

A study of the genus *Gryllomorpha* Fieber, 1853 (Orthoptera: Gryllidae: Gryllomorphinae)

A.V. GOROCHOV

A.V. Gorochov, Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, St. Petersburg 199034, Russia; orthopt@zin.ru

Twenty six species and subspecies of the genus *Gryllomorpha* are considered. Twelve of them are included in the nominotypical subgenus: *G. dalmatina dalmatina*, *G. d. schmidti* stat. n.; *G. longicauda longicauda* nom. resurr.; *G. l. adspersa* stat. n.; *G. brevicauda brevicauda*, *G. b. australis* subsp. n.; *G. b. borealis* subsp. n.; *G. occidentalis* sp. n.; *G. sovetica* sp. n.; *G. syriaca*, *G. rufescens*, *G. maghzeni*. Fifteen taxa are soundly or tentatively included in the subgenus *Gryllomorphella*: *G. miramae miramae*, *G. m. guentheri*, *G. albanica*, *G. antalya* sp. n., *G. zonata zonata*, *G. z. ifni* subsp. n., *G. robusta* sp. n., *G. ?canariensis*, *G. atlas* sp. n., *G. segregata* sp. n., *G. mira*, *G. uclensis uclensis*, *G. u. algeriana*, *G. u. ?pygmaea*, *G. sternlichti*. Type material for the majority of these species is briefly revised. Male copulatory structures for many species are described and illustrated for the first time. Neotype for *G. dalmatina* and *Acheta aptera* as well as a lectotype for *Gryllomorpha zonata* are designated.

Key words: Orthoptera, Gryllomorphinae, *Gryllomorpha*, new species, neotype designation

INTRODUCTION

The Gryllomorphinae Saussure, 1877 is a rather small subfamily of the family Gryllidae Laicharting, 1981. This subfamily is related to the subfamily Gryllinae and distributed from Mediterranean region to eastern part of Kazakhstan, northern part of Iran, Western Sahara, and Canary Islands. Including of some representatives from Australia (*Eurygryllodes* Chopard, 1951; *Maluagryllus* Otte, 1994), Europe (*Eugryllodes* Chopard, 1927), and South America (*Neogryllodes* Otte, 1994) in this subfamily (Eades & Otte, 2009) is erroneous or questionable. *Eurygryllodes* and probably *Maluagryllus* belong to the primitive tribe Eurygryllodini Gorochov, 1990 of the subfamily Gryllinae (Gorochov, 1990). *Eugryllodes* is a typical representative of the tribe Gryllini (Gorochov & Llorente, 2001). *Neogryllodes* is *nomen nudum* (no any generic description), and this name is based on an insufficiently described species.

So, the Gryllomorphinae consists of only 2 dependable tribes: Gryllomorphini and Petaloptilini Baccetti, 1959 (authorship of the latter tribe is ascribed to me in

the above-mentioned catalogue by Eades & Otte, but I only erected Baccetti's group Petaloptilae; see Gorochov, 1984a). The Petaloptilini includes 4 genera characterized by the male genitalia with the not arched endoparameres (having long apodemes) and small spermatophore sac: *Petaloptila* Pantel, 1890 (=*Discoptila* Pantel, 1890; see Gorochov, 2006) from Spain and continental Italy, *Acroneuroptila* Baccetti, 1959 from Sardinia I., *Glandulosa* Harz, 1979 from Asia Minor, and *Ovaliptila* Gorochov, 2006 from northern part of eastern half of Mediterranean region. The Gryllomorphini contains the widely distributed genus *Gryllomorpha* Fieber, 1853 and possibly the genus *Hymenoptila* Chopard, 1943 from western part of North Africa and from Canary Islands (Kevan & Hsiung, 1992). These genera are characterized by the male genitalia with the arched endoparameres (having short or almost absent apodemes) and large spermatophore sac.

One of main problems in taxonomy of *Gryllomorpha* is the absence of descriptions and illustrations of male genitalia for majority of its species, as the external structure in these species is often similar, and their body

size and coloration are rather variable. This genus was divided into 2 subgenera (Gorochov, 1984a): *Gryllomorpha* s. str. and *Gryllomorphella* Gorochov, 1984 (with *G. miramae* Medvedev, 1933 as a type species of the latter subgenus). Study of the new material on *Gryllomorpha* and of the old type material from some museums allows me to find a few additional characters for more distinct determination of several species and subspecies. This study shows also that the male genitalia in this genus are diverse, and *Gryllomorpha* is in need of division into more than 2 subgenera. However the male genitalia of many species of *Gryllomorpha* are unstudied up to now. It is a reason for tentative inclusion of all studied species in only 2 old subgenera evidently reflected a most ancient divergence of this genus.

The material considered here is deposited at the following institutions: Zoological Institute, Russian Academy of Sciences, St.Petersburg (ZISP); Museo Nacional de Ciencias Naturales, Madrid (MNCN); Muséum d'Histoire naturelle de la Ville de Genève, Geneva (MHNG); Natural History Museum, London (BMNH); Museum für Naturkunde der Humboldt-Universität, Berlin (MNHU); Naturhistorisches Museum, Wien (NHMW), Institute of Zoology, Armenian Academy of Sciences, Yerevan (IZAS); Tavrida National University, Simferopol (TNUS); G.H. Schmidt's collection, Universität Hannover (SCUH). For the loan of the material for this study, I wish to thank Dr. V. Llorente and Dr. I. Izquierdo (MNCN), Dr. B. Hauser (MHNG), the late Dr. G.B. Popov and J. Marshall (BMNH), Dr. K.K. Günther and I. Dorandt (MNHU), the late Dr. A. Kaltenbach (NHMW), the late Dr. A.S. Avetyan (IZAS), Dr. I.V. Maltsev (TNUS), and Prof. G.H. Schmidt from Hannover. This work is supported by the Russian Foundation for Basic Research (grant No. 07-04-00540) and partly based on collections of the Zoological Institute of RAS, which obtain financial support from Rosnauka for UFC no. 2-2.20.

DESCRIPTION

Genus *Gryllomorpha* Fieber, 1853

Type species *Acheta dalmatina* Ocskay, 1832.

Note. This genus is well known and clearly distinguished from all the other genera of Gryllomorphinae by the completely apterous body and absence of any thoracic gland. Male of this genus is also characterized by the bifurcate hind part of anal plate and some characters of genitalia: epiphallus is with the V-shaped median proximal sclerite (sometimes this sclerite is partly semimembranous or divided into 2 isolated lateral sclerites) and a pair of hind processes; ectoparameres are well developed, very different in shape; spermatophore sac is large and often convoluted, and endopameres are arched and with the short or almost absent apodemes (these structures are similar to those of Gryllinae, but this similarity is a result of convergence); guiding rod is partly semimembranous and provided with the more or less trifurcate sclerotization at the apex; hind part of genitalia has the transverse sclerite isolated from the other sclerotized parts (Figs 2-7).

At present differences between the subgenera *Gryllomorpha* and *Gryllomorphella* are insufficiently clear: majority of species belonging to *Gryllomorpha* s. str. differ from majority of species of *Gryllomorphella* in the short ectoparameres, weakly trifurcate apex of guiding rod, and presence of a pair of long and narrow sclerotized ribbons behind lateral parts of guiding rod (for comparison see Figs 2, a-c, e, g-i, k, n-p; 3, a-c, g-j, n-p, x; 4, a-c and Figs 4, g-i, l-n, p-r; 5, a-c, d-f, j-l, o-q; 6, a-c). But there are some species with only one of these characters (ectoparameres short, as in *Gryllomorpha* s. str., but sclerotized ribbons absent, and guiding rod strongly trifurcate, as in *Gryllomorphella*; Figs 6, f-h, k, l, o, p; 7, a-c, f, h-j, m-p, s). These species possibly belong to separate subgenera. It is necessary to note that a tentative inclusion in the above-mentioned subgenera is given for only the species considered here; all the

other species are in need of study of their male genitalia (their subgeneric position is very unclear).

Gryllomorpha (Gryllomorpha) dalmatina (Ocskay, 1832)
(Figs 1, a, b, c; 2, a-f)

Material studied. **Croatia:** 1 male, 1 female, "Trsteno Arboretum [not far from city Dubrovnik], Yugoslavia" (ZIAS); 2 nymphs, "Lesina [Hvar I.]", 1904, Rolle (ZISP); 1 male, 1 female, "Dalm. [Dalmatia]" (ZIAS). **Ukraine:** numerous specimens from different localities in southern part of Crimea (ZISP). **Abkhazia,** environs of city Sukhumi: 3 males, 10-30 Sept. 1981, Markosyan (ZISP); 1 female, 10 Oct. 1939, Bochkareva (ZISP); 2 nymphs, Aug. – Oct. 1911, Zajtsev (ZISP); 3 nymphs, 11 June 1982, Gorochov (ZISP). **Georgia:** 1 nymph, city Tbilisi, 18 Apr. 1912, Pastukhova (ZISP). **Russia:** 1 female, Astrakhan Region, "Kyrgyz st. [step]", Karuzin & Satunin (ZISP). **Montenegro:** 1 male, 2 nymphs, lake Scadar [Skadarsko], 2 Sept. 1966, Bey-Bienko (ZISP); 2 males, 2 females, 8 nymphs, environs of town Sutomore, 1-2 Sept. 1966, Bey-Bienko (ZISP); 2 females, same locality, 27 Sept. 1967, Matveyev (ZISP). **Greece:** 1 male, 1 female, "Corfu [Kerkyra I.]", 1866, Erber (ZISP). **Italy:** 4 males, 4 females, "Italien-Lasio, Umg. Sabaudia, Stranddüne bei Torre Paolo", Sept. 1980 (SCUH, ZISP); 2 females, "Mt. Saiano, 200-450 m, Makie, Nähe Sabaudia", 2 Oct. 1967 (SCUH, ZISP).

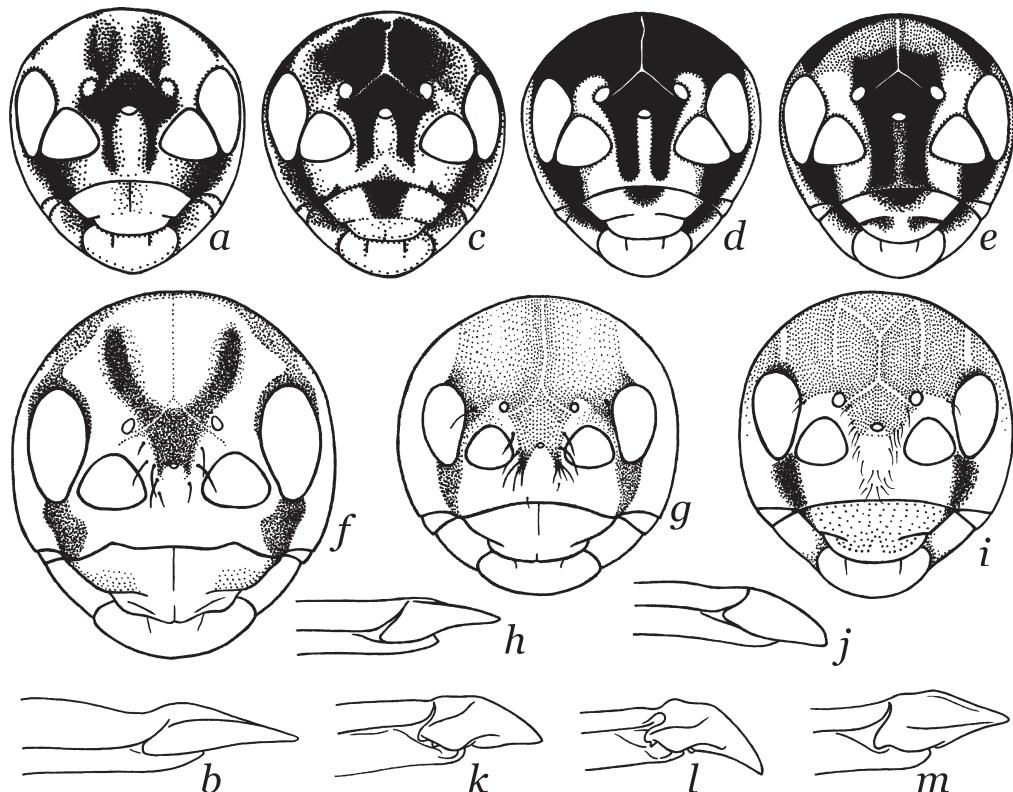
The male from Trsteno Arboretum has additional labels: "Neotypus *Acheta dalmatina* Ocsk., design. Gorochov", "Neotypus *Acheta aptera* Herr.-Sch., design. Gorochov". Specimens from Italy are the type series of *G. schmidti* Gorochov, 1996.

Note. *G. dalmatina* is the largest species of the genus *Gryllomorpha*. External morphology of *G. dalmatina* was described by numerous authors (Saussure, 1877; Pantel, 1890; Chopard, 1943, 1951; etc.), and its male genitalia were illustrated by Andreeva (1982), Gorochov (1984a), and some other authors. But some characters are not identical in populations of this species from different parts of Mediterranean region. The material listed above allows one to divide this species into 3 subspecies at least.

First of them is distributed in eastern-northern part of Mediterranean region: from Croatia to Abkhazia (presence of it in Tbilisi and especially in Astrakhan Region is in need of examination). Coloration of this subspecies is moderately light and distinctly spotted: yellowish with numerous brown and brownish spots (these spots are not very large; Fig. 1, a). Its head is semiglobular, rather high, with the rostrum between antennal cavities almost equal to scape in width, and with the maxillary palpi slender; pronotum is slightly wider than head, transverse; legs are rather long; hind tibiae are with the distal outer spine and dorsal outer spur distinctly shorter than nearest spine and spur; hind basitarsus is not widened; shape of male anal and genital plates are as in Figs 2, d, f; male genitalia (Figs 2, a-c) are with the hind epiphalllic processes having the rather narrow dorsal apical lobe and more or less widened ventral apical lobe (Fig. 2, c); ovipositor is 1.1-1.2 times as long as hind femur, and with the narrow acute apical part of dorsal valvae directed only backwards (Fig. 1, b).

Second subspecies is presented in Montenegro and Western Greece. Possibly it is also characteristic for the entire southern part of Balkan Peninsula with the adjacent islands. It differs from the previous subspecies in the hind epiphalllic processes of male genitalia with the distinctly wider dorsal apical lobe and almost not widened ventral apical lobe (Fig. 2, e), as well as in the ovipositor almost equal to hind femur in length (clearly shorter than in the previous specimens).

Third subspecies is known only from Italy. It is distinguished from first and second ones by the distinctly smaller body, clearly darker coloration (especially anterior part of head; Fig. 1, c), slightly shorter legs (length of hind femur is approximately 2.8 times as great as width of head; in the both previous subspecies, this ratio is 3-3.2), and hardly shorter ovipositor (hind femur is almost 1.1 times as long as ovipositor). The specimens from more western part of Europe and from Africa belonging (Goro-

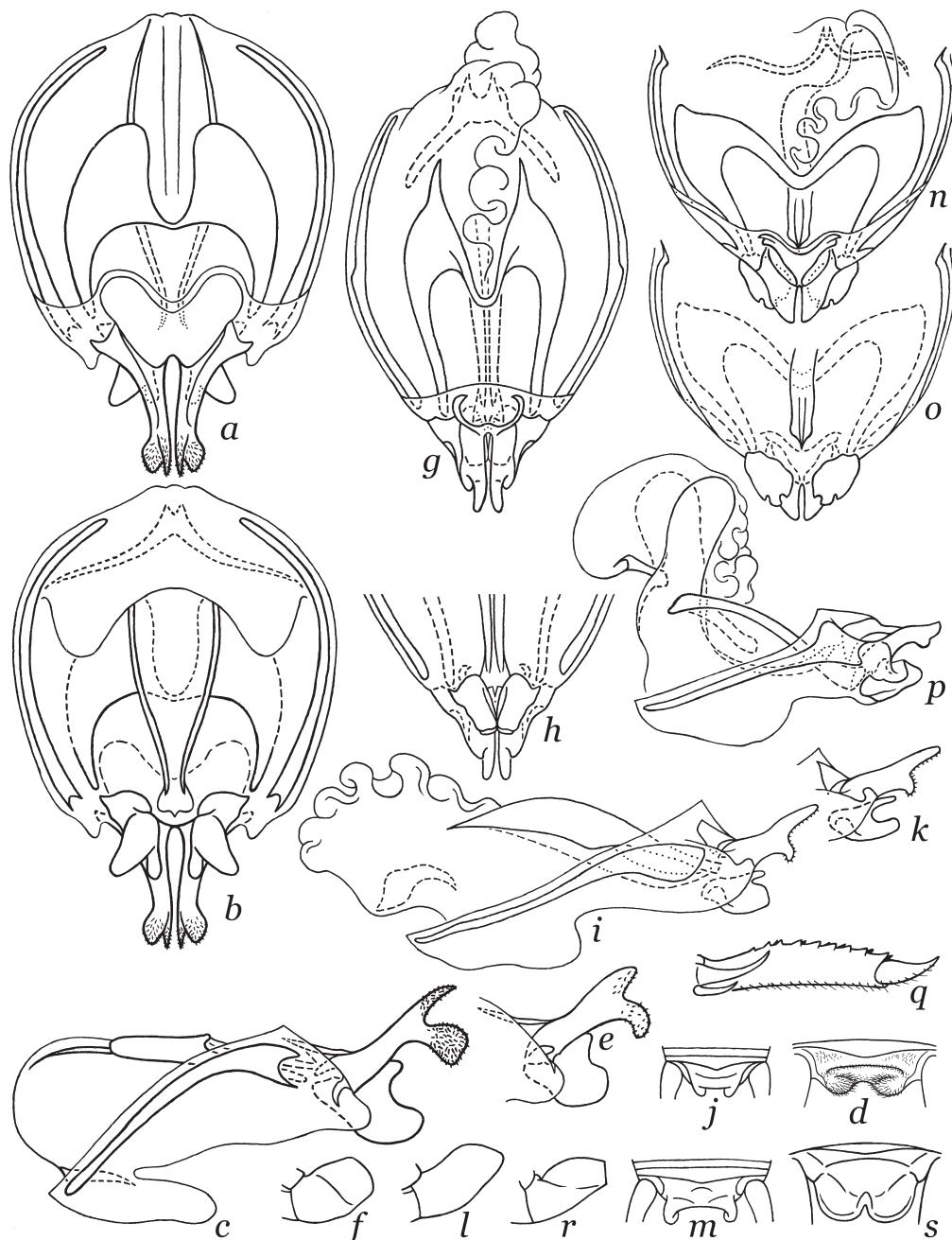


Figs 1, a-m. *Gryllomorpha* (a-f, k-m, *Gryllomorpha* s. str.; g-j, *Gryllomorphella*): **a, b,** *G. dalmatina dalmatina*; **c,** *G. d. schmidti*, holotype; **d,** *G. longicauda longicauda*; **e,** *G. l. adspersa*; **f,** *G. sovietica* sp. n., holotype; **g, h,** *G. miramae miramae*; **i, j,** *G. antalya* sp. n.; **k,** *G. brevicauda australis* subsp. n.; **l,** *G. b. borealis* subsp. n.; **m,** *G. occidentalis* sp. n. Male head in front (a, c-g, i); distal part of ovipositor from side (b, h, j-m). [a, c, after Gorochov, 1996; b, after Gorochov, 1984a]

chov, Llorente, 2001) or probably belonging (Chopard, 1943, 1951) to this species are in need of additional study for clarification of their subspecies position.

For these subspecies, there are several names which were synonymized with *G. dalmatina* by the different authors: *Acheta dalmatina* Ocskay, 1832 ("Dalmatia"); *Acheta aptera* Herrich-Schaffer, 1838 ("Ragusa" [city Dubrovnik in Dalmatia or province and town in Italy]), synonymized by Fieber (1853: 236); *Gryllomorpha fasciata* Fieber, 1853 (Switzerland), synonymized by Chopard (1967: 154); *Gryllomorpha pieperi* Harz, 1979 (Greece: Kos I.), synonymized by Bacetti (1992: 254); *Gryllomorpha dalmatina strumae* Andreeva, 1982 (Bulgaria), synonymized by Gorochov & Llorente (2001: 102).

There are two additional species names which may also belong to two subspecies of *G. dalmatina*: *G. cretensis* Ramme, 1927 (Greece: Crete I.) and *G. schmidti* Gorochov, 1996 (Italy). Correct usage of these names for the three above-mentioned subspecies is impossible without designation of neotype for the two first synonyms (their original descriptions are insufficient for subspecies determination, and their types are almost undoubtedly lost), as the original type locality of *dalmatina* ("Dalmatia") is very wide (from Croatia to Montenegro) and includes territories with two subspecies (the first and the second ones), and the original type locality of *aptera* ("Ragusa") may be situated in Dalmatia (Ragusa is one of old names of city Dubrovnik) or in Ital-



Figs 2, a-s. *Gryllomorpha* (*Gryllomorpha*), male: **a-d**, *G. dalmatina dalmatina*, Crimea; **e, f**, *G. dalmatina* ssp., Montenegro; **g-j**, *G. longicauda longicauda*; **k-m**, *G. l. adspersa*; **n-s**, *G. brevicauda australis* subsp. n., holotype. Genitalia from above (a, g, n), from below (b), and from side (c, i, p); same, but without proximal parts from below (h, o) and from side (e, k); anal plate from above (d, j, m, s); genital plate from side (f, l, r); hind basitarsus from side (q). [a-d, after Gorochov, 1984a; k, after Gorochov & Llorente, 2001]

ian province Ragusa; in first case, the name *aptera* belongs to the first subspecies, but in second one, this name may belong to the third subspecies.

So, for an exact fixation of synonymy of *dalmatina* Ocskay, 1832 and *aptera* Herich-Schaffer, 1838, I designate here the same specimen as a neotype for two these names. It is a male from Croatia (environs of Dubrovnik City) deposited in ZISP and having the labels listed in "Material studied". As a result of this action, the name *dalmatina* is fixed for the first subspecies, the name *aptera* is fixed as a junior objective synonym of *G. d. dalmatina*, and the name *schmidti* is considered a name of the third (Italian) subspecies (status of *G. schmidti*) is here changed for the subspecific one: *G. dalmatina schmidti* Gorochov, 1996, stat. n.). But the second subspecies distributed in Montenegro and Western Greece (and possibly in southern half of Balkan Peninsula and nearest islands) is now without correct name, as there are a few names belonging to not very sufficiently described specimens from different localities of Balkan Peninsula and Greece: *strumae* (Bulgaria), *pieperi* (Kos I.), *cretensis* (Crete I.); for decision of this problem, it is necessary to do a special investigation including examination of an additional material from these localities. The similar problem presents in relation to the name *fasciata* supposed for crickets from Switzerland and synonymized with *dalmatina*; this name may be also one of synonyms of *G. d. dalmatina*, but it is prematurely to synonymize these names before establishment of presence of this subspecies in this country.

The above-mentioned neotype for both "*Acheta dalmatina*" and "*Acheta aptera*" is designated in accordance to the article 75 of the recent International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature, 1999) and to all its requests and recommendations (paragraphs 75.2, 75.3, 75.A, and 75.B): 75.2 – the purpose of designation of this neotype is clarifying the taxonomic status and the

type locality for subspecies of *G. dalmatina* (see above), but not as an end in itself and as a matter of curatorial routine; 75.3.1 – the neotype is designated as a result of exceptional need in more exact determination of type locality of these taxa for clarification of the status of their names necessary for division of *G. dalmatina* into 3 subspecies, as the original type locality of *dalmatina* ("Dalmatia") is very wide (from Croatia to Montenegro) and includes territories with 2 subspecies, the original type locality of *aptera* ("Ragusa") may be situated in Dalmatia (Ragusa is one of old names of city Dubrovnik) or in Italian province Ragusa (in first case, the name *aptera* belongs to one subspecies, but in second one, this name may belong to another subspecies), and the original descriptions of both these taxa are insufficient for subspecies determination; 75.3.2 – the characters distinguished *G. d. dalmatina* from other known subspecies are given above (see characteristic of "first subspecies"); 75.3.3 – the information about the specimen, designated here as a neotype, is given above in the section "Material studied"; 75.3.4 – during long time, the types of *dalmatina* and *aptera*, judging by the authors of the recent cricket catalogues, were considered lost (Otte, 1994; Eades & Otte, 2009), and, moreover, the author of this paper received the personal communication from the late Dr. K. Harz that he had numerous contacts with curators of different European museums during his work on Orthoptera of Europe, and he cannot find these types (these informations allow me to consider them really lost); 75.3.5 – the characters of neotype here designated is in accordance to the original descriptions of both *dalmatina* and *aptera*, and its locality is in accordance (*dalmatina*) or probably in accordance (*aptera*) to those of these taxa ("Dalmatia" and "Ragusa" respectively); 75.3.6 – the locality of neotype is in environs of city Dubrovnik (former Ragusa) situated almost in central part of historic region "Dalmatia"; 75.3.7 – the neotype is deposited in the collection of ZIAS (Zoo-

logical Institute, Russian Academy of Sciences) which is one of biggest scientific zoological institutions having rich type collections; 75.A – the types are evidently lost (see 75.3.4 here), and the neotype may be considered topotypical to lost types (see 75.3.6 here); 75.B – the author had consultations with the late Dr. K. Harz, and now no another specialist (known for the author) who really work on taxonomy of European Gryllomorphinae.

Gryllomorphidae (Gryllomorphidae)
***longicauda longicauda* (Rambur, 1839),**
nom. resurr
(Figs 1, d; 2, g-j)

Acheta longicauda Rambur, 1839 (Spain).
Gryllomorphidae merobricensis Fernandes, 1959,
syn. n. (Portugal).

Material studied. Spain: 1 female, 2 nymphs, environs of city Malaga (BMNH); 1 male, Almeria, “Valle, 1800 m, S Nevada, 30SVGO600 T.M., Paterna del Rio”, 3 Sept. 1993, Barranco (MNCN); 1 female, Cadiz, “Algeciras, Mz. Escalera” (MNCN); 1 male, 3 females, Huelva, “Los Marines”, 4 Oct. 1968, Llorente (MNCN); 1 male, “Pinar de Peña del Aguila, Mancha Real (Jaeñ)” (MNCN). *Portugal:* 1 male, 1 female, “S^a. Penha (Grândola)”, 1 Oct. 1959 (MNCN).

Specimens from BMNH with additional labels: “Syntype”, “Rambur coll., Press by R. Oberthür, Brit. Mus., 1931, 137”, “*Acheta longicauda*”, “*Acheta longicauda* Rambur, Syntype, det. John Huxley, 1972” [female and nymphs were designated as lectotype and paralectotypes by Gorochov & Llorente (2001)]. 3 latter specimens from MNCN are determined as *G. merobricensis* by Fernandes, and two of them from Portugal are signed as paratypes of *G. merobricensis*.

Note. This subspecies was mentioned as *G. adspersa merobricensis* some years ago (Gorochov, Llorente, 2001), but now it is more reasonable to synonymize Fernandes's name with the subspecies of *G. longicauda* from Europe. So, the latter name is here resurrected from synonyms of *G. dalmatina* contra Eades & Otte (2009). This subspecies is more or less similar to *G. d. schmidti*

in the body size and coloration (which is rather dark; Fig. 1, d), but its body is smaller than in *G. d. dalmatina*, and its coloration is lighter than in the latter subspecies. Main differences of *G. l. longicauda* from the both subspecies of *G. dalmatina* consist in the narrower hind lobes of male anal plate (Fig. 2, j), longer male genital plate (as in Fig. 2, l), shorter epiphallus with the narrow V-shaped median sclerite and somewhat different shape of hind processes in profile (Figs 2, g, i), less high ectoparameres with the narrow hind notch in profile (Fig. 2, i), longer endoparameres with the acute proximal projections (Fig. 2, g), convoluted spermatophore sac (Figs 2, g, i), and distinctly longer ovipositor which is 1.3-1.4 times as long as hind femur.

Gryllomorphidae (Gryllomorphidae)
***longicauda adspersa* Bolivar, 1914, stat. n.**
(Figs 1, e; 2, k-m)

Gryllomorphidae adspersa Bolivar, 1914 (Morocco).

Material studied. Morocco: 1 male, 1 female, “Tanger, Olcese” (MNCN); 4 males, 9 females, 2 nymphs, “Tanger, M. Escalera” (MNCN).

First male with additional labels: “*tangeriana*”, “11”, “*Gryllomorphidae adspersa* Bol.”, “*Gryllomorphidae adspersa* Bol., det. E. Morales Agacino”, “Sintipo” [it was designated as lectotype by Gorochov & Llorente (2001)]. All other specimens were originally signed as syntypes, and now they are paralectotypes of *G. adspersa*.

Note. This subspecies was mentioned as *G. adspersa adspersa* some years ago (Gorochov & Llorente, 2001). Now it is reasonable to consider it an African subspecies of *G. longicauda* (see Note on *G. l. longicauda* above). The subspecies is very similar to nomino-typical one, but it differs from the latter subspecies in the somewhat lighter coloration (especially on head; Fig. 1, e), hardly wider notch between hind lobes of anal plate in male (Fig. 2, m), distinctly larger hind notch of ectoparameres in profile (Fig. 2, k), and slightly shorter ovipositor which is 1.1-1.2 times as long as hind femur.

Gryllomorpha (Gryllomorpha) brevicauda brevicauda Bolívar, 1914

Material studied. **Morocco:** 2 females, “Mogador [now town Essaouira], Mz. Escalera” (MNCR).

One of these females with additional labels: “N. 1.104”, “*Gryllomorpha brevicauda* Bol.”, “*Gryllomorpha brevicauda* Bol. det. E. Morales Agacino”, “Holotipo”, “Lectotipo”. Second female with other additional labels: “*brevicauda*”, “Paralectotype, test M. Paris 1991”.

Note. These specimens are in accordance to the original description of *G. brevicauda*, but size of lectotype designated by Paris (1994) is slightly smaller: length of body 10.3 mm, length of pronotum 2.1 mm, length of hind femur 7.9 mm, length of hind tibia 6.2 mm, and length of ovipositor 4.3 mm. In the original description (Bolívar, 1914), the following data were presented: length of body 11–12, length of pronotum 2.2, length of hind femur 8.5, and length of ovipositor 5 mm. The specimens studied are characterized by the following features of body structure: head semiglobular (rather high), approximately as wide as pronotum, with the rostrum between antennal cavities almost as wide as scape, and with the more or less long and thin maxillary palpi; pronotum distinctly transverse; fore and middle legs comparatively slender; hind legs robust, with 2 rows of numerous denticles on proximal half of dorsal tibial surface and 4 pairs of long spines (excepting apical spurs) on distal half of this surface; distal outer spine and dorsal outer spur of hind tibia almost equal and distinctly shorter than nearest spine and spur; hind basitarsus slightly widened, similar to that pictured in Fig. 2, q; anal plate with the rounded hind part; genital plate with the widely truncated apex; ovipositor rather short (hind femur approximately 1.8 times as long as ovipositor) and with the apical part of dorsal valves directed partly downwards (almost as in Fig. 1, l). Coloration of these specimens is yellowish with the following marks: head with distinct brown spot above (near) median ocellus, a pair of rather narrow brown transverse spots above previous spot (these paired

lus, a pair of wide brown transverse spots above previous spot (these paired spots are separated from the latter unpaired spot by the light V-shaped line and from each other, by the light median line and light lateral ocelli), a pair of brown spots under eyes, and brownish spots on hind part of vertex; pronotum with dark brown anterior edge of disc and with the brown spots on anterior half of disc and on upper part of lateral lobes; pterothoracic tergites with the wide transverse darkened (brownish grey) band on dorsum; abdominal dorsum with the brownish transverse stripes; hind femora with a few brown spots on dorsal part.

***Gryllomorpha (Gryllomorpha) brevicauda australis* subsp. n.**

(Figs 1, k; 2, n-s)

Holotype. **Morocco:** male, “Yeb. Tamarnut (Ifni [environs of town Sidi Ifni])”, June 1934, Escalera (MNCR). *Paratypes.* 1 male, 2 females, same data (MNCR, ZISP).

Description. Male (holotype). Shape of body parts as in nominotypical subgenus (see “Note” to *G. b. brevicauda* above). Structure of abdominal apex (unknown in nominotypical subspecies) characteristic: anal plate moderately transverse, with a pair of widely rounded (but not inflated) hind lobes and small notch between them (Fig. 2, s); genital plate elongate and with a pair of lamellar upper lobes partly curved inside and having sharply truncated apex (Fig. 2, r); epiphallus rather short; hind epiphallus processes simple and with small rounded tubercle on ventral surface (Fig. 2, p); V-shaped median sclerite of epiphallus moderately widened (Fig. 2, n); ectoparameres almost oval and with 3 small hind lobules (Fig. 2, o); endoparameres with widened lateroproximal parts having short and almost angular proximal projections (Fig. 2, n); spermatophore sac distinctly convoluted (Figs 2, n, p). Coloration yellowish with following marks: head with brown spot above (near) median ocellus, a pair of rather narrow brown transverse spots above previous spot (these paired

spots separated from latter unpaired spot by light V-shaped line and from each other, by light median line and light lateral ocelli), a pair of brownish spots under eyes, and weakly distinct light brownish spots on hind part of vertex; pronotum with brown anterior edge of disc and with 4 brownish spots on disc; pterothoracic and some abdominal tergites with weakly distinct light brownish transverse stripes; hind femora with 3 small brownish spots on inner surface and 1 small and weakly distinct light brownish spot on distal half of outer surface.

Variation. Second male with weakly distinct short longitudinal lines on vertex, 2 brownish spots on distal half of outer surface of hind femora, and somewhat smaller hind lobules of ectoparameres.

Female. General appearance as in male, but coloration slightly or hardly less spotted, anal plate more or less elongate and with rounded apex. Genital plate and ovipositor very similar to those of nominotypical subspecies, but apical part of dorsal valves of ovipositor directed only slightly downwards (Fig. 1, k).

Length (in mm). Body: male 14-14.5, female 12.5-13; pronotum: male 2.4-2.6, female 2.3-2.5; hind femur: male 9.8-10.4; female 8.8-9.7; hind tibia: male 8.2-8.6, female 7.2-7.7; hind basitarsus: male 2.8-3, female 2.5-2.7; ovipositor 4.8-5.

Comparison. The new subspecies differs from *G. b. brevicauda* in the slightly larger body and less spotted coloration (brown transverse spots between eyes much narrower, lateral lobes of pronotum without darkened spots, meso- and metanotum distinctly lighter).

Gryllomorpha (Gryllomorpha) brevicauda borealis subsp. n. (Fig. 1, l)

Holotype. Morocco: female, "Khemisset [town between cities Rabat and Meknes]", 30 Nov. 1927 (ZISP). **Paratype.** Nymph, same data (ZISP).

Description. Female (holotype). Shape of body parts as in *G. b. brevicauda* and *G. b.*

australis, but ovipositor somewhat shorter (hind femur 2.1 times as long as ovipositor) and with apical part of dorsal valvae slightly narrower and directed distinctly downwards (Fig. 1, l). Coloration as in nominotypical subspecies, but light areas of thoracic and abdominal dorsum with rather numerous brownish dots, pronotum with additional brown spots on hind half of disc, pterothoracic tergites with darkened dorsal band less wide, anterior abdominal tergites with similar band, other abdominal tergites with darkened transverse stripes almost indistinct, hind femora with brown spots on dorsal, inner, and outer surfaces (one of outer spots longitudinal and narrow, almost contacting with moderately large spot near apical part of femur; another outer spot large, situated at middle of dorsal part of outer femoral surface and fused with one of dorsal femoral spots), and cerci (excepting their base) slightly darkened.

Male unknown.

Length (in mm). Body 8; pronotum 1.8; hind femur 6.4; hind tibia 4.8; hind basitarsus 1.7; ovipositor 3.

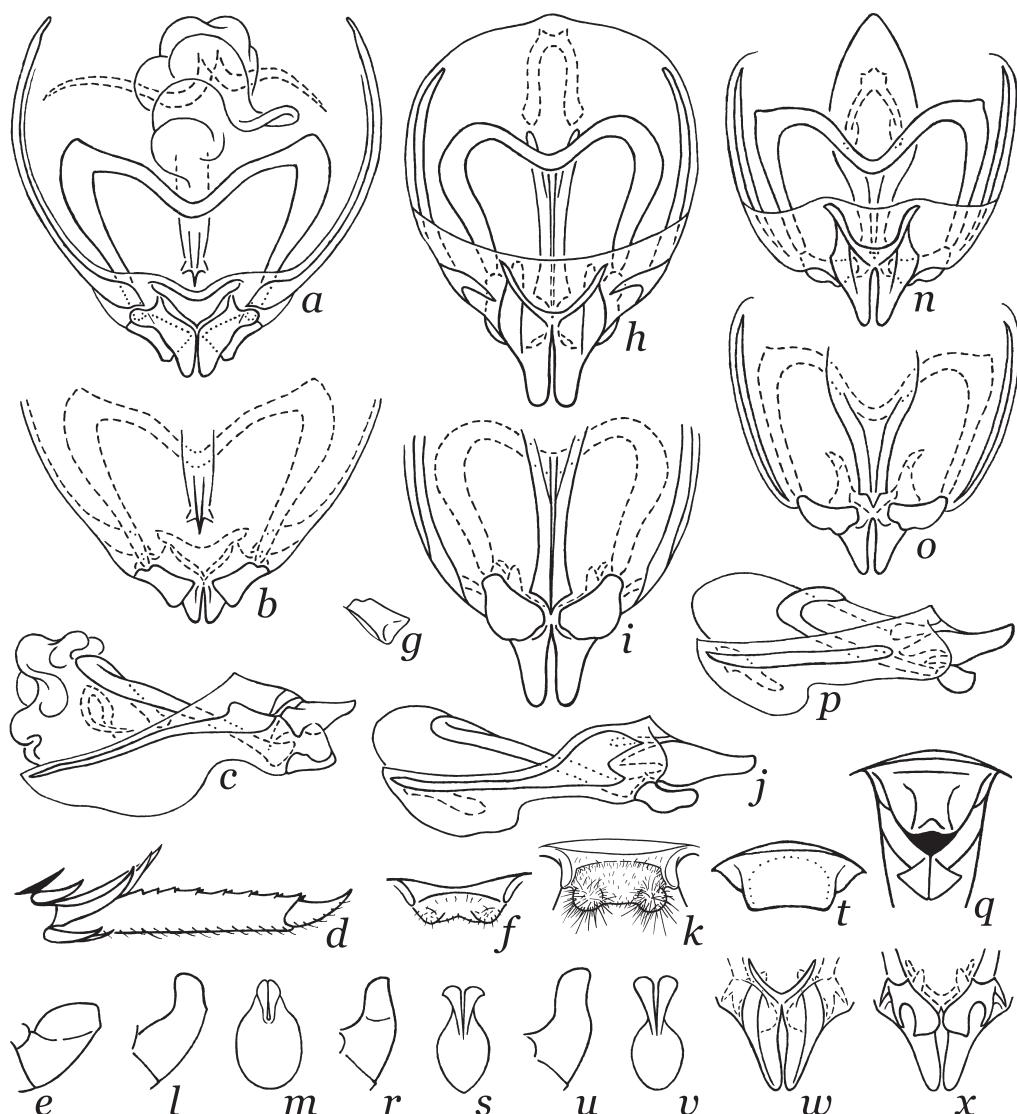
Comparison. The new subspecies differs from the both previous subspecies in the smaller body and shorter ovipositor. From *G. b. brevicauda*, it is additionally distinguished by the peculiarities of coloration listed above; and from *G. b. australis*, by the wider brown transverse spots between eyes and more spotted body.

Gryllomorpha (Gryllomorpha) occidentalis sp. n.

(Figs 1, m; 3, a-g)

Holotype. Morocco: male, "Sidi Ifni (Ifni)", Dec. 1934, Escalera (MNCN). **Paratypes.** 1 female, same data, but I.1935 (MNCN). **Western Sahara:** 1 male, 1 female, "Sáhara Español, El Aiun (SH)", 22 Sept -20 Oct. 1943 (MNCN); 1 male, 1 female, same data, but 11 Jan. 1943 (ZISP).

Description. Male (holotype). Shape of body parts similar to that of *G. brevicauda* (see previous note and descriptions), but hind basitarsus somewhat more slender



Figs 3, a-x. *Gryllomorpha* (*Gryllomorpha*), male: **a-g.** *G. occidentalis* sp. n. (a-f, holotype); **h-m.** *G. sovjetica* sp. n. (holotype); **n-s.** *G. syriaca* (n-q, holotype); **t-x.** *G. rufescens* (holotype). Genitalia from above (a, h, n), from below (without proximal parts) (b, i, o), and from side (c, j, p); ectoparamere from below (g); hind basitarsus from side (d); anal plate from above (f, k, t); anal and genital plates from above (q); genital plate from side (e, l, r, u) and from behind (m, s, v); distal part of genitalia from above (w) and from below (x).

(Fig. 3, d), anal plate shorter and with smaller and slightly inflated hind lobes (Fig. 3, f), and genital plate hardly shorter and with less sharply truncate apical part (Fig. 3, e). Genitalia also similar to those of *G. brevicauda*, but epiphallus wider and without tubercle on ventral surface of hind processes

(Figs 3, a, c), ectoparameres shorter (transverse) and with almost angular hind projection instead 3 lobules (Fig. 3, b), and endoparameres with narrower lateroproximal parts (Fig. 3, a). Coloration yellowish with very small and almost indistinct brownish spot above (near) median ocellus, not wide

brown transverse band between eyes (above previous spot) crossed by light median line, a few light brownish longitudinal stripes on rest of vertex, brown spot under each eye, narrow brown stripe along anterior edge of pronotum, moderately wide interrupted brownish transverse band on hind pronotal half, light brownish spots on rest of tergites (these spots partly fused with each other and forming more or less wide transverse bands), and a few small brownish spots on inner and outer surfaces of hind femora (outer spots similar to those of *G. b. borealis* in shape, but distinctly smaller and moved at distal half of femur).

Variation. Spotted coloration may be slightly more distinct or almost indistinct. Shape of ectoparameres insignificantly varied (Fig. 3, g).

Female. General appearance as in male, but spots on legs sometimes rather large (almost as in *G. b. borealis*). Genital plate small, with almost rounded hind edge having weak median notch; ovipositor approximately equal to hind femur in length, with more or less normal apical part (Fig. 1, m).

Length (in mm). Body: male 11.5-13.5, female 11.5-14; pronotum: male 2.1-2.2, female 2.1-2.3; hind femur: male 8.4-9, female 8.5-10; hind tibia: male 7-7.6, female 7-8.5; hind basitarsus: male 2.6-2.8, female 2.7-3; ovipositor 8.4-10.3.

Comparison. The new species is distinguished from all the congeners with known male genitalia by the very short (transverse) ectoparameres having the almost angular hind projection. From *G. algerica* Chop., *G. rungsi* Chop., *G. gracilipes* Chop., *G. monodi* Chop., *G. gestroana* Bol., and *G. bruehli* Gor., it differs in the ovipositor practically equal to hind femur in length (in 2 first species, ovipositor is distinctly shorter than hind femur, and in 4 other species, longer); from *G. minima* Wern. and *G. pygmaea* Menozzi, in the clearly larger body; from *G. sublaevis* Chop., in the distinctly more spotted coloration; from *G. fusca* Chop., in the much lighter (not dark) coloration and shorter hind lobes of male anal plate; and

from *G. macrocephala* Chop., in the angular apex of male genital plate and not widened hind basitarsus.

Gryllomorpha (Gryllomorpha) sovetica
sp. n.
(Figs 1, f; 3, h-m)

Holotype. **Kazakhstan:** male, plateau Ustirt [Ustyurt], town Beyneu, 31 Aug. 1960, Malkovsky (ZISP). **Paratypes.** 1 female, same data (ZISP). **Kazakhstan:** 1 female, town Mynaral near lake Balkhash, 21 Aug. 1903, Balkhash Expedition (ZISP); 3 nymphs, Mangyshlak Region [Mangyshlak Region], environs of vill. Beke, 30 July 1955, Grunin (ZISP). **Armenia,** city Yerevan: 2 females, in dwelling house, 2 Nov. 1951, Akramovsky (IZAS); 1 female, in building of Institute of Zoology, 10 Oct. 1978, Avetyan (IZAS). **Azerbaijan:** 1 male, 1 female, 1930, Predtetshevsky (ZISP).

Description. Male (holotype). Head semiglobular (rather high), approximately as wide as pronotum, with scape almost 1.5 times as wide as rostrum between antennal cavities, and with more or less long and thin maxillary palpi. Pronotum distinctly transverse. Fore and middle legs comparatively slender (hind legs missing). Anal plate short (shorter than in *G. brevicauda*, but longer than in *G. occidentalis*), with a pair of rather small (smaller than in *G. brevicauda*, but larger than in *G. occidentalis*) and slightly inflated hind lobes, and with rather wide notch between these lobes (Fig. 3, k); genital plate rather narrow in profile, with distinctly concave (in profile) dorsal edges and a pair of rather long apical lobes (these lobes lamellar and obliquely rounded at apex) (Fig. 3, l, m); epiphallus similar to that of *G. brevicauda* and *G. occidentalis*, but somewhat narrower, with longer hind processes lacking tubercle on their ventral surface, and with very narrow V-shaped sclerite (Fig. 3, h, j); ectoparameres almost oval (not transverse), without projection and lobules at apex, but with lobe-like proximal part (Fig. 3, i); endoparameres with narrow lateroproximal parts and without proximal projections (Fig. 3, h); spermatophore sac

simple (Fig. 3, h, j). Coloration yellowish white with brown V-shaped spot between eyes (Fig. 1, f), brownish both spot under each eye and longitudinal stripe behind each eye, a few brown spots on pronotal disc, and rather sparse brownish spots on pterothoracic and abdominal tergites.

Variation. Second male similar to holotype, but without darkenings under eyes and with more distinct spots on pterothoracic and abdominal tergites (its hind legs also missing).

Female. General appearance as in male, but anal plate with rounded hind part, and coloration of pterothorax and abdomen in female from Azerbaijan with more or less distinct transverse stripes (in this female, coloration of head as in second male). Hind femora with light brownish spot on outer surface (near middle of dorsal part) and a few brownish spots on inner surface; hind tibiae as in *G. brevicauda* and *G. occidentalis*, but with outer distal spine clearly shorter than nearest (also shortened) outer spur; hind basitarsus slender. Genital plate small and with widely and roundly truncate apex (hind edge of this plate slightly concave); ovipositor almost equal to hind femur in length, with normal apical part.

Length (in mm). Body: male 12-15, female 10.5-14; pronotum: male 2.3-2.5, female 1.8-2.2; hind femur, female 9.2-9.5; hind tibia, female 7.4-7.8; hind basitarsus, female 2.6-2.8; ovipositor 9-9.2.

Comparison. The new species is most similar to *G. syriaca* Harz, but clearly distinguished from it by the characters listed below (in "Note" to *G. syriaca*). From insufficiently described *G. gestroana* Bol. and some other species, the new species differs in the ovipositor practically equal to hind femur in length, and from all the other congeners, in the characteristic coloration and structure of male genitalia.

Note. These specimens were mentioned in some publications as *G. gestroana* Bol. (Gorochov, 1984b, 1986), but now it is clear that *G. gestroana* is a different species. *G. sovetica* is widely distributed in comparison

with majority of the other species of *Gryllo-morpha*. It may be a result of the adaptation of this species to usage of rodent burrows.

Gryllo-morpha (Gryllo-morpha) syriaca

Harz, 1979

(Figs 3, n-s)

Material studied. **Syria:** 3 males, 2 females, "Syrien, Homs – Palmyra, 64 km E Homs, 12.3.1977, No. 21, Nahostexkutsim [?], R. Kinkelbach et al" (MHNG); 1 male (ZISP). **Algeria:** 1 female, "Biskra", May 1924 (ZISP).

Specimens from MHNG with additional labels: "*Gryllo-morpha syriaca* sp. n. det. Kurt Harz 1979", "Holotypus" (in one of males), "Allotypus" (in one of females), "Paratypus" (in rest of these specimens).

Note. This species is very similar to *G. sovetica*, but distinguished from it by the male anal plate slightly longer and with the narrower distal part and almost indistinct hind lobes (Fig. 3, q), male genital plate with the hardly narrower (in profile) distal lobes having the posterodorsal corners acute (Figs 3, r, s), and male genitalia with the much shorter (transverse) ectoparameres and slightly different shape of endoparameral lateroproximal parts and of hind epiphallic processes (Figs 3, n-p). Coloration and length of ovipositor in these specimens somewhat varied: holotype and male from ZISP slightly lighter (with less distinct spots); ovipositor may be hardly longer or hardly shorter than hind femur. *G. bruehli* Gor. from Palestine is also similar to *G. syriaca* and *G. sovetica* (it probably belong to the same subgenus), but clearly distinguished by the almost uniformly light coloration and distinctly longer ovipositor which is 1.4 times as long as hind femur (Gorochov, 1993). It is necessary to note that one of the specimens from MHNG indicated by Harz (1979) as a paratype of *G. syriaca* is possibly a female (with the partly missing ovipositor) of another species; this female has the labels as in the other paratypes of *G. syriaca*, and it is not included by me in the above-mentioned material.

Gryllomorpha (Gryllomorpha) rufescens**Uvarov, 1924**

(Figs 3, t-x)

Material studied. **Egypt:** 1 male, 1 female, "Min. Agr. Egypt, Salloum", 5-12.8.1917, Allen (BMNH).

These specimens with additional labels: "Pres. by Imp. Bur. Ent. Brit. Mus. 1923-451", "*Gryllomorpha rufescens* sp. n. Det. B. Uvarov, Type" (in male), and "*Gryllomorpha rufescens* sp. n. Det. B. Uvarov, Paratype" (in female).

Note. The male designated as "Type" is a holotype of *G. rufescens*. External morphology of this species is sufficiently described by Uvarov (1924). *G. rufescens* is similar to *G. sovietica*, *G. syriaca*, and *G. bruehli* in the general appearance, but it differs from *G. sovietica* and *G. syriaca* in the almost uniformly light brown coloration with the weakly distinct small brown paired spots between dorsal parts of eyes and with a small brown spot under each eye, male anal plate rather short (as in *G. sovietica*) and with the almost truncate hind part, male genital plate with the roundly angular posterodorsal corners (Figs 3, u, v), hind epiphalllic processes slightly longer (Fig. 3, w), and ectopameres deeply bifurcate (Fig. 3, x); and from *G. bruehli*, in the distinctly shorter ovipositor which is almost 1.1 times as long as hind femur.

Gryllomorpha (Gryllomorpha) maghzeni**Bolivar, 1905**

(Figs 4, a-f)

Material studied. **Morocco:** 15 females, 1 nymph, "Mogador [now town Essaouria], Escalera" (MNCN); 1 male, "Mogador, Mz. Escalera" (MNCN); 1 male, "Cap Blanco, 3 st. S.W. von Mazagan [now fort Mazagan is part of city El Jadida]", 1902, Rigggenbach (ZISP).

Females and nymph with additional labels: "*Maghzeni*", "*Gryllomorpha maghzeni* Bol. det. E. Morales Agacino", "sintipo".

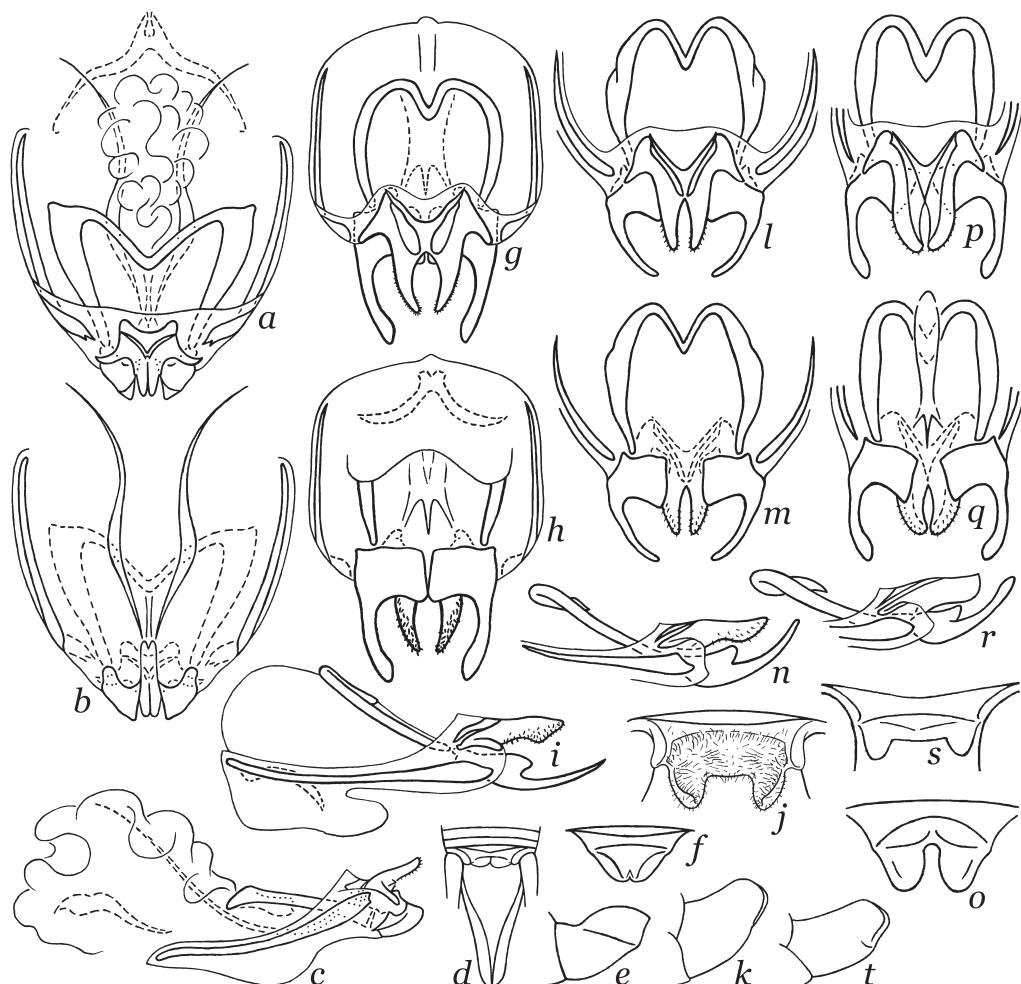
Note. General appearance of this species is sufficiently described and redescribed (Bolivar, 1905, 1914; Chopard, 1943), how-

ever its male genitalia are here illustrated for the first time (Figs 4, a-c). *G. maghzeni* is similar to small *G. dalmatina* in the shape of body parts and coloration, but its male anal plate longer and with the narrower hind part having the weak rounded hind lobes and very narrow (small) notch between them (Figs 4, d, f), male genital plate also longer and with the acute apex (Figs 4, d, e), male genitalia with the rather short (almost transverse) V-shaped epiphalllic sclerite, short hind epiphalllic processes, short and angular ectopameres, and convoluted spermatophore sac (Figs 4, a-c). These characters separate *G. maghzeni* from all the other congeners with known structure of male abdominal apex. Female of this species is characterized by the ovipositor approximately 1.1 times as long as hind femur.

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

(Figs 1, g, h; 4, g-k)

Material studied. **Ukraina:** 1 male, 2 females, "Ascania-Nova tesqua [near city Melitopol], Ross. mr.", 3-4 Sept. 1930, Medvedev (ZISP); 1 female, same data, but 26 Aug. 1927 (ZISP); 1 female, environs of city Odessa, western bank of Kujalnitskij Liman, 10 Oct. 1928, Znojko (ZISP); 1 female, Crimea, environs of city Simferopol, vill. Kurgannoe, under stone, 23 Oct. 1955 (ZISP); 1 nymph, Crimea, environs of town Sudak, Karadag, 25 Aug. 1952, Bogachev (TNUS). **Russia:** 1 male, 1 female, Rostov Region, vill. Razdorskaya, 9-18 Sept. 2001, Ponomarev (ZISP); 1 male, 1 female, Astrakhan Region, environs of vill. Chagaj, Baer's Hill, 15 Sept. 1967, Pisarev (ZISP). **Kazakhstan:** 1 male, 1 female, West Kazakhstan [Uralsk Region], environs of town Zhanybek (near border with Volgograd Region of Russia), 11 Sept. 1982, Kritskaya (ZISP); 1 male, 1 female, Atyrau [Guriev] Region, environs of town Inder, bank of river Ural, 14 Aug. 1990, Krivokhatsky & Zakharenko (ZISP); 1 nymph, Qaraghandy [Karaganda] Region, Ulytau [Ultau] District, 8-10 Aug. 1957, Malkovsky (ZISP); 2 males, 3 females, valley of river Shu [Chu], vill. Orgo-Saj, 27 Sept. 1981, Ovchinnikov (ZISP); 1 female, environs of city Almaty, 8 Aug. 1928, Shnitnikov (ZISP); 1 nymph, eastern part of Almaty Region [former



Figs 4, a-t. *Gryllomorpha* (a-f, *Gryllomorpha* s. str.; g-t, *Gryllomorphella*), male: a-f, *G. maghzeni*; g-k, *G. miramae miramae* (holotype); l-o, *G. m. guentheri* (holotype); p-t, *G. albanica*. Genitalia from above (a, g), from below (h), and from side (c, i); same, but without proximal part and guiding rod from above (l, p), from below (m), and from side (n, r); same, but without only proximal part from below (b, q); anal and genital plates from above (d); anal plate from above-behind (f) and from above (j, o, s); genital plate from side (e, k, t). [g-i, after Gorochov, 1984a]

Taldy-Kurgan Region], Panfilov District, mountains Arasan (1900 m), 25 Aug. 1972, Emets (ZISP). **Uzbekistan:** 1 female, station Ksiss, in rodent burrow, 16 Aug. 1964, Ergashev (ZISP).

Male from Ascania-Nova with additional labels: “*Gryllomorpha miramae* Medv., typus”, “Holotypus”. Females from the same place with additional labels: “*Gryllomorpha miramae* Medv., paratype” (in females collected in 1930), “Paratype” (in one of these females and in female collected in 1927).

Note. External morphology of this subspecies was sufficiently described by Medvedev (1933), and its male genitalia were illustrated by Gorochov (1984a). This widely distributed subspecies is characterized by the small body, transversally striped coloration with the more or less darkened area between rostral apex and anterior halves of eyes (Fig. 1, g), slender hind basitarsus, moderately short male anal plate with the rather long hind lobes and wide notch be-

tween them (Fig. 4, j), rather long and not high (in profile) male genital plate with the rounded distal lobes (Fig. 4, k), and male genitalia with the almost completely sclerotized epiphallus, rather wide membranous areas around V-shaped median epiphalllic sclerite, wide ectoparameres having the very long and not very narrow posterolateral process, narrow endoparameres, and simple spermatophore sac (Figs 4, g-i). Coloration is rather variable: in holotype and some other specimens from Europe, darkened area on face is distinctly developed, and dark (brown) transverse bands on body are wide (occupying most part of pterothoracic and abdominal tergites); in specimens from Astrakhan Region and Asia, head is sometimes almost uniformly yellowish, and body is usually with the narrow brownish stripes. Female genital plate is small, rather short, with the rounded posterolateral corners and slightly concave median part of hind edge; ovipositor is almost equal to the hind femur in length, with the normal apical part (Fig. 1, h). Medvedev (1933) indicated that the type specimens of *G. miramae* were collected in the deep part of *Citellus* burrows.

Gryllomorpha (Gryllomorphella)
***miramae guentheri* Harz, 1976, stat. n.**
(Figs 4, l-o)

Gryllomorpha guentheri Harz, 1976 (Greece).

Material studied. Greece: 1 male, 2 nymphs, "Hellas, Rentina Tal, 19 Aug. 1971, Au, Kulturgelände, R. Kinzelbach" (MHNG).

Male with additional labels: "*Gryllomorpha guentheri* n. spec. K. Harz det.", "Holotypus". Nymphs with additional labels: "*Gryllomorpha guentheri* n. sp. K. Harz det.", "Paratypus".

Note. This subspecies is very similar to *G. m. miramae*, but distinguished by the narrower notch between hind lobes of male anal plate (Fig. 4, o), narrow membranous areas around V-shaped median epiphalllic sclerite, very narrow posterolateral process of ectoparameres, and hardly widened lateral parts of endoparameres (Figs 4, l, m).

Gryllomorpha (Gryllomorphella)

***albanica* Ebner, 1910**

(Figs 4, p-t)

Material studied. Albania: 1 female, "Shkodra

N., 16 Sept. 1909, Albanien, Klaptoez" (NHMW).

Greece: 1 male, "Hellas, Selassia, N. Sparta", 18 Sept. 1973, Kinzelbach (MHNG); 1 female, "Hellas, Taygetos, 8 km ENE Prof. Elias Gipfel, 1600 m", 28 Sept. 1973, Kinzelbach (ZISP).

Female from Albania with additional labels: "det. Ebner, *Gryllomorpha albanica*, Type", "Coll. Nat. Mus. Wien", "Holoty whole".

Note. This species is most similar to *G. miramae*, but its male anal plate is slightly shorter and with the distinctly shorter hind lobes and very wide notch between them (Fig. 4, s), male genital plate is somewhat narrower in profile (Fig. 4, t), epiphallus is partly membranous and with the wider hind epiphalllic processes having the less oblique (almost truncate) hind part in profile, ectoparameres are almost as in *G. m. miramae*, and endoparameres are similar to those of *G. m. guentheri*, but with the slightly wider median sclerotization connected their proximal parts with each other (Figs 4, p-r). Holotype is with the ovipositor partly missing, but in a female from Greece, ovipositor almost 1.1 times as long as hind femur (slightly longer than in *G. miramae*).

Gryllomorpha (Gryllomorphella)

***antalya* sp. n.**

(Fig. 1, i, j)

Holotype. Turkey: female, eastern coast of Antalya Bay, environs of vill. Okurcalar not far from town Alanya, mouth of river Alara, on plough-land, at night, 1-10 Oct. 1994, Gorochov (ZISP).

Description. Female (holotype). Shape of body and its parts (excepting ovipositor) similar to that of *G. miramae* and *G. albanica*: head semiglobular, moderately high, with rostrum between antennal cavities almost equal to scape in width, and with long and slender maxillary palpi; pronotum approximately equal to head in width, dis-

tinctly transverse; legs slender (excepting clearly thickened hind femora), but not long; hind tibiae with distal outer spine and dorsal outer spur distinctly shorter than nearest spine and spur; hind basitarsus hardly widened; anal plate with round hind part; genital plate with short, almost angular, and rather wide hind median notch, as well as with roundly truncate (in profile) hind lateral lobes. Ovipositor distinctly shorter than in both above-mentioned species (hind femur almost 1.5 times as long as ovipositor) and with apical part of dorsal valves not acute and slightly directed downwards (Fig. 1, j). Coloration similar to that of light specimens of *G. miramae*, but spots under eyes more distinct, clypeus with numerous very weakly darkened large dots (Fig. 1, i), and transverse bands on thoracic and abdominal tergites light brown and comparatively wide.

Male unknown.

Length (in mm). Body 11; pronotum 1.8; hind femur 6.8; hind tibia 5.7; hind basitarsus 2; ovipositor 4.6.

Comparison. The new species is most similar to *G. miramae* and *G. albanica*, but clearly distinguished from them and from all the other similar species by the much shorter ovipositor with the apical part of dorsal valves not acute and slightly directed downwards.

Gryllomorpha (Gryllomorphella)
***zonata zonata* Bolivar, 1914**
(Figs 5, a-c)

Material studied. Morocco: 4 males, 3 females, "Mogador [now town Essaouira], Mz. Escalera" (MNCN).

One of males with labels: "*Gryllomorpha zonata* Bol., tipo", "*Gryllomorpha zonata* Bol., det. E. Morales Agacino", "Sintipo"; it is here designated as lectotype of *G. zonata*. Other specimens from Mogador signed as syntypes are paralectotypes of this species.

Note. These crickets are more or less similar to *G. miramae* and *G. albanica* in the shape of body parts and transversally striped

coloration, but their body is slightly larger, coloration of upper half of head is with 2 brown transverse bands between eyes and on hind part of vertex (the band between eyes contacts with a spot above median ocellus and has hind median widening almost contacting with the band on hind part of vertex), hind basitarsus is moderately widened (almost as in Fig. 5, g), male anal and genital plates are similar to those pictured in Figs 5, h, i, epiphallus is with the median V-shaped sclerite divided into 2 narrow lateral stripes (Fig. 5, a), ectoparameres are wider in profile (Fig. 5, c), ectoparameral medioproximal parts are situated more obliquely and with the rounded proximal edge (Fig. 5, b), spermatophore sac is convoluted (Fig. 5, c), and ovipositor is slightly shorter than hind femur (hind femur is almost 1.1 times as long as ovipositor).

Gryllomorpha (Gryllomorphella)

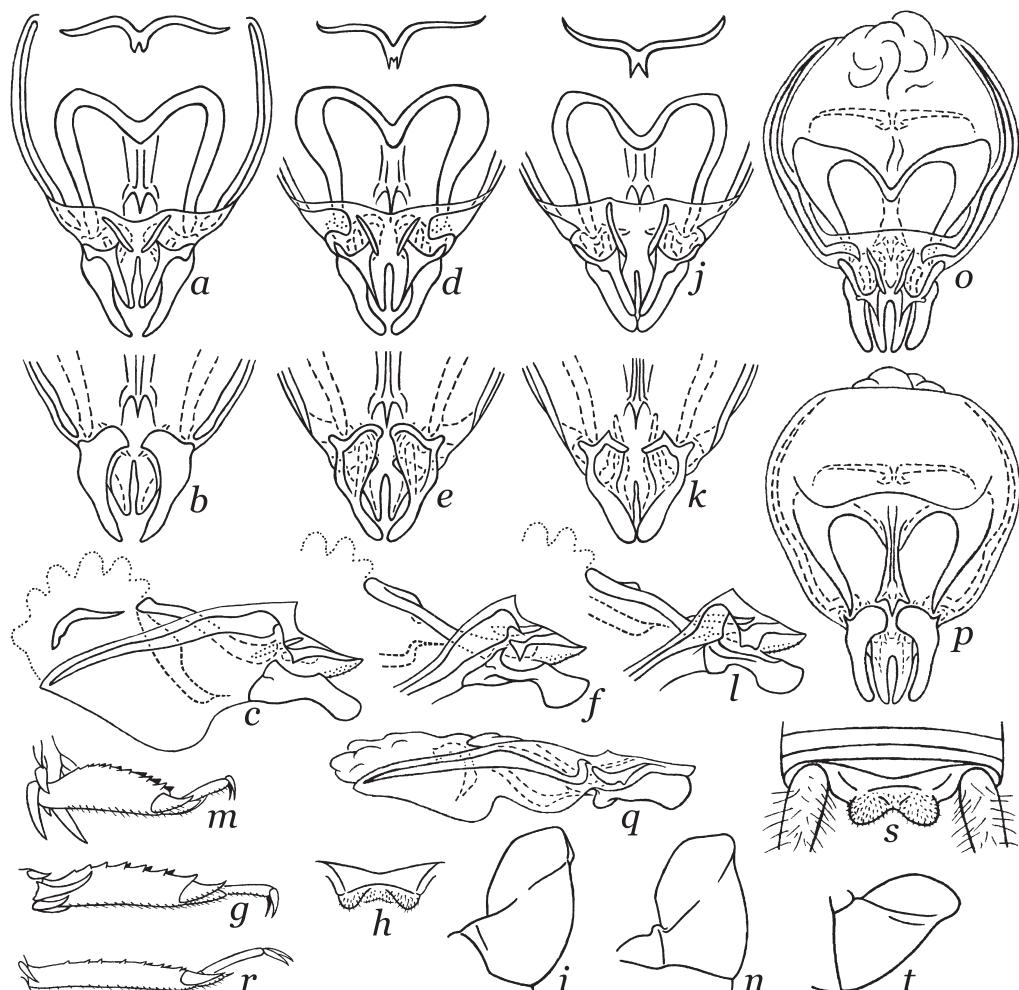
***zonata ifni* subsp. n.**

(Figs 5, d-i)

Holotype. **Morocco:** male, "Zoco Tlata Sboya; Ifni [environs of town Sidi Ifni]", 29 Oct. 1941, Morales (MNCN). **Paratypes.** **Morocco:** 1 female, "Uad Igruu Subu, Ifni", 3 Nov. 1941, Morales (MNCN); 1 female, "Sidi Ifni (Ifni)", I.1935, Escalera (ZISP).

Description. Male (holotype). Shape of body parts and coloration very similar to those of nominotypical subspecies, but head with wide yellowish transverse band between brown transverse bands situated between eyes and on hind part of vertex, epiphallus without hind lateral tubercles situated in *G. z. zonata* near hind medial processes (for comparison see Figs 5, a and d), ectoparameres partly membranous and with wider distal part in profile (Figs 5, e, f), and endoparameres with slightly wider lateroproximal part (Fig. 5, d).

Female. General appearance as in male, but coloration somewhat darker (almost as in *G. z. zonata*). Genital plate small, with distinct rounded notch at apex and short and round hind lateral lobes; ovipositor approximately 1.1 times as long as hind femur.



Figs 5, a-t. *Gryllomorpha (Gryllomorphella)*, male: **a-c**, *G. zonata zonata* (lectotype); **d-i**, *G. z. ifni* subsp. n. (holotype); **j-n**, *G. robusta* sp. n.; **o-t**, *G. ?canariensis*. Genitalia from above (o), from below (p), and from side (c, q); same, but without proximal parts (b, e, f, k, l), without only spermatophore sac (a), and without this sac and partly without rami (d, j) from above (a, d, j), from below (b, e, k), and from side (f, l); hind basitarsus from side (m, g, r); anal plate (h) and abdominal apex without genital plate (s) from above; genital plate from side (i, n, t). [o-q, s, ater Gorochov & Llorente, 2001]

Length (in mm). Body: male 11.7, female 11-12.5; pronotum: male 2.1, female 2.3-2.4; hind femur: male 8.6, female 9.3-9.5; hind tibia: male 6.2, female 6.6-6.8; hind basitarsus: male 2.2, female 2.4-2.5; ovipositor 10.2-10.4.

Comparison. The new subspecies differs from nominotypical one in the above-mentioned characters of male genitalia and distinctly longer ovipositor.

***Gryllomorpha (Gryllomorphella)
robusta* sp. n.**
(Figs 5, j-n)

Holotype. **Morocco:** male, "Sidi Ifni (Ifni)", Dec. 1934, Escalera (MNCN).

Description. Male (holotype). General appearance including coloration as in dark specimens of *G. zonata*, but there are some differences in structure of legs and abdomi-

nal apex: hind basitarsus distinctly shorter and strongly widened (Fig. 5, m), genital plate with hardly different shape of apical part in profile (Fig. 5, n), epiphallus with slightly less membranous hind medial processes (Fig. 5, j), ectoparameres partly membranous (as in *G. z. zonata*) and with distinctly shorter medioproximal parts having angular (not rounded) proximal edge (Figs 5, k, l), distal part of ectoparameres in profile intermediate between those of *G. z. zonata* and *G. z. ifni* (for comparison see Figs 5, c, f, and l), and endoparameres almost as in *G. z. zonata* (Fig. 5, j).

Female unknown.

Length (in mm). Body 12.3; pronotum 2; hind femur 8.7; hind tibia 5.9; hind basitarsus 1.8.

Comparison. The new species is most similar to *G. zonata*, but distinguished from it by the characters listed above. *G. robusta* is also similar to *G. macrocephala* in the shape of hind basitarsus, but head in *G. robusta* is smaller (not wider than pronotum), and coloration is distinctly more spotted.

Gryllomorpha (Gryllomorphella)
?*canariensis* Chopard, 1940
(Figs 5, o-t)

Material studied. Rather numerous females from Tenerife I. and 1 male from La Palma I., which were briefly studied by me, are listed in Gorochov & Llorente (2001). This material is deposited in MNCN.

Note. The male from La Palma I. is most similar to *G. zonata* and *G. robusta*, but it differs from them in the presence of distinct light median line between eyes, brown spot above median ocellus more distinctly separated from other brown bands, darker dorsal part of hind abdominal half, more membranous epiphallus with the longer lateroproximal lobes, ectoparameres almost as in *G. z. zonata* (but with the wider middle and distal parts in profile), and distinctly wider lateroproximal parts of endoparameres (Figs 5, o-q). The females from Tenerife I. (it is necessary to note that this species was

described from Tenerife I.; Chopard, 1939) are similar to male and to each other in general appearance, but their ovipositor is somewhat varied in length, and it is impossible to exclude that the specimens studied belong to more than one similar species of *Gryllomorphella*.

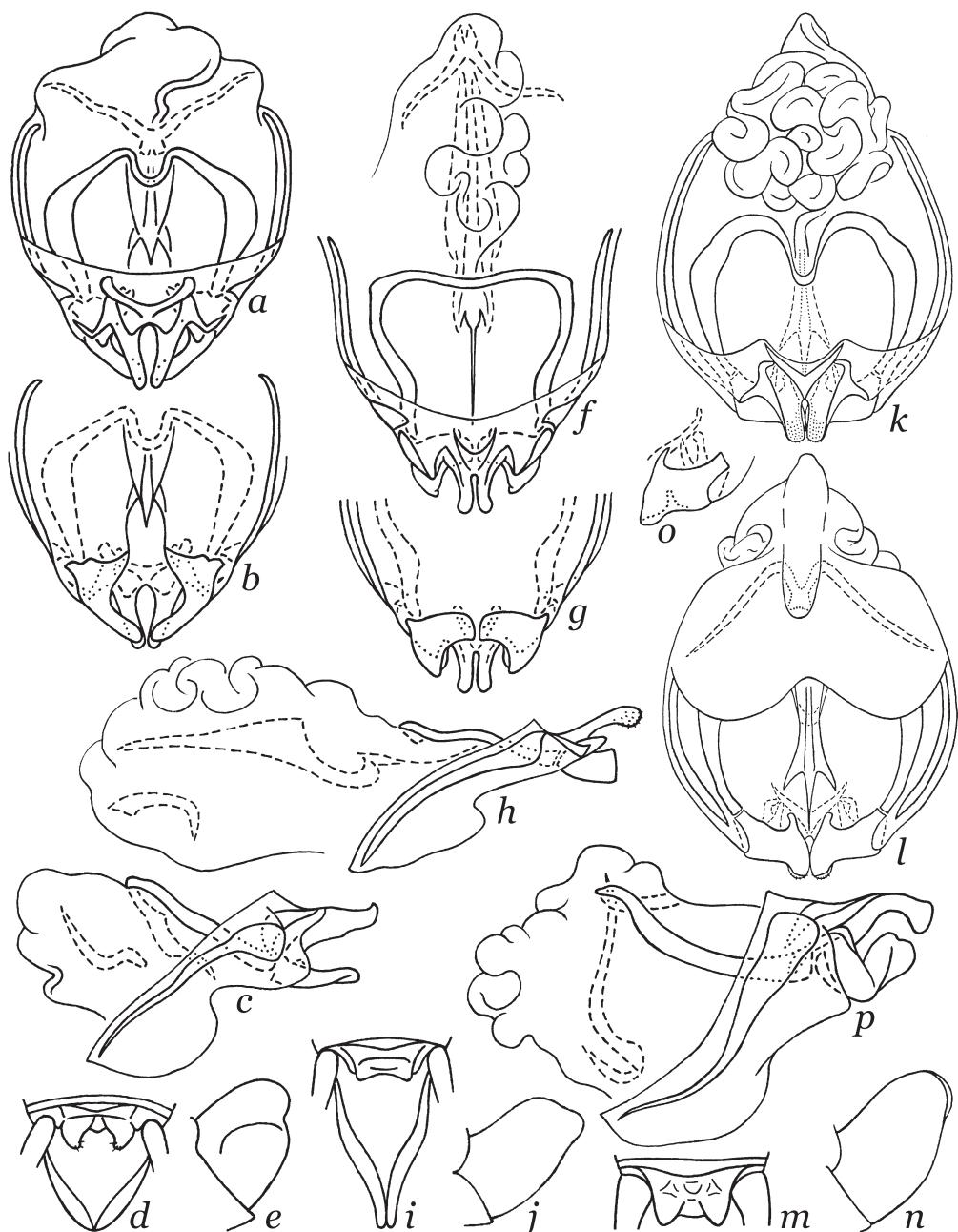
Gryllomorpha (Gryllomorphella) atlas
sp. n.
(Figs 6, a-e)

Holotype. **Morocco:** male, "Maroc., Mn-Atlas, Ifrane (1650)", 15-21 Sept. 1938, Rungs (MNCN). **Paratypes.** **Morocco:** 1 female, "Me-lilla, XI-1908, Arias" (MNCN); 1 male, 1 female, "Fashana [Gashana?], Melilla – Marruecos, Pardo Alcaide" (MNCN).

Description. Male (holotype). General appearance as in *G. miramae* and *G. albanica*, but coloration almost uniformly light: body yellowish with weakly distinct light brown small spot between ocelli, a pair of short transverse bands above lateral ocelli, transverse stripes on thoracic and abdominal tergites, and a few spots on hind femora. Abdominal apex distinguished from that of these species by following characters: anal plate very short (as in *G. albanica*) and with rather long hind lobes (almost as in *G. miramae*); genital plate clearly shorter and with angular notch in profile (Figs 6, d, e); epiphallus almost completely sclerotized and with wider and shorter V-shaped median sclerite (separated from other parts of epiphallus by rather large membranous areas) as well as with very narrow and angularly curved lateral lobes (Fig. 6, a); ectoparameres distinctly wider and somewhat less long; their proximal part smaller and with elongate angular medial lobe (Fig. 6, b); endoparameres slightly widened in middle part of their length (Fig. 6, a); spermatophore sac weakly convoluted (Figs 6, a, c).

Variation. Another male with angular apex of ectoparameres in profile.

Female. General appearance as in male, but transverse marks on head and on dorsal part of both thorax and abdomen slightly



Figs 6, a-p. *Gryllomorpha (Gryllomorphella)*, male: **a-e**, *G. atlas* sp. n. (holotype); **f-j**, *G. segregata* sp. n. (holotype); **k-p**, *G. mira*. (k-n, holotype; o, p, paratype). Genitalia from above (a, f, k), from below (l), and from side (c, h, p); same, but without proximal parts (b) and without proximal parts and guiding rod (g) from below; anal and genital plates from above (d, i); genital plate from side (e, j, n); abdominal apex without genital plate from above (m); ectoparamere from below (o). [k-n, after Gorochov, 1993]

more distinct (head with additional darkish spots on hind part of vertex). Hind femur approximately 1.05 times as long as ovipositor; apex of ovipositor normal.

Length (in mm). Body: male 9-10, female 10.5-12.5; pronotum: male 2-2.2, female 2-2.3; hind femur: male 7.9-8.2, female 8.1-8.4; hind tibiae: male 6.9-7.1, female 6.8-7.1; ovipositor 7.7-7.9.

Comparison. The new species differs from all the congeners by the long ectoparameres with rather small and angular proximal parts, wide and short V-shaped epiphallus sclerite which not divided into 2 isolated parts, weakly convoluted spermatophore sac, ovipositor hardly shorter than hind femur, and some peculiarities of coloration of head.

Gryllomorpha (Gryllomorphella?) segregata sp. n.

(Figs 6, f-j)

Holotype. Morocco: male, "Tanger, M. Escalera" (MNCN). *Paratypes.* 1 male, 1 female, same data (MNCN).

Description. Male (holotype). General appearance similar to that of *G. miramae* and *G. albanica*, but striped coloration less distinct: body yellowish with very light brown upper part of head (contacting with light brown area between ocelli), brownish spot under each eye and small mark along dorsal edge of each eye, weakly distinct transverse stripes on thoracic and abdominal tergites, and very weakly distinct spots on femora. Abdominal apex characteristic: anal plate moderately short and with almost truncate hind part having slight and rounded median notch; genital plate rather long, with narrow distal part (if to see from above) and rounded apical projection in profile (Figs 6, i, j); epiphallus partly membranous, with rather narrow median V-shaped sclerite and large and angular hind lateral lobes situated near hind medial processes (Fig. 6, f); ectoparameres short, characteristic in shape (their proximal part similar to that of *G. miramae* and *G. albanica*, but their distal part much shorter and widely truncate in

profile; Figs 6, g, h); endoparameres narrow and with almost straight sclerotized stripe connected their proximal parts with each other (Fig. 6, f); guiding rod with large (long) proximal part and long and narrow (virga-like) distal spine (Fig. 6, f, h); spermatophore sac long and distinctly convoluted.

Variation. Another male with hardly more distinct ornament and slightly angular hind notch of anal plate.

Female. General appearance similar to that of male, but coloration slightly darker (clypeus with slight brownish spot). Hind femur almost 1.15 times as long as ovipositor; apex of ovipositor normal.

Length (in mm). Body: male 9-10.5, female 9; pronotum: male 1.7-1.9, female 2; hind femur: male 6.5-7, female 7.6; hind tibia: male 5.3-5.6, female 6; ovipositor 6.6.

Comparison. The new species is strictly distinguished from all the other congeners with known male genitalia by the characteristic structure of epiphallus, ectoparameres, and guiding rod (see description). From the other similar congeners, it is differs in the shape of male anal and genital plates, length of ovipositor, and peculiarities of coloration named above.

Gryllomorpha (Gryllomorphella?) mira Gorochov, 1993

(Figs 6, k-p)

Material studied. Palestina: 2 males, 1 female, "Palästina, Wadi Ghuwev", 30 Dec. 1911, Brühl (MNHU, ZISP).

Male from MNHU with label "Holotype *Gryllomorpha (Gryllomorphella) mira* Gorochov, sp. n."; female from MNHU and male from ZISP are paratypes of this species.

Note. This species is sufficiently described by Gorochov (1993). It is similar to *G. uclensis* Pant., s. l. (Figs 7, a-r) and possibly *G. sternlichti* Chop. (Fig. 7, s) in the structure of male genitalia (Figs 6, k, l, o, p): epiphallus is semimembranous or partly membranous and with the moderately long

median V-shaped sclerite; ectoparameres are rather short and having 2 proximal lobes and 1 distal projection; endoparameres form almost M-shaped structure; guiding rod typical of *Gryllomorphella*; spermatophore sac convoluted (structure of ectoparameral base, guiding rod, and spermatophore sac in *G. sternlichti* is unknown). However *G. mira* is clearly differs from these species in the rounded proximal parts of endoparameres (Fig. 6, k) and ovipositor slightly longer than hind femur (in *G. sternlichti*, ovipositor is slightly shorter than hind femur, and in *G. uclensis*, these structures are almost equal in length), and from only *G. uclensis*, in the shorter hind lobes of male anal plate (Fig. 6, m), arched (in profile) hind epiphalllic processes (Fig. 6, p), longer virga of guiding rod (Fig. 6, l), and curved (in profile) ectoparameres (Fig. 6, p).

***Gryllomorpha (Gryllomorphella?) uclensis uclensis* Pantel, 1890**

(Figs 7, a-g)

Material studied. Rather numerous specimens of different sexes from Spain, which were briefly studied by me, are listed in Gorochov & Llorente (2001). This material is deposited in MNCN.

Note. This subspecies may be distributed also in France and Portugal (Chopard, 1943, 1951), but belonging of the specimens from North Africa and Italy (Chopard, 1943; Gorochov & Llorente, 2001) to *G. u. uclensis* is in need of checking. Its general appearance is somewhat diverse and more or less similar to *G. miramae*, *G. albanica*, *G. atlas*, and *G. segregata*. Differences of *G. u. uclensis* from these similar species consist in the characteristic shape of male anal and genital plates (Figs 7, d, e, g) as well as in the structure of male genitalia (Figs 7, a-c, f), and from the other possible subspecies of *G. uclensis*, in the characters listed below.

***Gryllomorpha (Gryllomorphella?) uclensis algeriana* Uvarov, 1941, stat. n.**

(Figs 7, h-m)

Gryllomorpha algeriana Uvarov, 1941 (Algeria).

Material studied. Algeria: 2 males, 1 female, "Bou-Saada", Sept. – Oct. 1937, Korsakoff (BMNH); 1 male (ZISP); 2 females, environs of city Constantine, forest, under stone, Nov. – Dec. 1971, Orlov (ZISP).

One of males from BMNH with labels: "Holotype", "*Gryllomorpha algeriana*, sp. n., Type, Det. B. Uvarov 1940"; its genitalia are missing. Other specimens from BMNH are paratypes of this subspecies.

Note. *G. u. algeriana* was originally described as a separate species (Uvarov, 1941), but it is very similar to the nominotypical subspecies. Differences of *G. u. algeriana* from *G. u. uclensis* consists in the slightly more distinct transversally striped coloration of majority of the specimens studied, almost truncate apex of male genital plate (Fig. 7, l), less distinct ventral lobes at the base of hind epiphalllic processes in profile (Fig. 7, j), and longer endoparameres with the more angular lateroproximal parts (Fig. 7, h).

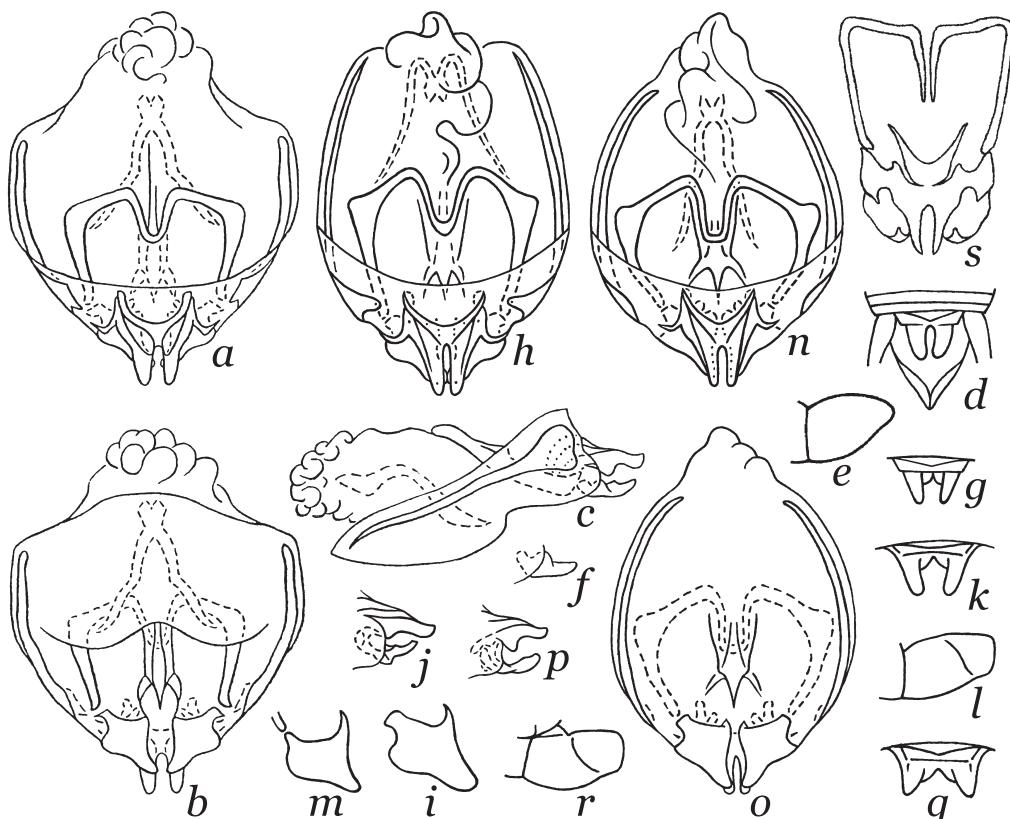
***Gryllomorpha (Gryllomorphella?) uclensis ?pygmaea* Menozzi, 1940**

(Figs 7, n-r)

Gryllomorpha pygmaea Menozzi, 1940 (Libya: Garian near Tripoli).

Material studied. Libya: 1 male, 1 female, city Tripoli (ZISP).

Note. General appearance of this subspecies similar to that of the both previous subspecies, but its coloration almost uniformly light: yellowish with the very weakly darkened stripes on thoracic and abdominal tergites, and in only male, with a light brownish transverse stripe between eyes. Anal plate is with the hind lobes slightly shorter than in the both previous subspecies (Fig. 7, q); genital plate is almost as in *G. u. algeriana* (Fig. 7, r); epiphallus in profile is with the well developed ventral lobes at the base of hind epiphalllic processes (Fig. 7, p); endoparameres are shorter than in *G. u. algeriana* (their length is as in *G. u. uclensis*) and with the proximal parts clearly wider than in *G. u. algeriana* and hardly wider than in *G. u. uclensis* (Fig. 7, n, o).



Figs 7, a-s. *Gryllomorpha (Gryllomorphella)*, male: a-e, *G. uclensis uclensis*, Barcelona; f, g, same, but Cordoba; h-m, *G. u. algeriana* (m, paratype); n-r, *G. u. ?pygmaea*; s, *G. sternlichti*. Genitalia from above (a, h, n), from below (b, o), and from side (c); same, but without proximal parts and guiding rod (s); abdominal apex from above (d); genital plate from side (e, l, r); ectoparamere from side (f) and from below (i, m); anal plate from above (g, k, q); distal part of genitalia from side (j, p). [a-c, f, after Gorochov & Llorente, 2001; s, after Chopard, 1963]

REFERENCES

- Andreeva, E.T. 1982. A contribution to the taxonomy of Gryllidae (Orthoptera) of Bulgaria. *Acta Zoologica Bulgarica*, **19**: 78-83.
- Baccetti, B. 1992. Notulae orthopterologicae. 50. Su alcuni ortotteroidei del Mediterraneo Orientale. *Fragmenta Entomologica*, **23**(3): 247-276.
- Bolívar, I. 1905. Nueva especie de "Gryllomorpha" de Marruecos. *Boletín de la Real Sociedad Española de Historia Natural*, **5**: 349-351.
- Bolívar, I. 1914. Dermápteros y Ortópteros de Marruecos. *Memorias de la Real Sociedad española de Historia natural*, **8**(5): 157-238.
- Chopard, L. 1939. Description d'un Gryllomorphe des îles Canaries (Orth. Gryllidae). *Annales de la Société Entomologique de France*, **108**: 172.
- Chopard, L. 1951. Orthoptérides. *Faune de France*, **56**: 1-359.
- Chopard, L. 1943. Orthoptérides de l'Afrique du Nord. *Faune de l'Empire Français*, **1**: 1-450.
- Chopard, L. 1963. Notes sur la faune des orthopteroïdes d'Israël et de quelques régions limitrophes (Blattodea, Gryllacridoidea, Grylloidea). *The Bulletin of the Research Council of Israel, Section B. Zoology*, **11**(4): 161-176.
- Chopard, L. 1967. Gryllides. *Orthopterorum Catalogus*, **10**: 1-211.
- Eades, D.C. & Otte, D. 2009. *Orthoptera Species File Online*. Orthopterists' Society. Available from: <http://osf2x.orthoptera.org> (15 March 2009).

- Fieber, F.X.** 1853. Synopsis der europäischen Orthopteren. *Lotos*, **3**(November): 232-238.
- Gorochov, A.V.** 1984a. Faunistic and systematic notes on Gryllidae (Orthoptera) of the Crimea. *Vestnik zoologii*, **1**: 12-20. (In Russian).
- Gorochov, A.V.** 1984b. Towards the fauna of crickets (Orthoptera, Gryllidae) of the Transcaucasus. *Vestnik Akademii Nauk Gruzinskoy SSR*, **114**(3): 621-624. (In Russian).
- Gorochov, A. V.** 1986. New and little known crickets (Orthoptera, Grylloidea) from Middle Asia and adjacent territories. *Trudy Zoologicheskogo Instituta AN SSSR [Proceedings of the Zoological Institute, USSR Academy of Sciences]*, **140**: 3-15. (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.
- Gorochov, A.V.** 1993. Grylloidea (Orthoptera) of Saudi Arabia and Adjacent Countries. *Fauna of Saudi Arabia*, **13**: 79-97.
- 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: Gryllophinae) and the partial revision of species included. *Far Eastern Entomologist*, **160**: 1-11.
- Gorochov, A.V. & Llorente, V.** 2001. Estudio taxonómico preliminar de los Grylloidea de España (Insecta, Orthoptera). *Graellsia*, **57**(2): 95-139.
- 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, 4th Edition*. London: International Trust for Zoological Nomenclature. 306 pp.
- Kevan, D.K.McE. & Hsiung, Ch.-Ch.** 1992. A summary of the orthopteroid insects known from Lanzarote, Canary Islands, with description of a new cricket species of the genus *Hymenoptila* Chopard, 1943 (Grylloptera; Grylloidea; Gryllidae). *Vieraea*, **21**: 77-100.
- Pantel, P.J.** 1890. Notes orthoptérologiques. I. Révision monographique du genre *Gryllo-morpha* Fieb. *Anales de la Sociedad Española de Historia Natural*, **19**: 335-370.
- Paris, M.** 1994. Catalogo de tipos de orthopterides (Insecta) de Ignacio Bolívar, I. *Eos* [1993], **69**: 1-271.
- Uvarov, B.P.** 1924. Some new and interesting Orthoptera in the collection of the Ministry of Agriculture, Cairo. *Ministry of Agriculture, Egypt. Technical and scientific service. Bulletin*, **41**: 1-41, pl. 1-3.
- Uvarov B.P.** 1941. New and less known southern palaearctic Orthoptera. *Transactions of the American Entomological Society*, **67**(4): 303-361, pl. 25-29.
- Otte, D.** 1994. *Orthoptera species file 1. Crickets (Grylloidea). A systematic catalog*. Academy of Natural Sciences, Philadelphia, 120 p.
- Saussure, H.** 1877. Gryllides. *Mémoires de la Société de Physique et d'Histoire naturelle de Genève*, **25**(1): 1-352, pl. 11-15.

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