**Supplementary Information**

**Morphological diversity of tropical demersal fishes across different marine habitats**

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**Supplementary Table S1 and Figures S1 to S3**

**Table S1.** Taxonomy and morphological characterization of 120 fish species on the continental shelf of Northeastern Brazil (4º˗9ºS). Total abundance (%) of species in three bottom habitat types: sand, algae and SWCR (Sand with rocks, coralline formations and sponges). Caudal fin type and body elongation aspect. Scores of significant principal components explaining morphological variation of species (PC1, PC2 and PC3), and images source: (1) ABRACOS surveys, (2) Froese & Pauly (2021), (3) Deda & Barbosa (2016), (4) Robertson & Tassel (2019), (5) Williams et al. (2010), (6) Rocha (2004).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Order** | **Family** | **Species** | **Code** | **% Sand** | **% Algae** | **% SWCR** | **Caudal****type** | **Elongation aspect** | **PC1** | **PC2** | **PC3** | **Images source** |
| **Acanthuriformes** | **Acanthuridae** | *Acanthurus bahianus* Castelnau, 1855 | aca.bah | 11.46 | 28.66 | 59.87 | Truncated | 0.4408 | -0.1540 | 0.0770 | 0.0394 | 1 |
|  |  | *Acanthurus chirurgus* (Bloch 1787) | aca.chi | 6.16 | 6.40 | 87.44 | Truncated | 0.3834 | -0.1939 | 0.0432 | 0.0426 | 1 |
|  |  | *Acanthurus coeruleus* Bloch & Schneider, 1801 | aca.coe | 0.00 | 0.00 | 100.00 | Emarginated | 0.3380 | -0.2526 | 0.1459 | 0.0383 | 1 |
|  | **Chaetodontidae** | *Chaetodon ocellatus* Bloch, 1787 | cha.oce | 7.64 | 5.73 | 86.62 | Truncated | 0.2484 | -0.3349 | -0.0848 | -0.0436 | 1 |
|  |  | *Chaetodon striatus* Linnaeus, 1758 | cha.str | 1.61 | 0.23 | 98.17 | Truncated | 0.2119 | -0.3727 | -0.1086 | -0.0724 | 1 |
|  | **Ephippidae** | *Chaetodipterus faber* (Broussonet, 1782) | cha.fab | 0.00 | 0.00 | 100.00 | Emarginated | 0.2699 | -0.3903 | 0.0495 | 0.1715 | 2 |
|  | **Pomacanthidae** | *Holacanthus ciliaris* (Linnaeus, 1758) | hol.cil | 0.00 | 46.15 | 53.85 | Truncated | 0.4549 | -0.4088 | -0.1061 | 0.3277 | 1 |
|  |  | *Holacanthus tricolor* (Bloch, 1795) | hol.tri | 0.00 | 0.00 | 100.00 | Truncated | 0.4671 | -0.2475 | -0.0993 | 0.1371 | 2 |
|  |  | *Pomacanthus paru* (Bloch, 1787) | pom.par | 3.92 | 2.94 | 93.14 | Rounded | 0.2771 | -0.5803 | 0.1120 | 0.0784 | 1 |
| **Albuliformes** | **Albulidae** | *Albula vulpes* (Linnaeus, 1758) | alb.vul | 50.00 | 0.00 | 50.00 | Forked | 0.7234 | 0.1833 | 0.0347 | -0.0071 | 1 |
| **Aulopiformes** | **Synodontidae** | *Synodus foetens* (Linnaeus, 1766) | syn.foe | 0.00 | 0.00 | 100.00 | Emarginated | 0.7328 | 0.2502 | -0.0004 | -0.0231 | 1 |
|  |  | *Synodus intermedius* (Spix & Agassiz, 1829) | syn.int | 0.00 | 0.00 | 100.00 | Emarginated | 0.7417 | 0.2257 | -0.0233 | -0.0281 | 4 |
|  |  | *Synodus synodus* (Linnaeus, 1758) | syn.syn | 0.00 | 0.00 | 100.00 | Emarginated | 0.7617 | 0.2240 | -0.0277 | -0.0070 | 4 |
|  |  | *Trachinocephalus* myops (Forster, 1801) | tra.myo | 12.90 | 0.00 | 87.10 | Emarginated | 0.6782 | 0.1555 | 0.0375 | -0.0319 | 1 |
| **Carangiformes** | **Carangidae** | *Caranx crysos* (Mitchill, 1815) | car.cry | 50.00 | 50.00 | 0.00 | Forked | 0.5939 | 0.0872 | 0.0752 | -0.0310 | 1 |
|  |  | *Caranx latus* Agassiz, 1831 | car.lat | 0.00 | 0.00 | 100.00 | Forked | 0.5881 | 0.0537 | 0.0886 | -0.0336 | 3 |
|  |  | *Chloroscombrus chrysurus* (Linnaeus, 1766) | chl.chr | 1.56 | 0.00 | 98.44 | Forked | 0.5053 | 0.0216 | 0.0948 | -0.0574 | 1 |
|  |  | *Decapterus punctatus* (Cuvier, 1829) | dec.pun | 100.00 | 0.00 | 0.00 | Forked | 0.6483 | 0.1444 | -0.0017 | -0.0428 | 1 |
|  |  | *Selar crumenophthalmus* (Bloch, 1793) | sel.cru | 11.54 | 0.00 | 88.46 | Forked | 0.6065 | 0.0881 | 0.0427 | -0.0746 | 1 |
|  |  | *Selene brownii* (Cuvier, 1816) | sel.bro | 47.62 | 0.00 | 52.38 | Forked | 0.3319 | -0.1529 | 0.1088 | -0.0513 | 1 |
|  |  | *Selene vomer* (Linnaeus, 1758) | sel.vom | 0.00 | 0.00 | 100.00 | Forked | 0.3660 | -0.2275 | 0.1617 | -0.0031 | 1 |
|  |  | *Uraspis helvola* (Forster, 1801) | ura.hel | 0.00 | 0.00 | 100.00 | Forked | 0.4951 | 0.0087 | 0.0780 | -0.0066 | 2 |
|  | **Echeneidae** | *Echeneis naucrates* Linnaeus, 1758 | ech.nau | 25.00 | 0.00 | 75.00 | Emarginated | 0.7793 | 0.2641 | -0.0533 | 0.0108 | 1 |
| **Clupeiformes** | **Clupeidae** | *Opisthonema oglinum* (Lesueur, 1818) | opi.ogl | 0.14 | 0.00 | 99.86 | Forked | 0.6246 | 0.0977 | 0.1116 | -0.0497 | 1 |
|  | **Engraulidae** | *Lycengraulis grossidens* (Spix & Agassiz, 1829) | lyc.gro | 0.00 | 0.00 | 100.00 | Forked | 0.6105 | 0.1163 | 0.0482 | -0.0162 | 4 |
|  | **Pristigasteridae** | *Chirocentrodon bleekerianus* (Poey, 1867) | chi.ble | 0.00 | 0.00 | 100.00 | Forked | 0.6347 | 0.1336 | 0.0181 | -0.0150 | 2 |
| **Dactylopteriformes** | **Dactylopteridae** | *Dactylopterus volitans* (Linnaeus, 1758) | dac.vol | 20.59 | 2.94 | 76.47 | Emarginated | 0.6510 | 0.1137 | -0.0227 | 0.0310 | 1 |
| **Elopiformes** | **Elopidae** | *Elops saurus* Linnaeus, 1766 | elo.sau | 100.00 | 0.00 | 0.00 | Forked | 0.7399 | 0.2076 | 0.0521 | 0.0273 | 1 |
| **Holocentriformes** | **Holocentridae** | *Holocentrus adscensionis* (Osbeck, 1765) | hol.ads | 2.64 | 80.76 | 16.60 | Forked | 0.5760 | -0.0272 | 0.1502 | 0.1020 | 1 |
|  |  | *Myripristis jacobus* Cuvier, 1829 | myr.jac | 0.00 | 0.00 | 100.00 | Forked | 0.5261 | -0.0684 | 0.0977 | 0.0418 | 5 |
| **Kurtiformes** | **Apogonidae** | *Apogon binotatus* (Poey, 1867) | apo.bin | 0.00 | 0.00 | 100.00 | Emarginated | 0.4906 | -0.0217 | 0.0205 | 0.0294 | 2 |
|  |  | *Astrapogon puncticulatus* (Poey, 1867) | ast.pun | 0.00 | 0.00 | 100.00 | Emarginated | 0.5255 | -0.0535 | 0.0460 | -0.0103 | 2 |
|  |  | *Phaeoptyx pigmentaria* (Poey, 1860) | pha.pig | 0.00 | 0.00 | 100.00 | Emarginated | 0.5912 | 0.0256 | 0.0525 | 0.0249 | 2 |
| **Lophiiformes** | **Antennariidae** | *Antennarius multiocellatus* (Valenciennes, 1837) | ant.mul | 0.00 | 0.00 | 100.00 | Rounded | 0.4934 | -0.1232 | -0.0827 | 0.0316 | 2 |
|  | **Ogcocephaliidae** | *Ogcocephalus vespertilio* (Linnaeus, 1758) | ogc.ves | 50.00 | 0.00 | 50.00 | Truncated | 0.7387 | 0.1871 | -0.0612 | 0.0249 | 2 |
| **Mulliformes** | **Mullidae** | *Mulloidichthys martinicus* (Cuvier, 1829) | mul.mar | 0.00 | 0.00 | 100.00 | Forked | 0.6436 | 0.1053 | 0.0941 | -0.0331 | 1 |
|  |  | *Pseudupeneus maculatus* (Bloch, 1793) | pse.mac | 56.45 | 3.13 | 40.41 | Forked | 0.5774 | 0.0711 | 0.0617 | -0.0726 | 1 |
|  |  | *Upeneus parvus* Poey, 1852 | upe.par | 0.00 | 0.00 | 100.00 | Forked | 0.6358 | 0.1061 | 0.0740 | -0.0160 | 2 |
| **Perciformes** | **Gerreidae** | *Diapterus auratus* Ranzani, 1842 | dia.aur | 0.00 | 0.00 | 0.00 | Forked | 0.4207 | -0.0534 | 0.1444 | -0.0715 | 2 |
|  |  | *Diapterus rhombeus* (Cuvier, 1829) | dia.rho | 0.00 | 0.00 | 100.00 | Forked | 0.3881 | -0.0778 | 0.1545 | -0.0890 | 2 |
|  |  | *Eucinostomus argenteus* Baird & Girard, 1855 | euc.arg | 85.17 | 0.10 | 14.73 | Forked | 0.5398 | 0.0240 | 0.1163 | -0.0388 | 1 |
|  |  | *Eucinostomus gula* (Quoy & Gaimard, 1824) | euc.gul | 1.03 | 0.00 | 98.97 | Forked | 0.5445 | 0.0273 | 0.0717 | -0.0541 | 1 |
|  |  | *Ulaema lefroyi* (Goode, 1874) | ula.lef | 0.07 | 0.00 | 99.93 | Forked | 0.5503 | 0.0482 | 0.0847 | -0.0295 | 1 |
|  | **Haemulidae** | *Anisotremus virginicus* (Linnaeus, 1758) | ani.vir | 0.00 | 37.50 | 62.50 | Forked | 0.4692 | -0.0681 | 0.0831 | -0.0756 | 2 |
|  |  | *Conodon nobilis* (Linnaeus, 1758) | con.nob | 0.00 | 0.00 | 100.00 | Truncated | 0.5315 | -0.0066 | -0.0132 | -0.0387 | 2 |
|  |  | *Haemulon aurolineatum* Cuvier, 1830 | hae.aur | 32.60 | 0.00 | 67.40 | Forked | 0.5583 | 0.0276 | 0.0316 | -0.0676 | 1 |
|  |  | *Haemulon melanurum* (Linnaeus, 1758) | hae.mel | 0.00 | 0.00 | 100.00 | Forked | 0.5689 | 0.0033 | 0.0136 | -0.0446 | 1 |
|  |  | *Haemulon parra* (Desmarest, 1823) | hae.par | 0.00 | 0.00 | 100.00 | Forked | 0.5587 | -0.0082 | 0.0048 | -0.0282 | 1 |
|  |  | *Haemulon plumierii* (Lacepède, 1801) | hae.plu | 34.15 | 6.74 | 59.11 | Forked | 0.5164 | -0.0343 | 0.0297 | -0.0165 | 1 |
|  |  | *Haemulon squamipinna* Rocha & Rosa, 1999 | hae.squ | 0.16 | 0.00 | 99.84 | Forked | 0.5211 | -0.0071 | 0.0211 | -0.0452 | 1 |
|  |  | *Haemulon steindachneri* (Jordan & Gilbert, 1882) | hae.ste | 33.80 | 0.00 | 66.20 | Forked | 0.5512 | 0.0096 | -0.0136 | -0.0471 | 1 |
|  |  | *Haemulopsis corvinaeformis* (Steindachner, 1868) | hae.cor | 0.00 | 0.00 | 100.00 | Forked | 0.5891 | 0.0238 | -0.0284 | -0.0410 | 1 |
|  |  | *Orthopristis ruber* (Cuvier, 1830) | ort.rub | 94.90 | 0.00 | 5.10 | Forked | 0.6043 | 0.0226 | -0.0081 | -0.0266 | 1 |
|  | **Labridae** | *Halichoeres poeyi* (Steindachner, 1867) | hal.poe | 0.00 | 0.00 | 100.00 | Truncated | 0.6783 | 0.0822 | -0.0524 | -0.0285 | 2 |
|  |  | *Halichoeres dimidiatus* (Agassiz, 1831) | hal.dim | 0.00 | 33.33 | 66.67 | Truncated | 0.6712 | 0.0677 | -0.0648 | -0.0420 | 6 |
|  | **Lutjanidae** | *Lutjanus analis* (Cuvier, 1828) | lut.ana | 0.00 | 0.00 | 100.00 | Emarginated | 0.5517 | -0.0323 | 0.0128 | 0.0316 | 1 |
|  |  | *Lutjanus synagris* (Linnaeus, 1758) | lut.syn | 36.18 | 27.80 | 36.01 | Emarginated | 0.5768 | -0.0094 | 0.0198 | 0.0351 | 1 |
|  |  | *Ocyurus chrysurus* (Bloch, 1791) | ocy.chr | 72.73 | 6.82 | 20.45 | Forked | 0.6085 | 0.0680 | 0.1092 | -0.0032 | 1 |
|  | **Malacanthidae** | *Malacanthus plumieri* (Bloch, 1786) | mal.plu | 0.00 | 0.00 | 100.00 | Emarginated | 0.7589 | 0.1581 | -0.0178 | 0.0099 | 2 |
|  | **Microdesmidae** | *Ptereleotris randalli* Gasparini, Rocha & Floeter, 2001 | pte.ran | 0.00 | 0.00 | 100.00 | Rounded | 0.7424 | 0.1398 | -0.0848 | 0.0345 | 2 |
|  | **Polynemidae** | *Polydactylus virginicus* (Linnaeus, 1758) | pol.vir | 0.00 | 0.00 | 100.00 | Forked | 0.6066 | 0.0443 | 0.1139 | -0.0344 | 3 |
|  | **Pomacentridae** | *Stegastes pictus* (Castelnau, 1855) | ste.pic | 0.00 | 0.00 | 100.00 | Forked | 0.4146 | -0.1577 | -0.0935 | 0.0100 | 2 |
|  |  | *Stegastes uenfi* Novelli, Nunan & Lima, 2000 | ste.uen | 0.00 | 0.00 | 100.00 | Forked | 0.5442 | -0.0877 | 0.1116 | 0.0904 | 2 |
|  | **Priacanthidae** | *Heteropriacanthus cruentatus* (Lacepède, 1801) | het.cru | 0.00 | 0.00 | 100.00 | Truncated | 0.5448 | -0.0647 | -0.0210 | 0.0581 | 1 |
|  |  | *Priacanthus arenatus* Cuvier, 1829 | pri.are | 0.00 | 0.00 | 100.00 | Truncated | 0.5942 | -0.0049 | -0.0284 | 0.0280 | 2 |
|  | **Scaridae** | *Cryptotomus roseus* Cope, 1871 | cry.ros | 0.00 | 0.00 | 100.00 | Truncated | 0.7161 | 0.1022 | -0.0719 | 0.0711 | 2 |
|  |  | *Sparisoma axillare* (Steindachner, 1878) | spa.axi | 1.52 | 65.15 | 33.33 | Truncated | 0.5516 | -0.0224 | -0.0137 | -0.0477 | 1 |
|  |  | *Sparisoma frondosum* (Agassiz, 1831) | spa.fro | 8.82 | 0.00 | 91.18 | Emarginated | 0.6005 | -0.0065 | -0.0184 | 0.0196 | 2 |
|  |  | *Sparisoma radians* (Valenciennes, 1840) | spa.rad | 0.00 | 0.00 | 100.00 | Truncated | 0.6032 | 0.0125 | -0.0324 | -0.0550 | 4 |
|  | **Sciaenidae** | *Odontoscion dentex* (Cuvier, 1830) | odo.den | 0.00 | 0.00 | 100.00 | Truncated | 0.5402 | 0.0127 | -0.0570 | -0.0179 | 1 |
|  |  | *Pareques acuminatus* (Bloch & Schneider, 1801) | par.acu | 75.00 | 5.00 | 20.00 | Truncated | 0.5564 | -0.0399 | -0.0911 | -0.0563 | 2 |
|  | **Scorpaenidae** | *Scorpaena bergii* Evermann & Marsh, 1900 | sco.ber | 0.00 | 0.00 | 100.00 | Rounded | 0.5360 | -0.0491 | -0.0728 | -0.0008 | 4 |
|  |  | *Scorpaena brasiliensis* Cuvier, 1829 | sco.brs | 0.00 | 0.00 | 100.00 | Truncated | 0.6112 | 0.0009 | -0.0326 | 0.0332 | 4 |
|  |  | *Scorpaena inermis* Cuvier, 1829 | sco.ine | 0.00 | 0.00 | 100.00 | Truncated | 0.5718 | -0.0044 | -0.0451 | 0.0196 | 4 |
|  |  | *Scorpaena isthmensis* (Meek & Hildebrand, 1928) | sco.ist | 0.00 | 0.00 | 100.00 | Truncated | 0.5975 | 0.0083 | -0.0334 | 0.0323 | 4 |
|  |  | *Scorpaena plumieri* Bloch, 1789 | sco.plu | 0.00 | 0.00 | 100.00 | Truncated | 0.5715 | -0.0147 | -0.0297 | 0.0384 | 1 |
|  | **Serranidae** | *Alphestes afer* (Bloch, 1793) | alp.afe | 0.60 | 0.40 | 99.01 | Rounded | 0.6197 | 0.0168 | -0.1010 | -0.0441 | 2 |
|  |  | *Cephalopholis fulva* (Linnaeus, 1758) | cep.ful | 0.00 | 3.33 | 96.67 | Rounded | 0.6529 | 0.0071 | -0.0606 | 0.0136 | 1 |
|  |  | *Diplectrum formosum* (Linnaeus, 1766) | dip.for | 69.57 | 0.00 | 30.43 | Emarginated | 0.6550 | 0.0646 | 0.0125 | 0.0600 | 1 |
|  |  | *Mycteroperca bonaci* (Poey, 1860) | myc.bon | 0.00 | 0.00 | 100.00 | Truncated | 0.6857 | 0.0864 | -0.0308 | 0.0233 | 3 |
|  |  | *Paranthias furcifer* (Valenciennes, 1828) | par.fur | 0.00 | 0.00 | 100.00 | Forked | 0.6482 | 0.0682 | 0.1093 | 0.0193 | 2 |
|  |  | *Rypticus bistrispinus* (Mitchill, 1818) | ryp.bis | 0.00 | 0.00 | 100.00 | Rounded | 0.6815 | 0.0653 | -0.1013 | 0.0001 | 4 |
|  | **Sparidae** | *Calamus calamus* (Valenciennes, 1830) | cal.cal | 23.94 | 1.41 | 74.65 | Forked | 0.5406 | -0.0260 | 0.0509 | -0.0494 | 1 |
|  |  | *Calamus penna* (Valenciennes, 1830) | cal.pnn | 0.00 | 100.00 | 0.00 | Forked | 0.5448 | -0.0211 | 0.0891 | -0.0250 | 1 |
|  |  | *Calamus pennatula* Guichenot, 1868 | cal.pen | 0.00 | 3.13 | 96.88 | Forked | 0.5666 | -0.0082 | 0.0456 | -0.0039 | 1 |
|  | **Sphyraenidae** | *Sphyraena barracuda* (Edwards, 1771) | sph.bar | 100.00 | 0.00 | 0.00 | Emarginated | 0.7489 | 0.2001 | 0.0083 | 0.0717 | 1 |
|  |  | *Sphyraena guachancho* Cuvier, 1829 | sph.gua | 93.75 | 0.00 | 6.25 | Forked | 0.7696 | 0.2171 | -0.0002 | 0.0492 | 1 |
|  | **Triglidae** | *Prionotus punctatus* (Bloch, 1793) | pri.pun | 5.26 | 5.26 | 89.47 | Truncated | 0.6568 | 0.0986 | -0.0230 | -0.0448 | 1 |
| **Pleuronectiformes** | **Achiridae** | *Achirus achirus* (Linnaeus, 1758) | ach.ach | 0.00 | 0.00 | 100.00 | Rounded | 0.3638 | -0.3068 | -0.0912 | -0.1030 | 1 |
|  |  | *Achirus lineatus* (Linnaeus, 1758) | ach.lin | 0.00 | 0.00 | 100.00 | Rounded | 0.2660 | -0.3245 | -0.1403 | -0.1143 | 1 |
|  | **Bothidae** | *Bothus lunatus* (Linnaeus, 1758) | bot.lun | 0.00 | 0.00 | 100.00 | Rounded | 0.4006 | -0.1930 | -0.1361 | -0.1183 | 2 |
|  |  | *Bothus ocellatus* (Agassiz, 1831) | bot.oce | 1.81 | 0.00 | 98.19 | Rounded | 0.4021 | -0.1871 | -0.1224 | -0.1056 | 1 |
|  |  | *Bothus robinsi* Topp & Hoff, 1972 | bot.rob | 0.00 | 0.00 | 100.00 | Rounded | 0.3496 | -0.2231 | -0.1249 | -0.0993 | 2 |
|  | **Paralichthyidae** | *Cyclopsetta fimbriata* (Goode & Bean, 1885) | cyc.fim | 0.00 | 0.00 | 100.00 | Rounded | 0.4944 | -0.1076 | -0.1130 | -0.0732 | 1 |
|  |  | *Syacium papillosum* (Linnaeus, 1758) | sya.pap | 12.50 | 18.75 | 68.75 | Rounded | 0.5282 | -0.0724 | -0.0844 | -0.0709 | 1 |
|  |  | *Syacium micrurum* Ranzani, 1842 | sya.mic | 0.42 | 0.00 | 99.58 | Rounded | 0.5782 | -0.0254 | -0.0753 | -0.0682 | 1 |
| **Siluriformes** | **Ariidae** | *Bagre marinus* (Mitchill, 1815) | bag.mar | 96.67 | 0.00 | 3.33 | Forked | 0.6378 | 0.1132 | 0.0831 | -0.0577 | 1 |
| **Syngnathiformes** | **Aulostomidae** | *Aulostomus maculatus* Valenciennes, 1841 | aul.mac | 0.00 | 2.94 | 97.06 | Rounded | 0.8266 | 0.3042 | -0.0770 | 0.0390 | 1 |
|  |  | *Aulostomus strigosus* Wheeler, 1955 | aul.str | 0.00 | 0.00 | 100.00 | Rounded | 0.8249 | 0.3024 | -0.0782 | 0.0450 | 2 |
|  | **Fistulariidae** | *Fistularia petimba* Lacepède, 1803 | fis.pet | 0.79 | 10.32 | 88.89 | Emarginated | 0.9221 | 0.3702 | -0.0752 | 0.0419 | 1 |
|  |  | *Fistularia tabacaria* Linnaeus, 1758 | fis.tab | 0.91 | 0.46 | 98.63 | Emarginated | 0.9010 | 0.3615 | -0.0695 | 0.0391 | 1 |
| **Tetraodontiformes** | **Balistidae** | *Balistes capriscus* Gmelin, 1789 | bal.cap | 75.00 | 25.00 | 0.00 | Emarginated | 0.4451 | -0.1558 | 0.0503 | -0.0274 | 2 |
|  |  | *Balistes vetula* Linnaeus, 1758 | bal.vet | 0.00 | 33.33 | 66.67 | Emarginated | 0.3546 | -0.2003 | 0.0983 | -0.0357 | 2 |
|  |  | *Xanthichthys ringens* (Linnaeus, 1758) | xan.rin | 0.00 | 0.00 | 100.00 | Emarginated | 0.4247 | -0.1256 | -0.0416 | -0.0566 | 5 |
|  | **Diodontidae** | *Chilomycterus spinosus* (Linnaeus, 1758) | chi.spi | 20.00 | 20.00 | 60.00 | Rounded | 0.6738 | 0.0474 | -0.0551 | 0.0747 | 1 |
|  |  | *Diodon holocanthus* Linnaeus, 1758 | dio.hol | 5.56 | 24.38 | 70.06 | Rounded | 0.6413 | 0.0344 | -0.1015 | 0.0909 | 1 |
|  | **Monacanthidae** | *Aluterus heudelotii* Hollard, 1855 | alu.heu | 0.00 | 0.00 | 100.00 | Truncated | 0.6103 | 0.0454 | -0.0555 | -0.0282 | 2 |
|  |  | *Aluterus monoceros* (Linnaeus, 1758) | alu.mon | 80.00 | 0.00 | 20.00 | Truncated | 0.6201 | 0.0632 | -0.0580 | -0.0174 | 2 |
|  |  | *Aluterus scriptus* (Osbeck, 1795) | alu.scr | 20.00 | 0.00 | 80.00 | Truncated | 0.6748 | 0.0925 | -0.0428 | -0.0174 | 2 |
|  |  | *Cantherhines macrocerus* (Hollard, 1853) | can.mac | 4.17 | 41.67 | 54.17 | Rounded | 0.4575 | -0.1105 | -0.0822 | -0.0177 | 1 |
|  |  | *Cantherhines pullus* (Ranzani, 1842) | can.pul | 5.56 | 55.56 | 38.89 | Rounded | 0.3955 | -0.1696 | -0.0610 | -0.0164 | 1 |
|  |  | *Monacanthus ciliatus* (Mitchill, 1818) | mon.cil | 0.00 | 0.00 | 100.00 | Truncated | 0.3720 | -0.1502 | -0.0571 | -0.0676 | 2 |
|  |  | *Stephanolepis hispidus* (Linnaeus, 1766) | ste.his | 5.45 | 0.25 | 94.30 | Truncated | 0.4776 | -0.1463 | 0.0823 | 0.1046 | 1 |
|  | **Ostraciidae** | *Acanthostracion polygonius* Poey, 1876 | aca.pol | 3.39 | 3.31 | 93.30 | Truncated | 0.6667 | 0.0493 | -0.0479 | 0.0651 | 1 |
|  |  | *Acanthostracion quadricornis* (Linnaeus, 1758) | aca.qua | 25.27 | 8.19 | 66.55 | Truncated | 0.6974 | 0.1002 | 0.0236 | 0.0529 | 1 |
|  |  | *Lactophrys trigonus* (Linnaeus, 1758) | lac.tri | 20.63 | 31.75 | 47.62 | Truncated | 0.6515 | 0.0694 | 0.0048 | 0.1014 | 1 |
|  | **Tetraodontidae** | *Canthigaster figueiredoi* Moura & Castro, 2002 | can.fig | 0.00 | 0.00 | 100.00 | Truncated | 0.6351 | 0.0220 | 0.0224 | 0.1261 | 2 |
|  |  | *Sphoeroides dorsalis* Longley, 1934 | sph.dor | 0.00 | 100.00 | 0.00 | Truncated | 0.6812 | 0.1099 | -0.0155 | 0.0928 | 1 |
|  |  | *Sphoeroides spengleri* (Bloch, 1785) | sph.spe | 0.06 | 0.00 | 99.94 | Truncated | 0.7192 | 0.1424 | -0.0389 | 0.0999 | 1 |
|  |  | *Sphoeroides testudineus* (Linnaeus, 1758) | sph.tes | 0.00 | 0.00 | 100.00 | Truncated | 0.6722 | 0.1065 | -0.0223 | 0.1072 | 1 |

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**Fig S1.** Examples of the correct and incorrect position and disposition of the fins in the fish images used in this study, where only the correct criterion was used to choose the images. Species used as examples: *Acanthurus bahianus* (a – b), *Holocentrus adscensionis* (c – d), *Selar crumenophthalmus* (e – f), *Haemulon plumierii* (g – h), *Acanthurus coeruleus* (i – j e m – n), *Acanthostracion polygonius* (k – l), and *Eucinostomus argenteus* (o – p).



**Fig. S2.** Didactic sketch of the morphospace concept used in this study. *n* = species number present in the morphospace.



**Fig. S3.** Variance explained by the first 10 principal components (PC) (a), and scree plot of the segmented regression indicating the first 3 significant PCs: PC1 (53.2%), PC2 (11.8%), and PC3 (8.9%) (b).