

## Some taxonomic and nomenclatural changes in Mantodea (Dictyoptera)

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**Abstract.** – Our long-term study on mantodean morphology and systematics revealed some taxonomic and nomenclatural issues which had not been tackled yet. We use the opportunity to rectify some of those problems by establishing, confirming or rejecting the following synonymies. *Congomantis* Werner, 1929, is a new junior synonym of *Musoniella* Giglio-Tos, 1916. *Plesiacanthops* Chopard, 1913, is removed from synonymy with *Acanthops* Audinet-Serville, 1831, and reinstated. *Mimomantis* Giglio-Tos, 1915, is confirmed as a junior synonym of *Negromantis* Giglio-Tos, 1915. *Beesonula* Uvarov, 1939, is a new junior synonym of *Caliris* Giglio-Tos, 1915, with *Beesonula keralensis* (Vyjayandi, Narendran & Mukherjee, 2006) being a new junior synonym of *Caliris pallida* (Werner, 1935). *Palaeothespis* Tinkham, 1937, and *Pseudothespis* Mukherjee, 1995, are new junior synonyms of *Arria* Stål, 1877. *Ephierodula* Giglio-Tos, 1912, is removed from synonymy with *Hierodula* Burmeister, 1838, and reinstated. *Montamantis* Yang & Wang, 1999, is a new junior synonym of *Ephierodula*. *Ephierodula immaculifemorata* Werner, 1922, is a new synonym of *Tamolanica phryne* (Stål, 1877).

**Résumé.** – **Quelques changements de taxonomie et de nomenclature pour les Mantodea (Dictyoptera).** Notre étude à long terme sur la morphologie et la systématique des Mantodea nous a révélé des problèmes de taxonomie et de nomenclature qui n'avaient pas encore été abordés. Nous saisissons l'opportunité de traiter quelques-uns de ces problèmes en établissant, confirmant ou rejetant les synonymies suivantes. *Congomantis* Werner, 1929, est un nouveau synonyme de *Musoniella* Giglio-Tos, 1916. *Plesiacanthops* Chopard, 1913, est retiré de la synonymie avec *Acanthops* Audinet-Serville, 1831, et réhabilité. *Mimomantis* Giglio-Tos, 1915, est confirmé comme synonyme de *Negromantis* Giglio-Tos, 1915. *Beesonula* Uvarov, 1939, est un nouveau synonyme de *Caliris* Giglio-Tos, 1915, avec *Beesonula keralensis* Vyjayandi, Narendran & Mukherjee, 2006, nouveau synonyme de *Caliris pallida* (Werner, 1935). *Palaeothespis* Tinkham, 1937, et *Pseudothespis* Mukherjee, 1995, sont de nouveaux synonymes de *Arria* Stål, 1877. *Ephierodula* Giglio-Tos, 1912, est retiré de la synonymie avec *Hierodula* Burmeister, 1838, et réhabilité. *Montamantis* Yang & Wang, 1999, est un nouveau synonyme de *Ephierodula*. *Ephierodula immaculifemorata* Werner, 1922, est un nouveau synonyme de *Tamolanica phryne* (Stal, 1877).

**Keywords.** – Praying mantids, synonymy, family group names.

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An ongoing long-term study on mantodean morphology and systematics recently completed by us has revealed several nomenclatural and taxonomic problems affecting the understanding of relationships among some less researched mantodean genera by past authors. In order to provide a more stable basis for mantodean systematic and diversity studies, we deal with these cases separately in this paper.

**Abbreviations.** – **NHM**, The Natural History Museum, London, United Kingdom; **NMB**, Naturhistorisches Museum, Basel, Switzerland; **NRM**, Naturhistoriska Riksmuseet, Stockholm, Sweden; **SMNK**, Staatliches Museum für Naturkunde, Karlsruhe, Germany.

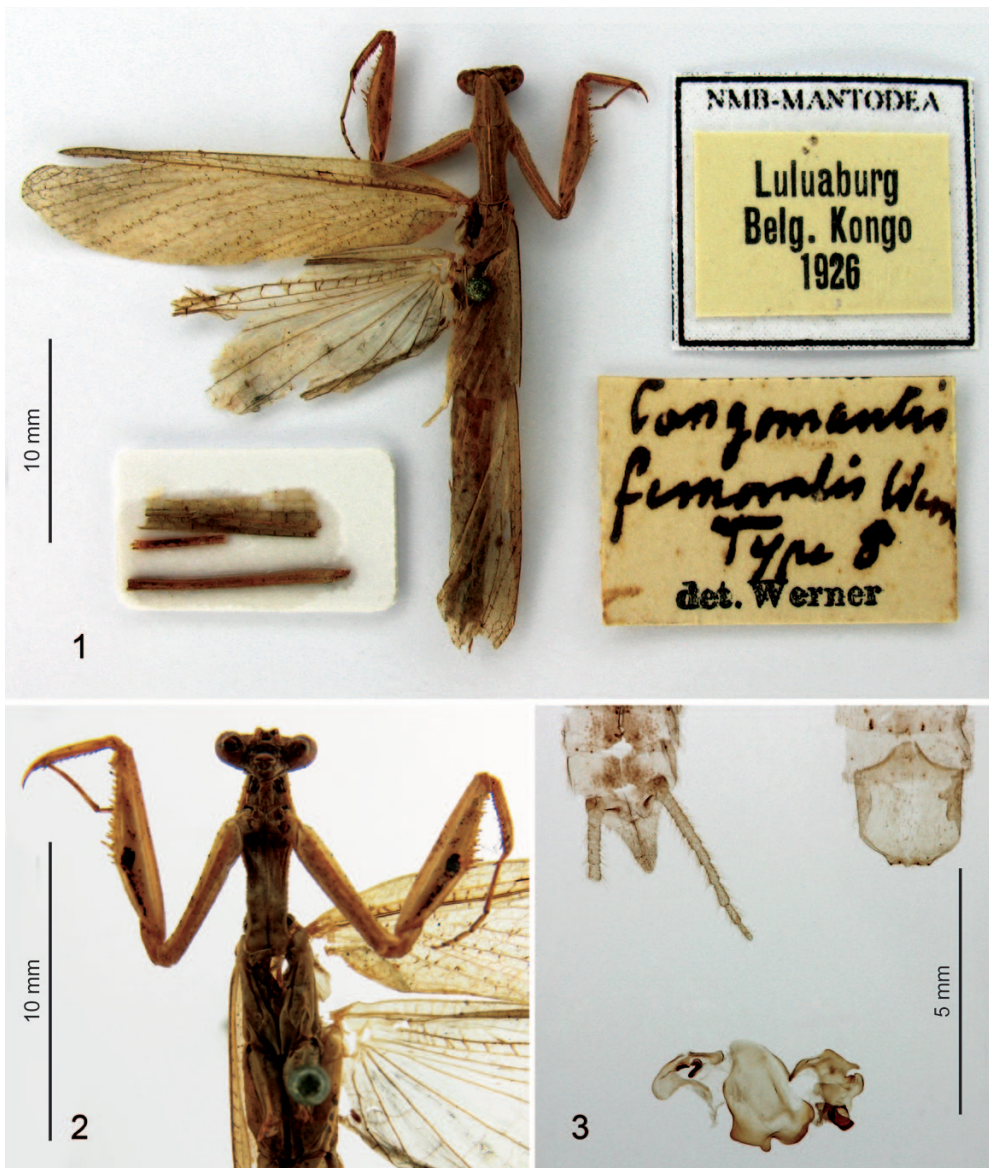
Family **Thespidae** Saussure, 1869

Genus **Musoniella** Giglio-Tos, 1916

*Musoniella* Giglio-Tos, 1916 : 4.

Syn. *Congomantis* Werner, 1929: 222, n. syn.

WERNER (1929) described *Congomantis* to include one species, *C. femoralis* Werner, 1929, known from a single male specimen with the label “Luluaburg, Belg. Congo, 1926” (today Kananga, Democratic Republic of the Congo). Examination of the type (NMB, fig. 1-2), particularly its very characteristic genitalia (fig. 3), revealed it to belong to *Musoniella*. The specimen exhibits all characteristic features of *Musoniella*: an elongate dorsal apical lobe on forecoxae; claw groove at the middle of femur; four postero-ventral spines on forefemora (not five as given by Werner, who frequently added the genicular spine to the number of postero-ventral spines); five (not four, as indicated by Werner) postero-ventral spines on the foretibiae; pronotum slightly longer than forecoxae, with distinctly developed supracoxal dilatation and a keeled



**Fig. 1-3.** – *Congomantis femoralis* Werner, holotype. – 1, Dorsal view and labels. – 2, Ventral view of forebody. – 3, Terminalia and genitalia. (Photos 1-2 Reinhard Ehrmann ©NMB, 3 by the authors).

metazona; an elongate stigma; the pilose costal margin of tegmen; a triangular supraanal plate; and genitalia of the thespid type, with a bifid lobe on the dorsal lamina of the left phallomere and ventral phallomere with both primary and secondary distal process.

The presence of a thespid in the heart of Africa is puzzling, but it cannot be excluded that the specimen was wrongly labelled. A similar case seems to be the label “Tanganjika” associated with the holotype of *Musoniella chopardi* Giglio-Tos, 1916, suspected by that author to be erroneous as well (GIGLIO-TOS, 1916). The morphology of *M. femoralis* most closely matches the damaged type of *M. laevithorax* (Chopard, 1916), but ultimately only a revision of *Musoniella*, including the study of male genitalia, can shed light on the identity of *M. femoralis*.

#### **Species included**

*Musoniella affinis* de Toledo Piza, 1961: E Brazil.

*Musoniella argentina* (Saussure, 1870): Argentina, S Brazil, Paraguay.

*Musoniella brasiliensis* Giglio-Tos, 1916: C Brazil.

*Musoniella chopardi* Giglio-Tos, 1916: Paraguay.

*Musoniella femoralis* (Werner, 1929), **n. comb.**: Democratic Republic of the Congo (?)

*Musoniella fragilis* (Piza de Toledo, 1965): S Brazil.

*Musoniella ipiranga* Rehn, 1918: S Brazil.

*Musoniella laevithorax* (Chopard, 1916): Paraguay, S Brazil.

*Musoniella longicauda* de Toledo Piza, 1969: SE Brazil.

*Musoniella parva* Beier, 1935: Paraguay.

Family **Acanthopidae** Burmeister, 1838.

Genus **Plesiacanthops** Chopard, 1913, **stat. rev.**

*Plesiacanthops* Chopard, 1913: 55.

*Acanthops tuberculata* Saussure, 1870, type species of *Plesiacanthops* by original designation (and all species putatively more closely related to this species than to any other member of *Acanthops* Audinet-Serville, 1831) is the Guianan sister-group of the western Amazon *Miracanthops* Roy, 2004, as evidenced by the following set of characters distinguishing the two genera from other Acanthopinae. Metazona of both male and female very elongate for the group (2.7-2.9 times as long as prozona) and with parallel margins; female tegmina rather narrow and with elongate apical lobe; male tegmina without subapical sinuation of costal field; male hindwings with truncate and lobed apex of discoidal field; male sternites with three projections on posterior margin; male genitalia with elongate ventral phallomere, distal process curved to the left, and weakly developed membranous lobe on left phallomere; and strong sexual dimorphism in the shape of the genicular lobes of the mid and hind legs, which are rounded in males but elongate in females (see RIVERA, 2005). *Plesiacanthops* is distinguished from *Miracanthops* by seven vs six postero-ventral spines on the forefemora, less elongate female tegmina, less elongate male hindwings, and rounded vs pointed basal lobe on ventral phallomere. Some additional species currently assigned to *Acanthops*, as *A. parva* Beier, 1942, and *A. soukana* Roy, 2002, share pronotal, wing or genital characters with *Plesiacanthops* and *Miracanthops*, but are known only by one sex. Whether they belong to one of these genera or deserve an own genus must await the discovery of their opposite sex.

**New diagnosis of Plesiacanthops.** – Acanthopinae of medium size, of brownish color, with convex vertex but without process, fore-femora with weakly developed dorsal lobe, costal field of male tegmina without apical sinuation, tegmina of female with elongate, more or less straight apical lobe, and sternites with three lobes on posterior margin.

**Head** slightly larger than long, tuberculate, with convex vertex, well-developed juxta-ocular bulges, and mammillate eyes. Frontal shield wider than high, posterior margin with two acute projections. Antennae moniliform, slightly but distinctly pilose in males.

*Pronotum* about four times as long as wide, supracoxal dilatation somewhat diamond-shaped but with rounded angles; pronotal margins serrate in females, very slightly serrulated in males; pronotum tuberculate on the prozona and along its median line; metazona 2.7-3.0 times as long as prozona, with two paramedian tubercles just behind supracoxal sulcus, which are very strongly developed in females.

*Meso- and metathorax* very pilose in males, less so in females; metasternum without cyclopean ear.

*Forelegs* tuberculate. Forecoxae shorter than metazona, posterior margin irregularly serrate, anterior margin with irregularly arranged teeth of different sizes, anterior side with numerous pale callous spots; apical lobes contiguous. Forefemora tuberculate, dorsal lobe weakly developed, with four discoidal, seven postero-ventral and 16 antero-ventral spines. Foretibiae with 23-28 postero-ventral and 17-20 antero-ventral spines; postero-ventral spines decumbent in proximal part of tibia, becoming more erect towards distal end.

*Mid and hind legs* short, pilose; mid and hind femora rectangular in cross section, without lobes, but with two dorsal and two ventral serrulate keels; genicular lobes rounded in males, acute in females; mid and hind tibiae with a dorsal lobe-like keel along their proximal two thirds, apical third keeled. Hind metatarsus shorter than remaining segments combined.

*Tegmina* opaque, slightly more than two times as long as pronotum in males, slightly less than two times as long as pronotum in females; costal field very wide, almost as wide as discoidal field, then narrowing at distal third of tegmen; male tegmen apex without falcation, female tegmen apex produced into a truncate lobe with undulated posterior margin; stigma dark. Alae longer than tegmina in males, smoky, with truncate, slightly undulating apex and small apical lobe; alae of females yellowish subopaque with dark suffusions between crossveins, comparatively long for the group, with truncate apex.

*Abdomen* fusiform in males, ovoid in females, tergites with lateral lobes, sternites with three lobes at posterior margin; supra-anal plate incised at apex; cerci pilose, rounded in cross-section, last segment enlarged, flattened and incised at apex.

*Male genitalia* with rounded basal lobe on ventral phallomere, sinuate distal process, short, truncate phalloid apophysis and weakly developed, pilose membranous lobe.

See ROY (2002) for the description of the two sexes of *P. tuberculata*.

***Species included.***

*Plesiacanthops tuberculata* (Saussure, 1870): Guyanas, N Brazil.

Family **Nanomantidae** Brunner de Wattenwyl, 1893

Genus ***Negromantis*** Giglio-Tos, 1915

*Negromantis* Giglio-Tos, 1915: 49.

Syn. *Mimomantis* Giglio-Tos, 1915: 52. PAULIAN, 1957: 44; EHRMANN, 2002: 224-225.

Syn. *Luteomantis* Sjöstedt, 1924: 6.

*Mimomantis* Giglio-Tos had already been synonymized with *Negromantis* Giglio-Tos by BEIER (1935: 55). The two genera had been described after type specimens of opposite sexes from the same location in Cameroon, both with nine postero-ventral spines on the foretibiae. BEIER (1935) also synonymized *Luteomantis* Sjöstedt with *Negromantis* in spite of its eight postero-ventral spines on the foretibiae, but otherwise very similar in its habitus. PAULIAN (1957), only referencing *Mimomantis*, described as *Mimomantis ? milloti* a species endemic to Madagascar, also very similar in its habitus, but with ten postero-ventral spines on the foretibiae. This species has been retained erroneously as the only member of the genus by EHRMANN (2002), despite not being the type species.

We here confirm the synonymy of the three genera, at least provisionally, because of the similar appearance of their species, and especially a typical spination of the forefemora, with 13 antero-ventral spines and the two apical-most long spines with two short spines between them.

***Species included.***

*Negromantis gracilis* (Giglio-Tos, 1915): Cameroon, Central African Republic.

*Negromantis gracillima* Kaltenbach, 1996: Zambia, Zimbabwe.

*Negromantis lutescens* (Sjöstedt, 1900): Cameroon, Central African Republic.

*Negromantis milloti* (Paulian, 1957): Madagascar.

*Negromantis modesta* Giglio-Tos, 1915: Sierra Leone to Cameroon.

#### Family **Haaniidae** Giglio-Tos, 1915

#### Genus **Caliris** Giglio-Tos, 1915

*Caliris* Giglio-Tos, 1915: 82.

*Beesoniella* Werner, 1935: 498, junior homonym of *Beesoniella* Lallemand, 1923 (Hemiptera).

Syn. *Beesonula* Uvarov, 1939: 458, n. syn.

*Beesonula* Uvarov, 1939 (replacement name for the preoccupied *Beesoniella* Werner, 1935) is a junior synonym of *Caliris* Giglio-Tos, 1915. *Beesonula* contains only one species which had been rather inaccurately described as *Beesoniella pallida* by WERNER (1935). However, examination of photographs of the now damaged type specimen (housed in the NHM, fig. 4-7) revealed many characteristic features present in *Caliris*. Among the most obvious characters

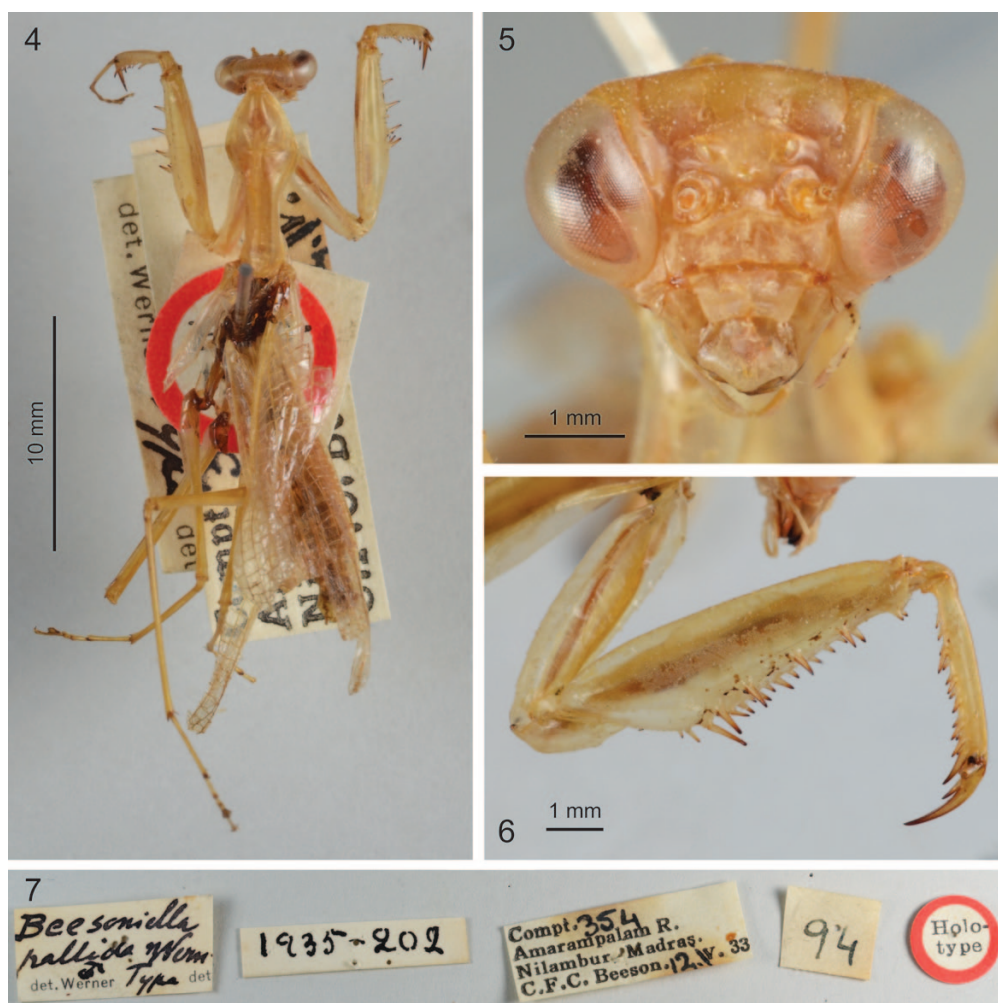


Fig. 4-7. – *Beesoniella pallida* Werner, holotype. – 4, Dorsal view. – 5, Anterior view of head. – 6, Posterior view of foreleg. – 7, Labels. (Photos Rob Byatt©BMNH).

are: the small tubercle between the compound eye and the base of the antenna; the shape of the frontal sclerite; the shallow groove on the anterior side of the forecoxae flanked by two rows of small spines; the divergent apical lobes; the configuration of the discoidal spines; the posterior dark stripe along the postero-ventral spines of forefemora and tibiae; and the number of six postero-ventral spines on the foretibiae, the first of which is longer than the remaining. The number of postero-ventral spines on the forefemora is four, not six as indicated by WERNER (1935). *Beesonula pallida* is conspecific with *Caliris keralensis* (Vyjayandi, Narendran & Mukherjee, 2006), as it fits all characters distinguishing it from *C. masoni* (Westwood, 1889) mentioned by VYJAYANDI (2007), and recently by CHATTERJEE *et al.* (2016) in their redescription of *C. keralensis* (see also GIGLIO-TOS, 1915). Therefore, *Beesonula* Uvarov, 1939, **n. syn.** of *Caliris* Giglio-Tos, 1915, and *Iris keralensis* Vyjayandi, Narendran & Mukherjee, 2006, **n. syn.** of *Beesoniella pallida* Werner, 1935.

**Species included.**

*Caliris elegans* Giglio-Tos, 1915: Malay Peninsula, Sumatra, Borneo.

*Caliris masoni* (Westwood, 1889): India.

*Caliris melli* Beier, 1933: China.

*Caliris pallens* Wang, 1993: China.

*Caliris pallida* (Werner, 1935), **n. comb.**: India.

Genus *Arria* Stål, 1877

*Arria* Stål, 1877: 46.

Syn. *Palaeothespis* Tinkham, 1937: 497, **n. syn.**

Syn. *Pseudothespis* Mukherjee, Hazra & Ghosh, 1995: 251, **n. syn.**

A comparison of the type specimen of *Arria cinctipes* Stål, 1877 (fig. 8-10) with the diagnoses of *Palaeothespis* Tinkham, 1937 (GE & CHEN, 2008), and *Pseudothespis* Mukherjee, Hazra & Ghosh, 1995 (SVENSON, 2007) did not reveal any distinctive characters justifying generic separation. With respect to the number of foreleg spines, shape and tuberculation of head and pronotum, and the shape of male tegmina and of the abdominal lobes in females, *Arria* and *Pseudothespis* fall into the range described for *Palaeothespis*. Therefore, we consider the following new synonymies: *Palaeothespis* Tinkham, 1937, **n. syn.** of *Arria* Stål, 1877, and *Pseudothespis* Mukherjee, Hazra & Ghosh, 1995, **n. syn.** of *Arria* Stål, 1877.

**Species included.**

*Arria cinctipes* Stål, 1877: E India.

*Arria leigongshanensis* (Ge & Chen, 2008), **n. comb.**: S China.

*Arria meghalayensis* (Mukherjee, 1995), **n. comb.**: E India (possibly synonymous with *A. cinctipes*).

*Arria oreophila* (Tinkham, 1937), **n. comb.**: S China.

*Arria pallida* (Zhang, 1987), **n. comb.**: S China.

*Arria sticta* (Zhou & Shen, 1992), **n. comb.**: S China.

Family **Mantidae** Latreille, 1802

Genus *Ephierodula* Giglio-Tos, 1912, **stat. rev.**

*Ephierodula* Giglio-Tos, 1912: 63.

Syn. *Montamantis* Yang & Wang, 1999: 97, **n. syn.**

*Ephierodula* has been synonymized with the hyper-diverse genus *Hierodula* Burmeister, 1838, by BEIER (1935). However, the species of this group form a monophyletic unit, clearly distinguishable from other species currently assigned to *Hierodula* by a unique set of characters: distinctly two- to three-banded forecoxae; forefemora with three maculations or bands; smooth

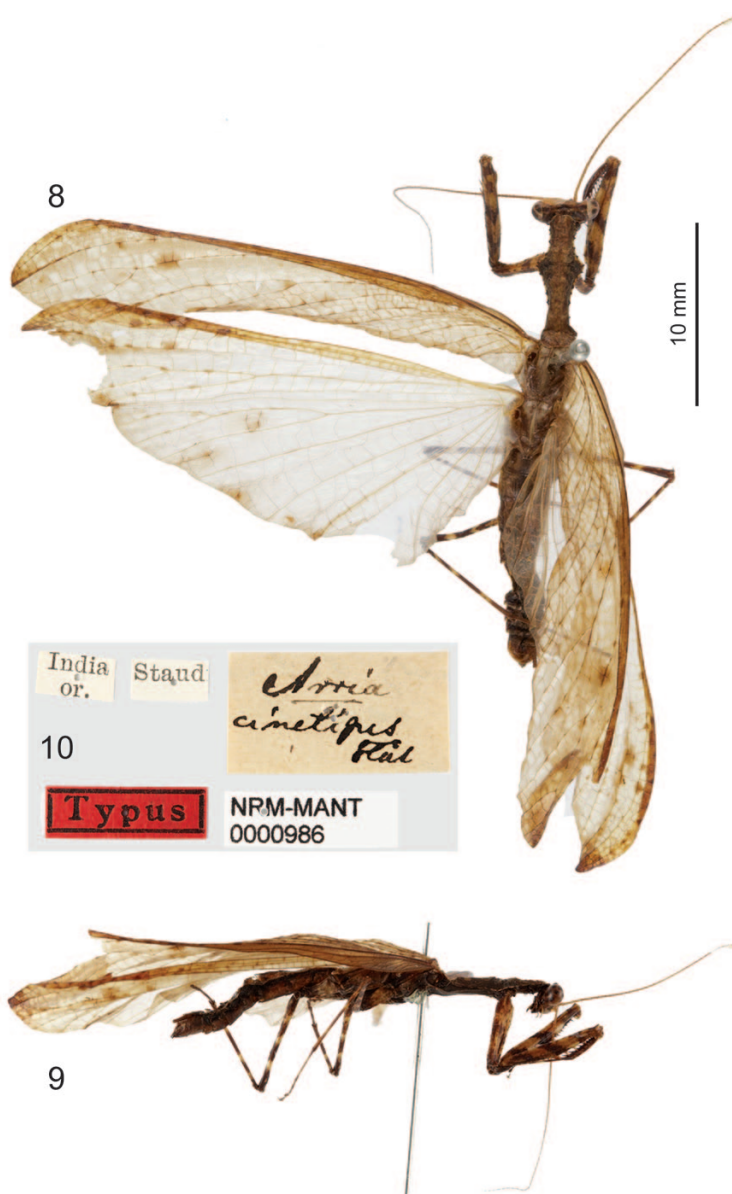
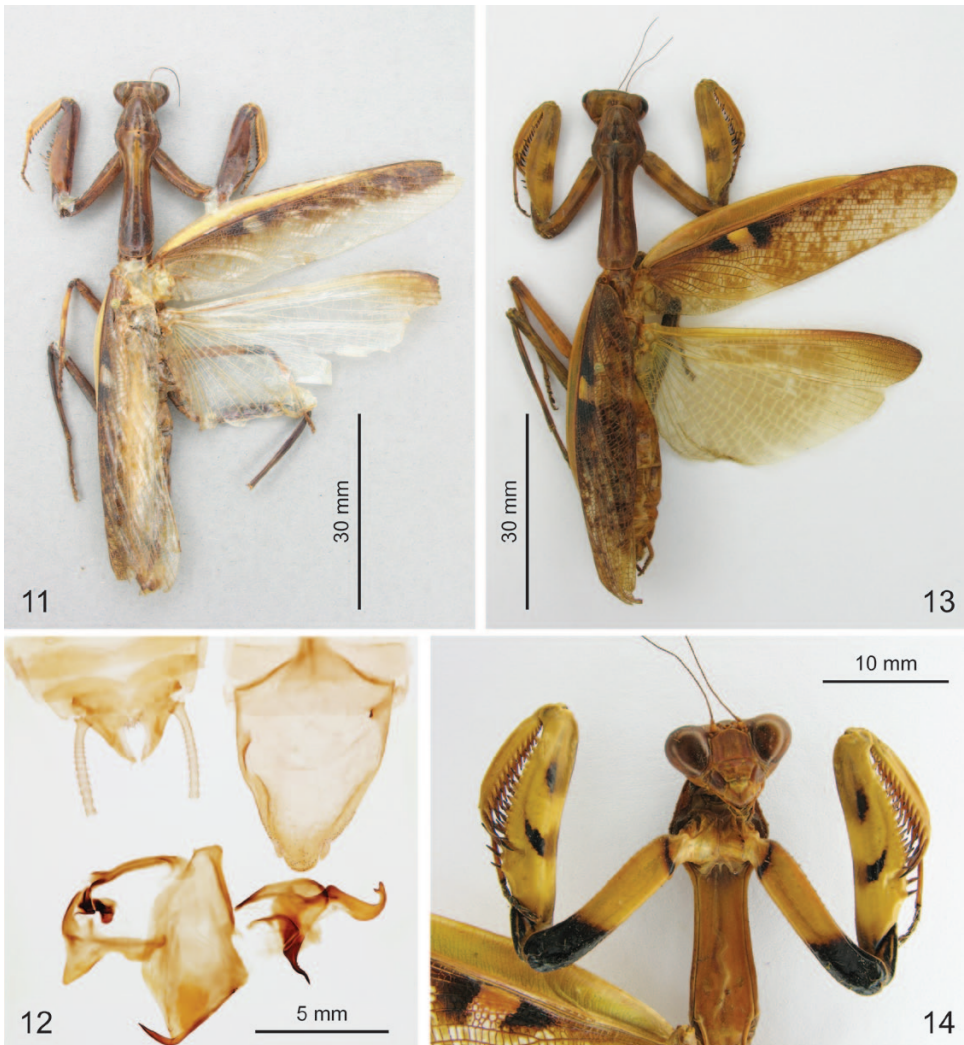


Fig. 8-10. – *Arria cinctipes* Stål, holotype. – 8, Dorsal view. – 9, Lateral view. – 10, Labels. (Photos Gunvi Lindberg©NRMS).

pronotal margins; very faintly denticulated forecoxae; a distinctly shaped metazona which widens toward the posterior end; a deeply incised, bilobed supra-anal plate in males; and not the least, the brownish body color with a green costal field ending after the third quarter of the wing [see descriptions in GIGLIO-TOS (1912), WERNER (1916) and YANG & WANG (1999), and fig. 11-14]. Therefore, we remove *Ephierodula* Giglio-Tos, 1912, from synonymy. *Montamantis* Yang & Wang, 1999, is a junior synonym of *Ephierodula*. This genus has frequently been confused by Chinese authors with *Hierodulella* Giglio-Tos, 1912 (ZHANG & ZOU, 1991, WANG, 1993, ZHU *et al.*, 2012, but see YANG & WANG, 1999), which, however, is endemic to Wallacea and does not occur in mainland SE Asia.



**Fig. 11-14.** – *Ephierodula heteroptera* (Werner). – **11-12**, Male from Thailand (SMNK-Mant. #04221): **11**, dorsal view; **12**, terminalia and genitalia. – **13-14**, Female from Mindanao (SMNK-Mant. #04044): **13**, dorsal view; **14**, antero-ventral view of fore body. (Photos 11,13-14 Reinhard Ehrmann ©SMNK, 12 by the authors).

***Species included.***

*Ephierodula albomaculata* (Zhang, 1991), **n. comb.**: S China.

*Ephierodula excellens* Werner, 1916, **comb. rev.**: Vietnam.

*Ephierodula heteroptera* (Werner, 1906), **comb. rev.**: Malay Peninsula, Sumatra, Java, Borneo, Mindanao.

*Ephierodula meihuashana* (Yang, 1999), **n. comb.**: S China (possibly synonymous with *E. excellens*).

Genus ***Tamolanica*** Werner, 1923

*Hireodula* (*Tamolanica*) Werner, 1923: 399.

*Ephierodula immaculifemorata* Werner, 1922, is considered as **n. syn.** of *Tamolanica phryne* (Stål, 1877) (fig. 15-16, see also SJÖSTEDT, 1930). Although its color pattern fits the one





**Fig. 15-16.** – *Tamolanica phryne* (Stål), ♂ from Mindanao (SMNK-Mant #10207). – 15, Dorsal view. – 16, Terminalia and genitalia. (Photo 15 Reinhard Ehrmann©SMNK, 16 by the authors).

observed in *Ephierodula*, this species lacks the peculiar shape of the costal field in females and the maculations on the forelegs, but possesses an expansion around the supracoxal dilatation and stronger teeth on the forecoxae. For the time being, we remove this species from *Ephierodula*, but the placement of *T. phryne* among the Australasian genus *Tamolanica* may be erroneous as well.

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