Taxonomic revision of \textit{Anacaena} THOMSON, 1859

IV. Australia

(Coleoptera: Hydrophilidae)

A. Komarek

Abstract

The species of \textit{Anacaena} THOMSON, 1859 (Coleoptera: Hydrophilidae) from Australia are revised taxonomically. All species hitherto assigned to \textit{Paranacaena} BLACKBURN, 1889 are transferred to \textit{Anacaena}. One new species, \textit{Anacaena eremitoides} sp.n., is described. Two new synonymies are established: \textit{Paranacaena tasmaniana} GENTILI, 2002 = \textit{Anacaena sublineata} (BLACKBURN, 1889), and \textit{Paranacaena hibrida} GENTILI, 2002 = \textit{Anacaena littoralis} d’ORCHYMONT, 1942.

Key words: Coleoptera, Hydrophilidae, \textit{Anacaena}, \textit{Paranacaena}, taxonomy, revision, Australia.

Introduction

The species of \textit{Anacaena} THOMSON, 1859 from the Australian Region have changed their generic assignment several times: BLACKBURN (1889) regarded them as \textit{Paracymus} THOMSON, 1867 and erected the subgenus \textit{Paranacaena}. KNISCH (1924) elevated \textit{Paranacaena} to generic rank. D’ORCHYMONT (1942) transferred them to \textit{Anacaena}, GENTILI (1993, 1996, 2002) again to \textit{Paranacaena}. HEBAUER (2003) established the monotypic genus \textit{Gentilina} HEBAUER, 2003. In a recent phylogenetic study (KOMAREK & BEUTEL 2006) \textit{Paranacaena} and \textit{Gentilina} were synonymized with \textit{Anacaena}. Following this study, the species treated herein are transferred formally to \textit{Anacaena}.

In the present contribution all species currently known are revised and keyed. One new species is described.

Material and methods

Type specimens of all species and about 600 additional specimens of \textit{Anacaena} collected in Australia were examined. They are deposited in thirteen different collections. Mouthparts, thoracic structures and male genitalia were dissected, macerated and cleared in concentrated lactic acid, and examined several hours later with a light microscope (Olympus BX 41) and a binocular (Leica MZ 12.5) with diffuse and focussed light sources. Measurements were taken using a micrometric eyepiece. Ink drawings were made with a drawing tube. Many label data are cited literally: “/” indicates a new line, “\” a new label.

Morphological remarks

The morphological terminology is based on KOMAREK (2004). Some additional morphological features relevant to species from the Australian Region are explained below. The protuberance on the mesoventrite is very similar in all species with the exception of \textit{A. nitens} (GENTILI, 1993),
and very similar to the protuberance in the Holarctic *A. lutescens* (STEPHENS, 1829). It is formed by a very short, flat carina meeting an approximately semilunar transverse ridge. All abdominal ventrites are completely covered with hydrofuge pubescence. The first ventrite is always lacking a carina, ventrite 5 lacks an apical excision. The median lobe consists of a pair of basal apophyses and a “main piece”. In most species, a deep median incision indicates the border between the distal “main piece” and the proximal apophyses. The length ratio of these two parts of the aedeagus is an important feature for distinguishing species. In some species the mesal margin of the basal apophysis is extended into a more or less large “tooth” connecting the median lobe with the parameres.

The following peculiar morphological features are present in many species of the Australian Region, and were used by GENTILI (1993) for establishing *Paranacaena*: 1) serial elytral punctation, in some species arranged in two alternating rows: a “primary” row of coarser punctures, strictly serial, with almost equal, comparatively large distances, and a “secondary” row of 2–3 times as many punctures, subserially arranged, finer, and with much shorter distances (Figs. 20, 21). 2) manubrium distinctly demarcated from the main piece of the phallobase and extended into a narrow basal spine.

The term “main piece of the phallobase” refers to the structure with distinctly inflected lateral margins (Figs. 6, 8, 10, 12, 14, 16) which are absent from the manubrium. The manubrium usually comprises a wider, distal portion and a narrow (often spine-like) proximal portion. The ventral face of the phallobase is distinctly excised in most species. The shape of this incision is a very constant specific feature. In *Anacaena* and many other genera of Hydrophilidae the anterior elytral base is more or less strongly overlapped by the posterior pronotal margin. It is distinctly delimited in some species, serving as a diagnostic feature, and referred to as “basal furrow” by GENTILI (1993). As it is rather an area with an even surface than a furrow it is denoted “anterior elytral declivity” in the present contribution.

**Acknowledgements**

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**Abbreviations**

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<th>Collections</th>
<th>Institution</th>
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<td>AEZS</td>
<td>A.E.Z. Short Collection, Ithaca (New York, U.S.A.)</td>
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<td>ANIC</td>
<td>Australian National Insect Collection CSIRO, Canberra (Australia)</td>
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<td>CLH</td>
<td>Collection of Lars Hendrich, München (Germany)</td>
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<td>CMB</td>
<td>Collection of Michael Balke, München (Germany)</td>
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<tr>
<td>FMNH</td>
<td>Field Museum of Natural History, Chicago (USA)</td>
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<td>MCZ</td>
<td>Museum of Comparative Zoology, Cambridge, Massachusetts (USA)</td>
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<td>MSNG</td>
<td>Museo Civico di Storia Naturale G. Doria, Genova (Italy)</td>
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<td>MSNV</td>
<td>Museo Civico di Storia Naturale, Verona (Italy)</td>
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<td>NHM</td>
<td>Natural History Museum, London (U.K.)</td>
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<td>NMW</td>
<td>Naturhistorisches Museum Wien (Austria)</td>
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**SAMA** South Australian Museum, Adelaide (Australia)

**ZMUC** Zoological Museum Copenhagen (Denmark)

**Morphology**

CI  
clypeal index = ratio of largest clypeal width to clypeal length anterior to eyes (Fig. 19)

EI  
elytral index = ratio of greatest elytral length to greatest elytral width

OI  
ocular index = ratio of smallest distance between eyes to diameter of eye

**Australian states**

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<td>Northern Territory</td>
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<td>Victoria</td>
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<td>WA</td>
<td>Western Australia</td>
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**Checklist of species of *Anacaena* from Australia**

1. *Anacaena eremita* (BLACKBURN, 1896)  NT, Q
2. *Anacaena eremitoides* sp. n.  NSW, Q
3. *Anacaena horni* (BLACKBURN, 1896)  ACT, NSW, NT, Q, SA, T, V, WA
4. *Anacaena lindi* (BLACKBURN, 1889)  ACT, NSW, Q, SA, V, WA
5. *Anacaena littoralis* d’ORCHYMONT, 1942  ACT, NSW, V, WA
7. *Anacaena sublineata* (BLACKBURN, 1889)  NSW, SA, T, V
8. *Anacaena wattsi* (GENTILI, 1993)  NSW, NT, Q, T, WA

**Anacaena eremita** (BLACKBURN, 1896)

*Paracymus* (*Paranacaena*) *eremita* BLACKBURN 1896: 257.


*Anacaena* (*Paranacaena*) *eremita*: d’ORCHYMONT 1942: 37 (footnote).

**TYPE LOCALITY:** Australia, Northern Territory, Paisley Bluff.


**ADDITIONAL MATERIAL EXAMINED:**


**DESCRIPTION:** Total length 2.2–3.0 mm, maximum width 1.3–1.7 mm, EL 1.06–1.26. Habitus (Fig. 1): distinctly convex dorsally, moderately broad, widest at midlength, very slightly attenuate apically. Elytral margins completely visible in dorsal view.

Head: Clypeus and frons dark brown, with rather small yellow preocular patches. Punctures on clypeus and frons moderately coarse, densely distributed, with unequal distances, interspaces 1–2 x as wide as one puncture. Microsculpture absent. Clypeus about as long as diameter of eye with blunt anterolateral angles and straight anterior margin, CI=4.0. Eyes very weakly constricted by anterior clypeal extension, OI=3.9. Antenna composed of eight antennomeres.
Maxillary palpus moderately slender; palpomere 2 weakly inflated, palpomere 4 with apical infuscation. Mentum sexually dimorphic: ventral face with a deep longitudinal median impression in males, with a shallow median impression in females. Lateral margins of mentum straight; anterior margin distinctly projecting; ventral face with widely spaced fine setiferous punctures; chagrination present. Labial palpi slender, shorter than lateral edge of mentum.

Thorax: Pronotum dark brown; intensity of coloration slightly decreasing towards lateral margins. Pronotal punctures fine, irregularly and moderately densely distributed; interspaces 1–3 x as wide as one puncture. Prosternum without distinct carina, with a knob-like extension on anterior third. Elytra dark brown, coloration slightly brighter towards lateral margins. Setae absent from lateral borders of pronotum and elytra. Callosity on shoulder regions absent. Anterior elytral declivity distinct. Sutural stria recognisable on posterior 0.7 of elytra in dorsal view. Punctures on elytra (Fig. 20) serially arranged; primary and secondary rows present; punctures of secondary row as strong as punctures on frons. Mesoventrite with distinct protuberance. Procoxae without spine-like setae. Legs and ventrites dark brown. Pro- and mesofemur ventrally almost entirely covered with hydrofuge pubescence; metafemoral pubescence restricted to anterior margin and proximal portion. Metatarsus distinctly shorter than metatibia.

Aedeagus (Figs. 6, 7): Main piece of phallobase slightly shorter than parameres, slightly wider than long, abruptly narrowing towards manubrium; spine-like extension of manubrium present. Parameres with wide base, distinctly curved in basal half, narrowing towards almost parallel-sided apical third; apex nearly cylindrical and weakly sclerotized. Median lobe widest at base, evenly narrowing towards pointed apex. Median lobe shorter than parameres, with corona in apical position; basal apophyses very long, longer than main piece of median lobe, with distinct extension into phallobase. Base of median lobe visibly connected with parameres.

DIFFERENTIAL DIAGNOSIS: This species is very similar to *A. eremitoides* (see below). From all other dark brown to black species from Australia, *A. eremita* can be distinguished by the arrangement of the elytral punctures (Fig. 20).

BIONOMICS: This species was found in a small semi-permanent stony creek and in a pool in the bed of a large sandy creek, among algae and dead leaves.

DISCUSSION: The punctures on the head are fine and dense (not scarce as noted by Gentili 1993); Gentili's (1993) observation “prosternal midline posteriorly protruding as a thorn” cannot be confirmed. Gentili (1993) notes that the mesoventrite lacks a tooth; however, a distinct protuberance similar to that of most species described herein is present.

DISTRIBUTION: Australia (NT, Q).

*Anacaena eremitoides* sp.n.

**TYPE LOCALITY:** Australia, Queensland, Cunningham’s Gap; fast running, clear, small creek, in still rock pools (personal communication by C. Watts).

DESCRIPTION: Total length 2.2–2.5 mm, maximum width 1.4 mm, EI 1.18–1.31. Habitus: distinctly convex dorsally, moderately broad, widest at midlength, very slightly attenuate apically. Elytral margins not completely visible in dorsal view.

Head: Clypeus and frons dark brown, with moderately large yellow preoculal patches. Punctures on clypeus and frons fine, rather widely spaced with unequal distances, interspaces 1–3 x as wide as one puncture. Microsculpture absent. Clypeus about as long as diameter of eye, with blunt anterolateral angles and straight anterior margin, CI=4.5. Eyes very weakly constricted by anterior clypeal extension, OI=3.6. Antennae composed of eight antennomeres. Maxillary palpus moderately slender, palpomere 2 weakly inflated, palpomere 4 with weak apical infuscation, or infuscation absent. Mentum flat with distinctly separated setiferous punctures, microstructure absent. Labial palpi slender, as long as lateral edge of mentum. Prosternum without distinct carina, with a weak knob-like extension on anterior third.

Thorax: Pronotum dark brown, with lighter brown coloration along lateral margins. Pronotal punctures fine, as on head, unequally and moderately densely distributed, interspaces 2–4 x as wide as one puncture. Elytra dark brown, with distinctly brighter brown coloration along lateral margins. Setae absent from lateral borders of pronotum and elytra. Callosity on shoulder regions absent. Anterior elytral declivity indistinct. Sutural stria recognisable in posterior 0.7 of elytra in dorsal view. Primary and secondary rows of elytral punctures present. Punctures of primary rows about as strong as punctures on frons and pronotum. Mesoventrite with distinct median protuberance. Procoxae without spine-like setae. Legs and ventrites as dark as elytra. Pro- and mesofemur almost entirely covered with hydrofuge pubescence ventrally. Metafemoral pubescence restricted to anterior margin and proximal portion. Metatarsus distinctly shorter than metatibia.

Aedeagus (Figs. 8–9): Main piece of phallobase slightly shorter than parameres, slightly wider than long, abruptly narrowing towards manubrium. Manubrium distinctly demarcated with spine-like extension. Parameres distinctly curved in basal half, wide at base, narrowing towards almost parallel-sided apical third; apex nearly cylindrical, weakly sclerotized. Median lobe widest at base, evenly narrowing towards pointed apex. Median lobe shorter than parameres, with corona in apical position, basal apophyses very long, longer than main piece of median lobe, with distinct extension into phallobase. Base of median lobe visibly connected with parameres.

DIFFERENTIAL DIAGNOSIS: This species is very similar to *A. eremita*, including the aedeagus. It can be distinguished from the latter mainly by the following morphological features: mentum shiny, with distinctly impressed setiferous punctures, chagrination absent; ventral face of mentum flat, depression absent; lateral margins of elytra slightly inflected ventrad, thus partly visible in ventral view; base of parameres slightly narrower (differences in the shape of the aedeagus very subtle, direct comparison with aedeagus of *A. eremita* recommended). From all other dark brown to black species from Australia, *A. eremitoides* can be distinguished by the presence of primary and secondary rows of elytral punctures.

BIONOMICS: This species occurs in pools and among vegetation at the banks of mountain creeks. It was also collected at artificial light sources.

DISCUSSION: The separate specific status is justified by the mentum which is distinctly different from *A. eremita*, and by different aedeagal characteristics.

DISTRIBUTION: Australia (NSW, Q).

ETYMOLOGY: The name of the epithet refers to the similarity with *A. eremita*.
Fig. 1: Habitus of *Anacaena eremita*. 
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Figs. 2–5: Habitus of 2) *Anacaena horni*, 3) *A. littoralis*, 4) *A. nitens*, 5) *A. wattsi*.
Paranacaena horni (BLACKBURN, 1896)

Paranacaena horni: KNISCH 1922: 2; GENTILI 1993: 290.

Anacaena horni: d’ORCHYMONT 1942: 54.

TYPE LOCALITY: Australia, Queensland, Palm Creek.

TYPE MATERIAL EXAMINED: Lectotype \( \sigma \) (NHM): “T / 5481 / Palm Cr. [handwritten on mounting card] \ Type [round label] \ Australia / Blackburn Coll. / B.M. 1910-236 \ Paracymus / horni, Blackb. [handwritten] \ \sigma \ Lectotypus / Paranacaena / horni Blackb. / E. Gentili 1992 \ [aedeagus mounted separately on a transparent card]”.

ADDITIONAL MATERIAL EXAMINED: AUSTRALIA: ACT: ADDITIONAL MATERIAL EXAMINED TYPE MATERIAL EXAMINED: TYPE LOCALITY: Australia, Queensland, Palm Creek.

DESCRIPTION: Total length 1.9–2.4 mm; maximum width 1.1–1.4 mm; EI 1.06–1.27. Habitus as diameter of eye, without distinct anterolateral angles, CI=4.3. Punctures on clypeus and frons interspaces 1–3 x as wide as one puncture. Eyes very weakly constricted by clypeal extension, OI=4.4. Antenna composed of eight antennomeres. Maxillary palpus moderately stout, palpomere 2 rather weakly inflated, palpomere 4 apically indistinctly infuscated, or infuscation absent. Mentum flat, with widely spaced, fine, setiferous punctures; microsculpture absent; lateral margins straight. Labial palpi slender.

Head: Clypeus variably colored: from entirely light brown with a narrow dark rim posterior to labrum, to dark brown (in some individuals almost black) medial portion and distinct yellowish preocular patches. Frons from dark brown to yellow. Labrum about as long labrum, to dark brown (in some individuals almost black) medial portion and distinct yellowish preocular patches. Frons from dark brown to yellow. Labrum about as long as diameter of eye, without distinct anterolateral angles, CI=4.3. Punctures on clypeus and frons moderately fine, unequally sized, moderately densely arranged with unequal distances, interspaces 1–3 x as wide as one puncture. Eyes very weakly constricted by clypeal extension, OI=4.4. Antenna composed of eight antennomeres. Maxillary palpus moderately stout, palpomere 2 rather weakly inflated, palpomere 4 apically indistinctly infuscated, or infuscation absent. Mentum flat, with widely spaced, fine, setiferous punctures; microsculpture absent; lateral margins straight. Labial palpi slender.

Thorax: Pronotum largely yellowish to light brown with variably sized central dark brown patch, sometimes split into three small patches, sometimes with one central patch surrounded by four
dark spots; central patch not always reaching anterior margin; in some individuals mesal portion of anterior pronotal margin with a dark brown rim detached from central patch. Pronotal punctures very fine, finer than on frons, interspaces about 3–4 x as wide as one puncture. Prosternum slightly bulged, without carina. Elytra variably colored, from light to dark brown; often dark brown with lighter areas, mainly laterally and apically, in some individuals also near scutellar shield, or largely light brown with darker areas or stripes. In lighter individuals punctures surrounded by darker brown patches. Setae absent from lateral borders of pronotum and elytra; in some individuals very fine, indistinct setae perceptible on apical portion of elytra, arising from dorsal face of elytral edge. Shoulder regions in some individuals slightly accentuated, sometimes with a darker brown patch, distinct callosity absent. Anterior elytral declivity narrow. Sutural stria recognisable in posterior 0.7 of elytra in dorsal view. Punctures on elytra (Fig. 21) moderately fine to very fine (finer on scutellar shield), distinctly coarser than on pronotum, serially distributed, primary and secondary rows present. Mesoventrite with distinct median protuberance. Procoxae without spine-like setae. Ventrites and legs dark brown. Profemur and mesofemur almost entirely covered with hydrofuge pubescence. Metameral pubescence restricted to anterior margin and proximal portion, with distinct, concave hairline. Metatarsus slightly shorter than metatibia.

Aedeagus (see aedeagus of A. lindi: Figs. 10–11): Main piece of phallobase less than half as long as parameres, wider than long, with slightly rounded lateral margins, abruptly narrowing to manubrium, distinctly demarcated from phallobase. Manubrium with spine-like extension. Parameres wide basally, lateral margins distinctly curved, mesal margins very slightly curved, almost parallel-sided at midlength; apex broadly rounded, weakly sclerotized. Median lobe almost parallel-sided with a bluntly pointed apex. Median lobe shorter than parameres, with corona in apical position, basal apophyses very long, longer than main piece of median lobe, with distinct extension into phallobase. Base of median lobe not visibly connected with parameres.

DIFFERENTIAL DIAGNOSIS: This species shows affinities to A. lindi and A. wattsi. For differences see under these species.

BIONOMICS: This species is found in various types of vegetation (tussocks of grass, sedges, weeds, sphagnum, bulrush, reeds, dead leaves) at the edge of fresh water lakes, ditches, shallow swamps, ponds, dams, flooded areas, various pools (mostly shallow, even drying), in gravelly or sandy creeks, and among stones in shallow, slowly flowing rivers. It can also be collected by UV light traps.

DISCUSSION: GENTILI (1993) lists the following morphological differences of A. horni and A. lindi: paler dorsal color, more distinct linear arrangement of elytral punctation, particularly in the periscutellar area, more slender body shape, and the absence of an “elytral basal furrow” (anterior elytral declivity). The difference in coloration and punctual arrangement can be confirmed by the present study. The difference in the body shape is very slight. An anterior elytral declivity is present in both species, though less distinct in A. horni. In addition to the characters listed by GENTILI (1993) the following features allow A. horni to be distinguished from A. lindi: lateral elytral margins more strongly inflected in A. horni, elytra therefore not completely visible in dorsal view; apical infuscation of maxillary palpomere 4 absent in many individuals of A. horni, present in all specimens of A. lindi examined; length ratio of metatarsus/metatibia greater in A. horni than in A. lindi. No differences could be observed between their aedeagi.

DISTRIBUTION: Australia (ACT, NSW, NT, Q, SA, T, V, WA).
**Anacaena lindi** (BLACKBURN, 1889)

Paracyamus (Paranacaena) lindi BLACKBURN 1889: 821.  
Anacaena lindi: d’ORCHYMONT 1942: 38.

**TYPE LOCALITY:** Australia, South Australia, Port Lincoln.

**TYPE MATERIAL EXAMINED:** Lectotype ♂, Paralectotype ♀ (NHM, both exs. mounted on one card): “Type [round label] / 550 / Australia / Blackburn Coll. / B.M. 1910-236. / Paracyamus / lindi, Blackb. [handwritten] / 1 ♂ Lectotypus / 2 ♀ Paralectotypus / Paranacaena / lindi Blackb. / E.Gentili 1992”.

**ADDITIONAL MATERIAL EXAMINED:**
DESCRIPTION: Total length 2.0–2.9 mm; maximum width 1.1–1.6 mm; EI 1.09–1.36. Habitus: distinctly convex dorsally, rather narrow, widest very slightly anterior to midlength, distinctly attenuate apically, apical portion narrowly rounded. Elytral margins completely visible in dorsal view in most individuals.

Head: Clypeus and frons dark brown, clypeus with large yellowish preocular patches. Punctures on clypeus and frons moderately fine, densely distributed, irregular, interspaces on average as wide as one puncture. Clypeus about as long as diameter of eye, with blunt anterolateral angles and straight anterior margin, CI=4.2. Eyes weakly constricted by anterior clypeal extension. Antennae composed of eight antennomeres, OI=3.6. Maxillary palpus moderately slender, palpomere 2 weakly inflated, palpomere 4 with apical infuscation. Mentum flat with straight lateral margins, with widely spaced, fine, setiferous punctures, microsculpture absent. Labial palpi moderately slender.

Thorax: Prosternum bulged, carina absent. Pronotum dark brown to blackish with variably sized, indistinctly demarcated brighter lateral margins (in most specimens narrow). Pronotal punctures fine, shallow, rather densely distributed, interspaces ca. 2–3 x as wide as one puncture. Microsculpture absent. Elytra dark brown to almost black with indistinct brighter areas of variable size, mainly at apical and lateral portion; some individuals with largely light brown elytra. Anterior elytral declivity distinct. Setae absent from lateral borders of pronotum and elytra. Callosity on shoulder regions absent. Sutural stria recognisable in posterior 0.7 of elytra in dorsal view. Punctures on elytra (Fig. 22) moderately fine, with some rows of subserially arranged punctures alternating with unordered punctuation; arrangement in primary and secondary series absent. Some coarser punctures present near lateral margins. Mesoventrite with distinct median protubrance. Procoxae without spine-like setae. Legs and ventrites dark brown. Pro- and mesofemur ventrally almost entirely covered with hydrofuge pubescence. Metafemoral pubescence restricted to a very narrow stripe at anterior margin and to proximal portion, with concave hairline. Metatarsus in most individuals distinctly shorter than metatibia.

Aedeagus (Figs. 10–11): See description of aedeagus of *A. horni*.

DIFFERENTIAL DIAGNOSIS: *A. lindi* has morphological affinities particularly to *A. horni*. It can be distinguished from the latter by the elytral punctuation (primary and secondary rows present in *A. horni*, absent in *A. lindi*). These two species also differ in the following features, even though in few individuals intermediate character states occur: lateral elytral margins less distinctly inflected, (almost) totally visible in dorsal view; color of head, pronotum and elytra...
much darker; punctuation of head and elytra denser, length ratio of metatarsus/metatibia smaller. No difference can be observed in the morphology of the aedeagus.

**Bionomics:** This species is found in litter along streams, in vegetated or sandy natural pools, in emergent vegetation and dead plants, in leaves and mud seepage, on algae on the surface of wet rocks, in shallow ditches at roads, in springs, in various vegetation (weed, dead leaves) in still parts of creeks, in small, rapid rivers with stony banks, in wet debris at waterfall base, and in rock pools. It was also collected in leaf and log litter on the floor of a *Nothofagus moorei* and *Eucalyptus* forest and by flight interception trap. *Anacaena lindi* must be viewed as an aquatic species which can inhabit a wide range of habitats.

**Discussion:** The close morphological affinity to *A. horni* was already pointed out by Gentili (1993) whose observations are evaluated under *A. horni* in the present study.

**Distribution:** Australia (ACT, NSW, Q, SA, V, WA). Not yet confirmed from Tasmania. Specimens reported by Gentili (1993) from different localities in Tasmania are in fact *A. horni*.

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**Anacaena littoralis**

*d’Orchymont, 1942*

*Paranacaena hibrida* Gentili 2002: 79; syn.n.

**Type Locality:** Australia, Victoria, Sea Coast.

**Type Material Examined:**


Paratype: The single specimen (♀) does not exist any more. The ISNB houses a pin with a label: “exemplaire / manque”.


**Additional Material Examined:**

**Australia: ACT:**


DESCRIPTION: Total length 2.3–2.9 mm; maximum width 1.3–1.6 mm; EI 1.14–1.30. Habitus (Fig. 3): distinctly convex dorsally, moderately broad, widest slightly anterior to midlength, slightly attenuate apically. Elytral margins completely visible in dorsal view.

Head: Clypeus and frons black. Very indistinct brighter preocular areas present in some individuals. Punctures on clypeus and frons moderately fine, densely distributed, interspaces 1–2 x as wide as one puncture. Microsculpture absent. Clypeus as large as diameter of eye, with blunt anterolateral angles and straight anterior margin, CI=4.8. Eyes circular in dorsal view, dorsal and ventral portion distinctly separated by lateral extension of clypeus, OI=4.8. Antennae composed of eight antennomeres. Maxillary palpus moderately slender, palpomere 2 weakly inflated, palpomeres 1–3 yellow, palpomere 4 entirely dark brown or with distinct apical infuscation. Mentum flat with straight lateral margins; anterior margin simply rounded without emargination. Ventral face of mentum with widely spaced setiferous punctures, microsculpture absent.

Thorax: Pronotum dark brown to black with indistinctly brighter, rufous, narrow lateral margins. Pronotal punctures moderately fine, finer than on frons, densely distributed, interspaces 1–2 x as wide as one puncture. Prosternum without median carina. Elytra dark brown to black, brighter brown areas sometimes present on lateral margins and apically. Setae absent from lateral borders of pronotum and elytra. Callosity on shoulder regions absent. Anterior elytral declivity distinct. Sutural stria recognisable in posterior 0.7 of elytra in dorsal view. Punctures on elytra (Fig. 23) coarse, densely distributed, interspaces on average 1–2 x as wide as one puncture. Punctures unordered on most parts of elytra; short subserial rows of punctures present near lateral margins. Microsculpture absent. Mesoventrite with distinct median protuberance. Procoxae without spine-like setae. Legs dark brown like ventrites. Pro- and mesofemur ventrally almost entirely covered with hydrofuge pubescence. Metatibial pubescence restricted to a very narrow stripe at anterior margin and to proximal portion. Metatarsus distinctly shorter than metatibia.

Aedeagus (Figs. 12–13): Main piece of phallobase about half as long as parameres, wider than long, abruptly narrowing to manubrium. Manubrium distinctly demarcated, with spine-like extension. Parameres slightly curved, widest at base, narrowing towards midlength, apex broadly rounded, very weakly sclerotized. Median lobe wide at base, evenly narrowing apicad, with bluntly rounded apex. Median lobe slightly shorter than parameres; corona very large, in subapical position, basal apophyses very long, about as long as main piece of median lobe, with distinct extension into phallobase. Base of median lobe mesally visibly connected with parameres.

DIFFERENTIAL DIAGNOSIS: A. littoralis has strong affinities to A. sublineata. It differs from the latter by the presence of an infuscated maxillary palpomere 4, by the equal distribution of punctures on pronotum and elytra, by the presence of distinct lateral rows of elytral punctures, by a smaller length ratio metatarsus/metatibia, and by a different aedeagus.

BIONOMICS: This species is found in different kinds of pools, in muddy or clear water, mostly in seepage, under dead leaves or plants. It was also collected at the edge of water in dry sclerophyll forest, and at UV blacklight.

DISCUSSION: In contrast to the observations published by d’ORCHYMONT (1942) and GENTILI (1993) the body form is not short but rather oblong oval and highly convex.
GENTILI (2002) pointed out that *Paranacaena hibrida* is “similar to some species of Australia”, and differs from all other species by the aedeagus, and additionally from *A. lindi*, *A. littoralis*, and *A. sublineata* by the absence of a metamemoral pubescence. GENTILI (1993) did not provide a description of the aedeagus of *P. littoralis*. The illustrations published by GENTILI (1993: Figs. 15, 16; 2002: Figs. 7, 8) suggest a different shape of the apical portion of the median lobe (pointed in *P. littoralis*, rounded in *P. hibrida*) and a different shape of the manubrium. However, re-examination of the male genitalia of the type specimens of *P. hibrida* and of additional material of both species revealed slight differences between some of the individuals, but in most of the specimens examined the shape of the male genitalia was identical. In contrast to the original description, a metamemoral pubescence restricted to the anterior margin is present.

**DISTRIBUTION:** Australia (ACT, NSW, V, WA).

*Anacaena nitens* (GENTILI, 1993), comb.n.

*Paranacaena nitens* GENTILI 1993: 293.

*Gentilina nitens* HEBAUER 2003: 112.

**TYPE LOCALITY:** Australia, Queensland, Buderim Mountain, Mooloolah.

**TYPE MATERIAL EXAMINED:** Holotype ♀ (SAMA): “Buderim-Mtn., Q. / Nr. Mooloolah [N of Caloundra, Brisbane] / C.J.W., Dec. 89 \ E.Gentili det., / Paranacaena / nitens m.\ SAMA Database / No. 25-008115”. The label was wrongly cited as “C. Watts 1989” by GENTILI (1993). HEBAUER (2001) asserted that “C.J.W.” is not identical with C.[Chris] Watts, and that the year of collection must have been 1889. **Paratypes:** 1 ♀ (SAMA): “Qu., Buderim Mt. / nr. Mooloolah / C.J.W. 12–1889 \ Paratypus \ E. Gentili det. \ SAMA Database / No. 25–008114”. I have not examined the other three female paratypes mentioned by GENTILI (1993).

**ADDITIONAL MATERIAL EXAMINED:**


**DESCRIPTION:** Total length 1.9–2.1 mm; maximum width 1.0 mm; EI 1.31–1.39. Habitus (Fig. 4): flattened-convex, narrow, elongate, widest slightly anterior to midlength, attenuate apically, apical portion narrowly rounded. Elytral margins completely visible in dorsal view.

Head: Clypeus and frons black without brighter preocular areas. Punctures on clypeus and frons moderately fine, densely distributed, interspaces 1–2 x as wide as one puncture. Microsculpture absent. Clypeus about as long as diameter of eye, with blunt anterolateral angles and straight anterior margin, CI=3.8. Eyes not emarginate anteriorly. Antennae composed of nine antennomeres, OI=3.7. Maxillary palpus slender, palpomere 2 not inflated, palpomere 4 with distinct infuscation. Mentum flat with straight lateral margins, anterior edge not emarginate, microsculpture absent.

Thorax: Pronotum black with narrow yellowish lateral margins. Pronotal punctures moderately fine, as on frons, moderately densely distributed, interspaces 1–3 x as wide as one puncture. Prosternum without median carina. Elytra black, with very narrow yellowish lateral margins, absent in some individuals. Pseudopileura slightly more than half as wide as epipleura. Setae absent from lateral borders of pronotum and elytra. Callosity on shoulder regions absent. Anterior elytral declivity large. Sutural stria recognisable in posterior 0.7 of elytra in dorsal view. Punctures on elytra (Fig. 25) moderately fine, slightly more densely set than on pronotum, interspaces on average 1–2 x as wide as one puncture. All punctures with subserial to serial arrangement, alternating primary and secondary rows absent. Microsculpture absent. Mesoventrite bulged without median protuberance. Procoxae with few spine-like setae. Legs paler than ventrites. Profemur pubescent on proximal two thirds, mesofemur on proximal three
fourths, and metafemur on more than proximal half with oblique hairline. Metatarsus slightly longer than metatibia. Meso- and metatarsus with long, fine swimming hairs, arising from dorsal face.

Aedeagus (Fig. 18): Phallobase about as long as parameres, manubrium broadly rounded, not distinctly demarcated from phallobase. Parameres knife-shaped, with distinctly curved lateral face and almost straight mesal face, widest at midlength, apices pointed. Median lobe wide at base, evenly narrowing apicad. Median lobe slightly shorter than parameres, with corona in subapical position; basal apophyses very short, without extension into phallobase. Base of median lobe mesally connected with parameres.

DIFFERENTIAL DIAGNOSIS: This species is remarkably different from all other species of *Anacaena* from the Australian Region. Striking differences are: comparatively narrow and rather flat body shape; eyes not constricted anteriorly; nine antennomeres; mesoventrite without protuberance; elytral punctation in equal series; procoxae with few spine-like setae; metafemoral pubescence extended to more than proximal half; swimming hairs present on meso- and metatarsus; phallobase longer than wide; manubrium wide; parameres knife-shaped.

BIONOMICS: *Anacaena nitens* has been found in splash water pools of about 10 x 10 cm at the border of a waterfall in a primary forest. The individuals fly away very quickly when irritated (personal communication by L. Hendrich).

DISCUSSION: In contrast to GENTILI (1993) the mentum is almost flat (not “excavated”). *Anacaena nitens* shares several peculiar features with the species of the *A. suturalis*-group (KOMAREK 2005) of the New World, e.g., the elongated, apically attenuate body shape, a serial elytral punctuation, swimming hairs on meso- and metatarsus, the presence of procoxal spines (present in at least some species of the *A. suturalis*-group), and the similar aedeagus. These character states, together with the features listed above (see Differential Diagnosis) place this species apart from all other species of *Anacaena* from the Australian Region. These conspicuous morphological differences convinced HEBAUER (2003) to erect a separate genus, *Gentilina*, for this species. HEBAUER (2003) assigned this new genus to Laccobiini, based on two characters (supposed synapomorphies) usually met in this tribe: a very wide pseudepipleuron (in relation to the epipleuron), and the presence of “systematic punctures” (HANSEN 1991). The presence of systematic punctures could not be confirmed in this study. The pseudepipleura are wider and the width ratio pseudepipleura/epipleura is larger than in most species of *Anacaena*, resembling some African species, e.g. *A. angulata* KOMAREK, 2004, *A. foveata* (KOMAREK, 2005), *A. striata* (HANSEN, 1999), *A. sucinea* KOMAREK, 2004. Wide pseudepipleura are also met in the Palearctic *A. globulus* (PAYKULL, 1798). The border between epipleura and pseudepipleura is usually formed as a series of small arcs (HANSEN 1991) in *Laccobius* and most Laccobiini. In *A. nitens* this border is straight, as in all species of *Anacaena*.

DISTRIBUTION: Australia (Q).

*Anacaena sublineata* (BLACKBURN, 1889), comb.n.

*Paracyclus* (*Paranacaena*) *sublineatus* BLACKBURN 1889: 821.


*Paranacaena tasmaniana* GENTILI 2002: 88; syn.n.

TYPE LOCALITY: Australia, South Australia, Roseworthy (near Adelaide).


ADDITIONAL MATERIAL EXAMINED:
AUSTRALIA: NSW: 2 ♂♂, 3 exs. (FMNH, MSNV): Kosciusko NP, Pipers Creek, NE Guthega, 1340 m, 36°21'S 148°25'E, low wet sclerophyll forest, in algal film at seep on rock face near stream, 14.II.1987, A. Newton & M. Thayer; V: 1 ♀ (ISNB): “Ferntree Gully / V.F.E. Wilson / 29.10.33”; 1 ♂ (FMNH): Mt. Buffalo NP, Eurobin Creek, 450 m, 36°43'S 146°50'E, wet sclerophyll forest, wet leaves and flood debris, forest stream, 12.II.1987, A. Newton & M. Thayer “830 FMHD # 87-264 \ Notohydrus n.sp. 3 n.sp. 46 / det. M.K. Thayer 1988”.

DESCRIPTION: Total length 2.5–2.7 mm; maximum width 1.4–1.5 mm; EI 1.12–1.30. Habitus: distinctly convex, moderately broad, widest at midlength, very slightly attenuate apically. Elytral margins completely visible in dorsal view.

Head: Clypeus and frons entirely black with or without precocular patches. Punctures on clypeus and frons moderately fine, densely and irregularly distributed, interspaces 1–2 x as wide as one puncture. Microsculpture absent. Clypeus about as long as diameter of eye, with blunt anterolateral angles and straight anterior margin, CI=4.2. Eyes distinctly emarginate anteriorly. Antennae composed of eight antennomeres, OI=4.2. Maxillary palpus moderately slender, palpomere 2 weakly inflated, palpomere 3 and 4 dark brown, palpomere 4 without apical infuscation. Mentum flat with straight lateral margins, very slightly impressed anteriorly, anterior margin with slight emargination. Labial palpi large, moderately stout.

Thorax: Prosternum without median carina. Pronotum dark brown to black with narrow, brighter, yellowish lateral margins. Pronotal punctures fine, slightly finer than on frons, with wider distances, interspaces 2–3 x as wide as one puncture. Elytra dark brown to black with very indistinct brighter, rufous, lateral margins and apical portion. Setae absent from lateral borders of pronotum and elytra. Callosity on shoulder regions absent. Anterior elytral declivity distinct. Sutural stria recognisable in posterior 0.7–0.8 of elytra in dorsal view. Punctures on elytra (Fig. 24) moderately coarse, densely distributed, largely unordered, but on some areas tending to form short rows. Punctures with equal distances, interspaces on average as wide as one puncture; coarser lateral punctures absent. Microsculpture absent. Mesoventrite with distinct median protuberance. Procoxae without spine-like setae. Legs dark brown to black like ventrites. Profemur pubescent on proximal two thirds, mesofemur ventrally almost entirely covered with hydrofuge pubescence. Metafemoral pubescence restricted to a very narrow stripe at anterior margin and to proximal portion. Metatarsus almost as long as metatibia.

Aedeagus (Figs. 14–15): Main piece of phallobase about half as long as parameres, wider than long, abruptly narrowing to the spine-like manubrium, distinctly demarcated from phallobase. Parameres plump, lateral margins not sinuate, very slightly curved, widest at base, evenly narrowing towards broadly rounded apex. Median lobe wide at base, evenly narrowing apicad, with a bluntly rounded apex. Median lobe shorter than parameres, corona in subapical position, basal apophyses very short, much less than half as long as main piece of median lobe, wide, with short extension into phallobase. Base of median lobe mesally not visibly connected with parameres.

DIFFERENTIAL DIAGNOSIS: The species has affinities to *A. littoralis*. It differs from this species mainly by the absence of an apical infuscation of the maxillary palpomere 4, by finer pronotal punctures which are less densely arranged than on elytra, by the absence of rows of coarse lateral elytral punctures, and by a larger length ratio metatarsus/metatibia. Both species are clearly distinguishable by aedeagal character states.
BIONOMICS: This species was found in the algal film on the surface of a rock near a stream, and under wet leaves and flood debris of a forest stream.

DISCUSSION: The body form of this species is rather oblong oval. A “short and broad body” (GENTILI 1993) could not be confirmed here. GENTILI (2002) separates P. tasmaniana from P. sublineata by dorsal punctation (stronger in A. tasmaniana), differences in the phallobase and the median lobe. However, I cannot confirm any differences regarding the aedeagus. The different phallobase is very likely due to a preparation artifact. In the specimens from Tasmania the elytral punctures are slightly less serial and slightly coarser than in the specimens from mainland Australia. This subtle difference can be caused by the geographic separation of the populations from Tasmania, which might represent a separate subspecies, a fact which must be clarified by studying more material. The subtle morphological difference of the elytral punctation does not justify a separate specific rank.

DISTRIBUTION: Australia (NSW, SA, T, V).

Anacaena wattsi (GENTILI, 1993), comb.n.

Paranacaena wattsi GENTILI 1993: 293.

TYPE LOCALITY: Australia, New South Wales, Maclean.


ADDITIONAL MATERIAL EXAMINED:


DESCRIPTION: Total length 1.7–2.1 mm; maximum width 0.9–1.1 mm; EI 1.24–1.34. Habitus (Fig. 5): distinctly convex dorsally, narrow, widest at midlength, attenuate apically, apex narrowly rounded. Lateral elytral margins very slightly inflected, elytra not completely visible in dorsal view.

Head: Clypeus light brown mesally, with brighter areas of variable size laterally, preocular patches present in some individuals; frons light brown. Punctures on clypeus and frons fine, irregular, moderately densely distributed, interspaces 1–3 x as wide as one puncture. Microsculpture absent. Clypeus about as long as diameter of eye, with blunt anterolateral angles and straight anterior margin, CI=4.2. Eyes very slightly emarginate anteriorly, OI=3.7. Antennae composed of eight antennomeres. Maxillary palpus moderately slender, palpmere 2 weakly inflated, palpmere 4 with infuscation, or infuscation absent. Mentum excavate centrally, sexually dimorphic: a sharp, longitudinal mesal furrow present in males, a very shallow excavation in females; some female individuals with almost flat mentum. Punctures present on
ventral face of mentum; microsculpture absent; lateral margins straight, anterior edge not emarginate. Labial palpi moderately stout, palpomere 3 slightly elongate.

Thorax: Pronotum largely light brown with very indistinctly darker central area. Pronotal punctures very fine, widely spaced. Prosternum with median carina in anterior third. Elytra light brown, very indistinctly darker brown areas present in most individuals. Setae absent from lateral borders of pronotum and elytra. Callosity on shoulder regions absent. Anterior elytral declivity distinct. Sutural stria recognisable in posterior 0.7 of elytra in dorsal view. Punctures on elytra very fine, with subserial distribution, rather widely spaced, interspaces on average more than 4 x as wide as one puncture, primary and secondary rows present; slightly coarser punctures present near lateral margins. Microsculpture absent. Mesoventrite with distinct median protuberance. Procoxae without spine-like setae. Legs and ventrites darker brown than elytra. Pro- and mesofemur ventrally almost entirely covered with hydrofuge pubescence, metathoracic pubescence restricted to a very narrow strip at anterior margin and to proximal portion. Metatarsus slightly shorter than metatibia.

Aedeagus: (Figs. 16, 17): Main piece of phallobase less than half as long as parameres, about as wide as long, narrowing to distinctly demarcated manubrium; manubrium with spine-like extension. Parameres slender, with almost straight lateral and mesal margins, widest at base, evenly narrowing towards broadly rounded, weakly sclerotized apex. Median lobe very slender, almost parallel-sided, with bluntly rounded apex; shorter than parameres, with corona in apical position; basal apophyses long, rather slender, with distinct extension into phallobase. Base of median lobe mesally visibly connected with parameres.

DIFFERENTIAL DIAGNOSIS: This species is very similar to *A. horni*, from which it can be distinguished mainly by the following features: body shape less wide, elytral color paler, elytral punctures finer, mentum excavate, punctures on mentum stronger, shape of aedeagus different.

BIONOMICS: This species has been collected in a stony creek in a rainforest, and in swamps with grass, sedges, reeds, among dead leaves. It was also collected at artificial light sources.

DISCUSSION: GENTILI (1993) pointed out the strong affinities between *A. wattsi* and *A. horni*. The morphological differences mentioned in the original description of *A. wattsi* can be confirmed, except for the difference in the length of the maxillary palpomere 2. The differences in the morphology of the mentum (excavate in *A. wattsi*, flat in *A. horni*) and the different aedeagus justify a separate specific status for *A. wattsi*.

DISTRIBUTION: Australia (NSW, NT, Q, T, WA).

Key to the species of *Anacaena* from Australia

1. Mesoventrite without protuberance; metathoracic pubescence extended on more than proximal half; procoxae with a few spine-like setae; eyes not constricted anteriorly; elytral punctures arranged in equal series (Fig. 25); nine antennomeres; phallobase longer than wide; manubrium wide; parameres knife-shaped (Fig. 18). ................................................................. *nitens*

   - Mesoventrite with distinct protuberance; metathoracic pubescence restricted to anterior margin and a small proximal portion; procoxae without spine-like setae; eyes slightly or strongly constricted anteriorly; elytral punctures unordered, or with primary and secondary series, or serial punctures alternating with unordered punctures (Figs. 20–24); eight antennomeres; phallobase not longer than wide; manubrium extended into a long spine; parameres not knife-shaped (Figs. 6–17) ......................................................... 2

2. Elytral punctuation arranged in primary and secondary rows (Figs. 20, 21) ................................................................. 3

   - Elytral punctuation not arranged in primary and secondary rows (Figs. 22–24) ................................................................. 6
Discussion

All species described herein are endemic to Australia. One species (A. nitens) shows morphological affinities with species of the A. suturalis-group of the New World. Some of the other species share several character states with species from New Guinea and from New Caledonia (elytral punctures arranged in serial rows, spine-like extension of manubrium). All the species described share apomorphic features with the species of Anacaena (Komarek & Beutel 2006). It is therefore justified to transfer them from Paranacaena to Anacaena. All species of Anacaena from Australia are to be considered aquatic.

Zusammenfassung


Fig. 19: Clypeus of *Anacaena horni*. Scale bar = 0.5 mm.
References


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