

NOTE

First record of *Taningia danae* (Cephalopoda: Octopoteuthidae) in the Mediterranean Sea*

ANTONI QUETGLAS¹, KHALED FLITI², ENRIC MASSUTÍ¹, WAHID REFES³,
BEATRIZ GUIJARRO¹ and SAID ZAGHDOUDI²

¹ IEO-Centre Oceanogràfic de Balears, P.O. Box 291, 07015 Palma de Mallorca, Spain.
E-mail: toni.quetglas@ba.ieo.es

² Ministère de la Pêche et des Ressources Halieutiques, Rue des Canons 16000 Alger, Algeria.

³ Institut des Sciences de la Mer et de l'Aménagement du Littoral, Bois des Cars BP 19, Alger, Algeria.

SUMMARY: The capture of a specimen of the oceanic cephalopod *Taningia danae* Joubin, 1931, caught during a bottom trawl survey carried out off the Algerian coast, is reported for the first time in the Mediterranean Sea. The individual, which was taken at 385-395 m depth, was a juvenile with a 55.6 mm mantle length and age of 132 days. This finding is important as there are few worldwide records of this species.

Keywords: first record, Octopoteuthidae, Mediterranean Sea, statoliths.

RESUMEN: PRIMERA CITA DE *TANINGIA DANAЕ* (CEPHALOPODA: OCTOPOTEUTHIDAE) EN EL MAR MEDITERRÁNEO. – Se cita por primera vez en el Mar Mediterráneo el cefalópodo oceánico *Taningia danae* Joubin, 1931, capturado en una campaña de arrastre de fondo en las costas de Argelia. El individuo, que fue pescado a 385-395 m de profundidad, era un juvenil de 55.6 mm de longitud del manto y 132 días de edad. Este hallazgo es importante dado el escaso número de especímenes capturados en todo el mundo.

Palabras clave: primera cita, Octopoteuthidae, Mar Mediterráneo, estatolitos.

The squid *Taningia danae* Joubin, 1931 is an oceanic species characterized by the presence of two rows of hooks on the arms and two large photophores on the tip of arm II (Guerra, 1992). The body is gelatinous and the juveniles have tentacles which disappear when they become adults. Another important feature of this squid is its large size. It can reach a mantle length (ML) of 1600 mm and more than 120 kg total weight (Roper and Vecchione, 1993; González *et al.*, 2003).

The biology of *T. danae* is rather unknown and the majority of the available data comes from individuals found in the stomach contents of large

predators such as sperm whales and sharks (Roper and Vecchione, 1993). As reported by other authors (Roper and Vecchione, 1993; González *et al.*, 2003), although fishing and marine research activities have increased in recent years, very few individuals have been obtained from these sources and the squids captured are of a small size, suggesting that the larger specimens may be able to avoid the nets or live in grounds where vessels do not usually work. The low number of captured specimens implies that the knowledge about the biology of *T. danae* would be increased progressively by single or small catches, which makes the information presented in this communication valuable.

*Received September 17, 2004. Accepted May 4, 2005.

Previous records confirm that *T. danae* is a globally distributed species present mainly in tropical and subtropical waters, but also venturing into boreal waters (Roper and Vecchione, 1993; Santos *et al.*, 2001; González *et al.*, 2003). Data from stomach contents in the north-east Atlantic have come principally from the Spanish coasts (Clarke and MacLeod, 1974), and some individuals have been fished by vessels operating in this area recently. Four large specimens were taken by commercial trawlers off Spain between July and December 2000: an adult female (Santos *et al.*, 2001), and two other females and a male (González *et al.*, 2003). Santos *et al.* (2001) also reported the capture of a juvenile taken by a research vessel at 800 m depth off west Scotland. The species has not been recorded in the Mediterranean Sea, neither inferred from stomach contents of predators nor from net catches (Mangold and Boletzky, 1987; Bello, 2004).

In the present paper we report the finding of a sexually indeterminate specimen of *T. danae* caught on 14 March 2003 by the R/V *Vizconde de Eza*, during a bottom trawl survey for a fishery assessment carried out in the trawl fishing grounds along the continental slope off Algeria (south-western Mediterranean). The sampling gear used was a GOC73 trawl, which has been used since 1994 by different surveys undertaken throughout the western Mediterranean (Bertrand *et al.*, 2002). The haul was performed in daytime hours (from 15:05 h to 16:05 h) between the coordinates 35°42.11N–01°23.76E and 35°44.03N–01°21.32E and in a narrow depth range from 385 to 395 m. Once captured the specimen was kept frozen and analysed in the laboratory. The squid was somewhat damaged (internal organs were not present, it had lost arm IV and the remaining arms lacked the tip ends) but it could be accurately identified by such external morphological characters as the gelatinous body, the presence of two rows of hooks on the arms, and the width of the oval-shaped fins, higher than 150% of the ML. The individual had no photophores on the ventral side of the mantle, the lack of which is a distinguishing characteristic that separates *T. danae* from *Octopoteuthis sicula* (Guerra, 1992), another Octopoteuthidae species reported in the Mediterranean by Mangold-Wirz (1973), which has one or two photophores on the mantle. The individual did not have tentacles which, according to Roper and Vecchione (1993), would have disappeared at 40–45 mm ML. The specimen was later preserved in 70% ethyl alcohol and deposited in the Centre

TABLE 1. – Morphometric and meristic data of *Taningia danae* captured off Algerian waters (western Mediterranean Sea). Linear measurements are in mm and weight in g (+ sign is added after weight value because the specimen had lost its visceral organs).

Variable	Value
Sex	Indeterminate
Tentacles	Not present
Mantle length	55.6
Total weight	15.9+
Mantle width	19.3
Head width	16.1
Fin length	44.2
Fin width	83.9
Upper rostral length	3.5
Lower rostral length	3.5
Right statolith length	1.528
Right statolith width	1.005
N° of statolith increments	132

Oceanogràfic de Balears collection (recorded under the number COB1/2003).

After identification, morphometric characters and total weight were taken to the nearest 0.1 mm and 0.1 g respectively (Table 1). The beaks were extracted and upper and lower rostral lengths were measured to the nearest 0.1 mm using a dissecting microscope. The right statolith was also removed and measured, both length and width as defined by Clarke (1978), to the nearest μm using a binocular microscope (40X) and a camera lucida. The statolith was prepared as described by Arkhipkin (1991), and Villanueva (1992), and growth increments counted using an image analysis system.

Assuming daily periodicity in deposition of growth increments in statoliths, the age of the specimen would be approximately 4.5 months since the number of growth rings was found to be 132. To the present date, the age of this type of squid has only been estimated in 4 specimens. The squid reported by Santos *et al.* (2001), was 542 days old (estimated ML~1600 mm), while the individuals analysed by González *et al.* (2003), were 647 and 1052 days old (ML = 1050 and 1320 mm respectively). Although the majority of small-sized cephalopods only live for one year, larger species would have longer life spans. This is the case of *T. danae*, in which the oldest specimen analysed so far shows that the species would live up to 3 years, assuming a daily periodicity in deposition.

Data of paralarval and juvenile specimens of *T. danae* reported by Roper and Vecchione (1993), led them to suggest an ontogenetic migration for the species beginning at less than 10 mm ML. The smallest individuals (~6–7 mm ML) occurred close to the surface (<100 m) and increasingly larger animals (up

to ~15 mm ML) occurred at increasingly greater depths (up to ~300 m depth). Although other pelagic squids undergo such ontogenetic movements (Villanueva, 1992; Quetglas *et al.*, 1998), the hypothesis should be taken with care owing to the small amount of data available. The specimen reported here is in accordance with the plot of size–depth data presented by Roper and Vecchione (1993), but the juvenile (32 mm ML) caught at 800 m depth in the north Atlantic (Santos *et al.*, 2001), did not.

In the Mediterranean there is a superficial inflow of Atlantic waters entering through the Strait of Gibraltar which bifurcates northward to the Spanish coast and eastward to North African coasts (Millot, 1999). This pattern of water circulation would explain the sporadic findings in the western Mediterranean basin of marine species coming from the east Atlantic. In terms of cephalopods, the list of occasional visitors reported in recent years includes *Teuthowenia megalops* (Sánchez, 1985), *Stoloteuthis leucoptera* (Orsi Relini and Massi, 1991), *Architeuthis sp.* (González *et al.*, 2000), and *Cranchia scabra* (Quetglas *et al.*, 2000). New records of alien species will probably be added to this list owing to the current increase in fishing and marine research activities in the area.

ACKNOWLEDGEMENTS

Thanks to Dr. Jonathan Rogerson for the English version.

REFERENCES

- Arkhipkin, A.I. – 1991. Methods for cephalopod age and growth studies with emphasis on statolith ageing techniques. In: P. Jereb, S. Ragonese and S. von Boletzky (eds.), *Squid age determination using statoliths. Proceedings of the International Workshop held in the Istituto di Tecnologia della Pesca e del Pescato*. (Special publication), 1: 11-17.
- Bello, G. – 2004. The biogeography of Mediterranean cephalopods. *Biogeographia*, 33: 201-217.
- Bertrand, J.A., L. Gil de Sola, C. Papaconstantinou, G. Relini and A. Souplet. – 2002. The general specifications of the MEDITS surveys. *Sci. Mar.*, 66(Suppl. 2): 9-17.
- Clarke, M.R. and N. MacLeod. – 1974. Cephalopod remains from a sperm whale caught off Vigo, Spain. *J. Mar. Biol. Ass. U.K.*, 54: 733-750.
- Clarke, M.R. – 1978. The cephalopod statolith, an introduction to its form. *J. Mar. Biol. Ass. U.K.*, 58: 701-712.
- González, M., M. Fernández-Casado, M.P. Rodríguez, A. Segura and J.J. Martín. – 2000. First record of the giant squid *Architeuthis sp.* (Architeuthidae) in the Mediterranean Sea. *J. Mar. Biol. Ass. U.K.*, 80: 745-746.
- González, A.F., A. Guerra and F. Rocha. – 2003. New data on the life history and ecology of the deep-sea hooked squid *Taningia danae*. *Sarsia*, 88, 297-301.
- Guerra, A. – 1992. Mollusca, Cephalopoda. In: M.A. Ramos *et al.* (eds.), *Fauna Ibérica*, vol. 1. Museo Nacional de Ciencias Naturales, CSIC, Madrid.
- Mangold-Wirz, K. – 1973. Les céphalopodes récoltés en Méditerranée par le "JEAN CHARCOT". Campagnes Polymede I et II. *Rev. Trav. Inst. Pêches Marit.* 37(3): 391-395.
- Mangold, K. and S.v. Boletzky. – 1987. Céphalopodes. Fiches FAO d'identification des espèces pour les besoins de la pêche. (Revisión 1). Méditerranée et Mer Noire. FAO, Rome: 633-714.
- Millot, C. – 1999. Circulation in the Western Mediterranean Sea. *J. Mar. Syst.*, 20: 423-442.
- Orsi relini, L. and D. Massi. – 1991. The butterfly squid, *Stoloteuthis leucoptera* (Verrill, 1878), in the Mediterranean. *J. Mar. Biol. Ass. U.K.*, 71: 47-51.
- Quetglas, A., F. Alemany, A. Carbonell, P. Merella and P. Sánchez. – 1998. Some aspects of the biology of *Todarodes sagittatus* (Cephalopoda: Ommastrephidae) from the Balearic Sea (western Mediterranean). *Sci. Mar.*, 62: 73-82.
- Quetglas, A., F. Alemany, A. Carbonell and P. Sánchez. – 2000. First record of *Cranchia scabra* Leach, 1817 (Cephalopoda: Cranchiidae) in the Mediterranean Sea. *Boll. Malacol.*, 35: 1-2.
- Roper, C.F.E and M. Vecchione. – 1993. A geographic and taxonomic review of *Taningia danae* Joubin, 1931 (Cephalopoda: Octopoteuthidae), with new records and observations on bioluminescence. In: T. Okutani, R.K. O'Dor and T. Kubodera (eds.), *Recent advances in cephalopod fisheries biology*, pp. 441-456. Tokai University Press, Tokio.
- Sánchez, P. – 1985. Sobre la presencia de *Teuthowenia megalops* (Prosch, 1849) (Cephalopoda, Cranchiidae) en el Mediterráneo. *Inv. Pesq.*, 49(2): 315-318.
- Santos M.B., G.J. Pierce, A.F. González, F. Santos, M.A. Vázquez, M.A. Santos and M.A. Collins. – 2001. First records of *Taningia danae* (Cephalopoda: Octopoteuthidae) in Galician waters (north-west Spain) and in Scottish waters (UK). *J. Mar. Biol. Ass. U.K.*, 81: 355-356.
- Villanueva, R. – 1992. Interannual growth differences in the oceanic squid *Todarodes angolensis* Adam in the northern Benguela upwelling system, based on statolith growth increment analysis. *J. Exp. Mar. Biol. Ecol.*, 159: 157-177.

Scient. ed.: P. Sánchez

