

**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).**

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RESUMEN: Se resume la literatura sobre los insectos ortopteroides de las Islas Canarias y se relaciona separadamente las especies de grillos (Grylloidea) del archipiélago y de los ortopteroides de la isla de Lanzarote. Se describe una nueva especie del género *Hymenoptila* Chopard, conocido previamente sólo de Africa del Norte occidental. Se discute la posición sistemática y la validez taxonómica de este género y de ciertos otros géneros emparentados con *Gryllomorpha* Fieber. Palabras Clave: Grylloptera, Grylloidea, Gryllidae, *Hymenoptila*, Lanzarote, Islas Canarias.

ABSTRACT: The literature on the orthopteroid insects of the Canary Islands is summarized and the species of crickets (Grylloidea) known to occur there are listed. The orthopteroids known from the island of Lanzarote are also listed. A new species of the gryllid genus *Hymenoptila* Chopard, otherwise known only from western North Africa, is described. Apart from a preliminary published indication, the presence of the genus in the Canary Islands was previously unknown. Its systematic position and taxonomic validity and certain other genera related to *Gryllomorpha* Fieber are discussed.

Key Words: Grylloptera, Grylloidea, Gryllidae, *Hymenoptila*, Lanzarote, Canary Islands.

INTRODUCTION

The orthopteroid insects of the Canary Islands have been treated in many publications of varying length and scope, though a fair proportion of them do not refer to crickets (Grylloidea), with which this paper is concerned. They include those of BRULLÉ (1839[1838-40]), HEYDEN (1872), KRAUSS (1890a,b, 1892), BOLÍVAR (1893), REBEUR-PASCHWITZ (1895), BOLÍVAR (1899), HELLER (1907), BOLÍVAR (1908), BURR (1911),

KRAUSS in MAY (1912), ESCALERA (1922), UVAROV (1922), ENDERLEIN (1929, 1930), BOLÍVAR (1936), C. WILLEMSE (1936), MISHCHENKO (1937), CHOPARD (1937, 1938), BOLÍVAR (1940), CHOPARD (1940a, 1942, 1946), UVAROV (1948), C. WILLEMSE & BRUIJNING (1939), C. WILLEMSE (1949, 1950), CAÑIZO (1954, 1955), CHOPARD (1954), MORALES AGACINO (1959), GARDNER (1960), BRINDLE (1968), JOHNSEN (1970), OVERGÅRD NIELSEN (1970), GANGWERE *et al.*, (1972), HOLZAPFEL (1972), HOLZAPFEL & CANTRALL (1972), KRUSEMAN & JEEKEL (1972), GANGWERE (1973), JOHNSEN (1974), KALTENBACH (1979) and MARTIN & OROMÍ (1987). This list is not complete, as there are many (often only passing) references to Canary Island orthopteroids in publications not primarily concerned with orthopteroid insects - from the reference to locusts by NÚÑEZ DE LA PEÑA (1676) to the ecological studies of lava flows by ASHMOLE & ASHMOLE (1988) - or with the Atlantic islands - for example, those of BOLÍVAR (1914, 1915), UVAROV (1923), MISHCHENKO (1936), CHOPARD (1937, 1943) or KEVAN (1987). (The last contains only a footnote recording a tettigonoid, *Conocephalus (Anisoptera) maculatus* (Le Guillou, 1841) from Gran Canaria, the only published mention of the species from the Canary Islands.) Nearly all of the references cited above (except for the most recent) are listed in HERRERA's (1982) catalogue of the saltatorial orthopteroid insects of Spain, which includes those of the Canary Islands.

THE GRYLLODEA OF THE CANARY ISLANDS

The following is a list of the known Canary Islands crickets (Grylloidea):

GRYLLOTALPOIDEA

GRYLLOTALPIDAE

Gryllotalpinae

Gryllotalpa africana Palisot de Beauvois, 1820 [not 1805 as usually indicated; the relevant *livraison* of the author's work was not published until the date indicated]. - Gran Canaria (BOLÍVAR, 1893; BURR, 1911; C. WILLEMSE, 1936; CHOPARD, 1954; HERRERA, 1982); Tenerife (GANGWERE *et al.*, 1972); La Gomera (KRAUSS in MAY, 1912); JOHNSEN, 1974). KRAUSS (1892), BOLÍVAR (1915), CHOPARD (1943) and HARZ (1969) mention *G. africana* from the Canaries, but without specific reference to any island. TOWNSEND (1983) confirms that this species does actually occur on the Canary Islands, but he is not specific as to the island; even his distribution map is vague in this respect.

Gryllotalpa robusta Townsend, 1983. - ? Tenerife. TOWNSEND (1983) indicates that this species occurs on the Canary Islands, but he gives no locality in his text or on his distribution map (which omits the islands). As its name suggests, this is a somewhat larger species than *G. africana*, so that it is possible that some previous reports of the European mole-cricket, *Gryllotalpa gryllotalpa* (Linnaeus, 1758), from the Canary Islands could refer to *G. robusta* - even the very old one of BRULLÉ (1839) under the synonym *G. vulgaris* Latreille, 1804, noted by KRAUSS (1892), BOLÍVAR (1893), BURR (1911), BOLÍVAR (1915), C. WILLEMSE (1936) and JOHNSEN (1974). CHOPARD (1954) lists *G. gryllotalpa* as questionable from Tenerife; HERRERA (1982) does not mention it for the Canary Islands.

MOGOPLISTOIDEA

MOGOPLISTIDAE

Arachnocephalinae

Pseudomogoplistes squamiger (Fischer, 1843). - No island (CHOPARD, 1937, 1943; C. WILLEMSE, 1949; HARZ, 1969; PAUL, 1987); Tenerife (CHOPARD, 1954; GANGWERE *et al.*, 1972; HERE 1982). Specimens have also been examined from the island of La Palma (collected by P. Oromí in 1986) and of El Hierro (collected by J.L. Martín at Cueva Don Justo, 15.V.1984 and 17.XI.1985, and by N.P. and M.J. Ashmole, 1986, in caves near the sea at Orchilla and Lomo Negro, 1986). The species was transferred to the present (then new) genus from *Mogoplistes* Audinet-Serville, 1839, by GOROKHOV (1984b), who also recognized the relevant subfamily as Tribe Arachnocephalini. PAUL (1987) makes some brief, recent observations for southern England, where the species is rare and very localized.

Cycloptiloides canariensis (Bolívar, 1914). - Tenerife (BOLÍVAR, 1914, 1915; CHOPARD, 1946 [island not noted]; C. WILLEMSE, 1950; CHOPARD, 1954, 1968 [island not noted in latter]; GANGWERE *et al.*, 1972; HERRERA, 1982).

GRYLLOIDEA

OECANTHIDAE

Oecanthinae

Oecanthus pellucens (Scopoli, 1763). - Tenerife (HEYDEN, 1872; KRAUSS, 1892; C. WILLEMSE, 1936; CHOPARD, 1942; C. WILLEMSE, 1949; CHOPARD, 1954; GANGWERE *et al.*, 1972; HERRERA, 1982); La Palma (CHOPARD, 1942; C. WILLEMSE, 1949; CHOPARD, 1954; HERRERA, 1982). BOLÍVAR (1893), BURR (1911) and BOLÍVAR (1915) mention the species from the Canaries, but without reference to islands.

TRIGONIDIIDAE

Trigonidiinae

Trigonidium cicindeloides (Rambur, 1839). - Tenerife (KRAUSS, 1892; C. WILLEMSE, 1936; CHOPARD, 1954; GANGWERE *et al.*, 1972; HERRERA, 1982); Gran Canaria (BURR, 1911). BOLÍVAR (1893, 1915) mentions the species from the Canaries, but without reference to any island.

Nemobiinae

? *Nemobius sylvestris* (Bosc d'Antic, 1792). - No island (HARZ, 1969; Herrera, 1982). We may perhaps have overlooked some other reference to this species for the Canary Islands. NADIG & STEINMANN (1969), whose paper is listed by Herrera (1982) in respect of the distribution of the species, include the "atlantisch Inseln," but no specific group. The species is actually known from the Azores (references in CHOPARD, 1967).

GRYLLIDAE

Gryllomorphae

Gryllomorpha canariensis Chopard, 1940. - Tenerife (CHOPARD, 1940a; C. WILLEMSE, 1949; CHOPARD, 1954, 1967 [no island given in latter]; GANGWERE *et al.*, 1972; HERRERA, 1982; ASHMOLE & ASHMOLE, 1988). This is presumably the species noted from Tenerife as *Gryllomorpha* sp. by C. WILLEMSE (1936).

Gryllomorpha gracilipes Chopard, 1943. - Fuerteventura (CHOPARD, 1954, 1967; HERRERA, 1982). This is an interesting occurrence as the species is also Moroccan; Fuerteventura is, with its neighbour, Lanzarote, one of the nearest of the Canary Islands to Morocco.

Gryllomorpha longicauda (Rambur, 1839). - Tenerife (KRAUSS, 1892; C. WILLEMSE, 1936; CHOPARD, 1954; GANGWERE *et al.*, 1972; KRUSEMAN & JEEKEL, 1972; HERRERA, 1982); no island (BOLÍVAR, 1893; BURR, 1911; BOLÍVAR, 1915 [queried]). The species is also known from the islands of La Palma (collected by P Oromí, 1984) and El Hierro (Hiramas, inland caves, collected by N.P. and M.J. Ashmole, 1986).

Hymenoptila sp(p). New species described herein. - Lanzarote (ASHMOLE & ASHMOLE, 1988). MARTIN & OROMÍ 1990.

Gryllinae

Acheta domesticus (Linnaeus, 1758). - No island (KRAUSS, 1892 [unconfirmed]; BOLÍVAR, 1893, 1915); Gran Canaria (C. WILLEMSE, 1936; CHOPARD, 1954; HERRERA, 1982). There may be some doubt as to the occurrence of the true House cricket in the Canary Islands.

Acheta hispanicus Rambur, 1839. - Tenerife (KRAUSS, 1892; Kirby, 1906; C. WILLEMSE, 1936; CHOPARD, 1954; GANGWERE *et al.*, 1972); Gran Canaria (BOLÍVAR, 1893; C. WILLEMSE, 1936; CHOPARD, 1954); La Gomera (KRAUSS in MAY, 1912); El Hierro (CHOPARD, 1954). BURR (1911), BOLÍVAR (1915), CHOPARD (1967) and HERRERA (1982) mention the species from the Canaries, but without reference to a specific island. Herrera also indicates that BOLÍVAR's (1893) *Gryllus hispanicus* refers to *Modicogryllus guanchicus* (below), but this is also listed by that author (as *Gryllus*); there seems to be a *lapsus calami* on Herrera's part.

Acheta meridionalis (Uvarov, 1921) [Syn.: *Gryllulus canariensis* Chopard, 1938]. - Tenerife (CHOPARD, 1938, 1943 [no island in latter]; MORALES AGACINO, 1945; C. WILLEMSE, 1949; CHOPARD, 1954, 1967 [no island in latter]; GANGWERE *et al.*, 1972; GANGWERE, 1973; JOHNSEN, 1974); La Gomera (JOHNSEN, 1974). HERRERA (1982) lists this species from the Canaries, but without reference to an island.

Gryllodes supplicans (Walker, 1859) f. *sigillatus* (Walker, 1869). [The normal brachypterous-micropterous form was previously given specific status, and still is so by some authors.] - Tenerife (GANGWERE *et al.*, 1972). This species was omitted for the Canary Islands by HERRERA (1982).

Gryllus bimaculatus DeGeer, 1773 [Syn.: *G. capensis* (Fabricius, 1775)]. - No island (BRULLÉ, 1839, as *G. capensis*; BOLÍVAR, 1915; HERRERA, 1982); Tenerife (HEYDEN, 1872; BORMANS, 1883; KRAUSS, 1892; BOLÍVAR, 1893; BURR, 1911; C. WILLEMSE, 1936; CHOPARD, 1942; C. WILLEMSE, 1949; C. WILLEMSE & BRUIJNING, 1949; CHOPARD, 1954; GARDNER, 1960; GANGWERE *et al.*, 1972; KRUSEMAN & JEEKEL, 1972; JOHNSEN, 1974); El Hierro (KRAUSS, 1892; C. WILLEMSE, 1936; CHOPARD, 1954); Gran Canaria (BOLÍVAR 1893; BURR, 1911; C. WILLEMSE, 1936; CHOPARD, 1942; C. WILLEMSE, 1949; CHOPARD, 1954; GARDNER, 1960); La Gomera (BOLÍVAR, 1893; KRAUSS in MAY, 1912; WILLEMSE, 1936; CHOPARD, 1954; JOHNSEN, 1974); Tafira (BOLÍVAR, 1893); La Palma (CHOPARD, 1942; C. WILLEMSE, 1949; CHOPARD, 1954). BOLÍVAR (1915) also gives *Gryllus* [as *Acheta*] *campestris* Linnaeus, 1758, for the Canary Islands, but this is erroneous.

Modicogryllus guanchicus (Krauss, 1892). [The generic status of this species may have to be checked in the light of recent research on the genus]. - Tenerife (KRAUSS, 1892; KIRBY, 1906; C. WILLEMSE, 1936; CHOPARD, 1954; GANGWERE *et al.*, 1972; HERRERA, 1982); Gran Canaria (BOLÍVAR, 1893; C. WILLEMSE, 1936; CHOPARD, 1954;

HERRERA, 1982); La Gomera (KRAUSS in MAY, 1912; JOHNSEN, 1974). BURR (1911), BOLÍVAR (1915) and CHOPARD (1967) give the species from the Canary Islands only.

Modicogryllus palmetorum (Krauss, 1902). [The generic status of this species, like the above, may need to be checked]. - Tenerife (GANGWERE *et al.*, 1972). This species is not listed for the Canary Islands by HERRERA (1982).

Platygryllus brunneri (Saussure, 1877). [The name of this species is sometimes attributed to SÉLYS-LONGCHAMPS (1867), but his "*Gryllus Brunneri*" (pp. 24, 27) is a *nomen nudum*. The species was not described under the name until ten years later, when SAUSSURE (1877) described "*Gr. Brunneri*, de Sélys" from a number of widely scattered localities, including Tenerife. SAUSSURE (1877) also indicated "*Gr. contaminatus*! Gerstäck." to be a synonym. GERSTAECKER (1869) had briefly described "*Gryllus contaminatus*" from a single immature female from Endara in East Africa and had given a slightly more detailed description later (GERSTAECKER, 1873) under "*Gryllus contaminatus*, n. sp.". If the two names are indeed synonyms, *brunneri* Saussure, 1877, should fall in favour of the senior *contaminatus* Gerstaecker, 1869! To avoid confusion, however, it is best to regard the latter as a *nomen dubium*, since it is based only on an unique female nymph, the identity of which must remain uncertain. CHOPARD (1967), in his catalogue of Gryllidae, makes no reference to *contaminatus*, nor to the *nomen nudum* of Sélys-Longchamps!]. - Tenerife (SAUSSURE, 1877; KRAUSS, 1892; C. WILLEMSE, 1936; CHOPARD, 1954; GANGWERE *et al.*, 1972); Gran Canaria (CHOPARD 1954); La Gomera (KRAUSS in MAY, 1912; JOHNSEN, 1974). BOLÍVAR (1893), BURR (1911), BOLÍVAR (1915), CHOPARD (1967) and HERRERA (1982) refer to the species from the Canaries, but from no specific island.

Tartarogryllus bordigalensis (Latreille, 1804). [The specific name of this species was originally spelt as given; the spelling *burdigalensis*, almost invariably used in the past, is invalid; for comment, see KEVAN (1990)]. - Tenerife (GANGWERE *et al.*, 1972; JOHNSEN, 1974). CHOPARD (1967) and HERRERA (1982) mention the species as occurring in the Canaries, but give no specific island. JOHNSEN (1974) claimed that his was the first record for the Canary Islands, but it was not the first to be published.

THE ORTHOPTEROID INSECTS OF LANZAROTE

From the above, it will be seen that, in the Gryllodea, only a single, undescribed species has been recorded from Lanzarote, which is faunistically one of the least well known of the Canary Islands. The number of known Lanzarote species of orthopteroid insects is small. They may be listed as follows:

DICTYOPTERA

BLATTODEA

BLATTOIDEA

BLATTIDAE

Periplaneta americana (Linnaeus, 1758). - BORMANS (1883), KRAUSS (1892), C. WILLEMSE (1936), CHOPARD (1954).

BLABEROIDEA

NAUPHOETIDAE

Rhyarobia maderae (Fabricius, 1781). - BORMANS (1883), KRAUSS (1892), C. WILLEMSE (1936), CHOPARD (1954).

ECTOBLIOIDEA

BLATTELLIDAE

Lobolampra lindbergi Chopard, 1954. - CHOPARD (1954).

MANTODEA

MANTOIDEA

EMPUSIDAE

Hysicorypha gracilis (Burmeister, 1838). - KRUSEMAN & JEEKEL (1972).

Blepharopsis mendica (Fabricius, 1775) - KRAUSS (1892), C. WILLEMSE (1936), CHOPARD (1954), KALTENBACH (1979).

DERMAPTERA

FORFICULOIDEA

SPONGIPHOROIDEA

ANISOLABIDIDAE

Euborellia annulipes (Lucas, 1847). - BORMANS (1883), KRAUSS (1892), C. WILLEMSE (1936), CHOPARD (1954).

FORFICULOIDEA

LABIDURIDAE

Labidura riparia (Pallas, 1773). - BOLÍVAR (1893), C. WILLEMSE (1936), CHOPARD (1954), BRINDLE (1968).

FORFICULIDAE

Forficula auricularia Linnaeus, 1758. - BOLÍVAR (1893), C. WILLEMSE (1936), BRINDLE (1968).

GRYLLOPTERA

TETTIGONIOIDEA

Nil. - One or more species to be anticipated.

GRYLLODEA

GRYLLOIDEA

GRYLLIDAE

Hymenoptila sp(p). - ASHMOLE & ASHMOLE (1988). To be described herein.

ORTHOPTERA, s. str.

TETRIGODEA

Nil. - One species to be anticipated.

ACRIDODEA

ACRIDOIDEA

ACRIDIDAE

Schistocerca gregaria gregaria (Forskål, 1775). [Syn.: *Acridium peregrinum* (Olivier, 1804)]. - BORMANS (1883), KRAUSS (1892), C. WILLEMSE (1936), CAÑIZO (1954, 1955), JOHNSEN (1974). Specimens would be from immigrant populations only, though the Desert locust has been known to breed briefly on one or two of the Canary Islands (CAÑIZO, 1955).

Calliptamus plebeius (Walker, 1870). [Misplaced, misidentified or mis-spelt in the literature!]. - KRAUSS (1892 - as *Caloptenus italicus* (Linnaeus, 1758) with var. *marginellus*

(Audinet-Serville, 1838)), C. WILLEMSE (1936 - as *Calliptamus italicus* var. *marginellus*), KRUSEMAN & JEEKEL (1972 - as *C. plebejus*). JAGO (1963), in revising *Calliptamus* Audinet-Serville, 1838, did not indicate that "*Heteracris plebeia*" Walker, 1870, was described as being from the "Sandwich Isles" (i.e., the Hawai'ian Islands) instead of the Canaries! There is no evidence that *C. italicus* occurs in the Canary Islands. In discussing *C. barbarus barbarus*, Costa (1863), also noted (on hearsay) by C. WILLEMSE (1936) for the Canaries, he says: "so far as is known *C. plebeius* (Walker, 1870) is the only species found on these islands..."; and elsewhere: "... misidentified as *Caloptenus italicus* by HEYDEN (1872)" [from Tenerife]. JAGO (1963) does not list Lanzarote for *C. plebeius* - only Gran Canaria, El Hierro, Tenerife "and probably other islands".

Arminda lancerottensis Holzapfel, 1972. - HOLZAPFEL (1972), JOHNSEN (1974).

Sphingonotus canariensis canariensis Saussure (1884). - KRAUSS (1892), C. WILLEMSE (1936), CHOPARD (1954), HERRERA (1982). A recent record is 1, Lanzarote, Isote de Halcones, old lava rocks, 25.III.1985, [N.] P. Ashmole. Curiously enough, the holotype of this species, originally described as *Sphingonotus savignyi* "*stirps*" *canariensis*, is not from the Canary Islands, but from the Cape Verde Islands - see also MISHCHENKO (1936), who mentions the Canary Islands only in general terms.

? *Sphingonotus caeruleus* (Linnaeus, 1767). [The specific name is usually mis-spelt *coeruleus*. There is possibly misidentification of the previous species or of *S. willemsei* Mischenko, 1937(b), not otherwise recorded from Lanzarote]. - KRAUSS (1892), C. WILLEMSE (1936), JOHNSEN (1974). BORMANS (1883) records *S. callosus* (Fieber, 1853) - i.e., *S. azureus* (Rambur, 1838) - from Lanzarote, presumably referring to the same species as referred to in the foregoing references. HEYDEN's (1872) "*Oedipoda caeruleus*," from Tenerife, appears to be *S. willemsei* (see C. WILLEMSE, 1949). MISHCHENKO (1937a) does not recognize *S. caeruleus* as a Canary Islands species, though JOHNSTON (1956) retains it as such in his catalogue.

Sphingonotus rubescens rubescens (Walker, 1870). - CHOPARD (1954), KRUSEMAN & JEEKEL (1972), HERRERA (1982).

Wernerella aspera (Brullé, 1839). - KRAUSS (1892), HERRERA (1982). C. WILLEMSE (1936) gives "*Sphingonotus asper* Brullé" [as of 1838], but BRULLÉ (1839) did not mention any particular Canary island, let alone Lanzarote.

Wernerella pachecoi (Bolívar, 1908). - BOLÍVAR (1908, 1914), C. WILLEMSE (1936), JOHNSTON (1956), HERRERA (1982). CHOPARD (1954), in his table of species, indicates only Fuerteventura for the species, but this is presumably a misprint.

Wernerella picteti (Krauss, 1892). - KRUSEMAN & JEEKEL (1972).

Acrotylus insubricus insubricus (Scopoli, 1786) [no subspecies in references]. - CHOPARD (1954), KRUSEMAN & JEEKEL (1972). HERRERA (1982) omits Lanzarote.

Acrotylus longipes (Charpentier, 1845). - BORMANS (1883), KRAUSS (1892), C. WILLEMSE (1936), CHOPARD (1954), HERRERA (1982).

Acrotylus patruelis (Herrich-Schaeffer, 1838). - CHOPARD (1954), HERRERA (1982).

Aiolopus thalassinus thalassinus (Fabricius, 1781) [no subspecies in references]. - CHOPARD (1954), HERRERA (1982).

Omocestus simonyi (Krauss, 1892). [Some authors place *Omocestus* Bolívar, 1878, as a subgenus of *Stenobothrus* Fischer, 1853]. KRAUSS (1892), BOLÍVAR (1893) [Lanzarote

not mentioned, but could be no other locality], C. WILLEMSE (1936), CHOPARD (1954), JOHNSTON (1956), KRUSEMAN & JEEKEL (1972), HERRERA (1982). BOLÍVAR (1893) suggests that "*Stenobothrus Simonyi* Krauss" is the "*Acridium biguttatum*" of BRULLÉ [1839].

THE SUBFAMILY GRYLLOMORPHINAE

Before describing the new species of *Hymenoptila*, the discovery of which stimulated the present paper, it would be appropriate to make a few observations regarding the subfamily of Gryllidae to which it belongs.

The subfamily Gryllomorphae was first established as "Légion des Gryllomorphites" by SAUSSURE (1877: 65, 268), KARNY (1915: 71) being, so far as we are aware, the first author to use the present subfamily spelling and status, although the two genera which he mentioned are now excluded. Saussure's "Gryllomorphites" included three genera: *Gryllomorpha* Fieber, 1853 (which he altered to *Gryllomorphus*), with two species; *Landreva* Walker, 1869 (which he changed to *Landrevus*, though not on the first occasion that he used it), with seven species; and his monotypic *Odontogryllus* Saussure, 1877.

In the following year, SAUSSURE (1878: 451) briefly discussed the position of *Landreva* (as *Landrevus*). He suggested its exclusion (along with related genera, meaning *Odontogryllus*) from his "Gryllomorphites," and proposed for these the name "Landrevites". He does not, however, appear to have used that name again. More formal recognition of the group, did not come until more than a century later, when GOROKHOV (1982) recognized the gryllid subfamily Landrevinae, which he equated with SAUSSURE's "Landrevites". The subfamily name therefore dates, according to the *International Code of Zoological Nomenclature*, from Saussure, 1878. Almost simultaneously with Gorokhov, OTTE & ALEXANDER (1983) recognized the Landrevini as a tribe of Gryllinae, but without reference to Saussure's name. Meantime, various authors, notably CHOPARD (1967), had included *Landreva* and numerous related genera, together with *Gryllomorpha* and its relatives, in a single tribe, Gryllomorphini, virtually after the manner of SAUSSURE (1877). Currently, most of the genera listed for the tribe by CHOPARD (1967) are no longer included, as will be seen by reference to GOROKHOV (1982), OTTE & ALEXANDER (1983) and OTTE (1988).

The second of the above publications left in the "Gryllo-morphinae" several genera, such as *Gryllapterus* Bolívar, 1912, which were moved to the Landrevinae (or Landrevini) in the others. It also placed two Australian genera, *Eurygryllodes* Chopard, 1951, and *Malua* Otte and Alexander, 1983, neither of which were mentioned by OTTE (1988), in the same group. The authors were, however, skeptical about the relationships of the three genera mentioned above. *Gryllapterus* certainly seems to belong to the Landrevinae. We are uncertain about the other two, but do not believe that they really belong in the Gryllomorphae, *sensu stricto*, and do not so regard them here. It may also be noted that OTTE (1988) combined the Landrevinae (as tribe Landrevini) with the monogeneric tribe Pteroplistini to form a single subfamily, which he called Pteroplistinae. This name dates from CHOPARD (1936: 378, 379) - though OTTE did not indicate this - and is thus technically junior to Landrevinae (of SAUSSURE, 1878), which should take precedence for a family-group name combining both relevant taxa. Further, DESUTTER (1987) re-established full family

status for the "Pteroplistidae," following (without saying so) CHOPARD (1949), who misleadingly indicated that this name was then new, though only the taxonomic status was so. DESUTTER did not put forward any view on the position of the Landrevinae (her concern was almost exclusively Neotropical), but, if OTTE's (1988) treatment be correct (which we are in no position to dispute), her Pteroplistidae (OTTE's Pteroplistinae) should be called Landrevidae (OTTE's Pteroplistinae)!

The Gryllomorphae as here understood, are now restricted to a few genera confined to the Mediterranean region, in the wide sense (including North Africa, the Canary Islands, the Black Sea area and the Near East), extending to Transcaucasia and Uzbekistan (ÉRGASHEV, 1966; GOROKHOV, 1986). The following genera are currently included:

Gryllomorpha Fieber, 1853 - type-species: *Acheta dalmatina* Ocskay, 1832 [with subgenus *Gryllomorphella*, recently erected by GOROKHOV (1884a) - type-species: *Gryllomorpha miramae* Medvedev, 1933].

Petaloptila Pantel, 1890 - type-species: *Gryllomorpha* (*sic*) *alienus* Brunner von Wattenwyl, 1882.

Discoptila Pantel, 1890 - type-species: *Gryllomorpha fragosoi* Bolívar, 1885 [with which GOROKHOV (1984a) has recently synonymized *D. brevis* Be - Bienko, 1964].

Hymenoptila Chopard, 1943 - type-species *Petaloptila rotundi-pennis* Chopard, 1939 [other included species, *P. panteli* Bolívar, 1914].

Acroneuroptila Baccetti, 1960 - type-species: *A. sardoa* Baccetti, 1960.

Glandulosa Harz, 1979 - type species: *Gryllomorpha willemsei* Uvarov, 1934.

Of these, GOROKHOV (1984a) placed all but *Gryllomorpha* in a tribe Petaloptilini (based on Petaloptilae of Baccetti, 1959, and misprinted "Pelaloptelini" in OTTE, 1988) separated from the Gryllomorphini, not so much on the grounds that *Gryllomorpha* alone is apterous (or virtually so) in both sexes, but largely on the basis of the form of the male genitalia; the females were not considered, as such, and only *Discoptila*, besides *Gryllomorpha*, was studied. As tegminal vestiges are lacking in the females of *Hymenoptila*, but are present as minute, lateral, scale-like structures in *Gryllomorpha wettsteini* (Weber, 1934) - see figure in HARZ (1969), repeated by F. WILLEMSE (1985) - there would seem to be no justification for recognizing two tribes on the basis of the presence or absence of vestigial wings.

Various taxonomic keys, etc., have been published that purport to separate the genera of Gryllomorphae, *sensu stricto*, or, earlier, to distinguish the species now called *Hymenoptila panteli* (Bolívar, 1914) from others. Nevertheless, though most of them may be satisfactory for males, so far as they go (they may be relevant only to particular geographic areas), they do not distinguish between females of *Gryllomorpha* and *Hymenoptila*, nor do they operate fully when only one sex is known, as in the case of the anomalous *G. wettsteini* (Werner, 1934) or *Acroneuroptila sardoa* Baccetti, 1960. Such keys will be found in PANTEL (1890), BURR (1909), CAPRA (1937), CHOPARD (1943), BACCETTI (1960), BE - BIENKO (1964), HARZ (1969, 1976, 1979), BACCETTI (1979), GOROKHOV (1984a) and F. WILLEMSE (1985). BURR was not satisfied that the genera to which he referred - raised from their original subgeneric status of PANTEL (1890) - were distinct, and WILLEMSE indicated the unreliability of his key on account of the poor state of knowledge of various species.

Hymenoptila CHOPARD, 1943

Petaloptila Pantel, 1890 (part); BOLÍVAR, 1914: 217; CAPRA, 1937: 289, 295; CHOPARD, 1939: 112, 113; CAPRA, 1940: 45, 48.

Hymenoptila CHOPARD, 1943: 172, 173, 217; MORALES AGACINO, 1947: 257; BACCETTI, 1960: 5, 6, 11, 12; CHOPARD, 1967: 150; HARZ, 1976: 56; BACCETTI, 1979: 5, 14, 15; OTTE & ALEXANDER, 1983: 72; GOROKHOV, 1984a: 15, 17; OTTE, 1988: 282; ASHMOLE & ASHMOLE, 1988: 82, 86, 88.

Type-species (by original designation, CHOPARD, 1943: 217): *Petaloptila rotundipennis* Chopard, 1939 = *Hymenoptila rotundipennis* (Chopard, 1939).

The genus was erected by CHOPARD (1943) to accommodate two Moroccan species previously assigned to *Petaloptila* Pantel, 1890, originally described as a subgenus of *Gryllomorpha* Fieber, 1853. The latter became the type-genus of the subfamily Gryllomorphae, though CHOPARD (1943) did not recognize the subfamily when he erected *Hymenoptila*. The two included species were *Petaloptila panteli* Bolívar, 1914, and *P. rotundipennis* Chopard, 1939, the latter being designated as type species - which MORALES AGACINO (1947) did not consider appropriate, though there was nothing he could do about it! *Hymenoptila* was said to differ from *Petaloptila* in that the tegminal vestiges of the male are less thickened and with more distinct venation, and that there is a lack of "differentiation" at the base of the abdomen. In his key to genera (which did not include *Petaloptila*, since that genus is not North African), *Hymenoptila* is distinguished from *Gryllomorpha* by having wings (meaning tegmina) in the males (as with *Discoptila* Pantel, 1890); no means of distinguishing the females was given. From *Discoptila*, *Hymenoptila* was distinguished by having flat, elongate tegmina [vestiges only], not convex, rounded ones, and four [but see comment later], instead of three, terminal spurs on the middle tibiae. In the text, it is also noted that females of *Discoptila* possess very small tegmina [vestiges], whereas those of *Hymenoptila* are [entirely] apterous.

It is apparent that the whole subfamily needs revision and that the genera should be redefined, but this cannot be attempted here. All that may be said for the present is that, although *Petaloptila* can be distinguished by the presence and form of the tegmina in **both** sexes (those of the males being broader, more heavily sclerotized and meeting or overlapping dorsally), the characters that have been used to differentiate *Hymenoptila* from *Gryllomorpha* are unsatisfactory when only females are available. *Acroneuroptila* has distinctive tegminal vestiges in the male (see BACCETTI, 1960) and, though the female is unknown (at least to us), it, too, has three, not four, terminal spurs on the middle tibiae.

As regards the number of mid-tibial terminal spurs in *Hymenoptila*, it may be noted that BOLÍVAR (1914), in describing *H. panteli* (as *Petaloptila*), wrote "*calcaribus tantum duabus*" (i.e., with only two spurs), so that CAPRA (1937) also noted two mid-tibial spurs for the species. On the other hand, CHOPARD (1939) indicated four mid-tibial spurs for *Petaloptila* (now *H.*) *rotundipennis*, but that the two outer ones were shorter than the inner ones. When he erected *Hymenoptila*, however, CHOPARD (1943) gave four spurs as a **generic** character, again mentioning them in his redescription of *H. rotundipennis*, but failing to refer to them for *H. panteli*! In fact, the short, outer mid-tibial spurs of that species are difficult to see, and BOLÍVAR (1914) may have missed them. They are present on all the

Hymenoptila specimens, including presumed *H. panteli*, that we have seen, though very small in the latter. Unfortunately the holotype of *Hymenoptila* (formerly *Petaloptila*) *panteli* (together with some other specimens assigned to that species that were in the Instituto Español de Entomología, Madrid) was destroyed by fire in 1969 when on loan to another institution (Dra. V. LLORENTE, *in litt.*, 1985), so that it cannot be re-examined.

We are reticent to recognize *Hymenoptila* as distinct from *Gryllomorpha* on the basis of one sex only. The absence of tegminal vestiges in females makes it impossible to assign these to one genus or the other using characters that have been previously considered, and the presence of minute, lateral, scale-like, vestigial tegmina in females of *Gryllomorpha wettsteini* (Werner, 1934) - suggesting that the unknown males of that species may have appreciable tegminal vestiges - confuses the issue still further!

On comparing several species of *Gryllomorpha* with those of *Hymenoptila*, we would observe that the degree of inflation of the upper clypeus does not distinguish the two genera, as the rather exaggerated condition found in *G. dalmatina* (Ocskay, 1832) is not matched in other members of the genus, such as *G. longicauda* (Rambur, 1839), to cite a Canary Island species. Tentatively one could perhaps accept that the dorsum of the pronotum, particularly posteriorly, is a little more shiny in *Hymenoptila* than in *Gryllomorpha* (the character has been mentioned previously for other genera) and that the posterior metatarsus is relatively a little longer. In *Gryllomorpha* this last seems to be rather more strongly compressed and only about twice as long as the longest (inner, middle) terminal, hind-tibial spur, whereas, in *Hymenoptila*, the hind metatarsus in the specimens that we have examined is distinctly longer than twice the length of the spur. BOLÍVAR (1914), however, in his original description of *Petaloptila* (now *H.*) *panteli*, writes "*calcaribus internis medium metatarsi attingentibus*" (i.e., with the internal spur reaching the middle of the metatarsus), which, if correct, would negate this character as indicating a generic difference. As noted above, however, it is not now possible to verify the statement by reference to the holotype, but in the "*panteli*" that we have examined the metatarsi are longer, as indicated above.

Another point of comparison between *Hymenoptila* and *Gryllomorpha* that might be mentioned concerns the length of the ovipositor. CHOPARD (1939) stated that the female of his *Petaloptila* (now *H.*) *rotundipennis* was similar to that of *Gryllomorpha dalmatina* (Ocskay, 1832), but had a longer ovipositor, perhaps implying a generic difference. This would not be applicable, however, for *G. longicauda* (Rambur, 1839), as its name suggests, has a long ovipositor! [Incidentally, CHOPARD (1939) gave the length of the ovipositor as only 6 mm; this was a misprint, corrected (without comment) later (CHOPARD, 1943) to 16mm.]

The two previous species of *Hymenoptila* have already been indicated. With their literature citations, they are as follows:

***Hymenoptila rotundipennis* (CHOPARD, 1939)**

Gryllomorpha dalmatina [*nec* (Ocskay, 1832)]; CHOPARD, 1936a: 170

Petaloptila rotundipennis CHOPARD, 1939: 109 fig. 4-6, 111.

Hymenoptila [only]; CHOPARD, 1943: 173 fig. 271.

Hymenoptila rotundipennis; CHOPARD, 1943: 217, 218 incl. fig. 333; MORALES AGACINO, 1947: 257; 1956: 176; CHOPARD, 1967: 151.

Diagnosis. Larger species (body length *ca.* 16-17 mm; male tegminal vestiges longer, reaching at least to posterior margin of second abdominal tergum, widening and broadly rounded posteriorly, venation sparse but distinct; male subgenital plate compressed at apex and slightly excised, the lobes with posterior margins truncate; female subgenital plate fairly widely and deeply excised; valves of ovipositor with apices strongly punctured and with external longitudinal carina near the middle of the surface of the valve. Known from Morocco (Atlas).

Hymenoptila panteli (BOLÍVAR, 1914)

Petaloptila Panteli BOLÍVAR, 1914: 217; CHOPARD, 1936a: 170 (also ? as *Petaloptila* sp.); CAPRA, 1937: 295 (no generic name), 296; CHOPARD, 1939: 112; 1940b: 155; CAPRA, 1940: 48.

Hymenoptila Panteli; CHOPARD, 1943: 217, 218.

Hymenoptila panteli; MORALES AGACINO, 1947: 256; 1956: 176; CHOPARD, 1967: 151; ASHMOLE & ASHMOLE, 1988: 82.

Diagnosis. Medium-sized species (body length *ca.* 14-15.5 mm); tegminal vestiges only a little longer than pronotum, scarcely widened posteriorly, obtusely pointed apically, not reaching second abdominal tergum, pellucid, almost membranous, venation indistinct; male subgenital plate acute, not excised apically; female subgenital plate angularly excised; valves of ovipositor with apices weakly punctured, external longitudinal carina situated near upper margin of valve. Known from western Morocco and Ifni.

Hymenoptila lanzarotensis, n. sp.

(Figs 1- 7)

Hymenoptila sp. 1 and sp. 2; ASHMOLE & ASHMOLE, 1988: 80, 82; MARTIN & OROMI, 1990 :Indicated as belonging to a single species, p. 88.

Diagnosis. Small species (body length *ca.* 9.5-12 mm); male tegminal vestiges distinctly longer than pronotum, but barely, if at all, surpassing posterior margin of first abdominal tergum, moderately widened distad, apices obtusely rounded, almost membranous with venation reduced to indistinct reticulation; male subgenital plate triangular, not excised apically; female subgenital plate triangularly excised apically to form a pair of rounded lobes; subterminal part of ovipositor valves weakly punctate ventrally, external longitudinal carina situated about middle of exterior face. Known only from the northeastern Canary Islands.

Holotype:, Canary Is.: [N.] Lanzarote I., malpaís lava, 18 m, V.1984, [N.]P. & M.[J.] Ashmole, coll. no. 0804 (In GIET Collection, Departamento de Biología Animal-Zoología, Universidad de La Laguna, La Laguna, Tenerife, Islas Canarias - as "GIET" hereafter).

Size: small for genus. Head: approximately equal in width to pronotum; eyes not prominent; rostrum not wider than basal antennal segment; ocelli not very distinctly visible, arranged in an isosceles triangle; clypeus moderately inflated; maxillary palpi with articles 3 to 5 elongate, the 5th distinctly longer than the 3rd, the 4th between them in length, 5th

slightly curved downward, somewhat expanded and obliquely rounded-subtruncate apically. Pronotum: distinctly wider than long, slightly narrowing distad, disc moderately convex with an antero-median longitudinal furrow, a posterior triangular depression and very fine, covered with short pubescence, but rather shiny; anterior margin slightly biarcuate, posterior margin slightly concave, both strongly ciliate; lateral lobe longer than deep with anterior and ventral margins rather straight, the latter somewhat ascending distad, the angle between them rather rounded, posterior part of lobe depressed and with a somewhat raised, sinuous margin. Tegminal vestiges: lateral in position, reaching approximately to the posterior margin of first abdominal tergum, rather elongate, narrowed at base, anterior (lateral) margin rather straight, posterior (inner) margin somewhat convex, apices rounded, whole area rather membranous, venation reduced to indistinct reticulation. Legs: middle tibia with 4 apical spurs; posterior metatarsus slightly compressed, rather elongate, distinctly more than twice as long as longest (interior median) apical spur of hind tibia. Abdomen: cerci about as long as abdomen with long, fine setae; abdominal terminalia and genitalia of characteristic form, as illustrated (Figs. 5, 6). Coloration: general colour brown with paler appendages; occiput brown; rostrum darker with a paler median patch; eyes blackish; cheeks paler; clypeus, antennae and palpi testaceous; pronotal disc brown with a pair of paler, laterally-directed, elongately triangular patches, posterior margin pale, lateral lobes brown above, pale below; tegminal vestiges brown, anterior (lateral) margins narrowly paler; abdominal terga brown with posterior margins pale.

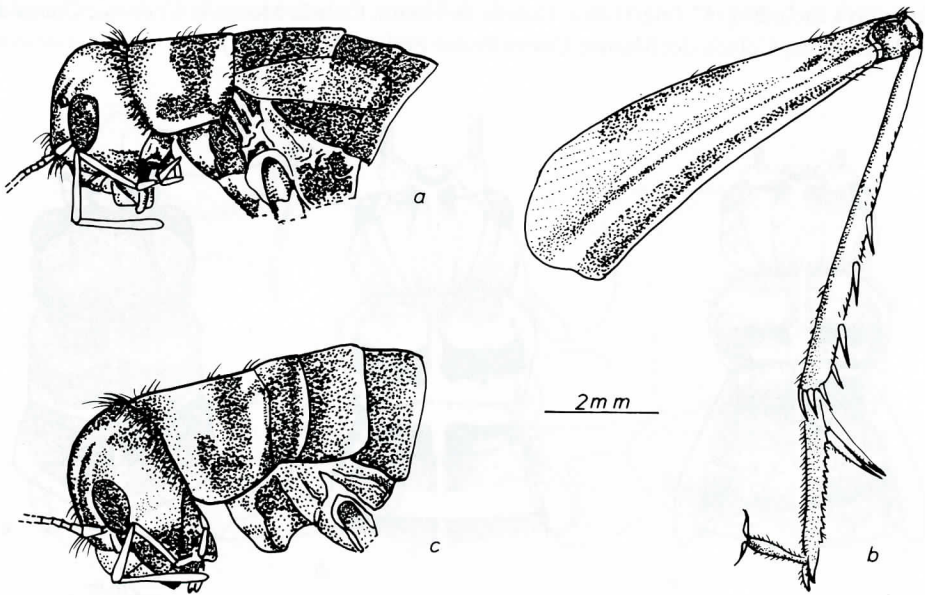


Fig. 1. *Hymenoptila lanzarotensis*, n. sp., paratype (coll. no. 0802), lateral: a) head and pronotum; b) hind leg; c) paratype (coll. no. 0803), lateral: head and pronotum.

Measurements: length of body 9.6, pronotum 2.1, tegminal vestiges 3.0, hind femora 7.0 mm. (This specimen is slightly smaller than some paratypes.)

Allotype:, same data as holotype, but "Lava Lake, ca. 350 m" and coll. no. 0809 (GIET).

This agrees in morphology and coloration with the holotype, except for the complete absence of tegminal vestiges and in the sexual differences in the abdominal terminalia (Fig. 7). Subgenital plate triangularly excised apically so as to form a pair of rounded lobes. Ovipositor about as long as rest of insect, apically with weak ventral punctation, lateral carinae along outer faces of valves situated about equidistant from upper and lower margins. *Measurements*: length of body (without ovipositor) 11.2, pronotum 2.3, hind femur 8.4, ovipositor 11.0 mm.

Paratypes (all Canary Is.: N. Lanzarote I, coll. N.P. & M.J. Ashmole): same data as allotype, but coll. nos. 0802 & 0803, 1, 1 (In Lyman Entomological Museum, Macdonald Campus of McGill University, Ste-Anne-de-Bellevue, Quebec, Canada - as "LEM" hereafter); Lago de Lava, Timafaya, alt. 350 m, 23-27.III.1985, coll. no. 8525, 1 (GIET); Timanfaya Park, off Islote de Halcones, recent lava, 25-29.III.1985, coll. nos. 8758 & 8702, 1, 1 (GIET); Cueva de las Palomas, or Cueva de los Naturalistas, N. of Masdache, lava tube in recent lava flow, 26.III-2.IV.1985, coll. no. 8796, 1, 1 (GIET). Canary Is. : Fuerteventura, Cueva del Llano, Villaverde, 15.XI. 1990, J.C. Rando leg. 18 (2, 2, LEM; 9, 5 in the Facultad de Biología, Universidad de La Laguna, La Laguna, Tenerife, Islas Canarias).

Damaged specimens (not regarded as paratypes; all Canary Is.): Lanzarote, Parque de Timanfaya, 5 - 11, V. 1988, Coll. J.L. Martin; the collecting area of the Parque de Timanfaya including: C. Lago Lava; Colada de Nauto; Colada Montaña Cuervos; Cueva de los Pescadores; Colada del Mauro; Cueva Pedro Perico (3, 3, LEM.)

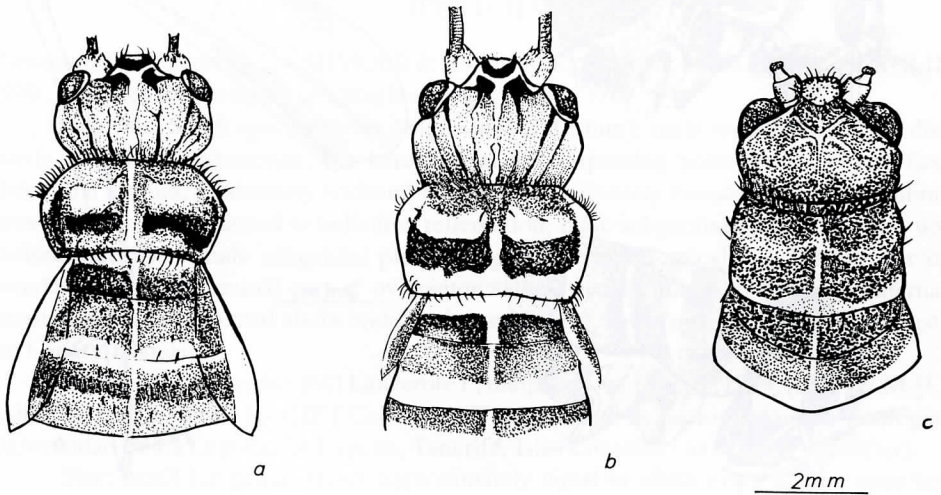


Fig. 2. *Hymenoptila lanzarotensis*, n. sp., head, pronotum and base of abdomen (dorsal): a) holotype; b) last-instar nymph (coll. no. 0806); c) paratype (coll. no. 0803).

Immature specimens (not regarded as paratypes; all Canary Is.): N. Lanzarote I., coll. N.P. & M.J. Ashmole; larger specimens, as with adults, pinned, smaller ones in alcohol; specimens without indication of repository are probably now in "GIET", but may still be with the Ashmoles, Department of Zoology, University of Edinburgh, Scotland): same data as holotype, coll. no. 0805, 4 (very small); as last, but coll. no. 0806, 1 (last-instar); as last but coll. no. 0832, 3 (last instar, 1, 2); same data as allotype, but coll. 0810, 1 (very small); Timanfaya, Islote de Halcones, old lava rocks, alt. 75 m, 25.III.1985, coll. no. 8511, 1 (small); Timanfaya, Seaside site, ca. 20 m inland (close above high tide mark), 24-28.III.1985, coll. nos. 8535a & b, 4 (medium-sized) and ca. 12 (small to very small); as paratypes 8702 (& 8758), also coll. no. 8702, 2 (medium-sized, GIET + 1 lost); as paratypes 8525, coll. no. 8815, 1 (small); as paratypes 8758 (& 8702), also coll. 8758, 3 (large: 2, GIET; 1, LEM); Timanfaya, Gull Rock site, ca. 200 m inland, alt. ca. 20 m, 24-28.III.1985, coll. nos. 8809, 8810, 8811, 3 (very small, small and medium-sized); Timanfaya, Barranco site, ca. 600 m inland, alt. ca. 20 m, 24-28.III.1985, coll. nos. 8813, 8814a & b, 3 (2, 1), 3 (2, GIET; 1, LEM) and 3 (1, 1, GIET; 1, LEM); as "Immature" 8511, but "older rocks surrounded by recent lava, 25-29.III.1895," coll. no. 8816, 2 (1, LEM; 1, GIET); Tabaiba site, 30.III-3.IV.1985, coll. no. 8882, 2 (small and very small).

This species is smaller than either of the two previously described. It is closer to *H. panteli* than to *H. rotundipennis*, the male tegminal vestiges being rather similar in lacking distinct venation, though they are relatively slightly longer. (In *H. rotundipennis*, they are longer and the venation, though sparse, is distinct.) The male genitalia are quite distinctive, as illustrated, though the subgenital plate is very similar to that of *H. panteli*. The female subgenital plate and ovipositor are more like those of *H. rotundipennis*, but the ventral punctation of the ovipositor valves is weaker, as in *H. panteli*.

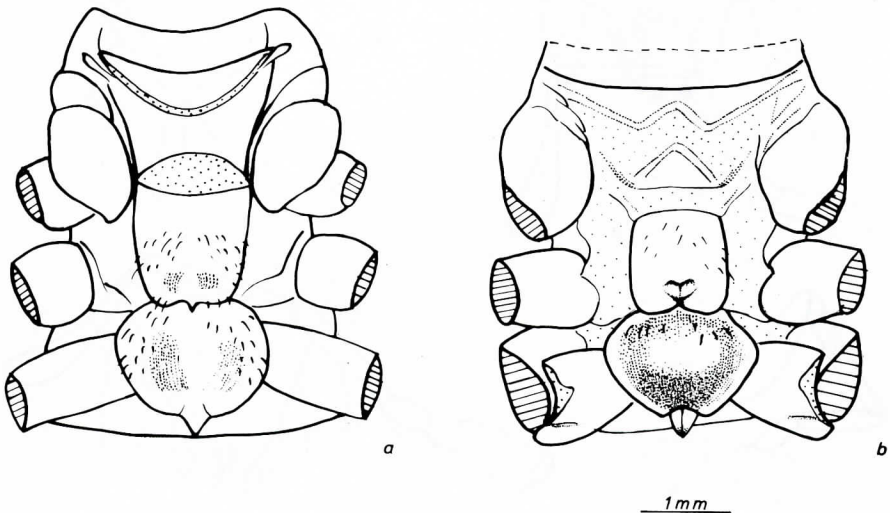


Fig. 3. *Hymenoptila lanzarotensis*, n. sp., thoracic sterna: a) composite drawing from holotype and paratype (coll. no. 0802); b) last-instar nymph (coll. no. 0806).

When ASHMOLE & ASHMOLE (1988) published the first report on the discovery of this species, they observed that “the occurrence of two species of cricket in the historic lava is somewhat surprising, and the presence of both species at the coastal site even more so; further work on the Lanzarote crickets is clearly needed”. This has, of course, now been done and the two have proved to belong to a single species, so that the results were not so surprising after all! What had originally appeared to be the second species turned out to be last-instar nymphs of *H. lanzarotensis*. These have a very adult-like appearance in both sexes. The usual clue to the nymphal condition of crickets, from the position of the tegmina, was not appropriate, for, even in the males, which had vestiges of tegmina, there was no venation to indicate that the rudiments were inverted and no hind-wing vestiges to lie above them. Furthermore, though the genitalic structures were distinctly simpler, they were still complex enough to suggest adult status! Similarly, though the ovipositors of last-instar female nymphs were shorter than those of the adults, they were well developed and deemed to indicate a specific, rather than an instar difference. Even experts can sometimes be deceived! For comparison with the adults, the features of last-instar male and female nymphs are illustrated in Figs 2-7.

Biological observations. CHOPARD (1943) commented briefly (on the basis of previous work) on the known general occurrence of species of *Hymenoptila*. What little biological information is available for *H. lanzarotensis*, other than that noted above from the data labels, is given by ASHMOLE & ASHMOLE (1988). The species is noted (their p. 80, table 5) as being “resident” on historic lava and to have an inferred ecological role as a scavenger. It is also said (their p. 82) to occur on “lava lake” and “coastal malpais” sites, as already noted. In their general conclusions on the fauna of the lava flows on Lanzarote, ASHMOLE & ASHMOLE compare the roles, in recent lava-flow ecology, of *Gryllomorpha* and *Hymenoptila* in the Canary Islands with that of another (unrelated) cricket genus,

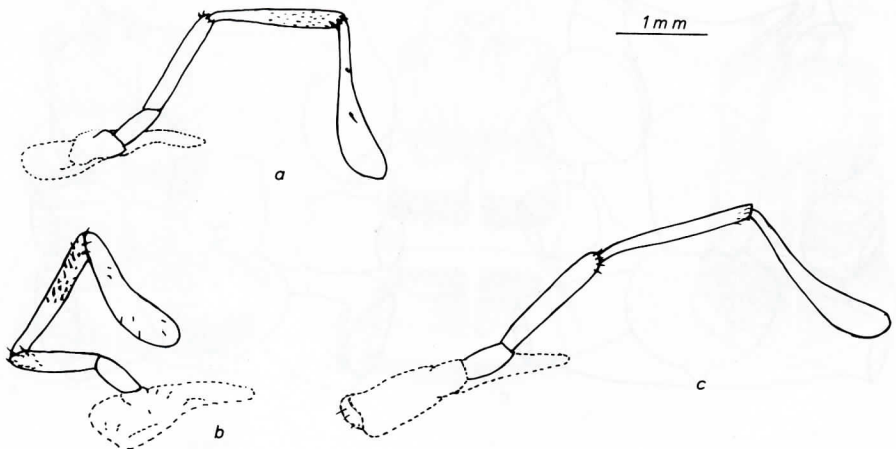


Fig. 4. *Hymenoptila lanzarotensis*, n. sp., maxillary palp: a) holotype; b) last-instar nymph (coll. no. 0806); c) allotype.

Caconemobius, in the Hawai'ian Islands (HOWARTH, 1979). They suggest that the two groups have similar roles, but that, in the Canary Islands, the crickets are less significant than in the Hawai'ian Islands. In the Canaries, the crickets are subsidiary to *Thysanura* (*Ctenolepisma longicaudata* Escherich); on Hawai'i the crickets are dominant.

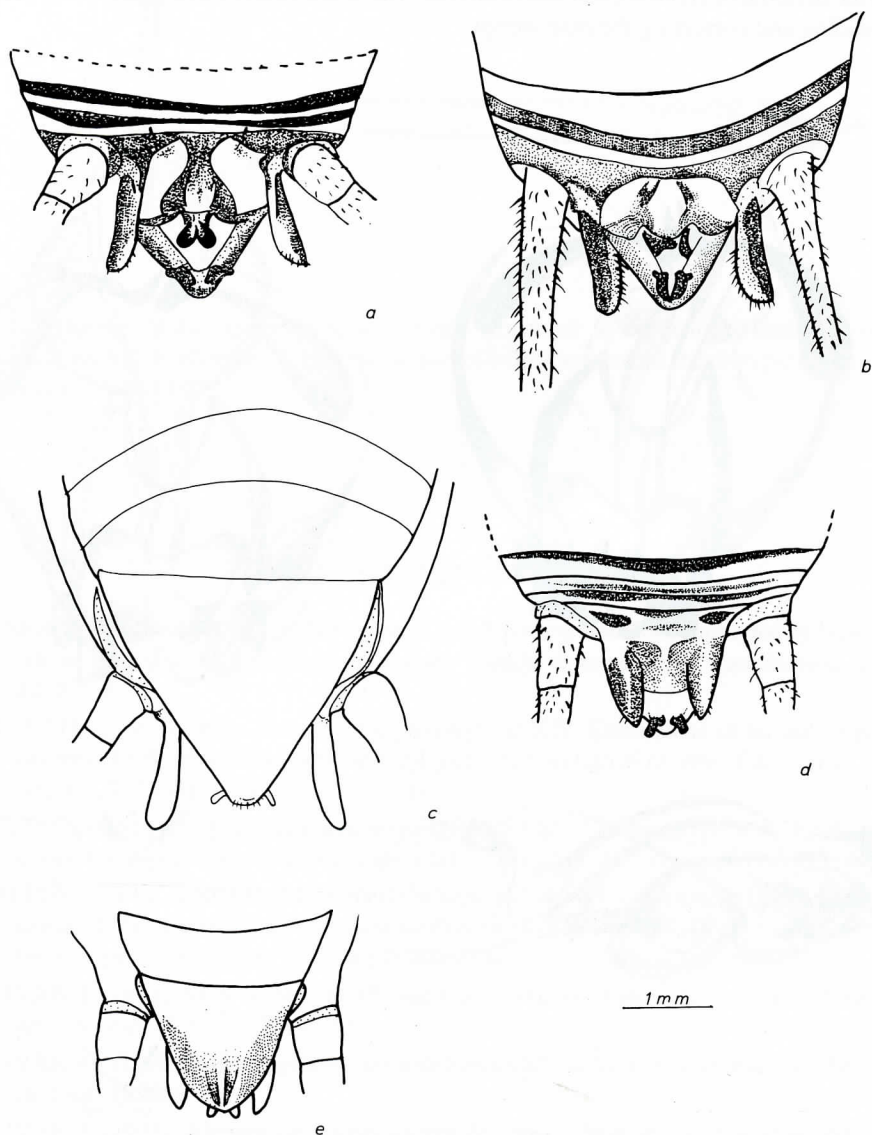


Fig. 5. *Hymenoptila lanzarotensis*, n. sp., male abdominal terminalia: a, b, d) dorsal; c, e) ventral; a, c) holotype; b) paratype (coll. no. 8758); d, e) last-instar nymph (coll. no. 0806).

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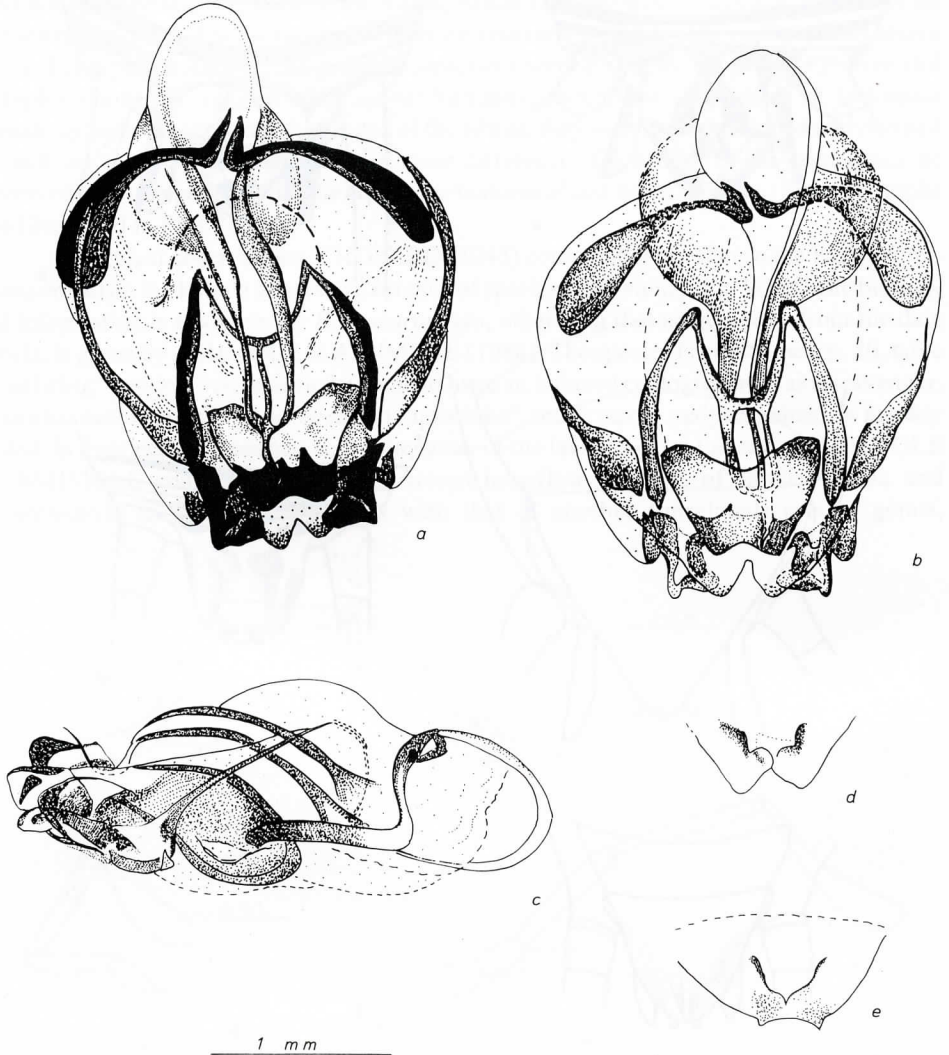


Fig. 6. *Hymenoptila lanzarotensis*, n. sp., male genitalia: a-c) holotype (a, dorsal; b, ventral; c, lateral); d, e) paratype (coll. no. 0806; d, dorsal; e, ventral).

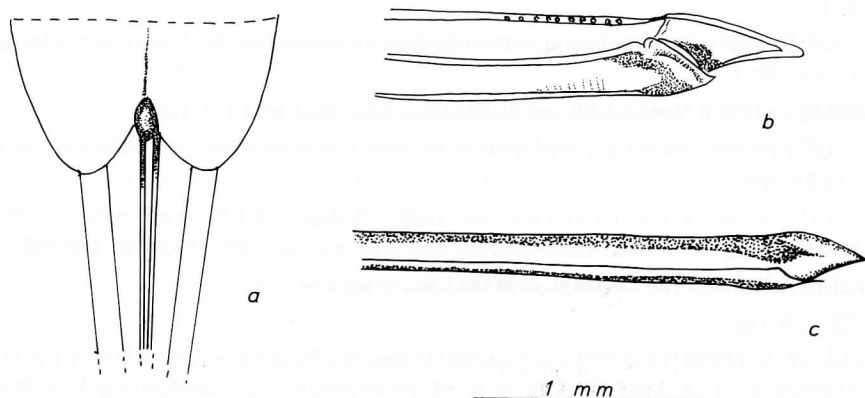


Fig. 7. *Hymenoptila lanzarotensis*, n. sp., female structures: a) subgenital plate and base of ovipositor, ventral (a, allotype); b, c) terminal part of ovipositor, lateral (b, allotype; c, last-instar nymph, coll. no. 8813).

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