



## Revision of Nearctic *Eparces* (Hymenoptera: Ichneumonidae: Ichneumoninae): description *Eparces australis* Claridge & Dal Pos sp. nov., nomenclatural notes, and new records of *Eparces quadriceps* (Cresson, 1867)

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### Abstract

The Nearctic species of the parasitoid wasp genus *Eparces* are revised. A new species, *Eparces australis* Claridge & Dal Pos sp. nov., is described from the southeastern USA. Additionally, nomenclatural comments on the other Nearctic species, *Eparces quadriceps* (Cresson, 1867) are provided, along with new records for the species from various states in the USA.

**Key words:** parasitoid wasp, taxonomy, North America

### Introduction

*Eparces* Förster, 1869 (Ichneumonidae: Ichneumoninae: Phaeogenini) is a small and striking parasitoid wasp genus that occurs in the Holarctic region. It is differentiated from other phaeogenin genera by the following combination of characters: body elongated; gena wide; basal flagellomeres of female stout (less than 1.5× as wide as long); epomia absent; juxtacoxal carina absent; female hind coxa without ventral projection; postpetiole granulate and impunctate; thyridium obsolete; and gastrocoelus obsolete or only indicated by a small transverse depression (see Selfa & Diller 1994 for additional characters).

Little is known of the biology of *Eparces* besides the fact that females of the Palearctic *Eparces grandiceps* (Thomson, 1891) overwinter as adults (Sebald *et al.* 2000). Like nearly all Phaeogenini, *Eparces* species almost certainly attack microlepidoptera and emerge from the host pupa, but which specific hosts are used and how the female access them remain a mystery. However, the elongated body suggests that they may attack stem-boring hosts, as in the similarly elongated *Auberteterus alternecoloratus* (Cushman, 1929), which attacks several stem-boring *Chilo* Zincken, 1817 species (Crambidae) in rice and maize (Chacko & Rao 1966; Cushman 1929; Rao *et al.* 1968; Sharma *et al.* 1967). Interestingly, both the new species described herein and *Eparces quadriceps* (Cresson, 1867) have been collected from (*Carex*) (Cyperaceae) (*E. quadriceps*: <https://bugguide.net/node/view/944880>), *Spartina* (Poaceae) (*E. quadriceps*: <https://bugguide.net/node/view/957117>), or otherwise on or near beaches (*E. australis*: records herein, *E. quadriceps*: <https://bugguide.net/node/view/531061>) suggesting the hosts of *Eparces* species may be feeding in semi-aquatic plants.

Two species are known from the Palearctic: *Eparces compressa* Gokhman, 1933 in eastern Russia and *Eparces grandiceps* in central and northern Europe (Yu *et al.* 2016). The single Nearctic species, *Eparces quadriceps*, has only been recorded from the northeastern region (Yu *et al.* 2016). The independent discovery of an unknown species in Arkansas, Florida, and Georgia by the authors was the impetus for the present work. Herein, we describe *Eparces australis* sp. nov. and provide an updated taxonomic treatment of *E. quadriceps*, including images, notes on the lectotype, a redescription, and new distribution records.

## Materials and methods

Morphological terminology follows Bennett *et al.* (2019). “T1”, “T2”, etc. refer to the corresponding metasomal tergites. The female holotype is described in full while only deviations in structure and coloration are noted for the male.

Photographs of the lectotype of *Eparces quadriceps* (Cresson, 1867) were taken with a Canon Eos 7D, Canon MP-E 65 mm f/2.8 1–5 × Macro and Canon Macro Lens EF 100 mm, using Zerene Stacker software ver. 1.04 for the stacking and enhanced using Photoshop ver. 24.4.0.

All other images were taken with a Canon 1200D body, a Canon EF-S 60 mm macro lens for habitus images, and a Venus Optics Laowa 25 mm Ultra-Macro lens for higher magnification images. Image stacking was performed with Helicon Focus 7 and processed in the web-based photo editor Photopea (photopea.com). Figures were assembled in LibreOffice Draw 5.4.4.2.

The distribution map was generated in the open-source software QGIS 3.6.2 using locality information from specimens examined and georeferenced with Google Earth (indicated with square brackets in material examined).

Label information for the lectotype is reported verbatim, using the following conventions: / = different lines; // = different labels; italic = handwriting.

Specimens examined were deposited in the following institutions:

|      |   |
|------|---|
| ANSP | Academy of Natural Sciences, Drexel University: Philadelphia, Pennsylvania, USA |
| DDPC | Davide Dal Pos Private Collection: Orlando, Florida, USA                        |
| EMUS | Entomology Museum, Utah State University: Logan, Utah, USA                      |
| FSCA | Florida State Collection of Arthropods: Gainesville, Florida, USA               |
| UCFC | University of Central Florida Collection: Orlando, Florida, USA                 |

## Taxonomy

### *Eparces* Förster, 1869

*Eparces* Förster, 1869: 193. Type species: *Centeterus (Eparces) grandiceps* Thomson, 1891, by subsequent monotypy in Thomson (1891: 1638).

### *Eparces australis* Claridge & Dal Pos sp. nov.

Figs 1–2, 5

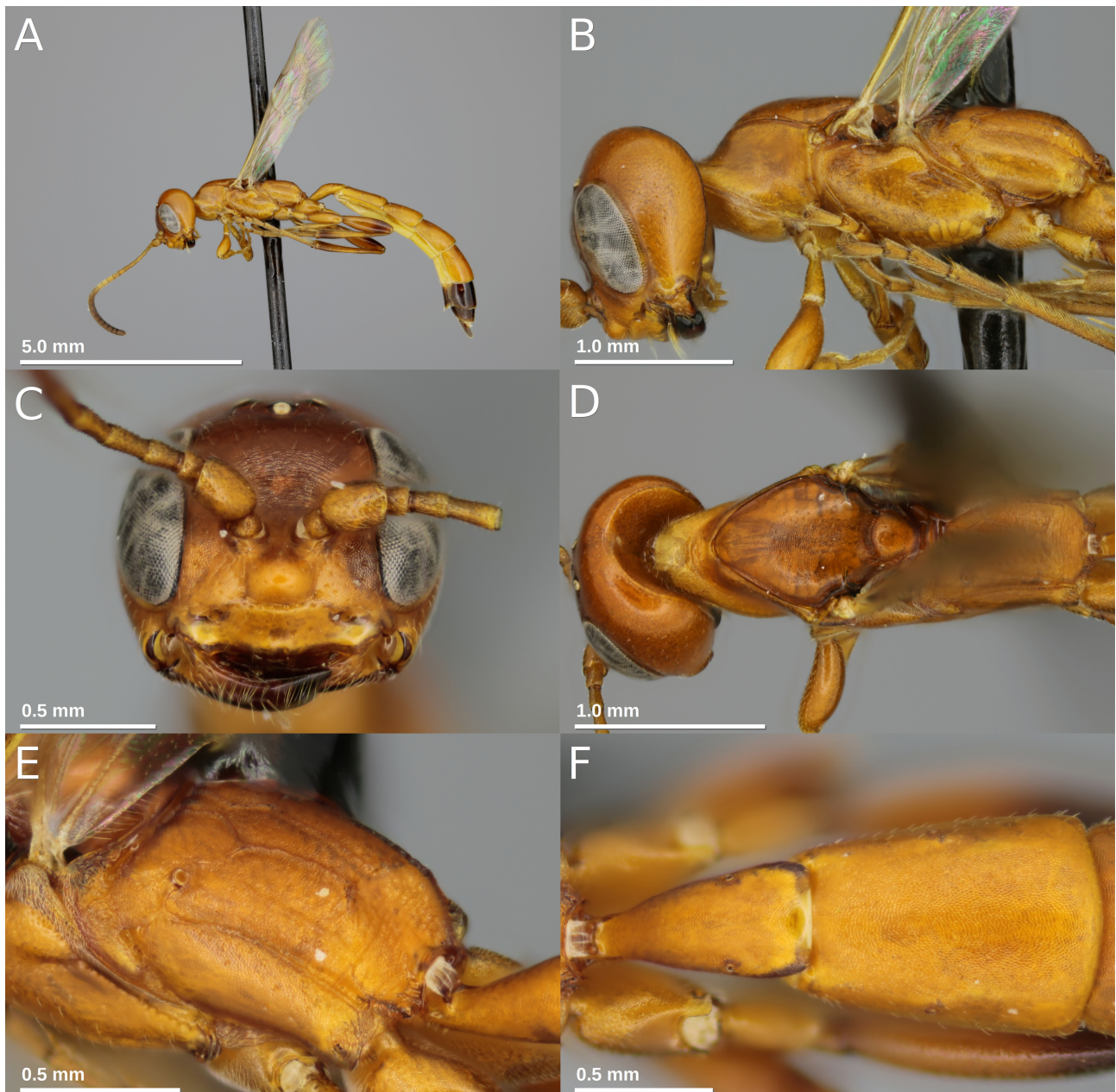
urn:lsid:zoobank.org:act:3376AB81-240F-4F7E-934B-5381DA43EBFC

**Diagnosis.** *Eparces australis* sp. nov. is diagnosed by the following combination of characters: color overall light brownish red with only T7–8 dark reddish-brown to black (head black in *E. quadriceps*); female head longer than in *E. quadriceps*; and posterior transverse carina of the propodeum usually obsolete, except in several specimens (always well-developed in *E. quadriceps*).

**Description.** Female (Fig. 1). Body length 8.6–9.0 mm; fore wing length 3.6–3.7 mm.

**Color.** Primarily light brownish-red except: clypeus brownish-yellow; mandible brownish-red with dark brown apex; incomplete yellowish-white banding on flagellomeres 8–10 and remainder dark brown; apical 0.3/0.4 of hind femur dark brown to black; apical 0.2/0.3 of hind tibia dark brown to black; and tarsomeres reddish-brown; T6–7 dark brown.

**Head.** Clypeus smooth to weakly granulate with a few scattered punctures. Supraclypeal area granulate and sparsely, shallowly punctate. Gena weakly granulate and impunctate or with a few scattered shallow punctures. Supra-antennal area weakly granulate to granulate with ventral 0.2/0.3 of supra-antennal area transversely rugulose, dorsal 0.7/0.8 with a few scattered punctures laterally. Vertex weakly granulate and impunctate. Antenna with 21–22 flagellomeres.



**FIGURE 1.** *Eparces australis* sp. nov. holotype, female (EMUSENT00006396): (A) lateral habitus; (B) lateral head and mesosoma; (C) anterior head; (D) dorsal head and mesosoma; (E) dorsolateral propodeum; (F) dorsal first and second metasomal tergites.

**Mesosoma.** Pronotum weakly granulate and impunctate or with a few nearly indistinct punctures dorsally. Mesonotum and scutellum weakly granulate with a few scattered, nearly indistinct punctures. Mesopleuron weakly granulate and sparsely, shallowly punctate. Speculum weakly granulate and impunctate. Ventral division of metapleuron granulate and impunctate. Propodeum granulate with a few shallow, nearly indistinct punctures laterally. Propodeal carinae subobsolete on dorsal face and obsolete on posteriorly (including posterior transverse carina).

**Metasoma.** Metasoma granulate, impunctate.

**Male** (Fig. 2). Body length: 7.0–9.7 mm; fore wing length: 3.2–4.7 mm. As in female, except: mandible yellow or yellowish-white except dark brown apex; flagellum light brownish-red becoming dark brown at extreme apex; head shorter; punctuation denser on supraclypeal area, mesonotum and mesopleuron; three male Arkansas specimens with posterior transverse carina of propodeum well developed. Antenna with 24–25 flagellomeres.

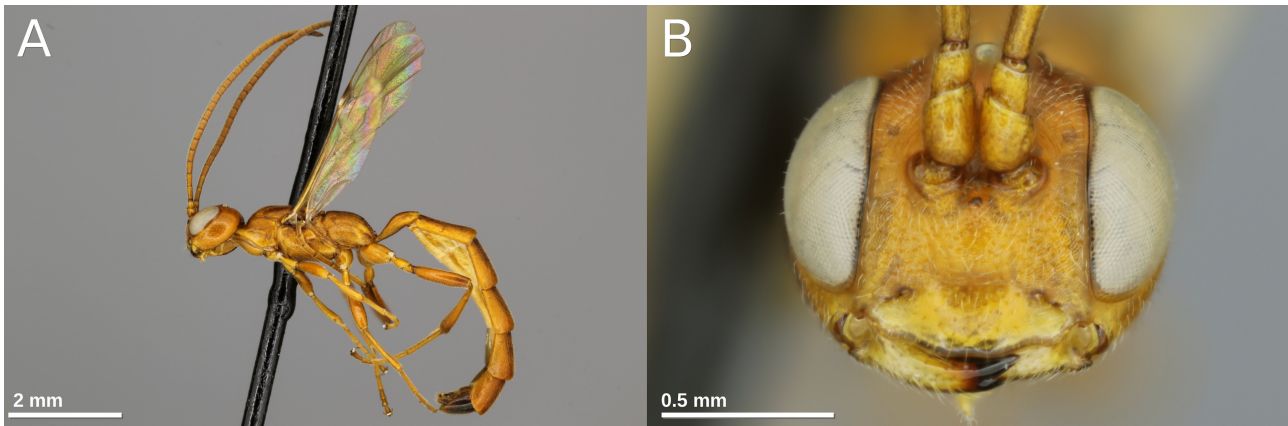


FIGURE 2. *Eparces australis* sp. nov. paratype, male (EMUSENT00000396): (A) lateral habitus; (B) anterior head.

**Material examined. Holotype:** USA • ♀ Florida; Alachua Co.; Georgia; McIntosh Co.; Sapelo Island; [31.3920 -81.2668]; 29.iv–09.v.1987; BRC Hymen. Team; Mal trap, shrub sand dunes; EMUSENT00006396. **Paratypes:** USA • ♂; Florida; Alachua Co.; Gainesville; Pierce’s Homestead; S9-T10S-R18E; 4–6.xi.1975; W. H. Pierce; Malaise trap; FSCA00051754 • ♂; Florida; Alachua Co.; Payne’s Prairie State Preserve; [29.6062 -82.3027] 3–6.vi.1984; Fairchild, G. B. & Weems, H. V.; Insect Flight Trap; FSCA00051758 • ♀; Florida; Highlands Co.; Archbold Biological Station; [27.1829 -81.3517]; 17.ix.1979; Weems, H. V., Jr. & Webber, T. A.; Insect flight trap; DDPC00094 • ♂; Florida; Highlands Co.; Archbold Biological Station; [27.1829 -81.3517]; 15–17.v.1980; Weems, H. V., Jr. & Lohrer, F. E.; Insect flight trap; FSCA00051756 • ♂; Florida; Highlands Co.; Archbold Biological Station; [27.1829 -81.3517]; 22–25.ii.1980; Weems, H. V., Jr. & Lohrer, F. E.; Insect flight trap; DDPC00095 • ♀; Florida; Levy Co.; Cedar Key; [29.1385 -83.0351]; 16.x.1976; Grissell, E. E.; on *Carex*; FSCA00051757 • 2♂♂, ♀; Georgia; McIntosh Co.; Sapelo Island; [31.3920 -81.2668]; 29.iv–09.v.1987; BRC Hymen Team; Mal trap, shrub sand dunes; EMUSENT00006025, EMUS00005581, EMUSENT00006218 • 4♂♂, ♀; Georgia; McIntosh Co.; Sapelo Island; [31.3920 -81.2668]; 20.vi–08.vii.1987; BRC Hymen Team; Mal trap, shrub sand dunes; EMUSENT00006430; EMUSENT00006655; EMUSENT00005891; EMUSENT00006211; EMUSENT00006314 • 2♂♂; Georgia; McIntosh Co.; Sapelo Island; [31.3920 -81.2668]; 16.vi–18.vii.1987; L. Masner & party; EMUSENT00005445, EMUSENT00004709 • ♂; Georgia; McIntosh Co.; Sapelo Island; [31.3920 -81.2668]; 27.viii–09.ix.1987; L. Masner & party; EMUSENT00005304 • 2♂♂; Georgia; McIntosh Co.; Sapelo Island; [31.3920 -81.2668]; 20.viii–09.ix.1987; L. Masner; EMUSENT00005491, EMUSENT00005478 • ♂; Georgia; McIntosh Co.; Sapelo Island; [31.3920 -81.2668]; 20.vi–18.vii.1987; L. Masner; EMUSENT00000396. **Non-types:** USA • 3♂♂; Arkansas; Rock Camp; [35.3625 -92.4598]; 04.x.2012; MT, CJR; trap# 26, 45, 38, 23, 21, 22, 35, 42, 48, 30, 32; EMUSENT00005807, EMUSENT00006490, EMUSENT00006500.

**Distribution.** USA: Arkansas, Florida, Georgia (Fig. 5).

**Etymology.** The species name is derived from the Latin adjective “*australis*” for southern in reference to the more southern distribution compared with all other *Eparces* species.

**Comments.** We do not designate the three male specimens from Arkansas as paratypes due to their overall denser, coarser punctation and well-developed posterior transverse carina of the propodeum.

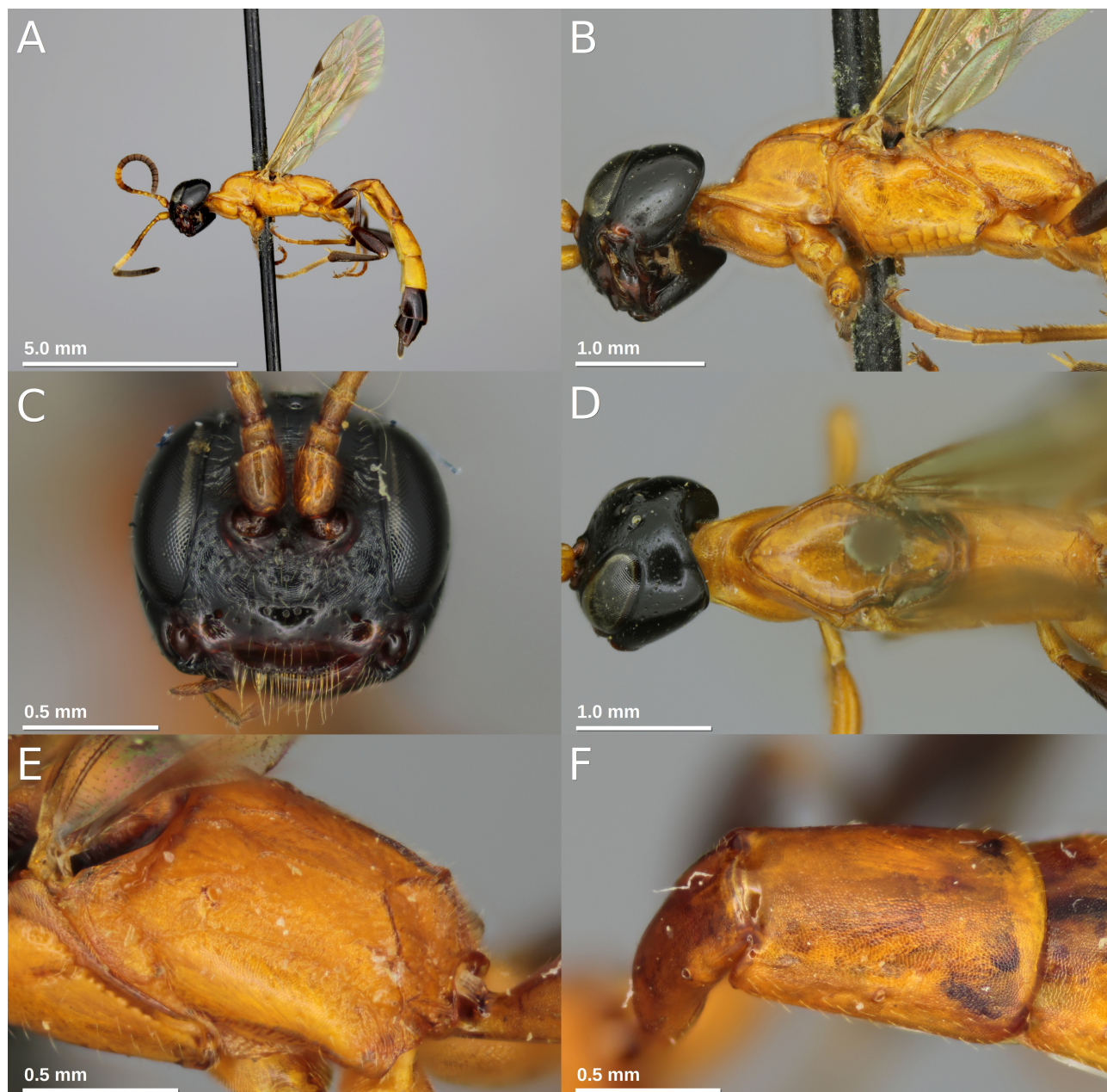
### *Eparces quadriceps* (Cresson, 1867)

Figs 3–5

*Ichneumon quadriceps* Cresson, 1867: 312. Holotype: ♀ [ANSP]; examined by DDP “[White label] Can. // [White label] *quadriceps* / ♀ *Cres* // [Red label] TYPE No. / 1304–”.

**Original type series.** In the original description, Cresson (1867: 312) mentioned two specimens—a male and a female—from Canada and Connecticut (USA). However, there was no indication of which of the two specimens was collected in either location, nor was one designated as the name-bearing type. Cresson (1916: 51) later compiled

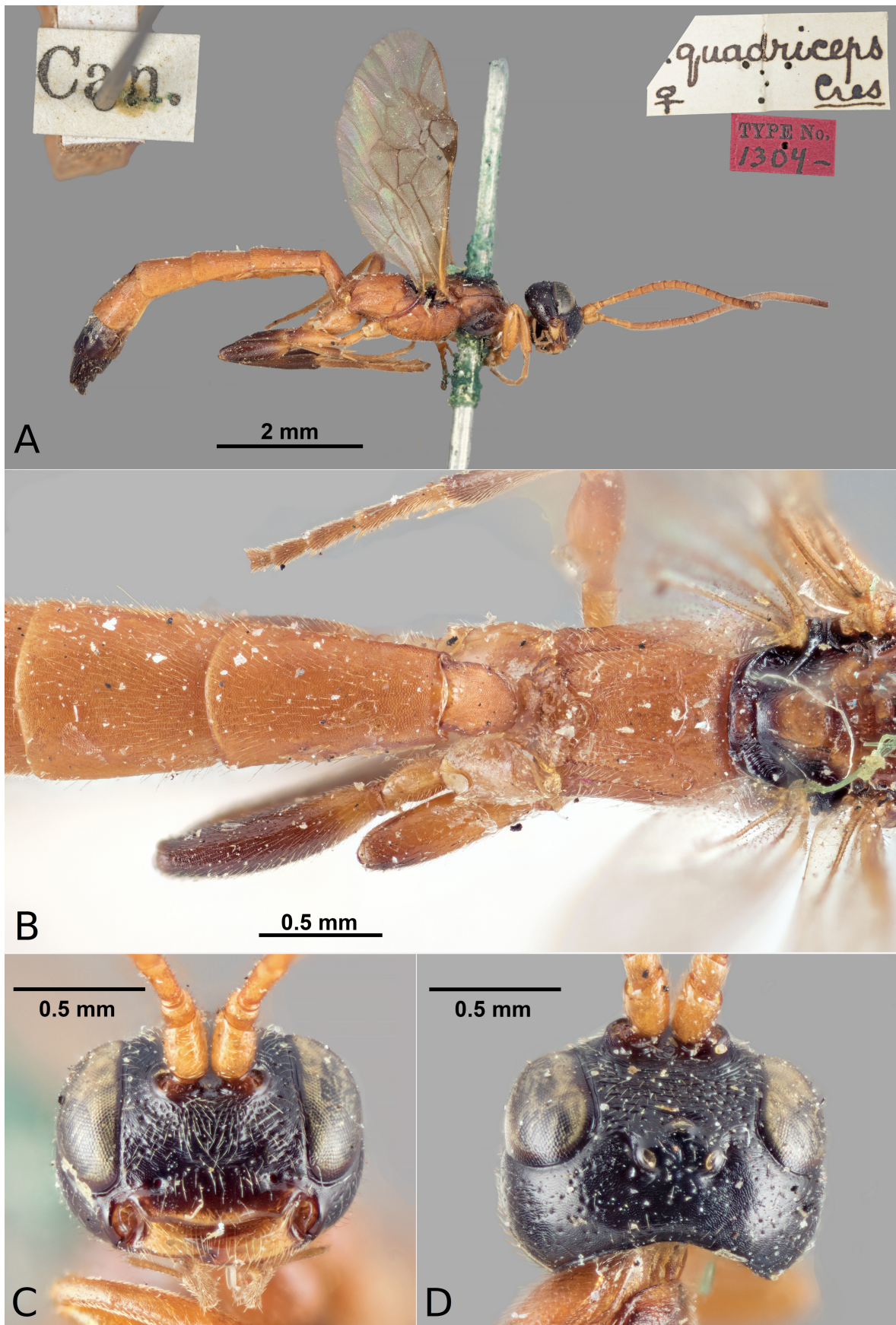
the type list of the Academy of Natural Sciences of Philadelphia (ANSP) and designated the lectotype as a female from “Canada. In good condition”.



**FIGURE 3.** *Eparces quadriceps* (Cresson, 1867), female (EMUSENT00004548 (A–B, D–F), EMUSENT00005137 (C)): (A) lateral habitus; (B) lateral head and mesosoma; (C) anterior head; (D) dorsal head and mesosoma; (E) dorsolateral propodeum; (F) dorsolateral first and second metasomal segments.

However, during a visit to the ANSP collection by DDP, the lectotype, which had been labeled and recorded in the literature as a female, was, in fact, a male specimen (Fig. 4). At this stage, it remains unclear whether Cresson misgendered one of the two specimens or if there was mismanagement during the segregation of the types. This issue has been extensively discussed by Dal Pos *et al.* (2022) for other species described by Cresson and housed at ANSP (e.g., *Asthenolabus canadensis* (Cresson, 1877)).

Despite this discrepancy, Cresson’s (1916: 51) lectotype designation remains valid (following ICZN 1999: Article 74.5), and thus, we can conclude that the lectotype is a male from Canada. A final determination cannot be made for the sex of the specimen from Connecticut, at this stage, and a more thorough study of the ANSP collection may provide further insights.



**FIGURE 4.** *Eparces quadriceps* (Cresson, 1867) lectotype, male: (A) lateral habitus and labels; (B) dorsal propodeum and first, second, and third metasomal segments; (C) anterior head; (D) dorsal head.

**Diagnosis.** *Eparces quadriceps* is differentiated from congeners by the following combination of characters: primarily brownish-red to light brownish-red with head and T5–7 dark brown to black (head light brownish-red in *E. australis*); female head shorter than in *E. australis*; and posterior transverse carina of propodeum always well developed.

**Description. Female** (Fig. 3). Body length 7.4–8.5 mm; fore wing length 3.6–4.0 mm.

**Color.** Primarily brownish-red to light brownish-red except: head black except mandibles dark red medially; antenna with scape, pedicel and flagellomeres 1–3/4 yellowish-brown to light brown, flagellomeres 4–5 brown, flagellomeres 7–10 yellowish-white to yellow, remainder dark brown; middle and hind legs with femora (except basal 0.1/0.3) and tibiae (except basal 0.2 of middle tibia) dark reddish-brown to black; middle and hind tarsomere 5 dark reddish-brown; T5–7 dark reddish-brown to black.

**Head.** Clypeus smooth to weakly granulate with a few scattered, coarse punctures. Supraclypeal area granulate and sparsely, shallowly punctate. Gena granulate and sparsely, shallowly punctate. Supra-antennal area granulate with dorsal 0.3/0.5 transversely rugulose, dorsal 0.5/0.7 with a few scattered, shallow punctures. Vertex granulate with scattered, nearly indistinct punctures. Antenna with 20–21 flagellomeres.

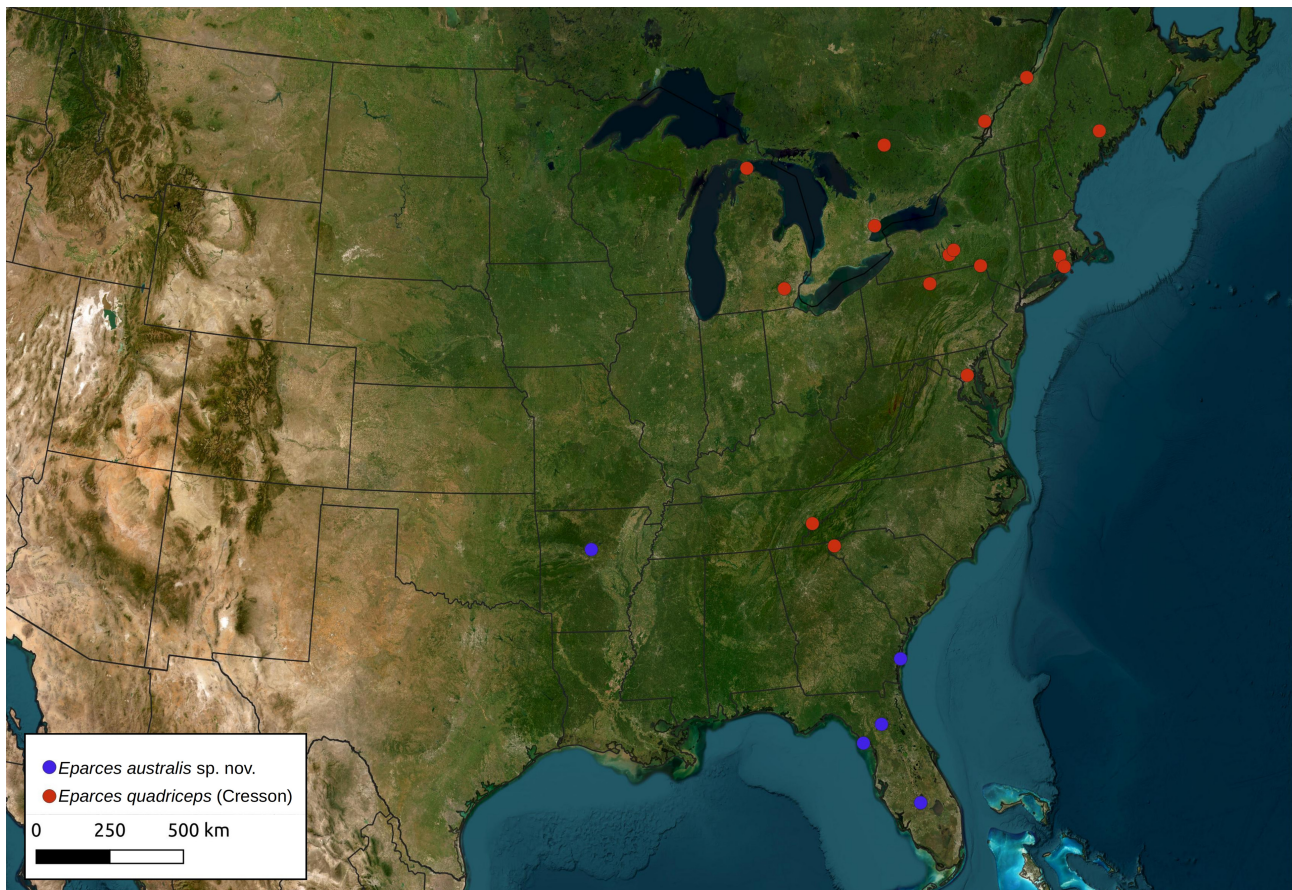
**Mesosoma.** Pronotum weakly granulate, punctuation varying from absent to a few shallow, indistinct punctures. Mesonotum and scutellum smooth to weakly granulate with scattered, indistinct punctures. Mesopleuron smooth to weakly granulate, punctuation varying from nearly absent to moderately punctate. Speculum smooth to granulate, impunctate to sparsely punctate. Ventral division of metapleuron granulate, impunctate or with a few scattered, shallow punctures. Propodeum granulate, impunctate. Propodeal carinae usually subobsolete (occasionally obsolete or well developed), except posterior transverse carina always well developed.

**Metasoma.** Granulate, impunctate.

**Male** (Fig. 4). Body length: 8.2–9.3 mm; fore wing length: 3.9–4.6 mm. As in female except: flagellum brownish-red becoming dark brown apically; middle leg with less extensive brown area; hind leg often with tarsus dark brown; head shorter; punctuation denser on supraclypeal area, mesonotum, mesopleuron and ventral division of metapleuron; supra-antennal area more coarsely rugulose. Antennae with 23–24 flagellomeres.

**Material examined. Non-types:** CANADA • ♂; Ontario; Algonquin Province Park; [45.8371 -78.3791]; 13.viii.1974; B. & C. Dasch; EMUSENT00006086 • ♂; Québec; 3 mi W Québec; [46.8095 -71.2990]; 04.viii.1981; B. & C. Dasch; EMUSENT00005602 • ♂; Québec; St. Esprit; [45.8997 -73.6660]; 21.viii.1956; H. & M. Townes; EMUSENT00004863 • ♂; Toronto; Swansea; [43.6416 -79.447]; 30.vii.1938; H. S. Parish; EMUSENT00004694. USA • ♂; Connecticut; New London Co.; North Stonington; [41.4410 -71.8815], 21.vii.1946; M. Townes; EMUSENT00004527 • ♂; Connecticut; Windham Co.; Canterbury [41.6984 -71.9079]; 25.vii.1937; M. Chapman; EMUSENT00004162 • ♀; Maryland; Prince George's Co.; Bowie; [39.0068 -76.7791]; 09.x.1943; H. & M. Townes; EMUSENT00005137 • ♂; Maine; Penobscot Co.; 4.5 mi W Bangor; [44.8021 -68.7711]; 12.viii.1986; B. & C. Dasch; EMUSENT00005707 • ♂; Rhode Island; Washington Co.; Westerly; [41.3776 -71.8273]; 23.vii.1936; M. Chapman; EMUSENT00004545 • ♀; Rhode Island; Washington Co.; Westerly; [41.3776 -71.8273]; 20.viii.1951; H. & M. Townes; EMUSENT00004548 • ♂; Michigan; Huron Mountains; 27.vii.1959; Henry Townes; EMUSENT00004879 • ♂; Michigan; Cheboygan Co.; Mackinaw City; [45.7781 -84.7281]; 04.viii.1980; B. & C. Dasch; EMUSENT00006214 • ♂; Michigan; Washtenaw Co.; Ann Arbor; [42.2760 -83.7381]; 21–23.vii.1971; Peter Rush; EMUSENT00004592 • ♂; New York; Hancock; [41.9555 -75.2810]; 03.viii.1935; H. K. Townes; EMUSENT00005251 • ♂; New York; Tompkins Co.; Ithaca; [42.4440 -76.5018]; 02.viii.1952; Dasch; EMUSENT00005586 • ♀; New York; Tompkins Co.; Ithaca; [42.4440 -76.5018]; 31.v.1950; EMUSENT00005800 • 2♂♂; New York; Tompkins Co.; McLean Bogs; [42.5487 -76.2660]; vii.1951; Dasch; EMUSENT00005907, EMUSENT00005797 • ♀; Pennsylvania; Tioga Co.; Gaines; [41.7520 -77.5578]; 06.vi.1985; B. & C. Dasch; trap; EMUSENT00005678 • ♂; South Carolina; Oconee Co.; 12 mi NW Walhalla, Oconee State Park; [34.8654, -83.1055]; 03.vi–13.viii.1981; S. B. Peck; EMUSENT00004508 • ♀; Tennessee; Blount Co.; GSMNP; Cades Cove; Wildcat Branch; [35.5794 -83.8352]; old field-forest edge; 549m; 02.vii.2004; Steck & Sutton *et al.*; UCFC235733.

**Distribution.** CANADA (Cresson 1867): Ontario (Townes & Townes 1951); Québec (Provancher 1882); USA: Connecticut (Cresson 1867); Maine (**new record**); Maryland (**new record**); Michigan (Carlson 1979); New Hampshire (**new record**); New York (Bradley 1918; 1926; Cushman 1928); Pennsylvania (**new record**); Rhode Island (**new record**); South Carolina (**new record**); Tennessee (**new record**); Virginia (Townes & Townes 1951) (Fig. 5).



**FIGURE 5.** Distribution of *Eparces australis* sp. nov. and *Eparces quadriceps* (Cresson, 1867).

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## References

- Bennett, A.M.R., Cardinal, S., Gauld, I.D. & Wahl, D.B. (2019) Phylogeny of the subfamilies of Ichneumonidae (Hymenoptera). *Journal of Hymenoptera Research*, 71, 1–156.  
<https://doi.org/10.3897/jhr.71.32375>
- Bradley, J.C. (1918) Descriptions and records of some interesting parasitic Hymenoptera mostly collected by Mr. Hachiro Yuasa in Tompkins County, New York. *Bulletin of the Brooklyn Entomological Society*, 13 (5), 97–106.
- Bradley, J.C. (1926) Hymenoptera. *Bulletin of the Lloyd Library of Botany, Pharmacy and Materia Medica*, 27, 165–176.
- Carlson, R.W. (1979) Family Ichneumonidae. In: Krombein, K.V. (Ed.), *Catalog of Hymenoptera in America North of Mexico. Vol. 1*. Smithsonian Institution Press, Washington, D.C., pp. 315–741.
- Chacko, M.J. & Rao, V.P. (1966) *Centeterus alternicoloratus* Cushman? var., a pupal parasite of the graminaceous borers, *Chilo partellus* (Swinhoe) and *Chilo traea auricilia* (Dudgeon). *Entomophaga*, 11, 297–303.  
<https://doi.org/10.1007/BF02372964>
- Cresson, E.T. (1867) A list of the Ichneumonidae of North America, with descriptions of new species. Part 1. *Transaction of the American Entomological Society*, 1, 289–312.  
<https://doi.org/10.2307/25076182>



- Cresson, E.T. (1916) The Cresson types of Hymenoptera. *Memoirs of the American Entomological Society*, 1, 1–134.
- Cushman, R.A. (1928) Family Ichneumonidae. In: Leonard, M.D. (Ed.), *A list of the Insects of New York. Vol. 101*. Cornell University Agricultural Experiment Station, New York, New York, pp. 920–960.
- Cushman, R.A. (1929) Three new ichneumonoid parasites of the rice-borer (*Chilo simplex* (Butler)). *Proceedings of the Hawaiian Entomological Society*, 7 (2), 243–245.
- Dal Pos, D., Heilman, V. & Welter-Schultes, F. (2022) Platylabini (Hymenoptera: Ichneumonidae: Ichneumoninae) of the south-eastern United States: new distributional data, taxonomic notes, illustrated keys, and an annotated catalogue of the genera and species. *Journal of Natural History*, 56 (45–48), 1869–1938.  
<https://doi.org/10.1080/00222933.2022.2134061>
- Förster, A. (1869) Synopsis der Familien und Gattungen der Ichneumonen. *Verhandlungen des Naturhistorischen Vereins der preussischen Rheinlande und Westfalens*, 25, 135–221.
- ICZN [International Commission on Zoological Nomenclature] (1999) *International Code of Zoological Nomenclature. 4<sup>th</sup> Edition*. The International Trust for Zoological Nomenclature, London, 306 pp.
- Provancher, L. (1882) Faune Canadienne. Hyménoptères. Additions et corrections. *Le Naturaliste Canadien*, 13, 321–336.
- Rao, V.P., Basu, A.N., Phalak, V.R., Chacko, M.J. & Dinesh Rao, H. (1968) Some new records of parasites of rice stem-borers in India. *Proceedings of the Indian Academy of Sciences*, 68, 91–110.  
<https://doi.org/10.1007/BF03051704>
- Sebald, H., Bauer, R., Schönitzer, K. & Diller, E. (2000) Ichneumonidae, die als Imagines überwintern. (Insecta, Hymenoptera, Ichneumonidae). *Entomofauna*, 21 (24), 285–290.
- Selfa, J. & Diller, E.H. (1994) Illustrated key to the western Palearctic genera of Phaeogenini (Hymenoptera, Ichneumonidae, Ichneumoninae). *Entomofauna*, 15 (20), 237–250.
- Sharma, A.K., Saxena, J.D. & Subba Rao, B.R. (1967) A catalogue of the hymenopterous and dipterous parasites of *Chilo zonellus* (Swinhoe) (Crambidae: Lepidoptera). *Indian Journal of Entomology*, 28, 510–542.
- Thomson, C.G. (1891) XLVII. Bidrag till kändedom af Ichneumones pseustici. *Opuscula Entomologica, Lund*, 15, 1603–1656.
- Townes, H.K. & Townes, M.C. (1951) Family Ichneumonidae. In: Muesebeck, C.F.W. & Krombein, K.V. (Eds.), *Hymenoptera of America North of Mexico. Vol. 2*. USDA, Washington, D.C., pp. 184–409.
- Yu, D.S.K., van Achterberg, C. & Horstmann, K. (2016) *Taxapad 2016, World Ichneumonoidea 2015*. Neapan, Ontario. Database on flash-drive. Available from: <http://www.taxapad.com> (accessed 7 May 2024)