

## Description of New Species of *Tettigonia* (Tettigoniinae: Orthoptera) from Pakistan

Riffat Sultana,\* Waheed Ali Panhwar and Muhammad Saeed Wagan

Department of Zoology University of Sindh, Jamshoro, Sindh Pakistan

**Abstract.**-A new species of genus *Tettigonia* Linnaeus, 1758, *Tettigonia chitralensis* collected from Chitral Pakistan is described and illustrated. It is distinguishable from *Tettigonia orientalis*, Uvarov, 1923 and *Tettigonia chinensis* Willemse, 1933 by having the elongated ovipositor (33-33.5mm) in length and 3.3 times longer than the pronotum. This new species is distinguishable from its closely related species *Tettigonia viridissima* (Linnaeus, 1758) by "U" shaped markings at posterior sulcus of the pronotum and two thin spines on the ventral surface of the prothorax. Beside this, *Tettigonia caudata* (Charpentier, 1842) was constructed as new record for this region.

**Key-words:** Tettigoniinae, *Tettigonia*, ovipositor.

### INTRODUCTION

An undescribed species assignable to the genus *Tettigonia* Linnaeus, 1758 was found from Chitral district of Khyber Pakhtunkhwa (KPK) in Pakistan while working on the taxonomic study of Tettigoniinae fauna. This subfamily Tettigoniinae is represented by several genera in the Holarctic region. The genus *Tettigonia* Linnaeus, 1758 is distributed throughout the Palaerctic region and Oriental region (Storozhenko, 1994). This genus was erected by Linnaeus in 1758 with the type species *Gryllus viridissimus*. Previously this genus comprised of 24 species now with the addition of *Tettigonia chitralensis* its number become 25.

Many researchers (Linnaeus, 1758; Bei-Bienko, 1965; Ingrisch and Shishodia, 1998; Bader and Massa, 2001; Garai, 2002; Ciplak, 2003; Wagan, 2008; Panhwar *et al.*, 2014; Riffat *et al.*, 2014; Greenwalt and Rust, 2014) have carried out significant work on the Tettigonioida fauna but less data about genus *Tettigonia* is available from Pakistan. Present study provisionally recognizes the genus *Tettigonia* according to the latest literature (Riffat and Wagan, 2013; Eades and Otte, 2014). No modern revision has been published for the genus *Tettigonia* before this. In addition to this, check-list of species was also provided. In the present paper, detail description of new species of this genus has been described and illustrated from Pakistan.

### MATERIALS AND METHODS

The adult *Tettigonia* were collected from pine trees and mulberry trees with the help of traditional insect hand-nets (8.89 cm in width and 50.8 cm in length). The standard entomological methods described by Vickery and Kevan (1983) and Riffat and Wagan (2012) were adopted for killing and preservation of specimens. Identification of specimens was carried out under a Stereoscopic Dissecting Binocular Microscope (Olympus SZX7, SZ2-ILST) with the help of keys and descriptions available in the scientific literature. The diagrams were all drawn with the help of an "Ocular Square Reticule" fitted in one eyepiece of the binocular microscope. All measurements are given in millimeters and were made with scales, dividers, and ocular square reticules. All collected material was deposited in the Sindh Entomological Museum (SEM) at Department of Zoology, University of Sindh, Jamshoro.

### RESULTS

#### CHECK LIST OF TETTIGONIA SPECIES

1. *Tettigonia acutipennis* Ebner, 1946
2. *Tettigonia balcanica* Chobanov & Lemonnier-Darcemont, 2014
3. *Tettigonia bricei* Greenwalt & Rust, 2014
4. *Tettigonia cantans* (Fuessly, 1775)
5. *Tettigonia caudata* (Charpentier, 1842) **New Record**
6. *Tettigonia chinensis* Willemse, 1933

\* Corresponding author: [riffatumer@hotmail.com](mailto:riffatumer@hotmail.com)  
0030-9923/2015/0005-1361 \$ 8.00/0  
Copyright 2015 Zoological Society of Pakistan

7. *Tettigonia dolichoptera* Mori, 1933
8. *Tettigonia hispanica* (Bolívar, 1893)
9. *Tettigonia ibuki* Furukawa, 1938
10. *Tettigonia chitralensis*, **New Species**
11. *Tettigonia krugeri* Massa, 1998
12. *Tettigonia longecalata* Chopard, 1937
13. *Tettigonia longispina* Ingrisch, 1983
14. *Tettigonia lozanoi* (Bolívar, 1914)
15. *Tettigonia macrocephalus* (Fischer von Waldheim, 1846)
16. *Tettigonia macroxipha* (Bolívar, 1914)
17. *Tettigonia orientalis* Uvarov, 1924
18. *Tettigonia savignyi* (Lucas, 1849)
19. *Tettigonia silana* Capra, 1936
20. *Tettigonia tsushimensis* Ogawa, 2003
21. *Tettigonia turcica* Ramme, 1951
22. *Tettigonia ussuriana* Uvarov, 1939
23. *Tettigonia vaucheriana* (Pictet, 1888)
24. *Tettigonia viridissima* (Linnaeus, 1758)
25. *Tettigonia yama* Furukawa, 1938

Genus *TETTIGONIA*, Linnaeus, 1758

*Tettigonia* Linnaeus, 1758, Syst. Nat. ed. 10:429

*Type species*

*Gryllus viridissimus* Linnaeus, 1758

*Diagnosis*

Body large, green or light brown. Fastigium of vertex 1.05-1.6 times narrower than first antennal segment. Pronotum usually smooth without lateral edges. Both fore and hind wings longer than the abdomen. Tegmina well developed, with rounded apex, 3.1-7.0 times longer than pronotum. Male cercus long, with large inner tooth placed shortly before the middle or near the base. Ovipositor straight, 2.7-4.3 times longer than pronotum. Subgenital plate of female with deep emargination on hind margin and with distinct lateral carinae.

***Tettigonia chitralensis*, new species**

(Fig. 1)

*Diagnosis*

This new species is very closely related to *Tettigonia viridissima* (Linnaeus, 1758) but it differs in size. In this new species fastigium of vertex narrower than the 1<sup>st</sup> antennal segment. Prothorax having 2 thin spines on ventral surface. The tegmina

gives authentic characteristics that is shaded from apex (Fig.1A). Ovipositor long and slanting (Fig.1E).

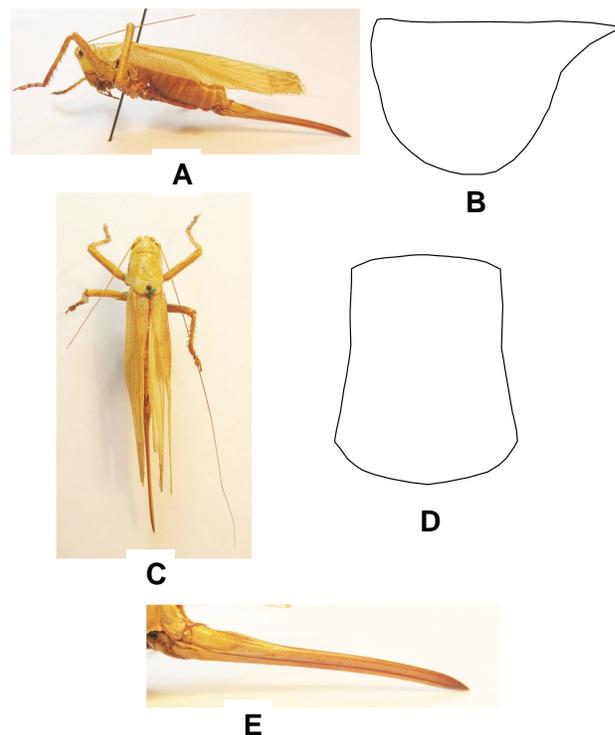


Fig. 1. *Tettigonia chitralensis* sp.nov. Female; A, adult LV; B, Pronotum lateral view; C, adult DV; D, Pronotum dorsal view; E, Ovipositor LV.

*Description of holotype*

Body cylindrical in shape; head ovoid. Pronotum rounded at posterior (Fig. 1D). Pronotum having “U” shaped marking at posterior sulcus (Fig.1B, C); antennae longer than the body. Prothorax having 2 thin spines on ventral surface. Tegmina and wings fully developed; tegmina surpassing the hind knees (Fig. 1A); ovipositor longer than the pronotal length; ovipositor is 3.3 times longer than the pronotum. Ovipositor long and slanting (Fig.1E).

*Coloration*

Body green or shiny yellowish when dried; abdomen having reddish brown spots. Tegmina having brown shades at apex. Ovipositor yellowish at base with dark brown color at apex.

*Measurement (in mm)*

♀: pronotum 10-10.5, tegmina 42.5-43, femur 32.5-33, tibia 28.5-29, ovipositor 33-33.5, total body length 29.5-30.

*Material examined*

*Khyber Pakhtunkhwa:* Chitral 2♀♀  
20.vi.2013 (Riffat and Waheed).

*Habitat*

Specimens were collected from the mulberry trees from Chitral (35°50'46"N 71°47'09"E).

*Ecology*

Chitral situated in the North West of Pakistan is a beautiful valley in the Hindukush range of mountains. It has always been a key route for many invaders to South East Asia, including Alexander the great Scythians and Mangol Changez Khan. The valley is covered with herbs, shrubs, trees. The common plant species found in Chitral are willow (*Salix*), juniper (*Juniperus* spp.) and poplar (*Populus* spp.). Fruit trees like mulberry (*Morus* spp.), walnut (*Juglans* spp.), apricot (*Prunus* spp.) and grapes (*Vitis* spp.) are found in the orchards of peasants and growers. Moreover, some cold resistant aromatic species like low shrubs, wormwood and low-laying cushion plants are also found.

*Remarks*

*Tettigonia chitralensis* sp. nov. is the 25<sup>th</sup> species assigned to this genus. The new species is very closely related to *Tettigonia viridissima* (Linnaeus, 1758) in the "U" shaped marking at posterior sulcus on the pronotum and having two thin spines on the ventral surface of prothorax. Moreover, it varies in the body coloration, in *T. viridissima* body green, from above with brown stripes. While in *T. chitralensis* sp. nov. having green or shiny yellow body coloration when dried, abdomen with yellowish spots. Tegmina having brown shade at apex. Ovipositor yellow at base with dark brown color at apex. Furthermore, the ovipositor is 3.3 times longer than the pronotum on the basis of these characters *T. chitralensis* is differ from *T. orientalis* and *T. chinesis*.

*Derivato nominis*

The specific epithet refers to the locality

"Chitral" from where the type specimen was collected.

*Depository*

All the material is deposited in the Sindh Entomological Museum (SEM) Department of Zoology, University of Sindh, Jamshoro, Pakistan

*Tettigonia caudata* (Charpentier, 1842)

*Tettigonia armeniaca* Tarbinsky, 1940

*Tettigonia kolenatii* (Fischer von Waldheim, 1846)

*Tettigonia longicauda* Eversmann, 1848

*Tettigonia prasina* (Fieber, 1852)

(Fig.2)

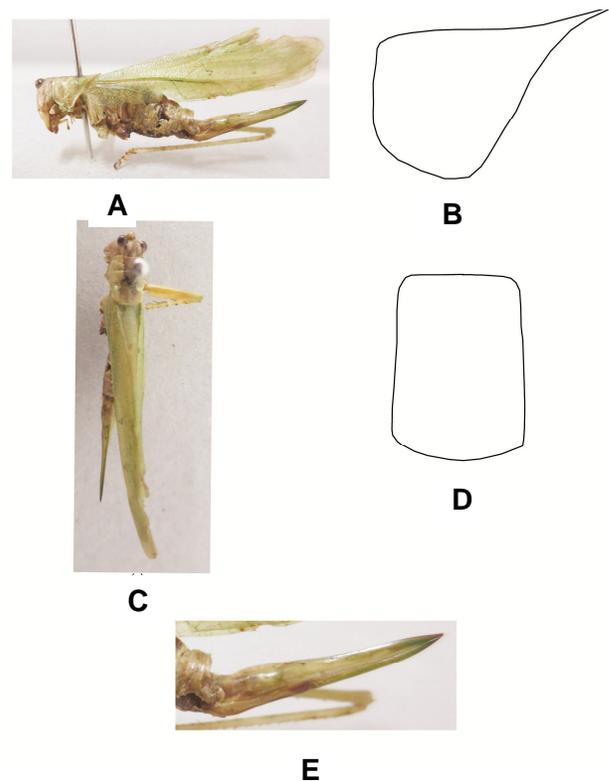


Fig. 2. *Tettigonia caudate*, Female; A, adult lateral view; B, Pronotum lateral view; C, adult dorsal view; D, Pronotum dorsal view; e, ovipositor lateral view.

*Description of female*

Size medium, coloration green (Fig. 2A, B). Pronotum and head from above characteristic dark brown spots (Fig. 2C,D). Vertex narrow produced upto the base of scape. Pronotum with well developed two spines extending upto mesosternum

(Pro, meso and meta sternum with well developed spines two one on each side). Ventral spines of the hind femur, each with a distinct basal black spot. Tegmina broadly rounded about equal to the wings (Fig. 2A). Fore tibia with well-developed spines. Ovipositor extending upto the end of tegmina; ovipositor 3.9 times longer than the pronotum. (Fig.2E).

#### Measurement (in mm)

1♀: pronotum 5.6, tegmina 32, femur 23, tibia 23.2, ovipositor 18, total body length 22.

#### Material examined

*KhyberPakhtunkhwa*: Mansehra near (Guest House) 1♀ 15.ix.2013 (Riffat and Waheed).

#### Habitat

A single female was collected from the tall pine's tree from Mansehra (34°19'60 N, 73°12'0E).

#### Remarks

*Tettigonia caudata* is of eastern origin and extends west to the eastern Switzerland and to eastern Germany, it is usually occur in dry warm, bushy and edge-rich habitats, mainly bushy grasslands, slopes, and occasionally fields mostly located in a richly textured landscape. Previously, Storozhenko (1994) reported this species from Russia. At the present, we have collected this species from pine tree along with thick herbaceous vegetation from Mansehra district. Present study suggests that if more surveys are to be made to the various localities of KPK, might lead to the addition of new wealth in *Tettigonia* diversity from this province.

### ACKNOWLEDGEMENT

This study was supported by grants received from Pakistan Sciences Foundation, PSF (No:PSF/Res/S-SU/Bio (423) and Higher Education Commission (HEC) Pakistan under Indigenous PhD Fellowship for 5000, Scholars Phase-II.

### REFERENCES

- BADER, A.K. AND MASSA, B., 2001. Tettigoniidae (Orthoptera) from Jordan with description of new species and re-description of less known species. *J. Orthop. Res.*, **10**:25-37.
- BEI-BIENKO, G.Y., 1965. *Fauna of the USSR Tettigonioidae (Orthoptera)*, **2**: 360.
- CIPLAK, B., 2003. Distribution of Tettigoniinae (Orthoptera, Tettigoniidae) bush-crickets in Turkey: the importance of the Anatolian Taurus Mountains in biodiversity and implications for conservation. *Biodiv. Conserv.*, **12**:47-64.
- EADES, D.C. AND OTTE, D., 2014. *Orthoptera species File Online*. Version 2.0/3.5. <http://orthoptera.speciesfile.org>. (Accessed 01.11. 2014)
- GARAI, A., 2002. Orthopteroid insect from Pakistan. *Esp. Buch. Ent.*, **9**:431-447.
- GREENWALT, D.E. AND RUST, J., 2014. A new species of *Pseudotettigonia* Zeuner (Orthoptera: Tettigoniidae) with an intact stridulatory field and reexamination of the subfamily Pseudotettigoniinae. *Sys. Ent.*, **39**:256-263.
- INGRISCH, S. AND SHISHODIA, M.S., 1998. New species and records of Tettigoniidae from India (Ensifera). *Bull. De-La. Soc. Ent. SUISE*, **71**:355-373.
- LINNAEUS, C., 1758. *Systema Naturae per regna tria naturae secundum classes, ordines, genera, species, cum locis*. (Ed. 10). Holmiae [=Stockholm] Sweden: *Laur. Salvinius*. Vol. **1**, III, pp. 823.
- PANHWAR, W.A., RIFFAT, S., WAGAN, M.S., KHATARI, I. AND SANTOSH, K., 2014. Systematic study on the various Tribes of Phaneropterinae (Tettigonioidae: Orthoptera) occurring in Pakistan. *Pakistan J. Zool.*, **46**: 203-213.
- RIFFAT, S. AND WAGAN, M.S., 2012. *Taxonomy of Tettigonioidae (Ensifera) of Pakistan*. First Technical Report (PSF), Res. No S-SU/Bio (423) Islamabad. Pp. 1-111.
- RIFFAT, S. AND WAGAN, M.S., 2013. *Taxonomy of Tettigonioidae (Ensifera) of Pakistan*. Final Technical Report (PSF), Res. No S-SU/Bio (423) Islamabad. pp 1-185
- RIFFAT, S., PANHWAR, W.A., WAGAN, M.S. AND KHATRI, I., 2014. Systematic status of true katydids *Sathrophyllia* (Orthoptera, Tettigonioidae, Pseudophyllinae) from Pakistan, with description of two new species. *ZooKeys*, **466**: 1-11. doi: 10.3897/Zookeys.466.8423
- STOROZHENKO, S.Y.U., 1994. Review of Orthoptera of Eastern Palearctica: genus *Tettigonia* Linnaeus (Tettigoniidae, Tettigoniinae). – *Far East. Entomol.*, **3**: 1-20.
- VICKERY, V.R. AND KEVAN, D.K.MCE., 1983. A monograph of the Orthopteroid insects of Canada and adjacent regions. *Mem. Lyman ent. Mus. Res. Lab.*, **13**: 680-1462.
- WAGAN, M.S., 2008. *Preliminary studies on long horned grasshopper (Tettigonioidae) of Sindh. 28<sup>th</sup> Pak. Cong. Zool.* p 69 (Abstract)

(Received 14 January 2015, revised 5 June 2015)