

Corrigendum to the Review Article (*Medit. Mar. Sci.* 23/1 2022, 196-212)**Established non-indigenous species increased by 40% in 11 years in the Mediterranean Sea****Argyro ZENETOS¹, Paolo G. ALBANO², Eduardo LÓPEZ GARCIA³, Nir STERN⁴, Konstantinos TSIAMIS¹ and Marika GALANIDI⁵**¹ Hellenic Centre for Marine Research, 19013, Anavyssos, Greece² Stazione Zoologica Anton Dohrn, Villa Comunale, 80121 Napoli, Italy³ Departamento Biología, Área de Zoología, Centro de Investigación en Biodiversidad y Cambio Global (CIBC-UAM), Universidad Autónoma de Madrid, C/ Darwin, 2 28049-Madrid, Spain⁴ Department of Marine Biology, National Institute of Oceanography, Israel Oceanographic and Limnological Research, Tel Shikmona 8030, Haifa 31080, Israel⁵ ÜEE LLC, Marine Ecology Division, Teknopark Izmir A1/49, Urla, Izmir, TurkeyCorresponding author: Marika GALANIDI; marika.galanidi@gmail.com

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With this corrigendum, the authors of Zenetos *et al.* (2022) wish to notify readers of a small number of omissions and corrections in the updated inventory of Mediterranean non-indigenous species (NIS), recently undertaken by them, and amend the total number of NIS reported in the Mediterranean until December 2021.

In the original article, the Zenetos *et al.* (2010) review of Mediterranean NIS was used as a starting point and any subsequent changes were documented in Annex I. Unfortunately, six species of the 2010 inventory were unintentionally omitted, five of which were already established at the time and are still considered valid and established alien species today (Table 1). The sixth one, the epipelagic siphonophoran *Sulculeolaria turgida* (Gegenbaur, 1854), is distributed in temperate and tropical regions in the three great oceans and has been reported from the western and eastern Mediterranean (Alvariño, 1971; 1974; Bouillon *et al.*, 2004), also as *S. angusta* Totton, 1954, with which it was synonymized by Carré (1979). According to Alvariño (1974), the siphonophoran species which are abundant in the Atlantic and have reached the easternmost Mediterranean region can be considered tracers of Atlantic waters; therefore this species is excluded from the inventory of NIS as range expanding.

The scyphozoan *Chrysaora pseudoocellata* Mutlu, Çağatay, Olguner & Yilmaz, 2020, originally described from the Mediterranean (Mutlu *et al.*, 2020), but con-

cluded to be an introduced species of Indo-Pacific origin (Douek *et al.*, 2020), was considered as casual with only two records until the end of 2020. It should be noted however that the species was recorded again in 2021, swarming at the same Turkish locality as the first record (Mutlu & Biçer, 2021), such that it can now be considered established.

Finally, the work by Castelló *et al.* (2020), not reported in the original article, had added another three species to the Mediterranean NIS inventory, two of which are already established, having been recorded in a large number of locations along the Lebanese coast (Table 1), while the third one, *Cirolana manorae* Bruce & Javed, 1987, is a casual occurrence.

With these amendments, the final number of established non-indigenous species in the Mediterranean reaches 759, while 242 species are reported as casual, for a total of 1001 NIS throughout the whole study period (establishment success rate of 75.8%). Including the 23 failed introductions, as assessed by Zenetos *et al.* (2022), the establishment success rate becomes 74%. When it comes to species first recorded in the 2011-2021 period, the only change compared with the original article is *C. pseudoocellata* which moved from the casual to the established species. Thus, the percentage of established species during the 11-year period is still very close to the 40% rate reported in Zenetos *et al.* (2022).

Table 1. Species added to the Mediterranean NIS inventory as presented in Zenetos *et al.* (2022) and its Annexes. For the definitions of “status” please refer to the original article. CTEN = Ctenophora, CNI = Cnidaria, POL = Polychaeta, ISO = Isopoda, CHAE = Chaetognatha.

Group	Species	Zenetos <i>et al.</i> (2010)	Status in 2020	Comments
	Omitted from Zenetos <i>et al.</i> (2010)			No change in status
CTEN	<i>Beroe ovata</i> Mayer, 1912	established	established	No change in status
CTEN	<i>Mnemiopsis leidyi</i> A. Agassiz, 1865	established	established	No change in status
CHAE	<i>Aidanosagitta neglecta</i> Aida, 1897	established	established	No change in status
CHAE	<i>Ferosagitta galerita</i> (Dallot, 1971)	established	established	No change in status
POL	<i>Branchiomma luctuosum</i> (Grube, 1869)	established	established	See Del Pasqua <i>et al.</i> (2018)
CNI	<i>Sulculeolaria turgida</i> (Gegenbaur, 1854)	established as <i>S. angusta</i>	excluded/range expansion	Alvariño (1974), Bouillon <i>et al.</i> (2004)
	Reported after Zenetos <i>et al.</i> (2010)			
ISO	<i>Apanthura addui</i> Wägele, 1981		established	Reported in eight stations along the Lebanese coast (Castelló <i>et al.</i> , 2020)
ISO	<i>Cirolana manorae</i> Bruce & Javed, 1987		casual	Castelló <i>et al.</i> (2020)
ISO	<i>Metacirolana rotunda</i> (Bruce & Jones, 1978)		established	Reported in 13 stations along the Lebanese coast and in Cyprus (Castelló <i>et al.</i> , 2020)
CNI	<i>Chrysaora pseudoocellata</i> Mutlu, Çağatay, Olguner & Yilmaz, 2020		established	Three records in Turkey and Israel (Mutlu & Biçer, 2021; Mutlu <i>et al.</i> , 2020; Douek <i>et al.</i> , 2020)

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References

- Alvariño, A., 1971. Siphonophores of the Pacific with a review of the world distribution. *Bulletin of the Scripps Institution of Oceanography*, 16, 14-32.
- Alvariño, A., 1974. Distribution of siphonophores in the regions adjacent to the Suez and Panama Canals. *Fishery Bulletin*, 72 (2), 527-546.
- Bouillon, J., Medel, M.D., Pagès, F., Gili, J.M., Boero, F. *et al.*, 2004. Fauna of the Mediterranean Hydrozoa. *Scientia Marina*, 68, 1-449.
- Carré, C., 1979. Sur le genre *Sulculeolaria* Blainville, 1834 (Siphonophora, Calycophorae, Diphyidae). *Annales de l'Institut Océanographique, Paris*, 55, 27-48.
- Castelló, J., Bitar, G., Zibrowius, H., 2020. Isopoda (Crustacea) from the Levantine Sea with comments on the biogeography of Mediterranean isopods. *Mediterranean Marine Science*, 21 (2), 308-339.
- Del Pasqua, M., Schulze, A., Tovar-Hernández, M.A., Keppel, E., Lezzi, M. *et al.*, 2018. Clarifying the taxonomic status of the alien species *Branchiomma bairdi* and *Branchiomma boholense* (Annelida: Sabellidae) using molecular and morphological evidence. *PLoS ONE*, 13, e0197104.
- Douek, J., Paz, G., Rinkevich, B., Gevili, R., Galil, B.S., 2020. First record of a non-native pelagiid jellyfish (Scyphozoa: Pelagiidae: *Chrysaora*) in the easternmost Mediterranean Sea. *BioInvasions Records*, 9 (3), 482-489.
- Mutlu, E., Biçer, E., 2021. Second occurrence of *Chrysaora pseudoocellata* in Antalya Gulf, the eastern Mediterranean Sea. *International Journal of Natural and Engineering Sciences*, 15 (3), 79-82.
- Mutlu, E., Çağatay, I.T., Olguner, M.T., Yilmaz, H.E., 2020. A new sea-nettle from the Eastern Mediterranean Sea: *Chrysaora pseudoocellata* sp. nov. (Scyphozoa, Pelagiidae). *Zootaxa*, 4790, 229-244.
- Zenetos, A., Gofas, S., Verlaque, M., Çinar, M.E., García Raso, J.E. *et al.*, 2010. 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. *Mediterranean Marine Science*, 11 (2), 381-493.
- Zenetos, A., Albano, P.G., Lopez Garcia, E., Stirn, N., Tsiamis, K. *et al.*, 2022. Established non-indigenous species increased by 40% in 11 years in the Mediterranean Sea. *Mediterranean Marine Science*, 23 (1), 196-212.

Supplementary Data

The following supplementary information is available online for the article:

Annex 1 (xls): Updated list of examined species with their assessed status in the literature, Zenetos *et al.* (2022) and the additions made with this corrigendum.