

1815

299

**HOPLOPLEURA VANDELEURIA, SP. NOV. AND
HOPLOPLEURA ALTICOLA, SP. NOV. (ANOPLURA :
HOPLOPLEURIDAE) FROM INDIAN RODENTS**

A.C. Mishra and H.R. Bhat

Virus Research Centre, Indian Council of Medical Research, Poona, India

ABSTRACT. Two new species of hoplopleurid lice, *Hoplopleura vandeleuria*, sp. nov., parasitizing *Vandeleuria oleracea* (Bennett) and *Hoplopleura alticola*, sp. nov., parasitizing *Alticola roylei* (Gray), are described from India. Their relationships with other members of the genus are also discussed.

Two new species of *Hoplopleura* are described in this paper. *H. vandeleuria*, sp. nov. is described from specimens collected from the Indian long-tailed tree mouse, *Vandeleuria oleracea* (Bennett) from Maharashtra and Mysore States, and falls within Kim's (1965) definition of the *H. hesperomydis*-complex. *H. alticola*, sp. nov., is from *Alticola roylei* (Gray) in the high altitude zone of Uttar Pradesh and Himachal Pradesh, and is close to *H. acanthopus* (Burmeister).

In the following description, measurements are given in millimetres. The terminology used for head chaetotaxy is same as in Mishra *et al.*, 1972 and Mishra and Dhanda, 1972. The illustrations were prepared with the help of camera lucida from cleared specimens mounted in canada balsam. Both the species are named after the type-hosts.

1. *Hoplopleura vandeleuria*, sp. nov. (Figs. 1-9)

Female : (Figs. 1, 3, 5, 6, 6A, 8). Total body length 1.13; range 1.03 to 1.21 (10 specimens).

Head (Fig. 5) : Approximately 1.4 times as long as wide; postantennal region approximately 0.7 times as long as wide; postantennal angles rounded. Pre-antennal region with 7 pairs of setae dorsally (OS 6 pairs, 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. Post-antennal region with 9 pairs of setae, all dorsal (OSHS, ISHS, PoAS, PDHS, ADHS and PCHS 1 pair each, MHS 3 pairs). ADHS set well apart from PDHS; ACHS indistinct or absent.

Thorax : Sternal plate (Fig. 3) 0.12 long, 0.06 wide; pear-shaped with a small rounded process anteriorly and long tapering process posteriorly, truncated at tip. A long and usually 2 minute setae on each side of mesonotum. *Legs* : same as in other members of genus.

Abdomen. Dorsal : Segment II with a single tergite, having 4 thin, elongate setae. Segment III with 3 tergites : anterior broad with 5 or 6 thin, elongate setae; middle with 4 or 5 setae, outer pair thick and sword-shaped, inner thin and elongate; posterior with 4 setae, all thick and sword-shaped. Segments IV to VII each with 3 tergites, having 4 to 7 sword-shaped setae. Segment VIII with single broad tergite having 4 or 5 sword-shaped setae. Terminal segment with 2 or 3 thin setae. No seta off the plates. *Ventral* : Segment II with a single sternite, lateral extensions produced anterolaterally, articulating with corresponding paratergite having 8 or 9 setae, outer 2 pairs thicker than inner. Segment III with 4 sternites : first broad with lateral extensions, a group of two enlarged setae present laterally on each side and usually 3 small setae present mesially; remaining 3 sternites with 7 or 8 setae each. Segments IV to VI each with 3 sternites, having 6 to 9 setae each. Segment VII with 2 sternites; anterior with 6 or 7 setae; posterior with 8 setae, outer 2 pairs long and sword-shaped, mesial two pairs minute. Remaining sternites modified to form genitalia. Usually seven setae off the plates between sternites and corresponding paratergites. *Lateral* : Paratergites (Fig. 6), surface squamous. Paratergite II with long tapering posterior angles; one minute seta along its dorsal side and two well developed medium-sized setae in cleft, dorsal almost as long as, ventral shorter than posterior angle of its side. Paratergite III bilobed, lobes serrate and slightly emarginate; 2 setae in cleft, both extending slightly beyond apices of lobes. Paratergites IV and V, same as III in shape; with 2 setae in cleft; dorsal minute, ventral well developed, almost as long as lobes. Paratergite VI same as V, except for acute ventral lobe. Paratergite VII with both lobes well developed, acute and serrate; both setae long. Paratergite VIII with ventral lobe absent, dorsal lobe extremely variable, absent, feebly developed or well developed and acute (Fig. 6a); both setae long.

Genitalia (Fig. 8) : Genital plate wide anteriorly, narrow posteriorly; anterior margin very close to posterior sternites of segment VII; 2 pairs of minute setae, inconsistent in position. Gonopods lobed, paired, surface squamous, with 3 setae each. Opening of vulva situated between gonopods, beset with numerous small filamentous processes. A group of 3 long, 1 or 2 minute setae situated posterolateral to gonopods on each side. Each genital lobe with 1 long, 6 small and 1 enlarged and flattened genital seta.

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

Male (Figs. 2, 4, 7, 9) : Total body length : 0.79; range 0.75 to 0.90 (10 specimens).

Head, thorax and legs as in female. Thoracic sternal plate (Fig. 4) 0.11 long; 0.056 wide.

Abdomen. Dorsal : Segment II with a single tergite having 2 pairs of thin elongate setae. Segment III with 2 tergites; anterior usually with 4, posterior with 7 to 9 thin elongate setae. Segments IV to VI each with single tergite,

having 7 or 8 thick sword-shaped setae. Segment VII also with single tergite, having 4 or 5 thick sword-shaped setae. Segment VIII with single tergite without seta. Terminal segment with several minute setae. No setae off the plates. *Ventral* : Segment II with a single sternite, lateral extensions produced anterolaterally, articulating with corresponding paratergites; usually having 8 setae, outer two pairs much thicker than inner. Segment III with 3 sternites : anterior broad, with lateral extensions; a group of two enlarged setae on each side and usually 3 small setae mesially; second and third with 7 or 8 setae each. Segments IV to VI each with 2 sternites, usually having 7 or 8 setae each. Segment VII with a single sternite, having 4 or 5 setae. Segment VIII also with a single broad sternite, usually having a pair of setae mesially. Terminal segment with several minute setae. Usually 4 setae off the plates between sternites and paratergites. *Lateral* : Paratergites (Fig. 7) II to VI same as in female. Paratergite VII with well developed dorsal lobe, ventral lobe absent; both setae long. Paratergite VIII small, devoid of lobes, both setae long.

Genitalia (Fig. 4) : Parameres thickened near base; pseudopenis pointed towards tip, curved dorsally.

Holotype ♀, VRC No. A-99516, INDIA : MYSORE STATE : Kaisodi (Shimoga District) from *Vandeleuria oleracea*, 25.viii.71, H.R. Bhat; *allotype* ♂, VRC No. A-99518, INDIA : MAHARASHTRA : Deccan Gymkhana, Poona, from same host species, 28.ix.71, A.C. Mishra; *paratypes* : 13 ♂♂, 24 ♀♀ with data as holotype; 2 ♂♂, 22 ♀♀ with data as for allotype; 3 ♀♀ VRC No. A-95420 with data as allotype except date 18.viii.71; 1 ♂, 2 ♀♀ VRC No. A-99253 with data as allotype except date 20.viii.71; 11 ♂♂, 27 ♀♀ with data as holotype except date 22.ix.71. 1 ♂, 2 ♀♀ (VRC No. A-99516) are deposited at Frost Entomological Museum, Pennsylvania State University, USA and all others in collection of Virus Research Centre, Poona.

Distribution : India : Mysore and Maharashtra States.

Hoplopleura vandeleuria, sp. nov. falls within *H. hesperomydis* group of Kim, (1965) and is close to *H. difficilis* Kim, *H. reithrodentomydis* Ferris and *H. onychomydis* Cook & Beer. *H. vandeleuria*, sp. nov. can be easily separated from these and other species of the *H. hesperomydis* group by a combination of following characters : ACHS indistinct or absent; thoracic sternal plate with posterior process truncated at tip; paratergite II and III with both setae well developed; paratergite IV to VI each with dorsal paratergal setae minute, ventral well developed; several setae off the plates between sternites and corresponding paratergites; genital setae modified, and spiniform.

2. *Hoplopleura alticola*, sp. nov. (Figs. 10 to 18)

Female : (Figs. 10, 12, 14, 15, 17). Total body length 1.28; range 1.14 to 1.65 (10 specimens).

Head (Fig. 14) : Approximately 1.4 times as long as wide; postantennal region approximately 0.7 times as long as wide; postantennal angles rounded.

Pre-antennal region with 7 pairs of setae dorsally (OS 6 pairs, PAS 1 pair), 5 pairs ventrally (CS 1 pair, VOS 4 pair). Antennal region with 1 pair minute setae (AS) dorsally, 1 pair medium-sized (VPHS) ventrally. Postantennal region with 10 pairs of setae, all dorsal (OSHS, ISHS, ACHS, PoAS, PDHS, ADHS and PCSH one pair each, MHS 3 pairs). ACHS close to ISHS; ADHS close to or almost adjoining PDHS.

Thorax : Sternal plate (Fig. 12) 0.14 long, 0.08 wide; club-shaped with posterior process rounded or truncated at tip. One long and two minute setae on each side of mesonotum. *Legs* : same as in other member of the genus.

Abdomen. Dorsal : Segment II with indistinct tergite, having 4 thin setae. Segment III with 3 tergites : anterior and middle indistinct, having 4 and 8 setae respectively; posterior narrow with usually 6 setae. Segments IV to VII each with 3 narrow tergites, having 5 to 10 setae near the posterior border of each. Segment VIII with single, comparatively broad tergite having 7 or 8 setae. Terminal segment with 4 setae near posterior margin and usually 2 thin setae on each lateral side. Setae off the plates between tergites and paratergites number 14 to 16 on each side. *Ventral* : Segment II with a single sternite, lateral extensions produced anterolaterally, articulating with corresponding paratergite, having 8 or 9 setae. Segment III with 4 sternites : first broad with lateral extensions, usually with a group of two enlarged setae laterally on each side (13 specimens), two or three on one side, two on other (5 specimens), in addition 3 small setae mesially; remaining 3 sternites with 7 to 10 setae on each. Segments IV to VI each with 3 narrow sternites, having 7 to 10 setae near posterior margin of each plate. Segment VII with 2 sternites : anterior narrow, having usually 8 setae; posterior comparatively broad, 2 pairs long outer setae and 2 pairs minute mesial. Remaining sternites modified to form genitalia. Setae off the plates between sternites and paratergites number 11 or 12 on each side. *Lateral* : Paratergites (Fig. 15) well developed. Paratergite II with long tapering posterior angles, ventral much longer than dorsal; one minute seta along its dorsal side, two medium-sized setae on posterior margin. Paratergite III with dorsal posterior angle long and tapering, ventral posterior angle almost acute and serrate; both setae medium-sized. Paratergites IV and V bilobed, inner margin of lobes somewhat serrate, outer angles well developed and pointed; both setae well developed, shorter than lobes. Paratergite VI with both lobes pointed, setae longer than lobes. Paratergites VII and VIII devoid of lobes; each with 2 long setae.

Genitalia : Genital plate of segment VIII fused with posterior sternite of segment VII to form complete genital plate; outline of plate indistinct posteriorly, with 2 pairs of long and 3 or 4 pairs of minute setae. Gonopods paired with 3 or 4 pairs of setae. Opening of vulva fimbriate, situated between gonopods. A group of 3 or 4 long and 1 or 2 minute setae situated posterolaterally, close to genital lobe. Each genital lobe with 6 to 8 setae; 1 outer long, 1 slightly enlarged (genital setae), remaining small.

Anal opening terminal, anal lobes with usually 3 minute anal setae each side.

Male : (Figs. 11, 13, 16, 18). Total body length 1.008; range 0.96 to 1.06 (5 specimens)

Head, thorax and legs as in female. Thoracic sternal plate (Fig. 13) 0.12 long; 0.07 wide.

Abdomen. Dorsal : Segment II with an indistinct tergite, having 2 pairs of thin setae. Segment III with 2 indistinct tergites; anterior with 4, posterior with 9 or 10 setae. Segments III to VI each with 2 narrow tergites, having 8 to 10 setae each. Segment VII with comparatively broader tergite having 11 to 13 setae. Segment VIII with indistinct tergite without setae. Terminal segment with numerous small setae on posterior side. Setae off the plates between tergites and paratergites number 10 to 11 on each side. *Ventral* : Segment II with single sternite, lateral extensions produced anterolaterally, articulating with corresponding paratergite; having 7 or 8 setae. Segment III with 3 tergites : anterior broad, with extensions produced laterally, a group of two enlarged setae on each side (6 specimens) or 3 on one side and 2 on other (2 specimens) and 3 small setae mesially; second and third each with 7 or 8 setae. Segments IV to VI each with 2 narrow sternites, having 7 or 8 setae each. Segment VII with comparatively broad sternite, usually having 2 pairs of setae. Segment VIII with indistinct sternite having a pair of setae, almost mesially. Terminal segment with several minute and small setae on posterior and posterolateral side. Setae off the plates between sternites and paratergites number 7 or 8 on each side. *Lateral* : Paratergites (Fig. 16) almost same as in female.

Genitalia : Parameres almost of uniform thickness; pseudopenis rounded basally, tapering distally, with serrated lateral margins.

Holotype ♀, VRC No. A 8142S, INDIA : U. P. : Martoli, Pithoragarh Distt. from *Alticola roylei*, 10.ix.67, H. R. Bhat; *allotype* ♂, VRC No. A 81423, data as for holotype; *paratypes* : 1 ♀ with data as for holotype; 1 ♂, 6 ♀♀ with data as for allotype; 3 ♂♂, 6 ♀♀, VRC No. A 81422, other data as for holotype. 5 ♂♂, 6 ♀♀ (VRC No. A 74819), INDIA : U. P. : Badrinath, Chamoli District, type host, 4.vi.67, H. R. Bhat; 1 ♂, VRC No. A 84664, INDIA : H. P. : Chhetra, Lahaul and Spiti, type host, 8.ix.68, S. M. Kulkarni. 1 ♂ (VRC No. A 74819) and 1 ♂, 2 ♀♀ (VRC No. A 81422) are deposited at Frost Entomological Museum, Pennsylvania State University, U. S. A., and all others in collection of Virus Research Centre, Poona.

Distribution : India: Uttar Pradesh and Himachal Pradesh.

Hoplopleura alticola, sp. nov. closely resembles *Hoplopleura acanthopus* (Burmeister 1830). Both the sexes of *H. alticola* can be easily distinguished by having the setae on paratergite VI longer than the lobes. The male can be further distinguished by the absence of prominent basal tooth-like projection on the pseudopenis.

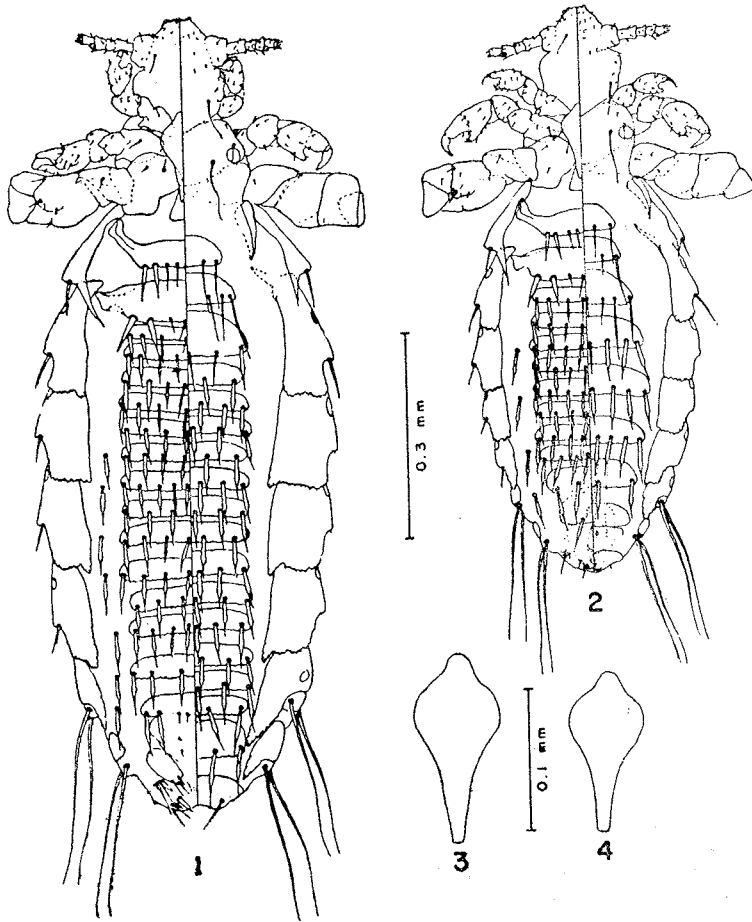
Discussion : Kim (1965) included the following 8 species and one subspecies in a species group named by him as "*H. hesperomydis*-complex" : *H. hesperomydis* (Osborn), *H. difficilis* Kim, *H. reithrodontomydis* Ferris, *H. onychomydis* Cook and Beer, *H. ferrisi* Cook and Beer, *H. ferrisi emphereia* Kim, *H. captiosa* Johnson, *H. similis* Kim and *H. cooki* Kim. His grouping was based mainly on the fact that these species key to *H. hesperomydis* in Ferris' monograph (1951). However, *H. captiosa* and *H. cooki* key to *H. intermedia* and not to *H. hesperomydis* because both possess a distinct dorsal lobe on the female paratergite VIII. *H. vandeleuria*, sp. nov. is peculiar in the sense that the dorsal lobe of the female paratergite VIII may be present or absent. Thus *H. vandeleuria*, sp. nov. is a transient form, linking *H. intermedia* and its related species, with species of *H. hesperomydis*-complex.

H. alticola, sp. nov. is closely related to *H. acanthopus* (Burmeister) which is also recorded from *Pitymys sikkimensis* during the survey in the Himalayan region.

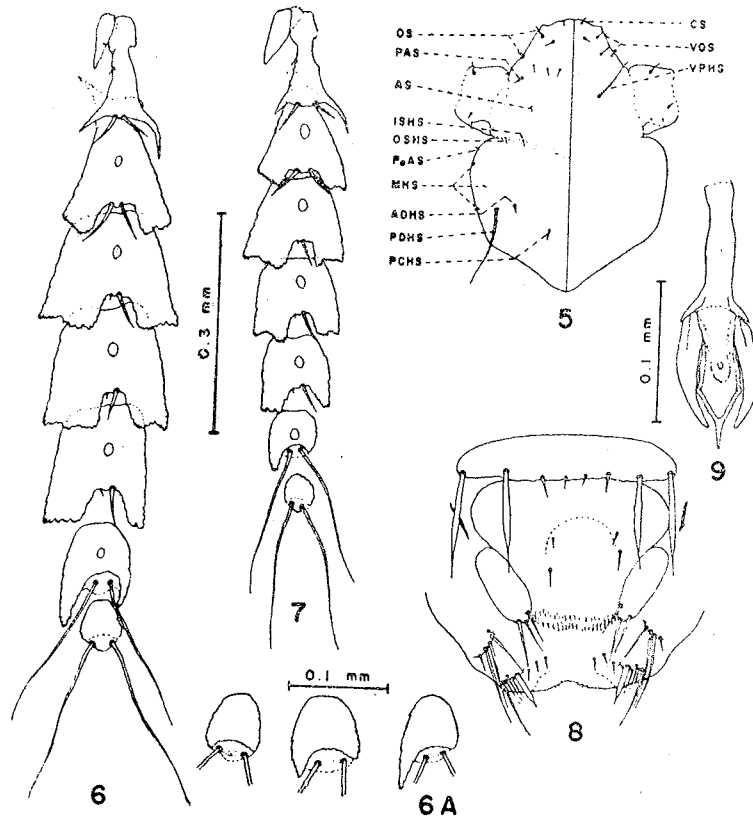
ACKNOWLEDGMENTS. A part of material for the present study was collected under a scheme of Indian Council of Medical Research for the survey of haematophagous arthropods in mountain regions of India under the supervision of Dr. T. Ramachandra Rao, former Director of VRC to whom we are indebted for his help and advice. We are grateful to Dr. Ke Chung Kim of Frost Entomological Museum, Pennsylvania, who has confirmed the identity of *Hoplopleura alticola* as a new species. Thanks are also due to Dr. N. P. Gupta, Director and Dr. V. Dhanda, Senior Research Officer, VRC, for their encouragement and valuable advice and to Mr. S. M. Kulkarni, Senior Research Officer, VRC, for providing an additional record of *H. alticola* from Himachal Pradesh.

REFERENCES

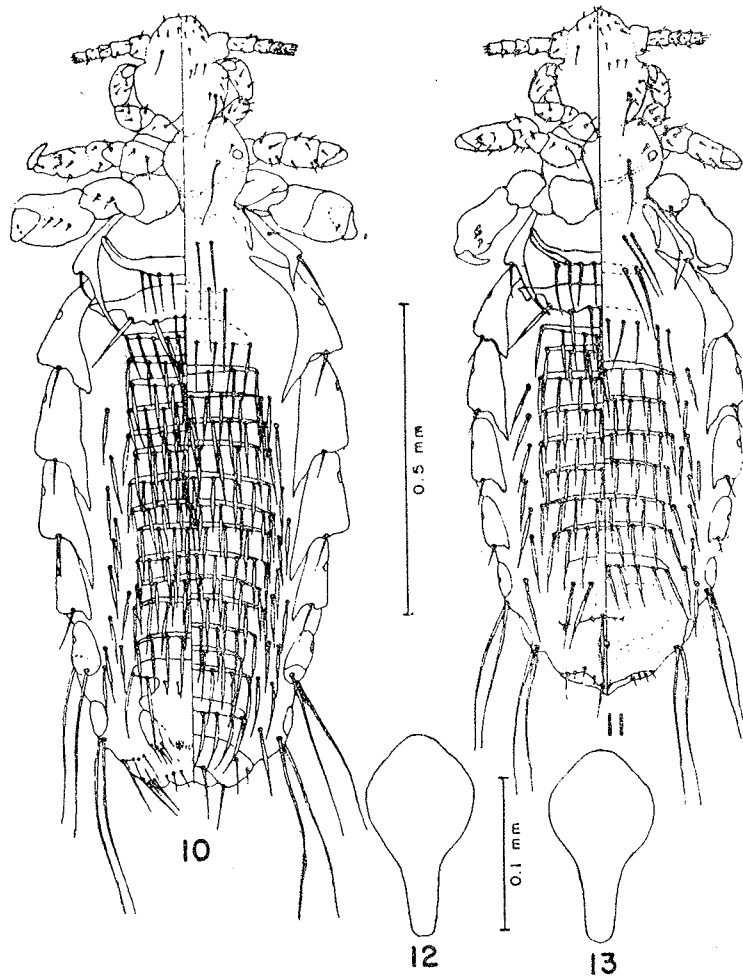
1. FERRIS, G. F. 1961. The sucking lice. *Mem. Pacif. Coast Ent. Soc.* 1 : 1-320, F 124.
2. KIM, KE CHUNG 1965. A review of *Hoplopleura hesperomydis*-complex. (Anoplura : Hoplopleuridae). *J. Parasit.* 51 : 871-887.
3. MISHRA, A. C., BHAT, H. R. AND KULKARNI, S. M. 1972. *Hoplopleura ramgarh* sp. n. *H. sinharh* sp. n. (Anoplura : Hoplopleuridae) parasitizing *Mus* spp. (Rodentia : Muridae) in India. *Parasitology* 65 : 11-21.
4. MISHRA, A. C. AND DHANDA, V. 1972. *Hoplopleura blanfordi* sp. n. *Polyplax blanfordi* sp. n. (Anoplura : Hoplopleuridae) parasitizing *Rattus (Rattus) blanfordi* (Thomas) (Rodentia : Muridae). *J. Parasit.* 58 : 393-399.



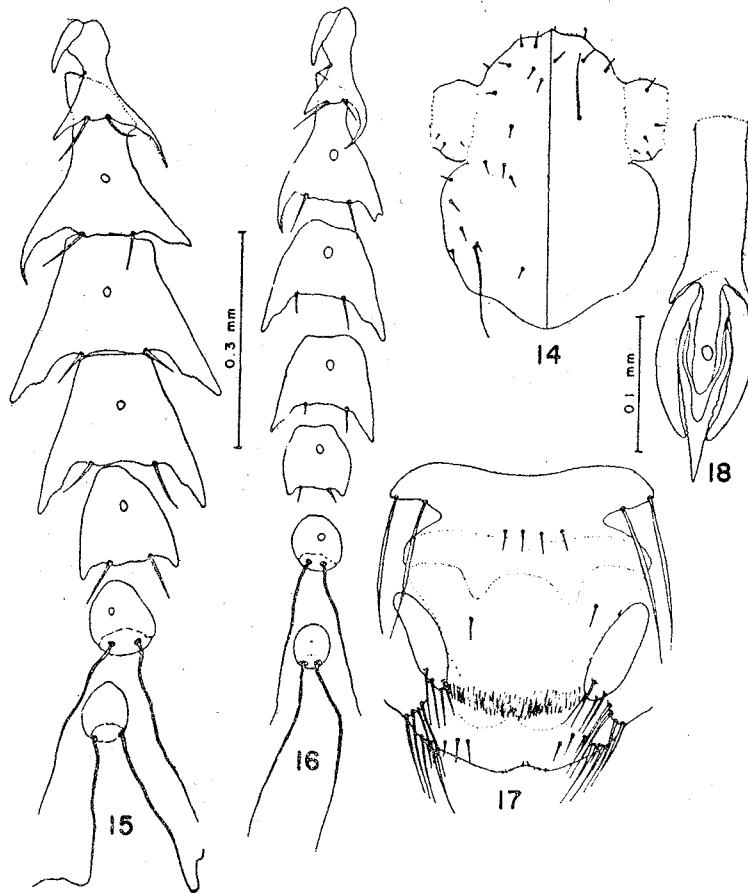
Figs. 1-4. *Hoplopleura vandeleuria*, sp. nov. : 1, Female, ventral and dorsal views; 2, Male, ventral and dorsal views. 3-4. Thoracic sternal plates: 3, female; 4, Male.



Figs. 5-9. *Hoplopleura vandeleuria*, sp. nov. : 5, Head, dorsal and ventral views (CS, Clypeal seta; OS, oral setae; VOS, Ventral oral setae; PAS, Pre-antennal seta; ACHS, Anterior central head seta; ISHS, Inner sutural head seta; OSHS, outer sutural head seta; PoAS, Post-antennal 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; 6-A, Female paratergite VIII showing variation in dorsal lobe; 7, Male; 8, Female terminal segments, ventral view; 9, Male external genitalia.



Figs. 10-13. *Hoplopleura alticola*, sp. nov. : 10, Female, ventral and dorsal views; 11, Male, ventral and dorsal views. 12-13. Thoracic sternal plates : 12, Female; 13, Male.



Figs. 14-18. *Hoplopleura alticola*, sp.nov. : 14, Head, dorsal and ventral views; 15-16. Paratergites : 15, Female; 16, Male; 17, Female terminal segments, ventral view; 18, Male genitalia.