Javanese Species of the Mite Genus Macrocheles (Arachnida: Acari: Gamasina: Macrochelidae)

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Source: Zoological Science, 20(10) : 1261-1272

Published By: Zoological Society of Japan

URL: https://doi.org/10.2108/zsj.20.1261

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**ABSTRACT**—Twelve mite species of the genus *Macrocheles* (Acari: Macrochelidae) were collected from the body surface of dung beetles in Java, Indonesia. Of these, three species, i.e., *Macrocheles jabarensis*, *M. jonggolensis*, and *M. sukabumiensis*, were described as new to science. Female of *M. dispers* was redescribed. Two species, i.e., *M. baliensis* and *M. sukaramiensis*, were recorded from Java for the first time. The occurrence of five species previously recorded from Java, i.e., *M. hallidayi*, *M. kraepelini*, *M. limue*, *M. oigru*, and *M. merdarius*, were reconfirmed. Taxonomic status of *M. sp. aff. glaber* was not settled in the present study, because we could not obtain the male and immatures which are indispensable for exact identification. In total 15 species of the genus *Macrocheles*, including 3 species already recorded but not collected in this research (*M. crispa*, *M. krantzi*, and *M. subbadius*), are known from Java up to date.

**Key words:** *Macrocheles*, Macrochelidae, mites, Java, Indonesia

**INTRODUCTION**


As the result of our investigation of macrochelid mites in Java in 2002, we found twelve species of the genus *Macrocheles* associated with dung beetles. Three of these species are described here as new to science, and two species are new records from Java.

All the mite specimens were collected from the ventral surface of scarabaeid dung beetles and were fixed in 70% ethyl alcohol. A part of the specimens were dissected under a stereoscopic microscope after clearing in lactic acid. Each body part was mounted on a slide in Hoyer’s medium or PVA (polyvinyl alcohol-lactic acid mixture) medium. Observations and photographs were made with compound, phase contrast, and differential interference contrast microscope. Illustrations were prepared with the aid of a drawing tube.

All measurements are given in micrometres (µm). Measurements in each description are provided as averages and range in parentheses, if more than two specimens were measured. Dorsal chaetotaxy follows Halliday (1987). Other terminology, especially the description of sternal ornamentation, follows Walter and Krantz (1986b). The holotypes will be deposited in the collection of the Museum Zoologicum Bogoriense, Bogor, Indonesia (MZB), and remaining specimens will be deposited in the MZB and the Zoological Collections of the Graduate School of Science, Hokkaido University, Sapporo, Japan (ZIHU).

**DESCRIPTIONS**

*Family Macrochelidae* Vitzthum, 1930

*Genus Macrocheles* Latreille, 1829

*M. baliensis* Takaku and Hartini, 2001


**Material examined.** Thirty three females, alt. 530 m, Kendalsari, Luwuk Waru, Malang, East Java, 26–28 August 2000, S. Hartini leg., ex *Onitis* sp.; 3 females, alt. 600 m, Cimenyan, Sukadamai, Jonggol, Bogor, West Java, 14

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The present species was originally described in the genus *Holocelaeno* (Macrochelidae) by Berlese (1910). Krantz (1967a) transferred this species to the genus *Macrocheles* on the basis of specimens in the Berlese collection, Florence.

**Material examined.** Although this species was not collected in our investigation, Berlese (1910) recorded this species from Java.

**Habitat.** *Copris affinis* (Scarabaeidae).

**Distribution.** Indonesia (Java).

**Macrocheles dispar** (Berlese, 1910)

(Figs. 1–6)


*Macrocheles* (*Coprholaspis*) *dispar*: Berlese, 1918: 151; Vitzthum, 1925: 13–16.

*Macrocheles dispar*: Walter and Krantz, 1992: 244, fig. 1D.

The present species was described by Berlese (1910). Walter and Krantz (1992) provided a photograph of the sternal shield and diagnosis of the species. However, the female dorsal setae show some variation, and males and immatures have not been described. Here we redescribe the adult female of this species on the basis of the materials collected in Java.

**Female.** Length of dorsal shield 698 (580–895), width at level of coxae II 401 (355–475) (n=20). Living specimens yellowish brown.

**Dorsum** (Fig. 1). Dorsal shield oval, attenuated posteriorly; surface with reticulation and punctations; lateral margin of the shield smooth; shield with 28 pairs of dorsal setae and 22 pairs of pores; j1 plumose distally; j4, z2, z4, r2-4, S5, J5, and Z5 pilose distally; j2, j3 and s2 simple in most specimens, but in some cases pilose distally; other setae simple.

**Venter** (Fig. 2). Length of sternal shield 141 (122.5–182.5), width at level of coxae II 135 (125–155) (n=20); sternal shield ornamented with lines and punctations: linea angulata (l.ang.), linea media transversa (l.m.t.), and linea oblique posteriores (l.o.p.) with distinct punctations; l.o.p. not connected with l.m.t.; l.m.t. complete; center of posterior half of the shield with small punctations; shield with 3 pairs of simple setae and 2 pairs of pores; all setae long, but not surpassing insertions of setae behind them. Metasternal shield small and free; each shield with 1 simple seta and an anterior pore.

Length of epigynial shield 132 (107.5–157.5), width 154 (107.5–192.5); surface ornamented with lines and punctations medially; shield with pair of simple setae on lateral side.

Ventralian shield pentagonal and ornamented with semiconcetric lines; length 228 (192.5–275), width 210 (182.5–245) (n=20); shield with 3 pairs of preanal setae, 1 pair of paranal setae, and 1 postanal seta; all setae simple. Ophisthogaster with simple and/or pilose setae and a pair of oblong metapodal shields. Postcoxal pore free from podal shield. Peritreme with stigmata at level between coxae III and IV; anterior extremities of peritreme located at level of setae z1.

**Gnathosoma** (Fig. 3) well developed and sclerotized; deutosternal groove with 5 transverse rows of denticles; 3 pairs of hypostomal setae and 1 pair of palpcxal setae present; all setae simple; internal posterior hypostomal setae longer than other setae. Palpal chaetotaxy of trochanter, femur, and genu 2-5-6. Tectum (Fig. 4) with median process and pair of lateral elements; median process bifurcated distally and with small spicules; lateral elements smooth. Fixed digit of chelicera (Fig. 5) 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 194 (175–250) and movable digit 75 (65–90) (n=19).

**Legs.** Most leg segments with simple, pilose, and plumose setae, except for coxae I-IV, trochanters I-III, genu II, genu I, tibiae II-III, and tarsus I with only simple setae. Leg chaetotaxy typical for the genus. Genu IV with 6 simple and pilose setae, and its chaetotaxy 1, 2/1, 2/0, 0.

Leg length (except ambulacrum, n=20): leg I, 630 (455–830); leg II, 561 (510–775); leg III, 548 (495–735); leg IV, 804 (725–1030).

**Sacculus foemineus** (Fig. 6). Pair of sacculi fused; small cornu rounded distally and sclerotized; spermatheca oval.

**Male and other stages.** Unknown.

**Material examined.** Nine females, alt. 980 m, Mt. Salak, Sukamantri, Ciomas, Bogor, West Java, 10–13 September 2001, Sarino leg., *ex Onthophagus* sp. and *Catharsius* sp.; 7 females, alt. 950 m, Mt. Halimun National Park, Cikaniki, Bogor, West Java, 27–28 February 2001, Rofik and Sarino leg., *ex Onthophagus* sp.; 1 female, alt. 600 m, Sukadamai, Sukamakmur, Jonggol, Bogor, West Java, 1 July 2001, S. Hartini and Ida leg., *ex Onthophagus* sp.; 1 female, alt. 900 m, Mt. Gede Pangrango National Park, Bodogol, Cicurug, Sukabumi, West Java, 7–9 July 2000, E. Cholik leg., *ex Catharsius* sp.; 1 female, Pegandan, Sampangan, Gajah Mungkur, Semarang, Central Java, 1 June 2001, Hengky leg., *ex Copris* sp.

**Habitat.** *Catharsius molossus* and genera *Aphodius*, *Catharsius*, *Copris*, *Enoplotrupes*, *Onthophagus*, *Paragymnopleurus* (Scarabaeidae).

**Distribution.** Indonesia (Java, Sumatra), Viet Nam, the Philippines, China (Szechuan), Taiwan.
Figs. 1–6. *Macrocheles dispar*, female. 1, dorsum; 2, venter; 3, ventral view of gnathosoma; 4, tectum; 5, chelicera; 6, *sacculus foemineus*.
Macrocheles hallidayi Walter and Krantz, 1986


The female of this species was adequately described and illustrated by Walter and Krantz (1986a), the male and immature stages were described on the basis of Sumatran specimens by Takaku (1998). Some specimens of *M. hallidayi* were also collected from Bali (Takaku and Hartini, 2001).


**Habitat.** *Helicopris bucephalus, Catharsius sagax,* and genera *Copris, Onitis, Onthophagus* (*Scarabaeidae*).

**Distribution.** India, Thailand, Cambodia, Indonesia (Java, Madura, Sumatra, Bali), and Malaysia (Sarawak).

Macrocheles kraepelini (Berlese, 1905)


Macrocheles (Copholaspis) kraepelini Berlese, 1918: 146; Vitzthum, 1926: 34–35.

Macrocheles (Copholaspis) multihamatus Vitzthum, 1926: 29–34, figs. 20–22.


The female of the present species was described by Berlese (1905) on the basis of material from Tjibodas, West Java. Krantz and Filipponi (1964) redescribed and illustrated this species. The male and immature stages were described by Halliday (1986) and Walter and Krantz (1986a).


**Habitat.** *Catharsius molossus, Copris incertis, Coptructyla ducalis, Onitis falcatus, Onthophagus laminatus, Onthophagus sp.* (*Scarabaeidae*), *Pachylister chinensis* (*Histeridae*), breadfruit compost, decaying forest litter.

**Distribution.** Pakistan, India, Thailand, Viet Nam, Malaya, Singapore, the Philippines, Fiji, Caroline Island, Australia, Indonesia (Java, Madura, Sumatra, Sulawesi).

Macrocheles krantzi Evans and Hyatt, 1963


A description and a figure of this species were given by Evans and Hyatt (1963), and variations in sternal ornamentation and dorsal setae were documented by Krantz and Filipponi (1964).

**Material examined.** This species was not collected in our investigation.

**Habitat.** Genera *Scarabaeus, Onthophagus* (*Scarabaeidae*), and dung. This species has been collected from poultry manure in West Java by Hartini and Aziz (1992); although their paper included some misidentification, *M. krantzi* was reconfirmed by GT on the basis of voucher specimens deposited in MZB.

**Distribution.** India, Sri Lanka, Australia, Indonesia (Java, Bali).

Macrocheles limue Samˇsiˇnák, 1962


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


Habitat. Genera Allonitis, Aphodius, Catharsius, Copris, Garreta, Heliocopris, Heteronitis, Liatongus, Notopedaria, Onthophagus, Pentodon, Phanaeus, Synapsidis (Scarabaeidae), other beetle families Histeridae, Lucanidae, Silphidae, Trogidae, mammals Rodentia, and soil, leaf litter, cow dung, compost, manure, and so on.

Distribution. Cosmopolitan. In Indonesia, this species is known from Java and Bali.

Macrocheles oigru Walter and Krantz, 1986


Macrocheles oigru: Takaku, 2001: 500, figs. 1 and 7; Takaku and Hartini, 2001: 324.

This species was adequately described and illustrated by Walter and Krantz (1986b).


Habitat. Onitis philemon, Onitis faliatus, Onitis sp., Copris sp., Onthophagus sp. (Scarabaeidae).

Distribution. India, Indonesia (Java, Sumatra, Bali).

Macrocheles subbadius (Berlese, 1904)

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


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

Material examined. Two females, alt. 600 m, Sukadamai, Sukamakmur, Jonggol, Bogor, West Java, 1 July 2000, S. Hartini and Ida leg., ex Onthophagus sp.; 3 females, alt. 980 m, Mt. Salak, Sukamantri, Ciomas, Bogor, West Java, 10–13 September 2001, Sarino leg., ex Onthophagus sp.

Habitat. Genera Aphodius, Catharsius, Copris, Coptdactyla, Euoniticellus, Geotrupes, Lepanus, Liatongus, Notopedaria, Onthophagus, Pentodon, Phanaeus, Synapsidis (Scarabaeidae), other beetle families Histeridae, Lucanidae, Silphidae, Trogidae, mammals Rodentia, and soil, leaf litter, cow dung, compost, manure, and so on.

Distribution. Europe, Saudi Arabia, Russia, U.S.A., Hawaii, China, Australia, New Zealand, Indonesia (Java).

Macrocheles sukaramiensis Takaku, 2001


A description and a figure of the female were given by Takaku (2001).

Material examined. Thirty two females, 4 males, alt. 980 m, Mt. Salak, Sukamantri, Ciomas, Bogor, West Java, 10–13 September 2001, Sarino leg., ex Catharsius sp. and Onthophagus sp.

Habitat. Catharsius molossus, Catharsius sp., Onthophagus sp. (Scarabaeidae)
Distribution. Indonesia [Java (new record), Sumatra].

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

The present species is assignable to the *glaber* species complex (Walter and Krantz, 1986b) because of the following female characteristics: 1) dorsal setae *j*1, *j*4, *z*4, and *z*5 pilose distally; 2) sternal ornamentation distinct; 3) ventral 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 allies, it is necessary to collect mites alive, rear male progeny from them individually, and then observe characters of male and/or immures (Halliday, 1986). In this investigation, we could not culture the female or collect the male and immatures, so that we cannot confirm the taxonomic status of the present species.

**Material examined.** Six females, alt. 600 m, Sukadamai, Sukamakmur, Jonggol, Bogor, West Java, 1 July 2000, S. Hartini and Ida leg., *ex Onthophagus* sp.; 5 females alt. 600 m, Cimenyan, Sukamakmur, Jonggol, Bogor, West Java, 3 September 2000, S. Hartini leg., *ex Onitis* sp.; 9 females, alt. 980 m, Mt. Salak, Sukamantri, Ciomas, Bogor, West Java, 10–13 September 2001, Sarino leg., *ex Copris* sp.; 1 female, alt. 680 m, Soekarno Hatta, Malang, East Java, 28 August 2001, S. Hartini leg., *ex Onitis* sp.

*Macrocheles jabarensis* sp. nov. (Figs. 7–12)

**Female.** Length of dorsal shield 736 (620–905), width at level of coxae II 411 (340–535) (n=20). Living specimens yellowish brown.

**Dorsum** (Fig. 7). Dorsal shield oval, attenuated posteriorly, surface ornamented with reticulation and punctations, lateral margin of shield smooth; shield bearing 28 pairs of dorsal setae and 22 pairs of pores; *j*1 plumose distally; *S*5, and *Z*5 pilose in distal half; *J*5 entirely pilose; other setae simple; in some cases, *j*4 pilose distally.

**Venter** (Fig. 8). Sternal shield length 143 (122.7–182.5), width at level of coxae II 152 (127.5–167.5) (n=20); *l.gn.* and *l.p.* distinct; *l.m.t.* complete; *l.arc.* distinct or present as a part of reticulation; shield with 3 pairs of simple setae and 2 pairs of pores; length of the setae similar to each other. Metasternal shield oval and free; each shield with 1 simple seta and an anterior pore.

Length of epigynial shield 124 (100–162.5), width 171 (150–215); surface ornamented with lines; shield with pair of simple setae and pores on lateral side.

Ventrinal shield with punctations along semiconcentric lines, and longer than wide; length 241 (195–297.5), width 226 (177.5–182.5); shield with 3 pairs of preanal setae, pair of paranal setae, and 1 postanal seta; all setae simple, except for pilose postanal seta. Ophisthogaster with more than 20 pairs of simple setae and a pair of oblong metapodal shields. Postcoxal pore free from podial shield. Peritreme with stigmata at level between coxae III and IV; anterior extremities of peritreme located at level of setae z1.

**Gnathosoma** (Fig. 9) well developed and sclerotized; deutosternal groove with 5 transverse rows of denticles; 3 pairs of hypostomal setae and 1 pair of palpcoxal setae present; all setae simple; internal posterior hypostomal setae longer than other setae. Palpal chaetotaxy of trochanter, femur, and genu 2:5:6. Tectum (Fig. 10) with median process and pair of lateral elements; median process bifurcates distally and with small spicules; lateral margin serrate. Fixed digit of chelicera (Fig. 11) 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 193 (175–242.5) and movable digit 87 (60–100) (n=20).

**Legs.** Most leg segments with simple, pilose and plumose setae, except for coxae I–IV, trochanters I–III, genu I, tibia I and II, tarsus I with only simple setae.

Leg chaetotaxy typical for the genus. Genu IV with 6 simple and pilose setae and its chaetotaxy 1, 2/1, 2/0, 0.

Leg length (except ambulacrum, n=20): leg I, 628 (500–810); leg II, 572 (385–710); leg III, 570 (440–740); leg IV, 815 (655–1085).

**Sacculus foemineus** (Fig. 12). A pair of fused sacculi; corium rounded distally and sclerotized; spermatheca oval.

**Male and other stages.** Unknown.

**Type series.** Holotype: female (MZB.Acar.2335), alt. 950 m, Mt. Halimun National Park, Cikaniki, Bogor, West Java, 27–28 September 2000, Rofik and Sarino leg., *ex Onthophagus* sp. Paratypes: 14 females, other data same as for holotype; 2 females, alt. 900 m, Mt.Gede Pangrango National Park, Bogolol, Cicurug, Sukabumi, West Java, 7–9 July 2000, E. Cholik leg., *ex Catharius* sp.; 3 females, alt. 980 m, Mt. Salak, Sukamantri, Ciomas, Bogor, West Java, 10–13 September 2001, Sarino leg., *ex Onthophagus* sp.

**Etymology.** The species name is derived from abbreviation of Jawa Barat (=West Java).

**Remarks.** Sternal ornamentation of the present species is similar to that of *M. dispar* (Berlese, 1910) recorded from Southeast Asia. However, *j*4, *z*4, and *r*2-4 are simple in *M. jabarensis*, while those setae are pilose distally in *M. dispar*.

*Macrocheles jonggolensis* sp. nov. (Figs. 13–18)

**Female.** Length of dorsal shield 728 (715–735), width at level of coxae II 480 (460–500) (n=4). Living specimens yellowish brown.

**Dorsum** (Fig. 13). Dorsal shield oval, attenuated posteriorly; surface ornamented with faint reticulation and punctations; lateral margin of shield smooth; shield bearing 28 pairs of dorsal setae and 22 pairs of pores; *j*1 plumose distally; *j*3, *j*5, *j*6, *z*1, *z*5, *z*6, and *J*2 simple; other setae pilose distally.

**Venter** (Fig. 14). Sternal shield wider than long; length 125, width at level of coxae II 171 (170–172.5) (n=4); ornamentation of sternal shield weak and without punctuations;
Figs. 7–12. *Macrocheles jabarensis* sp. nov., female, holotype. 7, dorsum; 8, venter; 9, ventral view of gnathosoma; 10, tectum; 11, chelicera; 12, sacculus foemineus.
Figs. 13–18. *Macrocheles jonggolensis* sp. nov., female, holotype. 13, dorsum; 14, venter; 15, ventral view of gnathosoma; 16, tectum; 17, chelicera; 18, sacculus foemineus.
anterior half of shield ornamented with lines; l.ang., I.o.a., and l.o.p. present; l.m.t. complete; l.o.p. connected to l.m.t. Shield with 3 pairs of simple setae and 2 pairs of pores; all setae long, but not surpassing insertions of setae behind them. Metasternal shield oval and free.

Length of epigynial shield 158 (127.5–140), width 168 (152.5–187.5) (n=4); surface without punctations and lines; shield with pair of simple seta on posterolateral corners.

Ventralian shield with semicentric faint lines, longer than width; length 231 (222.5–235), width 208 (205–212.5) (n=4); shield with 3 pairs of preanal setae, pair of paranal setae, and 1 postanal seta; all setae simple. Opisthogaster with simple setae; a pair of oblong metapodal shields. Postcoxal pore free from podial shield. Peritreme with stigmata at level between coxae III and IV; anterior extremities of peritreme located at lateral of setae z1.

*Gnathosoma* (Fig. 15) well developed and sclerotized; deutosternal groove with 5 transverse rows of denticles; 3 pairs of hypostomal setae and 1 pair of palpalcoxal setae present; all setae simple; internal posterior hypostomal setae longer than other setae; palpal chaetotaxy of trochanter, femur, and genu 2- 5- 6. Tectum (Fig. 16) with median process and pair of lateral elements; median process bifurcate distally and with small spicules; lateral margin smooth. Fixed digit of chelicera (Fig. 17) with simple dorsal seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal hook; movable digit with bidentate median tooth, small distal tooth, and terminal hook; arthroplidal process strongly pilose and long; length of fixed digit 220 (212.5–232.5) (n=3) and movable digit 86 (85–87.5) (n=4).

**Legs.** Most leg segments with simple, pilose, and plumose setae, except for coxae I–IV, trochanters I–III, genu I, tibiae I, III, tarsi I, III, IV with only simple setae and tarsus II with thick simple setae.

Leg chaetotaxy typical for genus. Genu IV with 6 simple and plumose setae and its chaetotaxy 1, 2, 1/0, 0.

Leg length (except ambulacrum, n=4): leg I, 581 (555–615); leg II, 568 (537.5–602.5); leg III, 544 (520–565); leg IV, 730 (702.5–742.5).

*Sacculus foemenus* (Fig. 18). A pair of connected broadly saccular; cornu distinct and sclerotized; spermatheca oval.

**Male and other stages.** Unknown

**Type series.** Holotype: female (MZB.Acar.2343.1), alt. 600 m, Sukadamai, Sukamakmur, Jonggol, Bogor, West Java, 25 October 2000, S. Hartini leg., *ex Gymnopleurus* sp. Paratypes: 3 females (MZB.Acar.2343.2-4), other data same as for holotype.

**Etymology.** The species name is derived from type locality.

**Remarks.** The present species is very similar to *Macrocheles transversus* Evans and Hyatt, 1963 from Africa in its external ornamentation as follows: 1) l.ang. joined into one line; 2) l.o.p. connected with l.m.t.; 3) sternal punctations absent. However, the shape of some dorsal setae are different between the two species. The majority of dorsal setae are distally pilose in the present species, while they are simple in *M. transversus*. For example, z2, z4, and Z1-Z5 of the present species are pilose distally, whereas those of *M. transversus* are simple, except for Z5.

**Macrocheles sukabumiensis** sp. nov. (Figs. 19–24)

**Female.** Length of dorsal shield 745 (700–795), width at level of coxae II 444 (425–530) (n=21). Living specimens yellowish brown.

**Dorsum** (Fig. 19). Dorsal shield oval, attenuated posteriorly; surface with areolate pattern; lateral margin of the shield smooth; shield with 28 pairs of dorsal setae and 22 pairs of pores; j1 plumose for most of its length; z1 short and simple; j5 and Z5 shorter than surrounding setae and pectinate; j6 fine with pilosity weak in some specimens; other setae pectinate for most of their length.

**Venter** (Fig. 20). Length of sternal shield 156 (150–175), width at level of coxae II 161 (150–175) (n=21); surface of shield with strong punctations around l.ang.; l.o.a., l.o.p., and l.arc. with punctations along those lines; l.m.t. almost complete and with distinct punctations; paired punctate areas present in posterior half of shield; shield with 3 pairs of simple setae and 2 pairs of pores; all setae long, but not surpassing insertions of setae behind them. Metasternal shield oval and free; each shield with 1 simple seta and an anterior pore.

Length of epigynial shield 119 (105–135), width 194 (170–225) (n=21); surface ornamented with lines and punctations anteriorly and medially; shield with pair of simple setae.

Ventrional shield pentagonal, broad, with punctations along transverse lines and laterally; length almost same as width; length 264 (235–295), width 257 (235–285) (n=21); shield with 3 pairs of preanal setae, pair of paranal setae, and 1 postanal seta; all setae simple, except for pilose postanal setae. Opisthogaster with simple and/or pilose setae; a pair of oblong metapodal shields. Postcoxal pore free from podial shield. Peritreme with stigmata at level between coxae III and IV; anterior extremities of peritreme located at level between seta z1 and j1.

*Gnathosoma* (Fig. 21) well developed and sclerotized; deutosternal groove with 5 rows of denticles; 3 pairs of hypostomal setae and 1 pair of palpalcoxal setae present; all setae simple; internal posterior hypostomal setae longer than other setae; palp chaetotaxy of trochanter, femur, and genu 2- 5- 6. Tectum (Fig. 22) with median process and pair of lateral elements; median process bifurcate distally and with small spicules; lateral margin smooth. Fixed digit of chelicera (Fig. 23) 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; arthroplidal process strongly pilose and long; length of fixed digit 221 (205–215) (n=7) and movable digit 75 (72.5–90) (n=19).

**Legs.** Most leg segments with simple and plumose setae, except for coxae I–IV, trochanters I–IV, tibia II and
Figs. 19–24. *Macrocheles sukabumiensis* sp. nov., female, holotype. 19, dorsum; 20, venter; 21, ventral view of gnathosoma; 22, tectum; 23, chelicera; 24, *sacculus foemineus*. 
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tarsi I and III with only simple setae.

Leg chaetotaxy typical for the genus. Genu IV with 6 simple and plumose setae and its chaetotaxy 1, 2/1, 2/0, 0.

Leg length (except ambulacrum, n=21): leg I, 640 (585–705); leg II, 580 (535–620); leg III, 560 (515–605); leg IV, 806 (700–865).

Sacculus foemineus (Fig. 24). A pair of fused sacculi; cornu rounded distally and sclerotized; spermatheca oval.

Male and other stages. Unknown

Type series. Holotype: female (MZB.Acar.2134.3), alt. 900 m, Mt. Gede Pangrango National Park, Bodogol, Cicurug, Sukabumi, Bogor, West Java, 7–9 July 2001, E. Cholik leg., ex Onthophagus sp. Paratypes: 3 females other data same as for holotype; 13 females, alt. 950 m, Mt. Halimun National Park, Cikaniki, Bogor, West Java, 6 July 2001, Rotik and Sarino leg., ex Onthophagus sp.; 4 females, alt. 980 m, Mt. Salak, Sukamantri, Ciomas, Bogor, West Java, 10–13 September 2001, Sarino leg., ex Onthophagus sp.

Etymology. The species name is derived from the type locality.

Remarks. The present species is similar to Macrocheles plumosus Evans and Hyatt, 1963 collected in the expedition to Sarawak, Malaysia. However, Macrocheles sukabamiensis is distinguishable from M. plumosus by the following characters: (corresponding conditions of M. plumosus in parentheses): 1) j1 normal length and more than distal half plumose (short and palmate); 2) z1 simple (pilose); 3) median part of sternal shield ornamented with punctations and lines, and without conspicuous reticulation (covered entirely by conspicuous reticulation); 4) genu IV with six simple and plumose setae (all setae strongly pilose).

Besides the abovementioned characters, punctate areas in the posterior half of the sternal shield of the present species are smaller than those of M. plumosus, and punctations in lateral side of ventrianal shield of the present species are weaker than those of M. plumosus.

Key to the species of the genus Macrocheles in Java (female only)

1. All dorsal setae simple, short, and spine-like, except for pilose J5 (and j1 slightly pilose in M. baliensis, M. krantzi, and M. limus). .................... 2
   – Some dorsal setae pilose or plumose or pectinate at least distally. ........................................................... 6

2. Posterior edge of sternal shield close to metasternal shield; l.arc. convergent medially; ventrianal shield expanded laterally. .......... M. limus Samšiňák, 1962
   – Posterior edge of sternal shield disjunct from metasternal shield; l.arc. not as above; ventrianal shield subtriangular or pentagonal, not expanded. .......... 3

3. L.o.a. of sternal shield connected by lines. .......... 4
   – L.o.a. absent or not connected by lines. ............ 5

4. Lines of sternal shield with distinct punctations; genu IV with 7 setae. .......... M. subradius (Berlese, 1904)
   – Lines and punctations of sternal shield very faint; genu IV with 6 setae. .......... M. merdarius (Berlese, 1889)

5. Anterior half of sternal shield ornamented with somewhat reticulate pattern of punctate lines............................. M. baliensis Takaku and Hartini, 2001
   – Ornamentation of sternal shield faint and without reticulate ornamentation. ... M. krantzi Evans and Hyatt, 1963

6. All dorsal setae pilose in most length, except for simple z1. .................... M. sukabamiensis sp. nov.
   – Some dorsal setae pilose in most length, except for simple z6. .......... 7

7. Some dorsal setae entirely pilose or pectinate. ........... 8
   – Dorsal setae simple or pilose distally, except for J5 pilose for the entire length. ........................................ 10

8. Dorsal setae j3, j4, z4, s4, and s5 simple. ................... M. crispa (Berlese, 1910)
   – Dorsal setae j3, j4, z4, s4, and s5 pilose. ............ 9

   – Genu IV with 6 setae. ... M. kraepelini (Berlese, 1905)

10. Sternal ornamentation developed; l.o.p. bifurcated and reached to l.m.t. .............................................. 11
   – Sternal ornamentation reduced; l.o.p. not bifurcated and disjunct from l.m.t. ........................................... 13

11. Most dorsal setae pilose distally, except for simple j3, j5, j6, j7, z5, z6, and z2. .......... M. jonggoensis sp. nov.
   – Most dorsal setae simple; j1, j4, z5, and S5 pilose distally. .......... 12

12. Most dorsal setae elongate and surpassing insertions of setae behind them. ........................................ M. oigru Walter and Krantz, 1986
   – Dorsal setae not elongate and not reaching insertions of setae behind them. ... M. sp. aff. glaber (Müller, 1860)

13. Most dorsal setae pilose distally, except for simple j5, j6, z5, z6, j2, Z1, and Z3; anterior half of sternal shield ornamented with slight reticulate pattern. .......... M. sukaramiensis Takaku, 2001
   – Most dorsal setae simple; j1, S5, and Z5 pilose distally; anterior half of sternal shield with one l.arc. .......... 14

14. Dorsal setae j4, r2-4, and z4 pilose distally. ................... M. dispar (Berlese, 1910)
   – Dorsal setae j4 simple or pilose distally; r2-4 and z4 simple. .......... M. jabarensis sp. nov.

ACKNOWLEDGMENTS

We would like to express our sincere thanks to Drs Arie Budi-man and Siti Nuramati Prijono (LPI) for their encouragement and giving us an opportunity to study this subject and use facilities; E. Cholik, Rotik and Sarino (LPI) who collected valuable specimens; and Professors H. Katakura (Hokkaido University) and J. Kojima (Ibaraki University) for their critical reading of this manuscript. This study was partly supported by RONPAKU (Dissertation Ph.D.) Program, Grant-in-Aid for Scientific Research (A)(2) (No. 11691161) and (B)(2) (No. 14740468) from the Japan Society for the Promotion of Science.
REFERENCES


Berlese A (1899) Acari Myriopoda et Scorpiones Hucusque in Italia Reperta fasc. 52 N. 1. Tipografia del Seminario, Padova

Berlese A (1904) Acari nuovi. Manipulus Illus. Redia 1: 258–280


Berlese A (1911) Acarorum species novae quindices. Redia 7: 429–435


Bregetova NG, Koroleva EV (1960) The macrochelid mites (Gamasoidea, Macrochelidae) in the USSR. Parazitol Sb 19: 32–154

[In Russian with English summary]


Oudemans AC (1903) Acarologia. Aanteekeningen, VIII. Entomol Ber 1: 100–103


Vitzthum HG (1925) Fauna Sumatrensis (Beitrag No. 5). Acarinae. Suppl Entomol 11: 1–79


Walter DE, Krantz GW (1986b) A review of glaber-group (s. str.) species of the genus Macrocheles (Acarina: Macrochelidae), and a discussion of species complexes. Acarologia 27: 277–294


(Received February 2, 2003 / Accepted July 29, 2003)