

## CHEYLETID PARASITES OR COMMENSALS IN MALAYSIA (ACARA: CHEYLETIDAE)

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----- ABSTRACT—The Cheyletid mites parasitic or commensal on mammals in Malaysia are revised. Following species have been found or recorded: *Cheyletus malaccensis* Oudemans, *C. fortis* Oudemans, *C. malayensis* Cunliffe, *C. bidentatus* n. sp., *C. pluridens* n. sp., *Cheletonella vespertilionis* Womersley, *Hylopecheyla malayi* n. sp., *Chelonotus selenirhynchus* Berlese and *Criokeron quinta* (Domrow & Baker). Two other species may also be expected: *Hylopecheyla bunguranensis* Fain and *Thewkachela ratufi* Ide & Kethley. -----

During the course of investigations made in Malaysia on the taxonomy and ecology of the vectors of scrub typhus and other potential vectors of zoonotic diseases by the Institute for Medical Research, Kuala Lumpur, thousands of reptiles, birds and mammals were collected and examined for ectoparasites. This paper brings to date mites of the family Cheyletidae that were found on insectivores, bats and rodents. This material comprises 9 species belonging to 5 genera. Among these taxa there are 3 new species: *Hylopecheyla malayi* n. sp., *Cheyletus bidentatus* n. sp. and *C. pluridens* n. sp.

All our measurements are in microns ( $\mu\text{m}$ ).

Genus *Cheyletus* Latreille, 1796

### 1. *Cheyletus malaccensis* Oudemans, 1903

*Cheyletus malaccensis* Oudemans, 1903: 84.

Two females were found on *Petinomys setosus* (White bellied flying squirrel), Paloh Estate, Kluang, Johore, 22. IV. 1971 (Coll. I. Muul).

### 2. *Cheyletus fortis* Oudemans, 1904

*Cheyletus fortis* Oudemans, 1904: 161.

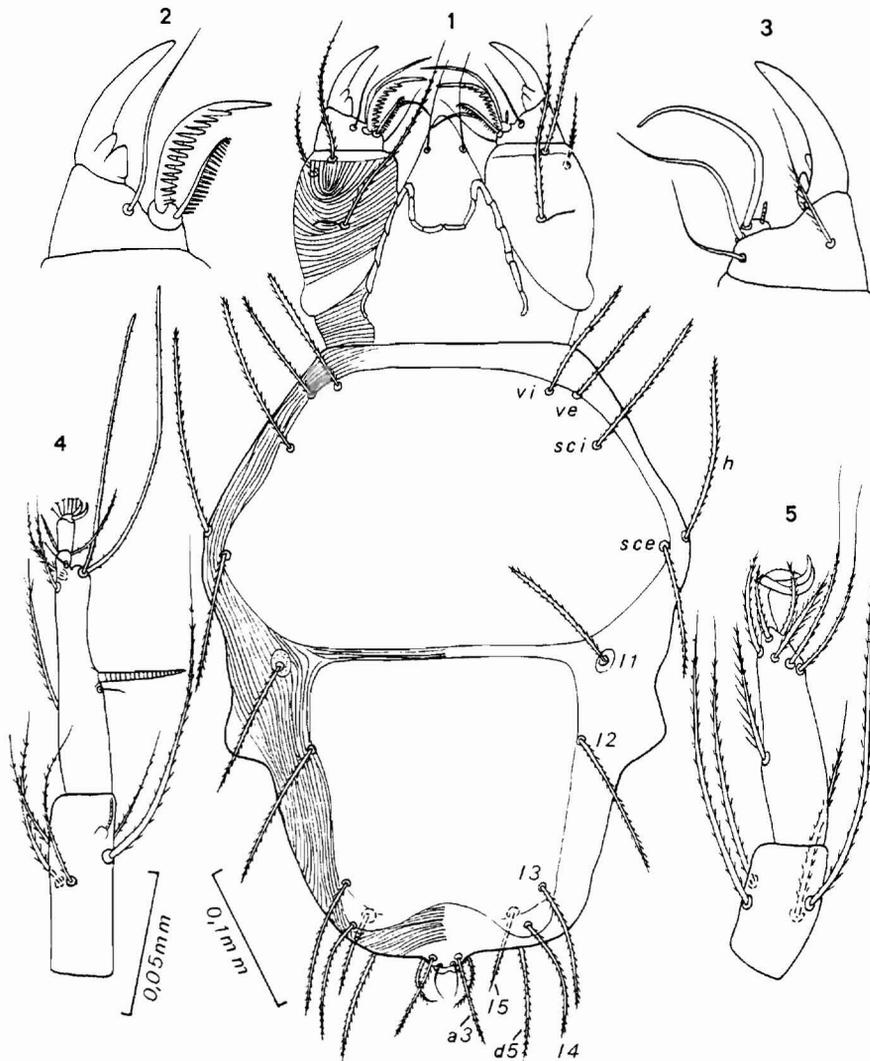
This species is distinguished from *C. malaccensis* mainly by the presence in the female of a single large tooth at the base of the apical spine of palptibia (also called palpal claw) instead of 2 teeth as in *C. malaccensis*. One may wonder if *C. fortis* is not merely a form of *C. malaccensis*. Nakada (1975) observed that in cultures of a species that he identified as *C. malaccensis* the palpal claw in the females may present either one or two basal teeth while in the nymphs this claw always bears two teeth. The females with only one tooth, however, were much more frequent than those with two teeth.

Summers and Price (1970) recorded *C. fortis* from the skin of different mammals, e. g. *Callosciurus* spp. in Burma and Formosa, *Rattus coxinga* in Formosa.

In Malaysia we found *C. fortis* from the following mammals: (1) *Callosciurus nigrovittatus*: Tioman Is., Pahang, 9. IV. 1962 (6 females, coll. F. L. Dunn); Subang Forest Reserve, Selangor, 2. III. 1963 (3 females, coll. R. S. Ratnam); Tanjong Rabok, Klang, Selangor, 11. III. 1971 (1 female, coll. R. S. Ratnam). (2) *Callosciurus notatus*: Gunong Jerai, 1100m, Kedak Peak, Kedak, 26. II. 1961

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Figs. 1-5: *Cheyletus malayensis* Cunliffe (holotype female)—1, dorsum; 2, palptarsus and palptibia, dorsally; 3, palptarsus and palptibia ventrally; 4, tarsus and tibia I; 5, tarsus and tibia IV.

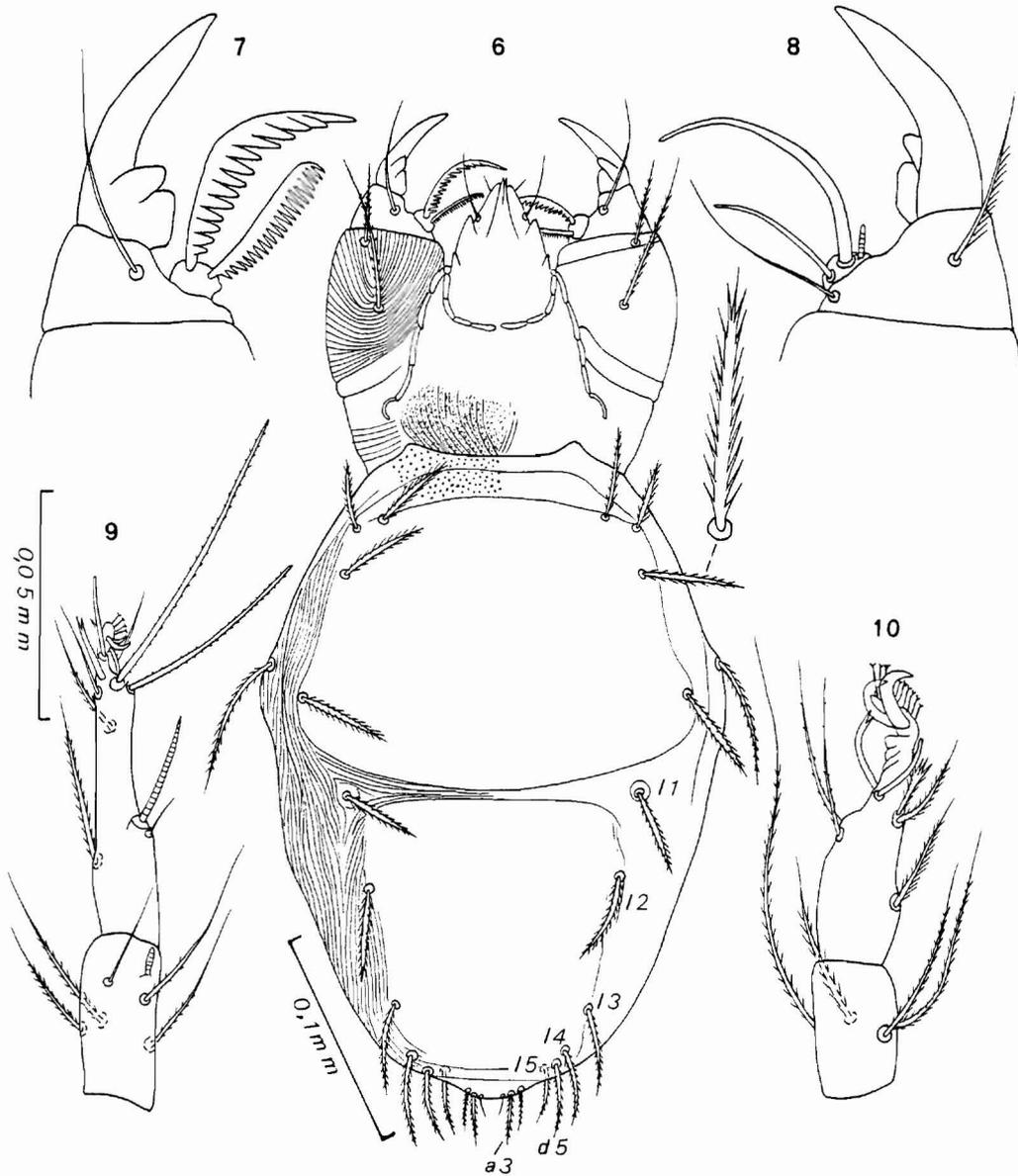
(1 female, coll. M. N. ); Subang Forest Reserve, Selangor 1 & 3. III, 1963 (11 females, coll. R. S. Ratnam; Tanjong Rabok, Klang, Selangor, 22. III, 1971 (1 female); Kampong Pulau Bentong, Balek Pulau, Penang, 21. VIII, 1972 (5 females, coll. B. L. Lim). (3) *Callosciurus prevosti*, Subang Forest Reserve, Selangor, 10-11. III, 1963 (5 females, coll. R. S. Ratnam). (4) *Ratufa bicolor*, Bukit Lagong Forest Reserve, Kepong, Selangor, 12. I, 1970 (4 females, coll. R. S. Ratnam). (5) *Rattus fulvescens*, Gunong Brinchang, 1500 m, Cameron Highlands, Pahang, 17. XII, 1970 (3 females, coll. M. N. ).

*C. fortis* and *C. malaccensis* are not parasitic on vertebrates and their presence on mammals was certainly accidental and resulted from a contamination in the nests of the hosts.

### 3. *Cheyletus malayensis* Cunliffe, 1962

*Cheyletus malayensis* Cunliffe, 1962: 201.

This species belongs to a group characterized by small length of the guard seta of solenidion  $\omega$ I (smaller than this solenidion) and by regular absence of setae *d* 1, *d* 2, *d* 3 and *d* 4. This group is comprized of 4 species. Of these 2 species (*C. malaccensis* and *C. eruditus*) are

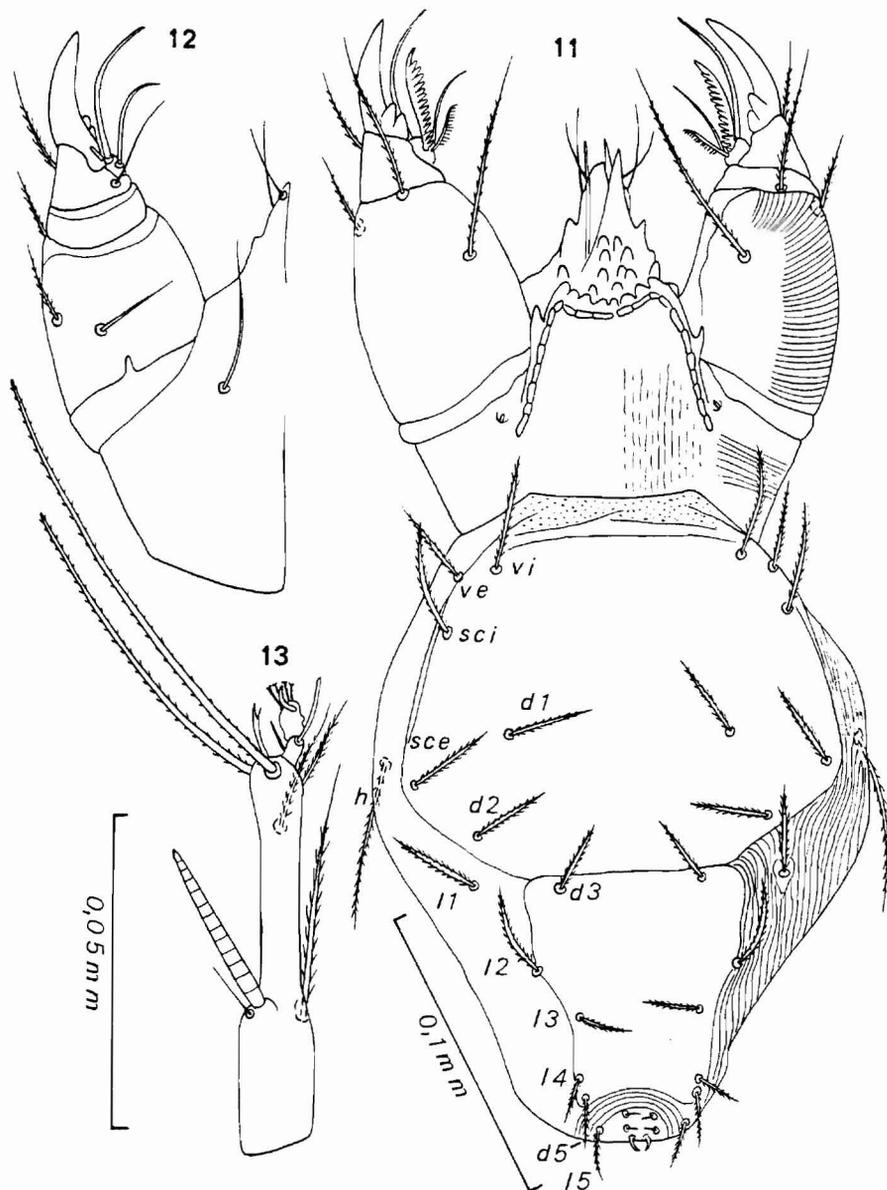


Figs. 6-10: *Cheyletus bidentatus* n. sp. (holotype female)—6, dorsum; 7, palptarsus and palptibia, dorsally; 8, palptarsus and palptibia, ventrally; 9, tarsus and tibia I; 10, tarsus and tibia IV.

commonly found in house dust and 2 are more frequently found on Asiatic birds, mammals or plants in various parts of Asia (*C. fortis*) or from nests of birds in Selangor, Malaysia (*C. malayensis*). We describe hereunder 2 new species belonging to this "malaccensis" group.

**REDESCRIPTION OF CHEYLETUS MALAYENSIS**—We have examined the holotype female of *C. malayensis*. Summers and Price (1970) have redescribed and partly refigured this species. We complete here the measurements of some setae and give a complete figure of the dorsum of the female.

**HOLOTYPE FEMALE** (Figs. 1-5)—Idiosoma 429 long and 345 wide. Total length including gnathosoma 590. Length and width of propodonotal shield 192 x 310 and of hysteronotal shield 168 x 190. These two shields are separated by a few striations. Lengths of setae: *vi* 84, *ve* 78, *sci* 105-112, *sce* 93, *h* 135, *l1* 87, *l2* 96, *l3* 90, *l4* 79, *l5* 66, *d5* 75. Legs: Tarsus I



Figs. 11, 13: *Cheyletus bidentatus* n. sp. (allotype male)—11, dorsum; 12, palp ventrally; 13, tarsus and tibia I.

90 long; solenidion  $\omega$  I 30 long, with a very short guard seta. Number of setae on legs I-IV as in *C. trouessarti* (see Fain, 1979), tibiae I, III and IV bearing very long dorsal setae (105 to 150). Gnathosoma: peritreme with 4 internal and 5-6 external links. Palptibial spine (=claw) with 2 unequal teeth. Palptarsus: external comb with 13-15 teeth, internal comb with 20-21 teeth. Rostrum without lateral projections.

HOST AND LOCALITY—The holotype female was found in the nest (n° 187) of *Mumia atricapilla* (now *Lonchura malacca*), in Rantau Panjang, 5 m. N. of Klang, Selangor, Malaysia, 26. IV. 1960.

#### 4. *Cheyletus bidentatus* nov. spec.

FEMALE (holotype) (Figs. 6-10)—Idiosoma 295 long and 205 wide. Total length including gnathosoma 420. DORSUM—The 2 shields are very large and very close to each

other. Length of setae: *vi* 42, *ve* 27-30, *sci* 45, *sc e* 40, *h* 55-60, *l 1* 36, *l 2* 42, *l 3* 42, *l 4* 39, *l 5* 30, *d 5* 36. Most of this setae flattened and lanceolate. Setae *d 1-d 4* absent. VENTER-Coxal setae as usual, 2-1-2-2, only the anterior coxal III is barbed. LEG CHAETOTAXY—Same number as in *C. trouessarti* (see Fain, 1979). Tarsus I 58 long, with a solenidion  $\omega$  24 long, the latter with a very short and thin guard seta. GNATHOSOMA—Peritreme M-shaped, with 4 internal and 5 external segments; posteroexternal link is strongly bent. The rostrum (apical part of gnathosoma) bears a pair of triangular dorsolateral projections. Palptibial spine (=claw) with 2 unequal basal teeth. External comb with 12-13 teeth; internal comb with 23-26 teeth (in 2 paratypes).

MALE (allotype) (Figs. 11-13)—Idiosoma 210 long, 165 width. Total length 320. Propodonal plate large. Hysteronotal plate distinctly narrowed in its posterior half. Dorsal setae flattened, unequal (18 to 55 long), the longest and the less enlarged is the *h*. The *d 1*, *d 2*, *d 3* and *d 5* are present. Tarsus I 63, with solenidion  $\omega$  30 long. Gnathosoma large; rostrum with 2 lateral projections and numerous dorsal sclerotized nodules. Palptibial claw with 2 basal teeth. Intern comb of palptarsus with 12-13 teeth, external comb with 13 teeth. Peritreme with 11-12 links at each side.

HABITAT—From the nest of *Hylopetes spadicus* n° R86385, Bukit Lanjan Forest Reserve, Selangor, 12. IX. 1970 (holotype and 3 paratype females, allotype and 3 paratype males, 1 nymph paratype) and n° 86800, Segamat, Labis Forest Reserve, Johore, Malaysia, 20. X. 1970 (1 female and 1 male, paratypes).

REMARK—This species is distinguished from other members of the "malaccensis" group, in female by the 2 triangular projections on the rostrum and the small size of the body.

#### 5. *Cheyletus pluridens* nov. spec.

FEMALE (holotype) (Figs. 14-18)—Idiosoma 333 long, 225 wide. Total length 468. Width of propodonal plate 210; length and width of hysteronotal plate 150 x 132. Length of setae: *vi* 54, *ve* 35, *sci* 135, *sc e* 75, *h* 160, *l 1* 60, *l 2* 130-140, *l 3* 130, *l 4* and *d 5* are broken, *l 5* 40. Lengths in a paratype: *l 4* 112, *d 5* 80. Setae *d 1-d 4* absent. Legs: tarsus I 69 long, solenidion  $\omega$  I 24 long, with a much shorter guard seta. Dorsal seta of tibia I, III, IV 85 to 140 long. Number of setae on legs as in *C. trouessarti*. GNATHOSOMA—Peritreme M-shaped, external part with 6 and internal part with 3-4 links. Rostrum without lateral projections. Palptibial spine (=claw) with 5 conical teeth (4 in paratypes). External comb of palptarsus with 16-17 teeth, internal comb with 22-23 teeth.

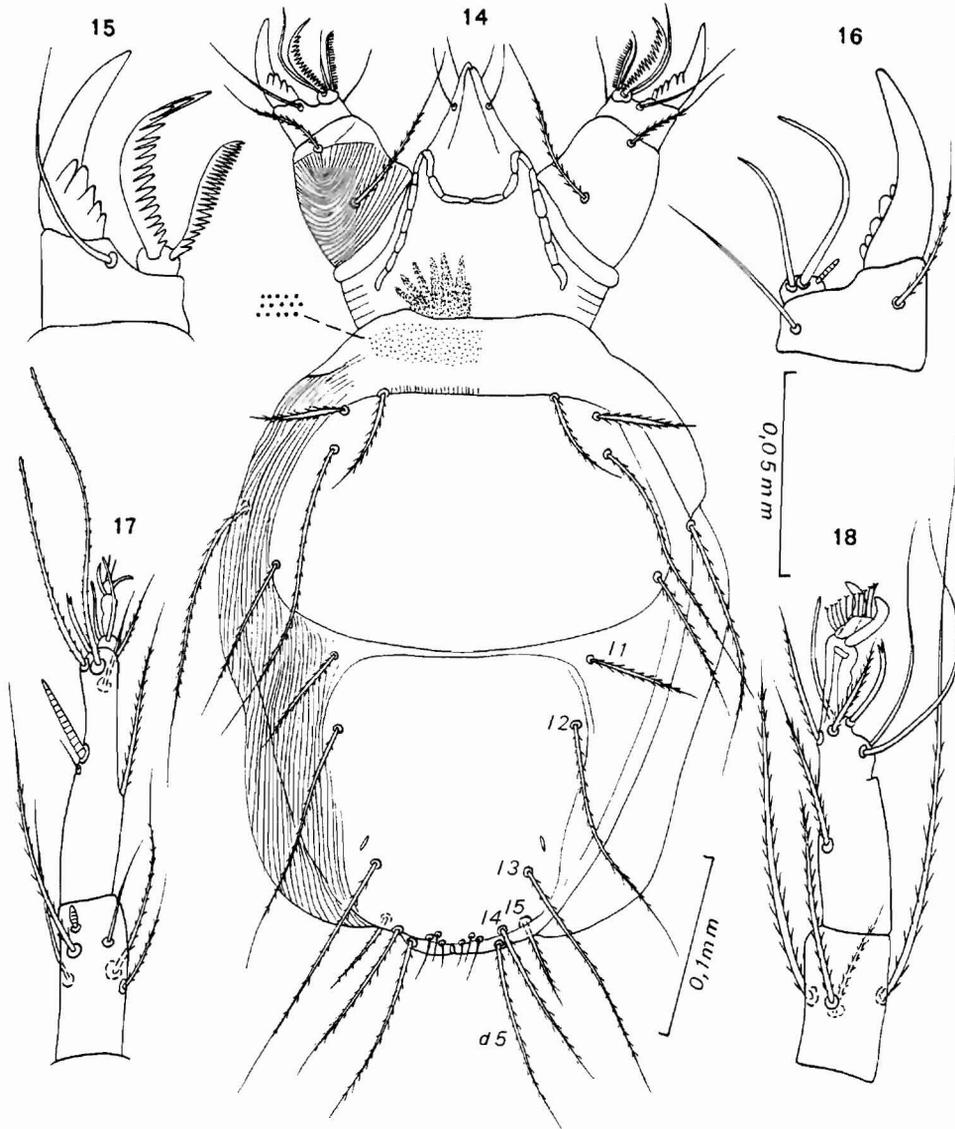
MALE—Unknown.

HABITAT—From *Rhinosciurus laticaudatus*, n° B46.420, Forest, near Kuantan, Pahang, 24. VI. 1957 (holotype female) and n° R 69657, Ulu Langat Forest Reserve, Selangor, Malaysia, 27. II. 1965 (2 paratype females).

REMARK—This species bears a large hysteronotal plate arriving close to the propodonal plate as in *C. malayensis*. It is distinguished from that species as well as from other species of the "malaccensis" group by the presence of 4-5 teeth on palpal claw and the unequal length of the dorsal setae.

#### Key to the females of the "malaccensis" group

1. Hysteronotal plate relatively very large and separated from propodonal plate by a distance much less than length of *l 1* ..... 2
- Hysteronotal plate relatively much smaller and separated from propodonal plate by a distance that exceeds the length of seta *l 1* ..... 4



Figs. 14-18: *Cheyletus pluridens* n. sp. (holotype female)—14, dorsum; 15, palptarsus and palptibia, dorsally; 16, palptarsus and palptibia ventrally; 17, tarsus and tibia I; 18, tarsus and tibia IV.

- 2. Palpal claw (=apical spine of palptibia) with 2 basal teeth. Dorsal setae only slightly unequal ..... 3
- Palpal claw with 4 to 5 basal teeth. Dorsal setae strongly unequal (35 to 160 long) ..... *C. pluridens* n. sp.
- 3. Rostrum (=anterior part of gnathosoma) with a pair of triangular dorsolateral projection. Idiosoma less than 300 long. Dorsal setae 27 to 60 long ..... *C. bidentatus* n. sp.
- Rostrum without projections. Idiosoma 429 long. Dorsal setae 78 to 135 long ..... *C. malayensis* Cunliffe
- 4. Palpal claw with 1 large basal tooth ..... *C. fortis* Oudemans
- Palpal claw with 2 basal teeth ..... 5
- 5. Palpal claw with 2 subequal teeth. Femur IV with 2 setae ..... *C. eruditus* (Schrank)
- Palpal claw with 2 very unequal teeth. Femur IV with 1 seta ..... *C. malaccensis* Oudemans

Genus *Cheletonella* Womersley, 1941*Cheletonella vespertilionis* Womersley, 1941

*Cheletonella vespertilionis* Womersley, 1941: 61 (fig. 7).

This species was described from an unidentified bat at Glan Osmond, South Australia. Summers and Price (1970) collected the same species from bat guano and forest soil in California.

Five female specimens of that species have been collected by M. N. in bat guano, Nurses hostel, Kuala Pilah, Negeri Sembilan, Malaysia, 4. VI. 1979. In our specimens the *sc i* setae are a little more closer to the *ve* setae than in the figures given by Womersley or Summers and Price. The setae *a 2* and *a 3* are forked.

Genus *Hylopecheyla* Fain, 1972

This genus has been created for a single species, *Hylopecheyla bunguranensis* Fain, 1972, parasitic on a sciurid, *Hylopetes everetti* in Bunguran Is., Natunas Islands. Only the male was known until now. A more complete description of the holotype with figures is in press (Fain, 1980).

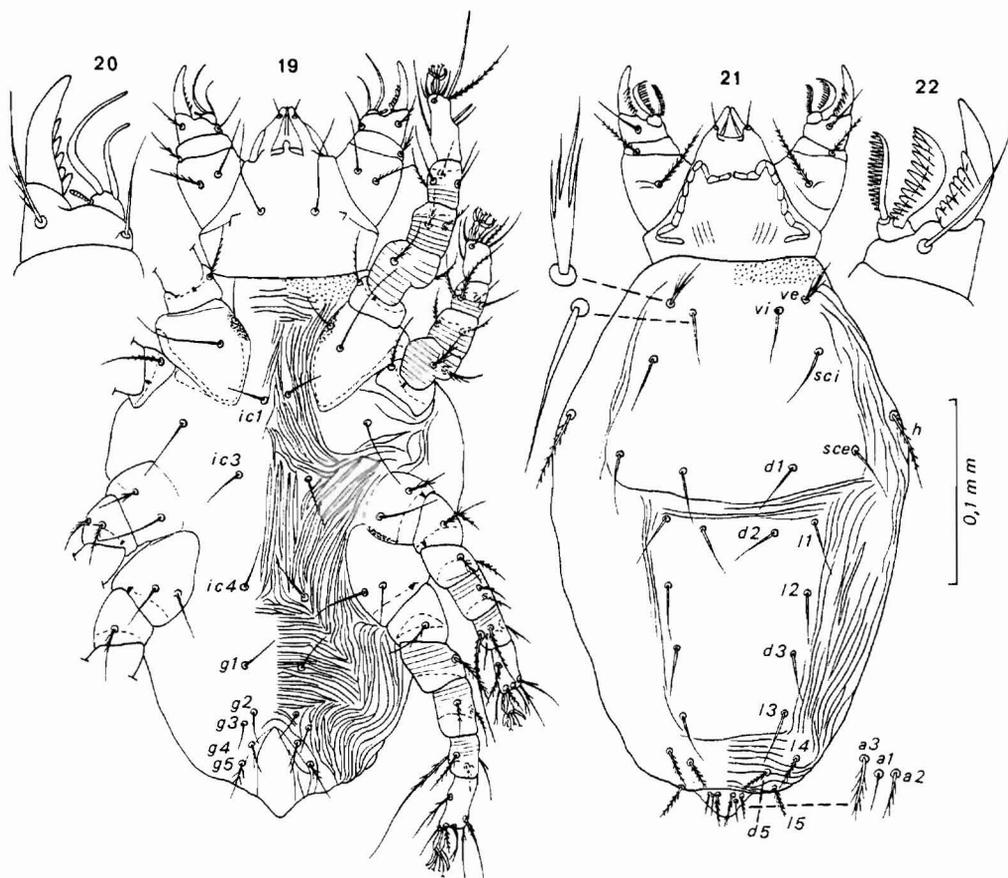
Recently Dr. Lukoschus sent us a male and several females of a cheyletid found on a related host *Hylopetes sagitta* from Java. The male appears conspecific with *H. bunguranensis* and we believe therefore that it belongs to that species or to a closely related species.

From *Tupaia glis*, Malaysia, M. N. found a series of mites, only females, that resemble the females from *Hylopetes sagitta* and apparently belong to the same genus but to another new species that we describe below. These females differ from *H. bunguranensis* by a series of important characters, e. g.: presence of setae *d 1*, *d 2*, *d 3* (absent in *H. bunguranensis*); setae *l 1* are on the hysteronotal plate (off the plate in *H. bunguranensis*); hysteronotal shield longer than wide (wider than long in *H. bunguranensis*); setae *d 5* and *l 5* much shorter.

We can now complete the definition of the genus *Hylopecheyla* by the characters of the female: Presence of two well-developed dorsal plates (propodonotal and hysteronotal). Palptibial apical spine with 4-7 basal teeth. Dorsal setae either smooth or with a few barbs. Ventral and genital chaetotaxy as in genus *Cheyletus*. Dorsal chaetotaxy: *vi*, *ve*, *sc i*, *sc e*, *h*, *l 1-l 5*. *d 5* present; *d 1*, *d 2* and *d 3* either present or absent; *d 4* absent. LEG CHAETOTAXY-Trochanters 1-1-2-1 (all barbed); femora 2-2-2-1; genua 2-2-2-2; tibiae 5-4-4-4; tarsi 9-7-7-7. Solenidiotaxy: tarsi 1-1-0-0; tibiae 1-0-0-0; genua 1-0-0-0. The solenidion of tarsus II is ventral. This genus differs from *Cheyletus* in the female by the much shorter shape of the legs, the shape of the peritremes abruptly bent posteriorly, the posterior migration of *sc e* behind the *h* setae. The male differs by the short aspect of legs, the presence of a chitinous longitudinal sclerotized projection on the dorso-internal surface of the palpfemur, and the presence on the palptibial claw of a series of transverse denticulate ridges.

*Hylopecheyla malayi* nov. spec.

FEMALE (Figs. 19-22)—Idiosoma 295 long and 182 wide. Total length (including gnathosoma in the midline) in holotype 375, in 3 paratypes: 365, 360 and 351. DORSUM-Cuticle in front of propodonotal plate covered with very small rounded nodules. Dorsal setae short (20 to 40), *h* setae the longest. Setae *l 1* situated on hysteronotal plate; *l 5* ventral. VENTER-Anterior region in front of coxae I with small nodules. Gnathosoma 93 wide (at base). Peritremes very long and abruptly bent in their posterior part. Palpfemur short. Palptarsus with internal comb bearing 18-20 narrow teeth and external comb bearing 10-12 larger teeth. Basal teeth in both combs much shorter than more apical ones. Palptibial spine (claw) with 4-7 (average 5) well developed unequal teeth. Legs short, all trochanters with a basal constriction and a dorso-apical swelling. All tarsi end in a pair of claws and a rayed empodium.



Figs. 19-22: *Hylopecheyla malayi* n. sp. (holotype female)—19, venter; 20, palptarsus and palptibia, ventrally; 21, dorsum; 22, palptarsus and palptibia, dorsally.

HOST AND LOCALITY—From *Tupaia glis* n° 600032, Jengka Forest A, Jengka Triangle Felda Scheme, Pahang, Malaysia, 6. II. 1979. Holotype and 11 paratypes females. Holotype in British Museum (Nat. Hist.).

Genus *Chelonotus* Berlese, 1895

*Chelonotus selenirhynchus* Berlese, 1893

*Chelonotus selenirhynchus* Berlese, 1893: 77; Baker, 1949: 311; Domrow, 1960: 456; 1964: 16.

*Chelonotus oudemansi* Baker, 1949: 311.

*Chelonotus ewingi* Baker, 1949: 311.

This species was described from *Baginia tenuis lowii* (= *Sundasciurus lowii*) (Low's little-squirrel) in Borneo. Two other species, *C. oudemansi* and *C. ewingi*, described by Baker (1949) from Celebes squirrels of the genus *Callosciurus* are considered by Domrow (1960) as synonyms. This author has given a new description and new figures of this species based on specimens from *Sundasciurus tenuis* and *C. prevosti*.

These mites are very frequent on squirrels from Malaysia, Borneo and Celebes. They live on the outer side of the ear lobe within a yellowish mass of debris and they produce mange. The number of mites found on each squirrel ranged from 4 to 118 with an average of 36 (total squirrels examined: 68) (Domrow, 1964).

All the specimens examined by Domrow (1964) were females and this author surmised that the species could be parthenogenetic. Another hypothesis is that the males are not parasitic and live in the squirrels' nests.

*C. selenirhynchus* has been found from 7 different host species belonging to the Sciuridae (genera *Callosciurus* and *Lariscus*) and the Insectivora (*Tupaia* and *Crocidura*) (Domrow, 1964).

In Malaysia M. N. found this species from the following hosts: (1) *Sundasciurus hippurus* (2 specimens) (Horse-tailed Squirrel), Subang Forest Reserve, Selangor, 8, II & 21, I 1969 (13 females, coll. R. S. Ratnam). (2) *Sundasciurus tenuis* (Slender Little Squirrel), Bukit Lanjan Forest Reserve, Selangor, 30, VI 1961 (5 females). (3) *Sundasciurus lowii* (2 specimens) (Low's Squirrel), Gunong Benom Forest Reserve, Pahang, 25, II 1967 (55 females). (4) *Lariscus insignis* (Striped Ground Squirrel), Gunong Benom Forest Reserve, Pahang, 25, II 1967 (24 females, coll. M. N.); Tanjong Rabok, Klang, Selangor, 9, III 1971 (12 females, coll. B. L. Lim); Simpang Pentang, Jelevu, Negri Sembilan, 21, II 1973 (12 females, coll. B. L. Lim). (5) *Tupaia glis* (Common Tree Shrew), Jengka Forest A., Jengka Triangle Felda Scheme, Pahang, 6, II 1979 (21 females, coll. J. B. Veera). (6) *Rattus amandalei* (Singapore Rat), Tioman Is., Pahang, 10, IV 1962 (14 females, coll. C. K. Ng). (7) *Rattus surifer* (Red Spiny Rat), Tioman Is., 28, IV 1966 (10 females).

#### Genus *Criokeron* Volgin, 1966

##### *Criokeron quinta* (Domrow & Baker, 1963)

*Nihelia quinta* Domrow & Baker, 1963: 230 (fig. 3).

This species has been described from *Tupaia glis* in Malaya. We have found this species from the same host from Gunong Jerai, 1100 m, Kedan Peak, 28, II 1961 (4 females, coll. M. N.; in logged forest, 18 m. from Kuala Brang, Ulu Trengganu, Trengganu, 12 & 14, IX 1972 (15 females, coll. by M. N. from 3 *Tupaia* specimens).

#### Genus *Thewkachela* Ide and Kethley, 1977

This monotypic genus resembles closely *Muricheyla* Fain, 1972 described from a single species *M. sicista* Fain, 1972, found on the Southern Birch Mouse *Sicista subtilis* (Dipodidae) in Caucasia.

The structure of the palptarsus, the dorsum and the venter are the same. The main difference consists in the presence in *Muricheyla* of three strong conical dorsal processes on tarsi III and IV which are absent in *Thewkachela*.

A third genus belonging to the same group as the two former genera has been described recently. It is distinguished from the latter by the presence of 2 combs on palptarsus (Fain, 1980).

##### *Thewkachela ratufi* Ide & Kethley, 1977

*Thewkachela ratufi* Ide & Kethley, 1977: 259.

This species has been described from *Ratufa affinis* (Sciuridae) in Sabah, (formerly North Borneo) and *R. bicolor* and *R. affinis* in Thailand. As the typical host is also present in Peninsular Malaysia, it is possible that this mite will occur here.

#### ACKNOWLEDGEMENTS

We thank Mr. R. Smiley, U. S. National Museum, Washington and Dr. F. S. Lukoschus, University of Nijmegen, who sent us some of the material utilized in our study. We owe our gratitude to the Director, IMR, Kuala-Lumpur and to the collectors whose names are given above.

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