

The Provancher Types of Bethylidae (Hymenoptera, Chrysoidea)

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ABSTRACT: Many holotypes of Bethylidae are poorly described and not illustrated, making species identity uncertain. Examination of these holotypes is thus necessary in order to check species identity. The three species of Bethylidae described by Léon Provancher, *Bethylus decipiens* (Provancher, 1887), *Epyris formicoides* (Provancher, 1887), and *Pseudisobrachium prolongatum* (Provancher, 1881), are re-described and illustrated based mainly on examination of their primary types. The results confirm that their current identity is correct and no nomenclatural acts are necessary.

Key words: holotypes, Nearctic region, species identity, taxonomy.

RESUMO: Os tipos de Provancher de Bethylidae (Hymenoptera, Chrysoidea). Muitos holótipos de Bethylidae são mal descritos e não ilustrados, tornando a identidade de suas espécies incerta. Isto faz com que seja necessária a análise desses holótipos para averiguar a identidade das espécies. São descritos e ilustrados três espécies descritas por Léon Provancher, *Bethylus decipiens* (Provancher, 1887), *Bethylus formicoides* Provancher, 1887 e *Pseudisobrachium prolongatum* (Provancher, 1881), baseados principalmente no exame de seus tipos primários. Os resultados confirmam que a concepção atual delas está correta e desta forma não é necessário propor atos nomenclaturais.

Palavras-chave: holótipos, identidade de espécies, região Neártica, taxonomia.

Introduction

Léon Provancher (1820–1892) was one of the first contributors to the taxonomy of Nearctic Hymenoptera, describing about 1000 species from

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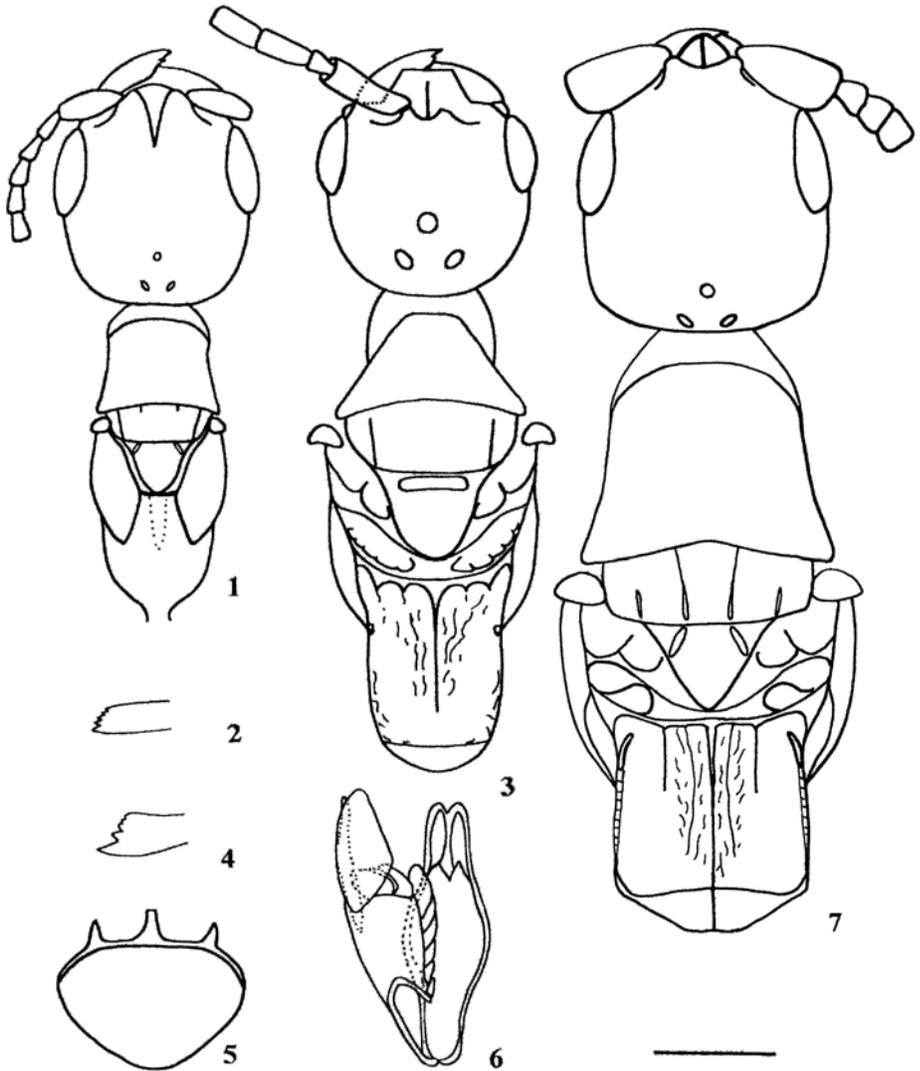
the region, mostly from eastern Canada (Barron, 1975). Barron (1975) summarized the information on Provancher's publications and collections, and reviewed Provancher's Ichneumonidae, which represent 540 of his species. Several other workers treated other families or superfamilies. Gahan & Rohwer (1917–1918) designated types for all of Provancher's species, except Apoidea, but did not label the specimens they designated as lectotypes.

Provancher described three species of Bethylidae, the first two, *Pseudisobrachium prolongatum* (Provancher, 1881) and *Epyris formicoides* (Provancher, 1887), were described in *Bethylus* and the third, *Bethylus decipiens* (Provancher, 1887), was described in *Gonatopus* (Dryinidae). During Provancher's time, only 102 species of this family had been described worldwide, including 18 from the Nearctic region. Evans (1962, 1978) re-described these three species of Bethylidae, but did not examine the types. Here I re-describe and illustrate Provancher's bethylid species for the first time, based on the examination of his type material to confirm their identity and generic placement.

Methods

Terms for structures generally follow Evans (1964) and Azevedo (1999), and terms for sculpture of the integument follow Harris (1979). Measurements and ratios used here are: LH, length of head, measured in frontal view, from the crest of the vertex to the median apical margin of the clypeus; WH, width of head, measured in frontal view, its maximum width including the eyes; WF, width of frons, its minimum width measured in frontal view, usually near the bottom of the eyes; HE, height of eye, measured in lateral view, its maximum height (length); LFW, length of fore wing; OOL, ocello-ocular line, measured in dorsolateral view, the shortest distance from the top of the eye to the posterior ocellus; WOT, width of the ocellar triangle, measured in frontal view, the maximum width, including the ocelli; DAO, diameter of anterior ocellus, measured in frontal view; shortest distance of the posterior ocelli to the crest of the vertex, measured in posterodorsal view; VOL, vertex-ocular line, measured in lateral view, the distance from the top of the eye to vertex crest.

Material was examined from the following institutions: Canadian National Collection of Insects, Ottawa, Ontario (CNCI); and Université de Laval, Ste. Foy, Québec (ULQC).



Figures 1–7. 1–2: *Bethylus decipiens*, lectotype (1, head and mesosoma, dorsal view; 2, mandible, frontal view). 3–6: *Pseudisobrachium prolongatum* (3, head and mesosoma, dorsal view, lectotype; 4, mandible, frontal view, lectotype; 5, hypopygium, male from Nova Scotia; 6, genitalia, ventral view, male from Nova Scotia). 7: *Epyris formicoides*, lectotype (head and mesosoma, dorsal view). Scale bar: 0.5 mm, except figure 7: 1.13 mm.

Taxonomy

Bethylus decipiens (Provancher, 1887)

(Figures 1, 2)

Gonatopus decipiens Provancher, 1887: 179; female lectotype designated by Gahan & Rohwer, 1917: 427.

Perisemus oregonensis Ashmead, 1893: 45; Evans, 1962: 7 (synonym designation).

Arysepyris californicus Bridwell, 1919: 34; Evans, 1962: 8 (synonym designation).

Bethylus brachypterus Whittaker, 1929: 385-386; Evans, 1962: 8 (synonym designation).

Bethylus flavicornis Whittaker, 1929: 386; Evans, 1962: 8 (synonym designation).

Bethylus decipiens; Krombein, 1958: 98 (generic transfer based on examination of type); Evans, 1962: 7 (key, redescription, list of synonyms); Evans, 1978: 221 (description of plesiotype); Gordh & Móczár, 1990: 3 (list of synonyms, catalogue).

Type locality: Cap Rouge, Quebec.

Lectotype female (ULQC), examined. In good condition; bearing four labels as follows: 1332 (yellow label); *Gonatopus decipiens* Prov. (red bordered label handwritten by Provancher); Lectotype 533 *Gonatopus decipiens* Prov. Comeau 1944 (red bordered label); Lectotype *Gonatopus decipiens* Prov. 1332 Gahan & Rohwer '15 Barron '71 (red label).

Lectotype description: Length 3.86 mm. LFW 0.46 mm.

Colour. Dark brown; antenna, tegula, trochanters, tibiae and tarsi brown, wings hyaline.

Head (Figure 1). Mandible with five small teeth (Figure 2). Clypeus with a short rounded median lobe and a low median carina, the clypeus and carina extending back on frons for a short distance. Antennal scrobe not carinate. Antenna with first four segments in a ratio of about 2:1:1:1, segment ten $2.25 \times$ as long as wide. Frons strongly coriaceous with inconspicuous, shallow punctures. WH $0.91 \times$ LH, WF $0.66 \times$ WH, WF $1.44 \times$ HE, OOL $2.46 \times$ WOT, frontal angle of ocellar triangle acute, posterior ocelli separated from vertex crest by $1.33 \times$ DAO. Vertex straight, its corners rounded, VOL $0.88 \times$ HE. Temples diverging anterad.

Mesosoma (Figure 1). Thorax coriaceous. Pronotal disc subquadrate. Notauli very weak, on anterior fourth of mesoscutum. Scutellar pits oblique,

slender, with posterior end acute. Propodeal disc $1.14 \times$ as wide as long, with a narrow, elevated, polished median longitudinal band, without median carina or transverse carina, with lateral carinae extending to propodeal foramen, otherwise areolate; propodeal declivity coriaceous, without median carina. Mesopleuron with small antero-central pit. Brachypterous, the fore wing not reaching posterior slope of propodeum; tegula present.

Metasoma. Hypopygium with straight posterior margin. Valvae well sclerotized, rectangular in dorsal view, $1.7 \times$ as long as wide, posterior margin with hairs $0.5 \times$ as long as the valvae. Sting 0.46 mm.

Remarks: Evans (1962) had no doubt that Provancher's name applied to this species, based on notes he received from Karl Krombein, who had examined Provancher's lectotype. Following re-examination of the lectotype, I confirm that it is indeed conspecific with the males and other females treated by Evans (1962, 1978) as *Bethylus decipiens*, even though the identity of species of Bethyridae can usually be determined confidently only using male genitalia.

***Pseudisobrachium prolongatum* (Provancher, 1881)**

(Figures 3–6)

Bethylus prolongatus Provancher, 1881: 265; lectotype male designated by Gahan & Rohwer, 1917: 398.

Isobrachim magnus Ashmead, 1893: 36-37; Evans, 1961: 266 (synonym designation).

Isobrachim myrmecophilum Ashmead, 1893: 36, 37-38; Evans, 1961: 266 (synonym designation).

Isobrachim mandibulare Ashmead, 1893: 36, 38; Evans, 1961: 266 (synonym designation).

Isobrachim montanum Ashmead, 1893: 36, 39; Evans, 1961: 266 (synonym designation).

Pseudisobrachium rugosulum Fouts, 1928: 122, 124; Evans, 1961: 266 (synonym designation).

Pseudisobrachium agilis Whittaker, 1929: 386-387; Evans, 1961: 266 (synonym designation).

Pseudisobrachium agile; Muesebeck & Walkley, 1951: 731 (unjustified emendation for *Pseudisobrachium agilis* Whittaker).

Pseudisobrachium prolongatus; Krombein, 1958: 97 (generic transfer based on examination of lectotype); Evans, 1961: 266 (description); Evans, 1978: 68 (re-description of male plesiotype, list of synonyms); Gordh & Móczár, 1990: 260 (list of synonyms, catalogue).

Type locality: Provancher did not give a collecting locality but Krombein (1958) and Gordh and Móczár (1990) gave the type locality as Cap Rouge, Quebec, without explanation.

Lectotype male (ULQC), examined. In good condition except metasoma missing; bearing four labels as follows: 944 (yellow label); *Epyris prolongatus* Prov. (red bordered label handwritten by Provancher); Lectotype *Bethylus prolongatus* Prov. Comeau '42 (red label); Lectotype *Bethylus prolongatus* Prov. 944 Gahan & Rohwer '15 Barron '71 (red label).

Lectotype description: Length of head and mesosoma 3.33 mm. LFW 3.58 mm.

Colour. Dark brown; antenna, apical half of mandible, tegula, and legs brown, palpi light brown, wings subhyaline and veins brown.

Head (Figure 3). Mandible with five apical teeth, the lower large and sharp, the three upper teeth very short and nearly fused (Figure 4). Clypeus with trapezoidal median lobe, without median tooth, and with median carina straight, slightly raised in profile, ill defined apically, and extending back for a short distance on frons. Antenna with first four segments in a ratio of 11:4:8:8, the third and fourth segments $1.78 \times$ and $1.75 \times$ as long as their respective diameters; flagellar pubescence subappressed, with some suberect setae standing out. Frons strongly coriaceous with dense, inconspicuous, shallow punctures. WH $0.95 \times$ LH, WF $0.72 \times$ WH, WF $1.59 \times$ HE, DAO $0.13 \times$ WF, frontal angle of ocellar triangle acute, posterior ocelli separated from the vertex crest by $1.71 \times$ DAO. Vertex convex, its corners broadly rounded, VOL $1.03 \times$ HE. Temples nearly parallel.

Mesosoma (Figure 3). Thorax as strongly coriaceous and punctated as frons, except mesosoma with deeper punctures. Notauli absent. Parapsidal furrows complete. Scutellar groove straight, deep and wide. Propodeal disc $0.92 \times$ as wide as long, with incomplete median carina; basal triangle ill-defined, limited by a areolate area; declivity without median carina, sides of propodeum coriaceous. Mesopleuron with a distinct callus. Fore wing with discoidal vein spectral and nearly interstitial with media vein. Claws simple.

Metasoma missing (see below).

Remarks. Provancher (1881) gave the sex of the type as female but the lectotype is clearly a male, as Evans (1978) had correctly noted. Sexual dimorphism in species of *Pseudisobrachium* is strong so even though the lectotype metasoma is missing there is no doubt about its sex. The following description and illustrations (Figures 5, 6) of the hypopygium and genitalia of *P. prolongatum* are based on a male labelled "Nova Scotia, Bridgetown,

16.IX.1913 G. E. Sanders, det. H.E. Evans 1960” (CNC).

Hypopygium with median stalk slightly longer than the lateral ones and posterior margin concave (Figure 5). Genitalia (Figure 6) with paramere having ventral arm $2.5 \times$ as wide as dorsal arm; vannus with four inclined grooves; aedeagus elliptical, apex rounded and emarginated, slightly shorter than dorsal arm of paramere, its apex as high as cuspis apex in ventral ventral.

On the basis of notes received from Oswald Peck, Karl Krombein, and Bill Mason, who had each examined Provancher’s type, Evans (1961) stated that it compared closely with his redescription of the species based on a male plesiotype. Following re-examination of the lectotype, I confirm that it is indeed conspecific with the male treated by Evans (1961). Gahan & Rohwer (1917–1918) quoted the type number as “744” (cf. 944, above), presumably by mistake.

Epyris rufipes (Say, 1824)

(Figure 7)

Epyris rufipes Say, 1824: 329; Evans, 1969: 250 (re-description). Evans, 1978: 149 (list of synonyms, re-description); Gordh & Móczár, 1990: 104 (list of synonyms, literature).

Bethylus formicoides Provancher, 1887: 179; female lectotype designated by Gahan & Rohwer, 1917: 398.

Epyris formicoides; Provancher, 1888: 402; Evans, 1969: 250 (synonym designation).

Epyris rufipes Cameron, 1888: 173-174 *nec* Say, 1824; Evans, 1969: 250 (synonym designation).

Epyris montezuma Cameron, 1897; Evans, 1969: 250 (synonym designation).

Mesitius vancouverensis Ashmead, 1893: 63, 64; Evans, 1969: 250 (synonym designation).

Mesitius nevadensis Ashmead, 1893: 63, 64-65; Evans, 1969: 250 (synonym designation).

Mesitius bifoveolatus Ashmead, 1893: 63, 66; Evans, 1969: 250 (synonym designation).

Epyris longicollis Kieffer, 1906: 241, 244; Evans, 1969: 250 (synonym designation).

Epyris nudicornis Kieffer, 1906: 242, 245; Evans, 1969: 250 (synonym designation).

Epyris gracilicollis; Kieffer, 1908: 28 (unnecessary new name for *Epyris longicollis* Kieffer).

Type locality: Hull, Quebec (according to label on lectotype; the original description gave Ottawa as the type locality).

Lectotype female [of *formicoides*] (ULQC), examined. In good condition; bearing six labels as follows: Hull, 25.8.84 [with illegible handwriting] (white label); 312 (blue label); 1028 (yellow label); *Epyris formicoides* Prov. (red bordered label handwritten by Provancher); Lectotype *Bethylus formicoides* Provancher Gahan & Rohwer '15 1028 Barron '71 (red label); 172 *Bethylus formicoides* Prov. Comeau '42.

Lectotype description. Length 4.8 mm. LFW 3.0 mm.

Colour. Head and mesosoma black, metasoma mostly black with some dark brown lateral spots and apex; mandibles dark brown; antenna, tegula and legs brown; forewings subhyaline, veins brown.

Head (Figure 7). Mandible with two sharp apical teeth, the lower one larger. Clypeus with subangulate median lobe, its base covered by frons, and with median carina complete, straight in profile. Antenna thick, the first four segments in a ratio of about 2:1:1:1; segment eleven $1.3 \times$ as long as wide; pubescence dense, appressed and short, except on scape dorsally, where it is suberect and long. Frons weakly coriaceous with sparse punctures. Eye small, with few long setae. WH $0.84 \times$ LH; WF $0.69 \times$ WH, WF $1.5 \times$ HE, OOL $2.0 \times$ WOT. Frontal angle of ocellar triangle just about right-angled; distance of posterior ocelli from vertex crest $1.0 \times$ DAO. Vertex slightly convex, with corners rounded; VOL $0.96 \times$ HE. Temples subparallel.

Mesosoma (Figure 7). Texture and punctuation mostly similar to that of frons. Pronotal disc $2.4 \times$ as long as mesoscutum. Notauli widely separated, straight, slightly wider and converging posteriorly. Parapsidal furrows only on posterior half of mesoscutum. Scutellar pits elliptical, oblique, widely separated from each other. Scutellum separated from propodeal disc by transverse metasomal fovea. Propodeal disc $1.18 \times$ as wide as long, with three sets of carinae: a complete median carina, a pair of discal carinae beside median carina, and a pair of sublateral carinae on anterior half of disc; median area striate, otherwise disc aciculate-coriaceous; posterior corner with small fovea; declivity with weak median carina. Mesopleuron entirely occupied by large, shallow fovea with small central pit. Fore wing with transverse median vein arched. Profemur $2.0 \times$ as long as wide. Mesotibia spinose. Tarsomeres with spinose apical margins on ventral side. Claws simple.

Metasoma. Polished, stout, $1.23 \times$ as long as mesosoma.

Remarks. Evans (1969) considered *E. formicoides* as a junior synonym of *Epyris rufipes* without, however, having examined the type of either species (the latter type is lost). At his request, James Gillaspay gave Evans detailed notes on the type of *E. formicoides*. Comparison of the notes with Say's description led Evans (1969) to propose the above synonym. I concur with Evans (1969) that *Bethylus formicoides* is indeed best regarded as a junior synonym of *E. rufipes*.

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