Haematopinus ludwigi nov. spec. from Sus verrucosus, Philippines, and Neotype Designation for Haematopinus brevicolus Fahrenholz from Taurotragus oryx pattersonianus, Uganda (Haematopinidae, Anoplura)

By Christian Weisser

Zoologisches Institut I der Universität Heidelberg

With 14 Figures and 4 Tables (Eingegangen am 25. Oktober 1973)

Abstract

Female and male of Haematopinus ludwigi nov. spec. are described and illustrated from specimens taken off a Wild Pig, Sus verrucosus, from Luzon, Philippines. The relationship of the suid-infecting species of the genus Haematopinus is discussed.

The female of Haematopinus brevicolus Fahrenholz, 1939, is redescribed and illustrated from 3 ♀♀ taken off an Eland, Taurotragus oryx pattersonianus, in Uganda. A neotype is designated.

Tables of measurements and head-indices of suid-infecting and of several bovid-infecting species are also given.

Introduction

There are five species of the genus Haematopinus known to infest the family Suidae; three of them occur in the Ethiopian region, one polypytic species (H. apri parasitic on Sus scrofa ssp.) in the Palearctic, and another polypytic species (H. suis) in the Oriental region, host-specific on members of the group Sus scrofa "crisatus-vittatus" and allies, and now found world wide on domestic pigs of nearly all breeds and on feral domestic pigs.

The morphological terminology used in this paper is that of Kim (1966) and Weisser and Kim (1973). The terminology of the Systematics Association Committee for Descriptive Biological Terminology (1962) is followed to describe the shape of certain structures. The morphology of H. ludwigi nov. spec. was compared with all known Haematopinus species, namely those of the Oriental region (Ferris 1933, Fahrenholz 1939a, Johnsson 1962, Weisser and Kim 1972).

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Haematopinus ludwigi nov. spec.
(Figs. 1—9)

In the course of an extensive examination and revision of material in the major collections of the world, specimens taken off a “Wild Pig” from Luzon, Philippines, and deposited in the Ferris Collection (now at the University of California, Berkeley) proved to belong to a new and distinct taxon. Additional material from three different lots was found later in the United States National Museum (Natural History). The host-house relationship of Suidae and Haema-
topius appears to be an old-established one and it is not surprising to find a Wild Pig, not belonging to the Sus scrofa species-group, an entirely new species of H. topius.

Type data: Holotype $\varphi$, allotype $\delta$, shortly after finding and only weakly sclerotized; paratypes two second instars, collected off a Wild Pig, Mt. Mafeking, Lucem, P. L. These specimens are mounted on two slides and deposited in the Perks Collection, Department of Entomology, British Museum. Data on other paratypes elsewhere in this paper.

Diagnosis: Haematopinus ludwigi nov. spec. is the most slender of the blood-inesting Anoplura. As in the African species (H. lupus, H. phacochoeris, H. meyeri) paracentral plates are found on segment 2 (which is apparent segment 1) to segment 8. H. ludwigi is distinguished by its lesser size, the absence of the common African sub-marginal semi-lunar tergites, the weakness of the median tergites, and the shorter and broader shape of the thoracic sternal plate (Fig. 8); the male differs from the males of lupus, phacochoeris, meyeri by having the pseudopenis symmetrical, broad, and not neatly pointed, the basal apodeme short (Fig. 6), and a somewhat differently shaped subgenital plate (Fig. 9, 1–II). On the other hand, the genitalia of the male ludwigi are similar to those of suis and apricus (Figs. 5, 6). Both sexes differ from suis and apricus by the relatively short hind (see head-indices in Tab. 2). The presence of paratergites on segment 2 as mentioned above, the deep incision between abdominal segments 6 and 7, the specific shape of the thoracic sternal plate (Fig. 8 A–V), and the abdominal chaetotaxy of the adults.

Description: Female: General appearance and chaetotaxy as in Fig. 1. Total body length (TBL) 3.36–4.32 mm ($n = 17$). Head (Fig. 2) somewhat longer (HL) than wide (HW); HW measured immediately posterior to the ocular lobes at the level of the first DMH (dorsal marginal head seta); head index $\tilde{H} = 15.5$ (Tab. 2). Antenna 5-segmented, long (Avl) and thin, length equal to HW or a little longer.

Thorax: Sclerotization of the mesothoracic and metathoracic pleural phragmata not reaching the natal pit; pleurae well-defined; sternal plate broader than long, enclosing with its anterior-lateral projections the pits of the prothoracic pleural apophyses (Fig. 1); legs long, femora thin, tibiae-tarsi and claws comparatively large. Abdomen ovate, lateral margins deeply lobed with the deepest incision between segments 6 and 7; small paratergites present on segment 2 (apparent segment 1); paratergites on segment 3 to 8 large, those on segment 8 borne on conical protuberances extending posteriorly; two pairs of median tergites in decreasing intensity from segment 2 to 7; clasp-like tergite of the terminal segments dorsomedially connected through a sclerotized bridge; terminal lobes very short.

Genitalia of $\varphi$: Gonopods elongate with strongly divergent inner margin, fringed with long setae; width between gonopods (WBG) at the level of the vulva = 0.29 mm; median genital plate entirely lacking (Fig. 3).

Male: TBL 2.86–3.41 mm ($n = 13$); general appearance like female, with the abdomen more regularly ovate. Head index $\tilde{H} = 15.1$ (Tab. 2).

Genitalia of $\delta$ (Fig. 6): Pseudopenis symmetrical and broad (the pseudopenis is sometimes also referred to as parameres; this term is incorrect, if one considers strictly the anatomical position; however, in order to differentiate between apically fused and apically separated parameral sclerites, the term 'pseudopenis' has commonly been in use for the fused structure); wall of endolheca with rough

Fig. 1. Haematopinus ludwigi n. spec. $\varphi$; left side—dorsal view, right—ventral; antennal chaetotaxy and legs on left side omitted.
hooks and scale-like squamous surface structure; basal opedeme short and broad, subgenital plate as in Figure 4 and 9, II.

Second nymphal stage: TBL 2.53 mm. Both specimens at hand agree in their external morphology almost completely with the comparable stages of H. nii, except the presence of the characteristic pair of paratergites on segment 2 (apparent segment 1). Illustration and a detailed description are considered to be needless in these circumstances.

Discussion: Haematopinus ludwigi nov. spec. is the sixth species of Anoplura described from Suidae. They all belong to the genus Haematopinus and are characterized by having the pits of the prothoracic pleural apodemes enclosed

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**Table 1. Measurements of the adults of Haematopinus ludwigi n. sp.**

<table>
<thead>
<tr>
<th></th>
<th>Type lot (Luzon)</th>
<th>Lot 2 (Luzon)</th>
<th>Lot 3 (Midoro)</th>
<th>Lot 4 (&quot;Lab.&quot;)</th>
<th>Lot 5 (Borneo)</th>
</tr>
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<tbody>
<tr>
<td>Φ (n = 1) &amp; Φ (n = 2) &amp; Φ (n = 3) &amp; Φ (n = 4) &amp; Φ (n = 5) &amp; Φ (n = 8)</td>
<td>Φ (n = 1) &amp; Φ (n = 2) &amp; Φ (n = 3) &amp; Φ (n = 4) &amp; Φ (n = 5) &amp; Φ (n = 8)</td>
<td></td>
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</tr>
<tr>
<td>TBL</td>
<td>3.58</td>
<td>3.14</td>
<td>3.3–3.6</td>
<td>2.8–3.1</td>
<td>3.5–3.9</td>
</tr>
<tr>
<td>HL (♀)</td>
<td>0.78</td>
<td>0.76</td>
<td>0.77</td>
<td>0.74</td>
<td>0.78</td>
</tr>
<tr>
<td>HW (♀)</td>
<td>0.49</td>
<td>0.90</td>
<td>0.51</td>
<td>0.50</td>
<td>0.49</td>
</tr>
<tr>
<td>AnL (♀)</td>
<td>0.34</td>
<td>0.37</td>
<td>0.51</td>
<td>0.53</td>
<td>0.30</td>
</tr>
<tr>
<td>WBG</td>
<td>0.20</td>
<td>—</td>
<td>0.17–0.19</td>
<td>—</td>
<td>0.22–0.23</td>
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Figs. 3–4, Haematopinus ludwigi n. spec. 3. Φ genital segments 7–11 with gonopods and ventral chaetotaxy. 4. Φ subgenital plate and chaetotaxy of segments 7–11.
by anterior-lateral projections of the sternal plate. Three species, H. latus, H. phacochoeri, and H. meinertzhageni are specific to the Ethiopian Suidae Potamochoerus porcus, Phacochoerus aethiopicus, and Hylomocherus meinertzhageni, and are in most morphological details very similar to each other. Two polytypic species, H. suis and H. apri, are known to infest wild boars of the genus Sus in the Oriental and Palearctic region, as well as their domestic and feral descend world wide (cf. Fairbairn 1933, Fammenhoil 1930 a). The species described herein belongs to yet another, geographically remote host species of the genus Sus, the Java Pig.


Figs. 5-7. 5. *Haematopinus* apri, ♂ genitalia (dorsal view) with basal apodeme, endotheca, aedeagus and surrounding symmetrical pseudapodites. 6. H. ludwigii n. spec., ♂ genitalia (dorsal — corresponding with Fig. 5). 7. H. ludwigii n. spec., ♂ abdominal segments 7-11 with dorsal dissection.
of the islands Luzon and Mindoro, Philippines. A single record from Sus barbatus (possible misidentification) in Borneo can be attributed to the same new species. As shown above, H. ludwigii nov. spec. shares many characteristics with the paleo-arcic and continental oriental species of the sub-infesting Haematopinus. Different from this group and rather similar to the morphology of the ethiopian species is predominantly the presence of an additional pair of parastrees on abdominal segments 2, the conspicuous deep incision between segments 6 and 7, and the lateral projections of the posterior part of the male subgenital plate (Fig. 9, II).

Merely on the basis of the external morphology, H. ludwigii nov. spec. appears to be a taxon intermediate between the Paleartic-continental Oriental group and the Ethiopian group of Haematopinus. However, considering the extreme isolation of the host in the insular Oriental region, this phenomenon cannot be regarded convincingly as a case of introgression, but must be seen in the context of the evolution and radiation of Suidelines and their Anopluran parasites.
In the collection of the British Museum (Natural History) a single slide with six specimens was found, labelled *Haeomatopinus taurotagi* ex *Tauroragia argy patersoni*, Uganda. Although the slide was included in a long row of properly identified material of *taurotagi*, those six specimens had nothing in common with this taxon but host and locality. Instead, they could be identified as *Haeomatopinus breviculus* Fahrenholz, which, up to now, has been a rather obscure species because of the fact that it was described in a little known German journal and without indication of host, locality, or adequate illustrations. The only type specimen, a female, is missing in the Fahrenholz Collection, and presumed to be lost (Prof. H. W. Leucke, 1973, personal communication).

Type data: A single female without indication of whether type host, nor locality. Originally filed under Nr. 2295 in the private collection of Farnesius. This collection is presently in care of Dr. Runnert, Museum, Berlin. The type is missing.

A reotype (center female) was selected from a slide with 3 ♀♀ and 3 nymphs in the collection of the BM(NH), London. The slide is labelled: *H. taurotagi* Gannings; *Tauroragia argy patersoni* Lydekker, Jin county, Karamoja, Uganda, Oct. 1941, T. W. Groenly; Hopkins Collection.

**Diagnosis:** *H. breviculus* is the smallest of the bovid-infesting species of *Haeomatopinus*. Distinct from the otherwise rather similar, *taurotagi* by its much smaller size, the distinctly broader and shorter thoracic sternal plate (Fig. 14 A—I), and the median sceleterse between the gonopods shaped like an inverted ‘U’ (Fig. 12), never shaped like a ‘W’ as in *taurotagi* (Fig. 13 a, b). Tergites, paraterges, gonopods, width between gonopods (WBG), shape of legs and head much as in *taurotagi* but in relative diminution. Distinct from *H. eurysemus* by the absence of paraterges on segment 2 (apparent segment 1) and the more elongate and distally curved gonopods (Fig. 13 a). Separable from *H. argus* Fielder & Stampa, 1958, the house of the Genegok, *Orx argus* grizzle Fie (identified by the shape of the head (Tab. 4—D, M, N), and the median genital sclerotization; in *H. argus* the forehead is more pointed, the sternal plate elongate with a median projection as in most other bovid-infesting species, the median genital plate is nearly square without any additional sclerotized structure comparable with the the inverted ‘U’ of *breviculus*.

**Description of female (male unknown):** General appearance and chaetotaxy as in Fig. 10, TBL $\bar{x} = 2.57$ mm ($n = 5$), Head relatively short and stout, length (HL) only little more than width (HW); HW measured at the level of the first seta (DMHS) posterior to the ocular lobes; head index = 13.2; forehead dorsally with a characteristic sclerotized transversal band (Fig. 11). Antennae 5-segmented, the length (AnL) nearly equal HL. Thorax: Sclerotization of the mesothoracic and metasternal pleural phragma apparently fused to a broad transversal band and surrounding the notal pit; two large dorsolateral projections of the metanotum; sternal plate broader than long (Fig. 14 A—D), never enclosing the prothoracic pleural apophyses; femora short and rounded, tibio-tarsi stout with short claws.

Abdomen regularly ovate, apically slightly pointed with conspicuous terminal lobes, lateral margins nearly smooth, paraterges rather small and present only on segments 3 to 8; two pairs of well developed median tergites on segments 2 to 7; strongly sclerotized, circular submarginal tergites on segments 3 to 8; clasp-like tergite of the terminal segments dorsomedially with a wide gap in the middle. Genitalia of ♀♀ (Figs. 12 and 13): Gonopods elongate and apically curved, with slightly divergent inner margins, these fringed with a dense row of setae; gonopodal apodemes conspicuously curved and projecting anteriorly into the lumen.

**Fig. 10. Haeomatopinus breviculus; left side — dorsal view, right — ventral; antennal chaetotaxy and legs on right side omitted. 10, ♀ total.**

Second nymphal stage: TBL $\bar{x} = 1.35$ mm. In comparison with the adults, head longer with less strongly pronounced ocular lobes; head index = 14.0. Thorax with a conspicuous notal pit and large spiracles. Legs relatively long with large tibial. Abdomen with faintly sclerotized median and submarginal tergites; paraterges on segments 3 to 8 well developed, those from 5 to 8 projecting.
borne on lateral protuberances, unlike those of the adults. A specific diagnosis is difficult because of the extreme similarity of nymphs of *H. breviculus* and *H. taurotragi*. The main difference is the relatively smaller size. The specimens are in the collection of the BM(NH), London.

Host distribution: The type host, *pattersonianus*, ranges from Kenya to the Tana River, and westwards to Rwanda and Uganda. Another subspecies, the Cape Eland, *T. oryx oryx* (Pallas, 1766), is found from Natal and the northern Cape Province to the Zambesi River and northern Southwest Africa; Livingstone’s

Eland, T. o. *livingstonii* (Selater, 1894), is found in the connecting area between the Zambesi River and central Tanzania (Dossat and Danilew 1970; for more detailed information see Ansell 1968).

Material examined: The neotype and the neoparatypes (3 ♀♀, 3 nymphs). The following material of *H. taurotragi* is also in the BM(NH): 3 ♀♀, 3 nymphs ex *T. oryx pattersonianus*, Shinyanga, Tanganyika Territory, IV. 1946 (Hopkins Collection); 2 ♀♀, 4 ♂♂, 1 nymph ex *Boophilus microplus* (= *T. oryx* sp.); Eland, Kwosyou Menagerie, 1865–8, Pres. by F. Moon; (these are the types and paratypes of *H. taurotragi* Cuminings); 3 ♂♂, 2 ♂♂, 1 ♀♀ ex *T. oryx*, Natal, S. Africa, 1921, Blaikoll. (used as illustration by Fenn 1933); 1 ♀♀, 1 ♂♂ ex *T. oryx* oryx, Muhumbwa, Natal, 12 XII. 1920, Bronson coll.; 3 ♂♂, 2 ♀♀ ex "Kudu" (*Tragelaphus s. strepsiceros* Pallas, 1766), Grahamstown, C.P., S. Africa, 1920, Bronson coll. In the Museum National d’Histoire Naturelle, Paris: 1 nymph (second instar) ex *Taurotragus derbianus* (Gray, 1847), Soeloez, C.A.R., Y. 1965 (type of *H. jonkeri* Paulin & Pajot, 1966, and synonym of *H. taurotragi*).

Notes: *H. breviculus* is in many basic morphological structures similar to *H. taurotragi*. There is, however, a quite distinctive difference in total body length and in the shape of the thoracic sternite plate (Fig. 14A—J). We do not have any information about the ectoparasitic ecology and topographical preferences of the two species.

*H. breviculus* was collected from the East African Eland, *pattersonianus*, in Uganda. *H. taurotragi* came off the same host species in Tanganyika Territory (Tanzania), but also off the Cape Eland, *oryx*, in Natal, and off the Kudu, *Tragelaphus s. strepsiceros*, in the Cape Province, and was recently recorded also from Transvaal (check "Material examined" and Fig. 14).

A second instar taken off a Derby Eland, *Taurotragus derbianus*, in the Central African Republic appears to belong to the most likely polytypic, species *H. taurotragi*. The adults of *taurotragi* and *breviculus* are quite distinct as shown in Tab. 3 and 4, and in the respective figures. They certainly cannot be seen as extreme forms of one species.

It should be mentioned that the Eland appears to be a rather susceptible host for louse infestation. From the Cape Eland in Transvaal the cattle louse, *H. eurytherus* (described as *H. brevipes* Fiedler & Stampa, 1956; synonym), has been recorded. *Lingonothus taurotragus* (Anopluca) is known from *T. oryx* sp. in various localities in Africa and represented in several collections. The Derby Eland is also said to be host of a "Lingonothus spec. nov. near taurotragus" (Hopkins 1949).

**Zusammenfassung**

Männchen und Weibchen von *Haematopinus hubrigi* nov. spec. werden beschrieben und abgebildet. Die Läuse wurden auf *Sus verruca* innerhalb der philippinischen Insel Luzon gefunden. Die morphologische Beziehung zwischen den *Haematopinus*-Arten, welche Schweine befallen, werden diskutiert.


Tabellen mit Körpermassen und den Kopfdicke der Schweinehaut und einiger Boviden-Läuse der Gattung *Haematopinus* sind beigefügt.
References


—, —: Rediscovery of Selenopotes tamarisc (Mjöberg, 1915), with ectoparasites of the Barren Ground Caribou. Parasitol. 66 (1973) 123—132, figs.


Christian Weissen, Zoologisches Institut I der Universität Heidelberg, 69 Heidelberg, Im Neuenheimer Feld 230