

### Fishing for diamondback squid in Tahiti: Adapting gear for small boats

*Another round of diamondback squid (Thysanoteuthis rhombus) fishing trials was recently completed in Tahiti. This was a collaborative assignment between the Pacific Community (SPC) and French Polynesia's Direction des Ressources Marine et Minières (DRMM). Previous trials, carried out by SPC in New Caledonia, Cook Islands and Fiji, were done from ships designed to spend several days at sea. This time, the mission had three objectives: 1) to confirm, or more accurately to advertise, the presence of diamondback squid in the waters off Tahiti; 2) to assess the possibility of using a smaller boat for fishing operations; and 3) to try out an electric reel modified to be used for commercial diamondback squid fishing off small boats.*

A similar trial to catch diamondback squid from small boats was successfully conducted in the waters around Aneityum Island in Vanuatu as part of a Japan International Cooperation Agency-funded programme to support Vanuatu Fisheries Department's coastal fisheries development strategies, as detailed in the SPC Fisheries Newsletter #144.<sup>1</sup> A 7-m fibreglass skiff was used, and a giant squid was successfully caught using a manually

operated hand reel. This gave Vanuatu fishermen an alternative fishing method to complement the fishing activities they were already doing, using the methods they were accustomed to: using wooden hand reels and hand-hauled lines.

French Polynesia has a large fleet of powered boats, called *poti marara*, operated by small-scale commercial



Figure 1. Vessel used for the diamondback squid trials (image: William Sokimi).

<sup>1</sup> See : [http://www.spc.int/DigitalLibrary/Doc/FAME/InfoBull/FishNews/144/FishNews144\\_48\\_Nimoho.pdf](http://www.spc.int/DigitalLibrary/Doc/FAME/InfoBull/FishNews/144/FishNews144_48_Nimoho.pdf)

fishermen that carry out day fishing for tuna and other pelagic species. The use of an adequately sized electric reel on these boats fits in well with improving fishing efficiency, and provides the means to fish for diamond-back squid with relative ease compared to hand hauling or manual hand-winding reels.

From 22 June to 3 July 2015, SPC's Fisheries Development Officer, William Sokimi, worked with DRMM's Manager for Projects and Development Programmes, Mainui Tanetoa, to carry out the Tahiti diamondback squid fishing trials.

### Boat used

A modified version of the Tahitian *poti marara* boat design was used as the platform for the trials. This vessel was built for DRMM's offshore activities. It is constructed from aluminium, is 6.7 m in length, and has a maximum beam of 2.50 m. It is powered by a 2-stroke Mercury Optimax 225 hp outboard engine. The design is meant for high speed and manoeuvrability on the open ocean. The deep V-shaped forward hull, which tapers to a shallow V at the aft end, is well adapted to large swells, choppy seas and rough weather conditions. The boat's stiff hull form (which provides stability) results in jerky and bobbing movements in choppy seas, although the boat still maintains a safe centre of gravity, thus making it a good working platform. The boat has more than sufficient space to conduct fishing operations (Fig. 1).

### Electric reel and mainline spools

A POP (Pacific Ocean Producers) Hawaii ¼ hp, heavy-duty electric reel was used during the trials. This reel was initially installed for vertical longline and deep bottom fishing, and came with an aluminium spool with a holding capacity of 750 m of 300-lb test monofilament line, and driven by a 12-V, high torque, low-amp motor (Fig. 2). Other features of the reel included a 6 mm x 64 mm heavy duty fiberglass davit or boom, 32 mm stainless steel pipe stanchion with a welded foot mount, stainless steel gunwale mounting bracket, adjustable drag system, and manual backup winding capability.

The reel had only a single speed but the drag could be adjusted to avoid rigid hauling. The flexible davit and elastic cord in the mainline system assisted with reducing harsh haul-back force. The reel performed beyond expectations during the trials.

In order to set 15 diamondback squid vertical longlines, the reel was modified to fit interchangeable plastic, hand-cast spools (254 mm outside diameter and 150 mm inside diameters). The Alvey hand-cast spool (Fig. 3) was found to be better suited for this type of operation



Figure 2. 12-V electric reel used during squid fishing trials (image: Pacific Ocean Producers Hawaii catalogue).



Figure 3. An Alvey hand-cast spool used for holding a single stainless steel mainline (image: William Sokimi).

than other plastic spools found on the island because it is thicker, non-brittle and stronger. It could also comfortably hold 500 m of 1.05 mm stainless steel wire with room to spare. The spool was changed after each line was set.

Aluminium coupling was machined on a lathe (Fig. 4) to specifically fit the dimensions of the Alvey plastic spools (Fig. 5). This coupling replaced the aluminium reel on the winding shaft. The same principle can be applied when adapting to other types of spools.

The plastic spool is locked to the coupling by two levers screwed tight by 6 mm butterfly screws (see Fig. 4). These butterfly screws should be increased to 13 mm or more to make it easier to tighten and loosen.

### Electric reel work rate

On average, it took 10 minutes to deploy a vertical longline, including the time taken to move to the next location.

It took around 15 minutes to haul back each line, including the transit time between lines.

### Gear and rigging

The fishing gear for this trial, excluding the electric reel, was shipped from Noumea, New Caledonia to DRMM for the fishing trials. A complete set of new diamond-back squid fishing gear was stored at SPC in anticipation of fishing trials around the region. The electric reel and additional plastic spools were provided by DRMM.

Fifteen diamondback squid vertical longline units were rigged for the trials. Each unit consisted of a flag marker, 450 m of mainline (1.05 mm #29 stainless steel wire) + 20 m red monofilament (#100 1.65 mm, 280-lb test), a trunk line consisting of 5 m x 4 mm elastic line + 3 x 5 m red monofilament sections, 3 bulb lures with 23-cm squid hooks, and a 1.2 kg silver sinker with 23-cm squid hooks.<sup>2</sup>

### Fishing trips

Fishing was planned for day trips only, beginning at dawn and returning before dusk. However, due to logistical constraints, actual fishing times always started later than dawn.

The fishing grounds were between 10 nm and 20 nm directly off Papeete, the capital of French Polynesia.



Figure 4. Coupling constructed especially to hold the Alvey hand-cast spools (image: William Sokimi).



Figure 5. A plastic spool fitted onto the coupling and locked in (image: Mainui Tanetoa).

During Day 1, eight vertical longlines were deployed to test the gear, and also to record the setting and hauling times for the electric reel. This provided an idea of the working rate of the reel, which was useful for planning how many vertical longlines to deploy during the next two fishing trips so that it would be possible to complete the full fishing operation within the planned schedule for the fishing trip.

<sup>2</sup> See illustration at : [http://www.spc.int/DigitalLibrary/Doc/FAME/InfoBull/FishNews/144/FishNews144\\_14\\_Sokimi.pdf](http://www.spc.int/DigitalLibrary/Doc/FAME/InfoBull/FishNews/144/FishNews144_14_Sokimi.pdf)

The units were deployed independently, with no line of connection between them. The lines were set in a linear sequence, 300 m and 500 m apart (Fig. 6). This method was faster and less labour intensive than the usual method of using connected vertical longlines, which require a horizontal longline reel system on the boat. The boat used in Tahiti was too small for an additional hauling reel system, which, additionally, would introduce a substantial cost that may dissuade small-scale fishermen from taking up the fishery.

### Squid catch

Catching large volumes of squid was not a priority for this project; rather, the main objectives were to train a local counterpart in using the fishing method and verify the presence of “giant” squids (diamondback and the less-valued neon flying squid).

Nevertheless, 8 lines were set on Day 1, 10 on Day 2 and 15 on Day 3:

- No squids were caught on Day 1, but a neon flying squid tentacle was attached to one of the lures, indicating the presence of this targeted squid species.
- Two diamondback squids were caught on Day 2 (total weight: 23 kg).
- Four diamondback squids (27.5 kg total) and one neon flying squid (8 kg) were caught on Day 3.

The average overall catch was only 0.045 squids per hook set, which is less than a third of the average catch of preceding SPC experiments (see table below). The fact that this campaign was mainly aimed at validating the use of a small boat for squid fishing and experimenting new hauling gear, combined with the very short period during which the fishing took place (three days) and the small number of lines set in total (33), could explain low catch rates. DRRM is planning other fishing

trials to fine-tune the equipment and establish more robust catch statistics. It would not be surprising to see increases in catch rates with future trials.

### Comparison of results obtained during the four experimental squid fishing campaigns conducted by the Pacific Community

While fishing trials in New Caledonia, Cook Islands, Fiji and French Polynesia were all conducted around the same time of year (i.e. June to August, the Southern Hemisphere’s cool season), and the gear and fishing methods used were comparable, the varying catch rates obtained at the four sites do not necessarily imply similar differences in stock sizes of squids. The sample size was too small to be statistically representative and the moon phase is likely to have an impact on squids’ feeding patterns; hence, the need to undertake fishing trials over a much longer period if meaningful catch data are to be obtained. It is hoped that the exploratory squid fishing trials will continue in these four countries with some parallel marketing trials conducted. Such efforts, if well monitored, would allow interesting analyses of both the squid resource and its potential development in the region.

#### For more information:

**William Sokimi**

*Fisheries Development Officer, SPC*

*WilliamS@spc.int*

**Michel Blanc**

*Nearshore Fisheries Development Adviser, SPC*

*MichelBl@spc.int*

*Summary of SPC squid fishing experiment catches*

Location	Date	Total no. of hooks set	Total catch (no. of squid)	CPUE* (no. of squid per line)	CPUE* (no. of squid per hook)	Ratio of diamondback squid	Ratio of neon flying squid
New Caledonia	21–31 August 2012	560	70	0.50	0.125	50%	50%
Cook Islands	20–30 July 2013	180	15	0.33	0.083	53%	47%
Fiji	30 June–4 July 2014	252	59	0.90	0.230	95%	5%
French Polynesia	22 June–3 July 2015	132	6	0.18	0.045	83%	17%
All experiments combined		1124	150	0.53	0.133	69%	31%

\* CPUE = catch per unit of effort