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## Two new species of *Minuthodes* Andrewes from New Guinea

(Insecta, Coleoptera, Carabidae, Lebiinae)

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*Minuthodes multisetosa*, spec. nov. and *M. biplagiata*, spec. nov. are newly described from the mainland of New Guinea and Salawati Island, respectively. They are closely related to the *regularis*-group (sensu Darlington 1968) within the New Guinean *Minuthodes*, though *M. multisetosa* is outstanding in having several anterior marginal setae on the pronotum and rows of elongate setae on the 3<sup>rd</sup>, 5<sup>th</sup>, and 7<sup>th</sup> intervals of the elytra. A partly revised key to the New Guinean species is provided.

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### Introduction

*Minuthodes* Andrewes is a moderately speciose genus of lebiine carabid beetles recognized by their conspicuously broad, depressed shape, in particular by their extremely wide pronotum. The genus extends from the Moluccas through New Guinea, New Britain to northern Australia (Darlington 1968, Baehr 1990, 1994), but it is most numerous in New Guinea, from where so far 9 species and one additional subspecies were described. The specific status of one of the New Guinean species, however, is somewhat doubtful (*M. irregularis* Darlington) and it is likely to be only a variation of the more widely distributed *M. regularis* Darlington.

The species occurring in New Guinea, New Britain, and the Moluccas are reported to live mainly in rain forest at or under bark of standing tree trunks and fallen logs (Darlington 1968, A. Riedel, pers. comm.), as do some of the northern Australian species. In Australia, however, certain species regularly occur under the bark of various eucalypts in open sclerophyll forest or woodland (Baehr 1990, 1994), and those species apparently avoid the rain forest. However, this mode of life is probably a secondary ecological shift, and it is only known from Australian species.

During his various trips to different parts of New Guinea (though mainly to Irian Jaya) Mr. A. Riedel (München) collected a fine sample of *Minuthodes* specimens that, inter alia, includes representatives of two conspicuous new species to be described below, both from extreme western Irian Jaya. Additional *Minuthodes* material available to me was collected by W. Ullrich in Papua New Guinea during 1979–1980 and was kindly sent for identification by Dr. I. Löbl from the Muséum d'histoire naturelle, Genève. Some *Minuthodes* specimens were recently (1996) collected by P. Schüle and P. Stüben (Düsseldorf) in mainland Irian Jaya and on Japen Island and they are stored in the Zoologische Staatssammlung, München. In the material collected about 25 years ago by Dr. R. W. Hornabrook (Wellington, New Zealand) in Papua New Guinea and recently sent for identification, an additional specimen of one of the new species was also included alongside with some specimens of described species.

## Measurements

Measurements have been made under a stereo microscope by use of an ocular micrometer. Length has been measured from apex of labrum to apex of elytra. Length of pronotum was taken along midline. Measurements, therefore, may slightly differ from that of other authors, especially Darlington.

## Abbreviations of collections mentioned in text

|         |  |
|---------|--|
| CBM     | working collection M. Baehr, München   |
| CBM-ZSM | Zoologische Staatssammlung, München, as permanent loan in the working collection of author |
| MNZ     | Museum of New Zealand, Wellington  |

## *Minuthodes biplagiata*, spec. nov.

Fig. 1

Types. Holotype: ♀, Irian Jaya, Sorong-Pr. Salawati Isl., Kalobo, 10-130 m, 19.-22.X.1996, leg. A. Riedel (ZSM-CBM).

**Diagnosis.** Easily distinguished by the bimaculate elytral pattern consisting of circular humeral spots only, and by the almost complete absence of elytral striae.

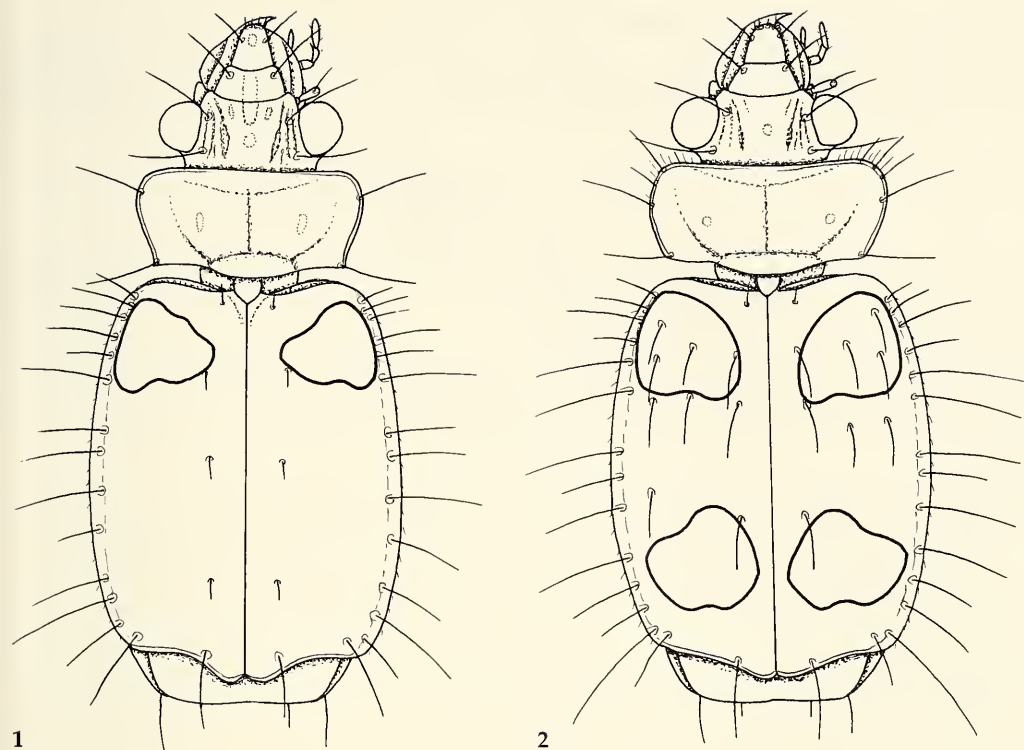
## Description

Measurements. Length: 5.2 mm; width: 2.5 mm; ratio width/length of pronotum: 2.0; ratio width of pronotum/width of head: 1.23; ratio length/width of elytra: 1.27.

**Colour.** Deep black, elytra with faint bluish lustre, bimaculate, with a large, moderately distinct, reddish, irregularly triangular humeral spot that extends from the position of 2<sup>nd</sup> stria to 8<sup>th</sup> stria though is not in contact to any part of margin. Palpi and antenna reddish-piceous, three basal antennomeres slightly lighter than rest. Legs blackish, only apical part of tibiae, and tarsi reddish-piceous. Undersurface black.

**Head.** Wide. Frons anteriorly in middle depressed, this depression prolonged onto clypeus. In centre of frons, posteriorly to apical depression, a deep, punctiform groove. Lateral impressions of frons deep, with about three or four rather irregular longitudinal furrows, the median one ending posteriorly in a deep, ovalish groove. Eyes large, markedly protruding, though head distinctly narrower than prothorax. Clypeo-frontal suture deep. Clypeus in middle depressed, anterior margin rather deeply excised, anterior angles rounded off, bisetose. Labrum elongate, considerably longer than wide, lateral borders oblique, apex straight, behind apex in middle with a small circular groove. Labrum 6-setose, the proximal seta far removed from apical margin, lateral margins apparently without additional hairs. Mandible with some longitudinal furrows on upper surface. Terminal palpomere of labial palpus as long as penultimate palpomere, apparently impilose. Maxillary palpus with sparse and very fine pilosity. Mentum with sharp, unidentate tooth. Antenna short, barely attaining basal angle of pronotum, median antennomeres but slightly longer than wide, densely pilose from apex of 4<sup>th</sup> antennomere, basal antennomeres sparsely setose. Microreticulation absent from frons and clypeus, present and isodiametric on labrum. Frons and clypeus irregularly punctate, surface highly glossy, apparently devoid of any pilosity.

**Pronotum.** Very wide, somewhat heart-shaped. Apex slightly wider than base, slightly concave, anterior angles rounded off. Sides almost evenly rounded, widest in anterior third, at anterior lateral seta. At this position margins with a very obtuse angle. Near basal angle with a short and faint sinuosity. Basal angles rectangular, laterally even faintly projecting. Base laterally straight, in middle gently pedunculate. Base bordered throughout, apex unbordered in middle. Lateral channel rather narrow throughout. Disk in middle somewhat raised. Median line distinct, in middle deeply impressed. Basal grooves fairly deep, oblique, prebasal transverse sulcus distinct. In middle between median line and lateral margin with a large, oblong, moderately deep groove. Anterior marginal seta situated in anterior third, at widest diameter of pronotum, posterior marginal seta situated at basal



**Figs 1, 2. Habitus.** 1. *Minuthodes biplagiata*, spec. nov. 2. *M. multisetosa*, spec. nov. Lengths: 5.2 mm; 5.6 mm.

angle. Microreticulation absent, puncturation irregular, fine and rather sparse on disk, coarse and denser laterally and apically. Surface glossy, with moderately dense, rather short, declined, yellow pilosity.

Elytra. Rather short and wide, widest behind middle, depressed. Humeri evenly rounded, sides gently convex, apex oblique, deeply sinuate, sutural angles rounded off, elytra slightly dehiscent at suture. Marginal channel slightly widened at anterior third. Striae almost absent, microreticulation absent, though whole surface densely punctate and pilose. Pilosity yellow, rather short, somewhat declined. Three discal pores situated at position of 3<sup>rd</sup> stria, though pores and the very short setae hardly discernible within the dense puncturation and pilosity. Marginal setae very elongate. Lateral margin extremely finely serrate and very sparsely pilose. Surface glossy. Posterior wings fully developed.

Lower surface. Proepisternum and prosternum impunctate and impilose, lower surface of hind body rather sparsely punctate and pilose. Metepisternum almost 2× as long as wide at apex. Terminal abdominal sternum of female 4-setose.

Legs. Structure of ♂ protarsus unknown.

♂ genitalia. Unknown.

♀ genitalia. Stylomere 2 rather short, with one large dorsomedial ensiform seta and two large mediolateral ensiform setae.

Variation. Unknown.

**Distribution.** Salawati Island off the Vogelkop peninsula, Irian Jaya. Known only from type locality.

**Collecting circumstances.** Not recorded, though the species lives most probably under the bark of trees in rain forest. Holotype collected in lowland.

**Etymology.** The name refers to the biplagiate pattern of the elytra.

**Relationships.** This species belongs to the group that includes *M. regularis* Darlington and the related *M. irregularis* Darlington (see below under *M. multisetosa*) from the New Guinean mainland and *M. simplex* Darlington from Goodenough Island.

*Minuthodes multisetosa*, spec. nov.

Figs 2, 3

**Types.** Holotype: ♂, Irian Jaya, Vogelkop, Meydougda, 1200-1400 m, 5.4.1993, leg. A. Riedel (ZSM-CBM). – Paratypes: 1♀, Irian Jaya, Pr. Manokwari, Testega, 1100-1200 m, 11.4.1993, leg. A. Riedel (CBM); 1♀, Goroka, New Guinea, 25/4/75, R. Hornabrook (MNZ).

**Diagnosis.** In shape and colour pattern very similar to *Minuthodes regularis* Darlington, though easily distinguished by the multiplication of the anterior marginal setae of the pronotum and by the series of conspicuously elongate setae on the 3<sup>rd</sup>, 5<sup>th</sup>, and 7<sup>th</sup> intervals of the elytra.

**Description**

**Measurements.** Length: 5.3-5.85 mm; width: 2.55-2.80 mm; ratio width/length of pronotum: 2.06-2.10; ratio width of pronotum/width of head: 1.33-1.39; ratio length/width of elytra: 1.27-1.30.

**Colour.** Black, posterior part of head with an indistinct, dark red, circular spot on either side. Elytra conspicuously quadrimaculate, with a large, orange, somewhat triangular humeral spot that extends from position of 3<sup>rd</sup> stria to 8<sup>th</sup> stria, and with a likewise large, irregularly transverse subapical spot of same colour that extends from position of 1<sup>st</sup> stria almost to 8<sup>th</sup> stria. Both spots not in contact to any part of basal, lateral, or apical margin. Palpi black, antennae black, though reddish from 2<sup>nd</sup> to basal half of 4<sup>th</sup> antennomere. Legs including tarsi black. Undersurface black.

**Head.** Wide. Frons anteriorly in middle with a deep, oblong fovea. Lateral impressions of frons shallow, with about tree rather irregular, longitudinal furrows, the median one ending posteriorly in a deep, oblong groove. Eyes large, markedly protruding, though head distinctly narrower than prothorax. Clypeo-frontal suture deep. Clypeus without distinct impression, anterior margin very faintly excised, anterior angles shortly rounded off, bisetose. Labrum fairly elongate, slightly longer than wide, lateral borders convex, apex straight. Labrum 6-setose, the proximal seta removed from apical margin, lateral margins apparently without additional hairs. Mandible with some longitudinal furrows on upper surface. Terminal palpomere of labial palpus as long as penultimate palpomere, apparently impilose. Maxillary palpus with sparse and very fine pilosity. Mentum with sharp, unidentate tooth. Antenna short, barely attaining basal angle of pronotum, median antennomeres but slightly longer than wide, densely pilose from apex of 4<sup>th</sup> antennomere, basal antennomeres sparsely setose. Microreticulation absent from frons and clypeus, present and isodiametric though rather superficial on labrum. Frons and clypeus coarsely though rather irregularly punctate, surface highly glossy, with rather sparse, anteriorly inclined, yellow pilosity.

**Pronotum.** Remarkably short and wide, somewhat heart-shaped. Apex slightly narrower than base, slightly concave, anterior angles very widely rounded off. Sides anteriorly markedly convex, evenly rounded, widest behind anterior third, about at position of the most posteriorly situated seta of the anterior group (actually the original anterior lateral seta). Near basal angle with a short and faint sinuosity. Basal angles obtuse, basal border laterally obliquely convex, incurved to basal angle. Base in middle gently pedunculate. Base coarsely bordered throughout, apex with weak or even shortly interrupted border in middle. Lateral channel rather narrow throughout. Disk in middle distinctly raised. Median line distinct, in middle deeply impressed. Basal grooves fairly deep, oblique, prebasal transverse sulcus deep. Anterior transverse sulcus rather shallow, oblique. In middle between median line and lateral margin with a shallow, rather indistinct, about circular groove, laterally of this with a fairly distinct depression that separates the raised disk from the depressed lateral part. Apical part of lateral margin with three or four elongate lateral setae and several shorter hairs, though the most posteriorly situated seta (the original anterior marginal seta) is the longest. Posterior marginal seta situated at basal angle. Microreticulation absent, puncturation rather fine and fairly dense. Surface glossy, with moderately dense, fairly elongate, slightly declined, yellow pilosity.

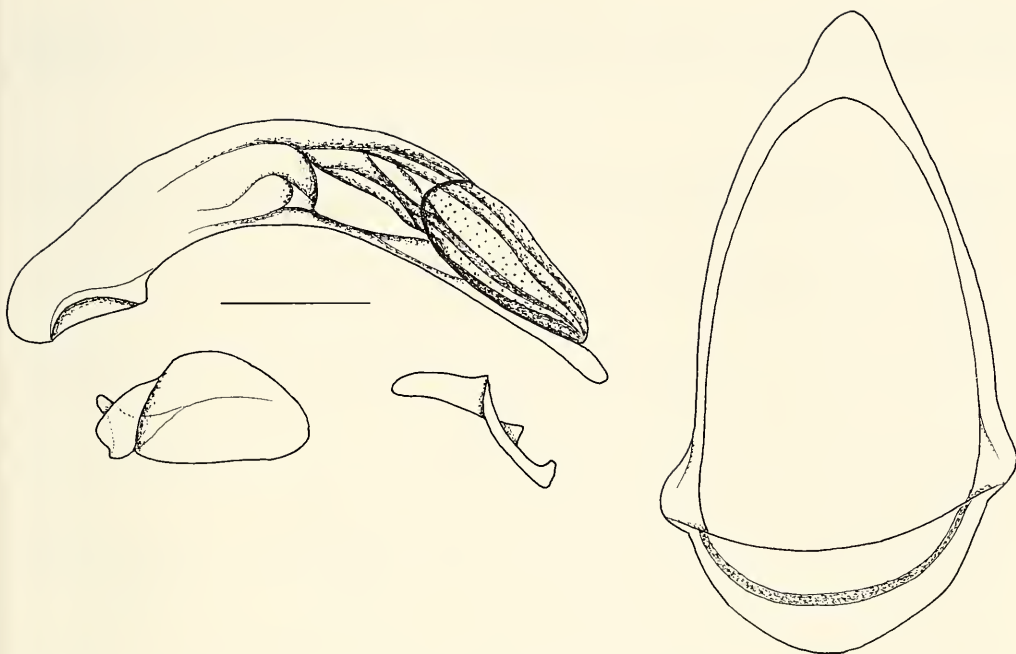


Fig. 3. *Minuthodes multisetosa*, spec. nov. Male genitalia: aedeagus, lateral view; right and left parameres; genital ring. Scale: 0.25 mm.

**Elytra.** Rather short and wide, widest at middle, depressed. Humeri evenly rounded, sides in middle almost straight, apex oblique, gently sinuate, sutural angles rounded off, elytra slightly dehiscent at suture. Marginal channel slightly widened at anterior third. Striae very indistinct, though intervals visible as low ridges. 3<sup>rd</sup> stria with 3-4, basal part of 5<sup>th</sup> stria with 1-2, and basal half of 7<sup>th</sup> stria with 2-3 very elongate, erect setae. Marginal setae very elongate. Lateral margin extremely finely serrate and sparsely pilose. Microreticulation absent, though whole surface densely punctate and pilose. Pilosity yellow, rather short, declined posteriorly. Surface highly glossy. Posterior wings fully developed.

**Lower surface.** Proepisternum impunctate, prosternum sparsely punctate and pilose at anterior margin. Lower surface of mesothorax and mesothorax very sparsely punctate and pilose; abdomen more densely pilose. Metepisternum almost 2× as long as wide at apex. Terminal abdominal sternum quadrisetose in both sexes.

**Legs.** Four basal tarsomeres of protarsus in the male slightly widened and biserially squamose, though 4<sup>th</sup> tarsomere with few squamae only.

♂ genitalia. Genital ring elongate, almost symmetric. Aedeagus rather curved, lower surface in apical half straight, apex straight, fairly short. Orificium rather elongate, turned to left side. Internal sac rather complexly folded, without any sclerites. Parameres very dissimilar, right paramere small, elongate, left paramere larger, rather triangular.

♀ genitalia. Stylomere 2 rather short, with one large dorsomedial ensiform seta and two large mediolateral ensiform setae.

**Variation.** Apart from some variation in size, little variation noted.

**Distribution.** Apparently widely distributed on the New Guinean mainland, since the species was collected in central Papua New Guinea and on the Vogelkop in westernmost Irian Jaya.

**Collecting circumstances.** Not recorded, though the species lives most probably under the bark of trees in rain forest. All specimens were collected at median altitude.

**Etymology.** The name refers to the multiplication of setae on pronotum and elytra.

**Relationships.** Probably this species is most closely related to *M. regularis* Darlington and the somewhat doubtful *M. irregularis* Darlington which perhaps is only a colour variation of the first species.

### Recognition

In Darlington's (1968) key to the New Guinean species of *Minuthodes* both new species would key out at couplet 5. Therefore, Darlington's key should be followed to this entry and then altered as below:

5. Elytra metallic blue-black ..... *metallica* Darlington
  - Elytra not metallic, black with or without reddish or yellow spots ..... 6.
6. Elytra not plainly pubescent; shining black, immaculate or bimaculate or quadrimaculate, but if maculate at least one pair of spots elongate .....
  - ..... *sexualis* Darlington (for subspecies see couplets 6a and 6b in Darlington's key)
  - Elytra plainly pubescent; when maculate spots not elongate ..... 7.
7. Elytra black, unspotted. Goodenough Island ..... *simplex* Darlington
  - Elytra bimaculate or quadrimaculate ..... 8.
8. Elytra bimaculate at humeri; apex of elytra rather deeply emarginate (Fig. 1). Salawati Island west of Vogelkop ..... *biplagiata*, spec. nov.
  - Elytra quadrimaculate; apex of elytra less deeply emarginate. Mainland of New Guinea ..... 9.
9. Pronotum with several anterior lateral setae; elytra with rows of elongate setae on 3<sup>rd</sup>, 5<sup>th</sup>, and 7<sup>th</sup> intervals (Fig. 2) ..... *multisetosa*, spec. nov.
  - Pronotum with single anterior lateral seta; elytra with three short setae on 3<sup>rd</sup> interval only ... 10.
10. Smaller (length 4.0-5.3 mm); elytral spots about regular in outline ..... *regularis* Darlington
  - Larger (length 5.5-5.8 mm); elytral spots irregular in outline ..... *irregularis* Darlington

### Acknowledgements

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