

Studies on morphological variations of *Exitianus indicus* (Distant, 1908)-(Hemiptera: Cicadellidae: Deltocephalinae, Chiasmini) from India

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ABSTRACT

The members of Cicadellidae are commonly known as leafhoppers and belongs to the order Hemiptera. In the present study the morphological variations of *Exitianus indicus* (Distant, 1908) are studied which are collected from different areas of India.

Keywords: Hemiptera, Cicadellidae, Deltocephalinae, Leafhopper, morphology.

INTRODUCTION

The species *Exitianus indicus* (Distant, 1908) belongs to the family Cicadellidae, order Hemiptera. They are the very common pest of rice paddy throughout India. In India the genus *Exitianus* Ball is represented by two species. *Exitianus indicus* and *Exitianus nanus*. In the present study the morphological variations of *Exitianus indicus* is described. The study is based on the collections from Chhattisgarh, Maharashtra, Tamil Nadu and Western Ghats.

This genus from old world was studied by Ross (1968), and recently it is reviewed by Zahniser (2008), Khatri and web (2010), Yani Duan and Yalin Zhang from China (2013) and Imran Khatri et. al (2014). This is an attempt to give the information of morphological variations of *Exitianus indicus* Distant from Western Ghats, India.

The following abbreviations are used for the measurements (in mm) of the specimens in the present study are as follows:

TL	Total length of the specimen
VL	Length of vertex
VW	Width of vertex
PL	Length of pronotum
PW	Width of pronotum
SL	Length of scutellum
SW	width of scutellum

MATERIAL AND METHODS

The specimens were collected by using sweeping net from different areas in India. Then they were relaxed and mounted on the paper triangles for the identification. Photographs were taken through the Leica EZ4 LED Stereomicroscope.

Systematic position of *Exitianus indicus* Distant

Order: Hemiptera
Suborder: Auchenorrhyncha
Infraorder: Cicadomorpha
Superfamily: Membracidea
Family: Cicadellidae
Subfamily: Deltocephalinae
Tribe: Chiasmini
Genus: *Exitianus*
Species: *indicus*

Taxonomy:

Exitianus Ball, 1929

Exitianus Ball, 1929. *Trans. Amer. Ent. Soc.*, 55 : 5
Type species. *Jassus (Thamnotettix) obscurinervis* Stal, 1859, by original designation

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Table-1. Morphological variations of *Exitianus indicus*

	Head	Body Size	Color	Wing venation
High Altitude	Presence of Thick transverse band on vertex and scutellum	Big in size (5mm to 6 mm)	Blackish	Very prominent
Low Altitude	Presence of thin transverse band on vertex and scutellum	Small in size (3 mm to 5 mm)	Brownish yellow	Dull, some times clear.

Table 2. Morphological variations of *Exitianus indicus*

Locality	Latitude	Longitude	Alt (m)	TL	VL	VW	PL	PW	SL	SW
Westren Ghats-TN Mukurthi Range Westren Catchment Beat	N 11.31886	E 76.120672	2355	5.3	0.4	1.5	0.6	1.5	0.8	1.2
Coimbatore-TN Amman padugai Madedarai Range	N 10.87859	E 076.81197	253	4.0	0.3	1.3	0.5	1.2	0.5	0.8
Coimbatore-TN Amman padugai Madedarai Range	N 10.87859	E 076.81197	253	4.9	0.4	1.6	0.6	1.4	0.6	1.2
Kanyakumari-TN Mahendragiri Reserve Forest Boodhapandi Range	N 8.78528	E 77.207195	204	5.1	0.3	1.6	0.6	1.5	0.8	1.1
Theni Dist-TN Vaigai Dam	N 10.207900	E 77.243660	930	5.2	0.4	1.6	0.6	1.5	0.8	1.0

Genus Characters: Members of the genus are most readily distinguished by usually having a transverse dark band on the vertex (**Plate 1: A, Plate 2: A & Plate 3: A**) . Vertex rounded anteriorly; ocelli large; disc convex; tegmina hyaline, appendix large, expanded, antepical cells closed, two in number.

***Exitianus indicus* (Distant, 1908)**

Athysanus indicus Distant, 1908. *Fauna Brit. India . Rhynchota* , 4 : 344 .

Exitianus indicus Oman, 1938, *Kan . Univ . Sci. Bull* , 24 : 383 .

Athysanus fusconervous Motschulsky (1863: 97) Ceylon. Synonymized by Ross (1968)

Athysanus atkinsoni Distant (1908: 345). India. Synonymized by Ross (1968)

Exitianus major, Ahmed, Qadeer and Malik 1988: 10, fig. 1. Synonymized by Khatri and Webb 2010: 10

Material examined:

Chhattisgarh (India): 2 ex., Lemru, Korba Dist. Chhattisgarh, 3.vi.2012, Coll. K. Chandra & P (Reg No. 4102/H15); 2 ex. Badalkhol WLS, Jashpur Dist, Chhattisgarh, 25.v.2012, Coll. A. Raha & P. (Reg. No. 4136/H15); 1 ex. Mhasamund, Barnwapara Dist, Chhattisgarh, 3.vii.2011, Coll. K. Chandra & P. (Reg No. 4140/H15);

Maharashtra (India): 1 ex., Ukshi, Ratnagiri Dist, Maharashtra, 1.vii.2014, Coll. M.E. Hassan and party (Reg. No. 4217/H15); 2 ex., Sangliwadi, Sangli Dist, Maharashtra, 20.vi.2014, Coll. M.E.Hassan and Party (Reg. No. 4216/H15); 1 ex., Godegaon, Bhandara Dist, Maharashtra, 3.ix.2013, Coll. M. E. Hassan & P.(Reg. No. 4264/H15);

Tamil Nadu (India): 1 ex. Mukurthi Range, Westren Catchment Beat, Westren Ghats, Tamil Nadu, 11.xii.2016, Alt. 2355 m, Coll. S. Prabakaran & P. (Reg. No. I/H: 1779); 1 ex. Madamba Forest, Kottayam Dist. Kerala, 21.xii.2014, Coll. R. Venkitesan (Reg. No. I/H: 1603); 2 ex., Amman pudugai, Madekarai Range, Coimbatore Dist, Tamil Nadu, 19.xii.2016, Coll. S. Prabakaran , N 10.87859, E 076.81197 (Reg. NO. I/H-1976); 1 ex., Mahendragiri Reserve Forest, Boodhapandi Range, Kanyakumari Dist. Tamil Nadu, 01.iv.2016, Coll. R. Babu, N 8.78528, E 77.207195 (Reg. No. I/H-1978); 1 ex., Vaigai Dam, Theni Dist. Tamil Nadu, 31.x.2013, Coll. R. Aengals, N 10.207900, E 77.243660 (Reg. No. I/H-1979)

Diagnostic characters: Body pale brownish; vertex with bow-like pitchy black fascia between the eyes, and a distinct longitudinal line at base; pronotum pale greyish colour, with two small pitchy black spots on each side at anterior margin; scutellum brownish yellow in colour, with

a black spot at each basal angle, tegmina subhyaline, its vein brownish, legs with brownish streaks; abdomen pale

also varies with the specimens of Pakistan (Imran Khatri, 2014) and China (Yani Duan, 2013).

Plate-1. *Exitianus indicus* (Distant): Collected from sangeli

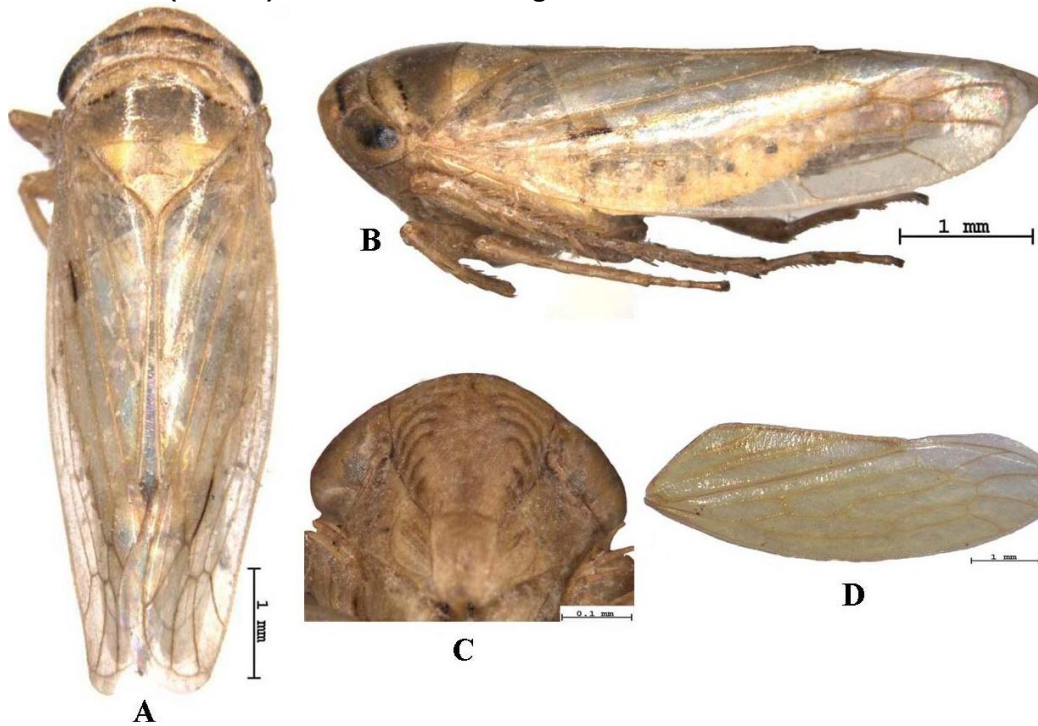
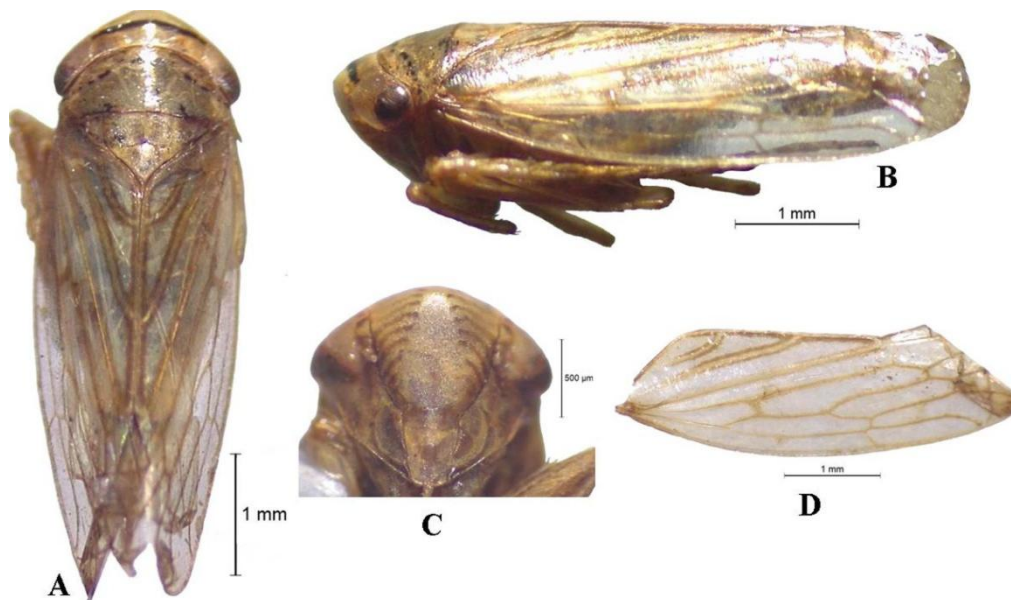


Plate-2. *Exitianus indicus* (Distant): Collected from Kannyakumari, Tamil Nadu, India (Low altitude); A. Dorsal view. B. Lateral View. C. Face, D. Wing



brown.

RESULTS AND DISCUSSION

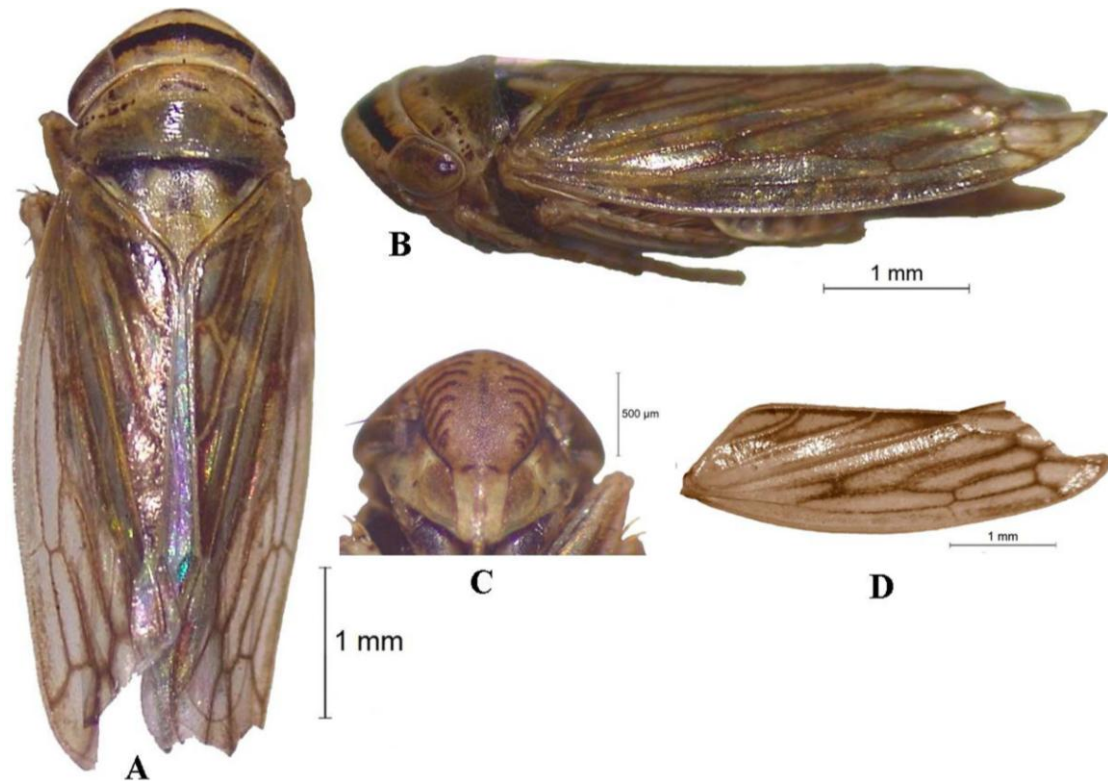
The specimen which is collected from the Westren Ghats (Plate 3 Images), India is showing morphological variation from the other specimens (Plate 1 & 2 Images) which are collected from the other places of India. And it

The specimen is blackish while the others are pale yellow brown in color; vertex with prominent thick black fascia between the eyes; pronotum with the anterior part moderately yellowish and blackish towards posterior part. Scutellum ochraceous with a large basal spot near each basal angle and a blackish central longitudinal line imperfectly visible extending half of the scutellum. All the above mentioned characters are unique in the specimen collected from Westren Ghats, high altitude region.

Distribution: Throughout India. *Elsewhere:* Nepal, Pakistan Australia; China; Philippines.

References

Plate-3. *Exitianus indicus* (Distant): Collected from Western Ghats, Tamil Nadu, India (High altitude); **A. Dorsal view. N. Lateral View. C. Face, D. Wing**



Economic Importance: *Exitianus indicus* is reported as a putative vector for *Candidatus Phytoplasma cynodontis* in India (Shailender Kumar et. al, 2015)

CONCLUSION

It can be concluded that the specimens which are located in the high altitudes showing morphological variations such as body size, coloration, wing venation. It is clear that morphological variations occur in the same species when they are located in the different geographical regions.

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Conflicts of Interest

Authors declare that there is no conflict of interests regarding the publication of this paper.

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