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# Short Communication: Caught fish species diversity of South Morotai, North Maluku, Indonesia

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**Abstract.** *Nabil WA, Habibah I, Aryochepridho, Trijoko. 2018. Caught fish species diversity of South Morotai, North Maluku,* Indonesia. *Ocean Life 2: 33-36.* South Morotai is a part of Morotai Island, an archipelago in eastern Indonesia with high fisheries potential such as fish, sea cucumbers, crabs, shrimp, and algae. Research on fish diversity in South Morotai is needed because there is no sufficient data and information about the potential of Morotai Island marine fisheries. The goal of this research was to collect data on fish species in Morotai, especially South Morotai. This research was conducted by surveys of fish caught by local fishermen in July 2017. Results showed that there were 23 species of fishes belonging to 14 families, with the highest diversity belonging to the Scaridae family (4 species). Serranidae and Acanthuridae each had 3 species identified. Balistidae and Labridae each had 2 species identified. One species was identified from each family of Rachycentridae, Lethrinidae, Lutjanidae, Sphyraenidae, and Mullidae.

**Keywords:** Caught fish species, diversity, South Morotai

## INTRODUCTION

Morotai Island is located at the northern end of North Halmahera Regency and is part of North Maluku Province. Geographically Morotai Island lies between 2˚00'-2 ˚40 'LU and 128 ˚15'-128 ˚48'BT, bordered by the Pacific Ocean to the North, Halmahera Sea to the East, the Morotai Strait to the South and the Sea of Sulawesi to the west. The total area of Morotai is 2,474.94 km$^2$ or 10 percent of the land area of North Maluku Regency (Edward 2015). This region holds great fishery potential, such as reef fish, algae, corals, and other marine invertebrates. These waters are suitable for the development of fishery-based industries as well as marine tourism.

Coral reefs are complex ecosystems in the tropics that contain high biodiversity. Naturally, coral reefs are habitat for many marine species for spawning, nurseries, feeding, and foraging, especially for a number of species that have significant economic value. The high diversity of marine biota in coral reefs makes these ecosystems hotspots of marine biodiversity (Fraser et al. 2003).

The reef fish community is one of the main components of the coral reef ecosystem and has an important role within this ecosystem, for example, as an indicator of coral condition. Almost all life stages of reef fish are directly or indirectly dependent on coral reef existence. As a coral-related fish, coral reef destruction affects diversity of reef fish (Rani et al. 2010).

The diversity of reef fish varies depending on the condition of the waters. This study aims to record the potential of fisheries, especially the diversity of reef fish in the sea of South Morotai. Thus, we aim to obtain data that describes fish species located in the region of South Morotai.

## MATERIALS AND METHODS

### Study area

The study was conducted in South Morotai, North Maluku, Indonesia (Figure 1). This area was characterized by sandy substrate consisting of species of seagrasses, seaweed, and coral reefs covering the bottom surface area. The research was carried out in July 2017 during the day.

### Procedures

The study was conducted by collecting data of fish species caught by local fishermen. Fishes were identified mainly using Gerald et al. (2003) and fishbase.org. The samples were identified by their morphological characters.


**Figure 1.** Map of the sea of South Morotai, North Maluku, Indonesia as a fishing catchment area

**Table 1.** Species diversity of fish found in South Morotai, North Maluku

| Family | Species |
|---|---|
| Rachycentridae | *Rachycentron canadum* |
| Serranidae | *Variola louti* |
| | *Epinephelus fasciatus* |
| | *Chromileptes altivelis* |
| Lethrinidae | *Lethrinus olivaceus* |
| Lutjanidae | *Lutjanus madras* |
| Scaridae | *Bolbometopon muricatum* |
| | *Hipposcarus longiceps* |
| | *Cetoscarus ocellatus* |
| | *Scarus quoyi* |
| Sphyraenidae | *Sphyraena barracuda* |
| Labridae | *Cheilinus undulatus* |
| | *Novaculichthys taeniourus* |
| Balistidae | *Rhinecanthus aculeatus* |
| | *Balistapus undulatus* |
| Mullidae | Unidentified |
| Acanthuridae | *Ctenochaetus striatus* |
| | *Acanthurus triostegus* |
| | *Naso* cf. *annulatus* |
| Siganidae | *Siganus canaliculatus* |
| Carangidae | *Caranx melampygus* |
| Hemiramphidae | *Hemiramphus far* |
| Belonidae | *Tylosurus crocodilus* |

## RESULTS AND DISCUSSION

### Fish diversity

The marine fish species observed can be classified into 23 species from 14 Families of Fish (Table 1). Each species has distinct characters that distinguished it from other species. The most abundant species found in South Morotai belonged to family Scaridae with four species, followed by Serranidae and Acanthuridae with three species each, Labridae and Balistidae with two species, Rachycentridae, Lutjanidae, Lethrinidae, Sphyraenidae, Siganidae Carangidae, Hemiramphidae, and Belonidae with one species each. One specimen from family Mullidae remains unidentified.

### Discussion

The term 'species' in this paper refers to the morphological species concept. Thus, other concepts of species were not used.

Scaridae, the parrotfishes, are known for their teeth which usually form a pair of beak-like plates in each jaw (Bellwood 2001). Parrotfishes are important to coral ecosystems due to their role as grazers on algae on the reef substrate. Bellwood and Choat (1990) divided the parrotfish community into two functional groups: excavators and scrapers. Excavators take relatively slow and large bites, leaving distinct scars on substratum. Scrapers take rapid, small bites, leaving only few scrapes on substratum.

Serranidae, which consists of groupers and sea basses, is one of the most important fish families in Indonesian marine fisheries (Genisa 1999). Serranid fishes have an opercle with 3 (rarely 2) flat spines and the margin of the preopercle is nearly always serrate or with 1 to 4 spines (Heemstra and Randall 2001). Groupers are usually placed in a cage culture by Morotai fishermen to enlarge their body mass before being sold in the market.

Acanthuridae contains surgeonfishes, tangs, and unicornfishes. The distinctive characteristic of this family is the spine (multiple spines on genus *Naso*) located on each side of the base of the tail (Allen et al. 2003).

Balistidae shares some similarities with Monacanthidae. Both have two-part dorsal fins, which the first spine of the front part is distinctively stout. The difference is the stout spine of Balistidae can be locked in place, which cannot be done by members of Monacanthidae (Allen et al. 2003).

Labridae is a large family of fish, which has various sizes and body shapes (Allen et al. 2003). Fishes belonging to this family have a terminal and protrusible mouth with teeth in jaws usually separate and caniniform (Westneat

2001). Within Labridae, the *Cheilinus undulatus* (humphead wrasse), is endangered species according to IUCN Redlist, was found during this research. The combination of a long time to reach a mature age and overfishing has caused a great decline of the humphead wrasse population in the last 30 years (Russell 2004). This species is a protogynous hermaphrodite and reaches first sexual maturation at about 35-50 cm total length or under 5 years of age (Sadovy et al. 2003). According to local fishermen, this species has a very high value at market, but the size and quantity in the local market is highly restricted due to government law. To make more money, local fishermen tend to sell this fish on the black market.

The Rachycentridae family consists of a single species, *Rachycentron canadum*. This migratory fish occurs in tropical and subtropical seas of the world, except in the central and eastern Pacific Ocean (Shaffer and Nakamura 1989).

Lethrinidae and Lutjanidae are two families which have sloped heads. Lethrinid fishes have a maxilla which is mostly concealed below infraorbital bones, not articulating broadly, with a distal tip of premaxilla and toothless vomer and palatines (Carpenter 2001). Lutjanid fishes have a maxilla which slips for most or all of its length under the lacrimal when the mouth is closed and usually have a vomer and palatines with teeth (Anderson dan Allen 2001). Several species of these two belong to economically important fishes in Indonesia, especially for the genera *Lethrinus* and *Lutjanus* (Genisa 1999). Fishes of these two families are usually sold by Morotai fishermen as salted fish.

Members of the Carangidae family are popular as game fish. They are strong open water swimmers that occasionally form large schools (Allen et al. 2003). These family members have two dorsal fins, with the first fin a moderate height or very low and arched (or elevated) above the pectoral fins, but straight posteriorly, extending onto the caudal fin (Smith-Vaniz 2001).

Sphyraenidae only contains a single genus, *Sphyraena*. The members of this family are often called barracudas. The long jaw of a barracuda is filled with an array of sharp pointed teeth (Allen et al. 2003). Fish from this family become a threat to swimmers and divers due to its aggressive behavior.

Hemiramphidae (halfbeak) and Belonidae (needlefish) belong to the order of Beloniformes. Both have a slender and elongated body with an unequally forked tail. This special feature on the tail allows them to jump out of water and briefly ‘run’ on the surface when frightened. We observed a needlefish jump out of the water when pursuing a jumping prey (probably a halfbeak).

Siganidae, the rabbitfishes, is a family of venomous fish which can inflict extremely painful wounds (Allen et al. 2003). The venom is injected through spines on the dorsal (13 spines), ventral (2 spines), and anal fin (7 spines). Spines on the ventral fins are separated by 3 soft rays, which is unique to this family (Woodland 2001). Local fishermen bite rabbitfish tail and swallow it raw in order to relieve pain from its sting.

Mullidae is a family of bottom feeders called goatfishes. A pair of barbels extending from the chin of this fish is responsible for its common name. These barbels are used as chemoreceptors in the search for food (Allen et al. 2003). The specimen observed in this research remains unidentified due to insufficient pictures and other data.

We believe there are many more unobserved fish species in Morotai seas. Thus, there is still a long way before we can truly understand the potentials of Morotai Island marine fisheries. There remains a wide area of sea that needs to be explored in South Morotai alone to further determine information on the marine biodiversity of this important area.

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