



<http://dx.doi.org/10.11646/zootaxa.3635.2.7>

<http://zoobank.org/urn:lsid:zoobank.org:pub:C5FA262D-741B-45E3-A077-CB1C0DB0BFE4>

Description of *Megistoleon thaumatopteryx* sp. nov. with notes on the genus *Megistoleon* Navás (Neuroptera, Myrmeleontidae)

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Abstract

A new African species of antlion, *Megistoleon thaumatopteryx* sp. nov., is described from Mozambique. The poorly known genus *Megistoleon* Navás, 1931 and the only other species currently attributed to it, *M. ritsemae* (van der Weele, 1907) are redescribed in order to provide a better comparison with the new taxon. These myrmeleontids are easily distinguishable by means of an exclusive set of characters besides a striking appearance.

Key words: Neuropterida, Myrmeleontinae, Myrmeleontini, Afrotropical region

Introduction

The Afrotropical region is characterized by a considerably rich and diverse antlion fauna, comprising almost a quarter of the living species of the family Myrmeleontidae. However, this great faunistic diversity is counterbalanced by an unclear taxonomy of numerous genera and a consequent poor state of knowledge. Relatively few modern revisions have been conducted, excluding the subfamily Palparinae (Michel & Akoudjin 2011; Michel & Mansell 2010). Notably, the African members of the tribe Myrmeleontini have not been subjected to a recent taxonomic study. Among the representatives of this tribe, the genus *Megistoleon* Navás, 1931 stands out for its peculiar and striking appearance because of extensive wing markings, an uncommon character in the tribe. This interesting genus appears to be very rare in collections, probably due to forest-dwelling habits, whereas its taxonomic situation (Stange 2004) has been clarified only recently by Prost (2010). The last author demonstrated the existence of only one valid species: *Megistoleon ritsemae* (van der Weele, 1907), distributed in west and central Africa. The recent opportunity to examine further specimens of this poorly known genus allowed to discover a new species of *Megistoleon* from Mozambique, besides to describe and illustrate some characters of taxonomic value not treated in the original descriptions of the former species such as terminalia and genitalia (van der Weele 1907; Navás 1931; Navás 1936), improving the characterization of the genus.

Material and methods

A Leica® MZ9.5 stereomicroscope was used for morphological observations, while a Leica® MZ16 stereomicroscope equipped with a DFC320 digital camera was utilized both for morphological measurements and for photographs. Once obtained, the photos were subsequently elaborated using LAS (Leica® Application Suite) applied software Version 2.5.0 R1. The software Adobe® Photoshop CS5 Extended Version 12.0 was utilized for post-shoot image processing. The length of the adults was measured from the vertex of the head to the tip of the abdomen. The length of the wings was measured longitudinally from the base to the apex, and the width was taken as the maximum width perpendicular to the length measurement line. Terminalia and genitalia were prepared by maceration in 10% KOH (potassium hydroxide) in cold water for several hours, subsequently washed in acetic acid and water, and finally stained in a saturated solution of Chlorazol Black in 95% ethanol.

Taxonomy

Megistoleon Navás, 1931

Type species: *Megistoleon fumosus* Navás, 1931.

Diagnosis. Large antlions but of delicate appearance, with broad wings characterized by conspicuous dark and white markings especially toward the apex, particularly extended in the hind wings. Antennae without apical club, interantennal distance shorter than one and a half of the scape diameter; wings with a particularly dense venation, costal field of forewing mostly biareolated, triareolated in proximity of the pterostigma; males equipped with *pilula axillaris* (Figs 1–2).

Redescription. Head with a moderately raised vertex; antennae long, slender and cylindrical without an apical dilatation, close at the base, their reciprocal distance not superior to one and a half of the scape diameter; labial palpi with the last segment only slightly swollen at the base in both sexes. Pronotum wider than long. Legs relatively long and slender, tibial spurs of all legs shorter than the first tarsomere. Wings broad, with very numerous dark crossveins; membranes mostly hyaline with dark markings and large dark suffusions toward the apex, particularly evident in the hind wings; pterostigmata distinct, very large and whitish in color. Forewing with ample costal field, biareolated except at the base, triareolated after the middle of the wing; Rs arising well after Cubital fork; Media posterior situated in close proximity of the cubital fork; anterior and posterior Banksian lines present (see comments). Hind wing with biareolated costal field only immediately before the pterostigma; 7 presectoral crossveins; Banksian line present (see comments). Hind wings of the males equipped with *pilula axillaris*. Abdomen elongated, shorter than the wings in both sexes. Male: ectoproct simple, not forcipated; IX sternite triangular; gonarcus arch-like, mediuncus slightly pronounced, parameres in close contact and almost fused. Female: anterior gonapophyses large and rounded, posterior gonapophyses digitiform and longer than the posterior gonapophyses, lateral gonapophyses rounded.

Comments. The genus *Megistoleon* shows the synapomorphies of the tribe Myrmeleontini: CuP of forewing originates at basal crossvein, forewing vein 2A runs close to 1A for short distance and then bends at sharp angle toward 3A merging with it, Rs arising distal from the base, hind wing with more than 4 presectoral crossveins, basitarsus of hind leg shorter than apical tarsomere (Markl 1954; Stange 2004). The relationships among the members of this tribe are still poorly understood, however this taxon is clearly recognizable thanks to a combination of apomorphic characters. The costal area of the forewing subdivided in two rows of cells for most of its length and three rows near the pterostigma, is a unique character of this genus. The only other genus of Myrmeleontini with triareolated costal area is the peculiar Fijian endemic *Dictyoleon* Esben-Petersen, 1923, but occasionally some specimens of *Weeleus* Navás, 1912, present this feature as simply a variable characteristic of individual value (New 1982). The above-mentioned genera are clearly separated by overall morphology and they are not closely related among them. Moreover, biareolated costal area in proximity of the pterostigma is present in other Myrmeleontini of conspicuous dimensions: *Hagenomyia* Banks, 1911, *Baliga* Navás, 1912 and in some particularly large species of *Myrmeleon* Linnaeus, 1767 (once included in *Macroleon* Banks, 1911). Another interesting and distinguishing character in *Megistoleon* is represented by the short interantennal distance, inferior to one and a half the scape width, while in most representatives of the tribe it is at least as wide as two times the scape width. Even in this case, the character is shared with a stand-alone genus: *Porrerus* Navás, 1913, a Neotropical taxon included in a dedicated subtribe (Stange 2004). The members of the genus *Megistoleon* can show Banksian lines on both pair of wings, however these are not always clearly discernible thus appearing a character of individual value, at least in *M. ritsemae*.

Megistoleon ritsemae (van der Weele, 1907)

(Figs. 1, 3, 5–8)

Diagnosis. Thorax mostly dark brown with two pale lateral stripes; forewings broad, hind wings narrower, almost falcate and a little longer than the first pair; forewing membrane mostly hyaline with dark brown infuscation at the apex and well defined markings just before the white pterostigma and in the radial area (Fig. 1).

Redescription. Size. Body length 41.4 mm (min-max 40.7–42.6); forewing length 47.2 mm (44.2–51.4), ratio width/length 0.028; hind wing length 49.0 mm (46.0–53.6), ratio width/length 0.13.

General coloring. Dorsally dark brown with yellowish stripes on the thorax and dark brown abdomen, ventral side very pale; brown markings of the wings restricted to the apical area.

1



2



MOZAMBIQUE, Sofala prov.
15 Km S Conduc, Riv. Chinizua 193 m
4/5.XII.2006 P. Schüle leg.

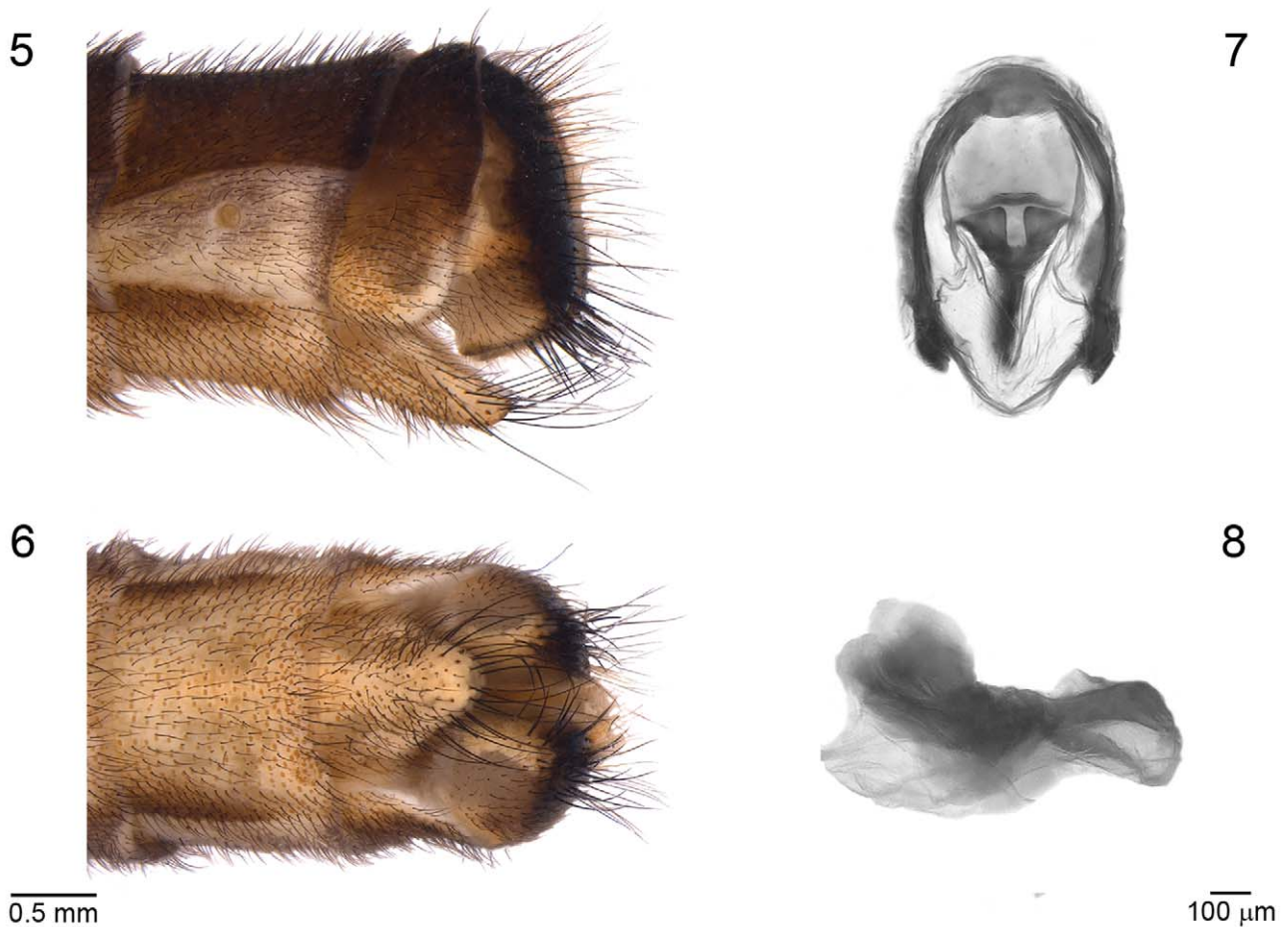
HOLOTYPUS
Megistoleon thaumatopteryx sp. nov.
Badano, 2013

10 mm

FIGURES 1–2. Habitus of *Megistoleon* species. **1.** *M. ritsemae*, male (Cameroon, Mt. Cameroon). **2.** *M. thaumatopteryx* sp. nov., holotypus, female (Mozambique, Sofala prov.), abdomen *in situ*.



FIGURES 3–4. Pronotum of *Megistoleon* species. **3.** *M. ritsemae* (Gabon, Ipassa), alcohol preserved specimen. **4.** *M. thaumatopteryx* **sp. nov.**, holotypus, female (Mozambique, Sofala prov.).



FIGURES 5–8. *Megistoleon ritsemae*. **5.** Male terminalia, lateral view. **6.** Male terminalia, ventral view. **7.** Male genitalia, gonarcus-paramere complex, ventral view. **8.** Male genitalia, gonarcus-paramere complex, lateral view.

Head. Vertex moderately raised, vertex and occiput pale brown with a central black stripe; frons and clypeus with a central black marking and with lateral light brown margins; labrum light brown; genae light brown; maxillary palpi light brown; labial palpi light brown with darker last palpomeres; antennae totally black, flagellomeres covered by short black setae.

Thorax. Pronotum dark brown with two lateral yellowish stripes and covered by sparse long and dark setae (Fig. 3); mesonotum and metanotum dark brown, the paler stripes of the pronotum continue along the sides of prescutum, mesoscutum, mesoscutellum, metascutum and metascutellum; yellowish brown areas are also present at wing insertion; pleural area marked by a longitudinal black stripe; ventral side very pale, almost whitish.

Legs. Coxae almost whitish; all pairs of legs with light brown femora and dorsally darker tibiae, tarsi brown; legs covered by long dark setae.

Wings. Wings of different shape: forewings broad with rounded apex, hind wings noticeably narrower, slightly falcate and a little longer than the first pair, venation mostly dark brown, longitudinal veins with alternating pale dashes; forewing with costal area divided in two rows of cells from Rs insertion and in three rows from middle length; pterostigma large, white and disposed after a contiguous dark marking; a small dark distinct spot is evident on the white coloured hypostigmatic cell; forewing membrane hyaline proximally with a stained apex; crossveins between M and CuA highlighted in brown; radial area with a dark brown elongate and curved marking; hind wing membrane basally hyaline and distally with a very large irregular brown marking; pterostigma very large, white, linked to a second white marking more apical in position; a small white spot is present near the posterior margin and bordered by the main brown area; apical wing margin of both wings infuscated (Fig. 1).

Abdomen. Abdominal tergites brown with paler, yellowish, posterior margins; sternites pale brown with darker lateral-posterior margins; pleural membrane light brown; abdomen with a thick covering of short black setae. Male terminalia as in Figs. 5–6. Ectoproct with the posterior portion darker than the anterior one; IX sternite completely pale. Male genitalia as in Figs. 7–8. Gonarcus arch-like; mediuncus flattened, only slightly prominent; parameres strongly connected to each other with an extended, flattened and sclerified apical part.

Specimens examined. 2♂♂ in alcohol: “Africa – Gabon: Makokou, Ipassa 520 m / 16.II-1.III.2012, C. Deiacco leg.”, D. Badano coll.; 1♂ pinned: “26.XII.1991 / Mt. Cameroon, Cameroon / leg. Rautenstrauch”, D. Badano coll.

Distribution. This rare antlion has been reported from Guinea, Congo, Gabon, Cameroon and Uganda (Prost 2010).

Ecology. The bio-ecology of this myrmeleontid is unknown, it appears to be a forest species. In Gabon (Makokou, Ipassa) it was collected at light during the first part of the night, from about 19:00 to 22:00, in a secondary growth forest (Deiacco pers. comm.).

***Megistoleon thaumatopteryx* Badano, sp. nov.**

(Figs. 2, 4, 9, 10)

Diagnosis. Thorax mostly pale brown with three parallel and well defined black stripes running for all its length; both wing pairs broad; forewing membrane hyaline with apex and posterior margin smoky, mottled and with large markings all along the wing, apex with a brown pseudo-fringe; hind wing dark marking encircling a round white area on the posterior margin (Fig. 2).

Description. Size. Body length 50.0 mm; forewing length 53.3 mm, ratio width/length 0.034; hind wing length 54.4 mm, ratio width/length 0.027.

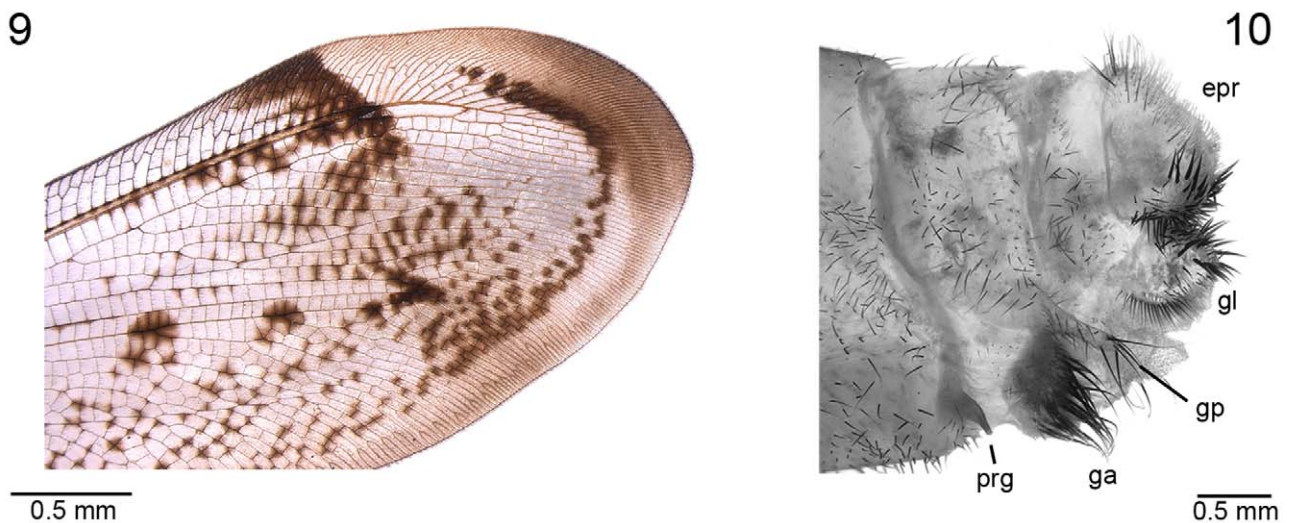
General coloring. Dorsally light brown with alternating black stripes and dark brown abdomen, ventrally noticeably paler; wings heavily marked and dotted of dark brown with some delimited white areas.

Head. Vertex moderately raised, vertex and occiput pale brown with a central black stripe; frons light brown with a large circular black marking; clypeus with a large central dark marking and lateral light brown margins; labrum light brown; genae light brown; maxillary and labial palpi light brown; antennae completely black, from the scape to the flagellum, covered by short black setae.

Thorax. Pronotum light brown with one central and two lateral black stripes, covered by long and dark setae along the posterior margin (Fig. 4); mesonotum and metanotum light brown, perfectly prosecuting the dark pattern of the pronotum, with a central large stripe traversing prescutum, central mesoscutum, mesoscutellum, central metascutum and metascutellum and two lateral narrower stripes on mesoscutum and metascutum; pleural area traversed by a large black stripe; sternal portion of the thorax very pale.

Legs. Coxae very pale; all pairs of legs uniform in coloring, completely light brown with darker last tarsal segments. Legs covered by dark setae.

Wings. Wings broad with rounded apex, venation dark brown with alternating, and not very definite, pale dashes on longitudinal veins; forewing with costal area biareolated from Rs insertion, triareolated from middle length; forewing presectoral crossveins distally divided in two rows; pterostigma very evident, white and preceded by a dark marking; the costal margin is noticeably swollen in proximity of the pterostigma; forewing membrane hyaline proximally, smoky distally and with a thick brown maculation; a series of small brown spots are present at the crossveins insertion on R; large markings are present along CuA with a “>” shaped marking in the rhegmal area; apical area and posterior margin heavily dotted with brown spots; along the apex, from the pterostigma to the Cubital area, a series of contiguous small markings creates a pseudo-fringe (*sensu* Akoudjin & Michel 2011) (Fig. 9); hind wing membrane basally hyaline except some small infuscations along MP and the posterior margin, apex with a very large irregular brown marking encircling a white round area on the posterior margin; a second large white marking, linked to the white pterostigma, is present in the apex; apical margin of both wings suffused with darker color (Fig. 2).



FIGURES 9–10. *Megistoleon thaumatopteryx* sp. nov., holotype. **9.** Apex of the right forewing. **10.** Female terminalia, lateral view. Ectoproct (epr), anterior gonapophysis (ga), posterior gonapophysis (gp), lateral gonapophysis (gl), pregenital plate (prg).

Abdomen. Tergites mostly brown, sternites yellowish brown; pleural membrane brown; abdominal sclerites covered by numerous black and short setae. Female terminalia as in Fig. 10. Pregenital plate triangular; anterior gonapophyses relatively large, rounded, provided with numerous long and thick setae; posterior gonapophyses elongated, digitiform, longer than the anterior pair, apically equipped with few long setae; lateral gonapophyses rounded, dorsal portion covered by large and strong digging setae, similar to those present on the ectoproct, ventral side provided with numerous thin setae. Male unknown.

Type material. Holotype. 1♀ pinned, terminalia in glycerol: “MOZAMBIQUE, Sofala prov./ 15 km S. Condué, Riv. Chinizua, 193 m/ 4./5.XII.2006 P. Schüle leg.” // HOLOTYPUS / *Megistoleon thaumatopteryx* n. sp. / Badano, 2012. **Type depository.** Museo Civico di Storia Naturale “G. Doria”, Genoa, Italy.

Etymology. Noun compound of Greek derivation: *thaumatopteryx*, “wonderful wing”, refers to the striking wing pattern.

Distribution. The new species is known only from the Mozambican type locality, a lowland forest.

Discussion

M. ritsemae (van der Weele) and *M. thaumatopteryx* sp. nov. may be immediately separated by quite evident characters such as the pigmentation of the pronotum and thorax, shape and pattern of the wings and the overall habitus in general. The combination of species-level diagnostic characteristics with those of the genus makes the members of the genus *Megistoleon* unmistakable among the whole family Myrmeleontidae. Moreover, the two species are allopatric in distribution: *M. ritsemae* is mainly distributed in the forest of western and central Africa,

reaching its eastern limit of distribution in Uganda, while *M. thaumatopteryx* **sp. nov.** is known from southeastern Africa. The distribution of the genus *Megistoleon* overlaps with the main forested areas in Sub-Saharan Africa, probably reflecting the ecological requirements of its members, however the paucity of specimens of both species makes biogeographical conclusions still premature.

Acknowledgments

The author is grateful to Bruno Michel (CIRAD, CBGP Montpellier-sur-Lez) for information about African Myrmeleontidae, Claudio Deiaco (Predore, Bergamo) for the collection of specimens in Gabon and finally Marcello Verdinelli (ISE CNR, Sassari) for assistance during the photograph.

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