

RAPID EXPANSION OF RECENTLY INTRODUCED SPECIES POPULATIONS OFF THE MEDITERRANEAN COAST OF TURKEY

M. B. Yokes^{1*}, M. Goren², S. Ü. Karhan³, V. Demir⁴, E. Kalkan⁵, B. S Galil⁶ and A. Diamant⁶

¹ Department of Molecular Biology & Genetics, Halic University - bakiyokes@halic.edu.tr

² Department of Zoology, Tel Aviv University

³ Department of Biology, Istanbul University

⁴ Institute of Marine Sciences and Management, Istanbul University

⁵ Department of Environmental Science, Bogaziçi University

⁶ National Institute of Oceanography, Israel Oceanographic and Limnological Research

Abstract

Recent surveys along the Mediterranean coast of Turkey have documented the rapid expansion of populations of tropical alien species such as *Amphisorus hemprichii*, *Percnon gibbesi*, *Aplysia dactylomela*, *Septifer forskali*, *Diadema setosum*, *Apogon smithii*, *Apogon quecketii*, *Nemipterus randalli* and *Vanderhorstia mertensi*.

Keywords: Eastern Mediterranean, Fishes, Mollusca, Foraminifera, Crustacea

The sublittoral macrofauna of the Mediterranean coast of Turkey was studied in May 2008 and July 2009. Eight bottom trawling sessions were performed at depth of 20-off Iskenderun and Antalya. The population increase of *Apogon smithii*, and *Nemipterus randalli* were noteworthy (Table 1). The Red Sea cardinal fish *A. smithii* was first recorded from Turkey during this study and seven individuals were collected in Iskenderun Bay in 2008 [1], which constituted only 0.003 % of the total biomass. A year later, its percentage increased almost hundred fold (0.29 %). Although an increase was observed also in the populations of *A. quecketii*, it was not significant, indicating that these *Apogon* spp. may have different ecological characteristics. An even more dramatic expansion was observed in the Indian Ocean threadfin bream *N. randalli*. In 2008, it constituted 0.01 % of the total biomass in Iskenderun Bay, whereas in 2009 it was already 1.86 %. A lesser but still prominent increase was observed in Antalya (0.02 % in 2008 vs 1.1% in 2009).

Tab. 1. Biomass percentage of the species observed in 2008 and 2009

	Iskenderun		Antalya	
	2008	2009	2008	2009
<i>Apogon smithii</i>	0,003	0,29	-	-
<i>Apogon quecketii</i>	0,03	0,04	-	-
<i>Nemipterus randalli</i>	0,01	1,86	0,02	1,1

In the framework of a marine biodiversity project, 113 stations off Kas (Antalya) have been regularly monitored by SCUBA diving from June 2002 to August 2009. 15 alien species have been recorded [2-6]. The populations of the foraminiferan *Amphisorus hemprichii*, brachyuran crab *Percnon gibbesi*, sea hare *Aplysia dactylomela*, bivalve *Septifer forskali* and the slender shrimp goby *Vanderhorstia mertensi* expanded remarkably. Both population density and their occurrence increased significantly (Table 2). *Amphisorus hemprichii* has been first recorded in the Mediterranean from 21 stations off Kas in 2002 [5]. One year later it spread to all 113 stations, and was found off Bodrum and Datça in the Aegean Sea as well. At present, the species occurs from Antalya to Bodrum on the southwestern coast of Turkey. Five years after it was first reported in Iskenderun Bay, *Septifer forskali* reached Antalya. Where it was recorded in four stations in 2006, 84 stations the next year and 113 stations two years later. In the populations of *Percnon gibbesi*, *Aplysia dactylomela* and *Vanderhorstia mertensi* expanded as well, but since these species need specific habitat types, they cannot inhabit all the sampling sites. However, the stations in which they are observed cover the entire region, indicating that these species also successfully invaded southwestern coast of Turkey. Not all alien species are invasive: two individuals of the needle-spined urchin *Diadema setosum* have been recorded off Kas in 2006 [3], but no other specimen was sighted since.

Tab. 2. The number of stations off Kas where alien species were observed 2002 - 2009

	Number of stations							
	2002	2003	2004	2005	2006	2007	2008	2009
<i>Amphisorus hemprichii</i>	21	113	113	113	113	113	113	113
<i>Percnon gibbesi</i>	0	0	0	0	2	3	5	25
<i>Aplysia dactylomela</i>	0	0	0	0	0	1	3	10
<i>Septifer forskali</i>	0	0	0	0	4	84	113	113
<i>Diadema setosum</i>	0	0	0	0	1	0	0	0
<i>Vanderhorstia mertensi</i>	0	0	0	0	0	0	1	24

In the past decade we have witness the rapid expansion of some thermophilic alien species along the coast of Turkey. It would be of interest to management to learn whether this could be ascribed to qualities inherent to these particular species, or to changes in the receiving environment.

References

- Goren M, Yokes MB, Galil BS, Diamant A (2008) Indo-Pacific cardinal fishes in the Mediterranean Sea - new records of *Apogon smithii* from Turkey and *A. queketii* from Israel. JMBA2-Biodiversity Records, published online, <http://www.mba.ac.uk/jmba/pdf/6417.pdf>
- Yokes MB, Galil BS (2006) New Records of Alien Decapods (Crustacea) from the Mediterranean Coast of Turkey, with a Description of a New Palaemonid Species. Zoosystema, 28(3): 747-755.
- Yokes MB, Galil BS (2006) The first record of the needle-spined urchin *Diadema setosum* (Leske, 1778) (Echinodermata: Echinoidea: Diademataidae) from the Mediterranean Sea. Aquatic Invasions, 1(3): 188-190.
- Yokes MB, Galil BS (2006) Touchdown - first record of *Percnon gibbesi* (H. Milne Edwards, 1853) (Crustacea: Decapoda: Grapsidae) from the Levantine coast. Aquatic Invasions, 1(3): 130-132.
- Meriç E, Yokes MB, Avsar N (2008) *Amphisorus hemprichii* Ehrenberg (Rhizopoda, foraminifera) along the Antalya coast. *Micropaleontology*, 54 (3-4): 277-292.
- Yokes MB, Bilecenoglu M, Goren M, Galil BS and Diamant A. 2009. Genetic evidence for wide distribution of the alien prawn-goby, *Vanderhorstia mertensi* Klausewitz, 1974 (Gobiidae) along the northeast Mediterranean. *Acta Ichthyologica et Piscatoria*, 39 (2) (in press).