

# Records of the Pughead Pipefish, *Bulbonaricus brauni* (Gasterosteiformes: Syngnathidae), from Amami-oshima Island, Central Ryukyu Archipelago, Southern Japan

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## Abstract

Two specimens of the Pughead Pipefish, *Bulbonaricus brauni*, were collected from shallow water of Amami-oshima island, central Ryukyu Archipelago, Japan. Previously *B. brauni* has been recorded in Japanese waters from the Yaeyama Islands, Okinawa-jima island, and the Ogasawara Islands. Therefore the present specimens represented the first record from the Amami Islands, and the northernmost record of the species.

**Key words:** Amami Islands, *Bulbonaricus brucei*, *Bulbonaricus davaoensis*, distribution, northernmost record, taxonomy

## Introduction

Three species, *Bulbonaricus brauni* (DAWSON and ALLEN 1978), *B. brucei* Dawson, 1984, and *B. davaoensis* (Herald 1953), are currently placed in the genus *Bulbonaricus*, but only the first is known from Japan (DAWSON 1984, SUZUKI *et al.* 2002, SENOU 2013). Species of *Bulbonaricus* have the pug-nosed head, lack dorsal and pectoral fins, and are easily distinguished from species of other genera (DAWSON 1984).

During an ichthyofaunal survey at Amami-oshima island in the Amami Islands, two specimens (female and male) of *B. brauni* were collected off southern part of the island at a depth of 15 m. The species, was previously recorded from off west coast of Sumatra in Indonesia, Western Australia, Palau, the Yaeyama Islands, Okinawa-jima island, and the Ogasawara Islands (SENOU 2013), with the northernmost record on the basis of voucher

specimens reported from Iriomote-jima island in the Yaeyama Islands, southern Ryukyu Archipelago, Japan. The present specimens are the first records of *B. brauni* from the Amami Islands and the northernmost records of the species.

## Materials and Methods

Counts and measurements follow DAWSON (1977, 1984). Measurements were made to the nearest 0.1 mm with needle-point digital calipers under a dissecting microscope. Standard and head lengths are abbreviated as SL and HL, respectively. The description is based on present two specimens KAUM-I. 72148 and KAUM-I. 72147. Counts and measurements of KAUM-I. 72147 are shown in parentheses when data differ between the two specimens. The specimens and underwater photographs of the two specimens are deposited at the Kagoshima University Museum, Kagoshima, Japan (KAUM). Additionally, underwater photographs of *B. brauni* in Japanese waters examined in this study are registered at the Image Database of Fishes in the Kanagawa Prefectural Museum of Natural History, Odawara, Japan (KPM-NR). Curatorial procedures for the collected specimens followed MOTOMURA and ISHIKAWA (2013). Institutional abbreviations follow ESCHMEYER (1998).

## Results and Discussion

### *Bulbonaricus brauni* (Dawson and Allen, 1978)

Standard Japanese name: Chin-yōjiu

Figs. 1–4

**Materials examined.** KAUM-I. 72148, 50.4 mm SL, female, KAUM-I. 72147, 40.1 mm SL, male, off Atetsu (28°10' 51" N, 129°16' 56" E), Setouchi, Amami-oshima island, Amami Islands, Kagoshima Prefecture, Japan, 15 m depth, 30 April 2015, T. FUJII.

**Description.** Caudal fin rays 10; 17 trunk rings + 46 (45) tail rings = 63 (62) total rings. Head length 6.3 (6.7) % of SL; pre-anus length 30.1 (27.4) % of SL; trunk depth 3.1 (2.7) % of SL; head width 29.5 (26.5) % of HL; snout length 8.9 (11.8) % of HL; orbital diameter 13.3 (14.3) % of HL.

Body eel-like, slender and slightly compressed; superior trunk and tail ridges continuous; median trunk ridge straight, extending to 1st tail ring; ventral ridges on mid-ventral line indistinct; all ridges on trunk and tail smooth; rings not distinct; no spines on head and body rings; U-shaped concave at ventral surface of trunk. Head pug-nosed; frontal process V-shaped, its dorsal margins denticulate and covered by fleshy wart; mouth inferior with fleshy lips, located below pointed tip of projecting preorbital portion; gill opening small, located at upper corner of gill cover. Dorsal, anal, and pectoral fins absent; caudal fin small.



Fig. 1. Lateral, dorsal, ventral views (top to bottom) of *Bulbonaricus brauni* (KAUM-I. 72148), 50.4 mm SL, female, off Atetsu, Setouchi, Amami-oshima island, Kagoshima Prefecture, Japan.



Fig. 2. Lateral view of *Bulbonaricus brauni* (KAUM-I. 72147), 40.1 mm SL, male, collected with KAUM-I. 72148.



Fig. 3. Head and trunk of *Bulbonaricus brauni* (top: KAUM-I. 72148, 50.4 mm SL, female; bottom: KAUM-I. 72147, 40.1 mm SL, male), off Atetsu, Setouchi, Amami-oshima island, Kagoshima Prefecture, Japan. Photographs of both specimens were shown at approximately 10-fold magnifications.

Head, body, and caudal fin in fresh specimen red with numerous tiny white spots uniformly distributed. Snout, preorbital portion, and lips solid white with no spots. Color when alive same as freshly killed specimen.

**Distribution.** The species has currently been recorded from the following localities in the eastern Indian and Pacific oceans on the basis of collected specimens, viz., Sumatra (Indonesia), North West Cape (Western Australia), Iwayama (=Nikko) Bay (Palau), Green Island (Taiwan), Iriomote-jima island in the Yaeyama Islands and Amami-oshima island in the Amami Islands (Japan) (DAWSON 1984, SUZUKI *et al.* 2002, Ho and LIN 2014, this study). Moreover the species has also been recorded by underwater photographs from several localities in Japanese waters, including Ishigaki-jima island (KPM-NR 95966) in the



Fig. 4. *Bulbonaricus brauni* (KAUM-I. 72148), 50.4 mm SL, female, in association with *Galaxea fascicularis*, Amami-oshima island, Kagoshima Prefecture, Japan.

Yaeyama Islands, Okinawa-jima island (KPM-NR 97639), Chichi-jima island (KPM-NR 97442) and Ani-jima island (KPM-NR 97447) in the Ogasawara Islands.

**Habitat.** *Bulbonaricus brauni* collected from Amami-oshima island lived among the calyxes of *Galaxea fascicularis* with a colony size of approximately 0.3 m in diameter at a depth of 15 m. SUZUKI *et al.* (2002) reported that *B. brauni* inhabits among branches of *G. fascicularis* with diameters ranging from 0.6 to 6 m at depths of 6-23 m in Iriomote-jima island. The holotype (WAM P. 25800-001) of the species was collected among dendrophylliid coral at a depth of 10 m, and the paratype (CAS 17789) was collected from *G. musicalis* at a depth of 0.6-4.6 m (DAWSON and ALLEN 1978).

**Remarks.** Characters of the present specimens are consistent with the diagnostic characters of *B. brauni* given by DAWSON and ALLEN (1978), DAWSON (1984), and SUZUKI *et al.* (2002): *i.e.*, frontal process V-shaped, its dorsal margins denticulate and covered by fleshy wart; trunk rings 17; and the head and body spotted. *Bulbonaricus brauni* is clearly distinguishable from its two congeners by its spotted body without stripes (*vs.* longitudinal stripes without spots in *B. brucei* and *B. davaoensis*), 17-18 trunk rings (*vs.* 15-16 in *B. brucei*), and the frontal process V-shaped (*vs.* rounded in *B. davaoensis*) (DAWSON 1984).

*Bulbonaricus brauni* was originally described by DAWSON and ALLEN (1978) on the basis of two specimens from Western Australia and Palau. YOSHINO (1990) firstly recorded the species from Japan in the result of an ichthyofaunal survey of Iriomote-jima island. YOSHINO (1990) also proposed a provisional Japanese name “chin-yōjiu” for *B. brauni*, being now treated as the standard Japanese name.

The northernmost record of *B. brauni* based on collected specimens has previously been presented from Kanokawa Bay (24°17' N, 123°43' E, KPM-NI 11786, 11787), Iriomote-jima island in the Yaeyama Islands, southern Ryukyu Archipelago, Japan (SUZUKI *et al.* 2002; see above). SENOU (2013) indicated that underwater photographs of *B. brauni* were taken from the Amami Islands, but the individuals were subsequently re-identified as other species of *Bulbonaricus* (SENOU personal communication). Therefore, the present specimens represented the first records of *B. brauni* from the Amami Islands, central Ryukyu Archipelago, also being the northernmost record of the species (approximately a 700 km north-west ward range extension).

*Bulbonaricus brauni* has been classified as 'IUCN Red List, endangered species, Rank IA' in the Okinawa Prefecture, Japan (YOSHINO 2012). The threat level rating is due to the lifecycle of the species being strongly associated with limited species of corals, and the fact that coral reef ecosystems have been and are still being damaged by mass coral bleaching and environmental destruction. However, the results of the present study suggest that *B. brauni* is more widely distributed in Japanese waters than previously thought. In addition, the colony size of *G. fascicularis* that *B. brauni* inhabits in the present study is smaller than those described by SUZUKI *et al.* (2002), who stated that *B. brauni* inhabits *G. fascicularis* larger than 0.6 m in diameter. Our observations suggest that *B. brauni* can inhabit smaller coral colonies than previously believed. In order to more precisely define the level of the threat to *B. brauni*, further surveys on the ecology and lifecycles of both the host corals and *B. brauni* are required.

## Acknowledgments

We are especially grateful to K. HAGIWARA (Yokosuka City Museum), S. YOKOYAMA (Diver's Guest House Orenchi), T. SHITAMITSU (Tokyo University of Marine Science and Technology), and D. UYENO, T. YOSHIDA and S. TASHIRO (Kagoshima University) for their help in field collections and examination of specimens. We also thank H. SENOU (KPM) for the opportunity to examine underwater photographs. We thank T. YOSHINO (Okinawa Churashima Foundation) for providing several references. H. MOTOMURA (KAUM) gave important advice on the manuscript. J. D. REIMER (University of the Ryukyus) improved the English in the manuscript. This study was supported in part by a Grant-in-Aid from the Japan Society for the Promotion of Science for JSPS Fellows (PD: 26-477) to the first author, and the Program for Establishment of Research and Education Network on Biodiversity and Its Conservation in the Satsunan Islands to the second author.

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