

A REVIEW OF THE SPECIES OF *ACROMETOPA* FIEBER, 1853
(ORTHOPTERA, TETTIGONIOIDEA, PHANEROPTERINAE) WITH SPECIAL
REFERENCE TO THE GREEK FAUNA

by

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ABSTRACT

The characters previously used for the distinction of the species of *Acrometopa* are reviewed and modified differential diagnoses are given. Neotypes for *A. macropoda* (Burmeister) and *A. servillea* (Brullé) and a lectotype for *A. syriaca* Brunner von Wattenwyl are designated. From the Aegean island of Icaria *A. cretensis daedali* nov. subsp. is described, and a key to the species and subspecies is given. The geographical variation within *A. macropoda* is described and discussed. A critical review of previous records in literature, together with the addition of new distributional data from Greece, has brought more logic in the known distributional pattern of the species.

INTRODUCTION

During the examination of a rich material of *Acrometopa* from Greece it became apparent that certain characters which had been considered of diagnostic value for the distinction of the species were not reliable. Moreover, evidence was found that the geographical variation in *Acrometopa macropoda* is considerably larger than was understood previously.

These conditions induced a renewed evaluation of the diagnostic characters of the taxa within the genus and a review of their differential diagnoses. The present paper gives the results of this study, which includes a re-examination of the type-material of most of the species involved. In addition an attempt is made to clarify the hitherto somewhat erratic picture of the distribution of the species.

MATERIAL AND ACKNOWLEDGEMENTS

The material on which this paper is based consists of 188 ♂ and 150 ♀ specimens in the author's collection (CW). Most of this has been collected in Greece by the author himself and his son Lucas in the years 1966 and 1969 to 1977, between the 1st of July and the 11th of August. In addition 64 ♂ and 43 ♀ specimens were borrowed from the institutions listed below (the abbreviations used in the following text are given in parentheses) :

Naturhistorisches Museum, Wien (NMW); Instituut voor Taxonomische Zoölogie, Amsterdam (ZMA); Istituto Politecnico di Biologia Animale, Catania (IBA); British Museum (Natural History), London (BMNH); Hope Department of Entomology, University Museum, Oxford (HMO); Natuurhistorisch Museum, Maastricht (NMM).

For the loan of material thanks are due to Dr. A. Kaltenbach, Vienna, Dr. G. Kruseman, Amsterdam, Dr. M. La Greca, Catania, Mrs. L. Pitkin, London, and Dr. C. O'Toole, Oxford. For valuable information on type-material I am much indebted to Dr. M. Descamps, Paris, and Dr. M. Dohrn, Halle-Wittenberg, and to the Institut für Pflanzenschutzforschung, Eberswalde (DDR).

SYSTEMATIC PART

Acrometopa Fieber, 1853

Acrometopa Fieber, 1853: 172; Brunner von Wattenwyl, 1878: 14, 85; 1882: 189, 246; 1891: 5; Ramme, 1927: 119; Bei-Bienko, 1954: 56, 121; Harz, 1969: 8, 18.

Type-species: *Phaneroptera macropoda* Burmeister, 1838.

Description. — A general description of the genus can be found in the references listed above. Some additional information, however, is required.

In the fore wing of the male the basal parts of the radial and medial areas have a series of sinuate and about parallel transverse veins with interspaces almost completely transparent and lacking the archdictyon which occupies the remainder of the wing (figs. 1-2). The bases of the anal, Cu2 and Cu1b areas are transformed into the stridulatory apparatus (figs. 4-5). The Cu2 vein of the left wing has become the stridulatory file (figs. 8-13). The file is slightly arcuate both horizontally and vertically, and divided into a wider anterior part with less numerous coarse teeth and a narrower posterior part with numerous, closely set fine teeth. The Cu2 vein of the right wing, often with traces of teeth, is strongly convex ventrally and bears in its middle a strongly sclerotized knob (figs. 6-7). Origin and function are unknown. The greater

part of the Cu1b area of the right wing is transformed into the mirror, and part of the hind margin of the wing, opposite the posteroproximal border of the mirror, into the scraper. Whereas the surfaces of the anal, Cu2 and Cu1b areas of the left wing are almost similar and horizontal, the conditions in the right wing are different. In the latter the Cu2 and Cu1b areas are obliquely vertical as a result of the convex course of the Cu2 vein.

In the female the fore wing is much shorter than in the male. The radial and medial areas are not modified as conspicuously as in the male and the archedictyon covers the whole wing (fig. 3). The stridulatory apparatus consists of series of small spines on the dorsal surface of the veins near the hind margin of the cubito-anal areas of the right wing.

The general colour of the male is bright green; the female is darker green, often with a bluish tinge. Brown specimens may occur but are very rare.

Distribution. — The range of the genus includes Corse, Sardegna, Sicilia, Italy, the coastal areas of Yugoslavia and Albania, Greece, Turkey, Cyprus, Syria, the Lebanon and Israel, and extends into Iraq and Egypt.

In the lists of material of the species the Greek localities are numbered, referring to the distribution map. The transcription of the Greek names is brought in accordance with the system adopted by the Permanent Committee on Geographical Names for British Official Use, London.

Stridulation. — Since the morphology of the male stridulatory file is quite different in various species, one might expect differences in the stridulation accordingly. We have heard the song of *Acrometopa macropoda*, *A. servillea*, *A. syriaca* and *A. cretensis* but without direct comparison we could not notice any dissimilarity.

The song of *Acrometopa* is quite characteristic. It lasts about five to ten seconds and ends in a peculiar, sharp metallic click which is characteristic for the genus. It is heard most frequently during twilight and in the night.

Krauss (1878: 502) compared the song of *Acrometopa macropoda* with that of *Tettigonia cantans*

(Fuessly). However, the sound of *A. macropoda* is by far not as loud as that of *T. cantans* and quite more frequently interrupted. The remarks by Burr (Burr, Campbell & Uvarov, 1923: 126) are more exact. He compared the timbre and nature of the song of *A. servillea* with that of *Phaneroptera*, *A. servillea* stridulating relatively louder and stronger.

Specific characters and classification. — In his revision of the genus Ramme (1927) emphasized the diagnostic value of a number of characters, viz. the shape and the apical structure of the male cercus, the shape of the male subgenital plate, the length and shape of the wings in both sexes, the length and curvature of the ovipositor and the presence or absence of a small triangular projecting lobe at the base of the ovipositor.

In the course of the present study it became apparent that, due to a wide intraspecific variation, some of these characters are not reliable. The shape of the male subgenital plate cannot be used to distinguish *A. italica*, *A. macropoda* and *A. servillea* from each other. The same applies to the length and shape of the wings, although the female of *A. cretensis* is distinguished by comparatively longer hind wings. Particulars of the ovipositor which were supposed to be distinctive by Ramme (1927: figs. 8a-8e) are actually subject to considerable infraspecific variation. However, the projecting lobe at the base of the ovipositor is a reliable feature. The shape of the male cercus and the structure of its apex have proved to be the most useful and reliable diagnostic characters in the genus.

A further diagnostic feature is provided by the morphology of the male stridulatory file. This serves well for separating the males of *A. macropoda*, *A. italica* and *A. servillea* (figs. 10-11), from *A. syriaca* (figs. 8-9) and *A. cretensis* (figs. 12-13), but cannot be used for the distinction of the three first mentioned species.

With the aid of the characters mentioned the species of *Acrometopa* can be separated satisfactorily, although the distinction between the females of *A. italica*, *A. macropoda* and *A. syriaca* remains doubtful. The general habit of *A. syriaca* is usually more robust, and *A. italica* is generally

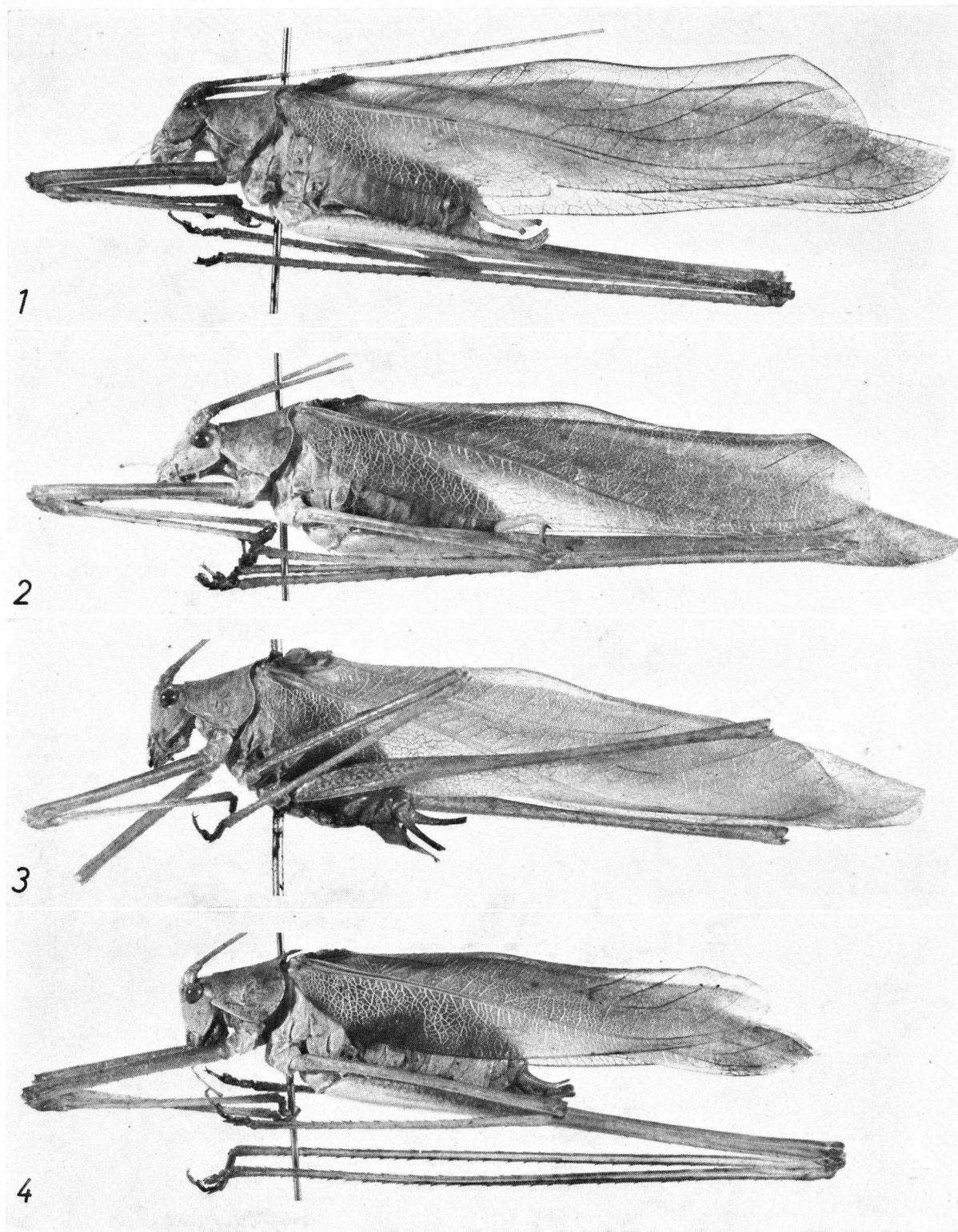


Plate I figs. 1-4. *Acrometopa*: 1, *A. macropoda* (Burmeister), neotype; 2, *A. servillea* (Brullé), neotype; 3, *A. syriaca* Brunner von Wattenwyl, lectotype; 4, *A. cretensis daedali* ssp. n., paratype.

somewhat smaller than *A. macropoda*. However, robust female specimens of *A. macropoda* from Istra and slender females from northwestern Greece are indistinguishable from *A. syriaca* and *A. italica*, respectively.

On account of the structure of the cercus, the subgenital plate and the stridulatory file of the male three groups of species can be distinguished, viz.

- (1) *A. italica*, *A. macropoda* and *A. servillea*,
- (2) *A. syriaca*,
- (3) *A. cretensis cretensis* and *A. cretensis daedali*.

The species of the first group have a parallel-sided subgenital plate and a very characteristic stridulatory file, and the tip of the cercus is excavate: weakly in *A. italica*, moderately in *A. macropoda* and strongly in *A. servillea*. The species of the second and third groups differ from those of the first in the subgenital plate which narrows apically, and the solid tip of the cercus. The cercus is provided with two minute teeth in the second, and simply pointed in the third group. The most characteristic differences between the three groups are found in the structure of the stridulatory files.

Juvenile specimens in their last instar may be identified by particulars of the male cercus and the lobe at the base of the ovipositor, which are already recognizable.

KEY TO THE SPECIES AND SUBSPECIES OF
ACROMETOPA

- 1. ♂ stridulatory file either in the anterior half with three, or near the middle with two sinuate elevations and depressions (figs. 10-13) 2
- ♂ stridulatory file in anterior half with very coarse, widely and regularly spaced teeth, without such elevations and depressions (figs. 8-9); ♂ cercus slightly incurved apically (fig. 42), terminating into a pair of minute, solid teeth (figs. 65-66); ♂ subgenital plate with lobes distinctly narrowing apically (fig. 31); ♀ without distinctly extending lobe between gonangulum and subgenital plate (fig. 26) (Egypt, Israel, the Lebanon, Syria, Iraq, Cyprus, Turkey, eastern Aegean islands, Greece: Thraki and Makedhonia, map) . *A. syriaca* Brunner von Wattenwyl
- 2. ♂ stridulatory file with two sinuate elevations and depressions in the middle (figs. 10-11); ♂ cercus with tip excavate, apical margin lamelliform (figs. 45-46); ♂ subgenital plate with lobes about parallel-sided (figs. 28-30); ♀ hind wing not extending beyond tip of fore wing 4
- ♂ stridulatory file with three sinuate elevations and depressions in anterior half (figs. 12-13); ♂ cercus with apex solid and pointed (figs. 43-44); ♂ subgenital plate

- with lobes slightly narrowing apically (figs. 32-33); ♀ hind wing extending beyond tip of fore wing . . . 3
- 3. ♂ cercus longer, strongly and evenly incurved all over its length (fig. 43) (Kriti and western Kiklâdhes, map) *A. cretensis cretensis* Ramme
- ♂ cercus shorter, abruptly and almost rectangularly incurved just beyond middle of length (fig. 44) (Ikaria, map) *A. cretensis daedali* ssp. n.
- 4. ♂ cercus in apical fourth moderately to rectangularly incurved (figs. 34-40), tip wider and distinctly excavate with lamelliform margin terminating into a hollow, beak-shaped process (figs. 45-61); ♀ with or without a distinctly extending lobe between gonangulum and subgenital plate (figs. 15-23) 5
- ♂ cercus in apical fourth slightly incurved (fig. 41), tip narrower and slightly excavate with lamelliform margin without beak-shaped terminal process but simply dentate (figs. 62-64); ♀ always without distinctly extending lobe between gonangulum and subgenital plate (figs. 24-25) (Corse, Sardegna, Sicilia, Italy, Dalmatia?) *Acrometopa italica* Ramme
- 5. ♂ cercus strongly, almost rectangularly incurved apically (figs. 38-40), with apex strongly excavate and lamelliform margin terminating in a long, beak-shaped, hollow process which is as long as or usually longer than the greatest width of apex of cercus (figs. 56-61); ♀ with a distinctly extending, roughly triangular lobe between gonangulum and subgenital plate, its size not smaller than in figs. 20-23 (from Syria, through Anatolia, the central and northern Aegean islands, into the Greek mainland east of a line running over the Pindhos range and, in same direction further southeastward, map) *Acrometopa servillea* (Brullé)
- ♂ cercus less incurved (figs. 34-37), apex less excavate with beak-shaped process shorter (figs. 45-55); ♀ usually without, but in southern Greece with a small extending lobe between gonangulum and subgenital plate, its size never larger than in figs. 15-19 (from Istra along the Adriatic coast of Yugoslavia and Albania, Ionian islands and western Greece, west of range of *A. servillea*, Gargano area of Italy, map) *Acrometopa macropoda* (Burmeister)

***Acrometopa macropoda* (Burmeister, 1838)**

(figs. 1-3, 15-19, 28, 34-37, 45-55, pl. I fig. 1, map)

Phaneroptera macropoda Burmeister, 1838: 689; Fischer, 1854: 237.

Phaneroptera dalmatina Serville, 1839: 415; Fischer, 1854: 237.

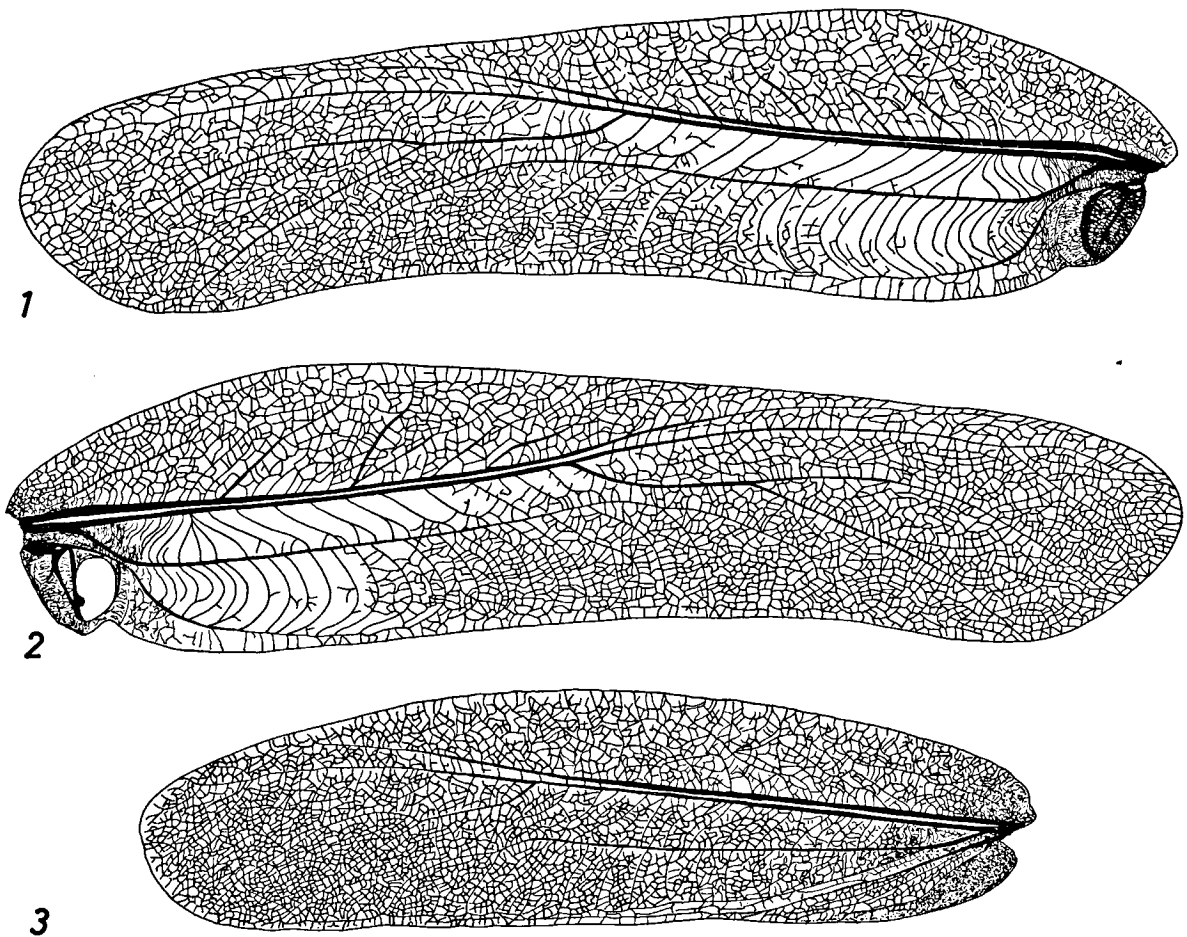
Acrometopa macropoda macropoda: Ramme, 1927: 121, figs. 5b-8b, 9.

Acrometopa macropoda; Uvarov, 1935: 75; La Greca, 1959: 101, fig. 113.

Acrometopa servillea; Brunner von Wattenwyl, 1878: 86; 1882: 290; Werner, 1902: 117; 1927: 428; Ramme, 1927: fig. 9; Werner, 1937a: 145; Bei-Bienko, 1954: 123 (all partim); Čejchan, 1963: 766.

Acrometopa italica; Kaltenbach, 1967: 189.

Material studied. — ♂ neotype, labelled: Jugoslavia (Crna Gora) Kotor 10 m 3.VIII.1963, F. Willemse (ZMA).



Figs. 1-3. Fore wing of *Acrometopa macropoda* (Burmeister) (Arkadhía, Trípolis), dorsal view: 1, left wing of ♂; 2, right wing of ♂; 3, left wing of ♀.

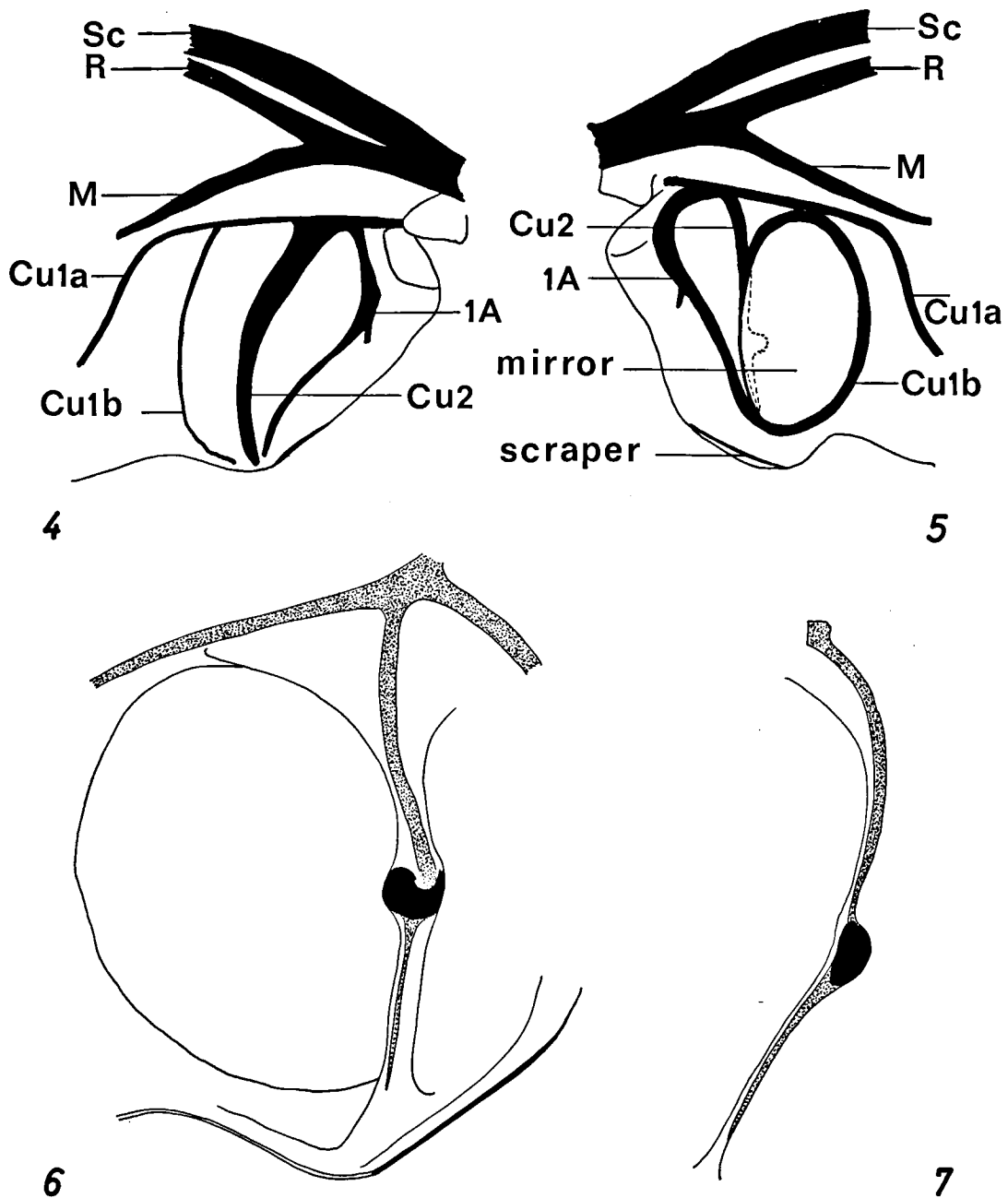
Yugoslavia: Istra: 2 km ESE of Valtura, 14.VII.1966, 7 ♂, 4 ♀; 2 km W of Labin, 15.VII.1966, 1 ♀; 4 km NW of Vižinada, Mirna-Valley, 12.VII.1966, 1 ♀ (all ZMA); Učka, VII.1965, C. v. Demelt, 1 ♂; Kanegra, VII.1966, C. v. Demelt, 2 ♀ (both CW); Dalmatia: —, 1 ♂, 2 ♀ (BMNH); Brazza (= Brač), San Pietro — Neresi, 20.VII.1912, 1 ♀ (BMNH); Montenegro: Mucha, 1 ♂; Krstač, 40 km NW of Nikšić 1000 m, 5.VIII.1968, Willemse c.s., 1 ♂ (both CW).

Italy: Is. Tremiti, S. Domino, 22.VI.1955, La Greca, 1 ♀; Gargano, Sannicandro, 27.V.1957, La Greca, 1 ♂ (both IBA), 4.VII.1977, F. & L. Willemse, 1 ♂, 1 ♀ (CW).

Albania: Çajup, 1.VIII.1935, A. G. H. Alston, 1 ♂ (BMNH).

Greece: Kérkira: (1a) Lake Antinioti, 2 ♂, 1 ♀; (1b) Lávkion, 1 ♂; (1c) Kassiópi, 1 ♂; (2a) Períthia, 5 ♂, 3 ♀; (2b) Petália, 1 ♂, 1 ♀; (2c) Yimáriorion, 5 ♂; (3) Gazátika, 6 ♂, 2 ♀; (4a) Kastellánoi, 1 ♂ (all CW); (4b) Benítzai (= Benitzes), 24.VII.1965, A. Kaltenbach, A. italica Ramme det. A. Kaltenbach, 1 ♀ (NMW); (5) Lake Korissíon, 1 ♀; Levkás: (6) Nikiána, N of Nidríon, 3 ♂, 5 ♀; (7) Áno Exánthia, 5 ♂, 9 ♀; Ioánnina: (8) river Sarandáporos, N of

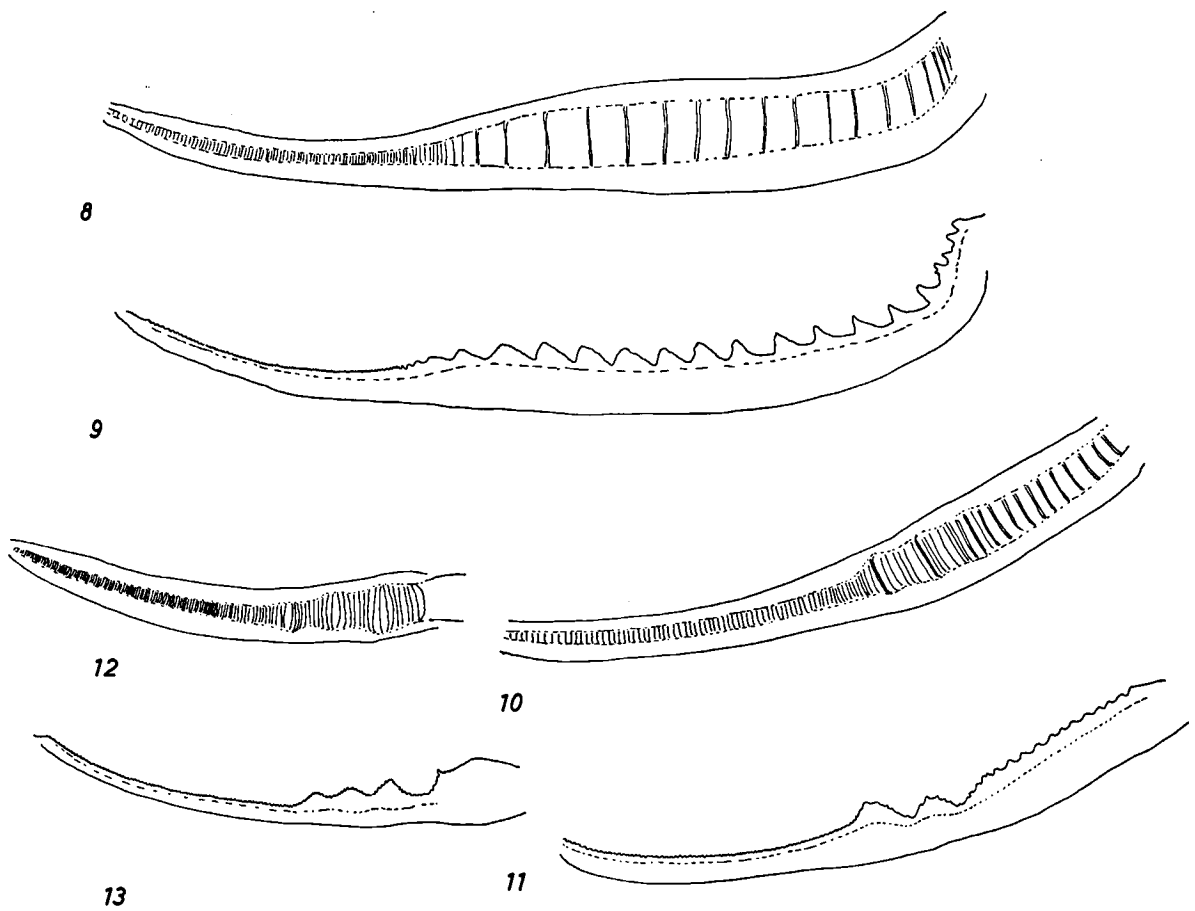
Kónitsa, 1 ♂; (9) Kalpáktion, 2 ♀; (12) Asfáka, 2 ♀; (11) Méga Peristérión, 1 ♀ (all CW); (10) Arísti, 700 m, 2.VIII.1973, La Greca, 1 ♀ (IBA); (13) Koutselión, 1 ♂; (14) Kaléntzion, 1 ♀; Árta: (15) Ramía-Livádhion, 1 ♂; Préveza: (16) Panayía, 1 ♀; Aitolía-Akarnanía: (17) Áktion, 1 ♂, 2 ♀; (18) Kokkinokhóri, 7 ♂, 5 ♀; Evritanía: (19) Proussós, 1 ♂; (20) Timfristós, above the village, 1 ♂, 2 ♀; Fokís: (21) Strómi-Moussounítsa, 1 ♀; Voiotia: (22) Mt. Parnassós, plateau above Arákhova, 5 ♂, 3 ♀ (all CW), 17.VII.1975, J. P. Duffels, 1 ♂ (ZMA), — (= Parnass), Krüper, coll. Br. v. W., *Acrometopa servillea* Brullé det. Br. v. W., 1 ♂, 1 ♀ (NMW); Akhaía: (23) Mt. Panakhaikón, above Romanoú, 1 ♀, above Zástova, 3 ♂, 1 ♀ (CW), 1200 m, 19.VIII.1973, La Greca-Messina, 1 ♂ (IBA); (24) Dhiakoptón, VII.1938, O. Grebenschikoff, 1 ♂, 1 ♀ (BMNH); (25) Mt. Aroánia, Káto Lousoi, above Kalávrita, 1 ♀; (26) Aroánia village, 3 ♂, 2 ♀; (27) Kaléntzi, 1 ♂, 5 ♀; (28) Skiadhá, 2 ♂; (29) Potamía, 2 ♀; Ilía: (30) Mármara, 1 ♂, 2 ♀; (31) Lálas, 2 ♀; (32) Lekhainá, 1 ♂; (33) Kallithéa, 4 ♂, 6 ♀; (34) Figalía, ruins Vassae, 7 ♂, 3 ♀; Arkadhía: (35) Vlákhoi, 1 ♀; (36) Ipsóus, 3 ♂, 1 ♀; (37) Karítaina-Róvia, 4 ♂, 4 ♀; (38) Khrisovítsi, 5 km E-12 km W, 4 ♂,



Figs. 4-7. Male stridulatory organ of *Acrometopa*: 4-5, dorsal view of base left (4) and right (5) fore wing; 6-7, Cu2 — vein of right fore wing in ventral view (6) and profile (7). (1A = first anal; Cu = cubitus; M = medius; R = radius; Sc = subcosta).

5 ♀; (39) Kardhará, 2 ♂, 1 ♀; (40) Trípolis, 3 km E & 5 km W, 27 ♂, 10 ♀ (all CW), 3-8 km NW, 800 m, 13.VII.1975, J. P. Duffels, 1 ♂, 1 ♀ (ZMA); Messínia: (41) Kámpos, 3 ♂, 9 ♀ (CW), VI.1901, Höltz, 1 ♂ (NMM); (42) Exokhóri (= Xechori), 5.VI.1937, F. Werner, *Acrometopa servillea* Brullé det. Werner, 1 ♂, 1 ♀ (NMW); (43) Kalámai-Spárti, 2 ♂; Lakonía: (44) Mistrás,

1 ♀; (45) Tópitza, above Anóyia, 5 ♂, 11 ♀ (all CW); (46) Monemvasía, 25.V.1937, F. Werner, *Acrometopa servillea* Brullé det. Werner, 2 ♂ (NMW); Argolís: (47) E of Akhladhókambos, 2 ♂, 2 ♀ (CW); Kíthira: (48) — (= Kythira = Cerigo), *Acrometopa servillea* Brullé det. Br. v. W., 1 ♂, 1 ♀, 27.V.1937, F. Werner, *Acrometopa servillea* Brullé det. Werner, 1 ♂ (NMW).



Figs. 8-13. Male stridulatory file of *Acrometopa*, ventral view (even numbers) and profile (odd numbers): 8-9, *A. syriaca* Brunner von Wattenwyl (Piéria, Litókhoron); 10-11, *A. servillea* (Brullé) (ibidem); 12-13, *A. cretensis daedali* ssp. n. (paratype).

Diagnosis. — ♂: Stridulatory file in the middle with two sinuate elevations alternating with depressions (figs. 10-11). Cercus in apical fourth moderately incurved (figs. 34-37); apex excavate, lamelliform margin terminating in a beak-shaped process of moderate length (figs. 45-55). Lobes of subgenital plate parallel-sided (fig. 28).

♀: Hind wing not extending beyond tip of fore wing. Lobe between gonangulum and subgenital plate vestigial to moderately developed (figs. 15-19).

Variation. — Throughout most of its range this species shows little variation. The apex of the male cercus varies in width (figs. 48, 50) but the general shape of the beak-shaped tip of the lamelliform margin is fairly constant (figs. 45-50). Also

the lobe between the gonangulum and the subgenital plate of the female is invariably vestigial (figs. 15-17).

The material from the Pelopónnisos, however, presents a considerable clinal variation. In the male the beak-shaped tip of the cercus is apparently longer and more slender, the minute teeth of the lamelliform margin are situated more ventrally, and the apical incurvation of the cercus is slightly stronger. This variation is shown in figs. 35-37 and 51-55 which were made from material collected at localities ranging from the northwest to the southeast of the Pelopónnisos.

Similarly the females from these localities differ from the typical specimens of *Acrometopa macropoda* in having a moderately developed lobe between the gonangulum and the subgenital plate

(figs. 18-19), although the size of the lobe does not attain that seen in *Acrometopa servillea*.

Distribution. — The range of the species covers Istra, the Adriatic coastal areas of Yugoslavia and Albania, the Gargano area of Italy, the Ionian islands and the western part of Greece and the Pelopónnisos eastward as far as a line indicated by the highest regions of the Píndhos range and farther southeastward in about the same direction, reaching the island of Kíthira (distribution map).

Remarks. — With the aid of the illustrations of the cercus both typical and atypical males of *Acrometopa macropoda* are easily distinguished. The same applies to atypical females. However, the female in its typical form cannot be properly distinguished from females of *Acrometopa italica* or *Acrometopa syriaca*.

The type-material of *Phaneroptera macropoda* could not be traced, neither in the Institut für Pflanzenschutzforschung (formerly Deutsches Entomologisches Institut), Eberswalde (in litt. 15.III.1977), nor in the Burmeister collection, preserved in the Zoological Department of the Martin-Luther-Universität, Halle-Wittenberg (M. Dohrn, in litt. 14.X.1977). The specimen may be considered lost, and designation of a neotype (pl. I fig. 1) was necessary. The type-locality, Dalmatia, is restricted here to Kotor (= Cattaro), a town which was part of Dalmatia at the time of Burmeister. The measurements of the ♂ neotype are (lengths in mm): body 24.0; pronotum 5.8; fore wing 36.0; hind wing 40.0; hind femur 30.2.

Since Fischer (1854) *Phaneroptera dalmatina* Serville, 1839, has been considered a synonym of *Acrometopa macropoda*. This synonymy is questionable, however, because both *Acrometopa macropoda* and *Acrometopa italica* have been recorded from Dalmatia, the type-locality of Serville's species. Unfortunately, the matter cannot be settled because the Serville's type-material is presumably lost (M. Descamps, in litt. 7.II.1977).

Previous records of *Acrometopa macropoda* as understood here were given under various names: *Acrometopa macropoda*, *Acrometopa servillea* and *Acrometopa italica*. A particular case to be mentioned is Beï-Bienko (1954), who based his

description of *Acrometopa servillea* on four specimens, 2 ♂ and 1 ♀ from Kíthira and 1 ♂ from Kérkira. The Kíthira material had been identified as *Acrometopa servillea* by Brunner von Wattenwyl, and apparently on account of similarity Beï-Bienko considered the Kérkira male conspecific with the Kíthira material. His comments upon this material are correct, and agree completely with the material from both localities at hand (figs. 48-49, 55). Presumably for similar reasons Čejchan (1963) assigned his Albanian material to *Acrometopa servillea*.

Acrometopa servillea (Brullé, 1832)

(figs. 10-11, 20-23, 29, 38-40, 56-61, pl. I fig. 2, map)

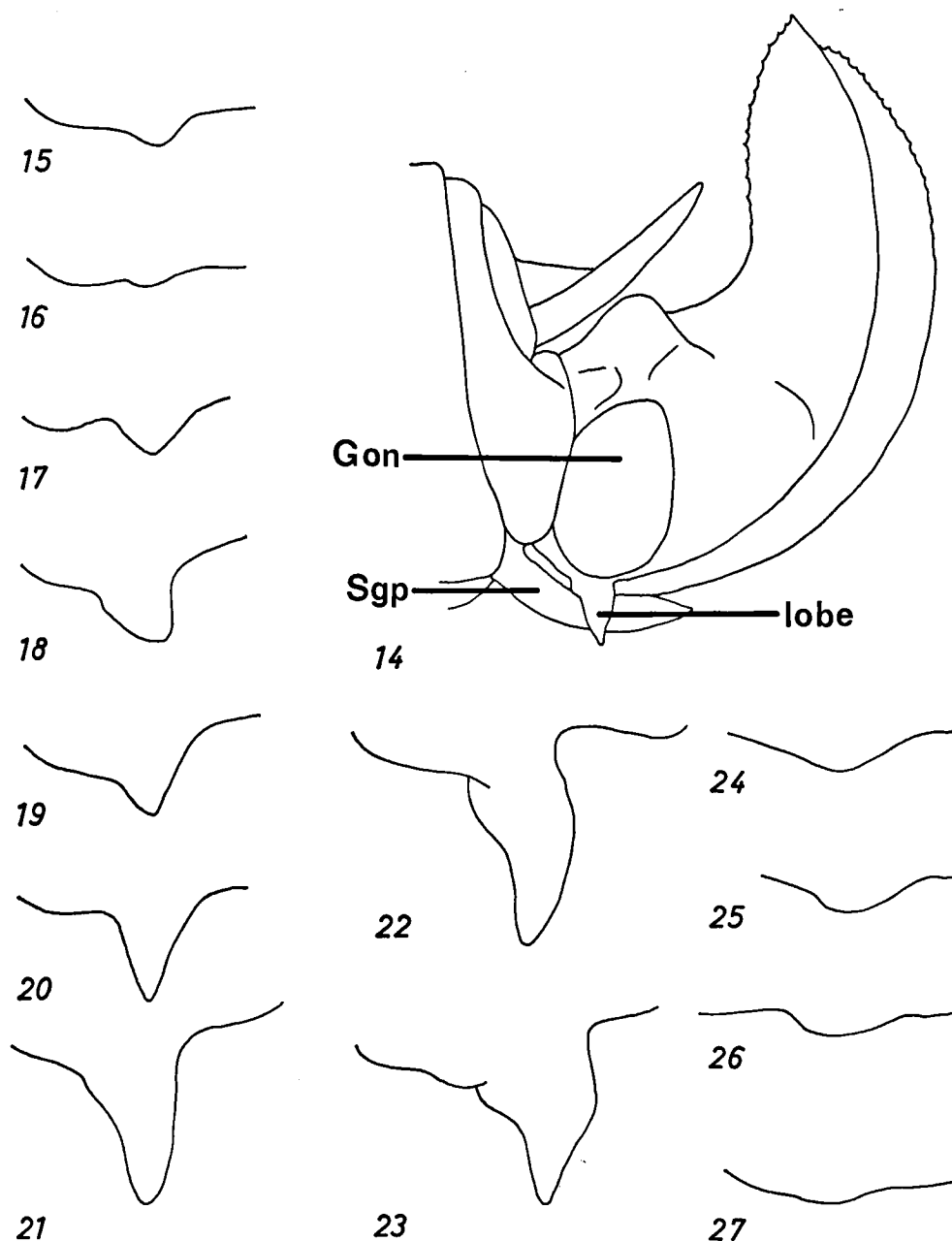
Phaneroptera servillea Brullé, 1832: 86, pl. 30 fig. 1.

Acrometopa servillea; Brunner von Wattenwyl, 1878: 86; 1882: 290, fig. 65 (both partim); Werner, 1902: 117 (partim); Burr, 1916: 193 (as *A. macropoda*); Berland & Chopard, 1922: 167; Burr, Campbell & Uvarov, 1923: 126, 150; Ramme, 1927: 122, figs. 5c-8c, 9, pl. 5 fig. 5a; Werner, 1933a: 400; 1934: 323; 1937a: 145 (partim); 1937b: 106, figs. 5-6, 1938: 166; Kaltenbach, 1965: 471.

Acrometopa cretensis; Werner, 1937b: 108 (partim).

Material studied. — Neotype ♂ labelled: Hellas (Pelop.: Korinthia) Sofikon (3 km N) 300 m 6.VII.1974 F. Willemse c.s. (ZMA).

Greece: Korinthia: (1) Mt. Killíni, Áno Tríkkala, 1 ♂, 2 ♀ (CW); 1150 m, 17.VIII.1973, La Greca, 1 ♂ (IBA); (2) Lávka, 3 km E, 1 ♂; (3) Sofikón, 3 km N, 1 ♂, 1 ♀; Argolis: (4) Skotíni, Mt. Olífyrtos, 1 ♂, 1 ♀; (5) Ligouríon, 4 km W, 1 ♀; (6) Áyios Eléni, SE of Epidhavros, 1 ♂ (all CW); Attiki: (7) Aiyina (= Aegina), 13.V.1937, *Acrometopa servillea* Brullé det. Werner, 1 ♂; (8) Athínai (= Athens), Heldreich, coll. Br. v. W., *Acrometopa servillea* Brullé det. Br. v. W., 1 ♂, 1 ♀ (all NMW); (9) Mt. Párnis, 1 ♂; Fthiótis: (10) Melidhóni, W of Arkítsa, 1 ♀; (11) Oíti village, 2 ♂, 7 ♀ (all CW); Tríkkala: (12) Tírna, 1300 m, 4.VIII.1973, La Greca, 1 ♂, 2 ♀ (IBA); (13) Khrisomiléa, 1 ♂ 2 ♀; (14) Mourikáni, 2 ♀; (15) Trigón, 1 ♂, 1 ♀ (all CW); (16) Kalambáka, 5.VIII.1973, La Greca, 1 ♀ (IBA); Ioánnina: (17) Ármata, 1 ♂, 1 ♀; Magnisia: (18) Glafirá, 1 ♂; (19) Khorefón, 1 ♀; Lária: (20) Dhímíttra-Anatóli, 1 ♂, 1 ♀; (21) Elassón, 4 km W, 1 ♂, 1 ♀; Grevená: (22a) Dheskatí, 5-10 km E, 1 ♂; (22b) Paraskeví, 1 ♂, 4 ♀; Kozáni: (23) Sérvia, 2 ♂; (24) Velvendós, 1 ♂; Piéria: (25) Litókhoron, 9 ♂, 1 ♀; Kilkís: (26) Plataniá, 1 ♂; (27) Évzonoi, 7 ♂, 2 ♀ (all CW); Thessaloníki: (28) Lembet, 6 km N of Thessaloníki, VI.1916, M. Burr, 1 ♂ (BMNH); Khalkidhiki: (29) Yerakíni, 1 ♀ (CW); Dráma: (30) Dráma, 3.VI.1964, 1 ♂; Kaválla: (31a) Kaválla, 21, (31b) Bátis, 30.VI.1963, 1 ♂, 1 ♀; Thásos: (32a) Liménos, 15.VI.1962, 1 ♀ (all Kaltenbach, *Acrometopa servillea* Brullé det. A. Kaltenbach, NMW); (32b) Prínos, 21.VII.1963, S. Daan & V. van Laar,

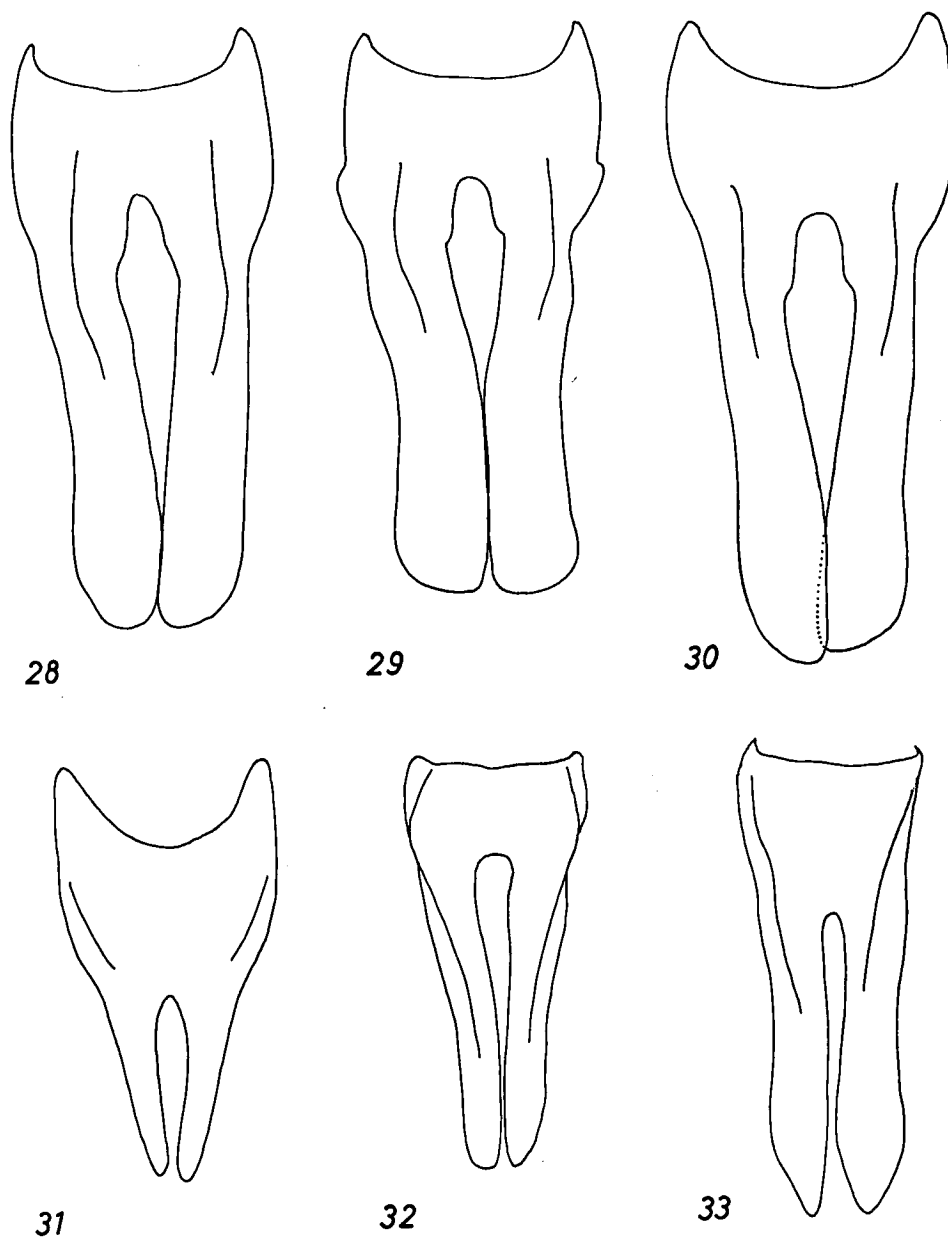


Figs. 14-27. Upper margin of lower ovipositor valve in *Acrometopa*: 14, left side of abdominal terminalia of *Acrometopa servillea* (Brullé) (Magnisia, Khoreftón), lobe between gonangulum (Gon) and subgenital plate (Sgp), as indicated, refers to figs. 15-27: 15-19, *A. macropoda* (Burmeister) (15, Istra, Učka; 16, Ioánnina, Kalpákion; 17, Akhaía, Kalávrta; 18, Voiotia, Mt. Parnassós, CW; 19, Arkadhía, Tripolis); 20-23, *A. servillea* (Brullé) (20, Korinthía, Mt. Killini; 21, Argolis, Skotini; 22, Fthiotis, Oíti; Trikkala, Trigon); 24-25, *A. italica* Ramme (24, Sicilia, paratype; 25, Italy, Sperlonga); 26, *A. syriaca* Brunner von Wattenwyl (Piéria, Litókhon); 27, *A. cretensis cretensis* Ramme (Kriti, Linoséli).

2 ♂ (ZMA); Lésvos: (33) Áyios Evstrátios (= Agiostrati), 5.VII.1936, F. Werner, *Acrometopa servillea* Brullé det. Werner, 1 ♂, 2 ♀; Khíos: (34) Khíos (= Chios), 30.VI.1936, F. Werner, *Acrometopa servillea* Brullé det. Werner, 2 ♂, 1 ♀ (both NMW), 11.VI.1934, 1 ♀ (BMNH);

Kykládhos: (35) Kéa, 2.VI.1936, F. Werner, *Acrometopa cretensis* Ramme det. Werner, 2 ♂ (NMW).

Anatolia: Izmir (= Smyrna) Br. v. W., 5943, *Acrometopa syriaca* Br. det. Br. v. W., 1 ♀ (cotype of *Acrometopa syriaca* Brunner von Wattenwyl, NMW).



Figs. 28-33. Male subgenital plate in *Acrometopa*, ventral view: 28, *A. macropoda* (Burmeister) (Crna Gora, Krstač); 29, *A. servillea* (Brullé) (Piéria, Litókhoron); 30, *A. italica* Ramme (Sicilia, paratype); 31, *A. syriaca* Brunner von Wattenwyl (Piéria, Litókhoron); 32, *A. cretensis cretensis* Ramme (Kriti, Mállia); 33, *A. cretensis daedali* ssp. n. (paratype).

Diagnosis. — ♂: Stridulatory file as in the type-species of the genus. Cercus apically strongly incurved (figs. 38-40); apex strongly excavate, lamelliform margin terminating into a beak-shaped process, which is as long as or, usually, longer than the greatest width of the apex of the cercus (figs.

56-61). Lobes of subgenital plate parallel-sided (fig. 29).

♀: Hind wing not extending beyond tip of fore wing. Between subgenital plate and gonangulum a well developed, roughly triangular projecting lobe arising from upper margin of lower valve of ovipositor (figs. 20-23).

Variation. — The amount of variation within this species is slight, but the differences found in the specimens from Mt. Killíni deserve to be mentioned. In that material the beak-shaped tip of the male cercus is slightly shorter (figs. 38, 56) and the lobe between the gonangulum and the subgenital plate of the female is apparently smaller than usual (fig. 20).

Distribution. — The range of the species covers Turkey, the central and northern Aegean islands, the northern and eastern parts of the Greek mainland, reaching westward as far as the eastern slopes of the Píndhos range and extending southward from Mt. Oíti into the extreme eastern part of the Pelopónnisos and some neighbouring islands as far south as the island of Kéa (distribution map).

Remarks. — Both the male and the female of this species are well characterized. Confusion is possible only with atypical forms of *Acrometopa macropoda*, in which case reference should be made to the illustrations given.

The type of *Phaneroptera servillea* Brullé could not be traced (M. Descamps, in litt. 23.VIII. 1976) and is presumably lost. The original publication refers to a male from the Pelopónnisos without precise locality. However, by far the largest part of that peninsula is occupied by *Acrometopa macropoda*. For these reasons a neotype is designated, a male from Sofikón in the eastern Pelopónnisos (pl. I fig. 2). Its measurements (length in mm) are as follows: body 26.5; pronotum 5.8; fore wing 35.0; hind wing 40.0; hind femur 32.1.

In literature records under the name of *Acrometopa servillea* from Greece are numerous. Some of these are referred now to *Acrometopa syriaca*, the record from Kríti to the nominate subspecies of *Acrometopa cretensis*, and several others to *Acrometopa macropoda*. The material from the island of Kéa (Kikládhes) recorded by Werner (1937b) under *Acrometopa cretensis* has been re-examined. It belongs partly to that species and partly to *Acrometopa servillea*.

Acrometopa italica Ramme, 1927

(figs. 24-25, 30, 41, 62-64)

Acrometopa macropoda italica Ramme, 1927: 121, figs. 5a-8a, 9.

Acrometopa italica; Uvarov, 1935: 75; La Greca, 1959: 102, fig. 113.

Material studied. — Paratypes labelled: Sicilia, Messina am Colle S. Rizzo, 2-400 m, 27.VII.1924, Ramme-Richter, 1 ♂, 1 ♀ (NMM), 1 ♀ (BMNH).

Sicilia: Portelli Mandrazzi (Peloritani), 1000 m, 23.VII. 1961, La Greca, 1 ♂ (ZMA); Vizzini (Catania), 28.VI. 1969, Nobile, 1 ♀ (ZMA); Randazzo, 800 m (Etna), 3.VII.1969, Marcellino & Ronsisvalle, 1 ♂, 1 ♀ (IBA).

Italy: Sperlonga (Terracina, Latina), 29.VI.1959, La Greca, 1 ♂, 1 ♀ (IBA), 1 ♂, 1 ♀ (CW); Puglia, Ruvo-Gravina, 300 m, 5.VII.1977, F. & L. Willemse, 3 ♂, 3 ♀ (CW); Liguria, Pegli, 21.VIII. 1917, ex Malc. Burr coll., 1 ♂, 1 ♀ (BMNH), 2 ♂, 1 ♀ (HMO).

Corse: Asco, 620 m, 24.VII.1953, H. Wiering, 1 ♂ (ZMA).

Dalmatia: Dalmatie Brunner de Wat., ex coll. M. Burr, 1 ♂, 1 ♀ (HMO).

Diagnosis. — ♂: Stridulatory file as in type-species of the genus. Cercus slightly incurved in apical fourth (fig. 41); apex narrow and slightly excavate, lamelliform margin without a beak-shaped terminal process but simply dentate (figs. 62-64). Lobes of subgenital plate parallel-sided (fig. 30).

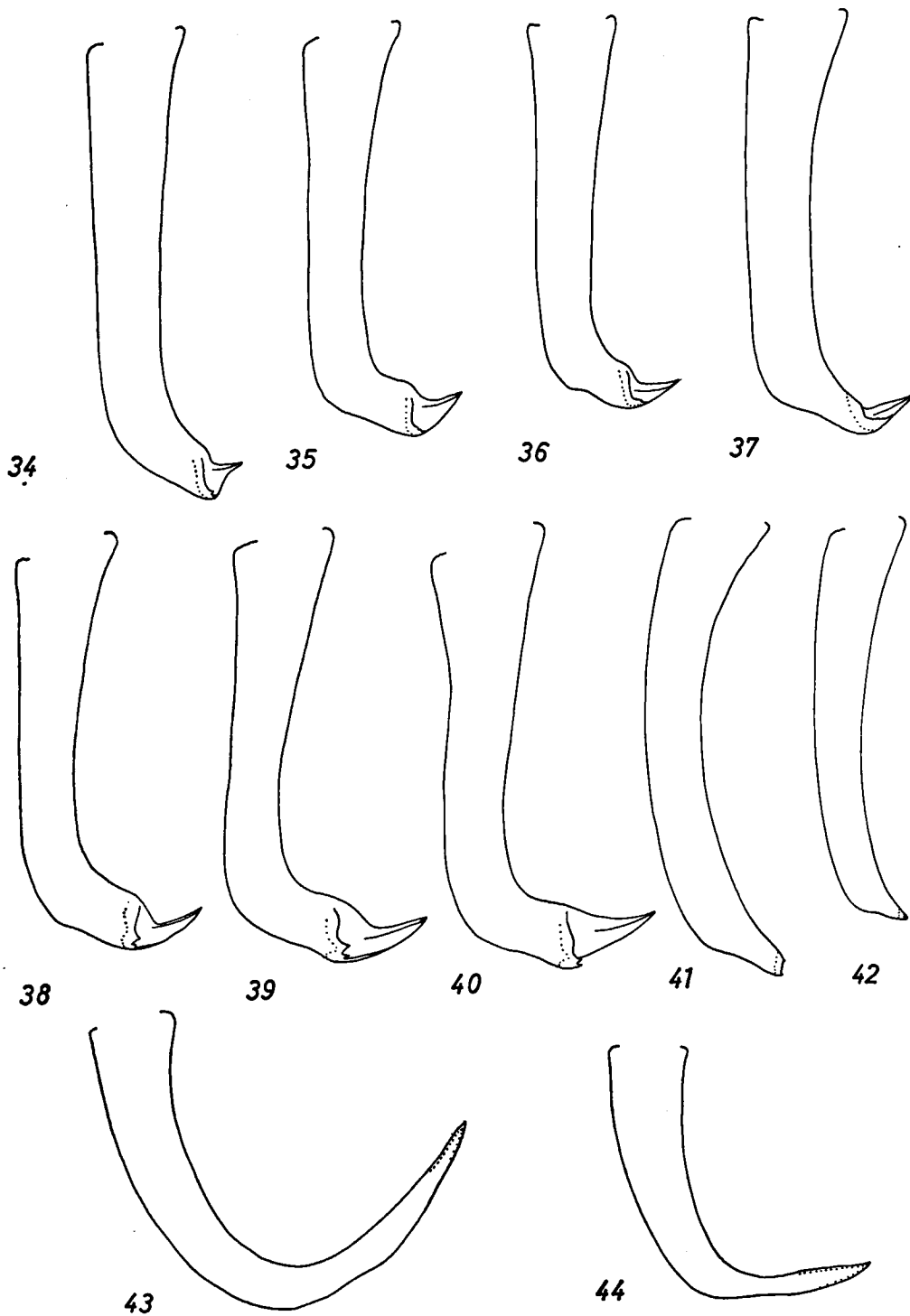
♀: Hind wing not extending beyond tip of fore wing. Lobe between gonangulum and subgenital plate vestigial (figs. 24-25).

Variation. — Not noticeable.

Distribution. — The range of the species covers Corse, Sardegna, Sicilia, continental Italy excluding the extreme northern part and the high mountains, and ? Dalmatia.

Remarks. — As was pointed out above in the discussion of the specific characters within the genus, the difference between *A. italica* and *A. macropoda* appears to concern the male cercus only.

Uvarov (1935) wrote that the distributional areas of *A. macropoda* and *A. italica* overlap in Dalmatia. His Dalmatian material has been re-examined and his identifications have proved to be correct. The record of *A. italica* from Dalmatia, however, has not been confirmed since.



Figs. 34-44. Left male cercus in *Acrometopa*, dorsal view: 34-37, *A. macropoda* (Burmeister) (34, Istra, Valtura; 35, Voïotia, Mt. Parnassós, CW; 36, Argolis, Akhlahókambos; 37, Kíthira, Werner); 38-40, *A. servillea* (Brullé) (38, Korinthía, Mt. Killíni; 39, Fthiótis, Oíti; 40, Thásos, Prínos); 41, *A. italica* Ramme (Italy, Sperlonga); 42, *A. syriaca* Brunner von Wattenwyl (Piéria, Litókhoron); 43, *A. cretensis cretensis* Ramme (Kriti, Mállia); 44, *A. cretensis daedali* ssp. n. (paratype).

Acrometopa syriaca Brunner von Wattenwyl, 1878

(figs. 6-9, 26, 31, 42, 65-66, pl. I fig. 3, map)

Acrometopa syriaca Brunner von Wattenwyl, 1878: 87; Werner, 1901: 289; Ramme, 1927: 122, figs. 5d-8d, 9; Werner, 1933b: 189 (?); 1936: 10; Ramme, 1939: 51; Bei-Bienko, 1954: 124; Kaltenbach, 1967: 191; Willemse, 1977: 52.

Acrometopa syriaca (?); Werner, 1933a: 400 (partim?).

Acrometopa festae Giglio-Tos, 1893: 13, pl. fig. 3; Ramme, 1927: 122; Werner, 1933b: 189.

Acrometopa elsae Werner, 1937b: 107, fig. 7; Ramme, 1939: 51.

Acrometopa macropoda; Werner, 1933b: 189.

Acrometopa macropoda macropoda: Salfi, 1929: 213; Jannone, 1936: 145, fig. 23; Salfi, 1937: 4.

Acrometopa sp.; Burr, Campbell & Uvarov, 1923: 127 (?).

Material studied. — Type-series of *Acrometopa syriaca*, labelled: Coll. Br. v. W. ex coll. Lederer Beirut, 8158, det. Br. v. W. *Acrometopa syriaca* Br., 1 ♂ (lectotype); Coll. Br. v. W. Aidin, 5906, *Acrometopa syriaca* Br. det. Br. v. W., 1 ♂ (paralectotype); Smyrna Br. v. W., 5943, det. Br. v. W. *Acrometopa syriaca* Br., 1 ♀ (paralectotype) (all NMW).

Type-series of *Acrometopa elsae*: (6) Sámos, Vathi (= Vathy), 2.VI.1936, F. Werner, *Acrometopa elsae* Wern. Type ♂ det. Werner, *Acrometopa syriaca* Br. det. Ramme, 1 ♂ (holotype); (7) Sámos, Marathókambos (= Marathokambos), 24.VI.1936, F. Werner, *Acrometopa elsae* Wern. cotype ♀ det. Werner, *Acrometopa syriaca* Br. det. Ramme, 1 ♀ (paratype) (both NMW).

Greece: Piéria: (1) Litókhonon, Hotel Lito, 19 ♂, 1 ♀ (CW); (2) Kolindrós, 10 km W, 24-26.VII.1965, Blommers e.a., 1 ♂ (ZMA); Évros: (3) Tukherón, 2 ♀ (CW); (4) Samóthraki, Therme S.L., 15.VIII.1962, Guichard & Harvey, 1 ♀ (BMNH); Lésvos: (5) Mitilíni (= Mytilene) Br. v. W., *Acrometopa syriaca* Br. det. Br. v. W., 1 ♂, 1 ♀ (NMW); Sámos: (6) Kouúsi & Khóra & Koumaradhaíoi, 25-27.VI.1977, M. C. & G. Kruseman, 2 ♂, 5 ♀ (ZMA); Dhodhekánisos: (8) Kós, Antimákhia (= Antimachia), 7.VI.1935, O. Wettstein, *Acrometopa syriaca* Br. det. Werner, 1 juv. ♂; (9) Ródhos, Rodhíni (= Rhodos, Rodini), 23 & 24.VI.1966, Kaltenbach, *Acrometopa syriaca* Br. v. W. det. Kaltenbach, 1 ♂, 1 ♀; (10) Kárpáthos, Voládha, 15-18.VI.1935, O. Wettstein, *Acrometopa syriaca* det. Werner, 1 ♂ (all NMW).

Cyprus: Ballapais, 6 km SE of Kyrenia, 200-240 m, 10.VI.1971, 1 ♀; E of Kyrenia, 11.VI.1971, both M. J. & J. P. Duffels, 2 ♂, 1 ♀ (all ZMA).

Israel: Tiberias, 18-27.V.1967, C. A. W. Jeekel, 6 ♂, 1 ♀ (ZMA).

Diagnosis. — ♂: Stridulatory file without elevations and alternating depressions (figs. 8-9). Size of stridulatory organ larger than in type-species. Cercus slightly incurved apically (fig. 42); apex narrow, not excavate but with a pair of minute and solid teeth (figs. 65-66). Subgenital plate

with lobes distinctly narrowing apically (fig. 31). Apical parts of antennae annulated.

♀: Hind wing not extending beyond tip of fore wing. Lobe between gonangulum and subgenital plate vestigial (fig. 26). Colouration as in male.

Variation. — Not noticeable.

Distribution. — The range of the species extends from Egypt, through Israel, Lebanon and Syria into Iraq and Anatolia, reaching westward to Cyprus, the islands of the eastern part of the Aegean Sea and the Greek part of Thráki and Makedhonía (distribution map).

Remarks. — The species is well characterized by the structure of the stridulatory file and the abdominal terminalia of the male. The female, however, may be confused with females of *A. macropoda* and *A. italica*. The colouration of the antennae may be helpful, but in preserved material these parts are usually broken off.

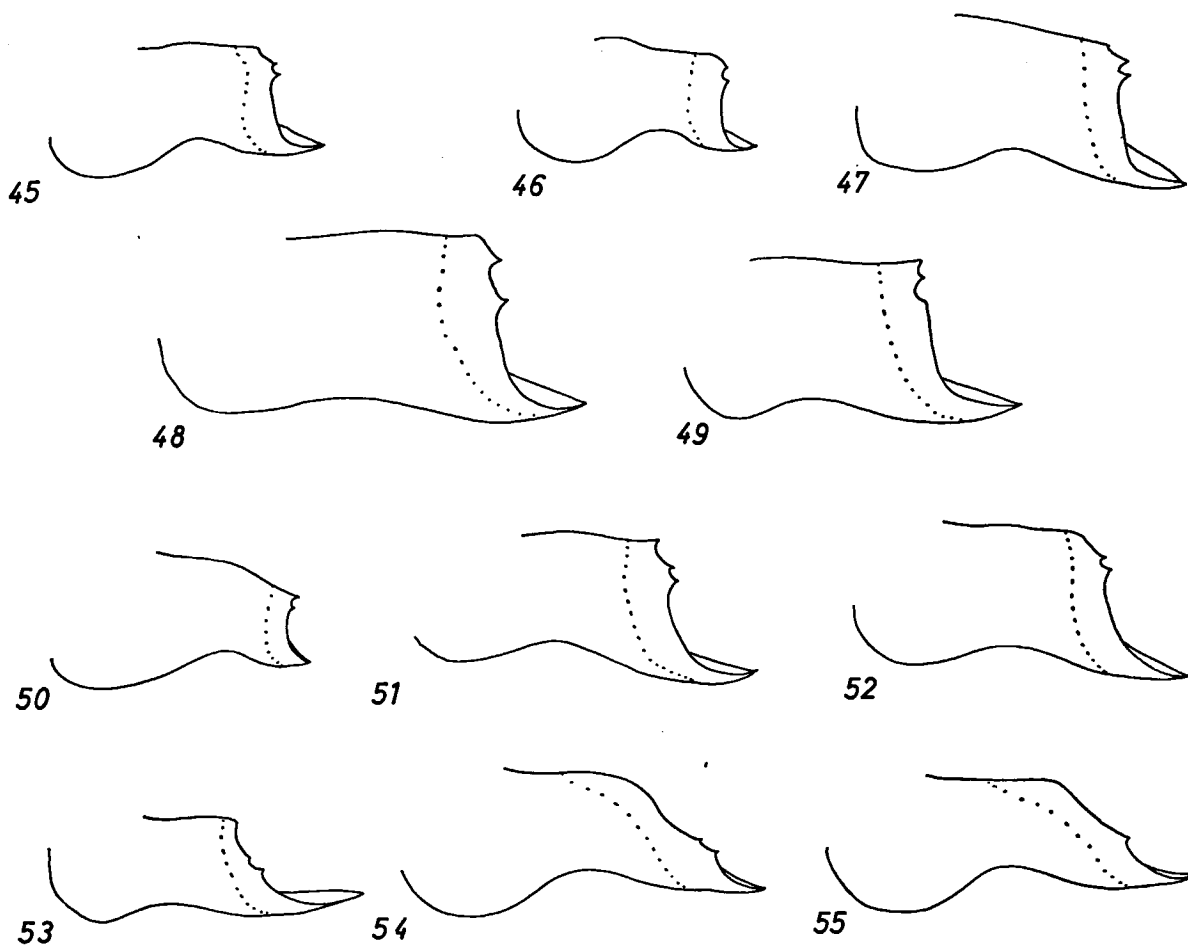
The lectotype of *Acrometopa syriaca* from Beirut (Pl. I fig. 3) has the following measurements (length in mm): body 21.0; pronotum 5.7; fore wing 35.0 mm; hind wing 40.0; hind femur 34.5. This male is conspecific with the female paralectotype from Aidin. The other female of the original type-series, from Izmir (= Smyrna), belongs to *Acrometopa servillea*.

Ramme (1927) and Werner (1933b) considered *Acrometopa festae* Giglio-Tos, 1893, synonymous with *Acrometopa syriaca*, and their opinion is followed here. The type material of *Acrometopa festae* could not be traced.

The synonymy of *Acrometopa elsae* Werner, 1937, with *Acrometopa syriaca*, which was established by Ramme (1939) could be confirmed by the actual examination of the type-specimens.

Most of the previous records of *Acrometopa syriaca* in literature seem reliable, but some are in need of confirmation, viz. Límnos (= Lemnos) (Werner, 1933a) and Khíos (= Chios) (Werner 1933b).

Literature records of *Acrometopa macropoda* from the eastern Aegean islands refer to female specimens only, except for one record from Ródhos (Salfi, 1937). Since females of *Acro-*



Figs. 45-55. Apex of male cercus in *Acrometopa macropoda* (Burmeister), posterior view (45, Istra, Valtura; 46, Crna Gora, neotype; 47, Ioánnina, Sarandáporos; 48, Kérkira, Patália; 49, Kérkira, Gazátika; 50, Árta, Ramía — Livádhion; 51, Voiótia, Mt. Parnassós, CW; 52, Arkadhía, Trípolis; 53, Argolís, Akhlahókambos; 54, Lakonía, Monemvasía; 55, Kíthira, Werner).

metopa macropoda and *Acrometopa syriaca* are indistinguishable, and the eastern Aegean islands are lying far outside the range of *Acrometopa macropoda*, these records are assigned now to *Acrometopa syriaca*. The record from Ródhos refers to a single male specimen which was probably misidentified.

Acrometopa cretensis Ramme, 1927

This species, which occurs in Kríti, the western Kikládhes and Ikaría, is well characterized by the shape of the male stridulatory file (figs. 12-13). Whereas the material from Kríti and the Kikládhes agrees completely with the original descrip-

tion, that from Ikaría differs clearly in the shape of the male cercus, and is described below as a new subspecies.

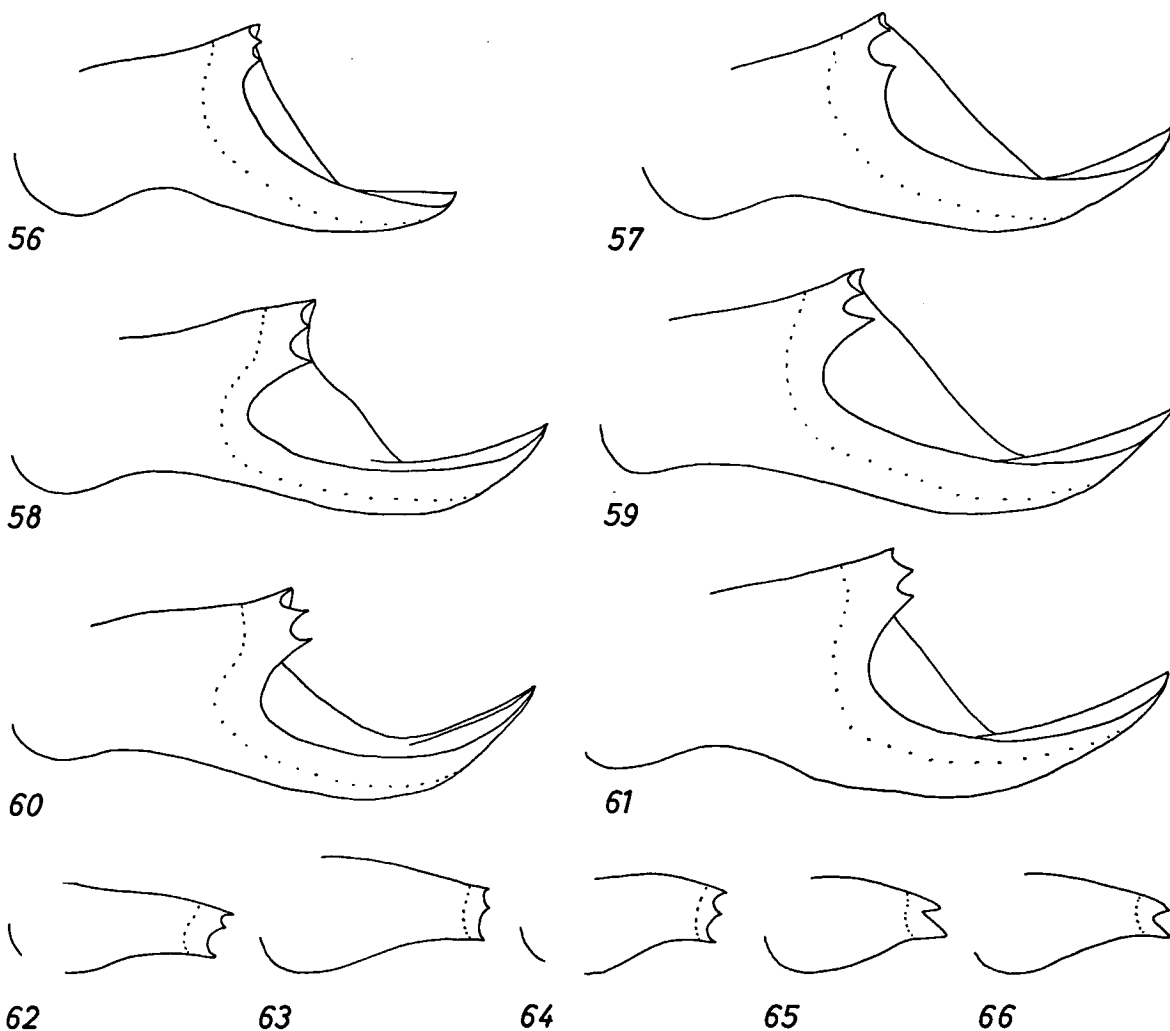
Acrometopa cretensis cretensis Ramme, 1927 (figs. 27, 32, 43, map)

Acrometopa macropoda; Kuthy, 1907: 553.

Acrometopa servillea; Werner, 1927: 428 (partim).

Acrometopa cretensis Ramme, 1927: 122, figs. 5e-8e, 9, pl. 5 figs. 5b-c; Werner, 1934: 322; 1937b: 108 (partim); Willemse & Kruseman, 1976: 125.

Material studied. — Kríti: Iráklion: (1) Stalís, 5 km NE Mállia, 4-20.VI.1970, Manoil, 1 ♂ (NMW); (2) Mállia, 9.VI.1972, 1 ♂; (3) Phaistós, 18.VI.1972, 1 ♀ (both M. C. & G. Kruseman, ZMA); Khanía: (4) Léyka Mts., Linoséli above Xilóskalo, 1300 m, 1 ♀ (CW).



Figs. 56-66. Apex of male cercus in *Acrometopa*, posterior view: 56-61, *A. servillea* (Brullé) (56, Korinthía, Mt. Killíni; 57, Korinthía, Lávka; 58, Korinthía, Sofikón, neotype; 59, Kilkís, Évzonoi; 60, Thásos, Prínos; 61, Khíos, Werner); 62-64, *A. italica* Ramme (62, Sicilia, paratype; 63, Italy, Sperlonga; 64, Corse); 65-66, *A. syriaca* Brunner von Wattenwyl (65, Piéria, Litókhoron; 66, Israel, Tiberias).

Kykládhos: (5) Kéa, 7.VI.1936, F. Werner, *Acrometopa cretensis* Rme det. Werner, 1 ♂, 1 ♀ (NMW); (6) Kímolos, 3.VI.1934, Werner, 1 ♂, 1 ♀ (NMW), 1 ♂ (BMNH); (7) Polívos, 6.VI.1934, *Acrometopa cretensis* Rme det. Werner, 1 ♂ (NMW).

Diagnosis. — ♂: Stridulatory file with three sinuate elevations alternating with depressions (figs. 12-13). Cercus slender, strongly and evenly incurved all over its length, apex pointed with a fine longitudinal crest (fig. 43). Subgenital plate with the lobes distinctly narrowing apically (fig. 32).

♀: Hind wing extending beyond tip of fore

wing. Lobe between gonangulum and subgenital plate vestigial (fig. 27).

Variation. — The smaller measurements of the Kriti material are not considered of specific importance since the measurements of the Kykládhos specimens are approaching those of the other species of the genus.

Distribution. — As far as known the range of the nominate subspecies of *Acrometopa cretensis* includes only Kriti and the western Kykládhos (distribution map).

Remarks. — Both sexes of this species are well defined.

Previous records of this species for the islands of Ios, Kíthnos, Andipáros and Sifnos (Werner, 1934) are not indicated on the distribution map, since they were based either on observations or on juvenile specimens.

Other previous records (Ramme, 1927), however, are indicated on the map and numbered as follows: Kríti: (8) Piskokéfalo; (9) Khamaízi; (10) Amári; (11) Rodhopou.

Acrometopa cretensis daedali subsp. nov.

(figs. 12-13, 33, 44, Pl. I fig. 4, map)

Material studied. — Hellas, Ikaría, Therma, 14-21.VI.1977, M. C. & G. Kruseman, ♂ holotype, ♀ allotype, 15 ♂ paratypes, 5 ♀ paratypes; Ikaría, Áyios Kírikos, 20.VI.1977, M. C. & G. Kruseman, 1 ♂ paratype; 17.VI.1963, S. Daan & V. van Laar, 3 ♂ paratypes (all ZMA).

Diagnosis. — ♂: Pl. I fig. 4. Differs from the nominate subspecies as follows. Cercus shorter, basal half more strongly tapering and, just beyond the middle of length abruptly and almost rectangularly incurved, slightly widening apically, tip pointed (fig. 44). Lobes of subgenital plate less narrowing apically (fig. 33).

♀: Similar to nominate subspecies.

Measurements (length in mm): body ♂ 24-27, ♀ 28-29; pronotum ♂ 5.5-5.9, ♀ 5.8-6.1; fore wing ♂ 27-30, ♀ 27-29; hind wing ♂ 32-34, ♀ 29-31; hind femur ♂ 29-32, ♀ 31-32.

Variation. — Not noticeable.

Distribution. — Known only from the Aegean island of Ikaría (distribution map).

Remarks. — The male is well-defined by the shape of the cercus. The female, however, cannot be distinguished from that of the nominate form.

Although the distinction between the two subspecies of *A. cretensis* concerns only a single character, the rate of difference and the importance of the character justify taxonomic recognition.

ZOOGEOGRAPHY

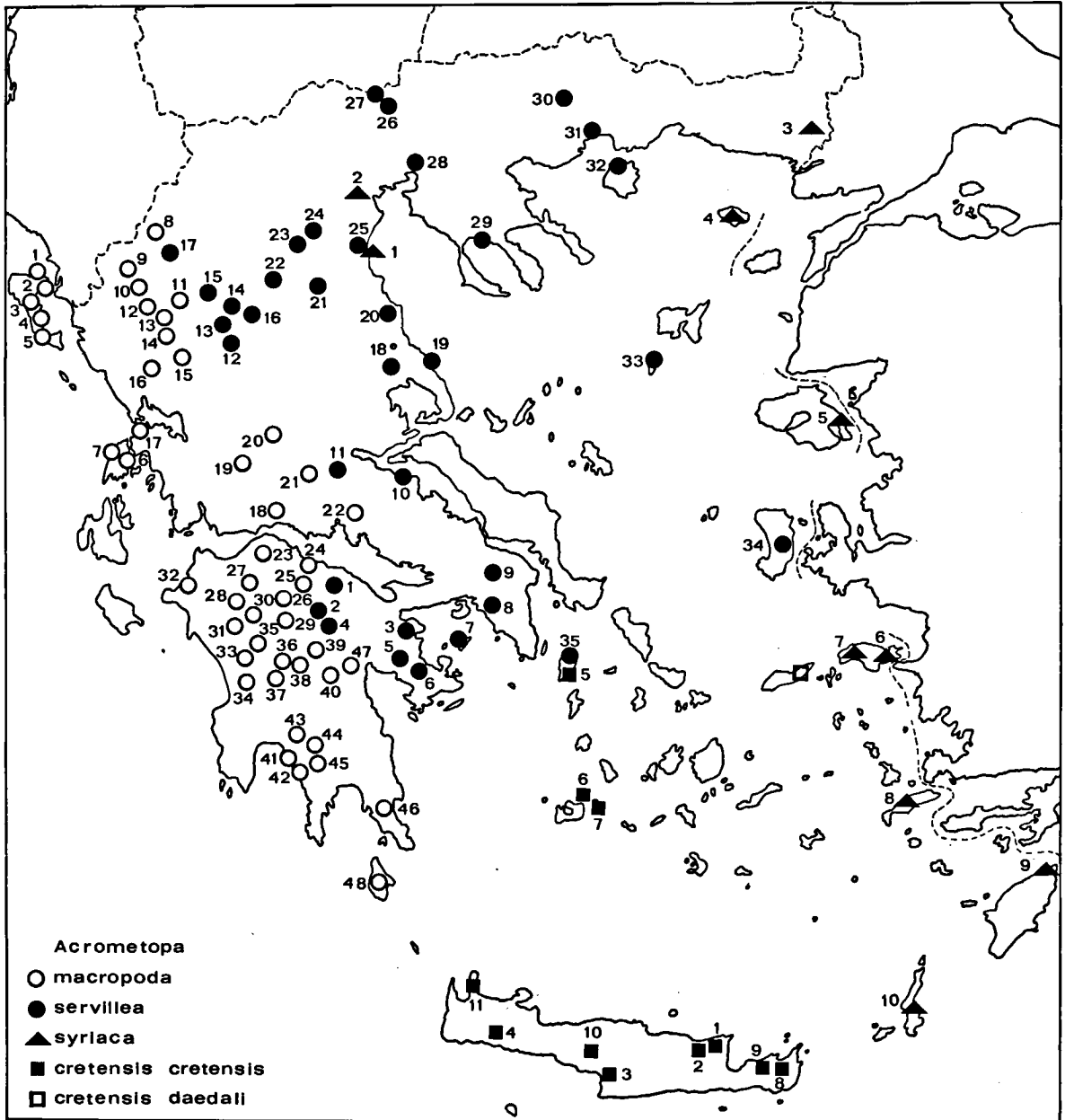
The recognition of three morphologically well defined groups of species within the genus *Acrometopa*, viz., (1) *A. italica*, *A. macropoda* and

A. servillea, (2) *A. syriaca*, and (3) *A. cretensis cretensis* and *A. cretensis daedali*, is supported by the distributional pattern of these groups. Since the geographical areas of *A. servillea*, *A. syriaca* and *A. c. cretensis* show a partial overlap the conclusion is that these species groups must be regarded as reproductively isolated taxa.

On the other hand, *A. italica*, *A. macropoda* and *A. servillea* apparently have an allopatric distribution (the record of *A. italica* from Dalmatia is considered doubtful). I have considered the possibility that *A. italica*, *macropoda*, and *servillea* are geographical races (subspecies) of one another. In my opinion, this is a boundary case, but since the morphological characters are sufficiently pronounced, I have retained for the moment a status as full species. Their geographical succession from the West to the East coincides with the structural changes in their characters. Although the distinction between the three taxa is rather easy, they seem to represent vicariant populations, and their reproductive isolation may not have been completed yet. This may be the reason of the morphological variation which occurs in a narrow zone where the areas of *A. macropoda* and *A. servillea* are in contact with each other. This zone reaches from Mt. Parnassós to the opposite part of the Pelopónnisos, through Arkadhía, southwestern Argolis, Lakonía and onto the island of Kíthira (localities of *A. macropoda* numbered 22, 24-25, 29, 39-40, 46-48, of *A. servillea* numbered 1). No variation occurs in the Pindhós range, however, although *A. servillea* occurs on the eastern slopes and *A. macropoda* on the western. Possibly the Pindhós range constitutes a nearly complete barrier, due to the fact that the species of *Acrometopa* cannot survive at altitudes above 1500 m.

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Map. The distribution of *Acrometopa* in Greece.

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Received: 23 February 1977