Eupholidoptera jacquelinae spec. nov. from the Greek island of Gavdos, south of Crete (Orthoptera: Tettigoniidae)

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Abstract

Description of a new species of the genus *Eupholidoptera* Maran. This new species, *E. jacquelinae,* was found on the Greek island of Gavdos, south of Crete. Its relation with other members of the genus is discussed on the basis of morphological traits.

Key words

New species, *Eupholidoptera*, taxonomy, Greece, Gavdos, habitat, distribution, biogeography

Introduction

As already stated by Willemse (Willemse & Kruseman 1976; Willemse 1980, 1984) Crete is remarkably rich in species of the genus *Eupholidoptera*: *E. cretica* Ramme, *E. forcipata* Willemse & Kruseman, *E. latens* Willemse & Kruseman, *E. pallipes* Willemse & Kruseman, *E. gemellata* Willemse & Kruseman and *E. astyla* (Ramme). After 1984, *E. annamariae* Nadig (1985) and *E. giuliae* Massa (1999) were added to the species list of Crete, in 2001, another two new species, *E. mariannae* Willemse & Heller and *E. rammei* Willemse & Heller. All these species, in total now 10, are known only from Crete, except for *E. astyla* which has also been recorded from Naxos (Ramme 1927). However, the record of a single male of *E. astyla* from Naxos is doubtful (Willemse & Heller 2001).

Off the south coast of Crete in the Libyan Sea is an islet named Gavdos. This small island, 9 km long, with an average width of 5 km, is inhabited by some 50 persons. It has an area of 27 km^2 and its highest point, situated on the SW coast, is no more than 382 m above sea-level. Gavdos is the southernmost point of land in Greece and also in Europe.

Gavdos lies at a distance of 40 km from the nearest point on the south coast of Crete and is separated from Crete by a sea depth of up to 1100 m. The island has been raised from the sea floor by the collision of two tectonic plates. This geographical isolation is favorable to the development of endemics. Gavdos is known for endemic land snails and plants (Welter-Schultes 1998). To what extent this is also the case in other groups of the fauna of Gavdos is unknown. Due to its isolated geographical location, little research has been done on the islet. Its orthopterous insect fauna was almost completely unknown.

Two collecting trips to the island (11 June 2000 and 30 April to 2 May 2001) showed the expectation of more endemic faunistic elements on Gavdos to be true for the Orthoptera: 4 specimens of an *Eupholidoptera* species were collected that clearly differ from any of the species previously described in that genus.

Eupholidoptera jacquelinae spec. nov.
(Figs 1-9)

Material examined.—
Holotype.— ♂ (collection Tilmans, Gouda); labelled: Hellas, Gavdos, 50 m /Karave, 11.VI.2000 / WGS84 N 34°51.003′ E 024°07.236′ / legnt. J.M. Tilmans & J.F.R. Tilmans-Smid. With additional label: Specimen nr 2000.005.02.
Allotype.— ♀ (collection Tilmans); labelled: Hellas, Gavdos, 50 m /Karave, 30.IV – 2.V.2001/ WGS84 N 34°51.003′ E 024°07.236′ / legnt. J.M. Tilmans & J.F.R. Tilmans-Smid. With additional labels: EX LARVA/imago: 25.V.2001 and Specimen nr 2001.004.13.
Paratypes.— 2 ♂♂: 1 ♂ (collection Fer Willemse, Eygelshoven), same data as holotype, but Specimen nr 2000.005.03; 1 ♂ (collection Tilmans), same data as allotype, but with additional labels: EX LARVA/imago: 25.V.2001 and Specimen nr 2001.004.12.

Description. — **Male**: general appearance, pronotum, elytra and legs as type species of genus. Stridulatory file of left elytron consists of about 120 teeth; shortest distance between proximal and distal end 3.5 mm, midfile greatest width of teeth 0.12 mm, density of teeth in middle two thirds portion of stridulatory file about 32 mm^{-1}. Last abdominal tergite (Fig. 1.) apically with round dorsomedian depression; posterior margin (Fig. 2) triangularly extended ventrally with v-shaped medial incision, strongly curved frontally, provided with apical tooth on either side; surface of extensions with transverse wrinkles; depression and extensions densely covered with golden-colored hairs.

Cercus (Fig. 3) long, slender, cylindrical with golden-colored short and long hairs, without any tooth, twice as long as greatest length of last abdominal tergite, slightly tapering apically; apical three fourths of cercus slightly bent inwards; tip obtusely conical.

Subgenital plate in ventral view (Fig. 4) convex, remarkably slender with well-defined median keel and next to it on both sides, a depression; strongly elongated apical lobes that (faintly discernable) pass into styli; styli long, slender (length 3 mm, width 0.5 mm), densely golden-haired, slightly flattened basally, apex obtusely conical; subgenital plate in lateral view (Fig. 5): along the strongly developed lateral margins a deep groove from base of subgenital plate to beginning of elongated apical lobes; apex of lobes dorsally armed with sharp spine that covers basis of stylus.

Titillator (Fig. 6) small, with basal parts extending, weakly curved laterally; apical parts fused, slightly swollen in basal half with medial depression, divided in apical half, from the narrow basis widen-

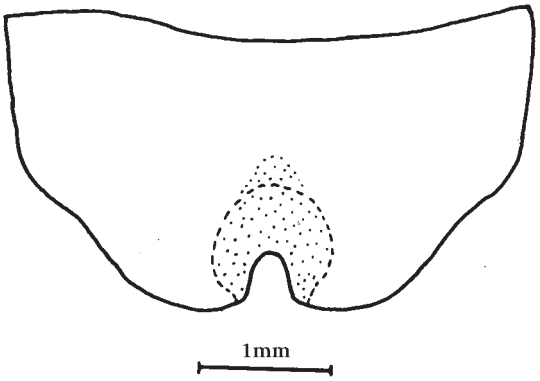

Fig. 1. Male apical tergite of *E. jacquelinae* (paratype) in dorsal view.

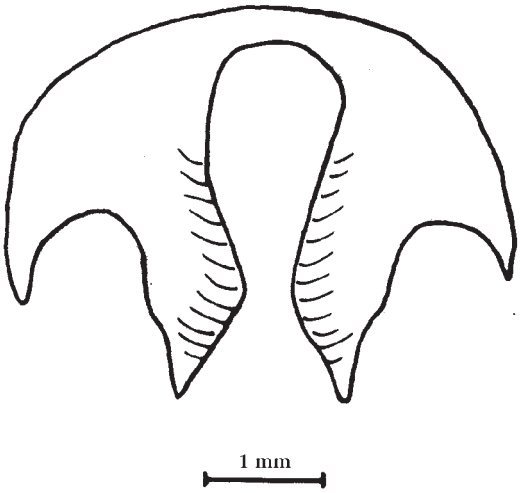

Fig. 2. Male apical tergite of *E. jacquelinae* (paratype) in posterior view.

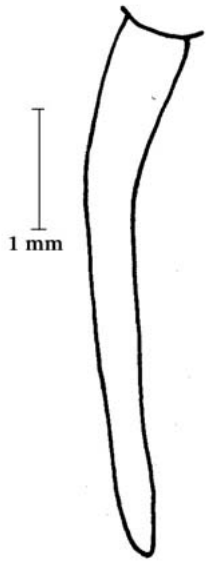

Fig. 3. Male left cercus of *E. jacquelinae* (paratype) in dorsal view.

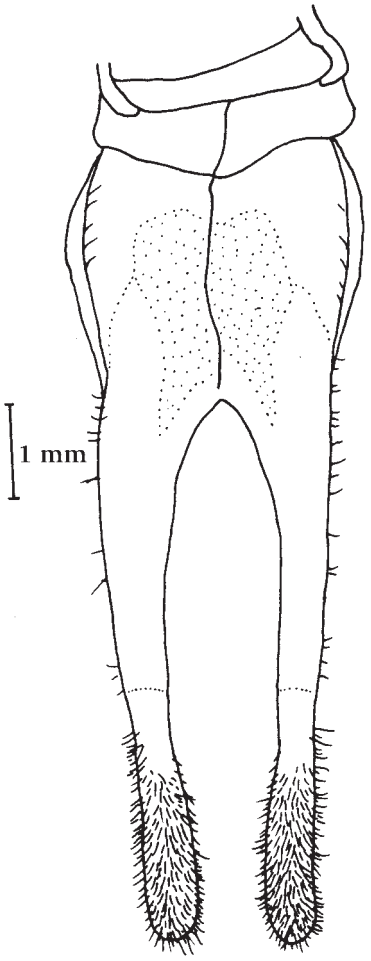

Fig. 4. Male subgenital plate of *E. jacquelinae* (holotype) in ventral view.

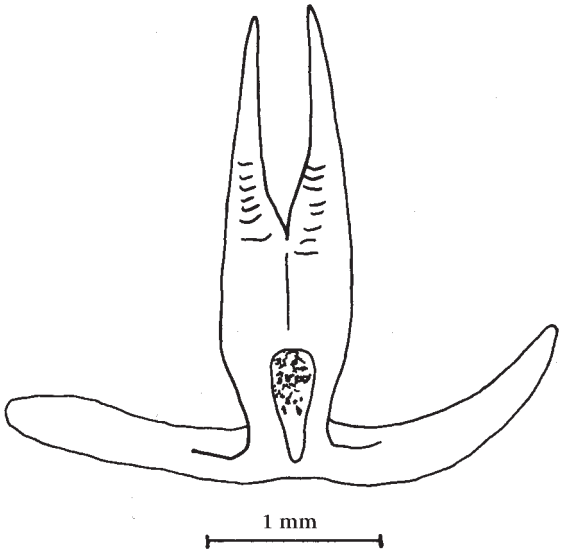

Fig. 6. Titillator of male *E. jacquelinae* (holotype) in posterior view.

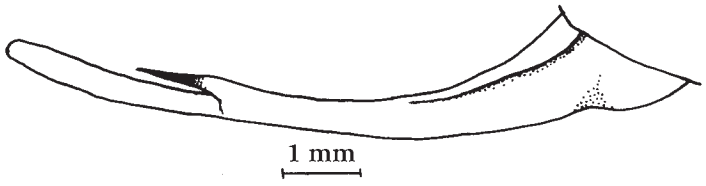

Fig. 5. Male subgenital plate of *E. jacquelinae* (paratype) in lateral view from right.

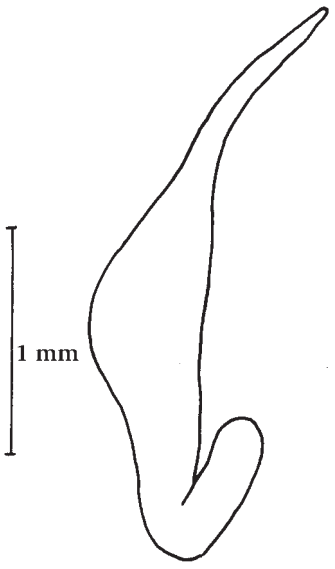

Fig. 7. Titillator of male *E. jacquelinae* (holotype) in lateral view from right.

ing up to middle of basal half, from there narrowing apically, tips simply pointed, parallel, surface with transverse wrinkles, in lateral view (Fig. 7) moderately curved dorsally.

Coloration of living specimens: general coloration brownish to olive-green (becoming more brown in preserved material). Pronotal dorsum brown to yellow, orange-brown flush with dark brown markings in middle of prozona, metazona yellow with brown flush. Pronotal lateral lobe with black dorsal fascia, in prozona not sharply delimited ventrally, in metazona more sharply delimited ventrally and strongly narrowing posteriorly, rest of pronotal lateral lobe yellow with vague brown marks except for broad bright yellow margin in metazona. Elytra: area between C and R white, other parts black. Last abdominal tergite blackish brown with vague lighter brown spot on both sides next to middle, lateral margins shiny black. Cercus brown. Subgenital plate from cream white to bright yellow, apical half of elongated apical lobe, basis of spine and stylus orange yellow, tip of spine blackish brown. Titillator in mature specimens: basal parts brown; basal half of apical parts pale yellow, apical half transparent with brownish tips. Legs white-yellow, dorsum of fore and mid femora on both margins with blackish brown marks and short stripes forming two untidy parallel stripes along length of femora; on outside of fore and mid femora also a line of blackish spots and marks. Fore and mid tibiae with blackish-brown spots at base of tibial spines, with blackish brown stripe on apical half of inside of fore femora and outside of mid femora. Hind femur dorsally with a longitudinal blackish brown stripe that nearly reaches blackish colored knee; outside medially with a row of blackish brown transverse stripes and with marks of same color above transverse stripes; inside with partly incomplete transverse stripes in upper half. Hind tibial spines with blackish brown tips.
Female: about same size as male. Elytron completely covered by pronotum or almost so.

Cercus short, conical with golden-colored short and long hairs, nearly straight, tapering apically; tip pointed, slightly bent inwards.

Subgenital plate (Fig. 8) longer than wide; slightly impressed on both sides of median groove, no wrinkles; hind margin obliquely convergent towards a triangular, median incision along one third of total length, apical lobes diverging with narrowly posterior angles; lateral sides slightly impressed; small lateral sclerite (Fig. 9, arrow) present between upper angle of lateral margin of subgenital plate and lower lateral margin of ninth tergite. Ovipositor nearly twice as long as pronotum, proximal half straight, apical half slightly curved dorsally.

Coloration generally as in male. Sternites, ventral part of subgenital plate and underside of femora yellowish green; lateral sides and hind margin of subgenital plate light brown. Black marking of pronotal lateral lobe notably less extensive than in male, yellow margin in metazona shorter than in male.

Measurements.— (mm) Body: male 24.9 – 32.8, female (not including ovipositor) 32; pronotum: male 10 to 11.2, female 10.5; hind femur: male 23.5 to 25.5, female 25.5; ovipositor: 20.0.

Habitat.— The habitat consists of a rocky ground with sparse vegetation of low trees (*Pinus brutia* Tenore), thorny shrubs and smaller plants, all specialised in surviving the dry, hot summers of Gavdos.

The vegetation of Gavdos is remarkably different from that of Crete, as a much greater part of the surface of the island (20%) is covered with natural forest (Welter-Schultes 1995, 1998).

It is noteworthy that on Crete several of the *Eupholidoptera* species and *Poecilimon cretensis* Werner prefer to live in shrubs of *Sarcopoterium spinosum* (Linnaeus); but on Gavdos, all specimens of *E. jacquelinae,* together with specimens of *P. cretensis* were collected only from bushes of *Erica verticillata* Bergius and not from *S. spinosum*. In the same habitat specimens of *Calliptamus barbarus barbarus* (Costa), *Pyrgomorpha conica conica* (Olivier), *Sphingonotus caerulans* (Linnaeus), *Chorthippus biroi* (Kuthy) and the mantid *Rivetina baetica* (Rambur) were also collected.

Distribution.—Known only from the island of Gavdos, this new species is probably endemic there. It may possibly also occur on the even smaller (only 2.75 km^2) satellite islet of Gavdopoula. The type material was collected at 50 m altitude, just above the harbor hamlet Karave, on the east coast of Gavdos.

Etymology.— This new species is dedicated by the author to his wife Jacqueline Tilmans-Smid who has accompanied him now for over 25 y on all field trips collecting Orthoptera. Her enthusiasm, never diminishing support and endurance, often generated interesting collecting results.

Discussion

With the description of *E. jacquelinae* and including the species described in Salman (1983), Harz (1988), Çiplak (1999), Massa (1999) and Willemse & Heller (2001), the genus now comprises some 50 species. The geographical area of the genus consists of Southern Europe (except Iberia), Asia Minor, Syria and Palestine.

This new species is well characterised by its unique male abdominal terminalia that distinguish it clearly from all other described species of the genus *Eupholidoptera*.

Comparison of the new species with this large number of congenerics reveals that it presents by far, more affinity with *E. spinigera* (Ramme) (1930), *E. prasina* (Brunner von Wattenwyl) (1882), *E. icariensis* Willemse (1980) and some Anatolian species, than with species occurring in the nearby island of Crete or those from continental Europe. The group of species mentioned above all show the combination of a male subgenital plate with elongated, tapering apical lobes, apical spines and the presence of styli. The apical lobes of the male subgenital plate in these species, however, are apparently shorter and, by far, less slender and elongated, than in *E. jacquelinae.* Moreover the inner side of the cerci of *E. prasina*, *E. spinigera* and in some specimens of *E. icariensis* is a little swollen medially, a feature absent in the new species. In addition, the titillators of *E. icariensis* and *E. prasina* differ from that of the new species. In 1930 when Ramme described *E. spinigera* he gave no description or figure of the titillator of that species. In 1951 he mentioned that by accident the titillator of the holotype of *E. spinigera* had been lost but that to his remembrance it resembled that of *E. prasina*. Unfortunately *E. spinigera* was known only from the male holo- and female allotype collected in 1893 in the island of Kithira. However, the present author and his wife were, quite recently, successful in their attempt to rediscover the species. The recently collected specimens show that the titillator of *E. spinigera* (Figs 10,11), indeed resembles that of *E. prasina*, *E. karabagi* and *E. icariensis* and therefore less that of *E. jacquelinae*.

Apart from these Greek species, also a number of Anatolian ones share with *E. jacquelinae* the combination of a male subgenital plate

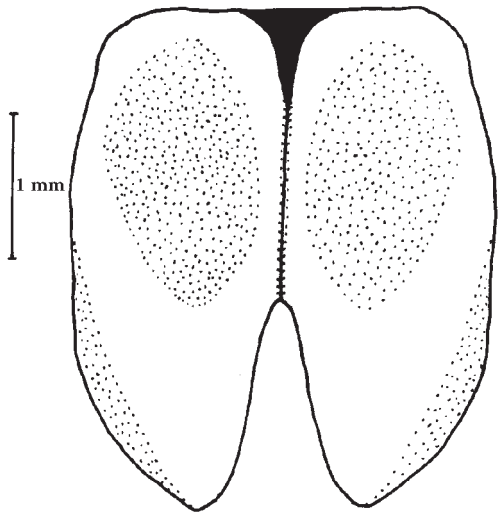

Fig. 8. Female subgenital plate of *E. jacquelinae* (allotype) in ventral view.

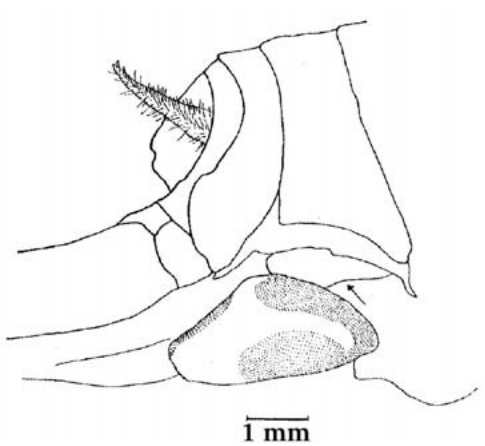

Fig. 9. Female subgenital plate of *E. jacquelinae* (allotype) in lateral view from right. Sclerite indicated by arrow.

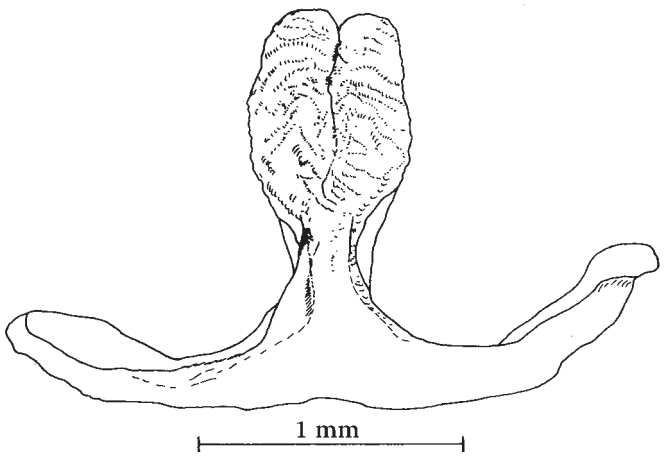

Fig. 10. Titillator of male of *E. spinigera* in posterior view. Male labelled: Hellas, Kithira, 250 m, 11-17.V.2002/1.5 km W.N.W. monastery Ayia Moni/7.2 km E. Frilingianika/ WGS84 N. 36°15.607′ E. 023°02.808′/legnt. J.M. Tilmans & J.F.R. Tilmans-Smid. With additional labels: EX LARVA/imago: 23.V.2002 and Specimen nr 2002.005.08.

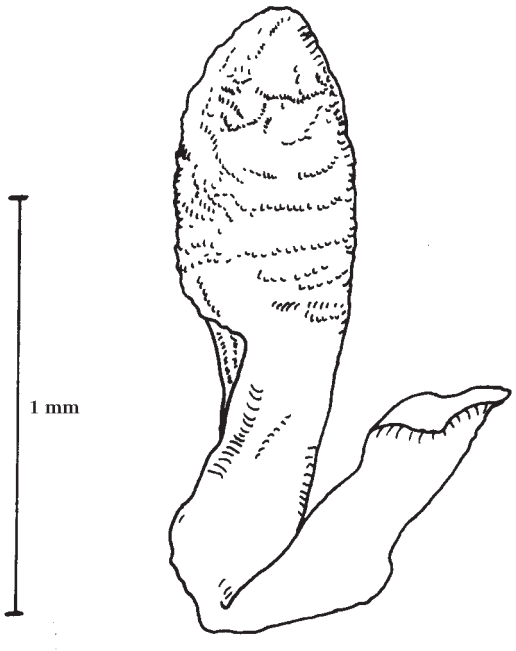

Fig. 11. Titillator of male of *E. spinigera* in lateral view from right. Same label data as in Fig. 10.

with elongated apical lobes, apical spines and the presence of styli: *E. tucherti* Harz (1988) from southwestern Anatolia and the southern Anatolian species *E. karabagi* Salman (1983) and *E. femorata* Çiplak (1999). However, also in these Anatolian species, the apical lobes of the male subgenital plate are much less elongated than in *E. jacquelinae* and the titillators differ from those of *E. jacquelinae*. Furthermore in *E. karabagi* and *E. femorata* the inner side of the cerci is medially a little swollen.

Comparison of the female subgenital plates of the above-mentioned species shows that none of them have, like *E. jacquelinae*, the combination of a subgenital plate that is longer than wide with medially a triangular or narrow incision of its hind margin.

The morphological resemblance of *E. jacquelinae* to other species of this genus presents an intriguing biogeographical problem. *E. spinigera* occurs in the island of Kithira, an offshore island of the extreme southeastern Peloponnese; *E. icariensis* is known from the eastern Aegean island of Ikaria, *E. prasina* from the eastern Aegean islands of Khios, Samos and the opposite part of Anatolia. All the other species discussed above are known from Anatolia. The location of the island of Gavdos, close to Crete, raises the likelihood of finding a close relative on this island. Instead closest relatives are found more remotely: northward in the island of Kithira, close to continental Europe and far more to the east, in some eastern Aegean islands and Anatolia. Explanation of this distribution is still an open question. A comprehensive study of the genus *Eupholidoptera*, particularly in relation to its geographical distribution in the Aegean and Anatolian area, is therefore necessary.

Acknowledgements

First of all I am much indebted to Dr. Fer Willemse (Netherlands/Eygelshoven) for his extended help during the preparation of this paper. I wish to express my gratitude to the two anonymous reviewers and Dr. Glenn Morris in giving useful advice for the improvement of this manuscript. Furthermore I would like to thank Nancy Morris for scanning the original figures of the manuscript and Dr. Francisco Welter-Schultes (Germany/Göttingen) for his information on the land snails and the vegetation of Gavdos.

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