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Two new *Pseudomigadops* JEANNEL, 1938 from the Falkland Islands

(Coleoptera, Carabidae, Migadopinae)

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Abstract

Pseudomigadops falklandicus handkei, subsp.n. and *P. falklandicus fuscus*, subsp.n. from the Falkland Islands are described. Both new subspecies of the widely distributed *P. falklandicus* s.str. inhabit small islands off the larger East and West Falkland Islands, respectively.

Introduction

Migadopinae are a small subfamily of very primitive (JEANNEL 1938) carabid beetles that represent one of the best examples of antarctic distribution, because they are only distributed in the southern parts of South America and Australia, in New Zealand (mainly in the South Island) and on several islands in the southern oceans. In the Falkland Islands so far four migadopine species were known, e.g. *Lissopterus quadrinotatus* WATERHOUSE, *L. hyadesi* subsp. *falklandicus* JEANNEL, *Migadops latus* subsp. *lebruni* JEANNEL, and *Pseudomigadops falklandicus* (WATERHOUSE) (ENDERLEIN 1913, CHAMPION 1918, JEANNEL 1938, SCHWEIGER 1959, ROUX & VOISIN 1982).

During a short visit to the Falkland Islands in January/February 1995 Dr. K. HANDKE (Delmenhorst) collected among other carabid species six *Pseudomigadops* specimens of two different forms that would belong to *Pseudomigadops falklandicus* (WATERHOUSE) acording to JEANNEL's key (JEANNEL 1938, p. 33). He kindly handled over the specimens to me for identification. Because key and description of JEANNEL did not allow exact identification, I compared the male holotype of *Pseudomigadops falklandicus* (WATERHOUSE) from BMNH that I received through courtesy of Mr. S. HINE and through kind assistence of Dr. M. BALKENOHL (Denzlingen).

To my surprise, both forms did not correspond to the type of *P. falklandicus*, but they represent two different and well defined subspecies of the latter, that are described herein. Moreover, this discovery also raises some questions about the evolution of these beetles in the Falkland Islands.

Measurements

Measurements were made under a stereo microscope using an ocular micrometer. Length has been measured from tip of labrum to apex of elytra, hence, measurements may slightly differ from those in the literature. For the prothoracic ratios, length has been measured along mid line, width of apex between the most advanced points of the anterior angles.

Deposition of types

The holotypes of the new subspecies are donated to Zoologische Staatssammlung München (ZSM), the paratypes are in the working collection of the author (CBM).

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Identification

For identification of the four described *Pseudomigadops* species the key of JEANNEL (1938, p. 33) is still useful, even though containing the following mistakes:

- the anterior angles of the pronotum in *P. ovalis* (WATERHOUSE) are not much less projecting than those of the other species;
- the ♂ mesotarsus – at least in *P. falklandicus* – has three tarsomeres widened and clothed instead of only two;
- *P. falklandicus* is not much larger than *P. darwini* (WATERHOUSE) and *P. nigrocoeruleus* (WATERHOUSE), since the ♂ holotype of *P. falklandicus* is only 8.4 mm long.

Despite these mistakes *P. falklandicus* is rather easily identified with JEANNEL's key. Therefore, a key is presented only for the subspecies of this species.

Key to the subspecies of *Pseudomigadops falklandicus* (WATERHOUSE)

1 Surface colour brown without any greenish lustre. Basal third of pronotum abruptly narrowed, lateral borders in basal part almost parallel (Fig. 3). Aedeagus large, less curved near apex, distinctly widened in apical half (Fig. 6). Pebble Island north of West Falkland Island ..... *P. falklandicus fuscus*, subsp.n.

– Surface colour blackish-brown with distinct greenish lustre. Basal third of pronotum more evenly narrowed, lateral borders in basal part oblique (Figs 1, 2). Aedeagus either smaller, more curved near apex, and apex but gently widened (Fig. 5), or thinner, more curved and asymmetric, and not widened in apical half (Fig. 4) 2

2 Larger subspecies, length c. 8.5 mm. Pronotum densely and coarsely punctate across base and in lateral channel, lateral channel anteriorly wider (Fig. 1). Femora and four basal antennomeres dark reddish-brown. Aedeagus large, in apical half not widened, with rather distinctly hook-shaped apex (Fig. 4). East Falkland Island ..... *P. falklandicus falklandicus* (WATERHOUSE)

– Smaller subspecies, length <7.5 mm. Pronotum almost impunctate across base and in lateral channel, lateral channel anteriorly narrow (Fig. 2). Femora and four basal antennomeres light reddish. Aedeagus small, in apical half slightly widened, with barely hook-shaped apex (Fig. 5). Sea Lion Island south of East Falkland Island ..... *P. falklandicus handkei*, subsp.n.

Pseudomigadops falklandicus falklandicus (WATERHOUSE)

Figs 1, 4, 7

Migadops falklandicus WATERHOUSE, 1842, p. 137
Pseudomigadops falklandicus, JEANNEL1938, p. 33.

Types: Holotype: ♂, "Type H.T.", "Falkland Is. C. Darwin", "63.44", "86", "*Migadops Falklandicus* Wat. Ann. nat. Hist. IX 137 East Falkland C. Darwin Esq." (BMNH).
Diagnosis: The nominate form differs from both new subspecies by distinctly punctate base of pronotum; it is further distinguished from *P. falklandicus fuscus*, subsp.n. by greenish lustre of surface, base of pronotum less abruptly narrowed, dark femora, and aedeagus near apex not widened and more curved down; from *P. falklandicus handkei*, subsp.n. distinguished by larger size, lateral border of pronotum more evenly sinuate, and larger aedeagus with apex distinctly hook-shaped.

Description.
Some important characters for subspecies distinction that are not or wrongly characterized in the description and in JEANNEL's key are added.

Measurements. Length: 8.4 mm; width: 4.1 mm. Ratios. Width/length of prothorax: 1.61; width base/apex of prothorax: 1.28; width widest diameter/base of prothorax: 1.12; width prothorax/head: 1.57.

Colour. Dark piceous to blackish, elytra with distinct greenish lustre. Femora dark reddish to piceous, four basal antennomeres and palpi dark reddish.

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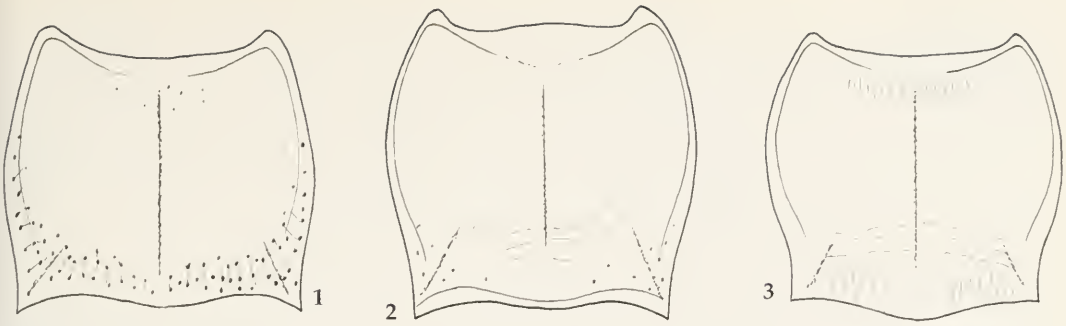

Figs 1-3: Outline of pronotum. 1. *Pseudomigadops falklandicus falklandicus* (WATERHOUSE). 2. *P. falklandicus handkei*, subsp.n. 3. *P. falklandicus fuscus*, subsp.n.

Pronotum (Fig. 1). Pronotum comparatively wide and short, with wide base. Anterior angles produced. Lateral border anteriorly gently rounded and rather oblique, in basal third regularly sinuate, basal third of lateral border oblique-sinuate. Basal angles acute, posteriorly markedly produced. Lateral channel even in anterior half fairly wide. Basal surface and posterior half of marginal channel conspicuously punctate and somewhat striolate.

Legs. Contrary to JEANNEL's statement three (not two) basal tarsomeres of mesotarsus widened and clothed.

♂ genitalia (Fig. 4). All genital sclerites thickly sclerotized. Genital ring almost circular. Aedeagus large, elongate, thin, equally wide throughout, markedly curved and asymmetric, apex widened, somewhat hook-shaped, turned to the right, moderately compressed, upper surface near apex regularly curved down. Orifice short, situated near apex, turned to the right. Internal sac at orifice with a small denticulate fold. Both parameres very large, differently shaped. Right paramere elongate, fully sclerotized, apex somewhat twisted, inner and lower surface in apical half densely pilose. Left paramere wider and shorter, apex membraneous, well separated from sclerotized part, apex densely pilose at lower and upper side.

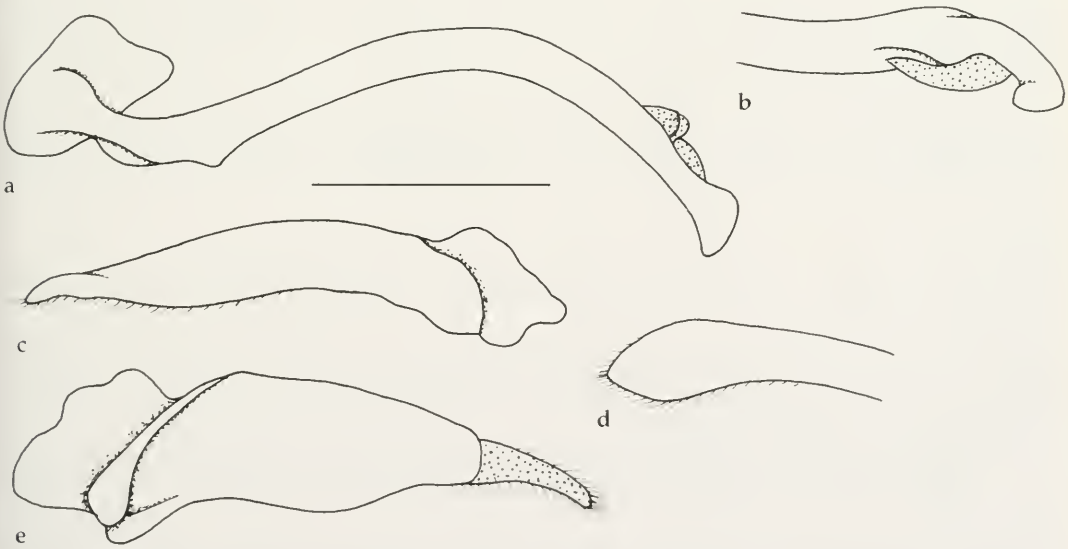

Fig. 4: *Pseudomigadops falklandicus falklandicus* (WATERHOUSE). ♂ genitalia. a. Aedeagus, left side, lateral view. b. Aedeagus, apex from below. c. Right paramere, lateral view. d. Right paramere, apex, ventrolateral view. e. Left paramere, lateral view. Scale: 1 mm.

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Figs 5: *Pseudomigadops falklandicus handkei*, subsp.n. ♂ genitalia. For legend see Fig. 4.

Distribution (Fig. 7): East Falkland Island (Waterhouse 1842, Jeannel 1938); Governour Island west of West Falkland Island (Roux & Vorin 1982).
Note: It is possible that the record of Roux & Vorin from Governour Island represents another subspecies, but the material was not available for comparison.

Pseudomigadops falklandicus handkei subsp.n.

Figs 2, 5, 7

Types: Holotype: ♂, "Falkland Inseln, Sea Lion Island, 25. 27.1.1995, leg. Dr. K. Handke" (ZSM). – Paratypes: 9♂♂, 3♀♀, same data (CBM, ZSM).
Diagnosis: The subspecies differs from both other subspecies by smaller size and and smaller aedeagus with barely hook-shaped apex; it is further distinguished from *P. falklandicus falklandicus* by base of pronotum impunctate and lateral border slightly more deeply sinuate, light femora, and wider parameres; from *P. falklandicus fuscus*, subsp.n. distinguished by greenish lustre of surface, lateral border of pronotum less abruptly narrowed, and aedeagus more curved and asymmetric.

Description.
Measurements. Length: 7.4-7.5 mm; width: 3.7-3.8 mm. Ratios. Width/length of prothorax: 1.53-1.59; width base/apex of prothorax: 1.21-1.23; width widest diameter/base of prothorax: 1.16; width prothorax/head: 1.45-1.50.

Colour. More or less dark piceous, elytra with distinct, head and pronotum with less distinct greenish lustre. Mouth parts and four basal antennomeres light reddish, legs piceous, femora contrastingly light reddish. Lower surface reddish-piceous, epipleura of pronotum and elytra light reddish.

Head. Similar to nominate subspecies.

Pronotum (Fig. 2). Similar to nominate subspecies, with the same acute and posteriorly produced basal angles, but base comparatively narrower, prebasal sinuosity slightly more abrupt, anterior curve of lateral border more convex, lateral channel in anterior half slightly narrower, and basal surface barely punctate and striolate.

Elytra. Similar to nominate subspecies, but elytra slightly more evenly rounded and widest in middle, whereas in the holotype of the nominate subspecies the elytra are widest in anterior third.

Lower surface. Similar to nominate subspecies, though metepisterna almost impunctate.

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Fig. 6: *Pseudomigadops falklandicus fuscus*, subsp.n. ♂ genitalia. For legend see Fig. 4.

Legs. In male four basal tarsomeres of protarsus and three basal tarsomeres of mesotarsus widened and squamose.

♂ genitalia (Fig. 5). Rather similar to nominate subspecies, but genitalia considerably (c. ⅓) smaller, aedeagus less thin, in apical half slightly widened, markedly curved and asymmetric, especially near apex, apex barely hook-shaped, moderately compressed, upper surface near apex slightly curved down. Both parameres very large, longer and relatively wider than in nominate subspecies. Membraneous apex of left paramere short, indistinctly separated from sclerotized part.

♀ genitalia. Stylomeres elongate, partly fused, stylomere 1 partly membraneous. Stylomere 2 elongate, straight, near apex on ventral surface with 1 nematiform seta arising from a pit. Without additional setae.

Variation. Minor variation noted in distinctness of greenish lustre on surface of head and pronotum.

Distribution (Fig. 7): Sea Lion Island, south of East Falkland Island.
Habits: Unknown. All known specimens collected at end of January.
Etymology: The name is a patronym of the collector

Pseudomigadops falklandicus fuscus subsp.n.
Figs 3, 6, 7

Types: Holotype: ♂, "Falkland-Inseln, Pebble Island, 28.1.-2.2.1995, leg. Dr. K. Handke" (ZSM). – Paratype: 1♀, same data (CBM)
Diagnosis: The subspecies differs from both other subspecies by absence of greenish lustre of surface and abruptly sinuate lateral borders of pronotum that are parallel in basal third; it is further distinguished from *P. falklandicus falklandicus* by impunctate base of pronotum, light femora, and aedeagus near apex slightly upturned; from *P. falklandicus handkei*, subsp.n. distinguishedby larger size and larger aedeagus.

Description.
Measurements. Length: 8.4-8.7 mm, width: 4.0-4.1 mm. Ratios. Width/length of prothorax: 1.48-1.54, width base/apex of prothorax: 1.33-1.34; width widest diameter/base of prothorax: 1.11-1.12, width prothorax/head: 1.53-1.54

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Colour. Reddish-piceous, surface even on elytra without any greenish lustre. Mouth parts and four basal antennomeres light reddish, legs piceous, femora contrastingly light reddish. Lower surface reddish-piceous, epipleura of pronotum and elytra light reddish.

Head. Similar to nominate subspecies.

Pronotum (Fig. 3). Rather similar to nominate subspecies, but narrower, with less acute and posteriorly less produced basal angles, and with even wider base. Prebasal sinuosity much more abrupt, basal part of lateral border parallel, anterior curve of lateral border more convex, lateral channel in anterior half slightly narrower, and basal surface barely punctate but more or less distinctly striolate.

Elytra. Similar to nominate subspecies, but elytra slightly more evenly rounded and widest in middle, whereas in the holotype of the nominate subspecies the elytra are widest in anterior third.

Lower surface. Similar to nominate subspecies, though metepisterna less distinctly punctate.

Legs. In male four basal tarsomeres of protarsus and three basal tarsomeres of mesotarsus widened and squamose.

♂ genitalia (Fig. 6). Rather similar to nominate subspecies, but aedeagus slightly larger, less thin, in apical half distinctly widened, less markedly curved and asymmetric, apex distinctly hook-shaped, markedly compressed, upper surface near apex slightly turned up. Both parameres very large, longer and relatively wider than in nominate subspecies. Membraneous apex of left paramere rather short, indistinctly separated from sclerotized part.

♀ genitalia. Similar to *P. falklandicus handkei*, subsp.n.

Variation. Some minor variation noted in degree of puncturation and striolation of surface of pronotum.

Distribution (Fig. 7): Pebble Island, north of West Falkland Island.
Habits: Unknown. Both known specimens collected from end of January to beginning of February.
Etymology: The name refers to the brownish, not lustreous surface.

Discussion

According to Schweiger (1959) the carabid fauna of the Falkland Islands is a mixture of very old endemic elements (paleoendemics), younger endemic elements (neoendemics), and recently introduced species. According to the same author the paleoendemics constitute a remainder of the old Gondwanaland fauna that persisted for a very long period in those islands that were not glaciated during the Glacial Period. The neoendemics arrived more recently on the islands from the north (southern part of mainland South America), though some of them likewise developed to separate, endemic species on the islands. Since the Falkland Islands were not or but slightly glaciated during the Glacial Period due to their low elevation, the carabid fauna is comparatively rich in species.

Among Carabidae apparently no further speciation occurred within the Falkland Archipelago, at least at the present state of knowledge, and in spite of the general loss of flight in almost all species. Nevertheless, because in *Pseudomogadops falklandicus* three well separated subspecies exist, better exploration of the islands or of the available material, and more detailed taxonomic examination may reveal comparable speciation events in other species (e.g. in *Lissopterus quadrinotatus* Waterhouse or *L. hyadesi* Fairmaire). Both new subspecies of *Pseudomigadops falklandicus* have been thus far discovered on rather small islands off the coast of the main islands, though whereas Sea Lion Island where *P. f. handkei* occurs is about 15 km off the coast, Pebble Island, the home of *P. f. fuscus*, is very close to West Falkland Island and is only separated by a narrow marine channel about 1 km wide. Hence, in *P. f. fuscus* at least, present isolation is perhaps not important, because the mentioned marine channel is perhaps too narrow to act as a barrier for distribution. Nevertheless, this subspecies is well distinguished from the nominate form. Unfortunately, thus far specimens from West Falkland Island are not available, therefore, at present nothing can be said about the taxonomic status of the population of *P. falklandicus* on that large island.

To conclude, examination of newly collected material of migadopine beetles has shown that in the Falkland Islands some speciation took place that may have occurred some time ago according to the quite distinct morphological differences. In future, more exhaustive collecting work on the Falkland Archipelago and more detailed taxonomic study of the available material will reveal whether comparable speciation events occurred or are still under progress in other species, and this could also throw light on the time when such speciation occurred.

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Fig. 7: Map of Falkland Islands. 1. East Falkland Island. 2. West Falkland Island. 3. Sea Lion Island. 4. Pebble Island. Scale: 25 km.

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