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New data on *Apteroloma* (Coleoptera: Agyrtidae) of central Asia and the Himalayas with a new synonymy

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Abstract

The distribution of *Apteroloma anglorossicum* (Semenov, 1890), *A. harmandi* (Portevin, 1903) and *A. sillemi* Jeannel, 1935 in central Asia and along the Himalayas is summarized, and the collecting circumstances and ecology of all three species from Gilgit District, Pakistan are described in detail. Revised diagnoses of all three species are provided, habitus and important morphological structures are illustrated, and available types have been examined. *Apteroloma jankovskii* Semenov and Znojko in Semenov, 1932 is confirmed as junior subjective synonym of *A. anglorossicum*. *Apteroloma heinzi* Schawaller, 1991 is newly treated as a junior subjective synonym of *A. harmandi*.

Key words: Coleoptera, Agyrtidae, *Apteroloma*, taxonomy, new synonymy, distribution, Palaearctic region

Introduction

Agyrtidae are a small family of staphylinoid beetles, with more than 60 valid extant species in eight genera, distributed in temperate areas of the northern hemisphere (with one genus known from New Zealand); most of the species display a relict or disjunct distribution pattern (Newton 2005). The genus *Apteroloma* Hatch, 1927 belongs to the subfamily Pterolomatinae, and currently includes 25 valid species or subspecies distributed in the eastern Palaearctic Region, and an additional nine in the Nearctic region (Newton 1997, Růžička 2015). Many of the species are common in alpine habitats, including at the edges of snow fields or along snow runoff streams, but others are found in forests or open habitats not adjacent to water (Newton 2005).

The current paper summarizes the distribution of three species of *Apteroloma* distributed in central Asia (one species with a range extending to Nepal and northern India). The initial impulse for this paper was the collection of recent material of three species of *Apteroloma* in Pakistan by Leonardo Latella, which was supplemented by other recently examined material from several museum collections. This led to the discovery of colour variation in one species and the synonymy of two former species, previously separated mostly on differences in colouration.

Material and methods

Museum abbreviations. Specimens examined in this study are deposited in the following museums and private collections (acronyms follow Arnett *et al.* 1993):

NHMW	Naturhistorisches Museum, Wien, Austria (H. Schillhammer)
JRUC	private collection of Jan Růžička, Praha, Czech Republic
NHMB	Frey collection, Naturhistorisches Museum, Basel, Switzerland (Eva Sprecher-Uebersax, M. Borer)
MHNG	Muséum d'Histoire Naturelle, Genève, Switzerland (G. Cuccodoro)

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MNHN	Muséum national d'Histoire naturelle, Paris, France (T. Deuve, Azadeh Taghavian)
MCSV	Museo Civico di Storia Naturale of Verona, Verona, Italy (L. Latella)
SMNS	Staatliches Museum für Naturkunde, Stuttgart, Germany (W. Schawaller)
ZFMK	Zoologische Forschungsinstitut und Museum "Alexander Koenig", Bonn, Germany (D. Ahrens)
ZMAS	Zoological Museum, Academy of Sciences, St. Petersburg (M.G. Volkovitsh)

Photographs of habitus and morphological details were taken using a Canon macro photo lens MP-E 65mm on a Canon 550D and multiple layers of focus combined in the Zerene Stacker 1.04 software (Zerene Systems 2013; http://www.zerenesystems.com/cms/stacker). Male and female terminalia were studied after short clearing in a hot 10% solution of KOH, mounted in temporary glycerine mounts on slides or as permanent Euparal mounts on microslides.

Measurements were taken from photographs as follows: length of pronotum was taken along median line in dorsal view; length of elytra was taken from the posterior margin of scutellum to the tip of elytra in dorsal view. Total body length was measured from anterior margin of labrum to the apex of elytra, with head facing forward.

Exact label data are cited only for the type material. Separate lines on labels are indicated (only for primary types) by "/", separate labels by "//". Author's remarks and comments are enclosed in square brackets. Printed label data are indicated by [p] and handwritten by [hw].

The distribution map was produced and edited in ESRI ArcMap 10.2 of ArcGIS Desktop 10.2 suite. For map layers, free level 0 and level 1 data from Global Administrative Areas (http://www.gadm.org) and Cross Blended Hypso with Relief, Water, Drains, and Ocean Bottom (http://www.naturalearthdata.com/downloads/10m-cross-blend-hypso/cross-blended-hypso-with-relief-water-drains-and-ocean-bottom/) were used.

Results

Apteroloma anglorossicum (Semenov, 1890)

(Figs 1, 5, 10, 14, 18–19, 22, 24–30)

Pteroloma anglorossicum Semenov, 1890: 297.
Apteroloma jankovskii Semenov and Znojko in Semenov, 1932: 340 (synonymy by Schawaller (1991))
Pteroloma klapperichi Hlisnikovský, 1964: 27 (synonymy by Schawaller (1991))

Type material examined. Holotype male of *P. anglorossicum* (ZMAS), labelled "Kandshut 7.700′ [ca. 2350 m] / Baltid [= Pakistan: Hunza valley, ca. 36°19'N, 74°39'E] 1. IX. [18]88 / Grombczewsk[y] [leg.] [in Cyrillic] // [round golden label] // Pteroloma anglorossicum / m. / [male symbol] Typ. un. ASem[enov] II. [18]93 [hw, Semenov's handwriting] // Coll. Semenov-Tian-Shansky [p] // [large orange label] // Zool. Inst. / St. Petersburg [p]" (left elytron missing).

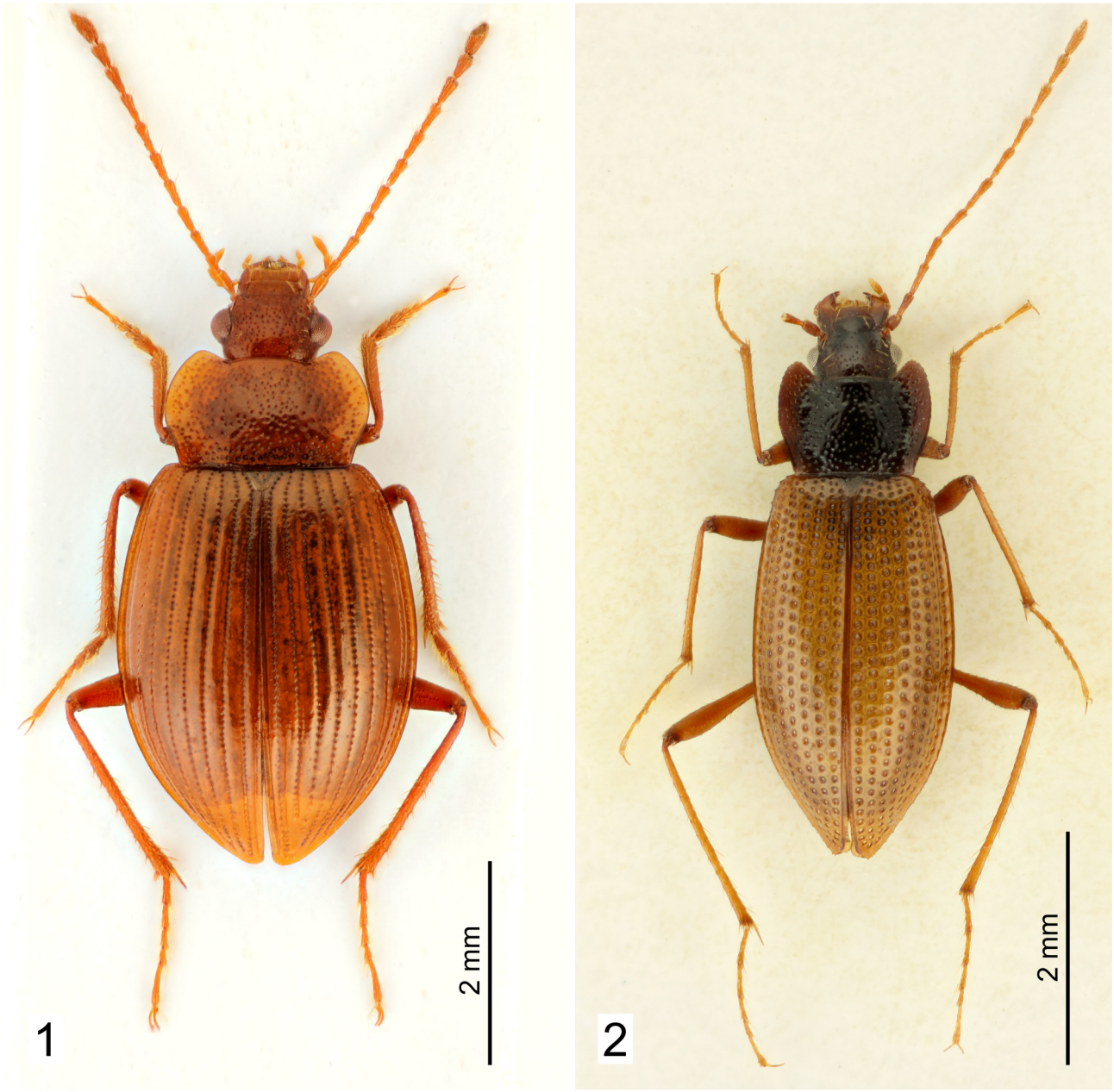
Holotype female of *A. jankovskii* (ZMAS), labelled "Verkh. Padsha-Ata / r. Ming-dzhilky' [= Padsha-Ata stream (in Namangan), ca. 41°00'N, 71°40'E, upper course of Ming-dzhilky river, N Fergana valley, Uzbekistan] / 11.VII. [19]29 I. Yank[ovskiy] [leg.] [in Cyrillic] // [round golden label] // Apteroloma / jankovskii nov. / Typ. un. [hw] / A. Semenov-Tian-Shansky [p] & Znojko [hw] det. [p] III. [19]32 [hw, Semenov's handwriting] // [large orange label] // Apteroloma / anglorossicum [hw] / det. Schawaller [p] 1990 [hw] // Zool. Inst. / St. Petersburg [p]".

Holotype male of *P. klapperichi* (ZFMK), labelled "J. Klapperich [leg.] / Do-Schak, 2500m / Khinjantal [= Khinjan, Baghlan province, ca. 35°36'N, 68°54'E], 26. 9. [19]52 / Hindukusch / O. Afghanistan [p] // Holotypus [p, red label] // PTEROLOMA Holotyp / KLAPPERICHI m. [male symbol] [hw, Hlisnikovský's handwriting] / det. Hlisnikovský 19[p] 64 [hw] [pink label]".

Additional material examined. Afghanistan: Baghlan province, Khinjan district, Hindu Kush, Salang mountain range, NE Salang pass, 2200–2400 m, 35°27.494'N, 68°58.399'E, 28.x.2010, small valley, single trees, small bushes, tall forbs, thistles, grass, Ch. Reuter leg., 1 male (JRUC); **Kyrgyzstan:** 25 km S Frunze [= Bishkek, ca. 42°38'N, 74°30'E], 800 m, 23.–27.v.1969, Emetz leg., 1 male (ZMAS); **Pakistan:** [Khyber Pakhtunkhwa province], Chitral [ca. 35°50'N, 71°46'E], Lotkoh, 2350 m, 29.v.1983, Besuchet & Löbl leg., 2 males, 3 females (MHNG); same data, 1 male, 1 female (JRUC); same data, 1 male, 1 female (SMNS); Cachem et Jam. [Gilgit-Baltistan], Skardu [ca. 35°21'N, 75°54'E], 18.ix.–4.x.1953, F. Schmid leg., 4 males, 2 females (MHNG); Northern

Areas [= Gilgit-Baltistan], Gilgit district, Kargah Valley, 35°53'51.4"N, 74°14'17.1"E, 1694 m, 26.x.–3.xi.2008, pitfall trap, L. Latella leg., 2 males (MCSV); Northern Areas [= Gilgit-Baltistan], Gilgit district, Bagrot Valley, 36°02'00.53"N, 74°34'01.01"E, 2444 m, 25.x.–2.xi.2008, pitfall trap, L. Latella & R. Ahmed leg., 1 female (SMNS); **Not located:** Kashmir, Lobzang, without date, [ex] Coll. Hauser, ex coll. Stocklein, 1 male (NHMB).

Diagnosis. Body length 6.0–6.5 mm. Body pale brown to brown (Fig. 1). Pronotum with regularly and densely distributed, large punctures; surface glossy, without microsculpture (Figs. 5, 29–30); ca. 1.7–1.8 times as wide as long medially; pronotum only slightly elevated and distinctly narrowing posteriad laterally (Fig. 5). Elytra broad, oval and flat, ca. 1.2–1.3 times as long as wide (Fig. 1); surface on intervals glossy, without microsculpture, with several short setae (Fig. 14); punctures in striae large, similar in size to pronotal punctures (row 3 with 48–58 punctures) (Figs. 10, 14); lateral margin of elytra smooth. Aedeagus with pointed, dorsally elevated apex in lateral view (Fig. 18); sides before apex distinctly broadened and heavily sinuate, apex widely, evenly rounded in dorsal view (Fig. 19). Female sternite 8 posteriorly evenly rounded; spiculum ventrale wide, rectangular anteriorly (Fig. 22).



FIGURES 1–2. Habitus in dorsal view of *Apteroloma anglorossicum* (1, ♂, JRUC, Afghanistan: Salang Pass) and *A. sillemi* (2, ♀, JRUC, Pakistan: Apobrook River).

Comments on synonymy. The male holotype of *P. anglorossicum* shares all diagnostic characters with the female holotype of *A. jankovskii*, namely lack of microsculpture on pronotum and elytra, dense punctures on pronotum and elytra of equal size, lateral margin of elytra smooth and body with pale brown colouration. Here we confirm the synonymy of the two names, already proposed by Schawaller (1991), and document in detail the habitus of holotypes of both species (Figs. 24–30).

The holotype of *P. klapperichi* was studied long time ago by both WS and JR. According to Dirk Ahrens, curator in ZFMK (personal communication, October 2013), it cannot now be located in the collection after large rearrangements and transfer of the collection into unit trays. The holotype specimen was also not located during the visit of JR to ZFMK in May, 2014. Here we follow the synonymy proposed by Schawaller (1991).

Distribution. Widely distributed, but generally sparse localities are known from Afghanistan, Pakistan, Kyrgyzstan and Uzbekistan. Nikolaev & Kozminykh (2002) also reported the species for Tajikistan and India, without more precise details. The above mentioned specimen from "Kashmir, Lobzang" has not been georeferenced. Known distribution is mapped on Fig. 38.

Apteroloma harmandi (Portevin, 1903)

(Figs 3–4, 8–9, 13, 16–17, 20–21, 23, 31–33)

Pteroloma harmandi Portevin, 1903: 334.
Pteroloma davidis: Schawaller 1979: 220 (misidentification).
Apteroloma heinzi Schawaller, 1991: 14, **syn. nov.**

Type material examined. Holotype male of *P. harmandi* (MNHN), labelled "MUSEUM PARIS / DARDJEELING [= Darjeeling district, ca. 27°03'N, 88°16'E, West Bengal, India] / HARMAND [leg.] 1836-91 [p] // 1836 / 1891 [hw, round label] // Pteroloma [hw] // TYPE [p, red characters] // Pteroloma / Harmandi Prt / Type - Bull. Mus. 1903. p. 334 [hw, two different writing styles] // Apteroloma / harmandi / (Port.) [hw] / R. Madge det. 197 [p] 1 [hw]". Paratypes 1 male, 1 female of *A. heinzi* (SMNS), labelled "Pakistan (Tangir- / Valley), Tal w. Juglote [Gilgit district, side valley W of Juglot, ca. 35°41'N, 74°34'E] / ca. 2500 – 3000 m / 19. VII. 1986, Heinz leg. [p] // PARATYPUS / Pteroloma / heinzi [male or female symbol] / SCHAWALLER [p, red label]"; paratype male of *A. heinzi* (NHMW), labelled "Kashmir, Pahalgam [India: Jammu and Kashmir state, ca. 34°01'N, 75°19'E] / lg.H.Franz, Okt.1977 [p] // PARATYPUS [p] [male symbol] / Apteroloma / heinzi [hw] / SCHAWALLER [p] // Apteroloma / heinzi n.sp. / 1990 [hw] / det. Schawaller [p]".

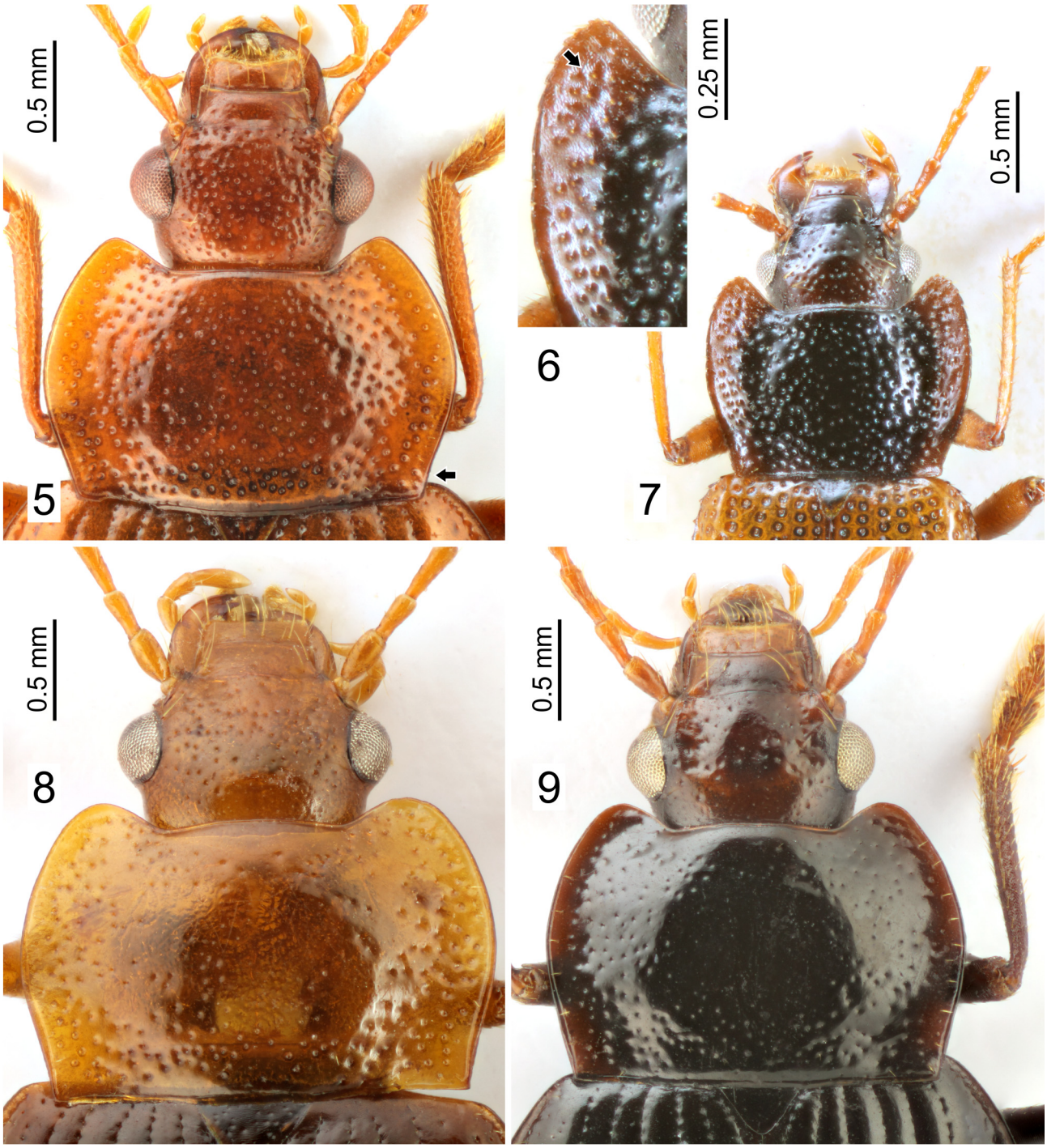
Additional material examined. Afghanistan: Nuristan province, Kamdeš [= Kamdesh, ca. 35°25'N 71°20'E], 1400 m, 19.ix.1971, O.N. Kabakov leg., 1 male, 1 female (ZMAS), 1 male, female (JRUC); same data, 1600 m, 20.ix.1971, 1 male, 2 females (ZMAS); Nuristan province, Paprok [ca. 35°33'N 71°17'E], 2000 m, 25.ix.1971, O.N. Kabakov leg., 2 males (ZMAS); Nuristan province, N Waygal [ca. 35°12'N 70°58'E], 3500 m, 2.vii.1972, O.N. Kabakov leg., 1 male, 2 females (ZMAS), 1 male (JRUC); N Waygal [ca. 35°12'N 70°59'E], 2700 m, 6.vii.1972, O.N. Kabakov leg., 2 males (ZMAS); same data, 7.vii.1972, 2 females (ZMAS); **Pakistan:** Azad Jammu and Kashmir, Muzaffarabad env., top of Leepa valley [ca. 34°20'N, 73°55'E], 3200–3300 m, 14.vi.1997, Heinz leg., 2 males, 3 females (SMNS); Dir [= Khyber Pakhtunkhwa province], Gujar Levy Post env., Lawarai pass [ca. 35°21'N, 71°48'E], 2800–3100 m, 5.–7.vii.1997, Heinz leg., 1 female (SMNS); Gilgit-Baltistan, Nanga Parbat Mt., Rama env. [ca. 35°20'N, 74°48'E], 3000–3500 m, 27.–30.vi.1997, Heinz leg., 1 male, 4 females (SMNS); Northern Areas [= Gilgit-Baltistan], Gilgit district, Bagrot Valley, 36°02'32.6"N, 74°34'8.3"E, 2600 m, 250 m from Hinarki Glacier snout, pitfall trap, 25.x.–2.xi.2008, L. Latella leg., 2 males, 1 female (MCSV); Northern Areas [= Gilgit-Baltistan], Gilgit district, Kargah Valley, 35°54'45.8"N, 74°15'26.9"E, 1611 m, 26.x.–3.xi.2008, pitfall trap, L. Latella leg., 2 males (MCSV, SMNS), 1 female (MCSV); Northern Areas [= Gilgit-Baltistan], Gilgit district, Kargah Valley, Neelo Cave, 35°53'51.4"N, 74°14'17.8"E, 1694 m, 3.xi.2008, L. Latella leg., 2 males, 1 female (MCSV); **Nepal:** Myagdi district, Daulagiri Himal, upper Myagdi Khola valley, Dshungel Camp [= Jungle Camp, ca. 28°36'N, 83°23'E], 3050 m, 2.vii.1998, Berndt & Schmidt leg., 2 females (SMNS); Myagdi district, Daulagiri, SE slope, upper Rahucat Khola (river) [=Rahughat Khola], upper Dwari village [ca. 28°30'N, 83°28'E], 2200 m, 11.v.2002, Schmidt leg., 2 males, 1 female (SMNS); Kali Gandaki valley, upper Lete [ca. 28°37'N, 83°38'E], 2900 m, 19.v.2002, J. Schmidt leg., 2 males (SMNS); Annapurna Mts., South Himal, Dhasia Khola [ca. 28°28'N, 84°00'E], 2900 m, 21.v.2001, J. Schmidt leg., 1 female (SMNS); Mustang district,

Dhaulagiri, SE slope, SW slope of Lete pass [ca. 28°24'N, 83°41'E], 3800–3900 m, 15.v.2002, J. Schmidt leg., 1 female (SMNS); Ganesh Himal, Jaisuli Kund env. [ca. 28°17'N, 85°05'E], 4300–4500 m, 13.–16.vi.2000, Expedition I. Ghalé, S. Tamang, R. Santa & S. Gurung, 2 females (SMNS); **India:** "MUSEUM PARIS / DARDJEELING / HARMAND [leg.] 1836-91 [p] // 1836 / 1891 [hw, round label] // TYPE [p, red characters] // Pteroloma / Harmandi / Prt. / Type - / Bull. Mus. 1903. p. 334 [hw]", 1 female (MNHN).

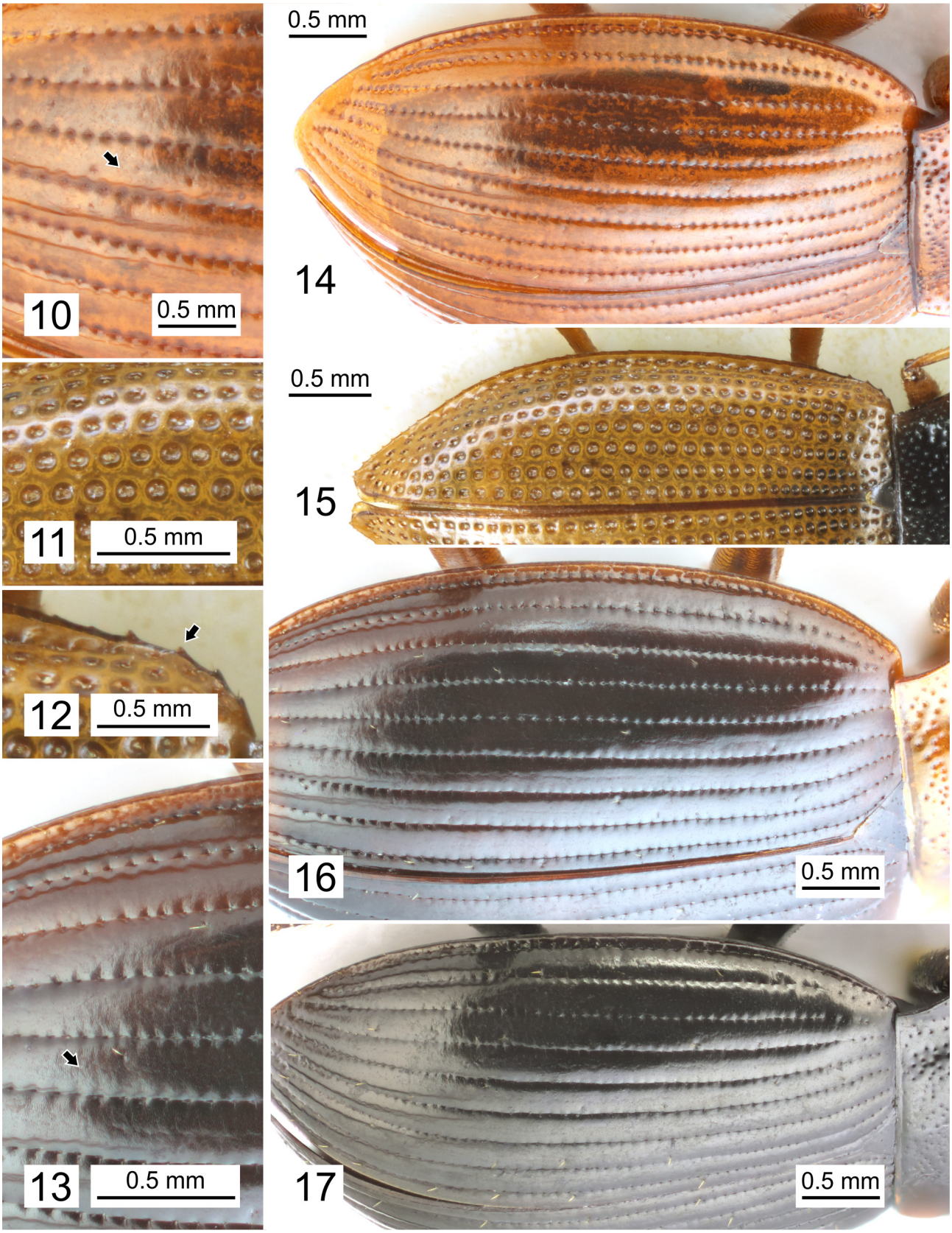
FIGURES 3–4. Habitus in dorsal view of *Apteroloma harmandi* (3, ♂, black morph, SMNS, Nepal: Dwari; 4, ♂, bicolour morph, SMNS, Pakistan: Kargah Valley).

Diagnosis. Body length 5.5–7.0 mm. Body uniformly black with brown antennae and tarsi (Fig. 3) or bicolorous, with light brown appendages, head and pronotum, and black elytra, meso- and metathorax and abdomen (Figs. 4, 31, 33). In teneral specimens, the whole body is pale brown. Pronotum with irregularly distributed, smaller punctures, medially with some impunctate areas; surface glossy, without microsculpture (Figs. 8–9); about 1.6–1.7 times as wide as long medially. Laterally, pronotum only slightly elevated and only slightly narrowing posteriad (Figs. 8–9). Elytra broad, oval and flat, about 1.2–1.3 times as long as wide (Figs. 3–4);

surface on intervals with fine, transverse microsculpture, with several short setae (Fig. 13); punctures in striae smaller, more superficial, distinctly smaller than pronotal punctures (row 3 with 65–73 punctures) (Figs. 16–17). Lateral margin of elytra smooth. Aedeagus evenly rounded with short, robust, straight apex in lateral view (Fig. 20); sides before apex distinctly broadened and slightly subparallel, apex widely and regularly rounded in dorsal view (Fig. 21). Female sternite 8 posteriorly slightly undulate; spiculum ventrale narrow, subrectangular anteriorly (Fig. 23).



FIGURES 5–9. Pronotum of *Apteroloma* species in dorsal view: *A. anglorossicum* (5, ♂, JRUC, Afghanistan: Salang Pass), *A. sillemi* (6–7, ♀, JRUC, Pakistan: Apobrook River) and *A. harmandi* (8, ♂, bicolour morph, SMNS, Pakistan: Kargah Valley; 9, ♂, black morph, SMNS, Nepal: Dwari).



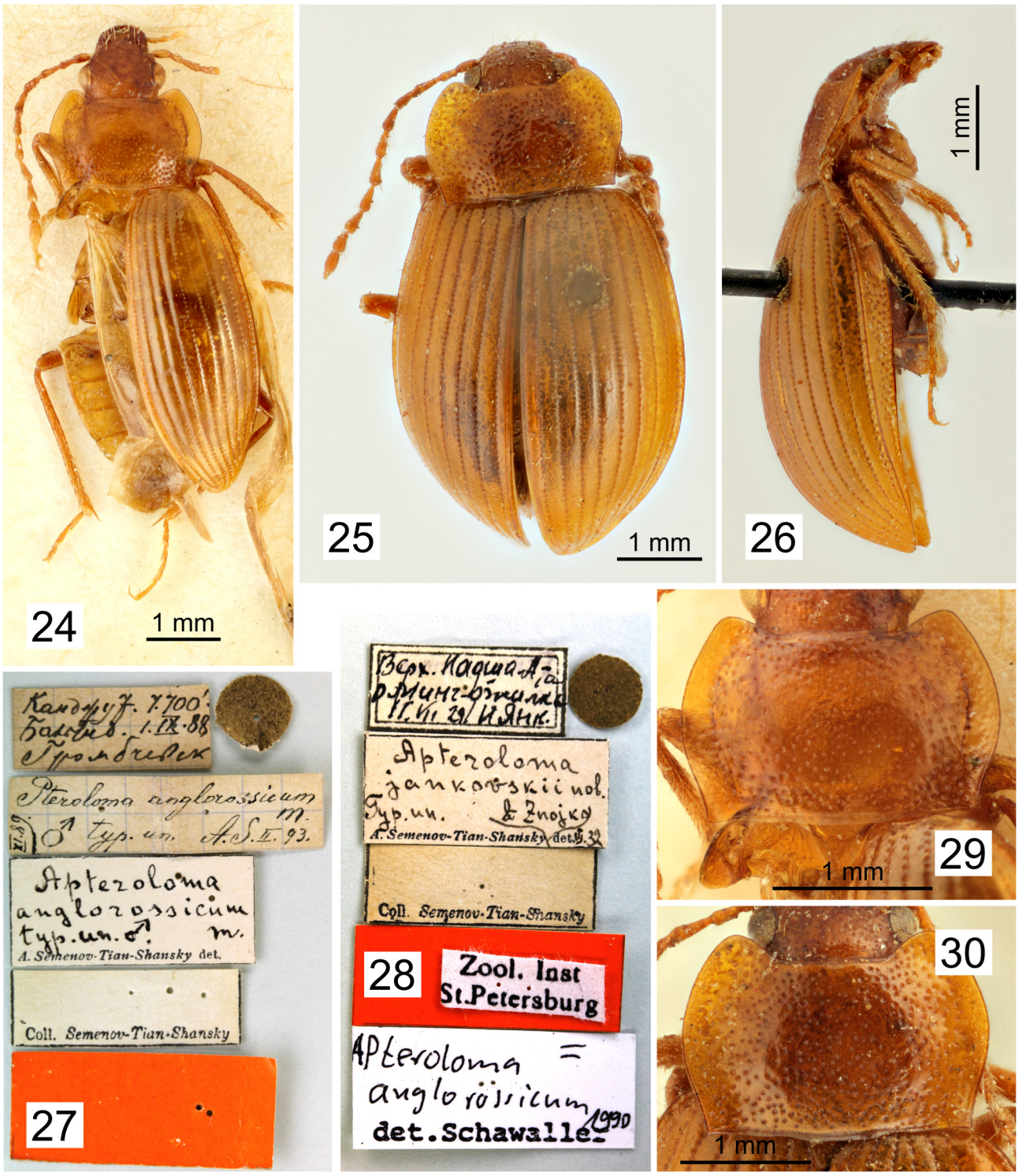
FIGURES 10–17. Elytra of *Apteroloma* species in dorsolateral view: *A. anglorossicum* (10, 14, ♂, JRUC, Afghanistan: Salang Pass), *A. sillemi* (11–12, 15, ♀, JRUC, Pakistan: Apobrook River) and *A. harmandi* (13, 16, ♂, bicolour morph, SMNS, Pakistan: Kargah Valley; 17, ♂, black morph, SMNS, Nepal: Dwari).

FIGURES 18–23. Terminalia of *Apteroloma anglorossicum* (18–19, holotype, ♂, ZMAS; 22, ♀, JRUC, Pakistan: Lotkoh) and *A. harmandi* (20–21, paratype of *A. heinzi*, ♂, NHMW; 23, ♀, JRUC, Afghanistan: Kamdesh). Aedeagus in lateral view (18, 20) and in dorsal view (19, 21), female sternum 8 in ventral view (22–23).

Comments on synonymy. Abundant examined material originated from Afghanistan to Nepal and India (see above), incl. holotype of *A. harmandi* from Darjeeling and paratypes of *A. heinzi* from Pakistan and Kashmir, share diagnostic characters of the species. These are the combination of small, irregularly distributed punctures and glossy surface on pronotum, elytra with distinct microsculpture and relatively small punctures in elytral rows, lateral margin of elytra smooth and characteristic shape of aedeagus, with robust, regularly rounded apex in dorsal view. The dimorphic colouration is variable, with body either uniformly black, or bicolored, with head and pronotum light brown and elytra black. This was also the main reason that Schawaller (1991) differentiated the black morph (*A. heinzi*) from Pakistan and Kashmir from the bicolored *A. harmandi*, known at that time only from Nepal and Darjeeling. Based on much more abundant material, we report here the occurrence of the bicolored morph intermixed with uniformly black specimens throughout the species' range, from Afghanistan and Pakistan to Nepal. Consequently, we treat *A. heinzi* as a junior subjective synonym of *A. harmandi*.

The habitus of the holotype of *Pteroloma harmandi* is documented in detail (Figs. 31–33). Although both male and female from MNHN are labelled as "types", only the male is described in Portevin (1903: 334) in detail and the female is attributed in a footnote on the same page to *P. harmandi* only tentatively, pending more material. Thus the male is here considered as holotype of *P. harmandi* and the female is not considered a part of the type series.

Distribution. Widely distributed through Afghanistan, Pakistan, India (Jammu and Kashmir, Himachal Pradesh, Darjeeling) and Nepal (Schawaller 1991, 1999, Nikolaev & Kozminykh 2002, Růžička & Schneider 2003). Known distribution is mapped on Fig. 38.



FIGURES 24–30. Habitus of holotype of *Apteroloma anglorossicum* in dorsal view (24, ♂, ZMAS); habitus of holotype of *A. jankovskii* in dorsal and lateral view (25–26, ♀, ZMAS). Original labels of holotypes of *A. anglorossicum* (27) and *A. jankovskii* (28). Pronotum in dorsal view of holotypes of *A. anglorossicum* (29) and *A. jankovskii* (30).

Apteroloma sillemi Jeannel, 1935

(Figs 2, 6–7, 11–12, 15)

Type material. Not examined.

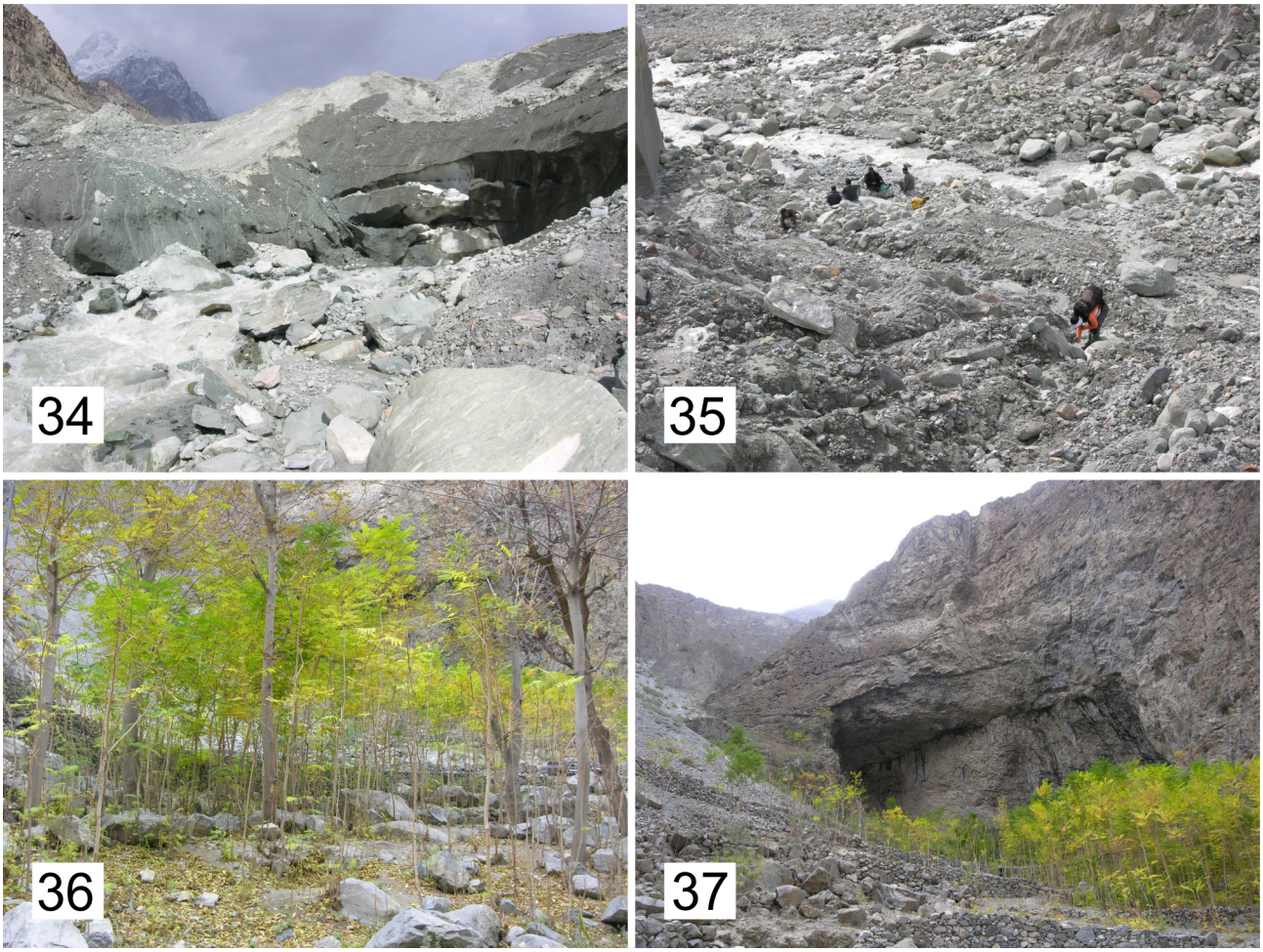
Material examined. Kyrgyzstan: Sarydzhaz river, 3 km NE above estuary of Ottuk river, 42.26355°N,

79.13807°E, 2760 m, 19.–20.vii.2000, G.A. Anufriev & D.V. Potanin leg., 1 female (ZMAS); **Pakistan:** Northern Areas [= Gilgit-Baltistan], Gilgit district, Bagrot valley, 5 m from Hinarchi Glacier snout, 36°02'32.4"N, 74°34'11.0"E, 2611 m, 18.vi.2008, V. Lencioni leg., 2 females (MCSV); same locality, 25.x.–2.xi.2008, pitfall trap, L. Latella & R. Ahmed leg., 1 male, 3 females (MCSV), 2 females (SMNS); Northern Areas [= Gilgit-Baltistan], Gilgit district, Bagrot Valley, 36°02'32.6"N, 74°34'8.3"E, 2600 m, 250 m from Hinarki Glacier snout, pitfall trap, 25.x.–2.xi.2008, L. Latella leg., 1 male (SMNS), 1 female (MCSV).

Diagnosis. Body length 4.5–5.5 mm. Body dark brown to black with pale brown appendages and elytra (Fig. 2). Pronotum with slightly irregularly distributed, very large punctures; surface medially glossy, without microsculpture; coarse isodiametric microsculpture is present laterally (Fig. 6); ca. 1.4–1.5 times as wide as long medially. Laterally, pronotum is distinctly elevated and only slightly narrowing posteriad (Fig. 7). Elytra very narrow, ca. 1.8–2.0 times as long as wide (Fig. 2); surface on intervals glossy, without microsculpture, with several very long setae (Fig. 15); punctures in rows very large, medially more than 5 times as large as pronotal punctures (row 3 with 37 punctures) (Fig. 11). Lateral margin of elytra distinctly and completely dentate (Figs. 12, 15). Aedeagus very elongate, with pointed, elongate, straight apex (Jeannel 1935: fig. 6).

Distribution. Rare species, described from a single male specimen from Pakistan (Karakoram range, Siachen glacier, Tehrong valley, 4125 m [ca. 35°15'N, 77°11'E]) (Jeannel 1935). Subsequently, two further specimens were reported from Kyrgyzstan (Terskey Alatoo Mts.: Ottuk; see above) (Nikolaev & Kozminykh 2002) and another female from another locality in Pakistan (Karakoram range, Hushe valley, Apobrok river, 3000 m [ca. 35°27'N, 76°21'E]) (Růžička & Schneider 2003). The new findings confirm the distribution of the species in the Karakoram range at high altitude and its presence in cold environments. Its known distribution is mapped on Fig. 38.

FIGURES 31–33. Habitus of holotype of *Pteroloma harmandi* in dorsal and lateral view (31, 33, ♂, MNHN). Original labels of holotype of *P. harmandi* (32).



FIGURES 34–37. Habitats with occurrence of *Apteroloma* species in Gilgit District, Pakistan. Bagrot Valley, near the snout of the Hinarki Glacier, where *A. sillemi* has been found (34). Bagrot Valley, the moraine of Hinarki Glacier, where both *A. sillemi* and *A. harmandi* has been found (35). Kargah Valley, the little and young woods of *Ailanthus* sp. where both *A. anglorossicum* and *A. harmandi* has been found (36). Kargah Valley, the entrance on Neelo Cave, where *A. harmandi* has been found (37). All photographs by L. Latella.

Discussion

Ecological notes. The species considered in this paper shows, like many Palaearctic Agyrtidae, a wide altitudinal range with a preference for high altitude. With the exception of a specimen of *Apteroloma anglorossicum* from Kyrgyzstan collected at 800 m a.s.l., all the specimens of the three studied species were collected at altitudes from 1400 m to 4500 m. The species most restricted to high altitudes seems to be *Apteroloma sillemi* (from 2600 m to 4125 m a.s.l.) while *A. harmandi* shows the greatest altitudinal range (from 1400 m to 4500 m a.s.l.).

The specimens of *A. anglorossicum* and *A. harmandi* from Kargah Valley (Gilgit District, Pakistan) were collected by means of two pitfall traps, baited with rotten meat, placed in a small wood of *Ailanthus* sp. (Fig. 36) near a stream at 1694 m a.s.l. The temperature at the collection time (3.xi.2008, 10:00) was 12.8 °C. *A. harmandi* was also found in the Kargah Valley at 1694 m a.s.l., in the entrance of Neelo Cave, a short cavern (Fig. 37), where the temperature was 16.2 °C.

In the Bagrot Valley (Gilgit District, Pakistan), six sampling sites were selected along an altitudinal gradient, from the Hinarche Glacier snout (bottom end) at 2600 m a.s.l. to woodland at 2256 m. *Apteroloma* species were found at three sites. *A. anglorossicum* was found only in a mixed broadleaved woodland (*Acer* sp., *Ailanthus* sp., Oleaceae gen. sp.) at an elevation of 2444 m a.s.l.; the temperature on the date of collecting the traps was 11.5 °C (2.xi.2008, 16:00). *A. harmandi* was collected in glacial moraine, 250 m distant from the glacial snout at 2600 m

a.s.l. (Fig. 35) and the temperature on the date of collecting the traps was 12.2 °C (2.xi.2008, 12:00). *A. sillemi* was found only at the two sampling sites near the glacier, at 5 m (Fig. 34) and 250 m respectively from the glacial snout.

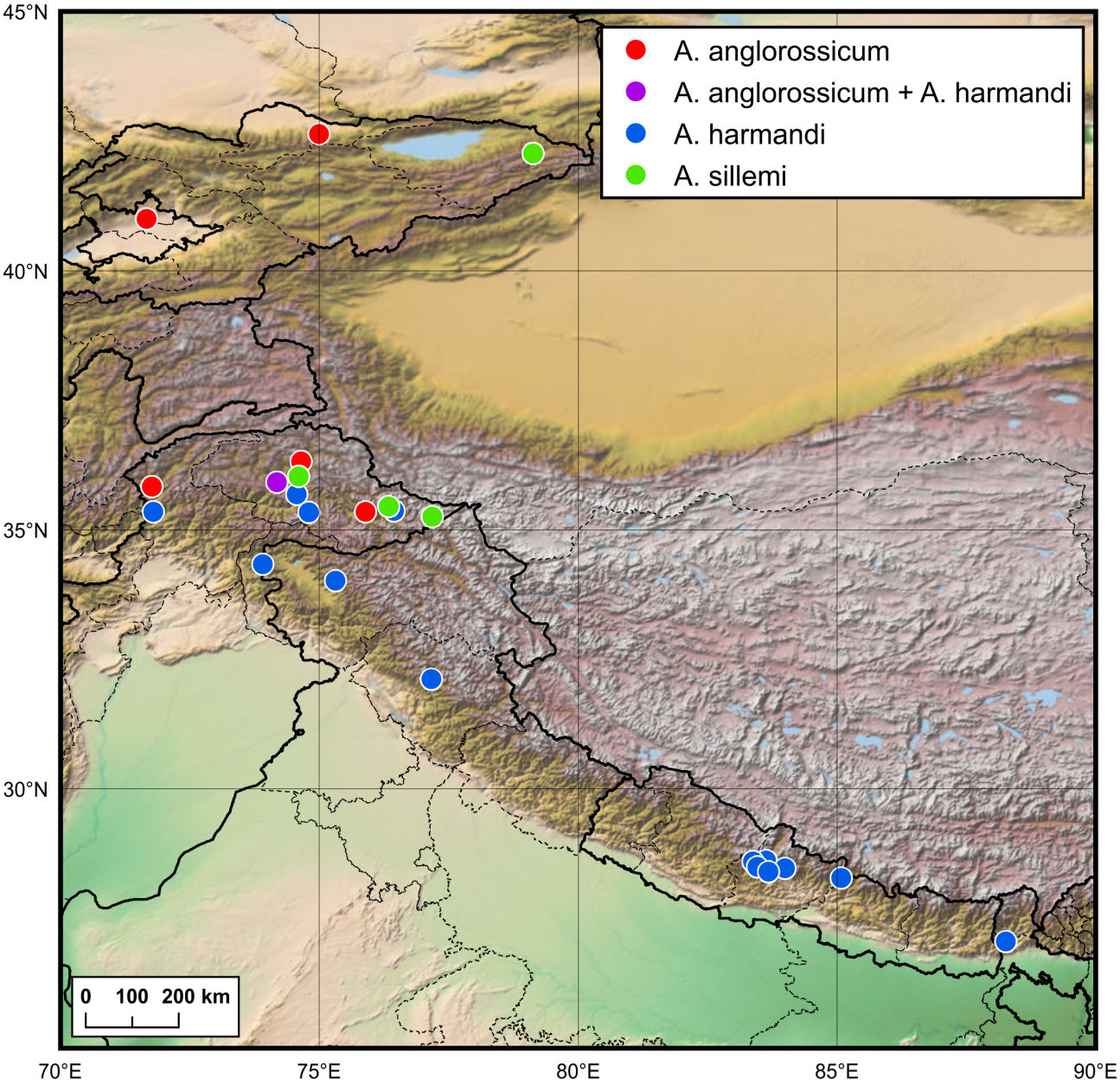


FIGURE 38. Distribution of *Apteroloma anglorossicum*, *A. harmandi* and *A. sillemi*.

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