

NEW SPECIES OF MEUBELIA WILLEMSE, 1932, FROM THE PHILIPPINES (Orthoptera: Pyrgomorphidae)¹

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Abstract: The Philippine genus *Meubelia* previously included two species. A re-examination of formerly known material and the discovery of further specimens show that 6 species are involved: 2 of these, including 1 that is new, are known as adults only from the male sex; 1 new species is known only by the female; the other 2 new species are known from both sexes. The *nomen nudum*, *Schistacra vittapennis* of Bruner has been found to be applicable to *Meubelia gracilis*; other undescribed "species" of "*Schistacra*" are also presumed to belong to *Meubelia*.

In a recent publication (Kevan 1966), the genus *Meubelia* was transferred from the Acrididae to the Pyrgomorphidae, the known species and their synonymy were discussed, and the types and genitalic structures figured. All material then known was listed. Almost simultaneously with the publication of the paper referred to, however, additional material came to light, which considerably increased our knowledge of the genus. Among the specimens involved were no fewer than four new species, all closely related to the type species, *M. gracilis* Willemse, 1932, but coming from different parts of the Philippines. Examples of two of these new species had been overlooked among the scanty material previously examined (Kevan, *op. cit.*), in one case because no adult was then known, and in the other, because of the great similarity to *M. gracilis*.

In addition to new species being discovered, a long-standing enigma was solved. Bruner (1915), in his catalogue of Philippine Orthoptera, listed a number of *nomina nuda*, intending to publish descriptions of the species at a later date, although he never accomplished this. One of the generic "names" that he used, *Schistacra* (with three "species"), unquestionably refers to *Meubelia* (see below).

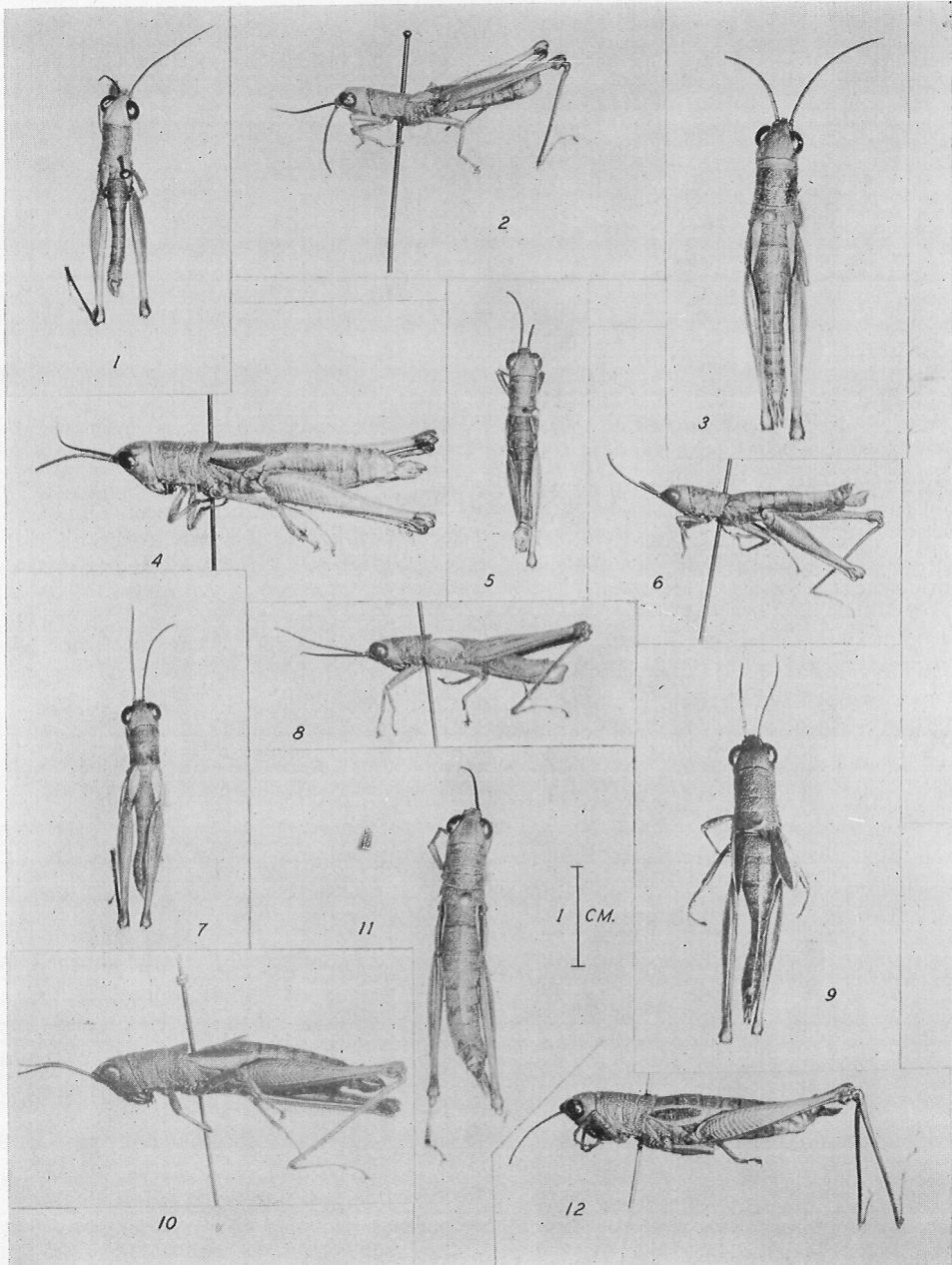
Genus *Meubelia* Willemse

Meubelia Willemse, 1932: 281, 283.

Schistacra Bruner, 1915: 254 [*nomen nudum*—not used alone]. **New Synonymy.**

The species of *Meubelia* now recognized are given below. It would not be practical to give a key to them, as 2 are known only from the male sex and 1 only from the fe-

1. Part of the collection is the result of fieldwork supported by a grant to Bishop Museum from the National Institutes of Health (AI 01734).



Figs. 1-12. Types of *Meubelia* species. 1, 2, *M. bruneri* n. sp., ♂ holotype; 3, 4, same, ♀ allotype; 5, 6, *M. bakeri* n. sp., ♂ holotype; 7, 8, *M. schistacra* n. sp., ♂ holotype; 9, 10, same, ♀ allotype; 11, 12, *M. bivittata* n. sp., ♀ holotype.

male.

Meubelia atriantennis (Willemse) Figs. 13-15.

?*Schistacra armata* Bruner, 1915: 254, *nomen nudum*. **New Synonymy.**

Philippinacris atriantennis Willemse, 1932: 285.

Meubelia atriantennis: Willemse, 1956: 83.—Kevan, 1966: 6 fig. 4A, B [♂ holotype], 7 figs. 5B [♂ head], 6B [♂ hind femur], 8, 9 fig. 7 A-E [phallic structures], 12 fig. 12 [distribution map].

The material that Bruner (*op. cit.*) referred to *Schistacra armata* has not been found in any institution to which his collection became dispersed. There is, however, no reason to doubt that it was congeneric with his other "species" of *Schistacra*. As *S. armata* was from southern Luzon (Mt Banahao), and since *M. atriantennis* is the only species of *Meubelia* known from that general area (actually from the Caramoan Peninsula, somewhat to the SE, but not too remote from Mt Banahao—see fig. 40), it would not seem unreasonable to assume that the former "name" may refer to the latter species. It is probable that the epithet "*armata*" refers to the presence of a denticle just above the infero-posterior angle of the lateral pronotal lobe, which is a feature found in both sexes of all species of *Meubelia*. In the related genus *Spinacris* Willemse, 1933, similar but more prominent denticles are present, so that it is just possible that Bruner's "name" refers to *S. elegans* Kevan, 1966, from the same area as *M. atriantennis*. It is unlikely, however, that Bruner would have placed a brachypterous species (*Spinacris*) in the same genus as a micropterous one (*Meubelia*).

The holotype of *M. atriantennis* has been illustrated by Kevan (*op. cit.*) and the distinctive phallic structures figured. Only part of the latter are repeated here for the sake of comparison (figs. 13-15). The male of this species is distinguishable from others also by its thicker (black) antennae and slightly more slender build.

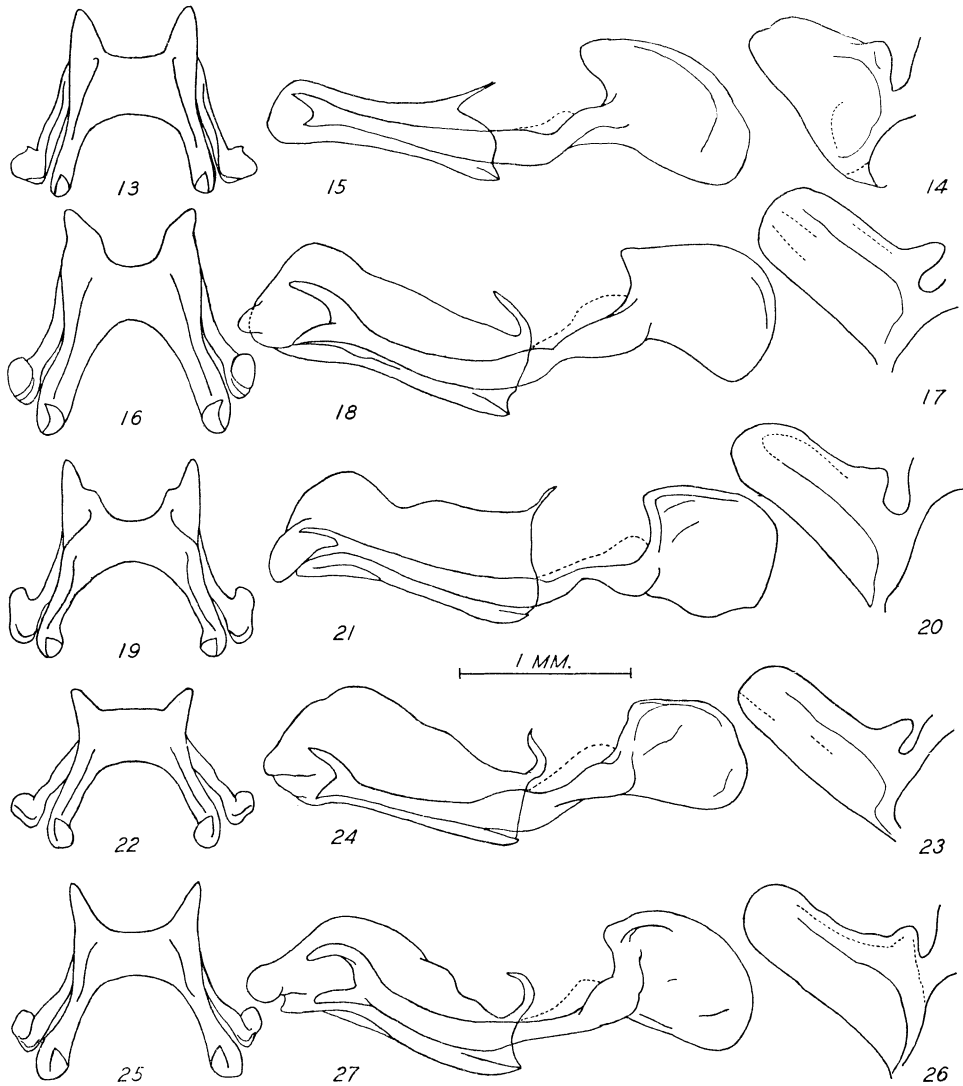
Meubelia bruneri Kevan, new species Figs. 1-4, 16-18, 28, 29, 36.

Meubelia gracilis Willemse, 1932: 282 [*partim*—immature specimen from Catbalogan only].
—Kevan, 1966: 9, 12 fig. 12 [*partim*—immature specimens from Samar I. (including Catabalogan) only].

♂ (Holotype). General morphology very similar to *M. gracilis*, but coloration more like that of *M. atriantennis* (see Willemse 1932; 1956); antennae with middle segments about 3× as long as wide (*i.e.* even longer than in *M. gracilis*), uniformly black (as in *M. atriantennis*); head and pronotum unicolorous olivaceous, the latter without dark anterior and posterior margins; tegminal vestiges uniformly bright red (not testaceous); hind knees distinctly blackish (as in *M. atriantennis*). Phallic structures (figs. 16-18) differing from those of other species as illustrated.

Length 20.5, pronotum 4.0, tegmen 3.0, hind femur 13.1 mm.

♀ (Allotype). Very similar to *M. gracilis*, differing chiefly in color-pattern of tegminal vestiges (fig. 36), which are longitudinally divided about equally into black anterior (ventral) and orange-red posterior (dorsal) halves, the former very narrowly margined orange-red, and the blackish hind knees. In this specimen the pronotum is not uniformly brownish-testaceous, but has an olive-green metazona. Subgenital armature and sper-



Figs. 13-27. Phallic structures of *Meubelia* species. 13-15, *M. atriantennis* (Willemse); 16-18, *M. bruneri* n. sp.; 19-21, *M. bakeri* n. sp.; 22-24, *M. gracilis* Willemse; 25-27, *M. schistacra* n. sp.; 13, 16, 19, 22, 25, epiphallus, dorsal; 14, 17, 20, 23, 26, right valve of cingulum, from right; 15, 18, 21, 24, 27, endophallus, from right.

matheca of a paratype illustrated in figs. 28 and 29 (2 paratypes have been examined).

Length 31.5, pronotum 6.5, tegmen 6.0, hind femur 17.5 mm.

Holotype ♂ and allotype ♀ (USNM) with printed labels "Island Samar, Baker"; the former also bears a label with a hand-written number "22288." Two ♀ paratypes, USNM, Kevan coll'n. (at present in Lyman Ent. Mus.) both with same data, the former bearing also the number "22272." The immature specimen previously recorded from the same

locality as *M. gracilis* by Kevan (1966) also belongs with certainty to this species, as does the female juvenile paratype of Willemse (1932). This last is in Maastricht and has the following labels: (1) Catbalogan Philippin.; (2) *Meubelia* n. g. ♀ larve [formerly the label bore the sign "♂", as in the original description, but this was altered later by Willemse (see Kevan, *op. cit.*)]. The known distribution is illustrated in fig. 40.

The species is named in recognition of Lawrence Bruner who was the first to refer to members of the genus *Meubelia*, even though he never described them.

***Meubelia bakeri* Kevan, new species** Figs. 5, 6, 19-21.

♂ (Holotype). Slightly more slender than other species, with the exception of *M. atri-antennis*, differing from all in being more or less uniformly olive-green in color, except for the black antennae (which have longer segments than in *M. atri-antennis*), brownish eyes, greenish-blue hind tibiae (olive-green dorsally in basal 1/2) and dull reddish tegminal vestiges; last narrower than in other species and rather more pointed. The phallic structures (figs. 19-21) are characteristic.

Length 20, pronotum 3.8, tegmen 2.2, hind femur 11.5 mm.

Holotype ♂ (USNM) with printed label, "Isl. Biliran, Philippines, Baker" and a handwritten label, "24526."

The adult female is unknown, the only other specimen available being a last-instar female nymph, now in the Lyman Ent. Mus. This bears the same data, but has no number; it is similarly colored to the holotype (the buds of the tegminal vestiges are likewise dull reddish) and it is therefore probable that the adult differs little in color from the male except that it is to be anticipated that the tegmina would bear a longitudinal black stripe. The known distribution is shown in fig. 40.

The species is named in recognition of F. C. Baker who collected insects extensively in the Philippines, and to whom we owe our knowledge of many species, including the present one.

***Meubelia gracilis* Willemse** Figs. 22-24, 30, 31, 37.

Schistacra picticornis Bruner, 1915: 254, *nomen nudum*. **New Synonymy.**

Schistacra vittapennis [sic] Bruner, 1915: 254, *nomen nudum*. **New Synonymy.**

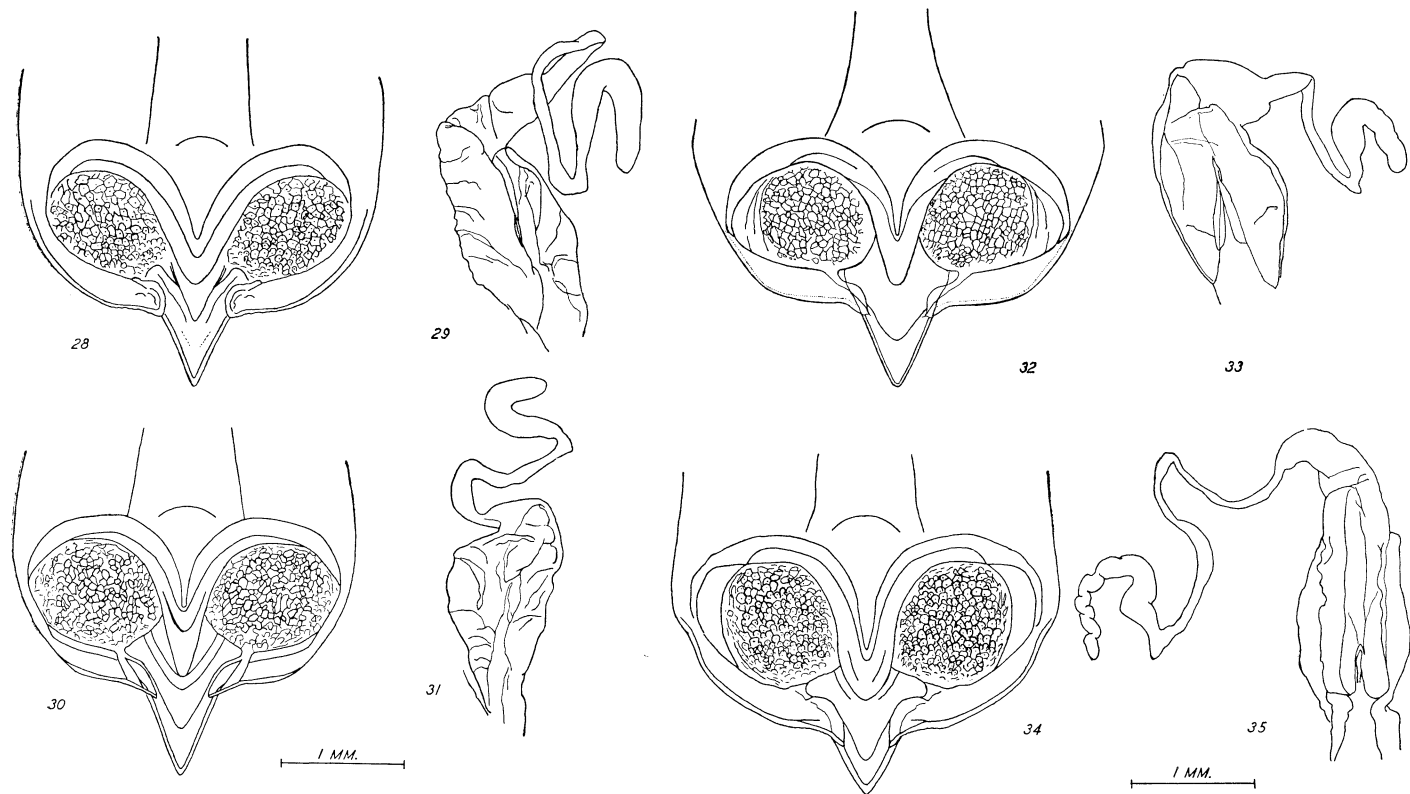
Meubelia gracilis Willemse, 1932: 282 [*partim*—all specimens except the immature specimen from Catbalogan—see *M. bruneri*].—Kevan, 1966: 6, 7 figs. 5C [♀ head], 6C [♀ hind femur], 8, 9 [*partim*—all except immature specimen from Catbalogan—see *M. bruneri*], fig. 8 A-D [phallic structures], 10 fig. 9 A-D [♂, ♀ holotypes], 11 figs. 10D, 11D [♀ subgenital armature and spermatheca], 12, fig. 12 [distribution map] [*partim*—all except immature specimens from Samar I.—see *M. bruneri*—and Mt. Empagatao—see *M. schistacra*].

Philippinacris gracilis: Willemse, 1932: 284, pl. XII, fig. 7 [♂ holotype].

Philippinacris gracilior Sjöstedt, 1932: 32, *nomen nudum*.

Meubelia willemsei Ramme, 1941: 80, 217.

Amongst some old accessions in the United States National Museum was found a female specimen, undoubtedly conspecific with the holotype of *Meubelia gracilis*, with the



Figs. 28-35. Female structures of *Meubelia* species. 28, 29, *M. bruneri*, n. sp.; 30, 31, *M. gracilis* Willemse; 32, 33, *M. schistacra*, n. sp.; 34, 35, *M. bivittata*, n. sp.; 28, 30, 32, 34, subgenital plate, dorsal; 29, 31, 33, 35, spermatheca and duct.

following labels: (1) Butuan, Mindanao, Baker [printed]; (2) 3282 [hand-written]; (3) *Schistacra vittapennis* [not "vittapennis"] Bruner [in that author's hand, on brick-red with black border]. This specimen was presumably intended to be the type of Bruner's *Schistacra vittapennis*, so that there is no doubt that *Schistacra* should be synonymized with *Meubelia* (if, indeed, a *nomen nudum* may be referred to as a synonym). No material bearing Bruner's identification as *Schistacra picticornis* has been found in any institution to which Bruner's collections were dispersed, but there can be no doubt that the "name" refers to the male of *S. vittapennis*, and hence to that of *M. gracilis*, to which the epithet "*picticornis*" might very aptly be applied. By way of confirmation, it may be noted that Bruner's specimen of "*S. vittapennis*" had been arranged (? by Bruner himself) in the Washington accessions among an undetermined series of 10 ♂♂, 4 ♀♀ and 1 nymph (♂) of *Meubelia gracilis*, all labelled "Surigao, Mindanao, Baker" [printed] (1 ♂ also bears the hand-written number "15231", 1 ♀ has "15288", another ♀, "16337", and the nymph, "16242"). Unfortunately no male from Butuan (whence Bruner recorded "*S. picticornis*") has yet come to light, but there can be no doubt that such a specimen would have proved to belong to the same species as the other material referred to.

The male of *M. gracilis* differs from that of all other known species of *Meubelia* in possessing very strongly variegated (annulated) antennae—contrary to the remarks of Kevan (1966), see under *M. schistacra*—, in the anterior and posterior margins of the pronotum being dark-bordered, and in the knees not being appreciably darker than the rest of the hind femora. The tegminal vestiges are testaceous, almost uniformly so in most specimens, although a few have an indication of darker pigmentation at the base, such as is found in the holotype. The last has been illustrated previously (Willemse 1932; Kevan 1966). The phallic structures are characteristic and are illustrated by Kevan (*op. cit.*); they are partially illustrated again herewith (figs. 22–24) for comparison and to indicate a certain degree of minor variation that occurs in the lateral view of the endophallus and cingulum valves.

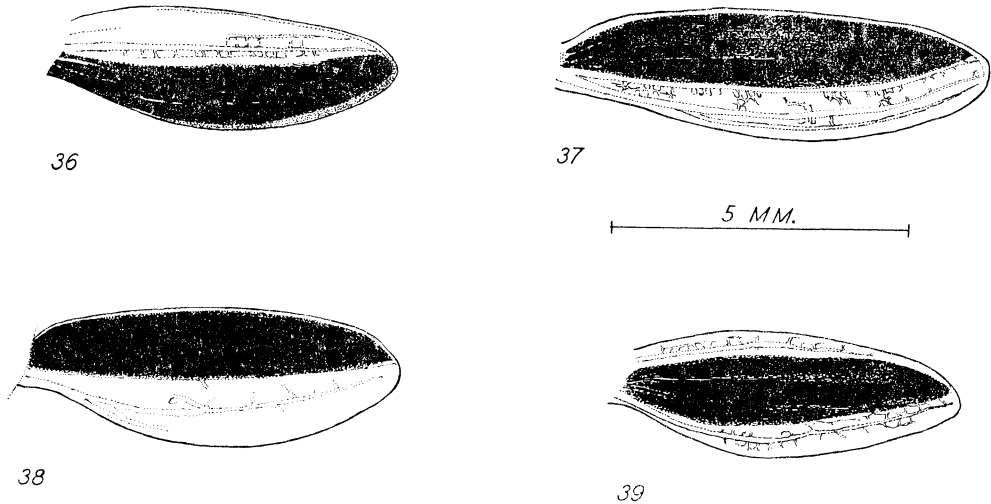
The female of *M. gracilis* (which has almost unicolorous dark antennae) is distinguishable from those of other species (so far as they are known) by the color pattern of the tegminal vestiges (fig. 37), in which the anterior (ventral) part (not quite 1/2) is testaceous or pale pinkish orange, and the posterior (dorsal) part (except for a pale narrow margin) is black (length of tegminal vestiges somewhat variable); the hind knees, as in the male are paler than in other species. The subgenital armature and spermatheca have been illustrated by Kevan (1966), although greatly inflated terminal part of the spermathecal duct was not shown. Figs. 30 and 31 illustrate these structures (for a different specimen) for comparison with other species. (The subgenital plate has been slightly more flattened and the terminal part of the spermathecal duct is shown in the present figures).

The revised distribution of the species is shown in Fig. 40.

Meubelia schistacra Kevan, new species Figs. 7–10, 25–27, 32, 33, 38.

Meubelia gracilis: Kevan, 1966: 12, fig. 12 [distribution map] [*partim*—Mt Empagatao specimens only], *nec* Willemse.

♂ (Holotype). Very similar to *M. gracilis*, but antennae almost uniformly dark (not variegated), pronotum brownish-testaceous, without dark margins, tegminal vestiges more



Figs. 36-39. Left tegmen-vestiges of *Meubelia* species in normal position (costal margin directed downwards). 36, *M. bruneri* n. sp.; 27, *M. gracilis* Willemse (paratype from Surigao—size varies considerably, e. g., the Dinagat paratype has considerably shorter tegmina); 38, *M. schistacra* n. sp.; 39, *M. bivittata* n. sp.

ovate-lanceolate (unicolorous yellowish-testaceous), hind femora very slightly stouter, more reddish brown with dark knees, and hind tibiae more uniformly dark with a small, pale, sub-basal macula. The phallic structures (figs. 25-27) are characteristic.

Length 20, pronotum 4.3, tegmen 3.5, hind femur 12.3 mm.

♀ (Allotype). Very similar indeed to *M. gracilis*; tegminal vestiges (fig. 38) similarly colored, but broader, with a more strongly convex anterior (ventral) margin; hind knees not so dark as in male and not so uniformly so, rather as in *M. gracilis*; hind tibiae reddish, not bluish as in that species. The subgenital armature and spermatheca (paratype) are illustrated in figs. 32 and 33. They differ only slightly from those of *M. gracilis*, but the base of the spermatheca is distinctly elbowed and its end slightly convoluted.

Length 29, pronotum 5.6, tegmen 6.4, hind femur 16.1 mm.

Holotype ♂ (BISHOP 7191) with following printed data labels: (1) PI Misamis Or. Mt. Empagatao, 1050-1200 m, 19-30.IV.61; (2) H. M. Torre Villas Collector BISHOP. Allotype ♀ (BISHOP), same data but with a 3rd label, "Rain Forest." Paratype ♀, same data as holotype (Kevan coll., Lyman Ent. Mus.).

Kevan (1966) believed that these specimens were but variants of *M. gracilis*, but it is now apparent that this is not so. *M. gracilis* seems to be confined to the northeastern part of Mindanao and adjacent islands¹, whereas *M. schistacra* is known only from the

1. Bucas [Grande], Siargao, Dinagat and Panaon Is. The following paratypes not seen by Kevan (1966), have now been examined: 1♂, 1♀ ["co-type"] from Siargao, and 1♀ from Bucas, in the Zoological Museum, Berlin (Dr K. K. Günther); 1♀ from Siargao and 1♀ from Panaon, in the Zoological Institute, Berlin-Eberswalde (Dr R. Gaedike), the last also checked by the author. The female paratype from Dinagat has also been re-examined by Dr F. Willemse to ensure that no further localized species was involved.

one locality in the northern part of the western peninsula of Mindanao (see fig. 40).

The name *schistacra* is applied to this species in order to perpetuate Bruner's original generic "name".

***Meubelia bivittata* Kevan, new species** Figs. 11, 12, 34, 35, 39

♀ (Holotype). Also very similar to *M. gracilis*, but tegminal vestiges (fig. 39) rather narrower, with central area black and both margins narrowly, but very distinctly bordered pinkish orange; hind knees very slightly darker than in *M. gracilis* and hind tibiae distinctly darker than in that species or in *M. schistacra*. Subgenital armature and spermatheca illustrated in figs. 34 and 35. The former differs slightly, but distinctly from the other species; the spermatheca is also similar but its end is rather narrower and distinctly convoluted, but there is no definite 'elbow' at its base (paratype similar to holotype).

Length 29, pronotum 6.0, tegmen 5.9 hind femur 15.2 mm.

Holotype ♀ (USNM), labelled "Iligan, Mindanao, Baker." 1 ♀ paratype labelled "Kolambugan, Mindanao, Baker" (Lyman Ent. Mus.) The species is thus known only from the NW part of the mainland of Mindanao (see fig. 40).

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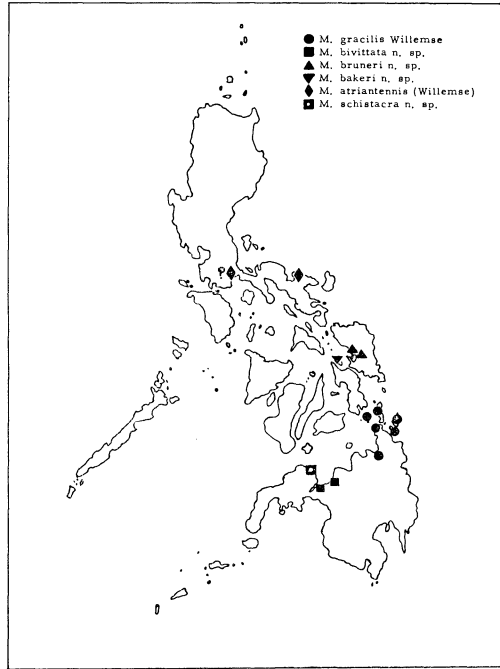


Fig. 40. Known distribution of *Meubelia* species.

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