

A New Look at Squid and Octopus Potentials of the Caribbean

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ABSTRACT

The potential for an octopus and squid fishery in the Caribbean was first discussed in 1960 and a survey of landings was reported in 1969. In 1973, landings in the Caribbean were estimated at around 900 metric tons with a predicted potential of about 100,000 mt. Despite these estimates and rising prices, little fishery development for cephalopods has taken place. Commercial species of squid and octopus occur throughout the Caribbean. Squid concentrations are known along and to leeward of the Windward and Leeward Islands and along the coast of Venezuela and Colombia in areas of upwelling. Experimental trawling for squid using high profile nets has not been attempted. Several vessels were reported to have been outfitted with automated jigging machines and lights, but no results from their use have been available. Only a small artisanal squid fishery occurs in the Caribbean.

Octopus vulgaris, the preferred species of octopus on the world market, occurs in shallow coastal waters around the perimeter of the Caribbean as well as a reef species, O. briareus. Only a single fishery for O. vulgaris is conducted in eastern Venezuela, primarily by trawlers, but some pot fishing is done. This fishery accounts for about one third of the more than 300,000 kg of octopus imported annually in the Port of Miami. In 1984, some shipments of octopus from Costa Rica were reported, but neither their actual area of origin nor species are known. At present, less than 5 percent of the extensive continental shelf from eastern Venezuela to eastern Yucatan is fished for octopus. With the increasing demand and rising prices, octopus represents an underutilized resource capable of extensive expansion.

INTRODUCTION

In 1959, at the 12th Annual Session of the Gulf & Caribbean Fisheries Institute, the writer presented a paper on the potentials for an octopus and squid fishery in the West Indies (Voss, 1960). In those years before 1959 on which the review was based, there was no squid fishery anywhere in the Caribbean and only a few squid showed up in local markets. In the same years, however, octopus were fished whole or part time by a number of fishermen from the north coast of South America through the islands to Cuba. This was an artisanal fishery

using water glass and octopus hooks and, in a few places, octopus pots. Octopus then sold for between US \$0.50-\$0.80 per kg. Erdman (pers. comm.) stated that there were a few part time octopus fishermen at La Parguera, Puerto Rico, who had an annual income each of about US \$1,000, averaging about 30 kg per day with up to 50 kg during the height of the season. The total recorded catch for the Caribbean was about 60 metric tons.

About 20 years later, the writer presented another paper at the 1968 CICAR meeting in Caracas, Venezuela (Voss, 1971). This presented the results of a mail survey with a 100 percent questionnaire return. The data showed that approximately 2,552 mt were landed from French Guiana to Cuba with a value of about US \$500,000. The price of octopus to the fishermen ranged from US \$1.20 to 1.80 per kg, a not insignificant amount. In 1973 the FAO landings of cephalopods were estimated at about 900 mt, a low figure. Voss (1973) estimated the potential at about 100,000 mt (Voss, 1973).

No accurate figures on the Caribbean cephalopod landings are available for 1984. The total catch for 1982 was 2,314 mt (FAO, 1984) of which all but 176 mt came from Venezuela. The world market has changed considerably and both octopus and squid are now in high demand. However, the price paid to the fishermen for squid has dropped. It is estimated (Voss, personal survey of Miami seafood importers) that approximately 300,000 kg of octopus enter the port of Miami annually, of which about 100,000 kg are thought to be of Venezuelan origin, the remaining 200,000 kg coming from Spain and Mexico. In 1984 Costa Rica shipped octopus to the U.S. but information as to actual place of origin is not available.

Historically, the countries around the Caribbean have been uninterested in cephalopods. The catch has been artisanal in nature and prosecuted in only a few countries. In the 1973 survey, most respondents stated that the cephalopods landed were mainly by-catch from the shrimp fishery and were often saved only for local consumption, especially where the fishermen were recent Italian or Spanish immigrants. While there was local personal squid fishing along piers and jetties in Colombia and Venezuela, the only fishery for these animals was in eastern Venezuela where there is a sizeable population of Spanish immigrants. In Cuba, the fishery was often conducted by recently arrived Canary Islanders. None of these fisheries indicated significant stocks.

From 1966 to 1971 the U.S. National Marine Fisheries Service and FAO undertook the UNDP Caribbean Fishery Development Project making a survey of the Caribbean Sea using the vessels MV FREGATA and MV CALAMAR (Wolf and Rathjen, 1974). While cephalopods were not surveyed during this project, early on Rathjen contacted the writer and stated that he thought that there was a sizeable stock of squid, species unknown, in the eastern Caribbean back of the Leeward Islands. He believed that a squid fishery might succeed in that area. Literature search revealed that this area constituted the old "West Indian

grounds" of the sperm whale fishery, the sperm whales congregating in areas of heavy squid concentrations. Indeed, there is still a small whale fishery in the Grenadines.

The species of squid supporting the whale populations have not been identified but probably consist of ommastrephid squid such as the orangeback, Ommastrephes pteropus, the flying squid, O. bartrami, the southern shortfin squid, Illex coindetii, and miscellaneous large midwater squid such as the scaled squid, Pholidoteuthis adami. Rathjen sent loliginid squid specimens to the writer for identification. These turned out to be an unknown species of a long fin squid later named Loligo surinamensis (Voss, 1974).

Investigations on cruises of the University of Miami research vessel JOHN ELLIOT PILLSBURY showed that squid were generally distributed through the Windward and Leeward Islands and along the north coast of South America especially in the area of upwelling offshore of Margarita Island, Los Roques and the Netherland Antilles. Later cruises along the Central American coast were less successful except in the vicinity of Providencia and Quito Sueno Bank where numbers of Illex were taken. None of these exploratory investigations used proper gear for capturing squid and those caught were taken incidental to other bottom life. The species captured were Loligo pealei, Doryteuthis plei, Loligo surinamensis, Loligo ocula, Sepio-teuthis sepioidea (and along the mainland Lolliguncula brevis), Illex coindetii, Ommastrephes pteropus and O. bartrami, all of possibly commercial importance with the exception of Sepio-teuthis sepioidea.

Throughout the Caribbean Sea, however, beyond the continental shelf night lighting resulted in the capture of the large ommastrephid squid, the orangeback and the flying squid, principally the former. They appeared whenever the ship was laying-to at night with over-the-side lights on.

Investigations on octopus along the islands and continental margins showed that two species predominated: Octopus vulgaris the common octopus and O. briareus the Caribbean reef octopus. Small numbers of these were taken through the Windward and Leeward Islands and from eastern Venezuela throughout the area westward and northward to Yucatan. While O. briareus does not appear numerous enough to support a fishery, O. vulgaris may be common locally and often occurs on trawlable bottom.

In the Gulf of Campeche another species occurs, the Mexican two-spotted octopus, Octopus maya, which in Yucatan supports a fishery (Voss and Solis, 1966; Solis, 1967). The full range of this species is not known at present but there are some records from the eastern side of the Yucatan Peninsula and it may occur in the Caribbean Sea. Further investigation is required. The Mexican two-spotted octopus is somewhat similar to but much larger than another species, the Atlantic two-spotted octopus, O. hummelincki, which occurs from South Florida to the Guianas.

A field guide to the major squid and octopus species of the Caribbean was published by the writer and contains notes on biology and distributions (Voss et al., 1973).

THE SQUID POTENTIAL

Because of the increasing world-wide interest in squid, many countries are looking toward these animals as a possible new fishery and source of income. In 1980 the squid landings for the world amounted to about 950,000 mt. Originally the fisheries were primarily Japanese but since 1960 Spain, Portugal and the Soviet Union have joined the fishery. In the 1970s Canada and the United States began controlling the squid fisheries in U.S. and Canadian waters as their own fishermen began to enter the industry. In the late 1970s Argentina and Uruguay discovered the squid stocks of their coasts now being harvested by a multi-national fleet. A newcomer in the fishery, Mexico is developing a squid fishery of great potential for the Peru or Humboldt squid, Dosidicus gigas, in the Gulf of California.

Cuba, by last report, has also entered the squid fishery not in her own waters but in those of South America, particularly Argentina. There is no information on a local squid fishery in Cuban waters.

At this time there is little information or data on the squid potential of the Caribbean Sea. There has been no exploratory squid fishing conducted in the area except in eastern Venezuelan waters where Dorytheuthis plei and Loligo surinamensis are taken by trawlers between Margarita Island and the delta of the Orinoco (Arocha, pers. comm). There is a report that several Venezuelan vessels were fitted with jigging machines and lights in early 1983 (Rathjen, pers. comm.) but this has not been confirmed and there are no published results. While squid are reported from around the Caribbean, few catch statistics are available. It is possible that sizeable stocks exist capable of supporting a fishery but this needs confirmation from experimental trawling.

The present price for both Illex and Loligo is low, ranging from about US \$0.32 to \$0.54 per kg. A fishery requires considerable tonnage to make it economically viable.

There is an interesting possibility for a seasonal and highly lucrative fishery. A number of swordfish tournaments are held each year in the U.S. Often the catch is dependant upon the bait or lure which is usually squid. The customary bait in Florida has been the short fin squid Illex illecebrosus but recently tournament fishermen have become aware of the larger, more robust and firmer squid, either Ommastrephes spp., Symplectoteuthis or Dosidicus, the latter two from the Pacific coast of South and Central America. Top quality, large, well preserved squid of this type may have a value of US \$6 to \$10 per animal. This market should be investigated. The same squid make ideal bait for blue marlin fishing although comparable prices probably could not be sustained. These squid can best be caught either by night lighting and jigging or by netting with the Japanese monofilament squid gill nets used in the Pacific for Ommastrephes bartrami, the flying squid. The most likely areas for such fishing would be in the upwelling area behind the Windward Islands and secondarily behind the Leewards.

In trawling for squid, the conventional shrimp trawl is not suitable. Several designs have been used and the Gulf of Mexico semi-balloon shrimp net is fairly effective. A much more productive net is the high rise net used in the Atlantic coast squid fishery of which there are several designs. Before undertaking a squid trawling program it is advisable to review and observe the middle Atlantic and New England squid trawling methods and techniques. Squid fishing gear and techniques are described by Rathjen (1984).

Jigging is a highly specialized operation with special techniques that have been developed by the Japanese. The main requirements are special light arrays and automatic jigging machines although experimental work can be done with less sophisticated light arrays and hand operated jigging reels. Experimental fishing is necessary.

OCTOPUS POTENTIAL

The octopus potential in the Caribbean is probably high but is practically untouched. There are small to medium size artisanal fisheries from Cuba and Puerto Rico through the island chain. The only significant fishery is in eastern Venezuela. It is a trawl fishery although some pots, now largely discontinued, were used by a few local fishermen (Arocha, pers. comm.). This fishery is growing and is expanding its efforts into the export field.

Octopus are caught on the continental shelf in depths less than 200 m. There is an extensive shelf area along the north coast of South America which broadens in the middle of Central America to one of the most extensive shelf areas in the region. Caddy (1983) stated that the shelf fisheries of the world were probably near their full yield of octopus but Rathjen and Voss (in press) have pointed out that less than 10 percent of the shelf area of the world has been explored for octopus and the fisheries for these animals has the potential for expansion to many times its present size. It is probable that most of the shelf areas of the Caribbean support large stocks of octopus, primarily the common octopus, *O. vulgaris*, which could be captured either by pot fishing or by trawling. In Florida and the Carolinas a pot fishery is now being developed with favorable results (Voss, 1985) and a new fishery in addition to the conventional one is being developed in Mexico and will be described later in this meeting.

The price of octopus on the world market is largely controlled by the catch from the Saharan Bank in Moroccan waters. The present price of frozen octopus in the United States is about US \$2.20-\$2.98 per kg. The imports are Spanish octopus from Africa, cleaned, frozen and packed in 5 kg packages and weight graded. Any octopus imported into the United States has to be competitive with the Spanish product. There are many other markets, however, the largest being Japan, where quality is the bottom line.

In the islands, where there is little continental shelf area, most octopus are caught traditionally by the use of a water glass and octopus hook, as reported by the writer (Voss, 1960) from Cuba and Puerto Rico. Small catches were landed in Dominica as by catch from a fish hook and line fishery (personal observation). Whether these were kept for human consumption or for bait was not determined.

In the United States small octopus are much sought after for the aquarium trade. In Florida the desired octopus is the Atlantic two-spotted octopus. It is small, attractive in appearance, and has a beautiful blue ring on each side of the head near the base of the side arms. It seldom attains a total length of more than 6 inches and thus is rather ideal for the small aquarium. It is imported in large numbers from Haiti and sells to aquarists for about US \$15 per animal. The price to the fisherman is not known as they are shipped in from Port-au-Prince by a local exporter. Actually they make poor aquarium animals because they seldom live for more than about 6 months after capture, having a short life span, but they are admirable for the dealer because there is a resulting high turn-over. This species and others might be developed into a lucrative business in areas where the animals occur are numerous.

CONCLUSION

While the potential for the development of cephalopod fisheries in the Caribbean is present, no effective exploratory fishing has been undertaken either for benthic shelf species or for pelagic squid. The presence of small fisheries in Venezuela and possibly Costa Rica, and artisanal fisheries through the island arc indicate the wide distribution of the animals, and broad areas of suitable bottom should support large populations. However, exploratory fishing with proper squid and octopus gear should precede any attempts to develop a squid or octopus fishery.

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