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Ecological traits influencing range expansion across large oceanic dispersal barriers: insights from tropical Atlantic reef fishes

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How do biogeographically different provinces arise in response to oceanic barriers to dispersal? Here, we analyse how traits related to the pelagic dispersal and adult biology of 985 tropical reef fish species correlate with their establishing populations on both sides of two Atlantic marine barriers: the Mid-Atlantic Barrier (MAB) and the Amazon–Orinoco Plume (AOP). Generalized linear mixed-effects models indicate that predictors for successful barrier crossing are the ability to raft with flotsam for the deep-water MAB, non-reef habitat usage for the freshwater and sediment-rich AOP, and large adult-size and large latitudinal-range for both barriers. Variation in larval-development mode, often thought to be broadly related to larval-dispersal potential, is not a significant predictor in either case. Many more species of greater taxonomic diversity cross the AOP than the MAB. Rafters readily cross both barriers but represent a much smaller proportion of AOP crossers than MAB crossers. Successful establishment after crossing both barriers may be facilitated by broad environmental tolerance associated with large body size and wide latitudinal-range. These results highlight the need to look beyond larval-dispersal potential and assess adult-biology traits when assessing determinants of successful movements across marine barriers.

Keywords: macroecology; biogeographic barriers; Amazon–Orinoco Plume; rafting; larval-development mode; body size

1. INTRODUCTION

Geographical barriers are important determinants of the evolution and distributions of animals and plants. For marine organisms, barriers to dispersal are often subtle and present a challenge for evolutionary ecologists seeking to understand population structure and speciation in the sea, and the formation of biogeographic provinces with distinctive biotas [1–3]. Aside from obvious physical obstacles such as landmasses, permeable or 'soft' aquatic barriers limit the distributions of marine organisms. Examples of such barriers include both large stretches of deep oceanic water [4–6] and near shore gradients in physical and chemical properties of sea water [2,7], both of which reduce the potential for ocean-wide colonization by near shore organisms. Some species have physiological, morphological, ecological and/or behavioural traits that improve their likelihood of overcoming such obstacles [6,8]. Thus, these barriers act as dispersal 'filters' that impact selected species rather than absolute barriers that are impassable to all [4,9].

Five biogeographic barriers have shaped the large-scale distributions of the present-day reef fish fauna of the tropical Atlantic Ocean: the Central American Land Bridge, the Mid-Atlantic Barrier (MAB; the stretch of tropical ocean between equatorial America and Africa), the Amazon–Orinoco Plume (AOP) along the northeast coast of South America, the cold Benguela upwelling zone off southwest Africa and the Arabian Land Bridge between Africa and Asia [3,10,11] (figure 1). The Isthmus of Panama, the Benguela Barrier and the Arabian Land Bridge isolate the Atlantic Ocean from other ocean basins, whereas the MAB and the AOP are major determinants of regional endemism patterns within the tropical Atlantic Ocean [2,3,5]. Here, we focus on the MAB and the AOP because (i) both are permeable, allowing some fish species to expand their geographical ranges over them, (ii) they allow investigation of potentially contrasting effects of two quite different types of barriers on a single Atlantic fauna of tropical reef fishes, and (iii) data on reef fish species distributions in relation to these two barriers are readily available [3]. The ongoing permeability of the MAB and the AOP is evidenced by genetic analysis of established populations from both sides of the barriers [12–16] and by observations of 'vagrants' that successfully crossed the barriers but have

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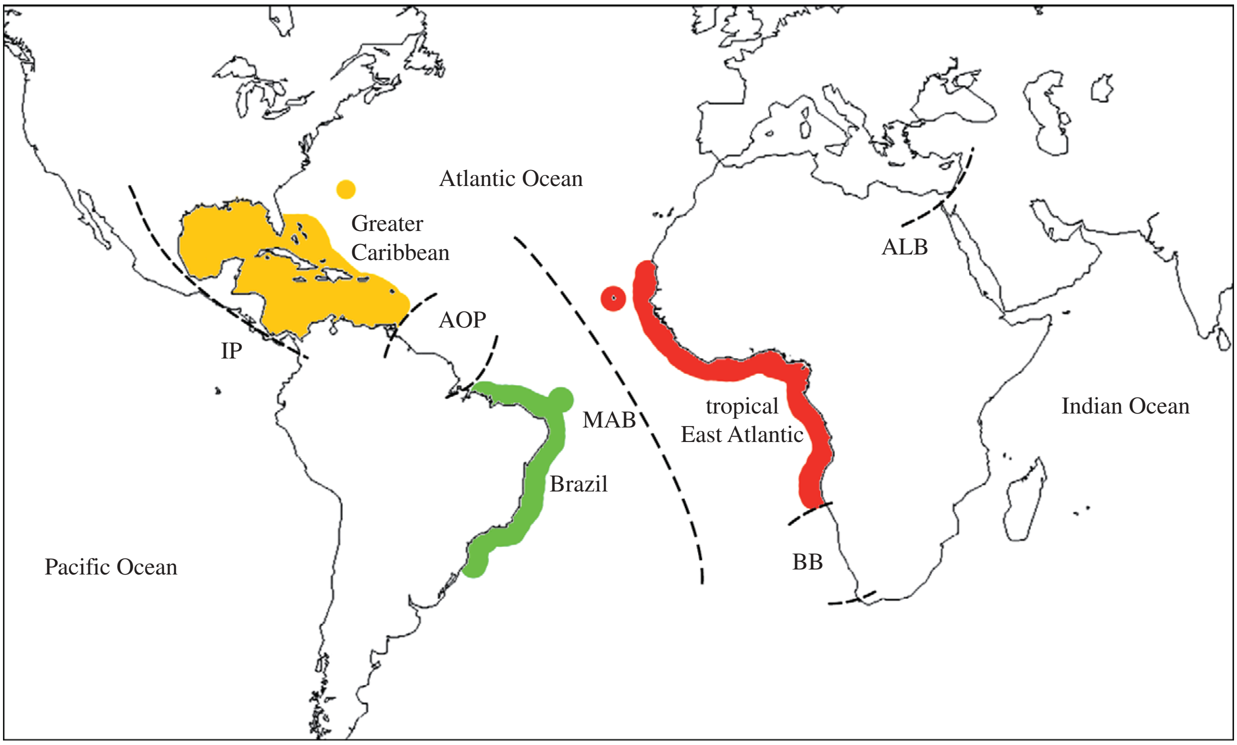

Figure 1. Biogeographic provinces and barriers affecting tropical reef fishes in the Atlantic Ocean. Land barriers: IP, Isthmus of Panama; ALB Arabian Land Bridge. Soft barriers: AOP, Amazon–Orinoco Plume; MAB, Mid-Atlantic Barrier; BB, Benguela Barrier.

not established populations in the new area [17]. The MAB and the AOP differ in their time of existence and mode of operation. The former is a deep-ocean barrier that was produced by the formation of the Atlantic Ocean basin as Africa and South America separated over the past 85 Myr. This gradually created a gap that has expanded to as much as approximately 3500 km across the equatorial Atlantic zone, where major east–west currents flow (although with a minimum straight-line distance between the continents of approx. 2800 km). This represents an extreme distance relative to regular larval dispersal by marine organisms [3]. By contrast, the approximately 10 Myr-old AOP is a coastal barrier formed by the formidable freshwater and sediment discharges of the Amazon and Orinoco rivers spreading along 2300 km of the northeast coast of South America [2]. These outflows produce dramatic changes in the physical and chemical properties of coastal waters in the area [2,18]. In the AOP, a thick (approx. 30 m deep) turbid, low-salinity layer at the surface effectively reduces connectivity of northern and southern populations of many coastal marine organisms [2]. Unlike the oceanic MAB, which only allows pelagic dispersal, the AOP is an inshore barrier which contains benthic habitat that potentially is available to reef fish species that can use non-reef habitats and tolerate reduced salinities.

The effectiveness of permeable barriers such as the AOP and the MAB on range expansion and regional faunal composition may be influenced by different species-level traits that affect not only the pelagic dispersal but also the potential to establish a new population after a barrier has been crossed. Variation in the larval-development mode of tropical reef fishes has been proposed as a determinant of species geographical ranges through its effects on the duration of the pelagic larval period [19–22]. Eggs from fishes that spawn in the water column (pelagic spawners) are subjected to ocean currents immediately after spawning, whereas eggs from demersal spawners are attached to the bottom and the larvae can disperse only after hatching, several days after spawning. It is generally assumed that the dispersal potential of larvae of pelagic spawners is greater than that of demersal spawners because propagules of the former spend more time in the pelagic stage [22].

Pelagic-dispersal potential is also influenced by the ability of species to raft with floating debris in the open sea. Marine organisms that raft as juveniles or adults are capable of crossing large expanses of ocean [23–25], and rafting by tropical reef fishes may be more common than previously thought [6,14,26]. Rafting may be an important dispersal mechanism because it facilitates the dispersal of multiple life stages (e.g. juveniles to adults) and is independent of the duration of the pelagic larval phase. Currently, however, we lack a general understanding of the significance of rafting as a mechanism for traversing large dispersal barriers by tropical reef fishes [6,26].

Expansion of a species geographical range to the far side of a barrier must be affected by its capacity to establish a population in the new habitat following dispersal across the barrier, which depends on the ability of adults and the larvae they produce to exploit new ecological conditions. The degree of adult and larval tolerance for a range of environmental conditions could thus affect the success of establishment. Among both terrestrial and marine organisms, large-bodied species tend to have broader geographical distributions [27,28], and large size may facilitate establishment by providing a degree of eurytolerance [9,29]. As indicators of tolerance for a range of environmental conditions by crossers of both the MAB and the AOP, we used adult body size, latitudinal-range within a province, and adult usage of both reef and non-reef habitats. Other adult traits we examined relate more to the potential for adults to live in habitat of the coastal

AOP: use of brackish habitats and the ability to live in depths below the freshwater plume. These two traits, plus use of non-reef habitats, could determine which species can use saline non-reef (sponge) habitats under the floating freshwater plume of the AOP [18], or in brackish, non-reef habitats within the plume itself.

In this study, we use a comprehensive compilation of species-level larval and adult traits described above and the geographical distributions of tropical reef fish species to investigate which traits predict range expansion across the MAB and the AOP. We then discuss how those traits relate to the distinctive mode of operation of each barrier. Our existing database on large-scale distributions of members of this fauna [3] greatly facilitated this analysis.

2. MATERIAL AND METHODS

(a) *Data collection*

Existing data on larval-development mode, association with marine flotsam, geographical distributions on each side of each barrier, latitudinal-range, maximum total length (our surrogate for body size) and maximum depth of the depth range were collected for 985 reef-associated tropical Atlantic fish species (electronic supplementary material, appendix S1). These included demersal and semi-pelagic species that typically associate with coral, rocky and/or coralline algal reefs. For Western-Atlantic species, data on reef species use of non-reef habitats (sand, mud, mangroves, seagrasses and other submerged vegetation, sponge beds), brackish habitat use and latitudinal-range within a province (the Greater Caribbean or Brazil) were taken from the literature, online databases (www.fishbase.org) and complemented from our own records.

Distributions relating to the MAB and the AOP came from a large database previously used by Floeter *et al.* (appendix S1 of [3]). Occurrence records include both established species and rare waifs, which could represent either rare arrivals or the last survivors at the end of a failed establishment following arrival in abundance. Occurrence records thus include information about both crossings and establishment, although the great majority (95.3%) of *trans*-barrier species are successful crossers which have established populations on both sides of a barrier.

Knowledge on the latitudinal-ranges and habitat use of species restricted to the tropical East Atlantic is insufficient for inclusion in analyses involving those two variables, which are limited to species resident in the West Atlantic. Latitudinal-range data came from regional databases (www.fishbase.org) [30] and the collection record database provided by the global aggregator Ocean and Biogeographic Information System (www.iobis.org). We calculated the intra-regional latitudinal-range of each species within either the Greater Caribbean or Brazilian provinces and used the larger of the two values for species found in both. Maximum total length data were mostly obtained from the literature [30–34]. Where length data could not be found (only 1.9% of the species), the mean maximum total length for the genus was used instead. Data on use of non-reef habitats, brackish habitats and maximum depth came from the same sources as the length data (and also [35]). Larval-development modes were assigned to each species following the classification by Thresher [19]: pelagic spawners (which release small, rapidly developing planktonic eggs into the water column at spawning), demersal spawners (which guard or brood slowly developing large demersal eggs to hatching, or give birth directly to swimming young) and balistid-type spawners (which guard rapidly developing small eggs to hatching, and mainly include balistids, monocanthids and tetraodontids). Finally, species were designated as rafters if they have been reported in the literature [24,36] or observed by us aggregating around drifting flotsam in the ocean.

(b) *Data analysis*

To determine the relative importance of different species-level traits associated with crossing the MAB and the AOP, statistical relationships between species traits and their distribution were investigated using generalized linear mixed-effect models (GLMMs). These models included the taxon (genus nested within family) as a random effect, accounting for the non-independence of species owing to shared evolution [37–39]. For the MAB, we conducted two analyses: (i) resident West-Atlantic species (i.e. excluding species with populations in the East Atlantic but not West Atlantic, and occurring in the West Atlantic only as vagrants, if at all) in order to analyse all trait variables and (ii) all species, but excluding latitudinal-range and habitat use, which were not available for many East-Atlantic species. For the AOP, we conducted a single analysis with all West-Atlantic resident species and all factors. Finally, to test for a possible disproportionate influence of super-dispersing families on the whole-fauna relationships, we repeated the above analyses after removing all species of Carangidae and Muraenidae, which contain many large species that either have semi-pelagic habits and associate with flotsam (Carangids), or possess very long-lived pelagic larvae (Muraenids, see [6,32,40]).

GLMMs allow both continuous and categorical predictor variables, and a nonlinear response variable [41]. Such models also account for the non-independence of species owing to shared evolution by making taxa a random variable [38,39,42,43]. This is accomplished by removing variation owing to differences among families or genera from the error term and allowing them to vary randomly around the overall mean [37,44,45]. Other independent variables (fixed effects) can then be examined, and any significant results can then be generalized to the entire fauna. Barrier crossing was considered to have binomial distributions of errors (crossing = 1 and not crossing = 0; these data were examined using a logit link function). The GLMM was run with the function glmmML from the R package glmmML [46,47]. To determine the best predictive model for crossing potential, we compared the full model with nested models in which one of the predictor variables was dropped (using the 'ANOVA' function in the R base statistics distribution). If an ANOVA found a dropped variable to have no significant effect on the model, then that variable was removed from the model (table 1*a*). Interactions (up to two-way) were examined and dropped in the same fashion. Plots of relationships between crossing and significant factors were derived from probability values produced as part of the output of each GLMM.

3. RESULTS

Among the entire suite of 985 species used in our analyses, 11.0 per cent from 71 genera and 35 families have trans-Atlantic distributions that span the MAB. By contrast, 39.5 per cent of 770 Western-Atlantic resident species from 175 genera and 51 families are distributed across the AOP in both Caribbean and Brazilian provinces. Among the Western-Atlantic residents, 87.5 per cent of the 104 species that cross the MAB also cross the AOP.

Table 1. Summary of generalized linear mixed-effect models statistics for effects of various traits on the ability of species to overcome two oceanographic barriers. (*a*) The effect of dropping each variable separately from full models (showing both Akaike information criteria (AIC) and χ^2-test statistics). (*b*) The final predictive model (showing estimates, standard error and *p*-values). (Coefficient in bold indicates that *p*-value is significant ($p < 0.05$)).

	Mid-Atlantic Barrier						Amazon–Orinoco Plume (770)		
	Western-Atlantic species only (770)			all species (985)					
(*a*) variable	d.f.	AIC	Pr (χ^2)	d.f.	AIC	Pr (χ^2)	d.f.	AIC	Pr (χ^2)
full model	11	377.3	—	8	501.1	—	11	642.8	—
rafting behaviour	10	383.8	**0.003**	7	565.6	**<0.001**	10	639.1	0.616
larval-development mode	9	376.2	0.238	6	499.3	0.336	9	652.8	**<0.001**
maximum body size	10	389.8	**<0.001**	7	523.2	**<0.001**	10	644.0	**0.061**
intra-regional latitudinal-range	10	416.6	**<0.001**	n.a.	n.a.	n.a.	10	793.8	**<0.001**
multi-habitat use	10	378.9	**0.055**	n.a.	n.a.	n.a.	10	645.8	**0.025**
maximum depth	10	375.8	0.491	n.a.	n.a.	n.a.	10	640.8	0.978
low-salinity affinity	10	377.3	0.160	n.a.	n.a.	n.a.	10	641.6	0.379
(*b*) variable	est.	s.e.	*p*	est.	s.e.	*p*	est.	s.e.	*p*
intercept	−10.324	1.174	**<0.001**	−6.258	0.699	**<0.001**	−7.026	0.818	**< 0.001**
rafting behaviour	1.550	0.484	**0.001**	2.434	0.394	**< 0.001**	n.a.	n.a.	n.a.
larval-development mode									
pelagic versus demersal	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.044	0.340	0.908
pelagic versus balistid	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.721	0.827	0.382
demersal versus balistid	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	−0.676	0.856	0.429
maximum body size	2.310	0.538	**<0.001**	2.572	0.426	**<0.001**	0.832	0.386	**0.031**
intra-regional latitudinal-range	0.200	0.038	**<0.001**	n.a.	n.a.	n.a.	0.256	0.026	**<0.001**
multi-habitat use	−0.741	0.368	0.065	n.a.	n.a.	n.a.	0.577	0.230	**0.012**

Thus, relative to the MAB, the AOP is crossed by many more species of a much broader range of taxa and ecotypes, and Western-Atlantic species that cross the MAB represent only 30 per cent of those that cross the AOP.

For the MAB, larval-development mode, maximum depth of occurrence and ability to live in brackish habitat did not add significant predicative power to the full GLMMs and were dropped from the final models (table 1*a*). For the AOP GLMMs, rafting ability, maximum depth of occurrence and ability to live in brackish habitat were dropped from the final models for the same reason (table 1*a*). Marginal predictor variables in the full models were retained in each final model: multi-habitat use for the MAB and maximum body size for the AOP (table 1*a*). There were no significant two-way interactions between predictor variables.

Significant positive predictors for overcoming both the MAB and the AOP were intra-regional latitudinal-range and maximum body size (table 1). Additional positive predictors for crossing one barrier were rafting ability for the MAB and multi-habitat use for the AOP. Larval-development mode was a significant predictor for the AOP in the full model, and was thus maintained in further analysis, but no significant differences were found in any pairwise tests between the three development modes in the final model (table 1*b*). For both the MAB and the AOP models, the intercepts were significantly different from zero, indicating that, while the significant traits increase the probability of barrier crossing, a lack of these traits does not mean that the probability is close to zero (figure 2).

The MAB and the AOP GLMMs that excluded data on species from super-disperser families produced the same patterns as the full models that included super-dispersers (electronic supplementary material, table S2). Large adult-size and rafting ability were significant predictors in all MAB models, including the GLMM for both East + West-Atlantic species that did not incorporate latitudinal-range as a factor.

4. DISCUSSION

Range expansions of tropical reef fish species over two permeable marine barriers to dispersal within the tropical Atlantic are associated with somewhat different suites of ecological traits. A pelagic-dispersal mechanism (rafting) was linked to crossing only one barrier, the MAB. Interestingly, variation in larval-development mode, which could well have some effect on larval-dispersal potential, did not act as a significant predictor for crossing either the MAB or the AOP. These results indicate that, for a large oceanic barrier for which relatively long transit times can be expected, basic variation in larval-development mode has no general effect on trans-barrier occurrence, but the 'increased dispersal potential provided by rafting does become important. Rafting may act not only as a pelagic-dispersal mechanism but also as an establishment enhancer. Rafting individuals enter a new area as juveniles or adults that have already passed through the early (larval) life-history stage of high mortality. Further, because flotsam is well known to act as an aggregator that attracts fishes, rafting individuals are more likely to arrive in groups. Both these factors could promote population establishment in a new area.

Pelagic larval duration (PLD) has been viewed as a convenient surrogate for dispersal potential in marine

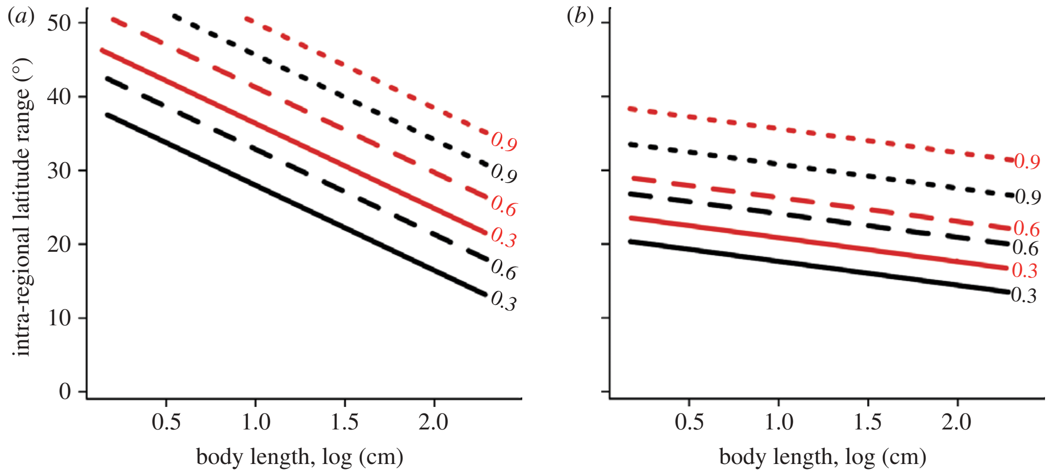

Figure 2. Line plots of predicted potential of overcoming each marine biogeographic barrier by Atlantic reef fishes as a function of their ecological traits. For visual simplicity, standard errors are omitted. Plots were derived from probability values produced by each GLMM (see table 1*b*). (*a*) Mid-Atlantic Barrier (MAB; black, rafter; red, non-rafter); (*b*) Amazon–Orinoco Plume (AOP; black, multi-habitat user; red, reef-habitats only). Rafter: juveniles/adults associate with flotsam; body size: maximum known length; multi-habitat user: associate with reef and other habitat types; intra-regional latitudinal-range: the largest range within either the Greater Caribbean or Brazilian Provinces.

species that have a sedentary adult stage and pelagic larvae. However, empirical support for the generality of this relationship is lacking, notably in the tropical Atlantic [48]. Because estimates of species' PLD are available for relatively few species, larval-development modes have been used as broad indicators of larval-dispersal potential [21]. Our analyses indicate that variation in larval-development mode is not a significant predictor of crossing either the MAB or the AOP. Any effects of variation in larval-dispersal potential indicated by larval-development mode seem to have been overwhelmed by stronger effects of rafting, habitat use, body size and latitudinal-range.

Significant predictors for both the MAB and the AOP are large latitudinal-range and large adult-size. The probability of successful establishment following transit across a barrier, and the factors that affect that success, has not been formally considered as a factor affecting the large-scale distributions of tropical reef fishes in previous studies. Latitudinal-range may be associated with the degree of tolerance of varying environmental conditions by both demersal adults and pelagic larvae [49], and large native ranges are often considered to be good predictors of invasion success [50]. Eurytolerance of environmental conditions by adults and larvae, as indicated by large latitudinal-ranges, may facilitate establishment of species of tropical reef fishes that cross the MAB and the AOP.

A relationship between large adult size and both range-size and barrier crossing has been documented for both terrestrial and marine species [8,51,52]. The positive correlation we found between body size and occurrence on both sides of the MAB and the AOP may reflect an advantage that large-bodied species have in population establishment in novel habitat [53]. Body size has long been suggested as a trait associated with colonization success, mainly because it is linked to faster growth, greater competitive ability, enhanced predator avoidance and tolerance of environmental variability [9,29,53]. In addition, longevity broadly correlates positively with body size among fishes [54], and long-lived individuals may provide a 'buffer' against extinctions during the population-establishment phase resulting from long intervals between sporadic recruitment events across barriers [38,55]. In summary, adults of large-bodied tropical reef fish species may be better at colonizing new habitats and expanding their ranges across marine barriers.

Multi-habitat use was the only habitat factor related to crossing of the AOP but not the MAB by Western-Atlantic species, and neither maximum depth of occurrence nor use of brackish habitats had any effect on crossing the AOP. Habitat eurytolerance may affect crossing the AOP in two different ways: (i) it may allow adults to use non-reef habitats within the AOP as stepping stones to facilitate crossing, or (ii) the ability to use a range of habitats may enhance establishment after crossing. Multi-habitat use did not predict species' crossing the MAB. As it is hard to see how being able to use a variety of habitats would not facilitate establishment after crossing both barriers, we suggest that the inconsistency between the effects of multi-habitat use in the MAB and the AOP may arise because multi-habitat use facilitates AOP-crossing through a stepping-stone effect during crossing rather than an establishment effect following crossing.

Migration traffic is likely to occur in both directions, which is potentially indicated by rare occurrences of some species one side of a barrier or the other [17]. However, determining the direction that various species crossed a barrier, and how biological and ecological traits might vary with respect to movements in each direction, will require complicated and time-consuming genetic studies involving many taxa (cf. [56]). At present, all we can say is which factors are involved in assisting species to overcome each barrier, and that our analyses have detected factors unrelated to larval-dispersal potential that have not been previously been examined for reef fishes.

Crossing both the MAB and the AOP is associated with large latitudinal-ranges and large body size, while rafting is an additional factor for the MAB and multi-habitat use for the AOP. These differences relate to the relative ease with which each barrier can be crossed. The AOP alone provides non-reef habitat useable by adults of certain species of reef fishes to facilitate crossing, and is probably easier to cross by a variety of types of pelagic propagules because it is narrower and current speeds across it are faster (http://oceancurrents.rsmas.miami.edu/atlantic/atlantic.html). The effect of this combination of factors is that many more species of a broader range of taxa and ecotypes cross the AOP than the MAB. The great majority of rafting species that cross the MAB also cross the AOP, and in fact more species of rafters cross the AOP [51] than cross the MAB [37]. However, rafting is not an important factor at the assemblage level for crossing the AOP because rafters represent a much smaller proportion of AOP crossers (17.4%) than of MAB crossers (36.1%).

The two barriers we examined have idiosyncratic features that endow them with a certain measure of uniqueness and thus limit generalizations that can be made to other large marine barriers, such as those that affect tropical reef fishes in the Indo-Pacific. The AOP is formed by the world's largest river discharge system, whose freshwater output influences the longest such stretch of coastline in the world. In addition, the AOP deposits huge amounts of rainforest plant debris as flotsam into the Atlantic Ocean every year [2]. The effects of other, smaller discharge systems on Indo-Pacific reef fish faunas, which also differ in taxonomic composition to the Atlantic reef fish fauna, remain to be assessed. The MAB, on the other hand, probably is broadly equivalent to other wide oceanic barriers in the Indo-Pacific, such as the 4000+ km wide Eastern-Pacific Barrier (EPB) [6,56]. Rafting may have an important role in dispersal across the EPB [6]. However, the role of rafting may be greatly enhanced with respect to crossing the MAB owing to the coastal geography of the Atlantic Ocean. Large continental landmasses on both sides of that barrier provide abundant potential sources of plant debris that form the floating substrata for rafting fishes, plus large targets where drifting material can deliver rafting reef fishes. By contrast, the EPB has a large land mass only on one side, and a few small, highly scattered islands on the other. Factors that could facilitate pelagic dispersal over the EPB were analysed separately by Robertson *et al.* [6], and no attempt was made to account for correlations between them. A reassessment of dispersal by transpacific shore fishes across the EPB that models a combination of a similar suite of factors to those we considered for the MAB and the AOP should provide a test of the generality of our findings. Finally, although our analyses were restricted to tropical fish assemblages, circulating ocean currents connect the eastern and western sides of both the North and the South Atlantic temperate zones. Further analysis on ecological traits of temperate fish and their distribution on either side of the Atlantic using a similar approach should present an opportunity to test hypotheses accounting for latitudinal differences in dispersal ability [8].

5. CONCLUSIONS

Our analyses of tropical Atlantic reef fishes clearly indicate that assessments of factors which influence the successful crossing of marine barriers that focus on variation in larval life histories as determinants of pelagic-dispersal ability, will be far from adequate for the many shore organisms that produce pelagic larvae. Inclusion of a broader range of pelagic-dispersal and adult-biology factors in our analyses relegated variation in major modes of larval-development to an insignificant role as a determinant of large barrier crossing by these fishes. Flotsam-rafting provides extra capacity to the pelagic-dispersal mechanism as well as possibly enhancing post-crossing establishment, and plays a substantial role in determining distributions relative to a large deep-water oceanic barrier. Multiple-habitat use may facilitate expansion over long stretches of coastal adverse conditions through a stepping-stone effect. Finally, adult and larval eurytolerance, as indicated by large size and large latitudinal-range, may influence faunal patterns of crossing large barriers by enhancing establishment. Future assessments of factors influencing the distributions of demersal marine organisms relative to large marine barriers must broaden their focus to include various pelagic-dispersal mechanisms, and factors that influence whether migrants successfully establish populations in the new habitat.

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Table S1. Species used in analyses in this study, examined by literature reviewed in the present study. *: Length and/or depth not available from the literature, values used were the mean for the genus. This represents only 1.9% (length) and 4.8% (depth) of the 985 species analyzed; variation from the genus average is probably very small in those cases (not more than 10 cm) because most are small poorly known gobiids and other small cryptic taxa. Furthermore, length and maximum depth values were log transformed prior to analyses, reducing the impact of any variation from the genus mean in such species. **Spawn**: larval-development mode; BAL = balistid type; DEM = demersal; PEL = pelagic. **Rafter:** if has been reported aggregating around drifting or stationary objects in the ocean. **Depth:** maximum depth of the depth range. **Length:** maximum total length. **Brackish:** if has been reported using brackish habitat. **Multi-habitat:** if has been reported using non-reef habitats. **Lat range:** intra-regional latitudinal range, i.e. the largest latitudinal range within one of the west Atlantic provinces (Caribbean or Brazil). **Caribbean; Brazil; East Atlantic:** species occurrence on each province; 0 = absent; 1 = present. **Notes:** 1. Distributional records from online databases contain many errors [Robertson, D. R. 2008 Global biogeographic databases on marine fishes: caveat emptor. *Divers. Distrib.* **14**, 891−892]. Hence we rigorously screened all records obtained from such those sources using guidebooks by professional scientists, and recent taxonomic revisions and faunal lists for localities published in refereed journals. We also reviewed outliers in the OBIS database to assess validity; e.g. records of shallow species in deep water were likely larvae. As the warm Gulf Stream carries propagules of some tropical species well to the north of their adult ranges we truncated the northern limits of the ranges of tropical species (those whose ranges include the entire Caribbean) at 35N, to limit outlier effects. 2. We did not include as rafters species recorded only from oil-rigs. Such structures, being large, composed of “rock”, and permanent, essentially represent suspended reefs that support and can help transport substantial numbers of reef-fish species, many of which are not known to associate with smaller, more ephemeral natural flotsam. Literature records of all these types of data were supplemented and corrected by our own observations and records

Family	Genus	Species	Spawn	Rafter	Depth (m)	Length (cm)	Brackish	Multihabitat	Lat. range	Caribbean	Brazil	Trop. East Atlantic
ACANTHURIDAE	Acanthurus	bahianus	PEL	NO	40	35	NO	YES	26	0	1	0
ACANTHURIDAE	Acanthurus	chirurgus	PEL	NO	70	34	NO	YES	28	1	1	0
ACANTHURIDAE	Acanthurus	coeruleus	PEL	NO	70	36	NO	YES	28	1	1	0
ACANTHURIDAE	Acanthurus	monroviae	PEL	NO	40	40	NO	NO	4	0	1	1
ACANTHURIDAE	Acanthurus	tractus	PEL	NO	40	35	NO	YES	26	1	0	0
ACANTHURIDAE	Prionurus	biafraensis	PEL	NO	10	24				0	0	1
ANTENNARIIDAE	Antennarius	bermudensis	PEL	NO	30	7.7	NO	NO	25	1	0	0
ANTENNARIIDAE	Antennarius	multiocellatus	PEL	NO	66	14.3	NO	NO	26	1	1	1
ANTENNARIIDAE	Antennarius	nummifer	PEL	NO	150	13				0	0	1
ANTENNARIIDAE	Antennarius	ocellatus	PEL	NO	150	42	NO	YES	27	1	0	0
ANTENNARIIDAE	Antennarius	pardalis	PEL	NO	50	10				0	0	1
ANTENNARIIDAE	Antennarius	pauciradiatus	PEL	NO	73	5.6	NO	YES	24	1	0	0
ANTENNARIIDAE	Antennarius	radiosus	PEL	NO	275	7.6	NO	YES	22	1	0	1
ANTENNARIIDAE	Antennarius	senegalensis	PEL	NO	80	28.5				0	0	1
ANTENNARIIDAE	Antennarius	striatus	PEL	NO	219	21	NO	YES	37	1	1	1
ANTENNARIIDAE	Histrio	histrio	PEL	YES	5	20	NO	NO	34	1	1	1
APOGONIDAE	Apogon	affinis	DEM	NO	300	11	NO	NO	25	1	0	1
APOGONIDAE	Apogon	americanus	DEM	NO	50	12	NO	YES	26	0	1	0
APOGONIDAE	Apogon	aurolineatus	DEM	NO	80	6.5	NO	NO	23	1	0	0
APOGONIDAE	Apogon	binotatus	DEM	NO	60	15	NO	NO	22	1	0	0
APOGONIDAE	Apogon	evermanni	DEM	NO	69	15	NO	NO	21	1	0	0
APOGONIDAE	Apogon	gouldi	DEM	NO	262	10.4	NO	NO	26	1	0	0
APOGONIDAE	Apogon	imberbis	DEM	YES	200	15				0	0	1
APOGONIDAE	Apogon	lachneri	DEM	NO	106	6.5	NO	NO	21	1	0	0
APOGONIDAE	Apogon	leptocaulus	DEM	NO	60	6	NO	NO	21	1	0	0
APOGONIDAE	Apogon	maculatus	DEM	NO	128	11.1	NO	NO	28	1	0	0
APOGONIDAE	Apogon	mosavi	DEM	NO	40	4.3	NO	NO	21	1	0	0
APOGONIDAE	Apogon	phenax	DEM	NO	50	8.1	NO	NO	21	1	0	0
APOGONIDAE	Apogon	pillionatus	DEM	NO	90	6.5	NO	NO	21	1	0	0
APOGONIDAE	Apogon	planifrons	DEM	NO	30	10.5	NO	NO	26	1	1	0
APOGONIDAE	Apogon	pseudomaculatus	DEM	NO	65	11	NO	NO	28	1	1	1
APOGONIDAE	Apogon	quadrisquamatus	DEM	NO	75	4.8	NO	YES	23	1	1	0
APOGONIDAE	Apogon	robbyi	DEM	NO	30	4.8	NO	YES	22	1	1	0
APOGONIDAE	Apogon	robinsi	DEM	NO	90	10.1	NO	NO	26	1	0	0
APOGONIDAE	Apogon	townsendi	DEM	NO	55	8.5	NO	NO	26	1	0	0
APOGONIDAE	Astrapogon	alutus	DEM	NO	20	6.5	NO	YES	28	1	0	0
APOGONIDAE	Astrapogon	puncticulatus	DEM	NO	15	10	NO	YES	23	1	1	0
APOGONIDAE	Astrapogon	stellatus	DEM	NO	40	8	NO	YES	26	1	1	0
APOGONIDAE	Phaeoptyx	conklini	DEM	NO	35	9	NO	YES	26	1	0	0
APOGONIDAE	Phaeoptyx	pigmentaria	DEM	NO	50	8	NO	NO	26	1	1	1
APOGONIDAE	Phaeoptyx	xenus	DEM	NO	60	7.5	NO	NO	23	1	0	0
AULOSTOMIDAE	Aulostomus	maculatus	PEL	NO	1000	100	NO	YES	26	1	0	0

AULOSTOMIDAE	Aulostomus	strigosus	PEL	NO	1000	100	NO	NO	23	0	1	1
BALISTIDAE	Abalistes	stellatus	BAL	NO	100	60				0	0	1
BALISTIDAE	Balistes	capriscus	BAL	YES	110	30	NO	YES	37	1	1	1
BALISTIDAE	Balistes	punctatus	BAL	NO	200	60				0	0	1
BALISTIDAE	Balistes	vetula	BAL	YES	120	50	NO	YES	28	1	1	1
BALISTIDAE	Canthidermis	maculata	BAL	YES	110	50	NO	NO	39	1	1	1
BALISTIDAE	Canthidermis	sufflamen	BAL	YES	75	65	NO	YES	40	1	1	1
BALISTIDAE	Melichthys	niger	BAL	YES	75	50	NO	NO	26	1	1	1
BALISTIDAE	Xanthichthys	ringens	BAL	YES	130	25	NO	NO	28	1	1	0
BATRACHOIDIDAE	Amphichthys	cryptocentrus	DEM	NO	70	34	YES	YES	23	1	1	0
BATRACHOIDIDAE	Halobatrachus	didactylus	DEM	NO	50	50				0	0	1
BATRACHOIDIDAE	Opsanus	beta	DEM	NO	5	30	NO	YES	23	1	1	0
BATRACHOIDIDAE	Opsanus	dichrostomus	DEM	NO	5	15	NO	NO	16	1	0	0
BATRACHOIDIDAE	Opsanus	pardus	DEM	NO	91	39	NO	NO	9	1	0	0
BATRACHOIDIDAE	Opsanus	phobetron	DEM	NO	12	21.5	NO	NO	5	1	0	0
BATRACHOIDIDAE	Opsanus	tau	DEM	NO	5	47.4	YES	NO	20	1	0	0
BATRACHOIDIDAE	Perulibatrachus	rossignoli	DEM	NO	100	40				0	0	1
BATRACHOIDIDAE	Porichthys	oculofrenum	DEM	NO	62	11	NO	YES	26	1	1	0
BATRACHOIDIDAE	Porichthys	plectrodon	DEM	NO	256	29	NO	YES	39	1	1	0
BATRACHOIDIDAE	Porichthys	porosissimus	DEM	NO	200	35	YES	YES	22	1	1	0
BATRACHOIDIDAE	Sanopus	astrifer	DEM	NO	30	27.8	NO	NO	3	1	0	0
BATRACHOIDIDAE	Sanopus	barbatus	DEM	NO	20	41	NO	NO	11	1	0	0
BATRACHOIDIDAE	Sanopus	greenfieldorum	DEM	NO	30	31	NO	NO	3	1	0	0
BATRACHOIDIDAE	Sanopus	johnsoni	DEM	NO	7	30	NO	NO	2	1	0	0
BATRACHOIDIDAE	Sanopus	reticulatus	DEM	NO	10	26	NO	NO	1	1	0	0
BATRACHOIDIDAE	Sanopus	splendidus	DEM	NO	25	29	NO	NO	1	1	0	0
BATRACHOIDIDAE	Thalassophryne	natereri	DEM	NO	200	22	YES	YES	26	1	1	0
BATRACHOIDIDAE	Thalassophryne	punctata	DEM	NO	200	22	YES	YES	2	0	1	0
BATRACHOIDIDAE	Vladichthys	gloverensis	DEM	NO	34	6.8	NO	YES	1	1	0	0
BLENNIIDAE	Blennius	normani	DEM	NO	200	11				0	0	1
BLENNIIDAE	Entomacrodus	cadenati	DEM	NO	1*	6.9				0	0	1
BLENNIIDAE	Entomacrodus	nigricans	DEM	NO	1	10	NO	NO	25	1	0	0
BLENNIIDAE	Entomacrodus	sp.n.	DEM	NO	1*	8.26*	NO	NO		0	1	0
BLENNIIDAE	Entomacrodus	vomerinus	DEM	NO	1*	7.9	YES	NO	17	0	1	0
BLENNIIDAE	Hypleurochilus	aequipinnis	DEM	NO	13.07*	7.5				0	0	1
BLENNIIDAE	Hypleurochilus	bananensis	DEM	NO	13.07*	10.5				0	0	1
BLENNIIDAE	Hypleurochilus	bermudensis	DEM	NO	27	12	NO	NO	11	1	0	0
BLENNIIDAE	Hypleurochilus	caudovittatus	DEM	NO	23	7	NO	YES	3	1	0	0
BLENNIIDAE	Hypleurochilus	fissicornis	DEM	NO	5	8.7	YES	YES	20	0	1	0
BLENNIIDAE	Hypleurochilus	geminatus	DEM	NO	23	10.5	NO	NO	14	1	0	0
BLENNIIDAE	Hypleurochilus	langi	DEM	NO	13.07*	7				0	0	1
BLENNIIDAE	Hypleurochilus	multifilis	DEM	NO	7	10	YES	NO	3	1	0	0
BLENNIIDAE	Hypleurochilus	pseudoaequipinnis	DEM	NO	2	7.5	YES	YES	24	1	1	1

BLENNIIDAE	Hypleurochilus	springeri	DEM	NO	4.5	6.4	NO	NO	19	1	0	0
BLENNIIDAE	Hypsoblennius	exstochilus	DEM	NO	7	6.3	NO	NO	11	1	0	0
BLENNIIDAE	Hypsoblennius	invemar	DEM	NO	30	5.8	NO	NO	24	1	1	0
BLENNIIDAE	Lipophrys	bauchotae	DEM	NO	6.6*	4.4				0	0	1
BLENNIIDAE	Lipophrys	caboverdensis	DEM	NO	6.6*	4				0	0	1
BLENNIIDAE	Lipophrys	velifer	DEM	NO	6.6*	5.8				0	0	1
BLENNIIDAE	Ophioblennius	atlanticus	DEM	NO	8	20				0	0	1
BLENNIIDAE	Ophioblennius	macclurei	DEM	NO	20	12.5	NO	NO	28	1	0	0
BLENNIIDAE	Ophioblennius	sp.EA	DEM	NO	8	12				0	0	1
BLENNIIDAE	Ophioblennius	trinitatis	DEM	NO	53	12	NO	NO	26	0	1	0
BLENNIIDAE	Parablennius	dialloi	DEM	NO	17.45*	11.12*				0	0	1
BLENNIIDAE	Parablennius	goreensis	DEM	NO	17	7				0	0	1
BLENNIIDAE	Parablennius	marmoreus	DEM	NO	35	10.8	NO	NO	35	1	1	0
BLENNIIDAE	Parablennius	parvicornis	DEM	NO	1	12				0	0	1
BLENNIIDAE	Parablennius	pilicornis	DEM	NO	25	12.7	NO	NO	40	0	1	1
BLENNIIDAE	Parablennius	salensis	DEM	NO	17.45*	6				0	0	1
BLENNIIDAE	Parablennius	sierraensis	DEM	NO	17.45*	11.12*				0	0	1
BLENNIIDAE	Parablennius	verryckeni	DEM	NO	10	4.9				0	0	1
BLENNIIDAE	Scartella	caboverdiana	DEM	NO	3	10				0	0	1
BLENNIIDAE	Scartella	cristata	DEM	YES	20	10	NO	NO	33	1	1	1
BLENNIIDAE	Scartella	emarginata	DEM	NO	3	10				0	0	1
BLENNIIDAE	Scartella	itajobi	DEM	NO	1	5	NO	NO	1	0	1	0
BLENNIIDAE	Scartella	poiti	DEM	NO	1	8.5	NO	NO	1	0	1	0
BLENNIIDAE	Spaniblennius	clandestinus	DEM	NO	30	5.1				0	0	1
BLENNIIDAE	Spaniblennius	riodourensis	DEM	NO	30	8				0	0	1
BOTHIDAE	Arnoglossus	capensis	PEL	NO	200	20				0	0	1
BOTHIDAE	Arnoglossus	imperialis	PEL	NO	350	25				0	0	1
BOTHIDAE	Bothus	guibei	PEL	NO	40	28.6				0	0	1
BOTHIDAE	Bothus	lunatus	PEL	NO	100	45	NO	YES	28	1	1	1
BOTHIDAE	Bothus	maculiferus	PEL	NO	45	25	NO	YES	23	1	1	0
BOTHIDAE	Bothus	ocellatus	PEL	NO	95	16	NO	YES	28	1	1	0
BOTHIDAE	Bothus	podas	PEL	NO	400	45				0	0	1
BYTHITIDAE	Calamopteryx	goslinei	DEM	NO	55	7.3	NO	NO	18	1	0	0
BYTHITIDAE	Calamopteryx	robinsorum	DEM	NO	210	5	NO	YES	22	1	0	0
BYTHITIDAE	Grammonus	claudei	DEM	NO	70	10	NO	NO	18	1	0	0
BYTHITIDAE	Grammonus	longhursti	DEM	NO	10	11				0	0	1
BYTHITIDAE	Ogilbia	cayorum	DEM	NO	8	7	NO	YES	11	1	0	0
BYTHITIDAE	Ogilbia	sp.(Abrolhos)	DEM	NO	8*	7*	NO	YES		0	1	0
BYTHITIDAE	Stygnobrotula	latebricola	DEM	NO	25	8	NO	NO	21	1	1	0
CALLIONYMIDAE	Diplogrammus	pauciradiatus	DEM	NO	10	6	NO	YES	18	1	0	0
CALLIONYMIDAE	Draculo	shango	DEM	NO	3	2.5				0	0	1
CALLIONYMIDAE	Paradiplogrammus	bairdi	DEM	NO	91	11.5	NO	YES	26	1	1	1
CARANGIDAE	Alectis	alexandrinus	PEL	NO	60	130				0	0	1

CARANGIDAE	Alectis	ciliaris	PEL	NO	100	150	NO	YES	40	1	1	1
CARANGIDAE	Carangoides	bartholomaei	PEL	YES	50	100	YES	YES	35	1	1	1
CARANGIDAE	Carangoides	ruber	PEL	YES	70	69	NO	YES	34	1	1	0
CARANGIDAE	Caranx	crysos	PEL	YES	160	76	YES	YES	38	1	1	1
CARANGIDAE	Caranx	fisheri	PEL	NO	220	53				0	0	1
CARANGIDAE	Caranx	hippos	PEL	YES	350	124	YES	YES	38	1	1	1
CARANGIDAE	Caranx	latus	PEL	YES	100	101	YES	YES	34	1	1	1
CARANGIDAE	Caranx	lugubris	PEL	YES	365	100	NO	YES	29	1	1	1
CARANGIDAE	Caranx	rhonchus	PEL	NO	200	60				0	0	1
CARANGIDAE	Caranx	senegallus	PEL	NO	200	100				0	0	1
CARANGIDAE	Decapterus	macarellus	PEL	YES	200	44	NO	YES	38	1	1	1
CARANGIDAE	Decapterus	punctatus	PEL	YES	100	36	NO	YES	36	1	1	1
CARANGIDAE	Decapterus	tabl	PEL	YES	400	51	NO	YES	30	1	1	0
CARANGIDAE	Elagatis	bipinnulata	PEL	YES	150	180	NO	YES	40	1	1	1
CARANGIDAE	Pseudocaranx	dentex	PEL	YES	200	122	NO	YES	40	1	1	1
CARANGIDAE	Selar	crumenophthalmus	PEL	YES	170	30	YES	YES	38	1	1	1
CARANGIDAE	Seriola	carpenteri	PEL	YES	200	73				0	0	1
CARANGIDAE	Seriola	dumerili	PEL	YES	350	190	NO	YES	38	1	1	1
CARANGIDAE	Seriola	fasciata	PEL	YES	150	79	NO	YES	34	1	1	1
CARANGIDAE	Seriola	lalandi	PEL	YES	825	150	NO	YES		0	1	1
CARANGIDAE	Seriola	rivoliana	PEL	YES	320	157	NO	YES	37	1	1	1
CARANGIDAE	Seriola	zonata	PEL	YES	360	78	NO	YES	36	1	1	0
CARANGIDAE	Trachinotus	carolinus	PEL	NO	70	64	YES	YES	36	1	1	0
CARANGIDAE	Trachinotus	falcatus	PEL	NO	36	149	NO	YES	35	1	1	0
CARANGIDAE	Trachinotus	goodei	PEL	NO	36	50.6	YES	YES	36	1	1	0
CARANGIDAE	Trachinotus	goreensis	PEL	NO	100	100				0	0	1
CARANGIDAE	Trachinotus	maxillosus	PEL	NO	88.4*	80				0	0	1
CARANGIDAE	Trachinotus	ovatus	PEL	NO	200	70				0	0	1
CARANGIDAE	Trachinotus	teraia	PEL	NO	88.4*	68				0	0	1
CARAPIDAE	Carapus	acus	PEL	NO	150	20.8				0	0	1
CARAPIDAE	Carapus	bermudensis	PEL	NO	235	20	NO	YES	28	1	1	0
CHAENOPSIDAE	Acanthemblemaria	aspera	DEM	NO	18	4	NO	NO	21	1	0	0
CHAENOPSIDAE	Acanthemblemaria	betinensis	DEM	NO	2.5	5.4	YES	NO	5	1	0	0
CHAENOPSIDAE	Acanthemblemaria	chaplini	DEM	NO	12	4.5	NO	NO	21	1	0	0
CHAENOPSIDAE	Acanthemblemaria	greenfieldi	DEM	NO	10	4	NO	NO	10	1	0	0
CHAENOPSIDAE	Acanthemblemaria	harpeza	DEM	NO	4.5	3.3	NO	NO	1	1	0	0
CHAENOPSIDAE	Acanthemblemaria	johnsoni	DEM	NO	12	3.1	NO	NO	2	1	0	0
CHAENOPSIDAE	Acanthemblemaria	maria	DEM	NO	9	5.2	NO	NO	20	1	0	0
CHAENOPSIDAE	Acanthemblemaria	medusa	DEM	NO	5	4	NO	NO	8	1	0	0
CHAENOPSIDAE	Acanthemblemaria	paula	DEM	NO	2	2.5	NO	NO	2	1	0	0
CHAENOPSIDAE	Acanthemblemaria	rivasi	DEM	NO	33	3.5	NO	NO	6	1	0	0
CHAENOPSIDAE	Acanthemblemaria	spinosa	DEM	NO	30	3.5	NO	NO	21	1	0	0
CHAENOPSIDAE	Chaenopsis	limbaughi	DEM	NO	21	8.2	NO	YES	21	1	0	0

CHAENOPSIDAE	Chaenopsis	megalops	DEM	NO	72	11	NO	YES	1	1	0	0
CHAENOPSIDAE	Chaenopsis	ocellata	DEM	NO	11	12.5	NO	YES	11	1	0	0
CHAENOPSIDAE	Chaenopsis	resh	DEM	NO	79	13	NO	YES	5	1	0	0
CHAENOPSIDAE	Chaenopsis	roseola	DEM	NO	64	4.8	NO	YES	1	1	0	0
CHAENOPSIDAE	Chaenopsis	stephensi	DEM	NO	4	5	NO	YES	4	1	0	0
CHAENOPSIDAE	Coralliozetus	cardonae	DEM	NO	4	2.5	NO	NO	21	1	0	0
CHAENOPSIDAE	Ekemblemaria	nigra	DEM	NO	3	7.1	NO	NO	6	1	0	0
CHAENOPSIDAE	Emblemaria	atlantica	DEM	NO	110	7.5	NO	YES	10	1	0	0
CHAENOPSIDAE	Emblemaria	australis	DEM	NO	30	3.1	YES	YES	1	0	1	0
CHAENOPSIDAE	Emblemaria	biocellata	DEM	NO	60	4.8	NO	NO	5	1	0	0
CHAENOPSIDAE	Emblemaria	caldwelli	DEM	NO	45	3.1	NO	YES	16	1	0	0
CHAENOPSIDAE	Emblemaria	caycedoi	DEM	NO	11	4.4	NO	YES	11	1	0	0
CHAENOPSIDAE	Emblemaria	culmenis	DEM	NO	64	6	NO	YES	1	1	0	0
CHAENOPSIDAE	Emblemaria	diphyodontis	DEM	NO	20	7	NO	YES	2	1	0	0
CHAENOPSIDAE	Emblemaria	hyltoni	DEM	NO	20	2.6	NO	NO	1	1	0	0
CHAENOPSIDAE	Emblemaria	pandionis	DEM	NO	25	7	NO	YES	24	1	0	0
CHAENOPSIDAE	Emblemaria	piratula	DEM	NO	30	5	NO	YES	6	1	0	0
CHAENOPSIDAE	Emblemaria	vitta	DEM	NO	32	2.1	NO	YES	3	1	0	0
CHAENOPSIDAE	Emblemariopsis	arawak	DEM	NO	14.66*	1.1	NO	NO	1	1	0	0
CHAENOPSIDAE	Emblemariopsis	bahamensis	DEM	NO	13	3	NO	NO	18	1	0	0
CHAENOPSIDAE	Emblemariopsis	bottomei	DEM	NO	18	3	NO	NO	9	1	0	0
CHAENOPSIDAE	Emblemariopsis	carib	DEM	NO	14.66*	1.5	NO	NO	1	1	0	0
CHAENOPSIDAE	Emblemariopsis	dianae	DEM	NO	5	2.5	NO	YES	2	1	0	0
CHAENOPSIDAE	Emblemariopsis	diaphanus	DEM	NO	5	3	NO	NO	14	1	0	0
CHAENOPSIDAE	Emblemariopsis	leptocirris	DEM	NO	18	2.6	NO	NO	17	1	0	0
CHAENOPSIDAE	Emblemariopsis	occidentalis	DEM	NO	26	2.3	NO	NO	17	1	0	0
CHAENOPSIDAE	Emblemariopsis	pricei	DEM	NO	30	3.2	NO	NO	2	1	0	0
CHAENOPSIDAE	Emblemariopsis	ramirezi	DEM	NO	15	3.6	NO	NO	3	1	0	0
CHAENOPSIDAE	Emblemariopsis	randalli	DEM	NO	15	3.4	NO	NO	2	1	0	0
CHAENOPSIDAE	Emblemariopsis	ruetzleri	DEM	NO	8	2.2	NO	NO	2	1	0	0
CHAENOPSIDAE	Emblemariopsis	signifer	DEM	NO	8	3	NO	NO	26	0	1	0
CHAENOPSIDAE	Emblemariopsis	sp.n.	DEM	NO	14.66*	2.95*	NO	NO	1	0	1	0
CHAENOPSIDAE	Emblemariopsis	tayrona	DEM	NO	15	3.6	NO	NO	1	1	0	0
CHAENOPSIDAE	Hemiemblemaria	simulus	DEM	NO	17	11.3	NO	NO	20	1	0	0
CHAENOPSIDAE	Lucayablennius	zingaro	DEM	NO	109	5.7	NO	NO	20	1	0	0
CHAENOPSIDAE	Protemblemaria	punctata	DEM	NO	20	5.1	YES	YES	2	1	0	0
CHAENOPSIDAE	Stathmonotus	gymnodermis	DEM	NO	5	4	NO	NO	20	1	0	0
CHAENOPSIDAE	Stathmonotus	hemphillii	DEM	NO	30	5	NO	NO	16	1	0	0
CHAENOPSIDAE	Stathmonotus	stahli	DEM	NO	10	4	NO	NO	8	1	0	0
CHAENOPSIDAE	Stathmonotus	tekla	DEM	NO	10	4	NO	NO	21	1	0	0
CHAETODONTIDAE	Chaetodon	capistratus	PEL	NO	20	20	NO	YES	27	1	0	0
CHAETODONTIDAE	Chaetodon	hoefleri	PEL	NO	150	27				0	0	1
CHAETODONTIDAE	Chaetodon	ocellatus	PEL	NO	60	15	NO	YES	28	1	1	0

CHAETODONTIDAE	Chaetodon	robustus	PEL	NO	70	20				0	0	1
CHAETODONTIDAE	Chaetodon	sanctaehelenae	PEL	NO	25	18				0	0	1
CHAETODONTIDAE	Chaetodon	sedentarius	PEL	NO	100	18	NO	NO	28	1	1	1
CHAETODONTIDAE	Chaetodon	striatus	PEL	NO	55	20	NO	YES	28	1	1	0
CHAETODONTIDAE	Prognathodes	aculeatus	PEL	NO	145	12	NO	NO	26	1	0	0
CHAETODONTIDAE	Prognathodes	aya	PEL	NO	200	17	NO	NO	17	1	0	0
CHAETODONTIDAE	Prognathodes	brasiliensis	PEL	NO	50	12	NO	NO	15	0	1	0
CHAETODONTIDAE	Prognathodes	guyanensis	PEL	NO	250	15	NO	NO	26	1	1	0
CHAETODONTIDAE	Prognathodes	marcellae	PEL	NO	140	12				0	0	1
CHLOPSIDAE	Chilorhinus	suensonii	PEL	NO	15	21	NO	YES	26	1	1	0
CHLOPSIDAE	Kaupichthys	hyoproroides	PEL	NO	56	15	NO	NO	25	1	1	0
CIRRHITIDAE	Amblycirrhitus	pinos	PEL	NO	46	9.5	NO	NO	26	1	1	0
CIRRHITIDAE	Cirrhitus	atlanticus	PEL	NO	5	16				0	0	1
CLINIDAE	Ribeiroclinus	eigenmanni	DEM	NO	17	10	NO	YES	7	0	1	0
CONGRIDAE	Ariosoma	anale	PEL	NO	55	36	NO	YES	23	1	1	1
CONGRIDAE	Ariosoma	balearicum	PEL	NO	732	33.6	NO	YES	37	1	1	1
CONGRIDAE	Conger	conger	PEL	NO	500	300				0	0	1
CONGRIDAE	Conger	triporiceps	PEL	NO	164	100	NO	YES	26	1	1	0
CONGRIDAE	Heteroconger	camelopardalis	PEL	NO	50	50	NO	YES	12	1	1	0
CONGRIDAE	Heteroconger	longissimus	PEL	NO	60	51	NO	YES	26	1	1	1
CONGRIDAE	Paraconger	caudilimbatus	PEL	NO	70	50	NO	YES	27	1	0	1
CONGRIDAE	Paraconger	notialis	PEL	NO	50	63				0	0	1
DACTYLOPTERIDAE	Dactylopterus	volitans	PEL	NO	80	45	NO	YES	45	1	1	1
DACTYLOSCOPIDAE	Dactyloscopus	crossotus	DEM	NO	7	7.5	NO	YES	22	1	1	0
DACTYLOSCOPIDAE	Dactyloscopus	tridigitatus	DEM	NO	29	8.5	NO	YES	23	1	1	0
DACTYLOSCOPIDAE	Gillellus	greyae	DEM	NO	27	9.8	NO	YES	12	1	1	0
DACTYLOSCOPIDAE	Gillellus	healae	DEM	NO	75	6.3	NO	YES	9	1	0	0
DACTYLOSCOPIDAE	Gillellus	inescatus	DEM	NO	30	2.8	NO	YES	1	1	0	0
DACTYLOSCOPIDAE	Gillellus	jacksoni	DEM	NO	17	2.9	NO	YES	7	1	0	0
DACTYLOSCOPIDAE	Gillellus	uranidea	DEM	NO	12	4.5	NO	YES	21	1	0	0
DACTYLOSCOPIDAE	Platygillellus	brasiliensis	DEM	NO	2	3.4	NO	YES	17	0	1	0
DACTYLOSCOPIDAE	Platygillellus	rubrocinctus	DEM	NO	31	4.8	NO	YES	21	1	0	0
DACTYLOSCOPIDAE	Platygillellus	smithi	DEM	NO	37	4.8	NO	YES	8	1	0	0
DACTYLOSCOPIDAE	Storrsia	olsoni	DEM	NO	1	3	NO	YES	1	0	1	0
DIODONTIDAE	Chilomycterus	antennatus	PEL	YES	25	30	NO	YES	21	1	1	0
DIODONTIDAE	Chilomycterus	antillarum	PEL	NO	44	30	NO	YES	28	1	1	0
DIODONTIDAE	Chilomycterus	reticulatus	PEL	NO	141	75	NO	YES	34	1	1	1
DIODONTIDAE	Chilomycterus	schoepfii	PEL	YES	17	33	NO	YES	29	1	0	0
DIODONTIDAE	Chilomycterus	spinosus	PEL	NO	190	25	NO	NO	24	0	1	0
DIODONTIDAE	Chilomycterus	spinosus mauretanicus	PEL	NO	100	25				0	0	1
DIODONTIDAE	Diodon	holocanthus	PEL	YES	100	50	YES	YES	38	1	1	1
DIODONTIDAE	Diodon	hystrix	PEL	YES	135	91	YES	YES	30	1	1	1
EPINEPHELIDAE	Cephalopholis	cruentata	PEL	NO	270	33	NO	YES	26	1	0	0

EPINEPHELIDAE	Cephalopholis	fulva	PEL	NO	160	39	NO	NO	26	1	1	0
EPINEPHELIDAE	Cephalopholis	nigri	PEL	NO	100	30				0	0	1
EPINEPHELIDAE	Cephalopholis	taeniops	PEL	NO	200	70				0	0	1
EPINEPHELIDAE	Dermatolepis	inermis	PEL	NO	250	91	NO	NO	28	1	1	0
EPINEPHELIDAE	Epinephelus	adscensionis	PEL	NO	100	62	NO	NO	28	1	1	1
EPINEPHELIDAE	Epinephelus	aeneus	PEL	NO	200	120				0	0	1
EPINEPHELIDAE	Epinephelus	caninus	PEL	NO	400	160				0	0	1
EPINEPHELIDAE	Epinephelus	costae	PEL	NO	200	140				0	0	1
EPINEPHELIDAE	Epinephelus	drummondhayi	PEL	NO	183	110	NO	NO	28	1	0	0
EPINEPHELIDAE	Epinephelus	fasciatus	PEL	NO	160	40				0	0	1
EPINEPHELIDAE	Epinephelus	goreensis	PEL	NO	300	140				0	0	1
EPINEPHELIDAE	Epinephelus	guttatus	PEL	NO	100	76	NO	NO	29	1	0	0
EPINEPHELIDAE	Epinephelus	itajara	PEL	NO	100	250	YES	YES	28	1	1	1
EPINEPHELIDAE	Epinephelus	morio	PEL	NO	300	125	NO	YES	29	1	1	0
EPINEPHELIDAE	Epinephelus	striatus	PEL	NO	100	100	YES	YES	31	1	0	0
EPINEPHELIDAE	Hyporthodus	flavolimbatus	PEL	NO	370	115	NO	YES	28	1	1	0
EPINEPHELIDAE	Hyporthodus	haifensis	PEL	NO	220	110				0	0	1
EPINEPHELIDAE	Hyporthodus	mystacinus	PEL	NO	400	115	NO	YES	20	1	1	0
EPINEPHELIDAE	Hyporthodus	nigritus	PEL	NO	525	235	NO	YES	28	1	1	1
EPINEPHELIDAE	Hyporthodus	niveatus	PEL	NO	525	122	NO	YES	31	1	1	0
EPINEPHELIDAE	Mycteroperca	acutirostris	PEL	NO	40	80	YES	YES	26	1	1	0
EPINEPHELIDAE	Mycteroperca	bonaci	PEL	NO	188	150	YES	YES	26	1	1	0
EPINEPHELIDAE	Mycteroperca	cidi	PEL	NO	160	115	YES	YES	5	1	0	0
EPINEPHELIDAE	Mycteroperca	fusca	PEL	NO	200	80				0	0	1
EPINEPHELIDAE	Mycteroperca	interstitialis	PEL	NO	150	84	YES	YES	29	1	1	0
EPINEPHELIDAE	Mycteroperca	marginata	PEL	NO	300	150	YES	NO	26	0	1	1
EPINEPHELIDAE	Mycteroperca	microlepis	PEL	NO	150	145	NO	YES	28	1	1	0
EPINEPHELIDAE	Mycteroperca	phenax	PEL	NO	100	107	YES	YES	26	1	0	0
EPINEPHELIDAE	Mycteroperca	rubra	PEL	NO	200	144				0	0	1
EPINEPHELIDAE	Mycteroperca	tigris	PEL	NO	112	101	NO	NO	26	1	1	0
EPINEPHELIDAE	Mycteroperca	venenosa	PEL	NO	137	100	NO	YES	28	1	1	0
FISTULARIIDAE	Fistularia	petimba	PEL	YES	200	200	YES	YES	36	1	1	1
FISTULARIIDAE	Fistularia	tabacaria	PEL	YES	200	200	NO	YES	38	1	1	1
GOBIESOCIDAE	Acyrtops	amplicirrus	DEM	NO	3	1.9	NO	YES	15	1	0	0
GOBIESOCIDAE	Acyrtops	beryllinus	DEM	NO	15	2.5	NO	YES	21	1	1	0
GOBIESOCIDAE	Acyrtus	artius	DEM	NO	15.24	3.302	NO	NO	21	1	1	0
GOBIESOCIDAE	Acyrtus	pauciradiatus	DEM	NO	9.26*	2.5	NO	YES	1	0	1	0
GOBIESOCIDAE	Acyrtus	rubiginosus	DEM	NO	4	3.5	NO	NO	21	1	0	0
GOBIESOCIDAE	Apletodon	dentatus	DEM	NO	10*	4				0	0	1
GOBIESOCIDAE	Apletodon	incognitus	DEM	NO	19	2.7				0	0	1
GOBIESOCIDAE	Apletodon	pellegrini	DEM	NO	10*	5				0	0	1
GOBIESOCIDAE	Apletodon	wirtzi	DEM	NO	1	1.4				0	0	1
GOBIESOCIDAE	Arcos	macrophthalmus	DEM	NO	8	9	NO	NO	18	1	1	0

GOBIESOCIDAE	Derilissus	altifrons	DEM	NO	68	2.1	NO	YES	9	1	0	0
GOBIESOCIDAE	Derilissus	nanus	DEM	NO	51	1.7	NO	NO	7	1	0	0
GOBIESOCIDAE	Derilissus	vittiger	DEM	NO	67	2.1	NO	YES	1	1	0	0
GOBIESOCIDAE	Diplecogaster	bimaculata	DEM	NO	36	6				0	0	1
GOBIESOCIDAE	Diplecogaster	bimaculata pectoralis	DEM	NO	36	2.2				0	0	1
GOBIESOCIDAE	Diplecogaster	ctenocrypta	DEM	NO	165	1.7				0	0	1
GOBIESOCIDAE	Gobiesox	barbatulus	DEM	NO	1	5.4	YES	NO	12	1	1	0
GOBIESOCIDAE	Gobiesox	lucayanus	DEM	NO	3	6	NO	NO	9	1	0	0
GOBIESOCIDAE	Gobiesox	punctulatus	DEM	NO	3	6.4	NO	NO	24	1	1	0
GOBIESOCIDAE	Gouania	wildenowi	DEM	NO	3	5				0	0	1
GOBIESOCIDAE	Lecanogaster	chrysea	DEM	NO	1*	2.1				0	0	1
GOBIESOCIDAE	Tomicodon	australis	DEM	NO	6	2.7	NO	NO	15	0	1	0
GOBIESOCIDAE	Tomicodon	briggsi	DEM	NO	12	2.1	NO	NO	5	1	0	0
GOBIESOCIDAE	Tomicodon	clarkei	DEM	NO	5	1.7	NO	NO	2	1	0	0
GOBIESOCIDAE	Tomicodon	cryptus	DEM	NO	8.5	2	NO	NO	15	1	0	0
GOBIESOCIDAE	Tomicodon	fasciatus	DEM	NO	5	3.6	NO	YES	13	1	1	0
GOBIESOCIDAE	Tomicodon	lavettsmithi	DEM	NO	1	3.2	NO	YES	2	1	0	0
GOBIESOCIDAE	Tomicodon	leurodiscus	DEM	NO	14	2.3	NO	NO	8	1	0	0
GOBIESOCIDAE	Tomicodon	reitzae	DEM	NO	22	4.1	NO	NO	17	1	0	0
GOBIESOCIDAE	Tomicodon	rhabdotus	DEM	NO	1	5	NO	NO	8	1	0	0
GOBIESOCIDAE	Tomicodon	rupestris	DEM	NO	3	3.4	NO	NO	14	1	0	0
GOBIIDAE	Barbulifer	antennatus	DEM	NO	3	2.5	NO	NO	19	1	0	0
GOBIIDAE	Barbulifer	ceuthoecus	DEM	NO	5	3	YES	YES	21	1	1	0
GOBIIDAE	Barbulifer	enigmaticus	DEM	NO	3	2.4	NO	NO	5	0	1	0
GOBIIDAE	Bathygobius	burtoni	DEM	NO	3.5*	8				0	0	1
GOBIIDAE	Bathygobius	casamancus	DEM	NO	3.5*	8.1				0	0	1
GOBIIDAE	Bathygobius	curacao	DEM	NO	5	7.5	YES	YES	21	1	0	0
GOBIIDAE	Bathygobius	mystacium	DEM	NO	2.5	7	NO	YES	21	1	1	0
GOBIIDAE	Bathygobius	soporator	DEM	NO	3	15	YES	YES	28	1	1	1
GOBIIDAE	Chriolepis	fisheri	DEM	NO	82	2	NO	NO	17	1	1	0
GOBIIDAE	Chriolepis	vespa	DEM	NO	183	3.8	NO	NO	23	1	1	0
GOBIIDAE	Corcyrogobius	lubbocki	DEM	NO	30	2				0	0	1
GOBIIDAE	Coryphopterus	alloides	DEM	NO	20	4	NO	YES	20	1	0	0
GOBIIDAE	Coryphopterus	dicrus	DEM	NO	15	5	NO	YES	21	1	1	0
GOBIIDAE	Coryphopterus	eidolon	DEM	NO	28	6	NO	YES	21	1	1	0
GOBIIDAE	Coryphopterus	glaucofraenum	DEM	NO	35	8	NO	YES	28	1	1	0
GOBIIDAE	Coryphopterus	hyalinus	DEM	NO	52	2.5	NO	NO	26	1	0	0
GOBIIDAE	Coryphopterus	kuna	DEM	NO	25	2.2	NO	YES	11	1	0	0
GOBIIDAE	Coryphopterus	lipernes	DEM	NO	25	3	NO	NO	21	1	0	0
GOBIIDAE	Coryphopterus	personatus	DEM	NO	46	4	NO	NO	26	1	0	0
GOBIIDAE	Coryphopterus	punctipectophorus	DEM	NO	37	7.5	NO	YES	18	1	0	0
GOBIIDAE	Coryphopterus	thrix	DEM	NO	37	5	NO	YES	23	1	1	0
GOBIIDAE	Coryphopterus	tortugae	DEM	NO	32	6	NO	YES	26	1	0	0

GOBIIDAE	Coryphopterus	venezuelae	DEM	NO	20	6	NO	YES	11	1	0	0
GOBIIDAE	Ctenogobius	saepepallens	DEM	NO	45	5	NO	YES	26	1	1	0
GOBIIDAE	Didogobius	amicuscaridis	DEM	NO	25	3.2				0	0	1
GOBIIDAE	Didogobius	sp.n.	DEM	NO	25.6*	3.6*				0	0	1
GOBIIDAE	Didogobius	wirtzi	DEM	NO	25	3.1				0	0	1
GOBIIDAE	Elacatinus	atronasus	DEM	NO	35	5	NO	NO	4	1	0	0
GOBIIDAE	Elacatinus	chancei	DEM	NO	65	5	NO	NO	13	1	0	0
GOBIIDAE	Elacatinus	colini	DEM	NO	17	3.2	NO	NO	2	1	0	0
GOBIIDAE	Elacatinus	dilepis	DEM	NO	30	2.5	NO	NO	20	1	0	0
GOBIIDAE	Elacatinus	evelynae	DEM	NO	50	4	NO	NO	20	1	0	0
GOBIIDAE	Elacatinus	figaro	DEM	NO	70	3.3	NO	NO	26	0	1	0
GOBIIDAE	Elacatinus	gemmatus	DEM	NO	3	2.54	NO	NO	18	1	0	0
GOBIIDAE	Elacatinus	genie	DEM	NO	30	4.5	NO	NO	18	1	0	0
GOBIIDAE	Elacatinus	horsti	DEM	NO	40	5	NO	NO	21	1	0	0
GOBIIDAE	Elacatinus	illecebrosus	DEM	NO	45	4	NO	NO	7	1	0	0
GOBIIDAE	Elacatinus	jarocho	DEM	NO	25	3.5	NO	NO	1	1	0	0
GOBIIDAE	Elacatinus	lobeli	DEM	NO	17	3.6	NO	NO	4	1	0	0
GOBIIDAE	Elacatinus	lori	DEM	NO	24	5	NO	NO	3	1	0	0
GOBIIDAE	Elacatinus	louisae	DEM	NO	106	3.81	NO	NO	19	1	0	0
GOBIIDAE	Elacatinus	macrodon	DEM	NO	20	5	NO	NO	21	1	0	0
GOBIIDAE	Elacatinus	multifasciatus	DEM	NO	1	5	NO	NO	16	1	0	0
GOBIIDAE	Elacatinus	oceanops	DEM	NO	40	5	NO	NO	14	1	0	0
GOBIIDAE	Elacatinus	pallens	DEM	NO	5	1.9	NO	NO	21	1	0	0
GOBIIDAE	Elacatinus	phthirophagus	DEM	NO	18	3.2	NO	NO	1	0	1	0
GOBIIDAE	Elacatinus	pridisi	DEM	NO	30	2.8	NO	NO	1	0	1	0
GOBIIDAE	Elacatinus	prochilos	DEM	NO	34	4	NO	NO	19	1	0	0
GOBIIDAE	Elacatinus	randalli	DEM	NO	53	4.6	NO	NO	9	1	0	0
GOBIIDAE	Elacatinus	redimiculus	DEM	NO	8	3	NO	NO	1	1	0	0
GOBIIDAE	Elacatinus	saucrus	DEM	NO	30	1.6	NO	NO	21	1	0	0
GOBIIDAE	Elacatinus	serranilla	DEM	NO	15	15	NO	NO	4	1	0	0
GOBIIDAE	Elacatinus	tenox	DEM	NO	70	3	NO	NO	9	1	0	0
GOBIIDAE	Elacatinus	xanthiprora	DEM	NO	25	4	NO	NO	24	1	0	0
GOBIIDAE	Elacatinus	zebrellus	DEM	NO	20	2	NO	YES	2	1	0	0
GOBIIDAE	Evermannichthys	bicolor	DEM	NO	41	3.1	NO	NO	3	1	0	0
GOBIIDAE	Evermannichthys	convictor	DEM	NO	65	1.8	NO	NO	13	1	0	0
GOBIIDAE	Evermannichthys	metzelaari	DEM	NO	41	2.4	NO	NO	17	1	0	0
GOBIIDAE	Evermannichthys	silus	DEM	NO	27.4	2.2	NO	NO	1	1	0	0
GOBIIDAE	Evermannichthys	spongicola	DEM	NO	57	3	NO	NO	17	1	0	0
GOBIIDAE	Gammogobius	steinitzi	DEM	NO	15	3.8				0	0	1
GOBIIDAE	Ginsburgellus	novemlineatus	DEM	NO	3	2.54	NO	NO	20	1	0	0
GOBIIDAE	Gnatholepis	thompsoni	DEM	NO	50	8.2	NO	YES	26	1	1	1
GOBIIDAE	Gobiosoma	grosvenori	DEM	NO	5	3	YES	YES	18	1	0	0
GOBIIDAE	Gobiosoma	hildebrandi	DEM	NO	6	4.6	YES	YES	10	1	0	0

GOBIIDAE	Gobiosoma	longipala	DEM	NO	9	5	NO	YES	5	1	0	0
GOBIIDAE	Gobiosoma	robustum	DEM	NO	9	5	YES	YES	13	1	0	0
GOBIIDAE	Gobiosoma	spes	DEM	NO	2	4.1	YES	YES	12	1	0	0
GOBIIDAE	Gobiosoma	spilotum	DEM	NO	2	2.7	NO	NO	4	1	1	0
GOBIIDAE	Gobiosoma	yucatanum	DEM	NO	2	2.6	YES	YES	6	1	0	0
GOBIIDAE	Gobius	atheriformis	DEM	NO	11	6.8				0	0	1
GOBIIDAE	Gobius	rubropunctatus	DEM	NO	70	8				0	0	1
GOBIIDAE	Gobius	senegambiensis	DEM	NO	77.25*	7.3				0	0	1
GOBIIDAE	Gobius	tetrophthalmus	DEM	NO	25	7.8				0	0	1
GOBIIDAE	Gobulus	myersi	DEM	NO	48	15	NO	YES	24	1	1	0
GOBIIDAE	Gorogobius	nigricinctus	DEM	NO	35	4				0	0	1
GOBIIDAE	Gorogobius	stevcici	DEM	NO	40	3.3				0	0	1
GOBIIDAE	Lesueurigobius	koumansi	DEM	NO	135	11				0	0	1
GOBIIDAE	Lythrypnus	brasiliensis	DEM	NO	15	1.6	NO	YES	26	0	1	0
GOBIIDAE	Lythrypnus	crocodilus	DEM	NO	18.3	1.5	NO	NO	20	1	1	0
GOBIIDAE	Lythrypnus	elasson	DEM	NO	36	2	NO	NO	20	1	0	0
GOBIIDAE	Lythrypnus	heterochroma	DEM	NO	16	2.5	NO	NO	18	1	0	0
GOBIIDAE	Lythrypnus	minimus	DEM	NO	20	1.5	NO	NO	20	1	0	0
GOBIIDAE	Lythrypnus	nesiotes	DEM	NO	51	1.9	NO	NO	22	1	0	0
GOBIIDAE	Lythrypnus	okapia	DEM	NO	15	1.4	NO	NO	17	1	0	0
GOBIIDAE	Lythrypnus	phorellus	DEM	NO	34	1.8	NO	NO	28	1	1	0
GOBIIDAE	Lythrypnus	sp.1(Noronha)	DEM	NO	25.7*	1.86*	NO	NO	1	0	1	0
GOBIIDAE	Lythrypnus	sp.2(Trindade)	DEM	NO	25.7*	1.86*	NO	NO	1	0	1	0
GOBIIDAE	Lythrypnus	spilus	DEM	NO	26	2.6	NO	NO	25	1	0	0
GOBIIDAE	Mauligobius	nigri	DEM	NO	7	8.7				0	0	1
GOBIIDAE	Microgobius	carri	DEM	NO	35	7.5	NO	YES	28	1	1	0
GOBIIDAE	Microgobius	microlepis	DEM	NO	5	5	NO	YES	15	1	0	0
GOBIIDAE	Nematogobius	ansorgii	DEM	NO	7	8				0	0	1
GOBIIDAE	Nematogobius	brachynemus	DEM	NO	7	5.7				0	0	1
GOBIIDAE	Nematogobius	maindroni	DEM	NO	7	8				0	0	1
GOBIIDAE	Nes	longus	DEM	NO	9	10	NO	YES	21	1	0	0
GOBIIDAE	Priolepis	dawsoni	DEM	NO	11	2.6	NO	YES	23	1	1	0
GOBIIDAE	Priolepis	hipoliti	DEM	NO	130	4	NO	NO	22	1	0	0
GOBIIDAE	Priolepis	robinsi	DEM	NO	27	4.3	NO	YES	2	1	0	0
GOBIIDAE	Psilotris	alepis	DEM	NO	1	2.4	NO	NO	12	1	0	0
GOBIIDAE	Psilotris	amblyrhynchus	DEM	NO	6	4.4	NO	YES	2	1	0	0
GOBIIDAE	Psilotris	batrachodes	DEM	NO	5	1.6	NO	YES	21	1	0	0
GOBIIDAE	Psilotris	boehlkei	DEM	NO	19	3.4	NO	YES	2	1	0	0
GOBIIDAE	Psilotris	celsus	DEM	NO	16	4.1	NO	NO	21	1	1	0
GOBIIDAE	Psilotris	kaufmani	DEM	NO	27	3.2	NO	NO	4	1	0	0
GOBIIDAE	Risor	ruber	DEM	NO	42	2.5	NO	YES	26	1	1	0
GOBIIDAE	Thorogobius	angolensis	DEM	NO	135	10.7				0	0	1
GOBIIDAE	Thorogobius	rofeni	DEM	NO	650	8.5				0	0	1

GOBIIDAE	Varicus	bucca	DEM	NO	229	4.5	NO	YES	14	1	0	0
GOBIIDAE	Varicus	imswe	DEM	NO	25	1.4	NO	NO	1	1	0	0
GOBIIDAE	Varicus	marilynae	DEM	NO	91	2.9	NO	YES	6	1	0	0
GOBIIDAE	Vomerogobius	flavus	DEM	NO	42	3	NO	NO	5	1	0	0
GOBIIDAE	Wheelerigobius	maltzani	DEM	NO	10	4.5				0	0	1
GOBIIDAE	Wheelerigobius	wirtzi	DEM	NO	1	3.5				0	0	1
GRAMMATIDAE	Gramma	brasiliensis	DEM	NO	40	16	NO	NO	22	0	1	0
GRAMMATIDAE	Gramma	dejongi	DEM	NO	30	4.5	NO	NO	1	1	0	0
GRAMMATIDAE	Gramma	linki	DEM	NO	130	8	NO	NO	17	1	0	0
GRAMMATIDAE	Gramma	loreto	DEM	NO	65	8	NO	NO	20	1	0	0
GRAMMATIDAE	Gramma	melacara	DEM	NO	135	11	NO	NO	16	1	0	0
GRAMMATIDAE	Lipogramma	anabantoides	DEM	NO	79	2.54	NO	NO	13	1	0	0
GRAMMATIDAE	Lipogramma	evides	DEM	NO	365	4	NO	NO	20	1	0	0
GRAMMATIDAE	Lipogramma	klayi	DEM	NO	150	4	NO	NO	17	1	0	0
GRAMMATIDAE	Lipogramma	regium	DEM	NO	102	2.5	NO	NO	14	1	0	0
GRAMMATIDAE	Lipogramma	roseum	DEM	NO	45	13	NO	NO	15	1	0	0
GRAMMATIDAE	Lipogramma	trilineatum	DEM	NO	100	3.5	NO	NO	20	1	0	0
HAEMULIDAE	Anisotremus	moricandi	PEL	NO	20	18	YES	NO	19	1	1	0
HAEMULIDAE	Anisotremus	surinamensis	PEL	NO	70	76	YES	NO	26	1	1	0
HAEMULIDAE	Anisotremus	virginicus	PEL	NO	66	40	NO	NO	26	1	1	0
HAEMULIDAE	Haemulon	album	PEL	NO	60	79	NO	YES	26	1	1	0
HAEMULIDAE	Haemulon	aurolineatum	PEL	NO	70	25	NO	NO	28	1	1	0
HAEMULIDAE	Haemulon	bonariense	PEL	NO	30	40	NO	YES	26	1	1	0
HAEMULIDAE	Haemulon	boschmae	PEL	NO	100	20	NO	YES	6	1	0	0
HAEMULIDAE	Haemulon	carbonarium	PEL	NO	30	40	NO	NO	26	1	0	0
HAEMULIDAE	Haemulon	chrysargyreum	PEL	NO	30	23	NO	YES	21	1	1	0
HAEMULIDAE	Haemulon	flavolineatum	PEL	NO	40	30	NO	YES	26	1	0	0
HAEMULIDAE	Haemulon	macrostomum	PEL	NO	40	45	NO	NO	26	1	0	0
HAEMULIDAE	Haemulon	melanurum	PEL	NO	50	35	NO	YES	26	1	1	0
HAEMULIDAE	Haemulon	parra	PEL	NO	40	41	NO	YES	26	1	1	0
HAEMULIDAE	Haemulon	plumierii	PEL	NO	68	53	NO	YES	28	1	1	0
HAEMULIDAE	Haemulon	sciurus	PEL	NO	40	46	NO	YES	26	1	0	0
HAEMULIDAE	Haemulon	squamipinna	PEL	NO	30	22	NO	NO	5	0	1	0
HAEMULIDAE	Haemulon	steindachneri	PEL	NO	75	30	YES	YES	26	1	1	0
HAEMULIDAE	Haemulon	striatum	PEL	NO	210	28	NO	NO	26	1	1	0
HAEMULIDAE	Orthopristis	chrysoptera	PEL	NO	110	40	YES	YES	23	1	0	0
HAEMULIDAE	Orthopristis	ruber	PEL	NO	70	40	YES	YES	27	1	1	0
HAEMULIDAE	Parapristipoma	humile	PEL	NO	100	37				0	0	1
HAEMULIDAE	Parapristipoma	octolineatum	PEL	NO	60	50				0	0	1
HAEMULIDAE	Plectorhinchus	macrolepis	PEL	NO	10	45				0	0	1
HAEMULIDAE	Plectorhinchus	mediterraneus	PEL	NO	180	80				0	0	1
HOLOCENTRIDAE	Corniger	spinosus	PEL	NO	275	23	NO	NO	28	1	1	1
HOLOCENTRIDAE	Holocentrus	adscensionis	PEL	NO	274	45	NO	NO	28	1	1	1

HOLOCENTRIDAE	Holocentrus	rufus	PEL	NO	125	44	NO	NO	28	1	0	0
HOLOCENTRIDAE	Myripristis	jacobus	PEL	NO	90	25	NO	NO	28	1	1	1
HOLOCENTRIDAE	Neoniphon	marianus	PEL	NO	120	22	NO	NO	22	1	0	0
HOLOCENTRIDAE	Ostichthys	trachypoma	PEL	NO	503	22	NO	NO	28	1	0	0
HOLOCENTRIDAE	Plectrypops	retrospinis	PEL	NO	182	15	NO	NO	26	1	1	0
HOLOCENTRIDAE	Sargocentron	bullisi	PEL	NO	120	16	NO	NO	26	1	1	0
HOLOCENTRIDAE	Sargocentron	coruscum	PEL	NO	22	13.5	NO	NO	26	1	0	0
HOLOCENTRIDAE	Sargocentron	hastatus	PEL	NO	200	25	NO	NO		1	0	1
HOLOCENTRIDAE	Sargocentron	poco	PEL	NO	152	13	NO	NO	20	1	0	0
HOLOCENTRIDAE	Sargocentron	vexillarium	PEL	NO	25	17.2	NO	NO	25	1	0	0
KUHLIIDAE	Parakuhlia	macrophthalmus	PEL	NO	30	20				0	0	1
KYPHOSIDAE	Girella	stubeli	PEL	NO	8	24				0	0	1
KYPHOSIDAE	Girella	zonata	PEL	NO	8	21				0	0	1
KYPHOSIDAE	Kyphosus	incisor	PEL	YES	30	90	NO	NO	28	1	1	1
KYPHOSIDAE	Kyphosus	sectator	PEL	YES	40	76	NO	NO	28	1	1	1
LABRIDAE	Bodianus	insularis	PEL	NO	50	33	NO	NO	5	0	1	0
LABRIDAE	Bodianus	pulchellus	PEL	NO	120	29	NO	NO	26	1	1	1
LABRIDAE	Bodianus	rufus	PEL	NO	70	50	NO	NO	26	1	1	0
LABRIDAE	Bodianus	scrofa	PEL	NO	200	46				0	0	1
LABRIDAE	Bodianus	speciosus	PEL	NO	70	50				0	0	1
LABRIDAE	Clepticus	africanus	PEL	NO	30	30				0	0	1
LABRIDAE	Clepticus	brasiliensis	PEL	NO	54	30	NO	NO	23	0	1	0
LABRIDAE	Clepticus	parrae	PEL	YES	100	30	NO	NO	26	1	0	0
LABRIDAE	Coris	atlantica	PEL	NO	120	30				0	0	1
LABRIDAE	Cryptotomus	roseus	PEL	NO	58	13	NO	YES	26	1	1	0
LABRIDAE	Decodon	puellaris	PEL	NO	275	30	NO	NO	28	1	1	0
LABRIDAE	Doratonotus	megalepis	PEL	NO	15	9.4	NO	YES	26	1	1	1
LABRIDAE	Halichoeres	bathyphilus	PEL	NO	275	23	NO	NO	28	1	0	0
LABRIDAE	Halichoeres	bivittatus	PEL	NO	54	22	NO	YES	28	1	1	0
LABRIDAE	Halichoeres	brasiliensis	PEL	NO	60	51	NO	YES	26	0	1	0
LABRIDAE	Halichoeres	burekae	PEL	NO	30	9.3	NO	NO	11	1	0	0
LABRIDAE	Halichoeres	caudalis	PEL	NO	100	20	NO	YES	28	1	0	0
LABRIDAE	Halichoeres	cyanocephalus	PEL	NO	91	30	NO	YES	24	1	0	0
LABRIDAE	Halichoeres	dimidiatus	PEL	NO	70	30	NO	YES	26	0	1	0
LABRIDAE	Halichoeres	garnoti	PEL	NO	20	30	NO	YES	28	1	0	0
LABRIDAE	Halichoeres	maculipinna	PEL	NO	25	15	NO	NO	28	1	0	0
LABRIDAE	Halichoeres	penrosei	PEL	NO	40	15	NO	NO	23	0	1	0
LABRIDAE	Halichoeres	pictus	PEL	NO	25	13	NO	NO	20	1	0	0
LABRIDAE	Halichoeres	poeyi	PEL	NO	54	20	NO	YES	26	1	1	0
LABRIDAE	Halichoeres	radiatus	PEL	NO	55	51	NO	YES	28	1	1	0
LABRIDAE	Halichoeres	rubrovirens	PEL	NO	25	23.1	NO	NO	1	0	1	0
LABRIDAE	Halichoeres	sazimai	PEL	NO	35	21.4	NO	YES	7	0	1	0
LABRIDAE	Halichoeres	socialis	PEL	NO	10	5.5	NO	NO	2	1	0	0

LABRIDAE	Lachnolaimus	maximus	PEL	NO	30	91	NO	YES	28	1	0	0
LABRIDAE	Lappanella	guineensis	PEL	NO	100	12				0	0	1
LABRIDAE	Nicholsina	usta	PEL	NO	80	30	NO	YES	34	1	1	0
LABRIDAE	Nicholsina	usta collettei	PEL	NO	50	24				0	0	1
LABRIDAE	Scarus	coelestinus	PEL	NO	75	77	NO	NO	26	1	0	0
LABRIDAE	Scarus	coeruleus	PEL	NO	25	120	NO	YES	28	1	0	0
LABRIDAE	Scarus	guacamaia	RAFT	NO	25	120	YES	YES	26	1	0	0
LABRIDAE	Scarus	hoefleri	PEL	NO	41.12*	60				0	0	1
LABRIDAE	Scarus	iseri	PEL	NO	30	27	NO	YES	21	1	0	0
LABRIDAE	Scarus	taeniopterus	PEL	NO	30	30	NO	NO	26	1	0	0
LABRIDAE	Scarus	trispinosus	PEL	NO	60	76.2	NO	YES	22	0	1	0
LABRIDAE	Scarus	vetula	PEL	NO	30	50	NO	NO	26	1	0	0
LABRIDAE	Scarus	zelindae	PEL	NO	54	33.2	NO	YES	26	0	1	0
LABRIDAE	Sparisoma	amplum	PEL	NO	54	64	NO	NO	26	1	1	0
LABRIDAE	Sparisoma	atomarium	PEL	NO	106	15	NO	YES	26	1	0	0
LABRIDAE	Sparisoma	aurofrenatum	PEL	NO	30	28	NO	YES	26	1	0	0
LABRIDAE	Sparisoma	axillare	PEL	NO	35	43	NO	YES	26	1	1	1
LABRIDAE	Sparisoma	chrysopterum	PEL	NO	30	46	NO	YES	26	1	0	0
LABRIDAE	Sparisoma	cretense	PEL	NO	50	50				0	0	1
LABRIDAE	Sparisoma	frondosum	PEL	NO	54	34.5	NO	YES	26	0	1	0
LABRIDAE	Sparisoma	griseorubra	PEL	NO	30	27	NO	NO	2	1	0	0
LABRIDAE	Sparisoma	radians	PEL	NO	77	20	NO	YES	26	1	1	0
LABRIDAE	Sparisoma	rocha	PEL	NO	25	26.8	NO	NO	1	0	1	0
LABRIDAE	Sparisoma	rubripinne	PEL	NO	30	48	NO	YES	26	1	0	0
LABRIDAE	Sparisoma	tuiupiranga	PEL	NO	20	25	NO	YES	10	0	1	0
LABRIDAE	Sparisoma	viride	PEL	NO	50	64	NO	NO	26	1	0	0
LABRIDAE	Thalassoma	bifasciatum	PEL	NO	21	15	NO	NO	26	1	0	0
LABRIDAE	Thalassoma	newtoni	PEL	NO	70.33*	17.76*				0	0	1
LABRIDAE	Thalassoma	noronhanum	PEL	NO	40	13.3	NO	NO	23	0	1	0
LABRIDAE	Thalassoma	pavo	PEL	NO	150	25				0	0	1
LABRIDAE	Xyrichtys	incandescens	PEL	NO	35	14.89	NO	YES	1	0	1	0
LABRIDAE	Xyrichtys	martinicensis	PEL	NO	40	15	NO	YES	26	1	1	0
LABRIDAE	Xyrichtys	novacula	PEL	NO	110	25	NO	YES	26	1	1	1
LABRIDAE	Xyrichtys	sanctaehelenae	PEL	NO	30	23.3				0	0	1
LABRIDAE	Xyrichtys	splendens	PEL	NO	52	15	NO	YES	22	1	1	0
LABRISOMIDAE	Labrisomus	albigenys	DEM	NO	5.5	6.5	NO	NO	16	1	0	0
LABRISOMIDAE	Labrisomus	bucciferus	DEM	NO	6.5	9	NO	YES	25	1	0	0
LABRISOMIDAE	Labrisomus	conditus	DEM	NO	4	13.4	NO	NO	1	0	1	0
LABRISOMIDAE	Labrisomus	cricota	DEM	NO	4	10.3	NO	NO	26	1	1	0
LABRISOMIDAE	Labrisomus	filamentosus	DEM	NO	91	12	NO	NO	13	1	0	0
LABRISOMIDAE	Labrisomus	gobio	DEM	NO	15	6.4	NO	YES	20	1	0	0
LABRISOMIDAE	Labrisomus	guppyi	DEM	NO	8	10.8	NO	NO	20	1	0	0
LABRISOMIDAE	Labrisomus	haitiensis	DEM	NO	24	7.1	NO	NO	20	1	0	0

LABRISOMIDAE	Labrisomus	kalisherae	DEM	NO	4.6	8.3	NO	YES	26	1	1	0
LABRISOMIDAE	Labrisomus	nigricinctus	DEM	NO	4.5	6.7	NO	NO	20	1	0	0
LABRISOMIDAE	Labrisomus	nuchipinnis	DEM	NO	21	22	NO	YES	26	1	1	1
LABRISOMIDAE	Malacoctenus	africanus	DEM	NO	8.55*	7.4				0	0	1
LABRISOMIDAE	Malacoctenus	aurolineatus	DEM	NO	4.5	7.5	NO	NO	20	1	0	0
LABRISOMIDAE	Malacoctenus	boehlkei	DEM	NO	30	6.5	NO	NO	16	1	0	0
LABRISOMIDAE	Malacoctenus	delalandii	DEM	NO	1.5	8.2	YES	YES	26	1	1	0
LABRISOMIDAE	Malacoctenus	erdmani	DEM	NO	6.5	3.8	NO	YES	20	1	0	0
LABRISOMIDAE	Malacoctenus	gilli	DEM	NO	4.5	7.5	NO	YES	26	1	0	0
LABRISOMIDAE	Malacoctenus	macropus	DEM	NO	7.5	5.2	NO	YES	26	1	0	0
LABRISOMIDAE	Malacoctenus	sp.1(aff.triangulatus)	DEM	NO	40	6.3*	NO	NO		0	1	0
LABRISOMIDAE	Malacoctenus	sp.2(Trindade)	DEM	NO	8.55*	6.3*	NO	NO	1	0	1	0
LABRISOMIDAE	Malacoctenus	sp.3(St Pauls Rocks)	DEM	NO	8.55*	6.3*	NO	NO	1	0	1	0
LABRISOMIDAE	Malacoctenus	sp.4(Noronha)	DEM	NO	8.55*	6.3*	NO	NO	1	0	1	0
LABRISOMIDAE	Malacoctenus	triangulatus	DEM	NO	18	5.8	NO	NO	21	1	0	0
LABRISOMIDAE	Malacoctenus	versicolor	DEM	NO	4.5	7.8	NO	YES	18	1	0	0
LABRISOMIDAE	Nemaclinus	atelestos	DEM	NO	256	3.8	NO	YES	22	1	0	0
LABRISOMIDAE	Paraclinus	arcanus	DEM	NO	3	3.2	NO	NO	20	0	1	0
LABRISOMIDAE	Paraclinus	barbatus	DEM	NO	50	5	NO	NO	19	1	0	0
LABRISOMIDAE	Paraclinus	cingulatus	DEM	NO	6.5	2.4	NO	YES	20	1	0	0
LABRISOMIDAE	Paraclinus	fasciatus	DEM	NO	12	6.1	NO	YES	23	1	0	0
LABRISOMIDAE	Paraclinus	grandicomis	DEM	NO	3	3.8	NO	YES	15	1	0	0
LABRISOMIDAE	Paraclinus	infrons	DEM	NO	48	2.4	NO	NO	12	1	0	0
LABRISOMIDAE	Paraclinus	marmoratus	DEM	NO	70	7.8	NO	YES	20	1	0	0
LABRISOMIDAE	Paraclinus	naeorhegmis	DEM	NO	7	2.8	NO	NO	15	1	0	0
LABRISOMIDAE	Paraclinus	nigripinnis	DEM	NO	6.5	5	NO	YES	26	1	0	0
LABRISOMIDAE	Paraclinus	rubicundus	DEM	NO	25	4.7	NO	NO	20	0	1	0
LABRISOMIDAE	Paraclinus	spectator	DEM	NO	7	5.2	NO	NO	15	0	1	0
LABRISOMIDAE	Starksia	atlantica	DEM	NO	24	2.5	NO	NO	20	1	0	0
LABRISOMIDAE	Starksia	brasiliensis	DEM	NO	1	3.5	NO	NO	22	0	1	0
LABRISOMIDAE	Starksia	culebrae	DEM	NO	10	3.7	NO	NO	7	1	0	0
LABRISOMIDAE	Starksia	elongata	DEM	NO	6	3.2	NO	NO	16	1	1	0
LABRISOMIDAE	Starksia	fasciata	DEM	NO	7	2.7	NO	NO	9	1	0	0
LABRISOMIDAE	Starksia	guttata	DEM	NO	14	4.6	NO	NO	4	1	0	0
LABRISOMIDAE	Starksia	hassi	DEM	NO	20	4	NO	NO	14	1	0	0
LABRISOMIDAE	Starksia	lepicoelia	DEM	NO	27	3.5	NO	NO	17	1	0	0
LABRISOMIDAE	Starksia	leucovitta	DEM	NO	30	3.6	NO	YES	1	1	0	0
LABRISOMIDAE	Starksia	melasma	DEM	NO	15	2.5	NO	NO	2	1	0	0
LABRISOMIDAE	Starksia	multilepis	DEM	NO	1	2.2	NO	NO	1	0	1	0
LABRISOMIDAE	Starksia	nanodes	DEM	NO	30	2.2	NO	NO	21	1	0	0
LABRISOMIDAE	Starksia	occidentalis	DEM	NO	15	3.6	NO	YES	10	1	0	0
LABRISOMIDAE	Starksia	ocellata	DEM	NO	24	6	NO	NO	11	1	0	0
LABRISOMIDAE	Starksia	rava	DEM	NO	26	3	NO	YES	2	1	0	0

LABRISOMIDAE	Starksia	sella	DEM	NO	29	3.1	NO	NO	1	1	0	0
LABRISOMIDAE	Starksia	sluiteri	DEM	NO	40	2.5	NO	NO	10	1	0	0
LABRISOMIDAE	Starksia	smithvanizi	DEM	NO	5	2.3	NO	YES	8	1	0	0
LABRISOMIDAE	Starksia	starcki	DEM	NO	19	4	NO	NO	13	1	0	0
LABRISOMIDAE	Starksia	variabilis	DEM	NO	3	4	NO	NO	5	1	0	0
LABRISOMIDAE	Starksia	y-lineata	DEM	NO	3.5	2.5	NO	NO	8	1	0	0
LETHRINIDAE	Lethrinus	atlanticus	PEL	NO	50	50				0	0	1
LUTJANIDAE	Apsilus	dentatus	PEL	NO	300	65	NO	NO	17	1	0	0
LUTJANIDAE	Apsilus	fuscus	PEL	NO	300	75				0	0	1
LUTJANIDAE	Lutjanus	agennes	PEL	NO	140.9*	139				0	0	1
LUTJANIDAE	Lutjanus	alexandrei	PEL	NO	54	24.3	YES	YES	17	0	1	0
LUTJANIDAE	Lutjanus	analis	PEL	NO	418	94	YES	YES	29	1	1	0
LUTJANIDAE	Lutjanus	apodus	PEL	NO	63	67	YES	YES	29	1	0	1
LUTJANIDAE	Lutjanus	buccanella	PEL	NO	230	75	NO	YES	28	1	1	0
LUTJANIDAE	Lutjanus	campechanus	PEL	NO	190	100	NO	YES	23	1	0	0
LUTJANIDAE	Lutjanus	cyanopterus	PEL	NO	65	160	YES	YES	28	1	1	0
LUTJANIDAE	Lutjanus	dentatus	PEL	NO	140.9*	150				0	0	1
LUTJANIDAE	Lutjanus	endecacanthus	PEL	NO	140.9*	85				0	0	1
LUTJANIDAE	Lutjanus	fulgens	PEL	NO	60	60				0	0	1
LUTJANIDAE	Lutjanus	goreensis	PEL	NO	50	80				0	0	1
LUTJANIDAE	Lutjanus	griseus	PEL	NO	180	66	YES	YES	28	1	0	1
LUTJANIDAE	Lutjanus	jocu	PEL	NO	64	128	YES	YES	28	1	1	1
LUTJANIDAE	Lutjanus	mahogoni	PEL	NO	100	48	NO	YES	28	1	0	0
LUTJANIDAE	Lutjanus	purpureus	PEL	NO	180	100	NO	NO	28	1	1	0
LUTJANIDAE	Lutjanus	synagris	PEL	NO	400	71	NO	YES	28	1	0	0
LUTJANIDAE	Lutjanus	vivanus	PEL	NO	290	84	NO	YES	28	1	1	0
LUTJANIDAE	Ocyurus	chrysurus	PEL	YES	180	86	NO	YES	28	1	1	0
LUTJANIDAE	Rhomboplites	aurorubens	PEL	YES	400	63	NO	YES	28	1	1	0
MALACANTHIDAE	Malacanthus	plumieri	PEL	NO	153	60	NO	YES	28	1	1	0
MICRODESMIDAE	Microdesmus	aethiopicus	DEM	NO	10	5.7				0	0	1
MICRODESMIDAE	Microdesmus	africanus	DEM	NO	10	7.5				0	0	1
MICRODESMIDAE	Microdesmus	bahianus	DEM	NO	2	5.3	NO	NO	19	1	1	0
MICRODESMIDAE	Microdesmus	carri	DEM	NO	1	5.9	YES	YES	19	1	0	0
MICRODESMIDAE	Microdesmus	lanceolatus	DEM	NO	37	6	NO	YES	5	1	0	0
MICRODESMIDAE	Microdesmus	longipinnis	DEM	NO	10	27	YES	YES	28	1	1	1
MICRODESMIDAE	Microdesmus	luscus	DEM	NO	8	4.8	NO	NO	11	1	0	0
MONACANTHIDAE	Aluterus	monoceros	BAL	YES	150	76	NO	YES	36	1	1	1
MONACANTHIDAE	Aluterus	schoepfii	BAL	YES	50	60	NO	YES	39	1	1	1
MONACANTHIDAE	Aluterus	scriptus	BAL	YES	120	110	YES	NO	39	1	1	1
MONACANTHIDAE	Cantherhines	macrocerus	BAL	YES	40	40	NO	NO	32	1	1	1
MONACANTHIDAE	Cantherhines	pardalis	BAL	YES	20	25				0	0	1
MONACANTHIDAE	Cantherhines	pullus	BAL	YES	50	20	NO	NO	28	1	1	1
MONACANTHIDAE	Monacanthus	ciliatus	BAL	YES	90	20	NO	YES	28	1	1	0

MONACANTHIDAE	Monacanthus	tuckeri	BAL	YES	50	9	NO	YES	27	1	0	0
MONACANTHIDAE	Stephanolepis	hispida	BAL	YES	110	18	NO	YES	38	1	1	1
MONACANTHIDAE	Stephanolepis	setifer	BAL	YES	80	20	NO	YES	30	1	1	0
MORINGUIDAE	Moringua	edwardsi	PEL	NO	22	60	YES	YES	26	1	1	0
MULLIDAE	Mulloidichthys	martinicus	PEL	YES	135	40	NO	YES	28	1	1	1
MULLIDAE	Mullus	auratus	PEL	YES	110	27	NO	YES	28	1	0	0
MULLIDAE	Mullus	barbatus	PEL	NO	300	30				0	0	1
MULLIDAE	Mullus	surmuletus	PEL	YES	60	40				0	0	1
MULLIDAE	Pseudupeneus	maculatus	PEL	YES	50	30	NO	YES	34	1	1	0
MULLIDAE	Pseudupeneus	prayensis	PEL	NO	300	55				0	0	1
MULLIDAE	Upeneus	parvus	PEL	NO	110	20	NO	YES	29	1	1	0
MURAENIDAE	Anarchias	euryurus	PEL	NO	100	25				0	0	1
MURAENIDAE	Anarchias	longicaudus	PEL	NO	70	22.5				0	0	1
MURAENIDAE	Anarchias	similis	PEL	NO	180	20	NO	NO	26	1	1	1
MURAENIDAE	Channomuraena	vittata	PEL	NO	100	150	NO	NO	19	1	1	1
MURAENIDAE	Echidna	catenata	PEL	NO	20	71	NO	NO	26	1	1	1
MURAENIDAE	Echidna	peli	PEL	NO	20	100				0	0	1
MURAENIDAE	Enchelycore	anatina	PEL	NO	370	120	NO	NO	28	1	1	1
MURAENIDAE	Enchelycore	carychroa	PEL	NO	54	33	NO	NO	26	1	1	1
MURAENIDAE	Enchelycore	nigricans	PEL	NO	100	100	NO	NO	26	1	1	1
MURAENIDAE	Gymnothorax	afer	PEL	NO	45	100				0	0	1
MURAENIDAE	Gymnothorax	bacalladoi	PEL	NO	604	34.7				0	0	1
MURAENIDAE	Gymnothorax	conspersus	PEL	NO	800	110	NO	YES	26	1	1	0
MURAENIDAE	Gymnothorax	funebris	PEL	NO	383	189	YES	NO	26	1	1	0
MURAENIDAE	Gymnothorax	hubbsi	PEL	NO	180	34	NO	YES	12	1	0	0
MURAENIDAE	Gymnothorax	kolpos	PEL	NO	230	93	NO	YES	17	1	0	0
MURAENIDAE	Gymnothorax	maderensis	PEL	NO	357	104	NO	YES	28	1	0	1
MURAENIDAE	Gymnothorax	mareei	PEL	NO	25	40				0	0	1
MURAENIDAE	Gymnothorax	margaritophorus	PEL	NO	25	70				0	0	1
MURAENIDAE	Gymnothorax	miliaris	PEL	NO	60	70	NO	NO	26	1	1	1
MURAENIDAE	Gymnothorax	moringa	PEL	NO	200	220	NO	YES	28	1	1	1
MURAENIDAE	Gymnothorax	nigromarginatus	PEL	NO	91	99	NO	YES	15	1	0	0
MURAENIDAE	Gymnothorax	polygonius	PEL	NO	256	84	NO	YES	28	1	1	1
MURAENIDAE	Gymnothorax	saxicola	PEL	NO	213	62	NO	YES	9	1	0	0
MURAENIDAE	Gymnothorax	unicolor	PEL	NO	20	100				0	0	1
MURAENIDAE	Gymnothorax	vicinus	PEL	NO	375	122	NO	NO	28	1	1	1
MURAENIDAE	Monopenchelys	acuta	PEL	NO	45	21	NO	NO	20	1	0	1
MURAENIDAE	Muraena	augusti	PEL	NO	250	118.6*				0	0	1
MURAENIDAE	Muraena	helena	PEL	NO	50	150				0	0	1
MURAENIDAE	Muraena	melanotis	PEL	NO	60	100	NO	NO		0	1	1
MURAENIDAE	Muraena	pavonina	PEL	NO	60	67	NO	YES	12	1	1	1
MURAENIDAE	Muraena	retifera	PEL	NO	91	90	NO	YES	28	1	1	0
MURAENIDAE	Muraena	robusta	PEL	NO	68	186	NO	NO	27	1	0	1

MURAENIDAE	Uropterygius	macularius	PEL	NO	137	29	NO	NO	26	1	1	0
MURAENIDAE	Uropterygius	wheeleri	PEL	NO	137*	54				0	0	1
OGCOCEPHALIDAE	Halieutichthys	aculeatus	UNK	NO	820	13.5	NO	YES	33	1	1	0
OGCOCEPHALIDAE	Ogcocephalus	corniger	UNK	NO	230	23	NO	YES	27	1	0	0
OGCOCEPHALIDAE	Ogcocephalus	cubifrons	UNK	NO	70	38	NO	YES	17	1	0	0
OGCOCEPHALIDAE	Ogcocephalus	declivirostris	UNK	NO	388	16.5	NO	YES	23	1	1	0
OGCOCEPHALIDAE	Ogcocephalus	nasutus	UNK	NO	305	38	NO	YES	21	1	0	0
OGCOCEPHALIDAE	Ogcocephalus	notatus	UNK	NO	172	17	YES	YES	23	1	1	0
OGCOCEPHALIDAE	Ogcocephalus	pantostictus	UNK	NO	31	31	NO	YES	9	1	0	0
OGCOCEPHALIDAE	Ogcocephalus	parvus	UNK	NO	258	10	NO	YES	28	1	1	0
OGCOCEPHALIDAE	Ogcocephalus	pumilus	UNK	NO	348	8.3	NO	YES	17	1	0	0
OGCOCEPHALIDAE	Ogcocephalus	rostellum	UNK	NO	228	19	NO	YES	28	1	0	0
OGCOCEPHALIDAE	Ogcocephalus	vespertilio	UNK	NO	200	30	YES	YES	27	1	1	0
OPHICHTHIDAE	Ahlia	egmontis	PEL	YES	37	47	YES	YES	26	1	1	0
OPHICHTHIDAE	Ichthyapus	ophioneus	PEL	NO	50	48	NO	YES	26	1	1	0
OPHICHTHIDAE	Myrichthys	breviceps	PEL	NO	30	102	NO	YES	26	1	1	0
OPHICHTHIDAE	Myrichthys	ocellatus	PEL	NO	30	110	NO	YES	26	1	1	0
OPHICHTHIDAE	Myrichthys	pardalis	PEL	NO	8	94				0	0	1
OPHICHTHIDAE	Ophichthus	cylindroideus	PEL	NO	46	93.3	NO	YES	32	1	1	0
OPHICHTHIDAE	Ophichthus	ophis	PEL	NO	50	210	NO	YES	26	1	1	1
OPHICHTHIDAE	Ophichthus	rufus	PEL	NO	48*	60				0	0	1
OPHICHTHIDAE	Pisodonophis	semicinctus	PEL	NO	30	80				0	0	1
OPHICHTHIDAE	Quassiremus	ascensionis	PEL	NO	12	71	NO	YES	26	1	1	0
OPHIDIIDAE	Brotula	barbata	PEL	NO	650	100	NO	YES	28	1	1	1
OPHIDIIDAE	Ophidion	barbatum	PEL	NO	150	25				0	0	1
OPHIDIIDAE	Ophidion	grayi	PEL	NO	60	30	NO	YES	10	1	0	0
OPHIDIIDAE	Ophidion	holbrookii	PEL	NO	75	30	NO	YES	28	1	1	0
OPHIDIIDAE	Ophidion	lagochila	PEL	NO	8	7	NO	YES	26	1	0	0
OPHIDIIDAE	Ophidion	marginatum	PEL	NO	100	25	NO	YES	13	1	0	0
OPHIDIIDAE	Ophidion	nocomis	PEL	NO	22	8.7	NO	YES	16	1	0	0
OPHIDIIDAE	Ophidion	selenops	PEL	NO	325	10	NO	YES	9	1	0	0
OPHIDIIDAE	Otophidium	chickcharney	PEL	NO	5	10	NO	YES	19	1	1	0
OPHIDIIDAE	Otophidium	dormitator	PEL	NO	15	7.5	NO	YES	21	1	1	0
OPHIDIIDAE	Otophidium	omostigma	PEL	NO	50	13	NO	YES	24	1	0	0
OPHIDIIDAE	Parophidion	schmidti	PEL	NO	8	10	NO	YES	25	1	0	0
OPHIDIIDAE	Parophidion	vassali	PEL	NO	8*	25				0	0	1
OPHIDIIDAE	Petrotyx	sanguineus	DEM	NO	15	20	NO	NO	20	1	0	0
OPISTOGNATHIDAE	Lonchopisthus	higmani	DEM	NO	100	18.7	NO	YES	6	1	0	0
OPISTOGNATHIDAE	Lonchopisthus	lemur	DEM	NO	531	10.3	NO	YES	29	1	1	0
OPISTOGNATHIDAE	Lonchopisthus	micrognathus	DEM	NO	86	17.8	NO	YES	22	1	0	0
OPISTOGNATHIDAE	Opistognathus	aurifrons	DEM	NO	59	12.7	NO	YES	23	1	0	0
OPISTOGNATHIDAE	Opistognathus	brasiliensis	DEM	NO	69	12.9	NO	YES	5	0	1	0
OPISTOGNATHIDAE	Opistognathus	cuvieri	DEM	NO	60.4*	11.4	NO	YES	20	0	1	0

OPISTOGNATHIDAE	Opistognathus	gilberti	DEM	NO	55	7.5	NO	YES	13	1	0	0
OPISTOGNATHIDAE	Opistognathus	lonchurus	DEM	NO	91	15.2	NO	YES	26	1	1	0
OPISTOGNATHIDAE	Opistognathus	macrognathus	DEM	NO	44	20	NO	YES	21	1	1	0
OPISTOGNATHIDAE	Opistognathus	maxillosus	DEM	NO	12	15.24	NO	YES	21	1	0	0
OPISTOGNATHIDAE	Opistognathus	nothus	DEM	NO	100	7.9	NO	YES	13	1	0	0
OPISTOGNATHIDAE	Opistognathus	robinsi	DEM	NO	46	15.9	NO	YES	11	1	0	0
OPISTOGNATHIDAE	Opistognathus	signatus	DEM	NO	68	8	NO	YES	8	1	0	0
OPISTOGNATHIDAE	Opistognathus	whitehursti	DEM	NO	60	7.8	NO	YES	22	1	1	0
OSTRACIIDAE	Acanthostracion	guineensis	BAL	NO	200	18				0	0	1
OSTRACIIDAE	Acanthostracion	notacanthus	BAL	NO	25	50				0	0	1
OSTRACIIDAE	Acanthostracion	polygonius	BAL	NO	80	50	NO	NO	34	1	1	0
OSTRACIIDAE	Acanthostracion	quadricornis	BAL	YES	80	55	NO	YES	35	1	1	0
OSTRACIIDAE	Lactophrys	bicaudalis	BAL	NO	50	48	NO	YES	26	1	1	0
OSTRACIIDAE	Lactophrys	trigonus	BAL	NO	50	55	NO	YES	35	1	1	0
OSTRACIIDAE	Lactophrys	triqueter	BAL	YES	50	30	NO	NO	35	1	1	0
PEMPHERIDAE	Pempheris	poeyi	PEL	NO	25	15	NO	NO	26	1	0	0
PEMPHERIDAE	Pempheris	schomburgkii	PEL	NO	25	15	NO	NO	26	1	1	0
PINGUIPEDIDAE	Parapercis	atlantica	PEL	NO	200	14.3				0	0	1
PINGUIPEDIDAE	Pinguipes	brasilianus	PEL	NO	150	70	NO	YES	25	0	1	0
PLATYCEPHALIDAE	Solitas	gruveli	PEL	NO	200	20				0	0	1
POMACANTHIDAE	Centropyge	argi	PEL	NO	170	5	NO	YES	28	1	0	0
POMACANTHIDAE	Centropyge	aurantonotus	PEL	NO	300	5	NO	YES	26	1	1	1
POMACANTHIDAE	Holacanthus	africanus	PEL	NO	40	45				0	0	1
POMACANTHIDAE	Holacanthus	bermudensis	PEL	NO	60	45	NO	NO	16	1	0	0
POMACANTHIDAE	Holacanthus	ciliaris	PEL	NO	57	45	NO	NO	26	1	1	0
POMACANTHIDAE	Holacanthus	tricolor	PEL	NO	135	25	NO	NO	26	1	1	0
POMACANTHIDAE	Pomacanthus	arcuatus	PEL	NO	60	60	NO	YES	28	1	1	0
POMACANTHIDAE	Pomacanthus	paru	PEL	NO	70	40	NO	YES	28	1	1	0
POMACENTRIDAE	Abudefduf	hoefleri	DEM	NO	20	20				0	0	1
POMACENTRIDAE	Abudefduf	luridus	DEM	NO	25	15				0	0	1
POMACENTRIDAE	Abudefduf	saxatilis	DEM	YES	41	23	NO	NO	28	1	1	1
POMACENTRIDAE	Abudefduf	taurus	DEM	YES	5	25	NO	NO	26	1	0	1
POMACENTRIDAE	Chromis	cadenati	DEM	NO	60	16.2				0	0	1
POMACENTRIDAE	Chromis	chromis	DEM	YES	40	25				0	0	1
POMACENTRIDAE	Chromis	cyanea	DEM	NO	70	15	NO	NO	25	1	0	0
POMACENTRIDAE	Chromis	enchrysura	DEM	NO	100	10	NO	NO	28	1	1	0
POMACENTRIDAE	Chromis	flavicauda	DEM	NO	61	8.5	NO	NO	26	0	1	0
POMACENTRIDAE	Chromis	insolata	DEM	NO	120	16	NO	NO	28	1	0	0
POMACENTRIDAE	Chromis	jubauna	DEM	NO	54	9.6	NO	NO	26	1	1	0
POMACENTRIDAE	Chromis	limbata	DEM	NO	45	12	NO	NO		0	1	1
POMACENTRIDAE	Chromis	lubbocki	DEM	NO	15	13				0	0	1
POMACENTRIDAE	Chromis	multilineata	DEM	YES	54	20	NO	NO	26	1	1	1
POMACENTRIDAE	Chromis	scotti	DEM	NO	120	10	NO	NO	28	1	1	0

POMACENTRIDAE	Microspathodon	chrysurus	DEM	NO	40	21	NO	NO	26	1	1	0
POMACENTRIDAE	Microspathodon	frontatus	DEM	NO	5	17				0	0	1
POMACENTRIDAE	Similiparma	hermani	DEM	NO	20	16				0	0	1
POMACENTRIDAE	Stegastes	adustus	DEM	NO	20	12	NO	NO	26	1	0	0
POMACENTRIDAE	Stegastes	diencaeus	DEM	NO	20	15	NO	NO	22	1	0	0
POMACENTRIDAE	Stegastes	fuscus	DEM	NO	12	13	NO	NO	26	0	1	0
POMACENTRIDAE	Stegastes	imbricatus	DEM	NO	25	10				0	0	1
POMACENTRIDAE	Stegastes	leucostictus	DEM	NO	5	12	YES	YES	26	1	0	0
POMACENTRIDAE	Stegastes	otophorus	DEM	NO	3	13	YES	YES	17	1	0	0
POMACENTRIDAE	Stegastes	partitus	DEM	NO	45	10	NO	NO	26	1	0	0
POMACENTRIDAE	Stegastes	pictus	DEM	NO	70	10	NO	NO	26	1	1	0
POMACENTRIDAE	Stegastes	planifrons	DEM	NO	30	15	NO	NO	25	1	0	0
POMACENTRIDAE	Stegastes	rocasensis	DEM	NO	10	8.5	NO	NO	1	0	1	0
POMACENTRIDAE	Stegastes	sanctipauli	DEM	NO	50	9	NO	NO	1	0	1	0
POMACENTRIDAE	Stegastes	variabilis	DEM	NO	30	12	NO	NO	26	0	1	0
POMACENTRIDAE	Stegastes	xanthurus	DEM	NO	30	12	NO	NO	26	1	1	0
PRIACANTHIDAE	Cookeolus	japonicus	PEL	NO	400	68	NO	NO	40	1	1	1
PRIACANTHIDAE	Heteropriacanthus	cruentatus	PEL	NO	300	51	NO	NO	26	1	1	1
PRIACANTHIDAE	Priacanthus	arenatus	PEL	NO	453	45	NO	NO	36	1	1	1
PRIACANTHIDAE	Pristigenys	alta	PEL	YES	175	33	NO	NO	28	1	1	0
PTERELEOTRIDAE	Ptereleotris	calliura	DEM	NO	50	12.5	NO	YES	12	1	0	0
PTERELEOTRIDAE	Ptereleotris	helenae	DEM	NO	60	12	NO	YES	21	1	0	0
PTERELEOTRIDAE	Ptereleotris	randalli	DEM	NO	65	12.5	NO	YES	26	1	1	0
SCIAENIDAE	Equetus	lanceolatus	PEL	NO	230	30	NO	YES	26	1	1	0
SCIAENIDAE	Equetus	punctatus	PEL	NO	105	25	NO	NO	26	1	1	0
SCIAENIDAE	Odontoscion	dentex	PEL	NO	30	30	NO	YES	26	1	1	0
SCIAENIDAE	Pareques	acuminatus	PEL	NO	110	25	NO	YES	31	1	1	0
SCIAENIDAE	Pareques	iwamotoi	PEL	NO	184	20	NO	YES	27	1	1	0
SCIAENIDAE	Pareques	umbrosus	PEL	NO	110	20	NO	YES	30	1	1	0
SCORPAENIDAE	Neomerinthe	beanorum	PEL	NO	375	19.5	NO	NO	17	1	0	0
SCORPAENIDAE	Neomerinthe	hemingwayi	PEL	NO	230	40	NO	NO	18	1	0	0
SCORPAENIDAE	Pontinus	castor	PEL	NO	400	46	NO	YES	16	1	0	0
SCORPAENIDAE	Pontinus	corallinus	PEL	NO	100	33	NO	YES	7	0	1	0
SCORPAENIDAE	Pontinus	nematophthalmus	PEL	NO	410	14	NO	YES	26	1	0	0
SCORPAENIDAE	Pontinus	rathbuni	PEL	NO	366	25	NO	YES	28	1	1	0
SCORPAENIDAE	Scorpaena	agassizii	PEL	NO	300	20	NO	YES	28	1	1	0
SCORPAENIDAE	Scorpaena	albifimbria	PEL	NO	50	9	NO	YES	26	1	0	0
SCORPAENIDAE	Scorpaena	angolensis	PEL	NO	311	25				0	0	1
SCORPAENIDAE	Scorpaena	annobonae	PEL	NO	48	4.4				0	0	1
SCORPAENIDAE	Scorpaena	bergii	PEL	NO	75	10	NO	YES	34	1	1	0
SCORPAENIDAE	Scorpaena	brachyptera	PEL	NO	155	7.5	NO	YES	21	1	0	0
SCORPAENIDAE	Scorpaena	brasiliensis	PEL	NO	163	35	YES	YES	30	1	1	0
SCORPAENIDAE	Scorpaena	calcarata	PEL	NO	110	16	NO	YES	28	1	1	0

SCORPAENIDAE	Scorpaena	dispar	PEL	NO	172	22.5	NO	NO	26	1	1	0
SCORPAENIDAE	Scorpaena	elachys	PEL	NO	100	6.4	NO	YES	15	1	0	0
SCORPAENIDAE	Scorpaena	elongata	PEL	NO	800	50				0	0	1
SCORPAENIDAE	Scorpaena	grandicornis	PEL	NO	30	15	NO	YES	26	1	1	0
SCORPAENIDAE	Scorpaena	inermis	PEL	NO	73	11	NO	YES	26	1	0	0
SCORPAENIDAE	Scorpaena	isthmensis	PEL	NO	100	26	NO	YES	28	1	1	0
SCORPAENIDAE	Scorpaena	laevis	PEL	NO	100	35				0	0	1
SCORPAENIDAE	Scorpaena	maderensis	PEL	NO	40	14				0	0	1
SCORPAENIDAE	Scorpaena	normani	PEL	NO	300	20				0	0	1
SCORPAENIDAE	Scorpaena	plumieri	PEL	NO	60	45	NO	YES	34	1	1	0
SCORPAENIDAE	Scorpaena	scrofa	PEL	NO	500	50				0	0	1
SCORPAENIDAE	Scorpaena	stephanica	PEL	NO	201	40				0	0	1
SCORPAENIDAE	Scorpaenodes	africanus	PEL	NO	50.6*	90				0	0	1
SCORPAENIDAE	Scorpaenodes	arenai	PEL	NO	50.6*	11				0	0	1
SCORPAENIDAE	Scorpaenodes	caribbaeus	PEL	NO	35	12	NO	NO	26	1	1	0
SCORPAENIDAE	Scorpaenodes	elongatus	PEL	NO	50.6*	15				0	0	1
SCORPAENIDAE	Scorpaenodes	insularis	PEL	NO	35	10	NO	NO	5	0	1	0
SCORPAENIDAE	Scorpaenodes	tredecimspinosus	PEL	NO	82	6.5	NO	NO	23	1	1	0
SERRANIDAE	Acanthistius	brasilianus	PEL	NO	40	60	YES	NO	15	0	1	0
SERRANIDAE	Alphestes	afer	PEL	NO	35	33	NO	YES	26	1	1	1
SERRANIDAE	Anthias	anthias	PEL	NO	300	27				0	0	1
SERRANIDAE	Anthias	nicholsi	PEL	NO	430	12.5	NO	NO	28	1	1	0
SERRANIDAE	Anthias	salmopunctatus	PEL	NO	45	6	NO	NO	1	0	1	0
SERRANIDAE	Anthias	tenuis	PEL	NO	915	12.5	NO	NO	27	1	0	0
SERRANIDAE	Bullisichthys	caribbaeus	PEL	NO	548	7	NO	YES	15	1	0	0
SERRANIDAE	Centropristis	fuscula	PEL	NO	100	15	NO	NO	11	1	0	0
SERRANIDAE	Centropristis	ocyurus	PEL	NO	100	30	NO	YES	14	1	0	0
SERRANIDAE	Diplectrum	bivittatum	PEL	NO	120	25	NO	YES	24	1	1	0
SERRANIDAE	Diplectrum	formosum	PEL	NO	110	30	NO	YES	31	1	1	0
SERRANIDAE	Diplectrum	radiale	PEL	NO	80	26	NO	YES	26	1	1	0
SERRANIDAE	Dules	auriga	PEL	NO	140	23	NO	YES	25	0	1	0
SERRANIDAE	Gonioplectrus	hispanus	PEL	NO	365	30	NO	NO	28	1	1	0
SERRANIDAE	Hypoplectrus	aberrans	PEL	NO	12	13	NO	NO	18	1	0	0
SERRANIDAE	Hypoplectrus	chlorurus	PEL	NO	23	13	NO	NO	17	1	0	0
SERRANIDAE	Hypoplectrus	gemma	PEL	NO	20	13	NO	NO	5	1	0	0
SERRANIDAE	Hypoplectrus	gummigutta	PEL	NO	20	13	NO	NO	15	1	0	0
SERRANIDAE	Hypoplectrus	guttavarius	PEL	NO	30	13	NO	NO	20	1	0	0
SERRANIDAE	Hypoplectrus	indigo	PEL	NO	35	15	NO	NO	20	1	0	0
SERRANIDAE	Hypoplectrus	nigricans	PEL	NO	67	15	NO	NO	22	1	0	0
SERRANIDAE	Hypoplectrus	providencianus	PEL	NO	15	13	NO	NO	9	1	0	0
SERRANIDAE	Hypoplectrus	puella	PEL	NO	90	15	NO	YES	26	1	0	0
SERRANIDAE	Hypoplectrus	sp. (tan hamlet)	PEL	NO	15	13	NO	NO	17	1	0	0
SERRANIDAE	Hypoplectrus	unicolor	PEL	NO	25	13	NO	NO	26	1	0	0

SERRANIDAE	Liopropoma	aberrans	PEL	NO	230	13.5	NO	NO	19	1	0	0
SERRANIDAE	Liopropoma	carmabi	PEL	NO	70	4.8	NO	NO	22	1	1	0
SERRANIDAE	Liopropoma	eukrines	PEL	NO	150	13	NO	NO	11	1	0	0
SERRANIDAE	Liopropoma	mowbrayi	PEL	NO	130	9	NO	NO	27	1	0	0
SERRANIDAE	Liopropoma	rubre	PEL	NO	45	6	NO	NO	25	1	0	0
SERRANIDAE	Liopropoma	sp.n.(Stome)	PEL	NO	125*	9.26*				0	0	1
SERRANIDAE	Paralabrax	dewegeri	PEL	NO	50	43	YES	NO	5	1	0	0
SERRANIDAE	Paranthias	furcifer	PEL	NO	128	40	NO	NO	26	1	1	1
SERRANIDAE	Parasphyraenops	incisus	PEL	NO	200	6.8	NO	NO	16	1	0	0
SERRANIDAE	Plectranthias	garrupellus	PEL	NO	375	10	NO	NO	27	1	0	0
SERRANIDAE	Pronotogrammus	martinicensis	PEL	NO	230	24	NO	NO	28	1	1	0
SERRANIDAE	Pseudogramma	gregoryi	PEL	NO	21	7.5	NO	NO	25	1	0	0
SERRANIDAE	Pseudogramma	guineensis	PEL	NO	20	2.3				0	0	1
SERRANIDAE	Rypticus	bistrispinus	PEL	NO	430	15	NO	YES	26	1	1	0
SERRANIDAE	Rypticus	bornoi	PEL	NO	70	7.5	NO	NO	21	1	0	0
SERRANIDAE	Rypticus	maculatus	PEL	NO	91	24	NO	NO	17	1	0	0
SERRANIDAE	Rypticus	randalli	PEL	NO	15	21.5	YES	YES	26	1	1	0
SERRANIDAE	Rypticus	saponaceus	PEL	NO	140	35	YES	YES	28	1	1	1
SERRANIDAE	Rypticus	sp.n. (STome)	PEL	NO	127.83*	20.166*				0	0	1
SERRANIDAE	Rypticus	subbifrenatus	PEL	NO	21	18	NO	NO	26	1	1	1
SERRANIDAE	Schultzea	beta	PEL	NO	170	15.5	NO	NO	24	1	0	0
SERRANIDAE	Serraniculus	pumilio	PEL	NO	165	8.6	NO	YES	28	1	0	0
SERRANIDAE	Serranus	accraensis	PEL	NO	150	20				0	0	1
SERRANIDAE	Serranus	africanus	PEL	NO	200	14				0	0	1
SERRANIDAE	Serranus	annularis	PEL	NO	86	9	NO	YES	28	1	1	0
SERRANIDAE	Serranus	atricauda	PEL	NO	90	43.2				0	0	1
SERRANIDAE	Serranus	atrobranchus	PEL	NO	276	12	NO	YES	28	1	1	0
SERRANIDAE	Serranus	baldwini	PEL	NO	80	7.4	NO	YES	26	1	1	0
SERRANIDAE	Serranus	cabrilla	PEL	NO	500	40				0	0	1
SERRANIDAE	Serranus	chionaraia	PEL	NO	100	6.5	NO	YES	21	1	1	0
SERRANIDAE	Serranus	flaviventris	PEL	NO	402	7.5	YES	YES	26	1	1	0
SERRANIDAE	Serranus	hepatus	PEL	NO	100	25				0	0	1
SERRANIDAE	Serranus	luciopercanus	PEL	NO	173	15	NO	NO	13	1	0	0
SERRANIDAE	Serranus	notospilus	PEL	NO	230	10	NO	YES	19	1	0	0
SERRANIDAE	Serranus	phoebe	PEL	NO	402	15	NO	NO	26	1	1	0
SERRANIDAE	Serranus	sanctaehelenae	PEL	NO	110	75				0	0	1
SERRANIDAE	Serranus	scriba	PEL	NO	150	36				0	0	1
SERRANIDAE	Serranus	sp.n. (Arraial)	PEL	NO	175.47*	20.41*	NO	NO		0	1	0
SERRANIDAE	Serranus	sp.n. (STome)	PEL	NO	175.47*	20.41*				0	0	1
SERRANIDAE	Serranus	subligarius	PEL	NO	80	10	NO	YES	13	1	0	0
SERRANIDAE	Serranus	tabacarius	PEL	NO	75	22	NO	YES	26	1	1	0
SERRANIDAE	Serranus	tigrinus	PEL	NO	40	12.3	NO	YES	26	1	0	0
SERRANIDAE	Serranus	tortugarum	PEL	NO	90	8	NO	YES	26	1	0	0

SPARIDAE	Archosargus	probatocephalus	PEL	NO	15	92	YES	YES	38	1	1	0
SPARIDAE	Archosargus	rhomboidalis	PEL	NO	20	33	YES	YES	34	1	1	0
SPARIDAE	Boops	boops	PEL	YES	350	36				0	0	1
SPARIDAE	Calamus	arctifrons	PEL	NO	22	25	NO	YES	7	1	0	0
SPARIDAE	Calamus	bajonado	PEL	NO	180	68	NO	YES	28	1	1	0
SPARIDAE	Calamus	calamus	PEL	NO	75	56	NO	YES	28	1	1	0
SPARIDAE	Calamus	campechanus	PEL	NO	18	21	NO	YES	4	1	0	0
SPARIDAE	Calamus	cervigoni	PEL	NO	70	20	NO	YES	3	1	0	0
SPARIDAE	Calamus	leucosteus	PEL	NO	100	46	NO	YES	17	1	0	0
SPARIDAE	Calamus	mu	PEL	NO	90	30	NO	YES	7	0	1	0
SPARIDAE	Calamus	nodosus	PEL	NO	89	54	NO	YES	7	1	0	0
SPARIDAE	Calamus	penna	PEL	NO	87	46	NO	YES	26	1	1	0
SPARIDAE	Calamus	pennatula	PEL	NO	147	37	NO	YES	26	1	1	0
SPARIDAE	Calamus	proridens	PEL	NO	60	46	NO	YES	17	1	0	0
SPARIDAE	Dentex	angolensis	PEL	NO	300	37				0	0	1
SPARIDAE	Dentex	barnardi	PEL	NO	100	40				0	0	1
SPARIDAE	Dentex	canariensis	PEL	NO	450	100				0	0	1
SPARIDAE	Dentex	congoensis	PEL	NO	400	50				0	0	1
SPARIDAE	Dentex	gibbosus	PEL	NO	220	106				0	0	1
SPARIDAE	Dentex	macrophthalmus	PEL	NO	500	65				0	0	1
SPARIDAE	Dentex	maroccanus	PEL	NO	500	45				0	0	1
SPARIDAE	Diplodus	argenteus	PEL	NO	28	46	NO	YES	40	0	1	0
SPARIDAE	Diplodus	argenteus caudimacula	PEL	NO	25	30	NO	YES	21	1	0	0
SPARIDAE	Diplodus	bellottii	PEL	NO	50	22				0	0	1
SPARIDAE	Diplodus	cervinus	PEL	NO	50	30				0	0	1
SPARIDAE	Diplodus	fasciatus	PEL	NO	100	60				0	0	1
SPARIDAE	Diplodus	prayensis	PEL	NO	100	35				0	0	1
SPARIDAE	Diplodus	sargus	PEL	NO	50	45				0	0	1
SPARIDAE	Diplodus	sargus cadenati	PEL	NO	150	45				0	0	1
SPARIDAE	Diplodus	sargus capensis	PEL	NO	50	45				0	0	1
SPARIDAE	Diplodus	sargus lineatus	PEL	NO	30	28				0	0	1
SPARIDAE	Diplodus	vulgaris	PEL	NO	160	45				0	0	1
SPARIDAE	Lagodon	rhomboides	PEL	NO	20	40	YES	YES	24	1	0	0
SPARIDAE	Oblada	melanura	PEL	NO	30	34				0	0	1
SPARIDAE	Pagellus	erythrinus	PEL	NO	400	44.5				0	0	1
SPARIDAE	Pagrus	africanus	PEL	NO	200	75				0	0	1
SPARIDAE	Pagrus	auriga	PEL	NO	170	80				0	0	1
SPARIDAE	Pagrus	caeruleostictus	PEL	NO	200	90				0	0	1
SPARIDAE	Pagrus	pagrus	PEL	YES	250	91	NO	YES	50	1	1	1
SPARIDAE	Sarpa	salpa	PEL	NO	70	51				0	0	1
SPARIDAE	Sparus	aurata	PEL	NO	150	70				0	0	1
SPARIDAE	Spondyliosoma	cantharus	PEL	NO	300	60				0	0	1
SPARIDAE	Viridentex	acromegalus	PEL	NO	60	52				0	0	1

SYNGNATHIDAE	Acentronura	dendritica	DEM	NO	10	8.1	NO	YES	28	1	1	0
SYNGNATHIDAE	Anarchopterus	criniger	DEM	NO	11	10	NO	YES	28	1	1	0
SYNGNATHIDAE	Anarchopterus	tectus	DEM	NO	26	12.5	NO	YES	26	1	1	0
SYNGNATHIDAE	Bryx	dunckeri	DEM	YES	72	7.5	YES	YES	28	1	1	0
SYNGNATHIDAE	Bryx	randalli	DEM	NO	10	9.3	YES	YES	15	1	0	0
SYNGNATHIDAE	Cosmocampus	albirostris	DEM	NO	50	21	NO	YES	26	1	1	0
SYNGNATHIDAE	Cosmocampus	elucens	DEM	NO	375	17	YES	YES	26	1	1	0
SYNGNATHIDAE	Cosmocampus	hildebrandi	DEM	NO	73	10	YES	YES	11	1	0	0
SYNGNATHIDAE	Hippocampus	algiricus	DEM	NO	38.83*	19.2				0	0	1
SYNGNATHIDAE	Hippocampus	erectus	DEM	YES	73	17.3	NO	YES	28	1	1	1
SYNGNATHIDAE	Hippocampus	hippocampus	DEM	NO	60	15				0	0	1
SYNGNATHIDAE	Hippocampus	reidi	DEM	YES	55	17.5	NO	YES	28	1	1	0
SYNGNATHIDAE	Hippocampus	zosterae	DEM	NO	21	5	NO	YES	11	1	0	0
SYNGNATHIDAE	Micrognathus	crinitus	DEM	NO	22	15	NO	YES	26	1	1	0
SYNGNATHIDAE	Micrognathus	erugatus	DEM	NO	2	11.7	NO	YES	17	0	1	0
SYNGNATHIDAE	Minyichthys	inusitatus	DEM	NO	100	3	NO	NO	26	1	1	0
SYNGNATHIDAE	Penetopteryx	nanus	DEM	NO	2	3.2	NO	NO	15	1	0	0
SYNGNATHIDAE	Syngnathus	acus	DEM	YES	110	50				0	0	1
SYNGNATHIDAE	Syngnathus	floridae	DEM	YES	22	25	YES	YES	30	1	0	0
SYNGNATHIDAE	Syngnathus	springeri	DEM	YES	128	38	YES	YES	11	1	0	0
SYNODONTIDAE	Synodus	foetens	PEL	NO	180	45	NO	YES	29	1	1	0
SYNODONTIDAE	Synodus	intermedius	PEL	NO	316	40	NO	YES	30	1	1	0
SYNODONTIDAE	Synodus	poeyi	PEL	NO	320	25	NO	YES	28	1	1	0
SYNODONTIDAE	Synodus	saurus	PEL	NO	400	40	NO	YES	28	1	1	1
SYNODONTIDAE	Synodus	synodus	PEL	NO	90	33	NO	YES	28	1	1	1
SYNODONTIDAE	Trachinocephalus	myops	PEL	NO	360	40	NO	YES	35	1	1	1
TETRAODONTIDAE	Canthigaster	capistratus	BAL	NO	35	12				0	0	1
TETRAODONTIDAE	Canthigaster	figueiredoi	BAL	NO	54	12	NO	NO	26	1	1	0
TETRAODONTIDAE	Canthigaster	jamestyleri	BAL	NO	98	10	NO	NO	27	1	0	0
TETRAODONTIDAE	Canthigaster	rostrata	BAL	NO	85	12	NO	NO	28	1	0	0
TETRAODONTIDAE	Canthigaster	supramacula	BAL	NO	68*	3.9				0	0	1
TETRAODONTIDAE	Ephippion	guttifer	BAL	NO	100	80				0	0	1
TETRAODONTIDAE	Sphoeroides	spengleri	BAL	NO	40	15	NO	YES	35	1	1	1
TRIPTERYGIIDAE	Enneanectes	altivelis	DEM	NO	25	4	NO	NO	26	1	1	0
TRIPTERYGIIDAE	Enneanectes	atrorus	DEM	NO	33	3.3	NO	NO	20	1	0	0
TRIPTERYGIIDAE	Enneanectes	boehlkei	DEM	NO	25	4	NO	NO	20	1	0	0
TRIPTERYGIIDAE	Enneanectes	jordani	DEM	NO	11	4	NO	NO	17	1	0	0
TRIPTERYGIIDAE	Enneanectes	pectoralis	DEM	NO	11	4	NO	NO	19	1	0	0
TRIPTERYGIIDAE	Enneanectes	smithi	DEM	NO	11	4	NO	NO	1	0	1	0
TRIPTERYGIIDAE	Tripterygion	delaisi	DEM	NO	40	8.9				0	0	1

Table S2. Summary of GLMM statistics for effects of various traits on the ability of species to overcome two oceanographic barriers with members of “superdisperser” families (Carangidae and Muraenidae) excluded to assess their possible ability to confound results. The first column summarizes the GLMM results for MAB including only species occurring in either of the West Atlantic provinces. Only those species were used to test effects of latitudinal range and habitat use, as relevant data are not available for many species restricted to the East Atlantic (see methods). (A) The effect of dropping each variable separately from full models (showing both AIC and chi-square test statistics). (B) The final predictive model (showing estimates, standard error, and p-values). Coefficient in bold indicates that *p*-value is significant ($p < 0.05$).

	Superdispersers species excluded								
	Mid-Atlantic Barrier						Amazon-Orinoco Plume (728)		
a)	*W Atlantic species only* (728)			*All species* (921)					
Variable	*df*	AIC	Pr (Chi)	*df*	AIC	Pr (Chi)	*df*	AIC	Pr (Chi)
Full model	11	323.0	-	8	423.1	-	11	605.0	-
Rafting behaviour	10	326.4	**0.019**	7	441.0	**<0.001**	10	603.5	0.482
Larval-development mode	9	322.4	0.182	6	421.4	0.315	9	614.8	**0.001**
Maximum body size	10	330.5	**0.002**	7	441.0	**<0.001**	10	605.6	0.106
Intra-regional latitudinal range	10	362.4	**<0.001**	NA	NA	NA	10	752.1	**<0.001**
Multi-habitat use	10	323.5	0.116	NA	NA	NA	10	609.0	**0.013**
Maximum depth	10	321.7	0.418	NA	NA	NA	10	603.1	0.793
Low-salinity habitat use	10	324.1	0.079	NA	NA	NA	10	603.6	0.448
b)									
Variable	*Est.*	*SE*	*p-val*	*Est.*	*SE*	*p-val*	*Est.*	*SE*	*p-val*
Intercept	-11.298	1.385	**<0.001**	-6.427	0.699	**<0.001**	-7.348	0.869	**<0.001**
Rafting behaviour	1.534	0.541	**0.004**	2.223	0.443	**<0.001**	NA	NA	NA
Larval-development mode									
Pelagic vs. demersal	NA	NA	NA	NA	NA	NA	-0.261	0.327	0.423
Pelagic vs. balistid	NA	NA	NA	NA	NA	NA	0.510	0.829	0.538
Demersal vs. balistid	NA	NA	NA	NA	NA	NA	0.772	0.849	0.363
Maximum body size	2.078	0.592	**<0.001**	2.674	0.479	**<0.001**	0.827	0.409	**0.043**
Intra-regional latitudinal range	0.227	0.046	**<0.001**	NA	NA	NA	0.245	0.028	**<0.001**
Multi-habitat use	-0.587	0.405	0.147	NA	NA	NA	0.646	0.239	**0.006**