Cah. Biol. Mar. (1994), **35** : 339-345
Roscoff

Finding of uncommon cephalopods (*Ancistroteuthis lichtensteinii, Histioteuthis bonnellii, Histioteuthis reversa)* and first record of *Chiroteuthis veranyi* in the Ionian Sea.

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Abstract : Finding of some uncommon cephalopods, *Ancistroteuthis lichtensteinii*, *Histioteuthis bonnellii*, *H. reversa* and the first record of *Chiroteuthis veranyi* in the Ionian Sea are reported here. Data were collected during a trawl survey carried out on red shrimp grounds during August 1993.

Résumé : Dans ce travail, les auteurs analysent des espèces de Céphalopodes peu communes ou rares en Méditerranée, *Ancistroteuthis lichtensteinii*, *Histioteuthis bonnellii*, *H. reversa* et ils signalent pour la première fois la présence de *Chiroteuthis veranyi* en mer Ionienne. Les exemplaires ont été capturés au cours d'une campagne de chalutage expérimentale, sur des fonds à crevettes rouges, au mois d'Août 1993.

INTRODUCTION

The scarcity of ecological knowledge on many species of cephalopods is certainly due to the technical problems of field observation and sampling.

Information on distribution and abundance come mainly from current research of biological oceanography, fishing activities, analysis on stomach contents of marine mammals and pelagic fishes. Recently, observations from submersibles have provided very interesting data about several aspects of the biology and ecology of cephalopods (Vecchione & Roper, 1991).

Cephalopods are captured commercialy and for research purposes using a variety of gears, primarily jigging machines, trawls and drift nets (Roper, 1991). While jigging, pelagic seining and potting are less destructive techniques that target specific sizes and species, trawling and drift netting are non-selective methods as far as size and species are concerned. Moreover, the animals are often damaged during collecting by means of these latter methods and therefore they are unsuitable for observation of morphometric characteristics and laboratory culture. However, since trawling is an effective method for catching benthic and necto-benthic animals, systematic research carried out by means of trawl surveys, aimed at the assessment of marine demersal resources, have improved the knowledge on cephalopod fauna in many Mediterranean districts, such as the Ionian Sea. *Neorossia caroli* (Joubin, 1902), *Octopus defilippi* (Veranyi, 1851) and *Sepiola ligulata* (Naef, 1912) have been recently found in this basin (D'Onghia *et al.*, 1989 ; Panetta *et al.*, 1991 ; D'Onghia *et al.*, 1992 ; Tursi & D'Onghia, 1992) increasing the number of species recorded in this area (Bello, 1987).

Further information on the presence of some uncommon pelagic species, *Ancistroteuthis lichtensteinii* (Férussac, 1848), *Histioteuthis bonnellii* (Férussac, 1835), *H. reversa* (Verril, 1880) and on the first finding of *Chiroteuthis veranyi* (Férussac, 1835) in the Gulf of Taranto (Ionian Sea), are reported in this paper.

MATERIALS AND METHODS

A trawl survey on red shrimp *Aristeus antennatus* (Risso, 1816) and *Aristaeomorpha foliacea* (Risso, 1827) bottoms, between 400 and 700 m depth, was carried out in the Ionian Sea (Fig. 1) during August 1993.

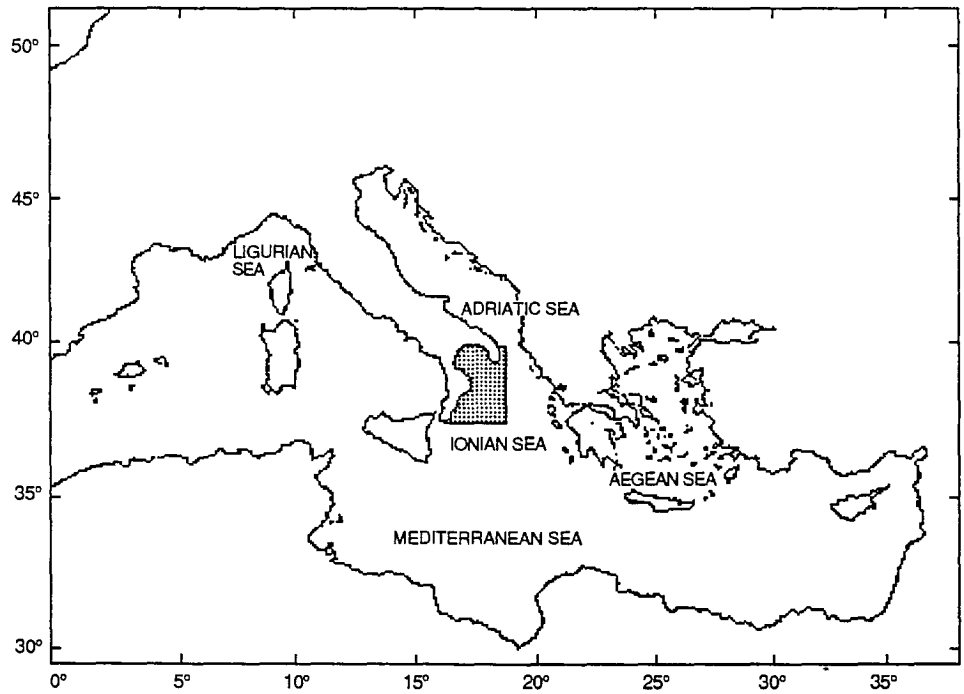

Fig. 1 : Area investigated (shaded) during August 1993 in the Ionian Sea.

A professional trawler of 75 tons gross tonnage was chartered, equipped with a 400 Hp engine and provided of 40 mm stretched mesh in the cod-end. The sampling design was random and the hauls were carried out during day-light.

The specimens were frozen for a more accurate examination in the laboratory and then fixed in 10 % formalin.

Diagnosis of the species was made on the basis of the characteristics described by Naef (1923) and reported by Roper *et al.* (1984) and Mangold & Boletzky (1987). The measure of dorsal mantle length (DML) was adopted for the size of defrozen specimens.

RESULTS

The four species reported in this paper belong to three families of Oegopsida : Onychoteuthidae, Histioteuthidae and Chiroteuthidae.

Ancistroteuthis lichtensteinii (Onychoteuthidae)

No specimens were found in the area during 103 experimental trawl hauls carried out between 400 and 650 m depth, from September 1985 to May 1993, in the context of the study "Stock Assessment of Demersal Resources". Only one specimen was caught during this last survey (August 1993) carried out on red shrimp grounds. It had the characteristics below :

Sampling site		Specimen characteristics			
Lat./Long.	Depth (m)	DML (mm)	Weight (g)	Sex	Maturity stage of gonad
39°07'59"N/17°23'07"E	627	110	33.2	f	immature

Although *Ancistroteuthis lichtensteinii* resembles the species *Onychoteuthis banksii*, which belongs to the same family, it can be distinguished from *Onychoteuthis* by a more slender body, a very long arm apparatus and the absence of light organs on the intestinal tract.

The tentacles are also very long. In the collected specimen, the right tentacle, still complete, measured 275 mm and bore 22 hooks on the club. Arm formula (2, 3, 4, 1) corresponded to that reported by Naef (1923).

Histioteuthis bonnellii (Histioteuthidae)

Two specimens were caught on Ionian meso-bathyal bottoms having the characteristics below :

Sampling sites		Specimens characteristics			
Lat./Long.	Depth (m)	DML (mm)	Weight (g)	Sex	Maturity stage of gonad
38°18'29"N/16°34'28"E	600	32	18	m	immature
39°32'13"N/17°06'53"E	570	22	8.5	-	immature

These two specimens presented a small conical mantle as large as the head. Photophores covered the skin of the mantle, head and arms. The latter were rather long and connected by the typical broad deep web; distinct, elongated dark light organs were present on the arm tips.

The gonad could only be recognized in one individual (which was an immature male).

Both specimens had arm formula (3, 2, 4, 1) according to Naef (1923).

Histioteuthis reversa (Histioteuthidae)

During August 1993, 15 individuals of *Histioteuthis reversa* were fished during 4 hauls out of the 21 carried out beyond 400 m depth :

Sampling sites		Specimens characteristics			
Lat./Long.	Depth (m)	DML (mm)	Weight (g)	Sex	Maturity stage of gonad
38°21'18"N / 16°38'35"E	600	48	33.1	m	immature
39°03'04"N / 17°22'34"E	690	65	67.9	m	immature
		48	48.9	m	immature
		50	36.8	f	immature
		50	33.6	m	immature
39°07'59"N / 17°23'07"E	627	95	98	m	mature
		100	197	f	immature
		65	66.3	m	immature
		66	59.7	m	immature
39°09'41"N / 17°22'11"E	510	75	96.7	m	maruting
		96	165	f	immature
		58	41	-	immature
		40	40.7	-	immature
		28	6	-	immature
		45	12.8	-	immature

Some large individuals were found : up to 100 mm DML in females and 95 mm DML in males. In some small specimens, sex was difficult to distinguish. All the females were immature. The gonad appeared fully developed with mature spermatophores in a male measuring 95 mm DML, while another male of 75 mm DML had not yet reached sexual maturity.

The presence of a mature and a maturing male could indicate that summer is included in the reproductive period of the species.

A small web between the arms and the lack of light organs on the arm tips are the main characteristics that distinguish *Histioteuthis reversa* from the previous species of the same genus.

Chiroteuthis veranyi (Chiroteuthidae)

The specimen caught in August 1993 presented the following characteristics :

Sampling site		Specimen characteristics			
Lat./Long.	Depth (m)	DML (mm)	Weight (g)	Sex	Maturity stage of gonad
39°07'59"N/17°23'07"E	627	36	20.5	-	immature

Although its body was in rather bad condition and the tentacular club was missing, the specific characteristics of *Chiroteuthis veranyi* were evident. The arm apparatus exceeded

body and head together in mass. Arm formula came out to be 4, 3, 2, 1. The fourth arm presented large lateral margins which bore a row of round violet photophores. A margin was also present along the entire third arm.

In this species all arms are connected at the base by small outer membranes which form pockets, as in the Histioteuthidae (Naef, 1923).

Although the tentacles were broken, the left part of the stalk was long and bore "glandular knobs" placed in a zig-zag pattern.

There were lens-shaped light organs on the ink sac. No sexual organs were observed in the collected specimen which was whitish and translucent.

DISCUSSION AND CONCLUSIONS

The presence of *Ancistroteuthis lichtensteinii* in the Gulf of Taranto was first recorded by Bello (1985 a, 1985 b). The author related the finding of specimens during trawl fishing at depth of 640-670 m as well as in the stomach contents of swordfish. While *Ancistroteuthis lichtensteinii* specimens were found stranded in large numbers in the Ligurian Sea (Torchio, 1965, 1968) and along the Sicilian coast (Berdar & Cavallaro, 1975), the catches of this species are rather scarce by bottom trawling (Morales, 1958 ; 1962 ; Lumare, 1970 ; Bello, 1985 a ; Sanchez, 1986).

The first record of *Histioteuthis bonnellii* in the Ionian Sea was related to an individual fished between 70 and 100 m depth (Torchio, 1967). Recently other catches, always of single specimens, have been achieved during deep water sampling (D'Onghia *et al.*, 1989 ; Tursi & D'Onghia, 1992).

Histioteuthis reversa has often been caught recently by trawl sampling on the mesobathyal bottoms (Panetta *et al.*, 1986 ; Tursi *et al.*, 1988 ; D'Onghia *et al.*, 1989 ; Tursi & D'Onghia, 1992) but was always represented by only few specimens.

The species belonging to the genus *Histioteuthis* seem associated with the bottom as deep as 4000 m (Guerra, 1992). In fact, they are more frequently caught in trawl nets and can be found in the stomach of *Galeus melastomus* (Bello, 1990) which is a typically demersal species. They are however always represented in the catches, but only by a small number of specimens.

Concerning *Chiroteuthis veranyi*, this is the first record of the species in the Gulf of Taranto (Ionian Sea). The occurrence of this species in the eastern basin goes back to the "Thor" expedition (Degner, 1925). Single larvae were found both by zooplankton sampling (Hoenigman, 1964) and in the stomach of tuna fish (Adam, 1966). Six specimens were collected in the western Korinthiakos Gulf using a commercial fishing vessel (Kaspiris & Tsiambaos, 1984). The largest specimen caught so far (95 mm) was recorded by Morales (1958).

An amphi-mediterranean distribution (Mangold & Boletzky, 1988), including the Adriatic Sea (Bello, 1990), is recognized for the four species recorded here. Vertical migra-

tion of these species is related to sunlight and it can be accompanied by ontogenic descent : the juvenile stage is epipelagic (planktonic) while adults are bathypelagic (nektonic) (Wirz, 1958 ; Voss, 1956 ; Torchio, 1965, 1968 ; Mangold-Wirz, 1973 ; Lu & Clarke, 1975 a, 1975 b ; Mangold & Boletzky, 1988 ; Guerra, 1992 ; Voss *et al.*, 1992 ; Villanueva, in press). Biological knowledge of these squids is rather limited and their abundance is still unknown in the Mediterranean Sea.

Although all these species are preyed on by marine mammals and pelagic or demersal fish, available data in the Mediterranean cannot explain their suspected schooling habit, as observed in Atlantic (Clarke & Mac Leod, 1974 ; Clarke 1980, 1983). Moreover, the results from midwater sampling (Roper, 1972) do not provide a reasonable conclusion about their abundance in the basin.

Finally these squids are, in our opinion, uncommon species in the Mediterranean, but the "uncommon" concept might also be linked to unsuitable sampling gear and to the scarcity of scientific surveys carried out in the water column.

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