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Apogonia rakovici sp. nov., a new species from southern Thailand (Coleoptera: Scarabaeidae: Melolonthinae: Diplotaxini)

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Taxonomy, new species, new records, *Apogonia apicalis* species group, Thailand, Malay Peninsula, Indonesia

Abstract. *Apogonia rakovici* sp. nov. is described from southern Thailand and compared with similar and probably related congeners. The newly described species is assigned into the *Apogonia apicalis* species group. *Apogonia laevicollis* Lansberge, 1879 is recorded from Bali Island, Malaysia and Thailand for the first time.

INTRODUCTION

The genus *Apogonia* Kirby, 1819 (Scarabaeidae: Melolonthinae: Diplotaxini) is one of the most species-rich melolonthine genera in the world. Bezděk (2004) published a catalogue of the tribe Diplotaxini of the Old World and counted 327 valid species and subspecies of *Apogonia*. Thanks to the efforts and publication activity of Marc Lacroix and Hirokazu Kobayashi over the last 20 years, the total number of *Apogonia* had risen to almost 530 species by the end of 2024.

Apogonia in the current broad sense seems to be quite heterogeneous, but there is no subgeneric or species grouping classification available. The striking exception is the *Apogonia apicalis* species group proposed by Kobayashi & Lien (2021). It includes unicolored black or dark brown species with slender and tridentate protibia, with all teeth closely spaced; the outer margin of the protibia is straight in the basal third; the lateral carina of the abdominal sternites is at least partially developed; the metafemur is slender; the male genitalia have a characteristic shape - the parameres are asymmetrical, basally fused, apically almost membranous, the right paramere has a well sclerotized conspicuous asymmetrical inner branch (Figs. 11-14). Kobayashi & Lien (2021) included eight *Apogonia* species in this: *A. apicalis* Moser, 1908, *A. annamensis* Moser, 1913, *A. kusuii* Kobayashi & Bezděk, 2011, *A. okushimai* Kobayashi & Bezděk, 2011, *A. ovaliformis* Kobayashi & Bezděk, 2011, *A. vietnamensis* Kobayashi & Bezděk, 2011, *A. paraovaliformis* Kobayashi & Lien, 2021 and *A. vinhphuensis* Kobayashi & Lien, 2021. It is likely that the group is much more diverse.

Among the *Apogonia* material sent to me for identification from the Naturkundemuseum Erfurt (Germany), I found a number of specimens of very characteristic new species from southern Thailand belonging to the *Apogonia apicalis* species group.

MATERIAL AND METHODS

The specimens were examined with an Olympus SZX9 stereomicroscope; measurements were taken with an ocular grid. Length measurements are from the anterior margin of the clypeus to the apex of the abdomen. The habitus photographs were taken with a Canon MP-E 65mm/2.8 1-5× macro lens attached to a Canon EOS 90D camera. Partially focused images of each specimen were stacked using the Helicon Focus v.3.20.2 Pro software.

Specimens of the newly described species are provided with one red printed label "*Apogonia rakovici* | sp. nov. | HOLOTYPE, male [or] PARATYPE, male [or] PARATYPE, female | det. Aleš Bezděk 2025".

Exact label data are cited for the type material examined. Separate labels are indicated by a double vertical bar "||", lines within each label are separated by a single vertical bar "|". Information in quotation marks indicates the original spelling. Our remarks and additional comments are placed in brackets, [p] - preceding data (within quotation marks) are printed; [hw] - the same but handwritten. HT - holotype, PT - paratype, ST - syntype.

The following codes identify the collections housing the material examined:

HKTC private collection of Hirokazu Kobayashi, Tokyo, Japan;
IECA Biology centre CAS, Institute of Entomology, České Budějovice, Czech Republic (Aleš Bezděk);
MNHN Muséum national d'Histoire naturelle, Paris, France (Antoine Mantilleri, Olivier Montreuil);
NMEG Naturkundemuseum Erfurt, Germany (Matthias Hartmann);
NMPC National Museum, Praha, Czech Republic (Lukáš Sekerka, Jiří Hájek);
RMNH Naturalis Biodiversity Center, Leiden, the Netherlands (Oscar Vorst).

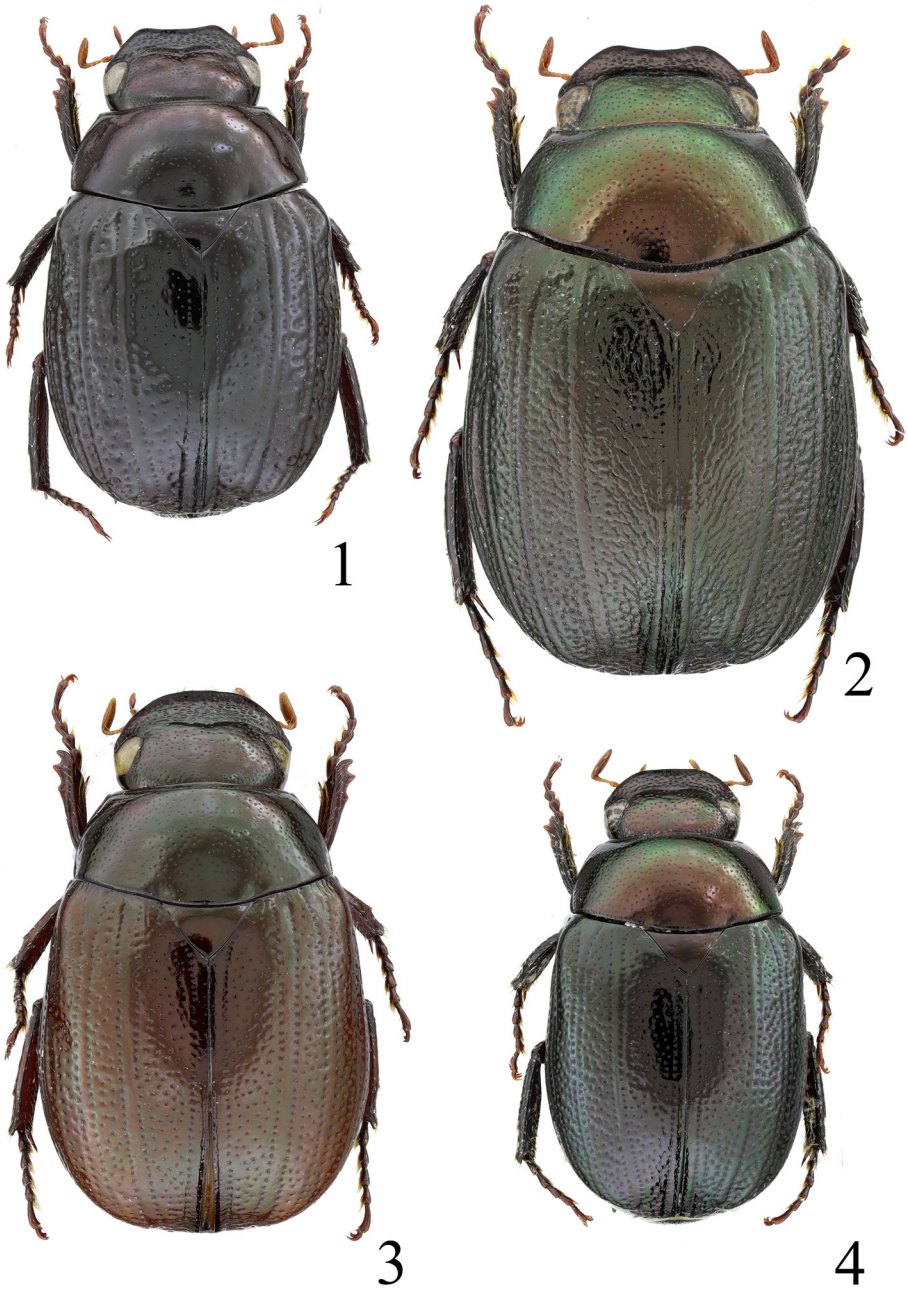
RESULTS

Apogonia rakovici sp. nov.

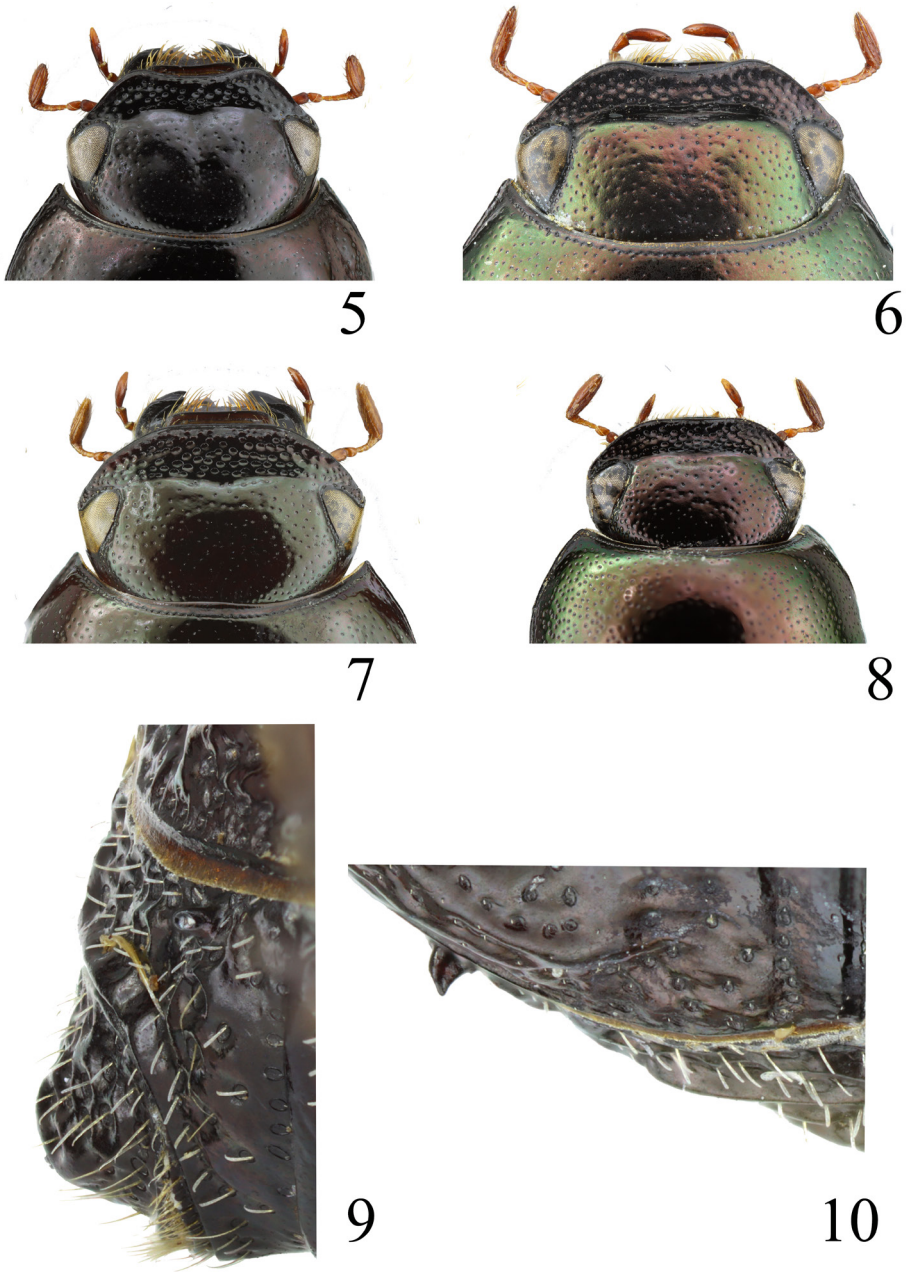
(Figs. 1, 5, 9-11)

Type locality. S Thailand, Phang Nga Province, Thimung district, 5 km S Khao Lak, 8°36'N 98°15'E, 10-100 m. a.s.l.

Type material (16 specimens)**.** Holotype (♂) (NMEG) (Figs. 1, 5, 9-11): "S-THAILAND, Phang-nga Prov. | Thimung distr., 5 km S Khao Lak | 8°36'N 98°15'E, 10-100 m | 01.-14.VIII. 2014, leg. A. Skale [p]". Paratypes: 1 ♂ (NMEG) and 2 ♀♀ (NMEG, NMPC): same data as HT;3 ♂♂ (NMEG, NMPC, HKTC) and 2 ♀♀ (NMEG): "S-THAILAND, Phang-nga Prov. | Takuapa distr., Khao Lak | 08°37.623'N 98°15.091'E, 50 m | 23.08.-02.09. 2010, leg. A. Skale [p]"; 1 ♂ (NMEG): "S-THAILAND, Phang-nga Prov. | Takuapa distr., vic. Khao Lak | 08°37'N 98°15'E, 40-80 m | 03.-16.VIII. 2012, leg. A. Skale [p]"; 1 ♀ (NMEG): "Thailand mer., Prov. Phang | Nga, Khao Lak Lam Ru | National Park, 2.-15. IV. 2008 | 98°14'02.16"E 8°37'22.91"N | leg. A. Pütz [p]"; 1 ♀ (IECA): "S-THAILAND, Phang-nga | Prov., Lamru Distr., 6 km | NE Lam Kaen, (white | banana waterfall) | 08°37.324N 98°18.362E | 75m 13.VIII.2012 | leg. A. Weigel PL [p]"; 1 ♂ (IECA): "Thailand SW, 10.11. | W of Phanom | S of Ranong | M. Snížek lgt., 2017 [p]"; 1 ♂ (NMEG): "S-THAILAND, Phang | Nga Prov., Khao Lak | N08°43.74' E098°14.72' | A. Skale, 15.8.2016 [p]"; 1 ♀ (NMEG): "THAILAND, Prov. Phang | Nga, Khuekkh., 52m NN | Chongfah Waterfall | 8°39'40"N 98°16'52"E | 6.IX.2018, leg. M. Frenzel [p]"; 1 ♀ (NMEG): "S-THAILAND, Phang Nga | Prov., 7 km E of Khao Lak, Ton | Chong Fah Waterfall | 8°39'21"N 98°17'13"E, 135m | A. Skale, 26.10.-7.11.2019 [p]".



Figs. 1-4. *Apogonia* spp., habitus, dorsal view: 1- *Apogonia rakovici* sp. nov., HT, 7.7 mm; 2- *Apogonia sulcaticeps scabra*, male from: Malaysia, Pahang, Frazer's Hill, 9.2 mm; 3- *Apogonia laevicollis*, male from: Malaysia, Kelatan, 30 km of Jeli, 7.9 mm; 4- *Apogonia cechovskyi*, HT, 6.9 mm. Photographs by R. Sehnal.



Figs. 5-10. *Apogonia* spp., details of body parts: 5- male head of *Apogonia rakovici* sp. nov., HT; 6- male head of *Apogonia sulcaticeps scabra* from Malaysia, Pahang, Frazer's Hill; 7- male head of *Apogonia laevicollis* from Malaysia, Kelatan, 30 km of Jeli; 8- male head of *Apogonia cechovskyi*, HT; 9- pygidium in lateral view of *Apogonia rakovici* sp. nov., HT; 10- propygidial spiracle of *Apogonia rakovici* sp. nov., HT. Not in scale. Photographs by R. Sehnal.

11

12

Figs. 11-12. *Apogonia* spp., aedeagus in left lateral, dorsal and right lateral views: 11- *Apogonia rakovici* sp. nov., HT; 12- *Apogonia sulcaticeps scabra*, male from: Malaysia, Pahang, Frazer's Hill. Not in scale. Photographs by R. Sehnal.

Description of holotype, male. Body length 7.7 mm. Body elongate, convex, surface black, shiny; tarsal segments, antennae and palpi dark brown (Fig. 1). Head (except for a few setae on ventral side of clypeus), pronotum and elytra bare, epipleura covered with short, recumbent, but well-visible pale setae. Legs and ventral surface with sparse, pale setation.

13

14

Figs. 13-14. *Apogonia* spp., aedeagus in left lateral, dorsal and right lateral views: 13- *Apogonia laevicollis*, male from: Malaysia, Kelatan, 30 km of Jeli; 14- *Apogonia cechovskyi*, HT. Not in scale. Photographs by R. Sehnal.

Head. Clypeus transverse, coarsely and densely punctate, anteriorly with distinct emargination (Fig. 2), broadly rounded laterally. Frons and vertex shallowly and sparsely punctate. Eye canthus prominent, largely fused with clypeus; borderline between eye canthus and clypeus invisible. Eye large, distinctly extended beyond the canthus. Antenna

with 10 antennomeres; club trimerous, distinctly shorter than antennal shaft. Antennomeres 1-7 with few isolated, erect setae; club sparsely covered with moderately long, erect setae. Labrum transverse, narrow, completely covered by clypeus, thus not visible from above, anteriorly with shallow emargination, covered with coarse irregular punctures bearing moderately long, erect setae.

Pronotum transverse, convex, widest at about the base. Anterior angles prominent, acute-angulate; posterior angles obtuse. Anterior margin with membranous border; anterior and lateral marginal lines complete, basal marginal line absent. Punctation shallow, irregular, punctures separated by 1-2 times their diameter, never confluent.

Scutellum triangulate, slightly wider than long; apex pointed, with only few shallow punctures, glabrous.

Elytron convex, widest about at middle; sutural angle obtuse-angulate. Disc of elytron covered with rather shallow, irregular punctures, similar to those on protonum. Lateral and apical parts of elytron with coarse, partially confluent, irregular punctures. Epipleuron with a row of short, recumbent setae. Apical half of lateral margin of elytron with membranous border. Macropterous.

Protibia narrow, tridentate, basal teeth in some specimens subobsolete; terminal calcar present. Outer margin of protibia straight in basal half, with two small denticles. Mesotibia and metatibia slightly expanded apically, covered with semirecumbent setae, at about basal third with short, incomplete, transversal carina armed with 5 or 6 short, thick setae. Terminal calcars of mesotibia and metatibia flattened, upper calcar pointed apically, lower calcar nearly blunt apically; upper calcar of mesotibia about 1.5 times as long as lower calcar; upper calcar of metatibia about 2 times as long as lower calcar. Mesofemur and metafemur long, narrow, with three longitudinal rows of semirecumbent short setae. Protarsomeres 1-4 short, about as long as wide; mesotarsomeres and metatarsomeres 1-4 elongated. Tarsomeres 1-4 on all legs with short and densely macrosetaceous pads ventrally. Tarsomere 5 elongate, ventrally and dorsally with few isolated setae. Claws equal, deeply cleft at the apex.

Ventral surface of thorax sparsely covered with setiferous punctures, setae short, recumbent. Abdominal sternites III-VII covered with coarse irregular punctures bearing short recumbent or semirecubent setae, setae becoming denser laterally. Abdominal sternite VIII nearly completely retracted beneath abdominal sternite VII, bare, only apical margin visible with a row of erect setae. Propygidium (= abdominal tergite VII) and abdominal sternite VII completely fused. Propygidial spiracle is located on the distinct spiny projection (Fig. 10). Pygidium remarkably convex (Fig. 9), irregularly coarsely punctate, covered with moderately long, semirecumbent setae.

Male genitalia. Parameres asymmetrical (Fig. 11), complex, fused basally, mostly weakly sclerotized. Right paramere with well sclerotized conspicuous asymmetrical hook-like inner branch.

Variability. Male paratypes slightly differ in size (total body length 6.3-8.2 mm, 7 specimens measured), two of them are brown, most probably teneral specimens. Sexual dimorphism is only weakly pronounced. The female differs from the male by the shorter and sparser setae on the ventral side of tarsomeres 1-4. Body length 6.9-8.0 mm (8 specimens measured).

Differential diagnosis. Of all members of the *Apogonia apicalis* species group, only three taxa have a deeply emarginated anterior margin of the clypeus: *A. rakovici* sp. nov., *A. sulcaticeps sulcaticeps* Ritsema, 1898 and *A. sulcaticeps scabra* Miyake, 1989. The clypeus of *A. s. sulcaticeps* and *A. s. scabra* is separated from the head by a deep groove (Fig 6), whereas the base of the clypeus of *A. rakovici* sp. nov. is normally developed (Fig. 5). There are two more species of the *A. apicalis* group distributed in southernmost Thailand and/or the Malay Peninsula: *A. laevicollis* Lansberge, 1879 and *A. cechovskyi* Kobayashi, 2017. These two species are clearly distinguished from *A. rakovici* sp. nov. by the shape of the anterior margin of the clypeus - which is simply rounded in both *A. laevicollis* and *A. cechovskyi* (Figs. 7-8). The male genitalia of all four taxa differ clearly from each other (compare Figs. 11-14). The male genitalia of *A. sulcaticeps sulcaticeps* have not been examined, as the nominotypical subspecies is only known from three female syntypes. Another useful character is the shape of the propygidial spiracle, which is located on a distinct spiny projection in *A. rakovici* sp. nov. (Fig. 10), while on a weak projection in *A. cechovskyi* or simply flat in *A. laevicollis*, *A. s. sulcaticeps* and *A. s. scabra*.

Etymology. The name of the species is dedicated to the late Miloslav Rakovič, the worldwide specialist on Scarabaeidae: Aphodiinae.

Distribution. Southern Thailand, Phang Nga Province.

MATERIAL USED FOR COMPARISON

Apogonia cechovskyi Kobayashi, 2017
(Figs. 4, 8, 14)

Type locality. "G. Belemban (Kg. Tabu Hitam) [sic!], Endau Ronpin [sic!] N.P. (600 m in alt.)."

Type material examined. HT, ♂ (IECA): "MALAYSIA WEST, PAHANG | 70 km SW of Kuala Rompin | Endau Rompin N.P. 600 m | G. Beremban (Kg. Tebu Hitam) | 13.iv.-3.v.2009, P. Čechovský lgt. [p]"; PT, 1 ♂, 1 ♀ (IECA), same data as for HT; PT, 2 unsexed specimens (IECA): "MALAYSIA | Cameron Highlands | Ringlet env. | 20.-21.11.2000 | F. & L. Kantner lgt. [p]"; PT, 1 ♂ (IECA): "W MALAYSIA - Pahang | Banjaran Bnom Mts. | 20 km S of Kampong Ulu | Dong, 17.-23.iv. 1997 | 1500-1900 m | P. Čechovský leg. [p]"; PT, 1 ♂ (IECA): "THAILAND, 1.-11.v.1998 | Chumphon prov. | Pha To env. | P. Průdek & R. Šigut leg. [p]"; PT, 1 ♂ (IECA): "THAILAND 14.-21. iii. 1996 | Chumphon prov. | Pha To env. 9°48'N 98°47'E | P. Průdek lgt. [p]"; PT, 1 ♂ (IECA): "S Thailand | Sai Buri, Pattani dist. | 23.- 28.4.1993 | J. Horák leg. [p]".

Distribution. Malay Peninsula and southernmost Thailand.

Remark. Based on morphological characters, this species belongs to the *Apogonia apicalis* species group.

Apogonia laevicollis Lansberge, 1879
(Figs. 3, 7, 13)

Type locality. "Java et Sumatra."

Type material examined. ST, 1 ♀ (MNHN): "Java Occ. | M. Salak [p] || Laevicollis | Lansb. [hw] || Ex Musaeo | VAN LANSBERGE [p]"; ST, 1 unsexed specimen (MNHN): "Java Occ. | Preanger. [p] || Ex Musaeo | VAN LANSBERGE [p] || Ritsema | vidit 1890 [p]"; ST, 1 ♂ (MNHN): "Sumatra | Occident. [p] || Ex Musaeo | VAN LANSBERGE [p] || Ritsema | vidit 1890 [p]".

Additional material examined. Indonesia (Bali): 1 dissected male (IECA), Bali W., Tjandikoesoema, 25-27-IV-1932, Prince Léopold; Indonesia (Java): 2 dissected males and 1 female (IECA), Java, Tenggergeb. [Mount Tengger], Drescher lgt.; Indonesia (Sumatra): 1 dissected male (IECA), Sumatra, Fort de Kock, 920 m, 1925, E. Jacobson lgt.; 1 dissected male (IECA), Sumatra, Harau valley, Payakumbuh, I. 1991, St. Jakl lgt.; 1 female (IECA), W Sumatra, Harau valley env., 500-800 m, III.-IV. 2005; 1 dissected male and 2 unsexed specimens (IECA), C Sumatra, Jambi prov., Teluk Kayu Putih env., 0-200 m alt., VIII. 2008, local collectors lgt.; Indonesia (Malay Peninsula): 1 dissected male (IECA), Malaysia, Taiping, IV. [19]79, K.C. Liew lgt.; 1 dissected male (IECA), Malaysia, Pahang, Benom Mountains, 15 km E Kampong Dong, 3.53°N 102.01°E, 300-1000 m, 24.III.-15.IV. 1998, L. Dembický and P. Pacholátko lgt.; 1 dissected male (IECA), Malaysia, Ipoh, 5 km of Tanjong, Rambutan, 13.-15. IV. 2000, M. Snížek lgt.; 1 female (IECA), Malayasia, Perak, 25 km NE of Ipoh, Banjaran Titi Wanggsa Mountains, Korbu Mount, 1200 m, 1.-15.IV. 2000, P. Čechovský lgt.; 1 dissected male (IECA), Malaysia, Kelatan, 30 km S of Jeli, Gunung Jual, Kampong Timor, 800 m, 10.IV.-6.V. 2018, P. Čechovský lgt.; 1 dissected male (IECA), same data, but 22.IV.-18.V. 2019; Thailand: 1 dissected male (IECA), S Thailand, Sai Buri, Pattani distr., 23.-28.IV. 1998, J. Horák lgt.; 1 dissected male (IECA), S Thailand, Satun prov., 15 km E of Satun, Thale Ban National Park, 6°42'40.7"N 100°10'09.7"E, 16.-19.IV. 2017, F. Pavel lgt.

Distribution. Indonesia (Java and Sumatra), **new country records** for Bali Island, Malay Peninsula and Thailand.

Remark. Based on morphological characters, this species belongs to the *Apogonia apicalis* species group.

Apogonia sulcaticeps sulcaticeps Ritsema, 1898

Type locality. "East Sumatra: Serdang; Deli."

Type material examined. ST, 2 ♀♀ (RMNH): "Dr. B. Hagen | Tandjong Morawa | Serdang | (N.O. Sumatra). [p] || type [hw, blue label] || Apogonia | sulcaticeps | type Rits. [hw] || Museum | Leiden [p] Apogonia | sulcatices | Rits. [hw] Det. [p]"; ST, ♀ (RMNH): "Deli [p] || H. Veen | Deli | Sumat. [hw, rounded label] || type [hw, blue label] || Apogonia | sulcaticeps | type Rits. [hw] || Museum | Leiden [p] Apogonia | sulcatices | Rits. [hw] Det. [p]".

Distribution. Indonesia (Sumatra).

Remark. Based on morphological characters, this nominotypical subspecies belongs to the *Apogonia apicalis* species group.

Apogonia sulcaticeps scabra Miyake, 1989
(Figs. 2, 6, 12)

Type locality. "Maxwells Hill, near Taipin, Malaya."

Type material examined. None.

Additional material examined. Indonesia (Malaysia): 1 female (IECA), Malaysia, Pahang, Benom Mts., 15 km E Kampong Dong, 3°53'N 102°01'E, 300-1000 m, 24.III.-15.IV.1998, L. Dembický & P. Pacholátko lgt.; 1 dissected male (IECA), Malaysia, Pahang, Frazer's Hill, 8.-17.V.2010, by FIT, K. Matsuda lgt.; 1 female (IECA), Malaysia, Kelatan, 30 km S of Jeli, Gunung Jual, Kampong Timor, 80 m, 22.IV.-18.V.2019, P. Čechovský lgt. (IECA).

Remark. I did not examine the holotype of this subspecies. Male specimen from Malaysia I studied fits well with the primary description and the figure of male genitalia in Miyake (1989, fig. 3).

Distribution. Malay Peninsula.

Remark. Based on morphological characters, this subspecies belongs to the *Apogonia apicalis* species group.

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