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First data on fecundity of the squid *Abralia veranyi* (Cephalopoda: Enoploteuthidae)

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Investigation of the fecundity in *Abralia veranyi* from the Mauritanian slope showed that potential fecundity of this species is 10,000–26,000 including 1200–2400 (mean 1900) yolk oocytes and ripe eggs. Up to 1000 ripe eggs of 0.7–0.8 × 0.8–0.9 mm (mean weight 0.30 mg) were found in oviducts. In mated females there were found 13–226 (mean 71) spermatangia. Spawning is intermittent.

The squid *Abralia veranyi* (Rüppel, 1844) occurs in the tropical Atlantic and Mediterranean Sea (Nesis, 1987; Young et al., 1998). It is the dominating micronectonic squid species of the slope waters off north-west Africa (17–25°N) at a depth ranging from 200 to 400 m. Below these depths it is replaced by *Abraliopsis atlantica* and *A. hoylei* (unpublished data). Despite its abundance, the reproductive biology of this species, particularly its fecundity, is not known. This short communication represents the first data on female reproductive system weight, fecundity, egg size and weight, and number of spermatophores attached in the female during copulation.

Eleven advanced maturing and mature females of 37–43 mm dorsal mantle length (ML) were collected on 25–27 June 1997 aboard the RV 'AtlantNIRO' in surface trawl sets undertaken during the night at 17°20–18°33N, and at 190–380 m depth. A research midwater trawl of type RT/TM 70/300 (mesh size 68 mm; 10 mm in the codend) was used. Squid were stored in 6% formaldehyde. Fecundity and egg size were estimated ashore in all 11 squid. Due to the effect of preservation, the eggs were not always perfectly symmetrical and, following Clarck (1934), to obviate any selection of the longest or shortest diameter, the micrometer was placed in a horizontal position in the eyepiece and the diameter parallel to the graduation on the micrometer measured. This average egg diameter was estimated in 50 ripe eggs per female. In some oocytes with a regular ovoid form, longest and shortest diameters were measured. To estimate oocyte number in the ovary, three 15–30 mg samples were taken, that was equal to 15–40% of the whole ovary weight. It was possible to count all oocytes in samples, because oocytes <0.05 mm in diameter were absent in all animals studied. Therefore, the total number of oocytes in the reproductive system of prespawning (maturing) females, therefore, was considered to be the total oocyte production during ontogeny.

Potential fecundity (PF) was calculated as the sum of total oocyte number in the ovary and egg number in oviducts. Relative fecundity (RF) was estimated as the ratio of PF to body weight (BW). An index of potential reproductive investment (PRI) was calculated as the product of RF and the weight of an individual ripe egg (Laptikhovsky & Nigmatullin, 1993).

All mature females were mated. Spermatangia were attached to the seminal receptacle, which is the median pocket on the inner mantle (Burgess, 1998). Each set of spermatangia consisted of 13–226 (mean 71) ones. All sets containing more than 50–100 spermatangia consisted of 2–3 'simple' sets whose spermatangia differed in length and condition.

The weight of the reproductive system varied from 10.0 to 17.2 (mean 13.3)% of BW. This weight comprised the ovary weight which ranged from 4.5 to 10.6 (7.0)% of BW, and the weight of the oviductal glands 1.6–5.5 (3.0)%.

There were 98–1076 eggs (usually 400–700 eggs) in the oviducts. The average egg diameter was 0.8–0.85 (mean 0.82) mm, and the egg weight ranged from 0.27 to 0.34 (mean 0.30) mg. Ovoid eggs measured 0.7–0.8 × 0.8–0.9 mm.

Size distribution of oocytes was unimodal (Figure 1A). Oocytes of 0.1 mm were the most frequent in the maturing and early spawning females, whilst oocytes of 0.2 mm were predominant in the female of advanced spawning stage. The range of yolk oocytes represented 2.7–12.8 (mean 7.3)% of the total oocyte number in ovary. Total number of yolk oocytes and ripe eggs (YO) was 1200–2400 (mean 1900) (Figure 1B). The relative fecundity (RF) was 2400–5800 (mean 4300) egg g^{-1} (Figure 1C). The potential fecundity (PF) varied from 10,000 to 26,000 of oocytes (Figure 1D). The PRI was 0.7–1.7 (mean 1.2).

All reproductive features of *A. veranyi* are similar to those of the enoploteuthid squid *Abraliopsis atlantica* and *A. hoylei* inhabiting oceanic waters of the same region (Laptikhovsky, 1999 in press). According to the relationship between egg number in oviducts and PF, it seems that this species has prolonged intermittent spawning as occurred in the above cited species, and in *Abralia trygonura* (Young & Mangold, 1994). It is noteworthy that inshore *A. veranyi* has smaller eggs and higher PF than both oceanic *Abraliopsis* species. This situation is contrary to Ommastrephidae, a macronectonic family of squid that inhabit the same environment. The members of the oceanic subfamily Ommastrephinae are mainly r-strategists and have smaller eggs and higher PF than the members of the more inshore subfamily Todarodinae (Nigmatullin & Laptikhovsky, 1994). Thus, *Todarodes sagittatus* from the slopes of the eastern Atlantic has lower PF and longer eggs than the oceanic squid *Sthenoteuthis pteropus* and *Ommastrephes bartrami* from the same area (Laptikhovsky, 1995). These differences between both families could be related to the peculiarities of adult mortality whose patterns, perhaps, may be quite different for micronecton (Enoploteuthidae) and macronecton (Ommastrephidae) in both habitats (slope and open ocean).

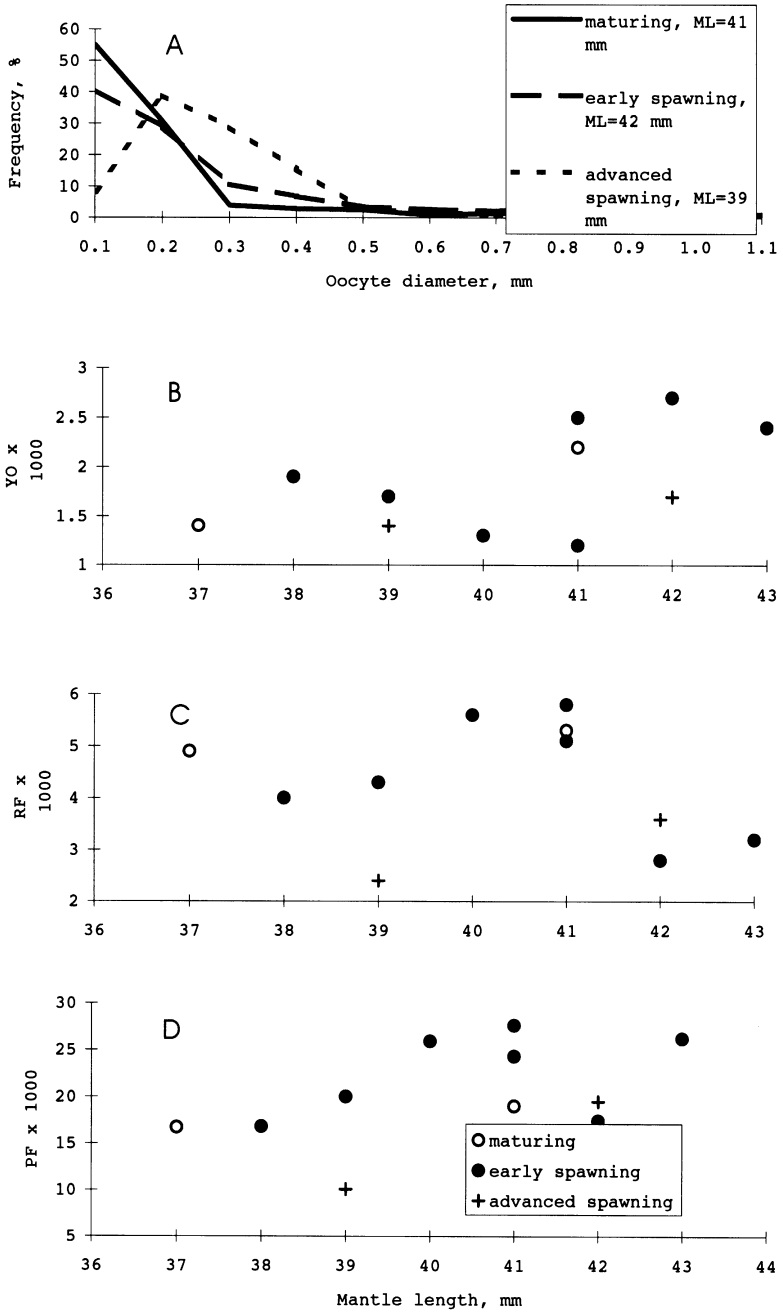

Figure 1. Size distribution of oocytes in three females (A), yolk oocyte (YO) number (B), relative fecundity (RF) (C) and potential fecundity (PF) (D) of *Abralia veranyi*.

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