

On the emergence of squid jigging in India

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Cephalopods, locally known as 'Makul', have emerged in recent times as one of the prime foreign exchange earners in India. Trawl nets operating up to 100 m depth account for nearly 85% of the cephalopod landings in Indian marine waters. The introduction of high opening bottom trawl nets resulted in rapid increase in cephalopod production. Other gears that exploit cephalopods are boat seines, purse seines, *do/* nets etc. Jiggers, a specialised gear developed and operated in Japan for cephalopods was not in use in Indian waters. Hand jigging for cephalopods has slowly emerged in Indian waters and has been reported along various places such as Vizhinjam - Kerala (Nair, 1985), Kanyakumari - Tamilnadu and Trivandrum - Kerala (Joel and Ebenezer, 1987), Palk Bay coast - Tamilnadu (Lipton *et al.*, 1990), Tuticorin - Kerala (Balasubramanian *et al.*, 1995), Karnataka (Geetha *et al.*, 2006), Devipattinam, Palk Bay and Keelakarai in the Gulf of Mannar - Tamilnadu (Venkatesan and Shanmugavel, 2008) and Ratnagiri - Maharashtra (Sujit Sundaram and Sawant, MS).

The earliest account of primitive squid jigging from Indian waters was given by Hornel (1917). In this the fishermen of the Palk Bay region used special hooks by long jiggers with 5 to 6 hooks arranged in a grapnel fashion. Besides, the local fishermen used to catch cephalopods by an ingenious method which involved erection of a 'Y' shaped pole known as 'machan' in the shallow waters of the Bay and, below the 'machan', hooks were kept hidden under the cover of leaves. The squids which used to congregate approach the leaves for depositing their eggs or for hiding, were lifted off with the jerking movement of the hooks. Narasimham (2005) has given a review of squid jigging practices carried out in Indian waters.

Nair (1985) has given a review of squid jigging practices carried out the world over. According to him, a typical hand-jig has mainly three parts: a thin rod with two or sometimes three tiers of hooks, another rod with a weight attached to it, and a 40-60 m long line tied to the later. The first rod is a piece of umbrella rib about 30 cm long and tied to its one end in a circle are 4 or 5 hooks of No.9-12. About three centimetres

above the circle, there is another circle of similar hooks. Above this there is a still larger single hook of No.7 or No.8. The free end of the rod is tied to a long plastic monofilament line. About 150 cm above the rod, another small rod 30 cm in length is attached on the line parallel to it. An iron weight of about 100-150 g is tied at the middle of this rod with a 30 cm string. The long line is wound on a wooden line holder.

Generally, squid jigging is carried out in boats which are fitted with halogen lamps connected to 8-12 v batteries. The fishermen generally set out for fishing late in the evening and unload the catch the next day early morning. After reaching the fishing grounds, the boats are anchored and on spotting cephalopods, the jigs are gently thrown towards them. Lights are put on and since squids are photo-tropic they are attracted by the illumination and aggregate around the boundary zone between the illuminated and shadow zones. The cephalopods are also attracted by the movement of the brightly coloured shrimp shaded lure. The cephalopods get hooked to the sharp hooks around the device, which are then lifted up and gently removed with the help of a scoop net.

Once the jigging is over, they come to the fish landing centre, early morning for unloading the catch. According to Nair (1985) though the fishing continues throughout the night, the catches increase around midnight. Often the peak is about 0400 to 0500 hrs, and the high catch is popularly known as 'morning harvest'. There are fluctuations in the catch according to the phases of the moon; the best squid catches are obtained during dark nights and high tides. The catches during a new moon phase are invariably more than around full moon.

The jigs are made of bakelite moulding to resemble a live shrimp which at the time of operation lures cephalopods. The lures are brightly coloured in different shades. A small lead weight is attached to the lower part of the lure so that it maintains the jig in a proper dorso-ventral position. Another type of jig is also used which is cylindrical in shape and is coated with radium, which illuminates in the dark. Both the jigs have pointed recurved hooks, usually numbering

from 16 to 18 in two rows, are attached in tail region. No baits are used for jigging. Each jig is tied to nylon wire rope with length ranging from 6-15 m and is rolled on a wooden frame reel or spindle.

Though the basic features of jigs are same everywhere, some modifications are made by fishers for practical utility and therefore there are small variations in the size and the number of hooks, length of the rod, size of the weight and the length of the long line. The methods followed at various centres are as follows:

Vizhinjam-Kerala (Nair, 1985): The hand-jig is operated from a catamaran by two fishermen during day time. The jig consists of a thin rod. After reaching the fishing grounds, the baited jig is lowered into the water, releasing the required length of the line. The weight touches the bottom and the jig would be lying in a horizontal position on the bottom away from the weight. The cuttlefish, on seeing the bait, entangles it with all its arms trying to pull it, and this is felt on the line by the fisherman operating the hand jig. The hook is then slowly hauled up and when the cuttlefish reaches near the surface, it is collected with a small scoop net. Normally the fishing is done 5 to 7 km away from the shore, but sometimes jigging is carried out up to 10 km, especially during February to April. The usual range of the depths of operation is 30-50 m, but sometimes fishing is done up to depth of 60-75 m. The fishermen go for fishing early in the morning and return in the afternoon and the actual fishing may last for 5-6 hours.

Kanyakumari-Tamilnadu and Trivandrum-Kerala (Joel and Ebenezer, 1987): The gear used here is similar to 'Achil' described by Lazarus (1984), but with minor variations to suit cuttlefish collection. Fishermen use miniature anchor hooks, making use of the line-sinker-hook bait combination and the fishing technique is hand-jigging. The main line, a nylon thread of gauge No.60 and a length of 5 m or more, has a sinker weighing about 150 g attached at its far end. Short branch-lines, each having a hook (Size No.10 or 9) at its end are rigged to the main line at definite intervals with different permutations and combinations. In this, fishery baits such as



crab, fish, cuttlefish etc. are used. The fishing operation is at 30 to 50 m depth from a catamaran with one or two men or from a plank-built boat with outboard motor and a crew of four or five. This gear, according to the fishermen, is used to catch cuttlefish that concentrates near the bottom during breeding season. Apart from this, the fishermen here use a simplified form of anchor hook with two iron rods of about 30 cm length, a sinker weighing 150 g, a few metres of No.60 nylon thread, eight to ten hooks of the size No.9 etc to form a circle of hooks. Usually live baits such as crabs are used and the movements of the legs of the crab are supposed to attract the cuttlefish. The catch is then collected by a scoop net. The other modification which the fishermen use here is in respect of catching squids, similar to the Vietnam type. The gear is a miniature form of anchor hooks for cuttlefishes, but with minor differences. Here the preferred bait is meat or arms of squid and occasionally fish, crab or synthetic bristles are also used. The other modification is again a hook for catching cuttlefish, where a conical iron or lead weight of 150-250 g and a few hooks of size No.9 or 10 is used, forming a circle of hooks. The lure is a Nynex cloth-bit, preferably golden coloured, which envelops the cone just above the hooks.

Palk Bay Coast-Tamilnadu (Lipton *et al.*, 1990) Here 130 mm hooks were also used in addition to hooks tied to long lines. Non-mechanised, wooden plank built boats ranging from 5 to 12 m size are used by fishermen for squid jigging. Some of the fishermen also use catamarans which are about 4-4.5 m in length and a breadth of 3 to 3.5 m each. The jigs are operated from the boats at depths ranging from 3 to 10 m up to a distance of 8 km. The squid fishing is conducted mainly during two seasons from May-July and from October-November. The bulk of the catch comprises Palk Bay squid, *Sepioteuthis lessoniana*, with the size ranging from 90-230 mm and on rare occasions cuttle fishes were also caught.

Tuticorin-Kerala (Balasubramanian *et al.*, 1995) The jigs are operated at depth ranging from 30-50 m up to a distance of 12 km from shore. Since sandy bottom and areas where sea grasses grow luxuriantly are found to harbour squid and cuttlefish in good abundance, such areas are preferred by fishermen for jigging. The jigging fishing season in Tuticorin is between December-May and July-September. They leave the shore before sunrise and return before sunset. More

than 90% of the catch was constituted by a single species *Sepia pharonis* ranging in length between 160-410 mm and the remaining 10% was constituted by *Loligo* spp.

Karnataka (Geetha *et al.*, 2006) Fishermen from Kanayakumari installed Fish Aggregating Devices (FADs) for the first time in Karnataka waters for the exploitation of cephalopods. The cephalopods, which get aggregated near the FADs, are caught using hand jigs. They are fabricated with barbless steel hooks. Four hooks (No.9) are wound around lead weights of 5-6 inches of length in a row, using wire rope. Each jig is attached to a monofilament line of 3 mm diameter. Each fisherman uses one line with a single jig at a time. The craft are fibre boats with a length of 7.5 m and are fitted with 9.6 HP outboard engines. Crew consists of 5 members and they set out for fishing early in the morning. On reaching the FADs with the help of GPS, the jigs are released manually to the bottom and as the jigs pass over the cuttlefish shoals, individual cuttlefish are hooked. The line is hauled up manually and the cephalopods are unhooked on the raised platform of the craft. Fishing is done at 30-35 FADs on a day. The catch consisted mainly of *Sepia pharonis* of the size group 160-280 mm. The peak fishing season is between September-October.

Devipattinam, Palk Bay and Keelakarai in the Gulf of Mannar-Tamilnadu (Venkatesan and Shanmugavel, 2008) Hand jigging for squids and cuttlefishes are operated from thermocole float which uses Japanese made jigs with 1-2 tiers of hooks with weight attached to it and 7 to 14 m long line tied to it. Here hand jigging is mostly operated during the day time and sometimes during full moon night. The cuttlefish catch would comprise mainly of two species viz, *Sepia aculeata* (50-150 mm) and *Sepia pharonis* (60-259 mm), while squid catch would be entirely of *Sepioteuthis lessoniana* (40-240 mm). Squids would account for 54%, while cuttlefish would form 46%, Peak catch obtained would be during March and June.

Ratnagiri-Maharashtra (Sundaram and Sawant, Ms): The boats are fitted with halogen lamps connected to 12 v batteries. Small boats of about 4 m in length fitted with 8 HP outboard engines are used to catch squids. The depth of operation is between 14-15 m. Fishermen generally do not use jigs in these small boats. Only one

person in the boat engages in fishing by light jigging. The squids are caught by scoop nets, when they congregate near the boats after getting attracted to the light. The average CPUE of squids is 30-50 kg. Medium sized boats, which are 5-7 m in length use exclusively jigs and about 3-4 members are generally present in the boat. The boats are fitted with 16 HP outboard engines. The depth of operation is between 15-25 m. The average CPUE of cephalopods is 100-120 kg. Large sized boats with an over all length of 6-7 m are also used for squid jigging and are fitted with 24-32 HP outboard engines. The depth of operation is between 20-30 m. About 4-5 crew members are engaged in this activity and from this boat, even cast net, locally called a 'paag' are used for exploiting squids using light fishing. The average CPUE of cephalopods is 200-250 kg. More than 95% of the catch was constituted by the Indian squid, *Loligo duvauceli* and the remaining 5% was Pharaoh cuttlefish, *Sepia pharonis*. The dorsal mantle length of the squids, randomly measured, ranged between 71 mm to 327 mm with the corresponding weight ranging between 23 g to 590 g. The dominant mode was in the size group 140-149 mm. The size of *S. pharonis* varied between 224 mm to 310 mm.

Since the catch is extremely fresh, it fetches very high price and the fishery has become lucrative. Many fishermen are getting engaged in squid jigging. The present observation reveals the emergence of a new fishery for cephalopods along the Indian coast. In contrast, to the cephalopod catch by trawl net, the present exploitation by jigs is highly selective and brings in comparatively larger sized cephalopods belonging to one species. The freshness of the catch makes it much more commercially viable. With the introduction of necessary facilities such as introduction of powerful artificial light attracting system, mechanisation of jigging operations, financial assistance, technical know-how etc. to the fishermen, squid jigging fishery may enhance the cephalopod production from Indian waters.

References

- BALASUBRAMANIAN, T. S., RAJAPACKIAM, S. KASIM H. M. and AMEER HAMSA. K. M. S. 1995. Emergence of hand jigging for cephalopods along Tuticorin coast, *Mar. Fish. Infor. Serv., T and E ser.*, No.137: 13-16.

GEETHA, S., R. PRATHIBHA, D. NAGARAJA, LINGAPPA and NAIK. R. A. 2006. Fish aggregating devices used for cephalopod fishery along the Karnataka coast. *Mar. Fish. Infor. Serv., T and E ser.*, No.189: 9-13.

HORNELL, J. 1917. The edible molluscs of Madras Presidency. *Madras Fish. Bull.*, 11: 1-51.

JOEL, J. J. and EBENEZER. J. P. 1987. Newfangled tackles for cephalopods. *Mar. Fish. Infor. Serv., T and E ser.*, No.77: 18-20.

LAZARUS, S. 1984. 'Achil' a tackle for sardines. *Indian J. Fish.*, 31: 368-370.

LIPTON, A. P., RAO, P. V. GANAPATHI A. and THILLAIRAJAN. P. 1990. Emerging squid jigging fishery along the Palk Bay coast of Tamilnadu. *Fishing Chimes*, Vol.10, No.9: 28-31.

NAIR, K. P. 1985. Hand-jigging for cuttlefish at Vizhinjam with a note on modern squid jigging. In: E.G. Silas (Ed.) Cephalopod bionomics, fisheries and resources of the Exclusive Economic Zone of India. *Bull. Cent. Mar. Fis. Res. Inst.*, 37: 152-156.

NARASIMHAM, K. A. 2005. *Cephalopods*. Molluscan fisheries of India. 203-231.

SUJIT SUNDARAM and SAWANT D. (Ms). Emerging light and hand jigging fishery for cephalopods along Ratnagiri coast, Maharashtra.

VENKATESAN, V. and SHANMUGAVEL. A. 2008. Note on hand jigging fishery for squids and cuttlefishes at Devipattinam in the Palk Bay and Keelakarai in the Gulf of Mannar, south-east coast of India. *Mar. Fish. Infor. Serv., T and E ser.*, No.197: 11-12. ☺☺☺