

**Capture & Culture of Post-larval fish:
A possible alternative to overexploitation of artisanal fisheries in Toliara (Madagascar)?**

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Abstract :

The bay of Toliara (SW Madagascar) is heavily fished and management measures are necessary to decrease overexploitation. Marine Protected Areas (MPAs), supported by Malagasy government, are widely recognized as an important tool for management. But these MPAs are confronted to several problems among which the quasi-absence of alternative to fishing in a region where fish resources are vital. As a high rate of mortality is observed for fish post-larvae during their recruitment, the capture and culture of coral reef fish post-larvae (PCC) could be one of solution. A pilot experiment was carried out on the bay of Toliara (project IH.SM/PACP) from November 2008 to February 2009. Sampling was conducted by traditional fishers, near the villages of Sarodrano and Ankiembe, using light traps (CARE: Collect by Artificial Reef Eco-friendly) during the new moon period. At total 4049 post-larvae belonging to 33 families of reef fish were trapped during 17 days of fishing. The captures were dominated by species of commercial interest for food (*Siganidae*, *Lutjanidae*, *Gerreidae*, *Lethrinidae*), but also species for aquarium trade (*Pomacentridae*, *Chaetodontidae*, *Ostraciidae*). These results open a possible alternative for the regulation of artisanal fisheries in this region, translating the high mortality of post-larvae at settlement into high rates of survival in culture. However before developing this sector in Madagascar, it is important to have a longer sampling period, estimate the economic and technical feasibility of the method and its degree of acceptability by local population.



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Why to experiment a post larval capture in this area?

Madagascar includes an environmental goal of increasing conservation oriented Marine Protected Areas (MPAs). These MPAs are confronted to several problems among which the quasi-absence of alternative activities associated with marine resources. Small-scale fisheries based on Post-larval Capture and Culture (PCC) could be a possible activity which remove the risk of damaging coral reefs and the associated resources. PCC consists of capturing an insignificant proportion of pelagic post-larvae fishes and invertebrates and growing them out to a marketable size for food or ornamental fishes or for restocking depleted reefs.

The aim of this study is to evaluate the potentiality of catching fish post-larvae (PL) in the southwest coast of Madagascar (Toliara), a region submitted to overexploitation of the reef fishes. The achievement of this goal will help to see the feasibility of the PCC in this region.

Materials and methods

Floating nets (CARE: Collection by Artificial Reef-Ecofriendly) were used on two sites in the bay of Toliara. PL are attracted by light and go inside the traps which are collected by the artisanal fishermen during the new moon period.



Post larvae fish were collected and identified to the lowest possible taxonomic level.



Studying area : Bay of Toliara

Results & discussion

A total of 4049 PL were collected during the 3 months of collection from November 2008 to February 2009 with an average of 6 sampling nights per month. Total number of samples is 17 days of fishing, and 33 families were trapped during the study. The figures (Fig. 1-4) give more information of the results.

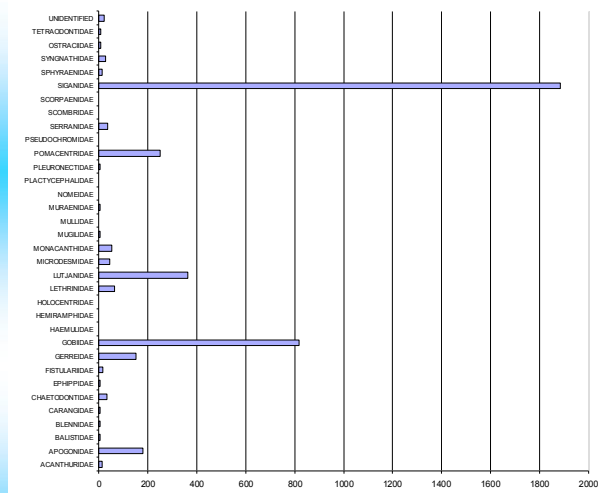


Fig. 1: Abundance and diversity of fish families

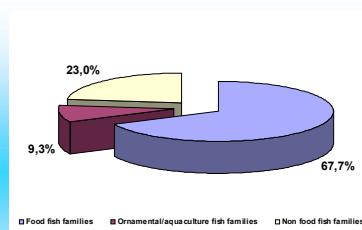


Fig. 4: Proportion of aquarium/aquaculture fish families

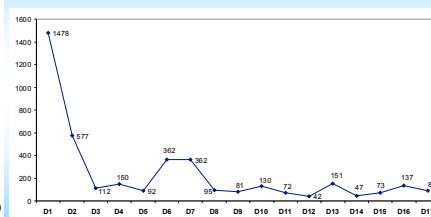


Fig. 2: Variations of total catch during the sampling period

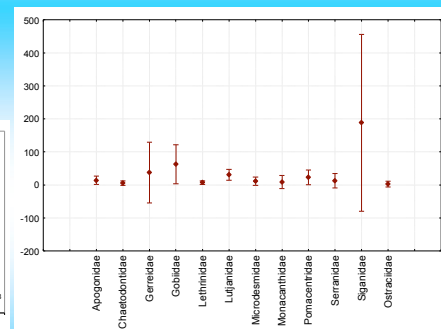


Fig. 3: Average of catches with confidence interval of some fish families

- There is predominance of some families: Siganidae (Rabbitfishes), Gobiidae (Gobies), Lutjanidae (Snappers), Pomacentridae (Damsel-fishes), Apogonidae (Cardinalfishes), Gerreidae (Mojarras), and Lethrinidae (Emperors).
- Post larvae having interest for food constitute the dominant part: Siganidae, Lutjanidae, Lethrinidae and Gerreidae. Families which present an interest for the aquarium market have a non negligible number; that is the case of the Pomacentridae (Damsel-fishes), Chaetodontidae (Butterflyfishes) and Ostraciidae (Boxfishes).
- Even if the reef is depleted on adult fish due to overexploitation, a high level of recruitment was observed during the 3 sampling months.

Conclusions

The Toliara Bay has a potentiality in fish post larvae. The reef fish Post Larvae can be a resource being able to create an alternative to the overexploitation of the marine species in this area. The PL collected along the Great Reef present a potential for the aquaculture of Siganidae for food and the species interesting the aquarium market.

Complementary studies are necessary to complete this pilot project such as (i) a more complete dataset i.e. annual basis and more replicates in order to see the variation of abundance and diversity during the year, (ii) the rate of survival during recruitment; (iii) the catchability of other catching tools as plankton-net. The feasibility of the culture of the PL must also be tested to study the environmental, technical and economical constraints linked to this activity. An analysis of the acceptability by the local population is important to propose the PCC as an alternative to the fisheries regulation and to involve the fishermen in the MPAs governance.