VIII ON A NEW SPECIES OF BLEPHAROCERID FLY FROM KASHMIR, TOGETHER WITH A DESCRIPTION OF SOME LARVAE FROM THE SAME LOCALITY

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(Plates xvi-xvii.)

While working in the Indian Museum in January and February, 1914 I was asked by Dr. Annandale to examine and report on the collection of Blepharocerid larvae and adults made by Mr. H. B. Bion of the Geological Survey of India at Nagaberan, in Kashmir. The collection has proved very interesting in more ways than one. The adults have proved to be specimens of a new species (*Philorus bionis*) of the genus *Philorus*, which genus has not hitherto been recorded from India. The larvae include specimens of 3 species, none of which appear to agree with the descriptions and figures of any of the previously described species; they either represent new species or belong to species whose larvae are unknown at present. It has to be noted that this is the first time that any Blepharocerid larvae are being described from India. The collection was made at an altitude of 10,000—10,500 ft., which appears to be the greatest height from which any species of the family have been recorded. All the specimens were obtained in rapid-running streams and were captured by means of a hand-net inserted into places where stones had just been overturned. The adult flies were taken in the same way and at the same time as the larvae.

An interesting point is the occurrence of such a large number of species (four) in the same locality. This, however, is a fact which has been previously noticed by Kellogg with reference to his New California larva, which was found to occur along with the larvae of *Bibiocephala comstocki* and *B. doanei* in most streams (*cf.* Kellogg, *Proc. Cal. Acad. Sci.* Zool., Vol. iii, No. 6, 1903).

I have to thank Dr. Annandale for giving me the opportunity of examining such an interesting collection. I have also to thank him and Mr. Brunetti for valuable suggestions and help during the course of the work. The illustrations were all drawn by Babu D. N. Bagchi of the Indian Museum staff under my supervision, and he has done the work with his usual skill. All the specimens described are in alcohol.

KEY TO THE SPECIES OF THE GENUS *PHILORUS*, KELLOGG.

Second longitudinal vein simple without branches; a cross-vein present between the 4th and 5th longitudinal veins.

A_1 Eyes contiguous, bisected by a simple groove.

1. *P. ancilla*, Osten-Sacken.

A_2 Eyes separated by a broad front; not bisected by a cross-band or groove.

b_1 Submarginal cell with a long pedicel.

2. *P. yosemite*, Osten-Sacken.

b_2 Submarginal cell sessile.

C_1 Second vein curving *downwards*, nearly parallel to the third vein; forking of 5th and 6th veins at nearly $\frac{1}{4}$ its length from the base.

3. *P. bilobata*, Loew.

C_2 Second vein curving *upwards*, in an opposite direction to that of the third vein; forking of the 5th and 6th veins at nearly $\frac{1}{3}$ its length from the base.

4. *P. bionis*, sp. nov.

Philorus bionis, sp. nov.

(Plate xvi, figs. 1-7.)

♂ ♀ *Head* (figs. 4, 5) transverse, narrower in width than the thorax; nearly black in colour; ocelli conspicuous. Proboscis brownish yellow, somewhat shorter than the vertical height of head in length.

Eyes widely separated; not bisected by any non-facetted cross-band; facets all of the same size, pubescent all over, black in colour.

Antennae (figs. 6, 7) 14-jointed; the scapal and 1st flagellar joints brown in colour, the remaining joints black.

Palpi 5-jointed; the 1st rather a short joint, the 2nd longer with a slightly swollen head, the 3rd pear-shaped with the terminal part coloured dark brown, the 4th a trumpet-shaped joint, the last nearly oblong in shape with a small peduncle by which it is inserted on the side of the 4th.

Mandibles absent in both ♂ and ♀

Thorax strongly arched on the dorsal side, with a distinct transverse suture. Dorsum is black with a trefoil-shaped yellowish-white mark on the posterior region. This is much more conspicuous in the ♀ than in the ♂

Abdomen: ♂ terga clove-brown in colour, sterna and pleura nearly white; hypopygium conspicuous, clove-brown in colour. ♀ terga light cinnamon-brown in colour, much less chitinised than in the ♂. A black line is seen on each side which is really formed by the tracheal vessel with its branches going to the abdominal stigmata.

Genitalia (figs. 1-2) very conspicuous. ♂ The hypopygium is during life bent upwards very much like the forceps of an earwig; there is a small dorsal plate covering only the basal parts of the genitalia. A much larger ventral plate with its sides turned upwards so as to enclose the genitalia from below and the sides is present. Its posterior edge has a wide shallow notch in the middle. From near the sides of this notch arise two leaf-like claspers which are folded in the middle along their length. They bend towards each other and meet nearly in the middle line. From the sides of the ventral plate, a little behind these claspers arise a pair of stiff three-lobed claspers. During life they are apparently turned towards each other so that one of the lobes of one meets the corresponding lobe of the other enclosing an arched surface between. Arising from the anterior part of the ventral plate are two beak-headed claspers, with their beaks turned towards one another and enclosing a space through which the penis is protruded. The penis is not visible in all specimens, but where it is seen it appears to be a cylindrical structure from which eight fine filamentous structures arise.[1] These appear to be the actual intromittent organs.

♀ The genitalia of the female are neither so conspicuous nor so complicated as those of the ♂ There is a dorsal and a ventral plate similar to that of the ♂ but much smaller. There is a pair of leaf-like claspers situated similarly to the claspers of the male but much smaller. The only other organs are a pair of small leaf-like claspers arising from near the middle of the anterior edge of the ventral plate. These guard the ♀ genital aperture.

Legs long and slender. The legs of the ♂ are proportionately much larger than those of the female. Colour of legs in ♂ brown, in the ♀ yellowish-white. *Front tibiae* without any spurs, the middle ones with a single terminal spur, the hind ones with a small spur in addition to and by the side of the terminal spur. *Ungues* pointed and hook-like. Pulvilli absent, empodia rudimentary.

Wings (fig. 3). The venation can be distinguished from that of other species of *Philorus* by the following characters: (1) the 2nd vein is bent upwards instead of downwards near its termination; (2) the forking of the 5th and 6th veins takes place at about $\frac{1}{3}$ its length from the base.

Halteres well-developed; both stem and club light brown in colour.

Immature stages unknown; it is possible that one of the three species of larvae found occurring with it may belong to it. But nothing can be said on this point until more information is available.

Length ♂ 4 to 5 mm. ♀ 5·5 to 6 mm. Described from 9 ♂ and 5 ♀ specimens, collected by Mr. Bion at Nagaberan, Kashmir.

Types preserved in the Indian Museum.

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[1] Fig. 1, 2 does not show the parts in their natural positions; it was drawn from a balsam preparation in which the parts had been pressed out flat.

LARVAE FROM KASHMIR.

Along with the specimens of adult ♂ and ♀ collected at Nagaberan, Kashmir, were enclosed nearly 275 specimens of larvae of all sizes. I first thought that they were all of one species, presumably *Philorus bionis*, sp. nov., with the adults of which they were found to occur It was only when I examined the whole collection carefully that I found them to belong to three distinct species and a form which appears to be only a variety of one of them. As none of the larvae agree with any Blepharocerid larvae previously described and figured,[1] it has become impossible to assign them to any species. I have, therefore, followed the only course open under the circumstances, *viz.* to describe the larvae and figure them without giving any names.

LARVA A.

(Plate xvii, figs. 8-10.)

The fully-grown larvae are from 7 to 8 mm. in length and moderately broad. In the collection before me there are younger specimens of various sizes from 3 mm. onwards. The general appearance agrees with that of typical Blepharocerid larva, being broadest at the head region with the successive segments slightly narrower than those in front of them. *The colour* of the dorsal surface varies from light cinnamon-brown to deep clove-brown. The difference in shade does not appear to depend on the size of the larva, but to some other cause, such as exposure to light.[2]

The markings on the head consist of a central rectangular dark area and two triangular ones on its sides, on the most anterior region of the head segment. In the centre of the rectangular patch is a nearly ellipsoidal area separated from the rest by a deep groove which appears as a bright line when viewed by transmitted light. The other markings on the head segment are two transverse bands, a faint one in the middle and a dark one in the posterior part of the segment. On each of the other segments of the body there is a transverse dark band in the middle. The ventral surface of the body is white with the exception of the suckers, which appear to the naked eye as dark circular rings. The lateral processes are light brown in colour.

Antennae: two-jointed, the 2nd joint having 4 or 5 small papillose hairs with globular heads at the end. Proximal half of each joint white, distal half black in colour.

Lateral processes single, with a tuft of long fine hair-like processes at the end of each. *Tracheal gills in groups* of 6.[3] There

[1] With the possible (but very improbable) exception of the larva of *P. yosemite*, described by Prof. Kellogg in *Psyche*, Vol. X, p. 186, I could not get a copy of this paper in any of the libraries in Calcutta.

[2] Mr. Bion informs us that all the larvae were much paler in life than they are in spirit.

[3] I have found the number of gills in a tuft vary from 5 to 7, but 6 is the most common number.

are 5 pairs of gill-tufts, one in front of each lateral process, excepting those of the head-segment. Behind the last sucker there are 4 gills much larger than the others. These probably represent another type of tracheal gills. This is the most common larva, over 260 specimens out of a total of over 275 larvae belonging to it.

Among specimens belonging to this species are some forms (Larva A') which are very much broader in proportion to their length than the typical individuals. I have not been able to find any other characters, in which they differ from the type and am not in a position to say whether they really represent the same species. The outline figure (fig. 11) will give a good idea of the appearance. The larvae appear to be very much like those of the genus *Blepharocera* as figured by Kellogg and others and it is to be hoped that they represent the larvae of *Blepharocera indica*, Brun., which has been described from the Western Himalayas (*Rec. Ind. Mus.* IV, p. 316 (1911) and *Fauna Brit. India*, Nematocera, p. 156).

Types preserved in the Indian Museum.

LARVA B.

(Plate xvii, figs. 12-13.)

Length 6-7 mm. The markings in the dorsum of the head and thoracic segment consist of a single dark patch with an ellipsoidal groove in the middle. In some there is a tendency to have this patch divided into three areas like those of the larva A. Behind there are some darkish markings. The abdominal segments have each a single dark transverse bar. There is a row of 6 spines on each side of the body, one spine being placed a little above the base of anterior lateral process; each of the abdominal segments except the last has 4 spines, a pair in front and a pair behind the transverse dark bar. The head and thoracic segment as well as the last segment have two spines only.

Lateral processes not very conspicuous, double; the anterior member of each pair longer and bearing at tip a long spiny hair; lateral processes pale fuscous in colour; tracheal tufts in groups of 4 each, rather short, 3 of them directed anteriorly and 1 posteriorly; antennae rather short, three-jointed.

Described from 15 specimens from among those collected by Mr. Bion at Nagaberan in Kashmir.

Types preserved in the Indian Museum.

LARVA C.

(Plate xvii, figs. 14-15.)

Long and broad; length 8-6 mm. The markings on the head and thoracic segment consist of a central rhomboidal area in two sides of which are two nearly triangular patches; the central

part is very pale in colour. Each segment has two spines, one above the other, on each side a little above the base of the lateral processes; besides this there are 2 spines in the mid-dorsal line of the head and thoracic and the last abdominal segment, and 4 on each of the other segments; lateral processes very conspicuous, double, the anterior member of each pair longer, pointed and bearing a number of fine hairs on its side and a single long spiny hair at its tip; the posterior member of each pair blunt and stout and bearing a number of fine hairs on its side; these lateral processes yellow in colour; tracheal tufts in groups of 4, moderately long, 3 directed forwards and 1 backwards. The suckers are proportionately broader than in larvae **A** and **B**; antennae longer than in larvae **A** and **B**, three-jointed, black in colour.

Described from a single specimen from among those collected by Mr. Bion at Nagaberan.

Types preserved in the Indian Museum.