Spatial and size feeding niche partitioning of the rhomboid mojarra Diapterus rhombeus (Cuvier, 1829) in a tropical Brazilian Bay

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ORIGINAL ARTICLE

Spatial and size feeding niche partitioning of the rhomboid mojarra *Diapterus rhombeus* (Cuvier, 1829) in a tropical Brazilian Bay

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Abstract
We examined the stomach contents of 287 individuals of rhomboid mojarra *Diapterus rhombeus* collected between June 1999 and May 2000 in three zones (inner, middle and outer) of a Brazilian tropical bay. Fish were grouped in five size-class (Total Length$_1$ ≤ 80 mm; TL$_2$ = 81–110; TL$_3$ = 111–140; TL$_4$ = 141–170; and TL$_5$ ≥ 171). The aim was to assess whether intraspecific spatial and size-feeding niche partitioning occurs and to describe the strategy used to explore the available resources. Crustacea and Polychaeta were the most important trophic categories and Harpacticoida (Index of Relative Importance, IRI = 66.9%) was the most preferred prey throughout all zones and size classes. The smallest individuals (TL ≤ 140 mm) occurred exclusively in the inner zone and fed mainly on Harpacticoida, Calanoida, sedentary Polychaeta and Nematoda, while the largest individuals (TL > 140 mm) fed mainly on Harpaticoida and Ostracoda. In the outer zone, the largest individuals feed mainly on Harpacticoida and *Caprella*. A high within-phenotype contribution to the niche width and a generalist zoobenthivore feeding strategy were detected. Partitioning the food items along space and growth seems to be the mechanism used by this species to decrease intraspecific competition.

Key words: *Tropical bays, demersal fishes, feeding habits, mojarras, partitioning resources*

Introduction

The functional role of coastal embayments and other semi-closed coastal systems for fishes has been widely identified as rearing grounds for juveniles (Lugendo et al. 2006; Fairclough et al. 2008; Gning et al. 2008). Because such systems may have a variety of habitats used by fishes during a particular part of their life cycle, partitioning of the resources is common among the smaller individuals distributed in shallower, more protected habitats, moving toward deeper areas as they grow and mature. Such behaviour has been reported for several fish species that use the bays as rearing grounds (Frodie & Mendoza 2006; Latour et al. 2008; Gning et al. 2010). In this context, intraspecific size segregation may be a strategy to minimize niche overlap, thus enabling resource partitioning among the individuals of a given species (Schafer et al. 2002). Habitat variation is, therefore, an important factor influencing the feeding strategy of a species by determining foraging opportunities with shifts in the diet during ontogenetic development, thereby reducing intraspecific competition (Ross 1986; Piet et al. 1999).

Fishes from the family Gerreidae, known as mojarras, are among the most abundant components of the ichthyofauna in tropical bays and are important resources in artisanal fishing worldwide (Austin 1971; Ayala-Pérez et al. 2001; Kanak & Tachihara 2006; Chen et al. 2007). *Diapterus rhombeus* (Cuvier, 1829) is a species restricted to the Western Atlantic, distributed from Florida to Bahia, Brazil (Gilmore & Greenfield 2002). This species is one of the most abundant demersal fishes of Central and South American coastal embayments, and an important component of artisan fishing (Aguirre-León & Yáñez-Arancibia 1986; Araújo & Santos 1999; Araújo & Azevedo 2001). In Brazil, this species is abundant in the Southeastern/Southern coast (Araújo & Azevedo 2001; Félix et al.

2007), and is the dominant species in Sepetiba Bay, a semi-closed coastal area in Rio de Janeiro State (RJ) (Pessanha & Araújo 2003), where it coexists with other abundant species of Gerreidae, e.g. *Eucinostomus argenteus* (Baird & Girad, 1855) and *Eucinostomus gula* (Cuvier, 1830), Sciaenidae, e.g. *Micropogonias furnieri* (Desmarest, 1823); and Haemulidae, e.g. *Orthopristis ruber* (Cuvier, 1830), during part of its life cycle (Araújo et al. 2002). *Diapterus rhombeus* is a second trophic level feeder according to Aguirre-León & Díaz-Ruiz (2006), feeding mainly on invertebrates that inhabit the bottom and the water column, particularly Polychaeta and Crustacea (Santos & Araújo 1997). Little information is available on the feeding habits of *D. rhombeus* (Austin 1971; Aguirre-León & Yáñez-Arancibia 1986; Santos & Araújo 1997), and no information is available pertaining to food partitioning or trophic strategy.

Sepetiba Bay is a sedimentary embayment in southeastern Brazil with spatial environmental heterogeneity. The major environmental gradient is from the inner to the outer bay with increasing water depth, salinity and transparency (Araújo et al. 1998). Such a gradient produces different habitat constraints. As the environmental conditions change, so can species prey composition. Thus, the exploitation of different habitats by *D. rhombeus* in different periods of its life cycle might be an important mechanism for fish population success in such systems.

According to Amundsen et al. (1996), the feeding strategy of one species can be divided into two components: (1) the within-phenotype component (variation in an individual's own resource use) and (2) the between-phenotype component (variation in resource use among individuals). Therefore, it is important to know how fish species adapt their feeding strategies in relation to different environments, prey availability and fish size-class and how the feeding behaviour of individuals influences the feeding strategy of the population. The main goal of this study was to describe the diet of *D. rhombeus* in the Sepetiba Bay by comparing changes in diet across fish-size and bay zones and to describe the strategy used to explore the available resources. We also explore whether spatial and size-feeding niche partitioning occurs as a mechanism to reduce intraspecific competition.

Material and methods

Sampling programme

Sepetiba Bay ($22°54'–23°04'$ S; $43°34'–44°10'$ W) was formed by extensive sand deposition, which formed a barrier beach as its southern boundary. The bay has a surface area of approximately 450 km^2, a mean depth of 8.6 m, a maximum depth of 30 m, and a drainage area of 2700 km^2 (Figure 1). This system encompasses different habitats such as mangroves, sandbanks, estuaries, rocky shores, and muddy and sandy beaches. Numerous marine fishes use the bay for spawning, nursery development and feeding (Araújo et al. 2002).
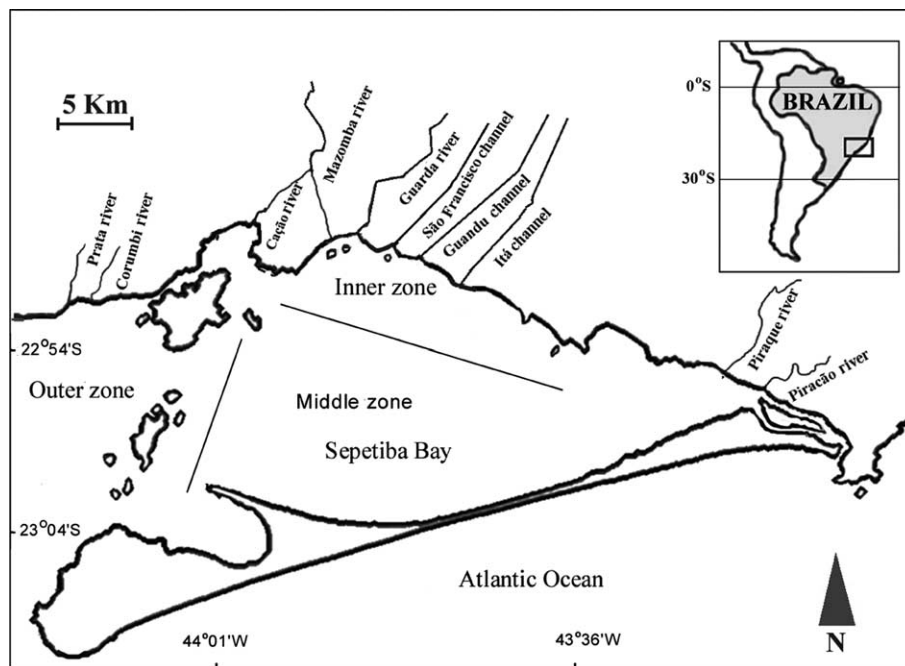

Figure 1. Map of the study area, showing the three zones (outer, middle and inner) of the Sepetiba Bay, RJ, Brazil.

Monthly sampling was carried out using bottom trawls, between June 1999 and May 2000. The sequence of sampling was random aiming to minimize the effect of the diel cycle with three replicated samples at each zone. A total of 18 trawls (9 during the day and 9 during the night) were performed for each sampling event. Bottom trawl tows were against the current, had 20-min duration on the bottom and a towing speed of approximately 3 km h^{-1}, covering a distance of 1500 m. The trawl had an 8 m headline, 11 m ground rope, 25 mm stretched mesh and 12 mm mesh cod-end liner. The outer zone has a sandy and gravel bottom and is close to the sea limit; the inner zone has a heavy muddy bottom and is located within the protected area of the Bay; and the middle zone has an intermediate bottom comprised of gravel, sand and mud (Guedes & Araújo 2008).

Immediately after collection, fish were anaesthetized in benzocaine hydrochloride (50 mg l^{-1}), and then fixed in 10% formaldehyde–seawater solution. After 48 h, they were transferred to 70% ethanol. All individuals were identified to species (Menezes & Figueiredo 1980), measured for total length (mm) and weighed (g). Stomachs were removed and food items were identified to the lowest possible taxonomic level.

Diet quantification

Stomach contents were analysed from a subsample of the fish captured in each zone. If a sample consisted of < 30 individuals, all stomachs were dissected and examined. For samples consisting of > 30 individuals, 30 individuals covering a wide size-range from each zone in each month were selected for dissection. Empty stomachs or those with unidentifiable contents were excluded from the analyses.

Each prey item was identified to the lowest possible taxonomic level using a stereomicroscope, counted and weighed to a precision of 0.001 g, and preserved in 70% ethanol. Food composition was expressed as a percentage: Index of Relative Importance (IRI) developed by Pinkas et al. (1971), which describes the relative contribution of food items in the diet as a calculation of the frequency of occurrence (%FO) and percentage composition by number (%N) and by mass (%M) (Hyslop 1980). The IRI was calculated using the equation: IRI = (%N + %M) × %FO. The index was expressed as a percentage for each prey item: %IRI = (IRI/σIRI) × 100, where sIRI is summed for all stomach samples. We did not calculate IRI for items that were not counted or weighted such as fragments of Cirrepidia, diatoms and algae. Only items that had IRI > 1% were shown.

Data analyses

A matrix of food items was constructed in order to reduce the number of samples and to facilitate feeding pattern detection as reported by Linke et al. (2001) and Schafer et al. (2002). Thus, for each size-class in each bay zone, the stomach contents of each of 3 to 5 individuals were grouped and their number and weight was averaged to represent a single sample. According to Platell & Potter (2001), pooling stomach contents of 3–5 individuals avoids eventual bias caused by individuals that have low numbers of small food items.

Spatial shifts in diet were assessed according to fish caught in each of the three bay zones: inner, middle and outer. To assess for possible changes in diet with respect to size, fish were grouped into five size-class: Total Length$_1$ ≤ 80 mm; TL$_2$ = 81–110 mm; TL$_3$ = 111–140 mm; TL$_4$ = 141–170 mm; and TL$_5$ ≥ 170 mm. These size classes were defined considering the sample size and to allocation of two size-class below and three size-class above the size at first maturation (L$_{50}$ = 110 mm TL) (González-Cabello 1985; Araújo et al. 1999; Aguirre-Leon & Diaz-Ruiz 2006). No seasonal changes in diet were considered, because no difference in diet composition among seasons was found according to nonparametric analysis of similarity (ANOSIM).

The numerical abundance feeding data values for samples by bay zones and size-class were square root-transformed and converted into a triangular matrix of similarities between all samples, using the Bray–Curtis similarity (Schafer et al. 2002). The results of this procedure were displayed on an ordination plot, generated by a non-metric Multidimensional Scaling (nMDS) procedure to assess size and spatial patterns. Spatial (among zones) and growth (among size-class) comparisons in diet composition were tested using ANOSIM. The Similarity Percentage (SIMPER) procedure was used to detect the species that contribute to within-group similarity. Significant differences detected by ANOSIM were those with $P < 0.05$ (Hourston et al. 2004). The ANOSIM, nMDS and SIMPER procedures were preformed with the PRIMER software package, version 5.0 (Clarke & Gorley 2001).

Trophic strategy

Feeding strategies among bay zones and size-class were analysed using the graphical method of Costello (1990), modified by Amundsen et al. (1996). In this method, the prey-specific mass (%M), defined as the mean gravimetric contribution of a food item (only for individuals that had this food item in their stomach), was plotted against the frequency of

occurrence (%FO), and then interpreted with respect to the position within the graph. The vertical axis represents the feeding strategy of the predator in terms of specialization or generalization. Predators are specialized on prey positioned in the upper part of the graph, whereas prey positioned in the lower part were eaten only occasionally (generalization). Moreover, it is possible to envisage populations with a high among-phenotype component, as different individuals specialize on different resource types with little or no overlap in resource use. Populations with a high within-population component produce high overlap as most of the individuals of the population utilize many resource types (Costello 1990; Amundsen et al. 1996). For this analysis, the stomach content of each individual fish was considered a single sample.

Results

Diet

A total of 287 stomachs were examined; 224 (79%) had identifiable prey and 63 (21%) were empty. Eight trophic taxonomic categories were identified according to the food items: Nematoda, Crustacea, Polychaeta, Molusca, Equinoderma, Telostei, Diatomacea and plants. Most items were benthic infaunal and epifaunal species, and the main items were Harpacticoida, Ostracoda, Polychaeta, Nematoda and *Caprella* (Table I).

Spatial variation

A spatial change in selection of feeding items was detected among the bay zones (Figure 2). Harpacticoida was the main food item throughout all three zones (inner zone, IRI = 57.3%; middle zone, IRI = 90.7%; outer zone, IRI = 30.7%). Other items were important, such as sedentary Polychaeta (IRI = 13.8%) and Ostracoda (IRI = 12.4%) in the inner zone, whereas *Caprella* (IRI = 31.2%) and Ostracoda (IRI = 18.2%) had a large contribution in the outer zone (Figure 2).

The nMDS ordination showed a stress of 0.20 for zone comparisons (Figure 3). Samples from the inner and middle zones are shown mainly on the right side of the diagram, while those from the outer zone are located on the upper-left part of the diagram (Figure 3). Significant differences in the diet were found by ANOSIM (R Global = 0.299; $P = 0.001$), confirming the differences in the diet among the zones. High dissimilarities were found between the middle and the outer zones ($R = 0.395$; $P = 0.001$), and between the inner and the outer zones ($R = 0.359$; $P = 0.001$). The inner and the

Table I. Frequency of occurrence (%FO), numerical percentage (%N), weight (%P), and Index of Relative Importance (%IRI) of food items from *Diapterus rhombeus* collected in Sepetiba Bay.

Feeding categories/items	%FO	%N	%P	%IRI
Nematoda	22.86	2.64	3.36	1.91
Crustacea				
Harpacticoida	78.02	50.31	11.24	66.88
Calanoida	28.25	11.42	3.91	6.03
Cyclopoida	3.58	0.27	0.48	<0.1
Cumacea	6.72	0.15	0.96	0.10
Ostracoda	46.63	8.75	6.02	10.25
Mysidacea	0.44	<0.1	<0.1	<0.1
Amphipoda	22.42	0.84	4.10	1.54
Caprella	30.94	6.02	3.08	3.92
Decapoda	0.44	<0.1	<0.1	<0.1
Crustacea larvae	1.34	<0.1	0.24	0.34
Polychaeta				
Polychaeta Errantia	23.31	2.84	3.94	2.20
Polychaeta Sedentaria	27.80	15.51	2.59	7.01
Mollusca				
Gastropoda	0.44	<0.1	<0.1	<0.1
Bivalvia	3.58	<0.1	0.57	<0.1
Echinodermata	0.44	<0.1	<0.1	<0.1
Telostei				
Telostei (eggs)	2.69	<0.1	0.48	<0.1
Telostei (scales)	3.13	<0.1	0.45	<0.1
Diatomacea	21.07	–	–	–
Algae	0.89	–	–	–
Plants	23.76	–	–	–
Digested Material	44.84	–	–	–

central zone showed significant differences but with a comparatively low R-value ($R = 0.185$; $P = 0.006$). According to SIMPER, differences in diet composition was due to the relatively higher consumption of sedentary Polychaeta and Harpacticoida in the inner zone, Harpacticoida in the middle zone, and Harpacticoida and *Caprella* in the outer zone (Table II).

Size variation

The size of the individuals ranged from 56 to 235 mm. Fish in the first three smaller size-class (TL ≤ 140 mm) were found only the inner zone, while fish in the larger size-class (TL > 140 mm) occurred in all three zones (Figure 4). Gut contents for the inner zone were predominated by Harpacticoida, Calanoida and sedentary Polychaeta for fish in smaller size-class (TL_1, TL_2 and TL_3), and by Harpaticoida and Ostracoda for fish in larger size-class (TL_4 and TL_5). In the outer zone, where fish were recorded only in larger size-class (TL > 140 mm), there was a predominance of Harpacticoida, *Caprella* and Ostracoda, while Harpacticoida were the main food item in the middle zone (Figure 4).

The nMDS ordination also showed a separation pattern for size-class, with fish samples in smaller size-class appearing on the right side of the diagram
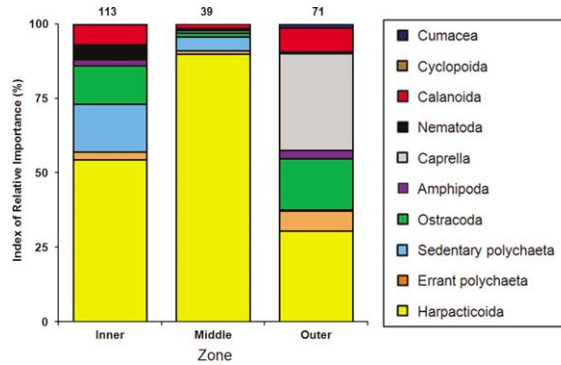
Figure 2. Index of Relative Importance (%IRI) for *Diapterus rhombeus* in three zones of Sepetiba Bay, Brazil; n = number of fish examined with food in the stomach.
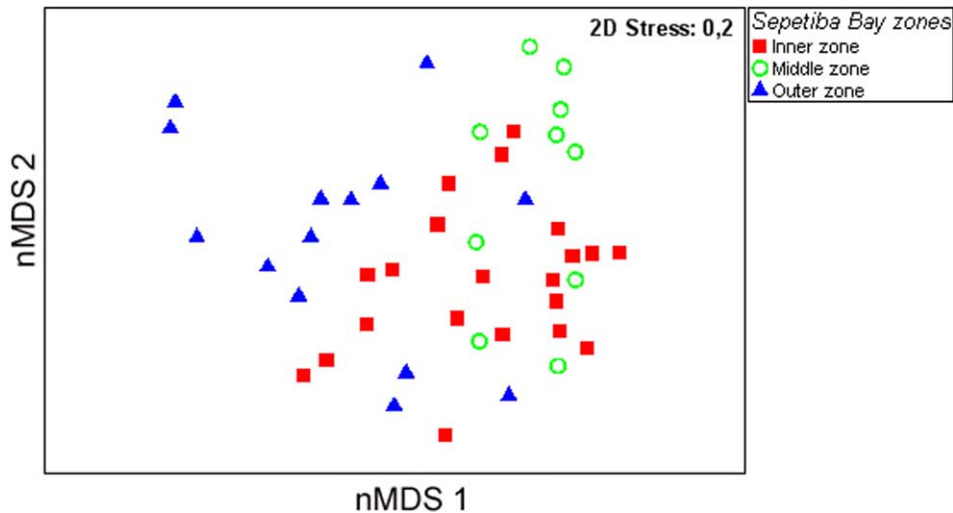

Figure 3. Diagram of the first two axes from non-metric Multidimensional Scaling (nMDS) from diet of *Diapterus rhombeus*, with samples coded by zones in the Sepetiba Bay, RJ.

while samples of larger-sized individuals were shown on the left side of the diagram (Figure 5). Significant differences in diet among size-class were detected by ANOSIM (R Global = 0.202; P = 0.001) with classes TL_4 and TL_5, differing significantly from TL_1. According to SIMPER, the diet of fish in the smallest classes (TL_1, TL_2 and TL_3) was mainly

Table II. Results of similarity of percentage (SIMPER) analysis for dietary composition of *Diapterus rhombeus* in the three zones of Sepetiba Bay.

Average similarity (%) / Feeding categories	Inner zone (49.07)	Middle zone (49.54)	Outer zone (38.24)
		Contribution (%)	
Harpacticoida	49.98	85.47	38.56
Polychaeta Errantia	19.07	18.14	
Ostracoda	10.68		13.30
Nematoda	7.55		
Calanoida	5.34		5.07
Amphipoda			3.78
Caprella			39.91

composed of Harpacticoida, sedentary Polychaeta, Nematoda and Calanoida, while the largest classes (TL_4 and TL_5) consumed mainly Harpacticoida, Ostracoda and *Caprella* (Table III).

Most of the food items were located in the inferior part of the Amundsen diagram, indicating that *Diapterus rhombeus* has a generalist feeding strategy (Figure 6). Although having low %M, a high %FO was found for items such as Harpacticoida (Figure 6), and to a lesser extent, sedentary Polychaeta and Nematoda in the smaller size-class (TL ≤ 140 mm), and for Harpacticoida, Ostracoda and *Caprella* in the larger size-class (TL > 140 mm). These items can be classified as main items by the IRI, differently from all other items, which are classified as rare (Figure 6).

Discussion

Harpacticoid copepods are the main food resource found in all three zones and support all size-class of
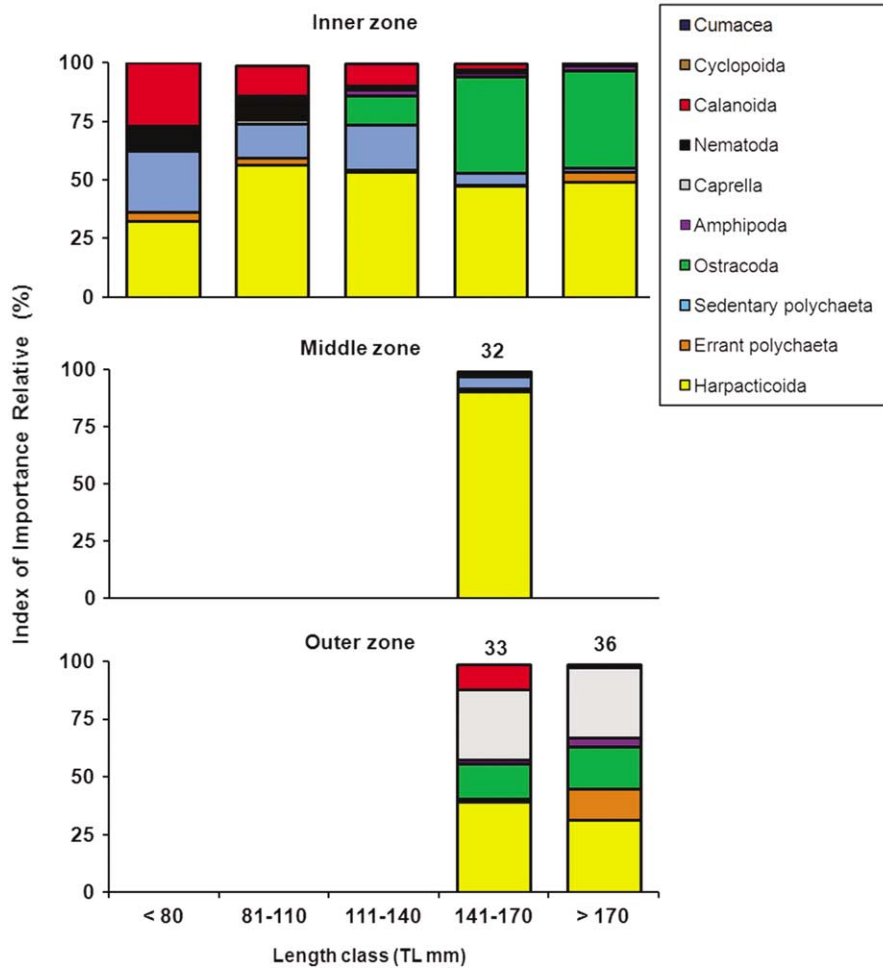
Figure 4. Index of Relative Importance (%IRI) for *Diapterus rhombeus* by size-class, as total length (TL), in the Sepetiba Bay; *n* = number of fish examined with food in the stomach.

Diapterus rhombeus populations in the Sepetiba Bay, which reflect the importance of this food item in this semi-enclosed coastal system. A diet based on zoobenthic organisms has been reported for *D. rhombeus* in other bays (Chaves & Otto 1998), beaches (Teixeira & Helmer 1997), mangroves
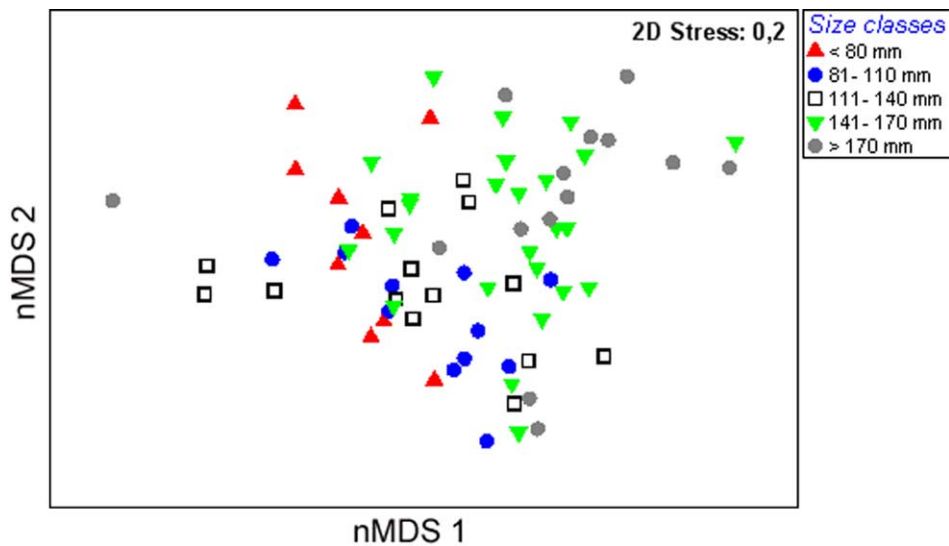
Figure 5. Diagram of the first two axes of ordination from non-metric Multidimensional Scaling (nMDS) of the diet of *Diapterus rhombeus*, with samples coded by size-class (TL).

Table III. Results of similarity of percentage (SIMPER) analysis for dietary composition of *Diapterus rhombeus* by size-class (TL, total length). $TL_1 \leq 80$ mm; $TL_2 = 81–110$ mm; $TL_3 = 111–140$ mm; $TL_4 = 141–170$ mm; and $TL_5 \geq 170$ mm.

Average Similarity (%) / Feeding categories	$TL_1(48.43)$	$TL_2(51.12)$	$TL_3(47.09)$	$TL_4(42.15)$	$TL_5(36.93)$
			Contribution (%)		
Harpacticoida	49.77	59.10	63.10	59.58	44.12
Polychaeta Errantia	23.05	11.71	22.34	5.24	6.77
Ostracoda				18.10	28.06
Nematoda	13.36	11.11			
Calanoida	12.06	10.05	4.64		
Caprella				7.96	12.38

(Austin & Austin 1971) and coastal lagoons (Ayala-Pérez et al. 2001). Although the importance of Harpacticoida was recorded for all Sepetiba Bay, the diet of *D. rhombeus* changes according to bay zones, indicating the trophic plasticity along this system of heterogeneous habitats. Habitat selection by *D. rhombeus* might be associated with the presence of those food items that are abundant in the inner zone, such as sedentary Polychaeta and Ostracoda, and these organisms have been reported as abundant for the inner zone of Sepetiba Bay by Calil et al. (2006). In the outer Bay zone, marine water with associated zooplankton and benthonic organisms such as calanoid copepods and caprellid amphipods are common (Coelho-Botelho et al. 1999), which we recorded as important food items for *D. rhombeus*.

Prey abundance is commonly associated with substrate type (Barreto 1999). Spatial distribution of benthic communities has been related to physical variables, such as water current and substrate grain size, among other factors (Dauvin et al. 2004; Esposito et al. 2010). The dominance in the diet of *D. rhombeus* of Polychaeta in the inner zone, in contrast with dominance of Amphipoda and *Caprella* in particular in the outer zone, are probably associated with the reported predominance of a muddy substrate in the inner bay, and sandy and coarse substrates in the outer bay, respectively (Soares-Gomes et al. 2002). Studies on diet of Pleuronectiformes carried out in the Sepetiba Bay (Guedes & Araújo 2008) reported a similar pattern of spatial distribution of feeding resources, with Polychaeta predominating as preferential fish food in the inner zone, while crustaceans were the predominant trophic category in the outer zone.

The frequent ingestion of food items, such as Harpacticoida and Polychaeta could be a result of a strategy developed by *D. rhombeus* to find, capture and consume the prey within the minimum possible time. This hypothesis is in accordance with the 'optimal foraging theory' and *D. rhombeus* might behave as both energy maximizer and number maximizer. Such concepts were proposed by Griffiths (1975), which consider energy maximizers

suitable for species that use diet with high proportion of highly energetic resources, while number maximizer are species that use the most abundant prey in the habitat. The significant ingestion of Harpacticoida corroborates this concept because of the high abundance and frequency of this food item observed in stomachs of *D. rhombeus*. Copepods have high caloric value, as found by Alheit & Scheibel (1982) and Gee (1989). A diet composed almost exclusively of copepods was described for *D. rhombeus* in the Términos Lagoon, México (Aguirre-León & Yáñez-Arancibia, 1986), and for mangrove areas in Porto Rico (Austin 1971).

Shifts in diet among size-class were found for *D. rhombeus* in the Sepetiba Bay and two main points can be highlighted concerning such changes. (1) The smaller individuals, caught exclusively in the inner bay zone, feed on a greater variety of prey when compared with the larger individuals in this zone; there is also a change in diet with ontogenetic development in the inner zone. (2) There is a change in diet of the large-sized individuals between the inner and outer zones.

The smaller individuals in the inner Bay use a wide range of food items, such as Harpacticoida, Calanoida, Nematoda and sedentary Polychaeta, which are replaced by Harpacticoida and Ostracoda as they reach larger sizes. The large consumption of Harpacticoida and Calanoida suggests that *D. rhombeus* uses vision to detect and pursue prey in the water column. In spite of not consuming an increased amount of prey or increasing prey-size as they grow, such intraspecific changes can be seen as a strategy to reduce competition and explore abundant resources available in the area. It is expected for most fish that the increase in mouth dimensions, and also probably swimming speed that accompanies an increase in the body size of each species, will be paralleled by a progressive and marked change in the size and composition of the prey ingested, but this was not observed for *D. rhombeus* in this study. Furthermore, the consumption of sedentary polychaetes allows the smallest individuals with limited swimming capacity to capture prey with limited
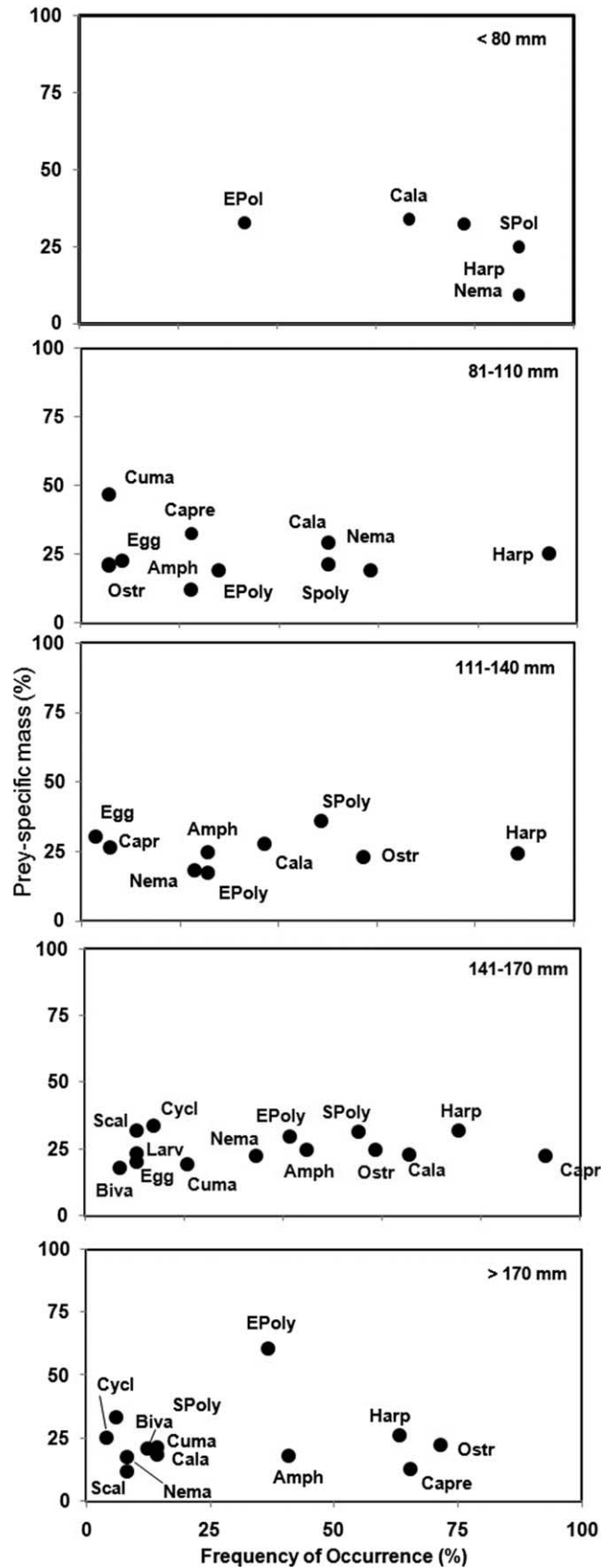
Figure 6. Feeding strategy of *Diapterus rhombeus* in Sepetiba Bay, Brazil. Food items: Amphi, Amphipoda; Biva, Bivalvia; Cala, Calanoida; Capre, *Caprella*; Cuma, Cumacea; Egg, Telostei eggs; EPoly, errant Polychaeta; Harp, Harpacticoida; Nema, Nematoda; Ostr, Ostracoda; Scal, Telost Scales; SPoly, sedentary Polychaeta.

mobility, energy the allocation of energy reserves for growth. *Diapterus rhombeus* ingested not only sedentary polychaetes, but also errant polychaetes, reflecting its ability to use a combination of vision and its highly protrusible mouth to target prey both on and just below the surface of the substrate. The larger individuals have better swimming capability and the protrusible jaw mechanism ensures a better prey selection than the smaller individuals. Such changes are important to obtain food and an important mechanism for a species to become comparatively more specialized (Austin 1971; Cyrus & Blaber 1982).

The large-sized individuals (> 140 mm TL) fed mainly on Harpaticoida and Ostracoda in the inner zone and on Harpacticoida, *Caprella* and Ostracoda in the outer zone. As expected, food availability is an important factor determining fish diet (Tse et al. 2008; Gning et al. 2010) and high prey densities represent abundant feeding opportunities in particular for those species that have feeding plasticity, such as *D. rhombeus*. Changes in diet composition of fishes of different size have already been reported elsewhere for *D. rhombeus* and are usually related to changes in abundance, diversity, and prey availability (Wooton 1990; Gerking 1994).

Information on the trophic strategy for mojarras in Brazilian ecosystems is scarce, although there is a reasonable indication that they have a wide trophic spectrum (Teixeira & Helmer 1997; Chaves & Otto 1998). In this study, *D. rhombeus* showed wide niche amplitude, and it was found to have a generalist feeding strategy according to the Amundsen diagram. While most individuals fed on Harpacticoida an ontogenetic-based feeding strategy was detected. The development of such a strategy allows *D. rhombeus* the capacity to be both opportunistic and shift to use a given resource, when compared with species that only have an opportunist feeding strategy. It is further suggested that ontogenetic-based feeding strategy can be a mechanism to decrease intraspecific competition, since the increase of niche width for a given species, based on biomechanics related to prey selection, result in reduced competition.

Changes in environmental conditions and abundance of benthic prey across coastal embayments lead predators to evolve flexible feeding strategies and lowers tendencies toward specialization (Wooton 1990; Piet et al. 1999). As a result of these environmental changes, fishes are usually characterized as having a generalist feeding strategy; sharing common resources and showing flexibility to exploit peaks in prey abundance (Griffiths 1975; Gerking 1994). *Diapterus rhombeus* has a zoobenthic feeding strategy and changes prey selection based upon ontogenetic stage and habitat. The ability of this generalist to shift feeding strategy by consuming infaunal prey is an important factor leading to the successful colonization of South American coastal embayments with high abundance for this species.

Acknowledgements

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