

Preliminary Squid Survey in Coastal Waters off Kuala Terengganu, Malaysia

ZAINAL S. ASHIRIN and ABDUL R. IBRAHIM

Fisheries and Marine Science Center
Universiti Pertanian Malaysia
Mengabang Telipot
21030 Kuala Terengganu
Malaysia

Abstract - A survey on squid catches was done in coastal waters off Kuala Terengganu, Terengganu, Malaysia, in 1989 and 1990. Data were taken from three gears: two commercial boats employing jigs and a purse seine, respectively, and a newly developed squid net. Fishing operations were carried out in open water during moonless nights. Emphasis was placed on the catch of the two most common and dominant squids found in the area, *Loligo chinensis* and *Loligo sibogae*. It was found that both *L. chinensis* and *L. sibogae* can be caught throughout the water column by the purse seine while mainly *L. sibogae* was obtained from near surface by the squid net. Jigs caught only *L. chinensis* and these were much bigger than the same species taken by the other two gears.

Squid fisheries have become one of the most important fisheries in Peninsular Malaysia, especially in Terengganu State. Terengganu fishers caught 4,646 tonnes of squids in 1984, 3,624 tonnes in 1987 and 11,835 tonnes in 1988.

Commercially important species include *Loligo chinensis* Gray, 1949; *Loligo sibogae* Adam, 1954; *Loligo duvaucelli* Orbigny, 1848; and *Loligo edulis* Hoyle, 1888. On the eastern coast of Peninsular Malaysia, squid fishing takes place from March until September. The fishery may be associated with the squids' spawning season which occurs in March-May and August-September (Chikuni 1984). They are mainly caught in coastal waters by bottom trawls during the day and by purse seines, squid nets and jigs by night.

Night fishing was a competitive operation among jiggers and very lucrative, such that the purse seiners and the demersal trawlers have also been attracted to the fishing grounds. They operate the gears close to each other on the fishing ground.

The objective of this survey was to determine the dominant squid species in the survey area as well as to find out the species caught by each gear.

Trials and observations were made from April to June 1989 and April to June 1990. All operations were done during moonless nights (before and after the new moon). The survey was made on the catch obtained from the three gears utilized, viz. jigs, squid net and purse seine, in waters about 20 km off Kuala Terengganu (Fig. 1). The depth of the water was around 22 m.

Jigs were of the traditional type, manually operated. Most operators used battery- or generator-powered fluorescent lamps to attract the squids to their boats (Said and Ashirin, in press). Jigs are normally set close to the sea bed. The jigs were operated by a few traditional fishers participating in the survey. The newly developed squid net was handled by Universiti Pertanian Malaysia staff. It was a rectangular, cast-operated net measuring 9.6 m by 9.6 m at the bottom. The lighting system consisted of ten 200-watt incandescent bulbs, a high-powered bulb of 550 watts and a controllable intensity red bulb of 500 watts used to aggregate the squids (Ashirin and Said, in press). The purse seine measured 200 m in length and 25 m in depth. It was operated by a coastal purse seine boat employing some 25 men.

Two sets of data were gathered every month. Each set consisted of catch data from each gear collected on consecutive days, for example, data from the purse seine was collected on the second day of the month, from the squid net on the third day and from the jigs on the fourth day. Species were determined and dorsal mantle lengths (DML) measured; their numbers and weights were also recorded.

A study of the echotrace of the echo sounder revealed that squid aggregations occurred when the attracting lamps had been switched on for more than two hours. There were two

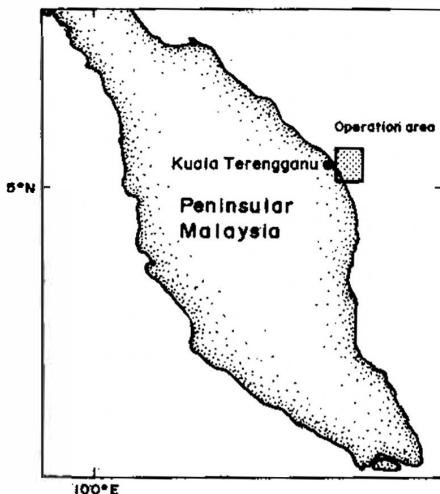


Fig. 1. Squid survey area, Peninsular Malaysia.

dense layers of aggregation: one above the sea bottom and another near the water surface.

As can be seen from Table 1, jigs caught only *L. chinensis* and *Sepia* sp. (In this note *Sepia* sp. and fish species caught are not discussed). The mean DML of *L. chinensis* caught by jigs ranged from 20.5 to 24.1 cm (Table 1), and the longest DML recorded was 41 cm.

The squid net caught mainly *L. chinensis* in 1989 and almost entirely *L. sibogae* in 1990. The mean DML of *L. chinensis* caught ranged from 11.9 to 18.8 cm while that of *L. sibogae* was 10.9-14.5 cm (Table 1).

Catch data from the purse seine was only available for 1990. In April and June, the purse seine caught mainly *L. chinensis*, while in May, only *L. sibogae* was caught. The mean DML of *L. chinensis* caught was only 11.6-12.7 cm.

Most squids are positively phototactic but other biological information is sparse. *L. chinensis* is abundant in the South China Sea (Chikuni 1984). Chatiyaputta (1982) reported that in Thailand 15-40% of the bottom trawl catch was composed of *L. chinensis* and 10-16% *L. sibogae*. Chan and Karim (1987) reported that *L. chinensis* was a dominant species in bottom trawls in the South China Sea,

Table 1. Summary of results of squid surveys off Kuala Terengganu, 1989-1990¹.

Year/Month	<i>L. chinensis</i>			<i>L. sibogae</i>		<i>Sepia</i> sp.	Other spp. ²
	J	SN	PS	SN	PS	J	SN
1989	April	100 (24.1)	67 (18.8)	-	29 (14.5)	-	4
	May	99 (20.5)	49 (12.2)	-	10 (11.1)	1	40
	June	59 (22.4)	63 (11.9)	-	30 (10.9)	41	7
1990	April	100 (20.5)	1 (13.5)	71 (11.6)	99 (14.0)	29 (10.0)	-
	May	100 (21.0)	-	-	100 (13.4)	100 (11.6)	-
	June	100 (21.2)	14 (13.6)	85 (12.7)	86 (11.7)	15 (11.0)	-

¹J, SN and PS refer to jigs, squid nets and purse seine, respectively; entries under J, SN and PS are % (in weight) contributed by each species to gear-specific catch. Numbers in brackets are mean dorsal mantle lengths (DML, in cm).

²Including *Loligo duvaucelli* and *L. edulis*.

while *L. sibogae* contributed only 6%. Shibata et al. (1980) in a jigging survey in Phuket, southern Thailand, caught only *L. chinensis* as in this survey. The present survey suggests that larger *L. chinensis* are found mainly close to the seabed. Although jigs are a small fishing device used by small-scale fishers, they are selective and catch bigger *L. chinensis*.

L. sibogae is a semipelagic squid (Roper et al. 1984). Under dim light, *L. sibogae* aggregated densely under the light and were easily captured by the squid net. Other squid species such as *L. chinensis* and *L. duvaucelli* and fish beneath the aggregated school were also captured.

The purse seine can net almost all resources within the surrounded area and the depth of the net. Thus, *L. chinensis* and *L. sibogae* were both netted.

Acknowledgements

We thank the crew of RV Unipertama III, participating fishers and research assistant Syed Zainuddin for their invaluable work and cooperation in the data collection. Thanks are also due to Universiti Pertanian Malaysia for financial support.

References

- Ashirin, Z.S. and M.Z. Said. A feasibility study in the operation of the squid net. Proceedings of the Twelfth Annual Seminar, Malaysian Society of Marine Sciences, 18 November 1989. University of Malaya, Kuala Lumpur. (In press)
- Chan, E.H. and M.N. Karim. 1987. Preliminary data on squids (Loliginidae) from the Matahari Expedition 1985. Occasional Publication No. 3. Faculty of Fisheries and Marine Science, Universiti Pertanian Malaysia, Selangor.
- Chikuni, S. 1984. Cephalopod resources in the Indo-Pacific region, p. 264-305. In J.F. Caddy (ed.) Advances in assessment of world Cephalopod resources. FAO Tech. Pap. 231.
- Chatiyaputta, C. 1982. Squid fisheries of Thailand, p. 124-134. In Report of the Third Session of the Standing Committee on Resources Research and Development, 24 April-4 May 1982, Sydney, Australia. FAO Fish. Rep. 225.
- Roper, C.F.E., M.J. Sweeney and C.E. Nauen. 1984. Cephalopods of the world. FAO Fish. Synop. 125. Vol. 3, 277 p.
- Said, M.Z. and Z.S. Ashirin. A preliminary study on squid jigging using AC powered light. Proceedings of the First Symposium of Applied Biology. 27-28 February 1989. Universiti Pertanian Malaysia, Selangor. (In press).
- Shibata, K., P. Masthawe and Y. Kitagawa. 1980. A preliminary study on squid fishing around the Phuket waters employing squid headline. Curr. Tech. Pap. Train. Dep. Southeast Asian Fish. Dev. Cent. 8:173-190.