Indian Journal of Geo Marine Sciences
Vol. 51 (07), July 2022, pp. 650-653
DOI: DOI: 10.56042/ijms.v51i07.48858

Short Communication

A unique occurrence of large-sized diamondback squid *Thysanoteuthis rhombus* (Troschel, 1857) in the Gulf of Mannar

M Rajkumar*, M Midun, S Thirumalaiselvan, R Rajkumar & R Saravanan

ICAR-Central Marine Fisheries Research Institute, Kochi – 682 018, India

*[E-mail: mrajkumarcmfri@gmail.com]

Received 15 April 2020; revised 26 June 2022

The presence of the large-sized diamondback squid *Thysanoteuthis rhombus* (Troschel, 1857) in the Gulf of Mannar biosphere was confirmed after a two-decade absence, based on a single specimen observed during landings at the Pamban lighthouse Fish Landing Centre. A squid measuring 633 mm in mantle length and weighing 15.1 kg was caught in the hook and line at a depth of 20 m. The discovery of this species in the Gulf of Mannar unequivocally confirms that the population is still present in the ecosystem.

[**Keywords**: Diamondback squid, Gulf of Mannar, Hook and line, Mantle length]

Introduction

Thysanoteuthis rhombus (Troschel, 1857), the only species in the family Thysanoteuthidae, is an epipelagic oceanic squid. This species is found in the world's tropical and subtropical seas. It is a very large oegopsid squid species with a dorsal mantle length (DML) of up to 100 cm and a weight of about 24 kg[1]. This species is classified as the least concern (LC) by the IUCN however, citing in the Gulf of Mannar waters is rare[2]. Only a few studies have reported the presence of diamondback squid in the Indian waters[3-10]. In this study, occurrence of diamondback squid was recorded from the shallow waters after two decades, and it is the first record in the Gulf of Mannar hook and line fishery.

Materials and Methods

On March 29, 2021, a single female specimen was observed during routine field observation of the landings at Pamban lighthouse fish landing centre (Fig. 1). The specimen was photographed, and morphometric measurements were obtained. The identification of this species was confirmed based on its taxonomic characteristics[11].

Results and Discussion

Systematics

Phylum : Mollusca
Class : Cephalopoda
Order : Oegopsida
Family : Thysanoteuthidae Keferstein, 1866
Genus : *Thysanoteuthis* Troschel, 1857
Thysanoteuthis rhombus Troschel, 1857

The squid was caught in the hook and line of a 13.5-meter-long boat equipped with a 20-hp engine. The fishing operation was carried out at a depth of 20 m, 25 km off the coast of Pamban in the Gulf of Mannar. The squid, measuring 633 mm in mantle length and weighing 15.1 kg (Fig. 2), was auctioned off at the landing centre for Rs. 2350/-.

This bright red squid had a cylindrical muscular mantle that gradually tapered to a blunt end posteriorly. The fins were long and extended all the way down the sides of the mantle. The fin was typically rhomboid in shape, with a broad middle and tapering towards the anterior and posterior ends. The head was narrower and the eyes were prominently placed. Cirrate trabeculate covered the long oral arms with protective membranes. The outer lateral arms were longer than the inner dorsal arms and had a crest-like muscular projection at each arm's base. Such structures were absent from the other intermediary arms. Each arm had two rows of suckers with 20-26 sharp teeth on the sucker rings. The tentacles were weak, and the clubs were slightly bulged in the middle, with four rows of suckers and sucker rings with 15 – 20 sharp teeth.

Table 1 shows the specimen's morphometric measurements. Large populations of this squid can be found in the waters of Japan[11], where it is commercially exploited by some local fishermen but appear to be underutilised in other parts of the world[12,13]. Diamondback squid biomass in the global oceans is estimated to be 1.5 – 2.5 million tonnes[14], and it is abundant in the productive zone of the open

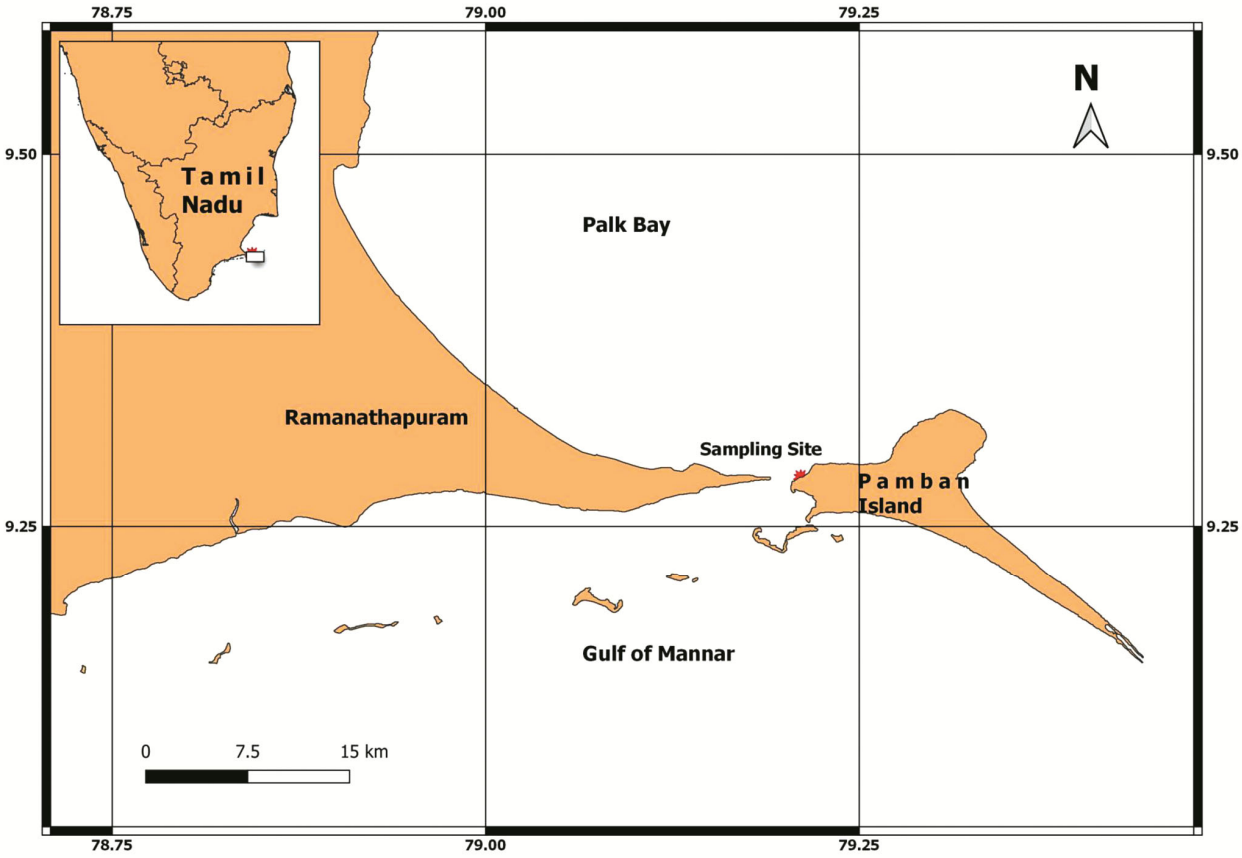

Fig. 1 — Location of Pamban fish landing centre, Southeast coast of India

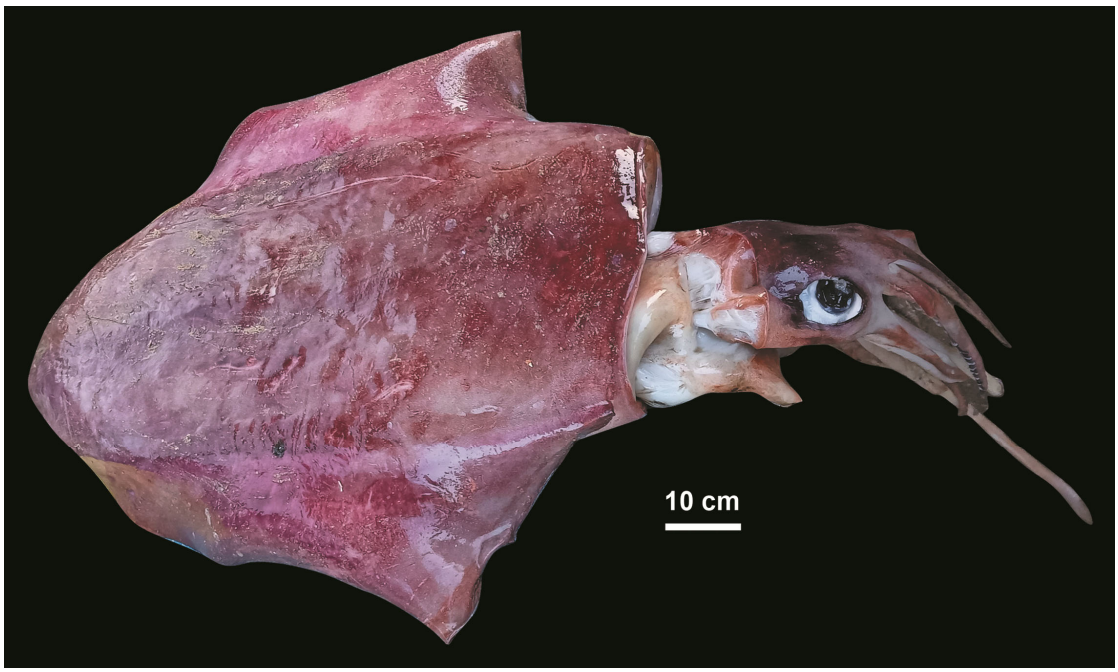

Fig. 2 — Diamondback squid *Thysanoteuthis rhombus* caught in hook and line operated in the Gulf of Mannar

ocean[15,16]. *T. rhombus* geographical distribution within the Indian EEZ is currently unknown, but sporadic and rare occurrences of *T. rhombus* in fish landings have been reported (Table 2).

Filioppova[2] found this species in the Indian Ocean at nine different locations, none of which are along the Indian coast. Barnard[17], Silas[18] and Silas *et al.*[19] noted in their cephalopod catalogue that an adult specimen of this species was stranded at the Cape of Good Hope. Landings of the same species have also been reported in Veerapandiyanpattinam (Gulf of Mannar) from a drift gill net[4] with a mantle length of 700 mm, 370 mm in Maharashtra from a trawler, 630 mm in Chennai from a drift gill net[8] and 1070 mm in Munambam from a trawler[9].

Sasikumar *et al.*[20] reported that the trawl landings mostly comprised of squids of 155 – 570 mm DML, whereas the larger squids of 570 – 670 mm DML were usually caught in drift-gillnets and hooks & lines (jigs). The most common size in the trawl fishery was 250 mm DML. Adult catches by trawlers and other vessels are incidental and the landing of the present specimen is typically a bycatch of myopsid squids.

Table 1 — Morphometric measurements of the diamondback squid *Thysanoteuthis rhombus* caught in the Gulf of Mannar

Sl. No	Morphometric characters	Measurements (mm)
1.	Total length	837
2.	Mantle length, dorsal	633
3.	Mantle length, ventral	603
4.	Mantle width, dorsal	621
5.	Mantle width, dorsal	616
6.	Fin width	202
7.	Head length dorsal	204
8.	Head width from eye to eye, dorsal	265
9.	Funnel length	77
10.	Eye diameter	41
11.	Eye lens diameter	17

Conclusion

In normal circumstances, this oceanic diamondback squid would not move towards the continental shelf, but warm currents in the surrounding region would have pushed it there. This species' presence in coastal waters may be due to an unusual stranding caused by upwelling and current, a well-known phenomenon[21]. The specimen for this study was caught at a depth of 20 m, which had not previously been reported, but it had previously been reported at a depth of 60 – 120 m. The squid is thought to have moved to the shallow waters of the continental shelf due to shoreward coastal currents. Recording this unusual distributional occurrence will aid future research into their ecology and migration patterns.

Acknowledgements

The authors thank the ICAR-Central Marine Fisheries Research Institute for financial assistance in carrying out this research. We are thankful to the Director of the ICAR-Central Marine Fisheries Research Institute in Kochi, as well as the Head In-Charge of the Mandapam Regional Centre, for their continuing support and encouragement in carrying out this work.

Conflict of Interest

The authors have no conflict of interest.

Author Contributions

MR & ST contributed to manuscript drafting, supervision and guidance. MM & RR contributed toward data collection and field survey. MR & RS contributed to the editing of the manuscript.

References

1 Roper C F E & Jerez P, Family Thysanoteuthidae, In: *Cephalopod of the World. An Annotated and Illustrated Catalogue of Species Known to Date*, Vol 2, Myopsid and Oegopsid Squids, edited by Jerez P & Roper C F E, FAO Species Catalogue for Fishery Purposes (FAO, Rome), No 4 (2) (2010) pp. 384.

2 Barratt I & Allcock L, *Thysanoteuthis rhombus* (amended version of 2014 assessment), The IUCN Red List of

Table 2 — Reports of *Thysanoteuthis rhombus* along the Indian coast

Region/ Coast	Length (mm)	Weight (kg)	Sex	Depth (m)	Literature
Gulf of Mannar	700 (DML)	12.25	Female	60	Kasim *et al.*[4]
Maharashtra coast	370 (DML)	1.80	Male	60 – 70	Sundaram *et al.*[7]
North Chennai	630 (DML)	6.0	Unsexed	100	Batcha *et al.*[8]
Munambam, Kerala	1070 (TL)	13.5	Unsexed	120	Baby[9]
Gulf of Mannar, Tamil Nadu	633 (DML)	15.1	Female	20	Present study

Threatened Species, (2020), e.T163228A177249178. https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T163228A177249178.en

3 Filippova J A, New data on the Cephalopoda of the Indian Ocean, *Proc Symp Mollusca*, 168 (1968) 257–264.

4 Kasim M, Marichamy R, Rajapackiam S & Balasubramanian T S, Rare squid, *Thysanoteuthis rhombus* Troschel from the Gulf of Mannar, India, *J Mar Biol Assoc India*, 39 (1-2) (1998) 182–184.

5 Mohamed K S, Kripa V & Joseph M, Occurrence of deep-sea squids in commercial trawl catches from Cochin, *Mar Fish Infor Serv T & E Ser*, 167 (2001) 5–7.

6 Chesalin M V & Zuyev G V, Pelagic cephalopods of the Arabian Sea with an emphasis on *Sthenoteuthis oualaniensis*, *Bull Mar Sci*, 71 (2002) 209–221.

7 Sundaram S, Hotagi J S & Kamble S K, Record of oceanic squid *Thysanoteuthis rhombus* off Maharashtra Coast, *Mar Fish Infor* Serv *T & E Ser*, 191 (2007) p. 28.

8 Batcha H, Thangavelu R, Poovannan P & Srinivasan G, Rare occurrence of diamondback squid *Thysanoteuthis rhombus* (Troschel, 1867) off Chennai coast, *Mar Fish Infor* Serv *T & E Ser*, 201 (2009) 14–15.

9 Baby K G, Huge diamondback squid (*Thysanoteuthis rhombus*) landed at Munambam Fisheries Harbour, *Mar Fish Infor Serv T & E Ser*, 209 (2011) p. 21.

10 Sajikumar K K, Sasikumar G, Venkatesan V, Vidya R, Alloycious P S, *et al*., Distribution, age and growth of the diamondback squid, *Thysanoteuthis rhombus* (Cephalopoda: Thysanoteuthidae) from the tropical Arabian Sea, *Fish Res*, 224 (2020) p. 105478.

11 Roper C F E, Family Thysanoteuthidae Keferstein, 1866, *FAO Species Catalogue, Vol. 3, Cephalopods of the World*, (1984) 187–188.

12 Nishimura S, Notes on the occurrences and biology of the oceanic squid *Thysanoteuthis rhombus* Troschel in Japan, *Publications of the Seto Marine Biological Laboratory*, 14 (1966) 327–349.

13 Bower J R & Miyahara K, The diamond squid (*Thysanoteuthis rhombus*): a review of the fishery and recent research in Japan, *Fish Res*, 73 (1–2) (2005) 1–11. DOI: 10.1016%2Fj.fishres.2005.01.020

14 Miyahara K, Ota T, Hatayama J, Mitsunaga Y, Goto T, *et al*., Tagging studies on the diamond squid (*Thysanoteuthis rhombus*) in the western Sea of Japan, *Bull Jpn Soc Fish Oceanogr*, 72 (1) (2008) 30–36.

15 Nigmatullin C M, Resources and fishery perspectives of nektonic epipelagic squid of world Ocean, In: *Reserve Food Biological Resources of Open Ocean and Seas of USSR*, edited by Alexeev A P, (VNIERH Press, Moscow), 1990, pp. 11–13 (In Russian).

16 Nigmatullin C M & Arkhipkin A I, A review of the biology of the diamondback squid, *Thysanoteuthis rhombus* (Oegopsida: Thysanoteuthidae), In: *Contributed Papers to International Symposium on Large Pelagic Squids, July 18-19, 1996, for JAMARC's 25th Anniversary of Its Foundation*, 1998, pp. 155–181.

17 Barnard K H, Rare squid at the Cape (*Thysanoteuthis rhombus* Trosch.), *J Conch*, 22 (1947) p. 286.

18 Silas E G, Cephalopoda of the west coast of India collected during the cruises of the research vessel VARUNA, with catalogue of the species known from the Indian Ocean, *Proc Symp Mollusca, Mar Biol Assoc India*, Pt. I: 1968, pp. 277–359.

19 Silas E G, Rao K S, Sarvesan R, Nair K P, Vidyasagar K, *et al.*, Some aspects of the biology of squids, In: Cephalopod bionomics, fisheries and resources of the Exclusive Economic Zone of India, edited by Silas E G, *Bull Cent Mar Fis Res Inst*, 37 (1985) 38–48.

20 Sasikumar G, SajiKumar K K, Sahib P K, Nataraja G D, Venkatesan V, *et al*., Emerging commercial importance for Diamondback squid in Kerala and Karnataka, *Mar Fish Infor Serv T & E Ser*, 239 (2019) p. 32.

21 Alejo-Plata M C & Urbano-Alonso B, The finding of diamond squid *Thysanoteuthis rhombus* in the Gulf of Tehuantepec, Northeastern Tropical Pacific, *Hydrobiologica*, 28 (1) (2018) 147–150.