



TWO NEW RECORDS OF LEAFHOPPERS OF THE GENUS *OPSIUS* FIEBER FROM INDIA

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ABSTRACT

Present study records two *Opsius* leafhopper species, *Opsius richteri* (Dlabola) and *Opsius stactogallus* Fieber from Delhi, India for first time. Earlier *Opsius richteri* had been described from Iran and *Opsius stactogallus* is distributed worldwide and now reported from India. This study reveals the new geographic distribution, and the species are redescribed and illustrated herein.

Key words: Auchenorrhyncha, Deltocephalinae, Cicadellidae, Opsiina, leafhopper, Opsiini, *Opsius*, new records, morphology, taxonomy, Hemiptera, redescription, distribution, *Opsius stactogallus*, *O. richteri*

Leafhopper family Cicadellidae, is one among the largest insect families with over 22,000 described species and many more awaiting description (Oman et al., 1990; Dietrich et al., 2001; Dietrich and Rakitov, 2002). Among Cicadellidae, Deltocephalinae is diverse, largest and most economically important subfamily with 38 tribes, 923 genera and >6700 valid species (Dai et al. 2017; Zahniser and Dietrich, 2013). The tribe Opsiini is distinguished from other tribes by the face oblique, not strongly depressed, not concave in profile; anterior margin of the head without carinae; antennal bases near middle or posteroventral (lower) corner of eyes; gena not extended on to dorsum behind eyes; the stem of connective longer and bifurcated aedeagus with two gonopores (Zahniser and Dietrich, 2013). This tribe is divided into four subtribes with >300 species, of which the subtribe Opsiina has been added with more genera (El-Sonbati et al., 2016, 2017; Sunil et al., 2020) and species (El-Sonbati et al., 2018, 2019; Sunil et al., 2020). The genus *Opsius* was established by Fieber (1866) with type species *Opsius stactogallus*. This genus is distinguished by its anterior margin of head never with carinae or ridge, face convex, and neither horizontal nor concave, aedeagal socle swollen and bulbous, with or without a pair of ventral processes. From India two species have been reported viz., *Opsius smaragdinus* (Distant, 1908) and *Opsius versicolor* (Distant, 1908). This genus was revised by El-Sonbati (2020) from Kingdom of Saudi Arabia dealing with

seven species including *Opsius wilsoni* El-Sonbati,, and all these species are restricted to moist habitats and feed on *Tamarix* spp. (Newete et al., 2019), and *Opsius* leafhoppers are well known honey dew producers on *Tamarix* spp. (Wiesenborn 2004; Virla et al. 2010; Siemion and Stevens 2015). *Opsius* contains thus 20 species worldwide, including four species from India so far. In this study first record of *Opsius stactogallus* and *Opsius richteri* Dlabola are documented from India.

MATERIALS AND METHODS

The specimens studied at the National Pusa Collection (NPC) insect museum, Division of Entomology, ICAR-Indian Agricultural Research Institute (IARI), New Delhi. The terminology followed is after Zahniser and Dietrich (2013) and El-Sonbati (2020). Male genitalia dissections were carried out as described by Oman (1949) and Knight (1965), and it is as follows- the abdomen was removed by inserting a sharp pin between the abdomen and thorax with gentle piercing. The abdomen was treated in 10% KOH for 2~4 hr to remove unsclerotized material by gently prodding the abdomen with the head of a pin. Afterwards, the abdomen was rinsed thoroughly in water. The internal structures were then removed by a hooked pin, before being stored in glycerol vials for study. Photographs were taken with a Leica DFC 425C digital camera on the Leica M205FA stereozoom automontage microscope.

RESULTS AND DISCUSSION

Opsius richteri Dlabola (Figs. 1-10; 11-19)*Opsius richteri* Dlabola 1960: 15

Redescription

Colour of head, pronotum and scutellum greenish yellow. Face yellow, genal margin greenish; ocelli reddish, eyes dark red (Figs. 1, 11). Forewings greenish yellow with small brown spots scattered throughout wings; antepical posterior region and apical cell region dusty whitish with large groups of brown spots (Figs. 2, 12). Head including eye 1.06x about width of pronotum. Anterior margin of vertex slightly produced; length of vertex half as long as it's wide in between eyes or 0.6x as width of eyes (Figs. 4, 14). Pronotum length 0.49x

as short as its width; anterior margin convex, posterior margin concave. Scutellum length 0.65x as short as its width; scutoscullar suture well developed (Figs. 3, 13).

Male genitalia with pygofer in dorsal view, 0.54x as long as wide; group of macrosetae confined to posterior half (Fig. 9). Valve broadly rounded at base, anterior margin of valve at middle greatly produced; middle length of valve 0.49x as short as its basal width (Fig. 10). Subgenital plate broadly triangular, uniseriate rows of macrosetae along with long hair like confined to outer lateral margin; tip of subgenital plate with rounded apex (in our specimen it's been broken) (Fig. 10). Style broadly bifid at base, wider at median region with well developed preapical lobe, apophysis short, fingerlike; length of style 0.36x as long as it's wide



Figs. 1-10. *Opsius richteri* Male: 1. Dorsal habitus; 2. Lateral habitus; 3. Pronotum; 4. Face; 5. Style; 6. Aedeagus with connective; 7. Lateral aedeagus; 8. Dorsal aedeagus; 9. Pygofer; 10. Subgenital plate with valve

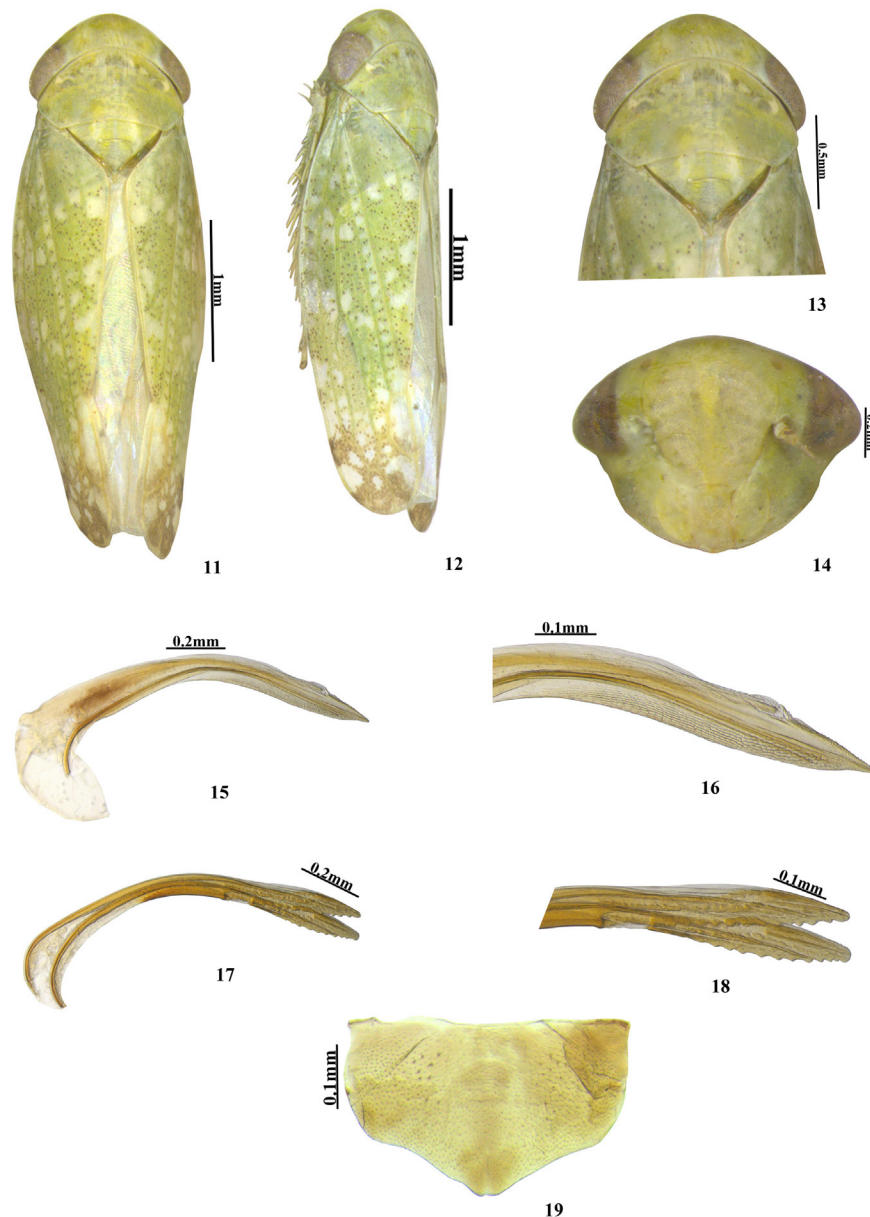
(Fig. 5). Connective inverted Y-shape, length of stem 3.1x as long as its arms (Fig. 6). Aedeagus in lateral view, well developed dorsal apodeme, aedeagus shaft and process C-shaped (Fig. 7). Aedeagus in dorsal view with only dorsal process, both distinctively curved or bent inward at base, aedeagal shafts with diverging branches bent inward at base, shorter than dorsal process. Gopopore opens apical (Fig. 8). Female genitalia with VIIth sternite 3x as broad at base as long medially, posterior margin concave with V-shape notch at middle, posterolateral angles acutely rounded (Fig. 19). First valvula lightly curved at middle, subapical

dorsal region maculose (Figs. 15-16). Second valvula slender throughout their length, small sparsely serrated teeth on subapical dorsal region (Figs. 17-18).

Measurements (mm): Male: Total body length 3.19; wide across eyes 1.037♂, Female: Total body length 3.16; wide across eyes 1.01

Material examined: 2♂, 11♀ India: IARI, New Delhi, 28.6139° N, 77.2090° E, light trap, 15.iv.1965, Subba Rao and Ramakrishnan (NPC).

Remarks: Earlier this species was reported from



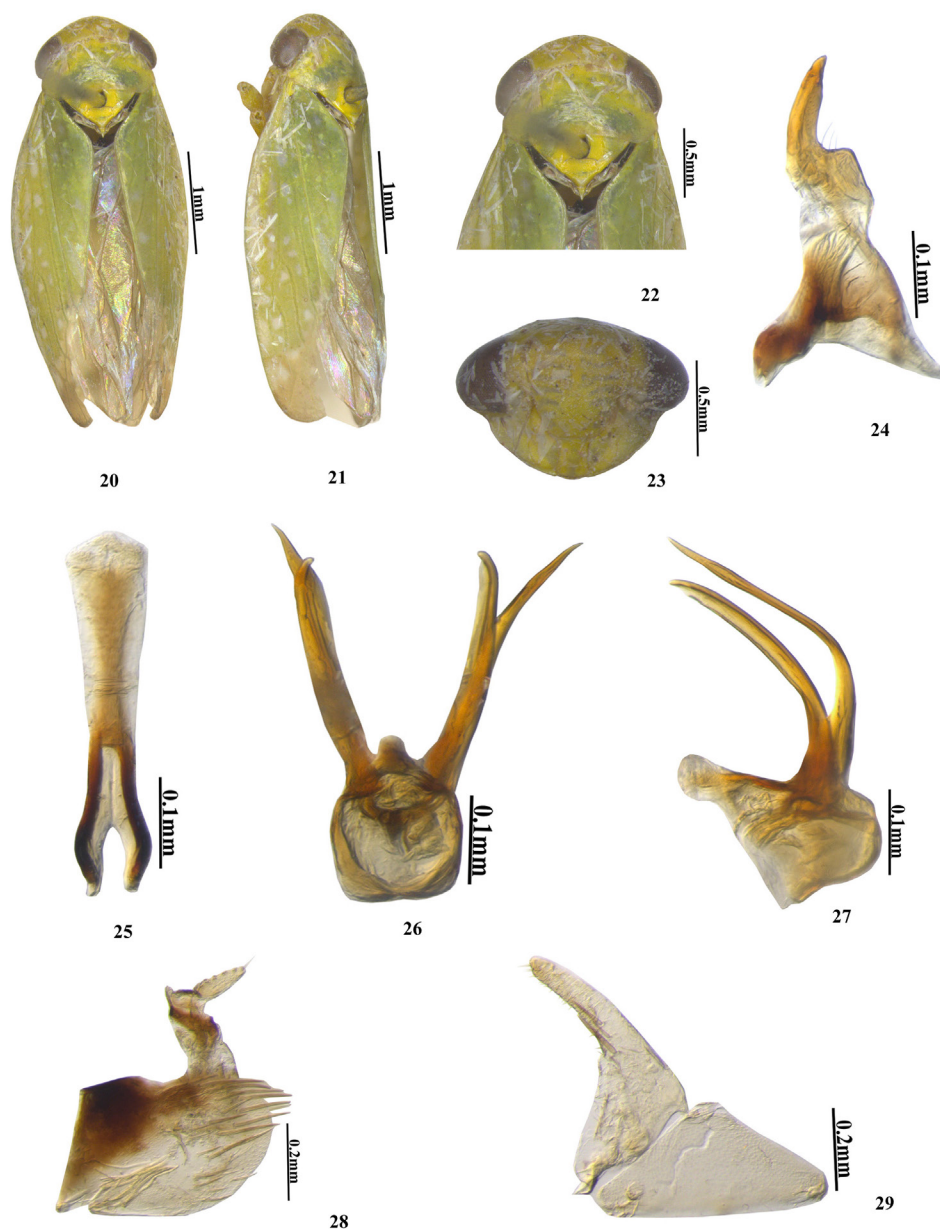
Figs. 11-19. *Opsioides richteri* Female: 11. Dorsal habitus; 12. Lateral habitus; 13. Pronotum; 14. Face; 15. Valvula I; 16. Valvula I apical; 17. Valvula II; 18. Valvula II apical; 19. VII sternite

Iran (Dlabola, 1960); Oman by El. Sonbati et al. (2020), now it is first time reported from India. This species similar to *O. scutellaris* with the aedeagal shaft branches diverging but differ by produced vertex, aedeagal shafts and dorsal process distinctively curved or bent inward at base, and length of aedeagal shaft 2x as short as dorsal process.

***Opsius stactogallus* Fieber (Figs. 20-29)**

Stactogala Amyot, 1847:217 (Official Index of Rejected and Invalid Works in Zoological

Nomenclature, ICZN Op. 2165) (Non binom.); *Jassus stactogala* Walker, F., 1851:894 (Nom.nud.); *Typhlocyba stactogala* Perris, 1857:176 (Nom. nud.); *Opsius stactogalus* Fieber, 1866:505; *Jassus (Thamnotettix) tamaricis* Kirschbaum, 1868:90 (Prim. hom.: *Jassus tamaricis* Becker, 1865); *Athysanus stactogalus* Fieber, 1872:11; *Athysanus heydeni* Fieber, 1872:11 (Nom.nud.); *Athysanus (Opsius) stactogalus* Fieber, 1872:31; *Athysanus (Opsius) heydeni* Fieber, 1872:31 (Nom.nud.); *Athysanus heydeni* Puton, 1875:138 (Nom.nud.); *Athysanus stactogala* Ferrari,



Figs. 20-29. *Opsius stactogallus* Male: 20. Dorsal habitus; 21. Lateral habitus; 22. Pronotum; 23. Face; 24. Style; 25. Connective; 26. Dorsal aedeagus; 27. Lateral aedeagus; 28. Pygofer; 29. Subgenital plate with valve

1882:129 (Missp.); *Athysanus stractogala* Fokker, 1900:33 (Missp.); *Limotettix stactogala* Butler, E.A., 1902:248; *Athysanus stactogallus* Graeffe, 1903:49 (Missp.); *Eutettix osborni* Ball, 1907:39; *Euscelis stactogalus* Olsen, 1921:33; *Limotettix stactogalus* Singh-Pruthi, 1925:208; *Eutettix stactogala* Osborn, 1928:301; *Eutettix stactogalia* Osborn, 1928:371 (Missp.); *Opsioides stactogalis* Knowlton, 1935:111 (Missp.); *Opsioides stactogalus* Lindberg, 1948:160 (Missp.); *Opsioides stactogalus* Stroud, 1950:666 (Missp.); *Opsioides stactogallus* Hopkins, L. & Carruth, 1954:1128 (Missp.); *Opsioides stactogalus* Evans, 1977:118; *Opsioides spinulosus* Giustina, 1981:106 tamarisk leafhopper (Common name); *Opsioides tamaracis* (Missp.)

Redescription

Colour of head, pronotum and scutellum lemon yellow. Vertex pale yellow; face greenish yellow with yellowish transverse lines on frons. Eyes and ocelli dark brown (Fig. 20). Pronotum anterior half-light yellowish and posterior half-light green. Scutellum yellowish, anterolateral triangles green (Fig. 22). Forewing yellowish green with brown spot irregularly placed, posterior subapical and apical cells pale brown (Fig. 21).

Head including eyes 1x as width of pronotum. Anterior margin of vertex rounded, parallel to posterior margin, length of vertex 0.63x as short as its half width between eyes (Fig. 23). Length of pronotum 0.47x as short as its width, anterior margin convex, not produced beyond eyes and posterior margin slightly straight. Length of scutellum 0.65x as short as its width, scutoscuteellar suture well developed (Fig. 22).

Male genitalia with pygofer in lateral view, 0.65x as long as its width, group of macrosetae confined to posterior half, posterior dorsal margin conically rounded (Fig. 28). Valve broadly triangular, 0.56x longer than its median length (Fig. 29). Subgenital plate triangular with digitated apex, uniseriate macrosetae confined to outer sublateral margin (Fig. 29). Style bifid, broad at base, preapical lobe well developed with few setae, apophysis beak shape, directed posteriorly (Fig. 24). Connective inverted Y-shape, stem 3.57x as long as arms (Fig. 25). Aedeagus in lateral view, well developed dorsal apodeme, aedeagus shaft slightly curved in middle and dorsal process bent medially, directed anteriorly (Fig. 27). In dorsal view, a pair of dorsal process present close to aedeagal shaft, shaft and process almost similar in length, projected anterior. Gonopore opens apical (Fig. 26).

Measurements (mm): Male: Total body length 4.05; wide across eyes 1.12

Material examined: 1♂, India: Delhi, 28.6139° N, 77.2090° E, light trap, 2.iii.1940, W. Kerr (NPC).

Remarks: *Opsioides stactogallus* is a cosmopolitan species, though it was first time reported from India. This species closely resembles to *O. heydeni* (Lethierry) but differentiated by style with broad base, well developed preapical lobe, subgenital plate with digitated apically. Aedeagus with dorsal process bent medially, directed anteriorly.

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AUTHOR CONTRIBUTION STATEMENT

SS conceived and designed the experiment, performed the experiment, prepared figures, and approved final draft. NMM conceived and designed the experiment, authorized or reviewed draft of the paper, and approved the final draft. PT performed the experiment, reviewed draft of the paper, and approved the final draft.

CONFLICT OF INTEREST

No conflict of interest.

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