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Citation	日本ダニ学会誌 = Journal of the Acarological Society of Japan, 15 (1): 29-46
Issue Date	2006-05-25
URL	http://s-ir.sap.hokkyodai.ac.jp/dspace/handle/123456789/1416
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Mites of the genus *Macrocheles* (Acari: Gamasida: Macrochelidae) Associated with Dung Beetles in Papua, Indonesia

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(Received 6 February 2006; Accepted 24 March 2006)

ABSTRACT

Ten mite species of the genus *Macrocheles* (Acari: Macrochelidae) were collected from the body surface of dung beetles (Scarabaeidae) in Papua, Indonesia, providing the first record of the genus for the area. Of these, five species, *Macrocheles erniae*, *M. kojimai*, *M. manokwariensis*, *M. timikaensis*, and *M. woroae*, were described as new to science. The remaining five species were *M. agilis*, *M. borealis*, *M. limue*, *M. merdarius*, and *M. sp. aff. glaber*.

Key words: Acari, Macrochelidae, *Macrocheles*, dung beetles, Papua, Indonesia

INTRODUCTION

So far more than 40 species of mites of the family Macrochelidae have been recorded or described from Indonesia (Berlese, 1905, 1910, 1921; Hartini and Takaku, 2003a, b, c, 2004; Hartini et al., 2003, 2005; Krantz, 1965, 1967a, b; Oudemans, 1903; Takaku, 1998, 2001; Takaku and Hartini, 2001; Vitzthum, 1931). These species were reported from Sumatra, Kalimantan, Java, Bali, and Lesser Sunda Islands. However, the macrochelid mite fauna of Papua (Irian Jaya, the old name for the western half of New Guinea Island) constituting the easternmost part of Indonesia is poorly known, represented by only *Glyphtholaspis gressitti* Krantz, 1967 recorded from Biak Island, Papua.

As a part of our serial studies on the taxonomy and biogeography of Indonesian macrochelids associated with dung beetles (Scarabaeidae: Scarabaeinae), the present paper deals with 10 species of the genus *Macrocheles* including 5 new species collected in Papua, Indonesia. This is the first report of the genus *Macrocheles* from Papua.

MATERIALS AND METHODS

All the mite specimens were collected from the body surface of scarabaeid dung beetles and were fixed in 70% ethanol. Some of the specimens were collected from pinned dry specimens of dung beetles deposited in the collection of Museum Zoologicum Bogoriense,

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Indonesia. Several mite specimens were dissected under a stereoscopic microscope after clearing in lactic acid. Each body part was mounted on a glass slide in Hoyer's medium or polyvinyl alcohol (PVA)-lactic acid mixture medium. Other specimens were mounted whole on slides in PVA or Hoyer's medium. Observations were made with a differential interference contrast microscope. Illustrations were prepared with the aid of a drawing tube.

All measurements are given in micrometers (μm). Measurements in each description are provided as averages and range in parentheses, if more than two specimens were measured. The dorsal chaetotaxy follows Halliday (1987). Other terminology, particularly that for the sternal ornamentation (Fig. 1), follows Walter and Krantz (1986). The holotypes will be deposited in the collection of the Museum Zoologicum Bogoriense, Bogor, Indonesia (MZB), and paratype specimens will be in the MZB and the zoological collections of the Graduate School of Science, Hokkaido University, Sapporo, Japan (ZIHU).

DESCRIPTIONS AND LOCALITY RECORDS

Macrocheles agilis Halliday, 2000

Macrocheles agilis Halliday, 2000: 278, figs. 1–10, 16, 22.

Diagnosis: Female. Dorsal shield with weak polygonal ornamentation on anterolateral areas, ornamentation in posterior half stronger and punctate; shield with 28 pairs of setae and 22 pairs of pores; j1, j3, z2, z4, s2, s4, s5, s6, r2, r3, r4, Z1, and Z5 distally pilose; J5 pilose for whole length, others smooth and pointed. Sternal shield with characteristic pattern of lines and punctations, including a transverse line joining st2, two short transverse lines in anterior half, and two punctate areas in posterior half.

Material examined: 1 female, 180 m alt., Tamrau Reserve, Saukarem, Auejou, Auberbalun, Manokwari, Papua, 13 June 2001, Erniwati leg., ex *Onthophagus* sp.

Habitat: Phoretic on the carrion beetles (Silphidae) *Diamesus osculans*, *Ptomaphila lacrymosa*, *P. perlata*, and a dung beetle *Onthophagus* sp.

Distribution: Indonesia (Papua), Papua New Guinea, Australia.

Remarks: The present species has been recorded from carrion beetles in Australia and Papua New Guinea (eastern half of New Guinea Island), except for a specimen collected from dung in New South Wales, Australia and a single specimen phoretic on a dung beetle in the present study.

Macrocheles borealis Halliday, 2000

Macrocheles borealis Halliday, 2000: 284, figs. 12, 18, 33–34.

Diagnosis: Female. Dorsal shield with weak polygonal ornamentation throughout except for central area between j3 and j6; shield with 29 pairs of setae and 22 pairs of pores; z1, j5, j6, z5, z6, and J1 smooth and pointed, J5 pilose for its entire length, others distally pilose; sternal shield with two linea arcuata (l.arc.).

Material examined: 1 female, site of Freeport Indonesia Co., Tembagapura, Timika, Fakfak, Papua, 11 March 1977, U. Rosichon leg., ex *Onthophagus* sp.

Habitat: Phoretic on scarabaeid beetles *Onthophagus tricavicollis* and *Onthophagus* sp.

Distribution: Indonesia (Papua), Australia.

Remarks: This specimen is tentatively identified as *Macrocheles borealis* Halliday, 2000, because of its similarities to *M. borealis* in most characters. However, the present specimen is different from the original description of *M. borealis* in the following two points (corresponding conditions of type specimens of *M. borealis* in parentheses): 1) j2 and j3 simple (distally pilose); and 2) sternal shield with one l.arc. (two l.arc.). These differences may be intraspecific or geographic variation. However, the variability of pilosity of dorsal setae and sternal ornamentation are not yet clear, because of the small number of specimens known, i.e., only 4 specimens used in the original description and a single specimen in the present study.

***Macrocheles limue* Samšičák, 1962**

(Fig. 1)

Macrocheles limue Samšičák, 1962: 2002–203, figs. 34–36, pls. 7, 8.

Macrocheles eurygaster Krantz, 1981: 3–7, figs. 1–20.

Macrocheles limue: Walter and Krantz, 1986: 283, fig. 3; Roy, 1991: 750; Roy, 1996: 311–314, figs. 1–14; Takaku, 2001: 501–502, figs. 4 and 10; Takaku and Hartini, 2001: 324–325; Hartini and Takaku, 2003c: 1264–1265.

All stages of this species were adequately described by Krantz (1981) under the name *Macrocheles eurygaster*.

Diagnosis: Most dorsal setae simple, except setae J5 bipectinate and j1 distally pilose. Sternal ornamentation well developed; linea angulata (l.ang.) convergent medially; two l.arc. straight; posterior edge of sternal shield close to metasternal shield; ventrianal shield expanded and with strongly dimpled reticulation.

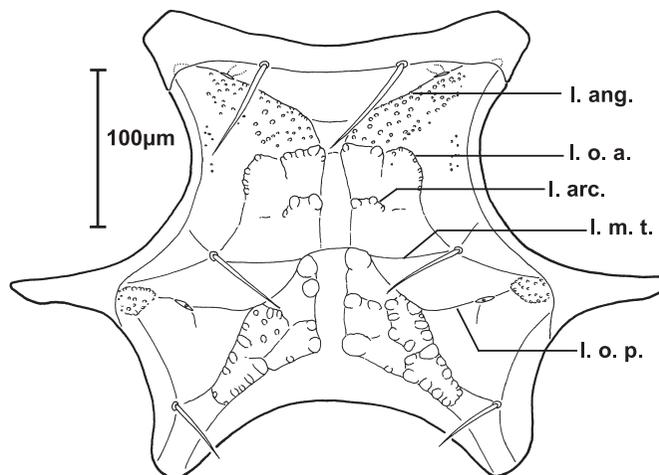


Fig. 1. Sternal ornamentation of *Macrocheles limue* Samšičák. l.ang., linea angulata; l.arc., linea arcuata; l.m.t., linea media transversa; l.o.a., linea oblique anteriores; l.o.p., linea oblique posteriores.

Material examined: 4 females, Sabron Yaru, Sentani, Jayapura, Papua, 7 July 2001; 1 female, Hine Kombe, Sentani, Jayapura, Papua, 6 July 2001; 1 female, Sentani, Sentani, Jayapura, Papua, 7 July 2001, S. Hartini leg., ex *Aphodius* sp.

Habitat: Phoretic on beetles of genera *Allonitis*, *Aphodius*, *Catharsius*, *Copris*, *Garreta*, *Heliocopris*, *Heteronitis*, *Liatongus*, *Oniticellus*, *Onitis*, *Onthophagus*, *Scarabaeus* (Scarabaeidae), *Pachylister lutarius* (Histeridae) and compost, soil, cow dung, elephant dung, leaf litter, etc.

Distribution: Indonesia (Java, Sumatra, Sulawesi, Bali, Madura, Lombok, Sumbawa, Sumba, Flores, West Timor and Papua), Ethiopia, Chad, Cameroon, Guinea, Zaire, Rwanda, Zambezi, Burundi, Kenya, Uganda, South Africa, Swaziland, India, China, and the Philippines.

Macrocheles merdarius (Berlese, 1889)

Holostaspis merdarius Berlese, 1889, fasc. 52(1), fig. 103.

Macrocheles merdarius: Filipponi and Pegazzano, 1963: 83–88, figs. V, VI, tav. XXIV; Hyatt and Emberson, 1988: 113–114, fig. 19B–D, pl. 2A; Halliday, 2000: 301–302; Takaku and Hartini, 2001: 326–327; Hartini and Takaku, 2003c: 1265; Hartini et al., 2003: 309.

A description, a figure, and synonymy were published by Filipponi and Pegazzano (1963) in their review of the *M. subbadius* species group.

Diagnosis: Female. Dorsal shield granular reticulate, bearing 28 pairs of dorsal setae; all dorsal setae simple; linea oblique anteriores (l.o.a.) of the sternal shield connected by lines; punctation very faint. Genu IV with 6 setae.

Material examined: 2 females, Hine Kombe, Sentani, Jayapura, Papua, 6 July 2001, S. Hartini leg., ex *Aphodius* sp.; 1 female, Kampung Harapan, Sentani, Jayapura, Papua, 7 July 2001; 5 females, Sentani, Jayapura, Papua, 7 July 2001, S. Hartini leg., ex *Aphodius* sp., *Onthophagus* sp.; 3 females, Sabron Yoru, Sentani, Jayapura, Papua, 8 July 2001, S. Hartini leg., ex *Aphodius* sp.; 23 females, Sabron Sari, Sentani, Jayapura, Papua, 8 July 2001, S. Hartini leg., ex *Aphodius* sp.

Habitat: Phoretic on beetles of genera *Aphodius*, *Catharsius*, *Copris*, *Coptodactyla*, *Euoniticellus*, *Geotrupes*, *Lepanus*, *Liatongus*, *Notopedana*, *Onthophagus*, *Pentodon*, *Coptodactyhanaeus*, *Synapsidis* (Scarabaeidae), *Pachylister lutarius* (Histeridae) and other beetle families Lucanidae, Silphidae, Trogidae, mammals Rodentia, and soil, leaf litter, cow dung, compost, manure, etc.

Distribution: Cosmopolitan. In Indonesia, this species is known from Java, Sulawesi, Kalimantan, Bali, Lombok, Flores, Sumbawa, Sumba, and Papua.

Macrocheles* sp. aff. *glaber (Müller, 1860)

The present species is assignable to the *glaber* species complex (Walter and Krantz, 1986) because of the following female characteristics: 1) dorsal setae j1, j4, Z4, and S5 pilose distally; 2) sternal ornamentation distinct; 3) ventrianal shield not greatly expanded and without strongly dimpled reticulations. Dorsal setae of the present species are significantly shorter than those of *M. oigru*, and general features of this species agree with those of *M. glaber*. However, for accurate identification of *M. glaber* and its allies, it is necessary to

collect mites alive, rear male progeny from them individually, and then observe characters of male and/or immature (Halliday, 1986). In this investigation, we could not culture the female nor collect the male and immatures, so that we cannot confirm the taxonomic status of the present species.

Material examined: 1 female, Sentani, Sentani, Jayapura, Papua, 7 July 2001, S. Hartini leg., ex *Aphodius* sp.

Habitat: Phoretic on *Onthophagus tricornis*, and genera *Aphodius*, *Catharsius*, *Copris*, *Oniticellus*, *Onitis*, *Onthophagus* (Scarabaeidae), *Pachylister lutarius* (Histeridae).

Distribution: Indonesia (Java, Sumatra, Kalimantan, Madura, Lombok, Sumbawa, Bawean, Flores, Sumba, West Timor, and Papua).

***Macrocheles erniae* n. sp.**

(Figs. 2–7)

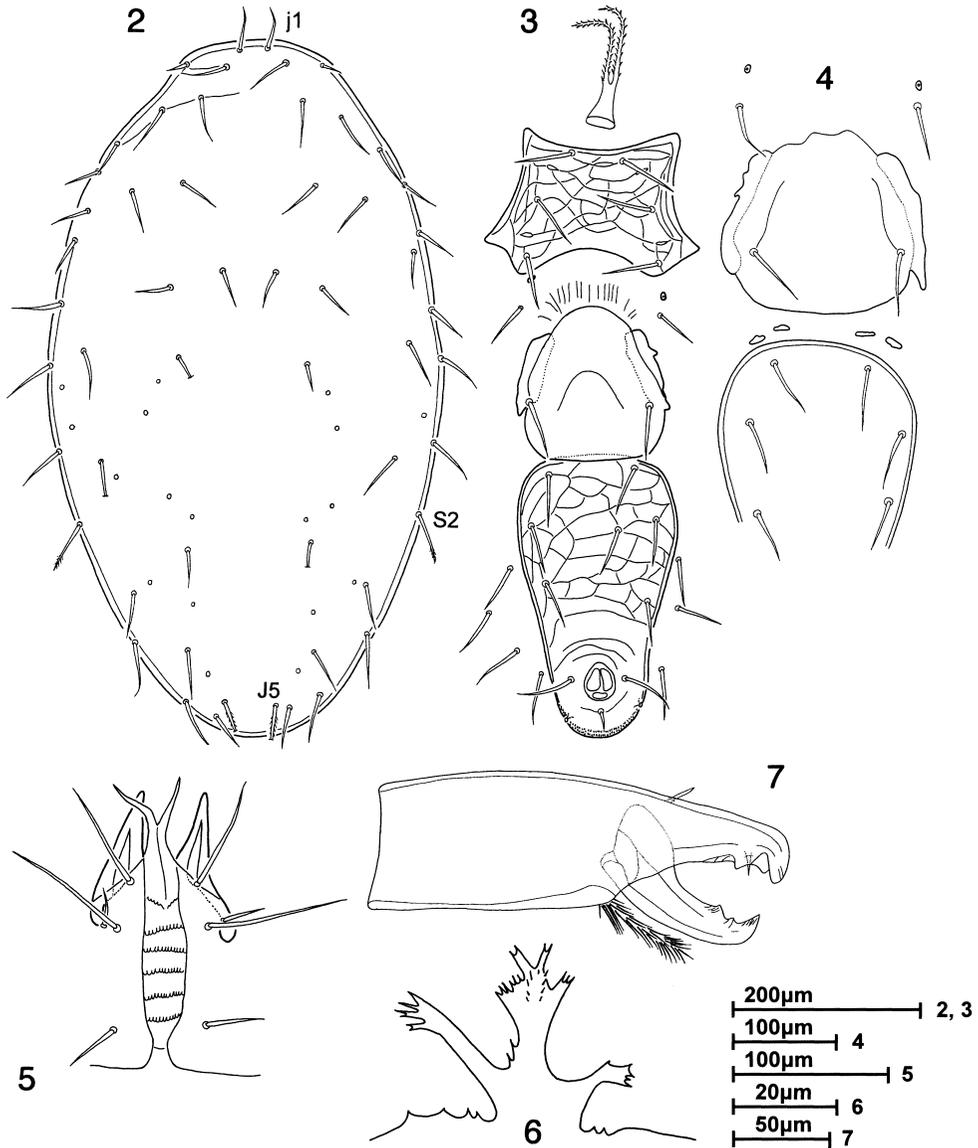
Type series: Holotype: female (MZB.Acar.2826.2), 180 m alt., Tamrau Reserve, Saukarem, Auejou, Auberbalun, Manokwari, Papua, 13 June 2001, Erniwati leg., ex Scarabaeidae. Paratypes: 3 females, other data same as for holotype.

Female: Length of dorsal shield 740 (735–745), width at level of coxae II 389 (345–420) (n=4).

Dorsum (Fig. 2): Dorsal shield oval, attenuated posteriorly; surface ornamented with faint reticulate pattern in posterior half; lateral margin of shield smooth; shield bearing 27 pairs of dorsal setae and 22 pairs of pores; setae j1 long simple; z6 absent; S2 slightly pilose; J5 entirely pilose; and other dorsal setae simple.

Venter (Fig. 3): Tritosternum typical for genus. Sternal shield wider than long; length 110 (105–115), width at level of coxae II 160 (155–165) (n=4); surface ornamented with distinct reticulation; shield bearing 3 pairs of simple setae and 2 pairs of pores; all setae long, simple, and surpassing insertions of setae behind them. Metasternal shield absent; a pair of long simple metasternal setae distant from anterior pores. Epigynial shield triangular, with convex line in the middle; shield with pair of simple setae laterally. Ventrianal shield ornamented with reticulation, longer than wide; length 316 (305–320), width 174 (170–175) (n=4); shield with 3 pairs of preanal setae (in some cases, with unpaired additional seta as in Fig. 3), pair of paranal setae, and 1 postanal seta; all setae simple; 2 pairs of small platelets located between epigynial and ventrianal shields (Fig. 4); cribrum located posterior to postanal seta. Opisthogastric setae simple. A pair of metapodal shield oblong. Postcoxal pore fused with podal shield. Peritremes with stigmata at a level between coxae III and IV; anterior extremities of peritremes lateral of setae z1.

Gnathosoma (Fig. 5): Well developed and sclerotized. Deutosternal groove with 5 transverse rows of denticles. Tectum (Fig. 6) with median process and pair of lateral processes; distal parts of median and lateral processes polyfurcated; basal margin serrate. Fixed digit of chelicera (Fig. 7) with simple dorsal seta, robust median tooth, large distal tooth, *pilus dentilis*, and terminal hook; movable digit with robust median tooth, small distal tooth and terminal hook; length of fixed digit 193 (185–195), length of movable digit 88 (85–95) (n=4).



Figs. 2–7. *Macrocheles erniae* n. sp. (holotype, female). 2, dorsum; 3, venter; 4, epigynial and ventrianial shields; 5, ventral view of gnathosoma; 6, tectum; 7, chelicera.

Legs: Most leg segments with only simple setae, except for femurs I, IV and tibia IV with simple and pilose setae. Leg chaetotaxy typical for genus; genu IV with 6 simple setae. Leg length (except ambulacrum, n=4): leg I, 528 (510–550); leg II, 498 (470–530); leg III, 435 (420–450); leg IV, 610 (600–620) (n=4).

Sacculus foemineus: Not observable in detail because of indistinct contour of sacculus.

Male and immature stages: Unknown.

Etymology: This species is named after Mrs. Erniwati, who is an entomologist at Indonesian Institute of Sciences (LIPI) and collected the type material.

Remarks: This species is similar to *Macrocheles howdenorum* Halliday, 2000 from Queensland, Australia in the ornamentation of ventral shield and the metasternal pores that are free from other plates and are on soft integument. However, *Macrocheles erniae* is distinguishable from *M. howdenorum* by the following characteristics (corresponding conditions of *M. howdenorum* in parentheses): 1) dorsal shield bearing 27 pairs (29 pairs) of setae; 2) dorsal setae z6 absent (present, smooth and pointed); 3) z2, r3, S1, and S5 simple (pilose distally); 4) J5 pilose entirely (smooth and pointed); 5) ventrianal shield long, 305–320 µm (234 µm, smaller than *M. erniae*); 6) ventrianal shield with 3 pairs of preanal setae (2 pairs); and 7) 2 pairs of small platelets located between epigynial and ventrianal shields (absent).

Although most species of the genus *Macrocheles* have 28 or 29 pairs of dorsal setae, the present species has only 27 pairs of setae due to the absence of setae z6. The small platelets between epigynial and ventrianal shields are also unusual in the genus, except for leaf-litter species as the members of *M. carinatus* species group and *M. opacus* species group (Hyatt and Emberson, 1988). The present species is distinguishable from congeners by these characteristics.

***Macrocheles kojimai* n. sp.**

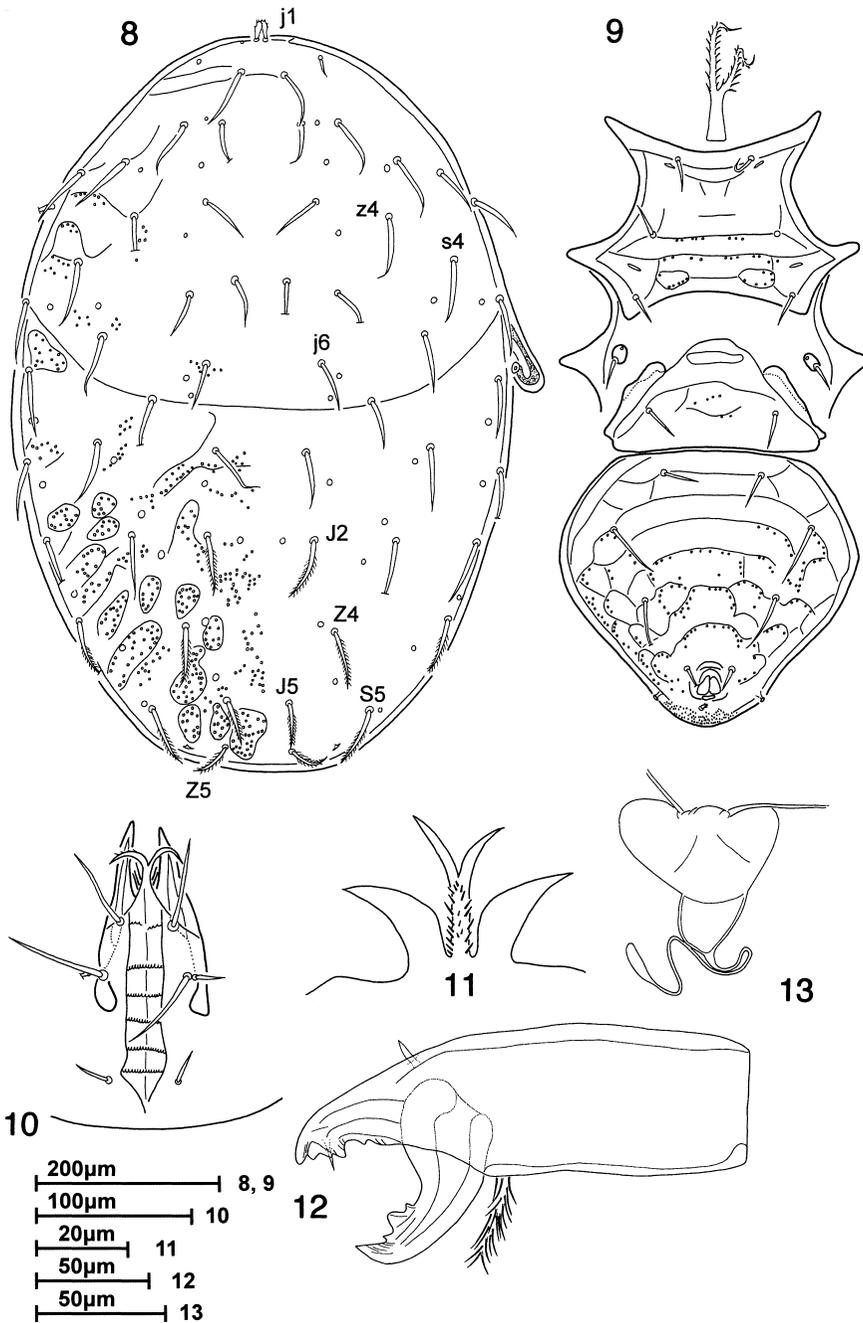
(Figs. 8–13)

Type series: Holotype: female (MZB.Acar.3027.1), 1500 m alt., site of Freeport Indonesia Co., Tembagapura, Timika, Fakfak, Papua, 17–20 March 1977, U. Rosichon leg., ex *Onthophagus* sp. Paratypes: 8 females, data same as for holotype. The specimens were collected from pinned dung beetles.

Female: Length of dorsal shield 771 (725–800), width at level of coxae II 417 (380–445) (n=9).

Dorsum (Fig. 8): Dorsal shield oval, surface ornamented with punctations around seta j6, z4, s4, s5, and in posterior half; lateral margin of shield smooth; shield with 29 pairs of dorsal setae and 22 pairs of pores; setae j1 plumose, J5, Z4, and Z5 entirely pilose; J2, S4, and S5 pilose in distal half; other dorsal setae long simple.

Venter (Fig. 9): Tritosternum typical for genus. Sternal shield nearly as long as wide; length 156 (145–165), width at level of coxae II 167 (155–175) (n=9); surface ornamented with punctations around linea media transversa (l.m.t.) and linea oblique posteriores (l.o.p.); l.ang. distinct and l.arc. present as short straight line; l.m.t. complete; l.o.p. present as a transverse line, and adjacent to l.m.t.; a pair of punctate area located posterior to l.o.p.; all setae simple and similar in length. Metasternal shields oval and free; each with simple seta and an anterior pore. Epigynial shield triangular, with pair of simple seta centrolaterally; surface ornamented with lines and punctations. Ventrianal shield broad, ornamented with semi-concentric pattern in anterior half, and with punctate polygons in posterior half; length 288 (255–310), width 321 (290–345) (n=9); shield with 3 pairs of preanal setae, pair of paranal setae, and 1 postanal seta; all setae simple, except for pilose postanal seta; cribrum



Figs. 8–13. *Macrocheles kojimai* n. sp. (holotype, female). 8, dorsum; 9, venter; 10, ventral view of gnathosoma; 11, tectum; 12, chelicera; 13, sacculus foemineus.

located posterior to postanal seta. Opisthogastric setae simple and pilose. With a pair of oblong metapodal shields.

Gnathosoma (Fig. 10): Well developed and sclerotized. Deutosternal groove with 5 transverse rows of denticles. Tectum (Fig. 11) with median process and pair of lateral processes; median process bifurcated and with small spicules laterally; basal margin smooth. Fixed digit of chelicera (Fig. 12) with simple dorsal seta, a proximal tooth, robust median tooth, 2 small distal teeth, *pilus dentilis*, and terminal hook; movable digit with bidentate median tooth, minute distal tooth, and terminal hook; length of fixed digit 180 (175–190), length of movable digit 73 (65–80) (n=9).

Legs: Most leg segments with simple, pilose and plumose setae, except for coxa and tarsus I, trochanters I–III with only simple setae and coxa III with only pilose setae. Leg chaetotaxy typical for the genus; genu IV with 6 pilose setae. Leg length (except ambulacrum, n=9): leg I, 560 (550–590); leg II, 551 (480–600); leg III, 522 (500–560); leg IV, 814 (790–850).

Sacculus foemineus (Fig. 13): Pair of globular sacculi present; cornu rounded distally and sclerotized spermatheca oblong.

Male and immature stages: Unknown.

Etymology: This species is named after Prof. J. Kojima, Ibaraki University, for his pertinent support throughout the present study.

Remarks: The present species is similar to *M. omicron* Halliday, 2000 from Queensland, Australia in the same type of ventral ornamentation. However, *M. kojimai* is distinguishable from *M. omicron* by the following features (corresponding conditions of *M. omicron* in parentheses): 1) j2, j3, j4, and J1 long, simple (finely pilose for most of their length); 2) J2 pilose in distal half (finely pilose for most of their length); and 3) Z4 entirely pilose (simple).

Macrocheles manokwariensis n. sp.

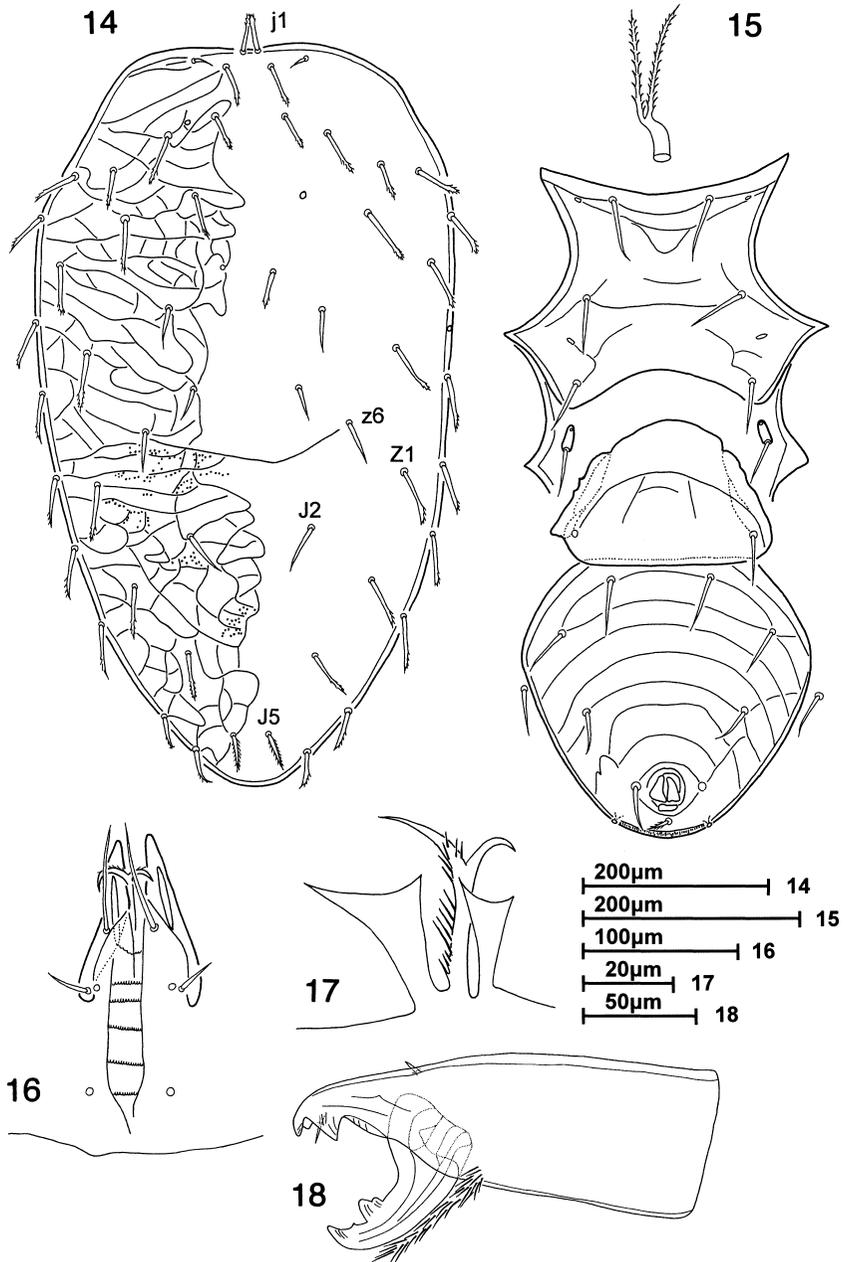
(Figs. 14–18)

Type specimen: Holotype: female (MZB.Acar.2827), 180 m alt., Tamrau Reserve, Sauko-rem, Auejou, Amberbalun, Manokwari, Papua, 13 June 2001, Erniwati leg., ex *Onthophagus* sp.

Female: Length of dorsal shield 755, width at level of coxae II 400 (n=1).

Dorsum (Fig. 14): Dorsal shield oval; entire surface ornamented with reticulation and with punctations around setae z6, Z1, and J2; lateral margin of the shield smooth; shield with 28 pairs of dorsal setae and 22 pairs of pores; setae j1 pilose distally; j6, z1, z5, z6, and J2 simple; J5 pilose entirely; other dorsal setae pilose distally or pilose in their half length.

Venter (Fig. 15): Tritosternum typical for genus. Sternal shield almost as long as wide; length 160, width at level of coxae II 165 (n=1); surface of shield ornamented with lines; l.arc. distinct; one l.arc. present; l.o.p. not connected to l.m.t.; l.m.t. complete. Metasternal shields small and free; each shield with 1 simple seta and an anterior pore. Epigynial shield triangular, with pair of simple setae; surface ornamented with faint lines. Ventrianal shield broad, ornamented with semi-concentric pattern and punctations along lines; length same as width; length 255, width 255 (n=1); shield with 3 pairs of preanal setae, pair of paranal setae,



Figs. 14–18. *Macrocheles manokwariensis* n. sp. (holotype, female). 14, dorsum; 15, venter; 16, ventral view of gnathosoma; 17, tectum; 18, chelicera.

and 1 postanal seta; all setae simple, except for pilose postanal seta; cribrum located posterior to postanal seta. Peritremes with stigmata at a level between coxae III and IV; anterior extremities of peritremes located at level of setae z1.

Gnathosoma (Fig. 16): Well developed and sclerotized. Deutosternal groove with 5 transverse rows of denticles. Tectum (Fig. 17) with median process and pair of lateral processes; median process bifurcated and with spicules laterally; basal margin serrate. Fixed digit of chelicera (Fig. 18) with simple dorsal seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal hook; movable digit with bidentate median tooth, minute distal tooth, and terminal hook; length of fixed digit 190, length of movable digit 70 (n=1).

Legs: Most leg segments with simple and pilose setae, except for coxae I–IV, trochanters I and III, tibia I, and tarsi I–III with only simple setae. Leg chaetotaxy typical for the genus; genu IV with 7 simple and pilose setae and its chaetotaxy 1, 2/1, 2/0, 1. Leg length (except ambulacrum, n=1): leg I, 550; leg II, 520; leg III, 500; leg IV, 720.

Sacculus foemineus: Not observed.

Male and immature stage: Unknown.

Etymology: The specific name is derived from the type locality, Manokwari.

Remarks: In ventral ornamentation, the present species is similar to *Macrocheles dispar* (Berlese, 1910) which has been collected from Sulawesi, Sumatra, Kalimantan, and West Java. However, *Macrocheles manokwariensis* is clearly distinguishable from *M. dispar* by the following features (corresponding conditions of *M. dispar* in parentheses): 1) setae j2, S1, S4, and Z1–Z4 pilose distally (simple); 2) sternal ornamentation with only lines (lines and punctations); and 3) genu IV with 7 setae (6 setae).

Macrocheles timikaensis n. sp.

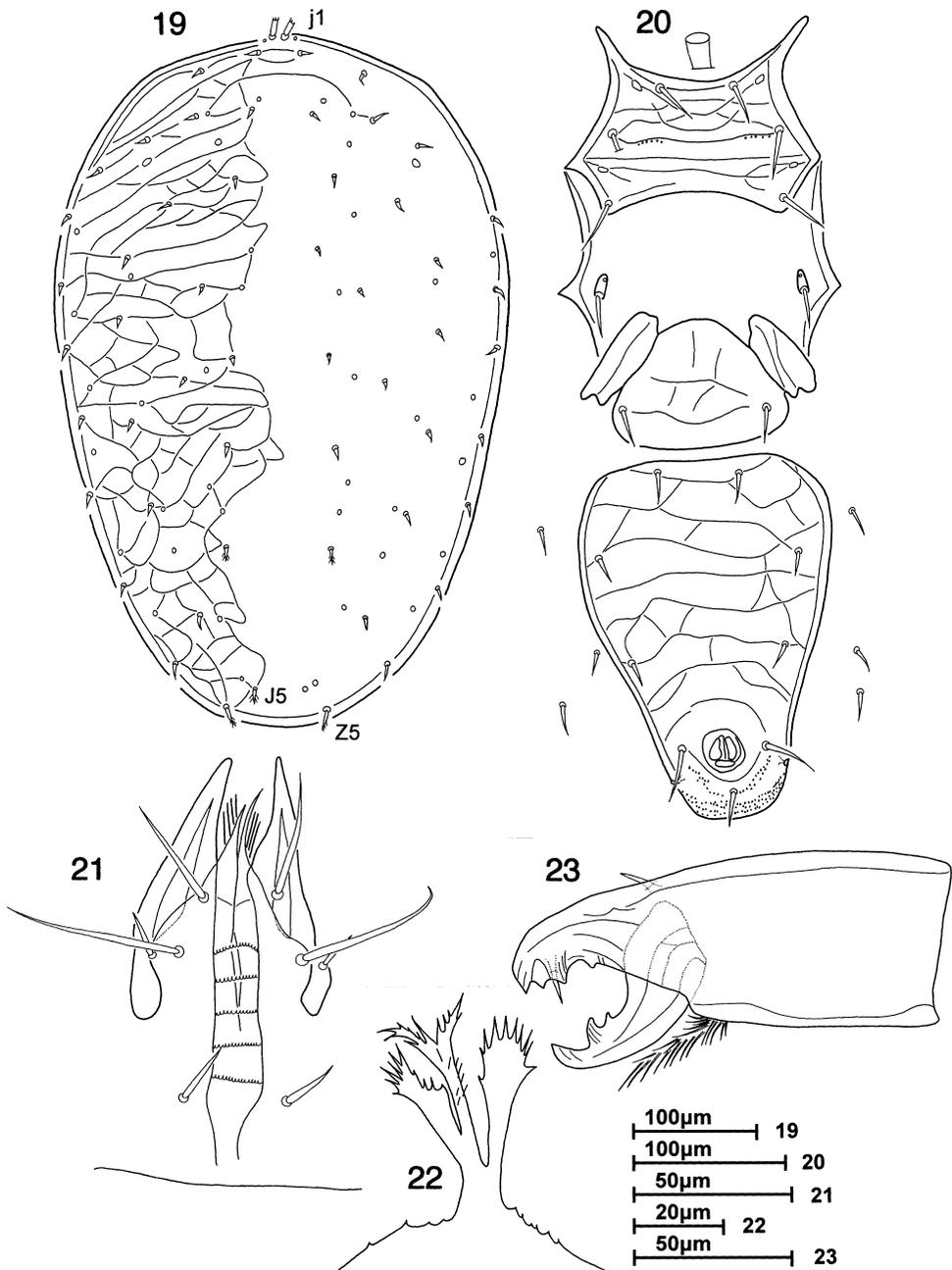
(Figs. 19–29)

Type series: Holotype: female (MZB.Acar.3024.3), site of Freeport Indonesia Co., Tembagapura, Timika, Fakfak, Papua, 11 March 1977, U. Rosichon leg., ex *Onthophagus* sp. Paratypes: 3 females and 1 male, other data same as for holotype. The specimens were collected from pinned dung beetles.

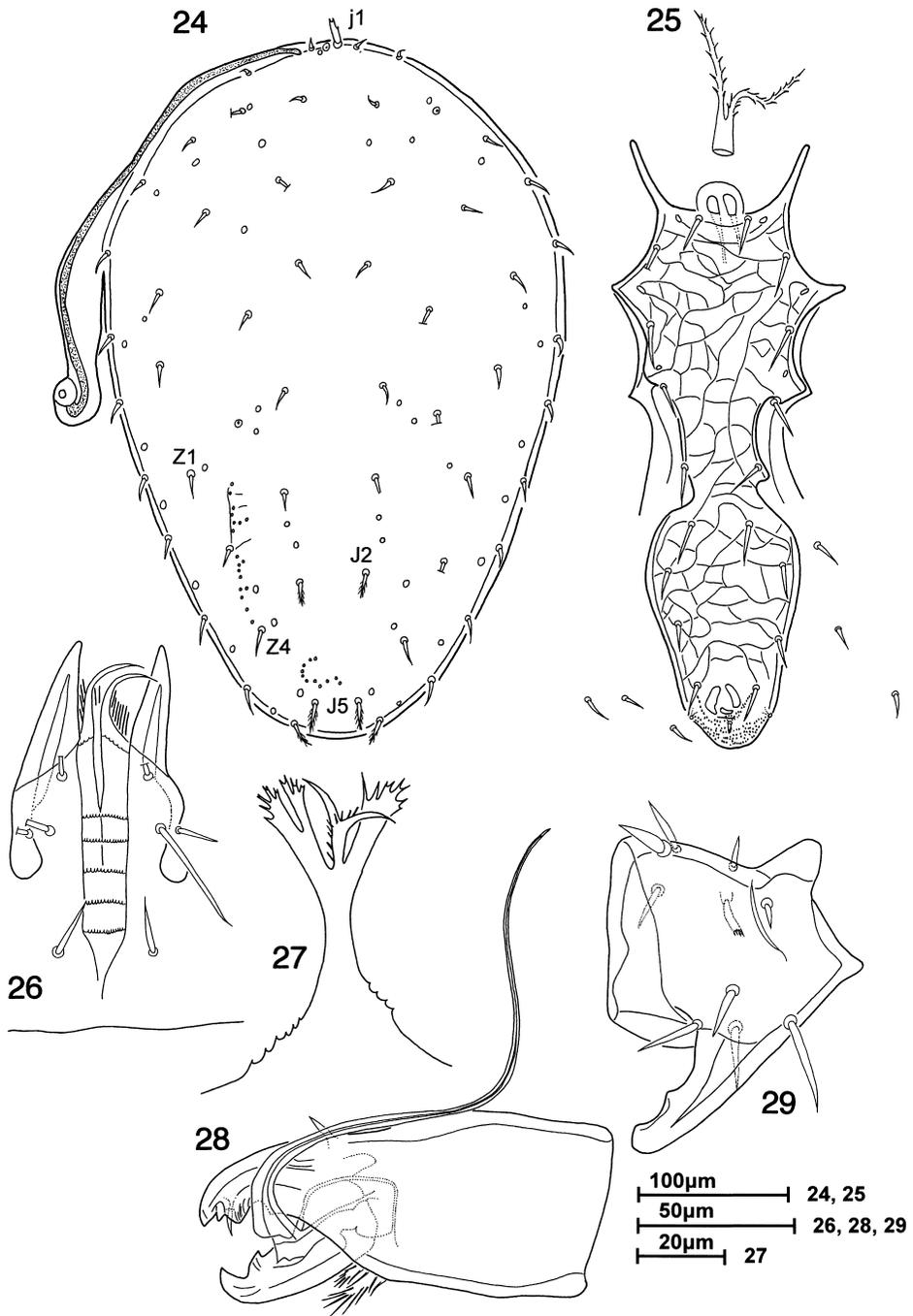
Female: Length of dorsal shield 529 (405–625), width at level of coxae II 326 (305–340) (n=4).

Dorsum (Fig. 19): Dorsal shield oval, attenuated posteriorly; surface ornamented with reticulate pattern; lateral margin of shield smooth; shield with 29 pairs of dorsal setae and 22 pairs of pores; setae j1 plumose; J5 pilose entirely; Z5 pilose in distal halves; J2 pilose in distal halves, in some cases simple; other dorsal setae small and simple.

Venter (Fig. 20): Tritosternum typical for genus. Sternal shield wider than long; length 66 (65–70), width at level of coxae II 111 (105–115) (n=4); surface of sternal shield ornamented with lines and punctations; l.ang., l.o.a., l.arc., and l.o.p. distinct; l.m.t. complete and with punctations along the line; 2 transverse lines present posterior to l.m.t. Metasternal shields oval and free; each with 1 simple seta and an anterior pore. Epigynial shield triangular, with pair of simple setae; surface ornamented with lines. Ventrianal shield ornamented with reticulate or somewhat semi-concentric pattern, and



Figs. 19–23. *Macrocheles timikaensis* n. sp. (holotype, female). 19, dorsum; 20, venter; 21, ventral view of gnathosoma; 22, tectum; 23, chelicera.



Figs. 24–29. *Macrocheles timikaensis* n. sp. (paratype, male). 24, dorsum; 25, venter; 26, ventral view of gnathosoma; 27, tectum; 28, chelicera; 29, femur II.

longer than wide; length 213 (200–240), width 151 (140–160); shield with 3 pairs of preanal setae, a pair of long paranal setae, and 1 postanal seta; all setae simple; cribrum with paranal extensions. Opisthogastric setae simple; pair of metapodal shields oblong. Postcoxal pore fused with podal shield. Peritremes with stigmata at a level between coxae III and IV; anterior extremities of peritremes located at level of setae j2.

Gnathosoma (Fig. 21): Well developed and sclerotized. Deutosternal groove with 5 transverse rows of denticles. Tectum (Fig. 22) with median process and pair of lateral processes; median process bifurcated and with many spicules; distal parts of lateral processes polyfurcated; basal margin serrate. Fixed digit of chelicera (Fig. 23) with simple dorsal seta, a proximal tooth, robust median tooth, large distal tooth, *pilus dentilis*, and terminal hook; movable digit with bidentate median tooth and terminal hook; length of fixed digit 133 (125–145), length of movable digit 151 (140–160) (n=4).

Legs: Most leg segments with simple and pilose setae, except for coxae I–IV, trochanters I–III, tibia and tarsus I with only simple setae. Leg chaetotaxy typical for genus; genu IV with 6 simple and pilose setae. Leg length (except ambulacrum, n=4): leg I, 356 (330–410); leg II, 349 (340–355); leg III, 296 (290–300); leg IV, 384 (370–410).

Sacculus foemineus: Not observed.

Male: Length of dorsal shield 475, width at level coxae II 240 (n=1).

Dorsum (Fig. 24): Dorsal shield similar to that of female; surface ornamented with punctations around Z1–Z4 and J5; shield with 29 pairs of dorsal setae and 22 pairs of pores; setae j1 plumose; J5 pilose entirely, J2 and Z5 pilose in distal halves; other dorsal setae small simple.

Venter (Fig. 25): Surface of holoventral shield ornamented with reticulation, length 330, width at level of coxae II 85 (n=1); 8 pairs of setae, 3 pairs of pores, pair of paranal setae, and 1 postanal seta present; all setae simple; cribrum with paranal extensions. Opisthogastric setae simple.

Gnathosoma (Fig. 26) as in female; tectum shown in Fig. 27. Fixed digit of chelicera (Fig. 28) with simple dorsal seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal hook; movable digit with robust median tooth, spermatodactyl, terminal hook, and without distal tooth; spermatodactyl remarkably long, its length 190 (n=1); length of fixed digit 130, length of movable digit 55 (n=1).

Legs: Most leg segments with simple and pilose setae, except for coxae I–IV, trochanters I–IV, tibiae I–II and tarsi I–II with only simple setae; femur II with large spur ventrally (Fig. 29); genu and tibia II with ventral small spur, respectively. Leg chaetotaxy typical for genus; genu IV with 6 setae. Leg length (except ambulacrum, n=1, leg II not available for measurement); leg I, 350; leg III, 270; leg IV, 350.

Immature stages: Unknown.

Etymology: This specific name is derived from the type locality, Timika.

Remarks: This species is similar to *Macrocheles rimbija* Halliday, 2000 recorded from Australia in the ventral ornamentation. However, *Macrocheles timikaensis* is distinguishable from *M. rimbija* by the following female features (corresponding conditions of *M. rimbija* in parentheses): 1) j4, z2, and z4 simple (pilose distally); 2) Z4, S4, and S5 simple (heavily pilose); and 3) sternal shield wider than long (longer than wide). Besides, all the

dorsal setae of the present species are shorter than those of *M. rimbija*. The paranal extensions of the cribrum seen in the present species are usual in soil-inhabiting species of *Macrocheles* and rarely observed in phoretic species as in adults and immatures of a few macrochelid species (Hartini and Takaku, 2003b). This character state of the present species may be plesiomorphic as in *Holostaspella katakurai* Hartini and Takaku, 2003.

***Macrocheles woroae* n. sp.**

(Figs. 30–34)

Type specimen: Holotype: female (MZB.Acar.3026), site of Freeport Indonesia Co., Tembapapura, Timika, Fakfak, Papua, 11 March 1977, U. Rosichon leg., ex *Onthophagus* sp. This specimen was collected from a pinned dung beetle.

Female: Length of dorsal shield 660, width at level of coxae II 380 (n=1).

Dorsum (Fig. 30): Dorsal shield oval, attenuated posteriorly, strongly areolate; lateral margin of the shield crenulate; shield with 29 pairs of dorsal setae and 22 pairs of pores; setae j1 broad anteriorly and strongly pectinate entirely; z1 simple; other dorsal setae pectinate (but s5 lost from the only available specimen).

Venter (Fig. 31): Tritosternum typical for genus. Length of sternal shield almost same as width; length 125, width at level of coxae II 130 (n=1); shield with coarse punctation and reticulations; l.m.t. complete; all sternal setae simple, not surpassing insertions of setae behind them. Metasternal shields oval and free; each shield with 1 simple seta and an anterior pore. Epigynial shield triangular, with pair of simple setae centrolaterally; surface strongly ornamented with punctations and lines. Ventrianal shield ornamented with irregular transverse lines of punctations, longer than wide: length 245, width 210 (n=1); shield with 3 pairs of preanal setae, pair of paranal setae, and 1 postanal seta; all setae simple; cribrum with paranal extensions. Opisthogastric setae simple and pilose; a pair of metapodal shields oblong. Postcoxal pore free from podal shield.

Gnathosoma (Fig. 32): Well developed and sclerotized. Deutosternal groove with 5 transverse rows of denticles. Tectum (Fig. 33) with median process and pair of lateral elements; median process bifurcated distally and with small spicules laterally; basal margin serrate. Fixed digit of chelicera (Fig. 34) with simple dorsal seta, robust median tooth, 2 small distal teeth, *pilus dentilis*, and terminal hook; movable digit with bidentate median tooth, minute distal tooth, and terminal hook; length of fixed digit 155, length of movable digit 65 (n=1).

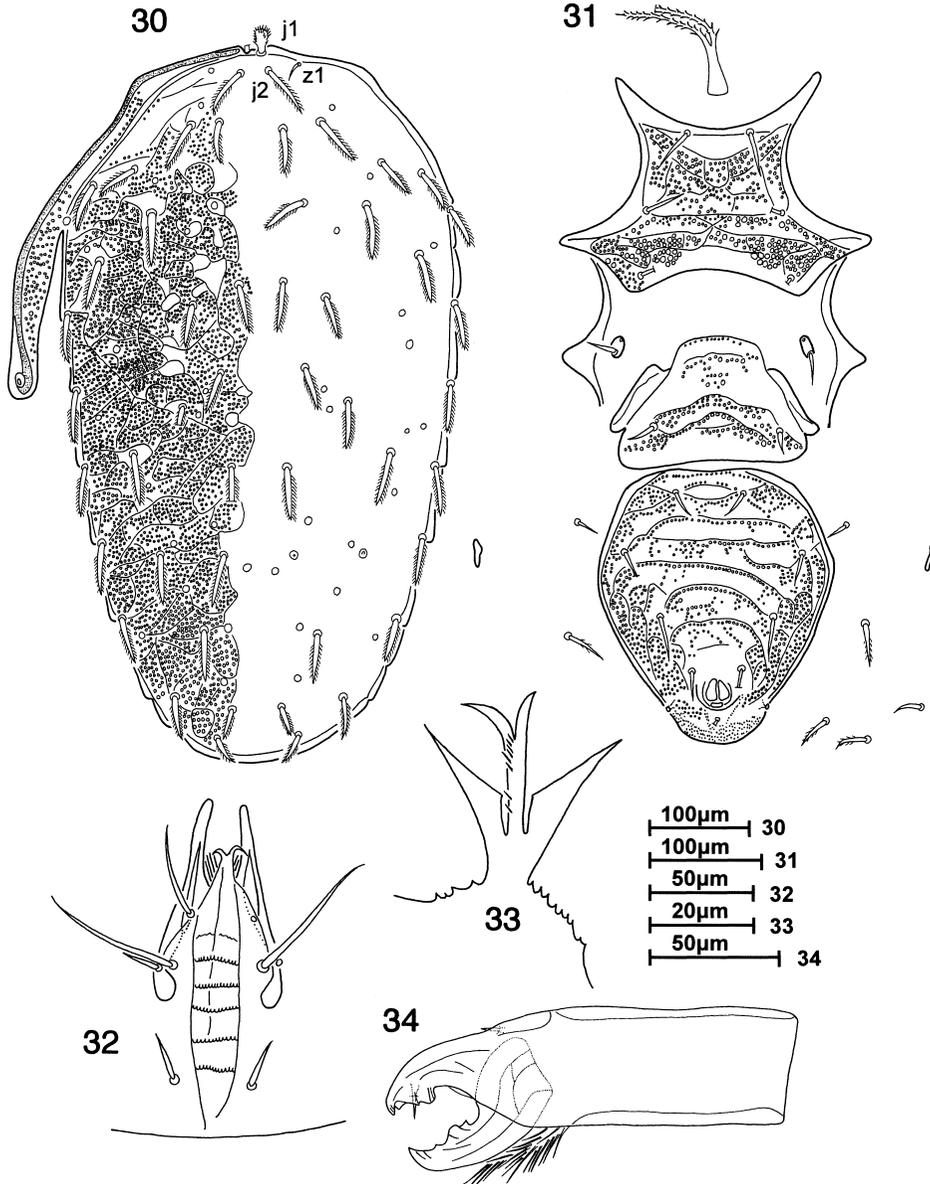
Legs: Most leg segments with simple, pilose, and plumose setae, except for coxa, trochanter, and tarsus I with only simple setae. Leg chaetotaxy typical for genus; genu IV with 6 plumose setae. Leg length (except ambulacrum, n=1): leg I, 450; leg II, 450; leg III, 410; leg IV, 580.

Sacculus foemineus: Not observed.

Male and immature stages: Unknown.

Etymology: This species is named in honour of Dr. Woro A. Noerdjito, who is an entomologist in LIPI and co-supervisor of SH in Indonesia.

Remarks: This species is similar in the shape of dorsal setae to *Macrocheles plumosus*



Figs. 30–34. *Macrocheles woroae* n. sp. (holotype, female). 30, dorsum; 31, venter; 32, ventral view of gnathosoma; 33, tectum; 34, chelicera.

Evans and Hyatt, 1963 from Kalimantan (Indonesia and Malaysia). However, *Macrocheles woroae* is distinguishable from *M. plumosus* by the following features (corresponding conditions of *M. plumosus* in parentheses): 1) dorsal shield bearing 29 pairs of setae (28 pairs); 2) areolate pattern covering most surface of dorsal shield (a part of dorsal shield); 3) j1 longer, broad anteriorly, and pectinate in the margin (extremely short and palmate); 4)

margin of dorsal shield crenulate (smooth); 5) j5 and z5 bipectinate (slightly bipectinate); 6) sternal shield with coarse punctations and reticulations (entirely covered by a conspicuous reticulation); and 7) epigynial setae located centrolaterally (on the posterior corner). Ornamentations of ventral shields of *M. woroae* is very similar to those of *Macrocheles eta* Halliday, 2000 from Australia, but *M. woroae* is different from *M. eta* in the following features (conditions of *M. eta* in parentheses): 1) j2, j3, j5, j6, z1, z5, z6, s2, s4, and J1 pectinate (fine smooth, pointed); 2) z2, r4, s6, J2, J5, Z3, S1, and S2 pectinate (pilose for most of their length); and 3) lateral margin of dorsal shield crenulate (smooth).

ACKNOWLEDGEMENTS

We would like to express our sincere thanks to Prof. H. Katakura (Hokkaido Univ.) for critical reading of this manuscript and Drs. Arie Budiman and Siti Nuramaliati Prijono (LIPI) for their encouragement and giving us an opportunity to study this subject and use facilities. We extend our thanks to two anonymous referees for their constructive criticism. This study was partly supported by Grant-in-Aid for Scientific Research (Nos. 11691161, 14740468, 17405011) from Japan Society for the Promotion of Science.

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摘要

インドネシア・パプア産食糞性甲虫類の体表上から採集されたハエダニ属のダニ類 (ダニ目: トゲダニ亜目: ハエダニ科)

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インドネシアのパプア (ニューギニア島西部) において採集された食糞性甲虫の体表上からハエダニ属 (*Macrocheles*) のダニ類 10 種が見つかった。パプアからのハエダニ属の記録は初めてである。10 種のうち 5 種 (*Macrocheles erniae*, *M. kojimai*, *M. manokwariensis*, *M. timikaensis*, *M. woroae*) を新種として記載した。残り 5 種は、オーストラリア、パプアニューギニアから記録がある *M. agilis*, オーストラリアで記録されている *M. borealis*, アジア・アフリカの熱帯域に生息する *M. limue*, 汎存種である *M. merdarius*, 種レベルの同定に必要なオス, 未成熟個体が得られていないため未同定である *M. sp. aff glaber* であった。