

HOPLOPLEURA BLANFORDI SP. N. AND POLYPLAX BLANFORDI SP. N. (ANOPLURA: HOPLOPLEURIDAE) PARASITIZING RATTUS (RATTUS) BLANFORDI (THOMAS) (RODENTIA: MURIDAE)

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ABSTRACT: Two new species of hoplopleurid lice, *Hoplopleura blanfordi* sp. n. and *Polyplax blanfordi* sp. n., are described from *Rattus (Rattus) blanfordi* (Thomas) from Peninsular India.

Two new species of hoplopleurid lice parasitizing *Rattus (Rattus) blanfordi* (Thomas) are described here. *Polyplax blanfordi* sp. n. was collected only from Maharashtra State, while *Hoplopleura blanfordi* sp. n. was collected from Maharashtra as well as Mysore States. Both the species are named after the host from which they were collected.

In the following descriptions, all measurements are given in millimeters. The terminology used for head chaetotaxy is based on studies by Kim (1965) and Kim and Emerson (1971), with slight modifications (Mishra et al., in press).

Hoplopleura blanfordi sp. n.

(Figs. 1-9)

Type data

Holotype: Female (V.R.C. A-95485), *Rattus blanfordi* Thomas, Gonaudi, Poona, India, 26 Feb. 71, collected by S. M. Kulkarni and A. C. Mishra. **Allotype:** Male, paratypes: 50 males, 75 females with data as in Table I, deposited in V.R.C. collection.

Diagnosis

Hoplopleura blanfordi sp. n. is close to *H. angulata* Ferris, *H. merionidis* Ferris, and *H. pater-soni* Johnson. It can be separated from these and other related species by a combination of the following characters: mesonotum dorsally with 2 pairs of minute setae; paratergites IV to VI with both paratergal setae minute; paratergites VI with both dorsal and ventral lobes emarginate; paratergites VII and VIII devoid of lobes.

Description

Female (Figs. 1, 3, 5, 6, 8): Total body length 1.23; range 1.17 to 1.30 (10 specimens).

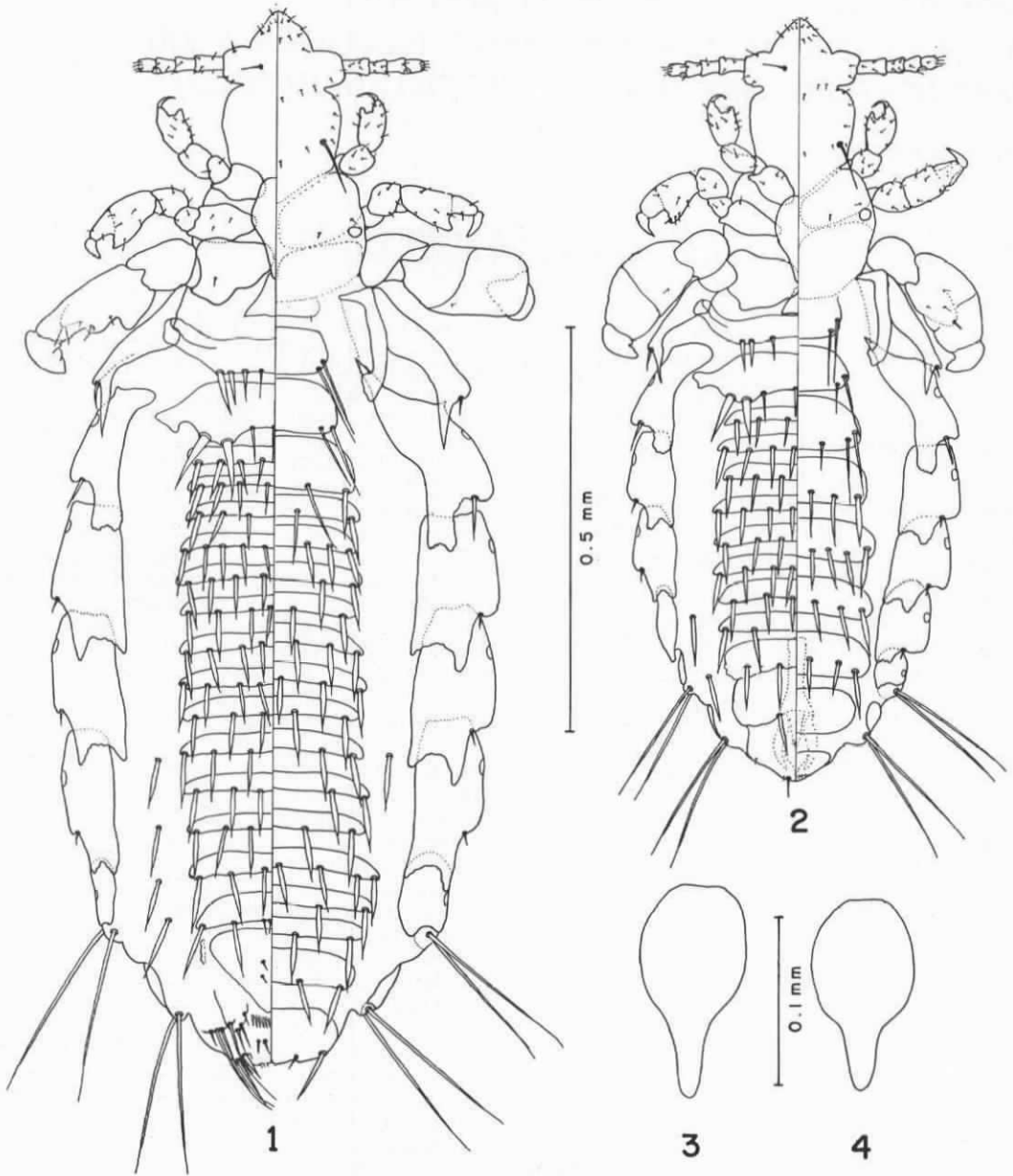
Head (Fig. 5): Approximately 1.7 times as long as wide; postantennal region as long as wide; postantennal angles rounded. Antennae 5-segmented with contiguous sensoria. Preantennal

region with 8 pairs of setae dorsally (OS 7 pairs, arranged in 2 rows, PAS 1 pair), 5 pairs ventrally (CS 1 pair, VOS 4 pairs). Antennal region with 1 pair of minute setae (AS) dorsally, 1 pair medium-sized setae (VPHS) ventrally. Postantennal region with 10 pairs of setae, all dorsal (OSHS, ISHS, ACHS, PoAS, PDHS, ADHS, and PCHS, 1 pair each, MHS 3 pairs); ADHS set well apart from PDHS.

Thorax: Sternal plate (Fig. 3) 0.12 long, 0.06 wide; clavate, anterior margin straight, posterior process narrow, gradually tapering with rounded apex. Two pairs of minute dorsal setae on mesonotum. **Legs.** First pair smallest, claws slender and curved; second pair longer, claws strong but pointed; third pair large and robust, claws broad and flattened, bluntly pointed.

Abdomen: **Dorsal.** Segment II with 2 tergites: anterior indistinct, attached to thorax, having a pair of minute setae posterolaterally; posterior distinct, having 2 long setae on each side posterolaterally. Segment III with 3 tergites: first broad having 2 long setae on each side posterolaterally; second broad having 2 pairs of setae, outer sword-shaped, inner thin and long; third narrow with setae as in second. Segments IV to VII each with 3 narrow tergites, having 4 to 6 sword-shaped setae on each. A seta off the plates each side, between anterior tergite of segment VI and corresponding paratergite. Segment VIII with single broad tergite, having usually 4 sword-shaped setae. Terminal segment with single tergite, having 2 pairs of setae, outer longer, inner short. **Ventral.** Segment II with a single sternite, a lateral extension produced anterolaterally, articulating with corresponding paratergite, usually having 8 or 9 setae. Segment III with 4 sternites, first broad with a knoblike extension produced laterally, a group of 2 enlarged setae present laterally on each side, and 3 small and thin setae present mesially; remaining 3 sternites narrow with 6 to 8 setae each. Segments IV to VI each with 3 sternites, 6 to 10 setae on each. Segment VII with 2 sternites: anterior usually with 6 setae; posterior with 8 setae, 2 pairs long outer, 2 pairs minute mesial. Four setae off the plates each side between sternites and paratergites of segments VI and VII. **Lateral.** Paratergites (Fig. 6) well developed. Paratergite II with acutely pointed posterior angles; 1 minute seta near midlength; 2 setae on posterior

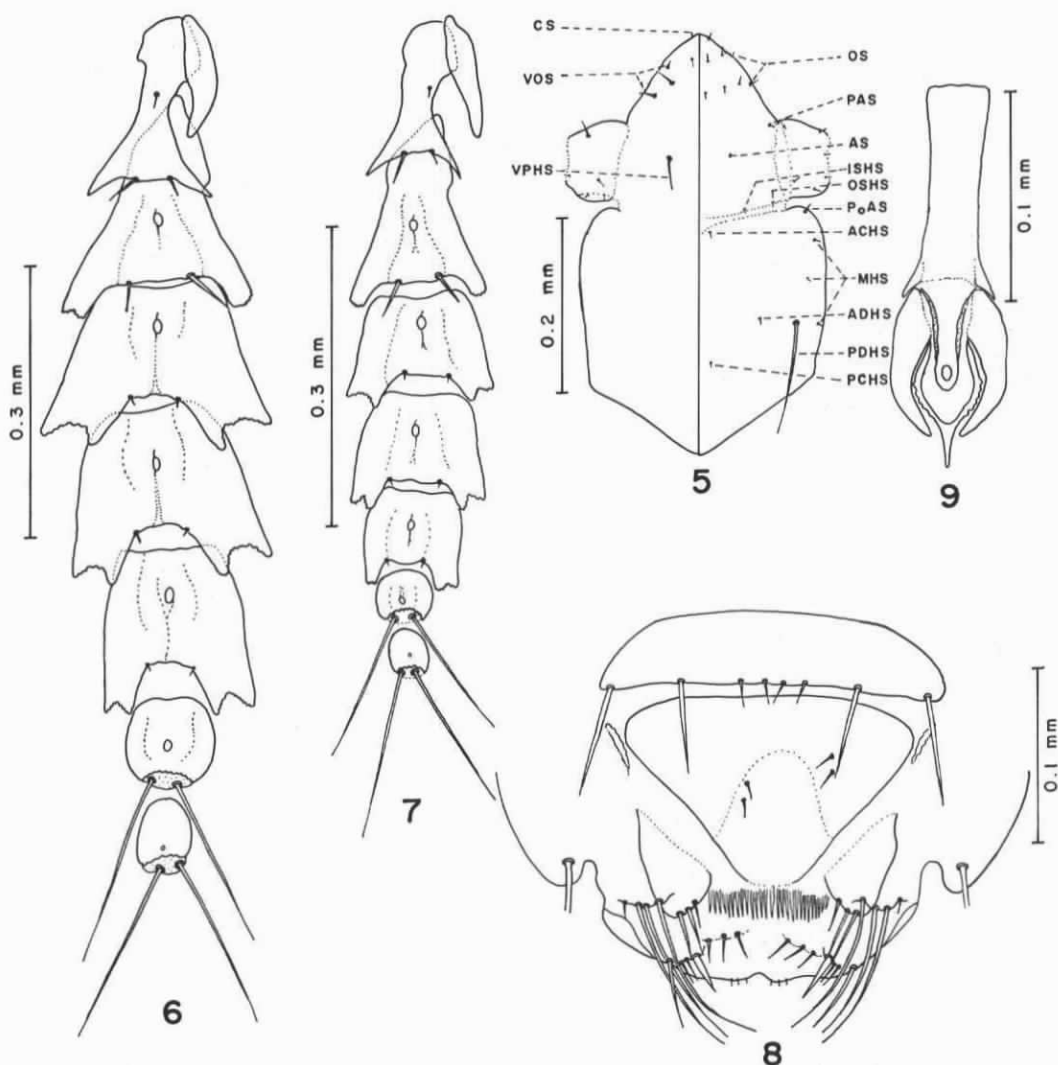
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FIGURES 1-4. *Hoplopleura blanfordi* sp. n. 1. Female, ventral and dorsal views. 2. Male, ventral and dorsal views. 3, 4. Thoracic sternal plates. 3. Female. 4. Male.

margin, ventral longer than dorsal, both fall short of posterior angles. Paratergite III with both lobes truncated, 2 setae on posterior margin, dorsal as long as lobe, ventral smaller. Paratergites IV to VI with both lobes well developed, emarginate; 2 minute setae present on posterior margin between lobes. Paratergites VII and VIII devoid of lobes, each having 2 long setae posteriorly.

Genitalia (Fig. 8): Genital plate triangular, wide anteriorly, narrows posteriorly, separated from posterior sternite of segment VII, usually with 2 pairs of minute setae, inconstant in position. Gonopods paired, triangular, with 3 setae on posterior margin. Opening of vulva situated between gonopods, beset with numerous small filamentous processes. A group of 3 long and 1 minute setae



FIGURES 5-9. *Hoplopleura blanfordi* sp. n. 5. Head, ventral and dorsal views. (CS, Clypeal setae; OS, oral setae; VOS, ventral oral setae; PAS, preantennal seta; ACHS, anterior central head seta; ISHS, inner sutural head seta; OSHS, outer sutural head seta; PoAS, postantennal head seta; MHS, marginal head setae; PDHS, principal dorsal head seta; ADHS, accessory dorsal head seta; PCHS, posterior central head seta; VPHS, ventral posterior head seta). 6, 7. Paratergites. 6. Female. 7. Male. 8. Female terminal segments, ventral view. 9. Male external genitalia.

situated posterolateral to gonopods on each side. Each genital lobe with a tuft of 7 setae; 1 long, 5 minute, and 1 enlarged and flattened genital seta.

Anal opening terminal; anal lobes with 3 minute setae on each side.

Male (Figs. 2, 4, 7, 9): Total body length 0.88; range 0.83 to 0.94 (10 specimens).

Head, thorax, and legs as in female. Thoracic sternal plate (Fig. 4) 0.10 long, 0.06 wide.

Abdomen: Dorsal. Segment II with a single tergite, having 2 long setae on each side postero-

laterally. Segment III with 2 broad tergites; anterior having a long outer and a small inner seta on each side, posterolaterally; posterior with 2 long outer setae posterolaterally and a small mesial seta on each side. Segments IV to VII each with single broad tergite, having 6 to 8 sword-shaped setae on each. Segment VIII with a single tergite without seta. Terminal segment with indistinct tergite, having 3 pairs of minute setae on posterior end. *Ventral.* Segment II with a single sternite, lateral extensions produced anterolaterally, articu-

TABLE I. *Hoplopleura blanfordi* sp. n. and *Polyplax blanfordi* sp. n. specimens collected from *Rattus* (*Rattus*) *blanfordi* (Thomas) in India.

V.R.C. "A" number	<i>H. blanfordi</i> sp. n.		<i>P. blanfordi</i> sp. n.		Locality	District and state	Altitude in meters	Date of collection	Collectors
	♂	♀	♂	♀					
11129	1	2	—	—	Kannur	Shimoga (Mysore State)	2,000	30-I-58	M. S. Gokhale
95289	—	—	2†	3*	Khandala	Poona (Maharashtra State)	680	5-XII-70	SMK & ACM
95297	—	—	3	4	"	"	"	"	"
95337	—	—	1	1	Gonaudi	"	650	24-XII-70	"
95366	—	1	—	—	Khandala	"	680	28-I-70	"
95442	—	1	—	1	Sinhgarh	"	1,270	5-II-71	"
95443	—	—	8	5	"	"	"	"	"
95446	—	—	3	4	Borghat	"	650	10-II-71	"
95475	2	7	—	—	Hirdoshi	"	680	19-II-71	"
95485	14†	28*	2	5	Gonaudi	"	650	26-II-70	"
95487	—	—	1	3	Sinhgarh	"	1,270	10-III-70	"
95490	—	—	—	5	"	"	"	"	"
95494	—	—	5	—	"	"	"	"	"
95511	—	—	3	16	Khandala	"	680	13-III-71	"
95531	—	—	17	20	Shirgaon	"	—	23-III-71	"
95540	—	—	4	1	Gonaudi	"	650	31-III-71	"
95598	—	—	2	2	Borghat	"	"	28-V-71	"
95600	—	—	—	1	"	"	"	"	"
99041	2	—	1	3	Atkarwadi	"	"	5-VI-71	"
99077	32	37	—	7	Dishli-Mulshi	"	"	30-VI-71	"
99096	—	—	1	2	Sinhgarh	"	1,270	9-VII-71	"
99116	—	—	5	15	Khandala	"	650	16-VII-71	"
99117	—	—	—	2	"	"	"	"	"
99126	—	—	7	6	Shera-Mulshi	"	680	27-VII-71	"
99128	—	—	15	20	"	"	"	"	"
99150	—	—	4	6	Sinhgarh	"	1,270	6-VIII-71	"
99152	—	—	7	4	"	"	"	"	"
99179	—	—	—	1	Khandala	"	680	13-VIII-71	"

* One of these females selected as holotype.

† One of these males selected as allotype.

lating with corresponding paratergite, usually having 6 setae. Segment III with 3 sternites: first broad, with a knoblike extension produced laterally, a group of 2 enlarged setae present laterally on each side, and 3 small and thin present mesially; second and third narrow, with 6 to 7 setae on each. Segments IV to VI each with 2 sternites, having 4 to 7 setae on each. Segment VII with a single sternite, usually having 4 setae. Segment VIII with a single large sternite, having 2 setae mesially. Terminal segment with a single indistinct sternite, having 3 pairs of setae, outer 2 pairs minute, inner pair small. Two setae off the plates on each side between sternites and paratergites of segments VI and VII. *Lateral*. Paratergites (Fig. 7) same as in female except that both setae of paratergite III are of same size; ventral lobe of paratergite VI is not emarginate.

Genitalia (Fig. 9): Parameres thickened near base; pseudopenis pointed toward tip, curved dorsally.

Polyplax blanfordi sp. n.

(Figs. 10–18)

Type data

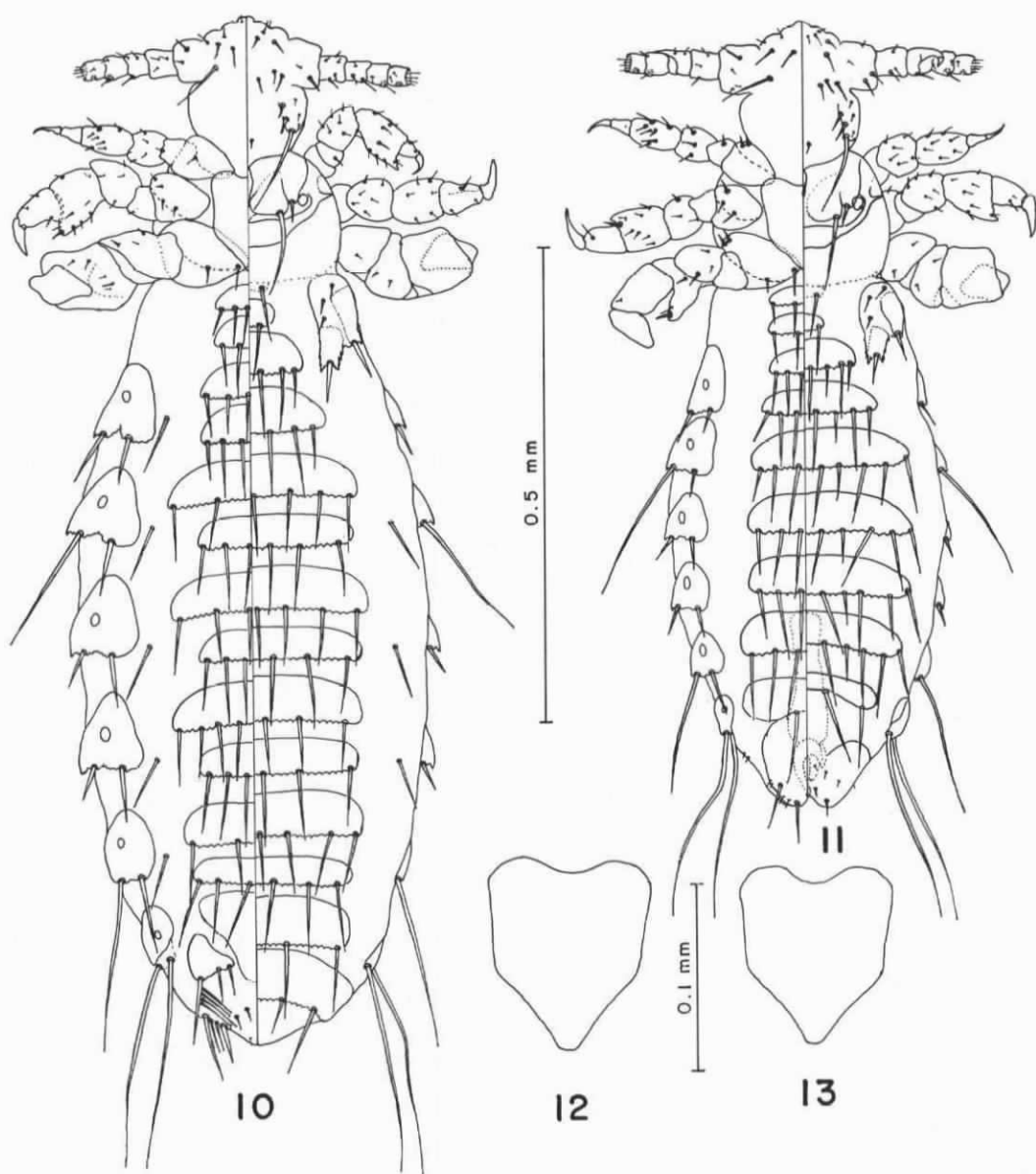
Holotype: Female (V.R.C. A-95289), *Rattus blanfordi* Thomas, Borghat, Khandala, Poona, India, 5 Feb. 70 collected by S. M. Kulkarni and A. C. Mishra. *Allotype*: Male, data as above. *Paratypes*: 90 males, 136 females, with data as in Table I, deposited in V.R.C. collection.

Diagnosis

Polyplax blanfordi sp. n. is close to *P. serrata* (Burmeister). It can be separated from this and other related species by a combination of the following characters: antennae strongly sexually dimorphic; thoracic sternal plate large with concave anterior end; paratergites III to VI subtriangular with only dorsal posterior angle produced into a small toothlike process; dorsal seta of paratergite IV longer than plate; dorsal seta of para-

lobes. Paratergites VII and VIII devoid of lobes, each having 2 long setae posteriorly.

gonopods, beset with numerous small filamentous processes. A group of 3 long and 1 minute setae



FIGURES 10-13. *Polyplax blanfordi* sp. n. 10. Female, ventral and dorsal views. 11. Male, ventral and dorsal views. 12, 13. Thoracic sternal plates. 12. Female. 13. Male.

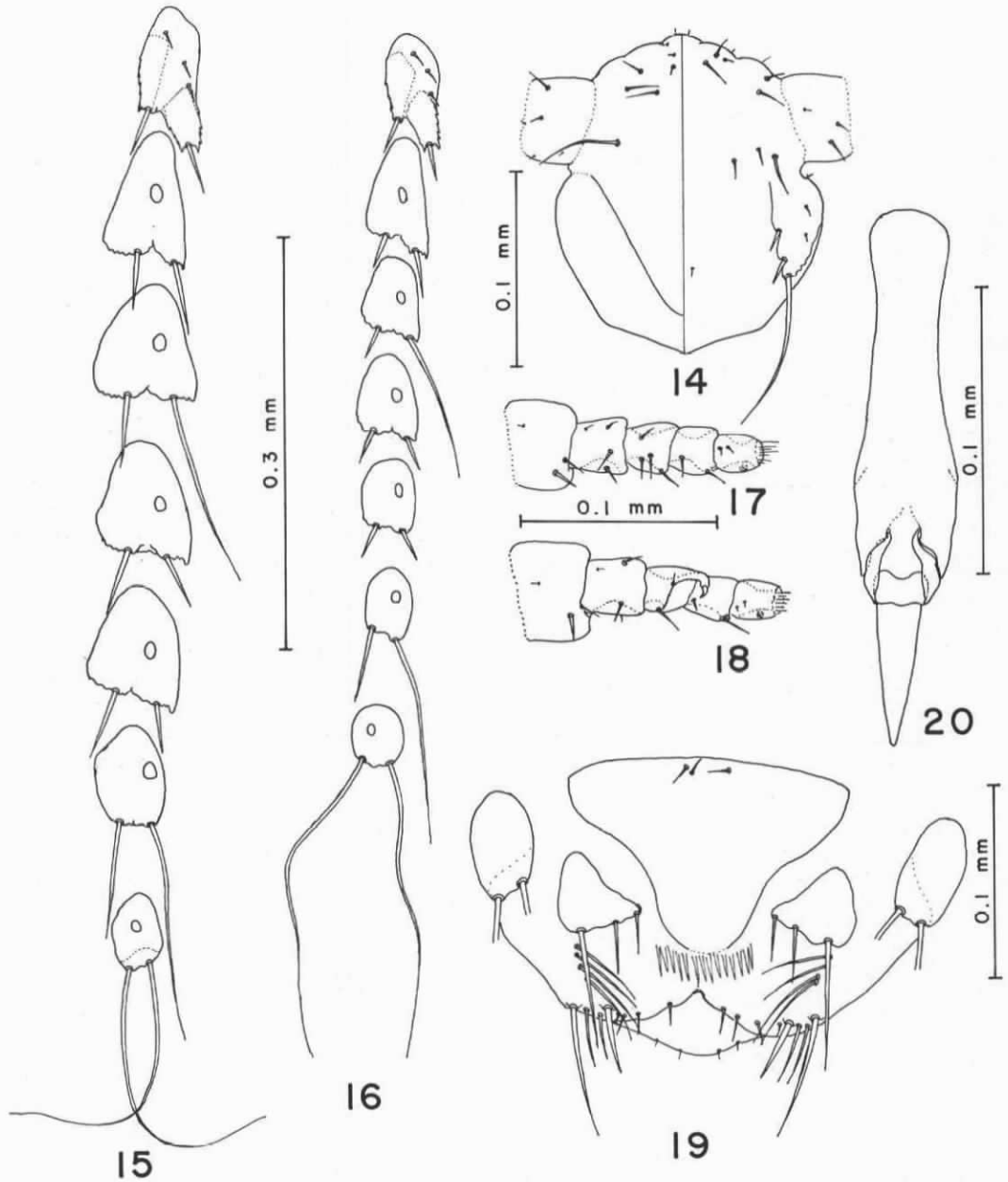
tergite VII about twice the length of ventral seta; pseudopenis longer than parameres, articulated at the tips of parameres.

Description

Female (Figs. 10, 12, 14, 15, 17, 19): Total body length 1.05; range 1.01 to 1.08 (10 specimens).

Head (Fig. 14): Approximately 1.2 times as long as wide; postantennal region about 0.7 times

as long as wide; postantennal angles rounded, occipital angles obtuse, gular area raised, gular folds present. Antennae (Fig. 17) 5-segmented, segments 2 and 3 unmodified, sensoria present on segments 4 and 5. Preantennal region with 4 pairs of setae dorsally (OS 3 pairs, PAS 1 pair), 6 pairs ventrally (CS and OS 3 pairs each). Antennal region with 1 pair of small dorsal setae (AS), 1 pair of long ventral setae (VPHS). Postantennal region with 10 pairs of setae, all dorsal (SHS, MHS



FIGURES 14-20. *Polyplax blanfordi* sp. n. 14. Head, ventral and dorsal views. 15, 16. Paratergites. 15. Female. 16. Male. 17, 18. Antennae. 17. Female. 18. Male. 19. Female terminal segments, ventral view. 20. Male genitalia.

3 pairs each, PoAS, ADHS, PDHS, and PCHS 1 pair each). PMHS placed immediately anterior to ADHS, ADHS is anterior to PDHS. ACHS absent.

Thorax: Sternal plate (Fig. 12) 0.12 long, 0.05 wide. Anterior margin sinuous, concave medianly, lateral margin subparallel anteriorly, convergent

posteriorly, terminating in bluntly pointed apex. Pronotum reduced to a narrow median longitudinal strip; mesonotum with a pair of setae on each side, outer small, inner long. **Legs.** First pair small with slender claws; second pair longer with well-developed claws; third pair largest with stout and flattened claws.

Abdomen: Dorsal. Segment II with 2 tergites, anterior indistinct, posterior small but distinct, each having 2 setae. Segment III with 2 tergites, both broad, usually having 6 setae on each. Segments IV to VII each with 2 tergites, anterior broader than posterior, having 6 or 7 setae each. Segments VIII and IX each with a single broad tergite, usually having 4 setae each. Terminal segment membranous, devoid of seta. Segments IV, V, and VI each with a single seta off the plates between tergites and corresponding paratergite on each side. **Ventral.** Segment II with 2 small but distinct sternites, each having 4 to 6 setae. Segment III with 2 sternites, both of same size, having 5 or 6 setae each. Segments IV to VII each with 2 sternites, anterior large and broad, posterior small and narrow; having 4 to 6 setae each. Rest of abdominal sternites modified to form genitalia. Segments III to VI each with a seta off the plates between sternites and corresponding paratergite on each side. **Lateral.** Paratergites (Fig. 15) present on abdominal segments II to VIII. Spiracles on paratergites III to VIII. Paratergite II having appearance of being divided into 2 with a membranous area in between; 3 minute setae on membranous depigmented area and a single seta on each lobe. Paratergites III to VI subtriangular, each with dorsal angle produced into small tooth-like process, ventral angle rounded; all paratergite setae smaller than plates, excepting dorsal seta of paratergite IV, which is much longer than plate. Paratergite VII devoid of lobes, dorsal seta about twice length of ventral seta. Paratergite VIII small, devoid of lobes, both setae long.

Genitalia (Fig. 19): Genitalia plate wide anteriorly, narrow posteriorly, with 3 or 4 small setae near anterior margin. Gonopods paired, triangular, situated posterolateral to genital plate; with 3 setae each. Opening of vulva beset with numerous small filamentous processes. A tuft of 4 setae present posterior to each gonopod. Each genital lobe with 8 setae (1 long, 2 small, 4 minute, and 1 short and stout genital seta).

Anal opening terminal; lobes with 2 or 3 pairs of minute setae.

Male (Figs. 11, 13, 16, 18, 20): Total body length 0.73; range 0.65 to 0.78 (10 specimens).

Head: As in female except antenna. Antennal segment III apicodorsally prolonged into a hook-like process, bearing a short stout seta (Fig. 18). **Thorax and legs** as in female. Thoracic sternal plate (Fig. 13) 0.1 long, 0.06 wide.

Abdomen: Dorsal. Segment II with 2 tergites, anterior indistinct, posterior distinct; each having 2 setae. Segment III with 2 distinct tergites, each having 7 or 8 setae. Segments IV to VII each with a single broad tergite, having 9 or 10 setae each. Segment VIII with a single narrow tergite, usually having 4 setae. Terminal segment with indistinct tergite, usually having 5 pairs of minute setae. No setae off the plates. **Ventral.** Segments II and III each with 2 distinct sternites, each having 4 to 6 setae. Segments IV to VII each

with single broad sternite, having 5 or 6 setae each. Segment VIII with a single sternite, having a pair of setae mesially. Terminal segment with indistinct sternite, having 2 pairs of long and several minute setae. No seta off the plates. **Lateral** paratergites (Fig. 16) much as in female.

Genitalia (Fig. 20): Parameres short; pseudopenis well developed, gradually tapering distally, articulating with apices of parameres.

DISCUSSION

Rattus (Rattus) blanfordi (Thomas), the type host of the two new hoplopleurid lice described here, is distributed only in Peninsular India (Ellerman, 1961). This rodent is known to play a role in the natural cycle of Kyasanur Forest Disease, an arthropod-borne virus disease affecting man and monkeys in some forested areas along the Western Ghats in Shimoga District, Mysore State (Rajagopalan et al., 1969). Both *Polyplax blanfordi* sp. n. and *Hoplopleura blanfordi* sp. n. appear to be extremely host-specific, as they have not been found on any other rodent examined in these areas. Most of the rodents examined had only one species of lice, but on three occasions both the species were found on the same host specimen. *Polyplax blanfordi* sp. n., however, was encountered much more frequently than *Hoplopleura blanfordi* sp. n. (Table I).

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