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ADDITION OF FISH SPECIES TO THE ESTABLISHED ALIEN FAUNA OF SINGAPORE: *AMBLYPHARYNGODON CHULABHORNAE* AND *BRACHYGOBIUS SABANUS*

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ABSTRACT. — The princess carplet, *Amblypharyngodon chulabhornae* Vidthayanon & Kottelat, and the lesser bumblebee goby, *Brachygobius sabanus* Inger, are herein added to the established alien freshwater fish fauna of Singapore.

INTRODUCTION

This article documents the presence of established populations of two alien freshwater fish species in Singapore. One is a diminutive and delicate cyprinid, the princess carplet, *Amblypharyngodon chulabhornae* Vidthayanon & Kottelat; the other is the brightly coloured lesser bumblebee goby, *Brachygobius sabanus* Inger. Both species have been obtained from the shallow margins of the Kranji Reservoir in the north-west of Singapore Island.

Amblypharyngodon chulabhornae was first recorded from Singapore on the basis of the two specimens (ZRC 4796) from Choa Chu Kang (Vidthayanon & Kottelat, 1990), which incidentally, are the largest examples of this species known to date. Ng & Lim (1996) subsequently cited *Amblypharyngodon chulabhornae* as a 'feral' species that was probably introduced accidentally into Singapore, but did not seem to be established then. The recent series from the Kranji marshes provides the first evidence that it has thriving populations in Singapore.

MATERIAL AND METHODS

The specimens referenced in this article are deposited in the Zoological Reference Collection (ZRC) of the Raffles Museum of Biodiversity Research (RMBR) at the National University of Singapore, where they have been assigned catalogue numbers with the prefix ZRC. SL refers to standard length, between the tip of the snout and the base of the caudal fin. TL refers to total length, between the tip of the snout and the tip of the caudal fin.

RECORDS AND OBSERVATIONS

Amblypharyngodon chulabhornae Vidthayanon & Kottelat, princess carplet
Actinopterygii: Cypriniformes: Cyprinidae

Diagnosis. — Body laterally compressed and slender; one dorsal fin; anal fin with broad base and concave distal margin; caudal fin forked; eyes large and bluish in life; mouth oblique without barbels; scales small, 42–50 in mid-lateral series; lateral line incomplete, perforating 6–7 scales; body pale greyish yellow with a silver lateral stripe and silver abdomen, fins transluscent with yellowish tinge. It attains a maximum size of 42.3 mm SL but usually under 37.9 mm SL. This species is native to the flood plains of the Chao Phraya and Mekong river basins in Thailand and Cambodia (Vidthayanon & Kottelat, 1990; pers. obs.).

Records. — Choa Chu Kang—ZRC 4796 (2 ex.: 39.6–42.3 mm SL), abandoned fish pond, coll: K. Lim, early 1987. Kranji Reservoir—ZRC 53312 (30 ex.: 18.5–23.7 mm SL), marsh ponds off Neo Tiew Lane 2, coll: H. H. Tan & K. Lim, 23 Dec.2011 (Fig. 1).

Remarks. — At the Kranji Marshes, *Amblypharyngodon chulabhornae* inhabits shallow (less than 30 cm depth), fairly still water along the bank in exposed areas. It appears to be gregarious and was obtained when a net was dredged through dense growths of aquatic vegetation such as *Hydrilla verticillata*. *Rasbora borapetensis*, *Gambusia affinis*, *Dermogenys collettei*, and *Trichopsis vittata* are fish that often appeared in the same catch.

Fig. 1. *Amblypharyngodon chulabhornae*, 23.5 mm SL specimen (ZRC 53312) from the Kranji Marshes. (Photograph by: H. H. Tan).

Amblypharyngodon chulabhornae is distinguished from its congeners in having 42–50 mid-lateral scales (instead of 50–79) and its lateral line piercing 6–7 scales (instead of 7–23 scales). The species is named after Her Royal Highness Princess Chulabhorn Mahidol of Thailand (Vidthayanon & Kottelat, 1990). In Singapore, *Amblypharyngodon chulabhornae* can perhaps be mistaken for the striped Chinese minnow, *Metzia lineata* (Pellegrin), another alien species which bears a similar appearance, but seems to have become locally extinct (see Ng & Lim, 1996 as *Rasborinus lineatus takakii*). The latter species has a complete lateral line that pierces 35–37 scales, is silvery with 8–10 narrow blackish longitudinal lines on the sides, and grows to a larger maximum size of 86 mm SL (Alfred, 1966 as *Rasborichthys altior*).

Brachygobius sabanus Inger, lesser bumblebee goby
Actinopterygii: Gobiiformes: Gobionellidae

Diagnosis. — Body short and heavy, cylindrical anteriorly, compressed posteriorly; two dorsal fins; pelvic fins united to form a disc; caudal fin with rounded margin; body yellow with three broad black bars, one black bar reaching the mid-ventral line behind the anal fin base, first black trunk bar overlapping at the front half of the first dorsal fin base; anterior basal portion of the first dorsal fin black; less than half of pectoral and pelvic fins black; head with one broad black bar, and a narrower bright yellow bar across the nape; 24–27 mid-lateral scales, 0–2 predorsal scales; no transverse rows of papillae on the cheeks. Maximum size 26.5 mm SL (about 33 mm TL). *Brachygobius sabanus* is described from Sabah in northern Borneo (Inger, 1958), but is also recorded from Bangkok in Thailand and Muar in Peninsular Malaysia (Larson, 2001).

Records. — Poyan Reservoir—ZRC 51117 (1 ex.: 15.8 mm SL), coll: H. H. Ng et al., 12 Sep.2007; ZRC 51118 (1 ex.: 13.6 mm SL), coll: H. H. Ng et al., 11 Sep. 2007. Kranji Reservoir— ZRC 50888 (1 ex.: 16.5 mm SL), coll: H. H. Ng et al., 13 Mar.2007; ZRC 53313 (5 ex.: 20.5–23.0 mm SL), marsh ponds off Neo Tiew Lane 2, coll: H. H. Tan & K. Lim, 23 Dec.2011 (Fig. 2). Sungei Buloh Wetland Reserve, freshwater pond B1—ZRC 53309 (8 ex.: 9.9–16.9 mm SL), coll: H. H. Tan, 16 Dec.2011; ZRC 53399 (1 ex.: 18.2 mm SL), coll: B. W. Low, 19 Jan.2012. Seletar, Lorong Banir stream —ZRC 53400 (1 ex.: 15.0 mm SL), coll: J. K. I. Ho, 21 Jan.2012.

Remarks. — In Singapore, estuarine reservoirs, coastal freshwater ponds and open country streams offer suitable habitat and water conditions for *Brachygobius sabanus*. The freshwater pond at Sungei Buloh Wetland Reserve had water with pH 6.2, salinity of 0.18 to 0.20 μS, and temperature of 28°C (B. W. Low, pers. comm.). The specimens were collected by scoop net from among grasses growing at the edges of the pond. At Kranji Reservoir, the gobies were observed on the mud substrate, or on submerged blades of grass along the water's edge at a depth of about 10 cm. They darted into deeper water when startled. We have encountered large numbers of these on submerged concrete surfaces at Tengeh Reservoir. *Brachygobius sabanus* in the open country stream at Lorong Banir were found among submerged grasses.

At the Sungei Buloh Wetland Reserve, *Brachygobius sabanus* is sympatric with *Brachygobius kabiliensis*, but they do not occur in the same habitat. *Brachygobius sabanus* is found only in freshwater, while *Brachygobius kabiliensis* inhabits a small tidal creek in brackish water. *Brachygobius sabanus* differs from *Brachygobius kabiliensis* in being

Fig. 2. *Brachygobius sabanus*, 21.4 mm SL specimen (ZRC 53313) from the Kranji Marshes. (Photograph by: H. H. Tan).

larger in size (26.5 mm compared to 15.5 mm in maximum SL), having 0 to 2 (instead of 7 to 8) predorsal scales, and one black band (instead of two black bands) reaching the mid-ventral line behind the anal fin (Inger, 1958).

Larson (2001) noted that there are four specimens of *Brachygobius doriae* (Günther) from Singapore collected in Jan.1947 by M. Rakowicz, at the California Academy of Sciences in San Francisco, USA. Owing to the lack of collecting information, it seems likely that the specimens have originated from the ornamental fish trade, and not obtained directly from the wild in Singapore (Larson et al., 2008). *Brachygobius doriae* and *Brachygobius sabanus* are similar in appearance, but can be distinguished by the amount of black on their first dorsal, pectoral and ventral fins. *Brachygobius doriae* has its first dorsal fin entirely black save for a narrow whitish distal margin, while the last one or two rays are colourless on *Brachygobius sabanus*. The pectoral and pelvic fins are black on at least the basal two-thirds on *Brachygobius doriae*; while on *Brachygobius sabanus*, black covers at most only the basal half of each of those fins (Inger, 1958). *Brachygobius doriae* also grows to a larger size (42 mm TL compared to 33 mm TL of *Brachygobius sabanus*) (Kottelat & Whitten, 1993; pers. obs.).

DISCUSSION

The origin of Singapore's feral populations of *Amblypharyngodon chulabhornae* is a mystery. We have never seen this species being sold as aquarium fish, nor traded as food fish. It seems most likely to have been imported as contaminants in batches of aquarium-worthy species of similar size, or even together with fingerlings of large food fishes. Large numbers must have escaped from holding facilities, or more likely been deliberately released.

There is no evidence of the occurrence of *Brachygobius sabanus* in Singapore until the first specimen was collected in Mar.2007 (see Alfred, 1966; Ng & Lim, 1996; Larson & Lim, 2005; Larson et al., 2008). In their compilation of alien fish diversity in Singapore's reservoirs, Ng & Tan (2010) either overlooked this species, or are treating it as a Singapore native, which is possible as it is recorded from neighbouring Peninsular Malaysia, and may have been missed by early collectors. However, we lean more to the assumption that local populations of *Brachygobius sabanus* originated from introduced stock. Such brightly coloured fish that inhabit shallow open habitats do not seem likely to have been missed by collectors.

Attractively marked in black and yellow bars, bumblebee gobies are popular ornamental fishes. *Brachygobius sabanus* and *Brachygobius doriae* are commonly offered for sale in aquarium shops in Singapore (pers. obs.), and it is likely that local wild populations are derived from fish imported possibly from Thailand or Indonesia. The many ornamental fish farms and import/export facilities adjacent to Kranji Reservoir and the Sungei Buloh Wetland Reserve suggest the reasonably good possibility of alien fish escaping into their water bodies. Such facilities, however, are absent around the reservoirs in the Western Catchment and Lorong Banir. The populations of *Brachygobius sabanus* there are, therefore, most likely derived from stocks that were deliberately released.

The ecological impact from the two recently established species is totally unknown and certainly invites research. With the evidence of self-perpetuating populations of *Amblypharyngodon chulabhornae* and *Brachygobius sabanus*, there are presently at least 45 species of alien freshwater fish known to have established populations in Singapore (Ng & Tan, 2010; Lim & Tan, 2011).

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LITERATURE CITED

Alfred, E. R., 1966. The fresh-water fishes of Singapore. *Zoologische Verhandelingen*, **78**: 1–68, 8 pls.

Inger, R. F., 1958. Notes on fishes of the genus *Brachygobius*. *Fieldiana (Zoology)*, **39**: 107–117.

Kottelat, M. & A. J. Whitten, 1993. *Freshwater Fishes of Western Indonesia and Sulawesi*. Periplus Editions Limited, Jakarta, Indonesia. xxxviii + 221 pp., 84 pls.

Larson, H. K., 2001. A revision of the gobiid fish genus *Mugilogobius* (Teleostei: Gobioidei), and its systematic placement. *Records of the Western Australian Museum*, Supplement No. **62**: i–vi, 1–233.

Larson, H. K. & K. K. P. Lim, 2005. *A Guide to Gobies of Singapore*. Singapore Science Centre. 164 pp.

Larson, H. K., Z. Jaafar & K. K. P. Lim, 2008. An annotated checklist of the gobioid fishes of Singapore. *The Raffles Bulletin of Zoology*, **56**: 135–155.

Lim K. K. P. & H. H. Tan, 2011. Addition of three cyprinid fishes to the established alien fauna of Singapore. *Nature in Singapore*, **4**: 377–382.

Ng H. H. & H. H. Tan, 2010. An annotated checklist of the non-native freshwater fish species in the reservoirs of Singapore. *Cosmos*, **6**: 95–116.

Ng, P. K. L. & K. K. P. Lim, 1996. The freshwater fishes of Singapore. *Journal of the Singapore National Academy of Science*, **22–24**: 109–124.

Vidthayanon, C. & M. Kottelat, 1990. *Amblypharyngodon chulabhornae* sp. nov., a new cyprinid fish from Thailand and Kampuchea. *Natural History Bulletin of the Siam Society*, **38**: 45–57.