Supplementary data

# **Appendix A1**

## **Reptiles**

### Chinese softshell turtle *Pelodiscus sinensis*

*Pelodiscus sinensis* is a [species](https://en.wikipedia.org/wiki/Species) of [softshell turtle](https://en.wikipedia.org/wiki/Softshell_turtle) [endemic](https://en.wikipedia.org/wiki/Endemism) to east Asia ([Inner Mongolia](https://en.wikipedia.org/wiki/Inner_Mongolia) to [Hainan](https://en.wikipedia.org/wiki/Hainan) region of China), with escapees having established populations in several Asian countries including Japan, India, Northern Vietnam and the River Amur region of Russia, as well as in Brazil, [Hawaii](https://en.wikipedia.org/wiki/Hawaii), Spain, and the Balkan and Danube regions of Europe (McKeown, [1996](#McKeown1996); Bonin et al., [2007](#Boninetal2007); Urošević et al., [2016](#Uroševićetal2016)). *Pelodiscus sinensis* can easily adapt to various freshwater habitats and represents one of the economically most important chelonians in the world, with hundreds of millions of specimens traded as food every year especially in Taiwan and Singapore. This species is also common in the pet trade of Europe and the USA (Somma et al., 2020). It is an aquatic, mostly carnivorous turtle whose diet consists of insects, crustaceans, molluscs, fish and plant material, and whose females can lay multiple clutches of eggs per year (Bonin et al., [2007](#Boninetal2007); Somma and Freedman, [2020](#SommaFreedman2020)). Because of its spread in the pet trade industry, *P. sinensis* poses a high risk of invasion in most European countries and in several states of the USA, where it can negatively impact the indigenous aquatic fauna (Somma and Freedman, [2020](#SommaFreedman2020)).

### Red-eared slider *Trachemys scripta elegans*

*Trachemys scripta elegans* is a semi-aquatic turtle native to the USA and Mexico, where it is the most commonly traded pet turtle. This species is also a popular pet worldwide and possibly the most invasive turtle species (<https://www.cabi.org/isc/datasheet/61560>). *Trachemys scripta elegans*, which is included in the [list of the world's 100 most invasive species](https://en.wikipedia.org/wiki/List_of_globally_invasive_species) (Lowe et al., [2000](#Loweetal2000)), prefers mostly the habitat types of the European pond turtle *Emys orbicularis*. Accidental escapes and intentional stocking of European wetlands by pet owners have resulted in a number of negative effects on native turtle populations (Héritier et al., [2017](#Héritieretal2017)). *Trachemys scripta elegans* can easily adapt to the European climate and is known to reproduce successfully in its invaded habitats. This species lives in various freshwater habitats (e.g. rivers, oxbows, lakes, ponds) and young individuals require a high proportion of animal material in their food (e.g. aquatic macroinvertebrates and dead animals), whereas adults gradually shift towards consumption of plant material (Girondot et al., [2007](#Girondotetal2007)). In the wild, this species always remains close to the water, except when laying eggs or dispersing into new water bodies (Héritier et al., [2017](#Héritieretal2017)). While still kept in captivity across Europe, the trade of *T. scripta elegans* has been forbidden in the European Union since 1997.

### Yellowbelly slider *Trachemys scripta scripta*

*Trachemys scripta scripta* is a semi-aquatic turtle native to south-eastern USA (Florida to south-eastern Virginia), where it represents the most common turtle species (Powel et al., [1991](#Poweletal1991)). It occurs in a wide variety of habitats, including slow-flowing rivers, floodplain swamps, marshes, seasonal wetlands and permanent ponds (Scriber et al., [1986](#Scriberetal1986)). *Trachemys scripta scripta* is popular as a pet, but together with the red-eared slider *T. scripta elegans*, the trade of this species has been forbidden in Hungary since 2017. The habitat and ecology of *T. scripta scripta* is quite similar to that of *T. scripta elegans* (Bonin et al., [2007](#Boninetal2007)). Similar to the latter, this species is also highly invasive and, despite a more restricted distribution, its rate of expansion is comparable (Rödder et al., [2009](#Rödderetal2009)). Individuals of this species can be found in large aggregations, especially in highly-urbanised habitats (Szajbert et al., unpublished).

## **Amphibians**

### American bullfrog *Lithobates catesbeianus*

*Lithobates catesbeianus* is native to eastern North America, but has been introduced in over 40 countries and four continents over the last century, making it one of the most widespread invasive species on the planet (Lever, [2003](#Lever2011); Ficetola et al., [2007](#Ficetolaetal2007); Urbina et al., [2020](#Urbinaetal2020)). Most introductions of *L. catesbeianus* have been intentional with the purpose of adding new food sources for human consumption or for the control of agricultural insect pests, but other populations have established as a result of unintentional escapes from breeding factories or of intensional release by pet owners (Bury and Whelan, [1985](#BuryWhelan1985); Kraus, [2008](#Kraus2008); <http://www.iucngisd.org/gisd/species.php?sc=80>). The high invasiveness of *L. catesbeianus* is due to its high mobility, generalised eating habits, high reproductive capacity, as well as behavioural and physiological adaptability to a variety of habitats and temperature regimes (Moyle, [1973](#Moyle1973); Adams and Pearl, [2007](#AdamsPearl2007); Chuang et al., [2019](#Chuangetal2019)). This species is known to impact on some native species through competition, predation and habitat displacement (Boone et al., [2004](#Booneetal2004); Pearl et al., [2004](#Pearletal2004)). Both tadpoles and adults are voracious feeders and can consume eggs or offspring of many species of native invertebrates and vertebrates, thus directly competing with native birds, reptiles, amphibians and fishes for limited food resources (Adams and Pearl, [2007](#AdamsPearl2007); Snow and Witmer, [2010](#SnowWitmer2010)). Substantial impacts hav been reported on aquatic vegetation, with tadpoles feeding on nitrogen-fixing algae, thereby affecting aquatic habitats by reducing algal biomass and in turn decreasing primary production and nutrient cycling (Pryor, [2003](#Pryor2003)). *Lithobates catesbeianus* has been recently implicated in the introduction and spread of harmful pathogens, particularly *Batrachochytrium dendrobatidis*, a fungus causing chytridiomycosis – a devastating infectious disease which can be severely pathogenic to some amphibians (Hanselmann et al., [2004](#Hanselmannetal2004); Pearl and Green, [2005](#PearlGreen2005); Garner et al., [2006](#Garneretal2006); Schloegel et al., [2010](#Schloegeletal2010)).

### Cane toad *Rhinella marina*

*Rhinella marina* is native to southern Texas in the USA and to the northern parts of South America (Zug and Zug, [1979](#ZugZug1979)). Between the 19th and 20th centuries, this species was introduced to other tropical and subtropical regions (i.e. Greater and Lesser Antilles, Philippines, Fiji, New Guinea, Australia, Florida, Hawaii) as a ‘biological weapon’ to control pests (Freeland, [1985](#Freeland1985)). *Rhinella marina* is also sold as a pet and is often accidentally or intentionally released into the wild, with a resulting increase in its range of expansion (Bartlett and Bartlett, [1999](#BartlettBartlett1999)). The species' spreading into new habitats can be quite rapid, as observed in Hawaii (Oliver, [1949](#Oliver1949)) and in Australia, where a population of one hundred individuals quickly grew to tens of millions (Alford et al., [1995](#Alfordetal1995)). There are several reasons why *R. marina* represents one of most dangerous invasive amphibian species worldwide, and these include high fecundity with females able to lay up to 36,100 eggs (Hearnden, [1991](#Hearnden1991)), being poisonous to most predators (Mailho-Fontana et al., [2018](#Mailho_Fontanaetal2018)), ability to consume a broad variety of prey including small vertebrates (Strussmann et al., [1984](#Strussmannetal1984); Isaacs and Hoyos, [2010](#Isaacs_Hoyos2016)), larger size relative to most native frogs and toads facilitating competition and predation (Shine, [2014](#Shine2014)), high locomotor capacity (Kosmala et al., [2017](#Kosmalatal2017)), and spread of diseases such as chytrid fungus and ranaviruses (Daszak et al., 1999; Brannelly et al., [2018](#Brannellyetal2018)). Although the establishment of *R. marina* in most parts of temperate and subpolar climatic zones is improbable (Kopecký et al., [2016](#Kopeckýetal2016)), the likelihood of impacts after establishment is very high as reported from the species’ non-native range (Catling et al., [1999](#Catlingetal1999); Shine, [2014](#Shine2014)).

## **Freshwater fishes**

### Brown bullhead *Ameiurus nebulosus*

*Ameiurus nebulosus* is native to North America and has several established populations throughout the world ([www.cabi.org/isc/datasheet/94468](http://www.cabi.org/isc/datasheet/94468)). Together with black bullhead *A. melas*, *A. nebulosus* has been cultivated for many decades in Europe, and both species were introduced to European inland waters almost simultaneously (Holčik, [1991](#Holčík1991)). *Ameiurus nebulosus* was primarily introduced for angling, sport and aquaculture purposes (Welcomme, [1988](#Welcomme1988); Holčik, [1991](#Holčík1991)). The species' establishment and spread to novel ecosystems has been facilitated by its ability to survive for prolonged periods in polluted warm-water environments with low oxygen concentrations, but also by its high degree of parental care and its generalist omnivore feeding habits even in turbid waters (Scott and Crossman, [1973](#ScottCrossman1973)). *Ameiurus nebulosus* is often cited as one of the most prevalent invasive species that impact native ichthyofauna (Dextrase and Mandrak, [2006](#DextraseMandrak2006)), and its main impacts include competition with native fish species and predation on benthic invertebrates and vertebrates including fish eggs (Scott and Crossman, [1973](#ScottCrossman1973); Grabowska et al., [2010](#Grabowskaetal2010)). Additional potential impacts have been reported on water quality (i.e. turbidity caused by physical disturbance and nutrient cycling) as a result of the species' benthivorous diet (Scott and Crossman, [1973](#ScottCrossman1973)).

### Goldfish *Carassius auratus*

*Carassius auratus* has been introduced worldwide through the aquarium trade from its native range in eastern Asia (Marr et al., [2013](#Marretal2013)). This species is one of the most widespread ornamental freshwater fish in the world mainly due to its high ecological tolerance to unfavorable environmental conditions such as low oxygen and high temperature, which make it able to benefit from environmental disturbances in recipient water bodies (Sollid et al., [2005](#Sollidetal2005)). Another major contributor to the wide distribution and establishment success of *C. auratus* is its omnivorous feeding strategy, which consists of a diet including planktonic crustaceans, insects and their larvae, phytoplankton, fish eggs and larvae, benthic vegetation, and detritus (Scott and Crossman, [1973](#ScottCrossman1973); Maitland, [2004](#Maitland2004)). *Carassius auratus* is thought to be one of the major causes in the decline of some native fish species in the USA (Deacon et al., [1964](#Deaconetal1964)), and reported impacts on native fishes include predation on fish eggs, larvae and adults (Scott and Crossman, [1973](#ScottCrossman1973)). Competition with native fishes (Scheffer et al., [1993](#Schefferetal1993)) and reproductive interference with native crucian carp *C. carassius* (Hänfling et al., [2005](#Hänflingetal2005)) resulting in species displacement have also been reported (Wheeler, [2000](#Wheeler2000); Navodaru et al., [2002](#Navodaruetal2002); Smartt, [2007](#Smartt2007)).

### Gibel carp *Carassius gibelio*

*Carassius gibelio* is native to east Asia and is considered to be one of the most invasive species in Europe (Tarkan et al., [2012a](#Tarkanetal2012a)) having recently expanded to North America (Elgin et al., [2014](#Elginetal2014); Ruppert et al., [2017](#Ruppertetal2017)). This species is an opportunistic omnivorous feeder that can withstand and thrive in degraded habitats. These traits together with its dual reproductive mode (i.e. allogynogenetic and gonochoristic: Emiroğlu et al., [2011](#Emiroğluetal2011)), which represents a most prominent feature amongst teleost species, contribute to its invasiveness. Negative impacts of *C. gibelio* have been mainly associated with reproductive interference, whereby hybridisation and gynogenesis cause exploitation of the males of other species to activate egg development (Paschos et al., [2004](#Paschosetal2004); Emiroğlu et al., [2011](#Emiroğluetal2011)). Also, newly-established *C. gibelio* populations in Canada have been shown to impact on both native fish and benthic invertebrate communities (Ruppert et al., [2017](#Ruppertetal2017)). Collectively, the species' potential to cause economic and environmental damage is due to altered trophic levels and shifts in food chains, with resulting changes in community structure with reduced native species biodiversity, negative impacts on aquaculture/fisheries activities, and hybridisation with native ichthyofauna (Navodaru et al., [2002](#Navodaruetal2002); Hänfling et al., [2005](#Hänflingetal2005); Tarkan et al., [2012b](#Tarkanetal2012b); Ruppert et al., [2017](#Ruppertetal2017)).

### Common carp *Cyprinus carpio*

As the world’s most successful coloniser (Balon, [1974](#Balon1974)), *Cyprinus carpio* has long been regarded as highly invasive and noxious worldwide, and especially so in North America (McCrimmon, [1968](#McCrimmon1968); Moyle, [1984](#Moyle1984)) and Australasia (Koehn, [2004](#Koehn2004)), but with localised impacts identified also in several other parts of the species' introduced range (Vilizzi, [2012](#Vilizzi2012)). Management of common carp has therefore become a priority issue in efforts to mitigate the species' detrimental effects on freshwater ecosystems (Vilizzi et al., [2015](#Vilizzietal2015)), and this is especially true for those ecosystems already degraded by human disturbance (e.g. Smith et al., [2009](#Smithetal2009)) but also those vulnerable to the effects of climate warming (e.g. Britton et al., [2010b](#Brittonetal2010b)). *Cyprinus carpio* is able to colonise these ecosystems by virtue of its generalist ecological requirements (Balon, [1974](#Balon1974), [2004](#Balon2004)), and ultimately the consequences of its invasion are a decrease in native biodiversity and concurrent homogenisation of the fish fauna (Marr et al., [2013](#Marretal2013)). Mitigation of these impacts generally results in costly eradication and control measures (whenever feasible) as well as economic losses due to a deterioration in amenity values (e.g. Vilizzi et al., [2015](#Vilizzietal2015)). Conversely, in other parts of its introduced range (e.g. central Europe), *C. carpio* may be accepted as a ‘naturalised’ species (i.e. long-established with self-sustaining populations: Copp et al., [2005](#Coppetal2005)) that poses little or no threat to the environment (e.g. Arlinghaus and Mehner, [2003](#ArlinghausMehner2003)), and where it is often also valued as a food stuff (Balon, [2004](#Balon2004); Britton et al., [2010b](#Brittonetal2010b)) or as a much prized angling amenity (Britton et al., [2010b](#Brittonetal2010b); Brazier et al., [2012](#Brazieretal2012)). Yet, in still other naturalised areas such as western Europe and Thrace and Anatolia, the invasiveness status of *C. carpio* is being re-assessed due to increasing awareness of the potential risks posed to native biota (e.g. Almeida et al., [2013](#Almeidaetal2013); Tarkan et al., [2017](#Tarkanetal2017)).

### Eastern mosquitofish *Gambusia holbrooki*

The high risk level of invasiveness posed by *Gambusia holbrooki* is a result of its flexible life-history traits (Alcaraz and García-Berthou, [2007](#AlcarazGarcíaBerthou2007)) aided by a close climate matching between its native and invasive areas of distribution (Fox et al., [2007](#Foxetal2007); Vidal et al., [2010](#Vidaletal2010)). As a small-sized live-bearer, the species' high rate of survival and early maturation in densely-weeded and highly productive aquatic habitats gives it a high chance to acclimatise and establish quickly in favourable environments, thereby making it the second most widespread alien species in Mediterranean inland waters (Economou et al., [2007](#Economouetal2007)). However, this distributional range also includes more northerly areas (e.g. of Europe), given the species' ability to persist over winter in the northern part of its native range (Krumholz, [1944](#Krumholz1944); Towns, [1977](#Towns1977)). The questionable role of *G. holbrooki* in mosquito control and suppression of malaria may decrease its positive socio-economic value in introduced areas, especially in view of its documented impacts on native fish faunas (Rincón et al., [2000](#Rincónetal2002); Caiola and de Sostoa, [2005](#CaiolaDeSostoa2005)). In this regard, there is evidence that eastern mosquitofish does not prefer dipteran larvae in the presence of other prey, and for this reason mosquito control efficiency remains doubtful (Mieiro et al., [2001](#Mieiroetal2001)).

### Pumpkinseed *Lepomis gibbosus*

The main documented detrimental impacts by *Lepomis gibbosus* relate to its feeding interactions with native fishes through opportunistic omnivory, with major ontogenetic shifts from plankton to benthic invertebrate feeding (Rezsu and Specziar, [2006](#RezsuSpecziar2006)) and dietary shifts with repartition of available food resources (Copp et al., [2017](#Coppetal2017)). In Iberia, this species has been shown to demonstrate aggressive behaviours towards native fishes when foraging for food and defending its territory (Almeida et al., [2014](#Almeidaetal2014)), hence in contrast to the absence of interaction as observed in a Turkish stream (Top et al., [2016](#Topetal2016)). Field studies of stream-dwelling *L. gibbosus* in southern England have found that, contrary to an initial suggestion of association with native brown trout *Salmo trutta*, the two species inhabit different parts of their preferred habitat, i.e. stream pools (Vilizzi et al., [2012](#Vilizzietal2012); Stakėnas et al., [2013](#Stakėnasetal2013)). Studies in Iberia have also found that the species appears to benefit from disturbance (Almeida et al., [2009](#Almeidaetal2009)). Whilst the majority of studies have provided only circumstantial evidence for ecological impacts of *L. gibbosus* (e.g. correlation between abundance of native and non-native species: García-Berthou and Moreno-Amich, [2000](#García_BerthouMoreno_Amich2000)), recent research on trophic interactions has evidenced modest changes in trophic ecology and growth rates of only one of three native fish in outdoor experiments (Copp et al., [2017](#Coppetal2017)). In Anatolia and Thrace, where the species is considered to be invasive, no evidence was found for adverse effects of adult *L. gibbosus* on endemic species in terms of habitat competition (Top et al., [2016](#Topetal2016)).

### Round goby *Neogobius melanostomus*

*Neogobius melanostomus* is native to Ponto-Caspian basins and, following colonisation since the 1990s of northern (Baltic Sea region) and western Europe (Skóra and Stolarski, [1993](#SkóraStolarski1993); Simonović et al., [1998](#Simonovićetal1998)), is now widespread in several major European river catchments. This species has also been introduced in the Great Lakes of North America (Jude et al., [1992](#Judeetal1992)), where it has spread quickly. Colonisation by *N. melanostomus*, mainly via ballast water and hull fouling (Ojaveer et al., [2015](#Ojaveeretal2015)), has been facilitated by commercial navigation through artificial waterways (Kornis et al., [2012](#Kornisetal2012); Šlapanský et al., 2017) and by commercial activities related to its use as live bait for fishing (Kornis et al., [2012](#Kornisetal2012)) and for boating (Hirsch et al., [2016](#Hirschetal2016)). Although this species is able to disperse on its own over short distances, its expansion rate is faster in navigable rivers systems (Manné et al., [2013](#Mannéetal2013); Šlapanský et al., [2017](#Šlapanskýetal2017)) via ballast-water transport (Adrian-Kalchhauser et al., [2016](#Adrian_Kalchhauseretal2016)). As a small-sized fish, *N. melanostomus* displays many life-history traits that can explain its invasion success. Thus, in its native range, the species spawns every 18–20 days during a protracted period that lasts from April to September with water temperatures ranging from 9 to 26°C (Marsden et al., [1996](#Marsdenetal1996); Corkum et al., [1998](#Corkumetal1998)). Females produce up to 9000 eggs depending on body size (Marsden et al., [1996](#Marsdenetal1996)) and relative fecundity generally ranges from 9 to 143 eggs/g body weight (Wandzel, [2000](#Wandzel2000); Tomczak and Sapota, [2006](#TomczakSapota2006)). Furthermore, the species' survival in the early life stages is facilitated by the relatively large size of larvae at hatching (i.e. >5 mm) and by the nest guarding behaviour of males. Reproductive strategy of *N. melanostomus* may change in invaded areas with earlier maturation and increased reproductive investment (Masson et al., [2018](#Massonetal2018)). Also, this species shows wide habitat tolerance by inhabiting fresh, brackish and marine (costal) waters, with thermal preferences ranging from −1 to 30°C and a capacity to withstand very low oxygen levels (Kornis et al., [2012](#Kornisetal2012)). Increased water temperatures in the context of climate change (close to the species' energetic optimum at ≈ 26°C) could help this species further expand futher its non-native range of distribution. *Neogobius melanostomus* is a predator that feeds on a wide variety of prey (Kornis et al., [2012](#Kornisetal2012)), and especially benthic organisms, fish eggs and larvae, but also molluscs such as zebra mussel *Dreissena polymorpha* (Coulter et al., [2011](#Coulteretal2011)). When colonising a new environment, *N. melanostomus* generally proliferates and dominates the fish community (e.g. Manné et al., [2013](#Mannéetal2013)) and can significantly impact ecosystem functions by modifying food web structure (i.e. as a predator or prey) and native species abundance via predation and competition – even though the intensity of such impacts is also influenced by local abiotic and biotic factors (Hirsch et al., [2016](#Hirschetal2016)).

### Chinese (Amur) sleeper *Perccottus glenii*

*Perccottus glenii* is a medium-sized fish native to the Far East region of Eurasia in Russia, north-east China and northern North Korea. The high invasiveness potential of this species, compounded with a lack of geographical barriers and absence of reliable methods for containment, contribute to its very high risk of expansion within climatically-compatible areas of Europe (Reshetnikov and Ficetola, [2011](#ReshetnikovFicetola2011)). Colonisation by *P. glenii* of non-native areas has been influenced by several (either accidental or intentional) introductions and consequent spread (Reshetnikov, [2009](#Reshetnikov2009)). The species' invasion of water bodies leads ultimately to transformation of ecosystems, as *P. glenii* occupies the niche of a top predator, with its diet including a wide range of animal species at all trophic levels (i.e. from ciliates to vertebrates: Reshetnikov, [2003](#Reshetnikov2003)). *Perccottus glenii* is believed to affect the populations of other fish species via predation, competition and transmission of diseases. In small water bodies, this species is capable of eliminating completely some fish species also by consuming their eggs (Reshetnikov, [2008](#Reshetnikov2008)). *Perccottus glenii* can tolerate poorly oxygenated water conditions, which enable it to survive in small, stagnant water bodies, such as those used by amphibians as breeding sites, where this species can actively feed on larval and even adult amphibians (Reshetnikov and Manteifel, [1997](#ReshetnikovManteifel1997)). Overall, introductions of this species can lead to a severe decrease in species richness of invertebrates, fish and larval amphibians (Reshetnikov, [2003](#Reshetnikov2003)).

### Topmouth gudgeon *Pseudorasbora parva*

*Pseudorasbora parva* has a native range of distribution in southeast Asia ranging from the River Amur basin in the north to the River Zhujiang basin in the south ([www.fishbase.org/summary/Pseudorasbora-parva.html](https://www.fishbase.org/summary/Pseudorasbora-parva.html)). This species has been classified as an international pest (Welcomme, [1992](#Welcomme1992)) and represents the most compelling example of accidental fish introductions (Gozlan et al., [2010](#Gozlanetal2010)). *Pseudorasbora parva* was first introduced in Ukraine and Europe from the River Amur (Russia) in the early 1950s as a result of contaminants of plant-eating ﬁsh consignments (Novitsky et al., [2015](#Novitskyetal2015)), and in the early 1960s from eastern China to Romania and Hungary together with Asian carp species for aquaculture (Gozlan et al., [2010](#Gozlanetal2010)). Since then, translocations of farmed fish, recreational fishing, ornamental fish trade and natural dispersal have resulted in the distribution of *P. parva* further expanding to Central and Western Europe and to Asia Minor (Gozlan et al., [2010](#Gozlanetal2010)). However, genetic methods have shown that in Europe there has been more than one invasion event from different areas of the species' native range (Baltazar-Soares et al., [2020](#Baltazar_Soaresetal2020)). Currently, *P. parva* is established in 39 countries, including almost all countries of Central and Southern Europe, the UK, Central Asia, North Africa and Oceania ([www.fishbase.org/summary/Pseudorasbora-parva.html](https://www.fishbase.org/summary/Pseudorasbora-parva.html)), as well as some areas of Japan, western China, Tibet (Gozlan et al., [2010](#Gozlanetal2010)) and southern Siberia (Interesova, [2016](#Interesova2016)). The successful establishment of *P. parva* in its non-native range is due to the availability of suitable habitat in artificial water bodies (e.g. Beyer et al., [2007](#Beyeretal2007); Onikura and Nakajima, [2012](#OnikuraNakajima2012); Záhorská et al., [2013](#Záhorskáetal2013); Csorbai et al., [2014](#Csorbaietal2014); Jia et al., [2019](#Jia2019)), a broad diet range (e.g. Hliwa et al., [2002](#Hliwaetal2002); Yalçın-Özdilek et al., [2013](#Yalçın_Özdileketal2013)), a short life span (e.g. Britton et al. [2007](#Brittonetal2007); Yan and Chen, [2009](#YanChen2009); Onikura and Nakajima, [2012](#OnikuraNakajima2012)), early maturity (e.g. Yan and Chen [2009](#YanChen2009); Záhorská and Kováč, [2009](#ZáhorskáKováč2009); Záhorská et al., [2013](#Záhorskáetal2013)), relatively high fecundity (Švolíková et al., [2016](#Švolíkováetal2016)), multiple spawning during the reproductive season (Katano and Maekawa, [1997](#KatanoMaekawa1997)), plasticity in timing and duration of the spawning period (Yan and Chen, [2009](#YanChen2009)), high diversity of spawning substrata (Pinder and Gozlan, [2003](#PinderGozlan2003)), different rates of embryonic development with delayed hatching (Zhu et al., [2018](#Zhuetal2018)), and parental care (Maekawa et al., [1996](#Maekawaetal1996); Pinder and Gozlan, [2003](#PinderGozlan2003)). In addition, *P. parva* is characterised by significant morphological variability – a manifestation of its adaptive phenotypic plasticity depending on environmental conditions (Kotusz and Witkowski, [1998](#KotuszWitkowski1998); Záhorská et al., [2009](#Záhorskáetal2009), [2013](#Záhorskáetal2013); Novitsky et al., [2015](#Novitskyetal2015)). *Pseudorasbora parva* is believed to compete for food with native fish (e.g. Declerck et al., [2002](#Declercketal2002); Britton et al., [2010a](#Brittonetal2010a); Ding et al., [2019](#Dingetal2019)), thereby causing economic losses (Musil et al., [2014](#Musiletal2014)) and at the same time its high trophic plasticity enables it to shift to a lower trophic level in the presence of competitors (Rolla et al., [2020](#Rollaetal2020)). *Pseudorasbora parva* displays parasitic host relationships in its recipient ecosystems and is a source of new parasites and carrier of infectious diseases (e.g. Yuryshynets and Zaichenko, [2015](#YuryshynetsZaichenko2015); Spikmans et al., [2020](#Spikmansetal2020)). Of note, this species can hybridise with other cyprinids (Gozlan and Beyer, [2006](#GozlanBeyer2006)).

### Amazon sailfin catfish *Pterygoplichthys pardalis*

*Pterygoplichthys pardalis* has flexible life-history traits that include high tolerance to harsh environmental conditions and high climate matching between its introduced and native ranges, with widely-reported adverse impacts on socio-economic systems (Orfinger and Goodding, [2018](#OrfingerGoodding2018)). This species has been shown to mature at different size and age in its invasive populations – a response likely attributable to different climatic conditions, local fish assemblages and food availability (Wei et al., [2017](#Weietal2017), [2018](#Weietal2018)). *Pterygoplichthys pardalis* can adapt to a wide range of environmental conditions including a relatively low lethal temperature (8.8℃–11.0℃), a range of acidic to alkaline waters (pH 5.5–8.0), hard water and poor water quality ([www.iucngisd.org/gisd/species.php?sc=1658](http://www.iucngisd.org/gisd/species.php?sc=1658)). Introduction of this species has resulted in adverse impacts including alteration of ecosystem nutrient dynamics, competition with native species and economic losses to fisheries (Chavez et al., [2006](#Chavezetal2006); Pound et al., [2011](#Poundetal2011); Capps et al., [2015](#Cappsetal2015)).

## **Marine fishes**

### Common lionfish *Pterois miles*

*Pterois miles* can be regarded as a ‘milestone’ amongst invasive species, especially since its invasion of the western Atlantic and Mediterranean Sea, which has been unprecedentedly rapid (Schofield, [2010](#Schofield2010); Bariche et al., [2017](#Baricheetal2017)). With its anti-predatory venomous defence (Kizer et al., [1985](#Kizeretal1985)), *P. miles* is a voracious predator that outcompetes native fishes for prey and also by directly eating their juveniles (Schofield, [2010](#Schofield2010)). The species' tolerance to a wide range of environmental conditions (Özgür Özbek et al., [2017](#ÖzgürÖzbeketal2017)), rich genetic diversity (Bariche et al., [2017](#Baricheetal2017)), successful reproductive traits (Morris, [2009](#Morris2009)) and high invasiveness potential (Bilge et al., [2019](#Bilgeetal2019)), not only limited to shallow waters (Andradi-Brown et al., [2017](#Andradi_Brownetal2017)), are all effective factors for its invasion success. *Pterois miles* represents a major ecological and socio-economic problem, and currently no scientific studies are available pointing to ways for its total eradication.

### Red lionfish *Pterois volitans*

*Pterois volitans* is native to the Indo-Pacific region but has spread throughout the Caribbeans following its introduction as a release from aquaria. This species is a generalist predator on fish and crustaceans and can reach high population densities that pose a threat to coral reef biodiversity (Albins and Hixon, [2013](#AlbinsHixon2013); Acero et al., [2019](#Aceroetal2019)). Impacts on fish abundance have been shown in several studies and include a decline in the abundance of 19 out of 25 fish species (mostly, small-bodied) in Gulf of Mexico reefs (Dahl et al., [2016](#Dahletal2016)). Detrimental effects on fish community composition and abundance have also been demonstrated, including a 79% reduction in fish recruitment on small Caribbean reefs (Albins and Hixon, [2008](#AlbinsHixon2008)), a reduction in algal grazing by native fish (Kindinger and Albins, [2017](#KindingerAlbins2017)), community shifts from coral to algal domination (Lesser and Slattery, [2011](#LesserSlattery2011)), and reduced populations of commercially important species with damage to the economy of island communities dependent on fishing (Albins and Hixon, [2008](#AlbinsHixon2008)). A further impact on human health is represented by the species' venomous fins with consequent hospitalisation (Badillo et al., [2012](#Badilloetal2012)). The rapid rate of dispersal of *P. volitans* has been demonstrated in the western Atlantic and shown to be facilitated by the planktonic movement of its eggs, which form a floating mass driven by currents at the water surface (Freshwater et al., [2009](#Freshwateretal2009)), and larvae (average pelagic duration of 26 days: Ahrenholz and Morris, [2010](#AhrenholzMorris2010)). Life-history attributes favouring the species' invasiveness include high annual fecundity (exceeding 2 million eggs), age at maturity of less than one year, and few predators (Côté et al., [2013](#Côtéetal2013)). *Pterois volitans* is also a habitat generalist that inhabits a range of water depths (down to 91 m: Lesser and Slattery, [2011](#LesserSlattery2011)) and salinities (Jud et al., [2015](#Judetal2015)), and is tolerant of artificial sites such as harbours (Claydon et al., [2012](#Claydonetal2012)). As a warm-water species, predicted climate change scenarios are likely to benefit *P. volitans*, and climate change is also considered an important factor for its further spread northwards and southwards in the western Atlantic (Grieve et al., [2016](#Grieveetal2016)).

### Dusky spinefoot *Siganus luridus*

*Siganus luridus* is naturally distributed in the Western Indian Ocean and has migrated to the Mediterranean Sea via the Suez Canal since 1955 (Ben-Tuvia, [1964](#Ben_Tuvia1964)), with successfully-established populations along Mediterranean coasts (Bariche, [2006](#Bariche2006); Daniel et al., [2009](#Danieletal2009); Andaloro et al., [2012](#Andaloroetal2012)). This species is a demersal herbivorous that mostly feeds on algae of rocky and hard bottom surfaces covered by dense vegetation (Bardamaskos et al., [2008](#Bardamaskosetal2008)). As a dominant species, *S. luridus* forms high-density populations (Giakoumi, [2014](#Giakoumi2014)) and is highly adaptable to the new food sources (Bariche, [2006](#Bariche2006)). Several studies have reported on the invasiveness of *S. luridus* (Golani, [1998](#Golani1998); Katsanevakis, [2011](#Katsanevakis2011); Bianchi et al., [2014](#Bianchietal2014)). This species has a highly detrimental feeding behaviour, which often results in the eradication of local algal communities (Sala et al., [2011](#Salaetal2011); Giakoumi, [2014](#Giakoumi2014)) and changes in food web structure (Aronov, [2002](#Aronov2002); Goren and Galil, [2005](#GorenGalil2005)). Some studies have reported competition with native herbivorous fish for space and food (Azzurro et al., [2007](#Azzurroetal2007); Katsanevakis, et al., [2009](#Katsanevakisetal2009)). Further colonisation by *S. luridus* should be a matter of major concern due to the current lack of effective ways for its eradication.

### Marbled spinefoot *Siganus rivulatus*

*Siganus rivulatus* is an invasive species (Sala et al., [2011](#Salaetal2011); Pickholtz et al., [2018](#Pickholtzetal2018)) that, due to its wide salinity tolerance, occurs in both marine and brackish waters and can harbor several parasite species (Diamant et al., [2000](#Diamantetal2000)). Studies have shown that *S. rivulatus* can have serious negative effects on algal communities (Sala et al., [2011](#Salaetal2011)). It has also been shown that the feeding behavior of *S. rivulatus* causes habitat degradation in its introduced areas (Katsanevakis, [2011](#Katsanevakis2011)) and decreases the number of herbivorous species (Bariche et al., [2004](#Baricheetal2004)). Since the dorsal, anal and pelvic fins of this species are poisonous (Bayhan and Kaya, [2015](#BayhanKaya2015)), they can cause severe pain in humans (Galil, [2018](#Galil2018)).

### Gilthead seabream *Sparus aurata*

*Sparus aurata* is a euryhaline and eurythermal teleost whose natural habitat ranges from the coasts of southern England to Mauritania, and also includes the Black Sea (Jardas, [1996](#Jardas1996)) and the Mediterranean Sea, where it is found in high abundances (Audoin, [1962](#Audouin1962); Chervinski, [1984](#Chervinski1984)). In the region of Macaronesia, *S. aurata* is considered native in the eastern Canaries (Dooley et al., [1985](#Dooleyetal1985)), but non-native and invasive in other areas including the western Canaries and Madeira (Alves and Alves, [2002](#AlvesAlves2002); Gonzalez-Lorenzo et al., [2005](#González_Lorenzoetal2005)). As an excellent food fish, *S. aurata* has a high commercial value and is of great importance to fisheries (Jouvenel and Pollard, [2001](#JouvenelPollard2001)). It is also one of the most important fishes used for aquaculture, with an average cultured production of 100 million metric tons per year. Escapees from cages during harvesting or as a result of accidental events (e.g. storms, sabotage) have been reported in Madeira (Alves and Alves, [2002](#AlvesAlves2002)). *Sparus aurata* is a voracious opportunistic predator capable of adapting its diet to the food available in the environment (see Balart et al., [2009](#Balartetal2009)), and can also be herbivorous (<https://www.fishbase.org/summary/Sparus-aurata.html>). This species can adapt successfully to salinities ranging from diluted sea water to hyper-saline media, and its pattern of development includes migrations amongst several habitats, such as the open sea, estuaries and lagoons (Bodinier et al., [2010](#Bodinieretal2010)). Due to its high adaptability for habitat and food, farmed *S. aurata* escapees can have direct impacts on the environment and the coastal marine fauna (Toledo-Guedes et al., [2009](#Toledo_Guedesetal2009); Ramirez et al., [2015](#Ramirezetal2015)) by competing with native species of similar ecological and feeding habitats (Balart et al., [2009](#Balartetal2009)). Should *S. aurata* reproduce successfully in Madeiran waters with resulting population increase, it could have negative impacts on ecologically related and economically important species such as red porgy *Pagrus pagrus* (Alves and Alves, [2002](#AlvesAlves2002)). As several pathogens are known to affect *S. aurata*, including viruses, bacteria, fungi and parasites (Diamant et al., [1994](#Diamantetal1994); Bordas et al., [1996](#Bordasetal1996); Castric et al., [2001](#Castricetal2001); Papapanagiotou and Trilles, [2001](#PapapanagiotouTrilles2001); Pujalte et al., [2003](#Pujalteetal2003); Abdel-Aziz et al., [2013](#Abdel_Azizetal2013)), escapees can also lead to the spread of parasites and/or diseases to communities in the wild (Mladineo, [2006](#Mladineo2006); Balart et al., [2009](#Balartetal2009); Toledo-Guedes et al., [2009](#Toledo_Guedesetal2009); Arechavala-Lopez et al., [2013](#Arechavala_Lopezetal2013)).

## **Tunicates**

### Purple colonial tunicate *Botrylloides violaceus*

*Botrylloides violaceus*, originally from the western Pacific Ocean, has currently a relatively wide distribution and has been recorded in several locations including the northeast Pacific (Cohen et al., [2005](#Cohenetal2005)), the northeast Atlantic (Dijkstra et al., [2008](#Dijkstraetal2008)), the western Pacific (Bock et al., [2011](#Bocketal2011)) and the Mediterranean Sea (Zaniolo et al., [1998](#Zanioloetal1998)). This species can tolerate a wide range of environmental factors including temperature, salinity and nutrients (Carman et al., [2007](#Carmanetal2007); Dijkstra et al., [2008](#Dijkstraetal2008)), and is therefore highly adaptable to different environments. *Botrylloides violaceus* is competitive during periods of high-water temperature (Stachowicz et al., [2002](#Stachowiczetal2002)), has a rapid growth rate, and can easily become the most dominant species. At high abundances, *B. violaceus* could inhibit the recruitment of other species, which in turn could lead to declines or shifts in species composition. Potential pathways of introduction for this species include hull fouling, aquaculture and ballast water. However, due to its brief planktonic stage, the likelihood of survival in ballast water is low (Carlton and Geller, [1993](#CarltonGeller1993)). It is suspected that the successful establishment of *B. violaceus* in several areas is due to the spread from aquaculture facilities (e.g. Bock et al., [2011](#Bocketal2011)). This tunicate is known to overgrow shellfish and other sessile invertebrate species and as a result is considered to be a pest to aquaculture practices (e.g. mussels). Fast-growing colonies of *B. violaceus* pose a risk of monoculture formation with consequent modification of natural benthic communities. Juvenile *B. violaceus* are consumed by snails (Whitlatch and Osman, [2009](#WhitlatchOsman2009)) and echinoderms (Dijkstra et al., [2008](#Dijkstraetal2008)). This could negatively affect communities, as their existence as a prey item has the potential to increase predator abundance, which in turn could impact other prey items (e.g. native sponge species: Thomassin, [1976](#Thomassin1976)).

### Sea vase *Ciona intestinalis*

*Ciona intestinalis* is distributed worldwide, although its native range of distribution is still not clearly determined. In this regard, this species is likely native to the northeast Atlantic and non-native or cryptogenic in the northwest Atlantic (e.g. Carver et al., [2006](#Carveretal2006); Zhan et al., [2012](#Zhanetal2012)) and also occurs in the Bohai and Yellow seas of China (Zhan et al., [2010](#Zhanetal2010)). *Ciona robusta* was formerly known as *Ciona intestinalis* type A, ant this species is likely native to the NW Pacific and introduced in the Atlantic, Mediterranean Sea, Oceania, and North and South Pacific oceans (Bouchemousse et al., [2016a](#Bouchemousseetal2016a)). *Ciona intestinalis* has been mainly introduced by biofouling, and regional dispersal within many coastal areas has resulted from slow-moving vessels travelling between regions (e.g. floating barges, small fishing or recreational water crafts: Carver et al., [2006](#Carveretal2006)). *Ciona intestinalis* is a cold-water/temperate ascidian normally observed in shallow coastal waters, but it can also occur up to a depth of ≈ 200–500 m (Brunel et al., [1998](#Bruneletal1998); Carver et al., [2006](#Carveretal2006); Therriault and Herborg, [2008a](#TherriaultHerborg2008a)). Adults of *C. intestinalis* are sessile, with a short life cycle involving spawning for external fertilisation and a non-feeding larva with a short planktonic phase (Bouchemousse et al., [2016b](#Bouchemousseetal2016b)). This species lives attached to natural (i.e. rocks, eelgrass and kelp) or human-made substrata (i.e. wood, metal or concrete docks, pilings and aquaculture gear: Dybern, [1965](#Dybern1965); McDonald, [2004](#McDonald2004); Sargent et al., [2013](#Sargentetal2013)). *Ciona intestinalis* can withstand short-term salinity fluctuations although it is usually found in seawater (Therriault and Herborg, [2008a](#TherriaultHerborg2008a)). This species is known to cause impacts at the population, community and ecosystem levels, as it can settle early in the season and outcompete with species that settle later (Carver et al., [2006](#Carveretal2006)). *Ciona intestinalis* can also form dense aggregations that can change species richness and community composition (hence impacting biodiversity), and can take up space that could be used as habitat by other species (Therriault and Herborg, [2008a](#TherriaultHerborg2008a)). These dense aggregations can also decrease water circulation, thereby limiting oxygen and food (Therriault and Herborg, [2008a](#TherriaultHerborg2008a)). Should *C. intestinalis* become a dominant member of the biofouling community, it may contribute to organic enrichment by the development of anoxic sediments with resulting degradation of the benthic community (Carver et al., [2006](#Carveretal2006)).

### Carpet sea squirt *Didemnum vexillum*

*Didemnum vexillum* has been shown to carry a high risk of invasiveness in its non-native range with resulting impacts due to its ability to spread via numerous human-related and natural vectors (Herborg et al., [2009](#Herborgetal2009); Lambert, [2009](#Lambert2009); Stefaniak et al., [2012](#Stefaniaketal2012)). This species tolerates a wide range of environmental conditions including temperature, salinity and water quality (Millar, [1971](#Millar1971); Lambert, [2002](#Lambert2002), [2005](#Lambert2005)). Similar to other invasive tunicates, *D. vexillum* has the capacity to reproduce rapidly, outcompete with native species, deteriorate environmental integrity, alter habitat complexity, and cause significant economic harm (Lambert, [2005](#Lambert2005); Daniel and Therriault, [2007](#DanielTherriault2007); Langyel et al., [2009](#Langyeletal2009); Mercer et al., [2009](#Merceretal2009); Auker, [2010](#Auker2010); Cordell et al., [2013](#Cordelletal2013)). In addition, *D. vexillum* is a successful fouling organism on many natural and artificial structures and has the ability to foul rapidly harbour facilities, vessel hulls and aquaculture equipment, thereby increasing its probability of dispersal (Daniel and Therriault, [2007](#DanielTherriault2007); Valentine et al., [2009](#Valentineetal2009)). This species may also be transferred via fragmentation dispersal, which can occur from very small fragments resulting in the transport by currents to other areas (Bullard et al., [2007](#Bullardetal2007); Morris and Carman, [2012](#MorrisCarman2012); Reinhardt et al., [2012](#Reinhardtetal2012)). *Didemnum vexillum* can also settle on and over-grow other species (i.e. ascidians, bivalves, marine grasses, and seaweeds) and can exert major negative impacts on the shellfish industry (Auker, [2010](#Auker2010); Dijkstra and Nolan, [2011](#DijkstraNolan2011); Switzer et al., [2011](#Switzeretal2011)). It is expected that global warming conditions will contribute to increased survival and establishment of this species with further potentially negative impacts in the more northern areas of its non-native range of distribution.

### Clubbed tunicate *Styela clava*

*Styela clava* is native to the northwest Pacific (Shanghai coasts to the Sea of Okhotsk) and the southeastern Bering Sea (Lützen, [1998](#Lützen1998); Fofonoff et al., [2003](#Fofonoffetal2003)) and has been introduced to coastal areas of North America, Europe, Australia and New Zealand (Fofonoff et al., [2003](#Fofonoffetal2003); Lambert, [2003](#Lambert2003); Locke et al., [2007](#Lockeetal2007); Ramsay et al., [2008](#Ramsayetal2008); Arsenault et al., [2009](#Arsenaultetal2009); Moore et al. [2014](#Mooreetal2014)). *Styela clava* has become widely distributed in coastal waters through ship fouling and recreational craft and transport of oysters (Fofonoff et al., [2003](#Fofonoffetal2003), Clarke and Therriault, [2007](#ClarkeTherriault2007); Clarke Murray et al., [2011](#Clarke_Murrayetal2011)). Its strong attachment and low drag coefficient enable *S. clava* to avoid dislodgement at flow velocities well above those of fast-moving vessels (i.e. > 70 km/h: Clarke Murray et al., [2011](#Clarke_Murrayetal2011)). In some regions, the establishment of this species may be facilitated by the provision of artificial structures related to aquaculture facilities (Locke et al., [2007](#Lockeetal2007)). *Styela clava* is a low intertidal to subtidal fouling species which typically occurs at 15–25 m depth (although it can be found at up to 40 m depth: Lützen, [1998](#Lützen1998); Therriault and Herborg, [2008b](#TherriaultHerborg2008b)). It is common in sheltered habitats with low wave action but has also been found on high energy outer coasts on partially protected surfaces of rocks or pilings (Lützen, [1998](#Lützen1998)). *Styela clava* is normally found attached to pier pilings, jetty walls, concrete structures, submerged ropes, buoys, floating docks, and vessel hulls (Lützen, [1998](#Lützen1998)), but can also attach itself to natural substrata such as bivalve beds and act as an epibiont on different species (Lützen, [1998](#Lützen1998)). *Styela clava* can withstand temperatures ranging from 0 to 23 °C and adults can withstand temporary drops in salinity to as low as 8‰ (Buizer, 1980; Lützen, [1998](#Lützen1998)). This species is known to cause impacts at different levels in the ecosystem and is known to grow to a considerable length and become a highly aggressive competitor for space and food. One of the reasons for this is due to its intense filtration rate, which can reduce the food available to co-occurring species, thereby affecting their growth and reduce settlement of other fouling organisms (Osman and Whitlatch, [2000](#OsmanWhitlatch2000)). *Styela clava* may lower the carrying capacity of bays in which blue mussel *Mytilus edulis* is cultured (Comeau et al., [2015](#Comeauetal2015)), and can also become the dominant ascidacian thereby altering community biodiversity and species richness (Lambert and Lambert, [1998](#LambertLambert1998), [2003](#LambertLambert2003)). Dense aggregations of *S. clava* can alter habitat structure and provide a secondary substratum for other fouling organisms, and can also transport viable cells and cysts of toxic phytoplankton (Lambert and Lambert, [1998](#LambertLambert1998), [2003](#LambertLambert2003); Lützen, [1998](#Lützen1998); Rosa et al., [2013](#Rosaetal2013)).

## **Freshwater invertebrates**

### Signal crayfish *Pacifastacus leniusculus*

*Pacifastacus leniusculus* belongs to the ‘old’ non-native crayfish species (i.e. introduced to and established in Europe before the 1980s), with astaciculture and fishery enhancement being the main introduction pathways. The species' long record of secondary introductions and establishment in at least 26 countries (Kouba et al., [2014](#Koubaetal2014)) is a result of its invasive traits including aggressiveness, high fecundity and longevity, early maturity, fast growth, opportunistic polytrophic feeding mode, exploitation of a wide range of habitats, tolerance to adverse environmental conditions, and the chronic carrying of the parasite *Aphanomyces astaci* (Holdich et al., [2006](#Holdichetal2006)). Also, *P. leniusculus* can co-exist with other indigenous crayfishes, which eventually out-competes. The uncontrolled nature of the freshwater crayfish trade in the European Union, despite the current strict legislative framework (European Commission [2014](#EC2014)), is highlighted by the documented live-trading and selling of this species in restaurants across Greece (Perdikaris et al., [2017](#Perdikarisetal2017)).

### Channeled applesnail *Pomacea canaliculata*

*Pomacea canaliculata* is native to South America and has been introduced as an ornamental species in Europe and the Mediterranean region, but also elsewhere in the world through aquaculture. In 2010, *P. canaliculata* invaded the rice fields of the Ebro Delta in Spain, and was later reported from France and Switzerland, where it has been eradicated. This species outcompetes with native snails and heavily impacts aquatic macrophytes and rice cultivations. *Pomacea canaliculata* can act as a host of the rat lungworm *Angiostrongylus cantonensis*, which can infect humans if ingested and cause potentially fatal eosinophilic meningitis ([www.cabi.org/isc/datasheet/88468](https://www.cabi.org/isc/datasheet/88468)). The area of potential establishment for this species comprises wetlands of southern Europe (i.e. Spain, southern France, and most parts of Italy and Greece) and of the Balkans up to the River Danube (EFSA, [2013](#EFSA2013)). In Europe, the introduction of *A. cantonensis* has been forbidden since 2012, even though the species is still commonly traded online (e.g. Mazza et al., [2015](#Mazzaetal2015)).

### Red swamp crayfish *Procambarus clarkii*

*Procambarus clarkii* is one of the most invasive species in the world and is known to exert severe ecological and economic impacts (Gherardi, [2006](#Gherardi2006)). Information on this species' biology and ecology is therefore more accurate than for other invasive species, which increases the level of confidence in risk screenings. One of the reasons why *P. clarkii* started its successful expansion in the wild is its opportunistic behaviour and physiology. In this respect, *P. clarkii* is highly tolerant of and adaptable to a wide range of aquatic conditions, including moderate salinity, low oxygen levels, extreme temperatures, and pollution (Cruz and Rebelo, [2005](#CruzRebelo2005)). Moreover, the species' high rate of reproduction and capacity of dispersion through more than one vector are amongst the factors that increase its capability to colonise rivers, wetlands, ponds and freshwater habitats in general (Gherardi, [2006](#Gherardi2006); Águas et al., [2014](#Águasetal2014)). Amongst the ecological impacts of this species is the disappearance of the Italian native crayfish *Austropotamobius pallipes* as a result of *P. clarkii* acting as a vector of the oomycete *Aphanomyces astaci* (Dieguez-Uribeondo and Soderhall, [1993](#Diéguez_UribeondoSoderhall1993); Aquiloni et al., [2012](#Aquilonietal2012)). Other impacts are linked to the species' intense burrowing activity, which could increase water turbidity with inhibition of primary production (Rodrìguez et al., [2003](#Rodrìguezetal2003)), as well as extended damage of river banks often leading to their collapse with resulting damage to agricultural fields (Correia and Ferreira, [1995](#CorreiaFerreira1995); Huner, [2002](#Huner2002)). In addition to its opportunistic auto-ecology, the introduction of *P. clarkii* in Europe and other parts of the world has been linked to its economic value for crayfish culture (e.g. Viosca, [1937](#Viosca1937)).

### Marbled crayfish *Procambarus virginalis*

*Procambarus virginalis* was discovered for the first time in German aquaria in the mid-1990s as *P*. *fallax* f. *virginalis* (Martin et al., [2010](#Martinetal2010)), and after two decades it obtained valid species status (Lyko, [2017](#Lyko2017)). This crayfish is one of the most popular ornamental invertebrates (Faulkes, [2015](#Faulkes2015)) partly due to its obligatory parthenogenetic reproduction mode (Scholtz et al., [2003](#Scholtzetal2003)). The specie' genetic uniformity, ease of culture and broad behavioural repertoire fosters its use as a model experimental organism (Hossain et al., [2018](#Hossainetal2018)). Since the native range of *P. virginalis* has never been recorded, its North-American origin is just estimated based on phylogenetic analysis. Whenever introduced to new areas, this species has proved a most successful invader with rapid reproduction and high adaptability (Jones et al., [2009](#Jonesetal2009)). Also, its survival during dry periods in burrows as well as at low winter temperatures has been confirmed (Veselý et al., [2015](#Veselýetal2015); Kouba et al., [2016](#Koubaetal2016)). *Procambarus virginalis* has been introduced to Europe (Chucholl et al., [2012](#Chucholletal2012); Patoka et al., [2016](#Patokaetal2016); Weiperth et al., [2020](#Weiperthetal2020)) and Madagascar (Kawai et al., [2009](#Kawaietal2009)), and some individuals have also been recorded in Japan (Faulkes et al., [2012](#Faulkesetal2012)). The main introduction pathway of *P*. *virginalis* is the pet trade, with both intentional releases and accidental escapes, but also human consumption (Hossain et al., [2018](#Hossainetal2018); Andriantsoa et al., [2020](#Andriantsoaetal2020)). The negative impacts on indigenous crayfish and native biota resulting from the expansion of *P*. *virginalis* are expected to increase in the future partly due to ineffective legislative regulations (Patoka et al., [2018](#Patokaetal2018)). Also, further spread of *P*. *virginalis* by ornamental aquaculture is expected especially in supplying countries of south-eastern Asia. This crayfish serves as one of the vectors of the crayfish plague pathogen *Aphanomyces astaci* (Mrugała et al., [2015](#Mrugałaetal2015)). For this reason, and also due to its high aggressiveness, the consequences of its spread can prove devastating to indigenous crayfish as in the case of *Cherax* spp. crayfish in New Guinea (Yonvitner et al., [2020](#Yonvitneretal2020)).

## **Marine invertebrates**

### Australian barnacle *Austrominius modestus*

*Austrominius modestus* is native to the subtropical and temperate zone of Australia and New Zealand. This species was introduced in Europe in the 1940s (Bishop, [1947](#Bishop1947)) from where it spread rapidly along the English coasts and was later found in France and the Netherlands (Harms, [1998](#Harms1998)). In continental Europe, the invasive range of *A. modestus* is from Denmark to Portugal and at two sites in the Mediterranean region (i.e. Thau Lagoon near Marseilles, and the Lagoon of Venice: <https://www.cabi.org/isc/datasheet/109096>). Amongst the factors responsible for the species' successful spread are tolerance of temperature and salinity changes (both larval and adult stages), feeding behaviour, high fecundity throughout most of the year, and relative short generation time (Harms, [1998](#Harms1998)).

### Chinese mitten crab *Eriocheir sinensis*

*Eriocheir sinensis* is a catadromous species that lives in freshwater but migrates to reproduce in saltwater. Adult and juvenile individuals can survive for up to 35 days out of water in wet meadows and up to ten days in burrows of river banks (Veilleux and de Lafontaine, [2007](#VeilleuxdeLafontaine2007)). As a naturally migrating species, *E. sinensis* can disperse widely, also due to its potential to migrate over 1000 km as part of its life cycle (Clark et al., [2006](#Clarketal2006)). The species' reproductive strategy involving the production of up to one million eggs, which the female carries on her body until hatching (Veilleux and de Lafontaine, [2007](#VeilleuxdeLafontaine2007)), further facilitates its potential for invasiveness. Introduction vectors include hitch-hicking on cargo ships and livestock, aquaculture, hull fouling and, occasionally, rafting on floating material (Veilleux and de Lafontaine, [2007](#VeilleuxdeLafontaine2007)). Ballast water is also a critical vector for *E. sinensis* larvae, which have a planktonic stage lasting up to two months (<http://iucngisd.org/gisd/species.php?sc=38>). *Eriocheir sinensis* has a varied diet including plants, animals and detritus, and can outcompete with native species for food. It is also known to erode river banks, as adult individuals prefer to burrow into the sediment as they mature and can live at densities of up to 19 individuals per m2 – a process that also causes siltation, which in turn can reduce habitat quality for other species including gravel-nesting fish (<http://iucngisd.org/gisd/species.php?sc=38>). *Eriocheir sinensis* has also been reported to clog water pipes, weirs and screens, fouling fishing gear, and eating captured fish and crustaceans before their harvesting (Veilleux and de Lafontaine, [2007](#VeilleuxdeLafontaine2007)). This species also carries a crayfish fungus and acts as an intermediate host of a lung fluke that can infect humans (Veilleux and de Lafontaine, [2007](#VeilleuxdeLafontaine2007)). *Eriocheir sinensis* can accumulate heavy metals that, albeit generally in concentrations below toxic levels to humans, can lead to biomagnification along the food chain (Veilleux and de Lafontaine, [2007](#VeilleuxdeLafontaine2007)). Management measures for *E. sinensis* primarily focus on prevention, as once established this species is notoriously difficult to eradicate ([www.iucngisd.org/gisd/speciesname/Eriocheir+sinensis](http://www.iucngisd.org/gisd/speciesname/Eriocheir+sinensis)). However, certain aspects of its natural life cycle may help reduce invasion success, especially where climatic conditions are less favourable. In this regard, the eggs and newly-hatched larvae of *E. sinensis* require water temperatures between 15 ℃ and 25 ℃ and salinities of 15–32 ppt to develop, with growth of juvenile crabs being optimal at 20–30 ℃ (Veilleux and de Lafontaine, [2007](#VeilleuxdeLafontaine2007)). Additionally, spawning occurs only once in a lifetime, and individuals take on average three years to reach maturity, and after spawning they die (Veilleux and de Lafontaine, [2007](#VeilleuxdeLafontaine2007)).

### Warty comb jelly *Mnemiopsis leidyi*

*Mnemiopsis leidyi* is native to estuaries and bays along temperate and subtropical coastal waters of North and South America, where it occurs at a wide range of temperatures and salinities (Purcell et al., [2001](#Purcelletal2001)). Since its invasion of the Black Sea in the early 1980s (Vinogradov et al., [1995](#Vinogradovetal1995)), the geographic range of *M. leidyi* has expanded over Eurasia via shipping and dispersal, demonstrating the species' ability to colonise new recipient ecosystems. *Mnemiopsis leidyi* has caused severe impacts on fish communities in the Black and Mediterranean seas (Shiganova et al., [2019](#Shiganovaetal2019)), and its competition with planktonic fish for zooplankton has resulted in a remarkable decline in the pelagic fisheries of these areas (Finenko et al., [2006](#Finenkoetal2006)). This species, which is listed amongst the world’s 100 most invasive species ([www.iucngisd.org/gisd/species.php?sc=95](http://www.iucngisd.org/gisd/species.php?sc=95)), was recently recorded in the Northern Adriatic Sea (Malej et al., [2017](#Malejetal2017)) and in 2018 was also recorded and sampled in the Port of Ploče (V. Lučić, pers. comm.). As the River Neretva Estuary (Croatia) is rich in planktonic fish and shellfish larval stages (Dulčić et al., [2007](#Dulčićetal2018)), these are likely to represent a profitable food source for *M. leidyi*, whose current establishment has the potential to cause severe impacts on the natural ecosystem, as in the case of the Black Sea fishery (Kideys, [2002](#Kideys2002)), and even more so under predicted global warming conditions (Shiganova et al., [2019](#Shiganovaetal2019)).

### Australian spotted jellyfish *Phyllorhiza punctata*

*Phyllorhiza punctata* is native to the tropical western Pacific from Australia to Japan (Rippingale and Kelly, [1995](#RippingaleKelly1995)). This species prefers to live in estuaries and lagoons and its temperature and salinity tolerances are fairly wide (García and Durbin, [1993](#GarcíaDurbin1993)). Although the first record of *P. punctata* was from Israel in 1965 (Galil et al., [1990](#Galiletal1990)), this species did not establish in the Mediterranean Sea until 2005 (Zenetos et al., [2005](#Zenetosetal2005)), and has since been reported from Greece (Abed-Navandi and Kikinger, [2007](#Abed_NavandiKikinger2007)), Sardinia (Boero et al., [2009](#Boeroetal2009)), Turkey (Çevik et al., [2011](#Çeviketal2011)), Tunisia (Gueroun et al., [2014](#Guerounetal2014)) and Malta (Deidun et al., [2017](#Deidunetal2017)). Despite the lack of clear evidence on the entry of this species into the Mediterranean Sea, it is believed to have entered via the Suez Canal (Galil et al., [1990](#Galiletal1990)). Blooms of *P. punctata* are known to be detrimental to fisheries (Johnson et al., [2005](#Johnsonetal2005)), as occurred in the year 2000 when fish and shrimp populations in the Gulf of Mexico decreased in abundance (Graham et al., [2003](#Grahametal2003)).

### Manila clam *Ruditapes philippinarum*

*Ruditapes philippinarum* is native to Asia and has been introduced to America and Europe, including the Northern Adriatic Sea, for aquaculture purposes during the 20th century (Savini et al., [2010](#Savinietal2010); Cordero et al., [2017](#Corderoetal2017)). Although this species was intentionally introduced along the Italian coasts of the north-western Adriatic Sea for aquaculture purposes in 1983 (Savini et al., [2010](#Savinietal2010)), its presence in this region has not been scientifically verified, probably due to its morphological similarity with its conspecific native grooved carpet shell *Ruditapes decussatus*. Regardless, *R. philippinarum* should adapt well to the regions' habitat due to its ability to tolerate warm-water environments (Savini et al., [2010](#Savinietal2010)), and especially so under predicted climate warming conditions. Of note, this species can act as a vehicle for the introduction of other non-native organisms (Savini et al., [2010](#Savinietal2010)).

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# **Supplementary Tables**

**Table S1** Taxa screened with the Aquatic Species Invasiveness Screening Kit (AS-ISK) listed according to aquatic organismal group. For each taxon, the Order and Family are provided together with the *a priori* categorisation for invasiveness (N = non-invasive; Y = invasive). Note that 24 species were assigned to two different groups depending on the aquatic habitat for which they were screened (see Table S4).

| **Aquatic organismal group** | **Order** | **Family** | **Taxon name** | **Common name** | ***A priori*** |
| --- | --- | --- | --- | --- | --- |
| Mammals | Rodentia | Cricetidae | *Ondatra zibethicus* | muskrat | Y |
|  |  | Myocastoridae | *Myocastor coypus* | coypu | Y |
| Birds | Anseriformes | Anatidae | *Aix galericulata* | mandarin duck | Y |
|  |  |  | *Alopochen aegyptiaca* | Egyptian goose | Y |
|  |  |  | *Cairina moschata* | Muscovy duck | Y |
|  | Pelecaniformes | Threskiornithidae | *Threskiornis aethiopicus* | African sacred ibis | Y |
| Reptiles | Crocodilia | Alligatoridae | *Caiman crocodilus* | spectacled caiman | Y |
|  |  |  | *Paleosuchus palpebrosus* | Cuvier's smooth-fronted caiman | N |
|  |  |  | *Paleosuchus trigonatus* | Schneider's smooth-fronted caiman | N |
|  |  | Crocodylidae | *Crocodylus rhombifer* | Cuban crocodile | Y |
|  |  |  | *Osteolaemus tetraspis* | African dwarf crocodile | N |
|  | Squamata | Boidae | *Eunectes notaeus* | yellow anaconda | Y |
|  |  | Colubridae | *Nerodia fasciata* | southern water snake | N |
|  |  |  | *Nerodia sipedon* | northern water snake | N |
|  |  |  | *Nerodia taxispilota* | brown water snake | N |
|  |  |  | *Thamnophis sirtalis* | common garter snake | N |
|  | Testudines | Chelidae | *Chelodina longicollis* | eastern snake-necked turtle | N |
|  |  |  | *Chelus fimbriata* | matamata turtle | N |
|  |  |  | *Emydura subglobosa* | red-bellied short-necked turtle | N |
|  |  | Chelydridae | *Chelydra serpentina* | common snapping turtle | Y |
|  |  | Emydidae | *Clemmys guttata* | spotted turtle | N |
|  |  |  | *Graptemys ouachitensis* | Ouachita map turtle | N |
|  |  |  | *Graptemys pseudogeographica* | false map turtle | Y |
|  |  |  | *Macrochelys temminckii* | alligator snapping turtle | Y |
|  |  |  | *Pseudemys concinna concinna* | eastern river cooter | N |
|  |  |  | *Trachemys scripta elegans* | red-eared slider | Y |
|  |  |  | *Trachemys scripta scripta* | yellowbelly slider | Y |
|  |  |  | *Trachemys scripta troostii* | Cumberland slider | Y |
|  |  | Geoemydidae | *Cuora flavomarginata* | yellow-margined box turtle | N |
|  |  |  | *Malaclemys terrapin* | diamond-backed terrapin | N |
|  |  |  | *Mauremys caspica* | Caspian turtle | N |
|  |  |  | *Mauremys reevesii* | Chinese tree-keeled pond turtle | N |
|  |  |  | *Mauremys rivulata* | Balkan terrapin | N |
|  |  | Kinosternidae | *Kinosternon subrubrum* | eastern mud turtle | N |
|  |  |  | *Sternotherus odoratus* | musk turtle | N |
|  |  | Trionychidae | *Pelodiscus sinensis* | Chinese softshell turtle | Y |
| Amphibians | Anura | Bufonidae | *Rhinella marina* | cane toad | Y |
|  |  | Ceratophryidae | *Ceratophrys ornata* | Argentine horned frog | Y |
|  |  | Dendrobatidae | *Dendrobates auratus* | green and black dart-poison frog | N |
|  |  |  | *Dendrobates tinctorius* | dyeing dart frog | N |
|  |  |  | *Ranitomeya fantastica* | fantastic poison frog | N |
|  |  | Dicroglossidae | *Dyscophus guineti* | false tomato frog | N |
|  |  |  | *Hoplobatrachus tigerinus* | Indus Valley bullfrog | N |
|  |  | Hylidae | *Ranoidea caerulea* | green tree frog | N |
|  |  |  | *Trachycephalus resinifictrix* | mission golden-eyed tree frog | N |
|  |  | Megophryidae | *Megophrys nasuta* | Malayan horned frog | N |
|  |  | Microhylidae | *Phrynomantis bifasciatus* | banded rubber frog | N |
|  |  | Pipidae | *Hymenochirus curtipes* | western dwarf clawed frog | N |
|  |  |  | *Xenopus laevis* | African clawed frog | Y |
|  |  | Ranidae | *Lithobates catesbeianus* | American bullfrog | Y |
|  |  |  | *Lithobates pipiens* | Northern leopard frog | N |
|  |  |  | *Pelophylax kurtmuelleri* | Balkan frog | Y |
|  |  |  | *Pelophylax saharicus* | Sahara frog | Y |
|  |  | Rhacophoridae | *Rhacophorus nigropalmatus* | Abah River flying frog | N |
|  | Caudata | Ambystomatidae | *Ambystoma mexicanum* | Mexican axolotl | Y |
|  |  | Salamandridae | *Cynops orientalis* | Chinese fire belly newt | N |
|  |  |  | *Cynops pyrrhogaster* | Japanese fire belly newt | N |
|  |  |  | *Pleurodeles waltl* | Iberian ribbed newt | N |
|  |  |  | *Tylototriton shanjing* | emperor newt | N |
|  |  |  | *Tylototriton verrucosus* | Hymalayan newt | N |
| Freshwater fishes | Acipenseriformes | Acipenseridae | *Acipenser baerii* | Siberian sturgeon | N |
|  |  |  | *Acipenser gueldenstaedtii* | Danube sturgeon | N |
|  |  |  | *Acipenser ruthenus* | sterlet sturgeon | N |
|  |  |  | *Acipenser schrenckii* | Amur sturgeon | N |
|  |  |  | *Huso huso* | beluga | N |
|  |  | Polyodontidae | *Polyodon spathula* | Mississippi paddlefish | N |
|  | Anguilliformes | Anguillidae | *Anguilla anguilla* | European eel | Y |
|  | Atheriniformes | Atherinidae | *Atherina boyeri* | big-scale sand smelt | Y |
|  |  |  | *Odontesthes bonariensis* | Argentinian silverside | N |
|  | Beloniformes | Adrianichthyidae | *Oryzias sinensis* | Chinese medaka | N |
|  | Characiformes | Characidae | *Gymnocorymbus ternetzi* | black tetra | N |
|  |  |  | *Paracheirodon axelrodi* | cardinal tetra | N |
|  |  |  | *Paracheirodon innesi* | neon tetra | N |
|  |  | Gasteropelecidae | *Gasteropelecus levis* | silver hatchetfish | N |
|  |  | Prochilodontidae | *Prochilodus lineatus* | streaked prochilod | N |
|  |  | Serrasalmidae | *Colossoma macropomum* | cachama | N |
|  |  |  | *Piaractus brachypomus* | pirapitinga | Y |
|  |  |  | *Pygocentrus nattereri* | red piranha | Y |
|  | Clupeiformes | Clupeidae | *Clupeonella cultriventris* | Black and Caspian Sea sprat | Y |
|  | Cypriniformes | Catastomidae | *Ictiobus cyprinellus* | bigmouth buffalo | N |
|  |  |  | *Ictiobus niger* | black buffalo | N |
|  |  |  | *Myxocyprinus asiaticus* | Chinese sucker | N |
|  |  | Catostomidae | *Catostomus commersonii* | white sucker | Y |
|  |  |  | *Cycleptus elongatus* | blue sucker | N |
|  |  | Cobitidae | *Chromobotia macracanthus* | clown loach | N |
|  |  |  | *Cobitis bilineata* | Italian spined loach | N |
|  |  |  | *Cobitis fahirae* | Küçük Menderes spined loach | N |
|  |  |  | *Cobitis kurui* | ‘türgi hink’ | N |
|  |  |  | *Cobitis taenia* | spined loach | N |
|  |  |  | *Koreocobitis rotundicaudata* | white nose loach | N |
|  |  |  | *Misgurnus anguillicaudatus* | oriental weatherfish | Y |
|  |  |  | *Misgurnus fossilis* | weatherfish | N |
|  |  |  | *Misgurnus nikolskyi* | ‘Nikolski vingerjas’ | N |
|  |  |  | *Paramisgurnus dabryanus* | ‘DaLingFuNiQiu’ | N |
|  |  | Cyprinidae | *Abbottina rivularis* | Chinese false gudgeon | Y |
|  |  |  | *Abramis brama* | freshwater bream | Y |
|  |  |  | *Alburnoides bipunctatus* | spirlin | N |
|  |  |  | *Alburnus alburnus* | bleak | Y |
|  |  |  | *Alburnus battalgilae* | Gediz shemaya | N |
|  |  |  | *Alburnus chalcoides* | Danube bleak | N |
|  |  |  | *Ballerus ballerus* | blue bream | N |
|  |  |  | *Ballerus sapa* | white-eye bream | N |
|  |  |  | *Barbus barbus* | barbel | Y |
|  |  |  | *Barbus pergamonensis* | ‘Bergama barbel’ | N |
|  |  |  | *Blicca bjoerkna* | silver bream | N |
|  |  |  | *Capoeta bergamae* | Bergama barb | N |
|  |  |  | *Carassius auratus* | goldfish | Y |
|  |  |  | *Carassius carassius* | crucian carp | N |
|  |  |  | *Carassius cuvieri* | Japanese white crucian carp | N |
|  |  |  | *Carassius gibelio* | gibel carp | Y |
|  |  |  | *Chondrostoma holmwoodii* | Izmir nase | N |
|  |  |  | *Chondrostoma nasus* | common nase | N |
|  |  |  | *Chrosomus eos* | northern redbelly dace | N |
|  |  |  | *Chrosomus erythrogaster* | sourthern redbelly dace | N |
|  |  |  | *Cirrhinus cirrhosus* | Mrigal carp | N |
|  |  |  | *Coreoleuciscus splendidus* | ‘swiri’ | N |
|  |  |  | *Ctenopharyngodon idella* | grass carp | Y |
|  |  |  | *Culter alburnus* | ‘QiaoZuiBo’ | N |
|  |  |  | *Cyprinella lutrensis* | red shiner | Y |
|  |  |  | *Cyprinus carpio* | common carp | Y |
|  |  |  | *Danio rerio* | zebra danio | N |
|  |  |  | *Garra rufa* | red garra | N |
|  |  |  | *Gibelion catla* | catla | N |
|  |  |  | *Gobio gobio* | gudgeon | N |
|  |  |  | *Gobio lozanoi* | Iberian gudgeon | Y |
|  |  |  | *Gobio obtusirostris* | ‘Nösurünt’ | N |
|  |  |  | *Hemibarbus labeo* | barbel steed | N |
|  |  |  | *Hemibarbus maculatus* | spotted steed | Y |
|  |  |  | *Hemiculter leucisculus* | sharpbelly | Y |
|  |  |  | *Hypophthalmichthys molitrix* | silver carp | Y |
|  |  |  | *Hypophthalmichthys nobilis* | bighead carp | Y |
|  |  |  | *Labeo rohita* | roho labeo | N |
|  |  |  | *Ladigesocypris irideus* | ‘vikerturb’ | N |
|  |  |  | *Ladigesocypris mermere* | Izmir minnow | N |
|  |  |  | *Ladislavia taczanowskii* | Tachanovsky's gudgeon | N |
|  |  |  | *Leucaspius delineatus* | sunbleak | Y |
|  |  |  | *Leuciscus aspius* | asp | N |
|  |  |  | *Leuciscus idus* | ide (golden orfe) | Y |
|  |  |  | *Leuciscus leuciscus* | common dace | N |
|  |  |  | *Leucos basak* | ‘basak’ | N |
|  |  |  | *Luciobarbus lydianus* | Lydian barbel | N |
|  |  |  | *Megalobrama amblycephala* | Wuchang bream | N |
|  |  |  | *Mylopharyngodon piceus* | black carp | Y |
|  |  |  | *Nipponocypris koreanus* | ‘Korea idakarbik’ | N |
|  |  |  | *Parachondrostoma toxostoma* | south-west European nase | N |
|  |  |  | *Pethia gelius* | golden barb | N |
|  |  |  | *Petroleuciscus smyrnaeus* | Izmir chub | N |
|  |  |  | *Phoxinus kumgangensis* | ‘Kumgangi lepamaim’ | N |
|  |  |  | *Pimephales promelas* | fathead minnow | Y |
|  |  |  | *Protochondrostoma genei* | South European nase | N |
|  |  |  | *Pseudogobio esocinus* | goby minnow | N |
|  |  |  | *Pseudorasbora parva* | topmouth gudgeon | Y |
|  |  |  | *Pungtungia herzi* | striped shiner | N |
|  |  |  | *Puntigrus partipentazona* | five-banded tiger barb | N |
|  |  |  | *Rhinichthys atratulus* | eastern blacknose dace | N |
|  |  |  | *Rhodeus amarus* | European bitterling | N |
|  |  |  | *Rhodeus ocellatus* | rosy bitterling | N |
|  |  |  | *Rutilus rutilus* | roach | Y |
|  |  |  | *Scardinius erythrophthalmus* | rudd | Y |
|  |  |  | *Squalidus gracilis* | Korean slender gudgeon | N |
|  |  |  | *Squalius cephalus* | chub | N |
|  |  |  | *Squalius fellowesii* | Aegean chub | N |
|  |  |  | *Telestes souffia* | souffia | N |
|  |  |  | *Tinca tinca* | tench | Y |
|  |  |  | *Vimba vimba* | vimba | N |
|  |  |  | *Zacco platypus* | freshwater minnow | N |
|  |  | Nemacheilidae | *Barbatula barbatula* | stone loach | N |
|  |  |  | *Oxynoemacheilus theophilii* | ‘Lesbos stone loach’ | N |
|  | Cyprinodontiformes | Fundulidae | *Fundulus heteroclitus heteroclitus* | mummichog | N |
|  |  | Poeciliidae | *Belonesox belizanus* | top minnow | Y |
|  |  |  | *Gambusia affinis* | western mosquitofish | Y |
|  |  |  | *Gambusia holbrooki* | eastern mosquitofish | Y |
|  |  |  | *Poecilia latipinna* | sailfin molly | Y |
|  |  |  | *Poecilia reticulata* | guppy | Y |
|  |  |  | *Poecilia velifera* | sail-fin molly | N |
|  |  |  | *Xiphophorus hellerii* | green swordtail | Y |
|  |  |  | *Xiphophorus maculatus* | southern platyfish | Y |
|  | Esociformes | Esocidae | *Esox lucius* | northern pike | Y |
|  |  |  | *Esox niger* | chain pickerel | N |
|  |  | Umbridae | *Umbra krameri* | European mudminnow | N |
|  |  |  | *Umbra pygmaea* | eastern mudminnow | Y |
|  | Gasterosteiformes | Gasterosteidae | *Culaea inconstans* | brook stickleback | N |
|  |  |  | *Gasterosteus aculeatus* | three-spined stickleback | N |
|  |  |  | *Pungitius platygaster* | southern ninespine stickleback | N |
|  | Mugiliformes | Mugilidae | *Chelon auratus* | golden grey mullet | N |
|  |  |  | *Chelon ramada* | thinlip grey mullet | N |
|  |  |  | *Chelon saliens* | leaping mullet | N |
|  |  |  | *Liza abu* | abu mullet | N |
|  |  |  | *Planiliza haematocheila* | so-iuy mullet | N |
|  | Myliobatiformes | Potamotrygonidae | *Potamotrygon motoro* | South American freshwater stingray | N |
|  | Osmeriformes | Osmeridae | *Osmerus eperlanus* | European smelt | Y |
|  |  | Salangidae | *Neosalanx taihuensis* | ‘taihu xinyinyu’ | N |
|  | Osteoglossiformes | Osteoglossidae | *Osteoglossum bicirrhosum* | arawana | Y |
|  | Perciformes | Ambassidae | *Parambassis apogonoides* | iridescent glassy perchlet | N |
|  |  |  | *Parambassis ranga* | Indian glassy fish | N |
|  |  | Anabantidae | *Ctenopoma nigropannosum* | twospot climbing perch | N |
|  |  | Centrarchidae | *Ambloplites rupestris* | rock bass | Y |
|  |  |  | *Lepomis gibbosus* | pumpkinseed | N |
|  |  |  | *Lepomis macrochirus* | bluegill | Y |
|  |  |  | *Micropterus dolomieu* | smallmouth bass | Y |
|  |  |  | *Micropterus salmoides* | largemouth bass | Y |
|  |  |  | *Pomoxis annularis* | white crappie | N |
|  |  |  | *Pomoxis nigromaculatus* | black crappie | N |
|  |  | Channidae | *Channa argus* | snakehead | Y |
|  |  |  | *Channa micropeltes* | Indonesian snakehead | Y |
|  |  |  | *Channa punctata* | spotted snakehead | Y |
|  |  | Cichlidae | *Acarichthys heckelii* | threadfin acara | N |
|  |  |  | *Amatitlania nigrofasciata* | convict cichlid | Y |
|  |  |  | *Amatitlania sajica* | t-bar cichlid | N |
|  |  |  | *Amphilophus citrinellus* | Midas cichlid | Y |
|  |  |  | *Apistogramma borellii* | umbrella cichlid | N |
|  |  |  | *Astronotus ocellatus* | oscar | Y |
|  |  |  | *Australoheros facetus* | chameleon cichlid | Y |
|  |  |  | *Cichla ocellaris* | peacock cichlid | Y |
|  |  |  | *Cichla temensis* | speckled pavon | N |
|  |  |  | *Cichlasoma bimaculatum* | black acara | Y |
|  |  |  | *Cichlasoma trimaculatum* | three spot ciclid | N |
|  |  |  | *Coptodon rendalli* | redbreast tilapia | N |
|  |  |  | *Coptodon zillii* | redbelly tilapia | Y |
|  |  |  | *Hemichromis fasciatus* | banded jewelfish | N |
|  |  |  | *Hemichromis letourneuxi* | kewel fish | Y |
|  |  |  | *Heterotilapia buttikoferi* | zebra tilapia | N |
|  |  |  | *Melanochromis auratus* | golden mbuna | N |
|  |  |  | *Mesonauta festivus* | flag cichlid | N |
|  |  |  | *Oreochromis aureus* | blue tilapia | Y |
|  |  |  | *Oreochromis mossambicus* | Mozambique tilapia | Y |
|  |  |  | *Oreochromis niloticus* | Nile tilapia | Y |
|  |  |  | *Parachromis managuensis* | jaguar guapote | Y |
|  |  |  | *Pterophyllum scalare* | freshwater angelfish | Y |
|  |  |  | *Rocio octofasciata* | Jack Dempsey | Y |
|  |  |  | *Symphysodon aequifasciatus* | blue discus | N |
|  |  |  | *Symphysodon discus* | red discus | N |
|  |  |  | *Trichromis salvini* | yellow belly cichlid | N |
|  |  | Gobiidae | *Acanthogobius flavimanus* | yellowfin goby | Y |
|  |  |  | *Babka gymnotrachelus* | racer goby | Y |
|  |  |  | *Benthophilus stellatus* | stellate tadpole-goby | Y |
|  |  |  | *Gobiosoma bosc* | naked goby | N |
|  |  |  | *Knipowitschia byblisia* | Byblis goby | N |
|  |  |  | *Knipowitschia caucasica* | Caucasian dwarf goby | N |
|  |  |  | *Knipowitschia caunosi* | Caunos goby | N |
|  |  |  | *Knipowitschia mermere* | Marmara goby | N |
|  |  |  | *Neogobius fluviatilis* | monkey goby | Y |
|  |  |  | *Neogobius melanostomus* | round goby | Y |
|  |  |  | *Padogobius bonelli* | Padanian goby | N |
|  |  |  | *Padogobius nigricans* | Arno goby | N |
|  |  |  | *Ponticola gorlap* | Caspian bighead goby | N |
|  |  |  | *Ponticola kessleri* | bighead goby | N |
|  |  |  | *Proterorhinus marmoratus* | tubenose goby | N |
|  |  |  | *Proterorhinus semilunaris* | western tubenose goby | Y |
|  |  |  | *Rhinogobius cliffordpopei* | ‘BoShiWenXiaHu’ | N |
|  |  |  | *Rhinogobius giurinus* | ‘ZiLingWenXiaHu’ | N |
|  |  |  | *Rhinogobius similis* | ‘Amur goby’ | N |
|  |  | Helastomatidae | *Helostoma temminckii* | kissing gourami | N |
|  |  | Latidae | *Lates niloticus* | Nile perch | Y |
|  |  | Moronidae | *Morone americana* | white perch | Y |
|  |  |  | *Morone chrysops* × *Morone saxatilis* | hybrid wiper × sunshine bass | Y |
|  |  | Odontobutidae | *Micropercops swinhonis* | ‘XiaoHuangYouYu’ | N |
|  |  |  | *Perccottus glenii* | Chinese (Amur) sleeper | Y |
|  |  | Osphronemidae | *Trichogaster lalius* | dwarf gourami | N |
|  |  |  | *Trichogaster trichopterus* | three spot gourami | N |
|  |  |  | *Trichopodus leerii* | pearl gourami | N |
|  |  |  | *Trichopodus microlepis* | moonlight gourami | N |
|  |  |  | *Trichopodus pectoralis* | snakeskin gourami | N |
|  |  |  | *Trichopsis pumila* | pygmy gourami | N |
|  |  | Osphronenidae | *Betta splendens* | Siamese fighting fish | N |
|  |  | Percichthyidae | *Coreoperca herzi* | Korean aucha perch | N |
|  |  |  | *Maccullochella peelii* | Murray cod | N |
|  |  | Percidae | *Gymnocephalus cernua* | ruffe | N |
|  |  |  | *Perca flavescens* | yellow perch | Y |
|  |  |  | *Perca fluviatilis* | Eurasian perch | Y |
|  |  |  | *Sander lucioperca* | pikeperch | Y |
|  |  |  | *Sander volgensis* | Volga pikeperch | N |
|  | Salmoniformes | Salmonidae | *Coregonus albula* | vendace | Y |
|  |  |  | *Coregonus autumnalis* | Arctic cisco | N |
|  |  |  | *Coregonus lavaretus* | European whitefish | N |
|  |  |  | *Coregonus muksun* | muksun | N |
|  |  |  | *Coregonus nasus* | broad whitefish | N |
|  |  |  | *Coregonus peled* | peled | N |
|  |  |  | *Hucho hucho* | huchen | N |
|  |  |  | *Hucho taimen* | taimen | N |
|  |  |  | *Oncorhynchus gorbuscha* | pink salmon | N |
|  |  |  | *Oncorhynchus keta* | chum salmon | N |
|  |  |  | *Oncorhynchus kisutch* | coho salmon | Y |
|  |  |  | *Oncorhynchus mykiss* | rainbow trout | Y |
|  |  |  | *Oncorhynchus tshawytscha* | chinook salmon | N |
|  |  |  | *Salmo marmoratus* | marble trout | N |
|  |  |  | *Salmo salar* | Atlantic salmon | Y |
|  |  |  | *Salmo trutta* | brown trout | Y |
|  |  |  | *Salvelinus alpinus alpinus* | Arctic char | N |
|  |  |  | *Salvelinus fontinalis* | brook trout | Y |
|  |  |  | *Salvelinus fontinalis × Salvelinus alpinus alpinus* | hybrid brook trout × Arctic char | Y |
|  |  |  | *Salvelinus namaycush* | lake trout | Y |
|  |  |  | *Salvelinus umbla* | ‘lake charr’ | N |
|  |  |  | *Thymallus thymallus* | European grayling | N |
|  | Scorpaeniformes | Cottidae | *Cottus gobio* | bullhead | N |
|  | Siluriformes | Amblycipitidae | *Liobagrus andersoni* | Korean torrent catfish | N |
|  |  | Callichthyidae | *Callichthys callichthys* | cascarudo | N |
|  |  | Clariidae | *Clarias batrachus* | Philippine catfish | Y |
|  |  |  | *Clarias gariepinus* | North African catfish | Y |
|  |  |  | *Clarias gariepinus × Heterobranchus bidorsalis* | North African catfish × African catfish | Y |
|  |  | Doradidae | *Pterodoras granulosus* | granulated catfish | N |
|  |  | Heptapteridae | *Rhamdia quelen* | South American catfish | N |
|  |  | Heteropneustidae | *Heteropneustes fossilis* | stinging catfish | N |
|  |  | Ictaluridae | *Ameiurus melas* | black bullhead | Y |
|  |  |  | *Ameiurus nebulosus* | brown bullhead | Y |
|  |  |  | *Ictalurus punctatus* | channel catfish | Y |
|  |  | Loricariidae | *Hypostomus plecostomus* | suckermouth catfish | Y |
|  |  |  | *Pterygoplichthys disjunctivus* | vermiculated sailfin catfish | Y |
|  |  |  | *Pterygoplichthys pardalis* | Amazon sailfin catfish | Y |
|  |  |  | *Pterygoplichthys* spp*.* | Amazon or vermiculated sailfin catfish | Y |
|  |  | Mochokidae | *Synodontis eupterus* | featherfin squeaker | N |
|  |  | Pangasiidae | *Pangasianodon hypophthalmus* | striped catfish | N |
|  |  |  | *Pangasius sanitwongsei* | giant pangasius | N |
|  |  | Schilbeidae | *Schilbe mystus* | African butter catfish | N |
|  |  | Siluridae | *Kryptopterus bicirrhis* | glass catfish | N |
|  |  |  | *Silurus asotus* | Amur catfish | N |
|  |  |  | *Silurus glanis* | European catfish (sheatfish) | Y |
|  |  |  | *Silurus triostegus* | Tigris catfish | N |
|  | Syngnathiformes | Syngnathidae | *Syngnathus abaster* | black-striped pipefish | N |
| Brackish fishes | Clupeiformes | Clupeidae | *Clupeonella cultriventris* | Black and Caspian Sea sprat | Y |
|  | Cyprinodontiformes | Poeciliidae | *Belonesox belizanus* | top minnow | Y |
|  |  |  | *Poecilia latipinna* | sailfin molly | Y |
|  | Perciformes | Cichlidae | *Coptodon zillii* | redbelly tilapia | Y |
|  |  |  | *Herichthys cyanoguttatus* | Rio Grande cichlid | N |
|  |  |  | *Mayaheros uropthalmus* | Mexican moharra | N |
|  |  |  | *Oreochromis aureus* | blue tilapia | Y |
|  |  |  | *Oreochromis mossambicus* | Mozambique tilapia | Y |
|  |  |  | *Oreochromis niloticus* | Nile tilapia | Y |
|  |  |  | *Oreochromis spilurus* | Sabaki tilapia | N |
|  |  |  | *Sarotherodon galilaeus* | mango tilapia | N |
|  |  |  | *Tilapia mariae* | spotted tilapia | Y |
|  |  | Gobiidae | *Gobiosoma bosc* | naked goby | N |
|  |  |  | *Proterorhinus marmoratus* | tubenose goby | N |
|  |  |  | *Rhinogobius brunneus* | Amur goby | N |
|  |  | Latidae | *Lates calcarifer* | barramundi | N |
|  | Syngnathiformes | Syngnathidae | *Syngnathus abaster* | black-striped pipefish | N |
| Marine fishes | Acipenseriformes | Acipenseridae | *Acipenser gueldenstaedtii* | Danube sturgeon | N |
|  |  |  | *Acipenser nudiventris* | fringebarbel sturgeon | N |
|  | Anguilliformes | Anguillidae | *Anguilla anguilla* | European eel | Y |
|  |  |  | *Anguilla rostrata* | American eel | N |
|  | Atheriniformes | Atherinidae | *Atherinomorus forskalii* | Red Sea hardyhead silverside | N |
|  |  |  | *Odontesthes bonariensis* | Argentinian silverside | N |
|  | Aulopiformes | Synodontidae | *Saurida lessepsianus* | ‘zurna balığı’ | N |
|  | Beloniformes | Hemiramphidae | *Hemiramphus far* | black-barred halfbeak | Y |
|  | Beryciformes | Holocentridae | *Sargocentron rubrum* | redcoat | N |
|  | Clupeiformes | Clupeidae | *Herklotsichthys punctatus* | spotback herring | N |
|  |  | Dussumieriidae | *Dussumieria elopsoides* | slender rainbow sardine | N |
|  |  |  | *Etrumeus golanii* | ‘Akdeniz hamsisi’ | N |
|  | Cyprinodontiformes | Fundulidae | *Lucania parva* | rainwater killifish | N |
|  | Elopiformes | Megalopidae | *Megalops atlanticus* | tarpon | N |
|  | Gadiformes | Bregmacerotidae | *Bregmaceros nectabanus* | smallscale codlet | N |
|  | Mugiliformes | Mugilidae | *Chelon auratus* | golden grey mullet | N |
|  |  |  | *Chelon ramada* | thinlip grey mullet | N |
|  |  |  | *Liza carinata* | keeled mullet | N |
|  | Perciformes | Acanthuridae | *Ctenochaetus binotatus* | twospot surgeonfish | N |
|  |  |  | *Ctenochaetus hawaiiensis* | chevron tang | N |
|  |  |  | *Ctenochaetus marginatus* | striped-fin surgeonfish | N |
|  |  |  | *Ctenochaetus truncatus* | Indian gold-ring bristle-tooth | N |
|  |  |  | *Zebrasoma flavescens* | yellow tang | N |
|  |  | Apogonidae | *Apogon queketti* | spotfin cardinal | N |
|  |  |  | *Apogon smithi* | Smith's cardinalfish | N |
|  |  |  | *Apogonichthyoides pharaonis* | ‘kardinal balığı’ | N |
|  |  |  | *Ostorhinchus fasciatus* | broadbanded cardinalfish | N |
|  |  | Bramidae | *Taractichthys longipinnis* | big-scale pomfret | N |
|  |  | Callionymidae | *Callionymus filamentosus* | blotchfin dragonet | Y |
|  |  | Carangidae | *Alepes djedaba* | shrimp scad | N |
|  |  |  | *Pseudocaranx dentex* | white trevally | N |
|  |  |  | *Trachurus indicus* | Arabian scad | N |
|  |  | Chaetodontidae | *Chelmon marginalis* | margined coralfish | N |
|  |  |  | *Chelmon muelleri* | blackfin coralfish | N |
|  |  |  | *Chelmon rostratus* | copperband butterflyfish | N |
|  |  |  | *Chelmonops curiosus* | western talma | N |
|  |  |  | *Chelmonops truncatus* | eastern talma | N |
|  |  |  | *Hemitaurichthys multispinosus* | many-spined butterflyfish | N |
|  |  |  | *Hemitaurichthys thompsoni* | Thompson's butterflyfish | N |
|  |  |  | *Hemitaurichthys zoster* | brown-and-white butterflyfish | N |
|  |  |  | *Heniochus intermedius* | Red Sea bannerfish | Y |
|  |  |  | *Heniochus pleurotaenia* | phantom bannerfish | N |
|  |  |  | *Heniochus singularius* | singular bannerfish | N |
|  |  |  | *Heniochus varius* | horned bannerfish | N |
|  |  |  | *Johnrandallia nigrirostris* | blacknosed butterflyfish | N |
|  |  |  | *Parachaetodon ocellatus* | sixspine butterflyfish | N |
|  |  |  | *Prognathodes aculeatus* | longsnout butterflyfish | N |
|  |  |  | *Prognathodes aya* | bank butterflyfish | N |
|  |  |  | *Prognathodes brasiliensis* | Brazilian butterflyfish | N |
|  |  |  | *Prognathodes dichrous* | bicolor butterflyfish | N |
|  |  |  | *Prognathodes falcifer* | scythemarked butterflyfish | N |
|  |  |  | *Prognathodes guyotensis* | ‘Urashima-chôchô-uo’ | N |
|  |  | Champsodontidae | *Champsodon nudivittis* | nakedband gaper | N |
|  |  |  | *Champsodon vorax* | Indo-Pacific gaper | N |
|  |  | Cichlidae | *Sarotherodon melanotheron* | blackchin tilapia | N |
|  |  | Gobiidae | *Acanthogobius flavimanus* | yellowfin goby | Y |
|  |  |  | *Acentrogobius pflaumii* | striped sandgoby | Y |
|  |  |  | *Oxyurichthys petersii* | ‘frogface goby’ | N |
|  |  |  | *Vanderhorstia mertensi* | Mertens' prawn-goby | N |
|  |  | Haemulidae | *Pomadasys stridens* | striped piggy | N |
|  |  | Labridae | *Pteragogus pelycus* | sideburn wrasse | N |
|  |  | Latidae | *Lates calcarifer* | barramundi | N |
|  |  | Leiognathidae | *Equulites klunzingeri* | ‘eksi balığı’ | N |
|  |  | Moronidae | *Dicentrarchus labrax* | European seabass | N |
|  |  |  | *Morone americana* | white perch | Y |
|  |  |  | *Morone saxatilis* | striped bass | Y |
|  |  | Mullidae | *Parupeneus forsskali* | Red Sea goatfish | N |
|  |  |  | *Upeneus moluccensis* | goldband goatfish | N |
|  |  |  | *Upeneus pori* | Por's goatfish | N |
|  |  | Nemipteridae | *Nemipterus randalli* | Randall's threadfin bream | Y |
|  |  | Pempheridae | *Pempheris rhomboidea* | dusky sweeper | N |
|  |  | Pomacanthidae | *Genicanthus bellus* | ornate angelfish | N |
|  |  |  | *Genicanthus watanabei* | blackedged angelfish | N |
|  |  |  | *Holacanthus tricolor* | rock beauty | N |
|  |  |  | *Pomacanthus maculosus* | yellowbar angelfish | N |
|  |  | Pomacentridae | *Abudefduf taurus* | Night sergeant | N |
|  |  |  | *Amphiprion akallopisos* | skunk clownfish | N |
|  |  |  | *Amphiprion ephippium* | saddle anemonefish | N |
|  |  |  | *Amphiprion sandaracinos* | yellow clownfish | N |
|  |  |  | *Amphiprion sebae* | Sebae anemonefish | N |
|  |  |  | *Neopomacentrus cyanomos* | regal demoiselle | N |
|  |  | Rachycentridae | *Rachycentron canadum* | cobia | Y |
|  |  | Sciaenidae | *Argyrosomus regius* | meagre | N |
|  |  |  | *Sciaenops ocellatus* | red drum | N |
|  |  | Scombridae | *Scomberomorus commerson* | narrow-barred Spanish mackerel | N |
|  |  | Serranidae | *Cromileptes altivelis* | humpback grouper | N |
|  |  |  | *Epinephelus aeneus* | white grouper | N |
|  |  |  | *Epinephelus fuscoguttatus* | brown-marbled grouper | N |
|  |  | Siganidae | *Siganus luridus* | dusky spinefoot | Y |
|  |  |  | *Siganus rivulatus* | marbled spinefoot | Y |
|  |  | Sillaginidae | *Sillago suezensis* | ‘silver sillago’ | N |
|  |  | Sparidae | *Acanthopagrus latus* | yellowfin seabream | N |
|  |  |  | *Sparus aurata* | gilthead seabream | Y |
|  |  | Sphyraenidae | *Sphyraena chrysotaenia* | yellowstripe barracuda | N |
|  |  |  | *Sphyraena flavicauda* | yellowtail barracuda | N |
|  |  | Terapontidae | *Pelates quadrilineatus* | fourlined terapon | N |
|  | Pleuronectiformes | Cynoglossidae | *Cynoglossus sinusarabici* | ‘sivrikuyruk dil balığı’ | N |
|  |  | Paralichthyidae | *Paralichthys dentatus* | summer flounder | N |
|  |  |  | *Paralichthys lethostigma* | southern flounder | N |
|  |  | Pleuronectidae | *Verasper moseri* | barfin flounder | N |
|  |  | Scophthalmidae | *Scophthalmus maximus* | turbot | N |
|  |  | Soleidae | *Solea senegalensis* | Senegale sole | N |
|  |  |  | *Solea solea* | common (Dover) sole | N |
|  | Salmoniformes | Salmonidae | *Salmo salar* | Atlantic salmon | Y |
|  | Scorpaeniformes | Peristediidae | *Peristedion cataphractum* | African armoured searobin | N |
|  |  | Scorpaenidae | *Dendrochirus barberi* | Hawaiian lionfish | N |
|  |  |  | *Dendrochirus bellus* | butterfly scorpionfish | N |
|  |  |  | *Dendrochirus biocellatus* | twospot turkeyfish | N |
|  |  |  | *Dendrochirus brachypterus* | dwarf lionfish | N |
|  |  |  | *Dendrochirus zebra* | zebra turkeyfish | N |
|  |  |  | *Parapterois heterura* | blackfoot firefish | N |
|  |  |  | *Pterois antennata* | broadbarred firefish | N |
|  |  |  | *Pterois lunulata* | luna lionfish | N |
|  |  |  | *Pterois miles* | common lionfish | Y |
|  |  |  | *Pterois mombasae* | frillkin turkeyfish | N |
|  |  |  | *Pterois radiata* | radial firefish | N |
|  |  |  | *Pterois russelii* | plaintail turkeyfish | N |
|  |  |  | *Pterois sphex* | Hawaiian turkeyfish | N |
|  |  |  | *Pterois volitans* | red lionfish | Y |
|  | Syngnathiformes | Fistulariidae | *Fistularia commersonii* | bluespotted cornetfish | N |
|  | Tetraodontiformes | Diodontidae | *Chilomycterus reticulatus* | spotfin burrfish | N |
|  |  | Monacanthidae | *Stephanolepis diaspros* | reticulated leatherjacket | N |
|  |  | Tetraodontidae | *Lagocephalus guentheri* | diamondback puffer | N |
|  |  |  | *Lagocephalus sceleratus* | silver-cheeked toadfish | Y |
|  |  |  | *Lagocephalus spadiceus* | half-smooth golden pufferfish | Y |
|  |  |  | *Lagocephalus suezensis* | ‘balon baliği’ | N |
|  |  |  | *Torquigener flavimaculosus* | yellowspotted puffer | N |
| Tunicates | Aplousobranchia | Clavelinidae | *Clavelina lepadiformis* | light-bulb ascidian | N |
|  | Enterogona | Ascidiidae | *Ascidiella aspersa* | dirty sea squirt | Y |
|  |  | Cionidae | *Ciona intestinalis* | sea vase | Y |
|  |  | Didemnidae | *Didemnum vexillum* | carpet sea squirt | Y |
|  |  |  | *Diplosoma listerianum* | grey encrusting compound tunicate | Y |
|  |  | Polyclinidae | *Polyclinum aurantium* | – | N |
|  |  |  | *Polyclinum constellatum* | – | N |
|  | Phlebobranchia | Corellidae | *Corella eumyota* | orange-tipped sea squirt | Y |
|  |  | Perophoridae | *Perophora japonica* | – | N |
|  | Pleurogona | Molgulidae | *Molgula plana* | ‘sea grapes’ | N |
|  |  | Pyuridae | *Microcosmus squamiger* | scaly tunicate | Y |
|  |  | Styelidae | *Asterocarpa humilis* | – | N |
|  |  |  | *Botrylloides niger* | – | N |
|  |  |  | *Botrylloides perspicuus* | – | N |
|  |  |  | *Botrylloides violaceus* | purple colonial tunicate | Y |
|  |  |  | *Botryllus schlosseri* | golden star tunicate | Y |
|  |  |  | *Polyandrocarpa zorritensis* | – | N |
|  |  |  | *Styela canopus* | rough sea tunicate | N |
|  |  |  | *Styela clava* | clubbed tunicate | Y |
|  |  |  | *Styela plicata* | pleated sea squirt | Y |
|  |  |  | *Symplegma brakenhielmi* | – | N |
|  | Stolidobranchia | Pyuridae | *Pyura tessellata* | – | N |
| Freshwater invertebrates | Amphipoda | Corophiidae | *Chelicorophium curvispinum* | Caspian mud shrimp | Y |
|  |  |  | *Chelicorophium mucronatum* | – | N |
|  |  |  | *Chelicorophium robustum* | – | Y |
|  |  | Gammaridae | *Chaetogammarus warpachowskyi* | – | Y |
|  |  |  | *Dikerogammarus haemobaphes* | demon shrimp | Y |
|  |  |  | *Dikerogammarus villosus* | killer shrimp | Y |
|  |  |  | *Echinogammarus ischnus* | – | Y |
|  |  |  | *Echinogammarus trichiatus* | – | N |
|  |  |  | *Gammarus roeselii* | – | N |
|  |  | Pontogammaridae | *Obesogammarus crassus* | thick scud | Y |
|  |  |  | *Obesogammarus obesus* | – | N |
|  |  |  | *Pontogammarus robustoides* | – | Y |
|  |  |  | *Turcogammarus aralensis* | – | N |
|  | Architaenioglossa | Ampullariidae | *Pomacea canaliculata* | golden apple snail | Y |
|  |  |  | *Pomacea diffusa* | spike-topped apple snail | Y |
|  | Basommatophora | Ancylidae | *Ferrissia californica* | fragile ancylid | N |
|  |  | Lymnaeidae | *Pseudosuccinea columella* | mimic lymnaea | N |
|  |  | Physidae | *Physella acuta* | European physa | N |
|  |  |  | *Stenophysa marmorata* | marbled aplexa | N |
|  | Decapoda | Aeglidae | *Aegla platensis* | ‘pancora’ | N |
|  |  | Astacidae | *Pacifastacus leniusculus* | signal crayfish | Y |
|  |  |  | *Pontastacus leptodactylus* | Danube crayfish | N |
|  |  | Atyidae | *Atya gabonensis* | gabon shrimp | N |
|  |  |  | *Atyaephyra desmarestii* | – | N |
|  |  |  | *Atyoida pilipes* | green lace shrimp | N |
|  |  |  | *Atyopsis moluccensis* | bamboo shrimp | N |
|  |  |  | *Caridina babaulti* | ‘green shrimp’ | N |
|  |  |  | *Caridina brachydactyla* | – | N |
|  |  |  | *Caridina breviata* | bumble bee shrimp | N |
|  |  |  | *Caridina brevicarpalis* | – | N |
|  |  |  | *Caridina caerulea* | blue leg poso | N |
|  |  |  | *Caridina cantonensis* | – | N |
|  |  |  | *Caridina dennerli* | Sulawesi cardinal shrimp | N |
|  |  |  | *Caridina gracilirostris* | needlenose caridina | N |
|  |  |  | *Caridina logemanni* | crystal red shrimp | N |
|  |  |  | *Caridina mariae* | tiger dwarf shrimp | N |
|  |  |  | *Caridina multidentata* | Amano shrimp | N |
|  |  |  | *Caridina parvidentata* | Malawa shrimp | N |
|  |  |  | *Caridina propinqua* | bengal caridina | N |
|  |  |  | *Caridina richtersii* | tangerine tiger shrimp | N |
|  |  |  | *Caridina rubropunctata* | leopard dwarf shrimp | N |
|  |  |  | *Caridina serratirostris* | ninjia shrimp | N |
|  |  |  | *Caridina simoni* | Sri Lanka dwarf shrimp | N |
|  |  |  | *Caridina spinata* | yellow goldflake | N |
|  |  |  | *Caridina woltereckae* | harlequin shrimp Sulawesi | N |
|  |  |  | *Halocaridina rubra* | red pond shrimp | N |
|  |  |  | *Lancaris kumariae* | – | N |
|  |  |  | *Neocaridina davidi* | cherry shrimp | N |
|  |  |  | *Neocaridina palmata* | marble dwarf shrimp | N |
|  |  |  | *Paracaridina zijinica* | mustang shrimp | N |
|  |  |  | *Paratya compressa* | nuka shrimp | N |
|  |  | Cambaridae | *Cambarellus (Cambarellus) chapalanus* | Zacapu dwarf crayfish | N |
|  |  |  | *Cambarellus (Cambarellus) montezumae* | – | N |
|  |  |  | *Cambarellus (Cambarellus) patzcuarensis* | Mexican dwarf crayfish | N |
|  |  |  | *Cambarellus (Pandicambarus) diminutus* | least crayfish | N |
|  |  |  | *Cambarellus (Pandicambarus) ninae* | Aransas dwarf crawfish | N |
|  |  |  | *Cambarellus (Pandicambarus) puer* | swamp dwarf crayfish | N |
|  |  |  | *Cambarellus (Pandicambarus) schmitti* | fontal dwarf crawfish | N |
|  |  |  | *Cambarellus (Pandicambarus) shufeldtii* | Cajun dwarf crayfish | N |
|  |  |  | *Cambarellus (Pandicambarus) texanus* | Brazos dwarf crawfish | N |
|  |  |  | *Creaserinus fodiens* | digger crayfish | N |
|  |  |  | *Faxonius limosus* | spinycheek crayfish | Y |
|  |  |  | *Faxonius neglectus chaenodactylus* | gap ringed crayfish | N |
|  |  |  | *Procambarus alleni* | Everglades crayfish | N |
|  |  |  | *Procambarus braswelli* | Waccamaw crayfish | N |
|  |  |  | *Procambarus clarkii* | red swamp crayfish | Y |
|  |  |  | *Procambarus cubensis* | – | N |
|  |  |  | *Procambarus llamasi* | – | N |
|  |  |  | *Procambarus ouachitae* | Ouachita River crayfish | N |
|  |  |  | *Procambarus paeninsulanus* | peninsula crayfish | N |
|  |  |  | *Procambarus pubescens* | brushnose crayfish | N |
|  |  |  | *Procambarus spiculifer* | white tubercled crayfish | N |
|  |  |  | *Procambarus vazquezae* | – | N |
|  |  |  | *Procambarus versutus* | sly crayfish | N |
|  |  |  | *Procambarus virginalis* | marbled crayfish | N |
|  |  | Desmocarididae | *Desmocaris trispinosa* | Guinea swamp shrimp | N |
|  |  | Diogenidae | *Clibanarius africanus* | charming hermit crab | N |
|  |  | Dotillidae | *Ilyoplax* spp*.* | semaphore crabs | N |
|  |  | Euryrhynchidae | *Euryrhynchus amazoniensis* | Amazon zebra shrimp | N |
|  |  | Gecarcinucidae | *Ceylonthelphusa kandambyi* | ‘leopardkrabbe’ | N |
|  |  |  | *Lepidothelphusa cognetti* | Sarawak land crab | N |
|  |  |  | *Lepidothelphusa* spp*.* | ‘semiterrestrial crabs’ | N |
|  |  |  | *Parathelphusa bogorensis* | purple vampire crab | N |
|  |  |  | *Parathelphusa pantherina* | Matano leopard crab | N |
|  |  |  | *Parathelphusa* spp*.* | – | N |
|  |  |  | *Sartoriana spinigera* | ‘tele kankra’ | N |
|  |  |  | *Sayamia bangkokensis* | Thai ricefield crab | N |
|  |  |  | *Syntripsa matannensis* | Matano molluscivore crab | N |
|  |  | Hymenosomatidae | *Limnopilos naiyanetri* | Thai micro crab | N |
|  |  | Palaemonidae | *Arachnochium kulsiense* | sand shrimp | N |
|  |  |  | *Arachnochium mirabile* | – | N |
|  |  |  | *Macrobrachium agwi* | – | N |
|  |  |  | *Macrobrachium assamense peninsulare* | – | N |
|  |  |  | *Macrobrachium dayanum* | Kaya River prawn | N |
|  |  |  | *Macrobrachium dienbienphuense* | ‘borstenhandgarnele’ | N |
|  |  |  | *Macrobrachium gracilirostre* | – | N |
|  |  |  | *Macrobrachium idae* | Orana River prawn | N |
|  |  |  | *Macrobrachium lanchesteri* | riceland prawn | N |
|  |  |  | *Macrobrachium pilimanus* | muff prawn | N |
|  |  |  | *Macrobrachium rosenbergii* | giant river prawn | N |
|  |  |  | *Macrobrachium scabriculum* | Goda River prawn | N |
|  |  |  | *Tenuipedium palaemonoides* | gold spotted shrimp | N |
|  |  | Parastacidae | *Cherax boesemani* | supernova crayfish | N |
|  |  |  | *Cherax communis* | – | N |
|  |  |  | *Cherax destructor* | common yabby | Y |
|  |  |  | *Cherax holthuisi* | apricot crayfish | N |
|  |  |  | *Cherax lorentzi* | – | N |
|  |  |  | *Cherax monticola* | – | N |
|  |  |  | *Cherax papuanus* | zebra crayfish | N |
|  |  |  | *Cherax peknyi* | zebra crayfish | N |
|  |  |  | *Cherax preissii* | koonac | N |
|  |  |  | *Cherax pulcher* | thunderbolt crayfish | N |
|  |  |  | *Cherax quadricarinatus* | Australian redclaw crayfish | Y |
|  |  |  | *Cherax snowden* | emerald fire crayfish | N |
|  |  |  | *Cherax tenuimanus* | hairy marron | N |
|  |  | Potamidae | *Heterochelamon tessellatum* | ‘Chinese panther crab’ | N |
|  |  |  | *Potamon fluviatile* | ‘Mediterranean freshwater crab’ | N |
|  |  | Potamonautidae | *Potamonautes lirrangensis* | Malawi blue crab | N |
|  |  | Sesarmidae | *Chiromantes angolense* | Angola marsh crab | N |
|  |  |  | *Geosesarma bicolor* | tomato vampire crab | N |
|  |  |  | *Geosesarma* spp*.* | ‘vampire crabs’ | N |
|  |  |  | *Geosesarma tiomanicum* | orange disco vampire crab | N |
|  |  |  | *Metasesarma aubryi* | red apple crab | N |
|  |  |  | *Metasesarma* spp*.* | ‘freshwater land crabs’ | N |
|  |  |  | *Neosarmatium meinerti* | red mangrove crab | N |
|  |  |  | *Parasesarma eumolpe* | face-banded seasarmine crab | N |
|  |  |  | *Perisesarma* spp*.* | ‘mangrove crabs’ | N |
|  |  |  | *Pseudosesarma moeschii* | Thai red crab | N |
|  |  |  | *Pseudosesarma* spp*.* | ‘mangrove crabs’ | N |
|  |  |  | *Sesarmops intermedius* | ‘chili red crab’ | N |
|  |  | Xiphocarididae | *Xiphocaris elongata* | yellow-nose shrimp | N |
|  | Diplostraca | Cercopagidae | *Cercopagis pengoi* | fish-hook waterflea | Y |
|  | Hirudinida | Piscicolidae | *Caspiobdella fadejewi* | – | Y |
|  | Limnomedusae | Olindiidae | *Craspedacusta sowerbii* | freshwater jellyfish | N |
|  | Mysida | Mysidae | *Hemimysis anomala* | bloody-red shrimp | Y |
|  |  |  | *Limnomysis benedeni* | – | Y |
|  |  |  | *Paramysis lacustris* | – | Y |
|  | Neotaenioglossa | Hydrobiidae | *Lithoglyphus naticoides* | gravel snail | Y |
|  |  |  | *Potamopyrgus antipodarum* | New Zealand mudsnail | Y |
|  | Terebellida | Ampharetidae | *Hypania invalida* | bristle worm | N |
|  | Unionoida | Unionidae | *Sinanodonta woodiana* | Chinese pond mussel | Y |
|  | Veneroida | Corbiculidae | *Corbicula fluminea* | Asian clam | Y |
|  |  | Dreissenidae | *Dreissena bugensis* | quagga mussel | Y |
|  |  |  | *Dreissena polymorpha* | zebra mussel | Y |
| Brackish invertebrates | Amphipoda | Pontogammaridae | *Pontogammarus robustoides* | – | Y |
|  | Anthoathecatae | Oceanidae | *Cordylophora caspia* | freshwater hydroid | Y |
|  | Decapoda | Parastacidae | *Cherax quadricarinatus* | Australian redclaw crayfish | Y |
|  |  | Penaeidae | *Penaeus vannamei* | whiteleg shrimp | N |
|  |  | Portunidae | *Callinectes sapidus* | blue crab | Y |
|  | Mytilida | Mytilidae | *Limnoperna fortunei* | Chinese freshwater mussel | Y |
|  |  |  | *Mytella strigata* | Guyana swamp mussel | Y |
|  | Sabellida | Serpulidae | *Ficopomatus enigmaticus* | Australian tubeworm | Y |
|  | Sessilia | Balanidae | *Amphibalanus subalbidus* | – | N |
|  | Veneroida | Dreissenidae | *Mytilopsis leucophaeata* | dark false mussel | Y |
|  |  | Mactridae | *Rangia cuneata* | Atlantic rangia | Y |
| Marine invertebrates | Alcyonacea | Clavulariidae | *Carijoa riisei* | white telesto | Y |
|  | Amphipoda | Caprellidae | *Caprella mutica* | Japanese skeleton shrimp | Y |
|  |  |  | *Caprella scaura* | – | Y |
|  |  | Gammaridae | *Gammarus tigrinus* | tiger scud | Y |
|  |  | Talitridae | *Platorchestia platensis* | sand flea | N |
|  | Anthoathecatae | Bougainvilliidae | *Koellikerina fasciculata* | – | N |
|  |  |  | *Nubiella mitra* | – | N |
|  |  | Corymorphidae | *Corymorpha annulata* | – | N |
|  |  |  | *Corymorpha bigelowi* | – | N |
|  |  | Corynidae | *Coryne eximia* | – | N |
|  |  | Cytaeididae | *Paracytaeis octona* | – | N |
|  |  | Magapiidae | *Kantiella enigmatica* | – | N |
|  |  | Moerisiidae | *Moerisia carine* | – | N |
|  |  |  | *Moerisia inkermanica* | – | N |
|  |  | Pandeidae | *Halitiara inflexa* | – | N |
|  |  |  | *Neoturris pileata* | – | N |
|  |  | Rathkeidae | *Podocorynoides minima* | – | N |
|  |  | Trichydridae | *Trichydra pudica* | – | N |
|  |  | Tubulariidae | *Ectopleura crocea* | pink-mouth hydroid | N |
|  | Beroida | Beroidae | *Beroe ovata* | brown comb jelly | Y |
|  | Calanoida | Acartiidae | *Acartia (Acanthacartia) tonsa* | ‘hankajalkaisäyriäinen’ | Y |
|  |  | Pseudodiaptomidae | *Pseudodiaptomus ardjuna* | – | N |
|  |  |  | *Pseudodiaptomus marinus* | – | Y |
|  | Carybdeida | Carukiidae | *Carukia barnesi* | box jelly | N |
|  | Cheilostomata | Bugulidae | *Bugula neritina* | branching moss worm | Y |
|  |  |  | *Bugulina stolonifera* | – | N |
|  |  | Membraniporidae | *Membranipora membranacea* | kelp encrusting bryozoan | N |
|  |  | Schizoporellidae | *Schizoporella errata* | branching bryozoan | Y |
|  |  | Scrupocellariidae | *Tricellaria inopinata* | – | Y |
|  |  | Watersiporidae | *Watersipora subtorquata* | red-rust bryozoan | Y |
|  | Coronatae | Paraphyllinidae | *Paraphyllina ransoni* | – | N |
|  |  | Periphyllidae | *Periphylla periphylla* | merchant-cap | N |
|  | Decapoda | Alpheidae | *Alpheus rapacida* | snapping shrimp | N |
|  |  | Aristeidae | *Aristeus antennatus* | blue and red shrimp | N |
|  |  | Calappidae | *Calappa granulata* | shamefaced crab | N |
|  |  | Gnatophyllidae | *Gnathophyllum elegans* | spotted bumblebee shrimp | N |
|  |  | Goneplacidae | *Eucrate crenata* | blunt-spined euryplacid crab | N |
|  |  | Grapsidae | *Pachygrapsus marmoratus* | marbled shore crab | N |
|  |  | Lithodidae | *Paralithodes camtschaticus* | red king crab | Y |
|  |  | Menippidae | *Eriphia verrucosa* | yellow round crab | N |
|  |  | Nephropidae | *Homarus americanus* | American lobster | Y |
|  |  | Oregoniidae | *Chionoecetes opilio* | snow crab | N |
|  |  | Palaemonidae | *Macrobrachium sintangense* | rockpool prawn | N |
|  |  |  | *Palaemon macrodactylus* | oriental shrimp | N |
|  |  | Panopeidae | *Dyspanopeus sayi* | Say mud crab | N |
|  |  |  | *Rhithropanopeus harrisii* | Harris mud crab | Y |
|  |  | Penaeidae | *Penaeus japonicus* | kuruma prawn | N |
|  |  |  | *Penaeus kerathurus* | caramote prawn | N |
|  |  |  | *Penaeus monodon* | giant tiger prawn | Y |
|  |  |  | *Penaeus vannamei* | whiteleg shrimp | N |
|  |  |  | *Trachysalambria curvirostris* | southern rough shrimp | N |
|  |  | Pilumnidae | *Actumnus globulus* | – | N |
|  |  | Pisidae | *Libinia dubia* | longnose spider crab | Y |
|  |  | Plagusiidae | *Percnon gibbesi* | nimble spray crab | Y |
|  |  | Portunidae | *Callinectes danae* | Dana swimcrab | Y |
|  |  |  | *Carcinus maenas* | green crab | Y |
|  |  |  | *Charybdis (Charybdis) hellerii* | spiny hands | Y |
|  |  |  | *Charybdis (Charybdis) japonica* | Japanese swimming crab | Y |
|  |  |  | *Charybdis (Charybdis) longicollis* | lesser swimming crab | N |
|  |  |  | *Charybdis (Charybdis) lucifera* | yellowish brown crab | N |
|  |  |  | *Gonioinfradens paucidentatus* | – | N |
|  |  |  | *Liocarcinus depurator* | blue-leg swimcrab | N |
|  |  | Scyllaridae | *Scyllarus pygmaeus* | pygmy locust lobster | N |
|  |  | Varunidae | *Eriocheir hepuensis* | Hepu mitten crab | Y |
|  |  |  | *Eriocheir sinensis* | Chinese mitten crab | Y |
|  |  |  | *Hemigrapsus sanguineus* | Asian shore crab | Y |
|  |  |  | *Hemigrapsus takanoi* | shore crab | Y |
|  |  | Xanthidae | *Xantho poressa* | jaguar round crab | N |
|  | Diplostraca | Cercopagidae | *Cercopagis pengoi* | fish-hook waterflea | Y |
|  | Isopoda | Sphaeromatidae | *Paracerceis sculpta* | – | N |
|  | Leptothecata | Aequoridae | *Aequorea conica* | – | N |
|  |  |  | *Aequorea globosa* | – | Y |
|  |  |  | *Aequorea vitrina* | – | N |
|  | Leptothecatae | Campanulariidae | *Campanularia morgansi* | – | N |
|  |  |  | *Clytia hummelincki* | – | N |
|  |  |  | *Clytia linearis* | – | N |
|  |  |  | *Clytia mccradyi* | – | N |
|  |  |  | *Sugiura chengshanense* | ‘shigeru shi kurage’ | N |
|  |  | Cirrholoveniidae | *Cirrholovenia tetranema* | – | N |
|  |  | Eirenidae | *Eirene viridula* | – | N |
|  |  | Eucheliotidae | *Eucheilota paradoxica* | – | N |
|  |  |  | *Eucheilota ventricularis* | – | N |
|  |  | Laodiceidae | *Laodicea fijiana* | – | N |
|  | Limnomedusae | Olindiidae | *Gonionemus vertens* | clinging jellyfish | Y |
|  |  |  | *Olindias singularis* | – | N |
|  |  |  | *Scolionema suvaense* | – | N |
|  | Lobata | Bolinopsidae | *Mnemiopsis leidyi* | warty comb jelly | Y |
|  | Myoida | Corbulidae | *Potamocorbula amurensis* | brackish-water corbula | Y |
|  |  | Myidae | *Mya arenaria* | softshell clam | Y |
|  | Mysida | Mysidae | *Rhopalophthalmus tattersallae* | mysid shrimp | N |
|  | Mytilida | Mytilidae | *Arcuatula senhousia* | Asian date mussel | Y |
|  |  |  | *Brachidontes pharaonis* | – | Y |
|  |  |  | *Mytilus galloprovincialis* | Mediterranean mussel | Y |
|  |  |  | *Perna perna* | brown mussel | Y |
|  |  |  | *Perna viridis* | Asian green mussel | Y |
|  | Narcomedusae | Aeginidae | *Solmundella bitentaculata* | – | N |
|  | Neogastropoda | Muricidae | *Rapana venosa* | purple whelk | Y |
|  | Neotaenioglossa | Calyptraeidae | *Crepidula fornicata* | slipper limpet | Y |
|  |  | Hydrobiidae | *Potamopyrgus antipodarum* | New Zealand mudsnail | Y |
|  |  | Littorinidae | *Littorina littorea* | common periwinkle | Y |
|  |  | Strombidae | *Conomurex persicus* | Persian conch | N |
|  |  | Vermetidae | *Eualetes tulipa* | – | Y |
|  | Nudibranchia | Coryphellidae | *Microchlamylla amabilis* | charming aeolid | N |
|  |  | Dotoidae | *Doto kya* | dark doto | N |
|  |  | Eubranchidae | *Leostyletus misakiensis* | Misaki balloon aeolis | N |
|  |  | Trinchesiidae | *Trinchesia albocrusta* | white-crust cuthona | N |
|  | Ostreoida | Ostreidae | *Crassostrea gigas* | Pacific oyster | Y |
|  |  |  | *Crassostrea virginica* | American cupped oyster | N |
|  | Phyllodocida | Nereididae | *Alitta succinea* | pile worm | Y |
|  |  |  | *Hediste diversicolor* | ragworm | N |
|  | Pleurogona | Molgulidae | *Molgula manhattensis* | common sea grape | N |
|  | Poecilosclerida | Coelosphaeridae | *Celtodoryx ciocalyptoides* | – | Y |
|  |  | Mycalidae | *Mycale (Mycale) grandis* | orange keyhole sponge | Y |
|  | Rhizostomeae | Cassiopeidae | *Cassiopea andromeda* | upside-down jellyfish | Y |
|  |  |  | *Cassiopea xamachana* | upside-down jellyfish | N |
|  |  | Cepheidae | *Cephea cephea* | crowned jellyfish | N |
|  |  |  | *Cotylorhiza erythraea* | – | N |
|  |  |  | *Marivagia stellata* | – | N |
|  |  |  | *Netrostoma setouchianum* | crown jellyfish | N |
|  |  | Mastigiidae | *Phyllorhiza punctata* | Australian spotted jellyfish | Y |
|  |  | Rhizostomatidae | *Rhopilema esculentum* | flame jellyfish | N |
|  |  |  | *Rhopilema nomadica* | nomad jellyfish | Y |
|  |  |  | *Rhopilema verrilli* | mushroom jellyfish | N |
|  |  |  | *Stomolophus meleagris* | cannonball jellyfish | N |
|  | Sabellida | Serpulidae | *Pileolaria berkeleyana* | – | N |
|  | Scleractinia | Dendrophylliidae | *Tubastraea coccinea* | orange cup coral | Y |
|  |  |  | *Tubastraea tagusensis* | – | N |
|  | Semaeostomeae | Pelagiidae | *Chrysaora fulgida* | Benguela compass jellyfish | N |
|  |  |  | *Chrysaora quinquecirrha* | sea nettle | N |
|  |  |  | *Mawia benovici* | – | N |
|  |  |  | *Pelagia noctiluca* | purple-striped jelly | Y |
|  |  | Ulmaridae | *Discomedusa lobata* | – | N |
|  | Sessilia | Balanidae | *Amphibalanus amphitrite* | purple acorn barnacle | N |
|  |  |  | *Amphibalanus eburneus* | - | N |
|  |  |  | *Amphibalanus improvisus* | bay barnacle | Y |
|  |  |  | *Amphibalanus venustus* | – | N |
|  |  |  | *Austrominius modestus* | Australian barnacle | Y |
|  |  |  | *Megabalanus coccopoma* | titan acorn barnacle | Y |
|  | Siphonophorae | Physaliidae | *Physalia physalis* | Portuguese man-of-war | N |
|  | Spionida | Spionidae | *Marenzelleria arctia* | – | Y |
|  |  |  | *Marenzelleria neglecta* | bristleworm | Y |
|  |  |  | *Marenzelleria viridis* | – | Y |
|  | Trachymedusae | Geryoniidae | *Liriope tetraphylla* | jewel jellyfish | N |
|  |  | Halicreatidae | *Haliscera bigelowi* | – | N |
|  |  | Rhopalonematidae | *Aglaura hemistoma* | – | N |
|  |  |  | *Amphogona pusilla* | – | N |
|  |  |  | *Arctapodema australis* | – | N |
|  |  |  | *Tetrorchis erythrogaster* | – | N |
|  | Veneroida | Dreissenidae | *Mytilopsis sallei* | Santo Domingo false mussel | Y |
|  |  | Petricolidae | *Petricolaria pholadiformis* | false angel wing | Y |
|  |  | Veneridae | *Ruditapes philippinarum* | Manila clam | Y |
| Freshwater plants | Alismatales | Araceae | *Lemna minuta* | least duckweed | Y |
|  |  | Hydrocharitaceae | *Elodea canadensis* | American waterweed | Y |
|  |  |  | *Elodea nuttallii* | Nuttall's waterweed | Y |
|  |  |  | *Najas marina* | holly-leaved naiad | Y |
|  |  | Potamogetonaceae | *Potamogeton crispus* | curled pondweed | Y |
|  |  |  | *Potamogeton natans* | broad-leaved pondweed | N |
|  |  |  | *Stuckenia pectinata* | fennel pondweed | N |
|  | Apiales | Apiaceae | *Hydrocotyle ranunculoides* | floating pennywort | Y |
|  |  |  | *Hydrocotyle verticillata* | whorled pennywort | Y |
|  | Ceratophyllales | Ceratophyllaceae | *Ceratophyllum demersum* | common hornwort | Y |
|  | Lamiales | Lentibulariaceae | *Utricularia australis* | bladderwort | N |
|  | Nymphaeales | Cabombaceae | *Cabomba caroliniana* | Carolina fanwort | Y |
|  | Ranunculales | Ranunculaceae | *Ranunculus peltatus* | pond water-crowfoot | N |
|  | Salviniales | Azollaceae | *Azolla filiculoides* | water fern | Y |
|  | Saxifragales | Haloragaceae | *Myriophyllum alterniflorum* | alternate watermilfoil | N |
|  |  |  | *Myriophyllum aquaticum* | parrot feather watermilfoil | Y |
|  |  |  | *Myriophyllum spicatum* | spiked watermilfoil | Y |
|  |  |  | *Myriophyllum verticillatum* | whorled leaf water milfoil | N |
| Marine plants | Alismatales | Hydrocharitaceae | *Halophila stipulacea* | broadleaf seagrass | Y |
|  | Bryopsidales | Caulerpaceae | *Caulerpa cylindracea* | – | Y |
|  |  |  | *Caulerpa lamourouxii* | coarse seagrape | N |
|  |  |  | *Caulerpa taxifolia* | killer algae | Y |
|  |  | Codiaceae | *Codium fragile fragile* | green sea fingers | N |
|  | Ceramiales | Rhodomelaceae | *Leptosiphonia brodiei* | – | N |
|  |  |  | *Womersleyella setacea* | – | N |
|  | Gigartinales | Cystocloniaceae | *Hypnea musciformis* | crozier weed | Y |
|  |  | Solieriaceae | *Eucheuma* spp. | ‘gusô’ | Y |
|  |  |  | *Kappaphycus alvarezii* | elkhorn sea moss | Y |
|  | Gracilariales | Gracilariaceae | *Gracilaria tikvahiae* | graceful red weed | N |
|  | Halymeniales | Halymeniaceae | *Grateloupia filicina* | Agardh chop-chop | N |
|  |  |  | *Grateloupia turuturu* | devil's tongue weed | Y |
|  | Ulvales | Ulvaceae | *Ulva australis* | southern sea lettuce | N |
|  |  |  | *Ulva ohnoi* | Japanese sea lettuce | N |
| Marine protists | Bacillariales | Bacillariaceae | *Pseudo-nitzschia brasiliana* | – | N |
|  | Chattonellales | Chattonellaceae | *Heterosigma akashiwo* | – | N |
|  | Dinophysiales | Dinophysiaceae | *Dinophysis caudata* | – | N |
|  | Ectocarpales | Chordariaceae | *Myrionema orbiculare* | – | N |
|  | Fucales | Sargassaceae | *Sargassum fluitans* | gulf weed | Y |
|  |  |  | *Sargassum muticum* | Japanese wireweed | Y |
|  | Gonyaulacales | Goniodomataceae | *Pyrodinium bahamense* | – | N |
|  |  | Gonyaulacaceae | *Alexandrium minutum* | ‘red tide dinoflagellate’ | Y |
|  | Gymnodiniales | Gymnodiniaceae | *Gymnodinium catenatum* | – | Y |
|  |  |  | *Margalefidinium polykrikoides* | – | N |
|  |  | Kareniaceae | *Karenia mikimotoi* | – | Y |
|  |  |  | *Karenia selliformis* | – | N |
|  | Laminariales | Alariaceae | *Undaria pinnatifida* | wakame | Y |
|  | Oligotrichida | Codonellidae | *Tintinnopsis ampla* | – | N |
|  | Peridiniales | Peridiniaceae | *Kryptoperidinium foliaceum* | – | N |
|  | Prorocentrales | Prorocentraceae | *Prorocentrum mexicanum* | – | N |
|  |  |  | *Prorocentrum micans* | – | N |
|  | Prymnesiales | Prymnesiaceae | *Prymnesium parvum* | golden alga | Y |
| Marine bacteria | Nostocales | Oscillatoriaceae | *Oscillatoria erythraea* | – | N |

**Table S2** Risk assessment areas (RAAs) for which aquatic organisms were screened. For each RAA, the following is provided: Type, Countries, Köppen-Geiger climate class (after Peel et al., [2007](#Peeletal2007)) or marine ecoregion (after Spalding et al., [2007](#Spaldingetal2007)), number of taxa screened, number of screenings, number of assessors. In case of multiple climate classes for the same RAA, the least represented one (whenever applicable) is given in parentheses. Climate class: A = Tropical; B = Arid; C = Temperate; D = Continental; E = Polar. Marine ecoregion: CIP = Central Indo-Pacific; TAtl = Tropical Atlantic; TEP = Tropical Eastern Pacific; TNA = Temperate Northen Atlantic; TNP = Temperate Northern Pacific; WIP = Western Indo-Pacific.

| **Risk assessment area** | **Type** | **Countries** | **Climate** | **Marine ecoregion** | **Taxa** | **Screenings** | **Assessors** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Aegean region of Turkey | Region | Turkey | C | – | 3 | 3 | 2 |
| Aegean Sea | Marine region | Greece, Turkey | – | TNA | 3 | 3 | 1 |
| Alabama | Part of country | United States of America | C | – | 1 | 1 | 1 |
| Anzali Wetland Complex | Water body | Iran | C | – | 31 | 60 | 2 |
| Arabian/Persian Gulf and Sea of Oman | Marine region | Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates | – | WIP | 136 | 136 | 11 |
| Australia | Country | Australia | ABC | – | 1 | 1 | 1 |
| Backwaters and coasts of Kerala | Marine region | India | – | WIP | 1 | 1 | 1 |
| Baltic Sea | Marine region | Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Russia, Poland, Sweden | – | TNA | 6 | 6 | 4 |
| Belarus | Country | Belarus | D | – | 20 | 22 | 4 |
| Belgium | Country | Belgium | C | – | 1 | 1 | 1 |
| Brazil | Country | Brazil | ABC | – | 2 | 2 | 1 |
| British Isles | Other political entity | Ireland, United Kingdom | C | – | 1 | 1 | 1 |
| Bulgaria | Country | Bulgaria | C(D) | – | 4 | 4 | 2 |
| Carpathian Basin | River basin | Austria, Croatia, Hungary, Romania, Serbia, Slovakia, Slovenia, Ukraine | C | – | 39 | 39 | 3 |
| Celtic Sea | Marine region | France, Ireland, United Kingdom | – | TNA | 2 | 2 | 2 |
| Central and southern Europe | Extensive geographical area | Andorra, Austria, Bosnia and Herzegovina, Croatia, Cyprus, Czechia, France, Germany, Gibraltar, Greece, Hungary, Italy, Malta, Monaco, Poland, Portugal, Slovakia, Spain | C(D) | – | 1 | 1 | 1 |
| Central Europe | Extensive geographical area | Austria, Czechia, Germany, Hungary, Poland, Slovakia | C(D) | – | 4 | 4 | 4 |
| Central Italy | Part of country | Italy | C | – | 1 | 1 | 2 |
| Chaleur Bay and Magdalen Islands | Marine region | Canada | – | Arctic | 1 | 1 | 2 |
| Chao Phraya River Basin | River basin | Thailand | A | – | 36 | 100 | 3 |
| Coastal waters of Albania | Marine region | Albania | – | TNA | 2 | 2 | 1 |
| Coastal waters of Continental Europe | Marine region | Albania, Andorra, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Moldova, Monaco, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden | – | TNA | 1 | 1 | 1 |
| Coastal waters of Grenada, Saint Vincent and the Grenadines | Marine region | Grenada, Saint Vincent and the Grenadines | – | TAtl | 10 | 10 | 3 |
| Coastal waters of Macaronesia | Marine region | Portugal, Spain | – | TNA | 2 | 2 | 2 |
| Coastal waters of Madeira Island | Marine region | Portugal | – | TNA | 1 | 1 | 1 |
| Coastal waters of Mexico | Marine region | Mexico | – | TAtl | 1 | 1 | 2 |
| Coastal waters of Northwest Europe | Marine region | Belgium, Denmark, Germany, Iceland, Ireland, Netherlands, Norway, United Kingdom, Sweden | – | TNA | 1 | 1 | 1 |
| Coastal waters of Poland | Marine region | Poland | – | TNA | 1 | 1 | 1 |
| Coastal waters of Portugal | Marine region | Portugal | – | TNA | 1 | 1 | 1 |
| Coastal waters of South Korea | Marine region | Republic of Korea | – | CIP | 57 | 57 | 1 |
| Coastal waters of South Newfoundland | Marine region | Canada | – | Arctic | 1 | 1 | 1 |
| Coastal waters of South Norway | Marine region | Norway | – | TNA | 1 | 1 | 1 |
| Coastal waters of Spitsbergen | Marine region | Norway | – | Arctic | 1 | 1 | 1 |
| Coastal waters of Sweden | Marine region | Sweden | – | TNA | 1 | 1 | 1 |
| Coastal waters of the British Isles | Marine region | Ireland, United Kingdom | – | TNA | 1 | 1 | 1 |
| Coastal waters of the Gulf of Mexico and Atlantic Ocean | Marine region | Mexico, United States of America | – | TAtl | 15 | 43 | 4 |
| Coastal waters of the Gulf of Thailand | Marine region | Thailand | – | CIP | 1 | 1 | 1 |
| Coastal waters of the Hudson Complex | Marine region | Canada | – | Arctic | 21 | 21 | 2 |
| Coastal waters of the United Kingdom | Marine region | United Kingdom | – | TNA | 3 | 4 | 4 |
| Coastal waters of Vietnam | Marine region | Vietnam | – | CIP | 2 | 2 | 2 |
| Conterminous United States | Part of country | United States of America | ABC | – | 3 | 3 | 1 |
| Continental Europe | Extensive geographical area | Albania, Andorra, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Moldova, Monaco, Montenegro, Netherlands, Norway, Poland, Portugal, North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland | CD | – | 8 | 8 | 1 |
| Croatia | Country | Croatia | C | – | 76 | 76 | 1 |
| Danube River Delta | Water body | Romania | C | – | 1 | 1 | 2 |
| Denmark | Country | Denmark | C | – | 1 | 1 | 1 |
| Dnieper, Neman and Pripyat River Basins | Country | Belarus | D | – | 24 | 24 | 2 |
| East India | Part of country | India | A | – | 1 | 1 | 1 |
| East Kolkata Wetlands | Water body | India | A | – | 1 | 1 | 1 |
| East North Sea | Marine region | United Kingdom | – | TNA | 1 | 1 | 6 |
| Eastern Mediterranean Sea | Marine region | Cyprus, Egypt, Greece, Israel, Jordan, Lebanon, Syria, Turkey | – | TNA | 4 | 4 | 3 |
| England | Part of country | United Kingdom | C | – | 68 | 68 | 1 |
| England and Wales | Part of country | United Kingdom | C | – | 4 | 4 | 2 |
| European Union | Other political entity | Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech, Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden | BCD | – | 4 | 4 | 2 |
| Florida | State | United States of America | AC | – | 1 | 1 | 1 |
| France | Country | France | C | – | 5 | 5 | 3 |
| Gangneungnamdae Stream Basin | River basin | South Korea | C | – | 12 | 12 | 1 |
| Georgia | Country | Georgia | CD | – | 4 | 4 | 1 |
| Germany | Country | Germany | C | – | 1 | 1 | 1 |
| Great Britain | Part of country | United Kingdom | C | – | 17 | 17 | 4 |
| Greater Caribbean | Marine region | Cuba, Jamaica, Puerto Rico | - | TAtl | 0 | 1 | 0 |
| Greece | Country | Greece | C | – | 8 | 8 | 3 |
| Hong Kong | Other political entity | China | C | – | 1 | 1 | 1 |
| Hungary | Country | Hungary | CD | – | 6 | 6 | 1 |
| Iberian Peninsula | Extensive geographical area | Portugal, Spain | BC | – | 10 | 10 | 4 |
| India | Country | India | ABC | – | 3 | 3 | 1 |
| Indonesia | Country | Indonesia | A | – | 1 | 1 | 1 |
| Iran | Country | Iran | BC | – | 2 | 2 | 2 |
| Kerala | Region | India | A | – | 7 | 7 | 2 |
| Lake Balaton catchment | Lake drainage basin | Hungary | C | – | 2 | 2 | 2 |
| Lake Marmara | Water body | Turkey | C | – | 35 | 70 | 2 |
| Lake Taal | Water body | Philippines | A | – | 2 | 2 | 3 |
| Lower Pearl River Basin | River basin | China | C | – | 32 | 96 | 3 |
| Madeira Island | Part of country | Portugal | C | – | 7 | 7 | 3 |
| Mediterranean Sea | Marine region | Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Gibraltar, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia, Turkey | – | TNA | 90 | 90 | 6 |
| Mexico | Country | Mexico | ABC | – | 1 | 1 | 2 |
| North Adriatic Sea | Marine region | Croatia, Italy, Slovenia | – | TNA | 1 | 1 | 2 |
| North and central Italy | Part of country | Italy | C | – | 2 | 2 | 1 |
| Northeast Atlantic | Marine region | Canada, United States of America | – | TNA | 1 | 1 | 1 |
| Northern Gulf of Mexico | Marine region | United States of America | – | TNA | 3 | 3 | 2 |
| Northern Iran | Part of country | Iran | BC | – | 1 | 1 | 2 |
| Northern Italy | Part of country | Italy | C | – | 1 | 1 | 1 |
| Northern Kyushu Island | Region | Japan | D | – | 14 | 14 | 2 |
| Norway | Country | Norway | CDE | – | 111 | 113 | 7 |
| Ontario | State | Canada | DE | – | 1 | 1 | 1 |
| Papua New Guinea | Country | Papua New Guinea | A | – | 1 | 1 | 1 |
| Pearl River Basin | River basin | China | C | – | 2 | 2 | 1 |
| Peninsular Malaysia | Part of country | Malaysia | A | – | 6 | 6 | 2 |
| Poland | Country | Poland | C(D) | – | 8 | 8 | 6 |
| Port of Leghorn | Marine region | Italy | – | TNA | 3 | 3 | 1 |
| Puerto Rico | Country | Puerto Rico | A | – | 1 | 1 | 2 |
| Republic of Macedonia | Country | North Macedonia | C | – | 2 | 2 | 2 |
| River Cauvery | Water body | India | A | – | 1 | 1 | 1 |
| River Neretva Basin | River basin | Bosnia and Herzegovina, Croatia | C | – | 24 | 48 | 2 |
| River Neretva Estuary | Water body | Croatia | C | – | 11 | 21 | 3 |
| River Ob Basin | River basin | Russia | D | – | 31 | 31 | 1 |
| Romania | Country | Romania | CD | – | 5 | 5 | 2 |
| Serbia | Country | Serbia | C | – | 2 | 2 | 1 |
| Sicily | Region | Italy | C | – | 3 | 3 | 1 |
| Singapore | Country | Singapore | A | – | 20 | 20 | 2 |
| Slovenia | Country | Slovenia | C | – | 76 | 76 | 1 |
| South Africa | Country | South Africa | BC | – | 12 | 24 | 4 |
| South Caucasus | Extensive geographical area | Armenia, Azerbaijan, Georgia | CD | – | 5 | 5 | 1 |
| Southern Europe | Extensive geographical area | Andorra, Bosnia and Herzegovina, Croatia, Cyprus, France, Gibraltar, Greece, Italy, Malta, Monaco, Portugal, Spain | BC | – | 1 | 1 | 1 |
| Southern Finland | Region | Finland | D | – | 6 | 6 | 3 |
| Southern Gulf of Saint Lawrence | Marine region | Canada | – | TNA | 26 | 26 | 1 |
| Southern Iraq | Region | Iraq | B | – | 1 | 1 | 1 |
| Southern Italy | Part of country | Italy | C | – | 3 | 3 | 1 |
| Southern Ticino River | River basin | Italy | C | – | 7 | 7 | 1 |
| South-western coasts of Anatolia | Marine region | Turkey | – | TNA | 45 | 45 | 3 |
| Strait of Georgia | Marine region | Canada | – | TNP | 1 | 1 | 1 |
| Thailand | Country | Thailand | A | – | 2 | 2 | 2 |
| Tocantins-Araguaia River Basin | River basin | Brazil | A | – | 2 | 2 | 1 |
| Tropical Eastern Pacific | Marine region | Colombia, Costa Rica, Ecuador, Panama | – | TEP | 2 | 2 | 2 |
| Turkey | Country | Turkey | BCD | – | 68 | 74 | 7 |
| Umbria | Region | Italy | C | – | 1 | 1 | 2 |
| United Kingdom | Country | United Kingdom | C | – | 10 | 12 | 6 |
| Upper Paraná River Basin | River basin | Brazil | BC | – | 2 | 2 | 3 |
| Vietnam | Country | Vietnam | AC | – | 28 | 28 | 3 |
| Western Iberia | Region | Portugal, Spain | C | – | 10 | 17 | 1 |
| Yarlung Zangbo River Basin | River basin | China | C | – | 24 | 26 | 3 |

**Table S3** Taxa screened according to risk assessment area, with details of assessor(s), BRA (Basic Risk Assessment) BRA + CCA (Climate Change Assessment) scores.

| **Taxon name** | **Risk assessment area** | **Assessor(s)** | **BRA** | **BRA+CCA** |
| --- | --- | --- | --- | --- |
| *Abbottina rivularis* | Anzali Wetland Complex | Hossein Rahmani | 9.5 | 21.5 |
|  |  | Seyed Daryoush Moghaddas | 13.5 | 23.5 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 24.0 | 24.0 |
| *Abramis brama* | Croatia | Tena Radočaj | 26.0 | 36.0 |
|  | Great Britain | Jennifer A. Dodd | 29.5 | 31.5 |
|  | River Neretva Basin | Branko Glamuzina | 15.0 | 23.0 |
|  |  | Pero Tutman | 16.0 | 26.0 |
|  | River Ob Basin | Elena Interesova | 27.0 | 33.0 |
|  | Slovenia | Ivan Špelić | 26.0 | 36.0 |
|  | Turkey | Nildeniz Top-Karakuş | 18.0 | 18.0 |
| *Abudefduf taurus* | Madeira Island | Nuno Castro | 6.0 | 6.0 |
| *Acanthogobius flavimanus* | Anzali Wetland Complex | Hossein Rahmani | 24.5 | 34.5 |
|  |  | Seyed Daryoush Moghaddas | 27.5 | 33.5 |
|  | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 20.5 | 24.5 |
| *Acanthopagrus latus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 8.0 | 12.0 |
| *Acarichthys heckelii* | Singapore | Joleen Chan | 0.0 | 2.0 |
| *Acartia (Acanthacartia) tonsa* | Arabian/Persian Gulf and Sea of Oman | Gemma Fenwick | 18.5 | 24.5 |
|  | Coastal waters of Spitsbergen | Anders Jelmert | 4.0 | 16.0 |
| *Acentrogobius pflaumii* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 19.5 | 25.5 |
| *Acipenser baerii* | England | Sebastian Kozic | 8.5 | 0.5 |
|  | Poland | Michał Skóra | 7.0 | 13.0 |
|  | Southern Finland | Riikka Puntila-Dodd | −3.0 | −7.0 |
|  | Turkey | Ali Serhan Tarkan | 7.0 | 7.0 |
|  | Vietnam | Thuyet D. Bui | 6.0 | 4.0 |
| *Acipenser gueldenstaedtii* | Coastal waters of South Korea | Umut Uyan | 4.0 | 0.0 |
|  | Southern Finland | Riikka Puntila-Dodd | −2.0 | −2.0 |
| *Acipenser nudiventris* | Coastal waters of South Korea | Umut Uyan | 1.0 | −5.0 |
| *Acipenser ruthenus* | England | Sebastian Kozic | 8.0 | 0.0 |
|  | Southern Finland | Riikka Puntila-Dodd | −5.0 | −5.0 |
| *Acipenser schrenckii* | Croatia | Tena Radočaj | 1.0 | 1.0 |
|  | Slovenia | Ivan Špelić | 4.0 | 0.0 |
| *Actumnus globulus* | Mediterranean Sea | Gianluca Stasolla | 9.0 | 13.0 |
| *Aegla platensis* | Norway | Gaute Velle | 11.0 | 15.0 |
| *Aequorea conica* | Mediterranean Sea | Nurçin Killi | 3.0 | 3.0 |
| *Aequorea globosa* | Mediterranean Sea | Nurçin Killi | 7.0 | 9.0 |
| *Aequorea vitrina* | Mediterranean Sea | Nurçin Killi | 3.0 | 3.0 |
| *Aglaura hemistoma* | Mediterranean Sea | Nurçin Killi | 4.0 | 4.0 |
| *Aix galericulata* | Poland | Radosław Włodarczyk | 21.0 | 21.0 |
|  | United Kingdom | Phil I. Davison | 9.0 | 13.0 |
| *Alburnoides bipunctatus* | England | Sebastian Kozic | 1.0 | 5.0 |
| *Alburnus alburnus* | Croatia | Tena Radočaj | 21.5 | 29.5 |
|  | Great Britain | Jennifer A. Dodd | 29.0 | 31.0 |
|  | Lake Marmara | Ali İlhan | −2.0 | 4.0 |
|  |  | Hasan M. Sarı | 13.0 | 19.0 |
|  | River Ob Basin | Elena Interesova | 25.0 | 31.0 |
|  | Slovenia | Ivan Špelić | 23.0 | 33.0 |
|  | Turkey | Ali Serhan Tarkan | 24.0 | 24.0 |
| *Alburnus battalgilae* | Lake Marmara | Ali İlhan | −7.0 | −7.0 |
|  |  | Hasan M. Sarı | −5.0 | −13.0 |
| *Alburnus chalcoides* | England | Sebastian Kozic | 9.0 | 13.0 |
| *Alepes djedaba* | South-western coasts of Anatolia | Halit Filiz | 9.5 | 17.5 |
| *Alexandrium minutum* | Arabian/Persian Gulf and Sea of Oman | Rogan Harmer | 44.0 | 56.0 |
| *Alitta succinea* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 24.0 | 30.0 |
| *Alopochen aegyptiaca* | Poland | Radosław Włodarczyk | 27.5 | 33.5 |
|  | Sicily | Giovanni Leonardi | 29.5 | 41.5 |
| *Alpheus rapacida* | Mediterranean Sea | Gianluca Stasolla | 6.0 | 12.0 |
| *Amatitlania nigrofasciata* | Chao Phraya River Basin | Matura Nimtim | 15.5 | 25.5 |
|  |  | Punyanuch Daengchana | 36.0 | 36.0 |
|  |  | Ratcha Chaichana | 30.0 | 42.0 |
|  | Croatia | Tena Radočaj | 18.5 | 18.5 |
|  | Lower Pearl River Basin | Fei Liu | 34.0 | 46.0 |
|  |  | Hui Wei | 36.0 | 46.0 |
|  |  | Yunjie Zhu | 46.0 | 58.0 |
|  | Slovenia | Ivan Špelić | 12.0 | 12.0 |
| *Amatitlania sajica* | Singapore | Shayne S. B. Yeo | −5.0 | −3.0 |
| *Ambloplites rupestris* | England | Sebastian Kozic | 4.5 | 8.5 |
|  | Turkey | Nildeniz Top-Karakuş | 15.0 | 19.0 |
| *Ambystoma mexicanum* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 16.0 | 22.0 |
| *Ameiurus melas* | Croatia | Tena Radočaj | 39.0 | 49.0 |
|  | England | Sebastian Kozic | 39.0 | 41.0 |
|  | River Neretva Basin | Branko Glamuzina | 11.0 | 19.0 |
|  |  | Pero Tutman | 13.0 | 13.0 |
|  | River Ob Basin | Elena Interesova | 39.5 | 51.5 |
|  | Slovenia | Ivan Špelić | 38.0 | 48.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 26.0 | 36.0 |
|  | Turkey | Ali Serhan Tarkan | 33.5 | 45.5 |
| *Ameiurus nebulosus* | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 15.5 | 19.5 |
|  | Central Europe | Kristína Žitňanová, Katarína Jakubčinová | 31.0 | 39.0 |
|  | Croatia | Tena Radočaj | 43.0 | 53.0 |
|  | England | Sebastian Kozic | 37.0 | 39.0 |
|  | River Neretva Basin | Branko Glamuzina | 18.0 | 30.0 |
|  |  | Pero Tutman | 14.0 | 24.0 |
|  | River Ob Basin | Elena Interesova | 35.0 | 47.0 |
|  | Slovenia | Ivan Špelić | 40.0 | 50.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 39.0 | 41.0 |
|  | Turkey | Nildeniz Top-Karakuş | 43.5 | 49.5 |
| *Amphibalanus amphitrite* | Arabian/Persian Gulf and Sea of Oman | Louisa Wood | 35.5 | 43.5 |
|  | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 27.0 | 37.0 |
| *Amphibalanus eburneus* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 32.5 | 30.5 |
| *Amphibalanus improvisus* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 25.5 | 17.5 |
|  | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 29.0 | 39.0 |
|  | Mediterranean Sea | Gianluca Stasolla | 33.0 | 41.0 |
|  | Port of Leghorn | Jonathan Tempesti | 28.0 | 34.0 |
| *Amphibalanus subalbidus* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 32.0 | 24.0 |
| *Amphibalanus venustus* | Arabian/Persian Gulf and Sea of Oman | Louisa Wood | 34.5 | 34.5 |
| *Amphilophus citrinellus* | Peninsular Malaysia | Abdulwakil O. Saba, M. N. Amal Azmai | 11.0 | 11.0 |
|  | Singapore | Joleen Chan | 6.0 | 8.0 |
| *Amphiprion akallopisos* | Coastal waters of South Korea | Umut Uyan | −4.0 | 0.0 |
| *Amphiprion ephippium* | Coastal waters of South Korea | Umut Uyan | −4.0 | 0.0 |
| *Amphiprion sandaracinos* | Coastal waters of South Korea | Umut Uyan | −4.0 | 0.0 |
| *Amphiprion sebae* | Coastal waters of South Korea | Umut Uyan | −4.0 | 0.0 |
| *Amphogona pusilla* | Mediterranean Sea | Nurçin Killi | 4.0 | 4.0 |
| *Anguilla anguilla* | Anzali Wetland Complex | Hossein Rahmani | −3.0 | −9.0 |
|  |  | Seyed Daryoush Moghaddas | 1.0 | −3.0 |
|  | Coastal waters of South Korea | Umut Uyan | 14.0 | 6.0 |
|  | Croatia | Tena Radočaj | 9.0 | 5.0 |
|  | Lake Marmara | Ali İlhan | −8.0 | −20.0 |
|  |  | Hasan M. Sarı | −4.0 | −16.0 |
|  | Slovenia | Ivan Špelić | 11.0 | 9.0 |
| *Anguilla rostrata* | Coastal waters of South Korea | Umut Uyan | 10.5 | 8.5 |
| *Apistogramma borellii* | Singapore | Joleen Chan | −7.0 | −5.0 |
| *Apogon queketti* | South-western coasts of Anatolia | Halit Filiz | 10.0 | 16.0 |
| *Apogon smithi* | South-western coasts of Anatolia | Halit Filiz | 10.5 | 16.5 |
| *Apogonichthyoides pharaonis* | South-western coasts of Anatolia | Halit Filiz | 6.0 | 14.0 |
| *Arachnochium kulsiense* | Norway | Charlotte Evangelista | 0.0 | 6.0 |
| *Arachnochium mirabile* | Norway | Charlotte Evangelista | 7.0 | 13.0 |
| *Arctapodema australis* | Mediterranean Sea | Nurçin Killi | 4.0 | 4.0 |
| *Arcuatula senhousia* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 21.5 | 11.5 |
| *Argyrosomus regius* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 21.0 | 29.0 |
| *Aristeus antennatus* | Mediterranean Sea | Gianluca Stasolla | −5.0 | −7.0 |
| *Ascidiella aspersa* | Arabian/Persian Gulf and Sea of Oman | Sebastian Kozic | 23.5 | 15.5 |
| *Asterocarpa humilis* | Northern Gulf of Mexico | Kathryn O'Shaughnessy, Anna L. E. Yunnie | 11.5 | 13.5 |
| *Astronotus ocellatus* | Chao Phraya River Basin | Matura Nimtim | 26.0 | 38.0 |
|  |  | Punyanuch Daengchana | 26.0 | 32.0 |
|  |  | Ratcha Chaichana | 19.0 | 31.0 |
|  | Croatia | Tena Radočaj | 17.5 | 17.5 |
|  | Lower Pearl River Basin | Fei Liu | 27.0 | 39.0 |
|  |  | Hui Wei | 27.0 | 39.0 |
|  |  | Yunjie Zhu | 31.0 | 43.0 |
|  | Singapore | Joleen Chan | 11.0 | 13.0 |
|  | Slovenia | Ivan Špelić | 18.0 | 18.0 |
| *Atherina boyeri* | Lake Marmara | Ali İlhan | 20.0 | 14.0 |
|  |  | Hasan M. Sarı | 34.0 | 34.0 |
|  | Turkey | Ali Serhan Tarkan | 23.0 | 23.0 |
|  |  | F. Güler Ekmekçi | 32.0 | 44.0 |
| *Atherinomorus forskalii* | South-western coasts of Anatolia | Halit Filiz | 9.0 | 17.0 |
| *Atya gabonensis* | Norway | Charlotte Evangelista | 12.0 | 18.0 |
| *Atyaephyra desmarestii* | Norway | Charlotte Evangelista | 19.0 | 25.0 |
| *Atyoida pilipes* | Norway | Charlotte Evangelista | 7.0 | 13.0 |
| *Atyopsis moluccensis* | Norway | Charlotte Evangelista | 7.0 | 13.0 |
| *Australoheros facetus* | Turkey | Nildeniz Top-Karakuş | 24.0 | 32.0 |
| *Austrominius modestus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 40.0 | 40.0 |
|  | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 35.5 | 45.5 |
|  | Mediterranean Sea | Gianluca Stasolla | 22.0 | 22.0 |
| *Azolla filiculoides* | Romania | Daniyar Memedemin | 48.5 | 60.5 |
|  | Southern Europe | Lorenzo Lazzaro | 40.0 | 50.0 |
| *Babka gymnotrachelus* | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 5.5 | 5.5 |
|  | Croatia | Tena Radočaj | 16.0 | 24.0 |
|  | England | Sebastian Kozic | 26.0 | 28.0 |
|  | Poland | Tomasz Kakareko | 6.0 | 6.0 |
|  | Slovenia | Ivan Špelić | 20.0 | 28.0 |
|  | Turkey | Ali Serhan Tarkan | 16.0 | 16.0 |
| *Ballerus ballerus* | England | Sebastian Kozic | −4.0 | −2.0 |
| *Ballerus sapa* | France | Gérard Masson | 26.0 | 34.0 |
| *Barbatula barbatula* | Croatia | Tena Radočaj | 14.0 | 10.0 |
|  | Slovenia | Ivan Špelić | 15.0 | 9.0 |
| *Barbus barbus* | Great Britain | Jennifer A. Dodd | 8.0 | 12.0 |
| *Barbus pergamonensis* | Lake Marmara | Ali İlhan | −7.0 | −19.0 |
|  |  | Hasan M. Sarı | −12.0 | −20.0 |
| *Belonesox belizanus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 40.0 | 34.0 |
|  | Chao Phraya River Basin | Matura Nimtim | 10.5 | 16.5 |
|  |  | Punyanuch Daengchana | 20.0 | 26.0 |
|  |  | Ratcha Chaichana | 27.0 | 39.0 |
|  | Lower Pearl River Basin | Fei Liu | 37.0 | 49.0 |
|  |  | Hui Wei | 36.0 | 44.0 |
|  |  | Yunjie Zhu | 37.0 | 47.0 |
| *Benthophilus stellatus* | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 7.5 | 9.5 |
| *Beroe ovata* | Arabian/Persian Gulf and Sea of Oman | Sebastian Kozic | 26.0 | 14.0 |
| *Betta splendens* | Peninsular Malaysia | Abdulwakil O. Saba, M. N. Amal Azmai | 14.0 | 14.0 |
| *Blicca bjoerkna* | Great Britain | Jennifer A. Dodd | 22.0 | 24.0 |
| *Botrylloides niger* | Arabian/Persian Gulf and Sea of Oman | Louisa Wood | 36.0 | 36.0 |
| *Botrylloides perspicuus* | Arabian/Persian Gulf and Sea of Oman | Gemma Fenwick | 24.0 | 28.0 |
| *Botrylloides violaceus* | Arabian/Persian Gulf and Sea of Oman | Gemma Fenwick | 31.0 | 39.0 |
|  | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 26.0 | 36.0 |
| *Botryllus schlosseri* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 30.5 | 40.5 |
| *Brachidontes pharaonis* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 36.0 | 48.0 |
| *Bregmaceros nectabanus* | South-western coasts of Anatolia | Halit Filiz | 12.0 | 14.0 |
| *Bugula neritina* | Arabian/Persian Gulf and Sea of Oman | Phil I. Davison | 34.0 | 44.0 |
| *Bugulina stolonifera* | Arabian/Persian Gulf and Sea of Oman | Phil I. Davison | 20.0 | 20.0 |
| *Cabomba caroliniana* | Vietnam | Laura Ruykys | 35.0 | 37.0 |
| *Caiman crocodilus* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 17.0 | 17.0 |
| *Cairina moschata* | Sicily | Giovanni Leonardi | 38.0 | 38.0 |
| *Calappa granulata* | Mediterranean Sea | Gianluca Stasolla | −8.0 | −8.0 |
| *Callichthys callichthys* | Chao Phraya River Basin | Matura Nimtim | 12.0 | 18.0 |
|  |  | Punyanuch Daengchana | 19.0 | 21.0 |
|  |  | Ratcha Chaichana | 24.0 | 36.0 |
|  | Lower Pearl River Basin | Fei Liu | 11.0 | 23.0 |
|  |  | Hui Wei | 11.0 | 13.0 |
|  |  | Yunjie Zhu | 9.0 | 11.0 |
| *Callinectes danae* | Mediterranean Sea | Gianluca Stasolla | 32.0 | 38.0 |
| *Callinectes sapidus* | Mediterranean Sea | Gianluca Stasolla | 43.0 | 47.0 |
|  | River Neretva Estuary | Luka Glamuzina | 27.0 | 31.0 |
|  |  | Pero Tutman | 35.0 | 47.0 |
| *Callionymus filamentosus* | South-western coasts of Anatolia | Halit Filiz | 13.5 | 19.5 |
| *Cambarellus (Cambarellus) chapalanus* | Norway | Lennart Edsman | 5.0 | 15.0 |
| *Cambarellus (Cambarellus) montezumae* | Norway | Lennart Edsman | 12.0 | 22.0 |
| *Cambarellus (Cambarellus) patzcuarensis* | Norway | Lennart Edsman | 11.5 | 21.5 |
| *Cambarellus (Pandicambarus) diminutus* | Norway | Lennart Edsman | 11.0 | 21.0 |
| *Cambarellus (Pandicambarus) ninae* | Norway | Lennart Edsman | 7.0 | 17.0 |
| *Cambarellus (Pandicambarus) puer* | Norway | Stein I. Johnsen | 6.0 | 16.0 |
| *Cambarellus (Pandicambarus) schmitti* | Norway | Stein I. Johnsen | 5.0 | 15.0 |
| *Cambarellus (Pandicambarus) shufeldtii* | Norway | Stein I. Johnsen | 5.0 | 15.0 |
| *Cambarellus (Pandicambarus) texanus* | Norway | Stein I. Johnsen | 8.0 | 18.0 |
| *Campanularia morgansi* | Mediterranean Sea | Nurçin Killi | −1.0 | −1.0 |
| *Capoeta bergamae* | Lake Marmara | Ali İlhan | −8.0 | −18.0 |
|  |  | Hasan M. Sarı | −13.0 | −23.0 |
| *Caprella mutica* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 12.0 | 22.0 |
| *Caprella scaura* | Mediterranean Sea | Agnese Marchini, Anna Occhipinti-Ambrogi | 13.0 | 13.0 |
|  | Port of Leghorn | Jonathan Tempesti | 17.5 | 21.5 |
| *Carassius auratus* | Anzali Wetland Complex | Hossein Rahmani | 37.0 | 49.0 |
|  |  | Seyed Daryoush Moghaddas | 41.0 | 53.0 |
|  | Chao Phraya River Basin | Matura Nimtim | 42.0 | 52.0 |
|  |  | Punyanuch Daengchana | 38.0 | 44.0 |
|  |  | Ratcha Chaichana | 13.0 | 25.0 |
|  | Croatia | Tena Radočaj | 22.0 | 30.0 |
|  | England | Sebastian Kozic | 46.0 | 54.0 |
|  | England and Wales | Emily R. Winter | 50.0 | 58.0 |
|  | Lower Pearl River Basin | Fei Liu | 28.5 | 40.5 |
|  |  | Hui Wei | 36.0 | 48.0 |
|  |  | Yunjie Zhu | 30.0 | 42.0 |
|  | Peninsular Malaysia | Abdulwakil O. Saba, M. N. Amal Azmai | 18.5 | 18.5 |
|  | Slovenia | Ivan Špelić | 30.0 | 38.0 |
|  | Turkey | Ali Serhan Tarkan | 31.0 | 41.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 37.0 | 45.0 |
| *Carassius carassius* | Anzali Wetland Complex | Hossein Rahmani | 36.0 | 48.0 |
|  |  | Seyed Daryoush Moghaddas | 27.5 | 39.5 |
|  | Croatia | Tena Radočaj | 17.0 | 21.0 |
|  | Great Britain | Jennifer A. Dodd | 14.0 | 16.0 |
|  | Slovenia | Ivan Špelić | 18.0 | 26.0 |
| *Carassius cuvieri* | Croatia | Tena Radočaj | 13.0 | 17.0 |
|  | Slovenia | Ivan Špelić | 15.0 | 21.0 |
| *Carassius gibelio* | Anzali Wetland Complex | Hossein Rahmani | 37.0 | 49.0 |
|  |  | Seyed Daryoush Moghaddas | 40.0 | 52.0 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 22.0 | 22.0 |
|  | Croatia | Tena Radočaj | 39.0 | 49.0 |
|  | England | Sebastian Kozic | 44.0 | 52.0 |
|  | Greece | Leonidas Vardakas | 39.0 | 43.0 |
|  | Lake Marmara | Ali İlhan | 33.0 | 45.0 |
|  |  | Hasan M. Sarı | 52.0 | 64.0 |
|  | Republic of Macedonia | Milica Ristovska, Vasil Kostov | 46.5 | 46.5 |
|  | River Neretva Basin | Branko Glamuzina | 26.0 | 38.0 |
|  |  | Pero Tutman | 26.0 | 38.0 |
|  | Slovenia | Ivan Špelić | 39.0 | 49.0 |
|  | South Caucasus | Tatia Kuljanishvili | 34.0 | 46.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 41.0 | 53.0 |
|  | Turkey | Ali Serhan Tarkan | 42.0 | 54.0 |
| *Carcinus maenas* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 49.0 | 61.0 |
|  | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 31.0 | 41.0 |
| *Caridina babaulti* | Norway | Charlotte Evangelista | 3.0 | 9.0 |
| *Caridina brachydactyla* | Norway | Charlotte Evangelista | 7.0 | 13.0 |
| *Caridina breviata* | Norway | Charlotte Evangelista | 0.0 | 6.0 |
| *Caridina brevicarpalis* | Norway | Charlotte Evangelista | 0.0 | 6.0 |
| *Caridina caerulea* | Norway | Charlotte Evangelista | −1.0 | 5.0 |
| *Caridina cantonensis* | Brazil | Henrique Anatole Cardoso Ramos | −3.0 | −3.0 |
|  | Norway | Charlotte Evangelista | −1.0 | 5.0 |
| *Caridina dennerli* | Norway | Charlotte Evangelista | 2.0 | 8.0 |
| *Caridina gracilirostris* | Norway | Charlotte Evangelista | 8.0 | 14.0 |
| *Caridina logemanni* | Norway | Charlotte Evangelista | 0.0 | 6.0 |
| *Caridina mariae* | Norway | Charlotte Evangelista | 2.0 | 8.0 |
| *Caridina multidentata* | Norway | Charlotte Evangelista | 7.0 | 13.0 |
| *Caridina parvidentata* | Norway | Charlotte Evangelista | −1.0 | 5.0 |
| *Caridina propinqua* | Norway | Charlotte Evangelista | 7.0 | 13.0 |
| *Caridina richtersii* | Norway | Charlotte Evangelista | 0.0 | 6.0 |
| *Caridina rubropunctata* | Norway | Charlotte Evangelista | −1.0 | 5.0 |
| *Caridina serratirostris* | Norway | Charlotte Evangelista | 7.0 | 13.0 |
| *Caridina simoni* | Norway | Charlotte Evangelista | 3.0 | 9.0 |
| *Caridina spinata* | Norway | Charlotte Evangelista | −1.0 | 5.0 |
| *Caridina woltereckae* | Norway | Charlotte Evangelista | −2.0 | 4.0 |
| *Carijoa riisei* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 18.5 | 26.5 |
| *Carukia barnesi* | Mediterranean Sea | Nurçin Killi | 6.0 | 12.0 |
| *Caspiobdella fadejewi* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 7.0 | 19.0 |
| *Cassiopea andromeda* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 45.0 | 55.0 |
|  | Mediterranean Sea | Nurçin Killi | 26.0 | 38.0 |
| *Cassiopea xamachana* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Catostomus commersonii* | England | Sebastian Kozic | 27.0 | 31.0 |
| *Caulerpa cylindracea* | Arabian/Persian Gulf and Sea of Oman | Jessica Elphinstone-Davis | 42.0 | 32.0 |
|  | Mediterranean Sea | Konstantinos Tsiamis | 26.0 | 32.0 |
| *Caulerpa lamourouxii* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 39.0 | 35.0 |
| *Caulerpa taxifolia* | Arabian/Persian Gulf and Sea of Oman | Jessica Elphinstone-Davis | 42.0 | 32.0 |
|  | Coastal waters of Madeira Island | João Gama Monteiro | 35.0 | 41.0 |
| *Celtodoryx ciocalyptoides* | Northeast Atlantic | Amelia Curd | 25.0 | 37.0 |
| *Cephea cephea* | Mediterranean Sea | Nurçin Killi | 0.0 | 4.0 |
| *Ceratophrys ornata* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 27.0 | 35.0 |
| *Ceratophyllum demersum* | Western iberia | Teresa Ferreira | 33.0 | 21.0 |
| *Cercopagis pengoi* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 44.0 | 34.0 |
|  | Baltic Sea | Maiju Lehtiniemi | 28.0 | 40.0 |
| *Ceylonthelphusa kandambyi* | Norway | Gaute Velle | 8.0 | 12.0 |
| *Chaetogammarus warpachowskyi* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 10.5 | 20.5 |
| *Champsodon nudivittis* | South-western coasts of Anatolia | Halit Filiz | 13.5 | 15.5 |
| *Champsodon vorax* | South-western coasts of Anatolia | Halit Filiz | 15.5 | 21.5 |
| *Channa argus* | Anzali Wetland Complex | Hossein Rahmani | 33.5 | 37.5 |
|  |  | Seyed Daryoush Moghaddas | 32.5 | 36.5 |
|  | Croatia | Tena Radočaj | 35.0 | 45.0 |
|  | England | Sebastian Kozic | 29.5 | 29.5 |
|  | Northern Kyushu Island | Norio Onikura | 13.0 | 15.0 |
|  | Slovenia | Ivan Špelić | 42.0 | 52.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 37.0 | 37.0 |
| *Channa micropeltes* | Croatia | Tena Radočaj | 20.0 | 20.0 |
|  | England | Sebastian Kozic | 19.5 | 19.5 |
|  | Slovenia | Ivan Špelić | 15.0 | 15.0 |
| *Channa punctata* | Croatia | Tena Radočaj | 15.0 | 19.0 |
|  | Slovenia | Ivan Špelić | 17.0 | 23.0 |
| *Charybdis (Charybdis) hellerii* | Coastal waters of Grenada, Saint Vincent and the Grenadines | Karin H. Olsson | 18.0 | 18.0 |
|  | Mediterranean Sea | Gianluca Stasolla | 20.0 | 30.0 |
| *Charybdis (Charybdis) japonica* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 39.0 | 31.0 |
| *Charybdis (Charybdis) longicollis* | Mediterranean Sea | Gianluca Stasolla | 32.0 | 40.0 |
| *Charybdis (Charybdis) lucifera* | Mediterranean Sea | Gianluca Stasolla | 15.0 | 25.0 |
| *Chelicorophium curvispinum* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 16.0 | 26.0 |
| *Chelicorophium mucronatum* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 14.5 | 24.5 |
| *Chelicorophium robustum* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 13.5 | 17.5 |
| *Chelmon marginalis* | Coastal waters of South Korea | Umut Uyan | −8.0 | −4.0 |
| *Chelmon muelleri* | Coastal waters of South Korea | Umut Uyan | −7.0 | −3.0 |
| *Chelmon rostratus* | Coastal waters of South Korea | Umut Uyan | −4.0 | 2.0 |
| *Chelmonops curiosus* | Coastal waters of South Korea | Umut Uyan | −8.0 | −4.0 |
| *Chelmonops truncatus* | Coastal waters of South Korea | Umut Uyan | −10.0 | −6.0 |
| *Chelodina longicollis* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 33.0 | 45.0 |
| *Chelon auratus* | Anzali Wetland Complex | Hossein Rahmani | −3.0 | −15.0 |
|  |  | Seyed Daryoush Moghaddas | 4.0 | −4.0 |
|  | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 12.0 | 16.0 |
| *Chelon ramada* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 19.0 | 25.0 |
|  | Turkey | Ali Serhan Tarkan | 23.0 | 23.0 |
| *Chelon saliens* | Anzali Wetland Complex | Hossein Rahmani | 3.0 | 3.0 |
|  |  | Seyed Daryoush Moghaddas | 2.0 | 6.0 |
| *Chelus fimbriata* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 18.0 | 30.0 |
| *Chelydra serpentina* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 50.0 | 62.0 |
| *Cherax boesemani* | Norway | Stein I. Johnsen | 11.0 | 21.0 |
| *Cherax communis* | Norway | Stein I. Johnsen | 12.0 | 22.0 |
| *Cherax destructor* | Norway | Lennart Edsman, Stein I. Johnsen | 22.5 | 32.5 |
|  | South Africa | Moleseng C. Moshobane | 43.0 | 43.0 |
| *Cherax holthuisi* | Norway | Stein I. Johnsen | 14.0 | 24.0 |
| *Cherax lorentzi* | Norway | Stein I. Johnsen | 12.0 | 22.0 |
| *Cherax monticola* | Norway | Stein I. Johnsen | 15.0 | 25.0 |
| *Cherax papuanus* | Norway | Stein I. Johnsen | 11.0 | 21.0 |
| *Cherax peknyi* | Norway | Stein I. Johnsen | 14.0 | 24.0 |
| *Cherax preissii* | Norway | Stein I. Johnsen | 14.0 | 24.0 |
| *Cherax pulcher* | Norway | Stein I. Johnsen | 12.0 | 22.0 |
| *Cherax quadricarinatus* | Coastal waters of Vietnam | Kieu Anh T. Ta | 18.0 | 18.0 |
|  | Mexico | Roberto Mendoza, Sergio Alberto Luna | 52.0 | 56.0 |
|  | Norway | Anders Jelmert | 2.5 | 12.5 |
|  |  | Stein I. Johnsen | 22.5 | 32.5 |
|  | South Africa | Moleseng C. Moshobane | 21.0 | 21.0 |
| *Cherax snowden* | Norway | Stein I. Johnsen | 12.0 | 22.0 |
| *Cherax tenuimanus* | Norway | Stein I. Johnsen | 21.0 | 31.0 |
| *Chilomycterus reticulatus* | Madeira Island | Nuno Castro | 14.5 | 14.5 |
| *Chionoecetes opilio* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 28.0 | 38.0 |
| *Chiromantes angolense* | Norway | Gaute Velle | 10.0 | 14.0 |
| *Chondrostoma holmwoodii* | Lake Marmara | Ali İlhan | −12.0 | −12.0 |
|  |  | Hasan M. Sarı | −13.0 | −25.0 |
| *Chondrostoma nasus* | Croatia | Tena Radočaj | 9.0 | 5.0 |
|  | England | Sebastian Kozic | 1.0 | −1.0 |
|  | Slovenia | Ivan Špelić | 14.0 | 10.0 |
| *Chromobotia macracanthus* | Brazil | Henrique Anatole Cardoso Ramos | 3.0 | −9.0 |
| *Chrosomus eos* | England | Sebastian Kozic | 1.0 | −1.0 |
| *Chrosomus erythrogaster* | England | Sebastian Kozic | −6.0 | −8.0 |
| *Chrysaora fulgida* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Chrysaora quinquecirrha* | Mediterranean Sea | Nurçin Killi | 24.0 | 28.0 |
| *Cichla ocellaris* | Chao Phraya River Basin | Matura Nimtim | 20.5 | 20.5 |
|  |  | Punyanuch Daengchana | 37.0 | 43.0 |
|  |  | Ratcha Chaichana | 28.0 | 40.0 |
|  | Lower Pearl River Basin | Fei Liu | 22.0 | 34.0 |
|  |  | Hui Wei | 16.0 | 26.0 |
|  |  | Yunjie Zhu | 26.0 | 38.0 |
|  | Vietnam | Kieu Anh T. Ta | 19.0 | 19.0 |
| *Cichla temensis* | Puerto Rico | J. Wesley Neal, Jason M. Bies | −4.0 | −4.0 |
| *Cichlasoma bimaculatum* | Conterminous United States | Jeffrey E. Hill | −5.5 | −3.5 |
| *Cichlasoma trimaculatum* | River Cauvery | Lohith Kumar | 43.0 | 55.0 |
| *Ciona intestinalis* | Arabian/Persian Gulf and Sea of Oman | Louisa Wood | 34.0 | 34.0 |
|  | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 32.0 | 42.0 |
| *Cirrhinus cirrhosus* | England | Sebastian Kozic | 6.5 | 8.5 |
|  | Vietnam | Thuyet D. Bui | 6.0 | 6.0 |
| *Cirrholovenia tetranema* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Clarias batrachus* | Anzali Wetland Complex | Hossein Rahmani | 38.0 | 50.0 |
|  |  | Seyed Daryoush Moghaddas | 33.0 | 45.0 |
|  | Turkey | Nildeniz Top-Karakuş | 45.0 | 49.0 |
| *Clarias gariepinus* | Croatia | Tena Radočaj | 25.0 | 35.0 |
|  | India | Vettath R. Suresh | 48.5 | 60.5 |
|  | Kerala | Smrithy Raj, Biju Kumar | 46.5 | 40.5 |
|  | Lake Marmara | Ali İlhan | 16.0 | 22.0 |
|  |  | Hasan M. Sarı | 29.0 | 41.0 |
|  | Slovenia | Ivan Špelić | 32.5 | 40.5 |
|  | Turkey | Ali Serhan Tarkan | 36.0 | 48.0 |
|  | Vietnam | Kieu Anh T. Ta | 25.0 | 25.0 |
| *Clarias gariepinus* × *Heterobranchus bidorsalis* | Croatia | Tena Radočaj | 19.0 | 23.0 |
|  | Slovenia | Ivan Špelić | 18.0 | 22.0 |
| *Clavelina lepadiformis* | Northern Gulf of Mexico | Kathryn O'Shaughnessy, Anna L. E. Yunnie | 14.0 | 14.0 |
| *Clemmys guttata* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 23.0 | 21.0 |
| *Clibanarius africanus* | Norway | Gaute Velle | 4.0 | 8.0 |
| *Clupeonella cultriventris* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 18.0 | 12.0 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 4.5 | 6.5 |
| *Clytia hummelincki* | Mediterranean Sea | Nurçin Killi | 10.0 | 14.0 |
| *Clytia linearis* | Mediterranean Sea | Nurçin Killi | 10.0 | 14.0 |
| *Clytia mccradyi* | Mediterranean Sea | Nurçin Killi | 10.0 | 14.0 |
| *Cobitis bilineata* | Iberian Peninsula | Paulo Branco | 6.0 | 6.0 |
| *Cobitis fahirae* | Lake Marmara | Ali İlhan | −14.0 | −16.0 |
|  |  | Hasan M. Sarı | −12.0 | −24.0 |
| *Cobitis kurui* | Lake Marmara | Ali İlhan | −15.0 | −27.0 |
|  |  | Hasan M. Sarı | −12.0 | −24.0 |
| *Cobitis taenia* | Great Britain | Jennifer A. Dodd | 4.0 | 6.0 |
| *Codium fragile fragile* | Arabian/Persian Gulf and Sea of Oman | Jessica Elphinstone-Davis | 28.5 | 18.5 |
| *Colossoma macropomum* | Tocantins-Araguaia River Basin | Débora Troca | 7.0 | 7.0 |
| *Conomurex persicus* | Eastern Mediterranean Sea | Konstantinos Tsiamis | 9.0 | 19.0 |
| *Coptodon rendalli* | Turkey | Ali Serhan Tarkan | 18.0 | 26.0 |
| *Coptodon zillii* | Anzali Wetland Complex | Seyed Daryoush Moghaddas | 32.0 | 44.0 |
|  | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 45.0 | 49.0 |
|  | Singapore | Shayne S. B. Yeo | 31.0 | 33.0 |
|  | Southern Iraq | Abbas J. Al-Faisal | 35.0 | 47.0 |
|  | Turkey | Ali Serhan Tarkan | 19.5 | 29.5 |
| *Corbicula fluminea* | Northern Kyushu Island | Yoshihisa Kurita | 35.0 | 35.0 |
|  | Southern Ticino River | Daniele Paganelli | 38.5 | 46.5 |
| *Cordylophora caspia* | Arabian/Persian Gulf and Sea of Oman | Phil I. Davison | 39.5 | 41.5 |
|  | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 25.0 | 35.0 |
| *Coregonus albula* | Croatia | Tena Radočaj | 14.5 | 4.5 |
|  | River Ob Basin | Elena Interesova | 20.0 | 10.0 |
|  | Slovenia | Ivan Špelić | 16.0 | 6.0 |
| *Coregonus autumnalis* | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 9.5 | 9.5 |
| *Coregonus lavaretus* | Croatia | Tena Radočaj | 14.5 | 10.5 |
|  | England | Sebastian Kozic | 17.0 | 13.0 |
|  | Slovenia | Ivan Špelić | 17.0 | 13.0 |
|  | Turkey | Ali Serhan Tarkan | 5.5 | −0.5 |
| *Coregonus muksun* | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 28.0 | 22.0 |
| *Coregonus nasus* | Southern Finland | Riikka Puntila-Dodd | 0.0 | 0.0 |
| *Coregonus peled* | Croatia | Tena Radočaj | 10.5 | 6.5 |
|  | River Neretva Basin | Branko Glamuzina | 1.5 | −4.5 |
|  |  | Pero Tutman | 8.5 | −3.5 |
|  | Slovenia | Ivan Špelić | 7.0 | 1.0 |
|  | Southern Finland | Riikka Puntila-Dodd | −4.0 | −14.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 30.0 | 24.0 |
| *Corella eumyota* | Northern Gulf of Mexico | Kathryn O'Shaughnessy, Anna L. E. Yunnie | 17.5 | 13.5 |
| *Coreoleuciscus splendidus* | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 5.5 | −2.5 |
| *Coreoperca herzi* | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 18.0 | 10.0 |
| *Corymorpha annulata* | Mediterranean Sea | Nurçin Killi | 4.0 | 10.0 |
| *Corymorpha bigelowi* | Mediterranean Sea | Nurçin Killi | 4.0 | 10.0 |
| *Coryne eximia* | Mediterranean Sea | Nurçin Killi | 11.0 | 13.0 |
| *Cottus gobio* | Great Britain | Jennifer A. Dodd | 9.5 | 13.5 |
| *Cotylorhiza erythraea* | Mediterranean Sea | Nurçin Killi | 0.0 | 4.0 |
| *Craspedacusta sowerbii* | Turkey | Nurçin Killi | 16.5 | 22.5 |
| *Crassostrea gigas* | River Neretva Estuary | Branko Glamuzina | 36.0 | 44.0 |
|  |  | Pero Tutman | 20.0 | 22.0 |
|  | Vietnam | Thuyet D. Bui | 21.0 | 21.0 |
| *Crassostrea virginica* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 22.0 | 16.0 |
| *Creaserinus fodiens* | Norway | Stein I. Johnsen | 14.0 | 24.0 |
| *Crepidula fornicata* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 38.0 | 30.0 |
|  | Celtic Sea | Dan Minchin | 54.0 | 66.0 |
| *Crocodylus rhombifer* | Vietnam | Laura Ruykys | −2.0 | −2.0 |
| *Cromileptes altivelis* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 25.0 | 17.0 |
| *Ctenochaetus binotatus* | Coastal waters of South Korea | Umut Uyan | −6.0 | 0.0 |
| *Ctenochaetus hawaiiensis* | Coastal waters of South Korea | Umut Uyan | −5.0 | 1.0 |
| *Ctenochaetus marginatus* | Coastal waters of South Korea | Umut Uyan | −8.0 | −4.0 |
| *Ctenochaetus truncatus* | Coastal waters of South Korea | Umut Uyan | −8.0 | −4.0 |
| *Ctenopharyngodon idella* | Anzali Wetland Complex | Hossein Rahmani | 12.5 | 24.5 |
|  |  | Seyed Daryoush Moghaddas | 17.5 | 29.5 |
|  | Belarus | Boris V. Adamovich | 17.5 | 29.5 |
|  |  | Lizaveta Vintsek, Viktor Rizevsky | 7.0 | 13.0 |
|  | Croatia | Tena Radočaj | 21.0 | 31.0 |
|  | England | Sebastian Kozic | 11.5 | 19.5 |
|  | France | Nicolas Poulet | 26.5 | 32.5 |
|  | Iberian Peninsula | David Almeida | 31.0 | 43.0 |
|  | Lake Balaton Catchment | Árpád Ferincz, Tibor Erős | 25.0 | 25.0 |
|  | Lake Marmara | Ali İlhan | 4.5 | −7.5 |
|  |  | Hasan M. Sarı | −8.0 | −20.0 |
|  | River Neretva Basin | Branko Glamuzina | 9.5 | 17.5 |
|  |  | Pero Tutman | 7.5 | 11.5 |
|  | River Ob Basin | Elena Interesova | 42.5 | 54.5 |
|  | Singapore | Joleen Chan | 12.0 | 14.0 |
|  | Slovenia | Ivan Špelić | 19.0 | 25.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 21.0 | 31.0 |
|  | Turkey | Ali Serhan Tarkan | 31.0 | 41.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 28.0 | 34.0 |
| *Ctenopoma nigropannosum* | Chao Phraya River Basin | Matura Nimtim | 6.0 | 6.0 |
|  |  | Punyanuch Daengchana | 10.0 | 12.0 |
|  |  | Ratcha Chaichana | 16.0 | 22.0 |
|  | Lower Pearl River Basin | Fei Liu | 14.0 | 26.0 |
|  |  | Hui Wei | 7.0 | 7.0 |
|  |  | Yunjie Zhu | 12.0 | 24.0 |
| *Culaea inconstans* | Southern Finland | Riikka Puntila-Dodd | −6.0 | −6.0 |
| *Culter alburnus* | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 19.5 | 27.5 |
| *Cuora flavomarginata* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 17.0 | 23.0 |
| *Cycleptus elongatus* | England | Sebastian Kozic | −3.0 | −1.0 |
| *Cynoglossus sinusarabici* | South-western coasts of Anatolia | Halit Filiz | 2.5 | 4.5 |
| *Cynops orientalis* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 46.0 | 58.0 |
| *Cynops pyrrhogaster* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 38.0 | 50.0 |
| *Cyprinella lutrensis* | Alabama | Daniel Akin | 32.0 | 32.0 |
|  | England | Sebastian Kozic | 11.5 | 19.5 |
| *Cyprinus carpio* | Anzali Wetland Complex | Hossein Rahmani | 15.5 | 27.5 |
|  |  | Seyed Daryoush Moghaddas | 25.5 | 37.5 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 24.5 | 24.5 |
|  | Croatia | Tena Radočaj | 28.0 | 38.0 |
|  | England | Sebastian Kozic | 28.0 | 38.0 |
|  | England and Wales | Emily R. Winter | 39.0 | 49.0 |
|  | Georgia | Levan Mumladze | 31.0 | 29.0 |
|  | Greece | Nicholas Koutsikos | 38.0 | 42.0 |
|  | India | Vettath R. Suresh | 39.0 | 45.0 |
|  | Kerala | Smrithy Raj, Biju Kumar | 38.0 | 26.0 |
|  | Lake Marmara | Ali İlhan | 7.0 | 7.0 |
|  |  | Hasan M. Sarı | 37.0 | 43.0 |
|  | Peninsular Malaysia | Abdulwakil O. Saba, M. N. Amal Azmai | 25.0 | 27.0 |
|  | River Neretva Basin | Branko Glamuzina | 17.5 | 29.5 |
|  |  | Pero Tutman | 15.0 | 27.0 |
|  | River Ob Basin | Elena Interesova | 37.5 | 49.5 |
|  | Slovenia | Ivan Špelić | 35.0 | 45.0 |
|  | South Africa | Jeffrey W. Hean | 35.5 | 41.5 |
|  |  | Olaf L. F. Weyl | 45.0 | 53.0 |
|  |  | Sean M. Marr | 45.0 | 51.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 22.0 | 26.0 |
|  | Turkey | Ali Serhan Tarkan | 41.0 | 53.0 |
|  | Upper Paraná River Basin | Sandra C. Forneck, Almir M. Cunico | 35.0 | 41.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 30.0 | 40.0 |
| *Danio rerio* | Chao Phraya River Basin | Matura Nimtim | 8.0 | 14.0 |
|  |  | Punyanuch Daengchana | 8.0 | 6.0 |
|  |  | Ratcha Chaichana | 4.0 | 4.0 |
|  | Lower Pearl River Basin | Fei Liu | 5.5 | 17.5 |
|  |  | Hui Wei | 9.0 | 15.0 |
|  |  | Yunjie Zhu | 9.0 | 21.0 |
| *Dendrobates auratus* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 14.0 | 14.0 |
| *Dendrobates tinctorius* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 8.0 | 12.0 |
| *Dendrochirus barberi* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 1.0 | 3.0 |
|  |  | Quenton M. Tuckett | 2.0 | −4.0 |
|  |  | Timothy J. Lyons | 6.0 | 6.0 |
| *Dendrochirus bellus* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | −1.0 | 1.0 |
|  |  | Quenton M. Tuckett | −1.0 | −1.0 |
|  |  | Timothy J. Lyons | 1.0 | 1.0 |
| *Dendrochirus biocellatus* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 2.0 | 4.0 |
|  |  | Quenton M. Tuckett | 4.0 | 2.0 |
|  |  | Timothy J. Lyons | 3.0 | 3.0 |
| *Dendrochirus brachypterus* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 14.0 | 14.0 |
|  |  | Quenton M. Tuckett | 9.0 | 9.0 |
|  |  | Timothy J. Lyons | 12.0 | 14.0 |
| *Dendrochirus zebra* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 8.0 | 8.0 |
|  |  | Quenton M. Tuckett | 4.0 | 6.0 |
|  |  | Timothy J. Lyons | 10.0 | 12.0 |
| *Desmocaris trispinosa* | Norway | Charlotte Evangelista | 3.0 | 9.0 |
| *Dicentrarchus labrax* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 13.0 | 17.0 |
| *Didemnum vexillum* | Chaleur Bay and Magdalen Islands | Nathalie Simard, Michèle Pelletier-Rousseau | 38.0 | 50.0 |
|  | Coastal waters of South Newfoundland | Cynthia H. McKenzie | 32.0 | 44.0 |
|  | Southern Gulf of Saint Lawrence | Renée Bernier | 43.5 | 55.5 |
| *Dikerogammarus haemobaphes* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 19.0 | 29.0 |
| *Dikerogammarus villosus* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 21.0 | 31.0 |
|  | Georgia | Levan Mumladze | 33.0 | 35.0 |
| *Dinophysis caudata* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 35.5 | 47.5 |
| *Diplosoma listerianum* | Arabian/Persian Gulf and Sea of Oman | Michał Skóra | 25.0 | 15.0 |
| *Discomedusa lobata* | Mediterranean Sea | Nurçin Killi | 4.0 | 4.0 |
| *Doto kya* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 6.0 | −4.0 |
| *Dreissena bugensis* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 26.5 | 38.5 |
| *Dreissena polymorpha* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 38.0 | 50.0 |
| *Dussumieria elopsoides* | South-western coasts of Anatolia | Halit Filiz | 8.5 | 14.5 |
| *Dyscophus guineti* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 10.0 | 12.0 |
| *Dyspanopeus sayi* | Mediterranean Sea | Gianluca Stasolla | 25.0 | 31.0 |
| *Echinogammarus ischnus* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 15.0 | 23.0 |
| *Echinogammarus trichiatus* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 7.5 | 11.5 |
| *Ectopleura crocea* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 29.0 | 21.0 |
| *Eirene viridula* | Mediterranean Sea | Nurçin Killi | 4.0 | 10.0 |
| *Elodea canadensis* | Romania | Daniyar Memedemin | 45.0 | 45.0 |
| *Elodea nuttallii* | Romania | Daniyar Memedemin | 48.0 | 48.0 |
| *Emydura subglobosa* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 17.0 | 29.0 |
| *Epinephelus aeneus* | River Neretva Estuary | Luka Glamuzina | −3.5 | 6.5 |
|  |  | Pero Tutman | −7.0 | −19.0 |
| *Epinephelus fuscoguttatus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 29.0 | 41.0 |
|  | Coastal waters of South Korea | Umut Uyan | 4.0 | 8.0 |
| *Equulites klunzingeri* | South-western coasts of Anatolia | Gökçen Bilge | 5.0 | 11.0 |
| *Eriocheir hepuensis* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 30.5 | 36.5 |
| *Eriocheir sinensis* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 42.0 | 32.0 |
|  | Coastal waters of Northwest Europe | Stephan Gollasch | 33.0 | 33.0 |
|  | Coastal waters of Poland | Sebastian Kozic | 23.5 | 21.5 |
|  | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 28.5 | 38.5 |
|  | Eastern Mediterranean Sea | Sebastian Kozic | 31.0 | 29.0 |
|  | Mediterranean Sea | Gianluca Stasolla | 55.0 | 65.0 |
| *Eriphia verrucosa* | Mediterranean Sea | Gianluca Stasolla | 0.0 | −4.0 |
| *Esox lucius* | Croatia | Tena Radočaj | 28.0 | 28.0 |
|  | Lake Marmara | Ali İlhan | 0.0 | 0.0 |
|  |  | Hasan M. Sarı | 17.0 | 17.0 |
|  | River Neretva Basin | Branko Glamuzina | 8.0 | 20.0 |
|  |  | Pero Tutman | 12.0 | 24.0 |
|  | River Neretva Estuary | Branko Glamuzina | 18.0 | 18.0 |
|  |  | Pero Tutman | 30.0 | 38.0 |
|  | Slovenia | Ivan Špelić | 27.0 | 27.0 |
|  | Turkey | Nildeniz Top-Karakuş | 40.0 | 44.0 |
| *Esox niger* | England | Sebastian Kozic | 13.0 | 17.0 |
| *Etrumeus golanii* | South-western coasts of Anatolia | Halit Filiz | 9.5 | 15.5 |
| *Eualetes tulipa* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 11.0 | 9.0 |
| *Eucheilota paradoxica* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Eucheilota ventricularis* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Eucheuma* spp. | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 26.5 | 28.5 |
| *Eucrate crenata* | Mediterranean Sea | Gianluca Stasolla | 8.0 | 14.0 |
| *Eunectes notaeus* | European Union | Dominika Kňazovická | 18.0 | 26.0 |
| *Euryrhynchus amazoniensis* | Norway | Charlotte Evangelista | 3.0 | 9.0 |
| *Faxonius limosus* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 30.0 | 42.0 |
|  | Hungary | András Weiperth | 51.0 | 57.0 |
|  | South Africa | Moleseng C. Moshobane | 50.0 | 50.0 |
| *Faxonius neglectus chaenodactylus* | Norway | Lennart Edsman | 31.0 | 41.0 |
| *Ferrissia californica* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 7.5 | 13.5 |
|  | Southern Ticino River | Daniele Paganelli | 15.5 | 19.5 |
| *Ficopomatus enigmaticus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 38.0 | 42.0 |
|  | River Neretva Estuary | Pero Tutman | 15.5 | 17.5 |
| *Fistularia commersonii* | South-western coasts of Anatolia | Halit Filiz | 38.5 | 50.5 |
| *Fundulus heteroclitus heteroclitus* | Turkey | Nildeniz Top-Karakuş | 24.0 | 28.0 |
| *Gambusia affinis* | Anzali Wetland Complex | Hossein Rahmani | 30.5 | 42.5 |
|  |  | Seyed Daryoush Moghaddas | 25.5 | 35.5 |
|  | Croatia | Tena Radočaj | 24.0 | 36.0 |
|  | England | Sebastian Kozic | 32.0 | 40.0 |
|  | Hong Kong | Kit Magellan | 49.0 | 51.0 |
|  | Kerala | Smrithy Raj, Biju Kumar | 37.0 | 37.0 |
|  | Lake Marmara | Ali İlhan | 24.0 | 30.0 |
|  |  | Hasan M. Sarı | 33.0 | 39.0 |
|  | Northern Kyushu Island | Yoshihisa Kurita | 9.0 | 15.0 |
|  | Singapore | Joleen Chan | 32.0 | 34.0 |
|  | Slovenia | Ivan Špelić | 37.0 | 47.0 |
|  | South Africa | Jeffrey W. Hean | 29.0 | 37.0 |
|  |  | Olaf L. F. Weyl | 31.0 | 33.0 |
|  |  | Sean M. Marr | 28.0 | 34.0 |
|  | Turkey | Ali Serhan Tarkan | 36.0 | 44.0 |
|  |  | Irmak Kurtul | 29.0 | 41.0 |
|  | Vietnam | Kieu Anh T. Ta | 19.0 | 19.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 29.0 | 31.0 |
| *Gambusia holbrooki* | Anzali Wetland Complex | Hossein Rahmani | 24.5 | 36.5 |
|  |  | Seyed Daryoush Moghaddas | 30.5 | 42.5 |
|  | Croatia | Tena Radočaj | 25.0 | 35.0 |
|  | England | Sebastian Kozic | 22.5 | 30.5 |
|  | Greece | Nicholas Koutsikos | 45.0 | 53.0 |
|  | Iberian Peninsula | José M. Santos | 29.0 | 41.0 |
|  | Lake Marmara | Ali İlhan | 17.0 | 23.0 |
|  |  | Hasan M. Sarı | 34.0 | 40.0 |
|  | River Neretva Basin | Branko Glamuzina | 10.0 | 14.0 |
|  |  | Pero Tutman | 19.0 | 29.0 |
|  | River Ob Basin | Elena Interesova | 35.0 | 47.0 |
|  | Slovenia | Ivan Špelić | 36.0 | 46.0 |
|  | Turkey | Ali Serhan Tarkan | 32.0 | 40.0 |
|  |  | Irmak Kurtul | 29.0 | 41.0 |
| *Gammarus roeselii* | Southern Ticino River | Daniele Paganelli | 21.0 | 25.0 |
| *Gammarus tigrinus* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 29.0 | 39.0 |
| *Garra rufa* | Lake Marmara | Ali İlhan | −7.5 | −1.5 |
|  |  | Hasan M. Sarı | −7.5 | −19.5 |
|  | Turkey | Ali Serhan Tarkan | 11.0 | 11.0 |
| *Gasteropelecus levis* | Chao Phraya River Basin | Matura Nimtim | −7.0 | −3.0 |
|  |  | Punyanuch Daengchana | −8.0 | −8.0 |
|  |  | Ratcha Chaichana | 6.0 | 10.0 |
|  | Lower Pearl River Basin | Fei Liu | 2.0 | 14.0 |
|  |  | Hui Wei | 1.0 | 3.0 |
|  |  | Yunjie Zhu | −2.0 | 6.0 |
| *Gasterosteus aculeatus* | Anzali Wetland Complex | Hossein Rahmani | 17.0 | 17.0 |
|  |  | Seyed Daryoush Moghaddas | 16.0 | 6.0 |
| *Genicanthus bellus* | Coastal waters of South Korea | Umut Uyan | −5.0 | −1.0 |
| *Genicanthus watanabei* | Coastal waters of South Korea | Umut Uyan | −4.0 | 0.0 |
| *Geosesarma bicolor* | Norway | Gaute Velle | 9.0 | 11.0 |
| *Geosesarma* spp. | Norway | Gaute Velle | 11.0 | 15.0 |
| *Geosesarma tiomanicum* | Norway | Gaute Velle | 11.0 | 15.0 |
| *Gibelion catla* | England | Sebastian Kozic | 5.5 | 5.5 |
| *Gnathophyllum elegans* | Mediterranean Sea | Gianluca Stasolla | −6.0 | −6.0 |
| *Gobio gobio* | Great Britain | Jennifer A. Dodd | 14.5 | 18.5 |
| *Gobio lozanoi* | Iberian Peninsula | Paulo Branco | 15.0 | 15.0 |
| *Gobio obtusirostris* | Croatia | Tena Radočaj | 7.0 | 7.0 |
|  | Slovenia | Ivan Špelić | 25.0 | 33.0 |
| *Gobiosoma bosc* | Belgium | Hugo Verreycken | 14.0 | 22.0 |
|  | Coastal waters of South Norway | Anders Jelmert | 16.0 | 22.0 |
|  | Denmark | Karin H. Olsson | 13.0 | 17.0 |
|  | East North Sea | Hugo Verreycken, Karin H. Olsson, Rob S. E. W. Leuven, Stephan Gollasch, Eric Feunteun, Anders Jelmert | 19.0 | 29.0 |
|  | Germany | Stephan Gollasch | 14.0 | 24.0 |
|  | Great Britain | Jennifer A. Dodd, Gordon H. Copp, Kathryn O'Shaughnessy, David B. Reeves | 11.0 | 17.0 |
| *Gonioinfradens paucidentatus* | Mediterranean Sea | Gianluca Stasolla | 19.0 | 23.0 |
| *Gonionemus vertens* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 9.0 | 1.0 |
|  | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Gracilaria tikvahiae* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 25.5 | 21.5 |
| *Graptemys ouachitensis* | Iberian Peninsula | Pedro Segurado | 17.0 | 5.0 |
| *Graptemys pseudogeographica* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 29.0 | 39.0 |
| *Grateloupia filicina* | Arabian/Persian Gulf and Sea of Oman | Phil I. Davison | 26.5 | 38.5 |
| *Grateloupia turuturu* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 25.5 | 17.5 |
| *Gymnocephalus cernua* | Croatia | Tena Radočaj | 24.5 | 28.5 |
|  | Great Britain | Jennifer A. Dodd | 32.0 | 34.0 |
|  | River Neretva Basin | Branko Glamuzina | 10.5 | 16.5 |
|  |  | Pero Tutman | 13.0 | 13.0 |
|  | Slovenia | Ivan Špelić | 24.0 | 24.0 |
|  | South Caucasus | Tatia Kuljanishvili | 38.0 | 48.0 |
|  | Turkey | Nildeniz Top-Karakuş | 27.5 | 35.5 |
| *Gymnocorymbus ternetzi* | Chao Phraya River Basin | Matura Nimtim | 6.0 | 12.0 |
|  |  | Punyanuch Daengchana | 5.0 | 5.0 |
|  |  | Ratcha Chaichana | −3.0 | −3.0 |
|  | Lower Pearl River Basin | Fei Liu | 16.0 | 28.0 |
|  |  | Hui Wei | 10.0 | 16.0 |
|  |  | Yunjie Zhu | 14.0 | 26.0 |
| *Gymnodinium catenatum* | Arabian/Persian Gulf and Sea of Oman | Rogan Harmer | 44.0 | 54.0 |
| *Haliscera bigelowi* | Mediterranean Sea | Nurçin Killi | 8.0 | 14.0 |
| *Halitiara inflexa* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Halocaridina rubra* | Norway | Charlotte Evangelista | 13.0 | 19.0 |
| *Halophila stipulacea* | Coastal waters of Grenada, Saint Vincent and the Grenadines | Phil I. Davison | 28.0 | 28.0 |
| *Hediste diversicolor* | Arabian/Persian Gulf and Sea of Oman | Gemma Fenwick | 15.0 | 15.0 |
| *Helostoma temminckii* | Chao Phraya River Basin | Matura Nimtim | 2.0 | 2.0 |
| *Hemibarbus labeo* | Croatia | Tena Radočaj | 4.0 | 4.0 |
|  | Slovenia | Ivan Špelić | 9.0 | 9.0 |
| *Hemibarbus maculatus* | Croatia | Tena Radočaj | 17.0 | 13.0 |
|  | Slovenia | Ivan Špelić | 21.0 | 21.0 |
| *Hemichromis fasciatus* | Croatia | Tena Radočaj | 10.0 | 10.0 |
|  | Slovenia | Ivan Špelić | 10.0 | 10.0 |
| *Hemichromis letourneuxi* | Chao Phraya River Basin | Matura Nimtim | 19.5 | 25.5 |
|  |  | Punyanuch Daengchana | 23.5 | 19.5 |
|  |  | Ratcha Chaichana | 23.0 | 35.0 |
|  | Lower Pearl River Basin | Fei Liu | 37.0 | 49.0 |
|  |  | Hui Wei | 40.0 | 40.0 |
|  |  | Yunjie Zhu | 43.0 | 55.0 |
| *Hemiculter leucisculus* | Anzali Wetland Complex | Hossein Rahmani | 31.0 | 43.0 |
|  |  | Seyed Daryoush Moghaddas | 27.0 | 39.0 |
|  | Turkey | Nildeniz Top-Karakuş | 32.0 | 38.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 17.5 | 25.5 |
| *Hemigrapsus sanguineus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 31.0 | 23.0 |
|  | Mediterranean Sea | Gianluca Stasolla | 33.0 | 45.0 |
| *Hemigrapsus takanoi* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 22.0 | 14.0 |
| *Hemimysis anomala* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 5.5 | 11.5 |
| *Hemiramphus far* | South-western coasts of Anatolia | Gökçen Bilge | 3.0 | 9.0 |
| *Hemitaurichthys multispinosus* | Coastal waters of South Korea | Umut Uyan | −14.0 | −14.0 |
| *Hemitaurichthys thompsoni* | Coastal waters of South Korea | Umut Uyan | −5.0 | −1.0 |
| *Hemitaurichthys zoster* | Coastal waters of South Korea | Umut Uyan | −3.0 | 1.0 |
| *Heniochus intermedius* | Coastal waters of South Korea | Umut Uyan | −10.0 | −6.0 |
| *Heniochus pleurotaenia* | Coastal waters of South Korea | Umut Uyan | −8.0 | −4.0 |
| *Heniochus singularius* | Coastal waters of South Korea | Umut Uyan | −5.0 | 1.0 |
| *Heniochus varius* | Coastal waters of South Korea | Umut Uyan | −6.0 | 0.0 |
| *Herichthys cyanoguttatus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 33.0 | 25.0 |
| *Herklotsichthys punctatus* | South-western coasts of Anatolia | Halit Filiz | 7.5 | 15.5 |
| *Heterochelamon tessellatum* | Norway | Gaute Velle | 2.0 | 6.0 |
| *Heteropneustes fossilis* | Turkey | Ali Serhan Tarkan | 21.5 | 29.5 |
| *Heterosigma akashiwo* | Arabian/Persian Gulf and Sea of Oman | Rogan Harmer | 44.0 | 56.0 |
| *Heterotilapia buttikoferi* | Chao Phraya River Basin | Matura Nimtim | 18.0 | 24.0 |
|  |  | Punyanuch Daengchana | 15.0 | 11.0 |
|  |  | Ratcha Chaichana | 28.0 | 38.0 |
|  | Lower Pearl River Basin | Fei Liu | 27.0 | 39.0 |
|  |  | Hui Wei | 28.0 | 36.0 |
|  |  | Yunjie Zhu | 24.0 | 36.0 |
| *Holacanthus tricolor* | Coastal waters of South Korea | Umut Uyan | −11.0 | −7.0 |
| *Homarus americanus* | Coastal waters of Continental Europe | Paul Stebbing | 33.0 | 33.0 |
| *Hoplobatrachus tigerinus* | Vietnam | Thuyet D. Bui | 15.0 | 15.0 |
| *Hucho hucho* | England | Sebastian Kozic | 5.0 | 1.0 |
|  | Southern Finland | Riikka Puntila-Dodd | −9.0 | −9.0 |
| *Hucho taimen* | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 31.0 | 29.0 |
| *Huso huso* | England | Sebastian Kozic | 16.0 | 22.0 |
|  | Southern Finland | Riikka Puntila-Dodd | −6.0 | −6.0 |
| *Hydrocotyle ranunculoides* | Northern Kyushu Island | Norio Onikura | 36.0 | 48.0 |
| *Hydrocotyle verticillata* | Southern Europe | Lorenzo Lazzaro | 2.0 | 4.0 |
| *Hymenochirus curtipes* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 43.0 | 55.0 |
| *Hypania invalida* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 5.5 | 7.5 |
| *Hypnea musciformis* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 48.0 | 54.0 |
| *Hypophthalmichthys molitrix* | Anzali Wetland Complex | Hossein Rahmani | 13.5 | 25.5 |
|  |  | Seyed Daryoush Moghaddas | 12.5 | 22.5 |
|  | Belarus | Boris V. Adamovich | 7.5 | 17.5 |
|  |  | Lizaveta Vintsek, Viktor Rizevsky | 6.0 | 12.0 |
|  | Croatia | Tena Radočaj | 15.0 | 25.0 |
|  | England | Sebastian Kozic | 27.5 | 37.5 |
|  | Lake Marmara | Ali İlhan | 0.0 | 6.0 |
|  |  | Hasan M. Sarı | 14.5 | 20.5 |
|  | River Neretva Basin | Branko Glamuzina | −1.5 | −5.5 |
|  |  | Pero Tutman | −9.0 | −11.0 |
|  | River Ob Basin | Elena Interesova | 36.5 | 48.5 |
|  | Slovenia | Ivan Špelić | 17.0 | 23.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 9.5 | 9.5 |
|  | Turkey | Ali Serhan Tarkan | 41.0 | 53.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 27.0 | 31.0 |
| *Hypophthalmichthys nobilis* | Anzali Wetland Complex | Hossein Rahmani | 12.5 | 24.5 |
|  |  | Seyed Daryoush Moghaddas | 12.5 | 22.5 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 6.0 | 12.0 |
|  | Croatia | Tena Radočaj | 15.0 | 25.0 |
|  | England | Sebastian Kozic | 23.5 | 31.5 |
|  | River Neretva Basin | Branko Glamuzina | −1.5 | −1.5 |
|  |  | Pero Tutman | −4.5 | −8.5 |
|  | River Ob Basin | Elena Interesova | 22.5 | 32.5 |
|  | Slovenia | Ivan Špelić | 16.0 | 22.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 21.0 | 21.0 |
|  | Turkey | Nildeniz Top-Karakuş | 31.0 | 33.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 27.0 | 31.0 |
| *Hypostomus plecostomus* | Chao Phraya River Basin | Matura Nimtim | 38.0 | 50.0 |
|  |  | Punyanuch Daengchana | 39.0 | 49.0 |
|  |  | Ratcha Chaichana | 35.0 | 45.0 |
|  | Lower Pearl River Basin | Fei Liu | 26.0 | 38.0 |
|  |  | Hui Wei | 34.0 | 46.0 |
|  |  | Yunjie Zhu | 27.0 | 39.0 |
|  | Vietnam | Kieu Anh T. Ta | 42.0 | 42.0 |
| *Ictalurus punctatus* | Anzali Wetland Complex | Hossein Rahmani | 30.0 | 42.0 |
|  |  | Seyed Daryoush Moghaddas | 31.0 | 43.0 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 1.0 | 1.0 |
|  | Croatia | Tena Radočaj | 36.0 | 48.0 |
|  | England | Sebastian Kozic | 17.0 | 27.0 |
|  | Northern Italy | Phillip J. Haubrock | 44.0 | 54.0 |
|  | River Ob Basin | Elena Interesova | 25.0 | 33.0 |
|  | Slovenia | Ivan Špelić | 33.0 | 43.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 14.0 | 14.0 |
|  | Southern Italy | Phillip J. Haubrock | 36.5 | 28.5 |
|  | Turkey | Ali Serhan Tarkan | 31.0 | 41.0 |
|  | Vietnam | Thuyet D. Bui | 21.0 | 21.0 |
| *Ictiobus cyprinellus* | River Ob Basin | Elena Interesova | 20.0 | 30.0 |
| *Ictiobus niger* | River Ob Basin | Elena Interesova | 12.5 | 22.5 |
| *Ilyoplax* spp. | Norway | Gaute Velle | 9.0 | 17.0 |
| *Johnrandallia nigrirostris* | Coastal waters of South Korea | Umut Uyan | −10.0 | −6.0 |
| *Kantiella enigmatica* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Kappaphycus alvarezii* | Coastal waters of Grenada, Saint Vincent and the Grenadines | Karin H. Olsson | 25.0 | 29.0 |
|  | Coastal waters of Vietnam | Thuyet D. Bui | 16.0 | 16.0 |
| *Karenia mikimotoi* | Aegean Sea | Evangelia Smeti | 33.5 | 33.5 |
|  | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 32.0 | 44.0 |
| *Karenia selliformis* | Arabian/Persian Gulf and Sea of Oman | Rogan Harmer | 43.0 | 55.0 |
| *Kinosternon subrubrum* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 25.0 | 35.0 |
| *Knipowitschia byblisia* | Aegean Region of Turkey | Daniela Giannetto, Laura Pompei | 0.0 | −12.0 |
| *Knipowitschia caucasica* | Turkey | Ali Serhan Tarkan | −4.0 | −4.0 |
| *Knipowitschia caunosi* | Aegean Region of Turkey | Daniela Giannetto, Laura Pompei | 0.0 | −12.0 |
| *Knipowitschia mermere* | Lake Marmara | Ali İlhan | −14.0 | −16.0 |
|  |  | Hasan M. Sarı | −11.0 | −19.0 |
| *Koellikerina fasciculata* | Mediterranean Sea | Nurçin Killi | 14.0 | 14.0 |
| *Koreocobitis rotundicaudata* | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 5.5 | −0.5 |
| *Kryptoperidinium foliaceum* | Arabian/Persian Gulf and Sea of Oman | Rogan Harmer | 42.0 | 54.0 |
| *Kryptopterus bicirrhis* | Chao Phraya River Basin | Matura Nimtim | 4.0 | 4.0 |
| *Labeo rohita* | England | Sebastian Kozic | 6.5 | 6.5 |
|  | Vietnam | Thuyet D. Bui | 5.0 | 5.0 |
| *Ladigesocypris irideus* | Aegean Region of Turkey | Daniela Giannetto | −9.0 | −21.0 |
| *Ladigesocypris mermere* | Lake Marmara | Ali İlhan | −14.0 | −26.0 |
|  |  | Hasan M. Sarı | −12.0 | −24.0 |
| *Ladislavia taczanowskii* | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 2.5 | −3.5 |
| *Lagocephalus guentheri* | South-western coasts of Anatolia | Sercan Yapıcı | 28.0 | 40.0 |
| *Lagocephalus sceleratus* | South-western coasts of Anatolia | Sercan Yapıcı | 40.0 | 52.0 |
| *Lagocephalus spadiceus* | South-western coasts of Anatolia | Sercan Yapıcı | 40.0 | 52.0 |
| *Lagocephalus suezensis* | South-western coasts of Anatolia | Sercan Yapıcı | 42.0 | 54.0 |
| *Lancaris kumariae* | Norway | Charlotte Evangelista | 7.0 | 13.0 |
| *Laodicea fijiana* | Mediterranean Sea | Nurçin Killi | −1.0 | −1.0 |
| *Lates calcarifer* | Coastal waters of South Korea | Umut Uyan | 15.0 | 23.0 |
|  | Conterminous United States | Jeffrey E. Hill | 10.0 | 16.0 |
| *Lates niloticus* | Turkey | Nildeniz Top-Karakuş | 19.0 | 23.0 |
| *Lemna minuta* | Romania | Daniyar Memedemin | 42.5 | 54.5 |
| *Leostyletus misakiensis* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 11.0 | 13.0 |
| *Lepidothelphusa cognetti* | Norway | Gaute Velle | 8.0 | 10.0 |
| *Lepidothelphusa* spp. | Norway | Gaute Velle | 8.0 | 10.0 |
| *Lepomis gibbosus* | Belarus | Helen S. Gajduchenko | 36.0 | 42.0 |
|  | Bulgaria | Eliza P. Uzunova | 32.0 | 38.0 |
|  | Croatia | Tena Radočaj | 30.0 | 40.0 |
|  | England | Sebastian Kozic | 33.0 | 45.0 |
|  | Greece | Nicholas Koutsikos | 34.0 | 44.0 |
|  | Iberian Peninsula | José M. Santos | 34.0 | 46.0 |
|  | Lake Marmara | Ali İlhan | 10.0 | 16.0 |
|  |  | Hasan M. Sarı | 34.0 | 40.0 |
|  | Poland | Grzegorz Zięba | 16.5 | 22.5 |
|  | River Neretva Basin | Branko Glamuzina | 23.0 | 33.0 |
|  |  | Pero Tutman | 26.0 | 38.0 |
|  | Slovenia | Ivan Špelić | 25.0 | 33.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 22.0 | 30.0 |
|  | Turkey | Ali Serhan Tarkan | 43.0 | 53.0 |
| *Lepomis macrochirus* | Northern Kyushu Island | Yoshihisa Kurita | 30.0 | 30.0 |
| *Leptosiphonia brodiei* | Arabian/Persian Gulf and Sea of Oman | Luke Aislabie | 30.0 | 30.0 |
| *Leucaspius delineatus* | England | Sebastian Kozic | 21.0 | 17.0 |
|  | River Neretva Basin | Branko Glamuzina | 8.0 | 12.0 |
|  |  | Pero Tutman | 0.0 | 4.0 |
|  | River Ob Basin | Elena Interesova | 21.0 | 31.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 21.0 | 23.0 |
|  | United Kingdom | Luke Aislabie, Hugo Verreycken | 34.0 | 32.0 |
| *Leuciscus aspius* | Iberian Peninsula | David Almeida | 19.0 | 9.0 |
|  | River Ob Basin | Elena Interesova | 25.0 | 25.0 |
| *Leuciscus idus* | Anzali Wetland Complex | Hossein Rahmani | 23.0 | 31.0 |
|  |  | Seyed Daryoush Moghaddas | 20.0 | 24.0 |
|  | Iberian Peninsula | David Almeida | 26.0 | 16.0 |
|  | Ontario | Sarah Nienhuis | 12.0 | 10.0 |
|  | United Kingdom | Karin H. Olsson | 7.0 | −1.0 |
|  |  | Luke Aislabie, Hugo Verreycken | 28.0 | 32.0 |
| *Leuciscus leuciscus* | Croatia | Tena Radočaj | 16.5 | 16.5 |
|  | Great Britain | Jennifer A. Dodd | 12.0 | 16.0 |
|  | Slovenia | Ivan Špelić | 20.0 | 10.0 |
| *Leucos basak* | Croatia | Tena Radočaj | 3.0 | −7.0 |
|  | Slovenia | Ivan Špelić | 4.0 | 0.0 |
| *Libinia dubia* | Mediterranean Sea | Gianluca Stasolla | 6.0 | 12.0 |
| *Limnomysis benedeni* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 4.5 | 12.5 |
| *Limnoperna fortunei* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 20.0 | 10.0 |
| *Limnopilos naiyanetri* | Norway | Gaute Velle | 8.0 | 12.0 |
| *Liobagrus andersoni* | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 4.5 | −3.5 |
| *Liocarcinus depurator* | Mediterranean Sea | Gianluca Stasolla | −4.0 | −4.0 |
| *Liriope tetraphylla* | Mediterranean Sea | Nurçin Killi | 8.0 | 14.0 |
| *Lithobates catesbeianus* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 48.5 | 60.5 |
|  | North and central Italy | Daniele Pellitteri-Rosa | 51.0 | 59.0 |
|  | Vietnam | Laura Ruykys | 40.0 | 46.0 |
| *Lithobates pipiens* | Continental Europe | Oldřich Kopecký | 11.0 | 11.0 |
| *Lithoglyphus naticoides* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 24.0 | 32.0 |
| *Littorina littorea* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 41.0 | 51.0 |
| *Liza abu* | Turkey | Ali Serhan Tarkan | 3.0 | 3.0 |
| *Liza carinata* | South-western coasts of Anatolia | Gökçen Bilge | 9.0 | 15.0 |
| *Lucania parva* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 11.0 | 17.0 |
| *Luciobarbus lydianus* | Lake Marmara | Ali İlhan | −8.0 | −20.0 |
|  |  | Hasan M. Sarı | −12.0 | −20.0 |
| *Maccullochella peelii* | Australia | Lance Lloyd | 41.0 | 53.0 |
| *Macrobrachium agwi* | Norway | Charlotte Evangelista | −1.0 | 5.0 |
| *Macrobrachium assamense peninsulare* | Norway | Charlotte Evangelista | 2.0 | 8.0 |
| *Macrobrachium dayanum* | Norway | Charlotte Evangelista | 10.0 | 22.0 |
| *Macrobrachium dienbienphuense* | Norway | Charlotte Evangelista | 2.0 | 2.0 |
| *Macrobrachium gracilirostre* | Norway | Charlotte Evangelista | 8.0 | 14.0 |
| *Macrobrachium idae* | Norway | Charlotte Evangelista | 9.0 | 15.0 |
| *Macrobrachium lanchesteri* | Norway | Charlotte Evangelista | 3.0 | 9.0 |
| *Macrobrachium pilimanus* | Norway | Charlotte Evangelista | 3.0 | 9.0 |
| *Macrobrachium rosenbergii* | Norway | Charlotte Evangelista | 15.5 | 21.5 |
| *Macrobrachium scabriculum* | Norway | Charlotte Evangelista | 8.0 | 14.0 |
| *Macrobrachium sintangense* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 33.0 | 23.0 |
| *Macrochelys temminckii* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 31.0 | 37.0 |
| *Malaclemys terrapin* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 23.0 | 35.0 |
| *Marenzelleria arctia* | Baltic Sea | Henn Ojaveer | 33.0 | 23.0 |
| *Marenzelleria neglecta* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 14.0 | 6.0 |
|  | Baltic Sea | Henn Ojaveer | 33.0 | 23.0 |
| *Marenzelleria viridis* | Baltic Sea | Henn Ojaveer | 33.0 | 23.0 |
|  | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 13.0 | 23.0 |
| *Margalefidinium polykrikoides* | Arabian/Persian Gulf and Sea of Oman | Rogan Harmer | 44.0 | 56.0 |
| *Marivagia stellata* | Mediterranean Sea | Nurçin Killi | 3.0 | 9.0 |
| *Mauremys caspica* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 42.5 | 54.5 |
| *Mauremys reevesii* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 19.0 | 29.0 |
|  | Iberian Peninsula | Pedro Segurado | 27.5 | 33.5 |
| *Mauremys rivulata* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 29.0 | 41.0 |
| *Mawia benovici* | Mediterranean Sea | Nurçin Killi | −1.0 | 1.0 |
| *Mayaheros uropthalmus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 30.0 | 20.0 |
| *Megabalanus coccopoma* | Arabian/Persian Gulf and Sea of Oman | Gordon H. Copp | 44.0 | 56.0 |
| *Megalobrama amblycephala* | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 13.5 | 13.5 |
| *Megalops atlanticus* | Coastal waters of South Korea | Umut Uyan | 6.0 | 12.0 |
|  | Tropical eastern Pacific | Gustavo A. Castellanos-Galindo, D. Ross Robertson | 27.0 | 33.0 |
| *Megophrys nasuta* | Continental Europe | Oldřich Kopecký | 6.0 | 12.0 |
| *Melanochromis auratus* | Chao Phraya River Basin | Matura Nimtim | 24.0 | 36.0 |
|  |  | Punyanuch Daengchana | 15.5 | 17.5 |
|  |  | Ratcha Chaichana | −5.0 | −5.0 |
|  | Lower Pearl River Basin | Fei Liu | 23.0 | 35.0 |
|  |  | Hui Wei | 18.5 | 24.5 |
|  |  | Yunjie Zhu | 15.0 | 27.0 |
| *Membranipora membranacea* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 23.0 | 33.0 |
| *Mesonauta festivus* | Chao Phraya River Basin | Matura Nimtim | 7.0 | 7.0 |
|  |  | Punyanuch Daengchana | 13.0 | 13.0 |
|  |  | Ratcha Chaichana | 11.0 | 17.0 |
|  | Lower Pearl River Basin | Fei Liu | 0.0 | 12.0 |
|  |  | Hui Wei | −1.5 | 4.5 |
|  |  | Yunjie Zhu | 1.0 | 7.0 |
|  | Singapore | Shayne S. B. Yeo | 4.0 | 6.0 |
| *Metasesarma aubryi* | Norway | Gaute Velle | 13.0 | 17.0 |
| *Metasesarma* spp. | Norway | Gaute Velle | 13.0 | 17.0 |
| *Microchlamylla amabilis* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 9.5 | −0.5 |
| *Microcosmus squamiger* | Arabian/Persian Gulf and Sea of Oman | Michał Skóra | 13.5 | 1.5 |
| *Micropercops swinhonis* | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 20.0 | 20.0 |
| *Micropterus dolomieu* | Croatia | Tena Radočaj | 27.0 | 27.0 |
|  | England | Sebastian Kozic | 29.0 | 37.0 |
|  | Northern Kyushu Island | Norio Onikura | 9.5 | −2.5 |
|  | Slovenia | Ivan Špelić | 20.0 | 20.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 3.5 | 5.5 |
|  | Turkey | Nildeniz Top-Karakuş | 17.0 | 21.0 |
|  | Vietnam | Kieu Anh T. Ta | 7.5 | 7.5 |
| *Micropterus salmoides* | Bulgaria | Dimitriy Dashinov | 32.0 | 36.0 |
|  | Central Europe | Barbora Števove, Kristína Slovák Švolíková | 35.0 | 45.0 |
|  | Croatia | Tena Radočaj | 34.0 | 42.0 |
|  | England | Sebastian Kozic | 29.0 | 37.0 |
|  | Northern Kyushu Island | Yoshihisa Kurita | 34.0 | 34.0 |
|  | River Neretva Estuary | Branko Glamuzina | 28.0 | 40.0 |
|  |  | Pero Tutman | 32.0 | 44.0 |
|  | Slovenia | Ivan Špelić | 32.0 | 40.0 |
|  | South Africa | Jeffrey W. Hean | 25.0 | 33.0 |
|  |  | Olaf L. F. Weyl | 33.0 | 37.0 |
|  |  | Sean M. Marr | 25.0 | 29.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 17.0 | 19.0 |
|  | Turkey | Nildeniz Top-Karakuş | 35.5 | 41.5 |
|  | Vietnam | Kieu Anh T. Ta | 7.5 | 7.5 |
| *Misgurnus anguillicaudatus* | Croatia | Tena Radočaj | 25.0 | 33.0 |
|  | River Ob Basin | Elena Interesova | 34.5 | 46.5 |
|  | Slovenia | Ivan Špelić | 27.0 | 35.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Shan Li | 33.0 | 45.0 |
|  |  | Ruibin Yang | 33.0 | 43.0 |
| *Misgurnus fossilis* | Croatia | Tena Radočaj | 3.0 | 3.0 |
|  | England | Sebastian Kozic | 0.0 | 4.0 |
|  | Slovenia | Ivan Špelić | 9.0 | 9.0 |
| *Misgurnus nikolskyi* | River Ob Basin | Elena Interesova | 23.5 | 33.5 |
| *Mnemiopsis leidyi* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 42.0 | 42.0 |
|  | Coastal waters of the United Kingdom | Sophie Pitois | 40.0 | 48.0 |
|  | River Neretva Estuary | Branko Glamuzina | 29.0 | 31.0 |
|  |  | Pero Tutman | 30.0 | 42.0 |
| *Moerisia carine* | Mediterranean Sea | Nurçin Killi | 11.0 | 13.0 |
| *Moerisia inkermanica* | Mediterranean Sea | Nurçin Killi | 11.0 | 13.0 |
| *Molgula manhattensis* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 23.5 | 33.5 |
| *Molgula plana* | Madeira Island | Paola Parretti | 5.0 | 7.0 |
| *Morone americana* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 20.0 | 10.0 |
|  | Coastal waters of South Korea | Umut Uyan | 27.5 | 37.5 |
|  | England | Sebastian Kozic | 33.0 | 43.0 |
|  | United Kingdom | Gordon H. Copp | 39.0 | 49.0 |
|  |  | Luke Aislabie, Hugo Verreycken | 33.0 | 43.0 |
| *Morone chrysops* × *Morone saxatilis* | Croatia | Tena Radočaj | 14.0 | 22.0 |
|  | Slovenia | Ivan Špelić | 24.0 | 32.0 |
|  | Southern Europe | Marina Piria | 19.0 | 21.0 |
|  | Turkey | Ali Serhan Tarkan | 12.0 | 12.0 |
| *Morone saxatilis* | Coastal waters of South Korea | Umut Uyan | 19.5 | 13.5 |
| *Mya arenaria* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 22.0 | 32.0 |
| *Mycale (Mycale) grandis* | Arabian/Persian Gulf and Sea of Oman | Gemma Fenwick | 25.5 | 33.5 |
| *Mylopharyngodon piceus* | Anzali Wetland Complex | Hossein Rahmani | 16.5 | 22.5 |
|  |  | Seyed Daryoush Moghaddas | 13.5 | 19.5 |
|  | Croatia | Tena Radočaj | 22.0 | 34.0 |
|  | England | Sebastian Kozic | 23.5 | 29.5 |
|  | River Ob Basin | Elena Interesova | 17.0 | 27.0 |
|  | Slovenia | Ivan Špelić | 20.0 | 26.0 |
|  | Turkey | Nildeniz Top-Karakuş | 27.0 | 33.0 |
| *Myocastor coypus* | Iran | Ali T. Qashqaei, Elnaz Najafi-Majd | 4.0 | 10.0 |
|  | Sicily | Giovanni Leonardi | 39.0 | 49.0 |
|  | United Kingdom | Peter Robertson | 41.0 | 41.0 |
| *Myrionema orbiculare* | Arabian/Persian Gulf and Sea of Oman | Phil I. Davison | 6.0 | 8.0 |
| *Myriophyllum alterniflorum* | Western iberia | Teresa Ferreira | 22.0 | 10.0 |
| *Myriophyllum aquaticum* | Northern Kyushu Island | Norio Onikura | 26.5 | 38.5 |
| *Myriophyllum spicatum* | Western iberia | Teresa Ferreira | 34.0 | 22.0 |
| *Myriophyllum verticillatum* | Western iberia | Teresa Ferreira | 3.0 | −9.0 |
| *Mytella strigata* | Backwaters and coasts of Kerala | Vettath R. Suresh | 33.5 | 37.5 |
| *Mytilopsis leucophaeata* | Georgia | Levan Mumladze | 29.0 | 33.0 |
| *Mytilopsis sallei* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 28.0 | 34.0 |
| *Mytilus galloprovincialis* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 36.0 | 30.0 |
| *Myxocyprinus asiaticus* | England | Sebastian Kozic | −4.0 | −2.0 |
| *Najas marina* | Western iberia | Teresa Ferreira | 2.0 | −10.0 |
| *Nemipterus randalli* | South-western coasts of Anatolia | Gökçen Bilge | 20.0 | 32.0 |
| *Neocaridina davidi* | Norway | Charlotte Evangelista | 15.5 | 25.5 |
| *Neocaridina palmata* | Norway | Charlotte Evangelista | 6.0 | 12.0 |
| *Neogobius fluviatilis* | Anzali Wetland Complex | Hossein Rahmani | 10.0 | 16.0 |
|  |  | Seyed Daryoush Moghaddas | 11.0 | 9.0 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 16.5 | 16.5 |
|  | Croatia | Tena Radočaj | 30.0 | 38.0 |
|  | England | Sebastian Kozic | 25.0 | 33.0 |
|  | Lake Marmara | Ali İlhan | −9.0 | −21.0 |
|  |  | Hasan M. Sarı | −2.0 | −14.0 |
|  | Slovenia | Ivan Špelić | 22.0 | 28.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 15.0 | 15.0 |
|  | Turkey | Ali Serhan Tarkan | 16.0 | 16.0 |
|  | United Kingdom | Karin H. Olsson | 19.5 | 21.5 |
| *Neogobius melanostomus* | Baltic Sea | Henn Ojaveer | 44.0 | 52.0 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 9.5 | 11.5 |
|  | Bulgaria | Dimitriy Dashinov | 43.0 | 53.0 |
|  | Croatia | Tena Radočaj | 42.0 | 52.0 |
|  | England | Sebastian Kozic | 39.0 | 47.0 |
|  | France | Laurence Masson | 43.0 | 47.0 |
|  | Lake Balaton Catchment | Árpád Ferincz, Tibor Erős | 39.0 | 43.0 |
|  | Slovenia | Ivan Špelić | 36.0 | 48.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 38.0 | 38.0 |
|  | Turkey | Ali Serhan Tarkan | 28.0 | 28.0 |
|  | United Kingdom | Karin H. Olsson | 32.5 | 42.5 |
| *Neopomacentrus cyanomos* | Greater Caribbean | D. Ross Robertson | 22.0 | 24.0 |
| *Neosalanx taihuensis* | Yarlung Zangbo River Basin | Dekui He, Shan Li | 15.0 | 27.0 |
|  |  | Ruibin Yang | 15.0 | 23.0 |
| *Neosarmatium meinerti* | Norway | Gaute Velle | 12.0 | 16.0 |
| *Neoturris pileata* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Nerodia fasciata* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 21.0 | 31.0 |
| *Nerodia sipedon* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 32.0 | 44.0 |
| *Nerodia taxispilota* | European Union | Tereza Šmídová | 14.0 | 26.0 |
| *Netrostoma setouchianum* | Mediterranean Sea | Nurçin Killi | −2.0 | 2.0 |
| *Nipponocypris koreanus* | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 6.0 | 12.0 |
| *Nubiella mitra* | Mediterranean Sea | Nurçin Killi | 14.0 | 14.0 |
| *Obesogammarus crassus* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 13.5 | 19.5 |
| *Obesogammarus obesus* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 13.0 | 19.0 |
| *Odontesthes bonariensis* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 29.0 | 23.0 |
|  | Coastal waters of South Korea | Umut Uyan | 17.5 | 25.5 |
|  | Croatia | Tena Radočaj | 18.0 | 20.0 |
|  | Slovenia | Ivan Špelić | 14.5 | 22.5 |
| *Olindias singularis* | Mediterranean Sea | Nurçin Killi | 4.0 | 10.0 |
| *Oncorhynchus gorbuscha* | British Isles | Gordon H. Copp | 29.0 | 17.0 |
|  | England | Sebastian Kozic | 32.0 | 42.0 |
|  | River Ob Basin | Elena Interesova | 12.0 | 12.0 |
| *Oncorhynchus keta* | River Ob Basin | Elena Interesova | 7.5 | 17.5 |
| *Oncorhynchus kisutch* | Iberian Peninsula | José M. Santos | −1.0 | −13.0 |
| *Oncorhynchus mykiss* | Anzali Wetland Complex | Hossein Rahmani | 19.5 | 7.5 |
|  |  | Seyed Daryoush Moghaddas | 20.5 | 16.5 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 12.0 | 12.0 |
|  | Bulgaria | Eliza P. Uzunova | 28.0 | 22.0 |
|  | Croatia | Tena Radočaj | 38.0 | 48.0 |
|  | England | Sebastian Kozic | 32.0 | 36.0 |
|  | Greece | Leonidas Vardakas | 25.0 | 19.0 |
|  | Lake Marmara | Ali İlhan | 2.5 | −9.5 |
|  |  | Hasan M. Sarı | −0.5 | −12.5 |
|  | Northern Kyushu Island | Yoshihisa Kurita | 34.5 | 22.5 |
|  | River Neretva Basin | Branko Glamuzina | 16.0 | 4.0 |
|  |  | Pero Tutman | 16.0 | 4.0 |
|  | River Ob Basin | Elena Interesova | 44.0 | 40.0 |
|  | Serbia | Predrag Simonović | 32.0 | 38.0 |
|  | Slovenia | Ivan Špelić | 26.0 | 32.0 |
|  | South Africa | Jeffrey W. Hean | 21.0 | 21.0 |
|  |  | Olaf L. F. Weyl | 22.0 | 14.0 |
|  |  | Sean M. Marr | 17.5 | 21.5 |
|  | South Caucasus | Tatia Kuljanishvili | 25.5 | 17.5 |
|  | Southern Finland | Riikka Puntila-Dodd | 14.5 | 22.5 |
|  | Turkey | Ali Serhan Tarkan | 20.0 | 20.0 |
|  | Vietnam | Thuyet D. Bui | 8.0 | 6.0 |
| *Oncorhynchus tshawytscha* | Croatia | Tena Radočaj | 12.0 | 12.0 |
|  | Slovenia | Ivan Špelić | 14.0 | 10.0 |
| *Ondatra zibethicus* | United Kingdom | Peter Robertson | 44.0 | 44.0 |
| *Oreochromis aureus* | Anzali Wetland Complex | Hossein Rahmani | 29.5 | 39.5 |
|  |  | Seyed Daryoush Moghaddas | 28.0 | 40.0 |
|  | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 48.0 | 52.0 |
|  | Southern Iraq | Abbas J. Al-Faisal | 32.0 | 44.0 |
|  | Turkey | Ali Serhan Tarkan | 22.0 | 32.0 |
| *Oreochromis mossambicus* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 44.0 | 48.0 |
|  | Croatia | Tena Radočaj | 32.5 | 32.5 |
|  | Kerala | Smrithy Raj, Biju Kumar | 46.0 | 50.0 |
|  | Slovenia | Ivan Špelić | 21.0 | 31.0 |
|  | Turkey | Ali Serhan Tarkan | 24.0 | 34.0 |
|  | Vietnam | Kieu Anh T. Ta | 27.0 | 39.0 |
| *Oreochromis niloticus* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 40.0 | 38.0 |
|  | Croatia | Tena Radočaj | 17.0 | 17.0 |
|  | Kerala | Smrithy Raj, Biju Kumar | 32.0 | 36.0 |
|  | Northern Kyushu Island | Yoshihisa Kurita | 25.0 | 35.0 |
|  | Pearl River Basin | Hui Wei | 25.5 | 35.5 |
|  | Slovenia | Ivan Špelić | 21.5 | 21.5 |
|  | South Africa | Jeffrey W. Hean | 18.0 | 28.0 |
|  |  | Olaf L. F. Weyl | 40.0 | 46.0 |
|  |  | Sean M. Marr | 32.0 | 38.0 |
|  | Southern Iraq | Abbas J. Al-Faisal | 24.0 | 36.0 |
|  | Thailand | Wansuk Senanan | 30.0 | 36.0 |
|  | Tocantins-Araguaia River Basin | Débora Troca | 43.0 | 43.0 |
|  | Turkey | Ali Serhan Tarkan | 23.0 | 35.0 |
|  | Upper Paraná River Basin | Mariele P. de Camargo, Almir M. Cunico | 34.5 | 38.5 |
|  | Vietnam | Thuyet D. Bui | 28.0 | 28.0 |
| *Oreochromis spilurus* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 36.0 | 48.0 |
| *Oryzias sinensis* | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 29.0 | 31.0 |
| *Oscillatoria erythraea* | Aegean Sea | Evangelia Smeti | 15.0 | 25.0 |
| *Osmerus eperlanus* | River Ob Basin | Elena Interesova | 11.0 | 11.0 |
| *Osteoglossum bicirrhosum* | Chao Phraya River Basin | Matura Nimtim | 14.0 | 16.0 |
|  |  | Punyanuch Daengchana | 17.0 | 19.0 |
|  |  | Ratcha Chaichana | 2.0 | 2.0 |
|  | Lower Pearl River Basin | Fei Liu | 12.5 | 24.5 |
|  |  | Hui Wei | 10.0 | 12.0 |
|  |  | Yunjie Zhu | 3.0 | 5.0 |
| *Osteolaemus tetraspis* | European Union | Dominika Kňazovická | 8.0 | 20.0 |
| *Ostorhinchus fasciatus* | South-western coasts of Anatolia | Halit Filiz | 12.5 | 18.5 |
| *Oxynoemacheilus theophilii* | Lake Marmara | Ali İlhan | −13.0 | −13.0 |
|  |  | Hasan M. Sarı | −14.0 | −26.0 |
| *Oxyurichthys petersii* | South-western coasts of Anatolia | Gökçen Bilge | −12.0 | −6.0 |
| *Pachygrapsus marmoratus* | Mediterranean Sea | Gianluca Stasolla | 8.0 | 6.0 |
| *Pacifastacus leniusculus* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 28.5 | 38.5 |
|  | Greece | Costas Perdikaris | 41.0 | 41.0 |
|  | Hungary | András Weiperth | 43.0 | 55.0 |
|  | Norway | Lennart Edsman, Martin Malmstrøm | 41.0 | 49.0 |
| *Padogobius bonelli* | Umbria | Laura Pompei, Massimo Lorenzoni | 22.0 | 22.0 |
| *Padogobius nigricans* | Central Italy | Laura Pompei, Massimo Lorenzoni | 3.0 | −5.0 |
| *Palaemon macrodactylus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 19.0 | 11.0 |
|  | Mediterranean Sea | Gianluca Stasolla | 31.0 | 41.0 |
| *Paleosuchus palpebrosus* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 19.0 | 23.0 |
|  | European Union | Dominika Kňazovická | 13.0 | 23.0 |
| *Paleosuchus trigonatus* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 26.0 | 32.0 |
| *Pangasianodon hypophthalmus* | India | Vettath R. Suresh | 33.0 | 41.0 |
|  | Peninsular Malaysia | Abdulwakil O. Saba, M. N. Amal Azmai | 17.0 | 23.0 |
|  | Turkey | Baran Yoğurtçuoğlu | 25.0 | 23.0 |
|  |  | F. Güler Ekmekçi | 30.0 | 42.0 |
|  |  | Nildeniz Top-Karakuş | 12.0 | 16.0 |
| *Pangasius sanitwongsei* | Turkey | Baran Yoğurtçuoğlu | 13.0 | 11.0 |
|  |  | F. Güler Ekmekçi | 10.0 | 22.0 |
| *Paracaridina zijinica* | Norway | Charlotte Evangelista | −1.0 | 5.0 |
| *Paracerceis sculpta* | Port of Leghorn | Jonathan Tempesti | 15.0 | 19.0 |
| *Parachaetodon ocellatus* | Coastal waters of South Korea | Umut Uyan | −5.0 | 1.0 |
| *Paracheirodon axelrodi* | Chao Phraya River Basin | Matura Nimtim | 5.0 | 5.0 |
|  |  | Punyanuch Daengchana | 13.0 | 15.0 |
|  |  | Ratcha Chaichana | 0.0 | 0.0 |
|  | Lower Pearl River Basin | Fei Liu | 10.0 | 22.0 |
|  |  | Hui Wei | 10.0 | 12.0 |
|  |  | Yunjie Zhu | 13.0 | 25.0 |
| *Paracheirodon innesi* | Chao Phraya River Basin | Matura Nimtim | 4.0 | 2.0 |
|  |  | Punyanuch Daengchana | 3.0 | −5.0 |
|  |  | Ratcha Chaichana | −11.0 | −9.0 |
|  | Lower Pearl River Basin | Fei Liu | 9.0 | 19.0 |
|  |  | Hui Wei | 9.0 | 13.0 |
|  |  | Yunjie Zhu | 9.0 | 21.0 |
| *Parachondrostoma toxostoma* | England | Sebastian Kozic | 0.0 | 2.0 |
| *Parachromis managuensis* | Chao Phraya River Basin | Matura Nimtim | 7.0 | 13.0 |
|  |  | Punyanuch Daengchana | 28.0 | 28.0 |
|  |  | Ratcha Chaichana | 22.0 | 34.0 |
|  | Lower Pearl River Basin | Fei Liu | 28.0 | 40.0 |
|  |  | Hui Wei | 27.0 | 39.0 |
|  |  | Yunjie Zhu | 46.0 | 58.0 |
| *Paracytaeis octona* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Paralichthys dentatus* | Coastal waters of South Korea | Umut Uyan | 6.0 | 2.0 |
| *Paralichthys lethostigma* | Coastal waters of South Korea | Umut Uyan | 8.0 | 4.0 |
| *Paralithodes camtschaticus* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 24.0 | 34.0 |
|  | Mediterranean Sea | Gianluca Stasolla | 23.0 | 11.0 |
| *Parambassis apogonoides* | Singapore | Shayne S. B. Yeo | −4.0 | −2.0 |
| *Parambassis ranga* | Singapore | Shayne S. B. Yeo | 3.0 | 5.0 |
| *Paramisgurnus dabryanus* | Northern Kyushu Island | Norio Onikura | 26.0 | 30.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 28.0 | 36.0 |
| *Paramysis lacustris* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 4.5 | 4.5 |
| *Paraphyllina ransoni* | Mediterranean Sea | Nurçin Killi | 1.5 | 1.5 |
| *Parapterois heterura* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 0.0 | −2.0 |
|  |  | Quenton M. Tuckett | 4.0 | −2.0 |
|  |  | Timothy J. Lyons | 4.0 | 0.0 |
| *Parasesarma eumolpe* | Norway | Gaute Velle | 12.0 | 16.0 |
| *Parathelphusa bogorensis* | Norway | Gaute Velle | 11.0 | 13.0 |
| *Parathelphusa pantherina* | Norway | Gaute Velle | 3.0 | 7.0 |
| *Parathelphusa* spp. | Norway | Gaute Velle | 10.0 | 14.0 |
| *Paratya compressa* | Norway | Charlotte Evangelista | 9.0 | 15.0 |
| *Parupeneus forsskali* | South-western coasts of Anatolia | Gökçen Bilge | 3.0 | 9.0 |
| *Pelagia noctiluca* | Mediterranean Sea | Nurçin Killi | 24.0 | 24.0 |
| *Pelates quadrilineatus* | South-western coasts of Anatolia | Sercan Yapıcı | 18.0 | 24.0 |
| *Pelodiscus sinensis* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 27.0 | 39.0 |
|  | Iran | Elnaz Najafi-Majd, Ali T. Qashqaei | 33.0 | 45.0 |
| *Pelophylax kurtmuelleri* | Central and southern Europe | Adriana Bellati | 41.5 | 53.5 |
| *Pelophylax saharicus* | Continental Europe | Oldřich Kopecký | 26.0 | 32.0 |
| *Pempheris rhomboidea* | South-western coasts of Anatolia | Gökçen Bilge | 8.0 | 14.0 |
| *Penaeus japonicus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 24.0 | 20.0 |
|  | Mediterranean Sea | Gianluca Stasolla | 29.0 | 41.0 |
| *Penaeus kerathurus* | Mediterranean Sea | Gianluca Stasolla | 1.0 | −5.0 |
| *Penaeus monodon* | Coastal waters of Grenada, Saint Vincent and the Grenadines | Gordon H. Copp | 47.0 | 47.0 |
| *Penaeus vannamei* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 30.0 | 24.0 |
|  | Coastal waters of the Gulf of Thailand | Wansuk Senanan | 15.0 | 19.0 |
|  | Vietnam | Thuyet D. Bui | 12.0 | 14.0 |
| *Perca flavescens* | England | Sebastian Kozic | 31.0 | 33.0 |
| *Perca fluviatilis* | Croatia | Tena Radočaj | 16.0 | 16.0 |
|  | Lake Marmara | Ali İlhan | 2.0 | 2.0 |
|  |  | Hasan M. Sarı | 31.0 | 31.0 |
|  | River Neretva Basin | Branko Glamuzina | 13.0 | 23.0 |
|  |  | Pero Tutman | 15.5 | 15.5 |
|  | Slovenia | Ivan Špelić | 23.0 | 29.0 |
| *Perccottus glenii* | Anzali Wetland Complex | Hossein Rahmani | 24.0 | 36.0 |
|  |  | Seyed Daryoush Moghaddas | 27.0 | 39.0 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 24.0 | 24.0 |
|  | Central Europe | Kristína Žitňanová, Katarína Jakubčinová | 31.5 | 39.5 |
|  | Croatia | Tena Radočaj | 37.0 | 47.0 |
|  | Danube River Delta | Ion Năvodaru, Aurel Năstase | 9.5 | 15.5 |
|  | England | Sebastian Kozic | 25.0 | 31.0 |
|  | Poland | Joanna Grabowska | 33.0 | 33.0 |
|  | River Ob Basin | Elena Interesova | 41.0 | 53.0 |
|  | Slovenia | Ivan Špelić | 34.0 | 46.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 41.0 | 45.0 |
|  | Turkey | Ali Serhan Tarkan | 28.0 | 40.0 |
| *Percnon gibbesi* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 6.0 | 0.0 |
|  | Mediterranean Sea | Gianluca Stasolla | 19.0 | 25.0 |
|  | Norway | Gaute Velle | 21.0 | 31.0 |
| *Periphylla periphylla* | Mediterranean Sea | Nurçin Killi | 8.0 | 8.0 |
| *Perisesarma* spp. | Norway | Gaute Velle | 12.0 | 16.0 |
| *Peristedion cataphractum* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 2.0 | 6.0 |
| *Perna perna* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 23.0 | 29.0 |
| *Perna viridis* | Coastal waters of Grenada, Saint Vincent and the Grenadines | Phil I. Davison | 45.0 | 45.0 |
| *Perophora japonica* | Madeira Island | Francesca Gizzi | 14.0 | 16.0 |
| *Pethia gelius* | Chao Phraya River Basin | Matura Nimtim | 7.0 | 11.0 |
|  |  | Punyanuch Daengchana | 12.0 | 14.0 |
|  |  | Ratcha Chaichana | 11.0 | 17.0 |
|  | Lower Pearl River Basin | Fei Liu | 4.0 | 16.0 |
|  |  | Hui Wei | 2.0 | 4.0 |
|  |  | Yunjie Zhu | 5.0 | 11.0 |
| *Petricolaria pholadiformis* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 14.0 | 6.0 |
| *Petroleuciscus smyrnaeus* | Lake Marmara | Ali İlhan | −13.0 | −13.0 |
|  |  | Hasan M. Sarı | −10.0 | −18.0 |
| *Phoxinus kumgangensis* | Gangneungnamdae Stream Basin | Jeong-Eun Kim | −1.5 | −7.5 |
| *Phrynomantis bifasciatus* | Continental Europe | Oldřich Kopecký | 6.0 | 12.0 |
| *Phyllorhiza punctata* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 31.0 | 23.0 |
|  | Coastal waters of Grenada, Saint Vincent and the Grenadines | Gordon H. Copp | 49.0 | 51.0 |
|  | Mediterranean Sea | Nurçin Killi | 25.0 | 27.0 |
| *Physalia physalis* | Mediterranean Sea | Nurçin Killi | 12.0 | 12.0 |
| *Physella acuta* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 12.0 | 18.0 |
|  | Southern Ticino River | Daniele Paganelli | 17.0 | 25.0 |
| *Piaractus brachypomus* | Croatia | Tena Radočaj | 17.0 | 17.0 |
|  | East India | Vettath R. Suresh | 18.5 | 20.5 |
|  | Slovenia | Ivan Špelić | 6.0 | 6.0 |
|  | Vietnam | Kieu Anh T. Ta | 9.5 | −2.5 |
| *Pileolaria berkeleyana* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 3.0 | 3.0 |
| *Pimephales promelas* | Central Europe | Barbora Števove, Kristína Slovák Švolíková | 30.0 | 40.0 |
|  | England | Sebastian Kozic | 11.5 | 19.5 |
|  | Turkey | Nildeniz Top-Karakuş | 42.0 | 52.0 |
| *Planiliza haematocheila* | Turkey | Ali Serhan Tarkan | 25.0 | 33.0 |
| *Platorchestia platensis* | Arabian/Persian Gulf and Sea of Oman | Louisa Wood | 31.5 | 37.5 |
| *Pleurodeles waltl* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 43.0 | 55.0 |
| *Podocorynoides minima* | Mediterranean Sea | Nurçin Killi | −4.0 | −4.0 |
| *Poecilia latipinna* | Anzali Wetland Complex | Hossein Rahmani | 9.5 | 15.5 |
|  |  | Seyed Daryoush Moghaddas | 17.0 | 23.0 |
|  | Arabian/Persian Gulf and Sea of Oman | Gordon H. Copp | 31.0 | 33.0 |
|  | Chao Phraya River Basin | Matura Nimtim | 18.5 | 28.5 |
|  |  | Punyanuch Daengchana | 16.0 | 18.0 |
|  |  | Ratcha Chaichana | 26.0 | 36.0 |
|  | Lower Pearl River Basin | Fei Liu | 24.0 | 36.0 |
|  |  | Hui Wei | 34.0 | 34.0 |
|  |  | Yunjie Zhu | 42.0 | 54.0 |
|  | Singapore | Joleen Chan | 8.0 | 10.0 |
| *Poecilia reticulata* | Chao Phraya River Basin | Matura Nimtim | 25.0 | 35.0 |
|  |  | Punyanuch Daengchana | 24.0 | 26.0 |
|  |  | Ratcha Chaichana | 20.0 | 32.0 |
|  | Conterminous United States | Jeffrey E. Hill | 11.5 | 13.5 |
|  | Croatia | Tena Radočaj | 17.0 | 17.0 |
|  | Kerala | Smrithy Raj, Biju Kumar | 31.5 | 43.5 |
|  | Lower Pearl River Basin | Fei Liu | 43.0 | 55.0 |
|  |  | Hui Wei | 39.0 | 51.0 |
|  |  | Yunjie Zhu | 42.0 | 54.0 |
|  | Northern Kyushu Island | Norio Onikura | 11.0 | 19.0 |
|  | Peninsular Malaysia | Abdulwakil O. Saba, M. N. Amal Azmai | 19.0 | 19.0 |
|  | Slovenia | Ivan Špelić | 16.0 | 16.0 |
| *Poecilia velifera* | Chao Phraya River Basin | Matura Nimtim | 5.5 | 7.5 |
|  |  | Punyanuch Daengchana | 13.5 | 11.5 |
|  |  | Ratcha Chaichana | 8.0 | 20.0 |
|  | Lower Pearl River Basin | Fei Liu | 13.0 | 25.0 |
|  |  | Hui Wei | 15.0 | 21.0 |
|  |  | Yunjie Zhu | 16.0 | 28.0 |
| *Polyandrocarpa zorritensis* | Arabian/Persian Gulf and Sea of Oman | Michał Skóra | 21.5 | 17.5 |
| *Polyclinum aurantium* | Madeira Island | Francesca Gizzi | 17.0 | 19.0 |
| *Polyclinum constellatum* | Arabian/Persian Gulf and Sea of Oman | Louisa Wood | 34.5 | 34.5 |
| *Polyodon spathula* | Croatia | Tena Radočaj | 13.0 | 13.0 |
|  | England | Sebastian Kozic | 17.0 | 21.0 |
|  | Slovenia | Ivan Špelić | −1.0 | −1.0 |
|  | Southern Europe | Marina Piria | 5.5 | 11.5 |
| *Pomacanthus maculosus* | Coastal waters of South Korea | Umut Uyan | −5.0 | −1.0 |
| *Pomacea canaliculata* | Northern Kyushu Island | Yoshihisa Kurita | 40.5 | 50.5 |
|  | Southern Europe | Elena Tricarico | 42.0 | 54.0 |
|  | Thailand | Kamalaporn Kanongdate | 55.0 | 61.0 |
|  | Vietnam | Kieu Anh T. Ta | 41.0 | 41.0 |
| *Pomacea diffusa* | Vietnam | Kieu Anh T. Ta | 8.0 | 8.0 |
| *Pomadasys stridens* | South-western coasts of Anatolia | Gökçen Bilge | 3.0 | 9.0 |
| *Pomoxis annularis* | Turkey | Nildeniz Top-Karakuş | 21.0 | 33.0 |
| *Pomoxis nigromaculatus* | Turkey | Nildeniz Top-Karakuş | 9.0 | 17.0 |
| *Pontastacus leptodactylus* | Georgia | Levan Mumladze | 36.0 | 42.0 |
|  | Greece | Costas Perdikaris | 32.0 | 36.0 |
|  | South Africa | Moleseng C. Moshobane | 28.0 | 28.0 |
| *Ponticola gorlap* | England | Sebastian Kozic | 17.5 | 25.5 |
| *Ponticola kessleri* | Croatia | Tena Radočaj | 30.0 | 40.0 |
|  | England | Sebastian Kozic | 25.0 | 33.0 |
|  | France | Laurence Masson | 30.5 | 38.5 |
|  | Slovenia | Ivan Špelić | 26.0 | 36.0 |
|  | Turkey | Ali Serhan Tarkan | 10.0 | 10.0 |
| *Pontogammarus robustoides* | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 24.0 | 34.0 |
|  | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 18.0 | 28.0 |
| *Potamocorbula amurensis* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 24.0 | 16.0 |
| *Potamogeton crispus* | Western iberia | Teresa Ferreira | 26.0 | 14.0 |
| *Potamogeton natans* | Western iberia | Teresa Ferreira | 6.0 | −6.0 |
| *Potamon fluviatile* | Norway | Gaute Velle | 4.0 | 10.0 |
| *Potamonautes lirrangensis* | Norway | Gaute Velle | 7.0 | 11.0 |
| *Potamopyrgus antipodarum* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 36.0 | 28.0 |
|  | Southern Ticino River | Daniele Paganelli | 26.0 | 34.0 |
| *Potamotrygon motoro* | Chao Phraya River Basin | Matura Nimtim | 7.0 | 7.0 |
|  |  | Punyanuch Daengchana | −4.0 | −4.0 |
|  |  | Ratcha Chaichana | 18.0 | 26.0 |
|  | Lower Pearl River Basin | Fei Liu | 15.5 | 27.5 |
|  |  | Hui Wei | 13.0 | 25.0 |
|  |  | Yunjie Zhu | 14.0 | 26.0 |
| *Procambarus alleni* | Norway | Lennart Edsman | 12.5 | 22.5 |
| *Procambarus braswelli* | Norway | Lennart Edsman | 9.0 | 19.0 |
| *Procambarus clarkii* | Hungary | András Weiperth | 53.0 | 65.0 |
|  | Norway | Lennart Edsman, Stein I. Johnsen | 17.5 | 27.5 |
|  | Southern Europe | Elena Tricarico | 55.0 | 67.0 |
|  | Southern Ticino River | Daniele Paganelli | 43.0 | 53.0 |
|  | Vietnam | Kieu Anh T. Ta | 39.0 | 39.0 |
| *Procambarus cubensis* | Norway | Lennart Edsman | 11.0 | 21.0 |
| *Procambarus llamasi* | Norway | Lennart Edsman | 9.0 | 19.0 |
| *Procambarus ouachitae* | Norway | Lennart Edsman | 10.0 | 20.0 |
| *Procambarus paeninsulanus* | Norway | Lennart Edsman | 9.0 | 19.0 |
| *Procambarus pubescens* | Norway | Lennart Edsman | 9.0 | 19.0 |
| *Procambarus spiculifer* | Norway | Lennart Edsman | 8.0 | 18.0 |
| *Procambarus vazquezae* | Norway | Lennart Edsman | 5.0 | 15.0 |
| *Procambarus versutus* | Norway | Lennart Edsman | 10.0 | 20.0 |
| *Procambarus virginalis* | Hungary | András Weiperth | 40.0 | 52.0 |
|  | Norway | Lennart Edsman | 34.0 | 44.0 |
|  |  | Lennart Edsman, Stein I. Johnsen | 28.0 | 32.0 |
|  | Papua New Guinea | Jiří Patoka | 33.5 | 23.5 |
| *Prochilodus lineatus* | Vietnam | Kieu Anh T. Ta | 5.0 | −7.0 |
| *Prognathodes aculeatus* | Coastal waters of South Korea | Umut Uyan | −6.0 | −2.0 |
| *Prognathodes aya* | Coastal waters of South Korea | Umut Uyan | −6.0 | −2.0 |
| *Prognathodes brasiliensis* | Coastal waters of South Korea | Umut Uyan | −6.0 | −2.0 |
| *Prognathodes dichrous* | Coastal waters of South Korea | Umut Uyan | −6.0 | −2.0 |
| *Prognathodes falcifer* | Coastal waters of South Korea | Umut Uyan | −10.0 | −6.0 |
| *Prognathodes guyotensis* | Coastal waters of South Korea | Umut Uyan | −6.0 | −6.0 |
| *Prorocentrum mexicanum* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 25.0 | 21.0 |
| *Prorocentrum micans* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 34.5 | 46.5 |
| *Proterorhinus marmoratus* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 29.5 | 17.5 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 10.5 | 10.5 |
|  | England | Sebastian Kozic | 18.0 | 18.0 |
| *Proterorhinus semilunaris* | Belarus | Helen S. Gajduchenko | 27.0 | 27.0 |
|  | France | Laurence Masson | 34.0 | 42.0 |
|  | Southern Finland | Riikka Puntila-Dodd | 13.0 | 13.0 |
|  | Turkey | Ali Serhan Tarkan | 10.0 | 10.0 |
| *Protochondrostoma genei* | England | Sebastian Kozic | 0.0 | 4.0 |
| *Prymnesium parvum* | Arabian/Persian Gulf and Sea of Oman | Jessica Elphinstone-Davis | 36.5 | 36.5 |
| *Pseudemys concinna concinna* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 28.0 | 36.0 |
| *Pseudocaranx dentex* | Coastal waters of South Korea | Umut Uyan | 7.0 | 13.0 |
|  | River Neretva Estuary | Luka Glamuzina | −11.0 | 1.0 |
|  |  | Pero Tutman | −2.0 | 0.0 |
| *Pseudodiaptomus ardjuna* | Arabian/Persian Gulf and Sea of Oman | Louisa Wood | 13.0 | 13.0 |
| *Pseudodiaptomus marinus* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 13.0 | 3.0 |
| *Pseudogobio esocinus* | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 10.0 | 6.0 |
| *Pseudo-nitzschia brasiliana* | Aegean Sea | Evangelia Smeti | 18.5 | 28.5 |
| *Pseudorasbora parva* | Anzali Wetland Complex | Hossein Rahmani | 18.5 | 30.5 |
|  |  | Seyed Daryoush Moghaddas | 22.5 | 34.5 |
|  | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 23.5 | 23.5 |
|  | Croatia | Tena Radočaj | 43.0 | 53.0 |
|  | England | Sebastian Kozic | 35.5 | 47.5 |
|  | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 26.5 | 32.5 |
|  | Greece | Leonidas Vardakas | 35.0 | 37.0 |
|  | Lake Marmara | Ali İlhan | 23.0 | 29.0 |
|  |  | Hasan M. Sarı | 40.0 | 46.0 |
|  | Republic of Macedonia | Milica Ristovska, Vasil Kostov | 46.0 | 46.0 |
|  | River Neretva Basin | Branko Glamuzina | 2.0 | 2.0 |
|  |  | Pero Tutman | 8.0 | 20.0 |
|  | River Ob Basin | Elena Interesova | 36.5 | 48.5 |
|  | Slovenia | Ivan Špelić | 44.0 | 54.0 |
|  | South Caucasus | Tatia Kuljanishvili | 32.0 | 44.0 |
|  | Turkey | Ali Serhan Tarkan | 40.0 | 52.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 35.0 | 39.0 |
| *Pseudosesarma moeschii* | Norway | Gaute Velle | 7.0 | 11.0 |
| *Pseudosesarma* spp. | Norway | Gaute Velle | 14.0 | 18.0 |
| *Pseudosuccinea columella* | South Africa | Moleseng C. Moshobane | 14.0 | 14.0 |
|  | Southern Ticino River | Daniele Paganelli | 36.0 | 44.0 |
| *Pteragogus pelycus* | South-western coasts of Anatolia | Gökçen Bilge | 2.0 | 8.0 |
| *Pterodoras granulosus* | Chao Phraya River Basin | Matura Nimtim | 9.0 | 13.0 |
|  |  | Punyanuch Daengchana | 24.0 | 24.0 |
|  |  | Ratcha Chaichana | 10.0 | 14.0 |
|  | Lower Pearl River Basin | Fei Liu | 15.0 | 27.0 |
|  |  | Hui Wei | 9.0 | 13.0 |
|  |  | Yunjie Zhu | 14.0 | 26.0 |
| *Pterois antennata* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 7.0 | 7.0 |
|  |  | Quenton M. Tuckett | 9.0 | 9.0 |
|  |  | Timothy J. Lyons | 9.0 | 9.0 |
| *Pterois lunulata* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 11.0 | 7.0 |
|  |  | Quenton M. Tuckett | 9.0 | 11.0 |
|  |  | Timothy J. Lyons | 12.0 | 8.0 |
| *Pterois miles* | Coastal waters of Grenada, Saint Vincent and the Grenadines | Phil I. Davison | 37.0 | 43.0 |
|  | Coastal waters of South Korea | Umut Uyan | 29.0 | 39.0 |
|  | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 35.0 | 39.0 |
|  |  | Quenton M. Tuckett | 32.0 | 36.0 |
|  |  | Timothy J. Lyons | 35.0 | 37.0 |
|  | Eastern Mediterranean Sea | Halit Filiz | 42.5 | 54.5 |
|  | South-western coasts of Anatolia | Halit Filiz | 45.5 | 57.5 |
| *Pterois mombasae* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 7.0 | 9.0 |
|  |  | Quenton M. Tuckett | 8.0 | 10.0 |
|  |  | Timothy J. Lyons | 7.0 | 7.0 |
| *Pterois radiata* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 7.0 | 7.0 |
|  |  | Quenton M. Tuckett | 12.0 | 14.0 |
|  |  | Timothy J. Lyons | 7.0 | 7.0 |
| *Pterois russelii* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 22.0 | 24.0 |
|  |  | Quenton M. Tuckett | 12.0 | 18.0 |
|  |  | Timothy J. Lyons | 19.0 | 19.0 |
| *Pterois sphex* | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 6.0 | 8.0 |
|  |  | Quenton M. Tuckett | 8.0 | 6.0 |
|  |  | Timothy J. Lyons | 5.0 | 5.0 |
| *Pterois volitans* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 32.0 | 26.0 |
|  | Coastal waters of Grenada, Saint Vincent and the Grenadines | Phil I. Davison | 36.0 | 42.0 |
|  | Coastal waters of Macaronesia | Ignacio Gestoso | 48.0 | 58.0 |
|  | Coastal waters of Mexico | Roberto Mendoza, Sergio Alberto Luna | 47.0 | 57.0 |
|  | Coastal waters of the British Isles | Phil I. Davison | 27.0 | 37.0 |
|  | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Allison L. Durland Donahou | 35.0 | 39.0 |
|  |  | Quenton M. Tuckett | 33.0 | 37.0 |
|  |  | Timothy J. Lyons | 34.0 | 36.0 |
| *Pterophyllum scalare* | Chao Phraya River Basin | Matura Nimtim | −1.5 | −1.5 |
|  |  | Punyanuch Daengchana | 5.0 | −3.0 |
|  |  | Ratcha Chaichana | −3.0 | −3.0 |
|  | Lower Pearl River Basin | Fei Liu | 8.0 | 20.0 |
|  |  | Hui Wei | 7.5 | 15.5 |
|  |  | Yunjie Zhu | 12.0 | 24.0 |
| *Pterygoplichthys disjunctivus* | East Kolkata Wetlands | Vettath R. Suresh | 44.5 | 56.5 |
|  | Lake Taal | Allan S. Gilles Jr, Elfritzson M. Peralta, Richard Thomas B. Pavia Jr | 39.0 | 39.0 |
|  | Turkey | Ali Serhan Tarkan | 37.0 | 49.0 |
| *Pterygoplichthys pardalis* | Chao Phraya River Basin | Matura Nimtim | 29.5 | 39.5 |
|  |  | Punyanuch Daengchana | 46.0 | 40.0 |
|  |  | Ratcha Chaichana | 43.0 | 53.0 |
|  | Indonesia | Jiří Patoka | 49.0 | 49.0 |
|  | Kerala | Smrithy Raj, Biju Kumar | 43.5 | 31.5 |
|  | Lake Taal | Allan S. Gilles Jr, Elfritzson M. Peralta, Richard Thomas B. Pavia Jr | 39.0 | 39.0 |
|  | Lower Pearl River Basin | Fei Liu | 44.0 | 56.0 |
|  |  | Hui Wei | 41.0 | 51.0 |
|  |  | Yunjie Zhu | 48.0 | 60.0 |
|  | Vietnam | Kieu Anh T. Ta | 38.0 | 38.0 |
| *Pterygoplichthys* spp. | Pearl River Basin | Hui Wei | 41.0 | 51.0 |
| *Pungitius platygaster* | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 4.5 | 6.5 |
|  | River Ob Basin | Elena Interesova | 6.5 | 12.5 |
| *Pungtungia herzi* | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 13.0 | 19.0 |
| *Puntigrus partipentazona* | Singapore | Joleen Chan | −3.0 | −1.0 |
| *Pygocentrus nattereri* | Turkey | Ali Serhan Tarkan | 19.5 | 19.5 |
|  | Vietnam | Kieu Anh T. Ta | 18.0 | 18.0 |
| *Pyrodinium bahamense* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 41.0 | 47.0 |
| *Pyura tessellata* | Madeira Island | Paola Parretti | 18.0 | 20.0 |
| *Rachycentron canadum* | South-western coasts of Anatolia | Gökçen Bilge | 28.0 | 38.0 |
|  | Tropical eastern Pacific | Gustavo A. Castellanos-Galindo, D. Ross Robertson | 20.0 | 26.0 |
| *Rangia cuneata* | Baltic Sea | Greta Srebaliene, Sergej Olenin | 1.0 | 5.0 |
| *Ranitomeya fantastica* | Continental Europe | Oldřich Kopecký | 3.0 | 9.0 |
| *Ranoidea caerulea* | Continental Europe | Oldřich Kopecký | 11.0 | 17.0 |
| *Ranunculus peltatus* | Western iberia | Teresa Ferreira | 4.0 | −8.0 |
| *Rapana venosa* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 40.0 | 32.0 |
|  | Coastal waters of Macaronesia | João Canning-Clode | 37.0 | 39.0 |
| *Rhacophorus nigropalmatus* | Continental Europe | Oldřich Kopecký | −2.0 | 4.0 |
| *Rhamdia quelen* | Chao Phraya River Basin | Matura Nimtim | 5.0 | 5.0 |
|  |  | Punyanuch Daengchana | 23.0 | 27.0 |
|  |  | Ratcha Chaichana | 14.0 | 24.0 |
|  | Lower Pearl River Basin | Fei Liu | 16.5 | 28.5 |
|  |  | Hui Wei | 19.0 | 25.0 |
|  |  | Yunjie Zhu | 15.0 | 27.0 |
| *Rhinella marina* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 48.5 | 60.5 |
|  | Continental Europe | Oldřich Kopecký | 20.5 | 28.5 |
|  | Vietnam | Kieu Anh T. Ta | 33.0 | 45.0 |
| *Rhinichthys atratulus* | England | Sebastian Kozic | 0.0 | 4.0 |
| *Rhinogobius brunneus* | Arabian/Persian Gulf and Sea of Oman | Gordon H. Copp | 12.5 | 12.5 |
| *Rhinogobius cliffordpopei* | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 21.5 | 27.5 |
| *Rhinogobius giurinus* | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 21.5 | 27.5 |
| *Rhinogobius similis* | Anzali Wetland Complex | Hossein Rahmani | −2.5 | 9.5 |
|  |  | Seyed Daryoush Moghaddas | 10.5 | 16.5 |
| *Rhithropanopeus harrisii* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 27.0 | 21.0 |
|  | Mediterranean Sea | Gianluca Stasolla | 37.0 | 45.0 |
| *Rhodeus amarus* | Croatia | Tena Radočaj | 13.0 | 13.0 |
|  | England | Sebastian Kozic | 17.0 | 27.0 |
|  | Lake Marmara | Ali İlhan | −13.0 | −23.0 |
|  |  | Hasan M. Sarı | −13.0 | −21.0 |
|  | River Neretva Basin | Branko Glamuzina | −4.0 | −6.0 |
|  |  | Pero Tutman | −5.0 | −9.0 |
|  | Slovenia | Ivan Špelić | 16.0 | 16.0 |
| *Rhodeus ocellatus* | Anzali Wetland Complex | Hossein Rahmani | 7.5 | 19.5 |
|  |  | Seyed Daryoush Moghaddas | 13.5 | 17.5 |
|  | Northern Kyushu Island | Norio Onikura | 26.0 | 32.0 |
| *Rhopalophthalmus tattersallae* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 1.0 | −9.0 |
| *Rhopilema esculentum* | Mediterranean Sea | Nurçin Killi | 14.0 | 14.0 |
| *Rhopilema nomadica* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 29.0 | 29.0 |
|  | Eastern Mediterranean Sea | Konstantinos Tsiamis | 19.0 | 29.0 |
|  | Mediterranean Sea | Nurçin Killi | 19.0 | 23.0 |
| *Rhopilema verrilli* | Mediterranean Sea | Nurçin Killi | 3.0 | 3.0 |
| *Rocio octofasciata* | Singapore | Shayne S. B. Yeo | 35.0 | 37.0 |
| *Ruditapes philippinarum* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 26.5 | 22.5 |
|  | Celtic Sea | Philippe Goulletquer | 33.5 | 45.5 |
|  | Coastal waters of Portugal | Paula Chainho | 36.0 | 40.0 |
|  | Coastal waters of Sweden | Rahmat Naddafi | 31.5 | 43.5 |
|  | Coastal waters of the United Kingdom | Hannah J. Tidbury | 40.5 | 50.5 |
|  |  | Laurence Miossec, Gordon H. Copp | 42.5 | 52.5 |
|  | North Adriatic Sea | Agnese Marchini, Anna Occhipinti-Ambrogi | 40.0 | 36.0 |
|  | River Neretva Estuary | Luka Glamuzina | 18.0 | 20.0 |
|  |  | Pero Tutman | 15.0 | 15.0 |
|  | Strait of Georgia | Thomas W. Therriault | 18.0 | 18.0 |
| *Rutilus rutilus* | Croatia | Tena Radočaj | 18.0 | 18.0 |
|  | Great Britain | Jennifer A. Dodd | 24.0 | 28.0 |
|  | Slovenia | Ivan Špelić | 31.0 | 41.0 |
|  | Turkey | Ali Serhan Tarkan | 26.0 | 36.0 |
| *Salmo marmoratus* | England | Sebastian Kozic | 8.0 | 8.0 |
| *Salmo salar* | Coastal waters of South Korea | Umut Uyan | 13.0 | 3.0 |
|  | England | Sebastian Kozic | 21.0 | 19.0 |
|  | Turkey | Ali Serhan Tarkan | 6.5 | 0.5 |
| *Salmo trutta* | Croatia | Tena Radočaj | 28.0 | 22.0 |
|  | River Ob Basin | Elena Interesova | 35.0 | 27.0 |
|  | Serbia | Predrag Simonović | 28.0 | 30.0 |
|  | Slovenia | Ivan Špelić | 33.0 | 25.0 |
|  | South Africa | Jeffrey W. Hean | 17.0 | 9.0 |
|  |  | Olaf L. F. Weyl | 19.0 | 9.0 |
|  |  | Sean M. Marr | 17.0 | 17.0 |
| *Salvelinus alpinus alpinus* | Croatia | Tena Radočaj | 28.0 | 22.0 |
|  | Great Britain | Jennifer A. Dodd | 24.0 | 22.0 |
|  | River Neretva Basin | Branko Glamuzina | 6.5 | 0.5 |
|  |  | Pero Tutman | 1.0 | 3.0 |
|  | Slovenia | Ivan Špelić | 13.0 | 5.0 |
|  | Turkey | Ali Serhan Tarkan | 6.5 | 2.5 |
| *Salvelinus fontinalis* | Croatia | Tena Radočaj | 28.0 | 20.0 |
|  | England | Sebastian Kozic | 27.0 | 17.0 |
|  | Lake Marmara | Ali İlhan | 12.5 | 0.5 |
|  |  | Hasan M. Sarı | −0.5 | −12.5 |
|  | Poland | Michał Skóra | 24.0 | 12.0 |
|  | River Neretva Basin | Branko Glamuzina | 16.0 | 14.0 |
|  |  | Pero Tutman | 4.0 | 0.0 |
|  | River Ob Basin | Elena Interesova | 27.0 | 21.0 |
|  | Slovenia | Ivan Špelić | 26.0 | 22.0 |
|  | Turkey | Ali Serhan Tarkan | 7.5 | 7.5 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 35.0 | 37.0 |
| *Salvelinus fontinalis* × *Salvelinus alpinus alpinus* | United Kingdom | Gordon H. Copp | 24.0 | 12.0 |
| *Salvelinus namaycush* | Croatia | Tena Radočaj | 21.0 | 11.0 |
|  | England | Sebastian Kozic | 18.0 | 6.0 |
|  | River Ob Basin | Elena Interesova | 20.0 | 14.0 |
|  | Slovenia | Ivan Špelić | 22.0 | 14.0 |
| *Salvelinus umbla* | Croatia | Tena Radočaj | 9.0 | 5.0 |
|  | Slovenia | Ivan Špelić | 13.0 | 5.0 |
| *Sander lucioperca* | Croatia | Tena Radočaj | 29.5 | 33.5 |
|  | England | Sebastian Kozic | 26.0 | 28.0 |
|  | England and Wales | Emma T. Nolan | 13.0 | 17.0 |
|  | Lake Marmara | Ali İlhan | 16.0 | 16.0 |
|  |  | Hasan M. Sarı | 29.0 | 29.0 |
|  | River Neretva Basin | Branko Glamuzina | 31.0 | 39.0 |
|  |  | Pero Tutman | 33.0 | 31.0 |
|  | River Ob Basin | Elena Interesova | 28.0 | 36.0 |
|  | Slovenia | Ivan Špelić | 24.0 | 28.0 |
|  | Turkey | Ali Serhan Tarkan | 23.0 | 21.0 |
| *Sander volgensis* | Turkey | Nildeniz Top-Karakuş | 9.0 | 13.0 |
| *Sargassum fluitans* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 33.0 | 39.0 |
| *Sargassum muticum* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 33.5 | 23.5 |
| *Sargocentron rubrum* | Coastal waters of South Korea | Umut Uyan | 22.5 | 30.5 |
|  | South-western coasts of Anatolia | Gökçen Bilge | 27.0 | 37.0 |
| *Sarotherodon galilaeus* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 29.0 | 25.0 |
| *Sarotherodon melanotheron* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 47.0 | 57.0 |
|  | Coastal waters of South Korea | Umut Uyan | 18.0 | 26.0 |
| *Sartoriana spinigera* | Norway | Gaute Velle | 13.0 | 17.0 |
| *Saurida lessepsianus* | South-western coasts of Anatolia | Sercan Yapıcı | 34.0 | 36.0 |
| *Sayamia bangkokensis* | Norway | Gaute Velle | 15.0 | 19.0 |
| *Scardinius erythrophthalmus* | Croatia | Tena Radočaj | 30.5 | 34.5 |
|  | Great Britain | Jennifer A. Dodd | 22.5 | 24.5 |
|  | River Ob Basin | Elena Interesova | 44.0 | 44.0 |
|  | Slovenia | Ivan Špelić | 20.0 | 28.0 |
| *Schilbe mystus* | Croatia | Tena Radočaj | 9.0 | 9.0 |
|  | Slovenia | Ivan Špelić | 9.0 | 9.0 |
| *Schizoporella errata* | Arabian/Persian Gulf and Sea of Oman | Phil I. Davison | 31.0 | 33.0 |
| *Sciaenops ocellatus* | Arabian/Persian Gulf and Sea of Oman | Louisa Wood | 20.5 | 20.5 |
|  | Coastal waters of South Korea | Umut Uyan | 24.5 | 32.5 |
| *Scolionema suvaense* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Scomberomorus commerson* | South-western coasts of Anatolia | Sercan Yapıcı | 24.0 | 30.0 |
| *Scophthalmus maximus* | Coastal waters of South Korea | Umut Uyan | 8.0 | 4.0 |
| *Scyllarus pygmaeus* | Mediterranean Sea | Gianluca Stasolla | −5.0 | −9.0 |
| *Sesarmops intermedius* | Norway | Gaute Velle | 11.0 | 15.0 |
| *Siganus luridus* | Coastal waters of Albania | Rigers Bakiu | 22.0 | 28.0 |
|  | Mediterranean Sea | Nildeniz Top-Karakuş | 38.0 | 40.0 |
|  | South-western coasts of Anatolia | Sercan Yapıcı | 32.0 | 44.0 |
| *Siganus rivulatus* | Coastal waters of Albania | Rigers Bakiu | 19.0 | 25.0 |
|  | Coastal waters of South Korea | Umut Uyan | 23.0 | 31.0 |
|  | South-western coasts of Anatolia | Sercan Yapıcı | 32.0 | 44.0 |
| *Sillago suezensis* | South-western coasts of Anatolia | Sercan Yapıcı | 9.0 | 9.0 |
| *Silurus asotus* | Croatia | Tena Radočaj | 13.0 | 9.0 |
|  | Slovenia | Ivan Špelić | 16.0 | 20.0 |
|  | Yarlung Zangbo River Basin | Dekui He, Ruibin Yang, Shan Li | 22.0 | 28.0 |
| *Silurus glanis* | Croatia | Tena Radočaj | 45.0 | 55.0 |
|  | England | Sebastian Kozic | 34.0 | 42.0 |
|  | England and Wales | Emma T. Nolan | 22.0 | 30.0 |
|  | Lake Marmara | Ali İlhan | 4.0 | −2.0 |
|  |  | Hasan M. Sarı | 24.0 | 18.0 |
|  | River Neretva Basin | Branko Glamuzina | 15.0 | 27.0 |
|  |  | Pero Tutman | 14.5 | 24.5 |
|  | River Neretva Estuary | Branko Glamuzina | 38.0 | 44.0 |
|  |  | Pero Tutman | 21.0 | 21.0 |
|  | Slovenia | Ivan Špelić | 38.0 | 48.0 |
|  | Turkey | Nildeniz Top-Karakuş | 45.0 | 45.0 |
| *Silurus triostegus* | Turkey | Nildeniz Top-Karakuş | 17.0 | 21.0 |
| *Sinanodonta woodiana* | Romania | Cristina Preda | 45.0 | 57.0 |
| *Solea senegalensis* | Coastal waters of South Korea | Umut Uyan | 5.0 | 11.0 |
| *Solea solea* | Coastal waters of South Korea | Umut Uyan | 4.0 | 10.0 |
| *Solmundella bitentaculata* | Mediterranean Sea | Nurçin Killi | 6.0 | 6.0 |
| *Sparus aurata* | Arabian/Persian Gulf and Sea of Oman | Gordon H. Copp | 41.0 | 39.0 |
|  | Coastal waters of South Korea | Umut Uyan | 10.0 | 18.0 |
|  | Madeira Island | Francesca Gizzi | 29.0 | 35.0 |
| *Sphyraena chrysotaenia* | South-western coasts of Anatolia | Sercan Yapıcı | 19.0 | 31.0 |
| *Sphyraena flavicauda* | South-western coasts of Anatolia | Sercan Yapıcı | 17.0 | 29.0 |
| *Squalidus gracilis* | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 14.0 | 20.0 |
| *Squalius cephalus* | Croatia | Tena Radočaj | 18.0 | 18.0 |
|  | Great Britain | Jennifer A. Dodd | 25.5 | 29.5 |
|  | River Ob Basin | Elena Interesova | 26.0 | 26.0 |
|  | Slovenia | Ivan Špelić | 27.0 | 27.0 |
| *Squalius fellowesii* | Lake Marmara | Ali İlhan | −7.0 | −7.0 |
|  |  | Hasan M. Sarı | −5.0 | −13.0 |
| *Stenophysa marmorata* | South Africa | Moleseng C. Moshobane | 0.5 | 0.5 |
| *Stephanolepis diaspros* | South-western coasts of Anatolia | Gökçen Bilge | 1.0 | 7.0 |
| *Sternotherus odoratus* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 40.0 | 52.0 |
| *Stomolophus meleagris* | Mediterranean Sea | Nurçin Killi | 11.0 | 11.0 |
| *Stuckenia pectinata* | Western iberia | Teresa Ferreira | 23.0 | 11.0 |
| *Styela canopus* | Coastal waters of Grenada, Saint Vincent and the Grenadines | Gordon H. Copp | 34.0 | 42.0 |
| *Styela clava* | Arabian/Persian Gulf and Sea of Oman | Michał Skóra | 28.5 | 16.5 |
|  | Coastal waters of the Hudson Complex | Jésica Goldsmit, Kimberly L. Howland | 38.0 | 48.0 |
| *Styela plicata* | Arabian/Persian Gulf and Sea of Oman | Michał Skóra | 33.5 | 29.5 |
| *Sugiura chengshanense* | Mediterranean Sea | Nurçin Killi | −1.0 | −1.0 |
| *Symphysodon aequifasciatus* | Singapore | Shayne S. B. Yeo | −1.0 | 1.0 |
| *Symphysodon discus* | Chao Phraya River Basin | Matura Nimtim | 4.5 | 6.5 |
|  |  | Punyanuch Daengchana | 14.0 | 20.0 |
|  |  | Ratcha Chaichana | −2.0 | −2.0 |
|  | Lower Pearl River Basin | Fei Liu | 9.0 | 21.0 |
|  |  | Hui Wei | 2.0 | 10.0 |
|  |  | Yunjie Zhu | 2.0 | 14.0 |
| *Symplegma brakenhielmi* | Arabian/Persian Gulf and Sea of Oman | Louisa Wood | 31.0 | 31.0 |
| *Syngnathus abaster* | Belarus | Lizaveta Vintsek, Viktor Rizevsky | 4.5 | 6.5 |
|  | South Caucasus | Tatia Kuljanishvili | 9.0 | 5.0 |
| *Synodontis eupterus* | River Neretva Estuary | Luka Glamuzina | 0.0 | 8.0 |
|  |  | Pero Tutman | −5.0 | −11.0 |
| *Syntripsa matannensis* | Norway | Gaute Velle | 2.0 | 6.0 |
| *Taractichthys longipinnis* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 6.0 | 6.0 |
| *Telestes souffia* | England | Sebastian Kozic | −8.0 | −12.0 |
| *Tenuipedium palaemonoides* | Norway | Charlotte Evangelista | 6.0 | 12.0 |
| *Tetrorchis erythrogaster* | Mediterranean Sea | Nurçin Killi | 4.0 | 4.0 |
| *Thamnophis sirtalis* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 24.0 | 34.0 |
| *Threskiornis aethiopicus* | United Kingdom | Phil I. Davison | 24.0 | 32.0 |
| *Thymallus thymallus* | Croatia | Tena Radočaj | 13.0 | 3.0 |
|  | Great Britain | Jennifer A. Dodd | 4.5 | 8.5 |
|  | River Neretva Basin | Branko Glamuzina | −4.5 | −12.5 |
|  |  | Pero Tutman | 0.5 | −11.5 |
|  | Slovenia | Ivan Špelić | 21.0 | 17.0 |
| *Tilapia mariae* | Arabian/Persian Gulf and Sea of Oman | Laura Lee | 18.0 | 6.0 |
| *Tinca tinca* | Croatia | Tena Radočaj | 32.0 | 36.0 |
|  | Great Britain | Jennifer A. Dodd | 30.5 | 32.5 |
|  | Lake Marmara | Ali İlhan | −5.0 | −5.0 |
|  |  | Hasan M. Sarı | 16.0 | 16.0 |
|  | River Neretva Basin | Branko Glamuzina | 15.0 | 19.0 |
|  |  | Pero Tutman | 12.0 | 16.0 |
|  | Slovenia | Ivan Špelić | 24.0 | 28.0 |
|  | Turkey | Ali Serhan Tarkan | 24.0 | 34.0 |
| *Tintinnopsis ampla* | Arabian/Persian Gulf and Sea of Oman | Rogan Harmer | 25.0 | 37.0 |
| *Torquigener flavimaculosus* | South-western coasts of Anatolia | Sercan Yapıcı | 31.0 | 43.0 |
| *Trachemys scripta elegans* | Anzali Wetland Complex | Seyed Daryoush Moghaddas | 31.0 | 43.0 |
|  | Carpathian Basin | András Weiperth | 39.0 | 43.0 |
|  | Hungary | András Weiperth | 39.0 | 43.0 |
|  | Northern Iran | Elnaz Najafi-Majd, Ali T. Qashqaei | 12.0 | 24.0 |
|  | Poland | Dariusz Pietraszewski | 22.5 | 34.5 |
|  | Turkey | Şerife Gülsün Kırankaya | 35.0 | 47.0 |
|  | Vietnam | Kieu Anh T. Ta | 33.0 | 33.0 |
| *Trachemys scripta scripta* | Carpathian Basin | András Weiperth | 39.0 | 43.0 |
|  | Hungary | András Weiperth | 39.0 | 43.0 |
| *Trachemys scripta troostii* | North and central Italy | Daniele Pellitteri-Rosa | 40.0 | 42.0 |
| *Trachurus indicus* | South-western coasts of Anatolia | Halit Filiz | 2.0 | 4.0 |
| *Trachycephalus resinifictrix* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 17.0 | 27.0 |
| *Trachysalambria curvirostris* | Mediterranean Sea | Gianluca Stasolla | 18.0 | 22.0 |
| *Tricellaria inopinata* | Arabian/Persian Gulf and Sea of Oman | Gemma Fenwick | 23.5 | 23.5 |
| *Trichogaster lalius* | Chao Phraya River Basin | Matura Nimtim | 0.5 | 4.5 |
|  |  | Punyanuch Daengchana | 16.0 | 16.0 |
|  |  | Ratcha Chaichana | 9.0 | 13.0 |
|  | Lower Pearl River Basin | Fei Liu | 7.0 | 19.0 |
|  |  | Hui Wei | 15.0 | 15.0 |
|  |  | Yunjie Zhu | 17.0 | 29.0 |
| *Trichogaster trichopterus* | Chao Phraya River Basin | Matura Nimtim | 7.0 | 7.0 |
| *Trichopodus leerii* | Chao Phraya River Basin | Matura Nimtim | 4.0 | 4.0 |
|  | Singapore | Shayne S. B. Yeo | 14.0 | 16.0 |
| *Trichopodus microlepis* | Singapore | Joleen Chan | −3.0 | −1.0 |
| *Trichopodus pectoralis* | Singapore | Joleen Chan | 6.0 | 8.0 |
| *Trichopsis pumila* | Singapore | Shayne S. B. Yeo | 1.0 | 3.0 |
| *Trichromis salvini* | Singapore | Shayne S. B. Yeo | 7.0 | 9.0 |
| *Trichydra pudica* | Mediterranean Sea | Nurçin Killi | 5.0 | 5.0 |
| *Trinchesia albocrusta* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 6.0 | −4.0 |
| *Tubastraea coccinea* | Coastal waters of Grenada, Saint Vincent and the Grenadines | Phil I. Davison | 42.0 | 44.0 |
| *Tubastraea tagusensis* | Arabian/Persian Gulf and Sea of Oman | Phil I. Davison | 29.0 | 29.0 |
| *Turcogammarus aralensis* | Dnieper, Neman and Pripyat River Basins | Vitaliy Semenchenko, Tatsiana Lipinskaya | 7.5 | 9.5 |
| *Tylototriton shanjing* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 9.0 | 11.0 |
| *Tylototriton verrucosus* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 9.0 | 11.0 |
| *Ulva australis* | Arabian/Persian Gulf and Sea of Oman | Jessica Elphinstone-Davis | 26.5 | 26.5 |
| *Ulva ohnoi* | Arabian/Persian Gulf and Sea of Oman | Jessica Elphinstone-Davis | 24.5 | 24.5 |
| *Umbra krameri* | England | Sebastian Kozic | 0.0 | 0.0 |
| *Umbra pygmaea* | Croatia | Tena Radočaj | 24.0 | 24.0 |
|  | England | Sebastian Kozic | 19.0 | 21.0 |
|  | Slovenia | Ivan Špelić | 20.0 | 20.0 |
|  | Turkey | Nildeniz Top-Karakuş | 19.0 | 23.0 |
| *Undaria pinnatifida* | Arabian/Persian Gulf and Sea of Oman | Stacey A. Clarke | 37.0 | 33.0 |
|  | Coastal waters of the United Kingdom | Hannah J. Tidbury | 20.0 | 14.0 |
| *Upeneus moluccensis* | South-western coasts of Anatolia | Gökçen Bilge | 22.0 | 30.0 |
| *Upeneus pori* | South-western coasts of Anatolia | Gökçen Bilge | 14.0 | 16.0 |
| *Utricularia australis* | Western iberia | Teresa Ferreira | −1.0 | −13.0 |
| *Vanderhorstia mertensi* | South-western coasts of Anatolia | Gökçen Bilge | 1.5 | 1.5 |
| *Verasper moseri* | Coastal waters of South Korea | Umut Uyan | 5.0 | −1.0 |
| *Vimba vimba* | England | Sebastian Kozic | 20.0 | 22.0 |
|  | Lake Marmara | Ali İlhan | −9.0 | −9.0 |
|  |  | Hasan M. Sarı | −11.0 | −19.0 |
| *Watersipora subtorquata* | Arabian/Persian Gulf and Sea of Oman | Gemma Fenwick | 29.0 | 29.0 |
| *Womersleyella setacea* | Mediterranean Sea | Konstantinos Tsiamis | 19.0 | 9.0 |
| *Xantho poressa* | Mediterranean Sea | Gianluca Stasolla | −2.0 | −4.0 |
| *Xenopus laevis* | Carpathian Basin | Bettina Szajbert, Gábor Herczeg | 43.0 | 53.0 |
|  | Florida | Jeffrey E. Hill | 9.5 | −0.5 |
| *Xiphocaris elongata* | Norway | Charlotte Evangelista | 11.0 | 17.0 |
| *Xiphophorus hellerii* | Chao Phraya River Basin | Matura Nimtim | 26.0 | 26.0 |
|  |  | Punyanuch Daengchana | 18.5 | 18.5 |
|  |  | Ratcha Chaichana | 14.0 | 24.0 |
|  | Croatia | Tena Radočaj | 10.0 | 10.0 |
|  | Lower Pearl River Basin | Fei Liu | 21.0 | 33.0 |
|  |  | Hui Wei | 25.0 | 31.0 |
|  |  | Yunjie Zhu | 27.0 | 39.0 |
|  | Slovenia | Ivan Špelić | 13.0 | 23.0 |
| *Xiphophorus maculatus* | Chao Phraya River Basin | Matura Nimtim | 18.5 | 20.5 |
|  |  | Punyanuch Daengchana | 18.5 | 18.5 |
|  |  | Ratcha Chaichana | 21.0 | 33.0 |
|  | Lower Pearl River Basin | Fei Liu | 21.0 | 33.0 |
|  |  | Hui Wei | 22.0 | 30.0 |
|  |  | Yunjie Zhu | 24.0 | 36.0 |
| *Zacco platypus* | England | Sebastian Kozic | −2.5 | 1.5 |
|  | Gangneungnamdae Stream Basin | Jeong-Eun Kim | 22.5 | 28.5 |
| *Zebrasoma flavescens* | Coastal waters of South Korea | Umut Uyan | −4.0 | 0.0 |
|  | Coastal waters of the Gulf of Mexico and Atlantic Ocean | Jeffrey E. Hill | −2.0 | 2.0 |

**Table S4** Species assigned to two different groups of aquatic organism depending on the risk assessment area’s habitat for which they were screened (see also Table S2).

|  |  |  |
| --- | --- | --- |
| **Species name** | **Group I** | **Group II** |
| *Acanthogobius flavimanus* | Freshwater fishes | Marine fishes |
| *Acipenser gueldenstaedtii* | Freshwater fishes | Marine fishes |
| *Anguilla anguilla* | Freshwater fishes | Marine fishes |
| *Belonesox belizanus* | Brackish fishes | Freshwater fishes |
| *Cercopagis pengoi* | Freshwater invertebrates | Marine invertebrates |
| *Chelon auratus* | Freshwater fishes | Marine fishes |
| *Chelon ramada* | Freshwater fishes | Marine fishes |
| *Cherax quadricarinatus* | Brackish invertebrates | Freshwater invertebrates |
| *Clupeonella cultriventris* | Brackish fishes | Freshwater fishes |
| *Coptodon zillii* | Brackish fishes | Freshwater fishes |
| *Gobiosoma bosc* | Brackish fishes | Freshwater fishes |
| *Lates calcarifer* | Brackish fishes | Marine fishes |
| *Morone americana* | Freshwater fishes | Marine fishes |
| *Odontesthes bonariensis* | Freshwater fishes | Marine fishes |
| *Oreochromis aureus* | Brackish fishes | Freshwater fishes |
| *Oreochromis mossambicus* | Brackish fishes | Freshwater fishes |
| *Oreochromis niloticus* | Brackish fishes | Freshwater fishes |
| *Penaeus vannamei* | Brackish invertebrates | Marine invertebrates |
| *Poecilia latipinna* | Brackish fishes | Freshwater fishes |
| *Pontogammarus robustoides* | Brackish invertebrates | Freshwater invertebrates |
| *Potamopyrgus antipodarum* | Freshwater invertebrates | Marine invertebrates |
| *Proterorhinus marmoratus* | Brackish fishes | Freshwater fishes |
| *Salmo salar* | Freshwater fishes | Marine fishes |
| *Syngnathus abaster* | Brackish fishes | Freshwater fishes |

**Table S5** Confidence level for the taxa screened (*n* = number of screenings) for all 55 questions (Total), for the 45 questions of the Basic Risk Assessment (BRA), and for the five questions of the Climate Change Assessment (CCA) of the AS-ISK.

| **Taxon name** | ***n*** | **Total** | **BRA** | **CCA** |
| --- | --- | --- | --- | --- |
| *Abbottina rivularis* | 3 | 3.08 | 3.14 | 2.56 |
| *Abramis brama* | 7 | 2.82 | 2.90 | 2.17 |
| *Abudefduf taurus* | 1 | 2.47 | 2.49 | 2.33 |
| *Acanthogobius flavimanus* | 3 | 2.98 | 3.01 | 2.72 |
| *Acanthopagrus latus* | 1 | 2.29 | 2.33 | 2.00 |
| *Acarichthys heckelii* | 1 | 2.96 | 3.18 | 1.17 |
| *Acartia (Acanthacartia) tonsa* | 2 | 2.19 | 2.29 | 1.42 |
| *Acentrogobius pflaumii* | 1 | 2.49 | 2.59 | 1.67 |
| *Acipenser baerii* | 5 | 3.02 | 3.08 | 2.53 |
| *Acipenser gueldenstaedtii* | 2 | 2.83 | 2.93 | 2.00 |
| *Acipenser nudiventris* | 1 | 2.67 | 2.76 | 2.00 |
| *Acipenser ruthenus* | 2 | 2.86 | 2.91 | 2.50 |
| *Acipenser schrenckii* | 2 | 1.83 | 1.90 | 1.25 |
| *Actumnus globulus* | 1 | 2.25 | 2.37 | 1.33 |
| *Aegla platensis* | 1 | 1.65 | 1.61 | 2.00 |
| *Aequorea conica* | 1 | 2.24 | 2.27 | 2.00 |
| *Aequorea globosa* | 1 | 2.36 | 2.41 | 2.00 |
| *Aequorea vitrina* | 1 | 2.24 | 2.27 | 2.00 |
| *Aglaura hemistoma* | 1 | 2.24 | 2.27 | 2.00 |
| *Aix galericulata* | 2 | 3.42 | 3.55 | 2.33 |
| *Alburnoides bipunctatus* | 1 | 3.07 | 3.14 | 2.50 |
| *Alburnus alburnus* | 7 | 2.50 | 2.55 | 2.07 |
| *Alburnus battalgilae* | 2 | 2.25 | 2.29 | 2.00 |
| *Alburnus chalcoides* | 1 | 2.71 | 2.78 | 2.17 |
| *Alepes djedaba* | 1 | 2.38 | 2.39 | 2.33 |
| *Alexandrium minutum* | 1 | 3.11 | 3.22 | 2.17 |
| *Alitta succinea* | 1 | 2.85 | 2.82 | 3.17 |
| *Alopochen aegyptiaca* | 2 | 2.62 | 2.66 | 2.25 |
| *Alpheus rapacida* | 1 | 2.64 | 2.61 | 2.83 |
| *Amatitlania nigrofasciata* | 8 | 2.71 | 2.75 | 2.38 |
| *Amatitlania sajica* | 1 | 2.24 | 2.27 | 2.00 |
| *Ambloplites rupestris* | 2 | 2.04 | 2.09 | 1.58 |
| *Ambystoma mexicanum* | 1 | 2.82 | 2.92 | 2.00 |
| *Ameiurus melas* | 8 | 3.09 | 3.16 | 2.50 |
| *Ameiurus nebulosus* | 10 | 3.00 | 3.06 | 2.52 |
| *Amphibalanus amphitrite* | 2 | 2.30 | 2.43 | 1.25 |
| *Amphibalanus eburneus* | 1 | 2.40 | 2.49 | 1.67 |
| *Amphibalanus improvisus* | 4 | 2.95 | 3.07 | 2.04 |
| *Amphibalanus subalbidus* | 1 | 2.65 | 2.69 | 2.33 |
| *Amphibalanus venustus* | 1 | 2.25 | 2.41 | 1.00 |
| *Amphilophus citrinellus* | 2 | 3.00 | 3.14 | 1.83 |
| *Amphiprion akallopisos* | 1 | 2.76 | 2.90 | 1.67 |
| *Amphiprion ephippium* | 1 | 2.78 | 2.92 | 1.67 |
| *Amphiprion sandaracinos* | 1 | 2.84 | 2.98 | 1.67 |
| *Amphiprion sebae* | 1 | 2.78 | 2.94 | 1.50 |
| *Amphogona pusilla* | 1 | 2.24 | 2.27 | 2.00 |
| *Anguilla anguilla* | 7 | 2.90 | 2.96 | 2.38 |
| *Anguilla rostrata* | 1 | 2.87 | 2.98 | 2.00 |
| *Apistogramma borellii* | 1 | 2.76 | 2.98 | 1.00 |
| *Apogon queketti* | 1 | 1.95 | 2.04 | 1.17 |
| *Apogon smithi* | 1 | 2.33 | 2.27 | 2.83 |
| *Apogonichthyoides pharaonis* | 1 | 1.98 | 2.10 | 1.00 |
| *Arachnochium kulsiense* | 1 | 2.69 | 2.90 | 1.00 |
| *Arachnochium mirabile* | 1 | 2.64 | 2.84 | 1.00 |
| *Arctapodema australis* | 1 | 2.24 | 2.27 | 2.00 |
| *Arcuatula senhousia* | 1 | 2.95 | 2.94 | 3.00 |
| *Argyrosomus regius* | 1 | 2.49 | 2.51 | 2.33 |
| *Aristeus antennatus* | 1 | 3.33 | 3.31 | 3.50 |
| *Ascidiella aspersa* | 1 | 3.15 | 3.16 | 3.00 |
| *Asterocarpa humilis* | 1 | 2.55 | 2.59 | 2.17 |
| *Astronotus ocellatus* | 9 | 2.76 | 2.84 | 2.11 |
| *Atherina boyeri* | 4 | 2.67 | 2.68 | 2.58 |
| *Atherinomorus forskalii* | 1 | 2.16 | 2.18 | 2.00 |
| *Atya gabonensis* | 1 | 2.71 | 2.92 | 1.00 |
| *Atyaephyra desmarestii* | 1 | 2.85 | 2.96 | 2.00 |
| *Atyoida pilipes* | 1 | 2.65 | 2.86 | 1.00 |
| *Atyopsis moluccensis* | 1 | 2.67 | 2.88 | 1.00 |
| *Australoheros facetus* | 1 | 1.51 | 1.57 | 1.00 |
| *Austrominius modestus* | 3 | 3.05 | 3.13 | 2.44 |
| *Azolla filiculoides* | 2 | 2.75 | 2.88 | 1.75 |
| *Babka gymnotrachelus* | 6 | 2.91 | 2.97 | 2.44 |
| *Ballerus ballerus* | 1 | 2.78 | 2.86 | 2.17 |
| *Ballerus sapa* | 1 | 2.22 | 2.29 | 1.67 |
| *Barbatula barbatula* | 2 | 2.55 | 2.59 | 2.25 |
| *Barbus barbus* | 1 | 2.42 | 2.49 | 1.83 |
| *Barbus pergamonensis* | 2 | 2.13 | 2.14 | 2.00 |
| *Belonesox belizanus* | 7 | 2.96 | 2.99 | 2.74 |
| *Benthophilus stellatus* | 1 | 3.04 | 2.94 | 3.83 |
| *Beroe ovata* | 1 | 2.85 | 2.84 | 3.00 |
| *Betta splendens* | 1 | 3.16 | 3.20 | 2.83 |
| *Blicca bjoerkna* | 1 | 2.71 | 2.82 | 1.83 |
| *Botrylloides niger* | 1 | 2.38 | 2.43 | 2.00 |
| *Botrylloides perspicuus* | 1 | 2.31 | 2.35 | 2.00 |
| *Botrylloides violaceus* | 2 | 2.59 | 2.69 | 1.75 |
| *Botryllus schlosseri* | 1 | 2.56 | 2.67 | 1.67 |
| *Brachidontes pharaonis* | 1 | 2.75 | 2.69 | 3.17 |
| *Bregmaceros nectabanus* | 1 | 2.33 | 2.31 | 2.50 |
| *Bugula neritina* | 1 | 2.96 | 3.06 | 2.17 |
| *Bugulina stolonifera* | 1 | 2.76 | 2.86 | 2.00 |
| *Cabomba caroliniana* | 1 | 2.71 | 2.92 | 1.00 |
| *Caiman crocodilus* | 1 | 2.35 | 2.39 | 2.00 |
| *Cairina moschata* | 1 | 2.40 | 2.45 | 2.00 |
| *Calappa granulata* | 1 | 3.35 | 3.27 | 4.00 |
| *Callichthys callichthys* | 6 | 2.58 | 2.63 | 2.17 |
| *Callinectes danae* | 1 | 3.13 | 3.08 | 3.50 |
| *Callinectes sapidus* | 3 | 3.32 | 3.35 | 3.00 |
| *Callionymus filamentosus* | 1 | 2.04 | 2.16 | 1.00 |
| *Cambarellus (Cambarellus) chapalanus* | 1 | 2.36 | 2.22 | 3.50 |
| *Cambarellus (Cambarellus) montezumae* | 1 | 2.36 | 2.22 | 3.50 |
| *Cambarellus (Cambarellus) patzcuarensis* | 1 | 2.53 | 2.41 | 3.50 |
| *Cambarellus (Pandicambarus) diminutus* | 1 | 2.38 | 2.24 | 3.50 |
| *Cambarellus (Pandicambarus) ninae* | 1 | 2.33 | 2.18 | 3.50 |
| *Cambarellus (Pandicambarus) puer* | 1 | 2.36 | 2.22 | 3.50 |
| *Cambarellus (Pandicambarus) schmitti* | 1 | 2.29 | 2.14 | 3.50 |
| *Cambarellus (Pandicambarus) shufeldtii* | 1 | 2.35 | 2.20 | 3.50 |
| *Cambarellus (Pandicambarus) texanus* | 1 | 2.33 | 2.18 | 3.50 |
| *Campanularia morgansi* | 1 | 2.29 | 2.33 | 2.00 |
| *Capoeta bergamae* | 2 | 2.08 | 2.09 | 2.00 |
| *Caprella mutica* | 1 | 2.82 | 2.86 | 2.50 |
| *Caprella scaura* | 2 | 2.73 | 2.87 | 1.58 |
| *Carassius auratus* | 15 | 3.01 | 3.05 | 2.67 |
| *Carassius carassius* | 5 | 2.80 | 2.84 | 2.47 |
| *Carassius cuvieri* | 2 | 1.75 | 1.81 | 1.33 |
| *Carassius gibelio* | 15 | 3.13 | 3.17 | 2.81 |
| *Carcinus maenas* | 2 | 2.76 | 2.80 | 2.50 |
| *Caridina babaulti* | 1 | 2.71 | 2.92 | 1.00 |
| *Caridina brachydactyla* | 1 | 2.78 | 3.00 | 1.00 |
| *Caridina breviata* | 1 | 2.73 | 2.94 | 1.00 |
| *Caridina brevicarpalis* | 1 | 2.73 | 2.94 | 1.00 |
| *Caridina caerulea* | 1 | 2.76 | 2.98 | 1.00 |
| *Caridina cantonensis* | 2 | 2.84 | 3.03 | 1.25 |
| *Caridina dennerli* | 1 | 2.78 | 3.00 | 1.00 |
| *Caridina gracilirostris* | 1 | 2.84 | 3.06 | 1.00 |
| *Caridina logemanni* | 1 | 2.67 | 2.88 | 1.00 |
| *Caridina mariae* | 1 | 2.67 | 2.88 | 1.00 |
| *Caridina multidentata* | 1 | 2.80 | 2.98 | 1.33 |
| *Caridina parvidentata* | 1 | 2.65 | 2.86 | 1.00 |
| *Caridina propinqua* | 1 | 2.73 | 2.94 | 1.00 |
| *Caridina richtersii* | 1 | 2.71 | 2.92 | 1.00 |
| *Caridina rubropunctata* | 1 | 2.69 | 2.90 | 1.00 |
| *Caridina serratirostris* | 1 | 2.85 | 3.08 | 1.00 |
| *Caridina simoni* | 1 | 2.71 | 2.92 | 1.00 |
| *Caridina spinata* | 1 | 2.80 | 3.02 | 1.00 |
| *Caridina woltereckae* | 1 | 2.82 | 3.04 | 1.00 |
| *Carijoa riisei* | 1 | 3.00 | 3.00 | 3.00 |
| *Carukia barnesi* | 1 | 2.36 | 2.41 | 2.00 |
| *Caspiobdella fadejewi* | 1 | 3.45 | 3.59 | 2.33 |
| *Cassiopea andromeda* | 2 | 2.85 | 2.92 | 2.25 |
| *Cassiopea xamachana* | 1 | 2.25 | 2.29 | 2.00 |
| *Catostomus commersonii* | 1 | 2.58 | 2.63 | 2.17 |
| *Caulerpa cylindracea* | 2 | 2.86 | 2.93 | 2.33 |
| *Caulerpa lamourouxii* | 1 | 2.60 | 2.65 | 2.17 |
| *Caulerpa taxifolia* | 2 | 2.29 | 2.43 | 1.17 |
| *Celtodoryx ciocalyptoides* | 1 | 2.62 | 2.82 | 1.00 |
| *Cephea cephea* | 1 | 2.31 | 2.35 | 2.00 |
| *Ceratophrys ornata* | 1 | 2.31 | 2.35 | 2.00 |
| *Ceratophyllum demersum* | 2 | 3.40 | 3.51 | 2.50 |
| *Cercopagis pengoi* | 2 | 3.10 | 3.05 | 3.50 |
| *Ceylonthelphusa kandambyi* | 1 | 1.78 | 1.76 | 2.00 |
| *Chaetogammarus warpachowskyi* | 1 | 3.55 | 3.59 | 3.17 |
| *Champsodon nudivittis* | 1 | 2.20 | 2.22 | 2.00 |
| *Champsodon vorax* | 1 | 2.09 | 2.04 | 2.50 |
| *Channa argus* | 7 | 2.81 | 2.88 | 2.21 |
| *Channa micropeltes* | 3 | 2.28 | 2.35 | 1.72 |
| *Channa punctata* | 2 | 2.01 | 2.11 | 1.17 |
| *Charybdis (Charybdis) hellerii* | 2 | 2.33 | 2.33 | 2.33 |
| *Charybdis (Charybdis) japonica* | 1 | 2.58 | 2.61 | 2.33 |
| *Charybdis (Charybdis) longicollis* | 1 | 2.98 | 2.98 | 3.00 |
| *Charybdis (Charybdis) lucifera* | 1 | 2.76 | 2.78 | 2.67 |
| *Chelicorophium curvispinum* | 1 | 3.62 | 3.69 | 3.00 |
| *Chelicorophium mucronatum* | 1 | 3.51 | 3.53 | 3.33 |
| *Chelicorophium robustum* | 1 | 3.53 | 3.59 | 3.00 |
| *Chelmon marginalis* | 1 | 2.78 | 2.92 | 1.67 |
| *Chelmon muelleri* | 1 | 2.78 | 2.92 | 1.67 |
| *Chelmon rostratus* | 1 | 2.71 | 2.86 | 1.50 |
| *Chelmonops curiosus* | 1 | 2.78 | 2.92 | 1.67 |
| *Chelmonops truncatus* | 1 | 2.80 | 2.96 | 1.50 |
| *Chelodina longicollis* | 1 | 2.35 | 2.51 | 1.00 |
| *Chelon auratus* | 3 | 2.91 | 2.95 | 2.61 |
| *Chelon ramada* | 2 | 2.72 | 2.77 | 2.33 |
| *Chelon saliens* | 2 | 3.38 | 3.43 | 3.00 |
| *Chelus fimbriata* | 1 | 2.56 | 2.63 | 2.00 |
| *Chelydra serpentina* | 1 | 3.15 | 3.20 | 2.67 |
| *Cherax boesemani* | 1 | 1.93 | 1.88 | 2.33 |
| *Cherax communis* | 1 | 1.87 | 1.82 | 2.33 |
| *Cherax destructor* | 2 | 2.96 | 2.99 | 2.75 |
| *Cherax holthuisi* | 1 | 1.91 | 1.86 | 2.33 |
| *Cherax lorentzi* | 1 | 1.93 | 1.88 | 2.33 |
| *Cherax monticola* | 1 | 1.91 | 1.86 | 2.33 |
| *Cherax papuanus* | 1 | 1.89 | 1.84 | 2.33 |
| *Cherax peknyi* | 1 | 1.95 | 1.90 | 2.33 |
| *Cherax preissii* | 1 | 1.95 | 1.90 | 2.33 |
| *Cherax pulcher* | 1 | 1.89 | 1.84 | 2.33 |
| *Cherax quadricarinatus* | 5 | 2.72 | 2.78 | 2.27 |
| *Cherax snowden* | 1 | 1.89 | 1.84 | 2.33 |
| *Cherax tenuimanus* | 1 | 2.11 | 2.08 | 2.33 |
| *Chilomycterus reticulatus* | 1 | 2.49 | 2.47 | 2.67 |
| *Chionoecetes opilio* | 1 | 2.58 | 2.61 | 2.33 |
| *Chiromantes angolense* | 1 | 1.65 | 1.61 | 2.00 |
| *Chondrostoma holmwoodii* | 2 | 2.08 | 2.09 | 2.00 |
| *Chondrostoma nasus* | 3 | 2.52 | 2.63 | 1.67 |
| *Chromobotia macracanthus* | 1 | 3.09 | 3.22 | 2.00 |
| *Chrosomus eos* | 1 | 2.69 | 2.69 | 2.67 |
| *Chrosomus erythrogaster* | 1 | 2.93 | 2.96 | 2.67 |
| *Chrysaora fulgida* | 1 | 2.42 | 2.47 | 2.00 |
| *Chrysaora quinquecirrha* | 1 | 2.31 | 2.35 | 2.00 |
| *Cichla ocellaris* | 7 | 2.72 | 2.74 | 2.50 |
| *Cichla temensis* | 1 | 3.15 | 3.18 | 2.83 |
| *Cichlasoma bimaculatum* | 1 | 2.80 | 2.88 | 2.17 |
| *Cichlasoma trimaculatum* | 1 | 3.09 | 3.22 | 2.00 |
| *Ciona intestinalis* | 2 | 2.65 | 2.76 | 1.83 |
| *Cirrhinus cirrhosus* | 2 | 2.93 | 2.99 | 2.42 |
| *Cirrholovenia tetranema* | 1 | 2.11 | 2.12 | 2.00 |
| *Clarias batrachus* | 3 | 2.73 | 2.78 | 2.33 |
| *Clarias gariepinus* | 8 | 2.57 | 2.62 | 2.10 |
| *Clarias gariepinus* × *Heterobranchus bidorsalis* | 2 | 1.93 | 1.95 | 1.75 |
| *Clavelina lepadiformis* | 1 | 2.42 | 2.49 | 1.83 |
| *Clemmys guttata* | 1 | 2.42 | 2.47 | 2.00 |
| *Clibanarius africanus* | 1 | 1.65 | 1.61 | 2.00 |
| *Clupeonella cultriventris* | 2 | 3.05 | 3.03 | 3.25 |
| *Clytia hummelincki* | 1 | 2.44 | 2.49 | 2.00 |
| *Clytia linearis* | 1 | 2.44 | 2.49 | 2.00 |
| *Clytia mccradyi* | 1 | 2.44 | 2.49 | 2.00 |
| *Cobitis bilineata* | 1 | 1.87 | 1.96 | 1.17 |
| *Cobitis fahirae* | 2 | 2.05 | 2.06 | 2.00 |
| *Cobitis kurui* | 2 | 2.05 | 2.05 | 2.00 |
| *Cobitis taenia* | 1 | 2.62 | 2.71 | 1.83 |
| *Codium fragile fragile* | 1 | 2.04 | 2.16 | 1.00 |
| *Colossoma macropomum* | 1 | 3.20 | 3.47 | 1.00 |
| *Conomurex persicus* | 1 | 3.44 | 3.43 | 3.50 |
| *Coptodon rendalli* | 1 | 2.95 | 2.98 | 2.67 |
| *Coptodon zillii* | 5 | 2.92 | 2.97 | 2.53 |
| *Corbicula fluminea* | 2 | 3.25 | 3.28 | 3.00 |
| *Cordylophora caspia* | 2 | 2.79 | 2.88 | 2.08 |
| *Coregonus albula* | 3 | 2.44 | 2.48 | 2.06 |
| *Coregonus autumnalis* | 1 | 3.31 | 3.47 | 2.00 |
| *Coregonus lavaretus* | 4 | 2.73 | 2.79 | 2.21 |
| *Coregonus muksun* | 1 | 3.00 | 3.06 | 2.50 |
| *Coregonus nasus* | 1 | 2.65 | 2.73 | 2.00 |
| *Coregonus peled* | 6 | 2.85 | 2.93 | 2.22 |
| *Corella eumyota* | 1 | 2.35 | 2.39 | 2.00 |
| *Coreoleuciscus splendidus* | 1 | 3.04 | 3.04 | 3.00 |
| *Coreoperca herzi* | 1 | 2.93 | 2.86 | 3.50 |
| *Corymorpha annulata* | 1 | 2.56 | 2.51 | 3.00 |
| *Corymorpha bigelowi* | 1 | 2.56 | 2.51 | 3.00 |
| *Coryne eximia* | 1 | 2.65 | 2.73 | 2.00 |
| *Cottus gobio* | 1 | 2.65 | 2.76 | 1.83 |
| *Cotylorhiza erythraea* | 1 | 2.25 | 2.27 | 2.17 |
| *Craspedacusta sowerbii* | 1 | 2.33 | 2.37 | 2.00 |
| *Crassostrea gigas* | 3 | 3.24 | 3.29 | 2.83 |
| *Crassostrea virginica* | 1 | 2.93 | 2.96 | 2.67 |
| *Creaserinus fodiens* | 1 | 2.47 | 2.35 | 3.50 |
| *Crepidula fornicata* | 2 | 2.99 | 3.05 | 2.50 |
| *Crocodylus rhombifer* | 1 | 2.20 | 2.29 | 1.50 |
| *Cromileptes altivelis* | 1 | 2.60 | 2.57 | 2.83 |
| *Ctenochaetus binotatus* | 1 | 2.80 | 2.96 | 1.50 |
| *Ctenochaetus hawaiiensis* | 1 | 2.75 | 2.90 | 1.50 |
| *Ctenochaetus marginatus* | 1 | 2.80 | 2.94 | 1.67 |
| *Ctenochaetus truncatus* | 1 | 2.78 | 2.92 | 1.67 |
| *Ctenopharyngodon idella* | 19 | 2.98 | 3.06 | 2.32 |
| *Ctenopoma nigropannosum* | 6 | 2.45 | 2.49 | 2.11 |
| *Culaea inconstans* | 1 | 2.95 | 3.06 | 2.00 |
| *Culter alburnus* | 1 | 3.53 | 3.61 | 2.83 |
| *Cuora flavomarginata* | 1 | 2.62 | 2.71 | 1.83 |
| *Cycleptus elongatus* | 1 | 2.33 | 2.43 | 1.50 |
| *Cynoglossus sinusarabici* | 1 | 2.07 | 2.12 | 1.67 |
| *Cynops orientalis* | 1 | 2.24 | 2.27 | 2.00 |
| *Cynops pyrrhogaster* | 1 | 2.51 | 2.53 | 2.33 |
| *Cyprinella lutrensis* | 2 | 2.83 | 2.88 | 2.42 |
| *Cyprinus carpio* | 24 | 3.13 | 3.20 | 2.58 |
| *Danio rerio* | 6 | 2.52 | 2.55 | 2.31 |
| *Dendrobates auratus* | 1 | 2.18 | 2.20 | 2.00 |
| *Dendrobates tinctorius* | 1 | 2.35 | 2.39 | 2.00 |
| *Dendrochirus barberi* | 3 | 2.40 | 2.44 | 2.06 |
| *Dendrochirus bellus* | 3 | 2.05 | 2.16 | 1.22 |
| *Dendrochirus biocellatus* | 3 | 2.36 | 2.44 | 1.72 |
| *Dendrochirus brachypterus* | 3 | 2.61 | 2.70 | 1.89 |
| *Dendrochirus zebra* | 3 | 2.54 | 2.58 | 2.22 |
| *Desmocaris trispinosa* | 1 | 2.69 | 2.90 | 1.00 |
| *Dicentrarchus labrax* | 1 | 2.73 | 2.80 | 2.17 |
| *Didemnum vexillum* | 3 | 2.83 | 2.92 | 2.11 |
| *Dikerogammarus haemobaphes* | 1 | 3.65 | 3.69 | 3.33 |
| *Dikerogammarus villosus* | 2 | 3.21 | 3.30 | 2.50 |
| *Dinophysis caudata* | 1 | 3.16 | 3.20 | 2.83 |
| *Diplosoma listerianum* | 1 | 2.71 | 2.73 | 2.50 |
| *Discomedusa lobata* | 1 | 2.27 | 2.31 | 2.00 |
| *Doto kya* | 1 | 2.16 | 2.10 | 2.67 |
| *Dreissena bugensis* | 1 | 3.65 | 3.71 | 3.17 |
| *Dreissena polymorpha* | 1 | 3.56 | 3.57 | 3.50 |
| *Dussumieria elopsoides* | 1 | 2.11 | 2.22 | 1.17 |
| *Dyscophus guineti* | 1 | 2.51 | 2.57 | 2.00 |
| *Dyspanopeus sayi* | 1 | 2.85 | 2.88 | 2.67 |
| *Echinogammarus ischnus* | 1 | 3.62 | 3.71 | 2.83 |
| *Echinogammarus trichiatus* | 1 | 3.65 | 3.73 | 3.00 |
| *Ectopleura crocea* | 1 | 2.69 | 2.65 | 3.00 |
| *Eirene viridula* | 1 | 2.56 | 2.51 | 3.00 |
| *Elodea canadensis* | 1 | 2.73 | 2.82 | 2.00 |
| *Elodea nuttallii* | 1 | 2.80 | 2.90 | 2.00 |
| *Emydura subglobosa* | 1 | 2.56 | 2.63 | 2.00 |
| *Epinephelus aeneus* | 2 | 3.63 | 3.67 | 3.25 |
| *Epinephelus fuscoguttatus* | 2 | 2.81 | 2.86 | 2.42 |
| *Equulites klunzingeri* | 1 | 1.71 | 1.80 | 1.00 |
| *Eriocheir hepuensis* | 1 | 3.04 | 3.16 | 2.00 |
| *Eriocheir sinensis* | 6 | 3.13 | 3.20 | 2.53 |
| *Eriphia verrucosa* | 1 | 3.55 | 3.63 | 2.83 |
| *Esox lucius* | 9 | 2.85 | 2.93 | 2.17 |
| *Esox niger* | 1 | 2.33 | 2.39 | 1.83 |
| *Etrumeus golanii* | 1 | 2.20 | 2.29 | 1.50 |
| *Eualetes tulipa* | 1 | 2.36 | 2.33 | 2.67 |
| *Eucheilota paradoxica* | 1 | 2.11 | 2.12 | 2.00 |
| *Eucheilota ventricularis* | 1 | 2.11 | 2.12 | 2.00 |
| *Eucheuma* spp. | 1 | 2.62 | 2.67 | 2.17 |
| *Eucrate crenata* | 1 | 2.29 | 2.20 | 3.00 |
| *Eunectes notaeus* | 1 | 3.05 | 3.08 | 2.83 |
| *Euryrhynchus amazoniensis* | 1 | 2.76 | 2.98 | 1.00 |
| *Faxonius limosus* | 3 | 3.52 | 3.62 | 2.67 |
| *Faxonius neglectus chaenodactylus* | 1 | 2.65 | 2.53 | 3.67 |
| *Ferrissia californica* | 2 | 3.31 | 3.41 | 2.50 |
| *Ficopomatus enigmaticus* | 2 | 3.05 | 3.11 | 2.58 |
| *Fistularia commersonii* | 1 | 2.96 | 2.96 | 3.00 |
| *Fundulus heteroclitus heteroclitus* | 1 | 1.56 | 1.63 | 1.00 |
| *Gambusia affinis* | 18 | 2.84 | 2.91 | 2.26 |
| *Gambusia holbrooki* | 14 | 2.98 | 3.03 | 2.55 |
| *Gammarus roeselii* | 1 | 2.84 | 2.90 | 2.33 |
| *Gammarus tigrinus* | 1 | 2.73 | 2.80 | 2.17 |
| *Garra rufa* | 3 | 2.28 | 2.32 | 2.00 |
| *Gasteropelecus levis* | 6 | 2.68 | 2.73 | 2.31 |
| *Gasterosteus aculeatus* | 2 | 3.28 | 3.32 | 3.00 |
| *Genicanthus bellus* | 1 | 2.76 | 2.90 | 1.67 |
| *Genicanthus watanabei* | 1 | 2.82 | 2.96 | 1.67 |
| *Geosesarma bicolor* | 1 | 1.75 | 1.71 | 2.00 |
| *Geosesarma* spp. | 1 | 1.69 | 1.65 | 2.00 |
| *Geosesarma tiomanicum* | 1 | 1.85 | 1.84 | 2.00 |
| *Gibelion catla* | 1 | 2.47 | 2.55 | 1.83 |
| *Gnathophyllum elegans* | 1 | 3.31 | 3.39 | 2.67 |
| *Gobio gobio* | 1 | 2.67 | 2.78 | 1.83 |
| *Gobio lozanoi* | 1 | 2.49 | 2.65 | 1.17 |
| *Gobio obtusirostris* | 2 | 2.17 | 2.20 | 1.92 |
| *Gobiosoma bosc* | 6 | 2.04 | 2.12 | 1.33 |
| *Gonioinfradens paucidentatus* | 1 | 2.31 | 2.22 | 3.00 |
| *Gonionemus vertens* | 2 | 2.44 | 2.41 | 2.67 |
| *Gracilaria tikvahiae* | 1 | 2.49 | 2.55 | 2.00 |
| *Graptemys ouachitensis* | 1 | 2.09 | 2.22 | 1.00 |
| *Graptemys pseudogeographica* | 1 | 2.44 | 2.47 | 2.17 |
| *Grateloupia filicina* | 1 | 2.67 | 2.76 | 2.00 |
| *Grateloupia turuturu* | 1 | 2.69 | 2.76 | 2.17 |
| *Gymnocephalus cernua* | 7 | 2.67 | 2.74 | 2.05 |
| *Gymnocorymbus ternetzi* | 6 | 2.63 | 2.66 | 2.36 |
| *Gymnodinium catenatum* | 1 | 3.07 | 3.18 | 2.17 |
| *Haliscera bigelowi* | 1 | 2.36 | 2.41 | 2.00 |
| *Halitiara inflexa* | 1 | 2.11 | 2.12 | 2.00 |
| *Halocaridina rubra* | 1 | 2.87 | 3.10 | 1.00 |
| *Halophila stipulacea* | 1 | 2.96 | 2.96 | 3.00 |
| *Hediste diversicolor* | 1 | 2.33 | 2.37 | 2.00 |
| *Helostoma temminckii* | 1 | 3.18 | 3.27 | 2.50 |
| *Hemibarbus labeo* | 2 | 1.93 | 1.94 | 1.83 |
| *Hemibarbus maculatus* | 2 | 1.99 | 2.05 | 1.50 |
| *Hemichromis fasciatus* | 2 | 2.10 | 2.05 | 2.50 |
| *Hemichromis letourneuxi* | 6 | 2.90 | 2.93 | 2.67 |
| *Hemiculter leucisculus* | 4 | 3.02 | 3.09 | 2.42 |
| *Hemigrapsus sanguineus* | 2 | 2.72 | 2.67 | 3.08 |
| *Hemigrapsus takanoi* | 1 | 2.71 | 2.63 | 3.33 |
| *Hemimysis anomala* | 1 | 3.51 | 3.63 | 2.50 |
| *Hemiramphus far* | 1 | 1.49 | 1.51 | 1.33 |
| *Hemitaurichthys multispinosus* | 1 | 2.84 | 2.94 | 2.00 |
| *Hemitaurichthys thompsoni* | 1 | 2.75 | 2.88 | 1.67 |
| *Hemitaurichthys zoster* | 1 | 2.73 | 2.86 | 1.67 |
| *Heniochus intermedius* | 1 | 2.82 | 2.96 | 1.67 |
| *Heniochus pleurotaenia* | 1 | 2.80 | 2.94 | 1.67 |
| *Heniochus singularius* | 1 | 2.78 | 2.94 | 1.50 |
| *Heniochus varius* | 1 | 2.84 | 3.00 | 1.50 |
| *Herichthys cyanoguttatus* | 1 | 3.00 | 2.88 | 4.00 |
| *Herklotsichthys punctatus* | 1 | 2.24 | 2.31 | 1.67 |
| *Heterochelamon tessellatum* | 1 | 1.56 | 1.51 | 2.00 |
| *Heteropneustes fossilis* | 1 | 2.93 | 2.94 | 2.83 |
| *Heterosigma akashiwo* | 1 | 3.00 | 3.10 | 2.17 |
| *Heterotilapia buttikoferi* | 6 | 2.55 | 2.53 | 2.69 |
| *Holacanthus tricolor* | 1 | 2.75 | 2.88 | 1.67 |
| *Homarus americanus* | 1 | 2.96 | 3.08 | 2.00 |
| *Hoplobatrachus tigerinus* | 1 | 2.95 | 2.94 | 3.00 |
| *Hucho hucho* | 2 | 2.64 | 2.73 | 1.83 |
| *Hucho taimen* | 1 | 3.15 | 3.27 | 2.17 |
| *Huso huso* | 2 | 2.75 | 2.90 | 1.50 |
| *Hydrocotyle ranunculoides* | 1 | 2.96 | 2.96 | 3.00 |
| *Hydrocotyle verticillata* | 1 | 2.05 | 2.04 | 2.17 |
| *Hymenochirus curtipes* | 1 | 3.18 | 3.20 | 3.00 |
| *Hypania invalida* | 1 | 3.60 | 3.73 | 2.50 |
| *Hypnea musciformis* | 1 | 2.67 | 2.73 | 2.17 |
| *Hypophthalmichthys molitrix* | 15 | 3.00 | 3.06 | 2.46 |
| *Hypophthalmichthys nobilis* | 12 | 3.05 | 3.12 | 2.47 |
| *Hypostomus plecostomus* | 7 | 2.89 | 2.91 | 2.69 |
| *Ictalurus punctatus* | 12 | 2.84 | 2.90 | 2.36 |
| *Ictiobus cyprinellus* | 1 | 2.45 | 2.49 | 2.17 |
| *Ictiobus niger* | 1 | 2.47 | 2.47 | 2.50 |
| *Ilyoplax* spp. | 1 | 1.87 | 1.88 | 1.83 |
| *Johnrandallia nigrirostris* | 1 | 2.76 | 2.90 | 1.67 |
| *Kantiella enigmatica* | 1 | 2.11 | 2.12 | 2.00 |
| *Kappaphycus alvarezii* | 2 | 2.38 | 2.42 | 2.08 |
| *Karenia mikimotoi* | 2 | 2.73 | 2.77 | 2.42 |
| *Karenia selliformis* | 1 | 3.09 | 3.20 | 2.17 |
| *Kinosternon subrubrum* | 1 | 2.49 | 2.55 | 2.00 |
| *Knipowitschia byblisia* | 1 | 2.42 | 2.49 | 1.83 |
| *Knipowitschia caucasica* | 1 | 3.04 | 3.04 | 3.00 |
| *Knipowitschia caunosi* | 1 | 2.44 | 2.49 | 2.00 |
| *Knipowitschia mermere* | 2 | 2.19 | 2.21 | 2.00 |
| *Koellikerina fasciculata* | 1 | 2.40 | 2.45 | 2.00 |
| *Koreocobitis rotundicaudata* | 1 | 3.05 | 3.00 | 3.50 |
| *Kryptoperidinium foliaceum* | 1 | 2.98 | 3.08 | 2.17 |
| *Kryptopterus bicirrhis* | 1 | 3.15 | 3.22 | 2.50 |
| *Labeo rohita* | 2 | 2.60 | 2.64 | 2.25 |
| *Ladigesocypris irideus* | 1 | 2.53 | 2.59 | 2.00 |
| *Ladigesocypris mermere* | 2 | 2.08 | 2.09 | 2.00 |
| *Ladislavia taczanowskii* | 1 | 2.98 | 2.94 | 3.33 |
| *Lagocephalus guentheri* | 1 | 3.15 | 3.14 | 3.17 |
| *Lagocephalus sceleratus* | 1 | 3.18 | 3.18 | 3.17 |
| *Lagocephalus spadiceus* | 1 | 3.18 | 3.18 | 3.17 |
| *Lagocephalus suezensis* | 1 | 2.55 | 2.59 | 2.17 |
| *Lancaris kumariae* | 1 | 2.78 | 3.00 | 1.00 |
| *Laodicea fijiana* | 1 | 2.29 | 2.33 | 2.00 |
| *Lates calcarifer* | 2 | 2.70 | 2.83 | 1.67 |
| *Lates niloticus* | 1 | 2.09 | 2.22 | 1.00 |
| *Lemna minuta* | 1 | 2.44 | 2.49 | 2.00 |
| *Leostyletus misakiensis* | 1 | 2.62 | 2.69 | 2.00 |
| *Lepidothelphusa cognetti* | 1 | 1.75 | 1.69 | 2.17 |
| *Lepidothelphusa* spp. | 1 | 1.73 | 1.67 | 2.17 |
| *Lepomis gibbosus* | 14 | 2.85 | 2.89 | 2.55 |
| *Lepomis macrochirus* | 1 | 3.40 | 3.53 | 2.33 |
| *Leptosiphonia brodiei* | 1 | 3.20 | 3.20 | 3.17 |
| *Leucaspius delineatus* | 6 | 2.94 | 3.01 | 2.36 |
| *Leuciscus aspius* | 2 | 3.02 | 3.13 | 2.08 |
| *Leuciscus idus* | 6 | 2.69 | 2.77 | 2.06 |
| *Leuciscus leuciscus* | 3 | 2.32 | 2.33 | 2.17 |
| *Leucos basak* | 2 | 2.68 | 2.82 | 1.58 |
| *Libinia dubia* | 1 | 2.71 | 2.71 | 2.67 |
| *Limnomysis benedeni* | 1 | 3.75 | 3.82 | 3.17 |
| *Limnoperna fortunei* | 1 | 2.91 | 2.82 | 3.67 |
| *Limnopilos naiyanetri* | 1 | 1.65 | 1.59 | 2.17 |
| *Liobagrus andersoni* | 1 | 3.11 | 3.08 | 3.33 |
| *Liocarcinus depurator* | 1 | 3.58 | 3.55 | 3.83 |
| *Liriope tetraphylla* | 1 | 2.36 | 2.41 | 2.00 |
| *Lithobates catesbeianus* | 3 | 2.89 | 3.00 | 2.00 |
| *Lithobates pipiens* | 1 | 3.09 | 3.12 | 2.83 |
| *Lithoglyphus naticoides* | 1 | 3.60 | 3.69 | 2.83 |
| *Littorina littorea* | 1 | 2.62 | 2.65 | 2.33 |
| *Liza abu* | 1 | 3.00 | 3.00 | 3.00 |
| *Liza carinata* | 1 | 2.16 | 2.18 | 2.00 |
| *Lucania parva* | 1 | 2.60 | 2.57 | 2.83 |
| *Luciobarbus lydianus* | 2 | 2.05 | 2.05 | 2.00 |
| *Maccullochella peelii* | 1 | 3.35 | 3.41 | 2.83 |
| *Macrobrachium agwi* | 1 | 2.65 | 2.86 | 1.00 |
| *Macrobrachium assamense peninsulare* | 1 | 2.62 | 2.82 | 1.00 |
| *Macrobrachium dayanum* | 1 | 2.62 | 2.76 | 1.50 |
| *Macrobrachium dienbienphuense* | 1 | 2.53 | 2.71 | 1.00 |
| *Macrobrachium gracilirostre* | 1 | 2.67 | 2.88 | 1.00 |
| *Macrobrachium idae* | 1 | 2.75 | 2.96 | 1.00 |
| *Macrobrachium lanchesteri* | 1 | 2.47 | 2.65 | 1.00 |
| *Macrobrachium pilimanus* | 1 | 2.58 | 2.78 | 1.00 |
| *Macrobrachium rosenbergii* | 1 | 2.73 | 2.94 | 1.00 |
| *Macrobrachium scabriculum* | 1 | 2.76 | 2.98 | 1.00 |
| *Macrobrachium sintangense* | 1 | 2.91 | 3.02 | 2.00 |
| *Macrochelys temminckii* | 1 | 2.51 | 2.65 | 1.33 |
| *Malaclemys terrapin* | 1 | 2.58 | 2.63 | 2.17 |
| *Marenzelleria arctia* | 1 | 3.13 | 3.22 | 2.33 |
| *Marenzelleria neglecta* | 2 | 3.08 | 3.08 | 3.08 |
| *Marenzelleria viridis* | 2 | 2.93 | 3.02 | 2.17 |
| *Margalefidinium polykrikoides* | 1 | 3.07 | 3.18 | 2.17 |
| *Marivagia stellata* | 1 | 2.31 | 2.35 | 2.00 |
| *Mauremys caspica* | 1 | 3.36 | 3.33 | 3.67 |
| *Mauremys reevesii* | 2 | 2.47 | 2.56 | 1.75 |
| *Mauremys rivulata* | 1 | 2.49 | 2.59 | 1.67 |
| *Mawia benovici* | 1 | 2.29 | 2.33 | 2.00 |
| *Mayaheros uropthalmus* | 1 | 2.93 | 2.82 | 3.83 |
| *Megabalanus coccopoma* | 1 | 2.38 | 2.47 | 1.67 |
| *Megalobrama amblycephala* | 1 | 2.98 | 3.08 | 2.17 |
| *Megalops atlanticus* | 2 | 2.81 | 2.92 | 1.92 |
| *Megophrys nasuta* | 1 | 3.25 | 3.24 | 3.33 |
| *Melanochromis auratus* | 6 | 2.55 | 2.56 | 2.44 |
| *Membranipora membranacea* | 1 | 2.62 | 2.73 | 1.67 |
| *Mesonauta festivus* | 7 | 2.45 | 2.51 | 1.98 |
| *Metasesarma aubryi* | 1 | 1.69 | 1.65 | 2.00 |
| *Metasesarma* spp. | 1 | 1.69 | 1.65 | 2.00 |
| *Microchlamylla amabilis* | 1 | 2.55 | 2.49 | 3.00 |
| *Microcosmus squamiger* | 1 | 2.60 | 2.59 | 2.67 |
| *Micropercops swinhonis* | 1 | 3.20 | 3.29 | 2.50 |
| *Micropterus dolomieu* | 7 | 2.44 | 2.51 | 1.88 |
| *Micropterus salmoides* | 14 | 3.03 | 3.09 | 2.49 |
| *Misgurnus anguillicaudatus* | 5 | 2.80 | 2.81 | 2.67 |
| *Misgurnus fossilis* | 3 | 2.04 | 2.07 | 1.78 |
| *Misgurnus nikolskyi* | 1 | 2.71 | 2.69 | 2.83 |
| *Mnemiopsis leidyi* | 4 | 3.25 | 3.32 | 2.75 |
| *Moerisia carine* | 1 | 2.65 | 2.73 | 2.00 |
| *Moerisia inkermanica* | 1 | 2.65 | 2.73 | 2.00 |
| *Molgula manhattensis* | 1 | 2.38 | 2.47 | 1.67 |
| *Molgula plana* | 1 | 1.62 | 1.69 | 1.00 |
| *Morone americana* | 5 | 2.49 | 2.57 | 1.87 |
| *Morone chrysops* × *Morone saxatilis* | 4 | 2.56 | 2.60 | 2.25 |
| *Morone saxatilis* | 1 | 2.82 | 2.92 | 2.00 |
| *Mya arenaria* | 1 | 2.76 | 2.82 | 2.33 |
| *Mycale (Mycale) grandis* | 1 | 2.47 | 2.53 | 2.00 |
| *Mylopharyngodon piceus* | 7 | 2.49 | 2.54 | 2.07 |
| *Myocastor coypus* | 3 | 2.85 | 2.93 | 2.17 |
| *Myrionema orbiculare* | 1 | 2.45 | 2.51 | 2.00 |
| *Myriophyllum alterniflorum* | 2 | 3.09 | 3.00 | 3.83 |
| *Myriophyllum aquaticum* | 1 | 3.07 | 3.12 | 2.67 |
| *Myriophyllum spicatum* | 2 | 3.42 | 3.57 | 2.17 |
| *Myriophyllum verticillatum* | 2 | 3.13 | 3.14 | 3.00 |
| *Mytella strigata* | 1 | 2.07 | 2.20 | 1.00 |
| *Mytilopsis leucophaeata* | 1 | 2.75 | 2.78 | 2.50 |
| *Mytilopsis sallei* | 1 | 2.80 | 2.80 | 2.83 |
| *Mytilus galloprovincialis* | 1 | 2.80 | 2.82 | 2.67 |
| *Myxocyprinus asiaticus* | 1 | 1.93 | 2.04 | 1.00 |
| *Najas marina* | 2 | 3.71 | 3.67 | 4.00 |
| *Nemipterus randalli* | 1 | 2.60 | 2.61 | 2.50 |
| *Neocaridina davidi* | 1 | 2.58 | 2.71 | 1.50 |
| *Neocaridina palmata* | 1 | 2.76 | 2.92 | 1.50 |
| *Neogobius fluviatilis* | 11 | 2.70 | 2.76 | 2.23 |
| *Neogobius melanostomus* | 11 | 2.94 | 3.02 | 2.23 |
| *Neopomacentrus cyanomos* | 1 | 3.45 | 3.59 | 2.33 |
| *Neosalanx taihuensis* | 2 | 2.87 | 2.84 | 3.17 |
| *Neosarmatium meinerti* | 1 | 1.69 | 1.65 | 2.00 |
| *Neoturris pileata* | 1 | 2.11 | 2.12 | 2.00 |
| *Nerodia fasciata* | 1 | 2.24 | 2.27 | 2.00 |
| *Nerodia sipedon* | 1 | 2.18 | 2.20 | 2.00 |
| *Nerodia taxispilota* | 1 | 3.11 | 3.00 | 4.00 |
| *Netrostoma setouchianum* | 1 | 2.22 | 2.24 | 2.00 |
| *Nipponocypris koreanus* | 1 | 2.89 | 2.94 | 2.50 |
| *Nubiella mitra* | 1 | 2.40 | 2.45 | 2.00 |
| *Obesogammarus crassus* | 1 | 3.60 | 3.71 | 2.67 |
| *Obesogammarus obesus* | 1 | 3.69 | 3.82 | 2.67 |
| *Odontesthes bonariensis* | 4 | 2.36 | 2.41 | 1.96 |
| *Olindias singularis* | 1 | 2.56 | 2.51 | 3.00 |
| *Oncorhynchus gorbuscha* | 3 | 2.47 | 2.60 | 1.44 |
| *Oncorhynchus keta* | 1 | 2.64 | 2.71 | 2.00 |
| *Oncorhynchus kisutch* | 1 | 3.25 | 3.24 | 3.33 |
| *Oncorhynchus mykiss* | 22 | 3.06 | 3.13 | 2.49 |
| *Oncorhynchus tshawytscha* | 2 | 2.47 | 2.48 | 2.42 |
| *Ondatra zibethicus* | 1 | 2.80 | 2.90 | 2.00 |
| *Oreochromis aureus* | 5 | 2.97 | 2.99 | 2.80 |
| *Oreochromis mossambicus* | 6 | 2.82 | 2.91 | 2.08 |
| *Oreochromis niloticus* | 15 | 3.07 | 3.16 | 2.40 |
| *Oreochromis spilurus* | 1 | 3.07 | 3.08 | 3.00 |
| *Oryzias sinensis* | 1 | 2.71 | 2.80 | 2.00 |
| *Oscillatoria erythraea* | 1 | 2.20 | 2.22 | 2.00 |
| *Osmerus eperlanus* | 1 | 2.73 | 2.80 | 2.17 |
| *Osteoglossum bicirrhosum* | 6 | 2.85 | 2.91 | 2.42 |
| *Osteolaemus tetraspis* | 1 | 3.13 | 3.20 | 2.50 |
| *Ostorhinchus fasciatus* | 1 | 2.27 | 2.37 | 1.50 |
| *Oxynoemacheilus theophilii* | 2 | 1.96 | 1.96 | 2.00 |
| *Oxyurichthys petersii* | 1 | 1.78 | 1.80 | 1.67 |
| *Pachygrapsus marmoratus* | 1 | 3.62 | 3.63 | 3.50 |
| *Pacifastacus leniusculus* | 4 | 3.22 | 3.29 | 2.63 |
| *Padogobius bonelli* | 1 | 2.80 | 2.90 | 2.00 |
| *Padogobius nigricans* | 1 | 2.85 | 2.86 | 2.83 |
| *Palaemon macrodactylus* | 2 | 2.92 | 2.87 | 3.33 |
| *Paleosuchus palpebrosus* | 2 | 2.67 | 2.72 | 2.25 |
| *Paleosuchus trigonatus* | 1 | 2.36 | 2.41 | 2.00 |
| *Pangasianodon hypophthalmus* | 5 | 2.60 | 2.64 | 2.23 |
| *Pangasius sanitwongsei* | 2 | 2.65 | 2.76 | 1.83 |
| *Paracaridina zijinica* | 1 | 2.64 | 2.84 | 1.00 |
| *Paracerceis sculpta* | 1 | 2.53 | 2.61 | 1.83 |
| *Parachaetodon ocellatus* | 1 | 2.76 | 2.92 | 1.50 |
| *Paracheirodon axelrodi* | 6 | 2.83 | 2.86 | 2.61 |
| *Paracheirodon innesi* | 6 | 2.57 | 2.58 | 2.47 |
| *Parachondrostoma toxostoma* | 1 | 2.53 | 2.55 | 2.33 |
| *Parachromis managuensis* | 6 | 2.82 | 2.87 | 2.39 |
| *Paracytaeis octona* | 1 | 2.11 | 2.12 | 2.00 |
| *Paralichthys dentatus* | 1 | 2.89 | 3.00 | 2.00 |
| *Paralichthys lethostigma* | 1 | 2.85 | 2.96 | 2.00 |
| *Paralithodes camtschaticus* | 2 | 2.86 | 2.90 | 2.58 |
| *Parambassis apogonoides* | 1 | 2.13 | 2.22 | 1.33 |
| *Parambassis ranga* | 1 | 2.27 | 2.31 | 2.00 |
| *Paramisgurnus dabryanus* | 2 | 3.11 | 3.20 | 2.33 |
| *Paramysis lacustris* | 1 | 3.65 | 3.73 | 3.00 |
| *Paraphyllina ransoni* | 1 | 2.22 | 2.24 | 2.00 |
| *Parapterois heterura* | 3 | 2.10 | 2.20 | 1.22 |
| *Parasesarma eumolpe* | 1 | 1.67 | 1.63 | 2.00 |
| *Parathelphusa bogorensis* | 1 | 1.85 | 1.84 | 2.00 |
| *Parathelphusa pantherina* | 1 | 1.67 | 1.63 | 2.00 |
| *Parathelphusa* spp. | 1 | 1.67 | 1.63 | 2.00 |
| *Paratya compressa* | 1 | 2.44 | 2.61 | 1.00 |
| *Parupeneus forsskali* | 1 | 2.18 | 2.29 | 1.33 |
| *Pelagia noctiluca* | 1 | 2.84 | 2.82 | 3.00 |
| *Pelates quadrilineatus* | 1 | 2.42 | 2.49 | 1.83 |
| *Pelodiscus sinensis* | 2 | 2.90 | 2.91 | 2.83 |
| *Pelophylax kurtmuelleri* | 1 | 3.15 | 3.22 | 2.50 |
| *Pelophylax saharicus* | 1 | 3.02 | 3.04 | 2.83 |
| *Pempheris rhomboidea* | 1 | 2.11 | 2.18 | 1.50 |
| *Penaeus japonicus* | 2 | 2.94 | 2.92 | 3.08 |
| *Penaeus kerathurus* | 1 | 3.55 | 3.57 | 3.33 |
| *Penaeus monodon* | 1 | 1.91 | 1.98 | 1.33 |
| *Penaeus vannamei* | 3 | 2.70 | 2.73 | 2.50 |
| *Perca flavescens* | 1 | 2.31 | 2.43 | 1.33 |
| *Perca fluviatilis* | 6 | 2.47 | 2.53 | 1.97 |
| *Perccottus glenii* | 12 | 2.98 | 3.01 | 2.68 |
| *Percnon gibbesi* | 3 | 2.75 | 2.73 | 2.89 |
| *Periphylla periphylla* | 1 | 2.33 | 2.37 | 2.00 |
| *Perisesarma* spp. | 1 | 1.64 | 1.59 | 2.00 |
| *Peristedion cataphractum* | 1 | 2.44 | 2.49 | 2.00 |
| *Perna perna* | 1 | 2.73 | 2.73 | 2.67 |
| *Perna viridis* | 1 | 3.16 | 3.18 | 3.00 |
| *Perophora japonica* | 1 | 2.45 | 2.51 | 2.00 |
| *Pethia gelius* | 6 | 2.62 | 2.67 | 2.25 |
| *Petricolaria pholadiformis* | 1 | 2.98 | 2.92 | 3.50 |
| *Petroleuciscus smyrnaeus* | 2 | 2.04 | 2.04 | 2.00 |
| *Phoxinus kumgangensis* | 1 | 3.15 | 3.22 | 2.50 |
| *Phrynomantis bifasciatus* | 1 | 3.13 | 3.10 | 3.33 |
| *Phyllorhiza punctata* | 3 | 2.45 | 2.44 | 2.50 |
| *Physalia physalis* | 1 | 2.49 | 2.55 | 2.00 |
| *Physella acuta* | 2 | 3.42 | 3.49 | 2.83 |
| *Piaractus brachypomus* | 4 | 2.62 | 2.69 | 2.04 |
| *Pileolaria berkeleyana* | 1 | 2.49 | 2.61 | 1.50 |
| *Pimephales promelas* | 3 | 2.36 | 2.48 | 1.33 |
| *Planiliza haematocheila* | 1 | 2.93 | 2.96 | 2.67 |
| *Platorchestia platensis* | 1 | 2.38 | 2.47 | 1.67 |
| *Pleurodeles waltl* | 1 | 2.20 | 2.22 | 2.00 |
| *Podocorynoides minima* | 1 | 2.13 | 2.14 | 2.00 |
| *Poecilia latipinna* | 10 | 2.79 | 2.86 | 2.17 |
| *Poecilia reticulata* | 12 | 2.97 | 3.02 | 2.51 |
| *Poecilia velifera* | 6 | 2.53 | 2.58 | 2.17 |
| *Polyandrocarpa zorritensis* | 1 | 2.51 | 2.63 | 1.50 |
| *Polyclinum aurantium* | 1 | 2.60 | 2.67 | 2.00 |
| *Polyclinum constellatum* | 1 | 2.55 | 2.61 | 2.00 |
| *Polyodon spathula* | 4 | 2.64 | 2.75 | 1.71 |
| *Pomacanthus maculosus* | 1 | 2.73 | 2.86 | 1.67 |
| *Pomacea canaliculata* | 4 | 3.43 | 3.48 | 3.04 |
| *Pomacea diffusa* | 1 | 2.40 | 2.45 | 2.00 |
| *Pomadasys stridens* | 1 | 1.65 | 1.69 | 1.33 |
| *Pomoxis annularis* | 1 | 2.18 | 2.33 | 1.00 |
| *Pomoxis nigromaculatus* | 1 | 2.25 | 2.41 | 1.00 |
| *Pontastacus leptodactylus* | 3 | 2.84 | 2.99 | 1.67 |
| *Ponticola gorlap* | 1 | 2.16 | 2.27 | 1.33 |
| *Ponticola kessleri* | 5 | 2.77 | 2.84 | 2.17 |
| *Pontogammarus robustoides* | 2 | 3.30 | 3.38 | 2.67 |
| *Potamocorbula amurensis* | 1 | 2.89 | 2.80 | 3.67 |
| *Potamogeton crispus* | 1 | 3.29 | 3.33 | 3.00 |
| *Potamogeton natans* | 1 | 3.09 | 3.10 | 3.00 |
| *Potamon fluviatile* | 1 | 1.64 | 1.65 | 1.50 |
| *Potamonautes lirrangensis* | 1 | 1.47 | 1.39 | 2.17 |
| *Potamopyrgus antipodarum* | 2 | 2.96 | 2.99 | 2.75 |
| *Potamotrygon motoro* | 6 | 2.65 | 2.70 | 2.19 |
| *Procambarus alleni* | 1 | 2.71 | 2.61 | 3.50 |
| *Procambarus braswelli* | 1 | 2.51 | 2.41 | 3.33 |
| *Procambarus clarkii* | 5 | 3.37 | 3.38 | 3.33 |
| *Procambarus cubensis* | 1 | 2.51 | 2.41 | 3.33 |
| *Procambarus llamasi* | 1 | 2.49 | 2.39 | 3.33 |
| *Procambarus ouachitae* | 1 | 2.53 | 2.43 | 3.33 |
| *Procambarus paeninsulanus* | 1 | 2.51 | 2.41 | 3.33 |
| *Procambarus pubescens* | 1 | 2.53 | 2.41 | 3.50 |
| *Procambarus spiculifer* | 1 | 2.49 | 2.37 | 3.50 |
| *Procambarus vazquezae* | 1 | 2.51 | 2.41 | 3.33 |
| *Procambarus versutus* | 1 | 2.49 | 2.37 | 3.50 |
| *Procambarus virginalis* | 4 | 3.24 | 3.24 | 3.21 |
| *Prochilodus lineatus* | 1 | 2.96 | 3.18 | 1.17 |
| *Prognathodes aculeatus* | 1 | 2.71 | 2.84 | 1.67 |
| *Prognathodes aya* | 1 | 2.76 | 2.90 | 1.67 |
| *Prognathodes brasiliensis* | 1 | 2.73 | 2.86 | 1.67 |
| *Prognathodes dichrous* | 1 | 2.78 | 2.92 | 1.67 |
| *Prognathodes falcifer* | 1 | 2.76 | 2.90 | 1.67 |
| *Prognathodes guyotensis* | 1 | 2.73 | 2.88 | 1.50 |
| *Prorocentrum mexicanum* | 1 | 2.51 | 2.57 | 2.00 |
| *Prorocentrum micans* | 1 | 2.67 | 2.69 | 2.50 |
| *Proterorhinus marmoratus* | 3 | 2.81 | 2.80 | 2.83 |
| *Proterorhinus semilunaris* | 4 | 2.91 | 2.97 | 2.42 |
| *Protochondrostoma genei* | 1 | 2.22 | 2.24 | 2.00 |
| *Prymnesium parvum* | 1 | 1.93 | 1.94 | 1.83 |
| *Pseudemys concinna concinna* | 1 | 2.47 | 2.51 | 2.17 |
| *Pseudocaranx dentex* | 3 | 2.92 | 3.05 | 1.89 |
| *Pseudodiaptomus ardjuna* | 1 | 2.20 | 2.22 | 2.00 |
| *Pseudodiaptomus marinus* | 1 | 2.93 | 2.92 | 3.00 |
| *Pseudogobio esocinus* | 1 | 3.07 | 3.16 | 2.33 |
| *Pseudo-nitzschia brasiliana* | 1 | 2.13 | 2.14 | 2.00 |
| *Pseudorasbora parva* | 17 | 2.97 | 3.00 | 2.65 |
| *Pseudosesarma moeschii* | 1 | 1.67 | 1.63 | 2.00 |
| *Pseudosesarma* spp. | 1 | 1.69 | 1.65 | 2.00 |
| *Pseudosuccinea columella* | 2 | 2.43 | 2.59 | 1.08 |
| *Pteragogus pelycus* | 1 | 1.42 | 1.43 | 1.33 |
| *Pterodoras granulosus* | 6 | 2.49 | 2.53 | 2.17 |
| *Pterois antennata* | 3 | 2.44 | 2.50 | 1.94 |
| *Pterois lunulata* | 3 | 2.40 | 2.50 | 1.61 |
| *Pterois miles* | 7 | 2.77 | 2.87 | 2.00 |
| *Pterois mombasae* | 3 | 2.30 | 2.34 | 1.94 |
| *Pterois radiata* | 3 | 2.44 | 2.50 | 1.89 |
| *Pterois russelii* | 3 | 2.36 | 2.42 | 1.83 |
| *Pterois sphex* | 3 | 2.38 | 2.44 | 1.83 |
| *Pterois volitans* | 8 | 2.80 | 2.91 | 1.96 |
| *Pterophyllum scalare* | 6 | 2.61 | 2.67 | 2.14 |
| *Pterygoplichthys disjunctivus* | 3 | 3.00 | 3.03 | 2.72 |
| *Pterygoplichthys pardalis* | 10 | 3.09 | 3.17 | 2.52 |
| *Pterygoplichthys* spp. | 1 | 3.44 | 3.63 | 1.83 |
| *Pungitius platygaster* | 2 | 3.07 | 3.06 | 3.17 |
| *Pungtungia herzi* | 1 | 3.09 | 3.04 | 3.50 |
| *Puntigrus partipentazona* | 1 | 2.91 | 3.14 | 1.00 |
| *Pygocentrus nattereri* | 2 | 2.79 | 2.83 | 2.50 |
| *Pyrodinium bahamense* | 1 | 3.13 | 3.20 | 2.50 |
| *Pyura tessellata* | 1 | 2.36 | 2.49 | 1.33 |
| *Rachycentron canadum* | 2 | 2.43 | 2.49 | 1.92 |
| *Rangia cuneata* | 1 | 2.07 | 2.18 | 1.17 |
| *Ranitomeya fantastica* | 1 | 3.38 | 3.37 | 3.50 |
| *Ranoidea caerulea* | 1 | 3.24 | 3.22 | 3.33 |
| *Ranunculus peltatus* | 2 | 3.42 | 3.55 | 2.33 |
| *Rapana venosa* | 2 | 2.60 | 2.60 | 2.58 |
| *Rhacophorus nigropalmatus* | 1 | 3.36 | 3.33 | 3.67 |
| *Rhamdia quelen* | 6 | 2.63 | 2.68 | 2.17 |
| *Rhinella marina* | 3 | 3.11 | 3.09 | 3.28 |
| *Rhinichthys atratulus* | 1 | 2.33 | 2.29 | 2.67 |
| *Rhinogobius brunneus* | 1 | 1.73 | 1.82 | 1.00 |
| *Rhinogobius cliffordpopei* | 1 | 3.64 | 3.78 | 2.50 |
| *Rhinogobius giurinus* | 1 | 3.65 | 3.78 | 2.67 |
| *Rhinogobius similis* | 2 | 3.12 | 3.17 | 2.67 |
| *Rhithropanopeus harrisii* | 2 | 2.96 | 2.96 | 3.00 |
| *Rhodeus amarus* | 7 | 2.61 | 2.67 | 2.12 |
| *Rhodeus ocellatus* | 3 | 3.20 | 3.24 | 2.83 |
| *Rhopalophthalmus tattersallae* | 1 | 2.62 | 2.69 | 2.00 |
| *Rhopilema esculentum* | 1 | 2.45 | 2.51 | 2.00 |
| *Rhopilema nomadica* | 3 | 3.01 | 3.07 | 2.44 |
| *Rhopilema verrilli* | 1 | 2.25 | 2.29 | 2.00 |
| *Rocio octofasciata* | 1 | 2.49 | 2.55 | 2.00 |
| *Ruditapes philippinarum* | 10 | 2.82 | 2.93 | 1.90 |
| *Rutilus rutilus* | 4 | 2.91 | 3.02 | 2.04 |
| *Salmo marmoratus* | 1 | 2.49 | 2.61 | 1.50 |
| *Salmo salar* | 3 | 2.74 | 2.83 | 2.00 |
| *Salmo trutta* | 7 | 3.09 | 3.18 | 2.31 |
| *Salvelinus alpinus alpinus* | 6 | 2.86 | 2.91 | 2.44 |
| *Salvelinus fontinalis* | 11 | 2.85 | 2.94 | 2.15 |
| *Salvelinus fontinalis* × *Salvelinus alpinus alpinus* | 1 | 1.73 | 1.73 | 1.67 |
| *Salvelinus namaycush* | 4 | 2.40 | 2.47 | 1.88 |
| *Salvelinus umbla* | 2 | 2.27 | 2.24 | 2.50 |
| *Sander lucioperca* | 10 | 2.83 | 2.92 | 2.08 |
| *Sander volgensis* | 1 | 1.80 | 1.90 | 1.00 |
| *Sargassum fluitans* | 1 | 2.95 | 3.06 | 2.00 |
| *Sargassum muticum* | 1 | 2.89 | 2.94 | 2.50 |
| *Sargocentron rubrum* | 2 | 2.21 | 2.24 | 1.92 |
| *Sarotherodon galilaeus* | 1 | 2.91 | 3.02 | 2.00 |
| *Sarotherodon melanotheron* | 2 | 3.03 | 3.08 | 2.58 |
| *Sartoriana spinigera* | 1 | 1.75 | 1.71 | 2.00 |
| *Saurida lessepsianus* | 1 | 2.91 | 3.02 | 2.00 |
| *Sayamia bangkokensis* | 1 | 1.69 | 1.65 | 2.00 |
| *Scardinius erythrophthalmus* | 4 | 2.86 | 2.95 | 2.13 |
| *Schilbe mystus* | 2 | 1.99 | 2.01 | 1.83 |
| *Schizoporella errata* | 1 | 2.65 | 2.73 | 2.00 |
| *Sciaenops ocellatus* | 2 | 2.46 | 2.58 | 1.50 |
| *Scolionema suvaense* | 1 | 2.11 | 2.12 | 2.00 |
| *Scomberomorus commerson* | 1 | 2.47 | 2.55 | 1.83 |
| *Scophthalmus maximus* | 1 | 2.82 | 2.92 | 2.00 |
| *Scyllarus pygmaeus* | 1 | 3.33 | 3.43 | 2.50 |
| *Sesarmops intermedius* | 1 | 1.65 | 1.61 | 2.00 |
| *Siganus luridus* | 3 | 2.72 | 2.81 | 1.94 |
| *Siganus rivulatus* | 3 | 2.90 | 2.96 | 2.39 |
| *Sillago suezensis* | 1 | 2.87 | 2.98 | 2.00 |
| *Silurus asotus* | 3 | 2.39 | 2.49 | 1.56 |
| *Silurus glanis* | 11 | 2.86 | 2.94 | 2.21 |
| *Silurus triostegus* | 1 | 1.75 | 1.84 | 1.00 |
| *Sinanodonta woodiana* | 1 | 1.55 | 1.61 | 1.00 |
| *Solea senegalensis* | 1 | 2.82 | 2.92 | 2.00 |
| *Solea solea* | 1 | 2.87 | 2.98 | 2.00 |
| *Solmundella bitentaculata* | 1 | 2.27 | 2.31 | 2.00 |
| *Sparus aurata* | 3 | 2.44 | 2.60 | 1.11 |
| *Sphyraena chrysotaenia* | 1 | 3.09 | 3.22 | 2.00 |
| *Sphyraena flavicauda* | 1 | 3.11 | 3.24 | 2.00 |
| *Squalidus gracilis* | 1 | 2.96 | 2.96 | 3.00 |
| *Squalius cephalus* | 4 | 2.70 | 2.78 | 2.08 |
| *Squalius fellowesii* | 2 | 2.01 | 2.01 | 2.00 |
| *Stenophysa marmorata* | 1 | 1.95 | 2.06 | 1.00 |
| *Stephanolepis diaspros* | 1 | 1.71 | 1.73 | 1.50 |
| *Sternotherus odoratus* | 1 | 2.75 | 2.73 | 2.83 |
| *Stomolophus meleagris* | 1 | 2.69 | 2.78 | 2.00 |
| *Stuckenia pectinata* | 1 | 2.87 | 2.86 | 3.00 |
| *Styela canopus* | 1 | 1.78 | 1.78 | 1.83 |
| *Styela clava* | 2 | 2.76 | 2.88 | 1.83 |
| *Styela plicata* | 1 | 3.07 | 3.27 | 1.50 |
| *Sugiura chengshanense* | 1 | 2.29 | 2.33 | 2.00 |
| *Symphysodon aequifasciatus* | 1 | 2.20 | 2.27 | 1.67 |
| *Symphysodon discus* | 6 | 2.46 | 2.49 | 2.19 |
| *Symplegma brakenhielmi* | 1 | 2.22 | 2.24 | 2.00 |
| *Syngnathus abaster* | 2 | 3.15 | 3.20 | 2.75 |
| *Synodontis eupterus* | 2 | 3.30 | 3.35 | 2.92 |
| *Syntripsa matannensis* | 1 | 1.55 | 1.49 | 2.00 |
| *Taractichthys longipinnis* | 1 | 2.27 | 2.43 | 1.00 |
| *Telestes souffia* | 1 | 2.82 | 2.86 | 2.50 |
| *Tenuipedium palaemonoides* | 1 | 2.35 | 2.51 | 1.00 |
| *Tetrorchis erythrogaster* | 1 | 2.24 | 2.27 | 2.00 |
| *Thamnophis sirtalis* | 1 | 2.22 | 2.24 | 2.00 |
| *Threskiornis aethiopicus* | 1 | 3.20 | 3.29 | 2.50 |
| *Thymallus thymallus* | 5 | 3.23 | 3.32 | 2.47 |
| *Tilapia mariae* | 1 | 3.13 | 3.02 | 4.00 |
| *Tinca tinca* | 8 | 2.68 | 2.73 | 2.21 |
| *Tintinnopsis ampla* | 1 | 2.80 | 2.98 | 1.33 |
| *Torquigener flavimaculosus* | 1 | 3.18 | 3.18 | 3.17 |
| *Trachemys scripta elegans* | 7 | 2.92 | 3.00 | 2.26 |
| *Trachemys scripta scripta* | 2 | 3.31 | 3.35 | 3.00 |
| *Trachemys scripta troostii* | 1 | 2.69 | 2.78 | 2.00 |
| *Trachurus indicus* | 1 | 2.38 | 2.43 | 2.00 |
| *Trachycephalus resinifictrix* | 1 | 2.49 | 2.53 | 2.17 |
| *Trachysalambria curvirostris* | 1 | 2.60 | 2.49 | 3.50 |
| *Tricellaria inopinata* | 1 | 2.47 | 2.53 | 2.00 |
| *Trichogaster lalius* | 6 | 2.67 | 2.72 | 2.28 |
| *Trichogaster trichopterus* | 1 | 3.35 | 3.41 | 2.83 |
| *Trichopodus leerii* | 2 | 2.80 | 2.84 | 2.50 |
| *Trichopodus microlepis* | 1 | 2.89 | 3.12 | 1.00 |
| *Trichopodus pectoralis* | 1 | 3.13 | 3.39 | 1.00 |
| *Trichopsis pumila* | 1 | 2.29 | 2.33 | 2.00 |
| *Trichromis salvini* | 1 | 2.11 | 2.12 | 2.00 |
| *Trichydra pudica* | 1 | 2.11 | 2.12 | 2.00 |
| *Trinchesia albocrusta* | 1 | 2.15 | 2.04 | 3.00 |
| *Tubastraea coccinea* | 1 | 3.09 | 3.12 | 2.83 |
| *Tubastraea tagusensis* | 1 | 2.67 | 2.76 | 2.00 |
| *Turcogammarus aralensis* | 1 | 3.58 | 3.71 | 2.50 |
| *Tylototriton shanjing* | 1 | 2.40 | 2.45 | 2.00 |
| *Tylototriton verrucosus* | 1 | 2.36 | 2.41 | 2.00 |
| *Ulva australis* | 1 | 1.80 | 1.90 | 1.00 |
| *Ulva ohnoi* | 1 | 1.62 | 1.69 | 1.00 |
| *Umbra krameri* | 1 | 2.29 | 2.29 | 2.33 |
| *Umbra pygmaea* | 4 | 2.01 | 2.08 | 1.42 |
| *Undaria pinnatifida* | 2 | 2.80 | 2.93 | 1.75 |
| *Upeneus moluccensis* | 1 | 2.40 | 2.45 | 2.00 |
| *Upeneus pori* | 1 | 2.07 | 2.18 | 1.17 |
| *Utricularia australis* | 2 | 3.64 | 3.65 | 3.50 |
| *Vanderhorstia mertensi* | 1 | 2.18 | 2.20 | 2.00 |
| *Verasper moseri* | 1 | 2.87 | 2.98 | 2.00 |
| *Vimba vimba* | 3 | 2.05 | 2.09 | 1.78 |
| *Watersipora subtorquata* | 1 | 2.38 | 2.43 | 2.00 |
| *Womersleyella setacea* | 1 | 3.31 | 3.41 | 2.50 |
| *Xantho poressa* | 1 | 3.64 | 3.59 | 4.00 |
| *Xenopus laevis* | 2 | 2.87 | 2.96 | 2.17 |
| *Xiphocaris elongata* | 1 | 2.69 | 2.90 | 1.00 |
| *Xiphophorus hellerii* | 8 | 2.54 | 2.58 | 2.19 |
| *Xiphophorus maculatus* | 6 | 2.62 | 2.66 | 2.28 |
| *Zacco platypus* | 2 | 2.61 | 2.65 | 2.25 |
| *Zebrasoma flavescens* | 2 | 2.73 | 2.81 | 2.08 |

# **Supplementary Tables References**

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