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**A CONTRIBUTION TO THE KNOWLEDGE OF
RYSZARDIA DECIPIENS (CROTCH), WITH DESCRIPTIONS OF
THREE RELATED SPECIES FROM INDONESIA
(COLEOPTERA, COCCINELLIDAE)**

By HARUO KATAKURA and SIH KAHONO

Abstract

KATAKURA, H. and KAHONO, S. 2016. A contribution to the knowledge of *Ryszardia decipiens* (Crotch), with descriptions of three related species from Indonesia (Coleoptera, Coccinellidae). *Ins. matsum. n. s.* 72: 17–31, 5 figs.

Current knowledge of the phytophagous ladybird beetle *Ryszardia decipiens* (Crotch) was reviewed. It occurs on the mountainous areas of Java and Bali, Indonesia, feeding on leaves of *Clematis lechenaultiana* and an unidentified *Clematis* species. Three related species, *Ryszardia sumatraedecipiens* Katakura, sp. nov., *R. paradecipiens* Katakura, sp. nov. and *R. clematophila* Katakura et Kahono, sp. nov., were described from Sumatra, Sulawesi and Java, respectively, on *Clematis* spp. and/or related *Naravelia* sp.

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INTRODUCTION

Ladybird beetles (Coccinellidae) are species rich and ecologically diverse, with predaceous, fungivorous and phytophagous species. They are currently placed in the superfamily Coccinelloidea (Coleoptera, Cucujiformia) (Robertson *et al.* 2015). Until recently, the family Coccinellidae has been classified into six subfamilies. However, recent synthetic analysis of morphology and molecular data uncovered their phylogenetic relationship, resulting in the recognition of two subfamilies, Microweisinae and Coccinellinae (Seago *et al.* 2011, also see, Ślipiński A 2007). The phytophagous ladybird beetles formerly treated as a subfamily is shown to be monophyletic, and is now treated as the tribe Epilachnini in the subfamily Coccinellinae along with many other tribes belonging to the four former subfamilies (Coccidulinae, Scymninae, Sticholotidinae and Ortaliinae) (Seago *et al.* 2011).

As in other tropical and subtropical regions of the world, Indonesia harbors abundant phytophagous ladybird beetles of the tribe Epilachnini, including serious crop pests (Kalshoven 1981; Katakura *et al.* 1988) and some species for which intensive evolutionary studies have been made (Matsubayashi *et al.* 2011, 2013; Fujiyama *et al.* 2013). However, the taxonomic identity of epilachnine "species" recorded from this region is often not clear, and, moreover, there exists many undescribed species. For example, Katakura *et al.* (2001) recorded a total of 26 species on Sumatra and Java, of which 12 species were left undetermined. A number of additional species have been found on these and other Indonesian islands in the course of our faunistic and evolutionary studies of epilachnine beetles conducted since 1990's. On the basis of the specimens obtained by these surveys, we herewith review our current knowledge of *Ryszardia decipiens* (Crotch, 1874), a poorly known species with previous reliable records only on Java, and describe three new species that are related to this species (Fig. 1).

MATERIAL AND METHODS

Terminology principally followed Ślipiński (2007) and Ślipiński and Tomaszewska (2010). Some terms followed Dieke (1947). The tergite X (proctiger) of female of the four species is bent over, and the true apical margin points forward. In this paper we use "hind margin" to denote the posterior margin of tergite X, and "true apical margin" as above. Observation was made under a dissecting microscope. Genitalia and some body parts were cleared in KOH solution, rinsed in tap water and examined and photographed in ethanol or glycerol. Photos were taken using digital cameras. Composite images of the whole body were produced using a built-in function of a digital camera (Olympus OMD EM-1), and those of some parts of genitalia, and final plates were produced using Adobe Photoshop CC 2014[®]. The following body parts were measured using an ocular micrometer attached to the dissecting microscope for specimens with adequate conditions (i.e., excluding specimens with distorted body and/or open elytra; the number of measured specimens are shown in parentheses): pronotum width (PRW), head width (HW), interocular distance (IOD), body length (BL), and body width (BW). Altitudes of sampling sites were shown in parentheses in the specimens list when available.

Half of the specimens including the holotypes will be deposited in Museum Zoologicum Bogoriense (MZB), Indonesia, and the rest in the Systematic Entomology Section, the Hokkaido University Museum, Sapporo, Japan (SEHU).

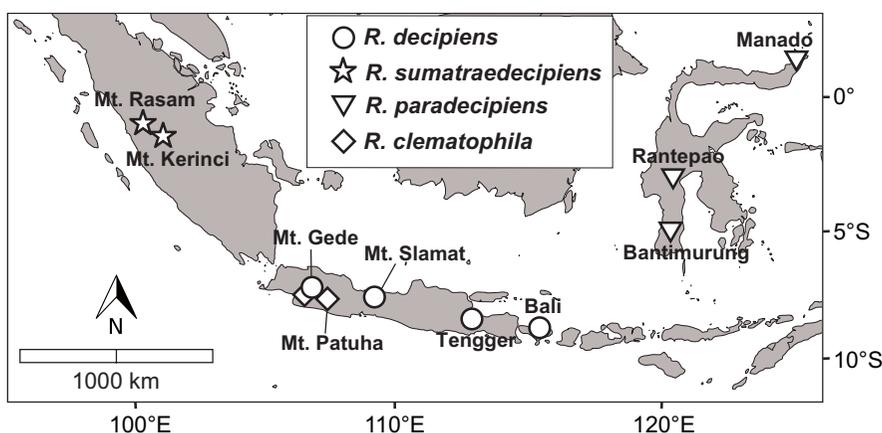


Fig. 1. Distribution map of the four species of *Ryszardia* treated in this study.

TAXONOMY

The generic classification followed Szawaryn *et al.* (2015) who revised the genera of world Epilachnini based on phylogenetic relationships inferred from morphological and DNA data, and established a number of new genera. Adopting their new system, we placed all the four species treated in this paper in the genus *Ryszardia* Tomaszewska & Szawaryn in Szawaryn *et al.*, 2015, that was established for a part of Asian members of the genus *Epilachna* Chevrolat in Dejean, 1837 (*sensu* Li & Cook 1961), with the type species *Epilachna decipiens* Crotch. The diagnostic characters of this genus shown by Szawaryn *et al.* (2015) are: mid and hind coxae with small tubercles on hind margin, metaventral postcoxal lines separated on metaventral process, epipleuron with foveae, and mid and hind tibiae with oblique carina near apex. These conditions were met in all four species treated in this paper. Szawaryn *et al.* (2015) further noted that the inner edge of metanepisternum in this and a related genus *Diekeana* Tomaszewska & Szawaryn in Szawaryn *et al.*, 2015, is serrate. However, serration was inconspicuous in the present specimens although the inner edge was not smooth.

Ryszardia decipiens (Crotch, 1874)
(Fig. 2)

Epilachna decipiens Crotch, 1874: 83–84 (Type locality: Java); Jadwiszczak and Węgrzynowicz 2003: 56.

Afissa decipiens: Bielawski 1961: 389–392.

Ryszardia decipiens: Szawaryn *et al.* 2015: 563.

Redescription. Body (Fig. 2A) short oval, strongly convex above. Dorsum reddish brown. Pronotum with dark rhombus-shaped spot medially. Elytron with six black spots arranged as in Fig. 2A. Spot 1 (postscutellar spot) and spot 5 (post-median spot) reaching suture, spot 4 (lateral spot) reaching margin. In some specimens, spot 1 and spot 2

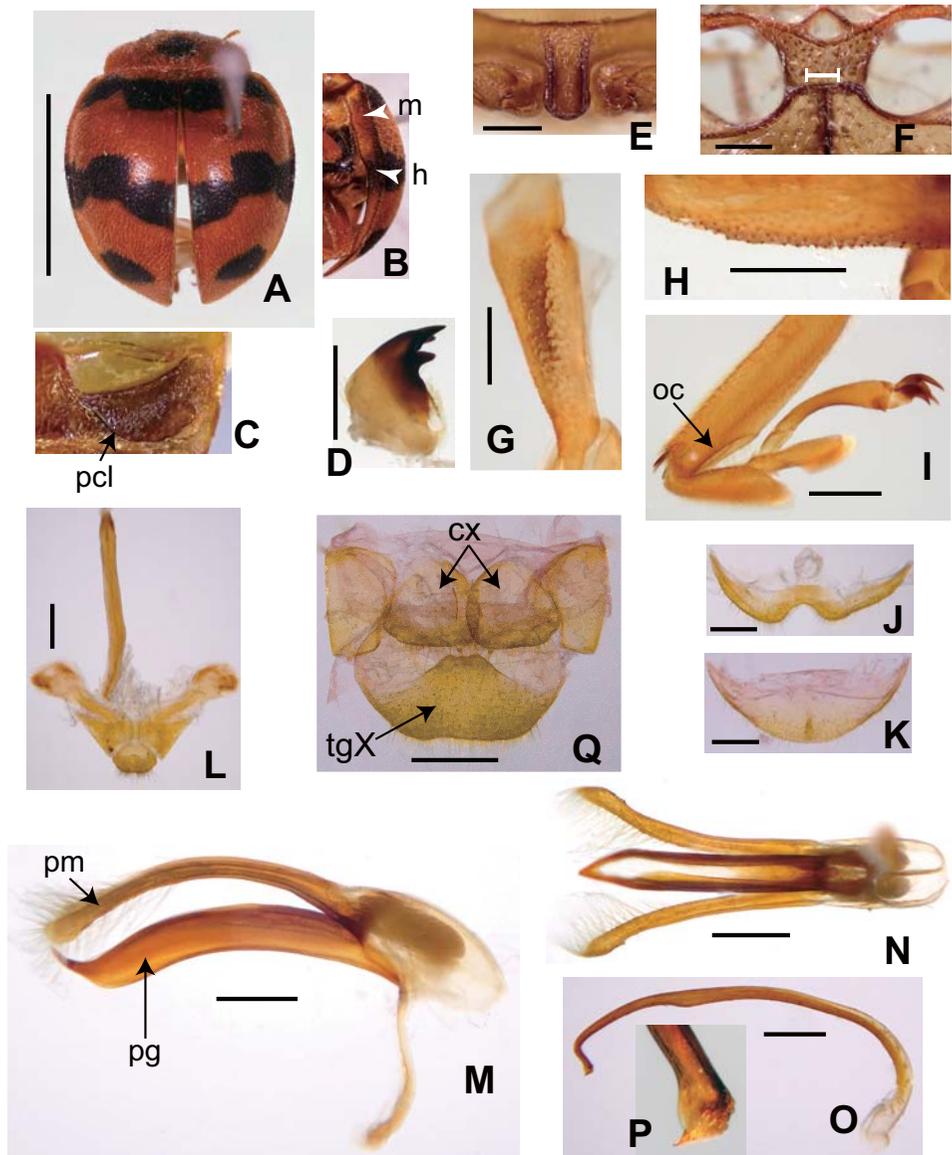


Fig. 2. *Ryszardia decipiens* (Crotch). A, habitus. B, epipleuron; arrows indicate foveae for the reception of middle (m) and hind (h) femora. C, postcoxal line (pcl). D, mandible (left). E, prosternal process. F, metaventral postcoxal line (part); postcoxal lines are separated by the distance shown by the white bar. G, metanepisternum (left). H, posterior part of left hind coxa from inside. I, left hind tibia and tarsus; oc, oblique cavity. J, ventrite 6 (male). K, ventrite 6 (female). L, male terminalia. M, tegmen, side view; pg, penis guide; pm, paramere. N, tegmen, from below. O, penis. P, penial apex. Q, female terminalia and genitalia (part); tgX, tergite X; cx, coxites. Scale bar for A, 5mm; for D to O, Q, 0.5mm.

(humeral spot) fused to form a basal fascia. Three spots on the middle level of elytron (spots 5-3-4) often fused to form a transverse fascia running from margin to suture; in such case constriction between spots obvious. Subapical spot always separate. In one specimen from Mt. Slamet, anterior half of elytral margin lined in black. Underside, metaventrite and anterior part of abdomen black, other parts including legs reddish brown.

Interocular distance ca. 2/3 head width. Antenna shorter than head width; composed of 11 antennomeres. Mandible tetridentate, incisor edge without tooth, surfaces without tubercles. Prosternal process with lateral carinae (Fig. 2E). Inner edge of metanepisternum inconspicuously serrate (Fig. 2G). Scutellum subtriangular or bell-shaped, longer than wide. Elytral epipleuron with foveae for reception of middle and hind femora (Fig. 2B); inner margin with bordering line nearly complete. Metaventral postcoxal lines widely separated on metaventral process (Fig. 2F). Fore and mid trochanters roundly produced. Mid and hind coxae with small tubercles on hind margin to posterior part of inner surface (Fig. 2H). Tibial spurs formula 1-2-2. Mid tibia and hind tibia with oblique carina on outer margin near apex (Fig. 2I). Tarsal claws long and bifid, without basal tooth. Abdominal postcoxal line (Fig. 2C) reaching or very close to posterior margin of ventrite 1, incomplete. Ventrite 6 deeply emarginate in male (Fig. 2J), rounded and equipped with low and short longitudinal ridge medially in the dorsal side in female (Fig. 2K).

Male terminalia and genitalia: Terminalia as in Fig. 2L. Apophysis single, stout. Tegminal basal piece without protrusions on inner margin near base of tegminal strut. Penis guide (median lobe) (Figs 2M, N) tubular, glabrous, gently curved down with nearly constant thickness toward apex, and curved upward near apex to form a sharp and pointed end; seen from below, split lengthwise in the middle. Parameres as long as or slightly longer than penis guide, lacking apical thorn (Figs 2M, N). Penis (siphon) (Fig. 2O) gently curved, suddenly narrowed at about 3/4 from base, and bent downward with right angle near apex; apex (Fig. 2P) widened and with minute dentitions.

Female terminalia and genitalia (Fig. 3Q): Tergite X, hind margin subtruncate, true apical margin subtruncate (Mt. Gede) or weakly convex (Mt. Slamet); coxites subtriangular.

Size: Male, HW 1.6–1.9 mm, IOD 1.0–1.3 mm, PRW 3.6–4.4 mm ($n = 5$); BL 7.3–8.0 mm, BW 5.7–7.1 mm ($n = 3$). Female, HW 1.7–2.1 mm, IOD 1.1–1.4 mm, PRW 3.8–4.8 mm ($n = 8$); BL 8.0–8.7 mm, BW 6.7–7.5 mm ($n = 6$).

Distribution (Fig. 1): Java (Mt. Gede, Mt. Slamet, Tengger), Bali.

Host plants: *Clematis lechenaultiana* DC., *Clematis* sp. (Ranunculaceae).

Material examined (5♂♂8♀♀; MZB.COLE.83563–83569; SEHU53401–53406): 1♂1♀, Cibodas (1400m), Java, 31 Oct. to 1 Nov., 1990 (H. Katakura); 1♂3♀♀, Cibodas, Foot of Mt. Gede, West Java, 5 Nov. 1994 (H. Katakura & S. Kahono); 1♀, Taman National Gede Pangrango, 10 July 2004 (S. Kahono); 1♂1♀, Mt. Slamet (2210m), Central Java, 31 Jan. 2009 (Sarino & S. Kahono); 1♂1♀, Kebun Raya Bali, Bali, 12 Aug. 2005 (S. Nakano, I. Abbas & S. Kahono); 1♂1♀, Kebun Raya Bali (1350m), Bali, 1 Dec. 2005 (H. Katakura).

Diagnosis and remarks: Crotch (1874) described this species from Java. Later, Bielawski (1961) figured the elytral pattern and described and figured the genitalia of this species for the first time on the basis of one male and one female. The locality of the female specimen was "Java" and that of the male specimen was described as "Tengger, 1800m," which is the name of a mountain in East Java. The genitalia of both

sexes described and figured by Bielawski (1961) well agree with those of the present specimens. The elytral pattern figured by Bielawski also coincides with some of the present specimens.

This species inhabits mountain regions of Java and Bali (Fig. 1). Javanese and Balinese specimens are very much alike in genitalia of both sexes. They are also similar in their external appearance with well developed elytral spots, in which basal two spots (spots 1-2) and three spots on the middle level (spots 5-3-4) are respectively very frequently coalescent as shown in Fig. 2A. In Mt. Gede, West Java, this species was collected on *Clematis lechenaultiana* and another unidentified *Clematis* species. In Mt. Slamet in Central Java and Kebun Raya Bali (Bali Botanic Garden), this species was found on a *Clematis* species having very similar leaf morphology to *Clematis lechenaultiana*. Korschevsky (1933) and Miwa and Yoshida (1935) reported this species from Formosa (Taiwan). However, these records need further confirmation because those authors did not examine genitalia. It is now well recognized that accurate identification of epilachnine species is difficult without information of genitalia (cf. Dieke 1947).

Ryszardia decipiens is very similar to *Epilachna paramagna* Pang & Mao, 1979 (probably belonging to *Ryszardia*), from Yunnan, China, in the detailed structure of male genitalia (Pang & Mao 1979; Ren *et al.* 2009). Moreover, the pattern of elytral spots of *R. decipiens* has some similarities with that of *E. paramagna* in Ren *et al.* (2009). However, there is difference among literatures in the elytral pattern of *E. paramagna*. The shape and position of elytral spots in *E. paramagna* in the original description (Pang & Mao 1979) was quite different from the photo of the same species in Ren *et al.* (2009), and the elytral pattern of *R. decipiens* resembles that of *E. paramagna* in Ren *et al.* (2009) but is dissimilar to the elytral pattern in the original description (Pang & Mao 1979). We refrain from synonymizing these two forms that were recorded from rather distant areas, until much more information about their morphology, biology and molecular data become available. It is because there is inconsistency in the elytral pattern of *E. paramagna* in the literature, and there are some cases in epilachnines in which morphologically nearly identical forms are shown to be different biological species based on biological (i.e., host plant) and molecular evidence (cf. Katakura 1997; Kobayashi *et al.* 2000). Unfortunately the host plant of *R. paramagna* is unknown. *Ryszardia decipiens* is also similar to *Epilachna magna* (Dieke, 1947) (also probably belonging to *Ryszardia*) from southern China (Yunnan, Fukien, Szechwan) in the structure of male genitalia, but is discernible from the latter by the thicker penis guide. Furthermore, *E. magna* has five spots on each elytron according to Dieke (1947), although it has six spots according to Pang and Mao (1979) and Ren *et al.* (2009). The host plants of *E. magna* are the eggplant (Solanaceae) and the Chinese yellow cucumber (Cucurbitaceae) (Pang & Mao 1979; Ren *et al.* 2009), both of which are distinctly different from the host plants of *R. decipiens*, i.e., *Clematis* spp. (Ranunculaceae).

The female internal reproductive organ of *R. decipiens* was treated in Katakura *et al.* (1994). The phylogenetic relationships of *R. decipiens* with some Asian epilachnines were analyzed by Katakura *et al.* (1994) and Kobayashi *et al.* (2009).

Ryszardia sumatraedecipiens Katakura sp. nov.

(Fig. 3)

Description. Body (Fig. 3A) nearly round, strongly convex above. Dorsum reddish

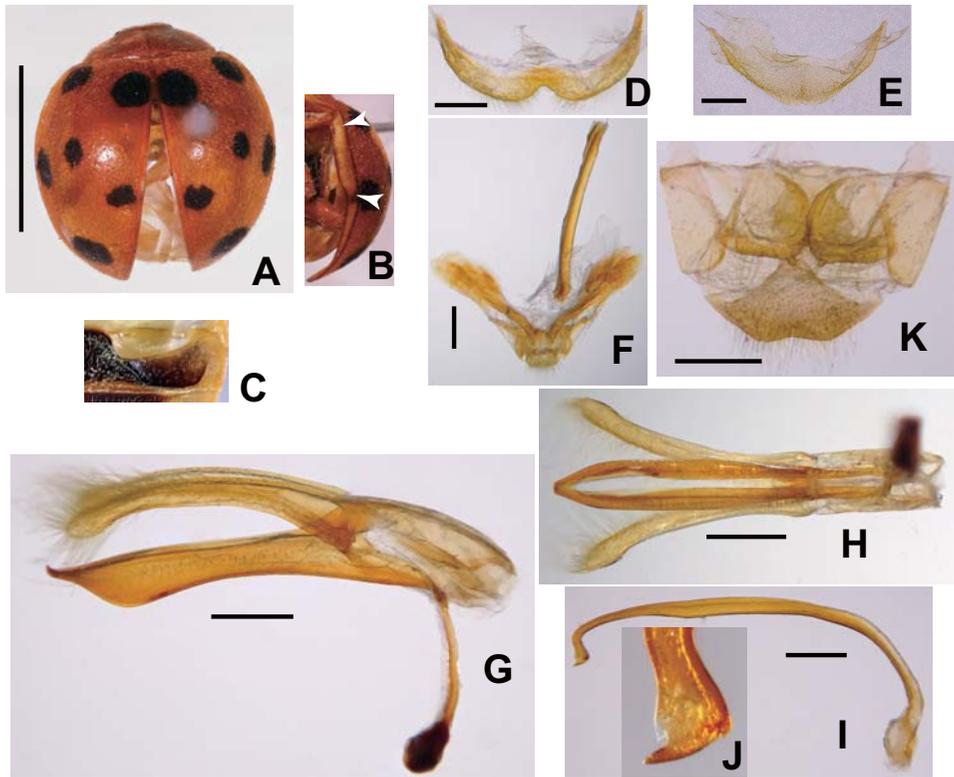


Fig. 3. *Ryszardia sumatraedecipiens* Katakura sp. nov. A, habitus. B, epipleuron; arrows indicate the depressions for the reception of middle and hind femora. C, abdominal postcoxal line. D, ventrite 6 (male). E, ventrite 6 (female). F, male terminalia. G, tegmen, side view. H, tegmen, from below. I, penis. J, penial apex. K, female terminalia and genitalia (part). Scale bar for A, 5mm; for D to I, K, 0.5mm.

brown. Pronotum spotless or with a faint or small black spot medially. Elytron with 6 black spots arranged as in Fig. 3A. Elytral spots always separate from each other except postscutellar spot that sometimes attached to the counterpart on suture. Middle lateral spot usually reaching margin. Underside, metaventrite and anterior part of abdomen black, other parts including legs reddish brown.

Interocular distance ca. $\frac{2}{3}$ head width. Antenna shorter than head width; composed of 11 antennomeres. Mandible tetradentate, incisor edge without tooth, surfaces without tubercles. Prosternal process with lateral carinae. Inner edge of metanepisternum serrate. Scutellum subtriangular or bell-shaped, longer than wide. Elytral epipleuron with foveae for reception of middle and hind femora (Fig. 3B); inner margin with bordering line nearly complete. Metaventral postcoxal lines widely separated on metaventral process. Fore and mid trochanters roundly produced. Mid and hind coxae with small tubercles on hind margin to posterior part of inner surface. Tibial spurs formula 1-2-2. Mid and hind tibiae with oblique carina on outer margin near apex. Tarsal claws long and bifid, without basal tooth. Abdominal postcoxal line (Fig. 3C), reaching posterior margin of ventrite 1,

incomplete laterally. Ventrite 6 deeply emarginate in male (Fig. 3D), rounded in female with a tiny medial ridge inside as in *R. decipiens* (Fig. 3E).

Male terminalia and genitalia: Terminalia as in Fig. 3F. Apophysis single, stout. Tegminal basal piece without protrusions on inner margin near base of tegminal strut. Penis guide (Figs 3G, H) tubular, glabrous, seen from side nearly straight, narrowed in the middle and then thickened again; apex pointed and bent upward; seen from below, split lengthwise in the middle. Parameres lacking apical thorn, slightly shorter than penis guide. Penis (Fig. 3I) gently curved, narrowed at about 3/4 from the base, and bent downward with right angle near apex; apex (Fig. 3J) widened, equipped with minute dentitions.

Female terminalia and genitalia (Fig. 3K): Tergite X with hind margin weakly concave and true apical margin subtruncate; coxites subtriangular.

Size: Male, HW 1.8–2.1 mm, IOD 1.2–1.3 mm, PRW 3.8–4.3 mm ($n = 7$); BL 7.5–8.3 mm, BW 6.7–7.2 mm ($n = 3$). Female, HW 1.8–1.9 mm, IOD 1.2 mm, PRW 3.8–4.0 mm ($n = 2$); BL 7.9 mm, BW 6.8 mm ($n = 1$).

Distribution: Sumatra (Mt. Rasam, Mt. Kerinci) (Fig. 1).

Host plants: *Clematis* spp. (Ranunculaceae).

Etymology: The species epithet is derived from the distribution range, Sumatra, and the suggested close relationship with *R. decipiens*.

Material examined: Holotype (♂; MZB.COLE.83570), Mt. Rasam, West Sumatra, Sumatra, Indonesia, 7 Nov. 2001 (S. Kahono & H. Katakura). Paratypes (6♂♂2♀♀; MZB.COLE.83571–83574; SEHU53407–53410): 4♂♂, data same with the holotype; 1♀, Mt. Rasam, West Sumatra, 6 Feb. 1994 (S. Nakano); 1♂, Mt. Rasam, West Sumatra, 8 May 1999 (S. Nakano); 1♂1♀ (abdomen lost), Mt. Kerinci (2080m), Jambi, Sumatra, 30 Jan. 2007 (N. Kamata).

Diagnosis and remarks: Katakura *et al.* (2001) reported this species as *Epilachna* sp. M. *Ryszardia sumatraedecipiens* is very similar to *R. decipiens*, *E. magna* and *E. paramagna* in morphology of the genitalia of both sexes. However, in *R. sumatraedecipiens*, the penis guide is narrowest at the middle seen laterally, and the apical bended part of the penis guide is shorter than those of other species (Fig. 3G). From *R. decipiens*, *R. sumatraedecipiens* is further discernible by the hind margin of female tergite X being weakly rounded (subtruncate in *R. decipiens*; Figs 2K vs. 3K). Moreover, *R. sumatraedecipiens* has round spots that are always separate from each other except for spot 1 that meets with the counterpart on the suture (Fig. 3A), and the body of *R. sumatraedecipiens* is nearly round while that of *R. decipiens* is short oval (Figs 2A vs. 3A).

This species has been known only in the Barisan Mountains in Sumatra (Fig. 1). In Mt. Kerinci, Jambi, this species was found on a *Clematis* species having very similar leaf morphology to *Clematis lechenaultiana*. In Mt. Rasam, West Sumatra, *R. sumatraedecipiens* feeds on another *Clematis* not yet unidentified to species.

Ryszardia paradecipiens Katakura sp. nov.

(Fig. 4)

Description. Body (Fig. 4A) nearly round. Strongly convex above. Dorsum yellowish brown. Pronotum spotless. Elytron with 5 black spots arranged as 2-2-1; elytral spots separate from each other, and not reaching margin or suture except spot 4 (outer spot of the second row) that reaches margin. Underside, metaventrite and anterior

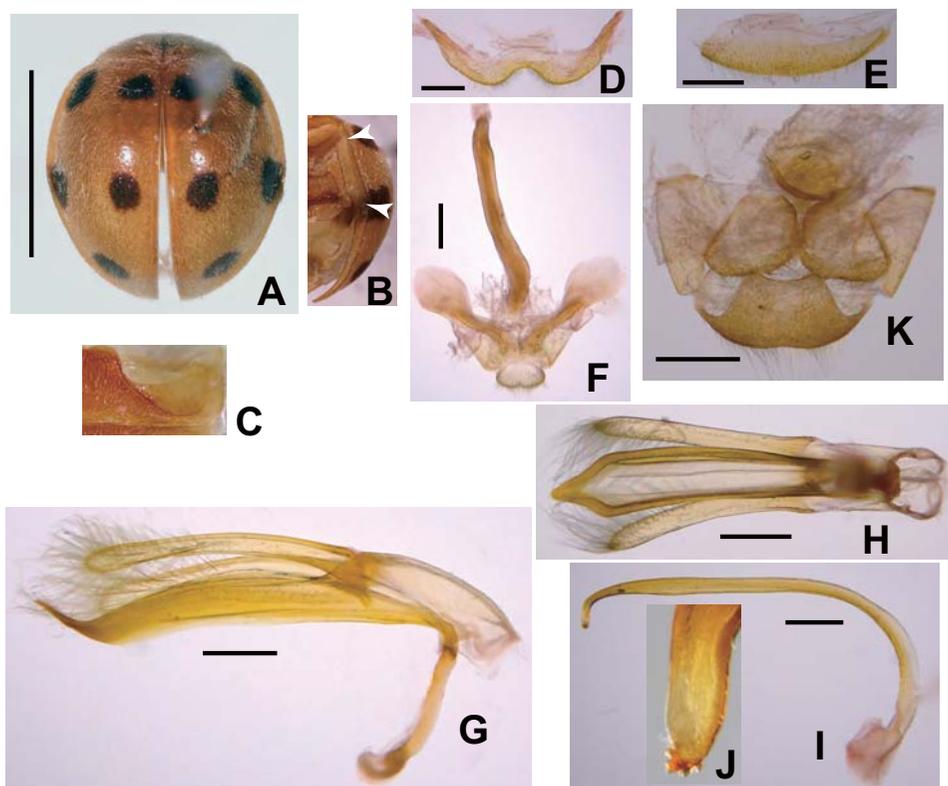


Fig. 4. *Ryszardia paradeciapiens* Katakura sp. nov. A, habitus. B, epipleuron; arrows indicate the depressions for the reception of middle and hind femora. C, abdominal postcoxal line. D, ventrite 6 (male). E, ventrite 6 (female, left side broken). F, male terminalia. G, tegmen, side view. H, tegmen, from below. I, penis. J, penial apex. K, female terminalia and genitalia (part). Scale bar for A, 5mm; for D to I, K, 0.5mm.

part of abdomen black, other parts including legs reddish brown.

Interocular distance ca. $2/3$ head width. Antenna shorter than head width; composed of 11 antennomeres. Mandible tetradentate, incisor edge without tooth, surfaces without tubercles. Prosternal process with lateral carinae. Inner edge of metanepisternum obscurely serrate. Scutellum subtriangular or bell-shaped, longer than wide. Elytral epipleuron with foveae for reception of middle and hind femora (Fig. 4B); inner margin with bordering line nearly complete. Metaventral postcoxal lines widely separated on metaventral process. Fore trochanter roundly, and mid trochanter angulately produced. Mid coxa with tubercles on hind margin. Hind coxa with small tubercles on hind margin to posterior part of inner surface. Tibial spurs formula 1-2-2. Mid and hind tibiae with oblique carina on outer margin near apex. Tarsal claws long and bifid, without basal tooth. Abdominal postcoxal line (Fig. 4C), reaching posterior margin of ventrite 1, incomplete laterally. Ventrite 6 deeply emarginate in male (Fig. 4D), rounded in female (4E).

Male terminalia and genitalia: Terminalia as in Fig. 4F. Apophysis single, stout.

Tegminal basal piece without protrusions on inner margin near base of tegminal strut. Penis guide (Figs 4G, H) glabrous, somewhat flattened tube, split wide open underside; seen from side nearly straight from base to ca. 3/5 of length, and then weakly curved down; near apex suddenly bent upward, forming rather long and sharply pointed apex. Parameres lacking apical thorn, distinctly shorter than penis guide. Penis (Fig. 4I) gradually narrowed and bent down near apex; apex blunt and multi-denticulate (Fig. 4J).

Female terminalia and genitalia(Fig. 4K): Tergite X with hind margin subtruncate or weakly concave and true apical margin truncate or concave; coxites subtrapezoidal.

Size: Male, HW 1.6–1.7 mm, IOD 1.0–1.1 mm, PRW 3.6–3.8 mm, BL 7.0–7.3mm; BW 6.1–6.5mm ($n = 3$). Female, HW 1.6–1.8 mm, IOD 1.0–1.1 mm, PRW 3.8–4.1 mm, BL 7.1–7.9mm, BW 6.3–6.8mm ($n = 2$).

Distribution: Sulawesi (northern and southern parts; Fig. 1).

Host plants: *Clematis smilacifolia* Wall., *Naravelia* sp. (?*laurifolia* Wall.) (Ranunculaceae).

Etymology: Based on the suggested close relationship with *R. decipiens*.

Material examined: Holotype (♂; MZB.COLE.83575), Tikara (865m), Rantepao, Tana Toraja, South Sulawesi, 22 Nov. 2005 (H. Katakura, N. Fujiyama & S. Kahono). Paratypes (2♂3♀♀; MZB.COLE.83576, 84781, 84782; SEHU53411, 53412): 1♂, data same with the holotype; 1♀, Pinaras (641m), Tomohon, near Manado, North Sulawesi, 18 Nov. 2005 (H. Katakura, N. Fujiyama & S. Kahono); 1♂1♀, Camba, Maros, South Sulawesi, 15 Aug. 2003 (S. Nakano, I. Abbas & S. Kahono); 1♀, Cagar Alam Karaenta (254m) near Bantimurung, South Sulawesi, 19 Aug. 2005 (S. Nakano, I. Abbas & S. Kahono).

Diagnosis and remarks: This species has an essentially same design of male genitalia with *Ryszardia decipiens*, *R. sumatraedecipiens*, *E. magna* and *E. paramagna*, but is separable from these four species by the penis guide with underside widely open and long and sharply pointed apical part (Figs 4G, H), the parameres distinctly shorter than penis guide (Fig. 4), and by the blunt penial apex equipped with denticles (Fig. 4I). In female genitalia, the coxites of *R. paradedecipiens* are subtrapezoidal (Fig. 4K), being different from rather subtriangular ones in *R. decipiens* and *R. sumatraedecipiens*. Furthermore, *R. paradedecipiens* is easily discernible from *R. decipiens*, *R. sumatraedecipiens* and *E. paramagna* by having five spots on each elytron (Fig. 4A) (six in the latter three species; for the elytral pattern of *E. magna*, see "Remarks" of *R. decipiens*).

This species seemed widespread in Sulawesi (Fig. 1) feeding on *Clematis* and *Naravelia*, although only 6 individuals were available for us.

Ryszardia clematophila Katakura et Kahono sp. nov.

(Fig. 5)

Description. Body oval (Fig. 5A), convex above. Dorsum reddish brown. Pronotum spotless or with a faint small dark spot medially. Elytra with two transverse fasciae and a pair of apical spots. Basal fascia not reaching base, margin, or suture. Second fascia touching margins, and may or may not be united on suture. Subapical spot transverse. In one female specimen, two separate spots present on each elytron instead of second fascia, suggesting that basal number of elytral spots can be five. Underside, metaventrite and anterior part of abdomen black, other parts including legs reddish brown.

Interocular distance ca. 2/3 head width. Antenna shorter than head width; composed



Fig. 5. *Ryszardia clematophila* Katakura et Kahono sp. nov. A, habitus. B, epipleuron; arrows indicate the depressions for the reception of middle and hind femora. C, abdominal postcoxal line. D, ventrite 6 (male, right side broken). E, ventrite 6 (female). F, male terminalia. G, tegmen, side view. H, tegmen, from below. I, penis. J, penial apex. K, female terminalia and genitalia. Scale bar for A, 5mm; for D to I, K, 0.5mm.

of 11 antennomeres. Mandible tetridentate, incisor edge without tooth, surfaces without tubercles. Prosternal process with lateral carinae. Inner edge of metanepisternum obscurely serrate. Scutellum subtriangular or bell-shaped, longer than wide. Elytral epipleuron with inconspicuous foveae for reception of middle and hind femorae (Fig. 5B); inner margin with bordering line nearly complete. Metaventral postcoxal lines widely separated on metaventral process. Fore and mid trochanters weakly roundly produced. Mid coxa hind margin with sparse obscure tubercles; hind coxa with small tubercles on hind margin. Tibial spurs formula 1-2-2. Mid and hind tibiae with oblique carina on outer margin near apex. Tarsal claws long and bifid, without basal tooth. Abdominal postcoxal line (Fig. 5C), nearly reaching posterior margin of ventrite 1, incomplete laterally. Ventrite 6, deeply emarginate in male (Fig. 5D), subtruncate or weakly rounded in female (Fig. 5E).

Male terminalia and genitalia: Terminalia as in Fig. 5F. Apophysis single, stout. Tegminal basal piece without protrusions on inner margin near base of tegminal strut. Penis guide (Figs 5G, H) glabrous, widened and flattened toward apex; corners of upper and side walls distinct; in profile gently curved down, tapering apically from the middle,

and curved upward near the apex to form a dull pointed end; seen from below, widely split lengthwise in the middle. Parameres as long as penis guide, lacking apical thorn. Penis (Fig. 5I) tapering apically near apex; apex (Fig. 5J) pointed, bent down and then up, forming a flat sigmoid shape seen laterally.

Female terminalia and genitalia (Fig. 5K): Tergite X with hind margin and true apical margin gently rounded; coxites subtriangular.

Size: Male, HW 1.6–1.7 mm, IOD 0.9–1.0 mm, PRW 3.1–3.4 mm ($n = 4$); BL 6.3–6.8 mm, BW 4.9–5.7 mm ($n = 4$). Female, HW 1.5–1.7 mm, IOD 1.0–1.1 mm, PRW 3.1–3.5 mm ($n = 7$); BL 6.9–7.3 mm, BW 5.6–6.1 mm ($n = 2$).

Distribution: Java (Mt. Gede, Mt. Patuha) (Fig. 1).

Host plant: *Clematis lechenaultiana* DC. (Ranunculaceae).

Etymology: The species epithet is derived from the genus name of the host plant.

Material examined: Holotype (♂; MZB.COLE.83577), Cibodas (ca. 1400m), 28 Nov. 1990 (H. Katakura). Paratypes (3♂♂8♀♀; MZB.COLE.83578–83582; SEHU53413–53418): 1♀, data same with the holotype; 1♂, Mt. Gede, West Java, 29 Oct. 1991 (H. Katakura); 1♀, Mt. Gede, West Java, 31 Oct. 1991 (H. Katakura); 2♂♂3♀♀, Mt. Gede, West Java, 5 Nov. 1993 (H. Katakura & S. Kahono); 3♀♀, Mt. Patuha, 13 Nov. 2004 (M. Kuwajima).

Diagnosis and remarks: This species was referred to as *Epilachna* sp. G in Katakura *et al.* (1994, 2001), Kobayashi *et al.* (2009) and Katoh *et al.* (2014).

In this species, the conditions of mid and hind legs (tubercles on hind margin of coxae and apically oblique outer margin of tibiae), which were considered very important as the characters of the genus *Ryszardia* (Szawaryn *et al.* 2015), are detectable, but less obvious compared with the other three species treated here. In the structure of both male and female genitalia, this species evidently belongs to the group that includes *R. decipiens*, *R. sumatraedecipiens* and *R. paradedecipiens* (and some continental species such as *E. magna*, *E. paramagna*, etc.). Katakura *et al.* (1994) and Kobayashi *et al.* (2009) showed a close relationship of *R. clematophila* and *R. decipiens*, based on morphological and molecular evidence, respectively. The present species is discernible from *R. decipiens* and two other species described here by the elytral pattern (Fig. 5A), smaller body size and details of male and female genitalia (penis guide and penis apex in male; shape of tergite X in female) (Figs 5G, H, I, K). *Ryszardia clematophila* somewhat resembles *Epilachna subacuta* (Dieke, 1947) from Szechwan, China, in body size and the morphology of penis (Pang & Mao 1979; Ren *et al.* 2009) and female tergite X (Dieke 1947), but the two species are separable by the distinctly different patterns of elytral spots, the shape of penis guide (Dieke 1947; Pang & Mao 1979; Ren *et al.* 2009), and the host plant (*Schisandra*, Schisandraceae, in *E. subacuta*; Pang & Mao 1979). *Ryszardia clematophila* is also similar to *Ryszardia dorotae* (Bielawski, 1979) from Bhutan (Bielawski 1979) in the shape of penis. However, the two species are quite different in body size, color and elytral patterns (*dorotae* is much larger, about 8.5–9.0 mm in length, and has entirely dark body with six separate spots on each elytron); tegmen and female's tergite X also differ. Katakura *et al.* (2001) mentioned that *Epilachna* sp. G (= *R. clematophila*) did not have cavities on elytral epipleura for the reception of middle and hind femora, but actually this species has inconspicuous foveae on the epipleura (see "Additional notes" below).

Ryszardia clematophila has been known only from mountain areas in West Java, feeding on *Clematis lechenaultiana*. In Mt. Gede, this species co-occurred with *R. decipiens* on the same host plant. In Mt. Gede, this species composes a putative mimicry

complex together with *Afissa orthofasciata* Dieke, 1947, feeding on *Tetrastigma papillosum* Planch. (Vitaceae) and *Henosepilachna bifasciata* (Fabricius, 1781) feeding on Solanaceae; body size and elytral patterns of the three species are very similar to each other despite their rather remote relationships (Katakura *et al.* 2001; Kobayashi *et al.* 2009).

The female internal reproductive system of *R. clematophila* was treated in Katakura *et al.* (1994), its oviposition pattern was given in Nakano *et al.* (2001), and phylogenetic relationships with other groups of epilachnines were treated in Katakura *et al.* (1994), Kobayashi *et al.* (2009) and Kotoh *et al.* (2014) under the name *Epilachna* sp. G.

ADDITIONAL NOTES

Dieke (1947) recognized the *szechuana* group and the *chapini* group in the species of the genus *Afissa* (later treated as *Epilachna sensu* Li & Cook 1961, before Szawaryn *et al.* 2015 revived this name) with "tergite X of the female having its apical part folded down and over so that the true apical margin pointing frontward." According to him, the *szechuana* group lacked "cavities" in elytral epipleura for the reception of middle and hind femora, which the *chapini* group had. Bielawski (1961) did not find such cavities in his two specimens of *E. decipiens*. However, Crotch (1874) mentioned in the original description of *E. decipiens* that "epipleuræ of the elytra foveolate." We also found certain foveae on elytral epipleura that would function as the receptors of femora in all the four species treated in this paper (Figs 2B, 3B, 4B, 5B). The four species should be placed in the *chapini* group, provided that these foveae correspond to Dieke's "cavities." However, the depth of foveae was variable among species. In *R. clematophila*, the foveae, especially that for middle femur, were shallow. Dieke (1947) also noticed the difference in the depth of "cavities" between two species of his *chapini* group, namely, *Epilachna chapini* (Dieke, 1947) and *E. magna*. These facts pose a question about the validity of the *szechuana* group and the *chapini* group defined solely by the conditions of epipleura. They may be better treated as a single group sharing the common characteristic feature of females' tergite X. Based on the literature and other information, Szawaryn *et al.* (2015) suggested that the two species of the *szechuana* group (*szechuana* and *subacuta*) might also be included in *Ryszardia*.

Molecular phylogenetic analyses showed that *R. clematophila* form a clade with *R. decipiens* within a clade comprising Asian species of the former *Epilachna* (Kobayashi *et al.* 2009; Kotoh *et al.* 2014). However, no phylogenetic analysis has been done for *R. sumatraedecipiens* and *R. paradedecipiens*, although the overall resemblance in morphology and host plants of the three allopatric species, *R. decipiens* in Java and Bali, *R. sumatraedecipiens* in Sumatra, and *R. paradedecipiens* in Sulawesi, strongly suggests that they are closely related to each other and probably speciated through vicariance events. It is notable that the distribution range of this group covers the areas separated by the Wallace line (i.e., Sulawesi *vs.* other islands), though no species related to these species has been known in more eastern parts of Indonesia, including the Lesser Sunda Islands (excluding Bali) and Papua. A detailed molecular phylogenetic analysis of the three species, as well as those involving the Asian continental relatives such as *E. magna* and other species in the *szechuana* + *chapini* group may contribute to our better understanding of zoogeography in Southeast Asia, from south China through the Malay Peninsula to the Greater Sunda Islands.

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