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Description of new species of the Genus, *Trigonocorypha* (Orthoptera: Tettigoniidae: Phaneropterinae) from Tamil Nadu, India

Govindaraj Divya and Natchiappan Senthilkumar

Abstract
Two new species of the Genus, *Trigonocorypha* Stal 1873 (Orthoptera: Tettigoniidae: Phaneropterinae) as *Trigonocorypha ponmaniae* sp. nov. and *Trigonocorypha thiruvannamalaiensis* sp. nov. collected from Coimbatore and Thiruvannamalai districts of Tamil Nadu respectively are described with morphological characteristics of the other four species reported from India. A key to identify the species of the reported Genus, *Trigonocorypha* of India has been provided.

Keywords: Tettigoniidae, Phaneropterinae, Trogonocorypha, Tamil Nadu, India

Introduction
The family Tettigoniidae is a heterogeneous and lesser known group of insects in the order Orthoptera (Bisby *et al.*, 2007) [1]. The said family is commonly known as bush crickets, there are 7200 species belonging to 1070 genera were known globally. Of which 160 species with 68 genera are reported from India (Shishodia *et al.*, 2010) [11]. According to Orthoptera species file, there are only four species were recorded in the Genus, *Trigonocorypha* Stal 1873 [13] in oriental region (http://orthoptera. speciesfile.org/HomePage/Orthoptera/HomePage. aspx). In India four species have so far been recorded viz., *T. unicolor* (Stoll 1787) [14], *T. abnormis* Brunner von Wattenwyl, 1878, [2] *T. brevinota* Ingrisch, 1996 [5] and *T. angustata* Uvarov, 1922[15] (Shishodia, *et al.*, 2010) [11] (Srinivasan 2012) [12] (Panhwar *et al.*, 2014) [16] (Koli *et al.*, 2014) [6] (Sultana *et al.*, 2013) [9] (Nagar *et al.*, 2015) [7] (Senthilkumar *et al.*, 2014) [10]. The present study deals with description and diagnoses of two new species proposed as *Trigonocorypha ponmaniae* sp. nov. and *Trigonocorypha thiruvannamalaiensis* sp. nov.

Materials and Methods
The adults were collected during night hrs (0600 - 2100) by search out and hand picking method at Maruthamalai hills in Coimbatore district and Jawathu hills in Tiruvannamalai district of Tamilnadu, India. The description of the two new species and key to the species of the Indian Trogonocorpha Stal 1873 are given in this paper. Specimens collected were photographed with a digital 0.3m CMOS sensor microscope and measurements (Max. 30f/s under 600 Lux brightness) were made using micro measure software. The terminology used is that of Rentz (1979) [8], Ingrisch and Shishodia (2000) [4], Ingrisch and Muralirangan (2004) [3], Nagar *et al.*, (2015) [7].

Genus: Triconocorypha Stal 1873
The fastigium is very low, wide, and triangular, wider basally than antennal pedicel; pronotum having with flat disc, slightly concave in the median, conspicuous, divergent posteriorly, serrate lateral carina with deep humeral notch. Tegmen wider in the middle and narrowed and acute at apex. Hind wings are longer as compared to tegmen and camouflaged green as with tegmen at the apex.

Trigonocorypha ponmaniae sp. nov.
Female: Body is large in size with short head. Fastigium of vertex is very low. triangular, wider basally than antennal pedicel, on upper side grooved eye globular, and extended laterally, antennal pedicel pointed anteriorly and almost in contact with frontal apex at a single point, on upper side are grooved or with lateral fringe.

Pronotum with flat, slightly concave disc; lateral carinae straight conspicuous, divergent posteriorly, with obtuse serrations. Posterior margin of pronotum rounded, and fringe with median sulcus

Lateral lobes of pronotum with two uneven and discontinuous transverse sulci are noticed. Humeral notch is continuous, conspicuously blend but strong and unequal depth. Prosternum tubercle are with clear diamond shaped. Wing venation of both fore and hind wings are clear Ovipositor is short, sickle shaped, strongly blend upward, obtuse triangular serrations on the entire upper and lower margins, apex on the ovipositor acute, upper blade is extended slight above the lower blade, horn like projection at base. One third of ovipositor both on upper and lower margins are with fine serrations. Cerci are long with fine hairs, sub genital plate is short, strongly triangular, raised upward.

Colouration: Large sized, green colour insect, and eyes are pale greenish dark in colour. Ovipositor is dark black in colour, lower margin in particular, most conspicuous fine serrations are black in colour entirely.

Male. Unknown.

Type Material. Holotype: 1 ♀, Maruthamalai hills, Coimbatore, Tamil Nadu, India. 17 III 2019. Coll. Smt. G. Ponmani.

Distribution: Coimbatore, Tamilnadu, India.

Etymology: The name of the species derived by the collector's name.

Discussion: The new species differs from other four species recorded in India namely, *T. unicolor* (Stoll 1787) [14], *T. abnormis* Brunner von Wattenwyl, 1878, [2] *T. brevinota* Ingrisch, 1996 [5] and *T. angustata* Uvarov, 1922 [15] by the different marking noticed in dorsal view of pronotum. Lateral carina of the pronotum with humeral notch conspicuous, blend but strong uneven depth. Median of the pronotum is with uneven marking unlike other species found in India. Two uneven transverse sulci in median of pronotum, clear wing venation, ovipositor flat, bent upwards, upper and lower margins are fully black in colour with fine and triangular serrations on both anterior and posterior margins from basal to distal end. Ovipositor is slightly longer than other species. Long cerci and strongly narrowed at tip with fine spur (Panhwar *et al*., 2014) [16] (Ingrisch, 1996) [5].

***Trigonocorypha thiruvannamalaiensis* sp. nov.**

Female: Body is large in size with short head. Fastigium of vertex is acute. Eyes are globular, and extended laterally. Antennal pedicel is pointed anteriorly and almost in contact with frontal apex at a single point, on upper side grooved or with lateral fringe. Pronotum is flat, slightly concave disc; lateral carinae straight conspicuous, divergent posteriorly, with obtuse serrations. Posterior margin of pronotum disc is round. Lateral lobes of pronotum is with strong patches on both sides, irregular humeral notch, conspicuously blend but strong and unequal depth, humeral notch is not single beaded and are joined and formed with 3,2,3,2 numbers. Prosternum tubercle absent; clear wing venation noticed in both fore wing and hind wings, ovipositor is short, sickle shaped, strongly blend, flat upward, pointed triangular serrations on the entire upper and lower margins, apex on the ovipositor acute, but upper blade is extended slight above the lower blade, horny projection at base. One third of the ovipositor is having strong sulcus from anterior to posterior margin, long cerci, sub genital plate is short, strong, triangular with raised upward.

Coloration: Large sized, green colour insect, eyes are pale green and dark in colour. Ovipositor upper and lower margins are black in colour, especially the serrations entirely.

Male: Unknown.

Type Material. Holotype: 1 ♀, Jawathu hills, Tiruvannamalai, Tamilnadu, India. 19 VI 2018. Coll. Smt. Divya. G.

Distribution: Tamilnadu, India.

Etymology: The name of the species derived by the collector's name.

Discussion: The new species differs from other four species recorded in India namely, *T. unicolor* (Stoll 1787) [14], *T. abnormis* Brunner von Wattenwyl, 1878, [2] *T. brevinota* Ingrisch, 1996 [5] and *T. angustata* Uvarov, 1922 [15] by the different marking noticed in dorsal view of pronotum. Lateral carina of the pronotum with humeral notch conspicuous, blend but strong uneven depth. Median of the pronotum with uneven marking unlike other species found in India. Clear wing venation, ovipositor flat, bent upwards, upper and lower margins are fully black, fine sharp serrations on both anterior and posterior margins from basal to distal end. Ovipositor is slightly longer than other species. Long cerci and strongly narrowed at tip with fine hairs (Panhwar *et al*., 2014) [16] (Ingrisch, 1996) [5].

Key to species of the genus *Trigonocorypha* recorded in India

1. Short and curved ovipositor 2

1(A). Long and narrowed ovipositor 3

2. Tegmina shorter, narrow or wide in the middle with pale band in its basal part; Ovipositor short, strongly flattened, bent upward, with fine serration on the entire upper margin and the apical part of lower margin, apex of ovipositor roundly obtuse..... 4

2 (A). Tegmina shorter and wide and without a pale band in its basal half; ovipositor short, strongly flattened, bent upward, with fine serration on the entire upper margin and the apical part of lower margin..... 6

3. Humeral notch blunt but deep ……...6 (A)

3 (A). Humeral notch blunt, that groove formed with 3, 2, 3, 2 series……7 (A)

4. Tegmina shorter, less than 50 mm; long ovipositor; Lateral carinae of pronotum parallel.....*T. abnormis* Brunner von Wattenwyl, 1878

4(A). Tegmina broad and slightly higher to hind wings…….5

5. Ovipositor short and curved upwards, broad with fine serrations on the upper margin and the apical part of lower margin, apex of ovipositor obtuse..... *T. brevinota* Ingrisch, 1996

5(A). Tegmina shorter and wide and without a pale band in its basal half; Pronotum humeral notch sharp but of moderate depth; Ovipositor short, strongly flattened, bent upward, with

fine serration on the entire upper margin and the apical part of lower margin, apex of ovipositor roundly obtuse.....*T. unicolor* (Stoll 1787)

6. Tegmina narrower than with a slight notch beyond the middle of anterior margin and a narrow pale band in its basal part ; ovipositor short, strongly and sharply bent upward, with thick serrations on the entire upper margin and very minimum in apical part of the lower margin ..... *T. angustata* Uvarov, 1922

6(A). Prosternum tubercle with clear diamond shaped .....…7

7. Lateral lobes of pronotum with two uneven and discontinuous transverse sulcus, Continuous humeral notch conspicuously blend but strong and unequal depth; Prosternum tubercle with conspicuous diamond shaped ……..... *T. ponmaniae* sp. nov.

7 (A). Pronotum lateral view with strong patches on both side, irregular humeral notch conspicuously blend but strong and unequal depth, humeral notch groove formed with 3, 2, 3, 2 series ……*T. thiruvannamalaiensis* sp. nov.

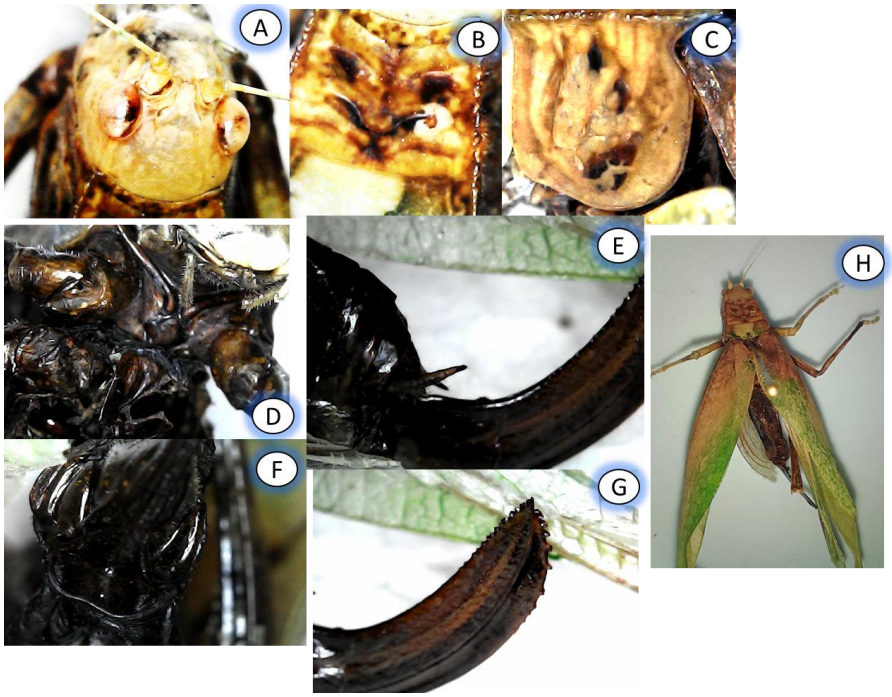

Plate 1: *Trigonocorypha ponmaniae* Divya & Senthilkumar sp. nov.

***Trigonocorypha ponmaniae* sp. nov.** ; A-Dorsal view of head & fastigium of vertex, B- Pronotum, C- Lateral view of pronotum, D- Prosternum, E- Cerci with Ovipositor, F- 10th abdominal tergite, G- apex of Ovipositor and H- Dorsal view of female.

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Plate 2: *Trigonocorypha thiruvannamalaiensis* Divya & Senthilkumar, sp. nov.

Trigonocorypha thiruvannamalaiensis sp. nov.: A-Dorsal view of head & fastigium of vertex, B- Dorsal view of Pronotum, C- Lateral Carina of pronotum, D-Lateral view of pronotum, Prosternum, E- Cerci with Ovipositor, F- 10th abdominal tergite, G- apex of Ovipositor and I-Dorsal view of Female.

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