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Sphallomorpha bilyi sp. nov. from Australia (Carabidae: Pseudomorphinae)

Martin BAEHR

Zoologische Staatssammlung, Münchhausenstr. 21, D-81247 München, Germany
e-mail: martin.baehr@zsm.mwn.de

Abstract. A new species of the subfamily Pseudomorphinae (Carabidae) from the Northern Territory of Australia is described: *Sphallomorpha bilyi* **sp. nov.** According to characters of external and genitalic morphology it belongs to the *S. grandis* (Laporte de Castelnau, 1867) species-group, but is the smallest member of this group so far recorded. The new species is introduced in the key to the species of the genus.

Taxonomy, new species, Coleoptera, Carabidae, Pseudomorphinae, *Sphallomorpha,* Australia

INTRODUCTION

In the rich carabid material in the Northern Territory of Australia, collected recently by Svatopluk Bílý of the National Museum, Prague, and kindly transferred to me for identification, *inter alia* a single pseudomorphine specimen was detected which belongs to an additional new species of the large genus *Sphallomorpha* Westwood, 1837.

Pseudomorphinae is a moderately large subfamily of Carabidae of outstanding shape and structure and with a very specialized biology. Most species are more or less depressed, possess flattened legs and a reduced chetotaxy. According to the genera to which they belong, they either look very similar to water beetles of the families Dytiscidae or Hydrophilidae, or to wood-inhabiting scolytids (Curculionidae: Scolytinae) or even colydiids (Colydiidae). The species of most genera are larviparous which mode of reproduction is very rare within Carabidae and generally within beetles. Members of all six genera so far distinguished occur in Australia, but the genus *Pseudomorpha* Kirby, 1825 occurs also in America where it is rather numerous. Very few species of the genera *Sphallomorpha* Westwood, 1837 and *Adelotopus* Hope, 1834 have been recorded from New Guinea, Java, and the Moluccas, and one species of the genus *Cryptocephalomorpha* Ritsema, 1875 even occurs in southern Africa, whereas most species of this small genus live in southern and south-eastern Asia. Baehr (1992, 1993a,b, 1994b, 1997, 2002, 2004, 2005, 2006, 2007, 2008, 2009a,b,c) in a couple of papers revised the Australian-Asiatic species and described the single African species. Erwin & Geraci (2008) recently revised the American species of the genus *Pseudomorpha* and split it into several genera, also raising the South American subgenus *Notopseudomorpha* Baehr, 1997 and the Australian subgenus *Austropseudomorpha* Baehr, 1997 to full generic status.

METHODS

Measurements were taken using a stereo microscope with an ocular micrometer. Body length was measured from the apex of the labrum to the apex of the elytra. The length of the

pronotum was measured along the midline, width of base of pronotum at the widest part of the basal angles, length of the elytra from the most advanced part of the humerus to the very apex.
For the chaetotaxy, which is very important for the identification of species of *Sphallomorpha*, the abbreviations as in Baehr (1992) are repeated below.
For dissection of the genitalia the specimen was weakened for a night in a jar under wet atmosphere, then the genitalia were removed and subsequently cleaned for a short while in hot KOH. The habitus photograph was obtained with a digital camera using ProgRes Capture Basic and AutoMontage and subsequently was worked with Corel Photo Paint 11.
The holotype of the new species is stored in the Museum and Art Gallery of the Northern Territory, Darwin (NTD).

CHAETOTAXY

supraorb	supraorbital seta (either side)
preorb	preorbital seta (either side)
clyp	clypeal seta (either side)
labr	labral setae (common)
ment.med	medial mental setae, at base of mental excision or mental tooth (common)
ment.lat	lateral mental setae, on wings of mentum (either side)
gloss	glossal setae, on ventral rim of apex of glossa (either side)
gul	gular setae, inside of gular suture (either side)
postorb	postorbital setae, posteriorly of eye on a conspicuous rim (either side)
suborb	suborbital setae, below eye, laterally of gular suture (either side)
pron.ant	anterior pronotal setae, near anterior angle of pronotum (either side)
pron.post	posterior pronotal setae, near posterior angle of pronotum (either side)
proeps	proepisternal setae, longitudinally and transversally on proepisternum (either side)
marg	marginal setae, along margin of elytra (either side)
st VI	setae on posterior border of sternum VI, the penultimate visible sternite (either side)
#m st VII	setae of male sternum VII, the terminal visible sternite (either side)
#f st VII	setae of female sternum VII, the terminal visible sternite (either side)

Genus *Sphallomorpha* Westwood, 1837

Sphallomorpha Westwood, 1837: 414. – For additional literature records and diagnosis see Baehr (1992).

Type species: *Sphallomorpha decipiens* Westwood, 1837, by monotypy.

Diagnosis. Wide, depressed species with prognathous head, elongate legs, comparatively complete chetotaxy, normal shaped, not foliaceous female gonocoxite, and not physogastric

larvae. As far as it was recorded, all species of this genus are oviparous. In males, the terminal sternum is excised and, in both sexes, it bears a variable number of elongate setae at the apical margin.

Remarks. In the general revision, Baehr (1992) united the former genera *Sphallomorpha* Westwood, 1937 and *Silphomorpha* Westwood (1837) because a clear distinction of both genera was no longer possible according to the rich material that was available for the revision. Actually it became evident that the character states used previously for the distinction of both genera, in certain species contradict one to another and, on the other hand, are widely overlapping in a couple of species which were formerly appointed to the one or the other genus.
As Baehr (1994a) demonstrated, *Sphallomorpha* in many character states is plesiomorphic as compared with the other pseudomorphine genera, and thus it represents the adelphotaxon of all other genera of Pseudomorphinae.
The genus *Sphallomorpha* presently includes 156 species of which only eight occur outside of Australia in New Guinea (Baehr 1992, 1993a,b, 1994a, 2002, 2004, 2005, 2006, 2008, 2009c). Species of *Sphallomorpha* usually are wide and rather depressed, they are either unicolourous black or piceous, or bear various, sometimes very vivid, colour patterns on the elytra and/or pronotum. In Australia they occur in a great variety of habitats, provided that some tree growth is present, but apparently they are very rare in rain forest. The Australian species are known to live under the loose bark of tree trunks of various eucalypts or in deep bark cracks on rough-barked eucalypt and non-eucalypt trees. They are extremely agile insects which fly deliberately, but are quite rarely encountered at light. Virtually nothing has been recorded about the habits of the New Guinean species. The larvae of the very few species of which the larvae were recorded, apparently live by ants (Moore 1974), but are not decidedly physogastric like the recorded larvae of the other pseudomorphine genera.
Baehr (1992) divided the genus into a number of putative monophyletic species groups which combine species that share certain synapomorphic character states of the external or genitalic morphology. The species described below belongs to the *S. grandis* (Laporte de Castelnau, 1867) species-group.

Sphallomorpha bilyi **sp. nov.**

(Figs. 1-2)

Type locality: Australia, Northern Territory, 40 km west of Katherine, 13°15′S 130°44′E, 63 m.

Type specimen. Holotype ♂ (NTD #1004386): "AUSTRALIA NT., 40km W of Katherine, 63 m, 13°15′S, 130°44′E, 28.11.2008, Sv. Bílý leg.".

Diagnosis. A small species of the *Sphallomorpha grandis* species-group with barely raised elytral intervals and with rather wide, obtusely triangular, suddenly deflexed apex of the aedeagus. The smallest species of the *S. grandis* species-group. Distinguished from similarly-sized species, in particular *S. sedlaceki* Baehr, 1992, from southeastern Australia, by the wider, laterally markedly sinuate aedeagus and extremely elongate, straight parameres.

Description. Measurements. Length 8.65 mm, width 4.45 mm. Ratios. Width pronotum/head = 1.51; width elytra/pronotum = 1.10; width/length of pronotum = 2.35; length/width of elytra = 1.22; length elytra/pronotum = 3.20.

Colour (Fig. 1). Black, only labrum, mouth parts, antenna, and tarsi dark reddish-piceous, lateral margins of pronotum and elytra very inconspicuously paler.

Chetotaxy (Fig. 1). Supraorb = 1; preorb = 1, clyp = 1; labr = 4; ment.med = 2; ment.lat = c.6; gloss = 4; gul = 2; postorb = 3-4; suborb = 5-6; pron.ant = 1; pron.post = 1; proeps = 1 + 2-3; marg = 16; st VI = 3; #m st VII = 3-4; #f st VII = ?. All head and pronotal setae very elongate.

Head. Rather wide, short, fairly depressed, without distinct frontal impressions. Eyes large, moderately projected. Clypeus very slightly concave, clypeal suture indistinct, in middle widely interrupted. Lateral border of head very oblique, feebly convex, slightly concave in front of eyes. Labrum moderately wide, laterally convex, anteriorly slightly excised, feebly raised. Mentum with obtusely triangular, unidentate mental tooth. Wings of mentum short, wide, apex evenly rounded, subapically convex, medially oblique. Glossa feebly excised, barely excavate, border obtuse. Dorsal part barely surpassing ventral, medially slightly excised, with few, delicate hairs. Gular sutures markedly angulate. Terminal palpomere of labial palpus rather elongate, narrow, with oblique apex, but not securiform; terminal palpomere of maxillary palpus elongate, almost parallel-sided, apex slightly oblique. Galea elongate, moderately large. Antenna elongate, median antennomeres c.3.5× as long as wide. Microreticulation of surface dense, very fine though distinct, isodiametric, punctation fairly dense, fine, difficult to detect within the microreticulation. Surface almost devoid of strioles inside of the eyes, without pilosity, rather glossy. Palpi very sparsely pilose. Galea with some very short setae along anterior border and at apex. Ventral surface with very short, sparse, erect pilosity.

Pronotum. Wide, moderately convex, slightly triangular, lateral margins not explanate. Apex wide, with rather deep excision. Anterior angles moderately projected, but obtuse at tip. Sides slightly but evenly convex, widest immediately in front of the posterior marginal seta. Basal angles widely rounded. Base gently bisinuate. Lateral margin anteriorly with distinct border line, which becomes very fine towards base. Apex finely bordered, base unbordered. Discal impressions very shallow. Microreticulation dense and very fine, slightly silky, isodiametric, punctation moderately dense, extremely fine, barely perceptible, surface with some fine, irregular strioles, without pilosity, rather glossy.

Elytra. Elongate, dorsally moderately convex, lateral margins in anterior half almost parallel. apicad slightly rounded, not explanate. Apex rather wide, straight and almost transverse. Only three to four median striae perceptible, striae very shallow, inconspicuous, impunctate. Intervals barely raised. Series of marginal pores rather spaced in middle. Microreticulation isodiametric to slightly transverse, dense, coarser than on head and pronotum, becoming more superficial towards apex. Punctation distinct and rather dense though somewhat irregular, moderately fine, with three to four punctures on the four median intervals. Surface with very sparse traces only of extremely short, erect pilosity, rather glossy.

Ventral surface. Prosternal process elongate, narrow, apex almost straight, ventral surface convex, straight to apex, with several short setae. Metepisternum c. 2.5× as long as wide. Terminal abdominal sternum in male deeply excised, with 3-4 elongate setae on either side.

Fig. 1. *Sphallomorpha bilyi* **sp. nov.** Habitus. Body length: 8.65 mm.

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Legs. Elongate, slender. Metatarsus as long as metatibia. Tarsomere 1 of metatarsus slightly shorter than tarsomeres 2 and 3 together. Tarsomeres 1-3 of male protarsus at apex with squamose pilosity.

Male genitalia (Fig. 2). Sternum VII moderately wide, with fairly narrow, rather deep excision. Genital ring wide, triangular, almost regularly symmetric, basal border feebly convex, lateral angles slightly prominent, though rounded, basal plate wide, short, anteriorly deeply excised, apex acute. Aedeagus rather wide, depressed, laterally distinctly bisinuate, lower border very gently convex, apex wide, obtusely triangular, straight, at tip suddenly bent down. Orificium rather short. Internal sac without any distinctly sclerotized pieces, with two large, twisted folds. Both parameres very elongate, right paramere straight, left paramere almost parallel-sided, with oblique and slightly convex apex.

Female unknown.

Etymology. The name is a patronym in honour of the collector, Svatopluk Bílý, the well known specialist of Buprestidae.

Biology. Not recorded. Probably a bark inhabiting species like its congeners.

Distribution. Australia (northern part of Northern Territory).

RECOGNITION

In the key to the species of the genus *Sphallomorpha* (Baehr 1992: 30), couplet 24 is easily reached. From this caption onwards all species are decidedly larger than *S. bilyi* sp. nov. and they possess quite differently shaped aedeagi. In particular those species with rather deep, about semicircular excision at the male sternum VII are much larger.

DISCUSSION

The detection of an additional new species of the putative well recorded genus *Sphallomorpha* in a fairly easily accessible and apparently well collected area again demonstrates the yet fragmentary knowledge that we possess of the carabid fauna of Australian Northern Territory, in spite of repeated collecting trips partly devoted to sampling of pseudomorphine beetles and generally to the corticolous and subcorticolous fauna of the Far North (e.g. Baehr 2009c). Hence it can be expected that additional species will be

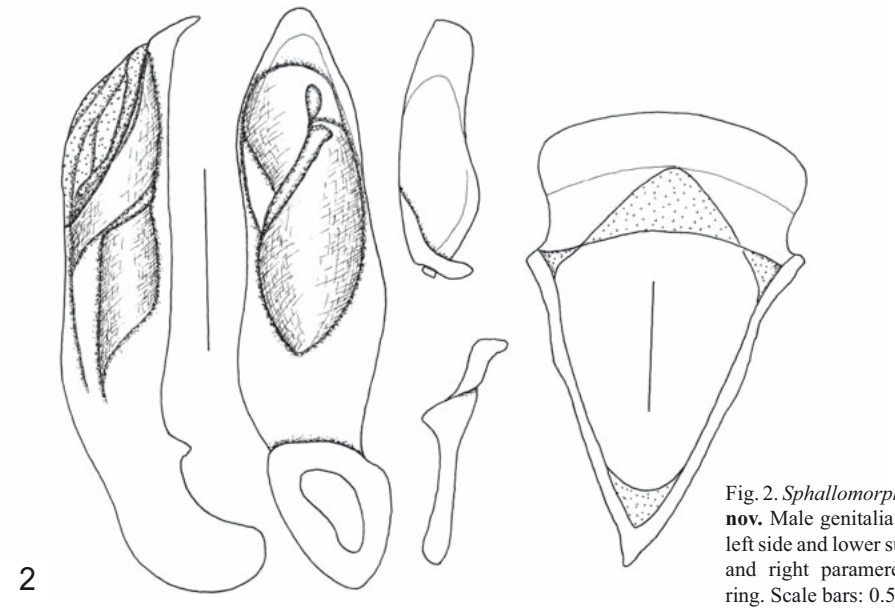

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Fig. 2. *Sphallomorpha bilyi* **sp. nov.** Male genitalia: aedeagus left side and lower surface, left and right parameres, genital ring. Scale bars: 0.5 mm

discovered, as more systematical sampling of the tree-living carabid (and non-carabid) fauna is conducted. The still fragmentary knowledge, however, not only depends on inadequate sampling or preference of collectors for certain easily accessible areas, but it may also depend on seasonality of these beetles or on their concentration on single trees for mating or hibernation purposes. It has been observed repeatedly that pseudomorphines of various genera and species seem to concentrate on single trees, even when trees of the same species, size, and exposition would be available in the near vicinity. It would require very systematic and scrutinized observations to find out the reason for such concentrations.

According to the body shape, shape of the mentum tooth, chetotaxy, and shape and structure of the aedeagus, the new species belongs to the *S. grandis* species-group of the revision (Baehr 1992). However, within this group of generally large to very large species, it is outstanding though its comparatively small size, and indeed it is the smallest member of the *S. grandis* species-group. Even when the sampling circumstancews were not recorded, certainly the species is corticolous as are its congeners and most probably the specimen was collected from under the loose bark of a bark-shedding eucalypt.

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REFERENCES

Baehr M. 1992: Revision of the Pseudomorphinae of the Australian Region 1. The previous genera Sphallomorpha Westwood and Silphomorpha Westwood. Taxonomy, phylogeny, zoogeography (Insecta, Coleoptera, Carabidae). *Spixiana Supplemente* **18**: 1-440.

Baehr M. 1993a: New species and new records of the genus Sphallomorpha Westwood from Australia. Supplement to the "Revision of the Pseudomorphinae of the Australian Region 1." (Insecta, Coleoptera, Carabidae). *Spixiana* **16**: 25-42.

Baehr M. 1993b: A remarkable new species of the genus Sphallomorpha Westwood from Irian Jaya (New Guinea). 2. Supplement to the "Revision of the Pseudomorphinae of the Australian Region 1." (Insecta, Coleoptera, Carabidae). *Spixiana* **16**: 207-211.

Baehr M. 1994a: Phylogenetic relations and biogeography of the genera of Pseudomorphinae (Coleoptera, Carabidae). In: Desender K., Dufrene M., Loreau M., Luff M. L. & Malfait J.-P. (eds.): Carabid Beetles: Ecology and Evolution. *Series Entomologica* **51**: 11-17.

Baehr M. 1994b: New species and new records of the genus Sphallomorpha Westwood from Australia and New Guinea. 3rd Supplement to the "Revision of the Pseudomorphinae of the Australian Region 1." (Insecta, Coleoptera, Carabidae). *Spixiana* **17**: 215-235.

Baehr M. 1997: Revision of the Pseudomorphinae of the Australian Region 2. The genera Adelotopus Hope, Cainogenion Notman, Paussotropus Waterhouse, Pseudomorpha Kirby, and Cryptocephalomorpha Ritsema. Taxonomy, phylogeny, zoogeography (Insecta, Coleoptera, Carabidae). *Spixiana Supplemente* **23**: 1-510.

Baehr M. 2002: New species and new records of Australian Pseudomorphinae. 4th Supplement to the "Revision of the Pseudomorphinae of the Australian Region." (Insecta, Coleoptera, Carabidae). *Spixiana* **25**: 101-129.

Baehr M. 2004: A peculiar new species of the genus Sphallomorpha Westwood from New Guinea (Coleoptera: Carabidae: Pseudomorphinae). *Koleopteroligische Rundschau* **74**: 25-31.

Baehr M. 2005: New species and new records of Australian Pseudomorphinae. 6th Supplement to the "Revision of the Pseudomorphinae of the Australian Region." (Insecta, Coleoptera, Carabidae). *Spixiana* **28**: 259-269.

Baehr M. 2006: A new and another remarkable species of the genus Sphallomorpha Westwood from central Queensland, Australia (Insecta, Coleoptera, Carabidae, Pseudomorphinae). *Mitteilungen der Münchner Entomologischen Gesellschaft* **96**: 119-124.

Baehr M. 2007: A new species of the genus Adelotopus Hope from northern Queensland, Australia (Insecta, Coleoptera, Carabidae, Pseudomorphinae). *Spixiana* **30**: 25-28.

Baehr M. 2008: New and rare pseudomorphine species from Western Australia (Insecta, Coleoptera, Carabidae, Pseudomorphinae). 8th Supplement to the "Revision of the Pseudomorphinae of the Australian Region." *Records of the Western Australian Museum* **24**: 151-180.

Baehr M. 2009a: A new and a little known species of Cryptocephalomorpha Ritsema. 11th Supplement to the "Revision of the Pseudomorphinae of the Australian Region." (Insecta: Coleoptera: Carabidae: Pseudomorphinae). *Stuttgarter Beiträge zur Naturkunde, Series A* **2**: 195-199.

Baehr M. 2009b: A new species of the genus Adelotopus Hope from the Moluccas. With new records of some New Guinean species of the genus Sphallomorpha Westwood. 10th Supplement to the "Revision of the Pseudomorphinae of the Australian Region." (Insecta, Coleoptera, Carabidae, Pseudomorphinae). *Spixiana* **32**: 39-43.

Baehr M. 2009c: New and rare species of the pseudomorphine genera Sphallomorpha Westwood, Adelotopus Hope, and Pseudomorpha Kirby mainly from far Northern Territory, Australia (Insecta, Coleoptera, Carabidae, Pseudomorphinae). 12th supplement to the "Revision of the Pseudomorphinae of the Australian Region". *Spixiana* **32**: 231-253.

Erwin T. L. & Geraci C. J. 2008: New genera of Pseudomorphini (Insecta: Coleoptera, Carabidae) in the Western Hemisphere. Pp. 77-100. In*:* Penev L., Erwin T. L. & Assmann T. (eds.): Back to the Roots and back to the future: towards a new synthesis between taxonomic, ecological, and biogeographical approaches in carabidology. In: *Proceedings of the XIII European Carabidologists Meeting, Blagoevgrad, August 20-24, 2007.* Pensoft Publishers, Sofia, 510 pp.

Moore B. P. 1974: The larval habits of two species of Sphallomorpha Westwood (Coleoptera: Carabidae: Pseudomorphinae). *Journal of the Australian Entomological Society* **13**: 179-183.

Westwood J. O. 1837: Illustrations of the Relationships existing amongst Natural Objects, usually termed Affinity and Analogy, selected from the Class of Insects. *Transactions of the Linnean Society of London* **18**: 209-221.