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Vinod Kumar Mishra
Guest Lecturer Zoology, Govt. Girls P.G. College, Rewa, Madhya Pradesh, India

NP Tripathi
Retd. Principal, Govt. New Science College, Rewa, Madhya Pradesh, India

Correspondence
Vinod Kumar Mishra
Guest Lecturer Zoology, Govt. Girls P.G. College, Rewa, Madhya Pradesh, India

Morphological studies on Jassids in Rewa Region

Vinod Kumar Mishra and NP Tripathi

Abstract
Jassids are certainly capable of flying to a great distances. Colias fieldii, the Dark clouded Yellow, for instance, migrates across Europe, crossing the channel to Britain. Author thus finds that most Jassids have a fairly wide distribution. At the other extreme however, Jassids can be extremely local, inhabiting only a very small area. An example of Jassids which the author found near Deolond in October 2015, and then again in the same locality, and even on the same tree in November 2016, which must have been six generations later. Incidently this is really an East India Jassids, and the author knows of only one other record in Central India. When Jassids remain only in specific locality, they are liable to form different races from the isolated populations, which with time may develop into different subspecies or even species.

Keywords: Morphological, Jassids, Rewa region

1. Introduction
The studey of the geographical distribution of insects is a subject which has received a great attention from many entomologist, yet on which is still in an in fact stage of development. Not only are very many insects yet to be discovered or named, but the complete distribution is known for very few. Also rather little is known of the evolution history of insect distribution. The study of insect distribution has progressed to very different degrees in different part of the world and for different group of insects, more or less proportion into the extent of entomological researches.

In few groups of insects, there has been possible to determine the course of development and spread of the world fauna, but in recent years a few excellent attempts have been made. Though, the extremes of geographical range of a species may be easily outlined on a map, it must be remembered that the actual occurrence of a species in most cases involves not only discontinues macro-geographic distribution, but also limited to a specialized niche within the area or range.

Some insects are distributed on all the continents and thus have world wide distribution. Most species of insects do not, however, occur in all places. Where the ecological conditions for their existence are favourable, but the distribution is usually restricted to a definite area or range. The range may comprise a single more or less large area, so that the distribution in continuous. The range may also be broken up into two or more parts, separated by more or less wide areas in which this insect does not occur, so that the distribution is discontinuous. The size of a range, where the insect species occurs are governed by the means of dispersal of the species and by historical and ecological factors. The factors that delimit a range or the limiting factors in distribution constitute biogeographical barriers:

1. The biological barriers like lack of food, existence of competitors and natural enemies.
2. The climatic conditions.
3. Physical barriers like large masses of water for land insects or high mountains like the Himalya for low land forms and desserts for forest types.

Available literature on the present investigation reveals that the Jassids are specifically adapted for definite climatic conditions and vegetation types. Mostly the Hemiptera (Homoptera) are the phytophagus are bound to specific group of plants, so that their distribution is severally limited.

During the past four years the author has been endeavoring to collect the Jassids from the Rewa region and its various adjoining areas. An examination of the collected insects has resulted in the discovery of a number of species and little known. The order Hemiptera is widely distributed, it is mainly tropical, majority of them are known from the oriental region. The order is known by 2, 500 species form the world.

2. Material and Methods

Collection of Jassids for observation in sites for the present research work has been done from paddy fields in Rampur Baghelan Satna, Mauganj Rewa, Manikwar Rewa, the local Chinmay Ashram, laxmanpur, Rewa and also near the village Anantpur about five kilometers from Rewa town. Particularly during September and October and more so on sultry humid nights these insects appear to be a nuisance under bright lamps.

3. Observation

It is important to note that this does not mean that Jassids do not cross these boundaries. Vanessa cardui (Painted Lady) a well - known migrant occurs in all regions. There are clear relationships between the regions bracketed together. There are no temperate climate Jassids in the South hemisphere. Australian Jassids are basically tropical, which means that in New Zeland's cooler climate only 7 species are recored.

Rewa regon in the world distribution

It was first considered that Rewa region was purely Oriental, and that the Palaearctic boundary ran through the Tibetan region of China, but it is now apparent that the higher regions of Rewa having the appropriately cooler climate also have many Palaearctic Jassids. In fact, the boundary appears to run through India at about the 3000 metre level. Of caouse there is no sharp dividing line. Oriental Jassids have been recorded up at 3840 m. and Palaearctic ones may be found in the lower part of this region. What author can say is that over 3000 m. 90% of the Jassids are Palaearctic, and below 2700 m. 90% are Oriental. Actually it is not always eay to say exactly what is Palaearctic and what is Oriental. What about the Jassids endemic to the high Vaindhyan, or those occuring equally on both sides. There are quite a few in both these categories which are considered differently by different experts. For the sake of simplicity in the present list the author will term them Vindhyan.

a) Palaearctic elements in Rewa region

Some palaearctic Jassids seem to be particularly prone to forming isolated populations and separate subspecies. Parnassius apollo, for instance, does this in Europe, each mountain range having its own subspecies or race. (The author believes there is a move to reduce the number of described races to a manageable number of about 150). In Rewa it works a little differently. Author does not have isolated mountain ranges so much as isolated valleys, separated by passes too high for many, but not all, Jassids to cross, thus, get isolated populations in neighbouring valleys. There is always the chance that in some isolated valley new endemic subspecies (or even species) may be found.

b) Oriental elements in Rewa region

These also are not without interest, due to the great difference in climate between the lushy East and the comparatively dry Western extremes of the district. We may, however, look in vain for a nice clear zoogeographic boundary between them, as it seems to occur in different places with different species.

Thus the high altitude regions as well as the extreme regions of North, East and West are particulary useful for the study of Jassids fauna.

4. Discussion and Conclusion

In this chapter of thesis the morphology and ecology of the grass leaf - hopper Exitiamus indicus, the most destructive pest of rice Nephotettix virescens and Hecalus porrectus which is a grass leaf - hopper as well as a pest of the rice, has been discussed in general and a comparison has been made with others, enumerating the similarites and variations with basic Jassid and Homopteran structures. Of the three Jassids, *E. indicus* and *N. virescens* under the division Macropsides belong to the subfamilies Deltocephaliae and Euscelinae respectively and *H. porrectus* belongs to the subfamily Hecalinae under the division Ulopides.

The three rice - leaf hoppers morphologically can be distinguished on the basis of their body length, colour, shape of vertex etc. The body length of *E. indicus* is about 4 to 5mm, of *N. virescens* 4.30 to 4.70 mm and of *H. porrectus* about 4-5 to 6.00 mm. The colour of *E. indicus* is plae, with various patterns of brown and black, of *H. porrectus* is green with four longitudinal orange lines on vertex and pronotum, three on scutellum, with the male fore - wing green with apical one - third brown, white spots present in apical and anteapical cells. The head, pronotum and scutellum of *N. virescens* are green in colour and the apical part of tegmen in the male is black, in female no black spots are found on the head, pronotum, scutellum and remaining parts of the tegmen, thus exhibiting sexual dimorphism.

The first cephalic part the head represents a typical Jassid structure, the vertex of *E. indicus* being sharply ridged, ochraceous, subangularly rounded in front, with single transverse a arcuate black strip between the eyes, while in *N. virescens* it is completely unmarked, and the vertex is much longer medially than next to eyes, but the vertex of *H. porrectus* is subfoliaceous, slightly upturned apically and with four longitudinal orange lines. The face is divided by suturned apically and with four longitudinal orange lines. The face is divided by sutures into ante clypeus, post clypeus, lora and genae. The frons is amalgamated with post clypeus, forming a single sclerite, the frontoclypeus. The fronto clypeus of *H. porrectus* is comparatively broader than that of *N. virescens* and *E. indicus*. The lateral margin of gena is strongly sinuate below the eye, it is remarkably characteristic of the head of *H. porrectus*.

The second part of the body thorax of *E. indicus* is very well developed and prominent, the pro-notum being collar - like and wide laterally and the pro-pleurae separating the eyes from the bases of the tegmina. The mesothorax is the largest part of the three thoracis segments and exhibits the primary divisions into pre-scutum, scutum, and scutellum. The pronotum of *H. porrectus* is slightly wider than the head and it is laterally carinate and concave posteriorly and possesses four olngitudinal orange lines.

The legs are also typical of Jassids and the hind - tibiae are flattened and bear prominent rows of spines with prominent bases, the fore - wings are of harder consistency than the hindwings just as in typical Jassids, both the wings showing a reduced venation. The fore - wings of *N. virescens* are greenish, subhyaline, with distinct black markings on the posterior side in the male exhibiting characteristic sexual dimorphism. Two pairs of large thoracic spiracles are present in all the three leafhoppers with an external lip type of closing mechanimsm. The abdomen is eleven segmented and bears a typical number of eight spiracles in both sexes in all three insects.

Pygofer of the male *E. indicus* possesses two large dark spines of which spine one is slender and elongate and the second spine is much shorter and twisted at the tips and the aedeagus has a well defined preapical notch, a sharp curved apex. The male pygofer of *N. virescens* is rounded and the first spine is long and slim, whereas the other spines, four in number, are short and the aedeagus shaft in its ventral aspect is more or less constricted in the middle and possesses five spines, whereas the pygofer of *H. porrectus* is heavily setose and the aedeagus bears a pair of terminal processes.

Several has described the head in Homoptera by entomologist Vickery (1908) [7], Berlese (1909) [1], Muir & Kersjaw (1911 and 1912) [4-5] and Duporte (1946) [2].

Homoptera head stuctures are of more primitive pattern than those of the Heteroptera, Spooner (1938) [6]. In a broad sense the structure of the heads of some of the members of the Fulgoridae show more primitive characters than those of any other family of the Homoptera Spooner, (1938) [6]. In the heads of *E. indicus* and *N. virescens* both, the backward extension of the postclypeus has not been accompanied by a corresponding movement of the antennae, the antennae and their ledges have remained nearer to the anterior than to the posterior corners of the eyes, with the loss of the frons, the frontoclypeus extends as far back as the hind margins of the face, the lora have maintained their position and original points of contact, however still remining associated with the tentorial pits, and the absence of maxillary sutures characterize the Macropside head of Evans (1946-47) [3]. Whereas, the *H. porrectus* head represents an Ulopide structure, since its frons, is ventral in position owing to the post extension of the postclypeus, the antennae having migrated to quite a posterior location and the ocelli lying in the marginal depressions.

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6. References

1. Berlese A, Gli Insetti. loro organizazzione, sviluppo, abitudini, rapport coll'uomo, Milan: Societa Editrice, Libraria. 1909; 1:1004-734.
2. Duporte EM. Observations on the morphology of the face in insects. J. Morph. 1946; 79:371-417.
3. Evans JW. A natural classification of leafhoppers (Jassoidea: Homoptera) part I-III Trans. R. ent. Soc. Lond. 1946-47; 96:47-60. 25 figs; 97-39-54, 3 figs. 98: 105-272, 36 figs.
4. Muir F, Kershaw JC. on the homologies and mechanism of mouth parts of Hemiptera. Psyche. 1911a; 18:1-12.
5. Muir F, Kershaw JC. The development of the mouth parts in the Homoptera with observationson the embryo of *Siphanta*. Psycne. 1912; 19:77-89.
6. Spooner CS. The phylogeny of Hemiptera based on a study of the head capsule. III. Biol. Mongr. 1938; 16(3):102-24.
7. Vickery RA. A comparative study of the external anatomy of plant lice. 12th rept. Minnesota State Ent. 1908, 178-191.