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On the status of some species of Braconidae (Hymenoptera) described by J. C. Fabricius and the synonymy of *Dichelosus* Szépligeti with *Coccygidium* De Saussure

CARLOS E. SARMIENTO M.[1] & MICHAEL SHARKEY[2]

[1] *Instituto de Ciencias Naturales, Universidad Nacional de Colombia, A. A. 7495 Bogotá, Colombia, e-mail: cesarmientom@unal.edu.co*

[2] *S-225, Dept of Entomology, University of Kentucky, Agric. Sci. Bldg-N., Lexington, KY, 40546, USA, e-mail: msharkey@uky.*

Abstract

The status of five species of Braconidae described by Fabricius is changed. Lectotypes are designated for all five. *Ichneumon hospitator*, *Bracon anator*, and *Ophion pennator* are transferred to the genus *Coccygidium* **combs**. **nov**. *Ichneumon ornator* is transferred to *Coccygidium* and considered a junior synonym of *C. hospitator* **comb.** and **syn. nov**. *Bracon similator* is transferred to the genus *Hemibracon* **comb**. **nov**. *Dichelosus fuscipennis* is considered a junior synonym of *C. hospitator* **syn. nov**. The genus *Dichelosus* is synonymized with *Coccygidium* **syn. nov.**, and the member species are all transferred to *Coccygidium: C. fuscipennis* **comb. nov.**, *C. peruensis* **comb. nov.**, *C. brasiliensis* **comb. nov.**, *C. dubiosus* **comb. nov.**, *C. similis* **comb. nov.**, *C. variegatus* **comb. nov.**, and *C. demerarus* **comb. nov.**

Key words: *Coccygidium*, *Zelomorpha*, *Bracon*, *Ichneumon*, Taxonomy

Introduction

As part of a larger revision of all Neotropical members of *Coccygidium*, (Sarmiento in prep.) the identities of five species of braconid described by Fabricius are clarified. Many early descriptions of species of Braconidae, even up to the first years of the 20th century, were based on color differences. Convergent color patterns are the result of the many widespread mimicry systems found in tropical members of the subfamilies Braconinae and Agathidinae. Thus, type series of some species are composed of mixtures of species from these two subfamilies. The examination of Fabricius' types is therefore a common and necessary task (Moure, 1960; Brindle, 1981; Colonnelli, 1993; Horstmann, 2001).

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The genus *Coccygidium* has never been thoroughly revised and the species descriptions are dispersed in the literature. Chou and Sharkey (1989) synonymized *Zelomorpha* with *Coccygidium*, citing a lack of autapomorphies for *Zelomorpha*, but Achterberg and Maetô (1990) considered these as separate entities because of the conspicuous long fore tibial spur in *Coccygidium*, a character that is absent in all the New World species and in the type species of *Zelomorpha*. No cladistic analysis has been published to resolve this debate and no structures have been proposed as evidence to support the monophyly of *Zelomorpha*, therefore we retain the wider concept of *Coccygidium* (sensu Chou and Sharkey) in this paper. Members of the genus may be recognized by the following set of character states: cleft claws, serrate ridge on hind basitarsomere, short and ventrally curved ovipositor, longitudinal carina in the hind trochantellus, apical antennal segment pointed. Additionally, as we discuss below, the diagnostic characters of the genus *Dichelosus* indicate that they are derived members of *Coccygidium*.

Most of the species discussed here were originally described by Fabricius under the genus *Ichneumon* (Fabricius, 1775; 1787); later, he transferred some of these to the genus *Bracon* (Fabricius, 1804). The exception to this is *Ophion pennator* Fabricius, 1804. Even though Fabricius' generic definitions rely mostly on structural characters, his species descriptions were largely based on color differences (e. g.: Fabricius, 1775; 1777; 1781; 1787; 1804). Some specimens of Fabricius' collection were physically relocated due to specimen exchanges and museum administrative policies (Zimsen, 1964; van Achterberg pers. com.); thus, there is not complete certainty on the taxonomic history of all specimens.

Materials and Methods

We reviewed the types of the five species described by Fabricius and carefully compared these with the original descriptions. Types were kindly provided by the Zoologisk Museum, Copenhagen University, (ZMUC). Given the difficulties of distinguishing members of *Dichelosus* from *Coccygidium*, we also checked for potential synonyms of species of *Dichelosus* described by authors such as Szépligeti (1902, 1908). *Dichelosus* types were kindly provided by the Hungarian Natural History Museum, (HNHM).

Fabricius' types are deposited in the University of Copenhagen Zoological Museum (ZMUC). Specimens used in the present paper belong either to the Kiel collection or to the Copenhagen collection proper. Specimens in the Kiel collection are those studied by Fabricius while he was professor at the University of Kiel (Zimsen, 1964) and are also physically located in the University of Copenhagen Zoological Museum. In this paper, species are treated in the numerical order designated by Zimsen (1964) in her large treatise of Fabricius' types. The specimen number given by Zimsen appears before each species heading in the text below.

All photographs were taken using a digital camera attached to a Leica MZ7.5 stereoscope. Images were assembled using the Auto-montage software™, and were processed using Adobe Photoshop v 7.

Results and Discussion

Five Fabricius types were examined: One belongs to the genus *Hemibracon* Szépligeti (Braconinae); the other four belong to the genus *Coccygidium* De Saussure (Agathidinae, Disophrini). All four species have the characters described above as diagnostic of the genus *Coccygidium*.

280. *Ichneumon hospitator* Fabricius, 1775

Fabricius (pg. 335) cited Nova Hollandia as the type locality of the species, which corresponds to Recife in Brazil. He mentions this species again in two publications (1793: 157) and (1804: 106). In the latter, Fabricius transferred this species to the genus *Bracon* but the specific part of the name was erroneously changed by the printer to *hospitor* (Zimsen, 1964). Zimsen (1964) reported two type specimens, one in the BMNH and the other deposited in the Kiel collection. Shenefelt (1970) cited *Ichneumon hospitator* Fabricius, 1775 and added the following text: (! London, lectotype needed. Specimen bearing "type" is male Agathidine. Other specimen is? [sic] *Curriea* male)." *Curriea* is a genus belonging to the Braconini (Braconinae), which is not known in the New World. Horstmann (2001) indicated that the species belongs to the Braconidae but did not comment further. The specimen in the Kiel Collection is an agathidine female that fits Fabricius´ original description (Fig. 1). The label attached to the specimen has the text "hospitator mihi" (Fig. 2) and it possesses all the characteristics of a Fabricius label as described by Zimsen (1964). "Mihi" means "of me" which was Fabricius' provisional note indicating that he intended to describe the species (van Achterberg pers. com.). Therefore we designate the Kiel specimen as the lectotype. We added a label to this specimen with the following data: LECTOTYPE, *Ichneumon hospitator* Fabricius, 1775, Designated by Sarmiento, C. 2004. *Ichneumon hospitator* belongs to the genus *Coccygidium*, thus, it is transferred to this genus. We consider *C. hospitator* to be the senior synonym of *Ichneumon ornator* Fabricius, 1787. Also, we examined the holotype of *Dichelosus fuscipennis* Szépligeti, 1902 and concluded that this is a junior synonym of *C. hospitator*. See below for a discussion of the status of the genus *Dichelosus.*

***Coccygidium hospitator* (Fabricius, 1775). New Combination**

—*Ichneumon hospitator* Fabricius, 1775 Systema Entomologiae, 335. Lectotype: Female, "hospitator mihi" [= of me], Kiel collection, ZMUC, here designated.

FIGURES 1–10. 1, Lectotype of *Coccygidium hospitator.* 2. Label attached to the *C. hospitator* lectotype. 3. Lectotype of *Hemibracon similator.* 4. Label attached to the *H. similator* lectotype. 5. Lectotype of *Ichneumon ornator*. 6. Label attached to the *I. ornator* lectotype. 7. Lectotype of *Coccygidium anator*. 8. Label attached to the *C. anator* lectotype. 9. Lectotype of *Coccygidium pennator.* 10. Label attached to the *C. pennator* lectotype. Scale bar = 0.5mm.

—*Ichneumon ornator* Fabricius, 1787, Entomologia systematica emendata et aucta. Vol. 2. Christ. Gottl. Proft, Hafniae. 99. Male ? [sic], Cajennae Dom. Von Rohr. [French Guiana]. ZMUC. **New Synonymy**

—*Bracon ornator* (Fabricius, 1793); Fabricius, J. C. 1804. Systema Piezatorum. Carolum Reichard, Brunsviga: 106. **New Synonymy**

—*Bracon hospitor* Fabricius, J. C. 1804. Systema Piezatorum. Carolum Reichard, Brunsviga: 106 [unjustified emendation]

—*Dichelosus fuscipennis* Szépligeti, 1902, Természetrajzi Füzetek. 25: 71 Female, "Brasilien: Teffe". Deposited in the Hungarian Natural History Museum, Hungary, Budapest (HNHM). **New Synonymy**.

—*Ichneumon ornator* Fabricius, 1787; Shenefelt, R.D. 1978. Braconidae 10. Braconinae, Gnathobraconinae, Mesestoinae, Pseudodicrogeniinae, Telengainae, Ypsistocerinae, plus Braconidae in general, major groups, unplaced genera and species. In: Hymenopterorum Catalogus (nova editio). Pars 15. pp. 1425-1872.

281. ***Bracon similator* Fabricius, 1804**

Fabricius described this species in his Sytema Piezatorum (pg. 106) and he cited America meridionali, Essequibo Smidt mus. De Sehestedt, as the collection locality. Zimsen (1964: 372) stated that the type series includes two specimens from Copenhagen and three from the Kiel collection. Shenefelt (1978) identified this species as a member of the Doryctinae. Actually the type series of *B. similator* Fabricius includes specimens of three braconid subfamilies, Doryctinae, Braconinae, and Agathidinae.

Specimens from the Copenhagen collection: The first specimen has a red label "Type", and a second label "Essequibo Smidt mus. De Sehestedt, *Bracon similator* Fabr." A second specimen only has a red label with the text "type". Both of these are conspecific and are *Megaloproctus* nr *harpactorinus* (Doryctinae). We attached a label to these specimens with the following information: DORYCTINAE, *Megaloproctus* nr *harpactorinus* Det.: M. Sharkey 2004.

Specimens from the Kiel collection: The first specimen is a female without any label and it is a specimen of *Coccygidium nigrobalteata* (Cameron, 1911); we attached the following label to it: AGATHIDINAE *Coccygidium nigrobalteata* (Cameron, 1911), Det.: C. Sarmiento 2004. The second specimen is an undescribed species of *Coccygidium*. The third specimen (Fig. 3) only has a Fabricius style label "similator" (Fig. 4). It is a member of the genus *Hemibracon* (Braconinae*)* Following Zimsen´s (1964) descriptions of Fabricius' type specimen labels we believe that this is the best candidate for the lectotype of the species; Shenefelt (1978) stated that this species belongs to the subfamily Doryctinae but he did not designate a lectotype nor did he suggest a generic placement for it. We transfer the species to the genus *Hemibracon* (Braconinae). We attached a label to this specimen with the following information: LECTOTYPE, *Bracon similator*, Fabricius, 1804, Designated by Sarmiento, C. 2004. The type series is clearly composed of different genera, and it is clear from Fabricius' original description that he included specimens with both short and long ovipositors.

***Hemibracon similator* (Fabricius, 1804) New Combination**

—*Bracon similator* Fabricius, 1804: 106, Lectotype: female, "similator". Kiel collection, ZMUC, here designated.

282. *Ichneumon ornator* Fabricius, 1787

Fabricius (pg. 264) noted Cayenne, French Guiana as the type location. Zimsen (1964) stated that there are two type specimens deposited in the Kiel collection. We looked at these specimens and found that one, which does not have a label, is a member of the genus *Lasiophorus* (Braconinae). We attached a label to it with the following text: BRACONINAE *Lasiophorus* sp., Det.: M. Sharkey 2004. The second specimen is a male Agathidinae (Fig. 5) with the label "ornator mihi" (Fig. 6). Because this label has all of the characteristics of Fabricius' calligraphy (Zimsen, 1964), we designate it as the lectotype. We attached a label to it with the following text: LECTOTYPE, *Ichneumon ornator* Fabricius, 1787, designated by Sarmiento, C. 2004.

Systema Piezatorum (1804: 106) Fabricius transferred *Ichneumon ornator* to *Bracon* and the Fabricius specimens in the ZMUC are stored under this generic name. Roman (1912) transferred it to the subgenus *Ipobracon* of *Bracon*. Shenefelt (1978) cited this species as *Bracon ornator* (Fabricius) and indicated that the systematic position needs correcting. Horstmann (2001) stated that the species belongs to the Braconidae without giving further comments. Here we consider this species to be a junior synonym of *Coccygidium hospitator* (Fabricius, 1775).

***Ichneumon ornator* Fabricius, 1787**

—*Ichneumon ornator* Fabricius, 1787, Entomologia systematica emendata et aucta. Vol. 2. Christ. Gottl. Proft, Hafniae. 99. Lectotype: female "ornator mihi [=of me]", Kiel collection, ZMUC, here designated. Junior synonym of *Coccygidium hospitator* **New Synonym.**

—*Brocon ornator* (Fabricius, 1793) Fabricius, J. C. 1804. Systema Piezatorum. Carolum Reichard, Brunsviga: 106

—*Bracon (Ipobracon) ornator* (Fabricius): Roman, A. 1912. Die Ichneumonidentypen C. P. Thunbergs. *Zoologiska Bidrag fran Uppsala*. 1: 270.

—*Ichneumon ornator* Fabricius, 1787; Shenefelt, R.D. 1978. Braconidae 10. Braconinae, Gnathobraconinae, Mesestoinae, Pseudodicrogeniinae, Telengainae, Ypsistocerinae, plus Braconidae in general, major groups, unplaced genera and species. In: Hymenopterorum Catalogus (nova editio). Pars 15. pp.1425-1872.

301. *Bracon anator* Fabricius, 1804

Fabricius (pg. 110) cited America meridionali as the type locality. According to Zimsen (1964: 373) six specimens of the type series are deposited in Copenhagen, and one in the Kiel collection. Shenefelt (1978: 1465) stated that its systematic position is uncertain and that a lectotype is needed. We examined three syntypes in the Kiel collection and four

putative syntypes from the Copenhagen collection. Six of these specimens have a small green tag, indicating that they are probably Fabrician types for which the original labels were replaced (Zimsen, 1964). Of these six, a female from the Kiel collection (Fig. 7) has two additional labels, one with the text "Type" and the other with the following data: Essequibo, Smidt, mus, Dom. Lund. *Bracon anator* Fabr. (Fig. 8). These data match the information provided by Fabricius in the original description. We designate this specimen as the lectotype and we attached a label with the following information: LECTOTYPE, *Bracon anator* Fabricius, 1804, Designated by Sarmiento, C. 2004. The second specimen of the Kiel collection is a conspecific male with a red label with the text "Type" and an additional small green tag. The third specimen is a female, also conspecific with the first two; it has a red label "Type", and a second label in Fabricius´ calligraphy with the text "anator". We attached labels to these two specimens each with the following text: Paralectotype, *Bracon anator* Fabricius, 1804, Designated by Sarmiento, C. 2004. These specimens belong to the genus *Coccygidium*, thus we transfer this species to that genus.

The four specimens of the Copenhagen collection belong to different genera of Braconidae as follows: Two specimens, both with a red label "Type" and a small green tag belong to the species *Labagathis rufoatra* Enderlein (Agathidinae). We added a label to each specimen with the following information: AGATHIDINAE *Labagathis rufoatra* Enderlein, 1920, Det.: M. Sharkey 2004. A third specimen has a red label with the text "Type" and a small green tag; this specimen belongs to the genus *Digonogastra* (Braconinae). We added a label to this specimen with the following information: BRACONINAE, *Digonogastra* sp., Det.: C. Sarmiento 2004. The fourth specimen, has a red label with the text "Type" and a small green tag; it belongs to the genus *Aleiodes* (Rogadinae). We added a label to this specimen with the following information: ROGADINAE *Aleiodes* sp., Det.: C. Sarmiento 2004.

***Coccygidium anator* (Fabricius, 1804) new combination**

—*Bracon anator* Fabricius, 1804 Syst. Piez.: 110, Lectotype: female, Type, Essequibo, Smidt, mus, Dom. Lund. *Bracon anator* Fabr. Kiel collection, ZMUC, here designated.

374. *Ophion pennator* Fabricius, 1804

Fabricius (pg. 135) cited America meridionali as the type locality. Townes (1961) identified it as an Agathidinae. Thunberg (1824: 314) synonymized *Ichneumon pellator* Thunberg, 1822 with *O. pennator.* Zimsen (1964) stated that the type series is composed of two specimens both deposited in the Copenhagen collection (ZMUC). Shenefelt (1970) cited this species as an unplaced Agathidinae. Horstmann (2001) indicated that this is a braconid without giving further information. One specimen is a female (Fig. 9) with a red label "Type", and a second label with the text *O. pennator,* am: meridionalis (Fig. 10). The

second specimen, labeled "type", is a male of *Hadrodactylus* sp. (Ichneumonidae). This specimen has a second label *Hadrodactylus* Tow. 58, and it was identified by Henry Townes. We designate here the female as the lectotype of *Ophion pennator* and we attached a label with the following data: LECTOTYPE *Ophion pennator* Fabricius, 1804, Designated by Sarmiento, C. 2004. This species exhibits all the characters of *Coccygidium*, thus, we transfer it to this genus.

***Coccygidium pennator* (Fabricius, 1804) New Combination**

—*Ophion pennator* Fabricius 1804 Syst. Piezat. 135.Lectotype: Female. Type, *O. pennator*, am: meridionalis, Copenhagen Collection, ZMUC, here designated.

—*Ichneumon pellator* Thunberg 1822: Thunberg 1824 Mem. Acad. St. Petersburg 9: 314.

The status of *Dichelosus* Szépligeti

The genus *Dichelosus* is a neotropical taxon described by Szépligeti (1902). The genus is currently composed of seven species (Shenefelt, 1970) with *D. fuscipennis* as the type species (Viereck 1914). Szépligeti (1902) included two other species, *D. brasiliensis*, and *D. peruensis*, and later (Szépligeti, 1908) he added three more, *D. dubiosus*, *D. similis*, and *D. variegatus*. Enderlein (1920) described *D. demerarus*. We had access to the types of the first five species; and the original descriptions of the last two provide us with enough information to assure that these fit into the original concept of the genus. *Dichelosus* was defined as having a smooth mesoscutum and a smooth propodeum (Szépligeti, 1902), but we have observed a continuous grade in degree of sculpture in species of neotropical *Coccygidium*, from highly rugose to completely smooth. Besides sculpture, species of *Dichelosus* exhibit all of the characters of typical members of *Coccygidium*. Because of the morphological grade, and since we could find no synapomorphies for *Coccygidium* exclusive of *Dichelosus*, we consider *Dichelosus* a junior synonym and we transfer these seven species to the genus *Coccygidium.*

***Coccygidium* De Saussure, 1892**

Ahngeria Kokujev, 1902; *Brachyropalum* Kriechbaumer, 1894; *Caenophylax* Schulz, 1911; *Lisitheria* Cameron 1904; *Neophylax* Ashmead, 1900; *Spilomicrodus* Cameron, 1911; *Xanthomicrodus* Cameron 1904; *Zelomorpha* Ahsmead, 1900; *Zelomorphidea* Viereck, 1912. (Synonymic list based on Sharkey, 1992)

Dichelosus Szépligeti, 1902: 71, type species *D. fuscipennis*. New Synonymy

Coccygidium fuscipennis (Szépligeti, 1902): 71, New Combination (= *D. fuscipennis*)

Coccygidium peruensis (Szépligeti, 1902): 72, New Combination (=*D. peruensis*)

Coccygidium brasiliensis (Szépligeti, 1902): 72, New Combination (=*D. brasiliensis*)

Coccygidium dubiosus (Szépligeti, 1908): 418, New Combination (=*D. dubiosus*)

Coccygidium similis (Szépligeti, 1908): 418, New Combination (=*D. similis*)

Coccygidium variegatus (Szépligeti, 1908): 418, New Combination (=*D. variegatus*)

Coccygidium demerarus (Enderlein, 1920): 197, New Combination (=*D. demerarus*)

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