

A NEW SPECIES OF *HAEMATOPINUS* (Haematopinidae:
Anoplura) FROM A PHILIPPINE DEER, *CERVUS*
NIGRICANS (Cervidae: Artiodactyla)¹

By Christian Weisser³ and Ke Chung Kim²

Abstract: In this paper *Haematopinus nigricantis*, n. sp. found on *Cervus nigricans* Brooke, 1877 from Luzon Island, the Philippines is described and illustrated. It is compared with *H. longus* Neumann, 1912.

The species of *Haematopinus* are found on Suidae, Bovidae, and Cervidae of the order Artiodactyla and on Equidae of the order Perissodactyla. *Haematopinus longus* Neumann is the only species previously described from the Cervidae. Through the courtesy of Dr K. C. Emerson, we have received specimens of a second *Haematopinus* species found on *Cervus*. *Haematopinus nigricantis*, n. sp. is here described and illustrated. *Haematopinus longus* Neumann from *Cervus unicolor* is compared with the new species. The morphological terminology of Kim (1966) is followed in this paper, unless otherwise specified. Terminology for simple symmetrical plane shapes developed by the Systematics Association Committee for Descriptive Biological Terminology (1962) is followed to describe the shape of structures.

We thank Dr K. C. Emerson of the U. S. National Museum, Washington, D. C. for making this collection available.

Haematopinus nigricantis Weisser and Kim, new species Fig. 1-7, 8 A-F, 9.

Type-data: Holotype ♀, Allotype ♂, ex *Cervus nigricans* Brooke, 1877, Bontoc, Mt. Province, Luzon, Philippines, 5.IX.1966, collector unknown (Vial. 23). Paratypes: 8 ♂♂ and 17 ♀♀, the data as for holotype. Holotype, allotype and most of paratypes are deposited in the collection of the United States National Museum of Natural History, Smithsonian Institution, Washington, D. C. Several paratypes are also deposited in the collections of the Frost Entomological Museum, Dr K. C. Emerson and the University of Minnesota.

♀. Total body length 3.18-3.71 mm (n=43). *Head* rather slender with distinct ocular points; clypeus only weakly sclerotized, except on margins of forehead; ocular sinuses and occipital region strongly sclerotized; chaetotaxy typically haematopinoid (fig. 5), with 4 labral setae (LrS) on frontal margin next to haustellum (2 of these setae may be moved somewhat to dorsal and the other 2 to ventral side), dorsally 3 oral setae (OS) next to anterior margin of

1. Authorized for publication as paper No. 4006 on 25 June 1971 in the journal series of the Pennsylvania Agricultural Experiment Station.
2. The Frost Entomological Museum, Department of Entomology, The Pennsylvania State University, University Park, Pennsylvania, 16802, U. S. A.
3. Permanent address: Zoologisches Institut, Universität Heidelberg, Heidelberg, Germany.

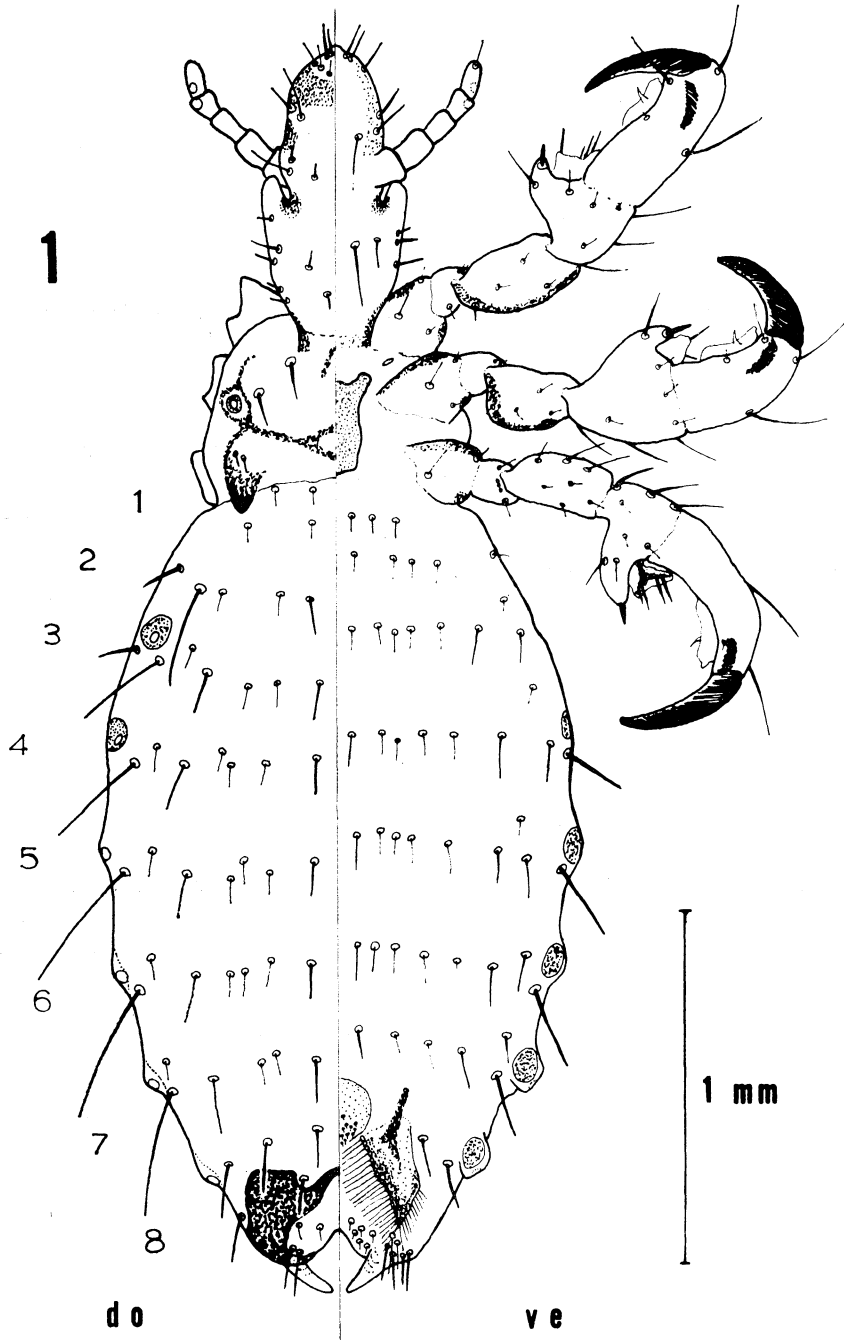


Fig. 1. *Haematopinus nigricantis*, n. sp., ♀; antennal chaetotaxy omitted.

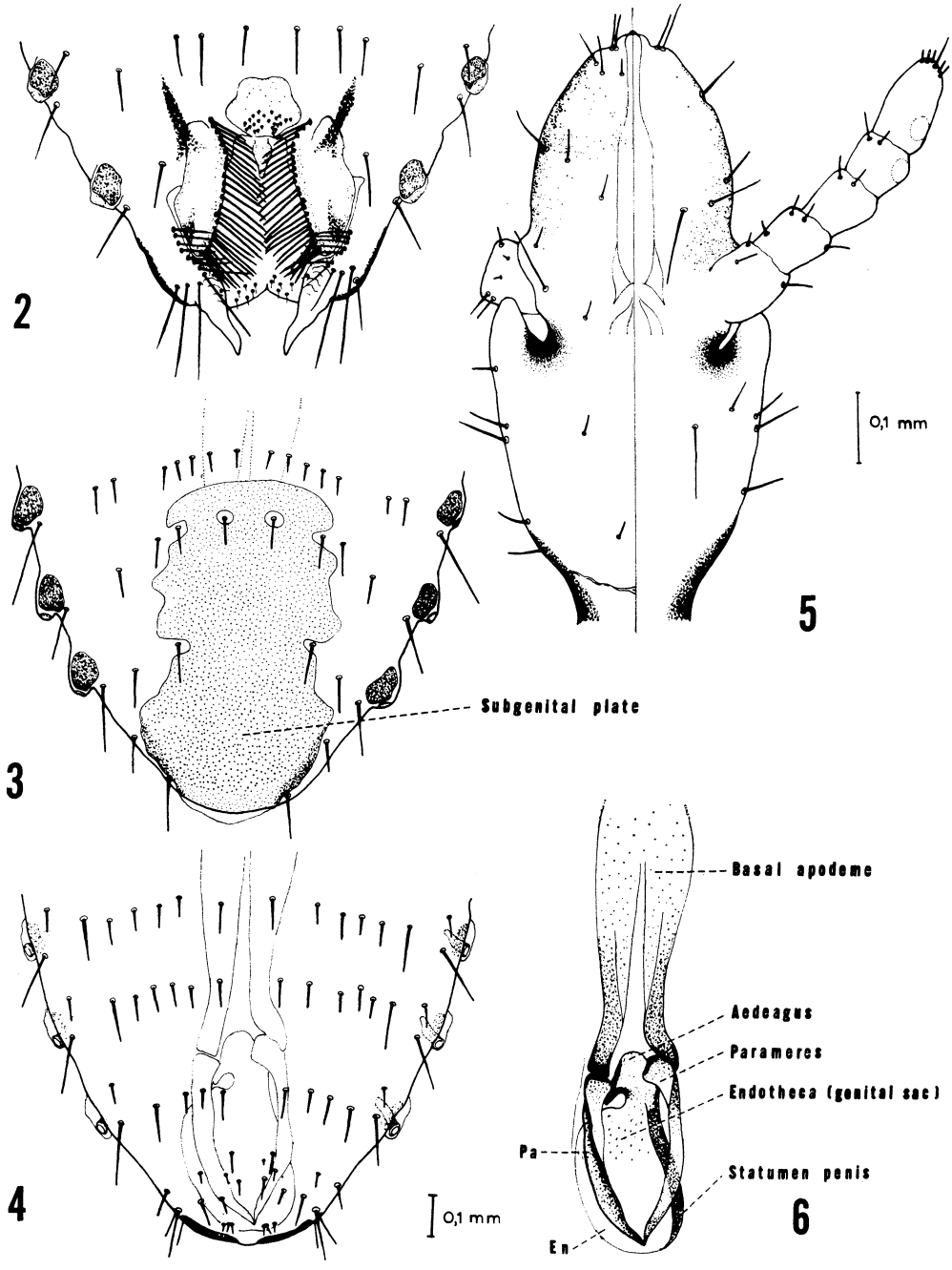
sclerotized clypeus, 1 preantennal marginal head seta (PaMHS) and 1 preantennal lateral head seta (PaLHS) next to former; 1 preantennal central head seta (PaCHS); 1 short preantennal seta (PaS=PAS of Kim 1966) and 1 longer antennal seta (AS); 1 central head seta (DCHS) placed mediad from ocular sinus; 1 short anterior and 1 short posterior postantennal central head seta (DAnCHS and DPoCHS=ACHS and PCHS of Kim 1966) and usually 4 marginal setae (DMHS) in dorsal postantennal area; ventral side with 2 apical setae as already mentioned above; 1 clypeal marginal seta (CIMS); a row of 3 preantennal head setae (VPaHS), the inner usually largest, the outer usually in marginal position; 1 large principal head seta (VPHS) and 1 smaller postantennal lateral head seta (VLMHS) closely associated with one of 4 ventral marginal head setae (VMHS) in postantennal area; these 8 marginal setae actually on upper or lower part of genae and appear on slide either dorsally or ventrally. Antennae 5-segmented: 0.48 mm (\bar{X} ; n=43) long; 1st segment of antenna widest, with 8 setae; 2nd segment with 8 setae; 3rd with 6 setae; 4th segment with 4 setae and a dorsal sensorium; 5th segment also with a dorsal sensorium and 3 setae including long terminal seta. Dimensional measurements of head given in Table 1.

Thorax relatively narrow, its length about 3/4 of its width (Table 1); distinct sternal plate as shown in fig. 1 and 7 A-F; ventral openings of prothoracic apodemes anteriolateral to sternal plate; dorsum with distinct notal pit and 2 large dorsolateral triangular projections of metanotum; dorsally 1 prothoracic and 1 mesothoracic seta next to spiracle; 2 metathoracic setae near triangular projection of metanotum; no setae on ventral side of thorax.

Legs typically haematopinoid (fig. 8); coxa with chitinized margins and 6 setae; trochanter with ring-shaped sclerotization and 4 setae; femur with its condyle and lateral margins strongly chitinized, and 10 anterior and 4 posterior setae; tibia with weak marginal sclerotization, but strongly chitinized toward thumb; 3 long setae on outer and 3 shorter setae on inner margin of tibia, 4 setae on anterior and 4 on posterior side, and a single spiniform seta on thumb; tibial lobe strongly chitinized in its central part, with 5 strong setae (only 3 setae on lobe of 2nd and 3rd pair of legs); tarsus sclerotized on entire outer margin and also proximally on inner margin; inner margin of tarsus distally with a very strong 'unguitractor' (a strongly chitinized point of attachment for claw muscles) and apically with entirely chitinous claw; inner margin of tarsus also bears a membranous pad (euplantula); 2 long outer marginal setae and 4 smaller setae present toward palm of hand.

Abdomen membranous, elliptic, with very small paratergites (paratergal plates) on segments 3-8; 6 typically haematopinoid spiracles present on margins of segments 3 and 4, and on marginal protuberances of segments 5-8 (fig. 1, 9). Chaetotaxy follows basically the pattern of Haematopinidae with 1 row of setae on each segment dorsally and ventrally, except 2 rows of setae on 1st dorsal segment (fig. 1, Table 1); dorsum of segments 3-7 with usually 2 lateral abdominal setae (DLAS), 1 of which large, the other small; a single dorsal mediolateral abdominal seta (DMLAS), 3 (occasionally 2 in ♀♀ and 4 in ♂♂) intermedian abdominal setae (DImAS), and 1 central abdominal seta (DCAS); the same sequence of setae is repeated, of course, on other 1/2 of dorsum; venter (beginning from median line as shown in fig. 1) with a row of 5-6 median abdominal setae (VMdAS), usually 2 lateral setae (VLAS) occasionally accompanied by 1 small irregular seta; 1 marginal abdominal seta next to each paratergite, however, in segments 2 and 3 visible on dorsal side of abdomen (fig. 1.)

Genitalia: Gonapophyses (gonopods) of 8th segment of haematopinoid type (fig. 2), but longer and narrower than in most other species; inner margins of gonapophyses slightly divergent and apically pointed; 2 well-developed apical lobes present, giving slender appearance of abdomen; median genital plate almost round, with 20 to 30 minute setae; a strong apodeme extending anteriorly into lumen of abdomen from each gonapophysis (fig. 1, 2); a small lemon-shaped sclerite placed between gonapophyses posterior to round median genital plate; dorsal genital plate strongly sclerotized, constricted to a narrow transversal bridge in its median part



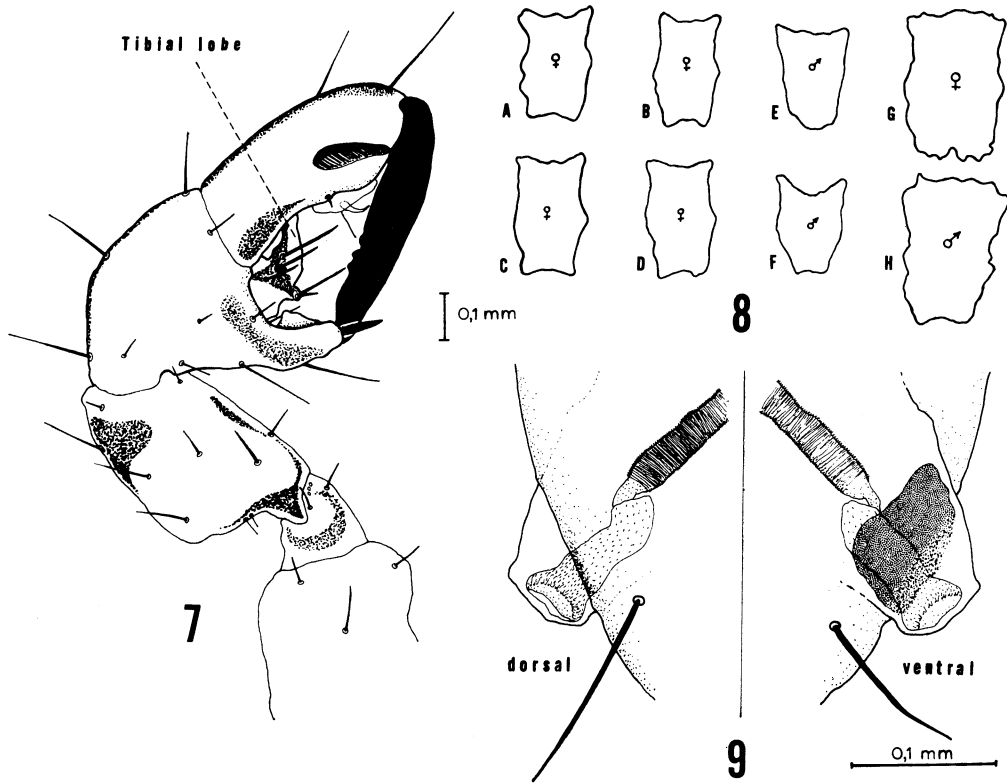


Fig. 7-9. 7, *Haematopinus nigricantis*, n. sp., foreleg showing its anterior side with the typical haematopinoid tibial lobe (lobus tibialis) and its setae. 8, Thoracic sternal plates: A-D, *H. nigricantis*, n. sp., ♀; E, F, *H. nigricantis*, n. sp., ♂; G, H, *H. longus* Neumann, 1912, ♀ (G) and ♂ (H). 9, *H. nigricantis*, n. sp., dorsal and ventral view of the spiracles of the abdominal segment 7.

and extending laterally around abdominal margins to ventral side. The ♀ chaetotaxy in genital segments (segments 9-10) modified as shown in fig. 2.

♂. Total body length 2.45-2.91 mm; antennae length 0.53 mm (\bar{X} ; n=11). ♂ has basically the same morphological features as ♀, unless mentioned here otherwise. Dimensional measurements of head and thorax given in Table 1. The ♂ genitalia very much the same as in most other members of genus (fig. 6); basal apodeme weakly sclerotized anteriorly, and increasingly strongly sclerotized in its posterior part, serving as a pivot around which parameres articulate freely; parameres posteriorly fused to a sharp point, surrounding endotheca and aedeagus; endotheca rugged in higher magnification, covered with many small hook-like structures; subgenital plate (ventral genital plate) extends anteriorly to segment 6 (fig. 3); chaetotaxy

Fig. 2-6. *Haematopinus nigricantis*, n. sp.; 2, 5, ♀; 3, 4, 6, ♂; 2, ♀ genital area with ventral chaetotaxy on abdominal segments 7-10; 3, ♂ subgenital plate and ventral chaetotaxy of abdominal segments 6-10; 4, posterior part of ♂ abdomen showing dorsal chaetotaxy of segments 6-10; 5, head of ♀ with outlines of cibarium and pharynx; antenna on dorsal side (left) omitted; 6, ♂ genitalia (dorsal view) showing the major sclerotized structures.

of ♂ abdomen slightly different from that of ♀ in number of dorsal intermedian setae (DIMAS) as shown in Table 3; chaetotaxy of segments 8-10 modified in connection with ♂ genital structures as represented in fig. 3 and 4, partly on Table 3.

SPECIMENS EXAMINED: Type series, and ex *Cervus nigricans*, Mt Alan, Bongabon, Nueva Ecija, Republic of Philippines, 20.II.1968, collector unknown, 1 ♂, 25 ♀♀.

Three ♂♂ and 3 ♀♀ of *Haematopinus longus* Neumann, 1912, ex *Cervus unicolor*, 20 km N of Chhep, Cambodia, 17.II.1952, Charles Wharton (RTB-15390), were also examined.

Table 1. Measurements (\bar{X}) of *Haematopinus longus* Neumann and *Haematopinus nigricantis*, n. sp. (in mm).

Characters	<i>H. longus</i>		<i>H. nigricantis</i>	
	♀	♂	♀	♂
Head length	0.79	0.71	0.87	0.76
Head width	0.48	0.44	0.48	0.44
Thorax length	0.55	0.48	0.56	0.49
Thorax width	0.92	0.78	0.81	0.72
Sternal plate length	0.363	0.343	0.265	0.230
Sternal plate width	0.244	0.218	0.172	0.152

Table 2. Character indices of *Haematopinus longus* Neumann and *Haematopinus nigricantis*, n. sp. (Head index=length/width $\times 10$; Thorax index=width/length $\times 10$)

Character indices	♀		♂	
	<i>longus</i>	<i>nigricantis</i>	<i>longus</i>	<i>nigricantis</i>
Head index	16.46	18.13	19.14	17.27
Thorax index	16.73	14.46	19.25	14.69

COMPARATIVE NOTES ON *Haematopinus longus* NEUMANN AND
Haematopinus nigricantis, N. SP.

H. longus was originally described by Neumann (1912) and redescribed by P. T. Johnson (1962) with a new record from Cambodia. *H. longus* and *H. nigricantis* are certainly closely related, and may be grouped together into a species-group, "longus-group".

H. longus is generally longer than *H. nigricantis*; ♀ total body length 3.70-4.70 mm (4.70 mm by Neumann 1912), and ♂ 3.00-3.40 mm (3.40 mm by Neumann 1912). In *H. longus* the head is shorter but just as wide, and thus appears stouter than in *H. nigricantis*. The chaetotaxy of the head is basically the same in both species. In *H. longus* the thoracic sternal plate is larger than in *H. nigricantis*, occupying almost the entire space between the coxae (fig. 8). The sclerotization of head and thorax seems also to be somewhat stronger than in the new species (Table 1, 2). The abdominal

paratergites of *H. longus* are much larger than those of *H. nigricantis*. There is a clear difference in the chaetotaxy of the abdomen between the 2 species. In the new species the number of DLMAS and VMAS is constantly higher as shown in Table 3.

Table 3. Distribution of principal setae on the abdomen of *Haematopinus longus* and *Haematopinus nigricantis*, n. sp. (Dorsal refers to the left 1/2 and ventral to the right 1/2; number in bracket indicates possible number of setae in ♂♂; MAS on segments 2 and 3 appear on the dorsal side next to the large DLAS; DLAS on segments 3-7 or 8 with 1 large and 1 small seta).

	Dorsal				Ventral			
	Segment	DLAS	DMLAS	DImAS	DCAS	VMdAS	VLAS	MAS
<i>Haematopinus longus</i>	1	1/1	-	-	1/1	2	-	-
	2	1	-	1	1	3	1	1
	3	2	1	1	1	4	2	1
	4	2	1	1	1	4	2	1
	5	2	1	1	1	4	2	1
	6	2	1	(1)	1	4	1-2	1
	7	2	1	-	1	2-3	1	1
	8	1-2	1	-	1		chaetotaxy of the genitalia	
	9	1	(1)	-	1		chaetotaxy of the genitalia	
<i>Haematopinus nigricantis</i>	1	1/1	-	-	1/1	2-3	-	-
	2	2	-	1	1	4-5	1	1
	3	2	1	2-3	1	5-6	2	1
	4	2	1	3-4(4)	1	5-6	2	1
	5	2	1	3-4(4)	1	5-6	2	1
	6	2	1	3-4(4)	1	5-6	2	1
	7	2	1	2-3(3-4)	1	3-4	1	1
	8	1	1	0(2)	1		chaetotaxy of the genitalia	
	9	1	(1)	-	1		chaetotaxy of the genitalia	

In comparison with the new species, the gonapophyses of *H. longus* are somewhat longer and less far apart, thus giving a more slender appearance. In both species the chaetotaxy of the genital area is within the same range of variation. There is no evident difference between the ♂ genitalia. Also the dimensions of the subgenital plates vary around the same mean.

In general, certain differences, as in dimensional measurements of the head, the thorax, the thoracic sternal plate, and the paratergites, and in the chaetotaxy of the abdomen, appear to be clearly outside of the range of specific variation.

Cervus nigricans Brooke 1877, the dark-colored deer from some of the Philippine Islands including Luzon, is currently considered to be a good species. The host animals of this new anopluran, from Bontoc on Luzon and Mt Alan on Mindoro, were captured in the highlands more than 2000 m (6000 ft) above sea level. On the other hand, *Cervus unicolor* Kerr, 1792 ('Sambar'), the host of *Haematopinus longus*, is found through-

out the Oriental region including the Malayan Islands and the Philippines. Two sambars on which *H. longus* were collected were from the lowland of Cambodia (17.II.1952, 20 km N of Chhep; 23.III.1952, Stung Traling-Koske; both collections by C. Wharton-RTB-15386 and RTB 15390).

REFERENCES

- Johnson, P. T.** 1962. Redescription of two cervid-infesting Anoplura from Southeast Asia. *Proc. Ent. Soc. Wash.* **64**: 107-08, figs.
- Kim, Ke Chung.** 1966. The Species of *Enderleinellus* (Anoplura, Hoplopleuridae) parasitic on the Sciurini and Tamiasciurini. *J. Parasit.* **52**: 988-1024.
- Neumann, L. G.** 1912. Notes sur les Pediculides III. *Soc. Zool. France* **37**: 141-45, figs.
- Systematics Association Committee for Descriptive Biological Terminology. 1962. Terminology of simple symmetrical plane shapes. *Taxon* **11**: 145-56, 245-47.