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# TREUBIA

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OF THE INDO-AUSTRALIAN ARCHIPELAGO*

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UDC: 594.1 (594)

Reni Ambarwati

### **New record of two mactrid bivalves (Bivalvia: Mactridae) from Indonesia**

TREUBIA, December 2015, Vol. 42, pp. 1–8.

The occurrence of two mactrid bivalves, *Mactra (Mactra) queenslandica* E.A. Smith and *Heterocardia gibbosula* Deshayes, in coastal water of Sidoarjo, East Java, Indonesia is reported here. The two species are examined and illustrated based on the local specimens collected. Previously, the distribution of *M. queenslandica* was reported only from northern – north-east Australia. This finding revealed that the distribution of this bivalve reaches Indonesian waters. Meanwhile, *H. gibbosula* is common in south-east Asian waters, however this is the first record for Indonesian waters. This result indicated that more mactrid bivalves could be discovered in Indonesian waters.

(Reni Ambarwati and Trijoko)

**Key words:** *Heterocardia gibbosula*, *Mactra queenslandica*, Mactridae, Sidoarjo

Indramayu). Six different haplotypes (YSB1, YSB2, YSB3, YSB4, YSB5 and YSB6) were identified in the sequenced yellow stem borer populations, with haplotype YSB2 being dominant.

(Hari Sutrisno)

**Key words:** COII, mitochondrial DNA, *Scirpophaga incertulas*, yellow stem borer

UDC: 595.42: 595.764 (594.59)

Sri Hartini

### **Macrochelid mites (Acari: Mesostigmata) associated with dung beetles in Baluran National Park, East Java, Indonesia**

TREUBIA, December 2015, Vol. 42, pp. 23–36.

Eight mite species of the family Macrochelidae (Acari: Mesostigmata) were collected from the body surface of dung beetles in Baluran National Park, East Java, Indonesia. Of these, one species, *Macrocheles subwallacei* sp. nov., is described as new to science. The female of *Macrocheles crispa* (Berlese, 1910) is redescribed and the male is described for the first time. The remaining six species are *Neopodocinum jaspersi* (Oudemans, 1900), *M. dispar* (Berlese, 1910), *M. hallidayi* Walter & Krantz, 1986, *M. entetiensis* Hartini & Takaku, 2005, *M. jabarensis* Hartini & Takaku, 2003 and *M. persimilis* Hartini, Dwibadra & Takaku, 2007.

(Sri Hartini, Dhian Dwibadra, Masahiro Ohara and Gen Takaku)

**Key words:** Baluran, dung beetles, East Java, Indonesia, Macrochelidae

UDC: 595.78: 577.2 (594.5)

Hari Sutrisno

### **Mitochondrial DNA variation of the rice yellow stem borer, *Scirpophaga incertulas* (Lepidoptera: Crambidae) in Java, Indonesia**

TREUBIA, December 2015, Vol. 42, pp. 9–22.

*Scirpophaga incertulas* is an economically important rice pest. A systematic investigation on the biological characteristics of ecological races linked to recent changes of agricultural practices and the environment has been conducted in order to assess genetic variation of *S. incertulas* in Indonesia. A 685bp segment of mitochondrial DNA, COII, was amplified from 42 yellow stem borer samples from five locations in Java (Madiun, Ngawi, Wonogiri, Tasikmalaya, and

UDC: 574.9: 57.065

Rena Tri Hernawati

**Exploring the dynamics during community assembly through community phylogenetics**

TREUBIA, December 2015, Vol. 42, pp. 37–52.

Species diversity through speciation and accumulate in ecological communities, a process known as community assembly. Relying on both evolutionary mechanisms acting at regional scale and ecological mechanisms acting at local scale, the process of community assembly results from intricate interactions among mechanisms at play across varying spatial and temporal scales. During the last decade, community assembly theory has been reconsidered in the light of evolutionary dynamics of species diversification and ecological dynamics have been formalised in an explicit spatial framework (*i.e.* metacommunity theory). The aims of the present review are: (1) to present the community assembly theory and the main paradigms that have been proposed, (2) to discuss how the metacommunity theory as defined an explicit spatial framework for community ecology, (3) to discuss the potential mechanisms at play during community assembly and their associated predictions, (4) to present new approaches to study community assembly based on phylogenetics approaches and discuss how they have been integrated in empirical studies.

(Rena Tri Hernawati, Daisy Wowor and  
Nicolas Hubert)

**Key words:** biogeography, community assembly, dispersal, phylogenetic community structure, speciation

beetles (Scarabaeidae). Of these, one is undescribed species *Macrocheles kaimanaensis* sp. nov. *Macrocheles hallidayi* Walter & Krantz, 1986 is newly recorded from Papua and West Papua (Indonesian parts of New Guinea Island). Males of *Holostaspella rosichoni* Hartini & Takaku, 2006 originally described from Papua were recorded for the first time. The other three species were *M. amaliae* Hartini, 2008, *M. dispar* (Berlese, 1910) and *M. waigeoensis* Hartini, 2008, which were previously collected from Raja Ampat, West Papua.

(Sri Hartini and Gen Takaku)

**Key words:** Indonesia, Kaimana, macrochelid mite, West Papua

UDC: 595.42 (594.81)

Sri Hartini

**Macrochelid mites (Acari: Mesostigmata) from Kaimana, West Papua, Indonesia, and endemism of macrochelid mite fauna in New Guinea Island**

TREUBIA, December 2015, Vol. 42, pp. 53–67.

As a result of our investigation in Lengguru, Kaimana, West Papua, Indonesia, six species belonging to two genera of macrochelid mites (Acari: Mesostigmata: Macrochelidae) were collected from the body surface of dung

**MACROCHELID MITES (ACARI: MESOSTIGMATA)  
FROM KAIMANA, WEST PAPUA, INDONESIA,  
AND ENDEMISM OF MACROCHELID MITE FAUNA IN NEW GUINEA ISLAND**

**Sri Hartini\*<sup>1</sup> and Gen Takaku<sup>2</sup>**

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**ABSTRACT**

As a result of our investigation in Lengguru, Kaimana, West Papua, Indonesia, six species belonging to two genera of macrochelid mites (Acari: Mesostigmata: Macrochelidae) were collected from the body surface of dung beetles (Scarabaeidae). Of these, one is undescribed species *Macrocheles kaimanaensis* sp. nov. *Macrocheles hallidayi* Walter & Krantz, 1986 is newly recorded from Papua and West Papua (Indonesian parts of New Guinea Island). Males of *Holostaspella rosichoni* Hartini & Takaku, 2006 originally described from Papua were recorded for the first time. The other three species were *M. amaliae* Hartini, 2008, *M. dispar* (Berlese, 1910) and *M. waigeoensis* Hartini, 2008, which were previously collected from Raja Ampat, West Papua.

**Key words:** Indonesia, Kaimana, macrochelid mite, West Papua

**INTRODUCTION**

Macrochelid mite fauna of Papua (eastern most part of Indonesia) is poorly known, and have only been studied by Krantz (1967), Hartini & Takaku (2006a, b) and Hartini (2008). The macrochelid mites associated with dung beetles reported from Papua include only 16 species belonging to 3 genera, i.e., *Glyphtholaspis* with only one species recorded from Biak, Papua (*Glyphtholaspis gressitti* Krantz, 1967), *Holostaspella* with two species recorded from Papua (*Holostaspella fatimahae* Hartini & Takaku, 2006 and *H. rosichoni* Hartini & Takaku, 2006) and *Macrocheles* with 13 species recorded from Papua (Hartini & Takaku 2006a, b; Hartini 2008).

Macrochelid mites have not been investigated comprehensively in Papua, and locality records are very limited, i.e., Manokwari, Timika, Jayapura (Sentani), Raja Ampat (Waigeo Island), and Biak. In the present study, one new location in Lengguru, Kaimana, West Papua is added.

**MATERIALS AND METHODS**

Scarabaeid dung beetles were collected by using dung trap installed in the forest in Lengguru, Kaimana, West Papua. Mite specimens were collected from the body surface of

scarabaeid dung beetles and were fixed in 70% ethanol. Specimens were mounted on slides in PVA (polyvinyl alcohol – lactic acid) medium, after clearing in lactic acid. In the description, all measurements are given in micrometers (µm). Measurements in each description are provided as average and range in parentheses. Dorsal chaetotaxy and other terminology follow Krantz (1967), Walter & Krantz (1986a, b), Halliday (1987, 2000), Hartini & Takaku (2006a, b) and Hartini (2008). The holotype and paratypes of new species are deposited in the collection of Museum Zoologicum Bogoriense (MZB), Bogor, Indonesia.

## RESULTS

Macrochelid mites were recorded from Lengguru, Kaimana, West Papua are six species belonging two genera (one species of *Holostaspella* and five species of *Macrocheles*). One species of *Holostaspella rosichoni* distributed only in Papua (Hartini & Takaku 2006b). Three species of *Macrocheles* (*Macrocheles kaimanaensis* sp. nov., *M. amaliae*, and *M. waigeoensis*) are distributed only in Papua (Hartini & Takaku 2006a, Hartini 2008), and two species of *M. hallidayi* and *M. dispar* are common to Indonesia (Hartini 2005).

They are as follows:

## DESCRIPTIONS

Family Macrochelidae Vitzthum, 1930

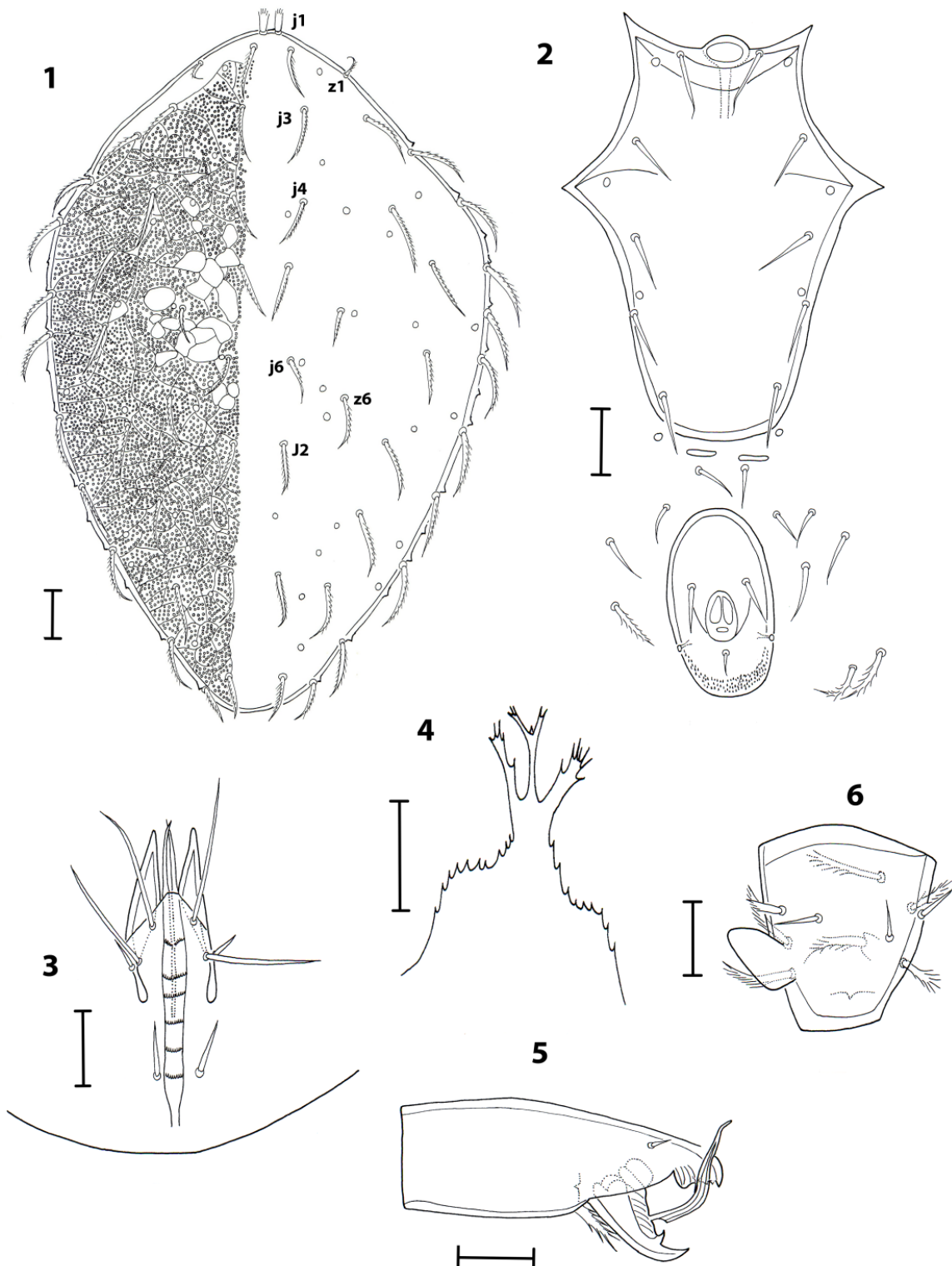
Genus *Holostaspella* Berlese, 1903

***Holostaspella rosichoni*** Hartini & Takaku, 2006 (Figs. 1-6)

*Holostaspella rosichoni* Hartini & Takaku, 2006a: 171-173, figs. 8-13.

Material examined.—23 females (MZB.Acar.8467.1-2, 8468.2, 8469.1-3, 8471, 8472.1-3, 8473, 8474.1-3, 8475.1, 8476, 8477.1, 8478.1-2, 8479.1-2, 8480, 8481), 8 males (MZB.Acar.8467.3, 8468.1, 8470.1-4, 8475.2, 8477.2), Avona, Lengguru area, Kaimana, West Papua, 22-23 October 2010, Giyanto leg., *Onthophagus* sp.

Diagnosis.—Female. Dorsal shield oval, attenuated posteriorly, sculptured laterally and posteriorly with strong punctations; lateral margin of shield serrated; shield bearing 29 pairs of setae and 22 pairs of pores; this species lacks anterior projection; all setae long and pectinate except for j1, which is short, broad and plumose; sternal shield ornamented with reticulations and punctations, and its posterior half with a pair of strong punctate area; epigynial shield with punctations; ventrianal shield ornamented with reticulation and strong punctations.



**Figures 1-6.** *Holospella rosichoni* Hartini & Takaku, 2006, male (MZB.Acar.8475.2): 1, dorsum; 2, venter; 3, ventral view of gnathosoma; 4, epistome; 5, chelicera; 6, femur II. Scales: 50  $\mu$ m.



Male.—Length of dorsal shield 676 (625-725), width at level coxae II 356 (325-395) (n=8).

Dorsum (Fig. 1). Dorsal shield similar to that of female, attenuated posteriorly, surface with strong punctations; lateral margin of the shield serrated; shield with 29 pairs of dorsal setae and 22 pairs of pores; j1 broad and plumose; other dorsal setae pectinate and long.

Venter (Fig. 2). Surface of sternoventral shield without ornamentation; length 295 (280-315), width at level of coxae II 120 (115-125) (n=8); l.m.t. not complete; 5 pairs of setae and 3 pairs of pores present; all setae simple, not reaching setae behind them. Anal shield small, longer than wide; length 126 (110-130), width 76 (70-90) (n=8); shield with 1 pair of paranal setae and 1 postanal seta, all setae simple; cribrum without paranal extension, but in some cases with short paranal extension; other opisthogastric setae simple and pilose. Peritreme with stigmata at a level between coxae III and IV; anterior extremities located at level of setae z1. Two pairs of platelets located between sternoventral and anal shields.

Gnathosoma (Fig. 3) as in female; epistome shown in Fig. 4. Fixed digit of chelicera (Fig. 5) with simple dorsal seta, robust median tooth, 2 small distal tooth, *pilus dentilis*, and terminal hook; movable digit with robust median tooth, spermatodactyl, terminal hook; and without distal tooth; spermatodactyl long, its length 67 (65-75) (n=8); length of fixed digit 153 (150-165), length of movable digit 63 (60-65) (n=8).

Legs. Most leg segments with simple, pilose and plumose setae, except for coxae I, III-IV, trochanter I, and tarsus I with simple setae; femur II with large spur ventrally (Fig. 6). Leg chaetotaxy typical for genus; genu IV with 6 plumose setae. Leg length (except ambulacrum, n=8); leg I, 435 (400-470); leg II, 438 (400-485); leg III 406 (370-440); leg IV, 606 (550-665) (n=8).

Other immature stages: Unknown

Habitat.—*Holostaspella rosichoni* has been collected from species of genus *Onthophagus* (Scarabaeidae).

Distribution.—Indonesia [Papua (Timika, Kaimana)].

Remarks.—Females of *Holostaspella rosichoni* were recorded in Raja Ampat, Papua, but males of *Holostaspella rosichoni* originally described from Papua were recorded for the first time.

Genus *Macrocheles* Latreille, 1829

***Macrocheles kaimanaensis* sp. nov.** (Figs. 7-18)

Material examined.—Type series. Holotype: female (MZB.Acar.8448), Lengguru area, Kaimana, West Papua, 22-23 October 2010, Giyanto leg., ex *Onthophagus* sp. Paratypes: 10 females (MZB.Acar.8449.1-5, 8450.1-4, 8451) and 3 males (MZB.Acar.8453.4, 8453.7, 8454.4), locality data same as holotype.

Description.—Female. Length of dorsal shield 771 (740-800), width at level of coxae II 469 (450-510) (n=11). Living specimens yellowish brown.

Dorsum (Fig. 7). Dorsal shield oval, surface with coarse punctures and punctations arranged in polygonal groups; lateral and posterior margins of the shield dentate; shield with 29 pairs of dorsal setae and 22 pairs of pores; setae j1 long and plumose; setae z1 plumose; z5 shorter than other setae and plumose; j5 inserted at a level posterior to z5; all others setae long, distally expanded and heavily plumose.

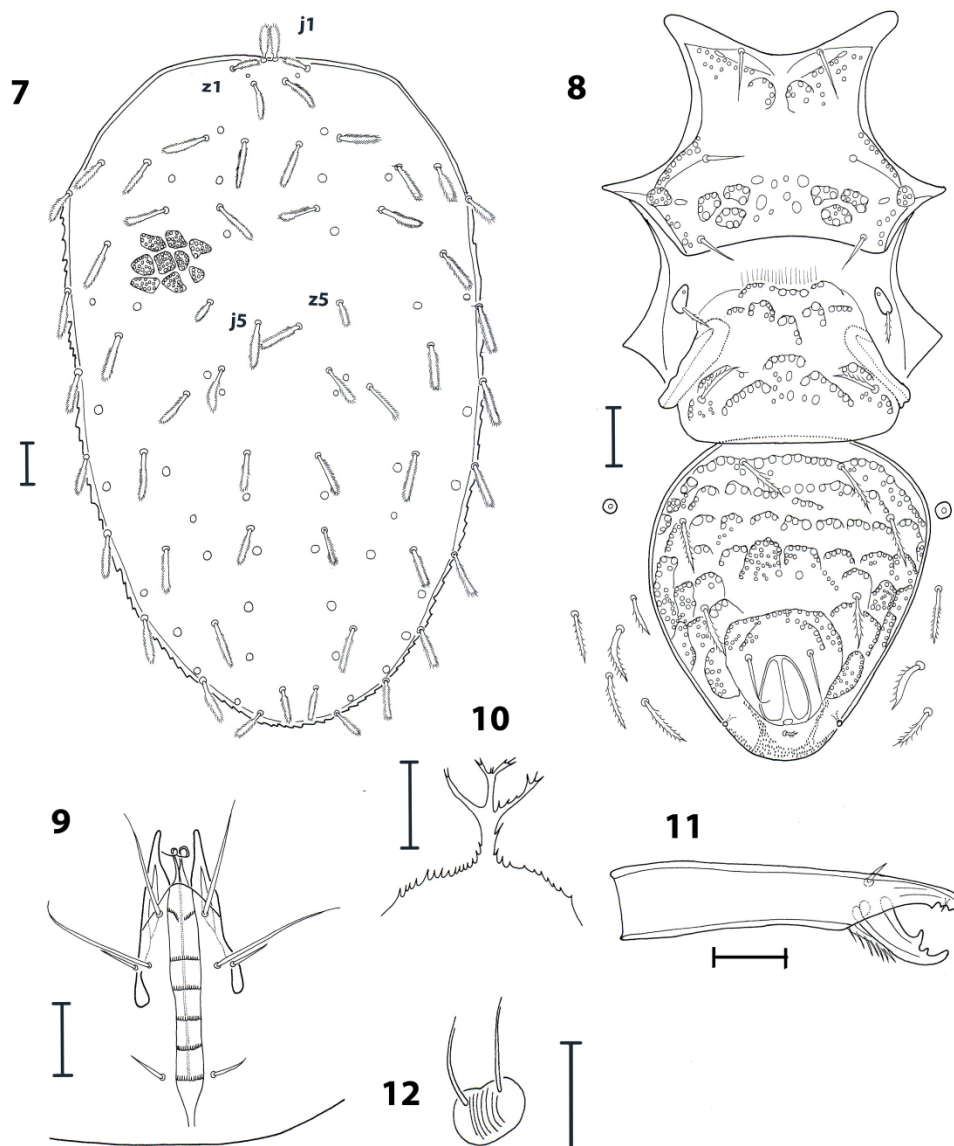
Venter (Fig. 8). Length of sternal shield 156 (145-162.5), width at level of coxae II 146 (142.5-150) (n=11); sternal shield ornamented with punctate linea angulata (l.ang.); posterior half with punctations arranged symmetrically in three large groups and with medial coarse punctations; shield with 3 pairs of simple setae and 2 pairs of pores. Metasternal shield small and free; each shield with 1 pilose seta and an anterior pore.

Length of epigynial shield 145 (137.5-150), width 183 (177.5-190); surface with coarse punctate ornamentation; shield with pair of pilose setae on lateral side.

Ventrianal shield pentagonal, with transversal lines and punctations; length 267 (250-287.5), width 243 (227.5-262.5) (n=11); shield with 3 pairs of preanal pilose setae, 1 pair of paranal simple setae, and 1 postanal thick pilose seta; cribrum with paranal extensions. Opisthogaster with 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. 9) well developed and sclerotised; 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. Epistome (Fig. 10) with median process and pair of lateral processes; median process bifurcate distally and with many spicules; distal part of lateral processes polyfurcated; basal margin serrate. Fixed digit of chelicera (Fig. 11) with simple dorsal seta, median tooth, 2 small distal teeth, *pilus dentilis*, and terminal hook;

movable digit with median tooth, small distal tooth and terminal hook; length of fixed digit 239 (237.5-242.5) (n=11), length of movable digit 73 (70-75) (n=11).



**Figures 7-12.** *Macrocheles kaimanaensis* sp. nov., holotype, female (MZB.Acar. 8448): 7, dorsum; 8, venter; 9, ventral view of gnathosoma; 10, epistome; 11, chelicera; 12, sacculus foemineus. Scales: 50  $\mu$ m.

**Legs.** Most leg segments with simple, pilose, plumose setae, except for coxa, trochanter and tarsus I with only simple setae; coxa to genu III with only plumose setae; coxa to genu and tarsi IV with only plumose setae. Leg chaetotaxy typical for the genus. Genu IV with 6 plumose setae. Leg length (except ambulacrum, n=11); leg I, 571 (560-610); leg II, 581 (570-590); leg III, 585 (570-600); leg IV, 873 (840-910).

**Sacculus foemineus.** Oval sacculus with wrinkles and rami, other structures not visible in available specimens (Fig. 12).

Male.—Length of dorsal shield 496 (490-500), width at level coxae II 317 (312.5-325) (n=3).

Dorsum (Fig. 13). Dorsal shield similar to that of female; dorsal shield oval, attenuated posteriorly; surface with coarse punctures and punctations arranged in polygonal groups; lateral and posterior margins of the shield dentate; shield with 29 pairs of dorsal setae and 22 pairs of pores; setae j1 long and plumose, setae z1 and z5 shorter than other setae and plumose; z1 not reaching insertion of j2; j5 inserted at a level posterior to z5; all other setae long, distally expanded and heavily plumose.

Venter (Fig. 14): Surface of sternoventral shield with lines and punctations; length 235 (230-240), width 118 (115-125) (n=3); 5 pairs of setae and 3 pairs of pores present; all setae simple, not reaching setae behind them. Ventrianal shield similar to that of female, pentagonal with reticulation and coarse punctations; length 143 (137.5-147.5), width 145 (137.5-150) (n=3); shield with 3 pairs of preanal pilose setae, 1 pair of paranal simple setae, and 1 postanal pilose seta; cribrum with short paranal extensions. Peritreme with stigmata at a level between coxae III and IV; anterior extremities located at level of setae z1.

Gnathosoma (Fig. 15) as in female; epistome shown in Fig. 16. Fixed digit of chelicera (Fig. 17) with simple dorsal seta, median tooth, 2 small distal teeth, *pilus dentilis*, and terminal hook; movable digit with median tooth, spermatodactyl, terminal hook; spermatodactyl long and surpassing length of movable digit, its length 65 (62.5-75) (n=3); length of fixed digit 147 (145-150), length of movable digit 50 (n=3).

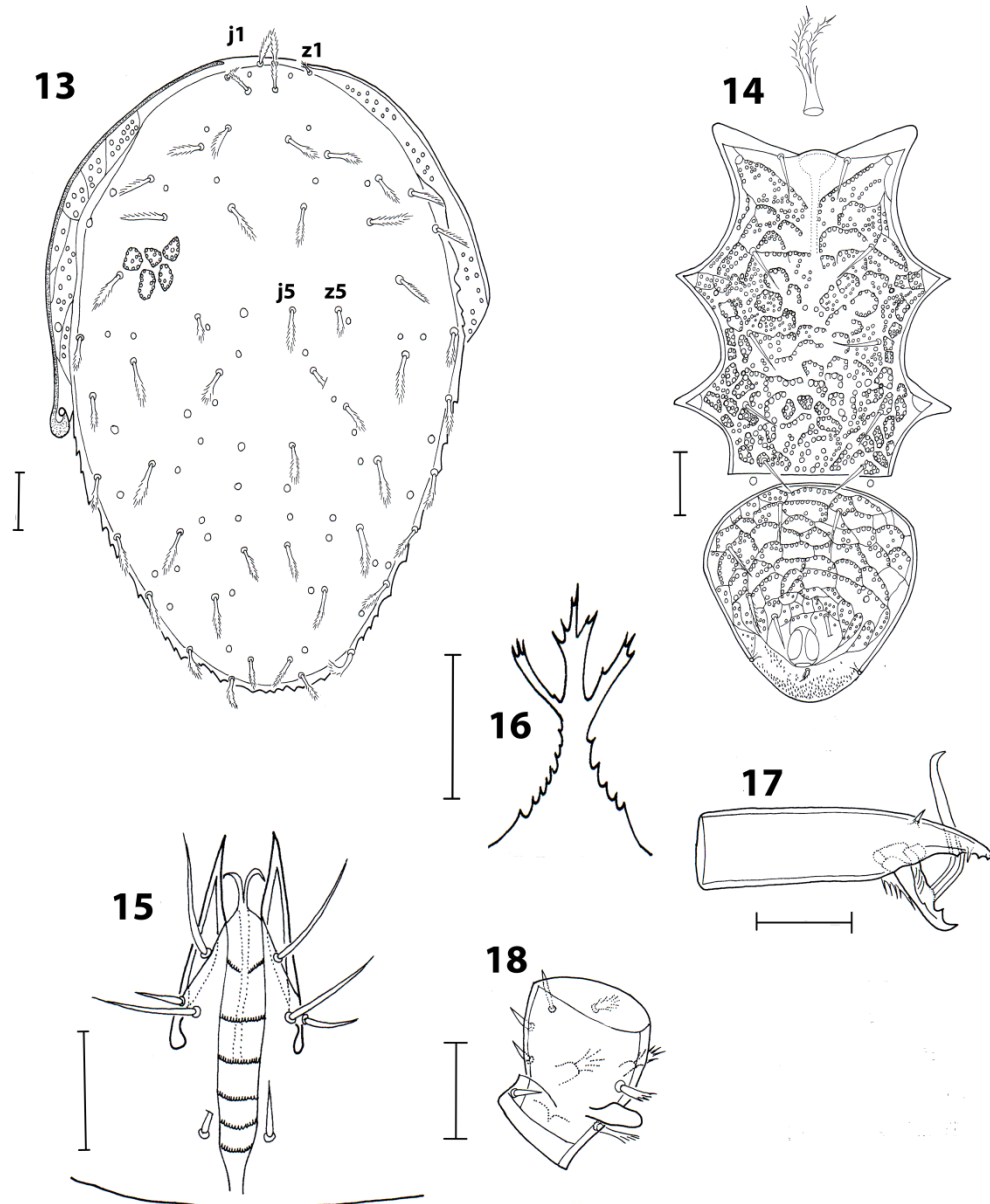
Legs. Most leg segments with simple, pilose and plumose setae, except for coxae, trochanter and tarsi I with only simple setae; coxae III-IV, trochanter, femur, genu, and tibia IV with only plumose setae; femur II with large spur ventrally (Fig. 18). Leg chaetotaxy typical for genus; genu IV with 6 setae. Leg length (except ambulacrum, n=3); leg I, 466 (462.5-472.5); leg II, 417 (412.5-425); leg III 408 (402.5-412.5); leg IV, 629 (622.5-632.5) (n=3).

Immature stages. Unknown

Etymology.—This specific name is derived from the type locality, Kaimana.

Remarks.—*Macrocheles kaimanaensis* sp. nov. is similar to *M. spiculatus* Halliday, 2000 recorded from Australia in the shape of dorsal shield and setae, but it is distinguished from the latter by the following characteristics (corresponding conditions of *M. spiculatus* in parentheses on the basis of the original description): 1) sternal setae simple (distally pilose); 2) surface of sternal shield with punctation along linea angulata and in posterior half (with

irregular polygonal ornamentation throughout); 3) epigynial shield ornamented with lines and coarse punctations (with distinct granular ornamentation throughout except for two circular smooth areas mediolaterally); and 4) paranal setae simple (distally pilose).



**Figures 13-18.** *Macrocheles kaimanaensis* sp. nov., paratype, male (MZB.Acar.8453.7): 13, dorsum; 14, venter; 15, ventral view of gnathosoma; 16, epistome; 17, chelicera; 18, femur II. Scales: 50  $\mu$ m.

The present species also resembles *Macrocheles plumosus* Evans & Hyatt, 1963 recorded from Kalimantan, Indonesia in the shape of dorsal shield and setae, but it differs from the latter in the following characteristics (corresponding conditions of *M. plumosus* in parentheses on the basis of the original description): 1) 29 pairs of dorsal setae present (28

pairs); 2) seta j1 long and plumose (short and palmate); 3) mid of sternal shield without ornamentation and l.m.t. (covered entirely by conspicuous reticulation and with complete and slightly undulating l.m.t.); 4) posterior half of sternal shield with punctations arranged symmetrically in three large groups and with medial coarse punctations (with conspicuous reticulation and punctate area); 5) epyginial seta and preanal setae plumose (simple); and 6) ventrianal shield with irregular punctation (with conspicuous transverse lines and lateral ornamentation).

***Macrocheles amaliae* Hartini, 2008**

*Macrocheles amaliae* Hartini, 2008: 15-17, figs. 6-10.

Material examined.—2 females (MZB.Acar.8461, 8462), locality data same as preceding species.

Diagnosis.—Female. Dorsal shield oval, ornamented with reticulations and punctations anteriorly, posteriorly and laterally; lateral margin serrate; shield bearing 29 pairs of dorsal setae and 22 pairs of pores; setae j1 broadened throughout, elliptical with strongly serrate edges; setae z1 minute and simple; Z4 and J5 pilose in distal two thirds; Z5 pilose in distal halves; other setae simple.

Habitat.—This species has been collected from species of genus *Onthophagus* (Scarabaeidae).

Distribution.—Indonesia [Papua (Raja Ampat, Kaimana)].

Remarks.—*Macrocheles amaliae* distributed in Raja Ampat, Papua, but is recorded from Kaimana for the first time.

***Macrocheles dispar* (Berlese, 1910)**

*Holostaspis dispar* Berlese, 1910: 251.

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

*Macrocheles dispar*: Walter and Krantz, 1992: 244, fig. ID; Hartini & Takaku, 2003a:1262-1263, figs. 1-6; Hartini *et al.*, 2003: 308; Hartini *et al.*, 2007: 75; Hartini *et al.*, 2009: 419; Hartini & Takaku, 2012: 9; Hartini *et al.*, 2013: 52; Dwibadra *et al.*, 2014: 45.

Material examined.—1 female (MZB.Acar.8460), locality data same as preceding species.

Diagnosis.—Female. Dorsal shield oval, attenuated posteriorly, shield with 28 pairs of dorsal setae and 22 pairs of pores; surface with reticulation and punctation; j1 plumose distally; j4, z2, z4, r2-4, J5, Z5 and S5 pilose distally; other setae simple. Sternal shield ornamented with lines and punctations; l. ang., l.m.t., linea oblique posteriores (l.o.p.) with distinct punctations; l.o.p. not bifurcated; l.m.t. complete; center of posterior half of the shield with small punctations.

Habitat.—*Macrocheles dispar* has been collected from scarabaeid beetle *Catharsius molossus*, *Copris sinicus*, *Onthophagus cervicapra*, *O. hirutulus*, *O. luridipenis*, *O. rudis*, *O. schwaneri*, *O. semiaureus*, *O. tricornis*, *O. trituber*, *O. vulpes*, *O. (Macronthophagus) rotundicollis*, *O. (Onthophagus) cribratus*, *O. (O.) javaecola*, *O. (O.) javensis*, *O. (O.) malangensis*, *O. (O.) orientalis*, *O. (Serrophorus) mulleri*, *O. (Gibbonthophagus) fuscopunctatus*, *Paragymnopleurus maurus*, *P. rudis*, *P. sparsus javanus*, *Sisyphus thoracicus*, and species of genera *Aphodius*, *Catharsius*, *Copris*, *Enoplotrupes*, *Onthophagus*, *Paragymnopleurus*, and was also collected from nest of *Apis dorsata dorsata* (Hymenoptera).

Distribution.—Indonesia [Java, Sumatra, Kalimantan, Lombok, Sulawesi, Papua (Raja Ampat, Kaimana)], Vietnam, the Philippines, China (Sichuan Province) and Taiwan.

Remarks.—*Macrocheles dispar* is widely distributed in Indonesia, but is recorded from Kaimana for the first time.

#### ***Macrocheles hallidayi* Walter & Krantz, 1986**

*Macrocheles hallidayi* Walter & Krantz, 1986a: 214-216, figs. 12-13.

*Macrocheles hallidayi*: Walter & Krantz, 1986b: 289, fig. 1b; Takaku, 1998: 30-36, figs. 1-14; Takaku, 2001: 501, figs. 3, 9; Takaku & Hartini, 2001: 325; Hartini & Takaku, 2003a: 1264; Hartini *et al.*, 2003: 308; Hartini *et al.*, 2005: 202; Hartini *et al.*, 2007: 75-76; Hartini *et al.*, 2009: 420; Hartini *et al.*, 2012: 529; Hartini *et al.*, 2013: 53; Dwibadra *et al.*, 2014: 45-46.

Material examined.—1 female (MZB.Acar.8459), locality data same as preceding species.

Diagnosis.—Female. Dorsal shield punctate–reticulate with well developed procurved line; 28 pairs of dorsal setae and 22 pairs of pores; setae j1 pilose for greater than half of their length; z1 shorter than j1 and not reaching insertions of j2; j5, j6, z5, z6, and J2 simple; S5 and Z5 strongly bipectinate; J5 serrate; other dorsal setae sparsely to strongly bipectinate. Sternal shield with strongly punctate margin along l. ang., and with two deeply punctate linea

arcuata (l.arc.), well developed l.m.t., l.o.p., area punctatae posteriores (a.p.p.), and area punctiformes (a.pf.). Genu IV with seven pectinate setae.

Habitat.—*Macrocheles hallidayi* has been collected from scarabaeid dung beetles *Catharsius dayacus*, *C. molossus*, *C. renaudpauliani*, *Onthophagus cervicapra*, *O. liliputanus*, *O. limbatus*, *O. schwaneri*, *O. (Onthophagus) javensis*, *O. (O.) orientalis*, *Microcopris hidakai*, and species of Scarabaeid genera *Aphodius*, *Catharsius*, *Copris*, *Heliocopris*, *Microcopris*, *Oniticellus*, *Onitis*, *Onthophagus*, *Paragymnopleurus*, and also collected from Trogidae and from nest of *Apis dorsata dorsata* (Hymenoptera).

Distribution.—Indonesia [Java, Madura, Sumatra, Kalimantan, Sulawesi, Bali, Lombok, Sumbawa, Flores, Sumba, Papua (Kaimana: new record)], Thailand, Cambodia, Malaysia (Sarawak) and India.

Remarks.—*Macrocheles hallidayi* is widely distributed in Indonesia, but recorded from Papua for the first time.

### *Macrocheles waigeoensis* Hartini, 2008

*Macrocheles waigeoensis* Hartini, 2008: 17-20, figs. 11-21.

Material examined.—1 female (MZB.Acar.8464), locality data same as preceding species.

Diagnosis.—Female. Dorsal shield strongly attenuated posteriorly, ornamented throughout with conspicuous punctate polygons, except for medial smoother area between j2-J2 and a part of anterior and posterior area; margin and posterior part strongly punctate; lateral margin smooth; a pair of curved lines running behind insertions of z6; shield bearing 29 pairs of dorsal setae and 22 pairs of pores; setae j1 broadened throughout, elliptical with strongly serrate edges; setae z1 simple; other setae finely pilose for most of the length.

Habitat.—*Macrocheles waigeoensis* has been collected from species of genus *Onthophagus* (Scarabaeidae).

Distribution.—Indonesia [Papua (Raja Ampat, Kaimana)].

Remarks.—*Macrocheles waigeoensis* was described by Hartini (2008) based on the specimen from Waigeo Island, Papua.



## DISCUSSION

Macrochelid mites previously recorded from New Guinea were 16 species of three species (Krantz 1967, Hartini & Takaku 2006a,b, Hartini 2008). This present study contributes two additional species to the list. These two species, i.e., *Macrocheles hallidayi* Walter & Krantz, 1986 and *M. kaimanaensis* sp. nov. are newly discovered from Kaimana.

Of these 18 species of macrochelid mites recorded from New Guinea Island, 10 species are endemic to New Guinea: *Holostaspella rosichoni*, *H. fatimahae*, *Macrocheles amaliae*, *M. erniae*, *M. kaimanaensis* sp. nov., *M. kojimai*, *M. manokwariensis*, *M. timikaensis*, *M. waigeoensis* and *M. woroae*. Based on this current finding, the endemic rate (number of species endemic in the island / number of species recorded from the island) in New Guinea is 56%, and this rate is the highest in major islands in Indonesia and Australia. The fauna of New Guinea is clearly different from Indonesian and Australian fauna. Besides, macrochelids in the island tend to have characteristic patterns in some morphological features. Typical numbers of dorsal setae in macrochelid mites are 28 pairs. However, such condition is not typical in macrochelids in New Guinea Island, and most of the species have 29 pairs of dorsal setae (2 species of *Holostaspella* and 6 species of *Macrocheles*), one *Macrocheles* has only 27 pairs, and one *Glypholaspis* has 28 pairs and 1 unpaired seta. Some phoretic species have many distinct pilose setae on dorsal shield and paranal extensions of cribrum (Hartini 2008, Hartini & Takaku 2006a, b) as in soil-inhabiting macrochelids. It is difficult for us to judge whether these characteristics are derived or ancestral states, because there are not enough data on phoretic and soil-inhabiting macrochelid mites in New Guinea Island. However, our present data leave no doubt on the peculiarity of fauna and morphological features of macrochelids in New Guinea.

### Key to species of the family Macrochelidae in New Guinea Island (female)

1. - Dorsal shield with unpaired seta Jx at level anterior to J2; posterior margin of dorsal shield divided into 4 broad pads, each with fine denticulations; sternal shield areolate.....*Glypholaspis gressitti* Krantz, 1967
  - Unpaired dorsal seta Jx absent; posterior margin of dorsal shield and ornamentation of sternal shield not as above .....2
2. - Femur II with sclerotised spur.....3
  - Femur II without sclerotised spur .....4
3. - Dorsal shield sculptured entirely; most of dorsal setae feather-like .....
  - .....*Holostaspella fatimahae* Hartini & Takaku, 2006

- Dorsal shield sculptured laterally and posteriorly; most dorsal setae pectinate ..... *H. rosichoni* Hartini & Takaku, 2006
- 4. - Dorsal shield bearing 27-28 pairs of dorsal setae .....5
  - Dorsal shield bearing 29 pairs of dorsal setae .....12
- 5. - Dorsal shield bearing 27 pairs of dorsal setae; setae z6 absent .....
  - .....*Macrocheles erniae* Hartini & Takaku, 2006
  - Dorsal shield with 28 pairs of dorsal setae; setae z6 present.....6
- 6. - All dorsal setae simple except for pilose j1 and J5 .....7
  - Dorsal shield with pilose or bipectinate/plumose setae.....9
- 7. - Posterior edge of sternal shield close to metasternal shield; l.ang. convergent medially ..... *M. limue* Samšičák, 1962
  - Posterior edge of sternal shield disjunct to metasternal shield, l.ang. not as above..... 8
- 8. - All dorsal setae simple, l.o.a. of sternal shield connected by lines .....
  - .....*M. merdarius* (Berlese, 1889)
  - Most of dorsal setae simple, except j1, j4, Z4 and S5 pilose distally; l.o.a. of sternal shield with lines and punctations ..... *M. aff. glaber* (Müller, 1860)
- 9. - Most of dorsal setae slightly or distinctly pilose except for some simple setae of dorsal hexagon (j5, j6, and z5); genu IV with 7 setae.....10
  - Most of dorsal setae with pilose; genu IV with 6 setae .....11
- 10.- Most of dorsal setae pilose distally or pilose in their half length except for simple setae of dorsal hexagon (j6 and z5); sternal shield with lines.....
  - .....*M. manokwariensis* Hartini & Takaku, 2006
  - Most of dorsal setae with sparsely to distinctly pilose except for simple setae of dorsal hexagon (j5, j6, and z5); sternal shield with lines and punctations.....
  - ..... *M. hallidayi* Walter & Krantz, 1986
- 11.- Sternal shield with lines and punctation; dorsal setae s5 and s6 simple; j2 and j4 pilose distally..... *M. dispar* (Belese, 1910)
  - Sternal shield with lines and punctation; dorsal setae s5 and s6 pilose distally; setae j2 and j6 simple ..... *M. agilis* Halliday, 2000
- 12.- Setae j1 broadened or broad anteriorly.....13
  - Setae j1 long and plumose/pilose.....15
- 13.- Most of dorsal setae simple, except for setae J5, Z4, and Z5 pilose in distal half ..... *M. amaliae* Hartini, 2008

- Most of dorsal setae pilose or pectinate..... 14
- 14.- Dorsal setae pilose for most of the length, except for simple z1; l.o.p. present as transverse line behind l.m.t.; a pair of distinct punctate areas located behind l.ang. and transverse l.o.p. .... *M. waigeoensis* Hartini, 2008
- Dorsal setae pectinate; sternal shield coarse punctate and reticulation.....  
..... *M. woroae* Hartini, 2008
- 15.- Most of dorsal setae simple.....16
- Most of dorsal setae pilose or distally expanded and heavily plumose.....17
- 16.- Most of dorsal setae small and simple, except for Z5 pilose in distal half; ventrianal shield longer than wide..... *M. timikaensis* Hartini & Takaku, 2008
- Most of dorsal setae long and simple, except for setae Z4 and Z5 entirely pilose; J2, S4, and S5 pilose distally; ventrianal shield wider than long.....  
..... *M. kojimai* Hartini & Takaku, 2006
- 17.- Most of dorsal setae pilose except for simple setae j5, j6, z1, z5, z6 and J1 .....  
..... *M. borealis* Halliday, 2000
- Most of dorsal setae distally expanded and heavily plumose.....  
..... *M. kaimanaensis* sp. nov.

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