



## VARIABLE TORPEDO RAY *TORPEDO SINUSPERSICI* OLFERS, 1831 WITH FULLY DEVELOPED FOETUS CAUGHT IN SHORE SEINE OPERATED FROM THIRUVANANTHAPURAM, KERALA

Bhagyalekshmi, V. and Biju Kumar, A.\*

Department of Aquatic Biology and Fisheries, University of Kerala,

Thiruvananthapuram- 695581, Kerala, India

\*Email: bijupuzhayoram@gmail.com

**Abstract:** This paper describes the uterine fecundity of variable torpedo ray *Torpedo sinuspersici* caught from Thiruvananthapuram coast, Kerala. A total of 15 foetus (11 females and 4 males) were recovered from a female specimen examined.

**Keywords:** Gulf Torpedo, Marbled Electric Ray, Reproduction

The varied reproductive strategies adopted by the elasmobranchs have been the primary reasons for their survival and successful existence in world's oceans in millions of years. The variable torpedo ray (Gulf Torpedo, Marbled Electric Ray) *Torpedo sinuspersici* von Olfers, 1831 is one of the most widely distributed electric rays of the Western Indian Ocean (Carvalho *et al.*, 2002, 2016). There is no targeted fishery for the torpedo rays in India and they are often landed as bycatch in trawl nets and other fishing gears. This species is categorized as Data Deficient in the IUCN Red List of Threatened Species because of the lack of distribution and biological information, derived mainly from uncertainty over its systematic status (Smale, 2006).

While compared with non-chondrichthyan species rays have complex reproductive methods and life histories such as slow growth, late sexual maturity, long life spans and low reproductive potential (Stevens *et al.*, 2000). Electric rays have internal fertilization and are yolk sac viviparous species (previously known as ovoviviparous) (Last *et al.*, 2016). We collected one female specimen of *T. sinuspersici* from a commercial shore seine operated from Puthenthope, Thiruvananthapuram, Kerala (Fig.1) landed with the shore seine catch on 11<sup>th</sup>

October 2017. The specimen measured 420mm in total length, 240mm in disc length and 290mm in disc width. The stomach was unusually large and we cut opened the stomach from the cloacal region (Fig. 2) and recorded the presence of foetuses arranged freely on uteri located in either side of stomach (Fig. 3). The right uterus had 9 foetus and left uterus had 6 foetus (Fig. 4). All foetus measured in between 100mm- 110mm and were sexually differentiated (Fig. 5). The presence of clasper at the point of posterior pelvic fin joining differentiate male from female. Right uterus had 6 female and 3 male and left uterus had 5 female and 1 male. All foetus possessed both external and internal yolk sacs (Fig. 5).

Females of common torpedo rays with fully developed foetus are caught in the months of October to December (Capape *et al.*, 2000). Uterine fecundity is recorded as 1-9 in *T. torpedo* (Quignard and Capape, 1974), 2-13 in *T. mamorata* (Capape, 1979), 5 in *T. fuscomaculata* (Capape and Farrugio, 1986), 6-15 in *T. mackayana* (Capape *et al.*, 2001) and 9-22 in *T. sinuspersici* (Compagno *et al.*, 1989). In all the species males outnumber females in the number of foetus. A study on the reproductive biology of *T. sinuspersici* inhabiting the east coast of India by

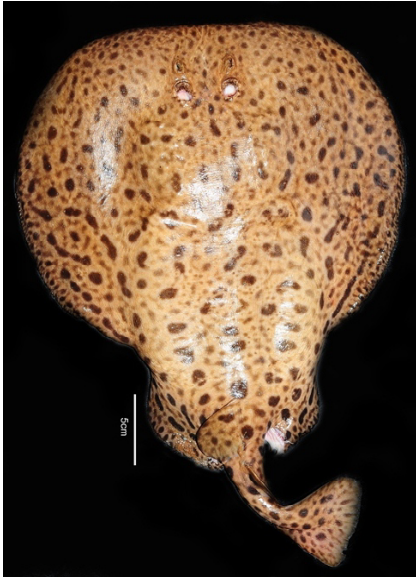


Fig. 1. *T. sinuspersici*- dorsal view



Fig. 2. *T. sinuspersici*- ventral view showing the left uterus



Fig. 3. *T. sinuspersici*- uterus cut open, showing the foetus



Fig. 4. Fifteen foetuses collected from a *T. sinuspersici*

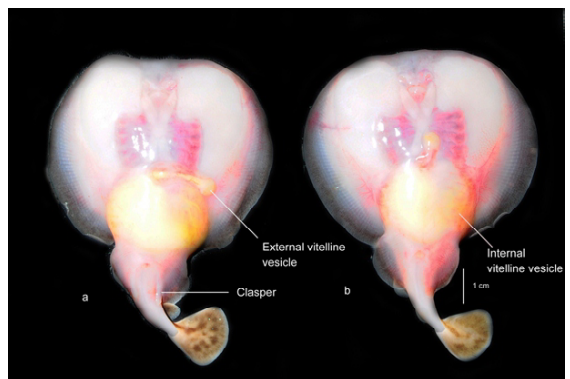


Fig. 5. Ventral view of male(a) and female(b)

Srikanya and Sujatha (2014) recorded that they are dioecious species having internal fertilization and external live bearing. They reported that *T. sinuspersici* with fully matured foetus were caught frequently in the months of March and April with a gestation period of 6 to 8 months (October to April). Uterine fecundity is 8- 16 in number and males were high in ratio. The fully developed foetus measured 102- 118mm in length.

The female of *T. sinuspersici* caught from the west coast of India in the month of October showed fully mature foetus in the uterus, indicating that the termination of gestation period in October (post-monsoon season). Further, in the sex ratio of foetus, females (11) outnumbered males (4), unlike the earlier reports on the genus *Torpedo*. This observation warrants further studies on the reproductive biology of *T. sinuspersici* in the west coast of India. The knowledge on reproductive biology is essential as it provides useful information for the management of this species in India.

## REFERENCES

- Capapé C. 1979. La torpille marbrée, *Torpedo marmorata* Risso, 1810 (Pisces, Rajiformes) des côtes tunisiennes!: nouvelles données sur l'écologie et la biologie de la reproduction de l'espèce, avec une comparaison entre les populations méditerranéennes et atlantiques. *Ann. Sci. nat., Zool.*, Paris, 13<sup>ème</sup> série, 1: 79-97.
- Capapé, C., Amadou Abdoulaye, S.E.C.K., Youssouph, D.I.A.T.T.A. and Mansor, D.I.O.P. 2001. Observations on the reproductive biology of *torpedo (tetronarce) mackayana* (torpedinidae), from the coast of Senegal (eastern tropical Atlantic). *Cybiurn*, 25(1): 95-99.
- Capapé C. and Farrugio, H. 1986. Nouvelle description de *Torpedo (Torpedo) fuscomaculata* Peters, 1855 (Pisces, Torpedinidae). *Bull. Inst. natl. scient. techn. Océanogr. Pêche Salammbô*, 13: 55-70.
- Capapé, C., Seck, A.A. and Diatta, Y. 2000. Reproductive biology of the common torpedo, *Torpedo torpedo* (Linnaeus, 1758) (Pisces, Torpedinidae) from the coast of Senegal (Eastern Tropical Atlantic). *Misc. Zool.*, 23: 9-21.
- Carvalho, M.R. de, Last, P.R. and Seret, B. 2016. *Torpedo* Rays. In, Rays of the World, (Peter R. Last, William T. White, Marcelo R. de Carvalho, Bernard Séret, Matthias F. W. Stehmann, Gavin J. P. Naylor, ed.), Cornell University Press, Australia, pp. 184- 203.
- Carvalho, M.R. de, Stehmann, M.F.W. and Manilo, L.G. 2002. *Torpedo adenensis*, a new species of electric ray from the Gulf of Aden, with comments on nominal species of *Torpedo* from the Western Indian Ocean, Arabian Sea, and adjacent area (Chondrichthyes: Torpediniformes: Torpedinidae). *American Museum Novitates*, No. 3369, 34pp.
- Compagno, L.J.V., Ebert, D.A. and Smale, M.J. 1989. Guide to the sharks and rays of Southern Africa. Struik, Cape Town. 160 pp.
- Last, P.R., de Carvalho, M.R., Naylor, G.J.P., Seret, B., Stehmann, M.F.W. and White, W.T. 2016. Introduction. In, Rays of the World, (Peter R. Last, William T. White, Marcelo R. de Carvalho, Bernard Séret, Matthias F. W. Stehmann, Gavin J. P. Naylor, ed.), Cornell University Press, Australia, 1-9.
- Quignard J.P. & C. Capapé. 1974. Recherches sur la biologie d'un Sélacien du golfe de Tunis, *Torpedo torpedo* Linné, 1758 (Écologie, sexualité, reproduction). *Bull. Inst. Océanogr. Pêche Salammbô*, 3(1-4): 99-129.
- Shrikanya, K.V.L. and Sujatha, K. 2014. Reproductive biology of the mottled electric ray, *Torpedo sinuspersici* Olfer, 1831 (Pisces: Torpedinidae) off Visakhapatnam, India. *Indian J. Fish.*, 61(1): 16-20.
- Smale, M.J. 2006. *Torpedo sinuspersici*. The IUCN Red List of Threatened Species 2006: e.T60136A12311480. <http://dx.doi.org/10.2305/IUCN.UK.2006.RLTS.T60136A12311480.en>. Downloaded on 12 December 2017.
- Stevens, J.D., Bonfil, R., Dulvy, N. and Walker, P. 2000. The effects of fishing on sharks, rays, and chimaeras (chondrichthyans), and the implications for marine ecosystems. *ICES Journal of Marine Science*, 57: 476-494.

