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Mehar-un-Nisa Maitlo

Department of Zoology, Shah
Abdul Latif University Khairpur
Mirs, Sindh, Pakistan

Waheed Ali Panhwar

1. Department of Zoology, Shah
Abdul Latif University Khairpur
Mirs, Sindh, Pakistan
2. SIGTET—Special Interest
Group Tetrigidae

Pygmy grasshoppers (Tetrigidae: Orthoptera) from district Naushahro Feroze, Sindh Pakistan

Mehar-un-Nisa Maitlo and Waheed Ali Panhwar

Abstract

Pygmy grasshoppers are mostly diverse groups of grasshoppers amongst order Orthoptera because of the small sizes and different appearance that show these species very unique in orthoptera group from their morphological aspect. These tiny individuals are mostly found swampy habitats, water canals, sides of rivers and in leaf litter, forests and grounds. Pygmy grasshoppers were collected from different talukas having agricultural lands and dense vegetation of district Naushahro Feroze through entomological insect capturing net. A total of 186 specimens which were collected during the October 2018- July-2019. The specimens were identified into family Tetrigidae, two subfamilies: Tetriginae and Scelimeninae with 05 genera and 07 specie; *Hedotettix gracilis*, (Haan, 1843), *Hedotettix lineifera* (Walker, 1871), *Hedotettix punctatus* Hancock 1909, *Paratettix meridionalis* (Rambur, 1838) New Record from Pakistan, *Ergatettix dorsiferus* (Walker, 1871) New Record from Pakistan, *Thoradonta nodulosa* (Stål, 1861) New Record from Sindh and *Scelimena razalii* Mahmood, Idris & Salmah, 2007 New Record from Pakistan. Beside this distributional data of species along with description of species is given. Confidently, this study will contribute to the knowledge of pygmy grasshoppers from this region.

Keywords: Pygmy grasshoppers, distribution, orthoptera

1. Introduction

Tetrigidae grasshoppers are commonly known as pygmy grasshoppers. They are pre-historic group of grasshoppers and are found to be similar like the other hoppers amongst order Orthoptera. Pygmy grasshopper possess associations and partialities to particular habitats and microhabitats. The pygmy grasshoppers are generally studied in Southeast Asia from ecological perspective and regarded as threatened in habitats. Beside this they prefer moist places swampy habitats^[1]. Pygmy grasshoppers are generally more diverse groups among Orthopterans due to their small size and unique appearance that make them more remarkable among other Orthopterans in morphological point of view. These little creatures are mostly ground dwelling and generally come across among leaf-litter in the floor of forests or in moist places, swampy habitats neighboring waterways, rivers or upended water. Tetrigidae grasshoppers comprises about 1700 species in 250 genera and regarded as second to the biodiversity of Caelifera after the family Acrididae^[2].

The Pygmy grasshoppers (Tetrigidae) are a monophyletic clade forming unique lineage amongst the grasshoppers in Caelifera^[3]. The pygmy grasshoppers usually prefer the aquatic, semi aquatic places in addition to plains. Amedegnato and Devriese^[4] thought that the species of tetrigidae are limno terrestrial and they need an aqueous environment/soaking areas in harshly terrestrial surroundings whereas few are reliant on water for the laying of their egg and development of hoppers. They seem to be virtuous divers and swimmers^[4, 5, 6].

Wagan and Kevan^[7] reported 07 species under 05 genera i-e: *Deltonotus*, Hancock 1904, *Epitettix* Hancock 1907, *Potua* Bolivar 1887, *Boliveritettix* Gunther 1939, *Lamellitettix* Hancock 1915 of Tetrigidae from India, Pakistan and Srilanka. Beside this, they discovered 02 new species i-e: *Potua aptera* n. sp. and *Bolivaritettix nathani* n. sp. The hitherto unknown male of *Epitettix tamilus* Gunther 1939, and females of *Criotettix latirons* Hebard 1929, and *Lamellitettix fletcheri* Hancock 1915 were also described for the first time. The following species were synonymized: *Hedotettix cristatus* Karny 1915, with *H. punctatus* Hancock 1909; and *Thoradonta pruthii* Gunther 1938, with *Th. sinuata* Hancock 1915. In addition, *Loxibolus parvispinus* Hancock 1912, was considered to be but a form of *L. acutus* Hancock 1904, and the name *Coptotettix rugosus* (Hancock 1904) was reinstated in place of *C. hancocki* (Kirby 1910). Suhail *et al.*,^[8] reported 08 species of tetrigid grasshoppers under 5 genera belonging

Corresponding Author:**Mehar-un-Nisa Maitlo**

Department of Zoology, Shah
Abdul Latif University Khairpur
Mirs, Sindh, Pakistan

to the subfamilies Scelimeninae and Metrodorinae collected from various localities of Rawalpindi Division. Out of which 04 genera i-e: *Eucriotettix*, *Bolivaritettix*, *Thoradonta* and *Eurymorphopus* and 07 species, viz., *Eucriotettix montanus*, *E. grandis*, *Bolivaritettix laticeps*, *Criotettix annandalei*, *Thoradonta apiculata*, *T. sinuata* and *Eurymorphopus latilobus* were recorded for the first time from Pakistan. Majeed *et al.*,^[9] reported 06 species of pygmy grasshoppers from Thal Punjab. Mahmood *et al.*,^[10] studied Tetrigidae from Azad Jammu and Kashmir and recorded *Oxyphyllum pennantium* Hancock, *Cingalotettix perugodes* Blackith, *Bolivaritettix nilgircus* (Hebard), *Bolivaritettix ghumtianus* (Hancock), *Thoradonta nodulosa spiculoba* (Hancock), *Coptotettix annandalei* Hancock and *Tetrix mundus* Walker, which were recorded for the first time from Pakistan. Sultana *et al.*,^[11] studied the genus *Hedotettix* Bolivar 1887 and reported three species i-e: *Hedotettix gracilis* (Haan, 1843),

H. lineifera (Walker, 1871), and *H. attenuates*, Hancock, 1904, of this genus from Sindh Pakistan. Skejo *et al.*,^[16] studied leaf-mimic pygmy grasshoppers from Indo sub-continent. But no work has been conducted on the Tetrigidae of district Naushahro Feroze.

2. Materials and Methods

2.1 Sampling and Killing

Pygmy grasshoppers were collected from different sites (agricultural fields and their surrounding vegetation) of district Naushahro Feroze through traditional insect net (8.89 cm in diameter and 50.8 cm in length) as well as by hand picking (Figure 1 & 2). Collected material was brought into Entomological Laboratory at Department of Zoology, Shah Abdul Latif University Khairpur Mirs and killed into insect killing jar containing potassium cyanide or by using insect killer^[12].

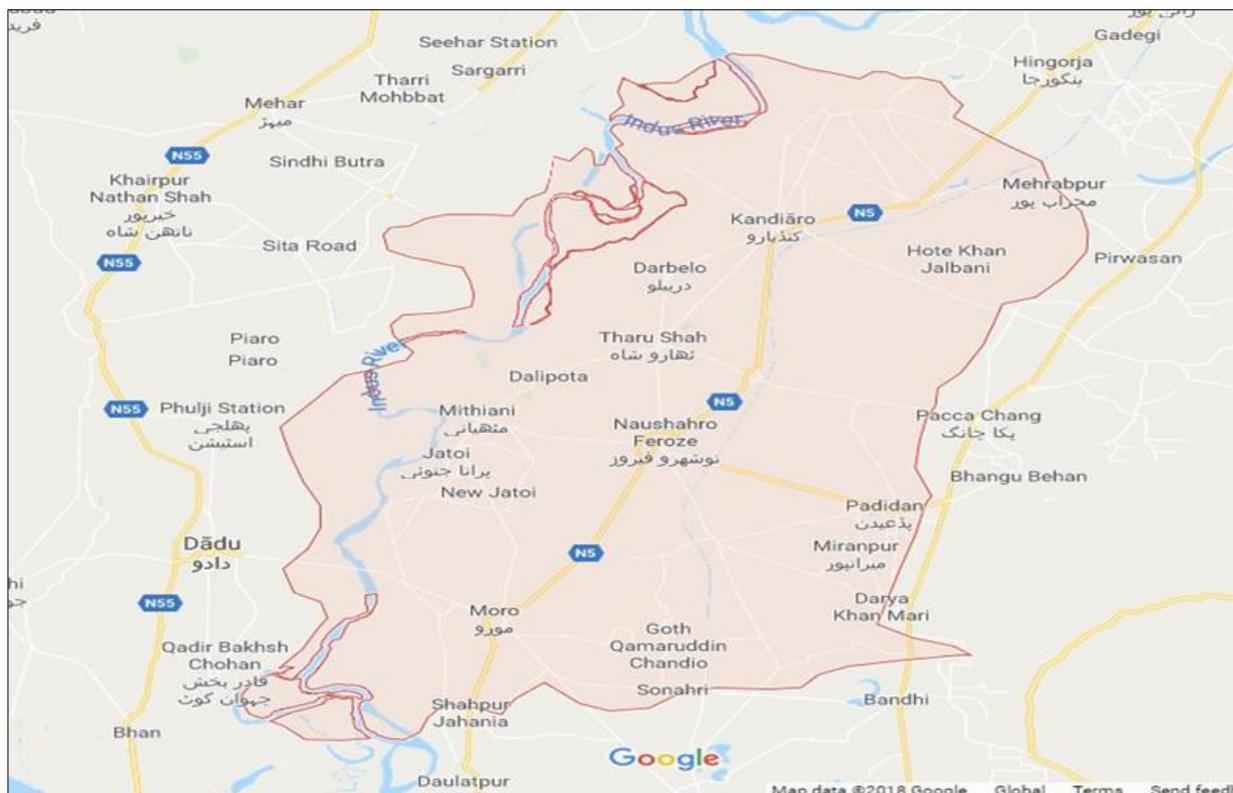


Fig 1: Map of District Naushahro Feroze



Fig 2: Showing the sites of collection

2.2 Fixation and identification of samples

Pygmy grasshoppers were fixed by insertion of insect pins place on pronotum. Important taxonomic characters were emphasized by the removal of dust through camel brush of Zero size. The Pygmy grasshoppers were identified on the basis identification keys present in the literature and Cigliano *et al.*, [7, 13, 17] (<http://orthoptera.speciesfile.org/>) (Figure 4).



Fig 3: Identifying the samples

2.3 Morphology and Measurements

Morphological characteristics of species were noted. Measurements of body parts were taken with the help of scale divider. Distribution of species in each taluka has been provided [8, 14, 15].

3. Results

Pygmy grasshoppers were captured from different talukas from different agricultural field and vegetation of district Naushahro Feroze through insect traditional net as and some of specimens were captured by hand picking method. A total of 186 specimens which were collected during the October 2018- July-2019. The specimens were identified into Family Tetrigidae, two subfamilies : Tetriginae and Scelimeninae with 05 genera and 07 specie; *Hedotettix gracilis* (Haan1843), *Hedotettix lineifera* (Walker, 1871), *Hedotettix punctatus* Hancock 1909, *Paratettix meridionalis* (Rambur, 1838) New Record from Pakistan, *Ergatettix dorsiferus* (Walker, 1871) New Record from Pakistan, *Thoradonta nodulosa* (Stål, 1861) New Record from Sindh and *Scelimena razalii* Mahmood, Idris & Salmah, 2007 New Record from Pakistan (Table. 1, 2 & Figure 4).

Table 1: New record of Pygmy grasshoppers from District Naushahro Feroze

Families	Subfamilies	Species	Status
Tetrigidae	Tetriginae	<i>Hedotettix gracilis</i> (Haan, 1843)	Sultana <i>et al.</i> , (2017) Sukkur
		<i>Hedotettix lineifera</i> (Walker, 1871)	Sultana <i>et al.</i> , (2017) Sukkur
		<i>Hedotettix punctatus</i> Hancock, 1909	Wagan 1990 Hyderabad
		<i>Paratettix meridionalis</i> (Rambur, 1838)	New Record Pakistan
		<i>Ergatettix dorsiferus</i> (Walker, 1871)	New Record Pakistan
	Scelimeninae	<i>Thoradonta nodulosa</i> (Stål, 1861)	New Record Sindh
		<i>Scelimena razalii</i> Mahmood, Idris & Salmah, 2007	New Record Pakistan

Table 2: Showing the distribution of collected specimens of Pygmy grasshoppers from district Naushahro Feroze

Taluka	Male	Female	Total (n=186)	Percen (%)
Moro	08	13	21	11.29
Naushahro feroze	07	17	24	12.90
Bhiria	15	24	39	20.96
Kandiaro	13	31	44	23.65
Mehrabpur	16	42	58	31.18
Total	59	127	186	100

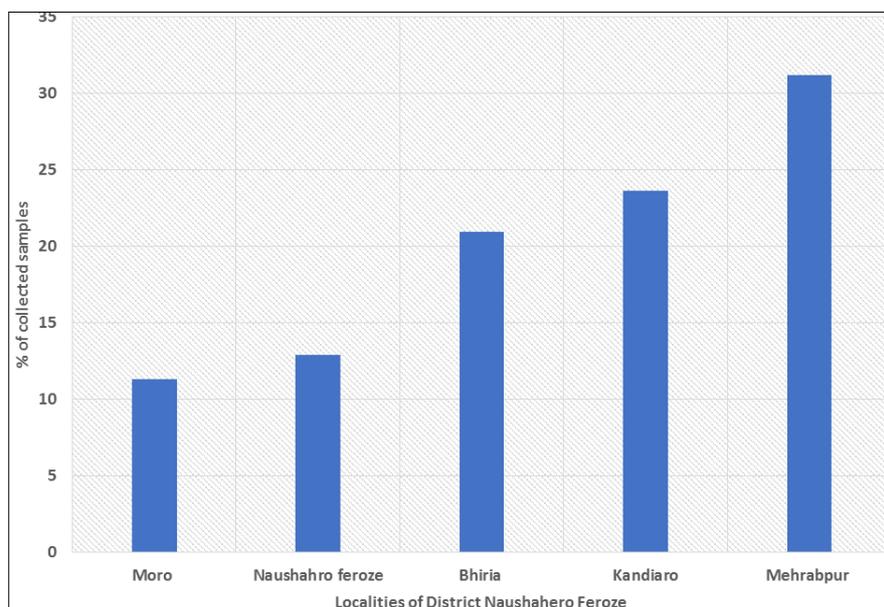


Fig 4: Showing the distribution of collected specimens of pygmy grasshoppers from district Naushahro Feroze

3.1 *Hedotettix gracilis* (Haan, 1843)

urn:lsid:Orthoptera.speciesfile.org:TaxonName:70292

Description

Body longer, generally dusty brown in color. Antennae filiform with 14 segments. Head small, fastigium of vertex broader as compared to *Hedotettix lineifera*. Pronotum finely sturdy, without definite color pattern spots behind the shoulder, median carina compressed. Tegmina oval, obtusely rounded at extremity. Cerci small pointed, with white spines. Valves of the ovipositor with fine teeth, or spine like projection, apex pointed and curved.

Material Examined. Several specimens

3.2 *Hedotettix lineifera* (Walker, 1871)

urn:lsid:Orthoptera.speciesfile.org:TaxonName:70288

Description

Body rigid, wrinkled and small. Antennae are filiform with 13-segments. Head is small, fastigium of vertex is narrow and carrying prominent median carina, frontal ridge is deeply sulcated above the lateral ocelli. Lateral ocelli are not much elevated. Pronotum contains compressed and undulating median carina. Tegmina are short and obtusely rounded at the margin. Wings are hyaline. Hind femur is broad towards the base and outer surface is convex in shape. Cerci are narrow and pointed at the apex, while its apical portion is white and dark at the base. Sub-genital plate is long and curved.

Material Examined. Several specimens.

3.3 *Hedotettix punctatus* Hancock, 1909

urn:lsid:Orthoptera.speciesfile.org:TaxonName:70277

Description

Body moderate in size, vary in color dusty grey with yellowish patches. Antennae are filiform. Head is small. Fastigium of vertex is narrow and slightly curved with obscure carina. Pronotum is rigid and wrinkled. Median carina may or not be much compressed. Tegmina are elongated and rounded at the apex. Wings are hyaline. Hind femur is brown with yellowish patches, median carina is serrated. Hind tibiae with 8-9 spines. Cerci small narrow and pointed at the apex. Sub-genital plate is long and curved.

Material Examined. Several specimens.

3.4 *Paratettix meridionalis* (Rambur, 1838)

urn:lsid:Orthoptera.speciesfile.org:TaxonName:69461

Description

Breadth of fastigium, form of the median femora, shape of the ovipositor valves and length of the pronotum. Fastigia of intermediate breadth occur, but the intergradation is interrupted, permitting this character to be used in forming species groups. The median femora are most variable. The shape of the ovipositor valves, especially the dorsal ones, is some what less valuable in determining relationships because of its high adaptational value. These structures vary from an elongate, dagger-like form.

Material Examined. Several specimens.

3.5 *Ergatettix dorsiferus* (Walker, 1871)

urn:lsid:Orthoptera.speciesfile.org:TaxonName:74462

Description

Head having distinct eyes evacuated overhead pronotum. The vertex is 0.8 X wider than eye. Anterior margins reach upto the eyes. Pronotum reaches about middle of post femur. Vertex is slightly convex from both side of median carinae and projecting above the pronotum. Vertex a little depressed with medial and lateral carinae almost raised to dorsal margin of eyes. Hardly concave above lateral ocelli. Distinctly projecting between antennae. Frontal costa in lateral view very little projecting between eyes. Surface granular and with scattered tubercles. Anterior margin sub truncate. Posterior apex broadly rounded. Prozonal carinae low parallel. Median carinae distinct but low in lateral view faint convex between sulci and faintly depressed between.

Material Examined. Several specimens

3.6 *Thoradonta nodulosa* (Stal, 1861)

urn:lsid:Orthoptera.speciesfile.org:TaxonName:70616

Description

Pronotum is covered by various granules and numerous nodules. Head is not protrude over level of pronotum surface. Vertex 1.9-2.3 time wider as eyes. Anterior margins straight

protruding but not crossing anterior margins of eyes. Lateral margin crumpled upward direction but not crossing the top of eye. Median carinae visible and swollen from anterior part and visible near eyes. Ovipositor first valve 3.2 time long and saw like in structure.

Material Examined. Several specimens.

3.7 *Scelimena razalii* Mahmood, Idris & Salmah, 2007

urn:lsid:Orthoptera.speciesfile.org:TaxonName:70416

Description

Body large sized for Tetrigidae in genera. Antennae filiform, 13-segmented; antennal bases below the level of lower margin of eyes; 1st massive scapus. Transverse and lateral carinae of the vertex slightly elevated. Frontal costa long. Fastigium of vertex with deep concavities behind lateral carinae.

Material Examined. Sindh: Naushahro Feroze proper 3.v.2019 2♂ (Leg. Maitlo & Panhwar)

4. Conclusion

Existing study concludes that district Naushahro Feroze is surrounded with huge biodiversity of insects and is less explored area for the insect fauna particularly Tetrigidae (Pygmy Devils/Pygmy grasshoppers). Thus, present study resulted in discovery of new records of Tetrigids. In addition, it added some to distribution of less known species.

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