

New Species and Records of some Crickets (Gryllinae: Gryllidae: Orthoptera) from Pakistan

AZHAR SAEED, MUHAMMAD SAEED† AND MUHAMMAD YOUSUF

Department of Agricultural Entomology, University of Agriculture, Faisalabad-38040, Pakistan

†Nichimen Corporation, 20/11 U-Block, New Multan Colony, Multan

ABSTRACT

Adult crickets were collected from various localities of Pakistan and identified upto species level. The species of eight genera, viz., *Tarbinskiellus*, *Phonarellus*, *Callogryllus*, *Plebiogryllus*, *Tartarogryllus*, *Gryllopsis*, *Gryllus* and *Gryllodes* belonging to the subfamily Gryllinae are presented. Each genus is represented by a single species in Pakistan. The former five genera and their representative species are new record to the area, while two species, i.e. *Callogryllus ovilongus* and *Plebiogryllus retiregularis* are new to science. New taxa are described in detail, while only the differential and ew characters, if any, from the published descriptions, are given in case of already described species.

Key Words: Systematics; Crickets; Gryllinae

INTRODUCTION

Crickets are commonly met insects. They are important to us due to two reasons: firstly, being pests of various agricultural crops, vegetables, lawns, ornamental plants, harvested grains both ate threshing floors and in godowns, and household articles, and secondly, being predators of small insects. As pests, cricket species such as *Gryllus bimaculatus* plays havoc by feeding voraciously on seed and seedlings of cotton, millets and oil-seeds every year necessitating re-sowing of the crop twice or even thrice (Younis *et al.*, 1980). Such repeated sowings cause immense losses of seed, water, labour and time.

The role of crickets as biological control agents is although of minor importance, however, it cannot be neglected altogether. Sometimes, they prove useful due to their feeding on important insect pests. For example, *Gryllus bimaculatus* has been seen feeding on grasshoppers and caterpillars (Anonymous, 1971-73) while *Gryllodes sigillatus* on a hemipterous stored grain pests *Aphanus littoralis* and its eggs. A single cricket could eat as many as 25 eggs in less than seven hours (Corby, 1946).

The taxonomy of these important insects has been well explored throughout the world, especially in the Oriental region including India. However, in Pakistan the group has not been exposed to extensive systematic work apart from some attempts of preliminary nature (Abdullaha, 1955; Latif & Asghar, 1957; Ghouri & Ahmed, 1959; Chopard, 1969; Qayyum *et al.*, 1987; Saeed & Yousuf, 1990).

Keeping in view these scattered efforts an extensive survey was carried out to explore the cricket fauna of

Pakistan along-with its distribution and habitat. This comprehensive study yielded a large number of specimens of the crickets. The subfamily Gryllinae was represented by 16 genera from the area, however out of these only eight are presented here.

MATERIALS AND METHODS

Adult crickets were collected from various localities of the four climatic regions of Pakistan as detailed by Ahmad (1951). The specimens were collected from houses, godowns, leaf litter and other decaying vegetable matter, rotting logs, bushes, hedges, crop fields, under stones and near banks of water sources. They were killed in cyanide bottle, pinned and their body parts set on appropriate setting-boards. Thereafter, they were properly labelled and stored in collection boxes having naphthalene balls for their safety from different insect-pests like dermestid beetles, ants etc. These collections were also supplemented with specimens of the previous workers as well as the students collection in the Department of Agriculture Entomology, University of Agriculture, Faisalabad, Pakistan.

The male genitalia were dissected by relaxing the specimens either with steam from a water bath or by placing them in a desicator for 10-12 hours. A longitudinal mid-ventral incision was made and the entire contents of the last four or five abdominal segments were removed. The specimens were lightly stuffed with cotton and the abdominal walls were moulded around it, with the help of glue, to as near their original shape as possible. After clearing the removed viscera in cold 10% potassium hydroxide for 10-12 hours, the genitalia were separated out, thoroughly

washed in distilled water for several times and preserved in glycerin in microvials.

The identification were made using a revolving stage and a Wild M3B binocular microscope (10X x 6.4X, 10X x 16X, 10X x 40X) up to the specific level. The free hand sketches of various taxonomically important parts along with the genitalia of almost all the species, whether previously described or new, were drawn.

New taxa have been described in detail while only the differential and new characters, if any from the published descriptions have been given in case of already described taxa.

The classification and terminology given by Randell (1964), Chopard (1969) and Otte and Alexander (1983) were partly followed.

RESULTS AND DISCUSSION

Each of the eight genera of the subfamily Gryllinae discussed in this manuscript is represented by a single species, viz., *Callogryllus ovilongus*, *Phonarellus minor*, *Plebiogryllus retiregularis*, *Tarbinskiellus portentosa*, *Tartarogryllus tartarus*, *Gryllodes supplicans*, *Gryllopsis pubescens* and *Gryllus bimaculatus*. Out of these the former five genera and their representative species are new record from the region, while two species *Callogryllus ovilongus* and *Plebiogryllus retiregularis* have been described as new to science.

Genus *Tarbinskiellus* Gorokhov

1983. *Tarbinskiellus* Gorokhov, Ent. Obozr., 62(2): 314-330.

Type: *Acheta portentosa* Lichtenstein

The specimens of a single collected species exactly tally with the published description (Gorokhov, 1983) of this genus.

Tarbinskiellus portentosa (Lichtenstein)

1796. *Acheta portentosa* Lichtenstein, Cat. Mus. zool. Hamburg, 3: 85.

1813. *Gryllus* (*Acheta*) *achatinus* Stoll, Spectres, Gryll. Achet., p. 4.

1813. *Gryllus* (*Acheta*) *fuliginosus* Stoll, Spectres, Gryll. Achet., p. 5

1839. *Brachytrupes ustulatus* Serville, Ins. Orth., p. 326.

1839. *Gryllus achatinus* Burmeister, Handb. Ent., 2: 735.

1877. *Brachytrypus achetinus* Saussure, Mem. Soc. Geneve, 25: 121.

1893. *Brachytrypes achatinus* Brunner v.W., Ann. Mus. Geneve, 33: 197.

1906. *Brachytrypes portentosus* Kirby, Synon. Cat. Orth., 2: 22.

1910. *Liogryllus formosanus* Matsumura, Schadl. u. nutz. Ins. Zuckerr. Formosa, p. 8.

1964. *Brachytrupes portentosus* Randell, Canad. Ent., 96(12): 1587

1983. *Tarbinskiellus portentosus* Gorokhov, Ent. Obozr., 62(2): 314-330.

All the specimens greatly conform to the published description (Chopard, 1969; Tandon and Shishodia, 1972 and Saeed, 1989) of this species except the measurements of various body parts.

Material examined:

1 ♂ 5 ♀, unlabelled, taken from the students' collection in the Department of Agricultural Entomology, University of Agriculture, Faisalabad, Pakistan.

New record:

A single male has been recorded for the first time from Pakistan. Earlier only a single female was identified from this region (Saeed, 1989).

Genus *Phonarellus* Gorokhov

1983. *Phonarellus* Gorokhov, Ent. Obozr., 62(2): 314-330.

Type: *Gymnogryllus minor* Chopard

The collected specimens of a single species resemble the published description (Gorokhov, 1983) of this genus.

Phonarellus minor (Chopard)

1877. *Brachytrypus* (*Gymnogryllus*) *erythrocephalus* (nec Serville) Saussure, Mem. Soc. Geneve, 25: 130.

1959. *Gymnogryllus minor* Chopard, Stuttg. Beitr.z. Naturk., p. 1.

1983. *Phonarellus minor* Gorokhov, Ent. Obozr., 62(2): 314-330.

The specimens mainly conform to the published description (Chopard, 1969; Saeed, 1989) of this species except in the following characters: Some specimens are entirely black (including the head) like the variety *melanocephalus* of *erythrocephalus*. Antennae with or without whitish segments. Apical field of male elytra with 4-6 harps (oblique veins), Sc usually 1-2 branched.

Material examined:

Islamabad 1 ♀, 8-VII-93; Abbottabad 1 ♂, 14-IX-94; Changa Manga (Kasur) 1 ♀, 15-VI-93; Faisalabad 1 ♀, 5-IX-87; 1 ♀, 14-VII-89; Gojra (Faisalabad) 2 ♂ 3 ♀, 28-IX-88; 1 ♂ 2 ♀, 29-IX-88; Layyah 1 ♂, 10-IV-89; 1 ♀, 25-VI-89; Lahore 3 ♀, 8-VII-89; Pakpattan 1 ♀, 9-VII-88; 1 ♂ 9 ♀, 12-X-88; Sargodha 1 ♀, 5-X-88; 1 ♀, 6-X-88; Head Sulemanki (Bahawalnagar) 1 ♂, 14-VI-93; 11 ♂ 18 ♀, unlabelled, taken from the students' collection in the Department of Agricultural Entomology, University of Agriculture, Faisalabad, Pakistan.

Fig. 1. *Callogryllus ovilongus* sp. nov. A, face E; B, head, pronotum and elytra E, dorsal aspect; C, circus and ovipositor

Habitat:

This species has been collected from light near cultivated areas of sugarcane and vegetables and from grasslands, herbs and the forest plantation.

New record:

It is recorded for the first time from Abbottabad, Changa Manga, Islamabad, Lahore and Layyah. Earlier this species was reported from Lyallpur (Faisalabad) and Rawalpindi (Chopard, 1969), and from Faisalabad, Gojra, Pakpattan, Rawalpindi and Sargodha (Saeed, 1989).

Discussion:

Specimens of this species were placed under *Gymnogryllus erythrocephalus* on the basis of antennae which are without a whitish ring (Saeed, 1989). This character, however, seems to be inconstant as the present collection contains the specimens which are with or without of a whitish ring in their antennae. It may be further added that the measurements of various body parts in both types of specimens greatly differ from

those of *G. erythrocephalus*, but exactly tally with those of *G. minor*. It was, therefore, thought appropriate to place both types of specimens under the latter species.

G. erythrocephalus is considered to be a serious pest of germinating cotton (Yunus *et al.*, 1980) in Pakistan. Actually, it is *Phonarellus minor*, because the former species was neither found in field nor in the museum specimens. Perhaps, it might not present in the region.

Genus *Callogryllus* Sjostedt

1909. *Callogryllus* Sjostedt, Kilimandjaro-Meru Exp., 3; 105.

Type: *Callogryllus kilimandjaricus* Sjostedt

A single collected female completely agrees with published description (Chopard, 1969) of this genus.

***Callogryllus ovilongus* sp. nov.**

(Figs. 1, A-C)

Female:

Size large (17.5 mm). Body stout, cylindrical; colouration pale testaceous.

Head:

Fig. 2. *Plebeiogryllus etiegularis* sp. nov. A, head and pronotum ♂, dorsal aspect; B, elytra ♂; C-E, genitalia ♂; C, epiphallus, dorsal aspect; D,E, phallic complex, ventral and lateral aspects

Rounded, shining black above, as wide as pronotum; occiput with 4 obsolete lines; frontal rostrum 3.5 times as wide as 1st antennal joint; cheeks yellow; face pale; clypeo-frontal suture straight (Fig. 2), obsolete in the middle. Maxillary palpi pale brown, 5th joint longer than 3rd, widening and obliquely truncate at apex. Antennae brown.

Thorax:

Pronotum cylindrical, 1.4 times broader than long, its anterior margin very feebly concave, posterior straight; disk brownish, provided with small reddish-brown bristles, slightly convex, with sides almost straight; lateral lobes pale whitish, with straight inferior margins.

Legs of the same colour as the body; anterior tibiae with a large, oval external and a very minute, rounded internal tympanum; posterior femora rather short, stout, 1.3 times as long as tibiae and 2.6 times as long as wide, pale with reddish tinge on external face; posterior tibiae with 4-5 internal, 5-6 external spines; posterior basitarsi with 4-5 internal, 6-7 external denticles.

Elytra very short, reduced to lateral pads, separated by a wide gap on the median line; dorsal field triangular, presenting 3 oblique veins; lateral field with 4 regularly spaced, almost straight veins, Sc unbranched.

Abdomen:

Yellowish, gradually tapering posteriorly, with a wide median brown band and a few spots of the same colour toward lateral sides. Ovipositor very long, almost as long as body, slender, 1.5 times as long as posterior femora, with small, narrow, acute apical valves.

Material examined:

Holotype: 1 E, 1-VII-93, Pakistan Forest Institute (Peshawar).

Habitat:

It has been collected from the leaf-litter under a dense forest plantation.

Distinguishing characters:

A very distinct species which resembles *C. pallidus*, but can easily be distinguished by its large and stout body, very wide frontal rostrum, shining black head, with just a suspicion of lines on occiput and very long ovipositor.

Derivation of name:

The name of this species has been derived from its ovipositor, which is very long.

Repository:

The holotype female has been deposited in the Insect Museum, Department of Agricultural

Entomology, University of Agriculture, Faisalabad, Pakistan.

Genus *Gryllopsis* Chopard

1877. *Grylloides* Saussure, Mem. Soc. phys. Hist. nat. Geneve, 25: 206.

1928. *Gryllopsis* Chopard, Rec. Ind. Mus., 30: 13.

Type: *Grylloides hebraeus* Saussure

A single female collected entirely conforms to the published description (Chopard, 1969; Saeed, 1989) of this genus.

***Gryllopsis pubescens* Chopard**

1928. *Gryllopsis pubescens* Chopard, Rec. Ind. Mus., 30: 13.

It greatly resembles the published description of Chopard (1969) except the abdominal tergites which are entirely mottled with brown.

Material examined:

Abbottabad 1 E, 11-VII-93.

Habitat:

It is a very rare species which has been collected from the plant debris under very thick plantation along road side.

New record:

It has been recorded for the first time from Pakistan.

Discussion:

The specimens differ from other members of this genus in having somewhat depressed body and abundant pubescens (Chopard, 1969). However, it will be necessary to know the male before finally deciding to include it in this genus.

Genus *Gryllus* Linnaeus

1758. *Gryllus* Linnaeus, Syst. Nat. ed. 10, 1: 425.

1770. *Acheta* Fabricius, Syst. Ent., p. 279.

1877. *Liogryllus* Saussure, Mem. Soc. Geneve, 25: 134.

1877. *Homaloblemmus* Saussure, Mem. Soc. Geneve, 25: 247.

1961. *Lenigryllus* Chopard, Eos, 37: 270.

Type: *Gryllus (Acheta) campestris* Linnaeus

The specimens of a single species completely resemble the published description (Chopard, 1969; Otte and Cade, 1984c; Saeed, 1989) of this genus.

***Gryllus bimaculatus* De Geer**

1773. *Gryllus bimaculatus* De Geer, Mem. Ins., 3: 521.

1775. *Acheta capensis* Fabricius, Syst. Ent. ed. 10, 1: 281.

1788. *Acheta bimaculata* Herbst, Fuessly Archiv, p. 192.

1791. *Gryllus capensis* Olivier, Encycl. Method., Ins., 6: 635.

1813. *Gryllus (Acheta) rubricollis* Stoll, spectres, Gryll., p. 6.

1836. *Gryllus campestris* (nec. Linne.) Blanchard in Cuvier, Regne anim., Ins., 14: 81.

1855. *Gryllus lugubris* Stal, Oefv. vet. Akad. Forh., 12: 351.

1869. *Gryllus interruptus* Walker, Cat. Dermap. Saltat. Brit. Mus., 1: 35.

1869. *Gryllus marginalis* Walker, Idem. Ibid., 1: 25.

1877. *Liogryllus bimaculatus* Saussure, Mem. Soc. Geneve, 25: 139.

The collected material entirely conforms to the published description (Abdullah, 1955; Chopard, 1969; Saeed, 1989) of this species, but differs in the elytra (from Otte and Cade, 1984), which are more than 3 times as long as pronotum and the posterior femora which are 0.67-0.79 times as long as elytra and 1.11 - 1.30 times as long as posterior tibiae.

Material examined:

Islamabad 1 ♂ 1 E, 8-VII-93; 2 E, 11-IX-94; Kalat 1 ♂, 6-IX-93; Ziarat 6 ♂ 2 E, 10-X-83; Zhob 1 E, 13-X-93; Panjgur 2 ♂ 1 E, 15-X-93; Abbottabad 1 E, 14-IX-94; Peshawar 1 ♂, 1-VIII-93; Bhurban (Murree) 1 E, 13-IX-94; Faisalabad 1 E, 14-VII-88; 4 E, 16-VII-88; Lahore 2 ♂, 15-VI-89; 1 ♂ 1 E, 25-VI-89; Murree 1 E, 12-VII-93; Pakpattan 1 E, 15-IV-89; 1 ♂, 14-IV-89; 1 E, 18-IV-89; Rawalpindi 2 E, 14-VIII-88; 1 E, 18-VIII-88; Head Sulemanki (Bahawalnagar) 2 ♂ 1 E, 14-VI-93; Sukkur 1 E, 23-X-93; Karachi 1 E, 26-X-93; 15 ♂ 30 E, unlabelled, taken from students' collection in the Department of Agricultural Entomology, University of Agriculture, Faisalabad, Pakistan.

Habitat:

It is most common and widely distributed species found in grassy areas, soil cracks, crop fields, around towns and villages and more often collected on light.

Discussion:

This species exhibits some colour variations, such as the elytra may lack the characteristic yellow spots, show an entirely reddish-yellow colour or the legs may be partly reddish or blackish. Another remarkable variety is entirely reddish-brown with testaceous elytra.

It has been recorded as a serious pest of cotton, millets, oil-seeds and grain at the threshing floors in D. G. Khan division and its adjoining areas in Pakistan (Anon., 1971-73; Yunus *et al.*, 1980).

Genus *Plebeigryllus* Randell

1964. *Plebeigryllus* Randell, Canad. Ent., 96(12): 1597.

Type: *Gryllus plebejus* Saussure

The collected specimens of a single new species greatly tally with the original published description

(Randell, 1964) of this genus.

***Plebeigryllus retiregularis* sp. nov.**

MALE:

Size medium (13.5 - 15.0 mm). Body colouration blackish-brown, with brownish-yellow elytra.

Head:

Shining black, without any ornamentation; face black, with slight reddish tinge; clypeo-frontal suture strongly angulate. Ocelli lined with brownish-yellow. Palpi brown, maxillary with 4th segment shorter than 3rd and 5th, the latter longest, widened, obliquely truncated at apex. Antennae brown.

Thorax:

Pronotum black, narrowing anteriorly, 0.84 - 0.89 times as wide as posterior margin, anterior margin strongly concave, narrowly ferruginous, posterior nearly straight; disk almost glabrous or very finely pubescent; lateral lobes black, with inferior margin strongly ascending backwards.

Legs blackish-brown, with slight reddish tinge, unicolourous, without any markings; anterior tibiae perforated on both sides, with a large, oval, external and a small, rounded internal whitish tympanum; posterior femora short, strong, finely pubescent; posterior tibiae armed with 5 internal, 5 - 6 external pointed spines; posterior basitarsi with 4 - 6 internal, 6 - 7 external denticles.

Elytra slightly extending beyond the abdomen, brownish-yellow, with a pale lateral band, the latter also extending inward at base; mirror distinctly wider than long, with rounded anterior margin, divided behind middle by a curved vein; diagonal vein long; 1st chord uniformly rounded, 2nd and 3rd strongly sinuate; harps with 3 oblique veins, sinuate, regularly-spaced; apical field short, provided with 4 veins, transverse veinlets forming almost regular, nearly rectangular cells; lateral field with 6 - 7 regularly-spaced veins, Sc bearing 3 - 4 branches. Wings long, caudate.

Abdomen:

Abdomen and cerci wholly black. Genitalia with epiphallus roughly quadrate, its anterior margin deeply and broadly emarginate, sides sinuate, with very feebly visible lateral lobes, posterior margin with a small, upward-curved, bluntly-pointed, median lobe; ectoparameres hidden beneath epiphallus in dorsal aspect.

Material examined:

Holotype: 1 ♂, unlabelled.

Paratype: 1 ♂, unlabelled.

Both males were taken from the students' collection in the Department of agricultural Entomology, University of Agriculture, Faisalabad, Pakistan.

Habitat:

Unknown.

Distinguishing characters:

This species has a close resemblance to *Platygryllus melanocephalus* (Chopard, 1969) but differs from it in the following characters:

Maxillary palpi brown; apical field of elytra with regular reticulation; lateral field with 6 - 7 veins; abdomen wholly black; epiphallus without truncated posterior margin.

It is also fairly distinct from *P. guttiventris*, with which its genitalia has a little resemblance.

Derivation of name:

The name of this species has been derived from the reticulation of the apical field of elytra, which is regular.

Repository:

The type material has been deposited in the Insect Museum, Department of Agricultural Entomology, University of Agriculture, Faisalabad, Pakistan.

Genus *Gryllodes* Saussure

1874. *Gryllodes* Saussure, Miss. Sci. Mexique Amer. centr. Resh. Zool., 6: 409.

1906. *Gryllololandrevus* Bolivar, Voy. Rothschild, Insectes, p. 196.

Type: *Gryllus sigillatus* Walker

The collected material of a single species entirely agrees with the published description (Chopard, 1969; Otte and Alexander, 1983; Saeed, 1989) of this genus.

***Gryllodes supplicans* (Walker)**

1859. *Acheta supplicans* Walker, Ann. Mag. nat. Hist., (3)4: 221.

1869. *Gryllus nanus* Walker, Cat. Dermapt. Saltat. Brit. Mus., 1: 214.

1869. *Gryllus pustulipes* Walker, Idem. Ibid., 1: 51.

1869. *Gryllus sigillatus* Walker, Idem. Ibid., 1: 46.

1869. *Gryllus supplicans* Walker, Idem. Ibid., 1: 36.

1874. *Gryllodes poeyi* Saussure, Miss. Mexique, Orth., p. 420.

1877. *Cophogryllus walkeri* Saussure, Mem. Soc. Geneve, 25: 233.

1877. *Gryllodes pustulipes* Saussure, Idem. Ibid., 25: 210.

1877. *Gryllodes sigillatus* Saussure, Idem. Ibid., 25: 210.

1877. *Piestodactylus nanus* Saussure, Idem. Ibid., 25: 531.

1895. *Scapcipedus fuscoirroratus* Bolivar, Ann. Soc. ent. Fr., p. 386.

1899. *Homalogryllus indicus* Bolivar, Ibid., 68: 800.

1901. *Miogryllus transversalis* Scudder, Psyche, 9: 257.

1906. *Grylloides nanus* Kirby, Synon. Cat. Orth., 2: 43.
 1912. *Grylloides subapterus* Chopard, Ann. Soc. ent. Fr., 81: 403.
 1922. *Gryllolandrevus abyssinicus* Bolivar, Voy. Rothschild, Ins., p. 196.
 1925. *Grylloides supplicans* Chopard, Idem. Ibid., (9)15: 510.
 1925. *Grylloides greeni* Chopard, Ann. Mag. nat. Hist., (9)15: 511.
 1926. *Acheta tokyonis* Okasaki, Dobutsu-Kyozai Korogi, p. 206.

This widely distributed species greatly tallies with the published description (Walker, 1869; Chopard, 1969; Saeed, 1989) of this species except the posterior tibiae, which are with 5 spines on each margin (rarely with 4 or 6 on internal margin), mirror with 2 dividing veins (very rarely undivided) and wings very short, reduced to lateral pads in micropterous females.

Material examined:

Islamabad 1 E, 8-VII-93; 6 ♂, 11-IX-94; Panjgur 2 E, 6-IX-93; Sibi 4 E, 7-IX-93; Zhob 1 ♂ 3 E, 6-IX-93; Dera Ismail Khan 1 ♂ 4 E, 22-IX-94; Kohat 1 E, 4-VIII-93; Mingora (Swat) 1 ♂ 4 E, 5-VII-93; Peshawar 2 ♂, 1-VIII-93; 3 ♂ 3 E, 2-IX-93; 1 ♂, 17-IX-94; Changa Manga (Kasur) 2 ♂, 15-VI-93; 3 ♂ 1 E, 22-IX-94; Faisalabad 14 ♂ 12 E, 10-IV-88; Gutwala (Faisalabad) 1 ♂, 21-VI-93; Head Marala (Sialkot) 2 E, 17-VI-93; Lal Sohanra (Bahawalnagar) 1 ♂, 21-VIII-93; Mianwali 1 ♂ 1 E, 4-X-88; Murree 1 E, 13-VIII-93; Pakpattan 3 ♂ 10 E, 15-VI-88; 3 ♂ 2 E, 16-VI-88; 3 ♂ 1 E, 11-X-88; 1 ♂, 25-V-89; 1 E, 7-VII-89; Rawalpindi 1 E, 20-VIII-88; 1 E, 2-IX-88; 1 E, 4-IX-88; 1 E, 8-IX-88; 1 ♂ 1 E, 9-IX-88; 3 ♂ 1 E, 9-VII-93; Sargodha 1 E, 25-V-88; Sialkot 1 E, 15-VI-93; Badin 1 ♂ 2 E, 24-X-93; Hyderabad 2 ♂ 3 E, 25-X-93; Sukkur 4 ♂ 1 E, 20-X-93; 10 ♂ 25 E, unlabelled, taken from students' collection, Department of Agricultural Entomology, University of Agriculture, Faisalabad, Pakistan.

Habitat:

It is widely distributed throughout Pakistan and is generally found in houses in association with human habitation, rarely occurring in the leaf-litter, with its macropterous forms collected from lights.

Discussion:

Grylloides supplicans and *G. sigillatus* were previously considered to be two different species (Chopard, 1969) (this fauna was written much before 1967, but published in 1969). In 1967, the former was synonymised with the latter, but contrary to this, it was claimed that *G. supplicans* had priority over *G. sigillatus* (Kevan, 1980). Later on, their status as separate

species was restored due to their holotype females described from different countries and the slight differences in male genitalia (Otte, 1987b; Chopard, 1969).

The above view was also not held good by some workers who claimed that they were two forms of the same species. For example, the macropterous individuals were produced from the micropterous parents under controlled laboratory conditions (Ghouri and McFarlane, 1957, 1958a, b; Toms, 1993) and also by a combination of factors, such as crowding and high protein diet, temperature, relative humidity and day to night ratios (Masaki and Oyama, 1963; McFarlane, 1964; Mathad and McFarlane, 1968). This idea is also supported by the present research which reveals that the male genitalia in both the forms were exactly similar.

It was further stated that the macropterous forms have fully developed elytra and wings in both sexes (Kevan, 1980). But the present research shows that only the females have fully developed elytra and wings (rarely wings abortive) while the males have always their wings abortive. It may be added here that the micropterous females and brachypterous males are very abundant in this region.

Genus *Tartarogryllus* Tarbinskii

1940. *Tartarogryllus* Tarbinskii, Salt. Orth. Ins. Azerb., pp. 18, 114.

Type: *Gryllus tartarus* Saussure

The collected individuals of a single species resemble the published description (Randell, 1964; Gorokhov, 1978) of this genus.

***Tartarogryllus tartarus* (Saussure)**

1874. *Gryllus tartarus* Saussure in Fedch., Voyage Turkest. Orth., 2(5): 34.

1921. *Gryllus tartarus* v. *obscurus* Uvarov, Ent. monthly Mag., 7: 50.

1934. *Gryllus tartarus obscurior* Uvarov, Eos, 10:41.

1940. *Gryllus intermedius* Chopard, Ann. Soc. ent. Fr., 109: 164.

1940. *Tartarogryllus tartarus* Tarbinskii, Salt. Orth. Ins. Azerb., p. 114.

1943. *Gryllus intercalatus* Chopard, Orth. Afr. N., p. 184.

1951. *Gryllus tartarus* Ramme, Mitt. zool. Mus. Berlin, p. 382.

1954. *Acheta tartara* Chopard, Verh. naturf. Ges. Basel, 65: 47.

1958. *Acheta tartarus* Karabag, Orth. Faun. Turkestan, p. 88.

A single collected pair conforms to the published description (Gorokhov, 1978) of this species except the ectoparameres which are roundly pointed at their apices.

Material examined:

Khanewal 1 ♂, 18-VII-88; Pakpattan 1 E, 9-VII-88.

Habitat:

Both the specimens of this species were collected on lights near cultivated fields.

New record:

This species has been recorded for the first time from Pakistan.

ACKNOWLEDGEMENTS

We sincerely thank Dr Daniel Otte, Academy of Natural Sciences of Philadelphia, U.S.A., Dr A.V. Gorokhov, Zoological Institute, Leningrad, U.S.S.R., Dr R.B. Toms, Transvaal Museum Pretoria, South Africa, and Dr Yashiro Oshiro, Maejima, Naha, Japan, for their generous help in sending the valuable literature on gryllids during this project.

REFERENCES

- Abdullah, M., 1955. Gryllidae of Lyallpur. M.Sc. Thesis, Univ. Punjab, Lahore, Pakistan.
- Ahmad, K.S.D., 1951. Climatic regions of West Pakistan. *Proc. 3rd. Pak. Sci. Conf.*, 101–35.
- Anonymous, 1971-73. Control of crickets in Dera Ghazi Khan District. Cricket Control Scheme, p. 4.
- Chopard, L., 1967. Gryllides-Fam. Gryllidae. In: *Orthopterorum Catalogus*, Beier, M. (ed.), 10: 1–211.
- Chopard, L., 1969. The fauna of India and adjacent countries, Orthoptera, Vol. 2, Grylloidea. *Zool. Surv. India*, Calcutta, p. 421.
- Corby, D.H.L., 1946. *Aphanus* (Hemiptera: Lygaeidae) in stored ground-nuts. *Bull. Ent. Res.*, 37: 609–17.
- Ghouri, A.S.K. and H. Ahmad, 1959. A study of the crickets (Grylloidea) of Pakistan. *Proc. Pak. Sci. Conf.*, 11: 49.
- Ghouri, A.S.K. and J.E. McFarlane, 1957. Extra-ordinary development of wings in *Grylodes sigillatus* (Walk.) (Gryllidae). *Proc. Pak. Sci. Conf.*, 7: 52.
- Ghouri, A.S.K. and J.E. McFarlane, 1958a. Observaions on the development of crickets. *Canad. Ent.*, 90: 158–65.
- Ghouri, A.S.K. and J.E. McFarlane, 1958b. Occurrence of a macropterous form of *Grylodes sigillatus* (Walker) (Orthoptera: Gryllidae) in laboratory culture. *Canad. J. Zool.*, 36: 837–8.
- Gorokhov, A.V., 1978. Crickets of the genera *Tartarogryllus* Tarb. and *Modicogryllus* Chop. (Orthoptera: Gryllidae) in middle Asia. *Ent. Obozr.*, 57: 97–105.
- Gorokhov, A.V., 1983. Contribution to the knowledge of crickets of the tribe Gryllini (Orthoptera: Gryllidae). *Ent. Obozr.*, 62: 314–30.
- Kevan, D.K.Mc.E., 1980. The Orthopteroid insects of the Bermudas. *Mem. Lyman Ent. Mus. Res. Lab.*, 8: 1–182.
- Latif, A. and M.A. Asghar, 1957. Two new species of Grylloidea. *Proc. 8th Pak. Sci. Conf.*, p. 69.
- Masaki, S. and N. Oyama, 1963. Photoperiodic control of growth and wing-form in *Nemobius yezonensis* Shiraki (Orthoptera: Gryllidae). *Kontyu*, 31: 16–26.
- Mathad, S.B. and J.E. McFarlane, 1968. Two effects of photoperiod on wing-development in *Grylodes sigillatus* (Walk.). *Canad. J. Zool.*, 46: 57–60.
- McFarlane, J.E., 1964. Factors affecting growth and wing-polymorphism in *Grylodes sigillatus* (Walk.): Dietary protein level and a possible effect of photoperiod. *Canad. J. Zool.*, 42: 767–71.
- Otte, D. 1987. Nomenclatural tail-shakes systematic dog. Reply to Dr. Kevan. *Metaleptea*, 9: 16–8.
- Otte, D. and R.D. Alexander, 1983. The Australian crickets (Orthoptera: Gryllidae). *Acad. Nat. Sci. Phil. Monogr.*, 22, p. 477.
- Otte, D. and W. Cade, 1984. African crickets (Gryllidae). 6. The genus *Gryllus* and some related genera (Gryllinae: Gryllini). *Proc. Acad. Nat. Sci. Phil.*, 136: 98–122.
- Quayyoom, M. A., Ramzan and K. Ali, 1987. A phenetic approach to the taxonomy of Gryllidae of Faisalabad at generic level. *Proc. 5th. Pak. Congr. Zool.*, pp: 227–84.
- Randell, R.L., 1964. The male genitalia in Gryllinae (Orthoptera: Gryllidae) and a tribal revision. *Can. Ent.*, 96: 1565–1607.
- Saeed, A. and M. Yousuf, 1990. Checklist of the crickets (Grylloidea: Orthoptera) of the Punjab. *Pakistan J. Zool.*, 22: 407–12.
- Saeed, A., 1989. Crickets (Grylloidea: Orthoptera) of the Punjab. M.Sc. Thesis, Univ. Agric., Faisalabad, Pakistan.
- Tandon, S.K. and M.S. Shishodia, 1972. Notes on the collection of Grylloidea (Orthoptera) from NEFA, India. *Orient. Ins.*, 6: 281–92.
- Toms, R.B., 1993. More winged females of the cricket *Grylodes supplicans* (Walk.). *S. Afr. J. Zool.*, 28: 122–4.
- Walker, F., 1869. Catalogue of the specimens of Dermaptera-Saltatoria and supplement to the Blattariae in the collection of the British Museum. Vol. 1. Gryllidae, Blattariae, Locustidae. *Brit. Mus. Publ., Lond.*, P. 117.
- Yunus, M., M. Yousuf and G. Jilani, 1980. Insect and spider mite pests of cotton in Pakistan. Final Report, P.L. 480 Project, Univ. Agric., Faisalabad, Pakistan.

(Received 04 January 2000; Accepted 10 June 2000)