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NON-INDIGENOUS FOULING SPECIES IN THE MARINA OF ROME

SPECIE NON INDIGENE INCROSTANTI PRESSO IL PORTO TURISTICO DI ROMA

Abstract - *Nine non-indigenous species and seven cryptogenic species were recorded in the marina of Rome in 2015 in the framework of a Mediterranean-wide survey of non-indigenous species in marinas. The non-indigenous bryozoan* Amathia verticillata *was by far the most abundant fouling species in the marina, also occurring on many boats.*

Key-words: *macrobenthos, artificial substrata, boating, introduced species.*

Introduction - Globally, shipping is the most important vector of introduction of marine non-indigenous species (NIS); both the larger commercial vessels and the smaller recreational boats act in the process of NIS introduction, via ballast water and hull fouling (Hulme, 2009; Clarke-Murray *et al*., 2011). In the Mediterranean Sea, shipping and boating occur within a complex network of port structures (Kölzsch and Blasius, 2011), thus facilitating the spread of propagules. Moreover, the abundance of artificial hard structures in ports provides suitable habitat for NIS, accelerating their spreading process (López-Legentil *et al*., 2015). The present study is part of a wider project aimed at investigating NIS in Mediterranean marinas. Here we report data from the marina of Rome, located South-East of the Tevere river mouth, in the town of Ostia. This marina was built in 2001 close to the ancient Roman port and hosts 840 berths allocated along 16 piers.

Materials and methods - The survey was carried out on July 13th 2015. The methodology used was a rapid assessment protocol (Marchini *et al*., 2015) undertaken within a six hour period. Fouling biota were collected from submerged ropes and from several piers by scraping the artificial substrate using a handheld rigid net. Some large-sized organisms were identified *in-situ*, the others were collected for taxonomic identification in the laboratory.

Results - Nine NIS and seven cryptogenic species were identified from the marina of Rome (Tab. 1). The cryptogenic species recorded are common fouling organisms in port environments in the Mediterranean Sea. Among the identified NIS, a few are ancient invaders with a widespread distribution in the Mediterranean Sea (*Amathia verticillata*, *Amphibalanus improvisus*, *Hydroides elegans*, *Hydroides dirampha*, *Styela plicata*), while others have a more recent introduction history, and are new for the Latium coast (*Caprella scaura*, *Celleporaria brunnea* and *Paranthura japonica*). Of special concern was the outbreak in the marina of the bryozoan *A. verticillata*, found attached to every type of submerged artificial substrate: pontoons, boats propellers and hulls, tubes, ropes, buoys, etc. The anomalous high temperature of the water (28-30 °C) in the marina of Rome in summer 2015 probably contributed to this alarming outbreak: according to local boaters, with these favourable temperatures *A. verticillata* colonies were able to settle and grow within just one week.

This abundant fouling species exacerbates problem for boaters and for the marina structures, thus requiring more intensive cleaning efforts.

Tab. 1 - List of non-indigenous (NIS) and cryptogenic (CRY) species identified.
Lista delle specie non indigene (NIS) e criptogeniche (CRY) identificate.

Taxa	Species	Status
	Hydroides elegans (Haswell, 1883)	NIS
Annelida	*Hydroides dirampha* Mörch, 1863	NIS
Mollusca	*Anadara transversa* (Say, 1822)	NIS
	Amphibalanus amphitrite (Darwin, 1854)	CRY
	Amphibalanus improvisus (Darwin, 1854)	NIS
	Apocorophium acutum (Chevreux, 1908)	CRY
	Caprella scaura Templeton, 1836	NIS
	Elasmopus rapax Costa, 1853	CRY
	Monocorophium acherusicum (Costa, 1853)	CRY
Crustacea	*Paranthura japonica* Richardson, 1909	NIS
	Amathia verticillata (delle Chiaje, 1822)	NIS
	Bugula neritina (Linnaeus, 1758)	CRY
	Celleporaria brunnea (Hincks, 1884)	NIS
Bryozoa	*Watersipora subtorquata* (d'Orbigny, 1852)	CRY
	Botryllus schlosseri (Pallas, 1766)	CRY
Tunicata	*Styela plicata* (Lesueur, 1823)	NIS

Conclusions - Due to a lack of historical NIS data in the port of Rome, we cannot pinpoint the timing of introductions for the NIS presented in Tab. 1. Interviews with boat owners and technical staff from the marina reported that *A. verticillata*, the most clearly identifiable species, has been present for the last decade, but never with such high abundances. The enclosed design of the marina and the location next to the Tevere river mouth have probably favoured the massive growth of *A. verticillata*, as well as the rich fauna associated with it: for example, the non-indigenous *C. scaura* and *P. japonica* find a suitable habitat in the branches of the invasive bryozoan (Marchini *et al*., 2015).

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