



Short Communication

Key to the Tribes and Genera of Tettigoniioidea (Orthoptera) of Pakistan

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ABSTRACT

A key to the 20 tribes and 22 genera of Tettigoniioidea is provided, with figures, from Pakistan.

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Authors' Contributions

RS conceived and designed the experiment, collected the material and wrote this manuscript. WAP prepared illustrations. MSG identified and confirmed the specimens and helped in analysis of the data.

Key words

Tettigoniioidea, Tribes, Genera, Pakistan.

The Tettigoniidae (Ensifera) is a heterogeneous family with more than 1120 recognized genera and 6800 species. It is considered the largest family within the Orthoptera (Bisby *et al.*, 2007). Members of this family are also known as one of the most widespread old world insect groups (Jago, 1997). Samways (1989) and Ciplak (2003) reported that species usually live in open places, mainly in dry habitats, over a wide range of altitudes.

The first valid information on Tettigoniidae was given by Stål (1874), but a thorough review was provided by Brunner (1878, 1893, 1895) and Retdenbacher (1891), which are now considered out of date. After these 19th century publications, there is no consolidated work, and one has to consult numerous publications (Uvarov, 1942; Ragge, 1956, 1961; Bei-Bienko, 1965; Ingrisch, 1990, 2002; Ingrish and Shishodia, 1998; Ciplak, 2000; Naskrecki, 2001; Bader and Massa, 2001; Andreeva, 2003; Riffat and Wagan, 2007, 2012; Wagan, 2008). More recently, Riffat *et al.* (2013, 2014) and Panhwar *et al.* (2013, 2014) studied the morphological status of various species of Tettigoniidae from Pakistan.

This article has revised the Tettigoniodea tribe key to include 47 new species from Pakistan discovered by Riffat *et al.* (2013). It is thus not surprising that intensifying the research on the Tettigoniodea fauna of Pakistan reveals many new taxa and records. A total of 22 known genera are included in the key. Figures are also provided and

additional figures can be found in Riffat *et al.* (2013, 2014, 2015) and Panhwar *et al.* (2013, 2014).

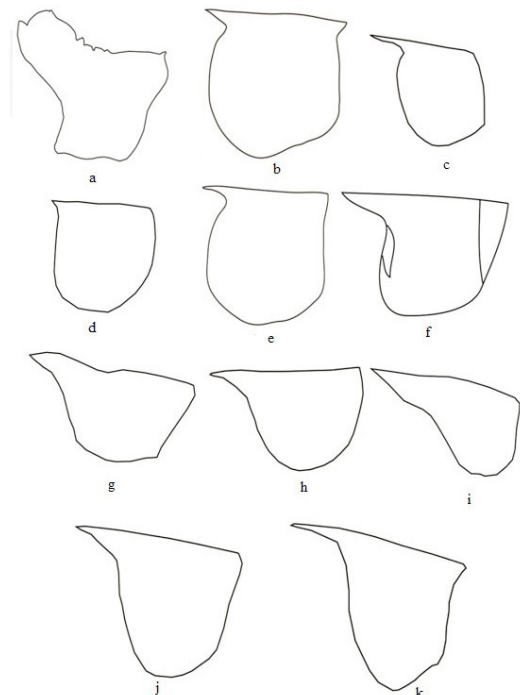


Fig. 1. Pronotum lateral views; a, *Sathrophyllia rugosa*; b, *Trigonocorypha unicolor*; c, *Letana bulbosa*; d, *Tylopsis lillifolia*; e, *Holochlora japonica*; f, *Playcleis intermdia*; g, *Glyphonotus sinensis*; h, *Tettigonia caudata*; I, *Eupholidoptera karatolosi*; j, *Decticus albifrons*; k, *Afromecopoda monroviana*.

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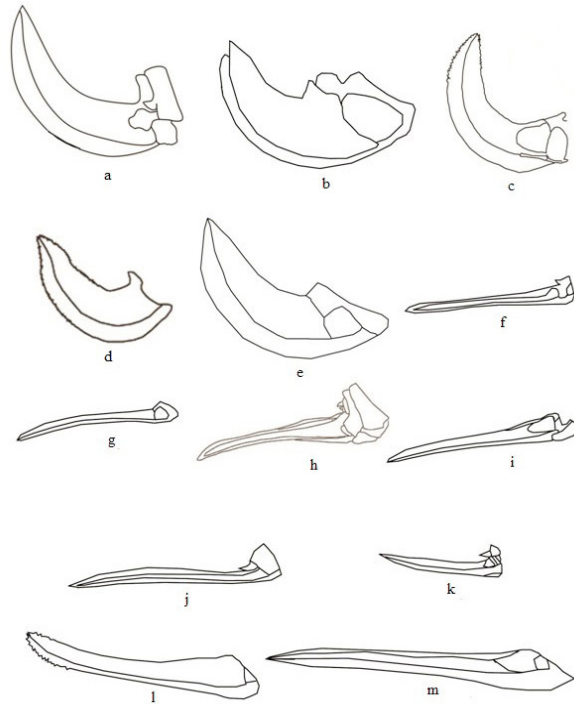


Fig. 2. Ovipositor lateral views: a, *Phaneroptera roseata*; b, *Holochlora japonica*; c, *Ducetia japonica*; d, *Tylopsis lillifolia*; e, *Isopsera spinosa*; f, *Glyphonotus sinensis*; g, *Gampsocleis akbari*; h, *Eupholidoptera karatolosi*; i, *Tettigonia caudate*; j, *Euconocephalus incertus*; k, *Conocephalus maculatus*; l, *Decticus albifrons*; m, *Mecopoda platyphoea*.

KEY TO TETTIGONIOIDEA TRIBES AND GENERA FROM PAKISTAN

The characters given in the key will separate the Pakistan genera but not necessarily the tribes from a wider distribution. Genera in this key are grouped by tribe, and some of these are based on the following structures: body size, pronotum, fastigium, cerci, subgenitalplate, and shape of ovipositor.

- 1. Size large (38 mm), head short and rounded in appearance 2
- Size (approx. 29mm) head short, rounded face flattened *Sathrophyllia*
- 2. Pronotum pronounced with or without tubercle (Fig. 1a) *Cymatomerini*
- Pronotum flat without tubercle (Fig. 1b).....3
- 3. Fastigium wide and triangular, *Trigonocorypha*
- Fastigium of vertex narrow and conical.... *Hexacentrus*
- 4. Cerci long and curved (Fig. 3e)..... *Phaneropterini*
- Cercilong, strongly curved, pointed apically 5
- 5. Ovipositor short, less than 1.5 times as long as

- pronotum (Fig. 2a) *Phaneroptera*
- Ovipositor not shorter than 2.2 times long as pronotum (Fig. 2b) *Holochlorini*
- 6. Subgenital plate of male with deep bifurcation (Fig. 3a) *Letanaeini*
- Subgenital plate of male not deeply bifurcate, having lobes (Fig. 3b)..... *Ducetini*
- 7. Pronotum smooth, flat behind the lateral lobes (Fig. 1e)8
- Pronotum not smooth, lateral carinae serrated and straight (Fig. 1b) *Trigonocoryphini*
- 8. Ovipositor short, wide, strongly curved with rough lateral surface (Fig. 2b) *Holochlora*
- Ovipositor relatively narrow, bent almost semi-circularly upwards (Fig. 2c)..... *Ducetia*
- 9. Pronotum with conspicuous but not deep humeral notches (Fig. 1c)..... 10
- Pronotum with shallow humeral notches on lateral lobes (Fig. 1d) 11
- 10. Cerci long, thin, curved (Fig. 3f) *Letana*
- Cerci not long, flattened, truncate, short, andthick (Fig. 3g).....13
- 11. Ovipositor lamelliform (Fig. 2d)... *Tylopsini (Tylopsis)*
- Ovipositor sickle-shaped (Fig. 2e)... *Isopserini (Isopsera)*
- 12. Wings short (5mm), dark brown..... *Drymadusini*
- Wings large (32mm), green18
- 13. Subgenital plate longer, wide, with excised apex (Fig. 3d) *Caloptera*
- Subgenital plate shorter, wide without excised apex (Fig. 3c) *Iranusa*
- 14. Wingsdark brown or dark gray in coloration15
- Wings brownin coloration 16
- 15. Size large (21mm), body brown, ovipositor slightly curved ventrally, obliquely slanting on dorsal side of apex. Prothorax with two long slender spines ventrally between forelegs, tegmina without distinct dots..... *Gampsocleidini*
- Size small (11.5 mm), body gray, ovipositor curved dorsally. Prothorax without spines ventrally, tegmina with dots..... *Platyceidini*
- 16. Pronotum with rudimentary lateral carinae. Pronotum not wrinkled dorsally (Fig. 1f) *Platycleis*
- Pronotum having caudal margin angular, lateral carinae parallel; surface lacking median carina (Fig. 1g).....17
- 17. Ovipositor sword-shaped and curved upwards, dorsal and ventral margins smooth, apex acute (Fig. 2f)..... *Glyphontini*
- Ovipositor slightly curved ventrally, obliquely slanting on dorsal side of apex (Fig. 2g)..... *Gampsocleis*
- 18. Pronotum smooth without lateral carinae (Fig. 1h) *Tettigoniini*
- Pronotum not smooth having rudimentary lateral

- carinae (Fig. 1i)..... *Eupholidoptera*
19. Ovipositor narrow, strongly compressed laterally (Fig. 2h).....Pholidopterini
 -- Ovipositor long extending upto end of tegmina (Fig. 2i).....*Tettigonia*
20. Vertex of head produced to form a tapering cone between antennal bases, notched below, extending beyond basal antennal segments Copiphorini
 -- Vertex of head not extending beyond basal antennal segment; produced as rounded tubercle with concave sides, not notched beneath.....Conocephalini
21. Ovipositor long and straight (Fig. 2j)...*Euconocephalus*
 -- Ovipositor sword-shaped, firm, and smooth (Fig. 2k)*Conocephalus*

22. Fastigium of vertex narrow, conical, apex acute.....23
 -- Fastigium of vertex rounded or truncates....Mecopodini
23. Cerci without denticles (Fig. 3h)Hexacentrini
 -- Cerci with denticles (Fig. 3i).....24
24. Ovipositor curves slightly upwards and crenulated at apex (Fig. 2l)*Decticus*
 -- Ovipositor robust, elongate, sometime incurved (Fig. 2m)..... *Mecopoda*
25. Pronotum dorsally convex, with well-marked median carina (Fig. 1j).....Decticini
 -- Pronotum flat dorsally, with humeral sinus (Fig. 1k)*Afromecopoda*
26. Fastigium of vertex conical, narrower than scapus, furrowed dorsally and separated by step-like incisionHimertulini (*Himertula*)
 -- Fastigium of vertex inversely ovoid, dorsal apex distinctly narrower than vertex fastigium, usually separated from vertex fastigium by a rather large gap..... *Glyphonotus*

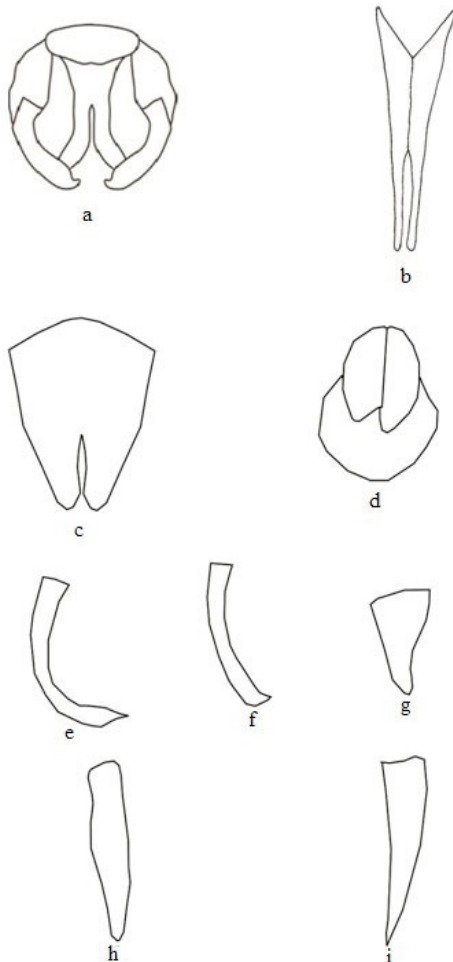


Fig. 3. Subgenital plate (a-d) and Cerci (e-i); a, *Letana rufonotata*; b, *Ducetia japonica*; c, *Iranusa grisea*; d, *Calopterus balucha*; e, *Phaneroptera gracilis*; f, *Letana rufonotata*; g, *Calopterus balucha*; h, *Hexacentrus unicolor*; i, *Decticus verrucivorus*.

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Statement of conflict of interest

Authors have declared no conflict of interest.

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