

Review of Turkish crickets from the subfamily Gryllomorphae (Orthoptera: Gryllidae)

Обзор турецких сверчков подсемейства Gryllomorphae (Orthoptera: Gryllidae)

A.V. GOROCHOV & M. ÜNAL

А.В. ГОРОХОВ, М. УНАЛ

A.V. Gorochov, Zoological Institute, Russian Academy of Sciences, 1 Universitetskaya Emb., St Petersburg 199034, Russia. E-mail: orthopt@zin.ru

M. Ünal, Abant İzzet Baysal Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, Bolu 14280, Turkey. E-mail: unal@ibu.edu.tr

The fauna of Gryllomorphae of Turkey is reviewed. Sixteen species and subspecies are established. *Ovaliptila anamur* sp. nov., *O. anitli* sp. nov., *O. alanya* sp. nov., *O. alanya proxima* subsp. nov., *O. alara* sp. nov., *O. teke* sp. nov., *O. ibrahimi* sp. nov., *Glandulosa borisi* sp. nov. and *Gryllomorpha dalmatina minutissima* subsp. nov. are described. *Ovaliptila beroni* (Popov, 1975), *Glandulosa kinzelbachi* Harz, 1979, *G. harzi* Gorochov, 1996 and *Gryllomorpha antalya* Gorochov, 2009 are briefly characterized based on the type material. *Ovaliptila buresi* Mařan, 1958 is indicated as a rather widely distributed species in the western part of Anatolia (but not in the southern coast of this peninsula). *Gryllomorpha dalmatina pieperi* Harz, 1979, *G. miramae* Medvedev, 1933 and the nominotypical subspecies of *G. miramae* are recorded from Turkey for the first time, but both subspecies remain open to question.

Дан обзор фауны Gryllomorphae Турции. Установлено шестнадцать видов и подвидов. Описаны *Ovaliptila anamur* sp. nov., *O. anitli* sp. nov., *O. alanya* sp. nov., *O. alanya proxima* subsp. nov., *O. alara* sp. nov., *O. teke* sp. nov., *O. ibrahimi* sp. nov., *Glandulosa borisi* sp. nov. и *Gryllomorpha dalmatina minutissima* subsp. nov. *Ovaliptila beroni* (Popov, 1975), *Glandulosa kinzelbachi* Harz, 1979, *G. harzi* Gorochov, 1996 и *Gryllomorpha antalya* Gorochov, 2009 кратко охарактеризованы на основании типового материала. *Ovaliptila buresi* Mařan, 1958 указывается как вид, довольно широко распространенный в западной части Анатолии (но не на южном побережье этого полуострова). *Gryllomorpha dalmatina pieperi* Harz, 1979, *G. miramae* Medvedev, 1933 и номинативный подвид *G. miramae* впервые отмечены для Турции, но оба подвида под вопросом.

Key words: crickets, taxonomy, Turkey, Orthoptera, Gryllidae, Gryllomorphae, new taxa

Ключевые слова: сверчки, таксономия, Турция, Orthoptera, Gryllidae, Gryllomorphae, новые таксоны

INTRODUCTION

The fauna of Gryllomorphae of Turkey has been poorly studied. In the previous publications (Uvarov, 1934; Harz, 1979; Popov, 1975; Us, 1975; Gorochov, 1996, 2009), only six species were described from Turkey as new ones: (1) *Glandulosa willemsei* (Uvarov, 1934); (2) *G. kinzelbachi*

Harz, 1979; (3) *G. harzi* Gorochov, 1996; (4) *Ovaliptila beroni* (Popov, 1975); (5) *O. uvarovi* (Us, 1975); (6) *Gryllomorpha antalya* Gorochov, 2009. Three species originally described elsewhere were indicated for Turkey by some other authors: *Discoptila fragosoi* (Bolivar, 1885), by Weidner (1964), Gümüşsuyu (1981) and Önder et al. (1999); *D. brevis* Bey-Bienko, 1964, by

Harz (1969) and Gümüşşuyu (1980); *Gryllomorpha dalmatina* (Ocskay, 1832), by Retowski (1889), Ebner (1919), Gümüşşuyu (1981) and Önder et al. (1999). However, these indications are either erroneous or need to be checked, and some of the latter generic and species names are outdated. This situation requests a special investigation, which was started by the authors of this paper some years ago. In October 2010, we visited the southern part of Anatolia from Alanya City to Adana Prov., and in September 2011, its southwestern part from Antalya City to İzmir Prov. This field study has shown the members of Gryllomorphae to be rather widely distributed in Turkey and to be very common in many localities of the southern and southwestern parts of Anatolia. Moreover it has shown that this subfamily is represented in Turkey by a greater number of species and subspecies than it seemed before our investigation, and that these taxa have mainly small geographic areas (Fig. 142).

The material collected as well as some additional specimens examined during this study are deposited at the following institutions: Zoological Institute of RAS, St Petersburg, Russia (ZIN); Abant İzzet Baysal Üniversitesi, Bolu, Turkey (AIBÜ); National Museum of Natural History, Sofia, Bulgaria (NMNHS); Muséum d'Histoire naturelle de la Ville de Genève, Geneva, Switzerland (MHNG). These insects were collected mainly in forests situated on banks of small rivers in low mountains (brief additional ecological information is given in the lists of material studied). However, some specimens were collected on walls and floor of caves (sometimes in the crevices of stalactites and under stones).

TAXONOMIC PART

The system of Gryllomorphae is not very clear. There are a few problems related to the tribal position of some genera as well as to the generic and subgeneric positions of some species. Additional problems were

introduced by the electronic catalogue of crickets (Eades et al., 2012) which partly used an eclectic classification by Otte (1994) lacking any taxonomic justification. In this connection, we consider it useful to give a more logical variant of Gryllomorphae classification, based on the works of Baccetti (1959), Gorochov (1984, 1986, 1990, 1995, 2006, 2009) and Gorochov & Llorente (2001).

The subfamily Gryllomorphae includes only two tribes known in the Ancient Mediterranean Region: Petaloptilini Baccetti, 1959 (Mediterranean) and Gryllomorphiini Saussure, 1877 (from Mediterranean to Middle Asia). Eades et al. (2012) erroneously added the Australian tribe Eurygryllodini Gorochov, 1990 (with the genera *Eurygryllodes* Chopard, 1951 and *Maluagryllus* Otte, 1994) which undoubtedly belongs to Gryllinae (Gorochov, 1990; Gorochov & Llorente, 2001). Moreover, Gorochov is still indicated in this electronic catalogue as the author of Petaloptilini, although it was Baccetti who first proposed a scientific name for this group of genera (Baccetti, 1959: Petaloptilinae); thus, according to the Code (International Commission on Zoological Nomenclature, 1999: articles 35.1 and 36.1), Baccetti is the author of all family group taxa based on the genus *Petaloptila* Pantel, 1890. The generic composition of Gryllomorphae is as follows:

Petaloptilini Baccetti, 1959

1) *Petaloptila* Pantel, 1890 (Iberian and Apennine Peninsulas) = *Discoptila* Pantel, 1980, synonymized by Gorochov (2006).

2) *Acroneuroptila* Baccetti, 1959 (Sardinia).

3) *Glandulosa* Harz, 1979 (Anatolia).

4) *Ovaliptila* Gorochov, 2006 (Anatolia, Balkans, islands between them, and northern Black Sea coast).

[Eades et al. (2012) indicated *Discoptila* as a separate genus of Petaloptilini having five species: *D. zernyi* (Werner, 1934) from Morocco, *D. fragosoi* (Bolivar, 1885) from

Spain, *D. sbordonii* Baccetti, 1979 and *D. clauseri* Schmidt, 1991 from Apennine Peninsula, and *D. willemsei* Karaman, 1975 from Montenegro. However, the first species probably belongs to the genus *Hymenoptila* Chopard, 1943 distributed in Morocco and Canary Islands (Gorochov, 2006); the second one is the type species of *Discoptila* which was evidently described from a subadult nymph of *Petaloptila* (Gorochov, 2006); *D. sbordonii* and *D. clauseri* were described from nymphs and a female of an unknown genus (or unknown genera) of Petaloptilini (Gorochov, 2006). *D. brevis* Bey-Bienko, 1964 from the Crimea is still indicated in the latter catalogue (Eades et al., 2012) as a synonym of *D. fragosoi* whereas it is actually a synonym of *O. buresi* (Mařan, 1958), which is the type species of *Ovaliptila* distributed from Bulgaria to the Crimea (Gorochov, 2006). The genus *Hymenoptila* is also included in Petaloptilini in this catalogue, but possibly it belongs to the tribe Gryllomorphini (Gorochov, 2009).]

Gryllomorphini Saussure, 1877

5) *Gryllomorpha* Fieber, 1853 (Canary Islands, North Africa, southern part of Europe including the Mediterranean islands, and area in Asia from Mediterranean coast to Kazakhstan and Iran).

?6) possibly *Hymenoptila* Chopard, 1943 (Morocco and Canary Islands).

[Three additional genera were erroneously included in Gryllomorphini by Eades et al. (2012): *Acroneuroptila*; *Eugryllodes* Chopard, 1927 from Iberian Peninsula and South France (the African and Asian species mentioned in this catalogue as representatives of *Eugryllodes* most probably do not belong to this genus); *Neogryllodes* Otte, 1994 based on a species from Argentina. The first genus is a member of the tribe Petaloptilini (Baccetti, 1959; Gorochov & Llorente, 2001; Gorochov, 2009); *Eugryllodes* is a representative of the tribe Gryllini from the subfamily Gryllinae (Chopard, 1967; Gorochov & Llorente, 2001); *Neo-*

gryllodes is an originally unavailable name since it was published by Otte (1994) without any description or diagnosis (Gorochov & Llorente, 2001).]

Order ORTHOPTERA

Family GRYLLIDAE

Subfamily GRYLLOMORPHINAE

Tribe PETALOPTILINI

Genus *Ovaliptila* Gorochov, 2006

Note. This genus was described by Gorochov (2006) for a group of related species distributed from Anatolia to Balkan Peninsula: *O. buresi* (Mařan, 1958), type species known from Bulgaria and Ukraine; *O. krueperi* (Pantel, 1890), *O. wettsteini* (Werner, 1934), *O. lindbergi* (Chopard, 1957), *O. newmanae* (Harz, 1969) and *O. kinzelbachi* (Harz, 1971) from Greece; *O. beroni* (Popov, 1975) from Turkey; *O. willemsei* (Karaman, 1975) from Montenegro. Here we add eight other species and subspecies to this list. *O. nana* (Baccetti, 1992), **stat. nov.** was described as *Discoptila lindbergi nana* from Kos I. (Greece) by Baccetti (1992); however, this is a distinct species distinguished from all the congeners (including all the new species described here) by the rather long male tegmina (which are not shorter than pronotum) in combination with the very short anteromedian part of epiphallal sclerite (which looks as a narrow transverse ribbon, almost angularly curved at the middle) and the long apodeme of mold of spermatophore attachment plate. The six new species and the new subspecies from Anatolia are described below.

This genus is characterized by the following features: male tegmina are short, oval or round in shape, reaching the middle part of metanotum or anterior part of first abdominal tergite, and with more or less glandular ventral surface; female tegmina are very small, lateral, completely or almost completely covered with the pronotum; hind wings are absent; male meta-

notum is with a distinct median convexity; anal plate is with a pair of posteromedian lobules in male, and simple (almost oval in shape) in female; male genitalia are with the epiphallic sclerite divided into two parts (transverse anteromedian part and arcuate posteromedian part) by a rather large membranous area (Figs 1, 3, 5, 7); posteromedian part of epiphallic sclerite is not divided into two lateral sclerites and has a group of very small denticles on external surface (Figs 1, 3, 5, 7); ectoparameres fused with the lateral parts of endoparameres (Figs 2, 6, 27, 30, 33, 36, 39, 41, 43, 45, 47, 49); ventral surface of genitalia near these ectoparameres are with small ventral sclerites (Figs 2, 6) which sometimes are connected with the mold of spermatophore attachment plate by a pair of sclerotized ribbons (Fig. 26); ovipositor is more or less long and with a characteristic apex (Fig. 50).

The taxonomic rank of some populations of Turkish *Ovaliptila* from different caves, located not far from each other, may not be very clear, as these populations may show rather insignificant differences in body structure, including differences in male genitalia. Sometimes it is not clear whether we are dealing with two (or more) subspecies or only with variability within one subspecies. In such cases, we used the following empirical approaches: small (but stable) differences in sexual structures involved in copulation and oviposition were considered a good reason for subdivision into species and subspecies, except for minor differences in the length of genital apodemes (as they may result from differences in age of imago or from different conditions of nymphal life); small differences in the complex of genital structures (especially participating in the fixation of female genital structures during copulation, in the attachment of spermatophore, and in the insertion of its tube into the spermathecal duct of female) were the reason to establish a species status; very small differences in few such structures (or in one such structure) justified a subspecies status only.

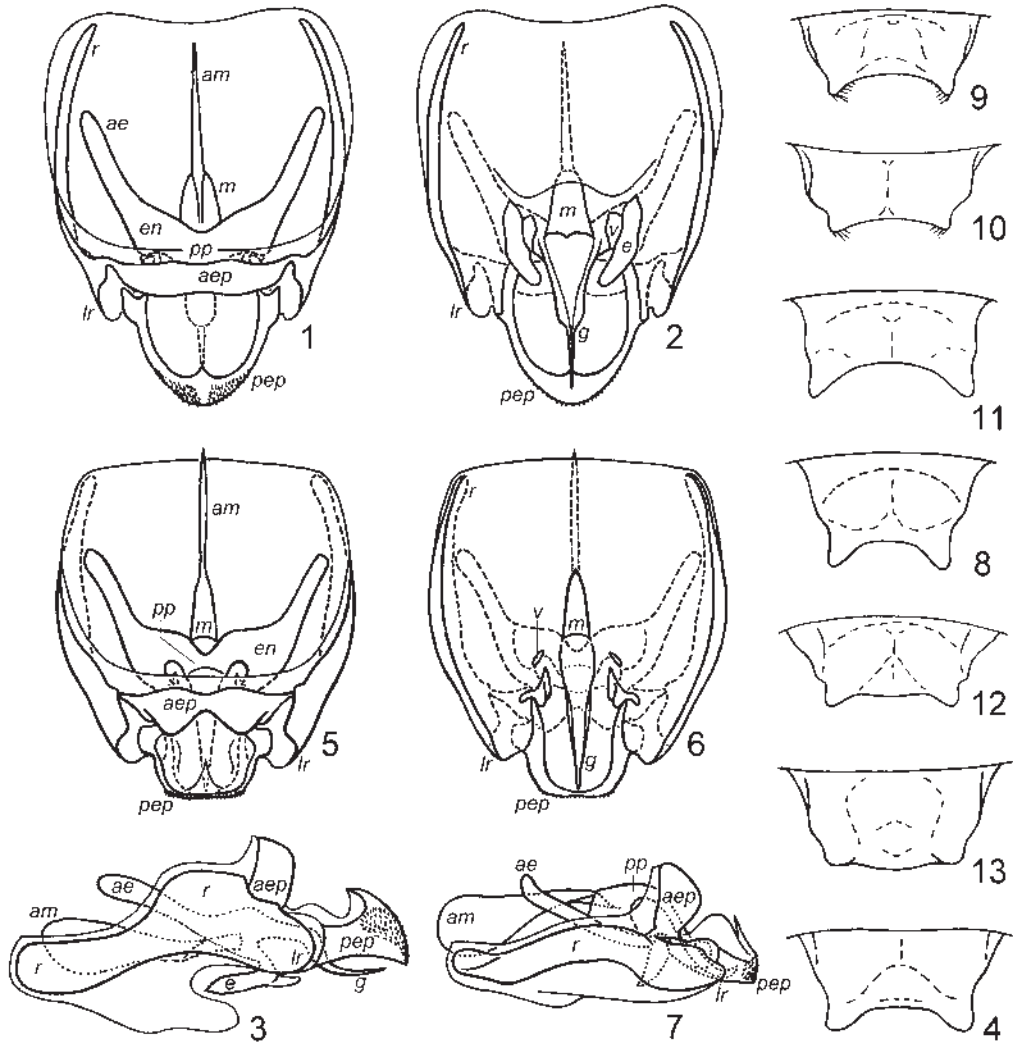
***Ovaliptila beroni* (Popov, 1975)**
(Figs 14, 15, 26–28, 51–54)

Discoptila beroni Popov, 1975

Holotype. Male, **Mersin Prov.**, Gülnar Distr., “Maara Cave” [the name of this cave is uncertain since “Maara” may be a misspelling of “mağra” (= cave in Turkish)] near Karatepe Vill., 17 Dec. 1972, coll. P. Beron & V. Beschkov (NMNHS).

Notes. We had a possibility to study only a single specimen (holotype) from the type series of *O. beroni*. However, this species was described based on seventeen specimens (holotype and paratypes) from two different localities (Popov, 1975). Twelve paratypes and five additional specimens mentioned by Popov are from the same locality as the holotype. They may really belong to *O. beroni*. Four other paratypes and an additional specimen are from Damlataş [= Damlatasch] Cave in Alanya City (Antalya Prov.). The latter specimens probably belong to the nominotypical subspecies of *O. alanya* **sp. nov.** which is here described from two other caves situated very near Alanya City. It is reasonable to note that we did not find any specimens of *Ovaliptila* in Damlataş Cave during our visit in October 2010 (now this cave is under strong anthropogenic pressure, as it is situated within the city).

Ovaliptila beroni was synonymized with *Discoptila uvarovi* Us, 1975 (Popov, 1984) and recorded from Antalya Prov. (Köhler et al., 2004; Gorochov, 2006), but these actions are problematic or erroneous. The holotype of the species described by Us is from “an unnamed cave between Aydinçik–Ovacik” (Us, 1975) located not so far from the type locality of *O. beroni*, because Karatepe Vill. is also situated between these villages (we cannot exclude the possibility that both these species may be from the same cave). Male genitalia of Us’s type specimens are unstudied up to now (we did not have a possibility to study these specimens). Thus, this name may be a synonym of *O. beroni* (which is more probable), or it may belong to a subspecies of *O. beroni* or a separate species (which is less probable).



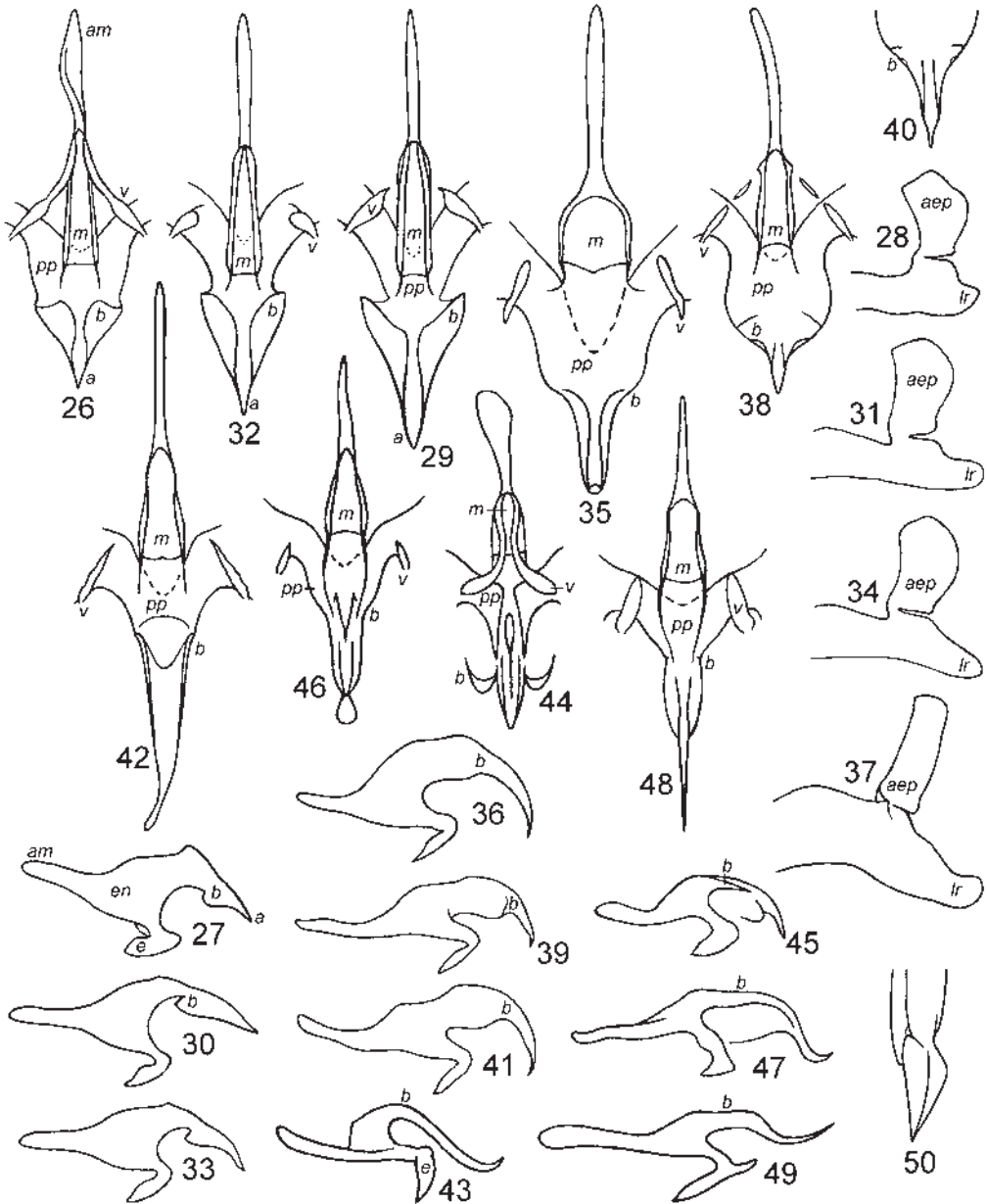
Figs 1–13. *Ovaliptila*; male (schematically). 1–4, *O. buresi*; 5–8, *O. alara* sp. nov.; 9, *O. anamur* sp. nov.; 10, *O. alanya proxima* subsp. nov.; 11, *O. anitli* sp. nov.; 12, *O. teke* sp. nov.; 13, *O. ibrahimi* sp. nov. Genitalia from above (1, 5), from below (2, 6), and from side (3, 7); anal plate from above and slightly from behind (4, 8–13). [1–3, 5–7, after Gorochov (1984, 2006)]. Abbreviations: *ae*, apodeme of endoparamere; *aep*, anteromedian part of epiphallallic sclerite; *am*, apodeme of mold of spermatophore attachment plate; *e*, ectoparamere; *en*, endoparamere; *g*, guiding rod; *lr*, posterior lobe of ramus; *m*, mold of spermatophore attachment plate; *pep*, posteromedian part of epiphallallic sclerite; *pp*, posteromedial parts of endoparameral sclerites fused (sometimes not fused) with each other; *r*, ramus; *v*, ventral sclerite.

The paratypes of Us's species from "Alanya cave" (Us, 1975) and the specimens from "Höhle Damlatas", determined by Weidner (1964) as *D. fragosoi*, and from "Höhlen von Alanua und Damlatos", determined by Harz (1969) as *D. brevis*, were also attributed by

Popov (1975) to his *D. beroni*. However, they may belong to *O. alanya alanya* (see above). The specimens recorded as Popov's species from Yalandünya [= Yalan Dünya] Cave not far from Gazipaşa City (Köhler et al., 2004), and those from the bank of Alara



Figs 14–25. *Ovaliptila*; male. 14, 15, *O. beroni*; 16, 17, *O. anamur* sp. nov.; 18, 19, *O. anitli* sp. nov.; 20, 21, *O. alanya alanya* subsp. nov.; 22, 23, *O. alanya proxima* subsp. nov.; 24, 25, *O. alara* sp. nov. Thorax with head and tegmina (one of them turned or erected) from above (14, 16, 18, 20, 22, 24); ventral and dorsal views of left (upper in photo) and right (lower in photo) tegmina, respectively (15); ventral view of right (17, 19, 23) and left (21, 25) tegmina.



Figs 26–50. *Ovaliptila* (schematically). 26–28, *O. beroni*; 29–34, *O. anamur* sp. nov. (29–31, Köşebükü Cave; 32–34, Anıtlı River); 35–37, *O. anıtlı* sp. nov.; 38, 39, *O. alanya alanya* ssp. nov.; 40, 41, *O. alanya proxima* ssp. nov.; 42, 43, *O. alara* sp. nov.; 44, 45, *O. teke* sp. nov.; 46, 47, *O. ibrahimi* sp. nov.; 48–50, *O. buresi*. Guiding rod with posteromedial parts of endoparameres, mold of spermatophore attachment plate, and ventral sclerites from below (26, 29, 32, 35, 38, 42, 44, 46, 48); endoparameres with guiding rod and ectoparameres from side (27, 30, 33, 36, 39, 41, 43, 45, 47, 49); posterior part of rami with anteromedian part of epiphallic sclerite from side (28, 31, 34, 37); guiding rod with fragment of posteromedial parts of endoparameres from below (40); distal part of ovipositor from side (50). [43, 49, 50, after Gorochov (1984, 2006).] Abbreviations: *a*, apical part of guiding rod; *b*, basal part of guiding rod; others, as in Figs 1–13.

River (Gorochov, 2006) belong to *O. alanya proxima* **subsp. nov.** and *O. alara* **sp. nov.**, respectively.

Ovaliptila beroni (sensu Popov) was accurately described and redescribed by its author (Popov, 1975, 1984). He also published several good illustrations including the pictures of male genitalia very similar to those of the holotype and probably belonging to it (Popov, 1975: Abb. 1–10). However, we cannot exclude that some other characters and pictures from these descriptions are based on *O. alanya*. So, it is useful to list the important characters visible in the holotype which is now in very poor condition: most part of the body is presented as separate sclerites, only the head and thorax are preserved in a more or less original condition (but separated from the antennae and legs). Colouration of body is almost uniformly light brown with the following darker and lighter areas: eyes brown; dorsal and medial tegminal surfaces as well as border on the ventral surface of tegmina (along their distal and lateral edges) are slightly darker than head, thoracic tergites and legs; rest of ventral tegminal surface is hardly lighter than general colouration. Structure of body parts preserved is typical of *Ovaliptila* (Popov, 1975, 1984; Gorochov, 2006) but with the following differences: scape is almost 2.5 times as wide as rostrum between antennal cavities; height of eye is slightly smaller than width of scape; tegmina are weakly elongate, approximately equal to pronotum in length, reaching the base of first abdominal tergite, oval in shape, and with cellular ventral surface consisting of numerous small folds and small concavities between them (Figs 14, 15); structure of anal plate is not clear, but, judging by Popov's pictures (Popov, 1975: Abb. 2–4), it probably was similar to that of *O. alanya* (see Fig. 10). Genitalia are with the posteromedian part of epiphallic sclerite rather well sclerotized along dorsal edge and comparatively low (Figs 53, 54); anteromedian part of epiphallic sclerite is rather wide but with distinct anterior and posterior median

notches (Fig. 51); posterior lobe of rami is short (Figs 28, 53, 54); guiding rod is also short, practically not curved in profile, and with a narrowly angular distal part (Figs 26, 27, 52); posteromedial parts of endoparameral sclerites (fused with each other) together are only hardly narrower than base of guiding rod (Figs 26, 52); mold of spermatophore attachment plate is rather long and narrow, with a long apodeme, and connected with small ventral sclerites (situated near ectoparameres) by sclerotized ribbons (Figs 26, 51, 52).

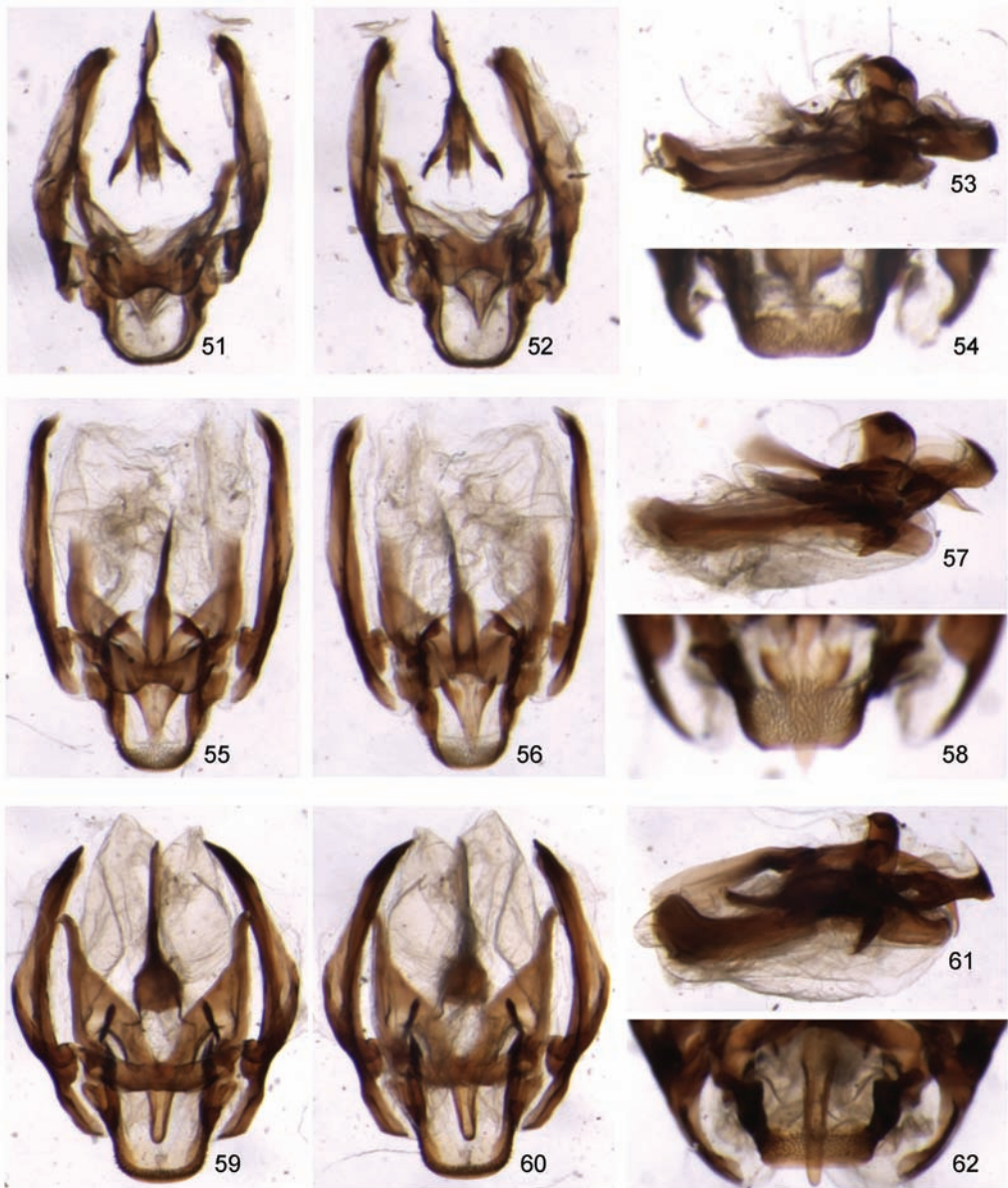
***Ovaliptila anamur* sp. nov.**

(Figs 9, 16, 17, 29–34, 55–58)

Holotype. Male, **Mersin Prov.**, Anamur Distr., environs of Anamur City, Köşekbükü Cave, 36°07.628'N, 32°45.594'E, 125 m, 12 Oct. 2010, coll. A. Gorochov & M. Ünal (ZIN).

Paratypes. Eight males, 1 female, 5 nymphs, same data as for holotype (ZIN and AIBÜ). One male, same district, bank of Anıtlı River (5–6 km N of sea coast), 36°09.474'N, 32°36.049'E, among rocks in forest, at night, 11 Oct. 2010, coll. A. Gorochov & M. Ünal (AIBÜ).

Description. Male (holotype). Colouration of body light brown (almost yellowish) with dark brown (almost blackish) eyes, brown border on dorsal surface of tegmina along all their edges and border on ventral surface of tegmina along their distal and lateral edges, yellowish white rest of ventral tegminal surface and anterior half of meso- and metanotum (mesonotum additionally with brown line along its posterior edge). External body structure typical of male of *Ovaliptila*, however with following features: head and tegmina as in *O. beroni*, but tegmina with small concavities on central part of ventral surface slightly wider and longer (Figs 16, 17); anal plate with a pair of moderately short posterolateral lobules (Fig. 9). Genitalia also similar to those of *O. beroni*, however posteromedian part of epiphallic sclerite less sclerotized along dorsal edge of this part and distinctly higher (Figs 57, 58), posterior lobe of rami much longer (Figs 31, 57, 58), guiding rod clearly longer and



Figs 51–62. *Ovaliptila*; male genitalia. **51–54,** *O. beroni* (51, 52, with mold of spermatophore attachment plate and ventral sclerites isolated from rest of genitalia and somewhat moved forwards; 53, without these mold and sclerites); **55–58,** *O. anamur* **sp. nov.**; **59–62,** *O. anitli* **sp. nov.** Genitalia from above (51, 55, 59), from below (52, 56, 60), and from side (53, 57, 61); posteromedian part of epiphallic sclerite with nearest structures from behind and slightly above (54, 58, 62).

with less narrow distal part having apex of this part hardly curved in profile (Figs 29, 30, 56, 57), posteromedial parts of endoparameral sclerites (fused with each other) together much narrower than base of guiding rod, and ventral sclerites not connected with mold of spermatophore attachment plate by any distinct ribbon-like sclerotizations (Figs 29, 55, 56).

Variations. Sometimes tegmina with darkened areas slightly lighter (almost light brown), and guiding rod of genitalia slightly shorter and without any apical curvature; in specimen from bank of Anıtlı River, this rod also slightly shorter than in holotype and with narrower distal part weakly turned downwards, posteromedial parts of endoparameral sclerites slightly wider, and ventral sclerites insignificantly different in shape (Figs 32, 33).

Female. General appearance as in male, but mesonotum without median convexity, tegmina very small (lobe-like) and completely covered with pronotum, and anal plate triangular and with rounded apex. Genital plate weakly transverse and with small posteromedian notch; ovipositor distinctly shorter than hind femur (this femur approximately 1.7 times as long as ovipositor).

Length in mm. Body: male 10.5–14, female 11; pronotum: male 2–2.4, female 2.6; tegmina, male 2–2.5; hind femora: male 9.5–11, female 11.2; ovipositor 6.6.

Comparison. The new species is most similar to *O. beroni*, but clearly distinguished from it by the characters of male genitalia listed above (especially by the posteromedian part of epiphallic sclerite distinctly higher and posterior lobe of rami much longer). From the other congeners, *O. anamur* differs in the following combination of characters: male tegmina are slightly longitudinal; guiding rod is not S-shaped in profile, and its distal part is not strongly curved downwards; mold of spermatophore attachment plate is with a rather long apodeme.

Etymology. The species is named after the city of Anamur.

Remark. The specimen from Anıtlı River may represent a separate subspecies of this species, but since this specimen is unique, the variability in the population from this locality cannot be assessed.

***Ovaliptila anitli* sp. nov.**

(Figs 11, 18, 19, 35–37, 59–62)

Holotype. Male, **Mersin Prov.**, Anamur Distr., bank of Anıtlı River (5–6 km N of sea coast), 36°09.474'N, 32°36.049'E, among rocks in forest, at night, 11 Oct. 2010, coll. A. Gorochov & M. Ünal (ZIN).

Paratypes. Three females; same data as for holotype (ZIN and AIBÜ).

Description. Male. Colouration light brown with slight reddish tinge, but eyes blackish, rostrum of head with darkish area around median ocellus, tegmina with very weakly darkened border on dorsal surface and yellowish white most part of ventral surface, cerci slightly darkened, and genital plate with darkish border along posterior edge. External structure of body similar to that of *O. beroni* and *O. anamur*, however lateral ocelli distinctly larger (almost twice as large as median ocellus; vs. almost as large as median ocellus), eyes also larger (their height hardly greater than width of scape), tegmina distinctly smaller (much shorter than pronotum, clearly not reaching metanotum) and almost round (Fig. 18), ventral tegminal surface with less distinct cellular structure (Fig. 19), and anal plate with longer posterolateral lobules (Fig. 11). Genitalia with posteromedian part of epiphallic sclerite low (almost as in *O. beroni*; Figs 61, 62), anteromedian part of epiphallic sclerite without any distinct median notches and clearly narrower than in *O. beroni* and *O. anamur* (Figs 37, 59, 61), guiding rod and posterior lobe of rami long (almost as in *O. anamur*), this rod rather thin and clearly arcuate in profile (Figs 35–37, 60–62), posteromedial parts of endoparameral sclerites (fused with each other) together much wider than base of guiding rod (Fig. 35), mold of spermatophore attachment plate distinctly shorter and almost twice as wide



Figs 63–74. *Ovaliptila*; male genitalia. 63–66, *O. alanya alanya* ssp. nov.; 67–70, *O. alanya proxima* ssp. nov.; 71–74, *O. alara* sp. nov. Genitalia from above (63, 67, 71), from below (64, 68, 72), and from side (65, 69, 73); posteromedian part of epiphallallic sclerite with nearest structures from behind and slightly above (66, 70, 74).

as in *O. beroni* and *O. anamur*, apodeme of this mold very long, and ventral sclerites clearly not connected with this mold by any sclerotized ribbons (Figs 35, 59, 60).

Female. General appearance as in male, but lateral ocelli and eyes intermediate between those of male and *O. anamur* in size, structure of mesonotum and tegmina as well as of abdominal apex practically indistinguishable from that of female of *O. anamur* except for longer ovipositor (hind femur approximately 1.1 times as long as ovipositor).

Length in mm. Body: male 12, female 11–14.5; pronotum: male 2.2, female 2.2–2.8; tegmina, male 1.6; hind femora: male 9.8, female 9–11; ovipositor 8–9.8.

Comparison. The new species is similar to *O. beroni* and *O. anamur*, but clearly distinguished by the larger eyes and lateral ocelli, shorter and almost round tegmina in male, longer posterolateral lobules of male anal plate, narrower anteromedian part of epiphallic sclerite lacking any distinct median notches, more arcuate guiding rod with a narrower proximal part, much wider posteromedial parts of endoparameral sclerites, distinctly shorter and wider mold of spermatophore attachment plate, and longer ovipositor (in *O. beroni* sensu Popov, hind femur is 1.4–1.7 times as long as ovipositor; Popov, 1975). From the other congeners, *O. anitli* differs in the wide and short mold of spermatophore attachment plate in combination with the long, thin, and arcuate guiding rod.

Etymology. The species is named after the Anitli River.

***Ovaliptila alanya* sp. nov.**

(Figs 20, 21, 38, 39, 63–66)

Holotype. Male, **Antalya Prov.**, Alanya Distr., Kadıncınarı [= Kadıni] Cave near northern part of Alanya City, 36°35.070'N, 32°04.677'E, 120 m, 22 Oct. 2010, coll. A. Gorochov & M. Ünal (ZIN).

Paratypes. **Antalya Prov.**, Alanya Distr.: 4 males, 8 females, 1 nymph, same data as for holotype (ZIN and AIBÜ); 2 males, 1 female, 1 nymph, locality Kestel near eastern part of Ala-

nya City, Dim Cave, 36°32.408'N, 32°06.538'E, 220 m, 10 Oct. 2010, coll. A. Gorochov & M. Ünal (ZIN and AIBÜ); 1 female, same cave, 16 Dec. 2007, coll. M. Rampini & C. Di Russo (ZIN).

Description. Male (holotype). Colouration and external structure of body very similar to those of *O. anamur*, but ocelli almost as in female of *O. anitli*, length of eye practically equal to width of scape, tegmina with roundly truncate distal part and distinctly smaller concavities on ventral surface (Figs 20, 21), and anal plate with slightly shorter posterolateral lobules (as in Fig. 10). Genitalia similar to those of *O. beroni* and *O. anamur*, however posteromedian part of epiphallic sclerite almost as in *O. beroni* (Fig. 65, 66), anteromedian part of this sclerite with median notches shallower (anterior notch distinctly shallower, posterior notch slightly shallower; Fig. 63), posterior lobe of rami approximately as in *O. anamur* (Figs 63–66), guiding rod with clearly narrower base of its distal half (Figs 38, 64), this half almost straight in profile and distinctly turned downwards (Fig. 39), posteromedial parts of endoparameral sclerites (fused with each other) together wider than base of guiding rod (more or less as in *O. anitli*), and ventral sclerites almost not connected with mold of spermatophore attachment plate by sclerotized ribbons (Figs 38, 64).

Variations. Some paratypes with upper half of head, dorsal surface of tegmina, tibiae, tarsi, abdominal tergites and cerci somewhat darker than rest of body (except blackish eyes and brown tegminal borders). Tegmina of specimens from Dim Cave with more rounded distal part (this part more or less as in *O. beroni* and *O. anamur*). Sometimes genitalia with posteromedian notch of anteromedian part of epiphallic sclerite almost as in *O. beroni* and *O. anamur*.

Female. General appearance as in male, but structure of mesonotum, tegmina and abdominal apex similar to that of female of *O. anamur*, however tegmina slightly larger (usually hardly visible behind pronotum) and ovipositor somewhat longer (hind femur 1.4–1.5 times as long as ovipositor).

Length in mm. Body: male 10.5–12.5, female 12.5–14.5; pronotum: male 2–2.2, female 2.2–2.6; tegmina, male 2–2.4; hind femora: male 9–10, female 9.5–12; ovipositor 6.9–7.8.

Comparison. The new species is distinguished from *O. beroni* and *O. anamur* by the anteromedian part of epiphallic sclerite with the anterior median notch distinctly shallower, guiding rod with distal half distinctly turned downwards and base of this half clearly narrower, posteromedial parts of endoparameral sclerites wider than base of guiding rod (in *O. beroni* and *O. anamur*, they are narrower than this base), and additionally from *O. anamur* by the shorter posteromedial lobules of male anal plate and longer ovipositor. *O. alanya* differs from *O. anitli* in the longer male tegmina, distinctly narrower and longer mold of spermatophore attachment plate, and shorter ovipositor. From the other congeners, *O. alanya* differs in the following combination of characters: male tegmina are slightly longitudinal (not round or slightly transverse); guiding rod is not S-shaped in profile; distal half of this rod is moderately long, thin, and directed downwards; mold of spermatophore attachment plate is with a rather long apodeme.

Etymology. The species is named after the city of Alanya.

Remark. *Ovaliptila alanya* was probably indicated as *D. beroni* from Damlatas Cave by Popov (1975, 1984) and as *D. uvarovi* from “Alanya Cave” by Us (1975).

***Ovaliptila alanya proxima* subsp. nov.**
(Figs 10, 22, 23, 40, 41)

Holotype. Male, **Antalya Prov.**, Gazipaşa Distr., Yalandünya Cave near Beyrebucağ Vill., 36°13.264'N, 32°24.117'E, 250 m, 11 Oct. 2010, coll. A. Gorochov & M. Ünal (ZIN).

Paratypes. Four males, 6 females, 3 nymphs, same data as for holotype (ZIN and AIBÜ).

Description. Male (holotype). Colouration and external structure of body very similar to those of holotype of *O. alanya alanya* **stat. nov.**, but proximal part of cerci

darker (brownish grey) and shape of tegmina as in paratypes of this subspecies from Dim Cave (Figs 22, 23). Genitalia also as in latter subspecies, however posteromedian part of epiphallic sclerite slightly higher (Figs 69, 70), narrow part of guiding rod clearly longer and distinctly arcuate (Figs 40, 41, 68, 69), and ventral sclerites without any traces of sclerotised ribbons partly connecting these sclerites with mold of spermatophore attachment plate in nominotypical subspecies (for comparison see Figs 38, 63, 64 and 67, 68).

Variations. One specimen with dorsal surface of tegmina slightly darker (almost uniformly brown); cerci sometimes uniformly light brown or yellowish.

Female. General appearance similar to male, but structure of mesonotum and tegmina as well as of abdominal apex indistinguishable from that of female of *O. alanya alanya* (hind femur approximately 1.5 times as long as ovipositor).

Length in mm. Body: male 10–13, female 10–12; pronotum: male 1.8–2.2, female 2–2.4; tegmina, male 2–2.3; hind femora: male 9.5–11, female 9.2–10.3; ovipositor 6.2–6.7.

Comparison. The new subspecies differs from the nominotypical one in the characters of male genitalia listed above. From the other congeners, it is distinguished by the same characters as *O. alanya alanya*.

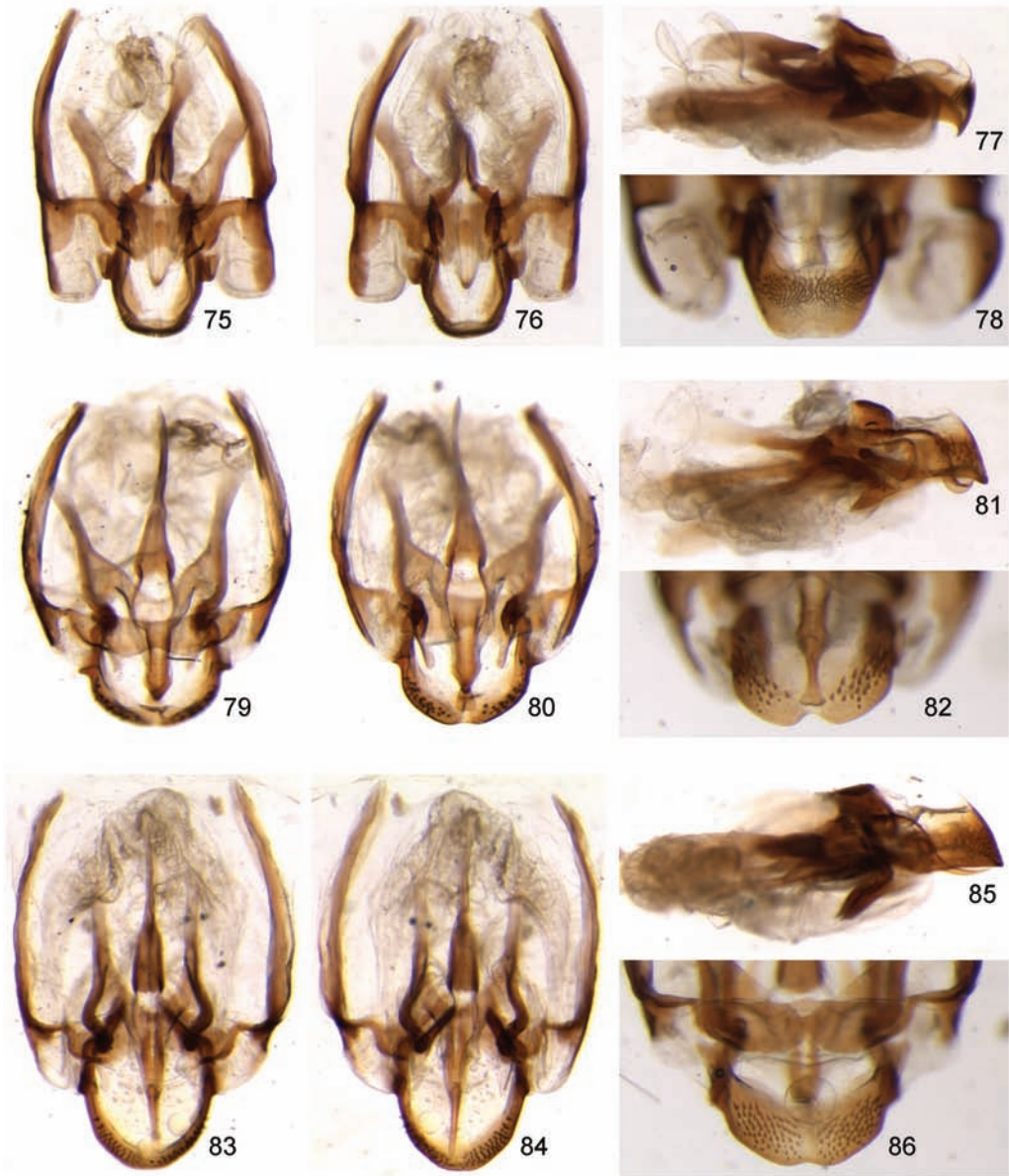
Etymology. This name is the Latin word “proxima” (nearest).

Remark. *Ovaliptila alanya proxima* was evidently indicated as *O. beroni* from the same cave by Köhler et al. (2004).

***Ovaliptila alara* sp. nov.**
(Figs 5–8, 24, 25, 42, 43, 71–74)

Holotype. Male, **Antalya Prov.**, Alanya Distr., ~30 km WNW of Alanya City, environs of Okurcalar Vill., bank of Alara River, on stone very near water in forest, at night, 1–10 Oct. 1994, coll. A. Gorochov (ZIN).

Paratypes. Forty-three males, 21 females, 1 nymphs, same data as for holotype (ZIN and AIBÜ).



Figs 75–86. *Ovaliptila*; male genitalia. 75–78, *O. teke* sp. nov.; 79–82, *O. ibrahimi* sp. nov.; 83–86, *O. buresi* (Gökçeler Cave). Genitalia from above (75, 79, 83), from below (76, 80, 84), and from side (77, 81, 85); posteromedian part of epiphallallic sclerite with nearest structures from behind and slightly above (78, 82, 86).

Description. Male (holotype). Colouration light brown with yellowish white most part of ventral tegminal surface as well as with brown distolateral half of dorsal tegminal surface, border along medial edge of this surface, rather wide band along posterior edge of mesonotum, narrow stripe along posterior edge of hind abdominal tergites, and most part of paraprocts. External body structure typical of *Ovaliptila*, but eyes rather large (slightly larger than in *O. anitli*; eye height / scape width = 1.3), lateral ocelli rather small (almost not larger than median ocellus), tegmina oval (approximately as in *O. anamur* in shape) and reaching base of first abdominal tergite (Fig. 24), ventral tegminal surface more or less similar to that of *O. alanya* (Fig. 25), and anal plate distinguished from that of *O. anitli* only by narrower notch between posterolateral lobules (for comparison see Figs 8 and 11). Genitalia with anteromedian part of epiphallic sclerite almost as in *O. beroni* and *O. anamur*, but with slightly sinuate anterior edge and somewhat deeper posteromedian notch (Figs 5, 71); posteromedian part of this sclerite low (almost as in *O. beroni*; Figs 7, 73, 74); posterior lobe of rami intermediate between those of *O. beroni* and *O. anamur* in length; Figs 7, 71–74); guiding rod long, moderately thin and gradually narrowing to very thin subapical part; apical part of this rod hardly widened, curved upwards and slightly asymmetrical (Figs 42, 43, 72–74); posteromedial parts of endoparameral sclerites together slightly wider than base of guiding rod and distinctly shorter than those in all previous species (Figs 5, 42, 72); mold of spermatophore attachment plate more or less similar to that of *O. beroni*, *O. anamur* and *O. alanya* (Figs 6, 42, 71, 72); ventral sclerites clearly not connected with this mold by any sclerotized ribbons (Figs 6, 42, 72).

Variations. Colouration of dorsal tegminal surface varies from almost completely dark brown to completely light brown. Sometimes tegmina shorter (reaching only distal part of metanotum), guiding rod

practically symmetrical, or posterior lobe of rami almost as in *O. beroni* in length.

Female. General appearance as in male, however structure of mesonotum, tegmina and abdominal apex almost indistinguishable from that of *O. anamur* and *O. alanya*, but tegmina hardly smaller than in *O. alanya* and ovipositor slightly longer than in *O. anamur* (hind femur approximately 1.4 times as long as ovipositor).

Length in mm. Body: male 10–13, female 9–12; pronotum: male 1.7–2.1, female 2–2.3; tegmina, male 1.9–2.3; hind femora: male 7–8.3, female 7.8–9; ovipositor 5.6–6.4.

Comparison. The new species differs from all the species considered above in the apical part of guiding rod hardly widened and clearly curved upwards. It is additionally distinguished from *O. anitli* by the longer anteromedian part of epiphallic sclerite and narrower mold of spermatophore attachment plate, and from the rest of the above-mentioned congeners, by the narrower base of guiding rod and shorter posteromedial parts of endoparameral sclerites. From all the other congeners, *O. alara* differs in the longitudinal male tegmina in combination with the deep posteromedian notch of anteromedian part of epiphallic sclerite, long and almost straight (not strongly S-shaped in profile) guiding rod having its apical part curved upwards, long apodeme of mold of spermatophore attachment plate, and absence of any sclerotized connection of this mold with ventral sclerites of male genitalia.

Etymology. The species is named after the Alara River.

Remark. These specimens were mentioned as *O. beroni* by Gorochov (2006) who supposed that the guiding rod of this species could be depicted by Popov (1975) in an unusual position (i. e. strongly turned downwards).

Ovaliptila teke sp. nov.

(Figs 12, 44, 45, 75–78, 87, 88)

Holotype. Male; **Antalya Prov.**, Central Distr., ~15 km W of Antalya City, bank of

Geyikbayırı River, 36°29.417'N, 30°29.100'E, 376 m, among dry leaves on forest floor, at night, 21 Sept. 2011, coll. A. Gorochov & M. Ünal (ZIN).

Paratypes. Antalya Prov.: 17 males, 14 females, 32 nymphs, same data as for holotype, but 6 Sept. 2011 [nymphs] and 21 Sept. 2011 [14 males, 4 females, and nymphs partly reaching imago in Oct.–Nov. 2011] (ZIN and AIBÜ); 22 males, 7 females, 29 nymphs, southern part of Kemer Distr., bank of Ulupinar River, 36°29.383'N, 30°28.439'E, 150 m, 7 Sept. 2011 [nymphs] and 20 Sept. 2011 [nymphs partly reaching imago in Oct.–Nov. 2011], coll. A. Gorochov & M. Ünal (ZIN and AIBÜ); 2 males, same district, ~15 km W of Kemer Town, Gedelme Cave, 36°36.764'N, 30°26.524'E, 720 m, 15 Dec. 2007, coll. M. Rampini & C. Di Russo (ZIN); 2 males, 1 female, 13 nymphs, Finike Distr., bank of Akçay River near Arifköy Vill., 700 m, 36°30.788'N, 30°01.721'E, 8 Sept. 2011, coll. A. Gorochov & M. Ünal (ZIN and AIBÜ); 14 males, 3 females, 22 nymphs, Kaş Distr., Kaş–Elmalı Road, bank of Kibris River near Kemerköy Vill., 36°22.072'N, 29°42.627'E, 310 m, 9 Sept. 2011 [nymphs] and 19 Sept. 2011 [imago], coll. A. Gorochov & M. Ünal (ZIN and AIBÜ). Paratypes (except males from cave) collected under same conditions as holotype.

Description. Male (holotype). Colouration: head and pronotum light brown with reddish tinge, however eyes blackish, anterior part of epicranium somewhat darkened (almost brown), ocelli whitish with darkish borders, and antennal flagellum brownish grey; tegmina dark brown with light brown area on ventral surface near medial edge; legs light brown with yellowish proximal part; venter of thorax yellowish; pterothoracic and abdominal tergites brown with darker posterior part of all tergites and light brown anterior half of mesonotum; cerci light brown with grayish tinge; anal and genital plates brown; rest of abdomen light brown. External body structure typical of *Ovaliptila*, but eyes and ocelli approximately as in *O. alara*, tegmina round and reaching posterior part of metanotum, ventral tegminal surface weakly cellular in lateral part and with characteristic transverse keels in middle and medial parts (Figs 87, 88), anal plate semimembranous and with membranous posteromedian convexity and

rather short posterolateral lobules (Fig. 12). Genitalia with anteromedian part of epiphallallic sclerite somewhat longer (wider) than in all previous species and having slightly sinuate anterior edge and distinct posteromedian notch; each posteromedial lobe of this part with small additional lateral lobule (Fig. 75); posteromedian part of epiphallallic sclerite very high (higher than in all previous species; Figs 77, 78); posterior lobe of rami very long (longer than in all previous species); guiding rod moderately short, arcuate in profile, with rather narrow and almost acute distal half directed downwards, and with much wider proximal half having a pair of distinct lateral lobes projecting backwards (Figs 44, 45, 75–78); posteromedial parts of endoparameral sclerites very narrow and not fused with each other (Figs 44, 76); mold of spermatophore attachment plate moderately narrow and comparatively short (Figs 44, 75); its apodeme rather long; ventral sclerites fused with sclerotized ribbons connecting these sclerites with above-mentioned mold (Figs 44, 75, 76).

Variations. Rarely body almost uniformly light brown, but with dark brown dorsum of tegmina; more frequently tegminal dorsum lighter (brown) and very similar to abdominal tergites in colouration. Specimens from Gedelme Cave with somewhat longer apodeme of mold of spermatophore attachment plate.

Female. General appearance similar to that of male, but genital plate and anterior half of majority of pterothoracic and abdominal tergites more or less light brown, and structure of mesonotum, tegmina and abdominal apex very similar to that of *O. anamur* and *O. alara* except longer ovipositor which is almost as in *O. anitli* in length (hind femur approximately 1.1 times as long as ovipositor).

Length in mm. Body: male 9–13, female 9.5–12; pronotum: male 1.8–2.3, female 2.2–2.6; tegmina, male 1.4–1.7; hind femora: male 8–10, female 9–10.5; ovipositor 8.5–9.5.

Comparison. The new species differs from all the species considered above in the darker colouration of tegmina, weakly bifurcate posteromedial lobes of anteromedian part of epiphallic sclerite, proximal half of guiding rod with a pair of distinct lateral lobes projecting backwards, posteromedial parts of endoparameral sclerites very narrow and not fused with each other. Additionally it is distinguished from *O. anitli* in the clearly shorter guiding rod and narrower mold of spermatophore attachment plate, and from all the other previous species, in the practically round male tegmina. From all the other congeners, *O. teke* differs in the presence of distinct transverse keels on ventral tegminal surface in combination with the arcuate (not S-shaped) guiding rod and simple (not bifurcate) apex of this rod.

Etymology. The species is named after Teke Peninsula between Antalya and Fethiye Bays.

***Ovaliptila ibrahimi* sp. nov.**

(Figs 13, 46, 47, 79–82, 89, 90)

Holotype. Male; **Muğla Prov.**, Fethiye Distr., 6 km NE of Yanıklar Vill., bank of Nil River, among dry leaves on forest floor, at night, 11 Sept. 2011 [nymph reaching imago 25–30 Sept. 2011], coll. A. Gorochov & M. Ünal (ZIN).

Paratypes. **Muğla Prov.:** 6 males, 24 females, 2 nymphs, same data as for holotype [nymphs partly reaching imago in Oct.–Nov. 2011 and (some females) from Dec. 2011 to March 2012] (ZIN and AIBÜ); 1 male, 1 female, Köyceğiz Distr., Yuvarlakçay River near Beyobası Vill. (not far from Köyceğiz Lake), 36°56.742'N, 28°48.504'E, 437 m, 12 Sept. 2011 [nymphs reaching imago 25–30 Sept. 2011 (male) and in Nov. 2011 (female)], coll. A. Gorochov & M. Ünal (ZIN and AIBÜ).

Description. Male (holotype). Colouration of body almost yellowish with blackish eyes, dark brown very narrow border around whitish ocelli as well as lateral and distal parts of dorsal tegminal surface, brown rest of this surface and wide border on ventral tegminal surface along its edges, brownish posterior half of mesonotum and transverse stripe along posterior edge of

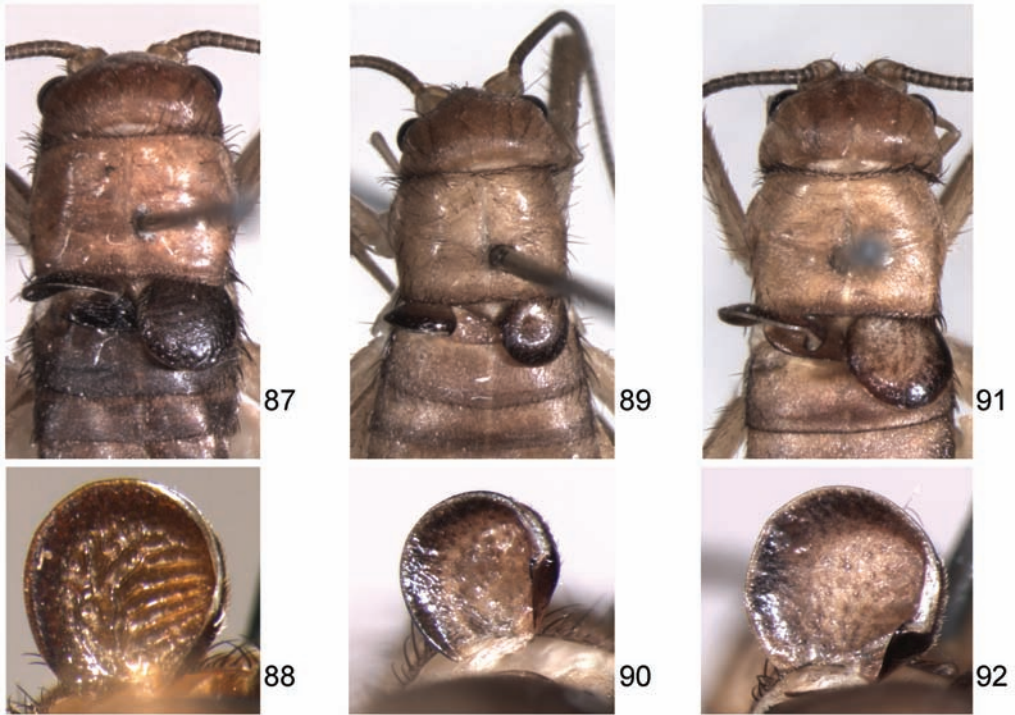
metanotum and of each abdominal tergite, yellowish proximal part of cerci, and light brownish grey antennal flagellum and rest of cerci as well as anal plate and areas on genital plate. External structure similar to that of *O. teke*, but with small and round tegmina reaching middle part of metanotum, hardly cellular ventral tegminal surface (Figs 89, 90), and very short posterolateral lobules of anal plate and convexity between them (Fig. 13). Genitalia with anteromedian part of epiphallic sclerite moderately long (wide) and having almost straight anterior edge and distinct posteromedian notch (Fig. 79); posteromedian part of epiphallic sclerite rather high and with very small denticles less numerous than in all previous species (Figs 81, 82); posterior lobe of rami short (Figs 79, 80); guiding rod moderately long, strongly S-shaped in distal half, and with flat and almost oval apical expansion (Figs 46, 47, 80, 81); posteromedial parts of endoparameral sclerites (fused with each other) distinctly wider than base of this rod (Figs 46, 80); mold of spermatophore attachment plate and its apodeme more or less similar to that of *O. teke* (Figs 46, 79, 80); ventral sclerites semimembranous, rather small and not connected with this mold by any sclerotized ribbons (Figs 46, 80).

Variations. Some specimens with somewhat darker (almost brown) areas on anterodorsal surface of epicranium and on anal plate; abdominal dorsum sometimes almost uniformly light brown or grayish brown.

Female. General appearance similar to male, but some females almost completely yellowish and structure of mesonotum, tegmina and anal plate practically as in females of previous species excepting *O. alanya*; genital plate very weakly notched (almost truncate) at apex; ovipositor long (hind femur 1.1–1.2 times as long as ovipositor).

Length in mm. Body: male 10–12, female 9–11; pronotum: male 1.8–2.3, female 2–2.5; tegmina, male 1.2–1.5; hind femora: male 7–9, female 7.6–9.2; ovipositor 7–7.6.

Comparison. The new species is distinguished from *O. nana*, described from Kos



Figs 87–92. *Ovaliptila*; male. **87, 88,** *O. teke* sp. nov.; **89, 90,** *O. ibrahimi* sp. nov.; **91, 92,** *O. buresi* (Gökçeler Cave). Thorax with head and tegmina (one of them erected) from above (87, 89, 91); ventral view of left tegmen (88, 90, 92).

I. (a Greek island situated not far from the type locality of *O. ibrahimi*), by the distinctly shorter male tegmina and wider antero-medial part of epiphallic sclerite. From all the other congeners, it differs in the rather large and flat apical widening of guiding rod.

Etymology. This species is named in memory of İbrahim Gümüşsuyu, first Turkish researcher of Grylloidea.

Remark. This species was possibly recorded by Gümüşsuyu (1980) as *D. brevis* from a locality between Muğla City and Köyceğiz Lake (Muğla Prov.).

Ovaliptila buresi (Mařan, 1958)
(Figs 1–4, 48–50, 83–86, 91, 92)

Discoptila buresi Mařan, 1958

Discoptila brevis Bey-Bienko, 1964

Material examined. **Muğla Prov.,** Milas Distr.: 11 males, 8 females, 3 nymphs, bank of Hamzabey

River near Gökçeler Vill., 60 m, 37°11.514'N, 27°45.512'E, among dry leaves on small river beach in forest, at night, 13 Sept. 2011 [nymphs partly reaching imago from end of Sept. to Nov. 2011 and (2 females) in Feb.–May 2012], coll. A. Gorochov & M. Ünal (ZIN and AIBÜ); 1 male, 3 nymphs, Gökçeler Cave near Gökçeler Vill., 60 m, 37°11.514'N, 27°45.512'E, 13 Sept. 2011 [collected as nymphs, imago in Oct. 2011], coll. A. Gorochov & M. Ünal (ZIN and AIBÜ). One male, **Aydın Prov.,** İncirliova Distr., Karlıçay River near Karagözler Vill., 560 m, 37°57.854'N, 27°48.576'E, among dry leaves on forest floor, at night, 14 Sept. 2011 [nymph reaching imago in Oct. 2011], coll. A. Gorochov & M. Ünal (ZIN and AIBÜ). **İzmir Prov.:** 1 male, 7 females, 1 nymph, Selçuk Distr., bank of Devrent River (branch of Büyük Menderes River) near Havutçulu Vill. (not far from Aydın City), 160 m, 37°52.748'N, 27°25.891'E, among dry leaves on small river beach in forest, at night, 15 Sept. 2011 [nymphs partly reaching imago from 25 Sept. to Nov. 2011 and (1 male) in June 2012],

coll. A. Gorochov & M. Ünal (ZIN and AIBÜ); 3 females, 1 nymph, Menderes Distr., Karacadağ Mts, bank of small river near Ataköy Vill., 45 m, 38°04.385'N, 27°08.438'E, among dry leaves on forest floor, at night, 16 Sept. 2011 [nymphs partly reaching imago from end of Sept. to Oct. 2011], coll. A. Gorochov & M. Ünal (ZIN and AIBÜ). 1 male, 4 females, 3 nymphs, Bayındır Distr., bank of small branch of Küçük Menderes River near Balcılar Vill., 38°16.453'N, 27°34.134'E, 250 m, among dry leaves on forest floor, at night, 17 Sept. 2011 [nymphs partly reaching imago in Oct.–Dec. 2011], coll. A. Gorochov & M. Ünal (ZIN and AIBÜ).

Note. This species was erroneously recorded from the Crimea as *Gryllomorphus fragosoi* Bolivar, 1885 by Retowski (1888), was described from Bulgaria as *D. buresi* by Mařan (1958), was redescribed from Crimea as a new species (*D. brevis*) by Bey-Bienko (1964), was possibly indicated from Muğla Prov. of Turkey as *D. brevis* by Gümüřsuyu (1980), and was probably recorded from Istanbul as *D. fragosoi* by Gümüřsuyu (1981) and Önder et al. (1999). However, the indication of *D. fragosoi* for the south-eastern part of Konya Prov. in Turkey (Gümüřsuyu, 1981: Ereğli) evidently refers to a different species. Gorochov (2006) argued the hypothesis that the Bolivar's species originally described from Spain could belong to the West-Mediterranean genus *Petaloptila* and synonymized Mařan's and Bey-Bienko's species names. Here, *O. buresi* is considered a species with rather wide distribution: from Bulgaria to the Crimea and Muğla Prov. of Turkey. Probably this species is also distributed in some other provinces of Turkey more northern than İzmir Prov.; for example, we have one female from Bursa Prov. [near Oylat Cave, 39°55'59"N, 29°35'20"E, 623 m, Fagus-pine-oak forest, litter, 23 Sept. 2010, coll. M. Marusik (ZIN)] which is practically indistinguishable from other females of *O. buresi*.

Ovaliptila buresi was described and illustrated in detail by Mařan (1958), Popov (1984) and Gorochov (1984, 2006). It is distinguished from other Turkish congeners by the following combination of characters:

colouration is from yellowish to light brown with reddish tinge, and with the blackish eyes, yellowish or brownish grey antennal flagellum, and brown or dark brown areas on tegmina along their borders (sometimes tegmina are almost completely brown); structure of body (excepting abdominal apex) is similar to that of *O. alara*, *O. teke* and *O. ibrahimi*, but male tegmina are more or less round, reaching middle or hind parts of metanotum (sometimes, hind edge of metanotum), and without any distinct cellular structures on ventral surface (Figs 91, 92); male anal plate is with posterolateral lobules longer than in *O. beroni*, *O. anamur*, *O. alanya*, *O. teke* and *O. ibrahimi*, but slightly shorter than in *O. anitli* and *O. alara* (Fig. 4); male genital plate is typical of this genus; in female, anal plate is typical of *Ovaliptila*, and genital plate is with a short (but distinct) posteromedian notch; in male genitalia, anteromedian part of epiphallal sclerite is moderately short (narrow), with anterior edge sinuate and posterior edge weakly notched (Figs 1, 83, 86); posteromedian part of this sclerite is more or less similar to that of *O. alanya proxima* and *O. ibrahimi* in height (i. e. somewhat lower than in *O. teke* and *O. anamur*, and higher than in all the other Turkish species), and with more numerous denticles than in *O. ibrahimi* (Figs 85, 86); guiding rod is thin and long, S-shaped in profile, with a long and spine-like distal part (Figs 2, 3, 48, 49, 84, 85); mold of spermatophore attachment plate is moderately long and narrow, with a long apodeme (Figs 1, 2, 48, 83, 84); ventral sclerites are large and not connected with this mold by any sclerotized ribbons (Figs 2, 48, 84); ectoparameres are somewhat larger (longer) than in all the other Turkish congeners (Figs 2, 3, 49, 84, 85); ovipositor is long (hind femur 1.1–1.2 times as long as ovipositor).

Genus *Glandulosa* Harz, 1979

Note. The genus *Glandulosa* was described by Harz (1979) for two Turkish spe-

cies: *Gryllomorpha willemsei* Uvarov, 1934 (type species) and *Glandulosa kinzelbachi* Harz, 1979. His understanding of *G. willemsei* was based on the specimens from Silifke Distr. (Mersin Prov.) situated very far from the type locality of this species. Gorochov (1996) described an additional species (*G. harzi* Gorochov, 1996) from the locality situated not very far from Silifke Distr., and supposed that Harz's *G. willemsei* could in fact be *G. harzi* (but not *G. willemsei*), because *G. willemsei* significantly differs from Harz's and Gorochov's specimens in some characters of external structure (see below). Here we attribute Harz's *G. willemsei* to a new species (*G. borisi* sp. nov.), very similar to *G. harzi* and with the area situated near that of *G. harzi* and including Silifke Distr. Thus, *Glandulosa* is an endemic (for Asiatic Turkey) genus containing four species considered below. It is interesting that all the known species of this genus are distributed in regions more eastern than Antalya City (*Glandulosa* species were very usual or numerous in all the suitable localities visited by us during our trips from Alara River to Adana Prov., and we did not see any specimens of *Glandulosa* during our trip from Antalya City to Muğla and İzmir Provinces).

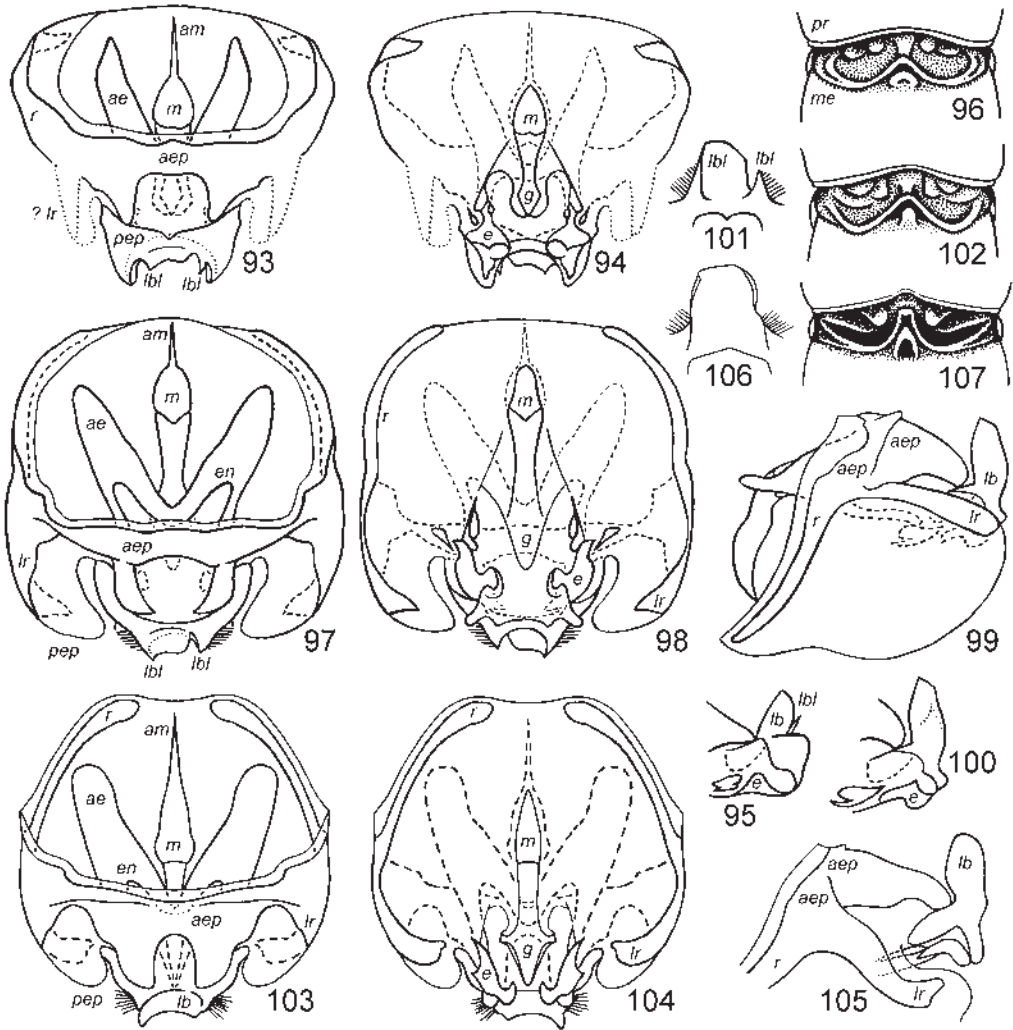
Glandulosa is characterized by the following features: all wings are completely absent; male pronotum is with a short (but clear) posteromedian notch; male mesonotum is with a special gland consisting of lobe-like and/or cup-like structure or structures (Figs 96, 102, 107); anal plate of male is broadly rounded or distinctly truncate at apex (Figs 117, 118), but in female, this plate is simple (roundly triangular in shape); male genitalia (Figs 93–95, 97–101, 103–106) are with the epiphallallic sclerite divided into two parts (as in *Ovaliptila*), but its anteromedian part is with a pair of rather long posterior projections, its posteromedian part has a comparatively large median lobe more or less asymmetrical and directed more or less upwards (often this lobe is with a few asymmetrical lobules at the apex), and

the latter epiphallallic part lacks any denticles (presence of very small denticles on this part is characteristic of some other representatives of Petaloptilini); ectoparameres in comparison to those of *Ovaliptila* are larger, more complicated in shape, and more separated from the endoparameres (Figs 94, 98, 104).

***Glandulosa kinzelbachi* Harz, 1979**
(Figs 93–96, 117)

Holotype. Male, **Hatay Prov.**, “Cebelib S. Antakya [= Cebel Akra Dağı or Kel Dağ in Yayladağı District of Antakya Prov.], Toprak Su (Dafni Quelle)”, 10 March 1977, coll. R. Kinzelbach et al. (MHNG).

Note. This species was described by Harz (1979) from a single male, however this description was very brief and did not contain any real comparison with *G. willemsei* (as Harz confused *G. willemsei* with a new species from Silifke Distr.). The holotype of *G. kinzelbachi*, studied by Gorochov some years ago, is characterized by the following characters: body is shiny; upper half of head is black, and lower one is dark brown with the antennae and palpi brown; ocelli are yellowish; tergites and anal plate are uniformly dark brown with some structures of meso- and metanotum light brown (Fig. 96); sternites and genital plate are light brown with the hind part of this plate almost dark brown; legs are also light brown, but hardly darker than sternites and with the hind tibiae brown; eyes are large (their height is almost 1.5 times as great as width of scape); rostrum between antennal cavities is weakly narrower than scape (in *G. willemsei*, it is slightly wider); apical segment of maxillary palpi is distinctly longer than subapical one (in *G. willemsei*, these segments are equal in length); pronotal disc with roundly concave posterior edge (Fig. 96); mesonotum (Fig. 96) is with a pair of cup-like structures bordered by a keel-like posterior fold, with a few short tubercles at the anterior part of these structures, and with the



Figs 93–107. *Glandulosa*; male (schematically). **93–96,** *G. kinzelbachi*; **97–102,** *G. harzi*; **103–107,** *G. borisi* sp. nov. Genitalia from above (93), from above and slightly in front (97, 103), from below (94), from below and slightly behind (98, 104), and from side (99); distal part of genitalia without posterior lobes of rami from side (95, 100); distal half of genitalia without valves from side (105); mesonotum with nearest pronotal and metanotal parts from above (96, 102, 107); median lobe of posteromedian part of epiphallallic sclerite from behind (101, 106). [93–102, after Gorochov (1996)]. Abbreviations: *lb*, median lobe of posteromedian part of epiphallallic sclerite; *lbl*, apical lobules of latter lobe; *me*, metanotum; *pr*, pronotum; others, as in Figs 1–13.

median part of the above-mentioned fold having a roundly angular curvature [in *G. willemsei*, male mesonotum anteriorly is with “a short and thick parabolic process, excavated above” (Uvarov, 1934)]; metanotum (Fig. 96) is with a short and rather wide anteromedian process rounded at the

apex and having a dorsomedian concavity (Uvarov’s description of *G. willemsei* metanotum does not contain any mention about such a process); anal plate is with the apex rounded (Fig. 117); genitalia as in Figs 93–95 (in holotype, posterior lobes of rami possibly missing).

***Glandulosa borisi* sp. nov.**
(Figs 103–107, 118)

Holotype. Male, **Mersin Prov.**, Aydıncık Distr., environs of Sipahili Vill., bank of Sipahili River not far from its mouth, 36°12.777'N, 33°29.980'E, 65 m, among dry leaves on forest floor, at night, 14 Oct. 2010, A. Gorochov & M. Ünal (ZIN).

Paratypes. **Mersin Prov.:** 28 males, 9 females, 16 nymphs, same data as for holotype (ZIN and AIBÜ); Silifke Distr., environs of Karakaya Vill., bank of Göksu River not far from its mouth, 36°25.264'N, 33°43.792'E, 55 m, among dry leaves on forest floor, at night, 16 Oct. 2010, A. Gorochov & M. Ünal (ZIN and AIBÜ); 23 males, 22 females, 11 nymphs, Erdemli Distr., environs of Koramşalı Vill., bank of Sorgun River not far from its mouth, 36°44.407'N, 34°11.226'E, 530 m, among dry leaves on floor under trees in rather deep canyon, at night, 17 Oct. 2010, A. Gorochov & M. Ünal (ZIN and AIBÜ); 23 males, 13 females, 6 nymphs, Tarsus Distr., environs of Keşbükü Vill., bank of Tarsus River (middle part of river), 37°01.723'N, 34°45.975'E, 147 m, among dry leaves on forest floor, at night, 20 Oct. 2010, A. Gorochov & M. Ünal (ZIN and AIBÜ).

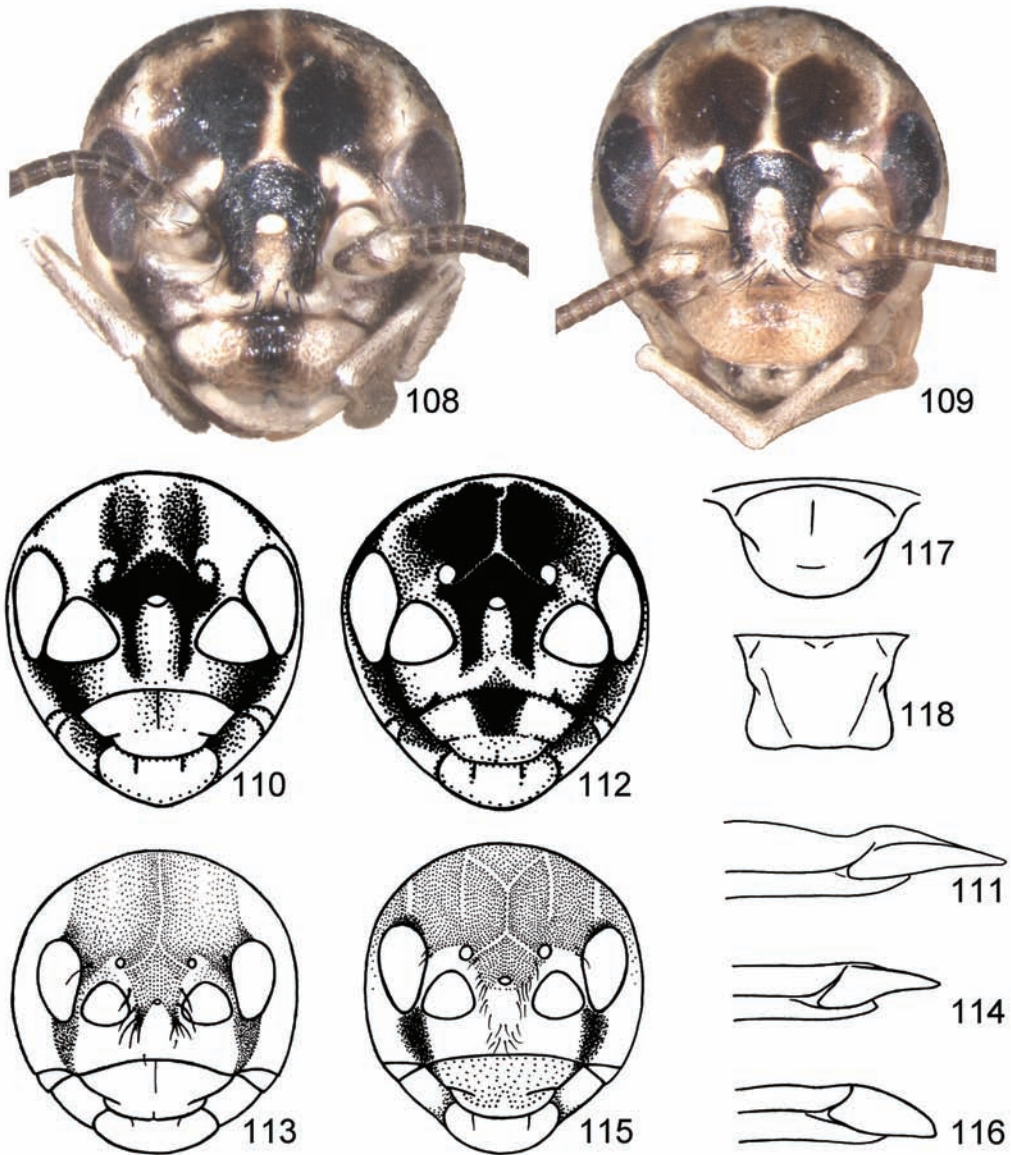
Description. Male (holotype). Body colouration: head dark brown with brown areas behind eyes, frons under both rostral apex and antennal cavities, clypeus, labrum and proximal part of mandibles, grayish brown antennae and apical segment of maxillary palpi, light brown rest of mouthparts and spot between lateral ocellus and eye, and yellowish white ocelli; tergites dark brown with indistinct reddish brown areas on anterior half of pronotal disc and with light brown parts of projections and folds on meso- and metanotum; legs and sternites yellowish with grayish brown spots on apical part of femora and of tibiae as well as light brown rest of tibiae; anal plate dark brown with a pair of small light brown spots near cercal bases; cerci yellowish with grayish tinge; genital plate light brown with lateral (dorsal) and distal borders brown. External structure of body similar to that of *G. kinzelbachi*, however pronotal disc posteriorly with almost angular notch (Fig. 107), median part of posterior mesonotal fold with narrower and longer angular projec-

tion having almost truncate apex (Fig. 107), anteromedian process of metanotum longer and with almost angular apex (Fig. 107), and anal plate more or less quadrate (posteriorly almost truncate; Fig. 118). Genitalia also similar to those of *G. kinzelbachi*, but anteromedian part of epiphallic sclerite with longer posterior lobes (Figs 103, 105), posteromedian part of this sclerite with long median lobe (Figs 103, 105, 106) directed almost vertically upwards and lacking any angular lobules (in *G. kinzelbachi*, this lobe short, directed partly upwards and partly backwards, and with distinct angular lobules; Figs 93, 95), posterior lobe of rami very long (Figs 103–105), guiding rod with narrower apex and a pair of small lateral projections at basal part (Fig. 104).

Variations. Body rather variable in size: paratypes from banks of Tarsus River distinctly smaller than other specimens of this species. Colouration sometimes slightly darker: with almost blackish head dorsum and tergites (except glandular structures) as well as with numerous oblique brown stripes on middle part of hind femora.

Female. General appearance not very similar to that of male, as body colouration distinctly lighter: head as in male, but with light brown spots on scapes; tergites light brown with numerous small brown spots and dots on all tergites, large reddish brown spots on pronotal disc, and dark brown pronotal lateral lobes; anal and genital plates completely light brown (sometimes almost yellowish) or with brown areas on anal plate. Body structure similar to that of male, however posterior edge of pronotal disc roundly and somewhat more weakly concave, meso- and metanotum simple, anal plate almost oval and with a pair of small lateral notches near basal part as well as with roundly angular apical part, genital plate with weak posteromedian notch, and ovipositor very long (approximately equal to hind femur in length) and with apex similar to that of *Ovaliptila*.

Length in mm. Body: male 7.7–12.8, female 8–13; pronotum: male 1.6–2.3, female



Figs 108–118. *Gryllomorpha* (108–116) and *Glandulosa* (117, 118). **108,** *G. dalmatina* ?*pieperi*; **109,** *G. dalmatina* *minutissima* subsp. nov.; **110, 111,** *G. dalmatina* *dalmatina*; **112,** *G. dalmatina* *schmidti*; **113, 114,** *G. miramae* *miramae*; **115, 116,** *G. antalya*; **117,** *G. kinzelbachi*; **118,** *G. borisi* sp. nov. Head in front (108–110, 112, 113, 115); distal part of ovipositor from side, schematically (111, 114, 116); male anal plate from above, schematically (117, 118). [110–116, after Gorochov (1984, 2009)].

1.8–2.6; hind femora: male 5.7–7.5, female 6.7–8.5; ovipositor 6.4–8.8.

Comparison. The new species is most similar to *G. harzi* but differs from the latter

in the characters listed below (in the note about *G. harzi*). From *G. kinzelbachi*, the new species differs in the characters listed above, and from *G. willemsei*, in the same

characters as *G. kinzelbachi* and in having the male anal plate truncate (not rounded) posteriorly.

Etymology. The new species is named in memory of Boris P. Uvarov, a famous orthopterist who described the first species of *Glandulosa*.

Glandulosa harzi Gorochov, 1996
(Figs 97–102)

Holotype. Male, **Antalya Prov.**, Alanya Distr., ~30 km WNW of Alanya City, environs of Okurcalar Vill., bank of Alara River, among dry leaves on forest floor, at night, 1–10 Oct. 1994, coll. A. Gorochov (ZIN).

Paratypes. Fifteen males, 6 females, same data as for holotype (ZIN).

Other material examined. Twenty one males, 22 females, 1 nymph, **Antalya Prov.**, Alanya Distr., locality Kestel near eastern part of Alanya City, bank of Dim River not far from its mouth, 36°32.408'N, 32°06.538'E, 220 m, among dry leaves on forest floor, at night, 10 Oct. 2010, coll. A. Gorochov & M. Ünal (ZIN and AIBÜ). **Mersin Prov.**, Anamur Distr.: 23 males, 18 females, 11 nymphs, bank of Anıtlı River (5–6 km N of sea coast), 36°09.474'N, 32°36.049'E, among dry leaves on forest floor, at night, 11 Oct. 2010, coll. A. Gorochov & M. Ünal (ZIN and AIBÜ); 14 males, 4 females, 16 nymphs, bank of Dragon River not far from its mouth, 36°14.278'N, 32°49.335'E, among dry leaves on forest floor, at night, 13 Oct. 2010, coll. A. Gorochov & M. Ünal (ZIN and AIBÜ).

Notes. This species was described and illustrated in sufficient detail (Gorochov, 1996). Gorochov wrote that *G. harzi* was possibly mentioned by Harz (1979) as *G. willemsei* from Silifke Distr., but now it is clear that this Harz's indication referred to *G. borisi* (see above). *G. harzi* has really a larger area than its type locality near Alara River, but not so large; it is distributed from Alanya Distr. of Antalya Prov. to Anamur Distr. of Mersin Prov. This species is most similar to *G. borisi*, but clearly distinguished from it by the following characters: general colouration is darker (in *G. harzi*, females have almost the same dark colouration as males, but in *G. borisi*, they are distinctly

lighter); posteromedian notch of male pronotal disc is more rounded (less angular) (for comparison see Figs 102, 107); median (strongly curved) part of hind fold of male mesonotum is shorter and wider; apex of this part is rounded (Fig. 102) (in *G. borisi*, this apex is almost truncate; Fig. 107); antero-medial process of male metanotum is usually narrower and without or almost without dorsal concavity (Fig. 102) (sometimes this concavity is distinct, but in *G. borisi* it is distinct in all the specimens studied; Fig. 107); anteromedial part of epiphallal sclerite is with the posterior lobes shorter, and narrower proximally (for comparison see Figs 97, 99, 103, 105); posteromedial part of this sclerite is with the median lobe shorter and having two asymmetrical lobules, one of which is small and almost spine-like (Figs 97, 101) (in *G. borisi*, this lobe is undivided into lobules and less asymmetrical; Figs 103, 106); basal part of guiding rod is without any lateral projections (Fig. 98) (in *G. borisi*, it is with a pair of distinct small lateral projections; Fig. 104).

Glandulosa willemsei (Uvarov, 1934)

Grylломорфа willemsei Uvarov, 1934

Note. This species was originally described in the genus *Grylломорфа* based on a single male from "Anatolian plateau: Akchehir [= Akşehir in the north-western part of Konya Prov.]" collected in October 1931 (Uvarov, 1934). This description was sufficiently detailed but included no data on the structure of genitalia (which is still unknown) and no illustrations. We did not study this specimen, and have no additional material from this locality or its environs. However, judging by Uvarov's description, the male of *G. willemsei* is similar to that of the previous congeners in general appearance but distinctly differs from them in the following characters: rostrum between antennal cavities is slightly wider than scape (in other congeners, it is weakly narrower); apical and preapical segments of maxillary palpi are of equal length (in the other con-



Figs 119, 120. *Gryllomorpha*, male from above. **119**, *G. dalmatina* ?*pieperi*; **120**, *G. dalmatina* *minutissima* sp. nov.

genera, apical segment of these palpi is significantly longer than preapical one); mesonotal gland anteriorly is with “a short and thick parabolic process, excavated above” (in other congeners, this gland is with a pair

of cup-like structures partly separated from each other by a rather narrow fold); metanotum apparently lacks an anteromedian process (Uvarov’s description of metanotum does not contain any mention about

such process); anal plate is with the “apex broadly rounded” (in other congeners except *G. kinzelbachi*, this apex is distinctly truncate). The specimens from Silifke Distr. of Mersin Prov., recorded by Harz (1979: 107, Fig. 18) as “allotypus” and “paratypi” of *G. willemsei*, evidently belong to *G. borisi* described above.

Tribe GRYLLOMORPHINI

Genus *Gryllomorpha* Fieber, 1853

Note. This genus was divided into two subgenera (*Gryllomorpha* s. str. and *Gryllomorphella* Gorochov, 1984) based on the species from the former USSR (Gorochov, 1984). The study of some other species (especially their male genitalia) shows that either these subgenera should be understood more broadly, or the genus should be divided into a greater number of subgenera (Gorochov, 2009). However, most of *Gryllomorpha* s. l. species are insufficiently studied up to now (their male genitalia are unknown or poorly studied) and such division seems premature. In view of this, we do not give any diagnoses of these subgenera and refer the readers to the above-mentioned paper by Gorochov (2009) where such an attempt was made. Fortunately, the subgeneric position of the Turkish species is clear (with the only exception of *G. antalya* Gorochov, 2009 whose male is unknown). Descriptions of this genus are numerous (for references see Gorochov, 2009). Its differences from *Hymenoptila* are not very clear, except the complete absence of wings in *Gryllomorpha* s. l. From the other genera of Gryllomorphae belonging to Petaloptilini, *Gryllomorpha* s. l. is distinguished by the same character in combination with the following features of male genitalia: spermatophore sac is large or very large (almost absent in Petaloptilini); endoparameres are much longer (more widely arcuate or less strongly curved) and having distinctly wider and/or shorter apodemes; mold of spermatophore attachment plate is transformed

into a V-shaped transverse sclerite lacking apodeme (Figs 121–123, 137–139).

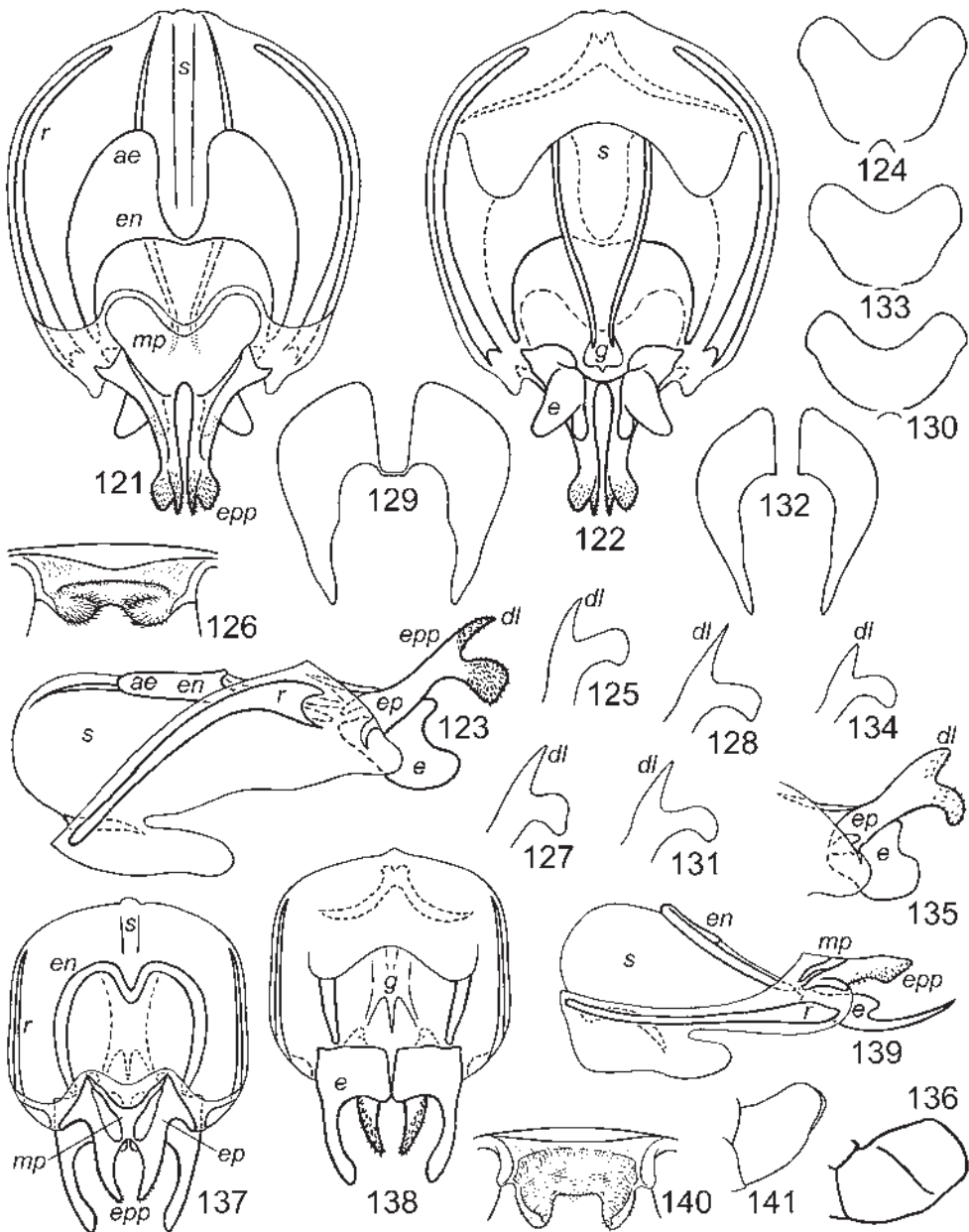
The previous indications of this genus for Turkey were attributed mainly to *G. dalmatina* without its division into subspecies. It was recorded from Istanbul, Ankara and Samsun in the northern half of Anatolia (Retowski, 1889; Ebner, 1919; Gümüşsuyu, 1981), but also from the more southern parts of Turkey (Gümüşsuyu, 1981): Southeastern Anatolia (Güneydoğu Anadolu), a large region situated near Hatay Prov. along the border with Syria; southeastern part of Konya Prov. (Ereğli). The two latter indications may refer to unknown subspecies of this species or to different species. Also an unknown species was recorded by Ebner (1919) as *Gryllomorpha* sp. from “Airan [= Ayrançı (the same part of Konya Prov.)]”; Ebner considered that this species had some features not characteristic of *G. dalmatina*. Finally, one new species (*G. antalya*) was recently described by Gorochov (2009) from the southern coast of Anatolia, and some other taxa of *Gryllomorpha* are added to the Turkish fauna here.

Gryllomorpha (Gryllomorpha) dalmatina ?pieperi Harz, 1979 (Figs 108, 119, 129–131)

Gryllomorpha pieperi Harz, 1979 (?)

Material examined. Twenty six males, 13 females, **Muğla Prov.**, Milas Distr., bank of Hamzabey River near Gökçeler Vill., 60 m, 37°11.514'N, 27°45.512'E, among dry leaves on small river beach in forest, at night, 13 Sept. 2011, coll. A. Gorochov & M. Ünal (ZIN and AIBÜ).

Note. Gorochov (2009) divided *G. dalmatina* (Ocskay, 1832) into at least three subspecies. For the eastern part of Mediterranean, he supposed not less than two subspecies: the nominotypical one distributed from Croatia to the Crimea and Abkhasia, and possibly also to the Caspian coast; a southern subspecies possibly distributed from Montenegro to Greece. According to this paper, the following names may be used for the latter subspecies: *G. cretensis*



Figs 121–141. *Grylломорфа*, male (121–125, 127–139, 141, schematically). **121–128,** *G. dalmatina dalmatina* (121–126, Crimea; 127, Bulgaria, Struma Valley; 128, Croatia, neotype); **129–131,** *G. dalmatina ?pieperi*; **132–134,** *G. dalmatina minutissima* subsp. nov.; **135, 136,** *G. dalmatina* subsp. (Montenegro); **137–141,** *G. miramae miramae*. Genitalia from above (121, 137), from below (122, 138), and from side (123, 139); median plate of epiphallus from above and slightly from behind (124, 130, 133); apical part of posterior epiphallus from side (125, 127, 128, 131, 134); anal plate from above (126, 140); endoparameres from above (129, 132); distal part of genitalia from side (135); genital plate from side (136, 141). [121–123, 126, 135–141, after Gorochov (1984, 2009)]. Abbreviations: *dl*, dorsoapical lobule of posterior epiphallus; *epp*, epiphallus posterior processes; *mp*, median plate of epiphallus; *s*, spermatophore sac; others, as in Figs 1–13.

Ramme, 1927 (Greece: Crete I.); *G. pieperi* Harz, 1979 (Greece: Kos I.) described from a nymph and synonymized with *G. dalmatina* by Baccetti (1992); *G. dalmatina strumae* Andreeva, 1982 (Bulgaria) synonymized with *G. dalmatina* by Gorochov & Llorente (2001). The first taxon is insufficiently studied, and its belonging to *G. dalmatina* is not evident; however, a single female from Crete I., recently studied by us, is similar to Ramme's description and distinguished from the above-mentioned Turkish specimens as well as from the other Greek and Montenegro specimens by the smaller body size and transversally banded (not spotted) colouration of abdominal dorsum; this is probably a separate subspecies. The type locality of the second taxon (Kos I.) is situated very close to the locality of the above-mentioned Turkish specimens (Fig. 142); since this taxon was described from a nymph, our identification of these specimens as *G. dalmatina pieperi* may be doubted. *G. dalmatina strumae* is a real synonym of *G. dalmatina dalmatina* (Figs 121–128); this opinion is supported by our study of a new material from the Struma Valley (its type locality) in Bulgaria.

The specimens from the Hamzabey River bank are most similar to those from Montenegro by the moderately small body (length in mm: pronotum of male 2–2.5 and of female 2.3–2.8, hind femora of male 7.5–9.5 and of female 9–10.5) and length of ovipositor which is practically as long as hind femur, but they differ from the latter in the somewhat darker colouration (Figs 108, 119) as well as dorsoapical lobule of posterior epiphallic processes narrower and more acute (for comparison see Figs 131, 135). The above-mentioned Turkish specimens are also similar to *G. dalmatina schmidtii* Gorochov, 1996 (Italy) by the body size and dark head (for comparison see Figs 108, 112), and to *G. dalmatina dalmatina* by the structure of dorsoapical lobule of posterior epiphallic processes (for comparison see Figs 123, 125, 127, 128, 131); however they differ from the Italian subspecies in the

somewhat lighter colouration of rest of body (Fig. 119) and slightly longer legs (length of hind femur is approximately 3 times as great as width of head) and ovipositor (in Italian subspecies, it is insignificantly shorter than hind femur), and from the nominotypical subspecies, in the darker colouration, distinctly smaller body size, clearly shorter median plate of epiphallus (for comparison see Figs 124, 130), and slightly shorter ovipositor (in *G. dalmatina dalmatina*, it is slightly longer than hind femur).

Grylломорфа (Grylломорфа)
***dalmatina minutissima* subsp. nov.**
 (Figs 109, 120, 132–134)

Holotype. Male, **İzmir Prov.**, Selçuk Distr., bank of Devrent River (branch of Büyük Menderes River) near Havuççulu Vill. (not far from Aydın City), 160 m, 37°52.748'N, 27°25.891'E, among dry leaves on small river beach in forest, at night, 15 Sept. 2011, coll. A. Gorochov & M. Ünal (ZIN).

Paratypes. Twelve males, 5 females, same data as for holotype (ZIN and AIBÜ). One female, **Aydın Prov.**, İncirliova Distr., Karlıçay River near Karagözler Vill., 560 m, 37°57.854'N, 27°48.576'E, on open soil of dry valley slope lacking trees near narrow forest stripe along river, at night, 14 Sept. 2011, coll. A. Gorochov & M. Ünal (ZIN and AIBÜ).

Description. Male (holotype). Body small for this species. Colouration of head intermediate between that of nominotypical subspecies and that of *G. dalmatina ?pieperi* and of *G. dalmatina schmidtii* (clypeus almost uniformly light, and dark spots above lateral ocelli large; for comparison see Figs 108–110, 112), but antennae with uniformly yellowish white proximal part, light brown base of flagellum, and greyish brown rest of flagellum; tergites with distinct transversally banded (almost not spotted) colouration (Fig. 120); rest of body yellowish white with brownish anal plate as well as with a few brown and brownish spots on distal third of all femora and on middle third of hind femora (Fig. 120). Head rostrum between antennal cavities almost equal to scape in width; legs comparatively

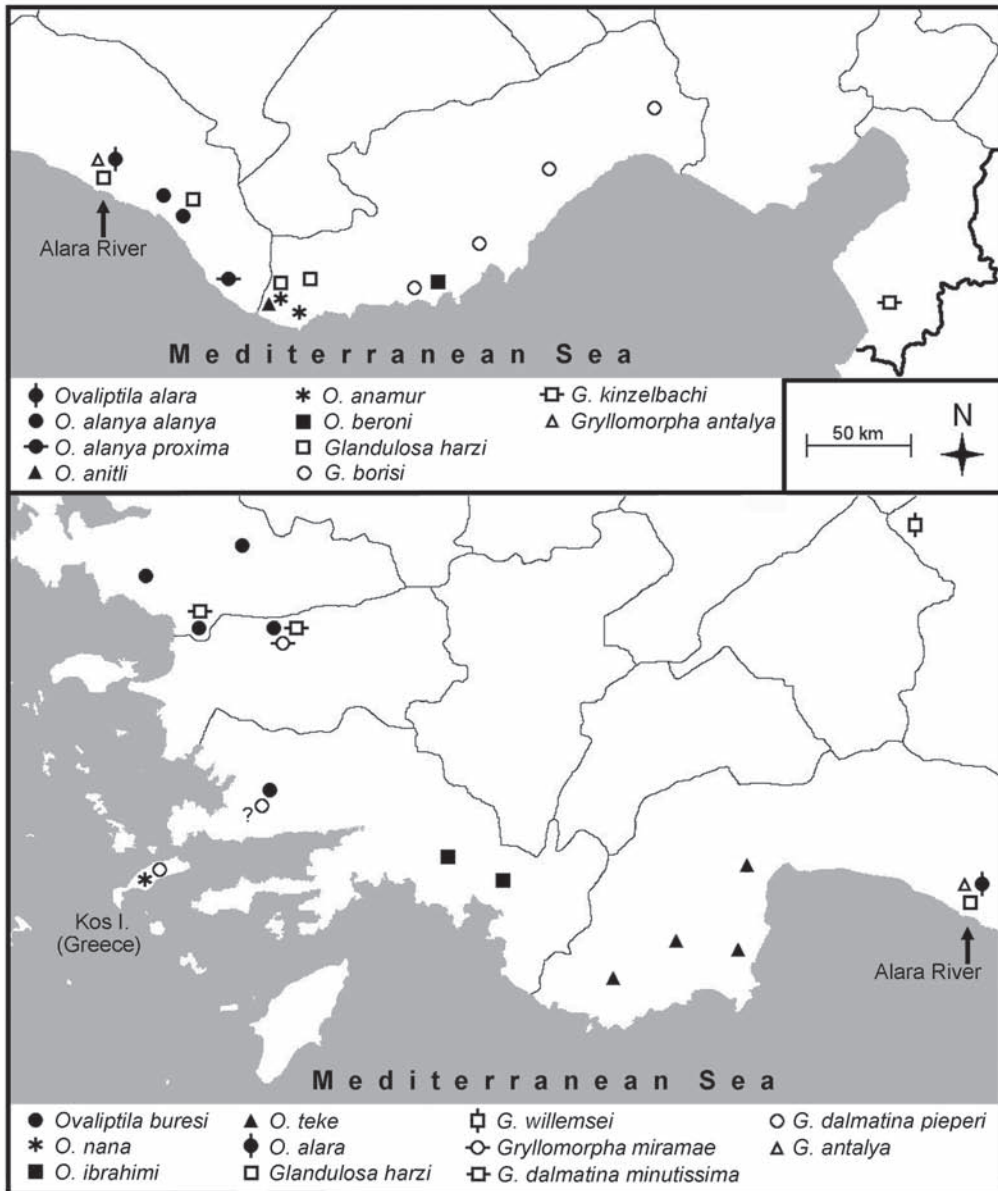


Fig. 142. Maps of distribution of Grylломorphinae species in the southern half of Anatolia.

long (length of hind femur approximately 3 times as great as width of head); anal and genital plates typical of this species (almost as in Figs 126, 136); genitalia with median plate of epiphallus intermediate between those of nominotypical subspecies and *G. dalmatina ?pieperi* in length (for comparison see Figs 124, 130, 133), apical part of

posterior epiphallic processes as in Fig. 134, and endoparameres somewhat narrower than in all other subspecies of *G. dalmatina* and without median sclerotized ribbon (Fig. 132).

Variations. Body colouration sometimes slightly darker: clypeus with more distinct brownish median spot, hind abdominal ter-

gites almost without light bands, and genital plate with slightly darkened marks on ventral surface.

Female. General appearance as in male, however structure of abdominal apex almost indistinguishable from that of all other females of this species including shape of ovipositor apex (Fig. 111), but length of ovipositor hardly smaller than that of hind femur.

Length in mm. Body: male 12.5–13.5, female 10–12; pronotum: male 2–2.2, female 2.1–2.4; hind femora: male 8.7–9.2, female 8.5–10; ovipositor 8–9.2.

Comparison. The new species is very similar to *G. cretensis* (probably *G. dalmatina cretensis* is more correct) by the small and transversally banded body, but it differs from the latter in the longer legs (vs. hind femur approximately 2.7 times as great as width of head) and more distinct spots on femora (vs. fore and middle femora almost uniformly light). From all other subspecies of *G. dalmatina*, this subspecies differs in the smaller and transversally banded body, moderately long median plate of epiphallus, and slightly narrower endoparameres lacking any sclerotized ribbon that connects the left and right endoparameres in other representatives of this species.

Etymology. This name is the Latin word “minutissima” (smallest).

***Gryllomorpha (Gryllomorphella) miramae ?miramae* Medvedev, 1933**

Material examined. Four males, 12 females, Aydın Prov., İncirliova Distr., Karlıçay River near Karagözler Vill., 560 m, 37°57.854'N, 27°48.576'E, on open soil of dry valley slope lacking trees near narrow forest stripe along river, at night, 14 Sept. 2011, coll. A. Gorochov & M. Ünal (ZIN and AIBÜ).

Note. These smallest representatives of Turkish *Gryllomorpha* (length in mm: pronotum 1.4–1.5 in male and 1.5–1.7 in female, hind femora 5.7–6 in male and 6–7 in female, and ovipositor 6.2–6.8) have a more or less transversally banded body colouration and are very similar to *G. mi-*

ramae miramae, described from Ukraine, as well as to *G. miramae guentheri* Harz, 1976, described from Greece, in general appearance; they were redescribed and illustrated by Gorochov (2009). Male anal plate of these specimens is more similar to that of Ukrainian specimens (Fig. 140), because in Greek ones, it has larger posterolateral lobules. Structure of male genitalia is more or less intermediate between those of these subspecies but more similar to that of the nominotypical subspecies (Figs 137–139): membranous areas between the epiphallus and its median plate are slightly narrower than in Ukrainian specimens but wider than in Greek ones; posterolateral process of ectoparameres is approximately as in *G. miramae miramae* (not as thin as in Greek subspecies); endoparameres are variable (one male is with narrow endoparameres, as in Ukrainian subspecies, but the other male is with slightly widened lateral part of endoparameres, almost as in *G. miramae guentheri*). These features allow us to identify these Turkish specimens as *G. miramae miramae*, though with some doubts. If this is correct, the wide distribution of this subspecies (from Bulgaria to Kazakhstan and possibly Uzbekistan) will be expanded up to the western part of Anatolia.

These Turkish specimens are also somewhat similar to *G. dalmatina minutissima* in the size and coloration of body but distinguished from it by a different colouration of head (Fig. 113), distinctly longer posterolateral lobules of male anal plate (Fig. 140), lower (narrower in profile) distal part of male genital plate (Fig. 141), very different male genitalia (Figs 137–139), and slightly different shape of ovipositor apex (Fig. 114).

***Gryllomorpha (?Gryllomorphella) antalya* Gorochov, 2009**
(Figs 115, 116)

Holotype. Female, Antalya Prov., Alanya Distr., ~30 km WNW of Alanya City, environs of Okurcalar Vill. not far from mouth of Alara

River, on plough-land, at night, 1–10 Oct. 1994, coll. A. Gorochov (ZIN).

Note. Only a single female of this species is known. It was described and illustrated in detail by Gorochov (2009). Here it is sufficient to repeat its comparison with *G. miramae* and to add a comparison with the smallest specimens of *G. dalmatina*. *G. antalya* differs from them in the distinctly shorter ovipositor (hind femur is almost 1.5 times as long as ovipositor; vs. almost equal to it) and clearly non-acute apex of ovipositor (for comparison see Figs 111, 114, 116). Size and colouration of body in *G. antalya* are most similar to those of *G. miramae* (for comparison see Figs 113, 115); for this reason, *G. antalya* is provisionally included in the subgenus *Grylломорфелла*.

ACKNOWLEDGEMENTS

We thank Dr A. Popov and Dr S. Grozeva from NMNHS (Sofia) as well as Dr B. Hauser from MHNG (Geneva) for the loan of some type material, and Dr M. Rampini and Dr C. Di Russo from Università degli Studi di Roma “La Sapienza” (Roma) for the accordance of some useful specimens to this study. This work is supported by the Presidium of the Russian Academy of Sciences (program “Biosphere origin and evolution of geo-biological systems”), Russian Foundation for Basic Research (project No. 10-04-00682), and İzzet Baysal Foundation of Abant İzzet Baysal University, Turkey.

REFERENCES

- Baccetti B.** 1959. Notulae orthopterologicae. XIV. Descrizione di un nuovo genere cavernicolo di Ortotteri scoperto in Sardegna. *Annali della Facoltà di Agraria dell'Università di Sassari*, 7: 3–13.
- Baccetti B.** 1992. Notulae orthopterologicae. 50. Su alcuni ortotteroidei del Mediterraneo orientale. *Fragmenta Entomologica*, 23(2): 247–276.
- Bey-Bienko G.Ya.** 1964. Order Orthoptera (Saltatoria). In: **Bey-Bienko G.Ya.** (ed.). *Opredelitel' nasekomykh evropeyskoy chasti SSSR [A key to insects of the European part of the USSR]*, 1: 205–290. Leningrad: Nauka. (In Russian).
- Chopard L.** 1967. Gryllides. Fam. Gryllidae: subfam. Gryllinae. *Orthopterorum catalogus*, 10. Gravenhage: Uitgeverij Dr. W. Junk. 211 p.
- Eades D.C., Otte D., Cigliano M.M. & Braun H.** 2012. *Orthoptera Species File Online*. Visited 15 April 2012. Available from: <<http://osf2.orthoptera.org/HomePage.aspx>>
- Ebner R.** 1919. VI. Orthopteren aus Kleinasien. In: **Toelg F.** *Ergebnisse einer zoologischer Forschungsreise nach Kleinasien*. Archiv für Naturgeschichte (A), 8: 130–176.
- Gorochov A.V.** 1984. Faunistic and systematic notes on Gryllidae (Orthoptera) of the Crimea. *Vestnik zoologii*, (1): 12–20. (In Russian).
- Gorochov A.V.** 1986. On system and morphological evolution of the cricket family Gryllidae (Orthoptera) with description of new taxa. *Communication 2. Zoologicheskij zhurnal*, 65(6): 851–858. (In Russian).
- Gorochov A.V.** 1990. New and little known taxa of orthopterans of the suborder Ensifera (Orthoptera) from tropics and subtropics. *Entomologicheskoye obozreniye [Revue d'Entomologie de l'URSS]*, 69(4): 820–834. (In Russian).
- Gorochov A.V.** 1995. System and evolution of the suborder Ensifera (Orthoptera). Part 2. *Trudy Zoologicheskogo Instituta Rossijskoy Akademii Nauk [Proceedings of the Zoological Institute of the Russian Academy of Sciences]*, 260(2): 1–213. (In Russian).
- Gorochov A.V.** 1996. New and little known crickets from the collection of the Humboldt University and some other collections (Orthoptera: Grylloidea). Part I. *Zoosystematica Rossica*, 4(1): 81–114.
- Gorochov A.V.** 2006. A new genus of the tribe Petaloptilini (Orthoptera: Gryllidae: Grylломорфинae) and partial revision of species included. *Far Eastern Entomologist*, (160): 1–11.
- Gorochov A.V.** 2009. A study of the genus *Grylломорфа* Fieber, 1853 (Orthoptera: Gryllidae: Grylломорфинae). *Zoosystematica Rossica*, 18(1): 25–47.
- Gorochov A.V. & Llorente V.** 2001. Estudio taxonómico preliminar de los Grylloidea de España (Insecta, Orthoptera). *Graellsia*, 57(2): 95–139.
- Gümüşsuyu İ.** 1980. A new record of *Discoptila brevis* Bey-Bienko (Orthoptera: Gryllidae) for Turkey. *Türkiye Bitki Koruma Dergisi*, 4(4): 239–241.

- Gümüştuyu İ.** 1981. *Türkiye Gryllidae (Orthoptera) faunası üzerinde sistematik çalışmalar ile türlerin habitat ve davranışlarına ait gözlemler*. Ankara Bölge Zirai Mücadele Araştırma Enstitüsü, Araştırma Eserleri Serisi, 42. Ankara. 94 p.
- Harz K.** 1969. *Die Orthopteren Europas, Bd 1*. Hague: Dr. W. Junk N.V. xx + 749 S.
- Harz K.** 1979. Neue Grillen aus Griechenland, Syrien und der Türkei. *Articulata*, **1**(11): 103–107.
- International Commission on Zoological Nomenclature.** 1999. *International Code of Zoological Nomenclature adopted by the International Union of Biological Sciences, 4th edition*. London: the International Trust for Zoological Nomenclature. xxix + 306 p.
- Köhler G., Renker C., Luis P.** 2004. A new cave population of *Discoptila beroni* Popov, 1975 (Insecta: Ensifera: Gryllidae) from southern Turkey, with some remarks on the genus. *Annalen des Naturhistorischen Museums in Wien (B)*, **105**: 265–275.
- Mařan J.** 1958. Eine neue Art der Gattung *Discoptila* Pantel aus Bulgarien. Orthoptera – Gryllidae. *Acta Entomologica Musei Nationalis Pragae*, **32**(490): 37–40.
- Önder F., Pehlivan E., Karsavuran Y., Tezcan S. & Kismalı S.** 1999. Catalogue of the collection of Gryllidae and Gryllotalpidae (Orthoptera) preserved in the Prof. Dr. Ni-yazi Lodos Museum, Izmir, Turkey. *Türkiye Entomoloji Dergisi*, **23**(2): 83–90.
- Otte D.** 1994. *Orthoptera species file 1. Crickets (Grylloidea)*. A systematic catalog. Philadelphia. 120 p.
- Popov A.** 1975. Eine neue *Discoptila* aus anatolischen Höhlen (Orthoptera, Gryllidae). *International Journal of Speleology*, **6**: 353–358.
- Popov A.** 1984. Le genre *Discoptila* Pant. (Orthoptera, Gryllidae). *Biologia Gallo-Hellenica*, **11**(1): 65–78.
- Retowski O.** 1888. Beiträge zur Orthopteren-Kunde der Krim. *Bulletin de la Société Impériale des Naturalistes de Moscou (nouvelle série)*, **2**(3): 402–415.
- Retowski O.** 1889. Verzeichnis der von mir auf meiner Reise von Konstantinopel nach Batum gesammelten Orthopteren. *Bericht über die Senckenbergische Naturforschende Gesellschaft in Frankfurt am Main*, 1889: 217–223.
- Us P.A.** 1975. Cave Orthoptera (Saltatoria: Rhaphidophoridae and Gryllidae) collected by Dr. Jean Gajac in Yugoslavia, Greece and Turkey. *Entomologist's monthly Magazine*, **110**: 182–192, pl. 6.
- Uvarov B.P.** 1934. Studies in the Orthoptera of Turkey, Iraq and Syria. *Eos*, **10**: 21–119.
- Weidner H.** 1964. *Discoptila fragosoi* (I. Bolivar, 1885) aus einer Höhle Südanatoliens (Orthoptera: Gryllidae). *Mitteilungen der Deutschen entomologischen Gesellschaft*, **23**(1): 17–20.

Received April 16, 2012 / Accepted May 24, 2012