XX THE HEMIPTEROUS FAMILY POLYCTENIDÆ

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There are among the parasites of bats very singular forms; but we are far from an even nearly complete knowledge of these small animals, because bats seldom receive attention from sportsmen. Several forms of these parasites, and specially interesting ones too, are known only from a few isolated individuals. In the genus *Ascodipteron*, which forms one of the best characterised families, only five females are known, and no male; while examples of another parasitic genus (*Polyctenes*), of which I have recently received a specimen by the great kindness of Dr. N. Annandale, of the Calcutta Museum, are likewise rarities. I take the opportunity, therefore, to give here a more complete review of the family they represent.

In 1864 Giglioli described the parasite of a Molossid from Amoy, in China, under the name "*Polyctenes*," which was proposed to the author by Westwood. At that time no other insects from bats but Diptera were known; these Diptera were all classified together as "Nycteribiidæ," and therefore the new genus was placed in the family Nycteribiidæ. The family "Streblidæ," founded in 1862, contained winged species only, *Polyctenes* being wingless. Westwood took occasion later, having got a second species, to examine the first one known in the exactest manner. In his *Thesaurus Entomologicus Oxoniensis* he gives very much enlarged and carefully delineated figures of all details. He ascertained thus that *Polyctenes* undergoes an ametabolic metamorphosis, and that it has a three-jointed proboscis.

As these characters, both important, do not allow the species to be placed among the Diptera, he brought the genus into the Anoplura by the side of the true lice and the bird-lice (Mallophaga). C. O. Waterhouse, who was able to describe in 1880 another American species, called attention to their relationship with the Hemiptera, and not with the Diptera. But these singular parasites came by rare exceptions only into museums, and therefore few scientists knew them by a personal examination. The few notes on their systematic position were disregarded, and the Polyctenidæ were still enumerated as late as 1896 among the Dipterous family Nycteribiidæ. Finally, I was able to examine two new species myself and to point out the systematic position in a more exact manner. These insects are true Hemiptera Heteroptera, and must be placed in the strictest relationship to the bed-bug. They have,

phylogenetically speaking, taken the important step from periodical blood-sucking to parasitism for life. They form a well characterised family, Polyctenidæ, which must be placed close by the side of the Acanthiadæ (Cimicidæ).

Of the genus *Polyctenes*, Gigl., seven species are known up to date:—

P. molossus, Gigl., "from the Chinese Molossus," from Amoy.
P. lyræ, Waterh., from *Megaderma lyra*, from Secunderabad (Madras Presidency).
P. intermedius, Speiser, from *Taphozous perforatus*, from Egypt.
P. talpa, Speiser, from *Megaderma spasma*, L., from Nias.
P. spasmæ, Waterh., from the same bat, from Java.
P. longiceps, Waterh., from *Molossus abrasus*, Temm., from Cajabon in Guatemala.
P. fumarius, Westw., from *Molossus rufus* var. *obscurus*, Geoffr., from Jamaica.

These seven species were described each from two specimens only, and besides these typical specimens there were found very few others; as far as I know, there are two more specimens of *P. intermedius*, mihi, and two American ones in museums.

The nineteenth specimen of this rare family, which was found by Dr. N. Annandale in November, 1908, at Trivandrum in Travancore on a specimen of *Cynopterus marginatus* in the local museum, seems to be the most interesting one except those first known. It belongs most probably to my *P. talpa*. It is not, however, a mature insect, but a nymph.

If we compare the drawings given by former authors, the new specimen seems to belong to *P. lyræ*, which is to be placed as a close ally, for it has, like this species, no ctenidia on the "elytra." The elytra, on the other hand, are longer than in *P. spasmæ*, the other species with which it must be compared particularly. The outline of the thorax agrees better with that of this latter species, but the bristles of the abdomen are in their arrangement quite different from those of any other form. A more detailed examination under the microscope showed that within the skin of this individual, which has no ctenidia on the thorax or on the elytra, was hidden as in its nymphal skin a new stage, which has such ctenidia on the thorax and on the elytra. For this reason the specimen cannot belong to *P. lyræ*, because that species has elytra without ctenidia while in a stage at which the thorax is already provided with its ctenidium. Of course it may be that the new individual is the connecting stage between *P. spasmæ* and *P. talpa*, which inhabit the same host. Then *P. spasmæ* would be the larval stage, the new specimen the nymph and *P. talpa* the full-grown insect. Be this as it may, it is now my duty to describe the peculiarities of the specimen from Travancore, which belongs certainly to the same species as *P. talpa*, mihi.

In the head and its appendages no peculiarity can be found except that the bristle at the hind angles of the dorsal surface is

wanting. The thorax has an outline somewhat different from that of the imago; it is widest a little before the middle of its length, whilst it reaches its greatest width in the imago behind this point. The arrangement of the bristles is exactly the same as in the imago, but the oblique rows of longer bristles on the anterior half contain on each side five instead of three bristles. The concave round impressions on the lateral and hinder parts are absent; they are wanting also on the elytra, which are a little shorter than in the imago. Their length is not greater than four-fifths of the width in the anterior part. The arrangement of the bristles on the abdomen is closely similar to that of *P. talpa*, mihi, as figured by me (1904) in the description of this species. The first segments are in the nymph also naked on the disk and bear on the hind border a simple row of very short bristles. But they bear at the posterior angles of the tergites on each side one longer bristle, which is not present in the imago. In this latter the segments vi to viii of the tergum are beset on their surface with many fine bristles, and on the hind border with considerably longer and stronger ones; while in the nymph they are all quite bare on their disk, and the seventh and eighth only bear the longer marginal bristles. The bristles on the sternal surface are also thinner than in the imago. The sternites bear scarcely more than a single row of very fine bristles, and in some cases in the middle before this a small group of similar ones.

A matter of peculiar importance is the structure of the tarsi. In the *Polyctenes* as yet known they must be described as four-jointed, but in this nymph they are clearly three-jointed in both the hinder pairs of feet. By this observation I find confirmed, in a very gratifying manner, what I asserted in 1904, namely, that the second and third tarsal joint of the Polyctenidæ is homologous with the second or middle tarsal joint of the other Hemiptera. For in the nymph now known this joint is, in fact, as I postulated then, the second tarsal joint not yet divided into two. From this statement arises a new and unexpected support to my views on the systematic position of the family Polyctenidæ.

The important results reached by the finding of this new specimen of the rare family may be enumerated as follows:—

(1) The Polyctenidæ are now with greater accuracy than before put in close affinity with the Acanthiadæ (Cimicidæ).

(2) The ctenidia on the head are phylogenetically older characters than those on the elytra, and the latter are older than those on the thorax: they appear within the individual life in this succession: the ctenidium on the elytra appears at a time when a ctenidium on the thorax is lacking (in *P. lyræ*, this being a nymphal stage).

(3) *P. spasmæ*, Waterh., may be perhaps a larval stage of *P. talpa*, mihi; should this be proved by specimens found later, the much older name given by Waterhouse has the priority.

To solve many other questions it would be of the greatest importance that we should be able to examine more individuals of this interesting family. Collectors and scientists who have an opportunity to examine bats in the countries where Polyctenidæ can be found (South Asia and tropical America) may be prayed to pay attention to these ectoparasitic insects as well as others on the bats; for the Nycteribiidæ certainly contain within their family many questions also to be solved. Whatever is collected must be preserved in alcohol, for only in specimens so prepared can the stages of metamorphosis contained within the skin be seen and examined.

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