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REVISION AND RESURRECTION OF THE GENUS NAME *MEZAMMIRA* FIEBER, 1876 (HEMIPTERA: CICADIDAE) WITH SPECIAL FOCUS ON ITS SPECIES FROM GREECE AND THE DESCRIPTION OF TWO NEW SPECIES

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Abstract - Cicada species of the genus *Mezammira* Fieber, 1876, previously known as species of the genus *Cicadivetta* Boulard, 1982, *Cicadetta* Kolenati, 1857, *Melampsalta* Kolenati, 1857, *Tettigetta* Kolenati, 1857 or also *Pauropsalta* Goding & Froggatt, 1904, were investigated in Greece. Arguments for a resurrection of the older generic name *Mezammira* are provided. Since the type species of this genus, *Mezammira flaveola* comb. nova, is lost or destroyed, we selected and are describing in this paper a neotype from the locality on Mt. Taigetos, not far from the *locus typicus* Mistra, Sparta, Greece, mentioned by Brullé (1833). We are adding also a description of a female, never published yet in the literature. Till now in Greece the following species of this genus were known: *Mezammira flaveola* comb. nova*, M. tibialis* comb. nova, *M. carayoni* comb. nova and *M. goumenissa* comb. nova. In the present paper we are describing in addition two new species: one from Peloponnese, *M. sakisi* sp. nova and one from Naxos Island, *M. filoti* sp. nova. Some of the Greek *Mezammira* species have very limited distribution areas. Their calling song patterns are characteristic with high repetition of short echemes of at least two different durations. Two of the species, *M. carayoni* comb. nova and *M. filoti* sp. nova are, according to our present knowledge, endemic to the islands of Crete and Naxos respectively and are allopatric to other *Mezammira* species. *Mezammira goumenissa* comb. nova and *M. sakisi* sp. nova live in sympatry or at least parapatry with the widely distributed *M.*

flaveola comb. nova in Southern Greece. This is probably the reason, that only these two species (*M. goumenissa* comb. nova and *M. sakisi* sp. nova) emit songs with the carrier frequency much higher than the remaining species, probably preventing acoustic interference.

KEY WORDS: *Mezammira*, *Cicadivetta,* taxonomy, bioacoustics, morphology, distribution, description, *Mezammira flaveola* comb. nova, neotype, *Mezammira sakisi* sp. nova, *Mezammira filoti* sp. nova, Greece

Izvleček - REVIZIJA IN PONOVNA UVEDBA RODOVNEGA IMENA *MEZAMMIRA* FIEBER, 1876 (HEMIPTERA: CICADIDAE) S POSEBNIM OZIROM NA VRSTE TEGA RODU V GRČIJI IN OPISOM DVEH NOVIH VRST

V Grčiji smo raziskovali škržade rodu *Mezammira* Fieber, 1876 (Hemiptera: Cicadidae), ki smo jih prej prištevali v rodove *Cicadivetta* Boulard, 1982, *Cicadetta* Kolenati, 1857, *Melampsalta* Kolenati, 1857, *Tettigetta* Kolenati, 1857 ali tudi *Pauropsalta* Goding & Froggatt, 1904. V članku navajamo utemeljitev za ponovno uvedbo rodovnega imena *Mezammira.* Ker je tipski primerek rodu, *Mezammira flaveola* comb. nova, izgubljen ali uničen, smo izbrali in v članku opisujemo neotip z lokalitete na Mt. Taigetosu, nedaleč od Mistre pri Šparti, Grčija, ki je *locus typicus*, kakor navaja Brullé (1833). Dodajamo še opis samice, ki do sedaj še ni bil objavljen. Do sedaj smo poznali v Grčiji naslednje vrste iz tega rodu: *Mezammira tibialis* comb. nova*, M. flaveola* comb. nova*, M. carayoni* comb. nova in *M. goumenissa* comb. nova. V tem članku objavljamo opisa dveh novih vrst s Peloponeza in z otoka Naxos, *M. sakisi* sp. nova in *M. filoti* sp. nova. Nekatere grške vrste iz rodu *Mezammira* imajo zelo ozko omejena območja razširjenosti. Skupna značilnost škržadov tega rodu so pozivni napevi s hitrim sosledjem kratkih ehemov vsaj dveh različnih dolžin. Dve vrsti, *M. carayoni* sp. nova in *M. filoti* sp. nova sta, kolikor vemo, endemični za otoka Kreto in Naksos ter sta alopatrični z ostalimi vrstami iz rodu *Mezammira*. *Mezammira goumenissa* comb. nova in *M. sakisi* sp. nova sta simpatrični ali vsaj parapatrični z vrsto *M. flaveola* comb. nova*,* ki je splošno razširjena v južni Grčiji. To je verjetno razlog, da imajo le napevi teh dveh vrst (*M. goumenissa* comb. nova in *M. sakisi* sp. nova) mnogo višje nosilne frekvence kot ostale vrste, kar verjetno zmanjšuje možnost križanja.

KLJUČNE BESEDE: *Mezammira*, *Cicadivetta,* bioakustika, morfologija, razširjenost, opisi, *Mezammira flaveola* comb. nova, neotip, *Mezammira sakisi* sp. nova, *Mezammira filoti* sp. nova, Grčija

Introduction

We begin with providing the arguments for the resurrection of the genus name *Mezammira* Fieber, 1876, instead of *Cicadivetta* Boulard, 1982a*, Cicadetta* Kolenati, 1857, *Melampsalta* Kolenati, 1857, or *Tettigetta* Kolenati, 1857 or also *Pauropsalta* Goding & Froggatt, 1904, and the species belonging to this genus are listed. In

Greece the genus *Mezammira* is represented by one of the widely distributed species in Europe, *Mezammira tibialis* (Panzer, 1798) comb. nova, which we found just recently in one locality near Litochoro (Gogala & Trilar, unpublished data). *Mezammira flaveola* (Brullé, 1833) comb. nova inhabits Peloponnese and some localities in continental Greece North of the Corinthian Gulf (Gogala & Drosopoulos, 2006). *Mezammira goumenissa* Gogala, Drosopoulos & Trilar, 2012 comb. nova was described recently under the name *Cicadivetta goumenissa* from a restricted area in Northern Peloponnese (Gogala et al., 2012, 2013) and *M. carayoni* (Boulard, 1982) comb. nova is an endemic species of the island of Crete (Boulard, 1982b; Trilar & Gogala, 2010).

During our investigations in recent years we discovered two new species belonging to the same genus *Mezammira*, one on the island of Naxos and the other in the Eastern Peloponnese: *M. filoti* sp. nova and *M. sakisi* sp. nova respectively, which we describe in this paper. We are also comparing characteristics of all other *Mezammira* species, found till now in Greece.

Materials and Methods

We collected data, recordings, specimens and observations during our expeditions to Greece in the cicada season in the years from 2004 to 2016 except the year 2009 (Fig. 1). Additional distributional data for this paper were provided by the second author (SP), W. Schedl and S. Drosopoulos† from their collections (Fig. 29, Table 1). We first localized cicadas acoustically and then, if possible, collected them with an entomological net. Collected and dry prepared specimens including the type material are deposited in the collection of the Slovenian Museum of Natural History (PMSL), additional material in the collections of the second author (SP) and S. Drosopoulos (his collection is currently deposited at the Agricultural University of Athens). Song recordings are deposited in the Slovenian Wildlife Sound Archive of the Slovenian Museum of Natural History (PMSL). Samples of selected recordings are available on the web pages Songs of European singing cicadas (http://www.cicadasong.eu).

In this paper we cite many times the work of Brullé (1833). There was a controversy about the year of publication, which is given on the front page of the book as 1832. We decided to follow the opinion of Gnezdilov and Bourgoin (2017) to change the publication year to 1833.

Taxonomy and morphology

The taxonomy and morphological terminology are based on Moulds (2005, 2012) and Sanborn (2014). *Mezammira* Fieber, 1876 belongs to the Cicadidae Latreille, 1802, subfamily Cicadettinae Buckton, 1889, and tribe Cicadettini Buckton, 1889. Morphometric measurements (using microscale of a microscope LEICA M205C) for formal descriptions are as follows (with accuracy indicated in parentheses):

BL: body length (0.1 mm);

FL: forewing length (0.1 mm);

FW: forewing width (0.05 mm);
VW: vertex width (0.024 mm);
HL: head length (0.016 mm);
HW: head width including eyes (0.05 mm);
PW: pronotum width including lateral angle of pronotal collar (0.05 mm);
Results are given as mean ± standard deviation (or minimum–maximum if N<6) if not stated otherwise.

For the names and spelling of localities we follow the local inscriptions and transliterations used in the maps of the "Nakas Road Cartography", Rafina Nr. 5, Nr. 8 and Skai Maps 311 Naxos. Distribution maps were created with GPS Visualizer (Schneider, 2003–2016).

Due to the high frequency range of the calls (see Gogala et al., 2012; Gogala & Drosopoulos, 2006), we detected the acoustic signals of these cicada species with the help of ultrasonic detectors. We used the ultrasonic detector Pettersson D-200 (heterodyne system) with electret microphones of the same producer (frequency range 10–120 kHz ± 0.15 kHz), mounted in front of a Telinga reflector (57 cm diameter) or a Renault R-4 front light reflector (15 cm diameter) and connected to the solid state recorders Marantz PMD-660, 670 (sampling rate up to 48 kHz) or Zoom H2 (sampling rate up to 96 kHz) (Gogala, 2013). For sound analyses, especially for determination of carrier frequency (center frequency, 5% and 95% frequency), we used RAVEN 1.4 (Cornell Lab of Ornithology), and for sonography we used AMADEUS Pro 2.0 (HairerSoft, 1998-2011) and the Seewave package (Sueur et al., 2008: oscillo, spectrogram, timer) on the R platform (R Core Team, 2015). For most of the macro photographs we used a Leitz multifocal system.

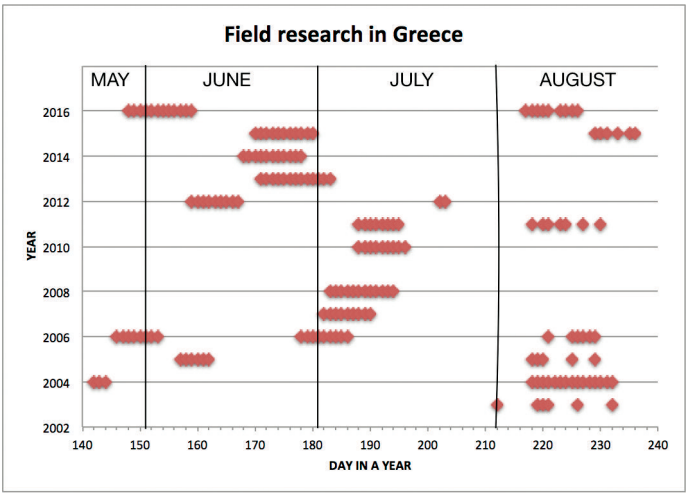


Fig. 1: Periods of our field research in Greece during years 2003 - 2016 within the main season for cicadas (May to August).



Fig. 2: Localities investigated during our field excursions to Greece 2004-2016.

Results

Taxonomy of the genus *Mezammira* Fieber, 1876

***Mezammira* Fieber 1876: 111**
(Figs. 4, 11, 12, 19, 26)
= *Heptaglena* Horváth (1911: 607) ***nomen praeoccupatum***: Horváth (1912), Dlabola (1959).
Type species: *Heptaglena libanotica* Horváth (1911: 607).
= *Oligoglena* Horváth (1912: 606) **syn. nov.**
Type species: *Oligoglena libanotica* Horváth (1911): Horváth (1912: 606).
= *Cicadivetta* Boulard (1982a: 50) **syn. nov.**
Type species: *Cicadivetta tibialis* (Panzer, 1798): Boulard (1982a: 50).
[*non Mezammira* Amyot, 1847: 157. *Nomen nudum*, unavailable name following ICNZ (Opinion 2165, 2006); *nec Mezammira* Amyot, 1848: 353. *Nomen nudum*, unavailable name following ICNZ (Opinion 2165, 2006)].

The valid genus name is the oldest potentially valid name (Article 23.1: ICZN, 1999) and the respective type species remains unchanged (Article 67.10). As these generic names with different name-bearing types refer to a single taxon, their names are subjective synonyms (Article 61.3.1.).

TYPE SPECIES. *Tibicen flaveolus* Brullé, 1833 by monotypy, see below.

Amyot (1847: 157; 1848: 353) fails to name a type species or representative. Fieber (1876: 50) considers taxa names of Amyot (1847) at the genus rank level. He quotes indeed "9. Genre *Cicadetta*. Am. mon. n° 377" and quotes also in his work on page 111 "*Mezammira* Am. mon. n° 379". As *Mezammira* Amyot (1847) is a *nomen nudum*, an unavailable name following ICNZ (Opinion 2165, 2006), Fieber (1876) is the first author to use the genus name *Mezammira* in a way that satisfies the criteria of availability. Fieber (1876) published the genus *Mezammira* as a junior synonym of *Cicadetta* and at the time the genus *Mezammira* was considered an available name. Indeed, it is only in 2006 that works of Amyot (1845–1847) were suppressed by the ICZN. Under the provisions of the Articles 11.6.1 and 50.7, the taxon dates from its first publication as a synonym. Fieber (1876) is therefore the author of *Mezammira,* who first published it as a junior synonym of the genus *Cicadetta* under the species *C. flaveola* (Brullé, 1833). Since Amyot failed to name a species in his genus *Mezammira,* Fieber (1876) is the first author to include a type species: *Tibicen flaveolus* Brullé (1833). The type species of this nominal genus, first published as a synonym is that nominal species first associated with it (Article 67.12): *Tibicen flaveolus* is automatically its type species by monotypy (Articles 67.2.2 and 69.3).

If the objects of the *Code* are to promote stability (Article 23.2), the reversal of precedence (Article 23.9) cannot be applied in this case under the common usage clause (Article 23.9.1.1) because the senior synonym has been used as a valid name after 1899 by Neave (1940: 143). Indeed, this author uses in his publication "*Mezammira* Amyot 1847, Ann. Soc. ent. France, (2) 5, 157.–Hem.". Therefore the prevailing usage of the name *Cicadivetta* cannot be maintained over *Mezammira* which has priority. Moreover, the work of Fieber (1876) fulfils the requirements of publication (Article 8), of availability (Article 11), of availability of a new name published before 1931 as there is a definition and an associated taxon (Article 12.1), of availability of the genus-group name because an available species name is used in association with *Mezammira* (article 12.2.5), and of the application of the genus-group name as there is a reference to a type species of the nominal taxon that it denotes (article 42.3). Even if there was a petition to suppress *Mezammira*, the genus *Oligoglena* Horváth (1912: 606) would then take precedence. So regardless, *Cicadivetta* is a junior synonym of the taxon.

However, it is also important to note that the description of Fieber (1876) doesn't match with the species *C. flaveola*: in his diagnosis Fieber probably describes a species belonging to the genus *Euryphara* Horváth, 1912. As Hagen (1856) and Puton (1875), Fieber (1872, 1876) considers *E. undulata* (Waltl, 1837) as a synonym of *M. flaveola* comb. nova and retains logically the older available name: *C. flaveola* (Brullé, 1833). Thus, if the type species is validly fixed, *M. flaveola* is not correctly described and misidentified with another species of small cicada. Therefore, the provision of article 70.3 applies (article 67.9) and in order to maintain the stability and universality of the nomenclature, we select under Article 70.3.1, and thereby fix as the type species, the nominal species previously cited as type species: *Tibicen flaveolus* Brullé, 1833.

We would also like to point out that Fieber (1876) mentioned *primo loco* Brullé's *Tibicen flaveolus* from Greece and that he had some doubts about identity of the taxon *C. virens* (= *Euryphara virens* (Herrich-Schäffer, 1835)) expressed by a question mark in front of it! During our field excursions we well investigated the region on and around Mt. Taigetos and all the small cicadas with yellow - black coloration near the locus classicus of Brullé (Mistra, Sparta, Greece) did correspond to a description of "*Tibicen flaveolus*" by the same author (Brullé, 1833).

DIAGNOSIS. Small species (body length 11–16 mm); length of the fore wings greater than 2.2 times of its width, not rounded at the apex; subcostal cell not expanded at the apex; forewing veins M and CuA meeting basal cell with their stems completely fused; hindwing with 4 to 6 apical cells, usually 5; male tergites 2 and 3 slightly enlarged, abdomen gradually narrowed caudad; sternite VIII as long or slightly shorter than sternite VII; uncus small, not dominant, duck-bill shaped; claspers hooked anterolaterad; pygofer dorsal beak well developed with basal lobe in ventral view showing inner tooth present.

Distribution and characteristics of taxa previously known from Greece

***Mezammira flaveola* (Brullé, 1833) comb. nova**

Tibicen flaveolus Brullé (1833): 112. [Type not examined, not found in the Muséum national d'Histoire naturelle (MNHN, Paris, France) and Muséum Jardin des Sciences de Dijon (MJSD, Dijon, France) collections, probably lost or destroyed.] Type locality: Peloponnese, Laconia, Mistra - Greece.

Cicada flaveola (Brullé, 1833): Walker (1850).

Cicadetta flaveola (Brullé, 1833): (Fieber, 1872).

Melampsalta flaveola (Brullé, 1833): Distant (1906).

Tettigetta flaveola (Brullé, 1833): Schedl (2001).

Cicadivetta flaveola (Brullé, 1833): Puissant & Sueur (2010), Gogala, Drosopoulos & Trilar (2012).

[*Cicadetta virens*: Fieber (1872), Hagen (1856), Puton (1875), Oshanin (1906), Gomez-Menor Ortega (1957), Nast (1972); *non* Herrich-Schäffer (1835). Misidentification].

[*Cicadetta undulata*: Fieber (1872), Hagen (1856), Puton (1875), Oshanin (1906), Gomez-Menor Ortega (1957); *non* Waltl (1837). Misidentification].

MORPHOLOGY. Figs. 3-6, 26c, 31a.

The species, described already by Brullé (1833) and depicted in his book (Fig. 3), has many morphological traits making the determination rather easy. Since the type specimen is lost or destroyed (see above) we selected a typical specimen from our material in the collection proposed to be a neotype. The locality, where this specimen has been collected, is on the southern slope of Mt. Taigetos not far from the Mistra castle, Sparta, Greece, the locus typicus of Brullé specimen. We should point out that this species is very abundant in the localities of higher elevations throughout the

Peloponnese (see below, Fig. 29), from the North (e.g. Mt. Panachaiko), West (e.g. Mt. Minthi), East (e.g. Mt. Korakovouni, Mt. Killini) and South (e.g. Mt. Taigetos).

NEOTYPE DESCRIPTION:

The **white label**: GR: Mani Peninsula/Mt. Taigetos/1.7.2013, 1288 m/N36° 56.735', E22° 22.536'/T.Trilar, M.Gogala leg.

The **red label**: NEOTYPE ♂/*Mezammira flaveola* (Brullé, 1833)/Gogala, Puissant & Trilar det. 2017.

The neotype is deposited in the Slovenian Museum of Natural History (Ljubljana, Slovenia).

Measurements: BL = 15.3 mm, FL= 16.2 mm, FW = 6.47 mm, HL = 8.48 mm, HW = 5.08 mm, PW = 5.49 mm, VW = 2.69 mm.

The body size of this species, given by Brullé is 13 mm. Measurements of our material provide for males a body length of 14.0±0.75 mm (12.6-15.5 mm, 38 males) and for females 14.1±0.5 mm (13.5-14.9 mm, 5 females).

Morphology, dorsal side

The main body coloration is yellow (e.g. neotype, to yellow-green in fresh animals), with black patterns (Figs. 4-6).

Head black, anterior parts of the supra-antennal plates, patch on frontal edge of postclypeus and a short median line at the epicranial suture yellow.

Pronotum - Pronotal collar, its lateral part, anterior edge of pronotum and the medial longitudinal band yellow. Two lateral fields and a dot in the middle of pronotal collar black (Figs. 4-6, 26c). This black dot is not connected with the hind edge of the pronotum or with the lateral black fields. (Only in a few male specimens (3 out of 43) there is a faint connection between this central dot and lateral fields.)

Mesonotum is also black with the exception of the yellow lateral edges, cruciform elevation, wing groove and the connected lateral posterior part of mesonotum yellow (Fig. 5c). Also **metanotum** except a darker basal part yellow.

Abdomen - First two terga black, the posterior edge of t2 yellow. Timbal with timbal plate, 2 long and two short ribs (Fig. 5a). Terga t3 - t8 yellow with black lateral patches and black medial part with exception of the yellow to orange posterior edge (Figs. 4, 5e, 5g). The extent of the black medial fields on terga is diminishing toward the genital segment.

Genital segment - The pygofer yellow, darker at the base. Genital segment of males has all the traits described for the genus *Mezammira*: conical inner tooth is present on the basal lobe (Figs. 5b, 31a), dorsal beak sharp, claspers pointed anterolaterad, pseudoparameres flat, short and not pointed at the tip (Figs. 5b, 31a).

Wings - Transparent**,** with exception of the yellow to orange basal parts, veins on forewings yellow, black around the apical cells. The number of apical cells on fore- and hindwings 8/5. Veins M+CuA on forewings connected to the basal cell by a common root, 1.4 times longer than arculus. First ulnar cell 1.4 times longer than the first apical cell. Plaga and the posterior edge of anal field on hind wings yellow, vein 2A gray infuscate.



Fig. 3: "Tibicen flaveolus" from the plate XXXI of the work of Brullé (1933).

Ventral side:

Head - Postclypeus dark, yellow at the lateral edges. Rostrum brown, with yellow mentum, reaching the posterior end of middle coxae (Figs. 5d, 5f).

Thorax - Sternum yellow with black patches and spots. Opercula reniform, yellow, not touching each other in the middle. Meracanthus yellow, triangular, flat and pointed. Fore legs yellow with dark patches and fasciae on coxae, trochanter and femora. Femur with primary spine and three secondary spines. Fore tibiae yellow and brown, tarsi brown to black distally. Mid and hind legs yellow with double dark patches on all parts of legs. One long and one short dark line on each femur. Tibiae yellow with basal black dots. Tarsal segments on mid and hind legs yellow, distally darker.

Abdomen - Sternites 1 and 2 yellow, dark in the middle parts. Sternites stIII - stVIII yellow. Sternite stVIII shorter (0.86 times) than stVII.

The female morphology of *Mezammira flaveola* comb. nova has never been described, therefore we show it here on the basis of the specimens from the collection PMSL (Fig. 4b). All together we have in this collection 4 specimens and further 2 are in the private collection of the second author (SP).

Measurements - BL = 14.2 mm (13.5-14.9 mm, N = 6), FL = 14.7 mm, FW = 5.85 mm, HL = 7.88 mm, HW = 4.71 mm, PW = 5.16 mm, VW = 2.29 mm. The ratio between M+CuA root length and arculus length is in this specimen 1 (in other specimens >1). Ulnar cell 1 is 1.78 times longer than apical cell 1.

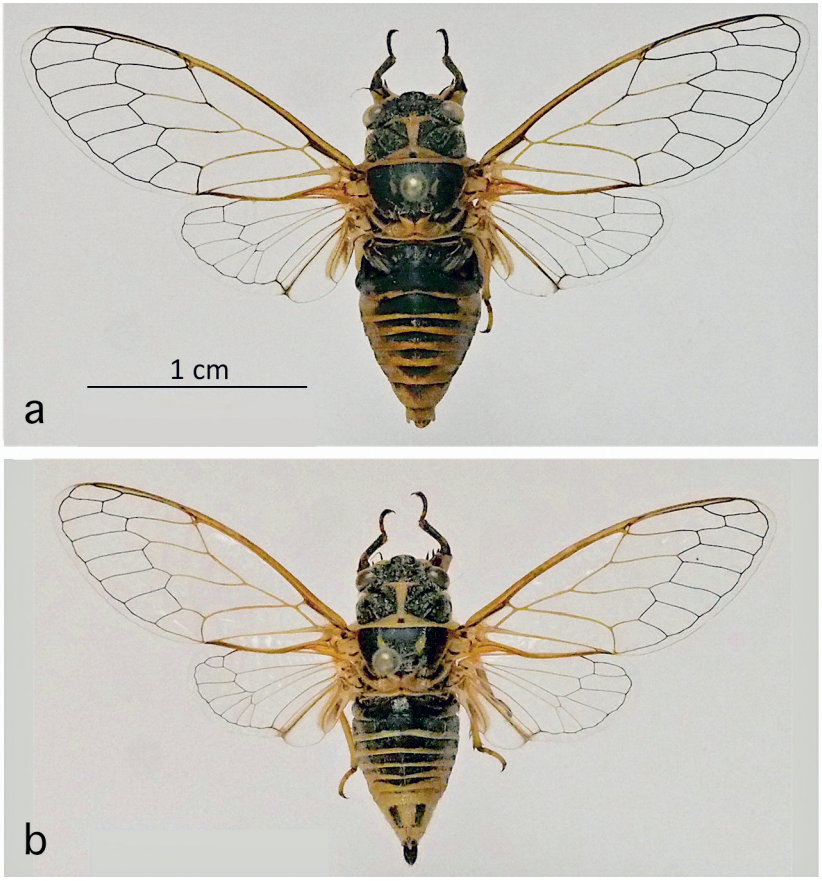


Fig. 4: *Mezammira flaveola* comb. nova; a - neotype male, b - female.

The main morphological characteristics are in female specimens very similar to those in males with exception of some thoracal (operculum) and abdominal structures. The most characteristic is abdominal segment 9, which is yellow with black longitudinal patches dorsally on both sides (Figs. 4b, 5g). In most animals also a dorsal beak is dark. Ovipositor brown, extending beyond the dorsal beak of abdominal segment 9 and anal styles (Fig. 5g).

DISTRIBUTION. *Mezammira flaveola* (Brullé, 1833) comb. nova under the name *Cicadivetta flaveola* (Brullé, 1833) in the work of Puissant & Sueur (2010) and Gogala, Drosopoulos & Trilar (2012), is not present in Spain. *Mezammira flaveola* comb. nova was indeed long confused with two other species inhabiting Spain which are *Euryphara virens* (Herrich-Schäffer, 1835) and *E. undulata* (Waltl, 1837), see: Fieber (1872: 2), Fieber (1876: 121), Hagen (1856: 89), Puton (1875: 111), Oshanin (1906: 19; 1912: 96) and Gomez-Menor Ortega (1957: 66). *Mezammira flaveola*

comb. nova is very different from *E. virens,* a species described by Amyot (1847, 1848) without being named in his work. *Euryphara virens* was also drawn by Gomez-Menor Ortega (1957: 67) under the name *Melampsalta flaveola* (misidentification).

This species is mentioned in the literature in many countries belonging to the Mediterranean or Asian area (see Metcalf, 1963; Duffels & Van der Laan, 1985 and Sanborn, 2014 for more precision). However, this small cicada is at present known with confidence only from Greece.

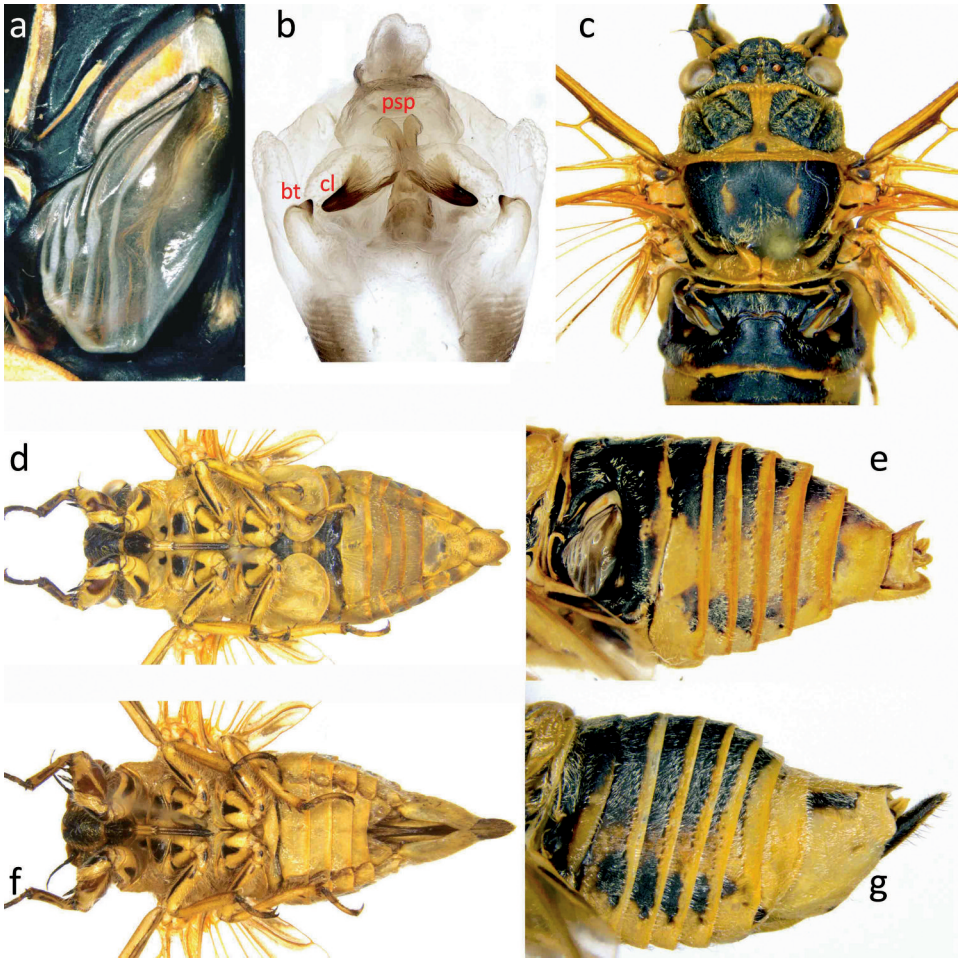


Fig. 5: *Mezammira flaveola* comb. nova, a, c-e - neotype male; f, g - female; a - left timbal; b - male genitalia (psp - pseudoparameres, cl - clasper, bt - tooth on the basal lobe of pygofer); c - details of central and anterior body parts; d - male body (neotype), ventral side; e - lateral view to the abdomen of the male neotype; f - ventral side of a female body with black markings on the legs, characteristic for animals of both sexes; g - lateral view to a female abdomen.



Fig. 6: *Mezammira flaveola* comb. nova from Mt. Mynthi, Peloponnese.



Fig. 7: Typical habitat of *Mezammira flaveola* comb. nova near the village Arbounas, Kleitoria, 1020m ASL.

This is the most common species of the genus *Mezammira* in Greece. We found it on Peloponnese and at some other localities in continental Greece north of the Corinthian Gulf. Outside of Peloponnese we found it on Mt. Elikona and in Epirus near Vavouri, Ano Kleidonia and in Drama (Fig. 29). According to Sakis Drosopoulos† it is present also on the island of Kalymnos (Gogala & Drosopoulos, 2006), but according to our present knowledge about a distribution of cicadas on both sides of the Rechinger line (Gogala & Trilar, 2014) this should be checked again. Data about the presence of this species in Western Europe and in Northwestern Africa are very doubtful (Puissant & Sueur, 2010; Puissant, unpublished data).

The calling song of *M. flaveola* comb. nova was described some years ago by Gogala & Drosopoulos (2006). Additional comparative information on morphology and the song characteristics are given also in this paper (Fig. 23).

We should add that this species is found usually in meadows on grass (Figs. 6, 7), other herbaceous plants and on small shrubs. We found it in the time period from June 9 till July 16 (according to the data from our collection and song recordings).

***Mezammira tibialis* (Panzer, 1798) comb. nova**

Tettigonia tibialis Panzer, 1798.
Cicada (*Tettigetta*) *tibialis* (Panzer, 1798): Kolenati (1857).
Cicadetta tibialis (Panzer, 1798): Szilády (1870).
Melampsalta tibialis (Panzer, 1798): Stål (1866).
Pauropsalta tibialis (Panzer, 1798): Distant (1906), Lodos & Kalkandelen (1981).
Tettigetta tibialis (Panzer, 1798): Kirkaldy (1908).
Cicadivetta tibialis (Panzer, 1798): Boulard (1982a , 1995), Puissant (2006), Puissant & Sueur (2010), Gogala et al. (2012).
Cicadetta tibialis (Panzer, 1798): Emelyanov (1996), Popov (1997).
[*Oligoglena libanotica*: Dlabola (1959) *non* Horváth (1911). Misidentification.]
= *Cicada* (*Tettigetta*) *tibialis* (Panzer, 1798) *caucasica* Kolenati, 1857 **syn. nov.**
[under the name *Melampsalta* (*Pauropsalta*) *tibialis caucasica* (Kolenati, 1857) *in*: Oshanin (1912)];
[under the name *Cicadetta caucasica* (Kolenati, 1857) *in*: Schumacher (1922), Metcalf (1963), Nast (1972), Duffels & Van der Laan (1985) and Sanborn (2014)].
= *Cicada tibialis minor* Eversmann (1859): Nast (1972).
= *Cicada tibialis imbecillis* Eversmann (1859) **syn. nov.**: Schumacher (1922), Nast (1972), under the name *Cicadetta caucasica* (Kolenati, 1857).
= *Cicadetta sareptana* Fieber, 1876 **syn. nov.**: Schumacher (1922), Nast (1972) under the name *Cicadetta caucasica* (Kolenati, 1857).
= *Cicadetta transylvanica* Fieber, 1876: Boulard & Mondon (1996), Puissant (2006).
= *Cicadetta cissylvanica* Haupt, 1935: Dlabola (1963), Lodos & Kalkandelen (1981).

Gogala et al. (1996) and Popov (1997) reported that they did not find any important difference in acoustic traits between *M. caucasica* comb. nova from Southern Caucasus and *M. tibialis* comb. nova from Slovenia. Emelyanov (1996) studied the morphology of both taxa and suggested the synonymy. Therefore *M. caucasica* comb. nova is considered as a junior synonym of *M. tibialis* comb. nova.

MORPHOLOGY. Figs. 8, 11a, 26a, 31c.

DISTRIBUTION. *Mezammira tibialis* comb. nova is, like *M. flaveola* comb. nova, mentioned in the literature in many countries belonging to the Mediterranean or Asian area (see Metcalf, 1963; Duffels & Van der Laan, 1985 and Sanborn, 2014 for more precision). Like *M. flaveola* comb. nova*, M. tibialis* comb. nova is not present either in Portugal and Spain (Sueur et al., 2004; Puissant, unpublished data) and this species was probably misidentified in these countries with species belonging to the genus *Tympanistalna* Boulard, 1982 (Puissant, unpublished data). The western limit of its distribution area is in France, precisely in the extreme south-east part of the country in the Alpes-Maritimes department (Puissant, 2006). This species was not found in the Maghreb area (Puissant, unpublished data) and its east and north-east area limits need to be confirmed. In the present state of our knowledge *M. tibialis* comb. nova is widely distributed in southern Europe and was just recently (29. 5. 2016) for the first time found in Greece in Central Macedonia near Litochoro (Gogala & Trilar, unpublished data) (Figs. 8, 29). The calling song was first described by



Fig. 8: *Mezammira tibialis* comb. nova from Litochoro, Greece.



Fig. 9: *Mezammira carayoni* comb. nova from Rethymno, Crete.

Boulard (1995) and in more details by Gogala et al. (1996) and Sueur & Puissant (2000).

***Mezammira carayoni* (Boulard, 1982) comb. nova**

Tettigetta carayoni Boulard, 1982b.

Tettigetta carayoni Boulard, 1982b: Trilar & Gogala (2010).

Cicadivetta carayoni (Boulard, 1982b): Puissant & Sueur (2010), Gogala, Drosopoulos & Trilar (2012).

MORPHOLOGY. Figs. 9, 11c, 26d, 31b.

DISTRIBUTION. *Mezammira carayoni* comb. nova is an endemic species of Crete (Fig. 29). Boulard described this species from the material collected by the French entomologist Jacques Carayon (1982b). The calling song was described by Trilar & Gogala (2010) and is similar to the calling song of *M. flaveola* comb. nova. This species is common in Crete from the seacoast to the highest localities and has not been found anywhere else. The type material was collected on 5th June (Boulard, 1982b) and we found *M. carayoni* in the time period from June 27 to July 3.

***Mezammira goumenissa* (Gogala, Drosopoulos & Trilar, 2012) comb. nova**

Cicadivetta goumenissa Gogala, Drosopoulos & Trilar, 2012.

MORPHOLOGY. Figs. 10, 11b, 26b, 31d.



Fig. 10: *Mezammira goumenissa* comb. nova, Mt. Panachaiko.

DISTRIBUTION. *Mezammira goumenissa* comb. nova is an endemic species of Greece (Fig. 29). This cicada was described recently (Gogala et al., 2012) and is restricted to a very small area in the Northern Peloponnese around the village of Goumenissa in localities at 700±50 m ASL. Imagoes were flying and singing there in the time period from June 9 to 28 (Gogala et al. 2013). However, we found this species later, on June 30 2015 also on Mt. Panachaiko in localities from 700 m up to 1300 m (Gogala & Trilar, unpublished data). The calling song of this species was described by Gogala et al. (2012, 2013).

Other taxa assigned to the genus *Mezammira*, not reported from Greece

The subspecies *Cicadetta tibialis acuta* Dlabola, 1961, synonymised with *Mezammira tibialis* (Panzer, 1798) by Nast (1972) (as *Cicadetta tibialis*), does not belong to the genus *Mezammira*. After examination of the three males of the type series deposited in the MNHN, the taxon described by Dlabola (1961) belongs in fact to the genus *Tettigetta* Kolenati, 1857: *Tettigetta acuta* (Dlabola, 1961) **comb. nova, stat. nov.** This species is known from Uzbekistan and the former Soviet Union (Dlabola, 1961).

***Mezammira parvula* (Fieber, 1876) comb. nova**

Cicadetta parvula Fieber, 1872: ***nomen nudum***.

Cicadetta parvula Fieber, 1876 [*non Cicada parvula* Say, 1825 ***nomen praeoccupatum***: Kirkaldy (1909), Davis (1920) = *Cicadetta calliope* (Walker, 1850)].

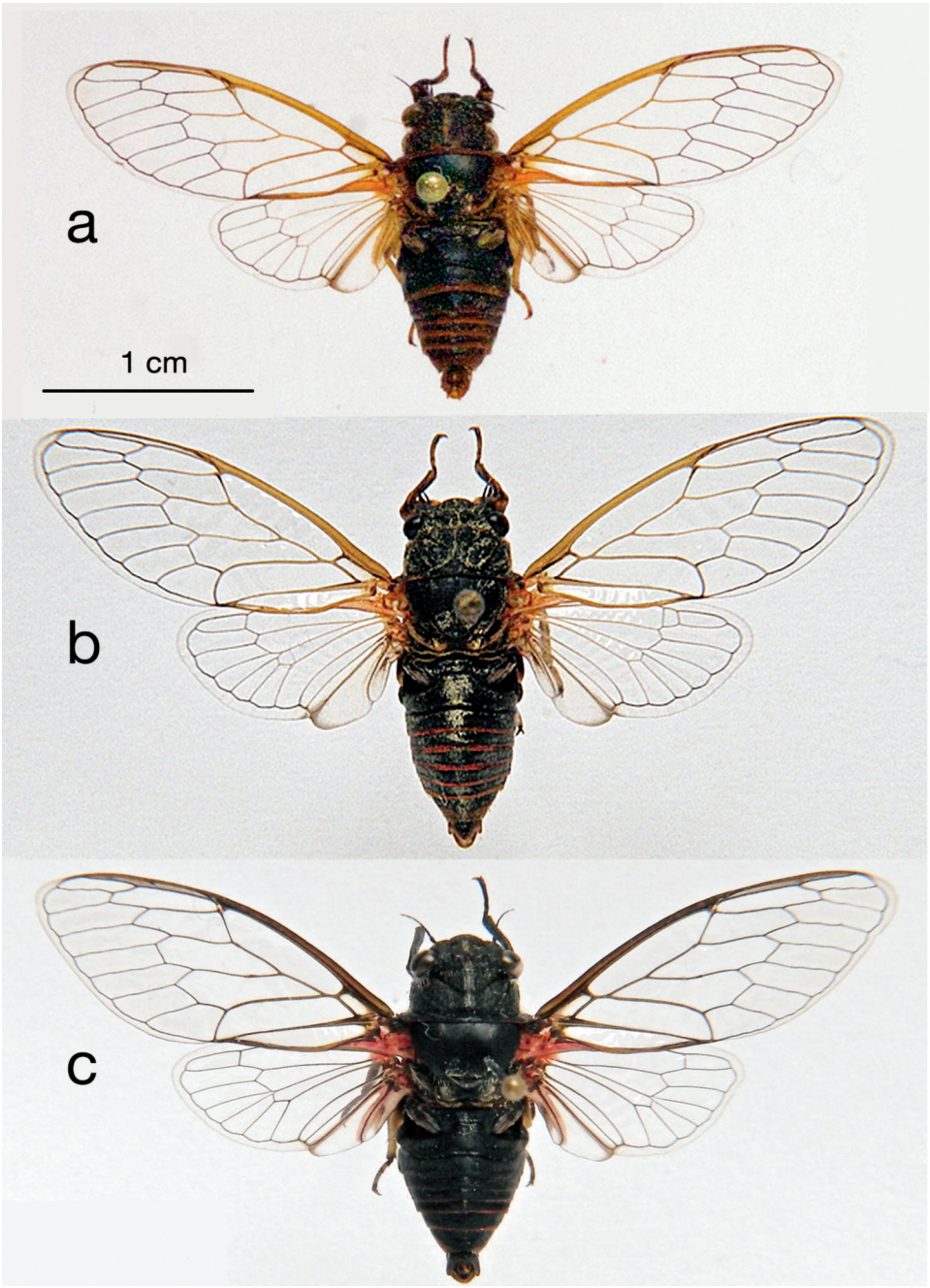


Fig. 11: Habitus of *Mezammira* species of Greece: a - *M. tibialis* comb. nova, b - *M. goumenissa* comb. nova, c - *M. carayoni* comb. nova

Melampsalta parvula (Fieber, 1876): Uhler (1888).
Tettigetta parvula (Fieber, 1876): Schedl (1999).
Cicadivetta parvula (Fieber, 1876): Puissant & Sueur (2010).
= *Cicadetta fieberi* Oshanin, 1908: Nast (1972), Lodos & Kalkandelen (1981).
= *Cicadetta fieberi* Kirkaldy, 1909: primary homonym, Nast (1972), Lodos & Kalkandelen (1981).
= *Oligoglena libanotica* (Horváth, 1911): Schedl (1999). Type in Natural History Museum in Budapest examined by Schedl (1999).

DISTRIBUTION. Turkey (Fieber, 1876; Nast, 1972; Lodos & Kalkandelen, 1981; Kemal & Koçak, 2010), Asia Minor (Oshanin, 1906), Lebanon (Horváth, 1911), Israel (Schedl, 1999). The presence of this species in Morocco (Nast, 1972; Lodos & Kalkandelen, 1981) is very doubtful (Puissant, unpublished data).

***Mezammira sibilatrix* (Horváth, 1901) comb. nova**

Cicadetta sibilatrix Horváth, 1901.
Pauropsalta sibilatrix (Horváth, 1901): Distant (1906).
Melampsalta sibilatrix (Horváth, 1901): Fahringer (1922).
Cicadivetta sibilatrix (Horváth, 1901): Gogala, Drosopoulos & Trilar (2012, 2013).

DISTRIBUTION. Turkey (Horváth, 1901; Fahringer, 1922; Nast, 1972; Lodos & Kalkandelen, 1981; Kemal & Koçak, 2010), Asia Minor (Horváth, 1901), Syria (Schumacher, 1923; Nast, 1972; Lodos & Kalkandelen, 1981), Lebanon (Schumacher, 1923), Israel (Schumacher, 1923; Nast, 1972; Lodos & Kalkandelen, 1981).

***Mezammira iphigenia* (Emelyanov, 1996) comb. nova**

Cicadetta iphigenia Emelyanov, 1996 [holotype and one paratype examined with photos of Vladimir Gnezdilov, Zoological Institute, Saint-Petersburg Collection].

DISTRIBUTION. Crimea (Emelyanov, 1996; Trilar et al., 2006), Romania (Trilar et al., 2006; Trilar & Gogala, 2008).

***Mezammira popovi* (Emelyanov, 1996) comb. nova**

Cicadetta popovi Emelyanov, 1996.

DISTRIBUTION. Tadzhikistan (Emelyanov, 1996; Popov, 1997).

***Mezammira turcica* (Schedl, 2001) comb. nova**

Tettigetta turcica Schedl, 2001.

DISTRIBUTION. Turkey (Schedl, 2001; Kemal & Koçak, 2010).

DESCRIPTION OF NEW TAXA

***Mezammira filoti* Gogala & Trilar sp. nova,**
morphology, acoustics, distribution

Type material: HOLOTYPUS + PARATYPUS 1-3 (♂♂), white labels: GR: Naxos: Filoti, 22.6.2014, 436 m, N37°02.484', E25°29.690', T.Trilar, M.Gogala leg.; PARATYPUS 4 (♂) and PARATYPUS 5 (♀): GR: Naxos: Filoti, 21.6.2014, 436 m, N37°02.487', E25°29.685', T.Trilar, M.Gogala leg.

Red labels: HOLOTYPUS/ *Mezammira filoti/* Gogala & Trilar 2017
PARATYPUS X/ *Mezammira filoti/* Gogala & Trilar 2017

The holotype and paratypes are deposited in the Slovenian Museum of Natural History (Ljubljana, Slovenia).

Morphology. Figs. 12-14, 26f.

Measurements - Body length, males (5): 12.04-13.69 mm, female (1): 12.04 mm.

Dorsal side

Head - Black with yellow markings. Median furrow on vertex (epicranial suture), front edge of the supra-antennal plates and median line on vertex yellow. Compound eyes in living animals reddish brown (Fig. 13).

Thorax - Pronotum black, pronotal collar broadly yellow, laterally darker, anterior edge and median line also yellow. Dark basal spot on pronotal collar diagonally connected with both black fields (Figs. 14a, 26f). Mesonotum black, lateral edges yellow. Fields between the cruciform elevation and the wing grooves pale yellow. Metanotum with black patch in the middle, laterally yellow (Fig. 14a).

Wings - Measurements: FL = 12.3±0.6, FW = 5.0±0.3, FL/FW = 2.5±0.1.

Wings hyaline, basal part of veins yellow to brown, distally black. Forewing veins M and CuA at the basal cell completely fused, fused stem 0.85-1.5 times as long as arculus. Number of apical cells on forewings 7 in the holotype and 7 or 8 in paratypes, on hindwings 5 (holotype), in two paratypes 6 on one side. Ulnar cells on forewings 1.36-2.33 times longer than apical cell 1. Apical cell a2 on hind wings larger than others.

Abdomen - Tergum black, distal edges of tergites reddish brown to yellow. Males: timbals with two long and two short ribs in addition to the timbal plate (Fig. 14c).

Female: Habitus similar to the males, except genital abdominal structures. Tergum dark, segments caudally yellow and reddish brown. Tergites t8 and ab9 at the sides broadly pale yellow (Figs. 14e, 14g).

Genitalia - Males: Pygofer yellow, darker at the base, dorsally black with black pointed dorsal beak. Upper lobe elongated, whitish or pale yellow. Basal lobe also pale yellow with darker inner tooth. Median lobe of uncus short, rounded. Claspers hooked anterolaterad, dark brown toward the tip. Pseudoparameres short, flattened, not pointed at the tip (Fig. 14b).

Ventral side

Head - Black, lateral edge of postclypeus brown. Rostrum brown with yellow menthum, reaching the posterior tips (distal end) of middle trochanters.

Thorax - Prosternum pale yellow with brown markings. Sternum yellow with dark patches. Males: Operculum and meracanthus yellow, in some paratypes darker at the base.

Legs - Coxae yellow with dark brown longitudinal patches. Front femora with primary and 3 secondary spines, female specimen with two secondary spines. Spines and their basis brown with one dark brown patch under the primary spine extending to trochanter. Medial side of front femora brown. Trochanter yellow and brown. Front tibiae brown, first tarsal segment yellow, metatarsus dark, claws yellow and darkened toward the tip. Mid and hind legs yellow with dark brown longitudinal patches, femora on the ventral side with a short dark line and frontally with a long dark line.

Abdomen - Sternites III-VI pale yellow, posterior edges red and yellow. Also sternite VIII pale yellow, slightly shorter or the same length as sternite VII. Sternites I, II and VII

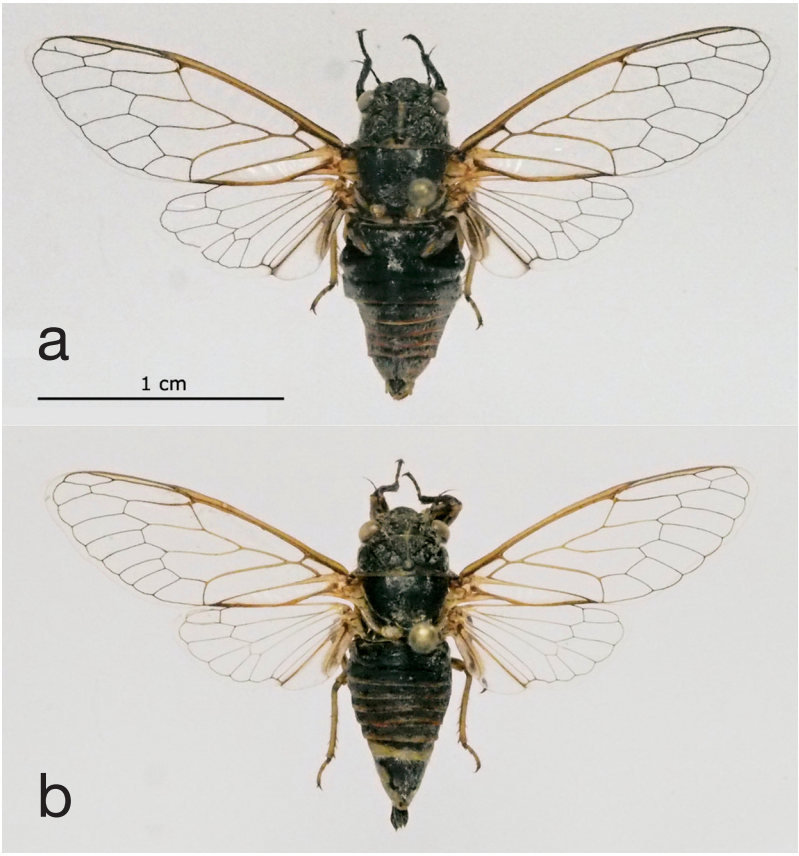


Fig. 12: *Mezammira filoti* sp. nova: a - holotype, b - female paratype 5.



Fig. 13: *Mezammira filoti* sp. nova from Naxos island.

darker (gray). Abdominal sternites III to VI pale yellow, sternite VII pale yellow with dark patch on each side. Females: Ovipositor brown, darker toward the tip. Gonocoxites IX-X dark brown (Figs. 14e, 14g). Ovipositor length is 38% of the body length.

Acoustic behaviour

Calling song - The calling song of this species is very similar to the song of *M. flaveola* comb. nova comprising two phrases, A and B. Phrase A is composed of fast repeating echemes of medium duration (MMM...) with the repetition rate 7.7-8.7 Hz. Singing animals periodically switch to phrase B with groups of longer (L) and a few very short echemes (S) inbetween (LSSLSSLSS...) (Figs. 15, 16). There is no interruption in song between phrases. The duration of echemes in phrase A is 25.8±4.3 ms (n=280) and the interval between them 98.7±6.5 ms (n=273). In phrase B the duration of L is 87.5±42.1 ms (n=213) and the duration of S is 7.7±4.5 ms (n=346). The duration of intervals in the phrase B is 83.6±25.3 ms (N=602). The number of long echemes in phrase B varies very much from a few L to 30 or 50 but the number of S echemes inbetween L echemes is very stable: 2, occasionally 1 or 3.

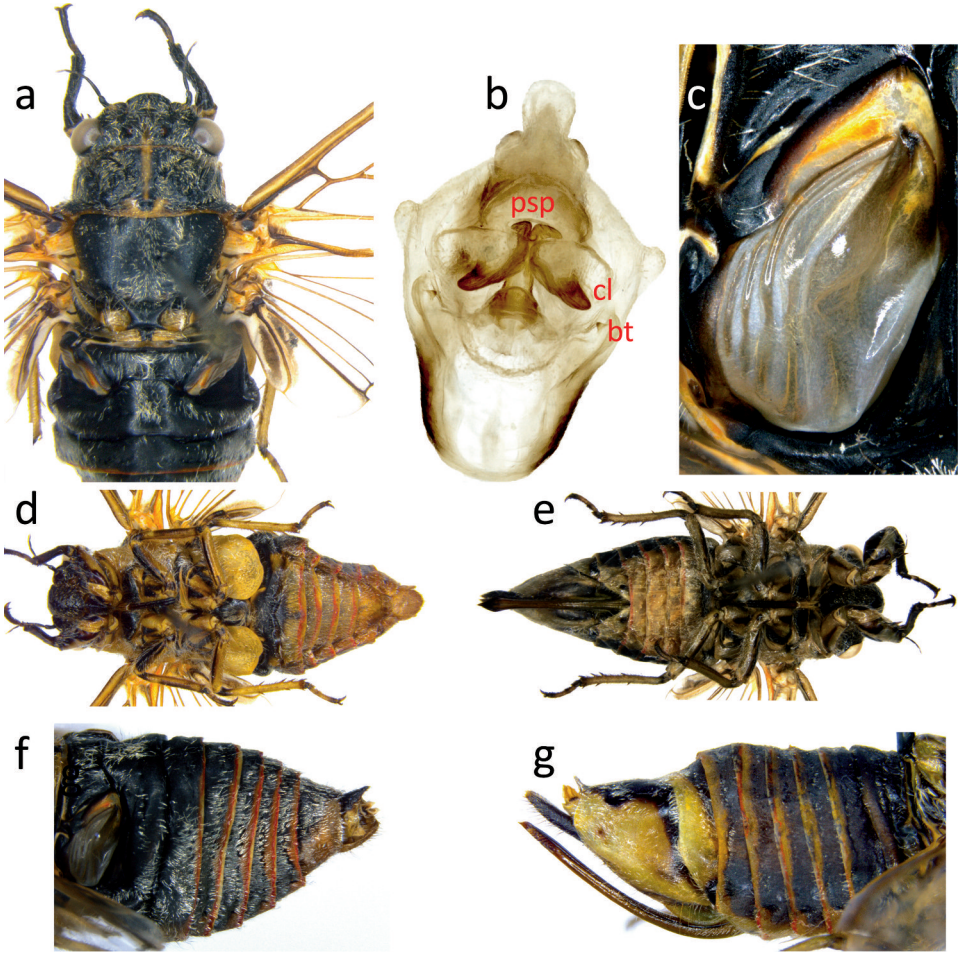


Fig. 14: *Mezammira filoti* sp. nova: a - body details of the holotype; b - male genitalia: psp - pseudoparameres, cl - claspers, bt - inner tooth on the basal lobe of pygofer; c - left timbal; d - male holotype, ventral side; e - female paratype 5, ventral side; f - lateral view of the male abdomen (holotype); g - lateral view of the female abdomen, paratype 5.

The carrier frequency of the calling song is in both phrases the same in the range of 10.8-17.8 kHz (5% limit - 95% limit) with the center frequency of 13.9 kHz (Table 3, Figs. 15, 27).

Etymology

We named this species after the village Filoti on the island of Naxos, where we found the only population of this new species.

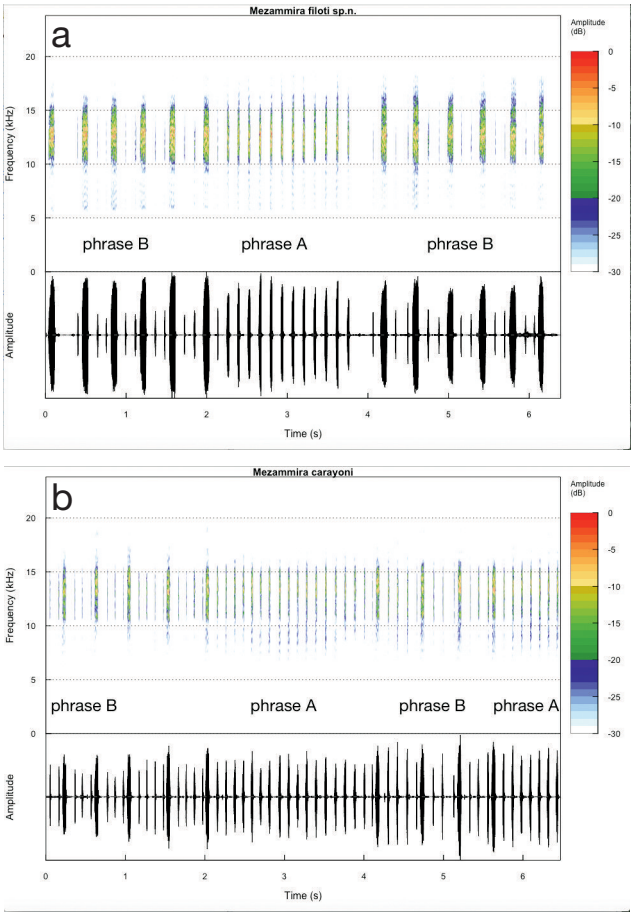


Fig. 15: *Mezammira filoti* sp. nova: a - Oscillogram and spectrogram of the selected part of the calling song with phrase B (0-2s, 4-6.5s) and phrase A (2-4s); b - song selection of *M. carayoni* comb. nova of similar length for comparison.

Distribution and Ecology

We found this species on the island of Naxos, but only in one locality with phrygana (garigue) vegetation near the village Filoti on the steep slope oriented to the northwest above the main road between Filoti and Apeiranthos. The locality is from the northwest surrounded by cultivated fields and gardens and from the other side by the steep rocky slope (Fig. 18). Anywhere else on the island we found only *Cicada orni* Linnaeus, 1758 and *Euboeana castaneivaga* Gogala, Trilar & Drosopoulos, 2011 (Fig. 17, unpublished data). *Euboeana castaneivaga* was described previously from the island of Evia and found later on the island of Andros (Gogala & Trilar, 2014). It is possible, that *M. filoti* sp. nova could in the future be found also in some

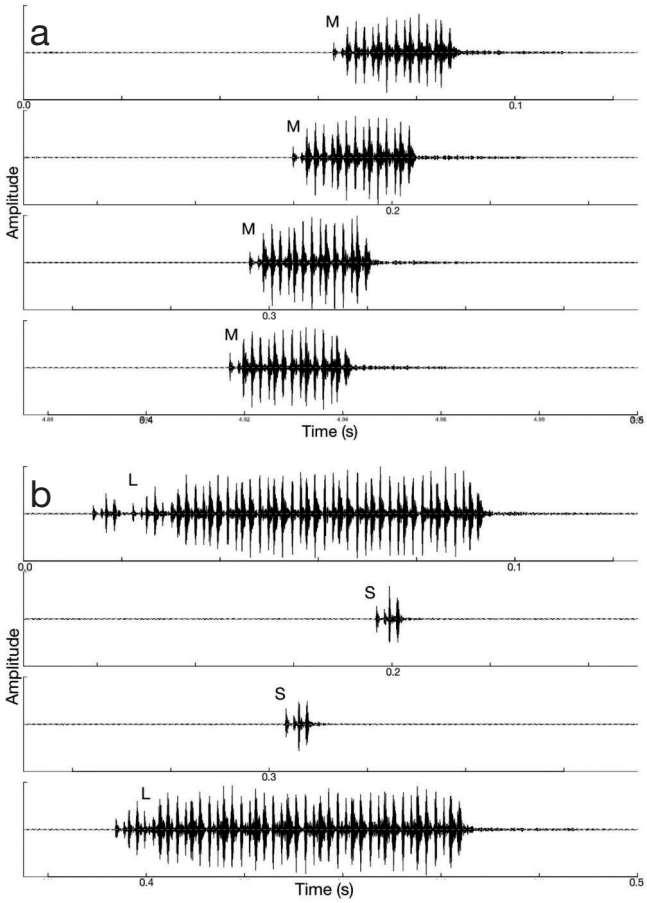


Fig. 16: *Mezammira filoti* sp. nova: Examples of phrase A with echemes MMM (a) and phrase B with a sequence LSSL (b) in extended time scale.

other localities on Naxos or on other islands of the Cyclades, but at present we know only the single locality, described above.

Due to the small (probably residual) population of *M. filoti* sp. nova its habitat should be protected by law.

***Mezammira sakisi* Gogala & Trilar sp. nova**
morphology, acoustics, distribution

Type material: HOLOTYPUS, the white label: GR: Peloponnese: Laconia, Evrotas, Kremasti, Mt.Chionovouni, 26.6.2015, 867 m, N36.98611˚ E22.90383˚, T.Trilar, M.Gogala leg.; PARATYPUS 1-10 (♂♂), 12-14 (♀♀), the white labels: GR: Peloponnese: Laconia, Evrotas, Kremasti, 26.6.2015, 915 m, N36.96796˚, E22.88843˚,

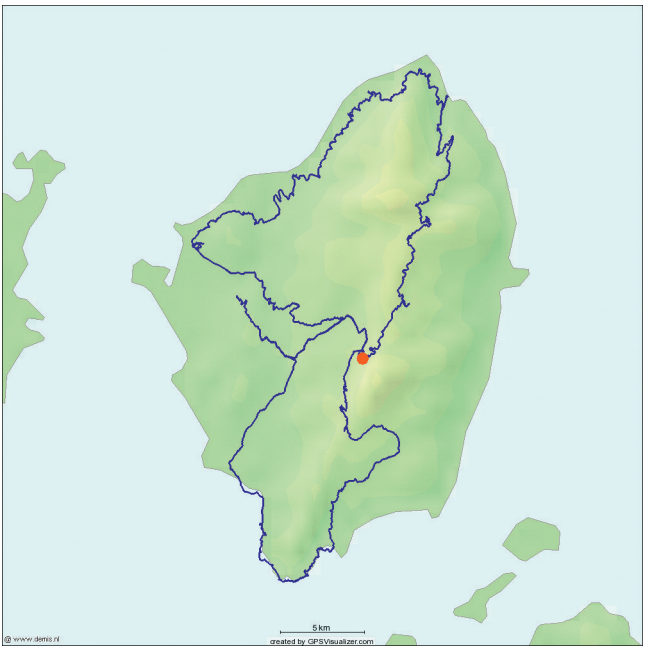


Fig. 17: Type locality of *Mezammira filoti* sp. nova (red dot) and tracks of our field research on Naxos.



Fig. 18: Habitat of *Mezammira filoti* sp. nova with phrygana vegetation near the village Filoti, island of Naxos.

T.Trilar, M.Gogala leg.; PARATYPUS 11 (♂) GR: Peloponnese: Laconia, Evrotas, Apidia, 26.6.2015, 225 m, N36.86963˚, E22.81469˚, T.Trilar, M.Gogala leg.

The red labels: HOLOTYPUS/ *Mezammira sakisi/* Gogala & Trilar 2017

PARATYPUS XX/ *Mezammira sakisi/* Gogala & Trilar 2017

The holotype and paratypes are deposited in the Slovenian Museum of Natural History (Ljubljana, Slovenia).

Morphology. Figs. 19-21, 26e.

Measurements - Body length, males (12): 11.6±0.7 mm, females (3) 11.6-13.7 mm.

Dorsal side

Head - Black with yellow markings. Median furrow on vertex (epicranial suture), anterior edge of the supra-antennal plates, a dot at the anterior part yellow. Compound eyes in living animals black (Fig. 20).

Thorax - Pronotum black, hind edge of pronotal collar and frontal edge of pronotum reddish brown or yellow, laterally darker, the median line brown or yellow (Figs. 21a, 26e). No dark median spot on pronotal collar.

Mesonotum black, lateral and hind edges yellow. Fields between the cruciform elevation and the wing grooves and further the lateral edge brown to pale yellow. Hind edges of metanotum yellow or lighter than ground color. Body parts covered with silvery hairs, longest ones behind the compound eyes and around the cruciform elevation.

Abdomen - Tergum black, distal edge of tergites reddish brown. Males: timbals with two long and two short ribs in addition to the timbal plate (Fig. 21c).

Wings - Measurements: FL = 12.7±0.9, FW = 5±0.3, FL/FW = 2.5±0.1 (N=30).

Wings hyaline, forewing veins M and CuA at the basal cell completely fused, fused stem 1.47±0.4 times longer than arculus. Number of apical cells on forewings 8 (in 2 paratypes unilaterally 9), on hindwings 5 (in 4 paratypes 6 on one side). Ulnar cell on forewings 1.36±0.11 times longer than apical cell 1.

Ventral side

Head - Black, lateral edge of postclypeus yellow. Rostrum extends slightly beyond the middle trochanters. Proximal part of antennae black, distally whitish.

Thorax - Thoracic sternum black with yellow markings. Males: Opercula reniform, gray, hind part lighter. Meracanthus triangular, edges curved upward, yellow.

Legs black, brown and yellow. Middle and hind femora black, with hind side yellow. In lighter specimens at the base, a short dark line and black longitudinal patch ventrally. Fore femora black with lateral yellow longitudinal fascia, median side brown. All legs with many hairs, tibia with spurs as well. Fore femora with primary and three secondary spines.

Abdomen - Sternites III-VII yellowish, in the middle proximal part often darker. Sternite VIII yellow, slightly shorter than sternite VII (stVIII/stVII = 0.8±0.1 (n=12)). Sternites I and II dark. Epipleurites gray, except the yellow hind and inner edge.

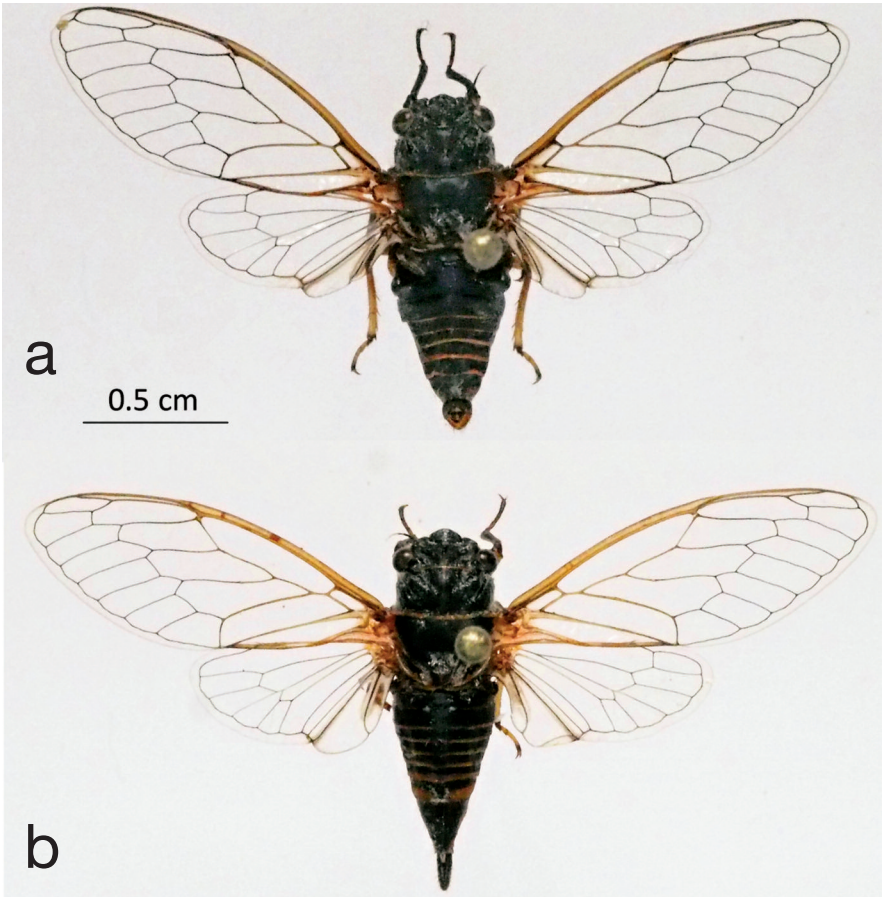


Fig. 19: *Mezammira sakisi* sp. nova: a - male holotype, b - female paratype 13.

Genitalia - Males: Very similar traits as in *M. filoti* sp. nova. Cylindrical inner tooth on the basal lobe present, dorsal beak sharp, claspers pointed anterolaterad, pseudoparameres flat, short and not pointed at the tip (Fig. 21b).

Females: Sternite VIII without dark spot (Fig. 21e). Ovipositor extends further behind the tip of tergite 9 as compared to the related species (e.g. *M. filoti*). The length of the ovipositor is 34% of the body size (Figs. 19b, 21e, 21g).

Acoustic behaviour

Calling song - The calling song of *M. sakisi* sp. nova (Fig. 22) is similar to the song of *M. flaveola* comb. nova (Fig. 23) with fast repetition of short echemes of different durations. The song is comprised of phrases of three different patterns, which change randomly without interruption through many minutes. We keep the designation of phrases (A, B, C) as in the paper describing the song of *M. flaveola* comb. nova (Gogala & Drosopoulos, 2006).



Fig. 20: *Mezammira sakisi* sp. nova on Kermes Oak (*Quercus coccifera*).

The simplest pattern or phrase A is the repetition of the same type of echemes (MMM...). In *M. sakisi* sp. nova the duration of echemes in phrase A is 33.1±5.1 ms (n=718). The intervals between echemes last in this phrase 80.3±9.1 ms (n=720) (Table 2, Fig. 22, 24).

The second pattern in phrase B is composed of groups of long echemes (L) with intervals filled in most cases with three very short echemes (LSSSLSSSL...) (Figs. 22, 24). The duration of long echemes in phrase B is 69.6±8.6 ms (N=278), and of the short ones 11.4±4.9 ms (n=950). The shortest echemes in this phrase consist of only one syllable with 4 timbal clicks as in the case of *M. filoti* sp. nova (see above and Fig. 24). The average interval duration between echemes in this phrase is 75.1±17.8 ms (n=944) with the exception of the last interval preceding the long echeme, which lasts 44.6±10.2 ms (n=280). The number of long echemes in the groups of the phrase B ranges from 3 to more than 15 (median 5).

The third pattern or phrase C comprises just the long sequences of alternating long and short echemes (LSLS...) or long and two short echemes (LSSLSS…). The duration of long echemes in this phrase is 83.1±8.8 ms (n=762) and of short echemes 20.3±4.7 ms (N=818). The average interval between echemes in such sequences is 42.5±10 ms (n=1578) and the repetition rate of echemes is 10.5 Hz (Fig. 22).

The time parameters presented above represent the calling song of animals, recorded in the **Eastern Peloponnese**.

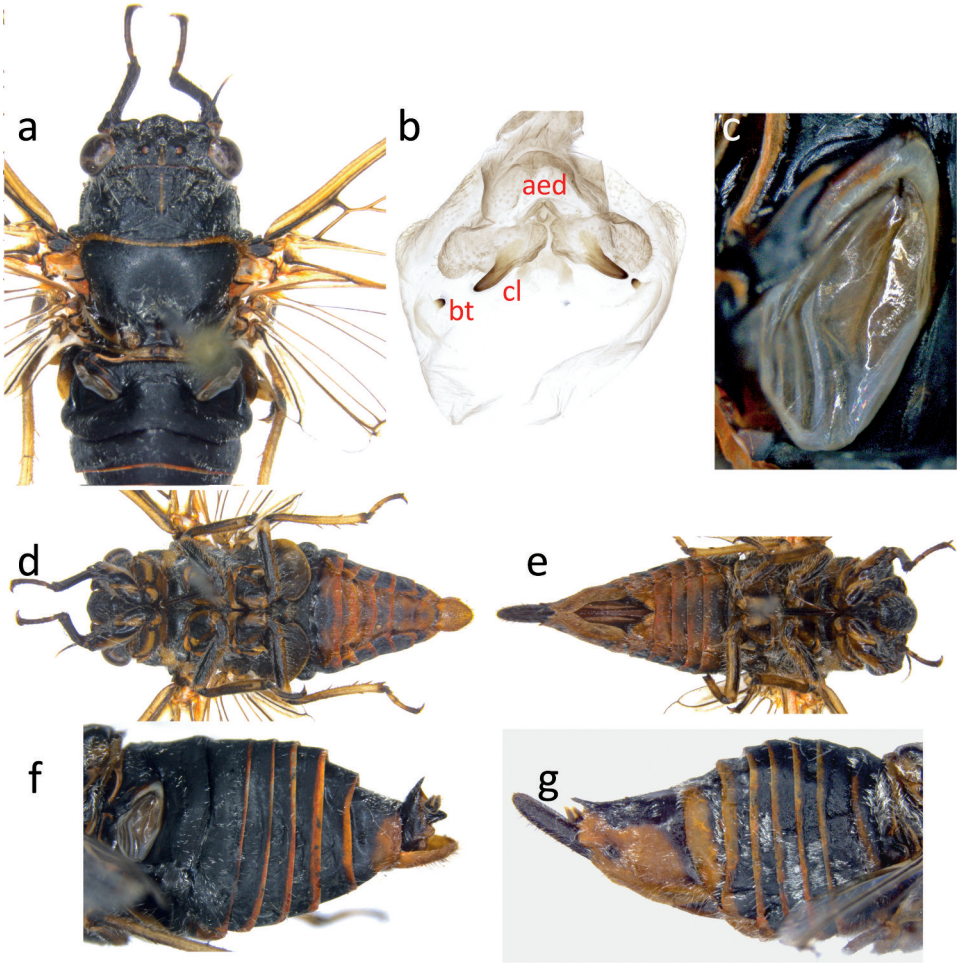


Fig. 21: *Mezammira sakisi* sp. nova: a, c, d, f – holotype, e, g – female paratype 13; a - body details of the holotype; b - male genitalia: aed - tip of aedeagus with pseudoparameres and a gonopore, cl - claspers, bt - inner tooth on the basal lobe of pygofer; c - left timbal; d - male holotype, ventral side; e - female paratype 13, ventral side; f - lateral view of the male abdomen (holotype); g - lateral view of the female abdomen, paratype 13.

The most important parameter in the calling song of *M. sakisi* is the carrier frequency, which is the same in all phrases. The center frequency of the recordings from the Eastern population is 18.7±0.5 kHz (n=20), with the lower (5%) limit at 16.7±1.7 kHz (n=20) and higher (95%) limit at 20.7±0.7 kHz (n=20) (Table 3, Fig. 27). These values are in both populations much higher as compared to the frequency range and center frequency of sympatric *M. flaveola* comb. nova (Table 3, Fig. 27).

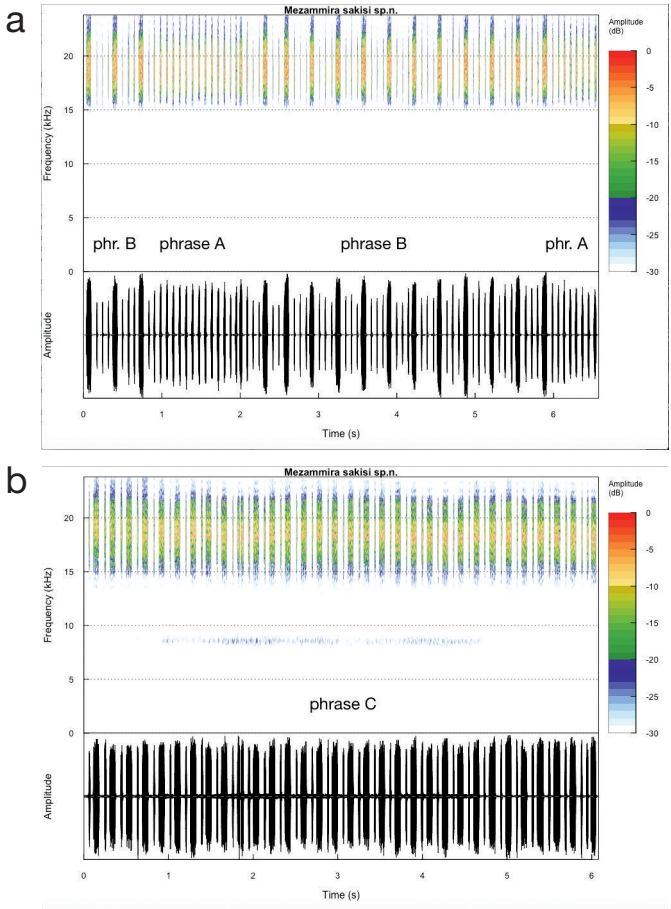


Fig. 22: Oscillogram and spectrogram of the selection in the calling song of *Mezammira sakisi* sp. nova with phrases A (0.8-2 s, 6-6.5 s) and B (0-0.8 s, 2-6 s) (a) and phrase C (b).

Etymology

The name of this species, *Mezammira sakisi* sp. nova, is devoted to the memory of our friend and excellent biologist Prof. Athanasios (Sakis) Drosopoulos†, who lead us to many most interesting habitats in his country and importantly shared our research on cicadas. He passed away on March 30th 2014 (Hoch et al., 2015).

Distribution and Ecology

We found *M. sakisi* sp. nova in the hills and mountains of Eastern Peloponnese from Ag. Andreas and Korakovouni, around Mt. Chionovouni and Mt. Madara to the Apides in the South East (Fig. 29). The animals were usually sitting and hiding in small shrubs (e.g. *Quercus coccifera,* Figs. 20, 25).

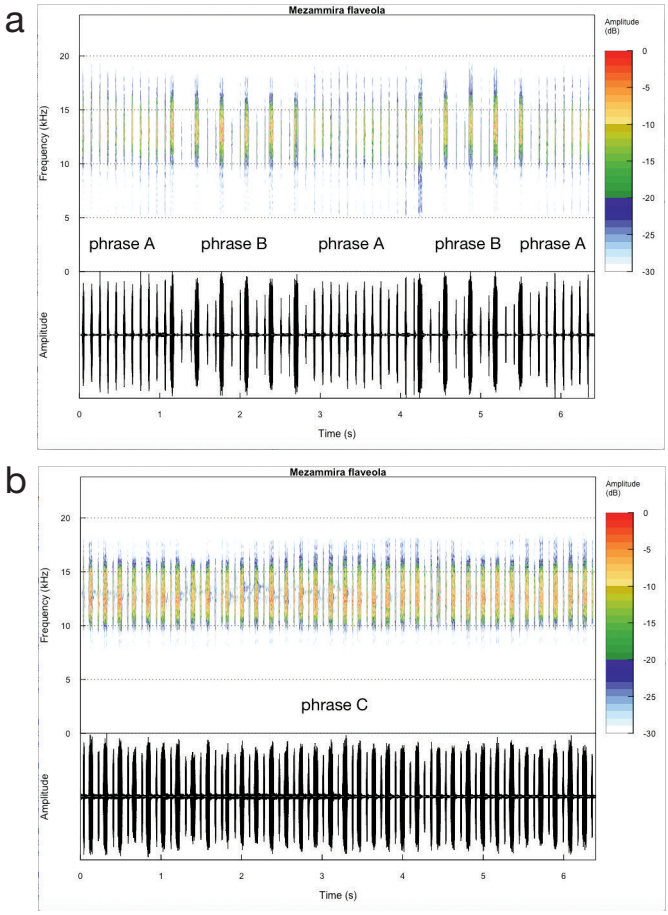


Fig. 23: *Mezammira flaveola* comb. nova phrase A and B (a) and phrase C (b). Shown is similar selection as in Fig. 22 - see the differences in carrier frequency range of the song as compared to the range of *M. sakisi* sp. nova (Fig. 22)!

Discussion

Comparison of all species present in Greece

with keys for discrimination by morphological and acoustic traits.

Cicadas of the genus *Mezammira* in Greece are represented, according to our present knowledge, by the following species: *M. flaveola* comb. nova (Figs. 4, 6), widely distributed and abundant species on Peloponnese and in some localities in central and northern Greece, *M. tibialis* comb. nova (Figs. 8, 11a), very common species in the entire southern part of Europe except Spain and Portugal, but only recently found near Litochoro in northern Greece, *M. carayoni* comb. nova (Figs. 9, 11c), the endemic

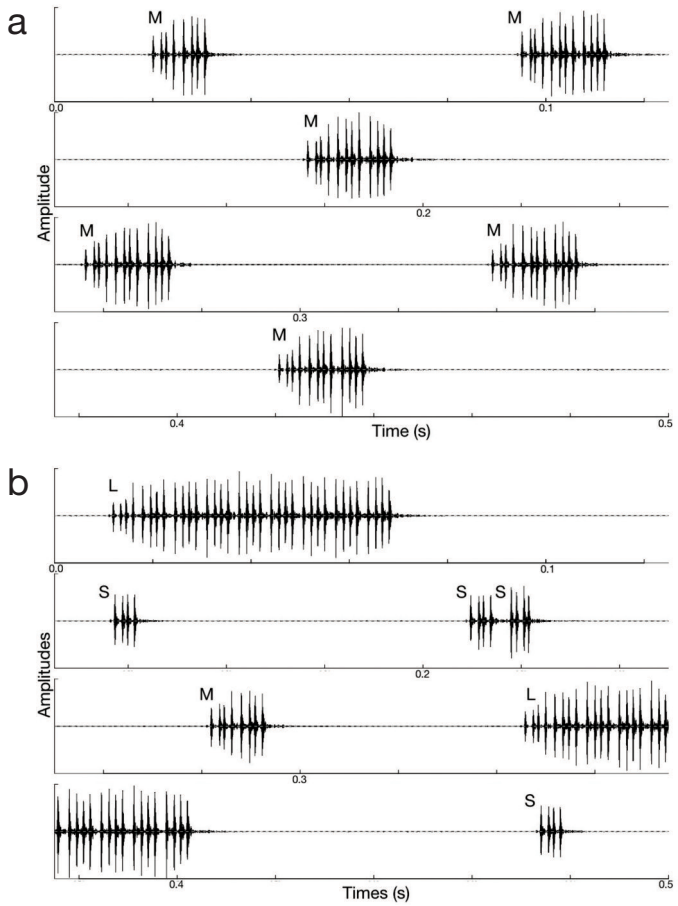


Fig. 24: *Mezammira sakisi* sp. nova: Examples of phrase A with echemes MMMMM (a) and phrase B with a sequence LSSMLS (b) in extended time scale.

species of Crete, and the recently described species from northern Peloponnese, *M. goumenissa* comb. nova (Figs. 10, 11b). In this paper we are describing two new species, *M. filoti* sp. nova from the island of Naxos and *M. sakisi* sp. nova, discovered in some localities on Peloponnese. After the comparison of morphological and acoustical traits we found many similarities but also differences among this group of species.

Similarities:

The common **morphological characteristics** show clearly, that all compared species belong to the same genus. These cicadas are small, with body length between 11.5-15.5 mm. Pygofer is dorsally beak shaped and is bearing an inner tooth on the basal lobe.



Fig. 25: Habitat of *Mezammira sakisi* sp. nova near Mt. Madara and village Kremasti in the Eastern Peloponnese.

Upper lobe is elongated, uncus is small, not prominent and semicircular or duck-bill shaped.

Pointed claspers are oriented anterolaterad, pseudoparameres are flat and not very long (with exception of *M. tibialis* comb. nova and *M. goumenissa* comb. nova, Figs. 31c, 31d). Sternite VIII is shorter or of similar length as sternite VII. Veins M and CuA on forewings are meeting the basal cell with stems completely fused. The number of apical cells in the forewings is in most species 8 (with exception of *M. filoti* sp. nova - 7), sometimes unilaterally 7 or 9, and on the hindwings 5 (unilaterally 3 - 6!). Exceptions are *M. carayoni* comb. nova and *M. goumenissa* comb. nova with 6 apical cells on the hind wings (Figs. 11b, 11c) (Boulard, 1982b; Gogala et al., 2012).

The common **acoustic trait** in the calling songs of Greek *Mezammira* species is fast repetition of short echemes of different durations in specific phrases, which are switching without interruption from one into the other (Figs. 15, 16, 22-24, 30). The only exceptions among Greek *Mezammira* species are again *M. tibialis* comb. nova and *M. goumenissa* comb. nova. For *M. tibialis* comb. nova, the longer duration M

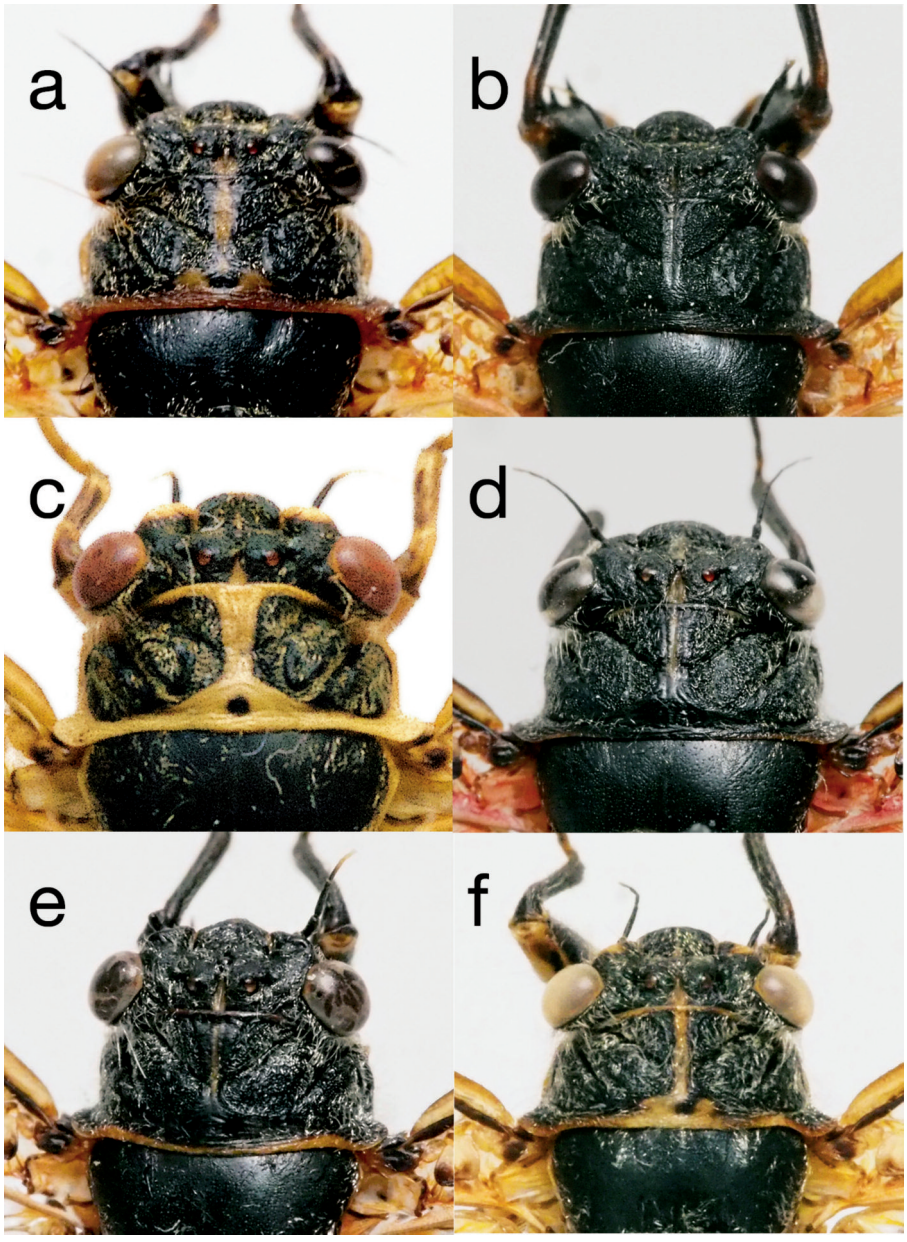


Fig. 26: Details of thoracal morphology. Upper row from left to right: a - *Mezammira tibialis* comb. nova, b - *M. goumenissa* comb. nova; middle row: c - *M. flaveola* comb. nova, d - *M. carayoni* comb. nova; lower row: e - *M. sakisi* sp. nova, f - *M. filoti* sp. nova - the connection of the black spot to the dark fields is only in this specimen present just on the right side.

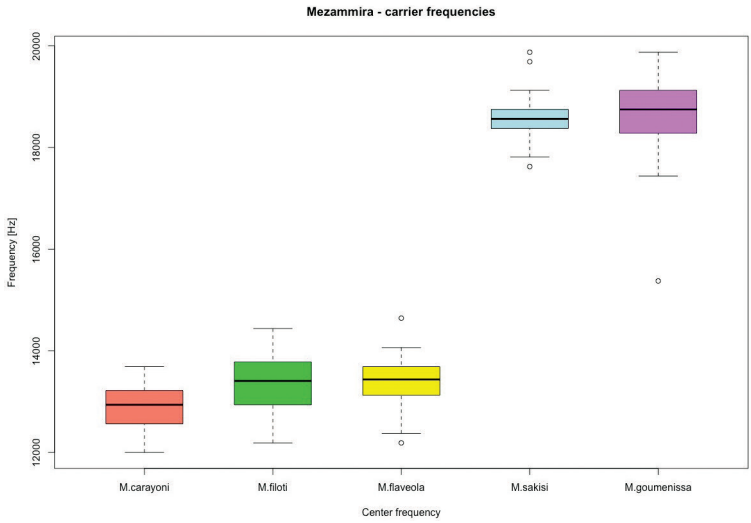


Fig. 27: Boxplot of center frequencies of the songs of different *Mezammira* species from Greece (except *M. tibialis* comb. nova).

and L echemes as compared to most of other species are characteristic (Gogala et al., 1996; Sueur & Puissant, 2000), and in *M. goumenissa* comb. nova in addition to the very fast repetition of short echemes also long (0.5 s) and very long echemes (up to 15 s) periodically appear in the song (Gogala et al., 2013). In all species the song may take many minutes without interruption. Carrier frequencies of the timbal sounds of all these species are high, from 10 to 24 kHz but with species specific differences.

Differences:

Differences between the Greek *Mezammira* species enable us to discriminate between these taxa by morphological and/or acoustic traits (Tables 2 and 3, Key).

Geographic distribution and acoustic parameters

Species *M. filoti* sp. nova and *M. carayoni* comb. nova are present only on the islands of Naxos and Crete respectively (Fig. 29). We do not exclude the possibility, that *M. filoti* sp. nova could in the future be found also on some other islands of the Cyclades. However, we did not find it on the island of Andros, which we investigated before (Gogala & Trilar, 2014). Regardless, it is clear that these two species are not sympatric with any other *Mezammira* species. Therefore, there is no selective pressure to prevent cross mating with closely related species, and the calling songs of the species can be and actually are very similar to the song of the in Greece widely distributed *M. flaveola* comb. nova (Figs. 15, 23 above).

The next species, which is present only very locally on the northern Peloponnese, is *M. goumenissa* comb. nova. This species is sympatric and even syntopic with *M. flaveola* comb. nova, but the song patterns and carrier frequency parameters are clearly different, probably at least partly preventing cross mating in the field. In

addition both species are phenologically slightly shifted (about 14 days) but still overlapping in imaginal occurence. Cicadas of *M. goumenissa* comb. nova are usually sitting on shrubs or small trees, and *M. flaveola* on the grass and herbaceous plants close to the ground.

A similar situation is also found with *M. sakisi* sp. nova, which also comes in contact with populations of *M. flaveola* comb. nova in Peloponnese. Song patterns of both species are similar with three phrases, the first one, A, comprised of repeating short echemes with similar duration (MMM), the second one, B, with long echemes and short echemes inbetween (LSSLSS...) and the third one, C, with interchanging sequences of one long and one or two shorter echemes (LMLM or LMMLMM...). One difference between the calling songs of both species is in the second phrase, where in the song of *M. sakisi* sp. nova the intervals between long echemes are filled usually with three short echemes (LSSSLSSS...) (Fig. 22 above), while the song of *M. flaveola* comb. nova in most cases has two short echemes (LSSLSS...) (Fig. 23 above). This and some other small quantitative differences could possibly not be enough to prevent cross mating, but there is another important difference between songs of both species. The carrier frequency of the song in *M. sakisi* sp. nova is, like in *M. goumenissa* comb. nova, much higher than in *M. flaveola* comb. nova (Figs. 22, 23, 27, 28).

However, carrier frequencies of the songs in the three allopatric species are lower and very similar (Table 3, Figs. 15, 23, 27, 28). Carrier frequency values for *M. tibialis* are inbetween both groups (Fig. 28). We measured also 5% and 95% frequency limits to get the values for the frequency range that animals use for communication. Using the mathematical relation between body size and carrier frequency developed by Bennet-Clark & Young (1994) we can see that the central carrier frequencies of three allopatric species fit very well with the general rule and the resonance properties of their body size. In contrast to this, the carrier frequencies of both species sympatric with *M. flaveola* comb. nova are much higher than expected, derived from their body size (Fig. 28).

We found *M. sakisi* sp. nova in Eastern Peloponnese, where we succeeded to collect 15 specimens, 12 males and 3 females.

On the slopes of Mt. Taigetos we recorded a very similar song with comparable high frequency range (Table 3) and three phrases A, B and C, but collected only 2 males of which one shows quite aberrant habitus, similar in some traits to *M. flaveola* comb. nova. Therefore we are not absolutely sure that we are dealing with the same taxon there (Fig. 29: *M.* cf. *sakisi*). It is also possible that this specimen exchanged some genes with the sympatric species and could thus be the result of introgression or hybridization between two lineages. Therefore we selected for analysis and description of the new species only specimens and recordings from the Eastern Peloponnese.

Further investigations of Mt. Taigetos population are needed. However, we should mention that we detected and recognised the characteristic song of *M.* cf. *sakisi* and its differences as compared to *M. flaveola* comb. nova for the first time on the slopes of Taigetos in the Rintomo gorge and near the village Dendra.

It should be mentioned, that in the morphological traits of *M. filoti* sp. nova we found high variability (e.g. number of apical cells, the length ratio between ulnar and apical cell, ratio of the length of the fused veins MCuA compared to the length of arculus). In the Fig. 26f we can see that in one specimen the connection between the black spot on pronotal collar and the lateral field exists only on one side. Could this variability be explained by inbreeding in a small population ocurring in an area of about 1.3 x 0.6 km, where the species is distributed on the island of Naxos? However, the acoustic traits, usually representing the specific-mate recognition system in cicadas (SMRS; e.g. Paterson, 1985; Den Hollander, 1995; Villet, 1995), appear to be more stable than morphological traits.

Are almost identical song patterns and carrier frequencies in three alopatric species *M. flaveola* comb. nova*, M. filoti* sp. nova and *M. carayoni* comb. nova evidence for a common ancestor with such characteristics?

The rhythmic pattern in *M. sakisi* sp. nova and the still enigmatic population on Mt. Taigetos is not very different either. However, the song pattern of *M. goumenissa* comb. nova differs substantially from all other species discussed in this paper (Gogala et al., 2013; Fig. 30) as well as from *M. tibialis* comb. nova (Gogala et al., 1996; Sueur & Puissant, 2000). But even in these species we find characteristic fast repetition of short echemes as stated earlier. We found substantial differences between *M. goumenissa*

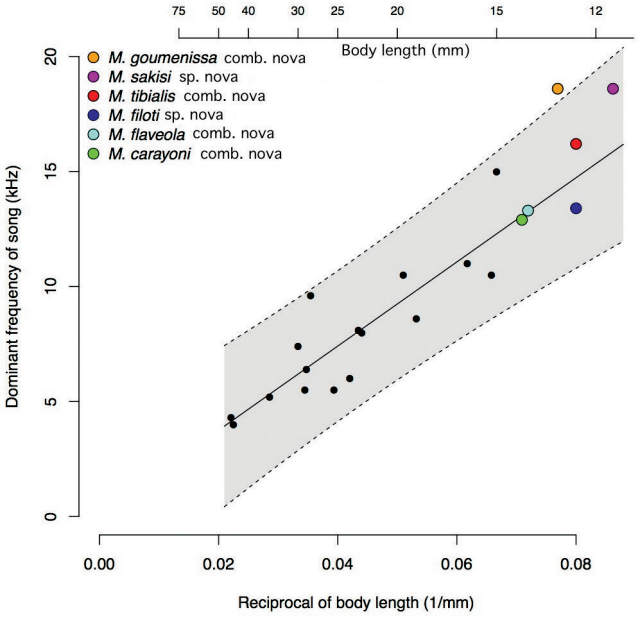


Fig. 28: Graph of dominant frequency in the song vs. the reciprocal of body length. Regression line ($r^2 = 0.764$) and shaded 95% prediction band are calculated from the data of Bennet-Clark & Young, (1994) (black points). For reference the body length scale is also shown.

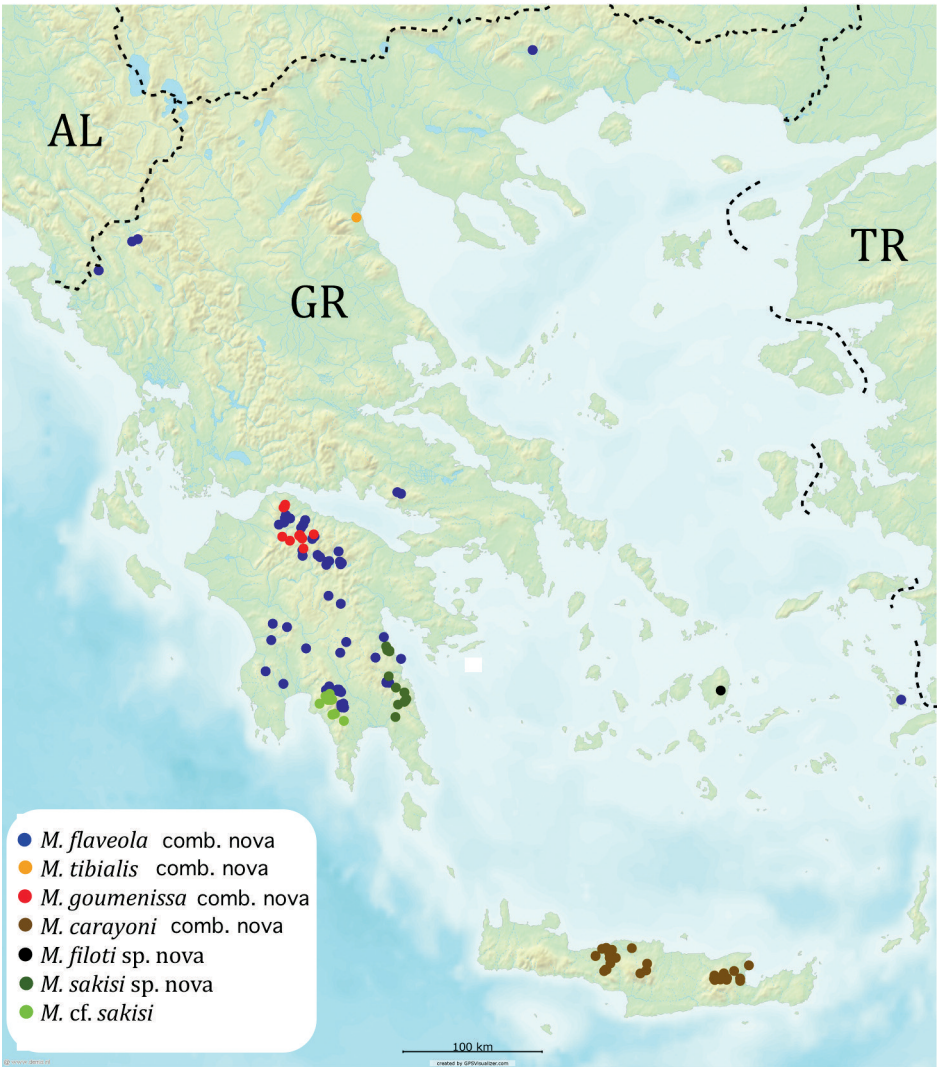


Fig. 29: Map with localities of Greek *Mezammira* species (see legend).

comb. nova and *M. tibialis* comb. nova on one hand compared to the rest of other *Mezammira* species also in morphology, e.g. genitalia with long pseudoparameres in contrast to short ones in the other species under discussion (Figs. 27c, 27d).

At the end and as it was published for the species of the genus *Cicadetta* (Hertach et al., 2016), we should mention that in the future many questions about the taxonomy, relation and phylogeny of *Mezammira* species studied could be clarified with more comprehensive analyses of acoustic recordings and molecular analyses.

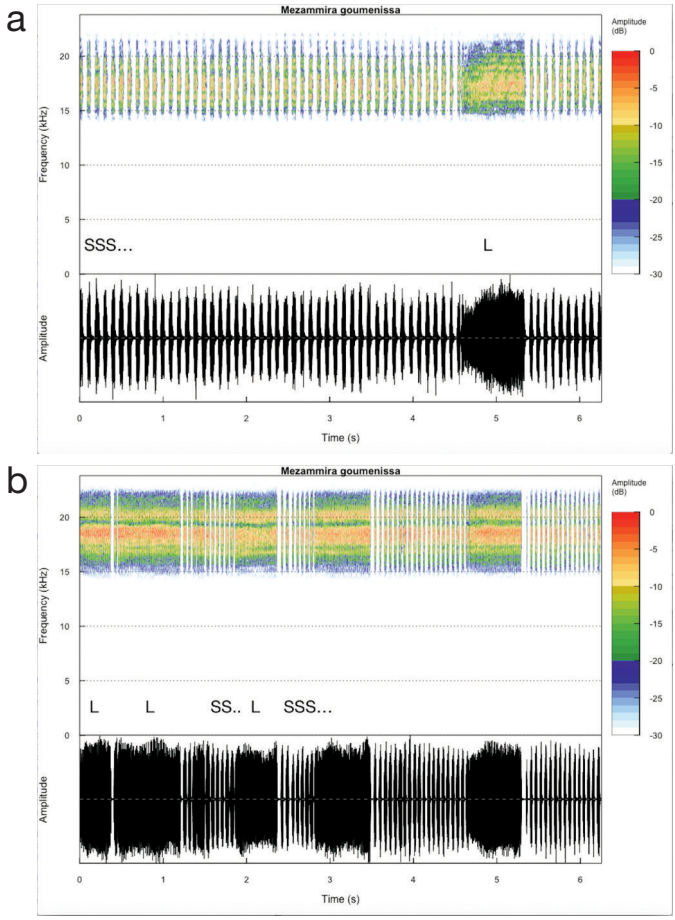


Fig. 30: *Mezammira goumenissa* comb. nova, part with long sequences of short and one long echeme (a) and part with many longer echemes and sequences of short ones with very high repetition rate (b). Song selections of similar duration as in Figs. 15, 22, 23.

We tried to show the differences between males of all taxa of the genus *Mezammira*, present in Greece, in the morphological and acoustic keys.

Morphological key

Common traits:
Body size 11-16 mm
Sternite VIII as long or slightly shorter than sternite VII
Pygofer basal lobe in ventral view showing inner tooth present
Claspers hooked anterolaterad

Median lobe of uncus small, not dominant, semicircular
(Forewing usually with 8 apical cells, hindwing usually with 5)

Differences

(1a) Body coloration yellow with black markings, pronotal collar with black medial spot, mostly not connected to the black lateral fields on pronotum → *Mezammira flaveola* comb. nova

(1b) Body coloration dark (black or brown) with yellow markings. If the central spot on the pronotal collar present, it is connected to the lateral black fields on pronotum → 2

(2a) Pseudoparameres long, flat, divergent, much longer than the uncus → 3

(2b) Pseudoparameres short, flat, hardly visible, not extending beyond the tip of uncus, → 4

(3a) Forewings with 8, hindwings usually with 5 apical cells. Pronotum with yellow dorsal midline, reddish basis of wings and redbrown hind part of abdominal tergites. Widely distributed species in southern Europe → *Mezammira tibialis* comb. nova

(3b) Forewings with 8, hindwings with 6 apical cells. Body coloration black with lighter markings, wing veins yellow. Inhabiting Northern Peloponnese → *Mezammira goumenissa* comb. nova

(4a) Prevailing body colour black with brown or redbrown markings. Apical cells on forewings 8, on hindwings 6. Proximal parts of wings red. Endemic species of Crete → *Mezammira carayoni* comb. nova

(4b) Prevailing body colour black or brown, with yellow and brown markings. Forewings with 7 or 8 and hindwings mostly with 5 apical cells → 5

(5a) Pronotal collar black, also the rest of pronotum with exception of yellow median line in the front part of pronotum. Opercula dark. The eyes in living animals black, the ratio of ulnar to apical cell in forewings 1.4. Small animals, species distributed in Eastern part of Peloponnese → *Mezammira sakisi* sp. nova

(5b) Pronotal collar with dark central spot connected to lateral black fields on pronotum, median line on pronotum broad. Opercula pale yellow → 6

(6a) Eyes in living animals red, abdominal terga with posterior part yellow and red. 7 or 8 apical cells on forewings, 5 on hind wings. Endemic species of the island Naxos → *Mezammira filoti* sp. nova

(6b) Eyes in living animals brown, species distributed on the western slope of Mt. Taigetos → a yet undefined taxon (*M.* cf. *sakisi*) with very similar acoustic characteristics as close related *M. sakisi* sp. nova

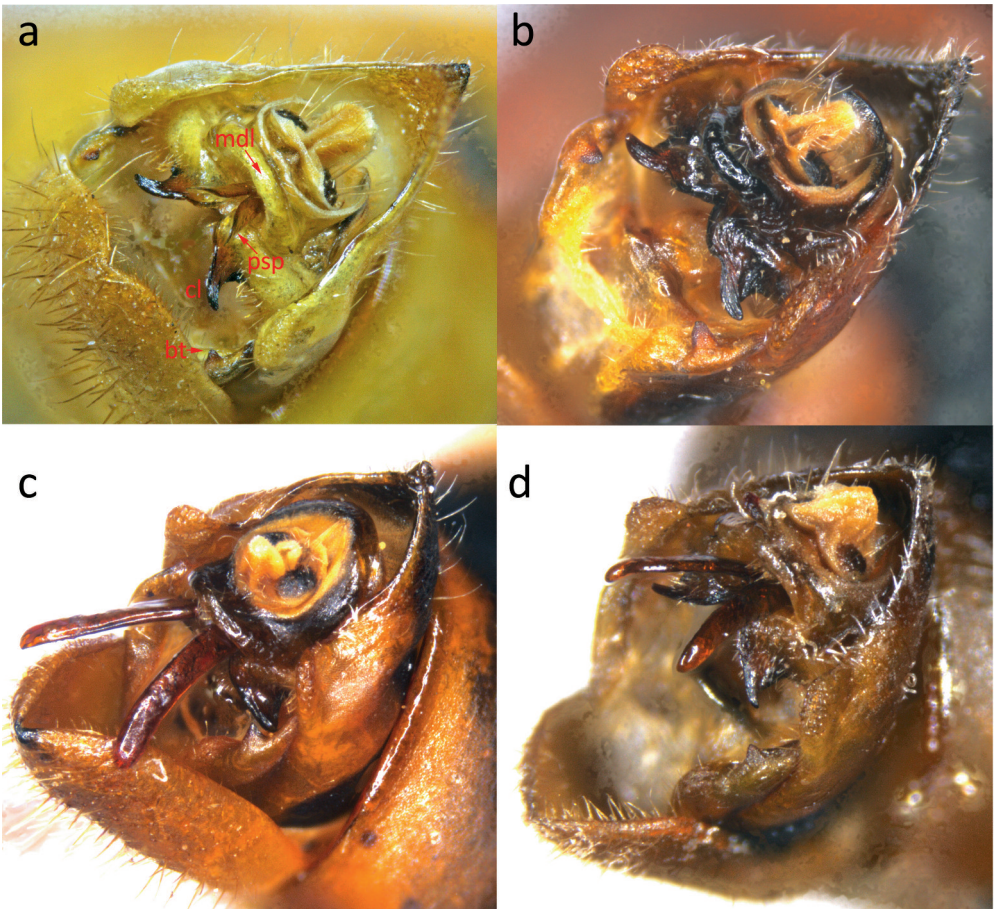


Fig. 31: Genitalia of: a - *Mezammira flaveola* comb. nova; b - *M. carayoni* comb. nova; c - *M. tibialis* comb. nova; d - *M. goumenissa* comb. nova Only in the last two species pseudoparameres are long and clearly visible (multifocus photography). mdl - median lobe of uncus, psp - pseudoparamere, cl - clasper, bt - inner tooth on the basal lobe of pygofer.

Acoustic key:

Common traits:

High pitched sound 10-24 kHz

Fast repetition of short echemes (repetition rate 5-20 Hz) prevailing in the song

Rhythmic sound with more than one type of echemes with different duration

Calling song organized in phrases (typical sequences of short and long echemes)

Phrases exchanging without interruption

No important amplitude or frequency modulation of echemes
Duration of longest echemes <150 ms (with exception of *M. tibialis* comb. nova and *M. goumenissa* comb. nova)
Duration of the interval between successive echemes <200 ms

Differences

(1a) Song comprising fast sequences of short echemes and long echemes, duration of longest ones exceeding 200 ms → 2
(1b) Song comprising sequences of short and longer echemes, duration of longest ones not exceeding 150 ms → 3

(2a) Two different phrases, phrase A with simple repetition of short echemes (~50 ms), phrase B comprising sequences of short echemes and single long echemes (~300 ms). Long echemes never longer than 0.5 s → *Mezammira tibialis* comb. nova
(2b) Duration of short echemes 26±7 ms, long echemes about 0.5 s and of very long echemes up to 15 s, carrier frequency 15-22 kHz → *Mezammira goumenissa* comb. nova

(3a) In addition to the phrase A (MMM) and phrase B (LSS(S)LSS) long sequences (many seconds) of the phrase C (LSLS) present → 4
(3b) Only phrase A (MMM) and B (LSS(S)LSS) present → 5

(4a) Carrier frequency 10-15 kHz → *Mezammira flaveola* comb. nova
(4b) Carrier frequency 15-22 kHz → *Mezammira sakisi* sp. nova and/or *M.* cf. *sakisi* from Taigetos.

(5a) Long echeme duration does not exceeding 50 ms. Endemic species of the island Crete → *Mezammira carayoni* comb. nova
(5b) Long echemes duration longer than 50 ms. Endemic species of the island Naxos → *Mezammira filoti* sp. nova

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References

Amyot C.J.B., 1847. Entomologie française. Rhynchotes. Ordre deuxième. Homoptères. Homoptera. Latreille. – *Annales de la Société Entomologique de France* **5**: 143–238.

Amyot C.J.B., 1848. *Entomologie française. Rhynchotes. Ordre deuxième. Homoptères. Homoptera. Latreille*. – Reprint of Amyot 1847 with different pages, 1–504.

Bennet-Clark H.C., Young D., 1994. The scaling of song frequency in cicadas. – *Journal of Experimental Biology* **191**: 291-294.

Boulard M., 1982a. Taxa nouveau pour la faune des Cigales de France [Hom.]. – *Bulletin de la Société entomologique de France* **87**(1/2): 49–50.

Boulard M., 1982b. Sur deux cigales nouvelles du bassin méditerranéen. – *Nouvelle revue d'Entomologie* **12**(1) : 101–105.

Boulard M., 1995. Postures de cymbalisation, cymbalisations et cartes d'identité acoustique des cigales. 1.- Généralités et espèces méditerranéenes (Homoptera Cicadoidea). – *EPHE Biol. Evol. Insectes* **7/8**: 1-72.

Boulard M., Mondon B., 1996. *Vies et mémoires de Cigales*. – Equinoxe, Barbentane, 160 pp.

Brullé G.A., 1833. 1.re Partie. Zoologie. Deuxième Section. Des animaux articulés. – In: Bory de Saint-Vincent J. B. G. M. 1832– 1836 – Expédition scientifique de Morée. Section des sciences physiques. III. – Levrault F. L., Paris, Strasbourg (France), 400 pp + pl. i–lxxxiii.

Buckton G.B., 1889a. Notes on the classification of Cicadae. – *Entomologist* **22**: 269-270.

Davis W.T., 1920. North American Cicadas belonging to the genera *Platypedia* and *Melampsalta*. – *Journal of the New-York entomological Society* **28**(2): 95-135.

Den Hollander J., 1995. Acoustic signals as specific mate recognition signals in leafhoppers (Cicadellidae) and planthoppers (Delphacidae) (Homoptera: Auchenorrhyncha). Speciation and the recognition concept, theory and application. – Baltimore: Johns Hopkins University Press, pp. 440–463.

Distant W.L., 1906. *A synonymic catalogue of Homoptera. Part. I. Cicadidae*. – British Museum, London, 207 pp.

Dlabola J., 1959. Unika und Typen in der Zikadensammlung G. Horváths (Homoptera, Auchenorrhyncha). – *Acta Zoologica Hungarica* **5**(1/2): 33–39.

Dlabola J., 1961. Die Zikaden von Zentralasiën, Dagestan und Transkaukasien. – *Acta Entomologica Musei Nationalis Pragae* **34**: 241–358.

Dlabola J., 1963. Typen und wenig bekannte Arten aus der Sammlung H. Haupt mit Beschreibungen einiger Zikadenarten aus Sibirien (Homoptera). – *Acta Entomologica Musei Nationalis Pragae* **35**: 313–331.

Duffels J.P., Van der Laan P.A., 1985. *Catalogue of the Cicadoidea (Homoptera, Auchenorhyncha) 1956–1980*. –W. Junk, Dordrecht, i-xiv + 414 pp.

Emelyanov A.F., 1996. Two new Cicadidae species similar to *Cicadetta tibialis* (Homoptera, Cicadidae). – *Zoologichesky Zhurnal* **75**: 1897–1900. [In Russian, English summary]

Eversmann E., 1859. Cicadae Volgo-Uralenses, oder die in den Gegenden östlich von der Wolga und dem Uralfluss, südlich bis zum Aralsee und dem Sir-Darja bis jetzt beobachteten Singzirpen. *Bulletin de la Société Impériale des naturalistes de Moscou* 32:147–151.

Fahringer J., 1922. Eine Rhynchotenausbeute aus des Turkei, Kleinasien und den benachbarten Gebieten. – *Konowia* **1**: 296–307.

Fieber F.X., 1872. *Katalog der europäischen Cicadinen, nach Originalien mit Benützung der neuesten Literatur*. – Carl Gerold's Sohn, Wien, i-iv + 1-19.

Fieber F.X., 1876. Les Cicadines d'Europe d'après les originaux et les publications les plus récentes. – *Revue et Magazine de Zoologie Pure et Appliquée* **4**: 11–268. [Translation from German by Rieber F.].

Gnezdilov V.M., Bourgoin T., 2017. The mythic species *Issus analis* Brullé, 1833 (Hemiptera, Fulgoroidea, Issidae): still an enigmatic taxon. *Zootaxa* 4; 4216(2): zootaxa.4216.2.6. doi: 10.11646/zootaxa.4216.2.6.

Gogala M., 2013.- *On the Trail of Mountain Cicadas*. – Slovenian Academy of Sciences and Arts, Ljubljana, and Royal Entomological Society, London. 173 pp.

Gogala M., Drosopoulos S., 2006. Song of *Cicadetta flaveola* Brullé (Auchenorrhyncha: Cicadoidea: Tibicinidae) from Greece. – *Russian Entomological Journal* **15**(3): 275–278.

Gogala M., Trilar T., 2014. Distribution of endemic cicadas (Hemiptera: Cicadidae) on Evia and adjacent islands in Greece. – *Acta entomologica slovenica* **22**(1): 45-58.

Gogala M., Drosopoulos S., Trilar T., 2012. *Cicadivetta goumenissa,* a new cicada species from Peloponesos, Greece (Hemiptera: Cicadidae). – *Acta entomologica slovenica* **20**(1): 5–16.

Gogala M., Drosopoulos S., Trilar T., 2013. New distributional and bioacoustic data about *Cicadivetta goumenissa* from Peloponnese, Greece (Hemiptera, Cicadidae). In: Popov A, Grozeva S, Simov N, Tasheva E (Eds): Advances in Hemipterology. – *ZooKeys* **319**: 83–91. doi: 10.3897/zookeys.319.4452.

Gogala M., Popov A.V., Ribarič D., 1996. Bioacoustics of singing cicadas of the western Palaearctic: *Cicadetta tibialis* (Panzer) (Cicadoidea: Tibicinidea). – *Acta entomologica slovenica* **4**(2): 45-62.

Gogala M., Trilar T., Drosopoulos S., 2011. Two new species and a new genus of Cicadettini (Hemiptera, Cicadidae) from the Greek island of Evia. – *Deutsche Entomologische Zeitschrift* **58**(1): 105–117.

Gomez-Menor Ortega J., 1957. Monographia de Cicadidos (Homoptera) de España. – *Memorias de la Real Academia de Ciencias exactas, fisicas y naturales de Madrid. Serie de Ciencias naturales* **19**: 89 pp.

Hagen H.A., 1856. Die Sing-Cicaden Europa's. – *Stettiner Entomologische Zeitung* **17**: 66–91.

Herrich-Schäffer G.A.W., 1835. *Nomenclator entomologicus. Verzeichnis der europäischen lnsecten; zur Erleichterung des Tauschverkehrs mit Preisen versehen. Erstes Heft. Lepidoptera und Hemiptera, leztere synoptisch bearbeitet und mit vollständiger Synonymie*. – F. Pustet, Regensburg, i-iv + 116 pp.

Hertach T., Puissant S., Gogala M., Trilar T., Hagmann R., Baur H., Kunz G., Wade E.J., Loader S.P., Simon C., Nagel P., 2016. Complex within a complex: integrative taxonomy reveals hidden diversity in *Cicadetta brevipennis* (Hemiptera: Cicadidae) and unexpected relationships with a song divergent relative. – *PLoS ONE* **11**(11): 1–41.

Hoch H., Asche M., Claridge M.F., 2015. Remembering Prof. Athanasios (Sakis) Drosopoulos (1944–2014) – biosystematist, entomologist, colleague and friend. – *Entomologica austriaca* **22**: 149-171.

Horváth G., 1901. Hémiptères du voyage de M. Martinez Escalera dans l'Asie-Mineure. – *Természetrajzi Füzetek* **24**: 469–485.

Horváth G., 1911. Hemiptera nova vel minus cognita e regione palaearctica. II. – *Annales Musei Nationalis Hungarici* **9**: 573–610.

Horváth G., 1912. Miscellanea Hemipterologica. X. Cicadidarum genera palaearctica. – *Annales Musei Nationalis Hungarici* **10**: 602–606.

ICZN, 1999. *International Code of Zoological Nomenclature. Fourth Edition*. – International Trust for Zoological Nomenclature, London, xxix + 306 pp.

Kemal M., Koçak A.-Ö., 2010. *Cicadidae* of Turkey and some ecological notes on *Tibicina serhadensis* Koçak & Kemal from Van Province (East Turkey) (Homoptera). – *Tesa News* **55**, 1–19.

Kirkaldy G.W., 1908. Bibliographical and nomenclatorial notes on the Hemiptera, No. 7. – *Entomologist* **41**: 12–15.

Kirkaldy G.W., 1909. Hemiptera, old and new, No. 2. – *The Canadian Entomologist* **41**: 388–392.

Kolenati F.A., 1857. Homoptera Latreille. Leach. Gulaerostria Zetterstedt. Meletemata entomologica. – *Bulletin de la Société Impériale de Moscou* **30**: 399–429.

Lodos N., Kalkandelen A., 1981. Preliminary list of Auchenorrhyncha with notes on distribution and importance of species in Turkey. V. Families Flatidae, Ricaniidae and Cicadidae. – *Türkiye Bitki koruma Dergisi* **5**(2): 67–82.

Metcalf Z.P., 1963. *Cicadoidea, Part 2 Tibicinidae*. – General Catalogue of the Homoptera, **8**(2): vi + 492 pp.

Moulds M., 2005. An appraisal of the higher classification of cicadas (Hemiptera: Cicadoidea) with special reference to the Australian fauna. – *Records of the Australian Museum* **57**(3): 375-446.

Moulds M., 2012. A review of the genera of Australian cicadas (Hemiptera: Cicadoidea). – *Zootaxa* **3287**: 1–262.

Nast J., 1972. Palearctic Auchenorrhyncha (Homoptera), an annotated check list. – *Polish Scientific Publications, Warsaw*, 550 pp.

Neave S.A., 1940. *Nomenclator Zoologicus. A list of the names of genera and subgenera in zoology from the tenth editions of Linnaeus 1758 to the end of 1935*. – The Zoological Society of London **3**: i–ii, 1–1065.

Opinion 2165, 2006. Opinion 2165 (Case 3327). Amyot, Méthode mononymique (1845–1847): correction to Opinion 686. – *Bulletin of Zoological Nomenclature* **63**(4): 284–285.

Oshanin V.T., 1906. Verzeichnis der palaearktischen Hemipteren mit besonderer Berücksichtigung ihrer Verteilung im Russischen Reiche. II. Band. Homoptera. I. Lieferung. – *Annals of Museum of Zoology of Academy of Science of Saint Petersburg* **11**: i–xvi, 1–192.

Oshanin V.T., 1908. Verzeichnis der palaearktischen Hemipteren mit besonderer Berücksichtigung ihrer Verteilung im Russischen Reiche. II. Band. Homoptera. III. Lieferung. – *Annals of Museum of Zoology of Academy of Science of Saint Petersburg* **13**: 385–492.

Oshanin V.T., 1912. *Katalog der paläarktischen Hemipteren (Heteroptera, Homoptera-Auchenorhyncha und Psylloideae)*. – R. Friedländer & Sohn, Berlin, pp. i–xvi, 1–187.

Panzer G.W.F., 1798. Tettigonia tibialis. – *Faunae Insectorum Germanicae initia: oder Deutschlands Insecten* 59: 5.

Paterson H.E.H., 1985. *The recognition concept of species. Species and Speciation*. –Transvaal Museum Monograph., Pretoria, pp. 21–29.

Popov A.V., 1997. Acoustic signals of three morphologically similar species of singing cicadas (Homoptera, Cicadidae). – *Entomologicheskoe Obozrenie* **76**(1): 3-15, 232. [In Russian]

Puissant S., 2006. *Contribution à la connaissance des Cigales de France: géonémie et écologie des populations (Hemiptera, Cicadidae)*. – ASCETE, Bédeilhac et Aynat, 193 pp.

Puissant S., Sueur J., 2010. A hotspot for Mediterranean cicadas (Insecta: Hemiptera: Cicadidae): new genera, species and songs from southern Spain. – *Systematics and Biodiversity* **8**(4): 555–574. doi: 10.1080/14772000.2010.532832.

Puton A., 1875. *Homoptera. Am. Serv. (Gulaerostria. Zett. Fieb.) Sect. I. Auchenorhyncha. Dumér. (Cicadina. Burm.)*. – Catalogue des Hémiptères (Hétéroptères, Cicadines et Psyllides) d'Europe et du bassin de la Méditerranée. 2e Ed. **1875**: 1–165.

R Core Team, 2015. R: A language and environment for statistical computing. – R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

Sanborn A.F., 2014. *Catalogue of the Cicadoidea (Hemiptera: Auchenorrhyncha)*. – Elsevier Academic Press, Amsterdam, Boston, Heidelberg, London, New-York, Oxford, Paris, San-Diego, San-Fransico, Singapore, Sydney, Tokyo, 1001 pp.

Schedl W., 1999. Contribution to the singing cicadas of Israel and adjacent countries (Homoptera, Auchenorrhyncha: Cicadidae et Tibicinidae). – *Linzer Biologische Beiträge* **31**(2): 823–837.

Schedl W., 2001. Eine neue Singzikade aus der Türkei, *Tettigetta turcica* nova spec. (Cicadoidea, Tibicinidae). – *Linzer Biologische Beiträge* **33**: 1287–1290.

Schneider A., 2003–2016. GPS Visualizer. – http://www.gpsvisualizer.com [1.10.2016].

Schumacher F., 1922. Nomenklatorische Notizen zu paläarktischen Cicadiden. – *Deutsche entomologische Zeitschrift* **1922**: 210–213.

Schumacher F., 1923. *Hemiptera-Homoptera* der 2. botan. Forschungsreise von A. Kneucker auf der Sinai-Halbinsel. – *Deutsche entomologische Zeitschrift* **1923**: 236–238.

Stål C., 1866. Hemiptera Homoptera Latr. – *Hemiptera Africana* **4**: 1–276.

Sueur J., Aubin T., Simonis C., 2008. Seewave: a free modular tool for sound analysis and synthesis. – *Bioacoustics* **18**: 213-226.

Sueur J., Puissant S., 2000. Emissions sonores d'une population française de *Cicadivetta tibialis* (Panzer, 1798) (Homoptera, Cicadoidea, Cicadidae). – *Annales de la Société entomologique de France* **36**: 261–268.

Sueur J., Puissant S., Simoes P.-C., Seabra S., Boulard M., Quartau J.-A., 2004. Cicadas from Portugal: revised list of species with eco-ethological data (Hemiptera: Cicadidae). – *Insect Systematics and Evolution* **35**(2): 177–187.

Szilády Z., 1870. Magyarországy rovargyüjtésem jegyzéke. – *Rovartani Lapok* **7**: 113–121.

Trilar T., Gogala M., 2008. New data on singing cicadas (Hemiptera: Cicadidae) of Romania. – *Entomologica Romanica* **13**: 29–33.

Trilar T., Gogala M., 2010. *Tettigetta carayoni* Boulard (Hemiptera: Cicadidae) from Crete, faunistic data and first description of its song. – *Acta entomologica slovenica* **18**(1): 5–18.

Trilar T., Gogala M., Popa V., 2006. Contribution to the knowledge of the singing cicadas (Auchenorrhyncha: Cicadoidea) of Romania. – *Acta entomologica slovenica* **14**(2): 175–182.

Uhler P.-R., 1888. Preliminary survey of the Cicadaea of the United States, Antilles and Mexico. – *Entomologica Americana* **4**: 81–85.

Villet M., 1995. Intraspecific variability in SMRS signal: some causes and implications in acoustic signalling systems. Speciation and the recognition concept, theory and application. – Baltimore: Johns Hopkins University Press; pp. 422–439.

Walker F., 1850. *List of the specimens of Homopterous Insects in the collection of the British Museum*. *Part. I.* – British Museum (Natural History) London, 260 pp.

Waltl Z., 1837. Beschreibung zweier neuer Gattungen aus Andalusien. – *Isis* **4**: 288.

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Table 1: *Mezammira* of Greece (based on bioacoustics)

***Mezammira carayoni* Boulard, 1982**

GR: island Crete: Chania: Kolymbari; 35°32.048'N, 23°46.753'E; 30 m; 19.5.2013; collected 1♂; J.-C.Streito.
GR: island Crete: Lasithi: Farsaro; 35°11.393'N, 25°29.832'E: 780 m; 17.6.2005; collected 3♂ 1♀; S.Peslier.
GR: island Crete: Lasithi: Aghios Nikolaos, Kritsa, Lato; 35°10'23.3"N, 25°39'13.9"E; 313 m; 2.6.2006; song heard; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Aghios Nikolaos, Kritsa, Panaghia Kera; 35°09'23.9"N, 25°39'19.2"E; 225 m; 2.6.2006; song heard; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Aghios Nikolaos, Kritsa, pod vrhom Lato; 35°10'10.8"N, 25°39'21.7"E; 315 m; 31.5.2006; recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Aghios Nikolaos, Ellounda; 35°15'27.0"N, 25°43'37.8"E; 24 m; 31.5.2006; song heard; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Aghios Nikolaos, Ellounda; 35°15'27.0"N, 25°43'37.8"E; 24 m; 1.6.2006; song heard; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Katharo Plateau, Katharo Tsivi; 35°10'27.1"N, 25°32'49.9"E; 1135 m; 1.6.2006; collected, recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Katharo Plateau, Kopraki; 35°09'50.0"N, 25°32'36.7"E; 1180 m; 1.6.2006; collected, recorded, photographed; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Lasithi Plateau, Aghios Georgios; 35°09'56.4"N, 25°29'30.7"E; 820 m; 1.6.2006; collected, recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Lasithi Plateau, Aghios Haralambos; 35°10'16.0"N, 25°26'20.5"E; 850 m; 1.6.2006; recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Lasithi Plateau, Mesa Lasithi; 35°11'29.8"N, 25°31'31.7"E; 995 m; 1.6.2006; collected; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Lasithi Plateau, Moni Vidianis; 35°11'31.4"N, 25°26'35.3"E; 810 m; 1.6.2006; collected; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi: Lasithi Plateau, Psychro, in front of the cave Dikteo Andro; 35°09'44.9"N, 25°26'46.8"E; 950 m; 1.6.2006; song heard; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi:Neapoli, Drasi; 35°13'16.1"N, 25°36'17.3"E; 340 m; 1.6.2006; recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Lasithi:Neapoli, Tzermiadhon; 35°12'22.9"N, 25°31'13.4"E; 920 m; 1.6.2006; recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Adele, Adelianos Kambos, hotel Adele Mare; 35°22'17.7"N, 24°33'04.9"E; 2 m; 28.5.2006; collected; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Adele, Harkia; 35°18'23.5"N, 24°34'47.5"E; 460 m; 27.5.2006; collected, recorded; T.Trilar, K.Prosenc Trilar.

GR: island Crete: Rethymno: Adele, Loutra; 35°21'11.7"N, 24°35'9.84"E; 100 m; 29.5.2006; song heard; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Adele, Mesi; 35°20'16.2"N, 24°34'31.7"E; 210 m; 27.5.2006; collected, recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Adele, Pigi; 35°21'30.4"N, 24°35'57.5"E; 41 m; 29.5.2006; song heard, recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Aghia Fotini, Pantanassa; 35°16'12.9"N, 24°35'08.7"E; 285 m; 28.5.2006; recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Aghia Fotini, Patsos, Kato Hadika; 35°13'47.3"N, 24°33'12.9"E; 655 m; 28.5.2006; recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Anoghia, Tsounia; 35°13'28.4"N, 24°52'52.7"E; 1410 m; 29.5.2006; recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Anoghia, Vathias; 35°16'07.3"N, 24°53'18.9"E; 960 m; 29.5.2006; collected, recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Armeni, Late Minoan Cemetery; 35°19'04.5"N, 24°27'48.1"E; 355 m; 28.5.2006; song heard; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Armeni, Somatas; 35°19'11.5"N, 24°27'50.5"E; 345 m; 28.5.2006; collected, recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Moni Arkadiou; 35°18'23.5"N, 24°37'50.0"E; 495 m; 27.5.2006; song heard; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Perama, Aghia; 35°22'09.2"N, 24°45'44.4"E; 140 m; 29.5.2006; recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Platanias; 35°21'54.0"N, 24°31'02.1"E; 458 m; 30.5.2006; collected; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Spili; 35°13'12.8"N, 24°32'03.0"E; 470 m; 28.5.2006; recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Spili, Kato Hadika; 35°13'46.6"N, 24°32'42.2"E; 655 m; 28.5.2006; collected, recorded; T.Trilar, K.Prosenc Trilar.
GR: island Crete: Rethymno: Nida Plateau, in front of cave Ideo Andro; 35°12'18.5"N, 24°49'57.0"E; 1475 m; 29.5.2006; recorded; T.Trilar, K.Prosenc Trilar.

Mezammira flaveola (Brullé, 1832)

GR: Boeotia: Levadia, Mt. Elikonas, 2 km before Kyriaki; 38°19.713'N, 22°49.843'E; 997 m; 12.7.2010; collected, recorded; M.Gogala, T.Trilar, K.Šporar, S.Drosopoulos.
GR: Boeotia: Levadia, Mt. Elikonas, 6 km before Kyriaki; 38°19.109'N, 22°51.655'E; 885 m; 12.7.2010; song heard; M.Gogala, T.Trilar, K.Šporar, S.Drosopoulos.
GR: East Macedonia and Thrace: Drama: Prosotsani; 41°10.798'N, 23°58.000'E; 160 m;12.8.1979; collected 1 specimen; S.Drosopoulos.
GR: Epirus: Ioannina: Kalpaki, Mesovouni, road to Aghios Minas; 39°57.348'N, 20°38.723'E; 725 m; 17.6.2012; collected 4♂; D.Morin.
GR: Epirus: Ioannina: Konitsa, Kalithea, Ano Klidonia; 39°58'14.4"N, 20°41'29.3"E; 967 m; 2.7.2006; collected, recorded; M.Gogala, T.Trilar, S.Drosopoulos.

GR: Epirus: Thesprotia: Tsamaria Mts., W of Vavouni: 39°46.07'N, 20°22.21'E; 680 m; 14.6.2005; collected; H.Rausch, R.Rausch.
GR: Peloponnese: Arkadia: Chimerini Meligou, Agia; 37°23.309'N, 22°43.169'E; 100 m; 11.6.2005; recorded; M.Gogala, S.Drosopoulos.
GR: Peloponnese: Arkadia: Kastanitsa; 37.25509°N, 22.65053°E; 947 m; 11.6.2005; recorded; M.Gogala, S.Drosopoulos.
GR: Peloponnese: Arkadia: Kollines; 37°17.2'N, 22°21.6'E; 850 m; 17.6.1990; collected; R.Linnavuori.
GR: Peloponnese: Arkadia: Levidi, Kapsia; 37°36'16.2"N, 22°21'52.1"E; 625 m; 28.6.2006; collected, recorded; M.Gogala, T.Trilar, S.Drosopoulos.
GR: Peloponnese: Arkadia: North Kynouria: Kastanitsa; 37.25509°N, 22.65053°E; 947 m; 20.6.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Arkadia: Paradisia; 37°18.885'N, 22°4.705'E; 515 m; 24.6.1996; collected 1♀; J.-M.Maldès.
GR: Peloponnese: Arkadia: South Kynouria: Kosmas (1); 37.09829°N, 22.74114°E; 1136 m; 21.6.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Arkadia: South Kynouria: Kosmas (2); 37.09216°N, 22.74510°E; 1079 m; 21.6.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Arkadia: South Kynouria: Kosmas (3), under the village; 37.09143°N, 22.7631°E; 859 m; 21.6.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Arkadia: South Kynouria: Kosmas pass; 37°05.558'N, 22°44.422'E; 1100 m; 17.6.1996; collected 3♂ 1♀; D.Morin.
GR: Peloponnese: Arkadia: Tyros, Paralia Tirou; 37°14.816'N, 22° 51.670'E; 5 m; 18.6.1996; collected 2♂; D.Morin.
GR: Peloponnese: Arkadia: Vlachokerasia, Alepochori; 37°21.371'N, 22°24.564'E; 890 m; 30.5.1995; collected 1♂; J.-M.Maldès.
GR: Peloponnese: Arkadia: Vlachokerasia, Alepochori; 37°21.371'N, 22°24.564'E; 890 m; 27.6.1996; collected 1♂; D.Morin.
GR: Peloponnese: Corinthia: Archea Feneos, Louzi; 37.88173°N, 22.26854°N; 788 m; 6.6.2016; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar
GR: Peloponnese: Corinthia: Goura (Gkoura); 37.94449°N, 22.34612°N; 917 m; 6.6.2016; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar
GR: Peloponnese: Corinthia: Kastania, hotel Xenia; 37.86808°N, 22.37241°N; 1125 m; 6.6.2016; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar
GR: Peloponnese: Corinthia: Kastania, Mt. Kylini (Mt.Ziria, Mt. Zirea), Oligirtos; 37.87412°N, 22.36350°N; 1154 m; 6.6.2016; collected; M.Gogala, T.Trilar, K.Prosenc Trilar
GR: Peloponnese: Corinthia: Lafka, Mt. Gkrimpini; 37.86056°N, 22.36412°N; 1218 m; 6.6.2016; heard; M.Gogala, T.Trilar, K.Prosenc Trilar
GR: Peloponnese: Corinthia: Mesino, Mosia (Mousi); 37.87792°N, 22.35633°N; 977 m; 6.6.2016; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar
GR: Peloponnese: Corinthia: under the pass Feneos; 37.87804°N, 22.25257°N; 964 m; 6.6.2016; collected (4♂), recorded; M.Gogala, T.Trilar, K.Prosenc Trilar

GR: Peloponnese: GR: Arkadia: Mount Menalo, Menalo Ski Resort; 37°39'22.8"N, 22°15'48.1"E; 1617 m; 28.6.2006; recorded; M.Gogala, T.Trilar, S.Drosopoulos.
GR: Peloponnese: Laconia: Mani Peninsula: Anavriti; 37°01.887'N, 22°22.024'E; 903 m; 28.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Anogia; Mt. Taygetos; ???, ???; ??? m; 19.6.1996; collected 1♂; D.Morin.
GR: Peloponnese: Laconia: Mani Peninsula: Perganteika; 37°02.236'N, 22°20.682'E; 1065 m; 28.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Taigeti, Korites Vrisi; 37°02.851'N, 22°20.105'E; 1258 m; 28.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Taigeti, Vataki Vrisi; 37°02.860'N, 22°20.962'E; 1119 m; 28.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Taigeti, Vataki Vrisi; 37°02.860'N, 22°20.962'E; 1119 m; 28.6.2014; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Xirocambi, Krioneri, Mt. Taygetos (1); 36°57.386'N, 22°23.118'E; 1548 m; 1.7.2013; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Xirocambi, Penteli, Katafygio, Mt. Taygetos (1); 36°57.033'N, 22°22.070'E; 1548 m; 1.7.2013; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Xirocambi, Penteli, Katafygio, Mt. Taygetos (2); 36°56.873'N, 22°22.514'E; 1391 m; 3.7.2013; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Xirocambi, Penteli, Mt. Taygetos; 36°56.735'N, 22°22.536'E; 1288 m; 1.7.2013; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Xirocambi, Penteli; 36°55.868'N, 22°23.492'E; 747 m; 1.7.2013; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Xirocambi, Penteli; 36°55.941'N, 22°22.302'E; 1027 m; 1.7.2013; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messenia: Trifylia, Mt. Egaleo, Palea Vrisi; 37.16625°N, 21.74513°E; 871 m; 28.6.2015; song heard; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messenia: Trifylia, Mt. Mynthi, deviation to Skliros; 37.45327°N, 21.92164°E; 1130 m; 29.6.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messenia: Trifylia, Mt. Mynthi, Kryoneri; 37.47512°N, 21.80389°E; 953 m; 28.6.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.

GR: Peloponnese: Messinia: Manesis; 37°5.1'N, 21°53.5'E; 175 m; 17.6.1990; collected; R.Linnavuori.
GR: Peloponnese: Messinia: Mani Peninsula: Agious Vasilios; 37°04.093'N, 22°16.121'E; 1304 m; 24.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messinia: Mani Peninsula: Mt. Kalathi (Sideroportas); 37°02.724'N, 22°14.548'E; 1091 m; 24.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messinia: Platania, Avlonas; 37°22.107'N, 21°47.499'E; 510 m; 7.6.1978, 31.5.1989: 12.7.1979; collected 3 specimens; S.Drosopoulos.
GR: South Aegean: Dodecanese: island Kalymnos; 36°58.901'N, 26°58.879'E; 26.6.1992; collected 1 specimen; S.Drosopoulos.
GR: West Greece: Achaea: Chelmos, Vrachni; 38°2.5'N, 22°8.9'E; 800 m; 6.6.1981; collected; ?.Probst.
GR: West Greece: Achaea: Goumenissa; 38°02.802'N, 22°01.297'E; 720 m; 16.7.2010; collected, recorded, photographed; M.Gogala, T.Trilar, K.Šporar, S.Drosopoulos.
GR: West Greece: Achaea: Goumenissa; 38°02.802'N, 22°01.297'E; 720 m; 10.6.2005; recorded; M.Gogala, S.Drosopoulos.
GR: West Greece: Achaea: Goumenissa; 38°02.802'N, 22°01.297'E; 720 m; 11.6.2005; recorded; M.Gogala, S.Drosopoulos.
GR: West Greece: Achaea: Goumenissa; 38°02'54.7"N, 22°01'47.4"E; 716 m; 28.6.2006; collected, photographed; M.Gogala, T.Trilar, S.Drosopoulos.
GR: West Greece: Achaea: Kalavryta, above the village (ob cest na smučišče, Spartium); 38°01.509'N, 22°07.747'E; 970 m; 10.6.2012; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: West Greece: Achaea: Kalavryta, deviation to Kerpini (and Rogi); 38°03.283'N, 22°08.514'E; 737 m; 9.6.2012; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: West Greece: Achaea: Kalavryta, Kampigadi, Dendra; 38°02.397'N, 21°52.936'E; 674 m; 11.6.2012; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: West Greece: Achaea: Kalavryta, Lagovouni, deviation to Kandalos; 37°57.108'N, 22°02.916'E; 753 m; 10.6.2012; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: West Greece: Achaea: Kalavryta, Manesi; 38°00.834'N, 21°56.694'E; 856 m; 10.6.2012; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: West Greece: Achaea: Kalavryta, Petsaki-Agias Pantelejmon; 38°07'04.1"N, 22°03'19.1"E; 973 m; 28.6.2006; recorded; M.Gogala, T.Trilar, S.Drosopoulos.
GR: West Greece: Achaea: Kleitoria, above the village Armpounas (3); 37.90799°N, 22.19270°N; 1162 m; 5.6.2016; collected (1♂), recorded; M.Gogala, T.Trilar, K.Prosenc Trilar

GR: West Greece: Achaea: Kleitoria, above the village Armpounas (1); 37.92078°N, 22.17276°N; 1018 m; 5.6.2016; collected (2♂), recorded; M.Gogala, T.Trilar, K.Prosenc Trilar
GR: West Greece: Achaea: Klitoria, Priolithos, spomenik padlim; 37°54.968'N, 22°02.988'E; 1019 m; 10.6.2012; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: West Greece: Achaea: Likouria; 37.85739°N, 22.24554°N; 1077 m; 6.6.2016; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar
GR: West Greece: Achaea: Petsaki; 38°5.9'N, 22°2.3'E; 870 m; 15.6.1990; collected; R.Linnavuori.
GR: West Greece: Achaea: Pteri (Fteri); 38°08.848'N, 22°04.272'E; 1135 m; 9.6.2005; recorded; M.Gogala, S.Drosopoulos.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Ano Salmeniko (2); 38.23665°N, 21.90267°E; 1003 m; 30.6.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Ano Salmeniko (3); 38.22894°N, 21.89293°E; 1305 m; 30.6.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Ovriokampos (1); 38.15221°N, 21.90643°E; 1053 m; 1.7.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Ovriokampos (2); 38.17998°N, 21.91155°E; 1327 m; 1.7.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Ovriokampos (3); 38.16020°N, 21.90433°E; 1221 m; 1.7.2015; collected, song heard; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Patero; 38.11822°N, 21.85462°E; 1035 m; 1.7.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Rakita; 38.15846°N, 21.94618°E; 1137 m; 1.7.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Thomeika; 38.13214°N, 21.89734°E; 1017 m; 1.7.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.

Mezammira goumenissa Gogala, Drosopoulos et Trilar, 2012

GR: West Greece: Achaea: Kalavryta, Lagovouni; 37°57.753'N, 22°03.401'E; 767 m; 10.6.2012; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Ano Salmeniko (1); 38.24723°N, 21.90613°E; 744 m; 30.6.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Ano Salmeniko (2); 38.23665°N, 21.90267°E; 1003 m; 30.6.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Western Greece: Achaea: Patras, Mt. Panahaiko, Ano Salmeniko (3); 38.22894°N, 21.89293°E; 1305 m; 30.6.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.

GR: West Greece: Achaea: Goumenissa; 38°02.802'N, 22°01.297'E; 720 m; 9.6.2005; recorded; M.Gogala, S.Drosopoulos.
GR: West Greece: Achaea: Goumenissa; 38°02'54.7"N, 22°01'47.4"E; 716 m; 28.6.2006; collected, recorded; M.Gogala, T.Trilar, S.Drosopoulos.
GR: West Greece: Achaea: Goumenissa; 38°03.098'N, 22°01.632'E; 720 m; 9.6.2012; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: West Greece: Achaea: Kalavryta, Kampigadi, Dendra; 38°02.397'N, 21°52.936'E; 674 m; 11.6.2012; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: West Greece: Achaea: Kalavryta, deviation to Kerpini (and Rogi); 38°03.283'N, 22°08.514'E; 737 m; 9.6.2012; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: West Greece: Achaea: Kalavryta, Manesi; 38°00.834'N, 21°56.694'E; 856 m; 10.6.2012; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: West Greece: Achaea: Kalavryta, Skepasto (ob cesti Goumenissa-Kalavryta); 38°01.700'N, 22°02.765'E; 799 m; 9.6.2012; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.

Mezammira sakisi **sp. nova**

GR: Peloponnese: Arkadia: Aghios Andreas; 37°19.634'N, 22°44.279'E; 150 m; 23./24.5.2004; recorded; M.Gogala, S.Drosopoulos.
GR: Peloponnese: Arkadia: South Kynouria: Kounoupia; 37.06039°N, 22.81868°E; 766 m; 22.6.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Arkadia: South Kynouria: deviation to Ieron Naos Agios Dinitrios; 37.13360°N, 22.75941°E; 866 m; 21.6.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Evrotas, Aghios Dimitrios (1); 36.95006°N, 22.83613°E; 531 m; 26.6.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Evrotas, Apidia; 36.86963°N, 22.81469°E; 225 m; 26.6.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Evrotas, Kremasti; 36.96796°N, 22.88843°E; 915 m; 26.6.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Evrotas, Kremasti, Mt. Chionovouni; 36.98611°N, 22.90383°E; 867 m; 26.6.2015; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Evrotas, Kremasti, Mt. Madara (1); 37.02908°N, 22.88890°E; 939 m; 22.6.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Evrotas, Kremasti, Mt. Madara (2); 36.97684°N, 22.89841°E; 967 m; 26.6.2015; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Arkadia: Aghios Andreas, Orino Korakovouni; 37.30297°N, 22.74752°N; 341 m; 4.6.2016; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar
GR: Peloponnese: Arkadia: Aghios Andreas, Orino Korakovouni; 37.30487°N, 22.75005°N; 400 m; 4.6.2016; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar
GR: Peloponnese: Arkadia: Aghios Andreas, Orino Korakovouni; 37.29536°N, 22.76495°N; 668 m; 4.6.2016; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar

GR: Peloponnese: Arkadia: Aghios Andreas, Orino Korakovouni; 37.29964°N, 22.76597°N; 649 m; 4.6.2016; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar

Mezammira cf. *sakisi*

GR: Peloponnese, Messinia, Mani Peninsula, Saidona, Mt. Taygetos; 36°53.415'N, 22°18.957'E; 1142 m; 30.6.2013; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Laconia: Mani Peninsula: Aghios Nikolaos, Panaghia Giatrissa; 36°50.666'N, 22°23.416'E; 948 m; 30.6.2013; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messinia: Mani Peninsula: Anatoliko, Kaskarakas Gorge (Rintomo Gorge); 36°58.822'N, 22°15.561'E; 689 m; 26.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messinia: Mani Peninsula: Karea; 36°58.929'N, 22°17.605'E; 1097 m; 26.6.2014; collected, recorded, fotographed; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messinia: Mani Peninsula: Kokkinovouni; 36°58.803'N, 22°16.951'E; 1164 m; 26.6.2014; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messinia: Mani Peninsula: Mt. Kalathi, Dendra; 37°00.325'N, 22°14.323'E; 1100 m; 25.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messinia: Mani Peninsula: Mt. Kalathi, Kria Vrisi; 37°00.562'N, 22°15.962'E; 1103 m; 25.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messinia: Mani Peninsula: Mt. Kalathi, Rizana; 37°01.253'N, 22°16.408'E; 1156 m; 25.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messinia: Mani Peninsula: Platoma, Koskarakas Gorge; 36°57.351'N, 22°11.371'E; 183 m; 27.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: Peloponnese: Messinia: Mani Peninsula: Saidona; 36°53.102'N, 22°17.701'E; 888 m; 27.6.2014; recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.

Mezammira filoti sp. nova

GR: South Aegean, island Naxos: Filoti; 37°02.487'N, 25°29.685'E; 436 m; 21.6.2014; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.
GR: South Aegean, island Naxos: Filoti; 37°02.484'N, 25°29.690'E; 451 m; 22.6.2014; collected, recorded; M.Gogala, T.Trilar, K.Prosenc Trilar.

Mezammira tibialis (Panzer, 1798)

GR: Central Macedonia: Pieria: Litochoro; 40.11146°N, 22.49306°N; 341 m; 29.5.2016; collected (3♂), recorded; M.Gogala, T.Trilar, K.Prosenc Trilar

Table 2: Morphological and bioacoustic traits for 6 *Mezammira* taxa from Greece (Grey – new taxa).

MORPHOLOGY	*M. flaveola*	*M. carayoni*	*M. goumenissa*	*M. filoti* 5♂1♀	*M. sakisi* 12♂3♀(E. Peloponnese)	*M.* cf. *sakisi* 2♂ (Taigetos)
apical cells forew.	8 (7-9)	8	8	♂7-8, ♀8 (9)	8 (9 unilat 2x)	8
apical cells hindw.	5 (3-6 also bilat.)	6 (5 unilat)	6	5 (6 unilat.)	5 (6 unilat 4x)	5 (6 unilat)
pronotum coloration	basal spot free,broad yellow mediane (3 specimens of 49 like *M. filoti*)	dark, yellow med., 1 lighter freshly hatched spec. ♂. with smudged spot	Like *M. carayoni*, black, sometimes yellow mediane distally	pronotum:dark basal spot connected with lateral dark fields	pronotum dark, no basal spot, only front and hind edges lighter	basal spot connected with lateral dark fields, broad yellow mediane
ulnar1/apikal1 cell	1.9	1.4	♂♂1-1.1 ♀♀1.1-1.2	1.4-2.3	1.4±0.1	1.8, 2.5
pronotum w/lwith collar w/l	2.01±0.06, conical 2.38±0.08	1.96±0.05, barrel 2.37±0.04	1.89±0.05, barrel 2.24±0.07	2.0, conical	2.0±0.12.4±0.1	1.8, barrel
MCuA/Arc	1.23 (0.5-2.5!)	1.17 (0.9-1.6)	≈1	0.9-1.5	1.5±0.4 (0.9-2.0)	1.27 (1-1.7)
Body length [mm]	♂♂13.9±0.8 (13.7-15.6) ♀♀ 13.9-14.7	14.1±0.7(13.0-15.1)	♂♂13 (12.4-13.8) ♀♀14.5 1	♂♂12.5±0.6 (12.0-13.7) ♀12.0	♂♂10.3-12.8 ♀♀11.6-13.7	♂♂11.6, 13.7
eye color (alive)	yellow	brown	brown	red	black	reddish brown
abd.stern. 8/7	0.85 (0.8-0.9)	1.04	1.0-1.2	0.95	0.8 - 0.9	0.94

ACOUSTICS	*M. flaveola*	*M. carayoni*	*M. goumenissa*	*M. filoti*	*M. sakisi* (E. Peloponnese)	*M.* cf. *sakisi* (Taigetos)
song structure	SSS/LSSL/LSLS phrases ABC	SSS/LSSL/LLL	SSS/SSSL/LLVL	MMM/LSSL/SSSL	MMM/LMLM/SSSL phrases ABC	MMM/LMLM/SSSL phrases ABC
Repetition rates [Hz]	MMM SE rep.r. 7-11	SE rep.r. A 8.9±1 B 9.3±1	MMM(2013) SE rep. r. 19±3-10±2	MMMSE rep.r. 7.7-8.7	MMM rep.r. 9 LSLS rep.r. 10.5 LSSL rep.r. 10.3	MMM rep.r. 8.2 LSLS rep.r. 12.6 LSSL rep.r. 13.3
MMM M dur/int [ms]	S: 8±1, M: 16-18, 25-29 Int 70-110	M: 21.9±4.5 Int 91.6±14.3	M: 26±7Int 25.8±0.6	M: 24.2±1.4 Int 96.6±0.6	M: 33.1±5.1 Int: 80.3±9.1	M: 30±10 Int: 79.1±29.4
LSS(S)L S/M L dur [ms,s]	S: 8, 16 L: 62-70	S: 6.3±1.2 L: 44.2±5.3	M: 26±7L: 535±88 VLE: <15s!	S: 5.3±1.6 L: 73,9±3.8	S: 11.4±4.9 L: 69.6±8.6 Int: 75.1±17.8 Int (LE): 44.6±10	M: 21.3±7.6 L: 58.4±8.7 Int: 58.2±13.3
$N_{L/group}$ $N_{S/L-L}$	$N_{L/group}$=5 (median) $N_{S/L-L}$ =2 (median)	$N_{L/group}$=9 (median) $N_{S/L-L}$=3 (median)	NA	$N_{L/group}$=10 (median) $N_{S/L-L}$ =2 (median)	$N_{L/group}$=5 (median) $N_{S/L-L}$ =3 (median)	$N_{L/group}$=4 (median) $N_{S/L-L}$ =3 (median)
LSLS S/L dur [ms]	S: 12.8±5.1 L: 51.2±4.7 Int: 62.6±9.2	NA	NA	NA	S: 20.3±4.7 L: 83.1±8.8 Int: 42.5±10	S: 36.7±8.8 L: 86.8±12.2 Int: 26.2±9.5
Frequency 5/CFr/95% [kHz]	10.2 **12.7** 14.2	11.3 **13.6** 15.2	15.5 **19.6** 22.1	10.8 **13.9** 17.8	16.7 **18.7** 20.6	14.7 **16.9** 19.5

Table 3: Carrier frequencies of 6 Greek *Mezammira* taxa. 5% and 95% frequency energy values give the lower and upper frequency limit of effective sound range. Max frequency values shown in this tables is very close to Center frequency values (50%), shown in Fig. 23 - see the explanation in Raven Pro Instruction manual (Grey – new taxa).

Taxon	*Mezammira carayoni*			*Mezammira flaveola*			*Mezammira filoti*		
Freq.	5%	95%	Max	5%	95%	Max	5%	95%	Max
COUNT	92	92	92	91	91	91	84	84	84
AVERAGE	11301	15182	13641	10175	14158	12697	10826	17790	13895
STDEV	270	314	657	309	407	593	1126	918	931
MEDIAN	11250	15375	13875	10313	14250	12750	11532	17813	13875
QUART 1	11063	15000	13313	9938	13875	12375	9750	17063	13500
QUART 3	11438	15375	14063	10313	14438	13125	11813	18563	14625
MIN	9938	14250	11250	9563	13313	10125	9188	15938	10500
MAX	11813	15563	14250	10875	15563	13500	12188	18938	16125

Taxon	*Mezammira* cf. *sakisi* (Taygetos)			*Mezammira sakisi* (E. Peloponnese)			*Mezammira goumenissa*		
Freq.	5%	95%	Max	5%	95%	Max	5%	95%	Max
COUNT	105	105	105	20	20	20	29	29	29
AVERAGE	14723	19468	16918	16650	20625	18675	15517	22125	19552
STDEV	94	99	485	776	655	481	1564	317	165
MEDIAN	14813	19500	16875	16969	20438	18750	15750	22125	19500
QUART 1	14625	19500	16688	16078	20250	18563	15750	21750	19500
QUART 3	14813	19500	17438	17250	20859	18938	16125	22500	19500
MIN	14625	19313	14813	14813	19688	17625	9375	21750	19125
MAX	14813	19688	18938	17625	21938	19688	16125	22875	19875