

Giambattista Bello (*), Antonio Potoschi () & Adolfo Berdar (***)**

ADULT OF *ANCISTROCHEIRUS LESUEURII* CAUGHT IN THE STRAITS OF MESSINA (CEPHALOPODA: ANCISTROCHEIRIDAE) (**)**

KEY WORDS: Cephalopoda, *Ancistrocheirus lesueurii*, Mediterranean Sea, new record

Summary

A sexually mature female of *Ancistrocheirus lesueurii* (28.8 cm ML) was caught in the Straits of Messina. This is the first occurrence of an adult specimen of the species in the Mediterranean Sea. Previously, only paralarvae had been collected here. The squid bears 24 photophores on the mantle ventral surface in bilaterally symmetrical arrangement. The arms bear, in addition to hooks, small suckers at their tips. The radula is typically teuthoid, with the rachidian tooth tricuspid.

Riassunto

Una femmina sessualmente matura di *A. lesueurii* (lunghezza del mantello: 28,8 cm) è stata catturata nello Stretto di Messina. Questo è il primo ritrovamento di un adulto della specie nel Mediterraneo. In precedenza in questo mare, erano state raccolte solo paralarve. L'esemplare porta sulla faccia ventrale del mantello 24 fotofori disposti in modo simmetrico rispetto al piano sagittale. Le braccia, oltre agli uncini, portano alle loro estremità numerose ventose. La radula è tipicamente teutoide, con il dente rachidiano tricuspid.

Introduction

Ancistrocheirus lesueurii (d'Orbigny, 1842) (Cephalopoda: Ancistrocheiridae) is a pelagic teuthoid squid living in tropical and temperate seas of the world ocean (ROPER *et al.*, 1984, 1985). It is the only known member of the family Ancistrocheiridae (CLARKE, 1988; BELLO, 1992). Following the examination of paralarvae from different oceans, YOUNG *et al.* (1992) suggest that the genus *Ancistrocheirus* might include more than one species.

Early juveniles, previously known as *Thelidoteuthis alessandrinii* (Verany, 1851), have frequently been caught throughout the world ocean (CLARKE, 1966; see also PIATKOWSKI & WELSCH, 1991, for recent references). However, only two adult specimens have been collected directly from the sea; an unsexed specimen at Felidu Atoll (Indian Ocean) (HOYLE, 1906) and a female off Japan (OKUTANI, 1976).

(*) Istituto Arion, Casella Postale 61, I-70042 Mola di Bari

(**) Dipartimento di Biologia Animale ed Ecologia Marina, Università di Messina, Salita Sperone 31, I-98166 S. Agata (Me)

(***) Via Consolare Valeria 31/b, I-98013 Contesse (Me)

(****) Lavoro accettato il 28 luglio 1993

In addition, the occurrence of many specimens of *A. lesueurii* in the stomachs of several predator species has been recorded. The holotype, described in FÉRUSAC & D'ORBIGNY (1834-48), was retrieved from the stomach of a dolphin from the Indo-Pacific Ocean (BELLO, 1992). JOUBIN (1900) collected several fragments of this species in the stomach of a dolphin from the Azores. In more recent times, it was discovered that *A. lesueurii* is an important item in oceanic food webs (CLARKE, 1983). It was found in the stomach contents of sperm whales (CLARKE & MACLEOD, 1974; CLARKE, 1980; MARTIN & CLARKE, 1986; CLARKE *et al.*, 1993), swordfish (TOLL & HESS, 1981; BELLO, 1991), sharks (DUNNING *et al.*, 1993), wandering albatross (CLARKE *et al.*, 1981).

Descriptions of *A. lesueurii* adults are given by FÉRUSAC & D'ORBIGNY (1834-48), JOUBIN (1900), HOYLE (1906), OKUTANI (1976), NESIS (1978, 1984), CLARKE (1980).

As regards the Mediterranean, several early juveniles have been collected in its western part (CLARKE, 1966); the first one to be collected was the holotype of *Loligo alessandrini* Verany, 1851. No adult occurrence has been recorded previously (BELLO, 1986). In this note the find of an adult female of *A. lesueurii* in the Straits of Messina is reported.

The peculiar hydrology of the Straits, between Sicily and mainland Italy, connecting the western to the eastern Mediterranean (MAZZARELLI, 1909) greatly favours the ascent and even stranding ashore of deep living animals, including cephalopods (ISSEL, 1925; BERDAR & CAVALLARO, 1975; BERDAR *et al.*, 1983).

Material and methods

The specimen of *Ancistrocheirus lesueurii* was collected by the second author in the Straits of Messina, on July the 31st 1984. It was caught by a squid jig with blinking light, baited with a piece of salted bony fish. The capture occurred at 70 m depth, at 20:30 h, with the moon in the first quarter. The exact place of capture was at the southern entrance of the Straits, one nautical mile off Capo Scaletta (Messina) on the Sicilian coast, where the sea depth is about 600 m. In that moment, there was no wind and a northward current, which is known to facilitate the ascent of deep living animals.

Measurements of the specimen were taken soon after its capture.

Results

Species identification was effected using the following elements of diagnosis (see the Introduction for a list of references regarding *A. lesueurii* description): typical body shape, fins shape and position; two rows of hooks on the arms; 24 large photophores in transverse rows on the ventral side of the mantle; several additional large photophores on the head and tentacles; gladius strengthened by a longitudinal cartilaginous rod; typical mandibles (CLARKE, 1986).

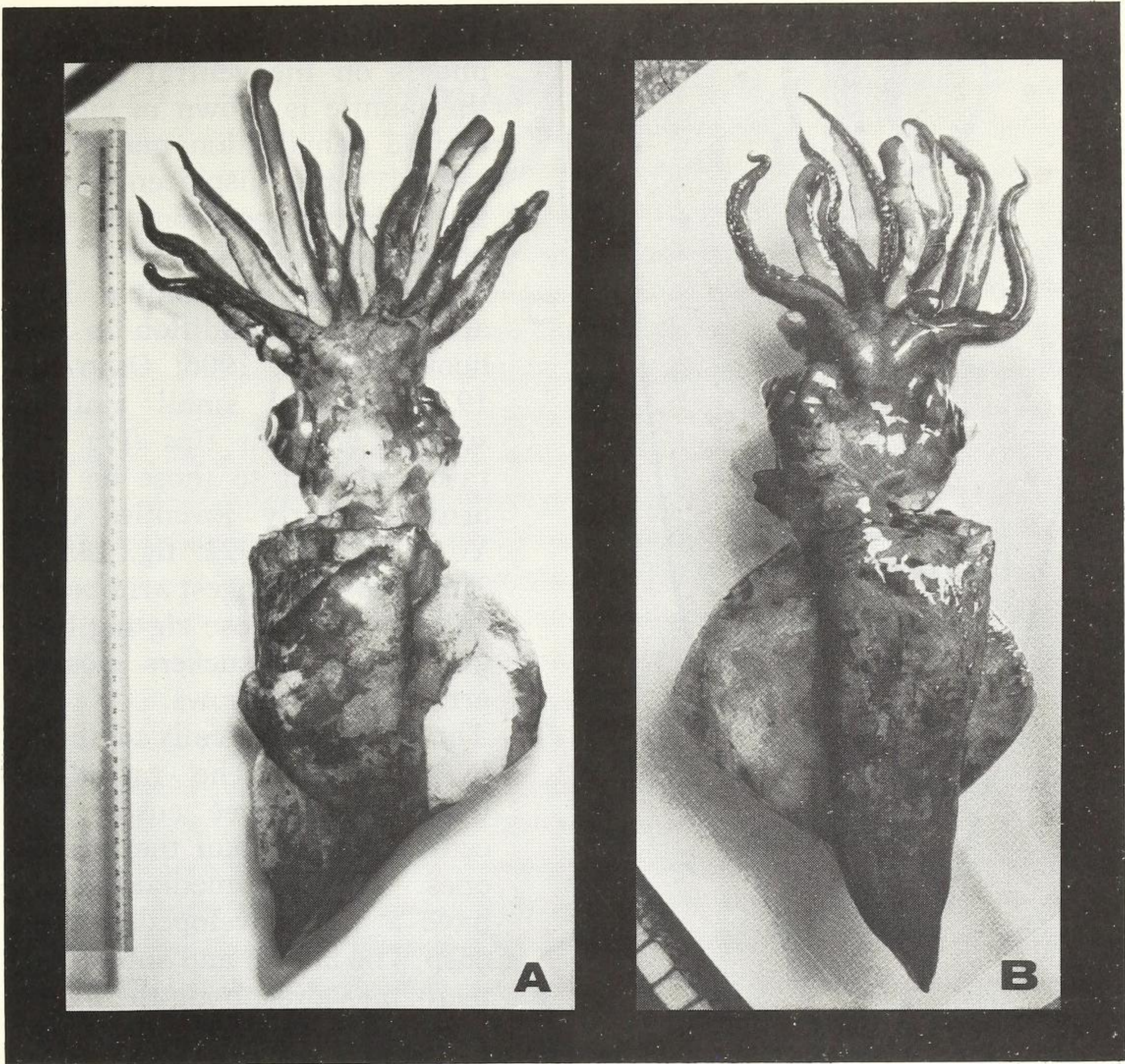


Fig. 1 - Specimen of *Ancistrocheirus lesueurii* caught in the Straits of Messina. The mantle is twisted with respect to the head. A: Dorsal view (the ruler is 50 cm long). B: Ventral view.

Sex: female, mature. The eggs were smooth and sized 2.5 x 1.9 mm.

Measurements and indices (according to ROPER & VOSS, 1983):

ML = 288 mm TL = 571 mm FLI = 83.3

FWI = 72.9 GLI = 75.7 GWI = 16.7

body weight = 1,095 g gonad weight = 173 g

arm formula: III = IV > II > I.

The body (Fig. 1) was semigelatinous and subject to distortion. Both tentacles were broken at the same distance from their attachment, and both clubs were missing. The cut area was not covered by pigmented skin. There were 9 photophores on each tentacle stump.

There follows a description of the features in our specimen which differ from previous specimens described by other authors.

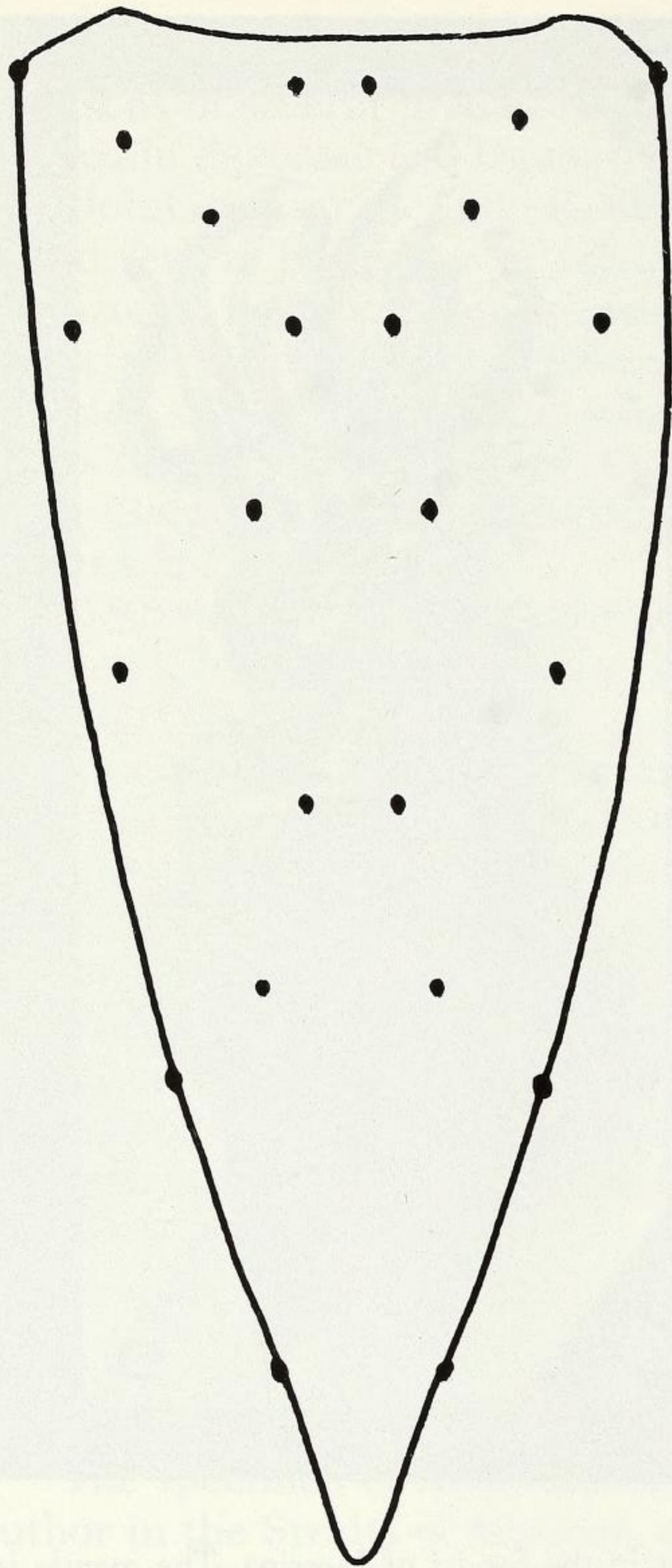


Fig. 2 - Distribution of the photophores on the mantle ventral side of *Ancistrocheirus lesueurii* (diagrammatic).

The distribution of photophores on the ventral side of the mantle is shown in Fig. 2. Mantle dehydration may have caused some displacement of the relative position of the photophores.

The arm tips are pointed. The arms bear, in addition to the hooks (HOYLE, 1906; OKUTANI, 1976), several small stalked suckers on their tips (Fig. 3), rather similar to those on the arms of early juveniles (e.g. YOUNG *et al.*, 1992: fig. 135b). The third and longest arm bears 44 hooks in a loose zig-zag line and about 50 suckers closely arranged in two rows.

The radula is typically teuthoid (NAEF, 1923). The rachidian tooth bears three cusps, the central longer than the lateral ones. The paramedian teeth have a well developed lateral cusp. The lateral and sublateral teeth measure about the same length as the rachidian and paramedian ones (Fig. 4).

The stomach contained skeletal remains of bony fishes and several small sized pieces (≤ 1 mm) of a blue plastic sheet.

Discussion

The specimen here described is quite similar to the one described by OKUTANI (1976), as far as sex, sexual maturity, and size are concerned (Okutani's specimen was 250 mm ML).

NESIS (1978, 1987; see also BELLO, 1992) attributed a great systematic importance to the number and position of the large light organs on the mantle ventral side. According to him (NESIS, 1987), adults of *Ancistrocheirus* bear 22 such light organs. Indeed, CLARKE (1980) showed that in *A. lesueurii* their number ranges from 18 to 24 and that their position may also differ from one specimen to another. In the present specimen, 24 light organs were counted on the mantle ventral side and they were all in rows of two or four, contrary to d'Orbigny's description (FÉRUSAC & D'ORBIGNY, 1834-48) but in agreement with CLARKE (1980).

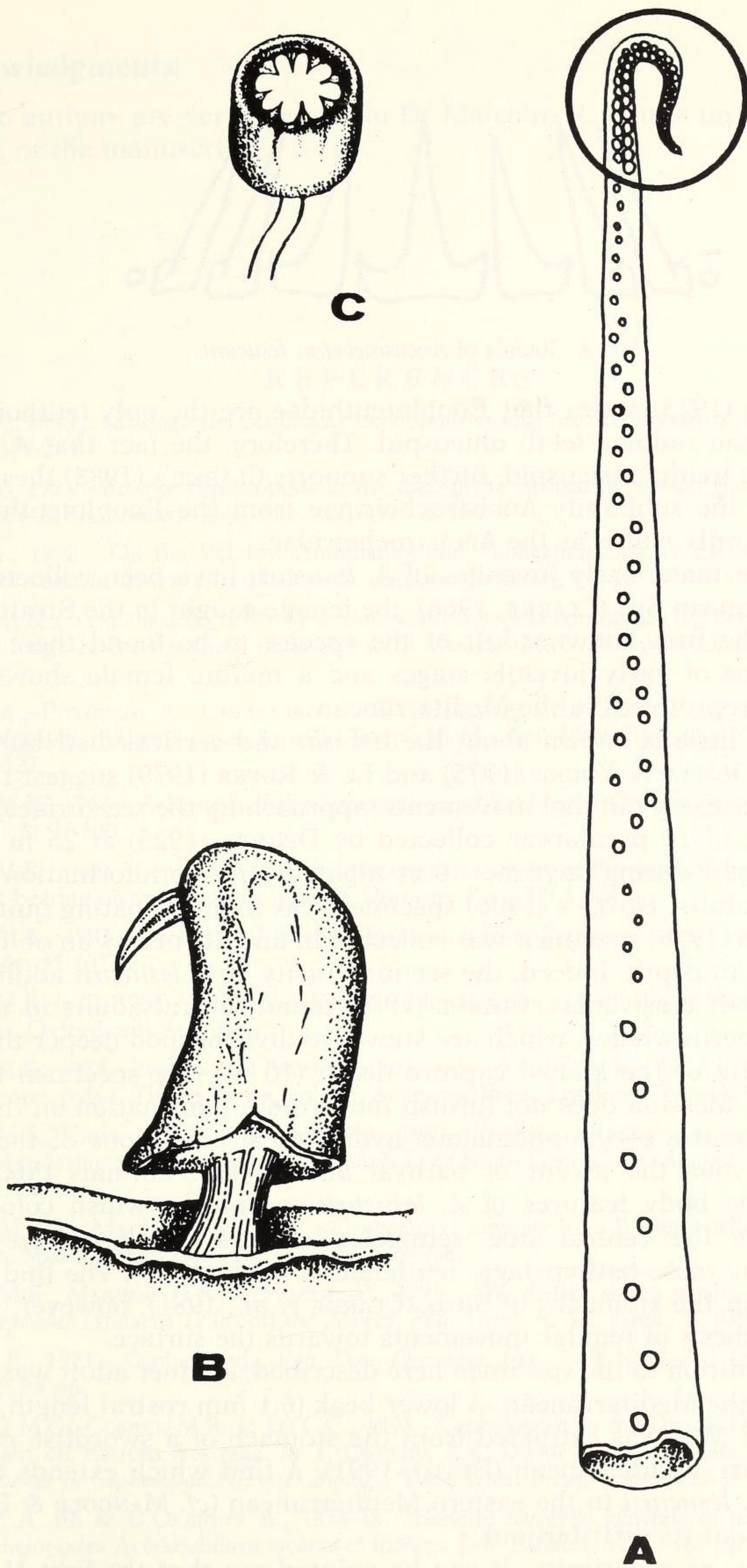


Fig. 3 - Third arm of *Ancistrocheirus lesueurii* (diagrammatic). A: Oral view of the arm; the tip of the arm, bearing suckers, is encircled. B: Hook from the proximal part of the arm. C: Sucker from the distal part of the arm.

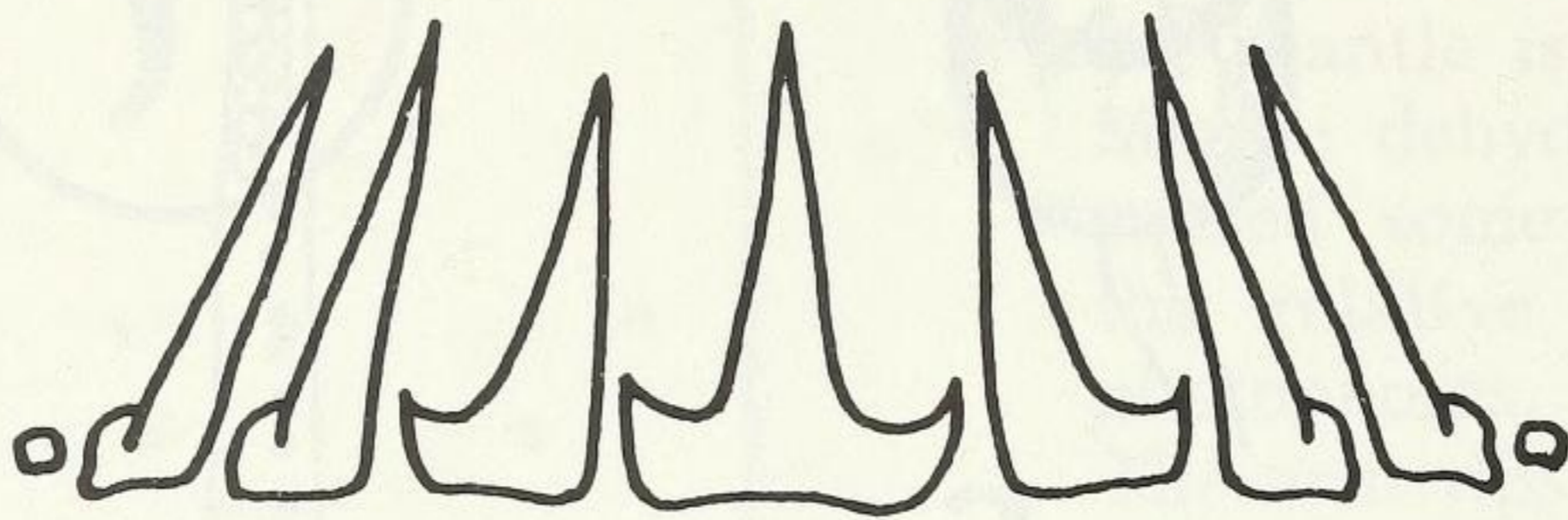


Fig. 4 - Radula of *Ancistrocheirus lesueurii*.

NAEF (1923) states that Enoploteuthidae are the only teuthoid squids to have the radular teeth unicuspid. Therefore, the fact that *A. lesueurii* rachidian tooth is tricuspid, further supports CLARKE's (1988) thesis, which removed the subfamily Ancistrocheirinae from the Enoploteuthidae and gave it family status as the Ancistrocheiridae.

While many early juveniles of *A. lesueurii* have been collected in the Mediterranean Sea (CLARKE, 1966), the female caught in the Straits of Messina is the first known adult of the species to be found there. The co-occurrence of early juvenile stages and a mature female shows that *A. lesueurii* reproduces in the Mediterranean.

Very little is known about the habitat and vertical distribution of *A. lesueurii*. ROPER & YOUNG (1975) and LU & ROPER (1979) suggest that juvenile stages carry out diel movements, approaching the sea surface at night. However, of 13 paralarvae collected by DEGNER (1925) at 25 m depth, 3 were caught during daytime, 10 at night. Even less information is available on adults. HOYLE's (1906) specimen was found «floating quite dead»; OKUTANI's (1976) specimen was collected in an ORI-net by an oblique haul from 850 m depth. Indeed, the seeming rarity of *A. lesueurii* adults is only due to their elusiveness. CLARKE (1980) found several adults in the stomachs of sperm whales, which are known to dive for food deeper than 1,000 m. In spite of the known capture depth (70 m), the specimen from the Straits of Messina does not furnish much more information on its normal depth, because of the anomalous hydrological conditions of the Straits, which favour the ascent of bathyal and abyssal animals (MAZZARELLI, 1909). The body features of *A. lesueurii* -purple brownish colour, light organs on the ventral side, semigelatinous tissues, large size-place it among the meso-bathypelagic teuthofauna (Voss, 1967). The find of adult remains in the stomachs of birds (CLARKE *et al.*, 1981), however, supports the hypothesis of regular movements towards the surface.

In addition to the specimen here described, another adult was recently found in the Mediterranean. A lower beak (6.1 mm rostral length, 20.7 cm estimated ML) was extracted from the stomach of a swordfish caught in the eastern Mediterranean (BELLO, 1991). A find which extends the presence of *A. lesueurii* to the eastern Mediterranean (*cf.* MANGOLD & BOLETZKY [1987] about its distribution).

Lastly, as a curiosity, it can be pointed out that the first Mediterranean adult specimen of *A. lesueurii* comes from the same area, i.e. the Straits of Messina, where Dr. Krohn collected the first paralarva of the species, described by VERANY (1851) as the new species *Loligo alessandrinii*.

Acknowledgments

The authors are very grateful to Dr Malcolm R. Clarke for his critical reading of the manuscript.

REFERENCES

- BELLO G., 1986 - Catalogo dei Molluschi Cefalopodi viventi nel Mediterraneo. *Boll. Malacol.*, **22**: 197-214.
- BELLO G., 1991 - Role of cephalopods in the diet of the swordfish, *Xiphias gladius*, from the eastern Mediterranean. *Bull. Mar. Sci.*, **49**: 312-324.
- BELLO G., 1992 - On the Validity, Authorship, and Publication Date of the Specific Name *Ancistrocheirus lesueurii* (Cephalopoda: Ancistrocheiridae). *Veliger*, **35**: 141-145.
- BERDAR A. & CAVALLARO G., 1975 - Ulteriore contributo alla conoscenza dei cefalopodi spiaggiati lungo la costa siciliana dello Stretto di Messina. *Mem. Biol. Mar. Oceanogr.*, **5**: 121-138.
- BERDAR A., POTOSCHI A., CAVALLARO G., CAVALIERE A. e LI GRECI F., 1983 - Su alcuni Cefalopodi spiaggiati e pescati nello Stretto di Messina. *Mem. Biol. Mar. Oceanogr.*, **13**: 115-127.
- CLARKE M.R., 1966 - A Review of the Systematics and Ecology of Oceanic Squids. *Adv. Mar. Biol.*, **4**: 91-300.
- CLARKE M.R., 1980 - Cephalopods in the diet of sperm whales of the southern hemisphere and their bearing on sperm whale biology. *Discovery Rep.*, **37**: 1-324.
- CLARKE M.R., 1983 - Cephalopod Biomass-Estimation from Predation. *Mem. Nat. Mus. Victoria*, **44**: 95-107.
- CLARKE M.R. (ed.), 1986 - A Handbook for the Identification of Cephalopod Beaks. Clarendon Press, Oxford, xiii + 273 pp.
- CLARKE M.R., 1988 - Evolution of Recent Cephalopods - A Brief Review. In M.R. Clarke & E.R. Trueman (eds.). *The Mollusca*, vol. 12. Academic Press, London & New York: 331-340.
- CLARKE M.R., CROXALL, J.P. & PRINCE, P.A., 1981 - Cephalopod remains in regurgitations of the wandering albatross *Diomedea exulans* L. at South Georgia. *Br. Antarct. Sur. Bull.*, **54**: 9-21.
- CLARKE M.R. & MACLEOD N., 1974 - Cephalopod remains from a sperm whale caught off Vigo, Spain. *J. mar. biol. Ass. U.K.*, **54**: 959-968.
- CLARKE M.R., MARTINS H.R. & PASCOE, P., 1993 - The diet of sperm whales (*Physeter macrocephalus* Linnaeus 1758) off the Azores. *Phil. Trans. R. Soc. Lond.*, B, **339**: 67-82.
- DEGNER E., 1925 - Cephalopoda. *Rep. Dan. Oceanogr. Exp. 1908-10 Medit. Adjacent Seas*, **2** (C1): 94 pp.
- DUNNING M.C., CLARKE M.R. & LU C.C., 1993 - Cephalopods in the Diet of Oceanic Sharks Caught off Eastern Australia. In T. Okutani, R.K. D'Dor & T. Kubodera (eds.), *Recent Advances in Cephalopod Fisheries Biology*. Tokai Univ. Press, Tokyo: 119-131.
- FÉRUSAC A. DE & D'ORBIGNY A., 1834-48 - Histoire naturelle générale et particulière des Céphalopodes Acétabulifères vivants et fossiles. J.-B. Baillière, Paris, 366 pp. (vol. 1, text), 144 pls. (vol. 2, atlas).
- HOYLE W.E., 1906 - The Cephalopoda. In J.S. Gardiner (ed.), *The Fauna and Geography of the Maldive and Laccadive Archipelagoes*. Vol. 2. Cambridge Univ. Press, Cambridge: 975-988.

- ISSEL R., 1925 - Contributo alla conoscenza ecologica delle larve planctoniche di Cefalopodi. *Mem. R. Com. Talassogr. Ital.*, **120**: 1-16.
- JOUBIN L., 1900 - Céphalopodes provenant des campagnes de la *Princesse-Alice* (1891-1897). *Résult. Camp. Sci. Albert I^{er} Monaco*, **17**: 135 pp.; 15 pls.
- LU C.C. & ROPER C.F.E., 1979 - Cephalopods from Deepwater Dumpsite 106 (Western Atlantic): Vertical Distribution and Seasonal Abundance. *Smithson. Contr. Zool.*, **288**: 36 pp.
- MANGOLD K. & BOLETZKY S.v., 1987 - Céphalopodes. In W. Fischer, M.-L. Bauchot & M. Schneider (eds.), Fiches FAO d'identification des espèces pour les besoins de la pêche. (Révision 1). Méditerranée et mer Noire. Zone de pêche 37. Vol. 1. FAO, Rome: 633-714.
- MARTIN A.R. & CLARKE M.R., 1986 - The diet of sperm whales (*Physeter macrocephalus*) captured between Iceland and Greenland. *J. mar. biol. Ass. U.K.*, **66**: 779-790.
- MAZZARELLI G., 1909 - Gli animali abissali e le correnti sottomarine dello Stretto di Messina. *Riv. mens. Pesca Idrobiol.*, **11**: 177-218.
- NAEF A., 1923 - Die Cephalopoden. *Fauna Flora Golf. Neapel*, **35** (1, 1): 863 p.; 19 pls.
- NESIS K.N., 1978 - Podsemejstvo Ancistrocheirinae (Cephalopoda, Enoploteuthidae). *Zool. Zh.*, **57**: 446-450.
- OKUTANI T., 1976 - Rare and Interesting Squids from Japan - V. A Gravid Female of *Ancistrocheirus lesueuri* (D'ORBIGNY, 1839) Collected in the Kuroshio Area (Oegopsida: Enoploteuthidae). *Venus*, **35**: 73-81.
- PIATKOWSKI U. & WELSCH W., 1991 - On the distribution of pelagic cephalopods in the Arabian Sea. *Bull. Mar. Sci.*, **49**: 186-198.
- ROPER C.F.E., SWEENEY M.J. & CLARKE M.R., 1985 - Cephalopoda. In W. Fischer & J.C. Hureau (eds.). FAO species identification sheets for fishery purposes. Southern Ocean (Fishing areas 48, 58 and 88) (CCAMLR Convention Area). FAO, Rome: 117-205.
- ROPER C.F.E., SWEENEY M.J. & NAUEN C.E., 1984 - FAO species catalogue. Vol. 3. Cephalopods of the world. *FAO Fish. Synop.*, **125** (3): 277 pp.
- ROPER C.F.E. & VOSS G.L., 1983 - Guidelines for Taxonomic Descriptions of Cephalopod Species. *Mem. Mus. Nat. Victoria*, **44**: 48-63.
- ROPER C.F.E. & YOUNG R.E., 1975 - Vertical Distribution of Pelagic Cephalopods. *Smithson. Contr. Zool.*, **209**: iv + 51 pp.
- TOLL R.B. & HESS S.C., 1981 - Cephalopods in the diet of the swordfish, *Xiphias gladius*, from the Florida Straits. *Fish. Bull.*, **79**: 765-774.
- VERANY J.B., 1851 - Mollusques Méditerranéens. I. Céphalopodes. Genova, 132 pp.
- VOSS G.L., 1967 - The biology and bathymetric distribution of deep-sea cephalopods. *Stud. Trop. Oceanogr.*, **5**: 511-535.
- YOUNG R.E., MANGOLD K.M. & VECCHIONE M., 1992 - The Enoploteuthid Group of Families. In M.J. Sweeney, C.F.E. Roper, K.M. Mangold, M.R. Clarke & S.v. Boletzky (eds.), «Larval» and Juvenile Cephalopods: A Manual for Their Identification. *Smithson. Contr. Zool.*, **513**: 55-66.