

DEEP BOTTOM FISHING IN NEW CALEDONIA

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INTRODUCTION

Deep bottom fishing can be considered to begin at a depth of 120 m, and to end around 400 m with the disappearance of the economically important species.

On the main island of New Caledonia and at Ouvéa, where the lagoon waters are filled with fish, the need to fish outside the barrier reef has not yet been felt. At Lifou and Mare, where deep water is close to shore, deep bottom fishing is occasionally carried out in depths averaging 180 m.

For several years there has been a fall-off in the sale of lagoon fish. The purchasing power of the consumers has decreased and the fear of eating toxic fish¹ is becoming increasingly great amongst those coming from France. Deep water fishes, which are of excellent quality and are never toxic, offer an opportunity to improve fish sales and to develop fishing activity.

The deep water fishes are represented by a small number of families and species, the dominant ones being the deep water snappers (Etelidae²). Descriptions of the species, information on their habitats resulting from fishing trials on the ORSTOM vessel *Vauban*, and details of the fishing methods used, are given below.

DEEP WATER FISH SPECIES

ETELIDAE (Deep water snappers)

(a) Genus *Pristipomoides*

The six species of this genus differ in colour and by the shape and number of scales; their fin counts are the same: D.X, 11, A.III, 8. This formula is also the same for the other genera: *Etelis*, *Tropidinius* and *Aphareus*. Concerning the lateral line scales, *P. multidentatus* has 50-52; *P. flavipinnis*, *P. filamentosus* and *P. sp.* have 60-62 and *P. sieboldi* and *P. auricilla* have 70-72.

Descriptions of the three most important species follow:

Yellow jobfish (*P. flavipinnis*)

The upper part of the head is marbled in pink-lilac and yellow-olive. The lateral line and the pectoral fin are yellow. The caudal fin is pink with a yellow margin. There are large yellow spots on the membrane of the dorsal fin. Its habitat is between 150 and 300 m and it lives permanently at the bottom. Maximum weight 3 kg.

Rosy jobfish (*P. filamentosus*)

The dorsal and ventral profiles are symmetrical. On capture the colour is white tinged with pink or violet, slightly silvery. The caudal fin has a red margin, particularly bright in the fork, and it is this characteristic which most quickly distinguishes it from the yellow jobfish. The other fins are tinged with yellow-pink.

1. Because of ciguatera.

2. Often classified as sub-family Etelinae of the Lutjanidae.

This species is found from 40-250 m, the optimum depth being 150 m. Unlike the preceding species it may leave the bottom, forming schools which follow the macro-plankton. It can reach 6 kg but averages slightly less than 2 kg.

Large-scaled jobfish (*P. multidens*)

It can be identified by its large scales, of which there are 50 along the lateral line, by the purplish-red colour veined with yellow on top of the head, and by a yellow line under the eye. It is caught at an average depth of 260 m outside the reef on the west side of New Caledonia and around 220 m to the south of the Isle of Pines where the slope is gradual. Average weight 4.5 kg.

(b) Genus *Etelis*

Short-tailed red snapper (*E. carbunculus*)

This species is a vivid orange red. The point of the lower lobe of the caudal fin is white. It has a robust shape, short tail and powerful canine teeth. It is caught between 230 and 440 m, most commonly around 320 m.

This is the largest of the deep water snappers and can reach 30 kg. About ten specimens over 18 kg have been taken in New Caledonia, but 6-8 kg is the usual size caught.

Long-tailed red snapper (*E. oculatus*)

This magnificent fish is cherry-red in colour, slender in form, with very elongated lobes to the caudal fin. Its dentition is weak. It is taken between 300 and 450 m. In weight it can reach 15 kg, but two thirds (by weight) of catches comprise specimens from 6-9 kg.

Outside the reef on the west of New Caledonia the average proportions of the two *Etelis* species (by weight) have been two-thirds *E. carbunculus* and one-third *E. oculatus*. The ratio is reversed on offshore banks, particularly those between Ouvea and Lifou and to the south of the Isle of Pines.

The two *Etelis* species are sold at a high price in Japan and Hawaii. In Reunion the price per kilo is 60F (1090 francs CFP or US\$15). Being excellent food fishes and never toxic, as mentioned earlier, they could be sold at 400 francs CFP (US\$5.50)/kg in Noumea.

(c) Genus *Tropidinius*

This genus is represented by two species, *T. zonatus* and *T. argyrogrammicus*, known as flower snappers. They are only of interest as indicators of favourable sites for *Etelis* as they are found between 250 and 400 m. The larger of the two, *T. zonatus*, is magnificently coloured with eight parallel bands alternately golden-yellow and vivid pink. It does not exceed 1.5 kg.

(d) Genus *Aphareus*

The small-tooth jobfish, *Aphareus rutilans*, with its large tail, is a fast swimmer. Its lower jaw is very long and projecting; it feeds on small prey. It lives near the bottom at an average depth of 150 m. It is taken irregularly with the best places seeming to be the sea mounts of the Loyalty Islands. Its weight can reach 10 kg.

SERRANIDAE (groupers, rock cods)

Epinephelus morrhua

Body greenish-brown marked with three or four darker brown encircling bands (longitudinal), sometimes with lines composed of dots. Small specimens are found from 140 m, the adults, which reach 6 kg in weight, as deep as 320 m.

Brown-spotted reef-cod (*E. chlorostigma*)

The whole fish is covered in very small, closely spaced hexagonal spots which are olive-green to ochre-yellow in colour. It is found between 150 and 280 m and can reach 7 kg, although the average weight is only 2 kg.

E. septemfasciatus

This large grouper reaches 50 kg. Distinctive features are the membrane of the dorsal fin, which is deeply indented between the spines, and the eight vertical and sharply defined black bands along the body. In New Caledonia it is found between 260 and 320 m but in Australia, Japan, at Reunion and Mauritius, it occurs in much shallower depths.

CARANGIDAE (trevallies, jacks)

Deepwater amberjack (*Seriola rivoliana*)

It is taken near the bottom between 140 and 340 m. The largest specimens (up to 25 kg) are found in the deepest water.

FISHING METHODS

Longlines

The risk of snagging and loss by using ordinary bottom longlines is very great on rough bottoms from 120-250 m. It is less at greater depths but is not reduced to the acceptable level of 10 per cent until depths greater than 400 m.

For this reason the use of a longline set directly on the bottom is avoided. Instead, the line is suspended 15-20 m from the bottom (Fig. 1). The diameter of the main line (nylon, kuralon) is 8 mm. Every 25 m it carries a branch line (Fig. 2) of 50 kg test monofilament nylon. Each of these has a 1 l capacity float, a 1 kg sinker and five hooks. A 6-8 mm diameter buoy line is attached to 8 kg sinkers at each end of the longline. For the artisanal fishery using boats of around 12 m length a single longline of 800 m with three buoy lines or two 400 m longlines each with two buoy lines should be adequate. In both cases some thirty nylon branch lines carrying a total of 150 hooks are attached by clips to the longline. Only a low powered winch is needed to haul the line. Lines are set for 3/4 to one and a half hours depending on the abundance of fish and the frequency of sharks.

On the *Vauban* the starboard side can be cleared to allow trawling. It is also on this side and towards the stern that the longlines are handled. First, two inflatable marker buoys and the buoy line are shot. The buoy line, about 400 m long for *Etelis* fishing, is let go at a moderate speed. On getting close to the attachment point of the buoy, longline and sinker, the speed is reduced so that the small submersible floats and branch lines can be attached without difficulty. The first branch line is unrolled before reaching the first of the 25 m marks along the longline. The branch line and float are then attached by snap clips next to the mark. If a 400 m longline is being used, 15 branch lines and floats are attached before reaching the terminal sinker. The final buoy line is then shot away more rapidly. The operation requires five people, including the captain who must keep a watchful eye to ensure the boat is kept in the desired depth. On a small boat four people are enough.

If an 800 m longline with three sinkers and three buoy lines is used the middle line is coiled ready on the stern and attached as the central weight passes by. Instead of unrolling the buoy lines and longline from a drum onto which they were rolled during retrieval, it is also possible to shoot the buoy lines and pay out the longline from baskets where they have been coiled.

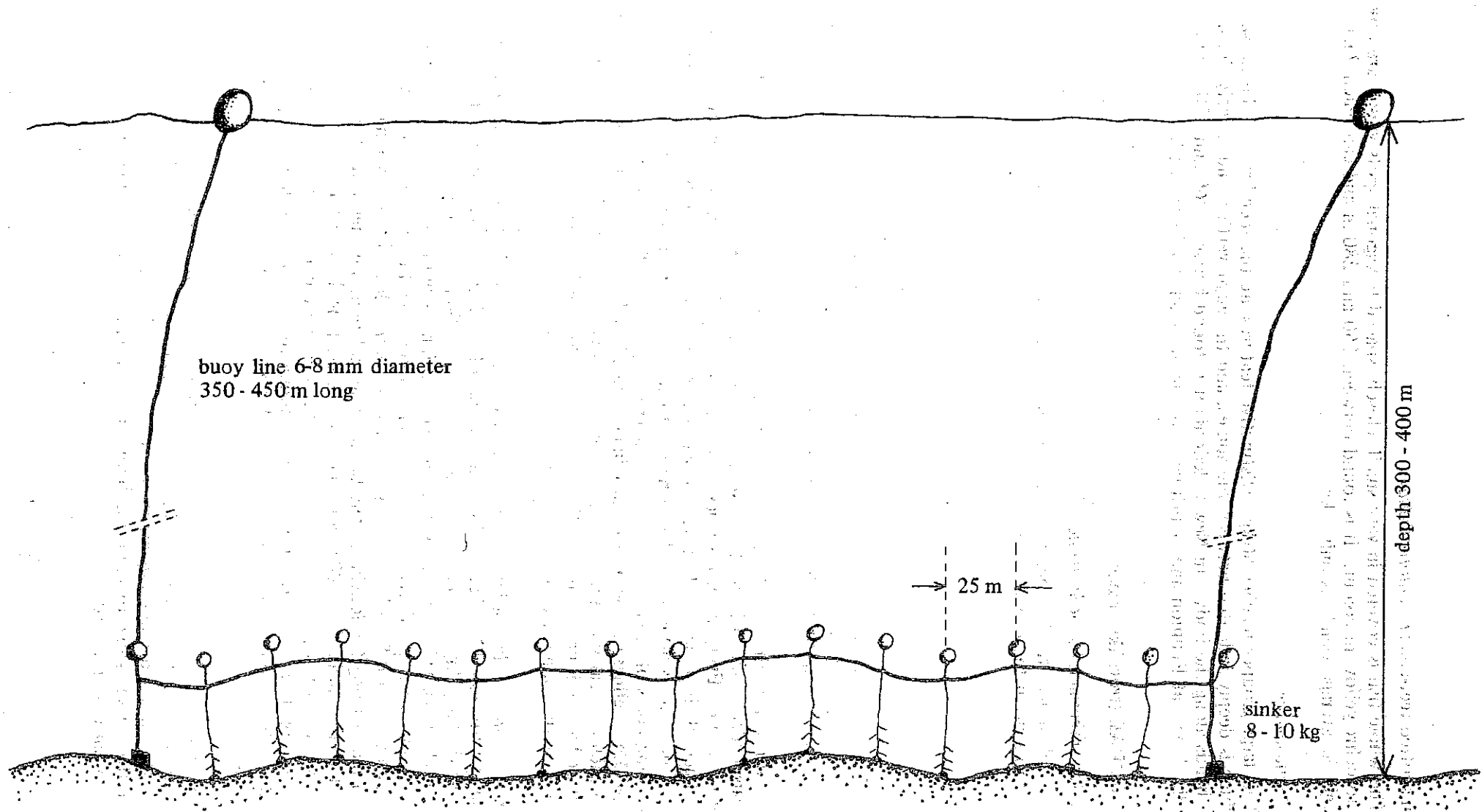


Fig. 1: Suspended longline for use in the deep water snapper fishery.

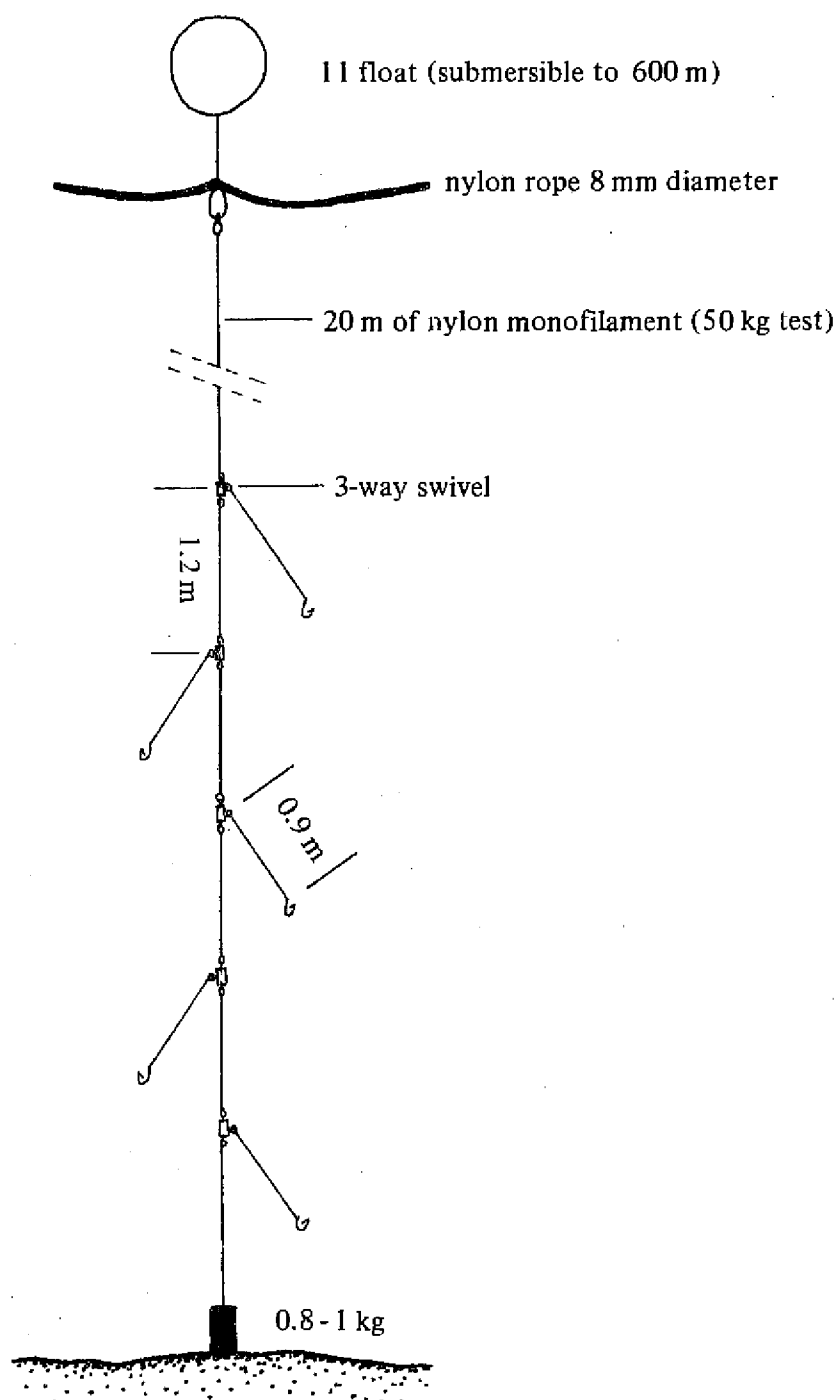


Fig. 2: Detail of branch line and its terminal rig.

Regarding the mounting of the branch lines, strong three-way swivels must be used at the attachment point for the trace carrying each of the five hooks (see Fig. 2). Suitable hooks are Mustad tuna circle or Mustad knife edge, sizes 7 or 8. At the moment of use the lower part of the branch line (about 6 m) is freed to allow baiting of the hooks. The rest of the nylon is kept rolled up by the tension of the snap clip. The part with the baited hooks and the 1 kg weight is put in the water first, drawing out the coils of nylon when the clip holding them has been released. The clip is then attached at the mark on the longline.

The longlines are used in two depth ranges.

150-250 m: The fish caught are predominantly pink and yellow snappers, seldom more than 3 kg in weight. When fish are very numerous (most commonly *Pristipomoides filamentosus*) they attract sharks of the genus *Carcharhinus* (*C. amblyrhynchos*, *C. albimarginatus*, *C. plumbeus*) which break the lines while attacking the hooked fish. It is necessary to make sure there are not too many sharks before leaving a line for one hour at these depths.

280-380 m: The *Carcharhinus* sharks, the main destroyers of the line, disappear successively in the order: *C. amblyrhynchos* (170 m), *C. albimarginatus* (300 m), *C. plumbeus* (320 m). In any case they become very rare after 260 m. The dogfish sharks (*Squalus*, 2 spp., *Centrophorus*) and the six-gilled cow shark (*Hexanchus vitulus*) which replace them, do relatively little damage.

By setting an 800 m line three times a day a catch of around 150 kg can be made, 90 per cent of which is *Etelis*. Squid, fresh or frozen, is the best bait.

This type of fishing is recommended because of the excellent quality of its target species, the deep water red snappers.

Fishing with reels

The sturdy 'red snapper' reel from the United States operated by hand or electrically, is recommended for the sea mounts found between Ouvéa and Lifou, Lifou and Mare, and the shelf extending to the south of the Isle of Pines. It is most useful for depths between 130 and 220 m sometimes permitting fishing to be carried out rapidly. In the *Etelis* zone, around 300 m, it is not so useful¹.

CONCLUSIONS

Satisfactory results obtained in fishing trials with longlines on the outer reef slope and offshore banks make it possible to recommend the creation of a small fleet of 10-15 m boats designed for deep bottom fishing and provided with ice holds. The fishery should concentrate on the 280-350 m depth range with trip lengths of five days, when the weather permits.



1. Editors' note: The SPC deep sea fisheries development project uses FAO design wooden handreels for deep bottom fishing with much success. They are simple, cheap, require few crew, and have proved effective down to 400 m.