

Egg morphology of three amblyceran Poultry Lice (Insecta Phthiraptera)

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With 3 figures

A. Introduction

The eggs of Phthiraptera remain permanently attached to the feathers/hairs of the hosts. Markings on the egg cases are species specific and can be useful in the identification of species infesting or ever parasitised the host. Workers like RICHTER (1870); HOHORST (1939), BLAVOVESTCHENSKY (1955), EICHLER (1963), EICHLER et al. (1974), BALTER (1968 a, b) and FOSTER (1969) have specifically discussed the egg morphology of several species. Besides, many workers have noted egg structure of individual species while discussing their biological aspects. BALTER (1968 b) studied eggs of three amillophagan species (belonging to 3 genera) with the help of SEM. FOSTER (1969) has also mentioned about the significance of egg morphology of Mallophaga in ecological studies. Furthermore, the egg structure can be quite useful in studying the oviposition site of lice as the egg laying is generally confined to particular areas of body (ASH 1960).

Three amblyceran species viz. *Menopon gallinae*, *Menacanthus stramineus*¹ and *Menacanthus cornutus* occur on the poultry birds (*Gallus gallus f. dom.*) of Dehradun (India). The eggs of these species can be differentiated on account of morphological characteristics. Workers like HOHORST (1939), BLAVOVESTCHENSKY (1955) and BALTER (1968 b) have noted the egg structure of *Menacanthus stramineus*. In the present report an attempt has been made to furnish information about the egg morphology of *Menopon gallinae* and *Menacanthus cornutus*. Furthermore, the egg structure of *Menacanthus stramineus* has also been discussed for the sake of comparison.

B. Material and Method

The nits of each type were collected from the birds (*Gallus gallus f. dom.*) carrying infestation of respective species. Feathers were gently plucked/cut from the oviposition site and the eggs masses teased out with the help

of fine needles (under stereoscopic binocular microscope). The intact eggs were gently processed through different grades of alcohol and stained in acid fuchsin to prepare the slides. Certain operculated eggs were pressed open at clove oil stage to separate the operculum.

C. Observation

Menopon gallinae (L., 1758)

The operculated fresh egg of *M. agllinae* apparently looks like a white translucent brinjal in appearance (0.9-1.1 mm in length and 0.2-0.3 mm in width) (Fig. 1). The mouth of egg is fringed with 22-25 equal sized tentacle-like tapering filamentous structures (0.08-0.09 mm in length). On closer examination, they appear to be membranous outgrowths rather than cylindrical structures. The mouth of the egg measures 0.16-0.17 mm in diameter and is covered with operculum which is a disc-like structure with a large opercular strand arising from the centre (0.3-0.4 mm in length) (Fig. 1). The tip of the opercular strand is generally curved downward towards the operculum, thus making a hook-like structure. Under the light microscope opercular process appears solid and the micropylar pores remain indistinct. The egg shell does not exhibit any sculpturing.

The eggs of *M. gallinae* remain translucent till 2nd day (as in fresh condition) but turn yellow on third day. It has been noted that the filaments bordering the egg mouth remain tilted or collapsed in the fresh eggs but start erecting as the development proceeds. Before the eclosion they give a lotus-like appearance to the opercular end. The opercular strand also straightens before the opening of operculum during hatching.

Menacanthus cornutus Schömmmer, 1913

The eggs of *M. cornutus* are also oval white in appearance (0.75-0.9 mm in length and 0.27-0.3 mm in width) (Fig. 2). They bear a large number of tentacle like filamentous structures (at the opercular ends) which occupy nearly anterior 1/6 portion of the egg and are arranged in 4 to 5 rows. The size of these filaments decreases but their number increases towards the anterior end of the egg. The basal most layer contains 20-22 filaments (130 to 137 μ in length and 5-6 μ in width at the base). The

¹ Editor's remark: *Menacanthus stramineus* = *Eomenacanthus stramineus*; *Menacanthus cornutus* = *Gallacanthus cornutus*. - E. M.

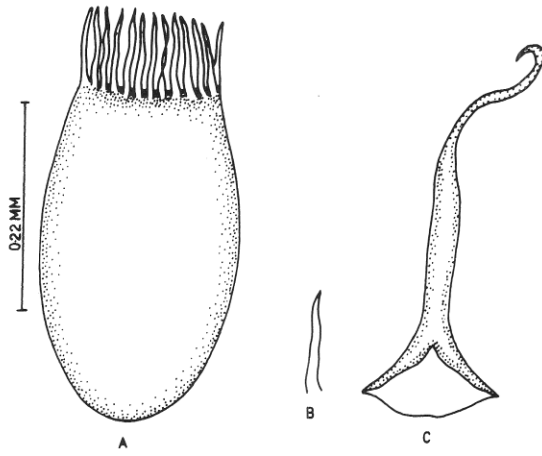


Fig. 1. Egg of *Menopon gallinae*: A – hatched egg; B – single filament; C – operculum.

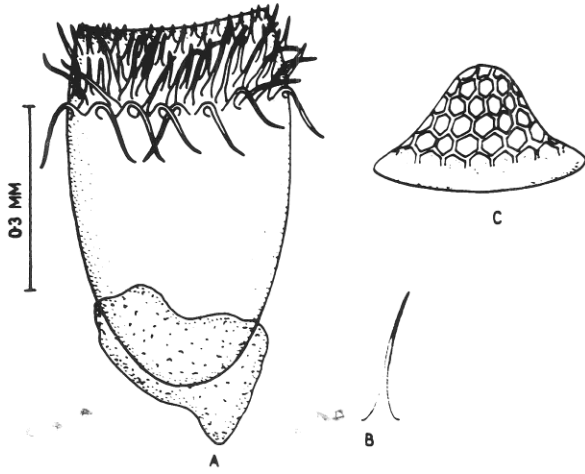


Fig. 2. Egg of *Menacanthus cornutus*: A – hatched egg; B – single filament; C – operculum.

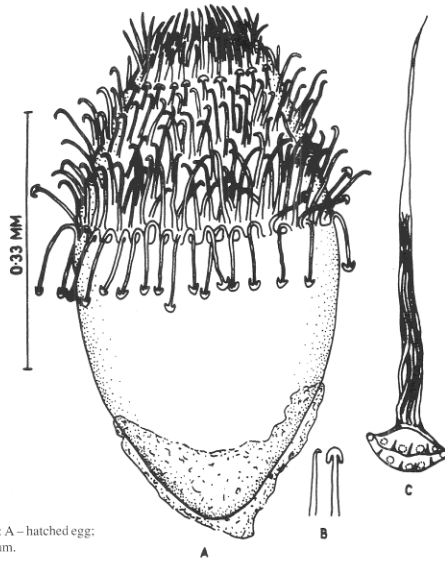


Fig. 3. Egg of *Menacanthus stramineus*: A - hatched egg; B - two types of filaments; C - operculum.

upper layer bears more than 30 filaments (23–30 μ in length and 3.4–3.6 μ in width at the base) (Fig. 2). The filaments of successive rows alternate with each other at the bases. None of these tentacles bear any anchor, plate or disc-like structure at the tip and all are alike in appearance (excepting the size).

The operculum of the eggs of *M. cornutus* is somewhat hat-like structure devoid of any strand or any other process. It is deeply sunken in the centre and measure 0.17–0.2 mm in diameter at the rim. The rim of the operculum is beset with 15–16 micropylar pores measuring 5.7 μ in diameter. Entire opercular wall shows beehive like sculpturings (polygonal markings) (Fig. 2). However, the rim of operculum is free from any marking. The egg shell of *M. cornutus* is also devoid of markings.

***Menacanthus stramineus* (Nitzsch, 1818)**

The operculated eggs of *M. stramineus* (1.1–1.3

mm in length and 0.35–0.4 mm in width) (Fig. 3) can be readily distinguished due to the presence of numerous filamentous structures (termed as hooks and anchors by BALTER (1968 b) occupying nearly anterior half of the egg. They appear to be present in several rows. The filaments present in the lowest row (nearly 40 in number) measure 0.14 to 0.15 mm in length and 5.5–5.7 μ in width. The tip of these filaments bears an inverted disc-like structure (22–23 μ in diameter) (termed by BALTER, 1968 b as anchor shaped structure, Fig. 3). A row of similar (anchor bearing) but smaller filaments occur at the anterior end also. The remaining filaments do not bear disc or anchor and are simple but tapering. They do not appear to be bifurcated terminally and (in light microscope) and are numerous in number (measuring 0.07–0.08 mm in length). The length of such filament decreases towards the anterior and of the egg. The filament present in anteriormost row overhang the mouth of egg, thus obscuring it.

The operculum of the eggs of *M. stramineus* resembles to that of *M. gallinae* in general appearance. It is a circular disc-like structure (0.14–0.16 mm in diameter) bearing a large opercular strand (0.44–0.5 mm in length and 33–35 μ in width the base), arising from the centre. However, the opercular strand of *M. stramineus* seems to be made up of 5–6 thread like structures which are intertwined in some-what rope-like manner (Fig. 3). There are eight micropylar apertures on the opercular disc.

D. Discussion

The operculated eggs of *Menacanthus cornutus* can be easily differentiated from that of *Menopon gallinae* and *Menacanthus stramineus* due to the absence of opercular strand which is present on the operculum of two latter species. Moreover, the peculiar polygonal sculpturing are present on the opercular disc of *Menacanthus cornutus* only. Furthermore, in *Menacanthus cornutus* the filaments are present in 4–5 rows (in contrast to one row in *Menopon gallinae* and several rows occupying anterior half of the egg in *Menacanthus stramineus*) and normally do not overhang the egg mouth. The egg of *Menopon gallinae* can be recognized by the presence of single circlet of membranous filaments present at the rim of the egg mouth. In contrast, the egg of *Menacanthus stramineus* possesses numerous filaments which are of two type. The disc or anchor bearing filaments are present only in case of *Menacanthus stramineus* and do not occur on the eggs of *Menopon gallinae* and *Menacanthus cornutus*.

The structure of egg of *Menacanthus stramineus* noted in present studies, resembles to much extent to the account given by earlier workers. However, Balter (1968 b) noted that in *Menacanthus stramineus*, filaments occur in 3 rows but in our case they seem to be arranged in several rows. Further, he has shown that the disc or anchor bearing filaments occur only in 3rd row. However, we found that a row of such filaments (smaller) occurs at anterior end also (in addition to last row). BALTER (1968 b) has mentioned that two type of egg (A & B) occur in *Menacanthus stramineus* and has described the B type.

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Summary

The egg morphology of three amblyceran phthirapterans viz. *Menopon gallinae*, *Menacanthus cornutus* and *Menacanthus stramineus* is discussed. The nature of operculum and the tentacle-like filamentous structures present on the eggs, can be used as diagnostic character in the recognition of three kinds of egg.

Zusammenfassung

Eimorphologie von drei amblycären Haushuhn-Federlingsarten (Insecta, Phthiraptera). – Die Eier der Menoponidae *Menopon gallinae* (L.), *Menacanthus* (= *Gallacanthus*) *cornutus* Schömmmer und *Menacanthus* (= *Eomenacanthus*) *stramineus* (Nitzsch) werden beschrieben und miteinander verglichen. Es wird auf die differential-diagnostische Bedeutung von Eideckel und fadenförmigen Fortsätzen des Exochorions aufmerksam gemacht.

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