *L. aeger* without locality label in the LeConte Collection (MCZC).

Type Material of synonyms examined: *L. insperatus*, California, Echo Lake, Tahoe, July 8, 1915, R. Hopping (CNIC). *Limonius knulli* (type destroyed, only labels, MCZC) Pennsylvania, Forksville, July 17, 1930, J.N. Knull (MCZC). Paratypes: Pennsylvania,

Laporte, June 24, 1930, J.N. Knull (FMNH). Maine, Meddybemps, June 28, 1922, R.J. Sim (FMNH).

**Material Examined: Canada: Alberta**, Banff, June 29, 1925, Owen Bryant (CASC). Banff N.P., Johnson's Cany, June 18, 1962, W.R. Mason, 3 (CMNC). Edmonton, June 20, 1917, F.S. Carr, 2 (CASC). Banff (June 24, 1925, June 1, 1928, June 23, 1928, June 27, 1928), O. Bryant, 8 (CASC). 8.5 km. S. Edmonton, May 29, 1981, Bright, 5 (CMNC). Edmonton, June 20, 1917, F.S. Carr (CASC). Edmonton, June, 9, N. Criddle (FMNH). Waterton (July 15, 1931, July 22, 1931) F.S. Carr, 2 (FMNH). Edmonton, June 9, 1917, F.S. Carr, 4 (MEMU). Waterton (July 18, 1931, July 22, 1931), F.S. Carr, 3 (MEMU). Edmonton, June, 9 (OSUC). **Manitoba**, Glenlea, 10 mi,S. Winnipeg, May 31- June 20, 1973, J. Redner & C. Starr, 2 (CMNC). **New Brunswick**, Bathurst, June, 22, J.N. Knull (FMNH). **Ontario**, Almonte, June 10-17, 1986, L. LeSage (CMNC). Calandar, July 19, 1920, Wenzel, 7(OSUC) 1 (FMNH). Carlsbad Spgs., July 20, 1982, L. LeSage (CMNC). Lanark, Kerr Lake, July 18-24, 1979, S.D. Hicks (CMNC). Sault Ste. Marie, July 5-6, 1961, G. Brumpton (CMNC). Scotia Jct, July 27, 1930, Wenzel, 3 (OSUC). Prince Edward Co. (July 2, 1926, June 11, 1944) Brimley, 2 (UCDC), Sudbury, 2 (CSUC). **Ottawa**, N. Scotia, June 8, 1918 (CASC). **Quebec**, Belvedere, Parc Gatineau, July 21, 1974, R. Sexton, 30 (CMNC). Montreal, June 10, 1961, E.J. Kiteley, 2 (CMNC). Rigaud, May 15, 1979, A. Smetama (CMNC). Riviere-du-Loup, May 21, 1983, L. LeSage (CMNC). Fort Coulonge (June 10, 1918, June 11, 1918, June 12, 1918, June 13, 1918) (CASC). Duparquet (June 5, 1934, June 18,1934, July 9, 1934, July 15, 1935, July 5, 1936, July 9, 1936, June 11, 1936, July 12, 1936, June 13, 1936, July 15, 1936, July 27, 1936, July 30, 1936, August 7, 1936, June 23, 1937, June 19, 1939, June 6, 1940, June 3, 1941), G. Stace & Smith, 18 (CASC). Truro, June 25, 1913 (CASC). **Saskatchewan**, Saskatoon, June 12, 1982, E.J. Kiteley, 11 (CMNC).

**United States: Arizona**, Apache Co., White Mts., Parker, Lot 107, June 4, 1933 (CASC). Apache Co., White Mts., Parker, Lot 106, July 6, 1933 (CASC). **California**, Alpine Co., Lake Alpine, June 20, 1936, R.P. Allen (CASC). El Dorado Co., Tahoe, Grass Lake, June 24, 1915 (CASC). El Dorado Co., Tahoe, L. Tahoe, Fallen Leaf L. (June 6, 1915, July 8, 1915, July 13, 1915), 3 (CASC). El Dorado Co., Mt. Tallac (July 7, 1899, July 2, 1901), Dr. A. Fenyves, 4 (MEMU). Placer Co., Glen Alpine, July 1, 1954, 4 (CASC). Plumas Co., Chester, July 7, 1948, D.J. & J.N. Knull (FMNH). Plumas Co., Chester, June 7, 1960, June 30, 1960, D.J. & J.N. Knull, 2 (OSUC). Shasta Co., Lassen Nat'l Park, Kelly's Resort, June 13, 1931 (CASC). Shasta Co., Lassen N. P., June 13, 1931 (FMNH). Siskiyou Co., SW. Slope of Mt. Shasta, 6500 ft., July 16, 1961, B. Malkin, 4 (FMNH). Siskiyou Co., Fish Lake (June 5, 1939, June 11, 1939), A.T. McClay, 2 (UCDC). Tehama Co., Mt. Lassen, June 20, 1960, D.J. & J.N. Knull, 10 (FMNH). Tehama Co., 5 mi. E. Mineral (June 9, 1960, June 20, 1960, June 26, 1960, June 30, 1960), D.J. & J.N. Knull, 7 (FMNH). Tehama Co., 12 mi. E. Mineral, July 7, 1958, D.J. & J.N. Knull, 2 (FMNH). Tehama Co., Mt. Lassen (July 23, 1956, June 20, 1960, June 28, 1960, July 2, 1963), D.J. & J.N. Knull, 77 (OSUC). Tehama Co., 5 mi. E. Mineral (June 6, 1960, June 9, 1960, June 12, 1960, June 15, 1960, June 23, 1960, June 26, 1960, June 28, 1960, June 30, 1960), D.J. & J.N. Knull, 53 (OSUC). Tehama Co., Mt. Lassen (July 2, 1963, July 5, 1963, July 10, 1963, July 17, 1963), D.J. & J.N. Knull, 31 (FSCA). Trinity Co., Nash Mine, June 13, 1913, 2 (CASC). Trinity Co., Carrville, 2400-2500 ft., June 11, 1934 (FMNH). Trinity Co., Big Flat, Coffee Creek, June 20, 1934 (FMNH). **Colorado**, Boulder Co., Longs Peak Inn, 9000 ft., July 13, 1926, E.C. Van Dyke (CASC). Conejos Co., Cumbres Pass, 10000 ft., June 20, 1935, 3 (CASC). Costilla/Huerfano Co., Veta Pass, June 24, Hubbard & Schwarz (FSCA). Gunnison Co., Gothic, July 7, 1952, C.V. Reichart (OSUC). Gunnison Co., Virginia Basin, July 14, 1952, C.V. Reichart (OSUC). Jackson/Grand Co., Rabbit Ears Pass, 8000 ft., June 17, 1949, Bryant (CASC).

Mineral Co., Wolf Creek Pass, July 21, 1938, D.J. & J.N. Knull (OSUC). Routt Co., Steamboat Springs, 8000 ft., August 15, 1944, Bryant (CASC). **Idaho**, Benewah Co., St. Maries, 2150 ft., June 12, 1949, A. J. Walz (WFBM). Bonner Co., Coolin, Priest Lake (July 17, 1927, July 18, 1927), E.C. Van Dyke, 2 (CASC). Bonner Co., Sagle, June 6, 1949, N.M. Downie, 2 (FMNH). Bonner Co., Sandpoint (July 17, 1954, July 4, 1967, July 5, 1967, July 10, 1967, July 11, 1971, July 16, 1967, July 28, 1969), N.M. Downie, 8 (FMNH). Bonner Co., Sagle (July 2, 1949, July 16, 1956), N.M. Downie, 2 (FMNH). Bonner Co., Schweizer Basin, 1500 ft. (June 14, 1983, June 16, 1983, June 20, 1983, July 11, 1984, July 17, 1984, June 20, 1985, June 27, 1986, June 27, 1986), N.M. Downie, 32 (FSCA). Bonner Co., Sandpoint (July 3, 1967, July 4, 1983, June 30, 1986), N.M. Downie, 12 (FSCA). Boundary Co. Selkirk Mts., Kaniksu National Forest, 5500 ft., July 11-13, 1967, N.M. Downie (FMNH). Butte Co., Craters of the Moon Nat. Mon., June 17, 1965, D.S. Horning, sweeping (WFBM). Kootenai Co., Moscow Bay, Cedar Mt., April 8, 1934, M.C. Lane, 2 (CASC). Latah Co., Moscow (May 25, 1950, May 28, 1950), N.M. Downie, 2 (FMNH). Latah Co., Moscow Mt., July 1, 1932, P. Rice (WFBM). Latah Co., Moscow, Moscow Mt., 4000 ft., July 23, 1936, B.F. Coon (WFBM). Latah Co., Moscow, J.M. Aldrich (WFBM). Latah Co., Moscow Mt., June 23, 1952, W.F. Barr (WFBM). Latah Co., Moscow, 3200 ft., June 13, 1929, W.E. Shull (WFBM). Latah Co., Laird Park, July 10, 1966, C. J. Horning (WFBM). Latah Co., Princeton, Moscow Mtn., June 14, 1953, J.A. Quist (CSUC). Latah Co., Viola, Moscow Mtn., June 15, 1953, J.A. Quist (CSUC). Valley Co., McCall, 8600 ft., June 14, 1931, K.E. Gibson, 2 (WFBM). Valley Co., McCall, July 23, 1951, W.F. Barr (WFBM). Valley Co., McCall, June, 23, J.H. Baker (OSUC). **Maine**, Aroostok Co., June 18, 1959, J.R. Gorham (FMNH). Hancock Co., Mt. Desert (July 5, 1929, July 6, 1929), J.N. Belkin, 8 (FSCA). Oxford Co., Paris, June 27, 1945, C.A. Frost (MEMU). Piscataquis Co., Kineo, June (CASC). Washington Co., E. Machias, June (CASC). Washington Co., Meddybemps, June 28, 1922, R.J. Sim (FMNH).

**Michigan**, Marquette Co., June 28, 1911, 8 (CASC). Marquette Co., Harvey, July 3, 1961, C.E. White (FSCA). Marquette Co., Huron Mountain Club, June, 1911, 5 (CASC).

**Minnesota**, Cook Co. Pine Mtn. Rd. W. of Gunflint Trail, July 2, 1984, N.M. Downie & Wappes (FMNH). Cook Co., Pine Mtn. Rd. W. of Gunflint Trail, July 2, 1984, Downie & Wappes, 2 (FSCA). Cook Co., Grand Marais, July 1, 1984, N.M. Downie (FSCA). Cook Co., Pine Mtn. Rd. W. of Gunflint Trail, July 2, 1984, Downie & Wappes, 4 (FSCA).

Hennepin Co., Gd. Marais, Bryant Lot 34, August 25, 1951 (CASC). **Montana**, Flathead Co., Glacier N. P., Two Medicine Lodge, July 6, 1938, 2,(CASC). **New Hampshire**, Carroll Co. Mt. Washington, July 6, 1935, J.W. Green (CASC). Carroll Co., Mt. Pist. Hse, July (CASC). Carroll Co., Mt. Washington, Fall (CASC). Carroll Co., Sanbornville, August 11, 1906 (CASC). Grafton Co., Lost River, June 8, 1962, C.E. White (FSCA). Hillsborough Co., Antrim, June 23, 1940, 2 (FSCA). Mt. Stinsra, July 2, 1924, Dartington (CASC). **New Mexico**, Catron Co., Mogolion Mt. (June 22, 1947, June 23, 1947), A.T. McClay, 8 (UCDC). Grant Co., Pinos Altos, July 4, 1975, K. Stephan (FSCA). Sandoval Co., La Ventana, Jemex Mts., 7200 ft., July 20, 1930, J. Chamberlin (CASC). Santa Fe Co., 8000 ft., July 23, 1926, E.C. Van Dyke, 2 (CASC). **New York**, Clinton Co., Up Saranac (July 3, 1928, July 12, 1928), J.W. Green, 6 (CASC). Clinton Co., Up Saranac, July 8, 1928, J.W. Green (FMNH). Clinton Co., Up Saranac, July 3, 1928, J.W. Green (MEMU). Maplecrest, Catskill Mts., June 30, 1926, F.W. Schott (FMNH). St. Lawrence Co., Rossie (June 12, 1963, June 14, 1965, June 16, 1965), N.M. Downie, 5 (FMNH). St. Lawrence Co., Rossie, June 18, 1981, N.M. Downie, 2 (FSCA). **Oregon**, Baker Co., Pine Creek, June 15, 1946, J.H. Baker, 7 (OSUC). Douglas Co., Diamond Lake, July 16, 1939, A.T. McClay (UCDC). Grant Co., Lunch Creek, Dixie Pass, Blue Mts., 4700 ft., June 24, 1952, B. Malkin, 4 (FMNH). Grant Co., Lunch Creek, Dixie Pass, Blue Mts., 4700 ft., June 24, 1952, B. Malkin & V.E. Thatcher, 3 (FMNH). Harney Co., Diamond, July 16, 1939, E.W. Jones (WFBM). Hood River Co., Homestead inn, Mount Hood (June

2, 1927, June 5th, 1927, July 2, 1927, July 3, 1927, July 5, 1927), E.C. Van Dyke, 14 (CASC). Hood River Co., Mt. Hood, 3000-6000 ft., June 25, 1925, 2 (CASC). Hood River Co., Mt. Hood, Cloud Cap Road, June 21, 1935, Secrumb (CASC). Jackson Co., Mt. Ashland, 6500-7100 ft., July 22, 1966, P.A. Opler (CASC). Jackson Co., Ashland Peak, Siskiyou Mts., 7000 ft., June 20, 1952, B. Malkin & I.M. Newwell (FMNH). Jackson Co., Butte Falls, June 11, 1939, A.T. McClay (UCDC). Klamath Co., Crater Lake, July 15, 1939, A.T. McClay (UCDC). Klamath Co., Crater Lake, July 19, 1938, A.T. McClay (UCDC). Klamath Co., Crater Lake National Park, 6500 ft., June 15, 1947, B. Malkin & S.S. Sargent (FMNH). Umatilla Co., Meacham, June 15, 1938, 2 (CASC). Union Co., Blue Mts, Tollgate Rd., 5000 ft., August 11, 1935, E.W. Jones (WFBM). Union Co., Blue mts, Tollgate Rd. 3000, June 7th, 1935, H. P. Lanchester, 2 (CASC). Union Co., Blue mts, Tollgate Rd., June 7, 1938, 4 (CASC). Wallowa Co., Blue mts, June 7, 1938, 8 (CASC). Wallowa Co., Blue mts, Moffet Mead, June 7, 1938, 2 (CASC). Wallowa Co., Blue Mts., July 20, 1951, D.J. & J.N. Knull, 2 (FMNH). Wallowa Co., Blue Mts. (May, 28, May, 29), M.C. Lane, 4 (FMNH). Wallowa Co., Blue Mts., Bone Springs, 5800 ft., June 27, 1935, E.W. Jones, 2 (WFBM). Wallowa Co., Blue Mts, Mottet Rd., 4500 ft., June 27, 1935, E.W. Jones (WFBM). Wallowa Co., Blue Mts. Mottet R.S., 5000 ft., June 5, 1941, E.W. Jones (WFBM). Wallowa Co., Blue Mts., Linoton Mt. Rd., June 10, 1938, E.W. Jones (WFBM). Wallowa Co., Blue Mts., May, 28, M.C. Lane (OSUC). Wallowa Co., Blue mts, Bone Spring, June 7, 1938, 25 (CASC). **Pennsylvania**, Monroe Co., Pocono Lake, July 20, 1918, J. W. Green (CASC). Monroe Co., Mt. Pocono Lake (July 3, 1930, June 10, 1932), J. W. Green, 2 (CASC). Sullivan Co., Laporte, June 24, 1930, J.N. Knull (FMNH). **Utah**, Utah Co., Aspen Grove Camp Mt., Timpanogos, 6800 ft. (CASC). Utah Co., Aspen grove, Environs, Timpanogos (CASC). Utah Co., Aspen Grove, July 26, 1931, B.C.H. Richmond (CASC). Utah Co., Aspen Grove B. C., May 30, 1931, J.R. Howell (CASC). Utah Co., Aspen Grove B. C. Environs, Aspen Grove, Timpanogos, 2

(CASC). Utah Co., Aspen Grove B. C. Aspen Grove, Mt. Timpanogos, July 6, 1935, 5  
 (CASC). Utah Co., Aspen Grove B. C. Aspen Grove, B.Y.U. Campus, Timpanogos, 2  
 (CASC). **Vermont**, Stowe, MT. Mansfield, Nose and Chin, June 12, 1966, Bell/ Chiolino,  
 2 (CASC). Windsor Co., Quechee, July 4, 1935, J.W. Green, 4 (CASC). **Washington**,  
 Columbia Co., Blue Mts, 6000 ft., June 28, 1931, M.C. Lane (CASC). Columbia Co.,  
 Blue Mts., Lewis Peak, 4800 ft., June 3, 1935, E.W. Jones (WFBM). Columbia Co., Blue  
 Mts., Black Snake Ridge, 4000 ft., May 22, 1936, E.W. Jones (WFBM). Columbia Co.,  
 Blue Mts., Lewis Peak, 4800 ft., June 3, 1935, E.W. Jones, (WFBM). Columbia Co.,  
 Blue Mts., Godman Springs, 5500 ft., June 25, 1935, E.W. Jones (WFBM). Klickitat Co.,  
 Ranger Station, June 21, 1935, S.E. Crumb (CASC). Klickitat Co., Ranger Station, 4000  
 ft., July 15, 1933, J. Wilcox (CASC). Okanogan Co., Lost Lake, Near Wauconda, July  
 14-16, 1948, D.G. Brannon (CSUC). Walla Walla Co., Walla Walla, July 6, 1944, E.W.  
 Jones, 5 (WFBM). Yakima Co., Yakima Ind., Forest Res., 3000 ft. (July 1, 1925, June  
 30, 1926, June 1, 1928), 4 (CASC). Yakima Co., Mt. Adams, 4500 ft., July 10, 1927,  
 M.W. Stone, 3 (CASC). Yakima Co., Mt. Adams (July, 10, July, 15), F.H. Shirck, 3  
 (FMNH). Yakima Co., Mt. Adams, Signal Pk., 4500 ft., July 10, 1927, K.E. Gibson  
 (WFBM). Yakima Co., Mt. Adams, Bird Creak Meadows, July 5, 1931, K.E. Gibson, 3  
 (WFBM). **Wyoming**, Albany Co., Laramie, July, 3, D.J. & J.N. Knull, 3 (FMNH). Albany  
 Co., Medicine Bow National Forest, July 2, 1946, A.T. McClay, 2 (UCDC). Yellowstone  
 Co., Yellowstone National Park., June 19, 1930, 3 (FMNH). Yellowstone Co.,  
 Yellowstone National Park, The Thumb, June 19, 1930, 5 (CASC). Yellowstone Co.,  
 Yellowstone National Park, The Thumb, June 19, 1930, J.N. Knull, 4 (OSUC). Teton Co.,  
 Grand Teton National Park, July 14, 1939, D.J. & J.N. Knull, 14 (OSUC).

Distribution: Interestingly, this species has apparently a disjunct distribution, including  
 both western and northeastern North America (Fig. 74).

Diagnosis: The geographically widespread *L. aeger* is most similar to *L. lanei*, but can be distinguished by the form of the male genitalia. The parameres of *L. aeger* (Fig.18) converge toward the apical blade, and the apical blade is wider than long and rounded apically. In *L. lanei* the parameres (Fig. 42) are subparallel, the apical blade is as long as wide, and triangular apically. *Limonius aeger* may be additionally confused with *L. aurifer* but the distinct brilliant metallic ruby pronotal color of that species is distinctive. Overall, *L. aeger* can be usually separated from the other small species (less than 8 mm) of *Limonius* by the rufotestaceous basal segment of the antennae and legs.

Notes: Apparently, *L. insperatus* has not been treated in the literature since its original description. After comparison of the five specimens of *L. insperatus* determined by J.N. Knull, with specimens throughout the range of *L. aeger*, no specific differences were noted.

*Limonius agonus* (Say)

*Elater agonus* Say 1839: 171-172. Type destroyed; Type locality: Massachusetts and Pennsylvania.

*Limonius agonus*, Candeze, 1860: 410, Fall, 1934: 26, LeConte, 1853: 434.

*Limonius dubitans* LeConte 1853: 433, Candeze, 1860: 407, Van Dyke, 1932: 340. Five type specimens (Syntype); Syntypes locality: (New York, Maryland, New Jersey, Connecticut, and Pennsylvania). New synonym.

Length 9.3-12 mm (length/width ratio 3-4). head Black except the clypeal margin sometimes reddish, clypeal margin entire not received medially or slightly received medially, frontal punctures deeply punctate, separated by less than width of punctures; covered with densely appressed golden setae. Antennae extending 2 to 3 segments beyond hind angles, segments 2 and 3 small, together as long as segment 4; antennal

color dark brown to black. Pronotum black throughout or with hind angles and hypomeral margin reddish yellow; 2.3-3 mm (length/width ratio as long as broad) lateral margins broadly rounded, hind angles short, hardly diverging; carina short and indistinct, less than 1/3 to 1/4 length of lateral margin, parallel with lateral margin; pronotal texture, deeply punctate, separated by less than width of punctures, covered with appressed yellow setae. Scutellum reddish to black, shell-like, deeply punctate, covered with long densely erect yellow setae. Hypomeron, not costate, not forming antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, deeply punctate, separated by more than width of punctures, with subappressed yellow setae; hypomeron black except posterior and interior border yellowish, deeply punctate, separated by less than width of punctures, covered with appressed yellow setae; metasternum black throughout, deeply punctate, separated by more than width of punctures, with appressed black setae, legs color, yellow.

Elytra 6.5- 8.5 mm (length/width ratio 2-3) reddish brown to dark brown, inter-strial moderately to deeply punctate; striae, moderately punctate.

Abdomen black except the margins reddish, finely punctate with appressed black setae.

Male Genitalia: Parameres with lateral margin tapering gradually toward apical blades, apical blades wider than long, lateral points distinct subapically, aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/4 the length of apical blades, parameres long 1.2 to 1.4 X length of basal piece.

Female bursa copulatrix (Fig 64) with small spines arranged in vaguely defined pattern on bursa walls.

Type Material Examined: Type destroyed.

Neotype male, Pennsylvania, Beaver Co., Phillipsburg, May 15, 1921, designated herein (CASC).

Type Material of Synonyms Examined: Five syntype specimens in LeConte Collection from Maryland, New York, New Jersey, Pennsylvania, and Connecticut.

Material Examined: **Canada: Ontario**, Bothwell, June 10, 1931, G.M. Stirrett, 4, on Willow (UCDC). Essex Co., Wheatley, May 1, 1963, K. Stephan (FSCA). Highgate, May 3, 1949, G.E. Coppel, 86 (CMNC). Union, June 6, 1947, D.S. Marshall, 21 (CMNC). Union, May 5, 1948, G.E. Coppel (CSUC). **Quebec**, Becancour, June 10, 1961, 4 (FSCA). Toronto, R.J. Crew (CASC). **Toronto**, May 12, 1926, L.J. Milne (UCDC).

**United States: Connecticut**, Hartford Co., Buckland, June 1, 1937 (CASC). Hartford Co., Windsor, June 1, 1917, A.W. Morrill, Tobacco (CASC). Hartford Co., Suffield, June 2, 1937, 2 (FMNH). Hartford Co., Avon, May 16, 1929, J.N. Belkin, 2 (FSCA). Hartford Co., Buckland, June 1, 1937, M.C. Lane (MEMU). Hartford Co., Buckland, June 1, 1937, M.C. Lane (OSUC). Hartford Co., Suffield, June 2, 1937, M.C. Lane (OSUC). Litchfield Co., Cornwall, May 26, 1922, Chamberlain, 4 (CASC). Litchfield Co., Cornwall, May 31, 1918, K.E. Chamberlin, 2 (FMNH). Litchfield Co., Cornwall, May 31, 1918, A. Champlain (FMNH). New Haven Co., Quinipiac R. Linear Tr. Wallingford, May 31, 2002, B. Kondratieff, R. Baumann, 7 (CSUC). Tolland Co., Ellington, June 20, 1917, F.M. Nichols (CASC). (WFBM). **District of Columbia**, Rock Creek Park, May 28, 1907, C.E. Burden, 2 (USNM). **Georgia**, Brooks Co., Burton, 1800 ft., May 21, 1911, J.C. Bradley (CASC). Clayton Co., 2000ft, May 18, 1926 (CASC). **Illinois**, Cook Co., Willow Springs, June 7, 1903, W.J. Gerhard (FMNH). Dekalb Co., Somonauk, May 17, 1930, H.S. Dybas (FMNH). Dekalb Co., Hopkins Park, June 5, 1932, H. Seevers (FMNH). La Salle Co., May 15, 1936 (CASC). Peoria Co., Jubilee College SP, June 6, 2002, B. Kondratieff, R. Baumann (CSUC). **Indiana**, LaPorte Co., Michigan City, June 11, 1935 (FMNH). Tippecanoe Co., Wildcat Creek (May 17, 1984, June 6, 1984), N.M. Downie, 3 (FMNH). Tippecanoe Co. (April 30, 1952, May 29, 1952, May 2, 1953, May 14, 1954, May 28, 1959, April 12, 1968, May 16, 1971, May 22, 1971, May 5, 1973), N.M. Downie, 9

(FMNH). Tippecanoe Co., Wildcat Creek, in Hgwy 26, May 2, 1988, N.M. Downie, 4  
(FMNH). Tippecanoe Co., Lafayette, September 26, 1972 (MEMU). Warren Co., May 10,  
1985, N.M. Downie (FMNH). **Maine**, Oxford Co., Paris (June 12, 1925, October 11,  
1925), C.A. Frost, 2 (FMNH). Oxford Co., Paris, June 13, 1910, C.A. Frost (MEMU).  
**Maryland**, Montgomery Co., Plummers Island Island, April 28, 1908, Schwarz, 2, April  
21, 1907, W.L. McAtee (USNM). Prince Georges Co., College Park, May 11, 1948, B.K.  
Dozier, sweeping (FSCA). **Massachusetts**, Middlesex Co., Concord (June 3, 1918,  
June 5, 1918), 9 (CASC). Middlesex Co., Sudbury, June 15, 1924, C.A. Frost, 2  
(FMNH). Middlesex Co., Sudbury, June 15, 1924, 2 (FMNH). Tyngs, Mer'ck River "Drift",  
April 25, 1901, Bowditch (CASC). Worcester Co., Sturbridge, June 24, 1949, C.V.  
Reichart, 2 (OSUC). **Michigan**, Macomb Co., Selfridge Fld., May 25, 1944, B. Malkin, 2  
(FMNH). **Minnesota**, Houston Co., May, 22, P.M. Schroder (FMNH). **New Hampshire**,  
Carroll Co. N. Conway (June 2, 1946, June 12, 1946), C.A. Frost, 4 (FMNH). Coos Co.,  
Zealand Camp W. Mts., 1500 ft., June 5, 1940, N.F. Hanson (FSCA). Grafton Co.,  
Rumney (June 30, 1924, July 1, 1924), 2 (CASC). **New Jersey**, Burlington Co.,  
Moorestown, June 5, 1931, R.J. Sim (CSUC). Cape May Co., Anglesea, June, 10, H.W.  
Wenzel (OSUC). Morris Co., Denville, May 4, 1941 (FMNH). Ocean Co., Lakehurst, May  
(FMNH). Union Co., Rahway, May 18, 1930, E. Lerch (USNM). Warren Co., Phillipsburg  
(May 25, 1913, June 14, 1914, May 27, 1920, May 24, 1930, June 12, 1931), J.W.  
Green, 9 (CASC). Warren Co., Phillipsburg, May, 25, J.W. Green (FMNH). May, 30,  
H.W. Wenzel, 2 (OSUC). **New York**, Clinton Co., Peru., May 29, 1914 (CASC). Clinton  
Co., June 10, 1916 (CASC). Clinton Co., Peru. (June 8, 1916, June 10, 1916), C.R.  
Crosby & W.T.M. Forbes, 2 (CASC). Erie Co., Lancaster, May 6, 1909, E. P. V. (CASC).  
Monroe Co., Honeoye Falls, May 16, 1913 (CASC). Monroe Co., Rochester Jc. (June 9,  
1914, June 16, 1914), M.D. Leonard, 2 (CASC). Oneida Co., June 1st, 1916, 3 (CASC).  
St. Lawrence Co., Canton (June 1, 1935, June 20, 1935), N.M. Downie, 2 (FMNH).

Richmond Co., Staten Island (USNM). Sullivan Co., S. Fallsburg, June 15, 1942, W. Spector (CASC). Tompkins Co., Ithaca (June 6, 1916, June 16 1917), 3 (CASC). Tompkins Co., Groton (May 31, 1942, May 31, 1953, June 4, 1953), N.M. Downie, 5 (FMNH). Tompkins Co., Ithaca (April 28, 1918, May 31, 1919), 2 (WFBM). Tompkins Co., Ithaca (April 30, 1939, May 7, 1939), E.D. McDonald, 2 (FSCA). **North Carolina**, Cherokee Co., Murphy, May, 2 (CASC). Davie Co., NC 106 Yadkin R., May 3, 2003, B. Kondratieff & R.F. Kirchner, 3 (CSUC). **Ohio**, Ashland Co., May 19, 1951, J.N. Knull, 2 (FMNH). Ashtabula Co., July, 13, R.T. Everly (FMNH). Ashtabula Co., June 5, 1937, Laura W. and R.T. Everly (OSUC). Clinton Co., May 12, 1961, F.J. Moore (OSUC). Delaware Co., May 19, 1951, N.J. & E.L. Sleeper, 2 (FMNH). Delaware Co., June 9, 1953, D.J. & J.N. Knull, 2 (FMNH). Delaware Co., May 19, 1951, N.J. & E.L. Sleeper (OSUC). Delaware Co., May 21, 1956, D.J. & J.N. Knull, 4 (OSUC). Erie Co., Sandusky, June 1, 1924, O. Cartwright (FMNH). Erie Co., Sandusky (FMNH). Franklin Co., Columbus, April 29, 1916 (CASC). Franklin Co., Columbus, April 25, 1925, J. Reeves, 2 (FMNH). Franklin Co., Columbus, May 9, 1925, O. Cartwright (FMNH). Franklin Co., Columbus, May 6, 1924, J.O. Pepper (FMNH). Franklin Co., May 24, 1949, E.L. Sleeper (FMNH). Franklin Co., Westerville, May 1, 1949, E.L. Sleeper (FMNH). Franklin Co., May 6, 1951, E.L. Sleeper (OSUC). Franklin Co., Columbus, May 17, 1938, D.H. Smith (OSUC). Franklin Co., Columbus (OSUC). Greene Co., May, 12, D.J. & J.N. Knull, 2 (FMNH). Hamilton Co., Cincinnati, May 26, 1904, 2 (OSUC). Hocking Co. (May, 20, May, 23, May 24, 1950, May, 29, May 8, 1951, May 15, 1954, June 4, 1964, May 17, 1966, May 19, 1966), D.J. & J.N. Knull, 33 (FMNH). Hocking Co. (May 20, 1930, May 20, 1953, May, 23, June 2, 1955, June 8, 1956, May 2, 1957, May 20, 1958, May 9, 1959, April 25, 1960, May 4, 1961, May 19, 1961, May 16, 1962), D.J. & J.N. Knull, 105 (OSUC). Hocking Co., June 3, 1949, J.N. Knull (OSUC). Sandusky Co. (April 24, 1942, May, 22, May, 25), G.R. Miller, 42 (OSUC). **Pennsylvania**, Allegheny Co., Pittsburgh, 2

(FMNH, CSUC). Beaver Co., Phillipsburg, May 15, 1921, 4 (CASC). Bucks Co., Cornwells, June 1, 1930, C.A. Thomas (CASC). Dauphin Co., Hummelstown (May 17, 1918, May 20, 1918, June 1, 1918), J.N. Knull, 3 (FMNH). Dauphin Co., Harrisburg (May 9, 1909, May, 15, May, 17, May, 22), J.N. Knull, 4 (FMNH). Dauphin Co., Harrisburg, May 10, 1912, A. Champlain (FMNH). Dauphin Co., Inglenook, May, 17, J.H. Knull (FMNH). Erie Co., Charter, May 28, 1931, J.N. Knull (FMNH). Greene Co., N. Cumberland, June 19, 1910, H.B. Kirk (FMNH). Lycoming Co., Barbours, June 1, 1931, J.N. Knull, 2 (FMNH). McKean Co., Mt. Alton (June 11, 1917, June 17, 1917, June 6, 1932), J.N. Knull, 6 (CASC). Northampton Co., Easton (May 30, 1910, May 18, 1914, June 20, 1915), J.W. Green, 4 (CASC). Sullivan Co., Forksville (May 30, 1931, June 1, 1931), J.N. Knull, 10 (FMNH). Sullivan Co., Laporte, June 2, 1930, J.N. Knull, 2 (FMNH). Sullivan Co., Forksville, June 1, 1931, J.N. Knull (OSUC). Sullivan Co., May, 7, J.N. Knull (OSUC). Sullivan Co., Laporte, June 2, 1930, J.N. Knull (OSUC). Warren Co., Warren, June, 16, J.N. Knull (FMNH). Westmoreland Co., Clark's Valley, May, 20, J.N. Knull, 2 (FMNH). Westmoreland Co., Clark's Valley, May 2, 1930, J.N. Knull (FMNH). Westmoreland Co., Clark's Valley, May, 2, J.N. Knull (OSUC). Newport, April 30, 1910, J.N. Knull (FMNH). **Tennessee**, Knox Co., Knoxville, April 12, G.G. Ainslie (USNM). Sevier Co., May 5, 1963, F.J. Moore, 4 (FSCA). Williamson Co., Harpeth R., Arno Rd., May 11, 2000, B. Kondratieff (CSUC). **Vermont**, Burlington, U.V.M, May 1, 1942 (CASC). W. Elmore, June 8, 1960, Bell/ Chiolino (CASC). Windham Co., Brattleboro, Spring 1894 (MEMU). Windsor Co., White River, June 5, 1914 (CASC). **Virginia**, Arlington Co., Rosslyn, May 10, 1913, W.D. Pierce (USNM). Bath Co., Back Creek, Hwy 39, Mountain Grove, May 21, 2004, B. Kondratieff, R. Zuellig, R.F. Kirchner, (CSUC). Bath Co., Blowing Sprgs Back Cr., May 24, 2002, B. Kondratieff (CSUC). Smyth Co., Rt 600 St. Clair Bottom, May 18, 1990, B. Kondratieff, J. Welch & R.F. Kirchner, 2 (CSUC).

Wythe Co., Austinville, New R., May 16, 2004, B. Kondratieff, R. Zuellig, R.F. Kirchner, 5 (CSUC).

Distribution: This species is found in eastern North America (Fig. 75).

Diagnosis: *Limenius agonus* was originally synonymized with *L. ectypus* (Say) by Horn (1879), but is considered here as a valid species. *Limenius agonus* can be distinguished from *L. ectypus* by the form of the male genitalia. The parameres of *L. agonus* (Fig.19) have the lateral margin tapering gradually toward apical blades, apical blades wider than long, lateral points distinctly subapically, aedeagus narrow, keeping the same width from the middle to tip, and extending beyond parameres by less than half the length of apical blades. The parameres of *L. ectypus* are bulbous basally, constricted before blades on apical fourth, apical blades triangular, aedeagus wide with rounded tip, and extending beyond parameres by half or more of the length of apical blades. Additionally, in *L. agonus*, the frons is poorly separated from labrum. Whereas, in *L. ectypus* the frons is well separated from labrum. Also *L. agonus* can be distinguished from *L. subauratus* by the form of the male genitalia. The parameres of *L. subauratus* (Fig. 61) with lateral margin subparallel basally gradually narrowing before blades on apical fourth, apical blades triangular; aedeagus gradually narrowing to tip, extending beyond parameres by one length of apical blades. Also *L. agonus* can be distinguished from *L. subauratus* by the antennal segments. In *L. agonus* segments 2 and 3 are small, together subequal to 4. In *L. subauratus* segment 2 is small, and segment 3 longer than half of segment 4.

Remarks: A neotype male was designated to present any future confusion about Say (1839) concept of this species.

Notes: A comparison of the syntypes of *L. dubitans* with typical *L. agonus*, indicated no specific differences. The male genitalia of both species are identical. However, the five syntypes of *L. dubitans* appear more robust than the more typical *L. agonus* examined from throughout its range.

*Limonius aurifer* LeConte

*Limonius aurifer* LeConte 1853: 429-430, Brooks, 1960: 29, Candeze, 1860: 386, Van Dyke, 1932: 338, Dietrich, 1945: 13. Holotype # 2329 (MCZC). Type locality Illinois.

Length: 5.75-7 mm (length/width ratio 3.3-3.5). Head brilliant ruby color, metallic clypeal margin entire, slightly received medially, frontal punctures deeply punctate, separated by less than width of punctures, with appressed yellow setae. Antennae reaching about 2 segments beyond hind angles; segment 2 and 3 small, together just shorter than segment 4, antennal color brown. Pronotum brilliant metallic ruby color, with hind angles reddish, 1.8-2.2 mm (length/width ratio 1.15-1.17) pronotal margin longer than broad sub-parallel, carina parallel with lateral margin less than  $\frac{1}{4}$  length of lateral margin, pronotal texture, deeply punctate, separated by more than width of punctures, covered with appressed red setae. Scutellum black, shell-like, subumbilicate punctures, with appressed yellow setae. Hypomeron, corinate anteriorad, forming small antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, deeply punctures, separated by less than width of punctures, with small appressed yellow setae; hypomeron black except posterior and anterior border orange, deeply punctures, separated by less than width of punctures, with small appressed yellow setae; metasternum black throughout, deeply punctate, with small appressed yellow setae, legs color, reddish to black.

Elytra 3.75- 4.5 mm (length/width ratio 2.14-2.37) dark brown to black, striae deeply punctate, inter-striae deeply punctate, covered with erect yellow setae.

Abdomen black throughout, deeply punctate separated by less than width of punctures, with finely appressed yellow setae.

Male genitalia (Fig. 20): parameres narrow, parallel on apical half, apical blades as wide as long, rounded apically, aedeagus wide with rounded tip, extending beyond parameres by less than 1/3 length of apical blades, parameres long 2.8 to 3 X length of basal piece. The female bursa copulatrix not sclerotized.

Type Material Examined: MCZC type number 2329, LeConte Collection the type without locality labels. In the LeConte Collection additional two specimens without locality label.

Material Examined: **Canada: Ontario**, Picton Co., Prince Edward, June 6, 1944, Brimley, 2 (CASC). Ridgeway, July 15, 1917, M.C. VanDuzee (CASC). **Quebec**, La Trappe, June 11, 1935, 2 (CASC)., LaTrappe, June 11, 1935, 2 (MEM). Montreal (CSUC).

**United States: Alabama**, Winston Co., Natural Bridge, June 22, 1958, H.R. Steeves, on foliage, 4 (FMNH). **Illinois**, Cook Co., Edgebrook, May 8, 1912 (FMNH). **Indiana**, Brown Co., June 12, 1970, N.M. Downie (FMNH). Brown Co., Bear Wallow, May 27, 1967, C.E. White (FSCA). **Kentucky**, Breathitt Co., Noble (June 23, 1955, July 20, 1955), C.J. Hay, 2 (FMNH). Rowan Co., Morehead, June 11, 1949, D.J. & J.N. Knull (FMNH). **Michigan**, Oakland Co., May 13, 1924, A.W. Andrews (FMNH). Wayne Co., Detroit (June 5, 1906, June 5, 1906, June 24, 1908), 3 (MEMU). Hrn. Mtn. Club., June (CASC). 5 (FMNH).

**Mississippi**, Tishomingo Co., Tishomingo State Park, June 16, 1991, T.L. Schiefer (MEMU). **New York**, Erie Co., Colden, August 19, 1917, M.C. VanDuzee (CASC). Essex Co., Whiteface Mt., 4867 ft., July 29, 1990, J. Huother (FSCA), St. Lawrence Co., Rossie (June 16, 1968, June 18, 1968, May 22, 1973, May 24, 1973, May 27, 1973, June 4, 1976), N.M. Downie, 7 (FMNH). Tompkins Co., Ithaca, July 24, 1940, J.N. Belkin (FSCA). Tompkins Co., Ithaca, July, 1895 (OSUC). **North Carolina**, Jackson Co., Balsam (May 19, 1959, May 28, 1959, June 10, 1959, June 19, 1959, June 7, 1961, June 7, 1969), W. Rosenberg, on ash, 8 (FMNH). Jackson Co., Blasam (June 2, 1961, May 25, 1962, May 27, 1962), W. Rosenberg, 3 (FSCA). Macon Co., Coweeta

Hydrologic Lab (July 13-21, 1974, May 25, 1986), R. Turnbow, 3 (FSCA). Yancey/Buncombe Co., Black Mts., 4 (CASC). Buncombe Co., Black Mts., June 1, 1902, 9 (CASC). Buncombe Co., Black Mts. (June 14, 1912, June 16, 1912), Beutenmüller, 2 (CASC). Buncombe Co., Black Mts. (May 18- July 17, 1902, June 5, 1912, June 14, 1912, June 15, 1912, June 18, 1912), W., 8 (OSUC). **Ohio**, Ashland Co., May 19, 1951, J. N. Knull & E.L. Sleeper (FMNH). Ashland Co., July 1, 1947, D.J. & J. N. Knull (FMNH). Champaign Co., Cedar Swn., July 26, 1966, D.J. & J.N. Knull (FMNH). Greene Co., May 16, 1957, D.J. & J.N. Knull (FMNH). Hocking Co. (April, 20, May 30, 1961, June, 1, June 5, 1961, July 10, 1962, May 20, 1963, May 18, 1965), D.J. & J. N. Knull, 24 (FMNH). Hocking Co. (May, 23, May, 29), D.J. & J.N. Knull, 2 (OSUC). Madison Co., London, June 23, 1904, J.S. Hine (OSUC). Scioto Co., Lucasville, June 15, 1963, K. Stephan (FSCA). **Pennsylvania**, Allegheny Co., Pittsburgh, H.G. Klages (FMNH). Allegheny Co., Pittsburgh, H.G. Klages (OSUC). Centre Co., State College, June 10, 1912, J.N. Knull (FMNH). Lycoming Co., Barbours (June 1, 1931, May 30, 1931, May 28, 1932, May 29, 1932), J.N. Knull, 21 (FMNH). Mercer Co., Pymatuning, Swamp, June, 14, J.N. Knull (FMNH). Sullivan Co., Laporte, June 4, 1932, 2 (CASC). Sullivan Co., Laporte, June 5, 1932, J.N. Knull, 4 (FMNH). Sullivan Co., Forksville (June 2, 1930, May 31, 1931, June 1, 1931), J.N. Knull, 5 (FMNH). **Tennessee**, Sevier Co., Great Smoky Mt. National Park (June 8, 1955, June 7, 1942, June 8, 1955), D.J. & J.N. Knull, 9 (FMNH). Sevier Co., May 5, 1963, F.J. Moore, (OSUC). Sevier Co., Great Smoky Mt. National Park (June 7, 1942, June 21, 1942), D. J. & J.N. Knull, 2 (OSUC). Sevier Co., Great Smoky Mt. National Park, May, 24, R.C. Osburn (OSUC).

Distribution: This species is found in eastern North America (Fig. 76).

Diagnosis: *Limonius aurifer* can be separated from all of the North American *Limonius* by the unique brilliant metallic ruby pronotum, and the parameres (Fig. 20) that are narrow, parallel on apical half, apical blades as wide as long.

*Limonius auripilis* (Say).

*Elater auripilis* Say 1823:172-173. Holotype destroyed (Mawdsley 1993). Type locality: Arkansas.

*Limonius auripilis*, LeConte, 1853: 429, Candeze, 1860: 382, Van Dyke, 1932: 336, Dietrich, 1945: 13.

*Limonius pubicollis* LeConte 1853: 429, Candeze, 1860: 382, Knull, 1947: 178-179. Syntype # 2526 (MCZC). Type locality: Texas, Illinois. Synonymized by Candeze, 1860: 382.

Length: 8.5-11.5 mm (length/width ratio 3.14-3.2). Head black throughout, clypeal margin deeply incised medially, frontal punctures deeply punctate, separated by more than width of punctures, covered with appressed golden setae. Antennae extending one or less segment beyond hind angles, segment 2 small, segment 3 as long as segment 4, antennal color dark brown to black. Pronotum black with posterior border of hypomeron yellowish, 2.12-3 mm (length/width ratio almost as long as broad), widest a middle, narrowing interiorly and posterior, broadly rounded, carina short, 1/6<sup>th</sup> length of margin, sub-parallel to pronotal margin, pronotal texture, deeply punctate, separated by less than width of punctures, covered with dense appressed light orange setae. Scutellum black, convex with anterior margin incised, with yellow setae. Hypomeron, costate anteriorad, forming small antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, deeply punctures, separated by more than width of punctures, with appressed yellow setae; hypomeron black except posterior and anterior border reddish, umbilicate punctures, separated by less than width of punctures, with small appressed yellow setae; metasternum black throughout, deeply punctate, with small appressed black setae, legs color, yellowish to orange.

Elytra 6- 8.16 mm (length/width ratio 2.4-2.43), black except the elytral base reddish, striae finely punctate, inter-striae deeply punctate, with Oppressed golden setae.

Abdomen black except the last two segments reddish to dark brown, finely punctate separated by more than width of punctures, with small appressed black setae.

Male genitalia (Fig. 21): parameres with lateral margin convex basally, apical blade 1.3 to 1.5 X longer than wide, with apex narrowly rounded, aedeagus gradually narrowing to tip, extending beyond parameres by 15%-25% length of apical blades, parameres long, 1.5 to 1.7 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype destroyed.

Type Material of Synonyms Examined: *Limonius pubicollis*, six syntype specimens, four of them without locality labels, one labeled "Texas" and one labeled "Illinois".

Material Examined: **Canada: Ontario**, Blytheswood, May 28, 1935, G.M. Stirrett (CMNC).

**United States: Alabama**, Etowah Co., Gadsden, May 9-11, 1940 (CASC). Monroe Co., Haies Island Park 31°43'23" N 87°28'10" W, May 26-31, 1995, J.A. MacGown, Mercury vapor and blacklight Trap (MEMU). Shelby Co., nr. Helena, April 24, 1955, H.R. Steven, on newly-cut stump (FMNH). **Arizona**, Pima Co., Baboquivari Mts., E.G. Smyth (CSUC) [? Possibly mislabeled]. **District of Columbia**, May 19, 1918 (CASC). **Florida**, Alachua Co., April 27, 1955, H.V. Weems (FSCA). Alachua Co. (October 20, 1938, May 19, 1951), 2 (FSCA). Alachua Co., Gainesville, March 3-24, 1953, B.K. Dozier (FSCA). Alachua Co., March, 1953, L.A. Hetrick (FSCA). Alachua Co., Gainesville, April 8, 1961, H.V. Weems, At *Quercus nigra* L. (FSCA). Alachua Co., Gainesville (March 19, 1961, March 25, 1961), H.V. Weems, 2 (FSCA). Alachua Co., April 13, 1956, R.A. Morse, at *Melilotus alba* (FSCA). Alachua Co., Gainesville (March 30, 1924, April 12, 1924), T.H. Hubbell, 2 (FSCA). Alachua Co., Gainesville (March 27, 1927, April 11, 1930), G.B.

Merrill, 2 (FSCA). Alachua Co., Gainesville, March 20, 1964, F.W. Mead, Edge of  
 hammock (FSCA). Holmes Co., 8 m. SW. Leonia, April 17, 1983, R. Turnbow (FSCA).  
 Jackson Co., Spring Lake, May 25, 1975, W.H. Cross (MEMU). Leon Co., 20 Mi. N. of  
 Tallahassee Tall Timbers Res. Sta., April 7, 1972 (FMNH). Leon Co., Tall Timbers Res.  
 Sta. 20 m. N. Tallahassee, May 3-6, 1972, R.L. Jacques (FSCA). Leon Co., Tall Timbers  
 Res. Sta., April 6, 1985, R. Turnbow (FSCA). Liberty Co., Apalachicola National Forest,  
 Camel Lake, May 16, 1971, H.V. Weems (FSCA). Liberty Co., Torreya State Park, May  
 15, 1964, R.E. White (FSCA). Wakulla Co., Ochlockonee River State Park, May 14,  
 1971, G.B. Fairchild, Mack Lading (FSCA). Walton Co., Hwy. 185, 1 m. SW. Holmes  
 Co., April 17, 1983, R. Turnbow (FSCA). (FMNH). **Georgia**, Lowndes Co., April 24,  
 1970, 2 (FMNH). Thomas Co., Thomasville (OSUC). Jloyal, May 21, 1906 (CASC).  
**Indiana**, Brown Co., June 8, 1973, N.M. Downie (FMNH). Brown Co., Bear Wallow  
 (June 9, 1967, June 20, 1967), C.E. White, 2 (FSCA). **Iowa**, Howard Co., Elma, Warren,  
 (CASC). Howard Co., Elma, July, 14 (FMNH). **Kansas**, Riley Co., Marlatt, July, 2  
 (CSUC). Riley Co., Popenoe, June, 29 (CSUC). **Louisiana**, St. Helena Parish, April 15,  
 1970, W.H. Cross, On Saturn yellow stickum trap (MEMU). **Michigan**, 7 (FMNH).  
**Mississippi**, Attala Co, 21-22 m. NE. Kosciusko, May 7, 1974, W.H. Cross (MEMU).  
 Choctaw Co., WNW. Ackerman, April 27, 1972, J.E. Leggett, 3 (MEMU). Clay Co., 45 m.  
 W. Pheba, June 13, 1972, J.E. Leggett (MEMU). Jefferson Davis Co., May 1, 1970, W.L.  
 Johnson (MEMU). Lafayette Co., Oxford, May 2, 1949, H.V. Weems (FSCA). Agriculture  
 College., May, 20, J.P. Welborn (MEMU). Agriculture College., April 29, 1917 (MEMU).  
 Agriculture College, March, 1915, W.B. Williams (MEMU). Agriculture College. (May 12,  
 1921, May 7, 1922), P.D. Sanders, 2 (MEMU). Agr. Coll., April 20, 1906, M. Taylor  
 (MEMU). **North Carolina**, Avery Co., Cranberry, June 9, 1919, H.W. Wenzel, 2 (FMNH).  
 Avery Co., Cranberry, June 9, 1919, H.W. Wenzel, 6 (OSUC). Burke Co., Morganton,  
 July 25, 1947, H.V. Weems (FSCA). Haywood Co., Shining Rock, July 2, 1961, H.V.

Weems, 8 (FSCA). Jackson Co., Balsam (July 21, 1955, June 22, 1955, June 14, 1957, May 24, 1958, June 24, 1958, May 20, 1959, July 4, 1959), W. Rosenberg, 7 (FMNH). Jackson Co., Blue Ridge Parkway, MM. 300, June 22, 1988, N.M. Downie (FMNH). Jackson Co., Balsam, June 1, 1956, D.J. & J. N. Knull, 2 (OSUC). Wake Co., Raleigh, April 12, 1953, B.K. Dozier (FSCA). Yancey Co., Mt. Mitchell, 2 (CASC). Yancey/Buncombe Co., Black Mts. (May 26, 1912, May 30, 1912, June 10, 1912, July 20, 1912), Beutenmüller, 5 (CASC). Yancey/Buncombe Co., Black Mts., 4 (CASC). Yancey/Buncombe Co., Black Mts. (May 15, 1912, June 8, 1912, June 9, 1912, June 10, 1912, June 11, 1912, June 20, 1912, June 26, 1912, June 28, 1912, July 2, 1912, Beutenmüller, 11 (OSUC). **Ohio**, Clinton Co., May 19, 1960, F.J. Moore (OSUC). Delaware Co. (May 20, 1943, May 29, 1949, May 30, 1950), D.J. & J. N. Knull, 7 (FMNH, CSUC). Delaware Co. (May 30, 1943, July 25, 1948, June, 2, June, 21, 1950, May, 21, May, 28, July, 2, August, 3), D.J. & J. N. Knull, 57 (OSUC). Delaware Co. (May, 26, June, 17), J. N. Knull, 7 (OSUC). Delaware Co., May, 21, D.J. & J. N. Knull (FSCA). Fairfield Co., August, 15, D.J. & J. N. Knull (OSUC). Franklin Co., June 12, 1940, D.J. & J. N. Knull, 2 (FMNH). Franklin Co., June 9, 1952, D.J. & J. N. Knull, 26 (OSUC). Franklin Co., June 9, 1952, D.J. & J. N. Knull (FSCA). Greene Co., May 19, 1955, D.J. & J. N. Knull (FSCA). Hocking Co., May 17, 1936, J.N. Knull, 2 (FMNH). Hocking Co., June 4, 1964, D.J. & J. N. Knull, 2 (FMNH). Hocking Co. (June 14, 1936, May 8, 1938, May 22, 1938, May, 2, May 20, 1959, May, 23, May 26, 1953, May 27, 1953, May, 28, June, 2, June 4, 1953, June, 12, June 20, 1953, June, 24, June, 25), D.J. & J. N. Knull, 53 (OSUC). Hocking Co., Cantwell Cliffs, June, 21, J.N. Knull (OSUC). Hocking Co. (May 24, 1936, June 14, 1936), J.N. Knull, 2 (OSUC). Hocking Co., May 20, 1953, D.J. & J. N. Knull (FSCA). Scioto Co., June 17, 1944, D.J. & J. N. Knull (OSUC). **Oklahoma**, Comanche Co., Fort Sill, West Range, Rock Cr., May 28, 2004, B. Kondratieff, R. Zuellig, R.F. Kirchner (CSUC). Latimer Co. (May, 1985, June, 1985), K.

Stephan, beating upland forest, 9 (FSCA). Latimer Co. (June, 1986, May, 1987, May, 1988, June, 1988, April, 1989, May, 1989, July, 1989, May, 1990, May, 1991, June, 1991, June, 1992, May, 1992, May, 1993, May, 1994), K. Stephan, 30 (FSCA). Latimer Co. (May, 1982, May, 1983, June, 1983, July, 1983, May, 1984, April, 1985, May, 1985, May, 1987, May, 1988, May, 1991), K. Stephan, 19 (TAMU). Latimer Co., 5 mi. W. Red Oak, June 11, 1977, K. Stephan (TAMU). Payne Co., Stillwater, June 14, 1930, H.L. Whitaker (CASC). **Pennsylvania**, Adams Co., Cold Springs (June 9, 1932, July 16, 1932), J.N. Knull, 2 (FMNH). Allegheny Co., June 12, 1937, A.C. Miller, 4 (OSUC). Clearfield Co., Boardman, July 16, 1931, J.N. Knull (FMNH). Clinton Co., Renovo, June, 17, J.N. Knull (FMNH). Clinton Co., Hammersley Fork, July 13, 1932, J.N. Knull (FMNH). Dauphin Co., Hummelstown, June 8, 1933, J.N. Knull (FMNH). Erie Co., Charter Oak, July 11, 1917, J.N. Knull (FMNH). Franklin Co., Chambersburg, May, 26, J.N. Knull (FMNH). Franklin Co., Horse Valley, May 22, 1932, J.N. Knull (FMNH). Lycoming Co., July 8, 1930, J.N. Knull (FMNH). McKean Co., Mont Alto. (June 3, 1932, June 11, 1932), J.N. Knull, 2 (FMNH). McKean Co., Kane, July 8, 1930, J.N. Knull (FMNH). McKean Co., Mont Alto., June 11, 1932, J.N. Knull (OSUC). Northampton Co., Easton (June 17, 1934, May 29, 1944), J.W. Green, 3 (CASC). Perry Co., July 4, 1930, J.N. Knull, 2 (FMNH). Potter Co., Sweden Valley, June 2, 1932, J.N. Knull, 4 (FMNH). Sullivan Co., Laporte, June 13, 1932, J.N. Knull (FMNH). Westmoreland Co., Jeannette, H.G. Klages (CASC). **Tennessee**, Sevier Co., Grt. Smoky M. National Park, June 21, 1935, H.S. Dybas (FMNH). Sevier Co., Grt. Smoky M. National Park (June 7, 1942, May 31, 1956), D.J. & J. N. Knull, 7 (FMNH). Sevier Co., Grt. Smoky M. National Park, June 16, 1946, G. Steyskal (OSUC). Sevier Co., Grt. Smoky M. National Park (June 20, 1940, June 7, 1942, June 14, 1942, June 21, 1942), D.J. & J. N. Knull, 17 (OSUC). Smith Co., Elmwood (CASC). **Texas**, Brazos Co., College Station, April 21, 1933, H.J. Reinhard (TAMU). Brazos Co., College Station, May, 1933, J.C. Gaines, on tanglefoot screen

(TAMU). Cass Co., Atlanta, May 26, 1964, K. Stephan (FSCA). Nacogdoches Co., 15 mi. E. of Nacogdoches, April 7, 1963, H.R. Burke, 2 (TAMU). Travis Co., Vic. Long Hollow Ck, March 26, 1994, M. Quinn, E. Riley, R. Wharton, on *Quercus virginiana*, 30°27'43", 97°52'19", 2 (TAMU). Tarrant Co., Lake Worth Nat. Ctr., May 6, 1981, C.S. Wolfe (CSUC). Travis Co., Vic. Cypress Creek, April 9-10, 1994, M. Quinn, E. Riley, R. Wharton, on *Quercus virginiana*, 30°25'58", 97°52'01" (TAMU). Uvalde Co., 26-29 m. N. Uvalde near Garner St. Park, May 20, 1977, P.T. Hovore (FSCA). Uvalde Co., Garner State Park, May 6, 1961, S.G. Wellso (TAMU). Victoria Co., 3 mi. S. Inez, May 6, 1978, N.M. Downie (FMNH). C.F. Baker (FMNH). **Virginia**, Bath Co., White Sulphur Springs, June (CASC). Hampton Co., Hampton, May 29, 1944, N.M. Downie (FMNH). Page Co., Skyland, June 18, 1924, Quirsfeld, 2 (CASC). **West Virginia**, Pocahontas Co., Cranberry Glades, August 13, 1957, H.V. Weems (FMNH).

Distribution: This species is widespread over central and eastern United States. There is only one record from Arizona in the CSUC collected by E.G. Smyth, if the locality is reliable, this species may have a wider distribution (Fig. 77).

Diagnosis: *Limenius auripilis* is most similar to *L. fulvipilis* but can be recognized by the deeply incised medially semicircular clypeal margin, antennal segment 2 smaller than segment 3, segment 3 almost as long as segment 4, and the pronotum as long as broad.

Note: A comparison of the six syntypes of *L. pubicollis* at the MCZC with the typical *L. auripilis* indicated no specific differences. The pronotum color of the six syntypes of *L. pubicollis* is black. Whereas, some specimens of *L. auripilis*, the black pronotum may have the hind angles yellow.

*Limenius basilaris* (Say).

*Elater basilaris* Say 1823: 172. Type destroyed; type locality: Missouri.

*Limonius basilaris*, LeConte, 1853: 431, Candeze, 1860: 398, Van Dyke, 1932:  
337, Dietrich, 1945: 15.

*Limonius semianeus* LeConte 1853: 432, Leng 1920: 168, Candeze, 1860: 398,  
Fall, 1934: 29. Holotype # 2533 (MCZC). Type locality: Georgia.  
Synonymized, Leng 1920: 168.

Length: 5.1-6.17 mm (length/width ratio 3.16-3.25). Head black throughout, clypeal margin strongly undulate and reserved medially, frontal punctures deeply punctate, separated by less than width of punctures, with appressed yellow setae. Antennae extending two to three segments beyond hind angles, segment 2 and 3 small, together about 2/3 length of segment 4, antennal color black. Pronotum black with hind angles and hypomerical margin yellow, 1.75-2.2 mm (length/width ratio 1.6-1.8), pronotal margin subparallel, carina sub-parallel with lateral margin, about 1/3 length of lateral margin pronotal texture, deeply punctate, separated by less than width of punctures, covered with appressed yellow setae. Scutellum shell-like, black, deeply punctate, with appressed yellow setae. Hypomeron, not costate anteriorad, not forming antennal groove; posterior border of hypomeron without teeth; prosternum, black except posterior and anterior borders yellowish deeply punctures, separated by less than width of punctures, with appressed yellow setae; hypomeron black except posterior and anterior borders yellowish, deeply punctures, separated by less than width of punctures, with appressed yellow setae; metasternum black throughout, finely punctate, with appressed yellow setae, legs color, yellowish to orange.

Elytra 3.15- 3.8 mm (length/width ratio 2.4-2.5), brown to black, striae finely punctate, inter-striae deeply and parallel punctate punctate, with subappressed yellow setae.

Abdomen black, finely punctate, with appressed yellow setae.

Male Genitalia (Fig. 22): parameres with lateral margin subparallel, apical blades triangular longer than wide, aedeagus thick with rounded tip. Extending beyond parameres by less than half the length of apical blades. Parameres long 2.8-3 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype destroyed.

Type Material of Synonyms Examined: the type of *L. semianeus*, Georgia, type MCZC number 2533.

Material examined: **Canada: Ontario**, Fisher Glen, June 11, 1931, W.J. Brown (UCDC). Normandale, June 18, 1931, W.J. Brown, 2 (UCDC). St. Williams, Backus Woods, May 28, 1982, D.E. Bright, 8 (CMNC). Thunder Bay, July 2, 1978, M. Sanborne (CMNC). Turkey Point, June 8, 1931, W.J. Brown, 2 (UCDC).

**United States: Alabama**, Cleburne Co., Cheaha State Park 33°29'02" N 85°49'00" W, May 19, 1998, J.A. MacGown, M.V. lamp in mixed forest, W.H. Cross Expedition (MEMU). Cleburne Co., Talladega National Forest, 33°28'28" N 85°50'07" W, May 18, 1998, T.L. Schiefer, M.V. lamp in mixed forest, W.H. Cross Expedition, 3 (MEMU). Cleburne Co., Cheaha State Park, 33°28'58" N 85°48'52" W, May 18, 1998, T.L. Schiefer, Blacklight & M.V. lamp in mixed forest (MEMU). Cleburne Co., Cheaha State Park, 33°29'35" N 85°48'32" W, May 15, 1998, T.L. Schiefer, Blacklight & M.V. lamp in mixed forest (MEMU). Dale Co., Ft. Rucker Mil. Res. (April 22, 1983, April 30, 1983), R. Turnbow, 2 (FSCA). Dekalb Co., DeSoto State Park T 6 S, R 10 E, Sec. 20 SW- 29 NW, 1360-1460 ft., May 19-23, 1990, T. Schiefer, 2 (MEMU). Dekalb Co., DeSoto State Park T 6 S, R 10 E, Sec. 29 NW, 1400-1500 ft., May 18-24, 1990, R. Brown & D. Pollock (MEMU). Dekalb Co., DeSoto State Park T 6 S, R 10 E, Sec. 19 W, 1600-1700 ft., May 18, 1990, R. Brown & D. Pollock, sweeping (MEMU). Monroe Co., 1 mi. S. Claiborne Dam 31°35'30" N 87°32'12" W, May 29-30, 1995, T.L. Schiefer, beating , 3 (MEMU).

Pickens Co., 6.5 mi. E. Gordo, May 22, 1988, R.L. Brown, sweeping (MEMU).

**Arkansas**, Crawford Co., Lk. Ft. Smith St. Pk., June 1, 1990, D.J. Heffern, 2, (CSUC).

Johnson Co., Ozark National Forest, May 12, 1987, R.L. Brown, 12 (MEMU). Loban Co., Magazine Mt., June 23, 1976, W.H. Cross, swept from flowering *Coronilla varia* (MEMU).

Logan Co., Cove Lake, T 7 N. R 25 W, Sec. 35 SE, 1020 Ft., May 14-20, 1989, T. Schiefer, & P. Porter (MEMU). Logan Co., Magazine Mt. 16 N. R 25 W, Sec. 20 SE, 2640 ft., May 15-20, 1989, J. MacGown & Q. Fang, sweeping, 20 (MEMU). Logan Co., Magazine Mt. 16 N. R 25 W, Sec. 23 NW, 2500 ft., May 15-16, 1989, R.L. Brown & J. MacGown, Blacklight Trap (MEMU). Logan Co., Cove Lake, T 7 N. R 25 W, Sec. 35 SE, 1020 Ft., May 14-20, 1989, T. Schiefer, & P. Porter (MEMU).

**Connecticut**, New London Co., Lyme (May 29, 1910, July 2, 1911), 3 (FMNH).

**Florida**, Alachua Co., Archer, April 22, 1961, R.E. Woodruff (FMNH). Alachua Co., Poe Springs, March 15, 1977, E.E. Grissell (CASC). Alachua Co., 2 mi. W. of Archer, March 22, 1958, Howeden & Dozier, sweeping oak, 4 (FMNH). Alachua Co. (March 30, 1954, March 10, 1955), H.V. Weems, 25 (FSCA). Alachua Co., April 2, 1956, R.A. Morse (FSCA). Alachua Co., Newnans L., March 29, 1960, R.E. Woodruff, 4 (FSCA). Alachua Co., Devil's Millhopper (March 31, 1960, April 2, 1961), R.E. Woodruff, 14 (FSCA). Alachua Co., April 15, 1949, E.H. McConkey (FSCA). Alachua Co., Micanopy, March 19, 1961, R.E. Woodruff, 12 (FSCA). Alachua Co., Gainesville, April 14, 1951, H.V. Weems (FSCA). Alachua Co., Devil's Millhopper, March 20, 1964, F.W. Mead, 2 (FSCA). Alachua Co., Poe Springs, March 15, 1977, E.E. Grissell, 4 (FSCA). Alachua Co., Gainesville, April 8, 1961, H.V. Weems, at *Quercus nigra* L., 2 (FSCA). Alachua Co., Poe Springs, March 15, 1977, E.E. Grissell, sweeping low vegetation, 9 (FSCA). Alachua Co., 2 mi. W. of Archer (May 22, 1953, May 23, 1953), B.K. Dozier, sweeping oak, 3 (FSCA). Alachua Co., Gainesville (April 20, 1984, April 21, 1984), N.M. Downie, 11 (FSCA). Alachua Co., April 20, 1984, N.M. Downie, 3 (FSCA). Alachua Co. (March 20, 1959, March 24, 1959), H.V. Weems, 2

(FMNH). Alachua Co., Devil's Millhopper, March 31, 1960, R.E. Woodruff, 3 (FMNH). Alachua Co., May 17, 1961, F.J. Moore (FMNH). Alachua Co., 2 mi. W. of Archer, March 22, 1958, Howeden & Dozier, sweeping oak (FMNH). Alachua Co., March 28, 1956, R.A. Morse, at *Melilotus alba* (FMNH). Alachua Co., Gainesville, March 24, 1953, H.F. Howden, sweeping weeds (FMNH). Alachua Co., Gainesville, April 6, 1990, N.M. Downie, sweeping weeds (FMNH). Alachua Co., Gainesville (April 21, 1984, April 6, 1990), N.M. Downie, 2 (FMNH). Columbia Co., Leone, April 9, 1971, N.M. Downie (FMNH). Columbia Co., O'Leno State Park (April 19, 1954, May 4, 1958), F.W. Mead, 3 (FSCA). Dixie Co., Old Town, April 11, 1980, N.M. Downie (FMNH). Franklin Co., Eastpoint (April 2, 1970, April 3, 1970, April 9, 1971, April 15, 1977, April 18, 1978, April 12, 1979), N.M. Downie, 16 (FMNH). Franklin Co., Eastpoint, April 5, 1972, N.M. Downie (FSCA). Jackson Co., Fla. Caverns State Park, April 23, 1961, H.V. Weems (FSCA). Gilchrist Levy Co., March 21, 1989, M.J. Rothschild, Manatee sp. (CASC). Gilchrist Levy Co., Manatee Springs State Park, March 21, 1989, M.J. Rothschild (FSCA). Manatee Co., July 16, 1962, D.C. Chancey (FSCA). Marion Co., Lake Kerr, Ocala National Forest, March 23, 1961, R.E. Woodruff (FMNH). Marion Co., Lake Kerr, Ocala National Forest, March 23, 1961, R.E. Woodruff, 14 (FSCA). Putnam Co., March 4, 1950 (FSCA). Volusia Co., De Leon Springs, April 19, 1960, R.E. Woodruff, 2 (FMNH). Volusia Co., De Leon Springs, April 19, 1960, R.E. Woodruff, 9 (FSCA). Wakulla Co., Ochlocknee St. Pk., April 6, 1983, N.M. Downie (FMNH) Wakulla Co., Ochlockonee Riv., State Park, April 15, 1982, N.M. Downie (CASC). Wakulla Co., Ochlocknee River State Park. (April 10, 1980, April 15, 1982, May 1, 1991), N.M. Downie, 4 (FMNH). Wakulla Co., Ochlocknee River State Park. (April 6, 1983, April 20, 1983), N.M. Downie, 4 (FSCA). Wakulla Co., Ochlocknee State Park., April 20, 1983, N.M. Downie, 2 (FSCA). Wakulla Co., Ochlockonee River State Park, April 15, 1982, N.M. Downie, 3 (FSCA). **Georgia**, Clarke Co., Whitehall Forest, May 12, 1975, R. Turnbow (TAMU). Fulton Co., Atlanta,

May 12, 1937, P.W. Fattig (FMNH). Glynn Co., Saint Simon Island, April 22- May 12, 1911, J.C. Bradley (CASC). Habershan Co., May 14, 1961, F.J. Moore, 5 (OSUC). Habun Co., May 18, 1961, F.J. Moore (OSUC). Lowndes Co., March 31, 1963, E.I. Hazard, 5 (FMNH). Lowndes Co., March 31, 1963, E.I. Hazard, 7 (FSCA). Rabun Co., Black Rock Mt., 3000 ft., May 20-25, 1911 (CASC). Rabun Co., Rabun Bald, June 6, 1937, P.W. Fattig (FMNH). White Co., Yonah Mt., June 20, 1937, P.W. Fattig (FMNH).

**Idaho**, Tippecanoe Co., May 28, 1985, N.M. Downie (FMNH). **Illinois**, Coles Co., Fox Ridge St. Pk., June 12, 1966, John D. Pinto (CASC). Cook Co., Irving Park ( June 8, 1912, June 18, 1912), 5 (CASC). Cook Co., Edgebrook, July 5, 1917 (FMNH). Cook Co., Chicago, June 3, 1906, W.J. Gerhard (FMNH). Cook Co., Palos Park, June 20, 1937, H.S. Dybas (FMNH). Cook Co., Willow Springs, May 5, 1933, H.S. Dybas (FMNH). DuPage Co., Glen Ellyn, May 30, 1902, W.J. Gerhard (FMNH). Saint Clair Co., Kahokia (May 31, 1898, June 1, 1904), G.W. Bock, 3 (MEMU). Saint Clair Co., Falling Springs, May 29, 1919, G.W. Bock (MEMU). Saint Clair Co. (June 8, 1903, June 10, 1904), G.W. Bock, 4 (MEMU). **Indiana**, Brown Co. (June 8, 1969, June 6, 1976), N.M. Downie, 3 (FMNH). Brown Co., Bear Wallow, June 10, 1972, R.L. Jacques (FSCA). Jasper Co., Jasper Pulaski Wla., June 27, 1997, S.G. Wellso (TAMU). Lake Co., Hessville, June 4, 1911, A.B. Wolcott (FMNH). Lake Co., Hessville, May 30, 1909, W.J. Gerhard, 3 (FMNH). Lake Co., Pine, May 21, 1905, W.J. Gerhard (FMNH). Lake Co., Miller, July 13, 1907 (FMNH). Marion Co., June 1, 1927, W.S.B., 4 (CASC). Marion Co., Tremont, May 30, 1936, W.J. Gerhard (FMNH). Morgan Co., Morgan-Monroe Forest, May 13, 1964, C.E. White, 2 (FSCA). Morgan Co., Boy Scout Camp Bradford, May 22, 1968, C.E. White (FSCA). Parke Co., Turkey Run State Park, June 14, 1951, H.S. Dybas & R.L. Wenzel (FMNH). Porter Co., Dunes Beach, July 6, 1961, C.E. White (FSCA). Pulaski Co., June 14, 1984, N.M. Downie (FSCA). Pulaski Co., Jasper, Pulaski State Forest (May 26, 1988, June 6, 1989, June 17, 1990, June 23, 1990), N.M. Downie, 12 (FSCA).

Tippecanoe Co. (May 17, 1959, June 7, 1956, May 31, 1963, May 28, 1985, May 25, 1988), N.M. Downie, 5 (FMNH). Tippecanoe Co. (June 6, 1981, May 17, 1982, July 8, 1982), N.M. Downie, 5 (FSCA). **Iowa**, Clinton Co., May 19, 1951, H. Zimmack (MEMU). Polk Co., W. Saylorville Lk., May 25, 1985, Wappes & Schieferstein (FSCA). **Kentucky**, Edmonton Co., July 17, 1919, G.W. Bock (MEMU). Knox Co., May 7, 1965, R.E. White (FMNH). Knox Co., May 1, 1965, R.E. White, 5 (FSCA). **Louisiana**, Grant Co., Grant Parish, 18 km. N. Alexandria, Stuart L. Camp, May 19-August 17, 1983, S. Peck, 2 (CMNC). **Maryland**, Anne Arundel Co., Annapolis, May 12, 1992, C.L. Staines (FSCA). Baltimore Co., Baltimore, May, 1902 (CASC). Baltimore Co., Beltsville, May 31, 1958, R.S. Beal (CASC). Cecil Co., Elk Neck State Forest, June 6, 1978, C.L. Staines (FSCA). Montgomery Co., Rock Creek Park, May 9, 1957, P.H. Arnaud (CASC). May 20, 1912, J.C. Thompson (CASC). Prince Georges Co., June 9, 1960, J.R. McCoy (MEMU). **Massachusetts**, Barnstable Co., Wood's Hole, July 24, 2000, 5 (CSUC). Bristol Co., Attleboro, June 27, 1925 (FMNH). Bristol Co., Freetown, August 15, 1900 (MEMU). Dukes Co., Vineyard Haven, Martha's Viney'd, June 1, 1968, T. Evans (CSUC). Essex Co., Nahant, May 13, 1926, Daslington (CASC). Hampshire Co., Amherst (June 11, 1954, June 18, 1954), F. Pacheco, 2 (FSCA). Middlesex Co., Framingham (June 8, 1907, June 6, 1909), C.A. Frost, 7 (FMNH). Middlesex Co., Framingham (June 16, 1934, June 18, 1934), 2 (FMNH). Middlesex Co., Ashland, June 7, 1925, C.A. Frost (FMNH). Middlesex Co., Medford, May 20, 1933, J.N. Belkin (FSCA). Norfolk Co., Brookline, June, 5 (CASC). Worcester Co., 2 (CASC). Worcester Co., Ashburnham, June 7, 1962, C.E. White (FSCA). Fall River, May 21, 1906, N.S. Easton (MEMU). **Michigan**, Cheboygan Co., July 16, 1943, J.L. Norman (FSCA). Clinton Co., Rose Lake, Widf. Expt. Sta., June 25, 1997, S.G. Wellso, 3 (TAMU). Midland Co., Sanford, June 7, 1944, B. Malkin, 4 (FMNH). Oceana Co., Pentwater, July 24, 1936, H.S. Dybas, 4 (FMNH). Presque Isle Co., Presque Isle, June 1, 1958, D.S. White (FSCA). 6 (FMNH).

**Mississippi**, Clairborne Co., 19 km. NE. Pt. Gibson, Owens Creek mi. 52, May 18-  
 August 16, 1983, S. Peck (CMNC). Tishomingo Co., Tishomingo State Park 34°36'20" N  
 88°11'33" W, April 4, 1998, J.A. MacGown, beating in mixed mesic forest (MEMU).  
 Winston Co., Tombigbee Nat. Forest 33°11'50" N 89°03'20" W (April 19, 1999, May 3,  
 1999, May 17, 1999, June 19, 1999), T.L. Schiefer, beating in mixed mesic forest, 13  
 (MEMU). Winston Co., Tombigbee Nat. Forest 33°10'20" N 89°03'55" W (May 3, 1999,  
 June 19, 1999), T.L. Schiefer, beating in mixed mesic forest, 2 (MEMU). Winston Co.,  
 Tombigbee Nat. Forest 33°13'01" N 89°05'42" W (April 12, 1999, April 19, 1999, May 3,  
 1999, May 10, 1999, May 17, 1999), T.L. Schiefer, beating in mixed mesic forest, 13  
 (MEMU). Winston Co., Tombigbee Nat. Forest 33°10'20" N 89°03'55" W, May 3, 1999,  
 May 17, 1999, J.A. MacGown, beating in mixed mesic forest, 4 (MEMU). Winston Co.,  
 Tombigbee Nat. Forest 33°13'01" N 89°05'42" W, May 10, 1999, J.A. MacGown, beating  
 in mixed mesic forest (MEMU). Winston Co., Tombigbee Nat. Forest 33°10'20" N  
 89°03'55" W (April 12, 1999, May 3, 1999, May 10, 1999), T.L. Schiefer, beating in  
 mixed mesic forest, 3 (MEMU). Winston Co., Tombigbee Nat. Forest 33°16'05" N  
 89°06'01" W, May 17, 1999, T.L. Schiefer, beating in mixed mesic forest (MEMU).  
 Winston Co., Tombigbee Nat. Forest 33°10'31" N 89°02'38" W, May 3, 1999, T.L.  
 Schiefer, beating in mixed mesic forest (MEMU). **Missouri**, Boone Co., UMC Dairy Farm  
 (May 27, 1975, May 30, 1975, June 24, 1975, June 26, 1975, June 30, 1975 D.D. Kopp,  
 sticky boards in oak, 6 (MEMU). Boone Co., Ashland, May 16, 1972, S.O. Swadener, 2  
 (MEMU). Boone Co., Ashland, June 20, 1976, W.S. Craig, Wildlife Area, 2 (MEMU).  
 Boone Co., UMC Dairy Farm (May 27, 1975, May 30, 1975, June 24, 1975, June 26,  
 1975), D.D. Kopp, sticky boards in oak, 8 (MEMU). Boone Co., UMC Dairy Farm (May  
 21, 1975), 48 (MEMU). Camden Co., 2 mi. NE Jct. N&O, June 28, 1973, S.O. Swadener  
 (MEMU). Carter Co., .5 mi. N Rt. 60 on P, June 13, 1974, S.E. Thewke, Oak Leaf, 4  
 (CASC). Clairborne Co., Natchez Trace, 5 mi. N. of 18, March 28, 1977, J.E. Wappes

(FSCA). Dallas Co., Tunas, May 3, 1966, W.S. Craig, 4 (MEMU). Franklin Co., Fern Glen, June 14, 1901, G.W. Bock (MEMU). Jefferson Co., Arnold, June 27, 1953, D.J. & J. N. Knull (OSUC). Johnson Co., Warrensburg, May 19, 1946, B. Malkin (FMNH). Miller Co., Bagnell, May 16, 1937, C. Wingo (MEMU). Monroe Co., Paris, June 28, 1945, C.A. Frost (MEMU). Reynolds Co., Stooping Tree Ridge, May 18, 1973, J.A. Gagne, 6 (MEMU). Reynolds Co., Stooping Tree Ridge, May 18, 1973, J.A. Gagne (TAMU). Saint Louis Co., St. Louis, 2 (CASC). Saint Louis Co., June 11, 1901, 2 (MEMU). Saint Louis Co. (May 14, 1898, May 29, 1898), G.W. Bock, 13 (MEMU). Shannon Co., Winona, May 9, 1947 (MEMU). Stone Co., 1 mi. E. Jct. 160 & 248, June 7, 1975, S.E. Thewke, 2 (MEMU). Taney Co., Forsyth, July 8, 1954, C.W. Wingo (MEMU). Washington Co., Richwoods, May 7, 1947, C.W. Wingo, 7 (MEMU). Winston Co., Louisville, March 24, 1981, G.L. Snodgrass, Berlese Litter hardwood forest (MEMU). Winston Co., May 31, 1971, W.H. Cross, Swept from flowering *Castanea pumila* (MEMU). Worth Co., Oxford, April 14, 1949, H.V. Weems, 5 (FSCA). **New Hampshire**, F.A. Sheriff (CASC). **New Jersey**, Atlantic Co., Da Costa, June, 29, J.W. Green (FSCA). Bergen Co., Mahwah, May 10, 1968, 2 (FSCA). Burlington Co., Medford, May 26, 1929, J.W. Green, 4 (CASC). Burlington Co., Chatsworth, May 25, 1929, J.W. Green, 11 (CASC). Camden Co., Atco, 2 (CASC). Camden Co., Atco, C.R. Boerner (CASC). Cape May Co., Anglesea, June, 20, H.W. Wenzel, 4 (OSUC). Essex Co., Montclair, May 6, 1935 (FMNH). Gloucester Co., Malaga, June, 1 (FMNH). Medford Co., Medford, May 26, 1929, J.W. Green (MEMU). Medford Co., Medford, May 26, 1929, J.W. Green (UCDC). Monmouth Co., Manasquan (June 13, 1935, June 16, 1935), 3 (FMNH). Morris Co., Towaco, June 15, 1958 (FSCA). Ocean Co., Barnegat, July 17, 1926, J.W. Green, 2 (CASC). Ocean Co., Lakehurst, May 25, 1941 (FMNH). Ocean Co., Lakehurst, May 30, 1925, Quirsfeld (FSCA). **New York**, Bronx Co., no date, Mosholu (CASC). Ontario Co., Geneva, May 30-June 10, 1991, J. Huether (FSCA). Schenectady Co., Schenectady, July 15, 1940,

N.M. Downie (FMNH). St. Lawrence Co., Bear Mt. (June 2, 1940, July 14, 1940, May 11, 1941), 5 (FMNH). St. Lawrence Co., Bear Mt., July 14, 1940, B. Malkin (FMNH). Suffolk Co., Yaphank, Long Island, May 22, 1915, G.P. Engelhardt (FMNH). Suffolk Co., Montauk Point, June 9, 1940 (MEMU). Westchester Co., New Rochelle, June 21, 1930, 2 (WFBM). **North Carolina**, Balsam Co., June 1, 1956, D.J. & J. N. Knull, 5 (OSUC). Buncombe Co., Asheville, May 15, 1913, 9 (CASC). Buncombe Co., Asheville (May 20, 1999, May 23, 1999, May 26, 1999, May 27, 1999), H.W. Cory, 6 (FMNH). Burke Co., Linville, 3500 ft., July 16, 1951, Bryant (CASC). Cherokee Co., Murphy, May (CASC). Macon Co., May 14, 1961, F.J. Moore, 6 (OSUC). Rockingham Co., Reidsville, May 30, 1973, J.S. Ashe, 2 (TAMU). Wake Co., Raleigh, May 17, 1952, B.K. Dozier, 2 (FSCA). Wake Co., Raleigh, May 10, 1958, D.H. Habeck (FSCA). Yancey/Buncombe Co., Black Mts., June, 1902, 2 (CASC). Yancey/Buncombe Co., Black Mts., May 22, 1912, Beutenmüller, (FMNH). **Ohio**, Clark Co., Clifton (May 30, 1938, June 4, June 14, 1938), D.J. & J. N. Knull, 4 (OSUC). Delaware Co., May, 23, P. Rice (OSUC). Fulton Co., June 24, 1934, H. Osborn (OSUC). Hocking Co., June 16, 1956, E.I. Hazard (FSCA). Hocking Co., May 24, 1963, R.E. White (FSCA). Hocking Co., June 8, 1958, F.W. Mead (FSCA). Hocking Co., June 7, 1954, H.V. Weems (FSCA). Hocking Co. (May, 13, May 22, 1938, May 26, 1938, June 1, 1938, June 16, 1938), D.J. & J. N. Knull, 27 (OSUC). Hocking Co., May 2, 1938, J. N. Knull (OSUC). Hocking Co., May 17, 1934, J.S. Caldwell (OSUC). Hocking Co., June 23, 1935, A.C. Miller, 2 (OSUC). Holmes Co., June 21, 1941 (FSCA). Scioto Co., June 1, 1961, F.J. Moore (OSUC). Scioto Co., June 17, 1944, D.J. & J. N. Knull (OSUC). **Oklahoma**, Latimer Co. (April, 1982, September, 1982, March, 1983, April, 1983, June, 1983, March, 1985, April, 1985), K. Stephan, beating in upland forest, 21 (FSCA). Latimer Co., 5 m. W. Red Oak, April 9, 1977, K. Stephan, beating upland forest, 2 (FSCA). Latimer Co., 5 m. W. Red Oak (April 4, 1977, April 9, 1977, April 27, 1978, May, 1981, May, 1984), K. Stephan, 17 (FSCA). Latimer Co. (March,

1987, March, 1986, April, 1986, May, 1986, June, 1986, April, 1988, May, 1988, April, 1989, May, 1989, April, 1994, May, 1994), K. Stephan, 39 (FSCA). Latimer Co., April, 1983, K. Stephan, upland forest, 5 (TAMU). Latimer Co., March, 1986, K. Stephan (TAMU). Latimer Co., 5 m. W. Red Oak (April 9, 1977, May, 1981), K. Stephan, 6 (TAMU). Latimer Co., April, 1983, K. Stephan, lowland forest (TAMU). McClain Co., Purcell, May, 7, R.L. Blickle (OSUC). **Pennsylvania**, Dauphin Co., Hummelstown, May 15, 1933, J.N. Knull (FMNH). Dauphin Co. (May 25, 1928, June 11, 1928, June 17, 1928), J.N. Knull, 3 (CASC). Dauphin Co., Hummelstown, May, 15, J.N. Knull, 8 (OSUC). Delaware Co., Castle Rock, July, 7, H.A. Wenzel, 2 (FMNH). Erie Co., North East, E. Craighead (WFBM). Ferry Co., July 4, 1930, J.N. Knull (FMNH). McKean Co., Mt. Alton, May 2, 1933, J.N. Knull (CASC). McKean Co., Mt. Alton, May, 1932 (CASC). McKean Co., Mt. Alton, June 30, 1931, J.N. Knull (UCDC). Northampton Co., Wind Gap, June 14, 1946, J.W. Green, 2 (CASC). Philadelphia Co., Frankford (July, 7, July, 20), H.A. Wenzel, 3 (OSUC). Pike Co., Milford, May 30- June 1, 1941, B. Malkin (FMNH). Westmoreland Co., Clark's Valley (June 3, 1930, June 8, 1930, June 18, 1930, July 3, 1930), J.N. Knull, 8 (FMNH). Westmoreland Co., Charter Oak., July 5, 1920, J.N. Knull (FMNH). Westmoreland Co., Charter Oak, June 21, 1917, J.N. Knull (WFBM). Renova, June, 17, J.N. Knull (FMNH). **South Carolina**, Aiken Co., Aiken, May 6, 1999, H.W. Cory (FMNH). **Tennessee**, Blount Co., Chilhowee Mt., June 7, 1955, D.J. & J. N. Knull, 4 (OSUC). Morgan Co., Burrville (May 24, 1953, June 7, 1953), B. Benesh, 2 (FMNH). Unicoi Co., Unaka Mt. Trl., June, Siepmann (FMNH). **Texas**, Anderson Co., April 10, 1960, H.R. Burke, 2 (TAMU). Anderson Co., 10 mi. SW of Elkhart, April 2, 1961, H.R. Burke, on *Quercus* sp., 7 (TAMU). Bastrop Co., Bastrop State Park., March 26, 1950, D.J. & J.N. Knull (FMNH). Bowie Co., Maud, April 29, 1941, D.J. & J. N. Knull, 6 (OSUC). Bowie Co., Texarkana, May, 20, J.N. Knull (OSUC). Brazos Co., College Station, April 8, 1982, R. Turnbow (FSCA). Brazos Co., College Station, March 23, 1972,

W.E. Clark (TAMU). Brazos Co., College Station, April 3, 1932, H.J. Reinhard (TAMU). Brazos Co., College Station, Lick Creek Park (April 28, 1996, May 1, 1997), E.G. Riley, 2 (TAMU). Harrison Co., Karnack, May 22, 1951, D.J. & J. N. Knull, 4 (OSUC). Leon Co., April 6, 1953, D.J. & J. N. Knull, 2 (OSUC). Sabine Co., 9 mi. E. Hemphill "Beech Bottom" (March 28-April 3, 1989, April 17- 24, 1989, April 25- May 7, 1989, May 8-21, 1989, May 22 - June 4, 1989), R. Anderson & E. Morris, Malaise Trap beechmagnolia forest, 17 (TAMU). San Jacinto Co., Double Lake, April 14, 1968, J.C. Schaffner (TAMU). Victoria Co., 3 mi. S. Inez, May 6, 1978, N.M. Downie (FMNH). Wood Co., Godwin Woods, 3.5 mi. SW Haiesville, April 28-29, 2000, J.C. Schaffner, at light, 3 (TAMU). Wood Co., 12 mi. N Hawkins, April 29, 2000, J.C. Schaffner, 2 (TAMU). Wood Co., 15 mi. N. Hawkins 32°98'42" N 95°10'04" W, April 29, 2000, E.G. Riley, 3 (TAMU). Wood Co., 18 mi. N. Hawkins 32°48'55" N 95°10'00" W, May 9, 1999, A. Gillogly (TAMU). **Virginia**, Falls Church Co., E. Falls Charch, May 21, 1916, J.N. Knull (WFBM). Fredericksburg Co., Fredericksburg (CASC). Fredericksburg Co., Fredericksburg, May, 1902, 12 (CASC). Lee Co., Dot, June 17, 1960, C.E. White (FSCA). Northampton Co., Cape Charles, May 4, 1924, 2 (CASC). Rappahannock Co., Rock Mills, August 28, 1971, C.L. Staines (FSCA). Shenandoah Co., 16 km. S. Strasburg, Elizabeth Furnace, May 12-August 22, 1983, S. Peck, 12(CMNC). **Wisconsin**, Dane Co., May 30, 1900, W.S. Marshall, 4 (MEMU). Polk Co., Balsam Lake, August 3, 1958, E.J. Kiteley (CMNC).

Distribution: This common species is found in throughout the eastern half of North America (Fig. 78).

Diagnosis: *Limonius basilaris* is very similar to *L. quercinus* but can be separated by the following: *L. basilaris* has a black pronotum with hind angles and hypomeral margin yellow, antennal segments 2 and 3 together about 2/3 length of segment 4, and, in the male, parameres have the lateral margin subparallel, apical blades triangular longer than wide, aedeagus thick with a rounded tip, extending beyond parameres by less than half

the length of apical blades. The pronotum of *L. quercinus* is completely black, antennal segments 2 and 3 longer than segment 4, and in the male the parameres have a lateral margin convex basally, concave along apical third, apical blades as long as wide, and the aedeagus gradually narrowing to tip, not extending beyond parameres (Fig. 55).

Notes: A comparison of the holotype of *L. semianeus* with the typical *L. basilaris* indicate no specific differences except the yellowish color of the elytra of the type and the hind angles of pronotum are more yellowish than typical *L. basilaris* specimens.

*Limonius beutenmuelleri* Van Dyke.

*Limonius beutenmuelleri* Van Dyke 1932: 351-352. Holotype # 3143 (CASC).

Type locality: Mt. Mitchell, Yancey Co., North Carolina.

Length: 6-7.2 mm (length/width ratio 2.8-3.75). Head black, clypeal margin entire, not reserved medially, frontal punctures deeply punctate, separated by less than width of punctures, with appressed yellow setae. Antennae extending one segment or less beyond hind angle, segment 2 small, segment 3 as long as segment 4, antennal color black. Pronotum black throughout, 1.9-2 mm (as long as broad), pronotal margin proudly rounded, carina about 1/3 length of lateral margin, diverging from lateral margin with area between visibly punctate (viewed dorsally) pronotal texture, deeply punctate, separated by more than width of punctures, covered with appressed yellow setae. Scutellum pentagonal black, deeply punctate, covered with appressed yellow setae. Hypomeron, strongly costate on anterior third, forming antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, deeply punctures, separated by more than width of punctures, with small appressed yellow setae; hypomeron black throughout umbilicate puncture, separated by more than width of punctures, with small appressed yellow setae; metasternum black throughout, deeply punctate, with small appressed yellow setae, legs color, dark brown becoming black basally.

Elytra 3.9- 5 mm (length/width ratio 2-2.4), black throughout, striae deeply punctate, inter-striae deeply punctate punctate, with erect yellow setae.

Abdomen dark brown to black small deeply punctate, with small appressed yellow setae.

Male genitalia (Fig. 23): parameres with lateral margin convex basally, gradually narrowing toward apical blades, apical blades as long as broad, rounded apically; aedeagus wide with narrow tip, extending beyond parameres by less than  $\frac{1}{4}$  length of apical blades. Parameres long, 1.2-1.4 X length of basal pieces.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype # 3143 (CASC), Mt. Mitchell, Van Dyke, June, 1902.

Material examined: **United States: North Carolina**, Dare Co., Half Way Point, June 8, 1903, W. Beutenmüller, 18 (FMNH). Yancey Co., Mt. Mitchell, June, 1902, 59 (CASC).

Yancey Co., Mt. Mitchell, July, 1902, E.C. Van Dyke, 12 (CASC, CSUC, FMNH). Yancey Co., Mt. Mitchell (FMNH). Yancey Co., Mt. Mitchell, 6000 ft., June 4, 1939, Quirsfeld, 2 (FMNH). Yancey/ Buncombe Co., Black Mts., June, 1902, E.C. Van Dyke (CASC).

Yancey/ Buncombe Co., Black Mts., June 2, 1912, W Beutenmüller, 22 (CASC).

Yancey/Buncombe Co., Black Mts., 4. (CASC). Yancey/Buncombe Co., Black Mts. (June, 1901, June, 1902, June 8, 1903), 3 (CASC). Yancey/ Buncombe Co., Black Mts., May 18- July 17, 1902, W. Beutenmüller, 6 (OSUC). Yancey/ Buncombe Co., Black Mtns., May, 15, W. Beutenmüller (FMNH).

Distribution: This species is only known from North Carolina (Fig. 79).

Diagnosis: *Limonius beutenmuelleri* is most similar to *L. consimilis* and *L. jonesi*. It can be separated from these two species by examination of the male genitalia. In *L. beutenmuelleri* the parameres (Fig. 23) have the apical blades as long as broad, aedeagus wide with narrow tip, extending beyond parameres by less than  $\frac{1}{4}$  length of apical blades. In *L. consimilis* parameres (Fig. 29) have the apical blades wider than long, and the aedeagus wide with rounded tip extending beyond parameres by about

apical blades length. In *L. jonesi* the parameres (Fig. 39) have the apical blades wider than long, rounded apically, aedeagus gradually narrowing to tip almost as long as parameres. Also in *L. beutenmuelleri* the hypomeron is strongly costate on anterior third, forming antennal grooves. Whereas, *L. consimilis* hypomeron not costate, not forming antennal grooves. *Limonius beutenmuelleri* also differs from *L. jonesi* by the pronotal shape. In *L. beutenmuelleri* the pronotal as long as broad. Whereas, *L. jonesi* is wider than long.

*Limonius bicolor* Van Dyke.

*Limonius bicolor* Van Dyke 1932: 344-345, Lane 1971: 22. Holotype # 3135 (CASC).

Type locality: Fallen Leaf Lake, Lake Tahoe, California.

Length: 8-10 mm (length/width ratio 2.5-3). Head dark brown to black, clypeal margin entire not received or slightly received medially, frontal punctures umbilicate punctures, separated by less than width of punctures, with appressed yellow setae. Antennae extending one segment beyond hind angles, segment 2 and 3 small, subequal together as long as or slightly longer than segment 4, antennal color dark yellow to light brown. Pronotum brown to black, 3.3-4.5 mm (length/width ratio 1.2-1.3), pronotal margin broadly rounded, carina converge, about 1/3 to 1/4 length of lateral margin, pronotal texture, deeply punctate, separated by less than width of punctures, covered with appressed yellow setae. Scutellum pentagonal, umbilicate punctures. Prosternum and hypomeron carinate anteriorad forming small antennal groove; posterior border of hypomeron dentate; prosternum, yellow to pale brown, umbilicate punctures, separated by less than width of punctures, laterally with small yellow setae; hypomeron yellow to pale brown, with dense umbilicate punctures, separated by less than width of punctures,

with small erect yellow setae; metasternum dark brown with some yellow maculae, deeply punctate, with small appressed yellow setae, legs color, yellowish to dark brown. Elytra 4.5- 5.34 mm (length/width ratio 1.5-1.8), yellow to dark brown, humeri often paler, striae deeply punctate, inter-striae shallowly punctate.

Abdomen pale brown to black, deeply punctate, with small appressed yellow setae.

Male genitalia (Fig. 24): parameres gradually narrowing toward apical blades, apical blades triangular, aedeagus gradually narrowed in the apical  $\frac{1}{4}$ , parameres long 2 to 2.5 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype # 3135 (CASC), **California**, Fallen Leaf Lake, Lake Tahoe, June 24, 1915,

Material examined: **United States: California**, Alpine Co., Lake Alpine, June 19, 1935, H.P. Allen (CASC). El Dorado Co., Tahoe, Grass Lake, June 24, 1915, E.C. Van Dyke (CASC). El Dorado Co., Tahoe, Angora L., June 22, 1915 (CASC). El Dorado Co., Fallen Leaf Lake, July 13, 1909 (CASC). El Dorado Co., Angora Lake, 8025 ft., June 1, 1930, A.T. McClay (UCDC). El Dorado Co., E.C. Van Dyke (CASC). El Dorado Co., Fallen Leaf Lake (July 19, 1915, June 25, 1915), 2 (CASC). El Dorado Co., Mt. Tallac, July 2, 1898 (CASC). El Dorado Co., Echo L., July 5, 1934, J.W. Tilden, 2 (CASC). El Dorado Co., L. Tahoe, July 1, 1915 (CASC). Fresno Co., Huntington Lake, 7000 ft., July 14, 1919, E.P. Van Duzee (CASC). Kern Co., Breckenridge, 6500 ft., June 18, 1969 (FSCA). Kings Co., Kings River, June 28, 1948, A.T. McClay (UCDC). Lassen Co., Facht, June 24, 1922, J.O. Martin (CASC). Mariposa Co., Yosemite Falls, June 2, 1931 (FMNH). Modoc Co., Hackamore (FMNH). Placer Co., Carnelian Bay, L. Tahoe, June 24, 1964, F.D. Parker (CASC). Placer Co., Lake Tahoe, June 19, 1948, D.J. & J.N. Knull (FMNH). Plumas Co., Meadow Valley, 3500-4000 ft., June 3, 1924, E.C. Van Dyke (CASC). Plumas Co., Meadow Valley, 4000-5000 ft. (June 7, 1924, June 19, 1924), E.C.

Van Dyke, 2 (CASC). Plumas Co., Chester (June 23, 1948, July 4, 1958, July 5, 1963, July 10, 1963), D.J. & J.N. Knull, 4 (FMNH). Riverside Co., Idyllwild, San Jacinto Mts., June 21, 1940, 2 (CASC). San Bernardino Co., Wrightwood, June 30, 1964, M.W. Stone (CASC). Sierra Co, Gold Lake, July 22, 1921 (CASC). Tehama Co., Mt. Lassen (June 20, 1960, June 20, 1963, June 30, 1963, July 2, 1963, July 5, 1963, July 6, 1963, July 8, 1963, July 12, 1963, July 17, 1963), D.J. & J.N. Knull, 28 (FMNH). Tehama Co., 5 mi. E. Mineral (June 6, 1960, June 9, 1960, June 12, 1960, June 15, 1960, June 20, 1960, June 23, 1960, June 26, 1960), D.J. & J.N. Knull, 32 (FMNH). Trinity Co., Nashmine, June 13, 1913 (CASC). **Nevada**, Clark Co., Charleston Mts., Lee Cyn, 6500 ft., May 24, 1940, 2 (CASC). Churchill Co., Dixie N.F., July, 1, D.J. & J.N. Knull (FMNH). **Oregon**, Harney Co., Burns, June 8, 1951, J.E. Davis (CSUC). Marion Co., Salem, May 16, 1941, F.P. Larson (CSUC). **Washington**, Walla Walla Co., Walla Walla, May 28, 1924, M.C. Lane (CSUC).

Distribution: This species is distributed in western United States (Fig. 80).

Diagnosis: *Limonijs bicolor* is most similar to *L. confusus* and *L. plebejus*. It can be separated from these species by the pale humeral elytra, dentate posterior border of hypomeron, and the type of the male genitalia. In *L. bicolor*, the parameres (Fig. 24) gradually narrow towards the apical blades, and apical blades are triangular. In *L. confusus* the parameres (Fig. 28) have the lateral margin subparallel, apical blades about 2 X longer than wide, with rounded tip, the aedeagus gradually narrows on the apical ¼, with pointed tip, and extending beyond parameres by 1/3 length of apical blades. The parameres of *L. plebejus* (Fig 54) has the lateral margin convex basally, curved before blades on apical fourth, apical blades longer than wide, narrowed, rounded apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than half the length of apical blades.

*Limonius californicus* (Mannerheim)

*Cardiophorus californicus* Mannerheim 1843: 238-239. Type apparently in the Zoological Museum, University of Moscow (ZMUM). Type locality: California.

*Limonius californicus*, Candeze, 1860: 407, Van Dyke, 1932: 340, Brooks, 1960: 29, Lane, 1971: 23.

*Limonius hispidus* LeConte 1853: 432, Candeze 1860: 407, Leng, 1920: 168.

Holotype # 2538 (MCZC), type locality: San Francisco, California.

Synonymized by Candeze 1860: 407.

*Limonius occidentalis* Candeze 1860: 411, Leng, 1920: 168. Syntypes: BMNH, type locality Oregon. Synonymized by Fall 1934: 26.

Length: 8-11 mm (length/width ratio 3 –3.5). Head dark throughout, clypeal margin entire not received medially, frontal punctures deeply punctate, separated by less than width of punctures, covered with appressed yellow setae. Antennae extending 2 to 3 segments beyond hind angles, segment 2 small, segment 3 intermediate in length between segment 2 and 4, antennal color dark brown to black. Pronotum black throughout or with hind angle paler, 2.3-3 mm (as long as broad), pronotal margin broadly rounded, carina converge, diverging from lateral margin with area between visibly punctate (viewed dorsally), pronotal texture, densely umbilicate and separated by less than width of punctures, punctures contiguous laterally, covered with appressed yellow setae. Scutellum dark brown to black, shell-like, finely punctate, covered with long appressed yellow setae. Hypomeron not carinate anteriorad, not forming antennal groove; posterior border of hypomeron without teeth; prosternum, brown to black, deeply punctate, separated by more than width of punctures, with subappressed yellow setae; hypomeron brown to black, deeply punctate, separated by less than width of punctures,

covered with densely appressed yellow setae; metasternum dark brown to black, deeply punctate, sparsely, separated by more than width of punctures, with appressed yellow setae, legs color, pale brown to brown.

Elytra 5- 7.75 mm (length/width ratio 2.2-2.6), pale brown to dark brown, striae finely punctate, inter-striae deeply punctate, covered with erect yellow setae.

Abdomen dark brown to black, finely punctate, covered with finely appressed yellow setae.

Male genitalia (Fig. 25): parameres have the lateral margins gradually narrowing from apical 1/5 toward apical blades, apical blades triangular with lateral angle pointed apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/5 length of apical blades. Parameres long 1.2 to 1.4 X length of basal piece.

Female bursa copulatrix (Fig 65) with spines clustered at one side of bursa walls.

Type Material Examined: The holotype of *Limonius californicus* is apparently in the Zoological Museum, University of Moscow (ZMUM).

Type Material of Synonyms Examined: *Limonius hispidus* Holotype # 2538 (MCZC), San Francisco, California.

*Limonius occidentalis*: Syntypes, BMNH examined.

Material Examined: **Canada: Alberta**, Medicine Hat (April 22, 1923, April 12, 1924), F.S. Carr, 2 (CASC). **British Columbia**, Nanaimo, Biol. Station, June 23, 1920 (CASC).

Osoyoos, April 24, 1925 (CASC). Spotted Lake, Richter Pass, March 29, 1941 (FMNH).

Vernon, May 10, 1928, R. Hopping (CASC).

**United States: California**, Alameda Co., January 1, 1890 (CASC). Alameda Co., 8 (CASC). Alameda Co., Oakland, November 29, 1906 (CASC). Alameda Co., Berkeley (December 13, 1919, April 11, 1926) (CASC). Alameda Co., hills back of Oakland, May 8, 1910 (CASC). Alameda Co., Oakland Hills, January 21, 1940, W.F. Barr (WFBM). Alameda Co., Piedmont, April 9, 1915, F.W. Nunenmacher (FMNH). Alameda Co., April

18, 1910, F.W. Nunenmacher (FMNH). Alameda Co., Berkeley, April 1, 1925, F.C. Hadden (OSUC). Alameda Co., Piedmont, April 16, 1912, F.W. Nunenmacher (OSUC). Alameda Co., 3 (MEMU). Alameda Co., Oakland Hills, December 14, 1926, E.G. Linsley, under bark (UCDC). Alameda Co., Berkeley, May 3, 1926 (UCDC). Contra Costa Co., May 1, 1937, R.E. Shaul (FMNH). Colusa Co., Rumsey Cn., May 9, 1959, J.L. Bath (CASC). Contra Costa Co., Vine Hill, December 25, 1913, F.E. Blaisdell (CASC). Contra Costa Co. (CASC). Fresno Co., Coalinga, Boy Scout Camp, March 19, 1931, E.P. Van Duzee (CASC). Fresno Co., April 27, 1949, H.L. Hansen, 2 (MEMU). Humboldt Co., May 4, 1911, F.W. Nunenmacher (CASC). Kern Co., Isabella, June 2, 1913 (CASC). Kern Co., Tejon Canyon, May 11, 1927, 4 (CASC). Kern Co., Kernville, May 7, 1931, A.T. McClay (UCDC). Lake Co., Lower Lake, May 13, 1922, E.P. Van Duzee, 3 (CASC). Lake Co., 4 mi. S. Middletown, May 10, 1964, C.D. Johnson (CASC). Los Angeles, Compton, April, 1915, J.E. Graf, 9 (CASC). Los Angeles Co., Claremont, March 20, 1972, M.W. Stone (CASC). Los Angeles Co., Long Beach, A. Hardy (CASC). Los Angeles Co., Downey, April 24, 1941, A.F. Howland, on alfalfa, 2 (CASC). Los Angeles Co., Alhambra (April 17, 1905, March 15, 1935), M.W. Stone, 2 (CASC). Los Angeles Co., Compton (April 1, 1915, March, 1915), J.E. Graf, 3 (CASC). Los Angeles Co., 3 (CASC). Los Angeles Co., Temple, February 20, 1931, M.W. Stone (CASC). Los Angeles Co., Pasadena (April, May, 1897), 3 (CASC). Los Angeles Co., Redondo, March 5, 3 (CASC). Los Angeles Co., Long Beach, February 26, 1916, 2 (CASC), March 16, 1944, C.G. Anderson (CSUC). Los Angeles Co., April, 25, C.H. Hicks, 2 (FMNH). Los Angeles Co., March 17, 1926, L.J. Machmore (FMNH). Los Angeles Co., Pasadena, June, K. Sloop, 4 (FMNH). Los Angeles Co. (FMNH). Los Angeles Co., Pasadena (June, 1932, June, 1933), 3 (OSUC). Los Angeles Co., Pasadena, April 4, 1932, A.T. McClay, 2 (UCDC). Los Angeles Co., Compton, April, 1915, J.E. Graf, 4 (UCDC). Los Angeles Co., Alhambra, March 5, 1935 (UCDC). Madera Co., Ahwahnee, May (CASC). Madera Co.,

Bass Lake, June 7, 1938, C.T. Sierra (CMNC). Madera Co., Oakhurst, June 5, 1942,  
 A.J. Walz, *Ceanothus* (WFBM). Marin Co., Fairfax, April 13, 1919, F.E. Blaisdell, 2  
 (CASC). Marin Co., Lagunitas (April 26, 1919, April 24, 1924), E.P. Van Duzee, 2  
 (CASC). Marin Co. (CASC). Marin Co., San Geronimo, April 23, 1913, J.C. Bridwell  
 (CASC). Marin Co., Nunenmacher (CASC). Marin Co., Cypress Rdg., April 2, 1922, 3  
 (CASC). Marin Co., Fort Baker, March 15, 1925, C.L. Fox (CASC). Marin Co., FairFax,  
 April 21, 1907, F.W. Nunenmacher (FMNH). Marin Co., Bolinas, July 3, 1949 (UCDC).  
 Marion Co., FairFax, April 21, 1907, E.C. Van Dyke (CASC). Mendocino Co., March 31,  
 1938 (CASC). Mendocino Co., Fort Bragg, October 11, 1913, 5 (CASC). Merced Co.,  
 March 29, 1947, B. Malkin (FMNH). Modoc Co., May 14, 1913, Nunenmacher (CASC).  
 Monterey Co., Monterey, May 30, 1911 (CASC). Monterey Co., Carmel, April 19, 1911  
 (CASC). Monterey Co., April 7, 1912 (CASC). Monterey Co., Carmel, February 20, 1927,  
 E.P. Van Duzee, 4 (CASC). Monterey Co., Carmel (March 12, 1911, March 5, 1914,  
 March 27, 1913), 3 (CASC). Monterey Co., April 8, 1923, L.S. Slevin (CASC). Monterey  
 Co., Elkhorn Slough, April 5, 1949 (UCDC). Napa Co., 4 (CASC). Niles Co., March 22,  
 1928, W.S.B., 2 (CASC). Orange Co., Anaheim, July 30, 1930, Slook, 4 (CASC). Orange  
 Co., Laguna Beach, March 11, 1937, J.Wilcox (CASC). Orange Co., Kimberly, May 27,  
 1952, M.C. Lane (FMNH). Orange Co., February 1, 1931 (OSUC). Orange Co.,  
 Anaheim, July 30, 1930, A.T. McClay, 4 (UCDC). Orange Co., Costa Mesa (April 2,  
 1957, October 11, 1956), M.E. Irwin (UCDC). Placer Co., 5 (CASC). Plumas Co.,  
 Meadow Valley, 3000-4000 ft., June 10, 1924, E.C. Van Dyke, 2 (CASC). Plumas Co.,  
 Meadow Valley, June 30, 1924, F.C. Hadden (FMNH). Riverside Co., Turkey Cr.P.C.,  
 San Jacinto Mts., May 10, 1960, E.L. Sleeper (CASC). Riverside Co., 131 San Dimas  
 Dr., May 12, 1979, M.W. Stone (CASC). Riverside Co., Riverside, Fairmont Park  
 (February 22, 1977, March 8, 1977), M.W. Stone, 2 (CASC). Riverside Co., Hemet  
 Reservoir, San Jacinto Mts., May 22, 1940, Donald Davis (CASC). Riverside Co.,

Idyllwild, San Jacinto Mts., June 16, 1940, Donald Davis (CASC). Riverside Co.,  
 Idyllwild, San Jacinto Mts., June 17, 1941, 24 (CASC). Riverside Co. (April 3, 1915, April  
 31, 1915), 2 (CASC). Riverside Co., Keen Camp, June 6, 1917, E.P. Van Duzee, 2  
 (CASC). Riverside Co., Saboba Spgs., June 2, 1917, E.P. Van Duzee (CASC).  
 Riverside Co., San Jacinto, May 29, 1917, E.P. Van Duzee (CASC). Riverside Co.,  
 Idyllwild, San Jacinto Mts., June 16, 1940, Donald Davis (CASC). Riverside Co.,  
 Idlewild, April 23, 1928 (CASC). Riverside Co., 131 San Dimas Dr., April 29, 1975, M.W.  
 Stone (CASC). Riverside Co., Keen Camp, June 14, 1946, D.J. & J. N. Knull, 4 (FMNH).  
 Riverside Co., Temecula, April 11, 1950, W.F. Barr (WFBM). Riverside Co., Idyllwild,  
 San Jacinto Mts. (May 20, 1939, June 9, 1939), R. F. Smith, 10 (WFBM). Riverside Co.,  
 Turkey Creek, San Jacinto Mts., May 22, 1939, R.F. Smith, *Lupinus*, 2 (WFBM).  
 Riverside Co., Idyllwild, San Jacinto Mts., June 1, 1939, R. F. Smith, sweeping, 4  
 (WFBM). Riverside Co., Idyllwild, San Jacinto Mts., May 28, 1939, B. Brookman  
 (WFBM). Sacramento Co., Elk Grove, April 2, 1952, E.C. Carlson, 5 (UCDC).  
 Sacramento Co. (March 19, 1944, March 12, 1944), A.T. McClay, 2 (UCDC), June, 1932  
 (CSUC). Sacramento Co., Sacramento River Levee, June 2, 1994, M.S. Wasbauer, 5  
 (CMNC). San Benito Co., The Pinnacles, April 11, 1930, A.T. McClay (UCDC). San  
 Benito Co., Panoche Plains, April 9, 1938, 3 (CASC). San Benito Co., San Juan Gr.,  
 April 9, 1939, 2 (CASC). San Bernardino Co., Santa Ana, March 7, 1942, J. Wilcox  
 (CASC). San Bernadino Co., July, 1900 (OSUC). San Bernardino Co., Oro Grande,  
 June 1, 1960, D.J. & J.N. Knull, 5 (FMNH). San Bernardino Co., Upland (April 7, 1949,  
 April 8, 1949), J.A. Quist, 2 (CSUC). San Diego Co., Bostonia, April 20, 1930, Ian Moore  
 (CASC). San Diego Co., Mission Valley, February 15, 1930, Ian Moore (CASC). San  
 Diego Co., Poway, F.E. Blaisdell, 3 (CASC). San Diego Co., Descanso, April 25, 1920,  
 E.P. Van Duzee (CASC). San Diego Co. (OSUC). San Diego Co., Lake Henshaw, 2725  
 ft., March 9, 1983, A. Smetama, (CMNC). San Diego Co., Lake Henshaw Dam, S. Oak

Wood, May 10, 1969, C.D. Howell (CASC). San Francisco Co. (March 3, 1907, March 29, 1907, March 15, 1908, October 12, 1913), 5 (CASC). San Francisco Co., April 10, 1908, F.E. Blaisdell (CASC). San Francisco Co. (March 25, 1917, January 24, 1927), C.L. Fox, 2 (CASC). San Francisco Co., February 20, 1913, J.C. Huguenin (CASC). San Joaquin Co., May 6, 1914, Nunenmacher (CASC). San Luis Obispo Co., Paso Robles, April 22, 1919, E.P. Van Duzee (CASC). San Luis Obispo Co., Atascadero, March 23, 1940, G.S. Mansfield (CASC). San Mateo Co., Half Moon Bay, April 22, 1950, R.S. Beal (WFBM). Santa Clara Co., Alma, May, J.E. Cottle (CASC). Santa Clara Co., Agnews, September 28, 1924, 5 (CASC). Santa Cruz Co., April 20, 1922 (CASC). Santa Cruz Co., Pajaro, April 25, 1917 (CASC). Santa Cruz Co., February 23, 1929, E.P. Van Duzee (CASC). Shasta Co., 2 (CASC). Siskiyou Co., Etna (April 1, 1939, May 7, 1939, May 21, 1970), F.D. Horn, 5 (CASC). Siskiyou Co., Shasta Retreat, 2416 ft., July 3, 1905, F.E. Blaisdell, 3 (CASC). Siskiyou Co., Dunsmuir, May 20, 1914 (CASC). Siskiyou Co., Walker, June 12, 1920, F.E. Blaisdell (CASC). Siskiyou Co., June 4, 1941, F.W. Nunenmacher (FMNH). Solano Co., Benicia, January 21, 1931 (CASC). Sonoma Co., Sebastopol (January 24, 1927, February 12, 1927, March 12, 1927, January 24, 1929), 18 (CASC). Sonoma Co., March 17, 1912, Kusche (CASC). Sonoma Co., Petaluma, March 22, 1983, A. Smetama, 2 (CMNC). Sonoma Co., Sebastopol, April 15, 1922, E. Rdeong (CASC). Sonoma Co., Russian River, May 1, 1898, 2 (OSUC). Stanislaus Co., Adobe Creek, 22 miles west of Patterson, May 23, 1948, Hugh B. Leech (CASC). Trinity Co., Carrville, June 6, 1913, June 23, 1913, 3 (CASC). Trinity Co., Carrville, 2400-2500 ft. (May 20, 1934, May 30, 1934), 2 (CASC). Trinity Co., Carrville, May, 31 (FMNH). Trinity Co., Carrville, 2400-2500 ft., May 29, 1934 (FMNH). Tulare Co., Porterville, March 19, 1934, R.P. Allen, 2 (CASC). Tulare Co., Sequoia Natl. Park, Paradise Valley, 3000-5000 ft., May 22, 1929 (CASC). Tulare Co., Sequoia Natl. Park, Ash Mt. R. (April 25, 1944, April 25, 1949), R.C. Bechtel, 4 (UCDC). Tulare Co., California Hot Spgs., May 17,

1937 (CASC). Tuolumne Co., Hetch Hetchy Dam, June 18, 1961, D.R. Miller (CASC).  
 Ventura Co., March 28, 1932, M.W. Stone (CASC). Ventura Co., Santa Paula, April 22,  
 1941 (CASC). Ventura Co., U.S. Soil Con., Somis, May 5, 1941, M.W. Stone (CASC).  
 Ventura Co., Santa Paula, March, 1915, J.E. Graf, 12 (CASC). Ventura Co., Somis, May  
 5, 1941, M.W. Stone (FSCA). Ventura Co., Camarillo, April 1, 1932, A.T. McClay  
 (UCDC). Ventura Co., Santa Paula, March, 1915, J.E. Grat (UCDC). Yolo Co., Davis,  
 April 25, 1948, B. Stevens (UCDC). Yolo Co., Davis (March 26, 1947, May 22, 1948),  
 A.T. McClay, 2 (UCDC). Yolo Co., Davis, March, 1934 (UCDC). Yolo Co., Elkhorn Ferry,  
 April 5, 1949, A.T. McClay, 9 (MEM). Yolo Co., Woodland, July 5, 1948, E.C. Carlson, as  
 a larva, adult by 4-4-1949 (UCDC). Yuba Co., April 7, 1933, Gammon Jones, alfalfa  
 (CASC). Victorv. (CASC). Palm Spr., March 22, 1919 (CASC). Neenah, May 7, 1928,  
 J.N. Knull, 3 (FMNH). Temple, April 21, 1921, K. Sloop, 2, (FMNH). 2 (FMNH), Santa  
 Ana, March 28, 1928, 4 (TAMU). Temple, April, 21, K. Sloop (OSUC). Cypress., March  
 28, 1931 (OSUC). Chino Creek, May 18, 1930 (UCDC). San Rafael, March 26, 1952,  
 E.I. Schlinger (UCDC). San Jose, April 16, 1931 (UCDC). **Idaho**, Benewah Co., 5 m. N.  
 Tensed, April 30, 1957, A.R. Gittins, 2 (WFBM). Bingham Co., Aberdeen, Exp. Station  
 (May 31, 1967, June 8, 1967, June 15, 1967), G. Carpenter, 15 (WFBM). Blaine Co.,  
 Carey, June, 14, D.M. DeLong (OSUC). Bonner Co., Sandpoint, 2086 ft., July 8, 1940,  
 R.A. Fisher (WFBM). Bonneville Co., Idaho Falls, May 20, 1982, D.J. Schotzko (WFBM).  
 Canyon Co., Parma, October, 1931, F.H. Jhirck, 19 (FMNH). Canyon Co., Caldwell,  
 2375 ft., May 17, 1950, 2 (WFBM). Canyon Co., Parma, 2224 ft. (April 24, 1921, April  
 26, 1921, October 16, 1922, May 15, 1925, May 4, 1927, June 1, 1927, June 1, 1929,  
 May 25, 1930), C. Wakeland, 31 (WFBM). Canyon Co., Parma, 2224 ft. (September 3,  
 1934, September 3, 1936), V.E. Nygren, 5 (WFBM). Canyon Co., Parma, 2231 ft., May  
 10, 1951, A.J. Walz (WFBM). Canyon Co., Caldwell, 2375 ft., June 5, 1952, H.C. Manis  
 (WFBM). Canyon Co., Parma, 2231 ft., August 20, 1940, 2 (WFBM). Canyon Co., Boise,

2739 ft., June, 1920 (WFBM). Canyon Co., Parma, May 1, 1932, F.H. Shirck, 5 (OSUC, CSUC). Latah Co., Moscow, May 13, 1950, N.M. Downie (FMNH). Latah Co., Moscow, May 6-10, 1942, T.A. Brindley (FMNH). Latah Co., Moscow, 2560 ft., April 5, 1930, C. Wakeland (WFBM). Latah Co., Moscow, 2560 ft., May 2, 1937, C. Wakeland (WFBM). Latah Co., Tomers Butte, May 15, 1951, V.H. Albee (WFBM). Latah Co., Moscow, April 25, 1932, T.A. Brindley (WFBM). Latah Co., Moscow, 2560 ft., April 30, 1937, C.C. Ball (WFBM). Latah Co., Moscow, May 12, 1954, S.W. Dahlen, alfalfa (WFBM). Oneida Co., Malad, May 17, 1956, A.R. Gittins (WFBM). Owyhee Co., Homedale, 2238 ft., June 1, 1956, R.W. Portman (WFBM). Gwen Springs, April 27, 1931 (WFBM). **Nevada**, Humboldt Co., NW McDermitt, June 5, 1951, Black & Davis (CSUC). Humboldt Co., Winnemucca, May 31, 1958, T.R. Haig (CASC). **Oregon**, Harney Co., Wrights Point, June 8, 1952, J.E. Davis (CSUC). Union Co., La Grande, May 16, 1922, L.P. RockWood (CASC). Benton Co., Corvallis, September 1, 1912 (CASC). Benton Co., Corvallis (CASC). Benton Co., Corvallis, May 19, 1912, H.S. Walters (FMNH). Benton Co., Corvallis, McCormack, 2 (OSUC). Benton Co., Corvallis, July, 9, W.J. Chamberlin (OSUC). Benton Co., Corvallis (April, 20, July, 9), 2 (OSUC). Crook Co., Prineville, May 27, 1933, E.W. Jones, 2 (WFBM). Lane Co., Eugene (October 10, 1941, April 19, 1942), B. Malkin, 2 (FMNH). Lane Co., Eugene, April 12, 1942 (FMNH). Lane Co., Bletchly, May 17, 1942 (FMNH). Malheur Co., Harper, May 2, 1932, F.H. Shirck (CSUC). Multnomah Co., Portland, April 17, 1936 (CASC). Multnomah Co., Portland, April 17, 1936, F. Lawrence (CASC). Umatilla Co., Umapine, March 23, 1932, E.W. Jones (WFBM). Union Co., Toll Gate Rd., Blue Mts. (June 7, 1938, June 11, 1938), 3 (CASC). Washington Co., Forest Grove, May 12, 1918 (CASC). Washington Co., Gaston, May 4, 1939, M.C. Lane (FMNH). Washington Co., Blooming, April 29, 1938, Mech trap, 4 (FMNH). Washington Co., Forest Grove, May 14, 1938, M.C. Lane, Mech. Trap (FSCA). Washington Co., Forest Grove, April, 20 (OSUC). Yamhill Co., McMinnville, K.M. Fender

(CASC). Yamhill Co., McMinnville, April 10, 1939, 3 (FMNH), 2 (OSUC). **Utah**, Box Elder Co., Park Valley, March 26, 1934, R.C. Roskelley, 2 (FMNH). Box Elder Co., Honeyville, May 11, 1931, G.H. Knowlton (OSUC). Cache Co., Clarkston, June, 12, G.F. Knowlton, 4 (OSUC). Cache Co., April 27, 1938, D.E. Hardy & G.S. Stains (OSUC). Davis Co. (April 23, 1954, May 3, 1956), G.F. Knowlton, 3 (OSUC). Tooele Co., Erda, May 2, 1952, G.F. Knowlton (FMNH). Uintah Co., LaPoint, May 11, 1933, E.K. Steffers (FMNH). Weber Co. (May 4, 1954, May 8, 1954, May 9, 1954, May 12, 1954), G.F. Knowlton, 6 (OSUC). **Washington**, Columbia Co., Dayton, May 17, 1953 (WFBM). Columbia Co., Starbuck, April 20, 1932, E.W. Jones (WFBM). Grant Co., Moses Lake, May 2, 1954, H. Davis & M.T. James, 5 (CSUC). Kittitas Co., Thrall, May 7, 1936, E.W. Jones (WFBM). Kittitas Co., Ellensburg, June 20, 1954, G.F. Knowlton, 2 (OSUC). Stevens Co., Colville, April 25, 1929, 4 (CASC). Walla Walla Co., Lowden, May 16, 1933, E.W. Jones (WFBM). Walla Walla Co., Walla Walla, March 6, 1937, From Soil (WFBM). Walla Walla Co., Walla Walla, December 8, 1936, E.W. Jones, From Soil (WFBM). Walla Walla Co., Prescott, May 8, 1935, E.W. Jones (WFBM). Walla Walla Co., Touchet, May 17, 1940, E.W. Jones (WFBM). Walla Walla Co., Walla Walla, April 11, 1936, E.S. Booth (CASC). Walla Walla Co., August 30, 1926, M.W. Stone, 3 (CMNC). Walla Walla Co., Walla Walla (May 28, 1924, May 10, 1936), M.C. Lane (CASC). Walla Walla Co., Walla Walla, April 19, 1924 (CASC). Walla Walla Co., Walla Walla, March 31, 1934, D.C. Alftine (WFBM). Walla Walla Co., Walla Walla, 500 ft., March 31, 1934, D.C. Alftine, 3 (WFBM). Walla Walla Co., Walla Walla, September 22, 1939, E.W. Jones, From Soil (WFBM). Walla Walla Co., Walla Walla, March 15, 1937, From Soil (WFBM). Whitman Co., Almota, May 29, 1923, M.C. Lane (CASC). Whitman Co., Pullman, May 1, 1909, W.M. Mann (CASC), June 5, 1948, T.J. Straka (CSUC). Yakima Co., Toppenish, April 17, 1926, M.C. Lane (CASC). Yakima Co., Toppenish, April 14, 1924, D. Dunavan (CASC). Yakima Co., Toppenish, May 1, 1930, I.W. Bales, 2 (CASC). Yakima Co., Toppenish,

April 28, 1938, K. Gray, on alfalfa (FMNH). Yakima Co., Toppenish, April 28, 1938, K. Gray, on alfalfa (FMNH). Yakima Co., Toppenish (August 14, 1925, August 18, 1925), R. W. Haegele, 11 (WFBM). Yakima Co., Toppenish, December 1, 1930, K.E. Gibson (WFBM). Yakima Co., Grandview, May 16, 1935, E.W. Jones (WFBM). Pierce Co., Spanaway, June 9, 1967, M.W. Stone (CASC). **Wyoming**, Albany Co., Laramie, April 22, 1894 (CASC).

Distribution: A common western species, and especially abundant in California (Fig. 81).

Diagnosis: *Limonius californicus* is most similar to *L. canus*. It can be distinguished by the bulbous parameres (Fig. 25) have the lateral margins gradually narrowing from apical 1/5 toward apical blades, the apical blades triangular with lateral angle pointed apically, and the aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/5 length of apical blades. In *L. canus* the parameres (Fig. 26) have the lateral margin gradually narrowing toward apical blades, apical blades triangular, aedeagus gradually narrowing to tip, and extending beyond parameres by less than 1/3 length of apical blades. Moreover, the clypeal margin of *L. californicus* is entire, whereas, in *L. canus* the clypeal margin is slightly concave medially.

Note: The holotype of *L. californicus* was unavailable for examination. The concept of the species follows Van Dyke (1932). Direct comparisons of the holotype of *L. hispidus* and syntypes of *L. occidentalis* with typical *L. californicus* throughout its range indicated no specific differences. The elytra of individuals between and within population can vary from pale brown to dark brown.

#### *Limonius canus* LeConte

*Limonius canus* LeConte 1853: 433, Van Dyke, 1932: 340, Brooks, 1960: 28, Lane, 1971: 23. Type # MCZC (2539). Type locality: San Diego, California.

*Limenius subcostatus* Motschulsky 1859: 370, Leng, 1920: 168, Schenkling, 1925: 297, Van Dyke, 1932: 354. Type locality: San Francisco, California. Synonymized by Van Dyke, 1932: 354.

*Limenius discoideus* LeConte 1861: 348, Dyke, 1932: 340, Fall, 1934: 25, Van Dyke, 1943: 46-47. Type # MCZC (2528). Type locality: Rocky Mountains, at the head of Missouri River. Synonymized by Van Dyke, 1932: 340.

Length: 7.5-12.5 mm (length/width ratio 3.13-3.75). Head dark brown to black, clypeal margin entire slightly received medially, frontal deeply punctate, separated by more than width of punctures, with appressed black setae. Antennae extending 1 to 2 segments beyond hind angles on males, not extending on females, segment 2 small, segment 3 intermediate in length between segment 2 and 4, antennal color dark brown to black. Pronotum black with posterior and anterior border of the hypomeron reddish, 2-3.3 mm (nearly as long as broad), pronotal margin broadly rounded, carina distinct with lateral margin approximately 1/4<sup>th</sup> length of lateral margin, pronotal texture, punctures distinctly umbilicate laterally, separated by less than width of punctures, covered with appressed yellow setae. Scutellum black, shell-like, deeply punctures, covered with dense appressed yellow setae. Prosternum and hypomeron not carinate anteriorad, not forming antennal groove; posterior border of hypomeron without teeth; prosternum, dark brown to black, umbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae; hypomeron pale brown to dark brown with black spot on the middle, umbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae; metasternum black, deeply punctate, covered with appressed yellow setae, legs color, dark brown to black.

Elytra 5.4- 8.9 mm (length/width ratio 2.23-2.7), pale brown to dark brown, striae shallowly punctate, inter-striae shallowly punctate.

Abdomen black except the last segment yellowish brown, deeply punctate, covered with appressed yellow setae.

Male genitalia (Fig. 26): parameres with lateral margin gradually narrowing toward apical blades, apical blades triangular, aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/3 length of apical blades. Parameres long 1.4 to 1.6 X length of basal piece.

Female bursa copulatrix (Fig 66) with spines clustered at one side of bursa walls.

Type Material Examined: Holotype number (MCZC 2539), San Diego, California.

Type Material of Synonyms Examined: the type of *L. discoideus*, without locality label, type MCZC number 2528.

Material examined: **Canada: British Columbia**, Conford, June 1, 1931, J.R.L. Howell (CASC). Kelowna, May 18, 1921, R.C. Treherne (CASC). Pescictan, May 7, 1925 (CASC). Ponticlon, May 7, 1925, Venalles (CASC). Revelstoke, June 22, 1943, B. Susden (FMNH).

**United States: California**, Butte Co., April 7, 1928, H.H. Keifer (CASC). Alameda Co., Livermore, April 30, 1928, E.P. Van Duzee (CASC). Alameda Co., Niles Cyn., May 14, 1922 (CASC). Alameda Co., March 12, 1941, F.W. Nunenmacher (FMNH). Butte Co., Chico, Hooker Oak, April 23, 1922, E.P. Van Duzee (CASC). Butte Co., Chico, April 18, 1928 (CASC). Butte Co., Chico, April 23, 1922, E.P. Van Duzee (CASC). C. Costa Co., Antioch, March 31, 1953, R. Schuster (FMNH). Calaveras Co., Mokelumne Hill (March, May), F.E. Blaisdell, 2 (CASC). Colusa Co., Grimes, February 27, 1948, Carlson, 4 (UCDC). Contra Costa Co., Antioch, March 22, 1941, 2 (CASC). Contra Costa Co., Antioch, March 16, 1951, J.C. Hall (UCDC). Del Norte Co., May 29, 1910, F.W. Nunenmacher (OSUC). Fresno Co., April 17, 1939, A.F. Howland, 7 (CMNC). Fresno

Co., Coalinga, Boy Scout Camp, March 19, 1931, E.P. Van Duzee, 5 (CASC). Humboldt Co., May 3, 1913, F.W. Nunenmacher (OSUC). Humboldt Co., Green Point, June 7, 1916, F.E. Blaisdell (CASC). Humboldt Co., (April 27, 1911, April 28, 1911, May 3, 1911, May 4, 1911), F.W. Nunenmacher, 28 (CASC). Humboldt Co., April, 1901 (CASC). Kern Co., 3 mi. N.E. Kernville, April 5, 1959, M.E. Irwin (CASC). Kern Co., Arvin, March 3, 1936, C.L. Smith (CASC). Kern Co., Onyx, March 7, 1957, E.I. Schlinger (UCDC). Lake Co., N. Fork Cache Crk. Hwy. 20, May 14, 1961, F.D. Parker (CASC). Los Angeles Co., Burbank, March, 1, C.H. Hicks (FMNH). Los Angeles Co., Pasadena, Dr. A. Fenyes (MEMU). Los Angeles Co., February 9, 1930, 3 (OSUC). Los Angeles Co., Bellflower, January 12, 1938, M.W. Stone, 2 (CASC). Los Angeles Co., Artesia, March 2, 1937, J.Wilcox (CASC). Los Angeles Co., Redondo, January, 1912, 10 (CASC). Los Angeles Co., Pasadena (April, 1897, February, January 5, 1929), 3 (CASC). Los Angeles Co., Glendale, March, 12, J.P. Reed, 2 (FMNH). Los Angeles Co., El Monte, February 12, 1937, M.W. Stone (FMNH). Los Angeles Co., Torrance, February 25, 1935, A.T. McClay (FMNH). Los Angeles Co., March 19, 1929, A.T. McClay (UCDC). Los Angeles Co., June 17, 1941, E.I. Schlinger (UCDC). Los Angeles Co., Alhambra, March 18, 1929, M.W. Stone (UCDC). Madena Co., April 22, 1969, D. Taylor (CMNC). Marin Co., Dillon Beach, March 20, 1970, Fred G. Andrews (CASC). Marin Co., Stinson Beach (February 21, 1926, February 22, 1926), 6 (UCDC). Mariposa Co., Santa Cruz Mtn. (CASC). Mariposa Co., Yosemite Valley, July, 20, E.G. Linsley (FMNH). Mendocino Co., Yorkville (April 30, 1924, April 24, 1928), E.P. Van Duzee, 5 (CASC). Mendocino Co., Hopland, May 9, 1928, E.P. Van Duzee (CASC). Mendocino Co., May 14, 1945, E.R. Leach (FMNH). Mendocino Co., E.R. Leach (FMNH). Monterey Co., Carmel (March 12, 1911, April 9, 1911, March 31, 1912, February 6, 1913, February 15, 1913, January 31, 1914, February 24, 1914, February 27, 1914, March 1, 1914, March 8, 1914, April 5, 1914, March 11, 1915, March 21, 1915, February 14, 1916, February 17, 1916, February 23,

1916, February 24, 1916, March 3, 1917, November 27, 1917, April 14, 1919, March 23,  
 1930), 34 (CASC). Monterey Co., Carmel (April 9, 1911, March 19, 1922), L.S. Slevin, 7  
 (CASC). Monterey Co., Corral de Tierra, March 2, 1934 (CASC). Napa Co., Mt. St.  
 Helena, March 22, 1930 (FMNH). Napa Co., Pope Valley, June 16, 1932, H.L. Mckenzie  
 (UCDC). Nevada Co., Sagehen near Hobart Mills, June 25, 1954, R.C. Blaylock  
 (UCDC). Sacramento Co., Brannan Island, April 8, 1967, P.A. Opler (CASC).  
 Sacramento Co., Michigan Bar, April 19, 1961 (CASC). Sacramento Co., April 23, 1922,  
 E.P. Van Duzee, 2 (CASC). Sacramento Co., Courtland, March 2, 1934, E.W. Jones  
 (WFBM). Sacramento Co. (March 10, 1928, March 15, 1928), C. Wakeland, 4 (WFBM).  
 Sacramento Co. (April 24, 1944, April 12, 1945, April 13, 1947, April 15, 1947, April 16,  
 1947, April 17, 1947, April 30, 1947, May 11, 1947), A.T. McClay, 14 (UCDC).  
 Sacramento Co., June 24, 1948, E.C. Carlson, 7 (UCDC). Sacramento Co., Crows  
 Landing, June 18, 1948, E.C. Carlson, 2 (UCDC). San Francisco Co., May 11, 1933,  
 J.E. Blum, 6 (MEMU). San Francisco Co., March 11, 1932, H.H. Keifer (CMNC). San  
 Francisco Co. (March 24, 1918, March 30, 1919, January 26, 1920), E.P. Van Duzee, 14  
 (CASC). San Francisco Co., March 1, 1931, J.A. Kusche (CASC). San Francisco Co.,  
 February 27, 1923, C.L. Fox (CASC). San Francisco Co. (March 1, 1908, February,  
 1925), F.E. Blaisdell, 34 (CASC). San Francisco Co., 2 (CASC). San Francisco Co.,  
 March 22, 1938, B.E. White (CASC). San Francisco Co. (April 12, 1906, March 15,  
 1908, March 21, 1915), 16 (CASC). San Francisco Co., Cliff House, March 21, 1915, A.  
 Hopping, 4 (CASC). San Francisco Co., Sand Dunes (March 25, 1907, March 25, 1917,  
 March 1, 1918, April 2, 1922, March 9, 1924, March 30, 1924, March 9, 1934), C.L. Fox,  
 17 (CASC). San Francisco Co., Ingleside, February 3, 1920, E.P. Van Duzee (CASC).  
 San Francisco Co., near Cliff House, (February 12, 1916, March 18, 1923), 2 (CASC).  
 San Francisco Co., Lake Merced, March, J.E. Cottle (FSCA). San Francisco Co., 2  
 (OSUC). San Francisco Co., February, 25, F.E. Blaisdell, 8 (FMNH, OSUC). San

Joaquin Co., Tracy, April 9, 1946, W.F. Barr, 2 (WFBM). San Joaquin Co., Tracy, April 12, 1934, 3 (CMNC). San Joaquin Co., Stockton, October 16, 1943, H.T. Osborn (CSUC). San Joaquin Co., Victor, April 23, 1953, E.M. Evans, 4 (UCDC). San Joaquin Co., Lockeford, April 20, 1950, E.C. Carlson (UCDC). San Joaquin Co., Lodi., April 21, 1965, R.O. Schuster, Grape, 3 (UCDC). San Mateo Co., Colma, July 3, 1964 (CASC). San Mateo Co., Half Moon Bay, April 22, 1950, R.S. Beal (WFBM). Santa Clara Co., Stevens Crk., March, 22 (FMNH). Santa Clara Co., Alum Rock Park, April 19, 1936, C.A. Hamsher (UCDC). Santa Clara Co., Los Gatos, April 25, 1921, L.S. Slevin (CASC). Santa Cruz Co., Corralitos, May 9, 1919, L.S. Slevin (CASC). Santa Cruz Co., March 31, 1984, D. Kissinger (FMNH). Santa Cruz Co., Watsonville, April 1, 1958, O.H. Schwab (UCDC). Shasta Co., June 2, 1913, F.W. Nunenmacher (CASC). Shasta Co., Palo Cedro, April 16, 1918 (CASC). Siskiyou Co., Mt. Shasta, J.E. Cottle (FSCA). Solano Co., Rio Vista, April 19, 1950, R.S. Beal, 3 (WFBM). Sonoma Co., Eldridge, May 3, 1914 (CASC). Sonoma Co., Guerneville, May 30, 1908, 2 (CASC). Sonoma Co., 2 (CASC). Sonoma Co., Russian River, May 14, 1893, 4 (MEMU). Sonoma Co., Eldridge, July, J.E. Cottle (FSCA). Sonoma Co., Russian River (May 14, 1893, May 1, 1898), 6 (OSUC). Santa Rosa, R. Eckert (CASC). 2 (FMNH). Stanislaus Co., Riverbank, February 22, 1934 (UCDC). Tehama Co. (April 28, 1913, April 29, 1913), F.W. Nunenmacher, 11 (CASC). Tehama Co., Cottonwood, April 8, 1920, R.P. Allen (UCDC). Tehama Co., Red Bluff, February 12, 1947, A.T. McClay (UCDC). Trinity Co., Carrville, 2400-2500 ft., May 17, 1934 (CASC). Trinity Co., Carrville, June 4, 1913 (CASC). Tulare Co., Visalia, F.T. Scott (CASC). Tulare Co., March, 1937, F.T. Scott, 4 (CASC). Tulare Co., Visalia, April, 1938, F.T. Scott (CASC). Tulare Co., Hopping (CASC). Tulare Co., Sequoia Natl. Park, 3000-5000 ft., May 15, 1929 (CASC). Tulare Co., Pine Flat, April 16, 1938 (CASC). Tulare Co., Kaweah, 1000 ft., April 10, 1907, Hopping (CASC). Tulare Co., Kaweah, Hopping, 4 (CASC). Tulare Co., Sequoia Natl. Park, Ash Mt. R., April 25, 1949, R.C.

Bechtel, 4 (UCDC). Tuolumne Co., Yosemite, June (CASC). Ventura Co., Saticoy,  
 March 11, 1924, C.T. Dodds (CASC). Ventura Co., Santa Paula, March 24, 1932, A.T.  
 McClay (UCDC). Yolo Co., Davis (April 18, 1959, April 14, 1961), L.R. Nault, 2 (CASC).  
 Yolo Co., Davis, 11, 1950, J.C. Hall (UCDC). Yolo Co., Davis (October, 1948, May 8,  
 1953), 2 (UCDC). Yolo Co., Davis (May 13, 1949, April 2, 1952), E.L. Schlinger, 4  
 (UCDC). Yolo Co., Davis, April 9, 1957, R.F. Schoeppner, 2 (UCDC). Yolo Co., Davis  
 (May 6, 1941, May 7, 1945, May 6, 1948, May 7, 1948, May 28, 1948, April 19, 1950,  
 April 2, 1952,), A.T. McClay, 27 (UCDC). Yolo Co., Putah Cyn, April 26, 1938, P. Paige  
 (CASC). Yolo Co., Putah Cyn, April 3, 1960, M.E. Irwin (CASC). Yolo Co., Putah Cyn,  
 April 30, 1963, D.Q. Cavagnaro (CASC). Yolo Co., Elkhorn Ferry, April 5, 1949, A.T.  
 McClay, 21 (MEMU). Yolo Co., Putah Cyn (April 25, 1948, April 3, 1951, April 4, 1951).  
 A.T. McClay, 7 (UCDC). Yolo Co., Elkhorn Ferry, May 10, 1951, E.L. Schlinger, 6  
 (UCDC). Yolo Co., Woodland, April 12, 1967, R.P. Allen (CMNC). Yolo/ Solano Co.,  
 Putah Cyn, May 2, 1936, B.E. White (CASC). Yolo/ Solano Co., Putah Cyn, March 24,  
 1958, D.E. Barcus (UCDC). Yolo/ Solano Co., Putah Cyn, April 15, 1954, N.A. Browne  
 (UCDC). Yolo/ Solano Co., Putah Cyn, April 8, 1951, A.T. McClay, 3 (UCDC). Yolo/  
 Solano Co., Elkhorn Ferry, April 5, 1947, A.T. McClay (UCDC). Yolo/ Solano Co., Putah  
 Cyn (April 21, 1944, May 1, 1949), R.C. Bechtel, 2 (UCDC). Yolo/ Solano Co., Putah  
 Cyn, April, 1950, J.C. Hall (UCDC). Yolo/ Solano Co., June 12, 1941 (UCDC). Yolo/  
 Solano Co., Putah Cyn, April 21, 1949, W.F. Ehrhardt (UCDC). Yolo/ Solano Co., Putah  
 Cyn, April 25, 1948, E.I Schlinger (UCDC). Yuba Co., Hort. Com., May 9, 1915, G.P.  
 Weldon (CASC). March 28, 1935, R.E. Campbell (CASC). Idaho, Ada Co., Boise., 2692  
 ft., April 22, 1953, L.L. Vail (WFBM). Ada Co., Boise., 2692 ft., April 22, 1953, L.L. Vail,  
 Peach tree,(WFBM). Boise Co., 2739 ft., April, 1914, T.H. Parks (CASC). Canyon Co.,  
 Parma, April 4, 1932, H.P. Lanchester (CASC). Canyon Co., Parma, May 5, 1931, F.H.  
 Shirck, 2 (FMNH). Canyon Co., Parma, 2231 ft., March 17, 1941, H.C. Manis (WFBM).

Canyon Co., Parma, May 10, 1938, E.W. Jones (WFBM). Canyon Co., Parma, 2224 ft., September 3, 1936, V.E. Nygren, 6 (WFBM). Canyon Co., Parma, 2224 ft., April 26, 1921, C. Wakeland (WFBM). Canyon Co., Parma, 2224 ft., July 1, 1928, H. Lanchester, WFBM. Canyon Co., Parma, May 5, 1931, F.H. Shirck, 4 (FMNH). Idaho Co., Kooskia, 1253 ft., May 17, 1956, R.W. Portman, alfalfa (WFBM). Idaho Co., Kendrick, 1219 ft., April 13, 1951, W.F. Barr, 2 (WFBM). Idaho Co., Whitebird, May 7, 1967, R.W. Portman (WFBM). Latah Co., Kendrick, April 4, 1908, (CASC). Latah Co., Moscow, 2560 ft., July, 1941, W.E. Shull (WFBM). Latah Co., Julietta, 1083 ft., May 17, 1952, W.F. Barr (WFBM). Latah Co., Lewiston, 550 ft., April 23, 1941, S. Lienk (WFBM). Latah Co., Lewiston, 550 ft., April 23, 1941, W. Hudson (WFBM). Latah Co., Lewiston, April 19, 1956, W.F. Barr (WFBM). Latah Co., Lewiston, April 30, 1932, J. Gilleff (WFBM). Latah Co., Lewiston, 550 ft., April 22, 1937, C.C. Ball (WFBM). Latah Co., Lewiston, 550 ft., May 8, 1935, B.F. Coon, 2 (WFBM). Latah Co., Lewiston, 550 ft. (April 15, 1936, April 28, 1936), V.E. Nygren, 2 (WFBM). Latah Co., Lewiston, 550 ft., April 15, 1936, C. Wakeland (WFBM). Latah Co., Lewiston, 736 ft., April 23, 1922, D.B. Whelan (WFBM). Latah Co., Bovill, June 11, 1948, A. J. Walz (WFBM). Latah Co., Lewiston, 550 ft. (May 24, 1944, April 18, 1948), A. J. Walz (WFBM). Latah Co., Lewiston, 736 ft., April 23, 1922, D.B. Whelan (WFBM). Nez Perce Co., Myrtle, April 15, 1951, N.M. Downie, 3 (FMNH). Nez Perce Co., Spalding (April 15, 1951, April 22, 1951), N.M. Downie, 4 (FMNH). Nez Perce Co., Lewiston, 550 ft., April 21, 1937, R.W. Every (WFBM). Nez Perce Co., Lewiston, 550 ft., April 8, 1949, W.F. Barr (WFBM). Nez Perce Co., Lewiston, 550 ft., April 23, 1941, S. Lienk (WFBM). Nez Perce Co., Myrtle, May 6, 1946 (WFBM). Nez Perce Co., Lenore, 1000 ft., May 7, 1938, H.C. Elg (WFBM). Nez Perce Co., Webb, May 16, 1953, W.F. Barr (WFBM). Nez Perce Co., Lewiston, May 15, 1964, D.S. Horning, 2 (WFBM). Nez Perce Co., Lenore, 1000 ft., May 6, 1949, A. J. Walz, 2 (WFBM). Nez Perce Co., Lapwai, 800 ft., April 23, 1948, A. J. Walz (WFBM). Nez Perce

Co., Spalding, April 16, 1949, A. J. Walz (WFBM). **Montana**, Cascade Co., Great Falls, May 23, 1930, 2 (CASC). Sanders Co., Findley's Flats Lolo National Forest, Hwy. 200, June 15, 1982, N.M. Downie (FMNH). **Oregon**, Baker Co., Durkee, May 11, 1938, E.W. Jones, 2 (WFBM). Benton Co., Corvallis, May, 3 (OSUC). Benton Co., Corvallis, March 28, 1930, J. Wilcox (CASC). Benton Co., Corvallis, 2 (CASC). Benton Co., Corvallis, June 21, 1909 (CASC). Benton Co., Corvallis, April 24, 1924, V.T. Shattuck (FMNH). Clackamas Co., Canby, April 22, 1933, E.W. Jones (WFBM). Clatsop Co., Sand dunes, Warrenton, June 1, 1951, J.E. Davis (CSUC). Coos Co., Myrtlepoint, June 9, 1911, J.R.Slevin, 2 (CASC). Curry Co., Myrtle Grove Park, Brooking, August 4, 1950, J.E. Davis (CSUC). Douglas Co., Roseburg, Burgess (CASC). Douglas Co., Dillard, May 25, 1933, E.W. Jones (WFBM). Jackson Co., Medford, April 1, 1915, L.G. Gentner, 2 (CASC). Jackson Co., Talent, April 16, 1922, L.G. Gentner, feeding on pear leaves (CASC). Jackson Co., Medford (April 13, 1933, April 17, 1933), E.N. Kjellesvig, 2 (FSCA). Jackson Co., Medford, April 1, 1915 (CASC). Jackson Co., Talent, May 5, 1935, Jim Baker (CASC). Jackson Co., Talent, April 8, 1932, L.G. Genfner (FMNH). Jackson Co., Ashland, April 14, 1941, A.T. McClay (UCDC). Jackson Co., Talent, April 16, 1932, L.G. Genfner, feeding on Pear leaves (FSCA). Josephine Co., June 11, 1910 (CASC). Josephine Co., Grants Pass, April 28, 1941, A.T. McClay (UCDC). Lane Co., Eugene (April 18, 1942, April 19, 1942, June 21, 1942, May, 1947), B. Malkin, 7 (FMNH). Lane Co., Drain, May 16, 1942, B. Malkin (FMNH). Lane Co., Winchester Bay, April 13, 1947, B. Malkin & I.M. Newell (FMNH). Malheur Co., Harper, May 10, 1938, E.W. Jones, 2 (WFBM). Marion Co., Salem (April 22, 1911, April 27, 1911), G.F. Moznette, 3 (CASC). Marion Co., Salem, April 24, 1926 (CASC). Marion Co., Salem, April 27, 1908, H.F. Wilson, (CASC). Morrow Co., Boardman, February 26, 1946, E.W. Jones (WFBM). Multnomah Co., Portland (April 11, 1940, May 8, 1940, May 9, 1940), K. Gray & J. Schuh, on cut leaf birch, 6 (FMNH). Multnomah Co., Portland, April 28, 1968, K. Gray, 2

(FSCA). Multnomah Co., Portland, April 16, 1940, K. Gray, on cut leaf (FSCA).  
 Multnomah Co., Portland (April 17, 1939, April 16, 1940, April 29, 1940), K. Gray, on  
 Nursery stock, 3 (FSCA). Yamhill Co., Dayton, May 20, 1939 (FMNH). Table Rock, April  
 17, 1937, L.G. Gentner (CASC). **Washington**, Asotin Co., Anatone, May, 1948, 24  
 (WFBM). Asotin Co., Clarkston, April 16, 1948, 8 (WFBM). Benton Co., Kennewick,  
 September 29, 1939, E.W. Jones (WFBM). Benton Co., Paterson, March 26, 1955, G.F.  
 Kraft (FSCA). Benton Co., Kennewick, April 23, 1938, K. Gray (FSCA). Benton Co.,  
 Hanford Site Sand Dunes W. of Columbia River, January 29, 1999, R.S. Zack & C.N.  
 Looney (CASC). Chelan Co., Wenatchee, April 21, 1965, L.E. Shme (CASC). Franklin  
 Co., Perry, April 14, 1933, E.W. Jones (WFBM). King Co., Seattle, May 23, 1914, 3  
 (CASC). King Co., Auburn, April 1, 1951, M.C. Lane (FMNH). Kittitas Co., Ellensburg,  
 May 14, 1940, E.W. Jones, 2 (WFBM). Pierce Co., Puyallup, June 2, 1929 (UCDC).  
 Pierce Co., Puyallup, May 6, 1948, on raspberries, 3 (FMNH). Pierce Co., Alderton, May  
 13, 1929 (FMNH). Pierce Co., Sumner, June 11, 1933, W.W. Baker (FMNH). Pierce Co.,  
 Sumner, June, 17, J. Wilcox (FMNH). Pierce Co., Sumner, April 26, 1951, M.C. Lane  
 (FMNH). Walla Walla Co. (August 30, 1926, May 13, 1927) M.W. Stone, 32 (CMNC).  
 Walla Walla Co., Walla Walla (April 17, 1935, April 27, 1938, April 30, 1938, April 19,  
 1942), M.C. Lane, 4 (CASC). Walla Walla Co., Walla Walla, May 1, 1909 (CASC). Walla  
 Walla Co., Walla Walla, May 13, 1927, M.W. Stone (CASC). Walla Walla Co., Walla  
 Walla (April 18, 1932, April 16, 1937), M.C. Lane, 2 (FMNH). Walla Walla Co., Walla  
 Walla, 1930, E.W. Jones (FMNH). Walla Walla Co., College Place, April 19, 1945, G.H.  
 Nelson (WFBM). Walla Walla Co., Touchet, May 17, 1940, E.W. Jones, 5 (WFBM).  
 Walla Walla Co., Walla Walla, May 26, 1940, E.W. Jones (WFBM). Walla Walla Co.,  
 Walla Walla (December 8, 1936, August 17, 1937, August 26, 1937, September 22,  
 1939), E.W. Jones, From Soil, 9 (WFBM). Walla Walla Co., Walla Walla (April 8, 1938,  
 September 30, 1938), From Soil, 2 (WFBM). Walla Walla Co., Walla Walla (April 1,

1938, April 10, 1940, March 25, 1941, April 30, 1945), E.W. Jones, 4 (WFBM). Walla Walla Co., Prescott, April 22, 1938, E.W. Jones (WFBM). Walla Walla Co., Walla Walla, 500 ft., March 31, 1934 (WFBM). Walla Walla Co., Touchet, April 17, 1952, M.C. Lane (FMNH). Walla Walla Co., College Place, April 11, 1936, E. Booth (MEMU). Walla Walla Co., May 13, 1927, M.W. Stone (UCDC). Whitman Co., Pullman, May 4, 1953, 2, J.A. Quist (CSUC). Whitman Co., Wawawai (May 6, 1908, May 1, 1909, May 14, 1909), W.M. Mann., 4 (CASC). Whitman Co., Wawawai, May 21, 1949, G. Trostle (FMNH). Whitman Co., Almota, April 13, 1935, E.W. Jones (WFBM). Whitman Co., Wawawai, April 18, 1939, E.W. Jones, 2 (WFBM). Whitman Co., Wawawai, April 18, 1949, W.F. Barr, 4 (WFBM). Whitman Co., Wawawai (May 8, 1956, May 1, 1966), D.S. Horning, 11 (WFBM). Whitman Co., Wawawai, April 23, 1941, M.C. Lane (FMNH). Whitman Co., Wawawai, April 7, 1955, G.F. Kraft (FSCA). Yakima Co., Yakima, April 5, 1925, M.C. Lane (CASC). Yakima Co., Sunnyside, May, 1931, I.W. Bales (CASC). Yakima Co., Toppenish, January, 1931, I.W. Bales (CASC). Yakima Co., Toppenish, May 2, 1924, F.H. Shirck, 2 (FMNH). Yakima Co., Toppenish (April 25, 1926, February, 1931), K.E. Gibson, 7 (WFBM). Yakima Co., Granger, April 14, 1928, K.E. Gibson (WFBM). Yakima Co., Satus, April 27, 1926, K.E. Gibson (WFBM). Yakima Co., Grandview, May 16, 1935, E.W. Jones (WFBM). Yakima Co., Yakima, May 22, 1968, K. Gray, 2 (FSCA).

Distribution: This species is found in western North America, especially abundant along the Pacific Coast from Washington south to California (Fig. 82).

Diagnosis: *Limonius canus* is most similar to *L. californicus*. In the male, the parameres (Fig. 26) of *L. canus* have the lateral margin gradually narrowing toward apical blades, apical blades triangular, aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/3 length of apical blades. Whereas, in *L. californicus* the parameres (Fig. 25) have the lateral margins gradually narrowing from apical 1/5 toward apical blades, apical blades triangular with lateral angle pointed apically, aedeagus

gradually narrowing to tip, and extending beyond parameres by less than 1/5 length of apical blades. The clypeal margin of *L. canus* is entire, slightly concave medially.

Whereas, in *L. californicus* the clypeal margin is entire.

Note: *Limonius discoideus* was treated as a subspecies of *L. canus* by Van Dyke (1932). Also Fall (1934) indicated that "it is true that all specimens of *L. discoideus* are females, but corresponding males, while quite similar to *L. canus*, are not *L. canus*". However, a comparison of the male genitalia of previously identified specimens of *L. discoideus* and *L. canus* from throughout its range were identical. As Van Dyke (1943) previously noted, the *L. discoideus* is "not restricted to the north and intermediate color phases are not uncommon". Apparently, what Fall (1934) treated were more rare color phenotypes of *L. canus*.

#### *Limonius clypeatus* Motschulsky

*Limonius clypeatus* Motschulsky 1859: 369, Van Dyke, 1932: 347-348. Type locality: Sutter's Fort, California.

Length: 6.72-9.44 mm (length/width ratio 3.36-3.75). Head black except clypeal margin reddish, clypeal margin strongly undulate and slightly received medially, frontal deeply punctate, separated by less than width of punctures, with appressed yellow setae. Antennae extending 2 to 3 segments beyond hind angles, segments 2 and 3 are small, together about as long as segment 4, black. Pronotum black with posterior and anterior border of the hypomeron reddish brown, 1.92-2.56 mm (length/width ratio 1.1-1.2), pronotal margin rounded and converging interiorly, posterior margin opposite scutellum notched, carina 1/4<sup>th</sup> length of lateral margin, subparallel with lateral margin, diverging from lateral margin with area between visibly punctate. pronotal texture, punctures dense umbilicate punctures, separated by less than width of punctures,

covered with suberect to decumbent yellow setae. Scutellum black, shell-like, deeply punctures, covered with long subappressed yellow setae. hypomerion strongly costate on anterior third forming antennal groove; posterior border of hypomerion without teeth; prosternum, black except the posterior border reddish, deeply punctate, separated by more than width of punctures, with small appressed yellow setae; hypomerion black except the posterior and anterior border reddish to orange, umbilicate punctures, separated by less than width of punctures, with small appressed yellow setae; metasternum black, deeply punctate, with small appressed yellow setae, legs color, yellow to pale brown.

Elytra 4.4- 6.48 mm (length/width ratio 2.2-2.45), black except some reddish on posterior and anterior border and the lateral margins, striae deeply punctate, inter-striae deeply punctate.

Abdomen reddish brown to black, deeply punctate, with small appressed yellow setae.

Male Genitalia (Fig. 27): parameres with lateral margin convex basally, subparallel apically toward blades, apical blades triangular and longer than wide, aedeagus gradually narrowing to tip, extending beyond parameres by less than  $\frac{1}{4}$  the length of apical blades. Parameres long, 1.8 to 2 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: The Holotype (MNFD Berlin).

Material Examined: **United States: California**, Del Norte Co., Crescent Mts. (June 18, 1963, June 25, 1963), D.J. & J.N. Knull, 3 (FMNH). Lake Co., N. Fork Cache Crk. Hwy. 20, May 14, 1961, F.D. Parker (UCDC). Merced Co., 8 mi. S. Cressey, April 28, 1963, C.D. Johnson, 3 (CASC). Monterey Co., Spreckels, April 8, 1918, C.F. Stahi, on *Malva parviflora* (CASC). Napa Co., Monticello, March 31, 1931, on grape, 2 (UCDC) Plumas Co., Quincy, June 27, 1960, D.J. & J.N. Knull, 8 (FMNH). Sacramento Co., Elk Grove, May 1, 1952, J.K. Hester, 2 (UCDC). Sacramento Co., Elk Grove, April 2, 1952, E.C.

Carlson, 2 (UCDC). Tulare Co., Visalia, March 21, 1939, F.T. Scott (CASC). Tulare Co., Visalia, March, F.T. Scott, 2 (FMNH). Yolo Co., Davis, May 5, 1948 (UCDC). Yolo Co., Davis (March 26, 1947, May 1, 1947, May 5, 1948, May 6, 1948, May 22, 1948, April 19, 1950, April 20, 1950, May 13, 1950, May 17, 1951), A.T. McClay, 29 (UCDC). Yolo Co., Davis, March, 1955, D.C. Force (UCDC). Yolo Co., Davis, April 16, 1966, C.R. Kovacic (UCDC). Yolo Co., Davis, April 24, 1947, April 25, 1948, B. Stevens, 3 (UCDC). Yolo Co., Davis, March 25, 1949, E.C. Carlson (UCDC). Yolo Co., Davis, April 28, 1961, D.Q. Cavagnaro (UCDC). Yolo Co., Davis, March, 1950, J.C. Hall (UCDC). Yolo Co., Davis, April 2, 1951, E.I. Schlinger (UCDC). Yolo Co., Davis (April 18, 1950, April 2, 1956), W.H. Lange, 5 (CASC). Yolo Co., Davis, March 26, 1956, E.A. Kurtz, 2 (CASC). Yolo Co., Davis, April 16, 1966, C.R. Kovacic, 5 (CASC). Yolo Co., Davis, May 1, 1966, R.O. Schuster (CASC). Yolo Co., Davis, May 5, 1948, A.T. McClay (FMNH). Yolo/ Solano Co., Putah Cyn, April 25, 1948, E.I. Schlinger (UCDC).

Distribution: This species is only known from California (Fig. 83).

Diagnosis: *Limonius clypeatus* most similar to *L. auripilis*, but it can be separated by the clypeal margin strongly undulate and slightly concave medially (Fig. 10), antennal segments 2 and 3 equal, combined almost as long as segment 4, and the pronotum is longer than broad. Whereas, *L. auripilis* has the clypeal margin deeply incised, and medially semicircular (Fig. 11). Additionally, the antennal segment 2 is small, about 2/3 length of segment 3, segment 3 almost as long as segment 4, and the pronotum as long as broad.

*Limonius confusus* LeConte.

*Limonius confusus* LeConte 1853: 430, Candeze, 1860: 390, Van Dyke, 1932:

338. Type # 2530 (MCZC). Type locality: Lake Superior.

*Limonius anescens* LeConte 1853: 431, Candeze, 1860: 413. Type # 2542

(MCZC). Type locality: New Jersey. Synonymized by Candeze, 1891: 148.

Length: 8.5-10 mm (length/width ratio 3.7-3.8). Head black throughout, clypeal margin entire, frontal deeply and closely punctured. Antennae extending 2 to 3 segments beyond hind angles, segments 2 and 3 are small, together just longer than segment 4, antennal color black. Pronotum black throughout except the posterior border of hypomeron reddish brown, 2.4-2.8 mm (length/width ratio 1.1-1.2), pronotal margin broadly rounded, carina distinct with lateral margin approximately 1/4<sup>th</sup> length of lateral margin, diverging from lateral margin by visibly puncture. pronotal texture, deeply punctate, separated by less than width of punctures, covered with densely finely appressed yellow setae. Scutellum reddish brown to black, pentagonal, densely punctate, covered with appressed yellow setae. Hypomeron costate anteriorad, forming small antennal groove; posterior border of hypomeron dentate; prosternum, brown to dark brown, deeply punctate, separated by more than width of punctures, covered with small separated appressed yellow setae; hypomeron brown to dark brown with, sub – umbilicate to umbilicate punctures, separated by less than width of punctures, covered with small appressed yellow setae; metasternum dark brown to black, finely punctate, covered with finely appressed yellow setae, legs color, orange throughout.

Elytra 5.9- 7 mm (length/width ratio 2.5-2.6), brown throughout, striae moderately to deeply punctate, inter-striae deeply punctate.

Abdomen brown becoming lighter brown to orange near lateral margin, deeply punctate, with small appressed yellow setae.

Male genitalia (Fig. 28): parameres with lateral margin subparallel, apical blades longer than width by about 2 X, triangular, aedeagus wide becoming narrow on the apical

fourth, with pointed tip, extending beyond parameres by 1/3 length of apical blades.

Parameres long, 2 to 2.5 X of apical blades.

The female bursa copulatrix not sclerotized.

Type Material Examined: Type # 2530 (MCZC). Type without locality label.

Type Material of Synonyms Examined: Type # 2542 (MCZC). Type without locality label.

Material Examined: **Canada, Ontario**, Essex Co., May, 1967, K. Stephan (FSCA).

Hasting Co., June 9, 1935 (CASC). Prince Edward Co., June 31, 1940, J. Brimley, 11 (CASC). Prov., King's Mt., June 23, 1970, H.V. Weems (FSCA). Tilbury, (May 3, 1961, May, 1967) K. Stephan, 2 (FSCA). Trenton, April 17, 1923 (WFBM). Unionville, June 6, 1947, D.S. Marshall (CMNC). **Quebec**, Aylmer, June 19, 1936, G. S. Smith (CASC). Belvedere, Parc Gatineau, July 21, 1974, R. Sexton, 4 (CMNC). Covey Hill, July 2, 1927, W.J. Brown (UCDC). Old Chelsea, June 13, 1961, J.R. Vockeroth (CMNC). Hudson, May, 10 (CASC). Laval Co., (CASC). Montreal, (May, 1899, May 28, 1903) 7 (CASC). Mount Saint Hilaire, May, 1909, 6 (CASC). Rigaud, May 15, 1979, A. Smetana & E.C. Becker, 5 (CMNC). Rouville Co., May 24, 1902, 2 (CASC).

**United States: Indiana**, LaPorte Co., Smith, May 25, 1935, H.S. Dybas (FMNH).

Pulaski Co., May 7, 1988, N.M. Downie (FSCA). Tippecanoe Co. (May 21, 1952, May 14, 1954, May 14, 1960), N.M. Downie, 4 (FMNH). **Iowa**, Story Co., Nevada, June 14, 1953, W.S. Craig (CASC). **Massachusetts**, Hampshire Co., W. Pelham, June 7, 1937, M.C. Lane, 2 (CASC, CSUC). Middlesex Co., Sherborn, June 14, 1945, C.A. Frost (CASC). Middlesex Co., Ashland, July 17, 1926, C.A. Frost (CASC). Middlesex Co., Sherborn, June 18, 1933 (FMNH). **Michigan**, Chippewa Co., Shelldrake, June 19, 1958, D.S. White (FSCA). Hrn. Mtn. Club, June (CASC). **New Hampshire**, Grafton Co., Rumney, June 13, 1924 (CASC). Hillsborough Co., Antrim, June 8-22, 1940 (FMNH). **New York**, Nassau Co., Wantagh, June 30, 1940 (FMNH). Oneida Co., Utica, June 30, 1929 (CASC). Oneida Co., Utica, May 30, 1929 (WFBM). Onondaga Co., Elbridge, May

23, 1940, N.M. Downie (WFBM). Onondaga Co., Elbridge (June 7, 1940, June 23, 1940), N.M. Downie, 2 (FMNH). Onondaga Co., May 16, 1946, N.M. Downie (UCDC). St. Lawrence Co., Rossie (June 27, 1942, May 12, 1965, June 12, 1978), N.M. Downie, 3 (FMNH). St. Lawrence Co., Canton, May 17, 1936, N.M. Downie, 2 (FMNH). St. Lawrence Co., Canton, May 17, 1936, 2 (FSCA). St. Lawrence Co., Rossie (May 16, 1982, May 28, 1982, May 30, 1982, May 25, 1986), N.M. Downie, 8 (FSCA). St. Lawrence Co., Grass Lake, July 11, 1988, N.M. Downie, 3 (FSCA). St. Lawrence Co., Rossie (June 17, 1967, June 12, 1968), N.M. Downie, 2 (FMNH). Tompkins Co., Ithaca (June 7, 1915, June, 1917, June 17, 1953), 5 (CASC). Tompkins Co. (June 12, 1965, May 30, 1976), N.M. Downie, 2 (FMNH). Tompkins Co., Groton (May 31, 1942, June 4, 1953), N.M. Downie, 2 (FMNH). **Ohio**, Clark Co., Clifton, June, 16, D.J.& J.N. Knull (FMNH). Delaware Co., May 19, 1947, June 2, 1949, May, 21, May, 29, May 30, 1950, June 11, 1950, June, 24), D.J.& J.N. Knull, 8 (FMNH). Greene Co., May 20, 1965, D.J.& J.N. Knull (FMNH). Greene Co., May 25, 1953, D.J. & J.N. Knull (OSUC). Hocking Co., Crane Hollow, May 24, 1936 (FMNH). Hocking Co. (May 18, 1945, May, 20, May, 23, May 25, 1945, May 26, 1952, May 29, 1952, June 8, 1956, June 2, 1964, June, 25, May 8, 1965), D.J.& J.N. Knull, 13 (FMNH). Hocking Co. (May,17, May, 20, May, 29, June 5, 1941, June, 16, June 20, 1953), D.J.& J.N. Knull, 6 (OSUC). Knox Co., May 14, 1939 (FSCA). 4 (CASC). **Pennsylvania**, Clarion Co., Cooksburg, July 9, 1930, J.N. Knull (FMNH). Clearfield Co., Clearfield, June 13, 1930, J.N. Knull (FMNH). Lycoming Co., Barbours, June 1, 1931, J.N. Knull (FMNH). McKean Co., Mount Alton (June 3, 1931, June 7, 1931, June 9, 1931, May 26, 1932), J.N. Knull, 6 (FMNH). McKean Co., Mount Alton, May 26, 1932, J.N. Knull, (OSUC). Monroe Co., Tannersville, June 2, 1948, J.W. Green (CASC). Perry Co., July 4, 1930, J.N. Knull (FMNH). Potter Co., Denton Hill, June 17, 1991, J. Huether, 2 (FSCA). Sullivan Co. (June 6, 1930, June 5, 1932, June 6, 1932), J.N. Knull, 15 (FMNH). Holiday, 2 (MEMU). **Tennessee**, Sevier Co., Great Smoky

Mts National Park, Greenbrier Cave, June 19, 1942, H.S. Dybas (FMNH). **Vermont**, Rutland Co., Long Trail, N. of Barrow's camp, 3 mi NW. of Johnson., 1300-1500 ft., June 11, 1961, R. & J. Bell (CASC). Windham Co., Brattleboro, Spring 1894 (CASC). Windsor Co., Quechee, July 4, 1935, J.W. Green (CASC).

Distribution: This species is found in the eastern United States (Fig. 84).

Diagnosis: *Limenius confusus* is similar to *L. plebejus*. It can be distinguished by the parameres (Fig. 28) with the lateral margin subparallel, apical blades 2 X longer than width, and triangular, aedeagus wide becoming narrow on the apical fourth, with pointed tip, and extending beyond parameres by 1/3 length of apical blades. In *L. plebejus*, the parameres (Fig. 54) have the lateral margin convex basally, curved before blades on apical fourth, apical blades longer than wide, rounded apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than half the length of apical blades.

Remarks: A comparison of the holotypes of *L. confusus* with the type of *L. aenescens*, indicated that only one species can be recognized. The elytral color of the holotype is darker in *L. confusus* and the pronotum is deeply punctate. Whereas, in *L. aenescens* the pronotum has subumbilicate punctures. However, the male genitalia are identical in all specimens examined.

#### *Limenius consimilis* Walker

*Limenius consimilis* Walker 1866: 325, Henshaw, 1885: 69, Horn, 1871: 316, Candeze, 1891:149, Leng, 1920: 168, Van Dyke, 1932: 341. Holotype (BMNC). Type locality: Western New York.

*Limenius nitidicollis* LeConte 1869: 378, Henshaw, 1885: 69, Candeze, 1891: 149, Leng, 1920: 168, Lane, 1952: 66. Type # 2535 (MCZC). Type locality: no locality data. Synonymized by Leng, 1920: 168.

Length: 4.5-7 mm (length/width ratio 2.8-3). Head dark brown to black, clypeal margin entire, not recurved medially, or slightly recurved medially, frontal punctures deeply punctate specially near the base, with appressed yellow setae. Antennae reaching 1-2 segments beyond hind angles; segments 2 and 3 small, together less than 1 1/2 length of segment 4; antennal color dark brown to black. Pronotum black throughout; 1.25-2 mm (length/width ratio as long as broad) margin broadly rounded, carina parallel to lateral margin, about 1/3 th length of lateral margin, pronotal texture, deeply punctate, separated by more than width of punctures, covered with appressed black setae. Scutellum dark brown to black, pentagonal, deeply punctate, covered with appressed yellow setae. Hypomeron, not costate, not forming antennal groove; posterior border of hypomeron dentate; prosternum, brown to dark brown, deeply punctate, separated by more than width of punctures, with small appressed yellow setae; hypomeron brown to dark brown, deeply punctate, separated by more than width of punctures, with appressed yellow setae; metasternum dark brown to black, deeply punctate, with finely appressed yellow setae, legs color, brown to dark brown.

Elytra 3.15- 4.9 mm (length/width ratio 1.9-2.1) dark brown to black, striae deeply punctate, with small erect yellow setae.

Abdomen brown to dark brown, deeply small punctate with fine appressed yellow setae.

Male Genitalia: Parameres (Fig. 29) with lateral margin convex basally, apical blades wider than long, aedeagus wide with rounded tip extending beyond parameres by about apical blades length., parameres long 2.5 to 3 X length of basal piece.

Female bursa copulatrix (Fig 67) with spines arranged in poorly defined rows in a circular or semicircular pattern around bursal walls.

Type Material Examined: The Holotype, *L. consimilis* without locality label is in British Museum of Natural History, London (BMNC).

Type Material of synonyms examined: Type of *L. nitidicollis* in LeConte Collection, Type # 2535 (MCZC) with no locality data.

Material Examined: **Canada: British Columbia**, Mt. Benson, S. Vancouver, May 26, 1953, R. Guppy (USNM). Pender Marbor (May 14, 1927, May 10, 1928), G.R. Hopping, 3 (CASC). Nanaimo, Biol. Station (June 22, 1920, June 23, 1920) (CASC). Quamichan Lake, Vancouver Island (USNM). **Alberta**, Edmonton, May 28, 1948, Mason (CMNC).

**United States: California**, Alameda Co., Livermore, March 31, 1929 (CASC). Alameda Co., Stony Brook Canyon, April 23, 1972, W.H. Tyson (CMNC). Marin Co., Lagunitas, March 21, 1925, H.H. Keifer (CASC). Mendocino Co., Pygmy Forest, 4 m. E. Ft. Bragg, June 15, 1948, 3 (CASC). Mendocino Co., Ft. Bragg, May 8, 1936, 4 (CASC).

Mendocino Co., Pygmy Forest, near of Mendocino City, May 7, 1936, 17 (CASC).

Mendocino Co., Mendocino (April 26, 1938, June 11, 1938, April 28, 1957), J.R. Helfer (CASC, USNM). Mendocino Co., Pygmy Forest, 4 m. E. of Mendocino City (May 7,

1936, April 4, 1938, May 21, 1938), 54 (CASC). Mendocino Co., April 26, 1938, J. Helfer (UCDC). San Luis Obispo Co., San Simeon, March 26, 1933, G.R. Hopping (CASC).

Santa Clara Co., 6 miles W. Saratoga, April 9, 1949, G.M. Chamberlain, 2 (TAMU).

Santa Cruz Co., Ben Lomond, May, 1932, L.W. Saylor (CMNC). Siskiyou Co. (June 1, 1911, June 2, 1911, June 3, 1911, June 4, 1911, June 5, 1911), F.W. Nunenmacher, 5

(CASC). Sonoma Co., Sobre Vista, April 16, 1911 (CASC). Sonoma Co., Sobre Vista, March 12, 1911, J.A. Kusche (CASC). Trinity Co., May 2, 1917, F.W. Nunenmacher

(CMNC). **Oregon**, Douglas Co., 2.5 mi. S, 2 mi. E North Umpqua River, Highway 138, 1400 ft., October 30, 1971, E.M. Banedict, 2 (CMNC). Lane Co., Eugene (April 5, 1942, April 12, 1942), 2 (FMNH). Multnomah Co., Portland, July 3, 1917, W.M. Giffard (CASC).

**Washington**, Asotin Co., April 12, 1940, M.C. Lane (CSUC). King Co., Duvall, May 9, 1931 (USNM). Lewis Co., Mt. Rainier NP, July 13, 2003, B. Kondratieff & J. Schmidt (CSUC). Pierce Co., Mt. Rainier NP Carbon R. Ranges Station, August 15, 1999, B.

Kondratieff (CSUC). Stevens Co., April 28, 1951, V.H. Albee (WFBM). Whitman Co., Snake River, Opp. Clarkston, April 16, 1933, I.W. Bales (USNM).

Distribution: This species appears to be common in the coastal ranges from southern British Columbia south to central California (Fig. 85).

Diagnosis: *Limonius consimilis* is similar to both *L. beutenmuelleri* and *L. jonesi*. In *L. consimilis*, the parameres (Fig. 29) have the apical blades wider than long, and the aedeagus is wide with rounded tip extending beyond parameres by about X length of apical blades. In *L. beutenmuelleri* the parameres (Fig. 23) have the apical blades as long as broad, and the aedeagus is wide with narrow tip, extending beyond parameres by less than  $\frac{1}{4}$  length of apical blades. In *L. jonesi*, the parameres (Fig. 39) have the apical blades wider than long, and the aedeagus gradually narrowing to tip almost as long as parameres. Also in *L. consimilis* the hypomeron is not costate, not forming an antennal groove. Whereas, *L. beutenmuelleri*, the hypomeron strongly costate on anterior third, forming a distinct antennal groove. Additionally, *L. beutenmuelleri* is currently only known from North Carolina. *Limonius consimilis* differs from *L. jonesi* by the pronotal shape. In *L. consimilis* the pronotum is as long as broad. Whereas, in *L. jonesi* it is wider than long.

Remarks: An examination of the holotype of *L. consimilis* at the BMNC supports the synonymy of *L. nitidicollis*.

*Limonius cribriceps* Van Dyke.

*Limonius cribriceps* Van Dyke, 1943: 44-45. Holotype # 5230 (CASC). Type locality: Greenhorn Mountains, Tulare Co. California.

Length: 12.5-13.6 mm (length/width ratio 3.47-3.7). dark brown to black, clypeal margin entire, frontal punctures subumbilicate separated by more than width of punctures, covered with suberect yellow setae. Antennae extending 1 or less segments

beyond hind angles; segment 2 small, segment 3 moderately long between 2 and 4, segments 2 and 3 together not more than 1.5 of segment 4, antennal color black.

Pronotum dark brown throughout; 3.5-3.52 mm (length/width ratio 1.1-1.12) margin broadly rounded, carina parallel with lateral margins, about 1/3 to 1/4 th of lateral margin, pronotal texture, dense umbilicate puncture, separated by less than width of punctures, covered with suberect yellow setae. Scutellum reddish brown, pentagonal, umbilicate punctures, with appressed yellow setae. Hypomerion, costate interiorly forming antennal groove; posterior border of hypomerion dentate; prosternum, reddish brown to dark brown, deeply punctate, separated by less than width of punctures, with appressed yellow setae; hypomerion yellowish brown, umbilicate punctures, separated by less than width of punctures, with appressed yellow setae; metasternum reddish brown, deeply to subumbilicate punctures, with appressed yellow setae, legs color, reddish brown to dark brown.

Elytra 8.5- 9.6 mm (length/width ratio 2.4-2.6) brown to dark brown, striae moderately to deeply punctate, inter-strial deeply punctate.

Abdomen reddish brown, deeply punctate separated by less than width of punctures, with appressed yellow setae.

Male Genitalia: Parameres with lateral margins parallel basally, constricted in the apical 1/3 toward apical blades, apical blades wider than long, rounded apically, aedeagus gradually narrowing to tip, almost as long as parameres. Parameres long 1.5 to 1.7 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype # 5230 (CASC), Greenhorn Mountains, Tulare Co. California, E.C. Van Dyke, May 7, 1931.

Material Examined: **United States: California**, Kern Co., 13 mi. E. of Onyx Walkers Pass, May 25, 1946, J.J. Dubois (CASC). Los Angeles Co., San Gabriel Canyon, May

18, 1932, R.P. Allen (CASC). Los Angeles Co., Fish Canyon, April 26, 1949, E.L. Schlinger (UCDC). Monterey Co., Tassajara, May 24, 1920, L.S. Slevin (CASC). Riverside Co., Pinon Flat, Santa Rosa Mts., June 27, 1941, D.J. & J.N. Knull (FMNH). San Bernardino Co., San Bernardino Mts., 4 mi. S. Camp Angelus, 4500 ft., June 8, 1958, G.H. Nelson (CMNC). **Oregon**, Klamath Co., Spencer Creek, June 15, 1958, J.D. Vertrees (FMNH).

Distribution: This apparently uncommon species is found in California and Oregon (Fig. 86).

Diagnosis: *Limonius cribriceps* is most similar to *L. sinuifrons*. The parameres (Fig. 30) of *L. cribriceps* have the lateral margins parallel basally, constricted in the apical 1/3 toward apical blades, apical blades wider than long, rounded apically, aedeagus almost as long as parameres. In *L. sinuifrons* the parameres (Fig. 59) have the lateral margin convex basally, apical blades wide longer than broad gradually pointed apically, and the aedeagus extending beyond parameres by ¼ to ½ the length of apical blades.

#### *Limonius crotchii* Horn

*Limonius crotchii* Horn, 1872: 148-149, Van Dyke, 1932: 335, Lane, 1971: 22.

Lectotype # 3389 (MCZC). Type locality: Oregon.

*Limonius shircki* Lane 1965: 183-185, Lane, 1971: 22. Holotype # 67820

(USNM). Type locality Parma, Idaho. New Synonym

*Limonius snakensis* Lane 1965: 185-186, Lane, 1971: 22. Holotype # 67821

(USNM). Type locality: Wawawai, Washington. New Synonym.

Length: 9.1-11 mm (length/width ratio 3.25-3.44). Head black throughout, clypeal margin entire, frontal punctures densely subumbilicate, separated by less than width of punctures, with erect yellow setae. Antennae extending one segment or less beyond hind angles; segments 2 and 3 small, together just longer than segment 4; antennal

color black. Pronotum black throughout; 2.5-3.2mm (length/width ratio as long as broad or slightly longer) pronotal margin moderately arcuate and converging anteriorad, carina short less than 1/5 length of lateral margin, converge, pronotal texture, sub-umbilicate puncture, separated by less than width of punctures, covered with short suberect yellow setae. Scutellum black, flat with anterior margin straight, covered with yellow setate. Hypomeron, costate interiorly forming antennal groove; posterior border of hypomeron dentate; prosternum, black throughout, deeply punctate, separated by about width of punctures, with subappressed yellow setae; hypomeron black throughout umbilicate punctures, separated by less than width of punctures, with appressed yellow setae; metasternum black throughout, finely, deeply punctate, with appressed yellow setae, legs color, dark brown to black.

Elytra 6.4-7.5 mm (length/width ratio 2.3-2.4) dark brown to black except the elytral base and half of lateral margin orange, inter-strial finely deeply punctate, striae moderately to deeply punctate.

Abdomen black throughout, finely deeply punctate, with appressed yellow setae.

Male Genitalia: Parameres with lateral margin subparallel, enlarged gradually toward apical blades, apical blades triangular, aedeagus gradually narrowing to tip, extending beyond parameres by 20% to 30% length of apical blades, parameres long, more than 2 X length of basal pieces.

The female bursa copulatrix not sclerotized.

Type Material Examined: Lectotype # 3389 (MCZC), Horn Collection, Oregon. In the Horn Collection there are also two paralectotypes--one male from Oregon, and one female from Corvallis, Oregon.

Type Material of synonyms examined: Holotype, *L. shircki*, Parma, Idaho, April 11, 1930, H.P. Lanchester (USNM). Holotype, *L. snakensis*, Wawawai, Washington, March 28, 1939, H. P. Lanchester (USNM).

Material Examined: **Canada: British Columbia**, Pender Marbor, April 26, 1928, G.R. Hopping (CASC).

**United States: California**, Kern Co., Lebec, June, 15, 1937, A.T. McClay (USNM). Los Angeles Co., Glendale, March, 24, J.P. Reed (FMNH). Los Angeles Co., Mt. Wilson, 6000 ft., June 23, 1918 (CASC). Los Angeles Co., Tanbark Flat, June 20, 1950, A.T. McClay (USNM). Modoc Co., Alturas, May, J.E. Cottle (CASC). San Bernardino Co., Seven Oaks, May 13, 1942, Bland Ewing (CASC). San Diego Co., Pine Hills, June 29, 1920, Dr. F. Psota (FMNH). San Diego Co., Poway, F.E. Blaisdell (CASC). Sonoma Co., 2 (FMNH). Trinity Co., Eagle Creek, June 2, 1947, A.T. McClay (UCDC). **Idaho**, Canyon Co., Parma, April 20, 1937, M.C. Lane (CMNC), Canyon Co., Parma (March 17, 1930, April 21, 1937) H.P. Lanchester, 2 (CMNC). Canyon Co., Parma, April 20, 1937, M.C. Lane (USNM). Idaho Co., State Creek, May 14, 1958, W.F. Barr (USNM). Idaho Co., Whitebird, May 7, 1967, R.W. Portman (CMNC). Twin Falls Co., Rock Creek Park, May 28, 1952, M.C. Lane (USNM). **Montana**, Flathead Co., Avalanche creek. Glacier National Park, July 12, 1920, E.H. Nast (CASC). Gallatin Co., June 13, 1917 (USNM). Jefferson Co., Twp. R., May 30, 1920 (USNM). Ravalli Co., Canyon Crk. Trailhd, Bitterroot NF, June 23, 2004, R. Durfee (CSUC). **Oregon**, Baker Co., Unity, May 21, 1935, M.C. Lane (USNM). Douglas Co., Roseburg, Burgess, 2 (CASC). Lane Co., Shoemaker, 1956 (CASC). Lane Co., Florence, July 7, 1914 (CASC). Jackson Co, Medford, (May 29, 1944, June 1, 1944, July 2, 1946, July 26, 1946, June 21, 1963), A.C. Fitch, 5 (CASC, UCDC). Jackson Co., Medford, April 23, 1946, A.T. McClay (UCDC). Malheur Co., Harper, May 2, 1932, H.P. Lanchester, 2 (CMNC). Marion Co. (USNM). Multnomah Co., Portland, Airport, 1930 (USNM). Yamhill Co., McMinnville, April 1, 1940, D.M. Fender (USNM). **Washington**, Clark Co., April 6, 1941 (FMNH). King Co., Seattle, May 5, 1913, 2 (USNM). Skagit Co., Mt. Vernon, April 20, 1939, F. Bjorkman (USNM). Spokane Co., Cheney, May 6, 1943 (USNM). Whitman Co., Wawawai (May 12, 1933,

May 14, 1933, April 14, 1934), R.D. Shenefelt, 14 (USNM). Whitman Co., Wawawai,  
May 14, 1933, I.W. Bales (CMNC).

Distribution: This species is found in Northwestern United States (Fig. 87).

Diagnosis: *Limonius crotchii* is most similar to *L. meridianus*. Males can be distinguished by the form of the male genitalia. In *L. crotchii* the parameres (Fig. 31) have the lateral margins sub-parallel and enlarged gradually toward apical blades, with slight curve in the middle. Whereas, in *L. meridianus* the parameres (Fig. 43) have the lateral margins parallel, of equal width from base to apical blades.

Notes: Comparing the types of *L. shircki*, and *L. snakensis*, with the type of *L. crotchii* indicated no differences except some variation in the elytral color, from black except the suture orange, to orange except the apical half black. Other characters, including the male genitalia were identical.

#### *Limonius definitus* Ziegler

*Limonius definitus* Ziegler, 1845: 268, LeConte, 1853: 434, Candeze, 1860: 404,  
Van Dyke, 1932: 342. Holotype lost. Type locality: "Carolina".

Length: 4.5-5.8 mm (length/width ratio 3 -3.4). Head dark brown to black, clypeal margin entire, or slightly received medially, frontal punctures umbilicate, separated by less than width of punctures, with appressed yellow setae. Antennae reaching about 2 to 3 segments beyond hind angles; segment 2 and 3 small, together just longer than segment 4, antennal color dark brown to black. Pronotum dark brown to black with hind angles yellow, 1.26-1.6 mm (as long as broad) with pronotal margins broadly rounded, carina almost not visible, pronotal texture, umbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae. Scutellum brown to dark brown, shell-like, deeply punctate, with appressed yellow setae. Hypomeron, not

costate, not forming small antennal groove; posterior border of hypomerion without teeth; prosternum, yellow to dark brown, deeply punctate, separated by more than width of punctures, with small erect yellow setae; hypomerion yellow to dark brown, umbilicate punctures, with small erect yellow setae; metasternum pale brown to dark brown, deeply punctate, separated by more than width of punctures, with small appressed yellow setae, legs color, yellow to dark brown.

Elytra 3.12- 4 mm (length/width ratio 2-2.37) brown to dark brown, striae deeply punctate, inter-striae moderately to deeply punctate, with erect yellow setae.

Abdomen reddish brown to black, finely punctate, separated by more than width of punctures, with finely appressed yellow setae. Male genitalia (Fig. 32): parameres forceps like, gradually narrowing to tip, apical blades not visible, aedeagus gradually narrowing to tip, with rounded tip, extending beyond parameres, parameres long 2 to 2.4 X length of basal piece.

Female bursa copulatrix (Fig. 68) with two combs, one on each side of bursal walls, each comb has five spines.

Type Material Examined: not located. This type refer to Samuel S. Haldeman (1812-1880); based on information in *Collectiones Entomologicae* (Gaedike 1995), Haldeman's collection went to Franklin & Marshall College in Lancaster, Pennsylvania transferred to the MCZC (via J. LeConte). (Personal communication, Dr. Jason D. Weintraub, Department of Entomology, Academy of Natural Sciences, Philadelphia). However, it is not at the MCZC (Personal communication, Dr. Philip D. Perkins, MCZ, Harvard University).

Material Examined: **United States: Alabama**, Cleburne Co., Cheaha, State Park (April 21, 1940, April 24, 1940, April 25, 1940, April 27, 1940, April 28, 1940, April 29, 1940), 106 (CASC). Cleburne Co., Cheaha State Park 33°28'58" N 85°48'52" W, May 15-20, 1998, T.L. Schiefer & J.A. MacGown, M.V. lamp in mixed forest, W.H. Cross Expedition,

3 (MEMU). Dekalb Co., De Soto State Park, May 5, 1940, 3 (CASC). Dekalb Co., De Soto State Park, May 4, 1940, E.C. Van Dyke (CASC). Madison Co., Monte Sano St. Pk., May 7, 1991, N.M. Downie, 2 (FMNH). **Delaware**, Kent Co., Bombay Hook, May 6, 1954, C.A. Triplehorn (OSUC). **Georgia**, Clarke Co., Whitehall Forest, April 16, 1975, R. Turnbow, 13 (FSCA). Clarke Co., 3 mi. N. Athens, April 13, 1974, R. Turnbow (FSCA). Union Co., Neel Gap, June 9, 1974, R. Turnbow (FSCA). **Kentucky**, Knox Co., (April 24, 1965, May 1, 1965, May 1, 1965, May 7, 1965), R.E. White, 7 (FSCA). **Maryland**, Montgomery Co. (June 4, 1902, April 29, 1905, June 16, 1910), D.H. Clemons, 3 (USNM). Montgomery Co., Takoma Park (April 30, 1951, May 4, 1952), D. Kissinger, 2 (FMNH). Prince Georges Co., Beltsville, May 22, 1910, E.A. Schwarz, 3 (USNM). St. Mary's Co., Lexington Park, April 30, 1963, C.E. White, 2 (FSCA). **Mississippi**, Tishomingo Co., Tishomingo State Park, April 11, 1986, S. MacDonald, M.V. lamp in mixed forest, W.H. Cross Expedition (MEMU). **New Jersey**, Atlantic Co., Buena (CSUC). Cumberland Co., Rutgers Exp. Sta., May 21, 1988, J.E. Wappes (FMNH). Essex Co., Newark, July, 4, J.E. Wappes, 2 (OSUC). Monmouth Co., Manasquan, June 16, 1930 (FMNH). Ocean Co., Lakehurst, E.A. Bischoff, 2 (USNM). Passaic Co., Green Wood Lake, May 22, 1927, 2 (CASC). May, 30, H.W. Wenzel (FMNH). **New York**, Orange Co., West Point, May 21, 1910, W. Robinson, 4 (USNM). Richmond Co., Great Kills (May 20, 1939, June 6, 1940), 2 (FMNH). **North Carolina**, Haywood Co., Lake Junaluska, May 24, 1954, H.V. Weems, 2 (FSCA). Macon Co., May 14, 1961, F.J. Moore (FMNH). Wake Co., Raleigh, April 15, 1955, Dale H. Habeck, dogwood flowers (CASC). Yancey/Buncombe Co., Black Mts. (May 20, 1912, May 22, 1912, June, 1902), Beutenmüller, 9 (CASC). **Pennsylvania**, Allegheny Co., Pittsburgh, June, 33 (TAMU). Allegheny Co., West View, June, 32 (TAMU). Dauphin Co., Hummelstown, May 30, 1917, J.N. Knull (OSUC). McKean Co., Mt. Alton (May 24, 1932, May 26, 1932), J.N. Knull, 2 (CASC). McKean Co., Mt. Alton, May 31, 1922, J.N. Knull, 3 (WFBM). McKean

Co., Mt. Alton, June 14, 1931, J.N. Knull, 2 (UCDC). Mt. Alton (May, 15, May, 16, 1931, May 17, 1931, May, 19, May, 20, May, 21), J.N. Knull, 24 (FMNH). Northampton Co., Wind Gap (May 28, 1931, May 28, 1932), J.W. Green, 17 (CASC). Northampton Co., Wind Gap, May 30, 1946, J.W. Green, 4 (UCDC). Stony Creek, Mills, April 4, 1951, D. Kissinger (FMNH). **South Carolina**, Oconee Co., Clemson College, April 10, 1935, J.N. Todd (FMNH). Oconee Co., Clemson, April 24, 1940, O.L. Cartwright, 2 (FMNH). **Tennessee**, Morgan Co., Burrville (May 5, 1953, May 13, 1960,), B. Benesh, 4 (FMNH). Morgan Co., Burrville, May 15, 1960, on dogwood blossom, 4 (FMNH). Morgan Co., Burrville, May 14, 1960, B. Benesh (FSCA). Sevier Co., Grt. Smoky M. Ntl. Pk., June 14, 1942, D.J. & J.N. Knull (FMNH). Sevier Co., Great Smoky Mts National Park, May, 24, R.C. Osburn (OSUC). Sevier Co., Great Smoky Mts National Park, June 14, 1942, D.J. & J.N. Knull (OSUC). **Virginia**, Fredericksburg Co., Fredericksburg, May, 1902, 4 (CASC). Lee Co., Dot, June 17, 1960, C.E. White (FSCA).

Distribution: This species is found in eastern United States, as far south as Georgia (Fig. 88).

Diagnosis: *Limonijs definitus* is most similar to *L. nimbatus*. In the male, the parameres (Fig. 32) of *L. definitus* are forceps-like, gradually narrowing to tip, and the aedeagus also gradually narrowing to tip. Whereas, in *L. nimbatus*, the parameres (Fig. 46) are also forceps-like, but with the same width from base to tip, and the aedeagus almost the same width from base to tip. Also in *L. definitus* antennal segments 2 and 3 are subequal to segment 4. In *L. nimbatus* combined antennal segments 2 and 3 combined are shorter than segment 4.

*Limonijs ectypus* (Say)

*Elater ectypus* Say, 1839: 167, LeConte, 1853: 433, Candeze, 1860: 409, Van Dyke, 1932: 341, Fall, 1934: 26. Type destroyed. Type locality: United States.

*Limonius pilosus* LeConte, 1853: 431, Candeze, 1860: 405, Henshaw, 1885: 69, Candeze, 1891: 149. Holotype # 2537 (MCZC). Type Locality: San Diego, California. Synonymized by Candeze, 1891: 149.

*Limonius infuscatus* Motschulsky, 1859: 371-372, Horn, 1871: 315-316, Van Dyke, 1932: 341, Fall, 1934: 27, Van Dyke, 1943: 47-48, Lane, 1971: 23. Type Locality: California. New Synonym.

*Limonius pilosulus* Candeze, 1891: 149, Van Dyke 1932, 340, Fall, 1934: 29, Lane, 1971: 23. Type Locality: California. Synonymized by Van Dyke 1932, 340.

*Limonius vernalis* Fall, 1910: 129-130, Leng, 1920: 168, Schenking, 1925:297, Van Dyke, 1932, 341. Type # 24360 (MCZC). Type Locality: Pasadena, California. Synonymized by Van Dyke, 1932, 341.

Length: 8-11 mm (length/width ratio 3.57-3.8). Head black except clypeal margin reddish, clypeal margin entire, slightly recurved medially, frontal punctures deeply punctate, separated by less than width of punctures, covered with long appressed yellow setae. Antennae extending about 2 segments beyond hind angles; segment 2 short, less than half of segment 4, segment 3 somewhat triangular and longer than half of segment 4, antennal color dark brown to black. Pronotum dark brown to black with posterior and anterior border of the hypomeron reddish, 1.9-2.7 mm (as long as broad), pronotal margin broadly rounded, carina subparallel with lateral margin less than ¼ th length of lateral margin, pronotal texture, punctures subumbilicate, separated by less than width of punctures, more densely punctate laterally, covered with appressed to erect yellow setae. Scutellum reddish to black, pentagonal, finely punctate, covered with long appressed yellow setae. Hypomeron, not costate, not forming antennal groove; posterior border of hypomeron dentate; prosternum, black with posterior and anterior borders

reddish, deeply punctures, separated by about width of punctures, covered with small appressed yellow setae; hypomeron brown to dark brown, deeply punctures, separated by less than width of punctures, covered with appressed yellow setae; metasternum black throughout, deeply punctate, with finely appressed yellow setae, legs color, yellowish brown.

Elytra 6- 8.16 mm (length/width ratio 2.68-2.8) brown to dark brown, striae finely punctate, inter-striae moderately to deeply punctate, covered with subappressed yellow setae.

Abdomen reddish brown to black, deeply punctate separated by less than width of punctures, with appressed yellow setae. Male Genitalia: Parameres bulbous basally, constricted before blades on apical fourth, apical blades triangular, aedeagus wide with rounded tip, extending beyond parameres by half or more the length of apical blades. Parameres 1 to 1.3 X length of basal piece.

Female bursa copulatrix (Fig 69) with spines arranged in poorly defined rows in a circular or semicircular pattern around bursal walls.

Type Material Examined: Destroyed.

Neotype male, Iowa, Fayette Co., Clermont, A.R. Rolfs, designated herein (CUIC).

Type Material of Synonyms Examined: *Limonius pilosus*, San Diego, California (MCZC).

*L. vernalis*, Pasadena, California. (MCZC).

Material Examined: **Canada: British Columbia**, Aldergrove, June 17, 1987, N.M.

Downie (FSCA). Ft. Langley, June 16, 1987, N.M. Downie (FSCA). Nanaimo, Biol.

Station, June 23, 1920 (CASC). Vernon, May, 5, Venables (USNM).

**United States: Arizona**, Tempe, August 3, 1932, M.W. Stone (FMNH). Templ, April, 21,

K. Sloop (OSUC). **California**, Del Norte Co., May 29, 1910, F.W. Nunenmacher

(OSUC). Humboldt Co., May 5, 1911, F.W. Nunenmacher (FMNH). Kern Co., Glennville,

May 7, 1931, A.T. McClay (UCDC). Los Angeles Co., Burbank, March, 23, C.H. Hicks

(FMNH). Los Angeles Co., Glendale, March, 12, J.P. Reed, 6 (FMNH). Los Angeles Co., Monrovia, March 16, 1930, C.H. Hicks (FMNH). Los Angeles Co., Pasadena (March, 28, July, 29), C.H. Hicks, 2 (FMNH). Los Angeles Co., Glendale, April, 17, K. Sloop, 7 (FMNH). Los Angeles Co., February 15, 1930, F.C. Hadden (FMNH). Los Angeles Co., Pasadena, May, Dr. A. Fenyes (FMNH). Los Angeles Co., Glendale (April, 7, April, 17), K. Sloop, 5 (OSUC). Los Angeles Co., Glendale, March, 12, J.P. Reed, 3 (OSUC). Los Angeles Co., Chester, June 7, 1960, D.J.& J.N. Knull (OSUC). Los Angeles Co., Pomona, April 4, 1931, H.L. Mckenzie (UCDC). Los Angeles Co., Tanbark Flat (June 20, 1950, June 28, 1950, July 4, 1950), A.T. McClay, 4 (UCDC). Los Angeles Co., Tanbark Flat, June 19, 1950, H.N. Yozoyama (UCDC). Los Angeles Co., June 17, 1945, E.I. Schlinger (UCDC). Los Angeles Co., 6 (MEMU). Los Angeles Co., Pasadena, Dr. A. Fenyes, 3 (MEMU). Madera Co., SE Madera Co., Tr. to Devil's Postpile Nat. Mon., 5000-6000 ft., August 2, 1995, R.S. Beal (CSUC). Mendocino Co., May 14, 1945, 2 (FMNH). Mendocino Co., Laytonville, May 8, 1930, A.T. McClay, 2 (UCDC). Napa Co., Monticello (April 9, 1930, March 31, 1931), L.M. Smith, 2 (UCDC). Napa Co., Monticello, May 29, 1930, L.M. Smith (UCDC). Orange Co., Placentia, April 7, 1929 (OSUC). Orange Co., February 1, 1931 (OSUC). Placer Co., Weimar (April 13, 1984, May 28, 1984), D. Kissinger, 3 (FSCA). Plumas Co., Chester (July 7, 1948, July 4, 1958, June 4, 1960, June 7, 1960, June 13, 1963, June 15, 1963), D.J.& J.N. Knull, 19 (FMNH). Plumas Co., Chester (June 4, 1960, June 7, 1960, June 13, 1960), D.J.& J.N. Knull, 5 (OSUC). Plumas Co., Quincy, June 27, 1960, D.J.& J.N. Knull (OSUC). Riverside Co., Chino Cyn., 6 mi. NW Palm Springs, 2000 ft., March 21, 1971, J.B. Heppner, sweeping grasses (FSCA). Riverside Co., Keen Camp, San Jacinto Mts., June 5, 1939, R.F. Smith (WFBM). Riverside Co., Herkey Creek, San Jacinto Mts., June 4, 1940 (WFBM). Riverside Co., Ribbonwood, San Jacinto Mts., May 20, 1939, R.F. Smith (WFBM). Sacramento Co. (May 20, 1944, May 21, 1944, May 26, 1945, April 3, 1947, April 15,

1947, April 16, 1947, April 20, 1947, April 30, 1947, May 3, 1947), A.T. McClay, 64 (UCDC). Sacramento Co. (April 25, 1950, May 4, 1950), E.C. Carlson, 7 (UCDC). Sacramento Co., Walnut grove, May 20, 1930 (UCDC). Sacramento Co., Elk Grove, May 1, 1950, J.K. Hester (UCDC). Sacramento Co., May 13, 1950, H.F. Robinson (UCDC). San Francisco Co., South San Francisco, February 28, 1950, R.S. Beal (WFBM). San Francisco Co., April 24, 1912, H.C. Fall (FMNH). Santa Clara Co., Alma, March, J.E. Cottle (FMNH). Santa Clara Co., San Jose, April 28, 1931, L.M. Smith (UCDC). Santa Clara Co., San Jose (May 7, 1927, April 29, 1928), 2 (UCDC). Santa Cruz Co., Ben Lomond, July 6, 1931, L.W. Taylor (FMNH). Sonoma Co., Plantation, May 16, 1969, R.P. Allen (FMNH). Sonoma Co., April 2, 1961, D.Q. Cavagnaro (FMNH). Sonoma Co., 1955, G. Young (FMNH). Sonoma Co., Forestville, April 12, 1932, A.T. McClay (FMNH). Trinity Co., Carrville, June 20, 1931, C.R. Bruck (FMNH). Trinity Co., Carrville, 2400-2500 ft., May 20, 1934, 2 (FMNH). Trinity Co., Carrville (FMNH). Trinity Co., Coffee Creek, May 17, 1934 (FMNH). Trinity Co., Eagle Creek (May 18, 1949, May 28, 1949, May 29, 1949), A.T. McClay, 3 (UCDC). Tulare Co., Sequoia National Park, 2000-3000 ft., May 29, 1928, A.T. McClay (UCDC). Tulare Co., Sequoia National Park, Ash Mt. (April 25, 1949, April 28, 1950, April 26, 1951), R.C. Bechtel, 4 (UCDC). Yolo Co., Davis, March 20, 1936, B.E. White, 2 (UCDC). Yolo Co., Davis, March 26, 1947, A.T. McClay, 2 (UCDC). Yolo Co., Davis (April 17, 1949, April 29, 1949), W.F. Ehrhardt, 2 (UCDC). Yolo Co., Davis (March, 1950, April, 1950), J.C. Hall, 3 (UCDC). Yolo Co., Davis, March 26, 1949, R.C. Bechtel, 4 (UCDC). Yolo Co., Davis, March 22, 1952, S. Miyagawa (UCDC). Yolo Co., Elk Slough, April 5, 1949, H. Hunt, 4 (UCDC). Yolo Co., April 21, 1949, A.T. McClay, 31 (MEMU). Yolo/ Solano Co., Elkhorn Ferry (April 5, 1949, April 6, 1949), A.T. McClay, 6 (UCDC). Yolo/ Solano Co., Elkhorn Ferry, April 16, 1952, E.I. Schlinger (UCDC). Yolo/ Solano Co., Putah Cyn., April 25, 1948, A.T. McClay (UCDC). Yolo/ Solano Co., Putah Cyn., April 25, 1948, E.I. Schlinger (UCDC). Yolo/

Solano Co., Elkhorn Ferry, May 12, 1952, R.M. Bohart (UCDC). Yolo/ Solano Co., Elkhorn Ferry, April 10, 1949, R.C. Bechtel (UCDC). Yolo/ Solano Co., Putah Cyn., April 13, 1950, S. Kappos, grass field (UCDC). Santa Ana, March 21, 1928, 6 (TAMU).

**Florida**, Liberty Co., Torreya St. Parke, April 19, 1978, N.M. Downie, 3 (FMNH). **Idaho**, Benewah Co., 5 m. N. Tensed, April 30, 1957, A.R. Gittins, Red Clover, 5 (WFBM). Bonner Co., Sagle (June 3, 1950, June 4, 1950, June 6, 1950, April 7, 1950), N.M. Downie, 4 (FMNH). Bonner Co., Sandpoint (April 5, 1951, June 6, 1954, June 6, 1969, June 7, 1969, June 17, 1971, February 13, 1971, June 20, 1973, May 10, 1974, June 18, 1974, June 28, 1975, June 11, 1976), N.M. Downie, 12 (FMNH). Bonner Co., 18 m. S. Sandpoint, June 7, 1966, R.W. Portman, 14 (WFBM). Bonner Co., 5 m. S. Colburn (June 1, 1966, June 7, 1966), R.W. Portman, 3 (WFBM). Bonner Co., 5 m. S. Elmira, June 7, 1966, R.W. Portman (WFBM). Bonner Co., Sandpoint (June 17, 1971, June 16, 1982, June 18, 1982, July 7, 1985, June 10, 1987, June 11, 1987, June 27, 1987), N.M. Downie, 31 (FSCA). Bonner Co., Spalding, May 8, 1937, R.E. Rodock (OSUC). Boudry Co., Bonners Ferry, April 3, 1963, R.W. Portman (WFBM). Boudry Co., 5 m. S. Bonners Ferry, June 7, 1966, R.W. Portman (WFBM). Canyon Co., Parma, F.H. Shirck, 4 (OSUC, CSUC). Idaho Co., Kimberly, May 27, 1952, M.C. Lane (FMNH). Kootenai Co., Coeur d' Alene, 2157 ft., May 12, 1950, H.C. Manis (WFBM). Kootenai Co., Post Falls, 2169 ft., May 6, 1927, A.R. Gittins, sweeping alfalfa (WFBM). Kootenai Co., Chilco, May 8, 1952, W.F. Barr (WFBM). Kootenai Co., Hayden Lake, June 7, 1966, R.W. Portman, 3 (WFBM). Kootenai Co., June 19, 1954, G.F. Knowlton (OSUC). Kootenai Co., Worley, April 30, 1957, A.R. Gittins, sweeping alfalfa (WFBM). Latah Co., Moscow, June 4, 1949, N.M. Downie (FMNH). Latah Co., Moscow, 2560 ft. (April 26, 1930, May 17, 1931), P. Rice, 2 (WFBM). Latah Co., Troy, July, 1951, W.F. Barr (WFBM). Latah Co., Laird Park, May 28, 1966, H.C. Manis, sweeping grass in meadow, 3 (WFBM). Latah Co., Laird Park, May 20, 1967, H.C. Manis, 17 (WFBM). Latah Co.,

Moscow, June 11, 1966, R.W. Portman (WFBM). Nez Perce Co., Spalding (May 15, 1951, May 17, 1952), W.F. Barr, 2, (WFBM). Nez Perce Co., Gifford, May 22, 1949, W.F. Barr (WFBM). Nez Perce Co., Webb, May 15, 1951, W.F. Barr, 4 (WFBM). Nez Perce Co., Lapwai, 800 ft., May 18, 1953, R.W. Portman, 12 (WFBM). Nez Perce Co., Myrtle, May 17, 1956, R.W. Portman, 2 (WFBM). Nez Perce Co., Spalding, April 16, 1945, A.J. Walz (WFBM). Nez Perce Co., Spalding (May 8, 1937, May 18, 1934, April 24, 1937), R.E. Rodock, 6 (OSUC). Nez Perce Co., Webb, May 18, 1939, R.E. Rodock (OSUC). **Illinois**, St. Clair Co., Kahokia (June, 8, June, 25), 2 (FMNH). **Indiana**, Henry Co., Big Blue R., Hwy 103, 5-Jun-02, B. Kondratieff, R. Baumann (CSUC). Knox Co., June 8, 1909, W.S. Biatchley (FMNH). Tippecanoe Co., May 28, 1959, May 12, 1968, May 25, 1968, May 22, 1971, June 2, 1973), N.M. Downie, 6 (FMNH). **Iowa**, Dickinson Co., 4 m. N.W. Spirit Lake, May 5, 1966, M.A. Brusven (WFBM). Fayette Co., Clermont (June 15, 1929, June 21, 1929), A.R. Rolts, 2 (FMNH). June 15, 1929, A.R. Rolfs (CUIC). Story Co., Ames, (May 28, 1943, May 28, 1949, June 3, 1957) (CSUC).

**Massachusetts**, Barnstable Co., Wood's Hole, July, 1900, 2 (CSUC). **Missouri**, Boone Co., Columbia (April 6, 1946, April 16, 1946), W.S. Crdig, 4 (MEMU). Douglas Co., Vera Cruz, June 7, 1947, W.S. Crdig (MEMU). Pike Co., New Hartford, June 6, 1947, W.S. Crdig (MEMU). Saint Louis Co., June 8, 1901, Dr. G.W. Bock (MEMU). **Montana**, Gallatin Co., 4800 ft., April, 12, R. Benton, 2 (USNM). Sanders Co., Thompson, June 24-30, 1950, B. Malkin (FMNH). Sanders Co., Findley's Flats Lolo National Forest, Hwy. 200, June 15, 1982, N.M. Downie (FMNH). Sanders Co., Findley's Flats Lolo National Forest, Hwy. 200, June 15, 1982, N.M. Downie, 9 (FSCA). **Nebraska**, Cass Co., Nehawka (May 17, 1932, May, 19, 1932), H. Pollard, 2 (FMNH). Howard Co., Middle Loup R., Hwy 281, June 7, 2002, B. Kondratieff, R. Baumann, 2 (CSUC). Valley Co., June 30, 1938, D.J. & J.N. Knull, 3 (FMNH). Valley Co., June 30, 1938, D.J. & J.N. Knull (OSUC). **New Hampshire**, Strafford Co., Durham, June 27, 1924 (FMNH). **Ohio**,

Greene Co., May, 12, D.J. & J.N. Knull (FMNH). Hamilton Co., Cincinnati, June, 10, 2 (OSUC). Hamilton Co., Cincinnati (May 15, 1906, June 26, 1906), 3 (FMNH). Hocking Co., May 27, 1950, N.J. & E.L. Sleeper, 2 (FMNH). Hocking Co. (May, 23, May 24, 1950), D.J. & J.N. Knull, 8 (FMNH). Hocking Co., June, 2, J.N. Knull (FMNH). Hocking Co. (June 2, 1955, May 2, 1957, May 14, 1954), D.J. & J.N. Knull, 3 (OSUC). Jefferson Co., Sugar Grove, May, 17 (OSUC). Lucas Co., Sylvania (FMNH). Scioto Co., Lucasville, June 15, 1963, K. Stephan (FSCA). **Oregon**, Benton Co., Corvallis, G.F. Knowlton (FMNH). Benton Co., Corvallis, April 11, 1940, J. Schuh & K. Gray, on nursery Stock, 2 (FSCA). Benton Co., Corvallis, May 15, 1941, Schuh & Gray, sweeping grass, 2 (FSCA). Benton Co., Corvallis (May 20, 1917, August, 17), 2 (OSUC). Clackamas Co., Canby (April 6, 1931, April 22, 1933), E.W.Jones, 3 (WFBM). Curry Co., Brookings, April 18, 1962, M.C. Lane (FMNH). Douglas Co., Dillard, May 25, 1933, E.W.Jones (WFBM). Douglas Co., Umqua River, Elkton, June 6, 1999, S. Clawson (CSUC). Jackson Co., Talent, March 23, 1940, A.T. McClay (UCDC). Jackson Co., Ashland, April 26, 1941, A.T. McClay (UCDC). Jackson Co., Brownsboro, June 13, 1941, A.T. McClay (UCDC). Jackson Co., April 28, 1946, A.T. McClay (UCDC). Jackson Co., Medford, April 6, 1949, C. Fitch (UCDC). Jackson Co., Butte Falls, April 27, 1941, A.T. McClay (UCDC). Lane Co., Eugene, June 1-15, 1946, B. Malkin (FMNH). Lane Co., Blachly, May 17, 1942 (FMNH). Lane Co., Eugene (March 20, 1942, June 6, 1942, June 18, 1942), 4 (FMNH). Lane Co., Springfield, May 2, 1942 (FMNH). Lane Co., Eugene (April 18, 1942, June 12, 1942), B. Malkin, 2 (FMNH). Lane Co., Walterville, June 3, 1946, B. Malkin, 2 (FMNH). Lincoln Co., Yachats, May 29, 1950, J.E. Davis (CSUC). Malheur Co., Ontario, May 11, 1948, J.E. Davis (CSUC). Marion Co., Salem, April 19, 1922, 3 (OSUC, CSUC). Multnomah Co., Portland (April 22, 1933, April 20, 1935), E.W.Jones, 5 (WFBM). Multnomah Co., Portland, April 11, 1940, J. Schuh & K. Gray, on nursery stock, 15 (FSCA). Multnomah Co., Gresham, broccoli blossoms, March 17, 1947, J. Schuh

(FSCA). Umatilla Co., Blue Mts., Grouse Creek Rd., June 5, 1941, E.W.Jones (WFBM).  
Wallowa Co., Blue Mts., June 24, 1937, E.W.Jones (WFBM). Wasco Co., The Dalles,  
May 20, 1948, D. Hammond (CSUC). Washington Co., Gaston, May 4, 1939, M.C. Lane  
(FMNH). Washington Co., Forest Grove, April 26, 1929, T.R. Chamberlin, swept from  
wheat, 2 (FSCA). Washington Co., Forest Grove, April, 20 (OSUC). **Pennsylvania**,  
Allegheny Co., Pittsburgh, June 23, 1924, Chermock (CSUC). Dauphin Co.,  
Hummelstown, May 22, 1933, J.N. Knull (FMNH). **Rhode Island**, Providence Co.,  
Pulaski Mgt. Area, June 1, 2002, B. Kondratieff, 2 (CSUC). **South Dakota**, Union Co.,  
Elk Point, June 3, 1953, H.C. Severin, 2 (FMNH). **Utah**, Cache Co., Millville, May 10,  
1938, G.F. Knowlton (OSUC). Cache Co., Cornish, May 9, 1935, G.F. Knowlton  
(FMNH). Cache Co., Logan (April 29, 1939, April 24, 1953), G.F. Knowlton, 2 (FMNH).  
Cache Co., Logan, April 13, 1936, C.J. Davis (FMNH). Cache Co., Logan, May 30, 1946,  
H.S. Beaudoin (FMNH). Cache Co., May 7, 1955, G.F. Knowlton (OSUC). Cache Co.,  
February 2, 1913, H.R. Hagan (OSUC). Cache Co., Benson, April 20, 1935, F.H.  
Gunnell (OSUC). Cache Co., Logan, May 8, 1941, R.B. Burnham (OSUC). Cache Co.,  
Logan, May 4, 1937, G.B. Harston (OSUC). Cache Co., Wellsville, May 17, 1951, G.F.  
Knowlton (OSUC). Cache Co., Clarkston, June, 12, G.F. Knowlton (OSUC). Cache Co.,  
Sandine Canyon, June 3, 1937, F.C. Harmston (OSUC). Cache Co., Providence, April  
14, 1936, C.F. Smith (OSUC). Cache Co., April 27, 1938, G.F. Knowlton (OSUC).  
Garfield Co., May 2, 1958, G.F. Knowlton (OSUC). Millard Co., June 6, 1956, G.F.  
Knowlton (OSUC). Salt Lake Co., Granite, April 25, 1936, G.F. Knowlton (FMNH). Salt  
Lake Co., Magna, April 16, 1953, G.F. Knowlton, 3 (OSUC). Sevier Co., Salina, March,  
4, G.F. Knowlton (OSUC). Tooele Co., Lake Point, April 16, 1953, G.F. Knowlton, 12  
(OSUC). Utah Co., Mapleton, May 23, 1936, G.F. Knowlton (OSUC). May 13, 1954, G.F.  
Knowlton (OSUC). **Washington**, Columbia Co., Blue Mts., Black Snake Ridge, 4000 ft.,  
May 22, 1936, E.W.Jones, 2 (WFBM). Columbia Co., Dayton (May 15, 1927, June 6,

1927) M.W. Stone, 2(CMNC). Grant Co., Moses Lake, May 2, 1954, H. Davis & M.T. James (CSUC). Pierce Co., Buckley, June 14, 1932, W.W. Baker (FMNH). Pierce Co., Ft. Lewis, June 19, 1936, E.W.Jones (WFBM). Pierce Co., Mt. Rainier NP, Westside Rd. 1.6 mi. N Hwy 706, May 30, 1997, B. Kondratieff (CSUC). Pierce Co., Spanaway, April, 14, J. Wilcox (FMNH). Pierce Co., Spanaway, June 29, 1933, W.W. Baker (OSUC). Snohomish Co., Silverton, April 27, 1947, E.C. Johnston (USNM). Spokane Co., Spokane, May 17, 1953, J.A. Quist, 2 (CSUC). Thurston Co., Yelm, June 4, 1961, M.C. Lane (FMNH). Thurston Co., Grand Mound, May 9, 1930, W.W. Baker, 2 (OSUC). Walla Walla Co., Walla Walla (May 1, 1930, May 9, 1932), M.C. Lane, 2 (FMNH). Walla Walla Co., Walla Walla (April 20, 1932, April 22, 1936, April 28, 1936, April 10, 1940, March 25, 1941), E.W.Jones, 10 (WFBM). Walla Walla Co., Dixie, May 13, 1936, E.W. Jones (WFBM). Walla Walla Co., College Place, April 26, 1936, E. Booth (MEMU). Whitman Co., Palouse, June 17, 1951, N.M. Downie (FMNH). Whitman Co., Pullman, May 11, 1950, N.M. Downie (FMNH). Whitman Co., Pyallman (WFBM).

Distribution: A common and apparently widespread species over North America (Fig. 89).

Diagnosis: *Limonius ectypus* is most similar to *L. agonus* and *L. subauratus*. In the male, *L. ectypus* can be separated from both of the above species by the form of the male genitalia. The parameres of *L. ectypus* (Fig. 33) are bulbous basally, constricted before blades on apical fourth, apical blades triangular, aedeagus wide with rounded tip, and extending beyond parameres by half or more of the length of apical blades. The parameres of *L. agonus* (Fig. 19) have the lateral margin gradually narrowing from apical  $\frac{1}{2}$  toward apical blades, apical blades wider than long, lateral points distinct subapically, aedeagus narrow, same width from the middle to tip, and extending beyond parameres by less than half the length of apical blades. The parameres of *L. subauratus* (Fig. 61) have the lateral margin subparallel basally gradually narrowing before blades on apical

fourth, apical blades triangular; aedeagus gradually narrowing to tip, extending beyond parameres by one length of apical blades. Additionally, in *L. ectypus* the frons is well separated from labrum. Whereas, in *L. agonus* and *L. subauratus*, the frons is poorly separated from labrum.

Remarks: A neotype male was designated to present any future confusion about Say (1839) concept of this species.

Notes: An examination of large series from single localities and throughout the eastern and western range of both *L. ectypus* and *L. infuscatus* indicated only one species could be consistently recognized. However, the apparent disjunctness of the records available, may indicate with further studies that two forms may be present.

*Limonius flavomarginatus* Knull

*Limonius flavomarginatus* Knull, 1938: 20-21. Holotype (FMNH). Type locality:

Rock Bridge, Washington Co., Ohio.

Length: 8.64-10.88 mm (length/width ratio 3.4-3.6). Head black except the clypeal margin reddish, clypeal margin entire, frontal punctures deeply punctate to subumbilicate separated by less than width of punctures, covered with appressed yellow setae. Antennae extending 1 or less segments beyond hind angles; segment 2 and 3 are small together just longer than segment 4, antennal color dark brown to black. Pronotum black with the anterior border of hind angles of hypomeron yellow to orange; 2.24-2.88 mm (as long as broad), pronotal widest at base becoming evenly narrower anteriorad, hind angles gradually enlarged, carina short, about 1/4 to 1/5 of lateral margin, subparallel to parallel to lateral margins, pronotal texture, deeply punctate, separated by less than width of punctures, covered with densely appressed yellow setae. Scutellum orange to pale brown, shell-like, with long appressed yellow setae. Hypomeron, strongly

costate interiorly forming antennal groove; posterior border of hypomeron dentate; prosternum, orange to pale brown, deeply punctate, separated by more than width of punctures, hypomeron reddish brown except anterior and posterior border orange, umbilicate punctures, separated by less than width of punctures, metasternum reddish to dark brown except the posterior and anterior border orange, deeply punctate, with fine appressed yellow setae, legs color, yellow.

Elytra 6.16-7.68 mm (length/width ratio 2.4-2.57) reddish to dark brown, striae deeply punctate, inter-strial finely punctate.

Abdomen reddish brown to dark brown, deeply punctate separated by less than width of punctures, with fine appressed yellow setae.

Male Genitalia: Parameres with lateral margins sinuate, apical blades about 1.5 as long as broad, pointed apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/5 the length of apical blades, parameres long 2.5 to 3 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype, **Ohio**, Washington Co., Rock Bridge, June 14, 1936, J.N. Knull (FMNH). Allotype, **Ohio**, Washington Co., Rock Bridge, June 14, 1936, J.N. Knull (FMNH).

Material Examined: **United States: Missouri**, Taney Co., Tumbling Cr. Cave, nr. Protem, July, 1975, B. Martin, 2 (CMNC). **Ohio**, Hocking Co. (June 15, 1945, June 21, 1945, June 25, 1945, June 2, 1955), D.J. & J.N. Knull (FMNH), Scioto Co., Shawnee Forest, June 7, 1943, D.J. & J.N. Knull (4) (FMNH). **Tennessee**, Sevier Co., Greenbrier, Great Smoky Mountains, June 12, 1931, P.N. Musgrave (CMNC).

Distribution: This apparently uncommon species has only been collected in Ohio (Fig. 90). This species has not been collected since 1965; it possibly extinct.

Diagnosis: *Limonius flavomarginatus* is most similar to *L. plebejus*. In the male, the parameres (Fig. 34) of *L. flavomarginatus* have the lateral margins sinuate, apical blades about 1.5 as long as broad, pointed apically, aedeagus extending beyond parameres by less than 1/5 the length of apical blades. In *L. plebejus* the parameres (Fig. 54) have the lateral margin convex basally, curved before blades on apical fourth, apical blades longer than wide, triangular, aedeagus extending beyond parameres by less than half the length of apical blades. Additionally, the clypeal margin of *L. flavomarginatus* is entire, whereas, in *L. plebejus*, the clypeal margin is slightly recurved medially.

*Limonius fulvipilis* Candeze

*Limonius fulvipilis* Candeze, 1860: 383, Van Dyke, 1932: 336. Lectotype (BMNC). Type locality: California.

*Limonius fulvipilis seminudus* Van Dyke, 1932: 348. Holotype # 3139 (CASC). Type locality: Carrville, Trinity Co., CA. New synonym.

Length: 8.64-12 mm ((length/width ratio 36-3.75). Head black, clypeal margin deeply incised medially, frontal punctures deeply punctate, separated by less than width of punctures, covered with densely, long, appressed golden setae. Antennae reaching about 1 segment beyond hind angles, segments 2 and 3 are small, together just longer than segment 4, antennal color black. Pronotum black throughout, 2.4-3.2 mm (length/width ratio 1.18-1.2) pronotal margin with lateral margin subparallel, carina about 1/3 length of lateral margin, diverging from lateral margin with area between visibly punctate (viewed dorsally), pronotal texture, subumbilicate punctures, separated by less than width of punctures, covered with densely, long, appressed golden to white setae. Scutellum black, pentagonal, deeply punctate, covered with long, thick, appressed yellow setae. Hypomeron, strongly costate anteriorad, forming antennal groove;

posterior border of hypomeron without teeth; prosternum, black throughout, deeply punctate, separated by more than width of punctures, with short, thick, appressed yellow setae; hypomeron black except the posterior and anterior border reddish brown, umbilicate punctures, separated by less than width of punctures, with thick, appressed yellow setae; metasternum black throughout, deeply punctate, with appressed black setae, legs color, dark brown to black.

Elytra 5.76-8 mm (length/width ratio 2.4 -2.5) black throughout, striae finely punctate, inter-striae deeply punctate, covered with thick appressed golden setae.

Abdomen black throughout, deeply punctate, separated by more than width of punctures, with appressed black setae.

Male genitalia (Fig. 35): parameres with lateral margins convex basally, curved before blades on apical fourth, apical blades triangular, with lateral peak, aedeagus wide with narrow tip, not extending beyond parameres. Parameres long 1.7 to 2 length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Lectotype number (Drawer Elateridae 02-401, BMNC).

California.

Type Material of Synonyms Examined: Holotype # 3139 (CASC).

Material Examined: **United States: California**, Alameda Co., Niles, April 19, 1914, F.E. Blaisdell (CASC). Alameda Co., Livermore, April 30, 1928, E.P. Van Duzee (CASC). Alameda Co., May 14, 1922, F.W. Nunenmacher (FMNH). Amador Co., Mokelumne, 2900-3100 ft., June, F.E. Blaisdell (CASC). Amador Co., Volcano, May 7, 1957, W.T. Crites (CASC). Butte Co., 5 mi. NE. Butte Meadows, Cherry Hill Cpgd., May 24-27, 1974, F.G. Andrews (CASC). Contra Costa Co., Mt. Diablo, May 13, 1923, E.P. Van Duzee (CASC). Contra Costa Co., Arbolado, May 14, 1913, 2 (CASC). Contra Costa Co., Mt. Diablo, Russelman Park, April 8, 1938 (CASC). Contra Costa Co., Mt. Diablo,

2600 ft., May 27, 1931, E.P. Van Duzee (CASC). Contra Costa Co., Lafayette, May 24, 1940, R. Hopping, 2 (CASC). El Dorado Co., Riverton, July, 4, R.Wagner, 2 (CASC). El Dorado Co., Riverton, July, 19, C.R. Bruck (FMNH). El Dorado Co., Riverton, June 17, 1946, A.T. McClay (UCDC). El Dorado Co., Pollock Pines (July 8, 1939, June 23, 1939), A.T. McClay, 2 (UCDC). Fresno Co., 4 mi. N. Pinchurst, June 28, 1962, C.D. Johnson (CASC). Fresno Co., Huckleberry Mdw., July, 1909, R. Hopping, 3 (CASC). Fresno Co., Campe 2, May 27, 1909, R. Hopping, 2 (CASC). Fresno Co., Stevenson Creek, Sierra N. F., May 27, 1915 (CASC). Fresno Co., Fence Meadow, June 4, 1932, K.A. Salman (FMNH). Fresno Co., Campe, May 27, 1909 (CASC). Humboldt Co., Weott (July 14, 1929, July 13, 1929, July 15, 1929), 6 (CASC). Humboldt Co., Weott, July 15, 1929, E.C. Van Dyke (CASC). Humboldt Co., Bull Crk., S. Fork Eel Riv., June 4, 1936, 3 (CASC). Madera Co., Sugar Pine, Dr. A. Fenyas (CASC). Madera Co., Miami, June, 3 (CASC). Madera Co., Bass Lake, April 18, 1934, R.P. Allen (CASC). Madera Co., Bass Lake (April 15, 1934, April 20, 1934, April 28, 1934), R.P. Allen, 3 (CASC). Madera Co., Bass Lake, June, 10, R.L. Furniss (FMNH), (OSUC). Madera Co., Bass Lake, 3000 ft., July 1, 1946, H.P. Chandler (CASC). Madera Co., Westfall Camp, Sierra Nat. Forest, June 15, 1967, B.S. Cheary (CASC). Madera Co., June, 3, R.L. Furniss, 9 (FMNH). Madera Co., June, 30, R.L. Furniss, 5 (FMNH). Madera Co., Oakhurst, June 6, 1942, A. J. Walz, *Ceanothus* (WFBM). Madera Co., Bass Lake, May 30, 1942, A. J. Walz (WFBM). Marin Co. (CASC). Marin Co., Lagunitas Cn. (April 24, 1910, June 4, 1911, April 23, 1916, April 28, 1928), 7 (CASC). Marin Co., Bear Vally, May 15, 1921, C.L. Fox (CASC). Marin Co., Inverness, May 3, 1936, 4 (CASC). Marin Co., San Geronimo, June, 1886 (CASC). Marin Co., Mill Valley, June 25, 1898, 3 (CASC). Marin Co., Corte Madera Cr. (FMNH). Marin Co., Lagunitas Cn., April 26, 1924, E.P. Van Duzee (CASC). Marin Co., Lagunitas Cn., June, 1911, J.C. Huguenin (CASC). Marin Co., Lagunitas Cn., April 29, 1928 (UCDC). Mariposa Co., Yosemite Valley (May 15, 1921, June 6, 1921, June 7, 1921), 3

(CASC). Mariposa Co., June 14, 1914, F.W. Nunenmacher, 2 (CASC). Mariposa Co., Yosemite Valley, June 1, 1946, B.E. White (CASC). Mariposa Co., Yosemite Valley, May 14, 1959, R.P. Allen (CASC). Mariposa Co., WaWona, September 21, 1938, Carl T. Sierra (CASC). Mariposa Co., Miami Ranger Station, May 23, 1942, *Libocedrus decurrens*, 2 (WFBM). Mendocino Co., Comptche, May 7, 1936, 3 (CASC). Mendocino Co., Yorkville (April 30, 1924, May 1, 1924, May 17, 1929), E.P. Van Duzee, 3 (CASC). Mendocino Co., Laytonville, May 2, 1930 (UCDC). Modoc Co., Eagleville, June 1, 1946, W.F. Barr (WFBM). Monterey Co., Carmel, June 15, 1908 (CASC). Napa Co., 4 (CASC). Napa Co., Rutherford, July 20, 1959, T.R. Haig, 2 (CASC). Placer Co., Forest Hill (June 9, 1931, March, 1898), 5 (CASC). Placer Co., 5 (CASC). Placer Co., 4 (MEMU). Placer Co., Forest Hill, May 6, 1962, A.S. Menke (UCDC). Placer Co., Emigrant Gap, June, 1937, A.T. McClay (UCDC). Placer Co., Grass Valley, May 2, 1966, R.E. Rice (UCDC). San Bernardino Co., Northfork (July 6, 1933, June 21, 1933), R.P. Allen, 2 (CASC). San Francisco Co., May 19, 1908, L. Merced (CASC). San Francisco Co., April 19, 1908, 2 (CASC). San Francisco Co., L. Merced, April 19, 1908, E.C. Van Dyke, 2 (CASC). San Mateo Co., Portola State Pk., May 7, 1950 (CASC). San Mateo Co. (May 8, 1916, June 8, 1917), F.W. Nunenmacher, 14 (FMNH). San Mateo Co., Portola Valley, April 22, 1921, W.M. Giffard (CASC). San Mateo Co., Crystal Lake, July, 1914, F.E. Blaisdell (CASC). San Mateo Co., La Honda, May 20, 1952 (CASC). Santa Barbara Co., Los Padres National Forest, June 25, 1941, D.J. & J.N. Knull, 2 (FMNH). Santa Clara Co., Los Gatos, June 4, 1910 (CASC). Santa Clara Co., Summit Rd., May 16, 1970 (UCDC). Santa Clara Co., Silver Creek, May 9, 1968, 2 (UCDC). Santa Cruz Co., Ben Lomand (May 17, 1931, June 25, 1932, June 11, 1933), 8 (CASC). Santa Cruz Co., May 11, 1933, E.J. Blum (CASC). Santa Cruz Co., June 1, 1919, E.P. Van Duzee (CASC). Santa Cruz Co., April 12, 1936, J.W. Tilden, 3 (CASC). Santa Cruz Co., Ben Lomond (May, 1931, May, 1932), L.W. Saylor, 4 (FMNH). Siskiyou Co., June 2, 1911, F.W.

Nunenmacher, 2 (CASC). Siskiyou Co., Mt. Shasta, J.E. Cottle (FSCA). Sonoma Co.,  
 Sobre Vista, May 21, 1911, J.A. Kusche (CASC). Sonoma Co., Mark West Spr., April 27,  
 1930, 5 (CASC). Sonoma Co., Guerneville (May 31, 1908, May 31, 1910), 4 (CASC).  
 Sonoma Co., Cazadero (April 12, 1918, April 13, 1918), E.P. Van Duzee, 4 (CASC).  
 Sonoma Co., Stillwater Cove, May 23, 1954 (UCDC). Tehama Co., Lassen Natural  
 Park, June 14, 1931 (CASC). Trinity Co., May 9, 1917, F.W. Nunenmacher (CASC).  
 Trinity Co., Nash Mine, June 12, 1913 (CASC). Trinity Co., Carrville, 2400-2500 ft., May  
 30, 1934, 6 (CASC). Trinity Co., Big Flat, Coffee Creek, June 21, 1934, 2 (CASC). Trinity  
 Co., May 9, 1917, F.W. Nunenmacher, 3 (FMNH). Trinity Co., Carrville (FMNH). Tulare  
 Co., Giant Forest, 6500 ft., July, 1915, G. Hopping (CASC). Tulare Co., California Hot  
 Springs. (June 3, 1939, June 4, 1939), 7 (CASC). Tulare Co., Sequoia Natl. Park,  
 Marble Fk. Bridge, 3000-5000 ft., June 12, 1929 (CASC). Tulare Co., Sequoia Natl.  
 Park, June 19, 1931, F.T. Scott (CASC). Tulare Co., Round Mdw., Giant Forest, June,  
 R. Hopping, 2 (CASC). Tulare Co., Balch Camp, 26 mi. E. Exeter, July 11, 1962, C.D.  
 Johnson (CASC). Tuolumne Co., May 20, 1914, F.W. Nunenmacher (CASC). Tuolumne  
 Co., Long Barn, June 5, 1931 (CASC). Tuolumne Co., Long Barn, May 24, 1930, E.P.  
 Van Duzee, 5 (CASC). Tuolumne Co., Calaveras Big Trees, June 7, 1931 (CASC).  
 Tuolumne Co., Long Barn, Bald Mt., 5600 ft., April 20, 1934, E.P. Van Duzee, 2 (CASC).  
 Tuolumne Co., Mather, July 10, 1957, M.E. Irwin (CASC). Tuolumne Co., Strawberry,  
 June 25, 1951, T.R. Haig (UCDC). Tuolumne Co., Strawberry, June 19, 1951 (UCDC).  
 Tuolumne Co., Mather, June 15, 1969, K. Stephan, 2 (FSCA). **Idaho**, Bonner Co.,  
 Sandpoint, June 18, 1974, N.M. Downie (FSCA). Bonner Co., Sagle, June 4, 1950, N.M.  
 Downie, 2 (FMNH). Kootenai Co., Farragut State Park, June 7, 1966, R.W. Portman, 5  
 (WFBM). Latah Co., Moscow Mts., May 28, 1950, N.M. Downie, 2 (CASC, CSUC). Latah  
 Co., Moscow Mts. (CASC). Latah Co., Troy, June 14, 1908 (CASC). Latah Co., Deary,  
 May 20, 1951, N.M. Downie, 3 (FMNH). Latah Co., Moscow, May 7, 1949, N.M. Downie

(FMNH). Latah Co., Moscow Mts., June 23, 1954, N.M. Downie (FMNH). Latah Co., Moscow Mts., May 15, 1951, N.M. Downie (FMNH). Latah Co., Moscow, 3000 ft., May 14, 1928 (WFBM). Latah Co., Mt. Moscow, June 13, 1929, W.E. Shull (WFBM). Latah Co., Moscow, Paradise Ridge, 3000 ft., June 28, 1930, P. Rice (WFBM). Latah Co., Moscow Mts., 3000 ft., May 18, 1951, V.H. Albee (WFBM). **Montana**, Lincoln Co., Noxon, June 23, 1975, N.M. Downie (FMNH). Missoula Co., June 16, 1971, N.M. Downie, 3 (FMNH). Sanders Co., Findley's Flats, Lolo National Forest, Hwy. 200, June 15, 1982, N.M. Downie, 2 (FSCA). Sanders Co., Findley's Flats, Lolo National Forest, Hwy 200., June 15, 1982, N.M. Downie, 2 (FMNH). **Oregon**, Douglas Co., Roseburg, May 12, 1965, K. Goeden (CASC). Grant Co., Blue Ridge Pk., June 27, 1936, M. Cracken, 2 (CASC). Jackson Co., Griffin Creek, May 5, 1956, Schuh & Vertrees (FMNH). Jackson Co., Phoenix, May 21, 1936, F. Lawrence (CASC). Jackson Co. Rogue River, May 16, 1951, A.B. Black (CSUC). Multnomah Co., May 15, 2003, B. Kondratieff (CSUC). Umatilla Co., Meacham, June 15, 1938, 5 (CASC). Umatilla Co., Meacham, June 19, 1927, M.W. Stone, 5 (CASC). Umatilla Co., Weston, May 15, 1934, E.W.Jones (WFBM). Union Co., Toll Gate Rd., Blue Mts., June 11, 1938, 4 (CASC). Union Co., Toll Gate Rd., Blue Mts., June 4, 1933, M.C. Lane (CASC). Union Co., Blue Mts., Tollgate Road, June 10, 1938, E.W.Jones, 2 (WFBM). Union Co., Tollgate, July 14, 1937, E.W.Jones (WFBM). Union Co., Blue Mts., Tollgate Road, May 23, 1941, M.C. Lane (UCDC). Wallowa Co., Moffet Mead, Blue Mts., June 7, 1938, 5 (CASC). Washington Co., Gaston, May 24, 1933, E.W.Jones (WFBM). Yamhill Co., McMinnville, June 14, 1942, D.M. Fender (CASC). Moffet Mead, Blue Mts., June 7, 1938 (CASC). **Washington**, Columbia Co., Blue Mts., May 17, 1936, M.C. Lane (FMNH). Columbia Co., Blue Mts., Eckler Mt. Rd., 3500 ft., June 25, 1935, E.W. Jones (WFBM). Kittitas Co., Easton, Koebele, 2 (CASC). Walla Walla Co., Walla Walla, Mill Cr., June 9, 1938, 4 (CASC). Walla Walla Co., Walla Walla, Mormon Crk., June 9, 1938, 2 (CASC). Walla

Walla Co., Walla Walla (May 1, 1936, May 8, 1936, May 9, 1936, May 21, 1938, May 22, 1938, May 10, 1941), M.C. Lane, 8 (CASC). Walla Walla Co., Walla Walla, June 4, 1936, H.P. Lanchester, 2 (CASC). Walla Walla Co., Walla Walla (May 8, 1936, May 22, 1938, May 17, 1944), M.C. Lane, 3 (FMNH). Walla Walla Co., Dixie, May 13, 1936, E.W. Jones, 3 (WFBM). Walla Walla Co. (June 18, 1935, May 3, 1936, May 7, 1936, May 9, 1936, May 5, 1945), E.W. Jones, 10 (WFBM). Walla Walla Co., Blue Mts., 3000 ft., May 22, 1936, E.W. Jones (WFBM). Walla Walla Co., Mormon Grade, April 20, 1938, K.E. Gibson (WFBM). Walla Walla Co. (May 8, 1936, May 17, 1944), M.C. Lane, 2 (UCDC). Walla Walla Co., May 12, 1939, 5 (UCDC). Walla Walla Co., May 9, 1936, E.W. Jones, 2 (WFBM). Whatcom Co., Mormon Grade, April 20, 1938, K.E. Gibson, 2 (WFBM). Whitman Co., Pullman, June 2, 1916 (CASC). Whitman Co., Pullman, May 7, 1949, N.M. Downie (FMNH). Whitman Co., Palouse (May 6, 1949, June 18, 1949, June 17, 1951), N.M. Downie, 3 (FMNH). Whitman Co., Blue Mts, Black Snake Ridge, 4000 ft., May 22, 1936, E.W. Jones (WFBM). Whitman Co., Blue Mts., Eckler Mt. Rd., 3500 ft., May 30, 1935, E.W. Jones (WFBM). Whitman Co., Blue Mts., 3000 ft., May 22, 1936, E.W. Jones, 2 (WFBM). Yakima Co., Tieton, June 20, 1936, S.E. Crumb (CASC). Yakima Co., Mt. Adams, Signal Park, 4500 ft., July 10, 1927, K.E. Gibson (WFBM). Yakima Co., Tieton, September 9, 1932, A.R. Rolfs (WFBM).

Distribution: This species is found in western North America (Fig. 91).

Diagnosis: *Limonius fulvipilis* can be recognized from *L. auripilis* by: the clypeal margin in *L. fulvipilis* is deeply incised medially, but not semicircular, segments 2 and 3 are small, combined just longer than segment 4, and the pronotum slightly longer than broad. Whereas, *L. auripilis* the clypeal margin is deeply incised medially, semicircular; antennal segment 2 smaller than segment 3, segment 3 almost as long as segment 4, and the pronotum as long as broad.

Note: The comparison of the lectotype of *L. fulvipilis* (BMNC) with the holotype of *L. fulvipilis seminudus* (CASC) indicated no specific differences except the pronotal and elytral setae golden in *L. fulvipilis* to white in *L. fulvipilis seminudus*. Also, these two forms are broadly sympatric.

*Limonius griseus* (Beauvois)

*Elater griseus* Beauvois, 1805: 214. Type locality: North America.

*Limonius griseus*, Candeze, 1860: 388, Van Dyke, 1932: 337.

*Elater cylindriformis* Say, 1823: 176, Say, 1839: 166. Type: destroyed. Type locality: United States.

*Limonius cylindriformis* LeConte, 1853: 430. Synonymized by Candeze, 1860: 388.

*Limonius hirticollis* Melsheimer, 1845: 215. Type lost. Type locality: Pennsylvania. Synonymized by Candeze, 1860: 388.

*Limonius interstitialis* Melsheimer, 1845: 215, LeConte, 1853: 430, Candeze, 1860: 389, Van Dyke, 1932: 337. Type lost. Type locality: Pennsylvania. Synonymized by Brown, 1933: 176.

*Limonius propexus* Candeze, 1860: 386, Candeze, 1891: 149, Leng, 1920: 168, Schenkling, 1925: 297, Van Dyke, 1932: 353. Type locality: "Southern United States near New Orleans". Synonymized by Van Dyke, 1932: 353.

Length: 10.56-14.56 mm (length/width ratio 3.5-3.7). Head dark brown to black, clypeal margin entire with slightly recurved medially, frontal densely umbilicate punctures, covered with densely appressed yellow setae. Antennae brown to dark brown, not reaching hind angles, segments 2 small, segment 3 just shorter than segment 4. Pronotum dark brown to black with posterior and anterior border reddish,

2.72-3.52 mm (length/width ratio as long as broad), pronotal margins broadly rounded. Carina, about 1/3 length of lateral margin, parallel to lateral margin. Pronotal texture, deeply punctate, becoming subumbilicate laterally, separated by less than width of punctures, covered with dense, appressed yellow setae. Scutellum reddish brown to dark brown, pentagonal, finely punctate, covered with long, dense, appressed yellow setae. Hypomeron costate anteriorad, forming small antennal groove; posterior border of hypomeron dentate; prosternum reddish brown to dark brown, umbilicate punctures, separated by less than width of punctures, covered with dense appressed yellow setae; hypomeron black with posterior and anterior border reddish, deeply punctate, separated by more than width of punctures, covered with dense appressed yellow setae; metasternum reddish brown to black, finely punctate, separated by about width of punctures, covered with dense appressed yellow setae, legs color, yellow to dark brown.

Elytra 7.36-10.4 mm (length/width ratio 2.5-2.7), reddish brown to black, striae subumbilicate punctures, inter-striae deeply punctate, separated by less than width of punctures, covered with densely appressed yellow setae.

Abdomen reddish brown to dark brown, finely punctate, covered with appressed yellow setae.

Male genitalia (Fig. 36): parameres with lateral margin convex basally constricted before blades in apical fourth, apical blades as wide as long, rounded apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than ¼ length of apical blades, parameres long 1.5 to 1.7 length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Syntype (BMNC).

Material Examined: **United States: Alabama**, Cleburne Co., Cheaha State Park 33°28'58" N 85°48'52" W, May 18, 1998, May 20, 1998, T.L. Schiefer, M.V. lamp in mixed forest, W.H. Cross Expedition, 5 (MEMU). Cleburne Co., Talladega National

Forest 33°33'30" N 85°42'35" W, May 19, 1998, T.L. Schiefer, M.V. lamp in mixed forest, W.H. Cross Expedition, 4 (MEMU). Cleburne Co., Cheaha State Park 33°29'02" N 85°49'00" W, May 18, 1998, T.L. Schiefer, M.V. lamp in mixed forest, W.H. Cross Expedition (MEMU). Cleburne Co., Cheaha State Park (April 28, 1940, May 1, 1940), 2 (CASC). Colbert Co., Barton, June 9-14, 1937 (CASC). Dekalb Co., De Soto, State Park, May 6, 1940 (CASC). Elmore Co., Hwy. 231, 6.2 m. S. Jct. Hwy. 14, June 4, 1989, R. Turnbow (FSCA). Madison Co., Monte Sano St. Pk., May 26, 1984, N.M. Downie (FMNH). Madison Co., Monte Sano St. Pk. (May 14, 1984, May 25, 1984, May 28, 1984), N.M. Downie, 3 (FSCA). Mobile Co., 4 (OSUC). Mobile Co., N.P. Loding (CASC). Monroe Co., Haies Island Park 31°43'23" N 87°28'10" W, July 24-25, 1995, T.L. Schiefer, beating (MEMU). Tallapoosa Co., Camp Hill, May 29, 1961, J.R. Bourne (MEMU). **Arkansas**, Johnson Co., 8 mi. N. Clarksville T10N, R 23 W, Sec. 2, May 10-12, 1987, R.L. Brown, Blacklight in deciduous Woods (MEMU). **Connecticut**, Litchfield Co., Cornwall, June 19, 1922, 6 (CASC). Litchfield Co., Cornwall, June 8, 1922, K.F. Chamberlain, 4 (CASC). Windham Co., Putnam, June 27, 1922, A.B. Klots (CSUC). **Delaware**, New Castle Co., Newark, May 20, 1908, C.O. Houghton (CASC). New Castle Co., Near Wilmington, June 11, 1930, L.A. Stearns (FSCA). New Castle Co., Newark, May 14, 1930 (FSCA). New Castle Co., Blackbird St. For., May 12, 1988, J.E. Wappes (OSUC). Sussex Co., Bridgeville, May 16, 1935, P. Rice (OSUC). Sussex Co., Bridgeville, May 18, 1932, May 25, 1932, 3 (FSCA). **Florida**, Jackson Co., Florida Caverns St. Pk., April 27, 1986, R. Turnbow (FSCA). **Georgia**, Brooks Co., Burton 1800 ft., May 21, 1911, J.C. Bradley (CASC). Clarke Co., Whitehall Forest, May 12, 1975, R. Turnbow (FSCA). Clayton Co., 2000 ft., May 18-26, 1911, J.C. Bradley (CASC). Dekalb Co., May 21, 1972 (FSCA). Rabun Co., Black Rock Mt., 3000 ft., May 20-25, 1911 (CASC). **Illinois**, Knox Co., Gailsburg, 3 (OSUC). La Salle Co., June 23, 1937, Floyd G. Warner (CASC). Pope Co., Eddyville, June 20, 1934, E. Ray (FMNH). St. Clair Co., June

8, 1904, Dr., G.W. Bock (MEMU). 5 (CASC). **Indiana**, Brown Co., June 8, 1970, N.M. Downie, 3 (FMNH). Brown Co., Bear Wallow, June 7, 1964, C.E. White, white pine bark (FSCA). Brown Co., Bear Wallow (June 20, 1964, May 7, 1965), C.E. White, 3 (FSCA). Brown Co., May 27, 1988, N.M. Downie (FSCA). Brown Co., May 19, 1963, C.E. White (FSCA). Crawford Co., Grantsburg, June 10, 1964, D. Eckert, at black light, 2 (FSCA). Fulton Co., April 30, 1904 (CASC). Kosciusko Co., August 16, 1926, 5 (CASC). Marion Co., Indianapolis, June, 1960, D.S. White (FSCA). Marion Co., Indianapolis (July 23, 1961, June 14, 1967), C.E. White 4 (FSCA). Morgan Co., Morgan Monroe For., April 25, 1964, C.E. White, white pine bark (FSCA). Posey Co., May 23, 1907 (FMNH). Posey Co., Hovey, June 19, 1963, C.E. White (FSCA). Pulaski Co., June 4, 1983, N.M. Downie, 3 (FSCA). Starke Co., San Pierre (June 4, 1984, June 7, 1984), N.M. Downie, 7 (FSCA). Tippecanoe Co. (May 14, 1954, May 29, 1954, June 1, 1966), N.M. Downie, 5 (FMNH). Tippecanoe Co., W. Lafayette, McCormick's Woods, June 6, 1982, N.M. Downie, (FSCA). Tippecanoe Co., McCormicks Woods, June 17, 1984, N.M. Downie (FSCA). April 30, 1904 (CASC). **Iowa**, Decatur Co., Leon, June 9, 1940 (CSUC). Guthrie Co., Sheeder Prairie (July 9, 1981, July 16, 1985), J.E. Wappes, 2 (WFBM). Guthrie Co., Sheeder Prairie, June 16, 1985, N.M. Downie (FSCA). Henry Co., Mt. Pleasant, May 19, 1930, M.C. Lean (CASC). Linn Co., 3 mi. N. Viola, June 27, 1972, E.L. Sleeper (CASC). Muscatine Co., Muscatine, May 25, 1949, W.D. Fronk (CSUC). Polk Co., Saylorville Lake, June 15, 1985, N.M. Downie (FSCA). Polk Co., W. Saylorville Lake, June 9, 1985, J.E. Wappes (FSCA). Polk Co., W. Saylorville Lake, May 25, 1985, Wappes & Schieferstein, 4 (MEMU). Polk Co., Brown Forest Preserve, June 20, 1982, J.E. Wappes (MEMU). Polk Co., W. Saylorville Lake, May 9, 1985, J.E. Wappes (MEMU). Polk Co., W. Saylorville Lake, May 25, 1985, J.E. Wappes (OSUC). Polk Co., Brown Forest Preserve, June 20, 1982, J.E. Wappes (OSUC). **Kansas**, Douglas Co., 900 ft., L.L. Dyche, 2 (CSUC). Finney Co., Knaus (CASC). Madiscn Co., M.C. Van Duzee (CASC).

Pottawatomie Co., Onaga, July 9, 1923, Crevecoeur (CASC). Pottawatomie Co., Onaga, June 18, 1909 (MEMU). Wilson Co., Benedict, Knaus, 2 (CSUC). **Kentucky**, Madison Co., M.C. Van Duzee (CASC). Rowan Co., Ramey Cr., Cave, Run Lake, May 25, 2002, B. Kondratieff, R.F. Kirchner (CSUC). **Louisiana**, Jefferson Co., Avon (June 20, 1929, June 24, 1929), J.N. Belkin, 5 (FSCA). Roslyn (June 11, 1930, July 9, 1930), J.N. Belkin, 6 (FSCA). **Maryland**, Anne Arundel Co., Edgewater, 21-24 June, 1991, C.L. Staines, black light (FSCA). Baltimore Co., Baltimore (April 30, 1909, June 6, 1909, June 7, 1909, June 12, 1909, June 18, 1909, June 20, 1909, June 24, 1909, June 26, 1909, June 27, 1909, June 28, 1909, July 3, 1909, July 8, 1909, July 11, 1909, July 15, 1909), F.E. Blaisdell, 37 (CASC). Baltimore Co., Sparrows Pt. (July 9, 1931, July 8, 1932), J.W. Green, 4 (CASC). Beltsville Co., Beltsville, May 5, 1934 (OSUC). Frederick Co., Braddock Heights, June 14, 1952, B.K. Dozier, sweeping oak, 2 (FSCA). Montgomery Co., Colesville (May 20, 1975, May 25, 1975, May 28, 1975, June 2, 1975, June 18, 1975, June 16, 1977, June 22, 1977), A.S. Menke, 9 (UCDC). Montgomery Co., Plummers Island Id., May 25, 1918 (CASC). Prince Georges Co., College Park, May 26, 1948, B.K. Dozier, sweeping weeds along Paint Branch (FSCA). Prince Georges Co., College Park (June 30, 1970, July 17, 1970), R.A. Belmont, 2 (UCDC). Worcester Co., Showell, May 8, 1989, M.J. Rothschild (FSCA). **Massachusetts**, Bristol Co., Attleboro, June 22, 1925 (FMNH). Hampden Co., Chicopee (July 17, 1897, July 8, 1898), 8 (MEMU). Hampden Co., W. Springfield, June 16, 1898 (MEMU). Middlesex Co., Tyngsboro, 3 (CASC). Middlesex Co., Melrose highlands, June 30, 1915 (CASC). Middlesex Co., C. A. Forst, Sherborn (CASC). Middlesex Co., Framingham, June 15, 1934 (FMNH). Middlesex Co., Sherborn, September 18, 1934 (FMNH). Middlesex Co., Natick, June 18, 1945 (FSCA). Middlesex Co., Framingham, June 15, 1948, C.A. Frost (FSCA). Norfolk Co., Milton (June 13, 1923, June 17, 1923), 3 (CASC). Worcester Co., Berlin, July 5, 1940 (FMNH). Worcester Co., Northboro, April 23, 1939, C.A. Frost, 3

(WFBM). Worcester Co., Sturbridge, June 24, 1949, C.V. Reichart (OSUC). July 21, 1924 (CASC). June 9, 1895 (MEMU). **Mississippi**, Grenada Co., May 29, 1944, J. Wilcox (FMNH). Lafayette Co., Oxford, May 2, 1949, H.V. Weems (FSCA). Rankin Co., June 4, 1963, L.A. Cambre (FMNH). Webster Co., the Cove T 20 N, R 8 E, Sec. 12, 17 mi. W. Walthall, June 15, 1988, T.L. Schiefer, blacklight trap, 3 (MEMU). Webster Co., the Cove T 20 N, R 8 E, Sec. 12, 17 mi. W. Walthall, June 25, 1988, R.L. Brown, sweeping (MEMU). Winston Co., Tombigbee Nat. Forest 33°15'18" N 89°05'29" W, June 21, 1999, T.L. Schiefer, blacklight trap in mixed mesic forest (MEMU). Winston Co., Tombigbee Nat. Forest 33°12'53" N 89°06'10" W, May 10, 1999, T.L. Schiefer, Blacklight Trap in mixed mesic forest, 5 (MEMU). Winston Co., Tombigbee Nat. Forest 33°16'05" N 89°06'01" W, May 17, 1999, T.L. Schiefer, blacklight trap in mixed mesic forest, 3 (MEMU). Winston Co., Tombigbee Nat. Forest 33°13'01" N 89°05'42" W, June 8, 1999, T.L. Schiefer, blacklight trap in mixed mesic forest (MEMU). **Missouri**, Boone Co., Ashland Wildlife Ar., June 17, 1977, C.N. Mckinnon (CSUC). St. Louis Co. (May 24, 1898, June 12, 1904), Dr. G.W. Bock, 3 (MEMU). **New Hampshire**, Hillsborough Co., Peterboro, May 15, 1966, T. Evans (CSUC). Rockingham Co., Seabrook, August, 1961, S.Goldman (CASC). Sullivan Co., Charlestown, June 17, 1937, M.C. Lane (CSUC). **New Jersey**, Bergen Co., Montvale, May 17, 1907, 8 (CASC). Burlington Co., Rancocas Park, May 29, 1926, R.J. Sim (CASC). Burlington Co., Riverton, October, 18 (CASC). Camden Co., Merchantville, May 29, 1926, C.A. Thomas (CASC). Camden Co., June 14, 1929, J.W. Green (CASC). Cumberland Co., Rutgers Exp. Sta. (May 21, 1988, May 20, 1989), J.E. Wappes, 2 (WFBM). Cumberland Co., Bridgeton, June 1, 1988, J. Huether (WFBM). Essex Co., Montclair, May 6, 1935 (FMNH). Monmouth Co., Red Bank, May 31, 1908, D.M. Castle (CASC). Monmouth Co., Manasquan, June 16, 1935 (FMNH). Monmouth Co., Manasquan (June 14, 1935, June 16, 1935), 6 (FMNH). Ocean Co., Lakehurst, May (FMNH). Salem Co., Vic Elmer (May 13, 1988, June 1, 1988), J.

Huether, 2 (MEMU). Sussex Co., June 23, 1973, R.L. Jacques, 2 (FSCA). Warren Co., Phillipsburg (June 14, 1914, June 24, 1917), J.W. Green, 3 (CASC). Warren Co., Phillipsburg, June 24, 1917, J.W. Green (FMNH). Warren Co., Phillipsburg (June 24, 1917, June 16, 1918), J.W. Green, 3 (FSCA). Warren Co., Phillipsburg, June 24, 1917, J.W. Green (UCDC). May 30, 1939 (FMNH). **New York**, Bronx Co., Bronx, June 3, 1939 (FMNH). Bronx Co., Van Cortlandt Park (May 4, 1939, May 23, 1939, June 15, 1939), 4 (FMNH). Kings Co., Brooklyn, July (CASC). Kings Co., Flatbush, August 11, 1915, Under Bark (WFBM). Montgomery Co., Oak Ridge, June 28, 1904 (USNM). Nassau Co., Wantagh, June 30, 1940, 3 (FMNH). Ontario Co., Geneva, May30-June 10, 1991, J. Huether (FSCA). Rockland Co., Piermont, June 13, 1934 (FMNH). Suffolk Co., Long Island, June 6, 1903 (USNM). Suffolk Co., Montauk, June 16, 1940, 2 (FMNH). Suffolk Co., Montauk Point Lighthouse, June 7, 1940, Washup (MEMU). Tompkins Co., June 11, 1960, N.M. Downie (FMNH). Ulster Co., Slide Mt., 3000 ft., June 29, 1915 (USNM). Westchester Co., Nepperhan, May 24, 1936 (FMNH). Westchester Co., Scarsdale, March 7, 1929 (WFBM). Westchester Co., Mt. Vernon, June 8, 1930, E. Lerch, 2 (WFBM). 4 (CASC). May 29, 1890 (MEMU). **North Carolina**, Cherokee Co., Murphy, May, 3 (CASC). Durham Co., Duke Forest, Durham, June, 1970, Hughes & Schrader, 2 (CASC). Haywood Co., Lake Junaluska, May 24, 1954, H.V. Weems (FSCA). Haywood Co., Lake Junaluska, June 30, 1961, H.V. Weems, at flowers of *Ceanothus americanus* (FSCA). Jackson Co., Blue Ridge Parkway., 3500 ft., July 20, 1950 (CASC). Jackson Co., Blue Ridge Pkwy, Milepost 300, June 22, 1988, N.M. Downie, 2 (FMNH). Jackson Co., Blue Rdge. Pkwy., Mile Post 310, June 22, 1988, J.E. Wappes, 2 (WFBM). Jackson Co., Blue Ridge Pkwy, Mile post 218, May 21, 1988, J.E. Wappes (WFBM). Jackson Co., Balsam, June 1, 1956, D.J.& J.N. Knull (OSUC). Jackson Co., Blue Ridge Pkwy, Milepost 300, June 22, 1988, N.M. Downie, 2 (FSCA). Buncombe Co., Black Mts. (CASC). Buncombe Co., Black Mts. (June, 1901, June, 1902), 9 (CASC). Buncombe

Co., Black Mts. (May 22, 1912, June 2, 1912, June 10, 1912, June 21, 1912, June 13, 1912, June 21, 1912, June 24, 1912, July 9, 1912), Beutenmüller, 9 (CASC). Buncombe Co., Black Mts., July 4, 1940, J.W. Green (CASC). Buncombe Co., Black Mts. (May 21, 1912, May 15, 1912, June 4, 1912, June 5, 1912, June 10, 1912, June 11, 1912, June 14, 1912, June 16, 1912, June 18, 1912, June 20, 1912), Beutenmüller, 14 (OSUC).

**Ohio**, Champaign Co., Urbana, June 2, 1950, R.E. Woodruff (FSCA). Clark Co., Clifton, June, 14, D.J.& J.N. Knull (FMNH). Clark Co., Clifton, May 30, 1938, D.J.& J.N. Knull, 3 (OSUC). Clark Co., Clifton, May, 21 (OSUC). Delaware Co. (May, 21, May, 26, May, 28, May, 30, June, 2, June 21, 1950, June, 21, July, 2, July, 8), D.J.& J.N. Knull, 23 (OSUC). Delaware Co. (May, 21, May, 28, June, 21), D.J.& J.N. Knull, 6 (FSCA). Fairfield Co., August, 15, D.J.& J.N. Knull (OSUC). Fairfield Co., Columbus, May 31, 1920 (FSCA). Fairfield Co., August, 15, D.J.& J.N. Knull (FSCA). Greene Co., July, 22, D.J.& J.N. Knull (FMNH). Greene Co. (May, 12, May 18, 1959, May 17, 1962, May, 27, June, 2, June, 20), D.J.& J.N. Knull, 14 (OSUC). Greene Co., June 11, 1959, D.J.& J.N. Knull (FSCA). Hamilton Co., June 23, 1968 (FSCA). Hocking Co. (May, 23, May 26, 1952, June 1, 1952, June, 2, June, 20), J.N. Knull, 6 (FMNH). Hocking Co. (May 22, 1938, May, 23, May 26, 1938, May, 29, June 1, 1938, June, 2, June 5, 1938, June 16, 1938, June 6, 1940, June, 12, June, 20, 1950, May 20, 1957, May 9, 1959, June 26, 1962, July, 20), D.J.& J.N. Knull, 57 (OSUC). Hocking Co. (June 2, 1955, May 20, 1958, May, 23, May 7, 1959, July, 20), D.J.& J.N. Knull, 10 (FSCA). Hocking Co., July 12, 1941 (FSCA). Marion Co., June, 1941, W.M. Barrows (FSCA). Muskingum Co., July 16, 1961, F.J. Moore (FSCA). Ottawa Co., Put-in Bay, July 7, 1935, J.N. Knull (OSUC). Scioto Co. (June 10, 1944, June 17, 1944, June 1, 1945, June 9, 1945), D.J.& J.N. Knull, 14 (OSUC). Scioto Co., Shawnee For., June 9, 1943, D.J.& J.N. Knull, 2 (OSUC). Scioto Co. (June 10, 1944, June 17, 1944, June 9, 1945), D.J.& J.N. Knull, 10 (FSCA). Scioto Co., Shawnee For., June 9, 1943, D.J.& J.N. Knull, 7 (FSCA). Wayne Co., Wooster, July 16, 1920, A.

Miller (FSCA). **Oklahoma**, Latimer Co. (June, 1983, June, 1984, July, 1995, June, 1986), K. Stephan, 14 (TAMU). Latimer Co., 5 m. W. Red Oak, April 27, 1978, K. Stephan (TAMU). Latimer Co., 5 m. W. Red Oak (April 16, 1977, June, 1977, May, 1981), K. Stephan, 12 (FSCA). Latimer Co. (June, 1982, June, 1983, April, 1984, May, 1984, June, 1984, April, 1985, May, 1985, June, 1985, March, 1986, April, 1986, June, 1986, April, 1987, May, 1987, July, 1987, March, 1988, April, 1988, June, 1988, April, 1989, May, 1989, May, 1991, March, 1992, May, 1992, April, 1993, April, 1994, May, 1995), K. Stephan, 63 (FSCA). Latimer Co., April, 1985, K. Stephan, beating in forest, 5 (FSCA). Latimer Co., February, 1985, K. Stephan, sifting forest litter (FSCA).

**Pennsylvania**, Allegheny Co. (June 12, 1937, June 19, 1937), A.C. Miller, 2 (OSUC). Allegheny Co., Pittsburgh, June 13, 1929, H.L. Chermock, 2 (UCDC). Beaver Co., Phillipsburg (May 15, 1921, June, 27), 5 (CASC). Beaver Co., Raccoon Creek State Park, June 23, 1978, F. Hovore (FSCA). Berks Co., Wyomissing, June 14, 1931, R.P. Seibert (WFBM). Cumberland Co., Eberlys Mill, April 19, 1909 (WFBM). Dauphin Co., Hummelstown (August 13, 1919, June 12, 1919), 3 (CASC). Dauphin Co., Harrisburg, May 9, 1929, J.N. Knull, 2 (CASC). Dauphin Co., Harrisburg, June 2, 1911 (CASC). Dauphin Co., Hummelstown (June 2, 1920, June 16, 1921), J.N. Knull, 2 (CASC). Dauphin Co. (August 2, 1927, October 24, 1927, August 19, 1928), J.N. Knull, 3 (CASC). Dauphin Co., Inglenook, May 30, 1912, K.F. Chamberlain (CASC). Dauphin Co., Inglenook (June 11, 1911, June 2, 1912), J.N. Knull, 2 (FMNH). Dauphin Co., Hummelstown (June, 11, 1917, June 7, 1920, June 7, 1930), J.N. Knull, 9 (FMNH). Dauphin Co., Inglenook (WFBM). Dauphin Co., Hummelstown, July 3, 1925, H.B. Kirk (WFBM). Dauphin Co., Hummelstown, July 3, 1925, H.B. Eirk (OSUC). Dauphin Co., Dauphin (July, 3, July, 6), J.N. Knull, 2 (OSUC). Dauphin Co., Inglenook, June, 10, J.O. Peppar (OSUC). Dauphin Co., Inglenook, June 3, 1917, J.N. Knull (OSUC). Dauphin Co., Hummelstown (June, 11, June 17, 1933), J.N. Knull, 3 (OSUC). Dauphin Co.,

Dauphin, July, 3, J.N. Knull (FSCA). Del. Co., July, 1896 (FMNH). Delaware Co., Castle Rock, June, 8, H.W. Wenzel, 12 (OSUC). Franklin Co., Pond Bank (June 5, 1931, August 5, 1931), J.N. Knull, 2 (FMNH). Franklin Co., Horse Valley, June, 22, J.O. Papper (OSUC). Greene Co., N. Cumberland, May 17, 1908 (OSUC). Greene Co., Caledonia, June, 18, J.O. Peppar (OSUC). Lancaster Co., May 19, 1921, F.M. Trimble (WFBM). McKean Co., Mt. Alton (May 16, 1932, July 3, 1932), J.N. Knull, 2 (CASC). McKean Co., Mt. Alton, May, 1932, 3 (CASC). McKean Co., Mont Alto, May 8, 1931, J.N. Knull (FMNH). McKean Co., Mt. Alton, June 10, 1932, J.N. Knull (OSUC). McKean Co., Mt. Alton (May 21, 1931, June 30, 1931), J.N. Knull, 2 (UCDC). McKean Co., Mt. Alton, July 5, 1941, J.W. Green (UCDC). McKean Co., Mt. Alton (May 21, 1931, June 5, 1931, June 14, 1931, June 21, 1931), 6 (UCDC). Northampton Co., Bethlehem, June 4, 1901, 2 (CASC). Northampton Co., Easton (June 18, 1918, July 19, 1928, July 15, 1929, June 4, 1930, June 17, 1934, June 24, 1934), J.W. Green, 10 (CASC). Northampton Co., Easton, June 24, 1934, J.W. Green (FMNH). Northampton Co., Wind Gap (June 18, 1931, June 19, 1931), J.W. Green, 2 (FSCA). Northampton Co., Easton (June 4, 1911, June 4, 1930, May 31, 1943), J.W. Green, 6 (UCDC). Northampton Co., Wind Gap, June 28, 1947, J.W. Green, 6 (UCDC). Perry Co., July 4, 1930, J.N. Knull (FMNH). Philadelphia Co., Philadelphia (May 31, 1896, June 13, 1897), 2 (FMNH). Pike Co., Milford, May 30-June 1, 1941, B. Malkin (FMNH). Westmoreland Co., Jeannette, H.G. Klages, 2 (CASC). Westmoreland Co., Clark's Valley (June 8, 1920, June 3, 1930, June 8, 1930, June 26, 1930, July 3, 1930), J.N. Knull, 7 (FMNH). Westmoreland Co., Clark's Valley, May, 30, J.O. Peppar, 7 (OSUC). Westmoreland Co., Clark's Valley, June 8, 1930, J.N. Knull (OSUC). Eberley's Mills, April 19, 1909 (FMNH). Hillside, June, 10 (MEMU). N. Cumberland, May 17, 1908 (OSUC). **Rhode Island**, Providence Co., Providence (April 6, 1919, May 20, 1919, June 4, 1919), 7 (MEMU). **South Carolina**, Florence Co., Florence, April 11, 1930, D.L. Cartwright (FMNH). Oconee Co., Clemson,

May 7, 1940, O.L. Cartwright (FMNH). Oconee Co., Clemson, May 2, 1977, H.V. Weems (FSCA). Pickens Co., Easley, April 19, 1926, J.D. Pepper (FMNH). Richland Co., Columbia, April 18, 1946, O.L. Cartwright (FMNH). **Tennessee**, Bledsoe Co., Sequatchie R., Nine Mile, May 12, 2000, B. Kondratieff (CSUC). Morgan Co., Burrville (May 17, 1952, June 4, 1952), 2 (FMNH). Sevier Co., Great Smoky Mt. National Park, June 20, 1935, H.S. Dybas (FMNH). Sevier Co., Great Smoky Mt. National Park (June 7, 1942, June 14, 1942, June 21, 1942), D.J.& J.N. Knull, 24 (OSUC). Sevier Co., Great Smoky Mt. National Park, June 21, 1942, D.J.& J.N. Knull (FSCA). (MEMU). **Virginia**, Bath Co., Cow Pasture R., County Rd 632 SW Nimrod Hall, May 21, 2004, B. Kondratieff, R. Zuellig, R.F. Kirchner, 2 (CSUC). Chesapeake Co., Hickory, May 7, 1953, G.H. Nelson, 8 (MEMU). Fairfax Co., Annandale, July 27, 1940 (FMNH). Fairfax Co., Falls Church, June-July, 1953, R.H. Arnett, At light (FSCA). Fauq. Co., July 7, 1940, G.H. Dieke (USNM). Franklin Co., Co Rd. 718, May 21, 2002, B. Kondratieff, R.F. Kirchner (CSUC). Fredericksburg Co., Fredericksburg (CASC). Hanover Co., Co Rd. 657, May 23, 2002, B. Kondratieff, R.F. Kirchner (CSUC). Montgomery Co., Blacksburg, May 17, 1981, W.H. Cross, in Apple tree, 2 (MEMU). Pittsylvania Co., Co Rd. 640, May 21, 2002, B. Kondratieff, R.F. Kirchner, 2 (CSUC). Smyth Co., 8 mi. NE of Marion, CR-620/716 bridge, N Fork Holston River, May 27, 1992, B. Kondratieff (CSUC). **West Virginia**, Washington Co., Winchester, June 25, 1963, K. Stephan (FSCA). **Wisconsin**, Walworth Co., Delavan, June 24, 1940, H.S. Dybas (FMNH). Cedar Lake, July 16, 1903, Dr. G.W. Bock, 2 (MEMU).

Distribution: This species is found throughout the eastern United States (Fig. 92), and specimens were examined as far west as eastern Kansas.

Diagnosis: *Limonius griseus* can be distinguished from *L. rudis* by the hind angles of the pronotum parallel sided, lateral margin distinctly beaded, prosternum reddish, and in the male genitalia the apical blades of the parameres narrower, the female bursa copulatrix

not sclerotized. Whereas, in *L. rudis* hind angles are divergent, lateral margin thinly beaded, prosternum piceus, and in the apical blades of the parameres wider, the female bursa copulatrix (Fig. 72) with spines arranged in poorly defined rows in a circular or semicircular pattern around bursal walls.

Notes: *Limonijs interstitialis* is only a larger and darker form of *L. griseus*.

*Limonijs huguenini* Van Dyke

*Limonijs huguenini* Van Dyke, 1932: 346-347. Type # 3138 (CASC). Type

locality: Plumas Co., California.

Length: 6-9.5 mm ((length/width ratio 3-3.17). Yellowish brown, clypeal margin entire, frontal punctures deeply punctate, separated by about width of punctures, with appressed yellow setae. Antennae reaching about 1 or 2 segments beyond hind angles; segments 2 and 3 moderately long, each one more than 2/3 length of segment 4, antennal color brown. Pronotum brownish orange throughout, 1.5-2.5 mm (as long as broad) pronotal margin longer than broadly rounded, carina distinct, approximately 1/4 length of lateral margin, pronotal texture, deeply punctate, separated by less than width of punctures, covered with erect brown to yellow setae. Scutellum yellowish brown with margins dark brown to black, pentagonal, finely punctate, with subappressed yellow setae. Hypomeron, corinate anteriorad, forming small antennal groove; posterior border of hypomeron without teeth; prosternum, pale brown to brown, deeply punctates, separated by more than width of punctures, with appressed yellow setae; hypomeron yellowish orange, deeply punctates, separated by more than width of punctures, with appressed yellow setae; metasternum brown except posterior and anterior border yellowish, deeply punctate, with finely appressed black setae, legs color, yellow.

Elytra 4.16-6.5 mm (length/width ratio 2 -2.17) brown except elytral base yellow, striae deeply punctate, inter-striae with parallel, deeply punctate, covered with erect black setae.

Abdomen brown except the last 2 segments yellowish brown, finely punctate separated by less than width of punctures, with small suberect yellow setae.

Male genitalia (Fig. 37): parameres short, gradually narrowing toward apical blades, apical blades longer than wide, triangular, aedeagus wide and rounded apically, extending beyond parameres by more than half the length of apical blades, parameres about as long as basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype # 3138 (CASC). Plumas Co., California, June 22, 1991, L. Munier (CASC).

Material Examined: **United States: California**, El Dorado Co., Mt. Tallac, July, 1899 (CASC). Fresno Co., Paradise Valley, Kings River, 7000 ft., July 16, 1910 (CASC). Fresno Co., Paradise Valley, Kings River, 7000 ft., July 23, 1910 (CASC). Shasta Co., Cayton, July, 17, 2 (CASC). Shasta Co., Cayton, July 11, 1913, E.P. Van Duzee (CASC).

Distribution: This uncommon species has been only collected in California (Fig. 93).

Diagnosis: *Limonius huguenini* is most similar to *L. nebulosus*, but in parameres (Fig. 37) are short, gradually narrowing toward apical blades, apical blades longer than wide, triangular, aedeagus wide and rounded apically. In *L. nebulosus* the parameres (Fig. 45) are unique broadly subtriangular, without apical blades, curving under the aedeagus distally, and aedeagus is broad, abruptly acuminate on apical fifth.

*Limonius humidus* Lane

*Limonius humidus* Lane, 1941: 137-139, Lane, 1971: 22. Holotype # 54847

(USNM). Type locality: Forest Grove, Oregon.

Length: 8.65-10.5 mm (length/width ratio 3.5-3.7). Head black throughout, clypeal margin entire not recurved medially or slightly recurved medially, frontal deeply punctate, separated by less than width of punctures. Antennae extending 2 to 3 segments beyond hind angles, segments 2 and 3 are small, together about as long as segment 4, black throughout. Pronotum black throughout, 2.8-3.5 mm (length/width ratio 1.15-1.3), pronotal margins parallel on basal half converging on apical half, planate along anterior angle, Carina, distinct, subparallel to pronotal margin anteriorad, 20-25% length of pronotal margin. pronotal texture, deeply punctate, separated by less than width of punctures, becoming umbilicate along anterior margin, covered with short, suberect black setae. Scutellum black, shell-like, deeply punctate, covered with appressed black setae. Hypomerion costate anteriorad forming small antennal groove; posterior border of hypomerion dentate; prosternum, black throughout, deeply punctate, separated by more than width of punctures, with small appressed yellow setae; hypomerion black throughout, umbilicate punctures, separated by less than width of punctures, with erect yellow setae; metasternum black, deeply punctate, with small appressed yellow setae, legs color, black throughout.

Elytra 5.65- 6.7 mm (length/width ratio 2-2.35), black except the elytral base orange, striae finely, deeply punctate, inter-striae deeply punctate.

Abdomen black, deeply punctate, with small appressed yellow setae.

Male genitalia (Fig. 38): parameres subparallel, apical blades with hook-like laterally, spear-like, 2 to 2.25 longer than broad, pointed apically, aedeagus wide basally, gradually narrowing on apical fourth with rounded tip, extending beyond parameres by

more than half the length of apical blades. Parameres long 3 to 3.5 X length of basal pieces.

The female bursa copulatrix not sclerotized.

Type Material Examined: The Holotype # 54847 (USNM), Forest Grove, Oregon, March 16, 1919 (USNM).

Material Examined: **United States: California**, Mendocino Co., 12 mi. E. of Ft. Bragg, Casper Lumber Camp, April 9, 1938 (CASC). Sonoma Co., March 1, 1912, Glen Ellen Kusche (CASC). **Oregon**, Benton Co., Baker Creek, May 6, 1936, KM & DM Fender (CASC). Benton Co., Corvallis, March 1, 1925, H.A. Scullen (CASC). Douglas Co., June 11, 1941, F.W. Nunenmacher (FMNH). Jackson Co., Roxy Ann Park, May 4, 1963 (USNM). Josephine Co., Wilderville, April 15, 1949, L.G. Gentner (USNM). Lane Co., Eugene, April 5, 1942 (FMNH). Yamhill Co., McMinnville, May 7, 1944, K.M & D.M. Fender (FMNH). Yamhill Co., McMinnville, March, 1938, KM & DM Fender (CASC). Yamhill Co. (April, 1935, May, 1935), E.S. Ross, 3 (CASC). **Washington**, King Co., Seattle, University of Washington Campus, May 2, 1946, M.H (CASC). Hatch. King Co., Seattle, University of Washington Campus, March 15, 1947, N. Vowles (CASC). King Co., Seattle, April 16, 1938 (CASC). Pierce Co., Spanaway, April 4, 1932, J. Wilcox (FMNH). Spokane Co., Mt. Spokane, June 22, 1957, H.S. Dybas (FMNH).

Distribution: This species is distributed only in the Pacific Northwest (Fig. 94).

Diagnosis: *Limonius humidus* is most similar to *L. stigma*. In the male the apical blades (Fig. 38) of *L. humidus* are spear-like, with hook-like laterally, and the aedeagus extends beyond parameres by more than half the length of apical blades. Also, the apical blades (Fig. 60) of *L. stigma* are spear-like, but not hook-like laterally, and the aedeagus extends beyond parameres by less than half the length of apical blades. Additionally, the hypomeron of *L. humidus* is costate anteriorad, forming a small

antennal groove. Whereas, in *L. stigma*, the hypomeron is not costate anteriorad, not forming a small antennal groove.

*Limonius jonesi* Lane

*Limonius jonesi* Lane, 1965: 182-183, Lane, 1971: 24. Holotype # 67819

(USNM). Type locality: Blue Mts., Mottet Ranger Station, Oregon.

Length: 6.56-7 mm (length/width ratio 3.12 -3. 56). Head black throughout, clypeal margin entire, slightly recurved medially, frontal umbilicate punctures, separated by less than width of punctures, with appressed yellow setae. Antennae extending about 1 segment beyond hind angles, segments 2 and 3 are small, together about 1.5 length of segment 4, black throughout. Pronotum black throughout, 1.68-1.84 mm (length/width ratio: almost wider than long), pronotal margin broadly rounded. Carina, short, less than 1/5 length of lateral margin, parallel to lateral margin. Pronotal texture, deeply punctate, separated by more than width of punctures, covered suberect to erect golden setae. Scutellum black, pentagonal, deeply punctate, covered with appressed yellow setae. Hypomeron costate anteriorad forming small antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, umbilicately punctate, separated by less than width of punctures, with small appressed golden setae; hypomeron black throughout, umbilicate punctures, separated by less than width of punctures, with small appressed golden setae; metasternum black, umbilicately punctate, with fine appressed golden setae, legs color, dark brown to black.

Elytra 4.56- 4.8 mm (length/width ratio 2.15-2.5), black throughout, striae deeply punctate, inter-striae deeply punctate. with appressed yellow setae.

Abdomen black, deeply punctate, with small appressed yellow setae.

Male genitalia (Fig. 39): parameres with lateral margin parallel, apical blades wider than long, rounded apically, aedeagus gradually narrowing to tip, almost as long as parameres. Parameres long 1.4 to 1.6 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: The Holotype # 67819 (USNM), Blue Mts., Mottet R.S., Oregon, 4500 ft. June 27, 1935, M.C. Lane (USNM).

Material Examined: **United States: Idaho**, Adams Co., McCall., Brundage Mt., June 23, 1938, M.C. Lane (USNM). Valley Co., Smith's Ferry, June 23, 1938, M.C. Lane (WFBM). Valley Co., Smith's Ferry, June 23, 1938, M.C. Lane, 2 (USNM). **Oregon**, Baker Co., Pine Valley, May 17, 1951, J.E. Davis (CSUC). Baker Co., Whitman N. F., Trail Cr., 5500 ft., June 12, 1939, M.C. Lane (CASC). Clackamas Co., Lake O' Woods, July 4, 1941, L.G. Gentner (CASC). Umatilla Co., Meacham, May 13, 1933, M.C. Lane (CASC). Union Co., Blue Mts., Tollgate R. S., May 23, 1941, M.C. Lane (FMNH). Wallowa Co., Blue Mts., Mottet Rs., 4500 ft., June 27, 1935, E.W. Jones, 5 (CASC). Wallowa Co., Blue Mts., Mottet Meadow, June 11, 1940, M.C. Lane (CASC). Wallowa Co., Blue Mts., Mottet Meadow, June 11, 1940, M.C. Lane (FMNH). Wallowa Co., Blue Mts., Mottet Rs., 4500 ft., June 27, 1935, E.W. Jones, 19 (WFBM). Wallowa Co., Blue Mts., Mottet Meadow, June 11, 1940, M.C. Lane (WFBM). Yamhill Co., Wapiti Lake, Goston, April 22, 1930 (USNM).

Distribution: This species is found in northwestern United States (Fig. 95).

Diagnosis: *Limonius jonesi* is most similar to both *L. consimilis* and *L. beutenmuelleri*. In *L. jonesi*, the parameres (Fig. 39) have the apical blades wider than long, and the aedeagus gradually narrowing to tip almost as long as parameres. In *L. beutenmuelleri*, the parameres (Fig. 23) have the apical blades as long as broad, rounded apically; and the aedeagus wide with narrow tip, extending beyond parameres by less than ¼ length of apical blades. In *L. consimilis*, the parameres (Fig. 29) have the apical blades wider

than long, aedeagus wide with rounded tip extending beyond parameres by about apical blades length. Also in *L. jonesi*, the hypomeron is costate, forming small antennal groove, whereas, in *L. consimilis*, the hypomeron is not costate, not forming an antennal groove. *Limonius jonesi* differs from *L. beutenmuelleri* by the pronotal shape. In *L. jonesi* the pronotum is wider than long. Whereas, in *L. beutenmuelleri* the pronotum is as long as broad. Additionally, *L. beutenmuelleri* is only known from North Carolina.

*Limonius kondratieffi* new species

Length: 8.16-9.44 mm (length/width ratio 3.3-3.6). Yellowish brown, clypeal margin entire, frontal punctures umbilicately punctate, separated by less than width of punctures, with small erect yellow setae. Antennae not reaching hind angles; segments 2 and 3 are small, together about 1.5 length of segment 4, antennal color yellowish brown. Pronotum brown to dark brown, 2-2.56 mm ((length/width ratio 1.1-1.15), pronotal margin broadly sinuate, with hind angles diverging, carinae parallel to lateral margin, .25-.35 % length of lateral margin, pronotal texture, umbilicate punctures, separated by less than width of punctures, covered with erect yellow setae. Scutellum reddish brown in the middle with black edges, shell-like, finely punctate, covered with appressed black setae. Hypomeron, strongly costate on anterior third forming antennal groove; posterior border of hypomeron without teeth; prosternum, rust brown, deeply punctates, separated by less than width of punctures, hypomeron rust brown, umbilicate punctates, separated by less than width of punctures, metasternum rust brown, deeply punctate, separated by less than width of punctures, covered with small appressed black setae, legs color, rust brown.

Elytra 5.6-6.24 mm (length/width ratio 2.2 -2.4) dark brown, striae finely punctate, interstriae deeply punctate, covered with appressed black setae.

Abdomen rust brown, finely punctate, separated by less than width of punctures, covered with appressed black setae.

Male genitalia (Fig. 40): Parameres broad subtriangular, without apical blades, aedeagus wide, keeping the same width with pointed tip, parameres length 2 to 2.5 x length of basal piece.

No female available

Type Material Examined: Holotype ♂, Ohio, Mount Logan, August 13, 1924, A.E. Miller, from corn, paratype ♂, same data as holotype. The holotype and the paratype are deposited in the Florida State Collection of Arthropods (FSCA).

Distribution: This species is only known from Ohio.

Diagnosis: *Limonius kondratieffi* is most similar to *L. nebulosus*. In the male, the parameres (Fig. 40) do not curve under aedeagus distally, and the aedeagus is wide, the same width with acute apex. In *L. nebulosus*, the parameres (Fig. 45) curve under aedeagus distally, and the aedeagus is broad, abruptly acuminate on apical fifth.

Additionally, in *L. kondratieffi* the antennae do not reach the hind angles of the pronotum, and segment 2 and 3 together about 1.5 length of segment 4. Whereas, in *L. nebulosus* the antennae reaches about 1 segment or less beyond hind angles of the pronotum, and segments 2 and 3 moderately long, each one more than 2/3 length of segment 4.

Etymology: *Limonius kondratieffi* is named in honor of Dr. Boris C. Kondratieff, Colorado State University.

*Limonius kuschei* Van Dyke

*Limonius kuschei* Van Dyke, 1932: 349-350. Holotype # 3141 (CASC). Type locality: Sonoma Co., California.

Length: 7.8-8.5 mm (length/width ratio 2.9-2.95). Head black throughout, clypeal margin strongly undulate and recurved medially, frontal deeply punctate, separated by less than width of punctures, with suberect black setae. Antennae extending one or less segment beyond hind angles, segments 2 and 3 are small, together just longer than segment 4, black throughout. Pronotum black throughout, 1.9-2.16 mm (length/width ratio .85-.95), pronotal margin broadly rounded. Carina, not visible. Pronotal texture, deeply punctate, closely in sides, separated by more than width of punctures in the middle, covered with erect yellow setae. Scutellum black, pentagonal, deeply punctate, covered with appressed yellow setae. Hypomeron costate anteriorad forming small antennal groove; posterior border of hypomeron without teeth; prosternum, dark brown to black, deeply punctate, separated by less than width of punctures, covered with appressed yellow setae; hypomeron dark brown to black, umbilicate punctures, separated by less than width of punctures, with suberect yellow setae; metasternum dark brown to black, deeply punctate, with appressed yellow setae, legs color, brown becoming black basally.

Elytra 5.5-5.9 mm (length/width ratio 2-2.2), dark brown to black, inter-striae finely, deeply punctate, with appressed yellow setae.

Abdomen dark brown to black, finely, deeply punctate, with appressed yellow setae.

Male Genitalia: no males available.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype # 3141 (CASC), Sonoma Co., California, April 9, 1912 (CASC). Paratypes, Sonoma Co., Eldridge (April 9, 1912, April 12, 1912) (2) J.A. Kusche (CASC).

Material Examined: **Canada: British Columbia**, Nanaimo, Biol. Station, June 22, 1920 (CASC).

**United States: California**, Glenn Co., July 7, 1935, F.L. Blanc (CMNC). Napa Co. Angwin, March 2, 1971, T. Griswold (CMNC).

Distribution: This species is only known from the type species and an additional specimen from British Columbia.

Diagnosis: *Limonius kuschei* is most similar to *L. consimilis*. It can be distinguished by: in *L. kuschei* pronotal wider than long, pronotal margins more rounded, and the carina not visible. Whereas, in *L. consimilis* pronotal as long as broad, pronotal margin broadly rounded, and the carina parallel to lateral margin, about 1/3 length of lateral margin. No males were available for examination.

*Limonius lanchesteri* Lane.

*Limonius lanchesteri* Lane 1941: 135-137, Lane 1971: 22. Holotype # 54846 (USNM), Type locality: Elmore Co., Rocky Bar, Idaho.

Length: 8.8-11 mm (length/width ratio 3.6-3.8). Head black throughout, entire slightly recurved medially, frontal umbilicate punctures, separated by less than width of punctures, with suberect yellow setae. Antennae extending 2 segments beyond hind angles, segments 2 and 3 are small, together just as longer as segment 4, black to dark brown. Pronotum black throughout, 2.32-3 mm (length/width ratio 1.16 –1.25), pronotal margin subparallel. Carina, distinct, subparallel to pronotal margin, 20-35 % length of pronotal margin. Pronotal texture, umbilicate punctures, separated by less than width of punctures, covered with subappressed yellow setae. Scutellum dark brown to black, pentagonal, covered with finely appressed yellow setae. Hypomeron strongly costate on anterior third forming antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, umbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae; hypomeron black throughout,

umbilicate punctures, separated by less than width of punctures, with appressed yellow setae; metasternum black throughout, deeply punctate, separated by less than width of punctures, covered with appressed yellow setae, legs color, dark brown becoming black basally.

Elytra 6-7.36 mm (length/width ratio 2.5-2.6), orange throughout, striae finely punctate, interstriae subumbilicate punctures, covered with short appressed black setae.

Abdomen dark brown becoming black basally.

Male Genitalia: parameres with parallel margins, becoming convex basally, apical blades triangular, 1.5 to 2 longer than broad, aedeagus, wide basally gradually narrowing to tip, extending beyond parameres by less than half the length of apical blades.

The female bursa copulatrix not sclerotized.

Type Material Examined: **Idaho**, holotype, Elmore Co., Rocky Bar, 6000 ft., June 7, 1937, H.P. Lanchester (USNM). Allotype, Custer Co., Challis, June 21, 1930, H.P. Lanchester (USNM). Paratypes, Elmore Co., Atlanta, 8600 ft., June 20, 1931, H.P. Lanchester (USNM). Elmore Co., Rocky Bar, 6000 ft., June 16, 1939, M.C. Lane (USNM). Valley Co., Smith's Ferry, June 23, 1938, M.C. Lane (USNM).

Distribution: This species was only known from the type series collected in Idaho (Fig. 96).

Diagnosis: *Limonius lanchesteri* is most similar to *L. rufihumeralis*. In males the parameres (Fig. 41) of *Limonius lanchesteri* have parallel margins, becoming convex basally. Whereas, in *L. rufihumeralis* the parameres (Fig. 58) have the apical half before apical blades subparallel. Additionally, the elytral color of *L. lanchesteri* is orange throughout. Whereas, in *L. rufihumeralis* the elytral color is black except the elytral base orange.

*Limonius lanei* Van Dyke

*Limonius lanei* Van Dyke, 1932: 350-351, Brooks, 1960: 30, Lane, 1971: 24.

Holotype # 3142 (CASC). Type locality: Lind, Washington.

Length: 6.5-7.5 mm (length/width ratio 3.25-3.4). Head black throughout, clypeal margin entire, frontal umbilicate punctures, separated by less than width of punctures, with short erect black setae. Antennae extending 1.5 to 2 segments beyond hind angles, segments 2 and 3 are small, together about as long as segment 4, black throughout. Pronotum black throughout, 2-2.2 mm (length/width ratio 1.15-1.25), pronotal margin parallel, carina converge, about 1/3 length of lateral margin, pronotal texture, closely, deeply punctate, separated by less than width of punctures, covered with appressed black setae. Scutellum black, pentagonal, umbilicate punctures, covered with appressed yellow setae. Hypomeron costate anteriorad forming small antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, deeply punctate, separated by more than width of punctures, with small appressed yellow setae; hypomeron black throughout, umbilicate punctures, separated by more than width of punctures, with small appressed yellow setae; metasternum black, umbilicately punctate, legs color, dark brown to black.

Elytra 4.3- 5 mm (length/width ratio 2.15-2.25), black throughout, striae deeply punctate, inter-striae deeply punctate. With short suberect black setae.

Abdomen black, umbilicate punctures, with small appressed yellow setae.

Male genitalia (Fig. 42): parameres with lateral margin convex basally, apical blades triangular, aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/3 length of apical blades. Parameres long 1.5 to 1.7 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype # 3142 (CASC), Lind, Washington, May1, 1924, M.C. Lane (CASC).

**Material Examined:** **Canada: Alberta**, Calgary, May 25, 1920, O. Bryant (CASC).

Medicine Hat (May 10, 1934, May 20, 1934), J. Carr, 2 (CASC). Medicine Hat, April 26, 1926, F.S. Carr (CASC).

**United States: California**, Alpine Co., Markleeville, May 7, 1959, R.P. Allen (CASC).

Modoc Co., Cedarville, May 29, 1939, P.C. Ting, 3 (CASC). Siskiyou Co., June 4, 1941,

F.W. Nunenmacher, 2 (FMNH). **Colorado**, Montezuma Co., June 19, 1998, S. Harrison,

5 (CSUC). **North Dakota**, Golden Valley Co., Sentinel Butte, June 22, 1935, K. Cooper

(USNM). **Oregon**, Baker Co., Hereford, May 6, 1941, M.C. Lane (CASC). Baker Co.,

Bridgeport, May 6, 1941, M.C. Lane (CASC). Baker Co., Durkee, Powell Cr., 4000 ft.,

June 21, 1945, M.C. Lane (CASC). Crook Co., Prineville, May 26, 1964, B. Juniper & K.

Goeden (CASC). Harney Co., Frenchglen, May 22, 1950, K.M. Fender (USNM). Malheur

Co., Harper, May 21, 1935, H.P. Lanchester (CASC). Malheur Co., Harper, May 10,

1938, M.C. Lane, 7 (CASC). Malheur Co., Hereford, May 6, 1941, M.C. Lane (CASC).

Malheur Co., Harper (May 2, 1932, May, 15, 1933), F.H. Shirck, 25 (FMNH). Malheur

Co., Harper, May 2, 1935, H.P. Lanchester, 2 (WFBM). Malheur Co., Harper, May 10,

1938, E.W. Jones (WFBM). Malheur Co., Harper, May, 15, F.H. Shirck, 6 (OSUC).

Wallowa Co., Blue Mts., June 13, 1945 (CASC). Wallowa Co., Blue Mts., July 20, 1951,

D.J.& J.N. Knull (FMNH). **Washington**, Adams Co., Lind, May 1, 1924, M.C. Lane, 3

(CASC). Adams Co., Lind, May 7, 1933, M.C. Lane, 2 (FMNH). Pierce Co., Puyallup,

April 22, 1931, W.M. Baker (CASC).

Distribution: This species is known from North Dakota to Colorado, and Oregon and Washington (Fig. 97).

**Diagnosis:** *Limonius lanei* is most similar to *L. aeger*, but can be distinguished by the parameres (Fig. 42) of *L. lanei* are subparallel, the apical blade is as long as wide, and triangular apically. In *L. aeger* the parameres (Fig. 18) are converge toward the apical blade, and the apical blade is wider than long and rounded apically.

*Limenius meridianus* Knull

*Limenius meridianus* Knull, 1947: 177-178. Holotype (FMNH). Type locality: Old man's Cave, Hocking Co., Ohio.

Length: 8.5-11 mm (length/width ratio 3.4-3.7). Head black throughout, clypeal margin entire not recurved medially or slightly recurved medially, frontal umbilicate punctures, separated by less than width of punctures, with suberect yellow setae. Antennae in male extending  $\frac{1}{2}$  to 1 segment beyond hind angles, in female not extending beyond hind angles, segments 2 and 3 small, together just longer than segment 4, black throughout. Pronotum dark blue to black throughout, 2.3-3 mm (slightly longer than broad or as long as broad), pronotal margin broadly rounded, carina converge, short, less than  $\frac{1}{6}$  length of lateral margin, pronotal texture, sub-umbilicate punctures, a few, separated by more than width of punctures, covered with sparse appressed golden setae. Scutellum black, pentagonal, deeply punctate, covered with densely erect yellow setae. Hypomeron strongly costate on anterior third, forming antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, deeply punctate, separated by less than width of punctures, with small appressed yellow setae; hypomeron black throughout, umbilicate punctures, separated by less than width of punctures, with densely small suberect yellow setae; metasternum black, deeply punctate, separated by more than width of punctures, with finely appressed yellow setae, legs color, dark brown to black.

Elytra 6-7.7 mm (length/width ratio 2.5-2.7), black except the base of each elytron orange, striae finely punctate, inter-striae deeply punctate, separated by less than width of punctures, with densely erect yellow setae.

Abdomen black, deeply punctate, separated by more than width of punctures, with finely appressed yellow setae.

Male genitalia (Fig. 43): parameres convergant basally, subparallel apically, apical blades 1.3 to 2 X as long as broad, pointed apically, aedeagus constricted to ½ width of basal portion, extending beyond parameres by less than 1/3 the length of apical blades. No female available.

Type Material Examined: Holotype (FMNH), Old man's Cave, Hocking Co., Ohio, May 17, 1936, D.J. & J.N. Knull (FMNH).

Material Examined: **United States: North Carolina**, Avery Co., Cranberry, June 9, 1919, H.W. Wenzel (OSUC). **Pennsylvania**, Washington Co., Charleroi, Ehrman (OSUC).

Distribution: This species has been only collected in North Carolina, Ohio and Pennsylvania (Fig. 98).

Diagnosis: *Limonius meridianus* is most similar to *L. crotchii*. In the male, the parameres (Fig. 43) of *L. meridianus* have lateral margins parallel, keeping the same width from base to apical blades. Whereas, in *L. crotchii* parameres (Fig. 31) have lateral margins sub-parallel, enlarged gradually toward apical blades, with slight curve in the middle.

#### *Limonius mirus* LeConte

*Limonius mirus* LeConte, 1853: 429, Candeze, 1860: 385, Van Dyke, 1932: 335.

Holotype # 2527 (MCZC). Type locality: San Diego, California.

*Limonius ulkei* Horn, 1871: 314, Horn, 1879: xvi, Van Dyke 1932: 343. Holotype #

3388 (MCZC). Type locality: California. Synonymized by Horn, 1879: xvi.

Length: 9-11 mm (length/width ratio 3 -3.14). Head black throughout, clypeal margin entire not recurved medially, frontal umbilicate punctures, separated by less than width of punctures, with short erect black setae. Antennae extending 1 to 2 segments beyond hind angles, segments 2 and 3 small, together just longer than segment 4, black

throughout. Pronotum black throughout, 2.5-3 mm (as long as broad), pronotal margin gradually narrowing forwards, carina diverging from lateral margin with area between visibly punctures (viewed dorsally), pronotal texture, umbilicately punctate, separated by less than width of punctures, covered short erect black setae. Scutellum reddish brown to black, pentagonal, densely punctate, covered with appressed yellow setae.

Hypomeron strongly costate on anterior fourth, forming antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, subumbilicate punctures laterally, separated by less than width of punctures, covered with appressed yellow setae; hypomeron black throughout, umbilicate punctures, separated by less than width of punctures, covered with densely appressed yellow setae; metasternum black, deeply punctate, separated by less than width of punctures, covered with densely appressed yellow setae, legs color, reddish black with tarsi paler.

Elytra 6-7.5 mm (length/width ratio 2.1-2.4), yellow to reddish brown throughout or with suture and portions of apical half black, striae moderately to deeply punctate, inter-striae moderately punctate and subparallel, covered with short suberect black setae.

Abdomen black, deeply punctate, separated by less than width of punctures, covered with densely appressed yellow setae.

Male genitalia (Fig. 44): parameres swollen, subparallel, apical blades with hook-like laterally, about 1.5 to 1.75 longer than broad with rounded tip, aedeagus wide with rounded tip, extending beyond parameres by  $\frac{1}{4}$  to  $\frac{1}{2}$  the length of apical blades.

Parameres long  $3\frac{1}{2}$  to 4 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype # 2527 (MCZC). San Diego, California (MCZC).

Type Material of Synonyms Examined: Holotype # 3388 (MCZC). California (MCZC).

Material Examined: **United States: California**, Alameda Co., Niles Cyn., April 15, 1922 (CASC). Alameda Co., Piedmont, September 20, 1932, F.W. Nunenmacher, 4 (CASC).

Contra Costa Co., Moraga Valley, April 4, 1920, E.P. Van Dyke, 2 (CASC). Contra Costa Co., Mt. Diablo, May 18, 1951, J. Helfer (USNM). Contra Costa Co., Richmond, April 30, 1929, A.T. McClay (CASC). El Dorado Co., Plecerville, June 22, 1929, E.C. Zimmerman (USNM). Humboldt Co. (CASC). Kern Co., Tehachapi Mts. Antelope Cyn., 4800-5200 ft., May 15, 1976, J.D. Pinto (CASC). Lake Co., Upper Lake, May 17, 1922, E.P. Van Dyke (CASC). Marin Co., Muir Woods, May 24, 1908 (CASC). Marin Co. Sausalito, May 13, 1906 (CASC). Marin Co., January 1, 1955, W. Rosenberg (CASC). Mendocino Co., June, 9, E. Leach (CASC). Monterey Co., Pebble Beach, May 28, 1922, 2 (CASC). Monterey Co., May 20, 1904, Coleman (USNM). San Mateo Co., Los Trancos Ck., Stanford University, March 4, 1955, P.S. Bartholomew (CASC). San Luis Obispo Co., Cayucos, June 12, 1937, F.T. Scott (USNM). San Mateo Co., San Bruno, March 4, 1949, D. Giuliani (CASC). San Mateo Co., San Mateo, April, 1912 (CASC). Santa Barbara Co., Buellton, April 7, 1936 (CASC). Santa Clara Co., Los Altos, June 18, 1950, D. Giuliani (CASC). Santa Clara Co., San Jose, April 26, 1921, L.S. Slevin (CASC). Santa Clara Co., Stanford University, April 14, 1967, P.S. Bartholomew (CASC). Somana Co. (USNM). Stanislaus Co., Modesto, April, 1931, H.E. Hinton (CASC). Tulare Co., Sequoia National Park, 2000-3000 ft., May 28, 1929, A.T. McClay, 4 (CASC).  
Distribution: This species was only been collected in California (Fig. 99).

Diagnosis: *Limonius mirus* is most similar to both *L. crotchii* and *L. meridianus*. In *L. mirus*, parameres (Fig. 44) are swollen, subparallel, apical blades with hooked laterally, about 1.5 to 1.75 longer than broad with rounded tip. In *L. crotchii*, the parameres (Fig. 31) have the lateral margins sub-parallel, enlarged gradually toward apical blades, with slight curve in the middle. Whereas, in *L. meridianus*, the parameres (Fig. 43) have lateral margins parallel, the same width from base to apical blades.

Notes: *Limonius ulkei* was synonymized by Horn (1879) with *L. mirus*, but Van Dyke (1932) did not agree with Horn and recognized it again as a valid species. Variation in

elytral color, ranging from complete reddish to orange with apical half black occurs between and within populations examined.

*Limonius nebulosus* Van Dyke

*Limonius nebulosus* Van Dyke, 1932: 345-346. Holotype # 3137 (CASC). Type locality: Grand Canyon, Arizona.

Length: 10-10.5 mm (length/width ratio 3.5-3.6). Yellowish brown, clypeal margin entire, frontal punctures umbilicately punctate, separated by more than width of punctures, with small erect yellow setae. Antennae reaching about 1 segment or less beyond hind angles; segments 2 and 3 moderately long, each one more than 2/3 length of segment 4, antennal color yellow. Pronotum reddish brown with posterior border of hypomeron yellow, 2.8-3 mm (as long as broad), pronotal margin broadly sinuate, with hind angles diverging, carina convergent, approximately 1/3 length of lateral margin, pronotal texture, shallowly umbilicate punctures, separated by less than width of punctures, covered with erect brown to yellow setae. Scutellum pale brown, pentagonal, umbilicate punctate, with suberect black setae. Hypomeron, strongly costate on anterior third forming antennal groove; posterior border of hypomeron without teeth; prosternum, yellow to dark brown, deeply punctate, separated by more than width of punctures, hypomeron brown except posterior and anterior border yellow, densely, deeply punctate, separated by less than width of punctures, metasternum reddish brown, deeply punctate, with small appressed black setae, legs color, yellow to orange.

Elytra 7-7.2 mm (length/width ratio 2.4 -2.5) yellow to pale brown, striae deeply punctate, inter-striae with subparallel, deeply punctate, covered with erect black setae.

Abdomen reddish brown, deeply punctate, with small, finely, black setae.

Male genitalia (Fig. 45): parameres broad subtriangular, without apical blades, curving under aedeagus distally, aedeagus broad, abruptly acuminate on apical fifth.

No female available.

Type Material Examined: Holotype # 3137 (CASC). Grand Canyon, Arizona, July 26, 1926, E.C. Van Dyke (CASC).

Material Examined: **Canada: British Columbia**, Steelhead, July 17, 1934, K.Graham (CASC). Steelhead (August 10, 1933, August 15, 1933), H.B. Leech, 2 (CASC).

**United States: Arizona**, Yavapai Co., 2 mi. WSW Prescott, 5700 ft., August 9, 2004, R.S. Beal, black light (CSUC). **California**, Calaveras Co., Camp Connell, August 22, 1935, R.P. Allen (CASC). Siskiyou Co., Castle Crags, September 1, 1914, Breeze (CASC).

Distribution: This species is found along the Pacific coast of North America (Fig. 100).

Diagnosis: *Limonius nebulosus* is most similar to *L. huguenini* and *L. kondratieffi*. In the male, the parameres (Fig. 45) of *L. nebulosus* are broad subtriangular, without apical blades, curving under aedeagus distally, and the aedeagus broad, abruptly acuminate on apical fifth. Whereas, in *L. huguenini* the parameres (Fig. 37) are short, gradually narrowing toward apical blades, apical blades longer than wide, triangular, and the aedeagus wide and rounded apically. In *L. kondratieffi*, parameres (Fig. 40) are broad subtriangular, without apical blades but not curving under aedeagus distally, aedeagus wide, keeping the same width with pointed tip. Additionally, *L. nebulosus* is found along the Pacific coast of North America, *L. huguenini* was only been collected in California, whereas *L. kondratieffi* is only known from Ohio.

#### *Limonius nimbatus* (Say)

*Elater nimbatus* Say, 1825: 265. Type destroyed. Type locality: New York.

*Pheletes nimbatus*, Leng, 1920: 168, Schenkling, 1925: 301.

*Limonius nimbatus*, Van Dyke, 1932: 342 Dietrich, 1945: 16.

*Limonius infernus* LeConte, 1853: 434, Candeze, 1860: 403, LeConte, 1866:

391, Leng, 1920: 168. Type # 2557 (MCZC). Type locality: Pennsylvania.

Synonymized by Leng, 1920: 168.

Length: 3.5-4.5 mm (length/width ratio 2.7 –2.8). Head pale brown to dark brown, clypeal margin entire with slightly received medially, frontal punctures subumbilicate, separated by less than width of punctures, with appressed yellow setae. Antennae reaching about 3 to 4 segments beyond hind angles; segment 2 and 3 small, together less than segment 4 length, antennal color pale brown to dark brown. Pronotum dark brown to yellow with hind angles yellow, .92-1.38 mm (as long as broad) with pronotal margins parallel, not visible, pronotal texture, umbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae. Scutellum brown to dark brown, triangular, deeply punctate, with finely small yellow setae. Hypomeron, not costate, not forming antennal groove; posterior border of hypomeron without teeth; prosternum, yellowish brown with posterior and anterior border yellow, deeply punctate, separated by less than width of punctures, with small appressed yellow setae; hypomeron yellowish brown with posterior and anterior border yellow, umbilicate punctures, with small appressed yellow setae; metasternum brown to reddish brown except the anterior border orange to yellow, deeply punctate, separated by more than width of punctures, with small appressed yellow setae, legs color, yellowish brown to dark brown.

Elytra 2.5-3 mm (length/width ratio 1.88-1.95) pale brown to dark brown, striae deeply punctate, inter-striae deeply punctate, covered with appressed yellow setae.

Abdomen brown to reddish brown, finely punctate, separated by less than width of punctures, with finely appressed yellow setae.

Male genitalia (Fig. 46): parameres forceps like, with the same width from base to tip, with pointed tip, apical blades not visible, aedeagus almost the same width from base to tip with rounded tip extending beyond parameres. Parameres long 2 to 2.4 X length of basal piece.

Female bursa copulatrix (Fig. 70) with two combs, one comb in each side of bursal walls, each comb has 7 spines.

Type Material Examined: type destroyed (Mawdsley 1993).

Type Material of Synonyms Examined: *Limonius infernus*, type # 2557 (MCZC), without locality label, with label "*Limonius nimbatus*".

Material Examined: **United States: Alabama**, Cleburne Co., Cheaha State Park 33°28'58" N 85°48'52" W (May 19, 1998, May 20, 1998), T.L. Schiefer, M.V. lamp in mixed forest, W.H. Cross Expedition, 11 (MEMU). Cleburne Co., Talladega National Forest 33°28'28" N 85°50'07" W, May 18, 1998, T.L. Schiefer, M.V. lamp in mixed forest, W.H. Cross Expedition, 8 (MEMU). Cleburne Co., Cheaha State Park 33°29'35" N 85°48'32" W, May 15, 1998, T.L. Schiefer, M.V. lamp in mixed forest, W.H. Cross Expedition (MEMU). Cleburne Co., Cheaha State Park 33°28'14" N 85°48'23" W, May 20, 1998, T.L. Schiefer, M.V. lamp in mixed forest, W.H. Cross Expedition, 7 (MEMU). Cleburne Co., Cheaha State Park 33°29'02" N 85°49'00" W, May 19, 1998, J.A. MacGown, M.V. lamp in mixed forest, W.H. Cross Expedition, 3 (MEMU). Cleburne Co., Cheaha State Park 33°28'58" N 85°48'52" W (May 16, 1998, May 19, 1998), J.A. MacGown, M.V. lamp in mixed forest, W.H. Cross Expedition, 3 (MEMU). Cleburne Co., Cheaha State Park 33°28'58" N 85°48'52" W, May 15-20, 1998, T.L. Schiefer & J.A. MacGown, M.V. lamp in mixed forest, W.H. Cross Expedition, 3 (MEMU). Cleburne Co., Cheaha State Park 33°29'35" N 85°48'32" W, May 15, 1998, T.L. Schiefer, Blacklight in mixed forest, W.H. Cross Expedition (MEMU). Madison Co., Monte Sano St. Pk. (May 24, 1984, May 17, 1987, May 27, 1987), N.M. Downie, 3 (FMNH). **Delaware, New**

Castle Co., Newark, May 18, 1911, C.O. Houghton (CASC). New Castle Co., Newark, May 10, 1953, C.A. Triplehorn, 2 (OSUC). New Castle Co., Newark, May 10, 1953, C.A. Triplehorn (FMNH). **Florida**, April 11, 1925 (UCDC). **Georgia**, Habersham Co., May 14, 1961, F.J. Moore, 3 (OSUC). Rabun Co., Black Rock Mt., 3000 ft., May 20-25, 1911 (CASC). Towns Co., Base Brasstown Rd., May 24, 1986, R. Turnbow (FMNH). **Kentucky**, Breathitt Co., Noble, June 10, 1955, C.J. Hay (OSUC). **Maryland**, Arundel Co., June 13, 1971, W.H. Cross, on flowers of *Castanea*, 3 (MEMU). Baltimore Co., Baltimore, May, 1902, 4 (CASC). Montgomery Co., Plummers Island (May 25, 1915, May 25, 1918), 7 (CASC). Montgomery Co., Plummers Island, April 30, 1909, F.E. Blaisdell, 7 (CASC) Montgomery Co., Takoma Park (May 25, 1951, May 4, 1952, May 9, 1952), D. Kissinger, 4 (FMNH). **New Jersey**, Essex Co., Montclair, November 15, 1935 (FMNH). 2 (MEMU). **New York**, Westchester Co., 3 (CASC). 5 (CASC). J.D. Sherman (CASC). **North Carolina**, Cherokee Co., Murphy, May, 2 (CASC). Macon Co., Highlands, June, 88, Blanchard, 4 (CASC). Yancey/Buncombe Co., Black Mts. (May 25, 1912, May 26, 1912, June 1, 1912, June 4, 1912), Beutenmüller, 6 (CASC). Yancey/Buncombe Co., Black Mts., June, 1902, 6 (CASC). Yancey/Buncombe Co., Black Mts. (May 22, 1912, May 25, 1912, May 26, 1912, June 1, 1912), Beutenmüller, 5 (OSUC). **Ohio**, Hocking Co., May 24, 1963, F.J. Moore, 3 (OSUC). Hocking Co. (May 25, 1945, May, 20, May, 23, May 26, 1955, June 2, 1957, May 18, 1965, June 1, 1965, June 11, 1965), D.J. & J.N. Knull, 13 (FMNH). **Pennsylvania**, Allegheny Co., Pittsburgh, June, 33, 2 (TAMU). Franklin Co., Chambersburg, June, 14, J.N. Knull (FMNH). Franklin Co., Chambersburg, June 6, 1924, J.R. Stear (FMNH). McKean Co., Mt. Alton. (May, 16, May, 18, May, 19), J.N. Knull, 25 (FMNH). McKean Co., Mt. Alton., May 19, 1931, J.N. Knull, 2 (UCDC). Montg Co., Glenside, May, 24, H.W. Wenzel, 2 (OSUC). Philadelphia Co., June, 9, 4 (CASC). Hunters Run, June 6, 1928, J.H. Knull (CASC). **Tennessee**, Sevier Co., May 5, 1963, F.J. Moore, 2 (OSUC).

Sevier Co., Great Smoky Mt. National Park, June 7, 1942, D.J. & J.N. Knull, 2 (OSUC).  
Sevier Co., Gatlinburg, 5 mi. N. Great Smoky Mt. National Park, June 13, 1942, H.S.  
Dybas (FMNH). Sevier Co., Great Smoky Mt. National Park, June 7, 1942, D.J. & J.N.  
Knull (FMNH). **Virginia**, Fairfax Co., Alexandria, May 21, 1977, F.G. Andrews, 2  
(CASC). Falls Church Co., E. Falls Church, May 21, 1916, J.N. Knull (FMNH). Page Co.,  
Luray, April 28, 1946, B. Malkin (FMNH). **District of Columbia**, May, 1918, 3 (CASC).  
May, 1908, E.P. Van Duzee, 4 (CASC).

Distribution: This species is found in eastern United States (Fig. 101).

Diagnosis: *Limonius nimbatus* is most similar to *L. definitus*. It can be distinguished by from the latter species by the parameres (Fig. 46) that are forcep-like, with the same width from base to tip, and aedeagus also the same width from base to tip. In *L. definitus* the parameres (Fig. 32) are also forcep-like, but gradually narrowing to tip, aedeagus gradually narrowing to tip. Also in *L. nimbatus* antennal segments 2 and 3 combined are shorter than segment 4. Whereas, in *L. definitus* antennal segments 2 and 3 combined are longer than segment 4.

Note: Comparing numerous typical specimens of *L. nimbatus* with the type of *L. infernus* indicated no specific differences.

#### *Limonius nitidulus* Horn

*Limonius nitidulus* Horn, 1871: 315, Van Dyke, 1932: 339, Brooks, 1960: 30,  
Lane, 1971: 24. Type # 8130 (MCZC). Type Locality: Oregon.

Length: 6-7 mm (length/width ratio 2.8-3). Head black throughout, clypeal margin entire, frontal deeply punctate, separated by less than width of punctures, with erect yellow setae. Antennae not extending beyond hind angles, segments 2 small, segment 3 about as long as segment 4, black throughout. Pronotum black throughout, 1.5-1.8 mm

(length/width ratio: as long as broad), pronotal margins broadly rounded. Carina, converge, about 1/3 length of lateral margin. Pronotal texture, deeply punctate, separated by less than width of punctures, covered erect yellow setae. Scutellum black, pentagonal, deeply punctate, covered with appressed yellow setae. Hypomeron costate anteriorad forming small antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, deeply punctate, separated by about width of punctures, with appressed yellow setae; hypomeron black throughout, umbilicate punctures, separated by less than width of punctures, with small appressed yellow setae; metasternum black, deeply punctate, with small appressed yellow setae, legs color, dark brown to black.

Elytra 4.3- 5 mm (length/width ratio 2-2.15), black throughout, striae subumbilicate punctures, inter-striae deeply punctate, with suberect yellow setae.

Abdomen black, deeply punctate, with small appressed yellow setae.

Male genitalia (Fig. 47): parameres with lateral margin parallel basally, constricted before blades on apical half, apical blades wider than long curved apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/3 the length of apical blades, parameres long, 1.2 to 1.5 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype female # 8130 (USNM), Oregon.

Material Examined: **Canada: British Columbia**, Duncan, Genoa Bay, June 19, 1928, W. Mathers, 3 (CASC). Vernon (June 26, 1920, May 2, 1924), R. Hopping, 2 (CASC). Pender Marbor (May 15, 1928, May 20, 1928), R. Hopping, 2 (CASC). Aspen Grove, May 12, 1931, J.R. Howell (CASC). Vancouver, May 31, 1931, H.B. Leech, 2 (CASC). Genoa Bay, June 19, 1928, W. Mathers (CASC). Mt. Frosty, Manning Prov. Pk., 7200, July 29, 1975, JM & BA Campbell (CMNC).

**United States: California**, Calaveras Co., Calaveras Big Trees, June 7, 1931 (CASC). Calaveras Co., Calaveras Big Trees, May 21, 1930, E.P. Van Duzee (CASC). Del Norte Co., Crescent City, May 27, 1910 (CASC). Del Norte Co. (May 27, 1910, May 29, 1910), F.W. Nunenmacher, 9 (FMNH). El Dorado Co., Tahoe, Mt. Tallac, April 30, 1930, A.T. McClay (UCDC). El Dorado Co., Mt. Tallac, July 14, 1898, Dr. A. Fenyés, 4 (MEMU). El Dorado Co., 2 (CASC). El Dorado Co., Mt. Tallac, July, 14, Dr. A. Fenyés (CASC). El Dorado Co., Glen Alpine, July 12-18, 1909, F.X. Williams, 24 (CASC). El Dorado Co., Mt. Tallac, F.E. Blaisdell (CASC). El Dorado Co., Mt. Tallac, Dr. A. Fenyés, 3 (CASC). El Dorado Co., Glen Alpine, July 5, 1901, 2 (CASC). El Dorado Co., Mt. Tallac, July 2, 1898, 3 (CASC). El Dorado Co., Glen Alpine, July 12-18, 1909, F.X. Williams (CASC). El Dorado Co., Fallen Leaf Lake, June 26, 1915, L. Tahoe (CASC). Mariposa Co., Tenaya Lake, Yosemite National Park, 8000 ft., July 9, 1946, H.P. Chandler (CASC). Nevada Co., Summit (June 25, 1898, July 4, 1898), 2 (CASC). Nevada Co., June 17, 1964, J.E. Slansky (UCDC). Plumas Co., Chester, June 17, 1960, D.J. & J.N. Knull (FMNH). Plumas Co., Chester, July 7, 1948, D.J. & J.N. Knull (FMNH). Shasta Co., 2 (CASC). Sierra Co., Yuba Pass, July 5, 1966, B.L. Brumley (UCDC). Tehama Co., Mt. Lassen National Park (June 8, 1960, July 8, 1963), D.J. & J.N. Knull, 12 (FMNH). Tehama Co., Mt. Lassen (June 20, 1960, July 3, 1963, July 10, 1963), D.J. & J.N. Knull, 4 (FMNH). Trinity Co., Carrville, July 1, 1913 (CASC). Tulare Co., Sequoia National Park, 9000 ft., June 9, 1929, A.T. McClay (UCDC). Tulare Co., Hell for Sure, August, 16, R.L. Furniss (FMNH). Tuolumne Co., July, 1892 (CASC). Tuolumne Co., Long Barn, May 24, 1930, E.P. Van Duzee (CASC). **Idaho**, Bonner Co., Schweizer Basin, June 22, 1985, N.M. Downie (FSCA). Bonner Co., Schweizer Basin, 1500 ft. (July 4, 1983, July 17, 1984), N.M. Downie, 4 (FSCA). Bonner Co., Sandpoint, July 4, 1983, N.M. Downie (FSCA). Bonner Co., Sandpoint, Schweizer Basin, June 24, 1987, 2 (FSCA). Bonner Co., Sandpoint (June 13, 1951, June 12, 1954, July 4, 1954, July 8, 1969, July 13, 1974, July

17, 1976), N.M. Downie, 6 (FMNH). Boundary Co., Selkirk Mts., Kaniksu National Forest, 5500 ft., July 11-13, 1967, N.M. Downie, 3 (FMNH). Clearwater Co., Elk River, June 16, 1951, W.F. Barr (WFBM). Clearwater Co., Weippe, 3006 ft., July 5, 1935, W.E. Shull (WFBM). Clearwater Co., Grangemont, May 28, 1936, C. Wakeland, 9 (WFBM). Franklin Co., Basia, June 28, 1961 (FMNH). Idaho Co., Lolo Pass., June 30, 1964, W.F. Barr, 4 (WFBM). Kootenai Co., Athol., June 18, 1952, W.F. Barr (WFBM). Kootenai Co., Farragut S.P., June 7, 1966, R.W. Portman, 2 (WFBM). Latah Co., Deary, 2775 ft., June 22, 1956, R.W. Portman, Red Clover, 2 (WFBM). Latah Co., Cedar Mt., Moscow, July 9, 1920, M.C. Lane (WFBM). Latah Co., Deary, 2775 ft. (May 23, 1949, September 27, 1951), W.F. Barr, 9 (WFBM). Latah Co., Laird Park, May 20, 1967, H.C. Manis, 6 (WFBM). Latah Co., Deary, June 12, 1948, A.J. Walz (WFBM). Latah Co., Laird Park, July 10, 1966, C.J. Horning, 2 (WFBM). Latah Co., Laird Park, May 20, 1967, H.C. Manis (WFBM). Latah Co., Deary, May 20, 1951, N.M. Downie (FMNH). Latah Co., Troy, May 8, 1949, N.M. Downie, 3 (FMNH). Latah Co., Moscow (May 13, 1950, May 27, 1951), N.M. Downie, 2 (FMNH). Nez Perce Co., Gifford (June 1, 1948, June 23, 1949), A.J. Walz, 2 (WFBM). Shoshone Co., Clarkia, June 11, 1933, I.W. Bales, 2 (CASC). Trout Co., 12 mi. N.E. Sandpoint, May 18, 1966 (WFBM). Valley Co., McCall, 8600 ft., June 14, 1931, K.E. Gibson (WFBM). Valley Co., McCall, June 29, 1935, F.H. Shirck, 29 (FMNH). Valley Co., McCall, June, 23, J.H. Baker (FMNH). **Montana**, Flathead Co., Glacier Natl. Park, Swiftwater Lake. (July 1, 1930, July 4, 1930), 2 (CASC). Lincoln Co., Clark's Peak, Cabinet National Forest, 4000-5000 ft., July 4, 1950, B. Malkin, 2 (FMNH). Sanders Co., Noxon, June 8, 1987, N.M. Downie (FSCA). **Oregon**, Benton Co., Macdonald Forest nr. Oak Crk. Lab., April 12, 1975, R. Turnbow (FSCA). Benton Co., Mary's Peak, G.F. Moznette (CASC). Benton Co., Mary's Peak (CASC). Benton Co., Corvallis, June 11, 1925 (CASC). Benton Co., Mary's Peak, 4100 ft., May 4, 1947, B. Malkin & M.J. Sargent (FMNH). Benton Co., Summit, July 5, 1929, H.A. Scullen (FMNH).

Benton Co., Baker Creek, June 11, 1939, K.M. & I.M. Fendar (FMNH). Clatsop Co.,  
 Cannon Beach, June 9, 1927, E.C. Van Dyke (CASC). Douglas Co., Windigo Pass (July  
 15, 1939, July 16, 1939), E.W. Jones, 5 (WFBM). Grant Co., Granite, June, 21, J.H.  
 Baker (OSUC). Jackson Co., Prospect, June 11, 1938, A.T. McClay, 2 (UCDC). Klamath  
 Co., Fremont Natl. Forest, 5000 ft., June 18, 1922 (CASC). Klamath Co., Fremont Natl.  
 Forest, 5000 ft., June 18, 1922, E.C. Van Dyke (CASC). Klamath Co., June 17, 1922,  
 W.J. Chamberlin, 8 (FMNH). Lake Co., May 26, 1913, F.W. Nunenmacher, 2 (CASC).  
 Lincoln Co., Eddyville, October 21, 1947, B. Malkin (FMNH). Marion Co., Elk Lake, 3750  
 ft., July 3, 1938, E.W. Jones, 9 (WFBM). Marion Co., Elk Lake, July 3, 1938, K.M.  
 Fendar, 12 (OSUC). Marion Co., Elk Lake, 3850 ft., July 3, 1938, M.C. Lane, 2 (CASC).  
 Marion Co., Elk Lake, July 3, 1938, K.M. Fendar, 2 (FMNH). Marion Co., Elk Lake, July  
 9, 1939, K.M. & I.M. Fendar (FMNH). Multnomah Co., Portland, June 30, 1957, W.H.  
 Lange (UCDC). Tillamook Co., Boyer, July 4, 1938, E.W. Jones (WFBM). Umatilla Co.,  
 Athena, Wild Horse Mt., May 14, 1938, K. Gray & J. Schuh, 2 (FSCA). Union Co.,  
 Tollgate, June 20, 1933, E.W. Jones (WFBM). Union Co., Blue Mts., Tollgate Rd., June  
 10, 1938, E.W. Jones, 4 (WFBM). Wallowa Co., Blue Mts., Mottet Ranger Station, 5000  
 ft., June 5, 1941, E.W. Jones, 9 (WFBM). Wallowa Co., Blue Mts., June 7, 1938 (CASC).  
 Wallowa Co., Trail Wallowa Lake, Aneroid Lake, 6000 ft., July 22, 1956, B. Malkin  
 (FMNH). Yamhill Co., Meadow Lake, June 5, 1942 (CASC). Blue Mts., Eckler Mt. Rd.,  
 3500 ft. (May 30, 1935, June 25, 1935), E.W. Jones, 5 (WFBM). **Washington**, Bonner  
 Co., Schweizer Basin, el. 1500 m., June 31, 1980, N.M. Downie (FMNH). Clallam Co.,  
 Port Angeles (May 25, 1907, May 26, 1907, May 27, 1907, May 28, 1907), 9 (CASC).  
 Clallam Co., The Forkes, July 2, 1920 (CASC). Columbia Co., Renpow, June 29, 1951,  
 N.M. Downie (FMNH). King Co., Seattle, May 9, 1907 (CASC). King Co., Mt. Baker, el.  
 1500 m., July 25, 1981, N.M. Downie, 4 (FMNH). Kittitas Co., Easton, 5 (CASC).  
 Mormon Grade, Walla Walla, May 4, 1937, H.P. Lanchester (CASC). Okanogan Co.,

Disautel, May 5, 1949, N.M. Downie (FMNH). Pierce Co., Paradise Park, 6000 ft., July 14-31, 1905, E.C. Van Dyke (CASC). Pierce Co., Paradise Valley, Mount Rainier National Park, July 17, 1936, 2 (CASC). Pierce Co., Paradise, Mt. Rainier, 5500 ft., July 4, 1934, O. Bryant (CASC). Pierce Co., Graham, August, 1954, A. Bryan (FMNH). Pierce Co., Puyallup, June, 10, W.W. Baker (FMNH). Pierce Co., Puyallup, June, 12, S.E. Crumb, 2 (FMNH). Pierce Co., Tacoma, April, 14, J. Wilcox (FMNH). Pierce Co., Mt. Rainier, July 20, 1960, D.J. & J.N. Knull (FMNH). Pierce Co., Mt. Rainier National Park, 1.5 mi NE Paradise, 6000 ft., August 2, 1979, JM & BA Campbell (CMNC). Spokane Co., Mt. Spokane St. Pk., 5881 ft., July 12, 1971, N.M. Downie, 3 (FMNH). Walla Walla Co., Walla Walla (May 10, 1941, April 19, 1942), M.C. Lane, 2 (CASC). Whitman Co., Pullman, March 16, 1889, W.M. Mann. (CASC). Clallam Co., Lake Crescent, June 11, 1933, E.W. Jones (WFBM). Clallam Co., Port Angeles, Olympic Hot Springs, June 12, 1933, E.W. Jones (WFBM). Clallam Co., Port Angeles, Olympic Hot Springs, June 12, 1933, E.W. Jones, 3 (WFBM). Clallam Co., Beaver, June 12, 1933, E.W. Jones, 2 (WFBM). Clallam Co., Quillayute, June 11, 1933, E.W. Jones (WFBM). Grays Harbor Co., Montesano, June 13, 1928, W.W. Baker, 9 (UCDC). King Co., Mt. Baker, 1500 ft., July 25, 1981, N.M. Downie, 12 (FSCA). Pacific Co., Ilwaco, May, 26, 5 (OSUC). Pierce Co., Ft. Lewis, June 19, 1936, E.W. Jones, 5, (WFBM). Pierce Co., Puyallup, November 23, 1928, W.W. Baker (UCDC). Pierce Co., Puyallup, April 24, 1927 (UCDC). Thurston Co., Tenino, Schwarz (OSUC). Walla Walla Co., Walla Walla (July 6, 1944, May 5, 1945), E.W. Jones, 8 (WFBM). Whitman Co., Blue Mts., April 25, 1937, E.W. Jones (WFBM). Whitman Co., Blue Mts., Godman Springs, 5500 ft., June 25, 1935, E.W. Jones (WFBM). Yakima Co., American River, June 20, 1936, E.W. Jones (WFBM). Yakima Co., Mt. Adams, Bird Creek Meadows, July 5, 1931, K.E. Gibson (WFBM).

Distribution: This species is found in the northwestern United States (Fig. 102).

Diagnosis: *Limenius nitidulus* is most similar to both *L. consimilis* and *L. beutenmuelleri*. In *L. nitidulus* the parameres (Fig. 47) have the apical blades wider than long curved apically, and the aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/3 the length of apical blades. In *L. beutenmuelleri* the parameres (Fig. 23) have the apical blades as long as broad, and the aedeagus wide with narrow tip, extending beyond parameres by less than ¼ length of apical blades. In *L. consimilis* the parameres (Fig. 29) have the apical blades wider than long, and the aedeagus wide with rounded tip extending beyond parameres by about apical blades length. Also in *L. nitidulus* the hypomeron is costate anteriorad, forming small antennal grooves. Whereas, in *L. consimilis* the hypomeron is not costate, and antennal grooves are not formed. In contrast, in *L. beutenmuelleri* the hypomeron is strongly costate on the anterior third, forming antennal grooves.

*Limenius norahae* new species

*Limenius norahae*. Holotype (CASC). Type locality: California, Trinity County, Big Flats.

Length: 6.96-8 mm (length/width ratio 3.6-4). Head black throughout, clypeal margin entire with slightly recurved medially, frontal subumbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae. Antennae brown, extending 1 to 2 segments beyond hind angles, segments 2 and 3 small, together just as long as segment 4 or less. Pronotum black with the posterior border of hypomeron orange, 1.76-2 mm (length/width ratio: 1.1-1.15), pronotal margins sub-parallel in front converging posteriorad. Carinae proximate and sub-parallel to lateral margin. Pronotal texture, deeply punctate to sub-umbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae. Scutellum reddish brown in the middle

becoming black in the edges, pentagonal, deeply punctate, covered with yellow setae. Hypomeron strongly costate on anterior third, forming antennal groove; posterior border of hypomeron without teeth; prosternum, black with some reddish in the extreme posterior and anterior border, deeply punctate to sub-umbilicate laterally, separated by more than width of punctures, covered with small appressed yellow setae; hypomeron black, punctures umbilicate with appressed yellow setae, metasternum black throughout, deeply punctate, separated by more than width of punctures, covered with appressed black setae, legs color, reddish black with paler tarsi.

Elytra 4.8- 5.6 mm (length/width ratio 2.5-2.8), yellow to reddish brown throughout or with suture and portions of apical fourth black, striae with deep punctate, inter-striae finely punctate, covered with short appressed yellow setae.

Abdomen black throughout, finely punctate, separated by more than width of punctures, covered with small appressed yellow setae.

Male genitalia (Fig. 48): parameres with lateral margin convex basally, curved gradually before blades on apical half, apical blades as wide as long, rounded apically, aedeagus gradually narrowing to tip, just extending beyond parameres, parameres long 1.6 to 2 x length of basal piece.

No female available.

Type Material Examined: Holotype ♂, California, Trinity Co., Big Flats, July 13, 1950, W.A. Russell, and 14 paratypes ♂, with the same locality label. The holotype and 10 paratypes are deposited in CASC, and 4 paratypes are deposited in CSUC.

Distribution: This species has only been collected at a single locality in California, and apparently has not been found since 1950.

Diagnosis: *Limonius norahae* is similar to *L. mirus* and was confused with it. It can be distinguished by the parameres (Fig. 48) which have the lateral margins convex basally, curved gradually before apical blades on apical half, and the apical blades as wide as

long. Whereas, in *L. mirus*, the parameres (Fig. 44) are swollen, subparallel, and the apical blades are hook-like laterally, about 1.5 to 1.75 longer than broad.

Note: *Limonius norahae* is named in honor of my wife, Norah A. Al-Motlak.

*Limonius olentangyi* Knull

*Limonius olentangyi* Knull, 1947:179. Holotype, female (FMNH). Type Locality:  
Delaware Co., Ohio.

Length: 7.5-8.5 mm (length/width ratio 3-3.13). Head black throughout, clypeal margin entire, frontal umbilicate punctures, separated by less than width of punctures, with erect yellow setae. Antennae not extending beyond hind angles, segments 2 small and 3 small, together slightly longer than segment 4, dark brown. Pronotum black throughout, 2.3-2.5 mm (length/width ratio: as long as broad), pronotal margins broadly rounded. Carina, diverging from lateral margin with area between visibly punctate (viewed dorsally). Pronotal texture, deeply punctate, separated by more than width of punctures, covered erect yellow setae. Scutellum dark brown to black, shell-like, finely punctate, covered with long finely appressed yellow setae. Hypomeron strongly costate on anterior third, forming antennal groove; posterior border of hypomeron dentate; prosternum, black throughout, deeply punctate, separated by more than width of punctures, with erect yellow setae; hypomeron black throughout, deeply punctate, separated by less than width of punctures, with erect yellow setae; metasternum black, deeply punctate, separated by less than width of punctures, with finely appressed yellow setae, legs color, yellow.

Elytra 5- 5.8 mm (length/width ratio 2-2.15), dark brown to black, striae finely punctate, inter-striae deeply punctate, with densely erect yellow setae.

Abdomen black, deeply punctate, separated by less than width of punctures, with appressed yellow setae.

Male genitalia (Fig. 49): parameres with lateral margin parallel, apical blades triangular, with hook like laterally, aedeagus thick, robust, dropper like, extending beyond parameres by about 1/3 length of apical blades, parameres long 2.5-3 X length of basal piece.

The female Holotype was not dissected and its genitalia are not illustrated.

Type Material Examined: Holotype, female in (FMNH), Delaware Co., Ohio, May 30, 1945, D.J. & J.N. Knull.

Material Examined: **United States: Ohio**, Delaware Co., May, 30, D.J. & J.N. Knull, 2 (USNM).

Distribution: This species was only been collected in Ohio (Fig. 103).

Diagnosis: *Limonius olentangyi* is most similar to *L. confusus*. In the male, the parameres (Fig. 49) of *L. olentangyi* has the lateral margins parallel, apical blades triangular, with hook like laterally, and the aedeagus thick, robust, dropper-like. In *L. confusus*, parameres (Fig. 28) with lateral margins subparallel, apical blades about 2 x longer than width, triangular, and the aedeagus wide becoming narrow on the apical fourth, with apex acute.

*Limonius ornatulus* LeConte

*Limonius ornatulus* LeConte, 1857: 46, Candeze 1860: 401, Van Dyke 1932: 342.

Holotype # 2534 (MCZC). Type locality: San Francisco.

*Limonius humeralis* Candeze, 1860: 402, Horn, 1871:316, Van Dyke 1932: 342,

Lane 1971: 24. Series, no type. Type locality: California. Synonymized by Horn, 1871:316.

*Limenius maculicollis* Motschulsky 1859: 372, Horn 1871: 316, Van Dyke 1932: 342, Lane 1971: 24. Type apparently in University of Moscow (ZMUM).  
Type locality: San Francisco, California. New Synonym.

Length: 4.24-6.5 mm (length/width ratio 3 –3.25). Head reddish brown to black, clypeal margin entire, slightly recurved medially, frontal punctures deeply punctate, separated by less than width of punctures, covered with erect yellow setae. Antennae extending 1 segment or less beyond hind angles, segment 2 and 3 small, together just longer than segment 4, antennal color brown to black. Pronotum dark brown to black with hind angles and hypomeral margin yellow, 1.40-2 mm (as long as broad), pronotal margin broadly rounded, carina almost not visible, parallel to lateral margin, pronotal texture, umbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae. Scutellum pale brown to black, pentagonal, deeply punctate, covered with appressed yellow setae. Hypomeron not carinate anteriorad, not forming antennal groove; posterior border of hypomeron without teeth; prosternum, reddish brown to black, deeply punctate, separated by less than width of punctures, with small appressed yellow setae; hypomeron yellow to black with posterior and anterior border orange, umbilicately punctate, separated by less than width of punctures, covered with appressed yellow setae; metasternum reddish brown to black, finely punctate, with finely appressed yellow setae, legs color, orange to dark brown.

Elytra 2.65- 4.3 mm (length/width ratio 2-2.15), this species has variable color, from pale brown throughout to black except elytral base orange, striae deeply punctate, inter-striae deeply punctate, covered with suberect yellow setae.

Abdomen reddish brown to black, finely punctate, covered with finely appressed yellow setae.

Male genitalia (Fig. 50): parameres curved in the middle, slender and knobbed at the tip, apical blades not visible, aedeagus with the same width from base to tip, with rounded tip, extending beyond parameres. Parameres long 1.4 to 1.6 X length of basal piece.

Type Material Examined: Type # 2534 (MCZC). San Francisco, California (MCZC).

Female bursa copulatrix (Fig. 71) with two combs, one comb in each side of bursal walls, each comb has 7 spines.

Type Material of Synonyms examined: The type of *L. humeralis*, series, no type (BMNH), the type of *L. maculicollis* apparently in the Zoological Museum, University of Moscow (ZMUM).

Material Examined: **United States: California**, Alameda Co., April (CASC). Alameda Co., Hills back of Oakland (April 12, 1908, May 14, 1911), 13 (CASC). Alameda Co., April 30, 1930, A.T. McClay, 2 (CASC). Alameda Co., Hills back of Oakland, March 26, 1932, E.C. Zimmerman, 4 (CASC). Alameda Co., Leona Hts., May 5, 1918, E.P. Van Duzee, 2 (CASC). Alameda Co., Oakland, August, 1933, E.J. Blum (CASC). Alameda Co., Hills back of Oakland, April 12, 1908, 2 (CASC). Alameda Co., Hills back of Oakland, May 14, 1911, E.C. Van Dyke, 2 (FMNH). Alameda Co., Oakland (April 23, 1950, April 29, 1950), B. Adeison, 4 (FMNH). Alameda Co. (May, 1935, June, 1935, May 9, 1936), R.E. Shaul, 3 (FMNH). Alameda Co., May 2, 1909, F.W. Nunenmacher (FMNH). Alameda Co., Hills back of Oakland, April, 18 (4) (FMNH). Alameda Co., Crow Canyon, June 12, 1939, W.F. Barr (WFBM). Alameda Co., Oakland, April 8, 1940, W.F. Barr, 11 (WFBM). Alameda Co., Hills back of Oakland (April 18, 1930, April 22, 1930, May 1, 1930, May 3, 1930, May 17, 1930, May 18, 1930, June 8, 1930), E. Zimmerman, 15 (WFBM). Alameda Co., Oakland Hills (April 8, 1940, May 21, 1950), W.F. Barr, 7 (WFBM). Alameda Co., Cedar Mt. Ridge, May 3, 1936, A.T. McClay, 2 (UCDC). Alameda Co., 4 (MEMU). Alpine Co., Sand flat Camp on Clark Fork, June 10, 1965, P.S. Bartholomew, On Pine (CASC). Butte Co., 5 mi. near Butte Meadows, Cherry Hill Cpgd.,

May 24-27, 1974, Fred G. Andrews (CASC). Butte Co., S. Madre, June (CASC). Butte Co., Oroville (April 29, 1928, May 24, 1957), H.H. Keifer, 2 (CASC). Butte Co., Chico, July 3, 1932, H. Dorn, 5 (FMNH). Butte Co., Paradise, May 4, 1968, 3 (UCDC). Butte Co., Paradise, April 24, 1942, A.T. McClay (UCDC). Butte Co., Paradise, May 4, 1968, P.M. Jump (UCDC). Calaveras Co., Big Trees, July 19, 1907, F.E. Blaisdell (CASC). Calaveras Co., Mokelumne Hill, April, F.E. Blaisdell, 3 (CASC). Contra Costa Co., July, 1962, W.H. Nutting, 3 (CASC). Contra Costa Co., Mt. Diablo, 2600 ft., May 27, 1931, E.P. Van Duzee (CASC). Contra Costa Co., E. Slope, Mt. Diablo, Russelman, April 19, 1931, E.P. Van Duzee (CASC). Contra Costa Co., Mt. Diablo, April 19, 1959, W.E. Simonds (CASC). Calaveras Co., near Dorrington, May 29, 1957, H. Ruckes, on foliage, 4 (FMNH). Calaveras Co., Calaveras Big Trees (May 31, 1952, June 1, 1952), 4 (FSCA). Colusa Co., Colusa, May 23, 1957, T.R. Haig (UCDC). Contra Costa Co. (April 12, 1913, April 4, 1917, April 11, 1917), F.W. Nunenmacher, 8 (FMNH). Contra Costa Co., Russelman Park, Mt. Diablo, May 5, 1957, B.J. Adelson, 2 (FMNH). Contra Costa Co., Richmond, April 30, 1929, L.M. Smith, 2 (UCDC). Contra Costa Co., Mt. Diablo, April 22, 1931, A.T. McClay (UCDC). Contra Costa Co., April 4, 1917, F.W. Nunenmacher, 7 (OSUC). El Dorado Co., 3 mi. E. Pleasant Valley, May 24, 1978, Fred G. Andrews (CASC). El Dorado Co., 2 mi. NE Virner, May 2, 1974, F.G. Andrews & K.S. Corwin (CASC). El Dorado Co., Pollock Pines, June 23, 1939, A.T. McClay (CASC). El Dorado Co., Placerville, May 27, 1915, F.B. Herbert (OSUC). El Dorado Co. (June 11, 1906, June 12, 1906), F.W. Nunenmacher, 3 (OSUC). El Dorado Co., Pollock Pines, May 17, 1938 (UCDC). El Dorado Co., Pollock Pines, June 23, 1939, A.T. McClay, 3 (UCDC). El Dorado Co., Placerville, June 2, 1963, R.L. Westcott (UCDC). El Dorado Co., May 20, 1937, J.E. Blum, 9 (CASC). El Dorado Co., Tahoe, Grass Lake (CASC). El Dorado Co., Tahoe, July 7, 1915, R. Hopping, 2 (CASC). El Dorado Co. (April 11, 1906, June 12, 1906), F.W. Nunenmacher, 8 (CASC). El Dorado Co., Fallen Leaf Lake, June 21, 1915,

L. Tahoe (CASC). El Dorado Co., Fallen Leaf Lake, June 21, 1915 (CASC). El Dorado Co., Fallen Leaf Lake, 6500 ft. (June 21, 1915, July 3, 1935, July 23, 1935, July 25, 1935), F.E. Blaisdell, 5 (CASC). El Dorado Co. (June 9, 1906, June 11, 1906, June 12, 1906), F.W. Nunenmacher, 4 (FMNH). El Dorado Co., May 29, 1954, E.I. Schlinger (UCDC). El Dorado Co., Pollock Pines, May 28, 1970, D.S. Chandler, 4 (FSCA). El Dorado Co., July 6, 1953, H.A. Hacker (FSCA). El Dorado Co., Pollock Pines, May 28, 1970, D.S. Chandler, 13 (UCDC). El Dorado Co., Pollock Pines (June 24, 1938, June 29, 1938, June 23, 1939), A.T. McClay, 29 (UCDC). El Dorado Co., Pollock Pines (June 24, 1938, June 29, 1938), 2 (UCDC). El Dorado Co., Riverton, June 17, 1946, A.T. McClay (UCDC). Felton Co., May 10, 1953, J.W. Green, 4 (OSUC). Fresno Co., Kings Canyon NP, June 24, 1955, D.H. Bartholomew, 13 (CASC). Fresno Co., Dunlap, 1909 (CASC). Fresno Co., Lower McKenzie Mill, June 3, 1908, R. Hopping (CASC). Fresno Co., Alore, Yraweeks, June 15, 1911 (CASC). Fresno Co., Camp Greeley, 2800 ft., May 22, 1914, 8 (CASC). Fresno Co., Oak Flat, 4000 ft. (June 7, 1909, June 26, 1912), 2 (CASC). Fresno Co., Pinehurst CC., May 23, 1915, F.W. Nunenmacher (FMNH). Humboldt Co., Willow Cr., June 15, 1916, F.E. Blaisdell, 2 (CASC). Humboldt Co., June 14, 1941, F.W. Nunenmacher, 13 (FMNH). Humboldt Co., Green Point (June 5, 1916, June 12, 1916), F.E. Blaisdell, 3 (CASC). Humboldt Co. (May 15, 1911, May 22, 1911), F.W. Nunenmacher, 3 (CASC). Humboldt Co., Willow Creek, June 12, 1932, H. Dorn, 4 (FMNH). Inyo Co., Crescent Mines. (June 18, 1963, June 25, 1963), D.J. & J.N. Knull, 4 (FMNH). Kern Co., Alta Sierra, 5800 ft., June 14, 1961, H. Howden, 8 (CMNC). Kern Co., Greenhorn Mt. (May 10, 1939, May 1, 1957), F.T. Scott, 2 (CASC). Kern Co., Glennville, May 17, 1930, A.T. McClay, 3 (UCDC). Lake Co., Clear Lake, April 24, 1926, E.R. Leach, 3 (CASC). Lake Co., Blue Lakes, May 16, 1922, E.P. Van Duzee, 2 (CASC). Lake Co., May, 1895, 2 (CASC). Lake Co., Adams Sps., June 18, 1911, F.E. Blaisdell (CASC). Lake Co., Middletown, May 12, 1940, J.W. Tilden (CASC). Lake Co., Hullville

(June 9, 1931, June 9, 1932, June 10, 1932), H. Dorn, 26 (FMNH). Lake Co., April 24, 1926, E.R. Leach (FMNH). Leg. A.R. Moldenke , Kern Co., Glennville, May 17, 1930, A.T. McClay, 2 (UCDC). Leg. A.R. Moldenke , Kings Co., June 24, 1955, P.S. Bartholomew, 2 (CASC). Leg. A.R. Moldenke , Kings Co., Kings R., Willow Fl., June 15 1964, P.S. Bartholomew (CASC). Leg. A.R. Moldenke , Kings River Co., June 26, 1948, A.T. McClay (UCDC). Leg. A.R. Moldenke , Lake Co., May, 1895 (CASC). Leg. A.R. Moldenke , Lake Co., Clear Lake, April 24, 1926, E.R. Leach, 5 (CASC). Leg. A.R. Moldenke , Lake Co., Kelseyville, May 15, 1922, E.P. Van Duzee, Soda Bay Spgs, 6 (CASC). Leg. A.R. Moldenke , Lake Co., Upper Lake, May 17, 1922, E.P. Van Duzee (CASC). Leg. A.R. Moldenke , Lake Co., Clear Lake, E.R. Leach (CASC). Leg. A.R. Moldenke , Lake Co., Hullville (June 9, 1931, June 9, 1932, June 10, 1932), H. Dorn, 19 (FMNH). Leg. A.R. Moldenke , Lake Co., April 24, 1926, E.R. Leach, 2 (FMNH). Leg. A.R. Moldenke , Lassen Co., Bridge Crk Camp (July 1, 1946, July 2, 1946, July 3, 1946), A.T. McClay, 14 (UCDC). Lassen Co., Bridge Crk Camp (July 1, 1946, July 2, 1946), A.T. McClay, 34 (UCDC). Lassen Co., 6 mi. SW. Nubieber, June 26, 1963, V.L. Vesterby, 2 (UCDC). Los Angeles Co., 2 (CASC). Los Angeles Co., Mt. Wilson, June (CASC). Los Angeles Co., Waterman Cn., May 29, 1916, J.O. Martin (CASC). Los Angeles Co., Pasadena, June, 1906, Grinnell (CASC). Los Angeles Co., Mt Wilson, June 23, 1918, 2 (CASC). Los Angeles Co., Angeles Nat. Forest, Vic. Henninger Flats, May 10, 1969, D.G. Marqua (CASC). Los Angeles Co., Angeles Nat. Forest, Charleton Chilao P.C., March 2, 1966, M.E. Thompson (CASC). Los Angeles Co., Mt. Wilson 5000 ft., May 26, 1918, J.O. Martin, 2 (CASC). Los Angeles Co., Mt. Wilson, Dr. A. Fenyes (CASC). Los Angeles Co., Mt. Wilson, Dr. A. Fenyes (FMNH). Los Angeles Co., Neenach, May 17, 1928, 3 (FMNH). Los Angeles Co., June 17, 1945, E.I. Schlinger, 5 (UCDC). Los Angeles Co., Pasadena, May, 29, J.N. Knull (OSUC). Madera Co., Ahwahnee, May, 2 (CASC). Madera Co., Bass Lake, June 9, 1937, B.E. White (CASC).

Madera Co., Bass Lake, June 15, 1932, R.L. Furniss (OSUC). Madera Co., Miami, June, 2 (CASC). 6 (FMNH). Madera Co., Oakhurst, June 5, 1942, A.J. Walz, *Ceanothus*, 6 (WFBM). Madera Co., Bass Lake, May 30, 1942, A.J. Walz, *Ceanothus* (WFBM). Madera Co., Oakhurst, June 1, 1942 (WFBM). Madera Co., Bass Lake, June 3, 1942, A.J. Walz, 2 (WFBM). Madera Co., Bass Lake, May 30, 1942, A.J. Walz, *Pinus ponderosa* (WFBM). Madera Co., June 3, 1932, 9 (OSUC). Madera Co., Sugar Pine, July 5, 1920, E. Schiffel (CASC). Madera Co., Ahwahnee, May, 2 (CASC). Marin Co., Woodacre, May 18, 1947, D Giuliani (CASC). Marin Co., Alpine Dam, April 11, 1933, E.J. Blum (CASC). Marin Co., Cypress Ridge, April 2, 1950, W.A. Russell (CASC). Marin Co., Cypress Ridge, April 11, 1920 (CASC). Marin Co., Fairfax, D Giuliani, 4 (CASC). Marin Co., Lagunitas, May 6, 1985, W.A. Russell (CASC). Marin Co., Mill Valley (June 4, 1915, May 31, 1924, May 31, 1925), 5 (CASC). Marin Co., Alpine Dam, April 11, 1933, E.J. Blum, 4 (CASC). Marin Co., Cypress Ridge, Fairfax, April 30, 1922, E.P. Van Duzee (CASC). Marin Co., Fairfax (April 21, 1902, April 21, 1907, May 7, 1911), F.E. Blaisdell, 24 (CASC). Marin Co., Muir Woods, May 17, 1908, F.E. Blaisdell, 5 (CASC). Marin Co., April, F.E. Blaisdell, 3 (CASC). Marin Co., Phoenix Lake (April 4, 1927, May 14, 1927, May 30, 1927), H.H. Keifer, 10 (CASC). Marin Co., Mill Valley (March 15, 1925, April 16, 1927), H.H. Keifer, 3 (CASC). Marin Co., Mill Valley, April 12, 1925, E.P. Van Duzee (CASC). Marin Co., Lagunitas, May 11, 1924, E.P. Van Duzee, 6 (CASC). Marin Co., April 21, 1956, W.H. Nutting, 4 (CASC). Marin Co., Fairfax (June 13, 1905, June 11, 1905), 4 (CASC). Marin Co., Mill Valley (April 28, 1913, May 1, 1916), 4 (CASC). Marin Co., Phoenix Lake., March 31, 1961, D.Q. Cavagnaro (CASC). Marin Co., Lagunitas, June 27, 1898 (CASC). Marin Co., Ross, April 28, 1918, E.P. Van Duzee, 3 (CASC). Marin Co., Ross, April 17, 1930 (CASC). Marin Co., Red Wood Canon, May, F.E. Blaisdell, 2 (CASC). Marin Co., Fairfax (June 13, 1905, July 2, 1911), 10 (CASC). Marin Co., Lagunitas, June, 11, J.C. Huguenin, 2 (CASC). Marin Co., Fairfax, June 13, 1919,

E.P. Van Duzee, Caelothus (CASC). Marin Co., Fairfax (April 13, 1919, May 25, 1919, May 9, 1920), E.P. Van Duzee, 4 (CASC). Marin Co., Mt. Tamalpais, June 23, 1918, E.P. Van Duzee, 2 (CASC). Marin Co., Mill Valley (April 15, 1924, April 21, 1924, June 8, 1924, May 24, 1925), E.P. Van Duzee, 5 (CASC). Marin Co., Mill Valley, April 4, 1947, D. Giuliani (CASC). Marin Co., Mt. Tamalpais, May 13, 1934, Owen Bryant, 2 (CASC). Marin Co., Mt. Tamalpais, May 1, 1913, F.E. Blaisdell (CASC). Marin Co., Mt. Tamalpais (May 23, 1909, June 20, 1909), 5 (CASC). Marin Co., June, 1911, J.C. Huguenin (CASC). Marin Co., Mt. Tamalpais (E. Slope), May 14, 1952, H.S. Dybas, 4 (FMNH). Marin Co., Fairfax, May 7, 1911, F.E. Blaisdell (FMNH). Marin Co. (May 13, 1906, May 25, 1919), F.W. Nunenmacher, 5 (FMNH). Marin Co., May 7, 1911, F.E. Blaisdell, 2 (FMNH). Marin Co., Lake Lagunitas, March 30, 1961, D.Q. Cavagnaro (WFBM). Marin Co., Phoenix Lake., March 31, 1961, D.Q. Cavagnaro (WFBM). Marin Co., Fairfax, May 14, 1939, W.F. Barr (WFBM). Marin Co., Muir Woods, July 10, 1948, R.S. Beal (WFBM). Marin Co., Fairfax, F.E. Blaisdell, 3 (MEMU). Marin Co., Muir Woods, F.E. Blaisdell (OSUC). Marin Co., Colfax, May 11, 1929, 7 (UCDC). Marin Co., Lake Lagunitas, March 30, 1961, D.Q. Cavagnaro (UCDC). Marin Co., Lake Lagunitas, May 9, 1965, K.D. Johnson (UCDC). Marin Co. (April 18, 1926, April 22, 1930), A.T. McClay, 10 (UCDC). Marin Co., Mt. Tamalpais, July 7, 1948, A.T. McClay (UCDC). Marin Co., Ross, April 17, 1930, A.T. McClay (UCDC). Marin Co., Ross, April 17, 1930 (UCDC). Marin Co., April 18, 1926 (UCDC). Marin Co., Muir Woods, F.E. Blaisdell, 4 (OSUC). Marin Co., April, 30, J.N. Knull, 2 (OSUC). Marin Co., Fairfax, May 7, 1911, F. Blaisdell, 2 (OSUC). Marin Co., Paradise Cove, April 30, 1933 (CASC). Mariposa Co., Yosemite Valley, May 22, 1921, C.T. Dodds, 2 (CASC). Mariposa Co., Yosemite Valley, July, 1912, J.C. Huguenin (CASC). Mariposa Co. (June 3, 1914, June 5, 1914, June 13, 1914), F.W. Nunenmacher, 22 (CASC). Mariposa Co., Fish Camp, 7 mi. NW, 7000 ft., July 6, 1946, H.P. Chandler, 2 (CASC). Mariposa Co., Yosemite Valley, May 20, 1934 (CASC).

Mariposa Co., Wawona, June (CASC). Mariposa Co., Yosemite Valley, July, 20, E.G. Linsley, 2 (FMNH). Mariposa Co., Mirror Lake, 4096 ft., May 21, 1931, 2 (FMNH). Mariposa Co., Miami Ranger Station, June, 1938, W.F. Barr, 19 (WFBM). Mariposa Co., Miami Ranger Station, July, 1938 (WFBM). Mariposa Co., Miami Ranger Station, July, 1938, L.R. Gillogly (WFBM). Mariposa Co., Mirror Lake, 4096 ft. (May 20, 1931, May 21, 1931), H.L. McKenzie, 13 (UCDC). Mendocino Co., Cummings, May 13, 1933, N. Donges, Collected from White *Ceanothus* (CASC). Mendocino Co., Willits, May 24, 1930, R. Hopping, 2 (CASC). Mendocino Co., Hopland, May 15, 1933, R. Hopping (CASC). Mendocino Co., Yorkville (April 30, 1924, May 1, 1924, May 17, 1929, E.P. Van Duzee, 10 (CASC). Mendocino Co., April 23, 1941, F.W. Nunenmacher (FMNH). Mendocino Co., E.R. Leach (FMNH). Mendocino Co., Ukiah, June 9, 1932, H. Dorn, 2 (FMNH). Madera Co., Coscadal, June 12, 1914, R. Hopping, 4 (CASC). Monterey Co., 17 mi. SE. Carmel Valley, May 5, 1973, Fred G. Andrews, 2 (CASC). Monterey Co., Carmel (May 15, 1908, June 9, 1908, May 16, 1909, April 21, 1912, April 21, 1912, April 4, 1915, May 1, 1918, May 14, 1918), 21 (CASC). Monterey Co., Carmel, May 14, 1921, L.S. Slevin, 5 (CASC). Monterey Co., June 12, 1914 (CASC). Monterey Co., Jamesburg, April 29, 1918 (CASC). Monterey Co., Tassajara, May 26, 1920, L.S. Slevin, 2 (CASC). Monterey Co., Santa Lucia Rge., 5000 ft., April 1, 1954 (CASC). Monterey Co., White Oak Cpg., Santa Lucia N. F., May 9, 1959, D.J. Burdick (CASC). Monterey Co., Pacific Grove, June 4, 1904, 3 (CASC). Monterey Co., Paraiso Hot Spgs., 1400 ft., June 15, 1954 (CASC). Monterey Co., Paraiso Spgs. (May 14, 1912, May 17, 1912, May 18, 1912, April 24, 1914, May 30, 1916, May 31, 1916), 7 (CASC). Monterey Co., Paraiso Springs (May 30, 1923, June 1, 1923), L.S. Slevin, 2 (CASC). Monterey Co., Bryson (April 25, 1917, May 18, 1920, May 20, 1920), E.P. Van Duzee, 3 (CASC). Monterey Co., Big Sur, June 16, 1969, K. Stephan (FSCA). Napa Co., Calistoga, June 12, 1934, Owen Bryant (CASC). Napa Co. (CASC). Napa Co., Mt. St. Helena (June 9, 1918, May

12, 1926), E.P. Van Duzee, 2 (CASC). Napa Co., Angwin, May 3, 1971, T. Griswold (CASC). Napa Co., Mt. St. Helena, June 19, 1941, D.J. & J.N. Knull, 2 (OSUC). Napa Co., Mt. St. Helena, June 19, 1941, D.J. & J.N. Knull (FMNH). Napa Co., Pope Valley, June 25, 1970, D.S. Chandler (UCDC). Napa Co., Mt. St. Helena, March 28, 1930, A.T. McClay (UCDC). Napa Co., Pope Valley, June 25, 1970, D.C. Chandler (UCDC). Nevada Co., Nevada City, May 16, 1930, E.P. Van Duzee (CASC). Nevada Co., Nr. Nevada City, 4500 ft., May 1, 1966, C.R. Kovaeic (CASC). Nevada Co., English Mt., 6500 ft., July 15, 1923, J.O. Martin, On Juniper, 3 (CASC). Nevada Co., Shotgun L., Bowman Mt. 6500 ft., July 13, 1923, J.O. Martin, 2 (CASC). Nevada Co., Graniteville, July 12, 1923, J.O. Martin (CASC). Nevada Co., White Cloud Cpgd, May 30, 1964, P.H. Arnaud (CASC). Nevada Co., Nevada City, May 27, 1941, A.T. McClay, 4 (FMNH). Nevada Co., June, 1933, F.T. Scott (FMNH). Nevada Co., June, 1933, F.T. Scott, 9 (OSUC). Nevada Co., Nevada City (May 23, 1940, May 27, 1941), A.T. McClay, 41 (UCDC). Nevada Co., Chicago Park, May 5, 1936, A.T. McClay, 2 (UCDC). Nevada Co., Camp Cielo near Nevada City, June 14, 1956, C.M. Gardella (UCDC). Nevada Co., 3 m. Washington, May 30, 1970, D.S. Chandler (FSCA). Nevada Co., Grass Vly., April 17, 1966, C.R. Kovacie, 5 (UCDC). Nevada Co., Washington (May 23, 1940, May 30, 1946), A.T. McClay, 11 (UCDC). Nevada Co., 3 mis. Washington, May 30, 1970, D.S. Chandler (UCDC). Placer Co., Emigrant Gap, June, 1937, M. Cazier (CASC). Placer Co., 4 (CASC). Placer Co. (May, 1932, June, 1933), F.T. Scott, 2 (CASC). Placer Co., Weimar (March 25, 1984, April 13, 1984, April 25, 1984), D. Kissinger, 16 (CASC). Placer Co., Weimar, March 25, 1984, D. Kissinger (FMNH). Placer Co., Weimar (April 13, 1984, April 29, 1984, May 28, 1984), D. Kissinger, 8 (FMNH). Placer Co., Emigrant Gap, June, 1937, M. Cazier, 11 (UCDC). Placer Co., Dutch Flat, May 29, 1954, E.I. Schlinger (UCDC). Plumas Co., Quincy, May 24, 1957, M.W Stone, 2 (CASC). Plumas Co., Feather River, May 24, 1957, M.W Stone, 2 (CASC). Plumas Co., Mohawk, July 13,

1957, D. Rentz (CASC). Plumas Co., July, 1933, E.J. Blum (CASC). Plumas Co. (June 13, 1913, June 14, 1913), F.W. Nunenmacher, 16 (CASC). Plumas Co., Chester (June 12, 1941, June 19, 1948, June 23, 1948, June 30, 1948, May 25, 1951, June 25, 1951, July 1, 1951, July 11, 1951, July 10, 1954, July 4, 1958, June 7, 1960, June 13, 1960), D.J. & J.N. Knull, 37 (FMNH). Plumas Co., Quincy, June 25, 1948, D.J. & J.N. Knull (FMNH). Plumas Co., Chester (June 12, 1941, June 14, 1946, June 23, 1948, July 1, 1951, July 11, 1951, July 10, 1954, July 14, 1954, July 1, 1958, July 4, 1958, July 12, 1958, June 4, 1960, June 7, 1960, June 13, 1960, June 15, 1963), D.J. & J.N. Knull, 71 (OSUC). Plumas Co., Chester, D.J. & J.N. Knull, 4 (OSUC). Plumas Co., Meadow Valley, 4000-5000 ft., July 23, 1930, J.N. Knull (OSUC). Plumas Co., Graeagle, June 17, 1949, E.I. Schlinger, 3 (UCDC). Plumas Co., Quincy, June 5, 1963, G. Jeskey (UCDC). Plumas Co., Quincy, June 20, 1949, E.I. Schlinger (UCDC). Plumas Co., Buck's Lake, June 23, 1949, W.F. Ehrhardt (UCDC). Potwisha, Sequoia Natl. Park, 2000-5000 ft. (May 18, 1929, May 25, 1929, May 8, 1931), 7 (CASC). Riverside Co., Idyllwild, May 12, 1934, M.W. Stone, 5 (CASC). Riverside Co., Banning (May 29, 1928, May 27, 1928, June 27, 1928), 21 (CASC). Riverside Co., Keen Camp, May 31, 1941, D.J. & J.N. Knull (FMNH). Riverside Co., Keen Camp, San Jacinto Mts., May 26, 1939, R.F. Smith, *Ceanothus* (WFBM). Riverside Co., 14 m. N.W. Idyllwild, 5000 ft., May 15, 1954, G.H. Nelson, 6 (MEMU). Riverside Co., Keen Camp, May 24, 1946, D.J. & J.N. Knull, 16 (OSUC). San Bernardino Co., .5 mi. SE Cedar Glen, R.E. Somerby, 2 (CASC). San Bernardino Co., L. Arrowhead, June 10, 1939, G.P. MacKenzie, 5 (FMNH). San Bernardino Co., Waterman Canyon, May 29, 1916, 3 (CASC). San Bernardino Co., Big Bear Lake, May 7, 1932, M.W. Stone, 3 (CASC). San Bernardino Co., Waterman Canyon, May 29, 1916, U.O. Marfin (CASC). San Bernardino Co., Running Springs, June 5, 1954, G.H. Nelson, 7 (WFBM). San Benito Co., Lewis Cn., May 11, 1907 (CASC). San Benito Co. (CASC). San Diego Co., Cuyamaca State Park, June 27, 1967,

M.W Stone, 7 (CASC). San Diego Co., Mt. Laguna, May 24, 1958, Ian Moore, 2 (CASC).  
 San Diego Co., F.E. Blaisdell, 5 (CASC). San Diego Co., Descanso, June 21, 1958, P.S.  
 Bartholomew (CASC). San Diego Co., Oceanside, April 15, 1918, R. Hopping (CASC).  
 San Diego Co., Cuyamaca State Park, May 19, 1941, D.J. & J.N. Knull, 17 (OSUC). San  
 Diego Co., June 27, 1967, M.W. Stone, 2 (UCDC). San Diego Co., Mt. Laguna, June 21,  
 1963, T. Botton, 2 (UCDC). San Diego Co., Pine Valley, June 21, 1963, T. Bolton  
 (UCDC), San Diego Co., May 10, 1929, H. Dorn, 2 (FMNH). San Francisco Co., 9  
 (CASC). San Francisco Co., April 19, 1946, D. Giuliani, 2 (CASC). San Francisco Co.  
 (April 28, 1903, March 30, 1909), 2 (CASC). San Francisco Co., Forest Hill, June 10,  
 1931 (FMNH). San Francisco Co., June 27, 1948, R.S. Beal, 2 (WFBM). San Francisco  
 Co., Forest Hill, June 10, 1931, J.N. Knull, 2 (OSUC). San Luis Obispo Co., Lopez  
 Canyon, 3 mi. N. Arroyo Grande Creek, April 17, 1965, Hugh B. Leech (CASC). San  
 Luis Obispo Co., Tassajara Ck., 7 mi. N. San Luis Obispo, June 4-5, 1971, John D. Pinto  
 (CASC). San Luis Obispo Co., Morro Bay, June 17, 1969, K. Stephan (FSCA). San  
 Mateo Co., Old La Honda Rd., May 22, 1955, P.S. Bartholomew, 2 (CASC). San Mateo  
 Co. (June 13, 1909, May 8, 1916), F.W. Nunenmacher, 3 (FMNH). San Mateo Co.,  
 Jasper Ridge, Stanford Univ., April 17, 1951, P.S. Bartholomew (CASC). San Mateo  
 Co., Crystal Lakes, May 26, 1921, W.M. Giffard, 3 (CASC). San Mateo Co., La Honda,  
 May 1, 1954, on Willow (CASC). San Mateo Co., La Honda (CASC). San Mateo Co.,  
 May 19, 1918, E.P. Van Duzee (CASC). San Mateo Co., Milbrae, March 30, 1957, D.  
 Rentz (CASC). San Mateo Co., 58 (CASC). San Mateo Co., Crystal Lakes, June 25,  
 1916, E.P. Van Duzee, 2 (CASC). San Mateo Co., Jasper Ridge, Stanford Univ. (June  
 17, 1951, May 5, 1963), P.S. Bartholomew, 2 (CASC). San Mateo Co., Corte Madera  
 Ck. Stanford University, P.S. Bartholomew, 2 (CASC). San Mateo Co., Corte Madera  
 Ck. Stanford University, June 25, 1952, P.S. Bartholomew, 3 (CASC). San Mateo Co., La  
 Honda, May 20, 1952 (CASC). San Mateo Co., Salada Bch, April 21, 1918, E.P. Van

Duzee, 3 (CASC). San Mateo Co. (August 31, 1948, April 22, 1949, April 18, 1950), R.S. Beal, 4 (WFBM). San Mateo Co., Lake Pilarcitos, April 14, 1940, W.F. Barr, 3 (WFBM). San Mateo Co., May 6, 1957, C. Cushner (FSCA). San Mateo Co., Hillsboro (March 30, 1957, April 6, 1957), D. Rentz, 4 (CASC). Santa Clara Co., Stevens Creek, April 22, 1956, P.S. Bartholomew (CASC). Santa Clara Co., Calumlet Ranch, San Gose, April 4, 1903, Rose W. Palterson (CASC). Santa Clara Co., Mt. Hamilton, May 18, 1956, D.J. Burdick (CMNC). Santa Clara Co., Pacheco Pass, April, 1928 (CASC). Santa Clara Co., San Jose, May 1, 1930, L.M. Smith, 8 (UCDC). Santa Clara Co., Pacheco Pass, May 27, 1937, A.T. McClay (UCDC). Santa Clara Co., San Jose, April 29, 1930, A.T. McClay (UCDC). Santa Clara Co., San Jose, May 1, 1930, 6 (UCDC). Santa Clara Co., Stanford University, April 7, 1905 (CASC). Santa Clara Co., Stanford University (May 17, 1953, April 4, 1955, April 24, 1955, May 12, 1956, May 26, 1957), P.S. Bartholomew, 8 (CASC). Santa Clara Co., Los Trancos Ck., Stanford University (June 27, 1951, July 1, 1951, May 10, 1952, May 13, 1956), P.S. Bartholomew, 9 (CASC). Santa Clara Co., Mt. Hamilton, May 10, 1973, F.G. Andrews, on *Eriodictyon* (CASC). Santa Clara Co., Palo Alto, April 7, 1917, E.P. Van Duzee, 2 (CASC). Santa Clara Co., Las Uvas Creek, July, 1909, J.C. Huguenin (CASC). Santa Clara Co., Jasper Ridge, Stanford University (April 20, 1952, May 1, 1962, May 5, 1963), P.S. Bartholomew, 6 (CASC). Santa Clara Co., West Ridge, Stanford University, March 27, 1955, P.S. Bartholomew, 4 (CASC). Santa Clara Co., Corte Madera Ck., Stanford University, June 25, 1952, P.S. Bartholomew (CASC). Santa Clara Co., Stevens Ck. (May 16, 1954, April 22, 1956), P.S. Bartholomew, 4 (CASC). Santa Clara Co., Stanford University, April, 16 (FMNH). Santa Clara Co., Stanford University, 2 (FMNH). Santa Clara Co., Stanford University, May 3, 1956, P.H. Arnaud (FMNH). Santa Clara Co., Mt. Hamilton, May 30, 1968 (UCDC). Santa Clara Co., Silver Creek, May 9, 1968 (UCDC). Santa Clara Co., Silver Creek, May 9, 1969, J. Smith, on *Ceanothus* (UCDC). Santa Clara Co., 6 mile West Saratoga, May

5, 1949, W.F. Chamberlain, *Ceanothus*, 9 (TAMU). Santa Clara Co., Saratoga, May 16, 1947, W.F. Chamberlain, *Ceanothus* (TAMU). Santa Clara Co., Stanford University, May 3, 1956, P.H. Arnaud, 4 (FSCA). Santa Cruz Co., St. Cruz Mts., May 20, 1926, J.A. Kusche (CASC). Santa Cruz Co., Sta Cruz Mts, 3 (CASC). Santa Cruz Co., Ben Lomand, May 16, 1931, 2 (CASC). Santa Cruz Co., Loma Prieta, May 6, 1954, 4 (CASC). Santa Cruz Co., April 12, 1936, J.W. Tilden, 5 (CASC). Santa Cruz Co., Bigbasin, June 30, 1956 (CASC). Santa Cruz Co., April 12, 1936, 2 (CASC). Santa Cruz Co., Ben Lomond, April 25, 1931, L.W. Taylor, 5 (FMNH). Santa Cruz Co., Highland Dist., June 2, 1957, S.M. Fidel, 2 (UCDC). Santa Cruz Co., May 3, 1970, J. Smith, on *Ceanothus* (UCDC). Santa Cruz Co., Empire Grade, May 2, 1970, J. Smith, on *Ceanothus* (UCDC). Santa Cruz Co., June 3, 1962, W.J. Turner (UCDC). Santa Cruz Co., May 13, 1970 (UCDC). Santa Cruz Co., Felton, May 10, 1953, J.W. Green (FSCA). Santa Cruz Co., Felton, May 10, 1953, J.W. Green, 2 (MEMU). Shasta Co., 1 mi. E. Montgomery Creek, May 28, 1966, R.M. Brown, 3 (CASC). Shasta Co., 4 (CASC). Shasta Co., Hatchet Mtn. Pass, 4368 ft., May 29, 1966, R.M. Brown (CASC). Shasta Co., Castle Crag, July 4, 1905 (CASC). Shasta Co., Shingletown, June 21, 1941 (CASC). Shasta Co., Castle Crag, June 25, 1911, Schuh & Gray, 4 (FMNH). Shasta Co., Shingletown (May 29, 1941, June 4, 1941), A.J. Walz, 2 (WFBM). Shasta Co., Hat Creek, June 1, 1941, 7 (WFBM). Shasta Co., Shingletown (June 4, 1941, June 21, 1941), 2 (WFBM). Shasta Co., Burney, June 9, 1941, A.J. Walz (WFBM). Shasta Co., Burney, June 9, 1944 (WFBM). Shasta Co., Hat Creek (June 20, 1955, June 21, 1955), R.D. Browning, 3 (UCDC). Shasta Co., Hat Creek, June 23, 1955, J.R. Jessen, 5 (UCDC). Shasta Co., Shingletown, June 16, 1941, 4 (UCDC). Shasta Co., Hat Creek, July 15, 1955, W.H. Lange, 2 (UCDC). Siskiyou Co., Shasta Spgs (June 9, 1920, June 10, 1920, June 12, 1920, June 13, 1920, June 17, 1920, June 18, 1920, June 19, 1920, June 22, 1920, June 23, 1920), C.L. Fox, 41 (CASC). Siskiyou Co. (May 28, 1911, May

31, 1911, June 1, 1911, June 2, 1911), F.W. Nunenmacher, 27 (CASC). Siskiyou Co., Mt. Bradley, June 18, 1920, C.L. Fox (CASC). Siskiyou Co., August 1, 1920, H.E. Ricksecker (CASC). Siskiyou Co., McCloud (June 4, 1927, June 4, 1929), 4 (CASC). Siskiyou Co., Cole, July 4, 1902 (CASC). Siskiyou Co., Young's Valley, 4600 ft. (July 31, 1971, August 3, 1971), E. Aagaard, 2 (CASC). Siskiyou Co. (May 31, 1911, June, 11, June 4, 1941), F.W. Nunenmacher, 5 (FMNH). Siskiyou Co., Siskiyou Summit, 3000 ft., July 5, 1946, B. Malkin (FMNH). Siskiyou Co. (June, 2, June, 11), F.W. Nunenmacher, 5 (OSUC). Siskiyou Co., Fowlers Camp (June 2, 1946, July 2, 1946), A.T. McClay, 25 (UCDC). Siskiyou Co., Mt. Shasta, July 16, 1945, A.T. McClay (UCDC). Siskiyou Co., Mt. Shasta, July 1, 1946, A.T. McClay, 2, (UCDC). Solano Co., Green Valley (April 20, 1939, April 8, 1948), A.T. McClay, 2 (UCDC). Sonoma Co., 4 (CASC). Sonoma Co., Sobre Vista, April 30, 1911, 4 (CASC). Sonoma Co., Mark West Springs, April 27, 1930 (CASC). Sonoma Co., May 5, 1897, 4 (MEMU). Sonoma Co., Mark West Springs, April 27, 1930, A.T. McClay (UCDC). Sonoma Co., Occidental, April 27, 1937, A.T. McClay, 2 (UCDC). Sonoma Co., Healdsburg, May 7, 1930, A.T. McClay (UCDC). Tehama Co., 5 mi. E. Mineral (June 9, 1960, June 12, 1960, June 14, 1963, June 15, 1960, June 20, 1960, June 23, 1960, June 26, 1960, June 30, 1960), D.J. & J.N. Knull, 16 (OSUC). Tehama Co., 12 mi. E. Mineral, June 6, 1960, D.J. & J.N. Knull (OSUC). Tehama Co., 12 m. W. Mineral, June 6, 1960, D.J. & J.N. Knull (OSUC). Tehama Co., Mt. Lassen, July 8, 1963, D.J. & J.N. Knull (FMNH). Tehama Co., 5 mi. E. Mineral, June 9, 1960, D.J. & J.N. Knull (FMNH). Tehama Co., 12 mi. W. Mineral, June 6, 1960, D.J. & J.N. Knull, 2 (FMNH). Tehama Co., 5 mi. E. Mineral (June 6, 1960, June 9, 1960, June 20, 1960), D.J. & J.N. Knull, 4 (FMNH). Tehama Co., Manton, May 16, 1970, L.S. Chandler (UCDC). Tehama Co., Mineral, June 25, 1963, V.L. Vesterby, 2 (UCDC). Trinity Co., Carrville, July 6, 1950, W.A. Russell (CASC). Trinity Co., Carrville, 2400-2500 ft., June 6, 1934 (CASC). Trinity Co., Mts. Between Weaverville & Carrville, June 18, 1931 (CASC).

Trinity Co., Carrville, June 21, 1913, 5 (CASC). Trinity Co., Nash Mine, June 14, 1913 (CASC). Trinity Co., Weaverville, June, 16, D.J. & J.N. Knull (FMNH). Trinity Co., Carrville, June, 20, 1931, 3 (FMNH). Trinity Co., 1934, 2 (FMNH). Trinity Co., Carrville, 2400-2500 ft., June 24, 1934 (FMNH). Trinity Co., Big Flat, Coffee Creek, June 22, 1934, 2 (FMNH). Trinity Co., May 1, 1917, F.W. Nunenmacher, 4 (FMNH). Trinity Co., Forest Glen, June 19, 1941, D.J. & J.N. Knull (FMNH). Trinity Co., Forest Glen, June 19, 1941, D.J. & J.N. Knull, 13 (OSUC). Trinity Co., Carrville, June 20, 1931, J.N. Knull, 3 (OSUC). Tulare Co., Sequoia Park, May 30, 1937, J.E. Blum (CASC). Tulare Co., Sequoia Natl. Park, Paradise Valley, 3000-5000 ft., May 22, 1929, 6 (CASC). Tulare Co., Sequoia Natl. Park, Marble Fk. Bridge, 3000-5000 ft., June 11, 1929, 10 (CASC). Tulare Co. (CASC). Tulare Co., Sequoia Natl. Park, May 12, 1937 (CASC). Tulare Co., Hospital Rock, May 25, 1919, R. Hopping (CASC). Tulare Co., Hospital Rock, Kaweah, May 25, 1919, R. Hopping (CASC). Tulare Co., Grouse Mdw, June 28, 1913, R. Hopping (CASC). Tulare Co., Grouse Mdw, June 28, 1913, R. Hopping (CASC). Tulare Co., Kaweah, 1000 ft., R. Hopping, 2 (CASC). Tulare Co., Grouse Mdw, June 20, 1913, R. Hopping (CASC). Tulare Co., Hospital Rock, 2000 ft., May 25, 1919 (CASC). Tulare Co., Kaweah, April 24, 1930, R. Hopping (CASC). Tulare Co., Hospital Rock, Kaweah, 2000 ft., May 25, 1919, R. Hopping, 4 (CASC). Tulare Co., Sequoia Natl. Park, Marble Fk. Bridge, 3000-5000 ft., June 11, 1929 (CASC). Tulare Co., Salt Cr., April 25, 1940, R. Hopping, 5 (CASC). Tulare Co., Kaweah, R. Hopping, 6 (CASC). Tulare Co., Kaweah, 1000 ft., R. Hopping (CASC). Tulare Co., Sequoia Natl. Park (April, 1931, April, 1934), F.T. Scott, 3 (CASC). Tulare Co., Tule River, Indian Res., May 11, 1932, R.P. Allen (CASC). Tulare Co., Colony Mill, June 14, 1905 (CASC). Tulare Co., Potwisha, Sequoia Natl. Park, 2000 ft., May 12, 1937, A.T. McClay, 2 (CASC). Tulare Co., Potwisha, Sequoia Natl. Park, 2000 ft., April, 1931, F.T. Scott, 2 (CASC). Tulare Co., Kaweah (FMNH). Tulare Co., Sequoia National Park, May 7, 1931, E.G. Linsley (FMNH). Tulare

Co., Sequoia National Park, 3000-5000 ft. (May 22, 1929, June 18, 1929), A.T. McClay, 4 (UCDC). Tulare Co., Sequoia National Park, 5000-7000 ft., June 19, 1929, A.T. McClay, 3 (UCDC). Tulare Co., Sequoia National Park, 2000-3000 ft. (May 21, 1929, May 22, 1929, May 23, 1929, May 25, 1929, May 27, 1929, June 13, 1929, June 15, 1929, June 18, 1929), A.T. McClay, 13 (UCDC). Tulare Co., Sequoia National Park, Ash Mt. R., April 28, 1950, R.C. Bechtel, 15 (UCDC). Tuolumne Co., Buck Meadows, 1.8 mi. W., May 21, 1973, Fred G. Andrews, 2 (CASC). Tuolumne Co., Mather, June 15, 1969, K. Stephan, 4 (CASC). Tuolumne Co., Ackerson Mather Rd. at middle Fork of Tuolumne River, June 18, 1967, G.R. Ballmer, 2 (CASC). Tuolumne Co., Yosemite, 3800-4000 ft., May 20, 1931 (CASC). Tuolumne Co., Yosemite, June (CASC). Tuolumne Co., Twain Harte, June 5, 1965, M.R. Lundgren, 2 (CASC). Tuolumne Co., Twain Harte, June 9, 1932 (CASC). Tuolumne Co., Lake Eleanor, July, 1891 (CASC). Tuolumne Co., May 16, 1914, F.W. Nunenmacher, 2 (CASC). Tuolumne Co., E. of Twain Harte on white *Ceanothus*, June 8, 1965, P.S. Bartholomew, 23 (CASC). Tuolumne Co., Yosemite, 4000 ft., May 20, 1934, Owen Bryant, 3 (CASC). Tuolumne Co., Yosemite, May 15, 1931, 4 (FMNH). Tuolumne Co., Yosemite (FMNH). Tuolumne Co., Twain-Harte, 4000 ft., July, 1937, F.E. Blaisdell (FMNH). Tuolumne Co., Yosemite, May 15, 1931, J.N. Knull, 6 (OSUC). Tuolumne Co., Yosemite, 3880-4000 ft., May 16, 1931, H.L. McKenzie, 3 (UCDC). Tuolumne Co., Mather, June 8, 1961, D.R. Miller, 2 (UCDC). Tuolumne Co., Mather, June 15, 1969, K. Stephan, 5 (FSCA). Tuolumne Co., Yosemite, 3880-4000 ft., May 29, 1938 (UCDC). Tuolumne Co., Yosemite, 3880-4000 ft., June 14, 1928, A.T. McClay (UCDC). Tuolumne Co., Strawberry, June 19, 1951, E.L. Silver (UCDC). Yolo Co., Davis, April 18, 1959, M.E. Irwin (CASC). Yolo Co., Putah Canyon, March 28, 1960, M.E. Irwin (UCDC). Yolo Co., Rumsey, May 3, 1936 (FMNH). S. Rosa (CASC). Yuba Co., Challenge, June 2, 1963, E.E. Ball, 3 (FSCA). **Oregon**, Benton Co., Canyonville, May 26, 1930, R. Hopping, 2 (CASC). Curry Co., Red Mt. Prairie, Sec. 16, T 39S, R11w,

Siskiyou Nat. For., July 5, 1969, R.L. Westcott, 2, (CASC). Curry Co., Hdw. Illinois R., May 25, 1930, R. Hopping, 7 (CASC). Curry Co., Oak Ridge, June 12, 1924, R. Hopping (CASC). Curry Co., NE Sec. 33, T33s, R14W vic. Bald Mt., July 9, 1982, R.L. Westcott, 12 (WFBM). Hood River Co., Mt. Hood, 3000-6000 ft., June 26, 1926 (CASC). Hood River Co., Near Dee, May 20, 1959, J. Schuh (CASC). Hood River Co., May 20, 1959, J. Schuh (FSCA). Hood River Co., Parkdale, May 27, 1938, J. Schuh (FSCA). Jackson Co., NE Sec. 25, T38s, R2E ca. 13mi. NE. Ashland, June 15, 1983, R.L. Westcott, 10 (WFBM). Jackson Co., Butte Falls, June 11, 1939, A.T. McClay, 5 (UCDC). Jackson Co., Prospect (June 11, 1938, June 14, 1941), A.T. McClay, 3 (UCDC). Josephine Co., Kirby, June 11, 1910 (CASC). Josephine Co., O' Brien (May 29, 1952, May 30, 1952), B. Malkin, 20 (FMNH). Union Co., Tollgate, June 7, 1966, K. Goeden, sweeping fir tree (CASC). Wallowa Co., Aneroid Lake, Wallowa Mts., 7500 ft., July 28, 1950, B. Malkin (FMNH). **Washington**, Chelan Co., Blewett, June 18, 1933, J. Wilcox, 2 (CASC). Thurston Co., Tenino, Schwarz, 6 (OSUC).

Distribution: This species is found in far western United States, especially common in California (Fig. 104).

Diagnosis: *Limonius ornatulus* is most similar to *L. definitus*. In male, the parameres (Fig. 50) of *L. ornatulus* are curved in the middle, slender and knobbed at the tip, apical blades not visible, and the aedeagus with the same width from base to tip, with a rounded tip. In *L. definitus*, the parameres (Fig. 32) are forceps-like, gradually narrowing to tip, and the aedeagus gradually narrowing to tip.

Notes: The male genitalia of the types of *L. ornatulus*, *L. humeralis*, and *L. maculicollis* are identical. Additionally, color patterns of the pronotum and elytra range from black except the hind angles and hypomeral margin yellow, to yellowish brown to orange except some darkening of the middle of the pronotum. The numerous specimens examined exhibited no discernable geographical patterns.

*Limonius pappi* Becker.

*Limonius pappi* Backer, 1976: 689-691. Holotype # 13032 (CASC). Type locality:  
Mono Co., California.

Length: 5.9-6.2 mm (length/width ratio 2.75-3.1). Head black throughout, clypeal margin entire, frontal deeply punctate, separated by less than width of punctures, with erect yellow setae. Antennae not extending beyond hind angles, segments 2 small, segment 3 intermediate in length between segment 2 and 4, black throughout. Pronotum black throughout, 1.5-1.6 mm (length/width ratio: wider than long), pronotal margins broadly rounded. Carina, converge, about 1/3 length of lateral margin, diverging from lateral margin with area between visibly punctures (viewed dorsally). Pronotal texture, umbilicate punctures, separated by less than width of punctures, covered with small appressed white setae. Scutellum black, pentagonal, deeply punctures, covered with appressed yellow setae. Hypomeron strongly costate on anterior third forming antennal groove; posterior border of hypomeron without teeth; prosternum, black throughout, deeply punctate, separated by less than width of punctures, with appressed yellow setae; hypomeron black throughout, umbilicate punctures, separated by less than width of punctures, with appressed yellow setae; metasternum black, deeply punctate, separated by more than width of punctures, with appressed yellow setae, legs color, black.

Elytra 4.2- 4.4 mm (length/width ratio 1.96-2.2), black throughout, striae finely punctate, inter-striae deeply punctate, with suberect yellow setae.

Abdomen black, moderately to deeply punctate, with appressed yellow setae.

Male genitalia (Fig. 50): parameres with lateral margins parallel basally, curved a little toward apical blades, apical blades wider than long, rounded apically, aedeagus

gradually narrowing to tip, as long as parameres or less, parameres long 1.8 to 2 X length of basal piece.

The female bursa copulatrix is not sclerotized.

Type Material Examined: Holotype, male # 13032 (CASC), California, Mono Co. Inyo National Forest, H.M. Hall Natural Area, pitfall trap in alpine meadow, 11,000 ft., July 18-August 1, 1973, R. Papp (CASC).

Material Examined: **United States: California**, Mono Co., Inyo National Forest, H.M. Hall Natural Area, 11000 ft., July 18-August 1, 1973, R. Papp, pitfall trap in alpine meadow, 127 (CASC) 10 (CMNC).

Distribution: This rare species is only known from Mono Co., California.

Diagnosis: *Limonius pappi* is most similar to *L. beutenmuelleri*. In the male, the parameres (Fig. 51) of *L. pappi* have lateral margins parallel basally, curved a little toward apical blades, apical blades wider than long, rounded apically, aedeagus gradually narrowing to tip, as long as parameres or less. Whereas, in *L. beutenmuelleri*, the parameres (Fig. 23) have lateral margin convex basally, gradually narrowing toward apical blades, apical blades as long as broad, rounded apically; aedeagus wide with narrow tip, extending beyond parameres by less than  $\frac{1}{4}$  length of apical blades. Also *L. beutenmuelleri* has a more robust habitus, and in *L. pappi* the hind angle of pronotum is more convergent. Additionally, *L. pappi* is known from California, and *L. beutenmuelleri* is known from North Carolina.

*Limonius pectoralis* LeConte

*Limonius pectoralis* LeConte, 1866: 391, Van Dyke, 1932: 338, Brooks, 1960: 29, Lane, 1971: 24. Type # 2532 (MCZC). Type locality: Fort Simpson, Hudson Bay Territory (Northwest Territories), Canada.

Length: 7.4-9.5 mm (length/width ratio 3.1-3.7). Head dark brown, clypeal margin entire, slightly recurve medially, frontal deeply punctate, separated by less than width of punctures, with suberect yellow setae. Antennae not extending beyond hind angles, segments 2 small, segment 3 as long as segment 4, black throughout. Pronotum dark brown to black, 2.1-2.7 mm (length/width ratio: as long as broad), pronotal margins broadly rounded. Carina, converge; short, less than 1/5 length of lateral margin. Pronotal texture, deeply punctate, separated by more than width of punctures, covered with short, appressed yellow setae. Scutellum reddish to dark brown, shell-like, finely punctate, covered with suberect yellow setae. Hypomerone costate anteriorad forming small antennal groove; posterior border of hypomerone without teeth; prosternum, yellow to dark brown, finely punctate, separated by less than width of punctures, with small appressed yellow setae; hypomerone yellowish brown, umbilicate punctures, separated by less than width of punctures, with small appressed yellow setae; metasternum brown to dark brown, finely and very densely punctate, with small appressed black setae, legs color, yellow.

Elytra 5- 6.5 mm (length/width ratio 2.17-2.5), dark brown to black, striae deeply punctate, inter-striae deeply punctate, with erect yellow setae.

Abdomen brown to dark brown, finely and densely punctate, with small appressed yellow setae.

Male genitalia (Fig. 52): Parameres gradually narrowing toward apical blades, apical blades triangular, aedeagus wide with narrow tip, extending beyond parameres by more than one length of apical blades, parameres long, 1.2 to 1.4 length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype, male # 2532 (MCZC), Fort Simpson, Hudson Bay Territory, Canada (Northwest Territories).

**Material Examined:** **Canada: Montreal**, Montreal (FMNH). **Ontario**, Westreo, June 16, 1928, A.H. Mac Andrews (FMNH). **Quebec**, Duparquet (June 9, 1936, June 1, 1938, May 30, 1940, May 31, 1941, June 3, 1942), G.S. Smith, 9 (CASC). **Saskatchewan**, (FMNH).

**United States: Alaska**, Yukon-Koyukuk Co., Rampart, July, 1915, G.W. Gasser, 2 (CASC).

**Distribution:** This species has a more far northern distribution than most *Limonius* in North America (Fig. 105).

**Diagnosis:** *Limonius pectoralis* is most similar to both *L. plebejus* and *L. confusus*. In *L. pectoralis*, the parameres (Fig. 52) gradually narrow towards the apical blades, apical blades are triangular, and the aedeagus is wide with a narrow tip, extending beyond parameres by more than one length of apical blades. In *L. confusus*, the parameres (Fig. 28) have lateral margin subparallel, apical blades longer than width by about 2 X and triangular, aedeagus wide becoming narrow on the apical fourth, with pointed tip that extends beyond parameres by 1/3 length of apical blades. In *L. plebejus*, the parameres (Fig. 54) have lateral margin convex basally, curved before blades on apical fourth, apical blades longer than wide, rounded apically, and the aedeagus gradually narrowing to tip, extending beyond parameres by less than half the length of apical blades. Also *L. pectoralis* antennal segment 2 small, segment 3 as long as segment 4. Whereas, in *L. plebejus* and *L. confusus* segment 2 and 3 are small, together just longer than segment 4.

*Limonius pictus* Van Dyke

*Limonius pictus* Van Dyke, 1932: 343-344, Lane, 1971: 22. Holotype # 3133 (CASC). Type locality: El Dorado Co., Fallen Leaf Lake, Lake Tahoe, California.

Length: 7.5-8.6 mm (length/width ratio 3.5-3.75). Head black throughout, clypeal margin entire, frontal subumbilicate punctures, separated by less than width of punctures, with appressed yellow setae. Antennae extending beyond hind angles by one segment or less, segments 2 and 3 small, together longer than segment 4, dark brown to black. Pronotum dark blue to black, 1.8-2.4 mm (length/width ratio: 1.13-1.2), lateral margins subparallel. Carina, short to obsolete. Pronotal texture, dense umbilicate punctures, separated by less than width of punctures on disk, contiguous laterally, covered with suberect yellow setae. Scutellum reddish to dark brown, shell-like, finely punctate, covered with suberect yellow setae. Hypomerion strongly costate on anterior third, forming antennal groove; posterior border of hypomerion dentate; prosternum, dark brown to black, subumbilicate punctures, separated by more than width of punctures, with small appressed yellow setae; hypomerion dark brown to black except the posterior and anterior border reddish, umbilicate punctures, separated by less than width of punctures, with small erect yellow setae; metasternum black throughout, deeply punctate, separated by more than width of punctures, with small appressed black setae, legs color, dark brown basally, yellowish apically.

Elytra 5.4- 6 mm (length/width ratio 2.5-2.7), the basal half yellow with one pair of black spots, the apical half black, striae deeply punctate, inter-striae deeply punctate, with small appressed yellow setae.

Abdomen black throughout, deeply, separated by more than width of punctures punctate, with small appressed yellow setae.

Male genitalia (Fig. 53): parameres with lateral margin convex basally subparallel toward apical blades, apical blades almost as long as wide, rounded apically, aedeagus gradually narrowing to tip, extending beyond parameres by 30%- 40% length of apical blades. Paramere length about 1.5 to 2 X length of basal pieces.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype, male # 3133 (CASC), El Dorado Co., Fallen Leaf Lake, Lake Tahoe, California, July 4, 1915 (CASC).

Material Examined: **United States: California**, Alpine Co., G. Alpine Sp., June 9, 1930, A.T. McClay (UCDC). Calaveras Co., Big Trees, June 6, 1931 (CASC). Calaveras Co., Tamarack, July 25, 1914, Wieslander (CASC). El Dorado Co., Fallen Leaf Lake (June 25, 1915, July 1, 1915, July 9, 1915), Lake Tahoe, 6 (CASC). El Dorado Co., Mt. Tallac (July 11, 1898, July 14, 1898), 2 (CASC). El Dorado Co., Glen Alpine, July 5, 1903, 3 (CASC). El Dorado Co. (CASC). El Dorado Co., Angora, June 22, 1915, L. Tahoe, 2 (CASC). El Dorado Co., Fallen Leaf Lake (June 29, 1915, July 6, 1915, July 7, 1915, July 9, 1915, July 13, 1915), Lake Tahoe, 9 (CASC). El Dorado Co., Fallen Leaf Lake, 6500 ft., July 8, 1935, F.E. Blaisdell (CASC). El Dorado Co., Echo Lake, July 16, 1941, A.T. McClay (CASC). El Dorado Co., vic South Lake Tahoe, June 26, 1985, R. Turnbow (FMNH). El Dorado Co., June 30, 1967, W. Goodman (UCDC). Fresno Co., Huntington Lake, 7000 ft., July 15, 1919, E.P. Van Duzee (CASC). Fresno Co., Summit Mdw, August 21, 1911, 2 (CASC). Fresno Co., Huckleberry Meadow., July, 1909, R. Hopping (CASC). Fresno Co., Huckleberry Meadow., 6500 ft., July, 1912 (CASC). Humboldt Co. (CASC). Fresno Co., Huntington Lake, July 26, 1987, A.T. McClay (UCDC). Mariposa Co., Yosemite Valley (May 22, 1921, May 26, 1921, June 5, 1921), 3 (CASC). Mariposa Co., Pohono Trail, 7000-7750 ft., June 18, 1931, H.L. Mckenzie (UCDC). Modoc Co., May, 22, K.L. Furniss (FMNH). Modoc Co., Cedar Pass, June 29, 1955, J.R. Jessen (UCDC). Nevada Co., Red Mt., July 3, 1911, C. Von Geldern (CASC). Placer Co., June (CASC). Placer Co., Lake Tahoe, July, 31, L.W. Saylor (FMNH). Placer Co., Lake Tahoe, June 19, 1948, D.J. & J. N. Knull, 2 (FMNH). Plumas Co., Chester (June 12, 1941, June 23, 1948, June 4, 1960, June 7, 1960, June 17, 1960, June 30, 1960, July 4, 1960), D.J. & J. N. Knull, 14 (FMNH). Plumas Co., Chester (May 7, 1960, June 13,

1960), D.J. & J. N. Knull, 2 (OSUC). Siskiyou Co., McCloud, June 20, 1914 (CASC). Siskiyou Co., Mt. Shasta, June 11, 1941, A.T. McClay (UCDC). Tehama Co., 5 mi. E. Mineral, June 6, 1960, J.N. Knull (CASC). Tehama Co., Mt. Lassen (June 20, 1960, June 20, 1963, July 2, 1963, July 5, 1963), D.J. & J. N. Knull, 8 (FMNH). Tehama Co., 5 mi. E. Mineral (June 6, 1960, June 9, 1960, June 15, 1960, June 12, 1960, June 23, 1960, June 26, 1960, June 30, 1960), D.J. & J. N. Knull, 43 (FMNH). Tehama Co., Lassen National Park, June 6, 1965, D.S. Chandler (UCDC). Tehama Co., 5 m. E. Mineral (June 6, 1960, June 23, 1960), D.J. & J. N. Knull, 2 (OSUC). Trinity Co., Big Flat, June 21, 1934 (CASC). Trinity Co., Big Flat, Coffee Creek (June 20, 1934, June 22, 1934), 2 (FMNH). Trinity Co., Nash Mine, June 13, 1913 (CASC). Trinity Co., Trinity Alps, July 14, 1939, E.C. Cerlson (CSUC). Tulare Co., Sequoia Natl. Park, 7000-9000 ft., June 24, 1929 (CASC). Tulare Co., Mineral King, July 31, 1913 (CASC). Tulare Co., Mineral King, August 13, 1958, W.E. Simonds (CASC). Tulare Co., Round Mdw Giant Forest, 6400 ft. (June, 12, July, 1915), R. Hopping, 2 (CASC). Tulare Co., Kaweah, 7500 ft. (June, 20, June, 22), R. Hopping, 2 (CASC). Tulare Co., Giant Forest, 6500 ft., July, 1915, R. Hopping (CASC). Tulare Co., Sequoia National Park, 7000 ft., June, 15, Welverton (FMNH). Tulare Co., Sequoia National Park, 7000-9000 ft., June 20, 1929, A.T. McClay (UCDC). Tuolumne Co., Yosemite, 3880-4000 ft., June 9, 1938 (CASC). Tuolumne Co., Yosemite National Park, 8500 ft., June 9, 1961, M.E. Irwin (CASC). Tuolumne Co., Strawberry 11m. North, June 24, 1951, D.P. Lawfer (UCDC). Myers, 6300 ft., June 16, 1930, A.T. McClay (UCDC). **Oregon**, Klamath Co., Klamath Falls, July 20, 1922 (CASC).

Distribution: This species is generally a Pacific Northwestern species, and common in California (Fig. 106).

Diagnosis: This species can be separated from other Nearctic *Limenius* by the basal half of the elytra yellow with one pair of black spots.

*Limonius plebejus* (Say)

*Elater plebejus* Say, 1825: 263. Type destroyed. Type locality: Indiana.

*Limonius plebejus*, LeConte, 1853: 431, Candeze, 1860: 390, Leng, 1920: 168, Schenkling, 1925: 297, Van Dyke, 1932: 338.

*Limonius metallescens* Melsheimer, 1844: 158, LeConte, 1853: 431, Leng, 1920: 168, Schenkling, 1925: 297, Van Dyke, 1932: 353. Holotype lost. Type locality: Pennsylvania. Synonymized by LeConte, 1853: 431.

Length: 7.7-9 mm (length/width ratio: 3.6 –3.85). Head black except the clypeal margin pale brown, clypeal margin entire with slightly recurved medially, frontal punctures deeply punctate, separated by more than width of punctures, with appressed yellow setae. Antennae not reaching the hind angles, or reaching the hind angles by less than 1 segment; segment 2 and 3 small, together just longer than segment 4, antennal color dark brown to black. Pronotum dark brown with posterior angles, anterior border, and hypomeron paler, 2.12-2.4 mm (length/width ratio: 1.15-1.25) with pronotal margins broadly rounded. Carina, Parallel to lateral margin, about ¼ to 1/3 length of lateral margin, pronotal texture, densely, deeply punctate becoming contiguous laterally, separated by less than width of punctures, covered with appressed yellow setae. Scutellum reddish brown to black, pentagonal, deeply punctate, with appressed yellow setae. Hypomeron, strongly costate on anterior third, forming antennal groove; posterior border of hypomeron without teeth; prosternum, reddish brown with posterior and anterior border orange, deeply punctate, separated by more than width of punctures, with small appressed yellow setae; hypomeron: yellow to dark brown, umbilicate punctures, separated by less than width of punctures, covered with appressed yellow

setae; metasternum reddish brown to black, deeply punctate, separated by more than width of punctures, with appressed yellow setae, legs color, yellow.

Elytra: 5.2 –6.3 mm (length/width ratio 2.5-2.6) reddish brown to dark brown, striae finely punctate, inter-striae deeply punctate, covered with appressed yellow setae.

Abdomen reddish brown, finely, deeply punctate, with finely appressed yellow setae.

Male genitalia (Fig. 54): parameres with lateral margin convex basally, curved before blades on apical fourth, apical blades longer than wide, narrowly rounded apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than half the length of apical blades. Parameres long 1.2 to 1.5 length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Type destroyed.

Type Material of Synonyms Examined: Type lost.

Material Examined: **Canada: Ontario**, Barhierville, June 5, 1976, E.J. Kteley (CMNC). Fisher Glen, June 12, 1931, W.J. Brown, 2 (UCDC). Gatineau Park, Meach Lake, June 11, 1978, J.M. Campbell (CMNC). Gatineau Park, Ramsey Lake, June 17, 1971, E.C. Becker (CMNC). Normandale, June 5, 1931, W.J. Brown (UCDC). Priest Cr., nr. Poltimore, May 28, 1969, Smetana (CMNC).

**United States: Connecticut**, New Haven Co., May 21, 1912 (FMNH). New London Co., Lyme, July 4, 1911, H.B. Kirk & Champlain (CASC). **Georgia**, Rabun Co., Black Rock Mt., 3000 ft., May 20-25, 1911 (CASC). **Illinois**, Cook Co., Willow Springs, July 3, 1907, E.P. Chope, 3 (FMNH). **Indiana**, Morgan Co., Cope, May 13, 1962, C.E. White (FSCA). **Iowa**, Woodbury Co., Sioux City, May 14, 1959, R. Miller, sweeping alfalfa, 3 (MEMU). **Kansas**, Saline Co., Salina, Knaus (CSUC). **Louisiana**, Roslyn, June 15, 1930, J.N. Belkin (FSCA). **Maine**, Piscataquis Co., Swmmit, Mt. Katahdin, June 21, 1934, J.N. Belkin (FSCA). **Maryland**, Baltimore Co., Baltimore, June, 1902 (CASC). Baltimore Co., Baltimore, Soldiers Delight, May 21, 1988, C.L & S.L. Stelnes, 2 (FSCA).

**Massachusetts**, Essex Co., Ipswich, May 22, 1926 (CASC). Middlesex, Arlington, May 9, 1926 (CASC). Middlesex Co., Framingham, May 27, 1934, C.A. Frost (FMNH). Middlesex Co., Fram' ham, May 27, 1934, C.A. Frost (CASC). Middlesex Co., Natick, May 24, 1936, C.A. Frost (CASC). Middlesex Co., Hopkinton, May 21, 1916, C.A. Frost (CASC). Middlesex Co., Framingham, June 15, 1948, C.A. Frost (FSCA). Middlesex Co., Natick, June 18, 1945, C.A. Frost (FSCA). Norfolk Co., Dover, May, 2 (CASC). Suffolk Co., Forest Hills, May 13, 1933, J.N. Belkin, 11 (FSCA). Worcester Co., Southboro, May 17, 1908 (CASC). Worcester Co., Berlin (June 18, 1940, July 5, 1940), 2 (FMNH). **New Hampshire**, Belknap Co., Squam Lake, July 11, 1937, J.W. Green (MEMU). Sullivan Co., Charlestown, June 17, 1937, M.C. Lane, 2 (OSUC). June 13, 1924 (CASC). **New Jersey**, Morris Co., Mountain Lakes (June 23, 1940, June 23, 1941), 2 (FMNH). Ocean Co., Lakehurst, May, 3 (FMNH). Passaic Co., May 19, 1933 (FMNH). Sussex Co., June 23, 1973, R.L. Jacques (FSCA). Warren Co., Phillipsburg (June 8, 1918, June 14, 1930), J.W. Green, 3 (CASC). Warren Co., Phillipsburg, June 24, 1917, J.W. Green (UCDC). (CASC). **New York**, Columbia Co., Copake, July 2, 1940, 2 (FMNH). Kings Co., Flatbush, May 4, 1916, Under stone (WFBM). Kings Co., Flatbush, May 20, 1910, beating (WFBM). Suffolk Co., Montauk, Long Island (June 16, 1940, May 18, 1941), 4 (FMNH). Suffolk Co., Montauk Point, Lighthouse, June 2, 1940 (MEMU). Tompkins Co. (June 6, 1957, June 11, 1966), N.M. Downie, 2 (FMNH). Tompkins Co., Groton, June 4, 1953, N.M. Downie (FMNH). Tompkins Co., May 1, 1957, N.M. Downie, sweeping (CASC). Tompkins Co., Ithaca, May 30, 1914 (CASC). Tompkins Co., McLean Bogs Res., May 15, 1941, R.H. Arnett (FSCA). Tompkins Co., June 11, 1963, N.M. Downie, 8 (FSCA). Westchester Co., Croton Falls, May 26, 1939 (FMNH). Westchester Co., Pelham, May 18, 1929, L. Lacey, 6 (UCDC). 6 (CASC). 3 (FMNH). **North Carolina**, Moore Co., Southern Pines, April, 1907 (CASC). Yancey/ Buncombe Co., Black Mts., May 2, 1912, Beutenmüller (FMNH). Yancey/Buncombe Co., Black Mts., May 22, 1912,

Beutenmüller (CASC). **Ohio**, Hocking Co., May 30, 1952, D.J. & J.N. Knull (FMNH).

**Pennsylvania**, Allegheny Co. (CASC). Allegheny Co. (June 8, 1937, June 12, 1937, June 19, 1937), A.C. Miller, 7 (OSUC). Allegheny Co., Pittsburgh, June, 1930, H.L. Chermock (UCDC). Allegheny Co., Pittsburgh, July 10, 1919 (MEMU). Butler Co., July 5, 1937, A.C. Miller, 2 (OSUC). Chester Co., Chadds Ford, June 19, 1988, N.M. Downie, 4 (FSCA). Columbia Co., June 20, 1930, J.N. Knull, 4 (FMNH). Crawford Co., Hartstown, June, 17, J.N. Knull, 2 (FMNH). Cumberland Co., Lemoyne, April 2, 1911, H.B. Kirk (OSUC). Dauphin Co., June 21, 1928, J.N. Knull (CASC). Dauphin Co., Harrisburg, May 24, 1912, Champlain (CASC). Dauphin Co., Harrisburg, May 16, 1910, H.B. Kirk (CASC). Dauphin Co., Hummelstown, May 20, 1921, J.N. Knull (CASC). Dauphin Co., Hummelstown (June 3, 1921, June 11, 1921, April 28, 1918, June 7, 1930, June 1, 1918, June 9, 1918, June 10, 1918, June 16, 1918), J.N. Knull, 12 (FMNH). Dauphin Co., Linglestown, June 14, 1920, J.N. Knull (FMNH). Dauphin Co., Hummelstown (June, 14, June, 15, June, 17), J.N. Knull, 4 (FMNH). Dauphin Co., Hummelstown, June 7, 1930, J.N. Knull (OSUC). Dauphin Co., Harrisburg, June 24, 1931, J.N. Knull (UCDC). Delaware Co., Castle Rock, June, 13, H.W. Wenzel, 4 (FMNH). Delaware Co., Castle Rock (May, 19, June, 13), H.A. Wenzel, 24 (OSUC). Erie Co., Northeast, July 22, 1920, J.N. Knull (FMNH). McKean Co., Mont Alto. (May 16, 1931, May 18, 1931, May 20, 1931), J.N. Knull, 7 (FMNH). McKean Co., Mt. Alton., May 19, 1932, J.O. Pepper (OSUC). McKean Co., Mt. Alton., June 21, 1931 (UCDC). Monroe Co., Tannersville (July 18, 1947, June 14, 1948, June 18, 1948, June 8, 1950), J.W. Green, 15 (CASC). Northampton Co., Easton (June 2, 1930, June 4, 1930, June 5, 1930, June 12, 1930, July 16, 1930 June 17, 1934, May 29, 1944), J.W. Green, 12 (CASC). Philadelphia Co., Angora, June, 27 (CASC). Sullivan Co., Laporte, June 6, 1932, J.N. Knull (OSUC). Warren Co., Warren, June, 16, J.N. Knull (FMNH). Westmoreland Co., Jeannette (June, 4, June, 30), H.G. Klages, 2 (CASC). Westmoreland Co., Jeannette, July 2, 1932, R.P.

Seibert, 3 (WFBM). Westmoreland Co., Jeannette, June, Knechtel, 4 (MEMU). **Rhode Island**, Washington Co., Narragansett, July 3, 1950, C.V. Reichart (FMNH). Washington Co., Anawan Cliffs, July 15, 1950, C.V. Reichart, 2 (OSUC). **Texas**, Gillespie Co., May 7, 1946, D.J. & J.N. Knull, 4 (FMNH). **Vermont**, Windsor Co., Bradford, June-July, 1963, R. Chipman (CASC). Windsor Co., Quechee, July 4, 1935, J.W. Green, 10 (CASC). Windsor Co., Quechee (July 4, 1935, July 14, 1937), J.W. Green, 2 (MEMU). Windsor Co., Quechee, July 4, 1935, J.W. Green, 4 (UCDC). **Virginia**, Bath Co., White Sulphur, July (CASC). Prince William Co., Shenandoah Park, Blue Ridge, 3000 ft., July 23, 1951 (CASC). **West Virginia**, Preston Co., July 29, 1999, C.L. & S.L. Staines (FSCA).

Distribution: This species is found in eastern North America (Fig. 107).

Diagnosis: *Limonius plebejus* is most similar to *L. confusus*. It can be distinguished by the parameres (Fig. 54) have the lateral margin convex basally, curved before blades on apical fourth, apical blades longer than wide, rounded apically, aedeagus gradually narrowing to tip, extending beyond parameres by less than half the length of apical blades. In *L. confusus*, the parameres (Fig. 28) have the lateral margin subparallel, apical blades longer than width by about 2X, triangular, aedeagus wide becoming narrow on the apical fourth, with pointed tip, extending beyond parameres by 1/3 length of apical blades.

*Limonius quercinus* (Say)

*Elater quercinus* Say, 1825: 262. Type destroyed. Type locality: Indiana.

*Limonius quercinus*, LeConte, 1853: 431, Candeze, 1860: 397, Van Dyke, 1932: 337.

Length: 5.5-6.4 mm (length/width ratio 3.3-3.4). Head black with clypeal dark brown, clypeal margin strongly undulate and recurved medially, frontal deeply punctate,

with appressed yellow setae. Antennae extending beyond hind angles by 2 to 3 segments, segments 2 and 3 small, together longer than segment 4, first three segments yellow, entire segments dark brown to black. Pronotum black throughout, 1.5-1.8 mm (length/width ratio: 1.1-1.2), pronotal margin subparallel. Carina, parallel with lateral margin, short, less than  $\frac{1}{4}$  length of lateral margin. Pronotal texture, deeply punctate, separated by less than width of punctures, covered with appressed yellow setae. Scutellum black, shell-like, deeply punctate, covered with appressed yellow setae. Hypomeran costate anteriorad, forming antennal groove; posterior border of hypomeran without teeth; prosternum, black throughout, deeply punctate, separated by more than width of punctures, with small black setae; hypomeran black with posterior and anterior border reddish, subumbilicate punctures, separated by less than width of punctures, with small black setae; metasternum black throughout, deeply punctate, separated by more than width of punctures, with small appressed yellow setae, legs color, pale brown to orange.

Elytra 3.75- 4.3 mm (length/width ratio 2.2-2.3), dark brown to black, striae deeply punctate to subumbilicate, inter-striae deeply punctate, with dense appressed yellowish brown setae.

Abdomen black with lateral margins yellow to dark brown, deeply punctate, separated by more than width of punctures punctate, with finely appressed yellow setae.

Male genitalia (Fig. 55): parameres with lateral margin convex basally, concave along apical third, apical blades as long as width with lateral peak, rounded apically, aedeagus gradually narrowing to tip, not extending beyond parameres. Parameres long 2 to 2.4 X length of basal piece.

The female bursa copulatrix is not sclerotized.

Type Material Examined: Type destroyed.

Material Examined: **Canada: Ontario**, Prince Edward Co. (June 15, 1936, June 28, 1936), Brimley, 4 (MEMU).

**United States: Alabama**, Cleburne Co., Talladega National Forest 33°28'28" N 85°50'07" W, May 18, 1998, T.L. Schiefer, M.V. lamp in mixed forest, W.H. Cross Expedition, 3 (MEMU). Cleburne Co., Cheaha State Park 33°28'58" N 85°48'52" W, May 16, 1998, J.A. MacGown, beating, 2 (MEMU). Coffee Co., Ft. Rucker Mil. Res., June 26, 1983, R. Turnbow (FSCA). Lawrence Co., June 19, 1923, B.C. Marshall, 2 (CASC). Madison Co., Monte Sano State Park, May 25, 1984, N.M. Downie, 3 (FSCA). Monroe Co., Big Flat Creek 31°36'30" N 87°24'53" W, May 27, 1995, T.L. Schiefer, beating, 2 (MEMU). Monroe Co., 1 mi. S. Claiborne Dam 31°35'30" N 87°32'12" W, May 29-30, 1995, T.L. Schiefer, beating, 5 (MEMU). Monroe Co., Haines Island Park 31°43'23" N 87°28'10" W, May 26-31, 1995, T.L. Schiefer, beating, 4 (MEMU). **Arkansas**, Crawford Co., Lk. Ft. Smith St. Pk., June 1, 1990, D.J. Heffern, 10 (CSUC). Johnson Co., 8 mi. N. Clarksville, May 29, 1982, R.L. Brown, sweeping, 2 (MEMU). Johnson Co., Ozark National Forest, May 12, 1987, R.L. Brown, 3 (MEMU). Logan Co., Magazine Mt., June 23, 1976, W.H. Cross (MEMU). Logan Co., Cove Lake, T 7 N. R 25 W, Sec. 35 SE, 1020 Ft., May 14-20, 1989, B.B. Brown, sweeping, 4 (MEMU). **Connecticut**, New Haven Co., May 21, 1910, J.N. Knull (FMNH). New London Co., Lyme, July 2, 1911 (FMNH). **Delaware**, New Castle Co., Newark, C.O. Houghton (CASC). **Florida**, Alachua Co., May 21, 1984, N.M. Downie (FMNH). Alachua Co., Devil's Millhopper, April 2, 1961, R.E. Woodruff, 5 (FSCA). Alachua Co., Gainesville, April 8, 1961, H.V. Weems (FSCA). Alachua Co., Devil's Millhopper, March 31, 1960, R.E. Woodruff, 3 (FSCA). Alachua Co. (April 20, 1984, May 21, 1984), N.M. Downie, 9 (FSCA). Columbia Co., O'Leno State Park, April 19, 1954, F.W. Mead, 2 (FSCA). Escambia Co., Pensacola, July 19, 1961, R.E. Woodruff, 2 (FSCA). Liberty Co., Torreya State Park, 30 April- 5 May, 1973, H.V. Weems & C.R. Artaud, Malaise Trap (FSCA). Liberty Co., Torreya State Park, May 15,

1964, R.E. White (FSCA). Liberty Co., Torreya State Park, April 17, 1963, R.E. Woodruff (FSCA). Liberty Co., Torreya State Park, April 17, 1963, E.I. Hazard, 23 (FSCA). Liberty Co., Torreya State Park, May 6, 1989, R. Turnbow (FSCA). Marion Co., Lake Kerr, Ocala National Forest, March 23, 1961, R.E. Woodruff (FSCA). Suwannee Co., Houston, April 28, 1924, T.H. Hubbell (FSCA). **Georgia**, Clarke Co., Athens (May 22, 1937, May 23, 1937), P.W. Fattig, 2 (FMNH). Dade Co., Head River, June 9, 1937, P.W. Fattig (FMNH). Habersham Co., June 22, 1962, E.I. Hazard (FSCA). Rabun Co., May 18, 1961, F.J. Moore (OSUC). Rabun Co., Black Rock Mt., 3000 ft., May 20-25, 1911, 3 (CASC). Rabun Co., Black Rock Mt., 2000-3500 ft., May 20-25, 1911, 2 (CASC). White Co., Yonah Mt., June 20, 1937, P.W. Fattig (FMNH). White Co., hwy. 75A, 1 mi. N. Jct. hwy. 129, May 24, 1986, R. Turnbow, 2 (FSCA). **Illinois**, Jackson Co., Makanda, Giant City St. Park, June 4, 1952, R.T. Bell, 2 (CASC). Kankakee Co., Pembroke Township, June 13, 1936, D.C. Lowric (FMNH). Saint Clair Co., Falling Springs, June 8, 1902, G.W. Bock (MEMU). Saint Clair Co. (June 8, 1903, June 1, 1904, June 10, 1904, May 27, 1905, June 9, 1905, June 16, 1907), G.W. Bock, 49 (MEMU). Saint Clair Co., Kahokia, June 1, 1904, G.W. Bock, 3 (MEMU). Saline Co., 7 mi. S. Horseshoe, May 24, 1966, J.D. Pimto (CASC). St. Clair Co. (April 6, 1899, June 10, 1904, June 21, 1904), Dr. G.W. Bock, 14 (MEMU). **Indiana**, Brown Co. (June 6, 1945, June 8, 1969, June 4, 1981), N.M. Downie, 11 (FMNH). Brown Co., Bear Wallow, June 10, 1972, R.L. Jacques, 8 (FSCA). Brown Co. (June 11, 1982, June 8, 1983), N.M. Downie, 5 (FSCA). Brown Co., Bear Wallow (May 15, 1965, July 3, 1965), C.E. White, 3 (FSCA). Kosciusko Co., Mineral Springs, July 29, 1923 (CASC). Lake Co., Osborn, June 4, 1911, 4 (FMNH). Lake Co., Clarke, July 6, 1904, 4 (FMNH). Marion Co. (June 1, 1925, June 1, 1927), 8 (CASC). Marion Co., Tremont, June 9, 1934, H.E. Brown, sweeping wood herb (MEMU). Marion Co., Indianapolis, July 3, 1960, D.S. White (FSCA). Morgan Co., Morgan Monroe Forest, May 27, 1964, C.E. White, 2 (FSCA). Porter Co., Beverly Shores, June 15, 1939, H.S.

Dybas (FMNH). Porter Co., Dunes State Park (June 10, 1965, July 21, 1965), C.E.

White, 5 (FSCA). Pulaski Co., Jasper Pulaski Forest (July 7, 1961, June 16, 1962), C.E.

White, 2 (FSCA). Pulaski Co., Jasper Pulaski State Forest (May 25, 1988, May 26, 1988, June 27, 1990), N.M. Downie, 7 (FSCA). Starke Co., San Pierre, June 7, 1983, N.M. Downie, 2 (FSCA). Tippecanoe Co. (June 30, 1955, June 7, 1956, June 16, 1960, June 2, 1964), N.M. Downie, 6 (FMNH). Tippecanoe Co., Lafayette, July 5, 1905, 4 (FMNH). Tippecanoe Co. (June 2, 1982, June 3, 1982, June 26, 1990), N.M. Downie, 6 (FSCA).

**Kentucky**, Edmonson Co., July 17, 1919, G.W. Bock, 22 (MEMU). **Maine**, Lincoln Co., June 16, 1939, D.J. Borrer (OSUC). **Maryland**, Anne Arundel Co., Edgewater, June 17, 1994, S.L. Staines (FSCA). Anne Arundel Co., Edgewater, April 29, 1988, C.L. & S.L. Staines (FSCA). Anne Arundel Co., Sherwood Forest, June 13, 1971, W.H. Cross (MEMU). Baltimore Co., Baltimore (May, 1902, June, 1902), 8 (CASC). Baltimore Co., Sparrows Pt. (July 5, 1931, July 6, 1931, July 8, 1932), J.W. Green, 10 (CASC). Baltimore Co., Baltimore, June 10, 1909, F.E. Blaisdell (CASC). Baltimore Co., Soliders Delight, May 25, 1991, C.L. & S.L. Staines, 2 (FSCA). Baltimore Co., Sparrows Point (July 6, 1932, June 29, 1933), J.W. Green, 2 (MEMU). Baltimore Co., Sparrows Point, July 5, 1931, J.W. Green, 7 (UCDC). Cecil Co., Elk Neck State Park, June 13, 1978, M.J. Rothschild (FSCA). Montgomery Co., Coiesville, June 2, 1975, A.S. Menke (UCDC). Montgomery Co., Plummerville Island (May 25, 1918, June, 7), 43 (CASC). Montgomery Co., Silver Spring, May 30, 1958, R.S. Beal (CASC). Montgomery Co., Plummerville Island, April 30, 1909, F.E. Blaisdell, 8 (CASC). Prince Georges Co., June 9, 1960, J.R. McCoy, 6 (MEMU). Prince Georges Co., Jugs Bay, May 6, 1990, C.L. & S.L. Staines (FSCA). Prince Georges Co., Prince Georges, Cedarville, June 3, 1988, R.J. Rabaglia (FSCA). Somerset Co., Princess Anne, May 27, 1985, M.J. Rothschild, 2 (FSCA). St. Mary's Co., Mechanicsville, May 18, 1989, C.L. Staines (FSCA). Worcester Co., Milburn Landing State Park, May 29, 1990, M.J. Rothschild (FSCA). Worcester Co.,

Worcester, Whitesburg, May 3, 1959, R.J. Rabaglia (FSCA). Worcester Co., Worcester,  
 Shad Landing State Park, May 18, 1985, C.L. Staines (FSCA). **Massachusetts**,  
 Hampshire Co., W. Pelham, June 7, 1937, M.C. lane (CSUC). Middlesex Co.,  
 Tansboro, 2 (CASC). Middlesex Co., Framingham, June 6, 1909, C.A. Frost (FMNH).  
 (FMNH). Fall River, June 3, 1909, N.S. Easton (MEMU). **Michigan**, Allegan Co.,  
 Fennville, June 28, 1993, J. Huether, *Cornus* flowers, 5 (FSCA). Clinton Co., Rose Lake,  
 Wildlife Exper. Station, June 25, 1997, S.G. Wellso, 3 (TAMU). Washtenaw Co., June  
 10, 1964, N.M. Downie (FMNH). 2 (FMNH). **Mississippi**, Pontotoc Co., 1 mi. SE Ecu  
 (June 20, 1980, July 16, 1980), W.H. Cross, Pitfall trap in deciduous woods, 2 (MEMU).  
 Smith Co., 1 mi. N. Raleigh, June 14-15, 1985, R. Brown & G. Burrows, 4 (MEMU).  
 Tishomingo Co., Tishomingo State Park, May 27, 1990, T.L. Schiefer (MEMU). Winston  
 Co., Tombigbee Nat. Forest 33°13'01" N 89°05'42" W, May 10, 1999, J.A. MacGown,  
 beating in mixed mesic forest, 17 (MEMU). Winston Co., Tombigbee Nat. Forest  
 33°11'50" N 89°03'20" W, May 17, 1999, T.L. Schiefer, beating in mixed mesic forest, 4  
 (MEMU). Winston Co., Tombigbee Nat. Forest 33°10'20" N 89°03'55" W (May 10, 1999,  
 May 17, 1999, May 24, 1999), T.L. Schiefer, beating in mixed mesic forest, 14 (MEMU).  
 Winston Co., Tombigbee Nat. Forest 33°12'49" N 89°06'28" W, July 9, 1999, T.L.  
 Schiefer, beating in mixed mesic forest (MEMU). **Missouri**, Boone Co., UMC Dairy Farm  
 (June 24, 1975, June 26, 1975, June 30, 1975), D.D. Kopp, Sticky Boards in oak, 9  
 (MEMU). Boone Co., Ashland, June 20, 1976, W.S. Craig (MEMU). Camden Co., Lake  
 of the Ozarks State Park, June 28, 1973, J.W. Smith, 4 (CASC). Camden Co., 2 m. NE  
 Jct. N&O on Route 54, June 27, 1973, S.O. Swadener, 8 (MEMU). Camden Co., 2.5 m.  
 SW Jct. N & O on Route 54, June 28, 1973, S.O. Swadener (FSCA). Douglas Co.,  
 Vanzant, July 5, 1975 (MEMU). Franklin Co., Fern Glen, June 14, 1901, G.W. Bock  
 (MEMU). Reynolds Co., Stooping Tree Ridge, June 22, 1973, J.A. Gagne (MEMU).  
 Saint Louis Co. (June 14, 1961, June 11, 1899), 7 (MEMU). Saint Louis Co. (May 29,

1898, June 11, 1899), G.W. Bock, 48 (MEMU). Taney Co., Forsyth, July 8, 1954, C.W. Wingo (MEMU). **New Jersey**, Atlantic Co., Da Costa, June, 2, H.W. Wenzel (OSUC). Atlantic Co., Egg Harbor, July 27, 1929, J.W. Green, 2 (FSCA). Bergen Co., Ramsey, May 1, 1925, W.J. Gertsch (FSCA). Cape May Co., Cape May, July 13, 1930, J.W. Green (CASC). Cape May Co., Anglesea, June, 20, H.W. Wenzel, 4 (OSUC). Essex Co., Newark, June, 10, Bischoll, 2 (OSUC). Gloucester Co., Woodbury, June, 30, 7 (FMNH). Monmouth Co., Freehold, July 19, 1926, J.W. Green, 2 (MEMU). Morris Co., Towaco, July 20, 1936 (FMNH). Morris Co., Morristown, August 18, 1940, B. Malkin (FMNH). Passaic Co., Wanaque, June 21, 1940, B. Malkin (FMNH). 6 (MEMU). **New York**, Kings Co., Brooklyn, June 1, 1940, W.M. Spector (FSCA). Queens Co., Kew Gardens, June 15, 1938, 3 (WFBM). Queens Co., Hollis, June 17, 1917 (WFBM). Richmond Co., Staten Island (CASC). Richmond Co., Staten Island, July 27, 1933, B. Malkin (FMNH). Schenectady Co., Schenectady, July 15, 1940, N.M. Downie, 2 (FMNH). St. Lawrence Co., Bear Mt., June 2, 1940 (FMNH). St. Lawrence Co., Bear Mt. (June 9, 1940, July 14, 1940), B. Malkin, 2 (FMNH). Steuben Co., Greenwood, June 18, 1922, 2 (WFBM). Westchester Co., Armonk, July 13, 1930 (CASC). Westchester Co., New Rochelle, June 17, 1940 (FMNH). Westchester Co., Harrison, June 2, 1935 (FMNH). Westchester Co., Briarcliff, June 10, 1935 (FMNH). Westchester Co., New Rochelle, June 17, 1940, B. Malkin (FMNH). Westchester Co., Van Cortlandville (June 13, 1939, July 11, 1939), 2 (FMNH). Westchester Co., N. Rochelle, June 21, 1930 (WFBM). Westchester Co., Millwood (June 19, 1936, June 27, 1936), J.G. Franclemont, 5 (FSCA). 8 (FMNH). **North Carolina**, Buncombe Co., Asheville (May 20, 1999, May 23, 1999, May 27, 1999), H.W. Cory, 3 (FMNH). Buncombe Co., Stocksville, June 26, 1935, H.S. Dybas (FMNH). Burke Co., Linville, 3500 ft., July 16, 1951, 30 (CASC). Cherokee Co., Murphy, May, 2 (CASC). Cleveland Co., May 20, 1972, J.S. Ashe (TAMU). Jackson Co., Blue Ridge, Parkway, 3500 ft., July 20, 1951, 6 (CASC). Moore Co., Southern Pines,

May 18, 1912, A.H. Manee (CASC). Rockingham Co., Reidsville, May 30, 1973, J.S. Ashe (TAMU). Moore Co., Southern Pines (CSUC). Yancey/Buncombe Co., Black Mts. (May 20, 1912, May 22, 1912, June 3, 1912, June 6, 1912, June 10, 1912, June 17, 1912, June 27, 1912, July 1, 1912, July 2, 1912, July 7, 1912, July 10, 1912), Beutenmüller, 17 (CASC). Buncombe Co., Black Mts. (June, 1902, June 7, 1902), 14 (CASC). Buncombe Co., Black Mts. (May 10, 1912, May 20, 1912, May 22, 1912, June 16, 1912, July 2, 1912), Beutenmüller, 8 (FMNH). Yancey/Buncombe Co., Black Mts., May 22, 1912, June 8, 1912, June 29, 1912, July 2, 1912, July 10, 1912), Beutenmüller, 12 (OSUC). **Ohio**, Adams Co., July, 14, J.N. Knull (FMNH). Adams Co., July 14, 1934, J.N. Knull, 9 (OSUC). Ashland Co., July, 1, D.J. & J.N. Knull (OSUC). Athens Co., June 20, 1935, W. Stehr, 8 (OSUC). Delaware Co., June 21, 1950, D.J. & J.N. Knull (OSUC). Fairfield Co., June 1, 1935, Laura W. & R.T. Everly (OSUC). Fairfield Co., Sugar Grove, June 10, 1917 (FSCA). Fulton Co., June 24, 1934, H. Osborn, 2 (OSUC). Hamilton Co., Cincinnati, May 29, 1904 (CASC). Highland Co., July 4, 1960, E.I. Hazard (FSCA). Hocking Co., May 24, 1963, F.J. Moore, 2 (OSUC). Hocking Co., Cantwell Cliffs, June 21, 1936, N.J. Knull (OSUC). Hocking Co. (May 22, 1938, May, 23, 1938, May 24, 1938, May 26, 1938, May 29, 1938, May 30, 1938, June 1, 1938, June 5, 1938, June 16, 1938, June 19, 1938, July 2, 1938), D.J. & J.N. Knull, 75 (OSUC). Hocking Co., June 14, 1936, J.N. Knull (OSUC). Hocking Co., May, 31, J.S. Caldwell (OSUC). Hocking Co., June 23, 1935, A.C. Miller, 4 (OSUC). Hocking Co. (June 16, 1956, June 17, 1961), E.I. Hazard, 5 (FSCA). Hocking Co., June 8, 1958, F.W. Mead, 14 (FSCA). Hocking Co., June 7, 1952, H.V. Weems, 9 (FSCA). Knox Co., Gambier, 5 (FSCA), Knox Co., Gambier, May, 1938 (FSCA). Licking Co., June 23, 1955, R.E. Woodruff (FSCA). Lorain Co., Amherst, July-August, 1958, H.J. Reinhard, 5 (TAMU). Scioto Co., June 10, 1944, D.J. & J.N. Knull (FMNH). Scioto Co. (June 1, 1961, May 24, 1963), F.J. Moore, 4 (OSUC). Scioto Co. (June 10, 1944, June 17, 1944), D.J. & J.N. Knull, 4 (OSUC). Scioto Co., Shawnee

Forest, June 9, 1943, D.J. & J.N. Knull (OSUC). Tuscarawas Co., June 1, 1963, D.J. & J.N. Knull (OSUC). Vinton Co., Vinton, June 5-12, 1900, 2 (OSUC). Warren Co., May 19, 1963, F.J. Moore (OSUC). 2 (CASC). **Oklahoma**, Latimer Co. (April, 1983, May, 1983, June, 1983, April, 1985, May, 1985, June, 1985), K. Stephan, beating in forest, 8 (FSCA). Latimer Co., 5 mi. W. Red Oak, May, 1981, K. Stephan, beating in forest, 2 (FSCA). Latimer Co. (April, 1986, May, 1986, June, 1986, May, 1988, May, 1989, June, 1993, April, 1994), K. Stephan, 11 (FSCA). Latimer Co., 5 mi. W. Red Oak, May, 1981, K. Stephan (TAMU). Latimer Co. (June, 1981, May, 1983, June, 1983, May, 1984, July, 1984), K. Stephan, 12 (TAMU). **Pennsylvania**, Allegheny Co., Pittsburgh (June 13, 1929, June, 1930), H.L. Chermock, 6 (UCDC). Dauphin Co. (June 6, 1928, June 15, 1928), J.N. Knull, 2 (CASC). Dauphin Co., Hummelstown, May 29, 1933, J.N. Knull, 6 (FMNH). Dauphin Co., Manada Gap, May 29, 1933, J.N. Knull, 5 (FMNH). Dauphin Co., Inglenook, June 20, 1909, J.N. Knull (FMNH). Dauphin Co., Linglestown, June 6, 1909, 2 (WFBM). Franklin Co., Chambersburg, May, 25, J.N. Knull (FMNH). McKean Co., Mt. Alton, May 6, 1932, J.N. Knull, 3 (CASC). McKean Co., Mt. Alton. (June 4, 1931, June 30, 1931), J.N. Knull, 2 (UCDC). Northampton Co., Easton (July 8, 1917, July 16, 1917), J.W. Green, 3 (CASC). Philadelphia Co., June, 6 (FMNH). Philadelphia Co., Frankford, H.W. Wenzel, 4 (OSUC). Westmoreland Co., Clark's Valley, June 8, 1930, J.H. Knull (CASC). Westmoreland Co., Clark's Valley (July 3, 1929, June 26, 1930, July 3, 1930, July 20, 1930), J.N. Knull, 5 (FMNH). Westmoreland Co., Clark's Valley, May, 15, J.O. Pepper (OSUC). N. Bloomfield, July 17, 1920, J.N. Knull (FMNH). Chestnut Hill (June 3, June 5, June 9, July 1), 7 (FMNH). **Tennessee**, Benton Co., July 1, 1948, I. Walker & P. White (FSCA). Blount Co., Chilhowee M., June 7, 1955, D.J. & J.N. Knull, 4 (OSUC). Davidson Co., Nashville, June 23, 1893 (MEMU). Franklin Co., Sewanee, June 7, 1958, H.R. Steeves, At light, 2 (FMNH). Morgan Co., Burrville (May 24, 1953, May 25, 1953), B. Benesh, 4 (FMNH). Sevier Co., Great Smoky Mt. National Park, June 21, 1935, H.S.

Dybas (FMNH). Sevier Co., Gatlinburg, June 16, 1960, C.E. White (FSCA). Sevier Co., Great Smoky Mt. National Park (June 7, 1942, June 14, 1942, June 9, 1955), D.J. & J.N. Knull, 7 (OSUC). Unicoi Co., Devils Cr. Tri., Unaka Sprs., June, Siepmann (FMNH). Wilson Co., Cedars of Lebanon State Park 36°04'56" N 86°18'51" W, June 10, 1997, J.M. Campbell (MEMU). **Texas**, Bastrop Co., Bastrop S. Pk., March 26, 1950, D.J. & J.N. Knull (FMNH). Harrison Co., Karnack, May 17, 1948, J.N. Knull (CASC). Harrison Co., Karnack, May 22, 1951, D.J. & J.N. Knull, 3 (OSUC). Sabine Co., 9 mi. E. Hemphill "Beech Bottom" (April 25- May 7, 1989, May 8-21, 1989, May 22 - June 4, 1989, June 5-17, 1989, June 18-23, 1989, June 23 - July 2, 1989, July 2- 13, 1989, March 20- April 29, 1990, April 29-May 3, 1990), R. Anderson & E. Morris, Malaise Trap beech magnolia forest, 45 (TAMU). Wood Co., 15 mi. N. Hawkins 32°98'42" N 95°10'04" W, April 29, 2000, E.G. Riley, 3 (TAMU). Wood Co., 3.5 mi. W. Hawkins, Little Sandy Hunt. Fish Club, May 9, 1988, R.S. Anderson (TAMU). **Virginia**, Carroll Co., Blue Ridge Parkway, milepost 100, June 21, 1988, N.M. Downie, 3 (FSCA). Essex Co., Champlain, June 21, 1995, C.L. Staines, 2 (FSCA). Fairfax Co., Alexandria, May 21, 1977, F.G. Andrews, 2 (CASC). Fairfax Co., Mt. Vernon, June 17, 1923, Quirsfeld, 6 (CASC). Falls Church Co., E. Falls Church, May 28, 1916, J.N. Knull (CASC). Fredericksburg Co., Fredericksburg (June 7, 1900, May, 1902), 3 (CASC). Roanoke Co., Mt. S. of Roanoke, June, Siepmann (FMNH). Roanoke Co., Mill Mtn., Roanoke, June, Siepmann (FMNH). Roanoke Co., Mt. n. e. of Roanoke, June, Siepmann, 2 (FMNH). **West Virginia**, Hardy Co., Lost River State Park, July 19, 1974, A.S. Menke (UCDC). Randolph Co., Spruce Knob Lake, June 25, 1988, N.M. Downie (FSCA). Washington Co., Winchester, June 25, 1963, K. Stephan (FSCA). **Wisconsin**, Dane Co., May 30, 1904, W.S. Marshall (MEMU).

Distribution: This species is widespread eastern North America (Fig. 108).

Diagnosis: *Limonius quercinus* is similar *L. basilaris* but differs by the pronotum being black throughout, antennal segments 2 and 3 together longer than segment 4, the

Parameres (Fig. 55) with lateral margin convex basally, concave along apical third, apical blades as long as wide with lateral peak, rounded apically, aedeagus gradually narrowing to tip, not extending beyond parameres. The pronotum of *L. basilaris* is black with the hind angles and hypomeral margin yellow, antennal segments 2 and 3 combined about 2/3 length of segment 4, and parameres (Fig. 22) with lateral margin subparallel, apical blades triangular longer than wide, aedeagus thick with rounded tip, extending beyond parameres by less than half the length of apical blades.

*Limenius rectangularis* Fall

*Limenius rectangularis* Fall, 1934: 30. Holotype # 24358 (MCZC). Type locality:  
Alpine, Texas.

Length: 10 mm (length/width ratio 3.3). Head dark brown, clypeal margin entire, frontal densely, shallowly punctate. Antennae extending beyond hind angles by about 4 segments, segments 2 and 3 moderately long, each of them about 2/3 of segment 4, yellowish brown. Pronotum brown throughout, 3.2 mm (length/width ratio: 1.28), pronotal margin parallel. Carina, short, less than 1/5 of the lateral margin, parallel with the lateral margin. Pronotal texture, deeply, densely punctate, separated by less than width of punctures, covered with erect yellow setae. Scutellum dark brown becoming pale brown in the middle, shell-like, deeply punctate, covered with long yellow setae. Hypomeron costate anteriorad, forming small antennal groove; posterior border of hypomeron without teeth; prosternum, brown throughout, deeply punctate, with small appressed yellow setae; hypomeron brown, deeply punctate, with small appressed yellow setae; metasternum brown throughout, deeply punctate, separated by less than width of punctures, with small yellow setae, legs color, brown.

Elytra 6.5 mm (length/width ratio 2.16), brown throughout, striae deeply punctate, interstriae deeply punctate, separated by less than width of puncture, covered with erect yellow setae.

Abdomen brown, deeply punctate, separated by less than width of punctures, with small yellow setae.

Male genitalia (Fig. 56): Parameres with lateral margin convex basally becoming subparallel apically, apical blades triangular, aedeagus thick gradually narrowing in the apical third, extending beyond parameres by about 1x length of apical blades.

No female available.

Type Material Examined: Holotype # 24358 (MCZC). Alpine, Texas, May 20, 1926, Poling (MCZC).

Distribution: This species is only known from the holotype.

Diagnosis: *Limonius rectangularis* is very similar to several species in the genus *Athous* especially in regard to the frons in lateral view, with depression (Fig. 12), however, all other characters are typical of other *Limonius* species.

#### *Limonius rudis* Brown

*Limonius rudis* Brown, 1933: 175-176. Holotype # 3446 (CNIC). Type locality:  
Bryon, Ontario.

Length: 11.68-13.76 mm (length/width ratio 3.5-3.7). Head black throughout, clypeal margin entire with slightly recurved medially, frontal umbilicate punctures, separated by less than width of punctures, covered with densely appressed yellow setae.

Antennae dark brown to black, not extending beyond hind angles, segments 2 small, intermediate in length between segment 2 and 4. Pronotum black throughout, 2.88-3.68 mm (length/width ratio as long as broad), pronotal margins broadly rounded. Carina,

about 1/3 length of lateral margin, subparallel to lateral margin. Pronotal texture, deeply punctate, separated by about width of punctures, covered with appressed yellow setae. Scutellum black, pentagonal, finely punctate, covered with long, appressed yellow setae. Hypomeron costate anteriorad, forming small antennal groove; posterior border of hypomeron dentate; prosternum, black throughout or with posterior and anterior border reddish, shallowly umbilicate punctures, separated by less than width of punctures, covered with dense appressed yellow setae; hypomeron black with posterior and anterior border reddish, deeply punctate, separated by less than width of punctures, covered with appressed yellow setae; metasternum black throughout, deeply punctate, separated by less than width of punctures, covered with finely appressed yellow setae, legs color, yellowish brown to dark brown.

Elytra 8.16-9.6 mm (length/width ratio 2.4-2.6), shiny, black throughout, striae finely punctate, inter-striae deeply punctate, covered with appressed yellow setae.

Abdomen black throughout, deeply punctate, separated by less than width of punctures, covered with finely, appressed yellow setae.

Male genitalia (Fig. 57): parameres with lateral margin convex basally constricted before blades in apical fourth, apical blades longer than broad, rounded apically, aedeagus wide then tapering to a pointed tip in the latter ¼, extending beyond parameres by less than 1/3 length of apical blades, parameres long 1.5 to 1.7 length of basal piece.

Female bursa copulatrix (Fig. 72) with spines arranged in poorly defined rows in a circular or semicircular pattern around bursal walls.

Type Material Examined: Holotype, California, El Dorado Co., Echo Lake, Tahoe, July 8, 1915, R. Hopping (CNIC).

Material Examined: **Canada: Ontario**, 3 (CASC). Ridgeway, E.J. Zavitz (USNM). Chaffeys Looks, June 28, 1963, J.C.E. Riotte (CMNC). Ridgeway, E.J. Zavitz, 2 (CMNC).

**United States: Illinois**, Coles Co., Fox Ridge St. Park., June 18, 1966, J.D. Pinto (CASC). Cook Co., Riverside (June 10, 1934, June 29, 1935), H.S. Dybas, 3 (FMNH). Cook Co., Palos Park, July 20, 1937, H.S. Dybas (FMNH). Knox Co., Galesburg (OSUC). La Salle Co., Starved Rock SP., March 7, 1938, F.G. Werner (CASC). **Indiana**, Allen Co., New Haven (June 26, 1986, July 11, 1986), N.M. Downie, 3 (FSCA). Brown Co., June 1, 1967, N.M. Downie (FMNH). LaPorte Co., Michigan City, July 7, 1935, H.S. Dybas, 2 (FMNH). Marion Co., Indianapolis, May 25, 1962, C.E. White (FSCA). Tippecanoe Co., Lafayette, July 5, 1989, N.M. Downie, U-V Light (CASC). Tippecanoe Co. (June 5, 1952, June 24, 1955, March 10, 1956, June 5, 1957, June 14, 1958, June 6, 1967, June 28, 1969, June 10, 1976), N.M. Downie, 8 (FMNH). Tippecanoe Co., W. Lafayette, McCormick's Woods (July 13, 1989, July 28, 1989), N.M. Downie, 3 (FSCA). Tippecanoe Co., McCormick's Woods, June 1, 1989, N.M. Downie (FSCA). Tippecanoe Co., W. Lafayette, McCormick's Woods, June 6, 1982, N.M. Downie (FSCA). Tippecanoe Co., June 9, 1982, N.M. Downie (FSCA). Tippecanoe Co., McCormick's Woods, July 1, 1989, N.M. Downie, 2 (CASC). Tippecanoe Co., May 31, 1956, N.M. Downie (FMNH). Warren Co., June 13, 1989, N.M. Downie (FMNH). Warren Co., June 6, 1983, N.M. Downie (FSCA). R.T. Weith, 2 (CASC). **Maryland**, Baltimore Co., Sparrows Pt., July 8, 1932, J.W. Green (CASC). Baltimore Co., Baltimore, June, 11 (CASC). Baltimore Co., Baltimore (June 12, 1909, June 13, 1909), F.E. Blaisdell, 2 (CASC). **Nebraska**, Knox Co., Niobrara 524 Ave & 893 Rd., June 28, 2003, B. Kondratieff & R. Zuellig (CSUC). **New Jersey**, Camden Co., S. Camden, H.W. Wenzel (OSUC). Sussex Co., High Pt., June 4, 1924, F.M. Schott (FMNH). **New York**, Niagara Co., Olcott, June 12, 1921, H. Dietrich (FMNH). Onondaga Co., Elbridge, May 26, 1940, N.M. Downie (FMNH). St. Lawrence Co., Rossie (June 27, 1942, May 18, 1981), N.M. Downie, 2 (FMNH). St. Lawrence Co., Rossie, May 30, 1982, N.M. Downie (FSCA). Tompkins Co. (June 1, 1957, June 8, 1964), N.M. Downie, 2 (FMNH). **North Carolina**,

Jackson Co., Blue Rdge. Pkwy., Mile Post 310, June 22, 1988, J.E. Wappes, 2 (FSCA).  
**Ohio**, Ashtabula Co., June 24, 1931, E.P. Breakey (OSUC). Clark Co., Clifton (May 22, 1942, July 2, 1962, June, 4), D.J.& J.N. Knull, 3 (FMNH). Clark Co., Clifton (June, 4, June 14, 1938, June, 16, June, 23), D.J.& J.N. Knull, 15 (OSUC). Clinton Co., June 16, 1961, F.J. Moore (OSUC). Delaware Co., (May 28, 1949, May 30, 1949), E.L. Sleeper, 5 (FSCA). Delaware Co. (May, 28, May, 30, June 21, 1950, June 2, 1953), D.J.& J.N. Knull, 14 (OSUC). Franklin Co., Columbus (May 25, 1938, June 5, 1951, May 25, 1952), D.J.& J.N. Knull, 5 (FMNH). Franklin Co., Westerville, (May 7, 1949, June 19, 1949), E.L. Sleeper, 4 (FSCA). Franklin Co. (June 2, 1952, June 9, 1952), D.J.& J.N. Knull, 9 (OSUC). Franklin Co., June 5, 1963, F.J. Moore (OSUC). Franklin Co., Columbus (June 9, 1938, May 20, 1938, May 24, 1938, June, 3, June, 5), D.J.& J.N. Knull, 27 (OSUC). Franklin Co. (June, 1, June 2, 1952, June 9, 1952), D.J.& J.N. Knull, 5 (OSUC). Franklin Co., Columbus, May 21, 1902 (OSUC). Franklin Co., Columbus, June 26, 1921, A.E. Miller (FSCA). Greene Co. (May 12, 1938, June 14, 1938, June 8, 1950), J.N. Knull, 3 (FMNH). Greene Co. (May 12, 1938, June, 20), D.J.& J.N. Knull, 13 (FMNH). Greene Co. (June, 2, June 8, 1950, June 15, 1953, July, 8, May 25, 1954, May 2, 1955, May, 12, June 12, 1955, June 15, 1955, May 19, 1956, May, 27, May, 28), D.J.& J.N. Knull, 30 (OSUC). Hamilton Co., Mt. Healthy, May, 1941, C.R. Neiswander (OSUC). Hamilton Co., Cincinnati, May 30, 1908, J.S. Hine (OSUC). Highland Co., July 16, 1961, E.I. Hazard (FSCA). Hocking Co., June, 21, J.N. Knull (FMNH). Ross Co., Mt. Logan, May 22, 1922, A.E. Miller (FSCA). Warren Co., June 4, 1952, D.J.& J.N. Knull, 6 (OSUC). Warren Co., Fort Ancient, June 10, 1940, R.M. Goslin, Light Trap (OSUC).  
**Pennsylvania**, Cumberland Co., Eberlys Mill, May 30, 1908 (FMNH). Delaware Co., Castle Rock, June, 8, H.A. Wenzel, 6 (OSUC). Delaware Co., Castle Rock, June, 8, H.W. Wenzel (FMNH). Erie Co., North East, May 19, 1906, F. Johnson (USNM).  
**Tennessee**, Davidson Co., Couchville Glade. 36°06'05" N 86°31'47" W, June 10, 1997,

T.L. Schiefer, beating in cedar glades (MEMU). Franklin Co., Anderson, April 6, 1986, A. Asquith (MEMU). Rutherford Co., Factory Road. 35°51'44" N 86°18'03" W, June 11, 1997, G. Hankins, in Cedar Glades (MEMU). Rutherford Co., Factory Road. 35°51'44" N 86°18'03" W, June 13, 1997, T.L. Schiefer, in Cedar Glades (MEMU). Wilson Co., Cedars of Lebanon S.F. 36°05'40" N 86°22'13" W, June 11, 1997, J.A. MacGown, in Cedar Glades, 8 (MEMU). Wilson Co., Cedars of Lebanon S.P. 36°04'56" N 86°18'51" W, June 14, 1997, T.L. Schiefer, in Cedar Glades, 2 (MEMU). Wilson Co., Lane Farm Glade. 36°01'52" N 86°22'12" W, June 12, 1997, T.L. Schiefer, in Cedar Glades, 2 (MEMU). **Texas**, Travis Co., Vic. Long Hollow Ck. 30°27'43", 97°52'19" (April 10, 1993, March 26, 1994, April 9, 1994, May 7, 1994), M. Quim, E. Riley, R. Wharton, on Queraus buokjeyi, 17 (TAMU). Travis Co., Vic. Cypress Creek. 30°25'58", 97°52'01", May 26-27, 1994, M. Quim, E. Riley, R. Wharton, 2 (TAMU). **Virginia**, Giles Co., Rich Creek Area, June 8, 1982, B. Kondratieff (CSUC). Smyth Co., Rt 600 St. Clair Bottom, May 23, 1990, B. Kondratieff, J. Welch & R.F. Kirchner (CSUC). Winchester Co., June 17, 1964, O. Peck (CMNC).

Distribution: This species is found in Wisconsin and eastern North America (Fig. 109).

Diagnosis: *Limonium rudis* can be recognized from *L. griseus* by the hind angles of the pronotum divergent, lateral margin thinly beaded, prosternum piceus, and in the male, the apical blades are wider, bursa copulatrix (Fig. 72) of the female has spines arranged in poorly defined rows in a circular or semicircular pattern around bursal walls. Whereas, in *L. griseus*, the hind angles of the pronotum are parallel sided, lateral margin distinctly beaded, prosternum reddish, and in the male, the apical blades are narrower, and in the bursa copulatrix lacks spines.

*Limonium rufihumeralis* Lane.

*Limonius rufihumeralis* Lane, 1941: 133-135, Lane, 1971: 22. Holotype # 54845

(USNM). Type locality: Slopes of Blue Mountains near Walla Walla, Washington.

Length: 9.75-10.5 mm (length/width ratio 3.75-4). Head black, clypeal margin entire, or slightly recurved medially, frontal umbilicate punctures, separated by less than width of punctures, with small suberect yellow setae. Antennae extending beyond hind angles by 2 to 3 segments, segments 2 and 3 small, together just longer than segment 4, black. Pronotum dark blue to black, 2.6-3 mm (length/width ratio: 1.16-1.25), pronotal margin parallel in posterior third narrowing slightly to anterior angles, disk convex. Carina, short, less than 1/5<sup>th</sup> length of lateral margin, subparallel with the lateral margin. Pronotal texture, with dense umbilicate punctures becoming larger toward margins, separated by less than width of punctures. Scutellum flat with anterior margin straight, color reddish black with yellow setae. Hypomerion strongly costate on anterior third, forming antennal groove; posterior border of hypomerion without teeth; prosternum, black throughout, deeply punctate, separated by less than width of punctures; hypomerion black throughout, umbilicate punctures, separated by less than width of punctures; metasternum black throughout, deeply punctate, separated by less than width of punctures, with finely appressed yellow setae, legs color, reddish to black.

Elytra 6.7-7 mm (length/width ratio 2.5-2.7), black except the elytral base orange, striae finely punctate, inter-striae deeply punctate.

Abdomen black throughout, deeply punctate, separated by more than width of punctures punctate, with finely black setae.

Male genitalia: apical half of parameres before apical blades subparallel, apical blades 2 X as long as wide, narrowing gradually to tip, aedeagus gradually narrowing to tip

extending beyond parameres by about half the length of apical blades. Parameres long 3 1/2 to 4 X length of basal piece.

The female bursa copulatrix is not sclerotized.

Type Material Examined: Holotype # 54845 (USNM). Walla Walla, Washington, April 29, 1936, M.C. Lane (USNM).

Material Examined: **Canada: Alberta**, June 1, 1928, O. Bryant, Swept from grass beside (CASC). **British Columbia**, Aspen Grove, June 4, 1931, J.R. Howell (CASC). Midday Valley, Merritt, June 14, 1926, W. Mathers (CASC). Vernon (June 5, 1921, May 1, 1924), R. Hopping, 2 (CASC).

**United States: Idaho**, Bear Lake Co., St. Charles Can., Wasatch Range, June 16, 1965, R.L. Westcott & L.S. Hawkins (WFBM). Bonneville Co., 11 mi. NE. Swan Valley, May 25, 1964, R.L. Westcott (WFBM). Caribou Co., 5 mi. E. Wayan, June 23, 1967, H.C. Manis (WFBM). Kootenai Co., Coeur d Alene, 2560 ft., April 25, 1917 (CASC). Kootenai Co., Coeur d Alene, June 15, 1930, H.V. Rust (FMNH). Kootenai Co., Chilco, May 21, 1958, A.R. Gittins (WFBM). Kootenai Co., Athol, April 29, 1957, W.F. Barr (WFBM). Latah Co., Moscow, 2560 ft., May 4, 1960, J.M. Aldrich (CASC). Latah Co., Moscow, May 13, 1950, N.M. Downie (FMNH). Latah Co., Moscow Mts., June 8, 1951, N.M. Downie (FMNH). Latah Co., Deary, May 20, 1951, N.M. Downie (FMNH). Latah Co., Moscow, June 14, 1930, P. Rice (WFBM). Latah Co., Moscow, 2560 ft., May 15, 1930, C. Wakeland (WFBM). Latah Co., Moscow, 2 (WFBM). Latah Co., Moscow, E.E. Wehr (WFBM). Latah Co., Mt. Moscow, June 13, 1929, W.E. Shull (WFBM). Latah Co., Laird Park, June 14, 1966, D.S. Horning (WFBM). Latah Co., Robinson Lake, May 8, 1957, A.R. Gittins (WFBM). Latah Co., Harvard, June 14, 1966, R.L. Westcott (WFBM). Latah Co., Moscow, 2560 ft. (March 20, 1928, April 21, 1929), 2 (WFBM). Latah Co., Laird Park, May 14, 1962, W.F. Barr (WFBM). Lemhi Co., Lemhi Pass, June 23, 1961, J.E. Henry (WFBM). Lewis Co., Winchester, May 4, 1945, W.E. Shull (WFBM). Nez

Perce Co., Central Grade, June 3, 1953, W.F. Barr (WFBM). Nez Perce Co., Central Grade, May 10, 1963, G.P. Markin (WFBM). Shoshone Co., Wallace (FMNH). Valley Co., McCall, June 29, 1935, F.H. Shirck, 2 (FMNH). **Montana**, Sanders Co., Findley's Flats, Lolo National Forest, Hwy 200, June 15, 1982, N.M. Downie (FMNH). **Oregon**, Baker Co., Pine Creek, 4100, May 27, 1945 (FMNH). Baker Co., Pine Creek, May 25, 1941, J.H. Baker (FMNH). Grant Co., Granite, June 21, 1945 (FMNH). Harney Co., Steen Mts., June 24, 1920 (CASC). Jackson Co., Medford, June 1, 1944, A.T. McClay (CASC). Lane Co., Franklin, June 1, 1948, G.E. Bohart (UCDC). Umatilla Co., Meacham, June 15, 1938 (CASC). Union Co., Catherine Creek, July 10, 1961, R.H. Abbott (WFBM). Wallowa Co., Wallowa Lake, June 15, 1938 (CASC). Wallowa Co., Wallowa Lake, June 12, 1940 (FMNH). **Utah**, Cache Co., Logan, May 6, 1952, W.J. McConnell (FMNH). Salt Lake Co., Salt Lake City, June 10, 1928, E.C. Van Dyke (CASC). **Washington**, Milton Co., Walla Walla River, June 10, 1938, E.W. Jones (WFBM). Spokane Co., Mt. Spokane State Park, June 12, 1971, N.M. Downie (FMNH). Walla Walla Co., Walla Walla (May 1, 1936, May 10, 1939, May 13, 1938), M.C. Lane, 5 (CASC). Walla Walla Co., Walla Walla, April 28, 1938, K.E. Gibson (CASC). Walla Walla Co., Walla Walla, May 1, 1936, M.C. Lane (OSUC). Walla Walla Co., Walla Walla (April 21, 1938, May 3, 1940), M.C. Lane, 2 (FMNH). Walla Walla Co., Walla Walla ( May 3, 1936, May 7, 1936), E.W. Jones, 3,(WFBM). Walla Walla Co., Walla Walla, Mormon Grade (April 20, 1938, May 3, 1940), K.E. Gibson, 2 (WFBM). Walla Walla Co., May 1, 1936, M.C. Lane (OSUC). Walla Walla Co. (May 1, 1936, May 13, 1936), M.C. Lane, 2 (UCDC). Whitman Co., Palouse, Kamiak, Butte, May 20, 1939, M.C. Lane (CSUC). Whitman Co., Palouse, Kamiak, Butte, May 6, 1953, Verne Newhouse (CSUC). Whitman Co., Pullman, May 12, 1933, I.W. Bales (CASC). Whitman Co., Pullman (May 28, 1949, May 25, 1951), N.M. Downie, 4 (FMNH). Whitman Co., Pullman, May 26, 1901, C.V. Piper (FSCA).

Distribution: This species is found in northwestern North America (Fig. 110).

Diagnosis: *Limenius rufihumeralis* is most similar to *L. crotchii*. In the male, the parameres (Fig. 58) of *L. rufihumeralis* have the apical half before apical blades subparallel, apical blades 2 X as long as wide, narrowing gradually to tip, aedeagus gradually narrowing to tip extending beyond parameres by about half the length of apical blades. In *L. crotchii*, the parameres (Fig. 31) have the lateral margin subparallel, enlarged gradually toward apical blades, with slight curve in the middle, apical blades triangular, aedeagus gradually narrowing to tip, extending beyond parameres by 20% to 30% length of apical blades.

*Limenius sinuifrons* Fall

*Limenius sinuifrons* Fall, 1907: 227, Van Dyke, 1932: 336. Holotype # 24359 (MCZC). Type locality: Coconino Co., Williams, Arizona.

*Limenius ovatus* Knull, 1934: 9. Holotype (FMNH). Type locality: Laguna, California. Synonymized, Fall 1934: 173.

*Limenius arizonicus* Van Dyke, 1943: 45-46. Holotype # 5331 (CASC). Type Locality: Cochise Co., Chiricahua Mts., Arizona. New synonym.

Length 9-13 mm (length/width ratio 3.21-3.7). head dark brown, clypeal margin entire, frontal punctures deeply to subumbilicate punctures, separated by less than width of punctures; covered with suberect yellow setae. Antennae extending 2 segments beyond hind angles, segments 2 small, segment 3 intermediate in length between segment 2 and 4, antennal color brown to dark brown. Pronotum reddish brown to dark brown; 2.7-3.5 mm (length/width ratio: 1.15-1.35) lateral margins subparallel in the middle, Carina, about ¼ length of lateral margin hind angles, parallel with lateral margin; pronotal texture, deeply to subumbilicate punctures, separated by less than width of

punctures, covered with erect to suberect yellow setae. Scutellum yellow to dark brown, pentagonal, deeply punctate, covered with subappressed yellow setae. Hypomeron, costate, anteriorad forming small antennal groove; posterior border of hypomeron dentate; prosternum, yellow to reddish-brown, subumbilicate punctures, separated by less than width of punctures, with small appressed yellow setae; hypomeron yellowish brown to brown, with dense umbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae; metasternum yellow to dark brown, deeply punctate, separated by less than width of punctures, with small appressed yellow setae, legs color, yellow to dark brown.

Elytra 6- 9 mm (length/width ratio 2.15-2.6) reddish brown to dark brown, striae moderately punctate, striae, moderately punctate, inter-strial finely punctate.

Abdomen yellow to dark brown, deeply punctate, punctures often separated by more than width of punctures.

Male Genitalia: Parameres with lateral margin convex basally, apical blades triangular, aedeagus gradually narrowing to tip, extending beyond parameres by  $\frac{1}{4}$  to  $\frac{1}{2}$  the length of apical blades.

The female bursa copulatrix not sclerotized.

Type Material Examined: Holotype, Coconino Co., Williams, Arizona, Barber & Schwarz (MCZC).

Type Material of Synonyms Examined: *L. ovatus*, San Diego Co., Laguna, California, August 8 (FMNH). *L. arizonicus*, Cochise Co., Chiricahua Mts., Arizona, 8-9000 ft. July 15, 1927, J.A. Kusche (CASC).

Material Examined: **United States: Arizona**, Cochise Co., Bar Foot Park, Chiricahua Mts., 9000 ft., July 29, 1927, J.A. Kasche, 2 (CASC). Cochise Co., Flye Pk., Chiricahua Mts., 9500 ft., July 9, 1927, J.A. Kasche, 2 (CASC). Cochise Co., Chiricahua Mts., Cave Creek, 7000 ft., June 24, 1927, J.A. Kasche (CASC). Cochise Co., Chiricahua

Mountains, June, 1908 (CASC). Cochise Co., Huachuca Mts., Copper Cyn., June 8, 1975, K. Stephan (FSCA). Coconino Co., Flagstaff (July 14, 1964, July 19, 1964, July 21, 1964, June 8, 1966), R.S. Beal, 5 (CASC). Coconino Co., Todd's Lodge, Oak Creek Cyn., July 19, 1965, R.S. Beal (CASC). Coconino Co., Williams, May, 29 (CASC). Coconino Co., Sedona, June 7, 1969, K. Stephan (FSCA). Gila Co., Pinal Mts., August 22, 1935 (CASC). Pima Co., Santa Catalina Mts., Bear Canyon, June 19, 1968 (FSCA). Pima Co., Santa Catalina Mts., Bear Canyon (June 30, 1970, June 25, 1973), K. Stephan, 3 (FSCA). Pima Co., Santa Catalina Mountains (June 23, 1940, July 21, 1942), 2 (CASC). Pima Co., Santa Catalina Mountains, Upper Bear Cyn., June 19, 1968, K. Stephan, 43 (CMNC). Santa Cruz Co., Madera Cyn., 4880 ft., May 18, 1965, D.N. Harrington (CASC). Yavapai Co., Williamson Val., 10 mi. N. Prescott, 5000 ft. (August 24, 1996, April 26-November 21, 2001), R.S. Beal, 3 (CSUC). Yavapai Co., Prescott, July 9, 1959, A. Raske (CMNC). **California**, San Diego Co., Cleveland N.F., Mt. Laguna, 6000 ft., March 1, 1983, A. Smetama (CMNC). San Diego Co., Cuyamaca Rancho State Park, (July 10, 1959, July 11, 1959, June 17, 1960), G.H. Nelson, Coll. at light, 5 (FMNH).

Distribution: This species is found in Arizona and San Diego Co., California (Fig. 111).

Diagnosis: *Limonius sinuifrons* is most similar to *L. cribriceps*. In the male, the parameres (Fig. 59) of *L. sinuifrons* have the lateral margin convex basally, apical blades wide longer than broad gradually pointed apically, aedeagus extending beyond parameres by  $\frac{1}{4}$  to  $\frac{1}{2}$  the length of apical blades. In *L. cribriceps*, the parameres (Fig. 30) have the lateral margins parallel basally, constricted in the apical  $\frac{1}{3}$  toward apical blades, apical blades wider than long, rounded apically, aedeagus almost as long as parameres.

*Limonius stigma* (Herbst)

*Elater stigma* Herbst, 1806: 86. Holotype lost (personal communication, Dr. B. Jaeger, Museum für Naturkunde Institut für Systematische Zoologie, Berlin). Type locality: Georgia.

*Limonius stigma*, Candeze, 1860: 404, Candeze, 1891: 148, Leng, 1920: 168, Van Dyke, 1932: 339.

*Elater armus* Say, 1839: 171. Holotype destroyed (Mawdsley 1993). Type locality: Massachusetts. *Gambrinus armus*, LeConte, 1853: 435.

*Pheletes stigma*, Leng, 1920:168, Schenkling, 1925: 302.

*Limonius stigma*, Van Dyke, 1932: 354.

Length: 6.5-10.25 mm (length/width ratio 3-3.5). Head black throughout, clypeal margin entire not recurved medially or slightly recurved medially, frontal deeply punctate, separated by less than width of punctures, covered with suberect yellow setae.

Antennae black throughout, extending about 2 segments beyond hind angles, segments 2 and 3 are small, together about as long as segment 4. Pronotum black throughout, 2.2-3.24 mm (length/width ratio as long as broad or slightly longer), pronotal margins subparallel. Carina, short, less than  $\frac{1}{4}$  length of lateral margin, parallel to lateral margin.

Pronotal texture, deeply punctate, separated by more than width of punctures, covered with suberect red setae. Scutellum dark brown to black, pentagonal, deeply punctate, covered with appressed yellow setae. Hypomeron not costate not forming antennal groove; posterior border of hypomeron dentate; prosternum, reddish-brown to black, deeply punctate, separated by more than width of punctures, with appressed yellow setae; hypomeron reddish brown to black, subumbilicate to umbilicate punctures, separated by less than width of punctures, with appressed yellow setae; metasternum reddish brown to black, deeply punctate, separated by more than width of punctures, with appressed yellow setae, legs color, brown to dark brown.

Elytra 4.16- 6.76 mm (length/width ratio 2-2.25), black except the elytral base orange, striae finely punctate, inter-striae deeply punctate, covered with suberect yellow setae.

Abdomen reddish brown to black, deeply punctate, separated by more than width of punctures, covered with finely appressed yellow setae.

Male genitalia (Fig. 60): parameres subparallel, apical blades spear-like, longer than broad, aedeagus wide becoming narrow on apical fifth, extending beyond parameres by less than half the length of apical blades. Parameres long: 3 to 3.5 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Type: lost.

Type Material of Synonyms Examined: Type *Elater armus* Say destroyed.

Material Examined: **Canada: Ontario**, Essex Co., Wheatley, May 1965, K. Stephan (FSCA).

**United States: Connecticut**, New Haven Co., April 21, 1911, Champlain (CASC). New Haven Co. (April, 21, May, 20), A. Champlain, 3 (FMNH). **Georgia**, Clayton Co., April 11, 1940 (CASC). **Indiana**, Pulaski Co., Jasper-pal. For., May 16, 1987, N.M. Downie (FMNH). **Massachusetts**, Middlesex Co., Natick (May 30, 1940, May 4, 1941), C.A. Frost, 8 (CASC). Middlesex Co., Natick, May 23, 1946, S.H. Frost, 3 (FMNH). Middlesex Co., Natick, May 14, 1939, C.A. Frost, 2 (FMNH). Middlesex Co., Natick, May 19, 1940 (FMNH). Middlesex Co., Natick, May 11, 1941, C.A. Frost, 4 (MEMU). Middlesex Co., Natick, May 19, 1940, in Foxhole, 2 (FSCA). Middlesex Co., Natick, May 3, 1942, C.A. Frost (FSCA). Middlesex Co., Medford, May 20, 1933, J.N. Belkin (FSCA). **New Jersey**, Essex Co., Orange Mt., May, 5, Bischott (MEMU). **New York**, Erie Co., Colden, May 23, 1904 (CASC). St. Lawrence Co., Rossie (May 23, 1973, May 24, 1974), N.M. Downie, 2 (FMNH). Tompkins Co., N. Lansing, May 19, 1936, N.M. Downie (FMNH). Tompkins Co., Ithaca, April 8, 1941, E.D. McDonald (FSCA). Tompkins Co., Ithaca, April 29, 1940,

R.H. Arnett (FSCA). Westch Co., Fordham Calder Ecol. Cntr. Armonk, April 26, 1970, D. Pirone (FMNH). N. Fairhaven (CASC). **Ohio**, Delaware Co., May 20, 1943, D.J. & J.N. Knull (FMNH). Hocking Co., Old Man's Cave, May 17, 1936, J.N. Knull (FMNH). Hocking Co. (May 2, 1939, May 5, 1940, June 3, 1940, May 9, 1957), D.J. & J.N. Knull, 4 (FMNH). Mahoning Co., May 24, 1938 (FMNH). **Pennsylvania**, Adams Co., Germantown, April 12, 1965 (CASC). Dauphin Co., Inglenook, June, 8, J.N. Knull (FMNH). Delaware Co., H.A. Wenzel (MEMU). Lycoming Co., Barbour, June 1, 1931, J.N. Knull (FMNH). Northampton Co., Wind Gap (May 28, 1931, May 30, 1946), J.W. Green, 2 (CASC). Sullivan Co., Forksville, June 7, 1932, J.N. Knull (FMNH). Sullivan Co., Laporte, June 4, 1933, J.N. Knull (FMNH). **West Virginia**, Pocahontas Co., May 14, 1986, B. Kondratieff (CSUC).

Distribution: This species is found in eastern North America (Fig. 112).

Diagnosis: *Limonius stigma* is most similar to *L. humidus*, but in the male, the apical blades (Fig. 60) of *L. stigma* are spear-like, not hook-like laterally, and the aedeagus extending beyond the parameres by less than half the length of apical blades. In *L. humidus*, the apical blades (Fig. 38) are spear-like, hook-like laterally, and the aedeagus extending beyond parameres by more than half the length of apical blades. Also in *L. stigma* the hypomeron is not costate anteriorad, not forming antennal grooves. Whereas, in *L. humidus* hypomeron is costate anteriorad, forming small antennal grooves.

Note: Since types are either lost or destroyed, Van Dyke (1932) concept of this species is accepted.

*Limonius subauratus* LeConte

*Limonius subauratus* LeConte 1853: 432, Candeze, 1860: 406, Van Dyke, 1932: 341, Lane, 1971: 23. Holotype # 2536 (MCZC). Type locality: Oregon.

*Limenius anceps* LeConte 1853: 433, Candeze, 1860: 408, Van Dyke, 1932: 341, Fall, 1934: 172, Dietrich, 1945: 16, Brooks, 1960: 28. Holotype # 2540 (MCZC). Type locality: New York. New Synonym.

Length: 8.2-10.5 mm (length/width ratio 3-3.5). Head black throughout, clypeal margin weakly entire, frontal punctures deeply punctate, separated by less than width of punctures, covered with appressed yellow setae. Antennae reaching 2-3 segments beyond hind angles; segment 2 short, less than half of segment 4, segment 3 somewhat triangular and longer than half of segment 4, antennal color brown. Pronotum black throughout or with hind angles pale, 2.32-2.5 mm (length/width 1.6-1.18) pronotal margin broadly rounded, hind angles not divergent, carina approximately  $\frac{1}{4}$  length of lateral margin, diverging from lateral margin with area between visibly punctate (viewed dorsally), pronotal texture, punctures subumbilicate on disk becoming umbilicate laterally, punctures separated by less than width of punctures, covered with appressed yellow setae. Scutellum dark brown to black, shell-like, deeply punctate, covered with densely erect yellow setae. Hypomerion, not costate, not forming antennal groove; posterior border of hypomerion without teeth; prosternum, black throughout, deeply punctures, separated by less than width of punctures, covered with small appressed yellow setae; hypomerion black throughout deeply punctures, separated by less than width of punctures, covered with small appressed yellow setae; metasternum black throughout, deeply punctate, with appressed yellow setae, legs color, yellow to pale brown.

Elytra 5.3- 7.5 mm (length/width ratio 2.5-2.6) pale brown to dark brown, striae finely punctate, inter-striae deeply punctate, covered with suberect yellow setae.

Abdomen black throughout, finely punctate separated by more than width of punctures, with appressed yellow setae. Male Genitalia: Parameres with lateral margin subparallel

basally constricted before blades on apical fourth, apical blades triangular rounded apically; aedeagus gradually narrowing to tip, extending beyond parameres by one length of apical blades, parameres long 1.7 to 1.8 X length of basal piece.

Female bursa copulatrix (Fig 73) with spines arranged in poorly defined rows in a circular or semicircular pattern around bursal walls.

Type Material Examined: Holotype # 2536 (MCZC). Oregon.

Type Material of Synonyms Examined: Holotype # 2540 (MCZC). New York.

Material Examined: **Canada: British Columbia**, Bon Accord (CASC). Chilliwack, May 6, 1958, M.C. Lane (FMNH). Essondale, June 1, 1963, W. Lasorko (FSCA). Midday Valley, Merritt (June 26, 1924, May 27, 1925), K.F. Auden, 3 (CASC). Midday Valley, Merritt, June 3, 1924, R. Hopping (CASC). Trinity Valley, May 6, 1929, R. Hopping (CASC). Vernon, June 28, 1920, R. Hopping (CASC). **Ontario**, Toronto, R.J. Crew, 5 (CASC). Unionville, June 6, 1947, D.S. Marshall, 13 (CMNC). **Quebec**, Becancour, May 30, 1959, J.C. Aube, 2 (FMNH). Becancour May 30, 1959, G. Chantal, 3 (FMNH). Joliette, June, Chaqnon (FMNH). Sherbrook, May 30, 1896 (CASC). Wakefield, June 4, 1930, W. J Brown (UCDC). **Toronto**, June 1-15, 1927, L. J. Milne (UCDC).

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Lane (CASC). Linn Co., Albany, May 8, 1939, M.C. Lane (FMNH). Multnomah Co., Portland (CASC). Multnomah Co., Portland, 19, 1927, E.W. Jones (FMNH). Tillamook Co., Manzanita (May 11, 1940, May 21, 1940), 4 (FMNH). Umatilla Co., Freewater, April 26, 1932, E.W. Jones (WFBM). Wasco Co., The Dalles, July 7, 1954, B. Malkin (FMNH). Yamhill Co., Dayton, May 9, 1940, K.M. Fender, 6 (FMNH). **Washington**, Clallam Co., Ferks, July 2, 1920, E.P. VanDuzee (CASC). Grays Harbor Co., Westport (April 9, 1933, April 28, 1936), J. Wilcox, 5 (CASC). Grays Harbor Co., Montesano (April 26, 1928, May 19, 1928), 2 (UCDC). King Co., Seattle (May 23, 1914, May 26, 1933), 7 (CASC). King Co., Mahoney's Grove, North Bend, May 13, 1936, H.P. Lanchester (CASC). King Co., Snoqualmie, May 13, 1950, B. Malkin (FMNH). Kittitas Co., Easton, 2 (CASC). Pierce Co., Sumner, May 29, 1933, E.W. Jones (WFBM). Pierce Co., Puyallup, June 10, 1933, E.W. Jones (WFBM). Pierce Co., Puyallup, May 1, 1931, A.R. Rolfs, 2 (WFBM). Pierce Co., Puyallup, May 10, 1928, W. Baker (UCDC). Snohomish Co., Sultan, April 11, 1933 (CASC). Walla Walla Co., Walla Walla (May 7, 1932, May 11, 1932, May 12, 1932, May 15, 1937), M.C. Lane, 9 (CASC). Walla Walla Co., Walla Walla (May 19, 1931, May 12, 1932), M.C. Lane, 2 (FMNH). Walla Walla Co. (April 2, 1935, May 9, 1936, May 12, 1937), E.W. Jones, 6 (WFBM). Walla Walla Co., March 29, 1937 (WFBM). Whatcom Co., Sumas, May 12, 1953, M.C. Lane (FMNH). Whitman Co., Wawawai, May 1, 1909 (CASC). Whitman Co., Wawawai, April 18, 1953, Verne Newhouse, 6 (CSUC). Whitman Co., Wawawai, May 2, 1953, Adel Kamal (CSUC). Whitman Co., Wawawai (April 15, 1953, April 18, 1953, April 27, 1953, April 29, 1953), J.A. Quist, 16 (CSUC).

Distribution: This species is widespread over North America (Fig. 113).

**Diagnosis:** *Limonius subauratus* is distinguished from two similar species, *L. ectypus* and *L. agonus* by the form of the male genitalia. The parameres of *L. subauratus* (Fig. 61) have the lateral margins subparallel basally, gradually narrowing before blades on apical fourth, and the aedeagus gradually narrowing to tip, extending beyond parameres

by one length of apical blades. The parameres of *L. ectypus* (Fig. 33) are bulbous basally, constricted before blades on apical fourth, and the aedeagus wide with a rounded tip, extending beyond parameres by half or more of the length of apical blades. The parameres of *L. agonus* (Fig. 19) with lateral margin gradually narrowing from apical  $\frac{1}{2}$  toward apical blades, apical blades wider than long, lateral points distinct subapically, aedeagus narrow keeping the same width from the middle to tip, extending beyond parameres by less than half the length of apical blades. Also *L. subauratus* can be distinguished from *L. ectypus* by the frons. In *L. subauratus*, the frons is poorly separated from labrum. Whereas, in *L. ectypus* frons is well separated from labrum. Additionally, in *L. subauratus* antennal segment 2 is small about  $\frac{1}{2}$  segment 3, segment 3 longer than half of segment 4. In *L. agonus* segments 2 and 3 small, together about as long as segment 4 or less.

Notes: The apparent disjunctness of populations in the eastern and western range of this species may warrant further subspecific status.

*Limenius ursinus* Van Dyke

*Limenius ursinus* Van Dyke, 1932: 349, Brooks, 1960: 28. Holotype # 3140

(CASC). Type locality: Larimer Co., Fort Collins, Colorado.

Length: 9-10 mm (length/width ratio 2.5-3). Head black throughout, clypeal margin entire with slightly recurved medially, frontal umbilicate punctures, separated by more than width of punctures, covered with densely appressed yellow setae. Antennae yellowish brown, extending 1 to 2 segments beyond hind angles, segments 2 small, segment 3 intermediate in length between segment 2 and 4. Pronotum black throughout with hind angles often paler, 3.2-4.5 mm (length/width ratio as long as broad), pronotal margins broadly rounded. Carina, short, less than  $\frac{1}{5}$  length of lateral margin, parallel to

lateral margin. Pronotal texture, densely umbilicate punctures, separated by less than width of punctures, covered with dense, suberect yellow setae. Scutellum black with some reddish in the middle, pentagonal, deeply punctures, covered with densely appressed yellow setae. Hypomeron costate anteriorad, forming small antennal groove; posterior border of hypomeron without teeth; prosternum, dark brown except the basal margin orange, umbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae; hypomeron brown with posterior and anterior border yellow, umbilicate punctures, separated by less than width of punctures, covered with appressed yellow setae; metasternum dark brown to black, deeply punctate, separated by more than width of punctures, covered with finely appressed yellow setae, legs color, yellow to reddish brown.

Elytra 5.6- 6.3 mm (length/width ratio 1.5-2), dark brown with reddish edges, striae finely punctate, inter-striae deeply punctate, covered with densely subappressed yellow setae.

Abdomen dark brown to black, deeply punctate, separated by less than width of punctures, covered with densely appressed yellow setae.

Male genitalia (Fig. 62): parameres with lateral margin wide in the base, gradually narrowing toward apical blades, apical blades as long as wide, rounded apically; aedeagus gradually narrowing to tip, extending beyond parameres by less than 1/3 the length of apical blades. Parameres long 1.7 to 2 X length of basal piece.

The female bursa copulatrix not sclerotized.

Type Material Examined: Larimer Co., Fort Collins, Colorado, May 12, 1904 (CASC).

Material Examined: **Canada: Alberta**, Lethbridge, May 26, 1922, H.L. Seamans (CASC).

**United States: Colorado**, Boulder Co., May 20, 1922, M. Pope (CASC). El Paso Co., Fountain Valley, 5800 ft., May 10, 1938, Bob Potts (CASC). (FMNH). Larimer Co., Lion's Park, Overland, near Poudre R., grass bog, Fort Collins, April 27, 2000, R. Carr & G. Carr (CSUC). Larimer Co., Poudre CYN 5 mi. W. of Hwy 287, Hwy 14, May 26, 2003, H.

Aldhafer, 11 (CSUC). **Nebraska**, Polk Co., May 12, 1960, R.G. Simpson (CSUC). **South Dakota**, Brookings Co., Volga, Truman (CASC). Brookings Co., Volga (MEMU). Brule Co., Chamberlain, June 5, 1947, H.C. Severin, 2 (CASC). Brule Co., Chamberlain, June 5, 1947, H.C. Severin (FMNH). Day Co., Bristol, May 25, 1952, H.C. Severin, 2 (FMNH). Lincoln Co., Canton, June 3, 1953, H.C. Severin, 3 (FMNH). Union Co., Alcester, May 21, 1953, J.A. Lofgren (FMNH). **Wyoming**, Platte Co., Warm Spring, Camp Guernsey, May 19, 2000, B. Kondratieff, R.E. Zuellig, J. Schmidt (CSUC).

Distribution: This species occurs along the Front Range of the southern Rocky Mountains to the Great Plains of South Dakota and Nebraska (Fig. 114).

Diagnosis: *Limonius ursinus* is most similar to *L. griseus*. In the male, the parameres (Fig. 62) of *L. ursinus* have the lateral margins wide at the base, and gradually narrowing toward the apical blades. In *L. griseus*, the parameres (Fig. 36) have the lateral margin convex basally and constricted before blades in apical fourth. Additionally, in *L. ursinus* the antennal segment 2 is small, segment 3 intermediate in length between segment 2 and 4. Whereas, in *L. griseus* segments 2 small, segment 3 just shorter than segment 4.

*Limonius venablesi* Wickham

*Limonius venablesi* Wickham, 1913: 27-28, Van Dyke, 1932: 335, Lane, 1971:

22. Holotype # 56427 (USNM). Type locality: Vernon, British Columbia.

Length: 10.5-13 mm (length/width ratio 3-3.5). Head black throughout, clypeal margin entire or with slightly recurved medially, frontal deeply punctate to subumbilicate punctures, separated by more than width of punctures. Antennae black, extending 1 to 2 segments beyond hind angles, segments 2 and 3 small, together just longer than

segment 4. Pronotum black throughout, 3-3.5 mm (length/width ratio: 1.15-1.5), pronotal margins subparallel in front converging posteriorad. Carina, short, less than 1/4 length of lateral margin, convergent. Pronotal texture, umbilicate punctures laterally, separated by less than width of punctures, covered with appressed golden setae. Scutellum yellowish brown to dark brown, pentagonal, very finely punctate. Hypomerion strongly costate on anteriorad third, forming antennal groove; posterior border of hypomerion dentate; prosternum, black throughout, deeply punctate, separated by more than width of punctures, covered with small appressed black setae; hypomerion black with posterior and anterior border reddish, with dense umbilicate punctures, separated by less than width of punctures, covered with small appressed yellow setae; metasternum reddish black to black, deeply punctate, separated by less than width of punctures, covered with small appressed yellow setae, legs color, reddish-brown to black.

Elytra 7- 9 mm (length/width ratio 2.5-3), yellow to reddish brown with 2 black vittae per elytron, one basally and one distally, striae with deep punctate, inter-striae finely punctate.

Abdomen black throughout, deeply punctate, separated by more than width of punctures, covered with small appressed black setae.

Male genitalia (Fig. 63): parameres with lateral margin convex basally, becoming parallel toward apical blades, apical blades lanceolate, 2 to 2.5 longer than broad, pointed apically. Aedeagus gradually narrowing to tip, extending beyond parameres by about half the length of apical blades. Parameres long 1.8 to 2 X length of basal piece.

Female bursa copulatrix not sclerotized.

Type Material Examined: Vernon, British Columbia, May 14. (USNM).

Material Examined: **Canada: British Columbia**, Kelowna, May 2, 1939, H. Leech (FMNH). Lumby, May 17, 1933, A.C. Thrupp (FMNH). Nicola Lake, May 30, 1921, R.

Hopping (CASC). Vernon, May 7, 1913, W.H. Brittain (CASC). Vernon, May 23, 1921, R. Hopping (CASC). Vernon, April 30, 1936, H. Richmond (CASC).

**United States: California**, Lassen Co., June 13, 1953, N.A. Browne (UCDC). Siskiyou Co., 40 Miles N. of McCloud, August 5, 1914, A. Hall (CASC). Siskiyou Co., Walker, June 1, 1920, C.L. Fox (CASC). **Idaho**, Latah Co., Moscow, 2560 ft., April 26, 1930, P. Rice (WFBM). Latah Co., Moscow, 2560 ft., May 6, 1912, J.M. Aldrich (WFBM). Latah Co., Moscow, 2560 ft., May 12, 1950, C. Wakeland (WFBM). Latah Co., Moscow, May 21, 1961, W.F. Barr (WFBM). Latah Co., Moscow, 2560 ft., May 12, 1936, R.E. Miller (WFBM). Latah Co., Potlatch, May 29, 1974, A.L. Antonelli (WFBM). Nez Perce Co., Lewiston, 550 ft., May 8, 1935, W.E. Shull (WFBM). Owyhee Co., Harden L., May 8, 1928 (WFBM). **Oregon**, Harney Co., Steen Mts., June 24, 1922 (CASC). Umatilla Co., Meacham, June 19, 1927, M.W. Stone (CASC). Umatilla Co., June 15, 1938, Meacham (CASC). Union Co., N. Powder, May 13, 1961, R.H. Abbott, (WFBM). **Washington**, Walla Walla Co., April 22, 1949, E.W. Jones (WFBM). Whitman Co., Wawawai, May 1, 1915 (CASC). Whitman Co., Pullman, May 9, 1920, 3 (CASC). Whitman Co., Pullman, April 13, 1905, April, 20), 2 (FMNH). Whitman Co., Pullman (May 10, 1949, May 28, 1949, May 19, 1956), N.M. Downie, 3 (FMNH). Whitman Co., Palouse, Kamiak Butte (May 24, 1935, May 20, 1939), K.E. Gibson, 3 (WFBM). Whitman Co., Pullman, May 24, 1907 (UCDC). Whitman Co., Pullman, May, 1921, C. Schwartze (CSUC). Whitman Co., Pullman (June 4, 1898, April 18, 1909), 3 (CSUC). Whitman Co., Pullman, June, 1921, Lowrin Bryne (CSUC).

Distribution: This species in Columbia River Basin east of the Cascades (Fig. 115).

Diagnosis: This species can be separated from all other Nearctic *Limonius* by the distinctive elytral pattern of black markings (Fig. 4).

*Limonius debilis* Dejean, *Nomen dubia*

*Limonius debilis* Dejean, 1837: 103.

No labeled specimens of *L. debilis* were found at the British Museum of Natural History (BMNH) or at the Museum National d'Histoire Naturelle, Paris (MNHN). Van Dyke (1932) listed this taxon, but did not treat it, nor have any other elaterid worker to my knowledge, since the original description.

Conclusions:

This revision will allow the identification of the known North American species of *Limonius*. However, much additional study is needed to fully understand the biological relationships of this genus. Clearly use of contemporary methods, including gene amplification, sequence analyses, and use phylogenetic methodology will lead to new insights in this important genus and its relatives.

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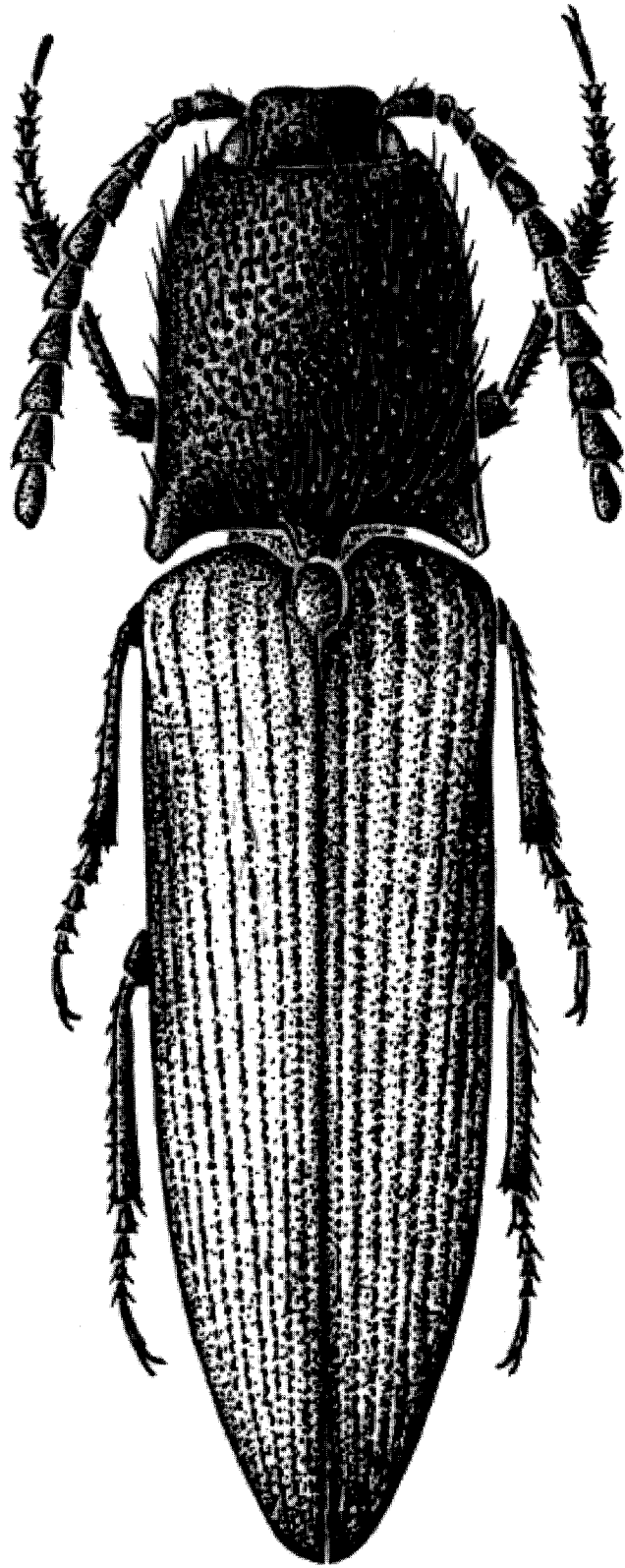
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Figure 1 *Limonius norahae* n.sp.



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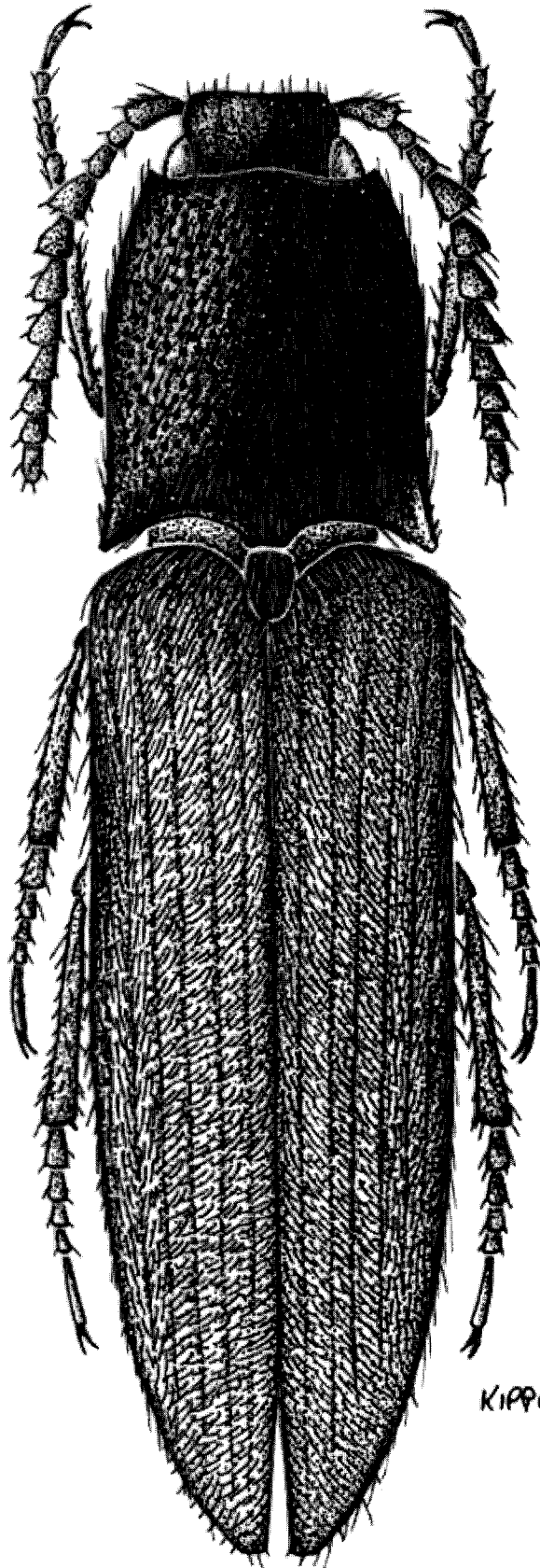
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Figure 2 *Limonius mirus* LeConte



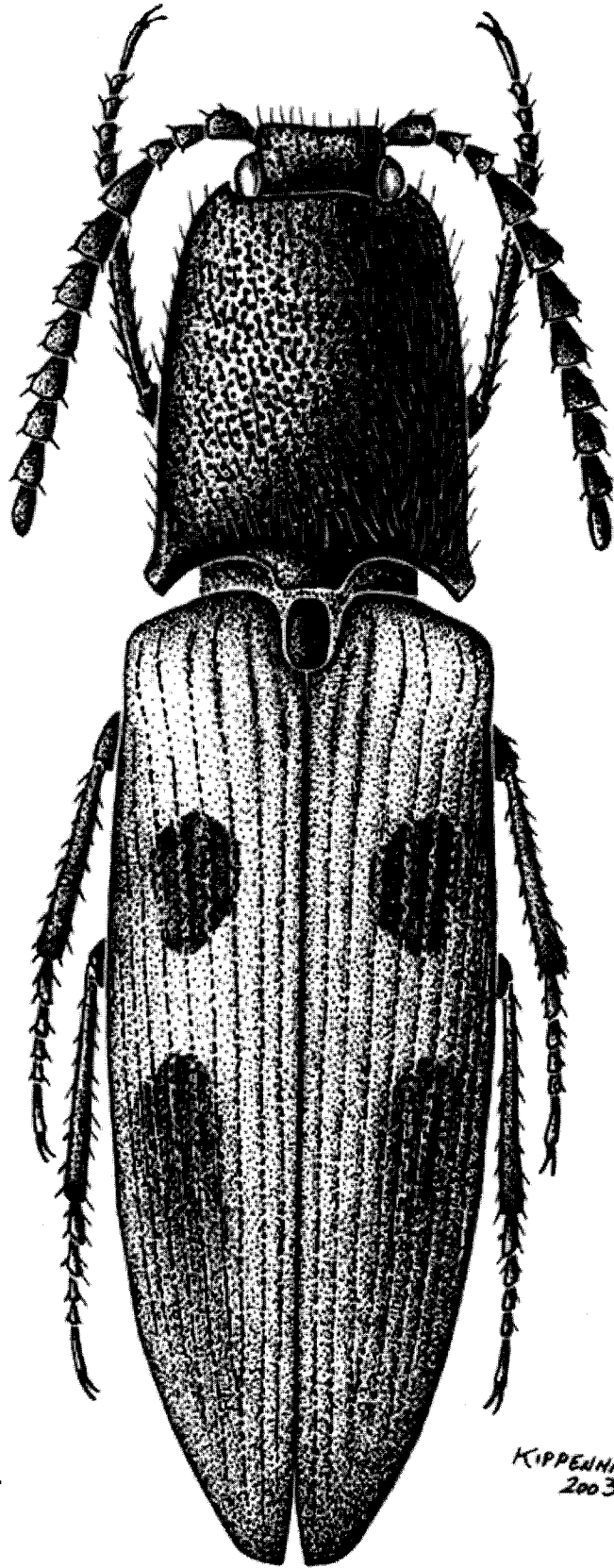
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Figure 3 *Limenius ursinus* Van Dyke



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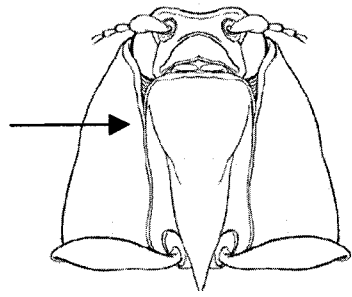
Figure 4 *Limonius venablesi* Wickham



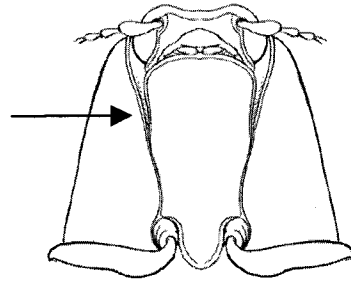
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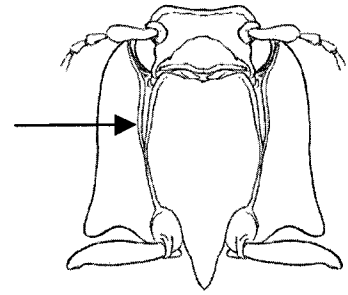
Figures 5-14. 5-7 Prosternal sutures of hypomeron. 5 *L. subauratus*, 6 *L. confusus*, 7 *L. clypeatus*. 8-11 Clypeal margin shapes. 8 *L. mirus*, 9 *L. bicolor*, 10 *L. basilaris*, 11 *L. auripilis*. 12-14 frons. 12 *L. kondraieffi*, 13 *L. subauratus*, 14 *L. mirus*.



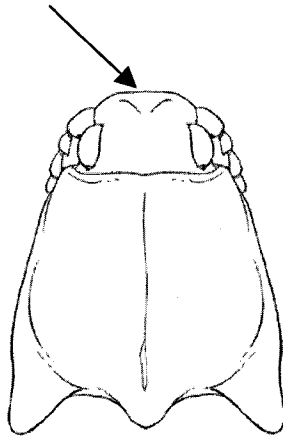
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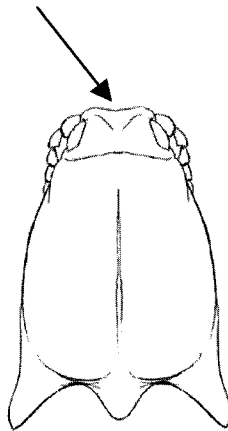
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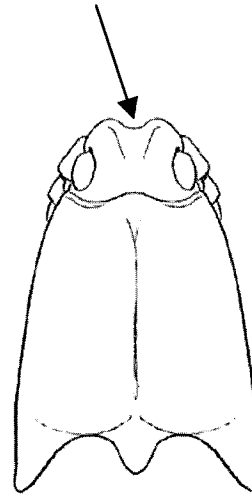
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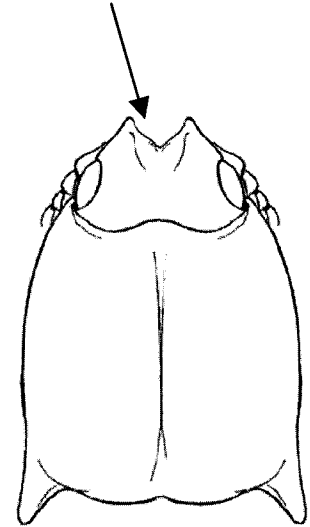
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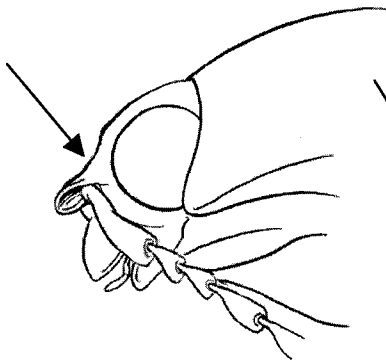
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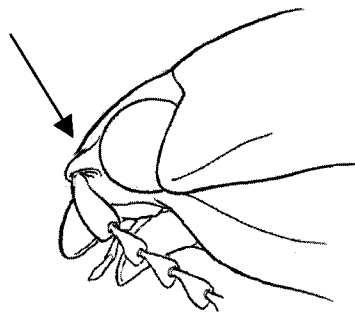
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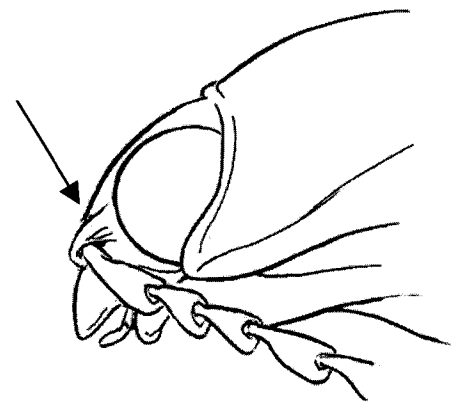
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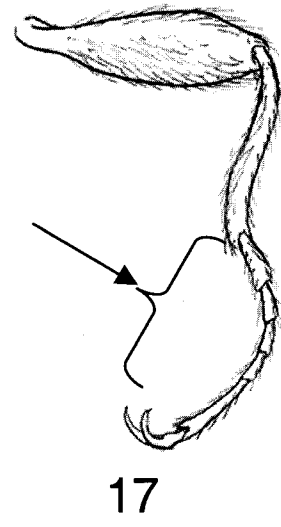
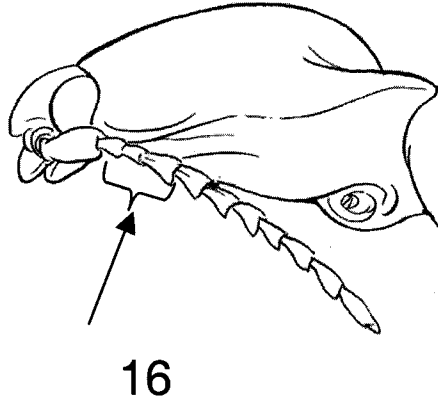
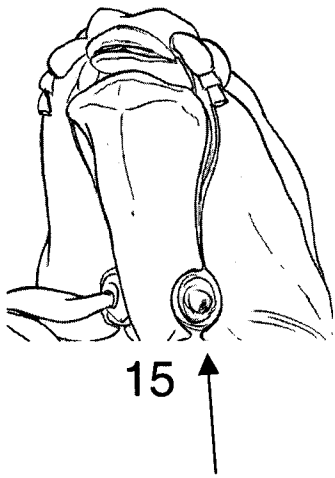


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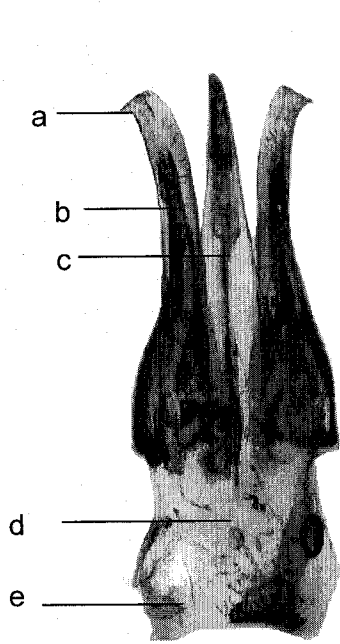


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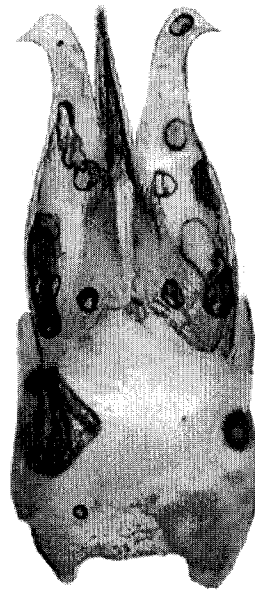
Figures 15-17: 15 the front coxal cavity of *Limenius* species, 16 the antennal segments of *Limenius* species, 17 the hind leg tarsi of *Limenius* species.



Figures 18-23: 18 Male genitalia of *L. aeger* a. apical blades; b. paramere; c. aedeagus;  
d. basal struts of aedeagus; e. basal piece. 19 *L. agonus*, 20 *L. aurifer*, 21 *L.*  
*auripilis*, 22 *L. basilaris*, 23 *L. beutenmuelleri*.



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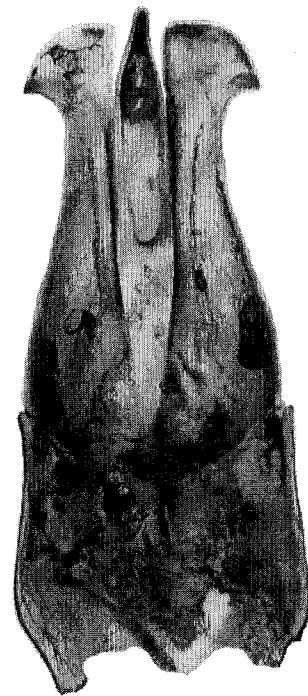
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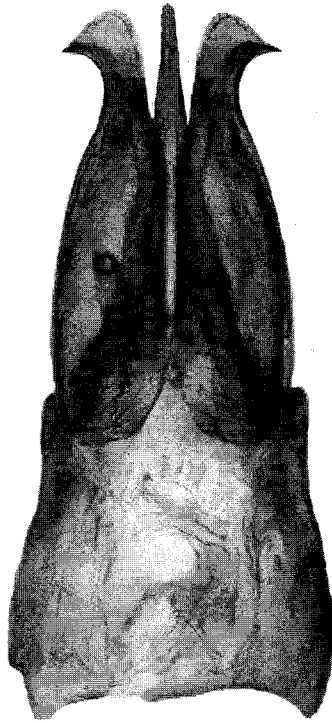


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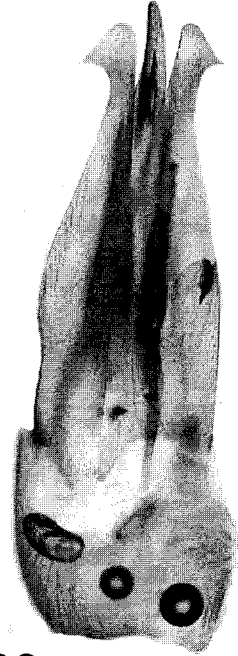
Figures 24-29. Male genitalia of *Limenius* species. 24 *L. bicolor*, 25 *L. californicus*, 26 *L. canus*, 27 *L. clypeatus*, 28 *L. confusus*, 29 *L. consimilis*.



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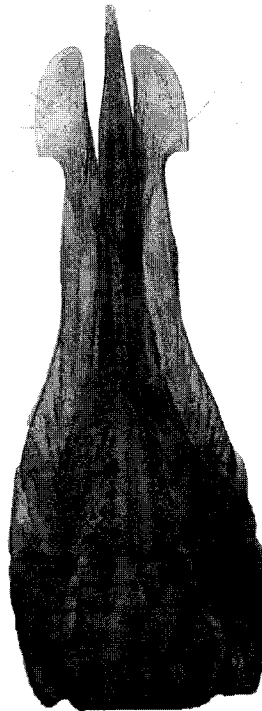
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Figures 30-35. Male genitalia of *Limonius* species. 30 *L. cribriceps*, 31 *L. crotchii*, 32 *L. definitus*, 33 *L. ectypus*, 34 *L. flavomarginatus*, 35 *L. fulvipilis*.



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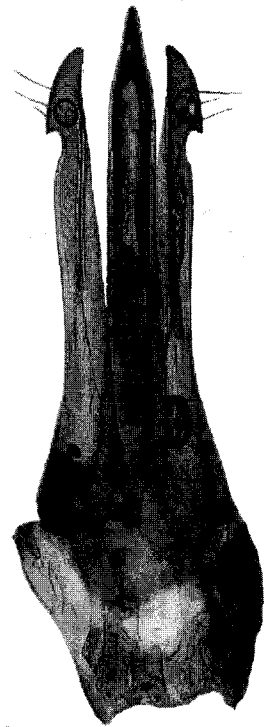
Figures 36-41. Male genitalia of *Limenius* species. 36 *L. griseus*, 37 *L. huguenini*, 38 *L. humidus*, 39 *L. jonesi*, 40 *L. kondratieffi*, 41 *L. lanchesteri*.



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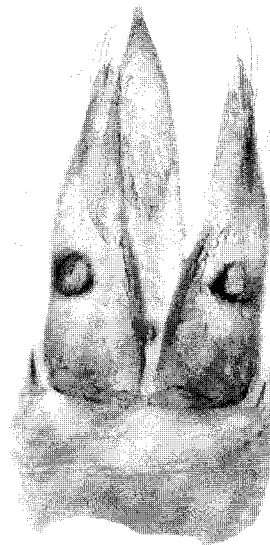
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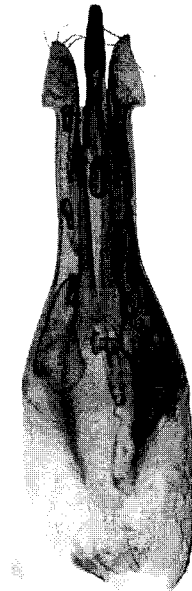
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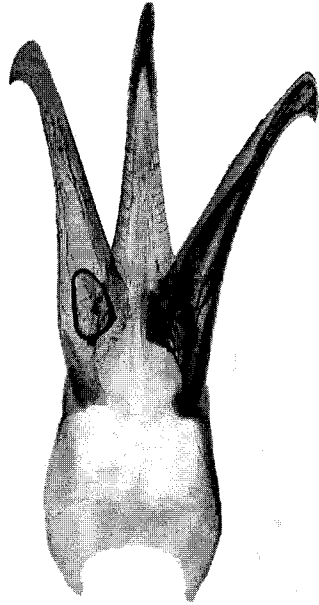


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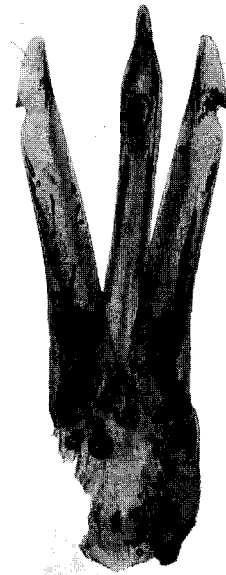
Figures 42-47. Male genitalia of *Limoni* species. 42 *L. lanei*, 43 *L. meridianus*, 44 *L. mirus*, 45 *L. nebulosus*, 46 *L. nimbatus*, 47 *L. nitidulus*.



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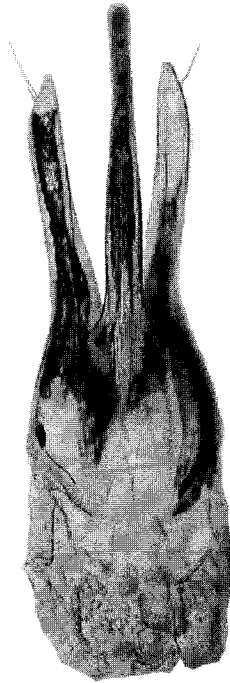
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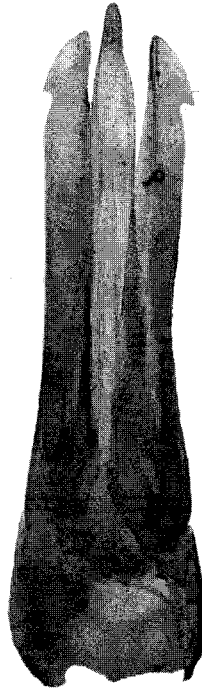


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Figures 48-53. Male genitalia of *Limenius* species. 48 *L. norahae*, 49 *L. olentangyi*, 50 *L. ornatulus*, 51 *L. pappi*, 52 *L. pectoralis*, 53 *L. pictus*,



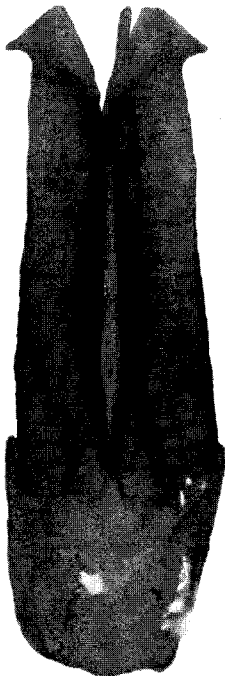
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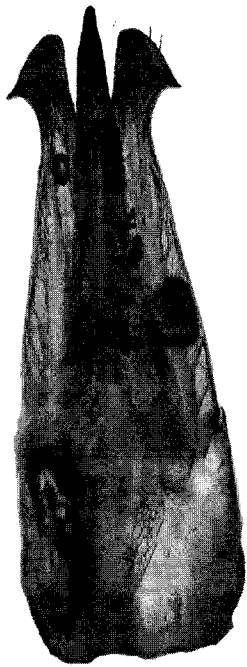


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Figures 54-59. Male genitalia of *Limonius* species. 54 *L. plebejus*, 55 *L. quæcinus*, 56 *L. rectangularis*, 57 *L. rudis*, 58 *L. rufihumeralis*, 59 *L. sinuifrons*.



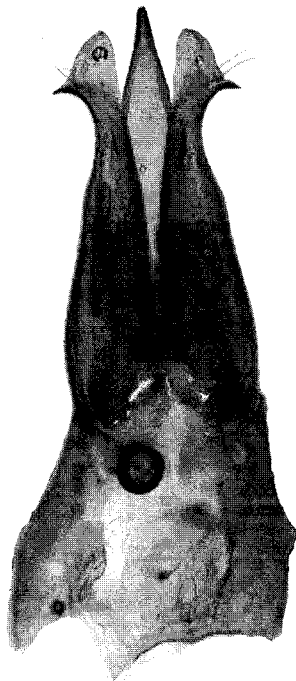
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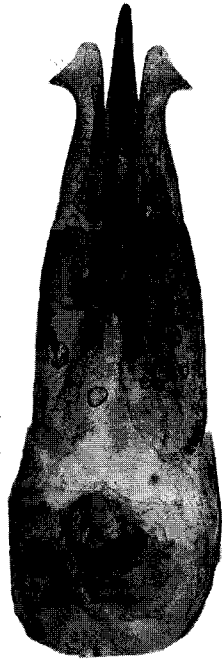


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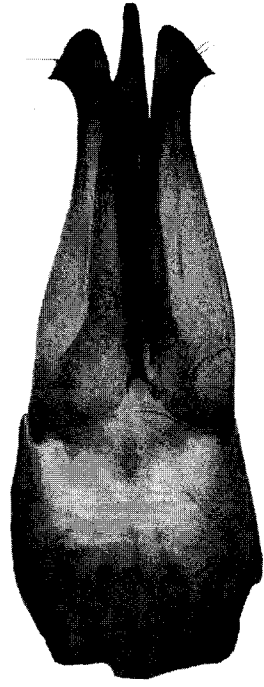
Figures 60- 63. Male genitalia of *Limenius* species. 60 *L. stigma*, 61 *L. subauratus*, 62 *L. ursinus*, 63 *L. venablesi*.



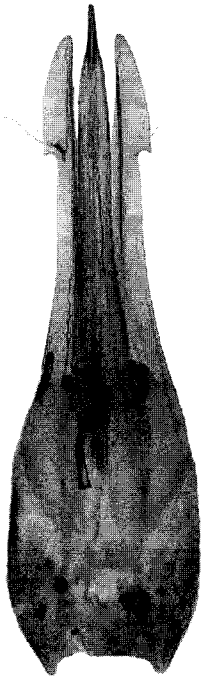
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Figures 64-69. Anterior Sclerites (of bursa copulatrix) of *Limonius* Species. 64 *L. agonus*, 65 *L. californicus*, 66 *L. canus*, 67 *L. consimilis*, 68 *L. definitus*, 69 *L. ectypus*.



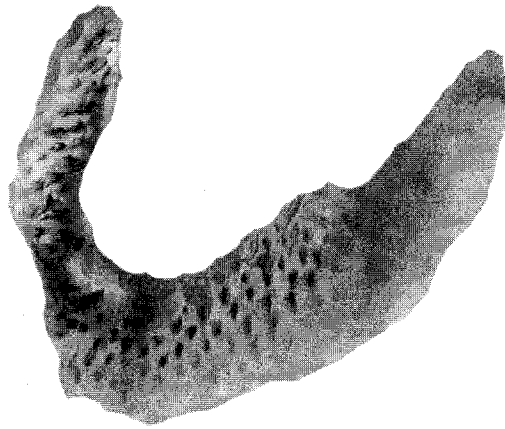
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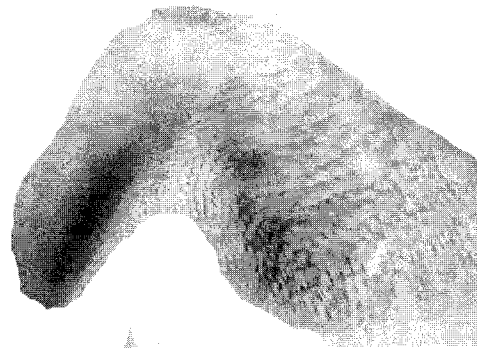
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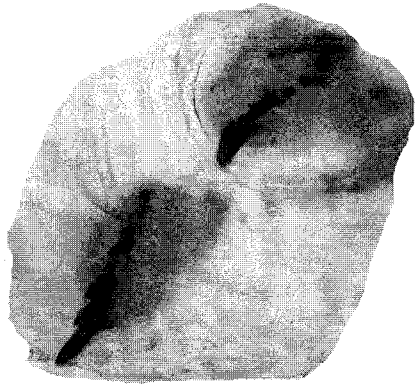


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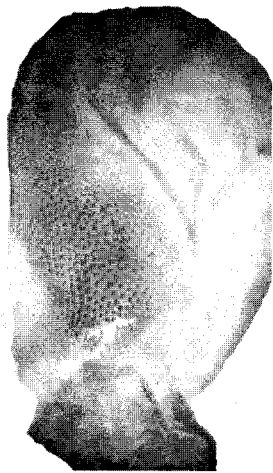
Figures 70-73. Anterior Sclerites (of bursa copulatrix) of *Limonius* Species. 70 *L. nimbatus*, 71 *L. ornatulus*, 72 *L. rudis*, 73 *L. subauratus*.



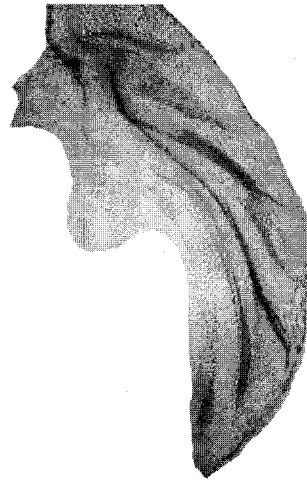
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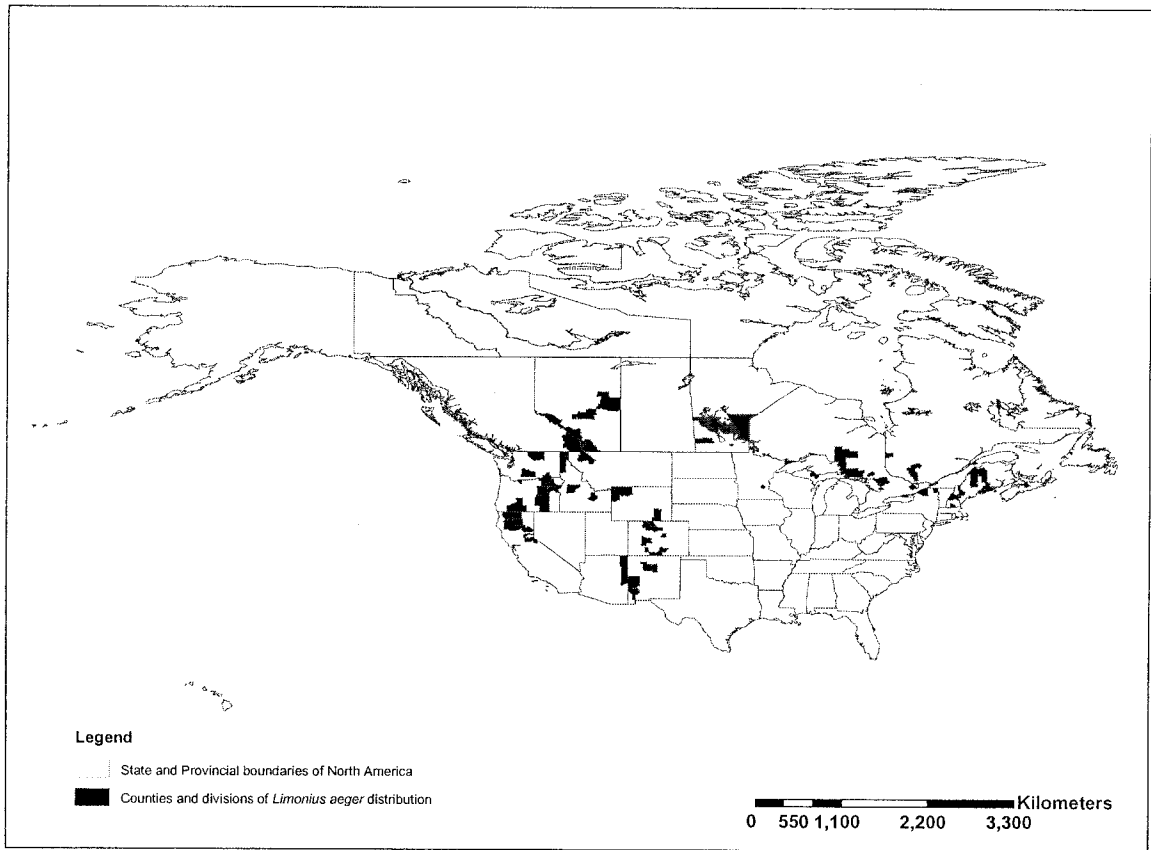


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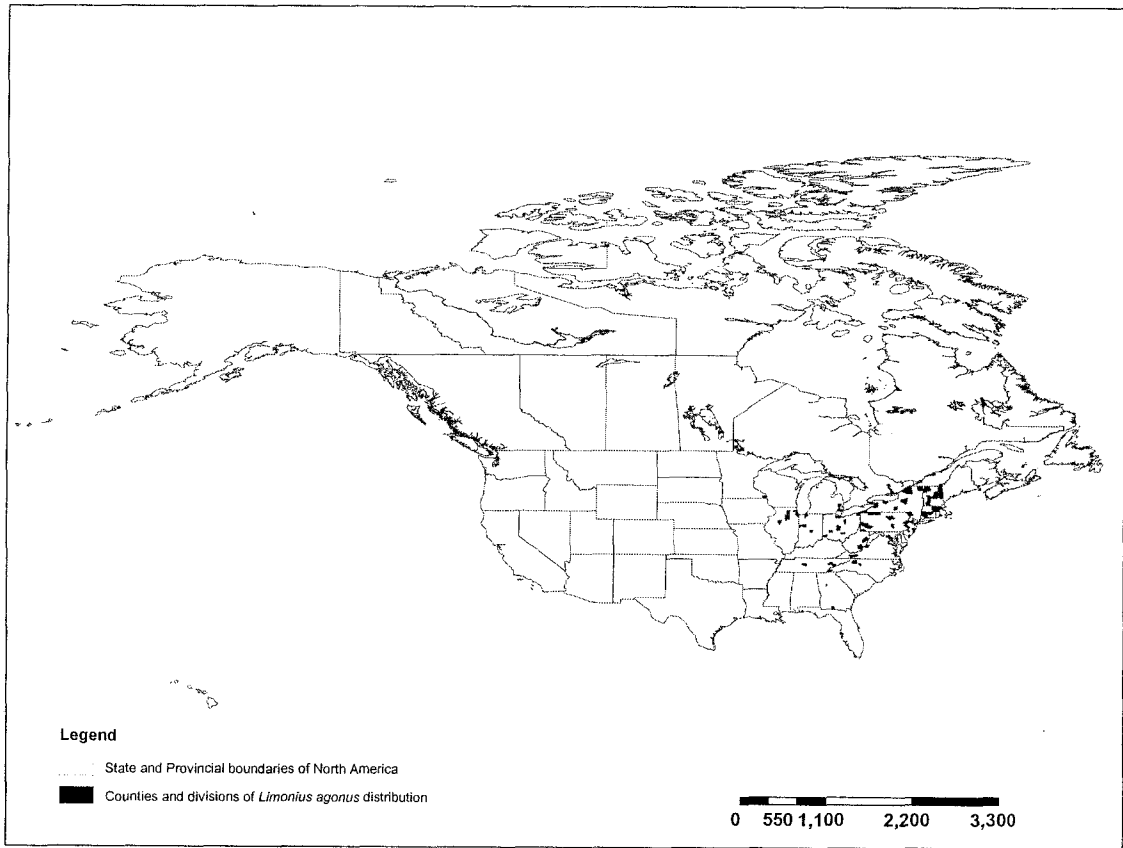


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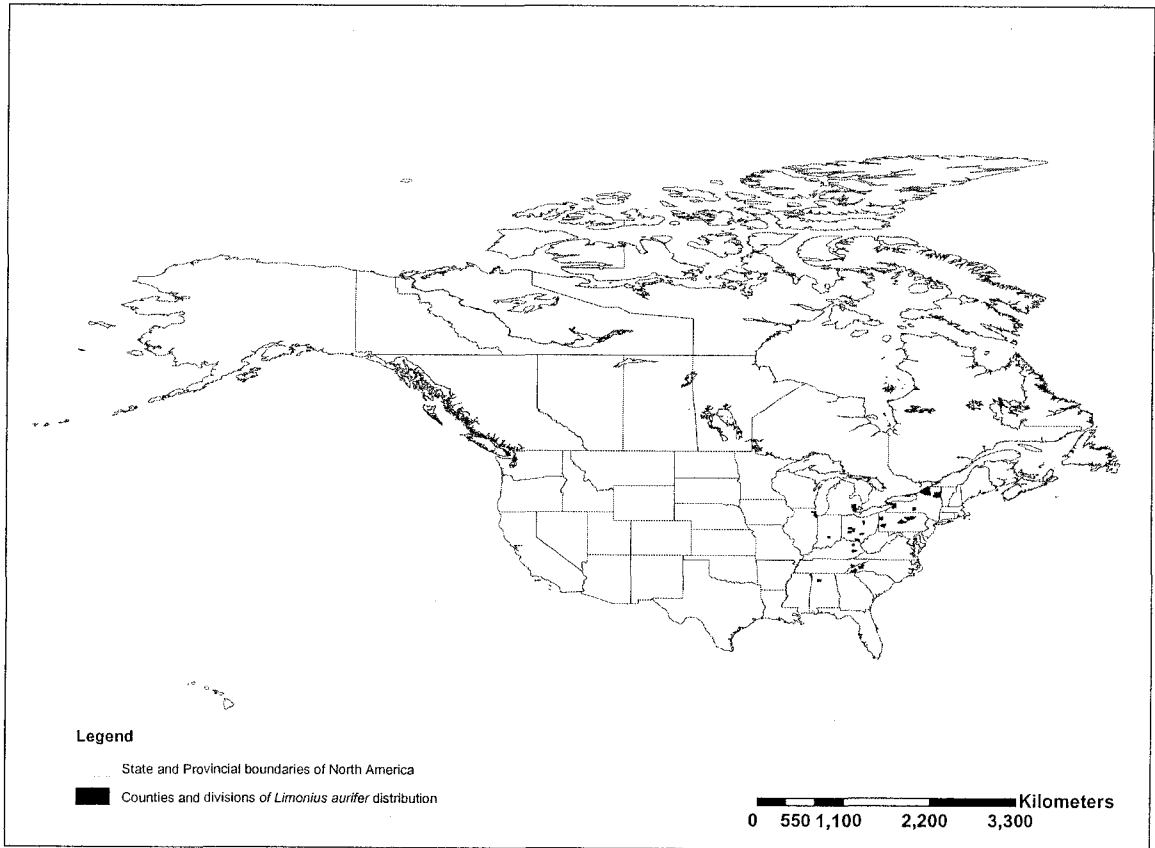
Figures 74-115. 74 *L. aeger*, 75 *L. agonus*, 76 *L. aurifer*, 77 *L. auripilis*, 78 *L. basillaris*, 79 *L. beutenmuelleri*, 80 *L. bicolor*, 81 *L. californicus*, 82 *L. canus*, 83 *L. clypeatus*, 84 *L. confusus*, 85 *L. consimilis*, 86 *L. cribriceps*, 87 *L. crotchii*, 88 *L. definitus*, 89 *L. ectypus*, 90 *L. flavomarginatus*, 91 *L. fulvipilis*, 92 *L. grisueus*, 93 *L. huguenini*, 94 *L. humidus*, 95 *L. jonesi*, 96 *L. lanchesteri*, 97 *L. lanei*, 98 *L. meridianus*, 99 *L. mirus*, 100 *L. nebulosus*, 101 *L. nimbatus*, 102 *L. nitidulus*, 103 *L. olentangyi*, 104 *L. ornatulus*, 105 *L. pectoralis*, 106 *L. pictus*, 107 *L. plebejus*, 108 *L. quecinus*, 109 *L. rudis*, 110 *L. rufihumeralis*, 111 *L. sinuifrons*, 112 *L. stigma*, 113 *L. subauratus*, 114 *L. ursinus*, 115 *L. venablesi*.



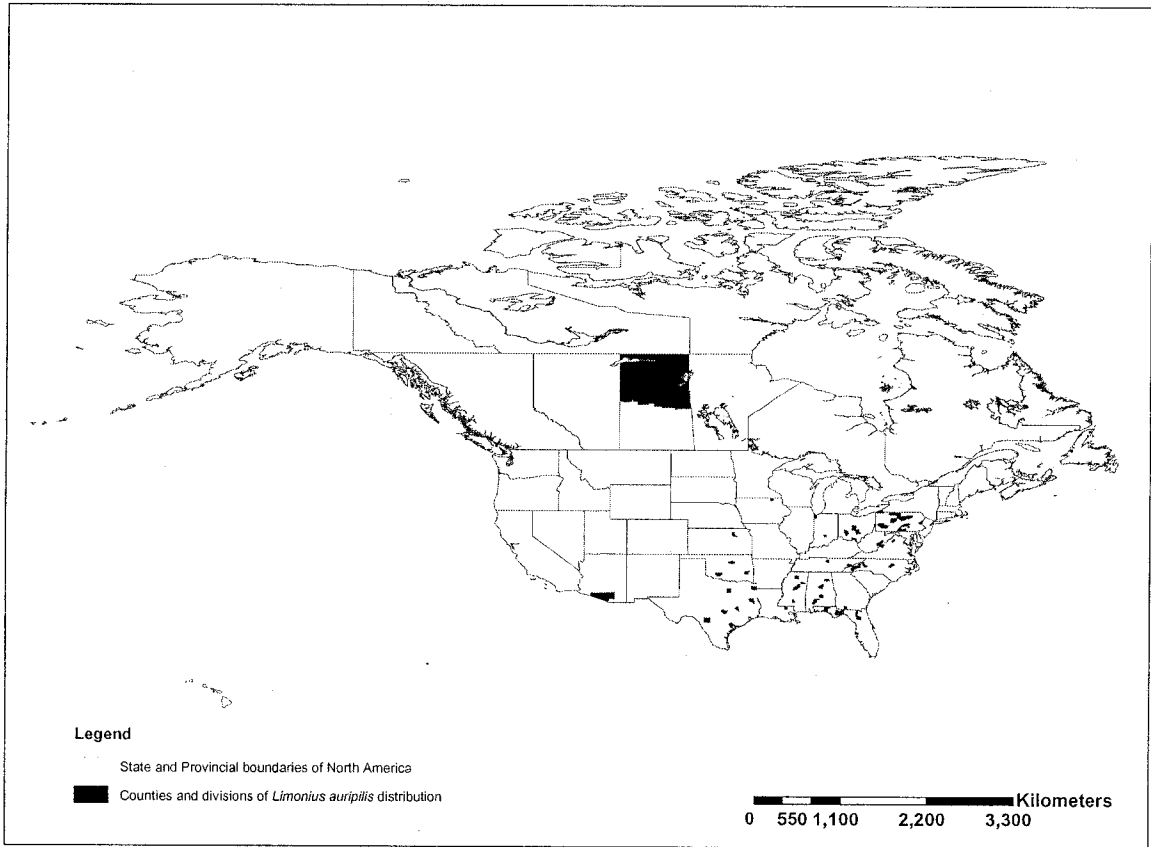
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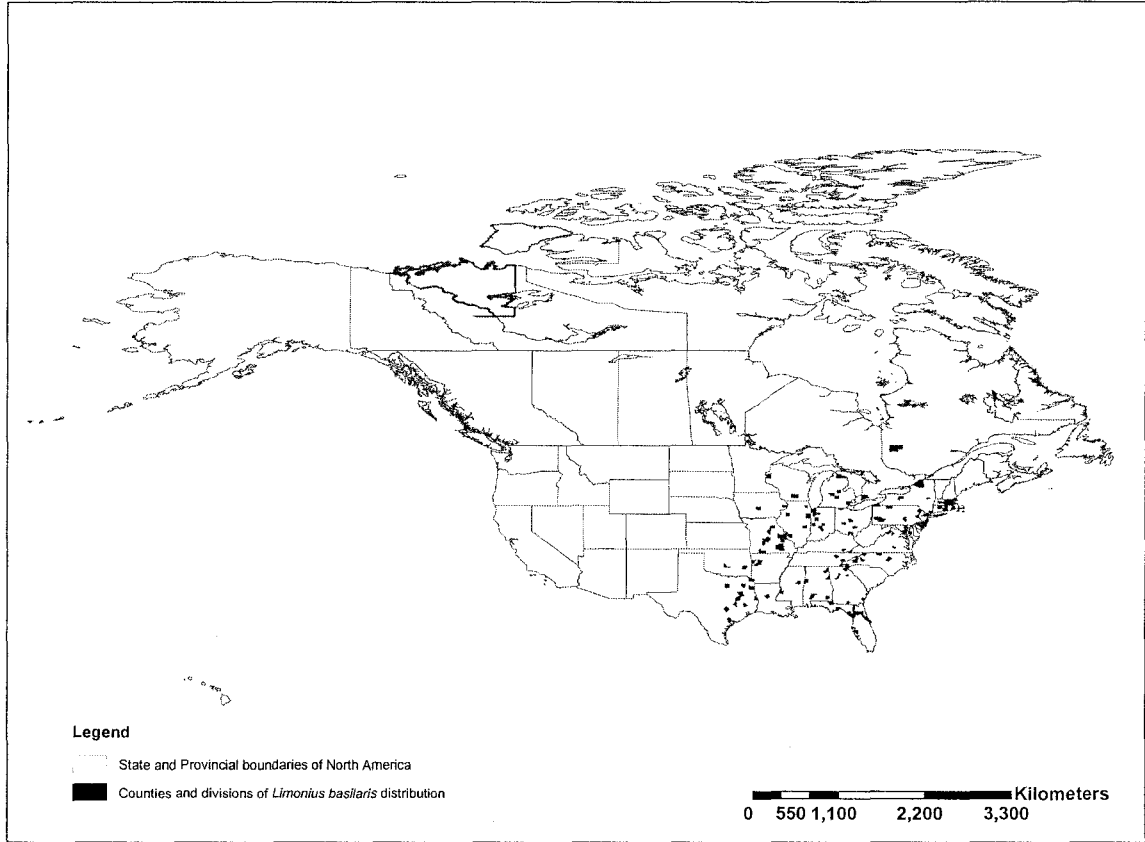
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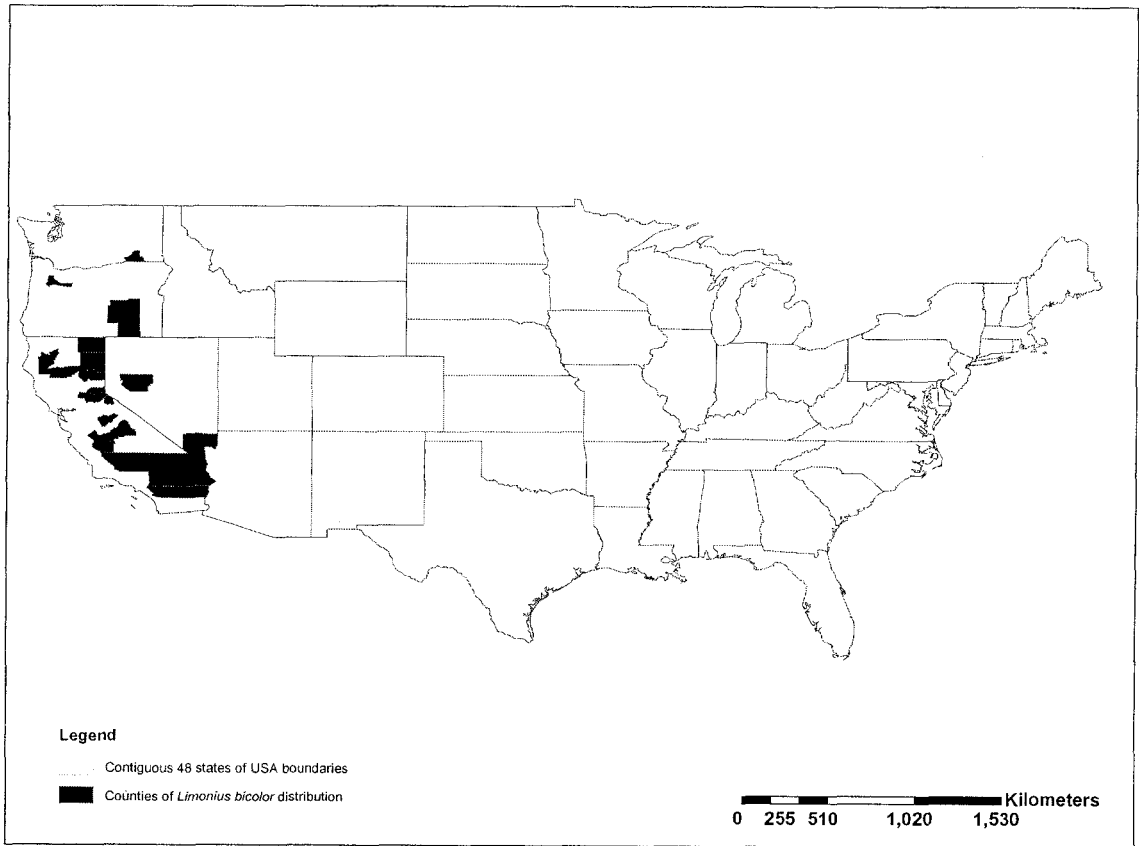
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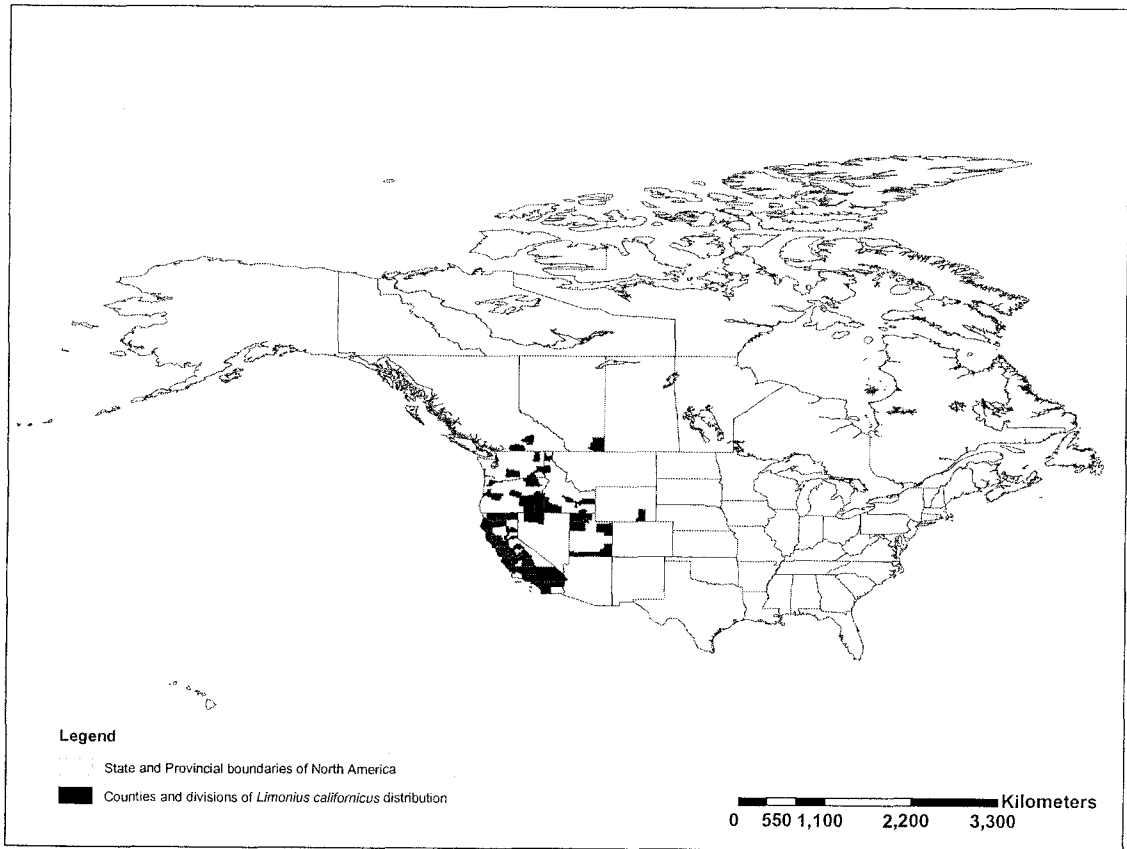
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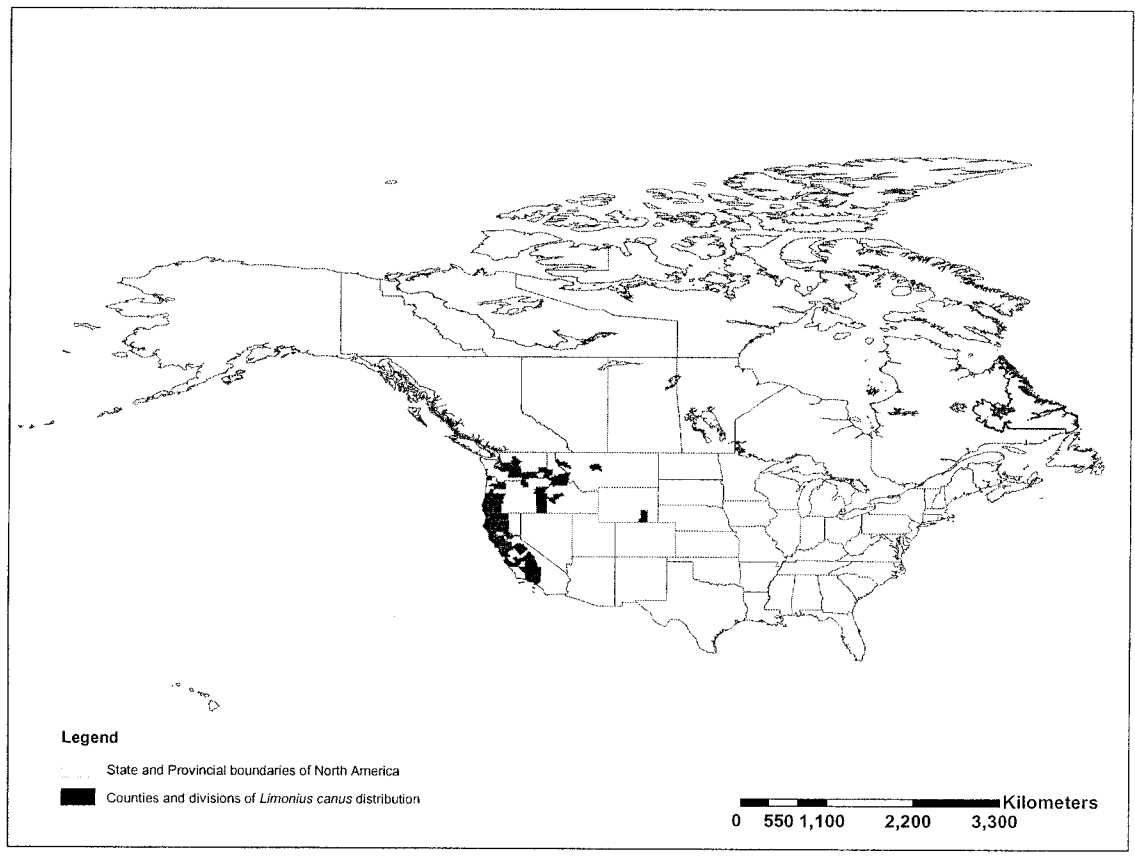
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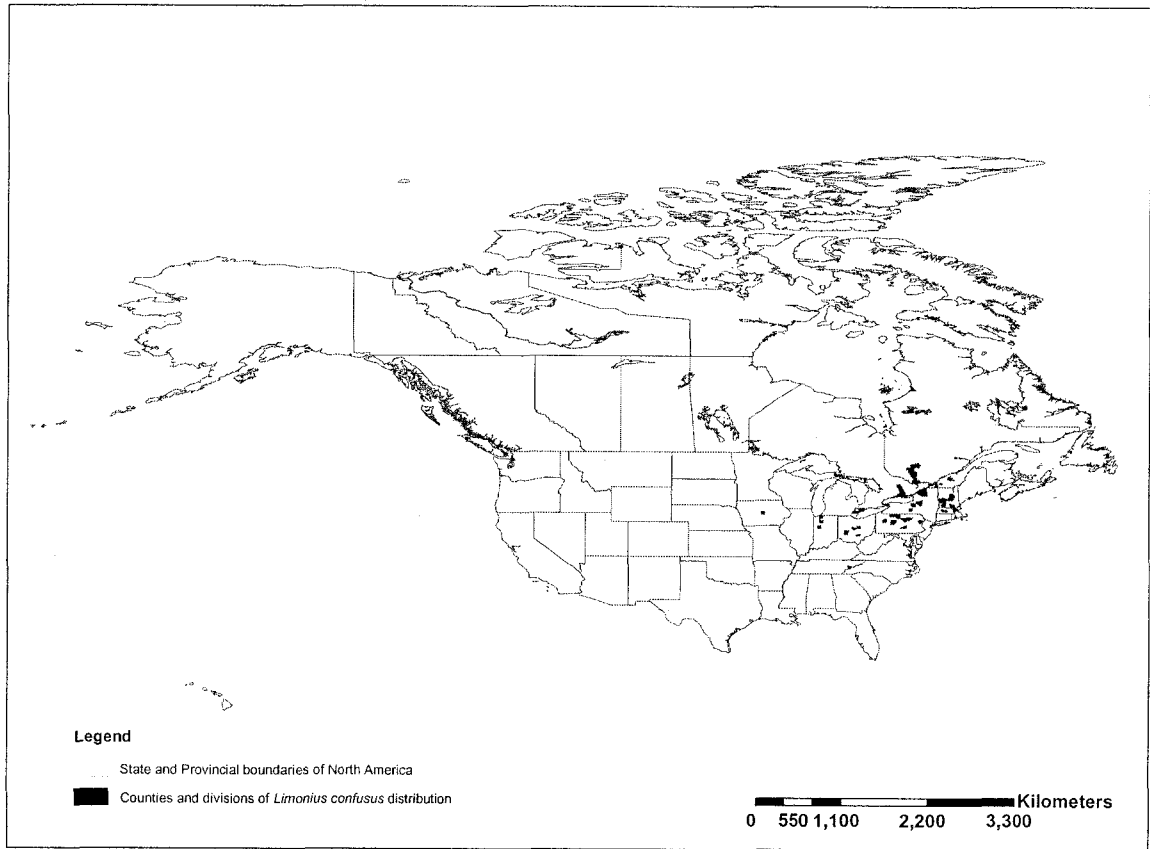
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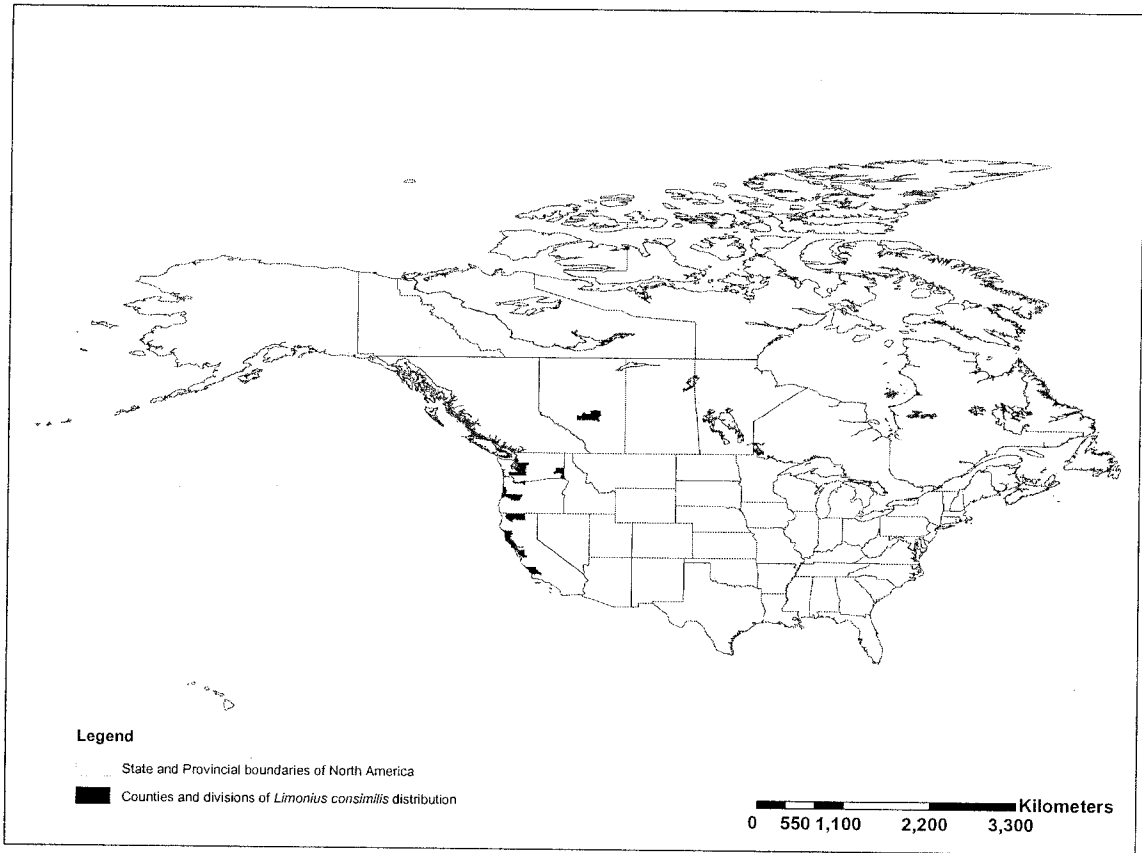
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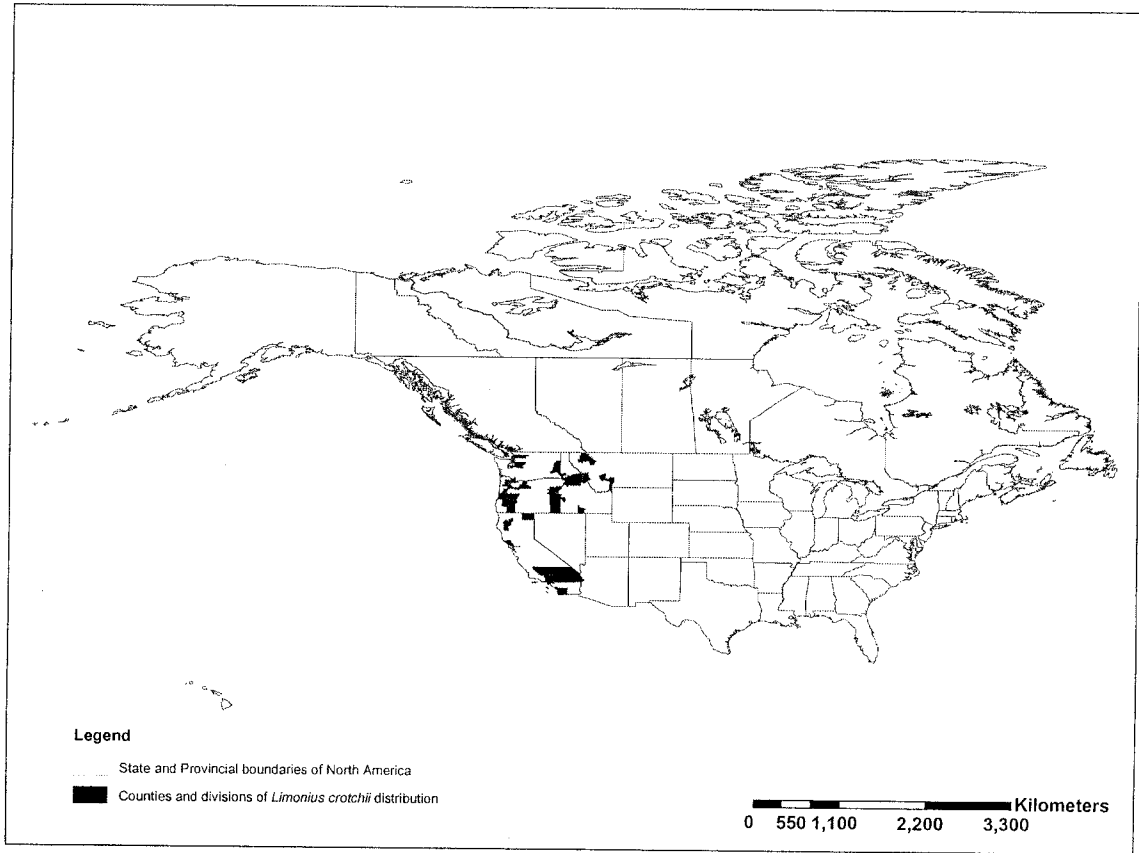
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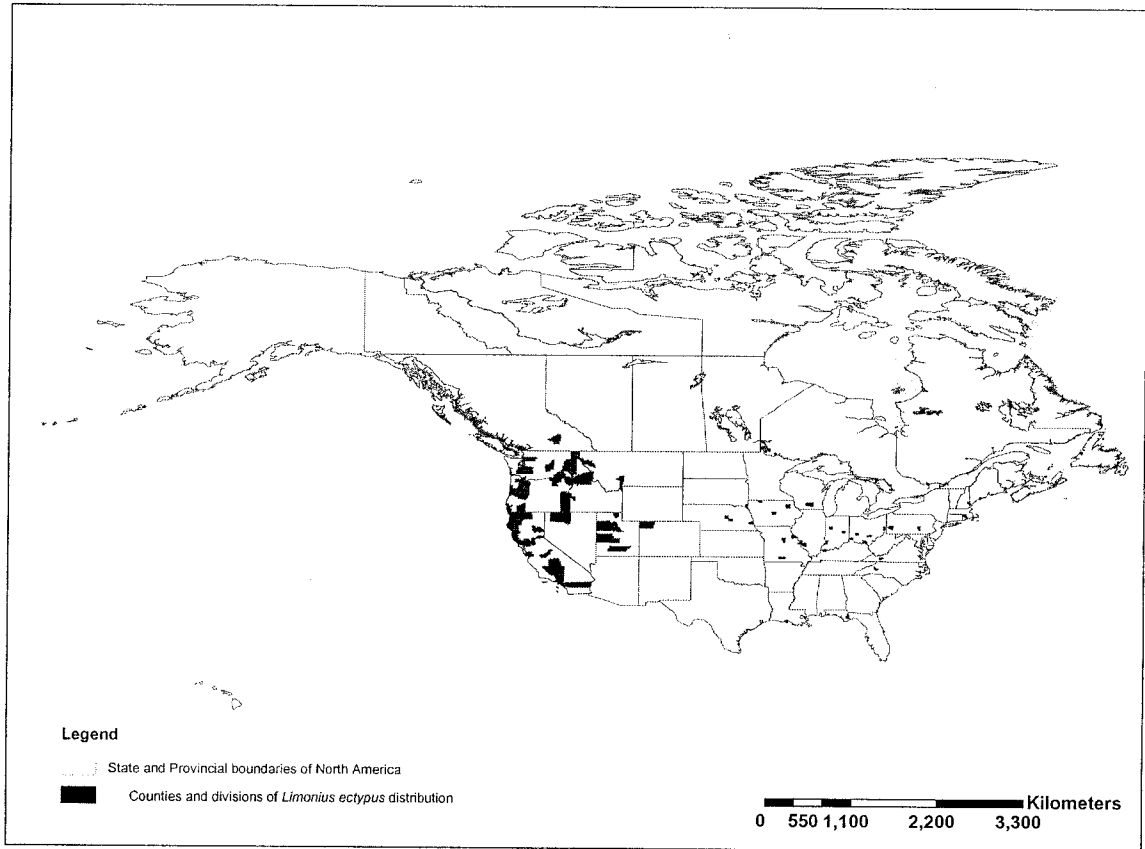
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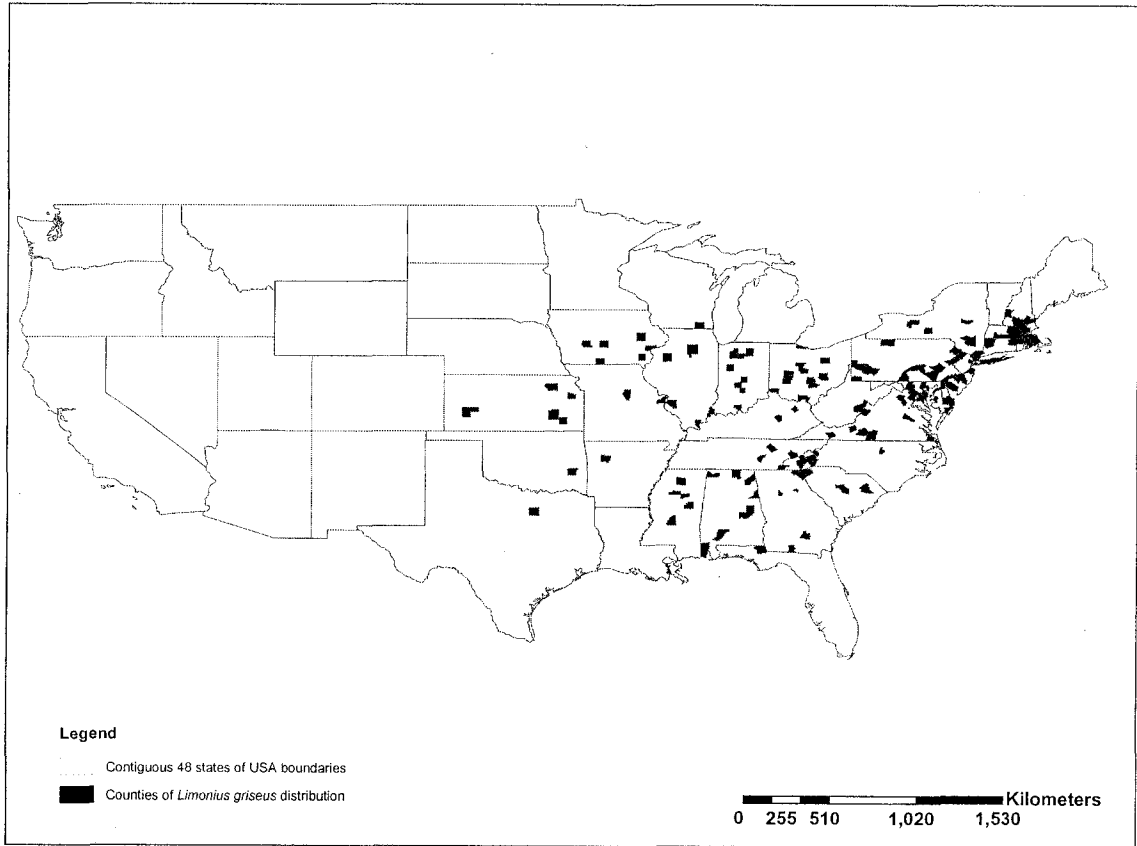
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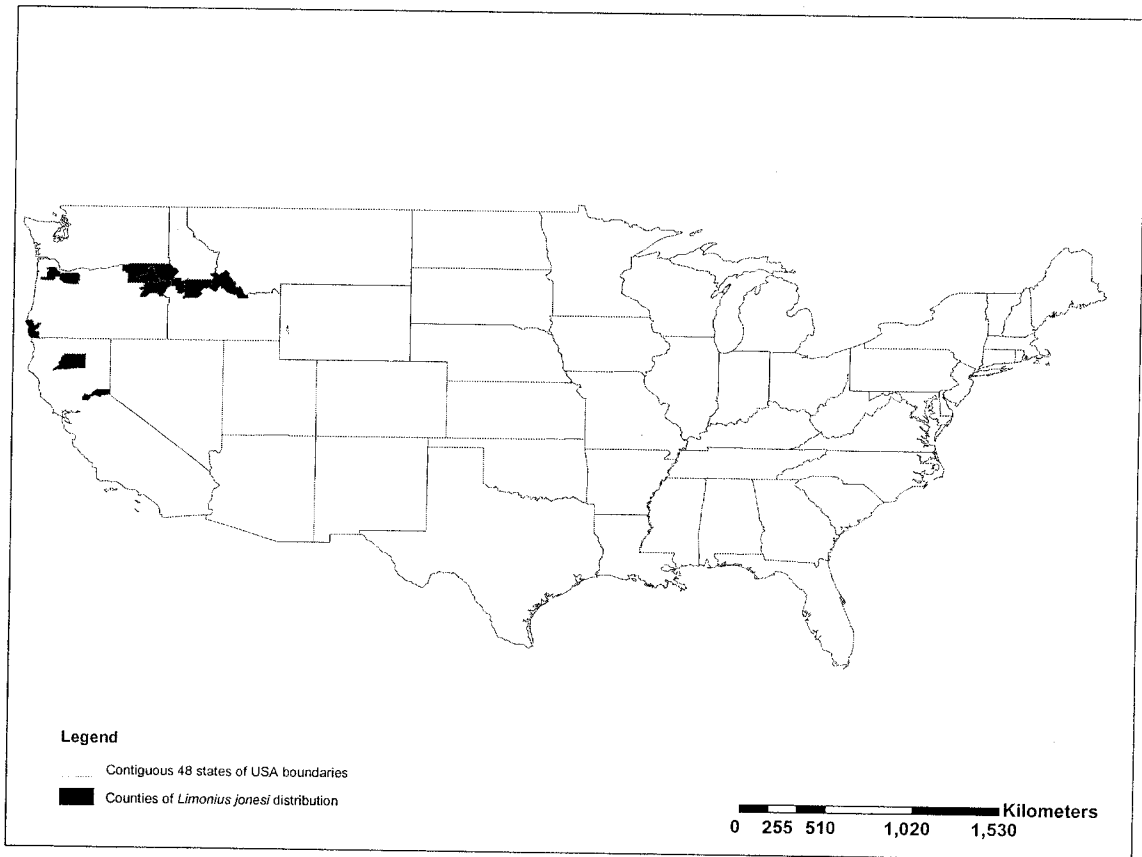
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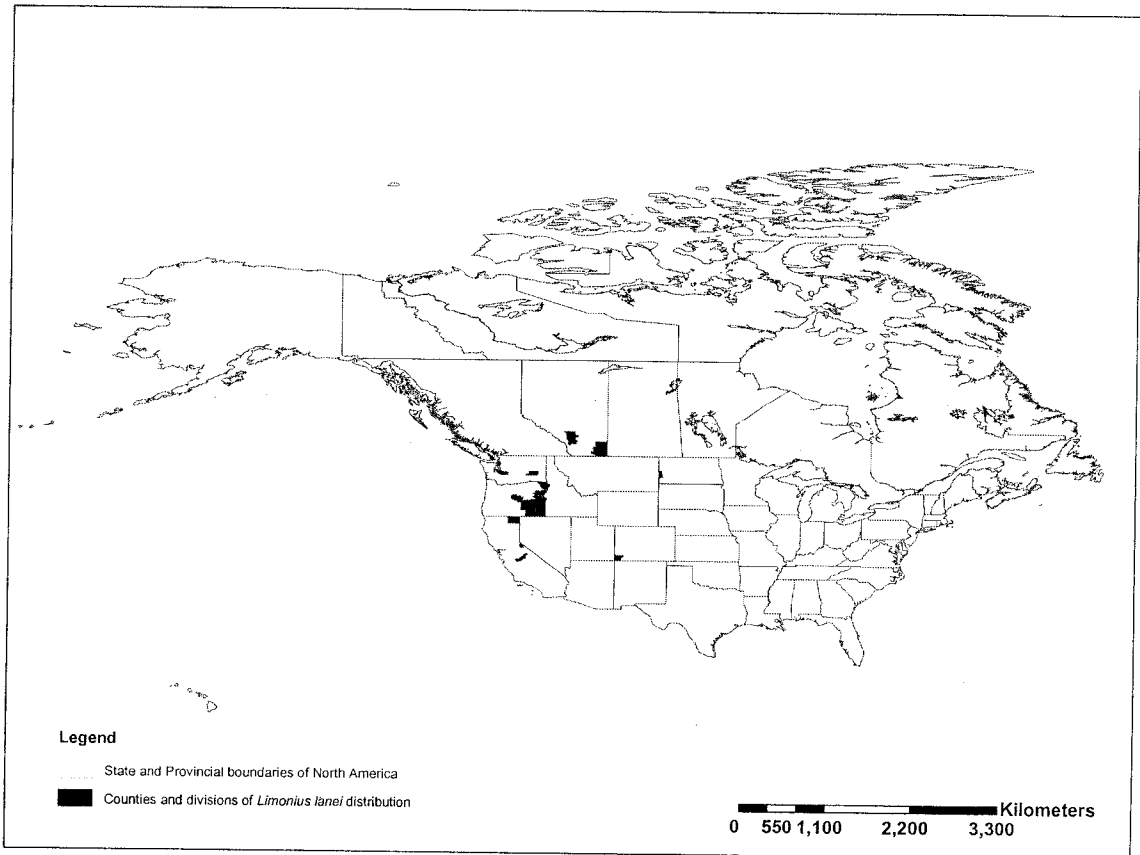
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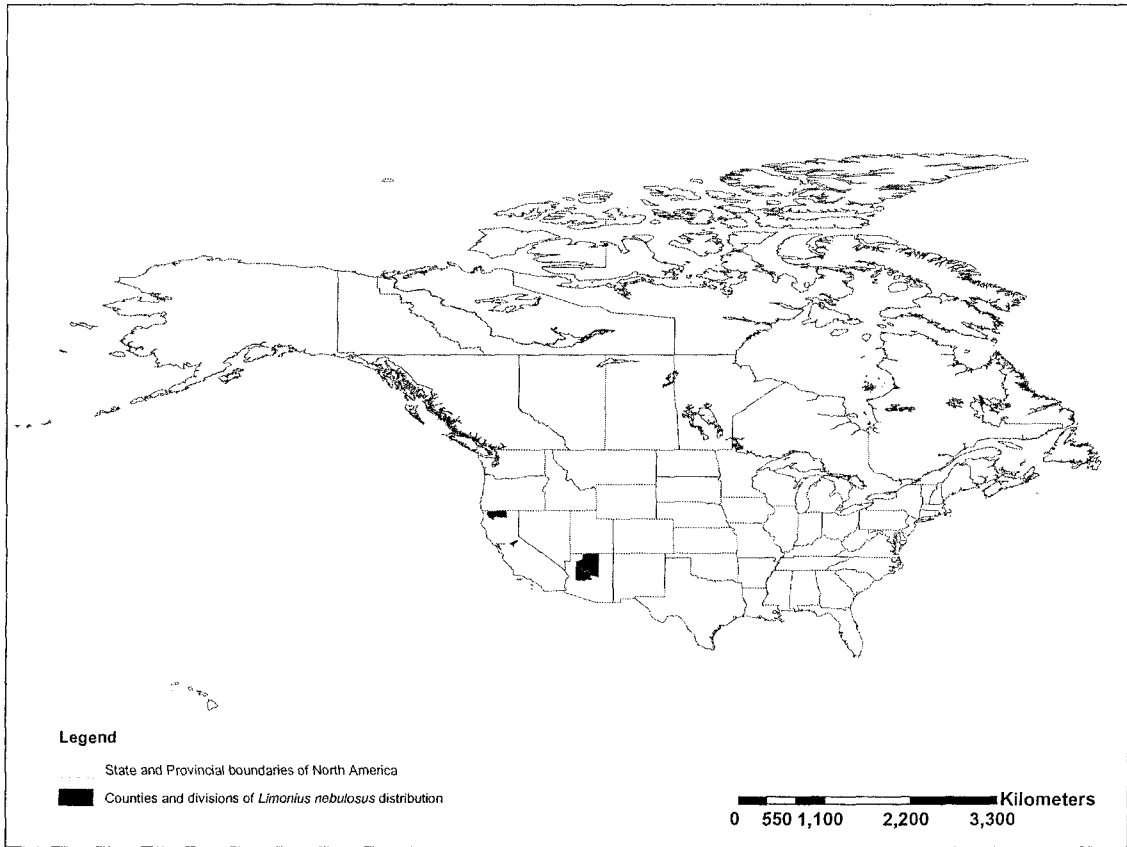
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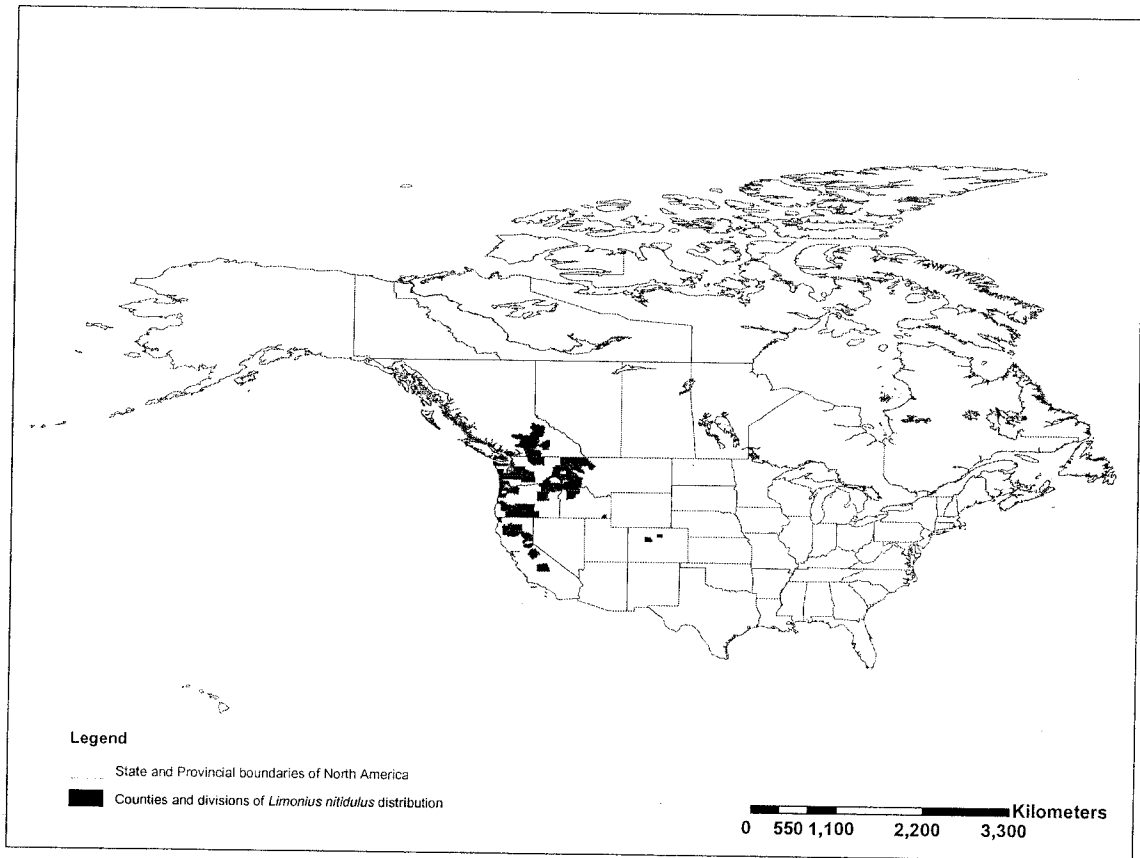
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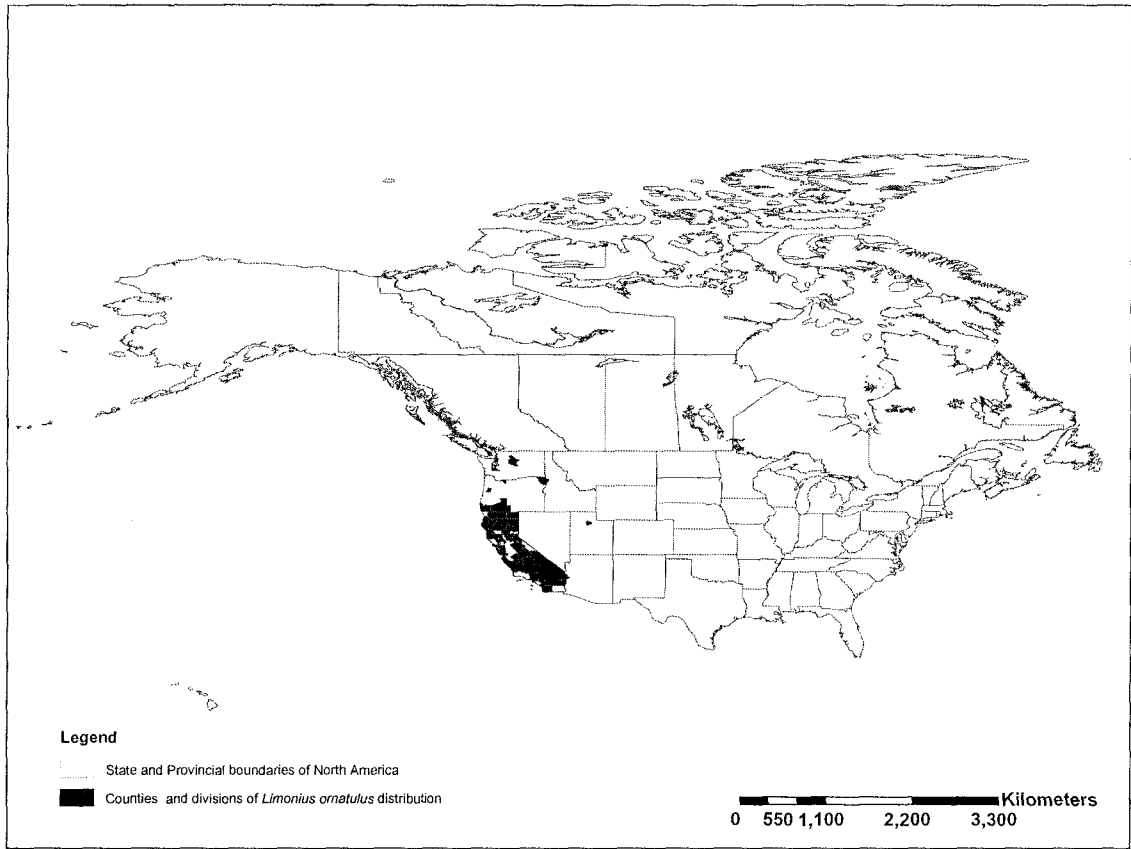
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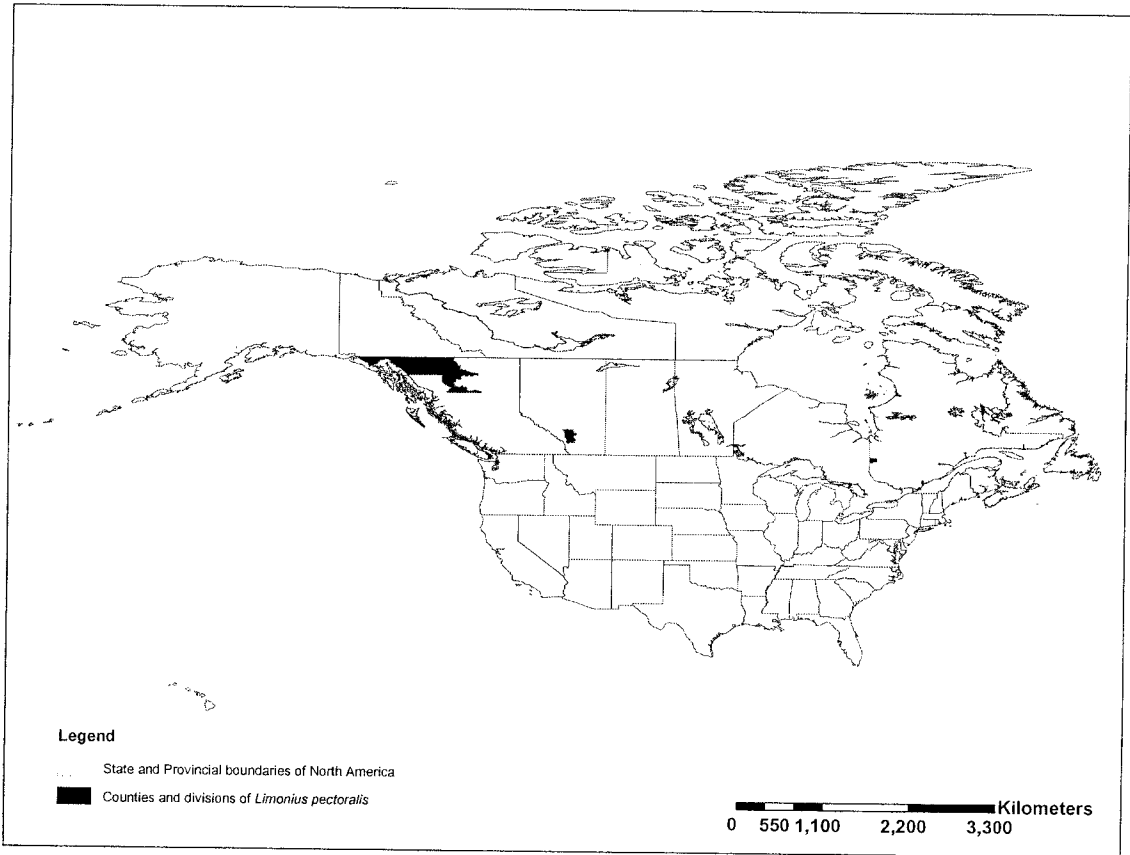
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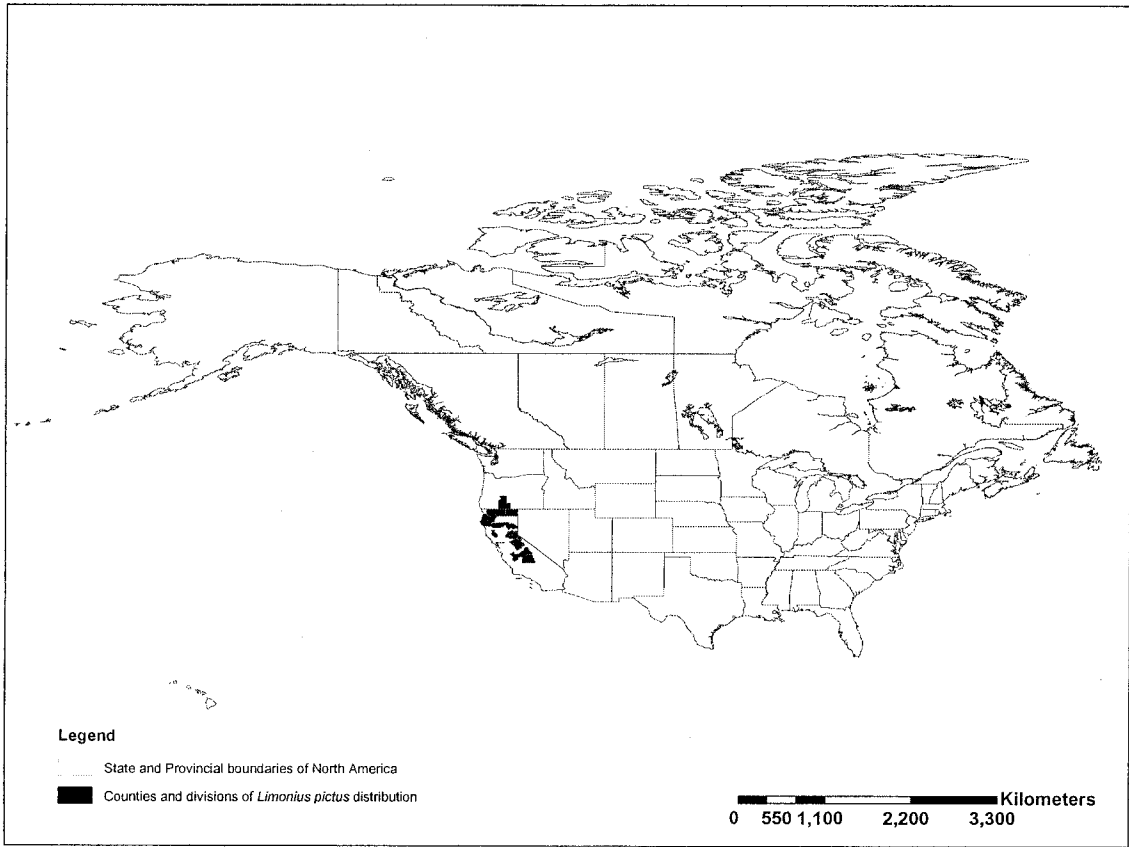
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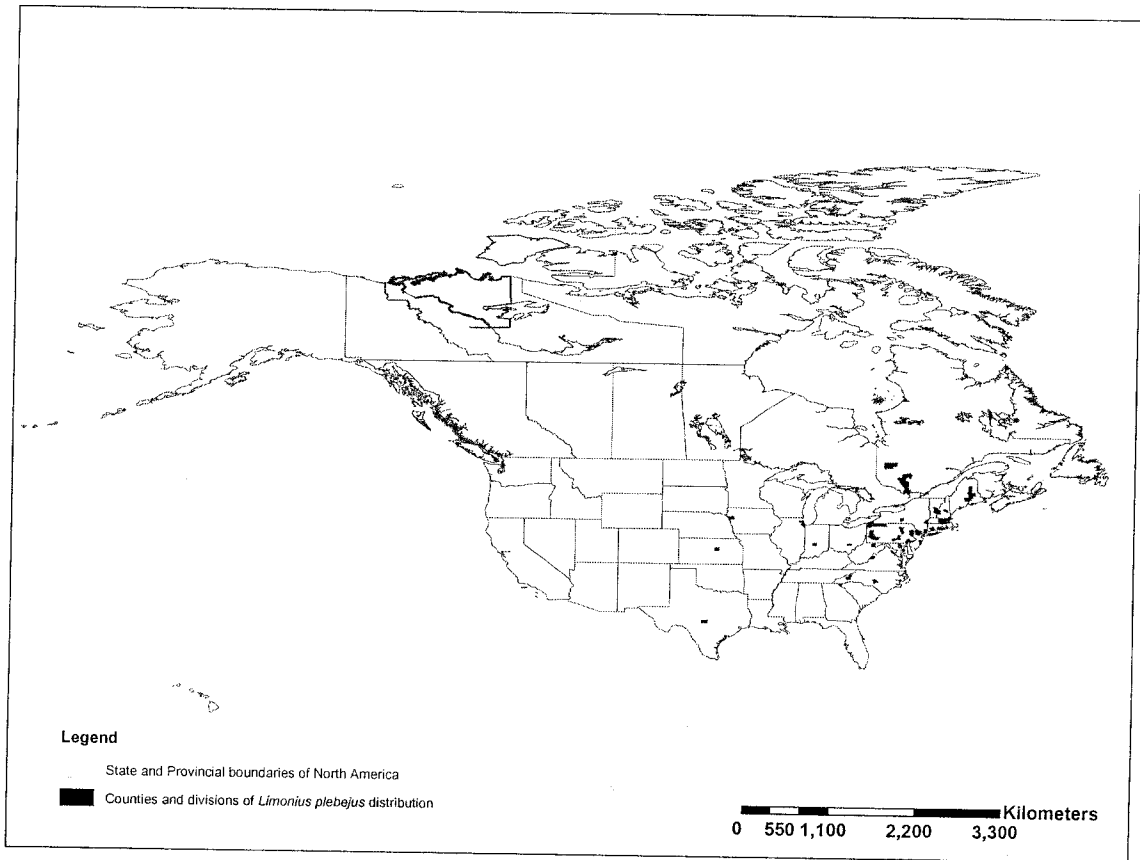
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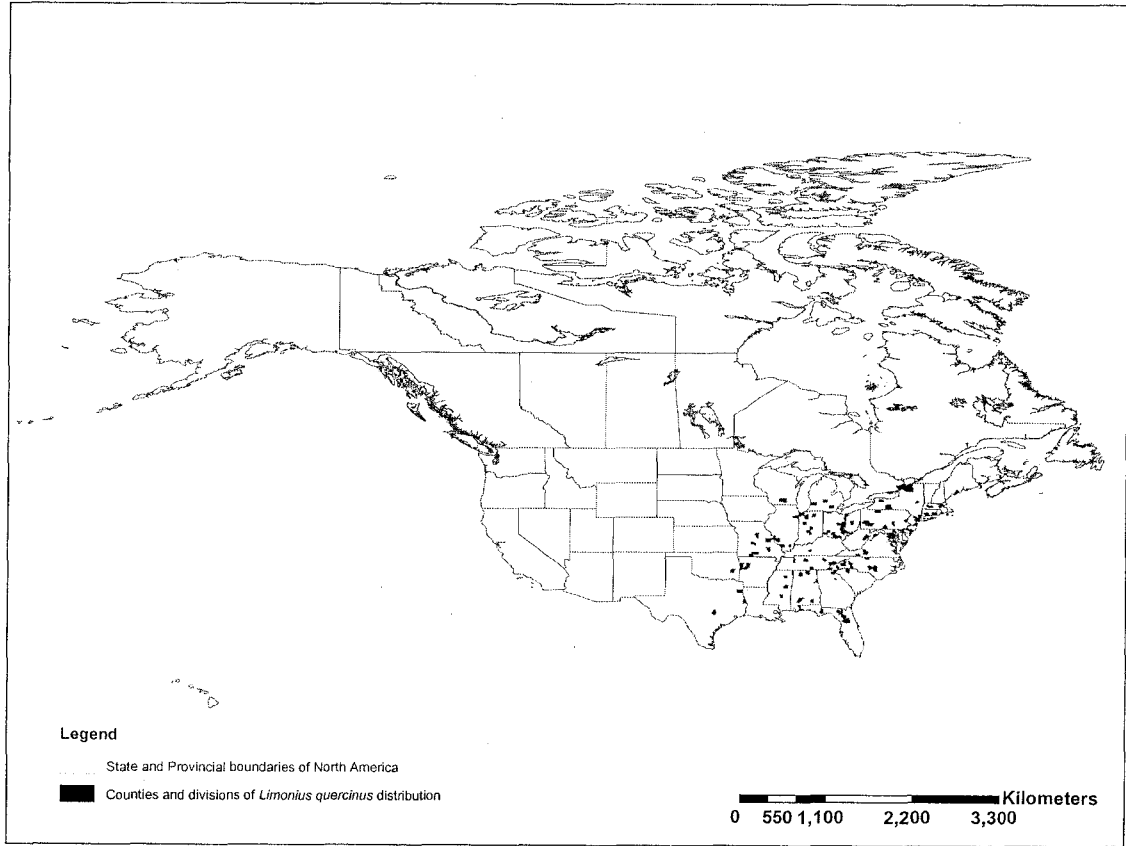
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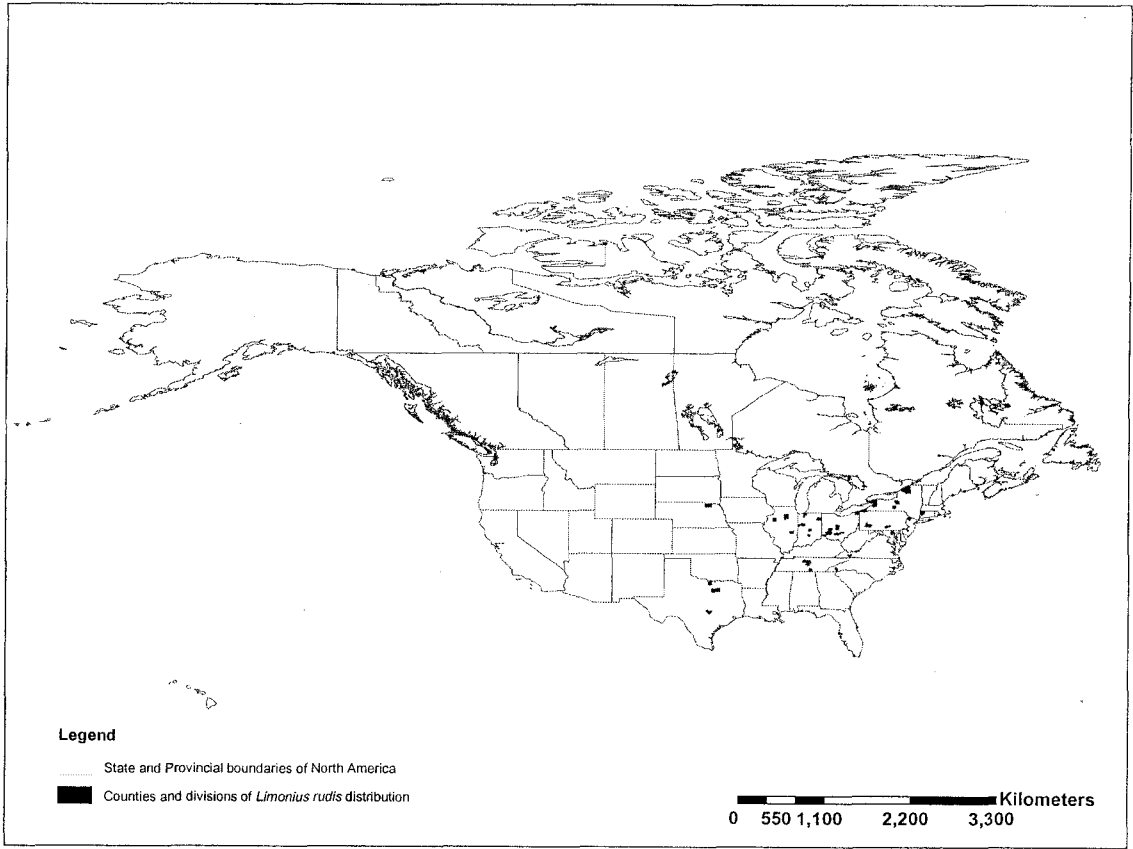
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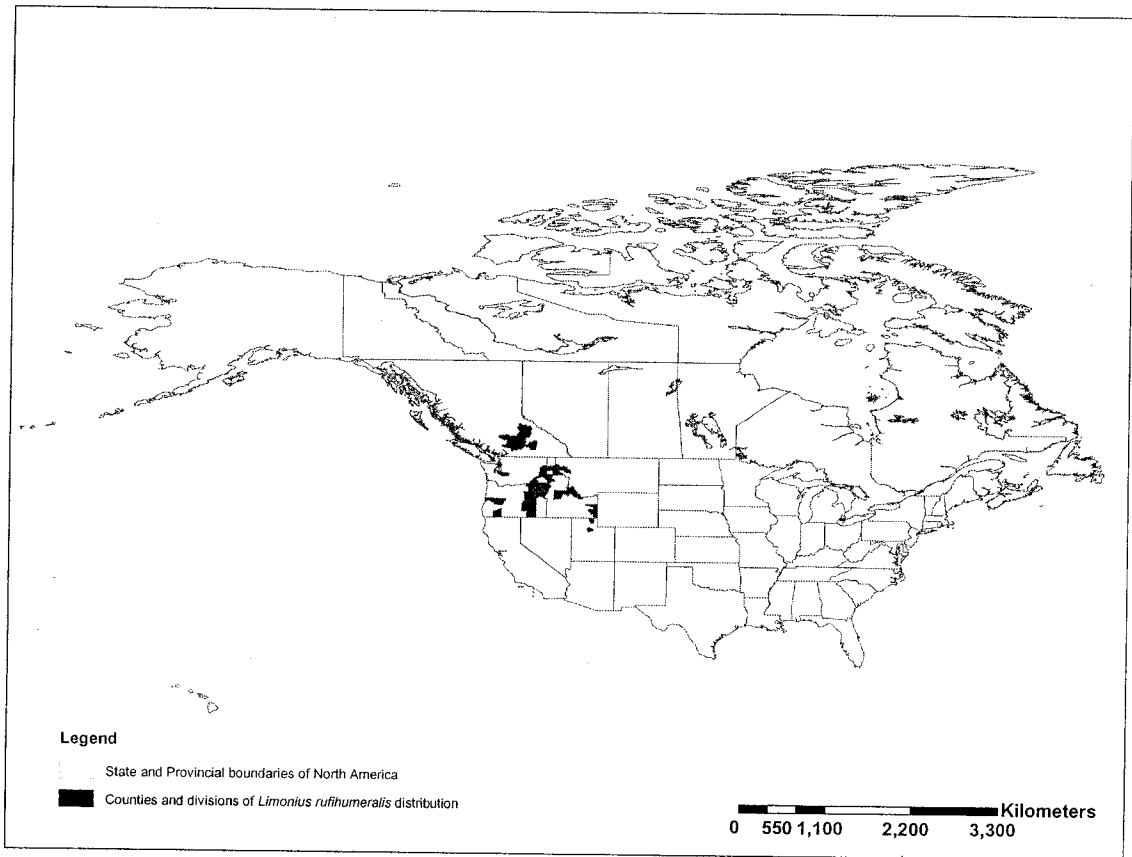
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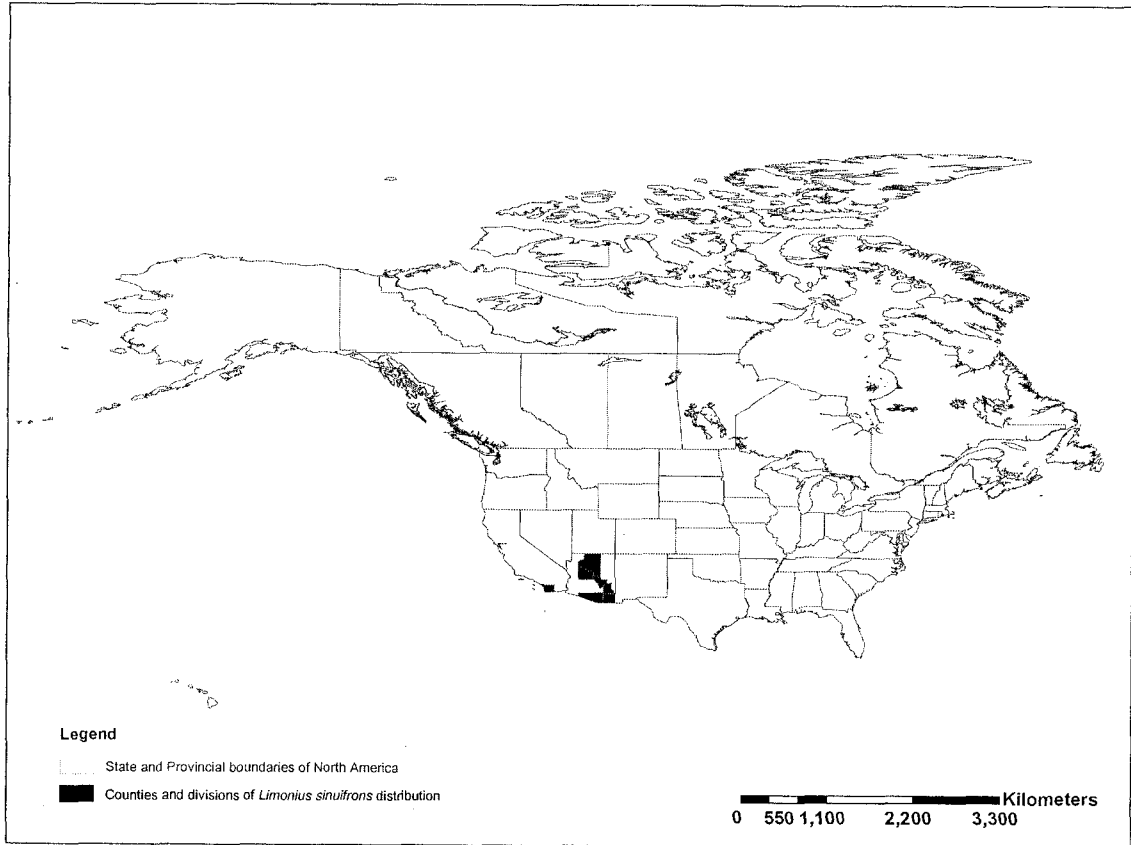
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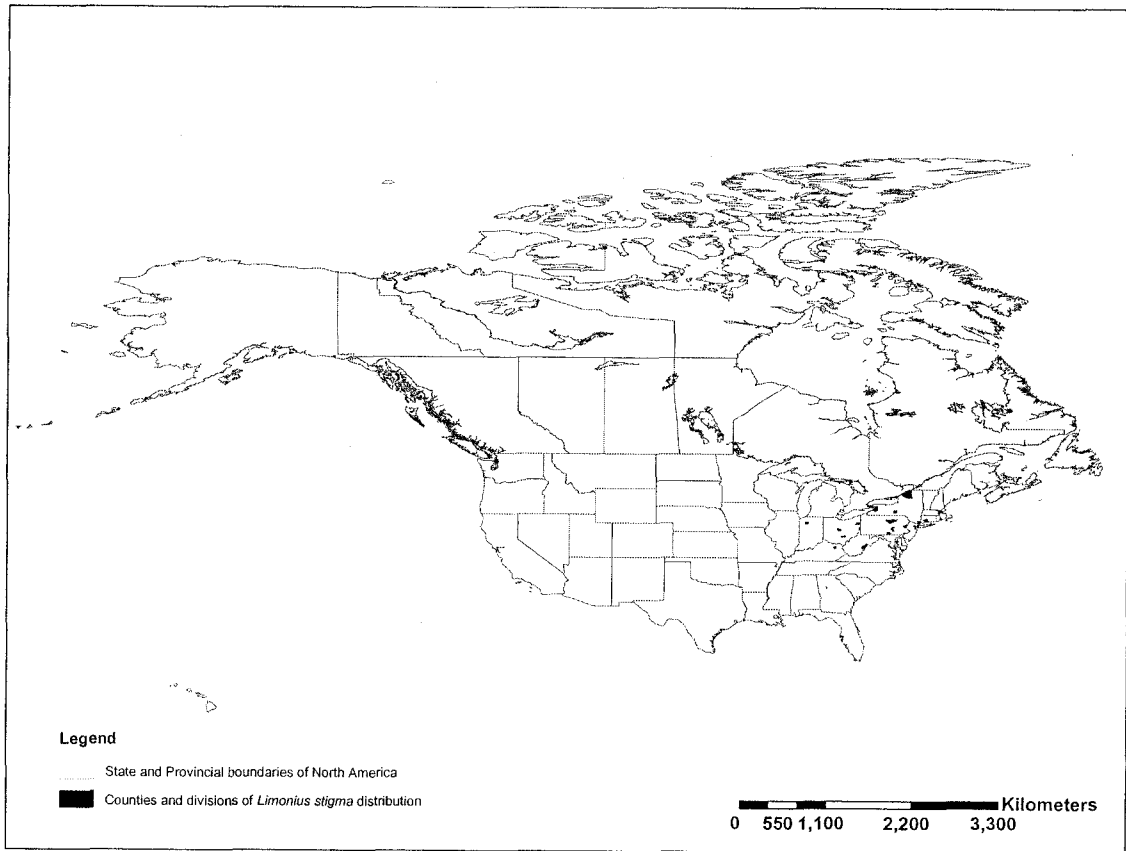
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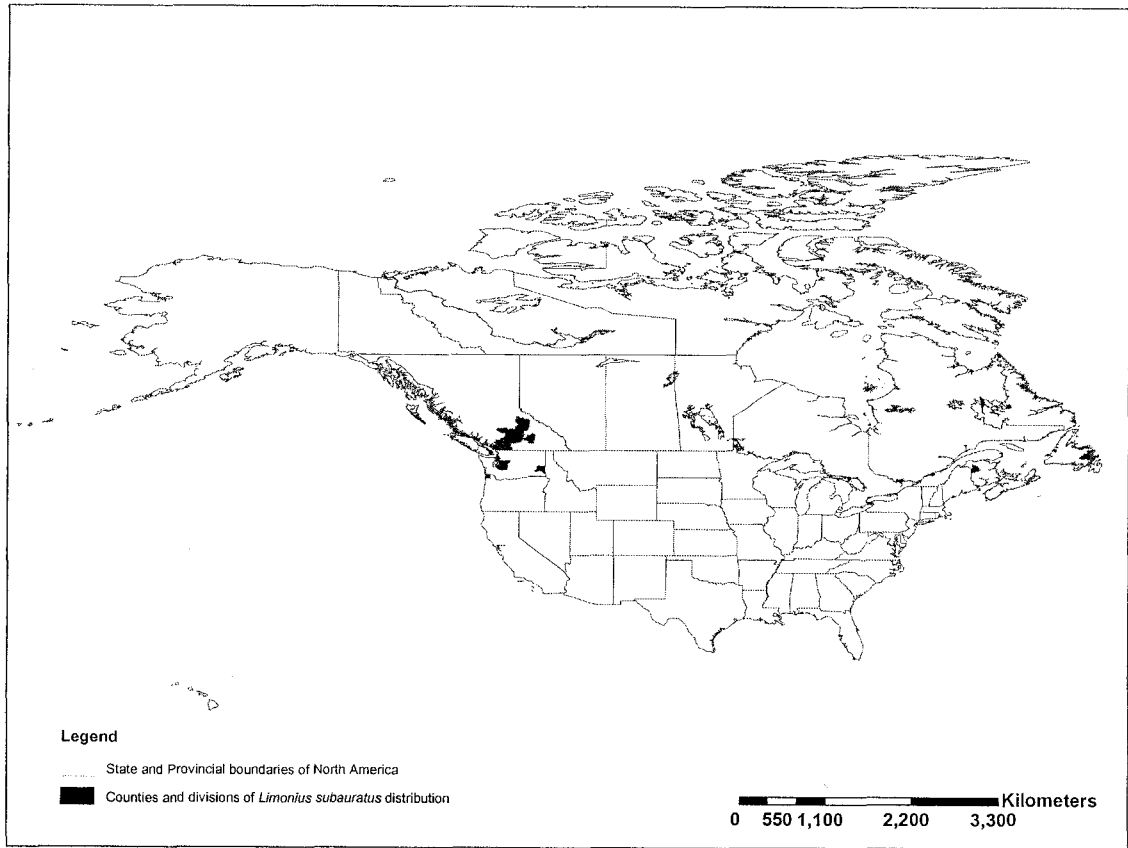
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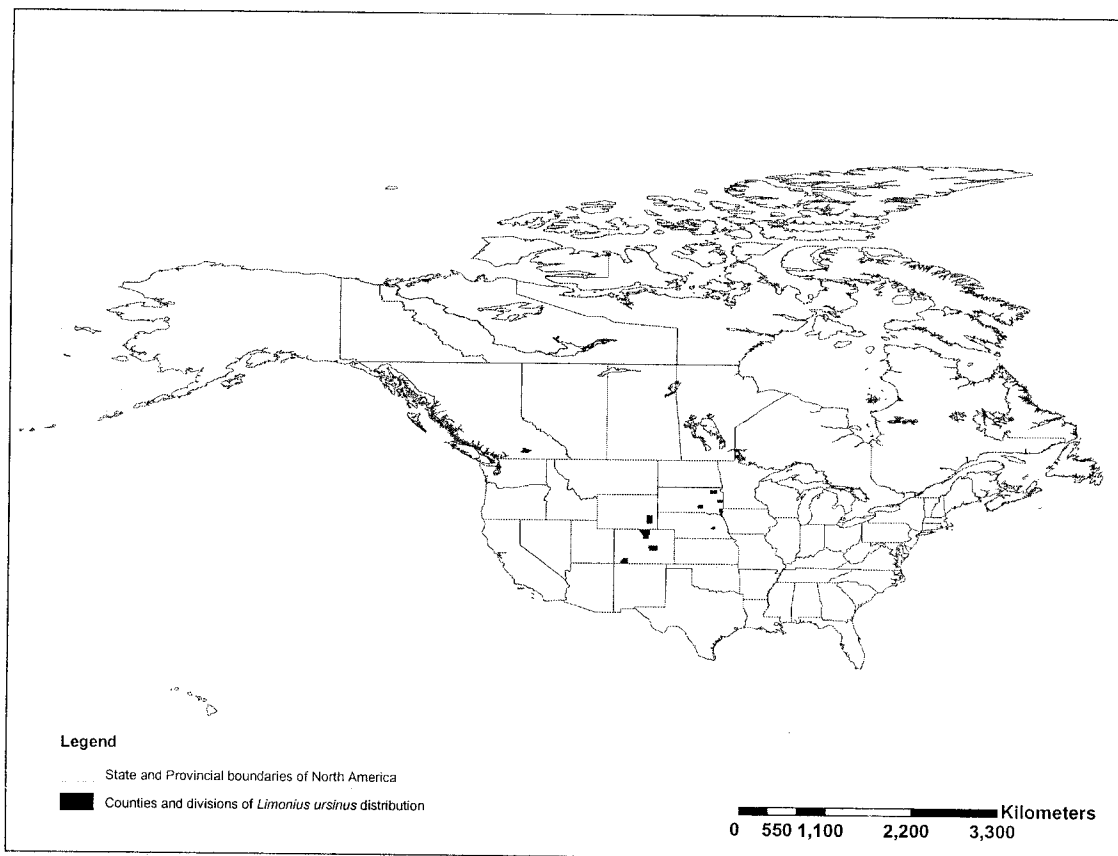
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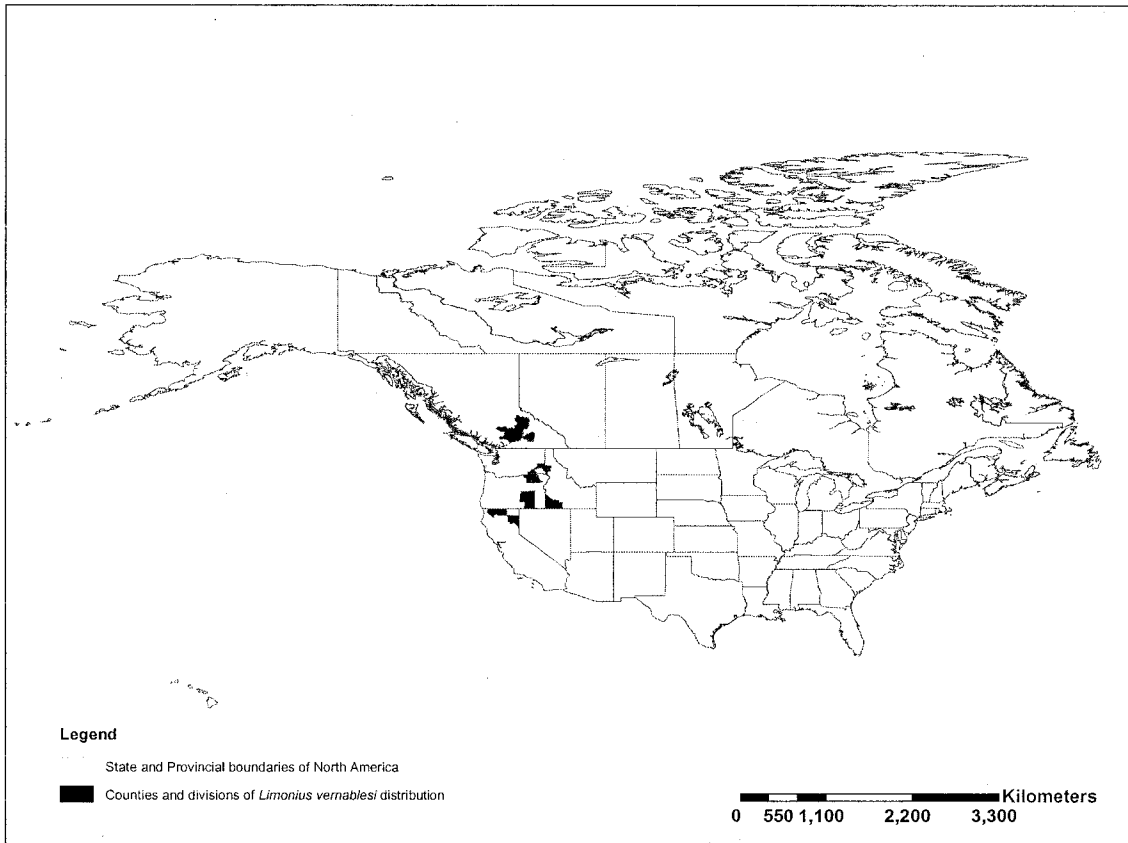
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