

Appendix 4

Fish family identification guide

A simple guide to families of fish taken by terns and noddies

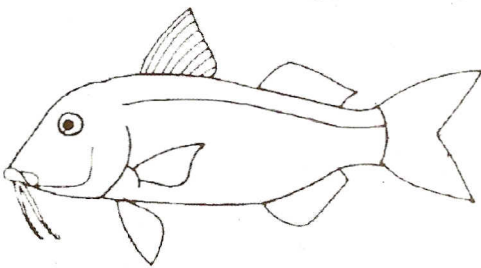
by

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The following identification guide is based on my collections of fish dropped by Roseate Terns (*Sterna dougallii*), Lesser Noddies (*Anous tenuirostris*), White Terns (*Gygis alba*) and Sooty Terns (*Sterna fuscata*) on Aride Island (Ramos 2000). These were identified using Smith and Heemstra (1986). Mullids (Goatfish, genera *Parupeneus* or *Mulloidichthys*, identified by Tony Gill of the Natural History Museum, London) were the most important prey items taken by Roseate Terns, Lesser Noddies and White Terns. Items regurgitated by Sooty Terns were mainly Exocoetidae (Flying-fish) and squid. Many of these fish are also taken by White-tailed Tropicbirds (*Phaethon lepturus*) and some other seabirds in Seychelles. The following is a guide to identifying the most common families of prey taken by these seabirds. Some of the fish taken by seabirds are immature stages of quite large fish.

1. Mullidae (goatfish)



The most distinct feature of an adult goatfish is a pair of long barbels on the chin, not visible on very small mullids taken by terns. However, two characteristics clearly separate mullids from other silvery fish that could be mistaken for mullids:

- Two well separated dorsal fins
- The first dorsal fin has 6 to 7 spines (the initial spine is sometimes very small), the second fin has 9 or 10 (usually 9) soft rays. The caudal fin is forked

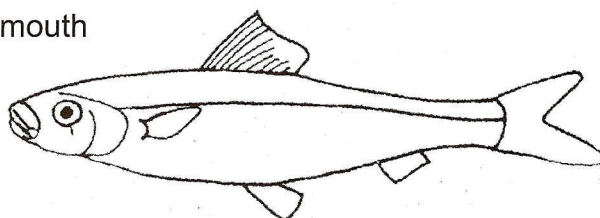
In contrast, clupeoid fish (herrings, sardines and anchovies) have only one dorsal fin. The other two families that a goatfish could be mistaken for are mullets (Mugilidae) and cardinalfishes (Apogonidae). Like goatfishes, the mullets and cardinalfishes have two separated dorsal fins. However, the first dorsal fin of mullets has only 4 rays. Cardinalfishes do not possess a forked caudal fin, are usually nocturnal (tend to hide in crevices during the day) and have a wider body.

2. Clupeidae (Herrings, Sardines and Pilchards)

Together with Engraulidae (anchovies), the Clupeidae form the so called clupeoid fish. The fins of fish in these two families have no spines.

Clupeidae are pelagic silvery fish, often forming large and densely packed shoals. The following characteristics enable to separate the Clupeidae from the Engraulidae (see drawings for both families):

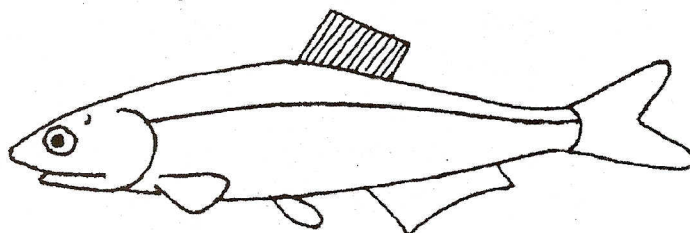
- Mouth more or less terminal
- Snout rarely projecting on front of mouth
- Maxilla not reaching past eye
- Teeth minute or absent



3. Engraulidae (Anchovies)

These are also pelagic fish, often forming dense shoals. They have silvery bellies when fresh.

- Body sub-cylindrical or compressed
- Snout prominent, projecting in front of lower jaw
- Maxilla reaching well past eye
- Teeth usually minute

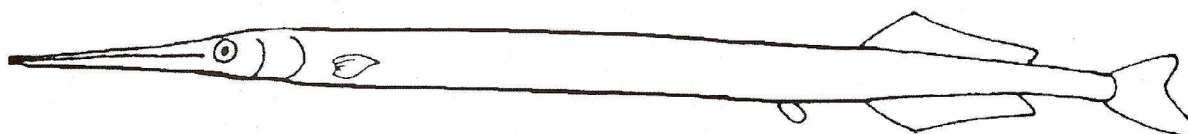


4. Belonidae (Needlefishes)

These fish are readily identified because both upper and lower jaws are extended into long beaks. They were observed in the bills of both Roseate and White Terns.

In the Hemiramphidae (halfbeaks) only the lower jaw extends into a long beak. Therefore, one should carefully examine whether the "beaks" of the needlefishes and the halfbeaks have been broken. The body of the collected needlefishes was elongate and more compressed than the body of the halfbeaks, which was more round.

- The caudal fin of the needlefishes is forked or emarginate with both lobes of approximately the same size.
- The pelvic fins are abdominal with 6 soft rays.
- On the whole the forms of pelvic, dorsal and anal fins differ slightly between needlefishes and halfbeaks (see drawings).

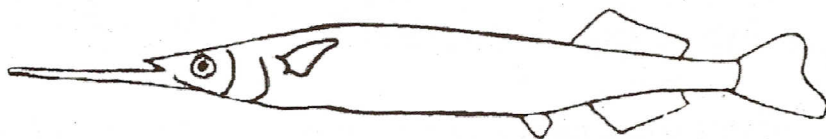


5. Hemiramphidae (Halfbeaks)

Only a few halfbeaks were collected. Some were quite large and may have been dropped by White-tailed Tropicbirds. Three specimens were identified as *Hemiramphus far* (Spotted Halfbeak).

The body is elongate and usually more round than that of needlefishes. Lower jaw extended into a long beak (except in a few genera, but these were not collected on Aride). The upper jaw is short and usually triangular in shape. Main features of fins are (see drawing):

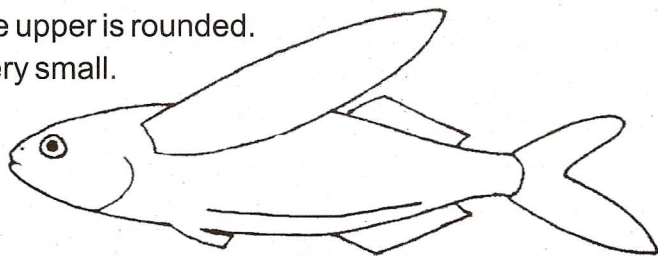
- Pectoral fins high on sides, short to long.
- Caudal fin forked or emarginate, with lower lobe greater than upper lobe.
- Pelvic fins abdominal, with 6 soft rays.



6. Exocoetidae (Flyingfish)

Common prey of White-tailed Tropicbirds and Sooty Terns, these fish are typical members of the epipelagic community of the open ocean. They may emerge rapidly from the water and glide over fairly long distances due to their expanded pectoral fins.

- The main characteristic of a flyingfish is the fact that the pectoral fins are very long, extending beyond the origin of the dorsal fin.
- The caudal fin is deeply forked with the lower lobe visibly longer than the upper lobe.
- The jaws are short, the upper is rounded.
- Teeth are absent or very small.

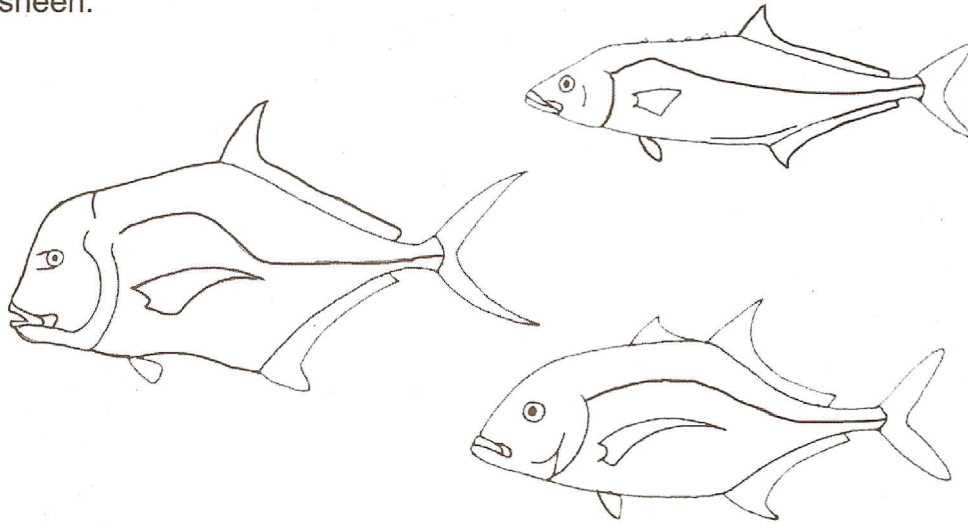


7. Carangidae (Kingfishes or Jacks or Trevallies)

Carangidae were not observed being taken by Roseate Terns. The few specimens that were collected under Lesser Noddy nests could have been dropped by Brown Noddies or White-tailed Tropicbirds. Body shape and colour pattern of these fish change so much with growth that juveniles and adults of the same species are often difficult to recognise. In general juveniles have deeper bodies, shorter fins and more contrasting colour patterns, often consisting of dark bars.

- Dorsal fin usually divided into separate spinous and soft-rayed fins or the spinous part very low with 4-8 spines (in some species spines may be obsolete or embedded).

- Anal fin with 2 anterior spines (only one spine in *Elagatis* and *Seriolina*) distinctly separated from rest of fin.
- Caudal fin strong, forked, with slender peduncle (anal-fin spines not visible in adults of some species).
- Adults are often bluish grey dorsally, silvery below with iridescent sheen.



8. Scombridae (Tunas, Mackerels and Bonitos)

Scombrids are epipelagic predators and many species form large schools. Mackerel were observed being taken by Roseate Terns and found below nests of Lesser Noddies. Bonitos were taken by White-tailed Tropicbirds.

- The body is elongate and fusiform.
- The anterior dorsal fin is usually short and separated from the posterior fin.
- Finlets present behind dorsal and anal fin.
- The caudal fin is deeply forked with supporting caudal rays.
- At least two small keels on each side of caudal peduncle and a larger keel in between in many species.
- Body covered with small to moderate scales or an area behind head and around pectoral fins covered with moderately large, thick scales, and the rest of the body naked or covered with tiny scales.

