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**A revision of *Anacaena* Thomson, 1859**  
**X. Laos, Malaysia, Myanmar, Thailand, and Vietnam**  
**(Coleoptera: Hydrophilidae)**

by A. Komarek

**Abstract.** The species of *Anacaena* Thomson, 1859 from Laos, Malaysia, Myanmar, Thailand, and Vietnam are revised. Seventeen species are reported from these countries. *Anacaena nanica* (Gentili, 2002) is redescribed and 14 new species, *A. brancuccii*, *A. feae*, *A. fikaceki*, *A. fuscopunctata*, *A. hajeki*, *A. lamdongica*, *A. laotica*, *A. latepatens*, *A. mazzoldii*, *A. mawara*, *A. montana*, *A. nongfana*, *A. schillhammeri*, and *A. shepardii* are described. *Anacaena maculata* Pu, 1964, originally recorded from China, also occurs in Laos and Thailand. Morphological details are illustrated and a key to the species is presented.

**Keywords.** Coleoptera – Hydrophilidae – *Anacaena* – key – new species – Oriental region – Laos – Malaysia – Myanmar – Thailand – Vietnam

### Introduction

Situated between China in the north and Indonesia in the south, Laos, Malaysia, Myanmar, Thailand, Vietnam, and Cambodia belong to the Oriental biogeographical region. Their hydrophilid fauna is still very poorly investigated, and only two species of *Anacaena* Thomson, 1859 have been previously described: *Anacaena minuscula* d'Orchymont, 1942 from Vietnam, and *Anacaena nanica* (Gentili, 2002) from Thailand. In recent decades, several sampling expeditions have been undertaken, yielding about 930 specimens of *Anacaena*. Most of the field trips took place in Thailand between 1979 and 2004, starting with the “Copenhagen Expedition” (1979), followed by collecting activities of M. Jäch (1988), P. Chantaramongkol and H. Malicky (1989), L. Dembický (1991, 1995), J. Horak (1992), W. Shepard (1994), H. Zettel (1995), P. Schwendinger (1995), P. Mazzoldi (1996–1999), A. Vitheepradit (2002–2004), and others. Collecting activities in Laos yielding rich *Anacaena* material were initiated by M. Štrba and R. Hergovits (1997), followed by V. Kubán (1997, 1999, 2001, 2002, 2008), D. Hauck (2001), J. Bezděk (2001), M. Brancucci (2003, 2004, 2007), J. Hájek (2010) and others. Myanmar has been a less frequent target of sampling. Field trips to this country have been undertaken by H. Schillhammer (2002, 2004) and by D. Boukal (2003). Among the few collecting trips to Vietnam have been those of P. Pacholátko and L. Dembický (1994 and 1995). Collecting trips to Malaysia were taken by M. Jäch (1992) and I. Sivec (1994). To date, no water beetle collecting activities have been recorded from Cambodia.

The examination of the *Anacaena* specimens collected during these expeditions yielded fourteen new species. Their geographical distribution exceeds the country's borders in many cases. It is reasonable therefore to describe the species of Laos, Malaysia, Myanmar, Thailand, and Vietnam together in one contribution.

### Material and methods

About 950 specimens of *Anacaena*, including types of *A. minuscula* and *A. nanica* and recently collected material from Laos, Malaysia, Myanmar, Thailand, and Vietnam, deposited in twelve collections, were examined and compared with specimens of *Anacaena* from China (KOMAREK 2012), Indonesia (KOMAREK 2010) and the Indian subcontinent (KOMAREK 2006).

Mouthparts, thoracic structures and male genitalia were dissected, placed in concentrated lactic acid and investigated several hours later. The specimens were examined using a Leica MZ 12.5 stereomicroscope with diffuse and focused light sources, and an Olympus BX 41 light microscope. Measurements were taken using a micrometric eyepiece, and drawings were made with the aid of CorelDraw X4. Within the precisely-cited label data, “/” indicates a change of line, “\” a change of label.

The morphological terminology is based on KOMAREK (2004, 2007). Some characters do not differ among the species examined here and are identical with features found in *Anacaena* species from China (KOMAREK 2012: Morphological remarks). Therefore they will not be mentioned in the descriptions below.

### Abbreviations

AEZS	..... A.E.Z. Short Collection, Lawrence (Kansas, U.S.A.)
CFH	..... Collection Franz Hebauer, Plattling (Germany)
CSH	..... Collection Skale, Hof (Germany)
E.I.	..... Elytral index (= largest elytral length / largest elytral width)
EMBC	..... Essig Museum Berkley, California (U.S.A.)
ISNB	..... Institut National des Sciences Naturelles, Bruxelles (Belgium)
MSNG	..... Museo Civico di Storia Naturale “Giacomo Doria” (Genoa, Italy), Fabio Penati
MSNV	..... Museo Civico di Storia Naturale, Verona (Italy)
NMB	..... Naturhistorisches Museum Basel (Switzerland)
NME	..... Naturhistorisches Museum Erfurt (Germany)
NMP	..... National Museum Praha (CZ)
NMW	..... Naturhistorisches Museum Wien (Austria)
ZMUC	..... Zoological Museum Copenhagen (Denmark)

### Checklist of species

1.	<i>A. brancuccii</i> sp.nov.	Laos
2.	<i>A. feae</i> sp.nov.	Laos, Myanmar, Thailand
3.	<i>A. fikaceki</i> sp.nov.	Laos
4.	<i>A. fuscopunctata</i> sp.nov.	Vietnam
5.	<i>A. hajeki</i> sp.nov.	Laos
6.	<i>A. lamdongica</i> sp.nov.	Vietnam
7.	<i>A. laotica</i> sp.nov.	Laos
8.	<i>A. latepatens</i> sp.nov.	Laos, Malaysia, Myanmar, Thailand
9.	<i>A. maculata</i> Pu, 1964	China, Laos, Myanmar, Thailand
10.	<i>A. mawara</i> sp.nov.	Malaysia
11.	<i>A. mazzoldii</i> sp.nov.	Thailand
12.	<i>A. minuscula</i> d’Orchymont, 1942	India (Tamil Nadu), Vietnam
13.	<i>A. montana</i> sp.nov.	Vietnam



- |                                      |                         |
|--------------------------------------|-------------------------|
| 14. <i>A. nanica</i> (Gentili, 2002) | Laos, Thailand, Vietnam |
| 15. <i>A. nongfana</i> sp.nov.       | Laos                    |
| 16. <i>A. schillhammeri</i> sp.nov.  | Laos, Myanmar, Thailand |
| 17. <i>A. shepardii</i> sp.nov.      | Laos, Myanmar, Thailand |

## Taxonomy

### *Anacaena brancuccii* sp.nov.

**Type locality:** Laos, Phongsaly Province, 21°41–2'N 102°06–8'E.

**Type material.** Holotype ♂ (NMB): “Laos, Phongsaly Province / 21°41–2'N 102°06–8'E / 28.v.–20.vi.2003 / Phongsaly [city on foot of mountain Phufa] env. / ~1500 m, Brancucci leg.”. – Paratype 1 ♀ (NMB): same sampling data.

**Description.** Total length 2.6–2.7 mm; maximum width 1.6–1.7 mm; E.I. 1.18. Habitus: oblong-oval, with greatest width at mid-length; elytra about 3.3× as long as pronotum in dorsal view.

Head (Figs 18, 35): labrum, clypeus and frons dark brown, with indistinct, yellow, triangular preocular patches smaller than diameter of eye; distance between patches as wide as distance between eyes. Coarser and finer irregular punctures mixed, distinctly impressed; interspaces about 1–4× as large as punctures; punctation slightly finer and denser towards clypeal margins; setae absent; series of indistinct, minute, densely arranged punctures present along inner margin of eyes. Clypeus large, straight anteriorly, with distinct blunt angles between lateral and anterior portion. Eyes not constricted anteriorly; dorsal and ventral portion of almost equal size. Frontoclypeal suture very indistinct, visible on lateral third of clypeus. Antennomere 3 not distinctly elongated; apical segment of antennal club longer than wide. Maxillary palpomere 2 (Fig. 18) slightly inflated; palpomere 4 widest slightly distal to mid-length, slender, with almost straight inner margin and convex outer margin; distinct infuscation present on distal third to distal half. Mentum (Fig. 35) *c.* 1.7× as wide as long; lateral margins with dense fringes of long, very fine setae; anterior margin with deep, distinct mesal incision; ventral punctures widely spaced, evenly distributed; labial palpi slender, longer than lateral edge of mentum; palpomere 3 longer than palpomere 2.

Thorax: pronotum dark brown; intensity of coloration decreasing towards lateral margins; brighter spots situated paramesally on posterior margin; punctation distinctly finer than on head, very weakly impressed, slightly denser towards lateral margins; lateral margins slightly curved, without setae; posterolateral corners quite narrowly rounded. Prosternum slightly reinforced by a median carina in anterior third. Elytra dark brown, intensity of coloration decreasing towards lateral margins and on posterior area; lateral margin without setae; shoulder regions not accentuated; punctures coarser than on head, strongly impressed; arrangement irregular; some subseriate rows present on lateral areas; interspaces 1–2× as wide as punctures. Mesoventrite distinctly elevated mesally, with sharply pointed protuberance.

Legs: dark brown; procoxa and protrochanter without spine-like setae; metafemur (Fig. 52) pubescent in mesal portion and on anterior half with horizontal hairline; metatarsus about as long as metatibia.



**Aedeagus** (Fig. 1): main piece of phallobase about as long as parameres, longer than wide; manubrium smoothly converging in sinuate lines, extended into a broad lobe, smoothly bent dorsad; borderline between pigmented and unpigmented part of ventral face of phallobase very indistinct. Lateral and mesal margins of parameres slightly curved; distance between lateral margins of parameres slightly wider than diameter of phallobase; apex narrow, asymmetrical, slightly pointing mesad; basal portion distinctly wider than apical part; ventral portion of bases fused, not reaching into phallobase, concealed by dorsal portion; dorsal portion very slightly curved, indistinctly reaching into phallobase. Median lobe shorter than parameres, with straight to slightly concave margins in apical half; corona in apical position of median lobe; basal apophyses shorter than main piece of median lobe, reaching less than mid-length of phallobase. Base of median lobe not distinctly connected with parameres by a mesal tooth.

**Etymology.** The epithet refers to Michel Brancucci, the collector of the type specimens.

**Biology.** Found in humid mountainous secondary forest (personal communication from M. Brancucci).

**Differential diagnosis.** The status as a species is mainly based on the aedeagus, which differs from the aedeagi of all other species of the region. Differs from all other species in reduced metafemoral pubescence (*A. fuscopunctata*, *A. maculata*, *A. mawara*) in its larger size, and from all *Anacaena* species of the region in features of the aedeagus.

**Distribution.** Laos.

### *Anacaena feae* sp.nov.

**Type locality:** Myanmar, Province of Karen.

**Type material.** Holotype ♂ (MSNG): “[Myanmar] Carin / Ascuii Ghedù / 1400–1500 m / L. Fea. III–IV. [18]88”. Paratype ♂ (NMW): THAILAND: “Thailand, Prov. / Chumphon, 3 km S Phato / Lang Suan, 09°46.093’N / 98°46.973’E, leg. T[homas] Ihle / 5.XI.2007, LF”. [collected by light trap on a path near a small stream within a tropical rain forest extending behind the small village of Phato.– information by T. Ihle]. LAOS: 1 ♂ (NMB): Laos, Luangphrabang [=Luang Prabang] Province, Thong Khan, 19°35’N 101°58’E, 750 m a.s.l., 11.–21.v.2002, Vít Kubán; 1 ♂ (NMB): Thailand, Thanon Thong Chai Range, “Thimongtha”, 350 m a.s.l., 15°02’N 98°35’E, 9.–13.iv.1991, Vít Kubán lgt. \ “Thailand 91 / Thanon Thong Chai / O. Král & Vít Kubán”.

**Description.** Total length 2.4 mm; maximum width 1.4 mm; E.I.: 1.20. Habitus: oval, with greatest width at mid-length; elytra about 3.1× as long as pronotum in dorsal view.

Head (Figs 19, 36): labrum, clypeus, and frons dark brown; clypeus with indistinctly demarcated yellow preocular patches. Irregular punctures very fine, indistinctly impressed; interspaces 1–3× as wide as punctures; series of very indistinct, minute, densely arranged punctures present along inner margin of eyes. Clypeus quite short, straight anteriorly, without distinct angles between lateral and anterior portion. Eyes very slightly constricted anteriorly; dorsal and mesal portion of almost equal size. Frontoclypeal suture very indistinct. Pedicellus slightly longer than wide; antennomere 3 slightly elongate, shorter than pedicellus; apical club segment slightly longer than wide. Maxillary palpomeres (Fig. 19) stout; palpomere 2 distinctly inflated; palpomere

4 with indistinct terminal infuscation, widest at mid-length, with convex inner and outer margins. Mentum (Fig. 36) *c.* 1.7× as wide as long, flat, slightly impressed anteriorly; lateral margins set with very fine, soft setae; anterior margin with small, distinct mesal excision; fine setiferous punctures on ventral face widely spaced. Labial palpi quite stout, slightly longer than lateral edge of mentum; palpomere 3 slightly longer and wider than palpomere 2.

Thorax: pronotum dark brown; intensity of coloration decreasing towards lateral margins; punctation very fine. Prosternum slightly convex, carina or knob-like structure absent. Elytra dark brown; intensity of coloration decreasing towards posterior portion; laterally with narrow light brown margin; setae on margins absent; punctures fine, but stronger than on pronotum, weakly impressed, irregular; interspaces 1–3× as wide as punctures; coarser punctures along lateral margins present, not serially arranged. Mesoventrite distinctly elevated mesally, forming a transverse ridge.

Legs: femora and tibiae dark brown, slightly less dark than ventrites; procoxa and protrochanter pubescent, with few stronger and longer setae; spine-like setae absent; metafemur (Fig. 53) pubescent on proximal third of ventral face, with oblique hairline; metatarsus shorter than metatibia.

Abdominal ventrites dark brown.

Aedeagus (Fig. 2): main piece of phallobase as long as parameres, about as long as wide; manubrium smoothly converging, extended into a narrow lobe; borderline between unpigmented and pigmented part of ventral face of phallobase not visible; lateral and mesal margins of parameres distinctly curved, distance between their lateral margins as wide as distance between lateral margins of phallobase; apex slightly inflated, slightly pointing mesad; basal portion distinctly wider than apical part; ventral portion of bases not visible; dorsal portion almost straight, without extension into phallobase. Median lobe distinctly shorter than parameres; corona in apical position of median lobe; basal apophyses shorter than main piece of median lobe, not reaching mid-length of phallobase. Base of median lobe distinctly connected with parameres.

**Etymology.** The epithet refers to L. Fea (CONCI 1975), collector of the type specimen. L. Fea (1852–1903) was an assistant at the MSNG. He undertook many expeditions to various tropical countries and described several new species.

**Biology.** Probably aquatic; collected in primary rain forest in the vicinity of a small brook at light.

**Differential diagnosis.** The status as a species is justified by the shape of the ridge on the mesoventrite and features of the aedeagus. It shares an oblique hairline on metafemur with *A. montana*, *A. nanica* and *A. latepatens*, a character state not occurring in other species of the region; differs from *A. montana* in the coloration of the elytra (stripes in *A. montana*), and from *A. nanica* and *A. latepatens* in the terminal infuscation of maxillary palpomere 4, the presence of distinct preocular patches, and in the shape of the mesoventrite (horizontal ridge present in *A. feae*). Differs from all species of the region in features of the aedeagus.

**Distribution.** Laos, Myanmar, Thailand.



*Anacaena fikaceki* sp.nov.

**Type locality:** Laos, Hua Phan Province, Phou Pane (Phou Phan) Mountain.

**Type material.** Holotype ♂ (NMP): “Laos-NE, Hua Phan Prov. / 20°12′01–30″N 104°00′34–55″E, 1750–1850 m, / Phou Pane Mt. / 8.v.2008, Vít Kubáň lgt.” [in rockpool. – information by the collector]. – Paratypes: 7 ♂♂, 4 ♀♀ (NMP, NMW): same data; 1 ♂, 1 ♀ (NMB): Laos, Hua Phan Province, Phu Phan Mountains, 20°12′N 104°01′E, 1500–1900 m a.s.l., 17.v.–03.vi.2007, M. Brancucci.

**Description.** Total length 2.8–3.0 mm; maximum width 1.6–1.8 mm; E.I.: 1.14–1.33. Habitus: oblong-oval, elytra not attenuated in dorsal view, with greatest width at mid-length; elytra about 3.1–3.5× as long as pronotum in dorsal view.

Head (Figs 20, 37): labrum with light brown anterior and dark brown posterior portion; clypeus dark brown with triangular yellow preocular patches of the size of one eye; frons dark brown. Irregular punctures fine, mixed with a few coarser punctures, quite distinctly impressed; densely arranged, with interspaces about 2–3× as large as punctures in central region; distribution more dense laterally; setae absent; minute serial punctures along inner margin of eyes present. Clypeus long, with straight or very shallowly excised anterior margin and indistinct, blunt angles between lateral and anterior portion. Eyes large, not constricted anteriorly; ventral portion about as large as dorsal portion. Frontoclypeal suture very indistinct. Pedicellus slightly longer than wide; antennomere 3 elongate, shorter than pedicellus; antennal apical club segment slightly longer than wide. Maxillary palpi (Fig. 20) slender; palpomere 2 distinctly inflated; palpomere 4 without apical infuscation, widest slightly distal to mid-length, with distinctly convex outer margin and straight inner margin. Mentum (Fig. 37) *c.* 1.7× as wide as long, slightly impressed anteriorly; lateral margins with very fine, soft setae, anterior margin with distinct mesal excision; fine setiferous punctures on ventral face widely spaced, with denser distribution anteriorly. Labial palpi slender, longer than lateral edge of mentum; palpomere 3 slightly longer than palpomere 2.

Thorax: pronotum yellowish to light brown, with distinct mesal infuscated patch of approximately trapezoid shape with wide and lobed base; punctation very fine, very widely spaced, very slightly impressed. Prosternum almost flat, without ridge. Elytra dark brown, with wide, light brown lateral margins and anteromesal area; margins without setae; shoulder regions slightly accentuated; punctures fine, distinctly impressed; irregular, interspaces about 1–2× as wide as punctures; short serial rows of coarser punctures present along lateral margin. Mesoventrite distinctly elevated mesally, with a sharply pointed protuberance.

Legs: femora mostly dark brown; procoxa and protrochanter pubescent, with some minute spine-like setae mesally; metafemoral pubescence (Fig. 54) extended in proximal 4/5 of ventral face, with round hairline; metatarsus about as long as metatibia.

Abdominal ventrites dark brown.

Aedeagus (Fig. 3): main piece of phallobase about as long as parameres, slightly longer than wide; manubrium smoothly converging, extended into a long, narrow lobe with central infuscation; borderline between unpigmented and narrow pigmented part of ventral face of phallobase almost reaching proximal edge. Lateral and mesal margins of parameres slightly curved, distance between lateral margins of parameres about as wide as distance between lateral margins of phallobase; apex moderately wide, slightly



pointing mesad, basal portion wider than apical part; ventral portion of bases distinctly fused mesally, visibly extending into phallobase; dorsal portion distinctly curved, without extension into phallobase. Median lobe distinctly shorter than parameres, wide basally; corona in subapical position; basal apophyses distinctly longer than main piece of median lobe, not reaching mid-length of phallobase. Base of median lobe distinctly connected with parameres by a small tooth.

**Etymology.** The species is dedicated to the hydrophilid specialist Martin Fikáček (NMP), who provided the specimens for examination.

**Biology.** Found in a rock-pool.

**Differential diagnosis.** The status as a species is mainly based on features of the aedeagus. Similar to *A. yunnanensis* d'Orchymont, 1942 from China (Yunnan), including features of the aedeagus; differing in maxillary palpi (apically infuscated in *A. yunnanensis*) and median lobe (basal apophyses very long in *A. fikaceki*); shares comparatively large body size and metafemoral pubescence with *A. laotica*. Differs from this species in the size of the preocular patches and the pronotal patch, and from all other species of the region in features of the aedeagus.

**Distribution.** Laos.

### *Anacaena fuscopunctata* sp.nov.

**Type locality:** South Vietnam, Cát Tiên National Park.

**Type material.** Holotype ♂ (NMW) "S-Vietnam / Nam Cat Tien Nat. Park / 1.–15.5.1994 / Pacholatko & Dembicky". – Paratypes: 2 ♂♂, 1 ♀ (NMW): same sampling data.

**Description.** Total length 1.8–2.1 mm; maximum width 1.0–1.4 mm; E.I.: 1.08–1.20. Habitus: oval; elytra not attenuated in dorsal view, with greatest width at mid-length, about 2.9–3.2× as long as pronotum in dorsal view.

Head (Figs 21, 38): labrum dark brown; clypeus dark brown with triangular yellow preocular patches of the size of one eye; frons dark brown. Irregular punctures fine, mixed with a few coarser punctures, quite indistinctly impressed, densely distributed; interspaces about 1–3× as large as punctures; setae absent; punctation not distinctly denser towards clypeal margins; minute serial punctures present along inner margin of eyes. Clypeus long, with straight anterior margin and indistinct blunt angles between lateral and anterior portion. Eyes large, not constricted anteriorly; ventral portion about as large as dorsal portion. Frontoclypeal suture very indistinct. Pedicellus about 1.3× as long as wide; antennomere 3 not distinctly elongated, not distinctly shorter than pedicellus; apical club segment not distinctly longer than wide. Maxillary palpi (Fig. 21) slender; palpomere 2 weakly inflated; palpomere 4 with indistinct apical infuscation or infuscation absent; widest at mid-length or slightly distal to mid-length, with distinctly curved outer margin and straight inner margin. Mentum (Fig. 38) *c.* 1.7× as wide as long, slightly impressed anteriorly; lateral margins with very fine soft setae; anterior margin with very slight mesal excision; with widely spaced, very fine setiferous punctures on ventral face, grouped anteriorly. Labial palpi quite stout; longer than lateral edge of mentum; palpomere 3 longer and wider than palpomere 2.

Thorax: pronotum yellowish to light brown, with indistinct small mesal infuscation, lateral margins and hind corners quite broadly curved; punctation very fine, very widely spaced, obsolete mesally, very slightly impressed on lateral portion. Prosternum slightly bulged with a minute ridge on anterior portion. Elytra of speckled appearance: light brown with very small dark brown spots marking punctures; margins without setae; shoulder regions very slightly accentuated; punctures fine, weakly impressed, irregular; interspaces about 1–3× as wide as one puncture; some slightly coarser punctures present near lateral margin. Mesoventrite distinctly elevated mesally, with a sharply pointed protuberance.

Legs: femora dark brown; procoxa and protrochanter pubescent, with some minute, spine-like setae mesally; metafemoral pubescence (Fig. 55) present in anterior half and on mesal portion with horizontal hairline; metatarsus about as long as metatibia.

Abdominal ventrites dark brown.

Aedeagus (Fig. 4): main piece of phallobase about as long as parameres, about as long as wide; manubrium smoothly converging, extended into a wide lobe, without central infuscation; borderline between unpigmented and pigmented part of ventral face of phallobase almost reaching manubrium, very indistinctly visible; lateral and mesal margins of parameres very slightly curved, distance between lateral margins of parameres as wide as distance between lateral margins of phallobase; apex moderately wide, slightly pointing mesad; basal portion distinctly wider than apical part; ventral portion of bases not fused mesally; moderately extending into phallobase, dorsal portion slightly curved, without extension into phallobase. Median lobe slightly shorter than parameres, lateral margins evenly converging towards apex, wide basally; corona in apical position of median lobe; basal apophyses about as long as main piece of median lobe or slightly shorter, not reaching mid-length of phallobase. Base of median lobe distinctly connected with parameres by a small tooth.

**Etymology.** *fuscus* (Lat.) = brown; the name of the epithet refers to the coloration of the elytral punctures and is used as an adjective.

**Biology.** not known.

**Differential diagnosis.** The specific status is mainly based on features of the aedeagus. Very similar to *A. hajeki* (for differences see following description); similar to *A. sichuana* KOMAREK, 2012 from Sichuan (China) in pronotal coloration and metafemoral pubescence; differing from this species in the coloration of the maxillary palpomere 4 (less distinct apical infuscation), elytral coloration (speckles) and size (smaller); shares the very small body size, the spotted coloration of the elytra and the horizontal hairline on the metafemora with *A. maculata*; can be separated from all species of the region in features of the aedeagus.

**Distribution.** Vietnam.

### *Anacaena hajeki* sp.nov.

**Type locality:** Laos, Attapeu Province, Annam Highlands Mountains, Dong Amphan.

**Type material.** Holotype ♂ (NMP): Laos, Attapeu Province, Annam Highlands Mountains, Dong Amphan NBCA, 1160 m a.s.l., Nong Fa (crater lake) environments, 15°05.9'N 107°25.6'E, 30.iv.–6.v.2010, J. Hájek. – Paratypes: 15 exs. (NMP, NMW): same sampling data.



**Description.** Total length 1.8–2.1 mm; maximum width 1.1–1.3 mm; E.I.: 1.18. Habitus oblong-oval, with greatest width at mid-length; elytra about 2.8 to 3.0× as long as pronotum in dorsal view.

Head: (Figs 22, 39) labrum black; clypeus and frons black, with sharply demarcated, yellow, approximately triangular preocular patches of about the size of one eye. Irregular punctures fine and deep; setae absent; interspaces 1–2× as large as punctures; punctation not distinctly denser towards clypeal margins; one series of very fine, densely arranged punctures present along inner margin of eyes. Clypeus long, straight anteriorly, with blunt anterolateral angles. Eyes not constricted anteriorly; dorsal portion about as large as ventral part. Frontoclypeal suture very indistinct or obsolete mesally. Antennomere 3 not elongated; apical club segment slightly longer than wide. Maxillary palpomere 2 distinctly inflated; palpomere 4 widest at mid-length, with straight inner margin and convex outer margin; narrowly rounded apical part with distinct terminal infuscation (Fig. 22). Mentum (Fig. 39) *c.* 1.7× as wide as long, slightly impressed anteriorly; anterior margin with distinct mesal incision; ventral punctures sparse, widely spaced, irregularly distributed; labial palpi slender, palpomere 3 with convex outer margin and almost straight inner margin; with apical infuscation; longer than lateral edge of mentum; palpomere 3 slightly longer than palpomere 2.

Thorax: pronotum with dark brown median patch not reaching anterior and posterior margins, reaching inner margin of eyes laterally, composed of a larger central spot accompanied by a smaller adjacent lateral spot on either side; lateral margins and hind corners quite broadly curved; punctation fine, weakly impressed, not finer than on head; interspaces 2–3× as wide as one puncture; punctation very slightly denser towards lateral margins. Prosternum distinctly convex. Elytra dark brown, intensity of coloration decreasing towards margins, with yellow anterior, mesal, and posterolateral areas; very fine setae present on posterior margin (elytral apex); shoulder regions slightly accentuated; punctures as fine as on head, irregular, with short series of coarser punctures laterally; interspaces 1–3× as wide as punctures; sutural stria anteriorly continuous with a series of very small, dark brown patches. Mesoventrite with a sharply pointed protuberance.

Legs: dark brown, femora with lighter brown distal areas; procoxa with some long, strong setae but spine-like setae absent; pubescence on metafemur restricted to anterior half and proximal portion (Fig. 56), with horizontal hairline; metatarsus about as long as metatibia.

Abdominal ventrites dark brown.

Aedeagus (Fig. 5): main piece of phallobase slightly longer than parameres, longer than wide; manubrium smoothly converging, extended into quite a wide lobe; borderline between unpigmented and pigmented part of ventral face of phallobase very indistinct, not reaching proximal edge. Lateral margins of parameres almost straight, mesal margins distinctly sigmoidal; distance between lateral margins of parameres as wide as diameter of phallobase; apex quite narrow, not inflated, distinctly pointing mesad; basal portion distinctly wider than apical part; ventral portion of bases indistinct, not fused, dorsal portion of bases moderately curved. Median lobe as long as parameres or very slightly shorter, lateral margins evenly converging towards apex; corona in apical position. Basal apophyses slightly shorter than main piece of median lobe, attaining



about one-third of length of phallobase. Base of median lobe distinctly connected with parameres by a small tooth.

**Etymology.** The species is dedicated to the entomologist Jiří Hájek, who collected the specimens.

**Biology.** Spring area, with numerous small muddy puddles resulting from footprints of people and animals; in forest pools with deep layer of decaying leaves, together with *Allopachria jirii* Wewalka, 2010, several species of *Microdytes*, *Lacconectus* and other dytiscids (information from J. Hájek).

**Differential diagnosis.** The status as a species is mainly based on features of the aedeagus. Very similar to *A. fuscopunctata*, shares the lack of fusion of the ventral part of the parameres with this species. Differs from *A. fuscopunctata* in the following features: habitus short-oval (more elongate in *A. fuscopunctata*); maxillary palpomere 4 with distinct terminal infuscation; mesal excision of mentum deep (comparatively shallow in *A. fuscopunctata*); labial palpi slender, with apical infuscation (stout, infuscation absent in *A. fuscopunctata*); pronotal coloration composed of three merging spots (with one small central patch in *A. fuscopunctata*); elytra not distinctly speckled; phallobase slightly longer than wide, lateral margins of parameres almost straight (sigmoidal in *A. fuscopunctata*). May be separated from the similar *A. brancuccii* by the pronotum (with a large central spot in *A. brancuccii*) and features of the aedeagus (parameres with narrow apex in *A. brancuccii*).

**Distribution.** Laos.

### *Anacaena lamdongica* sp.nov.

**Type locality:** South Vietnam, Central Highlands Region, Lam Dong Province, Bao Loc (town).

**Type material.** Holotype ♂ (NMW): “S-Vietnam / 14 km SW Bao Loc / 16.–29.5. 1994 / Pacholatko & Dembicky”. – Paratypes: 1 ♂, 2 ♀♀ (NMW): same data.

**Description.** Total length 2.4–2.6 mm; maximum width 1.5–1.6 mm; E.I.: 1.10–1.20. Habitus: high-convex in lateral view, rather short-oval in dorsal view, slightly attenuated towards elytral apex, greatest width at mid-length; elytra about 2.9–3.3× as long as pronotum in dorsal view.

Head (Figs 23, 40): labrum dark brown; clypeus dark brown with distinct, large, yellow preocular patches of the size of one eye; frons dark brown. Irregular punctures fine, distinctly impressed, densely arranged; interspaces about 2–3× as large as punctures, without setae; series of very indistinct, minute, densely arranged punctures present along inner margin of eyes. Clypeus long, with straight anterior margin and indistinct blunt angles between lateral and anterior portion. Eyes slightly protruding, not constricted anteriorly; ventral portion slightly larger than dorsal portion. Frontoclypeal suture very indistinct. Pedicellus more than 2× longer than wide; antennomere 3 distinctly elongated, shorter than pedicellus; apical club segment distinctly longer than wide. Maxillary palpi (Fig. 23) slender; palpomere 2 distinctly inflated; palpomere 4 without infuscation, widest at mid-length, with distinctly convex outer margin and very

slightly convex inner margin. Mentum (Fig. 40) *c.* 1.3× as wide as long, not impressed anteriorly; lateral margins with some very fine soft setae, anterior margin with shallow mesal excision; ventral punctures widely spaced, very fine, evenly distributed; labial palpi very stout; about as long as lateral edge of mentum or slightly shorter; palpomere 3 slightly longer and distinctly wider than palpomere 2.

Thorax: pronotum yellowish to light brown, with distinct, circular-to-oval, dark brown mesal infuscation reaching laterad to inner margin of eyes; punctation fine; interspaces about 2–3× as large as punctures. Prosternum slightly convex, with distinct knob-like anterior extension. Elytra dark brown, with indistinct darker longitudinal bands; margins without setae; shoulder regions very indistinctly accentuated; punctures fine, very strongly impressed, irregular; interspaces about 2× as wide as one puncture, with some coarser, serially arranged punctures near lateral margin. Mesoventrite distinctly elevated mesally, with a sharply pointed protuberance.

Legs: most parts of femora dark brown; procoxa and protrochanter pubescent without spine-like setae; metafemur (Fig. 57) with extended pubescence on proximal three-quarters of ventral face and sigmoidal hairline; metatarsus shorter than metatibia.

Abdominal ventrites dark brown.

Aedeagus (Fig. 6): main piece of phallobase longer than parameres, distinctly longer than wide; manubrium smoothly converging, extended into a short, wide lobe, strongly bent dorsad, with central infuscation; borderline between unpigmented and narrow pigmented part of ventral face of phallobase almost reaching proximal edge; lateral and mesal margins of parameres very slightly curved; distance between lateral margins of parameres as wide as distance between lateral margins of phallobase; apex quite wide; basal portion wider than apical part; ventral portion of bases fused mesally, without extension into phallobase; dorsal portion of bases slightly curved, without extension into phallobase. Median lobe shorter than parameres; corona in apical position of median lobe; basal apophyses distinctly longer than main piece of median lobe, reaching less than one-third of length of phallobase. Base of median lobe indistinctly connected with parameres.

**Etymology.** The name of the epithet refers to the province of Lam Dong and is used as an adjective.

**Biology.** Unknown.

**Differential diagnosis.** The status as a species is mainly based on features of the aedeagus. Mesoventrite (with high, pointed protuberance), metafemoral pubescence (extended with rounded hairline), and elytra (with longitudinal stripes), as in the similar *A. montana*; differs from this species in the pronotal coloration (central patch subdivided into three small spots in *A. montana*). It is similar to *A. pui* Komarek, 2012 and *A. gaoligongshana* Komarek, 2012 in features of the antenna (distinctly elongate antennomere 3), pronotum (narrowly rounded posterior angles), elytral coloration (longitudinal stripes); shares with *A. pui* features of the aedeagus (very short and strongly bent manubrium); differs from this species in the shape of the median lobe (elongate basal apophyses).

**Distribution.** Vietnam.



*Anacaena laotica* sp.nov.

**Type locality:** Laos, Vientane Province, Vang Vieng [village].

**Type material.** Holotype ♂ (NMW): “Vang Vieng / Vientane Prov. / LAOS / 8.V.2002 / H. Yoshitomi”. – Paratypes: 9 exs. (NMW): same data; 16 exs. (NMB): Laos, Phongsaly Province, Phongsaly environments, 21°41.2'N 102°06.8'E, ca. 1500 m a.s.l., 28.v.–20.vi.2003, Brancucci; 1 ♂ (NMB): Laos, Phongsaly Province, Phongsaly environments, 21°41'N 102°06'E, ca. 1500 m a.s.l., 6.–17.v.2004, Brancucci; 1 ♂, 2 ♀♀ (NMB): Laos, N, Oudomxai Province, 17 km NEE Oudomxai [=Muang Xai], village on road to Muang Xai at 20°34'35"N 102°11'55"E, 1095 m a.s.l. (erroneously labelled 20°45'N 20°34'35"N 102°09'E, 1100 m), at light, in a brook, and collected by intercept trap, 1.–9.v.2002, Vít Kubáň.

**Description.** Total length 3.0–3.3 mm; maximum width 1.7–1.8 mm (one dwarf ex. with 2.5 mm total length and 1.5 mm total width); E.I.: 1.11–1.22. Habitus: oblong-oval, with greatest width at mid-length; elytra about 2.9–3.1× as long as pronotum in dorsal view.

Head (Figs 24, 41): labrum yellow; clypeus yellow, with mesal infuscation of variable extent present in most individuals; frons dark brown. Irregular punctures very fine; interspaces about 1–3× as large as punctures, without setae; series of very indistinct, minute, densely arranged punctures present along inner margin of eyes. Clypeus long, slightly concave anteriorly, with very distinct angles between lateral and anterior portion. Eyes not constricted anteriorly; dorsal and mesal portion of almost equal size. Frontoclypeal suture visible on lateral portion. Pedicellus distinctly longer than wide; antennomere 3 elongate, distinctly shorter than pedicellus; apical club segment longer than wide. Maxillary palpi (Fig. 24) very slender; palpomere 2 slightly inflated; palpomere 4 without infuscation, widest slightly distal to mid-length, with distinctly curved outer margin and almost straight inner margin. Mentum (Fig. 41) *c.* 1.7× as wide as long, distinctly impressed anteriorly; lateral margins with fringes of very fine, soft setae; anterior margin with deep, distinct mesal excision; ventral punctures very fine, widely spaced, evenly distributed; labial palpi slender; longer than lateral edge of mentum; palpomere 3 not distinctly longer than palpomere 2.

Thorax: pronotum yellowish; small, dark brown, trapezoidal central patch in mesal third widening anteriorly, extending laterad to mesal margin of eyes or nearly so; punctation very fine, very widely spaced, slightly denser towards lateral margins. Prosternum slightly convex. Elytra yellowish light brown, with dark brown central infuscation formed by small merging patches marking punctures or forming dark brown longitudinal bands; wide yellow lateral margins, with yellow apical and anteromesal portion, and two or three short rows of very small black spots along lateral margins, distinctly contrasting with yellow ground colour. Indistinct, fine setae present on apex, arising from dorsal face; shoulder regions slightly accentuated; punctures fine, strongly impressed, irregular; interspaces 2–3× as wide as punctures; some slightly coarser punctures present near lateral margin. Sutural stria continuous with a series of small black spots in anterior third, reaching scutellar shield. Mesoventrite distinctly elevated mesally, with sharply pointed protuberance.

Legs: most parts of femora dark brown; procoxa and protrochanter pubescent, without spine-like setae; metafemur (Fig. 58) with extended pubescence on proximal four-fifths of ventral face and rounded hairline; metatarsus shorter than metatibia.

Abdominal ventrites dark brown; ventrite 5 with a small, very indistinct, shallow apical excision.



**Aedeagus** (Fig. 7): main piece of phallobase distinctly longer than parameres, distinctly longer than wide; manubrium abruptly converging, extended into a moderately narrow lobe; borderline between unpigmented and narrow pigmented part of ventral face of phallobase very deep, but not reaching proximal edge; lateral and mesal margins of parameres very slightly curved, almost evenly converging towards apex; distance between lateral margins of parameres slightly wider than distance between lateral margins of phallobase; apex narrow, pointing straight anteriorly; basal portion wider than apical part; ventral portion of bases distinctly curved, fused mesally with distinct sigmoidal extension into phallobase; dorsal portion of bases slightly curved, very slightly extended into phallobase. Median lobe slightly shorter than parameres; corona in apical position; basal apophyses shorter than main piece of median lobe, not reaching one-third of length of phallobase. Base of median lobe indistinctly connected with parameres.

**Etymology.** The epithet refers to the country of Laos and is used as an adjective.

**Biology.** Found in humid mountainous secondary forest (communication from M. Brancucci), collected in a brook, also at light and by intercept trap (communication from Vít Kubán).

**Differential diagnosis.** The status as a species is mainly based on the coloration of the pronotum and features of the aedeagus. It differs from all other species of the region in the coloration of the pronotum: yellowish-brown with dark brown trapezoidal patch in mesal third; differs also in features of the aedeagus.

**Distribution.** Laos.

### *Anacaena latepatens* sp.nov.

**Type locality:** MYANMAR, Sagaing Division, Alaungdaw Katthapa National Park, Pagoda Stream.

**Type material.** Holotype ♂ (NMW): MYANMAR, Sagaing Div., Alaungdaw Katthapa NP, Pagoda Stream below Log Cabin Camp, ca. 350 m a.s.l., 22°19.094'N 94°28.823'E, 09.–10.v.2003, D. Boukal "MBS 118". – Paratypes: MYANMAR: 130 exs (NMW): same sampling data; 8 exs. (NMW): Sagaing Div., Alaungdaw Katthapa NP, 22°19.094'N 94°28.823'E, ca 350 m a.s.l. 5.v.2003, D. Boukal et al. "107"; 4 exs. (NMW): Sagaing Div., Alaungdaw Katthapa NP, Pagoda Stream at Ku Mara Monastery, upstream of Log Cabin Camp, ca. 400 m a.s.l., 22°18.560'N 94°27.679'E, 06.v.2003, D. Boukal "MBS 111"; 1 ♂ (NMW): Sagaing Div., Alaungdaw Katthapa NP, ca. 350 m a.s.l., 22°19.113'N 94°28.518'E, 13.v.2003, H. Schillhammer et al. "122"; 1 ex. (NMW): Shan State, on the way to Kalaw W Heho, near Ingaung Stream (source), puddles on the meadow, ca. 1175 m a.s.l., 20°41.448'N 96°45.653'E, 8.vi.2004, H. Schillhammer, H. Shaverdo, U Myint Hlaing, "MBS 142"; 18 exs. (NMW): Sagaing Div., Alaungdaw Katthapa NP, Pagoda Stream near Log Cabin Camp, ca. 350 m a.s.l., 22°19.094'N 94°28.823'E, 06.v.2003, D. Boukal "MBS 110"; 17 exs (NMW): Sagaing Div., Alaungdaw Katthapa NP, Pagoda Stream upstream of Log Cabin Camp, ca. 360 m a.s.l., 22°19.084'N 94°28.744'E, 07.v.2003, D. Boukal "MBS 113"; 18 exs: Sagaing Div., Alaungdaw Katthapa NP, Khaung Din Stream, ca. 450 m a.s.l., between 22°18.360'N 94°25.937'E and 22°19.650'N 94°25.768'E small stream, 11.v.2003, D. Boukal "MBS 119"; 27 exs (NMW): Sagaing Div., Alaungdaw Katthapa NP, Pagoda Stream below Log Cabin Camp, sifted from wet leaf litter accumulated along stream, 5.v.2003, D. Boukal "MBS 104"; 1 ex. (NMW): Sagaing Div., Alaungdaw Katthapa NP, Pagoda Stream near Log Cabin Camp, slightly downstream of loc. MBS 107, 07.v.2003, D. Boukal "MBS 112". MALAYSIA: 13 exs. (NMW): Perak, Belum Exp., B. Camp, 5°30'07"N 101°26'21"E, 250m a.s.l., collected by light trap, 21.iii.–14.iv.1994, leg. I. Sivec; 1 ♀ (NMW): Malaysia, Perak, ca. 10km NE Gerik, 3.II.1992, M. Jäch "24". THAILAND: North: 1 ♀ (NMW): [Mae Hong Son Province] 12 km S Mae Hong Son, Pha Bong, 12.XI.1995, H. Zettel "13a"; 1 ♀ (NMW):



[Chiang Mai Province], Chiang Mai, zoo, at light, 1200 m a.s.l., 18°49'N 98°57'E, 10.–17.iv.1989, Chantaramongkol & Malicky; 1 ♂, 1 ♀ (NMW): Chiang Mai Province, Doi Inthanon, N. Park, Mae Klang Waterfall, 18°29'N 98°40'E, 415 m a.s.l., 3.iv.2002, "L-320 coll[ector]s: UMC and CMU teams"; 2 ♀♀ (NMW): Chiang Mai [Province], Doi Suthep-Piri N.P., Monthatarn Falls, groomed park area, open to sunlight and grassy banks, popular tourist site downstream of small falls, water clear, with moderate flow, substrate sand and gravel with leaves, logs, sticks, submerged mosses, very many aquatic dryopoids and aquatic hemiptera; 24.iii.1994, W. Shepard "WDS A 1044" [ecological remarks thankfully received by the collector]; 1 (NMW): Chiang Mai Prov., Doi Suthep-Pui N.P., Namtok Monthathan, 18°49'N 98°55'E, 700 m a.s.l., 29.iv.2003, Thamasenanupap, Ferro "L-489 AV"; 2 exs. (AEZS): Nan Province, Mae Charim N.P., Nam Wa River, 18°36'N 100°59'E, 335 m a.s.l., 23.iv.2003, AV, Prommi, Setaphan "L-478"; 1 ex. (AEZS): Tak Province, Larnsarn N.P., creek below Nam Tok Larnsarn, 16°46'N 99°00'E, 380 m a.s.l., 7.iii.2002, Vitheepadit, Kirawanich, Stes "L-270"; 1 ex. (AEZS): Thailand, Phitsanulok Province, Phu Hin Rongkhla N.P. Namtok Palad, 17°01'N 100°56'E, 300 m a.s.l., 7.v.2003, Vitheepadit, Prommi, Ferro "L-509"; 1 ♂ (NMW): Thailand, Phitsanulok Province, Phu Hin Rongkhla N.P., Namtok Palad, 16°59'N 101°00'E, 300 m a.s.l., 12.iii.2002, Sites, Vitheepadit & Kirawanich "L-289". Central: 1 ♂ (NMW): [Phitsanulok Province], E Phitsanulok, Phu Hin Rongkhla N.P., 15.XII.1999, P. Mazzoldi "5"; 1 ♂, 2 ♀♀ (NMW): (Phitsanulok and Phetchabun Provinces), Tung Salaeng Luang N.P., pond, 4.I.1997, Mazzoldi; 1 ♂, 2 ♀♀ (NMW): Phetchabun [Province], Nam Nao N.P., Huai Ya Krua, at the visitors' center for the NP, water clear, warm and with slow current over mud/sand/gravel substrate with detritus, many elmids, psephenids and very many hemiptera, 14.III.1994, W. Shepard "WDS A 1039"; 1 ♀ (NMW): [Kanchanaburi Province] Thung Yai Naresuan Nat. Park, Sankhlaburi [?], 27.XII.1996, P. Mazzoldi; 1 ♂ (NMW): [Kanchanaburi Province] Sangkhla Buri, road to Karen village, Ban Sane Pang 26.XII.1996, P. Mazzoldi. LAOS: 5 exs. (NMP): Laos, Sekong Province, ca. 51 km N Sekong (river), Ho Chi Minh trail, 15°49.6'N 106°39.8'E, ca. 410 m a.s.l., 14.–15.v.2010, J. Hájek; 1 ♂ (NMW): Laos NE, Hua Phan Prov., "Xamneua State" [Sam Neua is the capital of the Province], Salesi, Ph-Pan, around camp, 1450–1900 m a.s.l., 20°11'50.4" N 104°01'03.4"E, 16.–20.v.2004, M. I. Jeng.

**Description.** Total length 2.3–2.5 mm; maximum width 1.3–1.5 mm; E.I.: 1.06–1.18. Habitus: oblong-oval, with greatest width at mid-length; elytra about 2.8–3.3× as long as pronotum in dorsal view.

Head (Figs 25, 42): labrum light brown; clypeus light brown; mesal infuscation of variable extent present in most individuals, or clypeus dark brown with distinct yellow preocular patches; frons dark brown. Irregular punctures very fine, mixed with some coarser punctures, very widely spaced, without setae; series of very indistinct, minute, densely arranged punctures present along inner margin of eyes. Clypeus long, straight anteriorly, with indistinct angles between lateral and anterior portion. Eyes not constricted anteriorly; dorsal and mesal portion of almost equal size. Frontoclypeal suture very indistinct or obsolete. Pedicellus distinctly longer than wide; antennomere 3 elongate, distinctly shorter than pedicellus, apical club segment longer than wide. Maxillary palpomere 2 indistinctly inflated; palpomere 4 with apical infuscation (indistinct in some individuals), widest at mid-length, with distinctly curved outer margin and straight inner margin (Fig. 25). Mentum (Fig. 42) *c.* 1.8× as wide as long, quite flat, slightly impressed anteriorly; lateral margins with fringes of very fine, soft setae, anterior margin with deep, distinct mesal incision; fine setiferous punctures on ventral face evenly distributed. Labial palpi slender; slightly longer than lateral edge of mentum; palpomere 3 slightly longer than palpomere 2.

Thorax: pronotum yellowish-brown; dark brown, oval patch of variable extent present on central region, never reaching anterior margin and not reaching posterior margin in most cases, extending laterad to mesal margin of eyes or slightly beyond it; punctation almost obsolete, microsculpture absent. Prosternum slightly tectiform. Elytra largely dark brown or with light brown lateral and posterior areas and dark brown mesal



infuscation; small lighter areas near sutural stria and on anteromesal portion present in some individuals; fine setae present on posterior half of lateral margin and on apex, arising from dorsal face; shoulder regions very slightly accentuated; punctures fine, strongly impressed, irregular, with few slightly coarser punctures near lateral margin; interspaces 2–3× as wide as punctures. Mesoventrite distinctly elevated mesally, with sharply pointed protuberance.

Legs: femora mostly dark brown, but with lighter coloration on distal portion; tibia light brown. Procoxa and protrochanter pubescent, without spine-like setae. Metafemur (Fig. 59) pubescent on proximal two-thirds; hairline rounded anteriorly, slightly oblique posteriorly. Metatarsus shorter than metatibia.

Abdominal ventrites dark brown.

Aedeagus (Fig. 8): main piece of phallobase about as long as parameres, approximately as long or slightly longer than wide; manubrium smoothly converging, extended into a narrow lobe; ventral face of phallobase with deep, indistinctly visible incision, not reaching basal edge; lateral and mesal margins of parameres very slightly curved, almost evenly converging towards apex; distance between lateral margins of parameres as wide as distance between lateral margins of phallobase; apex narrow, straight; basal portion slightly wider than apical part; ventral portion of bases fused mesally, slightly extending into phallobase, dorsal portion of bases distinctly curved, without extension into phallobase. Median lobe shorter than parameres; corona in apical position of median lobe; basal apophyses about as long as main piece of median lobe, not reaching mid-length of phallobase. Base of median lobe distinctly connected with parameres by a small tooth.

**Etymology.** The epithet refers to the species' large distribution area (*late patens* = Latin: widely distributed) and is used as an adjective.

**Biology.** In small, slowly-flowing streams and in puddles near streams; sifted from wet leaves; also at light.

**Differential diagnosis.** The status as a species is mainly based on the shape of the aedeagus. Very similar to *A. shepardi* (for differences see that species); shares the oblique metafemoral hairline and a similar shape of the aedeagus with *A. bushiki* PU, 1963 from China (Hainan, Yunnan), and *A. feae* and *A. nanica*; can be distinguished from *A. bushiki* by the shape of the maxillary palpomere 4 (slender, asymmetrical in *A. latepatens*, "cigar-shaped" in *A. bushiki*), the metafemoral pubescence (less extended in *A. bushiki*) and the shape of the apex of the parameres (pointed in *A. latepatens*, wide in *A. bushiki*); differs from *A. feae* in the shape of the palpi (stout in *A. feae*) and the pronotal coloration (median infuscation with wider extension in *A. feae*); from *A. nanica* in the shape of the palpi (stout in *A. nanica*), the coloration of the clypeus (preocular patches absent in *A. nanica*), and the coloration of the maxillary palpomere 4 (apical infuscation absent in *A. nanica*); similar to *A. laotica* in the dorsal coloration; differs from this species in the shape of the pronotal patch. Aedeagus similar to that of *A. shepardi* in the shape of the manubrium (elongate in *A. shepardi*). Features of the aedeagus distinguish *A. latepatens* from all other species of the region.

**Distribution.** Laos, Malaysia, Myanmar, Thailand.



***Anacaena maculata* Pu, 1964**

*Anacaena maculata* Pu, 1964: 399 (Chinese); JIA 1997: 108 (English); KOMAREK (2012): redescription.

**Type material.** See KOMAREK (2012).

**Other material examined.** **LAOS:** 3 ♂♂, 2 ♀♀ (NMP, NMW): Laos NE, Hua Phan Prov., Ban Saluei, Phu Phan Mt., 20°15'N 104°02'E, 1500–2000 m a.s.l., 26.iv.–11.v.2001, J. Bezdek; 1 ♂ (NMB): Laos, Luangphrabang [Luang Prabang] Province, Thong Khan, 19°35'N 101°58'E, 750 m a.s.l., 11.–21.v.2002, Vit Kubán. **MYANMAR:** 2 exs. (NMW): Shan State, ca. 35 km N Aungban, ca. 1320 m a.s.l., 20°55.20'N 96°33.60'E, 31.v.–08.vi.2002, H. Schillhammer et al. “81a”; 2 exs. (NMW): Shan State, on the way to Kalaw W Heho, near Ingaung Stream (source), puddles on the meadow, ca. 1175 m a.s.l., 20°41.448'N 96°45.653'E, 8.vi.2004, H. Schillhammer, H. Shaverdo, U Myint Hlaing, “MBS 142”; 4 exs. (NMW): Shan State, ca. 5 km SW Kalaw, Ye Ayan, near reservoir, stream which goes through wetland, 9.vi.2004, H. Schillhammer, H. Shaverdo, U Myint Hlaing, “MBS 144”; 2 exs. (NMW): Shan State, SE Mintaingbin Forest Camp, ca. 1274 m a.s.l., 2 puddles on meadow in forest, 20°55.997' N 96°33.805'E 12.–19.vi.2004, H. Schillhammer, H. Shaverdo, U Myint Hlaing “MBS 147”; 11 exs. (NMW): Shan State, SE Mintaingbin Forest Camp, ca. 1274 m a.s.l., puddle on edge of meadow, 20°55.097' N 96°33.805'E 13.–17.vi.2004, H. Schillhammer, H. Shaverdo, U Myint Hlaing “MBS 147c”; 21 exs. (NMW): Shan State, SE Mintaingbin Forest Camp, ca. 1274 m a.s.l., 20°55.097'N 96°33.805'E, 2 puddles on meadow in forest, 31.v.–08.vi.2002, H. Schillhammer, U Myint Hlaing, U Aung Moe “MBS 81e”; 2 exs. (NMW): Shan State, NE Mintaingbin Forest Camp, above loc. 150, pool, 22.vi.2004, H. Schillhammer, H. Shaverdo, U Myint Hlaing “MBS 152”; 3 exs. (NMW): Shan State, NE Mintaingbin Forest Camp, very large pond, ca. 1290 m a.s.l., 20°55.640' N 96°33.634'E, 14., 15., 17., 19., and 20.vi.2004, H. Schillhammer, H. Shaverdo, U Myint Hlaing “MBS 150a”. **THAILAND:** 3 ♂♂, 5 ♀♀ (NMW): Thailand, Thung Salaeng Luang N.P., pond, 4.i.1997, P. Mazzoldi; 1 (NMW): Mae Hong Son Province, Mae Hong Son env., Ban Huai Po, 24.–30.vi.1993, Schneider; 1 (NMW): Chiang Rai Province, Muang Dist., Agricult. stn., Mt. Phangan, 15.i.1995, P.P. Chen; 1 ex. (AEZS): Nong Khai Province, Tarn Thong Forest Park, Tarn Thong Waterfall, 18°01'N 102°21'E, 188 m a.s.l., 7.v.2004, A. Vitheepradit “L-671”; 1 ex. (AEZS): Trang Province, Prince Songkhia Univ., 55 m a.s.l., 07°31'N 99°35'E, muddy pond near rubber field, 7.vi.2003, CMU & PSU teams “L-597”; 2 ((NMW): Chiang Mai Prov., Doi Inthanon N.P., Mae Pan Noi at Ban San Pathana bedrock stream; margin, 750 m a.s.l., 18°31'N 98°25'E, 4.iv.2003, UMC & CMU teams “L-446”.

**Description.** See KOMAREK (2012) and Figs 9, 26, 43, 60 in this communication.

**Remarks.** Specimens from Laos differ slightly from Chinese individuals in body shape (shorter), shape of the labial palpi (stouter) and features of the aedeagus (median lobe somewhat longer, manubrium less distinctly bent dorsally).

**Biology.** Mazzoldi collected specimens in a pond and Bezdek at light (personal communication from the collectors).

**Differential diagnosis.** Similar to *A. fuscopunctata*, but can be distinguished from this species in features of the aedeagus.

**Distribution.** China (Fujian, Guangdong, Hunan, Jiangxi, Yunnan), Laos, Myanmar, Thailand.

***Anacaena mawara* sp.nov.**

**Type locality:** Malaysia, Sabah (island of Borneo), Crocker range, Mawar waterfall.

**Type material.** Holotype ♂ (NMW): “Malaysia, Sabah, Crocker / Range, Mawar waterfall env. / 17.VI.1996, 9b. small pools in / primary forest, substrate: sand”.

**Description.** Total length 2.5 mm; maximum width 1.5 mm; E.I.: 1.14. Habitus: quite shortly oval, high-convex in lateral view, not attenuated in dorsal view, with greatest width at mid-length; elytra about 1.3× as long as pronotum in dorsal view.

Head (Figs 27, 44): labrum light brown; clypeus dark brown, with narrow, yellow preocular patches smaller than width of eye; frons dark brown. Irregular punctures fine, distinctly impressed, widely spaced; interspaces 3–4× as large as punctures, setae absent; series of very indistinct, minute, quite irregularly arranged punctures present along inner margin of eyes. Clypeus long, with straight anterior margin and distinct blunt angles between lateral and anterior portion. Eyes not constricted anteriorly; dorsal and mesal portion of almost equal size. Frontoclypeal suture obsolete. Pedicellus slightly more than 2× longer than wide; antennomere 3 elongate, distinctly shorter than pedicellus; apical club segment longer than wide. Maxillary palpomeres (Fig. 27) slender; palpomere 2 distinctly inflated; palpomere 4 without infuscation, widest slightly distal to mid-length, cylindrical with parallel-shaped inner and outer margins. Mentum (Fig. 44) *c.* 1.5× as wide as long, distinctly impressed anteriorly; lateral margins with dense fringes of very fine, soft setae, anterior margin with distinct mesal incision; ventral punctures widely spaced, fine, grouped in anterior half; labial palpi stout, about as long as lateral edge of mentum; palpomere 3 slightly longer and wider than palpomere 2.

Thorax: pronotum yellow, with large, dark brown central patch reaching laterad to lateral margin of eyes; not reaching anterior pronotal margin, almost reaching posterior pronotal margin; punctation fine, moderately densely arranged; interspaces about 2–3× as large as punctures. Prosternum with a small narrow ridge in anterior third. Elytra dark brown, intensity of coloration decreasing towards lateral margins and anteromesally; margins without setae; shoulder regions not accentuated; punctures moderately fine, not very strongly impressed, irregular; interspaces about as wide as punctures; coarser punctures present near lateral margin, without serial arrangement; sutural stria continuous with a series of minute black spots in anterior fourth, reaching scutellar shield. Mesoventrite distinctly elevated mesally, with a sharply pointed protuberance.

Legs: femora brown, less dark than ventrites; procoxa and protrochanter pubescent, without spine-like setae; metafemur (Fig. 61) with reduced pubescence, restricted to anterior half and proximal portion; horizontal hairline present; metatarsus shorter than metatibia.

Abdominal ventrites dark brown.

Aedeagus (Fig. 10): main piece of phallobase about as long as parameres, longer than wide; manubrium smoothly converging, extended into a wide, short lobe, slightly bent dorsad; without central infuscation; borderline between unpigmented and narrowly pigmented part of ventral face of phallobase almost reaching proximal edge. Lateral and mesal margins of parameres slightly curved; distance between lateral margins of parameres about as wide as distance between lateral margins of phallobase; apex narrow, basal portion wider than apical part; ventral portion of bases fused mesally, slightly extended into phallobase; dorsal portion very slightly curved, without extension into phallobase. Median lobe distinctly shorter than parameres; corona in apical position of median lobe; basal apophyses about as long as main piece of median lobe, reaching one-third of length of phallobase. Base of median lobe indistinctly connected with parameres.



**Etymology.** The epithet refers to the Mawar waterfall and is used as an adjective.

**Biology.** Found in the sandy substrate of small pools in primary forest.

**Differential diagnosis.** The specific status is mainly based on features of the aedeagus. It shares a horizontal metafemoral hairline with *A. fuscopunctata*, *A. maculata*, *A. brancuccii*, and *A. hajeki*; differs from these species in the elytral coloration (unicolored dark brown in *A. mawara*, “speckled” in *A. fuscopunctata* and *A. maculata*) and infuscation of maxillary palpomere 4 absent. It differs from all other species of the region in features of the aedeagus.

**Distribution.** Malaysia (Borneo).

### *Anacaena mazzoldii* sp.nov.

**Type locality:** Thailand, Loei Province, Phu Kradung National Park.

**Type material.** Holotype ♂ (NMW): Loei Prov., Phu Kradung N.P., 1150 m a.s.l., 29.XII.1999, P. Mazzoldi “19”. – Paratypes: 2 ♂♂, 5 ♀♀ (NMW): same sampling data; 1 ♂, 2 ♀♀ (NMW): Loei Prov., Phu Kradung N.P., 1250 m a.s.l., 28.XII.1999, P. Mazzoldi “15”; 2 ♀♀ (NMW): Loei Prov., Phu Kradung N.P., 1150 m a.s.l., 29.XII.1999, P. Mazzoldi “17”; 2 ♂♂, 2 ♀♀ (NMW): [Phitsanoluk Province] E Phitsanulok, Phu Hin Rongkla N.P., 15.XII.1999, P. Mazzoldi “5”; 2 ♂♂ (NMW): [Phitsanoluk Province] E Phitsanulok, Phu Hin Rongkla N.P., 1250 m a.s.l., 25.XII.1999, P. Mazzoldi “4”; 6 exs. (AEZS): Thailand, Phitsanuluk Province, Phu Hin Rongkla N.P., unnamed stream Sites, 3.iii.2002, Vitheepadit & Kirawanich “L-287”; 1 ♂ (NMW): Phu Hin Rongkla NP, Man Daeng Noi, margin, 16°57'N 101°03'E, 1600 m a.s.l., 15.xii.2002, CMU team.

**Description.** Total length 2.2–2.6 mm; maximum width 1.3–1.6 mm; E.I.: 1.02. Habitus: short-oval, with greatest width at mid-length; elytra about 2.6–3.0× as long as pronotum in dorsal view.

Head (Figs 28, 45): labrum, clypeus, and frons light brown; preocular patches absent. Irregular punctures very fine, indistinctly impressed; interspaces 1–3× as wide as punctures. Series of very indistinct, minute, densely arranged punctures present along inner margin of eyes. Clypeus long, straight anteriorly, with indistinct angles between lateral and anterior portion. Eyes not constricted anteriorly; dorsal and mesal portion of almost equal size. Frontoclypeal suture very indistinct. Pedicellus slightly longer than wide; antennomere 3 elongate, shorter than pedicellus; antennal apical club segment longer than wide. Maxillary palpomeres (Fig. 28) moderately slender; palpomere 2 distinctly inflated; palpomere 4 without infuscation, widest at mid-length, with distinctly curved outer margin and slightly curved inner margin. Mentum (Fig. 45) *c.* 1.7× as wide as long, slightly impressed anteriorly; lateral margins with very fine, soft setae, anterior margin with small, distinct mesal incision; ventral punctures widely spaced, fine, with slightly denser distribution anteriorly; labial palpi rather stout; slightly longer than lateral edge of mentum; palpomere 3 slightly longer and slightly wider than palpomere 2.

Thorax: pronotum yellowish-brown; two small, dark brown central patches narrowly separated; punctation obsolete. Prosternum slightly convex; carina or knob-like structure absent. Elytra light brown; ten darker brown longitudinal stripes present, indistinct in some cases, composed of small confluent spots; setae on margins absent; punctures very fine, weakly impressed, irregular; interspaces 1–4× as wide as punctures

mesally, about 2× as wide laterally, subseriate near lateral margins. Mesoventrite distinctly elevated mesally, with a pointed protuberance.

Legs: femora mostly dark brown, with less dark distal portion; tibia dark brown; procoxa and protrochanter pubescent with some spine-like setae on procoxa mesally; metafemur (Fig. 62) with pubescence on proximal four-fifths of ventral face and rounded hairline; metatarsus about as long as metatibia.

Abdominal ventrites dark brown.

Aedeagus (Fig. 11): main piece of phallobase shorter than parameres, about as long as wide; manubrium smoothly converging, extended into a moderately wide, short lobe; borderline between unpigmented and narrow pigmented part of ventral face of phallobase indistinctly visible, deep, not reaching proximal edge; lateral and mesal margins of parameres slightly curved; distance between lateral margins of parameres as wide as distance between lateral margins of phallobase; apex moderately wide, slightly pointing mesad; basal portion wider than apical part; ventral portion of bases visibly fused mesally, clearly reaching into phallobase; dorsal portion curved, without extension into phallobase. Median lobe distinctly shorter than parameres; corona in subapical position; basal apophyses longer than main piece of median lobe, almost reaching mid-length of main piece of phallobase. Base of median lobe indistinctly connected with parameres.

**Etymology.** The species is dedicated to the water-beetle specialist Paolo Mazzoldi (Brescia, Italy), who collected most of the types.

**Biology.** Found in streams.

**Differential diagnosis.** The specific status is mainly based on features of the aedeagus. It shares the pronotal coloration (small central patch, subdivided by a narrow median line) with *A. schillhammeri* and *A. nongfana*; may be distinguished from these species by the shape of the labial palpi (stout) and from all species of the region in features of the aedeagus.

**Distribution.** Thailand.

### *Anacaena minuscula* d'Orchymont, 1942

*Anacaena minuscula* d'Orchymont 1942: 47; KOMAREK 2006: 298 ff. (redescription).

**Type locality:** India, Tamil Nadu, Shembaganur (village), near Madurai.

**Type material examined.** Holotype ♂ (ISNB): "Chembaganor / Madura, Inde / coll. A. d'Orchymont [mounted on a yellow label: "Coll. R.I.Sc.N.B. / Inde"] \ A. d'Orchymont det. / *Anacaena / minuscula* m. \ Type". – Paratypes: VIETNAM: 4 exs. (ISNB): "Hanož / A. Grouvelle / coll. A. d'Orchymont [mounted on a yellow label: "Coll. R.I.Sc.N.B. / Nord / Vietnam"] \ Paratype"; 22 exs. (ISNB): "Hanož [handwritten] \ Coll. R.I.Sc.N.B. / Nord Vietnam: Hanož / ex coll. A. Grouvelle / coll. A. d'Orchymont \ Paratype".

**Description.** See KOMAREK (2006) and Figs: 12, 29, 46, 63 in this communication.

**Remarks.** *A. minuscula* is the only species occurring in India as well as in South-east Asia. The species has not been found in South-east Asia since its description by d'Orchymont, in contrast to many new records from the Indian Oriental region. This suggests that the Vietnamese sampling locality may possibly be erroneous.



**Biology.** The specimens from India were collected in streams, ponds and in hygropetric habitats.

**Differential diagnosis.** It differs from all other species of the region in the shape of the mesoventrite (with low horizontal ridge) and in features of the aedeagus.

**Distribution.** India, Tamil Nadu, Vietnam.

*Anacaena montana* sp.nov.

**Type locality:** South Vietnam, Lam Dong Province, Lac Duong District, Lang Bian (Lam Vien) Mountain.

**Type material.** Holotype ♂ (NMW): “S-Vietnam: 17.–21.4. / 12 km N Dalat 1995 / Lang Bian \ 12°03’N 108°27’E / 1580–1750 m / Pacholatko & Dembicky”. – Paratypes: 48 exs. (NMW): same sampling data; 1 ex. (NMW): “S-Vietnam: 28.–30.4. / 12 km N Dalat 1994 / Lang Bian / Pacholatko & Dembicky; 1 ex. (NMW): “S-Vietnam / 40 km NW An Khe / Buon Luoi , 620–750 m \ 14°10’N 108°30’E / 28.3.–12.4.1995 / Pacholatko & Dembicky”; 2 exs. (NMW): “S-Vietnam: 15.4.1995 / 16 km N Dalat-Ankroet / 1400 m 12°05’N 108°24’E / Pacholatko & Dembicky”.

**Description.** Total length 2.4–2.6 mm; maximum width 1.4–1.5 mm; E.I.: 1.14–1.25. Habitus: oblong-oval, high convex in lateral view, very slightly attenuated in dorsal view, with greatest width at mid-length; elytra about 2.8–3.6× as long as pronotum in dorsal view.

Head (Figs 30, 47): labrum yellow; clypeus light brown with distinct, large, yellow preocular patches of the size of one eye or larger; frons dark brown. Irregular punctures fine, distinctly impressed, densely arranged; interspaces about as large as punctures; setae absent; series of very indistinct, minute, densely arranged punctures present along inner margin of eyes. Clypeus long, with straight anterior margin and distinct, blunt angles between lateral and anterior portion. Eyes not constricted anteriorly; dorsal and mesal portion of almost equal size. Frontoclypeal suture visible on lateral portion. Pedicellus more than 2× longer than wide; antennomere 3 elongate, distinctly shorter than pedicellus; apical club segment longer than wide. Maxillary palpomeres (Fig. 30) slender; palpomere 2 distinctly inflated; palpomere 4 without infuscation, widest slightly distal to mid-length, with distinctly convex outer margin and slightly convex inner margin. Mentum (Fig. 47) c. 1.4× as wide as long, not distinctly impressed anteriorly; lateral margins with fringes of very fine, soft setae, anterior margin with shallow mesal incision; ventral punctures widely spaced, very fine, grouped in anterior half; labial palpi very stout; shorter than lateral edge of mentum; palpomere 3 not longer but distinctly wider than palpomere 2.

Thorax: pronotum yellow, with distinct dark brown central infuscation, consisting of one larger central patch merging with a smaller lateral patch on both sides. Punctuation fine, densely distributed; interspaces about 1–2× as large as punctures. Prosternum slightly convex, with a distinct knob-like extension projecting towards gula medially. Elytra light brown; ten dark brown longitudinal bands very distinct anteriorly and mesally, slightly less distinct and dissolving into discrete small spots laterally and posteriorly; margins without setae; shoulder regions slightly accentuated; punctures moderately fine, very strongly impressed, irregular, with some coarser punctures near lateral margin; interspaces about as wide as punctures, less wide on lateral margin;

sutural stria continuous with series of small black spots in anterior third, reaching scutellar shield. Mesoventrite distinctly elevated mesally, with a sharply pointed protuberance.

Legs: femora mostly dark brown; procoxa and protrochanter pubescent, with some spine-like setae; metafemur (Fig. 64) with extended pubescence and oblique hairline; metatarsus shorter than metatibia.

Abdominal ventrites dark brown, ventrite 5 without apical excision.

Aedeagus (Fig. 13): main piece of phallobase distinctly longer than parameres, markedly longer than wide; manubrium smoothly converging proximad, extended into a narrow lobe, strongly bent dorsad, with central infuscation; borderline between unpigmented and narrow pigmented part of ventral face of phallobase very deep, almost reaching proximal edge. Lateral and mesal margins of parameres very slightly curved; distance between lateral margins of parameres slightly wider than distance between lateral margins of phallobase; apex quite wide, pointing mesad; basal portion wider than apical part; ventral portion of bases fused mesally with slight extension into phallobase; dorsal portion slightly curved, with slight extension into phallobase. Median lobe shorter than parameres; corona in apical position; basal apophyses about as long as main piece of median lobe, not reaching mid-length of phallobase; base of median lobe distinctly connected with parameres by a small tooth.

**Etymology.** *Montanus* (Latin) = mountainous; the epithet refers to the mountains of Lang Bian where the specimens were found.

**Biology.** Unknown.

**Differential diagnosis.** The status as a species is mainly based on features of the aedeagus. It shares the stripes on the elytra and the shape of the phallobase (manubrium strongly bent dorsad) with *A. lamdongica*; may be distinguished from this species by the coloration of the pronotum (with circular-to-oval mesal infuscation in *A. lamdongica*). It differs from all species of the region in features of the aedeagus.

**Distribution.** Vietnam.

### *Anacaena nanica* (Gentili, 2002)

*Hebauerina nanica* Gentili, 2002:142–144.

*Anacaena nanica* (Gentili, 2002): syn. KOMAREK & BEUTEL 2007.

**Type locality:** Thailand, Nan Province, Doi Phu Kha National Park, Headquarter.

**Type material.** Holotype ♂ (NMW; aedeagus separately mounted on transparent card): “Tailand, N. Nan Prov. / Doi Phu Kha N.P. Headq. / 19°13'N, 101°07'E / 22.–26.IV.1999 / D. Hauck leg. \ Hebauerina nanica / gen. n. sp. n. Holotype / E. Gentili 2002 \ Holotype / E. Gentili / 2002“. – Paratypes: 1 ♂, 2 ♀♀ (CFH, MSNV, NMW): same sampling data.

**Other material examined.** 1 ♂, 1 ♀ (NMW): THAILAND: Nan [Province], Doi Phu Ka N.P., near Huai Nam Dan village, mountain stream with very clear water, in disturbed evergreen forest near village Huai Nam Dan, 1400 m a.s.l., with boulders and gravel, collected among sand and pebbles along the bank, 3.i.1999, P. Mazzoldi “26”; 3 exs. (NMW): Mae Hong Son [Province], Ban Huai Po, 1600–2000 m, 19°19'N 97°59'E, 17.–23.v.1991, L. Dembicky; 2 exs. (NMW): Mae Hong Son [Province], Ban Huai Po, 1600–2000 m, 19°19'N 97°59'E, 30.iv.–4.v.1991, L. Dembicky; 1 ♀ (NMW): Mae Hong Son [Province], Ban Si Lang, 1200m,



19°19'N 97°59'E, 23.–31.v.1991, L. Dembicky; 1 ♂ (NMW): [Chiang Mai Province], Doi Inthanon, Bang Khun Klang, 1200 m a.s.l., 18°32'N 98°32'E, 1989, Malicky & Chantaramongkol; 3 ♀♀ (NMW): Mae Hong Son [Province], Ban Si Lang, 1200 m a.s.l., 23.–31.v.1992, J. Horak; 2 ♀♀ (NMW): Doi Inthanon N.P., stream from Huai Sai Luang Waterfall, 1060 m a.s.l., 18°31'N 98°27'E, 20.iii.2002, Sites, Vitheepadit & Kirawanich “L-312”; 1 ♂ (CFH): Chiang Mai Prov., Doi Suthep, 1450 m a.s.l., 4.xi.1985, Burckhardt-Löbl; 1 ♂ (ZMUC): N-Thailand, Chiang Mai Province, Doi Inthanon, Nat. Park, Mae Klang, waterfall area, 20.x.1979, Zool Museum, Copenhagen Expedition; 1 ♂, 1 ♀ (ZMUC): N-Thailand, Chiang Mai Province, 7 km NW of Fang, Horticultural Experimental Station, 30.x.–2.xi.1979, Zool Museum, Copenhagen Expedition. LAOS: 1 ♂ (CFH): Laos NE, Hua Phan Prov., Ban Sakok, Phu Loei N.P., 20°10'N 103°12'E, 23.–26.v.2001, D. Hauck; 1 ex. (NMP): Laos, Louang Namtha Province, 20 km NW Louang Namtha (town), 21°09.2'N 101°18.7'E, 800–1000 m a.s.l., 5.–11.v.1997, M. Štrba & R. Hergovits; 258 exs. (NMB): Laos, Louang Namtha Province, Namtha–Muang Sing, 25 km NNW center of Louang Namtha (town), 21°09'17"N 101°19'13"E, 880 m a.s.l., at light and in a brook, 5.–31.v.1997, Vit. Kubán; 4 exs. (NMB): Laos, N, Oudomxai Province, 17 km NEE Oudomxai [Muang Xai], village on road to Muang Xai at 20°34'35"N 102°11'55"E, 1095 m a.s.l. (erroneously labelled 20°45'N 20°34'35"N 102°09'E, 1100 m), at light, in a brook, and collected by intercept trap, 1.–9.v.2002, Vit. Kubán; 18 exs. (NMB): Laos, Luangphrabang [Luang Prabang] Province, at border to Oudom Xai Province, 5 km W Ban Song Cha, road near bridge across Nam Miang River, 20°33–34'N 102°14'E 1200 m a.s.l., collected in brooks and at light, 1.–16.v.1999, Vit. Kubán. VIETNAM: 1 ♂: NMW): N-Vietnam: Thanh Hoa [Province], Cuc Phuong Nat. Park, 24.vi.1997, C. L. Li; 1 ♂ (NME): N-Vietnam, Tam Dao, 55 km NNW Hanoi, 800 m a.s.l., 15.–23.ix.1997, A. Napolov.

**Redescription.** Total length 2.2–2.7 mm; maximum width 1.4–1.7 mm; E.I.: 1.11–1.23. Habitus: oblong-oval, with greatest width at mid-length; elytra about 2.9–3.3× as long as pronotum in dorsal view.

Head (Figs 31, 48): labrum light brown; clypeus light brown with indistinct mesal infuscation of variable extension; frons darker. Irregular punctures very fine, very indistinctly impressed, widely spaced or obsolete in some cases; setae absent; series of very indistinct, minute, densely arranged punctures present along inner margin of eyes. Clypeus short, straight anteriorly; with very indistinct, blunt angles between lateral and anterior portion. Eyes not constricted anteriorly; dorsal and mesal portion of almost equal size. Frontoclypeal suture very indistinct. Pedicellus about 1.5× longer than wide; antennomere 3 distinctly longer than wide, shorter than pedicellus; apical club segment about 1.3× as long as wide. Maxillary palpomeres (Fig. 31) stout; palpomere 2 distinctly inflated; palpomere 4 entirely yellowish or with very indistinct apical infuscation, widest at mid-length, with distinctly convex outer margin and slightly convex inner margin. Mentum (Fig. 48) *c.* 1.8× as wide as long, slightly impressed anteriorly, lateral margins with very fine, soft setae; anterior margin with distinct mesal incision; ventral punctures widely spaced, evenly distributed, very fine; labial palpi stout; slightly longer than lateral edge of mentum, palpomere 3 slightly longer and distinctly wider than palpomere 2.

Thorax: pronotum with dark brown central infuscation of variable extension, not reaching anterior margin; intensity of coloration decreasing laterad, with wide yellowish margins; hind corners narrowly rounded; punctation very fine, very weakly impressed on lateral portion, obsolete mesally. Prosternum slightly convex, in some cases with minute knob-like antero-mesal extension. Elytra dark brown, or light brown with dark brown patch on accentuated shoulder region; indistinctly demarcated lighter areas present laterally, posteriorly, and anteromesally in some individuals; shortened rows of dark brown spots present on lateral portion, but very indistinct in some individuals; setae on margins absent; punctures very fine in anterior third, fine on posterior two-thirds; moderately impressed, irregular on most portions, tending to form irregular series on



some areas; rows of coarser punctures present near lateral margin; interspaces 1–2× as wide as punctures mesally, as large as punctures laterally. Sutural stria continuous with a series of small dark spots reaching scutellar shield. Mesoventrite distinctly elevated mesally, with sharply pointed protuberance.

Legs: femora largely dark brown, with lighter brown distal portion; tibia dark brown; procoxa and protrochanter pubescent without spine-like setae; metafemur (Fig. 65) pubescent on mesal two-thirds with oblique hairline; metatarsus shorter than metatibia.

Abdominal ventrites dark brown; ventrite 5 slightly truncate, without apical excision.

Aedeagus: (Fig. 14) main piece of phallobase about as long as parameres, slightly longer than wide; manubrium smoothly converging, extended into a long, narrow, slightly conical lobe; borderline between unpigmented and narrow pigmented part of ventral face of phallobase very indistinct, almost reaching proximal edge. Lateral and mesal margins of parameres very slightly curved; distance between lateral margins of parameres as wide as distance between lateral margins of phallobase; apex wide, pointing slightly mesad; basal portion slightly wider than apical part; ventral portion of bases visibly fused mesally, slightly reaching into phallobase; dorsal portion of bases distinctly curved, without extension into phallobase. Median lobe shorter than parameres; corona in subapical position; basal apophyses about as long as main piece of median lobe, not reaching mid-length of phallobase. Base of median lobe indistinctly connected with parameres.

**Biology.** Collected in forest streams, in mountain brooks, and at light.

**Differential diagnosis.** Aedeagus similar to that of *A. shepardi* (elongated manubrium); differs from this species in the shape of the metafemoral hairline (round in *A. shepardi*) and the shape of the palpi (slender in *A. shepardi*); shares an oblique metafemoral hairline with *A. feae* and *A. malaya*; from *A. malaya* it can be distinguished by features of the maxillary and labial palpi, from *A. feae* by the absence of preocular patches. From *A. lancifera* PU, 1963, a species widely distributed in China (KOMAREK 2012), it differs in the shape of the maxillary palpi (slender, asymmetrical in *A. lancifera*), the shape of the metafemoral pubescence (hairline semicircular in *A. lancifera*), and a feature of the basal lobe (manubrium with spine-like extension in *A. lancifera*).

**Remarks.** Based on apomorphies shared with species of *Anacaena*, the monotypic genus *Hebauerina* was synonymized by KOMAREK & BEUTEL (2007). The species is deeply nested within this genus. In contrast to GENTILI (2002), the head is not impunctate, but set with indistinct, very fine punctures; the humeral callosity, described as unique and thus one of the characters supposedly justifying the genus status of *Hebauerina*, is also found in other species of *Anacaena*; abbreviated series of coarser punctures on the lateral portion of the elytra are present in most species of *Anacaena*; a bulge is present on the prosternum but a keel is absent.

Differences in the shape and length/width ratio of the mentum and the labial palpomere 3 between the individuals from Thailand and Vietnam can be observed; however, these differences are very subtle and do not justify the status of a separate species.

**Distribution.** Laos, Thailand, and Vietnam.



*Anacaena nongfana* sp.nov.

**Type locality:** Laos, Attapeu Province, Annam Highlands Mountains, Dong Amphan, Nong Fa (crater lake).

**Type material.** Holotype ♂ (NMP) "Laos, Attapeu Prov. / Annam Highlands Mts / Dong Amphan NBCA, ca. 1160 m a.s.l. / Nong Fa (crater lake), env. / 15°05.9'N, 107°25.6'E / Jiří Hájek leg. 30.iv.–6.v.2010". – Paratypes 1 ♂, 1 ♀ (NMP, NMW): same sampling data.

**Description.** Total length 2.4–2.7 mm; maximum width 1.5–1.7 mm; E.I.: 1.18. Habitus: oblong-oval, with greatest width at mid-length; not attenuated towards apex; elytra about 2.9× as long as pronotum in dorsal view.

Head (Figs 32, 49): labrum, clypeus and frons light brown; intensity of coloration on clypeus decreasing laterad or with very indistinctly demarcated yellow preocular patches. Irregular punctures fine, quite weakly impressed; interspaces about 1–3× as large as punctures; setae absent; series of indistinct, minute, densely arranged punctures along inner margin of eyes very indistinct. Clypeus large, straight anteriorly, with blunt angles between lateral and anterior portion. Eyes not constricted anteriorly; dorsal and ventral portion of almost equal size. Frontoclypeal suture very indistinct, visible on lateral third of clypeus. Antennomere 3 not elongate; apical segment of antennal club longer than wide. Maxillary palpomere 2 slightly inflated; palpomere 4 widest slightly distal to mid-length, slender with straight inner margin and slightly convex outer margin; apical infuscation absent (Fig. 32). Mentum (Fig. 49) c. 1.7× as wide as long; lateral margins with dense fringes of long, very fine setae; anterior margin with deep distinct mesal incision; ventral punctures minute, widely spaced, evenly distributed; labial palpi very slender, longer than lateral edge of mentum; palpomere 3 slightly longer than palpomere 2.

Thorax: pronotum yellowish-brown; two small, dark brown central patches narrowly separated; punctation obsolete; lateral margins slightly curved, posterolateral corners quite narrowly rounded; lateral margin without setae. Prosternum without reinforcement or bulge. Elytra light brown, with yellowish lateral, posterior and anteromedial regions; lateral borders without setae; shoulder regions not accentuated; punctures fine, weakly impressed, shallow; arrangement irregular; some subseriate rows present on lateral areas; interspaces 1–2× as wide as punctures. Mesoventrite distinctly elevated mesally, with sharply-pointed protuberance.

Legs: dark brown; procoxa and protrochanter without spine-like setae; metafemur (Fig. 66) extensively pubescent except distal portion, with rounded hairline; metatarsus about as long as metatibia.

Aedeagus (Fig. 15): main piece of phallobase longer than parameres, longer than wide; manubrium smoothly converging, extended into a short, narrow lobe; borderline between pigmented and central unpigmented part of ventral face of phallobase very indistinct, reaching almost to manubrium; pigmented median line present on base of manubrium. Lateral and mesal margins of parameres slightly curved; mesal margin with slight bulge in apical half; distance between lateral margins of parameres as wide as diameter of phallobase; apex moderately wide, asymmetrical, slightly pointing mesad; basal portion slightly wider than apical part; ventral portion of bases fused, deeply reaching into phallobase; dorsal portion distinctly curved, not distinctly reaching into phallobase. Median lobe distinctly shorter than parameres, with margins in straight

convergence in apical half; corona in apical position; basal apophyses distinctly longer than main piece of median lobe, attaining less than mid-length of phallobase. Base of median lobe distinctly connected with parameres by a mesal tooth.

**Etymology.** The epithet refers to the type locality Nong-Fa, and is used as an adjective.

**Biology.** Collected together with *Anacaena hajeki* in muddy puddles and in forest pools (see under *A. hajeki*).

**Differential diagnosis.** The status as a species is mainly based on features of the aedeagus. It belongs among the species with an extended pubescence and a round hairline on the metafemur; as in *A. mazzoldii* and *A. schillhammeri* the small central pronotal patch is subdivided by a narrow median line; it may be distinguished from all other species of the region by features of the aedeagus.

**Distribution.** Laos.

### *Anacaena schillhammeri* sp.nov.

**Type locality:** Myanmar, Shan state, ca. 10 km NE Kalaw.

**Type material.** Holotype ♂ (NMW): “Shan State / ca. 10 km NE Kalaw / leg. H. Schillhammer, U / Myint Hlaing, U Aung / Moe, 30.5.2002 (MBS 79) \ small stream / ca. 1480 m / 20°41.45'N / 96°34.32'E”. – Paratypes: MYANMAR: 8 exs. (NMW): same data. THAILAND: 4 ♂♂, 3 ♀♀ (NMW): Samut Sakhon Province, Phu Pen N.P., 480–520 m a.s.l., 7.–8.XII.1995, P. Schwendinger. LAOS: 1 ♂, 1 ♀ (NMP, NMW): Laos, Houa Phan Province, 20°13'09–19"N 103°59'54"–104°00'03"E, 1480–1510 m a.s.l., Phou Pane Mt., 22.iv.–14.v.2008, Vít Kubáň; 1 ♂ (NMW): Laos NE, Hua Phan Prov., “Xamneua State” [Sam Neua is the capital of the Province], a creek between Salesi and Ph-Pan, 1453 m a.s.l., 20°13'07.1"N 103°59'58.9"E, 20.–23.v.2004, M.I Jeng; 1 ♂, 2 ♀ (NMB): Laos, Bolikhamsai Province, 8 km NE Ban Nape, 18°21'N 105°08'E, ca. 600 m a.s.l., 1.–18.v.2001, Vít Kubáň.

**Description.** Total length 2.1–2.5 mm; maximum width 1.3–1.6 mm; E.I.: 1.07–1.20. Habitus: quite oblong-oval, with greatest width at mid-length; elytra about 3.0–3.2× as long as pronotum in dorsal view.

Head (Figs 33, 50): labrum, clypeus, and frons light brown; preocular patches absent; lateral parts of frons slightly darker. Irregular punctures very fine, indistinctly impressed; interspaces 1–3× as wide as punctures; series of very indistinct, minute, densely arranged punctures present along inner margin of eyes. Clypeus long, straight anteriorly, with indistinct angles between lateral and anterior portion. Eyes not constricted anteriorly; dorsal and mesal portion of almost equal size. Frontoclypeal suture very indistinct. Pedicellus distinctly longer than wide; antennomere 3 elongate, shorter than pedicellus; apical club segment longer than wide. Maxillary palpomeres (Fig.33) slender; palpomere 2 distinctly inflated; palpomere 4 without infuscation, widest at mid-length, with distinctly convex outer margin and slightly convex inner margin. Mentum (Fig. 50) *c.* 1.9× as wide as long, slightly impressed anteriorly; lateral margins with very fine, soft setae; anterior margin with small, distinct mesal incision; ventral punctures widely spaced; labial palpi slender; slightly longer than lateral edge of mentum; palpomere 3 slightly longer, not wider than palpomere 2.

Thorax: pronotum yellowish-brown; two small, dark brown central patches narrowly separated; punctation very fine to obsolete. Prosternum slightly convex; carina



or knob-like structure absent. Elytra dark brown with very wide, light brown margins; setae on margins absent; shoulder regions not accentuated; punctures very fine, weakly impressed, irregular; interspaces 1–3× as wide as punctures; coarser or subseriate punctures along lateral margins absent. Mesoventrite distinctly elevated mesally with a pointed protuberance.

Legs: femora and tibiae mostly dark brown; femora with slightly lighter distal portion; procoxa and protrochanter pubescent, without spine-like setae; metafemora (Fig. 67) extensively pubescent, with rounded hairline; metatarsus about as long as metatibia.

Abdominal ventrites dark brown.

Aedeagus (Fig.16): main piece of phallobase as long as parameres or slightly shorter, about as long as wide; manubrium smoothly converging, extended into a narrow lobe; borderline between unpigmented and narrow pigmented part of ventral face of phallobase indistinct, not reaching proximal edge. Lateral and mesal margins of parameres slightly curved; distance between lateral margins of parameres slightly wider than distance between lateral margins of phallobase; apex rather narrow, pointing slightly mesad; basal portion slightly wider than apical part; ventral portion of bases visibly fused mesally, distinctly reaching into phallobase; dorsal portion curved, with very slight extension into phallobase. Median lobe slightly shorter than parameres; corona in apical position; basal apophyses shorter than main piece of median lobe, not reaching mid-length of phallobase. Base of median lobe distinctly connected with parameres by a small tooth.

**Etymology.** The species is dedicated to the entomologist Harald Schillhammer (NMW) who collected the type specimens in Myanmar.

**Biology.** In small streams; also collected at light and with intercept trap (Kubáň, personal communication).

**Differential diagnosis.** The status as a species is mainly based on features of the aedeagus. It belongs among the species with an extended pubescence and a round hairline on the metafemur; as in *A. mazzoldii* and *A. schillhammeri* the small central pronotal patch is subdivided by a narrow median line; can be distinguished from all other species of the region by features of the aedeagus.

**Distribution.** Laos, Myanmar, and Thailand.

### *Anacaena shepardi* sp.nov.

**Type locality:** Thailand, Chayaphum Province, Phu Kieo Wildlife Sanctuary.

**Type material.** Holotype ♂ (NMW): “[Thailand] Chayaphum [Province], Phu Kieo Wildl. Sanct., trib. to Huai Prom Mai, [16°26.04’N, 101°35.90’E], 5.iv.1994, W. Shepard “WDS A 1054”. Additional information provided by W. Shepard: water cool, clear and tea-colored, with no to very slow current, substrate mud and gravel over bedrock with moss on sides, collecting on shore and stream substrate by use of a large, relatively fine-meshed net, collected together with hemipterans (gerriids, veliids, hydrometrids and mesoveliids), larvae of psephenids, adult dryopids and several limnichids. – Paratypes: THAILAND: 4 ♀♀ (NMW): same sampling data; Loei Province: 1 ♂ 1 ♀ (NMW): Na Haew NP, Nam Tok Wahng Tahd, 750 m a.s.l., 17°28’N 100°57’E, 9.iii.2002, CMU team; 63 exs. (NMW, EMBC): Tak Province, Road Mae Sot–Umphang, 60 km



from Mae Sot, 1200 m a.s.l., 29.xii.1996, P. Mazzoldi; 3 ♂♂, 4 ♀♀ (NMW): Phetchabun Province, Lomsak district, Nam Nao N.P., 1100 m a.s.l., 2.i.1997, P. Mazzoldi; 1 ♀ (NMW): Phetchabun Province, 36 km SE Sila, Huai Nam Phang, at km 52 on Hwy 2216, muddy water with iron deposits, slow current, 8 m wide and 1–2 m deep, over mud substrate with leaf detritus, in a shaded ravine high on a hillside, heavily overgrown with vines and bushes, the collector had to almost tunnel through the vegetation, many associated dryopids, one limnichid, several *Timasius*, *Mesovelgia*, *Microvelia* and *Metrocoris*, 2.iii.1994, W. Shepard “WDS A 1024”; 1 ♂, 1 ♀ (NMW): Phetchabun Province, Nam Nao N.P., 24.xi.1995, H. Zettel “22”; 1 ♂ (NMW): Phetchabun Province, 37 km SE Sila, 25.xi.1995, H. Zettel “26”; 2 ♂♂ (NMW): Phetchabun Province, 36 km SE Sila, Ban Pala Yai, 25.xi.1995, H. Zettel “27”; 1 ♀ (NMW): Nakhon Ratchasima Province, Kao Yai N.P., 14.xi.1988, M. Jäch “3”; 1 ♀ (NMW): Chiang Mai Province, Mae Chem–Mae Hong Son, 1000 m a.s.l., 29.xii.1998, P. Mazzoldi “15”; 2 exs. (NMW): Chiang Mai Prov., Suthep Pui NP, creek from Mohk Fah Waterfall, leaf pack, 564 m a.s.l., 19°06'N 98°46'E, 25.iii.2003, Sites, Vitheepadit & Prommi teams “L-415”; 1 ♂ (NMW): Chiang Mai [Province] Doi Suthep, Huai Palad, stream falls, 660 m a.s.l., 15.i.2009, leg. H. Zettel & S. Silalom “60”; 1 ♂ (AEZS): Thailand, Chiang Mai Prov., Doi Inthanon N.P., Nam Tok Vachiratharn, 650 m a.s.l., 18°31'N 98°27'E, 3.iii.2002, Vitheepadit & Kirawanich “L-256”; 3 ♂♂ (AEZS): Nan Province, Mae Charim N.P., Nam Wa River, 18°36'N 100°59'E, 335 m a.s.l., 23.iv.2003, Prommi, Setaphan “L-478”. LAOS: 1 ♂ (NMB); Luangphrabang [Luang Prabang] Province, Thong Khan, 19°35'N 101°58'E, 750 m a.s.l., 11.–21.v.2002, Vít Kubáň. MYANMAR: 6 exs. (NMW): Sagaing Div., Alaungdaw Katthapa NP, Pagoda Stream below Log Cabin Camp, sifted from wet leaf litter accumulated along stream, 5.v.2003, D. Boukal “MBS 104”; 18 exs. (NMW): Sagaing Div., Alaungdaw Katthapa NP, Pagoda Stream below Log Cabin Camp, ca. 350 m a.s.l., 22°19.094'N 94°28.823'E, 09.–10.v.2003, D. Boukal “MBS 118”; 3 exs. (NMW): Sagaing Division, Alaungdaw Katthapa NP, Pagoda Stream near Log Cabin Camp, ca. 350 m a.s.l., 22°19.094'N 94°28.823'E, 06.v.2003, D. Boukal “MBS 110”; 4 exs. (NMW): Sagaing Div., Alaungdaw Katthapa NP, Pagoda Stream upstream of Log Cabin Camp, ca. 360 m a.s.l., 22°19.084'N 94°28.744'E, 07.v.2003, D. Boukal “MBS 113”; 1 ex. (NMW): Sagaing Div., Alaungdaw Katthapa NP, Khaung Din Stream, ca. 450 m a.s.l., between 22°18.360'N 94°25.937'E and 22°19.650'N 94°25.768'E, small stream, 11.v.2003, D. Boukal “MBS 119”.

**Description.** Total length 2.3–2.6 mm; maximum width 1.3–1.5 mm; E.I.: 1.09–1.22. Habitus: quite short-oval, with greatest width at mid-length; not attenuated; elytra about 2.8–3.5× as long as pronotum in dorsal view.

Head (Figs 34, 51): labrum light brown, clypeus and frons dark brown; clypeus with yellowish preocular patches, or light brown with indistinct medial infuscation of variable extent. Irregular punctures very fine, indistinctly impressed, mixed with some coarser punctures; interspaces 1–3× as wide as punctures; series of very indistinct, minute, densely arranged punctures present along inner margin of eyes. Clypeus long, straight anteriorly, with indistinct angles between lateral and anterior portion. Eyes not constricted anteriorly; dorsal and mesal portion of almost equal size. Frontoclypeal suture indistinct or not visible. Pedicellus distinctly longer than wide; antennomere 3 elongate, shorter than pedicellus; apical club segment distinctly longer than wide. Maxillary palpomeres (Fig. 34) slender; palpomere 2 weakly inflated; palpomere 4 widest slightly distal to mid-length, with distinctly curved outer margin and almost straight inner margin; terminal infuscation in apical fourth distinct, indistinct or absent. Mentum (Fig. 51) *c.* 1.8× as wide as long, slightly impressed anteriorly; lateral margins with very fine, soft setae, anterior margin with distinct mesal incision; ventral punctures widely spaced; labial palpi slender, longer than lateral edge of mentum; palpomere 3 slightly longer and very slightly wider than palpomere 2.

Thorax: pronotum yellowish-brown; small, circular dark brown patch in central region not reaching anterior and posterior margin; two distinctly smaller dark brown spots on either side of central patch present in many individuals; punctuation almost obsolete. Prosternum slightly convex, without carina or knob-like structure. Elytra



brown, with indistinct lighter areas laterally, posteriorly, and anteromesally present in some individuals. Setae on margins absent; shoulder regions slightly accentuated. Punctures very fine, weakly impressed, irregular; interspaces 1–2× as wide as punctures; subseriate rows near lateral margins absent or very indistinct, not coarser than mesal punctures. Mesoventrite distinctly elevated mesally, with a pointed protuberance.

Legs: femora mostly dark brown, in some cases with brighter distal portion; tibia dark or light brown; procoxa and protrochanter pubescent, with some spine-like setae on procoxa mesally; metafemur (Fig. 68) almost completely pubescent except apical portion and rounded hairline; metatarsus almost as long as metatibia.

Abdominal ventrites dark brown.

Aedeagus (Fig. 17): main piece of phallobase slightly shorter than parameres, about as long as wide; manubrium smoothly converging proximad, extended into a long, narrow lobe; borderline between unpigmented and narrow pigmented part of ventral face of phallobase very indistinct, almost reaching proximal edge. Lateral and mesal margins of parameres very slightly curved; distance between lateral margins of parameres as wide as distance between lateral margins of phallobase; apex wide, asymmetrical, not distinctly pointing mesad; basal portion slightly wider than apical part; ventral portion of bases visibly fused mesally, reaching slightly into phallobase; dorsal portion distinctly curved, without extension into phallobase. Median lobe slightly shorter than parameres; corona in subapical position; basal apophyses about as long as main piece of median lobe or very slightly shorter, not reaching mid-length of phallobase. Base of median lobe indistinctly connected with parameres.

**Etymology.** The species is dedicated to the entomologist W. Shepard (Essig Museum, Berkeley, California) who collected the holotype and provided valuable information on collecting details and the ecology.

**Biology.** Collected in stagnant water or streams with a slow current.

**Differential diagnosis.** The status as a species is mainly based on features of the aedeagus. Very similar to *A. latepatens*, but may be distinguished from this species in most cases by the pronotal coloration (with three merging patches), a different metafemoral hairline (round, more expanded), and always by features of the aedeagus (apex of parameres wide). *A. shepardi* shares a similar aedeagus with *A. nanica* and differs from this species in the following characters: clypeus slightly larger; pedicellus distinctly longer than wide; maxillary palpomeres slender, palpomere 2 weakly inflated, palpomere 4 with almost straight inner margin; shape of mentum slightly different; labial palpi slender, palpomere 3 not wider than palpomere 2; pronotum with small round central patch; elytral punctures weakly impressed, lateral subseriate punctures very slightly coarser; sutural stria slightly shorter; procoxa with some spine-like setae; metafemur with round hairline, metatarsus about as long as metatibia. Differs from all other species of the region by features of the aedeagus.

**Distribution.** Laos, Myanmar, and Thailand.

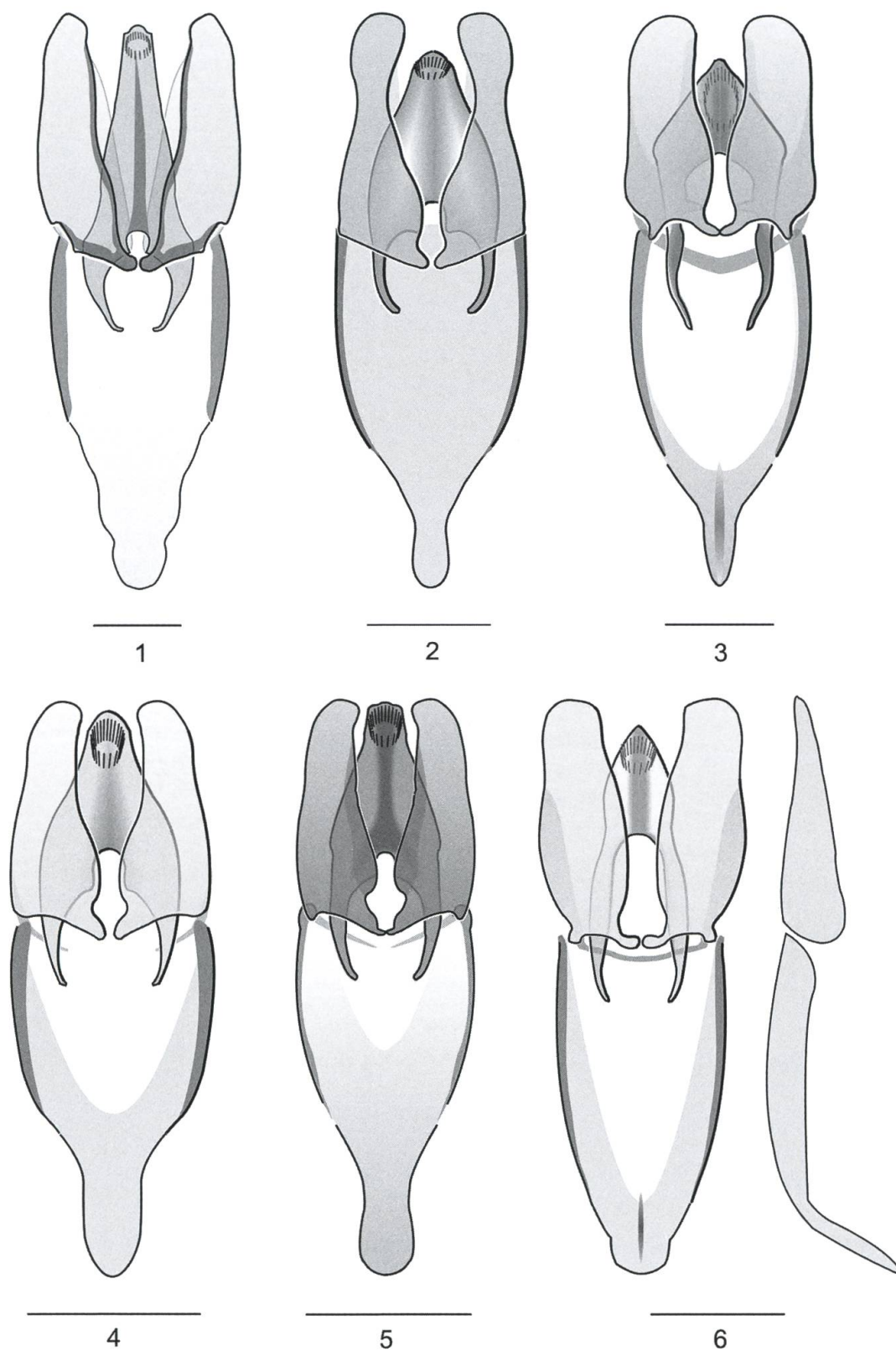
### Key to the species

Due to the individual variability of characters, the features used in the key may be misleading in some cases. Close examination of the aedeagus is therefore recommended. The females of some species cannot be identified with certainty.

1. Mesoventrite with a low horizontal ridge. .... ***minuscula***  
 – Mesoventrite with a high horizontal ridge or with a high, pointed protuberance. .... 2.
2. Pubescence on metafemur on anterior half with horizontal hairline (Figs 52, 55, 56, 60, 61). Elytra speckled or unicolored dark brown. .... 3.  
 – Pubescence on metafemur extended, with rounded (Figs 54, 57, 58, 62, 64, 66, 67, 68) hairline or reduced pubescence with oblique (Figs 53, 65, 59) hairline. Elytra not speckled, unicolored brown or with alternating dark and light brown longitudinal stripes. .... 7.
3. Elytra distinctly speckled; aedeagus: Figs 4, 9. .... 6.  
 – Elytra unicolored, dark brown. .... 4.
4. Maxillary palpomere 4: infuscation absent (Fig. 27); aedeagus: Fig. 10. .... ***mawara***  
 – Maxillary palpomere 4 with distinct infuscation (Figs 18, 22); aedeagus: Figs 1, 5. .... 5.
5. Body length 2.6–2.7 mm; pronotum dark brown with narrow yellow lateral margins, aedeagus: Fig. 1. .... ***brancuccii***  
 – Body length 1.8–2.1 mm; pronotum yellowish with a central dark brown patch accompanied by two smaller patches on each side; aedeagus: Fig. 5. .... ***hajeki***
6. Maxillary palpomere 4 (Fig. 21): infuscation absent or very indistinct; aedeagus: Fig. 4. .... ***fuscopunctata***  
 – Maxillary palpomere 4 (Fig. 26) with distinct infuscation; aedeagus: Fig. 9. .... ***maculata***
7. Pubescence on metafemur with oblique hairline, at least in posterior half (Figs 53, 65, 59). .... 8.  
 [A. *latepatens* (Fig. 59) is listed twice, because the metafemoral hairline is slightly oblique and might be considered as “rounded” in some individuals.]  
 – Pubescence on metafemur with rounded (Figs 54, 57, 58, 59, 62, 64, 66, 67, 68) hairline. .... 10.
8. Clypeus with yellowish preocular patches; mesoventrite with horizontal ridge; maxillary palpi stout (Fig. 19); aedeagus: Fig. 2. .... ***feae***  
 – Clypeus with or without yellowish preocular patches; mesoventrite with high, pointed protuberance; maxillary palpi stout (Fig. 31) or slender (Fig. 25). .... 9.

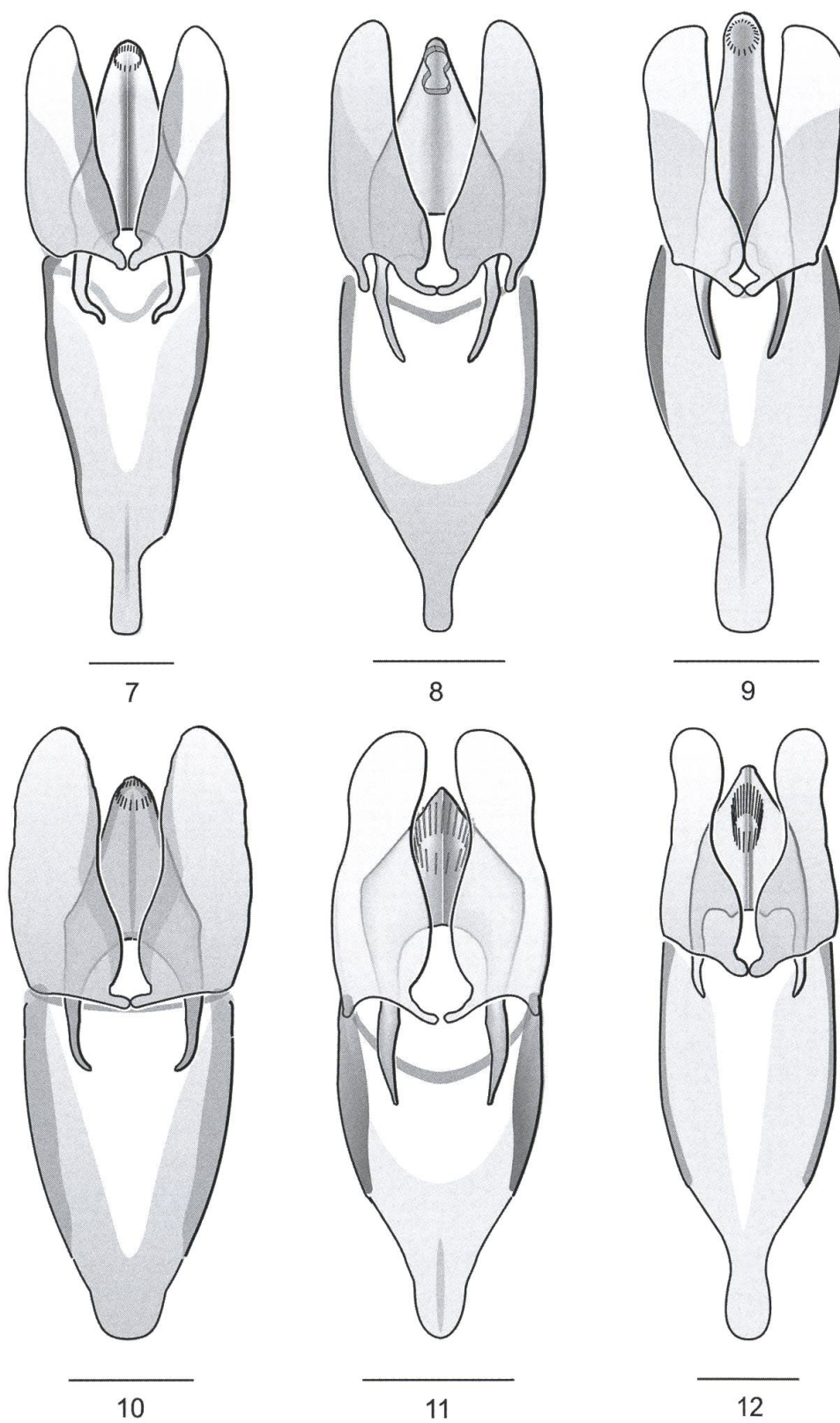


9. Maxillary and labial palpi stout (Fig. 31); aedeagus: Fig. 14. ... *nanica*  
 – Maxillary and labial palpi slender (Fig. 25); aedeagus: Fig. 8. .... *latepatens*
10. Pronotum with central dark brown patch, subdivided by a narrow median line (subdivision indistinctly visible in some cases). ..... 11.  
 – Pronotum largely dark brown or with a single central dark brown patch, accompanied by two smaller patches on each side in some species. .... 13.
11. Labial palpi stout (Fig. 45); aedeagus: Fig. 11. .... *mazzoldii*  
 – Labial palpi slender (Figs 59, 50); aedeagus: Figs 15, 16. .... 12.
12. Aedeagus: basal apophyses of median lobe short (Fig. 16). .... *schillhammeri*  
 Aedeagus: basal apophyses of median lobe long (Fig. 15). ... *nongfana*
13. Pronotum yellowish-brown with dark brown trapezoidal patch in mesal third. .... 14.  
 – Pronotum largely dark brown or with shape of central dark brown patch not trapezoidal. .... 15.
14. Aedeagus: basal apophyses of median lobe short (Fig. 7). .... *laotica*  
 – Aedeagus: basal apophyses of median lobe long (Fig. 3). .... *fikaceki*
15. Pronotum yellowish-brown with three dark brown patches in mesal third: a larger central patch and a smaller patch on each side; patches isolated from each other or partially confluent; aedeagus: Figs 13, 17. .... 16.  
 – Pronotum dark brown with narrow, yellowish-brown lateral margins (intensity of coloration decreasing towards lateral margins) or pronotum yellowish brown with dark brown, transverse-oval shaped patch in mesal third; aedeagus: Figs 6, 8. .... 17.
16. Clypeus with yellowish preocular patches; elytra with alternating dark and light brown longitudinal stripes; aedeagus with strongly bent manubrium: Fig. 13. .... *montana*  
 – Clypeus with or without yellowish preocular patches; elytra unicolored dark brown; aedeagus with conically elongate manubrium: Fig. 17. .... *shepardi*
17. Elytra with alternating dark and light brown longitudinal stripes; aedeagus: Fig. 6. .... *lamdongica*  
 – Elytra unicolored dark brown; aedeagus: Fig. 8. .... *latepatens*

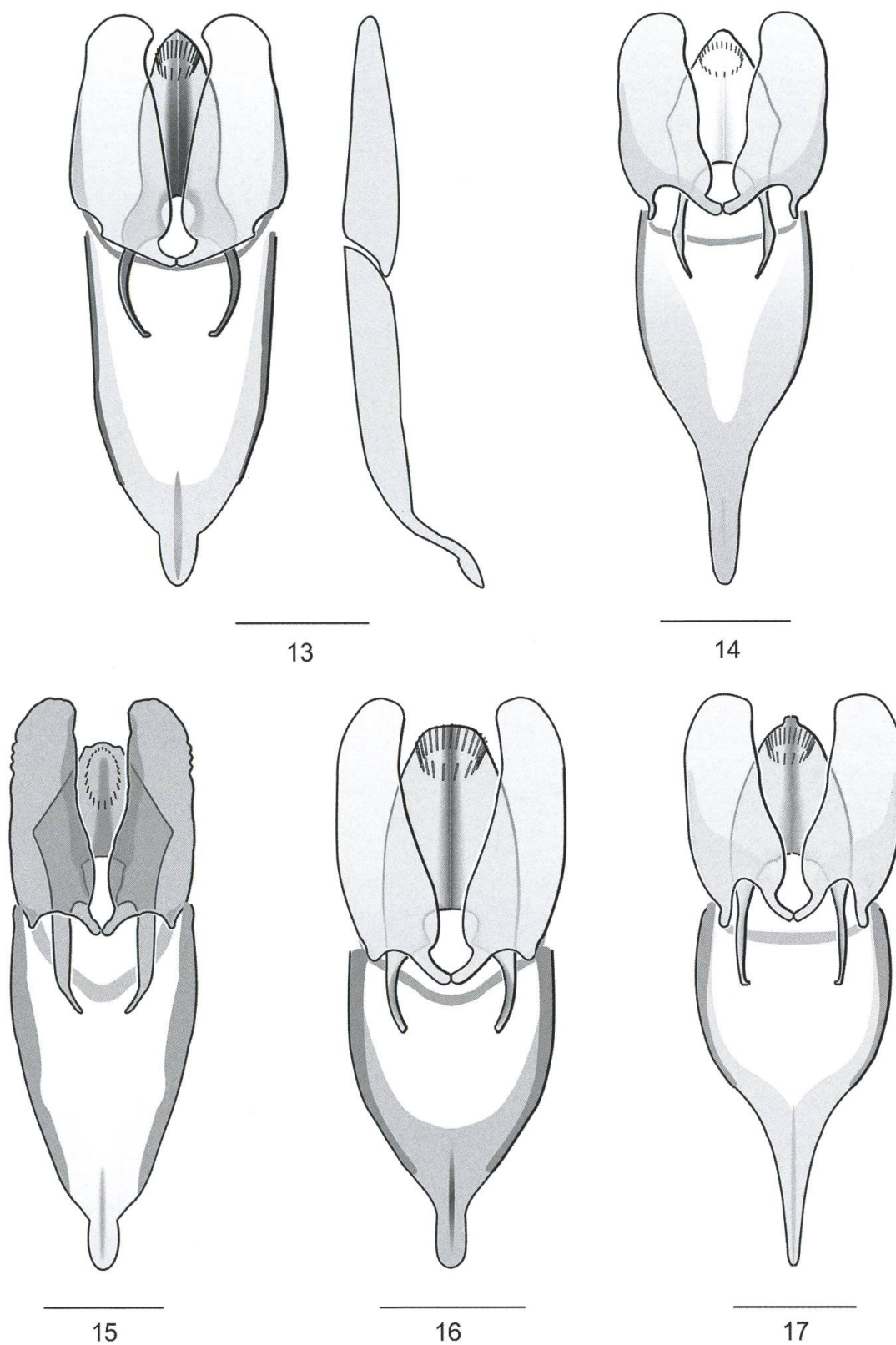


**Figs 1–6.** Aedeagus: 1 – *Anacaena brancuccii*; 2 – *A. feae*; 3 – *A. fikaceki*; 4 – *A. fuscopunctata*; 5 – *A. hajeki*; 6 – *A. lamdongica* (dorsoventral and lateral view). Scale bar = 0.1 mm.



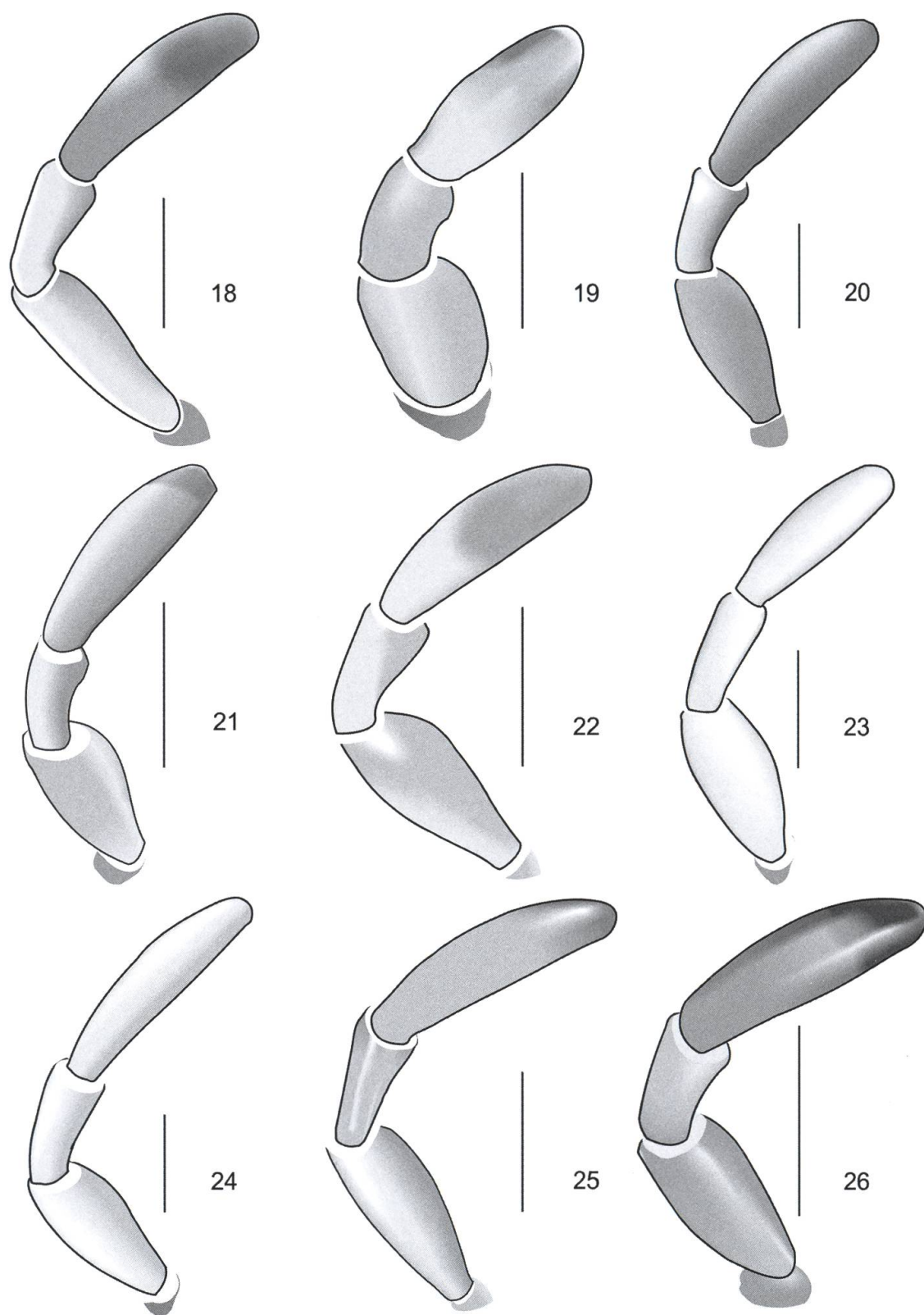


**Figs 7–12.** Aedeagus: 7 – *Anacaena laotica*; 8 – *A. latepatens*; 9 – *A. maculata*; 10 – *A. mawara*; 11 – *A. mazzoldii*; 12 – *A. minuscula*. Scale bar = 0.1 mm.

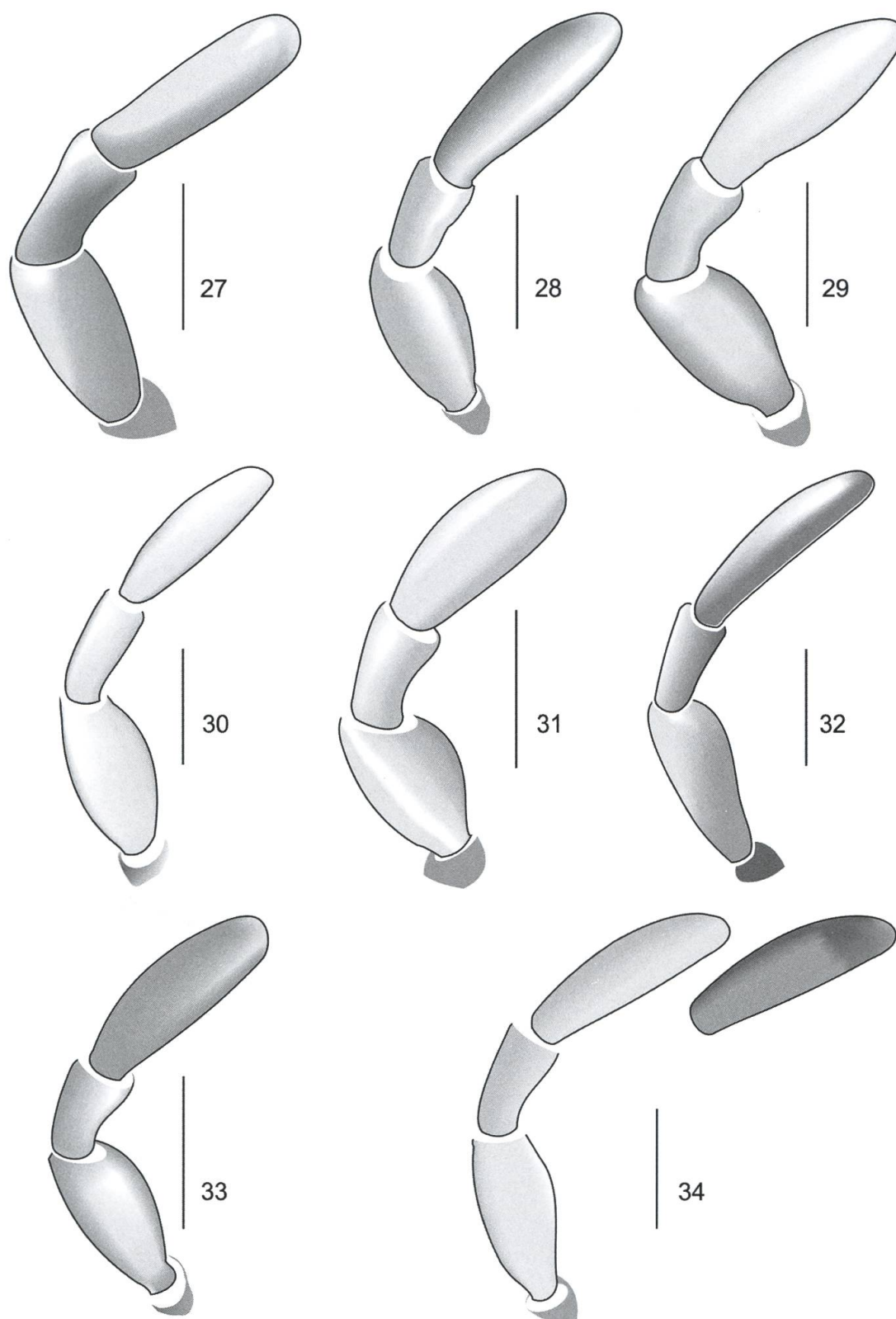


**Figs 13–17.** Aedeagus: 13 – *Anacaena montana* (dorsoventral and lateral view); 14 – *A. nanica*; 15 – *A. nongfana*; 16 – *A. schillhammeri*; 17 – *A. shepardi*. Scale bar = 0.1 mm.



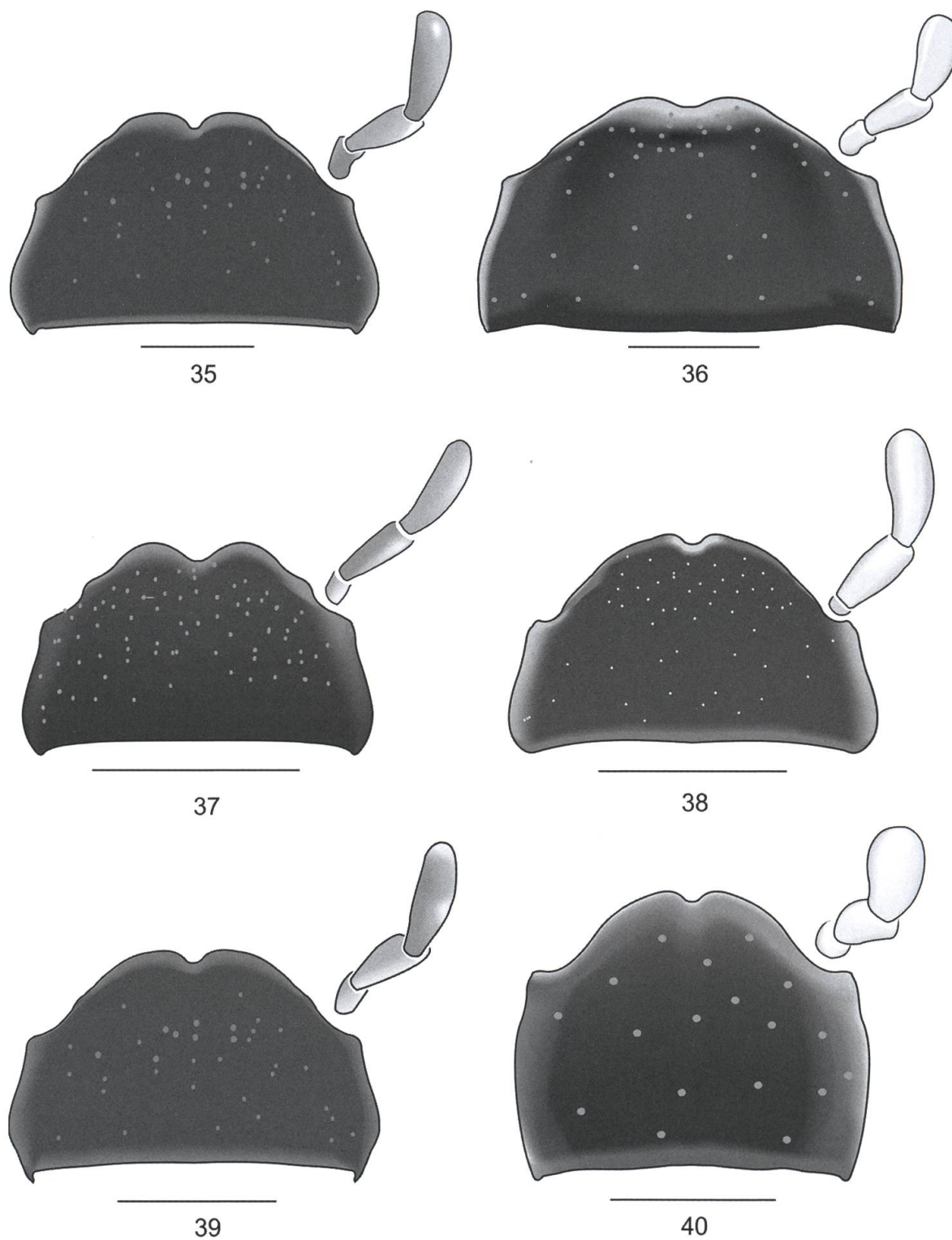


**Figs 18–26.** Maxillary palpi: 18 – *Anacaena brancuccii*; 19 – *A. feae*; 20 – *A. fikaceki*; 21 – *A. fuscopunctata*; 22 – *A. hajeki*; 23 – *A. lamdongica*; 24 – *A. laotica*; 25 – *A. latepatens*; 26 – *A. maculata*. Scale bar = 0.1 mm.

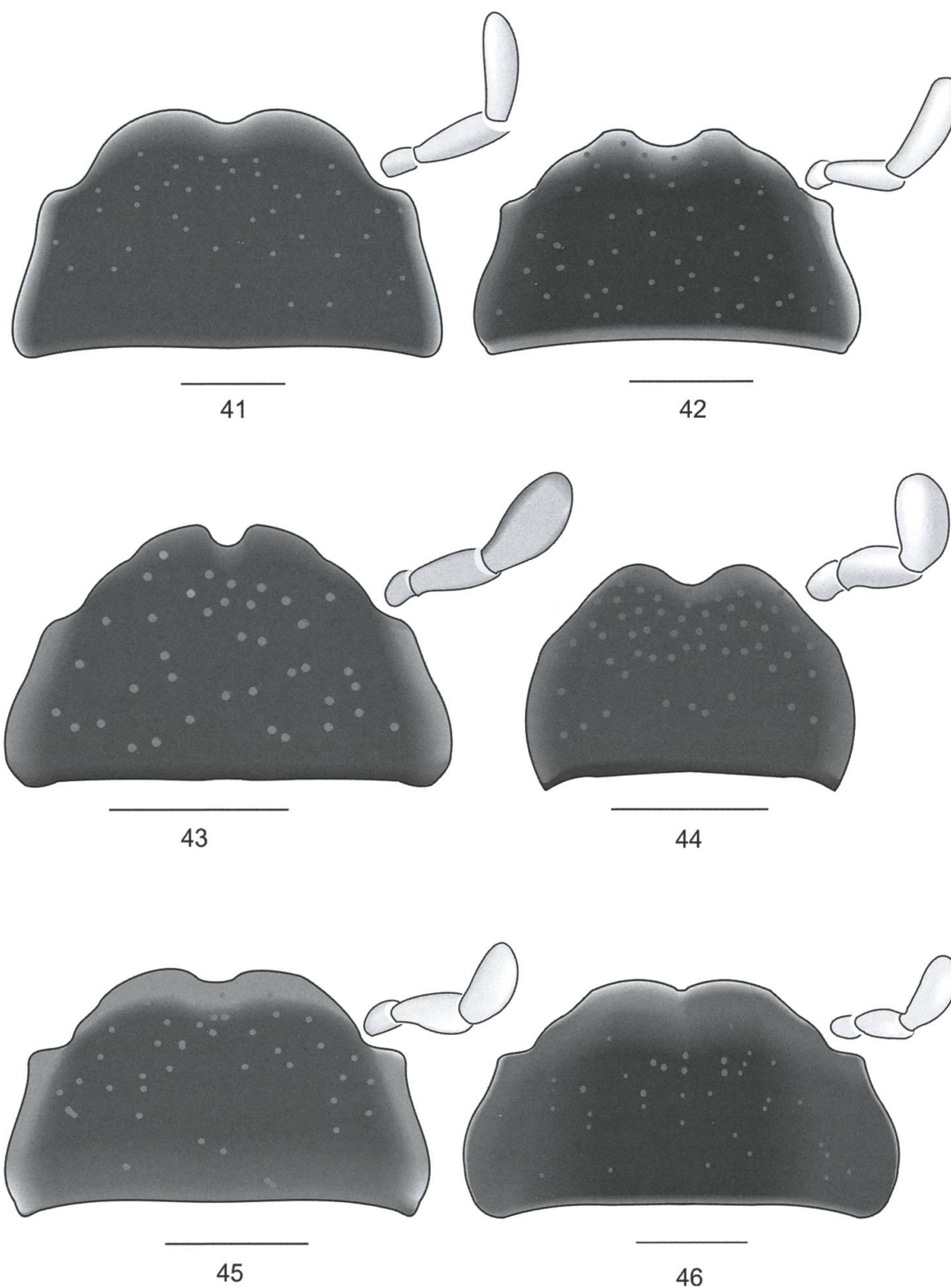


**Figs 27–34.** Maxillary palpi: 27 – *Anacaena mawara*; 28 – *A. mazzoldii*; 29 – *A. minuscula*; 30 – *A. montana*; 31 – *A. nanica*; 32 – *A. nongfana*; 33 – *A. schillhammeri*; 34 – *A. shepardii*. Scale bar = 0.1 mm.



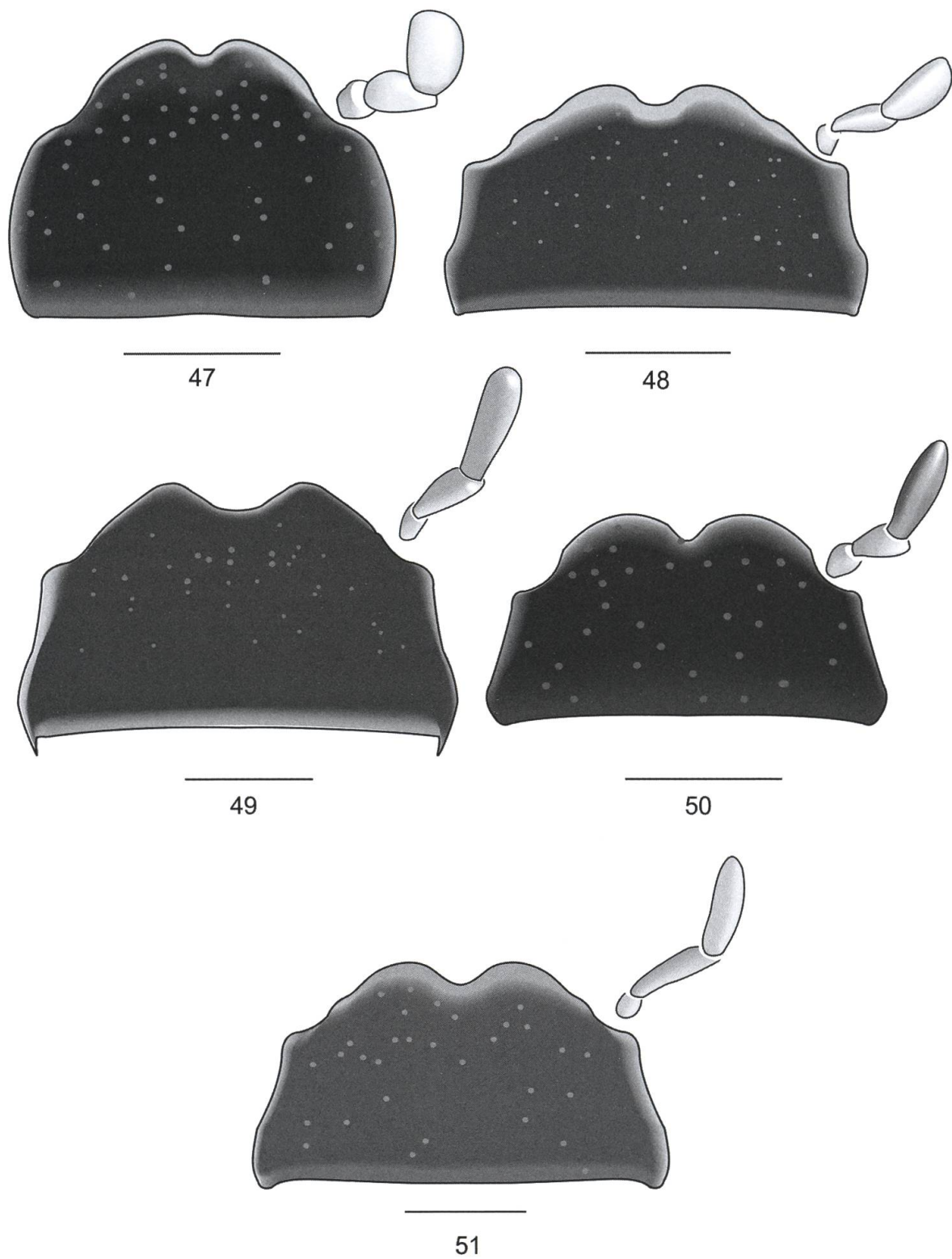


**Figs 35–40.** Mentum, labial palpi: 35 – *Anacaena brancuccii*; 36 – *A. feae*; 37 – *A. fikaceki*; 38 – *A. fuscopunctata*; 39 – *A. hajeki*; 40 – *A. lamdongica*. Scale bar = 0.1 mm.

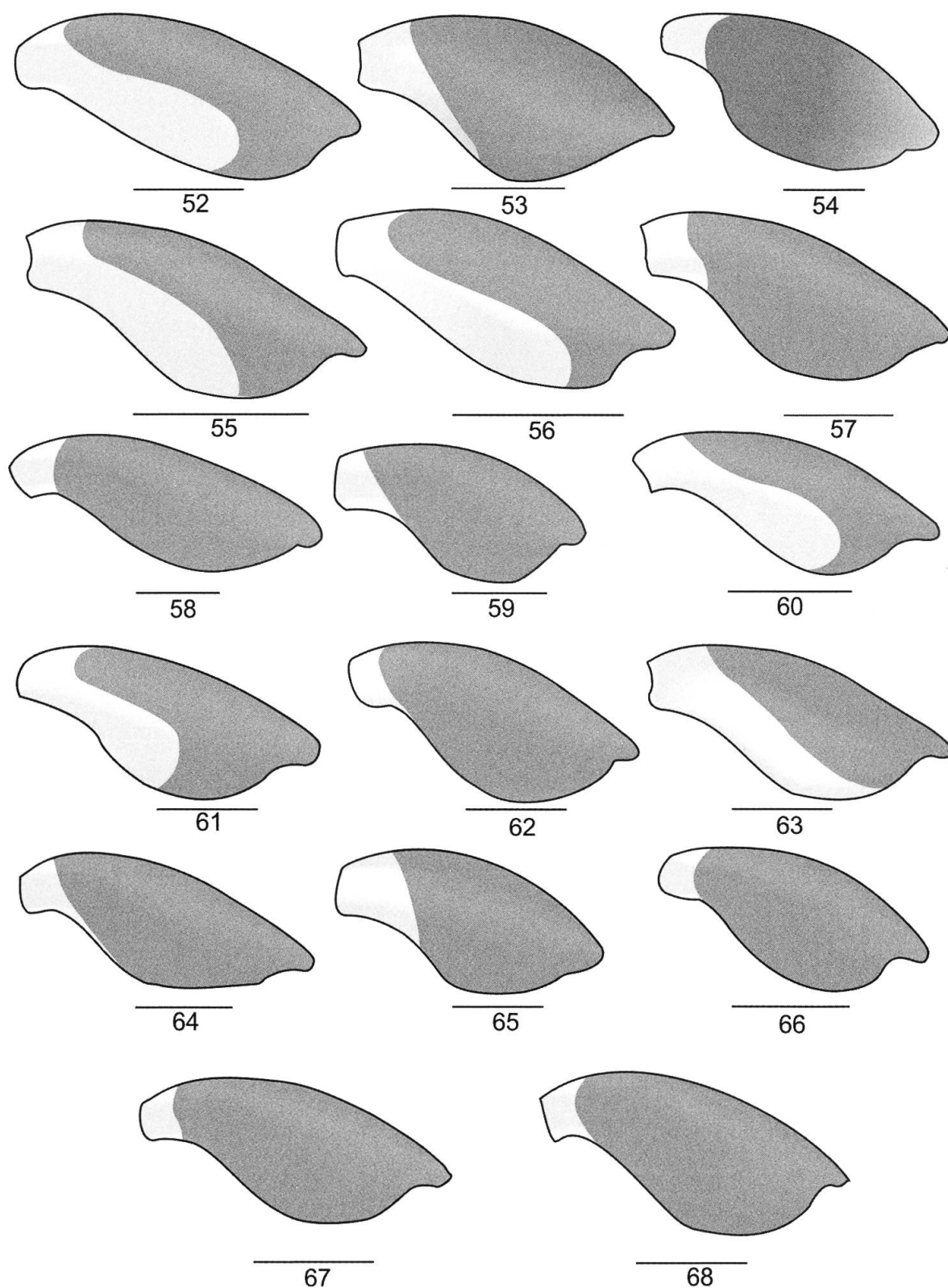


**Figs 41–46.** Mentum, labial palpi: 41 – *Anacaena laotica*; 42 – *A. latepatens*; 43 – *A. maculata*; 44 – *A. mawara*; 45 – *A. mazzoldii*; 46 – *A. minuscula*. Scale bar = 0.1 mm.





**Figs 47–51.** Mentum, labial palpi: 47 – *Anacaena montana*; 48 – *A. nanica*; 49 – *A. nongfana*; 50 – *A. schillhammeri*; 51 – *A. shepardii*. Scale bar = 0.1 mm.



**Figs 52–68.** Metafemur: 52 – *Anacaena brancuccii*; 53 – *A. feae*; 54 – *A. fikaceki*; 55 – *A. fuscopunctata*; 56 – *A. hajeki*; 57 – *A. lamdongica*; 58 – *A. laotica*; 59 – *A. latepatens*; 60 – *A. maculata*; 61 – *A. mawara*; 62 – *A. mazzoldii*; 63 – *A. minuscula*; 64 – *A. montana*; 65 – *A. nanica*; 66 – *A. nongfana*; 67 – *A. schillhammeri*; 68 – *A. shepardii*. Scale bar = 0.2 mm.



### Discussion

The number of fourteen new species of *Anacaena* presented in this contribution is not surprising in view of the extent of the area under consideration. Moreover, the five countries belong to the Tropical region, which is characterised by a high number of species in many groups, and is still very poorly investigated with regard to its hydrophilid diversity. It may be expected that future collecting activities in these countries will yield considerably more new species.

Five species were collected in larger quantities and are quite widespread in South-east Asia: *Anacaena latepatens* from Laos, Malaysia, Myanmar, and Thailand, *A. maculata* from Laos, Myanmar, Thailand and the Chinese provinces of Fujian, Guangdong, Hunan, Jiangxi, and Yunnan (KOMAREK 2012), *A. nanica* from Laos, Thailand and Vietnam, and *A. schillhammeri* and *A. shepardi* from Laos, Myanmar and Thailand. The other twelve species are known by a few individuals and their distribution appears in most cases very restricted. Whether this reflects endemic distribution patterns or is due to limited data cannot be decided for most of them. However, an endemic distribution is likely in the cases of *A. hajeki* and *A. nongfana*. Both were found in puddles near a crater lake, together with the endemic *Allopachria jirii* Wewalka. *Anacaena feae*, which was also collected in small numbers, seems to have a somewhat larger distributional area and occurs in Laos, Myanmar and Thailand. Of the species with a limited range, three are restricted to Vietnam, one to Thailand, and one to Malaysia. With eleven species, Laos is the country with the highest diversity in the region; seven of them are also found beyond the limits of Laos; each of them was collected in three or four other countries, whereas five are restricted to Laos.

The series of available specimens is far too limited for assessment of the morphological variability of the species. The species examined share many features with others from China and Taiwan (KOMAREK 2011, 2012) and their status as species is in most cases mainly justified by the distinctive aedeagus. Thus, females cannot be identified with certainty in many cases. *Anacaena minuscule*, described from India (type locality) and Vietnam (ORCHYMONT 1942), shares a very low crescent-shaped pre-episternal elevation with other species from India (KOMAREK 2006). In contrast, the pre-episternum of all other species from Laos, Malaysia, Myanmar, Thailand, and Vietnam described here, and also from Taiwan and China (KOMAREK 2011, 2012), bears a sharply pointed elevation. This suggests a Western (Indian) and an Eastern Oriental clade. However, this working hypothesis has to be confirmed by phylogenetic analysis based on suitable molecular data.

### Acknowledgements

I am grateful to the water beetle team of the NMW, particularly to Manfred A. Jäch and Heinrich Schönmann for their friendly support and the opportunity to use the facilities of the Coleoptera collection. Thanks are also due to Rolf G. Beutel (Jena, Germany) for critically reading the manuscript, to J. Bezdek, M. Brancucci, M. Fikáček, J. Hájek, V. Kubáň, P. Mazzoldi, and W. Shepard for valuable comments on the bionomics of the species, and to the curators of the collections listed above for loans of material.

### Zusammenfassung

Vierzehn neue Arten der Gattung *Anacaena* von Laos, Malaysia, Myanmar, Thailand, und Vietnam werden beschrieben: *Anacaena brancuccii*, *A. feae*, *A. fikaceki*, *A. fuscopunctata*, *A. hajeki*, *A. lamdongica*, *A. laotica*, *A. latepatens*, *A. mawara*, *A. mazzoldii*, *A. montana*, *A. nongfana*, *A. schillhammeri* und *A. shepardii*. *Anacaena nanica* (Gentili, 2002) wird neu beschrieben. Die Aedeagi und andere zahlreiche diagnostisch wichtige morphologische Details aller Arten werden abgebildet und ein Artenschlüssel angefügt.

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