

MALE REPRODUCTIVE ORGANS AND MODE OF PAIRING OF THE POULTRY BITING LOUSE *LIPEURUS TROPICALIS* (PETERS)

N. S. KRISHNA RAO AND C. A. KHUDDUS*

EXTERNAL genitalia in insects are considered to be of great importance in classification. In *Mallophaga*, Hopkins and Timmerman (1954) have pointed out the importance of the male genitalia in separating closely allied species. Pendergrast (1957) by his studies on Heteroptera has demonstrated the valid criteria, the reproductive organs bear in classifications.

During our study of the lice of poultry, a gross examination of the KOH-cleared specimens showed great variations of the phallobase, in shape and structure, which prompted us to study in detail the male reproductive organs of one species to form a basis for comparison with others. *Lipeurus tropicalis* (Peters) being one of the commonest in poultry and fairly big in size was selected. A description of the male reproductive organs and method of copulation are given, as many of the features have not been described so far in the literature.

MATERIAL AND METHODS

The reproductive organs were dissected under the stereomicroscope, fixed in formalin and studied. They were also stained in Hematoxylin-eosin on the slide itself and permanent mounts made in canada balsam after clearing in clove oil. More than 100 specimens were studied in this way.

RESULTS AND DISCUSSION

Male reproductive organs (Fig. 1).—These consist of a pair of testes, two vasa deferentia which join the vesicula seminalis and a pair of accessory glands. These open separately into the penis or aedeagus which rests on the phallobase. A bulbous ejaculatorius is absent.

The testis is bilobed. In one among the 100 examined, it was trilobed. At both ends are whip-like structures which are attached to the surrounding tissues. The vasa deferentia start at the junction of the two lobes, go along the muscular coat of the ductus ejaculatorius, proceed anteriorly and join the vesicula seminalis. A dilatation is seen at the junction. The vesicula seminalis

* Veterinary College, Bangalore.

extend anterior to the opening of the vasa deferentia, end blindly and are slightly shorter than the accompanying accessory glands, which are similarly tubular. In stained specimens, the glands are acidophilic and the seminal vesical basophilic. The two ducts of the latter unite before opening into the ductus ejaculatorius posteriorly; the accessory glands open a little behind this.

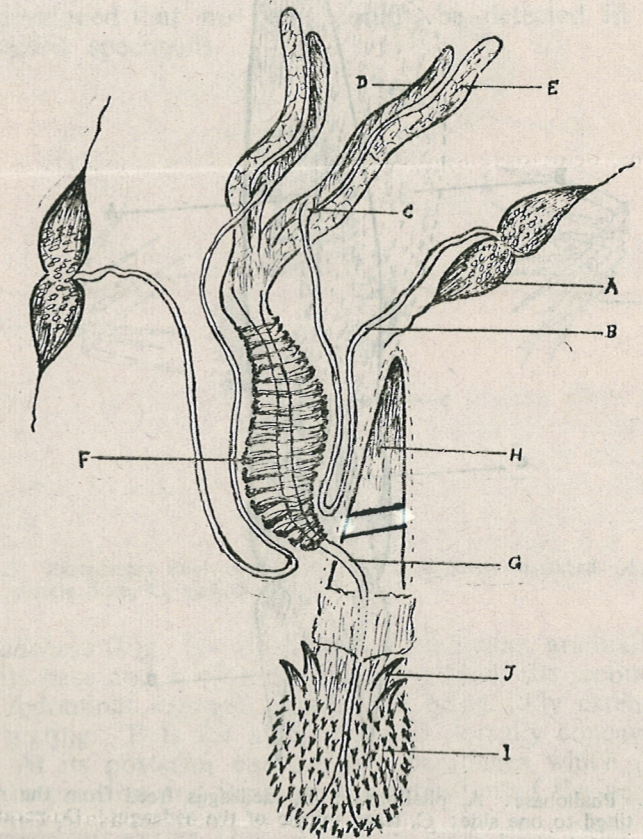


FIG. 1. Male genital organs of *L. tropicalis* (semi-diagrammatic). A, testis; B, vas deferens; C, junction of the vas deferens with vesicula seminalis; D, vesicula seminalis; E, accessory gland; F, ductus ejaculatorius with its muscular coat; G, free portion of the ductus ejaculatorius; H, phallobase with the 8th abdominal segment retained; I, aedeagus or penis everted; J, large spicule of the aedeagus.

The ductus ejaculatorius is tubular and surrounded by circular muscle fibres which are peculiar in shape (Fig. 3). On gross examination, this structure appears bulbous and glandular but on careful teasing, the muscle fibres are separated and the ejaculatory duct stands out. Each muscle fibre is half-ring-shaped with both ends filamentous. At the bend, neighbouring muscle fibres cross over, forming loops. Posteriorly, the duct comes out of

the muscular coat and joins the aedeagus or penis near its large spicules.

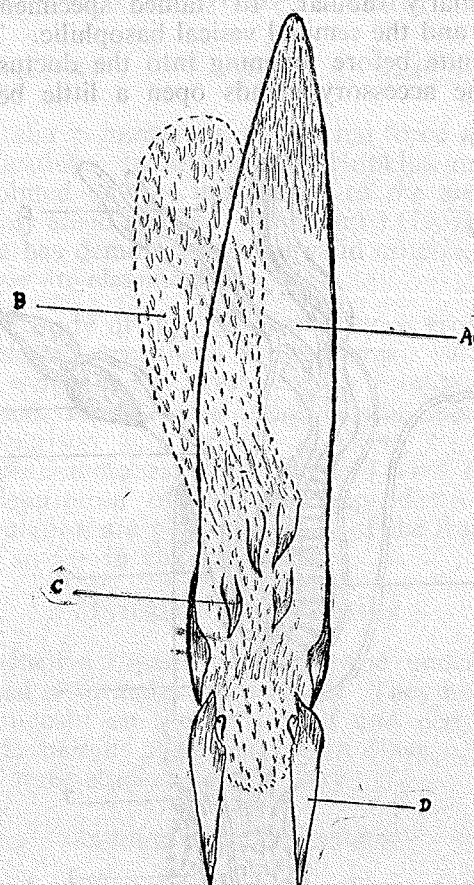


FIG. 2. Phallobase: A, phallobase; B, aedeagus freed from the muscular tissues and tilted to one side; C, large spicule of the aedeagus; D, paramere.

The aedeagus or penis is membranous and lies on the dorsal surface of phallobase attached by muscle fibres. The separation of the muscle fibres detaches it from the phallobase but its posterior end is wedged in-between the parameres and can be freed only when the latter are dissected out. In its normal position, the external surface is beset with a large number of small tubercles and posteriorly are four large spicules with their apices turned caudad. In specimens, wherein the penis is extended or everted naturally, it is seen that the tip (vesica) is swollen, very much resembling the glans penis of the mammals. In this position, the four large spicules are on or just below the swollen tip, turned forwards, the pointed ends directed cephalad. Specimens just after copulation

or separated while in copulation should be immediately fixed to demonstrate this structure. Qadri (1936) has described and figured the male genitalia said to be of *Lipeurus caponae* (?) which is similar to the one described here. The four large spicules situated posteriorly have been labelled by him as endomerer. As these are structures intimately related to the penis, they are called here simply as "spicules". He has also stated that the preputial sac is well developed that no penis could be detected in any of the dissected specimens.

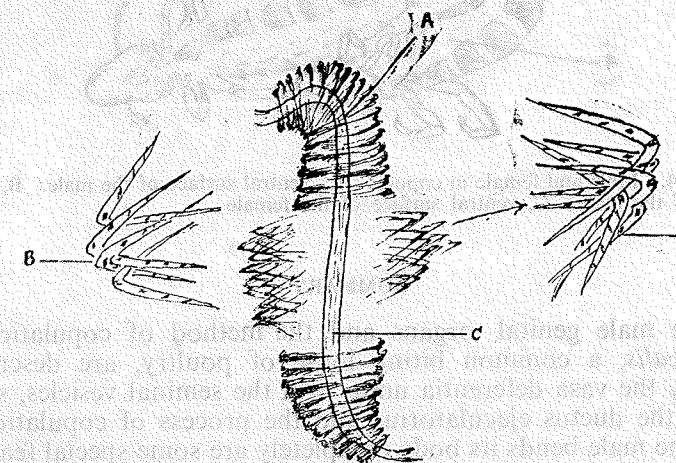


FIG. 3. Ejaculatory duct with its muscular coat partly dissected: A, muscular coat; B, muscle fibre, C, ejaculatory duct.

Phallobase (Fig. 2).—It is roughly triangular, gradually tapering to its base and sclerotised, extending from the second to the eighth abdominal segment, capable of being fully extended out during mating. It is flat anteriorly and dorsally concave posteriorly. At its posterior end are two parameres which probably hold it in position and facilitate the extrusion of the penis.

Method of pairing (Fig. 4).—The male slips from behind, underneath the female with its dorsal surface upwards. Then it bends its posterior part of the body to about 145° , the bend starting from about fifth abdominal segment and gets attached to the posterior end of the female. In the meanwhile the phallobase will have moved posteriorly. A short posterior part of the phallobase inclusive of the parameres gets well inside the last two segments of the female. The everted penis enters the genital chamber of the female. By the penis having a tuberculated surface and spicules, the swollen tip getting in to the genital chamber with a portion of the phallobase jutting in to the female, the two partners get firmly fixed and are not easily separated. The female in copula, when disturbed, was seen to move about with the bent

male attached at its posterior end. In one such specimen, which has been preserved, the male has taken hold of the hind leg of the female by its mouth.

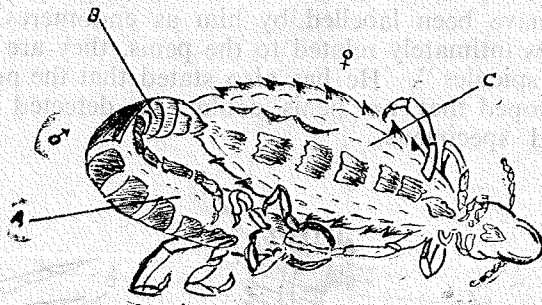


FIG. 4. Male and female in copula: A., ventral surface of the male; B, dorsal surface of the male; C, ventral surface of the female.

SUMMARY

The male genital organs and the method of copulation of *L. tropicalis*, a common biting louse of poultry, are described. The way the vasa deferentia unite with the seminal vesicles, structure of the ductus ejaculatorius and the process of copulation in which the male bends its body completely are some special features noticed. It is emphasised that the structure of male genital organs have great significance and importance in taxonomy.

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