

# **Critters in the Soil: Evaluating the Potential of Soil eDNA Metabarcoding in Assessing the Mangrove Infaunal Biodiversity of Oriental Mindoro**

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## **ABSTRACT**

In understanding the effects of restoration on mangrove ecosystems, assessing its infaunal diversity is important due to its links in ecosystem functioning and resilience. In the Philippines, traditional sampling methods involving morphology-based identification are time-consuming, labor-intensive, and expensive. eDNA metabarcoding is an emerging tool that could serve as an alternative or complementary method to evaluate the diversity of mangrove infaunal communities. It is relatively fast and non-intrusive which is useful for rapid biodiversity assessments and biomonitoring activities in Philippine mangroves. In this study, the potential of assessing mangrove soil biodiversity (in terms of presence and composition) using sediment eDNA metabarcoding and comparing it with traditional assessment will be evaluated. Then, the resulting soil infaunal assemblages will be compared among natural mangroves, mangrove-recolonized fishponds, and restored mangroves reminiscent of the fragmented mangrove stands in Oriental Mindoro. To detect the target taxa in the eDNA metabarcoding method, universal COI primer sets will be used to run sediment samples using high-throughput sequencing. For the traditional assessment, the cascade sieve method will be employed to collect individual samples and identify them using morphological characteristics. The results of the study will be the first obtained using eDNA metabarcoding of soil samples from mangrove forests in the country. Its application will be demonstrated with cross-validation from traditional methods, limitations will be identified, and recommendations made for future use of the method. The usefulness of this technique in conducting rapid assessments and biomonitoring could address knowledge gaps in infaunal biodiversity and its relationship with the ecosystem status of Philippine mangroves.

Keywords: Philippine mangroves, eDNA metabarcoding, infaunal biodiversity, mangrove restoration