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Kontaktperson: Mr Jan Haspeslagh .

Telefon Kontaktperson:
+32 59 342130

E-Mail Kontaktperson:
library@vliz.be

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Fer WILLEMSE & Luc WILLEMSE

***Eupholidoptera cephalonica* sp. nov. and diagnosis
of *E. epirotica* from Western Greece
(Orthoptera Tettigoniidae)**

Abstract - A new species of *Eupholidoptera*, *E. cephalonica* n. sp. is described from the Ionian island of Kefallinia. Based on newly collected material a diagnosis is presented for *E. epirotica* Ramme, 1927 until now only known from its type series. Opportunity is taken to present a distribution map of *Eupholidoptera* from Western Greece.

Riassunto - *Eupholidoptera cephalonica*, nuova specie e diagnosi di *E. epirotica* della Grecia occidentale (Orthoptera Tettigoniidae).

Gli Autori descrivono una nuova specie, *Eupholidoptera cephalonica* n. sp., della Grecia, affine ad *E. epirotica* (Ramme, 1927); di quest'ultima, nota solo per la serie tipica e recentemente riscoperta, forniscono ulteriori dati morfologici. Infine sintetizzano in una cartina la distribuzione finora conosciuta delle specie di *Eupholidoptera* nella Grecia occidentale.

Key words: Tettigoniidae, Greece, Ionian Islands, new species, distribution map

The genus *Eupholidoptera* Maran, 1953 ranges from Southeastern France to the Near East. Up to date about 50 species are recognized. Some are widely distributed but the range of most of them is restricted to small areas. Ramme (1951) and Harz (1969) recorded nine and Willemse (1980) 15 species and subspecies from Greece. This number has increased up to 20 since. Ten of these are endemic to Kriti (= Crete) (Willemse & Heller 2001). Again a new Greek species is recognized and described below. It is a close ally of *E. epirotica* (Ramme, 1927). The latter was known only from the type series. After about a century the species was re-discovered and opportunity is taken here to give more details of *E. epirotica*.

Unless otherwise stated, material has been collected by the authors and is deposited in the collection Willemse.

DESCRIPTIONS

***Eupholidoptera epirotica* (Ramme, 1927)** (figs 1-3, 7-9, 13-15, 19-20, 25-27, 33-34, 40-41)

MATERIAL STUDIED. Greece, Aetolia/Akarnania: Loutrakion (70 m) 1.VII.1986 (11 ♂♂, 3 ♀♀); Babini (W of Agrinion) 23.VI.1986 (2 ♂♂); Drimos (E of Vonitsa) 2.VII.1986 (3 ♂♂, 1 ♀); Aktion (NW of Vonitsa) 1.VII.1986 (6 ♂♂, 1 ♀); Mitikas (S of Vonitsa) (10 m) 23.VI.1986 (9 ♂♂, 3 ♀♀), 9.VII.1986 (1 ♀); surr. Monastirakion (200 m) 9.VII.1986 (1 ♀); Mt Akarnanika, above Thirion (800-1380 m) 27.VII.1987 (19 ♂♂, 5 ♀♀) (another pair of the latter series in collection A. Nadig); surr. Thirion (300 m) 11.VII.1986 (2 ♂♂, 2 ♀♀); Mt Akarnanika (1000-1450 m) 9-10.VII.1986 (6 ♂♂, 3 ♀♀); Mt Akarnanika, 1 km N of Thirion (400 m) 18.VII.2000 (5 ♂♂, 4 ♀♀).

DIAGNOSIS. The species is characterized by the abdominal terminalia resembling those of the type species *E. chabrieri* (Charpentier, 1825) and allied taxa in combination with a different titillator (Figs 1-3). The fused apical part of the titillator lacks any trace of lateral wing-like expansions; besides this part is long, slender, inflated, laterally also convex, surface smooth with a median longitudinal groove and over its entire length tapering regularly towards the base. The male cercus (figs 25-27) is slightly longer than in *E. chabrieri*, the basal tooth equally robust. In the male the median emargination of the hind margin of the last abdominal tergite is slightly wider than in *E. chabrieri*. Subgenital plate closely resembles that of *E. chabrieri*; the median extension of the distal part of the inner margin of the apical lobe often slightly expressed (figs 13-15); the armature near the base of the stylus variable: the tip of the apical processes with a single or two spines of equal length but often of different size, even within a single specimen (figs 7-9). The male stridulatory file as usual, shortest distance between proximal and distal teeth about 4.2-4.9 mm, greatest width of teeth 0.12 mm, total number of teeth 102-111, spacing of teeth in mid third 20-22 per mm. Female subgenital plate (figs 19-20) as in *E. chabrieri*.

The colour pattern of the pronotum (figs 33-34) varies a little but the dark markings on the dorsum of the prozona always conspicuous in both sexes and quite distinct from *E. chabrieri* and its closest relatives (e.g. the taxa *E. schmidti*, *bimucronata*, *garganica*, regardless whether considered as species or subspecies).

BIOACOUSTICS. The song can be heard in daytime but more often at twilight and night. The calling song consists of a long series of syllables, the syllables isolated from each other by intervals of about 0.5-1.5 s (fig. 40) roughly the same as in other species of the genus (Heller 1988).

HABITAT. Coarse herbage, bramble thickets, prickly bushes, shrubby areas, sometimes poor vegetation consisting mainly of *Quercus coccifera* L. At one site (surroundings of the village of Thirion, Mt Akarnanika) the population was abundant and specimens were found on the asphalt road, feeding on traffic victims of their own species (July 1986 and 1987). Visiting this spot many years later (July 2000), the situation was completely similar.

DISTRIBUTION. The species was known only from the type series, 4 ♂♂ and 2 ♀♀, "Epirus Erber Coll. Br. v. W." (studied; Willemse 1980). These specimens came in Brunner's collection from Josef Erber (1824-1884), an insect dealer in Vienna. Precise data are missing. The range of the recently collected material covers the northwestern part of the district of Aetolia/Akarnania, the extreme southwestern mainland of Greece (fig. 41). Though biogeographically this part of Greece may be considered the southernmost part of Ipiros (= Epirus), it belongs to Sterea Hellas (= Central Greece).

It is noteworthy that there is more *Eupholidoptera* material in Brunner's collection originating from Erber: one pair also labelled 'Epirus' but belonging to *E. chabrieri schmidti* and one male labelled 'Corfu' and belonging to *E. chabrieri garganica* (both studied and discussed in Willemse 1980). Kaltenbach (1967) records a single female of *E. epirotica* (Werner's collection) labelled "Korfu" (= Kerkira) (studied; Willemse 1980).

The origin of Werner's specimen is not clear (from Erber or a gift from Brunner to Werner or collected by Werner himself?). Schmidt (1981) described the song of *Eupholidoptera* males. The specimens originated from Korfu (= Kerkira) and he named them *E. chabrieri epirotica* without any reference to the black pattern of the pronotum or typical titillator. When visiting Kerkira, we collected 67 males and females of *Eupholidoptera* from 10 localities scattered all over the island (fig. 41). All of them agree with *E. chabrieri garganica* and lack the black coloration of the pronotum and typical titillator in *E. epirotica*. Therefore, we consider both records of *E. epirotica* from the island of Kerkira as doubtful and its occurrence there certainly needs confirmation. Consequently the Kerkira and "Epirus" localities of *E. epirotica* in map 64 of Willemse (1984) are omitted in the distribution map (fig. 41) given here.

DISCUSSION. Distinction of *E. epirotica* from nominate *E. chabrieri* and its allied taxa such as *schmidti* (Fieber, 1861) and *garganica* La Greca, 1959 as well as from other Greek species is discussed in Willemse (1980, 1986). However, the distinction between *E. epirotica* and *E. megastyla* (Ramme, 1939) needs an additional note. The range of *E. epirotica* borders on that of *E. megastyla*; apparently both species are parapatric. Populations of *E. megastyla* occurring close to those of *E. epirotica* become congruent in their coloration. Both species differ clearly from each other in the titillator and commonly also in the coloration of the dorsal side of head and particularly of the prozona of pronotum: in *E. epirotica* with a wide median solid black pattern (figs 33-34), in *E. megastyla* uniformly colored without such an obvious pattern (figs 37-38). In the parapatric populations of *E. megastyla*, however, the backside of head and especially of pronotum (figs 31-32) is like that of *E. epirotica*. The males are readily identified by their titillators but females lack reliable distinct characters. We found this 'black pronotum' colour variation of *E. megastyla* only in populations in the district of Aetolia/Akarnania (fig. 41): Anoxiatikon and Loutron (eastern side of Gulf of Amvrakikos) [partly collection J. Tilmans], Trifos (southwest of Amfilochia) [collection K.-G. Heller], Sklavaina (western side of Mt Akarnanika) and Mt Koutsiliaris (Achelooos Delta). The coloration of *E. megastyla* is known to be variable (figs. 37-38) (Willemse 1980; Nadig 1986) but the occurrence of solid black markings on the dorsum of the prozona of the pronotum (figs 31-32) is, as far as known, not found in other populations of this species.

***Eupholidoptera cephalonica* n. sp. (figs 4-6, 10-12, 16-18, 21-24, 28-30, 35-36, 39, 41)**

MATERIAL STUDIED. ♂ holotype, ♀ allotype, 4♂♂ paratypes: 'Hellas (Kefallinia), Mt Ainos plateau W of Tsarkanianas (550 m), 3.VII.1986, L. Willemse'; additional paratypes: Kefallinia, Limni Avikon (A.Nikolaos) (100 m) 5.VII.86, L. Willemse (3♂♂); 3-5 km S of Sami, 4.VII.86, L. Willemse (1♂, 1♀); surr. Patrikata (500 m) 4.VII.86, L. Willemse (2♀♀); surr. Neokhorion (400 m) 6.VII.86, L. Willemse (1♀); surr. Dhavgata, 7 km N of Argostolion (250 m) 4.VII.86, L. Willemse (2♂♂, 1♀); Mt Ainos (1000-1300 m) 2-3.VII.86, L. Willemse (1 juv. ♂).

DESCRIPTION. Male. General appearance robust, pronotum, elytra, legs and abdominal terminalia resembling type species, *E. chabrieri*. Hind femur 2.0-2.3 as long as pronotum. Lower inner margin of hind femur with 0-3 tiny spines.

Elytra dorsally completely covered or only just extending beyond hind margin of pronotum. Stridulatory file of left elytron: shortest distance between proximal and distad teeth 4.0-4.4 mm, greatest width of teeth 0.12 mm; number of teeth including most proximal and distal ones about 98, widest spacing in mid third of file, about 21 teeth per mm.

Last abdominal tergite (figs 23-24) slightly depressed in the middle with flattened U-shaped medial excision, on either side tapering into a short tooth pointing ventro-distal; width of median excision between one fourth to one third of the width of the tergite.

Cercus (figs 28-30) about one fourth longer than length of last tergite, slightly in- and upcurved, widest at base with strong basal tooth, tip obtusely pointed as usual in the genus; basal tooth from almost as long to twice longer than thick, tip hook-like, sharp.

Subgenital plate incised over about half its length, apical lobes slightly tapering inner margin with a slightly defined median extension (figs 16-18); tips of lobes (figs 10-12) long and slender, terminating into commonly one, but often two spines of different or sometimes equal size; styli slender, length slightly variable, roughly two thirds of cercus length.

Titillator (figs 4-6) with basal parts extending and curved laterally as in other *Eupholidoptera*; apical parts fused with median longitudinal groove, without any trace of lateral expansions ('wings'), strongly inflated and laterally convex, narrow at its base and widening distad, strongest at the base and by far less widening further distad, greatest width of the fused part less than twice its median length; apical parts terminating into divergent but slightly recurved apices, tips pointed and reaching in situ just beyond hind margin of tenth abdominal tergite.

General coloration yellowish brown. Head with face and labrum with symmetrical small black spots; occiput with some black markings separated by median line; behind antennae and eyes each a black band.

Pronotum (figs 35-36) of general colour; lateral lobe with lower margin widely yellow brown, remaining part of lateral lobe with scattered blackish brown dots, more solid black in hind part; dorsum with prozona often with inconspicuous dark brown markings but in a few specimens ranging to a narrow median black stripe divided by a yellowish median line, metazona of general colour or in some specimens with green flush; fore, lower and hind margins dark brown, on upper side blackish brown.

Elytron from dark to blackish brown, the area of Sc, R and M paler or even yellowish. Dorsum of first abdominal tergite, commonly covered by the elytra, black or dark brown. Last abdominal tergite completely and upper part of lateral side of subgenital plate black. Cercus blackish brown, particularly basally, including basal tooth. Legs with black pattern as in type species.

Female. Seventh abdominal sternite with a small protuberance in the middle of the posterior part. Subgenital plate (figs 21-22) as wide as long, ventral and lateral surfaces somewhat flattened, hind margin with a wide median excision of almost semicircular shape, apices of the lobes obtuse and slightly curled inwardly. Lateral sclerites without particulars. Ovipositor as in type species. Coloration as in male, subgenital plate with blackish flush along upper lateral margin.

Measurements (in mm): body ♂♂ 27.0-30.5, ♀♀ 27.0-29.0; pronotum ♂♂ 11.5-13.0, ♀♀ 11.8-12.5; hind femur ♂♂ 23.0-26.0, ♀♀ 25.0-29.0; ovipositor 20.3-25.2

BIOACOUSTICS. No record available.

HABITAT. Shrubby areas as usual.

DISTRIBUTION. Known only from the Ionian Island of Kefallinia (fig. 41).

ETYMOLOGY. Named after its occurrence in Kefallinia (in Greek) = Cephalonia (in Latin).

DISCUSSION. From morphological characters and distribution it is clear that *E. epirotica* and *E. cephalonica* are sister species. Reliable and consistent features to separate both species are the male titillator and cercus, the female subgenital plate and in both sexes the coloration of the pronotum. The fused part of the titillator in the new species tapers more abruptly near the base while in *E. epirotica* this part tapers over most of its length and looks thus more slender and elongate. The basal tooth of the male cercus in the new species is less thickset, slightly narrower and thus more slender than in *E. epirotica*. The median incision of the female subgenital plate in the new species is distinctly wider and more shallow than in *E. epirotica* but more conspicuously different are the tips of the apical lobes of the female subgenital plate which are simply obtusely angled in *E. epirotica* but peculiarly curved inward in the new species. The difference between *E. cephalonica* and *E. epirotica* in coloration of the backside of the pronotal prozona is commonly obvious but may approach each other exceptionally (figs 33-36). Distinction with other members of the genus offers no special problems.

The Ionian Islands are biogeographically interesting by their endemics of *E. leucasi* and *E. cephalonica* as well as by the transjonian distribution of *E. chabrieri garganica* in the Gargano area of Italy (Willemse 1980; Massa 1999). Like *E. epirotica* and *E. cephalonica* are sister species, the same is true for *E. chabrieri garganica* and *E. leucasi*. For convenience of the reader a distribution map (fig. 41) is given recording all taxa of the genus known from the Ionian Islands from Kerkira to Zakynthos and the opposite part of continental Greece. The localities are updated and based on the very few reliable records in the past and mainly on recently studied material (see legend of fig. 41). The distinction between *garganica* and *schmidti* in their zone of contact is arbitrary, an argument to consider these taxa subspecies of the *E. chabrieri* complex.

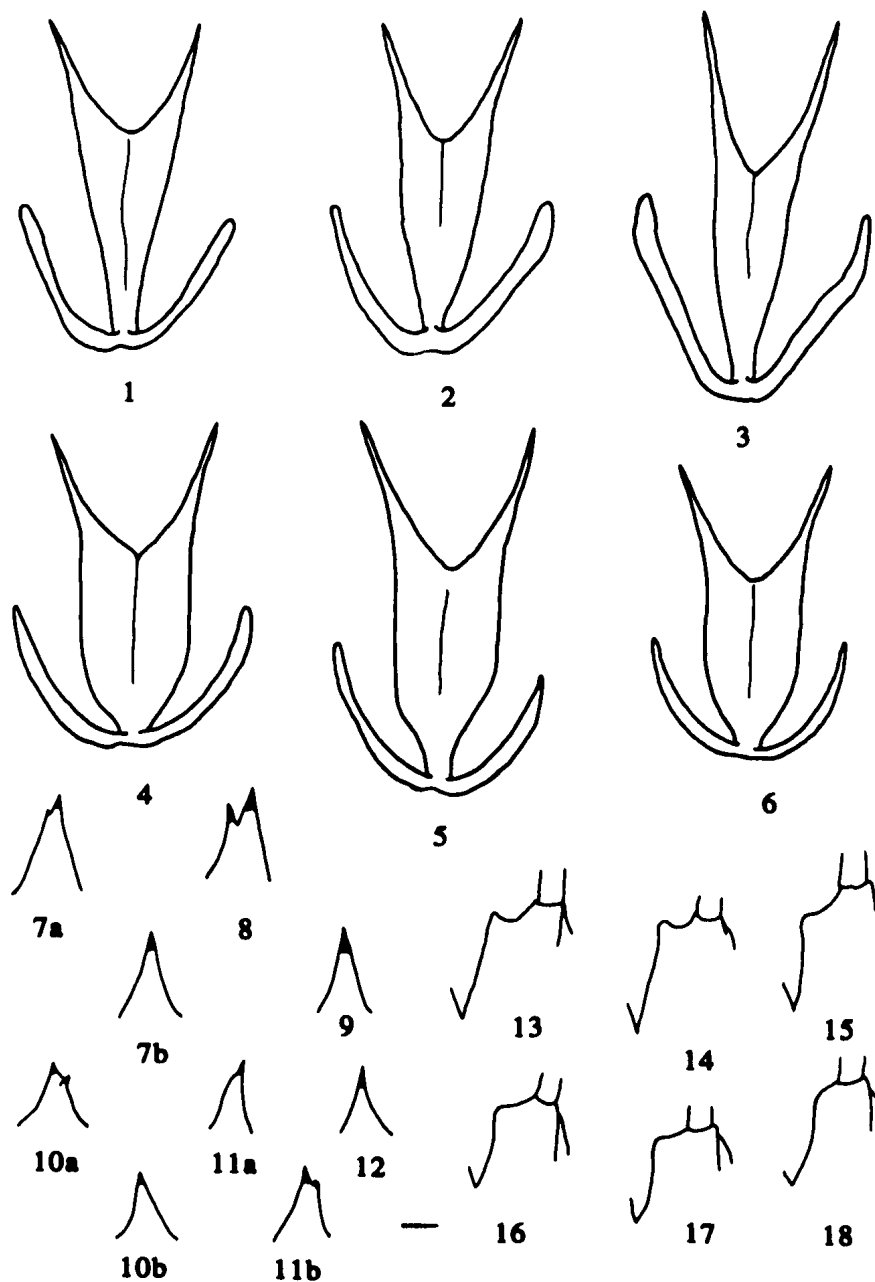
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Many thanks to Jos Tilmans and Klaus-Gerhard Heller for their distribution data and the latter also for providing the oscillogram.

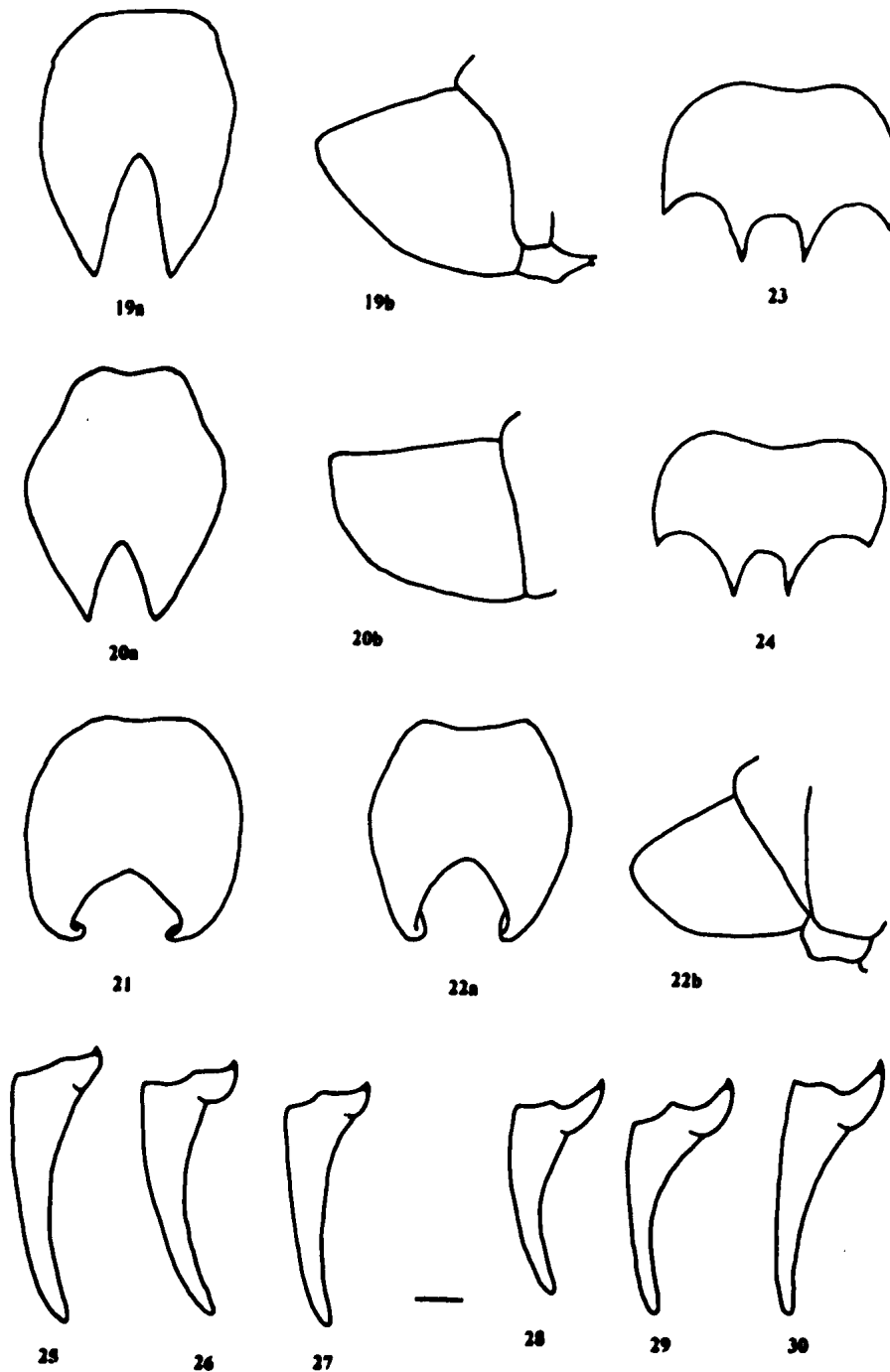
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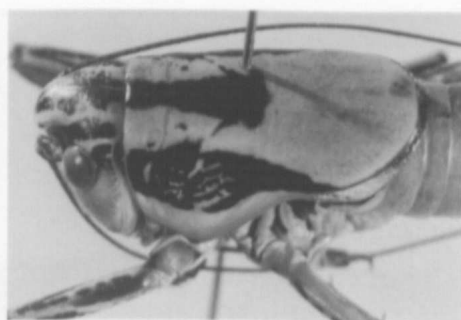
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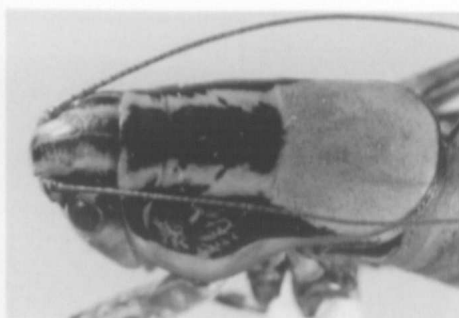
Figs 1-18. *Eupholidoptera* species, male. 1-3 - titillator in *E. epirotica* (1 from Babini, 2 from Mitikas, 3 from Loutrakion); 4-6 - same in *E. cephalonica* (4 from Dhavgata, 5 from plateau Mt Ainos, 6 from Limni Avigon); 7-9 - apical armature of lobes of subgenital plate in *E. epirotica* (7a-7b left and right lobe, from Mt Akarnanika, 8-9 from Thirion); 10-12 - same in *E. cephalonica* (10a-b right and left lobe, from Sami, 11a-b, right and left lobe, from Dhavgata, 12 from Limni Avigon); 13-15 - inner margin of right lobe of subgenital plate between base of stylus and deepest point of median incision, showing more or less developed median protuberance, in *E. epirotica* (13 from Aktion, 14-15 from Drimon); 16-18 - same in *E. cephalonica* (16 from Limni Avigon, 17-18 from plateau Mt Ainos). Scale = 1 mm in figs 1-6 and 13-18, 0.5 mm in figs 7-12.



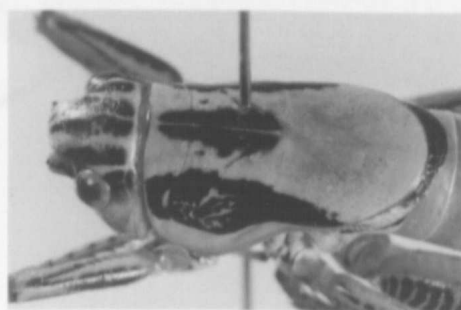
Figs 19-30. *Eupholldoptera* species. 19-20 - female subgenital plate in ventral (a) and lateral (b) view of *E. epirotica* (20 from Drimon, 21 from Thirion); 21-22 - same in *E. cephalonica* (21 from Neokhorion, 22 from Dhavgata); 23-24 - male last abdominal tergite in dorsal view in *E. cephalonica* (23 from Sami, 24 from plateau Mt Ainos); 25-27 - left male cercus in dorsal view in *E. epirotica* (25 from Mitikas, 26 from Aktion, 27 from Babini); 28-30 - same in *E. cephalonica* (28-29 from plateau Mt Ainos, 30 from Limni Avigon). Scale = 1 mm.



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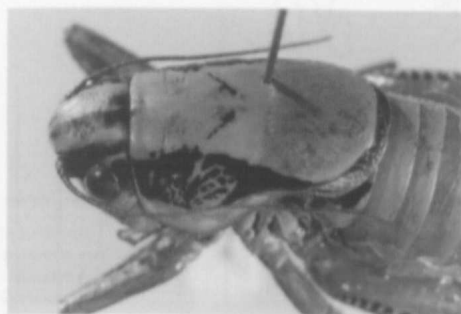
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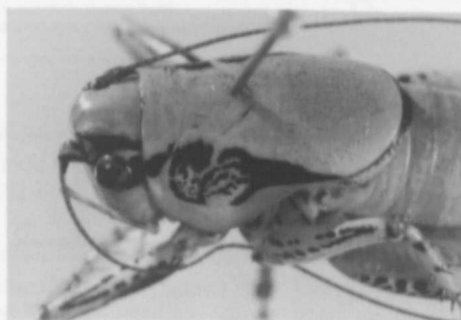
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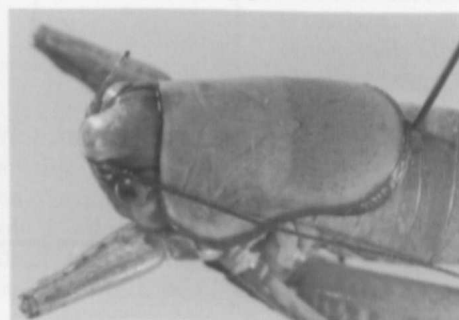
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Figs 31-38. *Eupholidoptera* species, pronotum in dorso-lateral view, showing minimum to maximum degree of black coloration: 31-32 - *E. megastyla*, aberrant color form from Sklavaina; 33-34 - *E. epirotica* from Loutrakion; 35-36 - *E. cephalonica* paratypes from Dhavgata; 37 - *E. megastyla* topotypical form from A. Nikolaos, Zakynthos; 38 - *E. megastyla* forma *willemsi* topotype from Achladokambos.

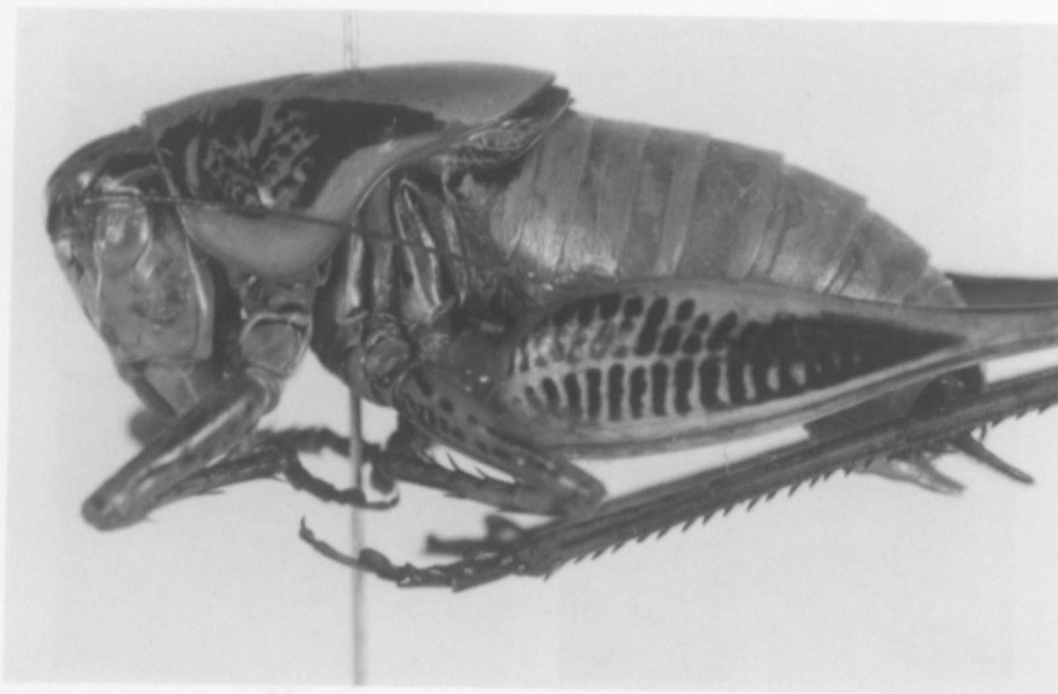


Fig. 39. *Eupholidoptera cephalonica* n. sp., holotype.

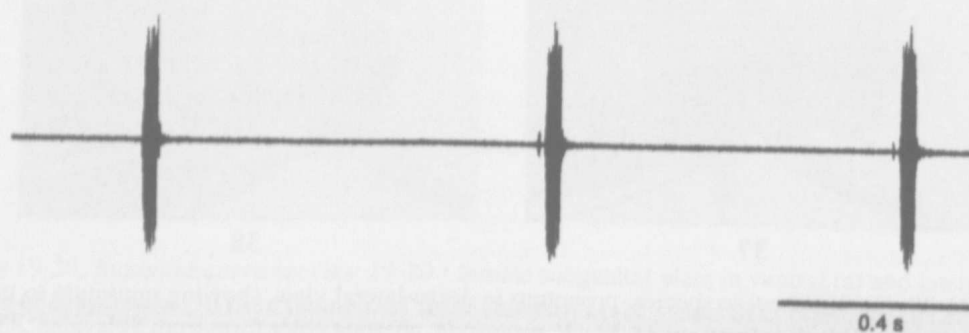
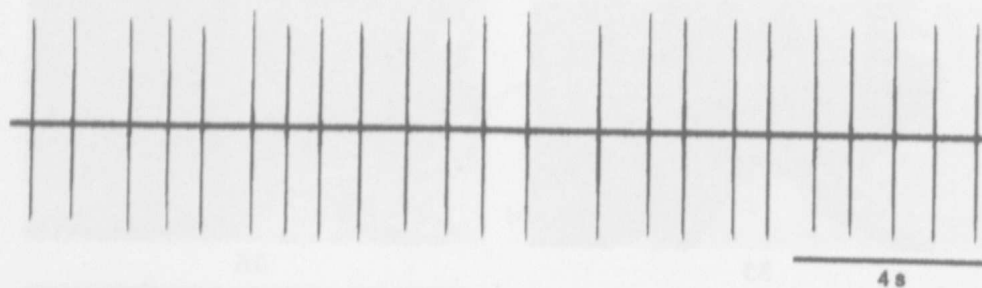


Fig. 40. *Eupholidoptera epirotica*, oscillogram of male calling song, collected 27.VII.1987 in Mt Akarnanika above Thirion; record of isolated specimen, in cage, 30.VII.1987, air temp. 27° C, 22.00 local time, almost dark.

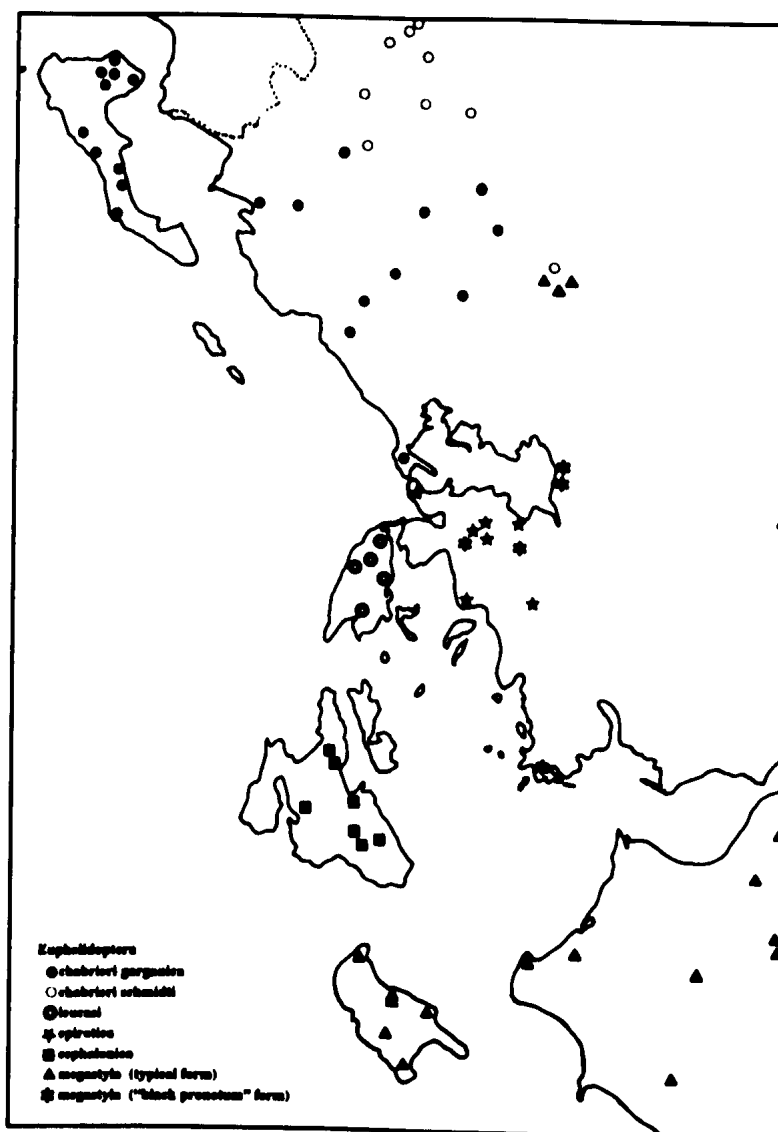


Fig. 41. Distribution map of *Eupholidoptera* species of the Ionian Is. and opposite continental Greece from few data in Ramme (1939) and Kaltenbach (1967), and many data from material in coll. Willemse, J. Tilmans and Kl.-G. Heller.

Localities summarized:
E. chabrieri garganica: Kerkira (Perithea 500 m; Gimarion 50 m; Gazatika 20 m; Limni Antinoti; Tsaki 100 m; Limni Korission; Petaliu 500 m; Pelekas 100 m; Laskion 100 m; Bentizes); Thesprotia (Igoumenitsa; Gliki; 2 km W of Karitiani near Thiamis river; Mt Soulion; Preveza (Panaiyia; Koroni; Nikopolis); Ioannina (Mt Tomaros; Dodoni; Vrosina; Kalentzi 8 km

N; Koutseli, S. of Ioannina). *E. chabrieri schmidti*: Ioannina (Botzaras, Ieromnimi, S of Kouklia, Asfaka, Kalpakion; Aristi; Papigon; Vitsa; Mt Mitsikeli); Arta (Katarraktis, Mt Tzoumerka). *E. leucasi*: Lefkas (Ano Exanthia; Nikiana (N of Nidhriou); Lefkas town (coll. K.-G. Heller); Episkopos, 4.5 km W. Spanokhori, 4 km NE Vasiliki (all coll. J. Tilmans). *E. epirotica*: Aitolia/Akarnania (Loutrakion; Babini; Aktion; Mitikas; Monastirakion; Thirion; Mt Akarnanika). *E. cephalonica*: Kefallinia (Mt Ainos plateau W of Tsarkamanas; Mt Ainos 1000-1300 m; Limni Avikon near A. Nikolaos; 3 km S Sami; Patriata; Neokhorion; Dhavgata, 7 km N of Argostolion). *E. megastyla* typical form: Zakynthos (Zakinthos town, type; Limni Keriou; Alikanas; A. Nikolaos; cape Skinari; Kato Gerakari); Iliia (Killini town; Lechena; Platanos-Pelopion near Pargos); Akhaia (Portes-Kharavyi, Mt Skollis; Mt Panakhaikon, Zastova-Psarthri; Mt Erimanthos, Kalentzi and A. Pandon-Alepkhorion; Khalandritsa); Evritania (Timfristos); Arta (Ramia-Livadion; Mt Tzoumerka W and SW of Theodoriana). *E. megastyla* aberrant colour form with black occiput and wide black median pattern of the backside of the pronotal prozona: Aitolia/Akarnania (Koutsiliaris hill, Acheloos Delta; Sklavaina; Trifos (coll. K.-G. Heller); Loutron (coll. J. Tilmans); Anixiatikon-Katafourka).

Authors' addresses:

F. Willemse, L. Willemse, Laurastraat 67, Eygelshoven 6471 JH, The Netherlands.
E-mail: fer.willemse@worldonline.nl
