

The Great Lakes Entomologist

Volume 42
Numbers 1 & 2 - Spring/Summer 2009 Numbers
1 & 2 - Spring/Summer 2009

Article 6

April 2009

A New Species of *Euryurus* From Southern Alabama and Remarks on the Status of *Illiniurus Beattyi* Shear (Diplopoda: Polydesmida: Euryuridae).

Michael C. Jorgensen
University of Illinois

Follow this and additional works at: <https://scholar.valpo.edu/tgle>



Part of the [Entomology Commons](#)

Recommended Citation

Jorgensen, Michael C. 2009. "A New Species of *Euryurus* From Southern Alabama and Remarks on the Status of *Illiniurus Beattyi* Shear (Diplopoda: Polydesmida: Euryuridae).," *The Great Lakes Entomologist*, vol 42 (1)

Available at: <https://scholar.valpo.edu/tgle/vol42/iss1/6>

This Peer-Review Article is brought to you for free and open access by the Department of Biology at ValpoScholar. It has been accepted for inclusion in The Great Lakes Entomologist by an authorized administrator of ValpoScholar. For more information, please contact a ValpoScholar staff member at scholar@valpo.edu.

A new species of *Euryurus* from southern Alabama and remarks on the status of *Illiniurus beattyi* Shear (Diplopoda: Polydesmida: Euryuridae).

Michael C. Jorgensen^{1,2}

Abstract

A new species of polydesmidan millipede of the family Euryuridae, *Euryurus lecythanoictes*, is described. Another millipede of Euryuridae, *Illiniurus beattyi* Shear, is considered to be an aberrant specimen and therefore not a true species. The family taxonomic history of Euryuridae is briefly covered with a discussion of gonopod anatomy.

The diplopod family Euryuridae Pocock, 1909 is a polydesmidan group with a known distribution confined to the eastern United States. These millipedes are of moderate size (<35 mm) with a distinctive bright orange and black color pattern. They are characterized by a broad epiproct, the only North American polydesmidan family with this character.

Genus *Euryurus* Koch, 1847 has been the root for various taxonomic levels representing an inconsistent assortment of taxa, beginning as the subfamily Euryurinae Pocock, 1909 in the family Platyrhacidae Pocock, 1895. Euryurinae contained three Latin American genera: *Amplinus* Attems, 1898, *Polylepiscus* Pocock, 1909, *Aphelidesmus* Brölemann, 1898, one Indonesian: *Polylepis* Bollman, 1893, and the North American *Euryurus*. By this time, over 20 species had been assigned to *Euryurus*, mostly South American, and Pocock essentially transferred all the Latin American species into *Aphelidesmus*. He recognized that the two North American species, *E. erythropygus* and *E. australis*, were not congeners of *Aphelidesmus* and left their status unchanged.

The subfamily was later reduced to tribal status by Brölemann (1916) along with Platyrhacini to make up the subfamily Platyrhacinae in Platyrhacidae. In this classification, Euryurini contained the genera *Euryurus*, *Amplinus*, *Polylepiscus*, *Polylepis* and the South American *Pycnotropis* Carl, 1914. *Aphelidesmus* was removed to the other platyrhacid subfamily Aphelidesminae

The first use of Euryuridae as a family name was that of Chamberlin (1918) in his descriptions of *Aphelidesmus divergens* and *Polylepiscus boreri*. This use was merely a heading preceding the descriptions with no further explanation. His inclusion of *A. divergens* suggests he was working from Pocock's (1909) classification. Euryuridae was later synonymized with Platyrhacidae by Attems (1938), a move that was mentioned, but not accepted in later works (Hoffman 1951, 1954). Hoffman (1954) then proposed that Euryuridae contain three subfamilies: Aphelidesminae, Amplininae and Euryurinae, the latter being the first exclusive familial grouping of euryurids in the present day context.

This classification remained unchanged until Hoffman (1975) reduced Euryuridae back to subfamily status within Platyrhacidae, with the three former subfamilies becoming tribes. Later, Hoffman (1998) reassessed the Platyrhacidae and concluded that the Euryurini actually have a closer affinity to xystodesmids

¹Department of Biological Sciences, University of Illinois at Chicago, Chicago, IL USA.

²Department of Zoology, Field Museum of Natural History, Chicago, IL USA. (e-mail: mjohns34@uic.edu).

than to platyrhacids and restored them to family status. As a result, Shelley (2003) formally grouped Euryuridae with Xystodesmidae, Eurymerodesmidae, Oxydesmidae and Gomphodesmidae in the superfamily Xystodesmoidea.

Currently, the family contains 12 species, three of which consist of subspecies pairs. The species are essentially identical in somatic characters, resulting in gonopod structure as the main species and genus delimiting character. The species are grouped into three genera: *Euryurus* Koch, 1847 (revised by Hoffman, 1978), *Auturus* Chamberlin, 1942 (revised by Shelley, 1982b) and *Illiniurus* Shear, 1968. These genera are defined by major character differences in gonopod structure, and species by variations within each generic model.

The gonopod structure of euryurids (Fig. 1) is simple, with most variation occurring at the acropodite. The prefemur is thick and hirsute, usually with a distinct concavity just basal to the acropodite. Additional processes are absent proximal to the prefemoral concavity and on the coxae. Generic differences are as follows. *Euryurus* species have elongated acropodites with a narrow mucronate solenomere, often with an additional subterminal process resulting in a bifid appearance. Many species also have one or two additional processes adjacent to the prefemoral concavity, termed the femoral basal lamella and the distal prefemoral knob (Hoffman 1978). In contrast, *Auturus* species have very short acropodites with a flattened solenomere and additional processes coiling laterally to produce a blunt calyx shape. *Illiniurus* is described in detail below.

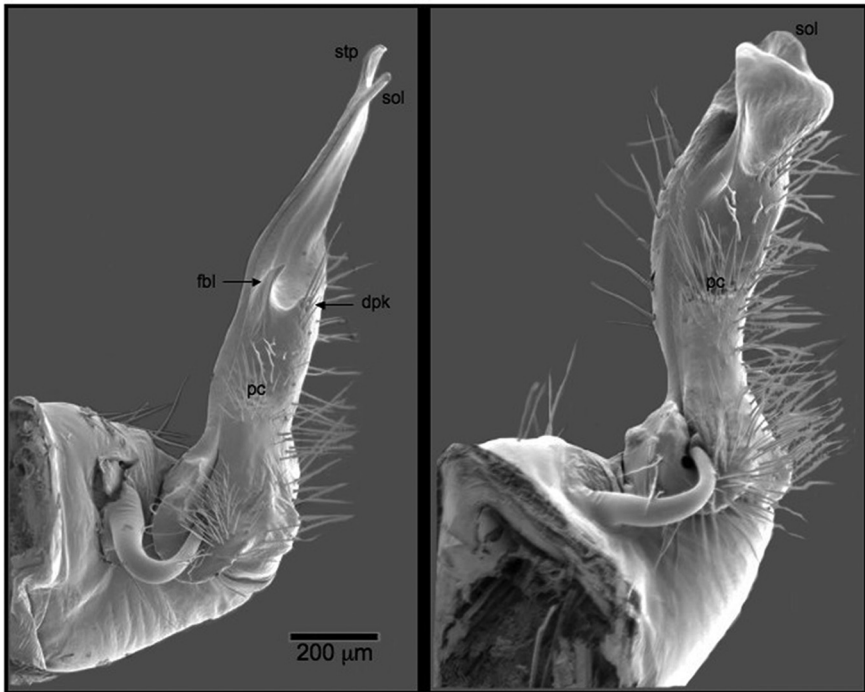


Figure 1. SEM images of left gonopod of *Euryurus leachii* (left) and *Auturus evides* (right), medial views. Solenomere (sol), sub-terminal process (stp), femoral basal lamella (fbl), distal prefemoral knob (dpk), prefemoral concavity (pc) are referred to in the text.

Materials and Methods

Specimens were examined with a Leica MZ8 dissecting microscope. Digital images were taken with a Microoptics®-Imaging-System (based at FMNH). Final images were assembled from 6-10 source images taken at different focal lengths using the software package Helicon Focus. Gonopods for scanning electron microscope (SEM) imaging were serially dehydrated in ethanol solutions, critical point dried and gold sputter coated. SEM images were taken with a JEOL 5600 LV scanning electron microscope (based at UIC) and retouched with Adobe Photoshop CS2.

Several different image types can be used to illustrate anatomical structures. Drawings, SEM and digital images are the most common and all have their own advantages and limitations. Drawings are ubiquitous in the diplopod literature and serve well, but they are interpretations of the illustrator and therefore subject to misinterpretation. When dealing with simple structures, such as euryurid gonopods, more objective SEM and digital images can convey as much, if not more, information as drawings. SEM images are informative due to their high resolution but are limited by only revealing the achromatic surface texture of the structure. These images can be supplemented with digital images which, although lacking in resolution, present the natural appearance of the structure. To maximize the amount of visual information given for this new species, all three image types are utilized in presenting the gonopod structure.

Results and Discussion

Illiniurus Shear, 1968. Proc. Biol. Soc. Wash. 81: 480.

Type species: *I. beattyi* Shear, by original designation.

Illiniurus beattyi Shear, 1968. Proc. Biol. Soc. Wash. 81: 480.

Type specimens: Male holotype, *vidi*, female paratype, *vidi* (MCZ) from Clear Springs, Union County, Illinois, collected 28 Oct. 1966 by J. M. Nelson.

Additional literature: Hoffman, 1978: 42-43. -- Hoffman, 1980: 164. -- Shelley, 1982b: 3250. -- Hoffman, 1999: 288 & 292.

Genus *Illiniurus* and its single species *I. beattyi* are based on a single male specimen from the southern tip of Illinois. It is characterized by gonopod structure, which is quite distinct from that of both *Auturus* and *Euryurus* (Fig. 2). The acropodite does not form the calyx characteristic of *Auturus*, is flattened, longitudinally folded and terminates with the solenomere. The solenomere itself is broad at its base, bordered on the lateral side by a small lamina, and a larger sub-terminal process on the medial side. In ventral view, this sub-terminal process and the solenomere form the bifid shape characteristic of *Euryurus* (Fig. 2). The distal prefemoral knob and prefemoral concavity are distinct; the femoral basal lamella is either highly modified or absent.

It is remarkable that the gonopod of this specimen has features of *Auturus* (short, blunt processes) and *Euryurus* (elongated, bifid telopodite), making it appear "transitional" between the two genera. This is even noted on the specimen's original label: "halfway between *Euryurus* and *Auturus*." The type locality of *I. beattyi* is within an area where two euryurid species, *Euryurus leachii* Gray, 1832 and *Auturus evides* Bollman, 1887, live in sympatry and share the same habitat. The female paratype's cyphopod anatomy is indistinguishable from those of *E. leachii* specimens. Additionally, the vial containing the *I. beattyi* specimens at the time of description also contained a male *A. evides* (Shear 1968).

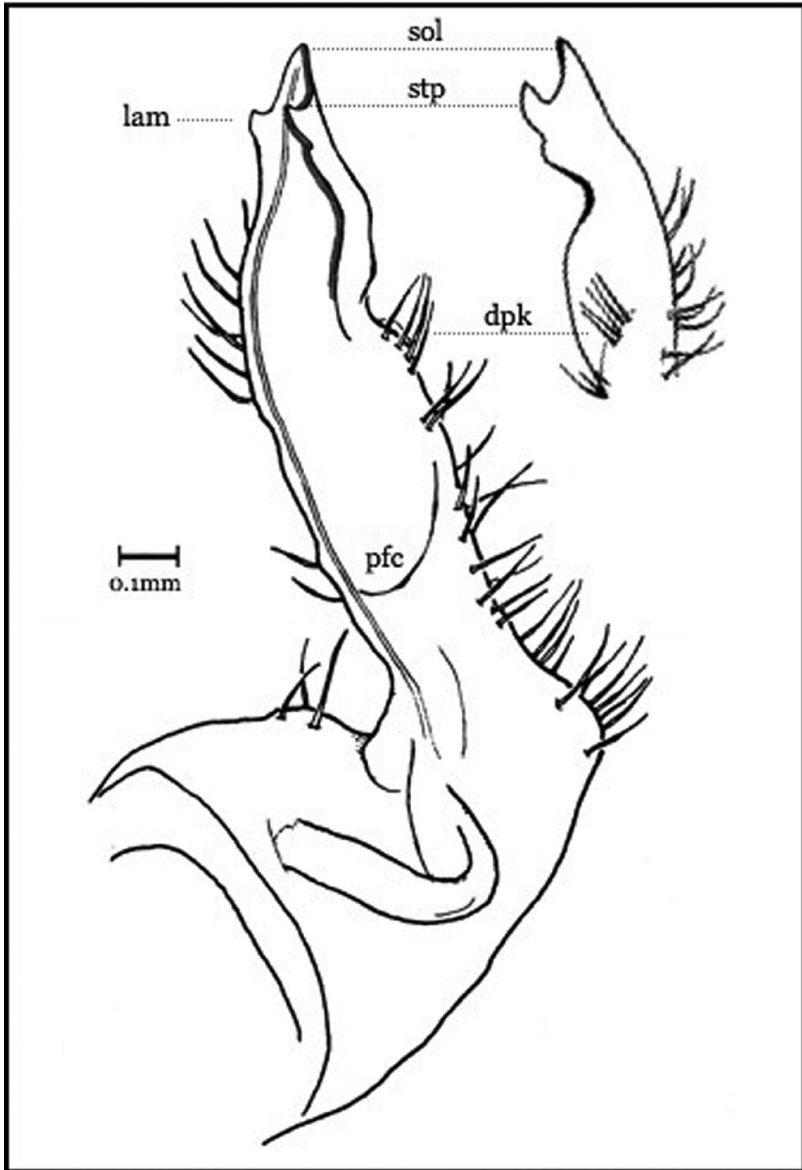


Figure 2. Left gonopod of *Illiniurus beattyi* holotype, medial view, and supplementary ventral view of acropodite. Small lamina mentioned in text (lam), other abbreviations same as in Figure 1.

Expeditions by Field Museum personnel to the type locality in 2006 and 2007 failed to yield additional specimens of *I. beattyi*, yet numerous individuals of *E. leachii* and *A. evides* were found. The male *I. beattyi* specimen likely represents a case of gonopod deformity, a common phenomenon in diplopods, and if so, an aberrant individual of one of the other local euryurid species. Another possible scenario is that it is a hybrid of *E. leachii* and *A. evides* as evidenced by its gonopod appearing “transitional” between the two. Unless a population of this species is found, the status of genus *Illiniurus* and species *I. beattyi* as natural taxa should be held with reservation.

The type specimens are deposited at the Museum of Comparative Zoology. The original description states this (Shear 1968, p. 480), but also states deposition at the American Museum of Natural History (Shear 1968, p. 483). This discrepancy led Shelley (1982b) and Hoffman (1999) to assume the material was lost. Only the left gonopod was present in the vial at the time of this study.

Euryurus C. L. Koch, 1847. System der Myriapoden, in *Kritische Revision der Insectenfauna Deutschlands*, ed. Herrich-Schäffer, 3, pg 138

Type species: *E. maculatus* Koch, 1847, by direct substitution (see Hoffman, 1999: 290).

8 species, eastern United States

Euryurus lecythanoictes, new species

Type specimens: Male holotype and paratypes (2 M, 1 F) from Escambia County, Alabama. Conecuh National Forest. ~2 miles north of AL 29 between mile markers 26 & 27; collected 2 Aug. 2008 by M. Jorgensen. Deposited Field Museum of Natural History (FMNH-INS 043-944).

Material examined: Types specimens mentioned above, 1 male collected with the types (legs harvested for DNA), 1 male from type locality collected by M. Walker, 21 June 2007 (gonopods mounted for SEM, legs harvested for DNA). All specimens are adults.

Diagnosis: *Euryurus lecythanoictes* is distinguished from other *Euryurus* species by both the absence of a subterminal process and the presence of a distinct femoral lamella on the gonopod. Only one other known species, *E. mississippiensis* (Causey, 1955), is without a subterminal process. However, the femoral lamella is completely absent in *E. mississippiensis*.

Description (based on holotype; consistent with other males): Color in life: dorsally, very dark, almost black with bright orange paranota tips and mid-posterior portion of each metazonite. Yellowish speckling between orange areas. Ventrally, all yellowish except orange paranota tips. Dorsal surface smooth, moderately convex, with paranota extended laterally. Posterior segments with paranota angled acutely caudad. Collum width subequal to that of ensuing tergites. Head smooth with evident epicranial suture. Facial setae pattern: subantennal 1-1, frontal 1-1, genal 2-2, clypeal ca. 6-6, labral ca. 10-10. Antennae long (ca. 3 mm) with antennomeres 2-6 distally clavate and subequal in size and shape. Ozopores open laterally on segments 5, 7, 9-10, 12-13, 15-19. Hypoproct elliptical with 1 pair setae near caudal margin. Paraprocts with 2 pair setae, posterior-most pair closer to medial margin. Epiproct subquadrate and very broadly spatulate. Gonopods without subterminal process; solenomere flat and wide, distally mucronate and retrorse. Femoral lamella very distinct and broad, yet distally mucronate (Figs. 3-5).

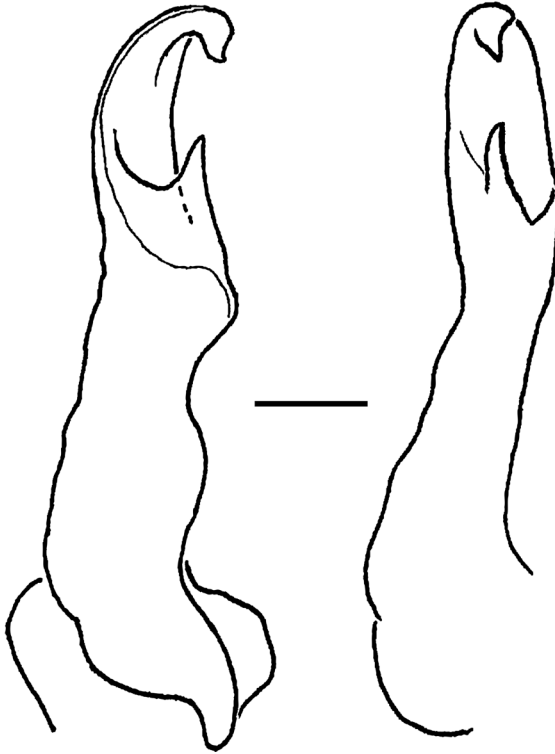


Figure 3. Right gonopod of *E. lecythanoictes* holotype, ventral view (left) and mesal view (right). Dense setae not depicted (see Figures 4 and 5). Bar = 0.2 mm.

Female specimen: Somatic characters consistent with above. Cyphopods (Fig. 6) composed of two ovoid valves shielded mesally by the receptacle and basally by the operculum (terminology *sensu* Hoffman, 1978). Mid-ventral margin of each valve extended into sclerotized, 2-lobed ventral lamina. Distal portion of lamina forms partial covering of the reproductive opening. Long setae directed toward and covering ventral margins of valves.

All specimens: length ca. 25 mm, width at 10th segment 3.5 mm.

Etymology: *lecythanoictes*, noun in apposition. The name is derived from the Greek words *lecythos* (bottle) and *anoiktes* (one that opens) describing the “bottle opener” shape of the gonopod.

Geography and ecology: Known only from the type locality. This locality is over 100 km from the nearest known range of a congener (Fig. 7). An intensive survey of southern Alabama is necessary to determine the full distribution of *E. lecythanoictes* and its neighbors. All specimens were collected beneath the bark of dead hardwood logs in a hardwood-pine forest. All Euryuridae species are typically associated with decaying hardwood logs near water, found either beneath the bark or underneath the log (Shelley 1982b).



Figure 4. Right gonopod of *E. lecythanoictes* holotype, ventro-lateral view. Bar = 0.2 mm.

The gonopod structure of *E. lecythanoictes* is quite different from all described euryurid species. This tempts one to designate a new genus to accommodate the species. However, this action would only serve to oversplit a species-poor family and add unnecessary complexity to millipede taxonomy. I therefore chose to assign it to *Euryurus* based on the elongation of the acropodite, the prominence of the femoral lamella, and the mucronation of the solenomere.

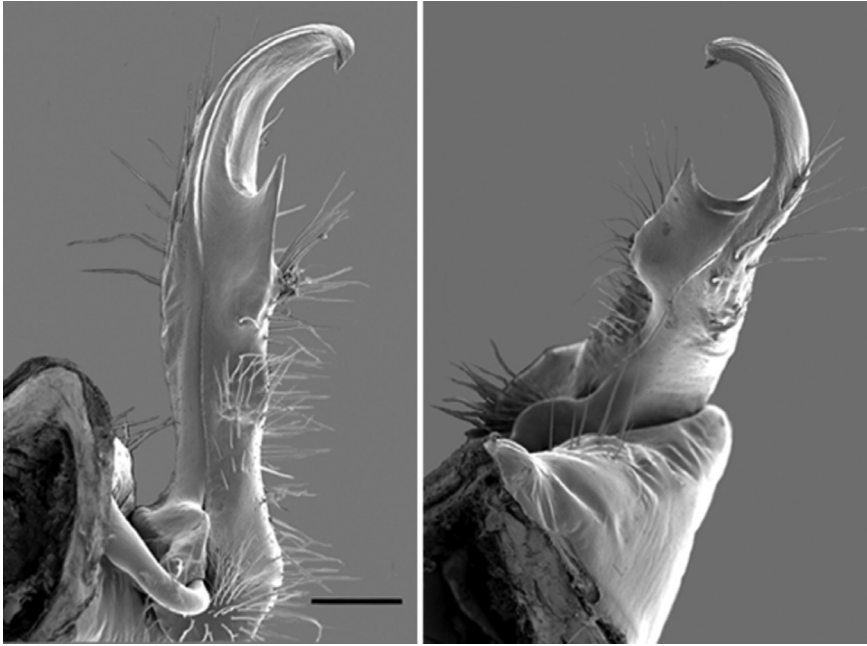


Figure 5. SEM of *E. lecythanoictes* specimen; left gonopod, dorso-medial view (left); right gonopod, dorso-lateral view (right). Bar = 0.2 mm.

Acknowledgments

I thank Matt Walker for collecting and sharing the first *E. lecythanoictes* specimen; Dr. H. Don Cameron (University of Michigan) for expert advice on developing the species name; Jim Louderman for leading expeditions to the type locality of *I. beattyi*; Jack Gibbons for instruction and assistance with the SEM; Dr. Gonzalo Giribet (MCZ) for loan of the *I. beattyi* type material. Drs. Richard Hoffman, Bill Shear, Petra Sierwald, Rüdiger Bieler and Thomas Wesener plus two anonymous reviewers provided comments that greatly improved the manuscript. This study was supported in part by Field Museum's Marshall Field Fund and NSF PEET grant, DEB 05-29715, to P. Sierwald, J.E. Bond, and W.A. Shear.

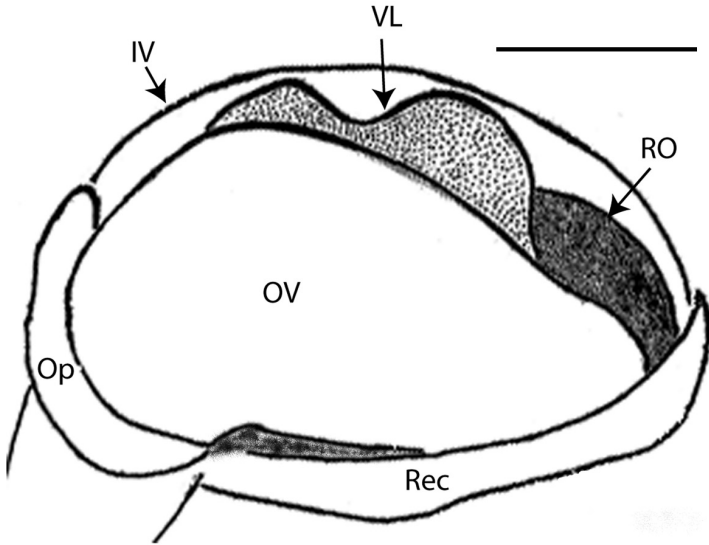


Figure 6. Right cyphopod of paratype specimen, ventro-caudal view. Setae not depicted. IV - inner valve; OV - outer valve; Op - operculum; Rec - receptacle; VL - ventral lamina; RO - reproductive opening. Bar = 0.2 mm.

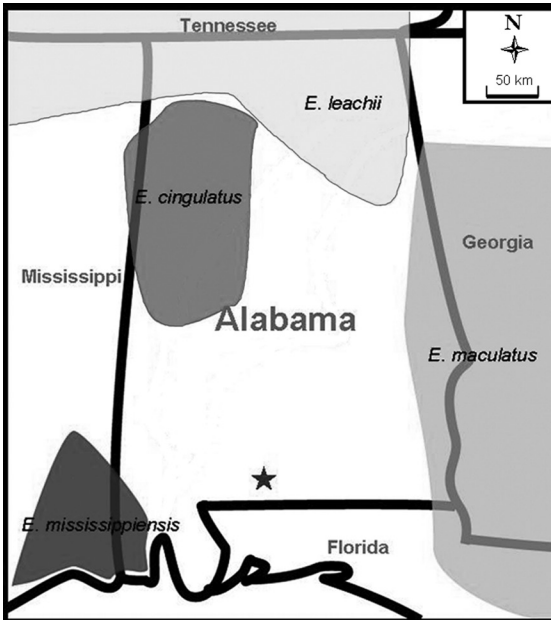


Figure 7. Type locality of *E. lecythanoictes* (star) and known distributions of neighboring Euryuridae species. Based on specimens listed in Hoffman 1978, Shelley 1982a, 1982b and collections by author.

Literature Cited

- Attems, C. M. T., Graf von. 1898.** System der Polydesmiden. I. Theil. Denkschr. Akad. Wiss. Wien, math.-nat. Klassen 67: 221-482
- Attems, C. M. T., Graf von. 1938.** Polydesmoidea II, Fam. Leptodesmidae, Platytrhachidae (sic), Oxydesmidae, Gomphodesmidae, pp 1-XXVIII, 1-487. *In* Das Tierreich 69, Myriapoda 3, Walter de Gruyter & Co., Berlin and Leipzig, Germany.
- Bollman, C. H. 1887.** Description of new genera and species of North American Myriopoda (Julidae). *Entomologica Americana* 2(12): 225-229.
- Bollman, C. H. 1893.** Classification of the Myriapoda. *Bull. U.S. Nat. Mus.* 46: 153-162.
- Brölemann, H. W. 1898.** Voyage de M. E. Simon au Venezuela (décembre 1887-août 1888. Myriapodes. *Ann. Soc. Entomol. France* 67: 241-313.
- Brölemann, H. W. 1916.** Essai de classification des Polydesmiens (myriapodes). *Ann. Soc. Entomol. France* 84: 523-608.
- Carl J. 1914.** Die Diplopoden von Columbien nebst Beiträgen zur Morphologie der Stematouliiden. *Mem. Soc. Neuch. Sci. Nat.* 5: 821-993.
- Causey N. B. 1955.** New records and descriptions of polydesmoid millipeds (order Polydesmida) from the eastern United States. *Proc. Biol. Soc. Washington* 68: 21-30.
- Chamberlin, R. V. 1918.** The Chilopoda and Diplopoda of the West Indies. *Bull. Mus. Comp. Zool.* 62: 149-262.
- Chamberlin, R. V. 1942.** New southern millipeds. *Bull. Univ. Utah* 32: 1-19.
- Gray J. E. 1832.** Myriapods, Pl. 135. *In* Griffith, E. (ed.), *The Animal Kingdom Arranged in Conformity with its Organization by the Baron Cuvier*, vol 15 (Class Insecta, vol. 2). Whittaker, Treacher and Co., London.
- Hoffman, R. L. 1951.** A new genus of Central American milliped (family Euryuridae), with notes on the American genera. *Proc. U.S. Nat. Mus.* 102: 235-243.
- Hoffman, R. L. 1954.** Further studies on American millipeds of the family Euryuridae (Polydesmida). *J. Washington Acad. Sci.* 44: 49-58.
- Hoffman, R. L. 1975.** A new genus and species of euryurid millipeds from Chiapas (Polydesmida: Platytrhachidae). *Proc. Biol. Soc. Washington* 88: 211-216.
- Hoffman, R. L. 1978.** North American millipeds of the genus *Euryurus* (Polydesmida: Platytrhachidae). *Trans. Amer. Ent. Soc.* 104: 37-68.
- Hoffman, R. L. 1980 (1979).** Classification of the Diplopoda. *Muséum d'Histoire Naturelle, Genève.* 237 pp.
- Hoffman, R. L. 1998.** Reassessment of the Platytrhachidae, a family of polydesmidan millipeds. *Myriapodologica* 5: 125-141.
- Hoffman, R. L. 1999.** Checklist of the millipeds of North and Middle America. - Virginia Museum of Natural History, special publication 8: 584 pp.
- Koch, C. L. 1847.** System der Myriapoden, pp. 1-196. *In* Panzer, G. W. F. and Herrich-Schäffer, G. A. W. (eds.), *Kritische Revision der Insectenfauna Deutschlands* 3, Felsseckersche Buchhandlung, Nürnberg, Germany.
- Pocock, R. I. 1909.** Chilopoda and Diplopoda, pp. 1-217. *In* Godman, F. D., and O. Salvin (eds), *Biologia Centrali-Americana*, Taylor and Francis, London.
- Pocock, R. I. 1895.** The Myriopoda of Burma, Pt. IV. Report upon the Polydesmoidea collected by Sig. L. Fea, Mr. E. W. Oates and others. *Ann. Mus. Civ. Stor. Nat. Genova, serie 2.* 14: 787-834.
- Shear, W. A. 1968.** A new genus and species of milliped from Illinois (Polydesmida, Euryuridae). *Proc. Biol. Soc. Washington* 81: 479-484.

- Shelley, R. M. 1982a.** Confirmation of the status of *Euryurus mississippiensis* (Causey), with congeneric records from the gulf states (Diplopoda: Polydesmida: Platyrrhacidae). Fla. Entomol. 65: 254-263.
- Shelley, R. M. 1982b.** Revision of the milliped genus *Auturus* (Polydesmida: Platyrrhacidae). Can. J. Zool. 60: 3249-3267.
- Shelley, R. M. 2003 (2002).** A revised, annotated, family-level classification of the Diplopoda. Arthropoda Selecta 11: 187-207.