

Babalimnichus splendens sp.n., a new jumping shore beetle from the Tonga Islands (Polynesia) (Coleoptera: Limnichidae, Thaumastodinae)

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Abstract

A new species of the intertidal genus *Babalimnichus* SATÔ (Coleoptera: Limnichidae, Thaumastodinae), *B. splendens*, sp.n., is described from the Tonga Islands, in the Pacific Ocean. It is the first species of the genus in the Australian Region, and the first Limnichidae to be recorded from small islands in the Pacific. The other two existing species of the genus occur in the Ryukyu Islands (Japan), in the limit between the Oriental and Palaearctic Regions; and the island of Taiwan, in the Oriental Region. The new species is well characterised by the existence of spines on the three pairs of tarsi.

Key words: Coleoptera, Limnichidae, Thaumastodinae, *Babalimnichus splendens*, biogeography, new species, Polynesia, Tonga Islands.

Introduction

The subfamily Thaumastodinae is a small group (five genera with 13 species) of highly modified intertidal Limnichidae (SPANGLER 1995; HERNANDO & RIBERA in press). They are morphologically homogeneous and well characterised, although their appearance is very different from other limnichid subfamilies. Probably as the result of convergent adaptations to jump, they resemble other families of jumping beetles (such e.g. Eucinetidae), or even groups in other orders of insects (e.g. some Auchenorrhyncha). In fact, the first species of the subfamily (*Pseudeucinetus zygops* HELLER, 1921) was described as a Melandridae (HELLER 1921). CHAMPION (1924a) independently described the same species, this time identifying it as a new subfamily of Limnichidae, and later recognised the synonymy (CHAMPION 1924b). The morphological particularities of the subfamily were recognised by COSTA et al. (1999), who in a phylogenetic study placed Thaumastodinae in an unresolved polytomy together with another two subfamilies of Limnichidae (Limnichinae and Cephalobyrrhinae) plus the families Heteroceridae and Dryopidae.

Within Thaumastodinae, two genera (*Martinius* SPILMAN and *Mexico* SPILMAN) occur in the Caribbean and Pacific coast of South America, and three (*Pseudeucinetus* HELLER, *Acontosceles* CHAMPION and *Babalimnichus* SATÔ) in the Oriental Region, in the Indian Ocean and in the Pacific Ocean (SPANGLER et al. 2001; HERNANDO & RIBERA in press). The genus *Babalimnichus* was described by SATÔ (1994) for two species, *B. taiwanus* SATÔ, 1994 from Taiwan, and *B. masamii* SATÔ, 1994 from the Ryukyu Islands (Japan). It is well characterised by the serrate elytral margins, the long apical setae of the parameres (which are exclusive among Limnichidae), and the posterior legs modified for jumping. The larvae of *B. masamii* was recently described by YOSHITOMI & SATÔ (2001), who also provide details of the habitat and likely feeding habits of the species (algae in the interstices of rock in intertidal coral reefs).

Among the unclassified material of Limnichidae in the collections of the Natural History Museum (London) (NHM) two females of a new species of *Babalimnichus* were found. These

specimens were collected in the island of Tongatapu (Tonga, Polynesia), in coral cliffs in the seashore. The new species described below extends the distribution of the genus to the Australian Region, and it is also the first Limnichidae to be recorded from the small islands in the Pacific Ocean.

We thank Prof. M. Satô for providing specimens of *Babalimnichus masamii* for study.

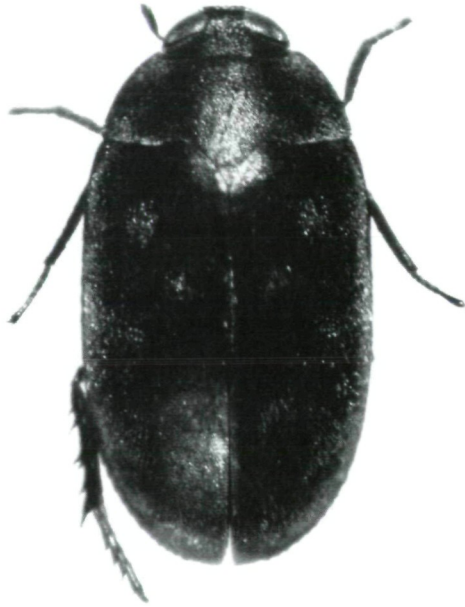


Fig. 1: Habitus of *Babalimnichus splendens* sp.n.

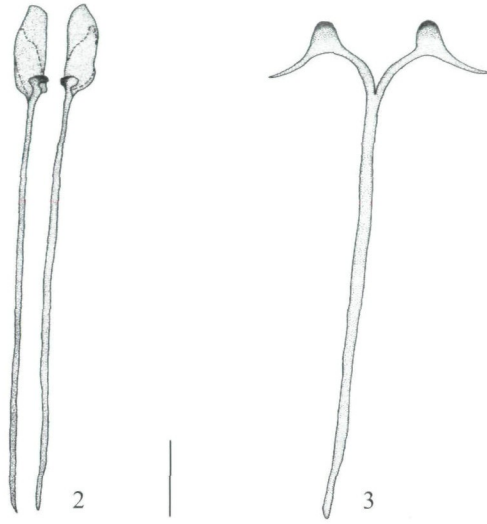
***Babalimnichus splendens* sp.n.**

TYPE LOCALITY: Makeke Beach, Tongatapu, Tonga Islands.

TYPE MATERIAL: **Holotype** female (NHM): "TONGA: / Tongatapu [hand written, HW] / Makeke Beach [HW] / on coral cliff by sea [HW] / 24· X· 74 [HW] / W. H. Pierce [HW] / TT5423, Batel[?] 136 [HW] / C.I.E. A. 9106 / Press by / Comm. Inst. Ent. / B.M.1979-1 / ? *Pseudeucinetus* sp. [HW] / det. R.B. Madge, 1979", with holotype label. **Paratype** (NHM): one female with same data as holotype, with paratype label.

DESCRIPTION: Habitus as in Fig. 1. Length 2.5 - 2.7 mm, maximum width 1.3 - 1.4 mm. Body elongated, parallel-sided, moderately convex; entirely covered by a dense hydrofuge pubescence; dorsal surface covered by very dense small punctures, with a rugose appearance; with a metallic green hue.

Head densely and strongly punctate. Eyes large and oval in shape; space between eyes on dorsal surface of head slightly depressed, equal to half of an eye diameter; eyes not protruding from edge of head. Clypeus parallel-sided, extended beyond insertion of antennae; labrum clearly separated from clypeus by a strong suture. Antennae short, with 11 segments; four terminal segments forming a loose club.



Figs. 2–3: Female genitalia of *Babalimnichus splendens* sp.n.: 1) ovipositor; 2) spiculum ventrale. Scale bar: 0.1 mm.

Pronotum transverse; anterior margin slightly sinuate; posterior margin straight except in centre, with an expansion firmly inserted in scutellum. Punctuation similar to that of head. Lateral margins slightly curved; with a strong border. Anterior angles of pronotum rounded, posterior angles straight.

Elytra parallel-sided; apex round, with two spiny projections close to suture, forming a locking device in conjunction with last abdominal sternite. Margin of elytra serrate, denticles more apparent at apex. Punctuation of elytra similar to that of head and pronotum. Surface covered by golden pubescence, with three poorly defined transverse lines (humeral, discal and apical) of silvery pubescence.

Ventral surface flat, black. Prosternal apophysis broad, apex truncate, strongly inserted in the mesosternum. Metasternum expanded laterally, posterior margin with a triangular extension between metacoxae. Metacoxae broad, margins strongly bordered; partially covering base of femora; with lateral excavations for reception of femora when legs are folded. Last abdominal sternite emarginate.

Legs with pro- and mesotibiae with an apical spine; metatibiae with external margin densely covered with strong spines; three first tarsomeres of pro- and mesotarsi with a small ventral spine; metatarsi with two strong spines in first three tarsomeres.

Female genitalia as in Figs. 2-3; ovipositor long, with dorsal and ventral apical valvae; dorsal valvae longer, ventral valvae short and acuminate; spiculum ventrale as long as ovipositor, with apex bifurcated. Male unknown.

DIFERENTIAL DIAGNOSIS: *Babalimnichus splendens* can be easily separated from the other two known species of the genus by the presence of spines in the tarsi of the three pairs of legs (they are present only in the metatarsi in *B. masamii* and *B. taiwanensis*). In addition to this character, *B. splendens* is larger than the other two species (2.5 – 2.7 vs. 1.7 – 2.1 and 1.9 – 2.0

mm respectively; SATÔ 1994); the general shape of the body, more parallel-sided in *B. splendens* (regularly acuminate towards the apex in the other two species); the depressed space between the eyes in *B. splendens* (convex in the other two species); the broader and stronger margin of the pronotum (narrower and less evident in the other two species); the stronger denticles on the elytral margin in *B. splendens* (less apparent in the other two species); and the metallic hue of the upper surface of *B. splendens* (absent in the other two species).

HABITAT: According to the label data, the two specimens were collected in coral cliffs in the coast in the intertidal area, a similar habitat to that of the other known species of the genus (SATÔ 1994; YOSHITOMI & SATÔ 2001).

ETYMOLOGY: From the Latin *splendens* (shiny), in reference to the metallic reflections of the body.

DISTRIBUTION: So far only known from the type locality.

BIOGEOGRAPHICAL NOTES: With the discovery of *B. splendens* in Tonga, the distribution of the genus is extended from the Oriental (Taiwan and the Ryukyu Islands) to the Australian Region. It is also the first species of the family known from the small islands of the Pacific Ocean (some limnichids are known from New Zealand, New Caledonia and most of the large islands in SE Asia). The two known areas of distribution of the genus are widely separated: Taiwan and the Ryukyu are situated ca. 125°E 25°N, and Tonga ca. 175°W and 20°S – i.e., with a distance of more than 60° of longitude and 45° of latitude, embracing the Equator. This type of disjoint distribution is similar to that of other intertidal Limnichidae (and other groups of intertidal insects), as in e.g. the genus *Hyphalus* BRITTON, present in the Pacific Ocean (New Zealand, Australia, Ryukyu Islands) and in the Indian Ocean (Aldabra) (HERNANDO & RIBERA 2000). As was the case with the genus *Hyphalus*, this distribution could simply reflect the incomplete knowledge of the fauna of some of the Pacific Islands, but could also be a product of long-range dispersal between islands.

According to the traditional zoogeographical divisions, Tonga would be included in the Australian Region, Pacific Subregion, together with the neighbouring Polynesian Islands. Most of these traditional classifications are however based on the distribution of mammals, but there are no native mammals (other than bats) on most of the Pacific Islands, so on that basis their biogeographical affinities would be uncertain (COX 2001). The same author, in a reconsideration of the traditional major biogeographic divisions, states that according to their flora, the Tonga Islands have to be included in the Indo-Pacific kingdom, Polynesian subkingdom (and separated from the Australian kingdom). Under this scenario, Taiwan, the Ryukyu and Tonga would belong to the same biogeographical area, and thus, although still widely disjoint, the distribution of the genus would encompass a single major region.

The intermediate condition of some Pacific Islands with respect to the biota of Australia and that of SE Asia is also recognised in an analysis of a large data set of plants and animals by TURNER et al. (2001). Their conclusion is that both Australian and Oriental elements are present in Polynesia. The colonisation could have proceeded as the Pacific plate advanced westwards, putting the islands within the reach of the colonisers from both the Australian and the Oriental Regions. The biota of Tonga is most similar to that of Fiji, and both are clustered within a larger group with most of the Australian and Pacific Islands (including Australia itself and New Guinea). Taiwan is included within a clade together with Malaysia and the islands west of the Wallace line (Borneo, Sumatra and Java) (TURNER et al. 2001). Under this scenario, which we favour, the distribution of *Babalimnichus* would include two of the major traditional biogeographical regions, the Oriental (with Taiwan and the Ryukyu) and the Australian (including Tonga and the rest of the Polynesian Islands as a subregion).

The knowledge of the water beetle fauna of Tonga is very scarce: BALFOUR-BROWNE (1945), in his revision of the fauna of Oceania, records only six species of Dytiscidae. All of them are found also in Fiji, and most in Samoa as well as in New Caledonia and Queensland. Only one (*Hydaticus fijiensis* RÉGIMBART) is endemic of Fiji, Tonga and the islands of "Papuasia" (New Guinea, Moluccas, Solomon Islands, Bismark Archipelago and nearby smaller islands) (BALFOUR-BROWNE 1945; see also BALKE 1993 for the species of the dytiscid genus *Rhantus*). The water beetle fauna agrees thus completely with the conclusions of TURNER et al. (2001), i.e. that Tonga has to be considered part of the Australian Region.

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