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New database of all marine species biological and ecological traits

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Offers of trait data and collaboration are welcomed

Why?

Enhance research and management use of marine species data.

How?

Add **attributes** to the 226,000 species in the World Register of Marine Species (WoRMS) www.marinespecies.org. Attributes are species socio-economic **status** and biological and ecological **traits**. Ten groups of attributes were prioritised based on end-user interest, availability, and applicability across most species (Table 1). Numerical traits were prioritised over categorical. Habitat can be derived from combinations of traits.

A **controlled vocabulary** of definitions of these and other traits will accompany the attributes to ensure clarity and consistency of use of terminology.

Table 1. Attributes prioritised to add to the World Register of Marine Species database.

Trait or Status	Categories
Taxonomy	Phylum, Class, Order, Family, Genus, Species
Environment	Marine, brackish, freshwater, terrestrial, pelagic, benthic, fossil
Geography	Locality name Latitude-longitude coordinates
Depth	Intertidal, subtidal, deep-sea (>500 m) Deepest and shallowest depth recorded in (1) literature and (2) in OBIS
Substratum	Mud, sand, gravel (pebble, cobble), boulder, bedrock, biogenic
Mobility	Mobile, immobile (sessile) Potential metres in life-time
Skeleton	Calcareous (aragonite, calcite), sulphate, chitinous, silicious, gelatinous, hydrostatic, exoskeleton, endoskeleton, cell wall
Diet	Carnivore, herbivore, parasite, detritivore, phototrophic, chemoautotrophic; Isotopic signature?
Body size	Maximum body length in mm excluding appendages. Maximum total body weight of individual
Species status	Introduced, Invasive, Conservation, Fishery, Aquaculture, Harmful, Ecological Indicator

Future Prospects

Adding traits may reveal more expected and unexpected results that will advance knowledge of marine biodiversity and inform management of natural resources (e.g. Figure 1). Each additional attribute multiplies potential uses of the database. Species could be classified by attributes and combined with data in OBIS and other datasets to compare species geographic distributions over time. Example questions include:

- Are invasive species a random sample of taxa, body sizes, and dietary preferences?
- Which species have calcareous skeletons and so be prone to ocean acidification?
- Are species of conservation concern larger, higher in the food web, and fished?
- How do global patterns of species richness vary geographically by body size, depth, and fishery importance?
- Do polluted and/or over-fished ecosystems lose ecological function due to loss of species with particular size-distributions and position in the food web?

Figure 1. Recent discoveries from WoRMS using only taxonomic information include:

- More species described in last decade than ever before
- Five times more authors describing species than in 1950's
- Long-term trend for less species being discovered in relation to number of taxonomists
- More accurate estimates of global marine species richness indicate 0.3-0.7 million species.