Lepidoptera of North America

1. Distribution of Silkmoths (Saturniidae) and Hawkmoths (Sphingidae) of Eastern North America

Contributions of the
C.P. Gillette Museumof Insect Biodiversity,
Department of Entomology,
Colorado State University, Fort Collins, Colo. 80523

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MAP

This is a report which complements the county atlas publications on Saturniidae and Sphingidae of the western United States by Peigler and Opler (1993) and Smith (1995), and which provides an assessment of the taxonomic problems among species. Gaps in knowledge are also acknowledged and described.

Methods

Information from institutional and private collections was gathered by personal inspection and through small contracts and requests to knowledgeable amateurs and professionals. Most provided specific county records but assessments of the abundance of common, widespread species was provided for Mississippi by Bryant Mather and for Missouri by Richard Heitzman.

Records from relevant literature were obtained through a fairly thorough search of Lepidoptera journals and included citations. State and local treatments of Lepidoptera were also included where available.

Records showing the historical occurrence in counties of the eastern United States were placed on maps of each species known or thought to occur in the area by Ferguson (1971 and 1972) and Hodges (1971). In the course of the project more recent discoveries and taxonomic treatments allowed for the inclusion of additional species. Time did not permit the mapping of Canadian records but the relevant literature was gathered and will be mapped in the future. Records dating from the late 1800's to present are included on the maps so that the maps are not necessarily indicative of the current distribution of each species. Moreover, some species, especially certain Sphingidae, are year-round residents only in the southern United States or more southerly tropical countries and are northward invaders and sometimes temporary colonists. The dots do not distinguish between resident and vagrant status.

Checklist of eastern species

Checklist numbers are from Hodges and others (1983), if available.

Family Saturniidae - Wild silk moths

7704 *Eacles imperialis* (Drury), includes subspecies *pini* Michener

7706 *Citheronia regalis* (F.)

7708 *Citheronia sepulcralis* G. & R.

7709 *Sphingicampa bicolor* (Harr.)

7712 *Sphingicampa bisecta* (Lint.)

7715 *Dryocampa rubicunda* (F.), includes subspecies *alba* Grt.

7716 *Anisota stigma* (F.), includes subspecies *fuscosa* Fgn.

7717 *Anisota manitobensis* McD., Canada only

7718 *Anisota consularis* Dyar

7719 *Anisota senatoria* (J.E. Smith)

7720 *Anisota peigleri* Riotte

7721 *Anisota finlaysoni* Riotte (Canada only)

7723 *Anisota virginiensis* (Drury), includes subspecies *pellucida* (J.E. Smith) and *discolor* Fgn.

7730 *Hemileuca maia* (Drury)

7731 *Hemileuca nevadensis* Stretch

7731.1 *Hemileuca nevadensis* Complex #1

7731.2 *Hemileuca nevadensis* Complex #2

7732 *Hemileuca lucina* Hy. Edw.

7746 *Automeris io* (F.)

7746.1 *Automeris louisiana* Fgn. & Brou

7757 *Antheraea polyphemus* (Cram.)

7758 *Actias luna* (L.)

7759 *Samia cynthia* (Drury)

7764 *Callosamia promethea* (Drury)

7765 *Callosamia angulifera* (Wlk.)

7766 *Callosamia securifera* (Maassen)

7767 *Hyalophora cecropia* (L.)

7768 *Hyalophora columbia* (S.I. Smith)

Family Sphingidae - Hawkmoths or Sphinx moths

7771 *Agrius cingulata* (F.)

7772 *Cocytius antaeus* (Drury)

7773 *Cocytius duponchel* (Poey)

7774 *Neococytius cluentius* (Cram.)

7775 *Manduca sexta* (L.)

7776 *Manduca quinquemaculata* (Haw.)

7777 *Manduca occulta* (R. & J.)

7778 *Manduca rustica* (F.)

7783 *Manduca jasminearum* (Guer.)

7784 *Dolba hyloeus* (Drury)
7786 *Ceratomia amyntor* (Geyer)
7787 *Ceratomia undulosa* (Wlk.)
7789 *Ceratomia catalpae* (Bdv.)
7790 *Ceratomia hageni* Grt.
7791 *Isoparce cupressi* (Bdv.)
7793 *Paratrea plebeja* (F.)
7796 *Sphinx eremitus* (Hbn.)
7797 *Sphinx eritmitoides* Stkr.
7802 *Sphinx chersis* (Hbn.)
7803 *Sphinx vashti* Stkr.
7807 *Sphinx canadensis* Bdv.
7808 *Sphinx franckii* Neum.
7809 *Sphinx kalmiae* J.E. Smith
7810 *Sphinx gordius* Cram.
7810.1 *Sphinx poecila* Stephens
7811 *Sphinx luscitiosa* Clem.
7812 *Sphinx drupiferarum* J.E. Smith
7815 *Sphinx pinastri* L.
7816 *Lapara coniferarum* (J.E. Smith)
7816.1 *Lapara phaeobrachycerous* Brou
7817 *Lapara bombycoides* Wlk.
7818 *Protambulyx strigilis* (L.)
7819 *Protambulyx carteri* R. & J.
7821 *Smerinthus jamaicensis* (Drury)
7822 *Smerinthus cerisyi* Kby.
7824 *Paonias excaecatus* (J.E. Smith)
7825 *Paonias myops* (J.E. Smith)
7826 *Paonias astylus* (Drury)
7827 *Laothoe juglandis* (J.E. Smith)
7828 *Pachyspinx modesta* (Harr.)
7829 *Pachyspinx occidentalis* (Hy. Edw.)
7830 *Pseudosphinx tetrio* (L.)
7832 *Erinnyis alope* (Drury)
7833 *Erinnyis lassauxii* (Bdv.)
7834 *Erinnyis ello* (L.)
7835 *Erinnyis oenotrus* (Cram.)
7836 *Erinnyis crameri* (Schaus)
7837 *Erinnyis obscura* (F.), includes *E. domingonis*
7839 *Erinnyis guttularis* (Wlk.)
7840 *Phryxus caicus* (Cram.)
7841 *Pachylia ficus* (L.)
7843 *Madoryx pseudothyreus* (Grt.)
7844 *Callionima parce* (F.)
7846 *Perigonia lusca* (F.)
7847 *Aellopos tantalus* (L.)
7848 *Aellopos clavipes* (R. & J.)
7849 *Aellopos titan* (Cram.)
7850 *Aellopos fadus* (Cram.)
7851 *Enyo lugubris* (L.)
7853 *Hemaris thysbe* (F.)
7854 *Hemaris gracilis* (G. & R.)
7855 *Hemaris diffinis* (Bdv.)
7859 *Eumorpha pandorus* (Hbn.)
7860 *Eumorpha intermedia* (B.P. Clark)
7861 *Eumorpha achemon* (Drury)
7863 *Eumorpha typhon* (Klug)
7864 *Eumorpha vitis* (L.)
7865 *Eumorpha fasciata* (Sulz)
7866 *Eumorpha labruscae* (L.)
7867. *Cautethia grotei* Hy. Edw.
7870. *Sphecodina abbottii* (Swainson)
7871. *Deidamia inscripta* (Harr.)
7873. *Amphion floridensis* B.P. Clark
7874. *Proserpinus gaurae* (J.E. Smith)
7875. *Proserpinnus juanita* (Stkr.)
7877. *Proserpinus flavofasciata* (Wlk.)
7884. *Darapsa versicolor* (Harr.)
7885. *Darapsa myron* (Cram.)
7886. *Darapsa pholus* (Cram.)
7887. *Xylophanes pluto* (F.)
7888. *Xylophanes porcus* (Hbn.)
7890. *Xylophanes tersa* (L.)
7891. *Xylophanes libya* (Druce)
7892. *Hyles euphorbiae* (L.), Canada only
7893. *Hyles gallii* (Rottemburg)
7894. *Hyles lineata* (F.)

Status

Two species, *Samia cynthia* and *Sphinx pinastri* are introduced exotics from abroad. The latter species was known from two counties and has disappeared. *Samia cynthia* occurs only in the Washington-Boston corridor in urban areas where it feeds on *Ailanthus*. Reports outside of this area are probably of reared specimens (Schweitzer, 1995). *Samia cynthia* now seems to have disappeared from some areas and is declining in others. The reasons for the decline are unknown.

Several species cause economic damage to crops and shade trees. These species include the hawkmoths *Manduca quinquemaculata, Manduca sexta, Ceratomia amyntor,* and *Ceratomia catalpae.* Among the silkmoths *Anisota stigma* and *Anisota senatoria* can cause economic damage to shade trees.

Many species, especially hawkmoths, occur in the East only as strays or vagrants. These include the following: *Cocytius duponchel, Neococytius cluentius, Manduca occulta, Sphinx eritmitoides, Erinnyis lassauxii, Erinnyis oenotrus, Erinnyis crameri, Erinnyis guttularis, Perigonia lusca, Callionima parce, Aellopos clavipes, Aellopos titan, Aellopos fadus, Eumorpha typhon, Xylophanes porcus,* and *Xylophanes libya.*

Several species are resident in Florida, to the west, or to the north in Canada, and seem rare in much of the East. In much of the East, these species may be considered strays (S) or marginal breeders (B): *Agrius cingulata (B, S), Cocytius antaeus (S* north of Florida), *Sphinx vashti (B,S), Sphinx canadensis (B,S), Pseudosphinx tetrio (S), Erinnyis alope (S), Erinnyis ello (S), Erinnyis obscura (S), Pachylia ficus (S), Aellopos tantalus (S), Enyo lugubris (S), Eumorpha fasciata (S* north of South Carolina and Mississippi), *Eumorpha vitis (S), Eumorpha labruscae (S), Cautethia grotei (S), Proserpinus juanita (B,* common to west), *Proserpinus flavofasciata (B,* common to north), and *Hyles gallii (B,S,* common to north).

Taxonomic Uncertainties

Hawkmoths

Taxonomic uncertainties cloud the status of some species. The western poplar sphinx (*Pachysphinx occidentalis)* may occur along the Gulf to Florida, but specimens from these areas need to be examined for their specific identity.

Two species of hawkmoth, *Sphinx gordius* and *S. poecila*, have been reported to be separate species (Riotte, 1980) and they reported overlap in Massachusetts (Schweitzer, 1995). Their exact ranges need to be exactly ascertained by examination of specimens.

The recently described *Lapara phaeobrachycerous* (Brou, 1994a) seems to be a narrow endemic, but the author states that specimens from the south Atlantic coastal plain have the general appearance of the newly described species, and detailed study is needed to delineate the distribution of the new species where it may overlap with *Lapara coniferarum.* It is now known that *Eumorpha intermedia* is a species separate from *Eumorpha pandorus* (Brou, 1980). In the United States, this species ranges from the vicinity of Brownsville, Texas, and ranges east along the Gulf coast and north to the Carolinas. Records of these two species need to be carefully scrutinized. It may well be that *E. intermedia* may not be as restricted as it seems.

Silkmoths

In the genus *Anisota*, several species are here treated as subspecies or synonyms of previously described species on the advice of J. Tuttle (personal communication and Tuttle, Collins, and Tuskes, in press).

A conifer-feeding form of *Eacles imperialis* ("pini") occurs in northern Michigan and northwards. Whether this is a separate species or a host race is unknown.

In the East *Hyalophora columbia* feeds on tamarack, a tree whose habitat may be declining, but this species now includes the more wide-ranging subspecies *nokomis* and *gloveri* which have much broader host ranges.

In the East there are several similar species of *Hemileuca*. One of these, the *Hemileuca nevadensis* complex, contains two species which are yet to be described. Species 1 occurs in just 2 counties just east of Lake Erie, and species 2 is known only from Sussex County, New York.

Eastern Endemics

Several species occurs mainly in the eastern United States and adjacent Canada, and a few of these may be of conservation concern. Some species are common and widespread in the East, even though they may have experienced losses in the Northeast during the 1970's, possibly due to aerial spraying against Gypsy moth outbreaks. Reputedly, the luna moth (*Actias luna)* was referred to as endangered in the East; yet this is one of the most common, widespread species of Saturniidae.

In addition to the two undescribed *Hemileuca*, other narrow endemics of seeming conservation concern are *Proserpinus gaurae* and *Automeris louisiana*. The former species is known from several states, but only from one or a few specimens in each state. The caterpillars eat *Oenothera* and probably occur in inland sandy habitats that are being invaded by woody vegetation. Careful study of this species, and management of its habitats are necessary.

Automeris louisiana occurs primarily in Louisiana counties on the Mississippi River delta, an area that is undergoing long-term subsidence. Whether the specific habitat of this moth is disappearing should be investigated.

Callosamia securifera feeds on *Magnolia virginiana* and ranges from Louisiana east to Florida and thence north to Virginia. Peigler (1979) states that the species has a specialized habitat and that it is declining throughout its range. Conversion of forests to even-age pine plantations and housing development, especially in Florida, are potential threats.

Long-term Declines

Several species have been reported to have declined or disappeared from some areas, yet remain common elsewhere. Other species seem to have declined and seem to be genuinely rare throughout their range in the East. Although the disappearance of certain Saturniidae in the Northeast has drawn much attention, these species are common to abundant in most of their range, and several Saturniidae are showing a slow recovery in the Northeast.

In contrast, several hawkmoths have experienced range-wide declines, but the reasons for these declines are not understood. Some species may depend on sandy barrens habitats or other open or scrubby habitats. Fire suppression and succession toward second-growth forest in much of the non-urban East may be a factor, but specific research is necessary. The species that seem to have undergone declines include *Manduca jasminearum, Sphinx luscitiosa,* and *Sphinx eremitus*. Other species such as *Sphinx chersis* and *Sphinx drupiferarum* may be declining in the East, but are widespread and common enough in the west (Smith, 1995).

Declines of large moths of both families seem to occur in urban areas throughout the East and are due to several factors including loss of appropriate habitat and, possibly, light pollution. The effects of control efforts on the expanding Gypsy moth, especially those using B.T. sprays have yet to be determined with any degree of exactness.

Gaps in distributional knowledge

With some exceptions the best distributional information is available for the Midwest and Northeast. Good information is available for the following southern states: Florida, Mississippi, and South Carolina. But the following states are poorly sampled or information was not available: Alabama, Arkansas, Louisiana, North Carolina, Tennessee, and Virginia. Among more northern states good information was not available for Indiana, Iowa, Minnesota, and Vermont.

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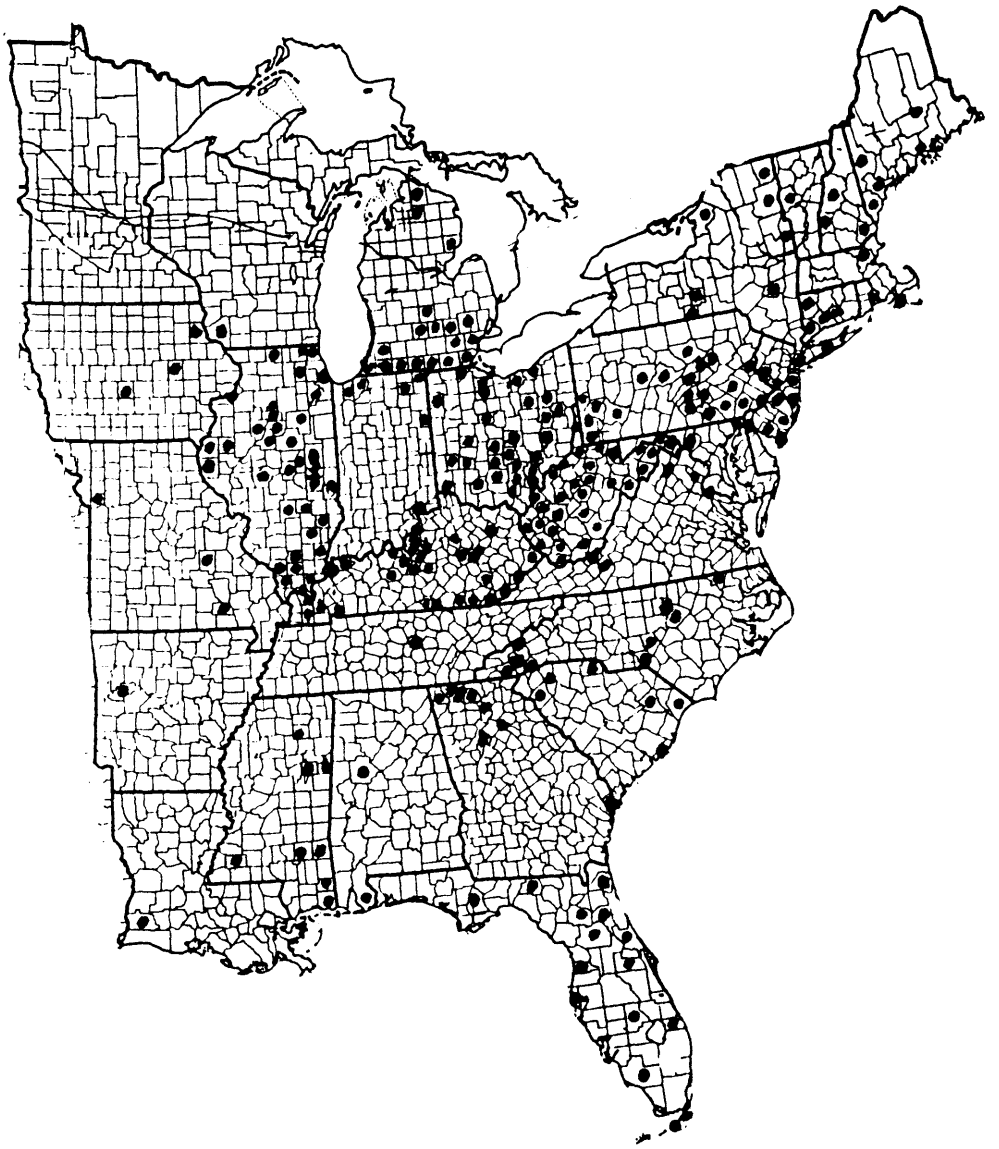
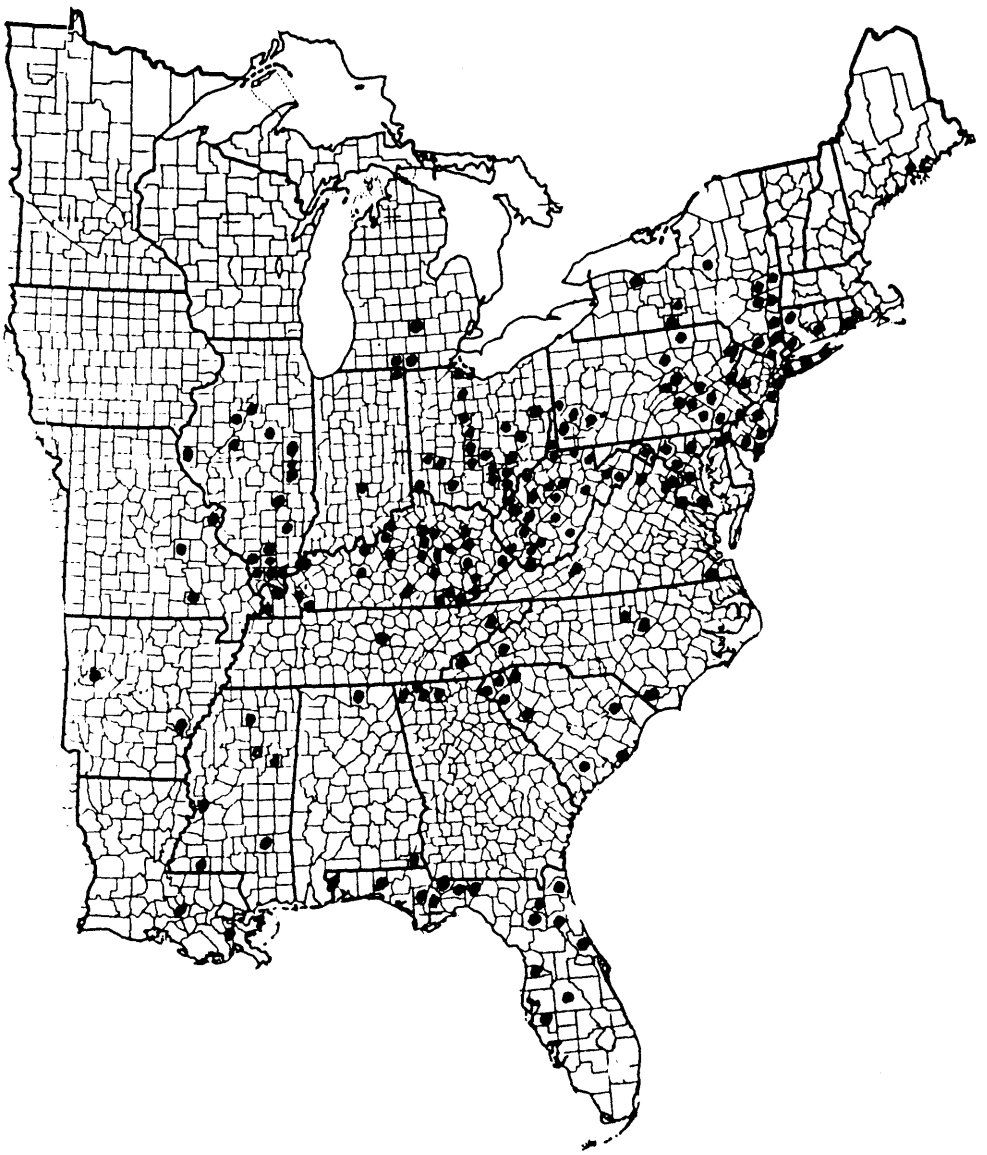
Maps for Wild Silkmoths

Saturniidae

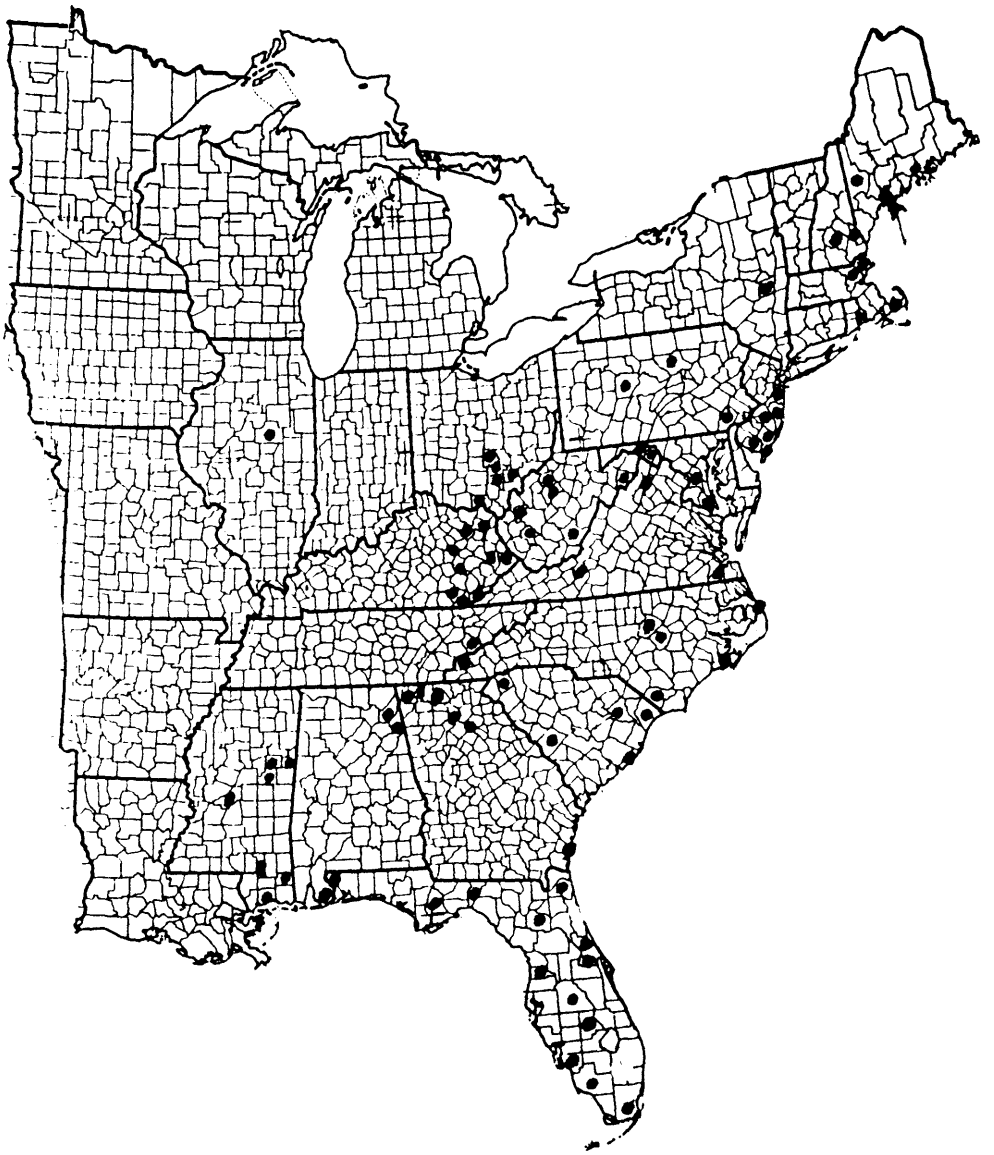
7704 *Eacles imperialis* (Drury), includes subspecies *pini* Michener



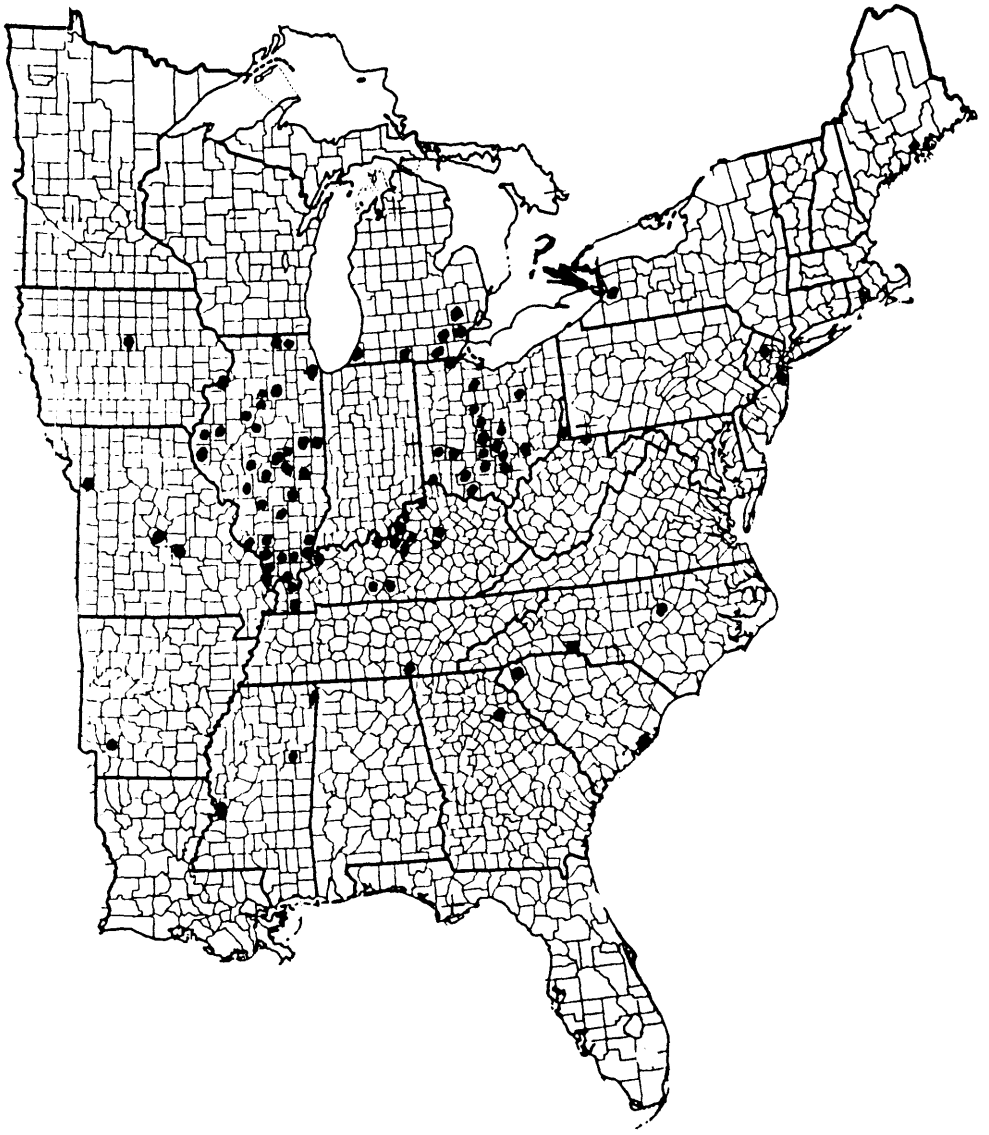
7706 *Citheronia regalis* (F.)



7708 *Citheronia sepulcralis* G. & R.



7709 *Sphingicampa bicolor* (Harr.)



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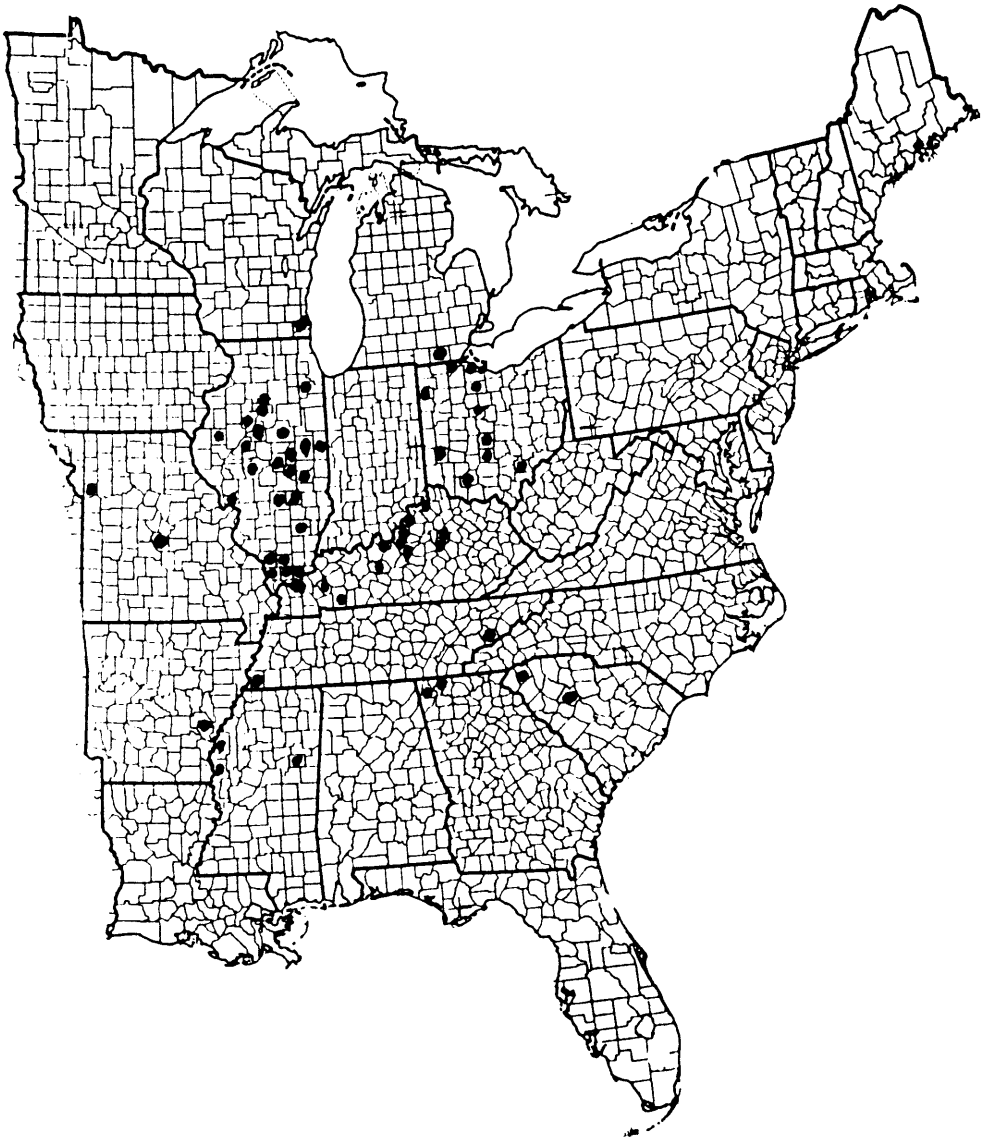
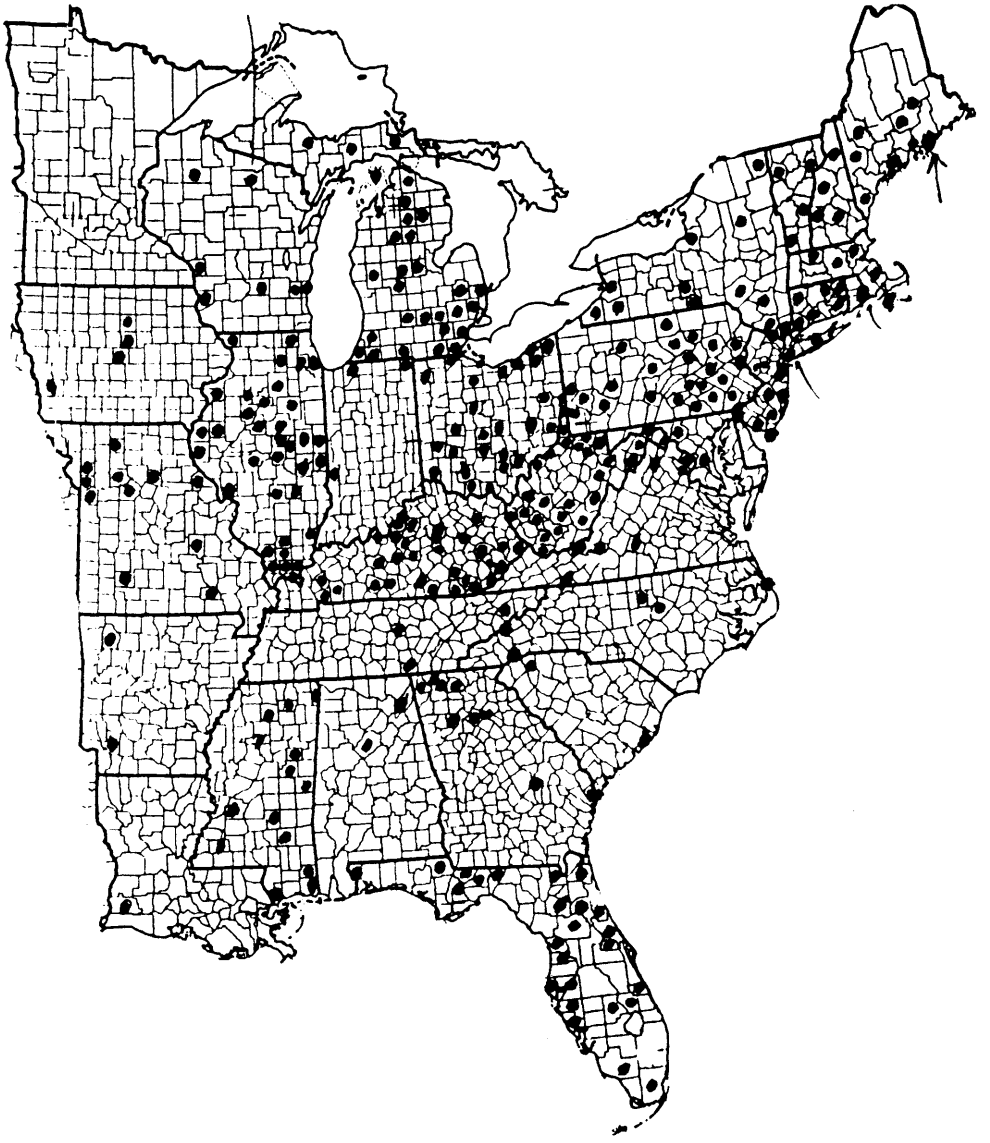
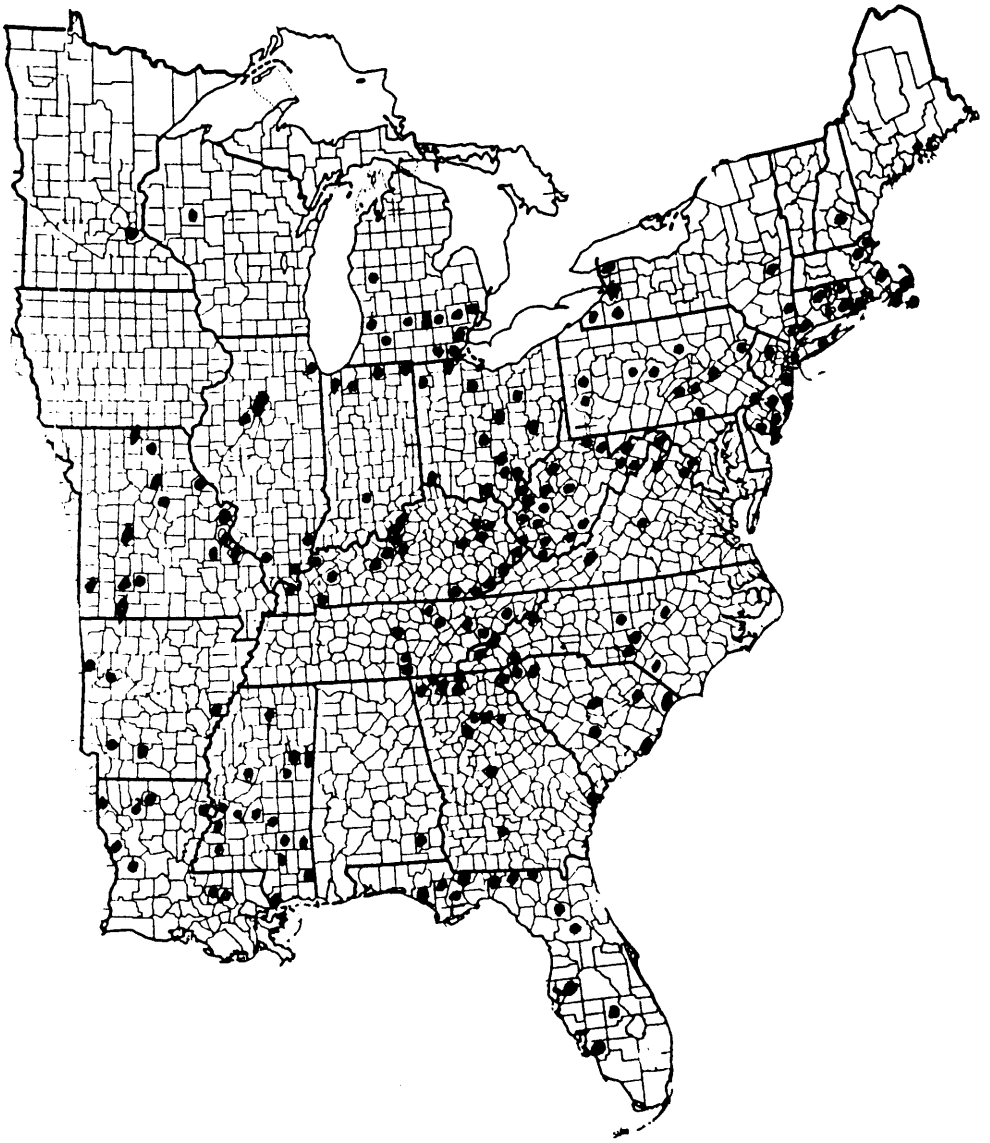


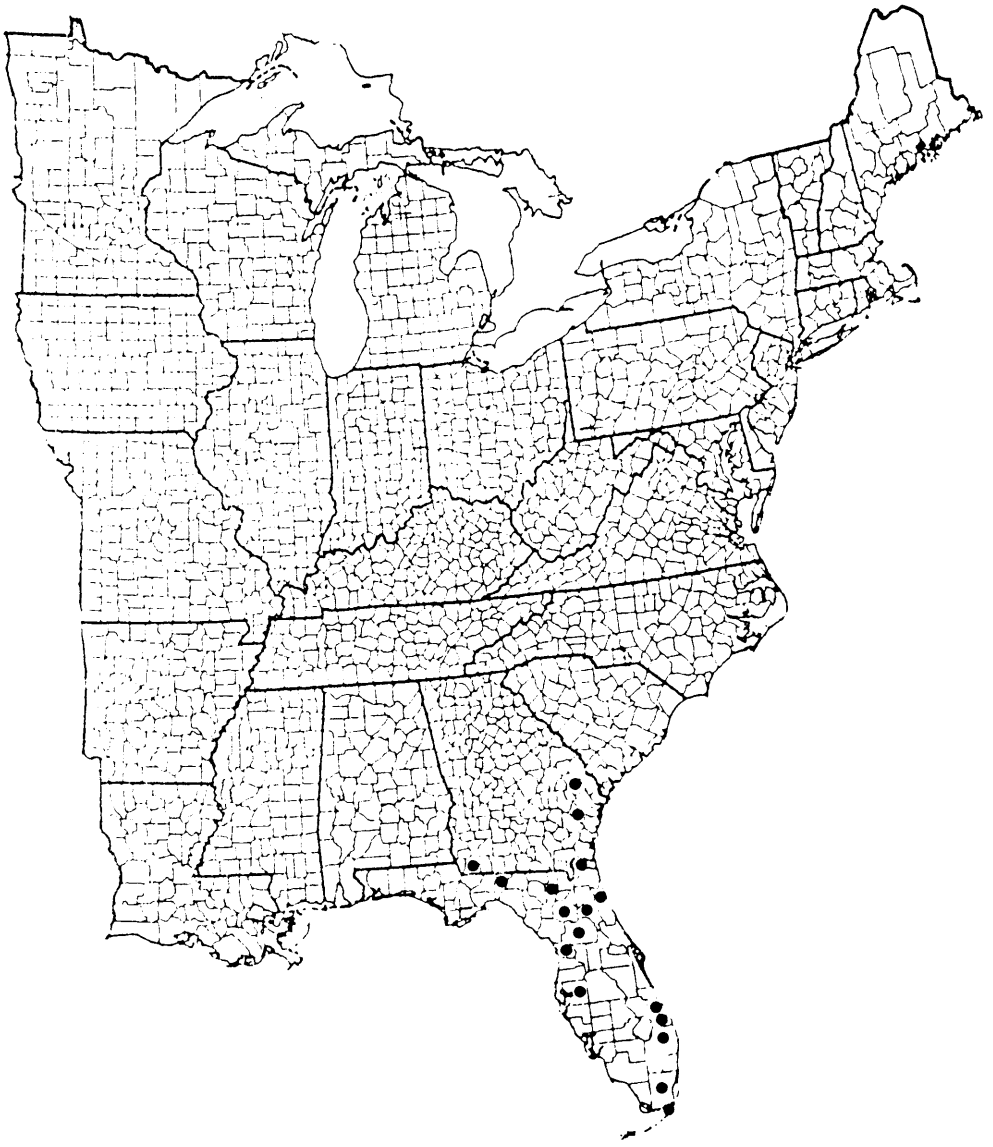
7715 *Dryocampa rubicunda* (F.), includes subspecies *alba* Grt.



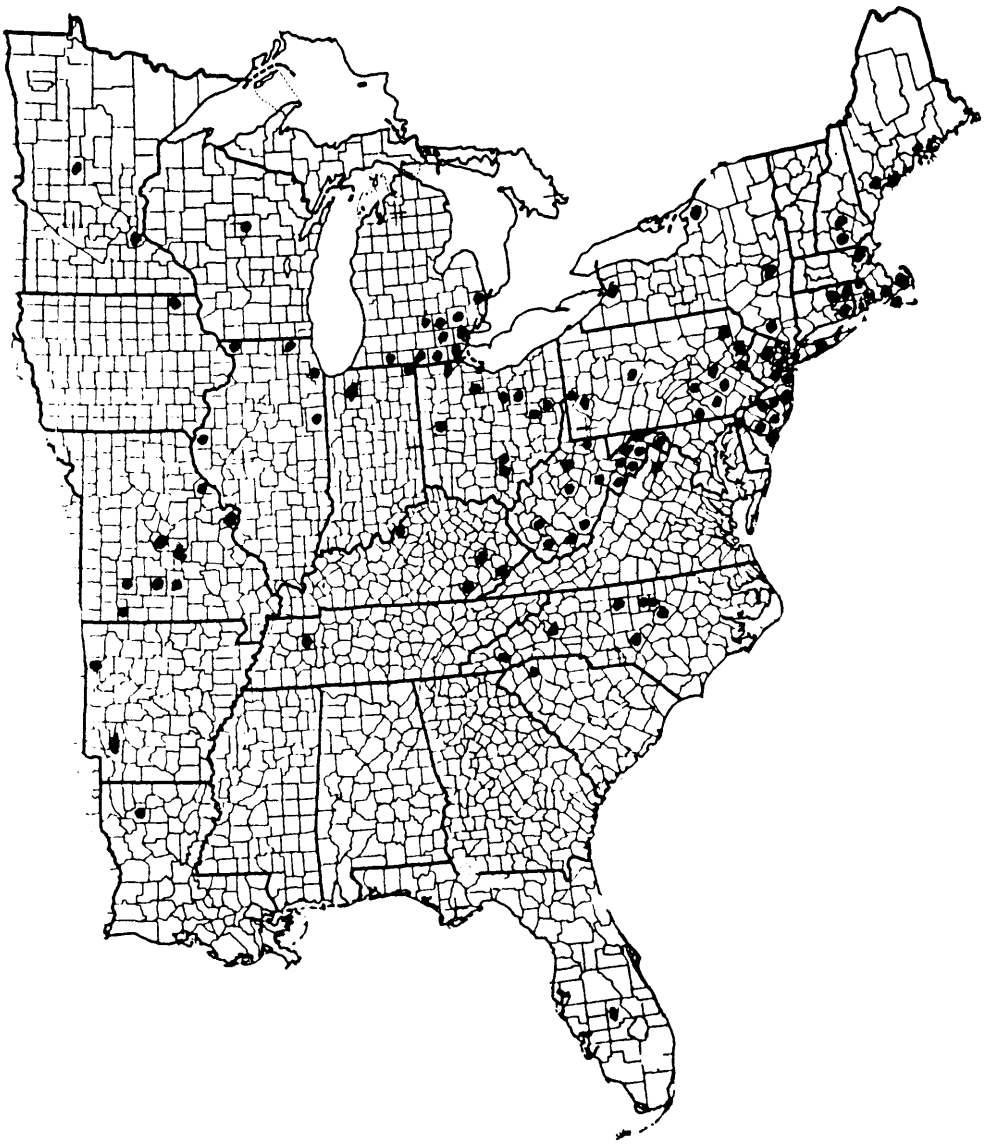
7716 *Anisota stigma* (F.), includes subspecies *fuscosa* Fgn.



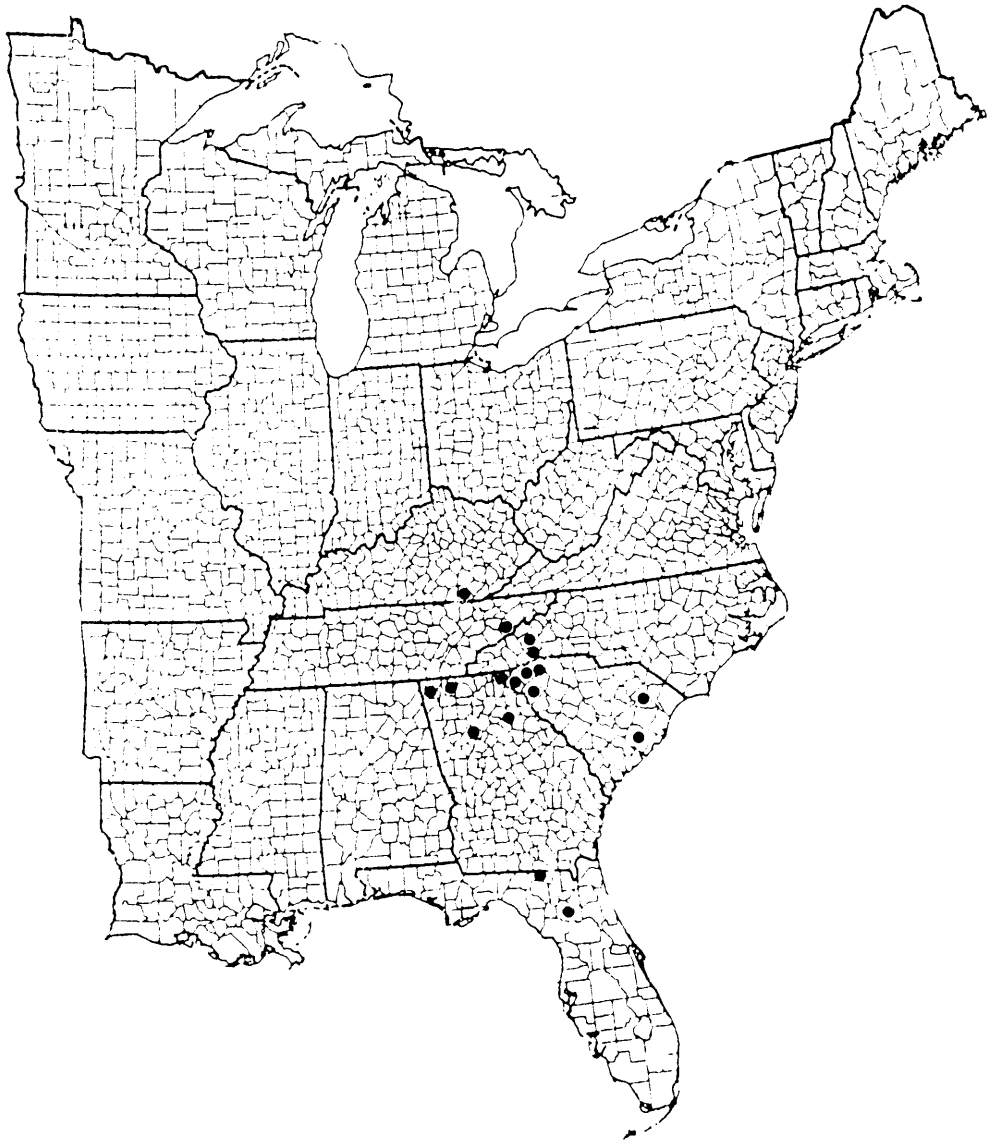
7718. *Anisota consularis* Dyar



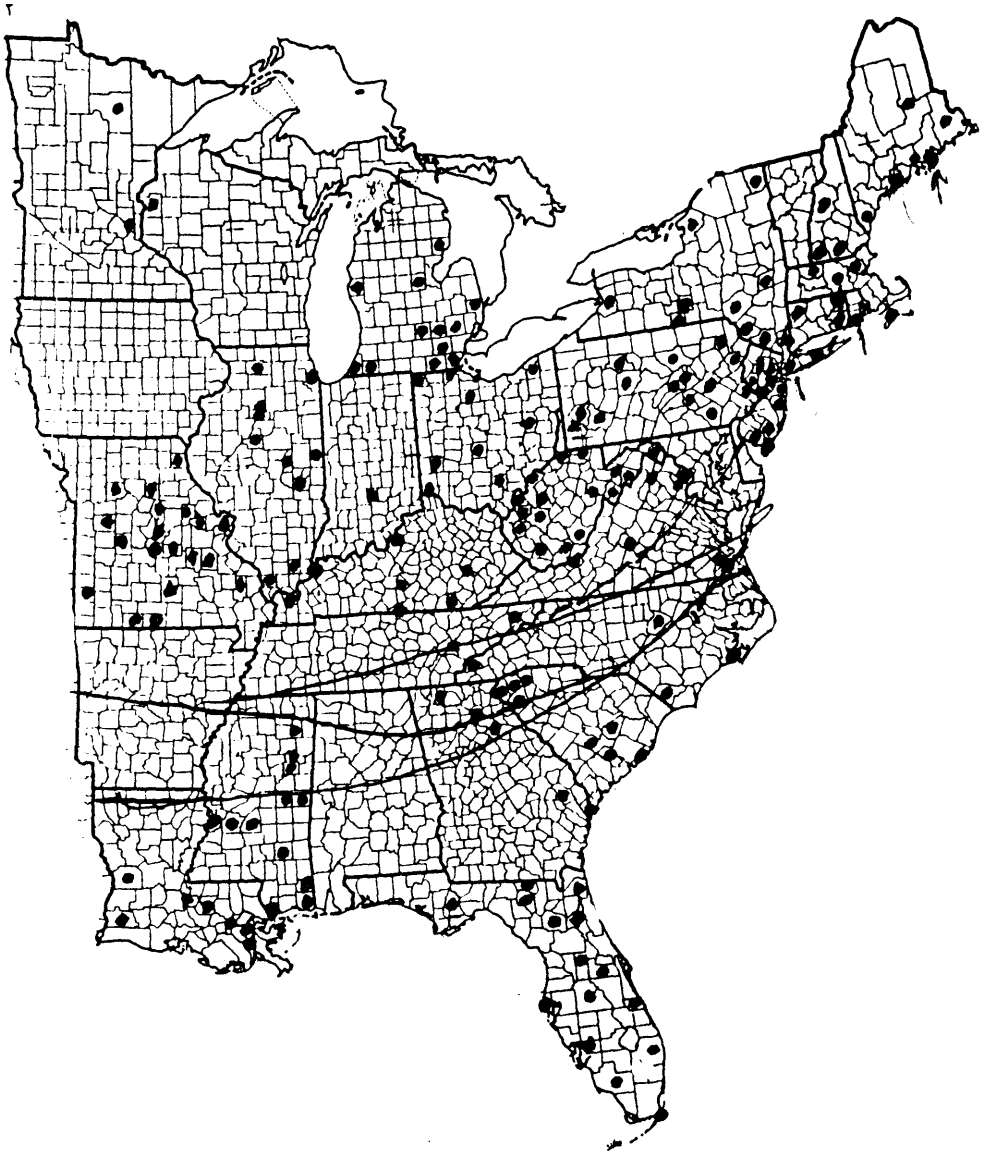
7719 *Anisota senatoria* (J.E. Smith)



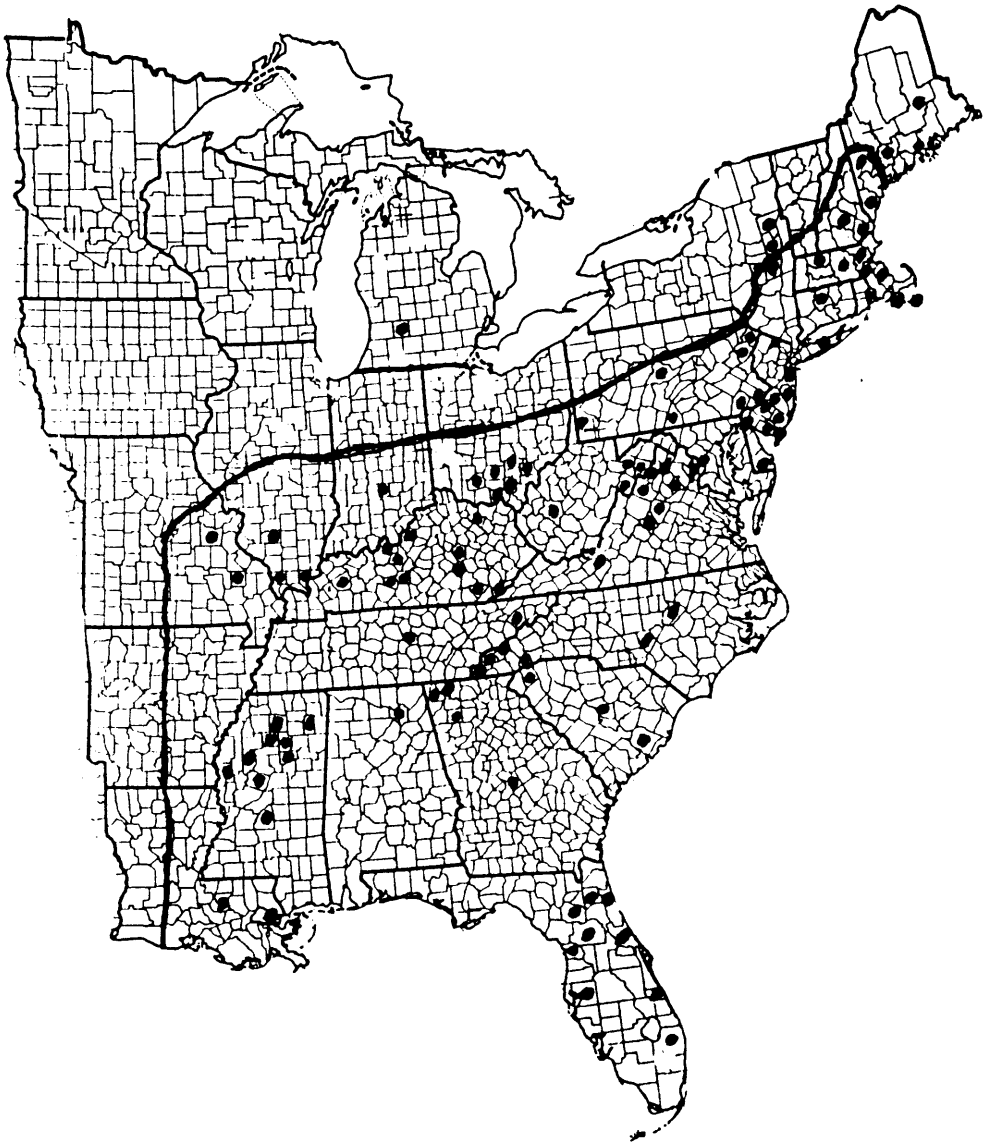
7720. *Anisota peigleri* Riotte



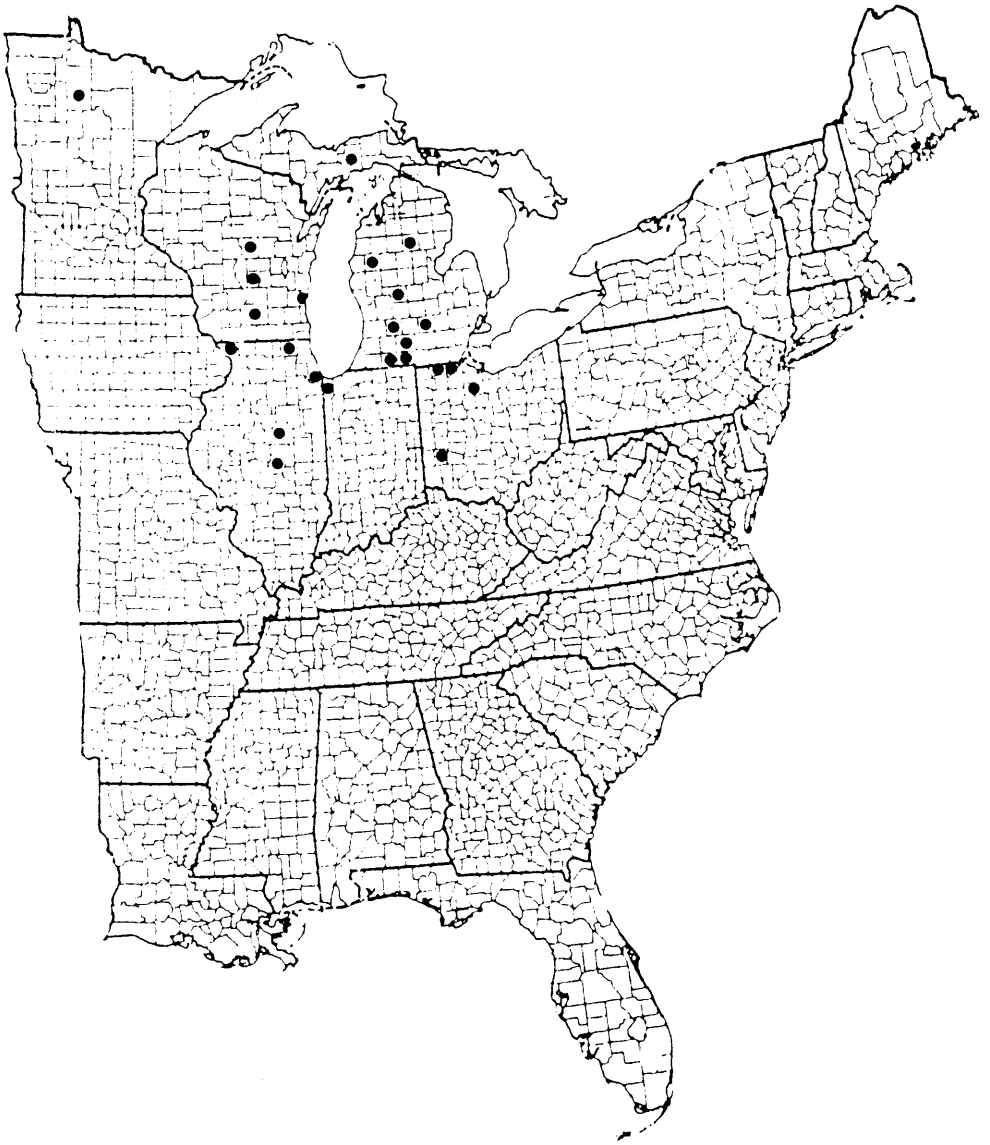
7723 *Anisota virginiensis* (Drury), includes subspecies *pellucida*



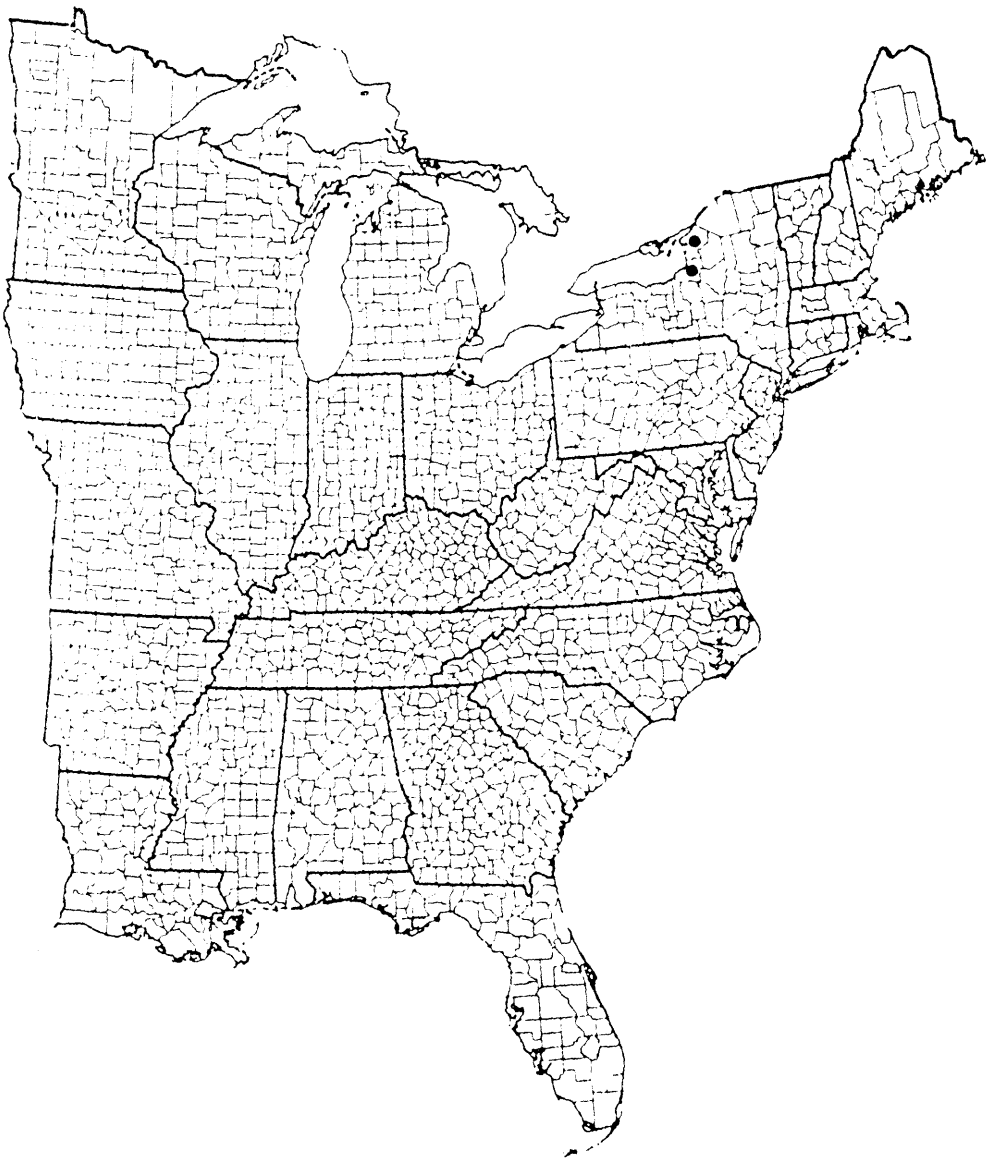
7730 *Hemileuca maia* (Drury)



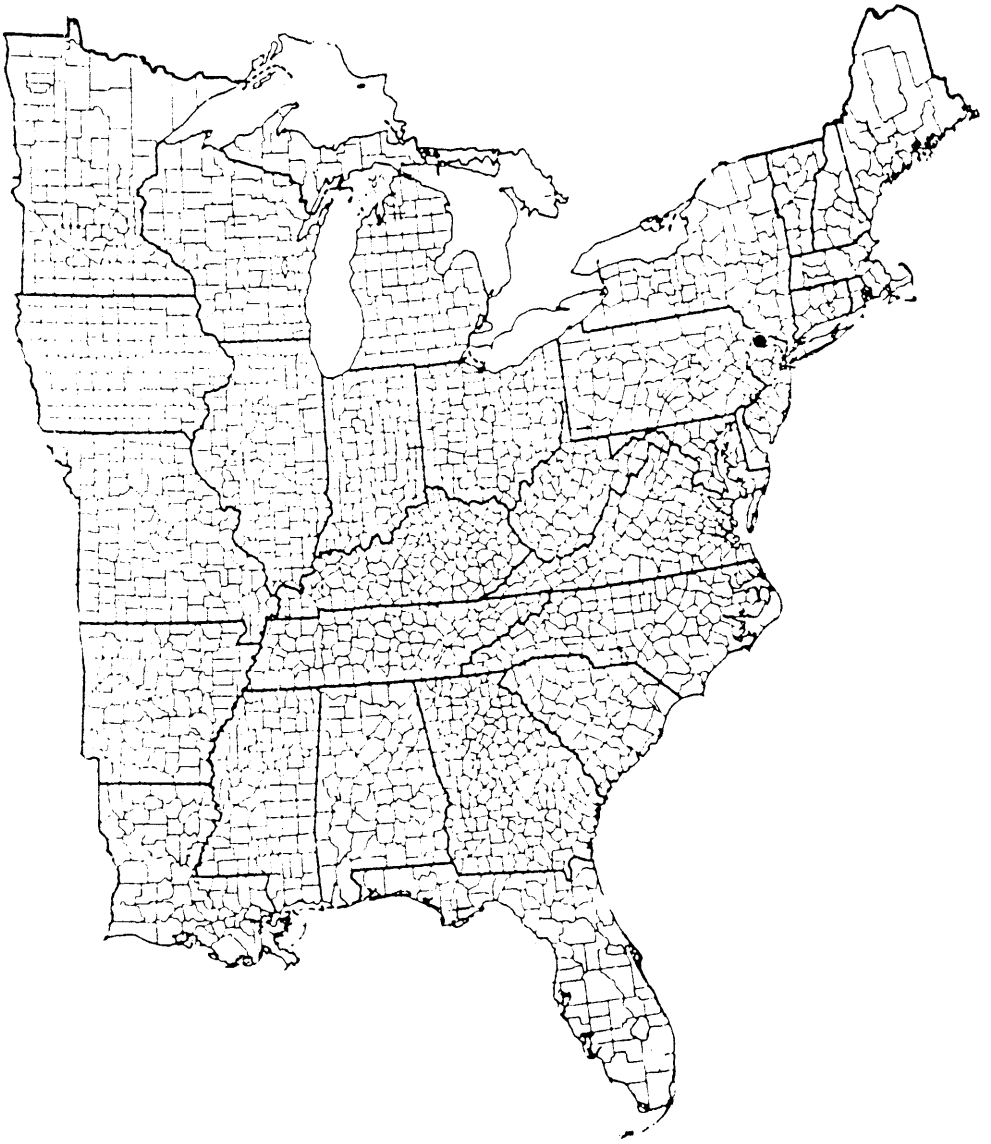
7731 *Hemileuca nevadensis* Stretch



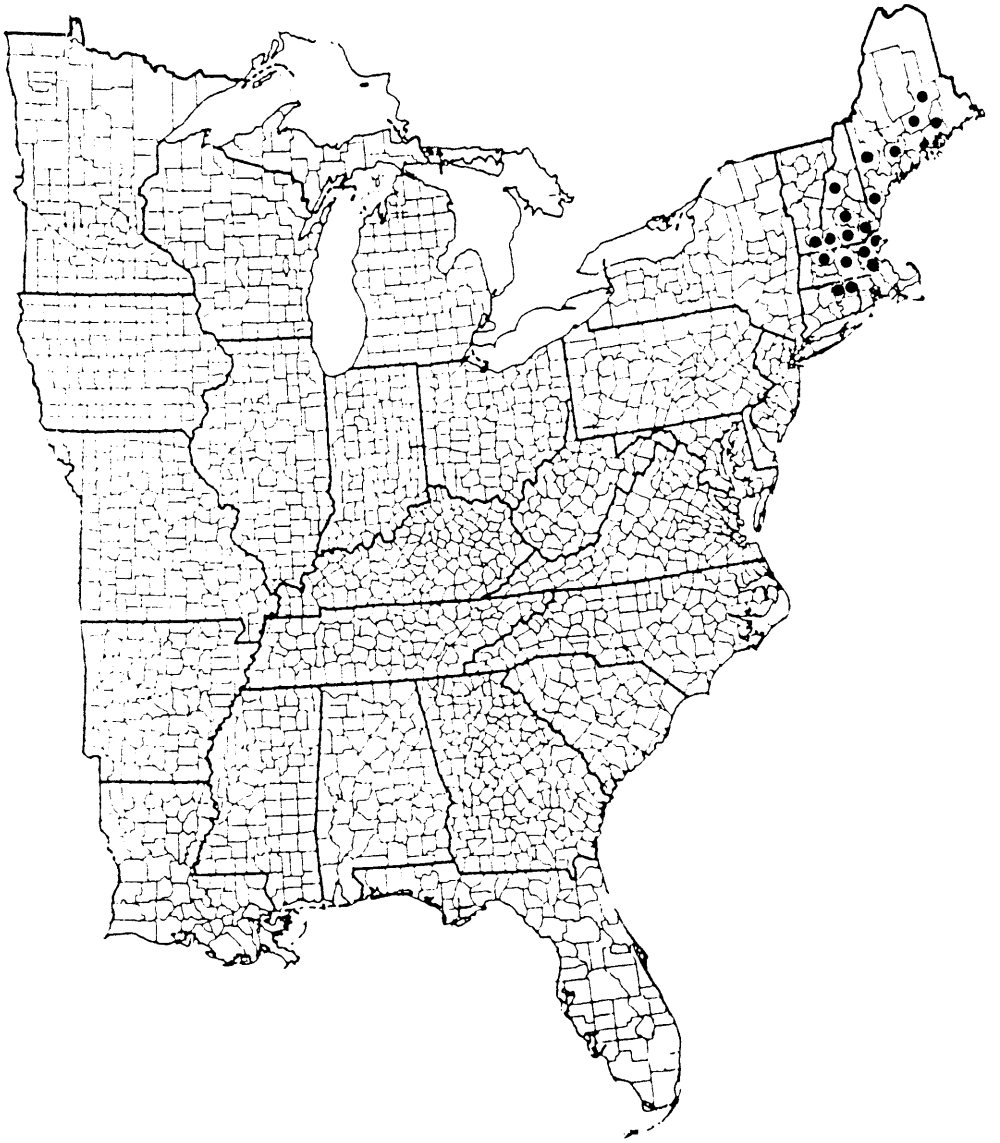
7731.1 *Hemileuca nevadensis* Complex #1



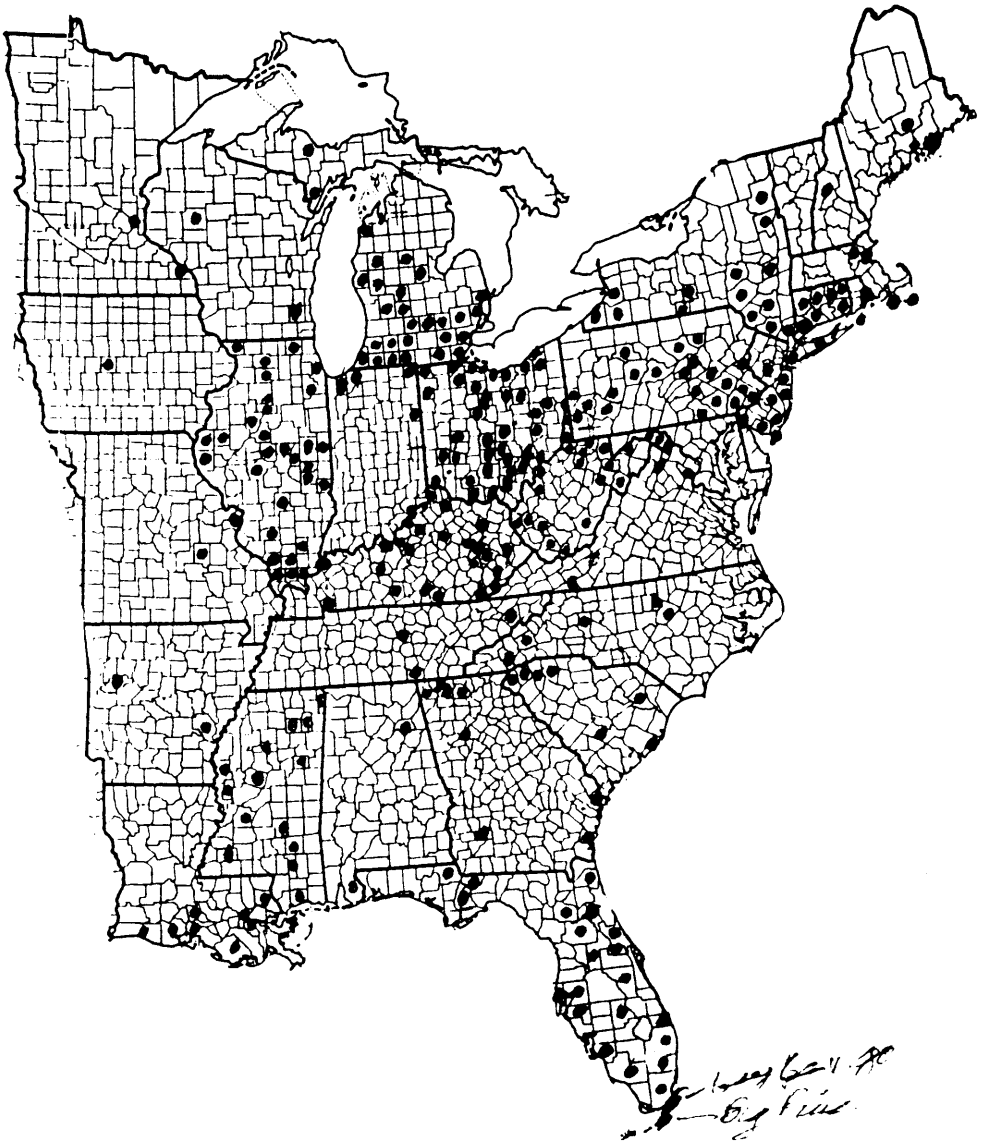
7731.2 *Hemileuca nevadensis* Complex #2



7732. *Hemileuca lucina* Hy. Edw.

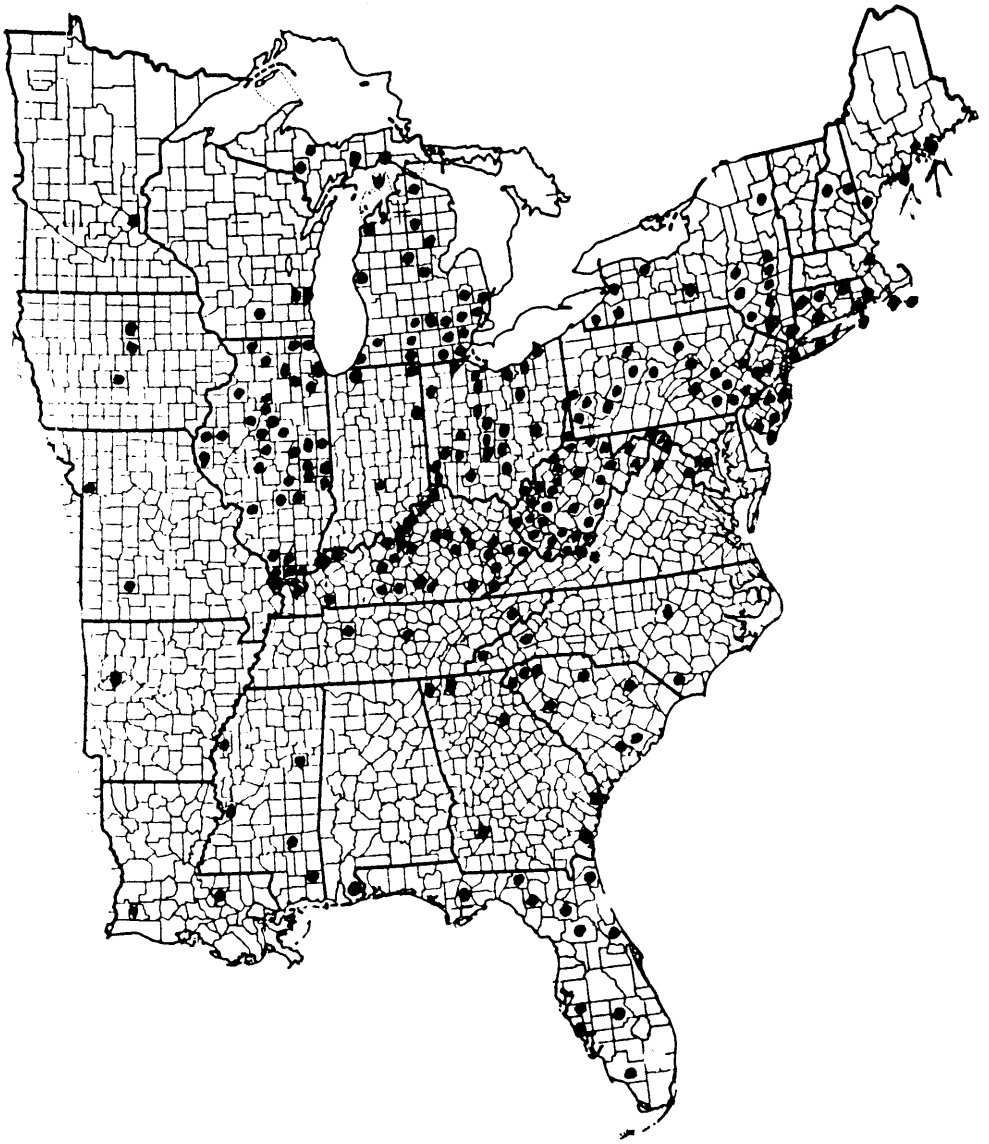


7746 *Automeris io* (F.)

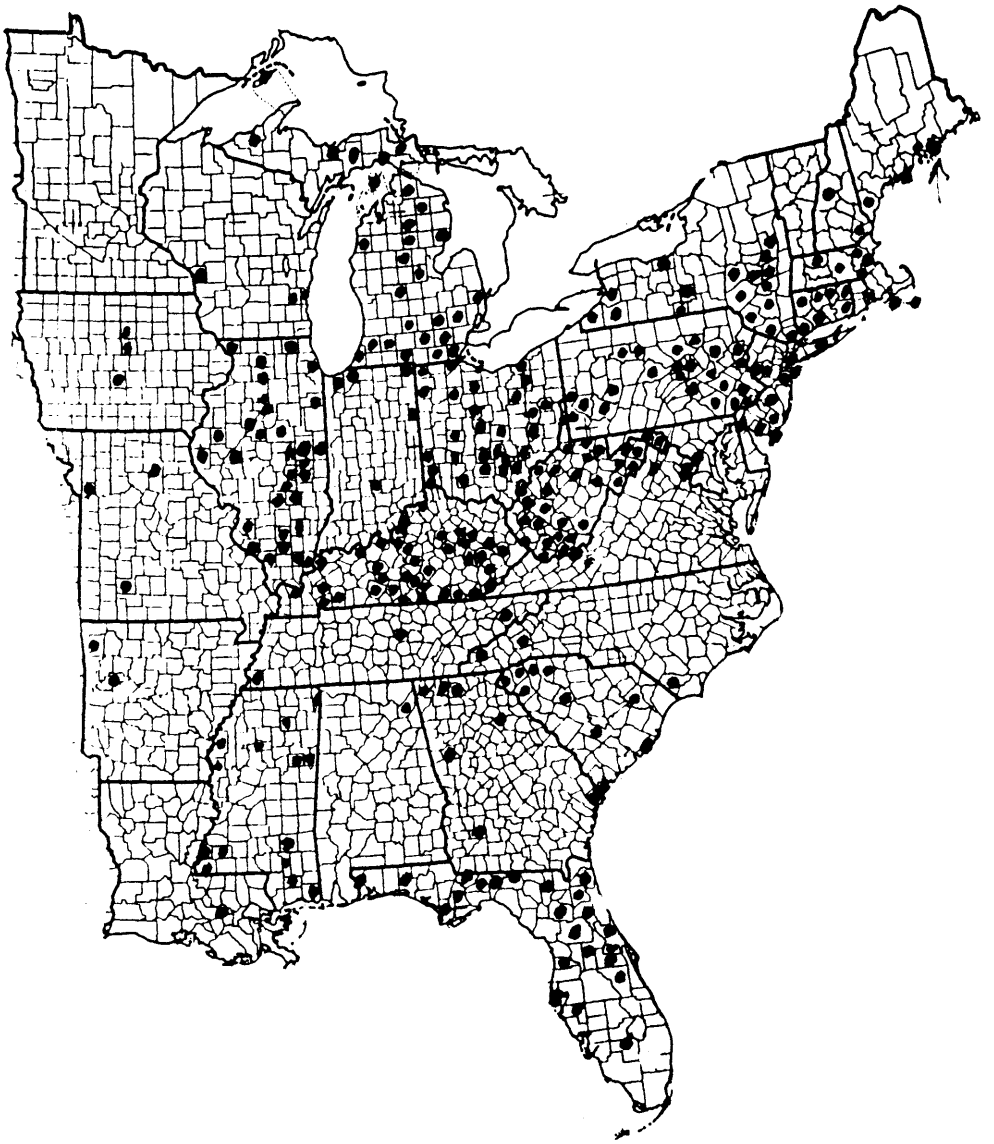


7746.1 *Automeris louisiana* Fgn. & Brou

7757 *Antheraea polyphemus* (Cram.)



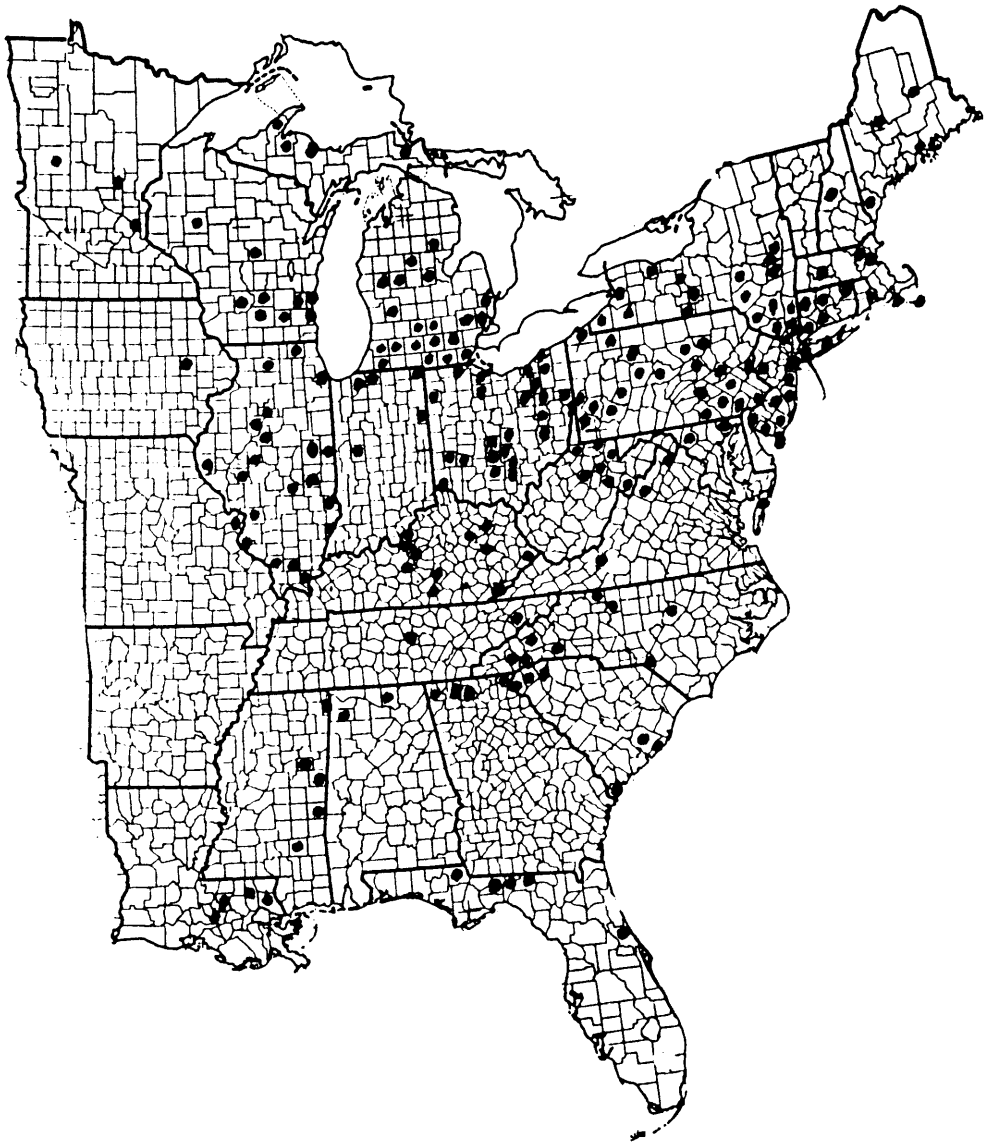
7758 *Actias luna* (L.)



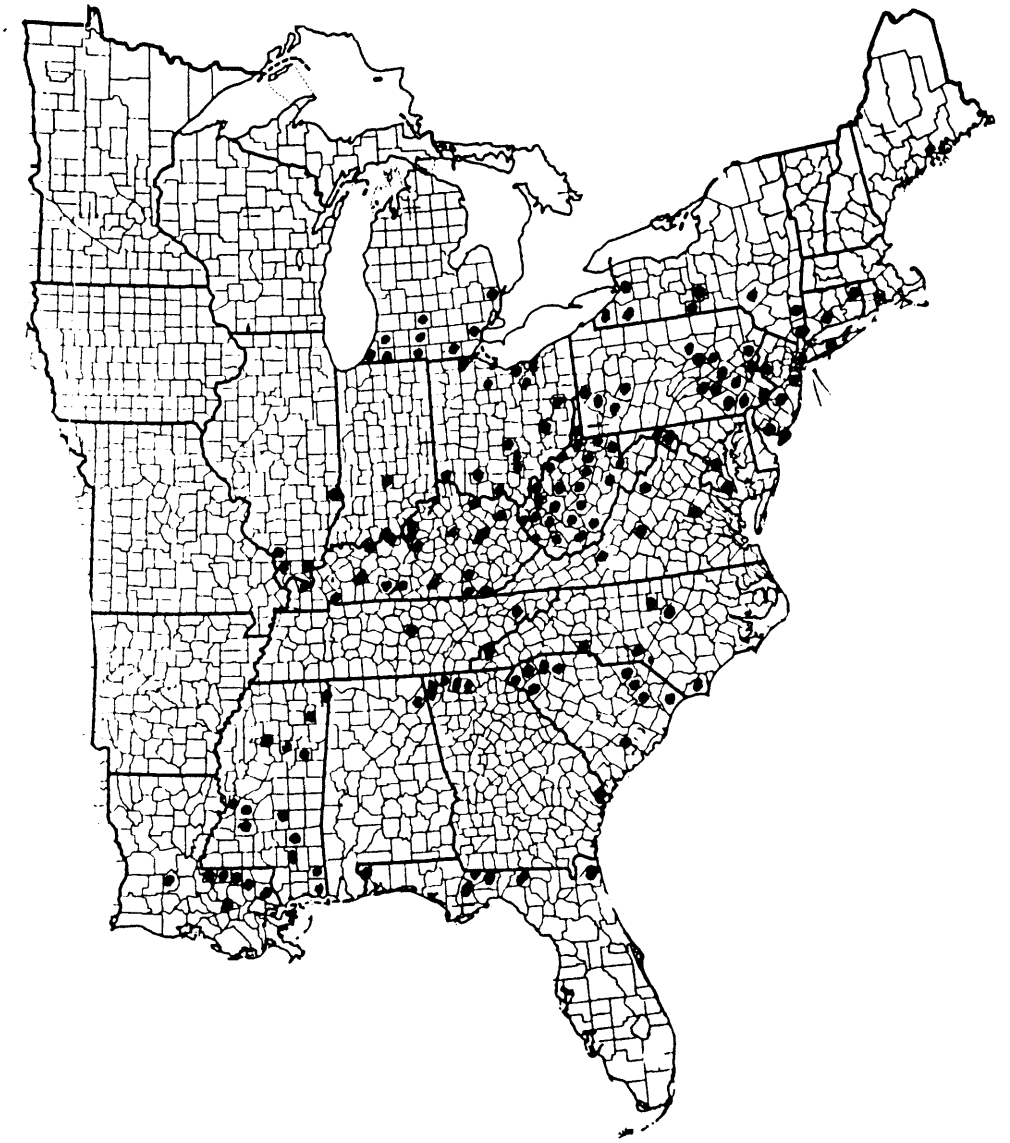
7759. *Samia cynthia* (Drury)

7766. *Callosamia securifera* (Maassen)

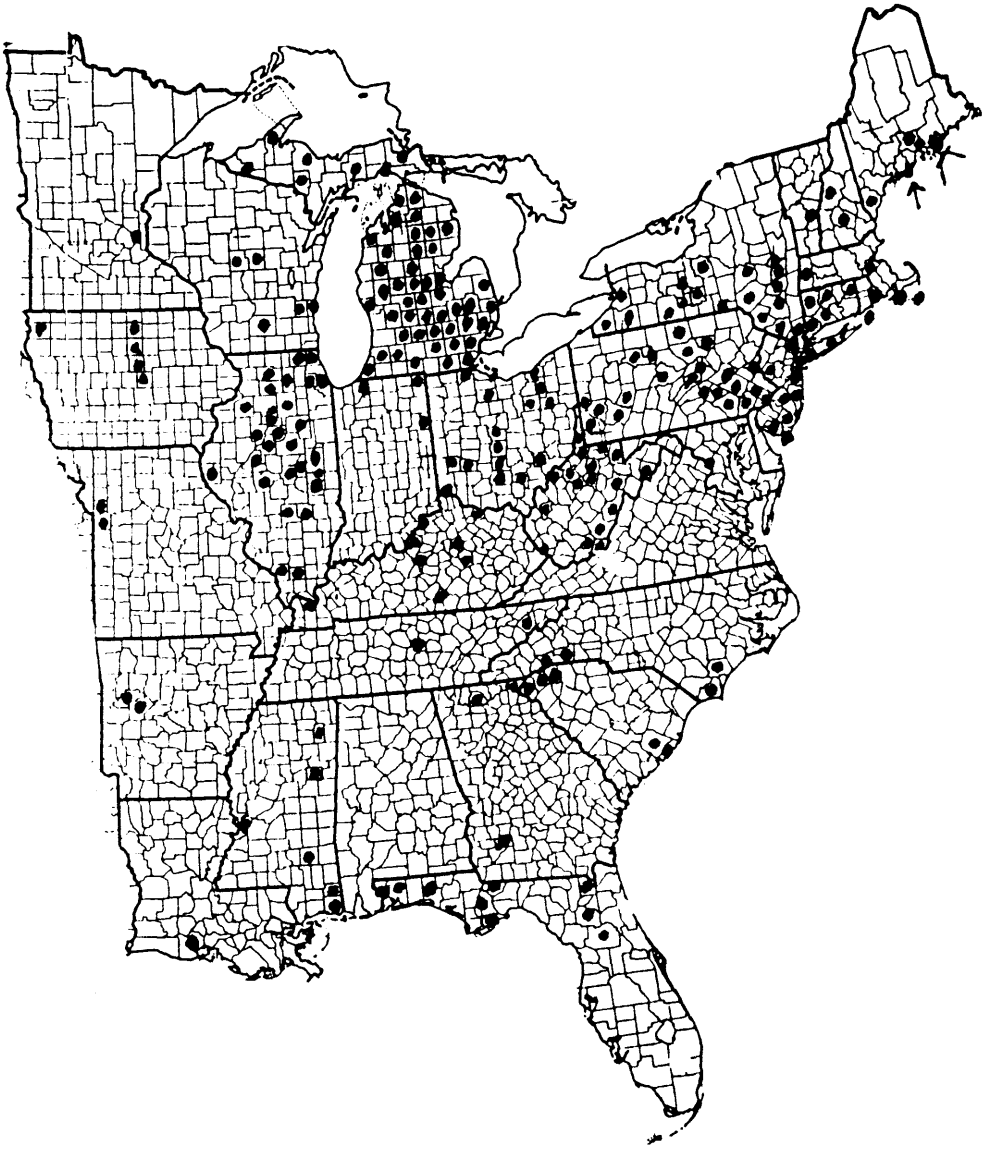
7764 *Callosamia promethea* (Drury)



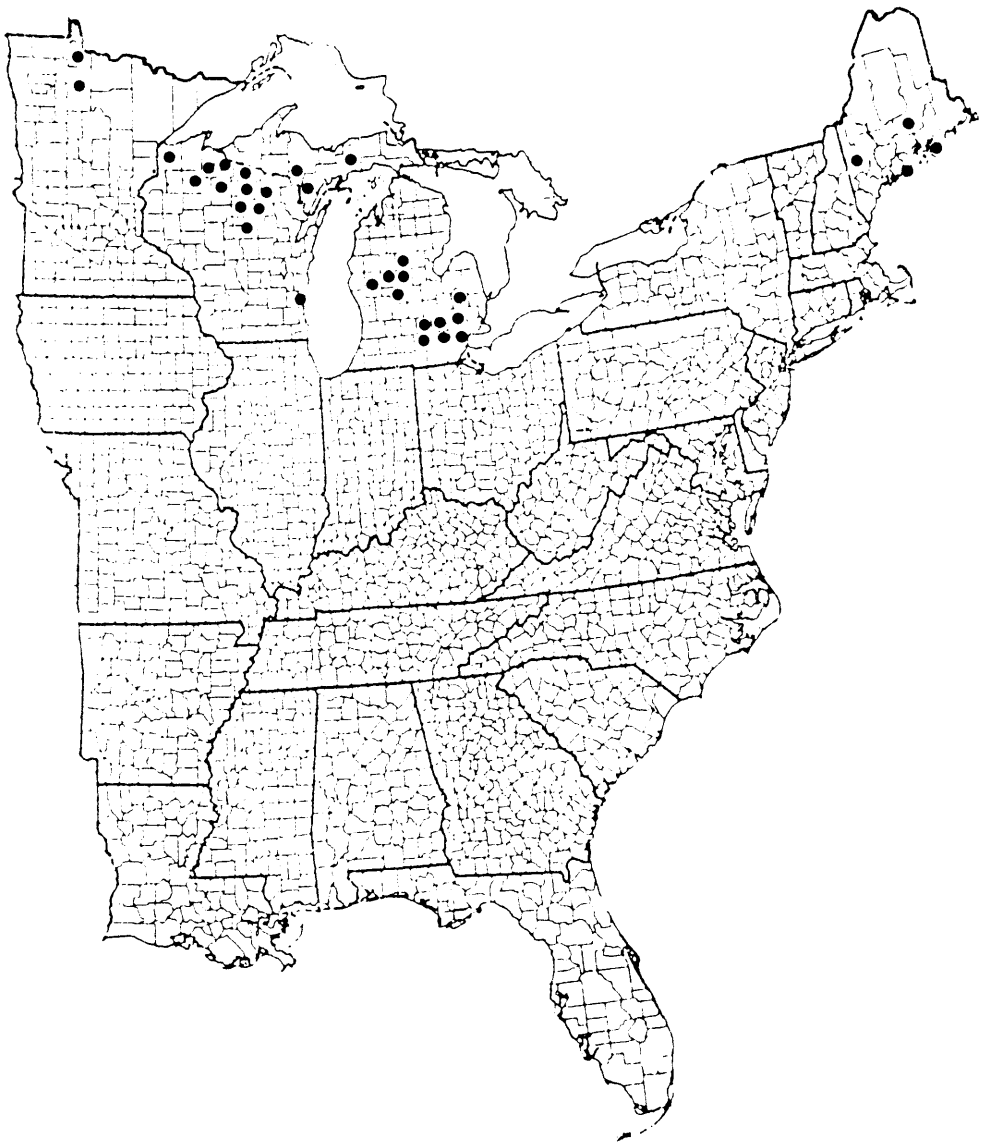
7765 *Callosamia angulifera* (Wlk.)



7767 *Hyalophora cecropia* (L.)



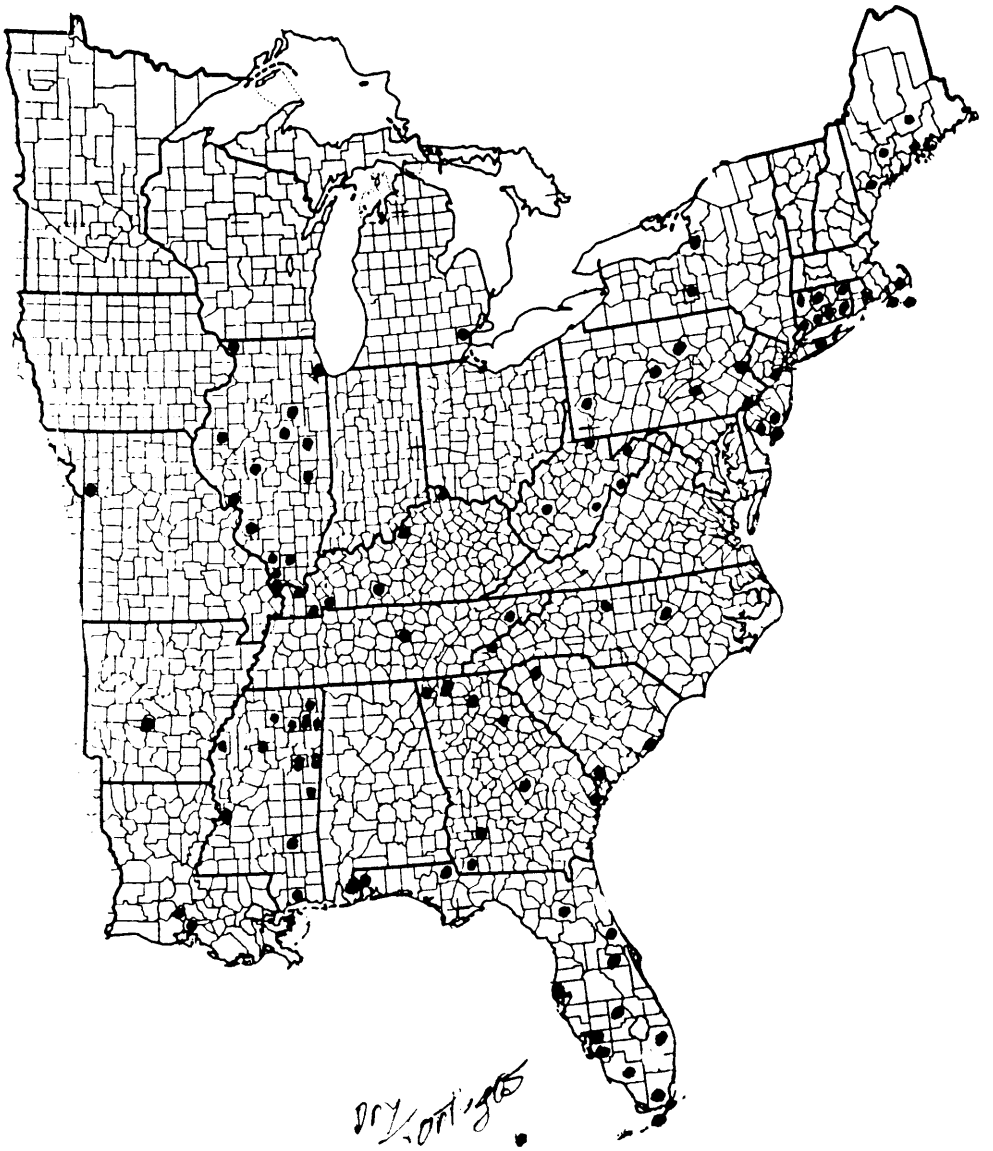
7768. *Hyalophora columbia* (S.I. Smith)



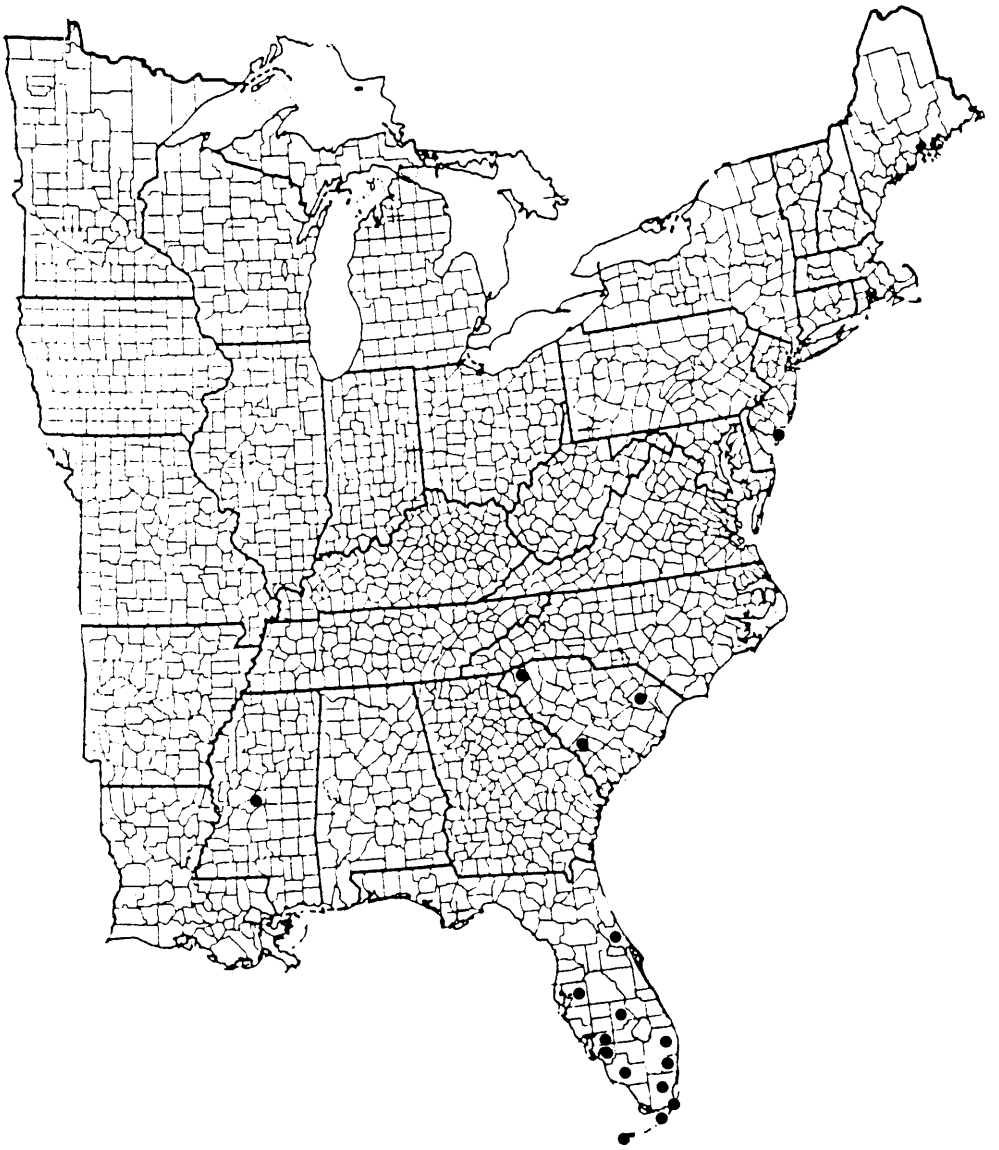
Maps for Hawkmoths

Sphingidae

7771 *Agrius cingulata* (F.)

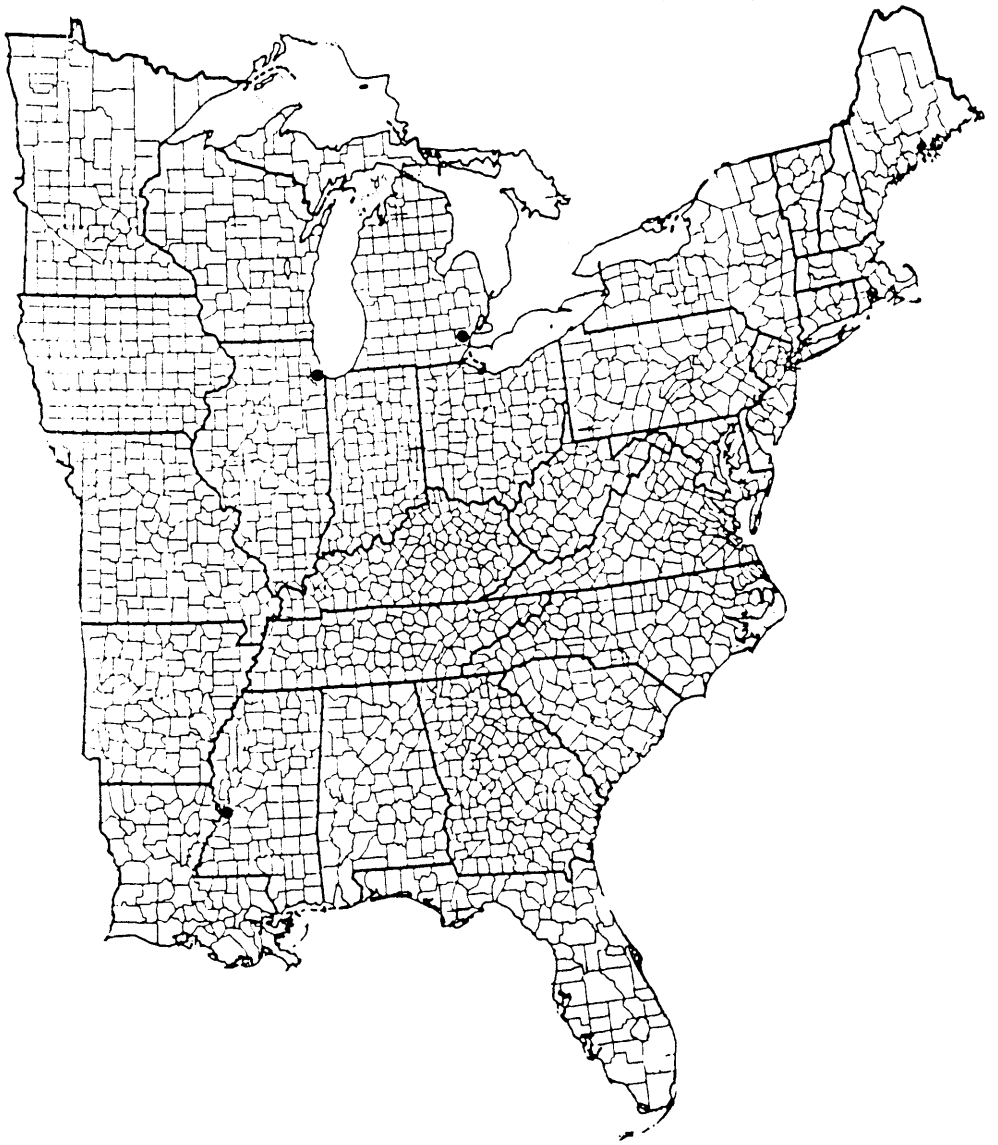


7772 *Cocytius antaeus* (Drury)

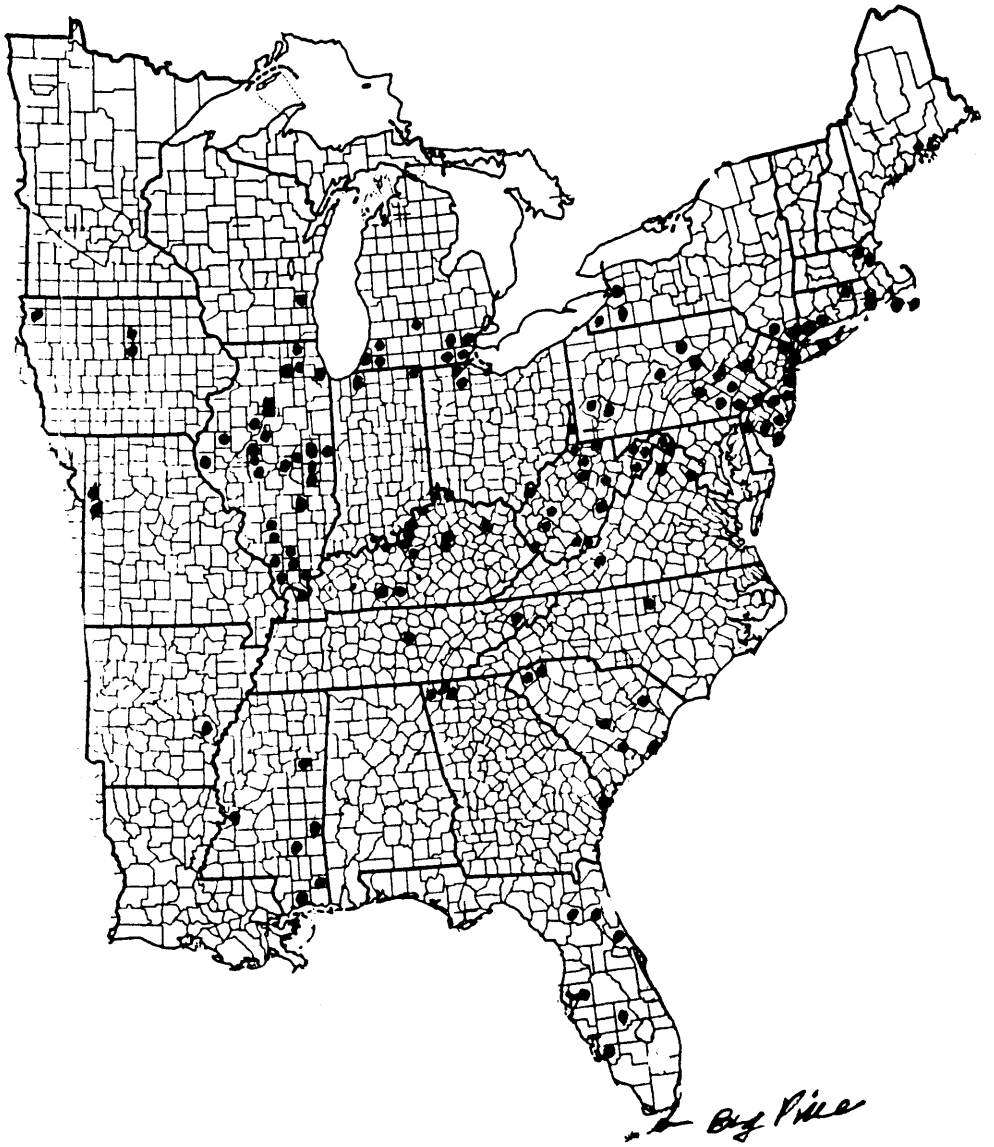


7773 *Cocytius duponchel* (Poey)

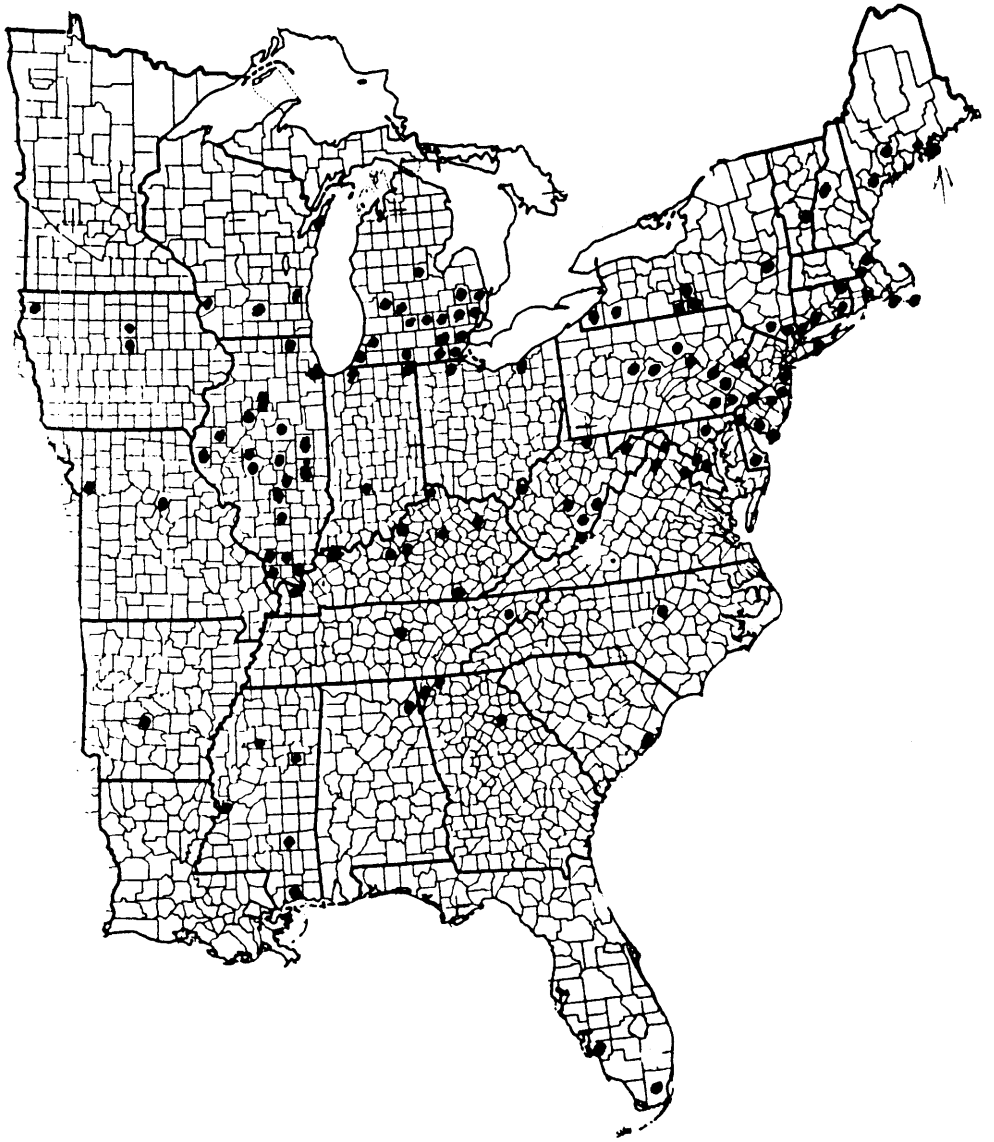
7774 *Neococytius cluentius* (Cram.)



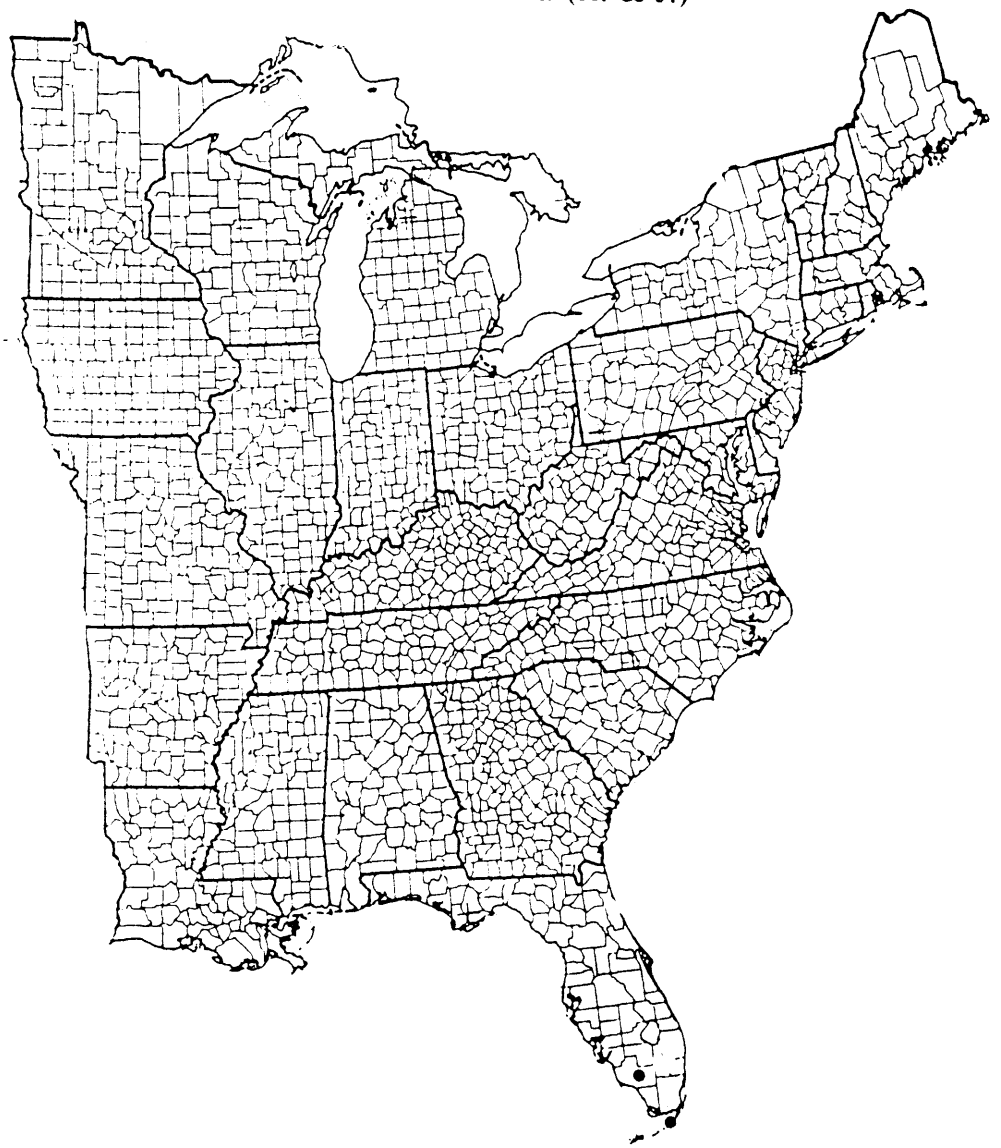
7775 *Manduca sexta* (L.)



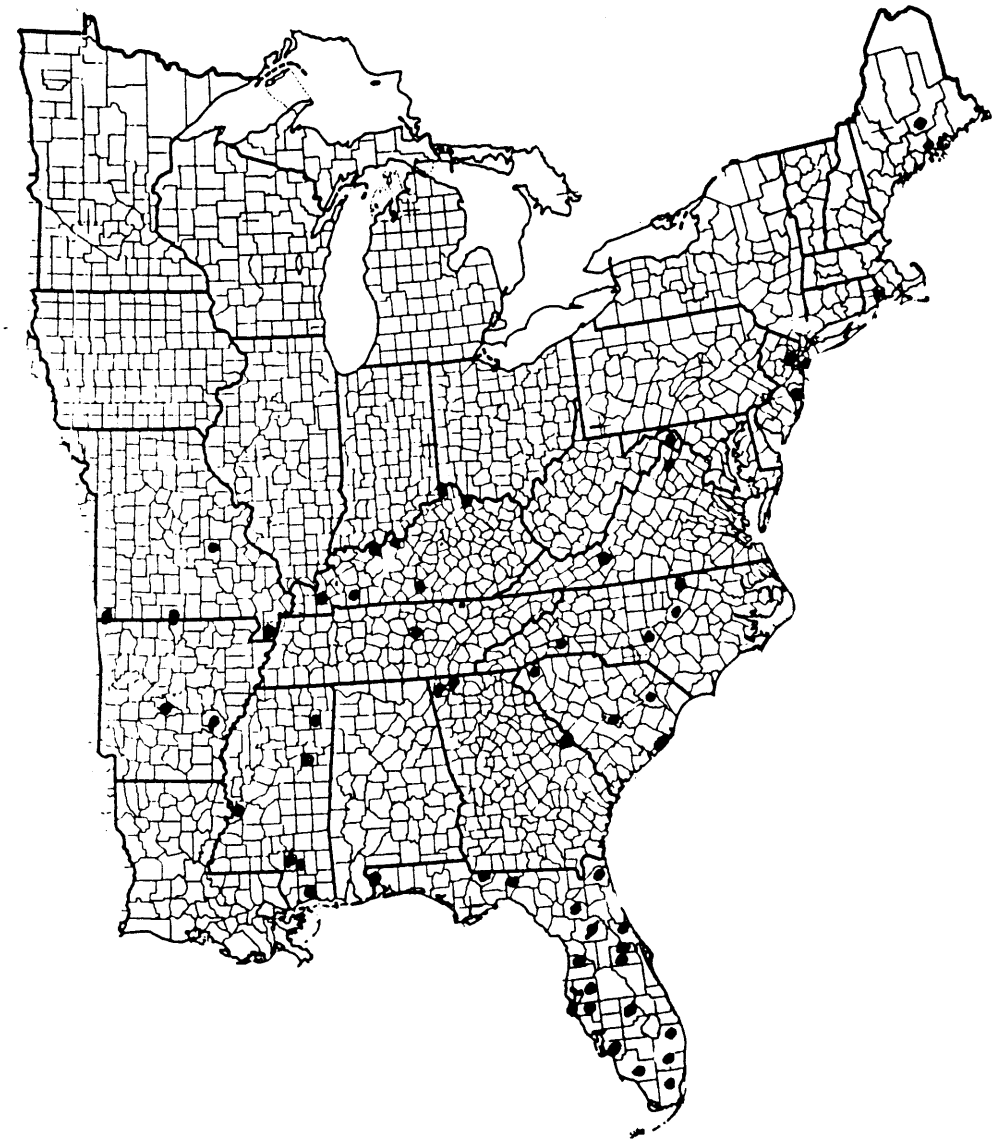
7776 *Manduca quinquemaculata* (Haw.)



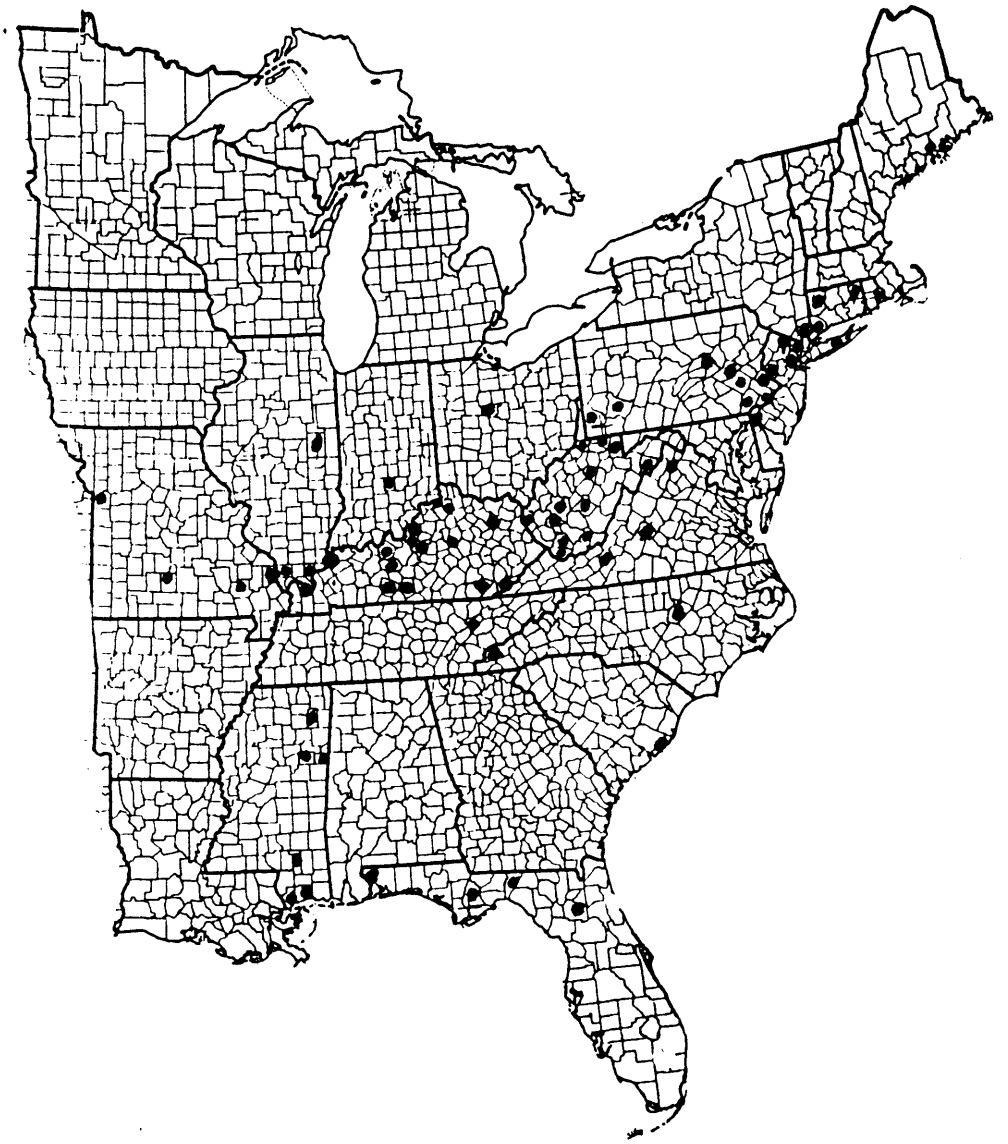
7777 *Manduca occulta* (R. & J.)



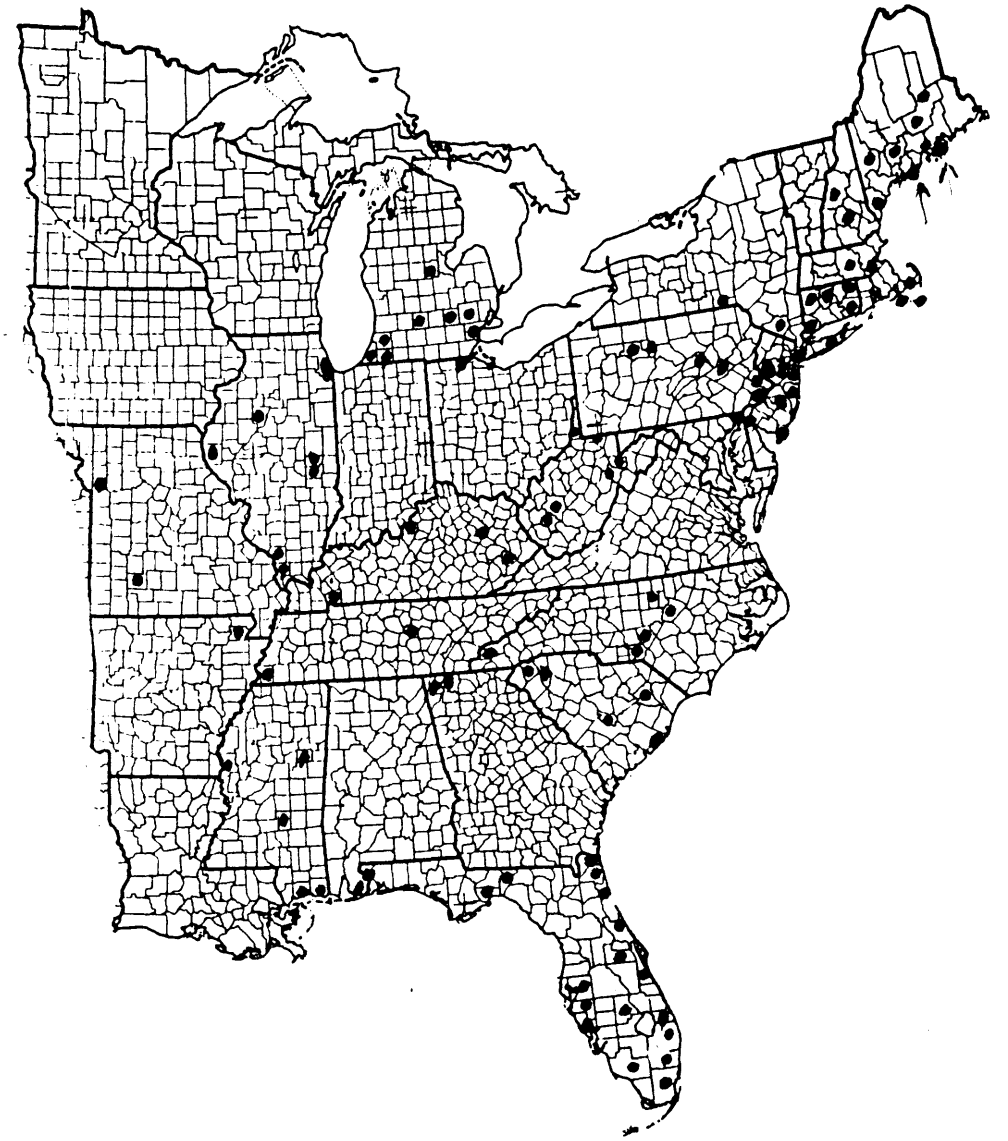
7778 *Manduca rustica* (F.)



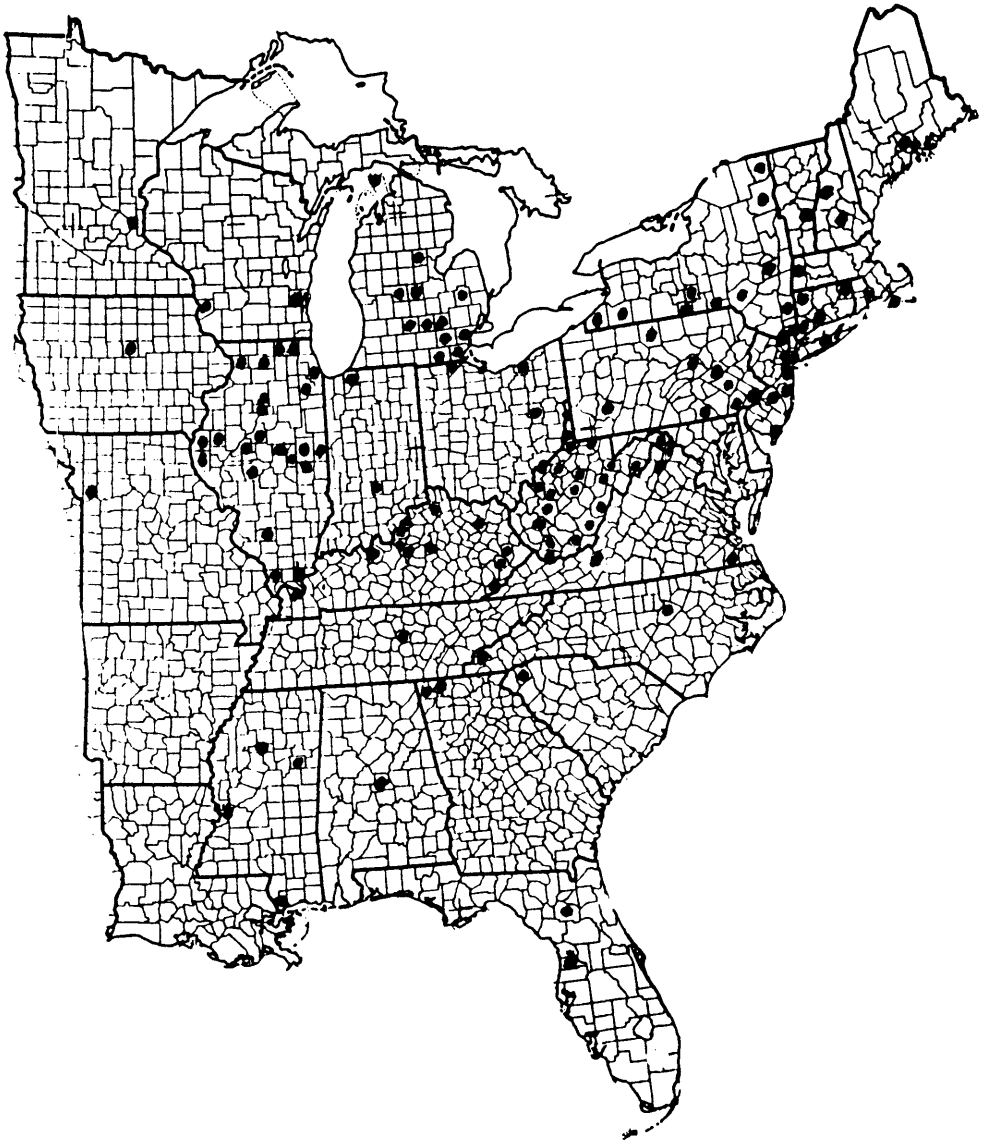
7783 *Manduca jasminearum* (Guer.)



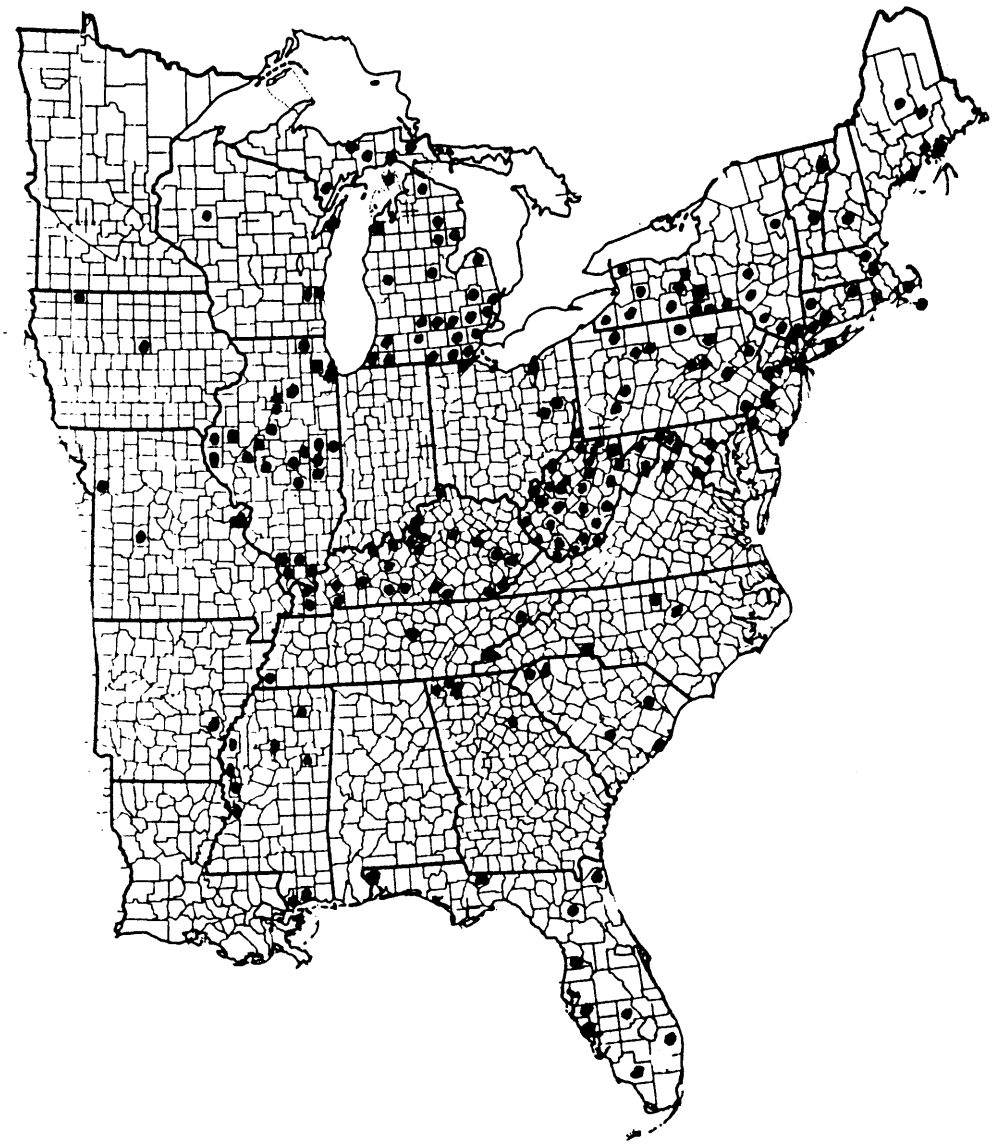
7784 *Dolba hyloeus* (Drury)



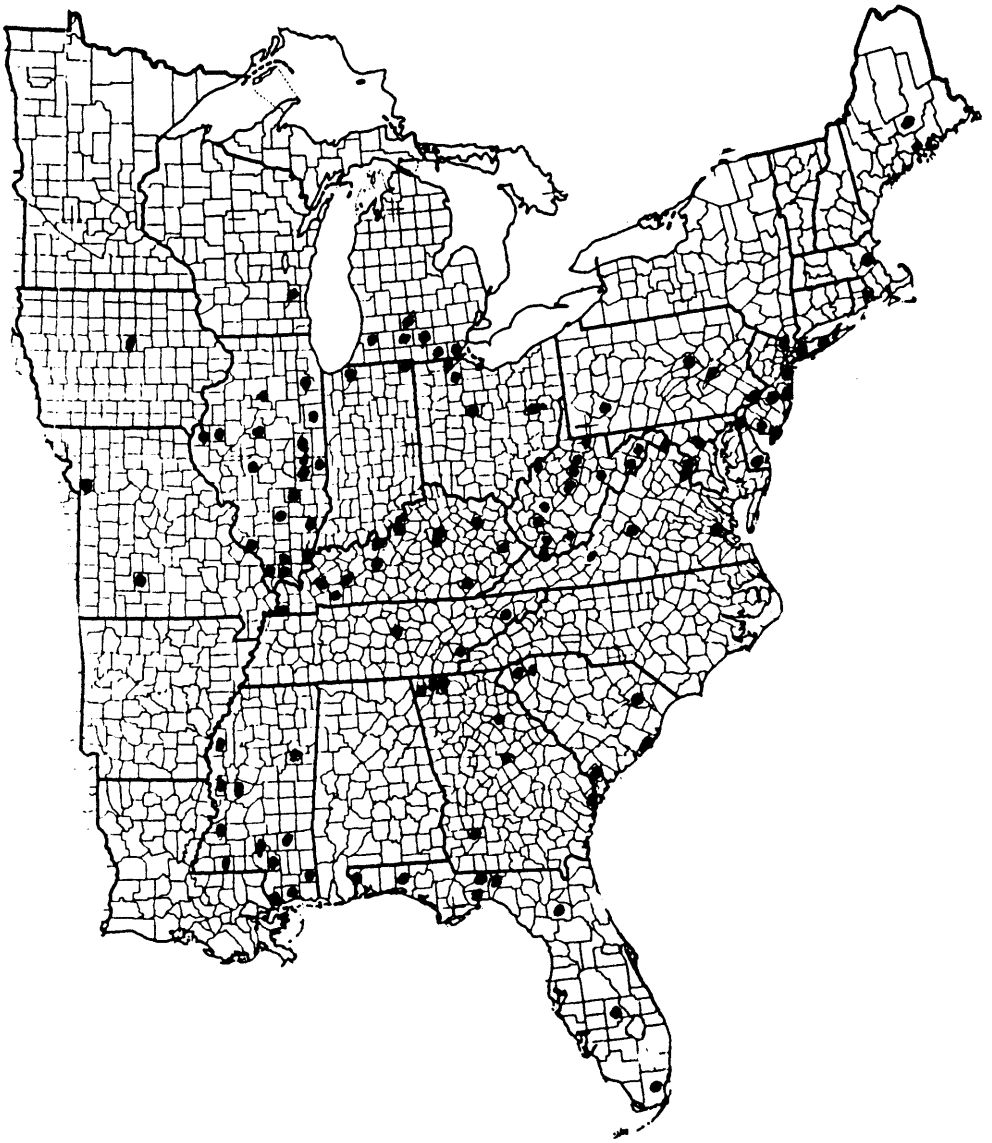
7786 *Ceratomia amyntor* (Geyer)



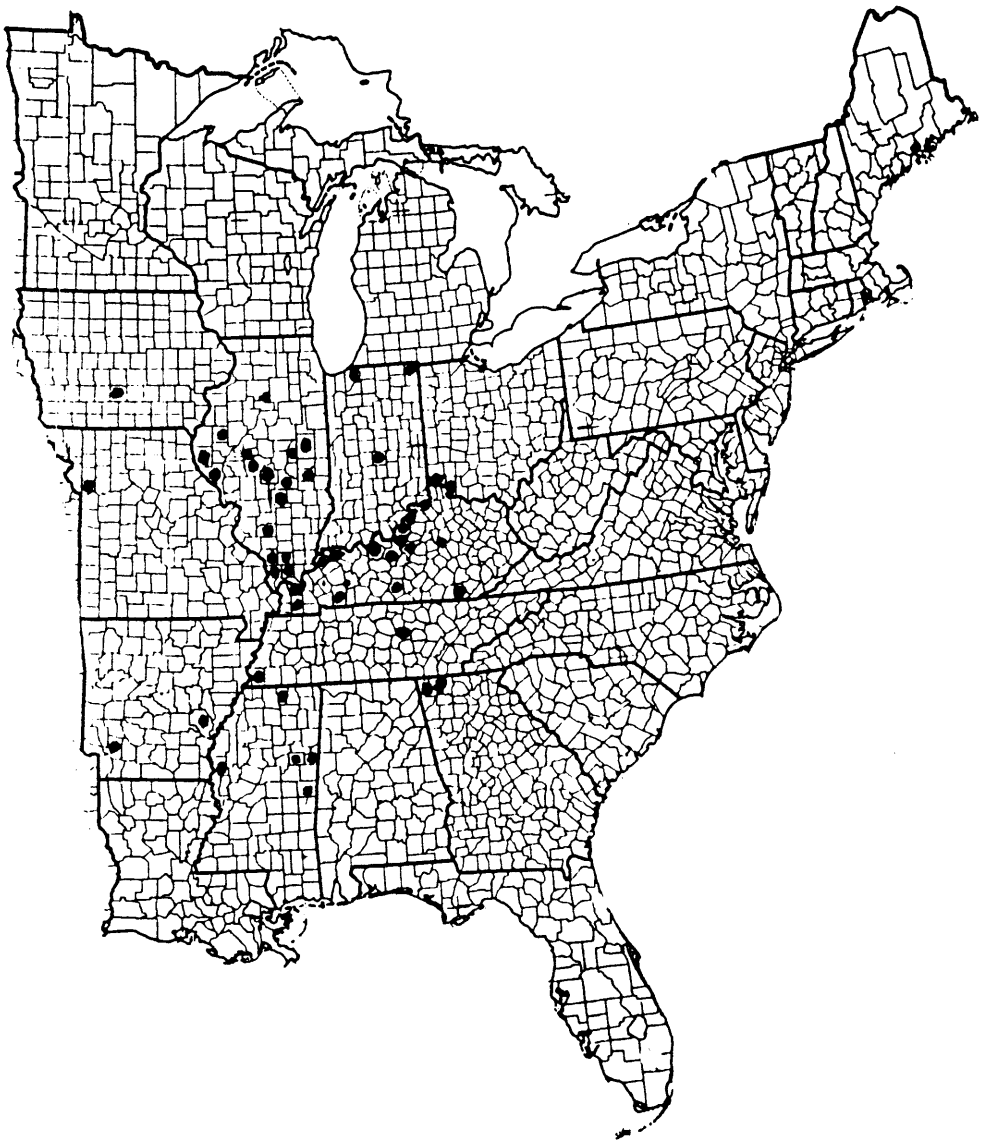
7787 *Ceratomia undulosa* (Wlk.)



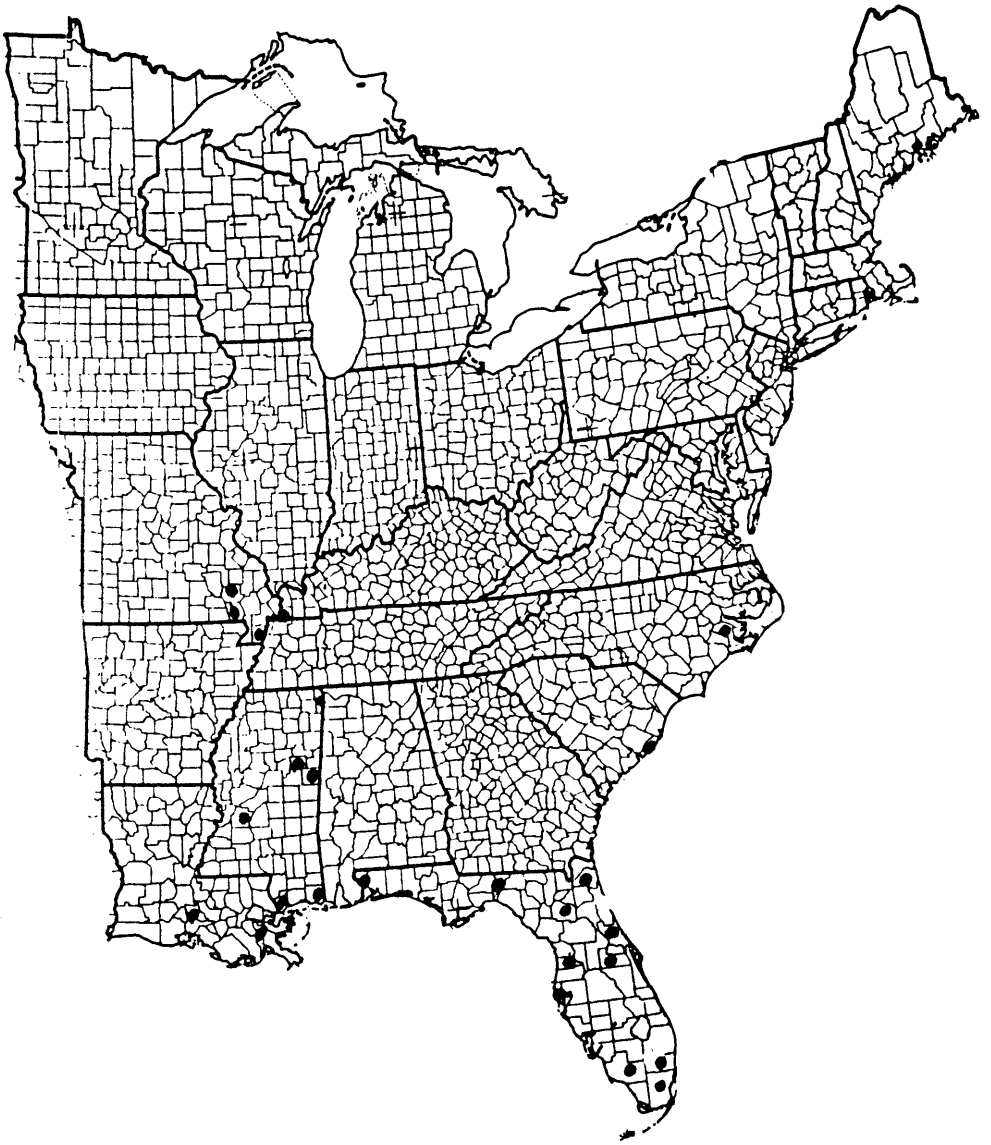
7789 *Ceratomia catalpae* (Bdv.)



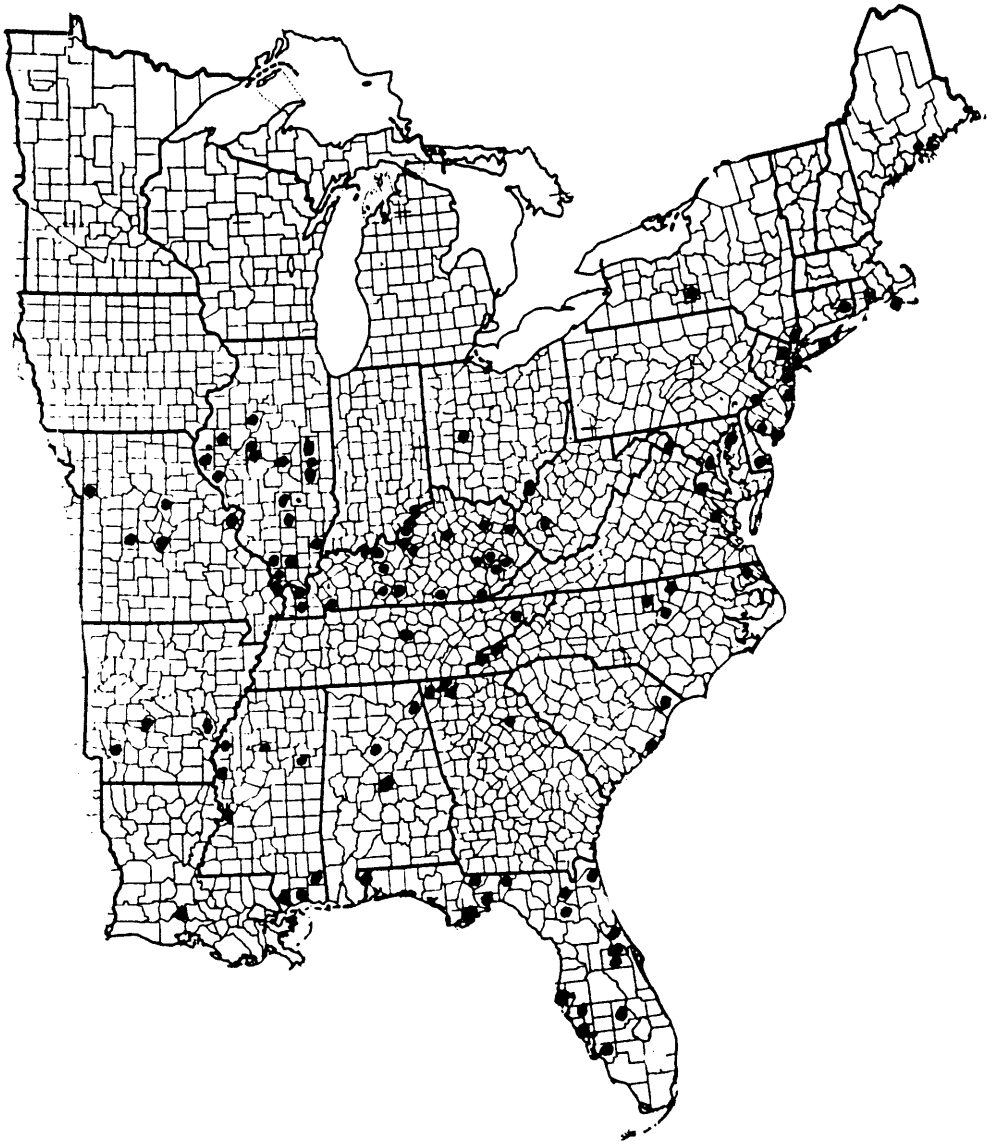
7790 *Ceratomia hageni* Grt.



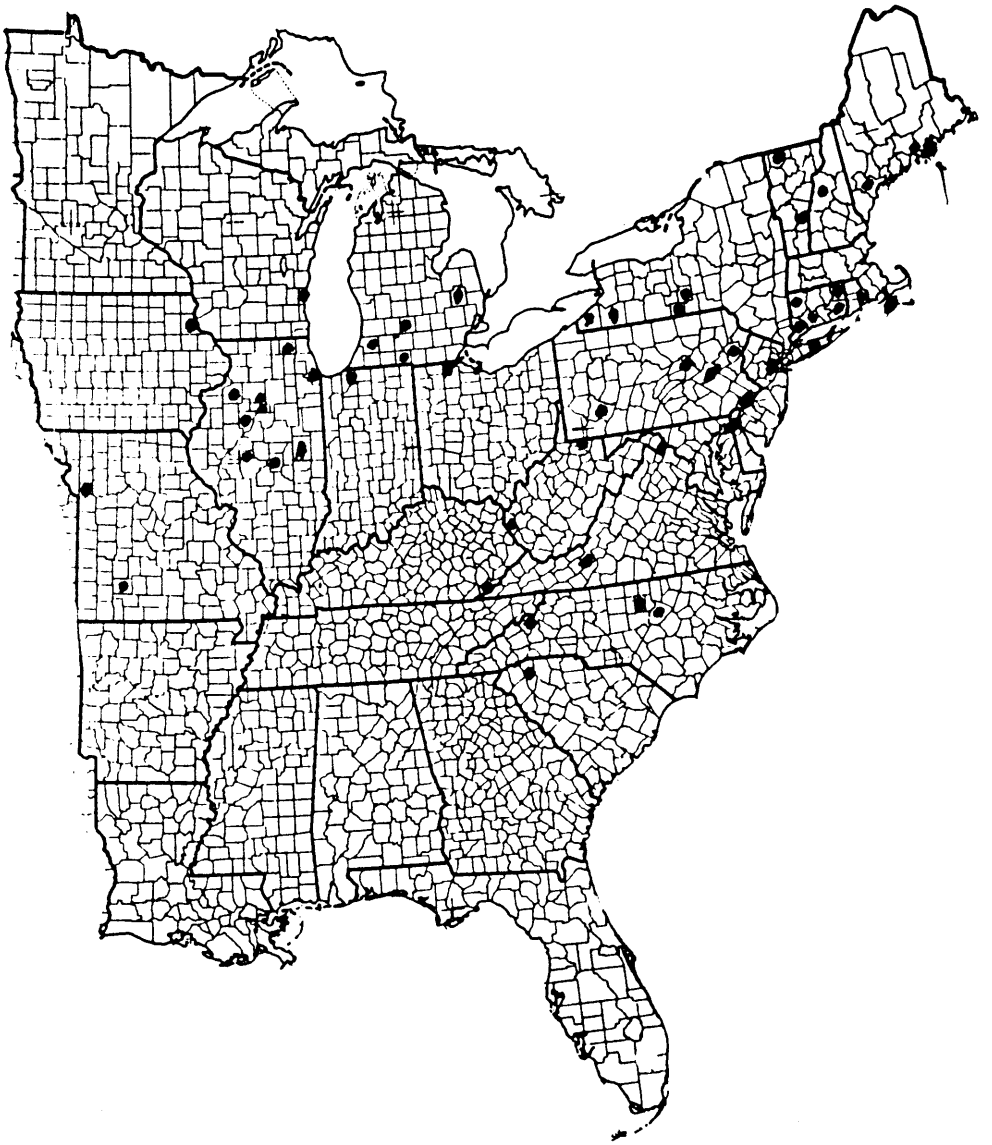
7791 *Isoparce cupressi* (Bdv.)



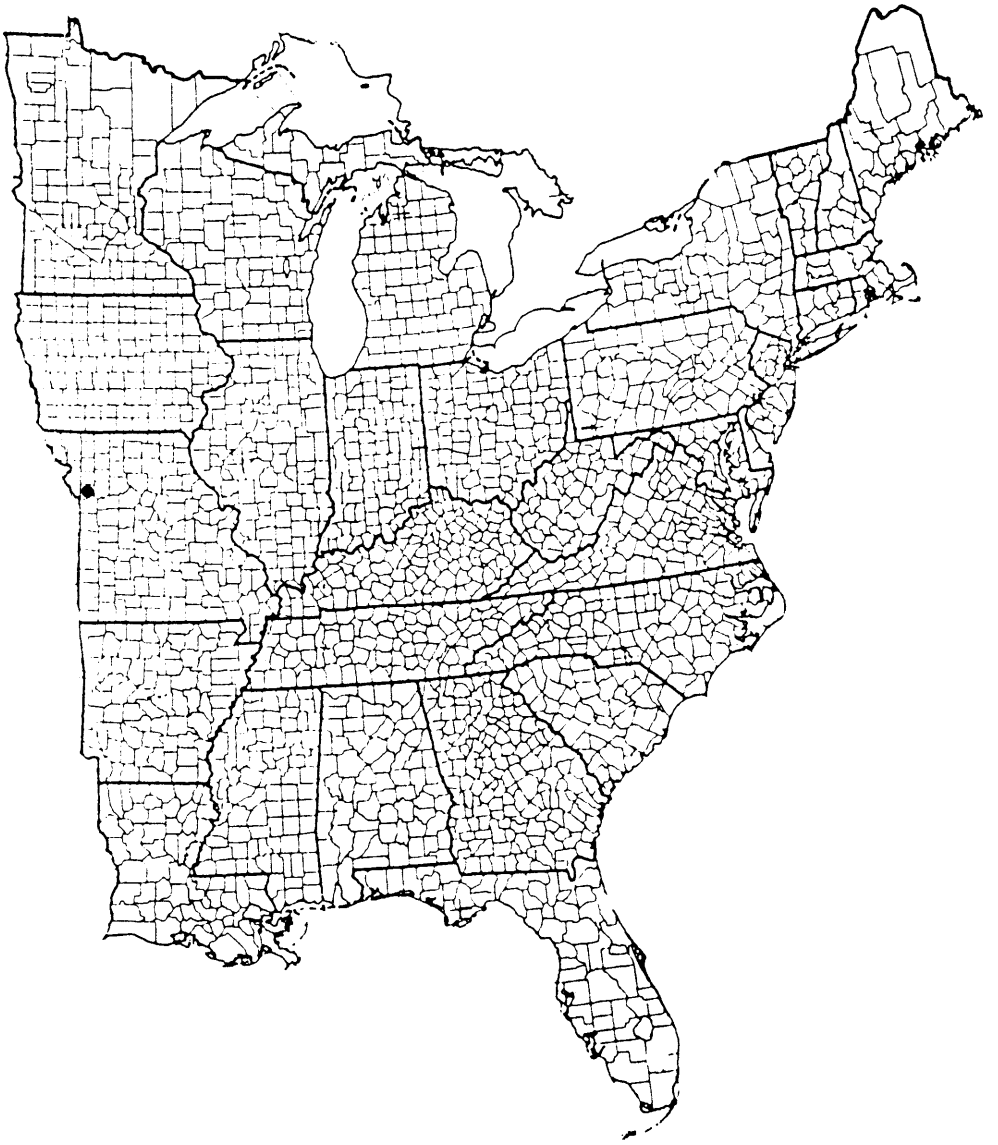
7793 *Paratrea plebeja* (F.)



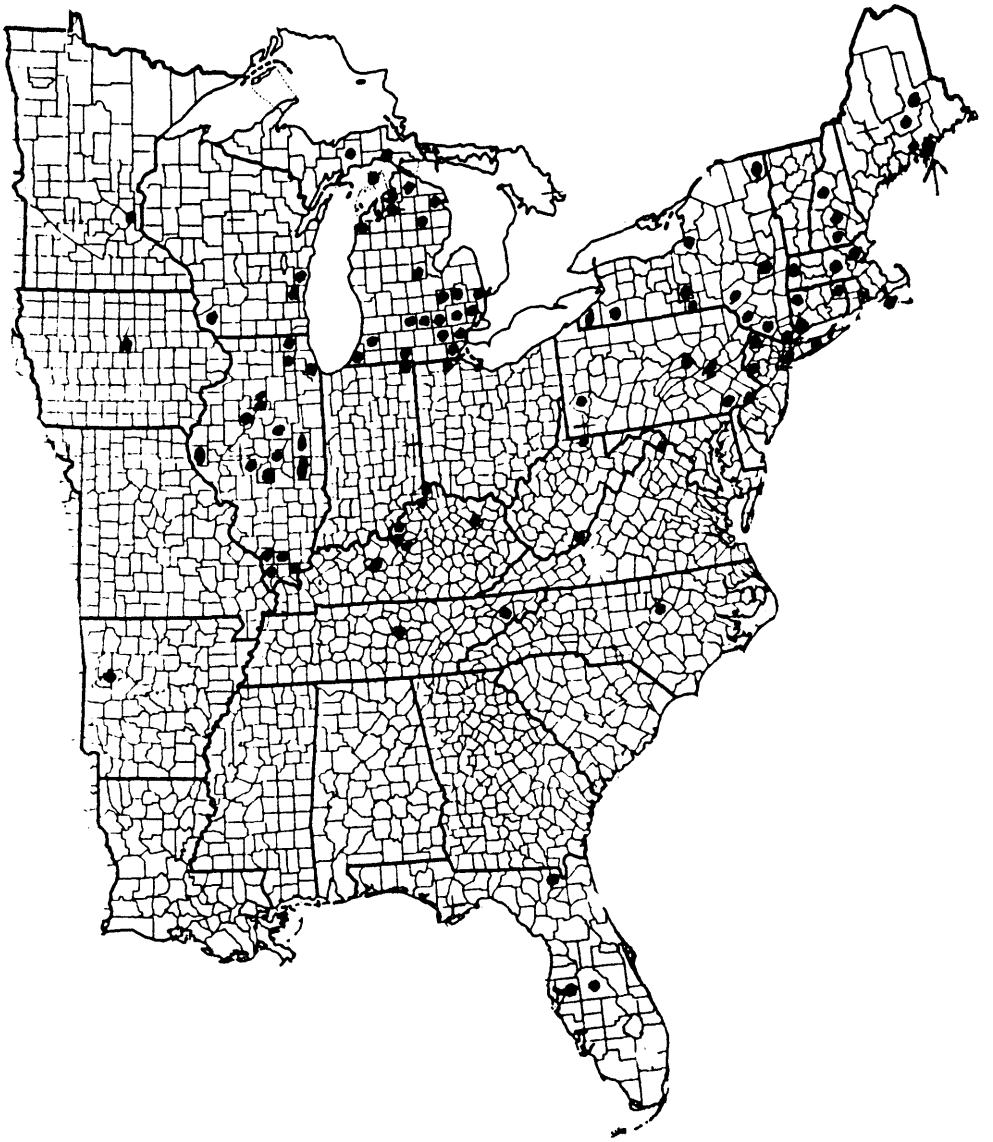
7796 *Sphinx eremitus* (Hbn.)



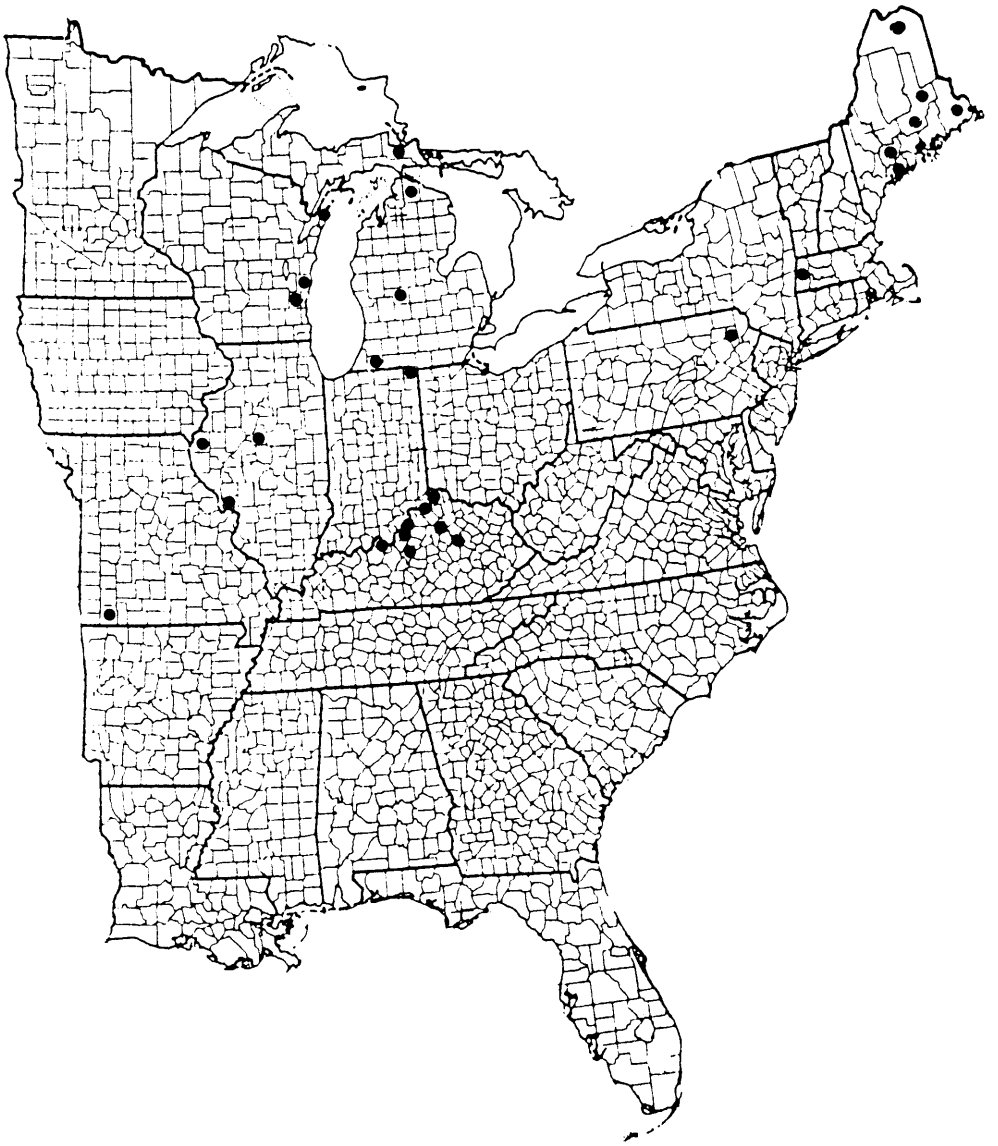
7797 *Sphinx eritmitoides* Stkr.



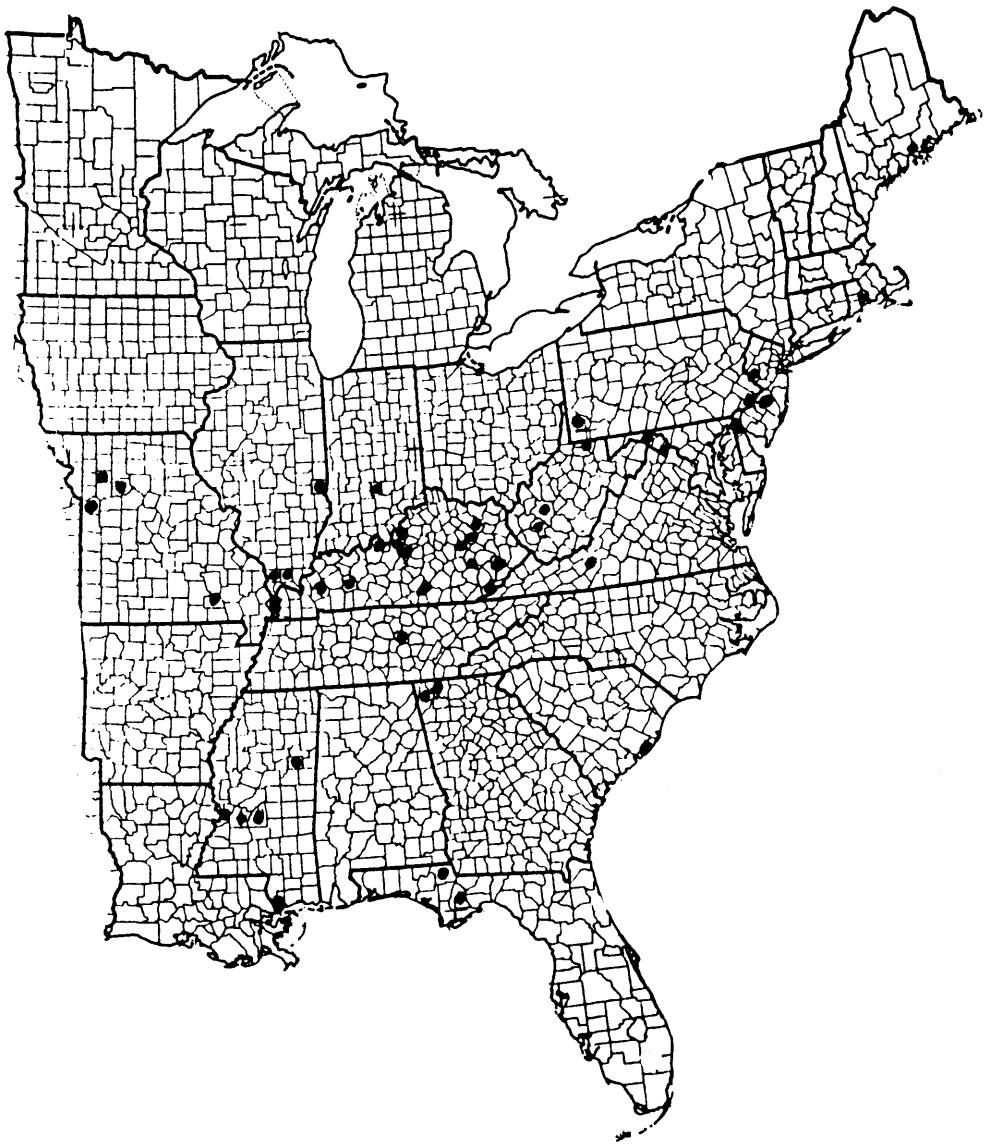
7802 *Sphinx chersis* (Hbn.)



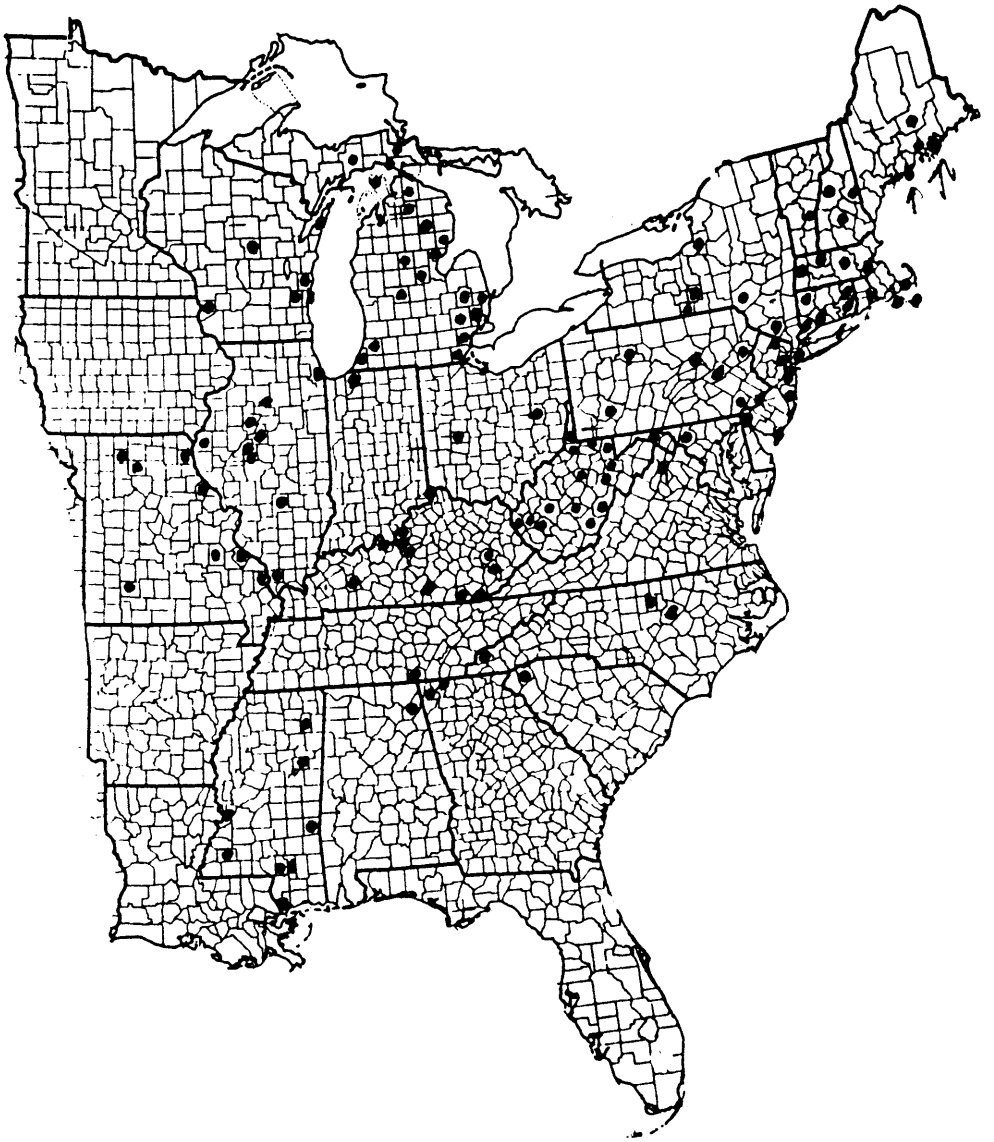
7807 *Sphinx canadensis* Bdv.



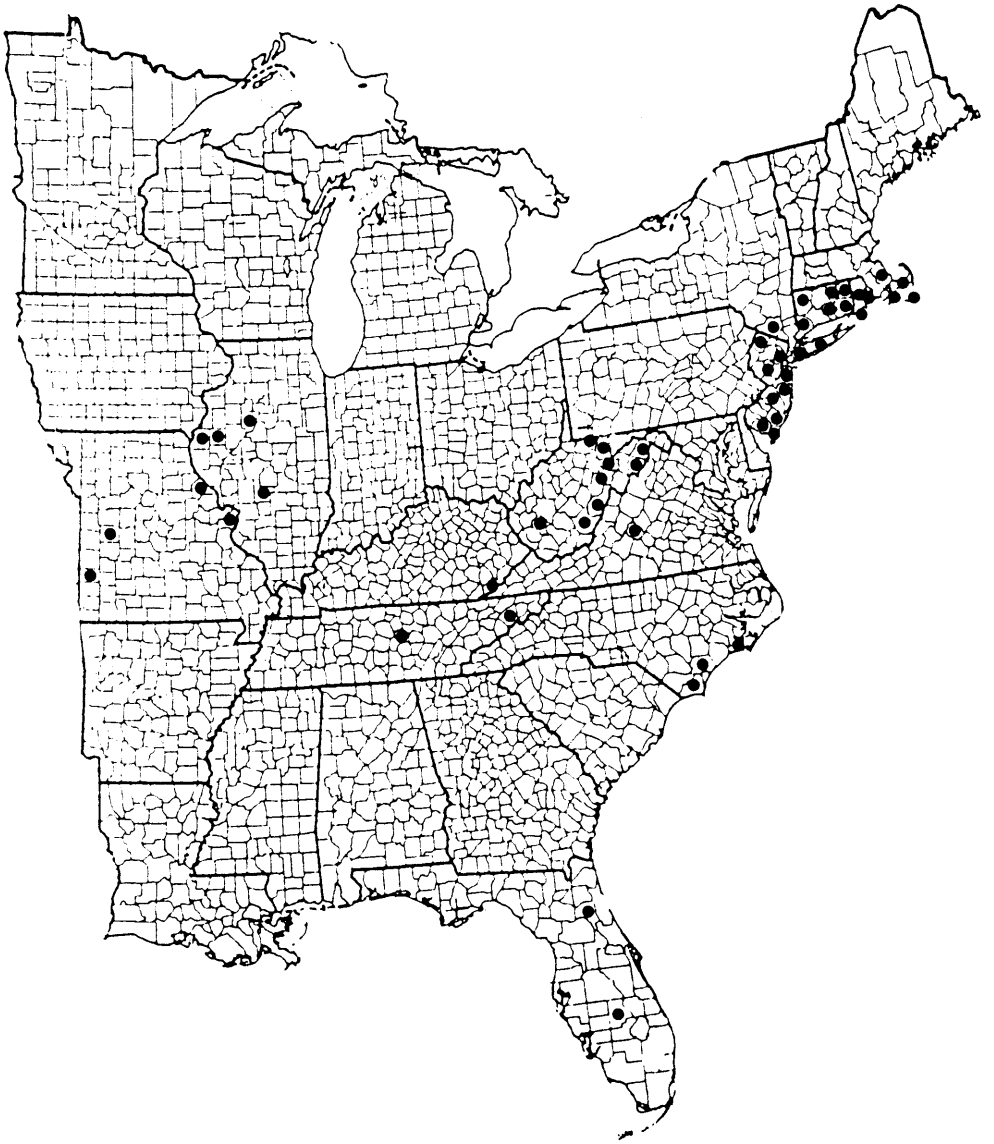
7808 *Sphinx franckii* Neum.



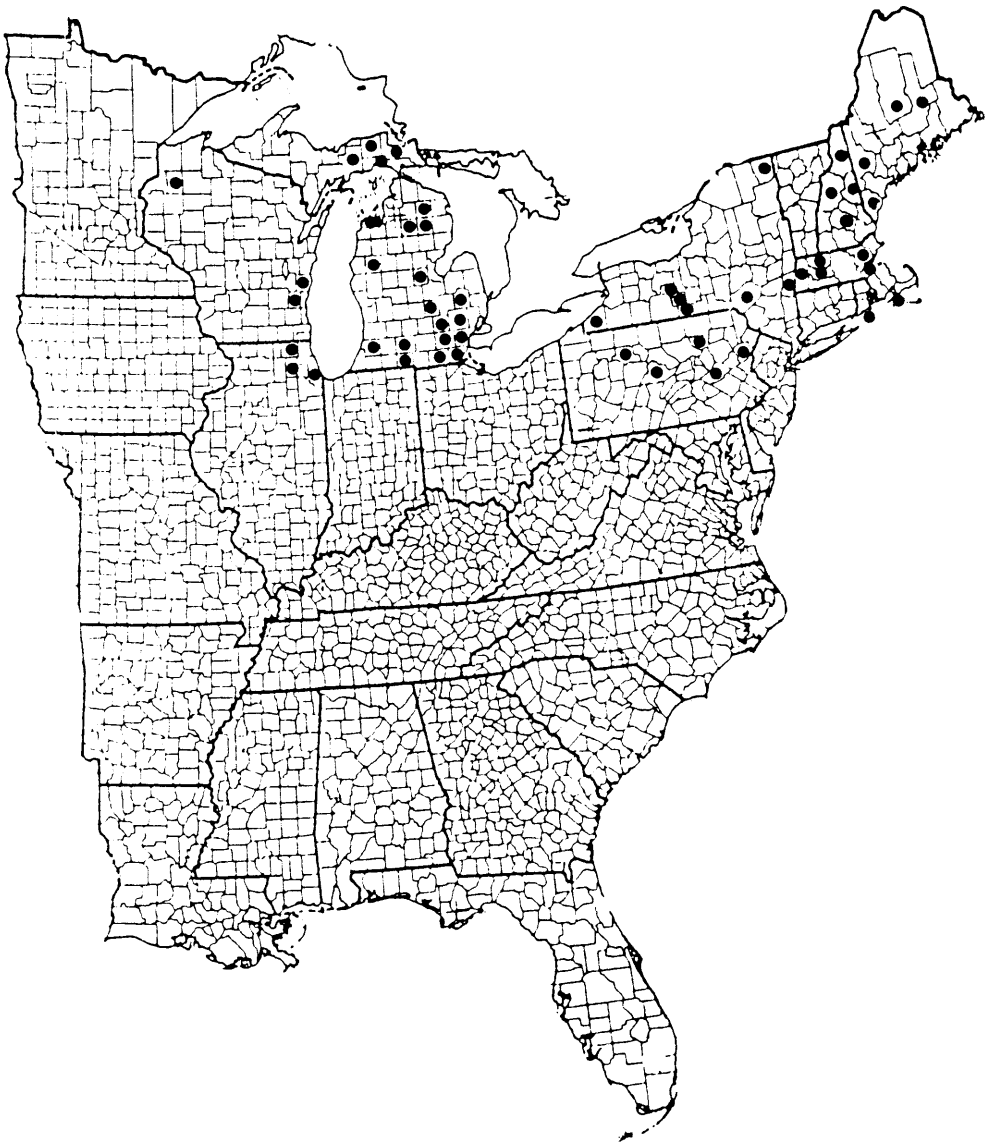
7809 *Sphinx kalmiae* J.E. Smith



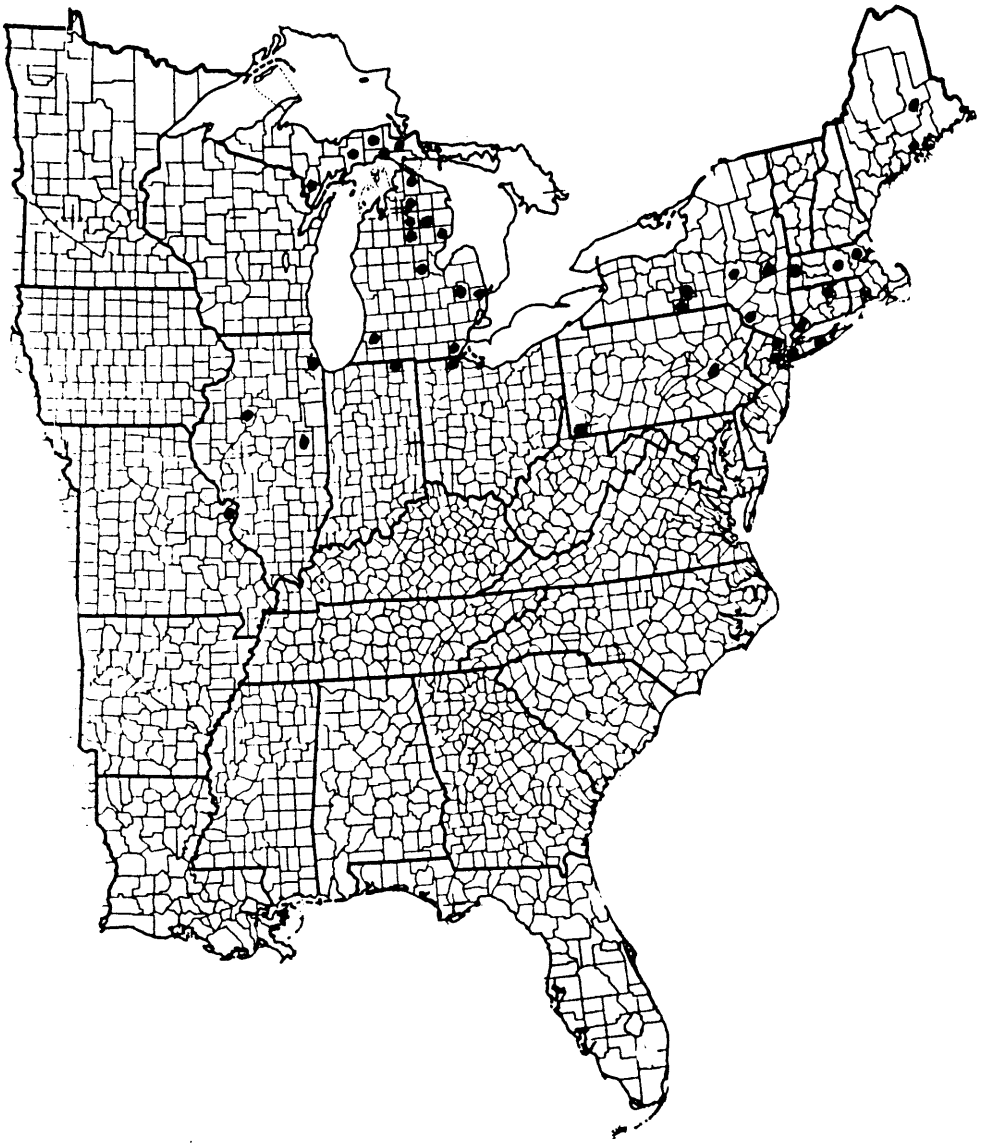
7810 *Sphinx gordius* Cram.



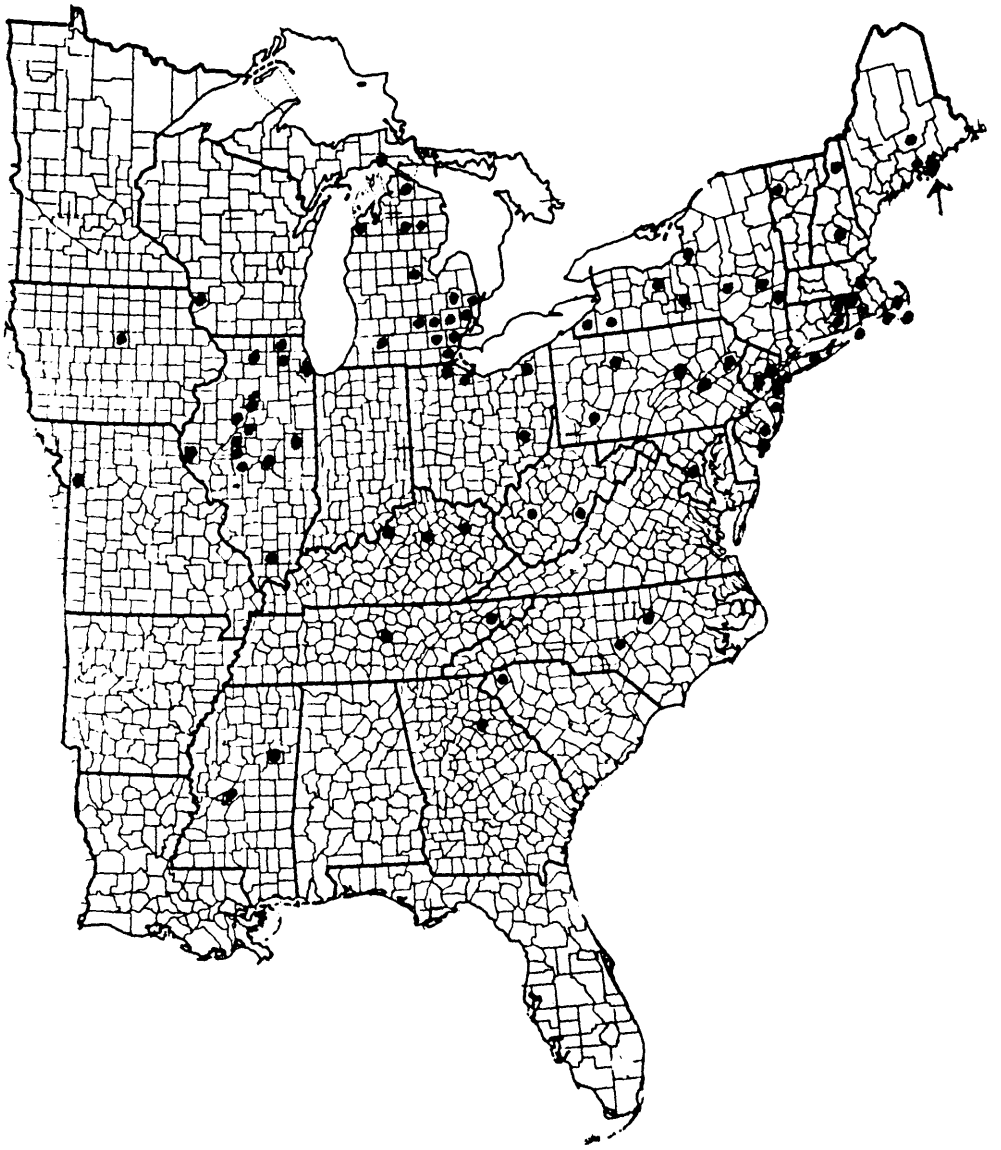
7810.1 *Sphinx poecila* Stephens



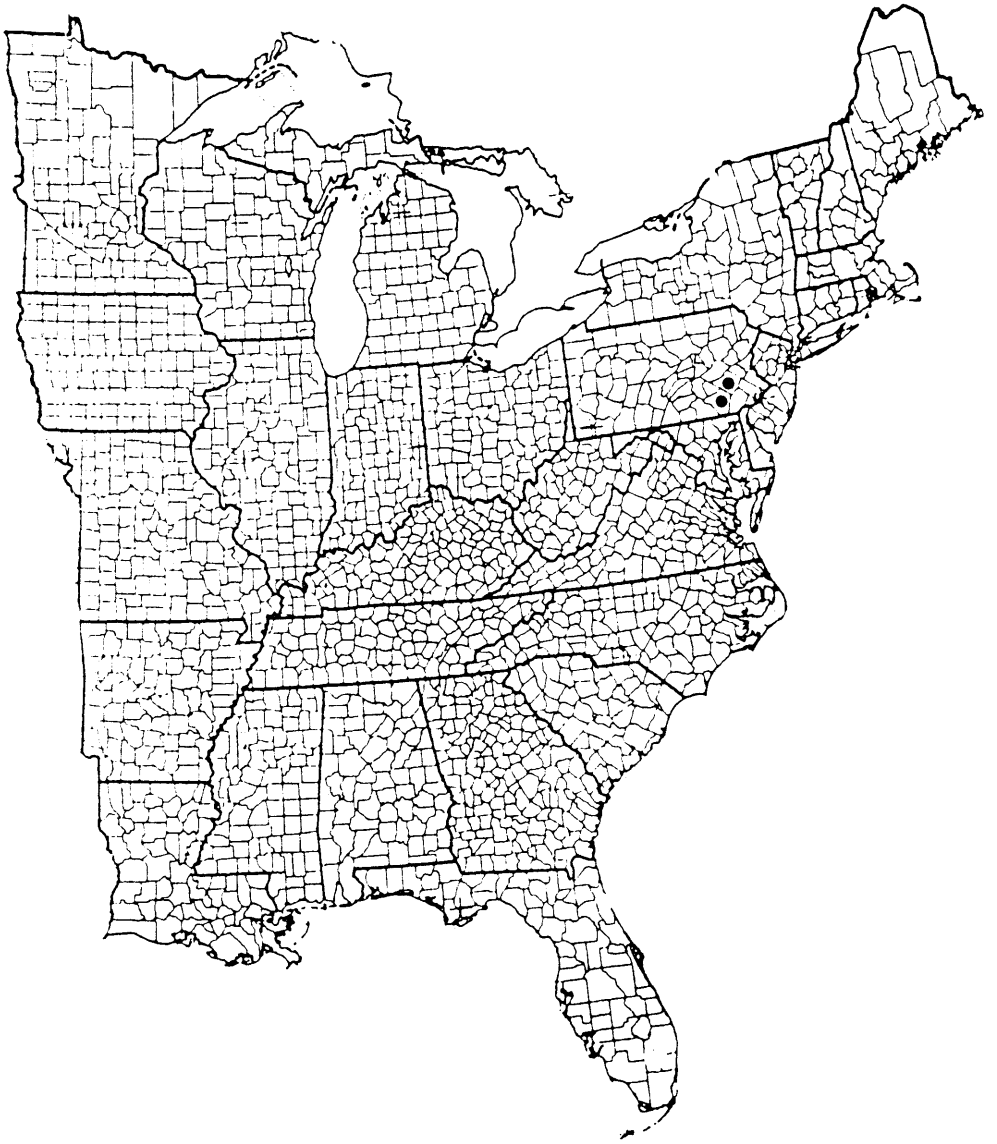
7811 *Sphinx luscitiosa* Clem.



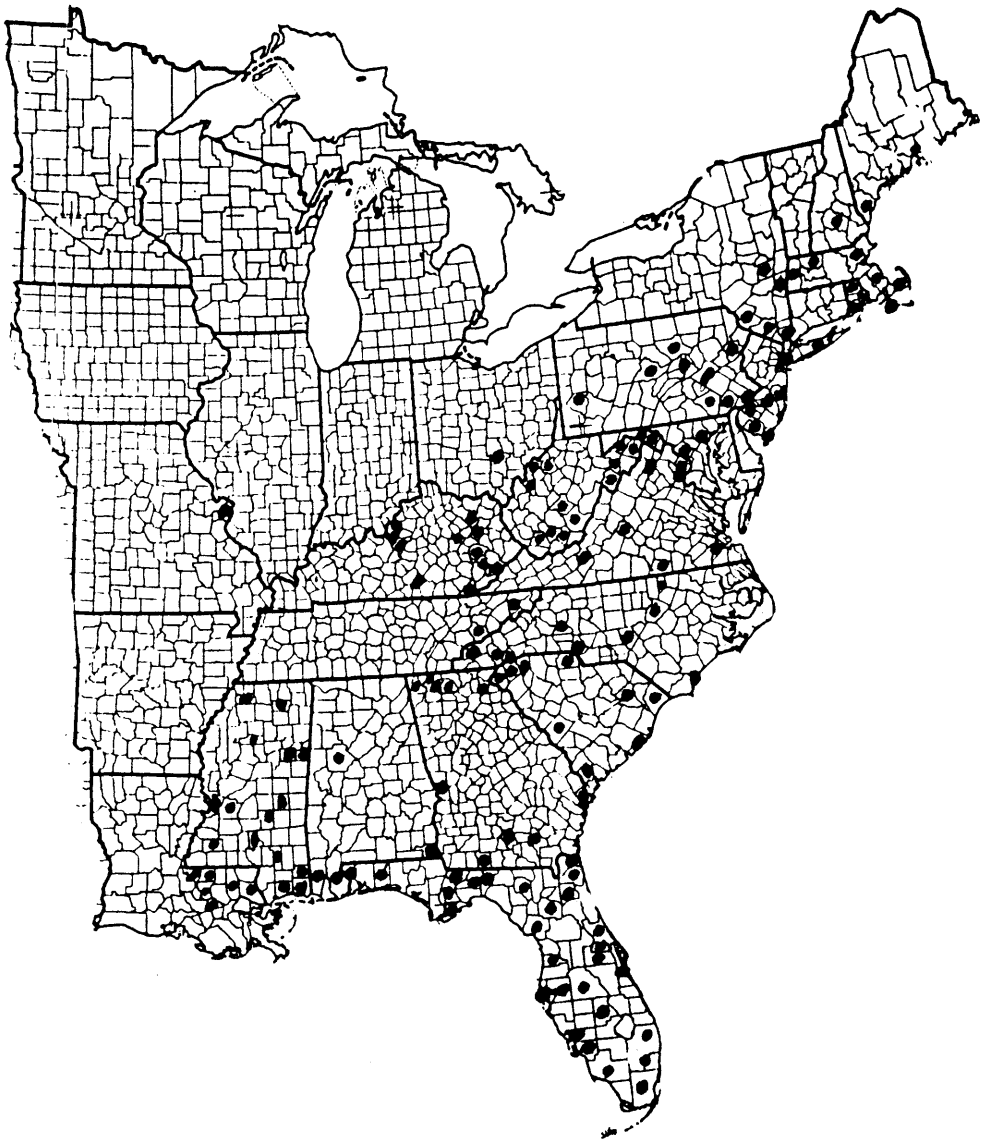
7812 *Sphinx drupiferarum* J.E. Smith



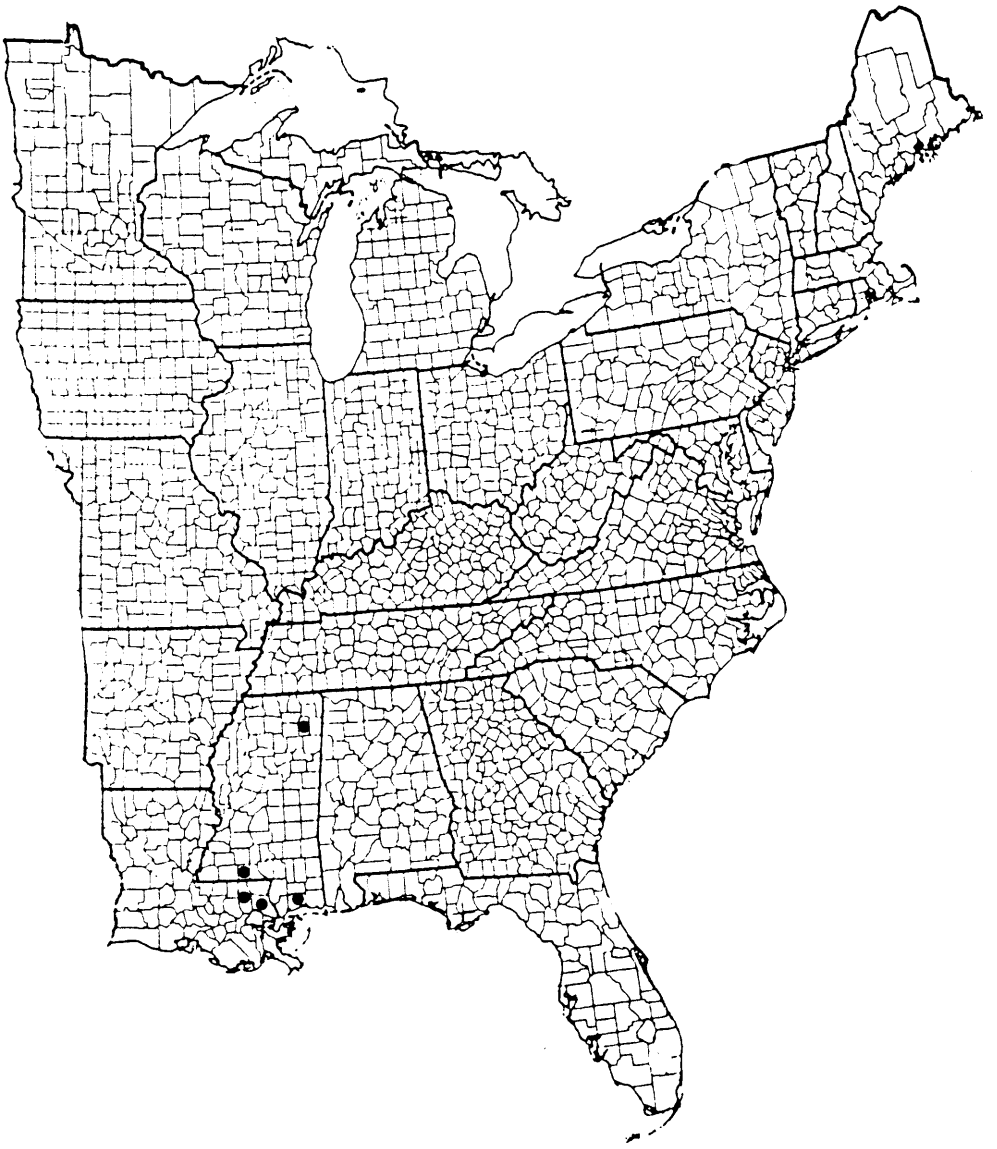
7815 *Sphinx pinastri* L.



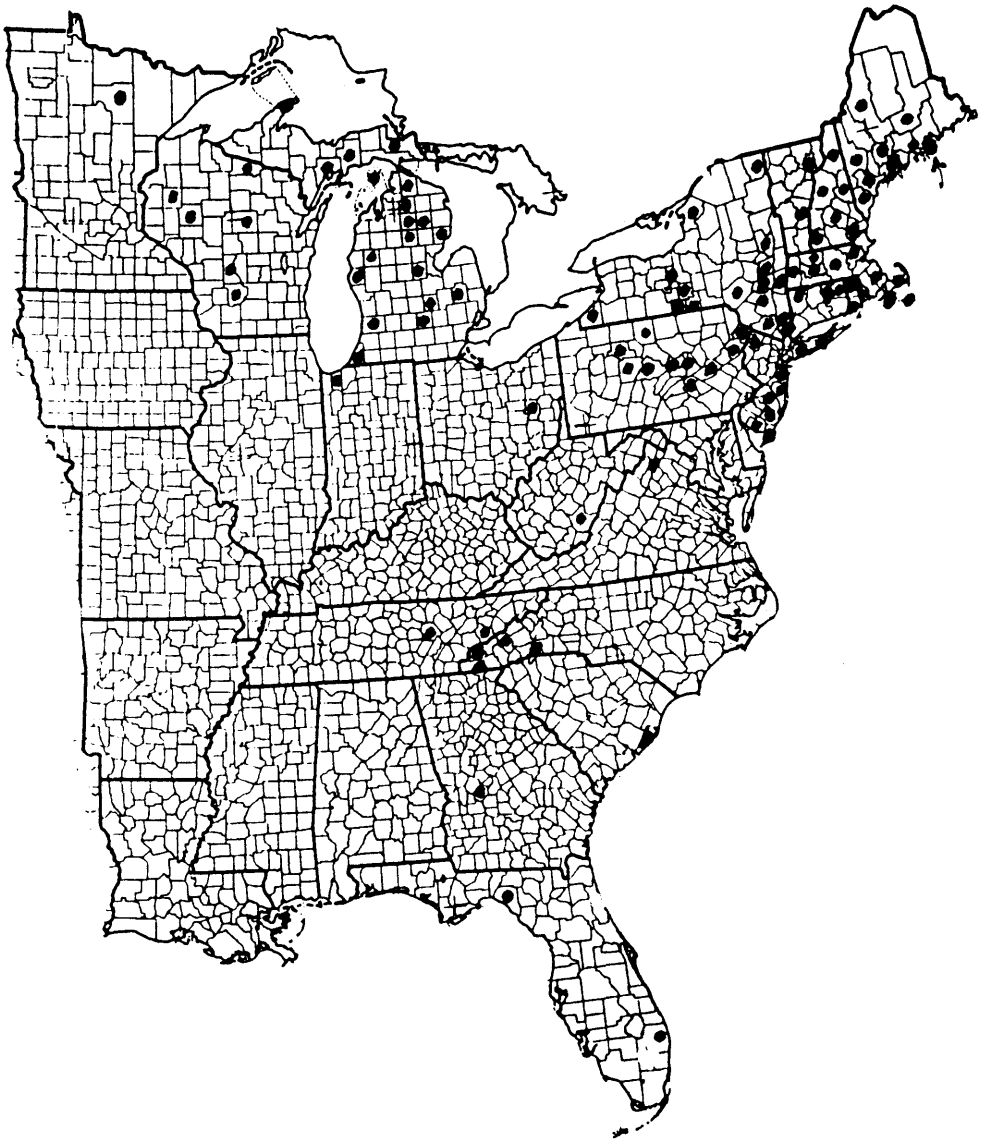
7816 *Lapara coniferarum* (J.E. Smith)



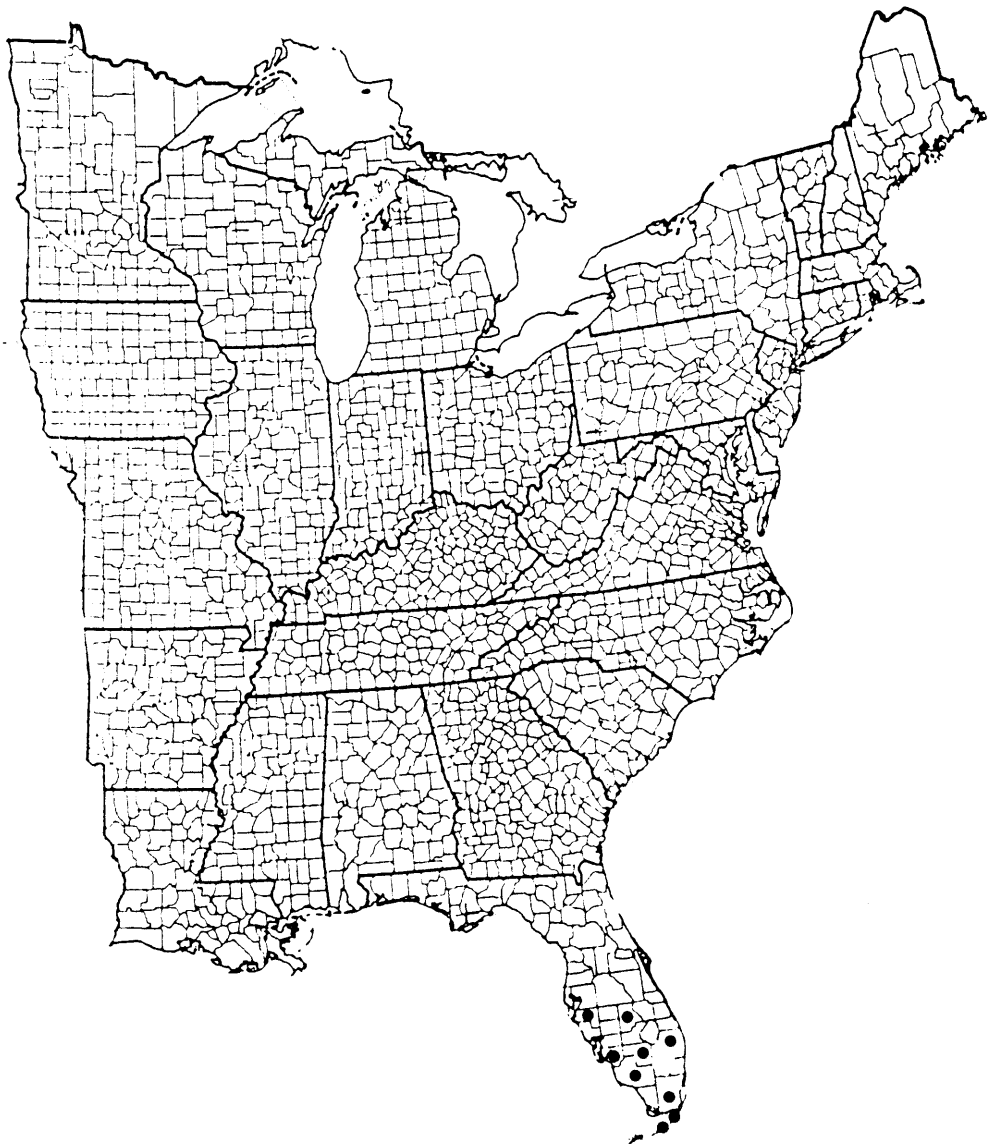
7816.1 *Lapara phaeobrachycerous* Brou



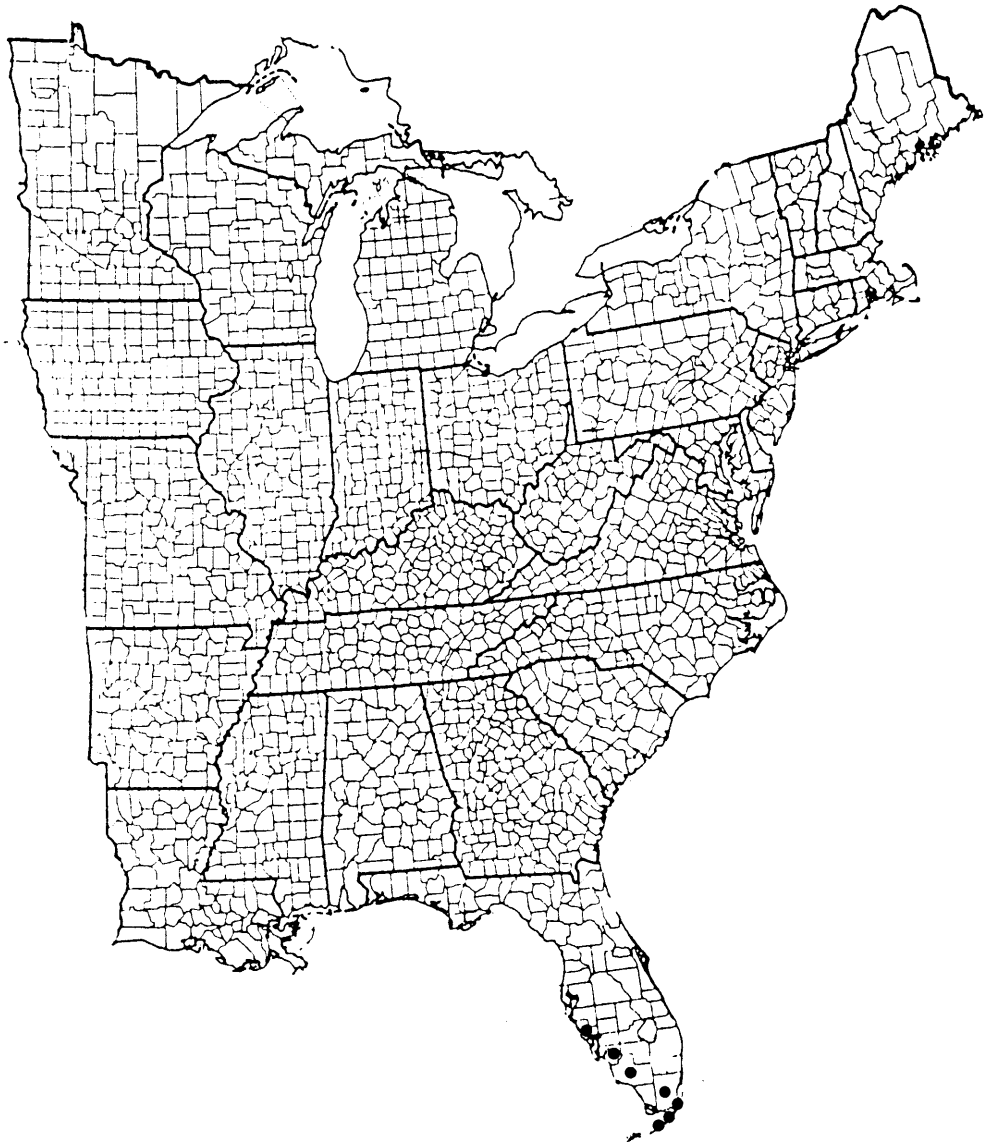
7817 *Lapara bombycoides* Wlk.



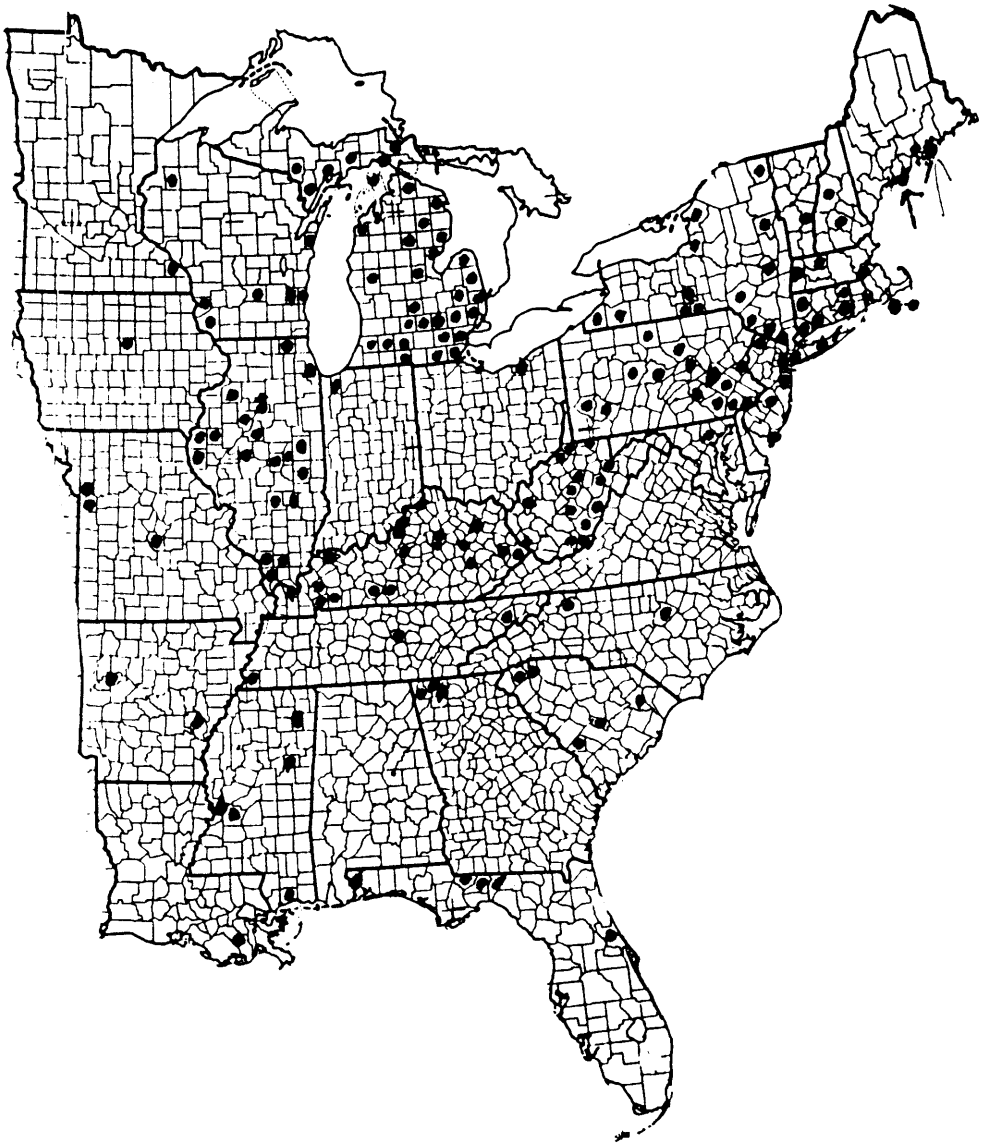
7818 *Protambulyx strigilis* (L.)



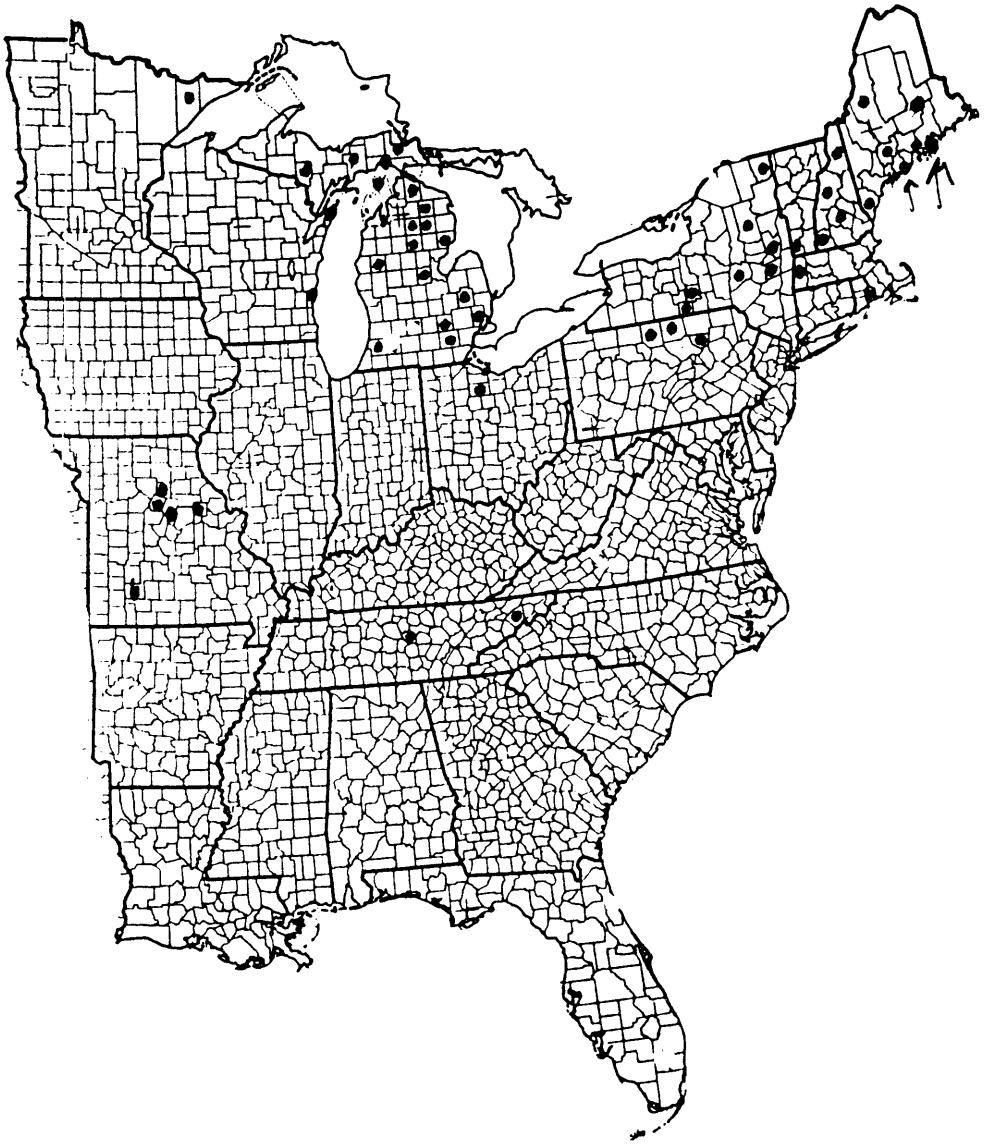
7819 *Protambulyx carteri* R. & J.



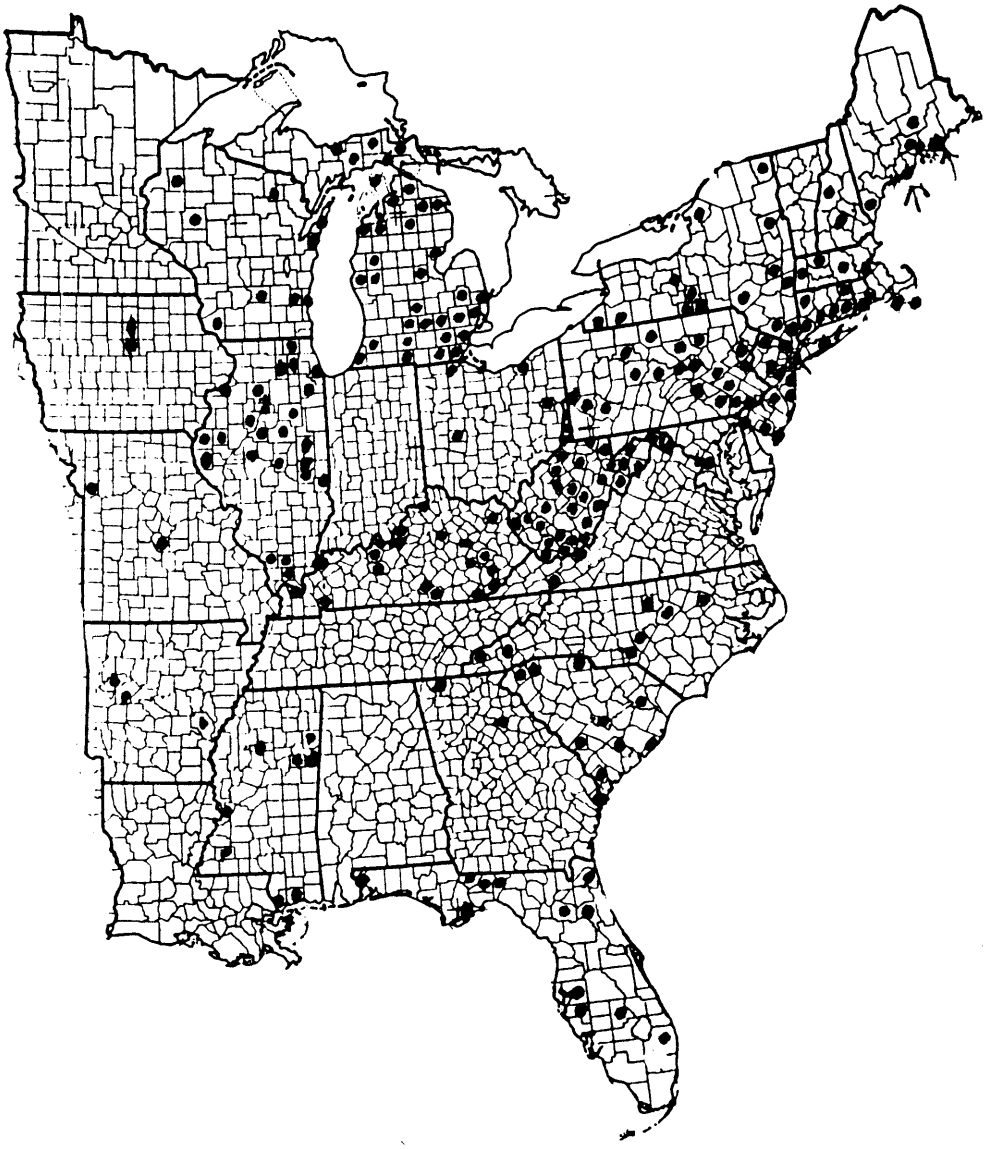
7821 *Smerinthus jamaicensis* (Drury)



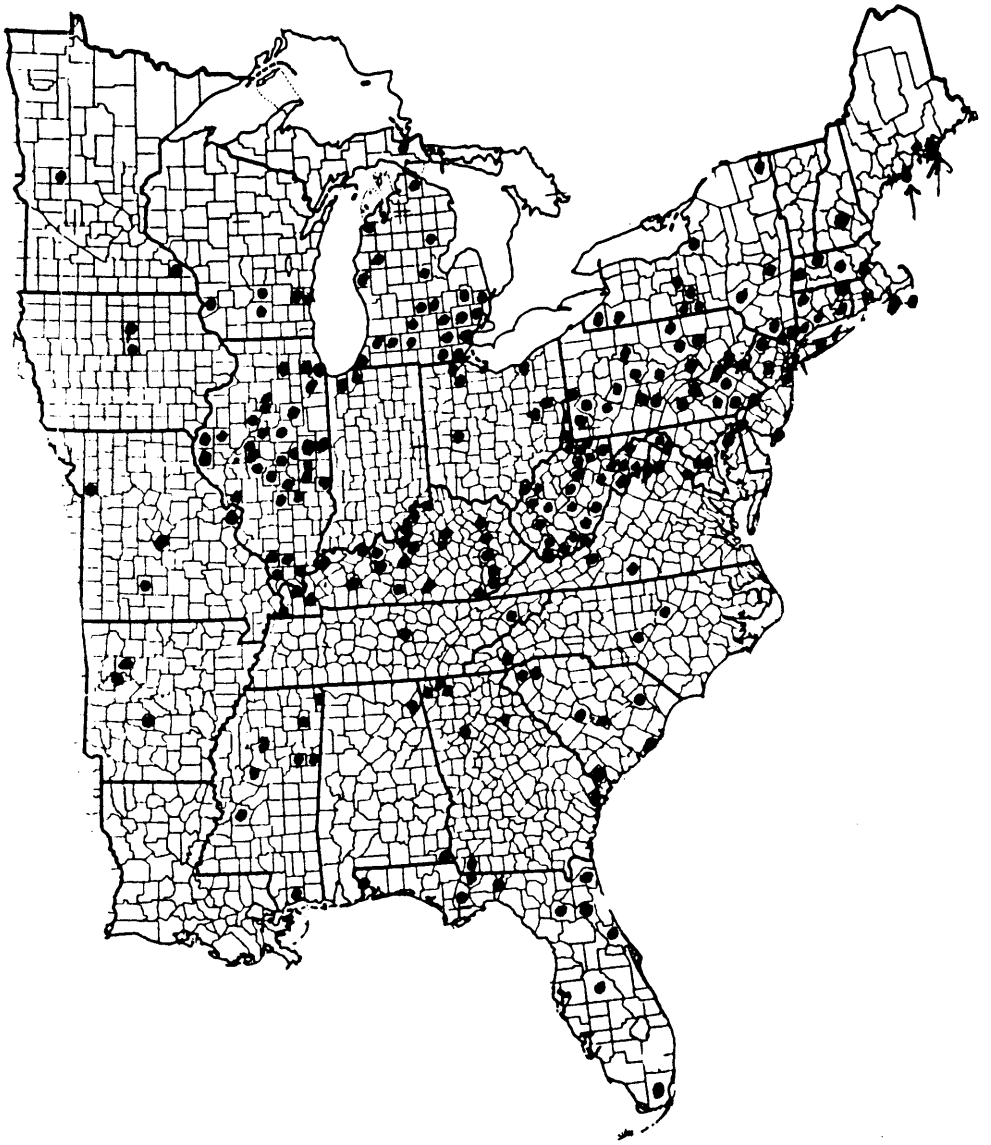
7822 *Smerinthus cerisyi* Kby.



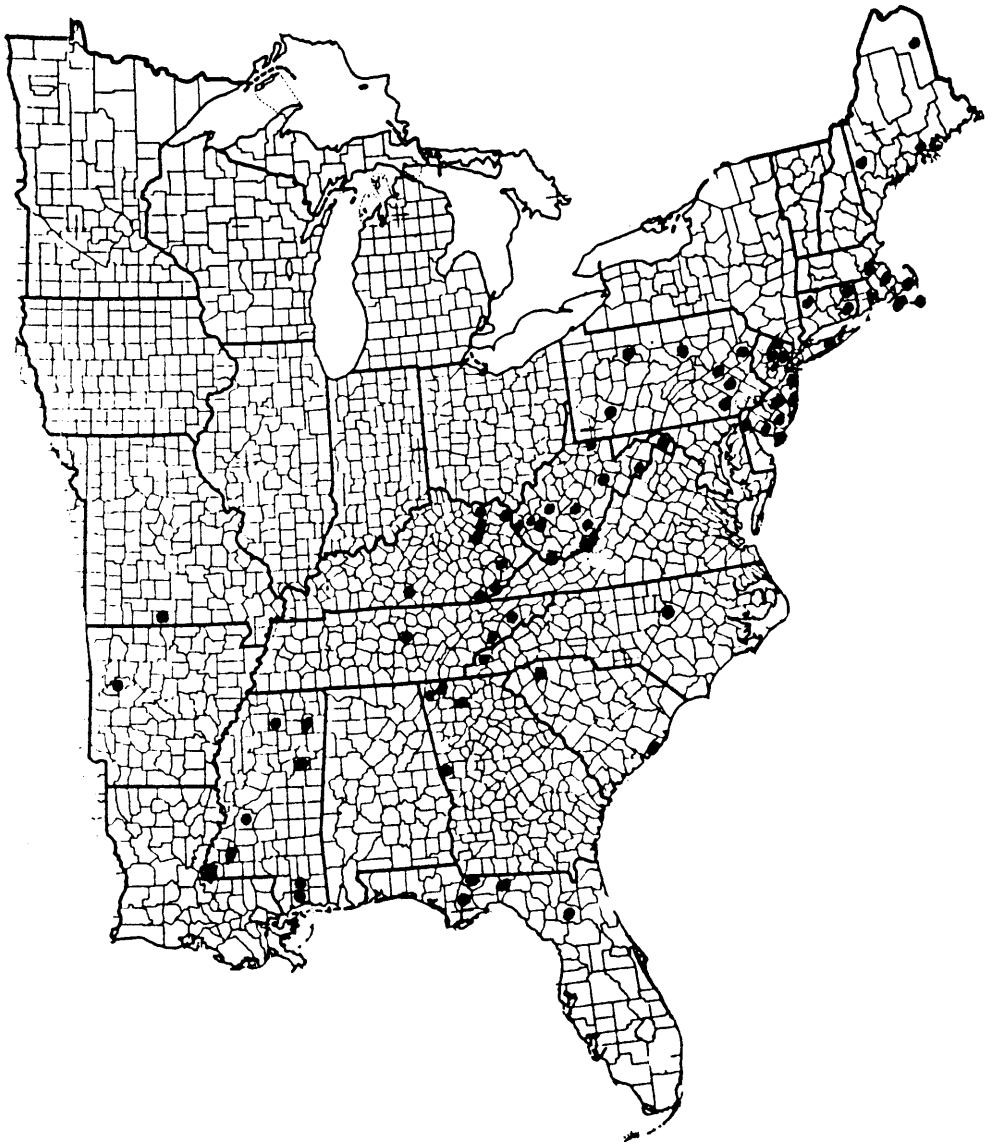
7824 *Paonias excaecatus* (J.E. Smith)



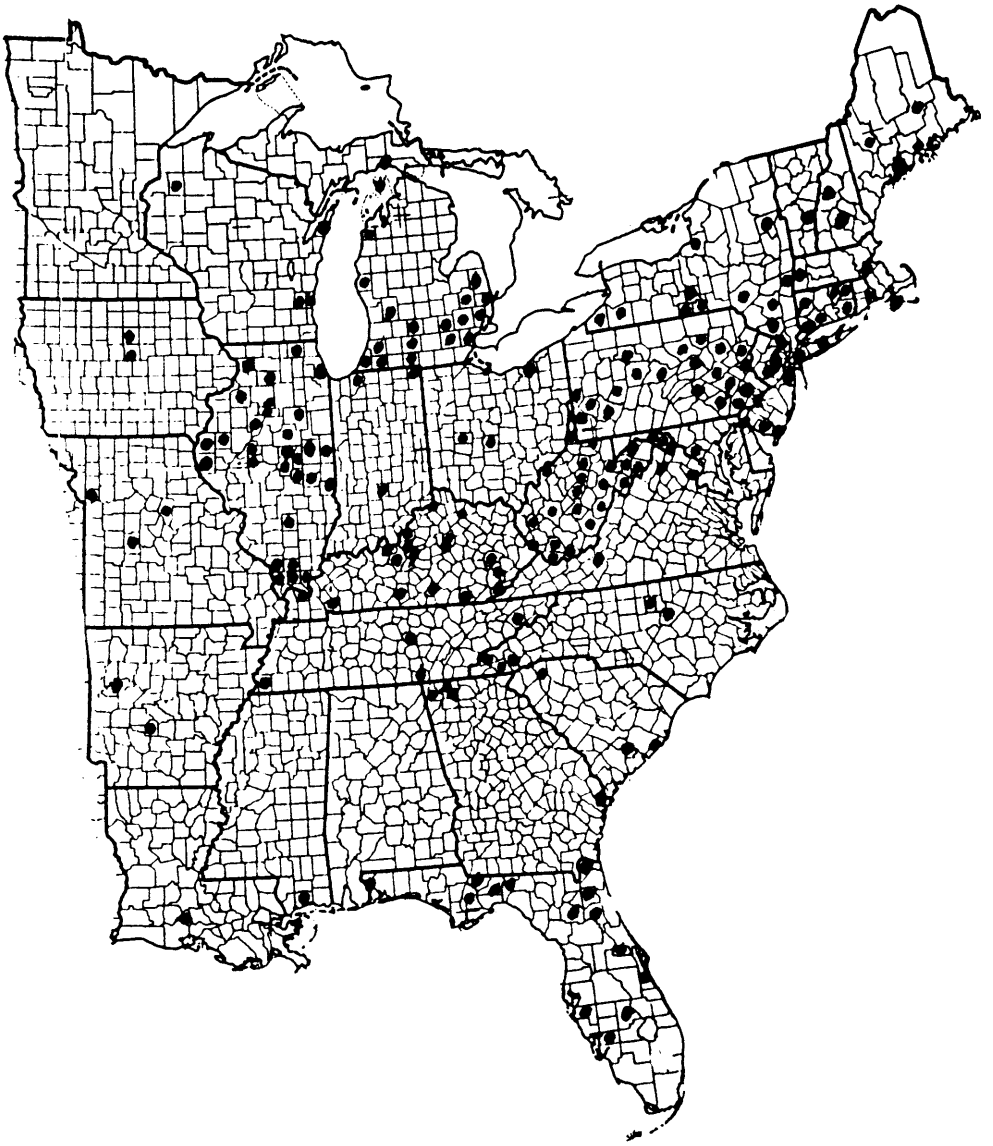
7825 *Paonias myops* (J.E. Smith)



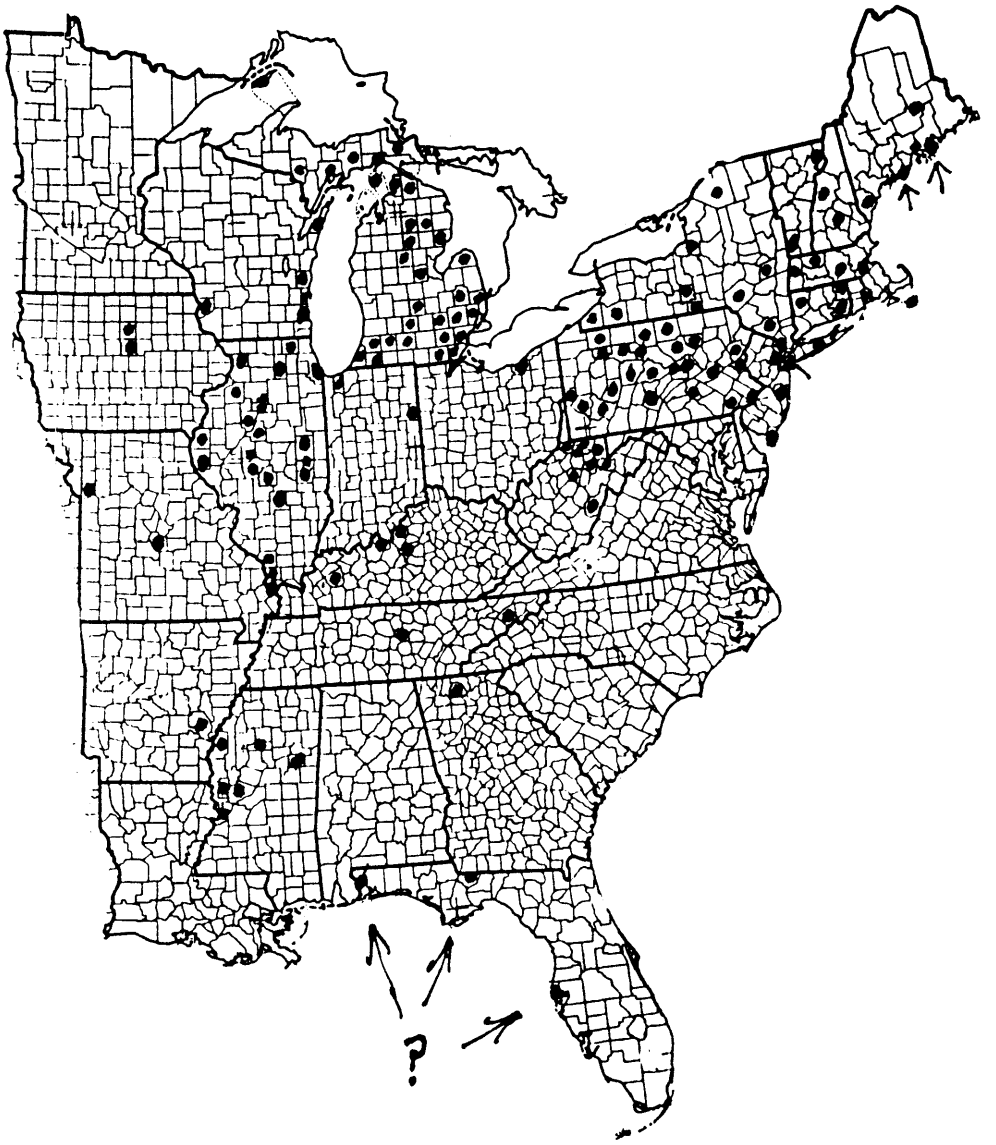
7826 *Paonias astylus* (Drury)



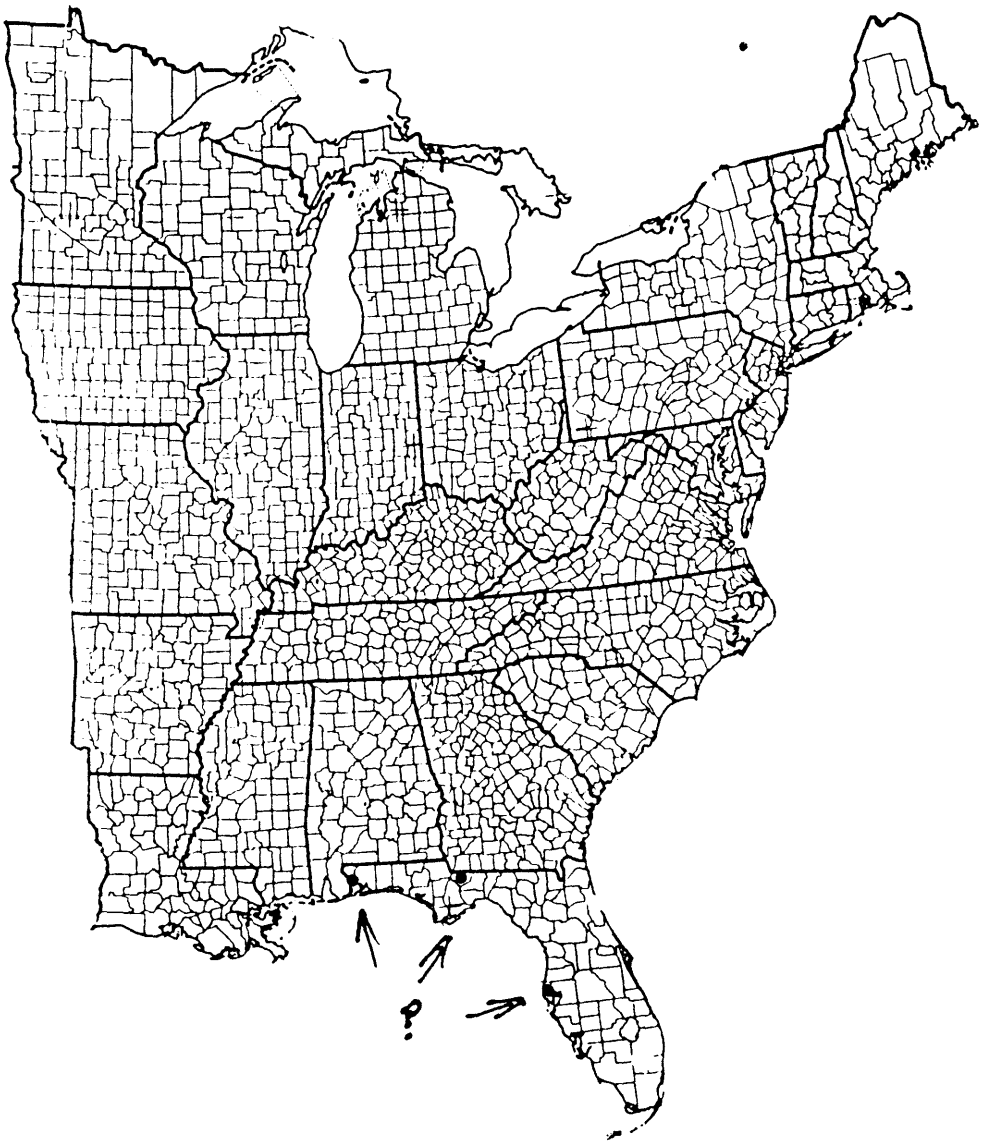
7827 *Laothoe juglandis* (J.E. Smith)



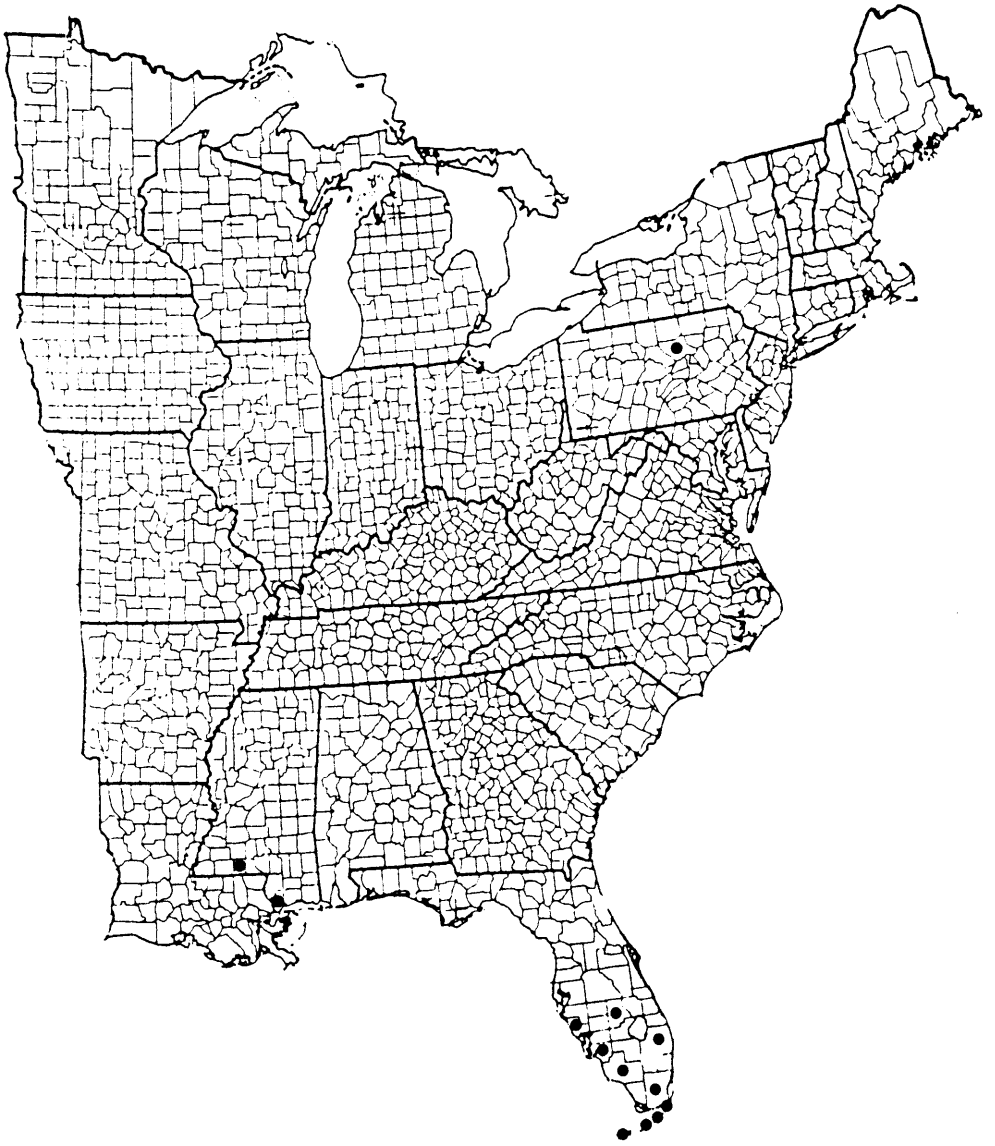
7828 *Pachyspinx modesta* (Harr.)



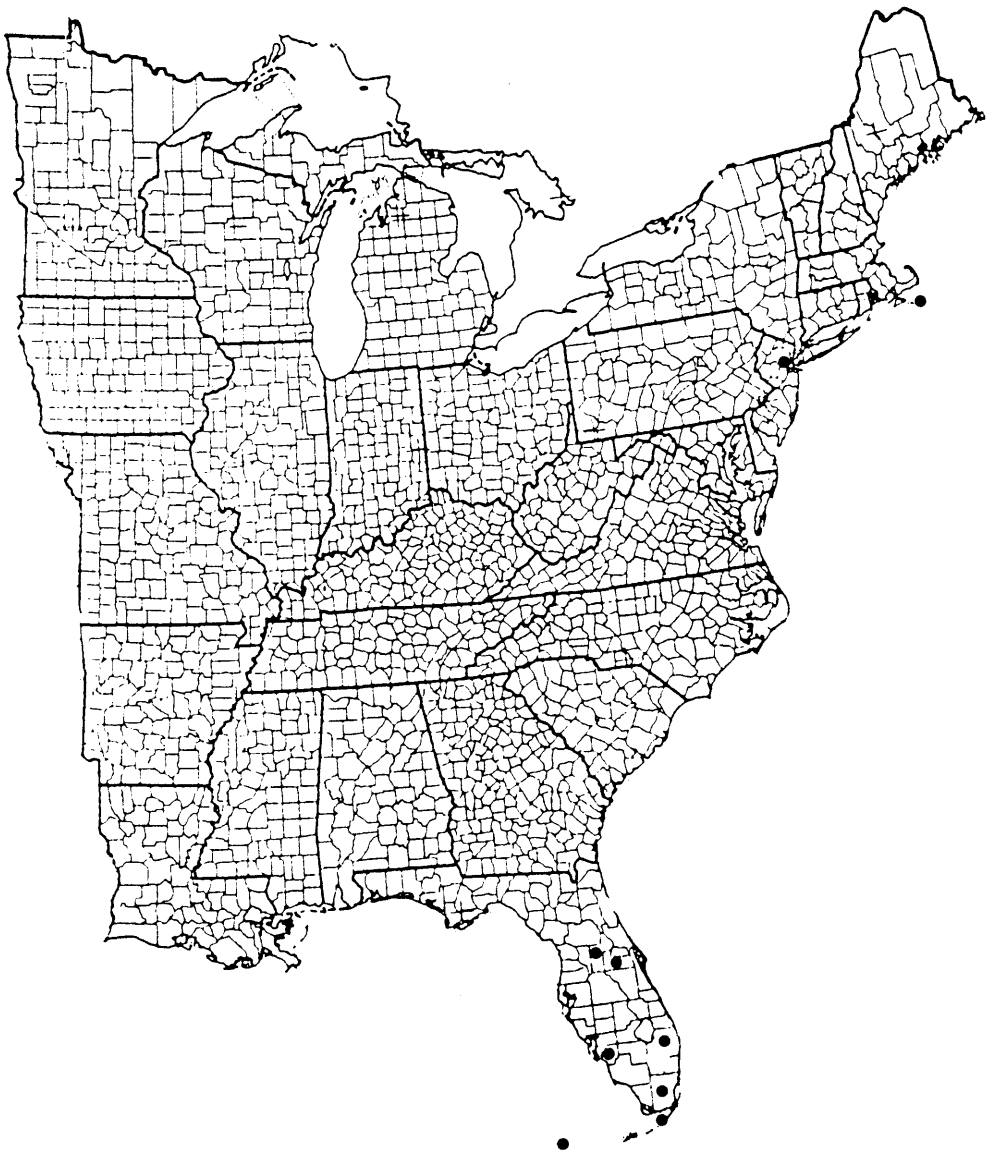
7829 *Pachyspinx occidentalis* (Hy. Edw.)



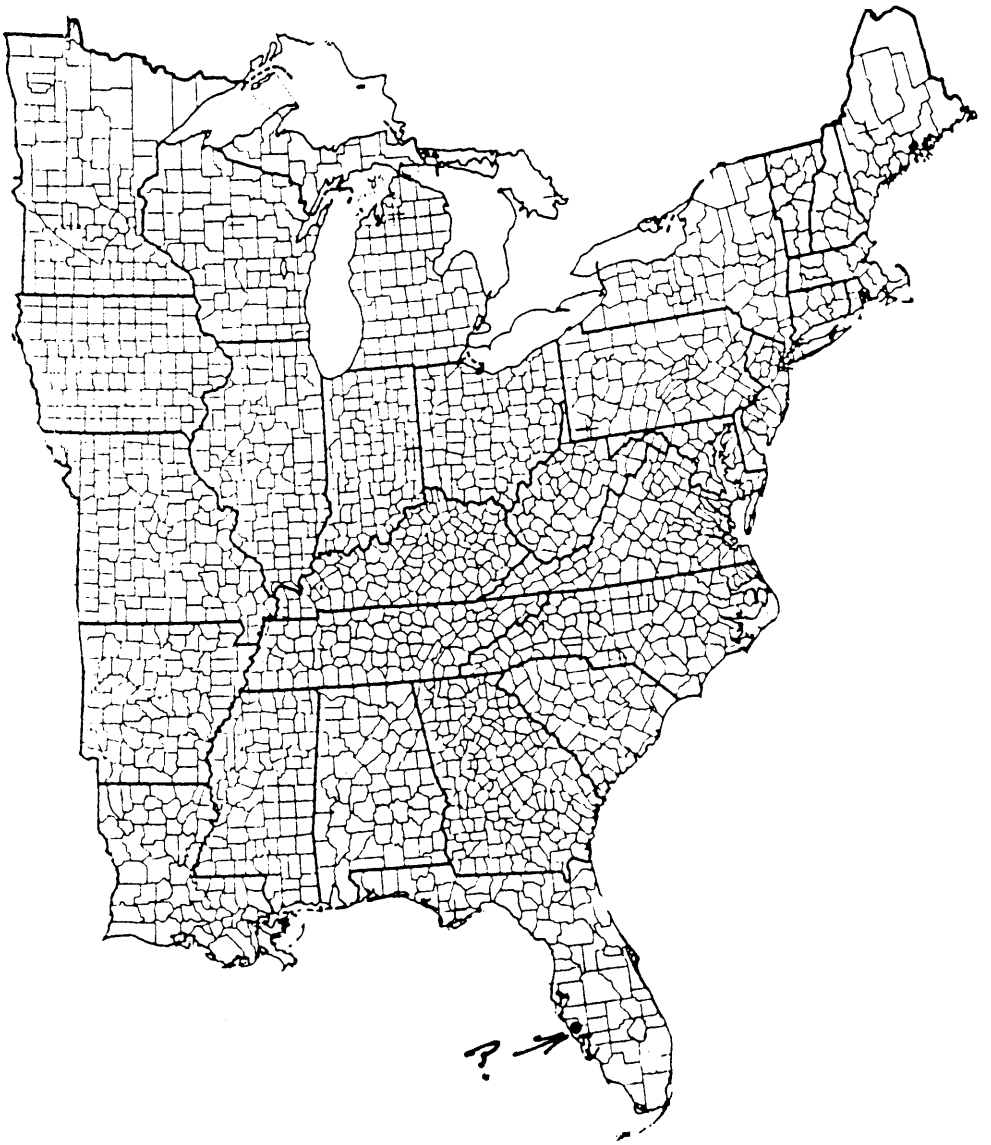
7830 *Pseudosphinx tetrio* (L.)



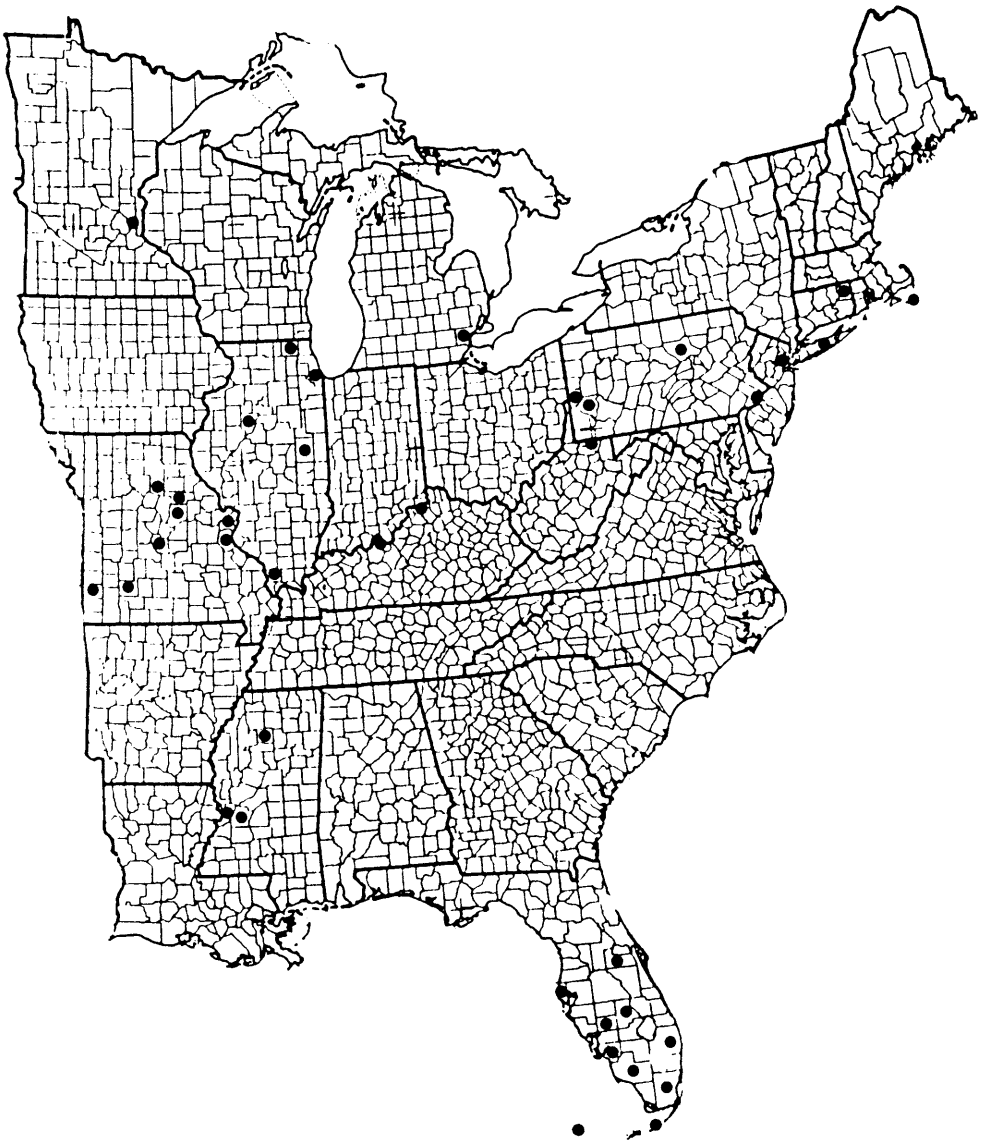
7832 *Erinnyis alope* (Drury)



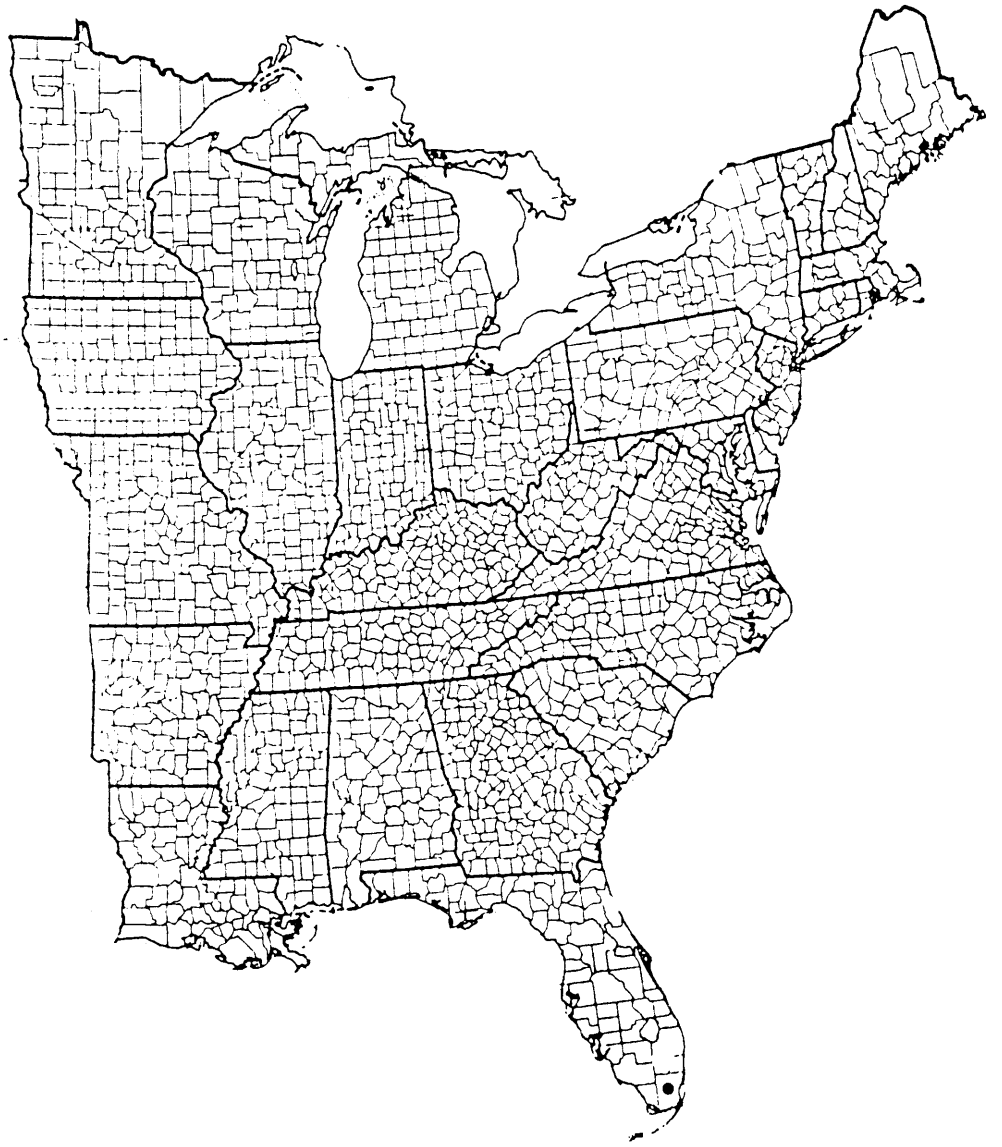
7833 *Erinnyis lassauxii* (Bdv.)



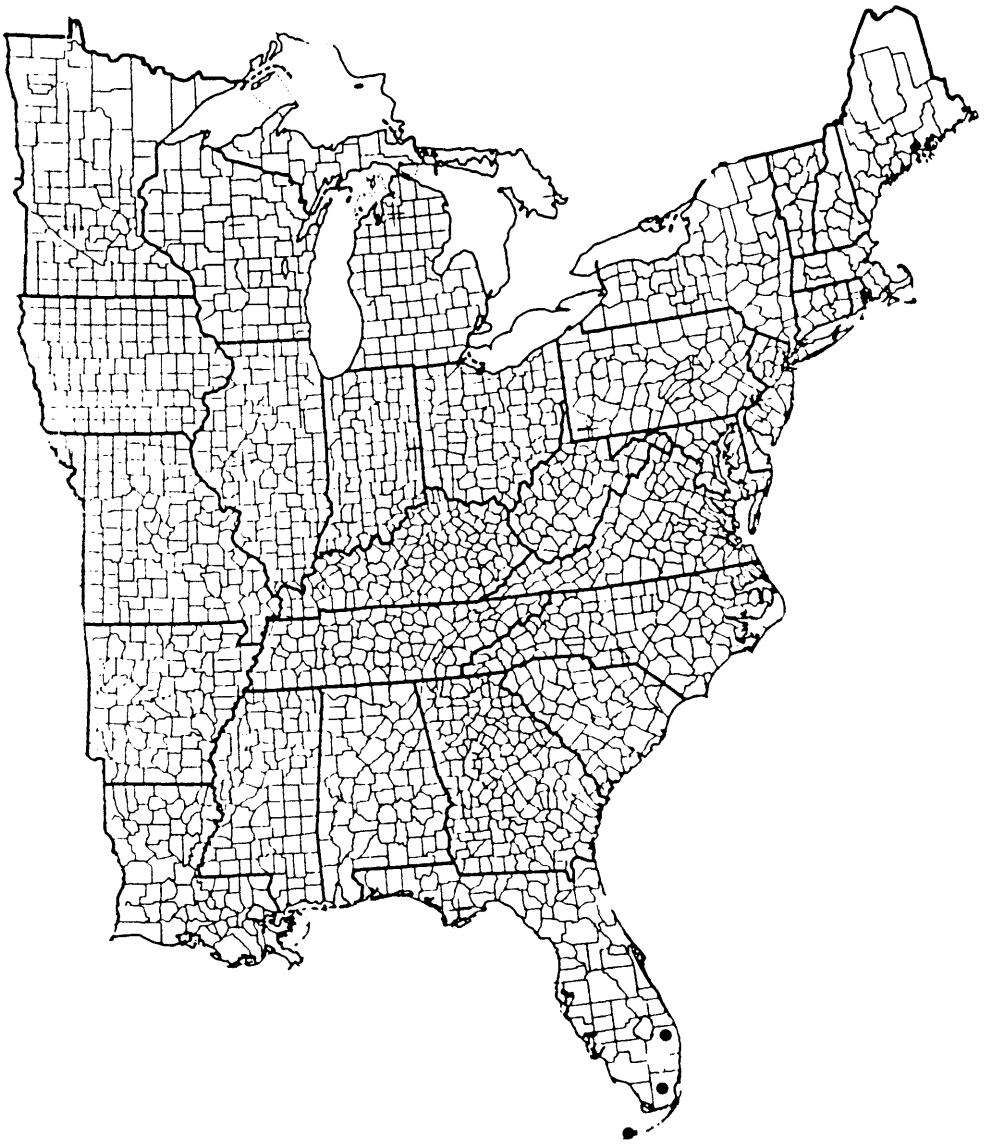
7834 *Erinnyis ello* (L.)



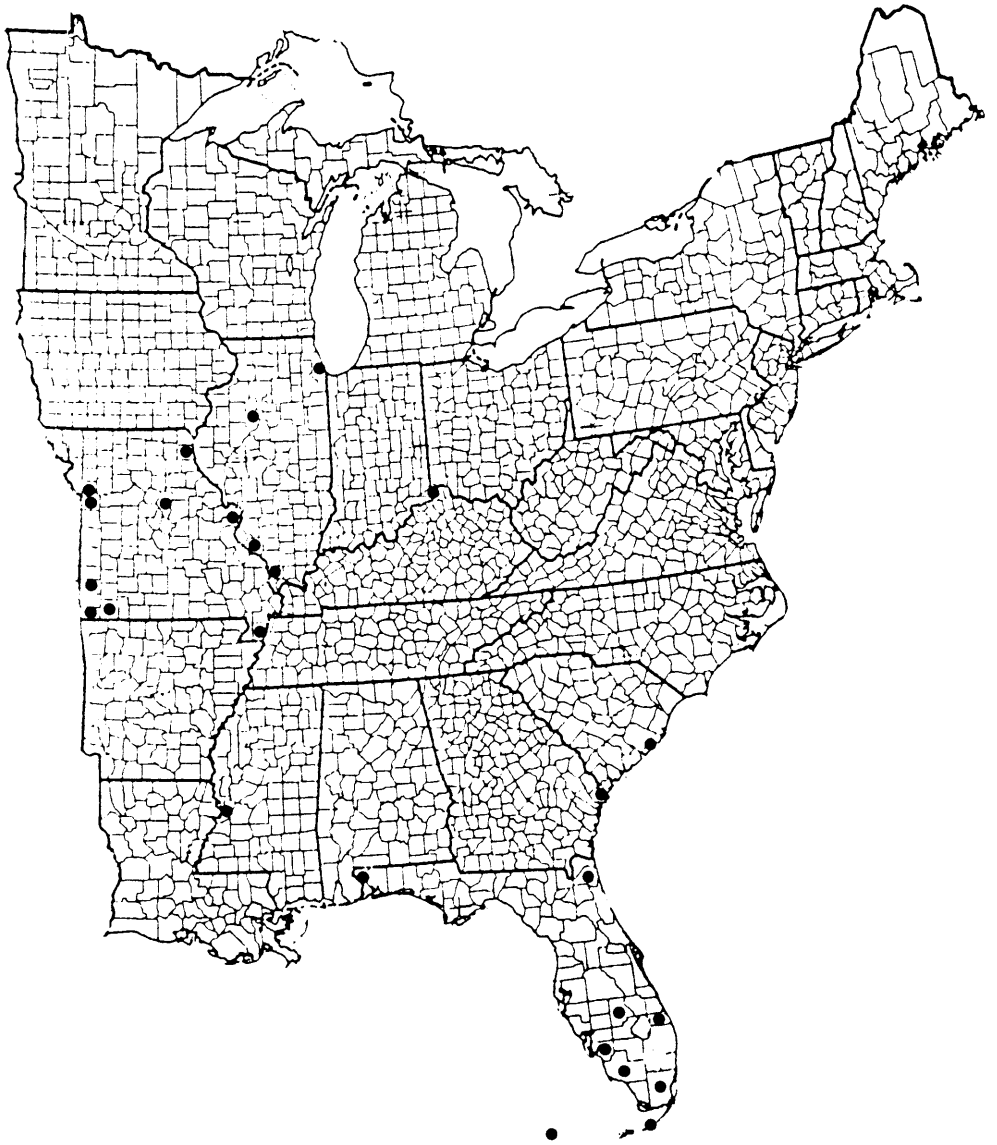
7835 *Erinnyis oenotrus* (Cram.)



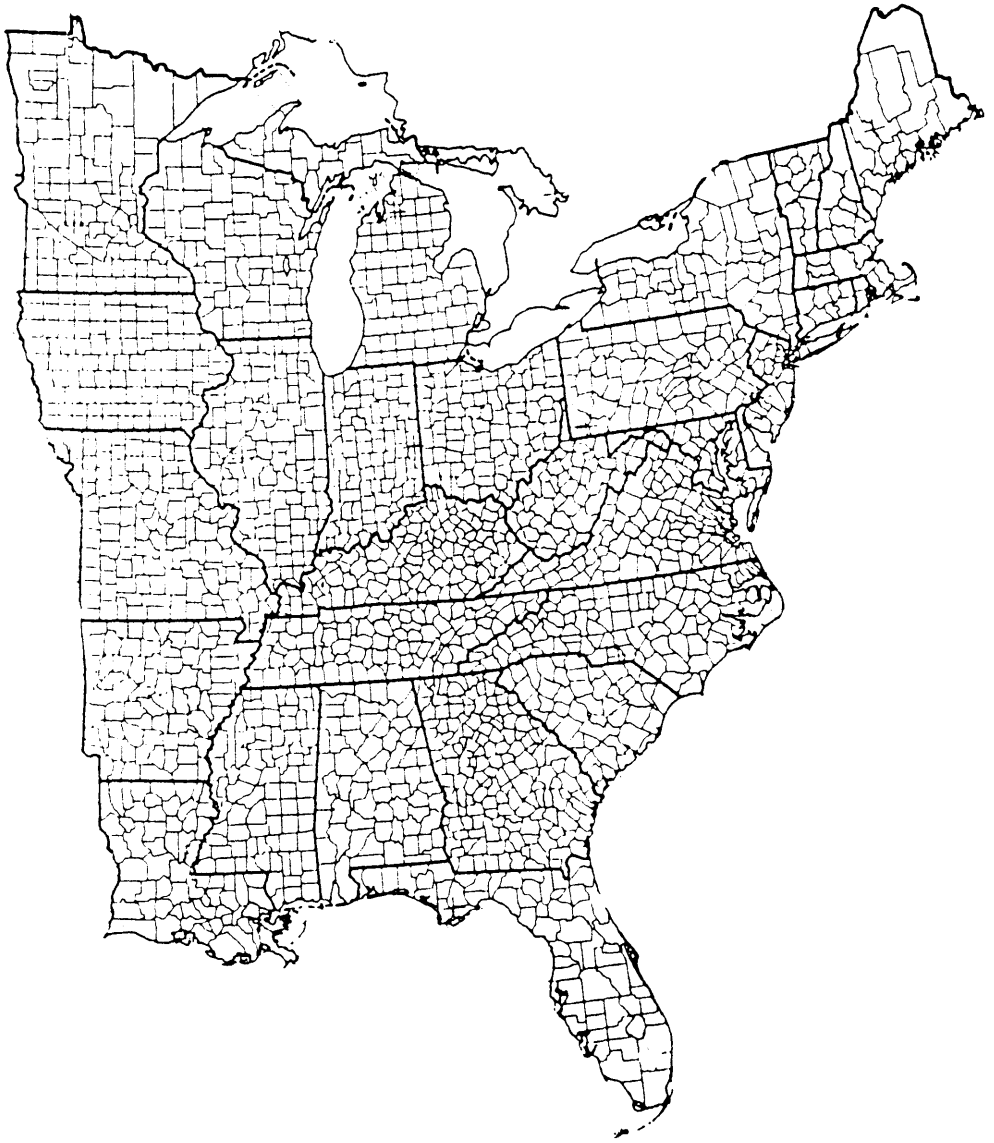
7836 *Erinnyis crameri* (Schaus)



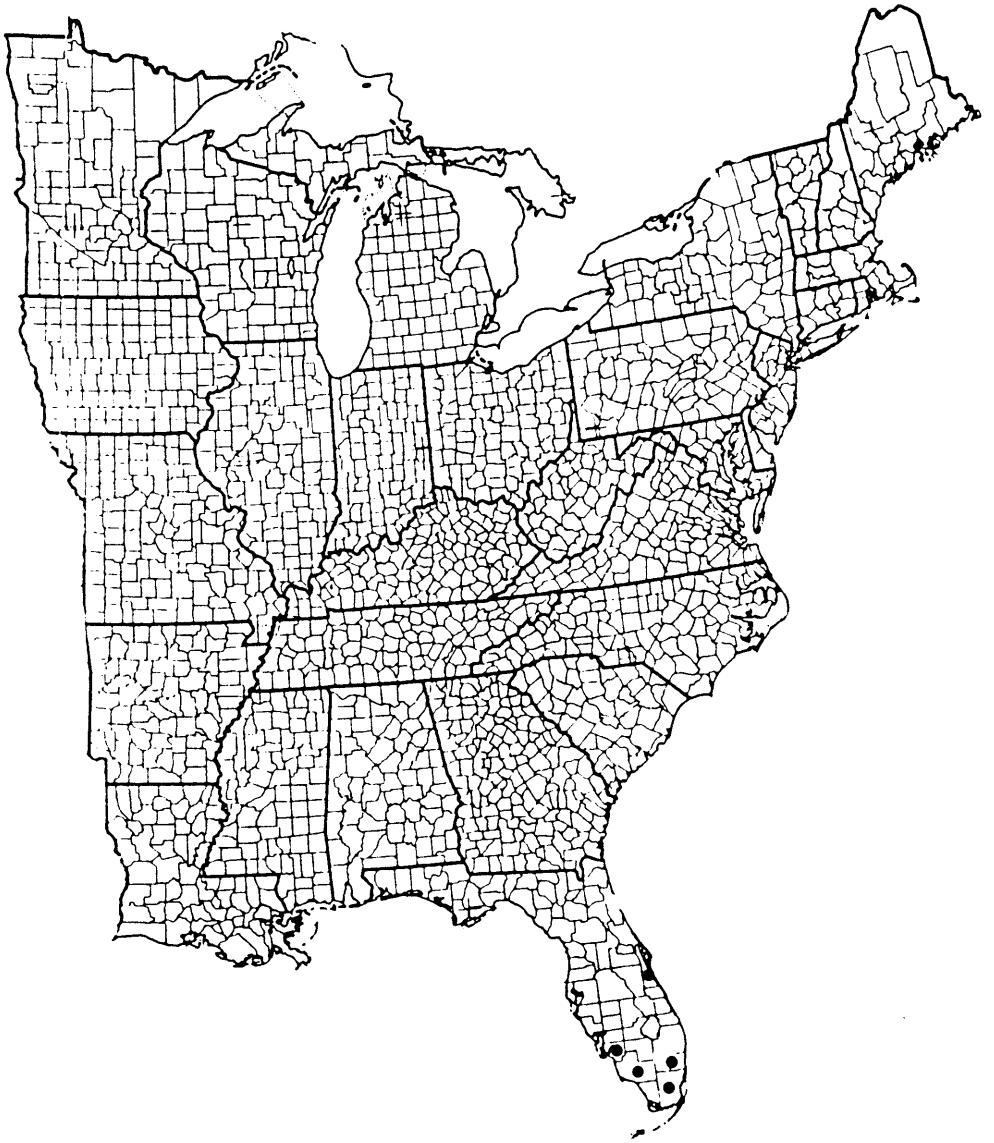
7837 *Erinnyis obscura* (F.), includes *E. domingonis*



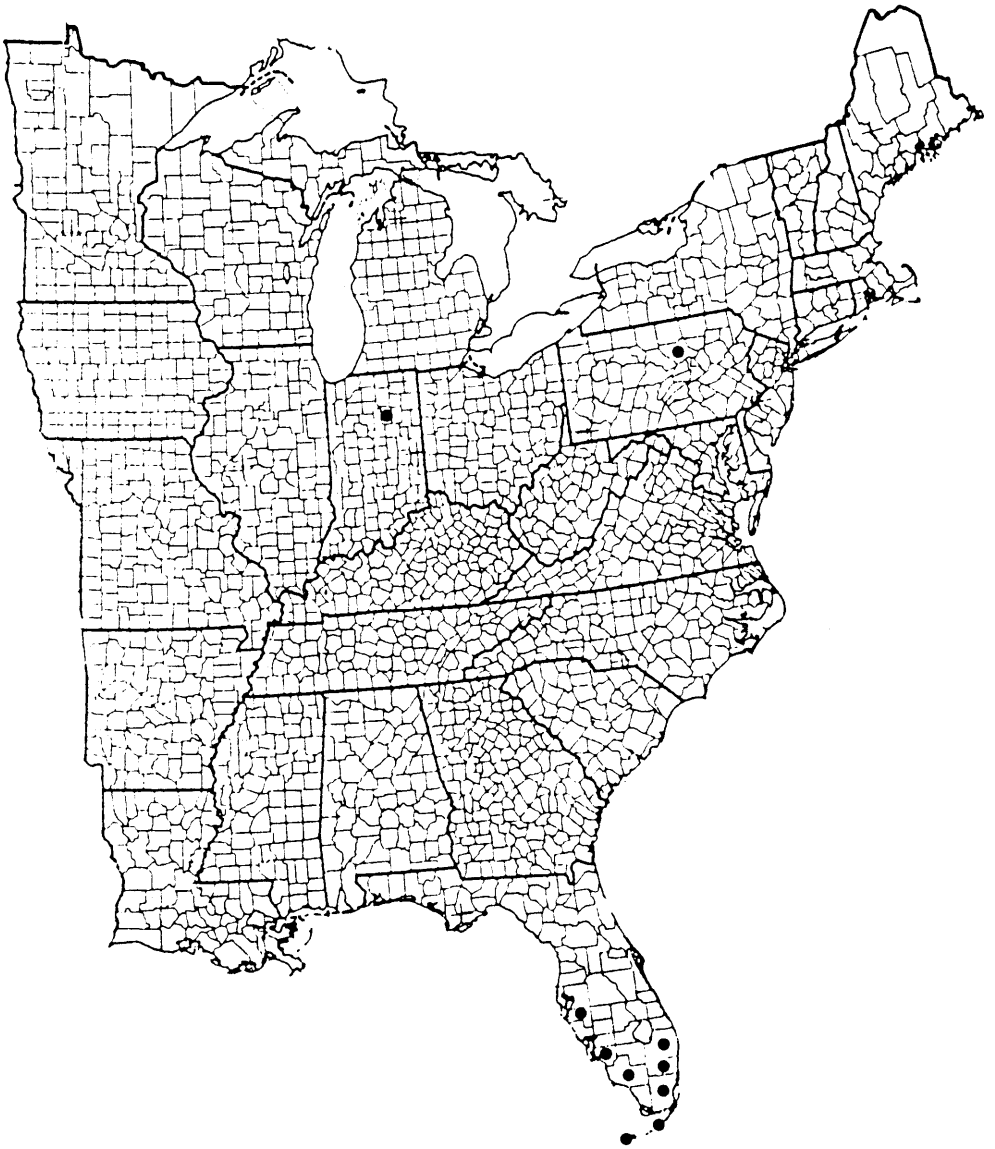
7839 *Erinnyis guttularis* (Wlk.)



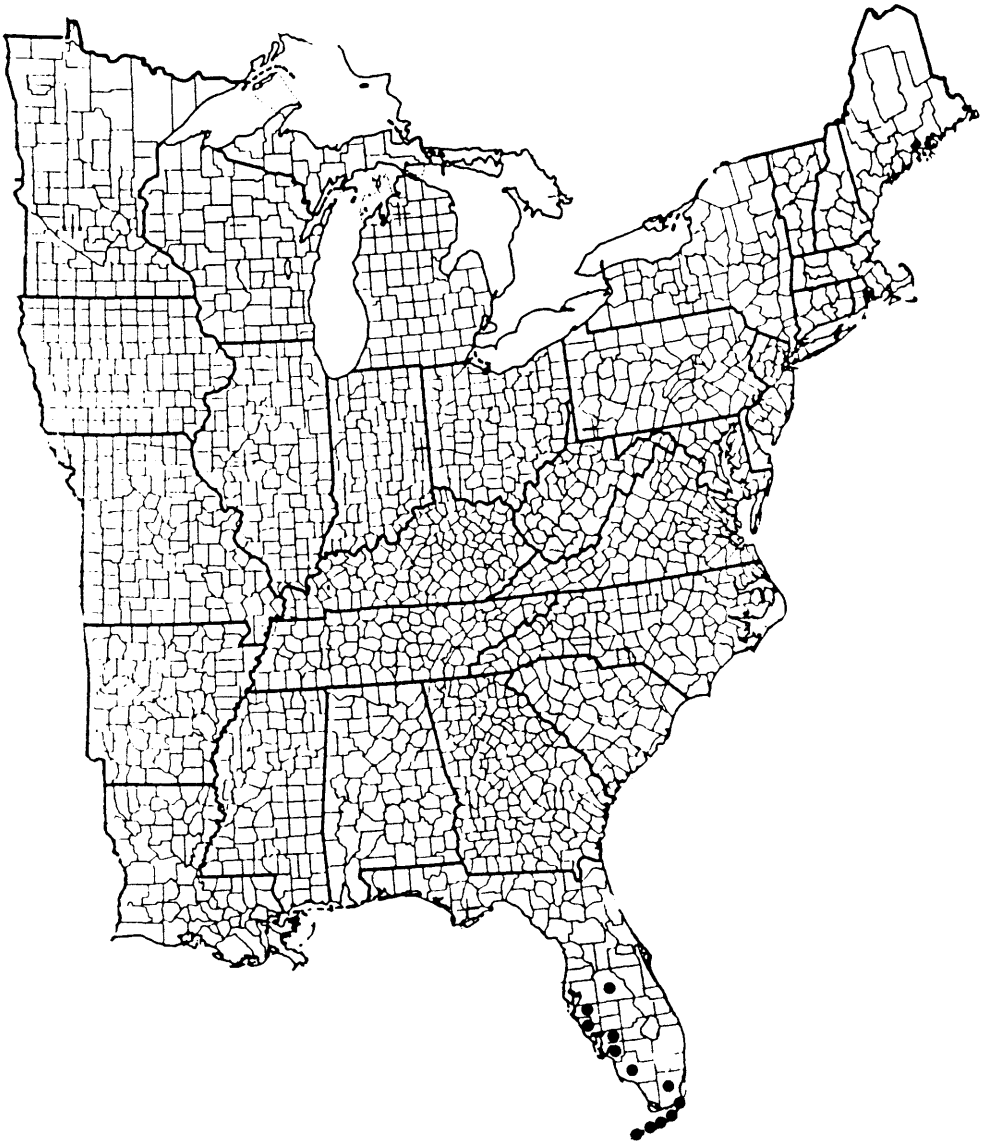
7840 *Phryxus caicus* (Cram.)



7841 *Pachylia ficus* (L.)



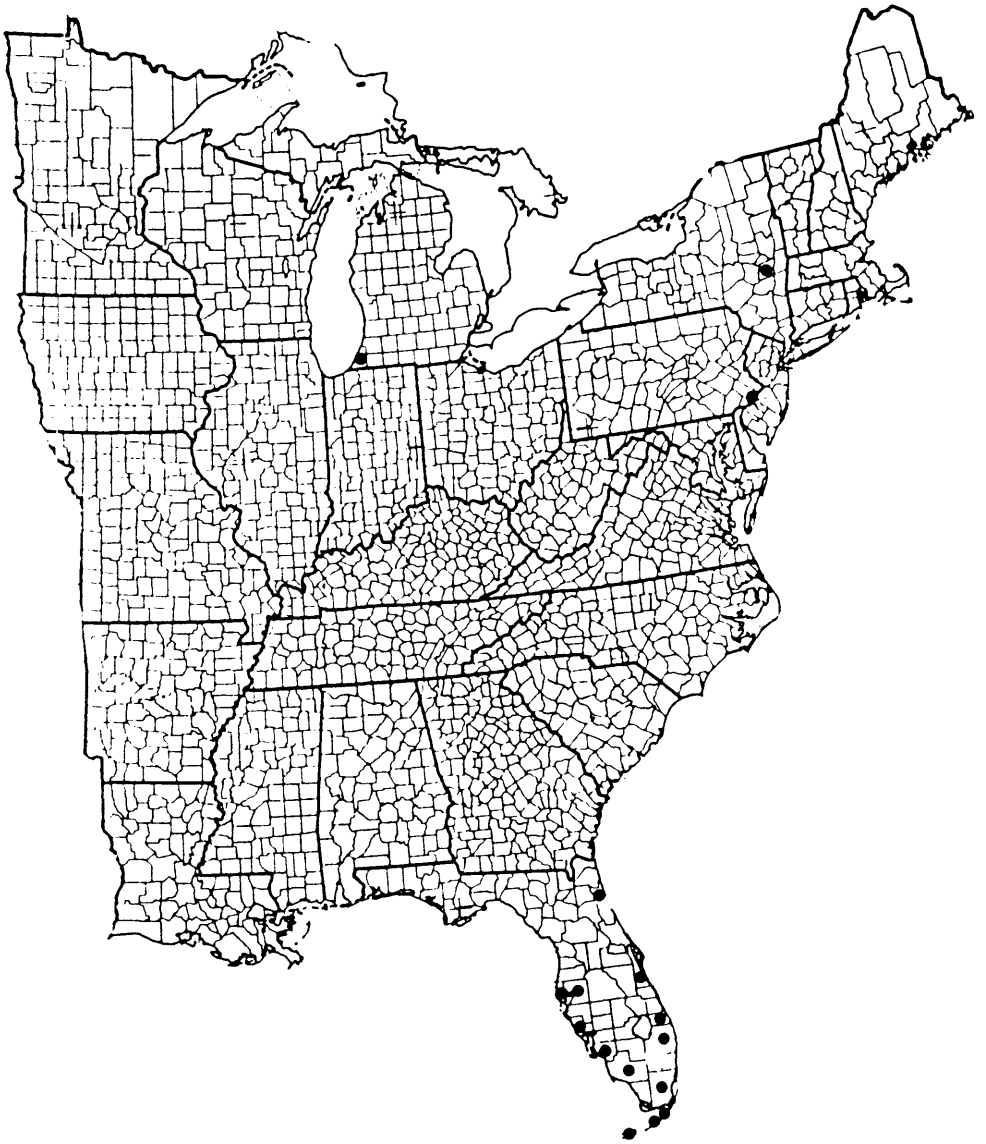
7843 *Madoryx pseudothyreus* (Grt.)



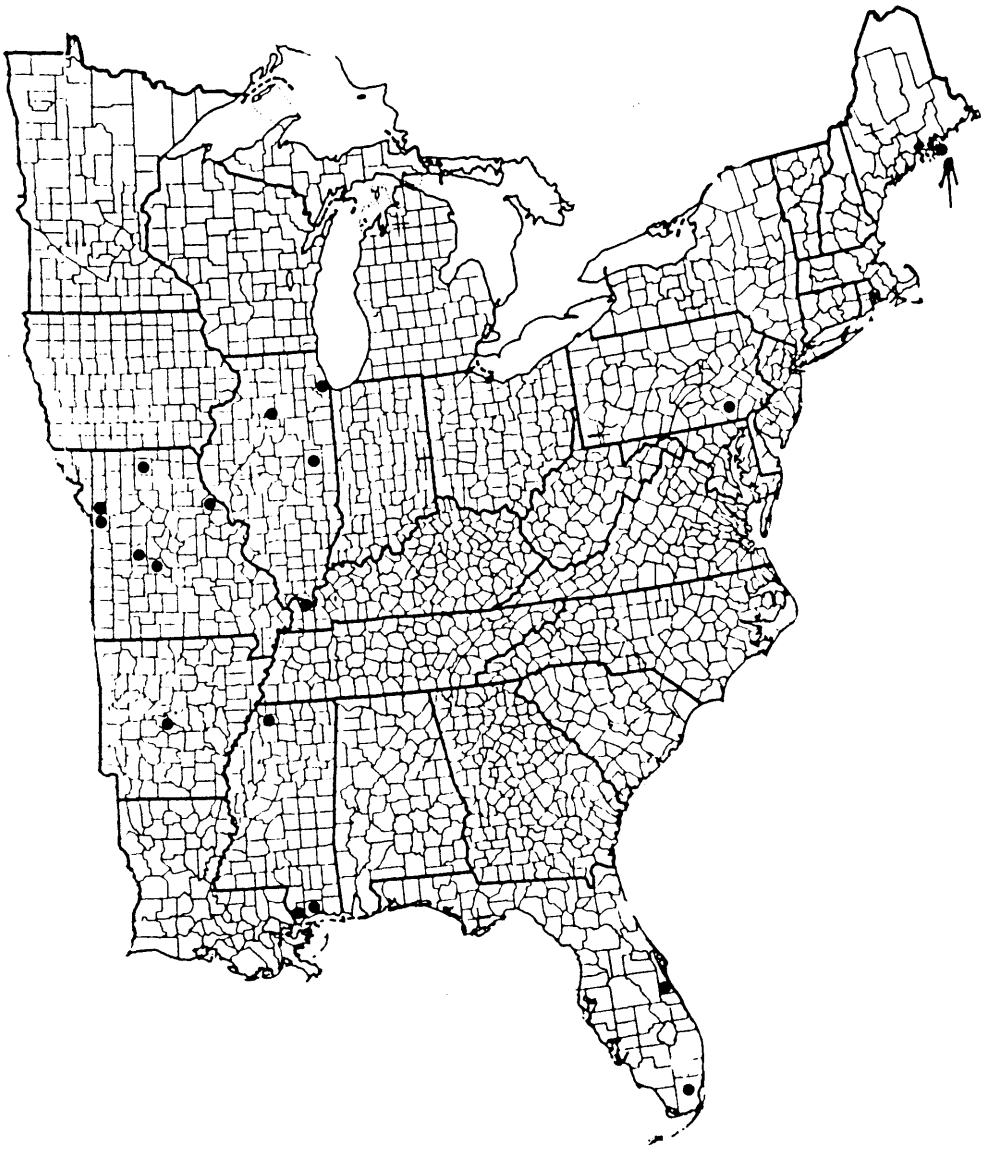
7846 *Perigonia lusca* (F.)

7844 *Callionima parce* (F.)

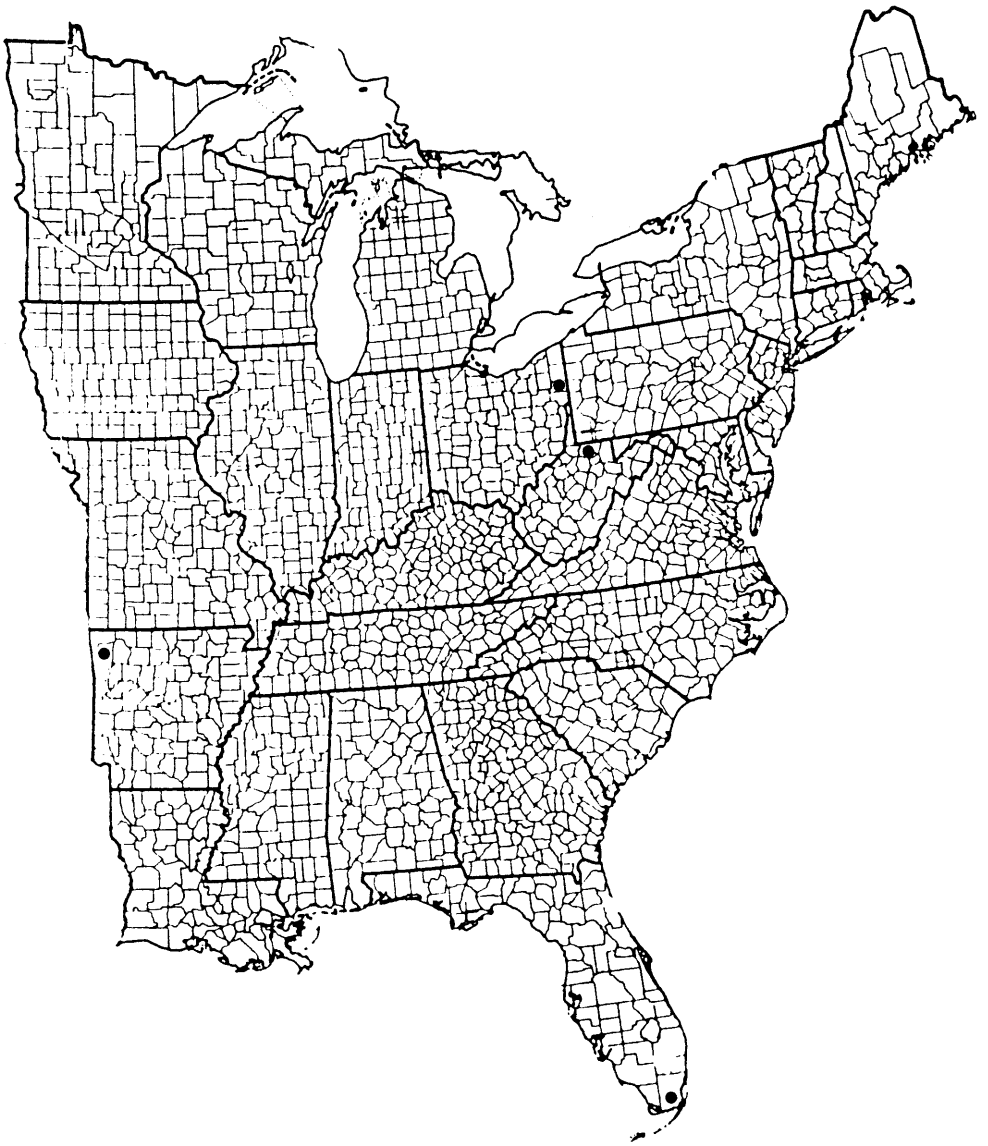
7847 *Aellopos tantalus* (L.)



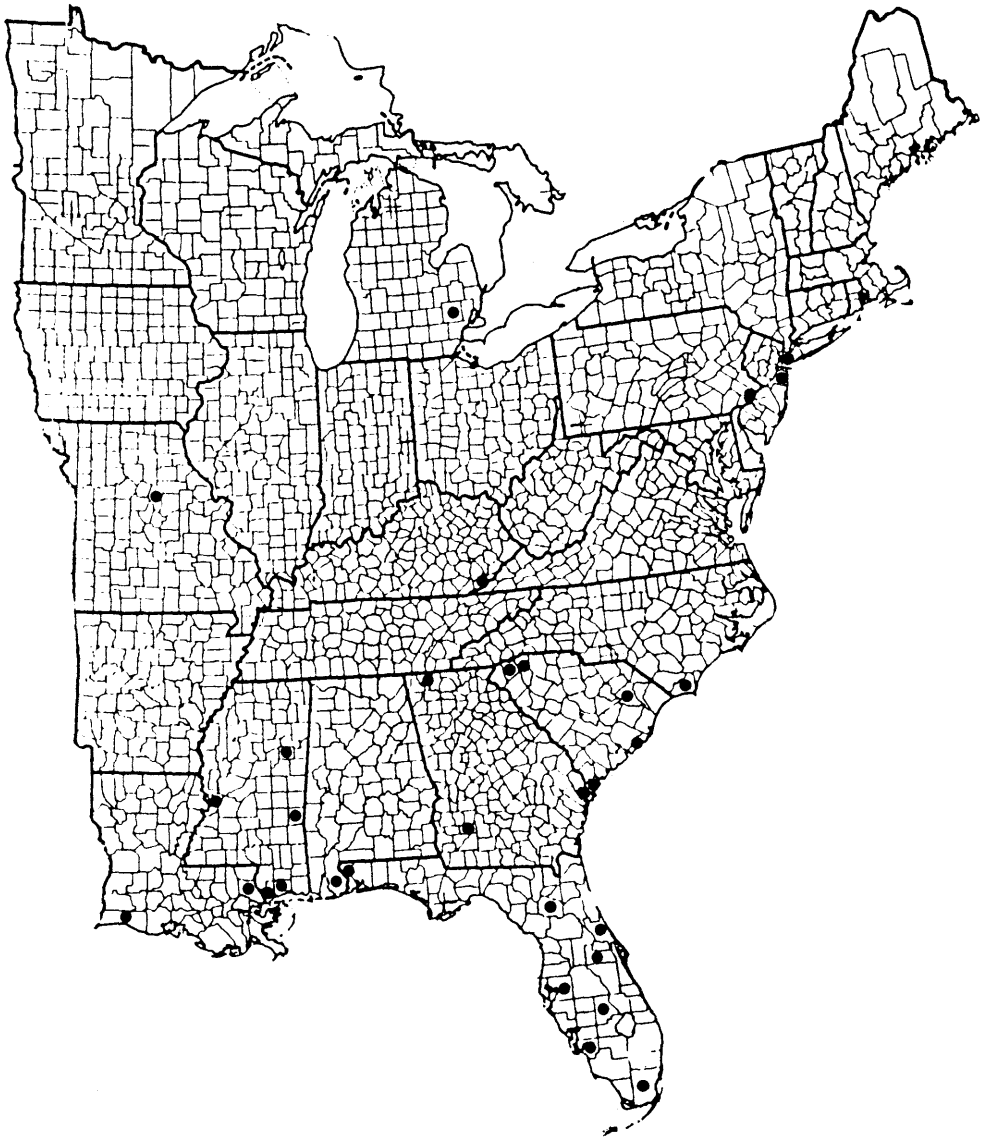
7849 *Aellopos titan* (Cram.)



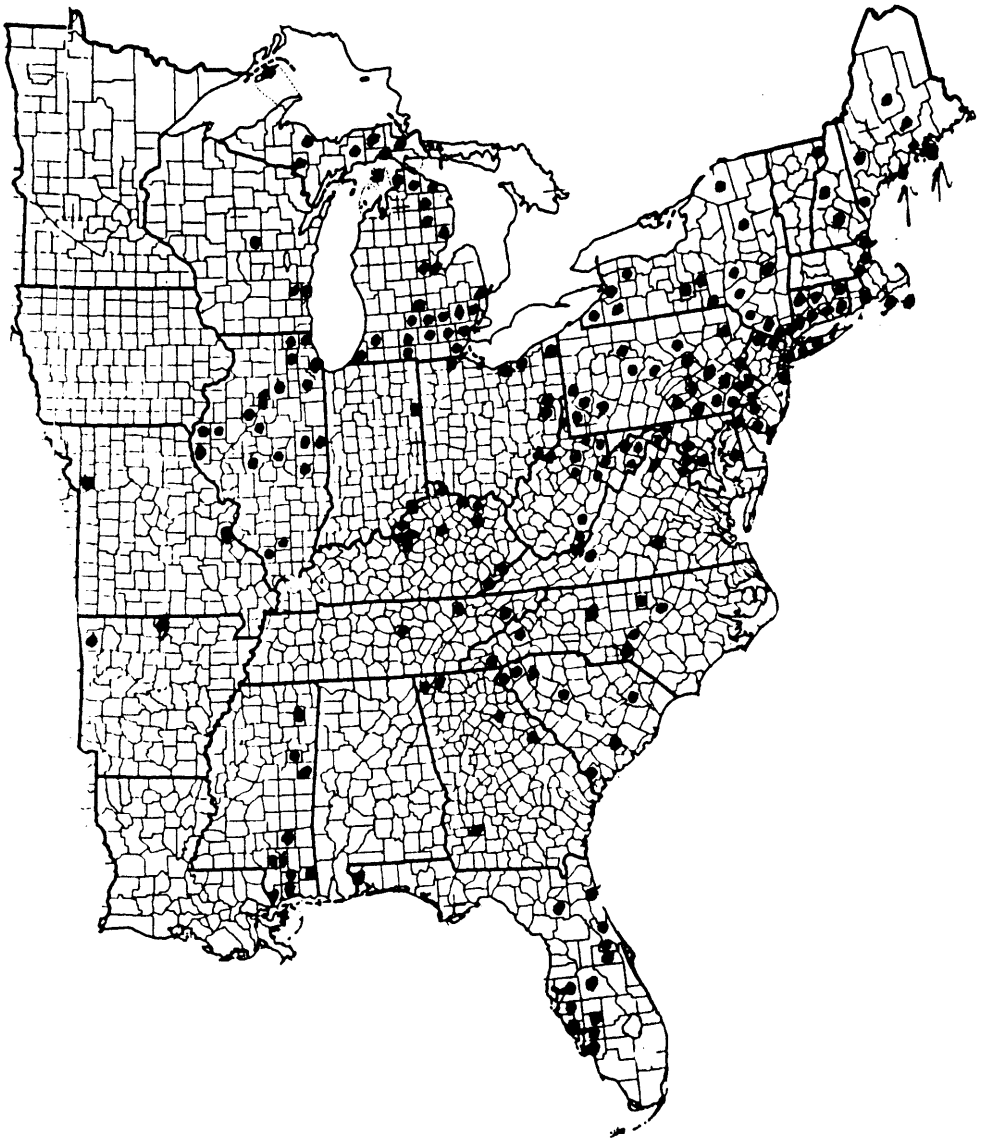
7850 *Aellopus fadus* (Cram.)



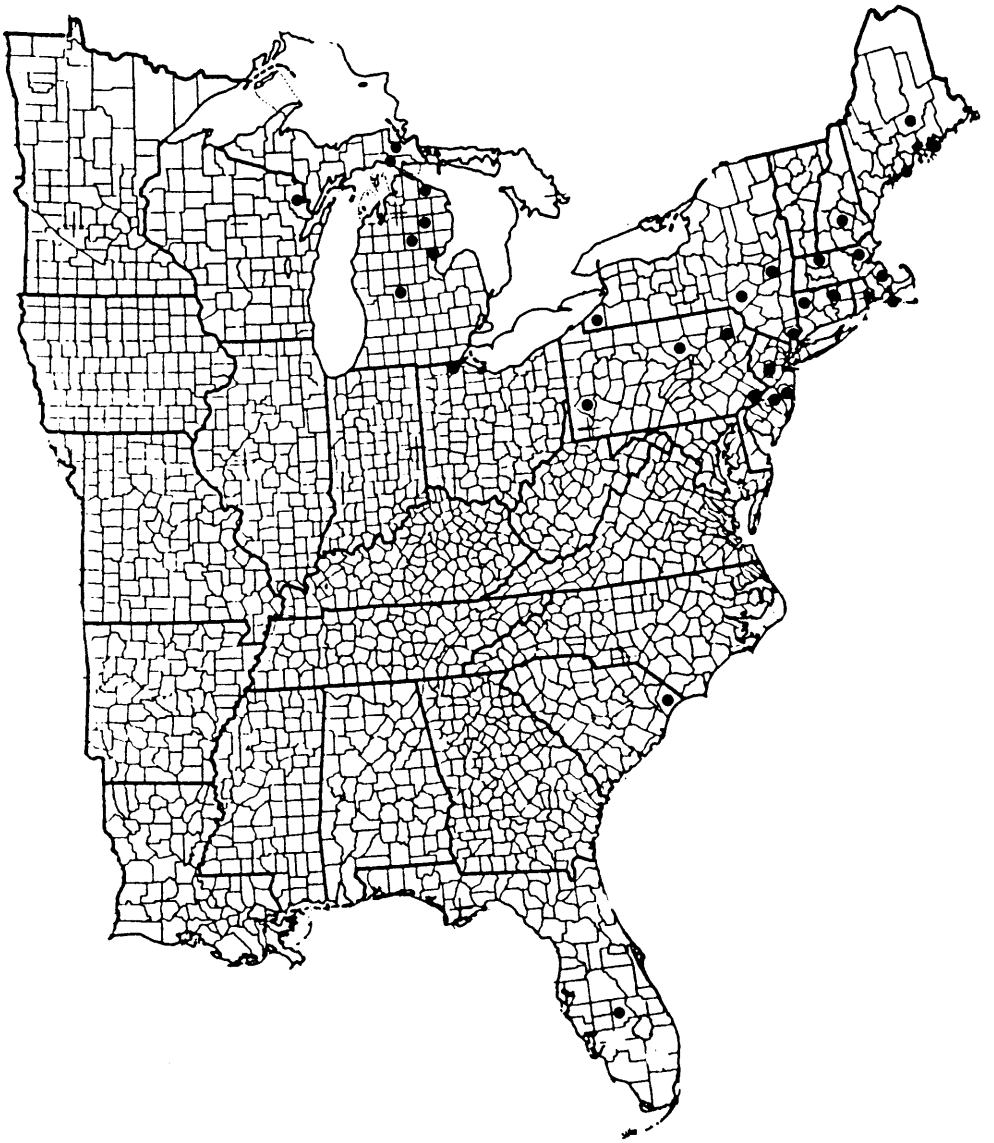
7851 *Enyo lugubris* (L.)



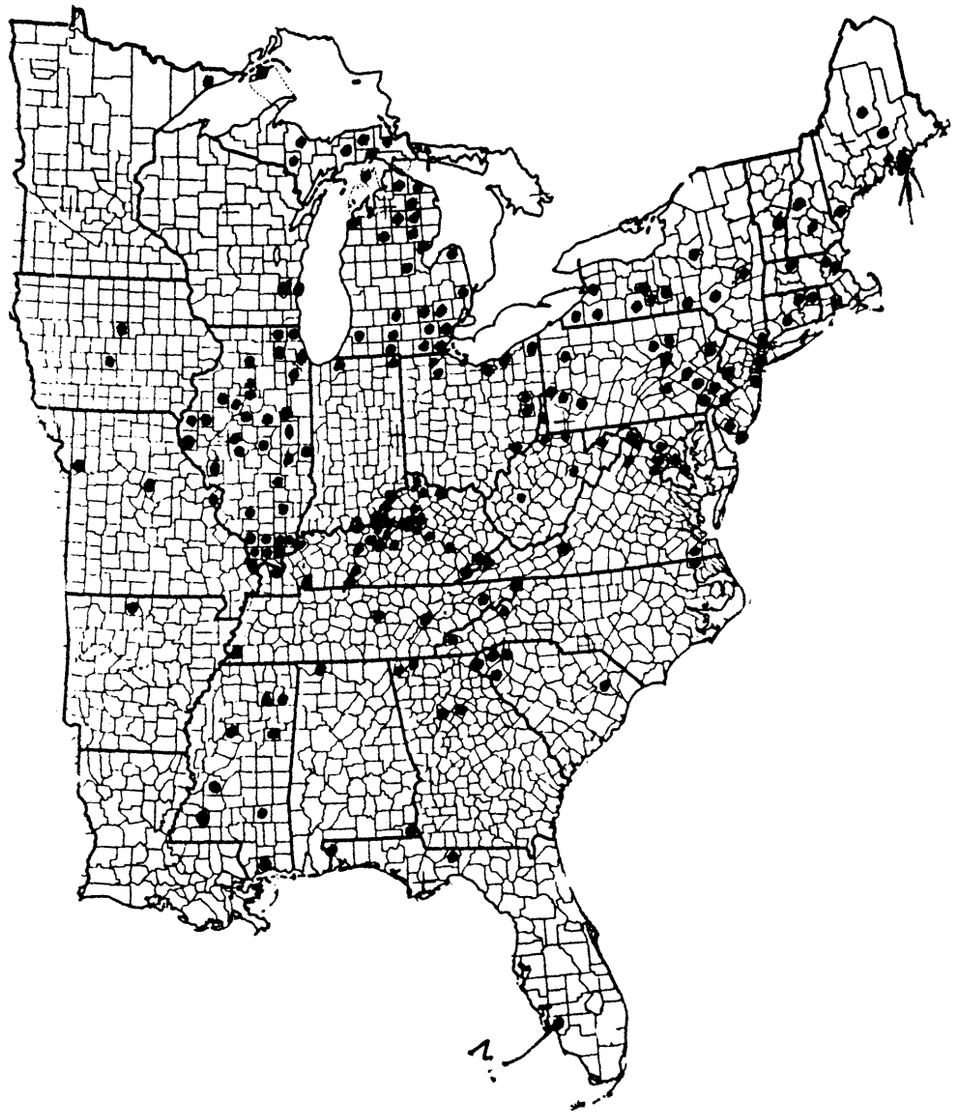
7853 *Hemaris thysbe* (F.)



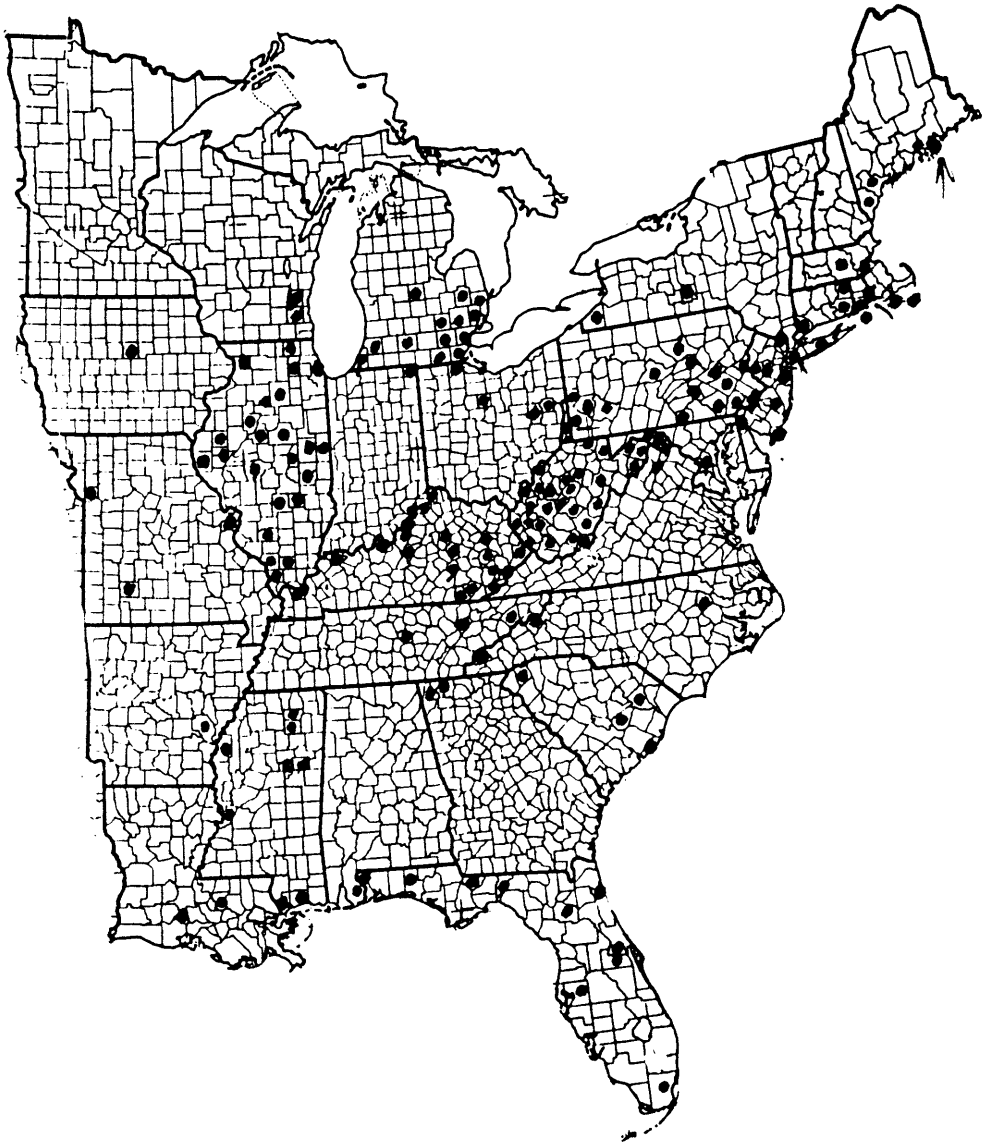
7854 *Hemaris gracilis* (G. & R.)



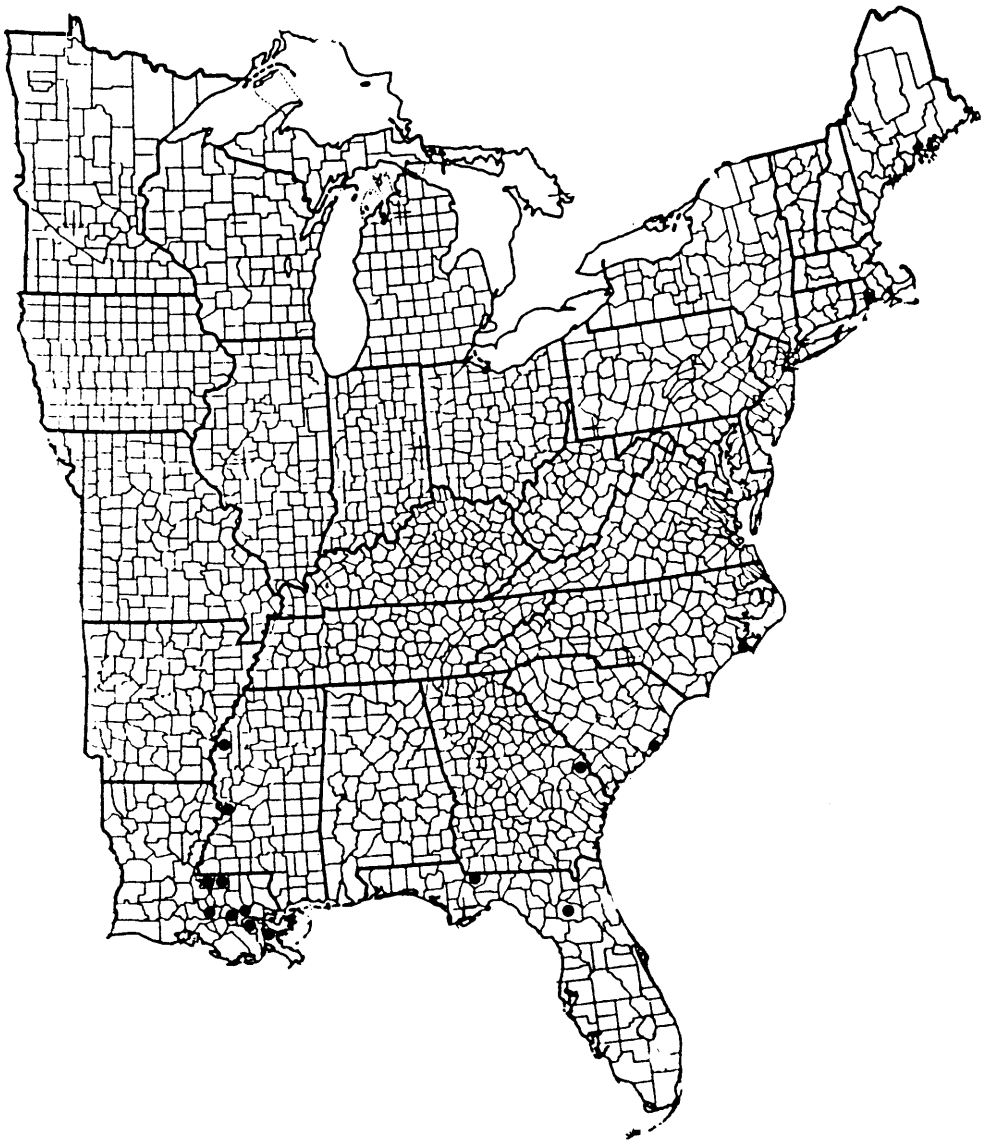
7855 *Hemaris diffinis* (Bdv.)



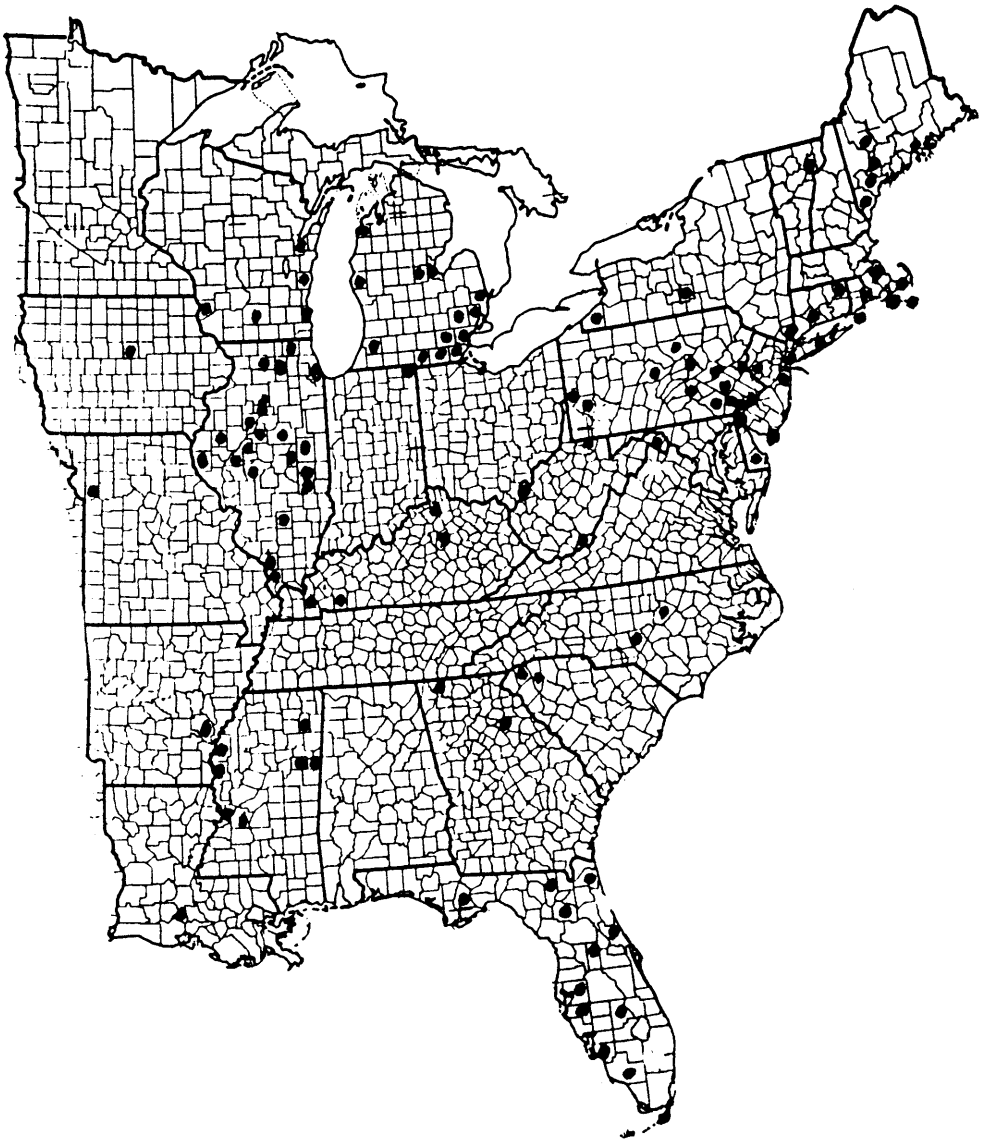
7859 *Eumorpha pandorus* (Hbn.)



7860 *Eumorpha intermedia* (B.P. Clark)



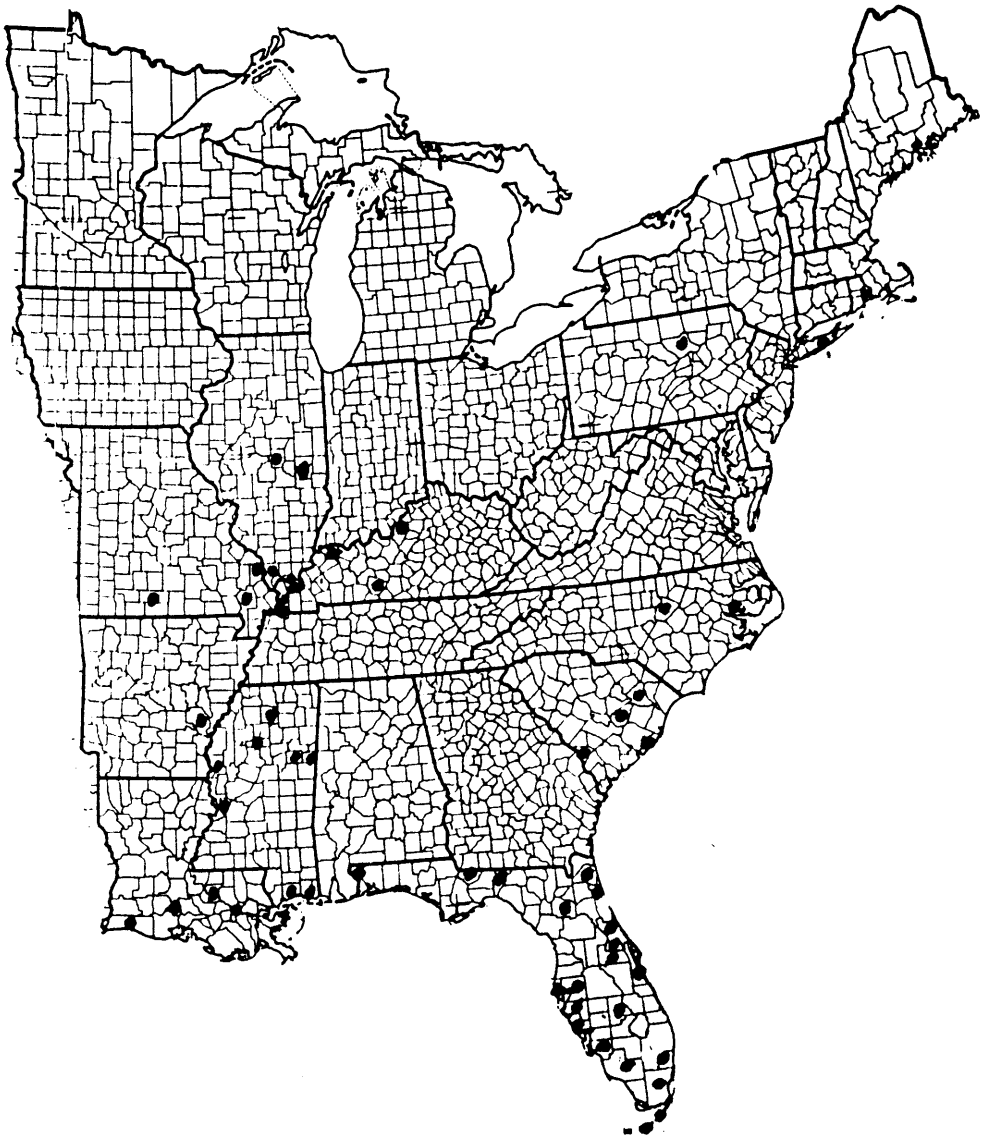
7861 *Eumorpha achemon* (Drury)



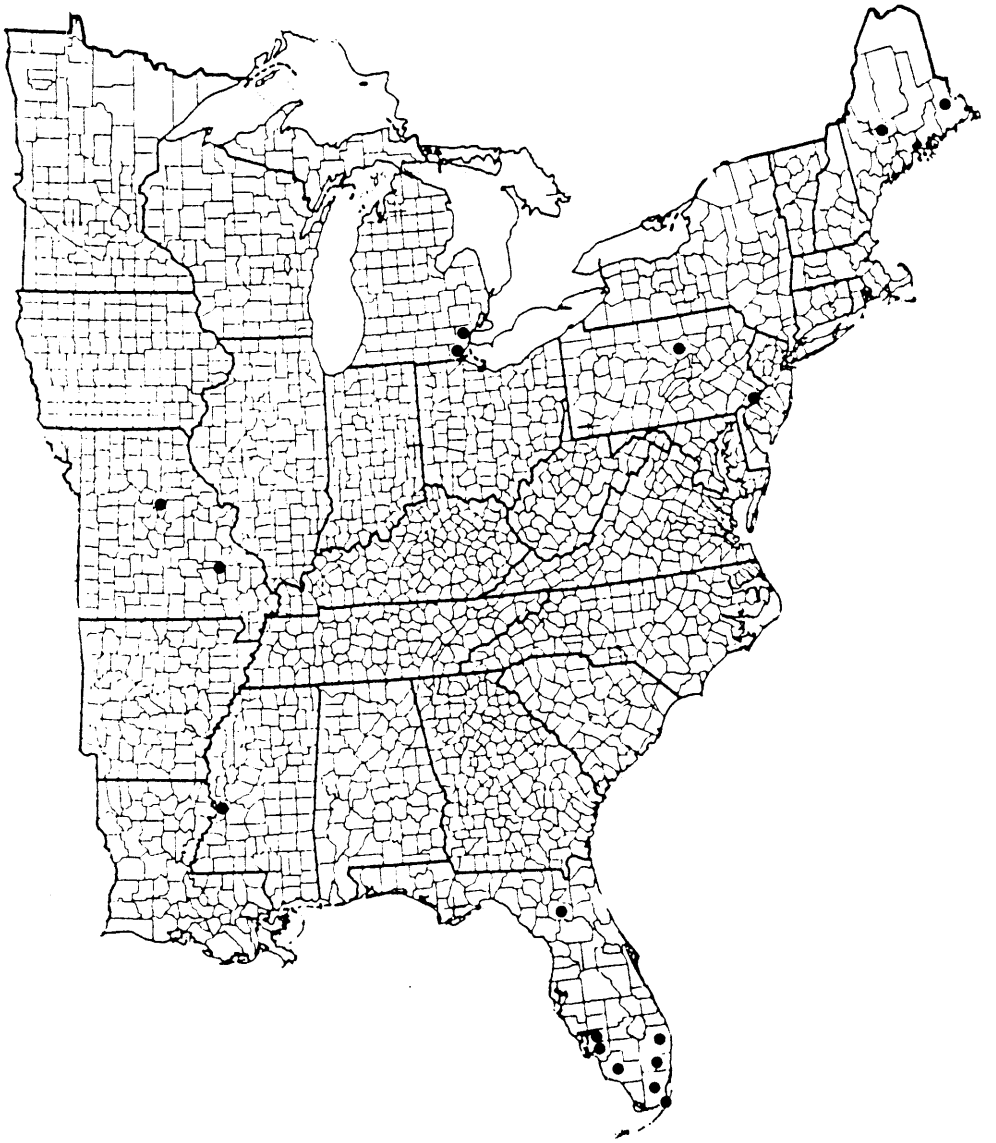
7863. *Eumorpha typhon* (Klug)

7864. *Eumorpha vitis* (L.)

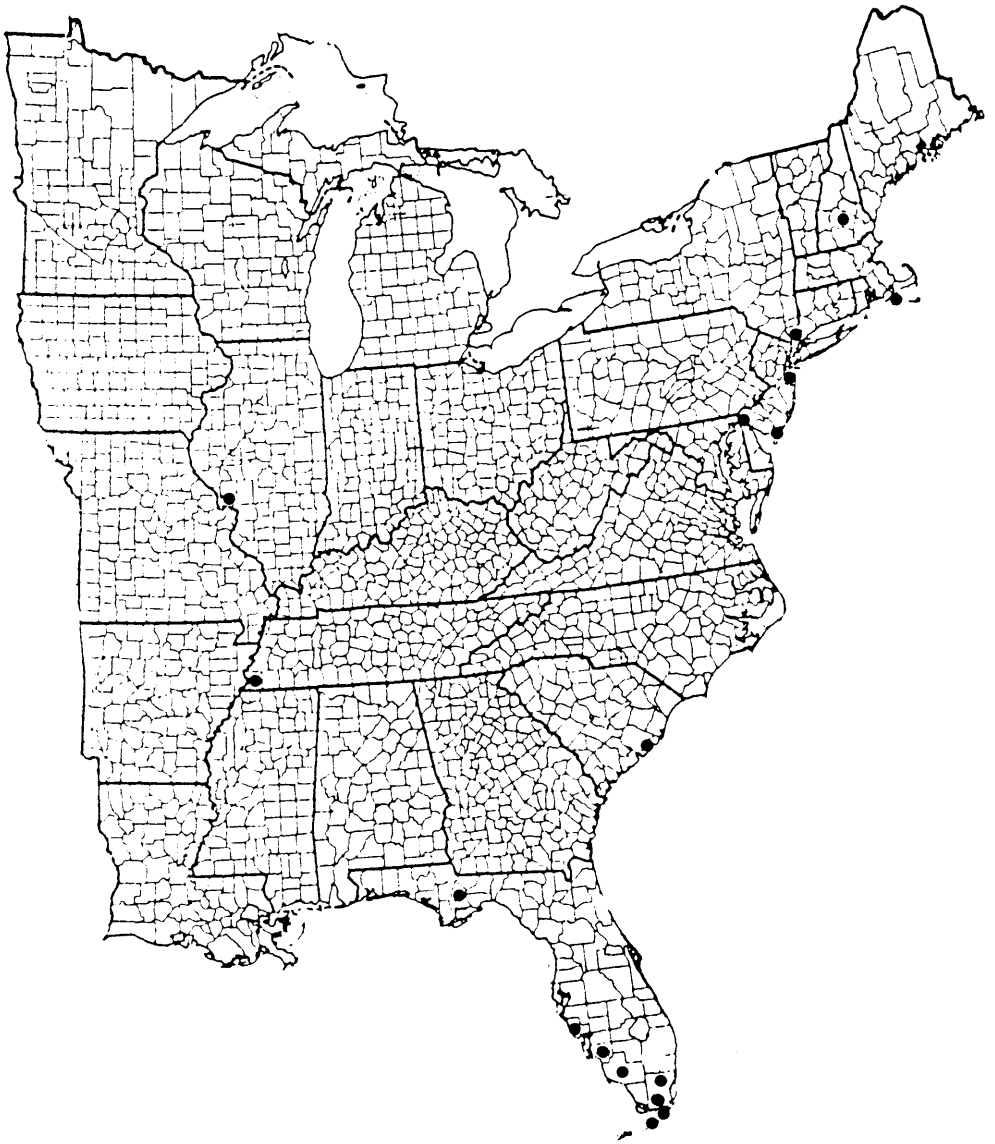
7865 *Eumorpha fasciata* (Sulz)



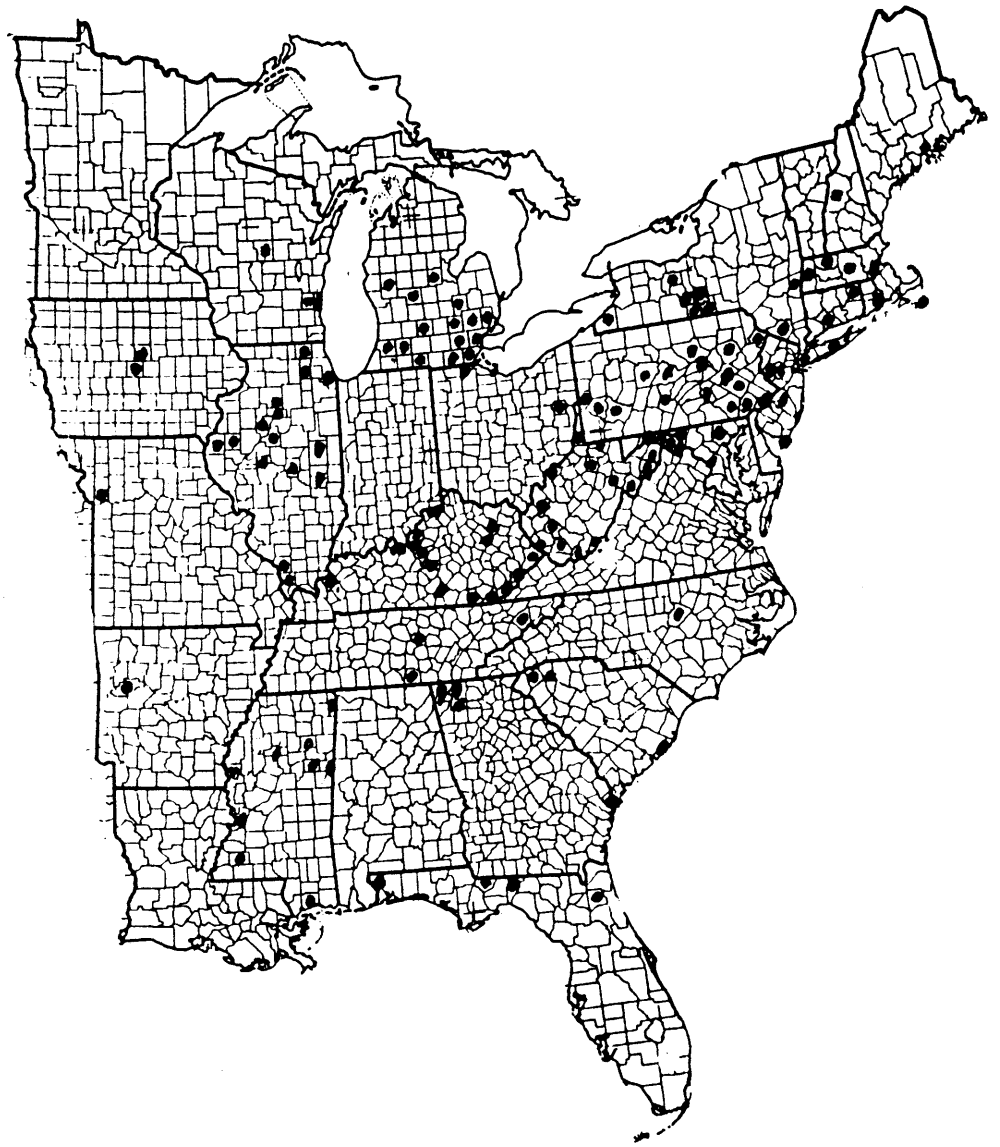
7866. *Eumorpha labruscae* (L.)



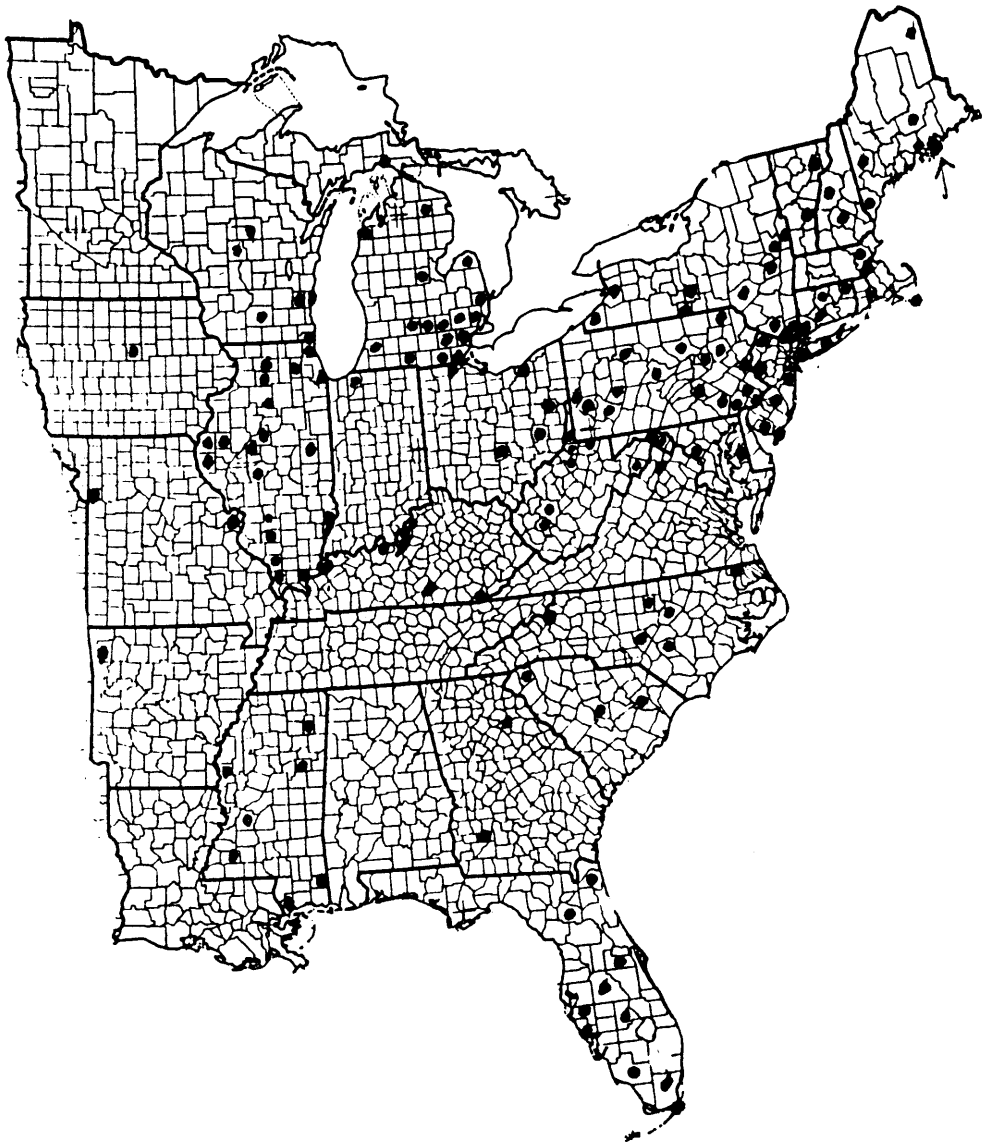
7867. *Cautethia grotei* Hy. Edw.



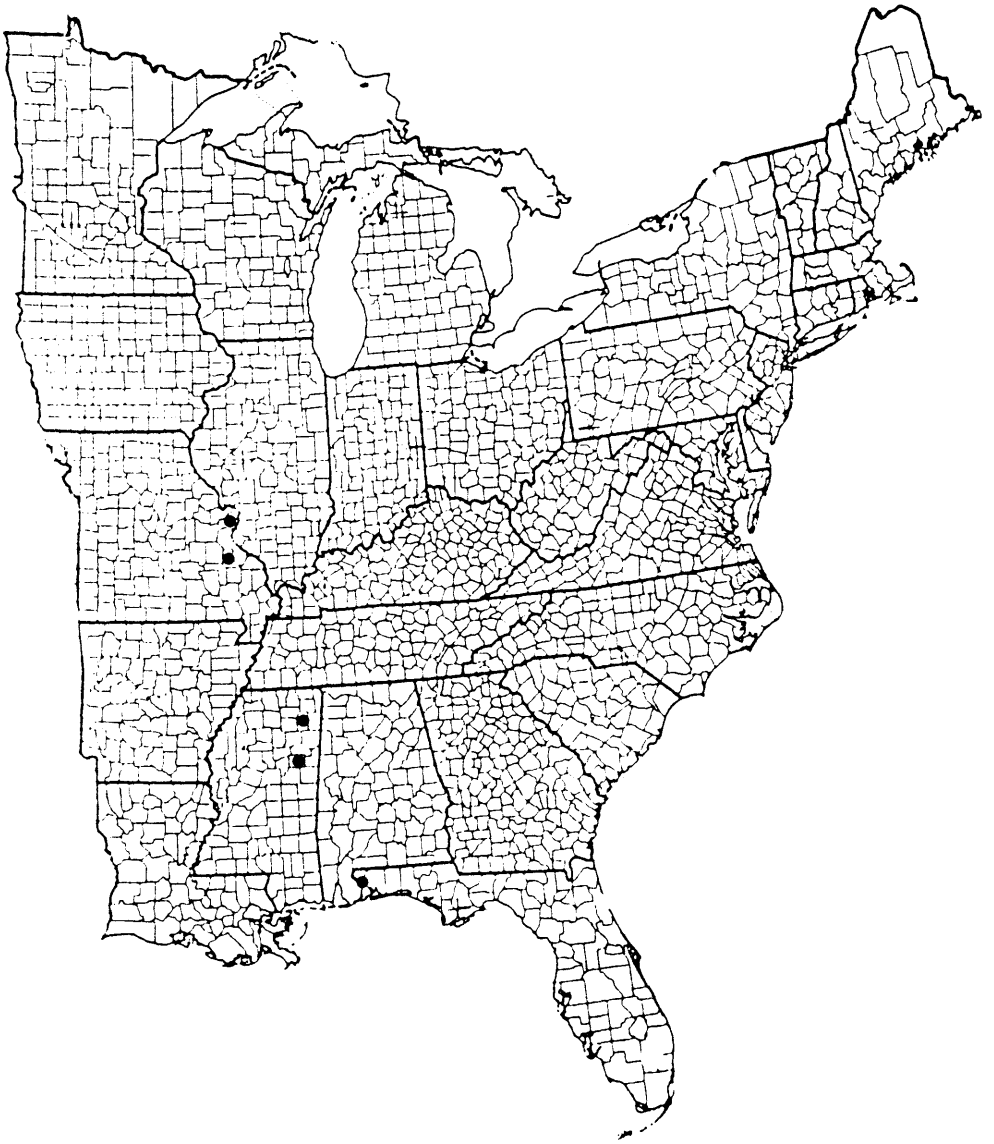
7871. *Deidamia inscripta* (Harr.)



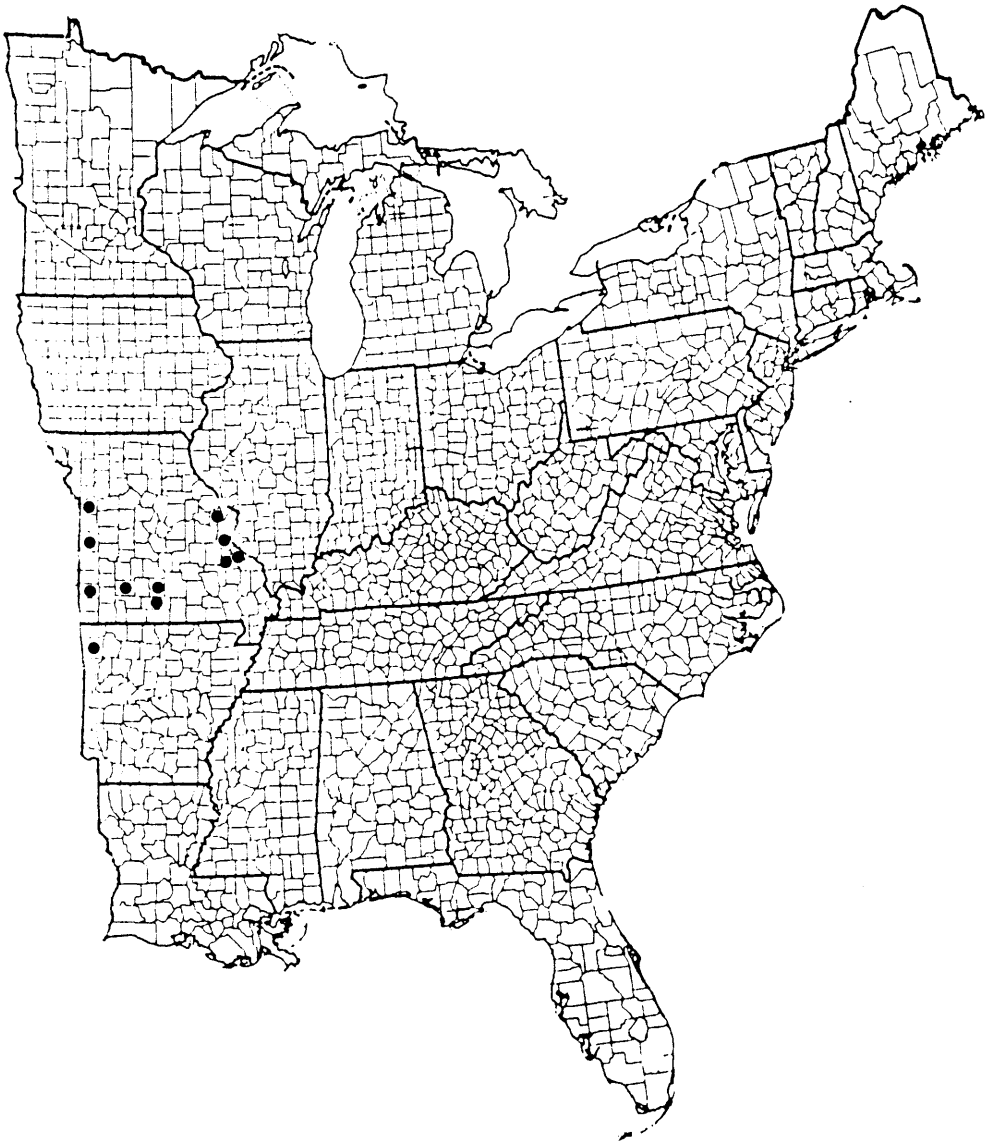
7873. *Amphion floridensis* B.P. Clark



7874. *Proserpinus gaurae* (J.E. Smith)

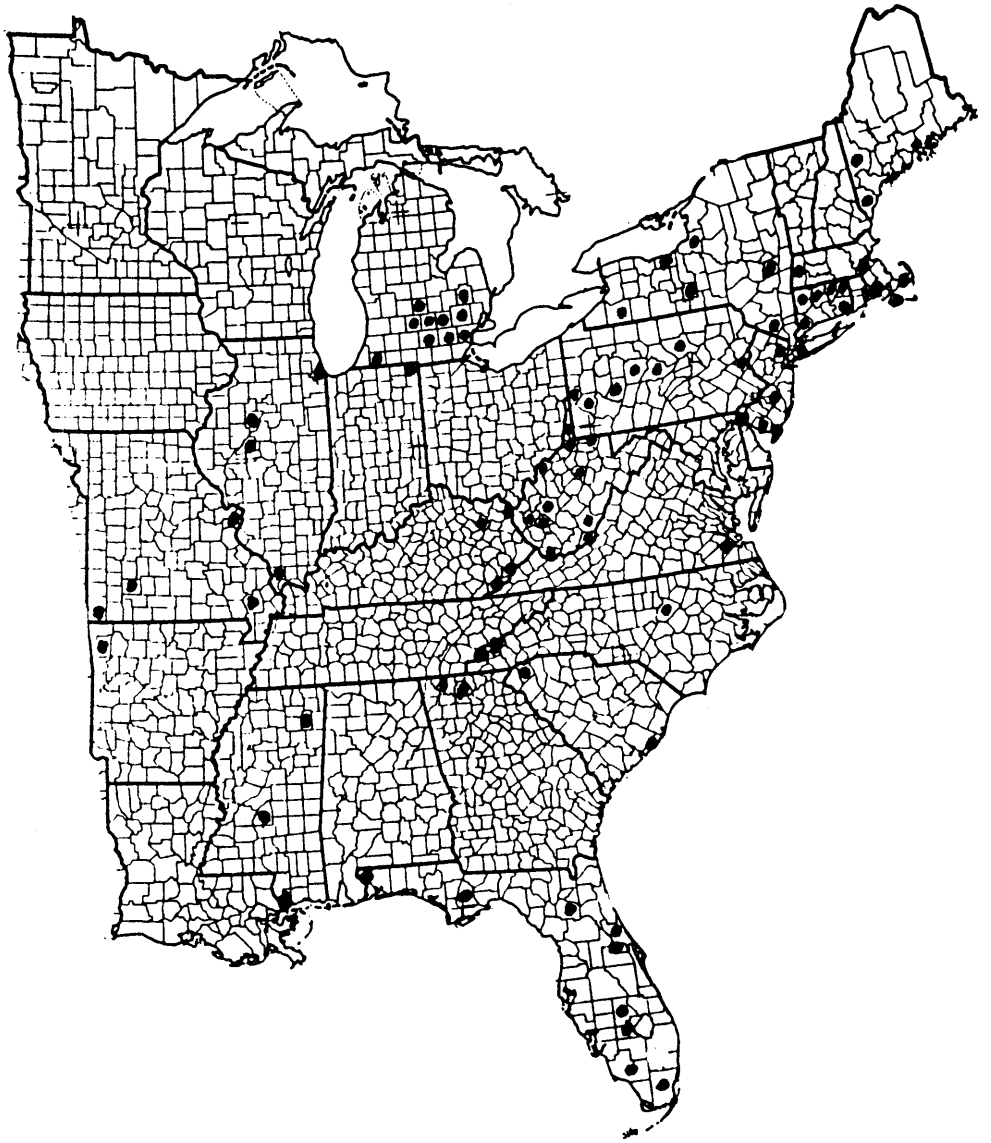


7875. *Proserpinus juanita* (Stkr.)

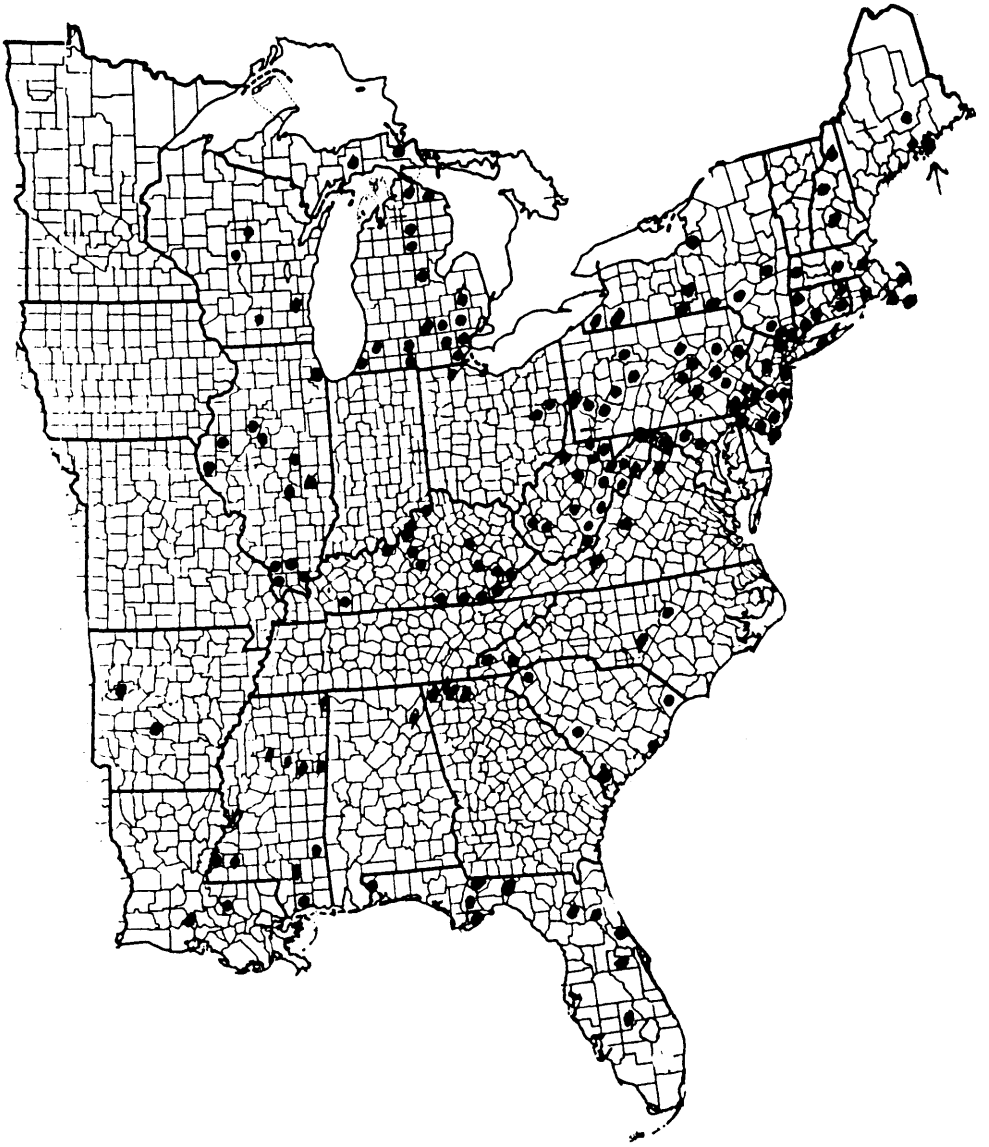


7877. *Proserpinus flavofasciata* (Wlk.)

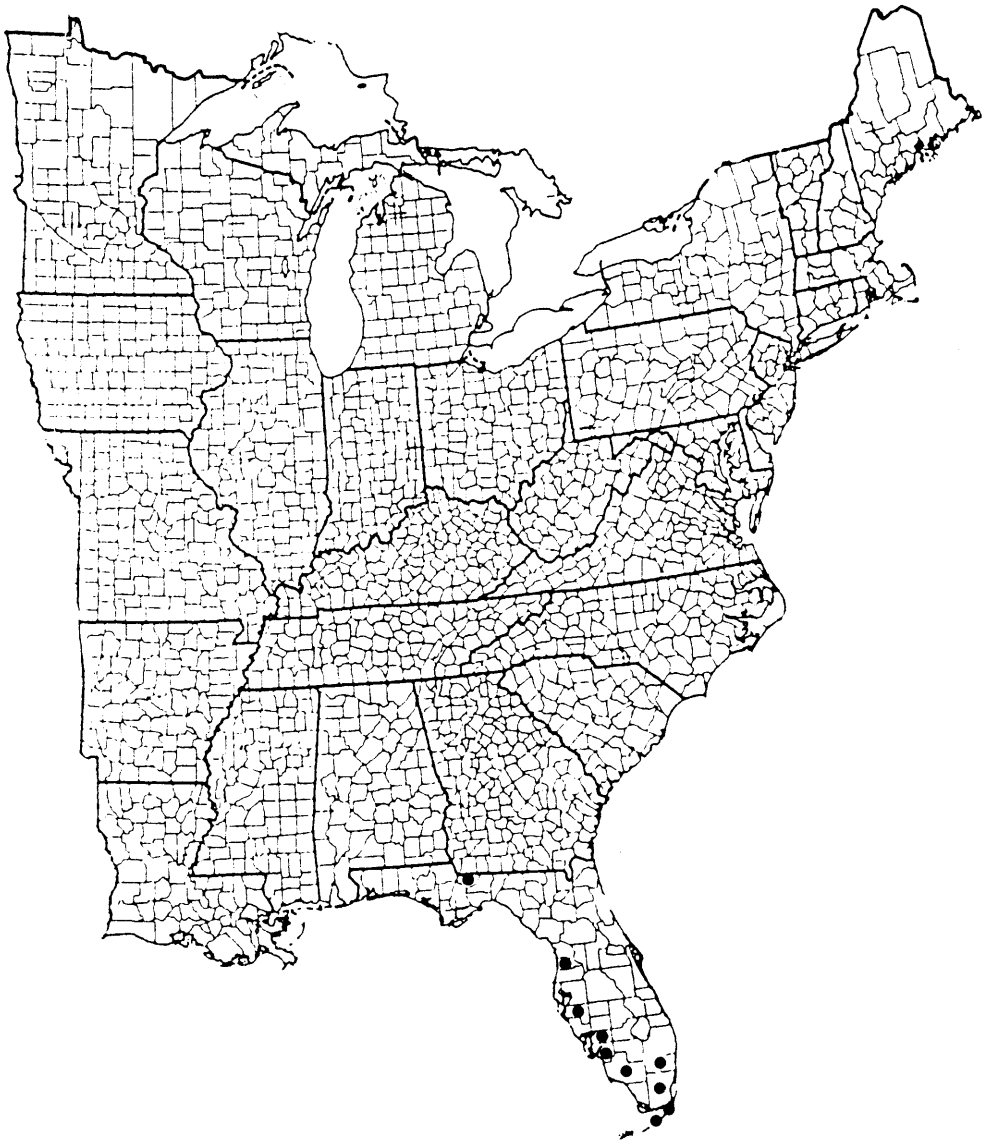
7884. *Darapsa versicolor* (Harr.)



7886. *Darapsa pholus* (Cram.)

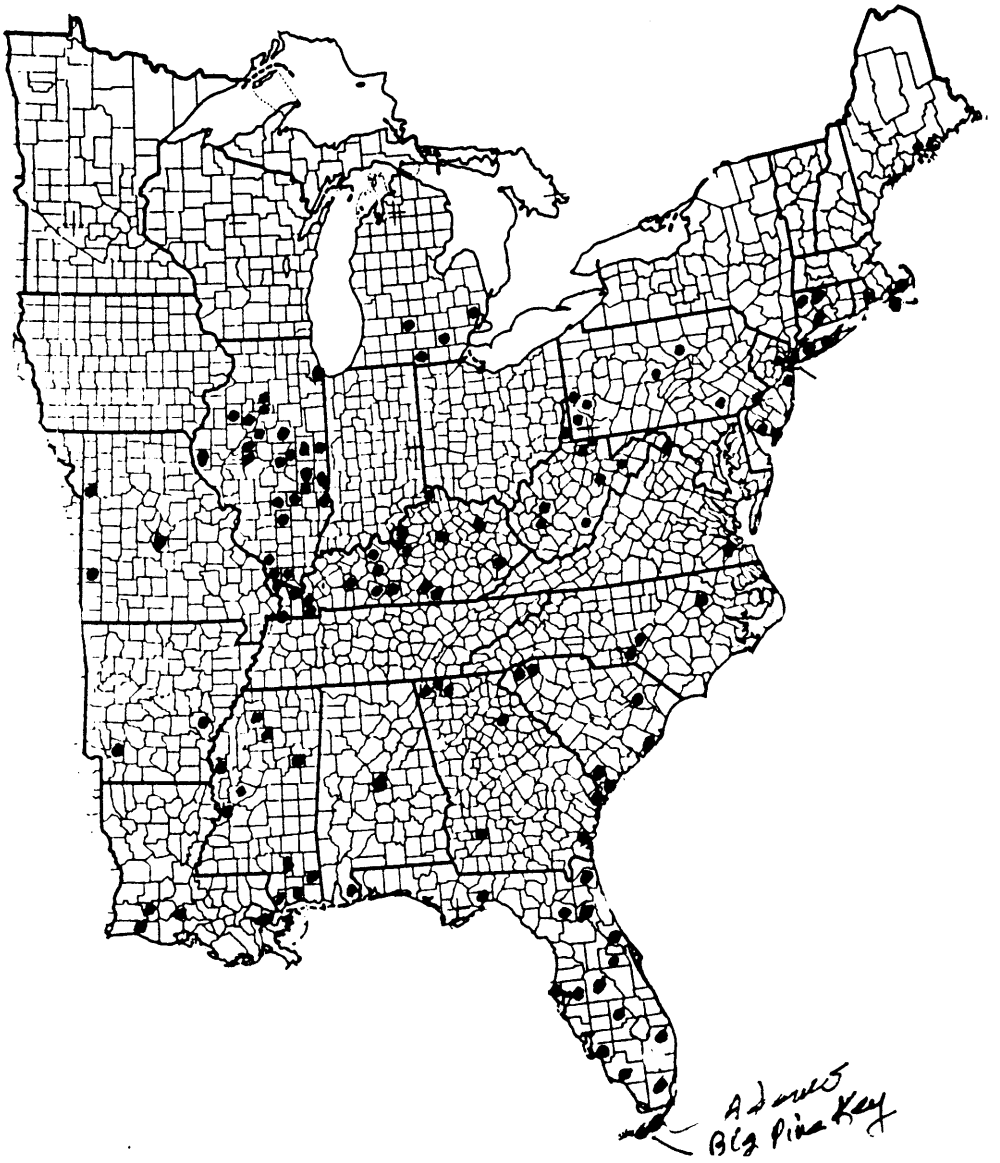


7887. *Xylophanes pluto* (F.)

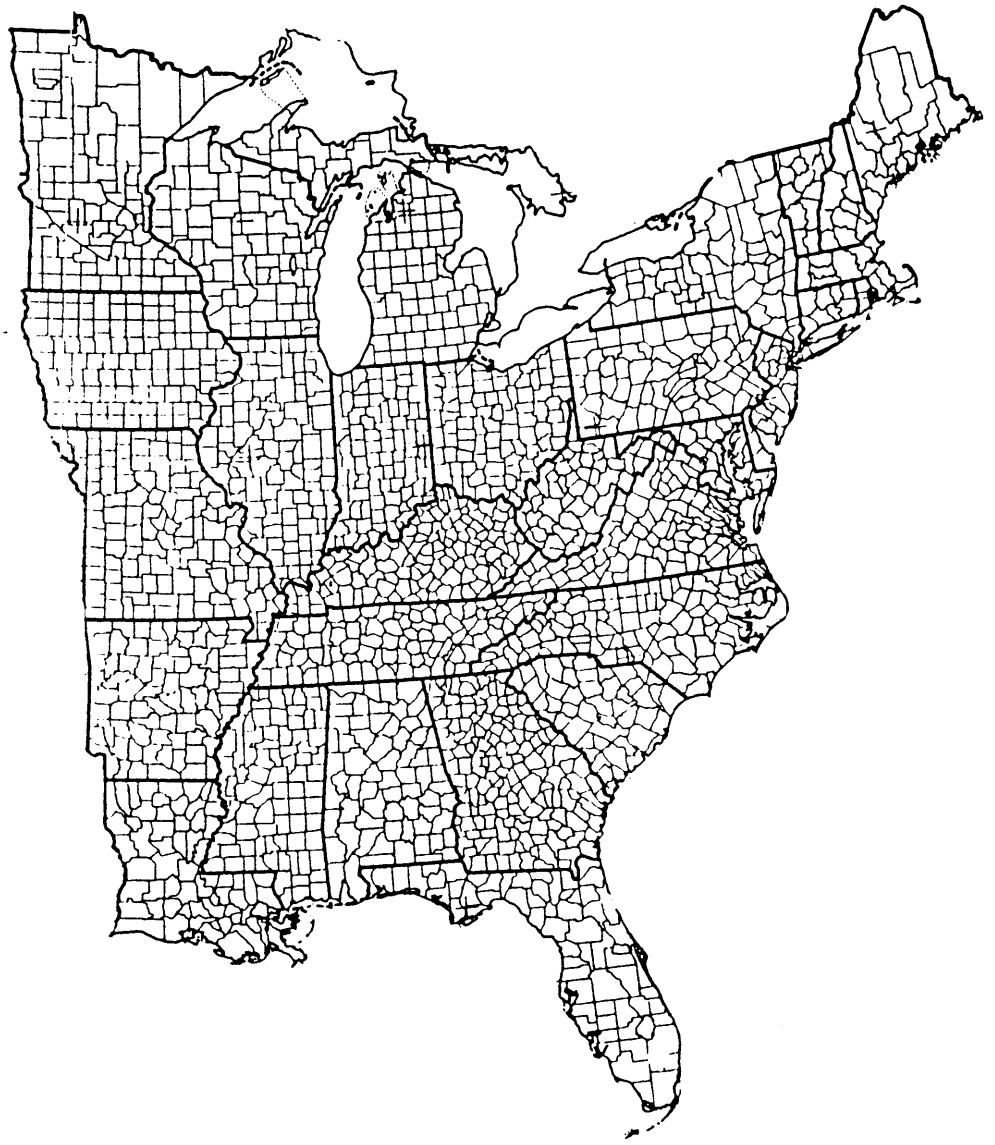


7888. *Xylophanes porcus* (Hbn.)

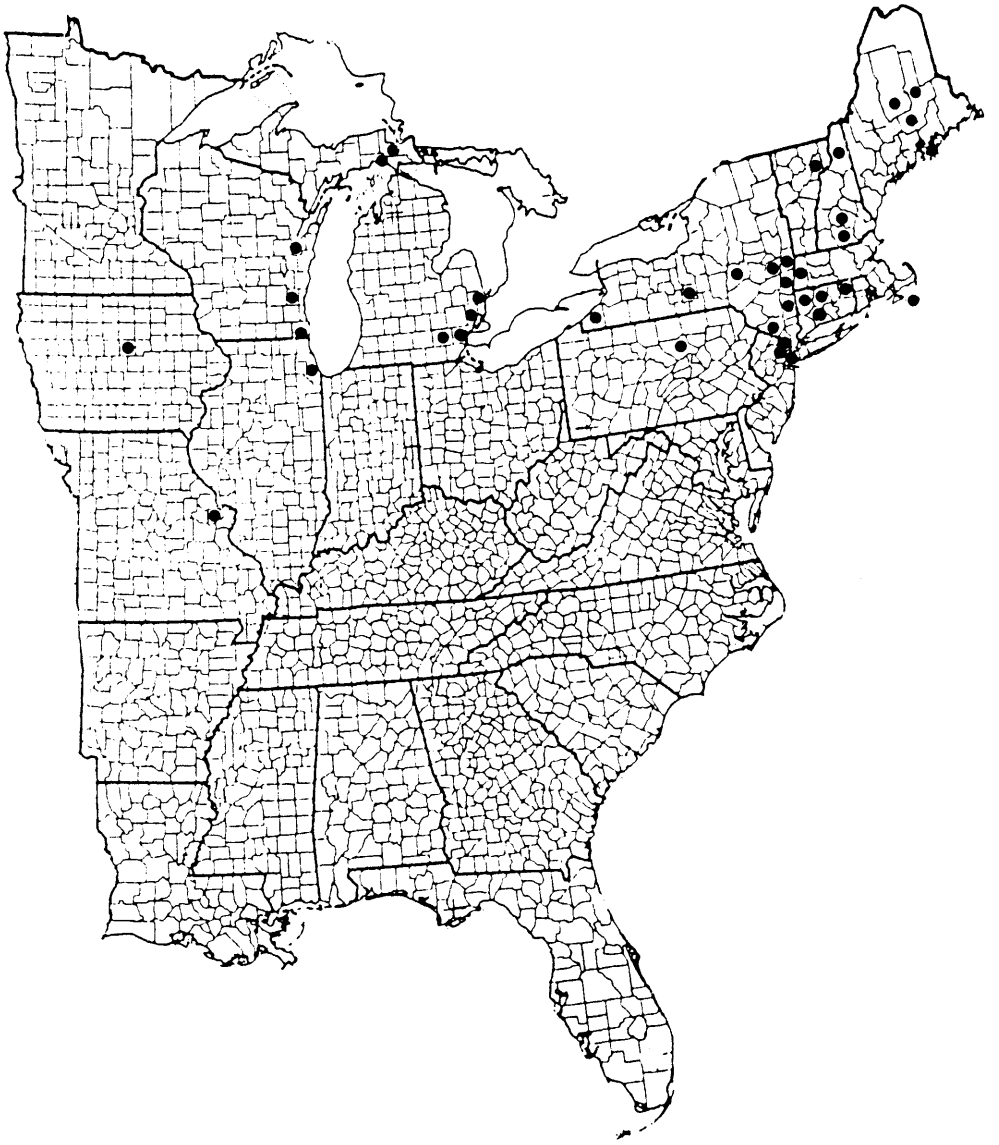
7890. *Xylophanes tersa* (L.)



7891. *Xylophanes libya* (Druce)



7893. *Hyles gallii* (Rottemburg)



7894. *Hyles lineata* (F.)