

Survey for milkfish fry collection in the Arnavon Islands, Solomon Islands



Milkfish fry fishing along the beach with a bulldozer net (image: Tim Pickering).

Whenever milkfish are mentioned in the Solomon Islands, it is not long before the Arnavon Islands (between Santa Isabel and Choisel islands) are also mentioned because this area is famous for an abundance of milkfish of all sizes. The Arnavon Islands are protected and managed by rangers in a three-way conservation co-management arrangement among the communities of Choisel, Isabel and Wagina islands. Shallow lagoons within these islands attract milkfish fry, and act as nursery areas for milkfish right up to juvenile sizes (1 kg or more).

In March 2013, a research survey to collect milkfish fry and fingerlings from the Arnavon Islands was conducted. The four-person survey team consisted of two master's students from the School of Marine Studies at the University of the South Pacific (USP), Simon Vuto and Joshua Lavisi, who were accompanied by Solomon Islands Ministry of Fisheries and Marine Resources (MFMR) Inland Aquaculture Officer, James Ngwaerobo, and SPC Inland Aquaculture Specialist, Tim Pickering. The survey was part of an Australian Centre for International Agricultural Research project¹ implemented by the WorldFish Center, Solomon Islands MFMR, and SPC's Aquaculture Section.

The two main target species of the survey were the introduced freshwater fish Mozambique tilapia (*Oreochromis mossambicus*), which was introduced in the islands in the 1960s, and the indigenous milkfish *Chanos chanos*. These two species were selected because they are low in the food chain (i.e. are mainly herbivorous) and are inexpensive to feed and grow in aquaculture ponds.

The main objectives of the survey were to: 1) monitor seasonal fry abundance, and study its relationship with

weather, tides and moon phases; 2) find out whether the reputation of the Arnavon Islands as a place with an abundance of milkfish extends to sizes of interest for capture-based aquaculture; and 3) determine whether the type of coral sand coast and marine environment found in these islands is better suited for fry capture than the fairly restricted collection sites along the steeply sloped gravel beaches of major high islands such as Guadalcanal.

The two USP students conducted the one-off survey in the Arnavon Islands for milkfish fry and fingerlings to help determine whether capture-based milkfish aquaculture is worth doing in the Solomon Islands. Accompanied by Ngwaerobo and Pickering, the students also tested the logistics of transferring fry from outer islands of the Solomons, such as the Arnavons, to Honiara for nursery and pond grow-out.

Tilapia are easy to breed in ponds or in tanks on land. Milkfish can be easily grown in freshwater ponds too, but their breeding takes place in the open sea. Operating a milkfish hatchery is technically demanding, and requires big breeders because the fish do not reach maturity until they are around five years old.

¹ ACIAR-funded project FIS 2010/057, "Developing inland aquaculture in Solomon Islands".

It took two days to go by inter-island vessel from Honiara to the village of Kia on Isabel Island, and from there by 40-hp fiberglass boat to the Arnavon Islands. The survey team was hosted and guided by three rangers — Rabo, Moses and Rudi — of the Arnavon Association, which administers the wildlife reserve there. Permits and permissions to conduct research in the reserve were obtained by the WorldFish Center beforehand.

A visual survey of the two major islands in the Arnavons (Sikopo Island and Kerehikapa Island) showed that the area is rich in milkfish habitat for small to medium juvenile stages, with the lagoons being high in primary productivity (e.g. rich, golden phytoplankton blooms, abundant cyanobacteria/algal floc) and having narrow openings to the open sea. Many milkfish schools, from fingerling size (6 cm) up to large juvenile (40 cm), were seen swimming in these lagoons, which are well known as a milkfish resource by fishers from Wagina, Choisel and Isabel islands.

The sampling plan followed the recommendations of Philippine milkfish experts and previously written reports, and involved using a bulldozer net along beaches with an onshore breeze and rising tide. In the Arnavon Islands, this proved impractical because the sea on the weather side of all the islands was choppy, making it too difficult to operate the bulldozer net. Furthermore, because the beaches are turtle nesting sites there are many sharks around, and any activity in these windward waters rapidly attracted small sharks into shallow water areas, even in broad daylight. Stingrays are also a major hazard to surveyors and we sighted several, some at very close range.

The trend that emerged from the survey was that the sheltered bay inside the “horseshoe” of each island had better catches of milkfish larvae than elsewhere. Dense shoals of baitfish aggregated there to feed on zooplankton within metres of the beach. The number of fry caught by the bulldozer net was greater at night than during the day at the same place, but was not startlingly high. After four

days and nights of systematic fishing, only 149 glassy fry were caught. In the Philippines, the minimum number of glassy fry considered to be “interesting” enough for a middleman to come and buy them is 2,000 fry.

Schools of small fingerlings swimming in the tidal lagoons of the Arnavon Islands (in depths of 10–20 cm) were observed, and the survey team caught some for experimental transport to Honiara. The only means of catching these fish was a mosquito bed-net as a seine, but even so, 27 fingerlings ranging in size from about 5–8 cm were caught.

A knotless-mesh seine net about 10 m long would be the most promising way to capture milkfish fingerlings from this type of environment for transport to grow-out ponds. The high primary productivity of these lagoons and their connections to the ocean mean that replenishment by new recruits will be quite rapid. Targeting larger milkfish for direct consumption should be avoided, however, for conservation reasons, and taking milkfish for home consumption from the Arnavon lagoons is restricted under the joint management plan for these islands.

The second objective of the survey was to conduct a trial of live shipment of fry from the Arnavons back to Honiara for nursery grow-out, to determine the logistics that were involved, and to further boost the number of fish available for stocking into the John Bosco Farm pond for an expanded grow-out trial during 2013. The survey team packed the 149 fry and 27 fingerlings into two eskies, using 6 L of transport water in each. The survey team departed the Arnavons at 0700 (bound for Isabel’s Suavanao Airport via Kia), and arrived at Henderson Field at 1530. The fish successfully acclimated to the MFMR milkfish nursery at Kukum with 100% survival.

Our conclusion is that transporting both fry and fingerling stages of milkfish within the Solomon Islands by air in modest, yet useful, quantities is a practical proposition, and does not require any special equipment apart from battery-powered aerators and eskie-style fish boxes. So far, fingerling stages are easier to find and catch for aquaculture than glassy fry. But, if it were possible to locate the right spot for glassy fry collection, that conclusion could easily change.

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Details of the bulldozer net and the targeted milkfish fry (insert). Images: Tim Pickering