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REVISED AND NEW DESCRIPTIONS OF INDIAN
ANOPHELES.

(With plate).

The monograph of the anopheles of India by James and Liston forms a complete revision of the adult stages of the Indian species. But in a number of the species the egg, larva and nymph still remain undescribed, and in others the descriptions of the immature stages require revision or more detailed treatment. There are also a few species in which, owing to want of material, the description of the adult stage has still to be revised, e.g., *P. nigrifasciatus*, *P. nursei*, etc. This will be done in the present section as material becomes available. Only descriptions will be utilised in which the actual adult insect, being preserved in the Bureau, is available for study at any time. In the case of eggs both the adult laying them and the eggs themselves will be preserved and catalogued. In the case of the larva and nymph, the skins mounted in balsam will be kept along with their respective mature insects. It is intended by these precautions to avoid the error which is so apt to occur of an immature stage of one species being described as that of another.

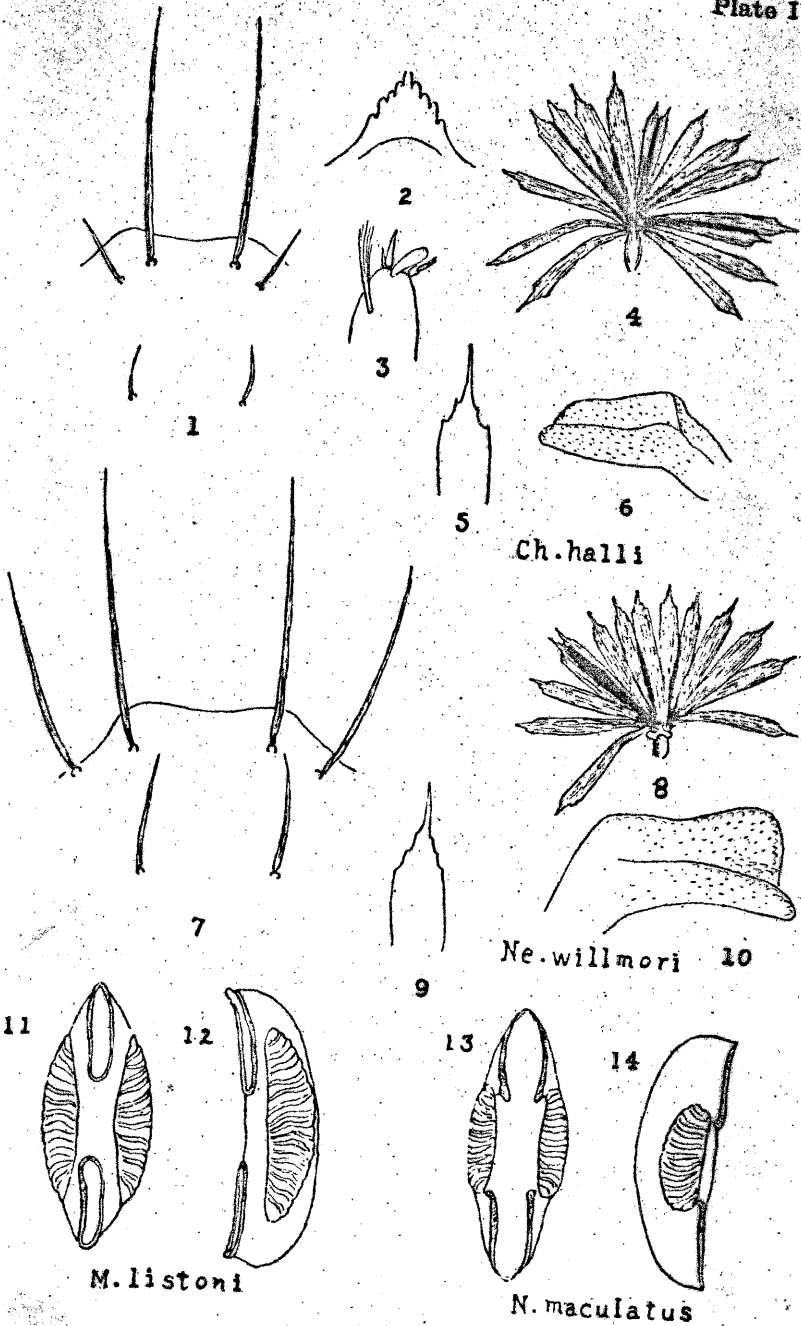
1.—Egg of *M. listoni*. (C. M. Bureau).—Four gravid female *M. listoni* (No. 347-Mus. Cat.) caught at Amritsar were allowed to oviposit. All laid eggs of the following description (No. 348-Mus. Cat.):—

Type 1.—Floats do not touch rim of upper surface.

Upper surface narrow, separated into two areas each of which is surrounded by a narrow frill. (Vide Plate.)

Lower surface shagreened, un-ornamented.

Floats long, occupying more than half the length of the egg, about 20 crinkles.



The egg resembles in general type that of *M. culicifacies*, but the double upper surface is unique.

II.—Egg of *N. maculatus* (C. M. Bureau).—A gravid female *N. maculatus* (No. 373-Mus. Cat.) caught at Madhupur in April was allowed to oviposit and laid eggs of the following description (No. 374-Mus. Cat.):—

Type II.—Floats touch the margin of upper surface.

Upper surface moderately broad, somewhat contracted where the frills end.

Frill narrow, striated; ceases abruptly on reaching the float forming a sharp turned in angle. (*Vide* Plate.)

Floats short, a little more than one-third the length of the egg.

Lower surface shagreened, un-ornamented.

The egg resembles exactly that of *N. maculipalpis*.

III.—Larva and nymph of *C. halli*, James (C. M. Bureau).—Larvæ collected from a number of different breeding places were all of a light fawn colour. They could be distinguished from other anopheles larvæ by their curiously short and stumpy appearance.

In all the larvæ examined the head was quite free from "head marking."

The antennæ have the usual characters. They carry sometimes a minute external hair. The spines covering the body of the antennæ are small and delicate. The basal hair is branched and about as long as the antenna.

The median frontal hairs are simple and arise far apart from one another. *The outer hairs, also simple, are very short, not more than one quarter the length of the median and arise*

from papillæ close to the base of the median hairs. There are two small posterior hairs. (*Vide Plate.*)

The mental plate is bluntly conical in shape and bears nine rounded teeth. The maxillæ carry a branched hair which arises from the outside near the apex and carries at its termination the following structures, two thick spines, a small foliate plate, a small flat process carrying two twin spines. The mandibles carry four large curved spines, a mass of similar but smaller spines, and a comb lying below the mandibular teeth. The mandibular teeth are blunt pointed and about five in number.

The hairs arising from the thorax are similar to those of other anopheles larvæ, but are small and imperfectly developed. The abdominal lateral hairs are also rather delicate and short. There are the usual double oar-shaped hairs on the first two segments and a single oar-shaped hair on the third segment. The rest of the lateral hairs are simple.

Palmate hairs are carried on the 3—7 segments. They are of moderate size measuring in the adult larva 1.2mm. In one larva in which they were counted the leaflets born by the different segments proceeding from the 3rd to the 7th was 11, 16, 16, 14, 12. The hair on the 7th segment is often rather small and inconspicuous.

The greatest breadth of the leaflet is about one-sixth the total length including the filament. The leaflet ends in a series of rather pointed teeth usually about three on each side of the filament. These lead up gradually to a short pointed filament. From the most basally placed "jag" to the point of the filament is about one-sixth of the total length of the leaflet.

The spiracle comb carries three large smooth processes and about eight smaller spines carrying fine teeth.

The hairs arising from the ninth segment are rather short and poorly developed.

A feature which serves to distinguish the larva of this species from that of all previously described ones is the extreme shortness of the external frontal hairs.

The nymph resembles in general appearance that of other anopheles. The air trumpets are of the shape usual in anopheles. They measure .45 mm from origin to terminal margin. The first abdominal segment carries a pair of large fan-shaped hairs. The hairs on the succeeding segments are very small and feeble. Lateral spines are present on the 4—7 segment, but are small and ill-developed. That on the 7th segment is, however, of medium size. The anal flaps measure .8mm. They are fringed with minute hairs.

The above descriptions are from cast skins of No. 160 (I), (II), and (III), Mus. Cat.

The larvæ were found abundantly in Golaghat in January in small muddy pools resembling the breeding places of *Nm. rossi* and in footprints of cattle. At the time of the year they were caught this species next to *My. nigerrimus* and *N. fuliginosus* was the commonest anopheles.

IV.—*Larva and nymph of Ne. willmori* (C. M. Bureau).—
The larvæ have no distinguishing feature to the naked eye.

The head markings are generally a dark V-shaped mark with a spot in front of this. There may be a bar in front of this again and two small spots near the eyes.

The antennæ have the usual characters. There is no branched lateral hair. The spines covering the body of the antenna are rather well developed. The basal hair is branched and about as long as the antenna.