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New species of the genus *Pentagonica* SCHMIDT-GOEBEL from the Oriental Region

(Coleoptera, Carabidae, Pentagonicini).

**2nd supplement to “The genus *Pentagonica* SCHMIDT-GOEBEL
in the Oriental, Papuan, and Australian Regions”.**

Martin BAEHR

Abstract

As a supplement to the revision of the genus *Pentagonica* SCHMIDT-GOEBEL in the Oriental Region five new species are described: *Pentagonica baliensis* from the island of Bali, *P. novairlandica* from New Ireland, *P. minuta* from New Guinea, and *P. polita* and *P. reticulata*, both from Malaysia. The new species are inserted in the recent keys to the Oriental-Papuan-Australian species of the genus *Pentagonica* (BAEHR 2012, 2013).

Introduction

In material received recently for identification I detected again some new species of the carabid genus *Pentagonica* SCHMIDT-GOEBEL, 1846 from the Oriental and Papuan Regions that are described in the present paper. This paper also covers a species which was omitted from the revision, because it is a single female. But now I am convinced that it is another new species. The paper also includes a specimen which was overlooked while working on the revision and which likewise represents a new species. Hence, the present paper is regarded a second supplement to my recent revision of the Oriental-Papuan-Australian *Pentagonica* (BAEHR 2012).

The carabid genus *Pentagonica* is almost worldwide distributed (except for the West Palearctic Region), but is most diverse in terms of species in the Oriental-Papuan-Australian Realm. From this area altogether 121 species were recorded, including a few occurring as far eastwards as Solomon Islands, Fiji, and Micronesia (BAEHR 2012, 2013). The bulk of the species is recorded from the southern Oriental Region and from New Guinea, but single species even occur in eastern Siberia. One species has been introduced into New Zealand. Apart from some widely distributed species, many species apparently are restricted to rather limited areas, and some of these seem to be rare, or have been rarely collected on whatever reasons. This is also true for the species described in present paper, most of which are available in the holotype only.

Information about morphological characters of the genus, taxonomy and distribution of the species, and on putative phylogenetic relations and biogeography can be taken from the revision (BAEHR 2012).

Methods

In the taxonomic section standard methods are used. The male and female genitalia were removed from specimens weakened for a night in a jar under wet atmosphere, then cleaned for a short while in hot 10% KOH. The habitus photographs were obtained with a digital camera using ProgRes CapturePro 2.6 and AutoMontage and subsequently were worked with Corel Photo Paint X4.

Measurements were taken using a stereo microscope with an ocular micrometer. Length has been measured from apex of labrum to apex of elytra. Length of pronotum was measured from the most advanced part of the apex to the most advanced part of the base. Length of orbit was measured from the posterior margin of the eye to the position where the orbit meets the neck. For estimation of the relative length of the

antenna, the 6th antennomere was measured. Attention was paid to take the measurement at the widest part of the antennomere and to omit the pilosity.

The types are stored in Naturkundemuseum Erfurt (NME), and in the working collection of the author in Zoologische Staatssammlung, München (CBM).

***Pentagonica baliensis* sp. n.**

(Figs 1, 6)

Holotype: female, "Indonesia, Bali Danau, Tamblingan, Gubug, 1000m, 17.12.2007, R. Grimm" (CBM).

Etymology. The name refers to the occurrence of this species on the island of Bali.

Diagnosis. Rather similar in shape and colouration to the widespread *P. erichsoni* SCHMIDT-GOEBEL, 1846 and to *P. reticulata* sp. n. Distinguished from both species by larger eyes and rounded, not denticulate apex of the elytra; further distinguished from *P. erichsoni* by less distinct pale lateral margins of pronotum and elytra, shorter antenna which is pilose from 4th instead from 5th antennomere, and absolutely depressed elytral intervals; and from *P. reticulata* by wider and less convex prothorax and longer elytra with less distinct, fairly transverse microreticulation.

Description

Measurements. Length: 4.6 mm; width: 2.05 mm. Ratios. Width/length of prothorax: 1.75; width of prothorax/width of head: 1.14; length of eye/length of orbit: c. 5.0; length/width of elytra: 1.42; width of elytra/width of prothorax: 1.81; length/width of 6th antennomere: 2.1.

Colour (Fig. 6). Black, lateral margin of pronotum barely, of elytra narrowly and rather inconspicuously dark yellow; clypeus, labrum, and palpi brownish; 1st antennomere in basal half brown, in apical half of 2nd, 3rd, and basal half of 4th antennomeres dirty yellow, rest of antenna pale brown; legs bright yellow; lower surface brown; epipleura of elytra reddish-brown.

Head (Fig. 6). Wide, almost as wide as prothorax; eye very large, c. 5 x as long as orbit, evenly curved into orbit, basal margin of head transversally convex; antenna rather elongate, surpassing base of pronotum by slightly more than 2 antennomeres; median antennomeres slightly > 2 x as long as wide; antenna pilose from 4th antennomere; microreticulation distinct, isodiametric, rather coarse, surface fairly dull.

Pronotum (Fig. 6). Rather wide, apex gently concave, lateral apical margins only slightly oblique but fairly convex; lateral basal margins near base not angulate but slightly convex; the raised lateral border almost reaching base, without forming a transverse prebasal ridge; basal part very short, wide; prebasal sulcus deep, with an elongate furrow in middle; marginal sulcus narrow, though rather deep; disk moderately convex; microreticulation distinct though finer than on head, isodiametric, surface rather dull.

Elytra (Fig. 6). Moderately short, slightly widened apicad, lateral margins very slightly convex throughout; apex slightly oblique and faintly concave, sutural angle rounded, without distinct denticle; surface rather convex but slightly depressed on disk; striae complete, distinct though not impressed, marked by rows of fairly coarse punctures; intervals absolutely depressed; microreticulation fine and rather superficial, consisting of moderately transverse meshes that are arranged in transverse rows, surface fairly glossy.

Male genitalia. Unknown.

Female gonocoxites (Fig. 1). Very small, short, and compact. Gonocoxite 1 obliquely triangular, with many extremely elongate, at apex acute ensiform setae at the medio-apical margin. Gonocoxite 2 obtusely triangular, compact, with 4 fairly elongate, stout ensiform setae on the ventro-lateral surface in the apical half, and with an elongate nematiform seta at the dorso-median margin close to apex.

Variation. Unknown.

Distribution. Island of Bali, Indonesia. Known only from the type locality.

Collecting circumstances. Little recorded, holotype sampled at medium altitude.

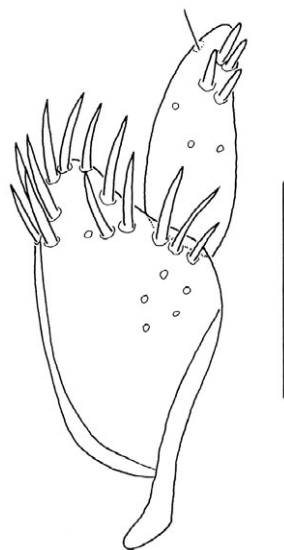


Fig 1. *Pentagonica baliensis* sp. n. Female gonocoxites. Scale bar: 0.1 mm.

Relationships. The species belongs to the *ruficollis*-group in the sense of BAEHR (2012) and most probably is related to *P. erichsoni* SCHMIDT-GOEBEL, 1846 and similar species.

***Pentagonica reticulata* sp. n.**

(Figs 2, 7, 11)

Holotype: female, "MALAYSIA W. KELANTA Road between Kampong Raji and Gua Musang, 1400-1700 (Ladang Pandrag), 1-28.iv.200 (*sic!*) 4°63'N-101°45'E/4°88'N-101°93'E, Cechovsky Petr lgt." (CBM).

Etymology. The name refers to the markedly microreticulate surface, particularly of the pronotum.

Diagnosis. Rather similar in shape and colouration to the widespread *P. erichsoni* SCHMIDT-GOEBEL, 1846 and to *P. baliensis* sp. n. Distinguished from *P. erichsoni* by less distinct pale lateral margins of pronotum and elytra, larger eyes, shorter antenna which is pilose from 4th instead from 5th antennomere, and absolutely depressed elytral intervals; and from *P. baliensis* by narrower and more convex prothorax, shorter elytra with more distinct, isodiametric microreticulation, and slightly denticulate apex of the elytra.

Description

Measurements. Length: 4.1 mm; width: 1.85 mm. Ratios. Width/length of prothorax: 1.55; width of prothorax/width of head: 1.09; length of eye/length of orbit: c. 4.0; length/width of elytra: 1.37; width of elytra/width of prothorax: 1.86; length/width of 6th antennomere: 2.4.

Colour (Fig. 7). Black, lateral margin of pronotum barely, of elytra narrowly and rather inconspicuously dark yellow; clypeus, labrum, and palpi brownish; 1st antennomere dark, 2nd, 3rd, and basal half of 4th antennomeres dirty yellow, rest of antenna brown; legs pale reddish; lower surface piceous; epipleura of elytra reddish-brown.

Head (Fig. 11). Wide, almost as wide as prothorax; eye large, c. 4 x as long as orbit, evenly curved into orbit, basal margin of head convex; antenna rather elongate, surpassing base of pronotum by slightly more than 2 antennomeres; median antennomeres slightly < 2.5 x as long as wide; antenna pilose from 4th antennomere; microreticulation distinct, isodiametric, rather coarse, surface fairly dull.

Pronotum (Fig. 11). Moderately wide, apex gently concave, lateral apical margins oblique, barely convex; lateral basal margins oblique and straight, near base not angulate; the raised lateral border almost reaching base, without forming a transverse prebasal ridge; basal part very short, wide; prebasal sulcus rather deep, without distinct pore or furrow in middle; marginal sulcus narrow, though rather deep; disk convex; microreticulation distinct, about as coarse as on head, isodiametric, surface rather dull.

Elytra (Fig. 7). Short, rather widened apicad, lateral margins convex throughout; apex slightly oblique and faintly convex, sutural angle with a faint, obtuse denticle; surface rather convex but slightly depressed on disk; striae complete, distinct though not impressed, marked by rows of fairly coarse punctures; intervals absolutely depressed; microreticulation very distinct, rather coarse, isodiametric, surface fairly dull.

Male genitalia. Unknown.

Female gonocoxites (Fig. 2). Very small, short, and compact. Gonocoxite 1 obliquely triangular, with many extremely elongate, at apex acute ensiform setae at the medio-apical margin. Gonocoxite 2 obtusely triangular, compact, with 4 fairly elongate, stout ensiform setae on the ventro-lateral surface in the apical half, and with an elongate nematiform seta at the dorso-median margin close to apex.

Variation. Unknown.

Distribution. West Malaysia. Known only from the type locality.

Collecting circumstances. Little recorded, holotype sampled at rather high altitude.

Relationships. The species belongs to the *ruficollis*-group in the sense of BAEHR (2012) and most probably is related to *P. erichsoni* SCHMIDT-GOEBEL, 1846 and similar species.

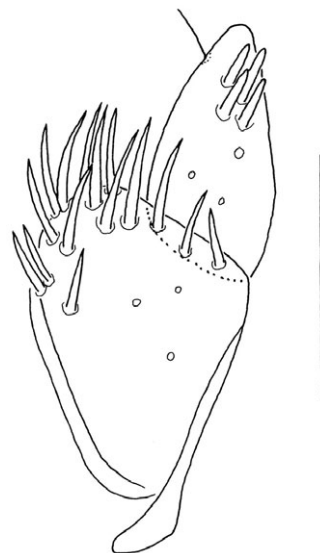


Fig. 2: *Pentagonica reticulata* sp. n. Female gonocoxites. Scale bar: 0.1 mm.

***Pentagonica novairlandica* sp. n.**

(Figs 3, 8)

Holotype: male, "PAPUA NEW GUINEA New Ireland prov., New Ireland bor., 5Km SW Fangalawa, Tesin, 100 m, 02°53'22" S, 151°09'46" E, Kulturland, 11.III.2000, leg. A. Weigel (CBM)".

Paratypes: 2 males, same data (CBM, NME).

Etymology. The name refers to the occurrence of this species on New Ireland.

Diagnosis. Rather similar to the widespread *P. communis* BAEHR, 2012, distinguished from that species by slightly wider prothorax, longer elytra, and slenderer aedeagus with more distinct preapical incision on the lower surface.

Description

Measurements. Length: 3.55-3.9 mm; width: 1.6-1.8 mm. Ratios. Width/length of prothorax: 1.78-1.80; width of prothorax/width of head: 1.24-1.27; length of eye/length of orbit: 4.3-4.5; length/width of elytra: 1.45-1.48; width of elytra/width of prothorax: 1.55-1.60; length/width of 6th antennomere: 2.15-2.2.

Colour (Fig. 8). Black, lateral margins of pronotum and elytra not perceptibly paler; clypeus dark piceous, labrum and palpi brownish; 1st antennomere piceous, rest of antenna paler, reddish; femora almost black, knees, tibiae, and tarsi pale reddish; lower surface including epipleurae almost black.

Head (Fig. 8). Wide though considerably narrower than prothorax; eye large, almost 4.5 x as long as orbit, evenly curved into orbit, basal margin of head convex; antenna moderately rather elongate, surpassing base of pronotum by about 2 antennomeres; median antennomeres slightly > 2 x as long as wide; antenna pilose from 4th antennomere; microreticulation distinct, isodiametric, rather coarse, surface moderately dull.

Pronotum (Fig. 8). Very wide, apex gently concave, lateral apical margins oblique and rather convex; lateral basal margins very oblique and slightly convex, near base not angulate; the raised lateral border almost reaching base, without forming a transverse prebasal ridge; basal part very short, wide; prebasal sulcus rather deep, without distinct pore or furrow in middle; marginal sulcus narrow, though rather deep; disk moderately convex; microreticulation distinct, though somewhat superficial, slightly finer than on head, isodiametric to slightly transverse, surface fairly glossy.

Elytra (Fig. 8). Elongate, slightly widened apicad, lateral margins slightly convex throughout; apex slightly oblique and very faintly convex, sutural angle rounded and slightly incurved; surface rather convex but slightly depressed on disk; striae complete, distinct though barely impressed, marked by rows of rather coarse punctures; intervals almost depressed; microreticulation distinct though slightly superficial, consisting of moderately transverse meshes, surface moderately glossy.

Male genitalia (Fig. 3). Genital ring wide, laterally irregularly convex, slightly asymmetric, with rather wide, convex basal plate and fairly wide, obtuse apex. Aedeagus moderately elongate, rather narrow, straight, slightly asymmetric; lower surface almost straight, but near apex suddenly turned down; apex short and wide, knobbed; internal sac with simple folding and without any sclerotized parts; both parameres rather short, with rounded apex.

Female gonocoxites. Unknown.

Variation. Very little variation noted.

Distribution. New Ireland. Known only from the type locality.

Collecting circumstances. Little recorded, sampled at low altitude in "cultivated land".

Relationships. The species belongs to the *papua*-group in the sense of BAEHR (2012) and is very similar and probably closely related to the widespread *P. communis* BAEHR, 2012.

***Pentagonica minuta* sp. n.**

(Figs 4, 9)

Holotype: male, "Papua NG, Morobe-Pr. Saruwaged Rge. Boana, 1000-1500m, 21.-22.10.1992, leg. A. Riedel" (CBM).

Etymology. The name refers to the very small body size of this species.

Diagnosis. Distinguished from other Papuan species of small body size by the very narrow prothorax, almost isodiametric microreticulation of the elytra, dirty yellow femora, and the very compact aedeagus with not knobbed, rather spatulate apex.

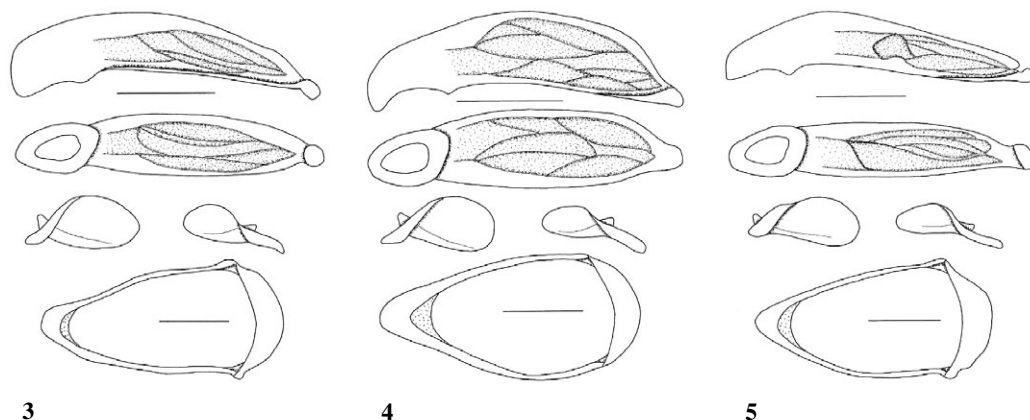


Fig. 3-5. Male genitalia: aedeagus, left side and lower surface, left and right parameres, genital ring. Scale bars 0.25 mm. **3.** *Pentagonica novairlandica* sp. n. **4.** *P. minuta* sp. n. **5.** *P. polita* sp. n.

Description

Measurements. Length: 3.3 mm; width: 1.55 mm. Ratios. Width/length of prothorax: 1.45; width of prothorax/width of head: 1.15; length of eye/length of orbit: 4.3; length/width of elytra: 1.36; width of elytra/width of prothorax: 1.79; length/width of 6th antennomere: 2.3.

Colour (Fig. 9). Piceous, elytra very slightly paler than the fore body, lateral margins of elytra very inconspicuously paler; clypeus dark piceous, labrum brown, palpi dirty yellow; 1st antennomere piceous, rest of antenna paler, reddish; legs pale reddish; lower surface reddish-piceous, epipleura of elytra reddish.

Head (Fig. 9). Wide, almost as wide as prothorax; eye large, slightly < 4.5 x as long as orbit, evenly curved into orbit, basal margin of head convex; antenna moderately elongate, surpassing base of pronotum by about 2 antennomeres; median antennomeres slightly > 2 x as long as wide; antenna pilose from 4th antennomere; microreticulation distinct, isodiametric, rather coarse, surface moderately dull.

Pronotum (Fig. 9). Comparatively narrow, apex gently concave, lateral apical margins oblique and slightly convex; lateral basal margins oblique and almost straight, near base not angulate; the raised lateral border almost reaching base, without forming a transverse prebasal ridge; basal part very short, wide; prebasal sulcus rather deep, without distinct pore or furrow in middle; marginal sulcus narrow, though rather deep; disk moderately convex; microreticulation distinct, about as coarse as on head, slightly superficial, isodiametric, surface fairly dull.

Elytra (Fig. 9). Short and rather wide, slightly widened apicad, lateral margins slightly convex throughout; apex slightly oblique and almost straight, sutural angle obtusely angulate; surface rather convex but depressed on disk; striae complete, distinct though barely impressed, marked by rows of coarse punctures; intervals almost depressed; microreticulation distinct though slightly superficial, rather coarse, consisting of isodiametric to slightly transverse meshes that are arranged in transverse rows, surface moderately glossy.

Male genitalia (Fig. 4). Genital ring wide, laterally convex, almost symmetric, with rather wide, convex basal plate and wide, convex apex. Aedeagus short and stout, wide, straight, slightly asymmetric; lower surface almost straight; apex short and wide, not knobbed; internal sac with simple folding and without any sclerotized parts; both parameres short, with widely rounded apex.

Female gonocoxites. Unknown.

Variation. Unknown.

Distribution. Northern Papua New Guinea. Known only from the type locality.

Collecting circumstances. Little recorded, holotype sampled at medium altitude.

Relationships The species belongs to the *papua*-group in the sense of BAEHR (2012), where it may be rather related to *P. fakfak* BAEHR, 2012 and *P. cognata* BAEHR, 2012, but these relationships are uncertain.

***Pentagonica polita* sp. n.**

(Figs 5, 10, 12)

Holotype: male, "MALAYSIA-W, Perak, 40km SE of IPOH), 900m, M. Banjaran Titi Wangsa, RINGLET, 25.iii.-3.iv.2002, P. Cechovsky leg." (CBM).

Etymology. The name refers to the absolutely glabrous, not microreticulate surface of the whole body.

Diagnosis. Distinguished from all other Oriental-Papuan species, except *P. laevis* BAEHR, 2012 and *P. palawanica* BAEHR, 2013, by absence of any microreticulation on the whole dorsal surface; distinguished from *P. laevis* by much larger eye, much wider prothorax with elongate and parallel-sided basal part, less rounded, dorsally much more convex elytra, and much finer punctation of the elytral striae; and from *P. palawanica* by larger eye, slightly longer antenna, conspicuously dark colour of the apical part of the antenna, and presence of several short striae on the anteriorly vaulted frons.

Description

Measurements. Length: 3.5 mm; width: 1.6 mm. Ratios. Width/length of prothorax: 1.61; width of prothorax/width of head: 1.0; length of eye/length of orbit: 5.0; length/width of elytra: 1.42; width of elytra/width of prothorax: 1.80; length/width of 6th antennomere: 2.7.

Colour (Fig. 10). Glossy black, elytra with inconspicuously reddish lateral margin; clypeus black, labrum, mandibles, and palpi piceous; 1st antennomere slightly piceous, 2nd, 3rd, and 4th antennomeres in basal half pale reddish, rest of antenna fairly contrastingly piceous; legs pale yellow; lower surface dark piceous, epipleurae of elytra dark reddish.

Head (Fig. 12). Wide, as wide as prothorax; eye large, c. 5 x as long as orbit, evenly curved into orbit, basal margin of head transversely convex; antenna rather elongate, surpassing base of pronotum by about 2.5 antennomeres; median antennomeres slightly > 2.5 x as long as wide; antenna pilose from 4th antennomere; clypeus and anterior part of frons in middle vaulted, frons behind with several short, irregularly longitudinal striae; neck constriction very deep; microreticulation absent, surface very glossy.

Pronotum (Fig. 12). Comparatively narrow, apex straight, lateral apical margins slightly oblique, straight; lateral basal margins oblique and very slightly concave, near base not angulate; the raised lateral border ended a long distance from base, without forming a transverse prebasal ridge; basal part elongate, rather narrow, parallel-sided; prebasal sulcus shallow, without distinct pore or furrow in middle; marginal sulcus narrow, though rather deep; disk convex; microreticulation absent, surface very glossy.

Elytra (Fig. 10). Moderately elongate, slightly widened apicad, lateral margins in basal half slightly convex, in apical part convex; apex slightly oblique and almost straight, incurved towards suture, sutural angle rounded; surface very convex; striae complete, distinct though not impressed, marked by rows of coarse punctures; intervals depressed; microreticulation absent, surface very glossy.

Male genitalia (Fig. 5). Genital ring wide, laterally slightly convex, almost symmetric, with wide, convex basal plate and rather narrow, convex apex. Aedeagus elongate and fairly narrow, straight, slightly asymmetric; lower surface almost straight; apex short and wide, knobbed and slightly upturned; internal sac with simple folding and without any sclerotized parts; both parameres comparatively elongate, the left one with widely rounded apex, the right one narrower, with obtusely triangular apex.

Female gonocoxites. Unknown.

Variation. Unknown.

Distribution. West Malaysia. Known only from the type locality.

Collecting circumstances. Little recorded, holotype sampled at medium altitude.

Relationships. In body shape, particularly in shape of prothorax and elytra this species is very similar to *P. palawanica* BAEHR, 2012 from the Philippine island of Palawan, and probably both are closely related. However, this putative relationship should be corroborated by future examination of the male genitalia of *P. palawanica*.

Recognition

The new species are introduced in the key to the genus (BAEHR 2012) and the additional key to some species (BAEHR 2013). For better use numbers of figures are mentioned as **B12** and **B13**.

***Pentagonica baliensis* sp. n. and *P. reticulata* sp. n.**

P. baliensis and *P. reticulata* can be followed on in the key in BAEHR (2012) to couplet 92. that must be altered as following:

92. Legs yellow 93.
 – Legs, or at least femora, dark 95.
93. Body size smaller, length < 4.6 mm **and** elytral striae only punctate, not impressed, intervals depressed **and** lateral margin of pronotum not or very inconspicuously pale (Figs 6, 7) **and** eye larger, ratio length of eye/orbit > 4; aedeagus unknown. Malaysia, Bali 93a.
 – Body size larger, length > 4.7 mm, but usually > 5 mm; eye smaller, ratio length of eye/orbit < 3.5; lateral margin of pronotum conspicuously pale; elytral striae various; aedeagus variously shaped 93b.
- 93a. Pronotum wider, ratio width/length 1.75; elytra longer, ratio length/width 1.42 (Fig. 6); microreticulation of elytra moderately transverse, superficial; sutural angle of elytra rounded. Bali ***baliensis* sp. n.**
 – Pronotum narrower, ratio width/length 1.55; elytra shorter, ratio length/width 1.37 (Fig. 7); microreticulation of elytra isodiametric, very distinct; sutural angle of elytra finely denticulate. Malaysia ***reticulata* sp. n.**
- 93b. = 93. in BAEHR (2012)

***Pentagonica novairlandica* sp. n., *P. minuta* sp. n.**

Both species can be followed on in the key to couplet 100. in the key of BAEHR (2012) that must be altered as following:

100. Elytra reddish-brown, laterally and apically slightly darker; 1st - 5th striae virtually not punctate; microreticulation of elytra very superficial and very transverse, surface glossy (**B12** fig. 220); 6th antennomere c. 2.4 x as long as wide; aedeagus unknown. Central western Papua New Guinea ***brandti*** BAEHR, 2012
 – Colour various, but usually elytra laterally and apically not darker than on disk; striae always punctate; microreticulation of elytra various, but usually more distinct; 6th antennomere either longer, > 2.7 x as long as wide, or shorter, < 2.3 x as long as wide. Sumatra and Borneo to New Guinea, New Ireland, north-eastern Australia, and Solomon Is. 101.
101. Antenna elongate, 6th antennomere > 2.7 x as long as wide. North-eastern Australia, central Papua New Guinea 102.
 – Antenna shorter, 6th antennomere < 2.3 x as long as wide. Sumatra and Borneo to New Guinea, New Ireland, north-eastern Australia, and Solomon Is. 103.
103. Pronotum very wide, ratio width/length > 1.82 (**B12** fig. 203); elytra short and wide, ratio length/width < 1.40; elytral striae barely impressed but rather coarsely punctate **and** microreticulation very transverse, rather consisting of transverse lines than meshes; apex of aedeagus not knobbed, nor upturned, slightly curved right (**B12** fig. 82). Halmahera ***quadratipennis*** LOUWERENS, 1956
 – Pronotum less wide, ratio width/length < 1.80, commonly less; elytra various; elytral striae various; microreticulation various; apex of aedeagus knobbed, or spatulate, or upturned, or straight (Figs 1, 2, **B12** figs 81, 83-91, 94-101). Sumatra and Borneo to New Guinea, New Ireland, north-eastern Australia, and Solomon Is., including Sulawesi and Halmahera 104.
104. Body size large, 4.7-5.7 mm; elytra elongate, ratio length/width > 1.49 (**B12** fig. 201); aedeagus with elongate, not knobbed, down-curved apex (**B12** fig. 81). North-eastern Papua New Guinea ***papua papua*** DARLINGTON, 1968
 – Body size smaller, < 4.6 mm, usually less; apex of aedeagus knobbed, or spatulate, or upturned, or straight but then short (Figs 1, 2, **B12** figs 83-91, 94-101). Sumatra and Borneo to New Guinea, New Ireland, north-eastern Australia, and Solomon Is. 105.

105. Eye comparatively small, <3.0 x as long as orbit (**B12** figs 251-253), if slightly larger, aedeagus deeply excised in front of apex (**B12** fig. 94); aedeagus: **B12** figs 83, 87, 89, 94. New Guinea 106.
- Eye larger, >3.8 x as long as orbit (Figs 8, 9, **B12** figs 254, 256); aedeagus: figs 1, 2, **B12** figs 84-86, 88, 90, 91, 95-101. Sumatra and Borneo to New Guinea, New Ireland, north-eastern Australia, and Solomon Islands 109.
109. Body size very small, length 3.3-3.35 mm; elytra rather short and wide, depressed (Fig. 9, **B12** fig. 205); elytral striae barely impressed, but fairly coarsely punctate; apex of aedeagus barely knobbed (Fig. 2, **B12** fig. 85). New Guinea 109a.
- Body size larger, length >3.6 mm; elytra various; elytral striae various; aedeagus usually knobbed or spatulate (Fig. 1, **B12** figs 86, 88, 90, 91, 95-101), when apex elongate then aedeagus less slender (**B12** fig. 84). Sumatra and Borneo to New Guinea, New Ireland, north-eastern Australia, and Solomon Islands 110.
- 109a. Pronotum wide, ratio width/length 1.70; much wider in comparison with head, ratio width of pronotum/head 1.29; aedeagus slender with elongate apex (**B12** fig. 85). South-western Papua Indonesia *fakfak* BAEHR, 2012
- Pronotum narrow, ratio width/length 1.45; much narrower in comparison with head, ratio width of pronotum/head 1.15; aedeagus thick, with short, apically wide apex (Fig. 4). North-eastern Papua New Guinea *minuta* sp. n.
110. Antenna brown **and** very short, ratio l/w of 6th antennomere < 1.8 **and** eye < 4 x as long as orbit **and** ratio width of pronotum/width of head > 1.24 (**B12** fig. 214); aedeagus unknown. Northern Papua Indonesia *darlingtoni* BAEHR, 2012
- **Either** antenna yellow except 1st or 1st-4th antennomeres; **or** antenna longer, ratio l/w of 6th antennomere 1.9 **and** eye c. 5 x as long as orbit **and** ratio width of pronotum/width of head 1.18 **and** aedeagus large and compact, apex small, convex at tip, deeply excised on the right side just in front of apical knob (**B12** fig. 96) **and** Batanta Is. off the west coast of Vogelkop Peninsula, western Papua Indonesia. Sumatra and Borneo to New Guinea, New Ireland, north-eastern Australia, and Solomon Islands 111.
111. Aedeagus parallel-sided, suddenly narrowed to the elongate, straight, not knobbed apex (**B12** fig. 84); body size small, length 3.6 mm; elytra rather short and wide; striae slightly impressed. Central Papua New Guinea *tekadu* BAEHR, 2012
- Aedeagus differently shaped, apex usually knobbed or spatulate (Fig. 3, **B12** figs 86, 88, 90, 91, 95-101); body size usually slightly larger; elytra various; striae various. Sumatra and Borneo to New Guinea, New Ireland, north-eastern Australia, and Solomon Islands 112.
112. Elytra short and wide, dorsally rather convex, ratio length/width 1.38; apex of elytra deeply excised, lateral apical angles sharply angulate (**B12** fig. 259); elytral striae not impressed, very inconspicuous, marked by spaced rows of fine punctures (**B12** fig. 219); aedeagus unknown. Waigeo Is. off the west coast of Vogelkop Peninsula, western Papua Indonesia *angulipennis* BAEHR, 2012
- Elytra various, but usually longer, dorsally usually less convex; apex of elytra less deeply excised, lateral apical angles at most obtusely angulate (Fig. 8, **B12** figs 206, 208-210, 215-218); elytral striae at least slightly impressed, more conspicuous, usually more coarsely punctate 113.
113. Apex of aedeagus distinctly spatulate (**B12** figs 96-101). Sulawesi, Halmahera, New Guinea, Australia: northern Queensland 114.
- Apex of aedeagus not spatulate, more or less distinctly knobbed (Fig. 3, **B12** figs 86, 88, 90, 91, 95). Sumatra, Borneo, New Guinea, New Ireland, Australia: northern Queensland, Solomon Islands. 119.
119. Prothorax comparatively narrow, ratio width of pronotum/width of head <1.22 (**B12** fig. 208); aedeagus with moderately elongate, very little knobbed apex (**B12** fig. 88). Sumatra, Borneo *parapapua* BAEHR, 2012

- Prothorax slightly wider, ratio width of pronotum/width of head >1.24 (Fig. 8, **B12** figs 206, 209, 210); aedeagus with either longer, barely knobbed apex (**B12** fig. 86), or with shorter apex (**B12** fig. 90), or with more distinctly knobbed apex (Fig. 3, **B12** figs 91, 95). New Guinea, north-eastern Australia, New Ireland, Solomon Islands 120.
- 120. Aedeagus slender, apex elongate, barely knobbed (**B12** fig. 86); elytral striae barely impressed, only punctate (**B12** fig. 206). Western Papua Indonesia *cognata* BAEHR, 2012
- Aedeagus either slender but with short apex (**B12** fig. 90), or more compact with conspicuously knobbed apex (Fig. 3, **B12** figs 91, 95); elytral striae various, commonly well impressed 121.
- 121. Aedeagus slender, apex short, barely knobbed, slightly upturned, lower surface near apex without distinct sinuosity (**B12** fig. 90). New Guinea *similis* BAEHR, 2012
- Aedeagus more compact, apex longer, conspicuously knobbed, not upturned, lower surface near apex with distinct sinuosity (Fig. 3, **B12** figs 91, 95). New Guinea, north-eastern Australia, New Ireland, Solomon Islands 122.
- 122. Aedeagus suddenly narrowed shortly in front of apex, apex smaller, lower surface near apex with conspicuous sinuosity (**B12** fig. 95); eye slightly smaller, <4 x as long as orbit. Central Papua New Guinea *garinae* BAEHR, 2012
- Aedeagus more regularly narrowed towards apex, apex larger, lower surface near apex with less conspicuous sinuosity (Fig. 1, **B12** fig. 91); eye slightly larger, >4.3 x as long as orbit. New Guinea, New Ireland, north-eastern Australia, Solomon Islands 123.
- 123. Pronotum usually slightly narrower, ratio width/length 1.72-1.79; elytra slightly shorter, ratio length/width 1.37-1.44; aedeagus more compact, with a less distinct preapical incision on the lower surface (**B12** fig. 91). New Guinea, north-eastern Australia, Solomon Islands *communis* BAEHR, 2012
- Pronotum usually slightly wider, ratio width/length 1.78-1.80; elytra slightly longer, ratio length/width 1.45-1.48; aedeagus slenderer, with a more distinct preapical incision on the lower surface (Fig. 3). New Ireland *novairlandica* sp. n.

***Pentagonica polita* sp. n.**

P. polita can be introduced in the keys of **Baehr** (2012 and 2013) at couplet 2. which must be altered as following:

- 2. Whole dorsal surface without microreticulation, very glossy; elytra dark with yellow margin 2a.
- At least head with perceptible microreticulation; when elytra with yellow margin, striae not as coarsely punctate. 3.
- 2a. Elytra wide and depressed, striae with very large punctures (**B12** fig. 155); aedeagus unknown. New Hebrides *laevissima* BAEHR, 2012
- Elytra narrower and dorsally very convex, striae with finer punctures (Fig. 10, **B13** fig. 4). Malaysia, Philippines: Palawan 2b.
- 2b. Eye larger, ratio eye/orbit 5.0 (Fig. 12); antenna longer, ratio length/width of 6. antennomere 2.7; apical part of antenna conspicuously darker than four basal antennomeres; aedeagus with obliquely knobbed apex (Fig. 5). Malaysia *polita* sp. n.
- Eye smaller, ratio eye/orbit <3.0 (**B13** fig. 7); antenna shorter, ratio length/width of 6. antennomere 2.2; apical part of antenna barely darker; aedeagus unknown. Philippines: Palawan *palawanica* BAEHR, 2013



6



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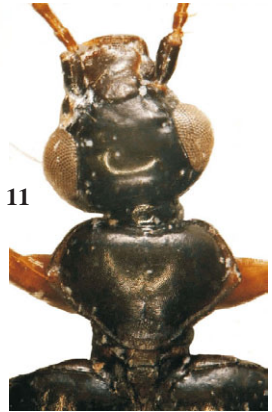
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Remarks

The five new species described in the present paper demonstrate the still insufficient knowledge of the species diversity and distribution of the Oriental and Papuan *Pentagonica*, in spite of the recent revision (BAEHR 2012) that covered ample material of a large number of museums and collections. These new species also demonstrate the necessity to collect systematically in various countries throughout the range of the genus. It seems that many species of *Pentagonica* possess very restricted ranges, so that short-range endemism seems to be more common than it was previously known. But this suggestion can be only proved, or rejected, by more systematic sampling. It has been shown in the mentioned revision that many species still are known only from single or few specimens, or from a single locality. Hence, it is to be expected that future collecting activities again should raise the number of recorded species. The material of the present paper corroborates this statement, because four of the five new species likewise are represented by single specimens only, and the fifth is known so far from the type locality.

One of the new species (*P. polita*) is difficult to attribute to one of the subgroups. It probably belongs in the *nitens*-group of the revision. However, in its absolutely glabrous surface it only reminds *P. laevissima* BAEHR, 2012 from the New Hebrides Islands and *P. palawanica* BAEHR 2013 from the island of Palawan in the Philippines, but is distinguished from both by the very large eye, besides some other minor character states of body shape and striation of the elytra. The four other new species can be more easily attributed to certain species groups: *P. baliensis* and *P. reticulata* to the *ruficollis*-group of the revision, where they are near to the widespread *P. erichsoni* SCHMIDT-GOEBEL; and *P. minor* and *P. novairlandica* to the *papua*-group, where they probably are near to *P. fakfak* BAEHR, 2012 and *P. cognata* BAEHR, 2012, and to *P. communis* BAEHR, 2012, respectively.

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Address of author:

MARTIN BAEHR
 Zoologische Staatssammlung München
 Münchhausenstr. 21
 81247 München
 Germany
 martin.baehr@zsm.mwn.de

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Figs 6-10. Habitus. Body lengths in brackets. **6.** *Pentagonica baliensis* sp. n. (4.6 mm). **7.** *P. reticulata* sp. n. (4.1 mm). **8.** *P. novairlandica* sp. n. (3.8 mm). **9.** *P. minuta* sp. n. (3.3 mm). **10.** *P. polita* sp. n. (3.5 mm).

Fig. 11-12. Head and prothorax. **11.** *Pentagonica reticulata* sp. n. **12.** *P. polita* sp. n.

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