

Ictiofauna demersal da plataforma continental interna ao largo de Ilhéus, Bahia, Brasil

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Abstract: We present an inventory of demersal fishes from the inner continental shelf off Ilhéus, Bahia, Brazil. Three sites were sampled monthly, between March 2003 and February 2005, with standardized bottom trawls (30 minutes, 16 m depth, 22/16 mm mesh). A total of 7,857 specimens were captured, belonging to three species of Chondrichthyes and 95 species of Actinopterygii (77 genera and 40 families). The occurrence of *Ampharius phrygiatus* represents a southern range extension for this species, which was previously known only from the narrow coastal stretch between Guyana and Maranhão State (Brazil). The record of *Synodus poeyi* represents the first record of this species in Brazil and in the South Atlantic, as it was previously recorded only in the Caribbean. The general structure of the demersal fish assemblage is described and commented upon.

Keywords: demersal fishes, brazilian northeast, new records, scianidae.

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Resumo: Apresentamos aqui um inventário de peixes demersais da plataforma continental interna em frente a Ilhéus, Bahia, Brasil. Três locais foram amostrados mensalmente, entre março de 2003 e fevereiro de 2005, com arrastos de fundo padronizados (30 minutos, 16 m de profundidade, malha de 22/16 mm). Foram capturados 7,793 indivíduos pertencentes a três espécies de Chondrichthyes e 95 espécies de Actinopterygii (77 gêneros e 40 famílias). A ocorrência de *Ampharius phrygiatus* representa uma extensão do limite sul conhecido para essa espécie, que era conhecida de um trecho costeiro relativamente restrito, entre a Guiana e o Maranhão (Brasil). O registro de *Synodus poeyi* representa o primeiro registro dessa espécie no Brasil e no Atlântico Sul, uma vez que ela havia sido previamente registrada apenas no Caribe. A estrutura geral da assembléia de peixes demersais é descrita e comentada.

Palavras-chave: peixes demersais, nordeste brasileiro, novas ocorrências, sciaenidae.

Introduction

The Southern coast of Bahia State, Brazil, comprises a mosaic of habitats with high ecological relevance such as beaches, rocky and coralline reefs, mangroves and extensive soft-bottom plains. The nearly 80 km of coastline to the east of Ilhéus municipality (14° 35' S and 15° 00' S) are noteworthy due to the presence of the estuaries of the Cachoeira and Almada rivers, which introduce significant amounts of nutrients, sediments and hyposaline waters into a narrow continental shelf averaging only 18 km width (Bittencourt et al. 2000). The region was recently categorized by the Brazilian Federal Government as a priority area for coastal and marine biodiversity conservation (MMA 2002), meaning that immediate action is needed for natural resources' assessment and management.

Despite the region's relevance, its marine biodiversity is being increasingly threatened by overfishing, similarly to worldwide trends. Main fish species targeted by commercial fleets in Ilhéus belong to families Lutjanidae (snappers) and Serranidae (groupers), which are captured with hook-and-line in and near the continental slope. Among invertebrates the main targets of commercial fisheries are lobsters and penaeid shrimps, especially seabobs (*Xiphopenaeus kroyeri*), these latter captured with bottom trawls operated over soft bottom (Bahia Pesca 2003). Shrimp fisheries are of special concern because of the habitat damage inflicted by the trawling gear, and also because of the low selectivity of the nets, resulting in large amounts of bycatch. Besides physically damaging the bottom, the unrelieved capture of huge amounts of small fish, including many juveniles, may affect prey availability and the overall trophic structure of the coastal ecosystem, precluding the restocking of exploited populations (e.g. Alverson et al. 1994).

Inventories of demersal fishes in Northeastern Brazil are still sparse in terms of geographic coverage (e.g. Menezes et al. 2003, Nunes & Rosa 1998), none of them covering the Southern coast of Bahia State. Recent fish inventories were focused on the deeper portions of the region (Costa et al. 2000, Boeckman et al. 2001), despite the fact that Bahia State has the largest and one of the most diverse shorelines and continental shelves in the country. Basic surveys of fish diversity, such as the one presented herein, are still needed in order to fill in geographic gaps of species lists of demersal marine fishes. The two significant range extensions recorded herein, including a new record for Brazil, corroborate the notion that even basic fish inventories are still needed in several regions of the tropical Eastern South American coast.

Material and Methods

Monthly samples of demersal fishes were obtained between March 2003 and February 2005 in three sites off Ilhéus (Figure 1). Bottom trawling was carried out at 16 m depths, always with a 0.55 × 1.0 m net pulled by a 8 m/20 hp boat during 30 minutes. The net was similar to those regularly employed by commercial fisheries targeting *X. kroyeri* (22 mm mesh in the body/sleeve, 16 mm at the codend), recording the same assemblage that is caught and discarded by this fishery. Specimens were transported in ice and stored frozen until identification with the most current literature (Figueiredo & Menezes 1978, 1980, 2000, Menezes & Figueiredo 1980, 1985, Carpenter 2002a, b, Menezes et al. 2003, Marceniuk 2005).

Total length (mm) and weight (g) was recorded for each specimen. Vouchers were deposited at the Universidade Federal da Paraíba (UFPB) and Museu de Zoologia, Universidade de São Paulo (MZUSP). Families' listing follows the sequence adopted by Menezes et al. (2003), while species within families are presented in alphabetical order.

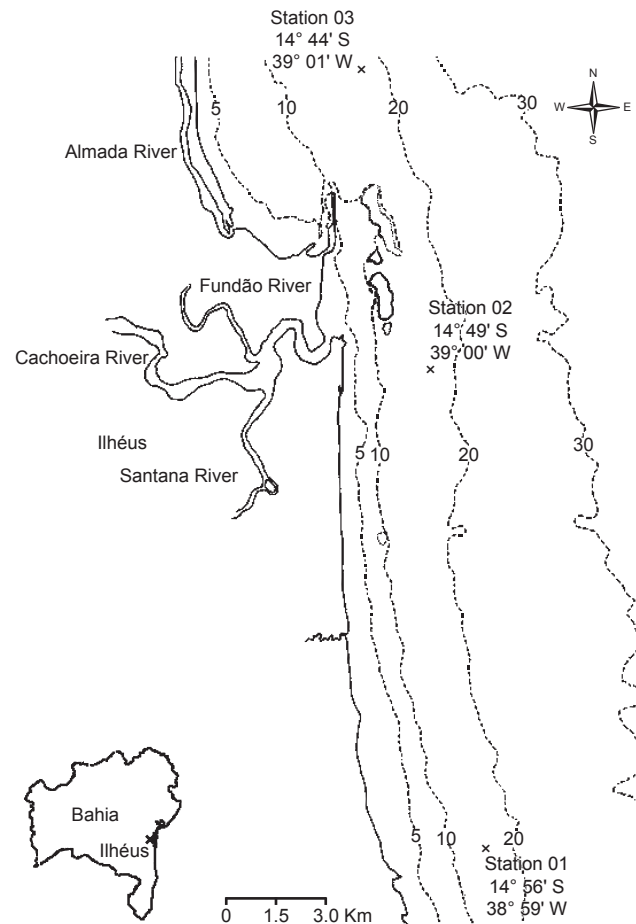


Figure 1. Map of studied area (Ilhéus Bahia state, Brazil) indicating the sample sites (x) and the isobaths (dashed lines).

Figura 1. Mapa da área de estudo (Ilhéus, Bahia, Brasil) indicando os locais de amostragem (x) e as isóbatas (linhas tracejadas).

An Index of Relative Importance (IRI) was calculated accordingly to Pinkas et al. (1971), allowing us to rank each species in terms of its relative importance in number of individuals, frequency of occurrence and relative biomass.

Results

A total of 7.857 specimens were captured, belonging to three species of Chondrichthyes and 95 species of Actinopterygii (77 genera and 40 families, species/family ratio = 2.45). Most recorded species (78) are definitely demersal fishes, but a considerable number of pelagic species was also recorded (21). Four Actinopterygii were identified only at the level of genus (*Lepophidium* sp., *Cynoscion* sp., *Stellifer* sp. e *Acanthurus* sp.).

Perciformes (IRI = 65.7%) was the most important order, followed by Pleuronectiformes (IRI = 12.3%), Clupeiformes (IRI = 12.2%) and Tetraodontiformes (7.1%). Sciaenidae was the most abundant family, both in number of species (17), individuals (56.5%) and biomass (48.7%). Amongst the five most abundant species four were sciaenids (Table 2), and these were responsible for 50% of the expressed dominance (IRI). The third most abundant species biasing the scianids' domination pattern was a pelagic sardine (Table 1) that was probably captured during the upward and downward travel of the net.

Table 1. Relative abundance (number of individuals – %N and weight – %W), frequency of occurrence (%FO) and Index of Relative Importance (IRI) of the most abundant species of fishes collected at inner continental shelf of Ilhéus, Bahia, Brazil.**Tabela 1.** Abundância relativa (número de indivíduos - %N e peso - %W), frequência de ocorrência (%FO) e Índice de Importância Relativa (IRI) das espécies de peixes mais abundantes coletadas na plataforma continental de Ilhéus, Bahia, Brasil.

	N (%)	W (%)	FO (%)	IRI (%)
<i>Isopisthus parvipinnis</i>	16.4	14.0	81.8	18.5
<i>Paralonchurus brasiliensis</i>	10.8	10.3	86.4	13.6
<i>Pellona harroweri</i>	11.6	4.0	86.4	10.0
<i>Stellifer brasiliensis</i>	8.2	6.3	86.4	9.3
<i>Larimus breviceps</i>	8.3	4.1	95.5	8.8
<i>Symphurus tessellatus</i>	4.2	6.3	90.9	7.0
<i>Stellifer stellifer</i>	8.0	2.4	86.4	6.7
<i>Trinectes paulistanus</i>	2.0	3.9	86.4	3.8
<i>Chilomycterus spinosus</i>	3.3	9.8	27.3	2.7
<i>Macrodon ancylodon</i>	2.0	4.0	59.1	2.6
<i>Odontognathus mucronatus</i>	2.8	1.9	72.7	2.6
<i>Cynoscion virescens</i>	0.9	3.6	50.0	1.7
<i>Polydactylus virginicus</i>	1.3	1.2	72.7	1.4
<i>Nebris microps</i>	0.5	2.8	45.5	1.1

Discussion

The relationship between the number of species and families (2.45) was slightly smaller than values recorded in similar studies of demersal fish assemblages in State of Paraíba (2.76) (Nunes & Rosa 1998) and Balneário de Atami, State of Paraná (2.69) (Godefroid et al. 2004), while being somewhat larger than that registered in a comparable study carried out in Penha, State of Santa Catarina (2.14) (Branco & Verani 2006). Thus, it remains unclear whether there are latitudinal trends in species/families ratios and their potential ecological or biogeographic significance.

The predominance of croakers (family Scianidae) in the study area was expected, as it is a prevalent pattern along the extensive soft bottom realm occurring across most of the inner Brazilian continental shelf (Vazzoler et al. 1999). The combined proximity of the coast and estuaries, low depths (16 m) and soft bottom (sandy/muddy) indeed assembles a preferred habitat for several sciaenid species (Vazzoler 1975, Rocha & Rossi-Wongtschowski 1998). Despite such wide-ranging homogeneous taxonomic structure at the level of families in soft bottom across the entire Brazilian continental shelf, the prevalent species seems to be quite variable geographically. In Rio Grande do Sul State, at 10-20 m depths, *M. furnieri* (Desmarest, 1823), *Macrodon ancylodon* (Bloch e Schneider, 1801) and *Paralonchurus brasiliensis* (Steindachner, 1875) are consistently dominant (Haimovici et al. 1996). On the other hand, near Penha, State of Santa Catarina, *Isopisthus parvipinnis* (Cuvier, 1830), *P. brasiliensis* and *Stellifer* spp. stand out in terms of their numerical dominance (Bail & Branco 2003). A similar assemblage occurs near Santos, State of São Paulo, where *I. parvipinnis*, *M. furnieri*, *P. brasiliensis*, and two *Stellifer* species also dominate (Paiva-Filho et al. 1987, Giannini & Paiva-Filho 1990). There are fewer studies in Northeastern Brazil, but in the States of Sergipe and Alagoas *M. furnieri*, *I. parvipinnis*, *Cynoscion virescens* (Cuvier, 1830) and *Nebris microps* Cuvier, 1830 were recorded as the most abundant species (Sudent 1969), while *Stellifer* spp. and *Larimus breviceps* Cuvier, 1830 were recorded as the most abundant species in State of Paraíba (Nunes & Rosa 1998). Such differences can be influenced not only by the few dispersal impediments and latitudinal gradients in temperature, but mainly by habitat preferences related to sediment type, prey availability and water characteristics.

Pleuronectiformes (“flatfishes”) represent another highly abundant group in the soft bottom habitats of the Eastern South American coast (Vazzoler 1975, Fagundes Netto & Gaelzer 1991, Rocha & Rossi-Wongtschowski 1998, Muto et al. 2000), and specific composition and dominance patterns among flatfishes also seems to vary across latitudinal and other environmental gradients (Araújo et al. 1997, Chaves & Corrêa 1998, Godefroid et al. 2004, Nunes & Rosa 1998). Relevantly though, the demersal fish assemblage recorded during the present study is highly similar to that recorded in the only other warm water/soft bottom locality that has been thoroughly sampled in Brazil (Nunes & Rosa 1998) (State of Paraíba).

The sampling gear (bottom trawls) chiefly targeted demersal fishes. Thus, records of pelagic fishes from families Carangidae, Clupeidae, Engraulidae, Pristigasteridae, Sphyraenidae and Trichiuridae are probably related to incidental captures during the upward and downward movements of the net (Fischer & Hureau 1985). A few demersal fishes that are generally associated with reefal or algal habitats were also recorded in very low abundances (<10 individuals). These include *Acanthostracion quadricornis* (Linnaeus, 1758), *Canthigaster figueiredoi* Moura & Castro, 2002, *Heteropriacanthus cruentatus* (Lacepède, 1801), *Holocentrus adscensionis* (Osbeck, 1765), *Haemulon aurolineatum* Cuvier, 1830, *Myripristis jacobus* Cuvier, 1829, *Pseudupeneus maculatus* (Bloch, 1793) and *Acanthurus coeruleus* Bloch & Schneider, 1801. Such unexpected records of reef fishes indicate some level of habitat and faunal heterogeneity in the continental shelf, underestimated in the present study due to its sampling methods and spatial sampling design.

The occurrence of the catfish (Ariidae) *Ampharius phrygiatus* (Valenciennes, 1840) represents a southern range extension for this species, which was previously known only from the narrow coastal stretch between Guyana and State of Maranhão (Brazil), off Northern South America (Menezes et al. 2003, Marceniuk 2005). The record of the lizardfish (Synodontidae) *Synodus poeyi* Jordan, 1887 represents the first record of this species in Brazil and in the South Atlantic, as it was previously recorded only in the Caribbean (Carpenter 2002a). These two significant range extensions corroborate the notion that basic inventories are still needed in several regions of the tropical Eastern South American coast.

Finally, we remark that the checklist provided herein represents a quite accurate picture of the soft bottom demersal fish fauna of this important region, despite constraints regarding the completeness of the assessment. This demersal fish assemblage also corresponds to the taxonomic spectrum captured as bycatch of penaeids' commercial fisheries in the Ilhéus region. Some of the fishes recorded herein are valuable commercially important species captured by line fisheries, such as *Carangoides crysos* (Mitchill, 1815), *Caranx latus* Agassiz, 1831 and *Lutjanus synagris* (Linnaeus, 1758) (Cervigón et al. 1992, Carpenter 2002a, b). In all cases the captured individuals of these commercial species were immature, adding to the concerns regarding bycatch of bottom trawling, especially in or near habitats that are potentially working as nursery grounds.

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Appendix 1. Checklist of fish species captured at the inner continental shelf of Ilhéus, Bahia, Brazil.

Apêndice 1. Lista das espécies de peixes capturadas na plataforma continental interna de Ilhéus, Bahia, Brasil.

-
- Class Chondrichthyes
 Order Rajiformes
 RHINOBATIDAE
Rhinobatos percellens (Walbaum, 1792)
 DASYATIDAE
Dasyatis guttata (Bloch & Schneider, 1801)
 GYMNURIDAE
Gymnura micrura (Bloch & Schneider, 1801)
- Class Actinopterygii
 Order Anguilliformes
 CHLOPSIDAE
Chilorhinus suensonii
 Lütken, 1852 (MZUSP 98972)*
 MURAENIDAE
Gymnothorax ocellatus Agassiz, 1831
 OPHICHTHIDAE
Ophichthus parilis (Richardson, 1848)
- Order Clupeiformes
 ENGRAULIDAE
Anchoa af. januaria Hildebrand, 1943
Anchoa lyoleps (Evermann & Marsh, 1900)
Anchoa spinifer (Valenciennes, 1848)
Anchoa tricolor (Spix & Agassiz, 1829)
Anchovia clupeoides (Swainson, 1839)
Anchoviella lepidostole (Fowler, 1941)
Cetengraulis edentulus (Cuvier, 1829)
Lycengraulis grossidens (Agassiz, 1829)
 PRISTIGASTERIDAE
Chirocentron bleekermanus (Poey, 1867)
Odontognathus mucronatus Lacepède, 1800
Pellona harroweri (Fowler, 1919)
 CLUPEIDAE
Harengula clupeola (Cuvier, 1829)
- Order Siluriformes
 ARIIDAE
Ampharius phrygiatus (Valenciennes, 1840)
 (MZUSP 95446)*
Aspistor luniscutis (Valenciennes, 1840)
 (MZUSP 95447 and MZUSP 95448)*
Bagre bagre (Linnaeus, 1758)
Bagre marinus (Mitchill, 1815)
Cathorops spixii (Agassiz, 1829)
 (MZUSP 95445)*
Notarius grandicassis (Valenciennes, 1840)
- Order Aulopiformes
 SYNODONTIDAE
Saurida brasiliensis Norman, 1935
Synodus foetens (Linnaeus, 1766)
Synodus poeyi Jordan, 1887
 (MZUSP 95441 and MZUSP 95442)*
- Order Ophidiiformes
 OPHIDIIDAE
Lepophidium sp. (MZUSP 95443)*
- Order Batrachoidiformes
 BATRACHOIDIDAE
Porichthys plectrodon Goode & Bean, 1882
- Order Lophiiformes
 ANTENNARIIDAE
Antennarius striatus (Shaw, 1794)
-

Appendix 1. Continued...

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- OGCOCEPHALIDAE
Ogcocephalus vespertilio (Linnaeus, 1758)
- Order Beryciformes
 HOLOCENTRIDAE
Holocentrus adscensionis (Osbeck, 1765)
Myripristis jacobus Cuvier, 1829
- Order Scorpaeniformes
 DACTYLOPTERIDAE
Dactylopterus volitans (Linnaeus, 1758)
 SCORPAENIDAE
Scorpaena dispar Longley & Hildebrand, 1940
 TRIGLIDAE
Prionotus punctatus (Bloch, 1793)
- Order Perciformes
 SERRANIDAE
Diplectrum radiale (Quoy & Gaimard, 1824)
Rypticus randalli Courtenay, 1967
 PRIACANTHIDAE
Heteropriacanthus cruentatus (Lacepède, 1801)
 CARANGIDAE
Carangoides crysos (Mitchill, 1815)
Caranx latus Agassiz, 1831
Chloroscombrus chrysurus (Linnaeus, 1766)
Selar crumenophthalmus (Bloch, 1793)
Selene setapinnis (Mitchill, 1815)
Selene vomer (Linnaeus, 1758)
- LUTJANIDAE
Lutjanus synagris (Linnaeus, 1758)
- GERREIDAE
Diapterus rhombeus (Valenciennes, 1830)
Eucinostomus gula (Quoy & Gaimard, 1824)
Eucinostomus melanopterus (Bleeker, 1863)
- HAEMULIDAE
Conodon nobilis (Linnaeus, 1758)
Haemulon aurolineatum Cuvier, 1830
Pomadasys corvinaeformis (Steindachner, 1868)
- POLYNEMIDAE
Polydactylus virginicus (Linnaeus, 1758)
- SCIAENIDAE
Ctenosciencia gracilicirrhus (Metzelaar, 1919)
Cynoscion sp.
Cynoscion jamaicensis (Vaillant & Bocourt, 1883)
Cynoscion virescens (Cuvier, 1830)
Isopisthus parvipinnis (Cuvier, 1830)
Larimus breviceps Cuvier, 1830
Macrodon ancylodon (Bloch & Schneider, 1801)
Menticirrhus americanus (Linnaeus, 1758)
Micropogonias furnieri (Desmarest, 1823)
Nebris microps Cuvier, 1830
Odontoscion dentex (Cuvier, 1830)
Ophioscion punctatissimus Meek & Hildebrand, 1925
Paralichthys brasiliensis (Steindachner, 1875)
Stellifer sp.
Stellifer brasiliensis (Schultz, 1945)
Stellifer rastrifer (Jordan, 1889)
Stellifer stellifer (Bloch, 1790)
- MULLIDAE
Pseudupeneus maculatus (Bloch, 1793)
Upeneus parvus Poey, 1852
- EPHIPPIDAE
Chaetodipterus faber (Broussonet, 1782)
- ACANTHURIDAE
Acanthurus sp.
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Appendix 1. Continued...

<i>Acanthurus coeruleus</i> Bloch & Schneider, 1801
SPHYRAENIDAE
<i>Sphyraena barracuda</i> (Edwards, 1771)
<i>Sphyraena guachancho</i> Cuvier, 1829
TRICHIURIDAE
<i>Trichiurus lepturus</i> Linnaeus, 1758
STROMATEIDAE
<i>Peprilus paru</i> (Linnaeus, 1758)
Order Pleuronectiformes
PARALICHTHYIDAE
<i>Cyclosetta chittendeni</i> Bean, 1895
<i>Etropus crossotus</i> Jordan e Gilbert, 1882
<i>Syacium micrurum</i> Ranzani, 1842
<i>Syacium papillosum</i> (Linnaeus, 1758)
ACHIRIDAE
<i>Achirus declives</i> Chabanaud, 1940
<i>Achirus lineatus</i> (Linnaeus, 1758)
<i>Trinectes microphthalmus</i> Chabanaud, 1928
<i>Trinectes paulistanus</i> (Miranda Ribeiro, 1915)

Appendix 1. Continued...

CYNOGLOSSIDAE
<i>Symphurus</i> af. <i>tessellatus</i> (Quoy e Gaimard, 1824)
Order Tetraodontiformes
MONACANTHIDAE
<i>Aluterus heudelotii</i> Hollard, 1855
<i>Aluterus monoceros</i> (Linnaeus, 1758)
<i>Monacanthus ciliatus</i> (Mitchill, 1818)
OSTRACIIDAE
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)
TETRADONTIDAE
<i>Canthigaster figueiredoi</i> Moura & Castro, 2002
<i>Lagocephalus laevigatus</i> (Linnaeus, 1766)
<i>Sphoeroides spengleri</i> (Bloch, 1785)
<i>Sphoeroides testudineus</i> (Linnaeus, 1758)
<i>Sphoeroides tyleri</i> Shipp, 1972
DIODONTIDAE
<i>Chilomycterus spinosus</i> (Linnaeus, 1758)

* Species with individuals placed in the Ichthyological Collection of Museu de Zoologia da Universidade de São Paulo (MZUSP).