

The new Checklist of the Italian Fauna: marine Mollusca

WALTER RENDA ¹, BRUNO AMATI ², CESARE BOGI ³,
GIUSEPPE BONOMOLO ⁴, DOMENICO CAPUA ⁵, BRUNO DELL'ANGELO ⁶,
GIULIA FURFARO ⁷, RICCARDO GIANNUZZI-SAVELLI ⁸,
RAFAEL LA PERNA ⁹, ITALO NOFRONI ¹⁰, FRANCESCO PUSATERI ¹¹,
LUIGI ROMANI ¹², PAOLO RUSSO ¹³, CARLO SMRIGLIO ¹⁴,
LIONELLO P. TRINGALI ¹⁵, MARCO OLIVERIO ¹⁶*

¹ *Via Bologna 18/A, I-87032 Amantea (Italy)*

² *Largo Giuseppe Veratti 37/D, I-00146 Roma (Italy)*

³ *Via Gino Romiti 37, I-57124 Livorno (Italy)*

⁴ *Via Giuseppe Mazzini 9, I-61022 Vallefoglia (Italy)*

⁵ *Vicolo delle Guglie 7, I-57124 Livorno (Italy)*

⁶ *Via Briscata 16, I-16154 Genova (Italy)*

⁷ *Dipartimento di Scienze e Tecnologie Biologiche ed Ambientali, Università del Salento, Centro Ecotekne Pal. A - S.P. 6, I-73100 Lecce (Italy)*

⁸ *Via Mater Dolorosa 54, I-901246 Palermo (Italy)*

⁹ *Dipartimento di Geologia e Geofisica, Università di Bari, via Orabona 4, I-70125 Bari (Italy)*

¹⁰ *Via B. Croce 97, I-00142 Roma (Italy)*

¹¹ *Via Castellana 64, I-90135 Palermo (Italy)*

¹² *Via delle Ville 79, I-55012 Capannori (Italy)*

¹³ *Santa Croce 421, I-30135 Venezia (Italy)*

¹⁴ *Dipartimento di Scienze, Università “Roma Tre”, Viale Marconi, 446, I-00146 Roma (Italy)*

¹⁵ *Via Elio Lampridio Cerva 100, I-00143 Roma (Italy)*

¹⁶ *Dipartimento di Biologia e Biotecnologie ‘Charles Darwin’, Sapienza Università di Roma, Zoologia, Viale dell’Università 32, I-00185 Roma (Italy)*

* *corresponding author, email: marco.oliverio@uniroma1.it*

Keywords: Mollusca, marine, Bivalvia, Caudofoveata, Cephalopoda, Gastropoda, Monoplacophora, Polyplacophora, Scaphopoda, Solenogastres, species list

SUMMARY

The mollusc fauna of the Mediterranean Sea is still considered as the best-known marine mollusc fauna in the world. The previous modern checklists of marine Mollusca were produced by joint teams of amateurs and professionals. During the last years the Italian Society of Malacology (Società Italiana di Malacologia – S.I.M.) maintained an updated version of the Mediterranean checklist, that served as the backbone for the development of the new Italian checklist. According to the current version (updated on April 1st, 2021), 1,777 recognised species of marine molluscs are present in the Italian Economic Exclusive Zone, including also the Tyrrhenian coasts of Corsica and the continental shelf of the Maltese archipelago. The new checklist shows an increase of 17% of the species reported in the 1995 Checklist. This is largely (yet not solely) due to the new wave of studies based on Integrative Taxonomy approaches. A total of 135 species (7.6%) are strictly endemic to the Italian waters; 44 species (2.5%) are alien and correspond to the 28% of the Mediterranean alien marine molluscs. All eight extant molluscan classes are represented. The families represented in the Italian fauna are 307, an increase of 14.6% from the first checklist, partly due to new records and partly to new phylogenetic systematics. Compared with the whole Mediterranean malacofauna, the Italian component represents 71% in species and 61% in families, which makes it a very remarkable part of the Mediterranean fauna.

INTRODUCTION

The project for an updated ‘Checklist of the Italian Fauna’ started in 2020 (Bologna et al. 2022) and the process is now complete for the phylum Mollusca. The database reported in this data paper will be continuously updated in its online webpage; this will make available a dynamically updated knowledge on the occurrence of the fauna in the country (Bologna et al. 2022). The aim of this data paper is to provide information on the updated checklist, limited to the marine species of the phylum Mollusca, with the description of the state of the art of the updated dataset as it currently stands in April 2021.

The phylum Mollusca comprises ca. 100,000 described species (including snails, slugs, limpets, clams, cockles, squids, octopuses, chitons, tusk-shells and many others), prevalently marine (with some lineages that successfully colonised freshwaters and terrestrial habitats) (Ponder et al. 2019, 2020). Molluscs are

classified into eight extant classes (Solenogastres, Caudofoveata, Polyplacophora, Monoplacophora, Cephalopoda, Gastropoda, Scaphopoda, Bivalvia) with an extraordinary degree of diversification of the body-plan and a few shared features: a body divided into a head, a foot, and a visceral mass; a radula (a buccal feeding apparatus, lacking in the bivalves); a coelom reduced to a pericardium and a small cavity surrounding gonads and kidney; a carbonatic shell or an external cover of carbonatic spicules (both lacking in most extant cephalopods, and in some gastropod lineages). The development is primarily indirect, through a lecithotrophic trocophore-like larva in most groups, with the independent evolution of larval planktotrophy in modern gastropods and bivalves, and of a direct development in cephalopods and several freshwater and terrestrial lineages of gastropods and bivalves.

The marine molluscs of the Mediterranean Sea (Fig. 1) are commonly regarded as the best known malacofauna in the world. The history of its modern inventory is traceable back to

the roots of European Malacology, and remarkable checklists of the Mediterranean molluscs were published already between the end of XVIII and the beginning of the XIX century (Oliverio 2003: Table I). In that time frame, the so-called “Golden Age” of European Malacology was the result of very fruitful collaborations among a large number of specialists, including professional and amateur malacologists. Then, the Golden Age rapidly declined and eventually ceased, to restart only in the last decades of the XX century. Of this time are the first new attempts to comprehensive revisions of the European marine malacofauna (Nordsieck 1968, 1972, 1982, Parenzan 1970, 1974, 1976, Bouchet & Warén 1980, 1985, 1986, 1993). This also allowed the completion of a project for a Mediterranean checklist, with the publication of the *Annotated check-list of Mediterranean marine mollusks* (Sabelli et al. 1990-1992, along with the iconographic support: Giannuzzi-Savelli et al. 1994, 1997, 1999, 2001, 2003, 2014) that is still considered a milestone in the field. The *Annotated check-list* served as the core of the project CLEMAM (*Check-List of European Marine Mollusca*: formerly at www.somali.asso.fr/clemam/index.clemam.html) which in turn provided the baseline for the MolluscaBase (<https://www.molluscabase.org/>) and the WoRMS (<http://www.marinespecies.org/>) online databases. It was also the baseline for the preparation of the issues on marine Mollusca of the Italian checklist (Bedulli et al. 1995a, b, c, Bello 1995, Bodon et al. 1995).

Afterwards, the checklist of marine Italian molluscs was entirely or partly updated in 2005 (see Relini 2006), 2008 (in Relini 2008, 2010), 2016 (Bello 2016). During the last years the Italian Society of Malacology has maintained an updated version of the Mediterranean checklist (<https://www.societaitalianadimalacologia.it/sistematica-2/mediterranea.html>), that served as the backbone for the development of the present project of Italian checklist. This is the witnessing of a new era in the compilation of the inventory of Biodiversity, with a bunch of pro-

fessional malacologists surrounded by a majority of skilled amateurs, the latter providing most of the knowledge and a vast array of data from their collections.

RESULTS

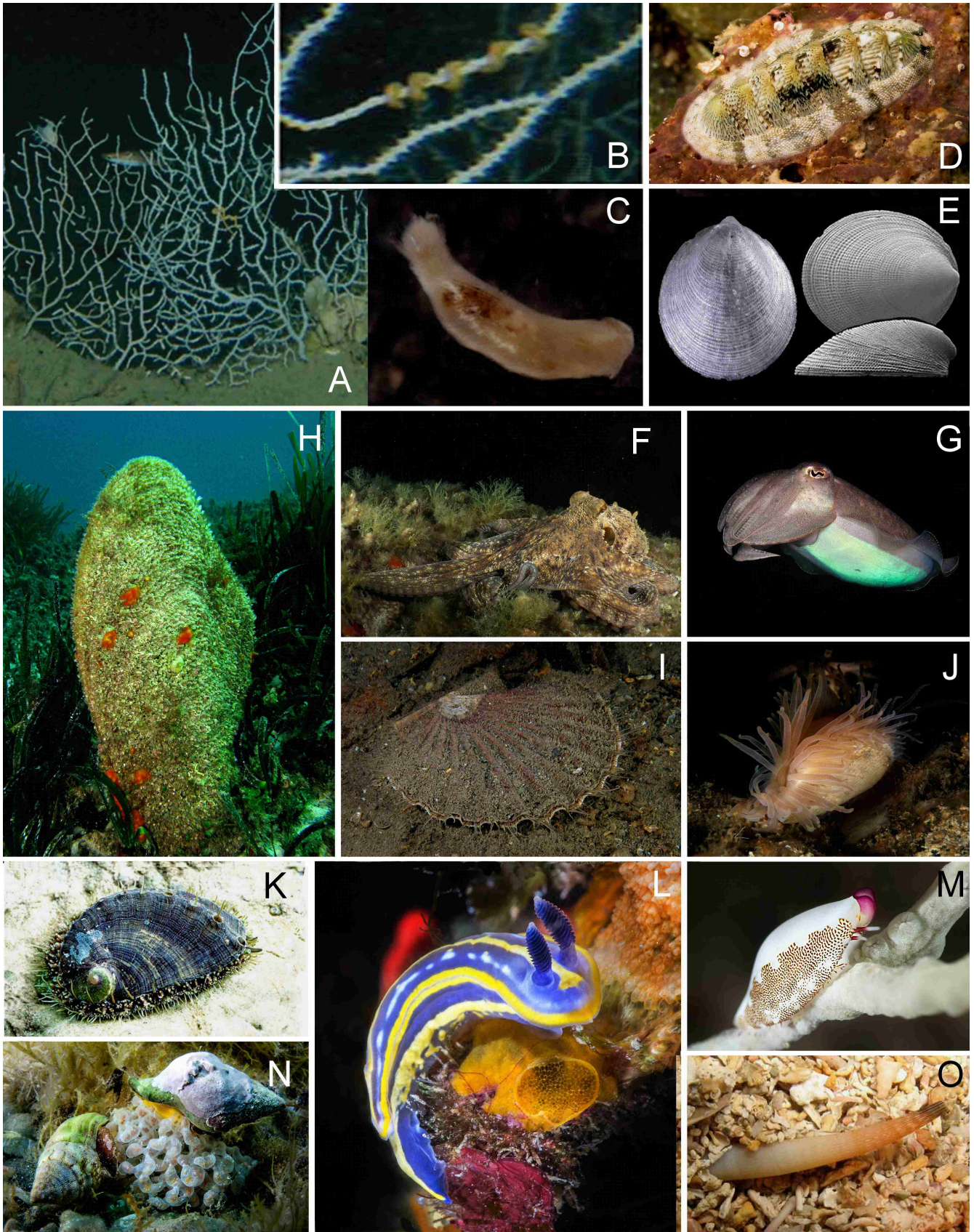
We present here summary statistics of the new checklist, also compared to the previous editions of 1995 (Bedulli et al. 1995a, b, c, Bello 1995, Bodon et al. 1995) and of 2018 (Salvini-Plawen 2008 a, b, Dell’Angelo 2008 a, b, Oliverio et al. 2008, Cattaneo-Vietti & Giovine 2008, Schiapparelli 2008, Steiner 2008, Bello 2008).

Additionally, we also provide a description of the database with brief information on taxonomic guidelines, bibliographic treatment, geographic scope, and other metadata information.

Summary statistics

The checklist includes 1,777 taxa at the species level, belonging to 780 genera and 307 families (Table 1). This represents an increase of 17% compared with the 1,518 species of the 1995 checklist, and of 9.8% compared with the 1,619 species of 2008.

All eight classes of molluscs are represented in the Italian waters (Table 1; yet the single monoplacophoran, *Veleropilina reticulata* (Seguenza, 1876) is still known on empty shells only). The total increase from the previous checklists (+259 species, compared to 1995; +158 compared to 2008), is almost entirely due to two classes, Gastropoda and Bivalvia. However, the small number of additional species scored for Polyplacophora (+8 species compared to 1995), represents an increase of 33% for the class. Interestingly, 173 species have been described as new after 1995 (representing 67% of the increase in species from 1996 to 2021, and 9.7% of the total count); 92 species have been described as new after 2008 (representing 58% of the increase in species from 2009 to 2021, and 5.2% of the total count).



<- previous page - Figure 1. Representative specimens of the marine Mollusca from Italy. A, B, Unidentified Solenogastres on a colony of *Eunicella cavolinii*: off Vibo Marina, Sector 3 (after Bo et al. 2011: fig. 5A). C, Unidentified Caudofoveata: off Civitavecchia, Sector 2. D, Polyplacophora, *Rhyssoplax olivacea* (Spengler, 1797): Santa Caterina, Sector 6, (courtesy Michele Solca). E, Monoplacophora, *Veleropilina reticulata* (Seguenza, 1876): off Capraia Is. Sector 2 (light and SEM images, 1.75 mm length: after <https://www.marinespecies.org/photogallery.php?album=668&pic=147793>). F, Cephalopoda, *Sepia officinalis* Linnaeus, 1858: Santa Caterina, Sector 6 (courtesy Michele Solca). G, Cephalopoda, *Octopus vulgaris* Cuvier, 1798: Faro, Portofino, Sector 1 (courtesy Michele Solca). H, Bivalvia, *Pinna nobilis* Linnaeus, 1758: Sector 9 (courtesy Sub Rimini Gian Neri). I, Bivalvia, *Pecten jacobaeus* Linnaeus, 1758: (courtesy Sub Rimini Gian Neri). J, Bivalvia, *Limaria tuberculata* (Olivi, 1792): Costa Paradiso, Sardinia, Sector 2 (courtesy Michele Solca). K, Gastropoda, *Haliotis tuberculata* Linnaeus, 1758: Capo Noli, Sector 1 (courtesy Giuseppe Mazza). L, Gastropoda, *Felimare tricolor* (Cantraine, 1835): Portofino, Sector 1 (courtesy Michele Solca). M, Gastropoda, *Simnia spelta* (Linnaeus, 1758), Punta dell'Indiano, Portofino, Sector 1 (courtesy Michele Solca). N, Gastropoda, *Euthria cornea* (Linnaeus, 1758) with egg capsules: Capo Noli, Sector 1 (courtesy Michele Solca). O, Scaphopoda, *Antalis vulgare* (Da Costa, 1778), La Maddalena Island.

The increase in the number of families represented in the Italian malacofauna is 19.9% compared to 1995, 6.6% compared to 2008. This is partly due to new species or records (e.g.: *Trogloncha yoidanyi* Giusti, Pagli & Micali 2018, first record of Larocheidae) and partly to new phylogenetic systematics (e.g.: transfer of the genus *Granulina* in the family Granulinidae [see Boyer 2017]).

Framed in the whole Mediterranean Province (2485 molluscan species, based on the updated Mediterranean Checklist compiled by SIM: <https://www.societaitalianadimalacologia.it/sistemica-2/mediterranea.html>), the Italian component represents 71.5% in species and 91.6% in families (307 out of 335) of the whole Mediterranean malacofauna. This makes the Italian marine malacofauna a very remarkable part of the whole Mediterranean malacofauna. A total of 136 species (7.7%) are strictly endemic to the Italian waters (Table 2).

The number of alien species is very remarkable: 44 species (Table 2), 2.5% of the malacofauna, with a strong increase during the recent years (Crocetta et al. 2013, Servello et al. 2019): they represent 28% of the 156 alien molluscan species recorded in the Mediterranean by the last review (Zenetos & Galanidi 2020).

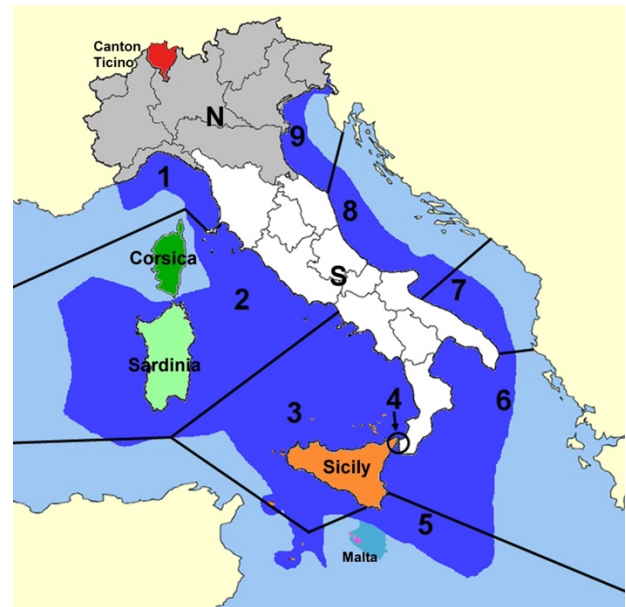


Figure 2. Geographical setting for the new ‘Checklist of the Italian fauna’. Marine sectors, with the Economic Exclusive Zone in blue: 1, Ligurian Sea (s.l.); 2, northern Tyrrhenian, including the sea around Corsica and Sardinia; 3, southern Tyrrhenian, including the sea around northern and southern Sicily and Pantelleria Is.; 4, Messina Strait; 5, southern Mediterranean, including the sea around south-eastern Sicily and Pelagie Islands, and the continental shelf around Malta (light blue); 6, Ionian Sea; 7, southern Adriatic; 8, mid-Adriatic; 9, northern Adriatic. Terrestrial and freshwater sectors: **Canton Ticino** (red); **N**, northern continental macro-region (grey shading); **S**, southern peninsular macro-region (white); **Sicily** (orange); **Sardinia** (light green); **Malta** (pink); **Corsica** (dark green).

Table 1. Summary of the marine molluscan diversity as derived from the present checklist (**in bold: 2021**), with a summary of the species and family numbers reported in the two previous checklists (1995, 2008).

class	specie (1995)	families (1995)	species (2008)	families (2008)	species (2021)	genera (2021)	families (2021)
Caudofoveata	4	3	6	3	5	3	3
Solenogastres	12	9	16	10	14	13	9
Polyplacophora	24	6	29	6	32	12	7
Monoplacophora	1	1	1	1	1	1	1
Gastropoda	1090	149	1156	174	1298	490	192
Bivalvia	316	65	340	66	357	212	67
Scaphopoda	13	2	13	6	12	7	6
Cephalopoda	58	21	58	22	58	42	22
total	1518	256	1619	288	1777	779	307

Table 2. Number of species scored in the 9 marine biogeographic sectors (see Table 3 for description), including total figures, Italian endemics and alien species.

Marine sector	total species	endemic species	alien species
1	1074	41	9
2	1349	72	18
3	1398	80	18
4	987	37	21
5	1167	31	13
6	1172	54	20
7	710	19	7
8	787	20	7
9	667	14	19
entire Italy	1777	136	44

Table 3. Description of the dataset with specific information relative to definitions and storage type for each of the 49 columns of the dataset.

Variable (column)	Description	Storage type
Phylum	Phylum name, Mollusca for all records	string
Class	Class name, either Caudofoveata, Solenogastres, Monoplacophora, Polyplacophora, Gastropoda, Bivalvia, Scaphopoda, or Cephalopoda	string
Order	Order name, according to MolluscaBase	string
Family	Family name, according to MolluscaBase	string
Genus	Valid genus name, according to MolluscaBase	string
Genus authorship	Genus descriptor, reported according to the rules of the ICZN (1999)	string
Species	Valid species name, according to MolluscaBase	string
Species authorship	Species descriptor, reported according to the rules of the ICZN (1999)	string
Subspecies	Valid subspecies name, according to MolluscaBase	string
Subspecies authorship	Subspecies descriptor, reported according to the rules of the ICZN (1999)	string
WoRMS (AphiaID)	Species AphiaID as reported in WoRMS	string
Endemic	Species known as endemic	binary
Alien	Species known as alien	binary
1	Marine Sector number 1 according to SIBM: Ligurian Sea North of Piombino and Capo Corso	binary
2	Marine Sector number 2 according to SIBM: Coasts of Sardinia and Corsica, with North Tyrrhenian Sea from Piombino to Gaeta	binary

Variable (column)	Description	Storage type
3	Marine Sector number 3 according to SIBM: Coasts of Campania, Tyrrhenian coasts of Basilicata, Calabria and Sicily	binary
4	Marine Sector number 4 according to SIBM: Messina Strait between Sicily and Calabria	binary
5	Marine Sector number 5 according to SIBM: South-Eastern coasts of Sicily, Pelagian Islands, Maltese archipelago	binary
6	Marine Sector number 6 according to SIBM: Eastern coast of Sicily (excluding Messina Strait), Ionian coasts of Calabria, Basilicata and Apulia (northward up to Otranto)	binary
7	Marine Sector number 7 according to SIBM: Lower Adriatic Sea, Coasts of Apulia between Otranto and Manfredonia	binary
8	Marine Sector number 8 according to SIBM: Mid Adriatic Sea, coasts between Manfredonia (Apulia) and Conero (Marche)	binary
9	Marine Sector number 9 according to SIBM: High Adriatic Sea, coasts from Conero (Marche) to Istria (Friuli - Venezia Giulia)	binary
Taxonomic notes	Taxonomic and nomenclatorial changes from the previous checklists (1995, 2008), or suggested changes to WoRMS	string
Distribution notes	Literature reference for the records in a geographical unit (not reported or corrected from the previous checklists (1995, 2008)	string

Table 4. List of the specialists who have contributed to this Checklist, with the taxonomic group under their care. Additionally, Marco Bodon, Simone Cianfanelli and Gianbattista Nardi shared data on brackish and intertidal-supratidal gastropods (Hydrobiidae, Cochliopidae, Tateidae, Assimineidae, Otinidae, Ellobiidae).

Specialist	Taxonomic expertise
Bruno Amati	Gastropoda: Patellidae, Lottiidae, Lepetellidae, Littorinimorpha
Cesare Bogi	Gastropoda: Lepetellida, Lepetidae. Bivalvia: Lucinoida, Venerida, Gastrochaenida, Adapedonta, Galeommatida, Myida
Giuseppe Bonomolo	Gastropoda: Littorinimorpha, Neogastropoda
Domenico Capua	Cephalopoda: all families
Bruno Dell'Angelo	Monoplacophora and Polyplacophora: all families
Giulia Furfaro	Gastropoda: Nudibranchia, Sacoglossa, Umbraculida, Pleurobranchomorpha, Runcinida, Anaspidea
Riccardo Giannuzzi-Savelli	Gastropoda: Neogastropoda
Rafael La Perna	Bivalvia: Cardiida, Carditida, Solemyoida, Nuculida, Nuculanoida, Arcoida
Italo Nofroni	Gastropoda: lower Heterobranchia. Bivalvia: Cardiida, Mytiloida
Marco Oliverio	Caudofoveata, Solenogastres: all families. Scaphopoda: all families. Mollusca (coordination)
Francesco Pusateri	Gastropoda: Neogastropoda
Walter Renda	Gastropoda: Lepetellida, Littorinimorpha, Neogastropoda, Pteropoda, Siphonariida, Ellobiida, Systellommatophora, Caenogastropoda. Bivalvia: Cardiida, Lucinoida, Ostreida, Venerida, Gastrochaenida, Adapedonta, Galeommatida, Myida. Mollusca (coordination)
Luigi Romani	Gastropoda: Seguenziida, Cocculinida, Cycloneritimorpha, lower Heterobranchia, Caenogastropoda, Trochida. Bivalvia: Solemyoida, Nuculida, Nuculanoida, Arcoida, Anomalodesmata, Pectinoida, Limoida
Paolo Russo	Gastropoda: Littorinimorpha, Neogastropoda, Caenogastropoda
Carlo Smriglio	Gastropoda: Neogastropoda, Trochida
Lionello P. Tringali	Gastropoda: lower Heterobranchia, Cephalaspidea

The biogeographic sectors (see Fig. 2, and Table 3 for definition) with the highest number of species are Sector 2 (coasts of Sardinia

and Corsica, with the North Tyrrhenian Sea from Piombino to Gaeta: 1,349 species) and Sector 3

(coasts of Campania, Tyrrhenian coasts of Basilicata, Calabria and Sicily: 1,398 species). As expected, the lowest molluscan diversity was scored in the Adriatic, and particularly in Sector 9 (northern Adriatic Sea, coast from Conero to Istria: 667 species) (Fig. 3A). Sectors 2 and 3 have also the highest number of scored endemics 72 spp. (5.3%) and 80 spp. (5.7%), respectively; Sector 9 has the lowest, 14 spp. (2.1%) (Fig. 3B).

Interestingly, the highest number of alien species is recorded from the Strait of Messina (Sector 4: 21 species, 2.1%), with high numbers also from Sector 6 (Eastern coast of Sicily excluding Messina Strait, Ionian coasts of Calabria, Basilicata and Apulia, northward to Otranto: 20 spp., 1.7%) and Sector 9 (19 species, 2.8%) (Fig. 3C).

Data set description

The checklist includes information in 49 fields, of which 24 have been used for the marine Mollusca (thus, excluding those concerning the presence/absence in terrestrial/freshwater areas and in the Italian Administrative Regions: Table 3). The first ten fields provide the taxa from Phylum to Family, followed by Genus and Genus authorship, Species and Species authorship, and eventually, when available, Subspecies and Subspecies authorship.

The following column reports the Aphid of the World Register of Marine Species, WoRMS (Horton et al. 2021). It is worthy of note that we have almost invariably adopted the taxonomy present in WoRMS and MolluscaBase, addressing in the relevant notes, specific cases where changes to WoRMS are suggested.

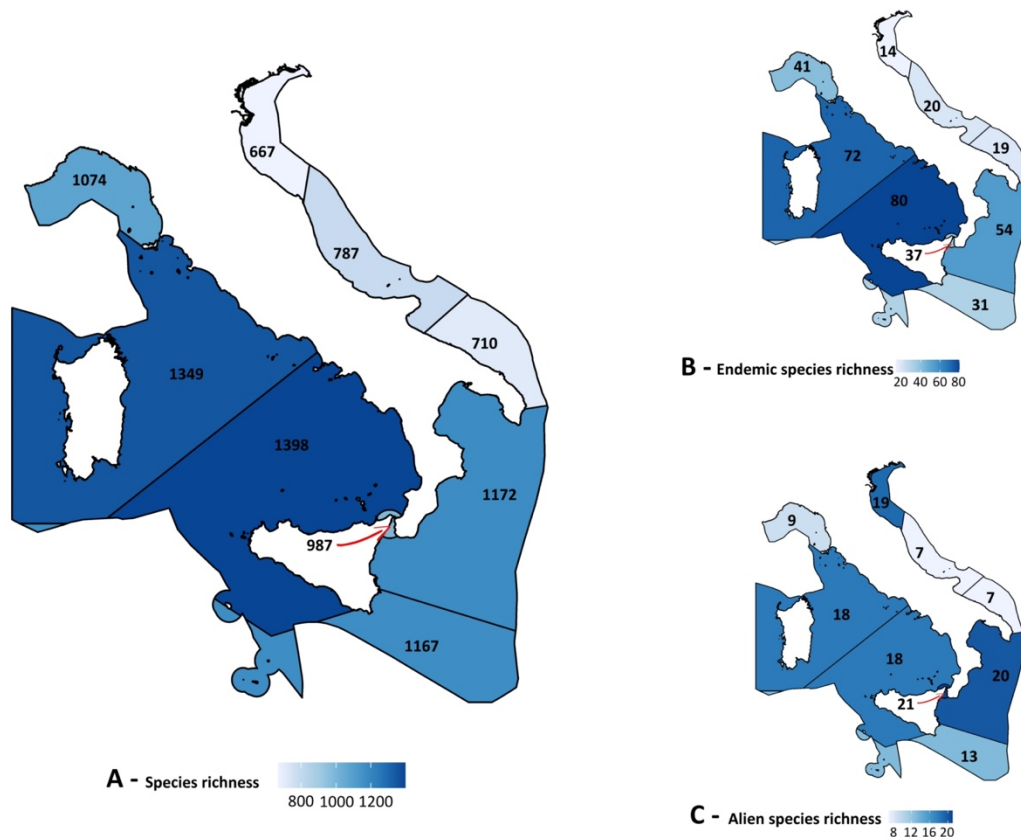


Figure 3. Patterns of richness in the biogeographic marine sectors (see Figure 2). A, Species richness: total number of species for each sector. B, Endemic species richness: number of Italian endemic species present in each sector. C, Alien species richness: number of species non-Indigenous for the Italian fauna, present in each sector.

Two fields report whether the species is currently known to be endemic to Italy, or whether it is a recent introduction, according to the definition of the Secretariat of the Convention on Biological Diversity (2002).

The following columns report the known occurrence of molluscs in each of the nine areas (Fig. 2; Table 3) used in the checklist of the marine flora and fauna published by the Società Italiana di Biologia Marina (Relini 2008, 2010) and largely based on the biogeographic sectors identified by Bianchi (2004), including records from the Italian Economic Exclusive Zone.

Two final columns report nomenclatorial and geographical notes, respectively, with the relevant literature references (particularly concerning taxonomic changes or new entries with respect to previous editions of the checklist, suggested changes to the taxonomy in WoRMS/MolluscaBase, and new geographic records with respect to the previous edition of the checklist).

A simplified version of the checklist is given in the Supplementary file.

Data set information

Object name: Checklist of the Italian Fauna: marine Mollusca

Characters encoding: Unicode (UTF-8)

Data set citation: Renda W., Amati B., Bogi C., Bonomolo G., Capua D., Dell'Angelo B., Furfaro G., Giannuzzi-Savelli R., La Perna R., Nofroni I., Pusateri F., Romani L., Russo P., Smriglio C., Tringali L. P., Oliverio M., 2021. Marine Mollusca. In: Bologna M.A., Zapparoli M., Oliverio M., Minelli A., Bonato L., Cianferoni F., Stoch F. (eds.), Checklist of the Italian fauna. Version 1.0. Last update: 2021-05-31.

Format name: xml, Extensible Markup Language, for the online version at LifeWatch Italy.

Format version: 1.0

Distribution: <https://dataportal.lifewatchitaly.eu/view/urn%3Auuid%3Ac1f2ab37-61e4-48e9-b3a9-15bdbf002f9d>

Date of creation: June 15th, 2020

Date of last revision: June 15th, 2020

Date of publication: July 23rd, 2021

Language: English

License of use: Creative Commons Attribution 4.0 International License

Metadata language: English

Metadata managers: Marco Bologna, Lucio Bonato, Fabio Cianferoni, Alessandro Minelli, Marco Oliverio, Fabio Stoch, Marzio Zapparoli & LifeWatch Italy

Management details

Project title: The new Checklist of the Italian Fauna: marine Mollusca

Database manager: Renda W., Amati B., Bogi C., Bonomolo G., Capua D., Dell'Angelo B., Furfaro G., Giannuzzi-Savelli R., La Perna R., Nofroni I., Pusateri F., Romani L., Russo P., Smriglio C., Tringali L. P., Oliverio M.; Marco Bologna, Lucio Bonato, Fabio Cianferoni, Alessandro Minelli, Marco Oliverio, Fabio Stoch, Marzio Zapparoli & LifeWatch Italy

Temporal coverage: Anything published until 1 April 2020.

Record basis: Published records in the scientific and grey literature.

Funding grants: No funding was specifically available for the project on marine Mollusca; funding for the update of the Checklist of the Italian fauna was obtained from LifeWatch Italy.

Geographic information

General description: The dataset covers records from the Italian Economic Exclusive Zone, including also the continental shelf of the Maltese archipelago and of the Tyrrhenian coasts of Corsica.

Geographic units: The geographical units for marine and coastal waters refer to the nine biogeographical sectors identified in the checklist of the marine flora and fauna published by the Società Italiana di Biologia Marina, SIBM (Relini 2008, 2010), and largely based on the biogeographic sectors identified by Bianchi (2004), including records from the Italian Economic Exclusive Zone.

Bounding box: The Italian Economic Exclusive Zone as defined in Flanders Marine Institute (2019) (but including also the Tyrrhenian coasts of Corsica and the continental shelf of the Maltese archipelago) bounded by the following min/max latitudes/longitudes:

Min. Lat - 35° 3' 51.9" N (35.0644°)

Max. Lat - 45° 48' 32.1" N (45.8089°)

Min. Long - 5° 53' 23" E (5.8897°)

Max. Long - 18° 59' 42.9" E (18.9952°)

Sampling design: We did not perform any additional sampling to collect records of marine Mollusca, but we used only published data.

Habitat type: Any type of marine habitat where Mollusca can be found was considered. The area encompassed by this survey, includes the pelagic and benthic realms, on hard and soft bottoms, from the intertidal, down to the 4000+ m depth of the southern Ionian Sea.

Biogeographic region: Within the Mediterranean Province of the Atlantic-Mediterranean Region, the dataset covers nine of the thirteen Mediterranean biogeographical Sectors (Bianchi et al. 2012).

Countries: Marine Economic Exclusive Zone of Italy (but including also the Tyrrhenian coasts of Corsica and the continental shelf of the Maltese archipelago).

Quality control for geographic data: We checked that the georeferenced records and the published localities in the scrutinized papers, actually matched the geographical units used for the checklist at the level of marine regions.

Literature records

General description: Only published records are included in the dataset. Searches through the literature were performed until April 1st, 2021.

Literature search methods: We searched through Web of Science, Scopus, and Google Scholar for keywords ('mollusc' or 'Mollusca', or 'gastropod' or 'Gastropoda', or 'bivalve' or 'Bivalvia', or 'chiton' or 'Polyplacophora', or 'cephalopod' or 'Cephalopoda', or 'Solenogastres', or 'Caudofoveata') and ('Italy' or 'Italian').

Literature list: A total of over 500 papers have been scrutinized to check for taxonomic/nomenclatural changes and geographical records.

Quality control for literature data: The team of the Società Italiana di Malacologia (SIM) is keeping a complete catalogue of indexed and grey literature on the Mediterranean marine molluscs, which was used to complete the search. The dynamic nature of the online dataset at Lifewatch Italy will allow including potentially overlooked records.

Taxonomic information

General description: Only records reporting species or subspecies were included, disregarding records identified only at higher levels.

Taxonomic coverage: phylum Mollusca (as included in MolluscaBase).

Taxonomic rank: Only species and subspecies are reported; the dataset reports higher taxa for each species, including Phylum, Class, Order, Family, Genus.

Taxon specialists: Bruno Amati, Cesare Bogi, Giuseppe Bonomolo, Domenico Capua, Bruno Dell'Angelo, Giulia Furfaro, Riccardo Gianuzzi-Savelli, Rafael La Perna, Italo Nofroni, Marco Oliverio, Francesco Pusateri, Walter Renda, Luigi Romani, Paolo Russo, Carlo Smriglio, Lionello P. Tringali. See Table 4 for details on individual expertise.

Nomenclature: The adopted nomenclature followed the species names in MolluscaBase (MolluscaBase eds. 2021), adopted also in WoRMS (Horton et al. 2021).

Taxonomic remarks: All taxonomic changes that occurred since the publication of the previous checklists (1995, 2008). Species that were included in the previous checklist and are now considered not valid or not present in Italian waters, are excluded from the dataset.

Quality control for taxonomic data: Taxonomic data were checked and updated to include revision of names, synonyms, delimitation of genera and higher taxa. All entries have been checked for congruency with the taxonomy in MolluscaBase and WoRMS.

ACKNOWLEDGEMENTS

We thank the whole community of malacologists, mostly members of the Italian Society of Malacology (SIM) who have constantly provided data, hints, corrections. Furthermore, we are grateful to Marzia Bo, Giuseppe Mazza, Mario Munaretto and Sub Rimini Gian Neri, Michele Solca, who provided images of living animals for Figure 1.

REFERENCES

- Bedulli D., Castagnolo L., Ghisotti F. & Spada G. (1995) Bivalvia, Scaphopoda. In: Minelli, A., Ruffo, S. & La Posta S. (eds), Check-list delle specie della fauna italiana, 17. Calderini, Bologna, 21 pp.
- Bedulli D., Cattaneo-Vietti R., Chemello R., Ghisotti F. & Giovine F. (1995b) Gastropoda Opisthobranchia, Divasibranchia, Gymnomorpha. In: Minelli, A., Ruffo, S. & La Posta S. (eds), Check-list delle specie della fauna italiana, 15. Calderini, Bologna, 24 pp.
- Bedulli D., Dell'Angelo B., Salvini-Plawen L. von (1995c) Caudofoveata, Solenogastres, Polyplacophora, Monoplacophora. In: Minelli, A., Ruffo, S. & La Posta S. (eds), Check-list delle specie della fauna italiana, 13. Calderini, Bologna, 5 pp.
- Bello G.B. (2017) Cephalopoda (update December 2016). In: Relini, G. (ed.), Checklist della flora e della fauna dei mari italiani. *Biologia Marina Mediterranea*: <http://www.sibm.it/CHECKLIST/cephalopoda%20aggiornamento%202017%20def.pdf> [accessed 2020, February 4].
- Bello G.B. (2008) Cephalopoda. In Relini, G. (ed.) Checklist della Flora e della Fauna dei mari italiani (II parte). *Biologia Marina Mediterranea*, 17 (Suppl. 1): 318–322.
- Bianchi C.N. (2004). Proposta di suddivisione dei mari italiani in settori biogeografici. *Notiziario SIBM*, 46: 57–59
- Bianchi, C.N., Morri, C., Chiantore, M., Montefalcone, M., Parravicini, V. & Rovere, A., (2012) Mediterranean Sea biodiversity between the legacy from the past and a future of change. In Stambler & Noga (eds) *Life in the Mediterranean Sea: a look at habitat changes*. Nova. Chapter 1, 55 pp.
- Bo, M., Bavestrello, G., Canese, S., Giusti, M., Angiolillo, M., Cerrano, C., Salvati, E. & Greco, S. (2011) Coral assemblage off the Calabrian Coast (South Italy) with new observations on living colonies of *Antipathes dichotoma*. *Italian Journal of Zoology*, 78 (2), 231–242. DOI: 10.1080/11250001003652619
- Bodon M., Favilli L., Giannuzzi-Savelli R., Giovine F., Giusti F., Manganelli G., Melone G., Oliverio M., Sabelli B. & Spada G. (1995) Gastropoda Prosobranchia, Heterobranchia Heterostropha. In: Minelli, A., Ruffo, S. & La Posta S. (eds), Checklist delle specie della fauna italiana, 14. Calderini, Bologna, 60 pp.
- Bologna, M.A., Bonato, L., Cianferoni, F., Minelli, A., Oliverio, M., Stoch, F. & Zapparoli, M. (2022) Towards the new Checklist of the Italian fauna. *Biogeographia – The Journal of Integrative Biogeography*, 37, ucl001. DOI: 10.21426/B637156271
- Bouchet P. & Warén A., (1980) Revision of the North-East Atlantic bathyal and abyssal Turridae. *Journal of Molluscan Studies*, Suppl. 8, 1–120. DOI: 10.1093/mollus/46.supplement_8.1
- Bouchet P. & Warén A. (1985) Revision of the Northeast Atlantic bathyal and abyssal Neogas-

- tropoda excluding Turridae (Mollusca, Gastropoda). *Bollettino Malacologico*, Suppl. 1, 121–296.
- Bouchet P. & Warén A. (1986) Revision of the Northeast Atlantic bathyal and abyssal Aclidiidae, Eulimidae and Epitoniidae (Mollusca, Gastropoda). *Bollettino Malacologico*, Suppl. 2, 297–576.
- Bouchet P. & Warén A. (1993) Revision of the Northeast Atlantic bathyal and abyssal Mesogastropoda excluding Turridae (Mollusca, Gastropoda). *Bollettino Malacologico*, Suppl. 3, 577–840.
- Boyer F. (2017) Révision de l'organisation supra-spécifique des gastéropodes granuliniformes. *Xenophora Taxonomy*, 16, 25–38.
- Cattaneo-Vietti, R. & Giovine, F. (2008) Gastropoda Opisthobranchia. In Relini, G. (ed.) Checklist della Flora e della Fauna dei mari italiani (II parte). *Biologia Marina Mediterranea*, 17 (Suppl. 1), 279–295.
- Crocetta, F., Macali, A., Furfaro, G., Cooke, S., Villani, G., & Valdes, A. (2013) Alien molluscan species established along the Italian shores: an update, with discussions on some Mediterranean “alien species” categories. *ZooKeys*, 277, 91. DOI: 10.3897/zookeys.277.4362
- Dell'Angelo, B. (2008) Monoplacophora. In Relini, G. (ed.) Checklist della Flora e della Fauna dei mari italiani (II parte). *Biologia Marina Mediterranea*, 17 (Suppl. 1), 234.
- Dell'Angelo, B. (2008) Polyplacophora. In Relini, G. (ed.) Checklist della Flora e della Fauna dei mari italiani (II parte). *Biologia Marina Mediterranea*, 17 (Suppl. 1), 231–233.
- Flanders Marine Institute (2019) Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 11. Available online at <http://www.marineregions.org/>. DOI: 10.14284/386
- Giannuzzi-Savelli, R., Pusateri, F., Micali, P., Nofroni, I. & Bartolini, S. (2014) Atlas of the Mediterranean seashells. Vol. 5. Heterobranchia. Danaus, Palermo, 298 pp.
- Giannuzzi-Savelli R., Pusateri, F., Palmeri, A. & Ebreo, C. (1994) Atlas of the Mediterranean seashells. Vol. 1. Archaeogastropoda. Evolver, Roma, 126 pp.
- Giannuzzi-Savelli, R., Pusateri, F., Palmeri, A. & Ebreo, C. (1997) Atlas of the Mediterranean seashells. Vol 2. Caenogastropoda 1, Discopoda-Heteropoda. Evolver, Roma, 258 pp.
- Giannuzzi-Savelli, R., Pusateri, F., Palmeri, A. & Ebreo, C. (1999) Atlas of the Mediterranean seashells. Vol 3. Caenogastropoda 2 (Ptenoglossa). Evolver, Roma, 128 pp.
- Giannuzzi-Savelli, R., Pusateri, F., Palmeri, A. & Ebreo, C. (2001) Atlas of the Mediterranean seashells. Vol. 7. Bivalvia part 1. Evolver, Roma, 246 pp.
- Giannuzzi-Savelli, R., Pusateri, F., Palmeri, A. & Ebreo C. (2003) Atlas of the Mediterranean seashells. Vol 4. Neogastropoda excluding Toxoglossa and Cancellarioidea. Evolver, Roma, 298 pp.
- Horton, T., Kroh, A., Ahyong, S., et al. (2021) World Register of Marine Species. Available from <https://www.marinespecies.org> at VLIZ. Accessed 2021-04-02. doi:10.14284/170
- International Commission on Zoological Nomenclature (1999). International Code of Zoological Nomenclature, fourth edition. The International Trust for Zoological Nomenclature, London. Available at: <https://www.iczn.org/the-code/the-international-code-of-zoological-nomenclature/the-code-online/>
- Minelli, A., Ruffo, S., & La Posta, S. (eds) (1993-1995). Checklist delle specie della Fauna d'Italia. Ministero dell'Ambiente, Comitato Scientifico per la Fauna d'Italia. Calderini. Fascicoli 1-110
- MolluscaBase eds. (2021). MolluscaBase. Accessed at <http://www.molluscabase.org> on 2021-04-02. doi:10.14284/448
- Nordsieck, F., (1968) Die Europäischen Meeres-Gehäuseschnecken (Prosobranchia). Vom Eismeer bis Kapverden und Mittelmeer. Fischer, Stuttgart, 273 pp.
- Nordsieck, F. (1972) Die europäischen Meeresschnecken (Opisthobranchia mit Pyramidellidae; Rissoacea). Vom Eismeer bis Kapverden, Mittelmeer und Schwarzes Meer. Fischer, Stuttgart, 327 pp.
- Nordsieck, F. (1982) Die europäischen Meeres-Gehäuseschnecken (Prosobranchia). Vom Eismeer bis Kapverden, Mittelmeer und Schwarzes Meer.

- Fischer, Stuttgart, 540 pp. DOI: 10.1002/iroh.3510680517
- Oliverio, M., Giannuzzi-Savelli, R., Giovine, F., Manganelli, G., Pusateri, F., Sabelli, B., Spada, G. (2008). Gastropoda Prosobranchia. In Relini, G. (ed.). Checklist della Flora e della Fauna dei mari italiani (II parte). *Biologia Marina Mediterranea*, 17 (Suppl. 1), 235–278.
- Oliverio, M. (2003) The Mediterranean molluscs: the best known malacofauna of the world... so far. *Biogeographia—The Journal of Integrative Biogeography*, 24(1), 195–208. DOI: 10.21426/b6110145
- Parenzan, P. (1970) Carta d'identità delle conchiglie del Mediterraneo. Vol. 1 (Gasteropodi). Bios Taras, Taranto, 283 pp.
- Parenzan, P. (1974) Carta d'identità delle conchiglie del Mediterraneo. Vol. 2, part 1 (Bivalvi). Bios Taras, Taranto, pp. 1–277 pp + 46 plates.
- Parenzan, P. (1976) Carta d'identità delle conchiglie del Mediterraneo. Vol. 2, part 2 (Bivalvi). Bios Taras, Taranto, pp. 283–546 + 56 plates. [+ Vol. 3 (Bibliografia): 1–50].
- Ponder, W.F., Lindberg, D R., Ponder, J.M. (2019) *Biology and Evolution of the Mollusca*. Vol. 1. CRC Press. DOI: 10.1201/9781351115667
- Ponder, W.F., Lindberg, D R., Ponder, J.M. (2020) *Biology and Evolution of the Mollusca*. Vol. 2. CRC Press. DOI: 10.1201/9781351115254
- Relini, G. (2006) La checklist della fauna marina italiana. *Notiziario S.I.B.M.* 49, 44–51.
- Relini, G. (ed.) (2008) Checklist della Flora e della Fauna dei mari italiani (I parte). *Biologia Marina Mediterranea*, 15 (Suppl. 1), 1–457.
- Relini, G. (ed.) (2010) Checklist della Flora e della Fauna dei mari italiani (II parte). *Biologia Marina Mediterranea*, 17 (Suppl. 1), 1–517.
- Sabelli, B., Giannuzzi-Savelli, R. & Bedulli D. (1990-1992) *Catalogo annotato dei molluschi marini del Mediterraneo (Annotated check-list of Mediterranean marine mollusks)*. Libreria naturalistica bolognese, Bologna, I-III, XVI + 781, pp.
- Salvini-Plawen, L. von. (2008) Caudofoveata. In Relini, G. (ed.) Checklist della Flora e della Fauna dei mari italiani (II parte). *Biologia Marina Mediterranea*, 17 (Suppl. 1), 226–227.
- Salvini-Plawen, L. von. (2008) Solenogastres. In Relini, G. (ed.) Checklist della Flora e della Fauna dei mari italiani (II parte). *Biologia Marina Mediterranea*, 17 (Suppl. 1), 228–230.
- Schiaparelli, S. (2008) Bivalvia. In Relini, G. (ed.) Checklist della Flora e della Fauna dei mari italiani (II parte). *Biologia Marina Mediterranea*, 17 (Suppl. 1), 296–314.
- Secretariat of the Convention on Biological Diversity (2002) Decision VI/23: Alien species that threaten ecosystems, habitats and species. Document UNEP/CBD/COP/6/23. Convention on Biological Diversity Secretariat, Montreal, Canada. Available at: <https://www.cbd.int/decision/cop/?id=7197>
- Servello, G., Andaloro, F., Azzurro, E., Castriota, L., Catra, M., Chiarore, A., Crocetta F., D'Alessandro M., Denitto F., Frogliola C., Gravilli C., Langer M.R., Lo Brutto S., Mastrototaro F., Petrocelli A., Pipitone C., Piraino S., Relini G., Serio D., Xentidis N.J. & Zenetos, A. (2019) Marine alien species in Italy: A contribution to the implementation of descriptor D2 of the marine strategy framework directive. *Mediterranean Marine Science*, 20(1), 1–48. DOI: 10.12681/mms.18711
- Steiner, G., (2008). Scaphopoda. In Relini, G. (ed.) Checklist della Flora e della Fauna dei mari italiani (II parte). *Biologia Marina Mediterranea*, 17 (Suppl. 1), 315–317.
- Zenetos, A., & Galanidi, M. (2020) Mediterranean non indigenous species at the start of the 2020s: recent changes. *Marine Biodiversity Records*, 13(1), 1–17. DOI: 10.1186/s41200-020-00191-4

Submitted: 7 January 2022

First decision: 20 April 2022

Accepted: 1 May 2022

*the Guest editors for the special section
“The new Checklist of the Italian Fauna”:*

*Marco A. Bologna, Lucio Bonato,
Fabio Cianferoni, Alessandro Minelli,
Marco Oliverio, Fabio Stoch, Marzio Zapparoli*

