

## ■ AQUACULTURE SECTION

### SPC Aquaculture Section publication: Regional strategy for developing marine finfish aquaculture in the Pacific Islands

In December 2007, the SPC Aquaculture Section hosted the Pacific-Asia Marine Fish Technical Workshop. Representatives from French Polynesia, New Caledonia, Marshall Islands, Palau, PNG and Solomon Islands were invited to participate. Regional organisations from Australia, the Pacific and Asia (Institut français de recherche pour l'exploitation de la mer [IFREMER]; Network of Aquaculture Centres Asia-Pacific; USP; Queensland Department of Primary Industries and Fisheries - Northern Fisheries Centre; The WorldFish Center; and the Australian Department of Agriculture, Fisheries and Forestry) also attended. Private sector investors for the region were represented as well, with Good Fortune Bay Fisheries (from Australia and Marshall Islands) and AQUALAGON (from New Caledonia) also in attendance.

This workshop was a technical consultation between marine fish aquaculture experts and SPC member PICTs that are active in marine fish aquaculture. Its goal was to provide SPC with advice on the most feasible options for marine fish aquaculture and identify a

regional framework for collaboration to address priority research and development needs in the Pacific.

A technical report is now available from the SPC Aquaculture Section. This report will be posted online soon. Please contact Antoine Teitelbaum for a copy of the report at AntoineT@spc.int.





### Regional strategy for developing marine finfish aquaculture in the Pacific islands

*A Report from the SPC Pacific Asia Marine Finfish Aquaculture Workshop – December 2007*

Prepared by SPC Aquaculture section  
(With contributions from the Service de la Pêche of French Polynesia)



SPC  
Secretariat of the Pacific Community



## A regional consultation to support the marine ornamental industry

SPC has been assisting the region to develop management and monitoring regimes to ensure the long-term sustainability of the marine ornamental trade whilst promoting best eco-friendly industry practices to ensure maximum benefits from these resources.

As part of this effort, the Aquaculture Section and the Live Reef Fisheries Section of SPC and the Secretariat of the Pacific Regional Environment Programme (SPREP) hosted a subregional workshop in Noumea, New Caledonia, in early December 2008 on the marine aquarium trade. The workshop was a technical consultation between private stakeholders, public stakeholders and specialists from this industry in the Pacific to examine current and new issues in the trade and to identify national and regional initiatives that will ensure the long-term sustainability of this important, yet relatively unknown industry.

The workshop objectives were to:

- Assess the global and regional trends of the industry in terms of markets and production systems;
- Investigate criteria for commercial viability at both community and company levels;
- Assess requirements and issues related to international agreements for export, such as compliance with the Convention on International Trade in Endangered Species (CITES) and the recent World Organisation for Animal Health (OIE) veterinarian requirements;
- Determine the role of certification programmes;
- Evaluate resource assessment techniques to ensure sustainability of wild fisheries;
- Identify further opportunities for aquaculture;

- Determine base requirements for national management plans; and
- Identify priorities for research, development and training.

Major exporting countries such as Fiji Islands, Marshall Islands, Kiribati, Vanuatu, Tonga and Solomon Islands were represented, while other countries that have marginal or developing trade in ornamentals, such as Cook Islands, French Polynesia, New Caledonia and PNG, were also present and actively participated in the various sessions. Representatives from Queensland's Department of Primary Industries and Fisheries presented the Queensland Great Barrier Reef approach to managing this industry, which is currently being implemented.

Private sector representatives who are highly regarded in the trade, such as Tony Nahacky from Fiji Islands, discussed the good practices of their companies and stressed issues such as the safety of the collectors, quality of the product and sustainability of the collection practices. Walt Smith from Walt Smith International presented his rock and coral farming projects, amongst other things, to the delight of smaller entrepreneurs from Vanuatu, Kiribati and Tonga who benefited greatly from those presentations. Tekinaiti Kaiteie from Moving Colors, a Kiritimati-based exporter, represented the Kiritimati Petfish Association and shared his experience and concerns about operating a business and shipping live animals from such a remote part of the world. The lack of support from NGOs and government agencies



**Flame angels (*Centropyge loriculus*) at an exporters' facility**

was also stressed and ways to improve this were discussed.

Representatives from NGOs, other independent organisations and USP actively participated in all sessions on topics such as aquaculture development, trade barriers, CITES, and sustainability of practices. Participants from the Marine Environmental Research Institute of Pohnpei, USP's Institute of Marine Resources (IMR), and the WorldFish Center in Solomon Islands all contributed their knowledge and experience to help improve this important industry in the Pacific.

Two field trips were organised by SPC. The participants visited the newly refurbished Aquarium des Lagons on Noumea's Anse Vata beach, where they were able to observe species from New Caledonia found in habitats ranging from the rivers to the outer reef. Some rare species were spotted by the more experienced fish watchers, while the 50 kg maori wrasse remained a favourite. A second field trip took over 20 participants for a snorkelling trip to the reef where ornamental trade enthusiasts and fish experts could see for themselves the fantastic New Caledonian marine life.

At the end of the workshop, an interactive CD with all the PowerPoint presentations was produced and distributed to participants. A technical report

**Top: Kalmet Kaltabang from Vanuatu and Jeff Kinch from SPREP at the SPC workshop**

**Middle: Cultured corals (here *Acropora* spp.) are increasingly in demand on the global market**

**Bottom: Loading aquarium fish onto an air freighter for export on Kiritimati Island, Kiribati**



is currently being prepared and will be available online soon.

#### EMERGING ISSUES AND CHALLENGES

A few key issues emerged from this workshop and form the basis of the work that will need to be pursued in the future.

#### Aquaculture – an alternative source of products

Aquaculture is providing the market with an increasing range of cultured products. For example, giant clam farming has increased since the first trials in the 1980s; in 2007 over 75,000 cultured clams were exported from the Pacific. Cultured corals and cultured live rocks are also being successfully marketed to environmentally conscious aquarists. As the culture of these products expands in the Pacific, alternative employment is being created for people in rural areas. Culture of fish such as the highly sought after clownfish is also increasing worldwide, and the Pacific seems to have good opportunities for development in this area.

#### Air transportation – a continuing saga

The aquarium trade has a symbiotic relationship with the airline industry. Live fishes and corals surviving on a limited oxygen supply must be shipped quickly to their destination, and the trade therefore depends on airlines to get its products to market. At the same time, the flow of outgoing airfreight cargo provides a steady stream of business, helping these international flight routes stay afloat. In Tonga for example, the ban on live-rock harvest caused a drop in airfreight cargo and reputedly contributed to the demise of one of the international flight connections.

#### Certification for a 'Pacific' product — a label for Pacific exemplary practices

Certification of best practices for the marine aquarium industry was deemed a high priority by both government and private-sector stakeholders at the Noumea workshop. Eco-labeling can add value to consumer products, or at least help maintain market share. The industry stakeholders, however, stressed a need to avoid past experiences with burdensome over-documentation and to apply certification in areas where operators already have strong commercial incentives to do well. The SPC-based Coral Reef Initiative in the South Pacific (CRISP) has announced an intention to carry out a feasibility study in 2009 to identify possible models for certification and eco-labeling in the marine aquarium trade, and to seek the one that is most appropriate for the industry in the Pacific.

#### International compliance

Today's global market has made compliance and reporting increasingly stringent and complex. As aquarium products move from one country to another they must comply with the powerful CITES, which aims to ensure that international trade is not affecting global biodiversity. Lately, the Pacific has been affected by temporary bans that have been imposed on some species. A factor in these bans has been poor coordination between environment departments, which typically issue CITES permits, and fisheries departments, which are responsible for the industry.

Biosecurity is an issue of increasing importance. Recently the European Commission (EC) imposed a requirement for all live aquatic imports to be accompanied by disease certification and for the exporting countries

to also be members of OIE. The Pacific has become an unintentional victim of this new requirement. Most, if not all, of the countries affected by this ruling lack the institutional and funding capacity to accommodate these measures. Fortunately, there are some conciliatory gestures from EC indicating that a regional approach coordinated by SPC may provide a temporary respite. However, this really only serves to raise a flag that increasingly stringent biosecurity measures in the trade are right around the corner.

#### WHAT LIES AHEAD?

With growing interest in the aquarium trade from Pacific countries, the trade is expected to continue to grow in the region. SPC will continue to coordinate efforts and provide the technical support and assistance required by PICTs to develop and manage this industry in a sustainable way. A 'Pacific' label that indicates high quality eco-friendly products that promote sustainability is an idea worthy of exploration by Pacific Island nations. And as for international trade measures, they have the capacity to either become a barrier for the Pacific marine aquarium trade or to assist the trade in keeping a clean image.

For further information please contact Being Yeeting, SPC Senior Fisheries Scientist (Live Reef Fisheries), email: [BeingY@spc.int](mailto:BeingY@spc.int), or Antoine Teitelbaum, SPC Aquaculture Officer (Aquaculture Section), email: [AntoineT@spc.int](mailto:AntoineT@spc.int)



## Building capacity for Solomon Islands in freshwater aquaculture

(By James Ngwaerobo, Aquaculture Officer, Solomon Islands Ministry of Fisheries and Marine Resources)

With the increasing pressure on capture fisheries, freshwater aquaculture has potential to develop among PICTs. SPC and USP are taking a lead to assist the development of tilapia and freshwater prawn farming among the PICTs.

The Aquaculture Development Plan for Solomon Islands, recently developed by the Solomon Islands Ministry of Fisheries and Marine Resources (MFMR) in collaboration with SPC, listed freshwater aquaculture (tilapia and prawn) as a priority. To further strengthen the Solomon Islands Freshwater and Brackish Programme, MFMR requested that SPC provide training to enable MFMR to build capacity to implement its programme. A three-week training and work attachment was conducted by SPC and USP in collaboration with the Aquaculture Unit of Dairy Farms (Fiji) Ltd. (DFF), and the Naduruloulou Research Station (NRS) of the Fiji Islands Department of Fisheries. As a member of MFMR staff based in the newly established Aquaculture Division, I was able to attend this training.

Freshwater and brackish water aquaculture has been established for more than two decades in Fiji Islands, so aquaculture infrastructure like feed mills, hatchery and culture technology, supporting institutions and personnel are comparatively well developed. This has created a foundation for training so that other PICTs can learn from experiences in Fiji. Nile tilapia and *Macrobrachium rosenbergii* prawn hatchery and grow-out practices are in operation, including one large commercial prawn farm at Navua and a number of smaller extensive and semi-intensive tilapia and prawn farms in other parts of

Fiji. There is a large freshwater aquaculture centre and prawn hatchery operated by the Fiji Islands Department of Fisheries at NRS in Tailevu, which is responsible for overseeing the development of this sector among rural communities. The establishment of a second, commercially oriented prawn hatchery by USP's IMR, and IMR's partnership with DFF to operate the Navua prawn farm, have further consolidated freshwater aquaculture in Fiji.

### The training

The training covered a wide range of practices in tilapia and prawn hatchery operation, husbandry and grow-out. This involved fieldwork, hands-on work experience, and lectures on tilapia and prawn biology. The training was conducted at the DFF Navua prawn farm, the IMR-USP hatchery in Suva, and NRS in Tailevu. Vanuatu Fisheries staff member Glen Alo was the first person sponsored by SPC to complete this training (in September 2008) and I was the second (in November 2008).

The Fiji freshwater aquaculture sector includes polyculture, integrated agriculture-aquaculture farming (tilapia and ducks) and monoculture of both tilapia and prawn. The different farming methods have been proven to work well and are suitable for PICTs. The main commercial species are Nile tilapia and rosenbergii prawn; grass carp (*Ctenopharyngodon idella*), big head carp (*Aristichthys nobilis*), silver carp (*Hypophthalmichthys molitrix*), puntius (*Puntius gonionotus*), gold fish and fancy carp (*koi*) are also raised.

### Grow-out — tilapia and prawn

Two weeks of attachment and training was spent on the pond cycle developed for prawn pond management: preparation and maintenance of ponds, application of lime and fertilizer, filling of ponds, stocking with prawns, feeding, daily maintenance, pond sampling, and record keeping. Also covered were feed preparation (ingredients and equipment), harvesting, and packaging of prawns. Field visits were made



Prawn feeding, USP hatchery



**Grass carp harvesting, Naduruloulou**

to a number of other farms to observe the different types of farming (monoculture, polyculture, and integrated farming). These topics were covered both at DFF, which focuses on prawn grow-out, and at NRS, which maintains broodstock for tilapia and prawn and produces juveniles for pond stocking.

#### **Hatchery — tilapia and prawn**

NRS operates hatcheries for both tilapia and prawn. These are 'master hatcheries', responsible nationally for maintenance and dissemination of the best possible broodstock for these species. I spent time here going through the steps for broodstock management and tilapia fingerling production for pond stocking.

#### **Prawn hatchery — green-water technique**

One week was spent in the IMR hatchery at USP for training on

a green-water technique for prawn larval culture. This method is an alternative to the clear-water culture technique usually practiced in Fiji Islands, and was learned under the guidance of Japan International Cooperation Agency (JICA) Senior Volunteer Tomohiro Imamura and the IMR hatchery team. Training covered all aspects of hatchery larval husbandry: water quality management, prawn larval development, and daily feeding.

#### **Implications for Solomon Islands**

Solomon Islands is preparing for the establishment of a fresh-water and brackish aquaculture sector under its Aquaculture Development Plan 2009–2014. This training in Fiji Islands has contributed to:

- Capacity building on skills and knowledge in best prac-

tices for farming and hatchery practices under Pacific Islands conditions;

- Our knowledge about the pond cycle for prawns;
- Developing MFMR's capacity to conduct its own experiments in Solomon Islands;
- MFMR's ability to conduct an import risk assessment on the viability of importing Nile tilapia *Oreochromis niloticus* as a better option for aquaculture than the Mozambique tilapia *O. mossambicus* already long established in Solomon Islands; and
- Capability of MFMR Aquaculture Section staff to carry out training for its provincial officers.

The training will help strengthen the work force and will contribute to current MFMR efforts to develop tilapia and prawn farming as an alternative livelihood under the Community-Based Fisheries Management Programme. This aims to improve food security for the increasing population as well as reduce the stress on our natural fish stocks.

