

XXII.—An Account of the Bird-lice of the Genus *Docophorus* (Mallophaga) found on British Auks (*continued*). By James Waterston, B.D., B.Sc., Imperial Bureau of Entomology.

(MS. received 15th September 1914. Read 26th October 1914.)

(B) MORPHOLOGICAL—THE MALE GENITALIA.

THAT the male genitalia of the Mallophaga as a group afford easily recognised and exact specific characters is becoming increasingly evident. So very sharply defined indeed are the chitinized portions of these organs, that it is in many cases possible by this means to determine accurately mere fragments of insects so bleached and rubbed as to be otherwise unrecognisable. Before describing in detail the species of Auk Docophori, already referred to, I think it useful to figure and annotate the external ♂ sexual apparatus of each, and to indicate shortly, by a table, how the five forms may thus be separated without recourse to any other characters.

The descriptive terms now employed have in part been recently introduced, and all are explained in *Ann. South Afr. Mus.*, vol. x., pt. ix., No. 14, pp. 279, 280, July (1914). The following short account will make subsequent description more intelligible:—

The copulatory apparatus (♂) in *Docophorus*, *Nirmus*, etc., consists of an internal chitinized lamina—the *basal plate*—to which many strong muscles are attached. Distally this plate bears a pair of laterally placed, freely movable blades (*paramera*), within which are two basally articulating and practically fixed more leaflike sclerites (*endomera*), from which issue apically a much smaller pair of *telomera*. Together the parts within the *paramera* may be referred to as the *mesosome*. The true *penis* is a simple chitinized tube lying immediately below, and often greatly exceeding in length, the *telomera*. The path of the *penis* inside the *mesosome* is as a rule easy to discern, especially apically. The *hypomeron* is the inferior support of the *penis*. When distinct it takes the form of a triangular, apically reflexed, hardly thickened membrane. Oftener it appears as the expanded base of the *penis*. These terms are purely descriptive, at present. The exact nature of the parts to which they apply has still to be ascertained.

The genitalia of *Docophorus acutipectus* show the typical parts clearly, and in Fig. 1 they have been separately labelled. No difficulty should be experienced in homologising the parts in the other species.

Docophorus acutipectus, Kell.

The basal plate is much longer (3:2) than, though hardly so wide as, the exerted portion of the apparatus. The paramera are broad, especially at the base which, on the inner side, is slightly doubly concave. The anterior and posterior angles of the base are distinct though rounded. The sulcus of articulation with the endomera is neither deep nor extensive. Its superior and inferior edges are parallel. Each parameron is a little broader medianly than at the base, and beyond the middle contracts rather sharply to a point. The ventral hair is at three-fifths. The sides of the paramera are continuously curved, and the outer is markedly convex.

The endomera are triangular in shape, convex externally, and doubly concave internally below. The median clear area is thus constricted at a point

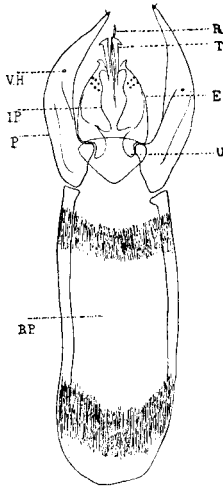


FIG. 1.
Docophorus acutipectus.

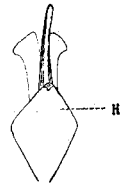


FIG. 1A.
Docophorus acutipectus from below
showing Hypomeron.

B.P. Basal plate. *P.* Parameron. *V.H.* Ventral Hair. *E.* Endomeron.
I.P. Inner Pattern. *U.* Uncus. *T.* Telomeron. *H.* Hypomeron. *Pe.* Penis.

beyond three-fourths. The basal uncus of the endomeron is well developed and closely adherent to the base of the parameron. Apex of endomera blunt, recurved and thickened, as is likewise the whole outer edge. There are about seven pre-apical ventral hairs in two rows on each endomeron.

The hypomeron is very broad and short. It is applied to the penis at the level of the apices of the endomera.

The telomera are particularly distinct. Each consists of a narrow

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chitinous strip or neck and a triangular head—the neck being much longer than the head or that portion of the penis which projects beyond.

The penis is generally straight.

Length of the apparatus from tip to posterior edge of basal plate about .46 mm.

Docophorus calvus, Kell.

The basal plate is barely so long as in *acutipectus*. In the proportion of 4:3 to the rest of the apparatus. The paramera are broad and straight for more than two-thirds of their length. Thereafter they contract suddenly—the bend being more abrupt on the inner edge. Ventral hair at two-thirds. Base of paramera heavily chitinized and quadrangular in shape. The upper edge of the articulation with the mesosome not nearly above the lower, which protrudes as a thin ventral lamina clasping the base of the mesosome.

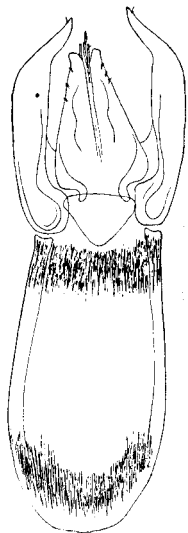


FIG. 2.
Docophorus calvus.

The mesosome is conspicuous, filling all the space between the closed paramera. In shape it is an isosceles triangle with blunted apex. The endomerai unci are small and strongly curved. The endomera are closely approximated. The ventral pattern does not reach so far back as in *acutipectus*, and its constriction is almost median. Each endomeron bears near the apex at the side three hairs in a row, and one a little behind these but below. Apices of endomera truncate and hardly reflexed. The telomera are linear, inconspicuous and projecting little beyond the endomera.

The penis is a little bent.

The hypomeron is long, narrow, and ends before the apex of the endomeron.

Length of the apparatus .5 mm.

Docophorus celedoxus, N.

The proportion between the basal plate and the free part of the apparatus is the same as in *calvus*, 4:3.

The paramera are similar to those of *calvus*, but are not so robust and broad, neither are they so abruptly bent. The ventral hair is rather nearer the base than in *calvus*, well within two-thirds. Upper distal angle of basal articulation distinct.

The mesosome does not fill entirely the intra-parameral area; nor does it end truncately as in *calvus*. Distally the endomera are loosely separate—their apices being somewhat drawn out and recurved. The hairs of



FIG. 3.
Docophorus celedocus.

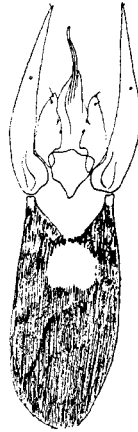


FIG. 5.
Docophorus megacephalus.



FIG. 4.
Docophorus merguli.



FIG. 4A.
Docophorus merguli, to show
Hypomeron.

the mesosome are sometimes indistinct. They are pre-apical and ventral, placed at the side of the inner clear area which, in this species, is not constricted,

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From their base outwards the telomera are gradually expanded into a distinct head, whose distal edges slope sharply.

The penis just reaches beyond the telomera.

The hypomeron is as in *calvus*.

Length of the apparatus, .5 mm.

Docophorus merguli, D.

The basal plate is at its widest anteriorly, and is little longer than the extruded apparatus. The paramera are long and narrow, except on their basal third. The ventral hair *before* half.

The outer sides of the endomera are practically straight and parallel to one another. The distal edge of each slopes slightly towards the penis but does not run directly to that part, there being a somewhat pronounced notch on each side of the penis. The endomera are not apically produced and reflected, thus in association they present a quadrate facies. Each endomeron bears distally 4-5 ventral hairs. Apically the endomera are somewhat apart.

The central pattern of the mesosome is pear-shaped; the basal articulation short and narrow.

The telomera, hypomeron and penis are closely associated. The former may be distinguished, by careful dissection, as two short, broad processes which do not form a head or hook.

The hypomeron seems inseparable from the penis, which appears as if thickened basally. Owing to the small size of the endomera the penis-hypomeron in this and the following species projects conspicuously.

Length of apparatus, .35 mm.

Docophorus megacephalus, D.

The basal plate is, in proportion to the exerted part of the genitalia, even shorter than in *merguli*. The plate is also more coloured than in the others of the group, being entirely dark save for a short semi-circular space near the junction of the paramera, and another spot in front. Bases of the paramera evenly rounded on the upper internal aspect. The paramera are broad to beyond half, and thereafter contracted gradually on the outer edges, while the inner remain straight. The ventral hair is placed just beyond half.

The endomera are roughly triangular with curved sides, and are widely apart distally, without any recurved apex. Their inner edges are convergent without actually meeting. On inner ventral edge of each parameron from the

apex backwards are 4-5 hairs, placed 3 near the apex and one at least farther back. Endomera considerably less than half the length of the paramera.

The penis is bent and is closely united with the telomera and hypomeron. As in *merguli* it is conspicuous.

Length of the apparatus, .44 mm.

KEY TO SPECIES OF DOCOPHORI FROM BRITISH AUKS, BASED ON
CHARACTERS OF MALE GENITALIA ALONE.

1. Paramera evenly bent from base to apex, *i.e.*, neither outer nor inner edge abruptly turned at any point (3).
Paramera suddenly bent and narrowed towards apex (2).
2. Telomera linear: inner pattern of mesosome constricted (*D. calvus*).
Telomera distally expanded: inner pattern of mesosome unconstricted (*D. celedoxus*).
3. Telomera free, stalked and capitate, longer than the projecting portion of the penis. Hypomeron distinct (*D. acutipectus*).
Telomera shorter than the projecting portion of the penis, with which and the hypomeron they are apparently fused (4).
4. Paramera long and narrow: ventral hair before half, sides of mesosome parallel or subparallel (*D. merguli*).
Paramera narrower on apical third, ventral hair beyond half, sides of mesosome slanting inwards (*D. megacephalus*).



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PART II.—MORPHOLOGICAL.

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