

THE *LUCIFOTYCHUS* OF EASTERN NORTH AMERICA
(COLEOPTERA:PSELAPHIDAE)¹

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INTRODUCTION

During a faunal survey of an old-growth coniferous forest in northern New Hampshire, an undescribed species of *Lucifotychus* Park and Wagner was discovered. Subsequent examination of collections from several institutions revealed that this new species was widely distributed in the northern United States and southern Canada, with another new species being found on Mt. Mitchell, North Carolina. These two species, with *L. testaceus* (Casey), are the only eastern representatives of this genus that has 17 species in the Pacific Northwest and California. This particular distribution pattern is similar to that of two other large genera of Pselaphidae, *Sonoma* Casey and *Actium* Casey, with the eastern taxa of *Sonoma* and *Lucifotychus* possessing some of the most different male features in their respective genera.

Lucifotychus was initially proposed by Park and Wagner (1962) to hold three species from the Pacific Northwest. They also proposed a new subgenus, *Custotychus* Park and Wagner, to hold a species from eastern North America, *Tychus daggyi* Park. Shortly thereafter Grigarick and Schuster (1962) transferred all the remaining western Nearctic taxa placed in *Tychus* Leach to either the western *Lucifotychus* (*Lucifotychus*) or their new genus *Hylotychus*, and indicated that all of the eastern species of *Tychus* should be placed in *Lucifotychus* (*Custotychus*) while restricting *Tychus* to certain Palearctic species. Park (1956) had previously reviewed the eastern species of "*Tychus*," and provided a key to the known species.

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In a recent treatment of the world Tychini, Chandler (1988) recognized three genera in the assemblage of tychine species from eastern North America: *Custotychus* Park and Wagner, a valid genus with at least ten species; *Nearctitychus* Chandler with a single species, *sternalis* (Raffray); and one species found to be an eastern member of the otherwise western Nearctic genus, *Lucifotychus*. This eastern species of *Lucifotychus* was originally described as *Tychus testaceus* Casey (1884), but was later synonymized by Casey (1894:491) under *Tychus minor* LeConte (1849) from Georgia without comment, and all subsequent treatments have followed this synonymy. *Tychus minor* was recognized as a member of *Custotychus* by Chandler (1988), and is restricted to the southeastern United States. Ecological information on *testaceus*, under the name of *minor*, has been discussed in three papers (Reichle 1966, 1969; Chandler 1987).

A second eastern species of *Lucifotychus*, *hirsutus* n. sp., was discovered during a survey of the insect fauna of an uncut spruce/fir forest at Norton Pool in northern New Hampshire. Both *testaceus* and *hirsutus* occur in New Hampshire, with *testaceus* largely collected from the southern half of the state, and *hirsutus* in the northern half at Mt. Washington and near the Quebec border. Collection records for *testaceus* indicate a preference for deciduous leaf litters and, to a much lesser extent, rotten deciduous logs. The studies dealing with this species (as *minor*, Reichle 1966, 1969; Chandler 1987) have confirmed this preference. Chandler (1987) found that *testaceus* was more abundant in an old-growth forest than in a 40-year old forest. *Hirsutus* is a more northern species found in equal numbers in New Hampshire at an old-growth spruce-fir forest (Norton Pool), and a 30-year old forest nearby. At both sites it was strongly associated with spruce and fir leaf litters, and rotting coniferous logs. There are a few Canadian records from moss and one from deciduous litter in Newfoundland. *Hirsutus* appears to be more common in a colder coniferous habitat, while *testaceus* prefers a warmer deciduous forest habitat.

All measurements are in millimeters. Illustrations were initially prepared from cleared disarticulated specimens for the two more common species, and checked when appropriate against whole specimens mounted on points. Deposition of specimens are indicated by codons that may be found associated with the names of

those arranging loans in the Acknowledgements. The two codons not found there are DSC, collection of the author, and DENH, Department of Entomology, University of New Hampshire, Durham.

KEY TO THE *LUCIFOTYCHUS* OF EASTERN NORTH AMERICA

1. Setae on elytra more erect with a basal angle of 40–60°, setae longer, 0.08–0.10; male protrochanters bearing distinct spine (Fig. 6), sixth sternite sharply emarginate at middle of apex, ventral lobe of aedeagus slender and simple (Fig. 5); Newfoundland to South Dakota*hirsutus* n. sp.
Setae on elytra lower with basal angle of 20–40°, setae shorter, 0.05–0.08; male protrochanters angulate or curved on ventral margin, sixth sternite apex broadly and gently curved, ventral lobe of aedeagus spinose or broad (Figs. 2, 8)2
2. Male eyes larger with about 30 facets, protrochanters bluntly angulate (Fig. 3), metatrochanters with basal angulation on ventral margin (Fig. 4), apex of aedeagus spinose; New Brunswick to Virginia and Minnesota.....*testaceus* (Casey)
Male eyes smaller with about 16 facets, ventral margin of all trochanters rounded, apex of aedeagus broad; North Carolina...
.....*quirsfeldi* n. sp.

Lucifotychus testaceus (Casey)

(Figs. 1–4, 9)

Tychus testaceus Casey 1884:31. Type localities: Cambridge, MA; Trenton Falls, NY; Ann Arbor, MI. The type series in the Casey Collection (USNM) consists solely of a single female from Ann Arbor, and is here designated as the LECTOTYPE. Brendel and Wickham 1890:248. Synonymized under *minor* in key without comment by Casey 1894:491.

Tychus minor, auctorum. Not *Tychus minor* LeConte 1849:82. Casey 1894:491. Leng 1920:131. Bowman 1934:118. Park 1956:95 (key).

Lucifotychus minor, auctorum. Reichle 1966, 1969. Chandler 1987.

Length 1.72–2.00. Body orange to reddish-brown, setae over dorsal portion of body relatively short and less apparent, basal angle of setae on elytra 30–40°. Males with 28–31 facets in eyes; protrochanters obtusely angulate on ventral margin, protibiae with small blunt preapical tooth on mesal margin, mesotibiae with small

blunt subapical tooth on mesal margin, metatrochanters with rounded angulation at base on ventral margin, metatibiae lacking any teeth; sternite VI twice as long as V, less convex at middle than preceding sternites, apex of VI slightly and very broadly emarginate along base of VII, VII twice as wide as long.

Females with 18–21 facets in eyes, lacking modifications of legs, sternite VI broadly rounded as in preceding sternites, as long as V.

Male specimen from Odiorne Point, New Hampshire: body 1.80 long, elytra 0.64 long, 0.76 wide, elytral setae 0.07–0.08 long.

Over 500 specimens examined from the following states and Canadian provinces: CANADA: Ontario, Quebec, New Brunswick. UNITED STATES: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Virginia, West Virginia, Michigan, Illinois, Iowa, Wisconsin, Minnesota. Reichle (1966) figures records for Indiana. Specimens in collections of: AMNH, CCC, CDAE, CNCI, DSC, DENH, FMNH, IMC, JAW, MHNG, LLC, MCZC, MZLU, REN, SEMC, USNM.

This species differs slightly from the definition of *Lucifotychus* by Chandler (1988) in possessing modified metatrochanters. It has been collected primarily from deciduous leaf litters (Chandler 1987 and collection records), and has been associated with deciduous leaf litters near bogs and swamps by Reichle (1966, 1969). Several Canadian records indicate that this species may be found in mosses. In the study by Chandler (1987) of two New Hampshire forests, *testaceus* was most common early in the season from May to June. The ranges of *testaceus* and *hirsutus* broadly overlap in southern Quebec and the Maritime Provinces, but the two species have been collected together only twice: on the Ile d'Anticosti and at Dosquet, Quebec. The two species may be readily separated by using the male features, but *testaceus* is also distinguished in the shorter and more depressed setae on the dorsal surface. *Testaceus* may be separated from *quirsfeldi* by the larger eyes for both sexes, as well as the male characters of the legs and aedeagus.

***Lucifotychus hirsutus* n. sp.**

(Figs. 5–7, 10)

Length 1.76–2.04. Body orange to red-brown, setae on dorsal surface shaggy in appearance, 0.08–0.10 long on elytra, basal

angle of setae on elytra 40–60°. Males with 23–28 facets in eyes; protrochanters sharply angulate on ventral margin, protibiae with small preapical tooth on mesal margin, mesotibiae with small subapical tooth on mesal margin, metatrochanters with rounded tooth at middle of ventral margin, metatibiae with small apical tooth on mesal margin; sternite VI over twice as long as V, with deep rounded impression in apical half to margin of VII, VI at apex with narrow deep emargination, VII nearly twice as wide as long.

Females with 20–22 facets in eyes, lacking modifications of legs, sternite VI broadly rounded as in preceding segments.

Male holotype: body 1.96 long, elytra 0.60 long, 0.69 wide, elytral setae 0.08–0.10 long.

Specimens examined, 34: HOLOTYPE male, *New Hampshire*, Coos Co, Norton Pool, 3 mi NE East Inlet Dam, IX-7-1986, D. S. Chandler, sift spruce/fir leaf litter (FMNH). PARATYPES: *New Hampshire* (DSC or DENH): 1 male, eutopotypical; 1 male, same data except V-9-1986, sift conifer leaf litter; 1 female, same data except V-26-1986, sift conifer logs; 1 female, same data except V-9/26-1986, flight intercept trap; 2 males, same data except VI-24-1986, sift conifer leaf litter; 1 male, same data except VIII-7-1986, M. J. Lyons; 1 male, same data except VIII-21-1986; 1 male, 1 female, 1 mi NE East Inlet Dam, V-10-1986, D. S. Chandler, sift conifer logs; 1 male, 1 female, same data except VI-24-1986, sift conifer leaf litter; 1 male, same data except VIII-7-1986, M. J. Lyons; 1 male, 2 females, same data except sift conifer logs; 1 male, Jefferson Notch, 3000', IX-20-1974, A. Newton, berlese forest litter; 1 male, Mt. Washington, Auto Road, 2700', VI-18-1982, D. S. Chandler, sift leaf litter along stream. *South Dakota*: 1 male, Custer Co., 7 mi E Custer, Rt. 16A, 5300', VII-12-1959, C. C. Hoff, woody debris at base of yellow pine (FMNH); 1 female, Pennington Co., 6 mi NW Keystone, Rt. 16, 5200', VII-11-1959, C. C. Hoff, midden of pine cone scales under oaks (FMNH). CANADA: *Newfoundland*: 1 male, 1 female, Pasadena, VIII-2-1976, E. E. Lindquist, ex:birch-maple litter (CNCI). *Nova Scotia*: 1 male, Cape Breton National Park, North Mtn., VII-11-1983, J. R. Vockeroth, pantraps (CNCI). *Nova Scotia*: 1 male, Cape Breton National Park, North Mtn., VII-11-1983, J. R. Vockeroth, pantraps (CNCI). *Quebec*: 1 male, 1 female, Dosquet, V-26/29-1976, C. Chantal, tamisage liiere feuillue (DSC); 1 male, same data except

V-24-1973, tamis sphaigne (CCC); 2 males, Ile d'Anticosti, Lac Larouche, VII-11-1973, VII-22-1973, C. Chantal, tamisage mousses (CCC, DSC); 1 female, Sept-Iles, IX-3-1990, C. Chantal (CCC); 1 male, Laurentide Park, VIII-28-1956, H. S. Dybas (FMNH); 1 male, Lac Cascapedia, Parc Gaspesie, 1700', VII-14-1972, J. M. & B. A. Campbell (CNCI). *Manitoba*: 1 male, 1 female, Sandilands Prov. Forest, 24 km W Hadashville, Hwy. 1, VI-17-1984, R. E. Roughley, berl. sample of moss in white cedar forest (JBWM). The name is derived from the more hirsute appearance of this species.

This species is most commonly collected in conifer leaf and log litters, and has been collected in mosses in Canada. In addition to the male differences, it may be separated from *testaceus* by the more shaggy appearance, with the dorsal setae longer and more erect, especially on the elytra.

Lucifotychus was defined by Chandler (1988) as having members possessing an apical appendix on the fourth segment of the maxillary palpi, a phallobase diaphragm, symmetrical genitalia, a complete array of the foveae that are found in the Tychini, unmodified male metatrochanters, and a number of other features. *Testaceus* possesses all of these features, but has weakly modified male metatrochanters. *Hirsutus* also has modified male metatrochanters, but the aedeagus has an asymmetrical penis and lacks a phallobase diaphragm. Since *hirsutus* possesses the unusual and derived feature of the appendix of the fourth segment of the maxillary palpi, it clearly belongs in or near *Lucifotychus*, and is placed in that genus until further work can be done on the Tychini of the eastern Palearctic region.

***Lucifotychus quirsfeldi* n. sp.**

(Figs. 8, 10)

Length 1.84–2.00. Body orange brown, setae over dorsal portion of body relatively short, basal angle of setae on elytra 20–40°. Males with 16 facets in eyes, trochanters not modified, protibiae with preapical spur on mesal margin, mesotibiae with blunt subapical spur on mesal margin, sternite VI twice as long as V, flattened at middle, apex of VI slightly and broadly emarginate along base of VII, VII nearly twice as wide as long.

Females with 16 facets in eyes, lacking modifications of legs; sternite VI broadly rounded as in preceding sternites, nearly as long as V.

Holotype male: body 2.00 long, elytra 0.60 long, 0.72 wide, elytral setae 0.06–0.07 long.

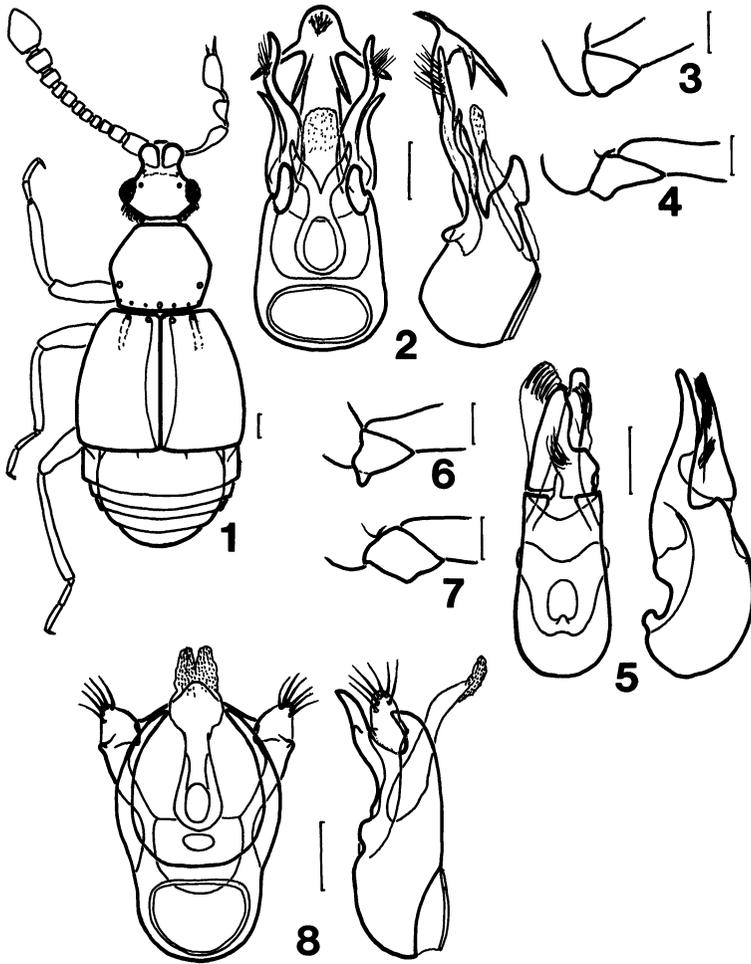
Specimens examined, 2: HOLOTYPE male, *North Carolina*, Yancey Co., Mt. Mitchell, 4–6000', VI-1939, Quirsfeld (CNCI). PARATYPE female, eutopotypical (DSC). The name for this species is taken from the collector of the series.

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SUMMARY

The largely western Nearctic genus *Lucifotychus* is represented by three species in eastern North America: *testaceus* (Casey) and *hirsutus* n. sp. from northeastern North America, and *quirsfeldi* n.



Figs. 1–4. *Lucifotychus testaceus*: 1, dorsal habitus; 2, dorsal and left lateral view of aedeagus; 3, posterior view right prochanter; 4, posterior view right metatrochanter. Figs. 5–7. *L. hirsutus*: 5, dorsal and left lateral view aedeagus; 6, posterior view right protochanter; 7, posterior view right metatrochanter. Fig. 8. *L. quirsfeldi*, dorsal and left lateral view aedeagus.

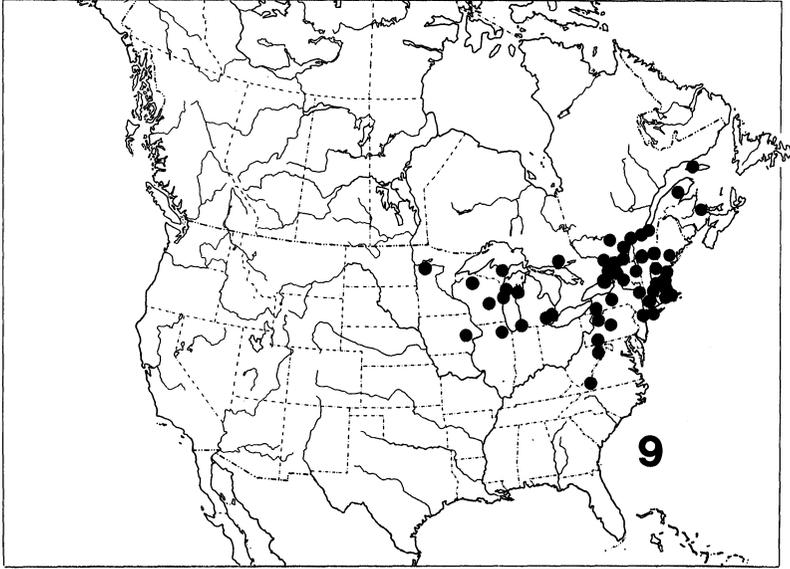


Figure 9. Distribution of *testaceus*.

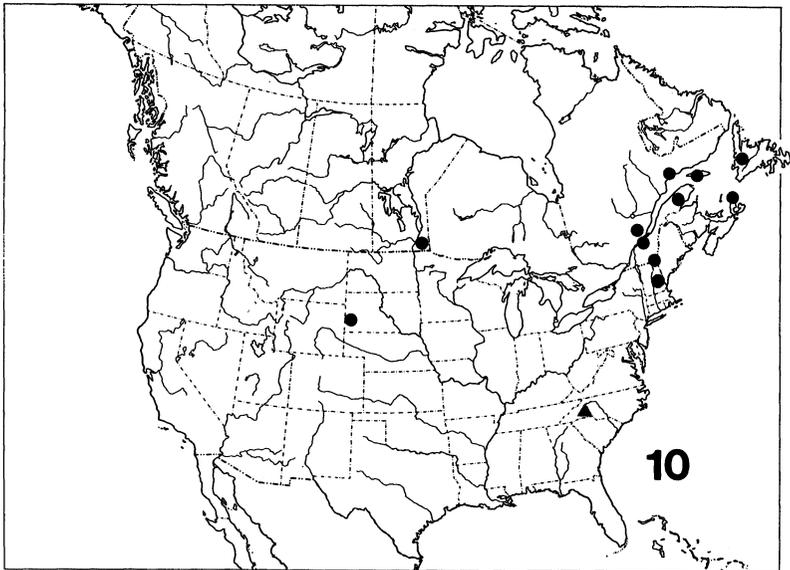


Figure 10. Distribution of *hirsutus* (circles) and *quirsfeldi* (triangle).

sp. from North Carolina. *L. testaceus* is associated with deciduous forest litter, and *hirsutus* with coniferous forest litter.

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