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Field Observations of Young *Ommastrephes bartrami* in Offshore Waters in the Ligurian Sea

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Given the relevant presence of teuthofagous mammals such as *Glodicephala melaena*, *Grampus griseus*, *Ziphius cavirostris* (Viale 1985, Notarbartolo di Sciarra et al. 1990), the Ligurian Sea is supposed to be rich in cephalopods, probably of species which at present do not constitute fishery resources. However, the distribution - if not the identity - of such pelagic species is unknown.

Taking Clarke's interesting notes (1966) on oceanic squids of genus *Ommastrephes* as a starting-point, I wondered if it might also be possible in the Mediterranean to see these animals in offshore waters at night. Some cruises on the R/V Minerva (CNR August 1987, July 1988, August 1989, December 1989, February 1990) gave me the opportunity to answer this question. It is a well-known fact that during the night, especially when the sea is very calm, a light put on the surface attracts squids which can then be easily fished with shrimp-like artificial lures. In the inshore waters of the Ligurian Riviera I have observed that such catches are composed mainly of *Loligo vulgaris* and to a smaller extent of *Illex coindetii*. The same fishing technique was used in offshore waters.

During the first two cruises on calm nights in which the ship was adrift in proximity to the bottoms of the Ligurian slope where *Aristeus antennatus* is the target species of the trawl-fishery (500-700 m depth), several sightings of young *ommastrephid* were registered. Optimal conditions were reached a few hours after the ship's engines had stopped and a light which had been put over the side of the boat started collecting small fish and shrimps (Myctophidae, *Pasiphaea sivado*, *Meganyctiphanes norvegica* etc.) which became food for the cephalopods. However, every caught specimen proved to be *Todarodes sagittatus*. Indeed, this squid is sporadically associated to the trawl mesobathyal catches.

During the 1989-90 cruises the ship reached deeper waters (more than 1000 m depth) up to a maximum of 40 miles from the Ligurian coastline. In the same conditions as described above, finally several specimens of the genus *Ommastrephes* were observed and caught.

In August the squids appeared in small groups (up to six individuals), passing rapidly under the light. They maintained a distance of about 1 m from each other and were seen repeatedly seizing the fish. Five of them were fished both with artificial bait and with a landing-net and preserved in formalin solution.

The second observation took place in December: they appeared in the same circumstances as before, but were less numerous and larger. On board, two large tanks filled with sea water were used to keep the freshly caught specimens. They showed astonishing changes of colour from dark red-brown, when the squid was lifted into the air, to a white and blue colour when it was put in the tank (the latter had white walls and was floodlit in the laboratory). This last coloration was very similar to that of pelagic fish, the dorsum being blue and the ventral surface white with silver hues. However, this colour was seen when there were single specimens in the tank, but on adding a second specimen a furious reaction was observed, with colour changes and emissions of jets of water and clouds of ink. Four specimens were fixed in formalin solution. The post mortem coloration is also very characteristic. A black colour appears on the dorsal surfaces which is sharply delimited laterally; the borderline runs through the middle of the second pair of arms.

On the final occasion in February, watching the sea surface in the above-mentioned conditions I was not able to see any of them, but a member of the crew fished a specimen, together with two *Todarodes sagittatus*, in the last hour of the night.

Examined materials:

14.08.89 Minerva st. 43°49' 09°07'
five specimens: M.L. 11; 14.5; 15.5; 15.5; 17.5 sex undetermined (no signs of hectocotylization on ventral arms).

09.12.89 Minerva st. 43°43' 09°09'
four specimens: males (initial hectocot.) M.L. 19.5; 19.5; 21.3; female M.L. 25.5

05.02.90 Minerva st. 44°08' 09°07'
one female specimen M.L. 27.5

All these fit the description of *Ommastrephes bartrami* given by Young (1972), with the exclusion of details regarding the dentition of suckers.

Discussion: a) Species identity

In the opinion of Nesis (1982/1987), the genus *Ommastrephes* includes only one species, *O. bartrami*, with three formally undescribed subspecies: a North Atlantic (M.L. to 86 cm); a North Pacific (M.L. to 53 cm) and a southern subspecies (M.L. to 65 cm). In particular, the North Pacific subspecies is probably the best known (Araya 1983), as it sustains a fishery yield of 150,000 t/year. In the past, three species have been recognized.

For the Mediterranean records, which have generally been sporadic, the authors concerned have used the name *O. bartrami* (Naef 1923; Issel 1925; Torchio 1967, 1971). However, recently Roper et al. (1984) assigned the Mediterranean forms to *O. caroli*. As a consequence, for the most recent specimens found in the Mediterranean both the terms *O. caroli* (Guescini and Manfrin 1986) and *O. bartrami* (Ragonese and Jereb in press) have been used for what is probably the same form. Following the remarks of Bello (1986) and while waiting for a revision of the genus, I prefer to maintain the name *O. bartrami* for these Ligurian specimens.

b) Significance of Ligurian records.

This species is poorly represented in the Ligurian and Mediterranean collections as generally only very rare big specimens are preserved; in these cases the doubt remains that they are exceptional finds. I am of the opinion that to have found young specimens on three occasions in the same area - in spite of the limited search allowed by the ship timetable i.e. a total of few hours - is indicative of their regular presence. The sizes of the examined specimens suggest that they belong to the same cohort, which has been monitored over a period of six months, precisely as is the case - although with an enormous difference in numbers - in the north Pacific at approximately the same latitude (Araya, 1983).

During the cruises of the Minerva I was not able to see large specimens, neither in the summer nor in the winter, but their presence in the area is testified by two specimens stranded at Santa Margherita Ligure (Museum of Natural History of Genoa; a female 59 cm ML studied by Issel, 1925) and from recent observations during offshore sport fishing (Orsi and Fida in preparation).

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