

NEW SPECIES AND RECORDS OF FUR MITES (ACARI: ASTIGMATA: ATOPOMELIDAE) FROM SOUTHEAST ASIAN RODENTS (RODENTIA: MURIDAE)

НОВЫЕ ВИДЫ И НОВЫЕ НАХОДКИ ПАРАЗИТИЧЕСКИХ КЛЕЩЕЙ (ACARI: ASTIGMATA: ATOPOMELIDAE) НА ГРЫЗУНАХ (RODENTIA: MURIDAE) В ЮГО-ВОСТОЧНОЙ АЗИИ

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ABSTRACT

Field collections of murid rodents in southwestern Borneo, supplemented by examination of museum specimens from various southeast Asian localities, yielded four new and eleven previously described species of fur mites of the genus *Listrophoroides* Hirst (Acari: Astigmata: Atopomelidae). The following associations are reported: *Listrophoroides (Listrophoroides) cremoriventer* Fain ex *Niviventer cremoriventer* from West Malaysia and Borneo; *L. (L.) ptilocercus* Fain ex *Sundamys muelleri* from Borneo; *L. (L.) rapit* sp.n. ex *Niviventer rapit*, *L. (L.) borneoensis* Fain ex *S. muelleri*, *L. (L.) pahangi* Fain ex *Leopoldamys sabanus*, and *L. (L.) brachypyx* Fain ex *Rattus tiomanicus*, all from Borneo; *L. (L.) bowersi* Fain ex *Dacnomys millardi* from N. Vietnam; *L. (Marquesania) cucullatus* (Trouessart) ex *Rattus tanezumi diardii* and *R. tiomanicus*, *L. (M.) lativentris* Fain and *L. (M.) sculpturatus* Fain, Nadchatram et Lukoschus ex *S. muelleri*, all from Borneo; *L. (M.) echiothrix* sp.n. ex *Echiothrix centrosa*, *L. (M.) interpolatus* Fain ex *M. dollmani*, *M. hellwaldii*, and *Maxomys* sp. from Sulawesi; *L. (M.) lenothrix* sp.n. and *L. (M.) pseudolativentris* sp.n. ex *Lenothrix canus* from West Malaysia; and *L. (Paklistrophoroides) scutalis* Fain ex *Leopoldamys edwardsi* from China and Laos.

РЕЗЮМЕ

Четыре новых и 11 известных видов паразитических клещей рода *Listrophoroides*

Hirst (Acari: Astigmata: Atopomelidae) зарегистрированы на грызунах подсем. Murinae (Rodentia: Muridae:) в Юго-Восточной Азии: *Listrophoroides (Listrophoroides) cremoriventer* Fain с *Niviventer cremoriventer* из Западной Малазии и Борнео; *L. (L.) ptilocercus* Fain с *Sundamys muelleri* с Борнео; *L. (L.) rapit* sp.n. с *Niviventer rapit*, *L. (L.) borneoensis* Fain с *S. muelleri*, *L. (L.) pahangi* Fain с *Leopoldamys sabanus*, and *L. (L.) brachypyx* Fain с *Rattus tiomanicus* – все с Борнео; *L. (L.) bowersi* Fain с *Dacnomys millardi* из Сев. Вьетнама; *L. (Marquesania) cucullatus* (Trouessart) с *Rattus tanezumi diardii* и *R. tiomanicus*, *L. (M.) lativentris* Fain и *L. (M.) sculpturatus* Fain, Nadchatram et Lukoschus с *S. muelleri* – все с Борнео; *L. (M.) echiothrix* sp.n. с *Echiothrix centrosa*, *L. (M.) interpolatus* Fain с *M. dollmani*, *M. hellwaldii* и *Maxomys* sp. с Сулавези; *L. (M.) lenothrix* sp.n. и *L. (M.) pseudolativentris* sp.n. с *Lenothrix canus* из Восточной Малазии, и *L. (Paklistrophoroides) scutalis* Fain с *Leopoldamys edwardsi* из Китая и Лаоса.

INTRODUCTION

The family Atopomelidae includes 47 genera and more than 370 species of permanent mono- or oligoxenous parasites inhabiting the fur of small mammals [OConnor, 1982; Bochkov, Fain, 2003; Fain, Bochkov, 2003]. These mites are largely limited in their distribution to tropical or subtropi-

cal climatic zones. There are five main centers of atopomelid biodiversity that differ dramatically from each other in the composition of their super-specific taxa: mainland Africa, Madagascar, Southeast Asia, Australia-Oceania, and the Neotropical region. The atopomelid fauna of Southeast Asia is represented by two genera, *Atopomelus* Trouessart, 1918 and *Listrophoroides* Hirst, 1923. The genus *Atopomelus* includes five species associated with eulipotyphlan mammals of the families Erinaceidae, Soricidae and Talpidae [Bochkov et al., in press]. The large genus *Listrophoroides* consists of 17 subgenera, only three of which occur in Southeast Asia: *Listrophoroides* s.str.; *Marquesania* Womersley, 1943; and *Paklistrophoroides* Fain et Hyland, 1980 [Fain, 1981]. The subgenus *Listrophoroides* includes 38 species, most of which parasitize Asian (35 mite species) and African (2 species) murine rodents (Rodentia: Muridae: Murinae) [Fain, 1972, 1981; Bochkov, Mironov, 2001]. The only exception is the type species of this subgenus, *Listrophoroides* (*L.*) *aethiopicus* Hirst, 1923, which parasitizes *Cricetomys gambianus* Waterhouse, 1840, an African representative of the murid subfamily Cricetomyinae [Fain, 1972]. The subgenus *Marquesania* was revised by Bochkov and Fain [2003] to include 13 species largely restricted to oriental murines. The single species, *Listrophoroides* (*M.*) *cucullatus* (Trouessart, 1893), associated with species of *Rattus*, has been recorded from other tropical regions in association with introduced commensal rats [Bochkov, Fain, 2003]. The third subgenus, *Paklistrophoroides*, includes four species associated with South Asian murines [Fain, 1981].

Most of the atopomelid genera or subgenera are associated with particular host groups. Therefore, investigation of the atopomelid fauna of Southeast Asia could help to reconstruct the processes of vicariance or dispersal of their primary hosts (murine rodents) from Indochina to islands of the Sunda shelf, Oceania and Australia and provide indirect data on the host phylogeny.

In this paper we describe four new species of the genus *Listrophoroides* from Southeast Asian murines and give new host and locality records for eleven previously described species. The complex of species of *Listrophoroides* (s. s.) associated with species of *Maxomys* is diverse and complicated and will be the subject of a separate study. Similarly, a study of the fauna associated with the complex of endemic murine rodents of the Philippine archipelago will be reported separately.

MATERIAL AND METHODS

Most of the specimens examined in this study were collected by one of us (AJG) in conjunction with field studies of the small mammal fauna of southwestern Borneo (West Kalimantan, Indonesia) in 1998–1999 and 2000. Hosts were trapped along elevational gradients in relatively undisturbed forest or montane grassland on Mt. Baka (Bukit Baka-Bukit Raya National Park), Mt. Panti (Gunung Palung National Park), and a small island, Karimata (Karimata Nature Reserve), located approximately 80 km from the West Kalimantan mainland. Host specimens were wrapped in cheesecloth, fixed in formalin, and later transferred to 70% ethanol. Specimens were unwrapped in the laboratory of BMOC, mites removed, cleared in lactophenol and mounted in Hoyer's medium. These collections were supplemented by specimens collected by AVB and BMOC from dried or fluid preserved host specimens in various institutions. Specimens collected by Guy Musser from central Sulawesi were obtained under the auspices of the Lembaga Ilmu Pengetahuan Indonesia, the Museum Zoologicum Bogoriense, and Archbold Expeditions at the American Museum of Natural History. We also examined type specimens in the collection of Dr. Alex Fain (Institut royal des Sciences naturelles de Belgique, Brussels, Belgium). Collection locality information is taken from the original host data. In the descriptions below, idiosomal chaetotaxy follows Griffiths et al. [1990]. All measurements are given in micrometers (mm) and are reported as follows: body length = total length from the anterior extremity of the gnathosoma to the posterior border of the body; body width = maximum width taken at whatever level it occurs; length of dorsal shields = maximum length, measured in the median line of the shield; length of the posterior legs = length from the most basal point of the trochanter to the apex of the tarsus, excluding pretarsal ambulacrum; length of the tibiotarsus = length from most basal point of this segment to the apex of the tarsus, excluding pretarsal ambulacrum. Names of hosts follow Musser and Carleton [in press]. Specimen depositories and reference numbers are cited using the following abbreviations:

AMNH — American Museum of Natural History, New York, USA

BMOC # — B.M. OConnor reference number

EMEC — Essig Museum of Entomology, University of California, Berkeley, USA

FMNH — Field Museum of Natural History, Chicago, USA

IRSNB — Institut royal des Sciences naturelles de Belgique, Brussels, Belgium

MVZ — Museum of Vertebrate Zoology, University of California, Berkeley, USA

MZB — Museum Zoologicum Bogoriense, Cibinong, Indonesia

NHM — Natural History Museum, London, England

UMMZ — Museum of Zoology, University of Michigan, Ann Arbor, USA

ZISP — Zoological Institute, Russian Academy of Sciences, Saint-Petersburg, Russia

SPECIES ACCOUNTS

Genus *Listrophoroides* Hirst, 1923

Type-species: *Listrophoroides aethiopicus* Hirst, 1923.

Subgenus *Listrophoroides* Hirst, 1923

1. *Listrophoroides (Listrophoroides) rapit* sp.n.

Figs 1, 2.

Diagnosis. In both sexes, dorsal shields covered by distinct granulate ornamentation. Dorso-basal process of femur I indistinct. Coxae III with distinct lines. *Male*. Postgenital shield strongly reduced. Anus situated ventrally. Lateral margins of opisthosomal lobe straight. *Female*. Postscapular shield with pair of well developed scutal organs near to bases of setae *si*. Proximal part of spermatheca sacculiform, sclerites of oviducts hook-like.

Male (Figs 1 A–C). Body 385–400 long (400), 150–160 wide (160) in 10 paratypes. Length and width of gnathosoma subequal. *Dorsum* (Fig. 1A). Prescapular shield rectangular. All shields completely covered by distinct granulated ornamentation. Postscapular shield 90–95 long (90) and 145–155 wide (150). Hysteronotal shield 185–190 long (190). Setae *e1* situated at level of *f2*. Distance *e1–e1* 35–45 (45). Setae *h3* about 25 long. *Venter* (Fig. 1B). Striate membranes of coxae II subequal in sizes to striate membranes of coxae I. Aedeagus cone-like with pair of small lateral projections, about 10 long (Fig. 1C). Postgenital shield strongly reduced. Coxae III with distinct lines. Sclerotized areas of coxae IV without projections and lateral folds. Anus situated ventrally. Setae *ps3* situated at level of anal slit. Anal fold present. Pair of sclerotized patches immediately present behind bases of setae *cxIV*. Opisthosomal lobe with widely rounded median incision and straight lateral margins. *Legs*. Femur

I with indistinct dorso-basal process. Femur IV about 20 wide, 1.7–1.8 times wider than femur III. Legs III and IV about 100 and 125 long, respectively. Tibia-tarsi III and IV subequal in length, about 35. Femur, genu, and tibio-tarsus IV subequal in length, 33–37 long. Solenidia *phi* of legs III and IV about 13 and 30 long, respectively.

Female (Figs 2A, B). Body 440–450 long, 160–170 wide in 10 paratypes. Length and width of gnathosoma subequal. *Dorsum* (Fig. 2A). Prescapular shield rectangular. All shields covered by distinct granulated ornamentation. Postscapular shield 105–110 long, 160–165 wide, bearing pair of well developed scutal organs near to bases of setae *si*. Hysteronotal shield 200–210 long. Distance *e1–e1* 100–105, 1.2–1.3 times longer than distance *e1–e1* posterior margin of hysteronotal shield. Proximal part of spermatheca sacculiform. Sclerites of oviducts hook-like. Spermatheca opened between lateral lobes. *Venter* (Fig. 2B). Striated membranes of coxae II subequal in size to membranes of coxae I. Coxae III with distinct lines. Epygynium weakly developed, arch-like. Setae *ps3* situated below level *e1*. Opisthosoma almost completely covered by unornamented opisthogastric shield. Lateral margins of opisthosoma with scales spreading slightly posterior level of setae *ps3* to level of setae *f2*. *Legs*. Femur I with indistinct dorso-basal process. Legs III and IV 105–110 and 115–120 long, respectively. Solenidia *phi* of legs III and IV about 10 and 4 long, respectively.

Etymology. The species name is derived from the species name of the host and is a noun in apposition.

Type material. Male HOLOTYPE (BMOC 99–0301–083, 1), 6 female paratypes (BMOC 99–0301–083, 2–7) ex *Niviventer rapit* (UMMZ 174433), INDONESIA: West Kalimantan, Singtang, Bukit Baka/Bukit Raya National Park, Mt. Baka, Juoi entry, 1420 m, 21 November 1998, coll. A.J. Gorog (AJG 154); 22 male and 42 female paratypes (BMOC 99–0301–086, 1–64) ex *N. rapit* (UMMZ 174434), same locality, 1310 m, 23 November 1998, coll. A.G. Gorog (AJG 160); 17 male and 7 female paratypes (BMOC 99–0301–089, 1–24) ex *N. rapit* (UMMZ 174435), same locality, 1340 m, 24 November 1998, coll. A.J. Gorog (AJG 164). Holotype in UMMZ, paratypes in UMMZ, MZB, FMNH, IRSNB, and ZISP.

Differential diagnosis. The new species belongs to the species group “*hongkongensis*” established by Fain [1981]. In females of all seven species of this group, including this newly recog-

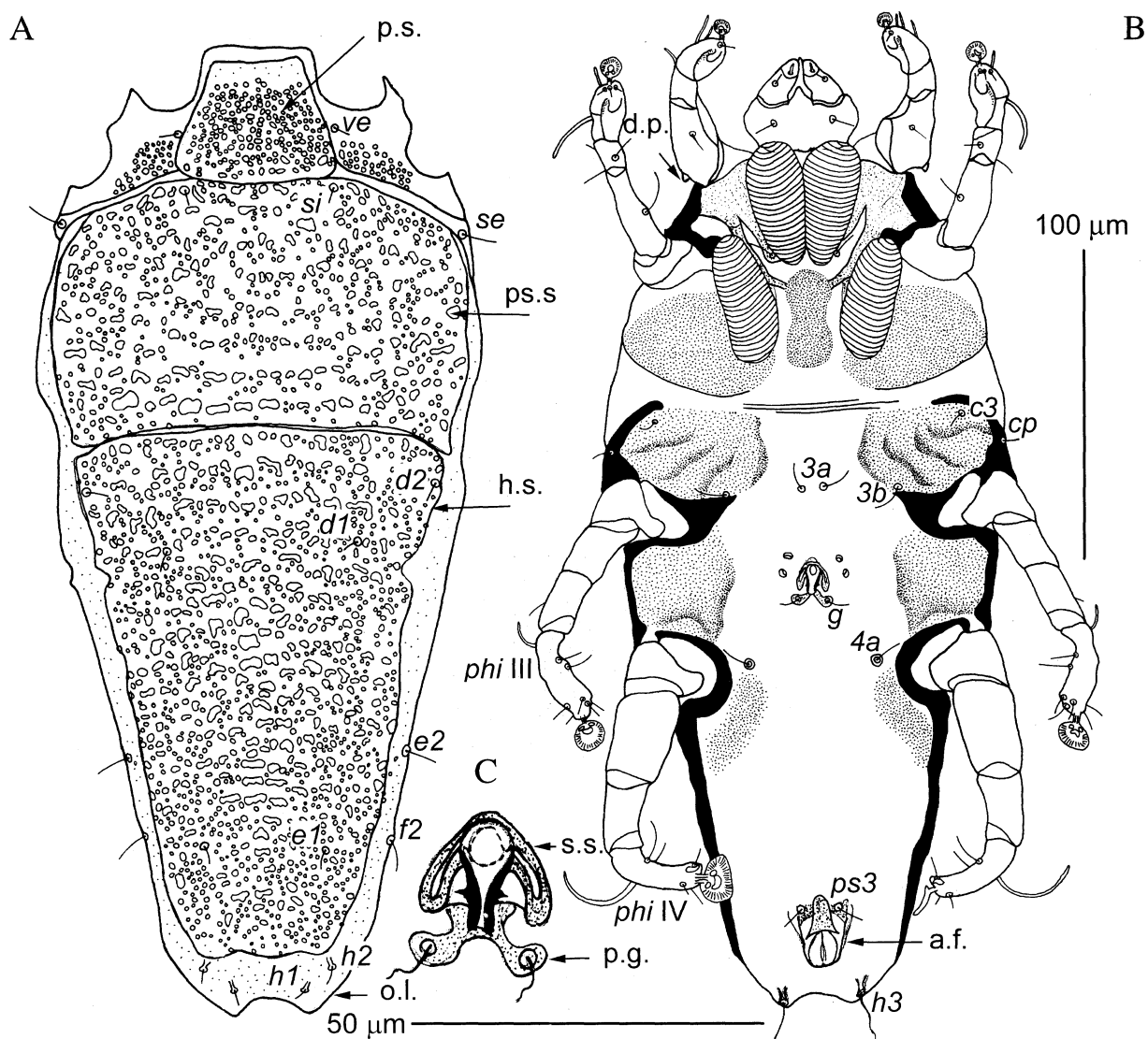


Fig. 1. *Listrophoroides (Listrophoroides) rapit* sp.n., male: A — dorsal view, B — ventral view, C — aedeagus. Abbreviations: a.f. — anal fold, d.p. — dorso-basal process of femur I, o.l. — opisthosomal lobe, h.s. — hysteronotal shield, p.g. — postgenital shield, p.s. — prescapular shield, ps.s. — postscapular shield, s.s. — supporting sclerite of aedeagus.

nized species, the postscapular shield bears a pair of scutal organs; in males, the anus is situated ventrally. The new species clearly differs from all other species of this group in both sexes by the distinctly granulated ornamentation completely covering the dorsal shields.

Host range and distribution. This species is only known from the type series ex *Niviventer rapit* (Bonhote, 1903) from southwest Borneo.

2. *Listrophoroides (Listrophoroides) cremoriventer* Fain, 1976

Listrophoroides hongkongensis cremoriventer Fain, 1976: 59, 1981: 87, fig. 110.

Listrophoroides cremoriventer, Bochkov, Mironov, 2001: 284.

Material examined. Two males and 7 females (BMOC 02-0515-002) ex *Niviventer cremoriventer* (UMMZ 110052), MALAYSIA: Selangor, Kepong, Bukit Lagong, 3° 15' N, 101° 36' E, 16 August 1966, coll. I. Muul; 7 males and 2 females (BMOC 93-0916-009) ex *N. cremoriventer* (FMNH 141364), MALAYSIA: Sabah, Banggi Island, Wak-Wak, 40 m, 10 February 1991, coll. S.M. Nor (SMN 015); 2 males and 3 females (BMOC 99-0301-013) ex *N. cremoriventer* (UMMZ 174430), INDONESIA: West Kalimantan, Ketapang, Gunung Palung National Park, Cabang Panti Research Station, 20 m, 22 August 1998, coll. A.J. Gorog (AJG 027); 1 male and 3 females (BMOC 99-0301-224) ex *N. cremoriv-*

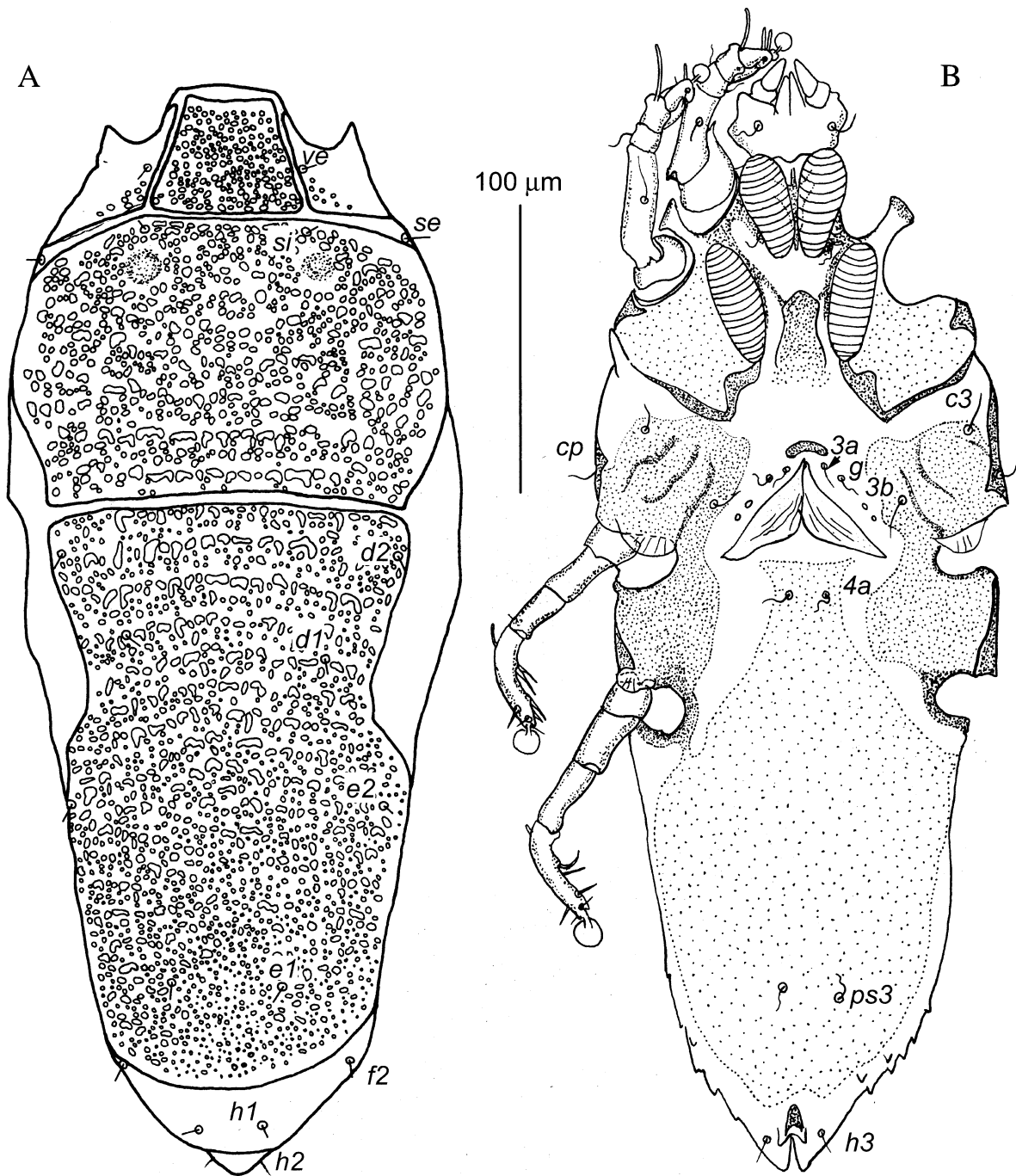


Fig. 2. *Listrophoroides (Listrophoroides) rapit* sp.n., female: A — dorsal view, B — ventral view.

enter (UMMZ 174432), same locality, Sedahan Village, 17 August 1999, coll. A.J. Gorog (AJG 511); 5 males and 2 females (BMOC 99-0301-195) ex *N. cremoriventer* (UMMZ 174431), INDONESIA: West Kalimantan, Sintang, Bukit Baka/Bukit Raya National Park, Mt. Baka, Juoi entry, 330 m, 18 December 1998, coll. A.J. Gorog (AJG 466).

Specimen deposition. Voucher specimens are deposited in UMMZ, FMNH, MZB.

Host range and distribution. This species was described from *Niviventer cremoriventer* (Miller, 1900) from West Malaysia by Fain [1976]. Later on, it was collected from *Niviventer langbianis* (Robinson et Kloss, 1922) in Vietnam [Bochkov and Mironov, 2001].

**3. *Listrophoroides (Listrophoroides) ptilocercus*
Fain, 1970**

Listrophoroides ptilocercus Fain, 1970: 284.

Listrophoroides ptilocercus Fain, 1981: 71, figs 81–84.

Material examined. Two males and 2 females (BMOG 93–0916–018) ex *Sundamys muelleri* (FMNH 141484), MALAYSIA: Sabah, Balambangan Island, Selamat Darat, 30 m, 11 March 1991, coll. S.M. Nor (SMN 247); 4 females (BMOG 93–0916–019) ex *S. muelleri* (FMNH 141485), same locality, 11 March 1991, coll. S.M. Nor (SMN 248); 4 males and 7 females (BMOG 00–1220–038) ex *S. muelleri* (UMMZ 174440), INDONESIA: West Kalimantan, Karimata Island, Karimata Nature Reserve, Air Misang, 10–100 m, 24 May 2000, coll. A.J. Gorog (AJG 603); 8 males and 11 females (BMOG 99–0301–194) ex *S. muelleri* (UMMZ 174436), INDONESIA: West Kalimantan, Sintang, Bukit Baka/Bukit Raya National Park, Mt. Baka, Juoi entry, 330 m, 16 December 1998, coll. A.J. Gorog (AJG 464); 1 female (BMOG 99–0301–200) ex *S. muelleri* (UMMZ 174437), same locality, 23 December 1998, coll. A.J. Gorog (AJG 476).

Specimen deposition. Voucher specimens are deposited in UMMZ, FMNH, MZB.

Host range and distribution. The original description of this species was based on a single male collected from an alcohol-preserved specimen of *Tupaia minor* Günther, 1876 (Scandentia: Tupaiidae) trapped in northern Borneo and housed in NHM [Fain, 1970]. Later it was collected again from several specimens of *Sundamys muelleri* (Jentink, 1879) from several localities in Malaysia [Fain, 1981]. The record from *T. minor* is obviously accidental and the true host of this species is *S. muelleri* [Fain, 1981]. We add here several new records from *S. muelleri* from Balambangan Island and southwest Borneo.

**4. *Listrophoroides (Listrophoroides) borneoensis*
Fain, 1970**

Listrophoroides borneoensis Fain, 1970: 284, 1981: 69, figs 77–80.

Material examined. One male (BMOG 99–0301–194) ex *Sundamys muelleri* (UMMZ 174436) INDONESIA: West Kalimantan, Sintang, Bukit Baka/Bukit Raya National Park, Mt. Baka, Juoi entry, 330 m, 16 December 1998, coll. A.J. Gorog (AJG 464).

Specimen deposition. Voucher specimen deposited in UMMZ.

Host range and distribution. As in the previous case, the original description of this species was based on a single male from an alcohol-preserved specimen of *Tupaia minor* (northern Borneo) housed in NHM [Fain, 1970]. Later it was collected again from several specimens of *S. muelleri* from different localities in Malaysia [Fain, 1981]. This species has also been reported from *Rattus argentiventer* (Robinson et Kloss, 1916) from West Malaysia [Fain, 1981]. We add here a new record from *S. muelleri* from southwest Borneo.

**5. *Listrophoroides (Listrophoroides) pahangi*
Fain, 1974**

Listrophoroides pahangi Fain, 1974: 172, 1981: 81, figs 97–100; Bochkov, Mironov, 2001: 284.

Material examined. Twenty males and 15 females (BMOG 99–0301–084) ex *Leopoldamys sabanus* (UMMZ 174503), INDONESIA: West Kalimantan, Sintang, Bukit Baka/Bukit Raya National Park, Bukit Baka, Juoi entry, 1440 m, 22 November 1998, coll. A.J. Gorog (AJG 156); 8 males and 10 females (BMOG 99–0301–102) ex *L. sabanus* (UMMZ 174506), same locality, 920 m, 5 December 1998, coll. A.J. Gorog (AJG 194); 7 males and 7 females (BMOG 99–0301–188) ex *L. sabanus* (UMMZ 174507), same locality, 560 m, 14 December 1998, coll. A.J. Gorog (AJG 455); 6 males and 6 females (BMOG 99–0301–202) ex *L. sabanus* (UMMZ 174509), same locality, 300–350 m, 25 December 1998, coll. A.J. Gorog (AJG 479); 6 males and 5 females (BMOG 99–0301–081) ex *L. sabanus* (UMMZ 174502), same locality, 1430 m, 20 November 1998, coll. A.J. Gorog (AJG 150); 4 males and 5 females (BMOG 99–0301–199) ex *L. sabanus* (UMMZ 174508), same locality, 300–350 m, 23 December 1998, coll. A.J. Gorog (AJG 474); 6 males and 6 females (BMOG 99–0301–014) ex *L. sabanus* (UMMZ 174497), INDONESIA: West Kalimantan, Ketapang, Gunung Palung National Park, Cabang Panti Research Station, 35–40 m, 25 August 1998, coll. A.J. Gorog (AJG 028); 9 males and 7 females (BMOG 99–0301–045) ex *L. sabanus* (UMMZ 174498), same locality, 585 m, 5 October 1998, coll. A.J. Gorog (AJG 086); 12 males and 5 females (BMOG 99–0301–052) ex *L. sabanus* (UMMZ 174499), same locality, 695 m, 13 October 1998, coll. A.J. Gorog (AJG 100).

Specimen deposition. Voucher specimens are deposited in UMMZ, FMNH, MZB.

Host range and distribution. This species was described from *Leopoldamys sabanus* (Thomas, 1887) from West Malaysia [Fain, 1974]. Later

it was recollected from the type host from North Vietnam, Malaysia, and Thailand, and also from *Leopoldamys edwardsi* (Thomas, 1882) from West Malaysia [Fain, 1981; Bochkov, Mironov, 2001]. We add here several records from the type host from different localities in southwest Borneo.

**6. *Listrophoroides (Listrophoroides) brachypyx*
Fain, 1974**

Listrophoroides brachypyx Fain, 1974: 21, figs 11–12, 1977: 291, 1981: 36, figs 21–22.

Material examined. Two males and 12 females (BMOC 99–0301–217) ex *Rattus tiomanicus* (UMMZ 174448), INDONESIA: West Kalimantan, Ketapang, Gunung Palung National Park, Sedahan Village, 15 August 1999, coll. A.J. Gorog (AJG 503); 7 males and 8 females (BMOC 99–0301–216) ex *R. tiomanicus* (UMMZ 174447), same locality, 15 August 1999, coll. A.J. Gorog (AJG 502); 5 males and 8 females (BMOC 99–0301–215), ex *R. tiomanicus* (UMMZ 174446), same locality, 15 August 1999, A.J. Gorog (AJG 501); 4 males and 4 females (BMOC 99–0301–214), ex *R. tiomanicus* (UMMZ 174445), same locality, 15 August 1999, A.J. Gorog (AJG 500); 5 males and 5 females (BMOC 99–0301–212), ex *R. tiomanicus* (UMMZ 174443), same locality, 15 August 1999, A.J. Gorog (AJG 498); 4 males (BMOC 99–0301–208), ex *R. tiomanicus* (UMMZ 174442), same locality, 14 August 1999, A.J. Gorog (AJG 494); 3 males and 3 females (BMOC 00–1220–021) ex *R. tiomanicus* (UMMZ 174458), INDONESIA: West Kalimantan, Karimata Island, Mt. Cabang, 785 m, 7 May 2000, coll. A.J. Gorog (AJG 558).

Specimen deposition. Voucher specimens are deposited in UMMZ, FMNH, MZB.

Host range and distribution. This species was described originally from a single male collected from an alcohol-preserved specimen of *Melomys platyops* (Thomas, 1906) collected in New Guinea [Fain, 1974]. It has been subsequently recorded from several species of *Rattus*: *R. exulans* from northern Borneo, *R. tiomanicus* (Miller, 1900) from West Malaysia, and *R. mindorensis* (Thomas, 1898) from Mindoro Island in the Philippines [Fain 1981]. The record of *L. brachypyx* from *Melomys platyops* was likely the result of museum contamination, because this species has never been collected again from any species of *Melomys*, despite the thorough investigation of atopomelid mites from New Guinea conducted by Fain [1977]. We think that this

species is specific to oriental species of *Rattus*. We record it from *R. tiomanicus* trapped in different localities in southwest Borneo.

**7. *Listrophoroides (Listrophoroides) bowersi*
Fain, 1979**

Listrophoroides bowersi Fain, 1979: 192, 1981: 92, figs 115–118.

Material examined. Nine males and 27 females (BMOC 99–0510–010) ex *Dacnomys millardi* (MVZ 186520), VIETNAM: Vinh Phuc Prov., Vinh Yen Distr., Tam Dao, 700–1000 m, 21° 27' 14.2"N, 105° 38' 31"E, 8 June 1997, coll. M.D. Matocq (MDM 047); 20 males and 18 females (BMOC 99–0510–011) ex *D. millardi* (MVZ 186496), same locality, 6 June 1997, coll. J.L. Patton (# 16866).

Specimen deposition. Voucher specimens are deposited in UMMZ, EMEC.

Host range and distribution. This species was known only from the type series ex *Berylmys bowersi* (Anderson, 1879) from Vietnam [Fain, 1981]. *Dacnomys millardi* Thomas, 1916 from northern Vietnam is a new host of this species.

Subgenus *Marquesania* Womersley, 1943

Type-species: *Listrophoroides expansus* Ferris, 1932.

**8. *Listrophoroides (Marquesania) cucullatus*
(Trouessart, 1893)**

Listrophorus cucullatus Trouessart, 1893: 699.

Listrophoroides cucullatus, Fain, 1970: 281; Domrow, 1992: 1555.

Listrophoroides (Listrophoroides) cucullatus, Fain, 1972: 10, figs 1–4, 1974: 17.

Listrophoroides (Marquesania) cucullatus, Fain, 1976: 17, 1977: 292, 1979: 142, 1981: 105; Bochkov, Fain 2003: 577, figs 1–6.

Listrophoroides expansus Ferris, 1932: 120; Domrow, 1958: 49, 1962: 297, 1967: 785; Zumpt, 1961: 306; Barrow et al. 1963: 169.

Marquesania expansa var. *expansa*, Womersley, 1943: 15.

Listrophoroides tragardhi Radford, 1940: 101; Domrow, 1958: 50.

Material examined. Three females (BMOC 93–0916–010) ex *Rattus tanezumi diardii* (FMNH 141366), MALAYSIA: Sabah, Banggi Island, Kalangkaman Banggi Peak, 40 m, 1 May 1991, coll. S.M. Nor (SMN 604); 3 males and 5 females (BMOC 99–0301–217) ex *Rattus tiomanicus* (UMMZ 174448), INDONESIA: West Kalimantan, Ketapang, Gunung Palung National Park,

Sedahan Village, 15 August 1999, coll. A.J. Gorog (AJG 503); 1 male and 2 females (BMOC 99-0301-216) ex *R. tiomanicus* (UMMZ 174447), same locality, 15 August 1999, coll. A.J. Gorog (AJG 502); 2 females (BMOC 99-0301-212), ex *R. tiomanicus* (UMMZ 174443), same locality, 15 August 1999, A.J. Gorog (AJG 498).

Specimen deposition. Voucher specimens are deposited in UMMZ, FMNH, MZB.

Host range and distribution. This species was described from *Rattus norvegicus* (Berkenhout, 1769) from an undetermined region of Asia [Trouessart, 1893]. It occurs on the widespread commensal species *R. norvegicus*, *R. rattus* (L., 1758), and *R. tanezumi* Temminck, 1844 but apparently restricted to tropical regions. It is also widely distributed on native species of *Rattus* in the Oriental region and New Guinea: *R. annandalei* (Bonhote, 1903) and *R. argentiventer* from West Malaysia; *R. hoffmanni* (Matschie, 1901) from Sulawesi; *R. tanezumi* Temminck, 1844 (= *mindanensis*) from Hong-Kong, Labuan Island, and southwest Borneo; *R. tiomanicus* (Miller, 1900) from West Malaysia; and *R. xanthurus* (Gray, 1867) from Sulawesi [Fain, 1977, 1981; Bochkov, Fain 2003]. It was also recorded on *Bunomys coelestis* (Thomas, 1896) from Sulawesi [Fain, 1981] and *Melomys platyops* (Thomas, 1906) and *Rattus niobe* (Thomas, 1906) from New Guinea [Bochkov, Fain 2003]. The record of a single male of *L. (M.) cucullatus* from *Apomys insignis* Mearns, 1905 from the Philippines [Bochkov and Fain 2003] needs confirmation. The records of this species from *Rattus exulans* (Peale, 1848) from New Guinea and the Philippines [Fain 1977, 1981; Bochkov, Fain, 2003] actually belong to a new, undescribed species. We add here more records of this species from *R. tanezumi diardii* from Banggi Island and *R. tiomanicus* from southwest Borneo.

**9. *Listrophoroides (Marquesania) lativentris*
Fain, 1981**

Listrophoroides (Marquesania) lativentris Fain, 1981: 108, figs 141-144; Bochkov, Fain, 2003: 594 figs 44-47.

Material examined. Nine males and 5 females (BMOC 93-0916-018) ex *Sundamys muelleri* (FMNH 141484), MALAYSIA: Sabah, Balambangan Island, Selamat Darat, 30 m, 11 March 1991, coll. S.M. Nor (SMN 247); 7 males and 8 females (BMOC 93-0916-019) ex *S. muelleri* (FMNH 141485), same data, coll. S.M. Nor (SMN 248); 9 males and 15 females (BMOC 93-

0916-025) ex *S. muelleri* (FMNH 147146), MALAYSIA: Sabah, Balambangan Island, Kuak Simpol, 50 m, 13 May 1991, coll. S.M. Nor (SMN 706); 1 female (BMOC 99-0301-194) ex *S. muelleri* (UMMZ 174436), INDONESIA: West Kalimantan, Sintang, Bukit Baka/Bukit Raya National Park, Mt. Baka, Juoi entry, 330 m, 16 December 1998, coll. A.J. Gorog (AJG 464); 2 females (BMOC 00-1220-024) ex *S. muelleri* (UMMZ 174439), INDONESIA: West Kalimantan, Karimata Island, Karimata Nature Reserve, Mt. Cabang, 680 m, 13 May 2000, coll. A.J. Gorog (AJG 576); 3 females (BMOC 00-1220-038) ex *S. muelleri* (UMMZ 174440), INDONESIA: West Kalimantan, Karimata Island, Air Misang, 10-100 m, 24 May 2000, coll. A.J. Gorog (AJG 603).

Specimen deposition. Voucher specimens are deposited in UMMZ, FMNH, MZB.

Host range and distribution. This species was previously known only from the original series collected from *Sundamys muelleri* from West Malaysia [Fain, 1981]. We add here several new records from *S. muelleri* from different localities on Balambangan Island and southwest Borneo.

**10. *Listrophoroides (Marquesania) sculpturatus*
Fain, Nadchatram et Lukoschus, 1981**

Listrophoroides (Marquesania) sculpturatus Fain, Nadchatram et Lukoschus, 1981: 111, figs 145-148; Bochkov and Fain, 2003: 596, figs 48-51.

Material examined. Two males and 2 females (BMOC 93-0916-018) ex *Sundamys muelleri* (FMNH 141484), MALAYSIA: Sabah, Balambangan Island, Selamat Darat, 30 m, 11 March 1991, coll. S.M. Nor (SMN 247); 3 males and 4 females (BMOC 00-1220-024) ex *S. muelleri* (UMMZ 174439), INDONESIA: West Kalimantan, Karimata Island, Karimata Nature Reserve, Mt. Cabang, 680 m, 13 May 2000, coll. A.J. Gorog (AJG 576).

Specimen deposition. Voucher specimens are deposited in UMMZ, FMNH, MZB.

Host range and distribution. This species was known only from the original series from *Sundamys muelleri* from West Malaysia [Fain, 1981]. The finding of a single female from an alcohol preserved specimen of *Maxomys panglima* Robinson, 1921 [originally determined as *Maxomys rajah* (Thomas, 1894), NHM specimen n° 94.7.2.66], from Palawan Island [Fain, 1981] is probably the result of museum contamination. We add here two new records from *S. muelleri* from Balambangan Island and southwest Borneo.

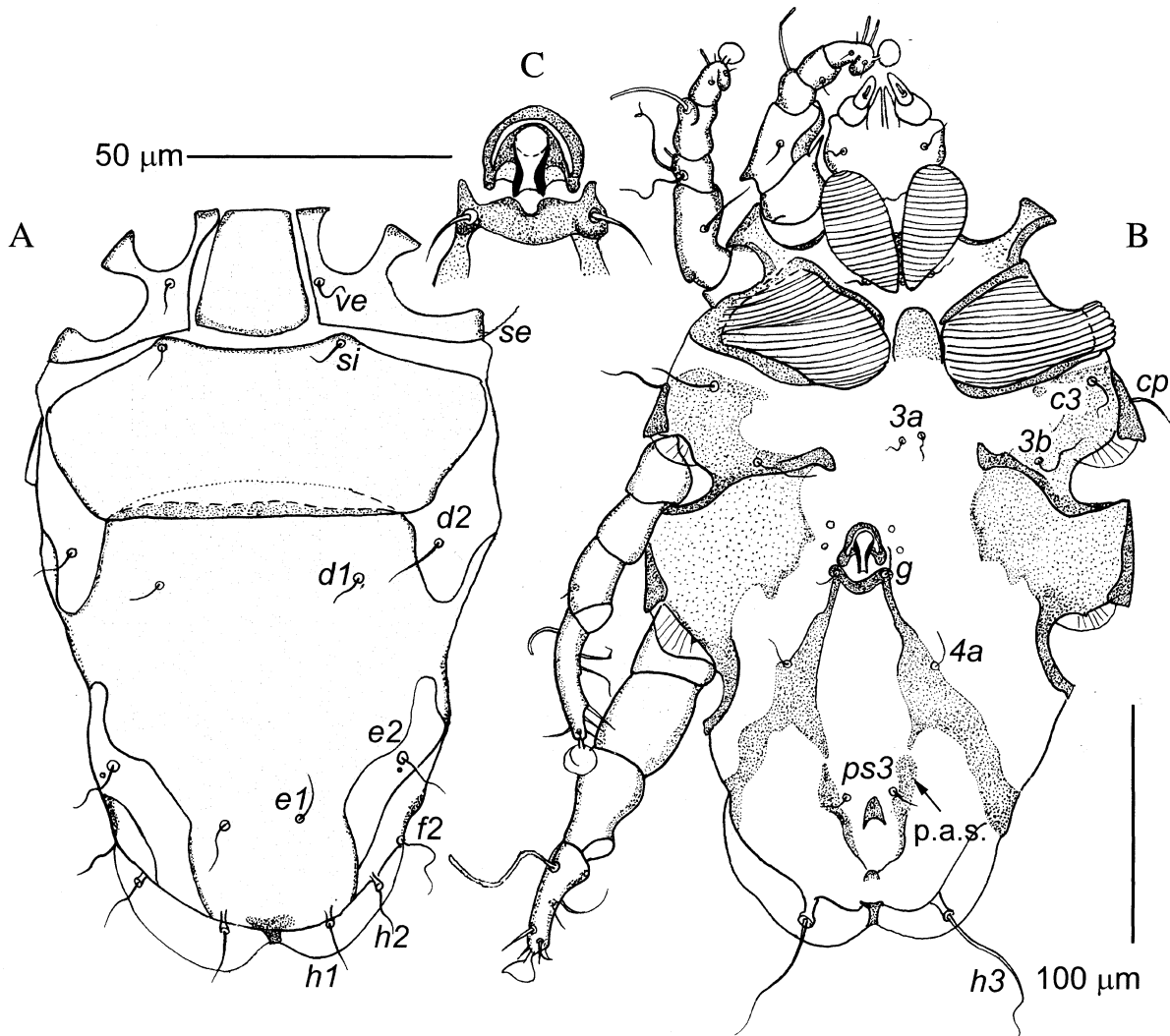


Fig. 3. *Listrophoroides (Marquesania) echiothrix* sp.n., male: A — dorsal view, B — ventral view, C — aedeagus. Abbreviations: p.a.s. — postanal sclerite.

11. *Listrophoroides (Marquesania) echiothrix* sp.n.

Figs 3, 4.

Diagnosis. In both sexes, dorsal shields without ornamentation. Coxae II wide, reaching lateral margins of body. Ventral process of femur I weakly developed, ventral process of genu I not developed. *Male.* Scales behind setae *e2* lacking. Postgenital shield in shape as inverted U. Lateral projections of postgenital shield fused with its median part and with postanal sclerite, their posterior ends reaching level of setae *f2*. Opisthosomal lobe widely rounded. *Female.* Distance *e1–e1* 2 times longer than distance between *e1* and posterior margin of hysteronotal shield. Setae *h3* and *ps3* relatively long, about 60 and 45, respectively.

Male (Figs 3 A, B). Body 350–375 long (370), 195–200 wide (200) in 10 paratypes. Length and width of gnathosoma subequal. *Dorsum* (Fig. 3A).

Dorsal shields without ornamentation. Postscapular shield 75–80 long (75), 175–180 wide (180), antero-lateral apodemes absent. Hysteronotal shield 165–175 long (175). Lateral incisions of hysteronotal shield distinctly developed, 50–55 long (55) and 25–35 wide (35), minimum distance between them 65–70 (70). Setae *e2* situated off hysteronotal shield, soft cuticle behind these setae without scales. Setae *e1* situated on hysteronotal shield, distance *e1–e1* 25–35 (30). Setae *h3* 55–65 long (55). *Venter* (Fig. 3B). Coxae II wide, reaching lateral margins of body. Coxae III without lines. Aedeagus cone-like, about 9 long (Fig. 3C). Supporting sclerite of aedeagus with fused anterior ends. Postgenital shield in form of inverted U. Lateral projections of postgenital shield fused with its median part and with postanal sclerite, posterior ends of these projections are reaching lateral margins of idiosoma at level of setae *f2*, about 120 long. Opisthosomal lobe

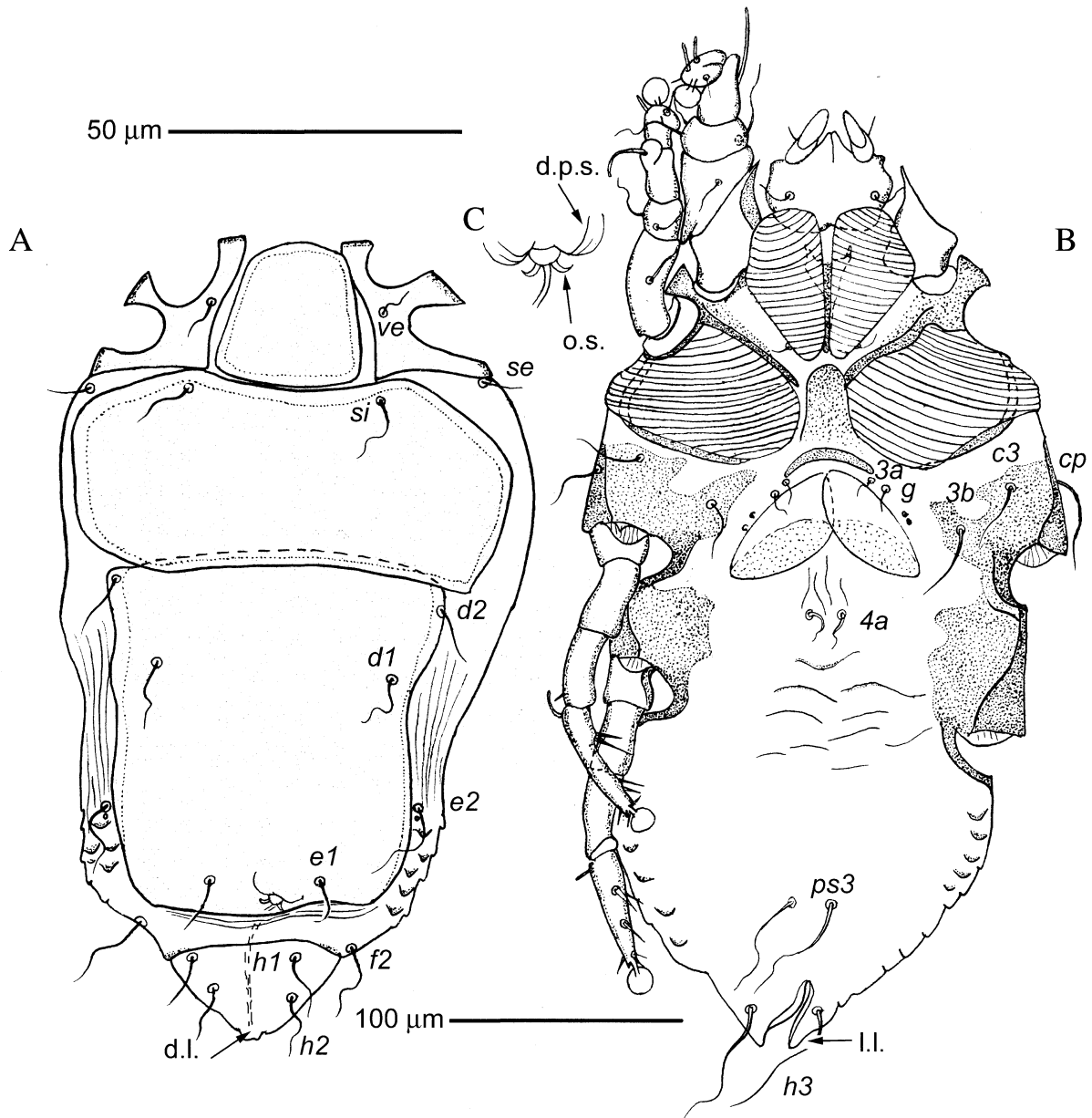


Fig. 4. *Listrophoroides (Marquesania) echiiothrix* sp.n., female: A — dorsal view, B — ventral view, C — spermatheca. Abbreviations: d.l. — dorsal lobe of opisthosoma, d.p.s. — distal part of spermatheca, l.l. — lateral lobes of opisthosoma, o.s. — oviduct of spermatheca.

with widely rounded lateral margins, median incision widely rounded. *Legs*. Femur I with weakly developed ventral process, dorso-basal process distinct. Genu I without ventral process. Femur IV about 30 wide, 2 times wider than femur III (15). Legs III and IV 130–135 (135) and 150–155 long (155), respectively. Tibio-tarsi III and IV 48–55 (50) and 45–50 long (47), respectively. Solenidia *phi* III and IV about 10 and 45 long, respectively.

Female (Figs 4 A–C). Body 380–390 long, 200–210 wide in 10 paratypes. Length and width of gnathosoma subequal. *Dorsum* (Fig. 4A). Dorsal

shields without ornamentation. Postscapular shield 85–90 long, 200–210 wide, antero-lateral apodemes absent. Hysteronotal shield 145–150 long. Width of this shield at level of setae *e1–e1* 115–130. Setae *d1* situated off this shield. Distance *e1–e1* 55–60, 2. times longer than distance *e1*–posterior margin of hysteronotal shield, 24–26. Setae *e2* and *f2* about 25 and 30, respectively. *Venter* (Fig. 4B). Striated membranes of coxae II wide, reaching lateral margins of body. Coxae III without lines. Lateral parts of opisthosoma with few lateral scales behind level of setae *e2*. Setae *ps3* and *h3* about 60 and 45,

respectively. Median part of opisthosoma without sclerotization and ornamentation. *Legs*. Femur I with weakly developed ventral process, dorso-basal process distinct. Genu I without ventral process. Legs III and IV 125–130 and 135–140 long, respectively. Solenidia *phi* III and IV 18–20 and 5–6 long, respectively.

Etymology. The species name is derived from the generic name of the host and is a noun in apposition.

Type material. Male HOLOTYPE (BMOC 04-0331-154, 1), 20 male and 20 female paratypes (BMOC 04-0331-154, 2-41) ex *Echiothrix centrosa* (FMNH 43409), INDONESIA: Central Sulawesi, Pinedapa, 01° 23' 30"S, 120° 37' 55"E, 7 February 1918, coll. U.C. Raven. Holotype in FMNH, paratypes in FMNH, UMMZ, IRSNB, and ZISP.

Differential diagnosis. The new species is closest to *L. (M.) dominator* Fain, 1976 from *Paruromys dominator* (Thomas, 1921) and *Rattus xanthurus* (Gray, 1867). In these species, the dorsal shields are without ornamentation, and the ventral process of genu I in both sexes and the opisthogastric shield of females are absent. *L. echiothrix* sp.n. differs from *L. dominator* by the following characters: in both sexes of *L. echiothrix* sp.n., the striated membranes of coxae II are wide, reaching the lateral margins of the body; in males, the median part of the postgenital shield is fused with its lateral projections, the posterior ends of these projections reaching the lateral margins of the idiosoma at the level of setae *f2*; in females, setae *f2*, *h3*, and *ps3* are about 30, 45, and 60, respectively. In both sexes of *L. dominator*, the striated membranes of coxae II reach the lateral margins of the body only in their anterior half; in males, the median part of the postgenital shield is distinctly separated from its lateral projections, and these projections do not extend as far on the lateral margins of the body; in females, setae *f2*, *h3*, *ps3* are about 7, 18, and 22, respectively.

Host range and distribution. This species known only from the type series ex *Echiothrix centrosa* (Miller et Hollister, 1921) from central Sulawesi.

12. *Listrophoroides (Marquesania) lenothrix* sp.n.

Figs 5, 6.

Diagnosis. In both sexes, postscapular shields with few short indistinct lines, hysteronotal shield without ornamentation. Coxae II wide, reaching lateral margins of body. Ventral processes of femur

and genu I well developed. *Male*. Scales behind setae *e2* lacking. Postgenital shield in shape as inverted U. Opisthosomal lobe with well developed lateral dilatations. *Female*. Prescapular shield with pair of U-shaped patches. Distance *e1-e1* 2 times longer than distance between *e1* and posterior margin of hysteronotal shield.

Male (Figs 5A–C). Body 370–390 long (380), 170–180 wide (170) in 3 paratypes. Length and width of gnathosoma subequal, 40. *Dorsum* (Fig. 5A). Postscapular shield 85–90 long (85), 155–165 wide (155), covered by few short indistinct lines, anterior-lateral apodemes present. Hysteronotal shield 145–155 long (145), without ornamentation. Lateral incisions of hysteronotal shield well developed, 25–35 long (30) and 22–25 wide (22), minimum distance between them 70–80 (80). Setae *e2* situated off hysteronotal shield, soft cuticle behind these setae without scales. Setae *e1* situated on hysteronotal shield, distance *e1-e1* 45–48 (45). Setae *h3* about 35 long. *Venter* (Fig. 5B). Coxae II wide, reaching lateral margins of body. Coxae III without lines. Aedeagus cone-like, about 9 long (Fig. 5C). Supporting sclerite of aedeagus with free anterior ends. Postgenital shield in form of inverted U. Lateral projections of postgenital shield 60–70 long (65), distance between posterior ends of these projections and adanal sclerite 18–22 long (18). Opisthosomal lobe with well developed lateral dilatations, and widely rounded median incision. *Legs*. Genu and femur I with hypertrophied ventral processes, dorso-basal process of femur I indistinct. Femur IV about 25 wide, 1.4 times wider than femur III (about 17). Legs III and IV 130–135 (130) and 145–155 long (145), respectively. Tibio-tarsi III and IV 45–50 (50) and 50–55 long (50), respectively. Solenidia *phi* III and IV about 25 and 40 long, respectively.

Female (Figs 6 A, B). Body 390–410 long, 175–180 wide in 10 paratypes. Length and width of gnathosoma subequal. Idiosomal setae relatively short, about 10. *Dorsum* (Fig. 6A). Prescapular shield with pair U shaped patches. Postscapular shield 85–90 long, 150–155 wide, covered by few short indistinct lines, anterior-lateral apodemes present. Hysteronotal shield 150–160 long, without ornamentation. Width of this shield at level of setae *e1-e1* 100–105. Setae *d1* situated off this shield. Distance *e1-e1* 45–55, 2 times longer than distance *e1*–posterior margin of hysteronotal shield, 20–30. *Venter* (Fig. 6B). Striated membranes of coxae II wide, reaching lateral margins of body. Coxae III without lines. Lateral parts of opisthosoma

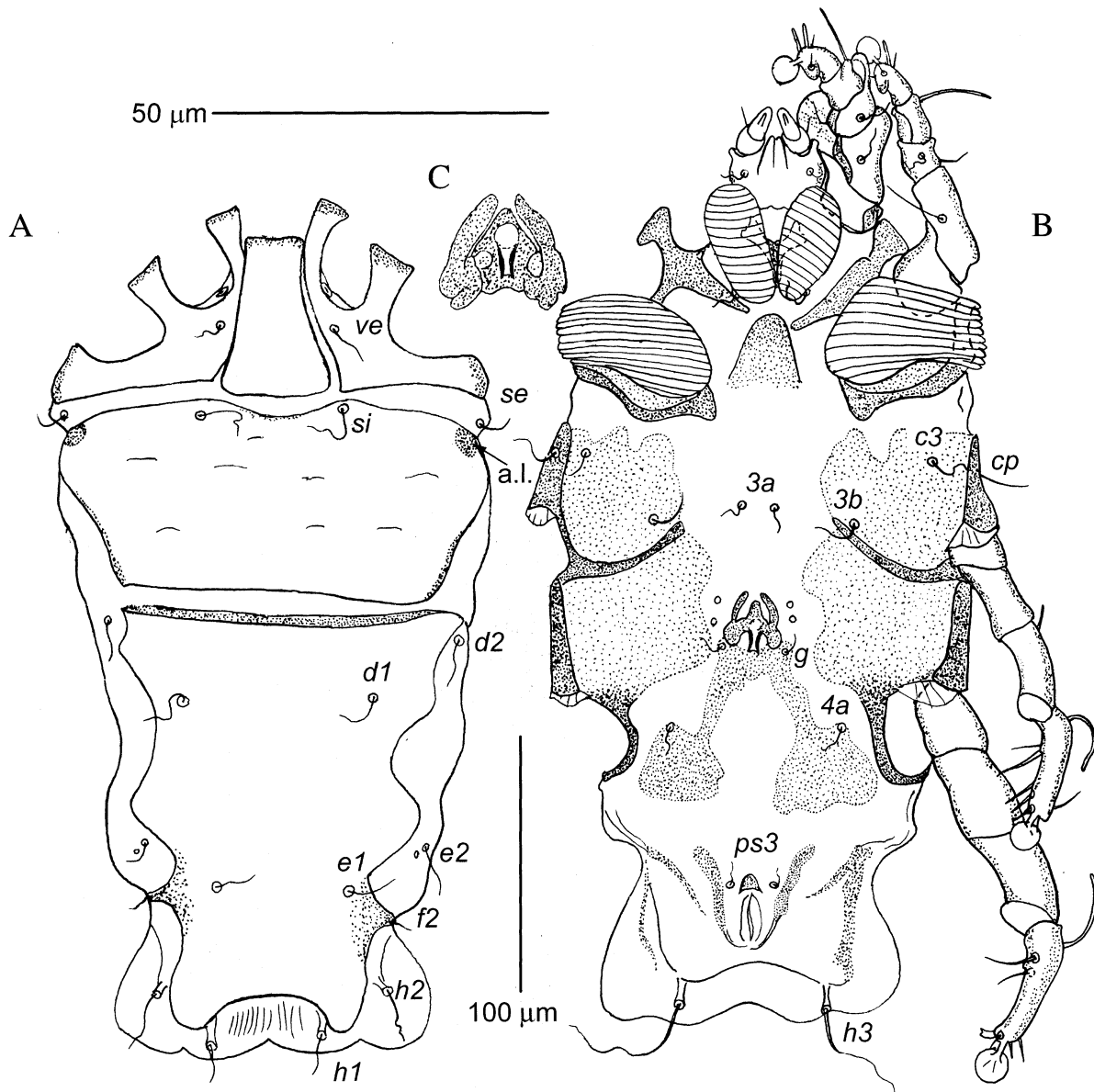


Fig. 5. *Listrophoroides (Marquesania) lenothrix* sp.n., male: A — dorsal view, B — ventral view, C — aedeagus. Abbreviations: a.l. — antero-lateral apodeme.

ma with few lateral scales behind level of setae *e2*. Median part of opisthosoma covered by transverse striations, weakly sclerotized, bearing pair of small lateral patches. *Legs*. Genu and femur I with hypertrophied ventral process, dorso-basal process of femur I indistinct. *Legs* III and IV 130–135 and 140–145 long, respectively. Solenidia *phi* III and IV about 25 and 10 long, respectively.

Etymology. The species name is derived from the generic name of the host and is a noun in apposition.

Type material. Male HOLOTYPE (BMOC 04–0331–155, 1), 3 male and 12 female paratypes (BMOC 04–0331–155, 2–16) ex *Lenothrix canus*

(FMNH 98625), MALAYSIA: Selangor, 4.8 km N Kepong, 03° 13'N, 101° 38'E, 20–21 January 1964, coll. D.D. Davis. Holotype in FMNH, paratypes in FMNH and UMMZ.

Differential diagnosis. The new species is easily distinguished from other representatives of the subgenus *Marquesania* by the following characters. In males of this species, the opisthosomal lobe has well developed lateral dilations; in females, the prescapular shield bears a pair of U-shaped patches. Females of *L. lenothrix* also differ from all other species of the subgenus except *L. echiothrix* sp.n., by the hysteronotal shield devoid of ornamentation. Females of *L. echiothrix* sp.n.

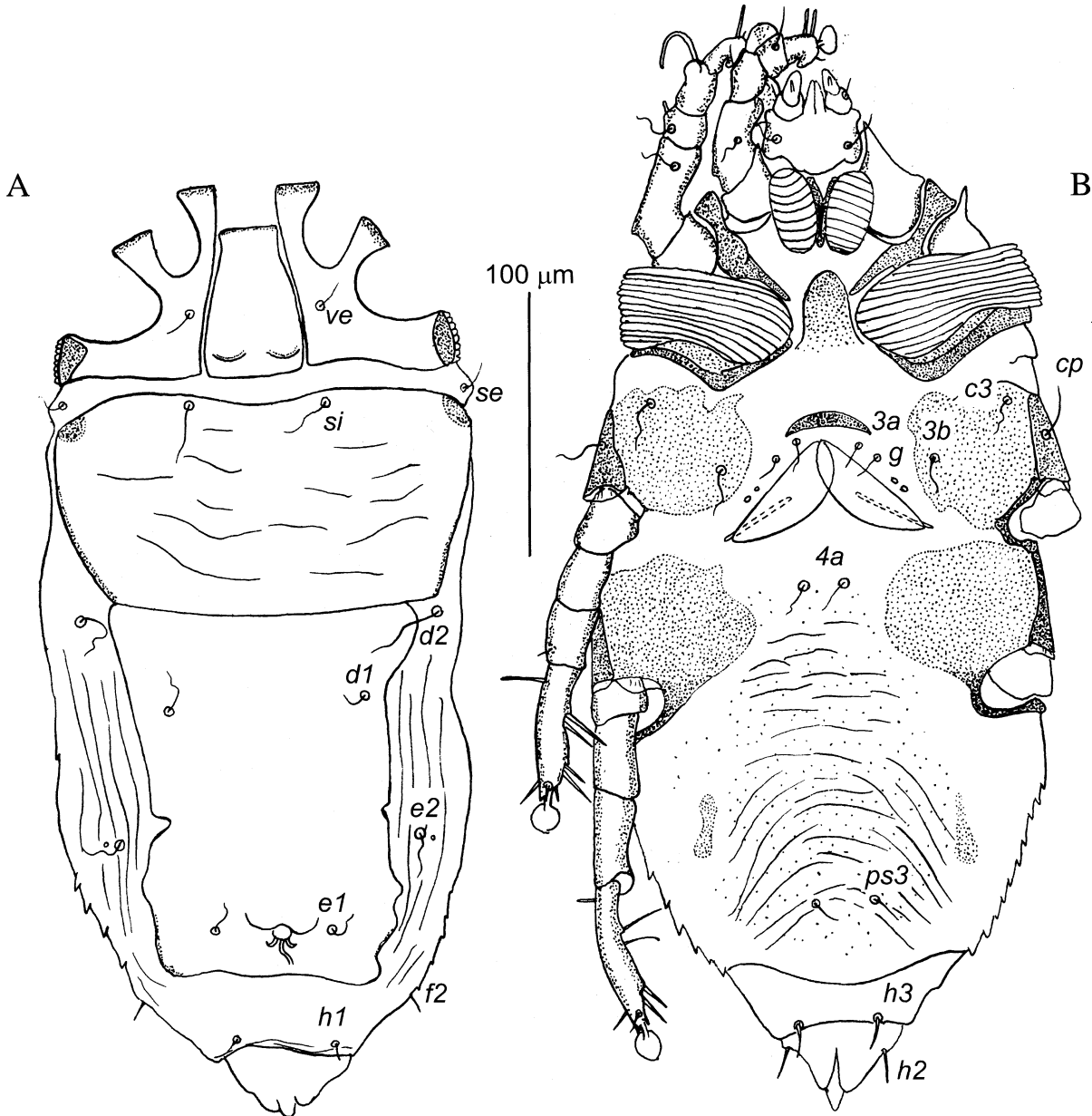


Fig. 6. *Listrophoroides (Marquesania) lenothrix* sp.n., female: A — dorsal view, B — ventral view.

differ notably from *L. lenothrix* sp.n. by the absence of the ventral process of femur I and by longer setae *ps3* and *h3*.

Host range and distribution. This species known only from the type series ex *Lenothrix canus* Miller, 1903 from West Malaysia.

13. *Listrophoroides (Marquesania) pseudolativentris* sp.n.

Figs 7, 8.

Diagnosis. In both sexes, coxae II wide, reaching lateral margins of body. Ventral process of femur and genu I well developed. *Male*. Dorsal shield without ornamentation. Postgenital shield in shape as inverted U. *Female*. Prescapular shield

with pair of longitudinal ridges. Distances *e1-e1* and *e1*—posterior margin of hysteronotal shield subequal.

Male (Figs 7 A, B). Body 350 long, 150 wide. Length about 45 long and 42 wide. *Dorsum* (Fig. 7A). Dorsal shields without ornamentation. Post-scapular shield 77 long, 145 wide, anterior-lateral apodemes present. Hysteronotal shield 145 long. Lateral incisions of hysteronotal shield about 20 long and 30 wide, minimum distance between them 50. Setae *e2* situated off hysteronotal shield, soft cuticle behind these setae without scales or with few of indistinct scales. Setae *e1* situated on hysteronotal shield, distance *e1-e1* 40. Setae *h3* 45 long. *Venter*

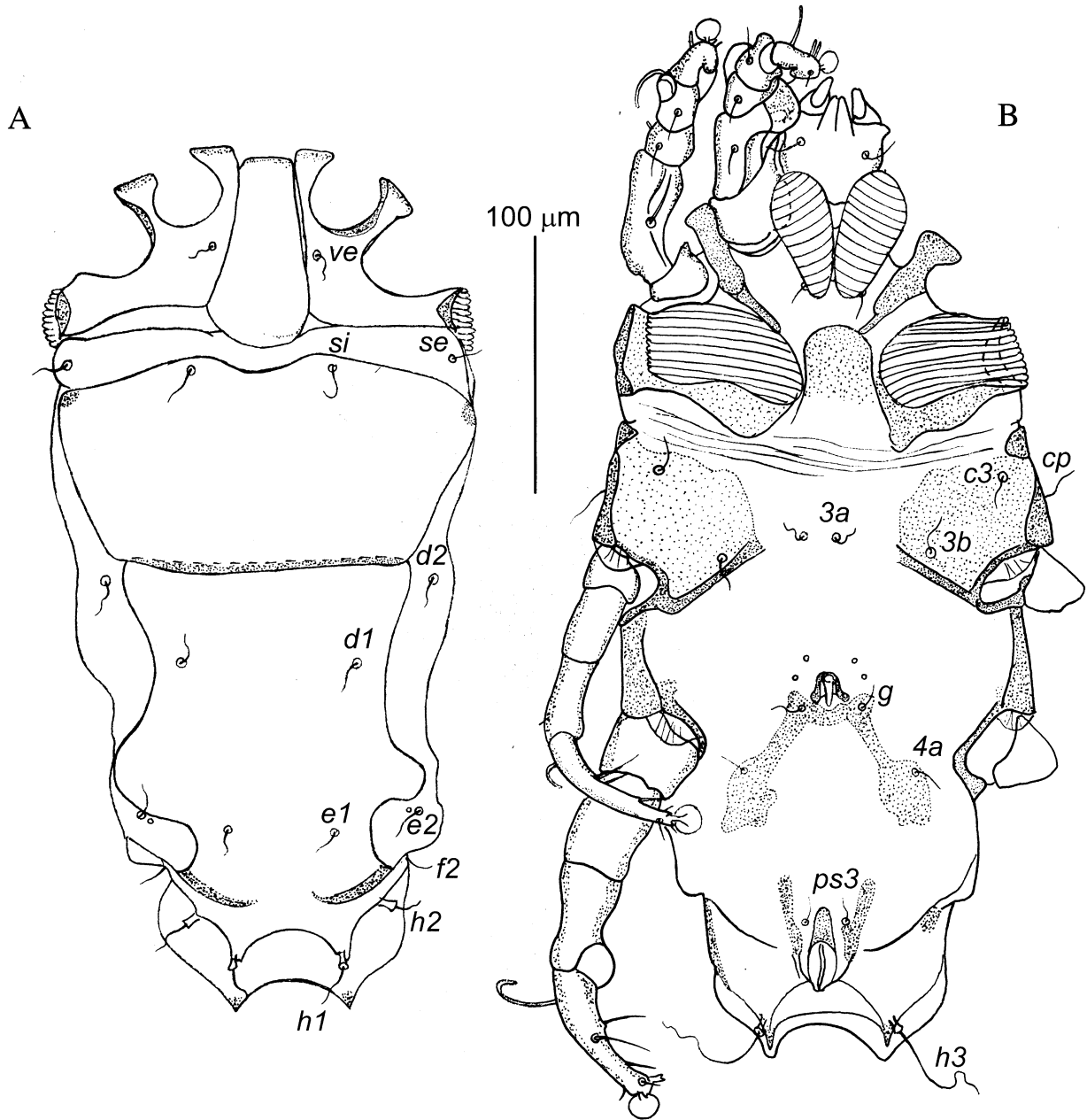


Fig. 7. *Listrophoroides (Marquesania) pseudolativentris* sp.n., male: A — dorsal view, B — ventral view.

(7B). Coxae II wide, reaching lateral margins of body. Coxae III without lines. Aedeagus cone-like, about 9 long. Supporting sclerite of aedeagus with fused anterior ends. Postgenital shield in form of inverted U. Lateral projections of postgenital shield 60 long, distance between posterior ends of these projections and adanal sclerite about 20 long. Opisthosomal lobe with widely rounded median incision, lateral parts well developed and widely rounded. *Legs*. Genu and femur I with well developed ventral processes, basal process of femur I indistinct. Femur IV about 25 wide, 1.6 times wider than femur III (about 15). Legs III and IV 125 (130)

and 145 (150) long, respectively. Tibio-tarsi III and IV about 50 and 55 long, respectively. Solenidia *phi* III and IV about 10 and 25 long, respectively.

Female (Figs 8 A, B). Body 385–390 long, 160–170 wide in 10 paratypes. Length and width of gnathosoma subequal, about 45 long. Idiosomal setae subequal in length. *Dorsum* (Fig. 8A). Prescapular shield with pair of longitudinal ridges, length ratio of this shield and ridges 1.5: 1, setae *si* about 30 long. Postscapular shield 80–85 long, 145–155 wide, covered by few short indistinct lines, anterior-lateral apodemes present. Hysteronotal shield 145–155 long, covered by rough

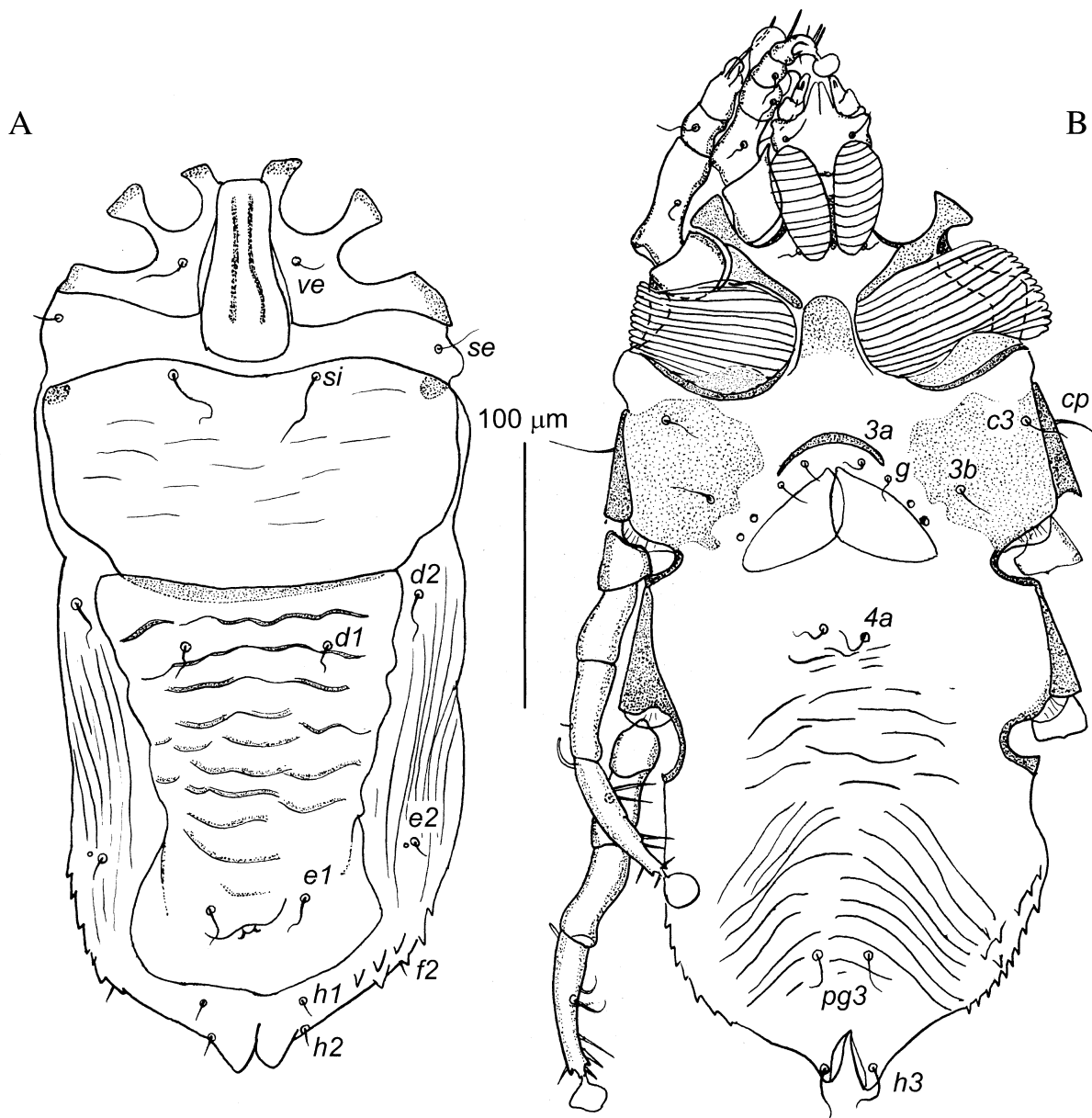


Fig. 8. *Listrophoroides (Marquesania) pseudolativentris* sp.n., female: A — dorsal view, B — ventral view.

undulating transversal lines reaching level of setae *e1*. Width of this shield at level of setae *e1*—*e1* 75–80. Setae *d1* situated off this shield. Distances *e1*—*e1* and *e1*—posterior margin of hysteronotal shield subequal, 35–45. *Venter* (Fig 8B). Striated membranes of coxae II wide, reaching lateral margins of body. Coxae III without lines. Lateral parts of opisthosoma with few lateral scales behind level of setae *e2*. Median part of opisthosoma covered by transverse striations, weakly sclerotized. *Legs*. Genu and femur I with well developed ventral processes, dorso-basal process of femur I indistinct. Legs III and IV 125–135 and 140–145 long, respectively. Solenidia *phi* III and IV about 15 and 7 long, respectively.

Etymology. The species name is derived from the similarities with *L. lativentris* and is a noun in apposition.

Type material. Male HOLOTYPE (BMOC 04–0331–155, 17), 10 female paratypes (BMOC 04–0331–155, 18–27) ex *Lenothrix canus* Miller, 1903 (FMNH 98625), MALAYSIA: Selangor, 4.8 km N Kepong, 03° 13'N, 101° 38'E, 20–21 January 1964, coll. D.D. Davis. Holotype in FMNH, paratypes in FMNH and UMMZ.

Differential diagnosis. The new species is closest to *L. lativentris* and differs from it by the following characters. In males of *L. pseudolativentris* sp.n., the postscapular shield is completely devoid of ornamentation, femur IV is about 1.6

times wider than femur III; in females, the ridges of the prescapular shield are 1.5 times shorter than this shield, the ornamentation of the postscapular shield is mostly indistinct, and setae *si* are about 30 long. In males of *L. lativentris*, the postscapular shield bears indistinct ornamentation, femora III and IV are subequal in width; in females, the ridges of the prescapular shield are 2.5–3 times shorter than this shield, the ornamentation of the postscapular shield is distinct, and setae *si* are about 15 long.

Host range and distribution. This species known only from the type series ex *Lenothrix canus* Miller, 1903 from West Malaysia.

14. *Listrophoroides (Marquesania) interpolatus* Fain, 1975

Figs 9, 10.

Listrophoroides papuanus interpolatus Fain, 1975: 1984, 1977: 293, fig. 293.

Listrophoroides interpolatus, Bochkov, Fain, 2003: 587, figs 24–27.

Male (Figs 9 A–C). Body 340–350 long, 130–135 wide in 10 specimens. Length and width of gnathosoma subequal. *Dorsum* (Fig. 9A). Dorsal shields completely covered by wave-like transverse lines. Postscapular shield 65–75 long, 120–130 wide. Hysteronotal shield 155–165 long. Lateral incisions of hysteronotal shield well developed, 22–26 long and 25–35 wide, minimum distance between them 35–50. Setae *e2* situated off hysteronotal shield, soft cuticle behind these setae without scales. Setae *e1* situated on hysteronotal shield, distance *e1–e1* 25–35. Setae *h3* 55–60 long. *Venter* (Fig. 9B). Coxae II wide, reaching lateral margins of body. Coxae III with distinct transverse line. Aedeagus cone-like, about 10 long (Fig. 9C). Supporting sclerite of aedeagus with fused anterior ends. Postgenital shield in form of inverted U. Lateral projections of postgenital shield 55–60 long, distinctly not reaching anterior ends of postanal sclerite, 20–25. Opisthosomal lobe widely rounded, with distinctly developed median incision. *Legs*. Genu and femur I with hypertrophied ventral process, dorso-basal process of femur I absent. Femur IV about 18 wide, 1.5 times wider than femur III. Legs III and IV 100–105 and 105–120 long, respectively. Tibio-tarsi III and IV 35–38 and 40–45 long, respectively. Solenidia *phi* III and IV about 10 and 35 long, respectively.

Female (Figs 10 A–E). Body 345–370 long, 125–130 wide in 10 paratypes. Length and width of gnathosoma subequal. Dorsal shields completely covered by wave-like transverse lines. *Dorsum* (Figs 10 A, D). Postscapular shield 75–80 long,

120–125 wide. Hysteronotal shield 145–155 long. Width of this shield at level of setae *e1–e1* 60–65. Setae *d1* situated off this shield. Distance *e1–e1* 35–37, 2–2.3 times longer than distance *e1*–posterior margin of hysteronotal shield, 15–20. *Venter* (Fig. 10B, E). Striated membranes of coxae II wide, reaching lateral margins of body. Coxae III with distinct transverse line. Lateral parts of opisthosoma with few lateral scales behind level of setae *e2*. Median part of opisthosoma with well developed shield and distinct ornamentation. *Legs*. Femur and genu I with hypertrophied ventral process, dorso-basal process of femur I absent. Legs III and IV 90–100 and 100–110 long, respectively. Solenidia *phi* III and IV 10–12 and 4–6 long, respectively.

Material examined. Six males and 12 females (BMOC 04–0507–031) ex *Maxomys dollmani* (AMNH 101100), INDONESIA: Southeast Sulawesi, Tanke Solokko, 1500 m, 12 January 1931, coll. G. Heinrich; 3 males and 13 females (BMOC 04–0507–057) ex *Maxomys hellwaldii* (AMNH 225820), INDONESIA: Central Sulawesi, Malakosa, Kuala Navusu, 76 m, 00° 57' 11"S, 120° 25' 34"E, 4 September 1975, coll. G.G. Musser (ASE 3190); 9 females (BMOC 04–0507–056) ex *M. hellwaldii* (AMNH 225789), same locality, 4 September 1975, coll. G.G. Musser (ASE 3121); 1 male and 9 females (BMOC 04–0507–055) ex *M. hellwaldii* (AMNH 225810), same locality, 6 September 1975, coll. G.G. Musser (ASE 3145); 5 males and 5 females (BMOC 04–0507–052) ex *M. hellwaldii* (AMNH 224873), INDONESIA: Central Sulawesi, Sungai Oha Kecil, 11 August 1974, coll. G.G. Musser (ASE 1780); 2 males and 7 females (BMOC 04–0507–053) ex *M. hellwaldii* (AMNH 101029), INDONESIA: Southeast Sulawesi, Wawo, 11 January 1922, coll. G. Heinrich (#797); 3 females (BMOC 04–0507–059) ex *Maxomys sp. A* (AMNH 223165), INDONESIA: Central Sulawesi, Lake Lindu, Tomado, 1000 m, 01° 19' 40"S, 120° 03' 02"E, 13 August 1973, coll. G.G. Musser (ASE 457); 2 males and 10 females (BMOC 04–0507–058) ex *Maxomys sp. A* (AMNH 223372), same locality, 19 August 1973, coll. G.G. Musser (ASE 530); 3 males and 13 females (BMOC 05–0507–057) ex *M. sp.* (AMNH 225820), INDONESIA: Central Sulawesi, Malakosa, Kuala Navusu, 76 m, 00° 57' 11"S, 120° 25' 34"E, 4 September 1975, coll. G.G. Musser (ASE 3190); 3 females (BMOC 04–0507–049) ex *M. sp. A.* (AMNH 265137), INDONESIA: Central Sulawesi, Paku, near. Lake Lindu, 01° 10' 12"S, 120° 02' 24"E, 24

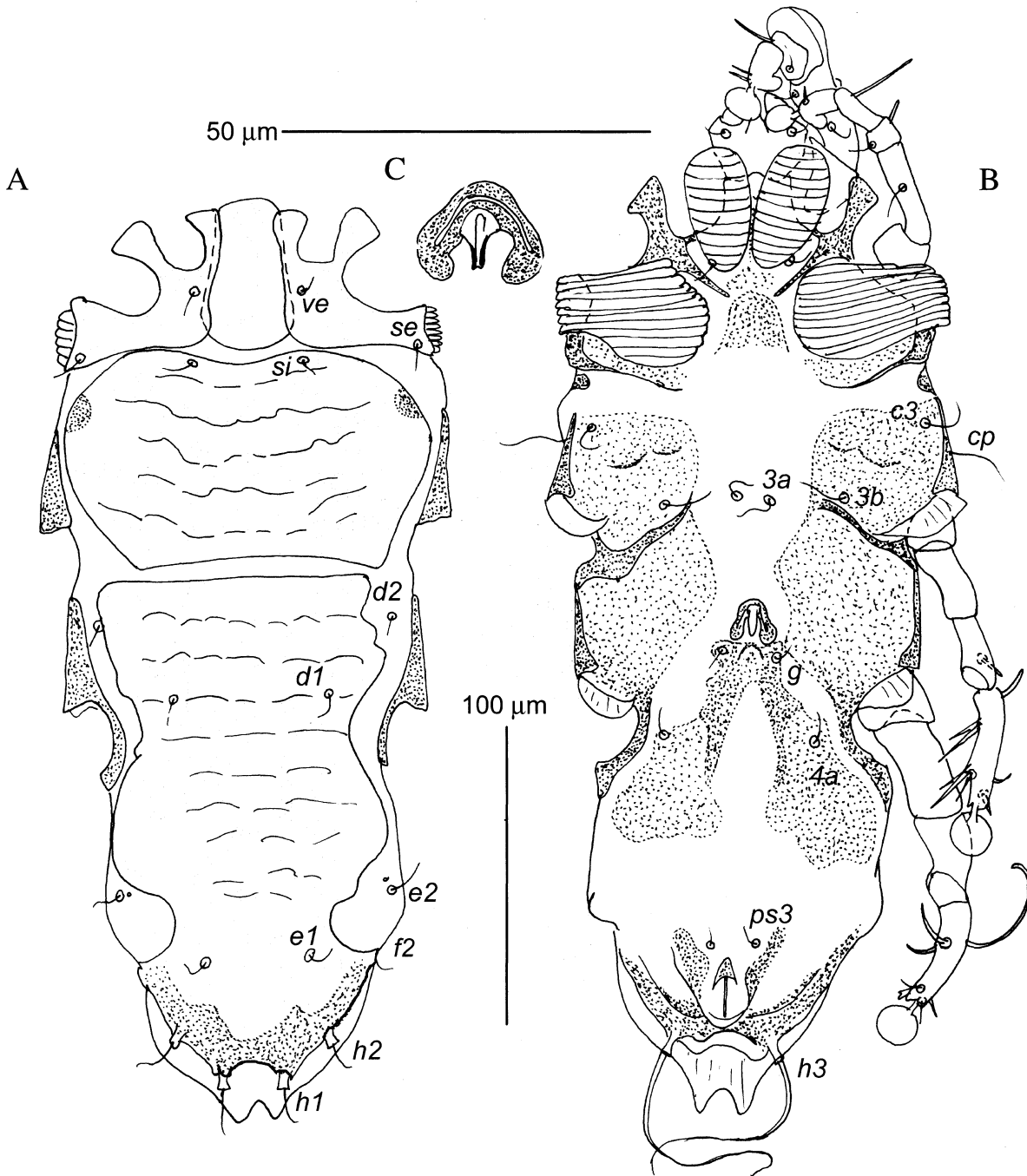


Fig. 9. *Listrophoroides (Marquesania) interpolatus* Fain, 1975, male (specimen from Sulawesi): A — dorsal view, B — ventral view, C — aedeagus.

January 1972, coll. unknown (#2453); 8 males and 6 females (BMOC 04-0507-048) ex *M. sp. B* (AMNH 224860), INDONESIA: Central Sulawesi, Sungai Sadaunta, 848 m, ~01° 19' S, 120° 03' E, 24 October 1974, coll. G.G. Musser (ASE 2242); 5 males and 5 females (BMOC 04-0507-051) ex *M. sp. B* (AMNH 224863), same locality, 1000 m, 24 October 1974, coll. G.G. Musser (ASE 2360); 2 males and 2 females (BMOC 04-0507-025) ex *M. sp. B* (AMNH 224861), same locality, 848 m, 31

October 1974, coll. G.G. Musser (ASE 2283); 3 males and 13 females (BMOC 04-0507-025) ex *M. sp. B* (AMNH 224861), same locality, 848 m, 23 October 1974, coll. G.G. Musser (ASE 2236).

Specimen deposition. Voucher specimens are deposited in UMMZ, AMNH, MZB.

Host range and distribution. This species occurs on *Rattus niobe* (Thomas, 1906) (type-host), *R. verecundus* (Thomas, 1904), and *Melomys moncktoni* (Thomas, 1904) in New Guinea [Fain,

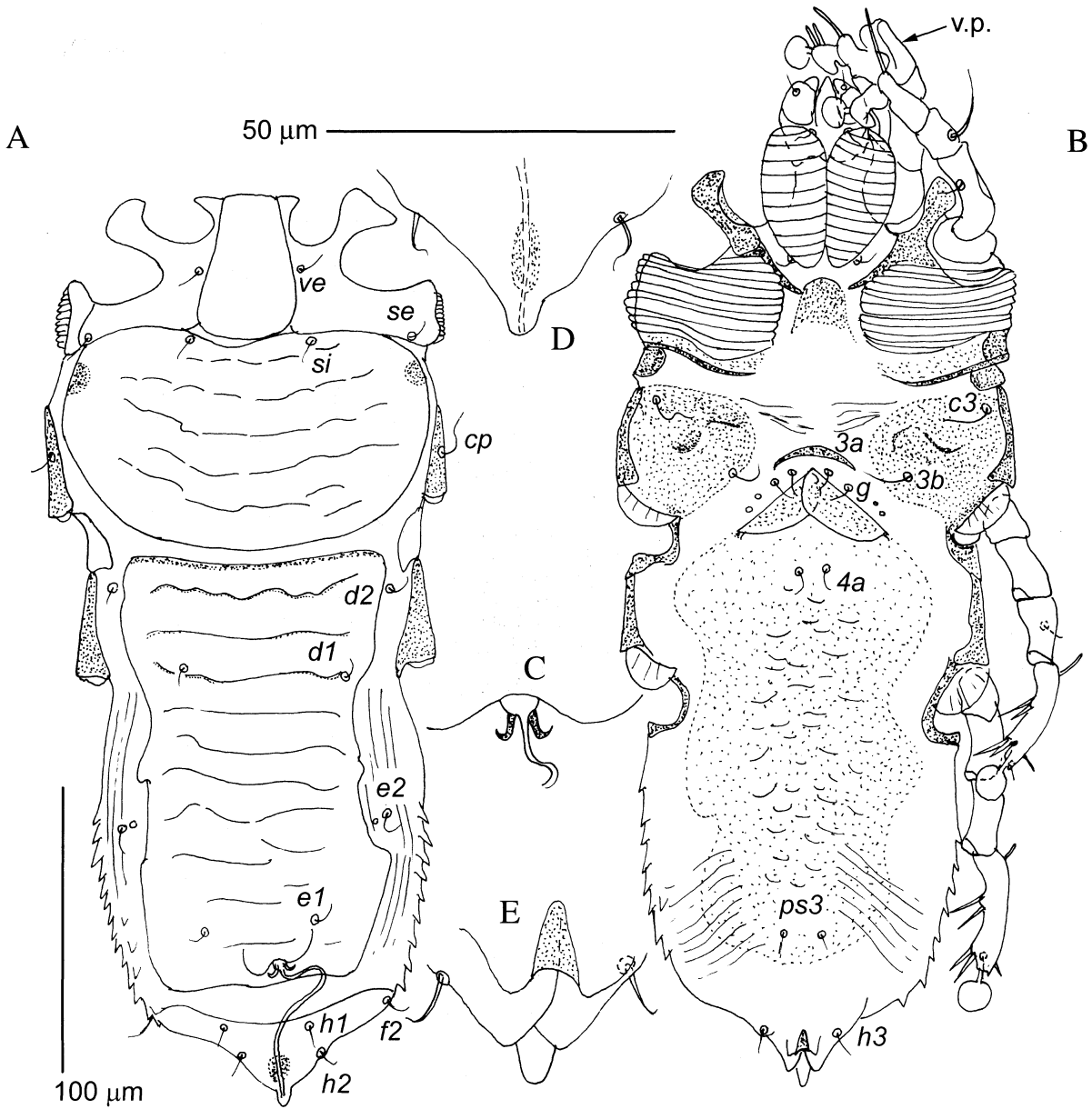


Fig. 10. *Listrophoroides (Marquesania) interpolatus* sp.n., female (specimen from Sulawesi): A — dorsal view, B — ventral view, C — spermatheca, D — opisthosomal end in dorsal view, E — same in ventral view. Abbreviations: v.p. — ventral process of femur I.

1975, 1977; Bochkov and Fain, 2003]. We record it from the endemic Sulawesian rats *M. hellwaldii* (Jentink, 1878), *M. dollmani* (Ellerman, 1941), and *Maxomys* sp. A and B [Musser and Holden, 1991: 406] for the first time. The specimens from Sulawesi do not differ significantly from typical *L. (M.) interpolatus* collected from New Guinean *Rattus* and *Melomys*. In all males from Sulawesi, the scales behind setae *e2* are consistently absent, whereas in New Guinean males, one-four scales are usually present. The range of *L. interpolatus* may reflect the

geographic distributions of its hosts rather than their phylogenetic relationships. It is possible that this species was originally associated with Sulawesian rodents and migrated to New Guinea on ancestors of the group of *Rattus* sometimes placed in the genus *Stenomys*.

**Subgenus *Paklistrophoroides*
Fain et Hyland, 1980**

Type-species: *Listrophoroides (Paklistrophoroides) decoratus* Fain et Hyland, 1980.

15. *Listrophoroides (Paklistrophoroides) scutalis* Fain, 1979

Listrophoroides (Listrophoroides) scutalis Fain, 1979: 192.

Listrophoroides (Paklistrophoroides) scutalis, Fain, 1981: 99, figs 127–130.

Material examined. Three males and 5 females (BMOC 04–0331–148) ex *Leopoldamys edwardsi* (FMNH 32705), CHINA: Fujian Prov., Fuching Hsien, 25° 43' 15"N, 119° 22' 44"E, January 1926, coll. H.R. Caldwell; 8 males and 2 females (BMOC 04–0331–147) ex *L. edwardsi* (FMNH 31967), LAOS: Phongsali Prov., Phong Saly, 21° 41' 15"N, 102° 06'E, 6 May 1929, coll. R.W. Hendee.

Specimen deposition. Voucher specimens are deposited in UMMZ, FMNH.

Host range and distribution. This species was known only from the type series ex *Leopoldamys edwardsi* from Vietnam [Fain, 1981]. We add here new records from the type host from China and Laos.

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