The concealed copulatory structures of the
Pyrgomorphidae
(Orth. Aeridoidea)

SUPPLEMENT (INCLUDING ILLUSTRATIONS OF SOME
PREVIOUSLY UNFIGURED TYPES)

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(Láms. II-VI).

Since the various parts of this series describing the concealed copulatory structures of all the known genera of Pyrgomorphidae have been completed for publication (Kevan, Akbar and Chang, 1970 et seq.), some new genera have been described and males have been discovered in two among the few genera for which they were previously unknown. In order to make it as complete as possible, therefore, opportunity is here taken to augment the present series with illustrations for such genera.

Most of the copulatory structures figured in this supplement have, indeed, recently been illustrated, but those for the male of Petasida White, 1845 (Monistriini) have not. Males of Spinacris Willemse, 1933, and both sexes of Philippyrgus Kevan, 1974 (both Verduliini, subtribe Meubeliina) are given by Kevan (1974). The genera Xenephias Kevan, 1973, mentioned but not figured by Kevan, Akbar and Chang (1974), is illustrated by Kevan (1973). It should be noted also that the genus Propsednura Rehn, 1953 (Psednurini) has recently been divided into two by Key (1972), so that the only species of "Propsednura" included in the present series (Kevan, Akbar and Chang, 1970) now represents the genus Psedna Key, 1972, and not Propsednura (cf. Kevan, Akbar and Chang, 1972). Although Key (1972) gives good figures for the latter genus, it is again illustrated here for the sake of completeness.

The abbreviations used in the accompanying figures are the same
as those used in Kevan, Akbar and Chang (l. c.), with the addition of AT for the spermathecal atrium (see below). AS (aedeagal sclerite) in Pyrgomorphidae is probably homologous with the gonopore process of other, Acridoidea, rather than with the true aedeagal sclerite, as will be discussed elsewhere, but for the sake of uniformity, the same abbreviation is retained for this structure (See Eades and Kevan, 1974).

**Tribe 2. Verduliini.**

Subtribe b. Meubeliana.

The genus Spinacris Willemse, 1933, was previously known to include two species: the type species, S. viridis Willemse, 1933, and S. elegans Kevan, 1966 (Kevan, Akbar and Chang, 1970). The males of both of these are now known, together with the female of a third species S. inermis Kevan, 1974. As an example of the phallic structures of Spinacris, those of S. elegans are here illustrated (fig. 1). The phallic structures of both previously known species and the female structures of all three are illustrated by Kevan, 1974. With regard to the female structures, it may be noted that the figure of the spermatheca of S. elegans in Kevan, Akbar and Chang (1. c., fig. 6 B) does not illustrate the characteristic sclerotized spermathecal atrium into which the terminal dilation of the spermathecal duct opens. This is comparable with what is found in Philippypyrus (fig. 3). It may also be noted that, in Kevan, Akbar and Chang (l. c., fig. 6 B), the region labelled TD (terminal dilation) in Meubelia bivittata is homologous with this spermathecal atrium, although less heavily sclerotized. The true terminal dilation lies above it at the end of the spermathecal duct proper (cf. Kevan, 1974).

The cingulum of Spinacris differs from that of other Verduliini sufficiently to make necessary a modification of the definition of the tribe given by Kevan, Akbar and Chang (l. c.). The basal emargination may be quite narrow, as in S. elegans (fig. 1 A), or it may be altogether smaller, as in S. viridis (Kevan, 1974). The endophalli in Spinacris and in Philippypyrus also depart from the definition of the tribe by virtue of the presence of prominent, anteriorly directed ventral processes to the endophallic apodemes (figs. 1 G, 2 G).
Fig. 1.—Phallic structures of Spinacris elegans Kevan (Verdulini, Meubeliina). Structures and abbreviations as in Kevan, Akbar and Chang (1970).
Fig. 2.—Phallic structures of *Philippyrus subapterus* Kevan (*Verduliini, Meubeliina*). Structures and abbreviations as in Kevan, Akbar and Chang (1970).
TRIBE 4. PSEDNURINI.

As indicated above, the figures of Kevan, Akbar and Chang (1970) for "Pseudnura" actually illustrate Pseudna nana (Rehn, 1953), so that no figure for Pseudnura Rehn, 1953, has been included in the present series. The concealed copulatory structures of P. peninsula-ris Key, 1972, are therefore shown here (figs. 4, 4 a). These are in part adapted from those of Key (1972).

Fig. 3.—Female subgenital plate, dorsal (A), and receptaculum seminis (B) of Philippyrgus subapterus Kevan (Verduiliini, Meubeliina). Abbreviations as in Kevan, Akbar and Chang (1970); AT = spermathecal atrium (see text).

TRIBE 17. MONISTRIINI.

Specimens of the sole representative of the genus Petasida White, 1845, namely P. ephippigera White, 1845, have recently been discovered after very many years, amongst them the previously unkown male sex (Calaby and Key, 1973). This is illustrated on Pl. II, figs. 7, 8.

The phallic structures of P. ephippigera (fig. 5), like the female structures, are very similar to those of Scutilla Sjöstedt, 1921 (cf. Ke-
Fig. 4.—Phallic structures of *Propseudura peninsularis* Key (*Psednurini*). Structures and abbreviations as in Kevan, Akbar and Chang (1970).
van, Akbar and Chang, 1972). Indeed apart from being larger and more strikingly coloured, and in having a more pronounced posterior projection of the pronotal disc, Petasida seems to be very closely related to Scutillya. It is possible that the latter may eventually be regarded as a synonym.

Fig. 4a.—Female subgenital plate, dorsal (A), and receptaculum seminis (B) of Propsednura peninsularis Key (Psednurini). Abbreviations as in Kevan, Akbar and Chang (1970).

**TRIBE 27. SPHENARIINI.**

Subtribe b. Sphenexiina.

As indicated by Kevan, Akbar and Chang (1974), a second monotypic genus of this subtribe is now known from the island of Socotra. This is Xenephias (type species X. socotranus), described and figured by Kevan (1973). The illustrations of the concealed copulatory structures are repeated here for the sake of completeness (fig. 6).
Fig. 5.—Phallic structures of *Petasida ephippigera* White (*Monistriini*). Structures and abbreviations as in Kevan, Akbar and Chang (1972).
Supplementary Photographs of Pyrgomorphid Type Specimens.

Opportunity is also taken here to present photographs of type spe-

Fig. 6.—Concealed copulatory structures of *Xenephias socotranus* Kevan (*Sphene-\nariini, Sphenesiina*) (after Kevan, 1973). Structures as in Kevan, Akbar and \nChang (1973).

cimens of certain Madagascar *Pyrgomorphidae* recently described by \nWintrebert (1972) and mostly referred to by Kevan, Akbar and Chang
(1971), but which have not hitherto been so illustrated (Pl. II, figs. 9-14; Pl. III-VI). These include one species of *Geloius* Saussure, 1899 (*Geloiini*) and one of *Ambositracris* Dirsh, 1963, and several of *Caprorhinus* Saussure, 1899 (*Orthacridini, Caprorhinina*).

As photographs of the types of all nominal species of *Atractomorpha* Saussure, 1862 (*Atractomorphini, Atractomorphina*) have been published, with one exception, this omission is also rectified here. The species in question is *A. nipponica* Steinmann, 1967, allegedly from Japan, but apparently mislabelled. It was previously suggested that it is possibly a member of the *aberrans*-group of the genus (*A. rufopunctata* Bolivar) from Africa, but examination of the unique holotype now shows that it is synonymous with *A. burri* Bolivar, 1905, an oriental species found from Nepal to S.E. China and southwards to Malaya, but unknown in Japan (*syn. nov.*).

*List of Abbreviations.*

A, Appendix of epiphallus.
AC, Apodemal plate of cingulum.
AE, Aedeagus.
AP, Anterior projection of epiphallus.
AS, Gonopore process (“Aedeagal sclerite” of authors).
AT, Spermathecal atrium (see text).
AV, Aedeagal valve.
B, Bridge of epiphallus.
BC, Basal thickening of cingulum.
BE, Basal emargination of cingulum.
BF, Basal fold of ectophallic membrane.
CM, Central membrane of ectophallus.
CV, Valve of cingulum.
DI, Dorsal inflection of endophallic apodeme.
E, Epiphallus.
EA, Endophallic apodeme.
ED, Ejaculatory duct.
EG, Egg-guide.
EM, Ectophallic membrane.
ES, Ejaculatory sac.
FP, Floor pouch of female genital chamber.
G, Gonopore (male).
ISR, Inflection of ramus of cingulum.
L, Lophus of epiphallus.
LL, Lateral lobe of ectophallic membrane.
LP, Lateral plate of epiphallus.
MLG, Median longitudinal groove of ovitract.
P, Phallotreme.
PD, Phallotreme duct.
PE, Posterior edge of female subgenital plate.
PVS, Post-vaginal sclerite (Contact area) of female genital chamber.
PZ, Pseudoarch of ectophallus.
RC, Ramus of cingulum.
SC, Caecum ("Diverticulum") of spermatheca.
SD, Spermathecal duct.
SP, Spermathecal vesicle.
SS, Spermatophore sac.
SV, Valve of spermathecal duct.
TD, Terminal dilation of spermathecal duct.
V, Vulva or female gonopore.
VAC, Ventral process of apodemal plate of cingulum.
VC, Ventral cleft of cingulum.
VEA, Ventral process of endophallic apodeme.
VED, Valve of ejaculatory duct.
VI, Ventral infold of ectophallic membrane.
VP, Ventral process of cingulum.
Z, Zygoma of cingulum.

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References.


[10] KEY, K. H. L.

EXPLANATION OF PLATES II-VI:

PLATE II.

Monistriini, Geloiini and Orthacridini (Caprorhinina).

Figs. 7-14.—7, 8) Petasida ephippigera White, 1845, ♂; 9, 10) Geloius tenalanensis Wintrebert, 1972, ♂ holotype; 9A, 10A) the same, ♀ allotype; 11, 12) Ambositracris morti Wintrebert, 1972, ♀ holotype; 13, 14) Atractomorpha burri, 1905. ♀ holotype of A. nipponica Steinmann, 1967.

PLATE III.

Orthacridini (Caprorhinina). Caprorhinus ssp. (all of Wintrebert, 1972); type specimens (♂ holotypes, ♀ allotypes), dorsal.

Figs. 15-28.—15) C. inflatus, ♂; 16) the same, ♀; 17) C. tenikae, ♂; 18) C. major, ♂; 19) the same, ♀; 20) C. monclari, ♂; 21) C. pauliani, ♂; 22) the same, ♀; 23) C. puerisalbis, ♂; 24) the same, ♀; 25) C. mahabensis, ♂; 26) C. ambahita, ♂; 27) the same, ♀; 28) C. descamps, ♂.

PLATE IV.

Orthacridini (Caprorhinina). Caprorhinus ssp. (all of Wintrebert, 1972; type specimens (♂ holotypes, ♀ allotypes), dorsal.

Figs. 29-43.—29) C. donskoffi, ♂; 30) C. ralinoroi, ♂; 31) C. lavonoensis, ♂; 32) C. fotadreensis, ♂; 33) C. cadeti, ♂; 34) the same, ♀; 35) C. seyrigi, ♂; 36) the same, ♀; 37) C. isoanalae, ♂; 38) the same, ♀; 39) C. andoahelenensis, ♂; 40) the same, ♀; 41) C. malzyi, ♂; 42) C. anivoranensis, ♂; 43) C. betrokae, ♂.
Plate V.

Orthacridini (Caprorhinina). Caprorhinus ssp. (all of Wintrebert, 1972; type specimens (♂ holotypes, ♀ allotypes with exception noted), lateral.

Figs. 44-57.—44) C. inflatus, ♂; 45) the same, ♀; 46) C. tenikae, ♂; 47) C. major, ♂; 48) the same, ♀; 49) C. pauliani, ♂; 50) the same, ♀; 51) C. puerisalbis, ♂; 52) the same, ♀ paratype; 53) C. mahabensis, ♂; 54) C. ambahita, ♂; 55) the same, ♀; 56) C. descampsii, ♂; 57) C. donskoffi, ♂.

Plate VI.

Orthacridini (Caprorhinina). Caprorhinus ssp. (all of Wintrebert, 1972; type specimens (♂ holotypes, ♀ allotypes), lateral.

Figs. 58-71.—58) C. ralinoroi, ♂; 59) C. lavononensis, ♂; 60) C. fodadrevensis, ♂; 61) C. cadeti, ♂; 62) the same, ♀; 65) C. isoanalae, ♂; 66) the same, ♀; 67) C. andohahelensisz, ♂; 68) the same, ♀; 69) C. malyzi, ♂; 70) C. anioranensis, ♂; 71) C. betrokae, ♂.
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