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# Tettigoniidae (Orthoptera) from Jordan with description of new species and redescription of less known species

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## Abstract

Twenty species of Tettigoniidae are recorded from Jordan, 13 of them for the first time. Two new species are described, *Uvarovistia rammei* and *Parapholidoptera willemsei*. New status is proposed for *Paradrymadusa philbyi* Uvarov (= *Scotodrymadusa philbyi*) and for *Platycleis (Incertana) erecta* Uvarov (= *Platycleis (Decorana) erecta*).

## Key words

New records, distribution, systematics, *Uvarovistia*, *Parapholidoptera*, *Scotodrymadusa*, *Platycleis*, new species.

## Introduction

Jordan lies in the Middle Eastern transition area, among three different biota: Mediterranean, Irano-Turanian and Saharo-Arabian. This zone is characterized by the Dead Sea depression, which is part of the Pliocene Afro-Syrian Rift Valley, extending from East Africa to Turkey and including Tiberias Lake and the Red Sea. The interchange between the Eurasian and African faunas and the particular isolation produced a remarkable species richness and a high degree of endemism in many groups of animals and plants; this is the main reason for its inclusion as one of the biodiversity hotspots of the Mediterranean basin (cf. Médail & Quézel 1999).

Orthoptera are rich in species in this region with many endemic species. However, this group has not received the required attention, particularly the Ensifera. The distribution and systematics of Jordan Ensifera are little known and their data scattered. The first orthopterologist who contributed to the knowledge of this geographical area was Giglio-Tos (1893, 1894). He published a list of species collected by E. Festa in Lebanon, Syria and Palestine (see also Festa 1894, Griffini 1893). Later authors, Krauss (1909), Buxton & Uvarov (1923), Uvarov (1922, 1923a, 1923b, 1927, 1933, 1934, 1939), Bodenheimer (1935), and Jannone (1936) recorded some new and less known species of Orthoptera (including Tettigoniidae) from Palestine and neighboring countries. Recently, a new species of *Anadrymadusa* was described from Al Mujeb Reserve in Jordan (Katbeh Bader & Massa 2000). However, the overall knowledge of this group of insects is currently limited, and its study may result in interesting and undescribed species.

## Method

A total of 296 specimens of Tettigoniidae were examined. They were collected by the following researchers: 1) J. and S. Klapperich between 1956 and 1969 (material not listed by Massa & Fontana 1998); 2) A. Katbeh Bader, as part of the activities conducted in the Animal Biodiversity Project in Jordan, sponsored by Higher Council for Science and Technology, and the Insect Fauna of Jordan Project, sponsored by the Deanship of Scientific research in the University of Jordan; 3) B. Massa, who collected specimens in May-June, October-November 1999 and April-May 2000, within the purview of the Project Artropodi della Vegetazione Spontanea funded by Ministero dell'Università e Ricerca Scientifica, Italy; 4) Paolo Audisio, Marco Bologna, Stefano De Felici, Teresa De Micco, Augusto Vigna Taglianti and Marzio Zapparoli (Roma and Viterbo Universities, Italy) (material not listed in the previous paper of Massa & Fontana 1998).

*Species account.*— The following 20 species of Tettigoniidae are recorded, 13 of them previously unrecorded from Jordan, and two new species are described: *Uvarovistia rammei* and *Parapholidoptera willemsei*. The number of specimens examined is reported in parentheses after the locality (male/female). The co-ordinates of the localities are in Table 1.

### *Acrometopa syriaca* Brunner von Wattenwyl 1878

*Material examined.*— 14 specimens.

Al Aridah 4.V.81 (7/3); Al Aridah Road 4.V.81 (1/0); Amman (1/1); Ar Rumman 4.VI.88 (1/0).

*Distribution.*— From Greece through Turkey and Cyprus to Iraq, Syria, Lebanon, Palestine and Egypt (Giglio-Tos 1893 as *A. festae*; Bodenheimer 1935; Naskrecki & Unal 1995). This species is recorded from Jordan for the first time.

### *Isophya savignyi* Brunner von Wattenwyl 1878

*Material examined.*— 79 specimens.

Ajloun 7.V.87 (0/2), V.98 (0/1); Al Aridah 3.IV.79 (2/1); 3.IV.95 (1/0); Al Fuhays 19.IV.89 (1/1); Al Jubayhah 6.IV.94 (1/0); 17.IV.94 (1/1); 6.V.96 (1/0); Amman 5.IV.90 (5/3); 22.IV.00 (10/10); As Salt 3.III.93 (0/1); Birayn 1.V.93 (1/0); Dair Abi Said 30.IV.00 (3/3); Ghawr Kabid 10.IV.93 (1/0);

**Table 1.** List of localities and their coordinates.

Ajloun	32° 20' N 35° 45' E
Al Aridah	32° 09' N 35° 43' E
Al Bahhath	31° 54' N 35° 48' E
Al Bunayyat	31° 53' N 35° 53' E
Al Fuhays	32° 01' N 35° 46'
Al Jubayhah	32° 01' N 35° 52' E
Al Mashari' a	30° 54' N 35° 33' E
Al Muwaqqar	31° 49' N 36° 06' E
Amman	31° 57' N 35° 56' E
Ar Rumman	32° 01' N 35° 50' E
Ar Rumaymin	32° 07' N 35° 48' E
Birayn	32° 15' N 32° 50' E
Dayr Alla	31° 59' N 35° 49' E
Dead Sea	31° 30' N 35° 30' E
Ghawr Kabid	32° 04' N 35° 34' E
Irbid	32° 33' N 35° 51' E
Jarash	32° 17' N 35° 54' E
Jordan Valley	32° 40' N 35° 30' E
Kurayyimah	32° 16' N 35° 36' E
Madaba	31° 43' N 35° 48' E
Marw	32° 37' N 35° 53' E
Muzayrib	32° 18' N 35° 41' E
Rajib	32° 14' N 35° 42' E
Suwaylih	32° 02' N 35° 50' E
Tabarbawr	32° 00' N 35° 57' E
Wadi as Sir	31° 57' N 35° 49' E
Wadi ash Shuqayq	31° 24' N 35° 33' E
Wadi Shu' ayb	31° 54' N 35° 38' E
Waqqas	32° 33' N 35° 36' E
Zabdah	32° 34' N 35° 40' E

Jarash 3.IV.96 (1/0); 14.IV.94 (2/0); 7.V.98 (1/0); Jordan Valley 12.I.96 (1/0); Judayta (Ajloun) 29.IV.00 (3/0); Muzayrib 25.IV.94 (0/1); 10.IV.93 (0/1); 22.III.98 (1/0); Suwaylih 28.III.93 (0/1); Wadi as Sir 15.III.86 (0/1); Wadi Kafrein (10 Km SW Naur) 30.III.87 (6/1); Wadi Shu'ayb 25.V.85 (0/1); Zabdah 11.IV.95 (4/2); Zarqa River (10 Km N of Amman) 28.IV.00 (1/1).

*Distribution.*— Turkey, Lebanon, Palestine and Jordan (Griffini 1893 as *I. festae*; Giglio-Tos 1893 as *I. festae*; Bodenheimer 1935; Ramme 1951; Naskrecki & Unal 1995). *Isophya savignyi* is common on Compositae flowers in early spring.

#### *Ruspolia nitidula* (Scopoli 1786)

*Material examined.*— 11 specimens.

Al Jubayhah 20.IV.98 (1/0); 25.XI.92 (1 nymph); Al Mashari'a 4.X.95 (1/0, 1 nymph); Dayr Alla 5.X.95 (0/1); Jordan Valley 1.V.98 (0/1); 20.XI.96 (0/1); Kurayyimah 21.X.95 (1/0); 22.X.95 (1/0, 1 nymph); Waqqas 23.X.95 (1 nymph).

*Distribution.*— Europe, N Africa and Macaronesian Is. (Chopard 1943; Bailey 1975; Massa 1999), Middle East (Lebanon: Giglio-Tos 1893 as *Conocephalus mandibularis*; Massa & Fontana 1998; Palestine: Bodenheimer 1935; Jannone 1936 as *Homorocoryphus eurostratus*), and Saudi Arabia (Popov 1981).

#### *Diogena fausta* (Burmeister 1838)

*Material examined.*— 5 specimens.

Shunit Nimrin (Dead Sea) 12.VII.94 (0/1); 4.IX.94 (0/1); Ghawr Kabid 27.IV.92 (1/0); 6.X.97 (0/1); 23.X.94 (1/0); 20.XI.92 (0/1).

*Distribution.*— Sahelian and Sudanian belts of Africa (from Morocco to Arabia) (Chopard 1943; Popov 1981; Massa 1998). This species is recorded for the first time from the Middle East.

#### *Phaneroptera nana* Fieber 1853

*Material examined.*— 13 specimens.

Al Bahhath 11.XI.92 (0/4); Al Bunayyat 27.XII.96 (1/0); Al Jubayhah 22.IV.98 (0/1); VIII.93 (0/1); 19.X.96 (1/0); As Salt XII.98 (1/0); Ghawr Kabid 23.10.97 (1/0); Jordan Valley 20.XI.96 (1/0); Madaba 9.X.84 (1/0); Wadi as Sir 14.X.93 (1/0).

*Distribution.*— Widespread in Europe, Middle East and N Africa, overlapping partially with *P. sparsa* (Ragge 1980). *Phaneroptera nana* is present in Jordan throughout the year, overwintering as imago or nymph. It was recently recorded by Massa & Fontana (1998) from Karak (7.XI.66) and Wadi Schu'ayb (9.II.68). It is common on grasses.

*Phaneroptera sparsa* Stål 1856

*Material examined.* — 1 specimen.  
As Salt 10.X.95 (1/0).

*Distribution.* — Most of Africa south of the Sahara, extending NW to Morocco, Canaries and Spain, and NE through Arabia to Levant and eastern Anatolia (Ragge 1980; Popov 1981). It was reinstated as valid species by Ragge (1980). Recently, it was recorded by Massa & Fontana (1998) from Jordan (Jarash 15.X.68, Amman 23.IX.67).

*Tylopsis lilifolia* (Fabricius 1793)

*Material examined.* — 42 specimens.

Al Jubayhah 8.V.98 (1/0); Amman 5.V.98 (0/1); 7.IX.98 (1/1, 21 nymphs); 10 Km N Amman 23.V.99 (1/0); As Salt 24.V.93 (0/1); 8.VIII.93 (2/3); Irbid 19.VII.75 (1/0); Jarash 29.V.64 (1 nymph); 28.VI.68 (1/0); 1.VI.80 (1/0); Jordan Valley 27.III.94 (1/0); 25.IV.96 (1/0); 4.X.97 (0/1); 17.X.91 (0/1); Umm Qays 24.V.99 (1/0).

*Distribution.* — It has a southern Mediterranean distribution, in S Europe, N Africa, and W Asia. In the Middle East, it has been recorded from Turkey, Lebanon, Syria, Iran, Palestine, Jordan, and Arabia (Giglio-Tos 1893; Uvarov 1934; Ragge 1964; Popov 1981; Naskrecki & Unal 1995; Massa & Fontana 1998, who record it from Jarash). Specimens from Jordan belong to the deserticolous form. This form is characterized by male cerci more attenuate at the tip, female subgenital plate lacking lateral lobes, and lateral pronotal lobes more angular than the typical form (Ragge 1964).

*Tettigonia caudata* (Charpentier 1845)

*Material examined.* — 4 specimens.

Amman 12.VI.80 (1/1); Marw 18.V.87 (1/1).

*Distribution.* — From C Europe to the Balkans, Caucasus, Syria, Palestine, Iraq, Iran, Turkey and Cyprus (Bodenheimer 1935; Uvarov 1938; Harz 1969; Willemse 1984). This is a new record to Jordan.

*Tettigonia viridissima* L. 1758

*Material examined.* — 7 specimens.

Kerak 23.IV.00 (1 nymph, reared in laboratory; ad.: 20.V); Jordan Valley 12.VI.87 (0/1); Judayta (Ajloun) 29.IV.00 (2/2); Zabdah 11.IV.95 (0/1).

*Distribution.* — Whole Palearctic region. In the Middle East, it was recorded from Palestine by Bodenheimer (1935), Iraq by Uvarov (1938), and Turkey by Naskrecki & Unal (1995). This species is recorded from Jordan for the first time. It was collected within grasses and bushes.

*Scotodrymadusa philbyi* (Uvarov 1927) n. stat.

*Material examined.* — 2 specimens.

Amman, University of Jordan 29.XI.85 (1/0); 21.V.95 (0/1).

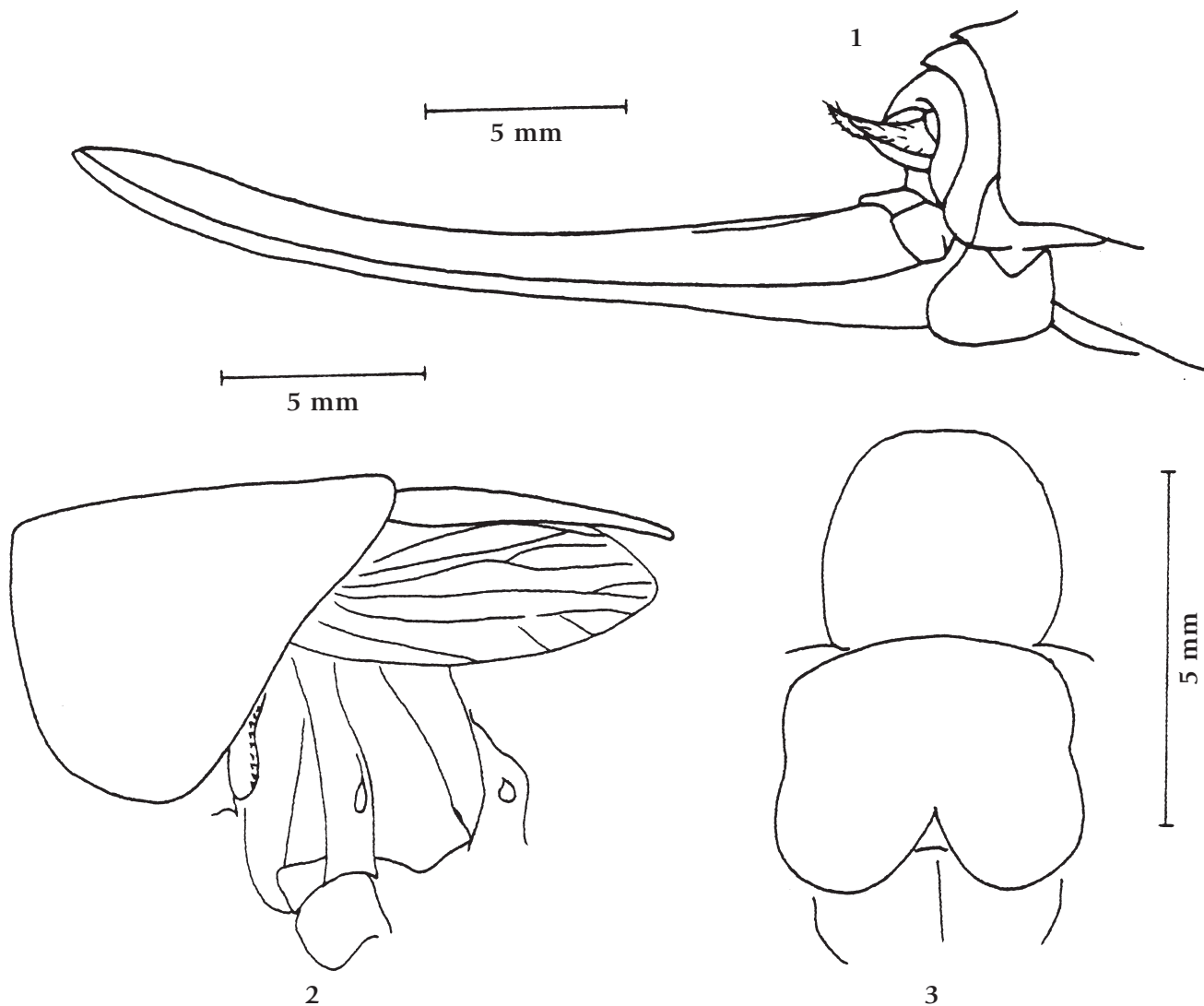
The genus *Scotodrymadusa* Ramme is characterized by: pronotum short and wide, ventral surface of femurs armed, genicular lobes of mid- and hind femurs armed on both sides, hind tibiae bearing 4 apical spurs ventrally, apical spine on upper inner side of fore tibiae, male cerci bearing an apical spine, tegmina overlapping and shorter than 3rd abdominal segment, and ovipositor gently upcurved and shorter than body length (Ramme 1951). This genus, as well as its related genera, needs a revision. It was not treated in the analysis of Rentz & Colless (1990) because of unavailability of specimens. Consequently the relations to other genera of Tettigoniinae remained unclear. We believe that some species belonging to this genus are actually erroneously listed within the genus *Paradrymadusa* Herman. The female of the latter genus, stated for *P. sordida* Herman, has lateral squamipterous tegmina, ovipositor as long as body length, gently downcurved, the male cerci bearing an internal spine (Brunner 1882; Harz 1969). Probably it is related to *Drymadusa* Stein and its allied genera more than to *Scotodrymadusa*.

Uvarov (1934) provided a key to three species, namely *P. rammei* Uvarov, *P. anatolica* Werner and *P. satunini* Uvarov. The same author in 1939 discussed the affinities of three other species: *P. philbyi* Uvarov, *P. palaestina* Uvarov and *P. annulicornis* Uvarov (including the ssp. *crenulata* Uvarov). These three species have a pattern of male and female genitalia similar to the previous three species. Only the female is known of the two other species, *P. maculata* Ebner and *P. syriaca* Pictet. Uvarov (1934) considered the first species related to the *P. anatolica* group. The second is known only from the Pictet (1888) description.

Ramme (1951) transferred *P. rammei*, *P. anatolica*, and *P. maculata* to the genus *Scotodrymadusa*. These species are characterized by the 10th abdominal tergite in males, which is much excised and provided with two acute lobes, by the male cercus with a strongly pointed apical spine, and ovipositor upcurved and shorter than body length. This does not match the characteristics of the genus *Paradrymadusa*, but instead, those of the genus *Scotodrymadusa*. The characters listed by Uvarov (1939) for *P. philbyi*, *P. palaestina*, *P. annulicornis* allow us to include these species also in *Scotodrymadusa*. Thanks to the kindness of Peter Schwendinger (Geneva Museum), who examined the female type of *P. syriaca*, we are now able to include it too in the genus *Scotodrymadusa*.

Figs 1-3 show the shape of the subgenital plate, ovipositor, pronotum, and tegmina (characters hitherto unrecorded) of this Syrian species. It is interesting to observe that even if it shows a pair of small spines on the prosternum, other characters are typical of *Scotodrymadusa*, namely, the ovipositor shape and overlapped tegmina. The specimen recorded by Giglio-Tos (1893) as *P. syriaca* from Lebanon, as supposed by Ramme (1951), is not a *Paradrymadusa*. Thus apart from the type species *P. sordida*, 16 other species are actually known to belong to *Paradrymadusa*, distributed through Georgia, Caucasus, Kurdistan, Daghestan, Tadzhikistan, Iran, Turkey to Syria.

The genus *Scotodrymadusa* should include 15 species. Seven occur in Turkey (*S. anatolica*, *S. maculata*, *S. rammei*, *S. satunini*, *S. turcica* Ramme, *S. kozana* Ramme, *S. amani*



**Figs 1-3.** *Scotodrymadusa syriaca* (Pictet) (holotype female). 1. Lateral view of last tergite, subgenital plate and ovipositor. 2. Lateral view of pronotum and tegmina. 3. Subgenital plate and 7th sternite (drawings by Peter Schwendinger).



Ramme), three occur in Iran (*S. persa* (Uvarov), *S. cincta* Bey-Bienko, and *S. gedrosica* Bey-Bienko), one occurs in Lebanon (*S. ebneri* Ramme), three are found in Palestine (*S. philbyi*, *S. palaestina*, *P. annulicornis*, including the ssp. *crenulata*), and finally, *S. syriaca* occurs in Syria.

**Description.**— The male of *Scotodrymadusa philbyi* collected in Jordan, matches very well the redescription of Uvarov (1939). The female, hitherto unknown, is characterized below.

**Male:** vertex narrow, just wider than first antennal segment (Fig. 4). Eyes oval, as long as subocular grooves. Pronotum wide and flat, shorter than fore tarsus, 1.5 times longer than high (Fig. 5); seen from above, large with lateral lobes obliquely sloping, such that the maximum width measures the same as their length. Tegmina overlapping and reaching the middle of the 2nd abdominal tergite, half as long as pronotum (Fig. 4); wings shorter than tegmina. Prosternum without spines.

Speculum wide, visible behind pronotum. Apex of inner lower knee lobes of fore femurs with two spines, apex of outer lobes unarmed; apex of inner lower knee lobes of intermediate femurs with one spine, apex of outer lobes with two spines; apex of both lower knee lobes of hind femurs with a very small spine. Inner and outer lower fore tibiae bearing 6 spines, outer upper tibiae 3 spines; hind tibiae with two apical spurs on upper, four on lower surface. Fore femurs with 3-4 spines on inner lower side, 0-1 on outer lower. Fore coxae armed. Plantulae of the metatarsus half the length of the metatarsus. Hind femurs and tibiae very long, more than 3 times the length of pronotum.

Last abdominal tergite of male broad, hairy, with two small pointed lobes, cerci hairy, with a long and pointed apical tooth on inner side, inserted at 90° on the cercus, conical in lateral view (Figs 6, 7). Subgenital plate with a small apical excision and a wide concavity (Fig. 8), styli conical, short, long c. 1/3 of the subgenital plate. Titillators very small and denticulate (Fig. 9).

Body surface greyish marbled, with brown lines and spots.

**Female:** similar characteristics as male (Figs 10, 11); cerci conical, hairy, ovipositor slender, gently upcurved, twice as long as pronotum (Fig. 12). Subgenital plate (which is damaged by *Anthrenus*) as long as wide, showing a very small apical excision and a central concavity; arcuate in lateral view (Figs 12, 13).

**Measurements** (in mm).— Total length: 23 (♂), 24 (♀); pronotum length: 7.5 (♂), 8.2 (♀); pronotum height: 4.5 (♂), 5.4 (♀); pronotum width: 7.3 (♂), 8.2 (♀); tegmina (from the hind border of pronotum): 3.4 (♂), 4.0 (♀); length of hind femurs: 23 (♂), 25.5 (♀); ovipositor length: 17.5.

*Platycleis (Platycleis) intermedia* (Serville 1839)

**Material examined.**— 21 specimens.

Ajloun 24.V.99 (6/0); Al Jubayhah 32.III.99 (0/1); 9.VIII.89 (0/1); Al Muwaqqar 26.VIII. 95 (2/0); 22.VII.95 (0/1); Amman 16.VI.63 (0/1); 5.V.98 (0/1); As Salt 22.IV.00 (0/2); Dair Abi Said 30.IV.00 (0/2); Ghawr Kabid 30.V.92 (0/1); Ash Schawbak 17.V.68 (1 nymph); Tabarbawr 29.V.98 (0/

1); Wadi as Sir 3.X.85 (0/1).

**Distribution.**— It is widespread and common all over the Mediterranean region, Central Europe, and as far as China to the east. In Jordan it is common on grasses.

*Platycleis (Platycleis) escalerae* Bolivar 1899

**Material examined.**— 1 specimen.

Irbid 25.IV.94 (0/1).

**Distribution.**— Throughout SE Europe and W Asia to Palestine (Kaltenbach 1969, 1974; Naskrecki & Unal 1995). It is recorded from Jordan for the first time.

*Platycleis (Decorana) erecta* (Uvarov 1939) n. stat.

**Material examined.**— 17 specimens.

Ajloun 24.V.99 (5/8, 1 nymph); Dair Abi Said 30.IV.00 (1/1 nymphs); Jarash 15.V.98 (0/1); Zarqa River (10 Km N of Amman) 23.V.99 (0/1).

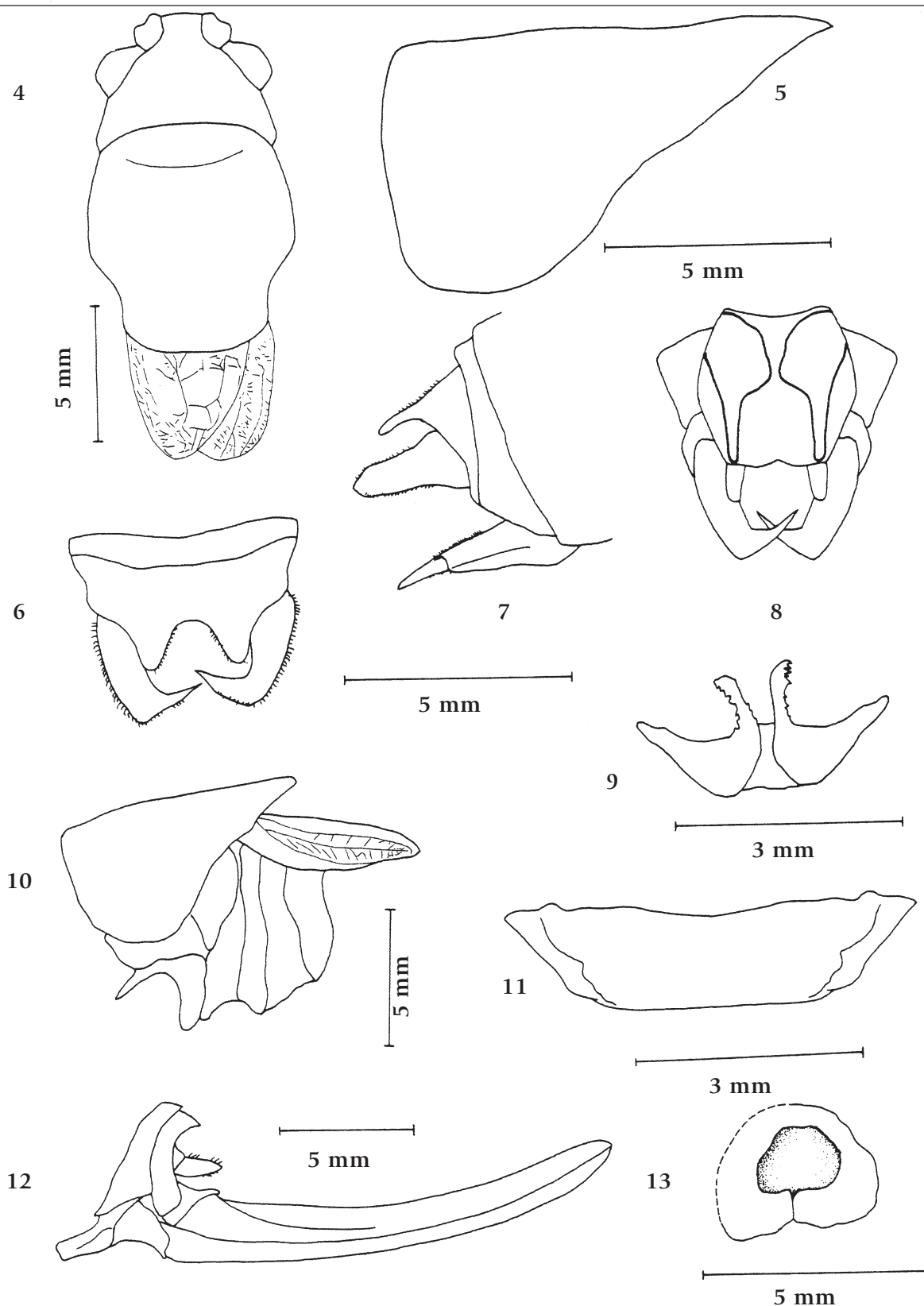
**Distribution.**— This species was described from one male from Palestine by Uvarov (1939), (as *Metrioptera erecta*). He excluded a possible synonymy with *Platycleis (Decorana) buxtoni* (Uvarov 1923 sub *Metrioptera buxtoni*) which was described from a single female from Palestine (Uvarov 1923a). The male of the latter species, which was depicted by Popov (1981), shows features which permit one to distinguish it from *P. erecta*. According to Zeuner (1941), Ramme (1951) and Harz (1969), the differences between *Decorana* and *Incertana* lie in the presence/absence of a median keel in the pronotum and in the shape of the ovipositor. The latter in *Decorana* is slender, elongate, with lamella thickened, somewhat downcurved, while in *Incertana* it is rather curved upward at the base, similar to that of *Tessellana*. According to the shape of the ovipositor we propose to include *P. erecta* in the subgenus *Decorana*, leaving for *Incertana* only the following species: *incerta* Brunner, *persica* (Uvarov) and *chopardi* (Jannone). The last taxon is similar to *P. incerta* and was considered a synonym by Ramme (1951, with some doubt), Harz (1969) and Willemse (1984), listed as valid species by Ragge (1990) and Otte (1997). Some characters of *P. erecta* are illustrated in Figs 14-19. It occurs within grasses and bushes.

*Festella festae* (Giglio-Tos 1893)

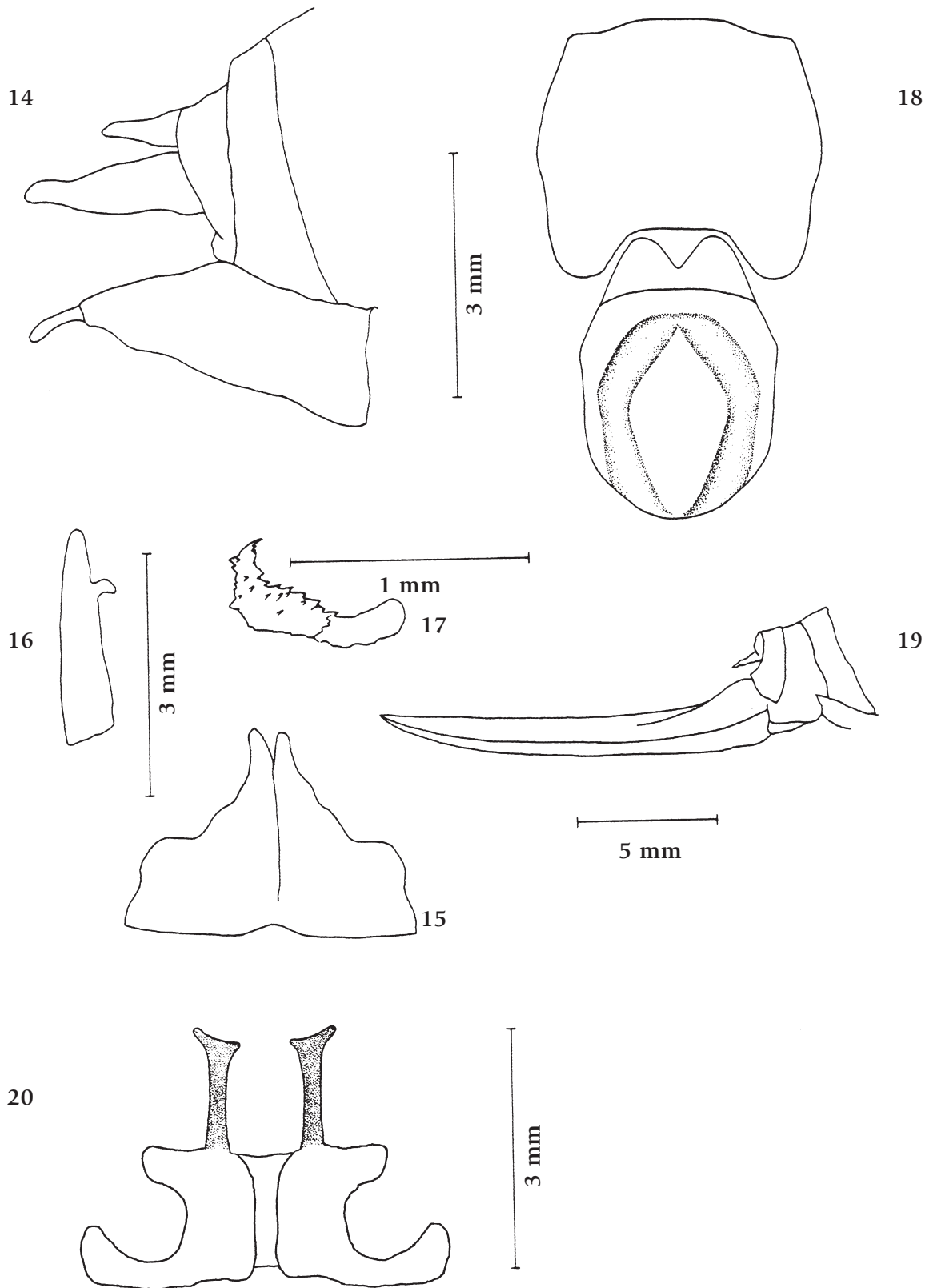
**Material examined.**— 3 specimens.

Ajloun 9.X.97 (0/1); Al Jubayhah (Amman) 31.X.99 (1/0); Ba'un (Ajloun) 29.X.99 (1/0).

**Distribution.**— This species was recorded from Palestine and Syria (at the eastern side of Tiberias Lake) by Giglio-Tos (1893, 1894). It was listed from Palestine by Bodenheimer (1935). Ramme (1951) recorded it from Turkey, depicting the titillators of one Turkish specimen. Males collected in Jordan show the titillators very different from Ramme's figure (Fig. 20), but the general characters agree with the description given by Giglio-Tos (1893, 1894). Thus we consider Jordanian specimens as belonging to this species.



Figs 4-13. *Scotodrymadusa philbyi* (Uvarov). 4. Head, pronotum and tegmina of male from above. 5. Lateral view of pronotum of male. 6. Last tergites and cerci of male from above. 7. Lateral view of terminal segments of abdomen of male. 8. Subgenital plate, styli and cerci of male from below. 9. Titillators. 10. Lateral view of pronotum and tegmina of female. 11. Prosternum of female. 12. Lateral view of last tergite, subgenital plate and ovipositor. 13. Subgenital plate of female (broken line area is badly preserved).



Figs 14-19. *Platycleis (Decorana) erecta* (Uvarov). 14. Lateral view of terminal segments of abdomen of male. 15. Subgenital plate of male. 16. Cercus of male. 17. Titillator. 18. Subgenital plate and 7th sternite of female. 19. Lateral view of last tergite, subgenital plate and ovipositor. 20. Titillators of *Festella festae* Giglio-Tos.



Turkish specimens need further investigation.

*Medecticus assimilis* (Fieber 1853)

*Material examined*.— 3 specimens.

Ar Rubbah (near Kerak) 19.VI.83 (0/1); As Salt 22.IV.00 (0/1, nymph, reared in laboratory; ad: 10.VI.00); Zarqa River (30 Km N of Amman) 29.V.99 (1 nymph).

*Distribution*.— Known from Caucasus and neighbouring countries, Turkey, Middle East, including Syria, Lebanon, Iran, Iraq and Palestine (Giglio-Tos 1893; Uvarov 1934; Bodenheimer 1935; Harz 1969; Kaltenbach 1974). This is a new record for Jordan.

*Decticus albifrons* (Fabricius 1775)

*Material examined*.— 1 specimen.

Kerak 23.IV.00 (0/1 nymph, reared in laboratory; ad.: 2.VI.00).

*Distribution*.— Mediterranean region and SW Asia (Naskrecki & Unal 1995).

*Eupholidoptera palaestinensis* (Ramme 1939)

*Material examined*.— 4 specimens.

As Salt 22.IV.00 (2/0); Judayta (Ajloun) 29.IV.00 (2/0).

This species, together with its synonym, *E. ledereri hebraea* (Uvarov 1939) (cf. Uvarov 1942; Ramme 1951; Kaltenbach 1969), is only known from Tiberias and Zerqa (Palestine). *E. palaestinensis* is very close to *E. ledereri* (Fieber). Ramme (1951) uses differences in the position of cercal teeth in the male to differentiate *E. ledereri* from the other six species, including *E. palaestinensis*. One male from Baniyas (Palestine) and another male from Aleih (Lebanon) were erroneously identified as *E. smyrnensis* (Brunner) by Giglio-Tos (1893) and later considered to be *E. ledereri* by Massa (1999), following Ramme's key. Series of specimens from different localities of Palestine, Syria, Jordan and Lebanon are needed to decide if the two taxa are really different species.

*Parapholidoptera willemsei* n. sp.

*Material examined*.— 34 specimens.

Judayta (Ajloun) 29.IV.00 (holotype ♂, 6 paratype ♂♂ and 3 paratype ♀♀, housed at the University of Palermo; 1 paratype ♀ in coll. F. Willemse, Eygelshoven; 2 paratype ♀♀ in coll. P. Fontana, Padua; 7 nymphs); Al Muzayrib (Irbid) 25.IV.94 (1/4 nymphs); As Salt 22.IV.00 (1/1 nymphs); Dair Abi Said 30.IV.00 (2/5 nymphs).

The genus *Parapholidoptera* was introduced by Ramme (1951) for species related to *Pholidoptera* which have the pronotum much prolonged behind, the tegmina almost covered by the pronotum, and the ovipositor straight or gently upcurved. Following the key of Ramme (1951), we found our specimens to be similar to *P. syriaca* (Ramme), known from Syria, Palestine and Turkey (Brunner 1882;

Bodenheimer 1935; Ramme 1930, 1939, 1951; Naskrecki & Unal 1995), and *P. punctifrons* (Burmeister) distributed in Syria, Lebanon and Palestine (Kaltenbach 1969). However, some characters, such as the shape of titillators and the shape and length of ovipositor, differ. Thus, we consider the Jordanian *Parapholidoptera* to belong to a new species that we name *P. willemsei*.

*Description*.— **Male**: very large species; pronotum flat and long, anterior margin rather straight, posterior margin rounded, first sulcus evident, main sulcus at the center of pronotum length. Lower and posterior borders of pronotum thickened. Tegmina not reaching end of first tergite. Last tergite provided with 2 appendices pointed and parallel, about 1/3 the tergite length, obviously downcurved (Figs 21, 22), cerci hairy, long and slender, with a tooth at the middle curved forwards (Fig. 22). Subgenital plate in lateral view with a keel ending at stylus (Fig. 21); from below as long as wide and with a small excision between the styli; styli hairy and slender, about 0.7 times as long as subgenital plate (Fig. 23). Hind femurs about 3 times longer than pronotum. Titillators thick along their entire length except the apical part, slender and provided with small tubercles; in lateral view upcurved (Figs 24, 25).

**Female**: larger than male. Tegmina fully covered by pronotum. Cerci conical, ovipositor thick along entire length, height 2/3 that of hind femur, 2 times longer than pronotum and 3/4 as long as hind femur (Fig. 26). Subgenital plate roughly triangular, apically excised and provided with two central concavities (Fig. 27).

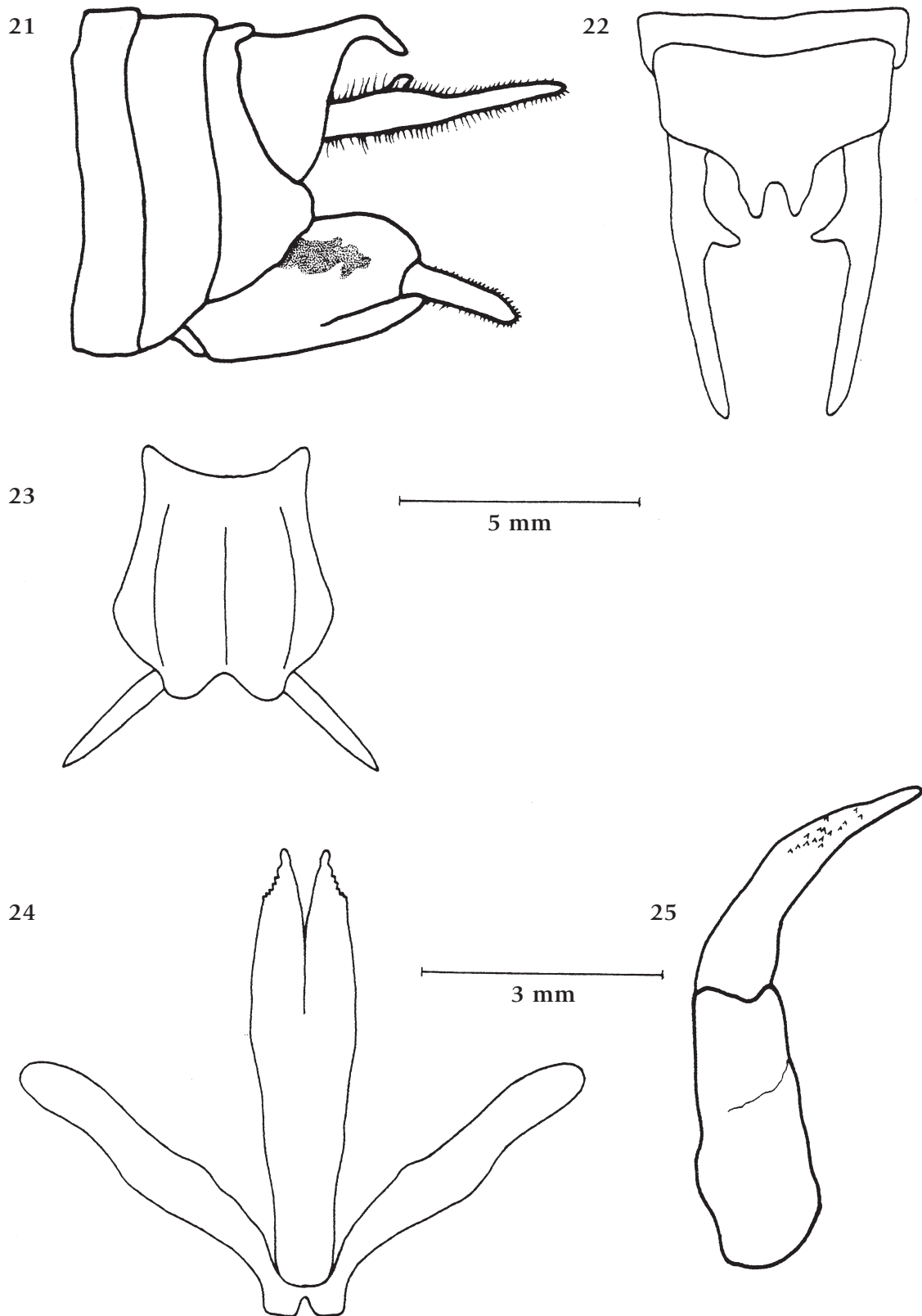
*Coloration*.— Pronotum with a wide white stripe bordered by black, tegmina black with lateral bands white, abdomen grey with two black stripes on sides, appendices of last tergite of male black. Male subgenital plate laterally and ovipositor dorsally with a black stripe.

*Measurements* (in mm).— Total length: 26–29.8 (♂), 27.7–31.9 (♀); pronotum length: 9.7–10 (♂), 11.5–12.1 (♀); max width of pronotum: 6.9–7.4 (♂), 7.5–8.1 (♀); length of hind femurs: 27–31.3 (♂), 31–34.8 (♀); height of hind femurs: 4.5–4.7 (♂), 5.1–5.4 (♀); ovipositor length: 24.8–25.2; ovipositor height: 3.5–3.6; ovipositor width: at base 3.5–3.6, at center 1.4–1.5.

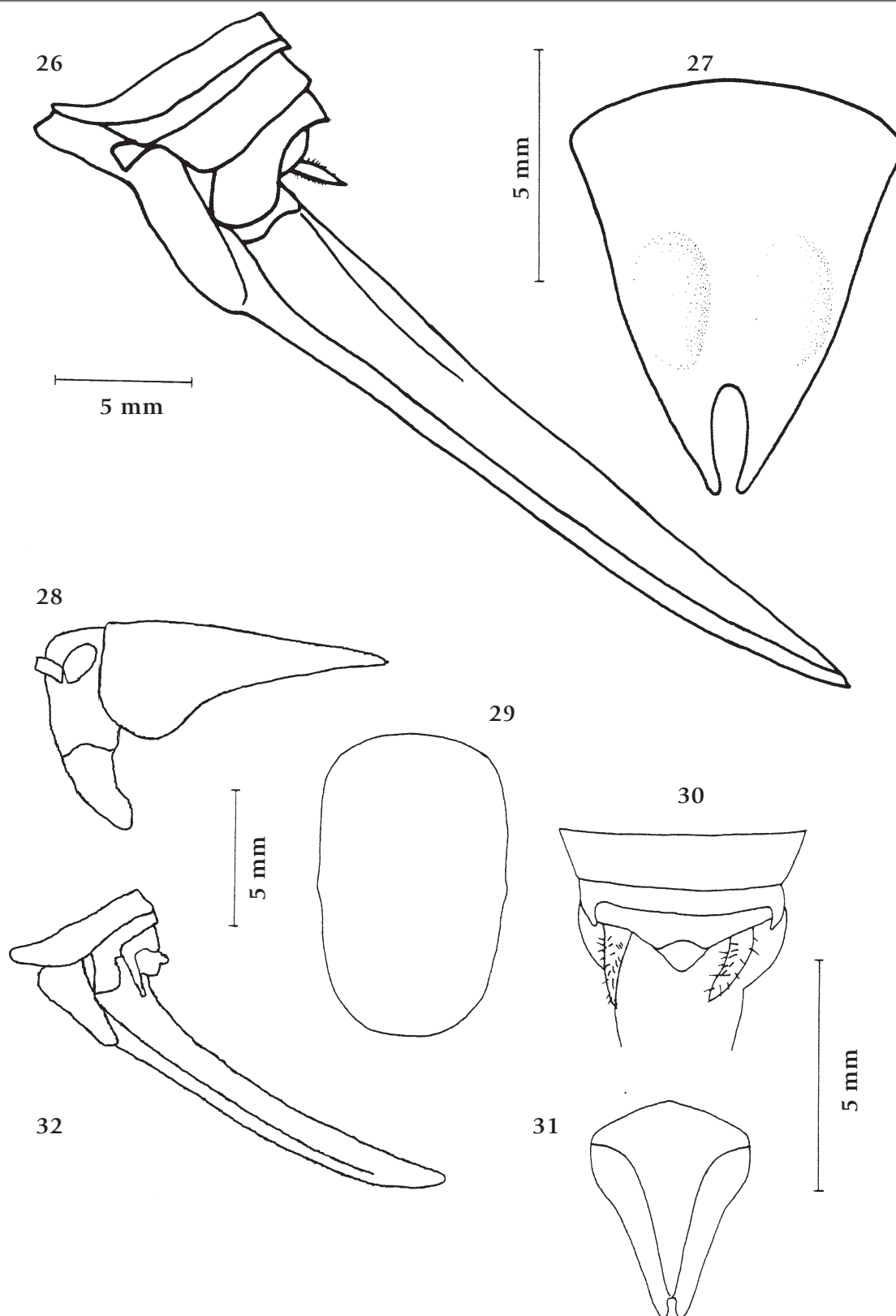
*Derivatio nominis*.— *Parapholidoptera willemsei* is dedicated to the Dutch orthopterologist Fer Willemse, who worked on the Orthoptera of the east Mediterranean area, contributing very much to our knowledge.

*Habitat*.— Specimens were collected within grasses and bushes, where they live in small colonies.

*Affinities*.— When Ramme (1951) described the genus *Parapholidoptera*, only six species belonged to it, all found in the Middle East. Currently, it includes 16 species, mostly found in Turkey. Species related to *P. willemsei* are *P. punctifrons* and *P. syriaca*. The last tergite of males of the latter two species has the appendices obviously diverging (Fig. 1 of Ramme 1930; Fig. 31 of Ramme 1939; Fig. 53 of



Figs 21-25. *Parapholidoptera willemsei* n. sp. (holotype male). 21. Lateral view of terminal segments of abdomen. 22. Last tergite and cerci from above. 23. Subgenital plate. 24. Titillators from above. 25. Lateral view of titillators.



Figs 26-27. *Parapholidoptera willemsei* n. sp. (paratype female) 26. Lateral view of last tergite, subgenital plate and ovipositor. 27. Subgenital plate.

Figs 28-33. *Uvarovistia rammei* n. sp. (holotype female). 28. Lateral view of head and pronotum. 29. Pronotum from above. 30. Last tergite and cerci from above. 31. Subgenital plate. 32. Lateral view of last tergite, subgenital plate and ovipositor.

Ramme 1951). The male subgenital plate of *P. willemsei* is more excised than that of *P. punctifrons* and *P. syriaca* (see Fig. 3 in Ramme 1930). The ovipositor is thick, high and short in *P. willemsei*, while it is slender in *P. punctifrons* and *P. syriaca*, being in the former 1.5 times longer than the pronotum and 2.5 mm wide and in the latter 2 times longer than the pronotum and 1.5 mm wide. The female subgenital plate is more excised in *P. willemsei* than in the other two species (see Fig. 4 in Ramme 1930). The titillators of *P. punctifrons* are slender and moderately curved in lateral view, but those of *P. syriaca* are enlarged only in the center: in the lateral view they are curved as those of *P. willemsei*, but more slender (see Fig. 30 in Ramme 1939; Fig. 52 in Ramme 1951). We also noticed differences in coloration in *P. willemsei*. There is a continuous white stripe on the lateral margins of the pronotum, black lateral stripes on the hind femurs, and along the sides of the abdomen. Such characters are lacking in the other two species.

*Uvarovistia rammei* n. sp.

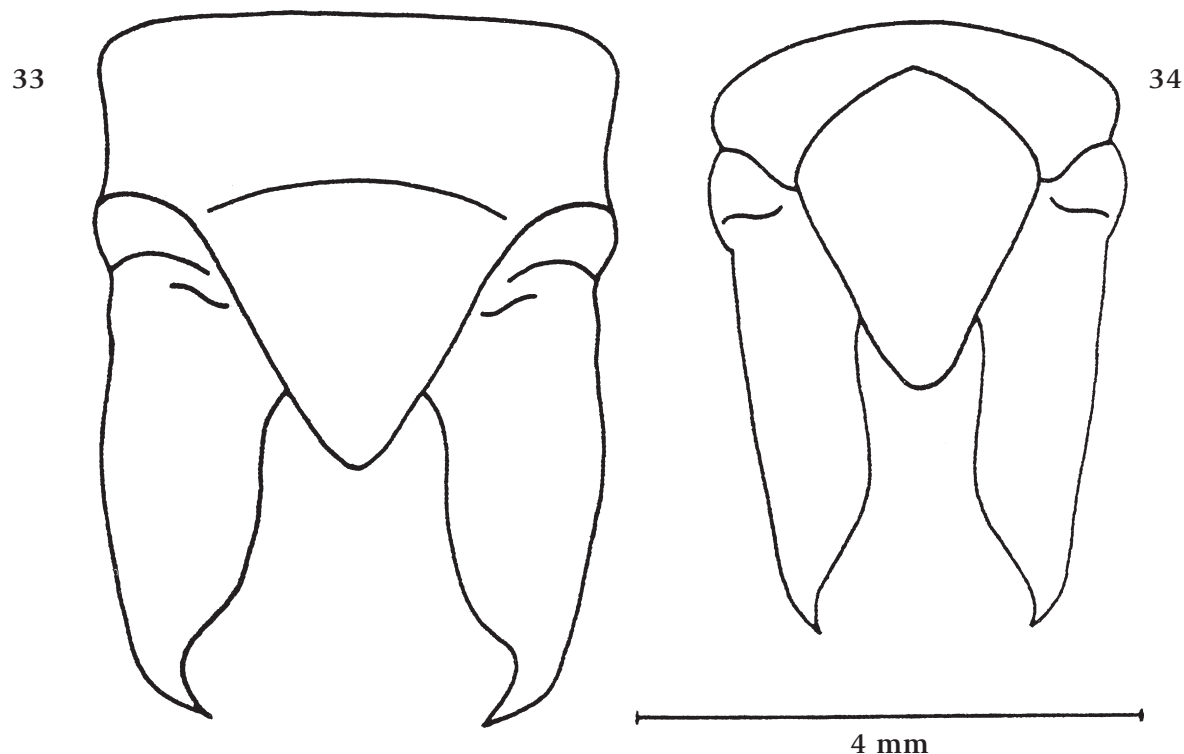
*Material examined*.— 1 specimen.

Ajloun 12.VII.87 (holotype female, deposited at Museo Civico di Storia Naturale, Genua).

The genus *Uvarovistia* Ramme is related to *Eupholidoptera* Ramme. Both have the 10th abdominal tergite black, but *Uvarovistia* is characterized by the 9th abdominal tergite brownish-black only at the sides with a transverse series of brown spots along the anterior margin; the tegmina are

covered by the pronotum; the female subgenital plate is unicolored, and the ovipositor short and weakly upcurved. The specimen listed above has the 9th abdominal tergite brown at the center with two brown spots at the sides. Other characteristics lie within those of *Uvarovistia*. There are five species belonging to this genus, *U. bakhtiara* (Uvarov) from Iran, *U. iraqa* (Uvarov) from Kurdistan (Iraq), *U. satunini* (Uvarov) from Armenia and Iran, *U. zebra* (Uvarov) from the border of Syria-Iraq, and *U. uvarovi* (Karabag) from Karpathos Is. (Greece) (Uvarov 1934; Ramme 1951; Harz 1969; Willemse 1984, 1985). The subgenital plate and the shape of the ovipositor of Jordanian specimens are different from those of the species listed above (cf. Uvarov 1934, Fig. 10; Harz 1969, Figs 1185-86). We thus consider it as belonging to a new species, that we name *Uvarovistia rammei*.

*Description*.— **Female**: fastigium of vertex about 2 times wider than scapus. Pronotum long and rather convex, its posterior margin broadly rounded, main sulcus at the center of pronotum length, first sulcus indistinct, shoulder excision indistinct, in lateral view with a small depression (Figs 28-29). Elytra covered by pronotum. Cerci hairy, long and pointed. Last tergite with a small excision (Fig. 30). Subgenital plate longer than wide, triangular with a deep apical excision (Fig. 31). Fore and middle femurs unarmed; fore tibiae with 3 spines on outer upper margin and 6 on inner and outer lower margins; middle tibiae with 2 spines on outer and 4 on inner upper borders and 6 on outer and inner lower borders; hind femurs 2 times longer than pronotum, armed



Figs 33-34. *Saga ephippigera* Fischer. Variability of cerci of male (33. W. Shu'ayb, 14.V.90; 34. Amman, 8.VI.76).

with 4 small black spines on inner and outer lower borders; hind tibiae with 5 inner lower (+ 2 apical), 6 outer lower (+ 2 apical), 24 inner upper and 20 outer upper spines. Ovipositor short, gently upcurved, longer than pronotum (Fig. 32).

**Coloration.**— Yellow testaceous; face uniformly cream with black spots beside eyes, 9th abdominal tergite black in center and with one black spot at each side, 10th abdominal tergite and ovipositor black.

**Measurements** (in mm).— Total length: 20.8; pronotum length: 9.7; pronotum height: 5.0; length of hind femurs: 19.0; ovipositor length: 11.5.

**Derivatio nominis.**— *Uvarovistia rammei* is dedicated to Willy Ramme, the late German orthopterologist who greatly contributed to knowledge of the orthoptero fauna of the Middle East.

### *Saga ephippigera* Fischer 1846

**Material examined.**— 31 specimens.

Al Jubayhah 1.VII.79 (1/0); 20.V.82 (0/1); 20.VI.86 (0/1); 2.VII.92 (0/1); 14.VIII.85 (0/1); Al Walah 20.VI.99 (0/1); Ar Rumman 4.VI.88 (0/1); As Salt 23.VII.74 (1/0); 17.VII.95 (0/1); 22.IV.00 (1 nymph); Amman 3.V.79 (1/0); 8.VI.76 (1/0); Ghawr Kabid 3.XII.?? (0/1); Jarash 18.V.98 (1/0); 29.V.98 (1/0); 31.V.98 (1/0); 1.VI.80 (1/0); 6.IX.92 (0/1); Judayta (Ajloun) 29.IV.00 (0/4 nymphs, one reared in laboratory; ad: 10.VI.00); Nahlah 8.VII.74 (1/0); Rajib 18.IV.00 (1 nymph); Tila' Al Ali 11.V.92 (1 nymph); Wadi Shu'ayb 4.V.90 (1/0); unlabeled (1/4).

**Distribution.**— Turkey, Palestine, Transjordan, Syria, Armenia, Caucasus, Iran and Iraq (in NW Syria and Iraq the subspecies *syriaca* Lucas) (Kaltenbach 1969, 1990; Naskrecki & Unal 1995). *S. uvarovi* Ramme is considered a doubtful synonym of *S. ephippigera* by Kaltenbach (1990). *S. uvarovi* was described by Ramme (1951) from a single male from Palestine, on the basis of small differences in the shape of tegmina and cerci. The series of the Jordanian specimens allow us to definitely establish the synonymy proposed by Kaltenbach (1990). Figs 33-34 show the extremes of variability of the male cerci.

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