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ARTICLE

Repositories of type specimens and insights for future taxonomic studies on Neotropical and Nearctic *Megalodacne* Crotch, 1873 (Coleoptera: Erotyloidea: Erotylidae)

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Abstract. *Megalodacne* Crotch, 1873 comprises over 150 species distributed across five subgenera. To date, no comprehensive taxonomic revision or phylogenetic study has been published for the genus. For future taxonomic and phylogenetic research, it is essential to gather detailed information on primary type specimens and to identify morphological characters with potential taxonomic value. In this study, we: (i) provide detailed information on the type specimens of Neotropical and Nearctic *Megalodacne* species; (ii) present images of these specimens or, when unavailable, of representative specimens to illustrate each species; and (iii) identify and discuss morphological characters with potential value for future taxonomic and phylogenetic studies. Additionally, lectotypes are designated for *Dacne audouini* Lacordaire, 1842, *Megalodacne batesi* Crotch, 1876, *Dacne multifida* Lacordaire, 1842, *Ips fasciata* Fabricius, 1777, and *Episcapha heros* Guérin-Méneville, 1841 (a junior synonym of *Megalodacne indica indica* (Linnaeus, 1758)). *Megalodacne indica multifida* (Lacordaire, 1842) is proposed as a **new junior synonym** of *M. indica indica.*

Keywords. Pleasing fungus beetles; Erotylinae; Taxonomy; Morphology.

INTRODUCTION

Megalodacne Crotch, 1873 comprises over 150 species distributed across five subgenera (Delkeskamp, 1952, 1981). It is one of the few genera of Erotylidae with a global distribution, with most species occurring in the Ethiopian, Oriental, and Australian regions (Delkeskamp, 1952, 1981; Chûjô & Chûjô, 1988). In the Neotropical region, six species and subspecies of the subgenus *Psephodacne* Heller, 1918 (restricted to the Neotropical region) are recognized: *Megalodacne audouini* Lacordaire, 1842; *M. batesi* Crotch, 1876; *M. indica indica* (Linnaeus, 1758); *Megalodacne indica latifasciata* Delkeskamp, 1952; *Megalodacne indica multifida* (Lacordaire, 1842); and *M. tortuosa* Lacordaire, 1842. In the Nearctic region, two species of the subgenus *Megalodacne* Crotch, 1873 (also present in the Ethiopian and Oriental regions) are found: *Megalodacne fasciata* (Fabricius, 1777) and *Megalodacne heros* (Say, 1823) (Delkeskamp, 1952, 1981; Boyle, 1954; Chûjô & Chûjô, 1988; Alvarenga, 1994). All species are morphologically homogeneous, characterized by an elongated body and typically exhibiting variations of transverse patches on the elytra.

Despite the broad distribution and diversity of *Megalodacne,* few taxonomic revisions have been published for the genus (*e.g.,* Delkeskamp, 1952; Boyle, 1954). A revisionary study of the Neotropical and Nearctic species is currently in progress by ISCPM. Advancing the taxonomy and phylogeny of any genus, including *Megalodacne,* requires thorough documentation of type specimens and the recognition of morphological characters with potential taxonomic value. The main objectives of this study are to: (i) provide detailed information on the type specimens of Neotropical and Nearctic *Megalodacne* species; (ii) present images of type specimens or, when unavailable, of representative specimens to illustrate the species; and (iii) identify and discuss morphological char-

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acters that may serve as a foundation for future taxonomic and phylogenetic studies of *Megalodacne.*

MATERIAL AND METHODS

Acronyms of scientific collections: CELC: Coleção Entomológica do Laboratório de Sistemática e Biologia de Coleoptera, Universidade Federal de Viçosa (Viçosa, Minas Gerais, Brazil); **CEMT:** Coleção Entomológica de Mato Grosso Eurides Furtado (Cuiabá, Mato Grosso, Brazil); **DZUP:** Coleção Entomológica Padre Jesus Santiago Moure, Universidade Federal do Paraná (Curitiba, Paraná, Brazil); **MNHN:** Muséum national d'Histoire naturelle (Paris, France); **UMZC:** University Museum of Zoology Cambridge (Cambridge, United Kingdom); **ZMUK:** Zoological Museum of Kiel University (Kiel, Germany).

Terms for external morphology, photographs, nomenclature and distribution data

Transcription of label data and dissection of specimens followed Pecci-Maddalena & Lopes-Andrade (2017) and Pecci-Maddalena *et al.* (2021). Terminology for external morphology (Table 1) follows Węgrzynowicz (2002), McHugh *et al.* (1997), and Lawrence *et al.* (2011), while terminology for color pattern follows Skelley (1998a). Higher taxonomic classification follows Cai *et al.* (2022). Photography methods follow Pecci-Maddalena & Lopes-Andrade (2017), Pecci-Maddalena *et al.* (2021), and Pecci-Maddalena *et al.* (2023). Specimens in Fig. 1A-D were photographed by the senior author at UMZC under the available conditions (an old stereomicroscope and a CANON 1000D camera). Photographs 1A-D were taken at drawer level, and for this reason, it was not possible to include scale bars. Photograph 1E was kindly provided by the curator of the ZMUK. Most photographs were taken with a CANON 70D mounted on a stereomicroscope using an adapter. Scale bars were added, and color adjustments were made with an image-editing program. Despite their low resolution, we chose to include photographs 1A-D because they depict primary types. In addition, the dorsal coloration patterns of the photographed specimens provide useful information for the study of Erotylinae. Information about UMZC specimens was obtained from our photographs and from data provided by Skelley (1998b). Images in Figs. 2A and 2I-J were sent to us by the ZMUK curator. Subgeneric classification of *Megalodacne* follows Delkeskamp (1952, 1981). Data on the geographic distribution of the species were obtained from Boyle (1956) and Alvarenga (1994). Following the CODE (ICZN, 1999), "Recommendation 74G. Not merely for curatorial purposes", the lectotype designations provided here are made as part of a revisionary study, and not merely for curatorial convenience. Lectotypes of *M. audouini, M. batesi,* and *M. indica multifida* were designated from a single syntype, whereas the lectotype of *M. fasciata* was chosen from two syntypes.

RESULTS

Taxonomy

Genus *Megalodacne* Crotch, 1873 (Figs. 1-5)

Megalodacne Crotch, 1873: 352 [description]. Gorham, 1888: 33 [citation]. Kuhnt, 1909: 114 [catalogue]. Heller, 1918: 141, 156 [citation]. Deelder, 1942: 56 [citation]. Delkeskamp, 1952: 62 [redescription]. Boyle, 1956: 78, 88 [redescription]. Alvarenga, 1965: 86 [citation]. Delkeskamp, 1981: 21 [catalogue]. Chûjô & Chûjô, 1988: 177 [catalogue]. Alvarenga, 1994: 4 [catalogue].

Included species (Neotropical and Nearctic)

Megalodacne audouini Lacordaire, 1842 (Fig. 1A)
Megalodacne batesi Crotch, 1876 (Fig. 1B)
Megalodacne fasciata (Fabricius, 1777) (Fig. 1E)
Megalodacne heros (Say, 1823) (Fig. 1F)
Megalodacne indica indica (Linnaeus, 1758) (Figs. 2C-E)
Megalodacne indica multifida (Lacordaire, 1842), **new junior synonym** (Fig. 1C)
Megalodacne indica latifasciata Delkeskamp, 1952
Megalodacne tortuosa (Lacordaire, 1842) (Fig. 1D)

Neotropical species

Subgenus *Psephodacne* Heller, 1918: 141. Heller, 1920: 57 [citation]. Delkeskamp, 1952: 65, 71, 73 [redescription]. Alvarenga, 1965: 88 [citation]. Delkeskamp, 1981: 21 [catalogue]. Subgenus-type: *Silpha indica* Linnaeus, 1758.

Megalodacne audouini Lacordaire, 1842 (Fig. 1A)

Dacne audouini Lacordaire, 1842: 66 [description]. Crotch, 1876: 416 [*Megalodacne*]. Gemminger & Harold, 1876: 3682 [catalogue]. Gorham, 1888: 33 [citation and redescriptions]. Kuhnt, 1909: 115 [catalogue]. Kuhnt, 1911: 80 [catalogue]. Schenkling, 1919: 93 [name unavailable]. Deelder, 1942: 112 [citation and distribution]. Blackwelder, 1945: 468 [catalogue]. Delkeskamp, 1952: 72 [citation]. Alvarenga, 1994: 4 [catalogue]. Skelley, 1998b: 11 [catalogue].

Primary type (UMZC): Lectotype, here designated (Fig. 1A). "TYPE [blue label, printed] \ TYPE audouini Ch. [printed]".

Other specimens examined: 3 specimens (CEMT) "Jalisco, nepis. Unión de Tula, cerca de San Gaspar. 19°55′38″N, 109°11′46″W, set. 1620, 14 ago 2004,

P. Carrillo y M.G. Torres legs. ex Ganoderma" [printed]; 4 specimens (CEMT) "Jalisco, San Cristobal de la Barran, Entrada rancho Poricos, "Ganoderma"; 24.vii.2004; 1,905 m; 21°05′15″N, 103°31′51″W; Nicolaide; Carrillo; Vaz-de-Mello leg. [printed]".

Distribution: Mexico.

***Megalodacne batesi* Crotch, 1876 (Fig. 1B)**

Megalodacne batesi Crotch, 1876: 416 [description]. Gemminger & Harold, 1876: 3682 [catalogue]. Kuhnt, 1909: 115 [catalogue]. Kuhnt, 1911: 80 [catalogue]. Blackwelder, 1945: 468 [catalogue]. Delkeskamp,

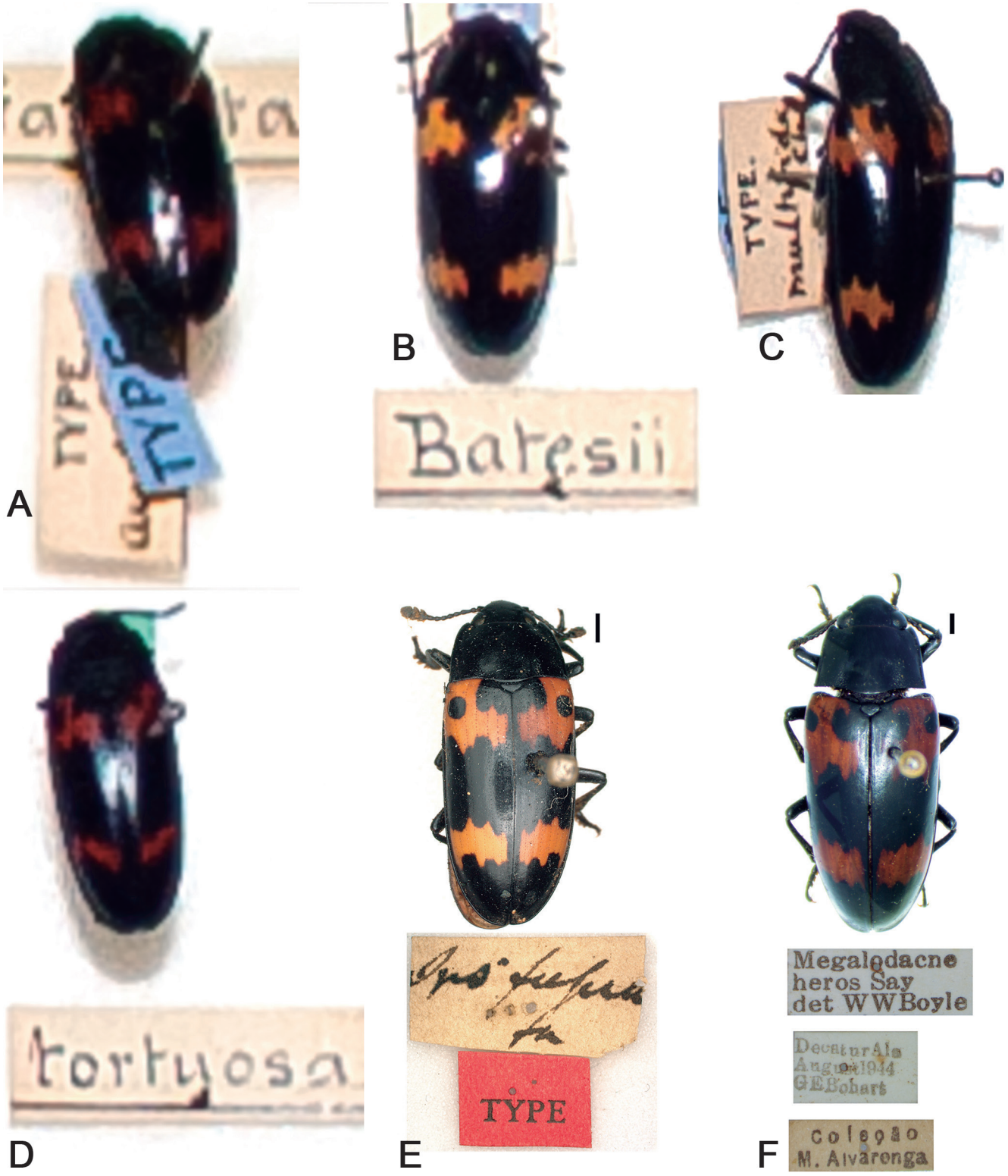

Figure 1. Specimens of *Megalodacne* Crotch, 1873: (A) lectotype of *M. audouini* Lacordaire, 1842 (UMZC). (B) lectotype of *M. batesi* Crotch, 1876 (UMZC). (C) lectotype of *M. indica multifida* (Lacordaire, 1842) (UMZC). (D) specimen of *M. tortuosa* (Lacordaire, 1842) (UMZC). (E) lectotype of *M. fasciata* (Fabricius, 1777) (ZMUK). (F) specimen of *M. heros* (Say, 1823) (DZUP). Scale bars: E-F = 1 mm.

1952: 71 [citation]. Alvarenga, 1994: 4 [catalogue]. Skelley, 1998b: 11 [catalogue].

Primary type (UMZC): Lectotype, here designated (Fig. 1B). "TYPE [blue label, printed] \ green label \ TYPE. [printed] Batesii [handwritten]".

Other specimens: 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ Serra Navio, Amapá, BR, XII.1972, M. Nobrega [handwritten] \ DZUP 372603 [printed]".

Distribution: Northern Brazil.

Megalodacne indica indica (Linnaeus, 1758) (Figs. 1-C, 2A-B, 4A, 5A)

Silpha indica Linnaeus, 1758: 360 [description]. Fabricius, 1781: 85 [citation]. Bedel, 1919: 114 [*Megalodacne*]. Mader, 1942: 176 [citation]; Mader, 1951: 225 [citation]. Delkeskamp, 1952: 67, 72 [redescription]. Alvarenga, 1994: 4 [catalogue]. Skelley, 1998b: 11 [catalogue].

Primary type: Not examined.

Other specimens examined: 1 specimen male, dissected (CELC) "BRASIL: MG, Viçosa, Mata do Paraíso, 03.xi.2014; leg. A. Orsetti, S. Aloquio, I. Maddalena, A. Komonen & C. Lopes-Andrade [printed] \ Trilha do Pesquisador [printed] Ex. *Ganoderma aplanatum* Ganodermataceae [handwritten]" \ CELC005558 [printed]; 1 specimen female, dissected "BRASIL: MG, Viçosa, Mata do Paraíso, 10.v.2014; leg. A. Orsetti [printed] \ ex *Ganoderma aplanatum* [printed] \ CELC005493 [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ FLORESTA DA TIJUCA, Guanabara BRASIL [printed], II. 1974 [handwritten], C.A. Campos Seabra [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed], I.I.1969, P.M. Oliveira [handwritten] \ 2128 [printed] \ ? [handwritten] \ DZUP 372582 [printed]"; 1 specimen "DPTº ZOOL, UF-PARANÁ [printed] \ SANTA TERESA – ES, BRASIL, 16/11/1967, C.T. & C. Elias [printed] \ DZUP 237296 [printed]"; 1 specimen (UMZC), **Lectotype,** here designated, "TYPE [blue label, printed] \ TYPE. [printed], heros Guér. = 4-guttata Ol. [handwritten]".

Remarks: 1) The primary type of *M. indica indica:* We contacted curators of potential collections that could house Linnaeus's specimens (*e.g.,* The Natural History Museum, London; UMZC, Cambridge – visited by ISCPM; and The Linnean Society, London), but the type was not found in these institutions. We also attempted to reach staff from the Uppsala collection (Sweden), which preserves part of Linnaeus's material, but without success. We suspect that the type of *M. indica indica* may still be housed in this collection, which requires future verification. Despite this uncertainty, the species is well represented in several collections containing Erotylidae material, including historical specimens (as verified by ISCPM at MNHN, Paris, and Museo Regionale di Scienze Naturali, Torino, among others). Therefore, the identification of *M. indica indica* can be readily achieved. 2) *Megalodacne indica indica* (L.) includes the following synonyms: (i) *Episcapha heros* Guérin-Méneville, 1841, a junior homonym of *Megalodacne heros* (Say, 1823), synonymized by Lacordaire (1842) with *M. quadriguttata;* (ii) *Engis signata* Laporte, 1840, synonymized by Lacordaire (1842); and (iii) *Erotylus quadriguttata* Olivier, 1792, synonymized by Bedel (1919). The type specimen of *Episcapha heros* Guérin-Méneville, 1841 is housed at UMZC. Based on a drawer-level image, we confirmed that it falls within the intraspecific variation of *M. indica indica*. The type specimens of *Engis signata* Laporte, 1840 and *Erotylus quadriguttata* Olivier, 1792 were not found. According to Horn *et al.* (1990), specimens described by Laporte (= Castelnau) are housed in several European museums and their identification requires further investigation. Regarding Olivier's specimens, they are expected to be housed primarily at UMZC or at MNHN (*see* Pecci-Maddalena *et al.,* 2023). Although specimens named *"quadriguttata"* were observed in these collections, we could not confirm whether they are indeed type specimens. 3) *Megalodacne indica multifida* (Fig. 1C) was described by Lacordaire (1842) as *"Dacne multifida"* based on a single adult female from Brazil. According to Lacordaire, the species is very similar to *M. quadriguttata,* differing in the weak elytral punctation. Delkeskamp (1952) considered *M. multifida* (Lacordaire, 1842) a subspecies of *M. indica* based on the elytral punctation, yellow and more dentate basal elytral fasciae, compared to other specimens of *M. indica*. The characters proposed by Lacordaire (1842) and Delkeskamp (1952) to consider *M. indica multifida* a separate taxon are fragile. Based on the examination of specimens from different Brazilian localities, it is clear that these characters constitute intraspecific variations under *M. indica*. Therefore, here we proposed *M. indica multifida* as a **new junior synonym** of *Megalodacne indica indica*. 4) *Megalodacne indica latifasciata* Delkeskamp, 1952, from Peru, differs from *M. indica indica* in the very large elytral fasciae (Delkeskamp, 1952). We suspected this character may be intraspecific variation; however, more *Megalodacne* specimens from Peru need to be examined for further considerations.

Distribution: *Megalodacne indica indica* is a broadly distributed species, especially in the central, southeastern, and southern portions of the Neotropical region.

Megalodacne indica latifasciata Delkeskamp, 1952

Megalodacne indica latifasciata Delkeskamp, 1952: 69 [description]. Alvarenga, 1994: 4 [citation].

Primary type: Not examined. Probably in Museum für Naturkunde Berlin (Berlin, Germany) (*see* Delkeskamp, 1952; Alvarenga, 1994).

Remarks: Delkeskamp (1952: 69) provided an illustration for this species.

Distribution: Peru and Ecuador.

Megalodacne indica multifida **(Lacordaire, 1842) (Fig. 1C)**

Dacne multifida Lacordaire, 1842: 72. Crotch, 1876: 416 [*Megalodacne*]. Kuhnt, 1909: 115 [catalogue]; Kuhnt, 1911: 80 [catalogue]. Guérin, 1948: 21 [citation]. Delkeskamp, 1952: 68, 72, 73 [subgeneric combination].

Primary type (UMZC): Lectotype, here designated (Fig. 1C). "TYPE. [printed] multifida Ch [handwritten] \ TYPE. [blue label, printed]".

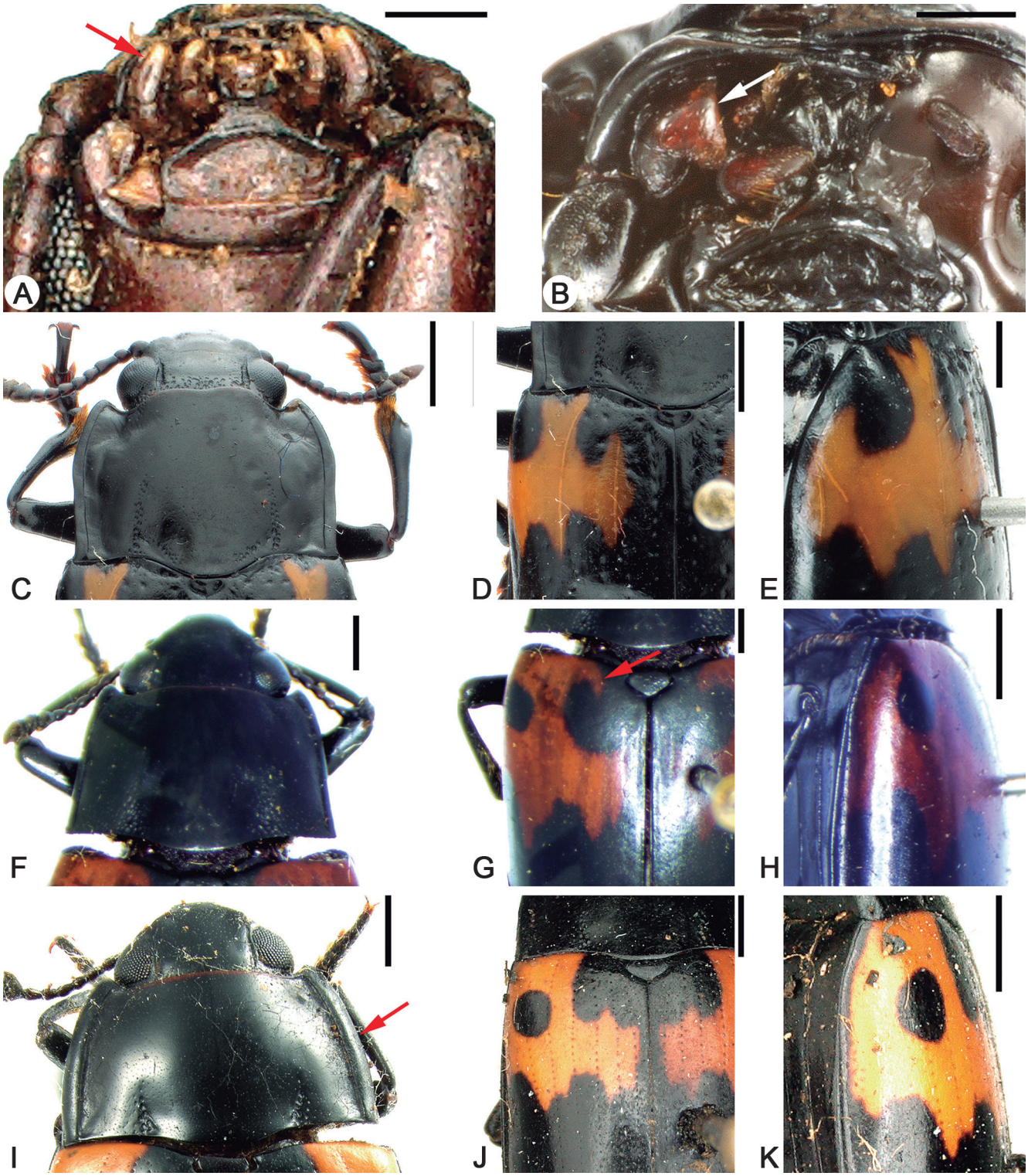

Figure 2. Morphological differences in the studied species of *Megalodacne* Crotch, 1873. Apical maxillary palpomere: (A) cylindrical (*M. fasciata* (Fabricius, 1777)), arrow; (B) axe-shaped (*M. indica indica* (Linnaeus, 1758)), arrow. Lateral pronotal marginal bead and pronotal curvature: (C) *M. indica indica* (Linnaeus, 1758); (F) *M. heros* (Say, 1823); (I) *M. fasciata* (Fabricius, 1777), arrow showing the wide pronotal marginal bead. Basal elytral fasciae, dorsal and lateral view, respectively: (D, E) *M. indica indica* (Linnaeus, 1758); (G, H) *M. heros* (Say, 1823), arrow showing the "tip" surpassing basal elytral edge; (J, K) *M. fasciata* (Fabricius, 1777). Scale bars: A, B = 0.5 mm; C, D = 2 mm; E-K = 1 mm.

Remarks: 1) New junior synonym of *Silpha indica* L. 2) Lacordaire (1842) described the species *Dacne brasiliensis,* which was later considered a synonym of *M. indica multifida* Delkeskamp (1952). Based on a drawer level image, the primary type of *D. brasiliensis* is probably housed at MNHN. However, additional information is required to confirm this identification and, therefore, a lectotype for *D. brasiliensis* is not designated in the present work.

Megalodacne tortuosa (Lacordaire, 1842) (Fig. 1D)

Dacne tortuosa Lacordaire, 1842: 69. Crotch, 1876: 416 [*Megalodacne*]. Gemminger & Harold, 1876: 3683 [catalogue]. Gorham, 1888: 34 [redescription]. Kuhnt, 1909: 115 [catalogue]; Kuhnt, 1911: 81 [catalogue]. Deelder, 1942: 112 [citation]. Blackwelder, 1945: 468

Figure 3. Morphological differences in the studied species of *Megalodacne* Crotch, 1873. Notesternal suture and prosternal pores, male and female specimens, respectively: (A-B) *M. indica indica* (Linnaeus, 1758); (C-D) *M. fasciata* (Fabricius, 1777); (E-F) *M. heros* (Say, 1823). Scale bars: 1 mm.

Table 1. Some morphological differences in the studied species of *Megalodacne* Crotch.

Features	*Megalodacne indica indica* (Linnaeus)	*Megalodacne fasciata* (Fabricius)	*Megalodacne heros* (Say)
Apical maxillary palpomere (Fig. 2A-B)	Axe-shaped	Cylindrical	Cylindrical
Basal elytral fasciae (Fig. 2D-E, G-H, J-K)	"Bat shaped": coarsely dentate, yellowish, laterally not closing humeral black spot; forming two well defined and narrowed tips	Dentate, isolating a circular black spot on each humeral callus and attaining the base of each elytron only along the outer half	Dentate, isolating a circular black spot on each humeral callus; narrowly inward, forming a tip, surpassing basal elytral edge, almost to scutellum, leaving a black spot narrowly joined to the black pronotum mostly by the black scutellum
Lateral pronotal marginal bead (Fig. 1C-I)	Narrower than base of protibia	Wider than base of protibia	Narrower than base of protibia
Pronotal curvature (dorsal view) (Fig. 1C-I)	Convex	Concave	Convex
Notosternal suture distance to pronotal lateral edge (Fig. 3B-C)	Close to pronotal edge	Far from pronotal edge	Far from pronotal edge
Prosternal pores pattern (Fig. 3)	Deep and coarse (males)	Thin and sparse (both sexes)	Thin and sparse (both sexes)
Parameres shape (Tegmen) (Fig. 4A-B)	Narrowed	Narrowed	Swollen
Metatibia curvature (males) (Fig. 5A-C)	Inner surface strongly curved	Straight inner margin	Straight inner margin
Metatibia tubercles (males) (Fig. 5A-C)	With strong tubercles on inner margin and distal surface	With minute, indistinct tubercles	With small, distict tubercles
Terminal abdominal ventrite (males)	Flat	Flat	With strong V-shaped projection (Fig. 5D)

[catalogue]. Delkeskamp, 1952: 70, 72, 73 [citation]. Alvarenga, 1994: 5 [catalogue]. Skelley, 1998b: 11 [catalogue].

Primary type: Probably at UMZC (Fig. 1D).

Remarks: Based solely on the available images and the information provided by Skelley (1998b), the single specimen labeled as *"M. tortuosa"* in the UMZC (Fig. 1D) cannot be confirmed as a primary type. Although it is likely the specimen used by Lacordaire (1842) in the original description of *M. tortuosa,* definitive confirmation will require further investigation in future studies.

Distribution: Mexico. Colombia.

Nearctic species

Subgenus *Megalodacne* Crotch, 1873: 352. Heller, 1918: 141 [citation]. Delkeskamp, 1952: 65 [citation]. Boyle, 1956: 90 [citation]. Subgenus-type: *Ips fasciata* Fabricius, 1777.

Megalodacne fasciata (Fabricius, 1777) (Figs. 1E, 2A, 2I-K, 3C-D)

Ips fasciata Fabricius, 1777: 213. Olivier, 1792: 433 [*Erotylus bifasciatus*]. Fabricius, 1801: 582 [*Engis fasciata*]. Latreille, 1804: 14 [Dacne fasciata (Fabricius)]. Crotch, 1873: 353 [*Megalodacne*]. Delkeskamp, 1952: 72 [citation]. Boyle, 1956: 90 [citation and redescription]. Skelley, 1998b: 11 [catalogue].

Primary type (ZMUK): Lectotype, here designated (Fig. 1E). "*Apis fasciata Fa* [handwritten] \ Type [red label, printed]".

Other specimens examined: 1 specimen male, dissected (CELC) "Georgia, Dougherty Co., Albany, about 4 miles N.E. February 21, 1969, Col. Lloyd R. Davis, Jr. [printed]"; 1 specimen female, dissected (CELC) "PENNA.: Delaware Co., Wallingford, 27-VI-1963, F.W. Skillman Jr., under maple bark [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ IND. Monroe County Bloomington [printed], #9, IV.16.1966 [handwritten], Ssrithunya \ DZUP 136428".

Distribution: Southeastern Canada, United States of America and northeastern Mexico.

Megalodacne heros (Say, 1823) (Fig. 1F, 2F-H, 3E-F, 4B)

Engis heros Say, 1823: 196. Lacordaire, 1842: 67 [*Dacne heros* (Say)]. Crotch, 1873: 353 [*Megalodacne heros* (Say)]. Delkeskamp, 1952: 72 [citation]. Boyle, 1956: 91 [citation and redescription]. Skelley, 1998b: 11 [catalogue].

Primary type: Not examined. Probably destroyed (*see* Discussion).

Other specimens examined: 1 specimen male, dissected (DZUP) "Coleção M. Alvarenga [printed] \ U.S. [handwritten] \ George Lewis Coll. B.M. 1926-369. [printed] \ *Dacne heros* [handwritten] \ DZUP 372604 [printed]"; 1 specimen female, dissected "*Megalodacne heros* Say det WWBoyle [printed] \ DecaturAla, August 1944, GEBohart [printed] \ Coleção M. Alvarenga [printed] \ DZUP 372600 [printed]".

Distribution: Southeastern Canada and United States of America.

DISCUSSION

Taxonomy

Given their wide distribution and representation in collections, it is important to identify the potential re-

positories for the types of *M. indica indica* and *M. heros.* According to Horn *et al.* (1990), the primary collections housing Linnaean material include the Linnean Society of London (where the type of *M. indica indica* is not located, as confirmed via personal communication with the curator) and the University Museum of Zoology, Cambridge (examined by the senior author; the type of *M. indica indica* was not found there). Two additional collections known to hold Linnaean materials are the Smithsonian Institution in Washington, D.C., and the Uppsala Museum in Sweden. Linnaeus (1758), in his description of *M. indica indica,* used the abbreviation "M.L.U.," which refers to the "Museum Ludovicae Ulricae," a collection currently housed at Uppsala University (*see* Dance, 1967; Low & Mendoza, 2013). Therefore, it is likely that the type of *M. indica indica* is deposited at this institution. As for the type of *M. heros,* it was presumably destroyed along with Say's collection, which suffered significant damage from insect pests (Boyle, 1956; Mawdsley, 1993). If this is confirmed, the designation of a neotype will need to be considered in future studies.

Figure 4. Parameres shape: (A) *Megalodacne indica indica* (Linnaeus, 1758) and (B) *M. heros* (Say, 1823). Scale bars: 1 mm.

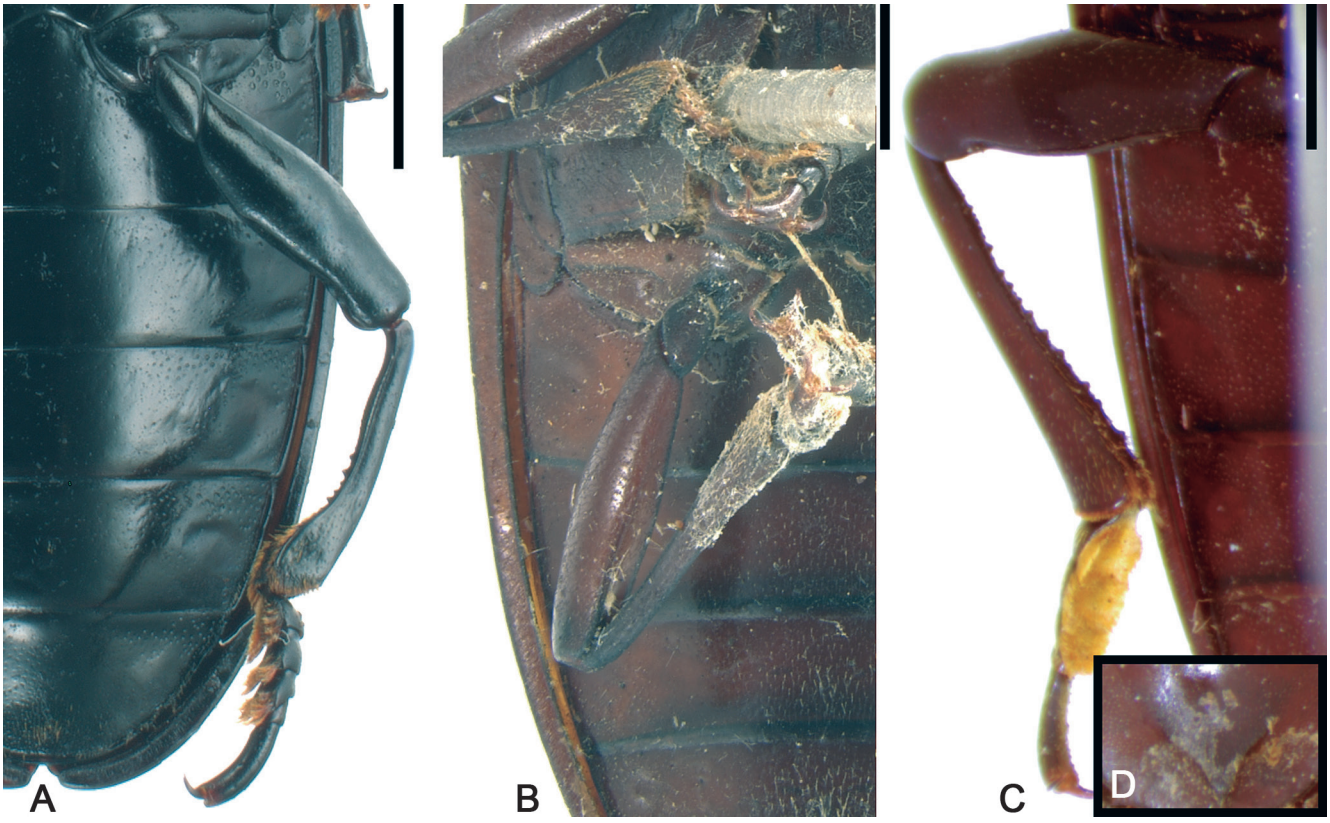

Figure 5. Metatibia in males (curvature and tubercular pattern): (A) *Megalodacne indica indica* (Linnaeus, 1758); (B) *M. fasciata* (Fabricius, 1777); (C) *M. heros* (Say, 1823). (D) Terminal abdominal ventrite in a male of *M. heros.* Scale bars: 1 mm.

Morphology (Table 1)

Differences in the shape of the apical maxillary palpomere between Nearctic and Neotropical species of *Megalodacne* were first noted by Delkeskamp (1952). The Neotropical species *Megalodacne indica indica, M. audouini* and *M. batesi* (examined specimens, but not included here) exhibit an axe-shaped apical maxillary palpomere, a characteristic of the Neotropical subgenus *Psephodacne*. Conversely, the Nearctic species *M. fasciata* and *M. heros* possess a cylindrical apical maxillary palpomere, characteristic of the widespread subgenus *Megalodacne*. In Erotylinae, the cylindrical shape is typical of Dacnini, a tribe primarily distributed in the Northern Hemisphere and considered the sister group to the other four tribes of Erotylinae (Węgrzynowicz, 2002). In contrast, the axe-shaped apical palpomere is observed in other tribes, such as Erotylini and Tritomini (*see* example in Pecci-Maddalena *et al.,* 2023). However, the genus *Megalodacne* and other genera within Megalodacnini exhibit a mixture of cylindrical and axe-shaped palpi. Given its binary and easily recognizable nature, we suggest that this character be included in future studies on *Megalodacne*.

Boyle (1956) used the characters "pronotal curvature" and "lateral pronotal marginal bead" to differentiate *M. fasciata* and *M. heros*. He described *M. fasciata* as having a "pronotum transverse, its lateral margins wide" and *M. heros* as having a "pronotum subquadrate, its lateral margins narrow". While these differences are recognizable, we observed that they are not always distinct. A larger number of *Megalodacne* specimens must be examined to determine whether these variations are consistent across the genus or diagnostic only for Nearctic species.

Color patterns in Erotylinae serve as useful diagnostic characters, although intraspecific variation must be considered to avoid misidentifications (*see* examples in Pecci-Maddalena *et al.,* 2021; Pecci-Maddalena *et al.,* 2023). The *Megalodacne* species studied here exhibit conspicuous differences in the pattern of the basal elytral fascia. *Megalodacne indica indica* displays a highly serrated yellow basal elytral fascia with pointed contours and a free black humeral spot that is not enclosed by the yellow patch. In contrast, *M. heros* and *M. fasciata* have a less serrated yellow fascia with smoother contours, and the black humeral spot is entirely surrounded by the yellow fascia. All examined specimens followed these patterns, suggesting that the elytral color pattern may serve as a reliable diagnostic character for *Megalodacne*.

Węgrzynowicz (2002) described the "interrupted notosternal suture" in *Megalodacne* (specifically *M. fasciata*). In this study, we observed that the notosternal suture of *M. indica indica* is continuous with the pronotal edge, a feature absent in *M. heros* and *M. fasciata*. Additionally, among the species examined, *M. indica indica* is the only one exhibiting conspicuously deep and sparse punctures on the prosternum, a condition found exclusively in males. Interestingly, Delkeskamp (1959) previously reported this same sexual dimorphism in African species of *Megalodacne,* such as *M. (Episcaphula) laeta* Arrow, 1917. Further examination of additional *Megalodacne* species and other genera within Megalodacnini and Erotylinae is necessary to assess the taxonomic relevance of this character, especially in defining species complexes.

Regarding male genitalia, the flagellar head, an internal sac structure in Erotylidae, has been a powerful taxonomic tool for species recognition, particularly at the subgeneric level (Skelley, 1998a; Pecci-Maddalena *et al.,* 2023). In *Megalodacne,* this structure will require further investigation during the taxonomic revision and its description was not included in this study. Conversely, significant variation was observed in the shape of the parameres between *M. indica indica* and *M. heros*. Unlike the flagellar head, the shape of the parameres is typically highly conserved in most Erotylinae (particularly in Erotylini and Tritomini). Future studies should explore whether the morphology of the parameres varies in other *Megalodacne* representatives (*e.g.,* African species), and whether this character holds taxonomic and phylogenetic significance for the genus.

With respect to the metatibiae in males, we observed that *M. indica indica* has strongly curved metatibiae, in contrast to *M. fasciata* and *M. heros,* which have straight metatibiae. This character has been documented in other Erotylidae, for instance in large males of *Mycotretus flavomarginatus* Lacordaire, 1842 (Erotylinae: Tritomini) and similar species (*see* Pecci-Maddalena *et al.,* 2023), and may be associated with body size, a hypothesis that warrants further investigation. Regarding the presence of tubercles on the metatibiae of males, some species of Dacnini also exhibit this character (*see* Skelley *et al.,* 2021). In the present study, *M. fasciata* is the only species that displays inconspicuous tubercles. Future phylogenetic studies should assess whether the presence of tubercles, as well as the curvature of the metatibiae, can be considered synapomorphies supporting clades within *Megalodacne*.

The terminal abdominal ventrite in males of *M. heros* is the only one that exhibits a conspicuous V-shaped projection. Neither of the two previous studies that examined this species in detail (Boyle, 1956; McHugh *et al.,* 1997) mentions any other congeneric species with this condition. Two other examined species of the subgenus *Megalodacne* (not included in this study), *M. decipiens* Delkeskamp, 1937 and *M. congoana* Duvivier, 1891, also do not exhibit this projection. This character may be exclusive to *M. heros,* a hypothesis that should be investigated in future studies.

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