# NOTES ON INDIAN BLEPHAROCERIDAE, III.

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During the last eighteen months an important collection of this family was kindly submitted to me by the authorities of the Indian Museum. I am very much indebted to them for the opportunity of studying it and especially to Dr. S. L. Hora who has collected the greater part of the material. This collection, which mainly consists of a large number of larvae and pupae, has been obtained from four widely distant localities as follows :—

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| 1. Khasi hills, Assam : Shillong and vicinity of Dumpep | *Apistomyia* N., *Horaia montana* Tonn. (all stages). |
| 2. Darjiling district : various localities in the vicinity of Tista Bridge | *Blepharocera* F., *Apistomyia* M., *Horaia longipes*, sp. nov., *Horaia montana*?, *Horaia* sp. |
| 3. United Provinces : Dehra Dun | *Blepharocera indica*? |
| 4. Punjab : Simla | *Apistomyia* O. |

This collection does not advance our knowledge of the Blepharocerid fauna of India to any great extent, except perhaps in the genus *Horaia*, because of the scarcity of imaginal forms which would have allowed to connect the early stages previously described by me[1] to quite definite species. As it is, I shall note here the progresses made in the genera *Blepharocera*, *Apistomyia* and *Horaia*.

## Genus **Blepharocera.**

### Larva E.

A number of larvae and pupae from Dehra Dun (United Provinces) collected by C. Dover, 22nd October 1930 and 29th September 1930, correspond well to my larva and pupa E described from Chamba (Punjab), but in this new material there are a couple of pupae with fully formed male imagines inside and a few with less advanced females. From these specimens it could be ascertained that the peculiar process on the inner side of the mid coxae of *B. indica*[2] is also present here ; it is found in both sexes, but in the male it is much smaller and can easily escape notice. The genitalia and other characters are not sufficiently defined in these immature imagines to ascertain definitely if they belong to *B. indica*, but the presence of the mid coxal process seems to point that way, unless of course it is present in all species of *Blepharocera* and has so far been overlooked.

The difference in size together with the difference in shape of the pupal sheath of the mouth parts, which I have mentioned previously

[1] Tonnoir, A. L., *Rec. Ind. Mus.*, XXXII, pp. 161-214 (1930).
Tonnoir, A. L., *Rec. Ind. Mus.*, XXXIII, p. 285, fig. 2 (1931).

(*l.c.*, p. 170), is, as is confirmed by an examination of a larger amount of material, certainly due to sexual dimorphism.

### Larva F.

Amongst the material collected in Darjiling there are a number of *Blepharocera* larvae similar to my Larva F originally described from Kawngmu (Burma). The warts on the dorsum of the divisions are sometimes less prominent ; a trace of them may be found on the abdominal tergites of the pupa as is the case of Pupa E.

In this species (F) the pupa is sometimes of very small size, scarcely reaching 3 mm. in length, the fly must therefore be unusually small for a *Blepharocera*. The male imagines are not sufficiently advanced in the pupae to allow the identification of the species by imaginal characters. The mid coxae are provided with hairy processes which are very much smaller than in *B. indica* ; as no other characters are discernible it is not possible to ascertain if this form is specifically distinct from *B. indica* or whether it is merely a small race of it. Besides Burma, it is so far known to extend to the Darjiling district ; it will probably be found in the whole of the Eastern Himalayan region.

### Genus **Apistomyia.**

Some new material of this genus was collected in Assam and Darjiling, the larvae from the former locality correspond to my Larva N, and those from the latter correspond to my Larva M. The pupa of species M, which was not present in the material previously examined by me, is abundantly represented. It does not materially differ from the already described Pupa O except in the form of the anterior internal lamella whose outside corner is not rounded but angular.

Some male and female imagines are well developed inside the pupae and by dissection it could be seen that the females belong to two types, one of which has the second antennal segment flattened and provided with an inner finger-like projection pointing forward and extending further than the base of the fourth segment. The other form has normal antennae. Although no difference can be detected in the lamellae of the pupae, it is clear that two species are found living in close association. As most of these pupae scarcely reach 3 mm. in length the fly must be remarkably small.

I do not think it proper to describe these species from the immature imagines extracted from the pupae, because in this genus the characters of the genitalia in both the sexes are almost uniform all through the species[1] and because accurate characters such as the wing venation and the structure of the legs are not available on account of the crumpled condition of these organs in the dissected specimens. Incomplete descriptions would unnecessarily increase the confusion in a genus, which, as noted already, must be represented in India by a large number of species.

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[1] *See* Tonnoir, A. L. *Notes on the genus Apistomyia. Proc. Lin. Soc. N. S. Wales*, LV, p. 139 (1930).

Some larvae of *Apistomyia* whose locality is uncertain owing to some of the tubes having been broken in transit and the locality labels getting mixed up, are peculiar in having a yellowish colouration and a broad, dark, dorsal vitta ; all *Apistomyia* larvae known so far are of uniform more or less dark brown colour.

## Genus **Horaia.**

The examination of the material of this genus confirms my previous opinion as to the multiplicity of species and also shows that several species may inhabit the same locality ; however, it is not yet possible to distinguish, with certainty, between the larvae of the various species.

### **Horaia montana** Tonnoir.

Three female flies were collected by J. Bhaduri at Pun-wa-sherra stream near Dumpep, Khasi hills (1st April 1930) ; they are the first imagines of this genus ever captured and evidently belong to the genotype *H. montana* which I have described from the Khasi hills (Lashdat stream). This species was described from nearly mature but crumpled imagines dissected out from some pupae, and I, therefore, had no clear idea of the general habitus of these flies.

The three female specimens were, therefore, a surprise to me as they have such a very robust appearance, quite unusual among the Blepharoceridae ; they could, at first sight, easily be taken for some Empididae, on account of the rather short and thick body and especially on account of the robust short-legs.

These specimens correspond well with the type, the genitalia being identical, as also the venation in which the little stump of a vein on Rs is also sometimes present. The antennae, however, differ from that shown in my Fig. 57 The second segment of the flagellum is only half the length of the first instead of being subequal to it ; besides there is a remarkable irregularity in the antennal segmentation of these specimens ; one has 9 segmented antennae, the other 8 segmented, with, on one side, an incomplete division of the penultimate or of the last segment. This observation induced me to make a re-examination of the material from the type-locality ; several imagines were dissected out of their pupae and were found to have either 8 or 9 segmented antennae ; sometimes the antennae were 8 segmented on one side and 10 on the other, and the relative length of the basal segments proved to be rather variable.

Other characters exhibited by the specimens from Pun-wa-sherra stream and which were not in evidence in the type are the rather strong infuscation of the wing and the following relative measurements of the legs :

| | Femora. | Tibiae. | $t_1$ | $t_2$ | $t_3$ | $t_4$ | $t_5$ | Claws. |
|---|---|---|---|---|---|---|---|---|
| I | 20 | 35 | 7 | 4 | 4 | 4 | 10 | 3·5 |
| II | 28 | 32 | 4 | 4 | 4 | 4 | 9 | 3·5 |
| III | 54 | 47 | 19 | 5 | 5 | 5 | 10 | 3·5 |

The front femora are very much incrassate in all their length, while the mid femora are more club-shaped; front and mid tibiae gradually tapering distally; the two hind tibial spurs subequal. The claws are conspicuously stout on all the legs, which are testaceous, with front and mid knees as well as 4 last tarsal segments of all pairs infuscated. The front and mid femora carry a conspicuous antero-dorsal row of hairs.

Length of body 5 mm.; wing 5·5 mm.

The larvae associated with these flies in the Pun-wa-sherra stream as well as those of the type-locality are characterized by their uniform dark brown colouration, their lateral appendages being ferrugineous, very seldom brownish. All those seen in the last instar were provided with dorsal spines and also those of the 3rd instar, but they were absent in the earlier instars. There do not seem to be any clearly defined morphological features to differentiate these larvae from those of other species except 2 or 3 conspicuous erect spinulous bristles on the dorsum of the lateral appendages in addition to the ordinary bristles. These stout bristles are usually less well developed in the other species.

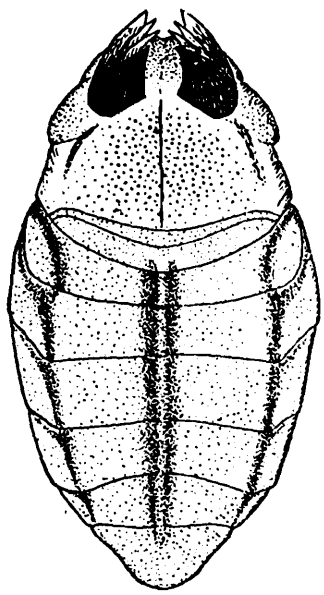
The length of the full-grown larva is 5 mm., that of the pupa 4 mm. The anterior lamellae of the latter are not corrugated as in Pupa R1.

**Horaia** spp.

Numerous larvae were collected by Dr. Hora in various localities in the vicinity of the Tista Bridge in May, June and February. The most interesting are those obtained at Pashoke Jhora, as many as 3 species were found there in association as follows:—

1. A large larva corresponding to Larva R1 and a large pupa with the characteristic corrugations of the anterior lamellae of Pupa R1. The imago inside the pupa was not sufficiently mature to ascertain characters but it does not seem different from the imago of Pupa R1 which is a species with 9-10 segmented antennae.
2. A medium-sized species represented by larvae in 3rd and 4th instars, with or without dorsal spines which are rather weak, the posterior part of the head sterites red and the lateral appendages pale as in Larva R3.
3. A number of very characteristic pupae with a peculiar sculpture of the dorsum. I give here a figure of this type of pupa, which is quite exceptional in the family; all pupae so far known having a perfectly rounded and smooth dorsum. It has not been possible to ascertain if these pupae correspond to the larvae with partly reddish head 9. Some of these larvae had the pupa rather well formed under their skin but when dissected out these prepupae showed no trace of the corrugation of the pupa now figured and as the breathing lamellae have no characteristic morphological features no conclusion could be reached on that point. One male and one female are sufficiently advanced in two of these pupae to allow the study of some of the imaginal characters. The antennae are eleven segmented, the eyes of the female undivided and all the tarsal claws small;

the genitalia of both sexes do not seem to differ from those of *H. montana.*



TEXT-FIG. 1. Pupa of *Horaia* sp.

4. A small species represented by a female fly only which differs conspicuously from *H. montana* in the elongate hind legs and for which I propose the name of *Horaia longipes*, sp. nov.

As the specimen was preserved in spirit its colouration is somewhat altered, however, the main features are discernible as follows :—

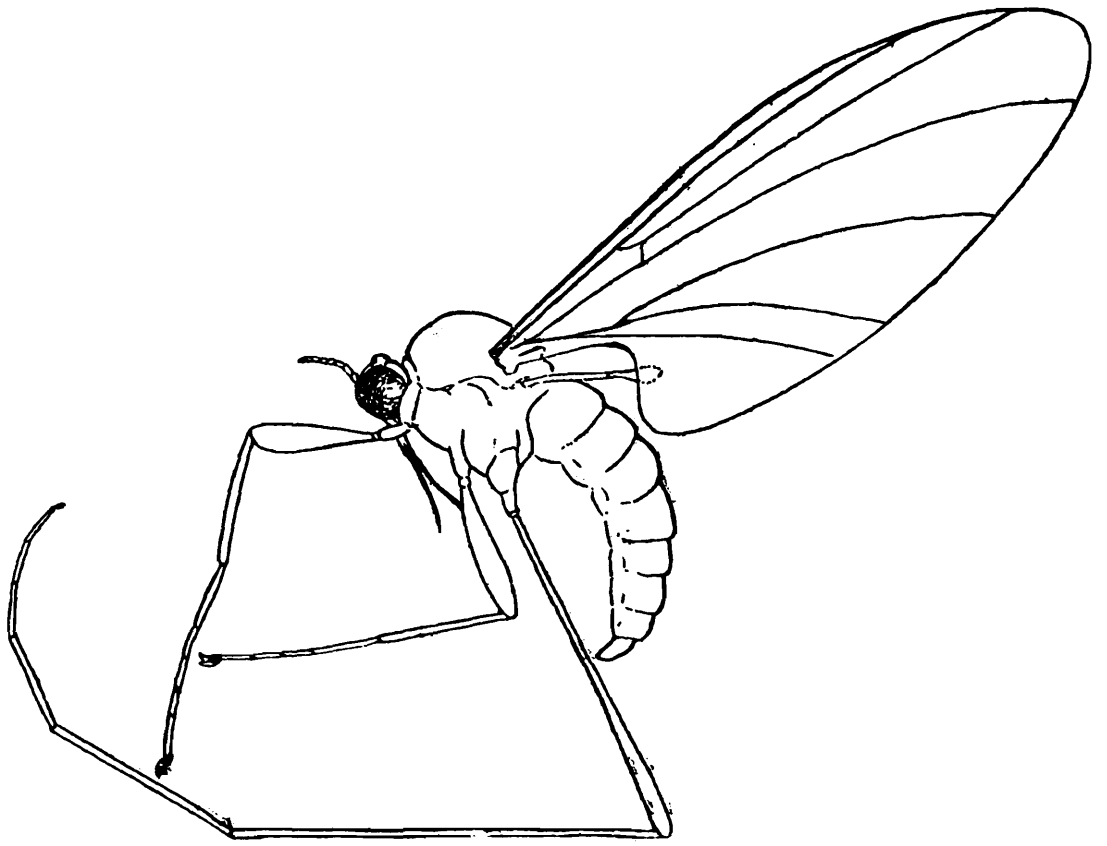
**Horaia longipes,** sp. nov.

*Female.*—Head blackish brown, disc of mesonotum velvety brown black, a trifurcate marking in front of the scutellum and the disc of the latter ferrugineous as well as most of the pleurae, sternum brownish, abdomen ferrugineous brown, posterior margin of the tergites darker; halteres brown. Legs ochraceous, distal half of front and mid tibiae infuscated.

Wing length 4·5 mm. body 3·5 mm.

Head transverse, eyes rounded, hairy undivided, relatively small, the frons being broad in consequence ; ocellar tubercule moderately developed. Antennae 8 segmented, the 2nd segment larger than the first, rather thick, the 3rd elongate cylindrical four times as long as broad, 4th and 5th together equal to 3rd, the others about as long as wide. Proboscis equal to three times the height of the head, the labellae are thin and cylindrical and more than twice the length of the labrum ; palpi very small, one segmented ; mandibles absent. Venation as shown in fig. 2 ; Rs simple, straight reaching the costa well before the tip of the wing and the costa prolonged only slightly past the tip of Rs ; *An* almost reaching the wing margin. Front and mid legs short, their

femora, especially the front ones, much incrassate, club shaped with multiple antero-dorsal rows of black hairs, tibiae spurless, tarsal claws



TEXT-FIG. 2. *Horaia longipes* sp. nov.

simple very stout. Hind legs much elongate, femora thin, tibiae with two spurs. Claws simple, normal, not incrassate. Leg measurements :—

| | Femora. | Tibiae. | $t_1$ | $t_2$ | $t_3$ | $t_4$ | $t_5$ | Claws. |
|---|---|---|---|---|---|---|---|---|
| I | 18 | 21 | 8 | 4 | 4 | 4 | 10 | 4 |
| II | 18 | 20 | 5 | 4 | 3 | 3 | 9 | 4 |
| III | 53 | 62 | 30 | 12 | 8 | 6 | 7 | 2 |

Genitalia as in *H. montana*, the end lamellae are provided with an upturned ventral distal process.

Type. Pashoke Johra, collected by Dr. S. L. Hora.

Among the larvae and pupae mentioned above from the same locality as this fly, none could be connected to this species with certainty.

## Horaia sp.

From various other localities in the Tista Bridge district Dr. Hora obtained numerous larvae and pupae very similar to those of *H. montana* from Assam, but the colouration of the body of the larva is not so dark, the colour of the appendages, however, is on the contrary much darker. There seems, however, to be a certain amount of variation in this respect. The imagines dissected out from the pupae all have nine-segmented antennae, otherwise they do not seem to differ from *H. montana*, so far as the crumpled condition of legs and wings allows to judge; all the claws of the female are also very stout.

Now that several species of the genus *Horaia* are more or less well known, the definition of the genus should be amended as follows :—

> Eyes either divided or undivided (at least in female), contiguous in male, far apart in female. Antennae 8 to 11 segmented. The proboscis may be twice as long as the head. Legs usually stout and short in female with claws of most pairs strongly developed. Venation as in *Paltostoma*, anal vein either complete or interrupted.

This modified diagnosis shows that this genus comes extremely near *Peritheates* from which, however, it differs widely in its early stages.

In conclusion I should like to point out that, as these notes have abundantly shown, no further important progress in the knowledge of the Blepharocerid fauna of India can be made unless collectors concentrate more on obtaining the adult stages rather than the early ones. From the latter one can only conclude that an important number of genera and species are represented in India but it is not possible to define them with any precision, and it is, therefore, impossible to satisfactorily establish their identity, which is after all the ultimate aim of a systematic study.