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Revision of *Amarochara* VI. New species and records from the Palaearctic and Oriental Regions (Coleoptera: Staphylinidae: Aleocharinae: Aleocharini)

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ASSING V. 2020: Revision of *Amarochara* VI. New species and records from the Palaearctic and Oriental Regions (Coleoptera: Staphylinidae: Aleocharinae: Aleocharini). *Acta Musei Moraviae, Scientiae biologicae* **105(2):** 207–217. – Three species of *Amarochara* Thomson, 1858 are described and illustrated: *Amarochara sinuosa* sp. nov. (North Laos, North Vietnam); *A. bifurcata* sp. nov. (Northeast Laos: Houa Phan province); *A. spinosula* sp. nov. (Northeast Laos: Houa Phan province). Additional records of five previously described species are reported, among them new country and new province records. The genus now includes a total of 50 species.

Keywords. Coleoptera, Staphylinidae, Aleocharinae, Aleocharini, *Amarochara*, taxonomy, new species, new records, Palaearctic region, Oriental region, Laos, Vietnam, new records

Introduction

According to NEWTON (2019), the genus *Amarochara* Thomson, 1858 currently includes 48 valid species. Twenty-six species are distributed in the Palaearctic, two in both the Palaearctic and Oriental, four in the Oriental, four in the Nearctic, two in the Neotropical, and ten in the Afrotropical regions (including Madagascar). These figures include "*Amarochara*" *flavicornis* Bernhauer, 1907, a species described from Japan and explicitly moved to the Athetini (generic affiliations unknown) by ASSING (2002a). This species is listed as Athetini incertae sedis in SCHÜLKE & SMETANA (2015) and in *Amarochara* by NEWTON (2019). While nearly all of the Palaearctic and Nearctic species have been revised recently (ASSING 2002a, b, 2007, 2010, 2015, KLIMASZEWSKI *et al.* 2018), the same is not true of those described from other zoogeographic regions. Primarily based on molecular studies, *Amarochara* was moved from the Oxypodini to the Aleocharini by OSSWALD *et al.* (2013).

Material examined since the latest supplement to the revision of *Amarochara* of the Holarctic region (ASSING 2915) includes three undescribed species from Laos and Vietnam, as well as additional records of several previously described species, among them new country and province records. For descriptions, illustrations, and detailed data on the distributions of the species recorded in this paper see ASSING (2002a, 2007, 2010, 2015).

Material and methods

The material treated in this study is deposited in the following collections:

MMB . . . . . Moravian Museum, Brno (P. Bařař)
MNB . . . . . Museum für Naturkunde, Berlin (incl. coll. Schülke; J. Frisch, M. Schülke, J. Willers)
NHMB . . . . . Naturhistorisches Museum Basel (M. Borer)
NMP . . . . . National Museum of Natural History, Praha (J. Hájek)
VNMN . . . . . Vietnam National Museum of Nature, Hanoi (via L. Barolozzi, Firenze)
cAss . . . . . author´s private collection
cFel . . . . . private collection Benedikt Feldmann, Münster
cGon . . . . . private collection Andrej Gontarenko, Odessa

The morphological studies were conducted using Stemi SV 11 (Zeiss) and Discovery V12 (Zeiss) microscopes, and a Jenalab compound microscope (Carl Zeiss Jena). The images were created using digital cameras (Axiocam ERc 5s, Nikon Coolpix 995), as well as Labscope and Picolay software.

Body length was measured from the anterior margin of the labrum to the abdominal apex, the length of the forebody from the anterior margin of the labrum to the posterior margin of the elytra, head length from the anterior margin of the clypeus (without anteclypeus) to the posterior constriction of the head, elytral length at the suture from the apex of the scutellum to the posterior margin of the elytra, and the length of the aedeagus from the apex of the ventral process to the base of the aedeagal capsule. The "parameral" side (i.e., the side where the sperm duct enters) is referred to as the ventral, the opposite side as the dorsal aspect.

The limits of the zoogeographic regions are in accordance with those mapped by Schülke & Smetana (2015).

Results

Including the new species described below, five *Amarochara* species are now known from Laos and the genus includes a total of 50 species (not counting "*A.*" *flavicornis*).

Amarochara umbrosa (Erichson, 1837)

Material examined. Kyrgyzstan: 1♂, Batken, S Ay-Kol, Teo-Jailoo valley, 39°43′N, 60°42′E, 2100 m, 28.VI.2012, leg. Frisch (MNB). **China:** 1♀, Sichuan, Nanping, 1500–1800 m, 14–19.VI.2002, leg. Murzin & Shokhin (MNB).

Amarochara umbrosa is the most widespread species of the genus, its distribution ranging from West Europe to West Siberia and China. The above specimens represent the first records from Kyrgyzstan, Middle Asia, and the Chinese province Sichuan.

Amarochara inermis Assing, 2002

Material examined. Lebanon: 1♂, Rayfoun, 33°58′N, 35°42′E, 990 m, mixed oak forest, pitfall trap, 14.II.–23.III.2016, leg. Reuter (cFel); 1♀ [identified by B. Feldmann], Marjayoun, Litani river, 33°21′N, 35°33′E, 280 m, pitfall trap, 11–18.III.2018, leg. Reuter (cFel).

The previously known distribution of *A. inermis* was confined to Israel. The above specimens represent the first records from Lebanon.

Amarochara forticornis (Lacordaire, 1835)

Material examined. Ukraine: 1♂, Kharkiv oblast, Dvorichna district, Novomlynsk env., grass roots near river, 17.IV.2018, leg. Gontarenko (cGon), 1♂, Odessa obl., Belyacvka distr., Troitskoye, deciduous forest, litter sifted, 20.III.2019, leg. Gontarenko (cGon).

This Ponto-Mediterranean element had already been recorded from Ukraine by Assing (2002a, 2007).

Amarochara wrasei Assing, 2002

Material examined. China: Sichuan: 1♀, 22 km NE Baoxing, Dengchigou Monastery, 30°32′N, 103°56′E, 1880 m, bamboo grove, sifted, 13.VI.2014, leg. Hájek & Růžička (NMP); 11♀♀, Xiao-Zhaizi National Nature Reserve, 7 km W Qingpianxiang, Xiaozhaizi, 32°01′N, 103°56′E, 1560–1700 m, flight interception trap, 27.VI.–1.VII.2017, leg. Kabátek et al. (MMB, cAss). **Yunnan:** 1 ex., SE Gejiu, 23°21′N, 103°11′E, 2320 m, margin of pasture, litter beneath shrubs sifted, 20.VIII.2014, leg. Schülke (MNB).
Laos: 1♂, 3♀♀, Xieng Khouang, 30 km NE Phonsavan, Phou Sane Mt., 19°38.2′N, 103°20.2′E, 1420 m, 10–30.V.2009, leg. Brancucci & Hauck (cAss); 2♂♂, 1♀, Houa Phan prov., Phou Pane Mt., 20°13′N, 104°00′E, 1480–1510 m, 22.IV.–14.V.2008, leg. Kubáň (cAss).

Amarochara wrasei is one of the most common and most widespread representatives of the genus in the southern East Palaearctic and Oriental regions. The above records are all within the previously known range. For a recent distribution map see Assing (2015).

Amarochara hamulata Assing, 2010

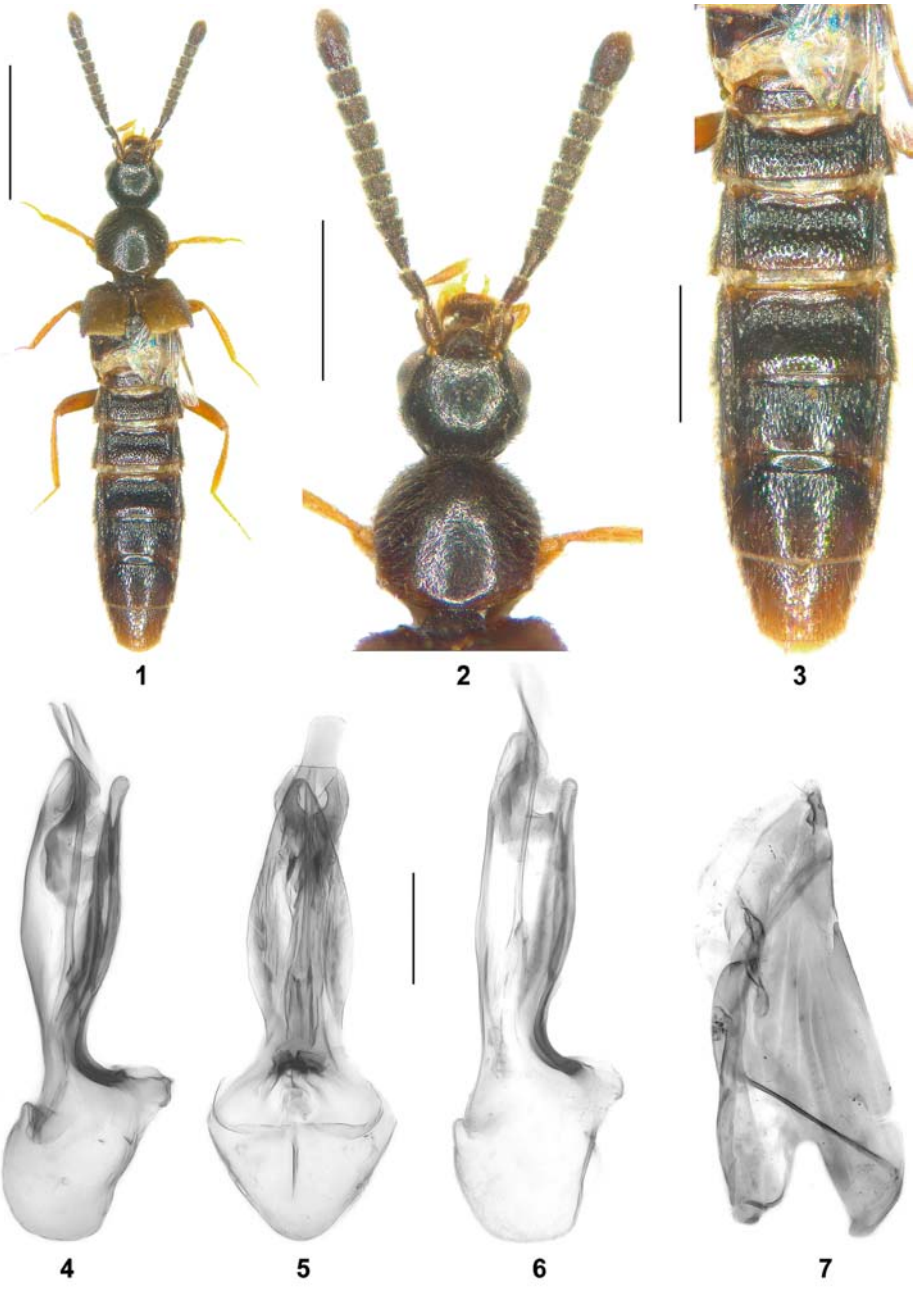
Material examined. China: Sichuan: 2♂♂, 1♀, Nanping, 1500–1800 m, 14–19.VI.2002, leg. Murzin & Shokhin (MNB, cAss).

This species was previously known only from the type locality, Tianmu Shan in Zhejiang province (Assing 2010).

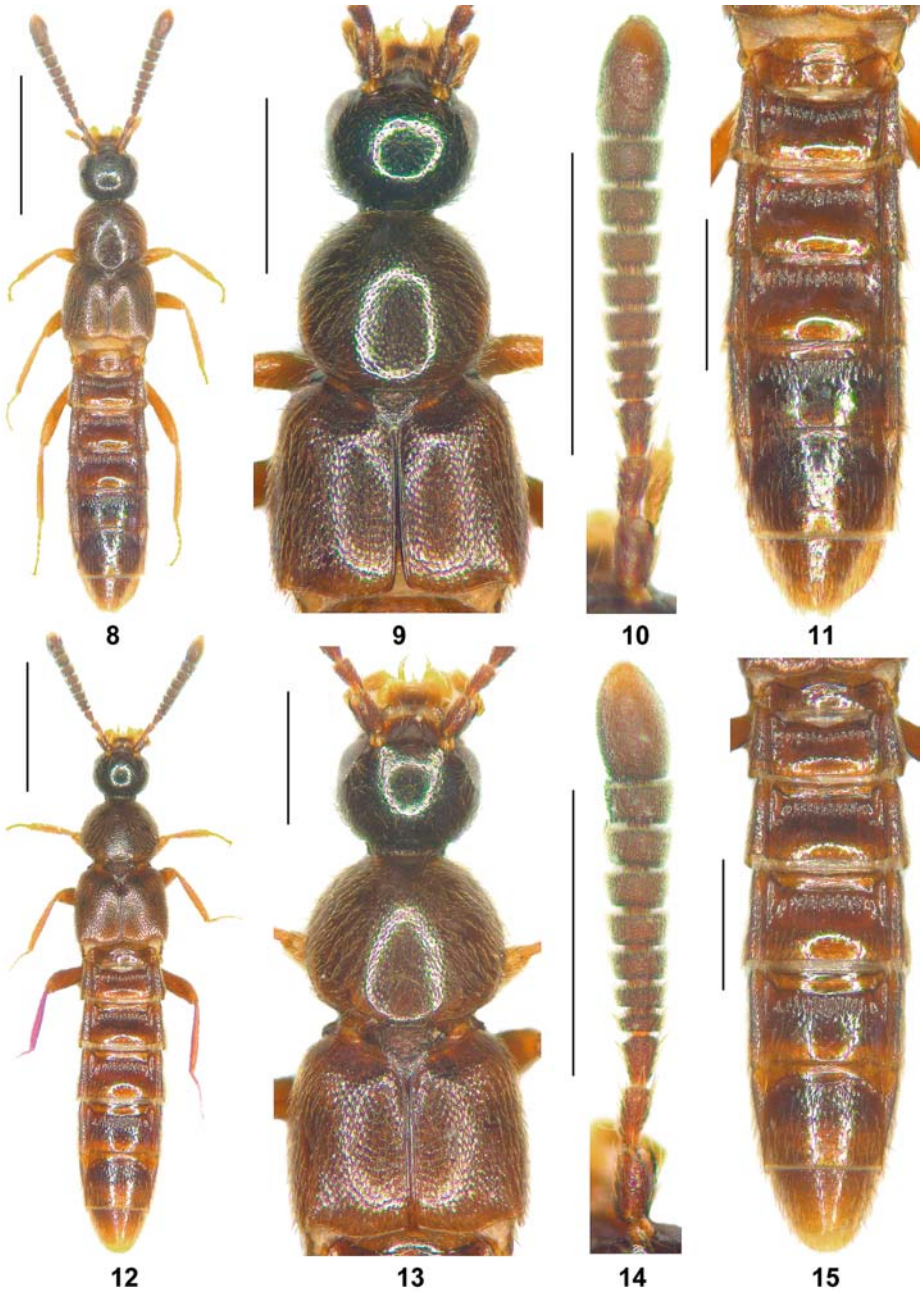
Amarochara sinuosa sp. nov. (Figs 1–7)

Type material examined. Holotype ♂: "LAOS – Xieng Khouang, 30 km NE Phonsavan, Phou Sane Mt., 19°38.2′N, 103°20.2′E, 1420 m, 10–30.V.2009, leg. Brancucci / Holotypus ♂ *Amarochara sinuosa* sp. n. det. V. Assing 2020" (NHMB). Paratypes: 2♂♂, 2♀♀: same data as holotype (cAss); 1♂, 1♀: same data as holotype, but leg. Hauck (cAss); 1♂: "N VIETNAM: Hoa Binh Prov., Pa Co Hang Kia Nature Reserve (700 m), 5–7.VI.2013, at light / legit L. Bartolozzi, S. Bami, F. Cianferoni, G. Mazz, E. Orbach (n° Mag. 2950)" [collected during expeditions in Vietnam in the framework of a Memorandum of Unterstanding between VNMN and Museo di Zoologia, Universitŕ di Firenze] (VNMN).

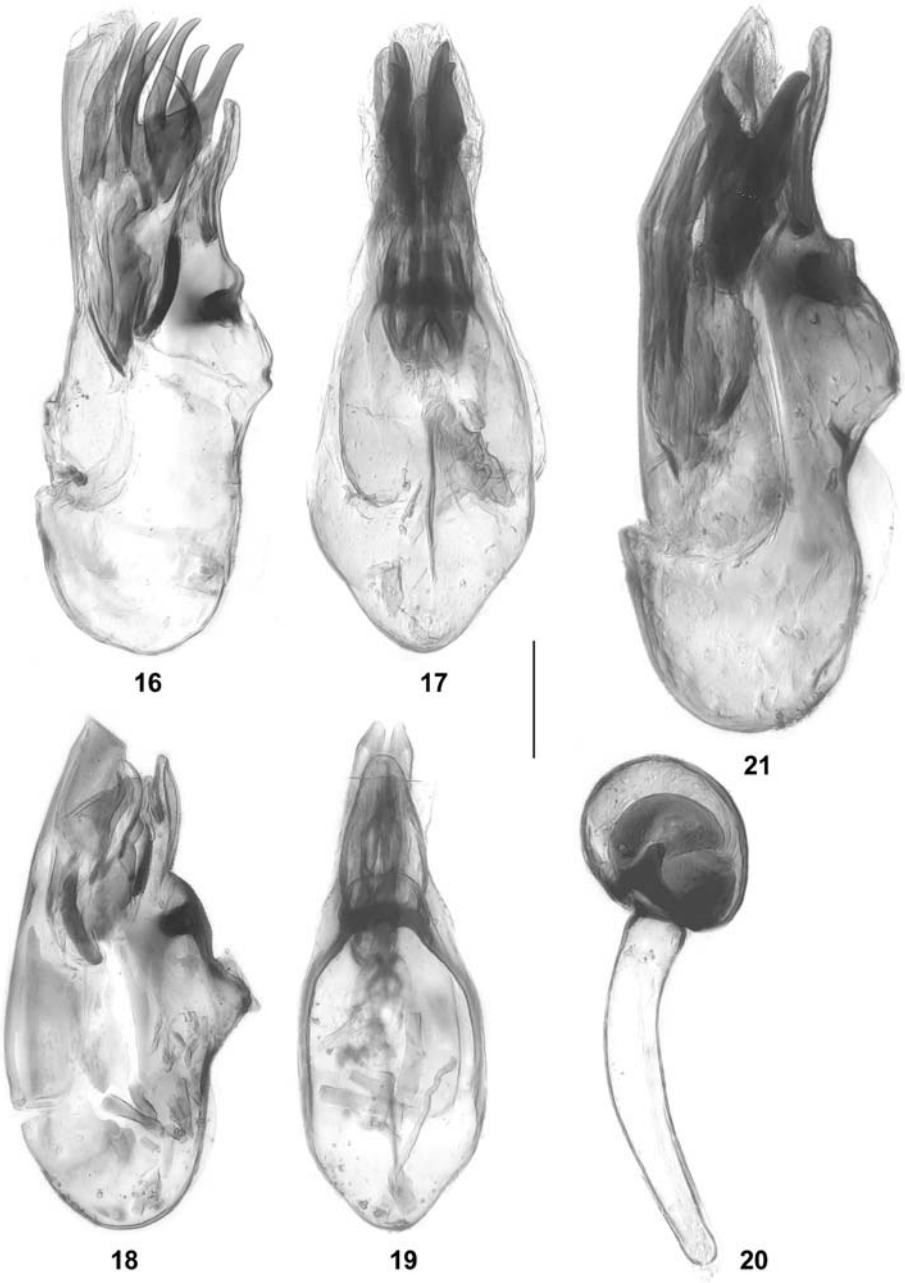
Comment. The paratype from Vietnam was already studied in 2017 and returned subsequently. It was originally intended to be the holotype and consequently still bears the now invalid label "Holotypus ♂ *Amarochara tonkinensis* [unavailable name] sp.n. det. V. Assing 2017".



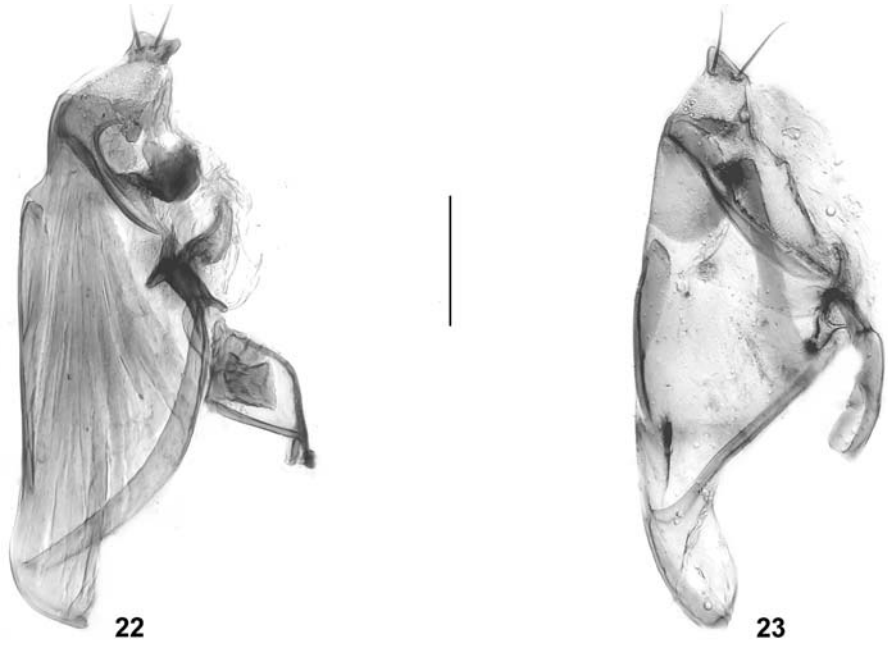
Figs 1–7. *Amarochara sinuosa* sp. nov. from Laos (**1–5, 7**) and Vietnam (**6**). 1 – habitus; 2 – head and pronotum; 3 – abdomen; 4–6 – median lobe of aedeagus in lateral and in ventral view; 7 – paramere. Scale bars: 1: 1.0 mm; 2–3: 0.5 mm; 4–7: 0.1 mm.



Figs 8–15. *Amarochara bifurcata* sp. nov. (**8–11**) and *A. spinosula* sp. nov. (**12–15**). 8, 12 – habitus; 9, 13 – forebody; 10, 14 – antenna; 11, 15 – abdomen. Scale bars: 8, 12: 1.0 mm; 9–11, 13–15: 0.5 mm.



Figs 16–21. *Amarochara bifurcata* sp. nov. (**16–17**), *A. spinosula* sp. nov. (**18–20**), and *A. armata* Assing, holotype (**21**). 16–19, 21 – median lobe of aedeagus in lateral and in ventral view; 20 – spermatheca. Scale bar: 0.1 mm.



Figs 22–23. *Amarochara bifurcata* sp. nov. (**22**) and *A. spinosula* sp. nov. (**23**). Paramere. Scale bar: 0.1 mm.

Description. Body length 3.5–4.0 mm; length of forebody 1.4–1.7 mm. Habitus as in Fig. 1. Coloration: body blackish with the elytra more or less extensively and more or less distinctly paler, brown to dark-brown; legs reddish-brown to brown with the tarsi yellowish to reddish; head blackish.

Head (Fig. 2) posteriorly without distinct neck, approximately 1.15 times as broad as long, broadest across eyes, posteriorly tapering immediately behind eyes; punctation fine and dense; interstices with distinct microsculpture. Eyes large and strongly convex, somewhat longer than distance from posterior margin of eye to posterior constriction of head in dorsal view. Antenna (Fig. 2) massive, 1.1–1.2 mm long; antennomere IV less than twice as broad as long, not disc-shaped; antennomeres V–X of similar width and decreasingly transverse, X approximately 1.5 times as broad as long, and XI slightly longer than the combined length of IX and X. Maxillary palpi very slender; palpomere III approximately five times as long as broad.

Pronotum (Fig. 2) relatively large, approximately 1.1 times as broad as long and 1.15–1.20 times as wide as head, posterior angles obtusely marked, maximal width in anterior half; punctation fine and very dense, even denser than that of head; pubescence very dense and suberect; interstices with shallow fine microsculpture.

Elytra relatively short, approximately 0.8 times as long as pronotum; posterior margin weakly sinuate near posterior angles; punctation as dense as that of pronotum, but

more distinct; interstices with shallow microsculpture. Hind wings fully developed. Metatarsomere I elongated, approximately as long as the combined length of II–IV.

Abdomen (Fig. 3): tergites III–V with moderately deep, very densely and coarsely punctate, but not carinate anterior impressions; disc of tergite III very densely and coarsely punctate, those of tergites IV–VI gradually less densely and less coarsely punctate; tergite VII with moderately dense and moderately fine punctation; punctation of tergite VIII rather fine; interstices with nearly obsolete microsculpture noticeable only at high magnification (100×), glossy; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII very weakly concave in the middle.

♂: posterior margin of sternite VIII broadly convex and with dense long marginal setae; median lobe of aedeagus (Figs 4–6) slender, 0.43–0.45 mm long; ventral process much longer than basal capsule, sinuate in lateral view; internal sac with long flagellum and with pair of weakly sclerotized apical structures; paramere (Fig. 7) with very small and slender apical lobe.

♀: sternite VIII of similar shape as that of male, posterior margin with shorter and brownish setae.

Comparative notes. *Amarochara sinuosa* is distinguished from its congeners by the shape of the aedeagus, from externally similar and geographically close species additionally as follows:

- from *A. formosana* Assing, 2002 (Taiwan) by a relatively larger and more transverse pronotum, less transverse antennomeres IV–X, larger and more convex eyes, the shape of the head (*A. formosana*: head not tapering immediately behind eyes), and coarse punctation of the abdomen, particularly of the anterior tergites;
- from *A. hamulata* Assing, 2010 (China: Zhejiang, Sichuan), which *A. sinuosa* resembles in size and the fine and dense punctation of the forebody, by the shape of the head (*A. hamulata*: head less transverse and not tapering immediately behind eyes), more massive antennae with less transverse antennomeres IV–IX, a relatively smaller pronotum (*A. hamulata*: pronotum nearly as broad as elytra), paler legs, relatively shorter elytra, and less dense punctation of the abdomen, particularly of the posterior tergites;
- from *A. megalops* Assing, 2002 (Nepal, China: Yunnan, Taiwan, Laos) by a less slender habitus, much less transverse antennomeres IV–IX (*A. megalops*: antennomere IV disc-shaped, more than three times as broad as long), a significantly longer and more oblong maxillary palpomere III, much denser and more distinct punctation of the forebody, and much denser punctation of the abdomen.

For illustrations of *A. formosana*, *A. hamulata*, and *A. megalops* see Assing (2002a, 2010).

Distribution and natural history. The species is currently known from two localities, one in North Laos (1420 m) and one in North Vietnam (700 m). The specimens from Laos were collected on the wing (probably with a Malaise or flight interception trap).

Etymology. The specific epithet (Latin, adjective) alludes to the sinuate ventral process of the aedeagus (lateral view), one of the most evident characters distinguishing this species from its closest relative, *A. formosana*.

Amarochara bifurcata sp. nov. (Figs 8–11, 16–17, 22)

Type material examined. Holotype ♂: "LAOS – Houa Phan prov., Phu Phan Mt., 20°12′N, 104°01′E, ca. 1750 m, 17.V.–3.VI.2007, leg. Vit Kuban / Holotypus ♂ *Amarochara bifurcata* sp. n. det. V. Assing 2020" (NHMB). Paratypes: 16♂♂, 3♀♀: same data as holotype (NHMB, cAss).

Description. Body length 3.0–4.0 mm; length of forebody 1.3–1.7 mm. Habitus as in Fig. 8. Coloration: forebody reddish-brown to black; abdomen blackish with tergites III–V and the apex more or less distinctly and more or less extensively reddish to brown; legs reddish to brown with the tarsi yellowish; antennae dark-brown to black.

Head (Fig. 9) weakly transverse, 1.05–1.10 times as broad as long, broadest across eyes, of weakly trapezoid shape (weakly tapering posteriorly), posteriorly with distinct constriction ("neck"); punctation fine and moderately dense; interstices with shallow microsculpture. Eyes large and strongly convex, approximately as long as distance from posterior margin of eye to posterior constriction of head in dorsal view. Antenna (Fig. 10) massive, 0.9–1.1 mm long; antennomere IV approximately three times as broad as long, noticeably shorter and more transverse than antennomere V, antennomeres V–X at least approximately twice as broad as long, and XI approximately as long as the combined length of VIII–X. Maxillary palpomere II slender, approximately four times as broad as long.

Pronotum (Fig. 9) relatively large, approximately 1.1 times as broad as long and 1.2–1.3 times as broad as head, posterior angles obtusely marked, maximal width in anterior half; punctation fine and dense, denser than that of head; pubescence moderately dense and suberect; interstices without microsculpture and glossy.

Elytra (Fig. 9) nearly as long as pronotum; posterior margin distinctly sinuate near posterior angles; punctation dense and fine; interstices without microsculpture. Hind wings fully developed. Metatarsomere I elongated, approximately as long as the combined length of II–IV, or nearly so.

Abdomen (Fig. 11): tergites III–V with rather deep anterior impressions, these impressions with dense and coarse punctation, punctures separated by short and fine longitudinal carinae; tergite VI anteriorly with oblong, puncture-like sculpture; remainder of tergal surfaces with sparse and fine punctation; tergite VII anteriorly with a transverse band of coarse punctures, posteriorly with fine and rather sparse punctation; interstices glossy, with extremely shallow traces of transverse microsculpture barely visible even at high magnification (100×); posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII smoothly convex.

♂: posterior margin of sternite VIII strongly convex and with rather sparse long marginal setae; median lobe of aedeagus (Fig. 16–17) approximately 0.5 mm long and of highly modified shape; internal sac with strongly sclerotized internal structures of distinctive shapes and arrangement; paramere (Fig. 22) approximately as long as median

lobe and of highly modified morphology, apical lobe short, strongly transverse, and with two long setae.

♀: sternite VIII indistinctly, obtusely angled in the middle, posteriorly with row of dense short marginal setae; spermatheca not distinctive.

Comparative notes. Based on the external characters and in particular on the derived shapes of the median lobe and the parameres of the aedeagus, *A. bifurcata* is undoubtedly most closely allied to *A. loebli* Pace, 1992 (Nepal) and *A. armata* Assing, 2002 (China) of the *A. loebli* group. It is distinguished from both species by the shape and highly distinctive internal structures of the aedeagus. In *A. armata*, the aedeagus is larger (length of median lobe 0.6 mm), the crista apicalis and the ventral process are of different shape, and the apical internal structures are more massive and apically less acute (Fig. 21). For additional illustrations of *A. loebli* and *A. armata* see Assing (2002a). For characters distinguishing *A. bifurcata* from the syntopic, hightly similar, and closely related *A. spinosula* see the following section.

Distribution and natural history. The type locality is situated in Houa Phan province, Northeast Laos. The specimens were collected at an altitude of 1750 m, most likely with Malaise or flight interception traps.

Etymology. The specific epithet (Latin, adjective) alludes to the pair of bifurcate apical internal structures of the aedeagus.

Amarochara spinosula sp. nov. (Figs 12–15, 18–20, 23)

Type material examined. Holotype ♂: "LAOS – Houa Phan prov., Phu Phan Mt., 20°12′N, 104°01′E, ca. 1750 m, 17.V.–3.VI.2007, leg. Vit Kuban / Holotypus ♂ *Amarochara spinosula* sp. n. det. V. Assing 2020" (NHMB). Paratypes: 4♂♂, 11♀♀: same data as holotype (NHMB, cAss).

Description. Body length 3.0–4.0 mm; length of forebody 1.3–1.7 mm. Habitus as in Fig. 12. Head of transversely quadrangular shape, i.e., not distinctly tapering immediately behind eyes. Eyes moderately convex. Pronotum with very dense fine punctation. Other external characters (Figs 13–15) as in *A. bifurcata*.

♂: posterior margin of sternite VIII strongly convex and with rather sparse long marginal setae; median lobe of aedeagus (Figs 18–19) approximately 0.4 mm long and of highly modified shape; internal sac with relatively small and rather weakly sclerotized internal structures of distinctive shapes and arrangement; paramere (Fig. 23) slightly longer than median lobe and of highly modified morphology, apical lobe short, strongly transverse, and with two long setae.

♀: sternite VIII indistinctly, obtusely angled in the middle, posteriorly with row of dense short marginal setae; spermatheca (Fig. 20) not distinctive.

Comparative notes. Based on the similar external and synapomorphically derived male sexual characters, *A. spinosula* belongs to the same lineage as *A. bifurcata*, *A. loebli*, and *A. armata*. It is reliably distinguished from the syntopic *A. bifurcata* only by the shape of the head (see description above), less convex eyes, and by a smaller and differently shaped median lobe of the aedeagus with much smaller, differently shaped, and less strongly sclerotized internal structures.

Distribution and natural history. The type locality and the circumstances of collection are identical to those of *A. bifurcata*.

Etymology. The specific epithet is the diminutive of the Latin adjective spinosa and alludes to the small internal structures of the aedeagus, which readily distinguish this species from the similar *A. bifurcata*.

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