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New taxa of the genus *Notagonum* Darlington from New Guinea related to *N. margaritum* Darlington

(Coleoptera, Carabidae, Platynini)

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As a continuation of a recent paper on the New Guinean species of the *angustellum* group of the genus *Notagonum* Darlington, 1952, a number of additional new taxa of this genus from New Guinea, related to *N. margaritum* Darlington, 1952, are described: *N. margaritum digulense*, *N. margaritum montorum*, *N. margaritum oculare*, *N. margaritum planipenne*, *N. excisipenne*, *N. ilagae*, and *N. laticolle*. The nominate subspecies of *N. margaritum* is redescribed, the male genitalia and certain features of the external morphology of all mentioned taxa are figured, and a key is provided for this group.

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Introduction

The platynine genus *Notagonum* was founded by P. J. Darlington (1952) in his monumental monography of the Carabidae of New Guinea for a group of species of “normal” platynine shape which do not exhibit any special character states which are so common in New Guinean Platynini: e.g. reduction or absence of tactile setae on head and/or pronotum, or on the elytra; specialized or odd body shape; metallic colour or characteristic colour patterns on the elytra; absence of flying wings, etc.

Most species of the genus *Notagonum* occur in New Guinea from where so far 54 species and additional 5 subspecies are known, most of which were described by Darlington (1952, 1971) and recently by Baehr (2008, 2010 this issue). Additional species exist in Australia and on islands of the Indo-Australian insular belt. The relationships of this genus are yet unsettled, as is the case in most of the numerous platynine genera occurring in New Guinea. But the introduction of the very rich New Guinean platynine fauna into a general systematic or phylogenetic concept of the Platynini at present is impossible, as

long as not even the relationships within the Oriental platynine fauna are understood. So, in the meantime the genus *Notagonum* is regarded a genus of convenience which covers most of the unspecialized New Guinean platynine species.

Baehr (2010) revised a group of species within the genus (the *angustellum* group in the sense of Baehr, 2010) which consists of rather small, narrow, more or less parallel-sided, quite depressed beetles which usually possess a narrow pronotum which is not much wider than the head. In the course of that study it became obvious that examination of the male genitalia, in particular the structure and armature of the internal sac, is mandatory for identification of the many species that exist and which commonly are very similar in body shape and external morphology. Encouraged by the work on the *angustellum* group I examined all male specimens of other groups of the genus from New Guinea and nearby areas available to me, some of which had been previously identified using Darlington’s (1952, 1971) keys and descriptions. These examinations again revealed many additional species, including some quite differently shaped and structured taxa

that, according to Darlington's keys, would belong to a single species. It further turned out that several species bear characteristic patterns of spines in the internal sac of the aedeagus which very much aid the identification of externally very similar species, but, on the other hand, again multiply the number of existing species. In the present paper only those taxa are mentioned that in Darlington's key would key out as *Notagonum margaritum* Darlington, 1952, but are more or less different in certain characters of their external morphology and also in shape and structure of their male genitalia.

The present study is another part of my ample work of identifications of New Guinean Carabidae, which mainly covers the rich material that O. Missa sampled during his extensive light collecting and fogging survey in 1993-1996 at Baiteta in Papua New Guinea (material in Institut Royal des Sciences Naturelles, Bruxelles), W. Ullrich's samples in the seventies and beginning eighties of last century, likewise in Papua New Guinea (material in Museum de l'Histoire Naturelle, Genève), the sampling activities of A. Riedel, A. Weigel, A. Skale and M. Balke during the last 15 years mainly in former Irian Jaya (present Papua Indonesia) (material mostly in the working collection of the author, München), the canopy light collecting of R. Kitching in 2000 at Oomsis in Papua New Guinea (material in Queensland Museum, Brisbane, and the collection of the author), and the material sampled by T. Lackner, Rob de Vos, and other Dutch collectors in Papua Indonesia from the 90ties of last century until present (material in Zoologisch Museum der Universiteit, Amsterdam). Additional material and types were examined from Museum of Comparative Zoology, Cambridge/Mass., National Museum of Natural History Naturalis, Leiden, The Natural History Museum, London, National Museum of Natural History, Prague, and from R. W. Hornabrooks collecting in the 50ties and 60ties of last century (material in Museum of New Zealand, Wellington).

Certainly the genus *Notagonum* would merit a general revision, but at present this is outside of the scope of this paper, because this would mean a full revision of the ample material enumerated in Darlington's volumes (Darlington 1952, 1971). The taxa newly described in the present paper have been compared with the complete type series of *N. margaritum*, but examination and dissection of the hundreds of specimens of New Guinean *Notagonum* present in the Museum of Comparative Zoology at Harvard University would require too much time at present. Moreover, the bulk of material examined by Darlington was from Papua New Guinea (eastern half of New Guinea) while most of the mentioned, more recently collected material is from the western

half, present Papua Indonesia (former Irian Jaya).

Although in general the New Guinean species of the genus *Notagonum* are quite similar in shape and structure, they can be divided roughly into a couple of species groups which possess, or lack, some conspicuous external features: e.g. unarmed, or denticulate, or spinose, sutural angle of the elytra, or even bidenticulate or bispinose apex of elytra, which means that a second denticle or spine is present at the end of 3rd interval; a remarkable narrow pronotum (which commonly is combined with pilose abdomen), or wide, laterally deeply sulcate pronota; elongate, depressed elytra, or wide, laterally and dorsally rather convex elytra. Although species exist which are intermediate and therefore difficult to group, this grouping can be of some use for a first sorting of the material to groups of externally similar species. Additional character states for species identification and differentiation are, for example: various impressions at different parts of the elytra; smooth, or crenulate elytral intervals; not, or more or less deeply emarginate 4th metatarsomere; presence and shape of microstructure on the elytral intervals, or absence of any microstructure; colouration, in particular presence, or absence, of distinct pale margins to pronotum and/or elytra; and, most important, shape and structure of the aedeagus, in particular, presence, number, and shape of any sclerotized spines or teeth.

Methods

Measurements were taken using a stereo microscope with an ocular micrometer. Body length has been measured from apex of labrum to apex of elytra, including any denticulations or spines. Body lengths, therefore, may slightly differ from those specified by Darlington (1952, 1971). Length of pronotum was measured from the most advanced parts of the apical angles to the most advanced part of the base, width of base at the widest part of basal angles. Length of elytra was measured from the most advanced part of humerus to the very apex. For estimation of the length of the antenna the 6th antennomere was measured. Attention should be paid to take the measurement at the widest part of the antennomere and to omit the pilosity.

For dissection of the male and female genitalia specimens were relaxed for a night in a jar under wet atmosphere, then the genitalia were removed and subsequently 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 edited with Corel Photo Paint 11.

Label data are exactly noted in all specimens, including all chiffres and abbreviations.

Abbreviations

CBM	Working collection M. Baehr in Zoologische Staatssammlung, München
MCZ	Museum of Comparative Zoology, Cambridge/Mass.
MHNG	Museum de l'Histoire Naturelle, G��n��ve
NHNL	National Museum of Natural History Naturalis, Leiden
NMPC	National Museum of Natural History, Praha
ZMAN	Zoological Museum of the University, Amsterdam

Taxonomy

Genus *Notagonum* Darlington

Darlington, 1952: 127. – Darlington 1971: 275; Lorenz 1998: 403; Baehr 2008: 60, 2010: 197.

Type species: *Notagonum externum* Darlington, 1952, by original designation.

Diagnosis. Genus of Platynini, characterized by presence of the full set of tactile setae on head, pronotum, and elytra; absence of any metallic colour or any other colour pattern on the elytra; not or but moderately excised 4th tarsomere of the metatarsus; and “normal” platynine body shape. Apart from very few exceptions, all species of *Notagonum* possess fully developed metathoracic wings. A more detailed diagnosis can be found in Darlington (1952: 127).

At present 54 species and additional 5 subspecies were described from New Guinea (Darlington 1952, 1971; Baehr 2008, 2010). Additional 18 species were recorded from Australia, New Caledonia, the Bismarck Archipelago, the Moluccas, Sulawesi, and the Indonesian Insular Belt (Lorenz 1998, 2005).

It is doubtful and at present impossible to decide, whether the genus is a monophyletic unit, or rather a genus of convenience that includes an assemblage of species which bear a more or less large number of plesiomorphic character states. Comparison with similarly unspecialized platynine genera of the Oriental and Afrotropical regions would be needed, but this is presently impossible, because no general phylogenetic analysis of the Palearctic and Paleotropical Platynini has been ever attempted. Certainly, even the species occurring in New Guinea are quite different in body shape, structure of elytra, and structure of the male aedeagus; so probably the genus in future should be divided into putative monophyletic groups of related species, which may be classified as subgenera or even genera.

The *margaritum* group

Notagonum margaritum Darlington, 1952 is a common species that was recorded from the whole of New Guinea (Darlington 1952, 1971). It was characterized by rather wide though very slightly cordiform pronotum, glabrous abdomen, minutely denticulate sutural angle of the elytra, not or but faintly angulate elytral apex opposite 3rd interval, barely excised latero-apical margin of the elytra, not or but slightly impressed elytra, and more or less distinctly crenulate elytral striae. However, even Darlington mentioned the variability of this species and accordingly, he has introduced the species twice in his key (Darlington 1952: 131, 132). As a consequence, specimens from different parts of New Guinea which would be identified as *N. margaritum* by use of Darlington’s key, not only differ in body shape and structure but also in the structure of their aedeagus, and thus, belong to related but separate taxa. Grace to the kind loan of almost the whole type series of *N. margaritum* from MCZ, NMHL and NMPC, I was able to define which specimens actually belong to *N. margaritum* proper, and to distinguish *margaritum*-like specimens of related taxa from various parts of New Guinea.

Main differences between the taxa of this group are in shape, particularly length, of the aedeagus, size of eyes, shape of the pronotum, structure of the apex of the elytra, and degree to which the elytral striae are punctate or crenulate. It became evident during comparison of the material, that almost all specimens that possess large, laterally much protruded eyes and short, very oblique or almost transversal orbits, have a short and stout aedeagus, whereas almost all specimens bearing smaller, less prominent eyes and larger orbits have a narrow, elongate aedeagus. The holotype of *N. margaritum*, but not all paratypes, exhibit the second combination of characters, and this combination occurs in populations from different areas throughout New Guinea. But even within the subgroup bearing this combination of character states some specimens have even longer and slenderer aedeagi, or perceptibly larger eyes, and accordingly, they are described as subspecies of *N. margaritum*, whereas specimens having a short aedeagus and large, protruded eyes are considered separate species.

This nomenclatorial procedure has been chosen, because even within those specimens of the type series of *N. margaritum* which were collected at the same locality and together with the holotype, both combinations of characters were found, and such common occurrence prohibits the classification as subspecies according to the current concept of subspecies.

Notagonum margaritum Darlington

Darlington, 1952: 133. – Darlington 1971: 277; Lorenz 1998: 403.

Diagnosis. Medium sized, dorsally depressed, black species with glabrous abdomen, usually but moderately protruded eyes and distinct, fairly elongate, oblique orbits, denticulate sutural apex of the elytra which is barely angulate opposite the 3rd interval; usually rather distinctly crenulate elytral striae; and narrow and elongate aedeagus without any sclerotized parts in the internal sac. It is distinguished from related species by the slender and elongate aedeagus and the moderately protruded eyes.

Distribution. The whole of mainland New Guinea. According to some differences in shape of eyes, pronotum, apex of elytra, and aedeagus five slightly different subspecies are provisionally distinguished. At the present state of knowledge most but not all of these occupy separate ranges.

Notagonum margaritum margaritum Darlington

Figs 1, 7, 8, 16, 24, 30

Darlington, 1952: 133. – Darlington 1971: 277; Lorenz 1998: 403.

Examined types. Holotype: ♂, “vic. Nadzab, Brit. N. G. July 1944 Darlington / *margar* ♂ desc / M.C.Z. Type 28607 / *Notagonum margaritum* Darl. / Aug-Dec 2005 MCZ Image Database” (MCZ). – Paratypes: 1♂, 6♀♀, same data (MCZ); 4♂♂, 5♀♀, “Chimbu Vy. N. G. (Bismarck Range) open. 5-7500 ft Oct’44 Darlington / Paratype *Notagonum margaritum* Darl.” (MCZ, 1 CBM); 1♂, 1♀, “NEW GUINEA: (NE) Wau. Morobe Distr. 1150 m, 16.X.1961 / J. Sedlacek Collector BISHOP / Native Collector BISHOP / *Notagonum margaritum* D. det. Darl. ‘69” (MCZ); 1♂, “vic. Hollandia, Dutch N. G. July-Sept 1944 Darlington / Paratype *Notagonum margaritum* Darl.” (MCZ); 1♂, “DUTCH NEW GUINEA: Cyclops Mts., Mt. Lina. 3500ft. iii.1936. L.E. Cheesman. B.M.1936-271. Paratype *Notagonum margaritum* Darl.” (MCZ); 1♀, “DUTCH NEW GUINEA: Cyclops Mts., Mt. Lina. 3500-4500ft. iii.1936. L.E. Cheesman. B.M.1936-271. Paratype *Notagonum margaritum* Darl.” (MCZ).

Diagnosis. Distinguished from the other subspecies of *N. margaritum* by combination of moderately produced eyes, fairly crenulate elytral striae, rather slender aedeagus, and moderately excised apex of the elytra.

Redescription

Measurements. Length: 6.6-8.7 mm; width: 2.45-3.3 mm. Ratios: Width/length of pronotum: 1.31-1.36; width widest diameter/base of pronotum: 1.23-1.29;

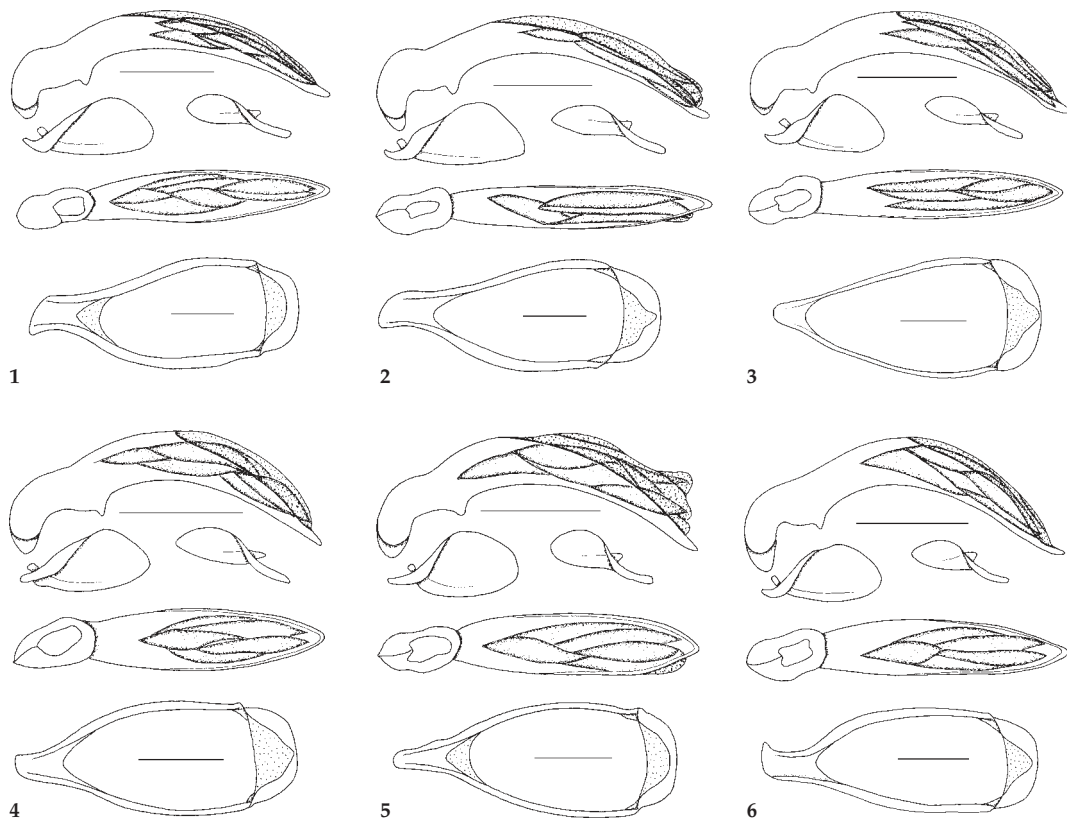
width head/pronotum: 1.36-1.44; length/width of elytra: 1.68-1.72; length/width of 6th antennomere: 3.5-3.7.

Colour (Fig. 8). Glossy black, lateral margins of pronotum and commonly also of elytra yellow or pale reddish, in some specimens also suture of elytra inconspicuously pale. Labrum and mandibles more or less light brown, palpi and antenna dirty yellow, though three basal antennomeres commonly brownish. Femora in basal half light brownish, in apical half dirty yellow, tibiae and tarsi slightly, but not contrastingly darker. Lower surface more or less dark piceous.

Head (Fig. 16). Moderately wide, considerably narrower than prothorax. Eyes large, but laterally only moderately protruded, orbits distinct, oblique, almost one third of length of eye. Clypeal suture laterally deep and distinct, in middle indistinct, clypeus basally slightly raised. Frontal furrows short, irregularly oblique, moderately deep, barely reaching the eye. Mandibles rather elongate (in group), straight, but not porrect. Antenna slender and elongate, surpassing base of pronotum by about 3.5 antennomeres, median antennomeres slightly more than 3.5 x as long as wide. Both palpi slender and elongate. Microreticulation fine and extremely superficial, visible only at very high magnification, surface virtually impunctate, very glossy.

Prothorax (Fig. 16). Moderately wide (in group), very slightly cordiform, with rather wide basis, widest slightly in front of middle, laterally evenly convex, very slightly concave near base. Disk depressed, lateral margins and lateral sulcus moderately wide (in group), margins slightly upturned, in basal fourth widened and considerably deeper, slightly explanate. Apical margin rather concave, apical angles projected but widely rounded. Basal angles obtusely rounded, base in middle straight, towards basal angles obliquely convex. Both apex and base completely bordered. Anterior and posterior transverse sulci very shallow, barely recognizable, median line well impressed, almost reaching apex and base. Anterior marginal seta located slightly in front of middle, at widest diameter, the posterior marginal seta located at basal angle. Disk with some fine, irregularly transverse striae, extremely finely and sparsely punctate and in some specimens with traces of extremely superficial, transverse microreticulation, very glossy.

Elytra (Figs 8, 24). Comparatively elongate (in group), distinctly widened towards apical third. Dorsal surface moderately depressed, with very shallow impression in basal third. Lateral border in basal half almost straight, little narrowed towards humeri, but slightly widened at basal third. Preapical sinuosity very shallow. Widest diameter about at



Figs 1-6. Male genitalia: aedeagus, left side, lower surface, left and right parameres, genital ring. 1. *Notagonum margaritum margaritum* Darlington. 2. *N. margaritum montorum*, subspec. nov. 3. *N. margaritum oculare*, subspec. nov. 4. *N. excisipenne*, spec. nov. 5. *N. laticolle*, spec. nov. 6. *N. ilagae*, spec. nov. Scale bars: 0.5 mm.

apical third. Humeri wide, rounded. Apex at suture with short tooth, at position of 3rd interval convexly but not angulately produced, excision moderately deep. Striae complete, well impressed, more or less distinctly crenulate, intervals very slightly convex. Microreticulation and punctures absent, surface very glossy.

Lower surface. Mesepisternum and Metasternum coarsely punctate, metepisternum barely punctate, c. 2.2 × as long as wide at apex. Abdomen impilose.

Male genitalia (Fig. 1). Large as compared with the genitalia of the other species of the *margaritum* group. Genital ring narrow, slightly asymmetric, apex markedly elongate, obliquely rounded. Aedeagus slender and elongate, depressed, narrow, almost symmetric, lower surface slightly concave. Apex rather short, straight, depressed, regularly narrowed to the obtuse tip. Folding of internal sac simple, no sclerotized parts present. Both parameres elongate, right paramere with obtusely angulate apex, left paramere triangular with obtusely rounded apex.

Female gonocoxites (Fig. 7). Gonocoxite 2 narrow and fairly elongate, straight, with rather acute apex; with two small ventro-lateral ensiform setae, a very short nematiform seta raising from a small pit on the dorso-median surface close to apex, but without a dorso-median ensiform seta. Apex of gonocoxite 1 on ventral surface with 6-8 comparatively elongate setae. Lateral plate multisetose at and near margin, setae moderately elongate.

Variation. Some variation noted in body size, relative width of pronotum, degree of punctuation of the elytral striae, and depth of excision of the apex of the elytra. Distinctness of microreticulation on the head also varies to some degree, but in all examined specimens throughout the subspecies' range some microreticulation is visible, except the single female from Aseki which virtually does not possess the slightest traces of microreticulation, even when examined at very high magnification. In all other characters this specimen however does not deviate, hence it is included in the nominate subspecies.

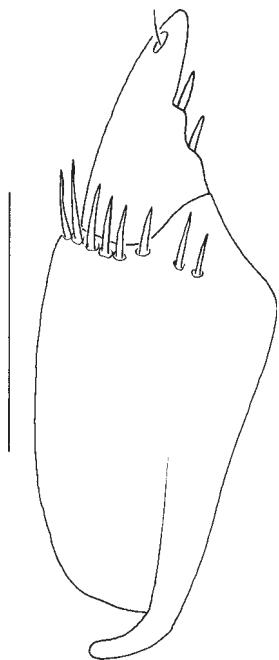


Fig. 7. *Notagonum margaritum* Darlington. Female gonocoxites 1 and 2. Scale bar: 0.25 mm.

Distribution (Fig. 30). Papua New Guinea and adjacent north-eastern Papua Indonesia.

Collecting circumstances. According to Darlington (1952) the type series was collected under stones and in pebble near streams, some non-typical specimens were sampled in "Malaise Trap" and at light. This subspecies apparently occurs from lowland to median altitude.

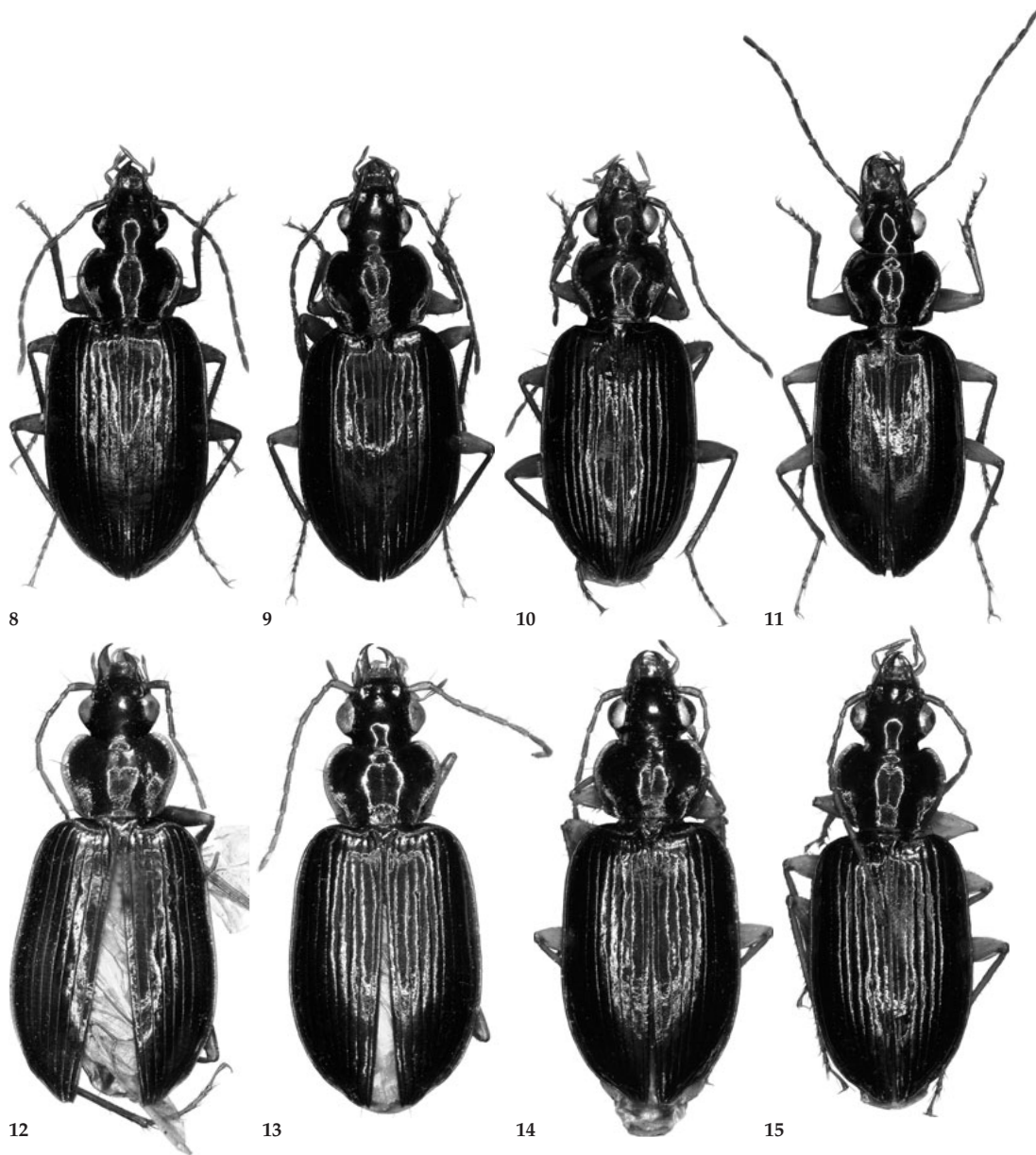
Non-typical material examined (16 ex.): 1♂, "NEW GUINEA: (NE) Wau. Morobe Distr. 1150 m, 17.IX.1961 / J. Sedlacek Collector BISHOP / *Notagonum margaritum* D. det. Darl. '69" (MCZ); 1♀, "NEW GUINEA: (NE) Wau. Morobe Distr. 1200 m, 15-30.IX.1962 J. Sedlacek / *Notagonum margaritum* D. det. Darl. '69" (MCZ); 1♂, 1♀, "NEW GUINEA: (NE) Wau. Morobe Distr. Mt. Missim (?) 1600-1800 m, 8.XII.1963 / W.W. Clissold Collector BISHOP / *Notagonum margaritum* D. det. Darl. '69" (MCZ); 1♀, "NEW GUINEA: (NE) Wau. Mt. Kaindi, 16 km SW of Wau, 2300 m, 8-9.VI.1962 / J. Sedlacek Collector BISHOP / *Notagonum margaritum* D. det. Darl. '69" (MCZ); 1♀, "NEW GUINEA: NE. Swart Val.: Karubaka 1350m., XI-18-1958 / J.L. Gressitt Collector / borrowed fr. BISHOP Mus. / *Notagonum margaritum* D. det. Darl. '69" (MCZ); 1♀, "Dobodura Papua, N. G. Mar-July, 1944 Darlington" (MCZ); 1♂, "Woitape Papua in native garden 14-16-1963 Coll. L. Smee / Goilala Subd., C. Dist., Papua. Alt. 5000' / Ex Coll. Dept. Agr. P.M. No.: HRID 182" (MCZ); 1♀, "Woitape in native

garden 14-16-1963 Coll. L. Smee / Goilala Subd., C. Dist., Papua. Alt. 5000' / Ex Coll. Dept. Agr. P.M. No.: HRID 179" (MCZ); 1♂, "PAPUA N. GUINEA Onerunka IX 73 nr. Kainantu W. G. Ullrich" (CBM); 1♀, "PAPUA N. GUINEA Onerunka XII 80 nr. Kainantu W.G. Ullrich" (MHNG); 1♂, "VI 79 PNG/EHProv. Umg. Kainantu Onerunka / Papua Nlle Guinée W.G. Ullrich" (CBM); 1♀, "24 I 79 Oner. / Papua Nlle Guinée W.G. Ullrich" (MNHG); 1♀, "Papua NG, Morobe-Pr. Aseki, Oiwa 1700m, Lux, 9.-14.4.1998, A. Riedel" (CBM); 1♂, 1♀, "New Guinea (NE) Aiyura 1600m – 9.V.66 / Malaise Trap J.L. Gressitt / borrowed from Bishop Mus. / *Notagonum margaritum* D. det. Darl. '69" (MCZ).

Notagonum margaritum montorum, subspec. nov.

Figs 2, 9, 17, 25, 30

Examined types. Holotype: ♂, "W.-Neuguinea/Baliem Valley Kanggime, 1550m/IR 4 3.9.-5.9.1990 leg. Balke & Hendrich" (CBM). – Paratypes: 1♂, "Neth. Ind. – American New Guinea Exped. Rattan Camp 1150 m ii-iii. 1939 L.J. Toxopeus / Paratype *Notagonum margaritum* Darl. / Paratype" (NHNL); 1♀, "Neth.-Ind – Amer. New Guinea Exp. Baliem Camp 1938 1900 m 16-27. XII L.J. Toxopeus leg. / Paratype *Notagonum margaritum* Darl." (MCZ); 6♂♂, 7♀♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, 16-VI-1959 op ultra violet licht / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (2 CBM, 11 NHNL); 3♂♂, 5♀♀, same data (1 CBM, 8 MCZ); 3♂♂, 3♀♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 16-VI-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 2♂♂, 1♀, same data (MCZ); 3♂♂, 4♀♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 16-V-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 1♂, "Museum Leiden Nieuw Guinea Exp. K. N. A. G. 1938 Araboebivak 17-X-1939 / C. West New Guinea Wissel Lakes Arabu Camp 1800m, 1939 Prof. Dr. H. Boschma / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 1♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 29-VI-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 1♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 11-VI-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (MCZ); 2♀♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 26-V-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (MCZ, NHNL); 1♂, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 5-VI-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 1♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 4-VI-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 1♀,



Figs 8-15. Habitus. Body length in brackets. 8. *Notagonum margaritum margaritum* Darlington (8.1 mm). 9. *N. margaritum montorum*, subspec. nov. (8.4 mm). 10. *N. margaritum oculare*, subspec. nov. (8.15 mm). 11. *N. margaritum planipenne*, subspec. nov. (7.8 mm). 12. *Notagonum margaritum digulense*, subspec. nov. (8.1 mm). 13. *N. excisipenne*, spec. nov. (7.6 mm). 14. *N. laticolle*, spec. nov. (7.2 mm). 15. *N. ilagae*, spec. nov. (7.8 mm).

"Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 6-V-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 1♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 23-VI-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 1♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 17-VI-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 2♂♂, 2♀♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil -VI-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det.

17-VI-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 1♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, op licht 22-V-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 2♂♂, 2♀♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil -VI-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det.

Darl. '69" (NHNL); 2♂♂, 3♀♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1260 m Sibil, 24-VIII-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 3♀♀, "Museum Leiden Neth. New Guinea Exp. Star Range, 1300 m Bivak 39, 26-VII-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (2 MCZ, 1 NHNL); 1♂, "Museum Leiden Neth. New Guinea Exp. Star Range, 1500 m Ok Tenma, op licht 19-V-1959 / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 1♀, "Museum Leiden Nieuw Guinea Exp. K. N. A. G. 1938 Araboebivak 2-XI-1939 / C. West New Guinea Wissel Lakes Arabu Camp 1800m, 1939 Prof. Dr. H. Boschma / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL); 1♂, 1♀, "Ned. Nieuw Guinea Sibil, Starenggeb. 5 Juni 1958 Coll. R.T. Simon Thomas / Hoogte: 1260 m Op lamplicht gevangen Gras – bos / Museum Leiden ex, collection C.J. Louwerens rec. 1979 / *Notagonum margaritum* Darl. det' 59 Darlington" (NHNL); 6♂♂, 5♀♀, "INDONESIA Papua Kecamatan Abenaho PASS VALLEY 3°51'S 139°05'E, 18-25.ii.2005 1700-2250m, dist. mtn.rainforest leg. T. Lackner" (2 CBM, 9 ZMAN); 1♀, "INDONESIA Papua Kecamatan Abenaho, PASS VALLEY 1950m 3°51'S, 139°05'E 11-17.ii.2005, at light" (ZMAN); 1♀, "INDONESIA Papua Kecamatan Oksibil MABILABOL 1340m 4°54'S – 140°37'E 21-25.ii.2005, at light" (ZMAN); 1♀, "INDONESIA Papua Star Mountains ABMISIBIL 1950-2200m 4°38'S – 140°33'E, 29.i.-9.ii.2005 leg. T. Lackner" (ZMAN).

Etymology. The name refers to the occurrence of this subspecies in the mountains of the Central Range.

Diagnosis. Distinguished from other subspecies by combination of but moderately protruded eyes, barely excised apex of the elytra, and even longer and slenderer aedeagus.

Description

Measurements. Length: 7.5-8.7 mm; width: 2.8-3.35 mm. Ratios: Width/length of pronotum: 1.30-1.35; width widest diameter/base of pronotum: 1.23-1.27; width head/pronotum: 1.35-1.40; length/width of elytra: 1.67-1.70; length/width of 6th antennomere: 3.6-3.75.

Colour (Fig. 9). Dark piceous to glossy black, lateral margins of pronotum and commonly also of elytra yellow or pale reddish. Labrum and mandibles more or less light brown, palpi and antenna dirty yellow, though at least four basal antennomeres brownish. Femora in basal half light brownish, in apical half dirty yellow, tibiae and tarsi slightly, but not contrastingly darker. Lower surface more or less dark piceous.

Head (Fig. 17). Much as in the nominate subspecies. Microreticulation usually extremely superficial, in a few specimens, however, slightly more distinct.

Prothorax (Fig. 17). Much as in nominate subspecies.

Elytra (Figs 9, 25). Much as in nominate subspecies, but striae not or but very finely crenulate. Apex at suture with short tooth, at position of 3rd interval barely produced, excision shallow. Microreticulation and punctures absent.

Lower surface. As in nominate subspecies.

Male genitalia (Fig. 2). Much as in nominate subspecies, but aedeagus even longer and slenderer, with short, slightly upturned apex.

Female gonocoxites. As in the nominate subspecies.

Variation. Some minor variation noted in body size, relative width of pronotum, and degree of punctuation of the elytral striae.

Distribution (Fig. 30). So far known only from the Central Range in central and eastern Papua Indonesia.

Collecting circumstances. Little recorded, though all specimens collected at median to rather high altitude. The specimens from Pass Valley sampled in "disturbed montane rainforest", those from Star Range at UV light.

Relationships. Probably more closely related to the nominate subspecies than to any other subspecies.

Notagonum margaritum oculare, subspec. nov.

Figs 3, 10, 18, 26, 30

Examined types. Holotype: ♂, "Mindik, 1200m, creek 28.IV.1998 / PAPUA N.G. Morobe Prov. leg. A. Riedel" (CBM).

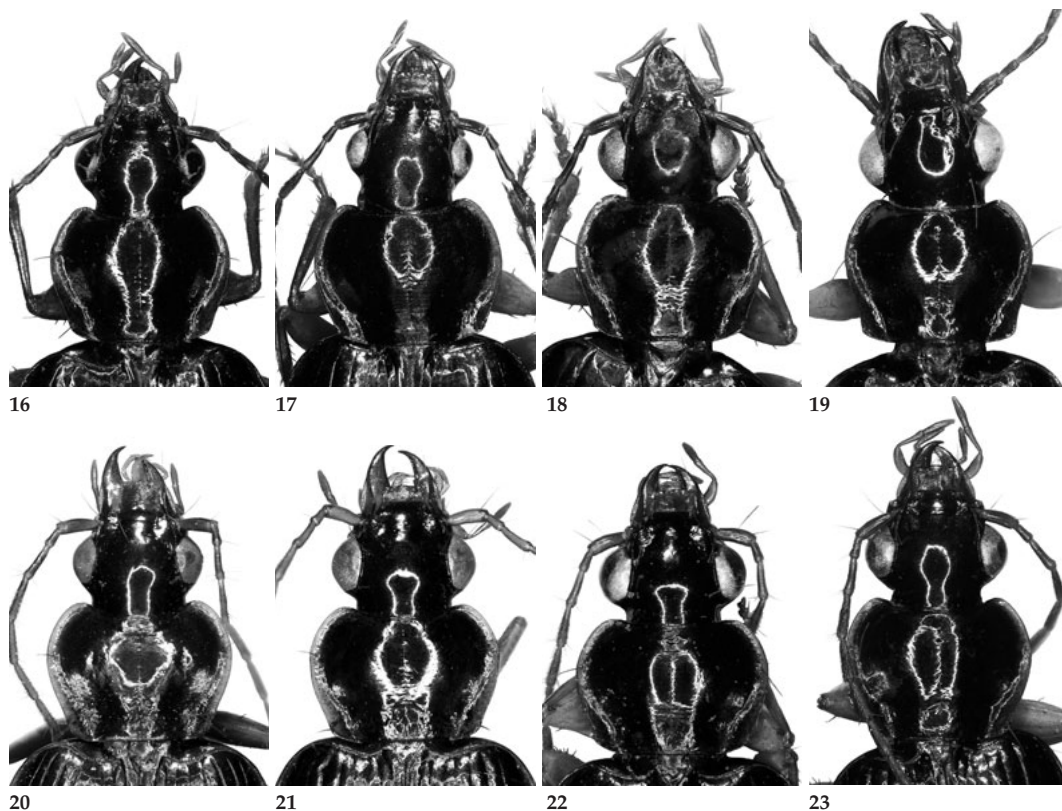
Etymology. The name refers to the large, protruded eyes of this subspecies.

Diagnosis. Distinguished from other subspecies by combination of markedly protruded eyes, deeply impressed and distinctly crenulate elytral striae and barely excised apex of the elytra.

Description

Measurements. Length: 8.15 mm; width: 3.0 mm. Ratios: Width/length of pronotum: 1.28; width widest diameter/base of pronotum: 1.23; width head/pronotum: 1.32; length/width of elytra: 1.70; length/width of 6th antennomere: 4.0.

Colour (Fig. 10). Glossy black, lateral margins of pronotum distinctly, of elytra less distinctly yellow. Labrum and mandibles light brown, palpi dirty yellow, almost the whole antenna brownish. Femora in basal half light brownish, in apical half dirty yellow,



Figs 16-23. Head and pronotum. 16. *Notagonum margaritum margaritum* Darlington. 17. *Notagonum margaritum montorum*, subsp. nov. 18. *Notagonum margaritum oculare*, subsp. nov. 19. *N. margaritum planipenne*, subsp. nov. 20. *Notagonum margaritum digulense*, subsp. nov. 21. *Notagonum excisipenne*, spec. nov. 22. *Notagonum laticolle*, spec. nov. 23. *Notagonum ilagae*, spec. nov.

tibiae and tarsi slightly, but not contrastingly darker. Lower surface more or less dark piceous.

Head (Fig. 18). Much as in nominate subspecies, but eye larger and laterally perceptible more produced, orbit shorter and less oblique. Antenna slightly longer, surpassing base of pronotum by almost 5 antennomeres, median antennomeres about 4× as long as wide. Microreticulation extremely superficial, barely recognizable even at very high magnification, surface very glossy.

Prothorax (Fig. 18). Much as in nominate subspecies, but slightly narrower, also narrower in comparison with head.

Elytra (Figs 10, 26). Much as in nominate subspecies, but striae more impressed and conspicuously crenulate. Apex at suture with short tooth, at position of 3rd interval only slightly produced, but not angulate, excision shallow. Microreticulation and punctures absent, very glossy, even slightly iridescent.

Lower surface. As in nominate subspecies.

Male genitalia (Fig. 3). Much as in nominate subspecies, but genital ring in holotype with less asymmetrical apex. Lower surface of aedeagus slightly more concave, apex slightly more upturned.

Female gonocoxites. Unknown.

Variation. Unknown.

Distribution (Fig. 30). Central eastern Papua New Guinea. Known only from type locality.

Collecting circumstances. Little recorded. Holotype collected at or near “creek” at median altitude.

Relationships. Questionable. The aedeagus is very similar to that of the nominate subspecies of *N. margaritum*, but the large, protruded eyes and the absolutely not excised apex of the elytra are quite different. Probably the exact taxonomical and nomenclatorial status will be better determined by a future examination using molecular data.

***Notagonum margaritum planipenne*, subspec. nov.**

Figs 11, 19, 30

Examined types. Holotype: ♀, "9.7.1996 10 Schüle/ Stüben West Papua 10 km nördl. Fakfak Rankondak II Garten/Sekwald" (CBM).

Etymology. The name refers to the depressed intervals of the elytra of this subspecies.

Diagnosis. Distinguished from other subspecies by combination of but moderately protruded eyes, not at all impressed elytral striae, and absence of any impression on the basal part of the elytra.

Description

Measurements. Length: 7.8 mm; width: 2.85 mm. Ratios: Width/length of pronotum: 1.31; width widest diameter/base of pronotum: 1.21; width head/pronotum: 1.28; length/width of elytra: 1.69; length/width of 6th antennomere: 3.85.

Colour (Fig. 11). Glossy black, lateral margins of pronotum distinctly, of elytra less distinctly yellow. Labrum and mandibles light brown, palpi dirty yellow, antenna dirty yellow, even basal antennomeres not much darker. Femora in basal half light brownish, in apical half dirty yellow, tibiae and tarsi slightly, but not contrastingly darker. Lower surface more or less dark piceous.

Head (Fig. 19). Much as in nominate subspecies, but antenna slightly longer, surpassing base of pronotum by about 4 antennomeres. Microreticulation extremely superficial, barely recognizable even at very high magnification.

Prothorax (Fig. 19). Much as in nominate subspecies, but slightly narrower with wider base, also narrower in comparison with head. Surface with finest traces of extremely superficial microreticulation, though very glossy.

Elytra (Fig. 11). Much as in nominate subspecies, but without any impression in basal third; striae little impressed, consisting of series of moderately fine punctures, interval absolutely depressed. Apex at suture with very short tooth, at position of 3rd interval barely produced, excision very shallow. Microreticulation absent.

Lower surface. As in nominate subspecies.

Male genitalia. Unknown.

Female gonocoxites. As in the nominate subspecies.

Variation. Unknown.

Distribution (Fig. 30). Fakfak Peninsula south of Vogelkop Peninsula. Known only from type locality.

Collecting circumstances. Little recorded, holotype collected in "garden/secondary forest".

Relationships. Due to the hitherto unrecorded male the taxonomical status is uncertain. In view of the little protruding eyes the specimen is provisionally alluded to *N. margaritum* as a subspecies, but it may be as well raised to specific status as the male genitalia are recorded.

***Notagonum margaritum digulense*, subspec. nov.**

Figs 12, 20, 27, 30

Examined types. Holotype: ♀, "Bowen-Digoel Tanah-Tinggi 30 km stroemop van Tanah Merah / W. G. N. v. d. Sleen leg. Z.-W. Nieuw Guinea VIII – IX 1929" (ZMAN). – Paratypes: 1♀, "Bowen-Digoel 150 km stroemop van Tanah Merah / W. G. N. v. d. Sleen leg. Z.-W. Nieuw Guinea VIII – IX 1929" (CBM); 1♀, "Museum Leiden L. D. Brongersma c.n. Tanah Merah Boven Digoel, 17 m 15-IV-1955 Neth. New Guinea / borrowed fr. Leiden Mus. Jan. 1962 / *Notagonum margaritum* D. det. Darl. '69" (NHNL).

Etymology. The name refers to the occurrence of this subspecies near Digul River.

Diagnosis. Distinguished from other subspecies by combination of but moderately protruded eyes, moderately wide pronotum with wide lateral margins, barely crenulate elytral striae, and distinctly excised apex of the elytra.

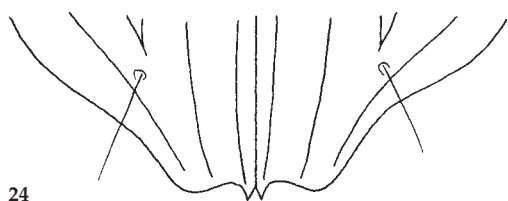
Description

Measurements. Length: 8.1-8.3 mm; width: 3.0-3.15 mm. Ratios: Width/length of pronotum: 1.27-1.30; width widest diameter/base of pronotum: 1.27-1.28; width head/pronotum: 1.37-1.42; length/width of elytra: 1.64-1.69; length/width of 6th antennomere: 4.15-4.2.

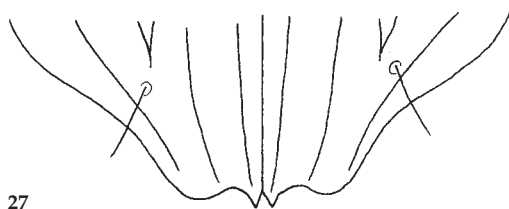
Colour (Fig. 12). Dark piceous to almost black, lateral margins of pronotum distinctly, of elytra less distinctly yellow. Labrum and mandibles light brown, palpi dirty yellow, antenna dirty yellow, but four basal antennomeres darker. Legs uniformly dark yellow, tibiae and tarsi not darker. Lower surface more or less dark piceous.

Head (Fig. 20). Much as in nominate subspecies, but antenna longer, surpassing base of pronotum by almost 5 antennomeres, median antennomeres more than 4× as long as wide. Microreticulation very superficial, but visible at high magnification. Surface glossy.

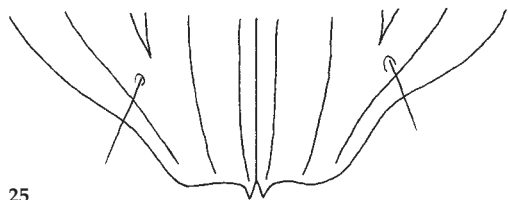
Prothorax (Fig. 20). Much as in nominate subspecies, but prothorax slightly narrower, with wider lateral margin and deeper lateral sulcus. Disk with traces of very fine, extremely superficial, transverse microreticulation which is recognizable only at very high magnification.



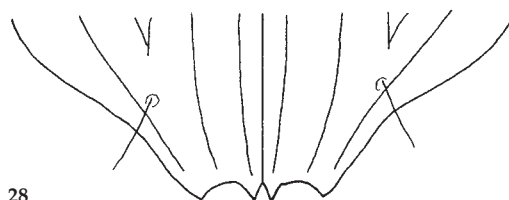
24



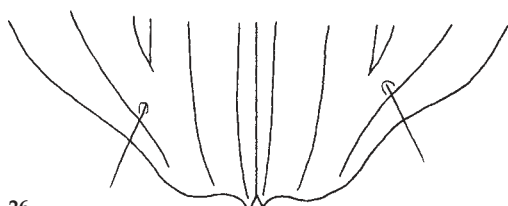
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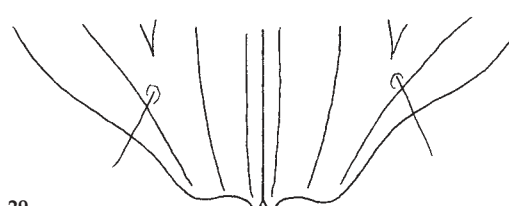
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26



29

Figs 24-29. Apex of elytra. 24. *Notagonum margaritum margaritum* Darlington. 25. *Notagonum margaritum montorum*, subsp. nov. 26. *Notagonum margaritum oculare*, subsp. nov. 27. *Notagonum margaritum digulense*, subsp. nov. 28. *Notagonum excisipenne*, spec. nov. 29. *Notagonum laticolle*, spec. nov.

Elytra (Figs 12, 27). Much as in nominate subspecies, but disk with rather distinct impression just in front of middle; striae well impressed, but almost not crenulate; intervals slightly convex. Apex at suture with very short tooth, at position of 3rd interval distinctly produced and even slightly angulate, excision rather deep. Finest traces of extremely superficial, very transverse microreticulation visible at very high magnification.

Lower surface. As in nominate subspecies.

Male genitalia. Unknown.

Female gonocoxites. As in the nominate subspecies.

Variation. Slight variation noted in relative length of the elytra.

Distribution (Fig. 30). South-eastern Papua Indonesia, at Digul River.

Collecting circumstances. Not recorded, all known specimens collected near Digul River, in lowland.

Relationships. Due to the hitherto unrecorded male the taxonomical status is uncertain. In view of the little protruding eyes the specimens are provisionally alluded to *N. margaritum* as a subspecies, but they

may be as well raised to specific status as the male genitalia are recorded.

Notagonum excisipenne, spec. nov.

Figs 4, 13, 21, 28, 31

Examined types. Holotype: ♂, "vic. Hollandia, Dutch N. G. July-Sept 1944 Darlington / Paratype *Notagonum margaritum* Darl." (MCZ). – Paratypes: 1♀, same data (MCZ); 1♂, "vic. Hollandia, Dutch N. G. July-Sept 1944 Darlington / Paratype *Notagonum margaritum* Darl. / *Notagonum margaritum* Darl. det. DARLINGTON" (NMPC); 1♂, 1♀, "vic. Nadzab, Brit. N. G. July 1944 Darlington / Paratype *Notagonum margaritum* Darl." (MCZ); 1♂, "New Guinea (SE) Busu River, 12 km. Sept. 21, 1956 / E.J. Ford, Jr. Collector / *Notagonum margaritum* D. det. Darl. '69" (CBM); 1♀, "Z. Nieuw Guinea Versteeg 1912.13 15.11.12" (ZMAN).

Etymology. The name refers to the markedly excised apex of the elytra of this species.

Diagnosis. Distinguished from related species by combination of large, laterally well produced eyes, moderately large and rather short aedeagus, deeply excised apex of elytra with angulate tooth

at end of 3rd interval, and but moderately crenulate elytral striae.

Description

Measurements. Length: 6.55-8.25 mm; width: 2.6-3.25 mm. Ratios: Width/length of pronotum: 1.34-1.37; width widest diameter/base of pronotum: 1.23-1.27; width head/pronotum: 1.30-1.37; length/width of elytra: 1.58-1.62; length/width of 6th antennomere: 3.45-3.7.

Colour (Fig. 13). Dark piceous to almost black, lateral margins of pronotum distinctly, of elytra less distinctly yellow or pale reddish. Labrum and mandibles more or less light brown, palpi and antenna dirty yellow, usually not even the basal antennomeres perceptibly darker than the rest. Femora in basal half light brownish, in apical half dirty yellow, tibiae and tarsi slightly, but not contrastingly darker. Lower surface more or less dark piceous.

Head (Fig. 20). Moderately wide, considerably narrower than prothorax. Eye large, laterally far protruded, but orbit still distinct, oblique, length about a fourth or slightly less than length of eye. Clypeal suture laterally deep and distinct, in middle indistinct, clypeus basally slightly raised. Frontal furrows short, irregularly oblique, moderately deep, barely reaching the eye. Mandibles rather elongate (in group), straight, but not porrect. Antenna slender and elongate, surpassing base of pronotum by about 3.5 antennomeres, median antennomeres about 3.5 × as long as wide, or slightly more. Both palpi slender and elongate. Microreticulation fine and extremely superficial, visible only at very high magnification, surface virtually impunctate, very glossy.

Prothorax (Fig. 21). Moderately wide (in group), very slightly cordiform, with moderately wide base, widest slightly in front of middle, laterally evenly convex, barely or not concave near base. Disk depressed, lateral margins and lateral sulcus fairly wide (in group), margins slightly upturned, in basal fourth widened and considerably deeper, slightly explanate. Apical margin rather concave, apical angles projected but widely rounded. Basal angles obtusely rounded, base in middle straight, towards basal angles obliquely convex. Both apex and base completely bordered, or basal border in middle shortly interrupted. Anterior and posterior transverse sulci very shallow, median line well impressed, almost reaching apex and base. Anterior marginal seta located slightly in front of middle, at widest diameter, the posterior marginal seta located at basal angle. Disk with or without some fine, irregularly transverse striae, extremely finely and sparsely punctate and usually with traces of extremely superficial, transverse microreticulation, very glossy.

Elytra (Figs 13, 28). Comparatively short (in group), distinctly widened towards apical third. Dorsal surface moderately depressed, with extremely shallow impression in basal third. Lateral border in basal half almost straight, little narrowed towards humeri, but slightly widened at basal third. Preapical sinuosity very shallow. Widest diameter about at apical third. Humeri wide, rounded. Apex at suture with short tooth, at position of 3rd interval distinctly produced and somewhat angulate, excision rather deep. Striae complete, well impressed, distinctly though finely crenulate, intervals very slightly convex. Finest traces of extremely superficial, very transverse microreticulation visible at very high magnification, punctures absent, surface very glossy.

Lower surface. Mesepisternum and metasternum coarsely punctate, metepisternum more or less densely punctate, c. 2.2 × as long as wide at apex. Abdomen impilose.

Male genitalia (Fig. 4). Rather small as compared with the genitalia of the other species of the group. Genital ring narrow, slightly asymmetrical, apex elongate, obliquely rounded. Aedeagus comparatively short and compact, moderately depressed, fairly wide, symmetric, lower surface in basal half concave, in apical half straight. Apex rather short, straight, depressed, regularly narrowed to the obtuse tip. Folding of internal sac simple, no sclerotized parts present. Both parameres elongate, right paramere with obtusely angulate apex, left paramere triangular with obtusely rounded apex.

Female gonocoxites. As in *N. margaritum*.

Variation. Some minor variation noted in body size, degree of punctuation of the elytral striae, and depth of excision at the apex of the elytra.

Distribution (Fig. 31). Northern Papua New Guinea, adjacent north-eastern Papua Indonesia.

Collecting circumstances. Not recorded.

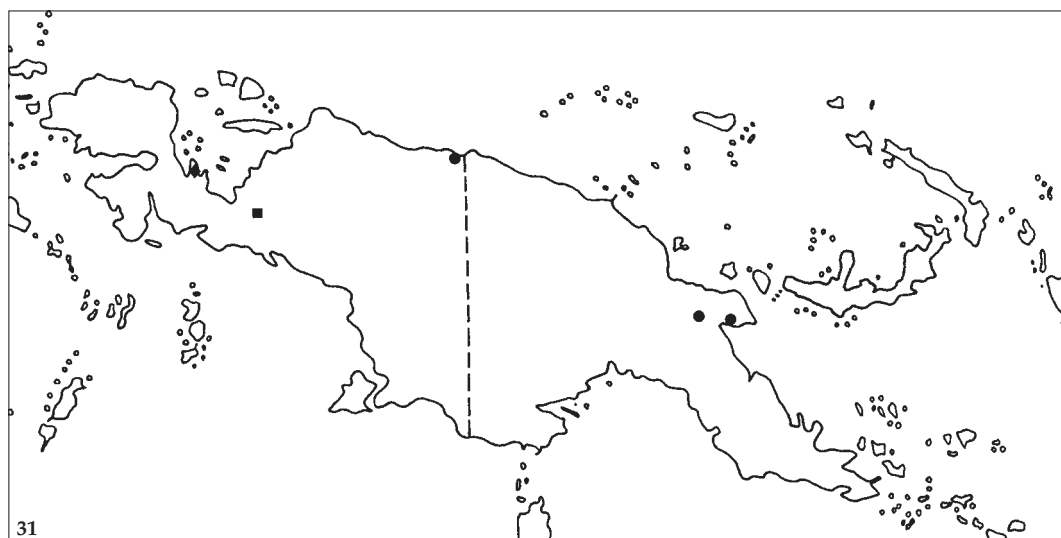
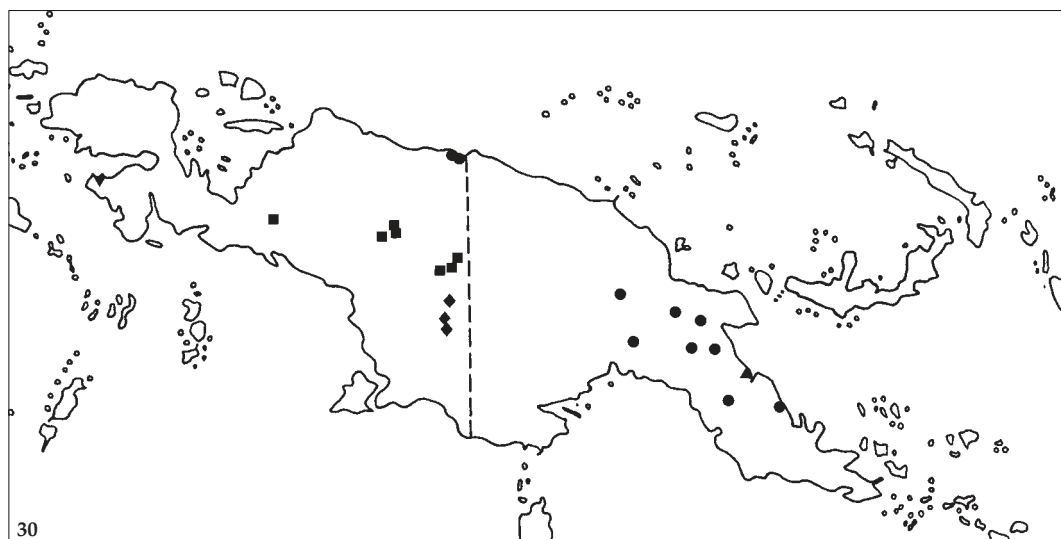
Relationships. According to body shape and to structure of the aedeagus, probably most closely related to *N. laticolle*, spec. nov.

Notagonum laticolle, spec. nov.

Figs 5, 14, 22, 29, 31

Examined types. Holotype: ♂, "Irian Jaya, Nabire-Dist. Wondiwai Mts. Yeratua, 560m, 8.-9.IV.1998 leg. M. Balke" (CBM). – Paratypes: 5♂♂, 12♀♀, same data (14 CBM, 1 MCZ, 1 NHNL, 1 ZMAN).

Etymology. The name refers to the wide pronotum as compared with the other taxa of this group.



Figs 30-31. Distribution. 30. ●, *Notagonum margaritum margaritum* Darlington. ■, *N. margaritum montorum*, subsp. nov. ▲, *N. margaritum oculare*, subsp. nov. ▼, *N. margaritum planipenne*, subsp. nov. ◆, *N. margaritum digulense*, subsp. nov. 31. ●, *N. excisipenne*, spec. nov. ◆, *N. laticolle*, spec. nov. ■, *N. ilagae*, spec. nov.

Diagnosis. Distinguished from related species by combination of large, laterally well produced eye, wide pronotum, moderately large but rather short aedeagus, slightly excised apex of elytra, and barely crenulate elytral striae.

Description

Measurements. Length: 7.0-7.4 mm; width: 2.65-2.95 mm. Ratios: Width/length of pronotum: 1.38-1.42; width widest diameter/base of pronotum:

1.22-1.27; width head/pronotum: 1.28-1.31; length/width of elytra: 1.63-1.67; length/width of 6th antennomere: 3.45-3.55.

Colour (Fig. 14). Glossy black, lateral margins of pronotum distinctly, of elytra less distinctly yellow or pale reddish. Labrum and mandibles more or less light brown, palpi dirty yellow, antenna light brown, three basal antennomeres usually slightly lighter than the rest. Femora in basal half light brownish, in apical half dirty yellow, tibiae and tarsi slightly, but not contrastingly darker. Lower surface dark piceous.

Head (Fig. 22). Moderately wide, considerably narrower than prothorax. Eye large, laterally far protruded, orbit very short, very oblique, length about a sixth of length of eye, or slightly less. Clypeal suture laterally deep and distinct, in middle indistinct, clypeus basally slightly raised. Frontal furrows short, irregularly oblique, moderately deep, barely reaching the eye. Mandibles rather elongate (in group), straight, but not perfect. Antenna slender and elongate, surpassing base of pronotum by almost 4 antennomeres, median antennomeres about $3.5\times$ as long as wide. Both palpi slender and elongate. Microreticulation fine and very superficial, visible only at high magnification, surface virtually impunctate, very glossy.

Prothorax (Fig. 22). Wide (in group), very slightly cordiform, with moderately wide basis, widest slightly in front of middle, laterally evenly convex, barely or not concave near base. Disk depressed, lateral margins and lateral sulcus moderately wide (in group), margins slightly upturned, in basal fourth widened and considerably deeper, slightly explanate. Apical margin rather concave, apical angles projected but widely rounded. Basal angles obtusely rounded, base in middle straight, towards basal angles obliquely convex. Both apex and base completely bordered, or basal border in middle shortly interrupted. Anterior and posterior transverse sulci very shallow, median line well impressed, almost reaching apex and base. Anterior marginal seta located slightly in front of middle, at widest diameter, the posterior marginal seta located at basal angle. Disk with or without some fine, irregularly transverse striae, extremely finely and sparsely punctate and usually with traces of extremely superficial, transverse microreticulation, very glossy.

Elytra (Figs 14, 29). Moderately elongate (in group), slightly widened towards apical third. Dorsal surface moderately depressed, with extremely shallow impression in basal third. Lateral border in basal half almost straight, little narrowed towards humerus, but slightly widened at basal third. Preapical sinuosity very shallow. Widest diameter about at apical third. Humerus wide, rounded. Apex at suture with short tooth, at position of 3rd interval only very slightly produced but not angulate, excision very shallow. Striae complete, well impressed, distinctly though finely crenulate, intervals very slightly convex. Finest traces of extremely superficial, very transverse microreticulation visible at very high magnification, punctures absent, surface very glossy.

Lower surface. Mesepisternum and metasternum coarsely punctate, metepisternum barely punctate, c. $2.2\times$ as long as wide at apex. Abdomen impilose.

Male genitalia (Fig. 5). Small as compared with the genitalia of the other species of the group. Genital ring rather narrow, very slightly asymmetric, apex elongate, narrow, rounded. Aedeagus comparatively short and compact, moderately depressed, fairly wide, almost symmetric, lower surface gently concave throughout. Apex short, straight, depressed, regularly narrowed to the obtuse tip. Folding of internal sac simple, no sclerotized parts present. Both parameres comparatively short, right paramere with obtusely angulate apex, left paramere triangular with widely rounded apex.

Female gonocoxites. As in *N. margaritum*.

Variation. Very little variation noted.

Distribution (Fig. 31). Wondiwoi Mountains in western Papua Indonesia. Known only from type locality.

Collecting circumstances. Little recorded, the type series collected at fairly low altitude, probably in rain forest.

Relationships. According to body shape and in particular to structure of aedeagus most closely related to *N. excisipenne*, spec. nov.

Notagonum ilagae, spec. nov.

Figs 6, 15, 23, 31

Examined types. Holotype: ♂, "Irian Jaya, Nabire-Dist., Nabire-Illaga km 54, 750m, IV.1998 leg. M. Balke" (CBM).

Etymology. The name refers to the occurrence of this species in the vicinity of the town of Ilaga.

Diagnosis. Distinguished from related species by combination of large, laterally well produced eyes, large but rather short aedeagus, not excised apex of elytra, and distinctly crenulate elytral striae.

Description

Measurements. Length: 7.8 mm; width: 2.85 mm. Ratios: Width/length of pronotum: 1.29; width widest diameter/base of pronotum: 1.31; width head/pronotum: 1.31; length/width of elytra: 1.70; length/width of 6th antennomere: 3.7.

Colour (Fig. 15). Glossy black, lateral margins of pronotum distinctly, of elytra barely pale reddish. Labrum and mandibles more or less light brown, palpi dirty yellow, antenna light brown, three basal antennomeres usually slightly lighter than the rest. Femora in basal half light brownish, in apical half dirty yellow, tibiae and tarsi slightly, but not contrastingly darker. Lower surface dark piceous.

Head (Fig. 23). Moderately wide, considerably

narrower than prothorax. Eye large, laterally far protruded, orbit very short, very oblique, length about a sixth of length of eye, or slightly less. Clypeal suture laterally deep and distinct, in middle indistinct, clypeus basally slightly raised. Frontal furrows short, irregularly oblique, moderately deep, barely reaching the eye. Mandibles rather elongate (in group), straight, but not porrect. Antenna slender and elongate, surpassing base of pronotum by almost 4 antennomeres, median antennomeres about $3.7\times$ as long as wide. Both palpi slender and elongate. Microreticulation fine and very superficial, visible only at high magnification, surface virtually impunctate, very glossy.

Prothorax (Fig. 23). Comparatively narrow (in group), very slightly cordiform, with comparatively narrow basis, widest slightly in front of middle, laterally evenly convex, not concave near base. Disk depressed, lateral margins and lateral sulcus moderately wide (in group), margins slightly upturned, in basal fourth widened and considerably deeper, slightly explanate. Apical margin rather concave, apical angles projected but widely rounded. Basal angles obtusely rounded, base in middle straight, towards basal angles obliquely convex. Both apex and base completely bordered. Anterior and posterior transverse sulci very shallow, median line well impressed, almost reaching apex and base. Anterior marginal seta located slightly in front of middle, at widest diameter, the posterior marginal seta located at basal angle. Disk with some very fine, irregularly transverse striae, extremely finely and sparsely punctate and here and there with finest traces of extremely superficial, transverse microreticulation, very glossy.

Elytra (Fig. 15). Rather elongate (in group), very slightly widened towards apical third. Dorsal surface comparatively convex, with very shallow impression slightly in front of middle. Lateral border in basal

half almost straight, but very slightly sinuate at basal third, little narrowed towards humerus, but slightly widened at basal third. Preapical sinuosity very shallow. Widest diameter about at apical third. Humerus wide, rounded. Apex at suture with short tooth, at position of 3rd interval only very slightly produced but not angulate, excision very shallow. Striae complete, well impressed, rather coarsely crenulate, intervals slightly convex. Microreticulation virtually absent, punctures absent, surface very glossy, somewhat iridescent.

Lower surface. Mesepisternum sparsely but coarsely punctate, metasternum and metepisternum barely punctate, metepisternum c. $2.2\times$ as long as wide at apex. Abdomen impilose.

Male genitalia (Fig. 6). Moderately small as compared with the genitalia of the other species of the group. Genital ring very narrow, slightly asymmetric, apex elongate, narrow, at tip asymmetrically hooked, tip slightly obliquely convex. Aedeagus moderately short and compact, fairly depressed, moderately wide, almost symmetric, lower surface rather concave. Apex short, straight, depressed, distinctly upturned, regularly narrowed to the obtuse tip. Folding of internal sac simple, no sclerotized parts present. Both parameres comparatively short, right paramere with obtusely angulate apex, left paramere triangular with widely rounded apex.

Female gonocoxites. Unknown.

Variation. Unknown.

Distribution (Fig. 31). Western Papua Indonesia. Known only from type locality.

Collecting circumstances. Little recorded, the holotype collected at medium altitude.

Relationships. Related to both preceding species, but distinct from both through the perceptibly larger aedeagus and the decidedly more crenulate elytra.

Table 1. Measurements and ratios of the taxa of the *Notagonum margaritum* complex. N, number of measured specimens; l, body length in mm; w/l pr, ratio width/length of pronotum; d/b pr, ratio width of widest diameter/width of base of pronotum; wpr/h, ratio width of head/width of pronotum; l/wel, ratio length/width of elytra; l/w 6th, ratio length/width of 6th antennomere.

	N	l	w/l pr	d/b pr	wpr/h	l/wel	l/w 6 th
<i>m. margaritum</i>	8	6.6-8.7	1.31-1.36	1.23-1.29	1.36-1.44	1.68-1.72	3.5-3.7
<i>m. montorum</i>	6	7.5-8.7	1.30-1.35	1.23-1.27	1.35-1.40	1.67-1.70	3.6-3.75
<i>m. oculare</i>	1	8.15	1.28	1.23	1.32	1.70	4.0
<i>m. planipenne</i>	1	7.8	1.31	1.21	1.28	1.69	3.85
<i>m. digulense</i>	3	8.1-8.3	1.27-1.30	1.27-1.28	1.37-1.42	1.64-1.69	4.15-4.2
<i>excisipenne</i>	6	6.55-8.25	1.34-1.37	1.23-1.27	1.30-1.37	1.58-1.62	3.45-3.7
<i>laticolle</i>	6	7.0-7.4	1.38-1.42	1.22-1.27	1.28-1.31	1.63-1.67	3.45-3.55
<i>ilagae</i>	1	7.8	1.29	1.31	1.31	1.70	3.7

**Key to the taxa of the
Notagonum margaritum complex**

1. Aedeagus narrow and elongate (Figs 1-3); usually eyes smaller and laterally less protruded, orbits fairly elongate (Figs 16, 17, 19, 20), except *N. margaritum oculare*, subspec. nov. which has large and protruded eyes (Fig. 18).....2.
- Aedeagus shorter and stouter (Figs 4-6); eyes large and laterally well protruded, orbits short (Figs 21-23). 6.
2. Elytral striae well impressed, elytra in basal third or half slightly though perceptibly impressed, or the 3rd and/or 4th striae perceptibly deepened; pronotum wider compared with the head, ratio width of pronotum/width of head >1.32 (Figs 16-18, 20); aedeagus narrow and elongate. Whole New Guinea except Vogelkop Peninsula.3.
- Elytral striae not impressed, consisting of a series of punctures, elytra in basal part not at all impressed, striae not deepened (Fig. 11); pronotum narrower compared with the head, ratio width of pronotum/width of head 1.28 (Fig. 19); aedeagus unknown. Fakfak Peninsula south of Vogelkop Peninsula.....
.....*margaritum planipenne*, subspec. nov.
3. Eyes large, laterally well protruded, orbits short (Fig. 18); elytral striae deep, markedly crenulate; elytra barely excised between suture and 3rd interval (Fig. 26); aedeagus moderately slender and elongate as in nominate subspecies (Fig. 3). Papua New Guinea, Morobe Prov.....
..... *margaritum oculare*, subspec. nov.
- Eyes smaller, laterally less protruded, orbits longer (Figs 16, 17, 20); elytral striae usually less deep and less crenulate; apex of elytra varied (Figs 24, 25, 27); aedeagus varied (Figs 1, 2).
..... 4.
4. Apex of elytra more or less distinctly excised between suture and 3rd interval (Fig. 24, 27); aedeagus moderately slender and elongate (Fig. 1), or unknown. Papua New Guinea, eastern Papua Indonesia.5.
- Apex of elytra barely excised between suture and 3rd interval (Fig. 25); aedeagus very slender and elongate (Fig. 2). Central and eastern central Papua Indonesia.
.....*margaritum montorum*, subspec. nov.
5. Pronotum less wide and more cordiform, with wide and deep lateral sulcus (Fig. 20); apex of elytra distinctly excised between suture and 3rd interval (Fig. 27); aedeagus unknown. South-eastern Papua Indonesia, in lowland.
.....*margaritum digulense*, subspec. nov.
- Pronotum wider and less cordiform, with narrower and less deep lateral sulcus (Fig. 16); apex of elytra less distinctly or little excised between suture and 3rd interval (Fig. 24); aedeagus moderately slender and elongate (Fig. 1). Papua New Guinea, north-eastern Papua Indonesia...
.....*margaritum margaritum* Darlington
6. Eye rather large and laterally protruded, but orbit fairly elongate and oblique (Fig. 21); apex of elytra distinctly excised between suture and 3rd interval, lateral margin of excision angulate (Fig. 28); aedeagus small, relatively slender, apex longer than in *N. laticolle*, spec. nov., not perceptibly upturned (Fig. 4). Central Papua New Guinea, adjacent north-eastern Papua Indonesia.*excisipenne*, spec. nov.
- Eyes large, laterally markedly protruded, orbits short and rather transversal (Figs 22, 23); apex of elytra less or not excised between suture and 3rd interval, lateral margin of excision rounded (Fig. 29); aedeagus either small and compact, with short apex (Fig. 5), or larger, with slightly upturned apex (Fig. 6). Western Papua Indonesia 7.
7. Elytral striae deep, distinctly crenulate; prothorax narrower, ratio width length 1.29; eye slightly less protruded (Fig. 23); apex of elytra not excised between suture and 3rd interval (Fig. 15); aedeagus larger, more curved, apex longer, distinctly upturned (Fig. 6). Panai Prov. between Nabire and Ilağa.*ilagae*, spec. nov.
- Elytral striae shallow, little or not crenulate (Fig. 14); prothorax wider, ratio width length >1.38; eye more protruded (Fig. 22); apex of elytra gently excised between suture and 3rd interval (Fig. 29); aedeagus smaller, less curved, apex shorter, straight (Fig. 5). Panai Prov., Wondiwai Mts.*laticolle*, spec. nov.

Remarks

Philip Darlington (1952) was right in his statement that the “species” *Notagonum margaritum* is quite variable throughout New Guinea. The present examination of material from almost the whole of New Guinea has confirmed this statement even for those populations which are still classed within this species, and has shown that a couple of populations which would be included in *N. margaritum* when using Darlington’s key and the character states he

mentioned, actually represent independent though still closely related species. The examination of the male genitalia once more was the key character for this new classification.

Hence, at present, the species *N. margaritum* in the restricted sense apparently occurs almost throughout the whole island of New Guinea, although from certain parts no material has been sampled or examined so far. Related species are now known to occur in central Papua New Guinea and immediately adjacent north-eastern Papua Indonesia, and in western Papua Indonesia. At the present state of knowledge, however, no additional material apart from the single specimen of *N. margaritum planipenne* has been recorded from Vogelkop Peninsula in extremely western New Guinea.

The nominate subspecies of *N. margaritum* was recorded so far mainly from Papua New Guinea, whereas other subspecies occur in central, southern, and western Papua Indonesia. Hence, *N. margaritum*, even in the restricted sense, belongs to the most widely ranging species of the genus *Notagonum* in New Guinea. The three species herein excluded from *N. margaritum* possess much more restricted ranges, at the present state of knowledge, or even are known from a single locality. But this may be due to still very inadequate sampling efforts in large parts of New Guinea, in particular in the western half.

It is further to be expected that more systematically sampling efforts, but also a comparable examination of other species or species complexes of New Guinean *Notagonum* in future could reveal a comparable multiplication of taxa. Hence, a definitive picture of the diversity and distribution of the New Guinean *Notagonum* is premature at the present state of revision.

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