

SGD 14.2: SUPPORTING AQUATIC ECOSYSTEMS THROUGH EDUCATION

Universities need to demonstrate how they are providing direct support through education in maintaining ecosystems in rivers, lakes and seas.

➤ Research Project: Conservation and Aquaculture Research and Development for *Glossogobius giuris* of Naujan Lake (GoBy Project)

IEC derived from the result of the project “Reproductive and Gut Analysis of White Goby, *Glossogobius giuris* (Hamilton 1822) in Naujan Lake”

Taxonomy, Anatomy and Morphological features of White Goby



SHORT COMMUNICATION

***Lernaea cyprina* (Copepoda, Lernaeidae) Infection on *Glossogobius aureus* (Gobiiformes, Gobiidae) from Naujan Lake under Captive Conditions**

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ABSTRACT

Lernaea cyprina, a parasitic cyclopoid copepod, is found to parasitize *Glossogobius aureus* (TL = 8–23 cm, BW = 8.6–101 g) maintained in concrete tanks. The infected fish displayed flashing behavior, localized redness, erosion of pectoral fin, and inflammation of the vent. Red sores were also found on the skin, buccal cavity, and mature female *G. aureus* were seen to be more susceptible to *L. cyprina* than males. The infection was successfully controlled by a salt dip at 10 ppt for 2–3 minutes followed by freshwater. This is the first record of *L. cyprina* infection in captive *G. aureus* in the Philippines.

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Keywords: *Lernaea cyprina*, *Glossogobius aureus*, infection, captive conditions

Lernaeids, often known as "anchor worms," are parasitic copepods with broad distribution due to their lack of host specificity. *Lernaea cyprina* is one of the most extensively studied species identified to infect over 100 fish species (Stöckler and Yanong 2017; Hossain et al. 2018). This

and Palisoc (1992) determined that 25% and a mean inter-specificity of 25% among *G. aureus* from

Aspects of the Biology and Ecology of the Naujan White Goby *Glossogobius aureus* Akihito and Meguro, 1975

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Research Paper

DIET COMPOSITION AND FEEDING HABITS OF NAUJAN WHITE GOBY *Glossogobius aureus* Akihito & Meguro, 1975 IN NAUJAN LAKE, PHILIPPINES

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ARTICLE HIGHLIGHTS

- The Naujan White Goby (*Glossogobius aureus*) is an economically important commodity, valued locally for dried fish, making it vulnerable to overexploitation.
- Domestication efforts attempt to lessen fishing pressure while conserving wild populations; however, the feeding ecology of this native fish in Naujan Lake is still unknown.
- Understanding *Glossogobius aureus*' diet composition and feeding habits from its natural habitat is critical for establishing its culture.
- Glossogobius aureus* is a benthic carnivore that feeds primarily on shrimp, followed by fish and other prey items.

ABSTRACT

Naujan White Goby (*Glossogobius aureus*), commonly processed as dried fish, is a local delicacy in Oriental Mindoro, Philippines. However, the product's growing popularity and rising demand have raised concerns about the overexploitation of this economically valuable species. While efforts to domesticate *G. aureus* have been initiated as a conservation measure, information on its feeding ecology in Naujan Lake National Park is lacking. This study investigated the diet composition, feeding habits, feeding intensity, and seasonal and site-based variations in the diet of *G. aureus* in Naujan Lake by monthly sampling from February 2020 to January 2021. A total of 1,938 *G. aureus* comprising 1,094 males and 844 females were collected, ranging from 75 mm to 280 mm in total length. *Glossogobius aureus* is a benthic carnivore. Shrimp forms the bulk of its diet, followed by fish and other prey. Occasional opportunistic feeding was observed in June to August when the usual prey were scarce. Pairwise comparison showed a significantly high percentage occurrence of shrimp observed during the dry months (January to March) and rainy months (September to November) compared to the lowest ingestion recorded in June and July ($P < 0.05$). The dietary patterns varied significantly across the six sampling sites and seasonal periods. Feeding intensity was the highest before spawning and declined during the spawning period. Males exhibited greater feeding activity compared to females. The findings offer valuable insights into the feeding patterns of *G. aureus*, which could help optimize dietary strategies for its successful culture in captivity.

Keywords: feeding ecology, foraging behavior, freshwater fish, Gobiidae, gut content analysis.

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INTRODUCTION

The foraging strategy and fish diet are crucial factors in understanding the trophic interactions among fish in a given community (Manko 2016). The dietary composition is influenced by various factors, including diel cycles (Carman et al. 2006), fish sizes (Dinh et al. 2017), habitats (Dinh et al. 2020), and seasons (Brush et al. 2012). Gut content analysis, a standard method in fish ecology, provides critical insights into dietary preferences, offering valuable information for fisheries

management and conservation (Chippis & Garvey 2007; Kamler & Pope 2001; Pikitch et al. 2004). Additionally, understanding feeding patterns may aid in optimizing feeding protocols for aquaculture fish species (Fabay et al. 2021; Ribeiro et al. 2022).

Naujan Lake National Park (NLNP), located on the northeast portion of Mindoro Island, is the 5th largest lake in the Philippines. This protected area is home to various economically important fishery resources. Lit et al. (2011) listed twenty-nine (29) fish species in the lake. Sixteen (16) of which are

limited aquaculture species with limited data from the lake were collected over 2 years to describe the biological aspects of the Naujan White Goby. Gonads were collected to measure fecundity; photos of the left side of the individuals were taken to describe the species growth dynamics using FISAT (FAO-2010). Geometric morphometrics was used to describe the photos taken from the samples. Size frequency analysis of individuals are at least 14 cm long with an average of 23.27 cm, with Z, F, and E_{max} of 4.273rd, respectively. The current exploitation rate is 0.17, which is below the theoretical sustainable exploitation rate (E_{max}). This study provides a detailed description of *G. aureus* from the Philippines.

Keywords: feeding index, geometric morphometric, native fish, feeding dynamics

14.3 SUPPORTING AQUATIC ECOSYSTEMS THROUGH ACTION

Universities need to demonstrate how they are providing direct support through actions in maintaining ecosystems in rivers, lakes and seas.

14.3.3 Maintain ecosystems and their biodiversity (direct work)

Work directly (research and/or engagement with industries) to maintain and extend existing ecosystems and their biodiversity, of both plants and animals, especially ecosystems under threat.

The GoBy project has a MOU with Multi-Marine Species Finfish Hatchery – BFAR MIMAROPA satellite branch located within the Bongabong Campus that aims to support and provide technical assistance to the implementation of the project.

Activities of the project conducted in partnership with BFAR Hatchery



July 29, 2024. During the orientation, Mr. Gabutero thoughtfully assigned students to specific areas aligned with their individual interests and fields of expertise. One group was designated to the Broodstock Conditioning Area, where they were introduced to essential aquaculture practices. Their responsibilities included monitoring fish health, observing feeding routines, assessing water quality, and checking the condition of fish eggs. This hands-on experience aimed to deepen their understanding of broodstock management and reinforce their practical skills in a real-world setting in coordination and supervision with BFAR Hatchery staff.

14.3.4 Technologies towards aquatic ecosystem damage prevention (direct work)

Work directly (research and/or engagement with industries) on technologies or practices that enable marine industry to minimise or prevent damage to aquatic ecosystems

➤ **Research Project: eH2O: An Internet of Things-based Aquaculture Farm Water Quality Management System**

The eH2O is an aquaculture technology innovation developed by Mindoro State University (MinSU) in collaboration with the Department of Science and Technology - MIMAROPA (DOST-MIMAROPA). It is an electronic water parameter monitoring device designed to address the critical challenges facing aquaculture operations in Oriental Mindoro. It offers a digital solution for automating water quality monitoring and management. The innovation has secured trademark approval from the Intellectual Property Office of the Philippines (IPOP HL) and is prepared for Utility Model (UM) application. The eH2O's innovative design includes a web-based platform for data storage and a mobile application for real-time monitoring of key water quality parameters such as temperature, salinity, pH, dissolved oxygen, nitrate, nitrite, total hardness, turbidity, and water level. Initially focusing on Oriental Mindoro, eH2O aims to bridge a critical gap in aquaculture practices by providing a user-friendly, web-based, mobile-accessible platform for realtime water quality monitoring and management. The system is designed to benefit fisheries, information technology, and computer engineering students. Additionally, it is also tailored to the needs of the local Micro, Small, and Medium, Enterprises (MSMEs), including the following industry partners: The Agritektura, WTL Shrimp Farm, BLJR Aqua Farm, and Angela's Agri-Aqua Resources. The successful completion of the eH2O has validated its potential to transform aquaculture practices through its innovative Internet of Things (IoT)-based water quality management system.

Installation of one (1) eH2O device at MinSU Bongabong Campus Multispecies Marine Hatchery to enhance water quality monitoring and aquaculture management

