

TRACKING THE INDOPACIFIC PELAGIC OCTOPUS *TREMOCTOPUS GRACILIS* IN THE MEDITERRANEAN

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Abstract

Underwater photographs of a pelagic octopus of the genus *Tremoctopus* in the Tyrrhenian Sea allowed to identify the Indopacific species *T. gracilis*. Both *T. gracilis* and *T. violaceus* have been tracked in the old and recent Mediterranean literature, and the hypothesis of the arrival of *T. gracilis* since at least the Thirties in the Mediterranean is proposed.

Keywords: *Tremoctopus gracilis*, alien cephalopod, Mediterranean

A large berried female of *Tremoctopus* was observed and photographed in coastal waters of the isle of Ponza, in the Tyrrhenian Sea in August 2002. Underwater photographs show an astonishing set of brilliant colours (1). We present here some taxonomical and biogeographical considerations regarding this record.

Pelagic octopuses of genus *Tremoctopus* have an asymmetrical crown of arms, with the dorsal pairs connected by a web, which develops to large sizes in adult females. The genus is characterized by a sharp sexual dimorphism, with a male/female ratio, in terms of mantle length, of about 1:10. Both sexes present autotomic processes in the arms: the male autotomizes his hectocotyized arm during maturity and more than one of these detached arms can be found in the mantle cavity of females. The females sheds segments of the first pair of arms, with the large web and its peculiar colour patterns.

Reviewing the genus, Thomas (2) described two species and two subspecies; at present four species are recognized (3): *T. violaceus* in the Atlantic Ocean and the Mediterranean Sea; *T. gracilis* in the Pacific and Indian Oceans; *T. gelatus* in deep waters worldwide and *T. robsoni* in New Zealand waters.

T. violaceus was described in the Mediterranean by Stefano delle Chiaje (4; 5). Verany (6) and Jatta (7) presented nice colour tables of this species; however the dorsal arms of females are cut at a short distance from the basis and only few spots in longitudinal array can be seen in the basal segment of the dorsal arms. The fully developed ocelli and wonderful colour pattern of the web of adult females was observed by Müller (8) in Messina (Sicily): the colour of the oral side was changing from orange to red or to violet and the ocellar spots were red with a ring of dazzling white.

The monographs by Jatta (7) and Naef (9) scarcely mention Müller's observations (8) probably because adult females were lacking in the material studied at the Zoological Station of Naples. They were completely forgotten also, 85 years later, when another similar observation was made in the North Adriatic. Kramer (10) obtained several females of *Tremoctopus* from fishermen, including three specimens bearing eggs. He observed some of these in the aquaria of the Station of Marine Biology of Rovigno d'Istria and noted that the dorsal arms of the female can be quickly dilated to a very long shape with large web or shortened and contracted, and that along the arm there are transversal lines of autotomy, which separate segments each one with a sucker and a typical pattern of ocelli. He provided a figure in which the ocellar spots are something different both from figures of previous literature and from those obtained on material of the Ligurian Sea (Villefranche) some years later (11).

The significance of the autotomy of the dorsal arm and the role of ocellar spot was given by Nesis (12): the detached segments have a defensive role "the broken off portion instantly widens up to the size of a handkerchief and the bright spots suddenly blazing before predator's eyes on the transparent membrane distract and probably frighten the enemy thus allowing the female to flee". According to Nesis (12) the specific pattern of ocelli on the arms of females has also a taxonomic value, being useful to separate the Atlantic Mediterranean form (at present *Tremoctopus violaceus*) from the indopacific form (at present *T. gracilis*): a single line of ocelli in the former and double lines of ocelli in the latter.

The Mediterranean literature presents the two cases: *T. violaceus* on the basis of the figures of Verany (6), Jatta (7) and especially of Portmann (11); *T. gracilis* in the figures of Kramer (10) and the recent photos (1). These facts represent an interesting geographical problem:

is *T. gracilis* native of the Mediterranean (as *T. violaceus*) or does it represent an alien species arrived through the Suez Canal?

In 1896 a specimen of the Indian ocean fish *Pampus argenteus*, probably transported by a ship, was fished in the Adriatic along the Istrian coast and thereafter preserved in the Museum of Zagreb (13). This event occurred some years before the first Red Sea species, *Atherinomorus lacunosus* was found in the Levantine area (1902) representing the beginning of lessepsian fish migration (14). At present several Red Sea species have been found as sparse records in the Adriatic (14 plus 2003 updating) suggesting transport by ships. The Istrian specimens of *T. gracilis* could have had the same origin. The fecundity of *T. gracilis* is high: Hamabe (15) counted 139.000 embryos on a single female. This fact could explain the local abundance of the introduced cephalopod.

Knowledge of *T. gracilis*, especially in the adult phase, seems poor: in fact its display of luminescent tissues, a rare characteristic in octopuses, has only been recorded in underwater observations in the Red Sea (16).

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References

- 1 - Belluscio A., Ardizzone G.D., Ponticelli M., Pellicciari C., 2003. Prima documentazione fotografica di una femmina ovigera di *Tremoctopus* (Cephalopoda, Octopoda) nel Mediterraneo - *Biol. Mar. Medit.* (submitted).
- 2 - Thomas R.F., 1977. Systematics, distribution and biology of cephalopods of the genus *Tremoctopus* (Octopoda, Tremoctopodidae). *Bulletin of marine science*, 27(3): 353-392.
- 3 - Mangold K.M., Vecchione M., Young R., 1996. Tremoctopodidae. In: Tree of life. Web Project. www.tolweb.org/tree.
- 4 - Delle Chiaje S., 1829. Memorie sulla storia e notomia degli animali senza vertebre del Regno di Napoli. Napoli, Vol. 1.
- 5 - Delle Chiaje S., 1841. Descrizione e notomia degli animali invertebrati della Sicilia citeriore - I Molluschi cefalopodi e pteropodi, Napoli.
- 6 - Verany J.B., 1851. Mollusques méditerranéens, observés, décrits, figurés et chromolithographiés d'après le vivant. I Partie : Céphalopodes de la Méditerranée, Gênes.
- 7 - Jatta G.I., 1896. Cefalopodi viventi nel Golfo di Napoli. Fauna u. Flora d. Golfes v. Neapel, Monogr. 23, Berlin.
- 8 - Müller H., 1852. Ueber das oberste Armpaar von *Tremoctopus*. *Verh. Physik. Med. Ges. Würzburg*. Bd. 3.
- 9 - Naef A., 1921-28. Die Cephalopoden. Fauna u. Flora d. Golfes v. Neapel, Monogr. 35.
- 10 - Kramer G., 1937. Einige Beobachtungen an *Tremoctopus violaceus*. *Note Ist. It.-Germ. Biol. Mar. Rovigno*, N°25: 3-11.
- 11 - Portmann A., 1952. Les bras dorsaux de *Tremoctopus violaceus* Delle Chiaje. *Rev. Suisse Zool.*, 59 : 288-293.
- 12 - Nesis K., 1987. Cephalopods of the world. Neptune City, TFH Publications: 351 p.
- 13 - Soljan T., 1975. I pesci dell'Adriatico. Mondadori Ed., 522 p.
- 14 - Golani D., Orsi Relini L., Massuti E., Quignard J.P., 2002. CIESM Atlas of exotic species in the Mediterranean - Vol 1 Fishes (F. Briand, Ed.). CIESM publ., Monaco, 256 p.
- 15 - Hamabe M., 1973. Egg mass and newborns of *Tremoctopus violaceus* Delle Chiaje, caught in the harbour of Kazumi, Hyogo prefecture. *Bull. Tokai Reg. Fish. Res. Lab.*, 75: 1-5.
- 16 - Goud J., 1989. Een bijzondere waarneming tijdens de Rode Zee-reis. Luminescente bij *Tremoctopus violaceus*: een pelagique octopussoort. *Vita Marina*, Vol. Nov/Dec : 75-78.