

BRUSH PARK FISHERY TARGETING ORNAMENTAL FISH IN NEGOMBO ESTUARY, SRI LANKA

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Introduction

Brush parks are kind of fish aggregating devices (FADs), that are designed to mimic the natural dry season habitat of the many species of fish. The operation of brush parks in Negombo estuary has a long history. The average number of brush parks operating per year in the Negombo estuary is about 1800- 2200 (Jayakodi, 2000). Brush parks do contribute significantly to the total yield of fish in the estuary (Wijeyaratne and Costa, 1986). Furthermore there is an ornamental fishery in the Negombo estuary apart from the food fish industry and the majority of the ornamental fish species caught from the estuary comes from the brush park fishery. In Negombo, ten fish collecting centers are located around the estuary, mainly along the Pamunugama road at Aluthkuruwa and Sarikkuwa (Jayakodi, 2000). Whilst more concentration is given to two fish species, *Monodactylus argenteus* (Monodactylidae) and *Scatophagus argus* (Scatophagidae), there are other small scale fisheries that are also being carried out in this estuary. The objective of the study was to determine the variation in brush park fishery targeting the ornamental fish and the composition and yield of the ornamental fish species in Negombo estuary.

Materials and Methods

Two study sites between Katunayaka and Kurana coastal belt were selected in the eastern side of the Estuary. The data were collected from a total of 36 randomly selected brush parks in two study sites from July 2008 to March 2009. Field visits were carried out once in two weeks and one brush park was observed on each day. The ornamental fish species were collected from the fishermen and fishes were identified up to species level. The standard length of twenty individuals of *Monodactylus argenteus* and *Scatophagus argus* were measured for each brush park and recorded. To determine the yield of each ornamental fish species the number of individuals belonging to each species was counted separately for each brush park and recorded. The salinity around each brush park was measured using a salinity meter and those measurements were used to analyze whether there is a relationship between ornamental fish yield with the salinity. The variations in brush parks and fishing methods targeting different ornamental fish species were observed in the field and the fisherman were interviewed to find out the variations in the construction and fishing of brush parks. The construction materials used to construct brush parks including different mangrove plant species and artificial materials were observed in the field and recorded.

Results

Altogether nine species of ornamental fish belonging to seven families caught by the brush park fishery in Negombo estuary including *Monodactylus argenteus*, *Scatophagus argus*, *Lutjanus argentimaculatus*, *Etroplus maculatus*, *Etroplus suratensis*, *Butis butis*, *Ambassis commersoni*, *Lates calcarifer* and *Tetraodon fluviatilis* were identified. The parts of six species of mangrove plants (*Rhizophora mucronata*, *Avicennia marina*, *Lumnitzera racemosa*, *Acrostichum aureum*, *Sonneratia alba* and *Excoecaria agallocha*) are used to construct brush parks. The large mangrove plant branches are pegged down in the shallow water of the lagoon in order to demarcate the boundary of brush parks and small twigs of mangroves are placed in the middle of the park. In addition to the mangrove branches artificial materials like worn out rubber tires are used to construct brush parks. The locations for the brush parks are selected by the fisherman using traditional knowledge in order to target different ornamental fish species of different sizes.

The lowest average monthly fish yield of ornamental fish species was reported in March 2009 and the highest ornamental fish yield in October 2008. Mean monthly ornamental fish yield ranged from 210 individuals per brush park in July 2008 to 63 individuals per brush park in March 2009. The lowest mean yield for species was recorded for the *Tetraodon fluviatilis* while the highest mean yield was recorded for the *Scatophagus argus*. According to the correlation analysis the total yield, the

yield of *Monodactylus argenteus* and the yield of *Scatophagus argus* decreased with the increasing salinity (r^2 for the total yield – 0.824, r^2 for the *Monodactylus argenteus* – 0.831 and r^2 for the *Scatophagus argus* – 0.841). The standard length measurements of *Scatophagus argus* shows that the majority (more than 50 %) of the individuals belong to the size class between 5.5 cm – 7.2 cm, while majority of *Monodactylus argenteus* individuals belong to the size class between 4.0 cm – 5.8 cm.

Discussion

Brush parks provide substrate for periphyton production (including bacteria, fungi, diatoms and filamentous algae together with rotifers, nematodes and crustaceans) and shelter for fish. In the Negombo estuary it is unlikely that any ornamental fish species other than *Etroplus maculatus* and *Etroplus suratensis* reproduce within them. Even these two fish species might not reproduce within the short soaking time (3-4 weeks) of brush parks (Amarasinghe, *et al.*, 2002). The *Scatophagus argus* and *Monodactylus argenteus* are the two main ornamental fish species caught by the brush parks. This may be due to the food habit of those two species and the tendency to hover around and under the floating and submerged objects. The ornamental fish yield in the brush park fishery showed considerable seasonal variations. The seasonal variation in yield observed may be attributed to seasonal salinity variations in the estuary (Silva, 1979). The use of different mangrove species varies with the target ornamental fish species. The yields of *Scatophagus*

argus and *Monodactylus argenteus* is relatively high with the use of *Excoecaria agallocha*. The number of tires used to construct brush parks varies with the area of brush park, target species and availability. Large numbers of worn out tires are used to target especially the adult stages of *Scatophagus argus*, *Etroplus maculatus* and *Etroplus suratensis*. When considering the standard length measurements of the individuals of *Scatophagus argus* and *Monodactylus argenteus* caught by the brush parks, it is clear that the majority of them are juveniles. The overexploitation of juveniles may influence to destroy the future ornamental fishery of these two fish species.

Conclusion

The ornamental fish species caught by the brush parks are dominated by two main species, namely *Scatophagus argus* and *Monodactylus argenteus*, while seven other ornamental fish species are also caught with a low level of frequency than that of two main species. The total ornamental fish yield showed a clear seasonal variation with highest yield in October 2008 and lowest yield in March 2009. Fishermen show distinct preferences for the type of wood used

in brush parks, as certain species appear to give higher yields than others. The mangrove species and number of worn out tires used to construct brush parks differs with the targeting ornamental fish species.

References

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