IOCBI 2026 Conference
The 1st International Online Conference on Biology
10–12 February 2026 | Online
MDPI

# Population Dynamics of Goatfish Species (*Parupeneus indicus and Parupeneus multifasciatus*) from Iligan Bay, Mindanao Sea Southern Philippines

Nelfa Dumaloan Canini
Department of Natural Sciences, Misamis University Ozamiz City, Philippines

## INTRODUCTION AND AIM

In Southern Philippines, Iligan Bay is considered as the biggest bay in the western part of Northern Mindanao connecting to the Bohol Sea, is recognized as one of the traditional fishing grounds in the Philippines (Jimenez et al., 2020). Commercial and municipal catch landings in this area include tunas, roundscads, big-eyed scads, sardines and coral reef fish such as goatfish species (NFRDI, 2017). The estimated production of goatfishes from municipal and commercial fisheries in the Philippines in 2018 was 19,808.73 mt and 5,187 mt, respectively (PSA, 2019). Despite their economic importance, no studies focused on population dynamics of goatfish species have been carried out from Iligan Bay, Southern Philippines. This paper presents the population dynamics of the selected goatfish species (P. *indicus* and P. *multifasciatus*) in the area to contribute to the current pool of information on goatfish in Southern Philippines which is essential in determining management options to improve their production in the future, an assessment on their stock, fishery, and reproductive characteristics in Iligan Bay. The generated information is an important input in a site-specific ecosystem-based fisheries management plan for goatfish species in Iligan Bay.

## METHODS

### Study Area


**Figure 1. Map of the study area in Northern Mindanao showing the different fish landing sites (stars) monitored in the present study.**

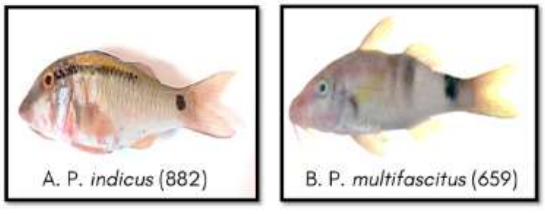


**Figure 2. Goatfish samples used in the study.**

### Data analyses

Length-weigh relationship
Growth parameters
Mortality and exploitation rate
Probability of capture
Recruitment pattern
Virtual population analysis
Relative year per recruit and relative biomass per recruit

### Acknowledgement

This work was supported by the Faculty Development program of Misamis University, Ozamiz City, Philippines and the DOST-SEI Accelerated Science and Technology Human Resource Development Program.

## RESULTS AND DISCUSSION

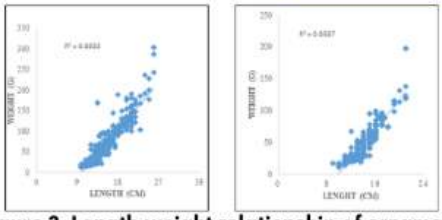

**Figure 3. Length-weight relationship of ornamental fish species (A) P. *indicus* (B) P *multifasciatus***

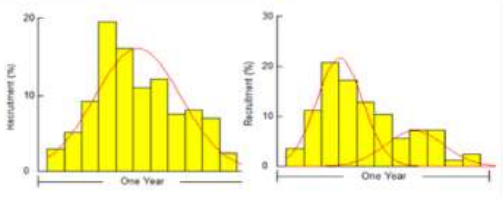


**Figure 7. Recruitment patterns of ornamental fish species (A) P. *indicus* (B) P *multifasciatus***

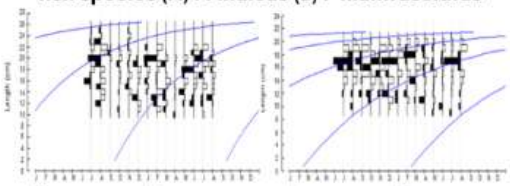

**Figure 4. Length-frequency distribution output of FISAT II with superimposed growth curve of ornamental fish species (A) P. *indicus* (B) P *multifasciatus***

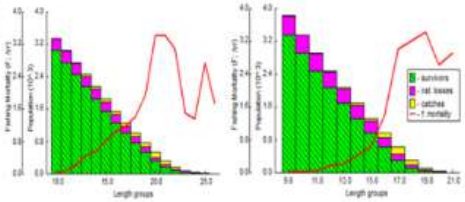


**Figure 8. Virtual population analysis of ornamental fish species (A) P. *indicus* (B) P *multifasciatus***

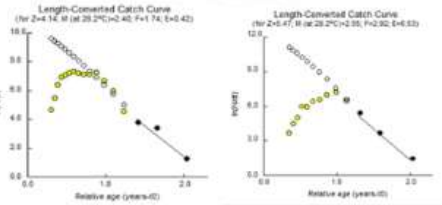


**Figure 5. Catch curve analysis of ornamental fish species (A) P. *indicus* (B) P *multifasciatus***

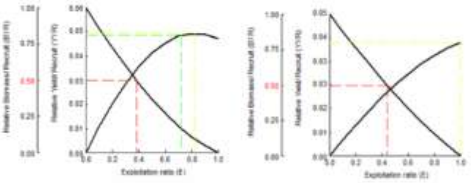

**Figure 9. Relative yield/recruit and biomass/recruit of ornamental fish species (A) P. *indicus* (B) P *multifasciatus***

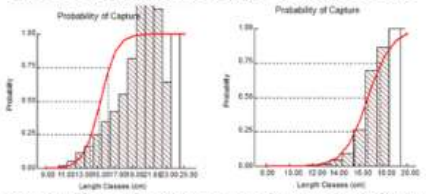


**Figure 6. The selection curve for probability of capture of ornamental fish species (A) P. *indicus* (B) P *multifasciatus***

This study analyzed the growth and exploitation of two goatfish species, P. *multifasciatus* and P. *indicus*, in Iligan Bay. Results showed that P. *multifasciatus* exhibits positive allometric growth ($b > 3$), becoming stouter as it grows, while P. *indicus* shows negative allometric growth ($b < 3$), becoming more slender (Rajesh et al., 2022).

Despite suitable environmental conditions, a critical management concern exists for P. *indicus* as the length at first capture ($Lc_{50}$) is lower than the length at first maturity ($Lm_{50}$), indicating that fish are being harvested before they have the chance to reproduce (Rehatta et al., 2021).

Management strategies, such as increasing net mesh sizes, are recommended to protect juveniles and ensure stock replenishment. Ultimately, while both species contribute to the local fishery, the high natural mortality of smaller fish and the overfishing of P. *multifasciatus* highlight the need for targeted conservation efforts (Zan-bi et al., 2022).

## CONCLUSION

While goatfish in Iligan Bay remain in good condition, P. *multifasciatus* is experiencing exploitation levels above the optimal limit, with fishing efforts primarily targeting larger individuals. These findings on length-weight correlations and size-specific mortality offer vital, previously unavailable baseline data for implementing ecosystem-based fisheries management in the region.

## FUTURE WORK / REFERENCES

A.D. Bayate (eds.). NFRDI- Bureau of Fisheries and Aquatic Resources. Quezon City, Philippines. 220 pp.
Jimenez, C. R.,D.L. Molina, J.P. Garcia, M.B. Quiñones, H.K.T. de la Rosa, J.J. Samson and M.C. Paghasian. 2020. Species Composition, Abundance, and Catch Trends of Roundscads Decapterus spp. in Iligan Bay, Northern Mindanao, Philippines. Journal of Environment and Aquatic Resources 5. 28-42.
National Fisheries Research and Development Institute. 2017. National stock assessment program: The Philippine Capture Fisheries Atlas. Santos, M.D., N.C. Barut and
Philippine Statistics Authority (PSA). 2019. Fisheries statistics of the Philippines 2016-2018. https://psa.gov.ph/content/fisheries-statistics-philippines. Cited 20Dec 2019
Rajesh, N., J. Imelda, N.K. Chadha, B. Ignatius, S. Sukumaran, P.P. Suresh Babu and A.M Babitha Rani. 2022. Genetic identity and length-weight relationships of Indo- Pacific sergeant Abudefduf vaigiensis (Quoy and Gaimard, 1825) from the south-east coast of India. Indian Journal of Fisheries. 69(1), 97-104.
Rehatta, B. M., M.M. Kamal, M. Boer, A. Fahrudin, Zairion, J.S.R. Ninef. 2021. Growth, mortality, recruitment pattern, and exploitation rate at shared stock flying fish (Exocoetidae) at border area of Indonesia and Timor Leste in Ombai
Strait. IOP Conference Series: Earth and Environmental Science. 744(1). https://doi.org/10.1088/1755-1315/744/1/012062 shelf of Côte d'Ivoire (West Africa). Journal of Wildlife and Biodiversity.
Zan-Bi, T. T., S. Sylla, S. Arra, and S.K.K. Amponsah, 2022. Population dynamics parameters of Bigeye grunt Brachydeuterus auratus (Pisces, Haemulidae) from the continental