

# Reappraisal of *Platynereis massiliensis* (Moquin-Tandon, 1869) (Nereididae), a neglected sibling species of *Platynereis dumerilii* (Audouin & Milne Edwards, 1834), in the Mediterranean Sea

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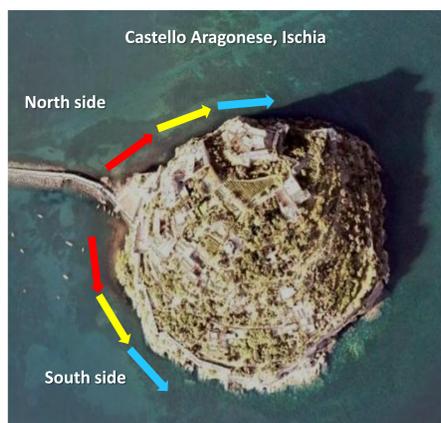
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*Platynereis massiliensis* (Moquin-Tandon, 1869) (Nereididae) is a sibling species of *Platynereis dumerilii* (Audouin & Milne Edwards, 1834), whose adult, not reproductive, stages are morphologically identical but with a highly different reproductive habit (see scheme below) (Hauenschild, 1951; Schneider et al., 1992; Valvassori et al., 2015).

In the Mediterranean Sea *P. massiliensis*, first described in the Marseille region, was successively recorded in the Gulf of Naples (Hauenschild, 1951) and in Banyuls sur Mer (Schneider et al., 1992).

However, these studies, since they were in German (Hauenschild, 1951) or focused on embryology and larval development (Schneider et al., 1992), have been ignored in the taxonomic/ecological literature. In fact, *P. massiliensis* is not reported in any of the Mediterranean polychaete check-lists and revisions (Valvassori et al., 2015), including the Italian coast (Castelli et al., 2008). Ecological and monitoring surveys, generally based on the analysis of formalin or alcohol-fixed adult, not-reproductive specimens, recorded only the presence of *P. dumerilii*, therefore *P. massiliensis* has been likely misidentified and confused with its most common and widespread sibling.

<i>Platynereis dumerilii</i>	<i>Platynereis massiliensis</i>
Gonochoric	Proterandric hermaphrodite
Semelparous	Iteroparous
Epitoke (heteronereis stage)	No epitoke
Free spawner	Brooder, semi-direct development
Oocyte size < 180 μ	Oocyte size > 250 μ
Planctotrophic	Lecitotrophic



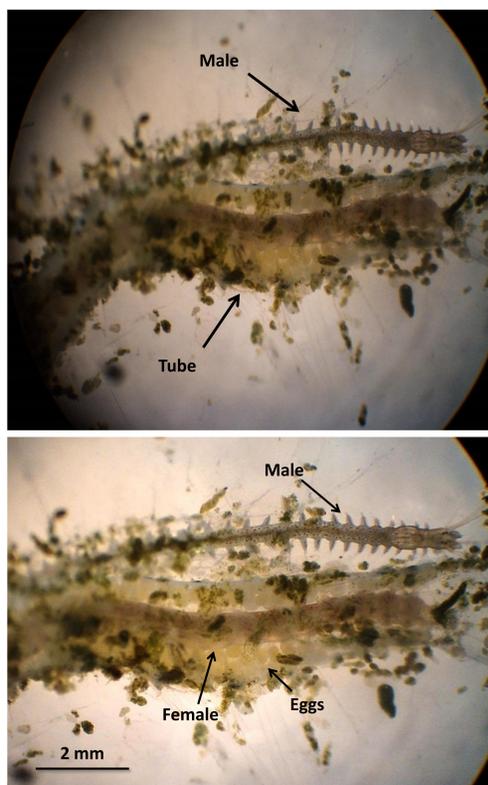
Studies of polychaete populations collected in the vegetated rocky reefs of the naturally acidified waters at the Castello Aragonese CO<sub>2</sub> vent system at the Ischia island (Calosi et al., 2013), revealed the occurrence of *P. massiliensis*, whose distribution seemed restricted to this acidified area (Lucey et al., 2015; Valvassori et al., 2015).



Specimens of *Platynereis* spp. were sampled from the acidified areas (low and extreme low pH) of the CO<sub>2</sub> vents system off the Castello Aragonese (Ischia) (mainly associated to the macroalgae *Halopteris scoparia*, *Dictyota* spp. and *Cladophora* sp.).

Specimens were reared in laboratory under controlled conditions (21 °C and L:D= 16:8; pH= 8.12) in Petri bowls (100 cc) and they were checked for water change, food supply (fresh spinach) and reproductive status approximately every week.

A few specimens of *Platynereis* sampled in various periods between May and October 2014 and 2015, inside the CO<sub>2</sub> vent's area of the Castello (low and extreme low pH) were observed to laid eggs inside their tubes after being kept in laboratory conditions for a period ranging between one to four weeks.



The eggs had a size of 250-350 μm diameter, and were oxygenated by ventilation movements of the female inside the tube. The eggs hatched approximately two weeks after being laid. The juveniles remained inside the parental tube up to 5-6 segments; at 9-10 segments they started to build their own tubes. Eggs dimension and juvenile morphology are consistent with other studies (Hauenschild, 1951, Helm et al., 2014).



The distribution of *Platynereis massiliensis* seems restricted to the acidified areas of the Castello vent's system, and this opens challenging questions about the evolutionary/ecological advantage of brooding as adaptation to ocean acidification and stressful conditions in general (Lucey et al., 2015; Gambi et al., 2016; Waege et al., submitted).

The species recorded in the Gulf of Naples (1951 and present data), and in Banyuls in 1992, should be included in the checklists of the Mediterranean and Italian marine polychaete fauna.

In the light of these results, the distribution of *Platynereis dumerilii* needs also to be reconsidered since the occurrence of its sibling species, *P. massiliensis*, could be more common and widespread than expected.

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