

## A REVIEW OF THE NEW GUINEAN SPECIES OF THE GENUS *HARMONIA* MULS. (Coleoptera: Coccinellidae)

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Until recently the genus *Harmonia* Muls. contained only one New Guinean species—*Harmonia octomaculata* (F.). In 1943 Timberlake in analyzing the type species of many genera arrived at the conclusion that *Callineda* Crotch, 1871 (type species: *Coccinella sedecimnotata* F.; desig. by Rey, 1873) constitutes a synonym of the genus *Harmonia* Muls., and accordingly he transferred *Callineda testudinaria* (Muls.) and *C. sedecimnotata* (F.) to *Harmonia* Muls. Thus, *Harmonia* Muls. consists now of 4 species: *Harmonia octomaculata* (F.), *H. testudinaria* (Muls.), *H. basinotata* n. sp. and *H. uninotata* n. sp.

The material used in this paper was received mainly from Bishop Museum, Honolulu. I was also able to examine the material from Deutsches Entomologisches Institut in Berlin and from Termesztudományi Museum in Budapest. I wholeheartedly thank Dr. J. L. Gressitt, Dr. Z. Kaszab and Dr. J. W. Machatschke for the loan of specimens.

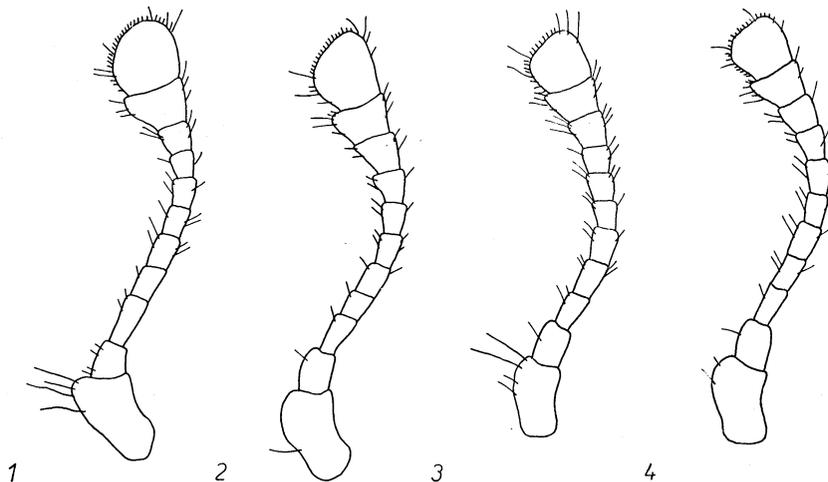
### *Harmonia octomaculata* (F.)

The species is distributed in the Indomalayan region as well as in the Australian. Its morphology is fairly well known and genitalia are given in the papers of Bielawski (1957) and that of Miyatake (1959). The color variability of Indian specimens is dealt with by Kapur (1956). The species has been recorded many times from New Guinea (Weise, 1902 & 1908; Korschefsky, 1932).

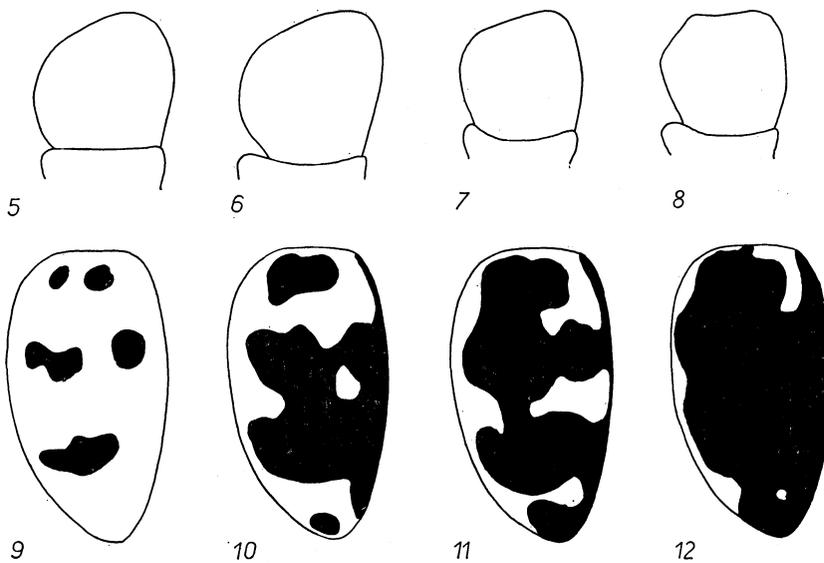
#### MATERIAL EXAMINED.

NW NEW GUINEA: 1, Wisselmeren, 1500 m, Itouda, Kamo V., 13. VIII. 1955, J. L. Gressitt; 1, Wamena, 1700 m, 10-25. II. 1960, T. C. Maa. NE NEW GUINEA: 2, Kainantu, 1650 m, M. V. light trap, 20-26. X. 1959, Maa; Stephansort, Astrolabe Bay, Biró, 1899, *Harmonia arcuata* F. v. *papuana* Weise, Typus. SE NEW GUINEA (Papua): 1, betw. Laloki R. & Brown R., 16. III. 1956, Gressitt; 8, Kiunga, Fly River, W. W. Brandt; 1, Daradae, nr. Javarere, Musgrove R., 2. X. 1958, Gressitt; 1, Laloki, Central Distr., 24. IV. 1959, C. D. Michener; 4, Port Moresby, 13. V. 1959, Michener; 13, Kapagere, nr. Rigo, 14-19. V. 1959, Michener; 1, Brown R., Central Distr., 25. V. 1959, Michener; 4, Laloki, nr. Port Moresby, 30. VIII-2. IX. 1959, Maa; 1, Daradae, 500 m, 80 km N of Port Moresby, 6. IX. 1959, Maa.

The elytra of the majority of specimens examined are very dark colored, black with red spots (figs. 10-12). Such coloring has also been observed in New Guinean specimens by Weise who in 1902 described them as *Harmonia arcuata* var. *papuana* Ws. Nevertheless, I have also seen specimens with dark color reduced to dark isolated spots (fig. 9); such



Figs. 1-4. Antennae: 1, *Harmonia octomaculata* (F.); 2, *H. testudinaria* (Muls.); 3, *H. basinotata* n. sp.; 4, *H. uninotata* n. sp.



Figs. 5-12. 5-8, last segment of antennal club: 5, *Harmonia octomaculata* (F.); 6, *H. testudinaria* (Muls.); 7, *H. basinotata* n. sp.; 8, *H. uninotata* n. sp. Figs. 9-12, *H. octomaculata* (F.), variability of the pattern of the elytra.

specimens are, however, rare. In most specimens the black spots are inter-connected in a very different way.

Antennae (fig. 1) slightly longer than frons (length of antennae—1.25 mm). Antennal segment 3, 2× as long as broad. Antennal segments 4 & 5 of equal length, longer than

3rd. Last antennal segment of antennal club (fig. 5) with margins regularly arched.

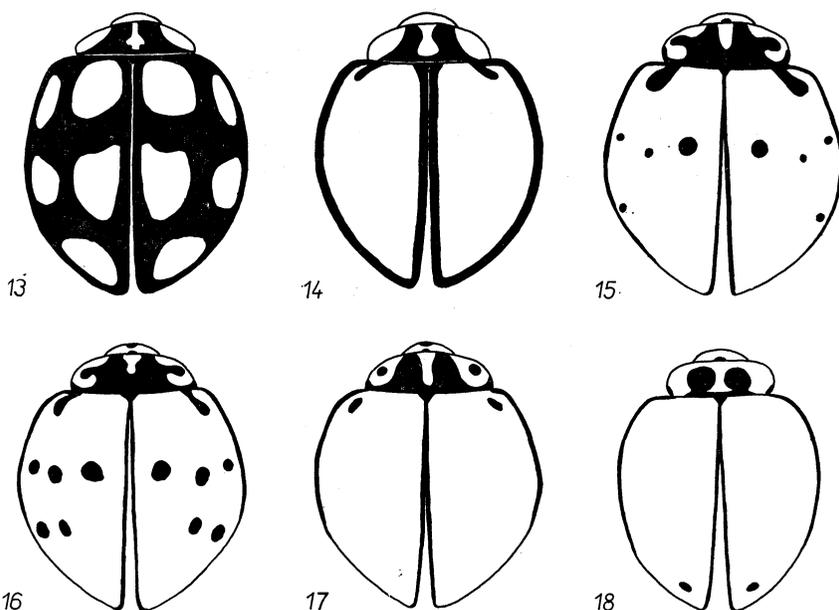
By the structure of its copulatory apparatus the species comes closest to *Harmonia testudinaria* (Muls.).

#### *Harmonia testudinaria* (Muls.)

This species was described by Mulsant in 1850 from Australia as *Daulis testudinaria* Muls. Crotch in 1874 included it in the genus *Callineda* Cr., where it remained until Timberlake (1943) transferred it to *Harmonia* Muls.

*Harmonia testudinaria* (Muls.) occurs in New Guinea, Australia (Korschefsky, 1932), and has been introduced to Hawaii (Terry, 1906).

The large material collected in New Guinea was received from Bishop Museum. The great majority of specimens belong to the form described by Korschefsky (1928); they have unicolorous elytra with a black suture and small spot situated at about 1/2 the width of the elytral base (fig. 14). In only 3 specimens are the elytra black with 5, large, brown red markings (fig. 13). In 1 specimen the preapical mark is fused to the mark situated at middle near suture. The pronotum is of similar color in all specimens.



Figs. 13-18. 13-14, *Harmonia testudinaria* (Muls.); 15-17, *H. basinotata* n. sp.; 18, *H. uninotata* n. sp.

**MATERIAL EXAMINED:** 141 specimens collected by W. W. Brandt, E. J. Ford, Jr., J. L. Gressitt, T. C. Maa, C. D. Michener, S. Thomas from 1955-1959. The specimens were taken mainly at high altitudes, with an average of 1600 m, and a high of 2200 m.

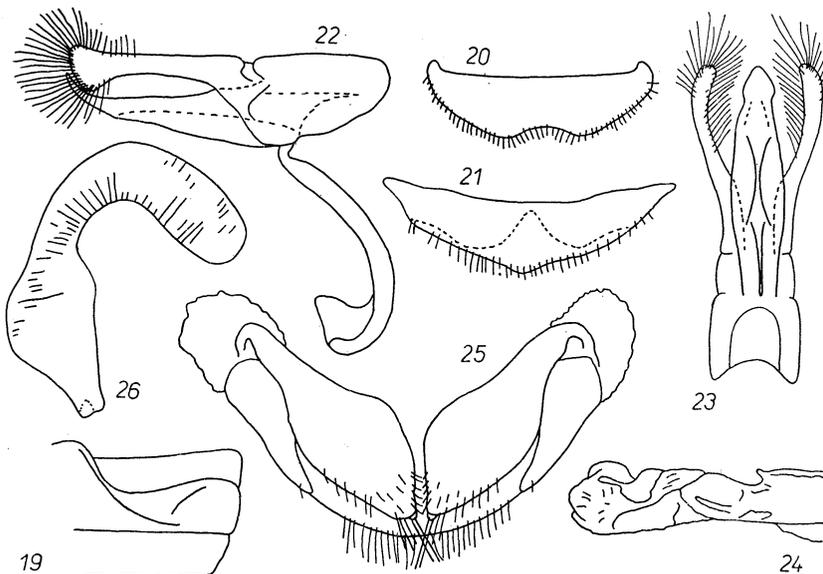
**NW NEW GUINEA:** Wisselmeren, Enarotadi; Okaitadi; Obano; Itouda Kano; Waghete Tigi L.; Duroto, E of Enarotadi; Kutsime, W of Swart Val.; Wamena. **NE NEW GUINEA:**

Goroka—Kabebe; Mt. Otto; Miramar, Asaro; Upper Chimbu; Nondugl; Tsenga; Bulolo; Sepalakambang, Salawaket Range; Finisterre Range, Saidor, Kiambavi Vill.; Finisterre Range, Saidor, Matoko Vill.; Sinofi; Swart Val., Karubaka; Feramin; Eliptamin Valley; Kainantu; Okapa; Moife; Tapo; Kassam; W. Highlands, Korn Farm.; Wahnes. SE NEW GUINEA (Papua): S. Highlands, Mendi; Dimifa SE of Mt. Siluwe; Rumpi; Anga Gorge E of Mendi; Aiyro Rumpi.

Antennae (fig. 2) length slightly exceeding width of frons (antennal length—1.25 mm). Antennal segments slightly longer than broad. Last segment of antennal club (fig. 6) “bulging” at one side, straight at the other; anterior margin oblique and passing gently into the arch of lateral margin.

Punctures on head very small and shallow, hardly visible, sparse. Spaces between them filled with shallow microreticulation effaced in some places. Punctures on pronotum very small, but slightly larger than those on head, shallow and very sparse; the spaces between them shining with minute perforations and cuts. Elytra with punctures almost all of nearly same size, only few being larger than remaining ones. Punctures fairly shallow and not particularly dense. Interstices strongly shining with marks of minute perforations.

Femoral line (fig. 19) branched, its curve reaching almost the posterior margin. Branching of femoral line not connected to main line and running obliquely toward anterior and lateral margins. Distance between branch end and anterior margin equal to distance between femoral line and posterior margin. Last abdominal sternite of ♂ (fig. 20) with posterior margin broadly excised, basal processes narrow and short; pubescence fairly dense but hairs rather short. Last abdominal sternite of ♀ (fig. 21) almost straight, basal processes bent sideways, middle of posterior margin slightly convex; pubescence scarce, and



Figs. 19–26. *Harmonia testudinaria* (Muls.): 19, femoral line; 20, last abdominal sternite of ♂; 21, last abdominal sternite of ♀; 22–23, genital armature of ♂; 24, siphon terminated; 25, genital armature of ♀; 26, receptaculum seminis.

hairs fairly short.

Genital armature of ♂ (figs. 22 & 23). Length of penis 1.2 mm, maximum width .28 mm. Penis slightly longer than parameres. In side view it tapers gradually from base to apex which is bent arch-like toward parameres. In ventral view it widens abruptly, and its posterior end appears somehow arrow-like; end of apex rounded. Maximum width of penis is about half way between base and apex. Parameres straight, club-like, broadened in distal part, pubescence dense consisting of long hairs. Basal part elongated posteriorly. Trabes narrow, broadened at its posterior end, its length slightly exceeding length of penis. Siphon semicircularly curved on 1/2 its length with a strongly elongated siphonal sack. Termination of siphon as in fig. 24.

Genital armature of ♀ (fig. 25). Length of genital plate .69 mm, maximum width .26 mm. Genital plates strongly tapering on both ends, genital tubercles small, pubescence scarce and short. Receptaculum seminis as in fig. 26. Entire surface with tiny but not numerous grooves.

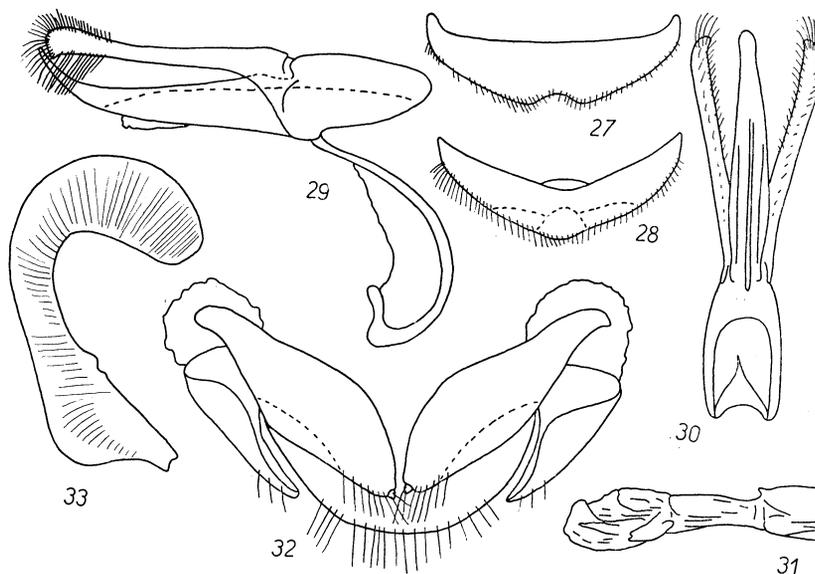
By the structure of its genital armature, the species comes close to *Harmonia sedecimnotata* (F.). The penis of the latter species (Bielawski, 1959), however, is shorter than the parameres, its apex more abruptly bent than in *Harmonia testudinaria* (Muls.). The apex of the penis in *testudinaria* is somehow arrow-shaped, while in *sedecimnotata* it is definitely less broadened. Moreover, the 2 mentioned species differ distinctly by their elytral color pattern. Of species occurring in the Australian area the 2—*Harmonia octomaculata* (F.) & *H. basinotata* n. sp., may be related to the species in question.

#### ***Harmonia basinotata* Bielawski, n. sp.**

Body feebly convex, almost semicircular in outline. Head yellowish brown with black clypeal margin and a black mark near base; in certain specimens this mark may be anteriorly elongated reaching more than 1/2 of head length; in still other specimens the mark may broaden sidewise covering the whole base of head.

Head appendages brown; apical segment of maxillae blackened at apex. Labrum dark brown or black. Pronotum yellow with black posterior angles and a black marking reaching from posterior to anterior margin; this mark is slightly divided in the middle and has 2 short branches at sides. In 1 specimen these projections are separated forming 2 black spots. Elytra testaceous, spots, suture and lateral margin, black (figs. 15–17). There are 1–6 spots on each elytron. Spots arranged in 3 rows: 1 elongated and broad spot situated near base and reaching posterior margin of elytron at one end with humeral tubercle at the other; 3 spots arranged in 1 row situated slightly before middle, and 2 spots slightly behind middle of each elytron. The size of spots varies; the middle spot in row 1 may be wanting as well as the interior one in row 2. In 1 specimen all spots are lacking except for basal one, which does not reach the posterior margin. Epipleuras of pronotum yellow in anterior 1/2, black in posterior one. Epipleuras of elytra yellow with exterior and interior margins black. Ventral surfaces of body and legs black; tarsi brown; epimera of mesonotum white.

Antennal (fig. 3) length slightly exceeding width of frons (length of antennae 1.15 mm). Antennal segments slightly longer than broad. Antennal segments 3–5 of almost equal length. Last segment of antennal club (fig. 7) with only slightly curved lateral margins



Figs. 27-33. *Harmonia basinotata* n. sp.: 27, last abdominal sternite of ♂; 28, last abdominal sternite of ♀; 29-30, genital armature of ♂; 31, siphon terminated; 32, genital armature of ♀; 33, receptaculum seminis.

and anterior margin almost straight. Anterior angles of pronotum distinctly rounded, fairly strongly protruding, posterior angles broadly rounded. Lateral margins of pronotum finely bordered, regularly arched. Anterior margin of pronotum straight. Scutellum with lateral margins parallel and slightly bordered. Humeral tubercles large and prominent. Humeral angles regularly rounded. Apical angles almost straight, slightly protruding. Lateral margins of elytra fairly broadly bordered, only slightly bent outward at apices. Tarsal claws single with a large tooth at base.

Punctures on head large but shallow and rather sparse. The spaces between them filled with distinct microreticulation. Punctures on pronotum of similar size as on head, fairly deep but sparsely distributed. The spaces between them shining with remnants of microsculpture. Puncturation on elytra consisting of larger and smaller punctures; they are rather shallow and not dense; interspaces with very fine, barely visible perforations.

Femoral line reaching almost to posterior margin, branched; the branch of femoral line not linked with the main line and running obliquely toward anterior and lateral margins, almost reaching anterior margin. Distance between end of femoral line and lateral margin more than 2× as long as distance between femoral line and posterior margin. In 1 specimen the femoral line is broken at branching point. Last abdominal sternite of ♂ (fig. 27) feebly bent, its posterior margin with a shallow excision in middle; pubescence scarce and short. Last abdominal sternite of ♀ (fig. 28) in shape of widely open V-mark, its posterior margin slightly concave in middle; pubescence fairly long and dense.

Length of body 5.9-7.8 mm.

Genital armature of ♂ (figs. 29-30). Length of penis 1.5 mm; maximum width .3 mm,

Penis longer than parameres. In side view it tapers regularly from base to apex; distal part (ca 1/3 of total length) curved arch-like and directed toward the parameres. In ventral view it is narrow, slightly broadened, with apex regularly rounded. Parameres straight, narrow, broad, club-like in posterior end; this "club" is terminated at the penis side by a short tooth. Pubescence dense but not particularly long. Basal part elongated and slightly narrowed posteriorly. Length of trabes smaller than that of penis. Trabes narrow, arched, angulated interiorly at posterior end. A fairly well sclerotized membrane between apex and base. Siphon long, narrow, bent arch-like at 1/3 way between base and apex. Siphonal sack long but narrow. Siphon terminated as in fig. 31.

Genital armature of ♀ (fig. 32). Genital plates strongly elongated and slightly bent S-like. Genital tubercles small, their pubescence scarce, but hairs fairly long. Length of genital plate .75 mm, maximum width .23 mm. Receptaculum seminis (fig. 33) large, arched in distal part, its base and apex distinctly broadened. Surface of receptaculum seminis with numerous, fine grooves.

Holotype ♂ (BISHOP 3261), Dimifa, SE of Mt. Giluwe, S. Highlands, 2200 m, SE New Guinea (Papua), 10. X. 1958, J. L. Gressitt.

Paratypes: 17 specimens from the same locality as holotype, collected at various times—4, 10. X. 1958; 12, 11. X. 1958; 1, 12. X. 1958.

Holotype and 9 paratypes are preserved in Bishop Museum, Honolulu, and 8 paratypes are kept in the Institute of Zoology, Polish Academy of Sciences, Warszawa.

The newly described species somehow resembles certain aberrations of *Harmonia testudinaria* (Muls.). The presence of a mark near the elytral base is a common character of both these forms, but the arrangement of elytral marks differs. On the other hand, *Harmonia basinotata* n. sp. and *H. sedecimnotata* (F.) show similar color pattern. Differences in coloring of pronotum and in structure of the copulatory apparatus of the ♂ seem to be good characters to separate *H. basinotata* n. sp. from the other 2 species.

*Harmonia basinotata* n. sp. is most closely related to *H. uninotata* n. sp. and the morphological differences are given below.

#### ***Harmonia uninotata* Bielawski, n. sp.**

Body feebly convex, its general outline broadly-oval. Head dark yellow with anterior part and base black. Pronotum dark yellow with 2 nearly circular, black markings near base which reach posterior margin of pronotum; margin between markings narrowly black, posterior angles of pronotum black. Scutellum black. Elytra testaceous with a small, black spot near apex (fig. 18). Lateral edges and suture black. Epipleuras of pronotum, except black part at posterior angles, yellow. Epipleuras of elytra, except for the narrow, black exterior edge, yellow. Underside of body and legs black, only epimerum of mesosternum whitish.

Antennal (fig. 4) length slightly exceeding breadth of frons. Antennal segments distinctly longer than broad, 1/3–1/5 of equal length. Last segment of antennal club (fig. 8) rounded at one side, slightly angulate at the other; anterior margin straight. Anterior angles of pronotum feebly rounded, strongly protruding; posterior angles broadly rounded. Lateral margin of pronotum slightly but regularly arched, very finely bordered. Pronotal surface slightly concave at sides, anterior margin of pronotum strongly arched. Scutellum

with lateral margins straight, delicately bordered. Humeral tubercles on elytra large and protruding. Humeral angles regularly, broadly rounded. Apical angle almost a right angle, angle slightly protruding. Lateral edge of elytra slightly bordered, inconspicuously excised at posterior end. Tarsal claws single with a broad tooth at base.

Punctures on head tiny, shallow and sparse; spaces between them with a fairly distinct microreticulation. Pronotum also with small, shallow and sparsely distributed punctures; interspaces strongly shining, with traces of microsculpture. Puncturation on elytra consisting of both small and large punctures, distinct, deep and densely distributed; interspaces shining, with tiny perforations.

Femoral line (fig. 34) branched, reaching up to  $3/4$  of segment length. Branching of femoral line obliquely directed towards middle and anterior margin, not connected with the main femoral line. Distance between end of femoral line and lateral margin more than  $4\times$  that between femoral line and posterior margin. Last abdominal sternite of ♀ (fig. 35) in shape of a broadly opened V-mark. Posterior margin slightly convex in middle, pubescence scarce, fairly short.

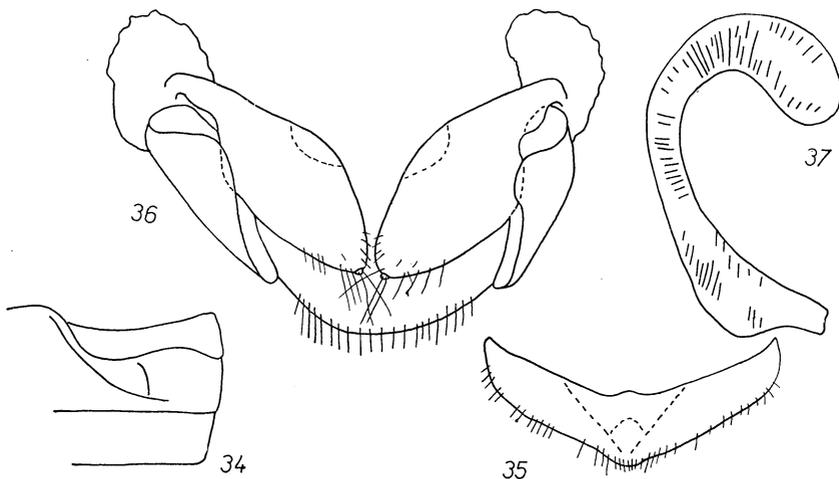
Length of body 6.8–7.3 mm.

Genital armature of ♂ (fig. 36). Genital plates strongly elongate, strongly narrowed at base, genital tubercles small, pubescence short, scarce. Length of genital plate 0.7 mm, maximum width 0.4 mm. Receptaculum seminis (fig. 37) large and long, strongly bent, broadened at posterior end, very narrow in middle. Receptaculum seminis surface with delicate, fairly numerous grooves.

Holotype ♀ (BISHOP 3262), Mt. Otto, 2200 m, NE New Guinea, 23. VI. 1955, J. L. Gressitt.

Paratypes: 2 ♀ ♀, same locality as holotype but 22. VI. 1955 & 24. VI. 1955.

Holotype and 1 paratype at Bishop Museum and 1 paratype at the Institute of Zoology, Polish Academy of Sciences, Warszawa.



Figs. 34-37. *Harmonia uninotata* n. sp.: 34, femoral line; 35, last abdominal sternite of ♀; 36, genital armature of ♀; 37, receptaculum seminis,

*Harmonia uninotata* n. sp. comes closest to *H. basinotata* n. sp. The species is easy to identify by its coloring of pronotum and presence of a preapical mark on the elytra, which is lacking in *H. basinotata* n. sp. The distinct differences between these 2 species can also be seen in the puncturation of the elytra. The punctures in *H. uninotata* n. sp. are very deeply set and distinctly differentiated into larger and smaller ones, while in *H. basinotata* n. sp. this differentiation is inconspicuous and punctures are smaller and shallower. The shape of the last segment of the antennal club differs in 2 species, but the genital armatures of ♀♀ are much alike.

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