

SOME ANOPLURA OF THE ORIENTAL REGION. A STUDY OF *HOPLOPLEURA PACIFICA* EWING AND ALLIES¹

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Abstract: *Hoplopleura rajah*, n.sp., from *Rattus surifer*, Laos, is described. It is a member of the group of Oriental and Pacific *Hoplopleura* typified by *H. pacifica* Ewing. The group is defined mainly on the basis of nymphal morphology. Included members of the *pacifica* group are as follows: *pacifica*, *oenomydis* Ferris, *irritans* Kuhn & Ludwig, *sicata* Johnson, *dissicula* Johnson, and *rajah*. *H. pectinata* (Cummings) is considered related to the *pacifica* group on the basis of nymphal morphology.

Previous studies of nymphal *Hoplopleura* (Cook & Beer 1959, Kim 1965, 1966, 1968, Johnson 1972) demonstrated that attributes of the immature stages can give good information about interspecific relationships in the genus. This paper concerns the relationships of a group of Oriental *Hoplopleura* species which is defined mainly by the morphology of the various nymphal stages.

The species of *Hoplopleura* typified by *pacifica* Ewing are found on murid rodents. Members of the group include, besides *pacifica*, *sicata* Johnson, *dissicula* Johnson, and a new species described in this paper. *H. oenomydis* Ferris is a probable member, as is *irritans* Kuhn & Ludwig. The other species of *Hoplopleura* from Australian murids, described by Kuhn & Ludwig (1966), are probably also in this group, but their nymphal stages have not been described. *H. pectinata* (Cummings), although aberrant in its adult and nymphal stages, is related to the *pacifica*-group species, judging by characteristics of the immature stages.

The *pacifica* group apparently has radiated most intensely in the Oriental Region and the majority of species known to belong to this group are found only there. At least 3 species do occur beyond the Oriental Region: *H. irritans* on Australian *Rattus assimilis*; *H. pacifica* found on *R. exulans* in Asia and in the Pacific Islands, and on cosmopolitan *R. norvegicus* and *R. rattus* ssp. through parts of the tropics and subtropics, and *H. oenomydis* on African *Oenomys*.

Adults are nonspecialized *Hoplopleura*, with few characters to distinguish them from other "typical" species. They are a part of the *hesperomydis-affinis* complex in the sense of Ferris (1921) and Johnson (1960). The abdominal sternal, tergal, and para-

tergal plates are normal in number and setation; the accessory dorsal head seta which occurs next to the large (principal) dorsal head seta (see Kim 1965) is present. The 1st abdominal tergum bears 2 setae; usually these are inserted on a plate but in some species the plate is indistinct or absent. Known nymphs share characters that distinguish them from nymphs of other *Hoplopleura* species, and serve to delineate the *pacifica* group. In common with other nymphs of *Hoplopleura*, there are thorn-like protuberances on the venter of the head, antennae, and legs. Special features are as follows: The thoracic venter is spiculated, and there are tegumentary scales on the abdomen in 2nd and 3rd instars (FIG. 19). On the venter, these scales are posteriorly drawn out into fine spicules. Head chaetotaxy is like that of the adult. Functional abdominal spiracles are not present but rudimentary ones are sometimes discernible. Ventrally the abdomen has 5 pairs of minute setae. Paratergal plates are never present. The 1st instar has 1 terminal abdominal seta on each side and 6 paired tergal plates. The relative size of the plates in proportion to the size of the abdomen, and whether they are overlapping or separated, probably depends upon the feeding state of the individual, with unfed nymphs having the posterior edge of 1 plate overlapping the anterior edge of the following one. Second and 3rd instars are similar except in size, the 3rd instar usually having the posterior tibiotarsus obviously larger than the 2nd. However, teneral nymphs may not exhibit this difference. Terminal abdominal setae are lacking in the later instars. Conservative members of the group have 5 paired tergal plaques on either side of the abdomen. The most anterior pair is sometimes coalesced. These plaques are irregular in outline and appear to be formed from joined tegumentary scales (FIG. 19). Minute setae are present on the anal lobe, which is not strongly extended or delimited in any of the species. The number and position of the anal setae vary within a single species. The abdominal setae of the 2nd and 3rd-stage nymphs are often extremely minute, difficult to see, and thus easily overlooked. Size differences among the species are not constant enough to use

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TABLE 1. Total body lengths, *Hoplopleura pacifica*-group nymphs.*

SPECIES	THIRD INSTAR	SECOND INSTAR	FIRST INSTAR
<i>pacifica</i>	0.70–0.90 mm (17)	0.55–0.65 mm (4)	0.40–0.50 mm (4)
<i>irritans</i>	0.85–0.90 mm (2)	—	—
<i>oenomydis</i>	0.75–0.80 mm (5)	0.60 mm (1)	—
<i>sicata</i> (Malaya)	0.85–0.90 mm (2)	0.75 mm (1)	0.55–0.65 mm (3)
<i>sicata</i> (Laos)	0.70–1.00 mm (21)	0.65–0.80 mm (10)	0.55–0.65 mm (9)
<i>dissicula</i>	—	0.70–0.75 mm (2)	0.55 mm (1)
<i>rajah</i> , n. sp.	0.90 mm (1)	—	—
<i>pectinata</i>	1.05–1.10 mm (2)	0.85 mm (2)	0.75 mm (3)

*No. in parentheses equals number of specimens measured.

in identification (TABLE 1). The shape and development of the postantennal angle of the head offers the most useful nymphal character for differentiation of the species. Ranging from *pectinata* to *oenomydis*, the postantennal angles are increasingly less prominent and well sclerotized (FIG. 8–14).

The bulk of material used in this study, from Laos and Vietnam, was made available through the Bishop Museum, Honolulu. The holotype of the new species and most of the material is deposited there. Like parts illustrated on a single plate are to the same scale. All setae have not been drawn on legs, antennae, and the preantennal part of the heads.

Hoplopleura pacifica Ewing. FIG. 13, 15–17, 19, 26
Hoplopleura oenomydis Ferris, 1921: 82 (*partim*, some records from Asian *Rattus*).—Pritchard, 1947: 374 (records from U.S. *Rattus* spp.).—Ferris, 1951: 132 (*partim*, some records from Pacific rats and cosmopolitan *Rattus* species).—Pratt & Lane, 1951: 145 (from U.S. *Rattus*).—Pratt & Karp, 1953: 497 (from U.S. *Rattus*).—Cook & Beer, 1959: 412 (from U.S. *Rattus*).—Stojanovich & Pratt, 1961: 314 (from U.S. *Rattus*).—Stojanovich & Pratt, 1965: 13 (from U.S. *Rattus*).—Dusbabek & Cerny, 1969: 2–8 (not seen, records from Cuban *Rattus rattus*).

Hoplopleura pacifica Ewing, 1924: 9.—Hopkins, 1949: 481.—Johnson, 1959: 577.—Johnson, 1964: 71. Voss, 1966: 29.

The types were from *Rattus exulans*, Hawaiian Islands. *H. pacifica* is a name that has had an interesting history, as may be surmised from the synonymical listing above. Generally, the original work of Ferris (1921, reiterated in 1951) has been followed, and all specimens from *R. rattus* and *R. norvegicus* have been regarded as *H. oenomydis*. Hopkins (1949) pointed out that, on distributional grounds, it was unlikely that *H. pacifica* was a synonym of *H. oenomydis*. Johnson (1964) discussed differences between adults of *oenomydis* and *pacifica* and both she and Voss (1966), who designated

and redescribed the lectotype of *pacifica*, asserted that *pacifica* was a valid name. Unfortunately, the latest "List of Common Names of Insects," printed by the Entomological Society of America in 1965, still accepts the "tropical rat louse" (from *R. rattus* ssp. and *R. norvegicus*) as being *H. oenomydis*, thus perpetuating the error. It is hoped that taxonomists will consider the present report which points out small but constant differences between the nymphs of *pacifica* and *oenomydis*. Concerning geographic distribution, *pacifica* does not occur on *R. rattus* and *R. norvegicus* throughout their present ranges, but only in certain parts of the tropics, subtropics, and areas closely integrated with subtropical areas by means of massive transportation systems (as in the southern United States). This suggests that *pacifica* is not a primary parasite of those species of rats (see Johnson 1960: 28). Further, *R. rattus* and *R. norvegicus* often occur in close contact with *R. exulans*, as invading species, through most of the range of the latter, but certainly do not occur commonly with *Oenomys hypoxanthus*, the host of *H. oenomydis*. In point of fact, the morphological differences between *oenomydis* and *pacifica*, both as adult and nymph, should serve to convince specialists in the field of anopluran taxonomy that *pacifica* is a valid name, referring to a species which has as its primary host *R. exulans*, and as secondary hosts, *R. rattus* ssp. and *R. norvegicus*.

Since my 1964 paper, I have noted one other distinguishing characteristic between adults of *oenomydis* and *pacifica*. In the specimens at my disposal, *H. oenomydis* has the 2 setae of the 1st abdominal tergum as long as the setae on the posterior margin of the plate on the 2nd abdominal tergum, while in *pacifica*, although variable in length, these setae are always shorter.

NYMPHS. 2nd and 3rd instars (FIG. 19) distinguished from other nymphs known in the group, except *H. irritans* Kuhn & Ludwig, by having small, but sclerotized, postantennal angles. Postantennal angle varies in appearance according to amount of flattening of specimen (FIG. 13, 15, 16) and is the anterior apex of projecting anterior-posterior ridge that may lie laterally or, if flattened in mounting, may be pressed down upon the

dorsal surface of the head. The ridge bears a number of pale, broad-based spicules as well as the normal 4 small lateral occipital setae. None of the specimens I examined had a lateral pair of small setae near the posterior apex of the abdomen as figured by Pratt & Karp (1953) and Cook & Beer (1959). However, as stated earlier, setation of this part of the abdomen is quite variable. *First instar* (FIG. 17, 26) with 6 paired tergal plates on abdomen, 1st plate much larger than others. Observed shape of these plates depends upon the amount of telescoping present. The specimen illustrated in FIG. 26 had these plates telescoped. Sclerotized postantennal angles (FIG. 17) barely indicated.

Nymphal specimens examined were from various subspecies of *R. rattus* and from *R. norvegicus* from Laos, Vietnam, Malaya, North Borneo, Taiwan, and Madagascar.

Hoplopleura irritans Kuhn & Ludwig

Hoplopleura irritans Kuhn & Ludwig, 1966: 664.

The types were from *R. assimilis* from Australia and Tasmania. The 3rd-stage nymph is similar to that of *pacifica* except that the tergal abdominal plaques are less distinct in the 2 specimens I examined (from *R. assimilis*, New South Wales). I have not seen the earlier stages of this species.

Hoplopleura oenomydis Ferris FIG. 14, 18, 20

Hoplopleura oenomydis Ferris, 1921: 82 (*partim*, only specimens from *Oenomys*).—Ferris, 1951: 139 (*partim*, specimens from *Oenomys*).—Johnson, 1960: 14—Johnson, 1964: 71.

The types were from *Oenomys hypoxanthus*, Kenya. Adults have been compared with *H. pacifica* adults by Johnson (1964). Ferris (1951) figures a nymph of *H. oenomydis* (his FIG. 60) which he calls a 1st instar. This specimen is probably a 2nd instar. Ferris did not state the host of the nymph he illustrated.

NYMPHS. *2nd and 3rd instars* (FIG. 20) unlike those of *H. pacifica* in that the postantennal angles are lacking (FIG. 14, 18). In flattened specimens (FIG. 18) there is no vestige of a sclerotization here, the entire anterior-posterior ridge being membranous. As in *H. pacifica*, the ridge has several pale, broad-based spicules. Tergal plaques were not visible in any of the specimens I examined. The first-stage nymph may prove to be similar to that of *pacifica*, judging from the closeness of the later stages.

Specimens examined included 5 3rd-instar and 1 2nd-instar nymphs from *Oenomys* sp., various localities, Congo.

Hoplopleura sicata Johnson FIG. 3, 5, 11, 12, 21, 25
Hoplopleura sicata Johnson, 1964: 73.

Types were from *R. cremoriventer*, North Borneo. I have seen numerous adults and nymphs that I believe to be *H. sicata* in 13 collections from Laotian *R. niviventer*. Adults of this population differ slightly from the types in that the apical lobe of paratergal plate VII is somewhat shorter and broader basally; the apical lobes on paratergal plates III–VI are shaggier apically than in the

typical population, and the longer apical seta of plate III–VI is usually shorter (compare FIG. 3a, b). The thoracic sternal plates of the 2 populations are similar, but the posterior process is usually broader in the Laotian population (compare FIG. 5a, b). Nymphs are similar except that the row of lateral occipital setae is set somewhat diagonally in the Laotian specimens (compare FIG. 11, 12). Part of this difference may be due to the extreme flattening of the specimens from Laos.

NYMPHS. *2nd and 3rd instars* (FIG. 21) with postantennal angles and lateral postantennal (occipital) margins well sclerotized: the angles narrowly rounded (FIG. 11, 12). Due to the rigid sclerotization, in flattened specimens the anterior-posterior ridge is not pressed down on the dorsal part of the head (FIG. 12), as is the case in *H. oenomydis*, *H. pacifica*, and *H. irritans*. Abdomen with slight signs of segmentation by virtue of horizontal indentations in the segment. Tergal plaques prominent; occasional specimens with incipient nonfunctional abdominal spiracles on varying number of segments. *1st instar* (FIG. 25) with postantennal angles and margins well sclerotized. Abdominal tergal plates as in figure.

From Laos, as well as the specimens from *R. niviventer*, I have seen single specimens from each of 3 *R. fulvescens*, from 1 *R. argentiventer*, a pair of adults and 5 nymphs from a pool of 3 *R. exiguus*, and a female from the type host, *R. cremoriventer*. Whether there is normal occurrence on rats other than *R. niviventer* and *R. cremoriventer* cannot be decided on the basis of the few specimens involved. Descriptions of the nymphal stages were based on specimens included in the type series as well as ones from Laotian *R. niviventer*.

Hoplopleura dissicula Johnson FIG. 10, 22, 27

Hoplopleura dissicula Johnson, 1964: 72.

The type series was from *R. muelleri*, Malaya and North Borneo (holotype from Malaya). Other than the types, I have examined a series of 1 male, 11 females from *R. muelleri*, Malaya, Selangor, Kepong, Bukit Lanjan Forest Reserve, December 1960 (Bishop Museum). Descriptions and figures of the nymphal stages are based on specimens associated with paratypes from Borneo.

NYMPHS. *2nd instar* (FIG. 22) with postantennal angles marked, rounded, more extended than in *H. sicata*. These angles and the lateral occipital head margins heavily sclerotized and rigid (FIG. 10). Lateral occipital setae marginal. Thoracic spiracle borne on prominent rounded lateral extension. Abdomen with well marked tergal plaques and horizontal indentations that indicate the various segments; 1 to 5 incipient spiracles occasionally present. Presumably the 3rd instar is similar to the 2nd. *1st instar* (FIG. 27) with 6 paired tergal plates, these large in relation to size of abdomen, and overlapping, in the available specimen. Postantennal angles and occipital head margins well sclerotized but not as extended as in 2nd instar.

Hoplopleura rajah, n. sp. FIG. 1, 2, 4, 6, 7, 9, 23

Type data: ♂ holotype (BISHOP 9620) and 2

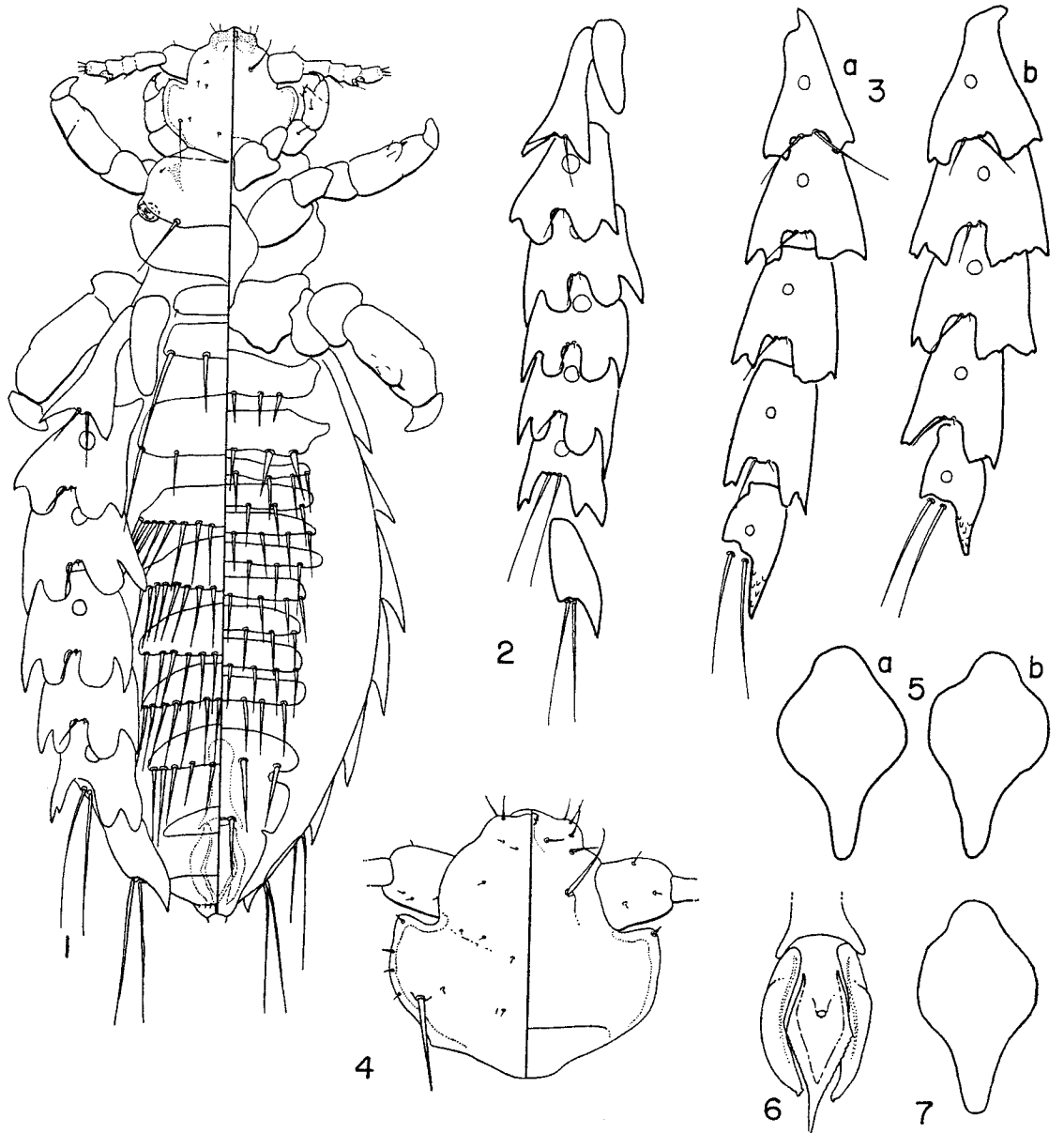


FIG. 1-7. *Hoplopleura pacifica*-group species. (1) *H. rajah*, ♂ holotype. (2) Same, paratergal plates. (3) *H. sicata*; a, paratergal plates III-VII, ♀ paratype no. RT B-20544; b, ♀, Laos, ex *Rattus niviventer* no. 70361. (4) *H. rajah*, head, holotype (5) *H. sicata*; a, thoracic sternal plate, ♀ as FIG. 3a; b, same, as FIG. 3b. (6) *H. rajah*, aedeagus, holotype. (7) Same, thoracic sternal plate.

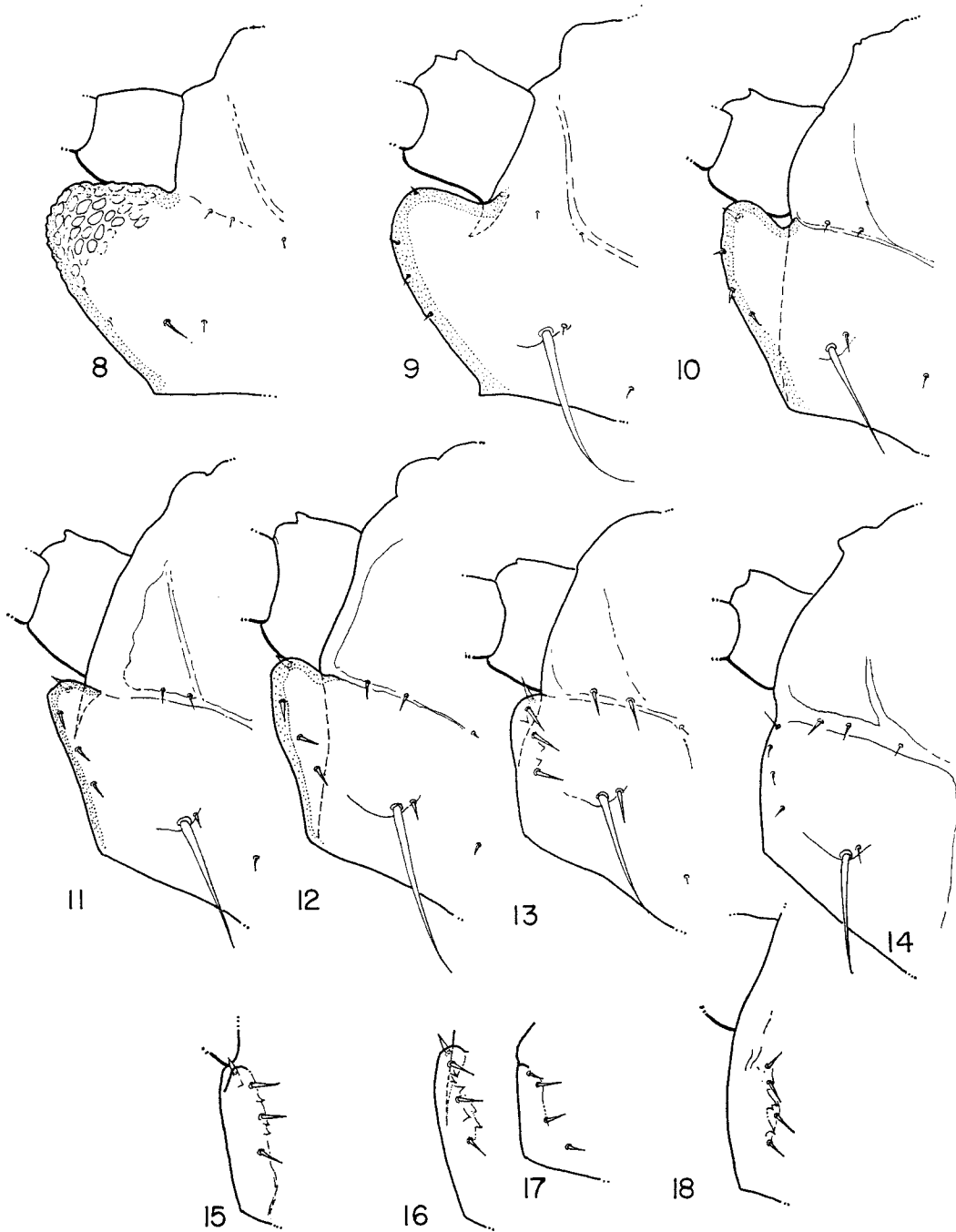


FIG. 8-18. *Hoplopleura pacifica*-group species, nymphs, occipital region and postantennal angles. (8) *H. pacticata*, 3rd instar, Malaya, ex *Rattus whiteheadi* no. 47558. (9) *H. rajah*, 3rd instar. (10) *H. dissicula*, 3rd instar, North Borneo, ex *R. muelleri* no. RT B-19213. (11) *H. sicata*, 3rd instar, North Borneo, ex *R. cremoriventer* no. RT B-19034. (12) Same, Laos, ex *R. niviventer* no. 70361. (13) *H. pacifica*, 3rd instar, Laos, ex *R. sladeni* no. 157. (14) *H. oenomydis*, 3rd instar, Congo, ex *Oenomys* sp. no. LI-2398. (15) *H. pacifica*, 3rd instar, postantennal angle and anterior-posterior ridge flattened onto head dorsum, Vietnam, ex unknown host no. 25. (16) Same, angle and ridge partially flattened, Madagascar, ex *R. norvegicus*. (17) Same, 1st instar, data as for FIG. 16. (18) *H. oenomydis*, 3rd instar, postantennal "angle" and ridge flattened onto head dorsum, Congo, ex *Oenomys* sp. no. LI-4433-34.

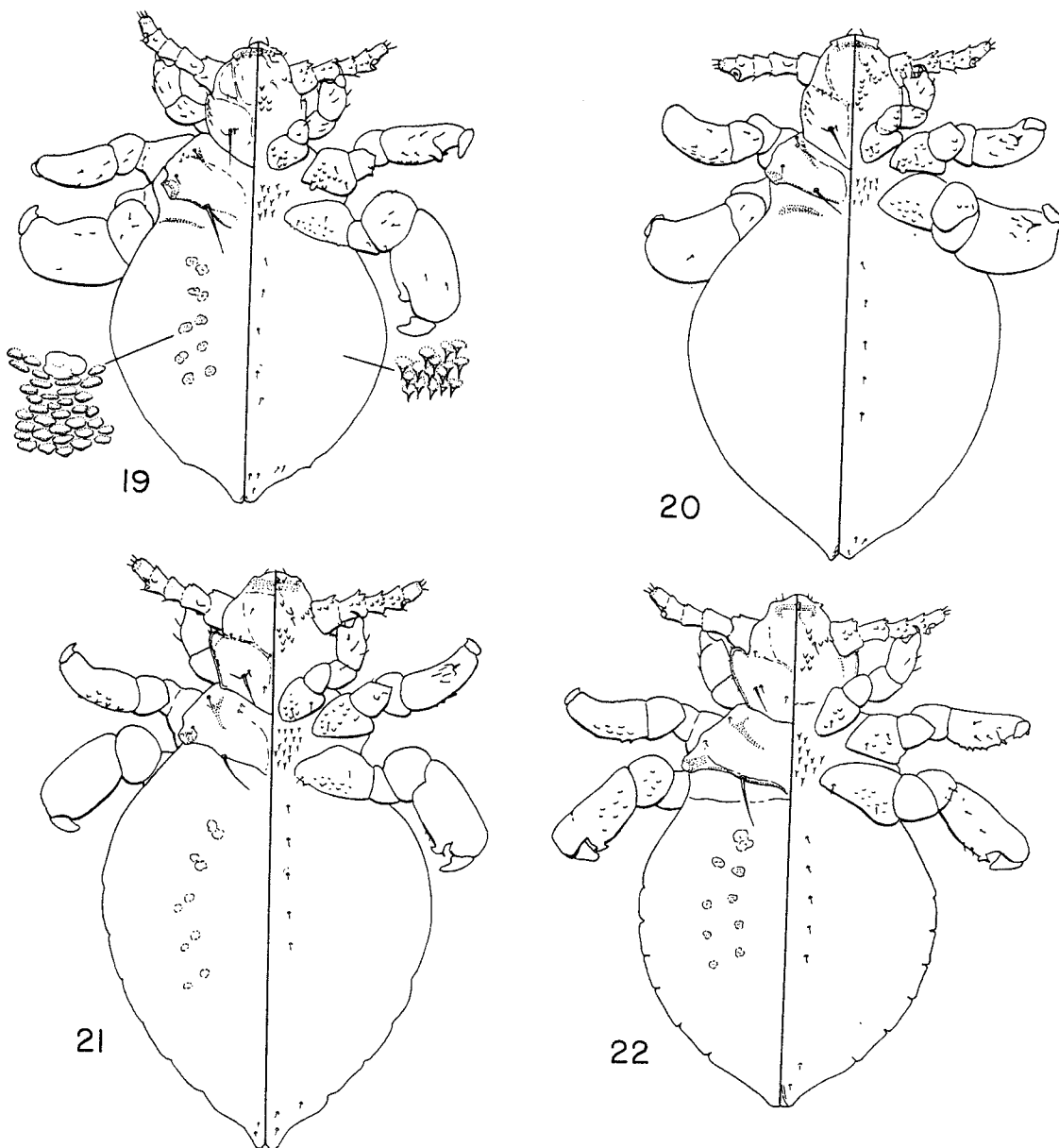


FIG. 19-22. *Hoplopleura pacifica*-group species, nymphs. (19) *H. pacifica*, 3rd instar, North Borneo, ex *Rattus rattus*. Inserts show (left) dorsal scales and a tergal plaque, and (right) ventral spiculated scales. Left line points to paired tergal plaques. (20) *H. oenomydis*, 3rd instar, Congo, ex *Oenomys* sp. no. LI-3006. (21) *H. sicata*, 3rd instar, North Borneo, ex *R. cremoriiventer* no. RT B-19034. (22) *H. dissicula*, 2nd instar, North Borneo, ex *R. muelleri* no. RT B-19213.

3rd-instar nymphs from *Rattus surifer*, Laos, Pakse, 24.VII.1960, no. R-70103.

Diagnosis: A member of the *pacifica* group. Distinct in having 1 acute bladeliike apical lobe on paratergal plate VIII, and plates III-VI each with the 2 apical lobes deeply subdivided (FIG. 2). Approaching *pectinata* by having the occipital region

of the head very broad (FIG. 4). Like that species, occurring on rats of the *rajah* group.

♂ (FIG. 1): *Head* (FIG. 4) not flattened anteriorly; postantennal angles marked, occiput very broad, its lateral margins well sclerotized but not rugose, these margins rounded; the 4 lateral occipital setae all marginal. Principal dorsal seta large, set well in from lateral margin; accessory seta present. *Thorax* with long seta medial to mesothoracic spiracle. Sternal plate

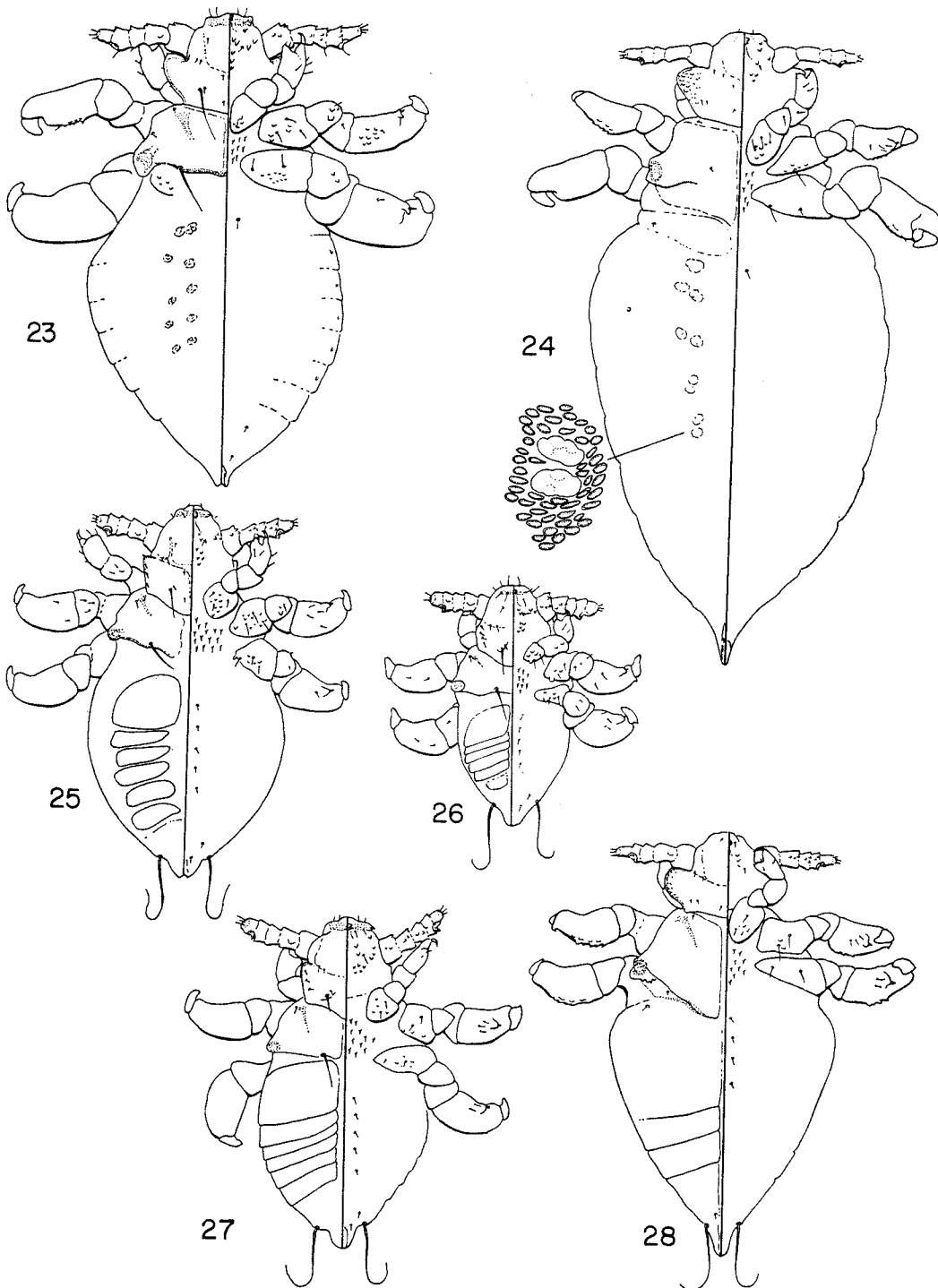


FIG. 23-28. *Hoplopleura pacifica*-group species, nymphs. (23) *H. rajah*, 3rd instar, Malaya, ex *Rattus whiteheadi* no. RT B-47558. (24) *H. pectinata*, 3rd instar, Malaya, ex *Rattus whiteheadi* no. RT B-47558. Insert shows dorsal abdominal tubercles and tergal plaques. (25) *H. sicata*, 1st instar, North Borneo, ex *R. cremoriventer* no. RT B-19183. (26) *H. pacifica*, 1st instar, Malaya, ex *R. rattus jarak*. (27) *H. dissicula*, 1st instar, Malaya, ex *R. muelleri* no. RT B-6112. (28) *H. pectinata*, 1st instar, North Borneo, ex *R. whiteheadi* no. RT B-19253.

as in FIG. 7. *Abdomen* with large tergal and sternal plates, 1 tergal and 2 sternal plates per typical segment. Sternal plates and setae of 2nd and 3rd segments arranged as usual in genus. Tergal plate of 1st segment large, definite, its 2 posteromarginal setae very small. No sword-shaped setae on abdomen and no setae present off tergal and sternal plates. Paratergal plates (FIG. 2) II with 2 acute apical lobes, pair of apical setae both extending beyond apices of lobes; plates III-VI with apical lobes each deeply subdivided, medial secondary lobes rounded, lateral secondary lobes acute; larger of the pair of apical setae on plates III-VI not extending beyond apices of lobes; plate VII with ventral apical lobe narrow, emarginate, dorsal apical lobe subdivided into 2 equal acute secondary lobes; plate VIII with single, smooth, acute, blade-like, dorsal lobe. *Aedeagus* (FIG. 6) of typical *Hoplopleura* type. *Length*. ♂, 1.30 mm; 3rd-stage nymph, 0.90 mm.

NYMPH. *3rd instar* (FIG. 23) with marked postantennal angles (FIG. 9) and broad occipital region as in adult. Postantennal angle and lateral occipital head margins well sclerotized. Lateral occipital setae marginal. Principal dorsal head seta long, accessory seta present. Thorax with large seta medial to mesothoracic spiracle. This spiracle set on rounded, posteriorly projecting extension. Abdominal segmentation indicated by deep lateral indentations; 5 incipient spiracles present. Only the most anterior pair of small abdominal setae visible on venter because 1 of the specimens was broken in the abdominal area; the other lacked the posterior part of the abdomen. Tergal abdominal plaques well developed; abdominal scales as in other members of the *pacifica* group. Lacking terminal abdominal setae; 2 setae ventrally each side, on anal lobe.

Hoplopleura pectinata (Cummings) FIG. 8, 24, 28
Polyplax pectinata Cummings, 1913: 35.

Hoplopleura pectinata: Ferris, 1921: 99.—Ferris, 1951: 142 (sinks *Ctenura* Ewing).—Johnson, 1964: 74.

Ctenura pectinata: Ewing, 1929: 199 (designated type of *Ctenura* Ewing).

The types were from *R. surifer*, Malaya. This species is common on *R. whiteheadi* and *R. rajah* in Malaya and North Borneo (Johnson 1964). *H. pectinata* was not present in the Laos and Vietnam collections.

A study of the nymphs of this peculiar and isolated species suggests that *pectinata* is most closely related to the *pacifica* group. The adult is strongly sclerotized, the usual sutures on the head and thorax that indicate the separate plates are missing or partial, and all the abdominal plates are very large. Major setae are reduced in size and some are missing or displaced. The principal dorsal head seta is moved to the lateral median, but its accessory seta occurs in the usual submedian position. Apparently all the lateral occipital setae may be missing, or they may be reduced in number from the usual 4. The seta medial to the mesothoracic spiracle is small.

NYMPH. *2nd and 3rd instars*, like adult, have the occipital region rugose and expanded laterally (FIG. 8, 24). Principal dorsal head seta small, set in from margin, its accessory seta present. Lateral occipital setae difficult to detect among the heavy rugosities of the occipital margin, visible number varies from 0 to 2. As with *pacifica*-group species, tergal plaques present

on abdomen. Abdominal dorsum with small tubercles rather than scales (FIG. 24). These tubercles continue onto lateral portions of venter, but center of venter appears membranous. Terminal abdominal setae lacking; 1 pair of minute medial setae anteriorly on venter of abdomen; abdominal dorsum with 1 small seta anteriorly, each side near lateral margin. Abdominal segmentation indicated by lateral indentations. In general nymphs these indentations are deep and continue across the abdomen. *1st instar* (FIG. 28) with head much as in older stages; small medial seta of thoracic dorsum posterior to spiracle; sclerite containing thoracic spiracle spiculate posteriorly. Four well marked paired tergal plates; anterior one very large; posterior one extended over anal segment. Four pairs of small ventral abdominal setae; 1 small seta each side laterally on anterodorsal part of abdomen; 2 terminal abdominal setae.

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HOPLOPLEURA DIAPHORA JOHNSON AND HOPLOPLEURA KITTI KIM: SIBLING SPECIES OF SUCKING LICE (ANOPLURA)?¹

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Abstract: *Hoplopleura diaphora* Johnson and *H. kitti* Kim are closely related Southeast Asian species of sucking lice. Both species occur normally on *Rattus bowersii*, and *H. kitti* also parasitizes *R. berdmorei* and *R. edwardsi*. Comparisons and illustrations of the nymphs of both species and illustrations of adults of *H. kitti* are included.

Host associations of species of Anoplura are usually more rigid than those found with other, more mobile, ectoparasites of mammals. A particular mammal species is seldom regularly parasitized by more than 1 species of a genus of Anoplura. If 2 species of a single genus occur regularly on the same host, usually they belong to different groups within the genus and are specially adapted morphologically for different ecological situations on the host. For example, there are long and short-headed species of *Linognathus* on African antelopes, and of *Polyplax* on African and near-eastern species of spiny mice of the genus *Acomys* (Hopkins 1949, Johnson 1960). Species that occur normally on the same host and resemble each other morphologically so closely that they could be called sibling species have not been recognized previously in the Anoplura.

In Southeast Asia (Malayan peninsula, Thailand, Laos and Vietnam) there is a pair of morphologically similar *Hoplopleura* species that are not closely related to other species in the genus, and that appear to be sibling species. These lice, *Hoplopleura diaphora* Johnson and *H. kitti* Kim, are found on related species of *Rattus* and in 1 case they occur normally

on the same host species, *R. bowersii*. Indeed, through a regrettable *lapsus*, Johnson (1964) included in the paratypic series of *H. diaphora* certain specimens that actually are *H. kitti*. All specimens of *diaphora* that I have seen, from Malaya and Vietnam, were taken from the type host, *R. bowersii*. *H. kitti*, on the other hand, occurs on *R. bowersii* in Malaya and Laos, *R. berdmorei* (type host) in Thailand, and on *R. edwardsi* in Laos. Whether the host range of *H. kitti* is truly broader than that of *H. diaphora* cannot be decided on the basis of the few collections available.

H. diaphora and *H. kitti*, unlike typical species of *Hoplopleura*, have the abdominal plates strongly reduced (mainly missing in female *diaphora*) and lack the enlarged, paired setae of the 1st plate of the 3rd abdominal sternum (FIG. 1, 2). Further, all nymphal stages have the tarsal claw of the 1st leg deeply bifurcate (FIG. 9), which suggests, in an exaggerated fashion, the condition often found in both nymphs and adults within the genus *Neohaematopinus*. A relationship to the *Hoplopleura pacifica* group (discussed by Johnson 1972) is suggested by the condition of the nymphal abdomen which has vague paired plaques on some of the dorsal segments. The nymph of *H. kitti* further resembles species of the *pacifica* group by having 1 terminal abdominal seta on each side in the 1st instar, and by lacking such setae in both the 2nd and 3rd instars.

Since a tendency toward complete loss of 1 or more abdominal or paratergal plates and setae is not an uncommon expression of abnormality in specimens of sucking lice, it may be that only a few elements of genetic material are necessary for

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