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Systematics and distributions of the genera *Cyrtusa* Erichson, *Ecarinosphaerula* Hatch, *Isoplastus* Horn, *Liocyrtusa* Daffner, *Lionothus* Brown, and *Zeadolopus* Broun of the United States and Canada (Coleoptera: Leiodidae: Leiodinae: Leiodini)

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Systematics and distributions of the genera *Cyrtusa* Erichson, *Ecarinosphaerula* Hatch, *Isoplastus* Horn, *Liocyrtusa* Daffner, *Lionothus* Brown, and *Zeadolopus* Broun of the United States and Canada (Coleoptera: Leiodidae: Leiodinae: Leiodini)

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Abstract. The following genera of Leiodini (Coleoptera: Leiodidae: Leiodinae) of the continental United States and Canada are reviewed: *Cyrtusa* Erichson, with two species; *Isoplastus* Horn, with two species (one new); *Liocyrtusa* Daffner, with three species; *Lionothus* Brown, with five species (three new), and *Zeadolopus* Broun, with four species (all genera are in the “*Cyrtusa* genus group”) and *Ecarinosphaerula* Hatch, with one named species (in the “*Leiodes* genus group”). The **new species** are *Isoplastus floridanus* Peck and Cook of Florida; *Lionothus bidentatus* Peck and Cook of Texas and Oklahoma, *Lionothus exiguus* Peck and Cook of Florida and Texas, and *Lionothus parvovulus* Peck and Cook of Arizona and New Mexico. Bionomic data on the species are given, and complete known distributions are mapped.

Introduction

Most of the genera and species in the beetle family Leiodidae in the continental United States and Canada have been reviewed and revised (see Peck 2001). Genera treated since 2001 are Catopocerinae: *Pinodytes* Horn (Peck and Cook 2011); Cholevinae: Anemadini: *Neoeocatops* Peck and Cook and *Nemadus* Thomson (Peck and Cook 2007); Cholevini: *Catops* Paykull, *Catopotrachus* Murray, *Sciodrepoides* Hatch, *Prionochaeta* Horn (Peck and Cook 2002); Leiodinae: Agathidiini: *Agathidium* Panzer, *Anisotoma* Panzer, *Gelae* Miller and Wheeler, and *Stetholeiodes* Fall (Miller and Wheeler 2004, 2005; Wheeler and Miller 2005); Leiodini: *Anogdus* LeConte (Peck and Cook 2013); Scotocryptini: *Aglyptinus* Cockerell (Peck 2004); Sogdini: *Hydnobius* Schmidt, *Kalohydnobius* Peck and Cook, *Macrohydnobius* Peck and Cook, *Platyhydnobius* Peck and Cook, *Stereus* Wollaston, *Sogda* Lopatin and *Triarthron* Märkel (Peck and Cook 2009); Platypsyllinae: *Leptinillus* Horn (Peck 2007) and *Platypsyllus* Ritsema (Peck 2006).

However, a few remaining genera in the Leiodinae have not received a recent review or revision. These are in the tribe Leiodini and most are in the “*Cyrtusa* genus group,” which was last studied by Daffner (1988). Only a very limited amount of material was available for that study. This paper completes the long-term revision of the leiodid genera of the continental United States and Canada, with a review of the remaining genera in the “*Cyrtusa* genus group” (*Cyrtusa* Erichson, *Isoplastus* Horn, *Liocyrtusa* Daffner, *Lionothus* Brown and *Zeadolopus* Broun) and the “*Leiodes* genus group” (*Ecarinosphaerula* Hatch).

Identification of the genera of Leiodini of North America north of Mexico is challenging because of the small body size of the adults, and the difficulty of observing the defining generic characters. Both of these are reasons that explain the past instability of generic concepts of these beetles.

Representatives of these genera are comparatively rare in collections. Most were previously collected by sweeping herbaceous understory vegetation at dusk, and this was a favored collecting technique for obtaining the material studied by Brown (1932, 1937a, 1937b) and that collected by Baranowski (1993: 11) in his study of North American *Leiodes* Latreille and his specimens reported upon by Daffner (1988). The relatively recent use of flight intercept traps (Peck and Davies 1980) and evening car netting (Peck and Cook 1992) has greatly expanded the number of specimens now available for study. All the adult beetles reported here were taken in moist to semi-arid habitats where there was a mixture of woody and herbaceous or grassy understory vegetation, often on sandy soils. Among the genera reported

here there are no known larvae or direct associations of larvae or adults with likely food materials. It is assumed that adults and larvae feed on subterranean fungi, as do members of the genus *Anogdus* LeConte which is also in the *Cyrtusa* genus-group (Peck and Cook 2013).

Materials

This study is based on the examination of over 2723 specimens from the Nearctic Region, many of which were collected by the authors. Few other collections have many specimens of these genera. It is the intention of this study to examine specimens and collections not reported in the work of Daffner (1988) and earlier authors. Additional specimens were borrowed for study from the following collections and curators at the time. Most collection addresses are given in full in Arnett et al. (1997).

ABSC Archbold Biological Station, Lake Placid, Florida, U. S. A. (M. Deyrup)

EMEC Essig Museum of Entomology, University of California, Berkeley, California, U. S. A. (J. A. Chemsak)

CMNC Canadian Museum of Nature Collection, Aylmer, PQ, Canada (R. Anderson, F. Génier)

CNCI Canadian National Collection of Insects, Agriculture Canada, Ottawa, Ontario, Canada (A. Smetana, A. Davies)

CSCA California State Collection of Arthropods, California Department of Agriculture, Sacramento, California, U. S. A. (F. G. Andrews)

FMNH Field Museum of Natural History, Chicago, Illinois, U. S. A. (A. F. Newton)

FSCA Florida State Collection of Arthropods, Gainesville, Florida, U. S. A. (M. E. Thomas, P. Skelley, B. Beck)

JCIC Joyce Cook Insect Collection, North Augusta, Ontario, Canada

MCZC Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, U. S. A. (P. D. Perkins)

SBMN Santa Barbara Museum of Natural History, Santa Barbara, California, U. S. A. (M. Caterino)

SBPC Stewart B. Peck Collection, Ottawa, Ontario, Canada (to be later placed in CMNC)

TAMU Texas A & M University, College Station, Texas, U. S. A. (E. G. Riley)

UMSP University of Minnesota Insect Collection, St. Paul, Minnesota, U. S. A. (P. J. Clausen)

USNM United States National Museum of Natural History, Washington, District of Columbia, U. S. A. (D. Furth)

Methods

Most of the specimens examined during this study were taken either with the use of flight intercept traps (also known as FIT or large area window traps, Peck and Davies 1980) in various kinds of forests or with nets mounted on a vehicle (car nets) driven slowly along forest roads at dusk (Peck and Cook 1992). Sweeping of low forest understory vegetation at dusk was used most successfully by the late W. J. Brown of the CNCI, Ottawa, and by us with only modest success. A few specimens have been taken by other methods, and these are indicated in the bionomics section of individual species discussions.

For holotype, lectotype, or paratype specimens we report label data as they appear on the specimen labels. We have not edited or altered this data for uniformity, but have quoted it to aid in recognition of type specimens seen by us. For non-type specimens label data are summarized to obtain generalizations about distributions, field notes, habitats, and seasonality. Full label data (or abbreviated locality data for common species) for specimens not listed in Brown (1932) and Daffner (1988) are given in the section on "New material examined". Not all specimen labels contained full information on locality, date, or habitat. We have not converted miles into kilometers, so as to preserve the original data on labels.

To confirm identification to species it is necessary to examine the aedeagus of male specimens. Females are difficult to place to species, unless collected with associated males. Male specimens were dissected after being relaxed and removed from points or a card. Relaxing was accomplished by immersion for one day in a commercial household ammonia-based window cleaning solution. The specimen was then dissected in alcohol. The aedeagus was examined, dehydrated in alcohol, and placed in Euparal mounting medium on a small acetate-plastic micro slide. External characters were examined with a

stereomicroscope from 10X to 200X magnification. Structures for illustration were photographed with a digital camera mounted on a stereomicroscope. Details were observed with a compound microscope and then added to outline illustrations made from the digital photographs. Illustrations of the aedeagus include features of the armature of the internal sac.

We have used the criteria of priority and alphabetical order to arrange the taxa in this paper. It is not desirable at this time to attempt a phylogenetic understanding of the generic relationships for all the species in the genera considered here due to the lack of a comprehensive study of the genera and species from outside the region under study.

Systematics

Leiodini

Key to the North American “*Cyrtusa*” and “*Leiodes*” genus-groups and their genera in the continental United States and Canada

1. Mesosternum vertical between mesocoxae; the “*Cyrtusa* genus group” 2
– Mesosternum oblique between mesocoxae; the “*Leiodes* genus group” 7
- 2(1). Antenna with 11 antennomeres, with interrupted 5-antennomere club, antennomere 8 narrow and disk-shaped 3
– Antenna with 10 antennomeres, with compact 3- or 4-antennomere club 5
- 3(2). Mesosternum with a median carina; each mandible with a single median tooth *Anogdus* **LeConte**
– Mesosternum not carinate; left mandible may have a small tooth, right mandible edentate... 4
- 4(3). Underside of head without antennal grooves; anterior margin of clypeus straight or evenly curved; both mandibles lack prominent teeth; male mesotibia with process on inner apical margin *Liocyrtusa* **Daffner**
– Underside of head usually with antennal grooves; anterior margin of clypeus clearly sinuous; left mandible in anterior third usually with one or two small teeth; male mesotibia without process on inner apical margin *Lionothus* **Brown**
- 5(2). Tibiae narrow; metatibia with spines on ventral side but not on outer margin; right mandible in anterior third with blunt tooth, left mandible edentate *Cyrtusa* **Erichson**
– Tibiae widened, shovel-like; outer margin of metatibia strongly spined; left mandible with large tooth at basal third, right mandible edentate 6
- 6(5). Antennal club with 4 antennomeres *Zeadolopus* **Broun**
– Antennal club with 3 antennomeres *Isoplastus* **Horn**
- 7(1). Mesosternum with a median longitudinal carina *Leiodes* **Latreille**
– Mesosternum unmodified, not carinate *Ecarinosphaerula* **Hatch**

The *Cyrtusa* genus-group

The *Cyrtusa* genus group is defined as Leiodini having a mesosternum that rises vertically between the mesocoxae (Brown 1937a: 158; Newton 1998: 86; Peck 2001: 252). In the continental United States and Canada the “*Cyrtusa* genus group” is composed of the genera *Anogdus* LeConte, *Cyrtusa* Erichson, *Isoplastus* Horn, *Liocyrtusa* Daffner, *Lionothus* Brown, and *Zeadolopus* Broun. This is in contrast to members of the “*Leiodes* genus-group” that have the anterior margin of the mesosternum lying obliquely between the mesocoxae, and whose North American members are *Ecarinosphaerula* Hatch and *Leiodes* Latreille.

Cyrtusa Erichson

Cyrtusa Erichson, 1842: 221. Type species: *Anisotoma subtestacea* Gyllenhal, 1813: 707; by subsequent designation of Thomson 1859: 58. Daffner 1982: 209; 1983: 136; 1988: 292.

Caenocyrtus Brown, 1937b: 172. Type species: *Amphicyllis picipennis* LeConte, 1863, by original designation (= *Cyrtusa subtestacea* (Gyllenhal, 1813)). Synonymy by Daffner 1988: 292.

Diagnosis. Body strongly convex, oval in shape. Antenna with 10 antennomeres, with 4-antennomere club. Mandibles form semicircle when closed; right mandible with blunt tooth on anterior one-third. Ventral side of head with paired antennal grooves next to eyes. Mesosternum vertical between coxae, vertical surface not carinate. All tibiae slender; protibia with distinct tarsal groove, its outer margin strongly spinose; mesotibia slightly widened and its outer margin densely spinose; metatibia with few spines on ventral surface near outer margin. Tarsal formula 5–5–4 in both sexes. Males distinguished by expanded pro- and mesotarsi, curved mesotibiae bearing a process on the inner apical margin, and by a toothlike expansion of the lower margin of the metafemur.

Distribution. The distribution of the genus is Holarctic and it is also found in southern India; it is questionably Afrotropical and Neotropical (Newton 1998).

Key to species of male *Cyrtusa* of the continental United States and Canada

1. Aedeagus (Fig. 1) with median lobe broad; parameres short, with only membranous apices extending beyond median lobe. Widespread Holarctic species..... ***C. subtestacea* Gyllenhal**
- Aedeagus with median lobe slender; parameres large, elongate, with apices extending beyond median lobe. California and Oregon ***C. grossepunctata* Daffner**

***Cyrtusa subtestacea* (Gyllenhal), 1813**

(Fig. 1, 16)

Anisotoma subtestacea Gyllenhal, 1813: 707. Type locality: Gottland, Sweden.

Amphicyllis picipennis LeConte, 1863: 25. Synonymy in Daffner 1988: 294. Holotype in MCZC, type number 3192, seen. Type locality: “northern New York.”

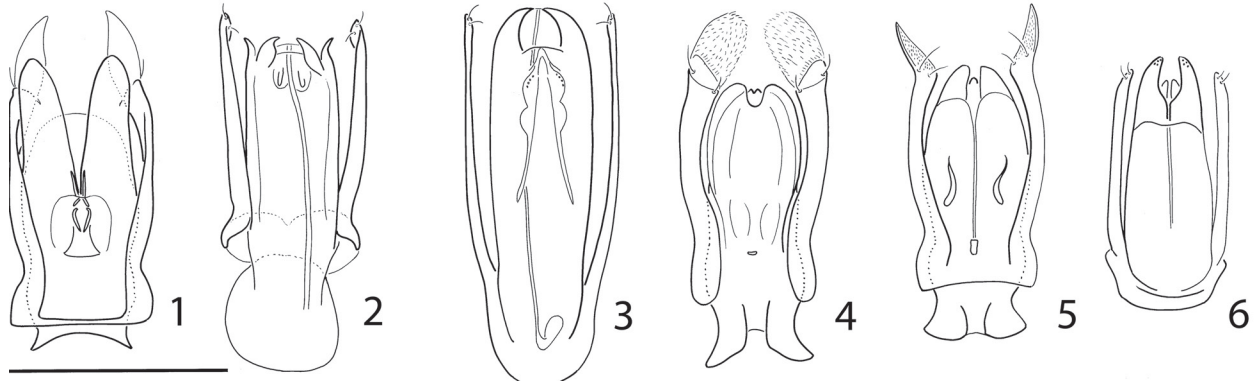
Cyrtusa picipennis (LeConte); Horn 1880: 294.

Caenocyrtus picipennis (LeConte); Brown 1937b: 172; Hatch 1957: 30.

Cyrtusa subtestacea (Gyllenhal); Daffner 1983: 138, 1988: 294.

Diagnosis. Length (pronotum + elytra) = 1.40–2.10 mm; greatest width = 1.00–1.50 mm. Reddish brown, shiny. Head with coarse, irregularly spaced punctures. Antennomere 2 longer and broader than 3; antennal club compact, antennomere 7 narrower than 8, apical antennomere slightly narrower than 9. Sides of pronotum rounded, posterior angles roundly obtuse. Pronotum coarsely, densely punctate laterally; punctation finer and more sparse medially. Elytral striae punctures coarse, finer anteriorly, separated by one diameter or more; interstriae punctures smaller, more widely spaced; anteriorly, striae punctures are not clearly distinguished from interstriae punctures. Metasternum strongly, densely punctate; medially, punctures finer and more sparse. Legs as in generic diagnosis. Abdominal sternites with dense microsculpture; sternites III–VII each with transverse row of small punctures in apical half. Median lobe of aedeagus (Fig. 1) broad, flat apically, weakly curved dorsoventrally; paired apices variable in length. Parameres broad, flat, each bearing two spines before thin, membranous apex that extends beyond apices of median lobe. Internal sac as in Fig. 1.

Remarks. We have found the structure of the internal sac (Fig. 1) to be consistent throughout North America. However, it appears to differ somewhat from the internal sac of *C. subtestacea* as illustrated by Daffner (1983: 137, fig. 500; 1988: 293, fig. 77). We have seen no European specimens of *C. subtestacea* for comparison, and think that the placing *C. picipennis* (LeConte) into synonymy under *C. subtestacea* (Gyllenhal) should be reexamined.



Figures 1–6. Aedeagi, dorsal, of *Cyrtusa* and *Isoplastus* species. **1)** *Cyrtusa subtestacea*. **2)** *Isoplastus fossor*. **3)** *I. floridanus*. **4)** *L. luggeri*. **5)** *L. nigriclavis*. **6)** *L. stephani*. Scale line = 0.3 mm.

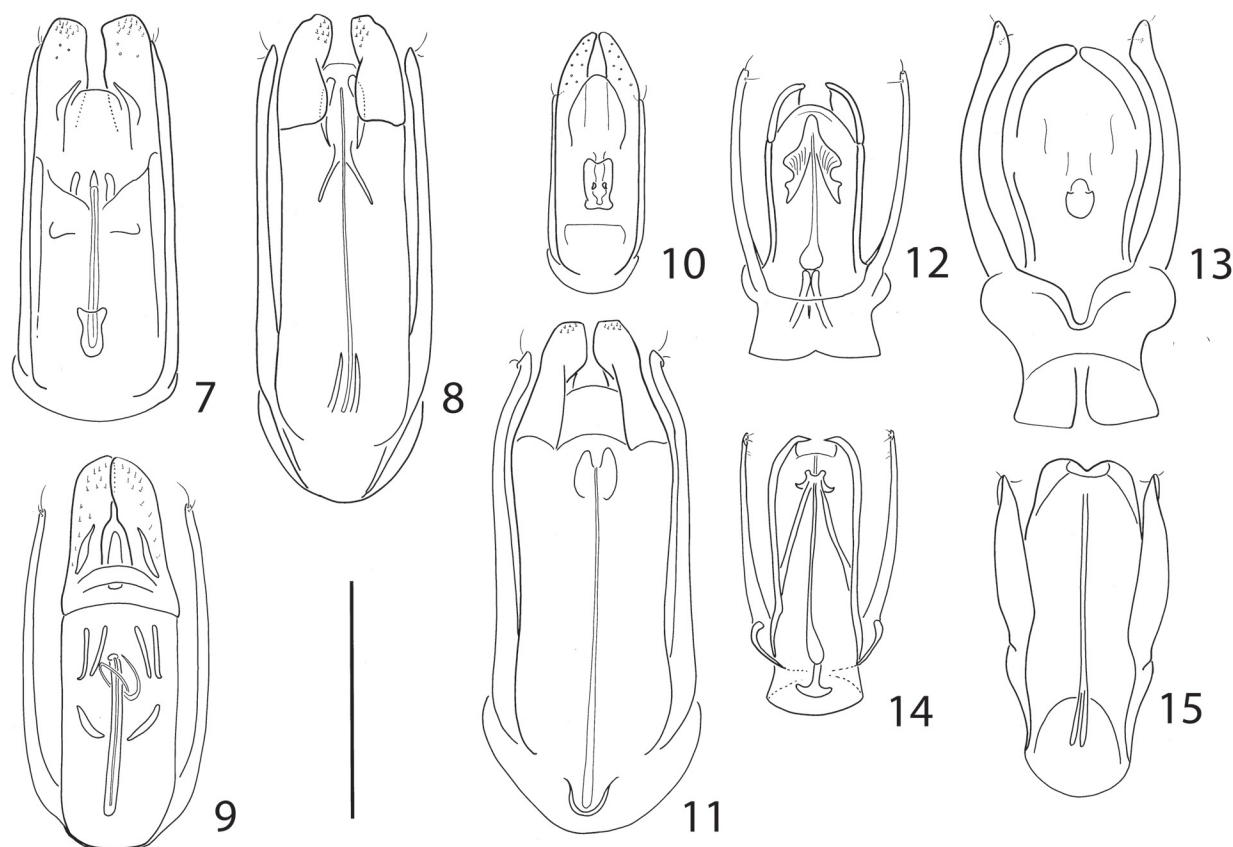
Distribution. North American distribution (Fig. 16): **CANADA.** BRITISH COLUMBIA, MANITOBA, NEW BRUNSWICK, NOVA SCOTIA, ONTARIO, QUEBEC. **UNITED STATES.** CALIFORNIA, COLORADO, DISTRICT OF COLUMBIA, IDAHO, IOWA, ILLINOIS, MASSACHUSETTS, MAINE, MICHIGAN, MINNESOTA, MONTANA, NEVADA, NEW MEXICO, NEW YORK, OREGON, UTAH, VERMONT, VIRGINIA, WASHINGTON. Extra-limital distribution: Europe; Siberia. The species is Holarctic.

Previously recorded in North America (LeConte 1863, Horn 1880, Brown 1937b, Hatch 1957, Daffner 1988) from: **CANADA.** BRITISH COLUMBIA. Creston (and 20 km NE). Kamloops (Lac du Bois). Oliver. Royal Oak. Summerland. Vancouver. **ONTARIO.** Brent (near Algonquin Park). Mer Bleue (near Ottawa). Hawthorne. Gogama (40 km NE, Mattagami River). Pelee Island. Simcoe. Arnprior. **QUEBEC.** Aylmer. Duparquet. Brome. **UNITED STATES.** DISTRICT OF COLUMBIA. IDAHO (northern). MAINE. Paris. MASSACHUSETTS. Elizabeth Island. Fall River. Framingham. Nashawena Island. Lincoln. Sherborn. MICHIGAN. Detroit. NEW MEXICO. Catron Co., 5 mi w Luna. Chavez Co., Bitter Lakes. WASHINGTON (southwestern).

Seasonality. Adults have been collected in the months from May to November, and mostly from June to August.

Bionomics. Adults have been collected mostly in forested habitats. They have been taken by flight intercept traps and evening car netting, but also in litter and blacklight traps. The species is seemingly absent from mid-continental grassland habitats.

New material examined. We have seen 182 specimens, from the following localities. **CANADA.** MANITOBA. Ste. Rita, Agassiz Provincial Forest. Volstoi-Vita, Rt. 209. **NEW BRUNSWICK.** Hwy. 112, 26 km W Canaan Forks. 60 km NW Moncton, rt. 116. **NOVA SCOTIA.** 40 km SE Truro, Trafalgar, Liscomb Provincial Sanctuary. Westchester to Londonderry. N of upper Tantalou, Indian Lake road. Clyde River road. **ONTARIO.** 20 km SE Almonte, Middleville to White Lake. 2 km N Cloyne, Stoll Lake road. Alfred, Alfred Bog. Almonte. Gloucester. Iroquois Falls, nw Industrial Road. Kemptville Forest. Limoges, Larose Provincial Forest. Manitoulin Island, 2 mi S Maple Point. N Lake Abitibi, 80 km E Cochrane. Marlborough Provincial Forest, 15 km W North Gower. Stittsville. Rondeau Provincial Park. Shirleys Bay, 15 km W Ottawa. Constance Bay. Wheatley. L3C6 Wolford Township 44° 52'03"N, 75°43'50"W. 7 km se Westport. **UNITED STATES.** CALIFORNIA. Fresno Co., Fresno. Del Norte Co., Gasquet. Siskiyou Co., Etna. COLORADO. Huerfano Co., La Veta Pass. DISTRICT OF COLUMBIA. IOWA. Webster Co., DeKalb Research Farm, 3 mi W Dayton. ILLINOIS. Champaign Co., Mahomet, Nettie Hart Memorial Woods. 3 mi NW Homer. MASSACHUSETTS. Lincoln. MINNESOTA. Roseau Co., Roseau. Frontenac. MONTANA. Toston. NEW MEXICO. Las Vegas. Roswell. Catron Co., 5 mi W Luna. 8 mi SE Luna. Chaves Co., Bitter Lakes N.W.R. NEVADA. Esmeralda Co., Fish Lake Valley dunes.



Figures 7–15. Aedeagi, dorsal, of *Lionothus* species. **7)** *L. ulkei*. **8)** *L. forticornis*. **9)** *L. bidentatus*. **10)** *L. exiguus*. **11)** *L. parvoculus*. Scale line = 0.3 mm for *L. ulkei*, *L. exiguus*; 0.4 mm for *L. forticornis*, *L. bidentatus*, *L. parvoculus*. Aedeagi, dorsal, of *Zeadolopus* species. **12)** *Z. egenus*. **13)** *Z. bifoveolatus*. **14)** *Z. oklahomensis*. **15)** *Z. rubricornis*. Scale line = 0.3 mm.

NEW YORK. Willard. OREGON. Harney Co., 17 mi E Frenchglen, Steens Mt. road. 3 mi E Frenchglen, Page Spring Camp. 62 mi SE Burns, Page Spring. UTAH. Benjamin. Callao. Provo. Richfield. Salt Lake, Salt Lake Airport. VERMONT. Franklin Co., Bakersfield. VIRGINIA. Fredericksburg. Bath Co., 9.6 km N Clifton Forge. Montgomery Co., Jefferson National Forest, Pandapas Pond. WASHINGTON. Benton Co., Hanford Site, West Lake.

***Cyrtusa grossepunctata* Daffner, 1988**

(Fig. 16)

Cyrtusa grossepunctata Daffner, 1988: 295. Holotype male in Daffner collection, not seen. Type locality: Sagehen Creek, Nevada County, CA.

Diagnosis (adapted from Daffner 1988). Length 1.6–2 mm. Body oval, strongly convex, reddish brown, head and antennal club slightly darker. Antenna elongate with strong club. Head finely and densely punctate. Pronotum twice as wide as long, base at obtuse hind angles slightly sinuate, punctation fine and sparse. Elytra oval, acuminate posteriorly, very strongly and densely punctate, punctures separated by one diameter, striae punctures clearly distinct only in the posterior half, basally interstriae punctures as strong as striae punctures. Metasternum strongly and sparsely punctate throughout. All sternites with series of fine punctures on lower margin, first sternite finely, densely and rugosely punctate. Aedeagus with median lobe slender; parameres large, elongate, with apices extending beyond median lobe. For illustration of aedeagus see Daffner (1988: 293, Fig. 79-80).

Distribution. North American distribution (Fig. 16). **UNITED STATES.** CALIFORNIA, OREGON.

Previously recorded (Daffner 1988) from: CALIFORNIA. Nevada Co., Sagehen Creek. Sacramento Co., Sacramento. Mendocino Co., Fort Bragg. OREGON. Umatilla Co., 16 mi E Ukiah, Frazier Camp.

Seasonality. Adults are known only from the months of May to August.

Bionomics. We assume that the species occurs in forested or wooded habitats.

New material examined. We have seen no new specimens of this species.

***Isoplastus* Horn**

Isoplastus Horn, 1880: 295; Brown 1937b: 173; Daffner 1988: 301. Type species: *Isoplastus fossor* Horn, 1880, by monotypy.

Diagnosis. Body strongly convex. Antenna with 10 antennomeres, with strong 3-antennomere club. Mandibles forming semicircle when closed together; left mandible with large tooth in basal one-third. Ventral side of head with distinct antennal grooves below eyes. Mesosternum vertical between the mesocoxae, without median carina. Tibiae strong, widened and shovel-like; protibiae with distinct tarsal grooves, their outer margins with strong spines; outer margins of meso- and metatibiae strongly spinose. Tarsal formula 5-5-4 in both sexes. Males are distinguished by large tooth-like expansion of lower margin of metafemur.

Distribution. The distribution of the genus is eastern Holarctic; it also occurs in Mexico, with undescribed species in the northern Neotropics (Newton 1998).

Key to species of male *Isoplastus* of the continental United States and Canada

1. Paired apices of median lobe of aedeagus each divided at tip (Fig. 2); parameres extending beyond apex of median lobe (Fig. 2); widely distributed, including Florida.....***I. fossor* Horn**
- Paired apices of median lobe inwardly curved, not divided at tips (Fig. 3); parameres reach apex of median lobe (Fig. 3); Florida ***I. floridanus* Peck and Cook, n. sp.**

***Isoplastus fossor* Horn, 1880**

(Fig. 2, 17)

Isoplastus fossor Horn, 1880: 295; Brown 1937b: 174; Daffner 1988: 302. Lectotype male in MCZC, type number 3191, seen; designated by Daffner 1988: 302. Type locality: District of Columbia.

Isoplastus uncus Wheeler, 1977: 77; Daffner 1988: 302, synonymy. Type male in MCZC, type number 32322, seen. Type locality: Fortin de las Flores, Veracruz, Mexico.

Diagnosis. Length (pronotum + elytra) = 1.18–2.00 mm; greatest width = 0.78–1.39 mm. Reddish brown, shiny. Head finely, sparsely punctate. Antennomere 2 clearly longer and broader than 3; antennomere 7 thin, about half width of 8; apical antennomere distinctly narrower than 9. Sides of pronotum rounded, posterior angles obtuse. Pronotum finely, sparsely punctate. Elytral striae punctures coarse, finer anteriorly, separated by one diameter or less, except anteriorly; interstriae punctures minute, sparse. Metasternum strongly, densely punctate. Legs as in generic diagnosis. Abdominal sternites III–VIII each with transverse row of small punctures on apical half; sternite III rugose. Median lobe of aedeagus (Fig. 2) broad, angled about 90 degrees in lateral view; paired apices each divided at tip. Parameres (Fig. 2) extend beyond apex of median lobe. Armature of inverted internal sac as in Fig. 2.

Distribution. North American distribution (Fig. 17): **CANADA.** ONTARIO, QUEBEC. **UNITED STATES.** ALABAMA, ARKANSAS, ARIZONA, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA,

INDIANA, KENTUCKY, LOUISIANA, MICHIGAN, MISSISSIPPI, NORTH CAROLINA, OKLAHOMA, SOUTH CAROLINA, TEXAS, VIRGINIA. Extra-limital distribution: Mexico (doubtful, see Remarks).

Previously recorded in North America (Horn 1880, Brown 1937b, Daffner 1988) from: CANADA. ONTARIO. Arnprior. QUEBEC. Aylmer. UNITED STATES. MICHIGAN. Detroit. DISTRICT OF COLUMBIA.

Seasonality. Adults have been collected from February to November, and mostly in June to August, with the early and late season records from southerly locations in Florida and Texas.

Bionomics. Adults have been collected in habitats ranging from open pine forest and juniper thicket to mature mixed and bottomland beech-magnolia forest. Taken mostly by flight intercept traps but also by sweeping and ultraviolet light traps.

Remarks. We question the above synonymy and think it needs re-examination. We suspect that *I. unicus* is actually a valid species, and we have seen several undescribed species of *Isoplastus* from Mexico and southward.

New material examined. We have seen 434 specimens from the following localities. CANADA. ONTARIO. L3C6 Wolford Township, 44° 52'03"N, 75°43'50"W. Tilbury. UNITED STATES. ALABAMA. Dale Co. Ft. Rucker Military Reservation. Jefferson Co., Hoover. ARKANSAS. Little Rock Co., Little Rock. Logan Co., Magazine Mountain. ARIZONA. Cochise Co., Chiricahua Mts., Turkey Creek. FLORIDA. Alachua Co., Gainesville. 10 km SW Gainesville. Jackson Co., Marianna, Florida Caverns State Park. Sneads, Three Rivers State Park. Leon Co., 20 mi N Tallahassee, Tall Timbers Station. Liberty Co. 14 km N Bristol, Appalachian Bluffs and Ravines Preserve. Suwanee Co., Suwanee River State Park. GEORGIA. Greene Co., Oconee National Forest. INDIANA. Tippecanoe Co. KENTUCKY. Edmonson Co., Mammoth Cave National Park. Metcalfe Co., 0.5 mi NE East Fork. LOUISIANA. Catahoula Parish, Walters, Catahoula National Wildlife Refuge. Grant Parish, 18 km N Alexandria, Stuart Lake Camp. Natchitoches Parish, Kisahatchie Bayou. West Feliciana Parish, Feliciana Preserve. MISSISSIPPI. Pontotoc Co., 32 km SW Tupelo, Tockshish. NORTH CAROLINA. Northampton Co., 7 km S Jackson. OKLAHOMA. Latimer Co., Red Oak. Wagoner Co., 3 mi W Wagoner. SOUTH CAROLINA Anderson Co., Pendleton. Oconee Co., 12 mi NE Walhalla. Pickens Co., Calhoun. TEXAS. Bell Co., 1 km W Youngsfort. Brazos Co., Lick Creek Park, College Station. Ellis Co., 3.6 mi NW Italy. Hays Co., 6 mi NW Dripping Springs. 6.5 mi SW Hunt. Kerr Co., Kerrville. Montgomery Co., 4.5 mi N Montgomery. Polk Co., 20 km S Coldspring. Sabine Co., 9 mi E Hemphill, Beech Bottom. San Augustine Co., Piney Woods Conservation Center. San Jacinto Co., 5 km S Coldspring. Shelby Co., 20 km SE Shelby. Tyler Co., 5 mi E Spurger. Wood. Co., Godwin Woods, 3.5 mi SW Hainesville. VIRGINIA. Fredericksburg. Warren Co., 4 km NNW Linden.

Isoplastus floridanus Peck and Cook, new species

(Fig. 3, 17)

Description. Length (pronotum + elytra) = 1.36–1.80 mm; greatest width = 0.96–1.36 mm. Yellowish to reddish brown, shiny. Head moderately coarsely, irregularly punctate. Antennomere 2 clearly longer and broader than 3; antennomere 7 thin, less than half as wide as 8; apical antennomere distinctly narrower than 9. Sides of pronotum rounded, posterior angles obtuse. Pronotum finely, moderately sparsely punctate. Elytral striae punctures coarse, closely spaced; striae rows reach base on inner half of elytra. Interstriae punctures fine, moderately sparse. Metasternum moderately coarsely, irregularly punctate. Legs as in generic diagnosis. Abdominal sternites III–VIII weakly rugose, each with transverse row of small punctures on apical half. Median lobe of aedeagus (Fig. 3) evenly curved in lateral view; acute tips of paired apices inwardly curved. Parameres not extending beyond apex of median lobe. Armature of inverted internal sac as in Fig. 3.

Type material. Holotype, male, in SBPC, with label data: "Archbold Biol. Sta./ Lk. Placid/ Highlands Co. FLA./ 2 July 1986/ M. Deyrup// Malaise Trap/ Trail 1 SSo".

Paratypes, 41, as follows: "FLORIDA: Collier Co./ Naples/ V-16 1984/ R.A. Belmont, colr./ u.v. black-light trap" (1, FSCA); same data except "VII-16 1984" (2, FSCA); "FLORIDA: Gilchrist Co./ W. High Springs, nr Poe/ Springs; 14-VI-1994/ C. Hernandez, pitfall" (2, FSCA); same data as holotype except "3 Sept. 1986// Trail 2 SSo" (1, ABSC); same data except "30 Aug. 1983" (1, ABSC); same data except "8 Aug 1987// SSo" (1, ABSC); same data except: "5 May 1985// Trail 2 SSo" (1, ABSC); same data except "29 Aug 1987// SSo" (2, ABSC); "Archbold Biol. Sta./ Lk. Placid/ Highlands Co. FLA/ 19 Aug 1993/ M. Deyrup" (1, ABSC); FL: Highlands Co./ Archbold Biol. Sta./ 18 June 1998; Mark Deyrup// in malaise trap in/ scrubby flatwoods/ near weather/ station" (1, ABSC); FL: Highlands Co./ Archbold Biol. Sta./ 28 August 2009/ M. Deyrup, H. Otte// flight trap w. pan/ Ceratiola habitat/ Site 2. N27.14512/ W081.35766" (1, ABSC); "FL: Highlands Co./ Carter Ck. North/ 13 April 2009/ M. Deyrup, A. May, H. Otte// Yellow sand scrub/ N27.533, W081.412/ bowl traps/ fringe tree area" (2, SBPC); same data except: "14 April 2009// Townes trap/ N27.53362/ W081.40720" (4, SBPC); "FL: Highlands Co./ Flamingo Villas/ 22 May 2009/ M. Deyrup, A. May, H. Otte// scrub habitat/ Townes trap/ N27.44228/ W081.38276" (1, ABSC); "FL: Highlands Co./ Flamingo Villas Pres/ 28 May 2009. H. Otte/ A. May, M. Deyrup// flight trap w. pan/ scrub habitat/ Site 4. N27.44231/ W081.37822" (1, SBPC); same data except: "26 May 2009// Malaise trap/ scrub habitat" (1, SBPC); "FL: Highlands Co./ Highlands Hammock/ State Park/ 26 May 2009. H. Otte/ A. May, M. Deyrup// flight trap w. pan/ scrub habitat/ Site 4. N27.43213/ W081.51671" (1, ABSC); same data except: "27 May 2009// scrub habitat/ flight trap pan/ N27.43378/ W081.51613" (1, ABSC); same data except: "4 Aug. 2009// scrub habitat/ bowl trap/ N27.48192/ W081.52861" (1, ABSC); same data except: "6 Aug. 2009// yellow bowl trap/ scrub habitat/ Site 8. N27.48376/ W081.52372" (1, ABSC); "FL: Highlands Co./ Highlands Park/ Estates. 14 Aug. 2009/ M. Deyrup, H. Otte/ A. May// scrub habitat/ flight trap/ N27.53864/ W081.35071" (1, ABSC); FL: Highlands Co./ Lake June State Pk./ 28 May 2009/ M. Deyrup, A. May/ H. Otte// Townes trap/ scrub habitat/ N27.29982/ W081.42441" (1, SBPC); same data except: "2 June 2009// flight trap w. pan/ scrub habitat/ N27.30001/ W081.42403" (2, SBPC); "FLORIDA: Levy Co./ 4.0 mi SW Archer/ 9-VI-1992; P.E./ Skelley, b-light" (1, FSCA); "FLORIDA: Levy Co./ 4.0 mi. SW Archer on/ Rt-24; 15-VI-1996/ P.E. Skelley. Uv light" (2, FSCA); "FL: Polk Co./ A.D. Broussard/ Catfish Ck. State Pk./ 5 Jun. 2009, M. Deyrup/ H. Otte, A. May// flight trap with pan/ scrub habitat/ N27.98598/ W081.49663" (1, SBPC); "FL: Polk Co./ Lake Marion Crk./ Estates/ 28-V-1998/ R. Morris/ FIT" (1, FSCA); FL: Polk Co. Lake/ Wales Ridge Forest/ 14 July 2009, H. Otte/ A. May, M. Deyrup// flight trap w. pan/ scrub habitat/ Site 5. N27.68668/ W081.49616" (1, ABSC); "FL: Polk Co., TNC/ Tiger Creek Pres./ 6 July 2009/ M. Deyrup, H. Otte/ A. May// scrub habitat/ flight trap/ N27.82158/ W081.47717" (1, SBPC); "UNITED STATES: FL: Sarasota Co., Myakka/ River St. Pk. 16&17.IV.08/ N27°16.5'W82°16. 2.8 km/ Liveoak-cabbage palm hammock/ Eve car netting. S. Peck 08-45" (1, SBPC).

Distribution. The species is known only from peninsular Florida, at the localities given above (Fig. 17).

Seasonality. Adults have been collected from the months of April to September, and mostly in June to August.

Bionomics. Adults have been collected mostly in forest and scrub vegetation on sandy soils. They have been taken by malaise, flight intercept, blacklight, car net, and yellow bowl traps.

Etymology. This species is named for the state of Florida, U.S.A., where all known specimens have been collected.

Liocyrtusa Daffner

Liocyrtusa Daffner, 1982: 209. Type species: *Anisotoma minutum* Ahrens, 1912, by original designation. Daffner 1983: 132; 1988: 284.

Cyrtusa Brown, 1937b: 171; nec *Cyrtusa* Erichson, 1842.

Diagnosis. Body moderately convex. Antenna with 11 antennomeres, with 5-antennomere club interrupted at antennomere 8, which is narrow and disc-shaped but clearly visible. Mandibles forming semicircle when closed together, and without prominent teeth. Ventral side of head without antennal

grooves. Mesosternum vertical between the mesocoxae, not carinate. Tibiae uniformly widened apically; protibia with distinct tarsal groove, its outer margin strongly spinose; mesotibia outer margin with two dense rows of spines; outer margin of metatibia with short, strong spines. Tarsal formula 5-5-4 in both sexes. Males distinguished by strongly curved mesotibiae bearing process on inner apical margin and by strong tooth-like expansion of lower margin of metafemur.

Distribution. The genus is Holarctic in distribution; it also occurs in India, Thailand, and China (Newton 1998).

Key to species of *Liocyrtusa* of the continental United States and Canada

1. Basal margin of abdominal sternites III-VII with a transverse row of large, deep punctures ...
..... *L. stephani* Daffner
- Basal margin of abdominal sternites III-VII without large, deep punctures 2
- 2(1). Punctures of elytral striae usually distinct up to base of pronotum; interval punctures smaller than strial punctures. Metatibia uniformly widened from base to apex; apex 3 times as wide as base *L. luggeri* (Hatch)
- Punctures of elytral striae clearly separated only in posterior half; interval punctures as large as strial punctures at the base. Metatibia narrow, apical half 2 times as wide as base
..... *L. nigriclavus* (Hlisnikovsky)

Liocyrtusa luggeri (Hatch, 1927)

(Fig. 4, 18)

Anogdus luggeri Hatch, 1927: 17. Holotype, female, in UMSP, seen. Type locality: Minnesota; no other data.

Cyrtusa luggeri (Hatch); Brown 1937b: 171.

Liocyrtusa luggeri (Hatch); Daffner 1985: 695; 1988: 286.

Diagnosis. Length (pronotum + elytra) = 1.49–2.16 mm; greatest width = 0.98–1.42 mm. Reddish brown, moderately shiny. Fine, irregular microsculpture scattered on head and pronotum, more prominent on elytra. Head with fine, moderately spaced punctures anteriorly; punctures larger and more closely spaced on vertex. Antennal club variable in width; antennomere 8 thin and about half width of antennomere 7; apical antennomere clearly narrower than 9 and 10. Sides of pronotum rounded, posterior angles obtuse. Pronotum moderately finely, sparsely punctate medially, punctures more closely spaced laterally. Elytral strial punctures coarse, separated by less than one diameter, visible to base of pronotum; interstrial punctures smaller and more widely spaced. Metasternum coarsely punctate, punctures more densely spaced laterally, with impunctate area medially. Metatibia broad, with apex about three times width at base. Male mesotibial process triangular. Abdominal sternite III rugose, sternites IV–VII each with row of fine punctures before apex. Median lobe of aedeagus broad; apical lobes short with rounded apices (Fig. 4). Parameres (Fig. 4) broad, with membranous apices extending beyond apices of median lobe. Internal sac as in Fig. 4.

Distribution. North American distribution (Fig. 18): **CANADA.** ALBERTA, BRITISH COLUMBIA, MANITOBA, ONTARIO, QUEBEC, SASKATCHEWAN. **UNITED STATES.** ARIZONA, CALIFORNIA, IDAHO, MINNESOTA, UTAH, WASHINGTON.

Previously recorded in North America (Hatch 1927, Brown 1937b, Daffner 1985, 1988) from: **CANADA.** BRITISH COLUMBIA. Creston. 23 km NE Creston. Mabel Lake at Squaw Valley. 13 km N Nelway. Royal Oak. Summerland. **MANITOBA.** Aweme. **ONTARIO.** Arnprior. Constance Bay. Leamington. Mer Bleue, near Ottawa. **QUEBEC.** Aylmer. **SASKATCHEWAN.** Saskatoon. **UNITED STATES.** ARIZONA. Flagstaff. CALIFORNIA. Nevada Co., Sagehen Creek. WASHINGTON. Okanogan Co., near Buzzard Lake.

Seasonality. Adults are known from the months of May to October, with most from June to August.

Bionomics. Adults have been collected in habitats ranging from tall-grass prairie and riparian forest, to spruce-aspen forest, and mostly from mixed hardwood forest. Taken by flight intercept traps, but also by evening car netting, sweeping, and ultraviolet light traps.

New material examined. We have seen 53 specimens from the following localities. **CANADA ALBERTA.** 15 km SW Beaver Mines on road 774. Cypress Hills Provincial park. **MANITOBA.** Richer, Sandilands Provincial Forest, forest road 19. Pinawa, route 433. 10-12 km E. Marchand. 17 km N Woodridge, highway 210. St. Rita, Agassiz Provincial Forest. Tolstoi to Vita. **ONTARIO.** Arnprior. Kemptville Forest. Constance Bay. Thunder Bay. L3C6 Wolford Township, 44° 52'03"N, 75°43'50"W. **UNITED STATES.** **ARIZONA.** Flagstaff, Oak Creek Canyon at Sterling Canyon. Pinery Creek, Chiricahua Mountains. Yavapai Co., Village Oak Creek. **IDAHO.** Bonner Co., Sagie. **MINNESOTA.** Lyon Co., Camden State Park. Pipestone Co., Pipestone National Monument. **UTAH.** Daggett Co., nr. Red Canyon, Flaming Gorge National Recreation Area. Summit Co., Henrys Fork Camp. **WASHINGTON.** Walla Walla.

***Liocyrtusa nigriclavis* (Hlisnikovsky, 1967)**

(Fig. 5, 19)

Liocyrtusa nigriclavis (Hlisnikovsky, 1967): 240; Daffner 1983: 134; 1988: 285. Holotype male in HNHB (Hungarian Natural History Museum, Budapest), not seen. Type locality: Cojbalsan aimak, 820 m, 20 km SW Somon Bajanuul, Mongolia.

Diagnosis. Length (pronotum + elytra) = 1.78–2.40 mm; greatest width = 1.22–1.70 mm. Pale to dark reddish brown, mostly shiny, antennal club often darker; some individuals with microsculpture on elytra. Head moderately coarsely and densely punctate. Antennal club variable in width, more robust in larger individuals. Antennomere 8 disc-like, about half width of 9. Apical antennomere clearly narrower than 9 and 10. Sides of pronotum rounded, posterior angles obtuse. Pronotum moderately finely punctate; punctures irregularly separated, more dense laterally. Elytral strial punctures coarse, separated by less than one diameter; striae cannot be separated apically from coarse interstitial punctures. Metasternum coarsely punctate; punctation dense laterally, sparse medially. Metatibia narrow, width at apex twice width at base. Male mesotibial process short, triangular. Abdominal sternite III coarsely punctate, sternites IV–VII each with transverse row of fine punctures before apex. Median lobe of aedeagus broad, apical lobes short with rounded apices (Fig. 5). Parameres (Fig. 5) broad, with membranous apices extending well beyond apices of median lobe. Internal sac as in Fig. 5.

Distribution. The species is Holarctic. North American distribution (Fig. 19): **CANADA.** ALBERTA, BRITISH COLUMBIA, MANITOBA, NUNAVUT TERRITORY, ONTARIO, QUEBEC, SASKATCHEWAN, YUKON TERRITORY. **UNITED STATES.** ALASKA, IDAHO, INDIANA, NORTH CAROLINA, NEVADA, UTAH, OREGON, VIRGINIA, WASHINGTON, WYOMING. Extra-limital distribution: Eastern Europe, Mongolia, Siberia.

Previously recorded in North America (Daffner 1983, 1988) from: **CANADA.** BRITISH COLUMBIA. 25 km W Creston. 10 km W Summerland. 13 km N Nelway. **ONTARIO.** Chaffeys Locks. Stittsville. **QUEBEC.** Gatineau. **UNITED STATES.** VIRGINIA. Pulaski Co., 7 mi SE Mechanicsburg. WYOMING. 34 mi E Lovell. OREGON. Clackamas Co., Salmon River near Zigzag. WASHINGTON. Okanogan Co., near Buzzard Lake.

Seasonality. Adults have been collected in the months from June to October, with most in July to September.

Bionomics. In North America, the species is mostly northern or at upper elevations in boreal forest or in tundra habitats. Adults have been collected in habitats ranging from subarctic tundra to spruce-

willow and pine and pine-aspen forests to mixed hardwood forest. They have been taken mostly by flight intercept traps, but also by evening car netting, and unbaited pit-traps.

New material examined. We have seen 232 specimens from the following localities. **CANADA ALBERTA.** Opal. **MANITOBA.** 100 road km SE Flin Flon. 17 km N Woodridge, Sandilands Provincial Forest. **NUNAVUT TERRITORY.** Kugluktuk, N67.78463, W115.20987. **ONTARIO.** 20 km SE Almonte, Middleville to White Lake. Chaffeys Locks, Queens University Biology Station. Gloucester. 15 km NW Renfrew. Hamilton. Manitoulin Island. Heckston, 20 km SE Kempville. 15 km W Ottawa, Shirleys Bay. Stittsville. L3C6 Wolford Township, 44° 52'03"N, 75°43'50"W. **SASKATCHEWAN.** Moose Mountain Provincial Park, Kenosee Lake. **YUKON TERRITORY.** Champagne, Alaska Highway km 1580. Dempster Jct., 40 km E Dawson. EMAN plot, site LMK333Y. Haines Jct, 10 km S. Long Lake Road, site LMK25 Moose Creek, 14 km NW Stewart Crossing. Ross River. **UNITED STATES. ALASKA.** 11 mi S Anderson Jct, Rt. 3, mi 270, Alaska highway. Big Delta. Nenana, 13 mi NE, mile 318, Alaska Highway. Tok. **IDAHO.** Clark Co., 2.8 km W rt. 115, Stoddard Campground. **INDIANA.** Tippecanoe Co. **NORTH CAROLINA.** Haywood Co., Balsam Mt., Blue Ridge Parkway. **NEVADA** White Pine Co., Snake Range, Wheeler Peak trail. **UTAH.** Summit Co., Bear River Camp. **WYOMING.** 34 mi E Lovell, Big Horn Mountains.

***Liocyrtusa stephani* Daffner, 1988**

(Fig. 6, 19)

Liocyrtusa stephani Daffner, 1988: 288. Holotype, male, in Daffner collection, not seen. Type locality: Latimer County, OK.

Diagnosis. Length (pronotum + elytra) = 1.55–1.68 mm; greatest width = 1.16–1.24 mm. Reddish brown, shiny. Head finely, sparsely punctate. Antennal club variable in width; antennomere 8 saucer-shaped, about half width of antennomere 9; apical antennomere longer than and almost as wide as 10. Sides of pronotum weakly rounded, posterior angles obtuse. Pronotum minutely, sparsely punctate. Elytral striae punctures coarse and closely spaced, striae distinct to base of pronotum; interstriae punctures minute, sparse. Metasternum coarsely, densely punctate laterally, finely punctate medially. Metatibia narrow, width at apex about twice width at base. Male mesotibial process moderately long, crossing over long tibial spine. Abdominal sternites III–VII each with a row of coarse punctures at base. Median lobe of aedeagus (Fig. 6) broad with moderately long apical lobes. Parameres (Fig. 6) narrow, not reaching apices of median lobe. Internal sac as in Fig. 6.

Distribution. North American distribution (Fig. 19): **UNITED STATES. ALABAMA. NEBRASKA, OKLAHOMA**

Previously recorded only from Latimer County, Oklahoma.

Seasonality. Adults are known from the months of March, May, and September.

Bionomics. The few collecting records suggest that adults occur in open and mixed forests. One specimen is from beach drift.

New material examined. We have examined three specimens with the following data: **UNITED STATES. ALABAMA.** Wilcox County, Camden, 24.III.1959, J. I. Cowger (1, USNM). **NEBRASKA.** Keith County, Arthur Bay, Lake McConaughy, 22.V.2008, R. Turnbow, beach drift (1, SBPC). **OKLAHOMA.** Latimer Co., IX.1990, K. Stephan (1, TAMU).

***Lionothus* Brown**

Lionothus Brown, 1937: 170. Type species: *Lionothus ulkei* Brown, 1937; by original designation. Daffner 1988: 288.

Pseudocyrtusa Portevin, 1942: 78. Type species: *Pseudocyrtusa australis* Portevin, 1942, by monotypy; synonymy by Newton 1983: 175.

Diagnosis. Body convex. Antenna with 11 antennomeres with 5-antennomere club interrupted at antennomere 8, which is narrow and disc-shaped but clearly visible. Mandibles variable, left mandible usually with one or two small blunt teeth on anterior one-third. Ventral side of head with or without well defined antennal grooves. Mesosternum vertical between mesocoxae, not carinate. Tibiae uniformly widened to apex; protibiae with tarsal grooves; outer margins of all tibiae with strong spines. Tarsal formula 5-5-4 in both sexes. Abdominal sternites III–VII each with basal transverse row of large punctures. Males are distinguished by larger, often sinuate spur on inner apical margin of usually straight mesotibia; inner apical margin of mesotibia not produced; and apical tooth-like expansion of the lower margin of the metafemur.

Distribution. The distribution of the genus is Nearctic and northern Neotropical (Mexico, Colombia) (Newton 1998).

Key to species of male *Lionothus* of the continental United States and Canada

1. Male mesofemur with acute tooth-like expansion at apex of inner margin ***L. ulkei* Brown**
– Male mesofemur without acute tooth-like expansion at apex of inner margin..... **2**
- 2(1). Smaller species, total length (pronotum + elytra) less than 1.5 mm; apical antennomere as wide as penultimate antennomere ***L. exiguus* Peck and Cook, n. sp.**
– Larger species, total length (pronotum + elytra) 1.8-2.6 mm; apical antennomere narrower than penultimate antennomere **3**
- 3(2). Antennal grooves well defined, outer margins demarked by carinae extending posteriorly beyond the eye ***L. forticornis* Daffner**
– Antennal grooves not well defined, outer margins not demarked by carinae **4**
- 4(3). Mandibles short, together forming semicircle, left mandible with 2 small teeth on apical one-third; eye of normal size, about half length of head .. ***L. bidentatus* Peck and Cook, n. sp.**
– Mandibles elongate, not forming semicircle when closed; left mandible with single tooth near middle; eye reduced, about one-third length of head.....
..... ***L. parvovulus* Peck and Cook, n. sp.**

***Lionothus ulkei* Brown, 1937**

(Fig. 7, 20)

Lionothus ulkei Brown, 1937b: 171; Daffner 1988: 290. Holotype, male, in CNCI, seen. Type locality: DC [District of Columbia.]

Diagnosis. Length (pronotum + elytra) = 1.50–2.00 mm; greatest width = 1.10–1.60 mm. Reddish brown, shiny. Head punctures fine anteriorly, coarser and denser posteriorly and laterally. Head with antennal

grooves ventrally. Mandibles short, forming semicircle when closed; minute tooth near middle of left mandible. Antennal club slender; antennomere 8 disc-like, nearly as wide as apex of 7; apical antennomere longer than and nearly as wide as 10. Eyes of normal size. Pronotum broad, weakly rounded laterally, posterior angles obtuse, basal margin strongly rounded. Pronotum finely punctate. Elytral stria punctures deep, separated by ± 1 diameter. Interstria punctures minute and sparse. Metasternum with fine punctures medially; coarse, unevenly spaced punctures laterally. Male mesofemur with acute toothlike expansion at apex of inner margin. Male mesotibia sinuate on inner margin. Abdominal sternites III–VII each with basal transverse row of large punctures. Median lobe of aedeagus (Fig. 7) cylindrical, strongly curved dorsoventrally at basal one-third; in lateral view, evenly dorsoventrally flattened in apical one-fourth; paired apices moderately broad. Parameres narrow, not reaching apex of median lobe. Internal sac as in Fig. 7.

Distribution. North American distribution (Fig. 20): **UNITED STATES.** DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, MARYLAND, MISSISSIPPI, OKLAHOMA, TEXAS, VIRGINIA.

Previously recorded in North America (Brown 1937b, Daffner 1988) from: **UNITED STATES.** DISTRICT OF COLUMBIA. FLORIDA. Dade Co., Chekika State Recreation Area, 50 km SW Miami. Deering Estate Park, S. Miami. Long Pine Key, Everglades National Park. Monroe Co., 1.5 km NW Royal Palm and Royal Palm Hammock. OKLAHOMA. Latimer Co., Red Oak. VIRGINIA. Luray, Shenandoah National Park.

Daffner (1988) includes a single specimen record from Arizona: Santa Cruz Co., Patagonia, Sonoita Creek Sanctuary. We have not seen this specimen to confirm the identity and have not included the record on our map.

Seasonality. Adults have been collected from April to November, with most in the months of June to August.

Bionomics. Adults have been collected in various forest types ranging from cypress swamp, subtropical hammock, pinelands, oak-palm hammock, bottomland forest, redbay-live oak forest, and post oak savannah, mostly on sandy soils, They have been taken mostly by flight intercept traps but some from malaise and black light traps.

New material examined. We have seen 242 specimens from the following localities: **UNITED STATES.** DISTRICT OF COLUMBIA. Washington. FLORIDA. Collier Co., Ochopee. Dade Co., Chekika State Recreation Area. Long Pine Key. Deering Estate Park. Highlands Co., Archbold Biology Station, Lake Placid. Highlands Hammock State Park. Hillsborough Co., Hillsborough State Park. Jackson Co., Florida Caverns State Park. Levy Co., 6 mi W Otter Creek. Monroe Co., Royal Palm Hammock. 1.5 km NW Royal Palm. Putnam Co., Welaka, University of Florida Station. GEORGIA. Clarke Co., Athens. MARYLAND. Talbot Co., Wittman. MISSISSIPPI. Pontotoc Co., 32 km SW Tupelo, Tockshish. OKLAHOMA. Latimer Co., Red Oak. TEXAS. Aransas Co., 10 km SE Austwell. Brazos Co., Lick Creek Park, College Station. El Paso Co., Wilderness Park Museum. Montgomery Co., 4.5 mi N Montgomery. Wood Co., 3.5 mi SW Hainesville, Godwin Woods. VIRGINIA. Ft. Monroe.

***Lionothus forticornis* Daffner, 1988**

(Fig. 8, 21)

Lionothus forticornis Daffner 1988: 291. Holotype, male, in Daffner collection, not seen. Type locality: Mark Twain National Forest, MO.

Diagnosis. Length (pronotum + elytra) = 1.90–2.40 mm; greatest width = 1.26–1.70 mm. Reddish brown, shiny. Head punctures fine and sparse anteriorly, coarser and more dense posteriorly and laterally. Head with antennal grooves ventrally. Mandibles short, forming semicircle when closed; small tooth at apical one-third of left mandible. Antennal club slender; antennomere 8 disc-like, narrower than apex of 7; apical antennomere about as long as and narrower than antennomere 10. Eyes of normal size. Pronotum broad, rounded laterally, posterior angles obtuse, basal margin rounded. Pronotum finely

punctate; punctures sparse medially, more dense laterally. Elytral striae punctures deep, separated by ± 1 diameter. Interstriae punctures minute and sparse. Metasternum finely punctate medially; with coarse, irregularly spaced punctures laterally. Male mesofemur unmodified. Male mesotibia straight on inner margin. Abdominal sternites III–VII each with basal transverse row of large punctures. Median lobe of aedeagus (Fig. 8) cylindrical, evenly curved in lateral view; paired apices short, moderately slender. Parameres narrow, not reaching apex of median lobe. Internal sac as in Fig. 8.

Distribution. North American distribution (Fig. 21): **CANADA.** ONTARIO, QUEBEC. **UNITED STATES.** ARKANSAS, FLORIDA, GEORGIA, ILLINOIS, INDIANA, KENTUCKY, LOUISIANA, MASSACHUSETTS, MICHIGAN, MINNESOTA, MISSISSIPPI, NORTH CAROLINA, NEW JERSEY, NEW YORK, OKLAHOMA, SOUTH CAROLINA, TENNESSEE, TEXAS, VIRGINIA. Extra-limital distribution: Mexico.

Previously recorded in North America (Daffner 1988) from: **CANADA.** ONTARIO. 7 km SW Carleton Place. Rondeau Provincial Park. **UNITED STATES.** MASSACHUSETTS. Middlesex Co., Lincoln. NEW JERSEY. Cape May Co., Eldora. INDIANA. Parke Co., 4 mi W Rockville. FLORIDA. Putnam Co., Welaka. Lake Co., Ocala National Forest, 5.6 mi S Astor Park, Alexander Springs Creek. Alachua Co., Gainesville. OKLAHOMA. Latimer Co., Red Oak.

Seasonality. Adults have been collected from February to October, with most in the months of June to August.

Bionomics. Adults have been collected mostly in upland and lowland mixed forests, and a few in juniper and other scrub vegetation. They were taken mostly by flight intercept traps, but a few in malt traps, malaise traps, by Berlese extraction from litter, sweeping, evening car netting, and blacklight traps.

New material examined. We have seen 855 specimens from the following localities: **CANADA.** ONTARIO. Chaffeys Locks, Queens University Biology Station. Heckston, 20 km SE Kemptonville. Rondeau Provincial Park. Shirleys Bay, 15 km W Ottawa. L3C6 Wolford Township, 44° 52'03"N, 75°43'50"W. QUEBEC. Hull, Gatineau Park. **UNITED STATES.** ALABAMA. Dale Co., Fort Rucker Military Reservation. Jackson Co., 10 mi N Scottsboro. Marshall Co., 1 mi NW Guntersville. ARKANSAS. Pulaski Co., Little Rock. Washington Co., 3 mi S Devils Den State Park. FLORIDA. Alachua Co., Gainesville. S. side Bivens Arm Lake. Calhoun Co., Scotts Ferry, highway 71. Clay Co., Gold Head Branch State Park. Columbia Co., O'Leno State Park. Dade Co., Chekika State Recreation Area. Gadsden Co., 1 km E Chattahoochee. Hernando Co., Bayport. Hillsboro Co., Hillsboro River State Park. Jackson Co., Florida Caverns State Park. Three Rivers State Park. Jefferson Co., Rt. 98 at W. Aucilla Sloughs. Lake Co., 5.6 mi S Astor Park, Alexander Springs Cree. Leon Co., 20 km N Tallahassee, Tall Timbers Research Station. Levy Co., 6 mi W. Otter Creek. 16 km NE Cedar Key. Liberty Co., 14 km N Bristol, Appalachian River Bluffs Preserve. Torreya State Park. Madison Co., 5 km S Ellaville. Marion Co., Ocala National Forest. Silver Springs Road. Okaloosa Co., Milligan. Osceola Co., Kenansville. Putnam Co., Welaka, University Florida Station. Sarasota Co., Myakka River State Park. St. Johns Co., Faver-Dykes State Park. Suwanee Co., Suwanee River State Park. Walton Co., 18 km SW Freeport. Topsail Hill State Park, Campbell Lake. GEORGIA. Macon, Ocmulgee National Monument. Brantley Co., Hickox. Clarke Co., Whitehall Forest. Greene Co., Oconee National Forest, Oconee River Recreation Area. McIntosh Co., Sapelo Island. ILLINOIS. Coles Co., Charleston. Jackson Co., 7 mi W Carbondale. Mason Co., Sand Ridge State Forest. INDIANA. Parke Co., 4 mi W Rockville. Tippecanoe Co. KENTUCKY. Edmonson Co., Mammoth Cave National Park. Rowan Co., 24 km SW Morehead, Cave Run Lake. Whitley Co., D. Boone National Forest. LOUISIANA. Calcasieu Parish, Sam Houston Jones State Park. Feliciana Parish, Feliciana Preserve. Grant Parish, 18 km N Alexandria, Stuart Lake Camp. 3 KM SW Pollack. MICHIGAN. Kalamazoo Co., Hickory Corners. MINNESOTA. Lyon Co., Camden State Park. Itasca Co., Plot 2, T 58, R 24, S 35. Pine Co., Little Sand Creek. MISSISSIPPI. Hind Co., 19 km NE Gibson, Owens Creek. Pontotoc Co., 32 km SW Tupelo. NORTH CAROLINA. Northampton Co., 5 km S Jackson. Wilkes Co., Jeffress Park, Blue Ridge Parkway. NEW YORK. Elbridge. OKLAHOMA. Latimer Co. Red Oak. SOUTH CAROLINA. Anderson Co., Pendleton. TENNESSEE. Sevier Co., 2.5 mi W Gatlinburg. TEXAS. Angelina Co., 2.5 mi N Rockland. Bandera Co., Lost Maple State Natural Area. Bell Co., 1 km

W Youngsport. Brazos Co., Lick Creek Park, College Station. Brewster Co., Big Bend National Park, N side Emory Peak, Maple Canyon. Ellis Co., 3.6 mi NE Italy. Hays Co., 6 mi NW Dripping Springs. Jeff Davis Co., Davis Mountains Resort, Upper Lympia Creek Canyon. Kerr Co., 6.5 mi SW Hunt. Polk Co., 20 km S Coldspring. Sabine Co., 8 mi E Hemphill. 9 mi E Hemphill, "Beech Bottom." San Jacinto Co., 5 km S Coldspring. Big Creek Scenic Area. Shelby Co., 20 km SE Shelbyville. Travis Co., Bull Creek Arm of Lake Austin. Trinity Co., 9.6 km S. Apple Springs. Tyler Co., L Kirby State Forest. Wood Co., 3.5 mi SW Hainesville. VIRGINIA. Bath Co., 9.6 km N Clifton Forge. Bedford Co., Blue Ridge Parkway, mile 55, White Oak Flat. Essex Co., 1 mi SE Dunnsville. Fairfax Co., Burling Park. Franklin Co., Blue Ridge Parkway, mile 154, Smart View. Shenandoah Co., 16 km S Strasburg, Elizabeth Furnace.

Note. One male, tentatively identified as this species, is from BRITISH COLUMBIA. 5 mi. NW Oliver, 12.VI.1958, H. & A Howden (CNCI). This outlier record needs to be confirmed with additional material. We do not show it on the map.

Lionothus bidentatus Peck and Cook, new species

(Fig. 9, 22)

Description. Length (pronotum + elytra) = 1.80–2.08 mm; greatest width = 1.16–1.44 mm. Reddish brown, shiny. Head punctures fine medially, moderately coarse on vertex, irregularly spaced. Antennal grooves not well defined. Mandibles short, forming semicircle when closed; two teeth at apical one-third of left mandible. Antennal club slender; antennomere 8 disc-like, distinctly narrower than apex of 7; apical antennomere slightly narrower than 9 and 10. Eyes of normal size. Pronotum broad, sides rounded, posterior angles roundly obtuse, basal margin rounded. Pronotal punctures minute and sparse. Elytral stria punctures round and deep, smaller near base, variably separated; interstria punctures minute and sparse. Metasternum with fine punctures medially; coarse, unevenly spaced punctures laterally. Male mesofemur unmodified. Male mesotibia weakly concave on inner margin. Abdominal sternites III–VII each with basal transverse row of large punctures. Median lobe of aedeagus (Fig. 9) cylindrical, strongly curved dorsoventrally; apical one-third progressively flattened to apex; paired apices broad and flat. Parameres narrow, each bearing two apical setae, not reaching apex of median lobe. Internal sac as in Fig. 9.

Type material. Holotype, male, in TAMU, with label data: "UNITED STATES: TEXAS: Bell Co./ 1 km W Youngsport, FIT/ Bowmer Rch., Lampasas Riv./ 30.96197°N. 97.72903°W/ IV-10–21-2010, T. Robbins".

Paratypes, 71, as follows: 20, same data as holotype (10, TAMU; 10, SBPC); "UNITED STATES Texas Brewster Co./ Big Bend National Park/ Maple Cyn. 5200'/ 9.VII.82 G.A.P. Gibson" (2, SBPC); same data except: "30.VI–9.VII.82/ pan trap" (2, SBPC); "UNITED STATES: TEXAS: Hays Co./ 6mi NW Dripping Springs/ 30°13.589'N, 98°11.096'W/ X-3–30-2005, FIT-ground/ 1,340', E.G. Riley et al.-119/ Juniperus unmanaged plot" (2, TAMU); same data except: "VI-3–30-2005/ 418/ Juniperus managed plot" (1, TAMU); same data except: "III-31–IV-26-2006/ 340" (2, TAMU); same data except: "IV-28–VI-2-2006/ 379/ Juniperus managed plot" (7, TAMU); same data except: "30°13.554'N, 98°11.039'W/ III-31–IV-27-2006/ 353" (5, TAMU); same data except: "IV-28–VI-2-2006/ 392/.Juniperus unmanaged plot" (5, TAMU); "UNITED STATES: TEXAS: Kerr Co./ 6.5 mi SW Hunt, 1960'/ 29°59.409'N, 99°23.244'W/ IV-28–VI-2.2006, FIT-grd./ E.G. Riley, et al.405/ upland deciduous forest" (7, TAMU); same data except: "IX-2–X-5-2006/ 561" (TAMU); 5, same data except: "VI-3–30-2006/ 444" (9, TAMU); same data except: "X-27–XI-11-2005/ 171" (1, TAMU); same data except "III-31–IV-27-2006/ 366" (TAMU); 1, "TEXAS: Wood Co./ Godwin Woods, 3.5 mi. SW/ Hainsville, V-29–VI-27-2000/ 32°42'30"N, 95°24'36"W/ Coll. Wm. Godwin, FIT" (2, TAMU); "OKLAHOMA:/ Latimer Co./ XI.2002/ K. Stephan" (1, TAMU); same data except "XII.2002" (1, TAMU).

Distribution. The species is known only from Oklahoma and Texas in the United States (Fig. 22).

Seasonality. Adults have been collected from April to December, mostly in the months of April and May.

Bionomics. Adults have been collected mostly in scrub and juniper thickets, and in upland mixed forest.

Etymology. The epithet "*bidentatus*" refers to the double teeth on the left mandible of this species.

***Lionothus exiguus* Peck and Cook, new species**

(Fig. 10, 22)

Description. Length (pronotum + elytra) = 1.34–1.44 mm; greatest width = 1.00–1.04 mm. Reddish brown, shiny. Head punctation variable in size and spacing. Antennal grooves not well defined. Mandibles moderately long, left mandible with blunt tooth near middle. Antennal club slender; antennomere 8 disc-like, narrower than apex of 7; apical antennomere longer than and as wide as 10. Eyes of normal size. Pronotum broad, sides rounded; posterior angles rounded, barely evident; basal margin rounded. Pronotal punctures minute and sparse. Elytral strial punctures round and deep, variable spaced; interstitial punctures minute and sparse. Metasternum finely punctate medially, coarsely punctate laterally; lateral punctures separated by less than one diameter. Male mesofemur unmodified. Male mesotibia straight. Abdominal sternites III–VII each with basal transverse row of large punctures. Median lobe of aedeagus (Fig. 10) cylindrical and curved in basal half, with flat paired apices. Parameres narrow, not reaching apex of median lobe. Internal sac as in Fig. 10.

Type material. Holotype, male, in SBPC, with label data: "UNITED STATES: TX: Cameron Co., 3m/ 15 km se Brownsville, TNC/ Southmost Preserve, N25°50.6'/ W97°22.9', palm forest FITs/ 1.III–4.IV.04, S. & J. Peck 04–54".

Paratypes, 7, as follows: same data as holotype (1, SBPC); "TX: Cameron Co./ Brownsville, Audubon/ Sabal Palm Grove/ 31.V–10.VIII.83/ S.&J. Peck, FIT" (1, SBPC); "UNITED STATES: TX: ne Cameron Co./ Laguna Atascosa NWR/ N26°14.0 W 97°21.0. 2 m/ Thorn thicket FIT, 1.III–6.IV.04/ S. & J. Peck, 04–50" (3, SBPC); "FLA: Columbia Co./ O'Leno State Park/ 16.VI–8.VIII.1981/ S. Peck, sand-oak-/ pine, intercept tp." (1, SBPC); "FLORIDA: Suwanee/ Suwanee R. St. Pk./ 15.VI–8.VIII.1981/ S. Peck, mixed/ forest intercept" (1, SBPC).

Distribution. The species is known only from Florida and Texas in the United States (Fig. 22). Its distribution in the extreme south of Texas suggests that the species may also occur in Mexico. The Florida populations seem to be disjunct from those in Texas. They may have once been connected across the Gulf Coastal Plain at times of Pleistocene low sea levels. This was a route from a western source for faunas moving into Florida, and is recognized for the movement of both vertebrates (Webb 1990) and arthropods (Deyrup 1989).

Seasonality. Adults are known only from the months of March to August.

Bionomics. Adults are known from mesic forests, thorn thicket, and palm forest, often on sandy soils. All were collected in flight intercept traps.

Etymology. Latin "*exiguus*", small, refers to the small size of this species.

***Lionothus parvocolus* Peck and Cook, new species**

(Fig. 11, 22)

Description. Length (pronotum + elytra) = 2.40–2.60 mm; greatest width = 1.48–1.72 mm. Reddish brown, shiny. Head punctures of moderate size, irregularly spaced, more dense laterally. Antennal grooves not well defined. Mandibles elongate, not forming semicircle when closed; both mandibles edentate, Antennal club slender; antennomere 8 disc-like, narrower than apex of 7; apical antennomere longer and narrower than 10. Eyes reduced in size, length about one-third length of head. Pronotum broad, sides weakly rounded, posterior angles obtuse, basal margin rounded. Pronotal punctures moderately small and dense. Elytral strial punctures round and deep, smaller toward base, separated by ± 1 diameter. Interstitial punctures fine and sparse; few large punctures between striae VI and VII. Metasternum finely punctate medially; coarsely, densely punctate laterally. Male mesofemur unmodified.

Male mesotibia weakly concave on inner margin. Abdominal sternites III–VII each with basal transverse row of large punctures. Median lobe of aedeagus (Fig. 11) cylindrical, strongly curved dorsoventrally, flattening to paired apices in apical one-fourth. Parameres slender, sinuate apically, not reaching apex of median lobe. Internal sac as in Fig. 11.

Type material. Holotype, male, in SBPC, with label data: “N. MEX: Lincoln Co./ Sierra Blanca, 8000’/ 15 mi NW Ruidoso/ 20.VIII.75, S. Peck// Oak Flat Camp/ Oak litter Ber 317”.

Paratypes, 20, as follows: same data as holotype (5, SBPC); “NMEX: Santa Fe Co./ 14 mi NE Santa Fe/ 18.VI–3.VII.79,/ S&J Peck, 9600’/ aspen w/stream” (5, SBPC); “ARIZ: 10miNW Flagstaff/ San Francisco Mts. 9500’/ 18–24.VII.79, S&J Peck/ spruce-fir-aspen/ meadow, malaise” (5, SBPC); “ARIZ: Flagstaff/ Oak Ck. Can. 5900’/ 17–25.VII.79, at/ Sterling Can./ riparian woods/ malaise, S&J Peck” (3, SBPC); “ARIZ: Cochise Co./ Rustler Park, 9000’/ VIII-31-1976/ Fred G. Andrews// Berlese soil/ around Amanita/ muscaria” (1, CSCA); “Chir. Mts. Ariz./ VIII-16-68 7500-/ 9500’ Sweeping/ V. Roth” (1, CSCA).

Distribution. The species is known only from Arizona and New Mexico in the United States (Fig. 22).

Seasonality. Adults have been collected in the months of June to August.

Bionomics. Adults have been collected in riparian forest, mixed forest, oak woodland, and upper elevation spruce-fir-aspen forest. They were taken mostly by flight intercept and malaise traps, and also in litter and by sweeping.

Etymology. Latin “*parvovulus*”, small eyes, refers to the reduced eye size of this species.

***Zeadolopus* Broun, 1903**

Zeadolopus Broun, 1903: 614. Type species: *Zeadolopus spinipes* Broun, 1903; by monotypy. Daffner 1982: 211; 1983: 138, 1988: 295; Newton 1983: 173.

Apheloplastus Brown, 1937b: 173. Type species: *Cyrtusa egena* LeConte, 1853; by original designation; synonymy by Newton 1983: 173.

Diagnosis. Body strongly convex. Antenna with 10 antennomeres with 4-antennomere club. Mandibles together forming semicircle; left mandible with large tooth on basal one-third. Ventral side of head with distinct antennal grooves below the eyes. Mesosternum vertical between the mesocoxae, not carinate. Tibiae expanded, shovel-like, their outer margins with strong spines. Tarsal formula 5-5-4 in both sexes. Males distinguished by large tooth-like expansion on lower margin of metafemur.

Distribution. The distribution of the genus is worldwide except for polar and the Afrotropical regions (Newton 1998).

Key to species of male *Zeadolopus* of the continental United States and Canada

1. Abdominal sternite III with two large foveae at anterior margin..... ***Z. bifoveolatus* Daffner**
– Abdominal sternite III without large foveae **2**
- 2(1). Paired apices of median lobe of aedeagus short and rounded (Fig. 15); parameres broad.....
..... ***Z. rubricornis* Daffner**
– Paired apices of median lobe inwardly curved (Fig. 12, 14); parameres narrower **3**
- 3(2). Metatibia more robust, widened near middle; inverted internal sac with a broad, fan-like structure apically (Fig. 12)..... ***Z. egenus* (LeConte)**
– Metatibia more slender, not widened near middle; inverted internal sac without a broad, fan-like structure (Fig. 14)..... ***Z. oklahomensis* Daffner**

***Zeadolopus egenus* (LeConte, 1853)**

(Fig. 12, 23)

Cyrtusa egena LeConte, 1853: 284; Horn 1880: 295. Lectotype, male, in MCZC, type number 3166, designated by Daffner 1988: 296, seen. Type locality: Habersham County, GA.

Cyrtusa impubis Zimmerman, 1869: 251. Holotype, female, in MCZC, type number 3194, seen. Type locality: DC. [District of Columbia]. Synonymy by Brown 1937b: 173.

Apheloplastus egenus (LeConte); Brown 1937b: 173.

Zeadolopus egenus (LeConte); Newton 1983: 173; Daffner 1988: 296.

Diagnosis. Length (pronotum + elytra) = 1.18–1.74 mm; greatest width = 0.86–1.28 mm. Yellowish to reddish brown, shiny. Head moderately coarsely, densely punctate. Antennal club darker than funicle; apical antennomere longer than and as wide as penultimate antennomere. Sides of pronotum rounded, posterior angles rounded; base rounded medially, weakly concave before posterior angles. Pronotal punctation fine and widely spaced. Elytral strial punctures deep and closely spaced, not clearly evident in basal one-fourth. Interstriae finely punctate. Metasternum coarsely, densely punctate; punctures finer medially. Metatibia widest from middle to apex, three times as wide as at base. Abdominal sternites III–VII each with transverse row of small punctures before apex. Median lobe of aedeagus (Fig. 12) broad, paired apices inwardly curved. Parameres extend to or slightly beyond apex of median lobe. Internal sac as in Fig. 12.

Distribution. North America (Fig. 23): **CANADA.** ONTARIO, QUEBEC. **UNITED STATES.** ALABAMA, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, ILLINOIS, INDIANA, KENTUCKY, MASSACHUSETTS, MARYLAND, MICHIGAN, NORTH CAROLINA, SOUTH CAROLINA, TEXAS, VIRGINIA, VERMONT.

Previously recorded in North America (LeConte 1853, Zimmerman 1869, Brown 1937b, Daffner 1988) from: **CANADA.** ONTARIO. Arnprior. Blackburn Hamlet. Leamington. Mer Bleue, near Ottawa. Ottawa. Port Rowan. Simcoe. **QUEBEC.** Aylmer. **UNITED STATES:** DISTRICT OF COLUMBIA. FLORIDA. Alachua Co., Gainesville. Dade Co., Everglades National Park, Long Pine Key. Sarasota Co., Myakka River State Park. Suwanee Co., Suwanee River State Park. GEORGIA. Habersham Co. KENTUCKY. 4 mi E Horse Cave. MASSACHUSETTS. Lincoln. Tyngsboro. MICHIGAN. Detroit. SOUTH CAROLINA. Oconee (not Greene) Co., Oconee National Forest.

Seasonality. Adults have been collected from the months of April to October, with most in June to August, and early and late records are from more southern localities.

Bionomics. Adults have been collected in wooded habitats ranging from mixed deciduous, open pine-land, and warm temperate bottomlands to mangrove-hammock transition and oak-palm hammock. They have been taken most often by flight intercept traps, evening car netting and ultraviolet light traps.

New material examined. We have seen 232 specimens from the following localities: **CANADA.** ONTARIO. Almonte. Chaffey's Locks, QUBS. Guelph. Kemptville Forest. Mer Bleue. Limoges, 40 km E Ottawa. Marlborough Forest, 15 km W North Gower. Pakenham Mountain road. Rideau Ferry to Portland. Rondeau Provincial Park. L3C6 Wolford Township 44° 52'03"N, 75° 43'50"W. Tilbury. **UNITED STATES.** ALABAMA. Blount Co., 7 mi S Cleveland. Jefferson Co., Hoover. Vestavia. Morgan Co., 3.5 mi SW Fayette. FLORIDA. Dade Co., Long Pine Key. Highlands Co., Archbold Biology Station. Monroe Co., Big Pine Key. Sugarloaf Key, Kitchings Hammock. Sarasota Co., Myakka River State Park. ILLINOIS. Champaign Co., Allerton Park, Monticello. Mahomet, Nettie Hart Memorial Woods. 3 mi NW Homer. Cook Co., Chicago Heights. INDIANA. Monroe Co., Bloomington. Tippecanoe Co., MARYLAND. Montgomery Co., Potomac. Rockville. Talbot Co., Wittman. Worcester Co., 8 km WNW Snow Hill. 6 km SW Snow Hill. NORTH CAROLINA. Transylvania Co., Mt. Pisgah, Blue Ridge Parkway mile 414. SOUTH CAROLINA. Greenville Co., Greenville. Oconee Co., Oconee State Park. TEXAS. Aransas Co., 10 km SE Austwell. Brazos Co., College Station, Lick Creek Park. Fort Bend Co., Brazos Bend State

Park. Montgomery Co., 4.5 mi N Montgomery. VIRGINIA. Fort Monroe. Fairfax Co., Burling Park. Warren Co., 4 km NNW Linden. VERMONT. Franklin Co., Bakersfield.

***Zeadolopus bifoveolatus* Daffner, 1988**

(Fig. 13, 24)

Zeadolopus bifoveolatus Daffner, 1988: 301. Holotype, male, in CMNC, seen. Type locality: Sugarloaf Key, Monroe County, FL.

Diagnosis. Length (pronotum + elytra) = 1.42–1.90 mm; greatest width = 1.00–1.42 mm. Light reddish brown, shiny. Head punctures variable in size and spacing. Antennal club usually not darker than funicle; antennomere 9 longer and wider than 8; apical antennomere narrower than 9, subequal in length. Sides of pronotum rounded, posterior angles rounded; base rounded medially, concave before posterior angles. Pronotal punctation fine and widely spaced. Elytral striae punctures deep and closely spaced; clearly visible almost to base. Interstriae finely punctate. Metasternum densely punctate with coarse punctures laterally, finer punctures medially. Metatibia evenly and strongly widened, widest at apex, there 3.5 times as wide as at the base. In males, abdominal sternite III with a pair of foveae at anterior margin; foveae usually bearing white setae; sternites IV–VII each with transverse row of small setose punctures near middle. Median lobe of aedeagus (Fig. 13) broad; paired apices curved, meeting apically. Parameres extend beyond apex of median lobe. Internal sac as in Fig. 13

Distribution. North America (Fig. 24). **UNITED STATES.** FLORIDA; only in the extreme south, in Dade and Monroe counties. Previously recorded (Daffner 1988) from: FLORIDA. Dade Co., Everglades National Park, Royal Palm Hammock. 1.5 km NW Royal Palm. S Miami, Deering Estate Park. Old Cutler Hammock. Monroe Co., Big Pine Key, Watsons Hammock. Big Torch Key. Cudjoe Key. Lignum Vitae Key. No Name Key. Sugar Loaf Key, Kitchings Hammock. Key Largo, Pennekamp State Park. Fat Deer Key. This distribution suggests that the species may also occur in Cuba or the Bahamas.

Seasonality. Adults are known from the cooler months of October to March.

Bionomics. All adults have been collected in subtropical hammock forests. They have been taken in flight intercept and malaise traps, except one in an ultraviolet light trap.

New material examined. We have seen 152 specimens. There are no new records.

***Zeadolopus oklahomensis* Daffner, 1988**

(Fig. 14, 24)

Zeadolopus oklahomensis Daffner, 1988: 298. Holotype, male, in Daffner collection, not seen. Type locality: Red Oak, OK.

Diagnosis. Length (pronotum + elytra) = 1.22–1.54 mm; greatest width = 0.90–1.20 mm. Reddish brown, shiny. Head punctures moderately coarse, irregularly spaced. Antennal club not or slightly darker than funicle; apical antennomere longer and narrower than penultimate antennomere. Sides of pronotum rounded, posterior angles rounded; base rounded medially, weakly concave before posterior angles. Pronotal punctation fine, irregularly spaced. Elytral striae punctures deep and closely spaced, discernible nearly to base. Interstriae finely punctate. Metasternum coarsely, densely punctate laterally, more finely punctate medially. Metatibia widest in apical half, 2.5 times as wide as at the base. Abdominal sternites III–VII each with transverse row of fine punctures near middle. Median lobe of aedeagus (Fig. 14) broad, paired apices inwardly curved. Parameres extend slightly beyond apex of median lobe. Internal sac as in Fig. 14.

Distribution. North America (Fig. 24). **UNITED STATES.** ALABAMA, ARKANSAS, FLORIDA, OKLAHOMA, TEXAS, VIRGINIA.

Previously recorded in North America (Daffner 1988) from: UNITED STATES. OKLAHOMA. Latimer Co., 5 mi W Red Oak.

Seasonality. Adults have been collected from April to November, with most being in the months of June to September.

Bionomics. Adults have been collected mostly in mixed hardwood forest. They have been taken by flight intercept or ultraviolet light or yellow pan traps.

New material examined. We have seen 48 specimens from the following new localities: **UNITED STATES.** ALABAMA. Jefferson Co., Westavia. ARKANSAS. Little Rock. FLORIDA. Alachua Co., Gainesville. Monroe Co., Middle Torch Key. OKLAHOMA. Marshall Co., Willis, Lake Texoma. TEXAS. Angelina Co., 4 mi SE Zavalla, Angelina National Forest. Bastrop Co., Bastrop State Park. Tyler Co., Kirby State Forest. Wood Co., 3.5 mi SW Hainesville, Godwin Woods. VIRGINIA. Bath Co., 9.6 mi N Clifton Forge.

***Zeadolopus rubricornis* Daffner, 1988**

(Fig. 15, 24)

Zeadolopus rubricornis Daffner, 1988: 299. Holotype, male, in CMNC. Type locality: S. Miami, Dade County, FL.

Diagnosis. Length (pronotum + elytra) = 1.40–2.02 mm; greatest width = 1.00–1.68 mm. Reddish brown, shiny. Head punctures moderately fine, variably spaced. Antennal club of same color as funicle; apical antennomere longer and narrower than penultimate antennomere. Sides of pronotum rounded, posterior angles rounded; base rounded medially, weakly concave before posterior angles. Pronotal punctation fine, widely spaced. Elytral strial punctures deep and closely spaced, not discernible near base. Interstriae finely, sparsely punctate. Metasternum finely, sparsely punctate medially; coarsely, irregularly punctate laterally. Metatibia widest just before apex, 3 to 4 times as wide as at base. Abdominal sternites III–VII each with transverse row of fine punctures before apex. Median lobe of aedeagus (Fig. 15) broad, paired apices short and broad. Parameres broad, not extending beyond apex of median lobe. Internal sac as in Fig. 15.

Distribution. North American distribution (Fig. 24): **UNITED STATES.** FLORIDA; only in the extreme south in Dade and Monroe counties.

Previously recorded in North America (Daffner 1988) from: **UNITED STATES.** FLORIDA. Dade Co., S Miami, Deering Estate Park. Everglades National Park, Royal Palm Hammock. Monroe Co., Big Pine Key, Watson Hammock. Cudjoe Key. Fat Deer Key. Key Largo, Pennekamp State Park. Lignum Vitae Key, near Islamorada. Sugarloaf Key, Kitchings Hammock.

Seasonality. Adults have been collected throughout the year, but mostly in the cooler months from October to February.

Bionomics. All collections are from subtropical hammock forest in extreme southern Florida. All have been taken by flight intercept and ultraviolet light traps.

New material examined. We have seen 132 specimens, including the following new localities: **UNITED STATES.** FLORIDA. Dade Co. Old Cutler Hammock, 7900 SW 176th St. Everglades National Park, Long Pine Key. Monroe Co. Big Pine Key, No Name Road. Big Torch Key. Key Vaca. Middle Torch Key. No Name Key. Stock Island. Sugarloaf Key, SE ¼, Section 23. This distribution suggests that the species may also occur in Cuba or the Bahamas.

The *Leiodes* genus-group

This group is characterized by having the mesosternum oblique between the mesocoxae. In North America it is known to contain only the genera *Leiodes* Latreille and *Ecarinosphaerula* Hatch. Baranowski (1993) revised the North American species of *Leiodes*. We here contribute new data on the genus *Ecarinosphaerula* Hatch.

Ecarinosphaerula Hatch

Ecarinosphaerula Hatch, 1929: 2 (as a subgenus of *Leiodes*). Type species: *Anisotoma ecarinata* Horn, 1880, by original designation.

Diagnosis. Body moderately flattened, oblong. Antenna with 11 antennomeres, with 5-antennomere club interrupted by small antennomere 8. Mandibles moderately long, without distinct teeth. Ventral side of head without antennal grooves. Pronotum transverse, about as wide as elytra. Elytra longer than wide. Prosternum short in front of procoxae. Mesosternum oblique, without median longitudinal carina. Metasternum longer than first two visible abdominal sternites combined. Abdomen with 6 visible sternites (sternites III–VIII) in both sexes. Legs moderately slender; all tibiae spinose on outer margin. Tarsal formula 5-5-4 in both sexes. Males distinguished by weakly expanded protarsi and mesotarsi, and by toothlike expansion of lower margin of metafemur. The distribution of the genus is western Nearctic (Newton 1998).

Discussion. We have examined five previously unreported specimens of *Ecarinosphaerula*. The label data of the specimens are as follows: “Pasadena/ Cal./ H.C. Fall Collection” (1 female, MCZC); “UNITED STATES: Cal., Tulare Co./ Sequoia Nat. Park, 7000’ Halstead Creek/ 29.V.1984/ R. Baranowski” (1 male, SBPC); “CA: Monterey Co./ 36°04.33’N, 121°34.95’W/ UC Big Creek Reserve/ vi.29-vii.6.2002/ M. Caterino, FIT(11)” (2 males, SBMN); “UNITED STATES: CA: Marin Co., 2kmS/ Olema, N38°00.5’W122°46’ Mixed ravine forest FIT, 20m/ 9.V-11.VI.03, S. Peck, 03-20” (2 males, SBPC).

There are at least two distinct species among these specimens, based on examination of male genitalia. The original description of the species *E. ecarinata* (Horn 1880: 292) was based on two specimens from western Nevada, with a label with the word “Morrison”, whom we assume was the collector, and which is not a locality. One of these specimens appears to be a female and bears a label as being the (unpublished?) lectotype (MCZC type 3012). An additional specimen, not seen by us, was reported by Hatch (1957) as *E. ecarinata* from Penticton, British Columbia. At this time, with the paucity of material of this genus, we cannot provide more information.

Ecarinosphaerula ecarinata (Horn, 1880)

(Fig. 21)

Anisotoma ecarinata Horn 1880: 292. “Lectotype”, female, in MCZC, type number 3012, (We do not know of a publication validating this specimen as the lectotype and we do not so designate it here.), seen; MCZC cotype 33560, seen. Type locality: “western Nevada,” probably from woodland or forest habitat in the vicinity of Reno or Lake Tahoe.

Leiodes (*Ecarinosphaerula*) *ecarinata* (Horn); Hatch 1929: 2.

Ecarinosphaerula ecarinata (Horn); Hatch 1957: 29.

Diagnosis. As for the genus.

Distribution. Previously recorded in North America (Horn 1880, Hatch 1929, 1957) from: CANADA. BRITISH COLUMBIA. Penticton. UNITED STATES. NEVADA (unspecified locality). CALIFORNIA. See Fig. 21.

Seasonality. The few known specimens were collected from May to July.

Bionomics. The few known adults with habitat data were collected in mixed forest.

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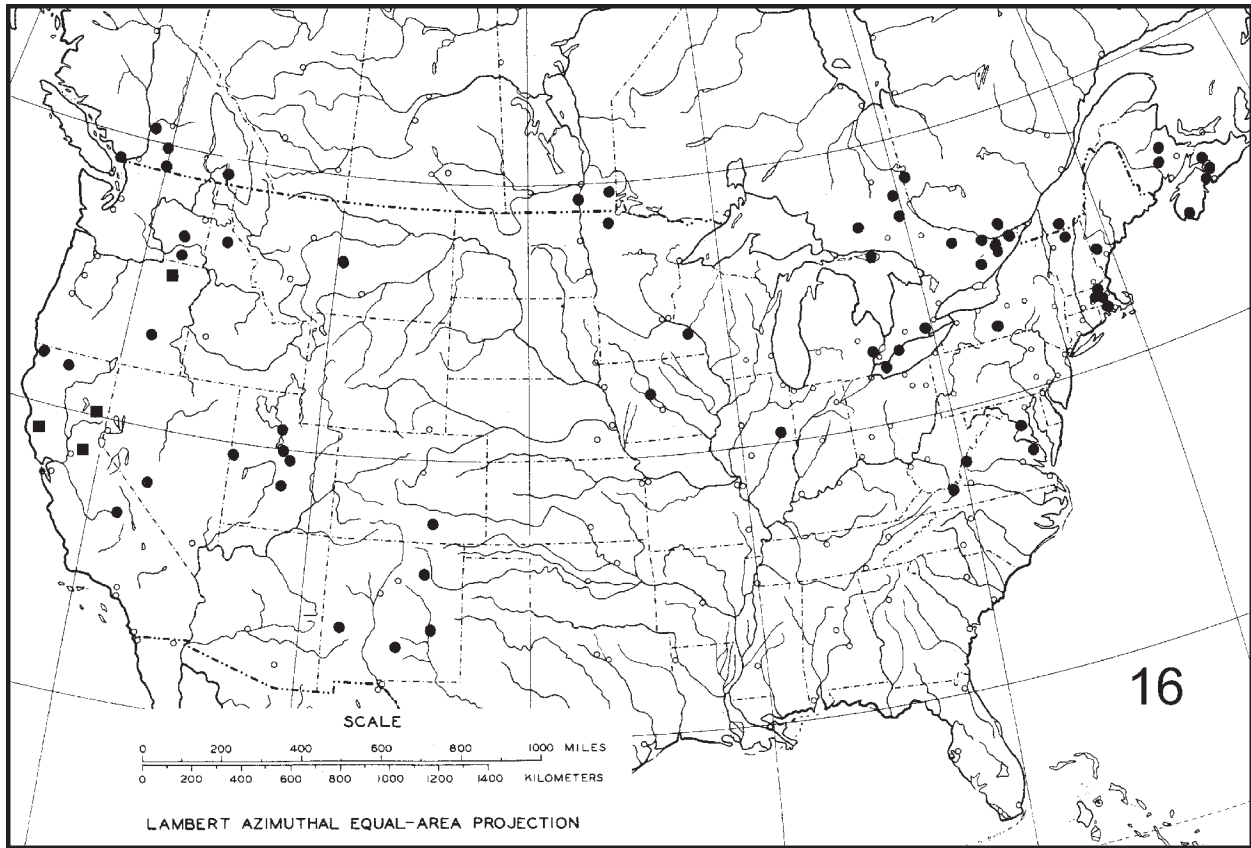


Figure 16. North American distribution of *Cyrtusa subtestacea* (black circles), *C. grossepunctata* (black squares).

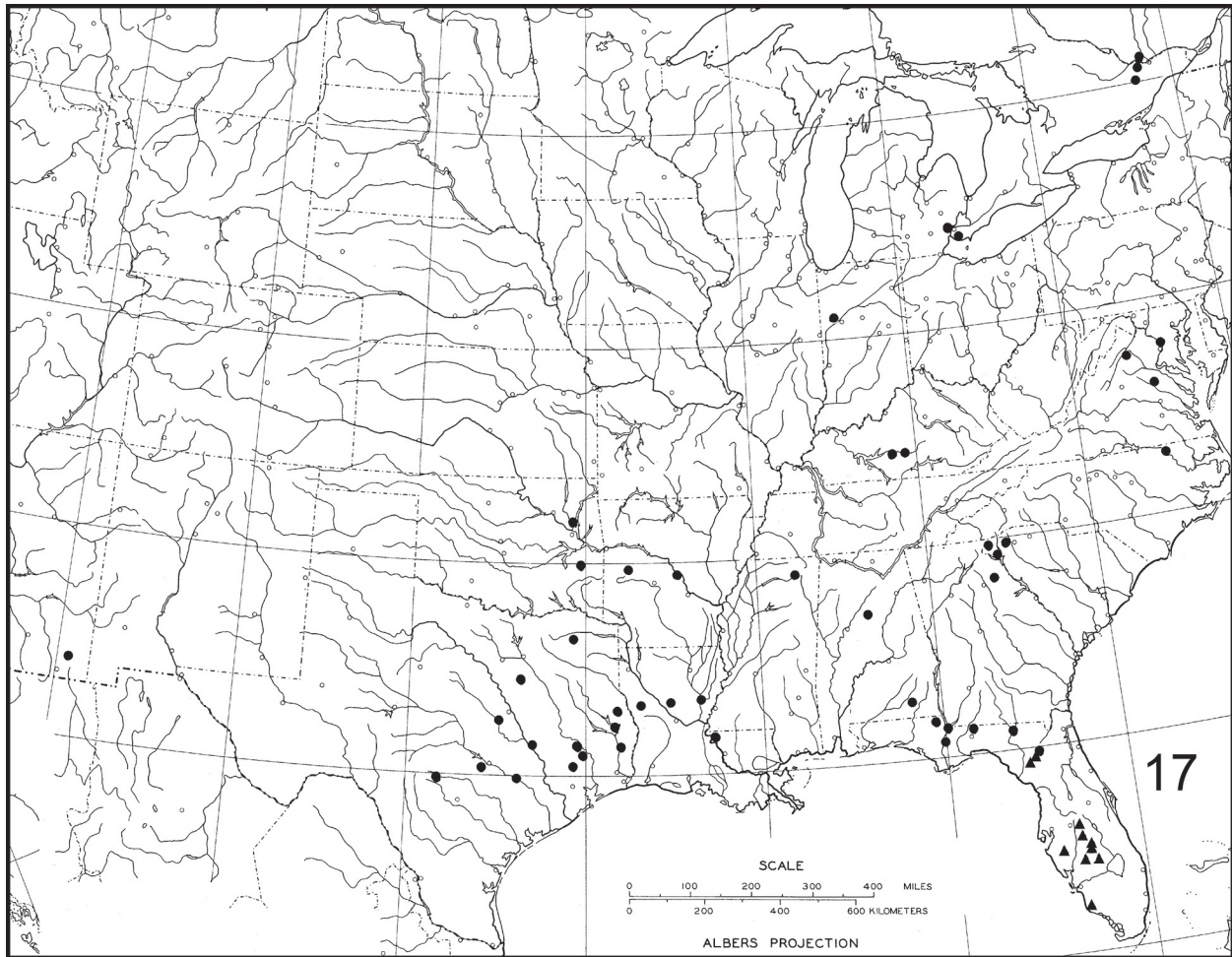


Figure 17. North American distribution of *Isoplastus fossor* (black circles), *I. floridanus* (black triangles).

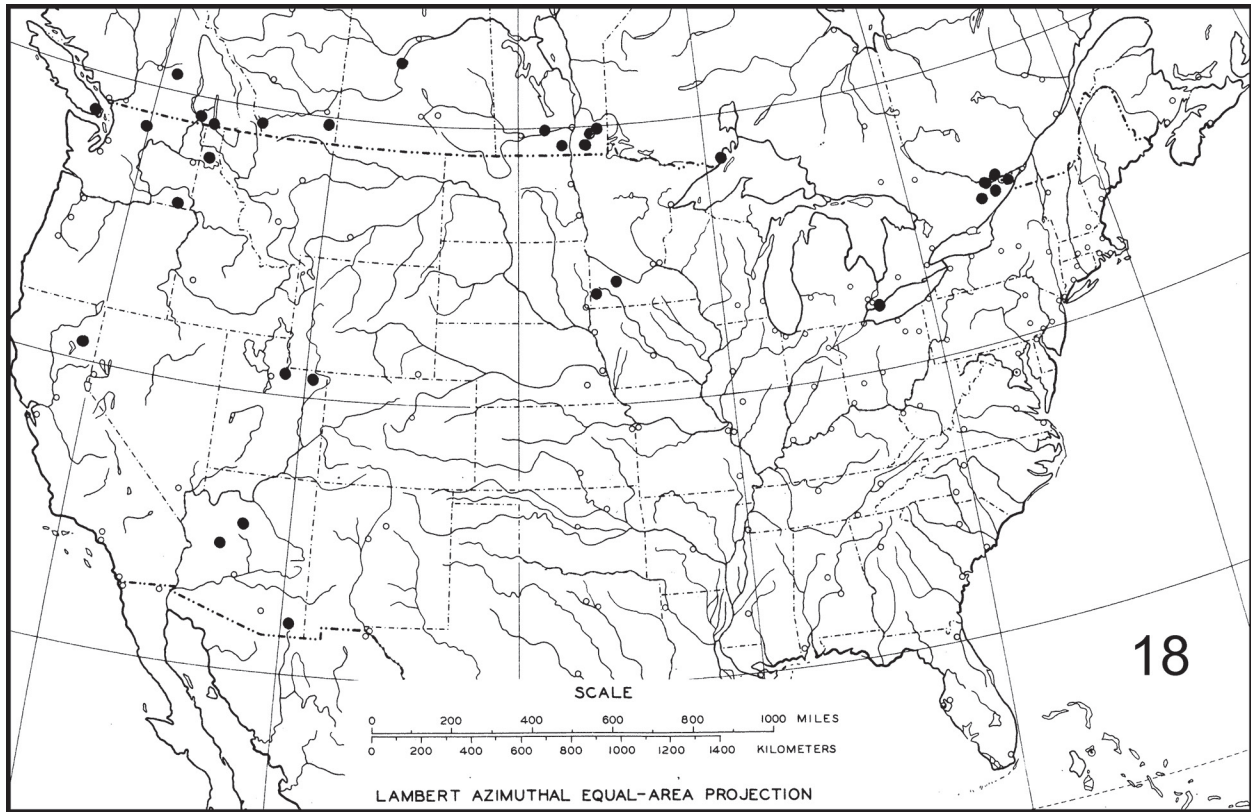


Figure 18. North American distribution of *Liocyrtusa luggeri* (black circles).

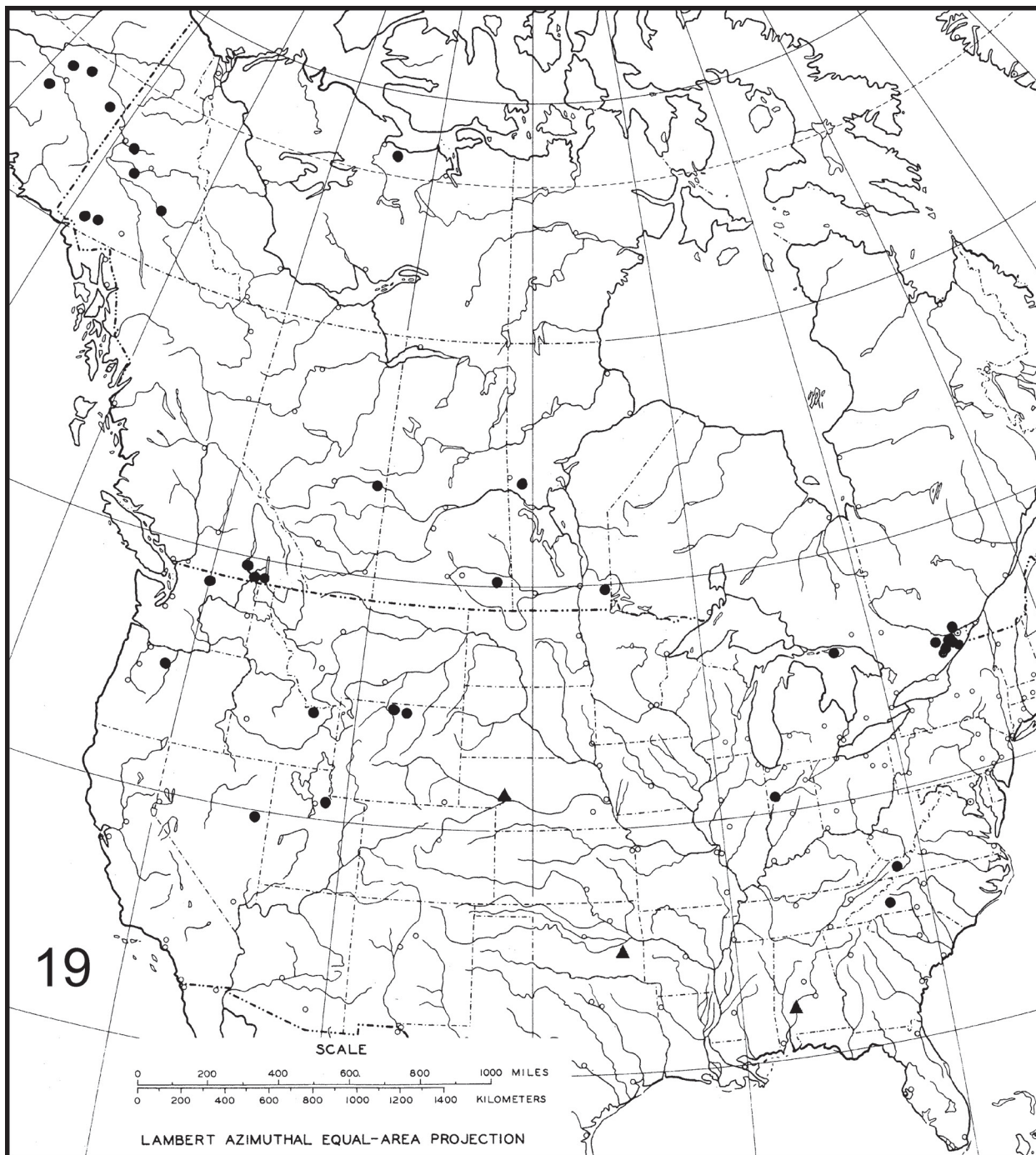


Figure 19. North American distribution of *Liocytusa nigriclavus* (black circles), *L. stephani* (black triangles).

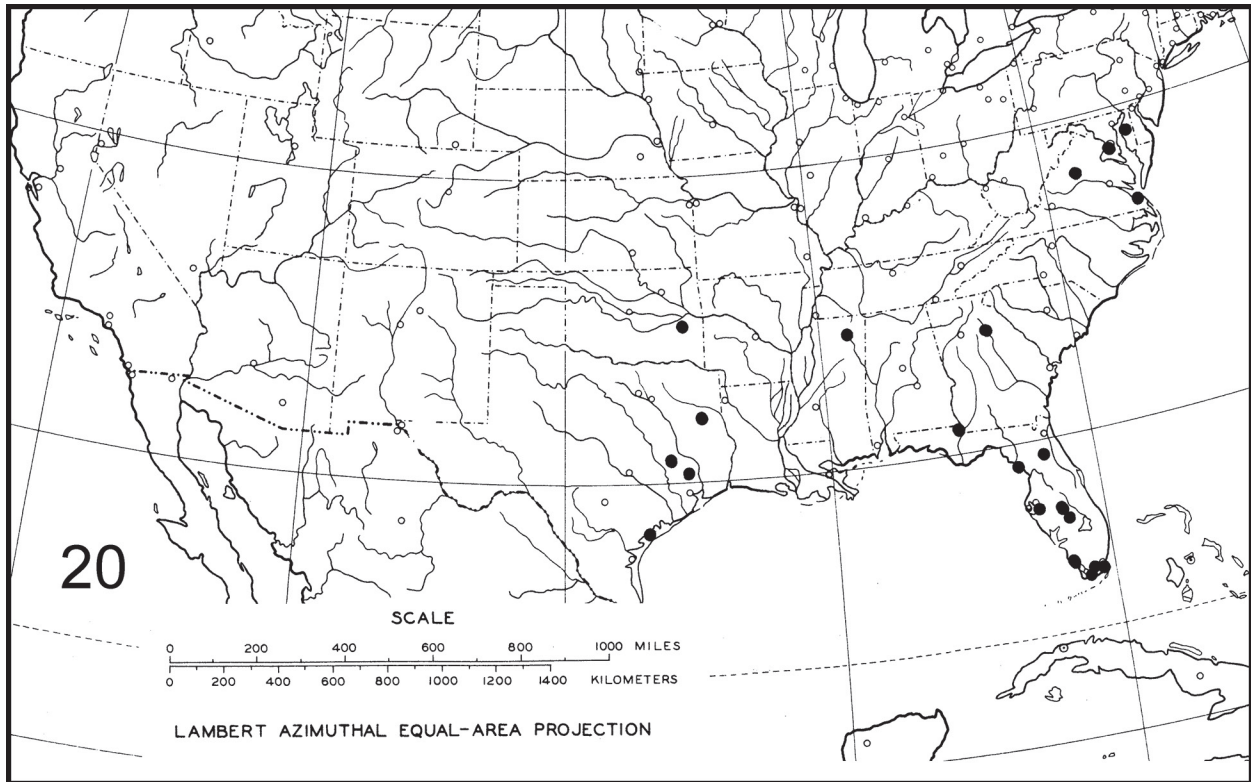


Figure 20. North American distribution of *Lionothus ulkei* (black circles).

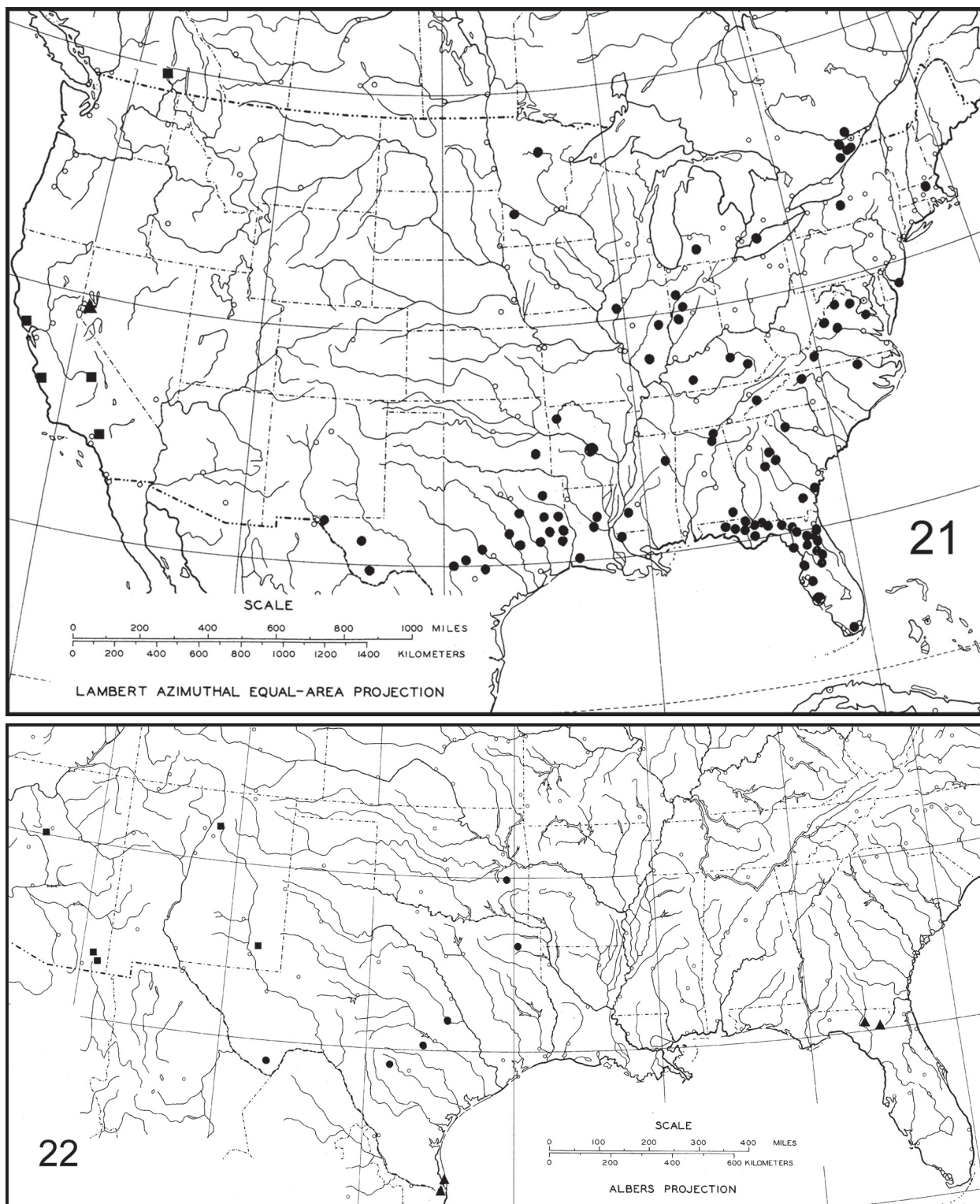


Figure 21. North American distribution of *Lionothus forticornis* (black circles), *Ecarinosphaerula* spp. (black squares), *E. ecarinata* type locality (black triangle).

Figure 22. North American distribution of *Lionothus bidentatus* (black circles), *L. exiguus* (black triangles), *L. parvoculus* (black squares).

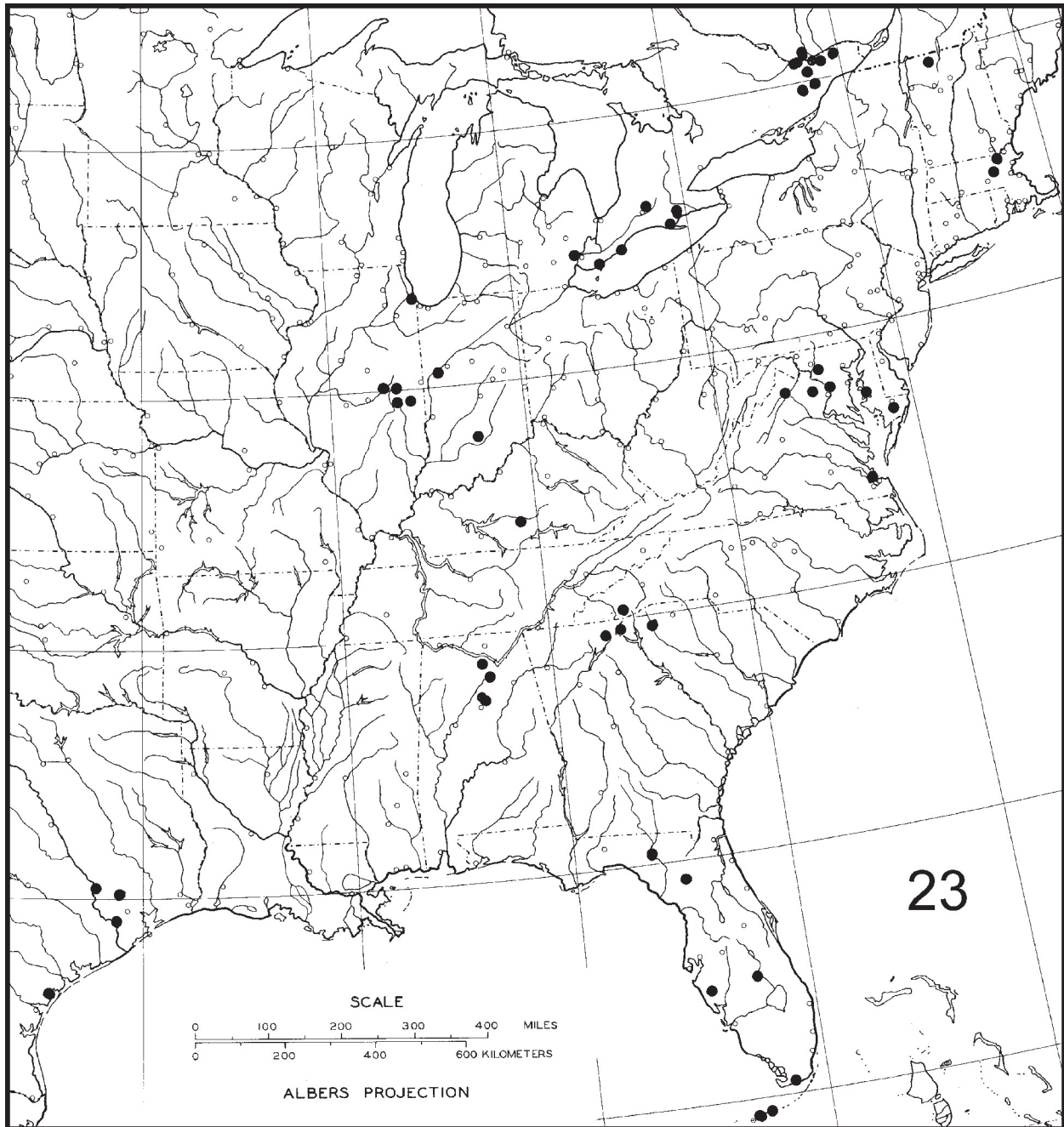


Figure 23. North American distribution of *Zeadolopus egenus* (black circles).

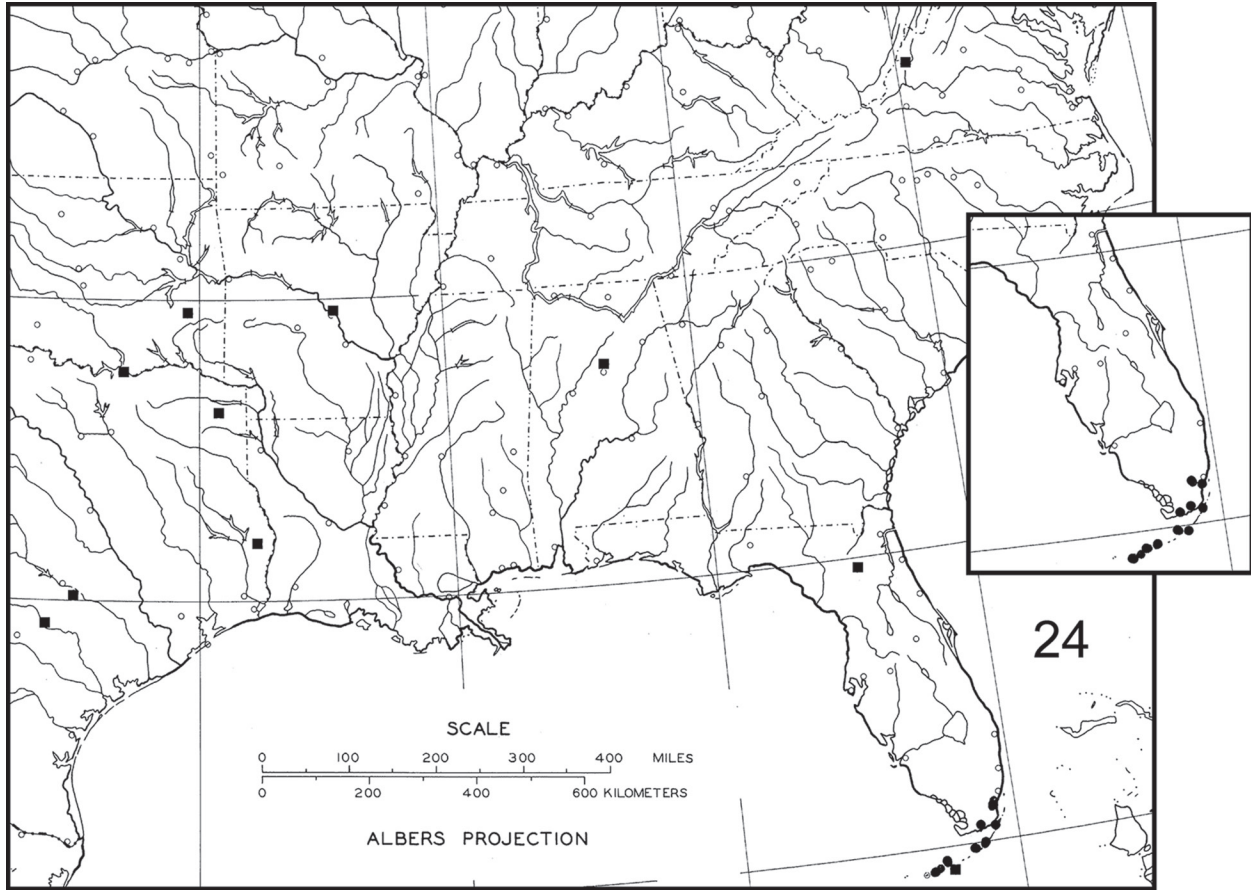


Figure 24. North American distribution of *Zeadolopus bifoveolatus* (black circles), *Z. oklahomensis* (black squares), *Z. rubricornis* (inset map, black circles).