Observations on the fecundity of *Rhynchobatus djiddensis* (Forskal, 1775)

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Focal Points at a Glance

In this contribution, the authors tell us about the rare bycatch landings of the valuable batoid elasmobranch(sting ray) fish, known as 'Giant Guitarfish', landed at New Ferry Wharf, Mumbai. It grows up to 3.1m weighing up to 227kg; Like other elasmobrauchs it is viviparous, giving birth to young ones instead of laying eggs. The details presented by the authors are very interesting and useful.

Elasmobranchs have a highly evolved reproductive system. It provides for internal fertilisation, that is followed by the production of the young, thereby eliminating the larval stages. They exhibit three types of reproduction, oviparous, viviparous and ovo-viviparous. Batoid sharks include sawfishes, skates, electric rays and stingrays. Literature on the reproduction of batoid fishes is less in general and there is not much of information on the breeding and development of these. Information on the embryonic development of these species is also very meagre.

Rhynchobatus djiddensis, the 'Giant guitarfish' or 'White-spotted shovelnose guitar fish' was previously believed to occur throughout a wide part of Indo-Pacific region, but recent evidences have shown that it has a species complex of four different species (Compagno and Musick, 2005). The complex includes *Rhynchobatus australiae*, the white-spotted guitarfish, *Rhynchobatus springeri*, broadnose wedge fish and *Rhynchobatus laevis*, smoothnose wedge fish. With these as separate species, the giant guitarfish has come to be restricted to Red Sea and tropical western Indian Ocean up to Eastern Cape in South Africa. The fish reaches up to 3.1 m length (Compagno *et al.* 1989), weighing as much as 227 kg (Compagno, 1986). The colour underneath is white and overall dark greyish overall or olive above. Large individuals lack the distinct white spots. The species is ovo-viviparous (aplacental ovo-viviparity) and a female can give birth up to 10 young ones at a time. The fish is hardy and remains alive out of water for quite some time. This species commonly occurs in inshore waters and in shallow estuaries and mainly feeds on crabs, lobsters, bivalves, small fishes and squids (Compagno *et al.* 1989; Myers, 1999).

Two pregnant *Rhynchobatus djiddensis* caught accidentally were landed at New Ferry Wharf, Mumbai on 8th of June 2009. The fishes were caught by trawlers while fishing at a depth of 30-40 m at 60-70 km towards northwest coast of Mumbai from the coastal waters. They are locally known as *Raja*. It is included and classified as vulnerable (VU) on the IUCN Red List (IUCN, 2010). The fins of the Giant guitarfish are among the most sought after than any other species in Asian markets and they are used for making shark-fin soup and other delicacies. An attempt was made to find out the fecundity of this species from the specimens landed. Fecundity is generally estimated from the number of mature ova and also based on the number of embryos present with yolk sac attached to the body of the embryo with a cord (Plate 1).

In Guitar fish, a pair of ovaries and uteri are present and are fully functional. The embryos feed initially on yolk, then receive additional nourishment from the mother by indirect absorption of uterine fluid enriched with mucus, fat or protein through specialised structures (Dulvy and Reynolds, 1997).

The mature females, apart from fully grown embryos, had large rounded eggs full of viscous yellow yolk, amidst numerous follicular cells and the mature ova. One female measured 225 cm in total length and in all seven fully developed embryos were observed in its ovary (Plate 2). Four embryos were on the right side of uteri and rest of three were on left lobe side. The total length of the embryos ranged between 279 mm to 290 mm. Yolk sac of the embryo was large, measuring 82 to 88 mm in diameter and the cord lengths ranged from 60 to 70 mm. Five mature ova ranging between 65-72 mm were also observed. Out of the seven embryos five were males and the other two were females (Table 1).

Another female measured 230 cm in total length. Along with developing embryos and mature ova a total of nine embryos and six

mature ova measuring 66-75 mm were observed in it. The embryos recorded were fully developed and the number of embryos on the right side of the uteri was five and remaining four was in the left lobe. The total length of the embryo ranged between 286 mm to 300 mm. Yolk sac of the embryo was large measuring 84 to 93 mm in diameter and the cord lengths ranged from 62 to 78 mm. Out of the nine embryos four were males and remaining five were females (Table 2).

Development of ova in the ovary and embryos in the uteri were observed simultaneously indicating the quick succession of ovulation and fertilisation after parturition. The cost recovered by the sale of these two fishes mentioned in the in two previous paragraphs was Rs.10,500 and Rs.10,800 respectively.

The resource is not targeted but is landed as a by-catch. However, when compared to 1960s and 1970s the landing of *R. djiddensis* are very less indicating overfishing. As it is included as a Vulnerable (VU) one in the IUCN Red list the fishes should be thrown back in to the sea, if alive, as a conservation measure. There is also a need to emphasise the need to conduct the detailed maturity and reproduction studies for better conservation practices. The observations in respect of the fecundity of this species in this contribution can be used as a baseline data for further studies on the reproductive biology of the fish which would help in formulating a conservation policy towards sustaining and conserving this species.

Table 1. Details of embryos recovered, measuring 225 cm

Length (mm)	Weight (mm)	Sex	Length of Cord (mm)	Yolk sac dia (mm)
279	290	M	60	82
285	300	M	61	82
291	300	F	61	83
292	310	M	61	85
292	320	M	62	85
292	320	M	62	86
300	330	F	70	88

Table 2. Details of embryos measuring 230 mm

Length (mm)	Weight (mm)	Sex	Length of Cord (mm)	Yolk sac dia (mm)
286	305	F	62	84
287	312	M	63	85
288	325	F	69	84
288	315	F	71	87
289	315	F	72	88
296	342	M	74	88
298	340	F	74	91
299	345	M	74	92
300	350	M	78	93

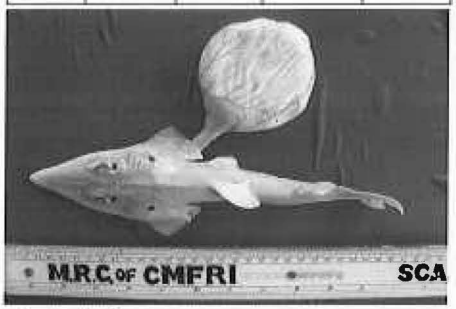

Plate 1. Embryo with yolk sac attached to body

Plate 2. Fully developed embryos recovered from second female

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