

**INDO-MALAYAN HAEMOLAEELAPS, WITH
DESCRIPTIONS OF NEW SPECIES**
(Acarina: Laelaptidae)

By Edward W. Baker¹, Robert Traub² and Thomas M. Evans³

During studies on the ecology of the rickettsial and viral diseases, particularly scrub typhus, undertaken by the U. S. Army Medical Research Unit (Malaya), and the Division of Virus Research and Medical Zoology of the Institute for Medical Research, Kuala Lumpur⁴, collections were made of ectoparasites of small mammals in Malaya and North Borneo. Laelaptid mites were frequently encountered during the surveys, and since these mites are important as actual or potential vectors or reservoirs of disease, a great need exists for a thorough knowledge of the Indo-Malayan laelaptid fauna, particularly since most species taken were new to science. This paper includes descriptions and illustrations of seven new *Haemolaelaps* from southeast Asia. *Haemolaelaps traubi* (Strandtmann, 1948), from Malaya and Borneo, is redescribed and figured.

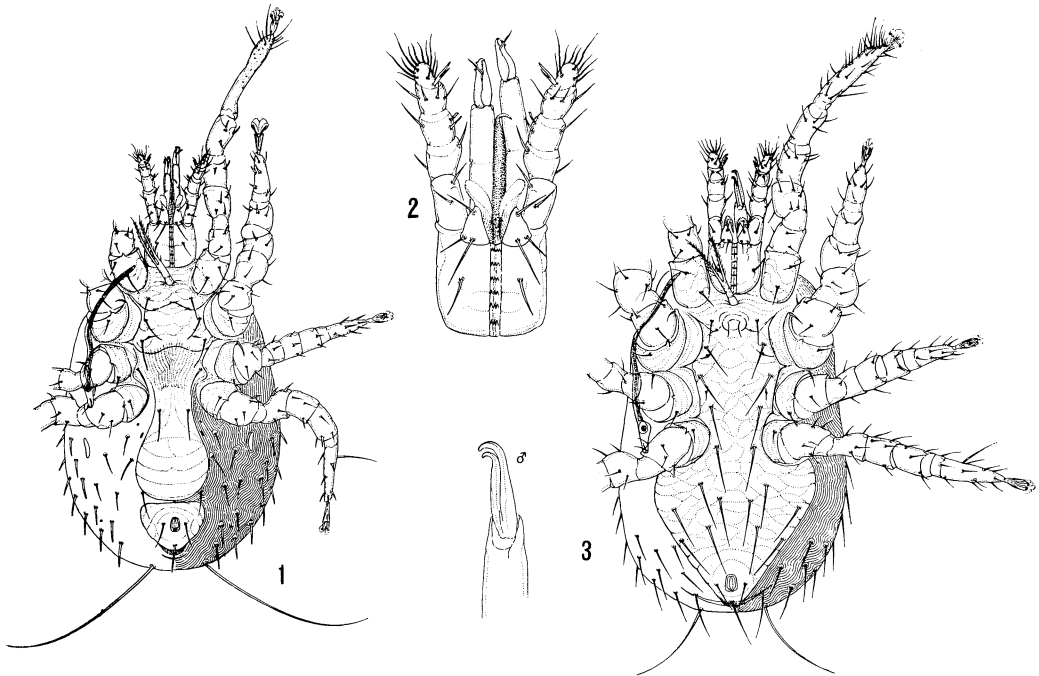
Haemolaelaps traubi (Strandtmann) Figs. 1-3.

Atricholaelaps traubi Strandtmann, 1948, Ent. Soc. Wash., Proc. 50 (7): 187-92.

Diagnosis. Pilus dentilis of chela straight, spine-like; sternal plate incomplete anteriorly so that anterior pair of sternal setae lie in front of plate; genito-ventral plate long, approaching anal plate; dorsal body setae shorter than distances between bases; posterior of body with a pair of long setae; tarsus I sclerotized, constricted, with few setae; tarsus IV with a long, proximal seta.

Female. Setae on dorsal shield slightly longer anteriorly, the longest almost reaching base of next row; a pair of very long terminal body setae. Pilus dentilis straight, sharp, not inflated. Presternal area sculptured and not clearly delineated from sternal plate. Sternal setae of about equal length, anterior pair slightly shorter than other 2 pairs; sternal pores lie at about a 30-35° angle; sternal plate wider than long. Genito-ventral plate large, long, approaching anal plate, expanding behind coxae IV, and slightly wider than anal plate; plate sculptured as figured. Anal plate broadly triangular, with rounded corners and an almost straight anterior margin, wider than long. Ventral body setae short,

1. Entomology Research Division, Agricultural Research Service, United States Department of Agriculture, Washington, D. C.
2. United States Army Medical Research Unit (Malaya), Kuala Lumpur, Malaya (Now with the Army Medical Research and Development Command, Washington, D. C.).
3. Clearwater, Florida.
4. This Division includes what was formerly known as the Colonial Office Research Unit.



Figs. 1-3. *Haemolaelaps traubi* (Strandtmann): 1, venter of ♀; 2, venter of gnathosoma; 3, venter of ♂.

stout. Metapodal plates longer than wide. Peritremes extend anteriorly to point slightly in front of midpoint of coxae I. Leg setae short and spiny; tarsus IV with a long proximal seta; tarsus I heavily sclerotized and constricted near middle, with few short proximal setae and several longer distal setae. Body 528 μ long and 350 μ wide.

Male. Distinguished by the pair of long setae on the posterior margin of the body. Tarsus I not modified as in the female. Ventral body setae long, reaching to or past base of setae in next row. Leg setae short, spiny; tarsus IV with the long proximal seta as in female.

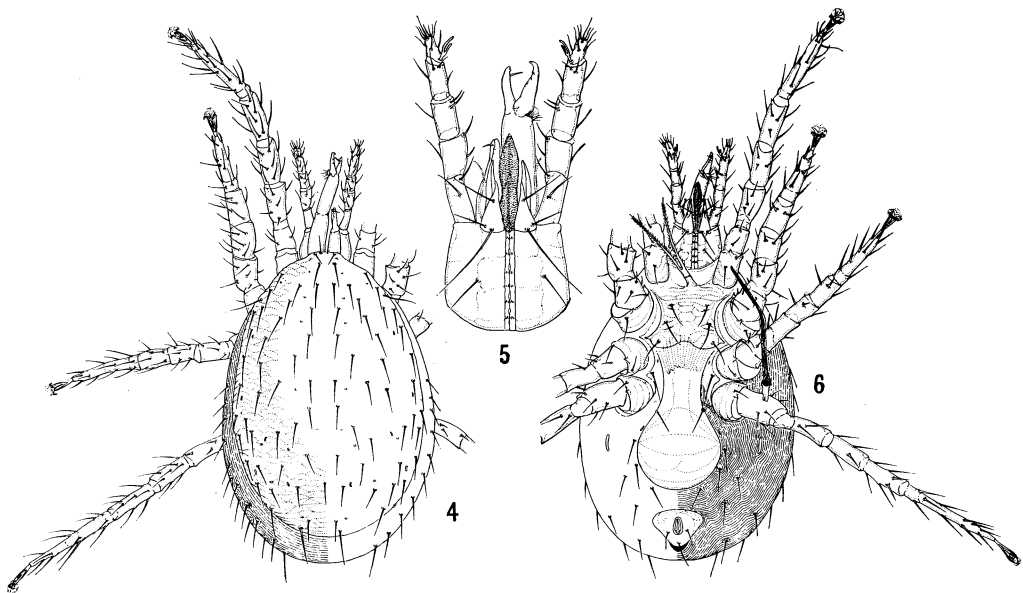
Types. Three cotypes, 2 in the U. S. National Museum, and 1 in the collection of R. W. Strandtmann, Lubbock, Texas. These were collected by the India-Burma Field Party of the United States of America, Typhus Commission, from *Callosciurus q. quinquestriatus* at Myitkyina, Burma. Records for Malaya are: 5 ♀♀ from *Callosciurus notatus* 23-III-1948, Selangor, Subang (in forest), by R. Traub and C. B. Philip; 1 ♀ from bird, "spider-hunter," 18-VII-1948, Cameron Highlands, Mt. Brinchang (elevation greater than 1,500 m) by R. Traub; 1 ♂ from *Callosciurus tenuis*, 31-VII-1948, Selangor, Ulu Gombak Forest Reserve, 20 km north of Kuala Lumpur, by R. Traub.

Haemolaelaps audyi Baker, Traub and Evans, n. sp. Figs. 4-6.

Diagnosis. Pilus dentilis straight, spear-like; sternal plate not strongly delineated anteriorly in all specimens; genital ventral plate expanded and rounded posteriorly, approach-

ing anal plate; dorsal body setae not quite as long as intervals between bases; tarsus IV without long proximal seta.

Female. Dorsal setation not heavy, setae not or barely reaching base of setae of next row, all of about equal size. Pilus dentilis sharp, straight, spine-like, not swollen. Pre-sternal area set off from sternal plate, although in some specimens the delineation is not so prominent as in others; anterior pair of sternal setae on anterior margin of plate and somewhat shorter than other sternal setae; sternal pores distinctly angled; sternal plate wider than long. Genito-ventral plate large, strongly expanded posteriorly, and approaching anal plate, sculptured as figured. Anal plate triangular, with rounded margins, not quite as long as wide, paired setae reaching past base of posterior seta. Metapodal plates longer than wide. Peritreme shorter than usual, barely reaching posterior margin of coxa I. Leg setae short, those on tarsus IV longer, but without any proximal seta on tarsus IV. Body 828 μ long and 540 μ wide.



Figs. 4-6. *Haemolaelaps audyi*, n. sp.: 4, dorsum of ♀; 5, venter of gnathosoma; 6, venter of ♀.

Male. A ♂, associated with ♀, is figured.

Types. Holotype ♀, U. S. National Museum Type No. 2469, collected from *Callosciurus tenuis*, Selangor, Gombak Forest Reserve, near Pahang Road, 20 km north of Kuala Lumpur, Malaya, 25-VI-1948, by R. Traub. One ♂, 12 ♀ paratypes with the same data. Other specimens examined were 10 ♀♀ from *Callosciurus hippurus*, same locality, 25-VI-1948, by R. Traub; 3 ♀♀ from tree squirrel nest, same locality, 31-VII-1948, by R. Traub; 1 ♀ from *Rattus rajah*, same locality as types, 15-VII-1948, by R. Traub; 3 ♀♀ from *Rhinosciurus laticaudatus*, loc. cit., 4-IV-1949, by R. Traub.

This species was collected in the Philippines from *Suillotaxis marcheri*, Palawan Island,

Iwahig Penal Colony, Santiago, 7-V-1947, by H. Hoogstraal (Field No. 3065, Chicago Museum Natural History Type No. 628F90); 3 ♀♀ from *Callosciurus steeri*, Palawan Island, Brook's Pt. Municipality, Mantalingajan Range, Mt. Balabacg, 900 m elevation, 5-V-1947, by D. S. Rabor (Field No. 3624, Chicago Museum Natural History Type No. 63032); 1 ♀ from *Hylopetes nigripes nigripes*, same locality, collector, and date.

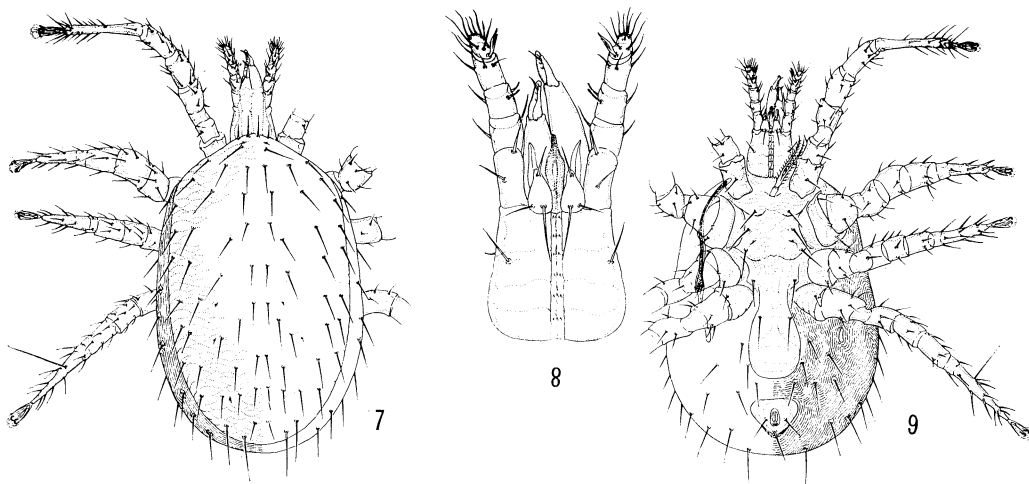
This species was also taken in North Borneo by members of the joint U. S. Army-Colonial Office Medical Research Unit from *Callosciurus lowii*, Mt. Kinabalu, Lumu Lumu, in cloud forest, 1,900 m elevation, VII-1951. Tom Harrisson of the Sarawak Museum, and B. Ensoll and Johan bin Adam of the Institute for Medical Research, Kuala Lumpur, collected this species in Sarawak as follows: Three ♀♀ from *C. notatus*, Kampong Tutar on Tinjar River, 5-VI-1950; five ♀♀ from *C. hippurus*, Mt. Dulit at 800 m elevation, 17-VI-1950; four ♀♀ from unidentified host at Kapit Rejang, 16-VII-1950; collections were also made from *C. prevosti*, Bukit, Manamang, Kuala Belaga, 12-VII-1959; *C. hippurus*, same locality, 17-VII-1950; and *C. hippurus*, Mt. Dulit, 800 m elevation, 17-VI-1950.

This species is named for J. R. Audy, formerly Chief of the Division of Virus Research and Medical Zoology of the Institute for Medical Research, Kuala Lumpur, and now Director of the George Williams Hooper Foundation of the University of California Medical Center, San Francisco.

Haemolaelaps nadchatrami Baker, Traub and Evans, n. sp. Figs. 7-9.

Diagnosis. Pilus dentilis straight, spine-like; sternal plate incomplete anteriorly; genital plate long, slightly expanded posteriorly, and approaching anal plate; dorsal body setae shorter than distance between their bases; tarsus I sclerotized and constricted; tarsus IV with a long proximal seta.

Female. Dorsal setae not strong and not usually reaching to base of next row; mar-



Figs. 7-9. *Haemolaelaps nadchatrami*, n. sp.: 7, dorsum of ♀; 8, venter of gnathosoma; 9, venter of ♀.

ginal setae tend to be longer. Pilus dentilis straight, spine-like. Presternal area not well delineated from sternal plate. Sternal plate setae of about equal length; anterior pores nearly horizontal and posterior pores distinctly angled; plate wider than long. Genito-ventral plate long, narrow, approaching anal plate; plate sculptured as figured. Anal plate broadly triangular, anterior margin straight, wider than long; paired anal setae surpassing base of posterior seta, of about same length as ventral body setae. Metapodal plates longer than wide. Peritremes extend anteriorly to center of coxae I. Tarsus I sclerotized, constricted, with setae on distal 1/2; leg setae short; tarsus IV with long dorsal proximal seta. Body 800 μ long and 500 μ wide.

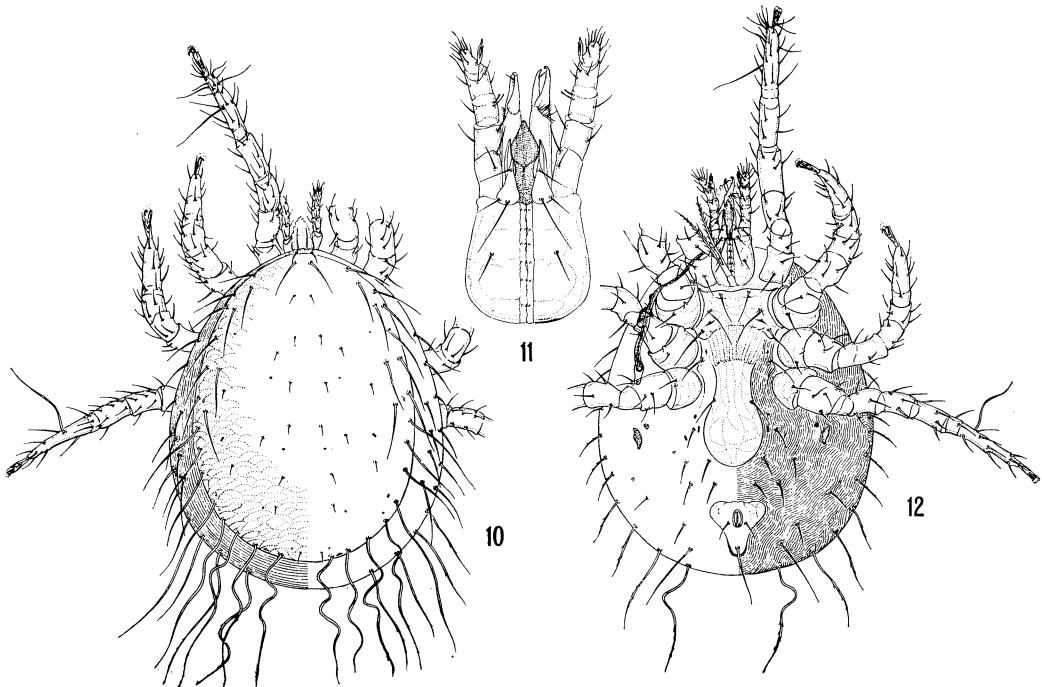
Male. Not known.

Types. Holotype ♀, U. S. National Museum Type No. 2470, and 4 ♀ paratypes collected from *Callosciurus caniceps*, Malaya, Selangor, Gombak Forest Reserve, 20 km north of Kuala Lumpur, VII-1948, by R. Traub; 2 ♀ paratypes collected from squirrel nest, same locality, 31-VII-1948, by R. Traub.

This species is named for M. Nadchatram of the Institute for Medical Research, Kuala Lumpur, Malaya.

Haemolaelaps neoflagellata Baker, Traub and Evans, n. sp. Figs. 10-12.

Diagnosis. Pilus dentilis straight, spine-like; sternal plate much wider than long and clearly delineated anteriorly; genito-ventral plate of medium length, not closely approach-



Figs. 10-12. *Haemolaelaps neoflagellata*, n. sp.: 10, dorsum of ♀; 11, venter of gnathosoma; 12, venter of ♀.

ing anal plate. Dorsal body setae distinctive; marginal setae long, those on posterior 1/2 of shield very long and whip-like; dorsal setae very short; tarsi I and IV each with a long medially placed dorsal seta.

Female. Dorsal body setae distinctive in that the marginal setae of the shield are very long, those on the posterior half of the shield being whip-like and about 3× as long as anterior portion; dorsal setae tiny, perhaps 1/4 as long as anterior marginal setae. Pilus dentilis sharp, straight, spine-like. Presternal area distinctly separated from sternal plate. Sternal plate much wider than long; anterior setae smaller than others; anterior pair of pores almost horizontal; posterior pair of pores set at a distinct angle. Genito-ventral plate not long, rounded behind coxae IV, and not approaching anal plate; genital setae not as long as posterior sternal setae; sculpturing as figured. Anal plate triangular, with rounded margins, not quite as long as wide, with lateral margins constricted; paired anal setae small, not quite reaching base of long posterior seta. Ventral body setae few, and except for a pair of long posterior setae, almost as long as paired anal setae. Metapodal plates longer than wide, larger than in other species. Peritremes extending to a point above anterior part of coxae I; peritreme with a large and a small lateral projection between coxae II and III. Tarsi I and II each with a long dorsal seta located medially; other leg setae short. Body 915 μ long and 650 μ wide.

Male. Not known.

Type. Holotype ♀, U. S. National Museum Type No. 2471, collected from *Rhinosciurus laticaudatus*, Selangor, Gombak Forest Reserve, 20 km north of Kuala Lumpur, Malaya, 5-VII-1948, by R. Traub.

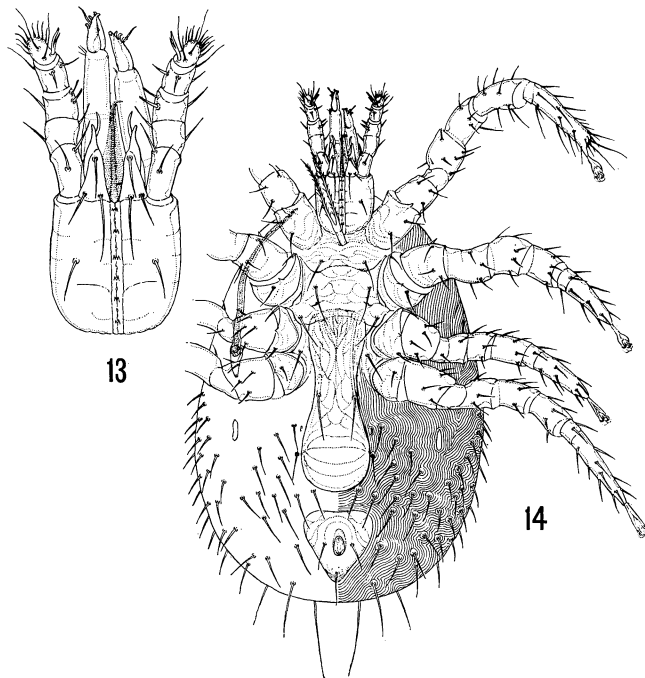
Haemolaelaps argentiventer Baker, Traub and Evans, n. sp. Figs. 13-14.

Diagnosis. Pilus dentilis straight, spine-like; anterior margin of sternal plate not well delineated; genito-ventral plate long, slender, gradually widening behind coxae IV and approaching anal plate; dorsal body setae length surpassing distance between setal bases; a pair of long posterior body setae present, but not so long as in *H. traubi*.

Female. Dorsal body setae of normal strength, longer than the longitudinal distance between their bases. Pilus dentilis sharp, spine-like; fixed chela slender, movable chela strong, teeth long, making chela appear three-pronged. Anterior margin of sternal plate not well delineated; sternal setae of about equal length, longer than distance between bases; anterior pair of pores almost horizontal; posterior pair of pores slightly angled. Genito-ventral plate long, slender, drop-shaped, expanding gradually behind coxae IV and nearly reaching anal plate. Anal plate triangular, with rounded margins, almost as long as wide, the paired anal setae just reaching base of posterior anal seta. Many ventral setae laterad of genito-ventral and anal plates. Metapodal plates small, longer than wide. Peritremes extend to center of coxae I. Leg setae short and of more or less equal length; without long setae on tarsi IV. Body 533 μ long and 345 μ wide.

Male. Not known.

Types. Holotype ♀, U. S. National Museum Type No. 2472, and 8 ♀ paratypes collected on *Rattus argentiventer*, Malaya, Selangor, Subang, 18-VIII-1948, by R. Traub.



Figs. 13-14. *Haemolaelaps argentiventer*, n. sp.: 13, venter of gnathosoma; 14, venter of ♀.

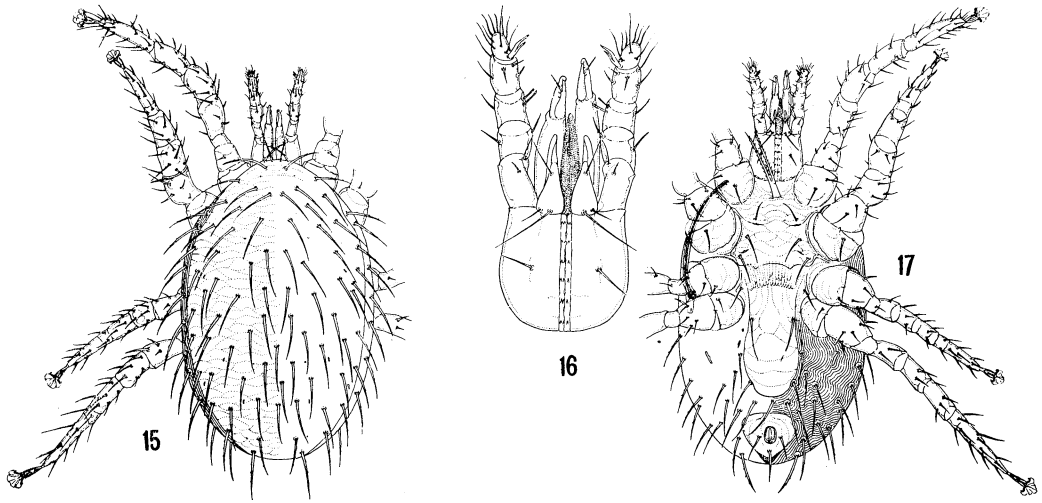
Haemolaelaps setosa Baker, Traub and Evans, n. sp. Figs. 15-17.

Diagnosis. Pilus dentilis slender, spine-like; sternal plate incomplete anteriorly; genito-ventral plate long, approaching anal plate; body setae of about equal length, strong, and longer than distance between bases; tarsal setae of more or less equal length.

Female. Setae on dorsal shield strong, longer than intervals between rows, and all of about equal size. Pilus dentilis spine-like, straight. Presternal area sclerotized and not delineated from sternal plate. Sternal plate incomplete anteriorly; anterior pair of sternal setae not so strong as others; anterior pair of sternal pores almost horizontal, whereas posterior pair are at a decided angle; plate wider than long. Genito-ventral plate long, only slightly widening behind coxae IV, almost reaching anal plate; sculptured as figured. Anal plate triangular, with rounded margins, about as long as wide; paired and unpaired anal setae subequal in length, the paired setae surpassing the base of the single seta. Ventral body setae strong and similar in length to dorsal setae. Metapodal plates small, longer than wide. Peritremes reaching to point midway above coxae I. Leg setae not distinctive; all setae short; those on tarsus IV somewhat longer. Body 660 μ long and 400 μ wide.

Male. Not known.

Type. A single ♀, the holotype, U. S. National Museum Type No. 2473, was collected from *Aeromys tephromeles*, Selangor, Gombak Forest Reserve, 20 km north of Kuala

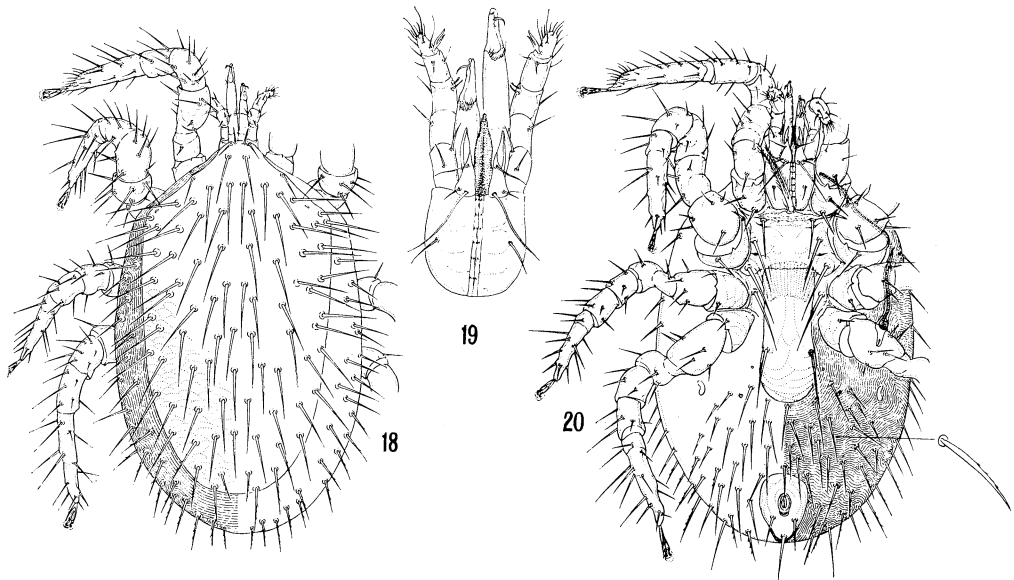


Figs. 15-17. *Haemolaelaps setosa*, n. sp.: 15, dorsum of ♀; 16, venter of gnathosoma; 17, venter of ♀.

Lumpur, Malaya, 2-VII-1948, by R. Traub.

***Haemolaelaps ultraspinosa* Baker, Traub and Evans, n. sp.** Figs. 18-20.

Diagnosis. Pilus dentilis spine-like, curved distally; sternal plate well developed, setae strong, long; genito-ventral plate short, only slightly expanded behind coxae IV; dorsal



Figs. 18-20. *Haemolaelaps ultraspinosa*, n. sp.: 18, dorsum of ♀; 19, venter of gnathosoma; 20, venter of ♀.

setae strong, spine-like, longer than intervals between bases; leg setae of more or less equal length.

Female. Setation of dorsal shield and body distinctive in that the setae are strong, long, and straight. Pilus dentilis spine-like, bent distally. Presternal area well delineated from sternal area. Sternal plate with 3 pairs of strong setae, the anterior pair being the weakest; the anterior pair of pores slightly angled, the posterior pair almost horizontal; plate much wider than long. Genito-ventral plate small, only slightly expanded behind coxae IV, not approaching anal plate; sculpturing as figured. Anal plate rounded, much longer than wide; paired anal setae about 2/3 as long as single posterior anal seta and located on line behind anal opening. Many long, strong, spine-like ventral body setae, all slightly serrated. Metapodal plates of normal size and longer than wide. Peritremes extend to point above anterior portion of coxae I. Leg setae short, spiny, of more or less equal length; no long tarsal IV setae. Body 800 μ long and 486 μ wide.

Male. Distinguished by setation similar to that of ♀. Body 560 μ long and 360 μ wide.

Types. Holotype ♀ and 1 ♀ paratype were collected from *Hylopetes nigripes nigripes*, Palawan Island, Puerto Princessa, Babuyan, Philippines, 15-III-1947, by F. Werner (Field No. 2332, Chicago Natural History Type No. 63025); 27 ♀ paratypes and 2 ♂ paratypes were collected from the same host, Palawan Islands, Brook's Pt. Municipality, Mantalingajan Range, Mt. Balabacg, 900 m elevation, Philippines, 7-V-1947, by F. Werner (Field No. 3474, Chicago Natural History Museum Type No. 63029); 8 ♀ paratypes collected from the same host and locality, 5-V-1947, by D. S. Rabor (Field No. 3624, Chicago Natural History Museum Type No. 63032). Holotype and paratypes in the Chicago Natural History Museum; paratypes in the U. S. National Museum.

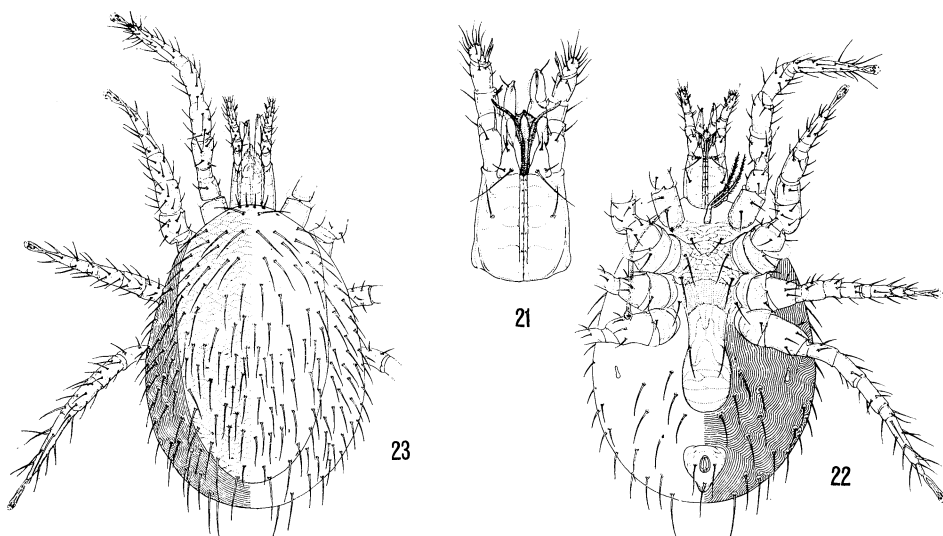
Haemolaelaps setaceosa Baker, Traub and Evans, n. sp. Figs. 21-23.

Diagnosis. Pilus dentilis long and slender; sternal plate incomplete anteriorly and barely separated from presternal area; the first pair of sternal setae appear to lie in front of the sternal plate; genito-ventral plate elongate but not approaching anal plate, widening only slightly behind coxae IV; dorsal body setae numerous, slender, longer than distance between bases; leg setae of more or less equal length.

Female. Setae on dorsal plate numerous, slender, longer than distance between bases. Pilus dentilis long and slender, not inflated nor hooked; presternal area and sternal plate not well delineated; anterior pair of sternal setae appear to lie in presternal area and are shorter than other sternal setae; anterior pair of pores almost horizontal, posterior pair set at a distinct angle; sternal plate wider than long. Genito-ventral plate long but not approaching anal plate, widening only slightly behind coxae IV, and sculptured as figured. Anal plate triangular, with rounded margins, longer than wide, and with all 3 setae of about equal length. Ventral body setae few in number, about as long as dorsal setae. Metapodal plates of usual size and longer than wide. Peritremes extend to about middle of coxae I. Leg setae of about equal length, those on tarsus IV somewhat longer, but there is no long dorsal tarsal seta. Body 680 μ long and 480 μ wide.

Male. Not known.

Types. Holotype ♀, U. S. National Museum Type No. 2474, collected from *Lariscus in-*



Figs. 21-23. *Haemolaelaps setaceosa*, n. sp.: 21, venter of gnathosoma; 22, venter of ♀; 23, dorsum of ♀.

signis, Malaya, Selangor, 20 km north of Kuala Lumpur, Malaya, 2-VII-1948, by R. Traub; 2 ♀ paratypes with the same data; 4 ♀ paratypes from tree squirrel nest, same area, 31-VII-1948, by R. Traub.

We are indebted to the following scientists for kindly furnishing specimens for study: J. R. Audy, formerly Chief, Division of Virus Research and Medical Zoology, Institute of Medical Research, Kuala Lumpur, Malaya; Harry Hoogstraal, now Chief of the Department of Medical Zoology of the U. S. Navy Medical Research Unit No. 3, Cairo, Egypt; and R. L. Wenzel of the Division of Insects, Chicago Natural History Museum, Chicago, Illinois. David Johnson of the Smithsonian Institution assisted R. Traub in collecting specimens in North Borneo, and on that expedition, Ben Ensoll and Phang Ong Wah served as capable field assistants, as in subsequent studies by the U. S. Army Medical Research Unit (Malaya). We are grateful to Tom Harrison, Curator of the Sarawak Museum, for making it possible for us to obtain specimens from Sarawak.

CORRECTION TO MONOGRAPH 2

In PACIFIC INSECTS MONOGRAPH 2, p. 56, line 16 from bottom, "wingless scelionid" should have read "wingless diapriid." Also, on the next line, "an herb, *Azorella*" should read "an umbelliferous herb, *Azorella*."