

Myobiid Mites of the Genus *Acanthophthirius*
(Acarina, Myobiidae) from Japan
(Part 1)

By

Kimito UCHIKAWA

Department of Parasitology, Faculty of Medicine,
Shinshu University, Matsumoto

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Acanthophthirius PERKINS, 1925, so far represented by more than 30 species is the largest genus of bat myobiids. The mites of this genus parasitize mainly bats of the family Vespertilionidae. The specificity of each mite species to a single host species is so strictly defined that the study of *Acanthophthirius* mites brings informations on the phylogenetic relationship among their host bats.

Although only a single anonymous species has been reported from Japan (DUSBÁBEK, 1969 a), some twenty species are expected to occur on bats of the family Vespertilionidae. The author has so far obtained more than ten species of mites of the genus with the aid of Mr. Teruo IRIE, Kumamoto Education Center, Kumamoto, Dr. Satoru KAMEGAI, Meguro Parasitological Museum, Tokyo, Dr. Kishio MAEDA, Gifu Dental College, Gifu, and Miss Mizuko YOSHIYUKI, National Science Museum (Nat. Hist.), Tokyo. With sincere thanks to all these persons, eight species of 3 subgenera known from both the sexes will be presented below.

The author has published a series of reports "Myobiid mites (Acarina, Myobiidae) parasitic on bats in Japan." The present paper, though entitled differently, corresponds to the fourth part in the series.

Genus *Acanthophthirius* PERKINS, 1925

Body elongated. Legs I consisting of five segments (trochanter-tarsus), with a pair of minute terminal claws. Dorsal setae expanded and striated, but not barbed. Setae *vi* situated distinctly posterior to *ve*, and vestigial in male. Vulva with vulvar valves but without genital hooks. Palpal hooks well developed (DUSBÁBEK, 1969 b). Unstriated weak sclerites present symmetrically on venter and some times also on dorsum. Claw formula on legs II–IV: 2–2–2 or 2–1–2 (in male of some species).

FAIN (1972 a, b, 1976) divided the genus into four subgenera mainly basing on male characteristics.

1. *Acanthophthirius (Acanthophthirius) plecotius* (RADFORD, 1938)

The male from Japan is slightly different from European specimens in having much weakly developed intercoxal setae, *ic*₂, though the females from Japan and Europe are quite alike each other. The Japanese mite has, however, been tentatively identified with *A. (A.) plecotius* (RADFORD).

Material examined. 2 ♂♂ 2 ♀♀ ex *Plecotus auritus*, Shimashima-dani, Nagano Prefecture, Japan, 25 March 1977.

2. *Acanthophthirius (Chiromyobia) luzonensis septentrionalis* subsp. nov.

(Figs. 1–2)

Male (Fig. 1). Setal arrangement and nature, and distribution of unstriated sclerites as in Fig. 1 A and B. Setae *sc i* and *d*₁ terminating in blunt tips. Genital plate situated between anterior level of trochanters III and basal level of setae *d*₂, bearing 4 pairs of minute setae, asymmetrically and distally (Fig. 1 C). Integumental protuberances present laterally on coxal regions III and IV. Intercoxal setae *ic*₄ modified into strong spines; *cx I*_{1–2}, *cx II*₄ and *cx IV* fine, and other coxal setae vestigial. Claw formula: 2–1–2; claws on II and IV strongly unequal, and claw on leg III very strong. Trochanter IV with a protuberance anterodistally.

Measurements in microns (holotype and paratype): Body (=idiosoma+gnathosoma) 460–460 long by 230–238 wide; *ve* 156–160; *sc e* 180–200; *sc i* 108–145; *d*₁ 55–60; *d*₂ 183–190; *l*₁ 185–188; *d*₄ 30–34; *d*₅ 25–25; *l*₄ 23–25; *ic*₄ 55–60; *cx I*₁ 8–9; *cx IV* 33–35.

Female (Fig. 2). Setation and setal nature and distribution of unstriated sclerites as in Fig. 2 A and B. Genito-anal region as in Fig. 2 C. Genital setae *g*₁ and *g*₂ subequal in length. A pair of sclerites at midlevel between *ic*₄ and *g*₁. Claw formula: 2–2–2; paired claws on all legs subequal.

Measurements in microns (allotype): Body 508 long by 230 wide; *ve* 128; *vi* 64; *sc e* 155; *sc i* 110; *d*₁ 62; *d*₂ 68; *d*₃ 55; *d*₄ 25; *d*₅ 28; *l*₁ 220; *l*₂ 65; *l*₄ 33; *g*₁ and *g*₂ about 23.

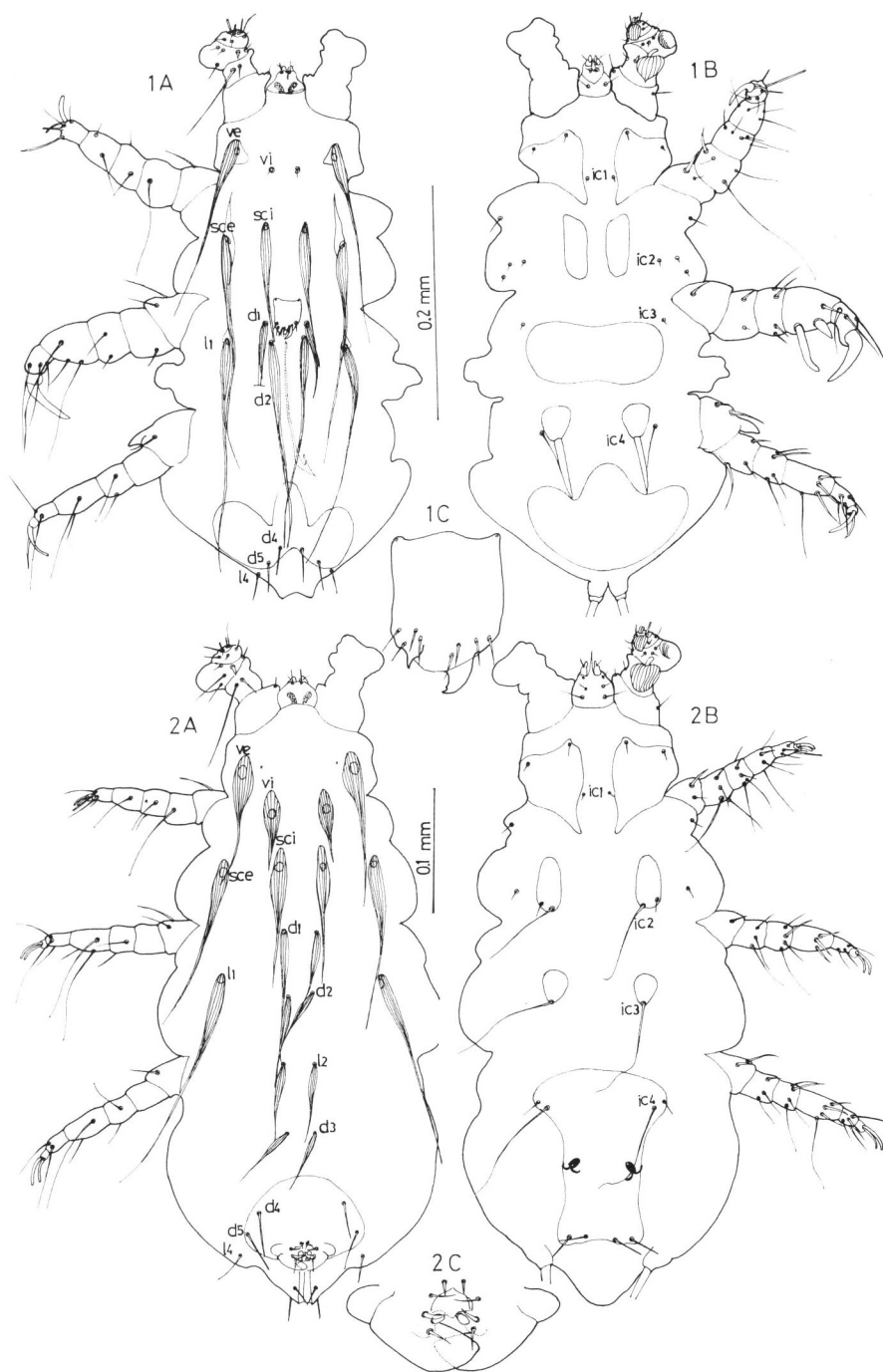
Material examined. Holotype male and a paratype male ex *Pipistrellus abramus*, Toyohashi City, Japan, 17 October 1974; allotype female ex *P. abramus*, Nagoya City, Japan, 8 August 1975.

The holotype male is deposited in the collection of the National Science Museum, Tokyo (NSMT-Ac 9045), and the other specimens in the collection of the author.

Notes. The new subspecies is separable from the nominate form, which was described as a parasite of an unknown bat from Manila, Philippines (WOMERSLEY, 1957), by the bluntly ended setae *sc i* and *d*₁ of the male and subequal genital setae *g*₁ and *g*₂ of the female.

It is probable that unknown host bat of *Acanthophthirius (Chiromyobia) luzonensis*

Figs. 1–2. *Acanthophthirius (Chiromyobia) luzonensis septentrionalis* subsp. nov. — 1. Male; A, dorsum; B, venter; C, genital plate. — 2. Female; A, dorsum; B, venter; C, genito-anal region.



luzonensis WERMASLY is closely allied to but not identical with *Pipistrellus abramus*.

3. *Acanthophthirius (Myotimyobia) hosonoi* sp. nov.

(Figs. 3–4)

Male (Fig. 3). Idiosoma elongate. Setae *sc e* on large sclerites; d_2 stout and spiniform; 3 pairs of dorsal, caudal setae terminating in blunt tips. Penis long and sinuate; genital plate asymmetrical, bearing 3 pairs of minute setae postero-laterally; sheath¹⁾ for penis wide and sickle-like, divided unilaterally (Fig. 3 C). Ventral setae ic_2 and ic_3 long; ic_4 short.

Measurements in microns (holotype and 2 paratypes in parentheses): Body 510 (470–520) long by 195 (170–190) wide; *ve* 128 (117–115); *sc e* 173 (160–160); *sc i* 123 (108–105); d_1 83 (70–90); d_2 88 (88–88); d_4 26 (23–23); d_5 30 (30–25); l_1 190 (170–158); l_4 25 (25–23); ic_2 75 (80–78); ic_3 80 (73–73); ic_4 18 (13–15); *cx* IV 15 (10–10).

Female (Fig. 4). Gnathosoma and legs essentially as in male. Dorsal setae d_4 and d_5 inflated basally. Ventral setae ic_2 – ic_4 long.

Measurements in microns (allotype and paratype): Body 565–605 long by 215–222 wide; *ve* 133–130; *vi* 85–90; *sc e* 193–190; *sc i* 113–113; d_1 103–85; d_2 95–75; d_3 110–93; d_4 65–70; d_5 55–48; l_1 210–205; l_2 100–85; l_4 30–28; ic_2 100–85; ic_3 88–83; ic_4 125–128; *cx* IV 11–15.

Material examined. Holotype male, allotype female and 2 paratype males ex *Myotis hosonoi*, Hakuba Village, Nagano Prefecture, Japan, 23 September 1951; a paratype female ex *M. hosonoi*, Mt. Fuji, Shizuoka Prefecture, Japan, 7 June 1974.

The holotype and allotype are deposited in the collection of the National Science Museum, Tokyo (NSMT–Ac 9043, 9044), and the other specimens in the collection of the author.

Notes. *Acanthophthirius (Myotimyobia) hosonoi* sp. nov. closely resembles *Acanthophthirius (Myotimyobia) klapaleki* (DUSBÁBEK), a parasite of *Myotis myotis*. In the latter mite, the sheath for penis is lacking in the male, and ic_4 of the female is two-thirds to a half as long as that of the new species.

The new species is named after the late Mr. Atsushi HOSONO, an excellent naturalist who greatly contributed toward clarification of the fauna of Japan.

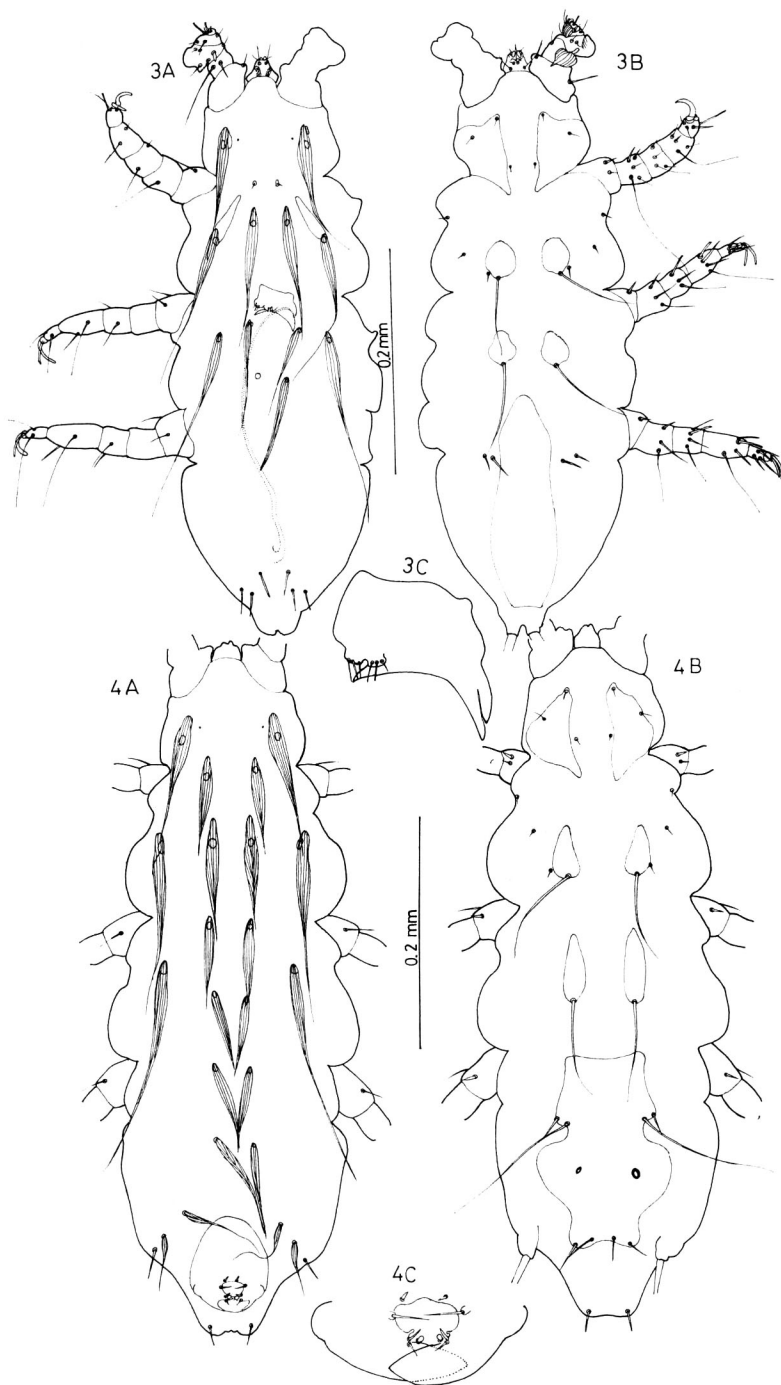
4. *Acanthophthirius (Myotimyobia) spinipes* FAIN, 1976

(Figs. 5, 7)

Male (Fig. 5). Setae *sc e* on large sclerites; *sc i* stout and reaching bases of d_1 ; d_1 stout; d_2 notched apically. Genital plate asymmetrical, bearing 7 setae; sheath

1) FAIN and WHITAKER (1976) adopted the term “sheat for penis”, but the present author modifies it to “sheath for penis”.

Figs. 3–4. *Acanthophthirius (Myotimyobia) hosonoi* sp. nov. — 3. Male; A, dorsum; B, venter; C, genital plate. — 4. Female; A, dorsum; B, venter; C, genito-anal region.



for penis cylindrical, coiled proximally; penis fine and long. Ventral setae ic_2 – ic_4 long. A notched, stout seta each ventrally on trochanters II–IV. Coxal regions I with a pair of hook-like processes postero-laterally.

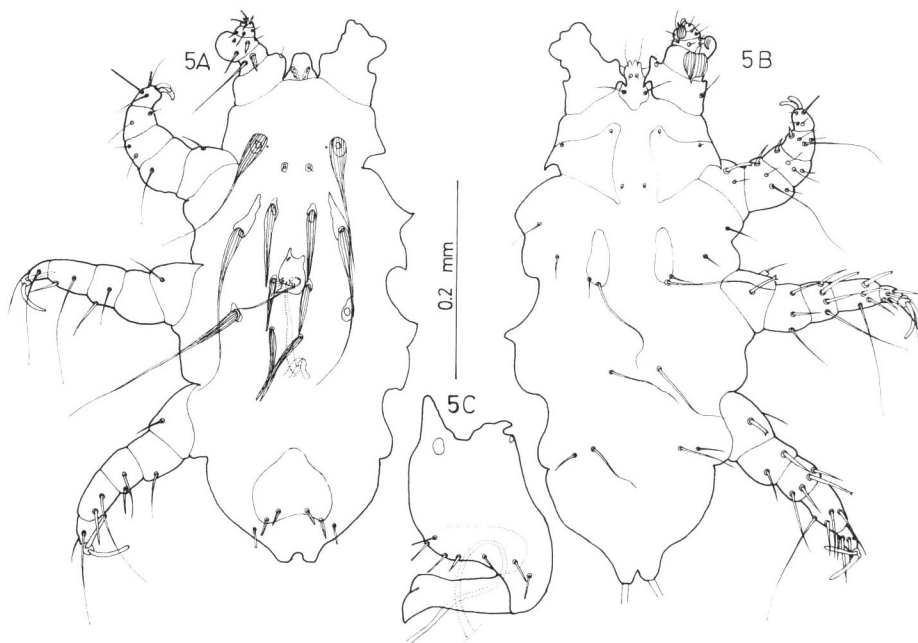


Fig. 5. *Acanthopthirius* (*Myotimyobia*) *spinipes* FAIN; male.

Measurements in microns (plesiotype and another specimen): Body 525–490 long by 235–210; ve 140–153; $sc\ e$ 200–210; $sc\ i$ 80–75; d_1 50–58; d_2 88–103; d_3 22–23; d_4 18–20; l_1 ?–205; l_2 18–18; ic_2 113–120; ic_3 70–80; ic_4 55–65; $cx\ IV$ 23–33; penis about 180.

Female. Claws on leg II short and strongly unequal (Fig. 7 F). Genital setae g_5 – g_7 present (Fig. 7 D).

Measurements in microns (2 specimens): Body 555–580 long by 280–293 wide; ve 138–150; vi 65–70; $sc\ e$ 190–195; $sc\ i$ 68–63; d_1 75–73; d_2 70–73; d_3 60–65; d_4 35–35; d_5 32–30; l_1 220–225; l_2 65–65; l_4 21–20; ic_2 108–105; ic_3 78–80; ic_4 43–48; $cx\ IV$ 20–20; distance between ic_4 and sclerite 35–35; distance between sclerite and g_1 58–70.

Material examined. Plesiotype male and 2 females ex *Myotis macrodactylus*, Zaibu Town, Kagoshima Prefecture, Japan, 3 May 1975; a male ex *M. macrodactylus*, Sayama Village, Kôchi Prefecture, Japan, 1 August 1969; a female ex *M. macrodactylus*, Shimashima-dani, Nagano Prefecture, Japan, 8 June 1977. The plesiotype male is deposited in the collection of the National Science Museum, Tokyo (NSMT-Ac 9048).

Notes. The Japanese female specimens well accord with the description of

Acanthophthirius spinipes FAIN, 1976, which has been known from only the female. As some females of the genus *Acanthophthirius* are often quite alike one another, it was necessary to compare the Japanese specimens with the type of *A. spinipes* FAIN. Dr. FAIN kindly examined both of them, and wrote to the author that any difference was not found among them. Thus, the mite was identified with *A. spinipes* FAIN. And it has been proved that the male of this species shows the characteristics of the subgenus *Myotimyobia* FAIN.

The type host of *A. (M.) spinipes* is *Myotis longipes* from Kashimere. As the mites of the genus *Acanthophthirius* are usually monoxenic, the host bat in Japan, *Myotis macrodactylus*, is considered to be very closely allied to or even identical with *M. longipes*.

5. *Acanthophthirius (Myotimyobia) iriei* sp. nov.

(Figs. 6–7)

Male (Fig. 6). Setae *sc e* on large sclerites; *sc i* stout, not reaching bases of d_1 . Genital plate symmetrical, bearing 4 pairs of setae; penis short and straight. Ventral setae ic_2 – ic_4 long. Legs and gnathosoma essentially as in *Acanthophthirius (Myotimyobia) spinipes* FAIN, but prominent hook-like processes lacking on coxal regions I.

Measurements in microns (holotype and paratype): Body 460–440 long by 200–193 wide; *ve* 130–120; *sc e* 168–160; *sc i* 48–45; d_1 73–78; d_2 84–93; d_4 18–18; d_5 27–23; l_1 185–175; l_4 28–25; ic_2 53–55; ic_3 46–55; ic_4 63–53; *cx* IV 18–15; penis 100–95.

Female (Fig. 7). Setae *sc i* not reaching bases of d_1 . Setae d_1 – d_5 , l_1 , l_2 , and l_5 distinctly longer than those of the preceding species. Ventral setae ic_2 – ic_4 long, ic_2 less than 100 μ long. Paired sclerites lacking on coxal regions IV. Claws on legs II not so strongly unequal.

Measurements in microns (allotype and 2 paratypes in parentheses): Body 554 (540–650) long by 256 (246–260) wide; *ve* 165 (145–155); *vi* 60 (57–60); *sc e* 210 (198–205); *sc i* 63 (63–64); d_1 88 (85–90); d_2 90 (88–85); d_3 95 (89–90); d_4 58 (53–58); d_5 40 (41–47); l_1 230 (235–225); l_2 85 (85–90); l_4 35 (34–35); ic_2 90 (83–78); ic_3 80 (75–80); ic_4 68 (73–70); *cx* IV 23 (22–25).

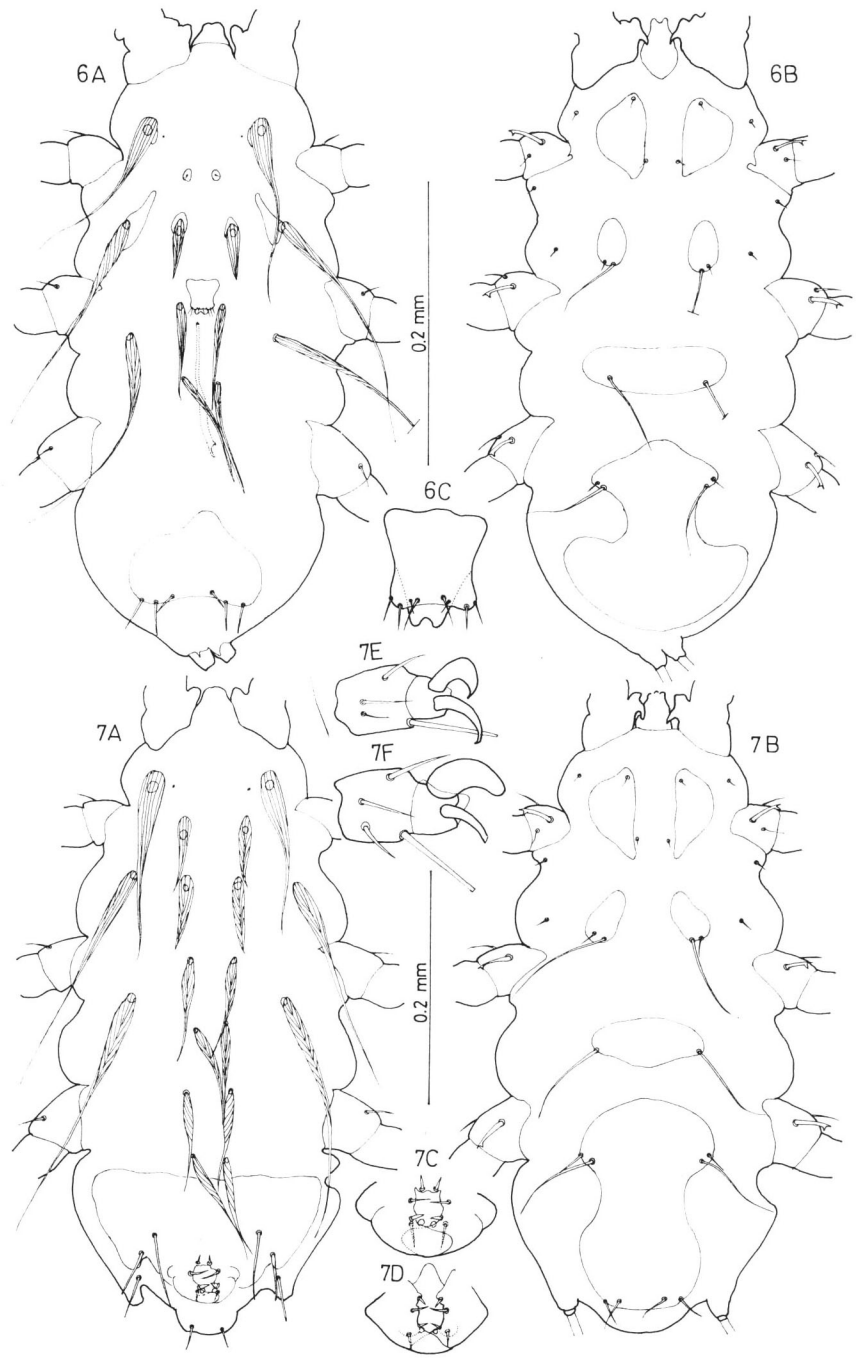
Material examined. Holotype male, allotype female and 2 paratype females ex *Myotis macrodactylus*, Zaibu Town, Kagoshima Prefecture, Japan, 3 May 1975; a

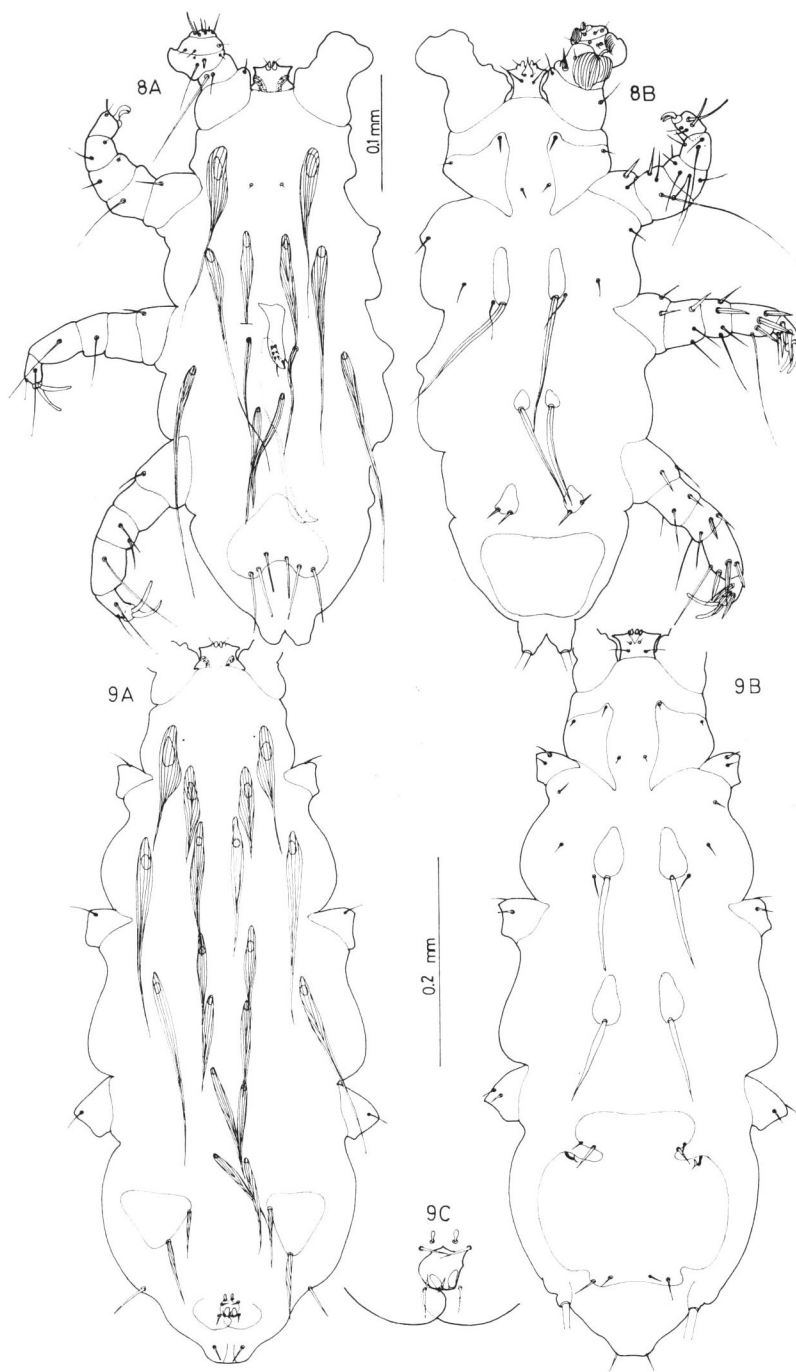
Figs. 6–7 (on page 168). *Acanthophthirius (Myotimyobia) iriei* sp. nov. — 6. Male; A, dorsum; B, venter; C, genital plate. — 7. Female; A, dorsum; B, venter; C, genito-anal region; E, tarsus II. — *Acanthophthirius (Myotimyobia) spinipes* FAIN. 7. Female; D, genito-anal region; F, tarsus II.

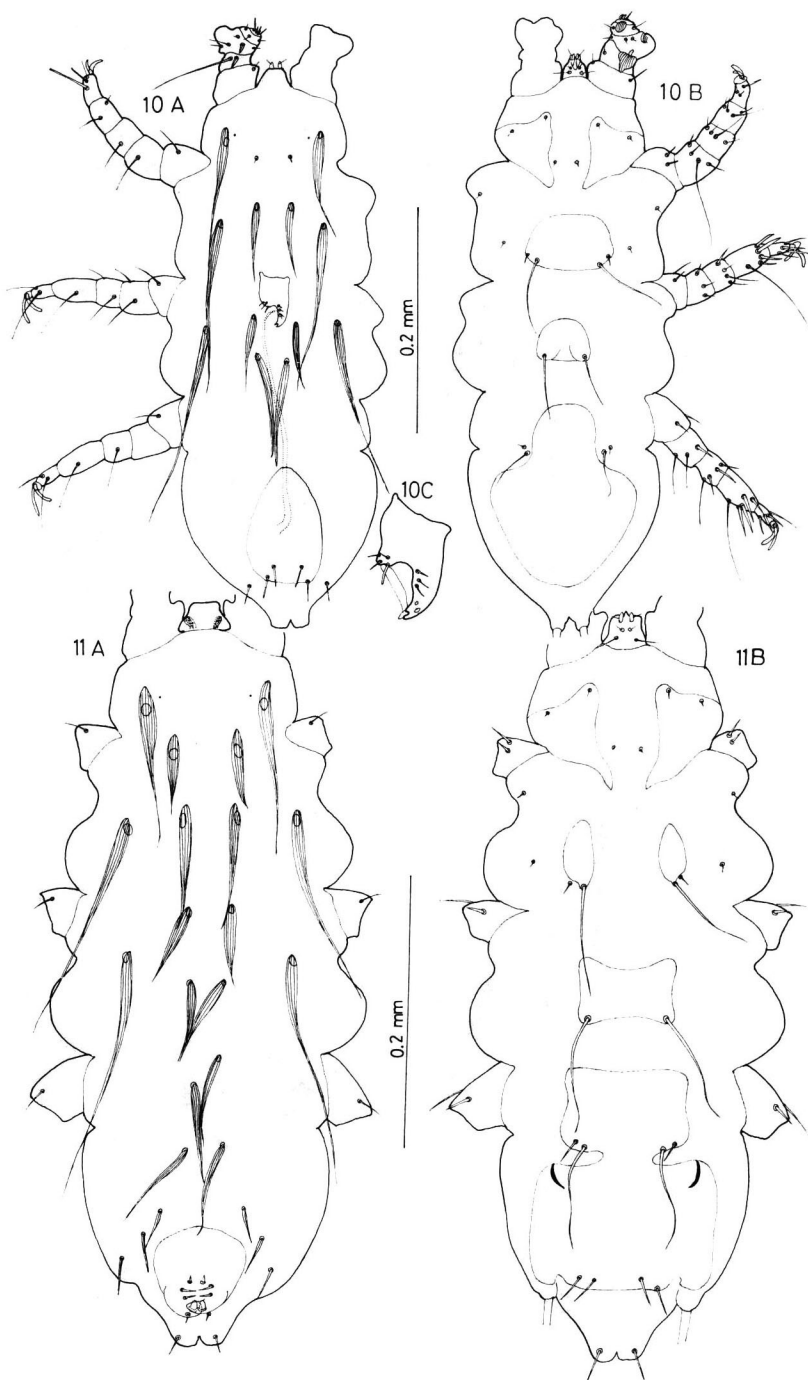
Figs. 8–9 (on page 169). *Acanthophthirius (Myotimyobia) murinus* sp. nov. — 8. Male; A, dorsum; B, venter. — 9. Female; A, dorsum; B, venter; C, genito-anal region.

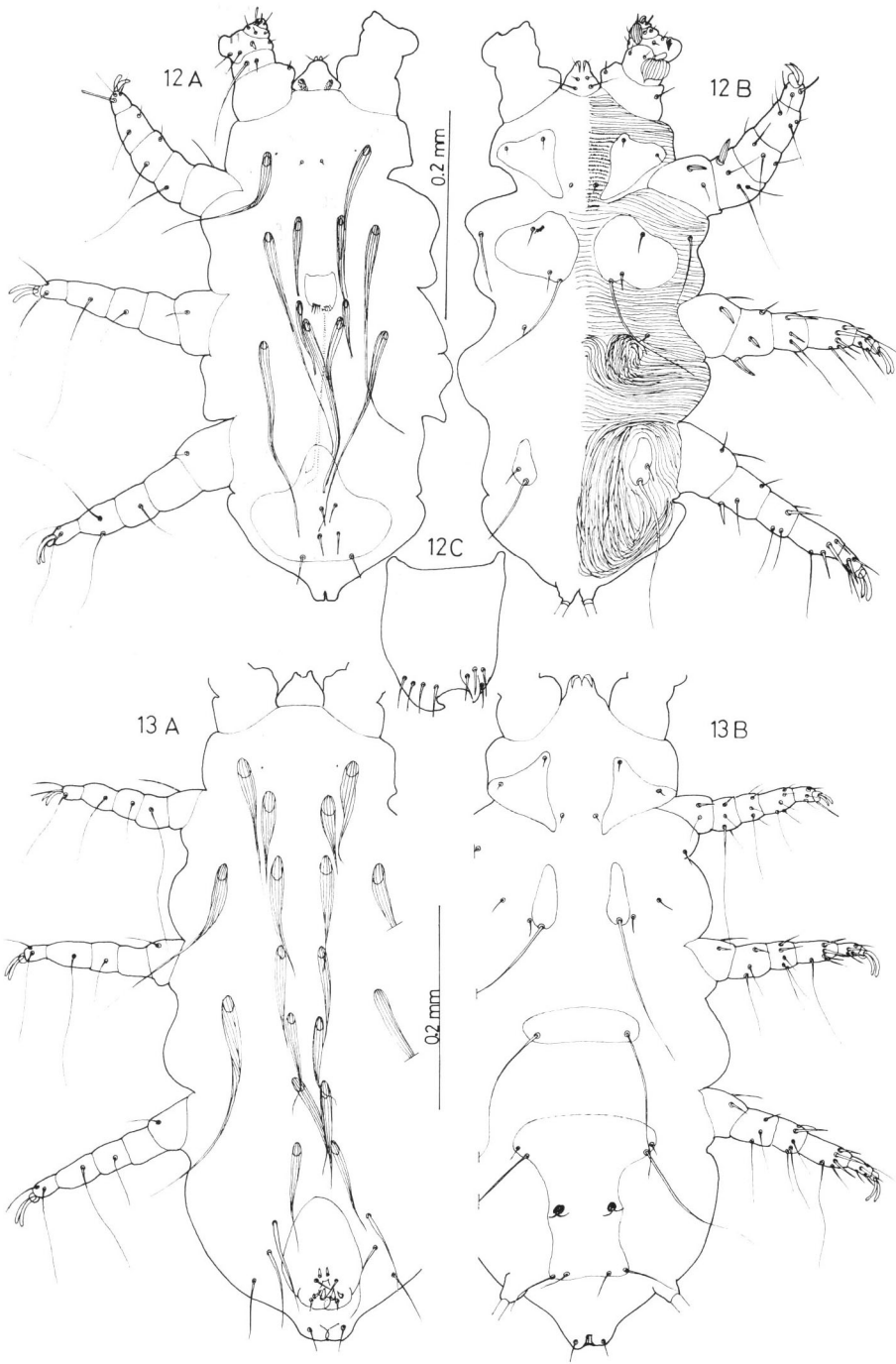
Figs. 10–11 (on page 170). *Acanthophthirius (Myotimyobia) simplex* sp. nov. — 10. Male; A, dorsum; B, venter; C, genital plate. — 11. Female; A, dorsum; B, venter; C, genito-anal region.

Figs. 12–13 (on page 171). *Acanthophthirius (Myotimyobia) vespertilionis* sp. nov. — 12. Male; A, dorsum; B, venter; C, genital plate. — 13. Female; A, dorsum; B, venter.









paratype male ex *M. macrodactylus*, Sayama Village, Kôchi Prefecture, Japan, 1 August 1969. The holotype and allotype are deposited in the collection of the National Science Museum, Tokyo (NSMT-Ac 9046, 9047), and the other specimens in the collection of the author.

Notes. DUSBÁBEK (1969 a) presented *Acanthopthirius* sp. from *Myotis macrodactylus* from Kyoto, Japan. This anonymous species may represent either *A. (M.) spinipes* FAIN or *A. (M.) iriei* sp. nov. These two species are, however, quite different from *A. (M.) caudatus* (BANKS) contrary to the prospect of DUSBÁBEK (1969 a).

6. *Acanthopthirius (Myotimyobia) murinus* sp. nov.

(Figs. 8–9)

Male (Fig. 8). Setae *sc i* long, extending beyond bases of d_1 ; d_2 stronger than d_1 . Penis fine and long; genital plate weakly developed, sack-like distally and bearing 4 pairs of minute setae. Ventral setae ic_2 and ic_3 well developed; *cx* II₁ considerably developed and longer than *cx* II₃. Gnathosoma wide dorsally. A ventral seta on femur I strong and striated.

Measurements in microns (holotype): Body 510 long by 210 wide; *ve* 153; *sc e* 213; *sc i* 105; d_1 88; d_2 105; d_4 35; d_5 43; l_1 203; l_4 44; ic_2 118; ic_3 90; ic_4 15; *cx* II₁ 33; *cx* II₃ 20.

Female (Fig. 9). Setae *ve* and *vi* uniquely swollen and striated. Ventral setae ic_2 and ic_3 spatulate; ic_4 spiniform and striated. A pair of sclerites close to ic_4 . Setae *ai* clavate; g_6 strong; g_7 situated distally on vulvar valve.

Measurements in microns (allotype): Body 680 long by 265 wide; *ve* 125; *vi* 95; *sc e* 198; *sc i* 135; d_1 88; d_2 90; d_3 95; d_4 48; d_5 58; l_1 196; l_2 98; l_4 40; ic_2 90; ic_3 83; ic_4 32.

Material examined. Holotype male and allotype female ex *Murina aurata ussuriensis*, Tega Town, Aomori Prefecture, Japan, 2 May 1959. They are deposited in the collection of the author.

7. *Acanthopthirius (Myotimyobia) simplex* sp. nov.

(Figs. 10–11)

Male (Fig. 10). Dorsal setae rather slender. Penis long; genital plate asymmetrical, bearing 4 and 3 setae laterally; sclerotized sheath for penis prominent. Ventral setae ic_2 – ic_4 long; coxal setae on I to IV coxal regions: 2–3–0–1. One each of extra setae ic_2 and ic_4 on a paratype.

Measurements in microns (holotype and 3 paratypes): Body 510 (500–510) long by 205 (195–205) wide; *ve* 122 (110–121); *sc e* 160 (143–160); *sc i* 80 (65–73); d_1 70 (54–55); d_2 95 (90–95); d_4 23 (23–28); d_5 23 (24–25); l_1 185 (178–185); l_4 20 (20–23); ic_2 70 (75–78); ic_3 55 (53–68); ic_4 45 (45–48).

Female (Fig. 11). Dorsal setae rather slender. Sclerites on coxal regions IV simple and crescent-shaped.

Measurements in microns (allotype and paratype): Body 548–565 long by 238–245 wide; *ve* 130–125; *vi* 65–63; *sc e* 180–160; *sc i* 103–100; *d*₁ 65–78; *d*₂ 75–75; *d*₃ 78–80; *d*₄ 33–35; *d*₅ 30–25; *l*₁ 200–185; *l*₂ 75–78; *l*₄ 33–28; *ic*₂ 85–90; *ic*₃ 95–83; *ic*₄ 70–95.

Material examined. Holotype male, allotype female, 3 paratype males, a paratype female and 3 nymphs ex *Myotis nattereri*, Kinpo Town, Kagoshima Prefecture, Japan, 3 May 1975. The holotype and allotype are deposited in the collection of the National Science Museum, Tokyo (NSMT–Ac 9049, 9050), and the other specimens in the collection of the author.

8. *Acanthophthirius (Myotimyobia) vespertilionis* sp. nov.

(Figs. 12–13)

Male (Fig. 12). Setae *sc i* and *d*₁ notched apically; *ic*₂ and *ic*₄ long, but *ic*₃ minute; *cx* II₃ strong; a ventral seta each on trochanters II–III and femora II–III modified into a spine. Penis short and straight; genital plate asymmetrical, bearing 4 pairs of minute setae. Ventral striation on coxal regions III and IV unique. Claws on leg II subequal. One each of extra setae on trochanter II, coxa I and coxa IV on holotype, and claws on leg II strongly unequal unilaterally on holotype.

Measurements in microns (holotype and paratype): Body 520–535 long by 248–245 wide; *ve* 140–120; *sc e* 195–175; *sc i* 90–90; *d*₁ 58–55; *d*₂ 183–170; *d*₄ 28–23; *l*₁ 205–?; *l*₄ 23–23; *ic*₂ 160–170; *ic*₃ 10–7; *ic*₄ 185–175; *cx* II₃ 48–45; penis 145–140.

Female (Fig. 13). Setae *d*₄, *d*₅ and *l*₄ fine and long; *ic*₂–*ic*₄ long; leg setae fine and long, and lacking spines on trochanters and femora II and III.

Measurements in microns (allotype and 5 specimens in parentheses): Body 680 (642–658) long by 312 (273–295) wide; *ve* 128 (110–130); *vi* 83 (73–110); *sc e* 198 (188–203); *sc i* 115 (110–128); *d*₁ 100 (80–103); *d*₂ 98 (85–110); *d*₃ 95 (85–95); *d*₄ 70 (75–95); *d*₅ 85 (65–70); *l*₁ 223 (205–233); *l*₂ 102 (80–90); *l*₄ 60 (55–78).

Material examined. Holotype male, allotype female, a paratype male, 5 paratype females, 7 females and a nymph ex *Vespertilio superans*, Tenma-bayashi Village, Aomori Prefecture, Japan, 19 June 1977. A male, 7 females and 4 nymphs ex *V. superans*, Aomori Prefecture, Japan, date uncertain. The holotype and allotype are deposited in the collection of the National Science Museum, Tokyo (NSMT–Ac 9051, 9052), and the other specimens in the collection of the author.

References

- DUSBÁBEK, F., 1969 a. To the phylogeny of genera of the family Myobiidae (Acarina). *Acarologia*, **11**: 537–574.
 — 1969 b. Generic revision of the myobiid mites (Acarina: Myobiidae) parasitic on bats. *Folia parasitol., Praha*, **16**: 1–17.
 FAIN, A., 1972 a. Diagnoses de nouveaux Myobiidae (Acarina: Trombidiformes). *Rev. Zool. Bot. Afr.*, **86**: 148–157.
 — 1972 b. Nouveaux acariens parasites (Sarcoptiformes et Trombidiformes). *Bull. Ann. Soc.*

- R. Belg. Ent.*, **108**: 242–252.
- FAIN, A., 1976. Notes sur des Myobiidae parasites de rongeurs, d'insectivores et de chiroptères (Acarina: Prostigmata). *Acta zool. pathol. Antverpiensia*, **64**: 3–32.
- WOMERSLEY, H., 1957. New genera and species of Acarina from bats from New Guinea, Philippines and Australia. *Trans. Roy. Soc. S. Austr.*, **80**: 67–72.