

FIRST FINDING OF NATURAL LAID EGGS FROM *LOLIGO FORBESI* STEENSTRUP, 1856 (MOLLUSCA: CEPHALOPODA) IN THE AZORES

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ARQUIPÉLAGO



PORTEIRO, FILIPPE M. & HELEN R. MARTINS 1992. First finding of natural laid eggs from *Loligo forbesi* Steenstrup, 1856 (Mollusca: Cephalopoda) in the Azores. - *Arquipélago. Life and Earth Sciences* 10: 119-120. Angra do Heroísmo. ISSN 0870-6581.

Natural laid eggs from *Loligo forbesi* have been encountered for the first time in Azores. The spawn was found inside a PVC trap set for octopus, at 25-30 m depth, during April 1992, and it consisted of twenty strands with 39 to 52 embryos, all in the same stage. The embryos degenerated after 28 days in aquarium. This finding is the first confirmation that *Loligo forbesi* spawns around the coasts of the Azores islands.

PORTEIRO, FILIPPE M. & HELEN R. MARTINS 1992. Primeira referência de uma postura natural de *Loligo forbesi* Steenstrup, 1856 (Mollusca: Cephalopoda) nos Açores. - *Arquipélago. Ciências da Natureza* 10:119-120. Angra do Heroísmo. ISSN 0870-6581.

Em Abril de 1992, foi registado pela primeira vez a ocorrência de uma postura natural de *Loligo forbesi* nos Açores. A postura encontrava-se dentro de uma armadilha de PVC, colocada a 25-30 m, utilizada para a captura de polvo. Foram contados 20 cordões ovígeros com 39-52 embriões, todos no mesmo estágio de desenvolvimento. Após 28 dias de incubação em cativeiro os embriões degeneraram. Esta observação é a primeira confirmação que *Loligo forbesi* se reproduz nas costas dos Açores.

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INTRODUCTION

Loligo forbesi was first reported from the Azores by DROUET (1858) (as *L. vulgaris*).

However, the first biological study commenced only in 1980 (MARTINS 1982). This study revealed that the Azorean population, which is the westernmost occurrence of this North-eastern Atlantic species, consists of much larger individuals (up to more than 90 cm dorsal mantle length or DML) than the populations along the coast of continental Europe (rarely exceeding 50 cm DML) e.g. the British Channel (see HOLME 1974). This fact caught the attention of a team from Marine Biomedical Institute, Galveston, Texas, whose aim was to cultivate squid from eggs, to be used in physiological research, specially neurology. However, egg strands of *Loligo forbesi* were unknown in the Azores, despite the fact that a great part of the exploited population are mature individuals. On the contrary, in the British Channel for

example, eggs have been found attached to submerged tree twigs, on submerged fishing floats, on rope moorings, and on crab pots (HOLME 1974; HANLON & al. 1989).

Several unsuccessful attempts were made to obtain eggs of *Loligo forbesi*. Fishermen were alerted during the "Fisheries Week" in Horta in 1985 (MARTINS 1986) and wooden boxes with weights were placed on the bottom at several localities off the southern coast of Pico at 120 to 180 m depth, known fishing grounds for mature individuals, in the hope to attract the squid.

Only in 1986 non-stress egg strands were obtained for the first time, from mature females in captivity in a wooden cage kept for this purpose in Horta harbour. Live eggs were successfully transported to Texas and were reared there (SEGAWA & al. 1988; HANLON & al. 1989; FORSYTHE & HANLON 1989).

No attempts have recently been made to find natural spawn of *Loligo forbesi*.

RESULTS

On April 15, 1992 *Loligo* eggs were found inside a trap set on April 10 for *Octopus* just outside the wall of Horta harbour (Faial island). The trap consisted of a tube of grey PVC with a diameter of 13.5 cm and a length of 27.5 cm. The cylinder that rested in horizontal position was open in one end while the other was sealed with concrete. The trap was placed at a depth of 25-30 m, where the temperature was 16°C. Only one of 12 traps contained squid eggs.

Twenty egg strands in groups of two, three or four were found inside the tube hanging from the uppermost part of the concrete. Each strand contained 39 to 50 eggs organised in spiral and enveloped by typical jelly tunics. The eggs were all of the same embryonic stage - 12 of SEGAWA & al. (1988). The egg strands were transferred to a tank with a closed circulating water system with a temperature of 18°C.

The dimensions of the different embryonic stages, during development, correspond to those referred by BOLETZKY (1987) and SEGAWA & al. (1988). The embryos aborted after 28 days, having reached stage 27⁺ of SEGAWA & al. (1988), probably due to oxygen depletion. The eye was almost covered by primary lid covers, Hoyle's organ visible, tentacles, arms II and III with one row of chromatophores, external yolk sac larger than embryo and DML = 2.1 mm.

DISCUSSION

Loligo forbesi is the only loliginid known in the Azores archipelago. Also, the large size of embryos, the chromatophoric pattern, and other characteristics mentioned above, leave no doubt that the spawn belong to this species. This finding is the first confirmation that *Loligo forbesi* spawns around the coast of the Azores islands.

Squid are caught by jigging at a depth of 100 to 250 m depending on the locality. 86 % of the individuals caught in this fishery are mature animals (MARTINS 1982). Young animals (ca. 12-18 cm DML) are sometimes caught at the surface during night with dipnet by fishermen using light, fishing for oceanic horse mackerel (*Trachurus picturatus*).

In November 1991, 7 squid with acoustic transmitters inserted in mantle cavity, were tracked both day and night in the area between Faial, Pico and S. Jorge islands. Depths telemeasured from the squid varied from 20 and 550 m.

No distinct diurnal patterns were observed, but the most shallow depth records were obtained at night (Frank Carey, personal communication).

Thus, from what we know about the habits of the adult *L. forbesi* in Azorean waters, we find it very surprising that an adult squid would come up and lay eggs in a depth of 25-30 m.

We do not know if *L. forbesi* is an one time spawner or not. However, our observations indicate that spawning may occur, intermittently during a short period: different strands laid by one female in captivity had embryos in different embryonic stages. The present spawn of ca. 1000 embryos indicates that it is only a fraction of a complete spawn.

It is possible that the squid in the Azores lay eggs underneath overhanging rocks or in caves which are part of the volcanic submarine morphology of the islands. It might be, that it is this behaviour that makes it so difficult to obtain natural eggs.

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Accepted 14 September 1992