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First Record of the Convict Cichlid *Amatitlania nigrofasciata* (Günther, 1867) on Mindanao Island, Philippines with Remarks on Some Endemic and Introduced Fishes in Sawaga River, Bukidnon

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ABSTRACT

The Convict Cichlid *Amatitlania nigrofasciata* (Günther, 1867) is an introduced freshwater fish, originally from Central America. We provide the first record of this species from Mindanao based on samples collected from the Sawaga River, Bukidnon, Mindanao Island. We also provided remarks of some fishes, including one endemic fish, the Half-beak (*Nomorhamphus philippinus*), and other introduced species recently sampled in the Sawaga River. We highlight the need to document the spread of introduced species in the river systems of Mindanao.

Keywords: Cichlidae, endemic, fish, freshwater, introduced invasive species (AIS), half-beaks, river

INTRODUCTION

A number of introduced freshwater fishes have been documented in the Philippines (Guerrero, 2014). There are currently 50 known introduced fish species in the country, mainly due to aquaculture, pest control, and aquarium

trade (Froese & Pauly, 2019).

One of these species includes the Convict Cichlid *Amatitlania nigrofasciata* (Günther, 1867). This species has a native range in Central America (Schmitter-Sotto, 2007) but now expanded to various countries and territories, such as the United States (including Hawaii), Canada, Colombia, Mexico, Peru, Japan, Italy, Israel, Australia, Indonesia, and the Philippines. This species has been reported in the Middle East (Esmaeili et al., 2013; Herrera et al., 2016; Mousavi-Sabet & Eagderi, 2016).

OBJECTIVES OF THE STUDY

The study aimed to document the presence of the Convict Cichlid and to present a brief list of some interesting freshwater fish species in the Sawaga River.

MATERIALS AND METHODS

Two individuals of *Amatitlania nigrofasciata* were caught opportunistically by the first author during sampling on 05 December 2020 in the Sawaga River (8.0097N, 125.1426E), Barangay Bangcud, Malaybalay City, Bukidnon (Fig. 1). The site is located about 13.6 km south of Malaybalay City. Fish were caught using gillnets (~5cm mesh size) with the aid of local fishermen. Identification was based on available taxonomic references and online databases (e.g., FishBase by Froese & Pauly, 2019).

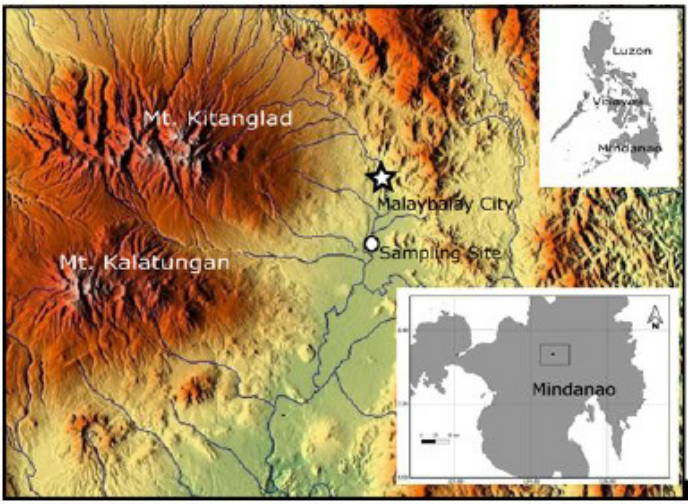

Figure. 1. Map showing the location of the sampling site in Sawaga River.

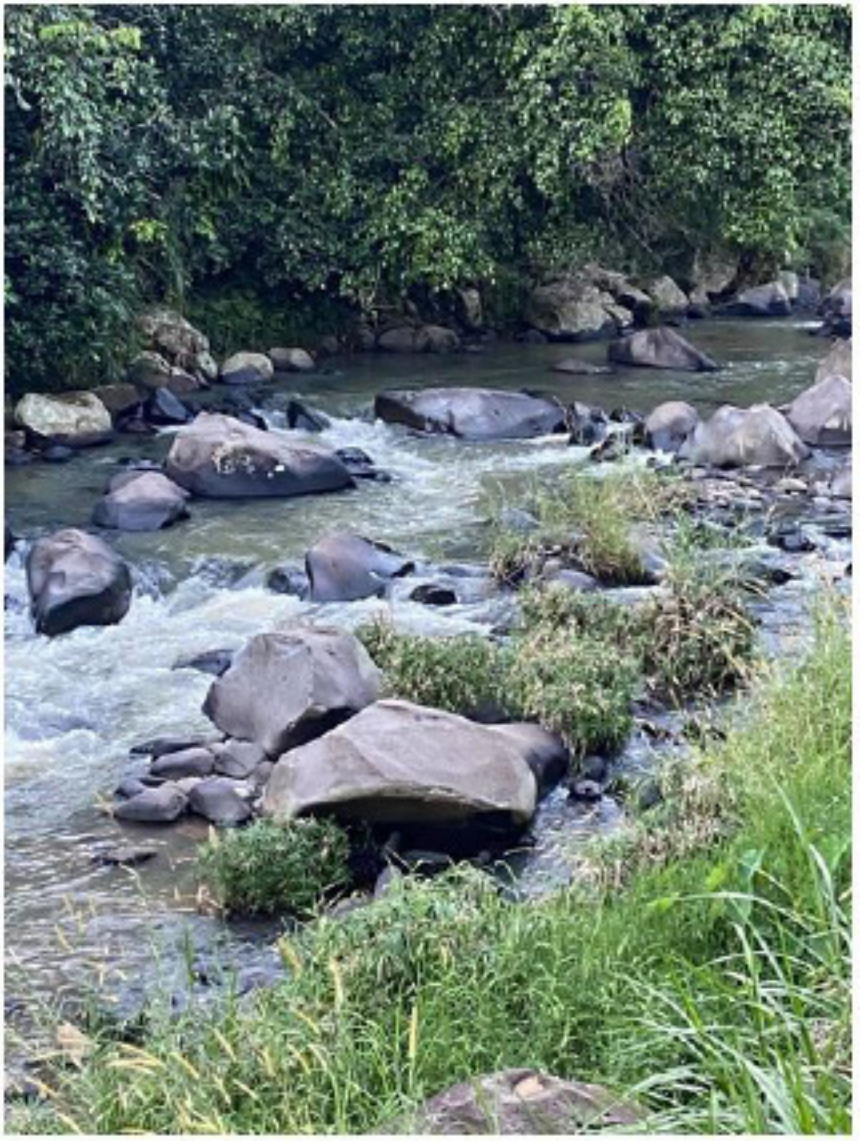

Figure 2. Habitat of the Convict Cichlid in Sawaga River, Malaybalay, Bukidnon.

RESULTS AND DISCUSSION

The Convict Cichlid is native to Central America (Froese & Pauly, 2019). It has been reported in countries outside of its native range, such as the United States (including Hawaii), Canada, Colombia, Mexico, Peru, Japan, Italy, Israel, Australia, Indonesia, and the Philippines. This species has been reported in the Middle East (Esmaeili et al., 2013; Mousavi-Sabet & Eagderi, 2016).

This is the first record of the introduced Convict Cichlid on Mindanao Island. No specific record is known as to when this species reached the Philippines (Guerrero, 2014; Labatos et al., 2014), although the first available account included an observation that this species occurs in Lapad River, Laguna (Luzon Island) (Froese & Pauly, 2019). Labatos et al. (2014) stated that this species was once known by the local fishermen as cultured in Tikub Lake, Tiaong, Quezon.

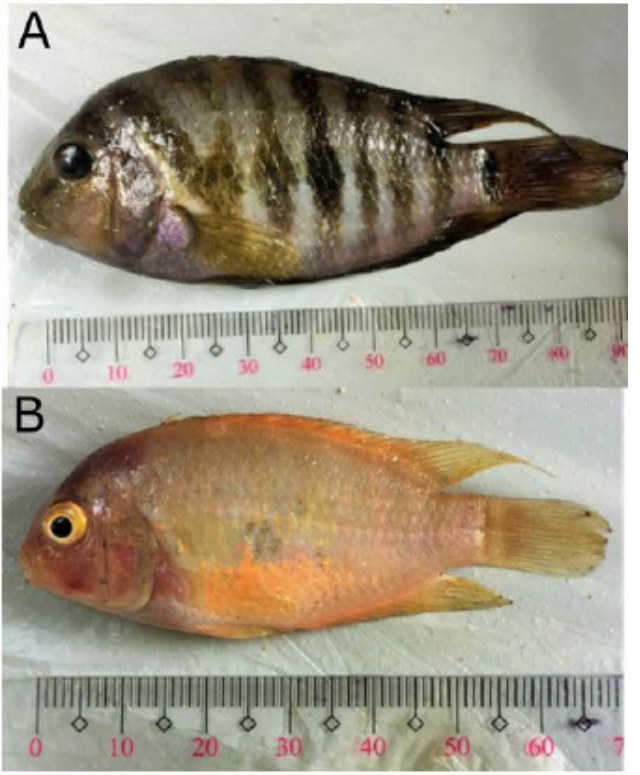

Figure 3. Convict Cichlid specimens from the Sawaga River.

This species is distinguished from other introduced cichlids in the country by having prominent vertical bars (~7; Fig.3A). This species has a body less than deep and 4th bar not forming Y-pattern (but I-shaped) compared to other similar members of the genus, *A. kanna* and *A. siquia* (Schmitter-Sotto, 2007). Vertebrae counts, however, cannot be determined as of this writing. There were no records of the other *Amatitlania* species in the Philippines. One of the two specimens (Fig. 3B) has yellowish coloration. Esmaeili et al. (2013) reported a variant of this species (though more reddish) from the Middle East.

In the Sawaga River, *A. nigrofasciata* specimens were caught in a portion of the river with a relatively strong current. This species can tolerate a wide range of habitat types and temperature ranges (20-36℃). We speculate that this cichlid probably arrived on Mindanao Island either through the aquarium pet trade or the aquaculture. These remain to be investigated in the near future.

Accounts of other fishes documented in Sawaga River (Fig. 4)

Figure 4. Other freshwater fishes documented at Sawaga River. (A) *Nomorhamphus philippinus*; (B) *Trichopodus trichopterus*; (C) *Cyprinus carpio;* (D) *Pterygoplichthys disjunctivus*; (E) *Xiphophorus hellerii;* (F) *Poecilia reticulata;* and (G) *Ophisternon bengalensis*.

Zenarchopteridae (Halfbeaks)

Halfbeak (Fig. 4A) *Nomorhamphus philippinus* Ladiges, 1972. Endemic. There are 20 species belonging to the genus *Nomorhamphus*, which has a limited distribution in freshwater bodies in Indonesia (Sulawesi) and the Philippines. There are six other species in the Philippines (*N. pectoralis*, *N. bakeri*, *N. rossi*, *N. manifestus*, *N. vivipara*, and *N. pinnimaculatus*). Thus far, 11 specimens (5 males: 32-45mm SL and 6 females: 34-66mm SL) were captured during two visits (10 December 2020 and 22 February 2021). Kobayashi et al. (2020) described a new species of *Nomorhamphus* (*N. aenigma*). Following the key provided by Meisner (2001), this genus is distinguished from the closely related *Dermogenys* in having "second anal-fin ray in males without a distinct geniculus; uniserial teeth not extending medially in a concave row from outer row of teeth; melanophores anterior to the anal fin in females not forming a distinct spot." We identified the specimens under this species based on the number of segments (9-10) of spiculus, the terminal segment of the spiculus shorter than the segmented portion, and the black pigment on the distal tips of the dorsal and anal fin rays as described by Meisner (2001). This species is known only in two locations in the Philippines, Cebu and Mindanao. Its presence in the Sawaga River is not surprising because 11 specimens were also collected in 1947 from Upi and Anonevo in Cotabato (Meisner, 2001).

Osphronemidae (Gouramies)

Snakeskin gourami (Fig. 4B) *Trichopodus trichopterus* Pallas, 1770. This species is potamodromous, which migrates within freshwater bodies only (Forese & Pauly, 2010). Hubilla et al. (2008) reported this species in the Agusan Marsh.

Cyprinidae (Carps)

Common Carp (Fig. 4C) *Cyprinus carpio* Linnaeus, 1758. Introduced. This species is among the most common introduced freshwater fish in the Philippines. Hubilla et al. (2008) reported this species in the Agusan Marsh.

Loricariidae (Sailfin Catfishes)

Janitorfish (Fig. 4D) *Pterygoplichthys disjunctivus* Weber, 1991. Distinguished from *P. pardalis* in having vermiculated patterns on the belly while the latter possess rounded spots. The genus may now be widely distributed due to its popularity in the aquarium trade and has been reported in some places like Zamboanga in Mindanao and Aparri, Cagayan in Northern Luzon (Chavez et

al., 2006). Hubilla et al. (2008) reported this species in the Agusan Marsh. This species was also sampled in 2014 at Lake Pinamaloy (N. Bucol, pers.comm.).

Poeciliidae (Guppies and Mollies)

Green Swordtail (Fig. 4E) *Xiphophorus hellerii* Heckel, 1848. This may have been introduced through the aquarium trade. Males are easily distinguished by their sword-like extension of the caudal fin. Two specimens were caught at the Sawaga River, but this could be more abundant in the area as reported to us by local fishermen.

Guppy (Fig. 4F) *Poecilia reticulata* Peters, 1859. Introduced. Photographed specimen is a female (male has brighter coloration, with colorful tail and caudal fin; about half the size; anal fin forming a gonopodium) and differs from another more common poeciliid, the Mosquitofish (*Gambusia affinis*), in location of dorsal fin origin. This species has become ubiquitous in any freshwater body in the country, ranging from major lakes and rivers to canals and drainages.

Synbranchidae (Swamp Eels)

Swamp Eel (Fig. 4G) *Ophisternon bengalensis* McClelland, 1844. Native. Only one specimen was collected. Other reports of this species in the Philippines include Bucol et al. (2010) in Bago River, Negros Island.

CONCLUSIONS

This paper is only a preliminary report of an ongoing study on the fish fauna of the Sawaga River spearheaded by Bukidnon State University (BukSU). It appears that a number of introduced fishes have reached Sawaga River, which is very close to high biodiversity areas, namely Mt. Kitanglad Natural Park and Mt. Kalatungan. The presence of the above-mentioned introduced fishes is not surprising at all. Most of these species are already well-established in many areas, not just in Mindanao but elsewhere. Yet, regulations aimed to suppress the further spread of these species remain to be fully implemented. Ironically, in some parts of the country, government agencies themselves introduced some of these fishes under the guise of either food production or eradication of pests, such as the case of the mosquitofish - these at the expense of the Philippine biodiversity.

RECOMMENDATIONS

Subsequent studies should comprehensively assess the fish fauna in other sites of the Sawaga River, especially the tributaries near the Mt. Kitanglad Natural Park. The mode of introduction of these species should be identified and addressed to minimize the further spread of these undesirable alien fish species.

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