

## **Comprehensive DNA Barcoding for Identifying Threatened Marine Annelids: Facilitating Detection, Description, Taxonomic Revision, and Distribution Data Collection of Rare Species**

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[Abstract]

Key Words: Annelida, tidal flat, DNA barcoding, new species description, taxonomy, threatened species, red list, monitoring sites 1000

This study aimed to improve the taxonomic situation of marine annelids, which constitute an important part of the marine benthic ecosystems, and to establish a baseline for the accumulation of biodiversity information that will be essential for quantitative and qualitative assessment of their distribution and risk of biodiversity loss.

Comprehensive sampling of marine annelids from various localities in Japan, mainly from the 10 tidal flat sites of the Monitoring Sites 1000 Project conducted by Biodiversity Center of Japan, Ministry of the Environment, Japan, was conducted. By conducting morphological identifications and DNA analyses of the newly obtained specimens, DNA barcode library for 255 species belonging to 110 genera in 40 families was established. Of these, the sequences of at least 200 species were determined for the first time in this study, which had not been previously deposited in public DNA databases. From the 10 tidal flat sites of the Monitoring Sites 1000 Project, 127 morphospecies belonging to 37 families were detected through morphological observations (of which 3 species were newly recorded in Japan), and 142 MOTU (molecular operational taxonomic unit) belonging to 85 genera in 36 families were detected by DNA analyses. These analyses showed that the difficulty of accurate identification for some annelid species based only on the currently recognized morphological characteristics. The analyses also revealed that the existence of many cryptic species, which have been overlooked to date, in 11 morphospecies, and the need for review of scientific names in 5 species.

In addition, taxonomic studies have been conducted on 66 species belonging to 27 genera in 15 families, including the above-mentioned cryptic species, and so far 28 species belonging to 13 genera in 9 families were described as new species in this study. The remaining 38 species belonging to 14 genera in 10 families are currently being studied taxonomically towards their formal descriptions.

The results obtained in this study were integrated into the biodiversity information obtained from literature survey, and "A Guidebook for the identification of Marine Annelids inhabiting Tidal Flats in Japan" was compiled. This guidebook was distributed to the people involved in the tidal flat survey of the Monitoring Sites 1000 Project in order to help their identifications and to feed back the results of this study to future monitoring surveys. Through this study, we also succeeded to establish a preliminary DNA barcode library a baseline for the accumulation of biodiversity information of marine annelids occurring Japanese tidal flats.

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