

NEWCOMER SPECIES FROM MALTESE WATERS: ADDITIONS AND AMENDMENTS

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The inventory of newcomers in Maltese waters is updated with the addition of 7 alien and 1 range-expanding species, while one previous entry in the inventory is omitted. Thus, a total of 72 alien and 8 range-expanding species have been recorded by February 2016. Half of these species have established populations in Maltese waters while a further 10% are considered to be invasive. The main modes of introduction for alien species in Maltese waters are 'Shipping' and 'Secondary dispersal' from elsewhere in the Mediterranean. More than half of these newcomer species were recorded since the year 2000.

Keywords: *Species introduction, Alien species, Phytobenthos, Sicily Channel, Zoobenthos*

Introduction

Timely updates to inventories of non-native species are essential to provide information on the distribution, introduction and dispersal pathways, and on impacts of such species. A total of 66 alien and 7 range-expanding species were confirmed from Maltese waters by December 2014 [1], but there have been a number of new records or changes in the status of previously recorded species since then, which are presented here (updated to February 2016). Definitions of establishment status and origin are as given in Evans *et al.*, 2015 [1].

Results and Discussion

New or updated records of newcomer species to be added to the Maltese inventory are listed in Table 1. The 2013 record of *Acanthurus monroviae* [2] was considered questionable [3], but is actually substantiated by a photo (J. Langenack, *pers. comm.*), while a second individual of this species was caught and photographed in November 2015. On the other hand, *Monticellina dorsobranchialis*, recently reported as a non-indigenous species in Maltese waters [4], is not included because it is known to be an Atlanto-Mediterranean species. A specimen of *Kyphosus* sp. was recorded from Malta in January 2016, but its specific identity could not be determined on the basis of photographs and this record was omitted from the inventory. Furthermore, *Stenothoe gallensis* should be removed from the inventory since this record was likely based on a misidentification of the native *S. catta* [5].

Tab. 1. Additions (filled circles) or updates (empty circles) to the inventory of alien and range-expanding species from Maltese waters. Vector: A: aquarium trade, D: dispersal, RE: range expansion, S: shipping, U: unknown; Status: C: casual; E: established; Origin: A: alien; RE: range expansion.

Species	Date	Vector	Status	Origin	Ref
• <i>Apionsoma misakianum</i>	2005	U	E	A	[6]
• <i>Maritigrella fuscopunctata</i>	2015	S / D	E	A	[7]
◦ <i>Ondina michaelae</i>	2009	S	C	A	[8]
◦ <i>Portunus segnis</i>	1972	U	C	A	[7]
• <i>Acanthurus coeruleus</i>	2013	U	C	A	[3]
• <i>Acanthurus monroviae</i>	2013	U	C	A	[2]
• <i>Heniochus intermedius</i>	2014	U	C	A	[3]
• <i>Pomacanthus maculosus</i>	2012	S / A	C	A	*
• <i>Sargocentron hastatum</i>	2016	U	C	A?	**
◦ <i>Stegastes variabilis</i>	2013	U	C	A	[9]
• <i>Enchelycore anatina</i>	2015	RE	C	RE	[10]

* Present authors, unpublished record

** Based on images published on social media

These updates bring the total number of newcomer species recorded from Maltese waters to 80, of which 72 are alien species with the remaining 8 having arrived via natural range expansion. Half of these species have established populations and a further 10% are considered invasive (Fig. 1a). Overall, 'Shipping' and 'Secondary dispersal' from elsewhere in the Mediterranean Sea are the most common introduction pathways for alien species into Maltese waters (Fig. 1b). More than half of the newcomer species were recorded since the year 2000, which is indicative of the accelerated rate of arrivals of new species in the last two decades.

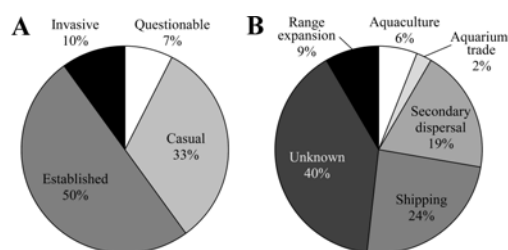


Fig. 1. Newcomer species recorded from Maltese waters by February 2016, grouped according to their (A) establishment success and (B) introduction pathway. All 80 newcomers were included in the analysis of establishment status, while species with a 'Questionable' status were excluded from the analysis of introduction pathways.

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