

## ANNEX IV

Systematic classification of all 255 species captured by crustacean and fish trawl métiers in the southern coast of Portugal (Algarve). In bold are represented the 93 discarded fish and cephalopod species used for the statistical analysis. Scientific names are according to Froese and Pauly (2012) and Appeltans *et al.* (2012).

|                         |   |
|-------------------------|---|
| Kingdom Animalia        |   |
| Phylum Chordata         |   |
| Subphylum Vertebrata    |   |
| Class Elasmobranchii    |   |
| Order Hexanchiformes    |   |
| Family Hexanchidae      | <i>Hexanchus griseus</i> (Bonnaterre, 1788)   |
| Order Carcharhiniformes |   |
| Family Scyliorhinidae   | <i>Galeus melastomus</i> Rafinesque, 1810<br><i>Scyliorhinus canicula</i> (Linnaeus, 1758)  |
| Order Squaliformes      |   |
| Family Dalatiidae       | <i>Dalatias licha</i> (Bonnaterre, 1788)  |
| Family Etmopteridae     | <i>Etmopterus pusillus</i> (Lowe, 1839)<br><i>Etmopterus spinax</i> (Linnaeus, 1758)  |
| Family Somniosidae      | <i>Scymnodon ringens</i> Barbosa du Bocage & de Brito Capello, 1864   |
| Family Centrophoridae   | <i>Centrophorus granulosus</i> (Bloch & Schneider, 1801)<br><i>Deania calcea</i> (Lowe, 1839)   |
| Order Torpediniformes   |   |
| Family Torpedinidae     | <i>Torpedo marmorata</i> Risso, 1810<br><i>Torpedo nobiliana</i> Bonaparte, 1835  |
| Order Rajiformes        |   |
| Family Rajidae          | <i>Dipturus batis</i> (Linnaeus, 1758)<br><i>Dipturus oxyrinchus</i> (Linnaeus, 1758)<br><i>Leucoraja naevus</i> (Müller & Henle, 1841)<br><i>Neoraja iberica</i> Stehmann, Séret, Costa & Baro, 2008<br><i>Raja asterias</i> Delaroche, 1809<br><i>Raja clavata</i> Linnaeus, 1758<br><i>Raja miraletus</i> Linnaeus, 1758<br><i>Raja montagui</i> Fowler, 1910<br><i>Raja undulata</i> Lacepède, 1802 |
| Order Chimaeriformes    |   |
| Family Chimaeridae      | <i>Chimaera monstrosa</i> Linnaeus, 1758  |

Kingdom Animalia

Phylum Chordata

Subphylum Vertebrata

Class Holocephali

Class Actinopterygii

Order Notacanthiformes

Family Notacanthidae *Notacanthus chemnitzii* Bloch, 1788

Order Anguilliformes

Family Synbranchidae *Synbranchus kaupii* Johnson, 1862

Family Ophichthidae *Echelus myrus* (Linnaeus, 1758)

Family Congridae *Conger conger* (Linnaeus, 1758)

Family Nemichthyidae *Nemichthys scolopaceus* Richardson, 1848

Family Nettastomatidae *Facciolella oxyrhyncha* (Bellotti, 1883)

*Venefica proboscidea* (Vaillant, 1888)

Order Clupeiformes

Family Clupeidae *Alosa fallax* (Lacepède, 1803)

*Sardina pilchardus* (Walbaum, 1792)

Family Engraulidae *Engraulis encrasicolus* (Linnaeus, 1758)

Order Osmeriformes

Family Argentinidae *Argentina sphyraena* Linnaeus, 1758

Family Alepocephalidae Alepocephalidae

Order Salmoniformes

Order Stomiiformes

Family Sternoptychidae *Argyropelecus aculeatus* Valenciennes, 1850

Family Phosichthyidae *Polymetme corythaeola* (Alcock, 1898)

Family Stomiidae *Stomias boa boa* (Risso, 1810)

Order Aulopiformes

Family Chlorophthalmidae *Chlorophthalmus agassizi* Bonaparte, 1840

Order Myctophiformes

Family Myctophidae *Myctophidae n.i.*

Kingdom Animalia

Phylum Chordata

Subphylum Vertebrata

Class Actinopterygii

Order Gadiformes

Family Macrouridae

***Coelorinchus caelorhincus* (Risso, 1810)**

*Coelorinchus occa* (Goode & Bean, 1885)

*Hymenocephalus gracilis* Gilbert & Hubbs, 1920

*Hymenocephalus italicus* Giglioli in Giglioli & Issel, 1884

***Malacocephalus laevis* (Lowe, 1843)**

***Nezumia sclerorhynchus* (Valenciennes, 1838)**

*Trachyrincus scabrus* (Rafinesque, 1810)

Family Moridae

*Gadella maraldi* (Risso, 1810)

***Mora moro* (Risso, 1810)**

Family Gadidae

***Gadiculus argenteus argenteus* Guichenot, 1850**

***Micromesistius poutassou* (Risso, 1827)**

Family Lotidae

***Gaidropsarus biscayensis* (Collett, 1890)**

*Gaidropsarus vulgaris* (Cloquet, 1824)

*Molva molva* (Linnaeus, 1758)

Family Phycidae

***Phycis blennoides* (Brünnich, 1768)**

*Phycis phycis* (Linnaeus, 1766)

Family Merlucciidae

***Merluccius merluccius* (Linnaeus, 1758)**

Order Ophidiiformes

Family Carapidae

*Echiodon dentatus* (Cuvier, 1829)

Order Batrachoidiformes

Family Batrachoididae

*Halobatrachus didactylus* (Bloch & Schneider, 1801)

Order Lophiiformes

Family Lophiidae

***Lophius budegassa* Spinola, 1807**

***Lophius piscatorius* Linnaeus, 1758**

Family Chaunacidae

*Chaunax pictus* Lowe, 1846

Kingdom Animalia

Phylum Chordata

Subphylum Vertebrata

Class Actinopterygii

Order Atheriniformes

Family Atherinidae *Atherina presbyter* Cuvier, 1829

Order Beloniformes

Family Belonidae *Belone belone* (Linnaeus, 1761)

Order Beryciformes

Family Trachichthyidae ***Hoplostethus mediterraneus mediterraneus* Cuvier, 1829**

Family Diretmidae *Diretmus argenteus* Johnson, 1864

Order Beryciformes

Family Berycidae *Beryx decadactylus* Cuvier, 1829

*Beryx splendens* Lowe, 1834

Order Zeiformes

Family Zeidae *Cyttopsis rosea* (Lowe, 1843)

*Zenopsis conchifer* (Lowe, 1852)

***Zeus faber* Linnaeus, 1758**

Order Syngnathiformes

Family Centriscidae ***Macroramphosus gracilis* (Lowe, 1839)**

***Macroramphosus scolopax* (Linnaeus, 1758)**

Order Scorpaeniformes

Family Sebastidae ***Helicolenus dactylopterus* (Delaroche, 1809)**

Family Setarchidae *Setarches guentheri* Johnson, 1862

Family Scorpaenidae ***Pontinus kuhlii* (Bowdich, 1825)**

*Scorpaena elongata* Cadenat, 1943

***Scorpaena notata* Rafinesque, 1810**

Family Triglidae ***Chelidonichthys cuculus* (Linnaeus, 1758)**

***Chelidonichthys lucerna* (Linnaeus, 1758)**

***Chelidonichthys obscurus* (Walbaum, 1792)**

*Eutrigla gurnardus* (Linnaeus, 1758)

|                        |   |
|------------------------|---|
| Kingdom Animalia       |   |
| Phylum Chordata        |   |
| Subphylum Vertebrata   |   |
| Class Actinopterygii   |   |
| Order Scorpaeniformes  |   |
| Family Triglidae       | <i>Lepidotrigla cavillone</i> (Lacepède, 1801)<br><i>Lepidotrigla dieuzeidei</i> Blanc & Hureau, 1973<br><i>Trigla lyra</i> Linnaeus, 1758<br><i>Trigloporus lastoviza</i> (Bonnaterre, 1788)<br><i>Peristedion cataphractum</i> (Linnaeus, 1758)   |
| Family Peristediidae   |   |
| Order Perciformes      |   |
| Family Serranidae      | <i>Anthias anthias</i> (Linnaeus, 1758)<br><i>Serranus cabrilla</i> (Linnaeus, 1758)<br><i>Serranus hepatus</i> (Linnaeus, 1758)  |
| Family Callanthiidae   | <i>Callanthias ruber</i> (Rafinesque, 1810)   |
| Family Epigonidae      | <i>Epigonus denticulatus</i> Dieuzeide, 1950<br><i>Epigonus telescopus</i> (Risso, 1810)  |
| Family Carangidae      | <i>Trachurus mediterraneus</i> (Steindachner, 1868)<br><i>Trachurus picturatus</i> (Bowdich, 1825)<br><i>Trachurus trachurus</i> (Linnaeus, 1758)   |
| Family Sparidae        | <i>Boops boops</i> (Linnaeus, 1758)<br><i>Dentex macrophthalmus</i> (Bloch, 1791)<br><i>Diplodus vulgaris</i> (Geoffroy Saint-Hilaire, 1817)<br><i>Pagellus acarne</i> (Risso, 1827)<br><i>Pagellus bogaraveo</i> (Brünnich, 1768)<br><i>Pagellus erythrinus</i> (Linnaeus, 1758)<br><i>Spondylisoma cantharus</i> (Linnaeus, 1758) |
| Family Centracanthidae | <i>Spicara maena</i> (Linnaeus, 1758)   |
| Family Mullidae        | <i>Mullus surmuletus</i> Linnaeus, 1758   |
| Family Cepolidae       | <i>Cepola macrophthalma</i> (Linnaeus, 1758)  |
| Family Trachinidae     | <i>Trachinus draco</i> Linnaeus, 1758   |

Kingdom Animalia

Phylum Chordata

Subphylum Vertebrata

Class Actinopterygii

Order Perciformes

Family Blenniidae

*Blennius ocellaris* Linnaeus, 1758

Family Callionymidae

***Callionymus lyra* Linnaeus, 1758**

***Callionymus maculatus* Rafinesque, 1810**

*Callionymus* spp.

*Synchiropus phaeton* (Günther, 1861)

Family Gobiidae

*Deltentosteus quadrimaculatus* (Valenciennes, 1837)

***Lesueurigobius sanzi* (de Buen, 1918)**

Family Trichiuridae

***Benthodesmus elongatus* (Clarke, 1879)**

***Lepidopus caudatus* (Euphrasen, 1788)**

Family Gempylidae

***Ruvettus pretiosus* Cocco, 1833**

Family Scombridae

***Scomber colias* Gmelin, 1789**

***Scomber scombrus* Linnaeus, 1758**

Family Caproidae

***Capros aper* (Linnaeus, 1758)**

Order Pleuronectiformes

Family Citharidae

***Citharus linguatula* (Linnaeus, 1758)**

Family Scophthalmidae

*Lepidorhombus boscii* (Risso, 1810)

*Lepidorhombus whiffiagonis* (Walbaum, 1792)

*Scophthalmus rhombus* (Linnaeus, 1758)

Family Bothidae

***Arnoglossus imperialis* (Rafinesque, 1810)**

***Arnoglossus laterna* (Walbaum, 1792)**

***Arnoglossus rueppelii* (Cocco, 1844)**

*Arnoglossus* spp.

***Arnoglossus thori* Kyle, 1913**

Family Soleidae

*Dicologlossa cuneata* (Moreau, 1881)

***Microchirus azevia* (Capello, 1867)**

***Microchirus boscanion* (Chabanaud, 1926)**

|                         |   |
|-------------------------|---|
| Kingdom Animalia        |   |
| Phylum Chordata         |   |
| Subphylum Vertebrata    |   |
| Class Actinopterygii    |   |
| Order Pleuronectiformes |   |
| Family Soleidae         | <i>Microchirus ocellatus</i> (Linnaeus, 1758)                       |
|                         | <b><i>Microchirus variegatus</i> (Donovan, 1808)</b>                |
| Family Cynoglossidae    | <b><i>Symphurus ligulatus</i> (Cocco, 1844)</b>                     |
|                         | <i>Symphurus nigrescens</i> Rafinesque, 1810                        |
| Order Tetraodontiformes |   |
| Family Balistidae       | <b><i>Balistes capriscus</i> Gmelin, 1789</b>                       |
| Family Tetraodontidae   | <b><i>Sphoeroides pachygaster</i> (Müller &amp; Troschel, 1848)</b> |
| Family Molidae          | <i>Mola mola</i> (Linnaeus, 1758)                                   |
| Phylum Arthropoda       |   |
| Subphylum Crustacea     |   |
| Class Malacostraca      |   |
| Order Decapoda          |   |
| Family Crangonidae      | <i>Aegaeon lacazei</i> (Gourret, 1887a)                             |
| Family Pandalidae       | <i>Chlorotocus crassicornis</i> (A. Costa, 1871)                    |
|                         | <i>Heterocarpus ensifer</i> A. Milne-Edwards, 1881b                 |
|                         | <i>Plesionika edwardsii</i> (Brandt, 1851)                          |
|                         | <i>Plesionika ensis</i> (A. Milne-Edwards, 1881b)                   |
| Family Pandalidae       | <i>Plesionika heterocarpus</i> (A. Costa, 1871)                     |
|                         | <i>Plesionika martia</i> (A. Milne-Edwards, 1883)                   |
| Family Pasiphaeidae     | <i>Pasiphaea sivado</i> (Risso, 1816)                               |
| Family Processidae      | <i>Processa noveli noveli</i> Al-Adhub & Williamson, 1975           |
| Family Aristeidae       | <i>Aristeus antennatus</i> (Risso, 1816)                            |
| Family Penaeidae        | <i>Parapenaeus longirostris</i> (Lucas, 1846)                       |
|                         | <i>Penaeopsis serrata</i> Spence Bate, 1881                         |
| Family Solenoceridae    | <i>Hymenopenaeus debilis</i> Smith, 1882                            |
|                         | <i>Solenocera membranacea</i> (Risso, 1816)                         |

Kingdom Animalia

Phylum Arthropoda

Subphylum Crustacea

Class Malacostraca

Order Decapoda

Family Calappidae

*Calappa granulata* (Linnaeus, 1758)

Family Diogenidae

*Dardanus arrosor* (Herbst, 1796)

Family Dorippidae

*Medorippe lanata* (Linnaeus, 1767)

Family Munididae

*Munida intermedia* A. Milne Edwards & Bouvier, 1899

*Munida rutllanti* Zariquiey Álvarez, 1952

Family Goneplacidae

*Goneplax rhomboides* (Linnaeus, 1758)

Family Homolidae

*Homola barbata* (Fabricius, 1793)

Family Inachidae

*Macropodia longipes* (A. Milne-Edwards & Bouvier, 1899)

Family Paguridae

*Pagurus alatus* Fabricius, 1775

*Pagurus excavatus* (Herbst, 1791)

Family Paguridae

*Pagurus prideaux* Leach, 1815

Family Parthenopidae

*Spinolambrus macrochelos* (Herbst, 1790)

Family Geryonidae

*Geryon longipes* A. Milne-Edwards, 1882

Family Polybiidae

*Bathynectes longipes* (Risso, 1816)

*Bathynectes maravigna* (Prestandrea, 1839)

*Liocarcinus depurator* (Linnaeus, 1758)

*Macropipus tuberculatus* (Roux, 1830)

*Polybius henslowii* Leach, 1820

Family Xanthidae

*Monodaeus couchii* (Couch, 1851)

Family Polychelidae

*Polycheles typhlops* Heller, 1862

Family Nephropidae

*Nephrops norvegicus* (Linnaeus, 1758)

Order Stomatopoda

Family Squillidae

*Rissoides desmaresti* (Risso, 1816)

Kingdom Animalia

Phylum Mollusca

Class Cephalopoda

Order Octopoda

Family Octopodidae

*Eledone cirrhosa* (Lamarck, 1798)

*Eledone moschata* (Lamarck, 1798)

*Octopus salutii* Vérany, 1836

*Octopus vulgaris* Cuvier, 1797

*Pteroctopus tetracirrhus* (delle Chiaje, 1830)

*Scaergus unicolorrhus* (delle Chiaje, 1838)

Order Sepiida

Family Sepiidae

*Sepia elegans* Blainville, 1827

*Sepia officinalis* Linnaeus, 1758

*Sepia orbignyana* Férussac, 1826

Order Sepiolida

Family Sepiolidae

*Neorossia caroli* (Joubin, 1902)

*Rossia macrosoma* (Delle Chiaje, 1828)

*Sepietta obscura* Naef, 1916

*Sepietta oweniana* (d'Orbigny, 1841)

*Sepiola atlantica* d'Orbigny, 1839

Order Oegopsida

Family Enoploteuthidae

*Abralia veranyi* (Rüppell, 1844)

Family Ommastrephidae

*Illex coindetii* (Vérany, 1839)

*Todarodes sagittatus* (Lamarck, 1798)

*Todaropsis eblanae* (Ball, 1841)

Order Myopsida

Family Loliiginidae

*Alloteuthis media* (Linnaeus, 1758)

Family Loliiginidae

*Alloteuthis* spp.

*Alloteuthis subulata* (Lamarck, 1798)

*Loligo vulgaris* Lamarck, 1798

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Kingdom Animalia

Phylum Mollusca

Class Bivalvia

Order Veneroida

Family Cardiidae

*Acanthocardia echinata* (Linnaeus, 1758)

*Cerastoderma edule* (Linnaeus, 1758)

*Laevicardium crassum* (Gmelin, 1791)

Family Solecurtidae

*Solecurtus scopula* (Turton, 1822)

Family Veneridae

*Venus nux* Gmelin, 1791

Order Carditoida

Family Carditidae

*Centrocardita aculeata* (Poli, 1795)

Order Nuculida

Family Nuculidae

*Nucula sulcata* Bronn, 1831

Order Arcoida

Family Arcidae

*Anadara diluvii* (Lamarck, 1805) †

Order Mytiloida

Family Mytilidae

*Jolya martorelli* (Hidalgo, 1878)

*Mytilus* spp.

Order Pterioida

Family Pinnidae

*Atrina fragilis* (Pennant, 1777)

*Atrina pectinata* (Linnaeus, 1767)

Order Ostreoida

Family Gryphaeidae

*Neopycnodonte cochlear* (Poli, 1795)

Order Pectinoida

Family Pteriidae

*Pteria hirundo* (Linnaeus, 1758)

Class Gastropoda

Order Neogastropoda

Family Buccinidae

*Buccinum humphreysianum* Bennet, 1824

*Troschelia berniciensis* (King, 1846)

Family Volutidae

*Ampulla priamus* (Gmelin, 1791)

*Cymbium olla* (Linnaeus, 1758)

Kingdom Animalia

Phylum Mollusca

Class Gastropoda

Order Vetigastropoda

Family Calliostomatidae *Calliostoma granulatum* (Born, 1778)

Order Vetigastropoda

Family Trochidae *Callumbonella suturalis* (Philippi, 1836)

Order Littorinimorpha

Family Calyptraeidae *Calyptraea chinensis* (Linnaeus, 1758)

Family Capulidae *Capulus ungaricus* (Linnaeus, 1758)

Family Cassidae *Galeodea echinophora* (Linnaeus, 1758)

*Galeodea rugosa* (Linnaeus, 1771)

*Semicassis saburon* (Bruguière, 1792)

Family Naticidae *Lunatia fusca* (Blainville, 1825)

Family Ranellidae *Monoplex corrugatus* (Lamarck, 1816)

*Monoplex parthenopeus* (Salis-Marschlins, 1793)

*Ranella olearium* (Linnaeus, 1758)

Family Tonniidae *Tonna galea* (Linnaeus, 1758)

Order Cephalaspidea

Family Philinidae *Philine aperta* (Linnaeus, 1767)

Order Cephalaspidea

Family Scaphandridae *Scaphander lignarius* (Linnaeus, 1758)

Order Pleurobranchomorpha

Family Pleurobranchaeidae *Pleurobranchaea meckeli* (Blainville, 1825)

Phylum Cnidaria

Class Anthozoa

Order Actiniaria

Family Hormathiidae *Actinauge richardi* (Marion, 1882)

*Calliactis parasitica* (Couch, 1842)

Order Scleractinia

Family Caryophylliidae *Caryophyllia (Caryophyllia) smithii* Stokes & Broderip, 1828

|                        |  |   |
|------------------------|--|---|
| Kingdom Animalia       |  |   |
| Phylum Cnidaria        |  |   |
| Class Anthozoa         |  |   |
| Order Pennatulacea     |  |   |
| Family Pennatulidae    |  | <i>Pennatula phosphorea</i> Linnaeus, 1758          |
| Phylum Annelida        |  |   |
| Class Polychaeta       |  |   |
| Order Phyllodocida     |  |   |
| Family Aphroditidae    |  | <i>Aphrodita aculeata</i> Linnaeus, 1758            |
| Phylum Echinodermata   |  |   |
| Subphylum Asterozoa    |  |   |
| Class Asteroidea       |  |   |
| Order Valvatida        |  |   |
| Family Asterinidae     |  | <i>Anseropoda placenta</i> (Pennant, 1777)          |
| Order Paxillosida      |  |   |
| Family Astropectinidae |  | <i>Astropecten aranciacus</i> (Linnaeus, 1758)      |
| Family Luidiidae       |  | <i>Luidia ciliaris</i> (Philippi, 1837)             |
| Subphylum Crinozoa     |  |   |
| Class Crinoidea        |  |   |
| Order Comatulida       |  |   |
| Family Antedonidae     |  | <i>Leptometra phalangium</i> (Müller, 1841)         |
| Subphylum Echinozoa    |  |   |
| Class Echinoidea       |  |   |
| Order Diadematoidea    |  |   |
| Family Diadematidae    |  | <i>Centrostephanus longispinus</i> (Philippi, 1845) |
| Order Cidaroida        |  |   |
| Family Cidaridae       |  | <i>Cidaris cidaris</i> (Linnaeus, 1758)             |
| Order Camarodonta      |  |   |
| Family Echinidae       |  | <i>Echinus melo</i> Lamarck, 1816                   |
|                        |  | <i>Gracilechinus acutus</i> (Lamarck, 1816)         |
| Family Parechinidae    |  | <i>Paracentrotus lividus</i> (Lamarck, 1816)        |

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Kingdom Animalia

Phylum Echinodermata

Subphylum Echinozoa

Class Echinoidea

Order Spatangoida

Family Spatangidae

*Spatangus purpureus* O.F. Müller, 1776

Class Holothuroidea

Order Aspidochirotida

Family Holothuriidae

*Holothuria (Panningothuria) forskali* Delle Chiaje, 1823

Family Stichopodidae

*Parastichopus regalis* (Cuvier, 1817)

Class Ophiuroidea

Order Euryalida

Family Gorgonocephalidae

*Astrospartus mediterraneus* (Risso, 1826)

Order Ophiurina

Family Ophiothricidae

*Ophiothrix fragilis* (Abildgaard, in O.F. Müller, 1789)

Family Ophiuridae

*Ophiura ophiura* (Linnaeus, 1758)

Kingdom Plantae

Class Bryopsidophyceae

Order Bryopsidales

Family Codiaceae

*Codium decorticatum* (Woodward) M.A.Howe, 1911

Kingdom Chromista

Phylum Ochrophyta

Subphylum Phaeista

Class Phaeophyceae

Order Fucales

Family Sargassaceae

*Cystoseira nodicaulis* (Withering) M.Roberts, 1967

*Cystoseira spinosa* Sauvageau, 1912

*Cystoseira* spp.

*Sargassum vulgare* C.Agardh, 1820

Order Dictyotales

Family Dictyotaceae

*Dictyota dichotoma* (Hudson) J.V.Lamouroux, 1809