FishShapes v1: Functionally relevant measurements of teleost shape and size on three dimensions

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Abstract:

Teleost fishes account for 96% of all fish species and exhibit a spectacular variety of body forms. Teleost lineages range from deep-bodied to elongate (e.g. eels,

needlefish), laterally compressed (e.g. ribbonfish) to globular (e.g. pufferfish) and include uniquely shaped lineages such as seahorses, flatfishes and ocean sunfishes. Adaptive body shape convergence within fishes has long been hypothesized but the nature of the relationships between fish form and ecological and environmental variables remain largely unknown at the macroevolutionary scale. To facilitate the investigation of the interacting factors influencing teleost body shape evolution we measured 8 functionally relevant linear traits on adult-sized specimens along with specimen mass. Linear measurements of standard length, maximum body depth, maximum fish width, lower jaw length, mouth width, head depth, minimum caudal peduncle depth and minimum caudal peduncle width were taken in millimeters with calipers, or tape measures for oversized specimens. We measured these traits on a total of 16523 specimens (1-3 specimens per species) at the Smithsonian National Museum of Natural History and took approximately 7000 person hours of data collection to complete. The data went through a three-step error-checking process to clean and validate the data and then species averages were calculated. We present the complete specimen dataset, which encompasses approximately one fifth of extant teleost species diversity, spanning ~90% of teleost families and ~96% of orders. The species and family names are compatible with the FishBase taxonomy (Pauly & Froese, 2019) and the order information with the phylogenetically informed taxonomy of Betancur-R et al. (2014). This dataset is licensed under Creative Commons CC0 1.0 Universal (CC0 1.0) but please cite this paper when using the data or a subset of it.

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