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Two New Records of Subgenus *Empoasca (Distantasca)* Dworakowska (*Hemiptera: Cicadellidae: Typhlocybinae: Empoascini*) from India

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A B S T R A C T

Taxonomic studies on Typlocybinae leafhopper fauna in north coastal districts of Andhra Pradesh was conducted during, 2017-19 at Department of Entomology, Agricultural College, Naira. In the present investigations a total of 14 leafhopper species under two tribes *viz.*, Empoascini and Erythronuerini of the subfamily Typhlocybinae were collected from different agricultural and horticultural crop ecosystems. Among these, two species were reported and described for the first time from India *viz.*, *Empoasca (Distantasca) barawa* (Dworakowska) and *Empoasca (Distantasca) faciata* (Dworakowska).

Introduction

Leafhoppers are small wedge shaped insects with two or more rows of spines on the hind tibiae and pronotum not extending back over the abdomen. These are belongs to the family Cicadellidae of the order Hemiptera.

The leafhoppers of the subfamily Typhlocybinae is mostly tiny, delicate and feeds on the contents of leaf parenchyma cells of their host plants. Their size ranges from 2.5 mm to 5.5 mm. The species of this subfamily differ from the other leafhoppers in lacking closed pre apical cells in the forewing and in having the acutely protruded hind basitarsus. The tribe Empoascini is the second largest tribe with 20 genera and 91 species from India.

The tribe Empoascini is a diverse group and differs from other leafhoppers in the subfamily Typhlocybinae in lacking an appendix in the forewing and in having a sub marginal vein at the apex of the hind wing and veins RP, MP' confluent distally (Dietrich, 2005). The leafhopper subgenus *Empoasca (Distantasca)* was first described by Dworakowska in 1972

as a separate genus, with *Empoasca terminalis* Distant (1918) as its type species. Later, Dworakowska (1972) found *Distantasca* has the same structure and wings venation as in *Empoasca Walsh*, but male genital segments are different. The members under the subgenus *Empoasca (Distantasca)* is primarily distinguished by the well-developed anal tube appendages and the long sub genital plates with macro setae not reaching the tip of the plate and numerous number of fine hair-like setae on the lateral surface.

Materials and Methods

The leafhoppers were collected by net sweeping method with the help of an insect collection net from the different field and horticultural crops *viz*., cereals, pulses, oil seeds, vegetables and fruit trees from of three North Coastal districts of Andhra Pradesh.

Insects trapped in the sweep nets were collected by using aspirator and killed with a cotton swab dipped in ethyl acetate.

The killed leafhopper specimens are transferred into petri dishes by using camel hair brush and kept in hot air oven at 45-50^0 C for about 5-6 hours for drying.

The collected leafhoppers were brought to the laboratory, processed, mounted on the thick chart triangular mounts and labelled with collection details, *viz.*, name of the collector, collection date, location of collection and host.

The dried specimens were preserved in the homeopathic vials. The procedure advocated by Knight (1965) was followed for mounting and preparation of male genitalia.

The illustrations made with the help of Labomed Trinocular Research Microscope using micap 3.6 digital camera attachment using the software.

Results and Discussion

Empoasca (Distantasca) barawa Dworakowska (Figures. a – c & 1-6)

Empoasca (Distantasca) barawa Dworakowska. 1980:159.

This species was first reported from Nepal and in the present studies it is reported for the first time from India.

Description

Body is shiny yellowish green in colour. The head is broader than the pronotum. The vertex is broad with well developed brown colour compounds eyes and ocelli are present. Both the fore and hind wings are long, yellowish green and having golden tinge apically. Abdominal apodemes are elongated, broad and reaching upto the 4th segment of abdomen. The aedegal shaft is long and narrow at base with one pair of appendages, which are not curved and strongly mesad. Aedeagal appenadages are long, broad at the base and narrower at the apex. Subgenital plate sinuate, with numerous number of fine hairs and macro setae over the surface. Styles are long, broad at base, tapering towards the tip and serrated at the apex. The anal tube appendages are not smooth with small tooth.

Measurements

Total body length: 3.25 mm; Length of the wings: 2.72mm; Ocular distance: 0.80mm; Length of the abdominal apodemes: 0.0044mm; Length of the subgenital plates: 0.0051mm; Length of the styles: 0.0033mm; Length of the pygofer process: 0.0041mm.

Specimens examined

3♂, Greengram, Bayalukinchangi, 25. XII.2018, Sangeetha.L; 1♂, 1♀ Greengram,

Ragolu, 12. I.2018.Sangeetha. L. 3♂, Cowpea, Nimmathorlada, 15. I.2019, Sangeetha. L.

***Empoasca (Distantasca) faciata* (Dworakowska) (Figures. d – h&7- 15)**

Distantasca faciata Dworakowska, 1972: 25.

Empoasca (Distantasca) faciata, Dworakowska, 1976: 4; Dworakowska, 1980: 163; Qin & Zhang, 2007: 190.

This species was earlier reported from china and in present studies it is reported for the first time from India.

Description

The body is yellowish green in colour. The head is green in colour and broader than the pronotum. Coronal suture on the vertex is very distinct. Compound eyes are brown in colour; the ocelli are indistinct. The wings are transparent and light green in colour.

The abdominal apodemes are elongated, broader and reaching upto the middle of the 4th abdominal segment. The aedeagal shaft produced with one pair of appendages, which are equally broad in profile. The aedeagal shaft is slightly longer than the preatrium. The subgenital plates are sinuate, broad at the base and having numerous number of fine hairs and few macro setae over the surface. Styles are slender, broader at the base and the apex is serrated. The connective broad with arms.

Measurements

Total body length: 3.26mm; Length of the wings: 2.65mm; Ocular distance: 0.80 mm; Length of the abdominal apodemes: 0.0042mm; Length of the subgenital plates: 0.004mm; Length of the styles: 0.002mm; Length of the pygofer process: 0.0031mm.

Specimens examined

2♂, Redgram, S.S.Valasa, 19.IX.2018, Sangeetha. L; 1♂, Rajma, Dumbriguda, 17.III. 2019, Sangeetha. L.

These two species are similar in external morphological characters, almost green colour and it is difficult to identify them externally but can be easily identified by using structures of male genital characters like anal tube appendages, pygofer appendages, aedeagus and its appendages. According to Zhang *et al.*, (2010)the major taxonomic character in *Empoasca (Distantasca) barawa* (Dworakowska) is aedeagal appendages not curved and in case of *Empoasca (Distantasca) faciata* (Dworakowska), major distinguishing character is the aedeagal shaft and appendages equally broad in profile.

Key to the species studied in the present investigation belonging to the tribe Empoascini.

Male subgenital plates are long, slender; The fore wing with a black spot in the apex of the cubital cell; the connective with arms --------- 2

A pair of black spots on vertex; subgenital plates very long with numerous hair like setae ----

Amrasca biguttula biguttula (Ishida)

----3 The Vertex without spots; subgenital plates shorter with very few micro setaeand also with macro setae *Amrasca bilobata* Mathew and Ramakrishnan

The aedeagal shaft with two pairs of appendages ---------- 4

----- The aedeagal shaft with one pair of appendages ---------- 5

The anal tube appendages with large sub apical tooth ---------- *Empoasca (Distantasca) terminalis Distant*

The Aedeagal shaft with pair of short appendages ---------- 6

------ The anal tube appendages with small teeth apically ---------- *Empoasca (Distantasca) latava (Dworakowska)*

The aedeagal shaft without small teeth apically ------ 7

The aedeagal shaft and appendages equally broad (Fig.7-15) ---------- *Empoasca (Distantasca) faciata* (Dworakowska)

The anal tube appendages smooth, without large tooth ---------- *Empoasca (Distantasca) bulbosa* (Dworakowska)

The anal tube appendages not smooth with small tooth ----------

-- The aedeagal appendages curved mesad at 1/3rd of their length from the tip ----- *Empoasca (Distantasca) tna (Dworakowska)*

------ Aedeagus appendages not curved (Fig.1-6)--------*Empoasca (Distantasca) barawa* (Dworakowska)

Pygofer process pre apically with tooth like lobe and apically straight ------- 12 –

------ Pygofer process without pre apical tooth like lobe --------- 13

Subgenital plate basally broad gradually narrower towards apex ---------- *Empoasca (Empoasca) motti* Pruthi

------- Subgenital plates are more or less uniform width throughout its length and sinuated in the outer margin ---------- *Empoasca (Empoasca) spirosa* Dworakowska and Viraktamath Pygofer process slightly curved without sinuation, anal tube process with longer hook ---------- *Empoasca (Empoasca) kerri* Pruthi

Fig.1 a – c *Empoasca (Distantasca) barawa*Dworakowska

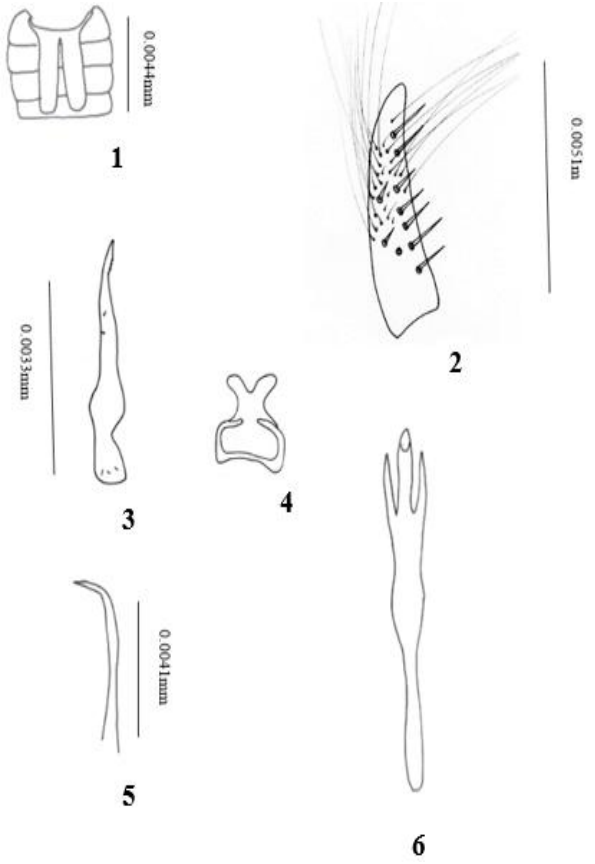
a

b

c

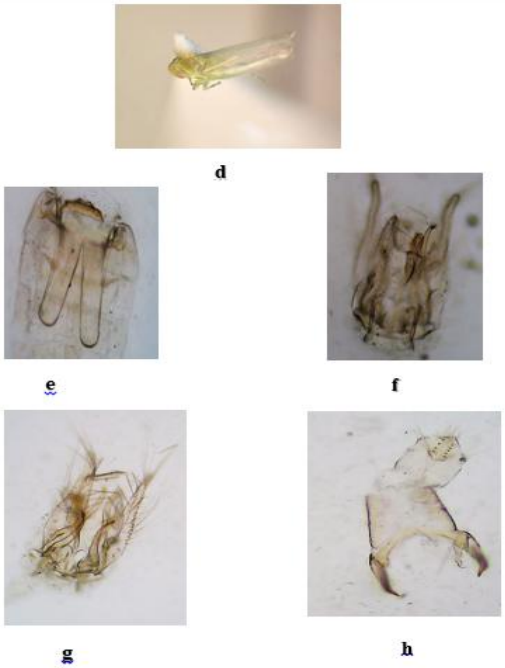
a. Adult lateral view (**35X**); b. Abdominal apodemes (**10X**); c. Malegenitalia(**10X**).

Fig.2 *1-6 Empoasca (Distantasca) barawa* Dworakowska



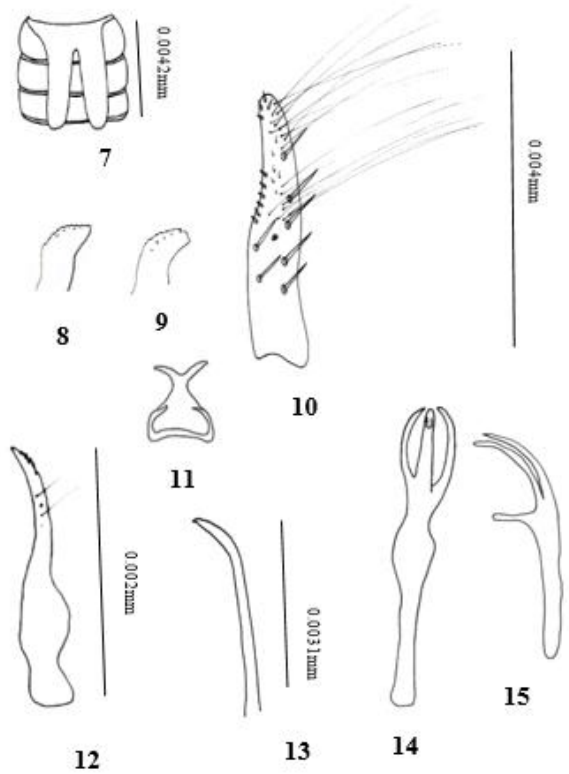
1. Abdominal apodemes; 2. Subgenital plates; 3. Styles; 4. Connective; 5. Pygofer process; 6. Aedeagus (ventral view)

Fig.3 d – h :*Empoasca (Distantasca) faciata* Dworakowska



d. Adult dorsal view (**35X)**; e. Abdominal apodemes; f. Male genitalia; g. Subgenital plates and styles; h. Anal tube.

Fig.4 7- 15. *Empoasca (Distantasca) faciata* (Dworakowska)



7. Abdominal apodemes; 8&9. Anal tube appendages; 10. Subgenital plates; 11. Connective; 12. Styles; 13. Pygofer process; 14. Aedeagus (ventral view); 15. Aedeagus (lateral view)

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