

Errata to the Review Article (*Medit. Mar. Sci.* 11/2, 2010, 381-493):

Alien species in the Mediterranean Sea by 2010. A contribution to the application of European Union's Marine Strategy Framework Directive (MSFD).

Part I. Spatial distribution

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The authors regret that Table 2 of the article (ZENETOS *et al.*, 2011) contained some errors. The errors pertain to nomen-

clature changes and the distribution/establishment success of alien species in the Mediterranean MSFD areas.

Nomenclature changes

The probable synonymy between *Ulva australis* and *Ulva pertusa* is consistent with their morphological similarities and it was suggested that *Ulva australis* is the valid name for the non-native green macroalga (COUCEIRO *et al.*, 2011).

Following HUBER (2010), *Brachidontes ustulatus* (Lamarck, 1819) is the valid name for *Brachidontes variabilis* (Krauss, 1848) = *Brachidontes pharaonis*.

Xenostrobus Wilson, 1967 has been put into synonymy of *Limnoperna* Rochebrune, 1882, so the species should be cited as *Limnoperna securis* (Lamarck, 1818), not *Xenostrobus securis*.

Musculista senhousia and *Musculista perfragilis* have been transferred to the genus

Arcuatula Jousseume in Lamy, 1919. The type species of *Arcuatula* is *A. arcuatula* (Hanley, 1843) which is hardly distinct from *senhousia*, and the name obviously has priority over *Musculista* YAMAMOTO & HABE, 1958.

Finally, *Hamimaera hamigera* (Haswell, 1879) and not *Linguimaera caesaris* Krapp-Schickel, 2003 is the valid name for *Maera hamigera* Haswell, 1880 (WoRMS).

The establishment success along with the corrected distribution of the species, as derived from sources that came later into our attention, is as follows. Three species namely *Hemimysis anomala*, *Neomysis integer* and *Cristapseudes omercooperi* are missing from Table 2, due to a regrettable lapsus.

Table 2

List of species with origin and establishment success in all Mediterranean MSFD areas (WMED=Western Mediterranean, CMED=Central Mediterranean, ADRIA=Adriatic Sea, EMED=Eastern Mediterranean). Establishment success abbreviated as est=established, cas=casual, cry=cryptogenic, que=questionable, abs=absent, +additions to Table 2.

Species	Author	Origin	WMED	CMED	ADRIA	EMED	source
Polychaeta							
<i>Eunice floridana</i>	(Pourtalès, 1867)	W Atlantic		ques	cas		1
<i>Janua (Dexiospira) steueri</i>	(Sterzinger, 1909)	Indo-Pacific				est	2
<i>Pherusa parmata</i>	(Grube, 1878)	Indo-Pacific				est	2
<i>Pherusa saldanha</i>	Day, 1961	Indian				est	2
<i>Prionospio (Minuspio) pulchra</i>	Imajima, 1990	Atlantic/Pacific		est		est	3
<i>Prospheerosyllis longipapillata</i>	(Hartmann-Schröder, 1979)	SW Pacific				cas	M.E. Cinar
<i>Sigambra parva</i>	(Day, 1963)	Indian	cas			que	4
Crustacea/Decapoda							
<i>Gonioinfradens paucidentata</i>	(A. Milne Edwards, 1861)	Indo-Pacific				est	M.Corsini-Foka
Crustacea/Mysidae							
+ <i>Hemimysis anomala</i>	G. O. Sars, 1907	Ponto-Caspian	est				5
+ <i>Neomysis integer</i>	Leach, 1814	NE Atlantic				unknown	6

Continued

Table 2 Continued

Species	Author	Origin	WMED	CMED	ADRIA	EMED	source
Mollusca/Gastropoda							
<i>Chrysallida fischeri</i>	Hornung & Mermod, 1925)	Red Sea				abs est	8
<i>Ostostomia lorioli</i>	(Hornung & Mermod, 1924)	Red Sea				est	A. Zenetos
Fish							
<i>Hemiramphus far</i>	(Forssk ål, 1775)	Indo-Pacific	+cas	est	cas	est	9
<i>Lagocephalus spadiceus</i>	(Richardson, 1844)	Indo-Pacific	+cas			est	9
<i>Siganus luridus</i>	(Rüppell, 1829)	Indian Ocean	est	est	+cas	est	10
<i>Syngnathus rostellatus</i>	Nilsson, 1855	N Atlantic	cas				11
<i>Chirocentrus dorab</i>	Forssk ål, 1775)	Indo-Pacific				quest	12
<i>Siganus javus</i>	(Linnaeus, 1766)	Indo-Pacific				quest	13
<i>Isurus paucus</i>	Guitart Manday, 1966	Circumtropical	cry				

1: SORESI *et al.*, 2004; 2: CINAR, 2009; 3: DAGLI & CINAR, 2011; 4: ERGEN, 1976; 5: WITTMANN & ARIANI, 2009; 6: MUNILLA & SAN VICENTE, 2005; 7: BAMBER *et al.*, 2009; 8: MAZZIOTTI *et al.*, 2005; 9: CHARFI-CHEIKHROUHA, 2004; 10: POLONIATO *et al.*, 2010; 11: HABLUTZEL & WILSON, 2011; 12: OREK, 2008; 13: IBRAHIM *et al.*, 2010.

Notes:

Chrysallida fischeri was first recorded from the Adriatic Sea (MAZZIOTTI *et al.*, 2002) and then described as *Turbonilla flavianoii* (MAZZIOTTI *et al.*, 2005).

Syngnathus rostellatus is present only in the WMED (the only valid record was given by REINA-HERVÁS *et al.*, 1981).

The identification of *Chirocentrus dorab* (OREK, 2008) was based on eggs and larvae and therefore it can be considered as questionable.

The record of *Siganus javus* can be considered doubtful, as the abstract of IBRAHIM *et al.* (2010) was not peer reviewed.

Isurus paucus is considered cryptogenic. In the past it could have been misidentified as *Isurus oxyrinchus* (HEMIDA & CAPAPE, 2008).

The records of *Syngnathus rostellatus* along the southern Turkey and the Gulf of Tunis appear to be questionable, see HABLUTZEL & WILSON (2011).

Moreover, one foram species (*Amphistegina lessonii*), one polychaete species (*Hydroides steinitzi*) and two fish species (*Kyphosus sectator* and *Dasyatis marmorata*) should be removed from the list of aliens.

- According to A. Almogi-Labin (pers. comm) the convention now is that *Amphistegina lessonii* is a native species in the Mediterranean Sea.
- *Hydroides steinitzi* is absent in the EMED (BEN ELIAHU & TEN HOVE, 2011). Having been recorded only from ship biofouling and not from an actual Mediterranean habitat, “ship-transported” seems a more appropriate designation than “casual” (BEN ELIAHU & TEN HOVE, 2011).
- With all probabilities *Dasyatis marmorata* is a native species. In the past, *D. marmorata* could have been confused and misidentified with *D. pastinacea* (GOLANI & CAPAPÉ, 2004; Golani personal comm.).

- *Kyphosus sectator* can be considered as native species. The first individuals were observed during the period 1846–1903 (ARIOLA, 1904) and afterward it was listed in the Italian and Mediterranean fish fauna (TORTONESE, 1986). ORSI-RELINI (2010)

and D. Golani (personal comm.) agree on that.

Table 3 contained a few typographical errors. They are critical since they involve the dispersion of four invasive species in MSFD areas. The correct distribution is as follows:

Table 3
Distribution of invasive (++) or potentially invasive alien species (+) in the Mediterranean MSFD areas.

Taxon	Species	WMED	CMED	ADRIA	EMED
Mollusca/Gastropoda	<i>Aplysia dactylomela</i>		++	+	++
Mollusca/Gastropoda	<i>Cellana rota</i>		+	+	++
Mollusca/Gastropoda	<i>Conomurex persicus</i>		+	+	++
Fish	<i>Siganus luridus</i>	+	++	+	++

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References

- ARIOLA, V., 1904. Pesci nuovi o rari per il Golfo di Genova. *Annali del Museo civico di storia naturale di Genova*, 1: 153-168.
- BAMBER, R.N., BIRD, G., BŁAŻEWICZ-PASZKOWYCZ, M. & GALIL, B., 2009. Tanaidaceans (Crustacea: Malacostraca: Peracarida) from soft-sediment habitats off Israel, Eastern Mediterranean. *Zootaxa*, 2109: 1-44.
- BEN-ELIAHU, M.N. & TEN HOVE, H.A., 2011. Serpulidae (Annelida: Polychaeta) from the Suez Canal - From a Lessepsian Migration Perspective (a Monograph). *Zootaxa*, 2848, 147 pp.
- CHARFI-CHEIKHROUHA, F., 2004. Premières observations de quatre espèces de poissons allochtones à Rafrat (Nord de la Tunisie). *Bulletin de l'Institut National des Sciences et Technologies de la mer, Salammbô*, 31: 125-127.
- CINAR, M.E., 2009. Alien polychaetes species (Annelida: Polychaeta) on the southern coast of Turkey (Levantine Sea, eastern Mediterranean), with 13 new records for the Mediterranean Sea. *Journal of Natural History*, 43 (37-38): 2283-2328.
- COLLIN, R., RAMOS-ESPLÁ, A.A. & IZQUIERDO, A., 2010. Identification of the South Atlantic spiny slipper limpet *Bostrycapulus odites* Collin, 2005 (Caenogastropoda, Calyptraeidae) on the Spanish Mediterranean coast. *Aquatic Invasions*, 5 (2): 197-200.
- COUCEIRO, L., CREMADES, J. & BARREIRO, R., 2011. Evidence for multiple introductions of the Pacific green alga *Ulva australis* Areschoug (Ulvales, Chlorophyta) to the Iberian Penin-

- sula. *Botanica Marina*, 54 (4): 391-402.
- DAGLI, E. & ÇINAR, M.E., 2011. Species of the subgenus *Minuspio* (Polychaeta: Spionidae: Prionospio) from the southern coast of Turkey (Levantine Sea, eastern Mediterranean), with the description of two new species. *Zootaxa*, 3043: 35-53.
- ERGEN, Z., 1976. Investigations on the taxonomy and ecology of Polychaeta from Izmir Bay and its adjacent areas. *Scientific Reports of the Faculty of Science, Ege University*, 209: 1-73.
- GOLANI, D. & CAPAPÉ, C., 2004. First records of the blue stingray, *Dasyatis chrysonota* (Smith, 1828) (Chondrichthyes: Dasyatidae), off the coast of Israel (eastern Mediterranean). *Acta Adriatica*, 45 (1): 107-112.
- HABLUTZEL, P.J. & WILSON, A.B., 2011. Notes on the occurrence of *Syngnathus rostellatus* (Teleostei: Syngnathidae) in the Mediterranean. *Marine Biodiversity Records*, 4 (e57): 1-4. (Published online)
- HEMIDA, F. & CAPAPÉ, C. 2008. On the occurrence of the longfin mako, *Isurus paucus* (Chondrichthyes: Isuridae) off the Algerian coast (southwestern Mediterranean). *Acta Adriatica*, 49 (2): 185-189.
- HUBER, M., 2010. *Compendium of bivalves. A full-color guide to 3,300 of the World's Marine Bivalves. A status on Bivalvia after 250 years of research*. ConchBooks, Hackenheim, Germany, 901 pp.
- IBRAHIM, A., LAHLAH, M., KASSAB, M.Y. GHANEM, W. & OGAILY, S., 2010. *Signatus javus*, a new record from the Syrian waters, with a reference to growth & feeding of two lessepsian fish. *Rapports Commission Internationale Mer Méditerranée* 39.
- MAZZIOTTI, C., AGAMENNONE, F. & TISSELLI, M., 2002. Prima segnalazione di *Chrysallida fischeri* (Hornung & Mermoud, 1925) (Gastropoda: Pyramidellidae) per il Mar Adriatico. *La Conchiglia*, 34 (302): 41-42.
- MAZZIOTTI, C., AGAMENNONE, F., MICALI, P. & TISSELLI, M., 2005. Descrizione di *Turbonilla flaianoi* n. sp. per il Mare Adriatico. *Bollettino Malacologico*, 41 (9-12): 79-84.
- MUNILLA, T. & SAN VICENTE, C., 2005. Suprabenthic biodiversity of Catalan beaches (NW Mediterranean). *Acta Oecologica*, 27: 81-91.
- OREK, Y.A., 2008. The first Mediterranean record of eggs and yolk-sac larvae of Indo-Pacific *Chirocentrus dorab* (Forsskål, 1775) (Teleostei: Chirocentridae). In: *32nd Annual Larval Fish Conference, August 4-7, 2008, Kiel, Germany*.
- ORSI-RELINI, L., COSTA, M.R. & RELINI, M., 2010. First record of the yellow sea chub *Kyphosus incisor* in the Mediterranean. *Marine Biodiversity Records*, 3 (e4): 1-3. (Published online)
- POLONIATO, D., CIRIACO, S., ODORICO, R., DULČIĆ, J. & LIPEJ, L., 2010. First record of the dusky spinefoot *Siganus luridus* (Rüppell, 1828) in the Adriatic Sea. *Annales for Istrian and Mediterranean Studies, Series Historia Naturalis*, 20 (2): 161-166.
- REINA-HERVÀS, J.A., MUÑOZ-CHÁPULI, R. & BLASCO, M., 1981. Presencia de teleosteos atlánticos en el Mediterráneo occidental. *Monografías y Trabajos de Zoología (Universidad de Malaga)*, 3-4: 49-56.
- SORESI, S., CRISTOFOLI, A., MASIERO, M., & CASELLATO, S., 2004. Benthic communities of rocky outcrops in the Northern Adriatic Sea: a quantitative survey. In: *Rapport du 37e Congrès de la Commission Internationale pour l'Exploration Scientifique de la mer Méditerranée*

- ranée, Barcelona, 7-11 June 2004.*
- TORTONESE, E., 1986. Kyphosidae. p. 912-913. In: *Fishes of the northeastern Atlantic and the Mediterranean. Volume 2*. Whitehead P.J.P., Bauchot M.-L., Hureau J.-C., Nielsen J. & Tortonese E. (Eds). UNESCO, Paris.
- WITTMANN, K.J. & ARIANI, A.P., 2009. Reappraisal and range extension of non-indigenous Mysidae (Crustacea, Mysida) in continental and coastal waters of eastern France. *Biological Invasions*, 11 (2): 401-407.
- YAMAMOTO, G. & HABE, T., 1958. Fauna of shell-bearing mollusks in Mutsu Bay. Lammellibranchia (1). *Bulletin of the Marine Biological Station Asamushi, Tôhoku University*, 9 (1): 1-20.
- ZENETOS A., S. GOFAS, M. VERLAQUE M..E. ÇINAR, J.E. GARCIA RASO, et al., 2010b. Alien species in the Mediterranean Sea by 2010. A contribution to the application of Union's Marine Strategy Framework directive Part I Spatial distribution. *Mediterranean Marine Science*, 11(2): 318-493.