HOPLOPLEURA INTERMEDIA KELLOGG AND FERRIS AND ITS ALLIES, WITH THE DESCRIPTION OF A NEW SPECIES
(ANOPLIDA: HOPLOPLEURIDAE)

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ABSTRACT—The species of sucking lice related to Hoplopleura intermedia Kellogg and Ferris are discussed on the basis of a study of both adult and nymphal morphology. The first-instar nymphs of Hoplopleura inexpectans Johnson are illustrated and described, and Hoplopleura ismaillae, new species, from Suda-
nese Mastomys natalensis ismaillae is described.

During the past decade the study of nymphal instars of Hoplopleura Enderlein has been used increasingly to solve problems of relationships of species in that genus (Cook and Beer, 1959; Kim, 1965; Johnson, 1972, and in press). Following Cook and Beer's pioneering work on North American Hoplopleura species, Kim's and Kim's and Emerson's (1968) papers have provided descriptions and figures of many Hoplopleura nymphs, thus laying the groundwork for their use in deciding interspecific relationships. Johnson (1960), using only adults, split the African species Hoplopleura intermedia Kellogg and Ferris (see Ferris, 1921, 1951) into three species: Hoplopleura inexpectans Johnson, from Proomys jacksoni; Hoplopleura zelotonyma Johnson, from Zelotomys hilde-
gardiae; and intermedia from Mastomys natalensis; and described a fourth related species, Hoplopleura captiva Johnson, from Mus muscu-
lus. In that paper, intermedia and allies were considered close to Hoplopleura hesperomydis (Osborn) from North American Peromyscus species. However, Kim (1965) investigated the setation of the head of Hoplopleura and found that the presence or absence of the accessory dorsal head seta (ADHS of Kim) is of considerable taxonomic impor-
tance. This small seta, which lies medial to the principal dorsal head seta (PDHS), at the posterolateral angle of the head, is missing in hesperomydis and allies, but always present in intermedia and allies. (Johnson 1960; Fig. 31) incorrectly shows this seta to be missing in inexpectans.) A comparison of the nymphs of the two groups, as pic-
tured and described by Cook and Beer (1959), Kim (1965, 1966), Wegner (1966), Kim and Emerson (1968) and Johnson (in press) offers convincing evidence that hesperomydis-like species are not par-
ticularly related to intermedia-like species. As is true of hesperomydis and allies, nymphal characters are sometimes superior for identification of intermedia-group species. In fact, Kim (1960), using nymphal morphology, found that paratypes of captiva J., from Thai Mus cerei-
color constituted a new species, Hoplopleura johnsonae Kim.

Figs. 1-6. Hoplopleura ismaillae, n. sp.: 1, holotype, distal part of third leg, distal part of third leg, 2, allotype; 3, female, paratergal plate; Melol, Denontinum; 4, holotype, thoracic sternal plate; 5, allotype, pseudo; 6, holotype, tergal plate of eighth abdominal segment. Fig. 7, H. intermedia k. and F., tergal plate of eighth abdominal segment, female, Sudan, host undetermined, no. HH-13038.
This paper includes remarks on adults and nymphs of the *intermedia* group, a description and figures of the first-instar nymph of *incryptum*, and the description of a new species. All the setae of the legs, antennae, and anterior part of the head are not drawn in on the figures. The holotype and allotype of the new species are deposited in the collections of the U.S. National Museum, Washington, D.C.

**Characterization of *H. intermedia* **

**Adults.** The accessory dorsal head setae present and the four small lateral ocipital setae (MHS, or marginal head setae of Kim (1965)) are present, with the anterior one placed posterior to the postantennal angle. The second and third antennal segments four and five are large and contiguous. According to the species, the head is variously rugose, smooth, or reticulate dorsally (figs. 8, 10, 12, 14). The setae medial to the mesothoracic spiracle are usually long, never extremely short or minute. The thoracic sternal plate is longer than broad, and extended posteriorly into a narrowed process (fig. 1). Its shape is of limited taxonomic value in the group. There are well developed tergal and sternal abdominal plates; on a typical segment the female has three plates both dorsally and ventrally, and the male has two plates centrally and one plate dorsally. The sternal plate of the second segment and first plate of the third segment are extended laterally to approach the corresponding paratergal plates. That of the third segment has the lateral group of two enlarged, apical setae on either side. According to the species, abdominal setae are worm-shaped to varying degree and are long, thin, and flexible (figs. 16–19). There are no setae laterally off the tegular plates, but four or more ventrolateral setae occur on segments 4–7, and sometimes on segment 8. The penultimate abdominal tergal plate bears 0–4 apical setae, depending on sex and species (figs. 6, 7). Paratergal plates III–VI each have two apical lobes which are roughly quadrate, and VII–VIII have a varying number of apical lobes depending on the species and sex. Shape of the aedeagus (fig. 5) apparently varies in this group, although size varies according to the species.

**Nymphs.** Like other *Hoplolamia*, all stages have thornlike tubercles ventrally on the head, antennae, and legs (fig. 15). Relative lengths of the principal basal head setae and the dorsal mesothoracic setae vary according to the species (figs. 9, 11, 13). Especially in second and third instar nymphs there may be a sclerotized denticulate extension on the posterior margin of the mesothoracic spiracle (macrothorax of Kim and Quennell, 1965). The abdominal and thoracicoventer is sclerotized and the abdomen is usually reticulate ventrally. There is always a pair of small setae anterodorsally on the abdomen, and occasionally a single single seta posterior to these. Second and third instars have six pairs of paratergal plates which are nearly equal and usually shaped according to the species, and in some species the apex is drawn out into a long, heavily spiked lance (figs. 20, 21). Incised nonfunctional spiracles are present on the paratergal plates. The first instar lacks any indication of paratergal plates. All instars have a single terminal abdominal seta on each side. In some species the terminal seta is set on a narrow, cylindrical prolongation of the integument, especially in the later instars. The anal lobe is extended and often apically bifurcate.
Hoplolepta inexpectans Johnson, first-instar nymph
(Fig. 15)

Description.—Lateral occipital head margins straight, slightly convergent posteriorly, inner natural head setae (ESHS of Kim, 1965) stouter than outer natural head setae (OSHS). Principal dorsal head setae stout, as large as dorsal mesothoracic setae. Mesocheiroan spiracle borne on blunt lateral prolongation, lacking macronerite. Lateral margins of abdomen wrinkled, lacking apicles and scales, dorsum covered with vaguely indicated "plates" which are split antero-posterily on median line. Terminal abdominal setae set on very small protuberances, anal lobe apically bifurcated, bearing small lateral setae on each side.

Length.—0.25–0.35 mm.

Material examined.—28 first-instar, ten second-instar, and six third-instar nymphs, with associated adults, from Rattus norvegicus, Angola.

Hoplolepta ismaelii, n. sp.
(Figs. 1–4, 12, 13, 18, 22, 23)


Length.—Female: holotype, 1.35 mm, paratypes, 1.25–1.3 mm, plus one terminal telescoped paratype of 1.0 mm. Male: 1.0 mm.

Diagnosis.—Separable from intermedia, zetofemurrí and inexpectans by a combination of the following: male with apical setae of paratergal plate III both longer than the apical lobes; both sexes with two long apical setae on plate VIII; both apical setae of plates IV–VI inserted on margin; head lacking dorsal rugosities or strong reticulation and with postanastomus (occipital) margins straight and slightly convergent posteriorly (fig. 12). Female further separable from intermedia by having at least one seta on the tergal plate of abdominal segment 8 (compare figs. 6, 7). Closest to capitosa and jonsonae. Separable from both these species by lacking swordshaped setae on the abdomen (compare figs. 18, 19), and further from female jonsonae, according to the original description of that species, by having the apical setae of paratergal plate III of unequal length. Third-instar nymph differing from that of capitosa by having paratergal plates 3–6 produced apically into narrowed oval processes (fig. 21) and from jonsonae, intermedia (fig. 21) and inexpectans by lacking marked apical processes on plates 1–2.

Description.—A member of the intermedia group. Only characters distinguishing ismaelii from other intermedia group species are described.

Female (fig. 1): Head (fig. 12, male), posteroventral angles rounded, lateral occipital margins straight, converging posteriorly, dorsum smooth except for slight reticulation and rugosities posterior to principal and accessory dorsal setae. Dorsal setae other than principal one all small, thin, but not minute.
Thomas.—Sternal plate as in fig. 4. Abdomen. Especially dorsally, setae of abdominal plates long, thin, flexible (fig. 18, scale). Tergal plate of segment 1 present, indistinct, one seta at each posteroventral angle; both setae small in holotype and all but one paratype; remaining paratype with seta long on one side. Paratergal plates (fig. 3), III with two apical setae of unequal length, both extending beyond apical lobes; pairs of apical setae on plates IV–VI marginal, small, thin, of equal length (one paratype has one abnormally large apical seta on plate IV, one side); plate VII with two long apical setae; plates III–VI with usual quadrate apical lobes; plate VII with both apical lobes quadrate, ventral one narrower; plate VIII with one dorsocentral lobe, this narrow, rounded to acute apically, usually about length of plate proper but in two paratypes it is considerably shorter. Genital setae of ninth segment long and blade-like.

Male (fig. 2): Head (fig. 12), thorax, and abdomen as female except in usual sexually dimorphic character and as follows: paratergal plate III with one apical seta extending beyond apical lobes, second seta not visible in only available specimen; plate VII with one acute dorsocentral lobe; ventral lobe merely indicated; plate VIII lacking apical lobes. Aedeagus (fig. 5) as in related species.

Third-instar nymph (figs. 13, 22, 23): nymphal skin broken and fragmented by emerging female within. Head (fig. 13) with dorsal setae not minute, principal dorsal setae equal in length to that of thoracic dorsum. Head not reticulate or rugose. Paratergal plates (fig. 22) with increasingly pronounced apical prolongations as they progress posteriorly. First plate lacking a prolongation; none of scales on plates extremely long. Terminal abdominal setae (fig. 23) not set on a pronounced protuberance. Anal segment apically broken off.

The host relationships of H. ismaillae, n. sp., are of particular interest since intermedia was taken from the type host of ismaillae and very near the type locality (Upper Nile Province, Bihar Doro from M. n. ismaillae, and Melat, from an undetermined host). It is possible that intermedia and ismaillae are geographical replacements of one another, but we lack information on this. H. intermedia has a broad geographical range, occurring on subspecies of Mastomys natalensis from South Africa to the Sudan. Morphological differences between intermedia and ismaillae are as great as between any of the other species of the intermedia group, arguing against the idea that they might be subspecies.

References


