

Larval fish of the Campos Basin, southeastern Brazil

Ana Cristina Teixeira Bonecker^{1*}, Mário Katsuragawa², Márcia Salustiano de Castro¹, Eduardo de Araújo Pinto Gomes¹, Cláudia Akemi Pereira Namiki² and Maria de Lourdes Zani-Teixeira²

¹ Universidade Federal do Rio de Janeiro, Instituto de Biologia, Departamento de Zoologia, CCS, Bloco A, Ilha do Fundão. CEP 21941-590, Rio de Janeiro, RJ, Brazil.

² Universidade de São Paulo, Instituto Oceanográfico, Departamento de Oceanografia Biológica, Praça do Oceanográfico, 191, Butantan. CEP 05508-120, São Paulo, SP, Brazil

* Corresponding author: ana@biologia.ufrj.br

ABSTRACT: Studies on the vertical distribution of larval fish in water masses along the Brazilian coast are very rare. The present study aimed to identify larval fish occurring in the surface (1 m) layer and at depth in four water masses of the Campos Basin, southeastern Brazil: South Atlantic Central Water (SACW) (250 m), Antarctic Intermediate Water (AAIW) (800 m), Upper Circumpolar Deep Water (UCDW) (1,200 m) and North Atlantic Deep Water (NADW) (2,300 m). Material used in this study was obtained in 2009 through nocturnal horizontal stratified hauls using a Multinet (500 µm mesh size) during both rainy (February to April) and dry periods (August to September). A total of 10,978 fish larvae comprising 169 taxa were identified during the rainy (n = 6,015) and dry (n = 4,963) periods. The number of taxa decreased as the sampling depth increased. Larvae of Clupeidae, Engraulidae and Scombridae dominated in samples collected in the surface layer, while Sternoptychidae and Myctophidae were the most representative families in SACW. The other three water masses were dominated by Gonostomatidae larvae.

INTRODUCTION

Ichthyoplankton studies in Brazil began in the 20th century when some international expeditions collected plankton along the Brazilian coast. One of the pioneers, Matsuura (1971; 1972), studied the life cycle of *Sardinella brasiliensis* (Clupeidae). Since then, other studies in Brazilian waters have considered the taxonomy of some families and the ecology, distribution, ontogeny and other aspects of the early life of fish (Bonecker *et al.* 1992; 1993; Katsuragawa *et al.* 1993, 2006; Nonaka *et al.* 2000; Bonecker and Castro 2006; Namiki *et al.* 2007a, 2007b; Campos *et al.* 2010; Castro *et al.* 2010).

Although stratified sampling of ichthyoplankton in different water masses is an important tool in the study of eggs and larval dynamics in oceanic water (Moser and Smith 1993; Sassa *et al.* 2004), this technique has not been explored on the Brazilian coast. Vertical distribution data for larval fish has only been published by Matsuura and Kitahara (1995), who investigated the vertical distribution of larval *Engralis anchoita* in relation to the SACW intrusion, and by Goçalo *et al.* (2011), who focused on Phosichthyidae to a depth of 100 m. Other studies analyzed the whole water column, but were restricted to a depth of 200 m (Bonecker *et al.* 1992/1993; Katsuragawa *et al.* 1993, 2006; Ekau *et al.* 1999; Nonaka *et al.* 2000; Bonecker and Castro 2006).

The Campos Basin, southeastern Brazil, has particular oceanographic features due to the presence of eddies and the occurrence of upwelling (Silveira *et al.* 2000; Rodrigues and Lorenzetti 2001). This area is also economically relevant due to the presence of many oilfields, and at present it is responsible for more than 80% of Brazilian oil production (Petrobras 2010).

The goal of this study is to report on larval fish occurring in a surface layer in the four water masses that influence the Campos Basin, which are the South Atlantic Central

Water (SACW), Antarctic Intermediate Water (AAIW), Upper Circumpolar Deep Water (UCDW) and North Atlantic Deep Water (NADW).

MATERIALS AND METHODS

The study area is located off southern Espírito Santo and northern Rio de Janeiro states, from 20°26'37.232" S, 40°20'03.872" W to 23°00'48.576" S, 42°00'42.944" W, approximately (Figure 1). The biological material examined was obtained as part of the Habitats Project - Campos Basin Environmental Heterogeneity by CENPES/PETROBRAS. Sampling was carried out during oceanographic cruises in the 2009 rainy period (February to April) and dry period (August to September) and it was performed along

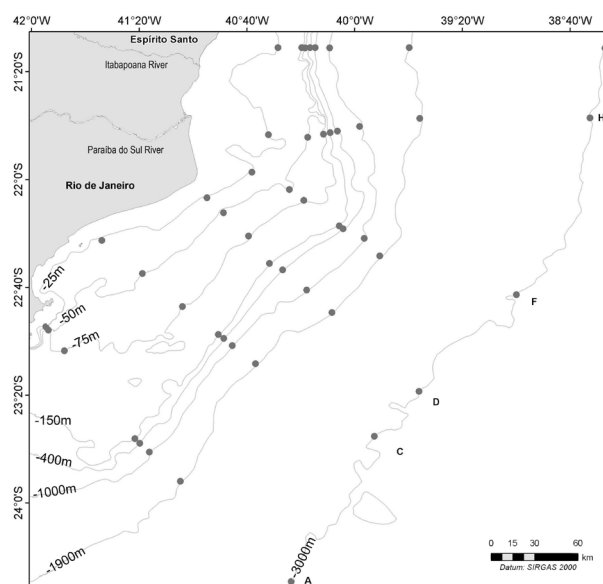


FIGURE 1. Study area showing the six grids and sampling stations.

six transects distributed perpendicularly to coastline from south to north, comprising a total of 48 stations (Figure 1). Ichthyoplankton was only collected at night using a Multinet that was towed horizontally at five depths, corresponding to the different water masses, totaling 216 samples: surface (1 m), 250 m (SACW), 800 m (AAIW), 1,200 m (UCDW) and 2,300 m (NADW). The Multinet was equipped with four nets with mesh apertures of 64 µm, 120 µm, 200 µm and 500 µm. Only the 500 µm net was used for ichthyoplankton analysis. At each depth, stratified hauls were done using an opening-closing mechanism: when the desired depth was reached the net was opened and towed, then after approximately 10–15 minutes the net was closed again. This procedure was repeated for each water mass, and after the water mass set was completed, the net was retrieved. Different nets were used at each depth to avoid sample contamination. Samples were immediately fixed in 4% buffered formalin.

Larval fish were sorted from all samples and preserved in 70% ethanol, except for the *leptocephalus* form, which was preserved in formalin 4% to avoid shrinkage. Identification was done to the lowest possible taxonomic level based on published descriptions (Moser 1996; Matsuura and Olivar 1999; Bonecker and Castro 2006; Richards 2006; Fahay 2007) and classification follows Nelson (2006). Specimens were deposited in the larval fish collection of the Zooplankton and Ichthyoplankton Integrated Laboratory, at the Universidade Federal do Rio de Janeiro, Brazil (DZUFRJ).

RESULTS AND DISCUSSION

Summary information of each sampling station and a checklist of all taxa collected are presented in Tables 1 and 2, respectively. Voucher information, including DZUFRJ catalogue number are listed in the Appendix 1. A total of 10,978 fish larvae were identified during the rainy (n=6,015) and dry (n=4,963) periods, comprising 169 taxa. Families Myctophidae and Carangidae had the highest numbers of taxa identified, with 17 and 12 taxa, respectively (Table 2).

There was considerable variation in species abundance

down the water column. A greater number of species were recorded in the surface layer compared to the other depths sampled. Larvae of Clupeidae (24%) were the most abundant in samples collected in the surface layer, with *Sardinella brasiliensis* being the most representative species (19%). Other abundant families at this depth included Myctophidae (16%), Engraulidae (16%) and Scombridae (14%) (Table 2). Similar results were also observed in the California Current (Moser and Smith, 1993), North Pacific (Sassa et al., 2004) and Indian Ocean (Muhling et al. 2007), where most fish larvae are concentrated in the most productive upper 200 m layer.

In the 250 m layer (SACW), two families were the most abundant: Sternoptychidae (34%) and Myctophidae (32%), mainly represented by larvae of different species of *Argylopleucus* (14%) and *Diaphus* (10%), respectively. Samples collected in the 800 m layer (AAIW) were dominated by Gonostomatidae (77%), mostly represented by *Cyclothone braueri* (46%) (Table 2). In the 1,200 m layer (UCDW) most larvae collected belonged to the families Gonostomatidae and Myctophidae, contributing with 40% each (Table 2). Larvae of *Cyclothone* spp. (Gonostomatidae) dominated all samples collected in the 2,300 m layer (NADW). The presence of *Cyclothone* spp. from the surface to the 2,300 m layer was unexpected. In the California Current, for instance, sampling was done up to 1,000 m, but the distribution of *Cyclothone* spp. was limited to 200 m depth (Moser and Smith 1993).

The data obtained in the present study, concerning larval occurrence, confirmed the previous studies (e.g. Bonecker et al. 1992, 1993; Katsuragawa et al. 1993, 2006; Nonaka et al. 2000; Bonecker and Castro 2006; Namiki et al. 2007a, 2007b; Campos et al. 2010; Castro et al. 2010; Goçalo et al. 2011). Nevertheless, sampling in all previous studies in the region was restricted to the depth of 200 m. The possibility of collecting ichthyoplankton below the traditional depth limit was very important in showing that larvae of many species can be abundant in deeper regions as well, notably larval *Cyclothone* spp. which occurred as far down as 2,300 m.

TABLE 1. Collection data of the fish larvae sampled in the Campos Basin during rainy (March-April/2009) and dry (August-September/2009) periods.

SAMPLING PERIOD	STATION	WATER MASS	SAMPLING DEPTH (M)	LOCAL DEPTH (M)	DATE	LOCAL TIME	LATITUDE	LONGITUDE
Rainy	A1	Surface	1	45.0	04/12/09	20:36	22°54'58.004" S	41°55'00,711" W
Rainy	A2	Surface	1	47.1	04/12/09	21:55	22°55'38.417" S	41°53'21,274" W
Rainy	A3	Surface	1	83.4	04/12/09	00:11	23°03'07.102" S	41°47'02.630" W
Rainy	A5	Surface	1	142.4	03/17/09	22:45	23°35'59.804" S	41°21'12.240" W
Rainy	A6	Surface	1	384.6	03/17/09	00:27	23°37'14.732" S	41°19'01.910" W
Rainy	A8	Surface	1	978.6	03/18/09	20:51	23°37'44.626" S	41°13'08.388" W
Rainy	A10	Surface	1	1,864.1	03/17/09	01:31	23°46'35.943" S	40°59'57.889" W
Rainy	A12	Surface	1	3,020.1	03/05/09	23:24	21°42'58.013" S	40°19'54.164" W
Rainy	A6	SACW	250	436.4	03/17/09	01:39	23°35'51.219" S	41°17'37.979" W
Rainy	A8	SACW	250	983.5	03/18/09	19:26	23°38'38.654" S	41°13'54.443" W
Rainy	A10	SACW	250	1,891.7	03/17/09	00:13	23°46'07.658" S	41°00'10.721" W
Rainy	A12	SACW	250	3,017.3	03/05/09	01:01	24°24'27.225" S	40°20'34.300" W
Rainy	A8	AAIW	800	1,011.1	03/18/09	16:52	23°40'14.291" S	41°15'16.675" W
Rainy	A10	AAIW	800	1,867.5	03/17/09	21:46	23°46'39.609" S	40°59'53.857" W
Rainy	A12	AAIW	800	3,016.1	03/05/09	03:27	24°23'08.880" S	40°21'58.227" W
Rainy	A10	UCDW	1.2	1,879.8	03/17/09	18:24	23°49'42.760" S	41°02'36.942" W
Rainy	A12	UCDW	1.2	3,012.1	03/05/09	06:34	24°23'57.775" S	40°22'06.870" W
Rainy	A12	NADW	2.3	3,015.1	03/05/09	10:44	24°25'26.866" S	40°24'05.095" W

TABLE 1. CONTINUED.

SAMPLING PERIOD	STATION	WATER MASS	SAMPLING DEPTH (M)	LOCAL DEPTH (M)	DATE	LOCAL TIME	LATITUDE	LONGITUDE
Rainy	C1	Surface	1	28.7	04/12/09	00:52	22°22'51.176" S	41°34'04.422" W
Rainy	C2	Surface	1	56.0	04/11/09	21:21	22°34'38.171" S	41°18'25.460" W
Rainy	C3	Surface	1	76.4	04/11/09	18:08	22°46'06.259" S	41°03'12.380" W
Rainy	C5	Surface	1	148.1	03/17/09	04:53	22°57'19.640" S	40°50'12.485" W
Rainy	C6	Surface	1	296.6	03/17/09	20:42	23°01'00.545" S	40°50'23.364" W
Rainy	C8	Surface	1	-	03/18/09	23:57	23°03'09.160" S	40°46'35.091" W
Rainy	C10	Surface	1	1,801.4	03/17/09	20:04	23°05'23.167" S	40°34'02.087" W
Rainy	C12	Surface	1	3,018.6	03/07/09	21:22	23°41'21.792" S	39°58'53.204" W
Rainy	C6	SACW	250	559.0	03/17/09	22:09	23°00'46.261" S	40°48'50.975" W
Rainy	C8	SACW	250	1,088.1	03/18/09	02:31	23°04'09.706" S	40°45'40.158" W
Rainy	C10	SACW	250	1,856.0	03/17/09	21:26	23°04'11.672" S	40°32'57.813" W
Rainy	C12	SACW	250	3,008.5	03/07/09	22:47	23°41'08.712" S	39°59'06.615" W
Rainy	C8	AAIW	800	1,048.3	03/18/09	04:06	23°04'58.197" S	40°46'56.277" W
Rainy	C10	AAIW	800	1,905.0	03/17/09	23:37	23°02'14.396" S	40°31'10.785" W
Rainy	C12	AAIW	800	3,019.1	03/07/09	21:37	23°38'16.463" S	39°52'46.857" W
Rainy	C10	UCDW	1.2	1,861.5	03/17/09	17:41	23°07'20.028" S	40°35'37.139" W
Rainy	C12	UCDW	1.2	3,006.8	03/07/08	01:04	23°35'41.162" S	39°50'45.581" W
Rainy	C12	NADW	2.3	3,009.6	03/07/08	05:01	23°34'10.963" S	39°51'05.227" W
Rainy	D1	Surface	1	31.3	04/10/09	02:40	22°06'20.709" S	40°54'15.939" W
Rainy	D2	Surface	1	56.0	04/09/09	23:48	22°12'01.969" S	40°48'15.453" W
Rainy	D3	Surface	1	73.4	04/09/09	21:11	22°20'46.613" S	40°39'02.170" W
Rainy	D5	Surface	1	136.4	03/21/09	18:54	21°42'58.013" S	40°31'11.456" W
Rainy	D6	Surface	1	321.3	03/21/09	22:24	22°33'53.468" S	40°28'02.079" W
Rainy	D8	Surface	1	990.7	03/20/09	01:59	22°40'34.959" S	40°16'59.569" W
Rainy	D10	Surface	1	1,904.4	03/23/09	04:36	22°48'44.536" S	40°07'43.109" W
Rainy	D12	Surface	1	2,989.9	03/08/08	20:41	23°17'56.237" S	39°35'22.345" W
Rainy	D6	SACW	250	411.6	03/21/09	20:57	22°34'03.668" S	40°27'41.234" W
Rainy	D8	SACW	250	990.6	03/22/09	04:11	22°40'28.500" S	40°16'51.123" W
Rainy	D10	SACW	250	1,947.1	03/23/09	03:18	22°50'15.651" S	40°09'01.684" W
Rainy	D12	SACW	250	2,994.7	03/08/08	22:13	23°15'45.071" S	39°33'26.988" W
Rainy	D8	AAIW	800	991.2	03/22/09	06:14	22°39'57.047" S	40°15'57.025" W
Rainy	D10	AAIW	800	1,846.6	03/22/09	22:14	22°47'53.099" S	40°06'57.072" W
Rainy	D12	AAIW	800	2,989.2	03/08/09	00:54	23°15'39.378" S	39°35'05.318" W
Rainy	D10	UCDW	1.2	1,989.6	03/22/09	18:54	22°49'47.345" S	40°07'58.529" W
Rainy	D12	UCDW	1.2	2,955.4	03/08/09	04:27	23°14'45.018" S	39°36'42.658" W
Rainy	D12	NADW	2.8	2,953.1	03/08/09	08:12	23°37'45.202" S	41°13'09.474" W
Rainy	F1	Surface	1	24.7	04/08/09	18:52	21°42'58.013" S	40°38'21.349" W
Rainy	F2	Surface	1	54.0	04/08/09	22:04	22°03'18.606" S	40°23'55.871" W
Rainy	F3	Surface	1	72.8	04/09/09	00:27	22°07'11.240" S	40°18'05.269" W
Rainy	F5	Surface	1	144.0	03/23/09	18:54	22°17'39.527" S	40°05'24.607" W
Rainy	F6	Surface	1	45.6	03/23/09	20:35	22°19'11.943" S	40°05'10.646" W
Rainy	F8	Surface	1	992.7	03/24/09	00:23	22°21'19.061" S	39°55'57.443" W
Rainy	F10	Surface	1	1,892.7	03/25/09	02:09	22°27'56.061" S	39°50'06.908" W
Rainy	F12	Surface	1	2,992.4	03/10/09	20:46	22°44'34.515" S	39°03'42.651" W
Rainy	F6	SACW	250	405.4	03/23/09	21:51	22°18'01.360" S	40°03'57.077" W
Rainy	F8	SACW	250	996.5	03/24/09	01:49	22°21'16.772" S	39°55'55.877" W
Rainy	F10	SACW	250	1,883.6	03/25/09	03:31	22°27'44.973" S	39°49'57.584" W
Rainy	F12	SACW	250	3,001.6	03/10/09	22:27	22°44'11.120" S	39°02'31.800" W
Rainy	F8	AAIW	800	1,010.0	03/24/09	03:56	22°20'46.303" S	39°55'10.191" W
Rainy	F10	AAIW	800	1,890.4	03/25/09	05:25	22°27'18.989" S	39°49'34.252" W
Rainy	F12	AAIW	800	2,994.1	03/10/09	00:50	22°42'56.033" S	39°03'16.710" W
Rainy	F10	UCDW	1.2	1,885.7	03/24/09	23:39	22°27'31.386" S	39°49'45.994" W
Rainy	F12	UCDW	1.2	3,027.3	03/10/09	17:47	22°45'56.676" S	38°58'05.050" W
Rainy	F12	NADW	2.3	3,016.1	03/10/09	06:25	23°36'03.230" S	41°21'16.626" W
Rainy	H1	Surface	1	25.4	04/02/09	18:50	21°43'28.063" S	40°31'49.556" W
Rainy	H2	Surface	1	45.0	04/02/09	21:56	21°44'47.909" S	40°17'24.243" W
Rainy	H3	Surface	1	72.8	04/02/09	23:40	21°42'48.063" S	40°11'32.086" W
Rainy	H5	Surface	1	144.9	04/09/09	01:11	21°42'18.856" S	40°09'03.573" W
Rainy	H6	Surface	1	392.1	04/01/09	23:47	21°41'34.658" S	40°06'28.413" W
Rainy	H8	Surface	1	1,005.0	03/31/09	19:19	21°39'56.885" S	39°58'17.894" W
Rainy	H10	Surface	1	1,895.1	03/31/09	02:11	21°38'10.423" S	39°35'47.816" W
Rainy	H12	Surface	1	3,123.3	03/11/09	00:23	21°51'44.609" S	38°34'14.174" W

TABLE 1. CONTINUED.

SAMPLING PERIOD	STATION	WATER MASS	SAMPLING DEPTH (M)	LOCAL DEPTH (M)	DATE	LOCAL TIME	LATITUDE	LONGITUDE
Rainy	H6	SACW	250	413.1	03/31/09	22:18	21°41'18.209" S	40°06'00.164" W
Rainy	H8	SACW	250	1,016.4	03/31/09	17:34	21°40'35.162" S	39°57'53.557" W
Rainy	H10	SACW	250	1,895.1	03/31/09	00:46	21°37'55.120" S	39°35'47.033" W
Rainy	H12	SACW	250	3,105.7	03/11/09	01:47	21°49'37.707" S	38°33'58.560" W
Rainy	H8	AAIW	800	989.9	03/31/09	15:22	21°40'03.551" S	39°58'08.078" W
Rainy	H10	AAIW	800	1,878.5	03/30/09	21:17	21°35'24.948" S	39°37'05.459" W
Rainy	H12	AAIW	800	2,864.9	03/11/09	04:20	21°46'01.176" S	38°33'29.062" W
Rainy	H10	UCDW	1.2	1,897.0	03/30/09	17:01	21°38'09.058" S	39°35'48.140" W
Rainy	H12	UCDW	1.2	2,836.4	03/11/09	11:15	21°35'46.651" S	38°32'18.993" W
Rainy	H12	NADW	2.3	2,806.6	03/11/09	16:35	23°37'11.276" S	41°18'57.167" W
Rainy	I1	Surface	1	26.3	04/02/09	01:33	21°10'34.687" S	40°28'19.797" W
Rainy	I2	Surface	2	47.0	04/01/09	23:34	21°10'33.616" S	40°19'28.869" W
Rainy	I3	Surface	1	56.7	04/01/09	22:15	21°11'44.420" S	40°18'24.935" W
Rainy	I5	Surface	1	96.5	04/01/09	20:09	21°11'47.904" S	40°16'33.309" W
Rainy	I6	Surface	1	449.7	04/01/09	18:24	21°11'18.686" S	40°14'34.015" W
Rainy	I8	Surface	1	995.5	03/29/09	21:29	21°11'57.878" S	40°09'09.517" W
Rainy	I10	Surface	1	1,887.8	03/29/09	03:24	21°09'49.440" S	39°39'32.312" W
Rainy	I12	Surface	1	2,929.1	03/12/09	00:25	21°25'34.263" S	38°28'35.148" W
Rainy	I6	SACW	250	459.9	04/01/09	16:59	21°10'45.400" S	40°14'30.313" W
Rainy	I8	SACW	250	998.3	03/29/09	19:57	21°11'46.745" S	40°09'26.462" W
Rainy	I10	SACW	250	1,888.6	03/29/09	04:51	21°09'21.675" S	39°39'30.213" W
Rainy	I12	SACW	250	2,969.2	03/12/09	01:42	21°23'40.814" S	38°28'20.719" W
Rainy	I8	AAIW	800	1,006.8	03/29/09	16:39	21°11'43.739" S	40°09'18.565" W
Rainy	I10	AAIW	800	1,885.1	03/29/09	01:00	21°08'22.376" S	39°39'24.615" W
Rainy	I12	AAIW	800	1,888.2	03/12/09	19:19	21°09'40.758" S	39°39'31.053" W
Rainy	I10	UCDW	1.2	1,887.9	03/28/09	20:04	21°09'40.758" S	39°39'31.053" W
Rainy	I12	UCDW	1.2	3,120.1	03/12/09	12:45	21°10'14.841" S	38°26'47.590" W
Rainy	I12	NADW	2.3	2,985.6	03/12/09	22:13	23°35'54.924" S	41°17'43.940" W
Dry	A1	Surface	1	43.1	08/25/09	03:49	22°54'37.543" S	41°54'33.788" W
Dry	A2	Surface	1	52.7	08/25/09	02:25	22°57'14.976" S	41°53'09.974" W
Dry	A3	Surface	1	80.5	08/24/09	00:41	23°03'36.283" S	41°47'39.234" W
Dry	A5	Surface	1	144.3	08/21/09	02:05	23°35'56.949" S	41°22'12.582" W
Dry	A6	Surface	1	345.3	08/21/09	00:37	23°37'44.382" S	41°20'39.582" W
Dry	A8	Surface	1	1,062.8	08/24/09	21:10	23°41'05.919" S	41°15'54.887" W
Dry	A10	Surface	1	1,934.3	08/24/09	19:52	23°51'26.652" S	41°04'10.272" W
Dry	A12	Surface	1	-	08/28/09	02:41	21°42'58.013" S	40°24'16.556" W
Dry	A6	SACW	250	620.4	08/20/09	23:13	23°38'15.717" S	41°19'18.908" W
Dry	A8	SACW	250	887.4	08/20/09	19:24	23°41'56.942" S	41°18'19.059" W
Dry	A10	SACW	250	1,945.4	08/22/09	21:27	23°50'59.469" S	41°03'57.489" W
Dry	A12	SACW	250	-	08/08/09	04:49	24°28'17.475" S	40°24'40.908" W
Dry	A8	AAIW	800	1,053.9	08/20/09	17:10	23°41'53.223" S	41°15'42.451" W
Dry	A10	AAIW	800	1,945.0	08/23/09	23:45	23°50'35.084" S	41°03'13.756" W
Dry	A10	UCDW	1.2	1,840.0	08/22/09	17:15	23°49'52.950" S	41°05'56.364" W
Dry	C1	Surface	1	27.4	08/27/09	04:43	22°22'36.814" S	41°33'42.444" W
Dry	C2	Surface	1	53.1	08/27/09	23:40	22°34'48.329" S	41°18'29.513" W
Dry	C3	Surface	1	77.2	08/26/09	20:06	22°46'53.609" S	41°02'58.477" W
Dry	C5	Surface	1	143.0	08/20/09	01:32	22°56'57.797" S	40°50'44.974" W
Dry	C6	Surface	1	208.3	08/20/09	00:46	22°57'29.914" S	40°49'08.525" W
Dry	C8	Surface	1	-	08/19/09	02:02	23°02'09.910" S	40°48'10.955" W
Dry	C10	Surface	1	-	08/17/09	23:38	23°07'59.069" S	40°37'32.584" W
Dry	C12	Surface	1	-	08/09/09	22:58	23°35'25.374" S	39°53'08.343" W
Dry	C6	SACW	250	397.7	08/19/09	21:55	22°59'01.592" S	40°48'38.520" W
Dry	C8	SACW	250	951.0	08/19/09	04:10	23°01'45.042" S	40°46'49.061" W
Dry	C10	SACW	250	-	08/16/09	21:53	23°08'12.413" S	40°37'47.504" W
Dry	C12	SACW	250	-	08/09/09	00:49	23°34'20.810" S	39°52'18.701" W
Dry	C8	AAIW	800	-	08/18/09	18:40	23°00'12.931" S	40°45'45.783" W
Dry	C10	AAIW	800	-	08/16/09	17:56	23°05'55.721" S	40°35'30.744" W
Dry	C12	AAIW	800	-	08/09/09	03:14	23°36'17.113" S	39°53'38.968" W
Dry	C10	UCDW	1.2	-	08/17/09	02:11	23°06'10.701" S	40°36'06.151" W
Dry	C12	UCDW	1.2	-	08/09/09	07:15	23°36'26.498" S	39°55'27.534" W
Dry	C12	NADW	2.3	-	08/08/09	20:16	23°35'29.769" S	39°52'30.400" W
Dry	D1	Surface	1	29.8	09/15/09	06:04	22°06'42.457" S	40°54'43.579" W

TABLE 1. CONTINUED.

SAMPLING PERIOD	STATION	WATER MASS	SAMPLING DEPTH (M)	LOCAL DEPTH (M)	DATE	LOCAL TIME	LATITUDE	LONGITUDE
Dry	D2	Surface	1	56.9	09/15/09	19:49	22°12'27.565" S	40°48'39.967" W
Dry	D3	Surface	1	71.7	09/15/09	17:47	22°21'11.475" S	40°39'58.747" W
Dry	D5	Surface	1	139.4	08/28/09	04:48	22°30'49.664" S	40°31'14.546" W
Dry	D6	Surface	1	394.0	08/28/09	02:56	22°33'21.940" S	40°26'24.770" W
Dry	D8	Surface	1	996.5	08/23/09	22:31	22°40'21.597" S	40°17'20.771" W
Dry	D10	Surface	1	2,345.6	08/28/09	19:45	22°55'43.833" S	40°12'59.816" W
Dry	D12	Surface	1	-	08/11/09	19:15	23°18'20.733" S	39°36'52.748" W
Dry	D6	SACW	250	431.5	08/28/09	01:39	22°34'15.791" S	40°26'34.694" W
Dry	D8	SACW	250	1,033.7	08/27/09	21:04	22°42'01.196" S	40°18'21.495" W
Dry	D10	SACW	250	1,698.5	08/28/09	21:49	22°53'12.868" S	40°16'37.421" W
Dry	D12	SACW	250	-	08/11/09	21:11	23°18'35.349" S	39°36'05.948" W
Dry	D8	AAIW	800	1,026.5	08/27/09	18:05	22°40'30.483" S	40°16'38.208" W
Dry	D10	AAIW	800	1,843.0	08/29/09	00:16	22°53'01.775" S	40°13'42.708" W
Dry	D12	AAIW	800	-	08/12/09	23:43	23°15'00.078" S	39°35'52.279" W
Dry	D10	UCDW	1.2	2,028.0	08/29/09	03:20	22°53'38.860" S	40°12'24.275" W
Dry	D12	UCDW	1.2	-	08/12/09	06:55	23°06'35.792" S	39°25'47.275" W
Dry	D12	NADW	2.8	-	08/11/09	16:31	23°18'38.094" S	39°36'00.809" W
Dry	F1	Surface	1	26.2	09/16/09	01:12	21°57'30.289" S	40°38'40.487" W
Dry	F2	Surface	1	113.4	09/15/09	04:28	22°03'31.941" S	40°23'48.614" W
Dry	F3	Surface	1	74.8	09/14/09	18:29	22°07'37.014" S	40°18'37.334" W
Dry	F5	Surface	1	148.3	08/30/09	04:57	22°17'24.392" S	40°05'18.910" W
Dry	F6	Surface	1	546.4	08/30/09	04:08	22°18'24.838" S	40°02'46.349" W
Dry	F8	Surface	1	1,482.1	08/29/09	23:04	22°17'19.974" S	39°52'22.765" W
Dry	F10	Surface	1	1,927.5	08/31/09	02:24	22°27'05.729" S	39°49'20.391" W
Dry	F12	Surface	1	-	08/12/09	19:02	22°42'03.674" S	38°59'30.362" W
Dry	F6	SACW	250	480.2	08/30/09	02:11	22°18'50.369" S	40°04'07.421" W
Dry	F8	SACW	250	1,113.6	08/29/09	21:20	22°18'36.583" S	39°53'42.781" W
Dry	F10	SACW	250	1,946.5	08/31/09	01:02	22°26'41.368" S	39°48'56.976" W
Dry	F12	SACW	250	-	08/12/09	21:10	22°41'13.659" S	38°58'46.180" W
Dry	F8	AAIW	800	1,026.4	08/29/09	19:06	22°20'34.711" S	39°54'57.720" W
Dry	F10	AAIW	800	1,917.8	08/30/09	22:24	22°27'05.282" S	39°49'22.926" W
Dry	F12	AAIW	800	-	08/13/09	00:15	22°40'21.363" S	38°59'07.920" W
Dry	F10	UCDW	1.2	1,957.2	08/30/09	19:46	22°29'30.968" S	39°51'28.621" W
Dry	F12	UCDW	1.2	-	08/13/09	04:18	22°41'42.033" S	38°57'36.588" W
Dry	F12	NADW	2.3	-	08/12/09	16:41	22°42'47.015" S	38°59'44.483" W
Dry	H1	Surface	1	28.1	09/14/09	01:10	21°44'06.875" S	40°31'33.874" W
Dry	H2	Surface	1	52.7	09/14/09	04:26	21°44'38.558" S	40°17'25.984" W
Dry	H3	Surface	1	69.0	09/14/09	22:11	21°43'16.660" S	40°11'35.854" W
Dry	H5	Surface	1	163.6	09/15/09	00:30	21°42'37.978" S	40°08'33.881" W
Dry	H6	Surface	1	430.0	09/04/09	22:14	21°42'21.716" S	40°05'21.647" W
Dry	H8	Surface	1	499.0	09/11/09	00:32	21°45'47.136" S	40°03'17.367" W
Dry	H10	Surface	1	1,915.0	09/05/09	19:33	21°36'34.591" S	39°37'07.954" W
Dry	H6	SACW	250	399.5	09/04/09	18:49	21°42'58.013" S	40°05'19.853" W
Dry	H8	SACW	250	811.3	09/11/09	02:27	21°46'05.332" S	39°58'33.290" W
Dry	H10	SACW	250	1,935.8	09/05/09	18:10	21°37'08.743" S	39°35'54.219" W
Dry	H8	AAIW	800	998.3	09/11/09	04:32	21°44'29.597" S	39°58'04.202" W
Dry	H10	AAIW	800	1,881.7	09/05/09	21:35	21°35'38.401" S	39°38'58.369" W
Dry	H10	UCDW	1.2	1,884.8	09/06/09	02:59	21°35'56.282" S	39°38'59.436" W
Dry	I1	Surface	1	33.30	09/13/09	20:12	21°11'55.793" S	40°28'09.569" W
Dry	I2	Surface	2	104.8	09/13/09	05:18	21°10'59.783" S	40°20'13.283" W
Dry	I3	Surface	1	65.0	09/13/09	04:07	21°11'41.212" S	40°17'58.318" W
Dry	I5	Surface	1	157.1	09/13/09	02:38	21°11'12.114" S	40°16'23.970" W
Dry	I6	Surface	1	521.6	09/13/09	00:56	21°10'54.206" S	40°14'27.094" W
Dry	I8	Surface	1	1,041.4	09/12/09	21:46	21°10'58.948" S	40°09'20.432" W
Dry	I10	Surface	1	1,922.2	09/11/09	19:42	21°11'15.206" S	39°39'37.904" W
Dry	I6	SACW	250	655.8	09/13/09	23:46	21°11'40.295" S	40°13'36.646" W
Dry	I8	SACW	250	1,029.6	09/12/09	20:17	21°11'01.712" S	40°09'31.031" W
Dry	I10	SACW	250	1,905.5	09/11/09	21:13	21°10'58.558" S	39°39'48.179" W
Dry	I8	AAIW	800	985.4	09/12/09	17:34	21°10'15.097" S	40°10'08.972" W
Dry	I10	AAIW	800	1,905.1	09/11/09	23:05	21°09'57.811" S	39°40'21.161" W
Dry	I10	UCDW	1.2	1,994.2	09/11/09	17:39	21°12'53.516" S	39°38'07.661" W

TABLE 2. Abundance (in number and as percentage) of fish larvae collected in each water mass during the 2009 cruise performed at Campos Basin.

Taxa	Water Masses									
	Surface		SACW		AAIW		UCDW		NADW	
	n	%	n	%	n	%	n	%	n	%
Elopiformes										
Elopidae										
<i>Elops</i> sp.	2	0.02								
Albuliformes										
Albulidae										
<i>Albula vulpes</i> (Linnaeus, 1758)	1	<0.01								
Anguilliformes	44	0.41	1	2.00	1	1.05				
Ophichthidae	11	<0.01								
<i>Ahlia egmontis</i> (Jordan, 1884)	1	<0.01								
<i>Ariosoma balearicum</i> (Delaroche, 1809)	2	0.02								
<i>Avocettina</i> sp.	1	<0.01								
<i>Ophichthus cylindroideus</i> (Ranzani, 1839)	2	0.02								
Clupeiformes	88	0.81								
Engraulidae	1,680	15.52								
Clupeidae	87	0.80	2	4.00						
<i>Harengula jaguana</i> Poey, 1865	471	4.35								
<i>Opisthonema oglinum</i> (Lesueur, 1818)	16	0.15								
<i>Sardinella brasiliensis</i> (Steindachner, 1879)	2,027	18.73								
Osmeriformes										
Bathylagidae										
<i>Melanolagus bericoides</i> (Borodin, 1929)			1	2.00						
Stomiiformes										
Gonostomatidae	4	0.04								
<i>Cyclothone acclinidens</i> Garman, 1899	2	0.02			4	4.21				
<i>Cyclothone alba</i> Brauer, 1906					11	11.58				
<i>Cyclothone braueri</i> Jespersen & Tåning, 1926	2	0.02			44	46.32	1	10.00		
<i>Cyclothone pseudopallida</i> Mukhacheva, 1964					11	11.58	1	10.00		
<i>Cyclothone</i> spp.	28	0.26			3	3.16	2	20.00	1	100
<i>Gonostoma elongatum</i> Günther, 1878	4	0.04								
<i>Margrethia obtusirostra</i> Jespersen & Tåning, 1919			1	2.00						
Sternoptychidae			3	6.00			1	10.00		
<i>Argyropelecus</i> spp.			7	14.00						
<i>Argyropelecus aculeatus</i> Valenciennes, 1850			2	4.00						
<i>Maurolicus stehmanni</i> Parin & Kobylansky, 1993	635	5.87	5	10.00						
<i>Sternoptyx diaphana</i> Hermann, 1781					2	2.11				
Phosichthyidae										
<i>Pollichthys maui</i> (Poll, 1953)	86	0.79	2	4.00						
<i>Vinciguerria nimbaria</i> (Jordan & Williams, 1895)	61	0.56	1	2.00	1	1.05				
Stomiidae	2	0.02								
<i>Stomias</i> sp.	1	<0.01								
unidentified larvae of Astronesthinae	1	<0.01								
unidentified larvae of Melanostomiinae	1	<0.01								
Aulopiformes										
Synodontidae	2	0.02								
<i>Saurida</i> sp.	51	0.47								
<i>Synodus</i> sp.	2	0.02								
<i>Synodus foetens</i> (Linnaeus, 1766)	20	0.18								
<i>Synodus synodus</i> (Linnaeus, 1758)	3	0.03								
<i>Trachinocephalus myops</i> (Forster, 1801)	2	0.02								
Chlorophthalmidae										
<i>Chlorophthalmus brasiliensis</i> Mead, 1958	1	<0.01								
<i>Parasudis truculenta</i> (Goode & Bean, 1896)	1	<0.01								
Scopelarchidae			1	2.00						
Paralepididae	3	0.03								
<i>Anotopterus pharao</i> Zugmayer, 1911					1	1.05				
<i>Lestidiops affinis</i> (Ege, 1930)	3	0.03								
<i>Lestidium atlanticum</i> Borodin, 1928	18	0.17								
<i>Lestrolepis intermedia</i> (Poey, 1868)	12	0.11								

TABLE 2. CONTINUED.

Taxa	Water Masses									
	Surface		SACW		AAIW		UCDW		NADW	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Stemonosudis</i> sp.	2	0.02								
<i>Sudis atrox</i> Rofen, 1963	1	<0.01								
Myctophiformes										
Neoscopelidae										
<i>Neoscopelus macrolepidotus</i> Johnson, 1863	1	<0.01								
Myctophidae	142	1.31	2	4.00	1	1.05	2	20.00		
<i>Benthoosema suborbitale</i> (Gilbert, 1913)	4	0.04								
<i>Bolinichthys distofax</i> Johnson, 1975	1	<0.01								
<i>Ceratospopelus warmingii</i> (Lütken, 1892)			1	2.00						
<i>Diaphus dumerilii</i> (Bleeker, 1856)	1	<0.01								
<i>Diaphus</i> spp.	681	6.29	5	10.00	2	2.11	1	10.00		
<i>Hygophum</i> spp.	13	0.12	1	2.00	1	1.05				
<i>Hygophum reinhardtii</i> (Lütken, 1892)	22	0.20								
<i>Myctophum affine</i> (Lütken, 1892)	182	1.68					1	10.00		
<i>Myctophum asperum</i> Richardson, 1845	1	<0.01								
<i>Myctophum nitidulum</i> Garman, 1899	2	0.02								
<i>Myctophum obtusirostre</i> Täning, 1928	3	0.03			1	1.05				
<i>Myctophum</i> sp.	3	0.03								
<i>Lampadena</i> sp.	2	0.02								
<i>Lampanyctus</i> cf. <i>photnotus</i> Parr, 1928	3	0.03								
<i>Lampanyctus</i> sp.	2	0.02								
<i>Lepidophanes gaussi</i> (Brauer, 1906)	399	3.69								
<i>Lepidophanes guentheri</i> (Goode & Bean, 1896)	215	1.99	5	10.00	2	2.11				
<i>Notolychnus valdiviae</i> (Brauer, 1904)			2	4.00						
<i>Notoscopelus caudispinosus</i> [Johnson, 1863]	2	0.02								
Lampriformes										
Lampridae										
<i>Lampris guttatus</i> (Brünnich, 1788)	1	<0.01								
Gadiformes										
Bregmacerotidae										
<i>Bregmaceros atlanticus</i> Goode & Bean, 1886	3	0.03			1	1.05				
<i>Bregmaceros cantori</i> Milliken & Houde, 1984	40	0.37								
Ophidiiformes										
Carapidae										
<i>Carapus bermudensis</i> (Jones, 1874)	1	<0.01								
<i>Echiodon dawsoni</i> Williams & Shipp, 1982	1	<0.01								
Ophidiidae	6	0.06								
<i>Ophidion selenops</i> Robins & Böhlke, 1959	1	<0.01								
Lophiiformes										
Ceratiidae										
unidentified larvae	1	<0.01								
Mugiliformes										
Mugilidae										
<i>Mugil</i> sp.	4	0.04								
Beloniformes										
Exocoetidae										
<i>Hirundichthys affinis</i> (Günther, 1866)	1	<0.01								
Stephanoberyciformes										
Melamphaeidae										
<i>Melamphaes simus</i> Ebeling, 1962			1	2.00						
Beryciformes										
Trachichthyidae										
<i>Paratrachichthys</i> sp.	1	<0.01								
Holocentridae										
<i>Myripristis</i> sp.	1	<0.01								
<i>Sargocentron</i> sp.	3	0.03								
Gasterosteiformes										
Syngnathidae										
	1	<0.01								

TABLE 2. CONTINUED.

Taxa	Water Masses									
	Surface		SACW		AAIW		UCDW		NADW	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Hippocampus reidi</i> Ginsburg, 1933	2	0.02								
Fistulariidae										
<i>Fistularia petimba</i> Lacepède, 1803	2	0.02								
<i>Fistularia tabacaria</i> Linnaeus, 1758	1	<0.01								
Scorpaeniformes										
Scorpaenidae	10	0.09								
<i>Pontinus corallinus</i> Miranda Ribeiro, 1903	1	<0.01								
<i>Scorpaena</i> sp.	7	0.06								
Triglidae										
<i>Prionotus</i> sp.	2	0.02								
Perciformes										
Serranidae	136	1.26								
<i>Anthias</i> sp.	2	0.02								
<i>Epinephelus</i> sp.	2	0.02								
<i>Pseudogramma gregoryi</i> (Breder, 1927)	1	<0.01								
<i>Rypticus</i> spp.	5	0.05								
<i>Serranus auriga</i> (Cuvier, 1829)	23	0.21			1	1.05				
<i>Serranus</i> spp.	171	1.58								
unidentified larvae of Athiinae	13	0.12								
unidentified larvae of Epinephelini	3	0.03								
Opistognathidae										
<i>Opistognathus</i> sp.	5	0.05								
Priacanthidae										
<i>Heteropriacanthus cruentatus</i> (Lacepède, 1801)	2	0.02								
Apogonidae	20	0.18								
<i>Apogon</i> sp.	9	0.08								
<i>Astrapogon</i> sp.	16	0.15								
Pomatomidae										
<i>Pomatomus saltatrix</i> (Linnaeus, 1766)	2	0.02								
Coryphaenidae										
<i>Coryphaena equiselis</i> Linnaeus, 1758	2	0.02								
<i>Coryphaena hippurus</i> Linnaeus, 1758	30	0.28								
Carangidae	15	0.14								
<i>Caranx crysos</i> (Mitchill, 1815)	1	<0.01								
<i>Caranx latus</i> Agassiz, 1831	8	0.07								
<i>Caranx</i> spp.	17	0.16								
<i>Chloroscombrus chrysurus</i> (Linnaeus, 1766)	30	0.28								
<i>Decapterus punctatus</i> (Cuvier, 1829)	14	0.13								
<i>Decapterus</i> spp.	11	0.10								
<i>Naucrates ductor</i> (Linnaeus, 1758)	3	0.03								
<i>Oligoplites</i> sp.	2	0.02								
<i>Pseudocaranx dentex</i> (Bloch & Schneider, 1801)	7	0.06								
<i>Selar crumenophthalmus</i> (Bloch, 1793)	66	0.61								
<i>Selene setapinnis</i> (Mitchill, 1815)	2	0.02								
<i>Selene vomer</i> (Linnaeus, 1758)	1	<0.01								
<i>Seriola</i> sp.	9	0.08								
<i>Trachurus lathami</i> Nichols, 1920	68	0.63								
Lutjanidae	12	0.11								
<i>Lutjanus synagris</i> (Linnaeus, 1758)	19	0.18								
<i>Lutjanus</i> spp.	5	0.05								
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)	1	<0.01								
Gerreidae	3	0.03								
<i>Diapterus rhombeus</i> (Cuvier, 1829)	5	0.05								
<i>Diapterus</i> sp.	7	0.06								
<i>Eucinostomus lefroyi</i> (Goode, 1874)	5	0.05								
<i>Eucinostomus</i> sp.	3	0.03								
Haemulidae	44	0.41								
<i>Haemulon plumierii</i> (Lacepède, 1801)	4	0.04								

TABLE 2. CONTINUED.

Taxa	Water Masses									
	Surface		SACW		AAIW		UCDW		NADW	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Sparidae	1	<0.01								
<i>Calamus</i> sp.	1	<0.01								
<i>Pagrus pagrus</i> (Linnaeus, 1758)	37	0.34								
Sciaenidae	45	0.42								
<i>Cynoscion</i> sp.	48	0.44								
<i>Menticirrhus americanus</i> (Linnaeus, 1758)	3	0.03								
<i>Pareques</i> sp.	1	<0.01								
<i>Stellifer</i> sp.	10	0.09								
Mullidae	30	0.28								
<i>Upeneus parvus</i> Poey, 1852	11	0.10								
Kyphosidae										
<i>Kyphosus incisor</i> (Cuvier, 1831)	1	<0.01								
Chaetodontidae	17	0.16								
unidentified larvae										
Pomacanthidae	11	0.10			1	1.05				
<i>Holacanthus tricolor</i> (Bloch, 1795)	1	<0.01								
<i>Holacanthus</i> sp.	1	<0.01								
Cirrhitidae										
<i>Amblycirrhitus pinos</i> (Mowbray, 1927)					4	4.21				
Pomacentridae	12	0.11								
<i>Abudefduf saxatilis</i> (Linnaeus, 1758)	1	<0.01								
<i>Stegastes leucostictus</i> (Müller & Troschel, 1848)	21	0.19								
<i>Microspathodon chrysurus</i> (Cuvier, 1830)	2	0.02								
Labridae	9	0.08								
<i>Doratonotus megalepis</i> Günther, 1862	13	0.12								
<i>Halichoeres poeyi</i> (Steindachner, 1867)	86	0.79								
<i>Halichoeres</i> sp.	1	<0.01								
Scaridae	31	0.29								
<i>Cryptotomus roseus</i> Cope, 1871	20	0.18	2	4.00						
<i>Scarus</i> spp.	17	0.16								
<i>Sparisoma</i> spp.	262	2.42	3	6.00	3	3.16				
Chiasmodontidae										
<i>Chiasmodon niger</i> Johnson, 1864	1	<0.01								
Uranoscopidae	1	<0.01								
unidentified larvae										
Tripterygiidae										
<i>Enneanectes altivelis</i> Rosenblatt, 1960	5	0.05								
Dactyloscopidae	6	0.06								
unidentified larvae										
Blenniidae	16	0.15								
<i>Hyppleurochilus fissicornis</i> (Quoy & Gaimard, 1824)	1	<0.01								
<i>Parablennius pilicornis</i> (Cuvier, 1829)	2	0.02								
Callionymidae										
<i>Callionymus bairdi</i> Jordan, 1888	5	0.05								
Eleotridae	1	<0.01								
<i>Dormitator maculatus</i> (Bloch, 1792)	9	0.08								
Gobiidae	46	0.43	1	2.00						
<i>Coryphopterus</i> sp.	8	0.07								
<i>Ctenogobius boleosoma</i> (Jordan & Gilbert, 1882)	1	<0.01								
<i>Ctenogobius</i> sp.	20	0.18								
<i>Gobiosoma nudum</i> (Meek & Hildebrand, 1928)	17	0.16								
<i>Microgobius carri</i> Fowler, 1945	6	0.06								
<i>Microgobius</i> sp.	9	0.08								
Microdesmidae										
<i>Microdesmus bahianus</i> Dawson, 1973	9	0.08								
<i>Microdesmus longipinnis</i> (Weymouth, 1910)	3	0.03								
Ptereleotridae										
<i>Ptereleotris randalli</i> Gasparini, Rocha & Floeter, 2001	222	2.05					1	10.00		

TABLE 2. CONTINUED.

Taxa	Water Masses										
	Surface		SACW		AAIW		UCDW		NADW		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Acanthuridae											
<i>Acanthurus</i> sp.	3	0.03									
Sphyraenidae											
<i>Sphyraena barracuda</i> (Edwards, 1771)	1	<0.01									
<i>Sphyraena guachancho</i> Cuvier, 1829	15	0.14									
<i>Sphyraena tome</i> Fowler, 1903	6	0.06									
Gempylidae	1	<0.01									
<i>Gempylus serpens</i> Cuvier, 1829	7	0.06									
<i>Nealotus tripes</i> Johnson, 1865	1	<0.01									
<i>Nesiarchus nasutus</i> Johnson, 1862			1	2.00							
Trichiuridae											
<i>Benthodesmus</i> sp.	30	0.28									
<i>Trichiurus lepturus</i> Linnaeus, 1758	12	0.11									
Scombridae	385	3.56									
<i>Auxis</i> sp.	44	0.41									
<i>Auxis rochei</i> (Risso, 1810)	9	0.08									
<i>Auxis thazard</i> (Lacepède, 1800)	3	0.03									
<i>Euthynnus alletteratus</i> (Rafinesque, 1810)	12	0.11									
<i>Sarda sarda</i> (Bloch, 1793)	7	0.06									
<i>Scomber colias</i> Gmelin, 1789	1,004	9.28									
<i>Scomberomorus</i> sp.	3	0.03									
<i>Thunnus atlanticus</i> (Lesson, 1831)	1	<0.01									
<i>Thunnus</i> spp.	41	0.38									
Istiophoridae	2	0.02									
unidentified larvae											
Nomeidae											
<i>Cubiceps</i> sp.	3	0.03									
Stromateidae											
<i>Peprilus paru</i> (Linnaeus, 1758)	1	<0.01									
Caproidae											
<i>Antigonia capros</i> Lowe, 1843	76	0.70									
Pleuronectiformes	1	<0.01									
Paralichthyidae	10	0.09									
<i>Citharichthys</i> sp.	1	<0.01									
<i>Syacium papillosum</i> (Linnaeus, 1758)	28	0.26									
Bothidae											
<i>Bothus ocellatus</i> (Agassiz, 1831)	25	0.23									
<i>Monolene antillarum</i> Norman, 1933	6	0.06									
Achiridae											
<i>Achirus lineatus</i> (Linnaeus, 1758)	2	0.02									
Cynoglossidae											
<i>Symphurus tessellatus</i> (Quoy & Gaimard, 1824)	1	<0.01									
<i>Symphurus trewavasae</i> Chabanaud, 1948	1	<0.01									
Tetraodontiformes											
Balistidae											
<i>Balistes capriscus</i> Gmelin, 1789	1	<0.01									
Monacanthidae	2	0.02									
<i>Aluterus heudelotii</i> Hollard, 1855	1	<0.01									
<i>Aluterus schoepfii</i> (Walbaum, 1792)	3	0.03									
<i>Aluterus</i> sp.	2	0.02									
<i>Stephanolepis hispidus</i> (Linnaeus, 1766)	32	0.30									
Tetraodontidae	2	0.02									
<i>Sphoeroides</i> sp.	1	<0.01									

ACKNOWLEDGMENTS: We thank Caio L. Gonçalves and Mykhaela Serak for sorting the ichthyoplankton from the samples, Dra. Paula N. Campos and Camilla N. Garbini for helping with the identification of fish eggs and larvae, and Petrobras, who made possible the sampling and material analysis.

LITERATURE CITED

- Bonecker, A.C.T. and M.S. Castro. (ed.) 2006. *Atlas de larvas de peixes da região central da Zona Econômica Exclusiva brasileira*. 1ª. edição. Rio de Janeiro: Museu Nacional (Série Livros n.º. 19). 214 p.
- Bonecker, S.L.C., C.R. Nogueira, A.C.T. Bonecker, L.H.S. Santos, M.V. Reynier and D.R. Tenenbaum. 1992/1993. Estudo hidrológico e planctonológico da região entre Cabo Frio (RJ) e o Arquipélago de Abrolhos (BA). *Nerítica* 7(1-2): 71-86.
- Campos, P.N., A.C.T. Bonecker and M.S. Castro. 2010. Occurrence and distribution of Carangidae larvae (Teleostei, Perciformes) from the Southwest Atlantic Ocean, Brazil (12°S - 23°S). *Journal of Applied Ichthyology* 26(6): 920-924.
- Castro, M.S., W.J. Richards and A.C.T. Bonecker. 2010. Occurrence and distribution of larval lanternfish (Myctophidae) from the southwest Atlantic Ocean. *Zoologia* 27(4): 541-553.
- Ekau, W., P. Westhaus-Ekau and C. Medeiros. 1999. Large scale distribution of fish larvae in the continental shelf waters off North-east Brazil. *Archive of Marine Research* 47(2/3): 183-200.
- Fahay, M.P. 2007. *Early stages of fishes in the Western North Atlantic Ocean (Davis Strait, Southern Greenland and Flemish Cap to Cape Hatteras)*. Volumes I and II. Dartmouth: Northwest Atlantic Fisheries Organization, 1696 p.
- Goçalo, C.G., M. Katsuragawa and I.C.A. da Silveira. 2011. Patterns of distribution and abundance of larval Phosichthyidae in the Southeastern Brazilian Waters. *Brazilian Journal of Oceanography* 59: 213-229.
- Katsuragawa, M., Y. Matsuura, K. Suzuki, J.F. Dias and H.L. Spach. 1993. O ictioplâncton ao largo de Ubatuba, SP: composição, distribuição e ocorrência sazonal (1985-1988). *Publicação Especial do Instituto Oceanográfico* 10: 85-121.
- Katsuragawa, M., J.H. Muelbert and J.F. Dias. 2006. O ictioplâncton na região entre Cabo de São Tomé (RJ) e o Chuí (RS); p. 359-446. In C.L.D.B. Rossi-Wongtschowski and L.S.P. Madureira (orgs.). *O ambiente oceanográfico da plataforma continental e do talude na região sudeste-sul do Brasil*. São Paulo: Edusp.
- Matsuura, Y. 1971. A study of the life history of Brazilian sardine, *Sardinella aurita*. I. Distribution and abundance of sardine eggs in the region of Ilha Grande, Rio de Janeiro. *Boletim do Instituto Oceanográfico* 20(1): 33-60.
- Matsuura, Y. 1972. Egg development of scaled sardine, *Harengula pensacolae* Good & Bean (Pisces, Clupeidae). *Boletim do Instituto Oceanográfico* 21: 129-135.
- Matsuura, Y. and E.M. Kitahara. 1995. Horizontal and vertical distribution of anchovy *Engraulis anchoita* eggs and larvae off Cape Santa Marta Grande in southern Brazil. *Archive of Fishery and Marine Research* 42(3): 239-250.
- Matsuura, Y. and M.P. Olivar. 1999. Fish Larvae; p. 1445-1496. In D. Boltovskoy (ed.). *South Atlantic zooplankton*. Leiden: Backhuys Publishers.
- Moser, H.G. 1996. *The early stages of fishes in the California Current region*. La Jolla: California Cooperative Oceanic Fisheries Investigations (CALCOFI) Atlas No33, 1505 p.
- Moser, H.G. and P.E. Smith. 1993. Larval fish assemblages of the California Current region and their horizontal and vertical distributions across a front. *Bulletin of Marine Science* 53(2): 645-691.
- Muhling, B.A., L.E. Beckley and M.P. Olivar. 2007. Ichthyoplankton assemblage structure in two meso-scale Leeuwin Current eddies, eastern Indian Ocean. *Deep-Sea Research II* 54(8-10): 1113-1128.
- Namiki, C., A.C.T. Bonecker and M.S. Castro. 2007a. Carapidae larvae (Acanthomorpha, Paracanthopterygii, Ophidiiformes) from the oceanic region of the southwest Atlantic Ocean off Brazil (12°S - 22°S). *Deep-Sea Research. Part 1, Oceanographic Research Papers* 54(2): 292-295.
- Namiki, C., A.C.T. Bonecker and M.C. Castro. 2007b. Occurrence and abundance of three larval codlet species (Bregmacerotidae, Teleostei) in the Southwest Atlantic Ocean (12°S - 22°S). *Journal of Applied Ichthyology* 23(2): 136-141.
- Nelson, J.S. 2006. *Fishes of the World*. 4th edition. Hoboken: John Wiley & Sons, 601 p.
- Nonaka, R., Y. Matsuura and K. Suzuki. 2000. Seasonal variation in larval fish assemblages in relation to oceanographic conditions in the Abrolhos Bank Region off eastern Brazil. *Fishery Bulletin* 98(4): 767-784.
- Petrobras. 2010. *Bacia de Campos - A maior reserva de petróleo do Brasil*. Eletronic Database accessible at http://www2.petrobras.com.br/Petrobras/portugues/plataforma/pla_bacia_campos.htm. Captured on 30 January 2012.
- Richards, W.J. (ed.). 2006. *Early stages of Atlantic fishes: an identification guide for the Western North Atlantic*. Volumes I and II. Boca Raton: CRC Press, 2640 p.
- Rodrigues, R.R. and J.A. Lorenzetti. 2001. A numerical study of the effects of bottom topography and coastline geometry on the Southeast Brazilian coastal upwelling. *Continental Shelf Research* 21(4): 371-394.
- Sassa, C., K. Kawaguchi, Y. Hirota and M. Ishida. 2004. Distribution patterns of larval myctophid fish assemblages in the subtropical-tropical waters of the western North Pacific. *Fisheries Oceanography* 13(4): 267-282.
- Silveira, I.C.A., A.C. Schmidt, E.D. Campos, S.S. Godoi and Y. Ikeda. 2000. A Corrente do Brasil ao largo da costa leste brasileira. *Revista Brasileira de Oceanografia* 48(2): 171-183.

RECEIVED: April 2012

ACCEPTED: October 2012

PUBLISHED ONLINE: December 2012

EDITORIAL RESPONSIBILITY: Michael Maia Mincarone

APPENDIX 1. Voucher information on the fish larvae collected in Campos Basin. Number of specimens in parenthesis.

- Elopidae:** *Elops* sp. (2) DZUFJR 28074; 28079. **Albulidae:** *Albula vulpes* (1) DZUFJR 28078. **Anguilliformes:** (46) DZUFJR 28081-28094. **Ophichthidae:** (11) DZUFJR 28035-28040; 28077. *Ahlia egmontis* (1) DZUFJR 28070. *Ophichthus cylindroideus* (2) DZUFJR 28069; 28073. **Congridae:** *Ariosoma balearicum* (2) DZUFJR 28071-28072. **Nettastomatidae:** *Avocettina* sp. (1) DZUFJR 28076. **Clupeiformes:** (88) DZUFJR 29692-29700. **Engraulidae:** (1,680) DZUFJR 29749; 29827-29830; 29832-29838; 29840; 29842-29867; 29869-29870; 29872; 29874-29877. **Clupeidae:** (89) DZUFJR 29764-29772. *Harengula jaguana* (471) DZUFJR 28233; 29751-29757; 29759; 29762. *Opisthonema oglinum* (16) DZUFJR 29737-29743. *Sardinella brasiliensis* (2,027) DZUFJR 28228-28232; 28234-28236; 28833; 29784-29785; 29787-29789; 29791-29797; 29799-29800; 29802-29806; 29808-29817. **Bathylagidae:** *Melanolagus bericoides* (1) DZUFJR 29675. **Gonostomatidae:** (4) DZUFJR 29614. *Cyclothone* spp. (34) DZUFJR 29631-29649; 29750. *Cyclothone acclinidens* (6) DZUFJR 29539-29543. *Cyclothone alba* (11) DZUFJR 29615-29617. *Cyclothone braueri* (47) DZUFJR 29582-29603. *Cyclothone pseudopallida* (12) DZUFJR 29621-29628. *Margrethia obtusirostra* (1) DZUFJR 28028. *Gonostoma elongatum* (4) DZUFJR 29613. **Sternoptychidae:** (4) DZUFJR 28027; 28194. *Argyropelecus* spp. (7) DZUFJR 28023-28024; 29763; 29820-29822. *Argyropelecus aculeatus* (2) DZUFJR 28025-28026. *Sternoptyx diaphana* (2) DZUFJR 28019-28020. *Mauroliscus stehmanni* (640) DZUFJR 28127-28141; 28351. **Phosichthyidae:** *Pollichthys maui* (88) DZUFJR 28095-28105. *Vinciguerria nimbaria* (63) DZUFJR 28166-28173; 28175-28182. **Stomiidae:** (2) DZUFJR 28371-28372. *Astronesthininae* (1) DZUFJR 28370. *Melanostomiinae* (1) DZUFJR 28369. *Stomias* sp. (1) DZUFJR 28373. **Synodontidae:** (2) DZUFJR 28337-28338. *Saurida* sp. (51) DZUFJR 28374-28379. *Synodus* sp. (2) DZUFJR 28339-28340. *Synodus foetens* (20) DZUFJR 28347-28349. *Synodus synodus* (3) DZUFJR 28431-28441. *Trachinocephalus myops* (2) DZUFJR 28335. **Chlorophthalmidae:** *Chlorophthalmus brasiliensis* (1) DZUFJR 29730. *Parasudis truculenta* (1) DZUFJR 29728. **Scopelarchidae:** (1) DZUFJR 28190. **Paralepididae:** (3) DZUFJR 28029-28031. *Anotopterus pharao* (1) DZUFJR 28015. *Lestidiopsis affinis* (3) DZUFJR 28032-28034. *Lestidium atlanticum* (18) DZUFJR 28115; 28117-28126. *Lestrolepis intermedia* (12) DZUFJR 28041-28047. *Stemonosudis* sp. (2) DZUFJR 28021-28022. *Sudis atrox* (1) DZUFJR 28018. **Neoscopelidae:** *Neoscopelus macrolepidotus* (1) DZUFJR 27693. **Myctophidae:** (147) DZUFJR 27816-27838; 27840-27841; 27843-27854; 29941. *Benthosema suborbitale* (4) DZUFJR 27706-27707. *Bolinichthys distofax* (1) DZUFJR 27708. *Ceratoscopelus warmingii* (1) DZUFJR 27695. *Diaphus* spp. (689) DZUFJR 27918-27942; 27968-27970; 27972-27976; 27979-27982; 27984; 27986; 27988-28014. *Diaphus dumerilii* (1) DZUFJR 28832. *Hygophum* spp. (15) DZUFJR 27735-27743. *Hygophum reinhardtii* (22) DZUFJR 27744-27753. *Myctophum* sp. (3) DZUFJR 27697-27698. *Myctophum affine* (183) DZUFJR 28220-28227. *Myctophum asperum* (1) DZUFJR 27699. *Myctophum nitidulum* (2) DZUFJR 27704-27705. *Myctophum obtusirostre* (4) DZUFJR 27715; 27718; 27720-27721. *Lampadena* sp. (2) DZUFJR 27711-27712. *Lampanyctus* sp. (2) DZUFJR 27702-27703. *Lampanyctus* cf. *photonotus* (3) DZUFJR 27701. *Lepidophanes guentheri* (222) DZUFJR 27898-27899; 27901-27907; 27909-27916; 27944-27952; 27954-27967. *Lepidophanes gausi* (399) DZUFJR 27754-27772; 27776-27777; 27779-27784; 27786-27789. *Notolychnus valdiviae* (2) DZUFJR 27691-27692. *Notoscopelus caudispinosus* (2) DZUFJR 27694. **Lampridae:** *Lampris guttatus* (1) DZUFJR 29671. **Bregmacerotidae:** *Bregmaceros atlanticus* (4) DZUFJR 28408; 28414; 29781. *Bregmaceros cantori* (40)

- DZUFJR 28406–28407; 28409–28413. **Carapidae:** *Carapus bermudensis* (1) DZUFJR 28363. *Echiodon dawsoni* (1) DZUFJR 28362. **Ophidiidae:** *Ophidion selenops* (1) DZUFJR 27288. **Ceratiidae:** (1). **Mugilidae:** *Mugil* sp. (4) DZUFJR 29546; 29554; 29558. **Exocoetidae:** *Hirundichthys affinis* (1) DZUFJR 27548. **Melamphaeidae:** *Melamphaes simus* (1) DZUFJR 29777. **Trachichthyidae:** (1) DZUFJR 28204. *Paratrachichthys* sp. (1) DZUFJR 28203. **Holocentridae:** *Myripristis* sp. (1) DZUFJR 27539. *Sargocentron* sp. (3) DZUFJR 27540. **Syngnathidae:** (1) DZUFJR 28831. *Hippocampus reidi* (2) DZUFJR 28187. **Fistulariidae:** *Fistularia petimba* (2) DZUFJR 27542–27543. *Fistularia tabacaria* (1) DZUFJR 27541. **Scorpaenidae:** *Pontinus corallinus* (1) DZUFJR 28261. *Scorpaena* sp. (7) DZUFJR 28262; 28264. **Triglidae:** *Prionotus* sp. (2) DZUFJR 28197–28198. **Serranidae:** (136) DZUFJR 29895–29923; 29925–29927. *Serranus* sp. (171) DZUFJR 29878–29894; 29912–29922. *Serranus auriga* (24) DZUFJR 29907–29909; 29928–29930. *Athiinae* (13) DZUFJR 29903–29906. *Anthias* sp. (2) DZUFJR 29938. *Epinephelini* (3) DZUFJR 29910–29911. *Epinephelus* sp. (2) DZUFJR 29937. *Pseudogramma gregoryi* (1) DZUFJR 29931. *Rypticus* spp. (5) DZUFJR 29932–29936. **Opistognathidae:** *Opistognathus* sp. (5) DZUFJR 28365–28368. **Priacanthidae:** *Heteropriacanthus cruentatus* (2) DZUFJR 29744. **Apogonidae:** (20) DZUFJR 29701–29707. *Apogon* sp. (9) DZUFJR 29708–29712. *Astrapogon* sp. (16) DZUFJR 29713–29715; 29717–29723. **Pomatomidae:** *Pomatomus saltatrix* (2) DZUFJR 29745–29746. **Coryphaenidae:** *Coryphaena equiselis* (2) DZUFJR 27799. *Coryphaena hippurus* (30) DZUFJR 27790–27792; 27794–27798; 27800; 27802; 27804; 27806; 27807; 27810–27814. **Carangidae:** (15) DZUFJR 27572; 27620; 27625; 27628; 27633–27634. *Caranx* spp. (17) DZUFJR 27641; 27645; 27659; 27675; 27688–27690. *Caranx crysos* (1) DZUFJR 27683. *Caranx latus* (8) DZUFJR 27646; 27664. *Chloroscombrus chrysurus* (30) DZUFJR 27563; 27567; 27570–27571; 27576; 27617; 27621; 27630–27631; 27640; 27651; 27684–27685. *Decapterus* spp. (11) DZUFJR 27562; 27565; 27568; 27573; 27575; 27578. *Decapterus punctatus* (14) DZUFJR 27627; 27635; 27638; 27652; 27667; 27671; 27680. *Naucrates ductor* (3) DZUFJR 27636–27637. *Selar crumenophthalmus* (66) DZUFJR 27632; 27648; 27657; 27681; 27687. *Selene setapinnis* (2) DZUFJR 27619. *Selene vomer* (1) DZUFJR 27564. *Oligoplites* sp. (2) DZUFJR 27569–27670. *Seriola* sp. (9) DZUFJR 27642; 27654; 27666; 27677. *Pseudocaranx dentex* (7) DZUFJR 27650; 27674; 27679; 27682. *Trachurus lathami* (68) DZUFJR 27573; 27624; 27629; 27643–27644; 27647; 27649; 27653; 27655–27656; 27658; 27661–27663; 27686. **Lutjanidae:** (12) DZUFJR 28208–28210; 28212; 28241. *Lutjanus* spp. (5) DZUFJR 28211; 28239; 28245. *Lutjanus synagris* (19) DZUFJR 28237–28240; 28242–28243; 28246–28248. *Rhomboplites aurorubens* (1) DZUFJR 28244. **Gerreidae:** (3) DZUFJR 27345; 27351. *Eucinostomus* sp. (3) DZUFJR 27380; 27428; 27434. *Diapterus* sp. (7) DZUFJR 27431; 27433. *Diapterus rhombeus* (5) DZUFJR 27346; 27382; 27437; 27439. *Eucinostomus lefroyi* (5) DZUFJR 27344; 27347; 27383; 27430. **Haemulidae:** (44) DZUFJR 27299; 27301; 27305–27306; 27308. *Haemulon plumierii* (4) DZUFJR 27300; 27302; 27304. **Sparidae:** *Calamus* sp. (1) DZUFJR 29568. *Pagrus pagrus* (37) DZUFJR 29559–29567. **Sciaenidae:** (45) DZUFJR 27443; 27445; 27449; 27452–27453; 27455–27457; 27464; 27474–27475; 27479; 27482. *Cynoscion* sp. (48) DZUFJR 27441; 27446–27447; 27450; 27454; 27459; 27472–27473; 27476–27478. *Menticirrhus americanus* (3) DZUFJR 27290; 27480. *Pareques* sp. (1) DZUFJR 27481. *Stellifer* sp. (10) DZUFJR 27440; 27442; 27448; 27451. **Mullidae:** (30) DZUFJR 27515; 27535; 27859–27861; 27877; 27884; 27887. *Upeneus parvus* (11) DZUFJR 27513–27514; 27530; 27862; 27864; 27880; 27882. **Kyphosidae:** *Kyphosus incisor* (1) DZUFJR 29531. **Chaetodontidae:** (17) DZUFJR 29733–29736. **Pomacanthidae:** (12) DZUFJR 27310–27313; 28192. *Holacanthus* sp. (1) DZUFJR 28191. *Holacanthus tricolor* (1) DZUFJR 27309. **Cirrhitidae:** *Amblycirrhitus pinos* (4) DZUFJR 29673. **Pomacentridae:** (12) DZUFJR 27315; 27317; 27326; 27329. *Abudefduf saxatilis* (1) DZUFJR 27324. *Stegastes leucostictus* (21) DZUFJR 27314; 27316; 27319; 27322–27323; 27325; 27327–27328. *Microspathodon chrysurus* (2) DZUFJR 27320. **Labridae:** (9) DZUFJR 28272; 28276; 28288; 28291. *Doratonotus megalepis* (13) DZUFJR 28277; 28279–28281; 28284; 28286–28287; 28289–28290. *Halichoeres* sp. (1) DZUFJR 28282. *Halichoeres poeyi* (86) DZUFJR 28273–28275; 28278; 28283. **Scaridae:** (31) DZUFJR 28107–28114; 28186. *Cryptotomus roseus* (22) DZUFJR 28055; 28057–28068. *Scarus* spp. (17) DZUFJR 28048–28054. *Sparisoma* spp. (268) DZUFJR 28142–28143; 28145–28165. **Chiasmodontidae:** *Chiasmodon niger* (1) DZUFJR 29670. **Uranoscopidae:** (1) DZUFJR 27556. **Tripterygiidae:** *Enneanectes altivelis* (5) DZUFJR 29782. **Dactyloscopidae:** (6) DZUFJR 29533–29534; 29536. **Blenniidae:** (16) DZUFJR 29510–29513. *Hypoleurochilus fissicornis* (1) DZUFJR 29515. *Parablennius pilicornis* (2) DZUFJR 29503; 29505. **Callionymidae:** *Callionymus bairdi* (5) DZUFJR 29618–29620. **Eleotridae:** (1) DZUFJR 27297. *Dormitator maculatus* (9) DZUFJR 27291; 27293–27295. **Gobiidae:** (47) DZUFJR 27270–27276; 27278; 27282; 27484; 27488; 27494; 27497; 27500; 27502; 27506–27508. *Coryphopterus* sp. (8) DZUFJR 27292; 27296. *Ctenogobius* sp. (20) DZUFJR 27489–27492; 27495–27496; 27498–27499; 27501; 27504–27505. *Ctenogobius boleosoma* (1) DZUFJR 27277. *Gobiosoma nudum* (17) DZUFJR 27483; 27485; 27493; 27503. *Microgobius* sp. (9) DZUFJR 27279–27281. *Microgobius carri* (6) DZUFJR 27486–27487. **Microdesmidae:** *Microdesmus bahianus* (9) DZUFJR 28319; 28320–28324; 28326. *Microdesmus longipinnis* (3) DZUFJR 28325; 28327. **Ptereleotridae:** *Ptereleotris randalli* (223) DZUFJR 27581–27615; 29939. **Acanthuridae:** *Acanthurus* sp. (3) DZUFJR 29672. **Sphyraenidae:** *Sphyraena barracuda* (1) DZUFJR 28454. *Sphyraena guachancho* (15) DZUFJR 28442; 28444–28445; 28447–28449; 28451; 28457–28458. *Sphyraena tome* (6) DZUFJR 28443; 28455–28456. **Gempylidae:** (1) DZUFJR 29691. *Gempylus serpens* (7) DZUFJR 29680; 29682; 29684–29686. *Nealotus tripes* (1) DZUFJR 29687. *Nesiarichthys nasutus* (1) DZUFJR 29688. **Trichiuridae:** *Benthodesmus* sp. (30) DZUFJR 28250; 28252; 28256–28260. *Trichiurus lepturus* (12) DZUFJR 28249; 28251; 28253–28255. **Scombridae:** (385) DZUFJR 28459; 28461–28462; 28464; 28467; 28469–28470; 28472–28476; 28479; 28481–28483; 28486–28487; 29940. *Axius* sp. (44) DZUFJR 28380–28390. *Axius rochei* (9) DZUFJR 28330–28334. *Axius thazard thazard* (3) DZUFJR 28359–28361. *Euthynnus alletteratus* (12) DZUFJR 28341–28345. *Scomber colias* (1,004) DZUFJR 28416–28419; 28421–28430. *Sarda sarda* (7) DZUFJR 28355–28358. *Scomberomorus* sp. (3) DZUFJR 28328–28329. *Thunnus* spp. (41) DZUFJR 27842; 28391; 28393–28395; 28397; 28400–28405. *Thunnus atlanticus* (1) DZUFJR 28346. **Istiophoridae:** (2) DZUFJR 29656–29657. **Nomeidae:** *Cubiceps* sp. (3) DZUFJR 29823. *Peprilus paru* (1) DZUFJR 28188. **Caproidae:** *Antigonia capros* (76) DZUFJR 28352–28354. **Pleuronectiformes:** (1) DZUFJR 29677. **Paralichthyidae:** (10) DZUFJR 28213–28214; 28216–28218. *Citharichthys* sp. (1) DZUFJR 28217. *Syacium papillosum* (28) DZUFJR 28215; 29516–29530. **Bothidae:** *Bothus ocellatus* (25) DZUFJR 29569–29580. *Monolene antillarum* (6) DZUFJR 28205–28207. **Achiridae:** *Achirus lineatus* (2) DZUFJR 29676. **Cynoglossidae:** *Symphurus tessellatus* (1) DZUFJR 29727. *Symphurus trewavasae* (1) DZUFJR 29726. **Balistidae:** *Balistes caprisicus* (1) DZUFJR 29669. **Monacanthidae:** (2) DZUFJR 28314; 28317. *Aluterus* sp. (2) DZUFJR 28307; 28310. *Aluterus heudelotii* (1) DZUFJR 28311. *Aluterus schoepfii* (3) DZUFJR 28293; 28301. *Stephanolepis hispidus* (32) DZUFJR 28292; 28294; 28296–28299; 28302–28304; 28306; 28308; 28312–28313; 28318. **Tetraodontidae:** (2) DZUFJR 28199–28200. *Sphoeroides* sp. (1) DZUFJR 29775.