POST-LARVAL CAPTURE AND CULTURE (PCC) TECHNOLOGY: A SUSTAINABLE ALTERNATIVE FOR THE MARINE AQUARIUM TRADE AND THE CONSERVATION OF BIODIVERSITY AT REUNION ISLAND (SW INDIAN OCEAN)

S. VERMOND[1,2,a], J-N. FABRE[3,b], G. LECAILLON[4,c], P. BOSC[1,d] & P. CHABANET[2,e]

a- sophievermond@hotmail.com
b- jeannoelfabre@hemispheresud.eu
c- ecocean_label@yahoo.com
d- bosc.arda@wanadoo.fr
e- pascale.chabanet@ird.fr

1- ARDA, Z.I. Les sables, BP 16, 97427 Etang-Salé, La Réunion (France)
2 - IRD, BP 172, 97492 Ste Clotilde cedex, La Réunion (France)
3 - SCEA Hemisphère sud, Magasin 10, Port Ouest, 97420 Le Port, La Réunion (France)
4 - ECOCEAN, Immeuble Emeline 1, 1 avenue Saint Sauveur, 34980 St Clément de rivière

Between 1.5 and 2 million people worldwide are believed to keep marine aquaria. The trade which supplies this hobby is a global multi-million dollar industry. Nearly all tropical marine aquarium fish and invertebrates in trade are wild adults taken directly from coral reefs and adjacent habitats mainly in developing countries. At the same time, coral reefs worldwide are threatened and the marine aquarium trade has been blamed for being one of the pressures faced by reefs. Such a situation requires measures aimed at the preservation of the biodiversity and the Post-larval Capture and Culture (PCC) could be a solution as this technology reconciles the objectives of conservation and development of coral ecosystems.

Extremely high natural mortality (> 95%) of reef fishes occurs during the colonization from the planktonic larval phase to their juvenile benthic phase. As the PCC collects the post-larvae prior to the high natural mortality, this technique has a minimal impact on the overall biomass of plankton through collection. The post-larvae captured are then reared in an inland farm. After an overall period of 3 months, eco-friendly tank-raised marine fish are obtained and can supply the ornamental aquarium trade.

In Reunion Island, a first experimentation has been conducted for 15 months. Almost 200 different species were caught belonging to 43 fish families. An overall 75% of the caught post-larvae were interesting for the marine aquarium trade (Pomacentridae, Acanthuridae, Chaetodontidae…). More than 2000 fish were successfully exported to Europe.

This first successful experiment of PCC at Reunion Island opens perspectives for the future as the post-larvae caught could be also reared as food-fish and/or for restocking artificial reefs developed actually at Reunion Island.

Post-larval Capture and Culture (PCC) technology: a sustainable alternative for the marine aquarium trade and the conservation of biodiversity at Reunion Island (SW Indian ocean)

S. VERMOND [1,2], J-N. FABRE [3], G. LECAILLON [4], P. BOSC [2] & P. CHABANET [1]

[1] Institut de Recherche pour le Développement (IRD), BP172, 97492 Sainte Clotilde, France, [2] Association Réunionnaise de Développement de l'Aquaculture (ARDA), Magasin 10, Port Ouest, 97420 Le Port, France, [3] SCEA Hémisphère Sud , Magasin 10, Port Ouest, 97420 Le Port, France, [4] Ecocean, 1 av. Saint-Sauveur, 34780 Saint Clément de Rivière, France - Contact: sophievermond@hotmail.com

Introduction to PCC in Reunion Island:

The marine aquarium hobby is worth an estimated US$200-330 million annually. Nearly all tropical marine aquarium fish and invertebrates in trade are wild adults taken directly from coral reefs. At the same time, coral reefs worldwide are threatened and the marine aquarium trade has been blamed for being one of the pressures faced by reefs. Such a situation requires measures aimed at the preservation of the biodiversity and the Post-larval Capture and Culture (PCC) could be a good alternative as this technology reconciles the objectives of conservation and development of coral ecosystems.

The tropical volcanic Reunion Island is about 215 km long including 25 km of fringing coral reefs and about 100 km of rocky coasts. In 2007, a pilot project started there to introduce sustainable technologies aimed at the production of high quality marine aquarium products.

In 2009 a partnership between Hémisphère Sud, ARDA and IRD started through the European program RUN Sea Science. One of the objectives of this program is to improve our knowledge about post-larval colonization around Reunion Island.

Offshore aquaculture cages, Ferme Marine de la Réunion, where CAREs are deployed

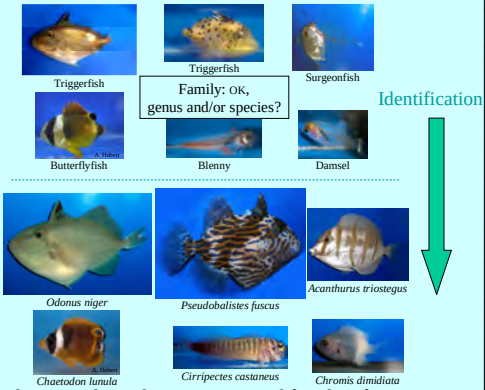
Materials and methods:

Post-Larvae (PL) are collected at night with light traps (CARE*) in Saint-Paul bay

CARE* = Capture by Artificial Reef Ecofriendly ©

Sorting and identification when possible

Rearing (~ 2 months)

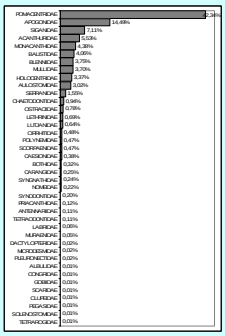


Undetermined post-larvae were raised for identification

Results of the 2-year pilot project:

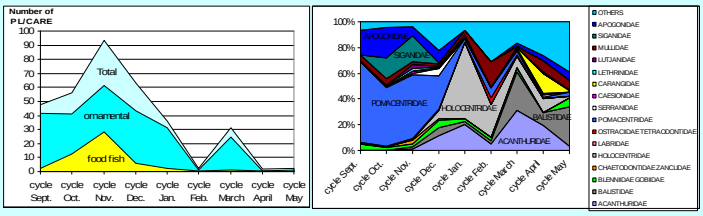
A total of 20674 post-larvae (PL) were collected with 583 CARE traps within 92 nights representing 17 months of collection. 195 species were identified during the study, representing 40 families.

During the rearing (average of 3 months), the survival rate has been higher than 80%.



Diversity of fish families

Study of one fishing season (Sept. 2008 to May 2009)



~ 40 PL/CARE/night has been collected during the study and an important seasonality of PL colonization has been notified : 93 PL/CARE/night in Nov. (summer), almost no colonization from May to September (winter)

- More than 65% of collected PL suited the ornamental fish market

More than 2000 fishes were successfully exported to Europe (France, Spain, Italy) with an average mortality rate of 1%.

Conclusions:

Reunion Island seems to be a suitable site to develop PCC.

- good accessibility of fishing sites
- good species richness
- high rate of PL which suit the ornamental fish market
- successful rearing and export.

But:

- no colonization during winter
- efforts are to be made for marketing (e.g. ecocertification criteria ?) to enhance local sales and export.

A recommendation concerning the use of PCC has just been included in Grenelle de la mer in France.

Overall PCC perspectives in Reunion Island:

- The capture and culture of post-larvae in Reunion Island has been successful. But the economic study is still on-going concerning the ornamental market and some efforts will be needed to push post-larvae on the European market.
- The RUN Sea Science program will improve our knowledge concerning the colonization and behavior of post-larvae around Reunion Island and may help to predict which species colonize where and when.
- With the current implementation of a Marine Protected Area along the reefs of West Reunion Island, the PCC technology could be assessed as a way to manage and follow the evolution of the fish population.
- PCC through restocking food fish on artificial reefs could also be useful for fishermen.