NYCERIBIIDAE

Basilia (Paracyclopodia) burmensis (Theodor)

Very little work has been done on the morphology of the male genitalia of Nycteribiidae. Theodor (1953) has dealt with the male genitalia of the family. Mukerji and Dasgupta (1954) have given an account of the external anatomy of Cyclopoedia sykesi wherein they have also described the male genitalia. This work, however, suffers from several inaccuracies and descriptional errors so far as the male genitalia are concerned. Schlein and Theodor (1971) in their work have also included the skeletal-muscular system of the nycteribid Penicillidia dufourii.

The abdomen of Basilia (P.) burmensis is dorso-ventrally compressed, and ends in a sharply tapering cone which, in fact, is a syn-segment being composed of segments seven to ten. Mukerji and Dasgupta (1954) in C. sykesi label its counterpart as seventh segment and are silent about its composite nature. Schlein and Theodor (1971) consider it to represent the ninth segment. The very fact that it bears the seventh pair of spiracles at one end, and the proctiger at the other, clearly establishes its composite nature.

Although externally symmetrical, the syn-segment possesses enough internal evidence of having undergone a process of torsion through 360. Mukerji and Dasgupta (1954) in C. sykesi, and Schlein and Theodor (1971) in P. dufourii, are silent on this point.

The dorsum of the syn-segment (Fig. Bb. 3) is composed of the amalgamated terga of the involved segments, and any individual boundaries are not discernible. Apically, it bears a pair of slender, acutely tapering surstyli which are tucked underneath so as to be invisible from above (Fig. Bb. 1; ss).
The ventral portion of the syn-segment, on the other hand, is mostly membranous. It, nevertheless, possesses certain sclerotic structures which serve to identify the various components. The seventh and eighth sterna are completely membranous and it is not possible to differentiate them.

The ninth sternum, however, clearly stands out as a horse-shoe shaped structure. Mukerji and Dasgupta (1954) call it 'sub-genital plate' and consider the same to belong to the seventh segment. Schlein and Theodor (1971) term it as 'hypandrium' which, according to them, represents the anterior part of the ninth sternum.

The two ends of the horse-shoe shaped ninth sternum are posteriorly closed by a more or less wedge-shaped plate, slightly arched plate. The latter is a composite structure formed as a result of fusion of the paramores with the tenth sternum (Fig.Bb.1,3; pmr:S10). Mukerji and Dasgupta (1954) in C. sykesi call it 'genital chamber'. Schlein and Theodor (1971) in P. dufourii term a similar structure as 'posterior part of the ninth sternum'.

The aedeagus (Fig.Bb.2,4;Aed) is in the form of a short and stout spine which for the greater part of its length is closely flanked by a pair of flap-like structures borne by the phallobase. Basally, the aedeagus receives the end of the ejaculatory duct (Fig.Bb, 4;Dej). The base of the aedeagus is further associated with an aedeagal apodeme (Apa) which projects anteriorly in the abdominal cavity, and is responsible for the movement of the aedeagus.

The description of aedeagus given by Mukerji and Dasgupta (1954) makes interesting reading. In their text -fig.8 (p.17), the aedeagus is shown to be composed of two parts, viz., an 'external part' and an 'abdominal part'. At another place, however, (p.21) the aedeagus is mentioned as being composed of two parts, viz., an external part (this time termed as 'phallobase'), and an internal part termed as the 'aedeagus proper', which according to the authors
'everts out' at the time of copulation. In a cross-section (text-fig. 13), the former is shown as a tubular structure containing the latter in its lumen. Similarly, in their text-fig.12, the intro-mittent organ is labelled as 'penis'. The ejaculatory duct, likewise, is shown to enter the end of what looks like to be the aedeagal apodeme, but labelled by the authors as 'penis'. The aedeagal apodeme, however, is a solid structure and cannot possibly serve as a conduit for the seminal fluid. These authors seem to have confusingly regarded the aedeagus and the aedeagal apodeme as one structure, which is erroneous. Schlein and Theodor (1971) clearly show the ejaculatory duct ending at the base of the aedeagus.

The sternum (Fig.Bb.1,4;ss) are in the form of a pair of slender, acutely tapering processes borne laterally at the posterior end of the syn-segment, and as already mentioned earlier, are flexed under the abdomen so as to be concealed from view from above. The sternum are basally articulated with the syn-segment, but do not receive any muscles. They seem to be indirectly movable under the influence of the muscles inserted on the composite, arched plate (Fig.Bb.4), which indirectly serve as flexors of the sternum. The extension of the sternum seems to be brought by compression of the abdomen and consequent rushing in of the body fluids, besides relaxation of the above mentioned muscles. Mukerji and Dasgupta (1954) call these as 'claspers' without commenting on their exact nature. Schlein and Theodor (1971) term these structures as 'cerci' and consider the sternum to be absent.

As already mentioned earlier, the aedeagus is closely flanked for the greater part of its length by a pair of flap-like structures which arise from a common base (Fig.Bb.2,4;Phb). Mukerji and Dasgupta (1954) do not mention any such structures in C. sykesi. Schlein and Theodor (1971) in P. dufourii term these as 'praegonites'
and consider them to be possibly the parameres. The present writer, however, considers these structures to be merely the modifications of the phallobase, as the true parameres have fused with the tenth sternum to form a composite plate.

The proctiger (Fig.3b.1;Ptgr) is a very short annular structure, laterally flanked by the tiny paraprocts (Papt), and providing exit to the alimentary canal. Mukerji and Dasgupta (1954) make no mention of the paraprocts in males, but describe anal opening in the female as being flanked by two 'chitinous plates'. Schlein and Theodor (1971) also do not record the presence of any paraprocts, and consider that the basal parts of the 'cerci' form a frame around the anus.

**Muscles of the Terminalia**

Besides the muscles which move the pedennis, the composite plate formed by the fusion of parameres with the tenth sternum, and those which are associated with the proctiger, other muscles of the male terminalia can conveniently be placed in three categories, viz., the inter-tergal muscles, the inter-sternal muscles, and the tergo-sternal muscles. The inter-tergal muscles consist of two wide bands extending between the sixth tergum and the basal part of the dorsum of the syn-segment, and have not been included in the description which follows. These muscles serve as retractor of the dorsum of the syn-segment.

I. **Inter-sternal muscles:**

**Ventral retractor of the syn-segment:** (Fig.Bb.4;1)

This broad muscle arises laterally on the fifth sternum and is inserted on the internal inflection associated with the base of the venter of the syn-segment (representing the sixth sternum?). Schlein and Theodor (1971) do not record this muscle.

**Ventral retractor of the syn-segment:** (Fig.Bb.4;2)

This muscle arises medially on the fifth sternum, and is
like-wise inserted on the basal margin of the syn-segment. Schlein and Theodor (1971) do not record this muscle.

Retractor of the ninth sternum: (Fig.Bb.4;3)

This muscle arises on the internal inflection associated with the base of the venter of syn-segment (representing sixth sternum ?), and is inserted anteriorly on the ninth sternum. Schlein and Theodor (1971) do not record this muscle.

II. Tergo- sternum muscles:

Levator of the ninth sternum: (Fig.Bb.4;4)

This muscle arises dorso-laterally from the anterior part of the syn-segment, and is inserted antero-laterally on the apodeme of the ninth sternum (ApSp). It appears to be homologous with the muscle 'No.2' described by Schlein and Theodor (1971) in P. dufourii.

III. Muscles of the paramere:

Adductor of the composite plate: (Fig.Bb.4;5)

This broad and massive muscle arises dorso-laterally on the syn-segment, and is inserted laterally on the composite plate (pmarC10). This muscle also serves as an indirect flexor of the surstylus (ss). It is homologous with the muscle 'No.10' described by Schlein and Theodor (1971) in P. dufourii.

IV. Muscles of the aedeagus:

Retractor of the phallobase: (Fig.Bb.4;6)

This muscle arises laterally on the apodeme of the ninth sternum, and is inserted anteriorly on the phallobase (Phb). It is homologous with the muscle 'No.4a' described by Schlein and Theodor (1971) in P. dufourii.

Protractor of the aedeagus: (Fig.Bb.4;7)

This muscle arises on the postero-lateral aspect of the ninth sternum, and is inserted laterally of the aedeagal apodeme(Apa). It is homologous with the muscle 'No.5a' described by Schlein and
Theodor (1971) in *P. dufourii.*

V. Muscles of the proctiger:

Dorsal retracor of the paraproct: (Fig. Bb. 4; 8)

This very weak muscle arises postero-medially from the dorsal aspect of the syn-segment, and is inserted dorsally on the paraproct. It appears similar to the muscle 'No. 12' described by Schloin and Theodor (1971) in *P. dufourii,* where it is shown to be inserted on the anterior end of the 'corci' forming the frame of the anus.
Ed: Pusilia (Paracyclocnida) humensis (Theodor)

(Mysteribiidae)