

Culturing Fish Larvae

A New Tool for Restocking Coral Reefs in Fiji

by Julien Grignon



Above: Fish farm at the University of the South Pacific, Fiji. Insert: Larval fish. Page 35. Top left and right: Larval fish. Below left: Sorting out larval fish. Below right: Demonstrating the use of a crest net at Navutulevu.

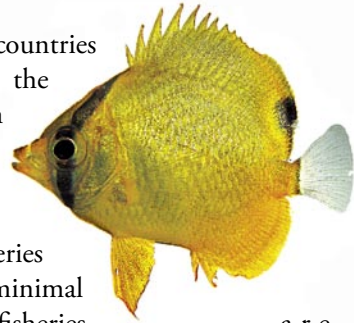
Almost all Pacific countries are affected by the disappearance of fish in coastal areas. In the last 15 years, overfishing and mis-management have depleted most of the healthy coastal fisheries to levels unable to support minimal fisheries production. Subsistence fisheries are threatened and the need to reverse the decline in natural fish resources has now become critical for the growing coastal populations.

Of the several approaches available to solve this global problem, the regulation of fish resource-use is the primary and necessary means of protecting and sustaining fish stocks. The creation of sanctuaries such as Marine Protected Areas (MPA), aquaculture, education and critical assessment of traditional practices are all contributions to the solution. Additional initiatives such as releasing cultured fish in the wild are new alternatives that may reduce the time needed to restore fisheries to more productive levels and rebuild the structure of certain food webs.

Over the past 25 years, there has been an increase in the number of marine species that can be produced in hatcheries and subsequently used for release programs all over the world. Despite this increase, there are still a large number of species that cannot be produced cost-effectively in hatcheries. In the case of coral reef fisheries, the large number of species impacted by exploitation and habitat degradation makes it impossible to develop cost-effective hatchery-based releasing programs for each species.

Through our understanding of the natural coral reef fish cycle a potential solution to these limitations has been identified, that is collecting fish larvae when they are trying to colonise reefs (post-larvae). Recent studies have confirmed that up to 70% of post-larval fish trying to colonize reefs will naturally disappear during the first two days, mainly due to predation. Collection of larval fish during reef colonisation can be considered a new sustainable fishery as it does not have an additional negative impact on population replenishment (as most post-larval fish do not survive this stage).

In the past ten years, the capture and culture of fish larvae has been of intense interest in French Polynesia and the Solomon Islands where the marine aquarium trade is the primary target. Fishing tools and aquaculture methods have been specifically developed and this activity is now internationally recognized as



an alternative sustainable fishing practice.

While the primary target has been the ornamental market, more than half the fish collected are not suitable for this trade. This by-catch can instead be used in aquaculture programs for food fish production, or fish release programs. Depending on the situation, reef fish releasing has the potential to restore depleted populations (due to over fishing, destruction habitat), enhance natural stocks or even ensure the conservation of some species.

In Fiji, a program has recently started to look at the effectiveness of coral reef restocking based on fish larvae capture. The three main aims of the project are to:

1. Determine which fish can be captured in Fiji including, how to capture them, where are the best sites for capture, and what time of the year is the best period for collection.
2. Determine how they can be cultured to improve growth and survival.
3. Determine how they can be released to improve survival in the wild and improve success of the release program.

In order for this project to be successful an experimental approach is needed to increase the understanding of the ecology of these coral reef fish. As such, most of this project is scientific in nature. There is also a substantial local community aspect to the work.

The community aspect is in two main parts. Firstly, the



capture and culture of ornamental fish larvae for local suppliers in the marine aquarium trade is being trialled in one local community. This involved the testing of fish capture tools and the culture of the fish in the lagoon. The focus of this work is to develop local capacity in fish capture and culture techniques in a cost-effective manner appropriate for communities.

The second community aspect is concerned with the restocking of coral reef fish using the captured and cultured fish larvae. The primary purpose of this work is to increase local fish stocks and ultimately protect the coastal reef fisheries or subsistence fisheries. Most coastal communities in Fiji have some form of marine protected area (MPA). The capture, culture and release of coral reef fish in these areas may improve the effectiveness of the MPAs and reinforce local understanding of the importance of active resource management i.e. by actually adding fish to the MPA, rather than just restricting access to the resource.

At the end of this project, researchers will know whether the coral reef restocking program based on the capture and culture of fish larvae is feasible, cost-effective and can be adopted on a broader scale by local communities in Fiji.

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