

Successful diamondback squid fishing trials in Fiji

The diamondback squid (*Thysanoteuthis rhombus*) is found in tropical and subtropical waters. While it is not a traditional fishery and most fishing communities do not know that it even exists, it is potentially an untapped resource for Pacific Island countries. The neon flying squid (*Ommastrephes bartramii*) is another large squid species found in the same areas. This squid is smaller than the diamondback but is much larger than the commonly seen species at the surface. The average size of a diamondback squid (mantle length) ranges from 60–100 cm and it can weigh up to 30 kg, although it averages around 20 kg (Fig. 1). The neon flying squid has mantle lengths that range between 25 cm and 60 cm and can weigh between 5 kg and 13 kg. An awareness of the presence of diamondback squid in the Pacific Islands region followed two successful trials carried out by SPC in New Caledonia in 2012 and the Cook Islands in 2013.

Fishing trials were again conducted from 30 June to 4 July 2014, this time in Fiji in waters north of Kadavu Island and south of Suva to ascertain the presence of diamondback squid there. This was prompted by a request from the Fiji Fisheries Department to first confirm the presence of the species and to disseminate information about it to local fishermen and entrepreneurs with the hope that they will source local markets to supply their catch to. The project was facilitated by SPC's Fisheries Development Officer, William Sokimi. The trials were conducted over four fishing days.

This exploratory fisheries development work is part of the SPC Nearshore Fisheries Development Section's mandate and work programme to strengthen food security, create new livelihood opportunities, and initiate fisheries diversification projects in order to identify new resources or utilise existing resources that are commercially viable but have not been tapped. The section's role is to also introduce capture methods to make these resources available as food security alternatives or as potential market products. Assistance in Fiji was made possible through programme funding from the New Zealand Aid programme for project costs, and the Government of France and the Australian Agency for International Development for SPC technical support. The Fiji Fisheries Department met all of the logistical costs for crew and participants, and for fishing vessel trip costs, gear construction venue, use of a crane truck, and other associated operational costs. Graham and Mathew Southwick of the Fiji Fish Marketing Group Ltd provided the much needed longline reel and horizontal mainline that was used during the trials.

Fishing gear and catch method

The full fishing trial operation was conducted over two weeks. During week 1, gear was assembled at the Fiji Fisheries Department workshop in Lami and then transferred to the FMV *Bai Ni Takali* to be set up for the fishing operations. Fishing gear preparations and fishing operations were carried out by selected Fisheries Department technical staff and crew of the FMV



Figure 1. Some of the diamondback squid caught during the Fiji trials.

Bai Ni Takali. Fishing operations were conducted during week 2.

The fishing method is basically a series of vertical longlines set approximately 600 m apart on a horizontal longline. The vertical longline system (Fig. 2) consists of stainless steel wire as the main dropline to which a trunkline is attached. A watertight light and three lures with hooks are connected to the trunkline with a leaded lure at the end. Each dropline is made of 450 m of 1.05 mm (212 lb test) flexible stainless steel wire. The trunkline was made up of 6 sections:

- ✓ one section of 20 m x 2 mm red monofilament line (400 lb test),
- ✓ one section of 5 m x 4 mm elastic absorber (250 lb test),
- ✓ four sections of 2.0 mm red monofilament line (400 lb test).

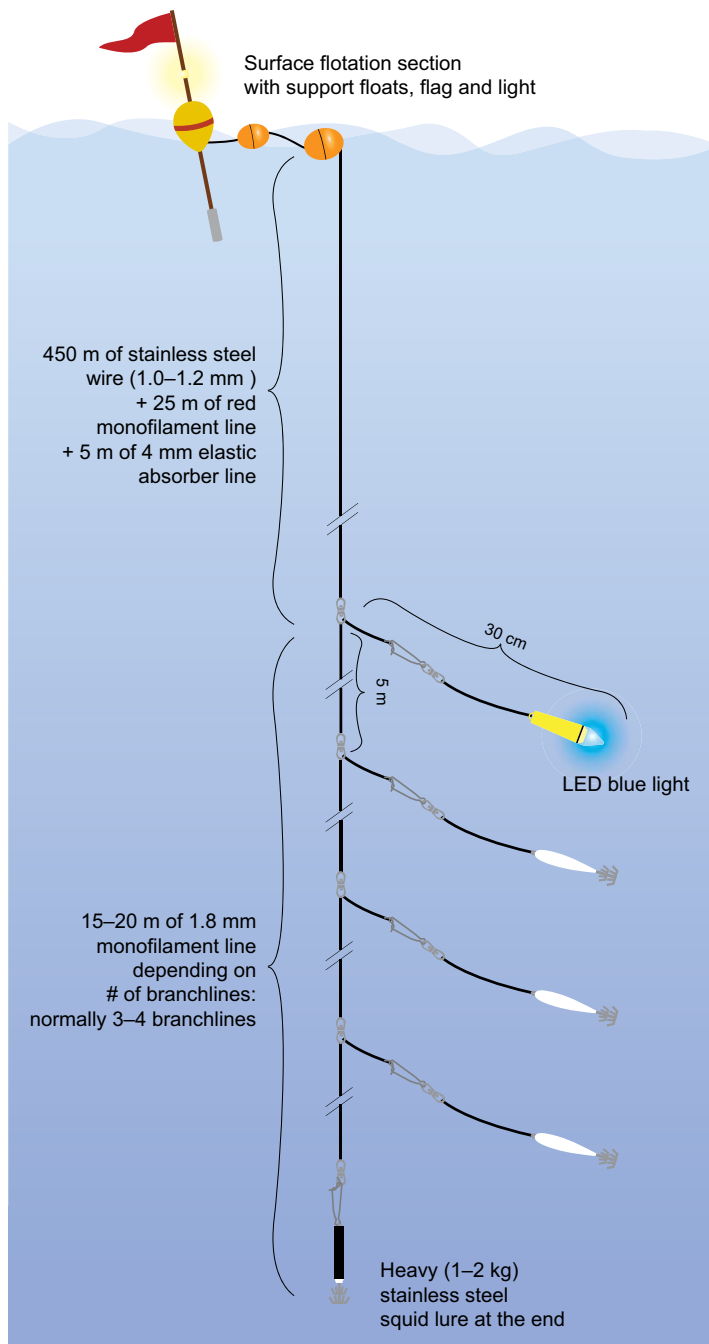


Figure 2. Diamondback squid vertical longline gear (illustration: Boris Colas).

Fishing reel

The fishing reel is a model NKAF-3A from Fuji Kizai Co. Ltd, Japan. Three extra spools were ordered, making four reels in all. Each spool contained five sets of 1.05 mm (212 lb test) stainless steel wire mainline. The NKAF-3A weighs 38 kg, has a haul-back power of 30 kg with a haul-back speed of 46–80 m/min and a spool capacity of 2500–2600 m of 1.05 mm stainless steel wire. The reel is powered by DC 12 volts and draws up to 50 watts (Fig. 3).

Catch and effort

During this trial, 15 vertical longlines were set on day 1, 18 on day 2, and 15 on each of the last two days. Catch consisted of:

- ✓ Set 1 (15 lines/60 hooks): 17 pieces caught, 3 missed. All diamondback
- ✓ Set 2 (18 lines/72 hooks): 26 pieces caught, 5 missed. 25 diamondback, 1 neon flying squid
- ✓ Set 3 (15 lines/60 hooks): 5 pieces caught, 6 missed. 4 diamondback, 1 neon flying squid
- ✓ Set 4 (15 lines/60 hooks): 11 pieces caught, 7 missed. 10 diamondback, 1 neon flying squid

Total catch: 56 diamondback squid, 3 neon flying squid, 21 missed.

Table 1 summarises the catch, effort and catch per unit of effort (CPUE) obtained during the trials in Cook Islands, Fiji and New Caledonia. The greatest CPUE was obtained in Fiji (0.230 squid per hook set vs 0.083 in Cook Islands and 0.125 in New Caledonia), where the composition of the catch was largely dominated by diamondback squid (95% of the catch). Diamondback squid has a higher market value than the neon flying squid.

Table 1. Summary of the results obtained during the three experimental squid fishing campaigns.

	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
Fiji	252	59	0.90	0.230	95%	5%
Cook Islands	180	15	0.33	0.083	53%	47%
New Caledonia	560	70	0.50	0.125	50%	50%
All experiments combined	992	144	0.58	0.150	69%	31%



Figure 3. NKAf-3A reel mounted on the starboard quarter of the MFV Bai Ni Takali.

Comments

The diamondback squid resource is currently unexploited in the Pacific Islands region. Therefore, it may appear to be abundant when first fished but Okinawan diamondback squid fishery indicates that the resource is fragile and needs to be managed with caution in order for sustainable harvests to take place.

After the successful fishing trials in Fiji (Fig. 4), the Fiji Fisheries Department planned to continue fishing trials to identify other fishing areas around the country and to better assess and understand the resource. Potential local markets will be investigated with local fishermen, and fishing companies will be encouraged to take an interest in the fishery. Immediate attention will be directed at the local market, targeting hotels and restaurants. Japanese market prices appear to be too low to make exports economically viable but there should be some immediate potential with local hotels and restaurants. However, while the export market may seem uneconomical, it is up to the entrepreneur to ascertain this with trial exports.

The diamondback squid is consumed as sashimi and sushi in Japan. A diamondback squid recipe booklet (with 53 recipes) has been published by the Dominica Fisheries Division in Cooperation with the Japan International Cooperation Agency. This booklet will be distributed with sample pieces to hotels and restaurants. A questionnaire will also be issued with the sample pieces in order to get feedback from chefs on their customers' responses to the dishes.

If the marketing trials are successful, then the catch method should be adapted for use on small vessels so that small-scale fishermen can also benefit from this development.

At this stage, limited licensing should only be issued to local fishing companies to further evaluate the potential of the fishery and to gradually fortify the development bases for a local industry.

Recommendations

- ✓ Continue fishing operations to better assess and understand the resource and to identify the best fishing zones around Fiji.
- ✓ Focus on first developing a local market for the squid, targeting the tourism industry and restaurants.
- ✓ Consider selecting a local fishing company to adopt the fishery and to pilot the marketing angle.
- ✓ Plan to adapt the fishing method to small vessels so that their owners can tap into the industry and support the pilot company with squid catch.
- ✓ Assess data and carry out a stock assessment when practical.
- ✓ Limit licensing until more is known about the fishery's potential.

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Figure 4. Diamondback squid releasing ink while being hauled in.