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ICHTHYOPLANKTON AND STATION DATA FOR SURFACE TOWS TAKEN DURING THE 1987 EASTERN TROPICAL PACIFIC DOLPHIN SURVEY ON THE RESEARCH VESSELS *DAVID STARR JORDAN* AND *McARTHUR*

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ABSTRACT

This report provides ichthyoplankton, juvenile/adult fish, and associated station and tow data from the surface plankton samples collected during the 1987 Southwest Fisheries Science Center eastern tropical Pacific dolphin survey. It is the first in a series of reports that presents these data for all SWFSC ETP dophin surveys from 1987 to the present. In total, 116 stations were sampled with Manta nets between 30 July and 10 December, 1987, during which two research vessels surveyed within an area extending from about 10° S to 20° N, and from the Gulf of Panama westward to about 147° W. The data are presented in six tables, and distributions of the 20 most frequently occurring larval fish taxa are shown in a series of figures. The background, methodology, and necessary interpretive information are given in an accompanying text.

INTRODUCTION

In 1986 the Southwest Fisheries Science Center (SWFSC) conducted the first of a series of dolphin surveys in the eastern tropical Pacific (ETP). The purpose of these multi-ship surveys was to monitor abundance and distribution of ETP dolphin stocks and concurrently to monitor physical and biological variables in their habitat (Holt. et al. 1987; Holt and Jackson 1987; Thayer et al. 1988a, b). A primary objective was to determine the relation between environmental variables and population trends in ETP dolphin stocks. The physical oceanography was conducted jointly with NOAA=s Atlantic Oceanographic and Meteorological Laboratory (AOML). On the 1987 survey (Thayer et al. 1988c, d) and all suceeding surveys, Manta (surface) net tows were taken at night in conjunction with the oceanographic operations (1987 survey, this report; 1988 survey, Ambrose et al. 2000; 1989 survey, Charter et al. 2000; 1990 survey, Sandknop et al. 2000; 1992 survey, Watson et al. 2000). The purpose of this was to study the distribution and abundance of ETP fish larvae and extend the ichthyoplankton time series begun during the Eastropac Expedition (Ahlstrom 1971, 1972). This report, the first in the series, provides ichthyoplankton and associated station and tow data from the 1987 eastern tropical Pacific dolphin survey conducted from July 30 to December10, 1987.

The survey was conducted aboard the NOAA research vessels *David Starr Jordan* and *McArthur*. Hydrographic and biological data for *Jordan* and *McArthur* cruises, other than Manta net tow data, are reported in Thayer et al. (1988c, d) and analyzed further in Fiedler (1992), Fiedler and Philbrick (1991), and Fiedler et al. (1990, 1992). Usually two conductivity-temperature-depth instrument (CTD) casts were made each night to 1000 m to measure temperature, salinity, oxygen, chlorophyll, phaeophytin, and nutrients, and to collect water samples for productivity measurements. Acoustic backscatter and sea surface temperature, salinity, and fluorescence were measured continuously while the ship was underway. Four expendable bathythermograph (XBT) casts were made daily at six-hour intervals. In addition to marine mammal observations, data on bird and turtle sightings were made throughout the survey. Robert Pitman made observations on surface organisms and associated environmental variables at night-light stations throughout the survey and made extensive collections of fishes, squids, and other surface-living organisms. Data on fish stomach contents were recorded from fishes caught incidentally by trolling and rod-and-reel; unidentifiable stomach contents were preserved for subsequent laboratory analysis. Surface plankton samples were collected with a Manta net after dark at most stations.

SAMPLING AREA AND PATTERN

A total of 178 Manta tows was made on the survey, 86 aboard the *Jordan* (Figure 1) and 92 aboard the *McArthur* (Figure 2). The survey was conducted in four legs for both vessels:

Jordan Leg 1	8B29 August	San Diego, California to San José, Guatemala
Jordan Leg 2	5 SeptemberB2 October	San José, Guatemala to Panama City, Panama
Jordan Leg 3	6 OctoberB4 November	Panama City, Panama to Manzanillo, Mexico
Jordan Leg 4	8 NovemberB10 December	Manzanillo, Mexico to San Diego, California

McArthur Leg 1 30 July–27 August	San Diego, California to Hilo, Hawaii
McArthur Leg 2 2 September–1 October	Hilo, Hawaii to Panama City, Panama
McArthur Leg 3 6 October–3 November	Panama City, Panama to Panama City, Panama
McArthur Leg 4 9 November–10 December	Panama City, Panama to San Diego

ICHTHYOPLANKTON SAMPLING GEAR AND METHODS

Plankton tows were made with a Manta net (Brown and Cheng 1981) identical to that used on California Cooperative Oceanic Fisheries Investigations (CalCOFI) cruises. It consists of a rectangular mouth 15.5 cm deep and 86 cm wide attached to a frame that supports square lateral extensions covered with plywood and urethane foam. These extensions stabilize the net when it is towed and keep the top of the net at the sea surface. The net material is constructed of 0.505 mm nylon mesh. The towing bridle is asymmetrical with one side longer than the other; when the net is towed this bridle arrangement forces the mouth away from the ship at a slight angle. A General Oceanics flowmeter was suspended across the center of the net mouth to measure the amount of water filtered during each tow. Two towing procedures were used on this survey. On the *Jordan* the tow line attached to the bridle was attached to the hydrographic wire and then lowered to slightly below the surface of the water before the net was deployed. On the *McArthur* the net was towed from a boom on the starboard side of the ship. A weight attached to the tow line in front of the bridle kept the top of the net mouth at the surface and the tow line below the mouth of the net. Hauls were made at a ship speed of 1.0–2.0 knots for 15 minutes. Samples were preserved in 5% buffered formalin and returned to the plankton sorting laboratory at the SWFSC at the end of the cruise.

LABORATORY PROCEDURES

The ichthyoplankton was removed from the invertebrate portion of each sample and bottled separately in 3% buffered formalin. In addition to fish eggs and larvae the samples contained limited numbers of surface-living juvenile, and occasionally adult, stages of fishes; these also were removed and bottled separately in 3% formalin. The volume of water filtered by each net was computed from the flowmeter readings. Constituent taxa in the samples were identified by five of the authors (D. A. A., S. R. C., H. G. M., E. M. S., and W. W.) of this report in the Ichthyoplankton Ecology Laboratory of the La Jolla Fisheries Resources Division. Early ontogenetic stages of fishes are difficult to identify and this is further complicated by the large number and diversity of species which contribute to the ichthyoplankton in the ETP. Most identifications were based on descriptions of ontogenetic series of fishes in an identification guide to early stages of fishes in the California Current and adjacent regions (Moser 1996). Larval specimens that could not be identified with the guide were identified by establishing ontogenetic series on the basis of morphology, meristics, and pigmentation, and then linking these series through overlapping features to known metamorphic, juvenile, or adult stages (Powles and Markle 1984). Fischer et al. (1995) was a primary source of information on distribution and taxonomy of adult fishes of the ETP. Except for damaged specimens, a large proportion of the larvae and most juvenile/adults taken in the surface tows could be identified to species. The types of larvae most difficult to identify were those of tropical shorefishes (e.g., Sciaenidae, Gerreidae) but most oceanic fishes could be identified to species or at least to genus. A total of 84 larval fish categories (including unidentified and disintegrated) was identified: 49 to species, 22 to genus, and 11 to family.

The following taxonomic categories in Tables 2–5 require special explanation:

Bothus spp. – Larvae represent a single species for which two names are available, *B. constellatus* and *B. leopardinus* (see discussion in Moser 1996).

Cyclothone spp. – Small or damaged larvae lacking diagnostic characters.

Disintegrated fish larvae **B** larvae that could not be identified because of their poor condition; separated from the "unidentified" category to monitor the general condition of the ichthyoplankton samples through the time series.

Exocoetus spp. **B** *E. monocirrhus* and *E. volitans* occur in the study area and their larvae smaller than about 10 mm cannot be reliably distinguished.

Hirundichthys spp. **B** Small or damaged larvae lacking diagnostic characters, probably most are *H. marginatus*.

Lestidium spp. **B** Larvae are a single species, *Lestidium* sp. Ege 1953. Adults collected during other studies of the ETP resemble *Lestidium bigelowi* Graae 1967, known from in the Indian Ocean.

Mugil spp. **B** Mugilid larvae lacking the full complement of anal fin elements (larvae < ~ 5**B**6 mm) and those with 12 total anal fin elements could not be identified to species; *Mugil cephalus* has 11 (rarely 10) total anal fin elements.

Prognichthys spp. **B** *P. sealei* and *P. tringa* occur in the study area and their larvae cannot be reliably distinguished. The former species has a primarily oceanic distribution whereas the latter is coastal; the larvae collected during the 1987 survey probably are prodominantly (perhaps entirely) *P. tringa*.
Scomberesocidae **B** *Cololabis saira* and *Elassichthys adocetus* co-occur in much of the study area and their larvae smaller than about 11-12 mm cannot be reliably distinguished. *Scomberesox saurus* and *E. adocetus* co-occur south of the equator and small larvae of these two species cannot be distinguished. All larval records of this family are listed as Scomberesocidae; all were collected south of the equator where *C. saira* does not occur.

Unidentified fish larvae **B** Larvae that were generally in good condition but could not be identified because of their small size or early stage of development.

Vinciguerria lucetia ***B*** *V. lucetia* is the most common *Vinciguerria* species in the study area, but *V. nimbaria* and *V. poweriae* also occur in the eastern Pacific, primarily west of about 130° W; larvae of the three species are very difficult to distinguish and it is possible that some *V. nimbaria* and *V. poweriae* were included within *V. lucetia*.

SPECIES SUMMARY

Of the five most abundant taxa for the entire 1987 survey, the thread herring genus *Opisthonema* ranked first in abundance with 30.2% of the total larvae and tied for 14th in occurrence with 3.9% positive tows (Tables 2 and 3). The Panama lightfish *Vinciguerria lucetia* ranked second in abundance and occurrence with 18.8% of the total larvae and 32.6% positive tows. The shortwing flying fish *Oxyporhamphus micropterus* ranked third in abundance and first in occurrence with 11.6 % of total larvae and 37.6% positive tows. The sauries (family Scomberesocidae) ranked fourth with 7.0% of the total larvae and were tied for 11th in occurrence with 5.1 % positive tows. The Panama lanternfish *Benthosema panamense* ranked fifth in abundance with 5.3% of the larvae and tied for 28th in occurrence with 1.7% positive tows.The next five most abundant taxa were the scombrid genus *Auxis* (4.4% of total larvae), the pompano dolphinfish *Coryphaena equiselis* (4.1%), the flyingfish genus *Prognichthys* (3.1%), the bigeye cigarfish *Cubiceps pauciradiatus* (2.7%), and the family Gerreidae (1.3%). These species ranked 4th, 3rd , 6^{th,} 5th , and tied for 11th in frequency of occurrence, respectively. The ten most abundant taxa comprised 72.9% of all the larvae collected on ETP survey cruises in 1987. The remaining 27.1 % was distributed among 74 other taxa (including the "disintegrated" and "unidentified" categories). Of the ten most abundant taxa, four are epipelagic, two are coastal pelagic, one is both epipelagic and coastal pelagic, two are mesopelagic species that migrate to the epipelagic zone at night, and one is a shorefish family.

EXPLANATION OF FIGURES AND TABLES

Figures 4–23. Lengths of vertical bars are proportional to total larval counts for each station.

Table 1. This table lists for each tow the pertinent station and tow data for ichthyoplankton stations occupied during *Jordan* cruise 8710JD and *McArthur* cruise 8710JD. Cruises are designated by a six character alphanumeric code; the first two digits indicate the year and the second two the month, followed by the ship code, JD (*David Starr Jordan*) or M4 (*McArthur*). Data are listed sequentially by tow number. Regions are based on 15° latitude × 15° longitude squares (Figure 3). Time is listed as local time at the start of each tow in 24-hour designation. The values for total fish eggs and larvae are raw counts (unadjusted for volume of water filtered).

Table 2. Pooled occurrences of all larval fish taxa taken in Manta net tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4. Taxa are listed in rank order.

Table 3. Pooled counts (unadjusted for volume of water filtered) of all larval fish taxa taken in Manta net tows on the *Jordan* cruise 8710JD and *McArthur* cruise 8710JD. Taxa are listed in rank order.

Table 4. Numbers of fish larvae for each taxon taken in Manta net tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4, listed by tow number (Figures 1and 2). Numbers of larvae are listed as raw counts and number per 100 m^3 of water filtered. Fish orders and families are listed in phylogenetic sequence (Eschmeyer 1998); other taxa are listed alphabetically.

Table 5. Average number of larvae (per 100 m^3 of water filtered) for each taxon taken in Manta net tows in the regions (see Figure 3) occupied on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4.

Table 6. Numbers (raw counts) and size ranges of juvenile fishes taken in Manta net tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4. Fish orders and families are listed in phylogenetic sequence (Eschmeyer 1998), genera and species are listed in alphabetical order. For each entry, the tow number is given first in bold type, the count is next in parentheses, and size range is given last.

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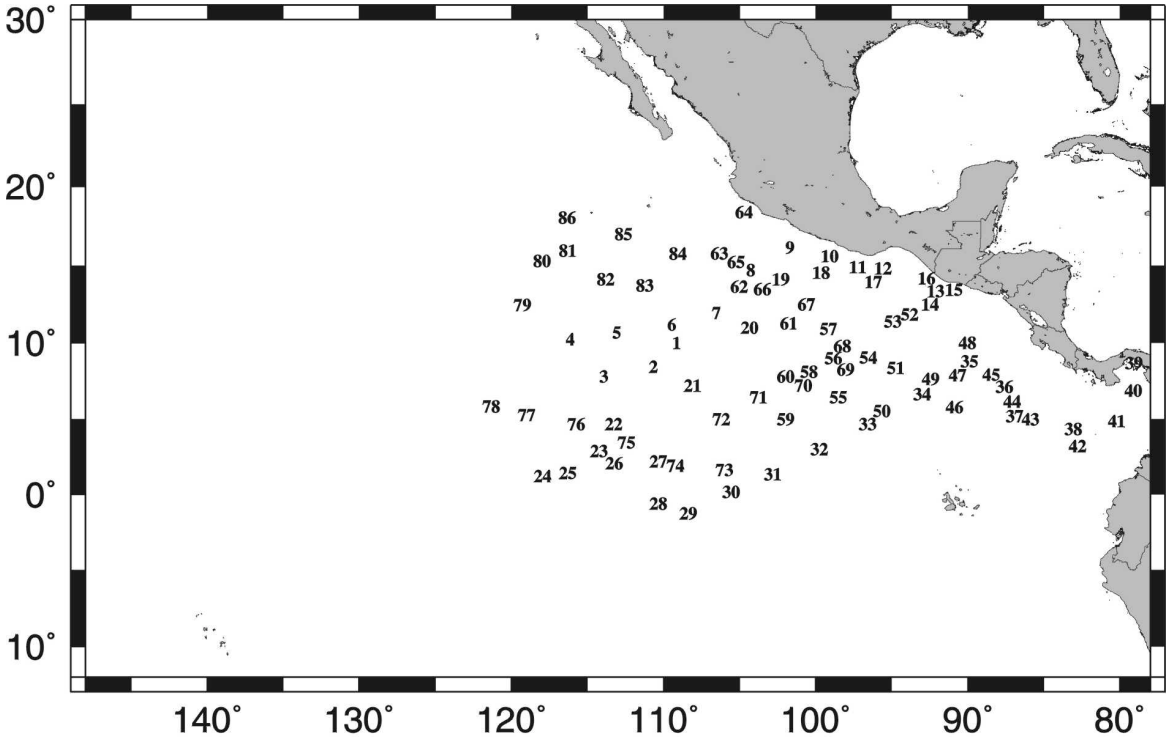

Figure 1. Manta net tow stations for *Jordan* cruise 8710JD.

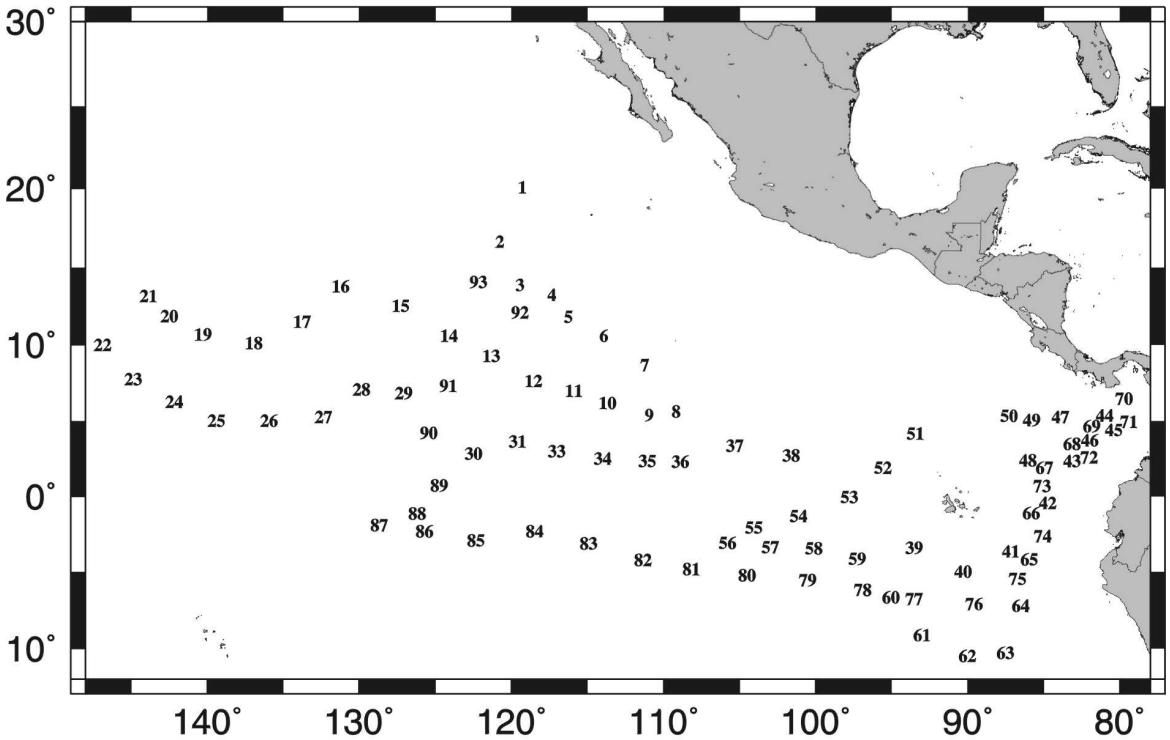

Figure 2. Manta net tow stations for *McArthur* cruise 8710M4.

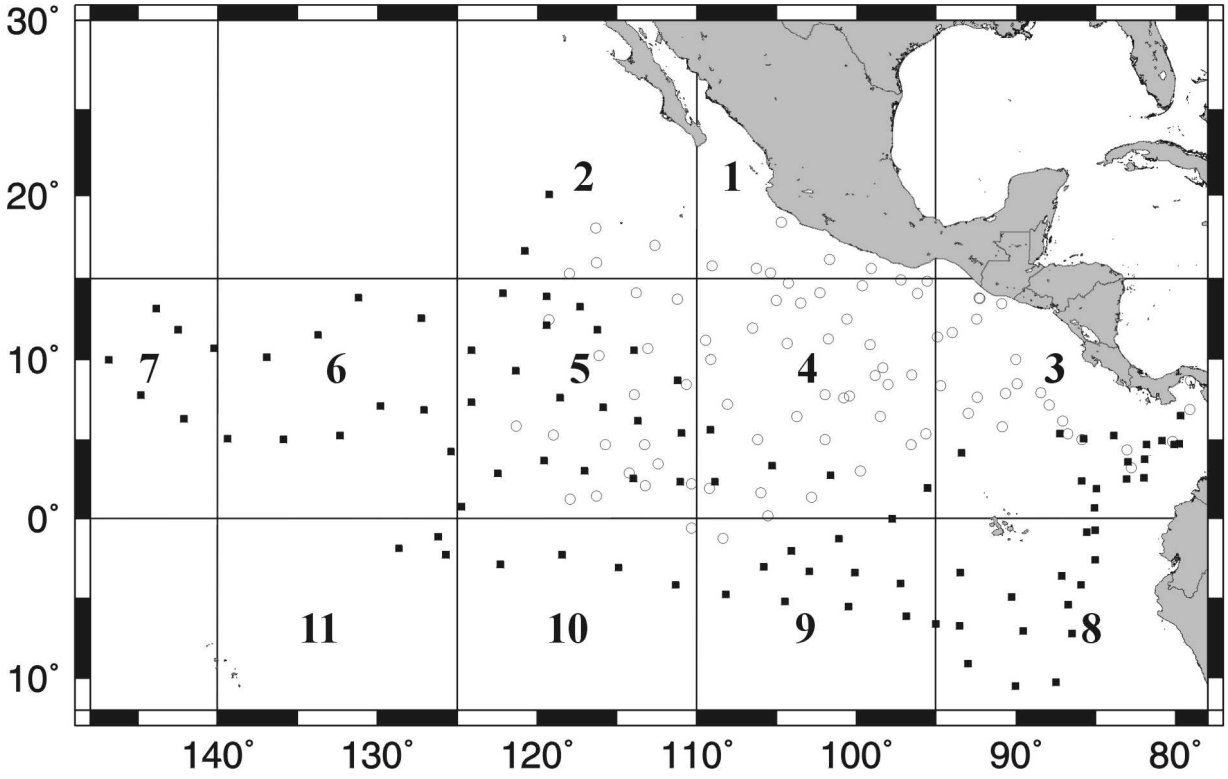

Figure 3. Sampling regions for 1987 eastern tropical Pacific dolphin survey indicated by numbers 1 to 11; Manta net tow stations for *Jordan* cruise 8710JD are indicated by circles and for *McArthur* cruise 8710M4 by solid squares.

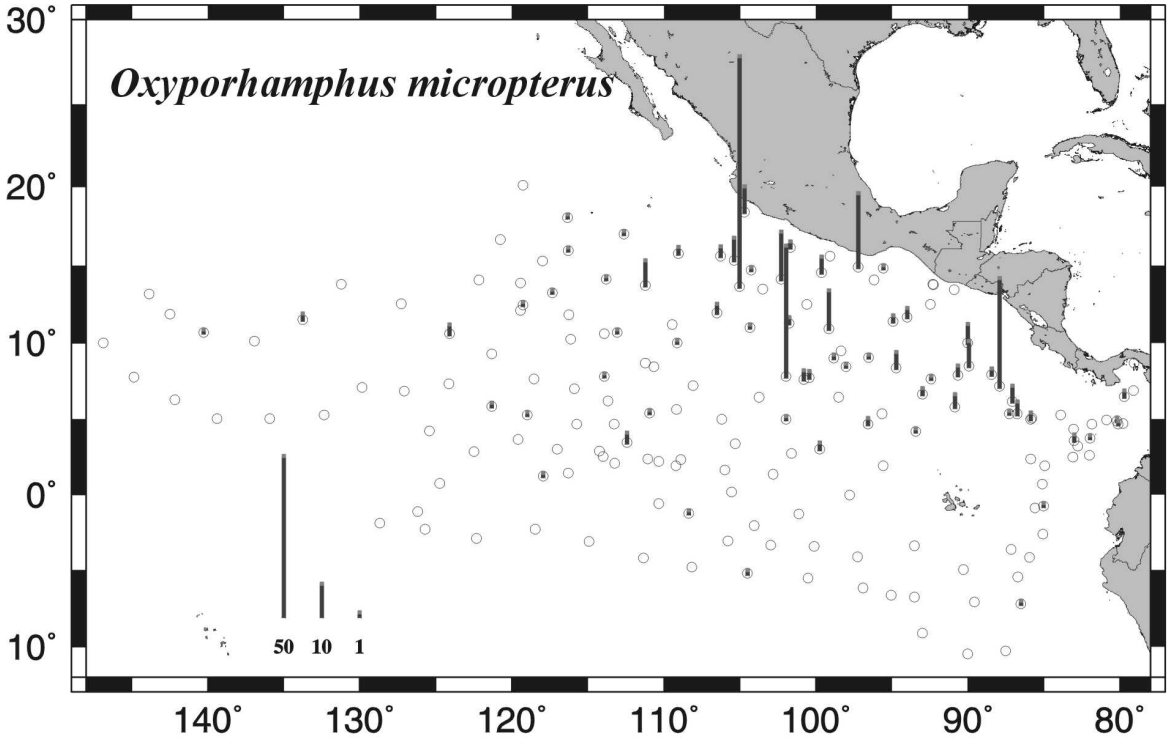

Figure 4. Distribution of *Oxyporhamphus micropterus* larvae from Manta net tows: 8710JD & 8710M4. Lengths of vertical bars are proportional to total larval counts for each station.

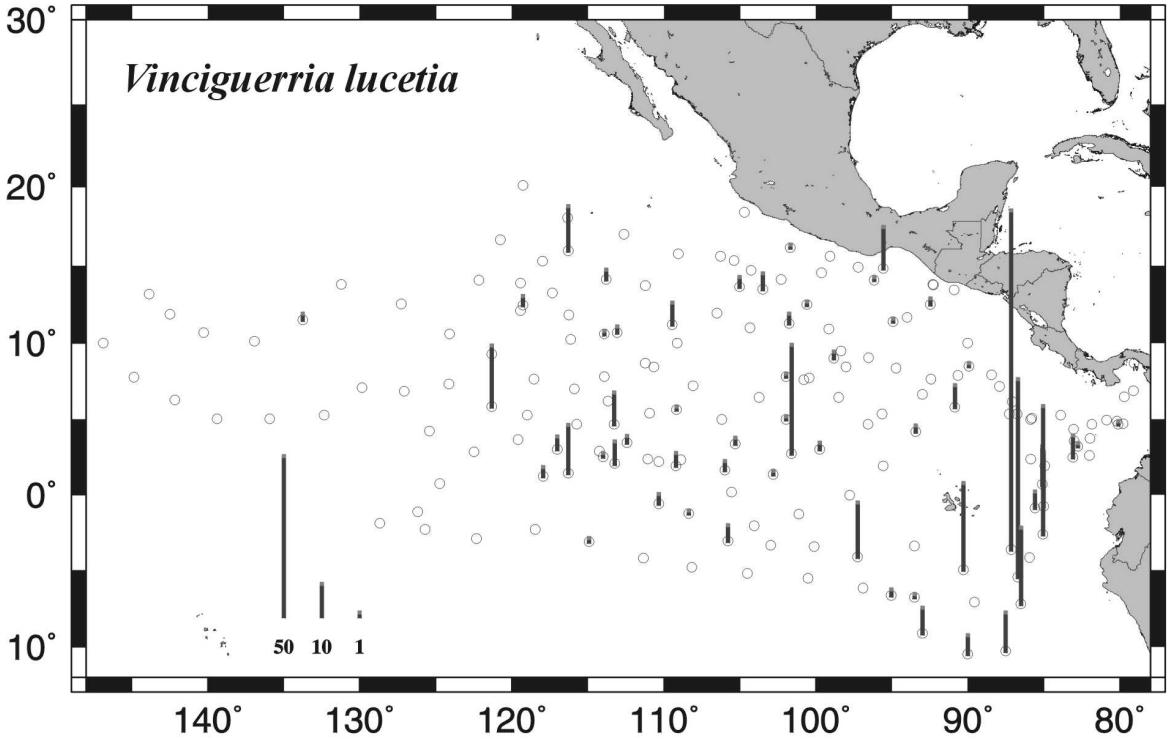

Figure 5. Distribution of *Vinciguerria lucetia* larvae from Manta net tows: 8710JD & 8710M4.

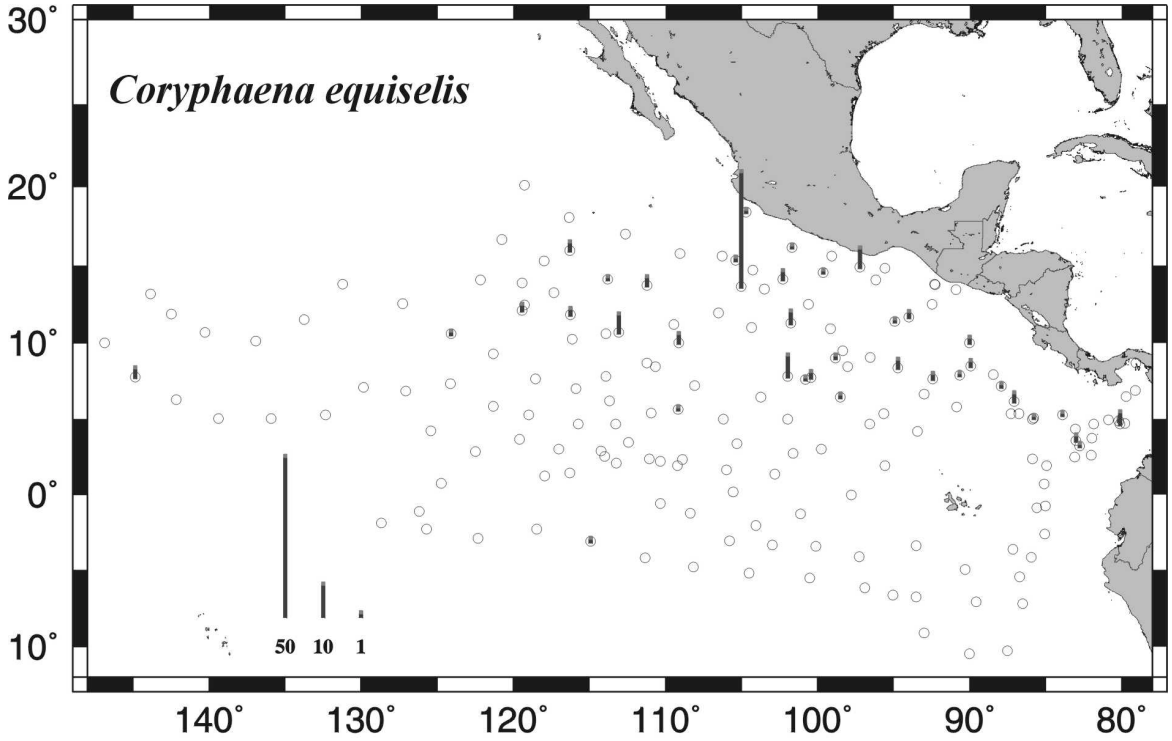

Figure 6. Distribution of *Coryphaena equiselis* larvae from Manta net tows: 8710JD & 8710M4.

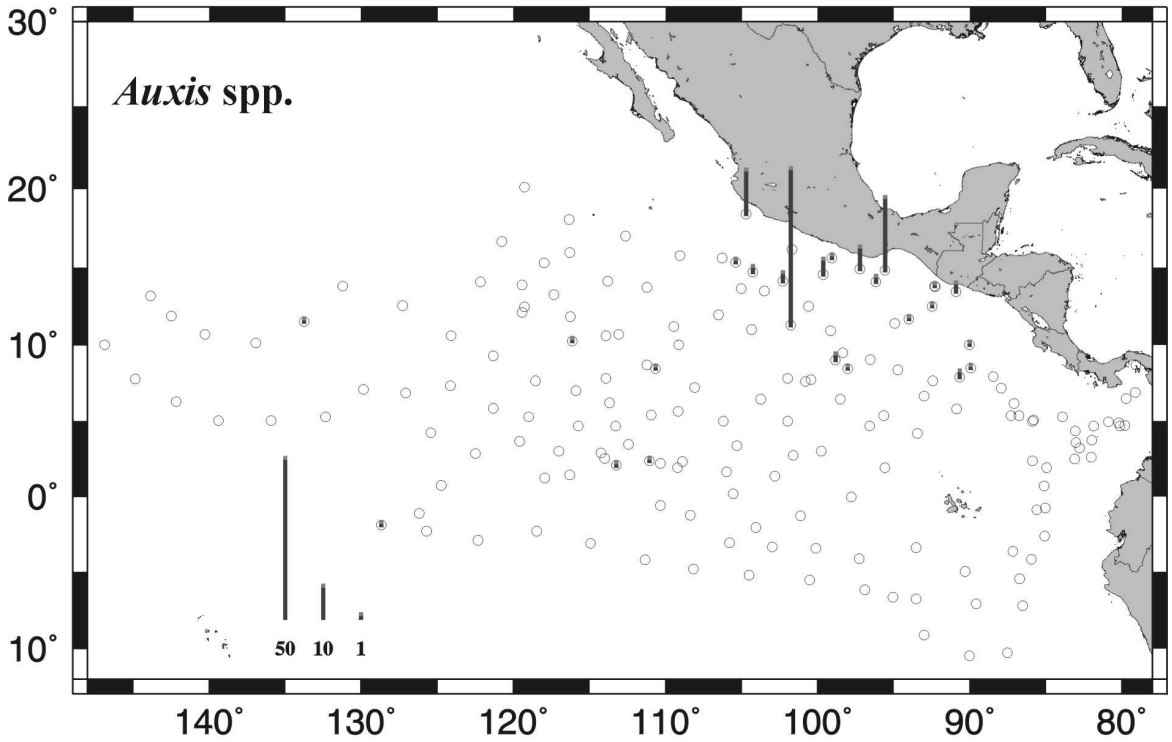

Figure 7. Distribution of *Auxis* spp. larvae from Manta net tows: 8710JD & 8710M4.

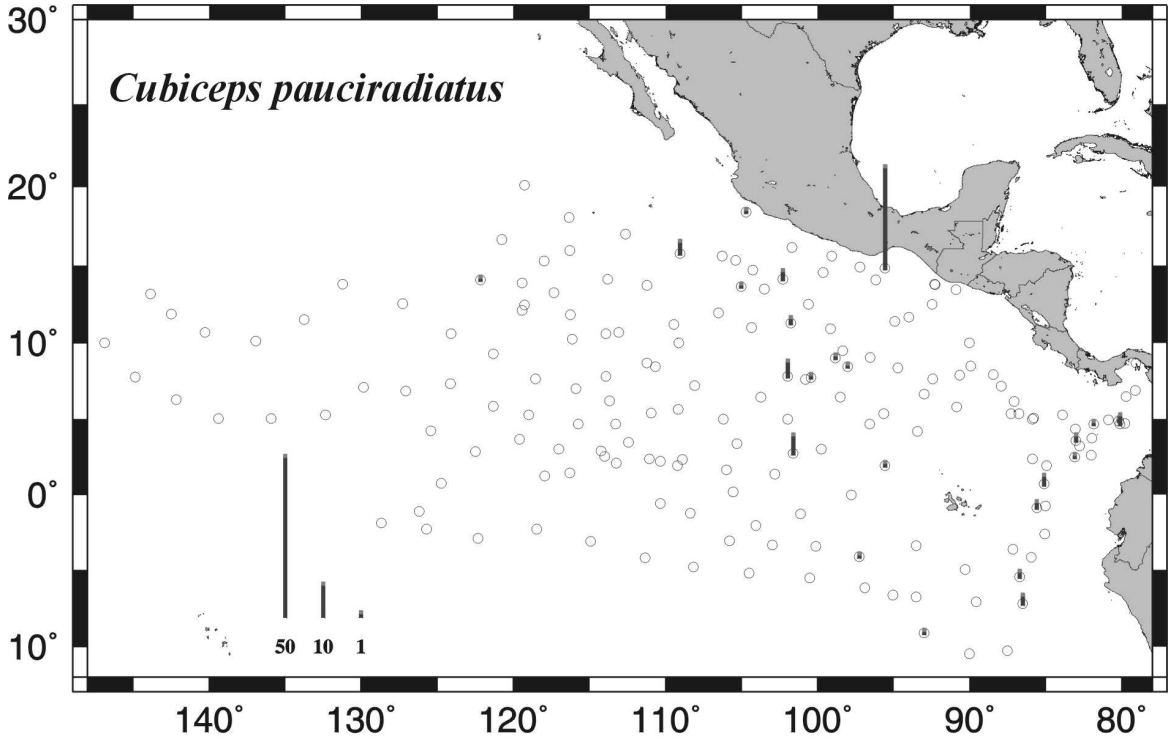

Figure 8. Distribution of *Cubiceps pauciradiatus* larvae from Manta net tows: 8710JD & 8710M4.

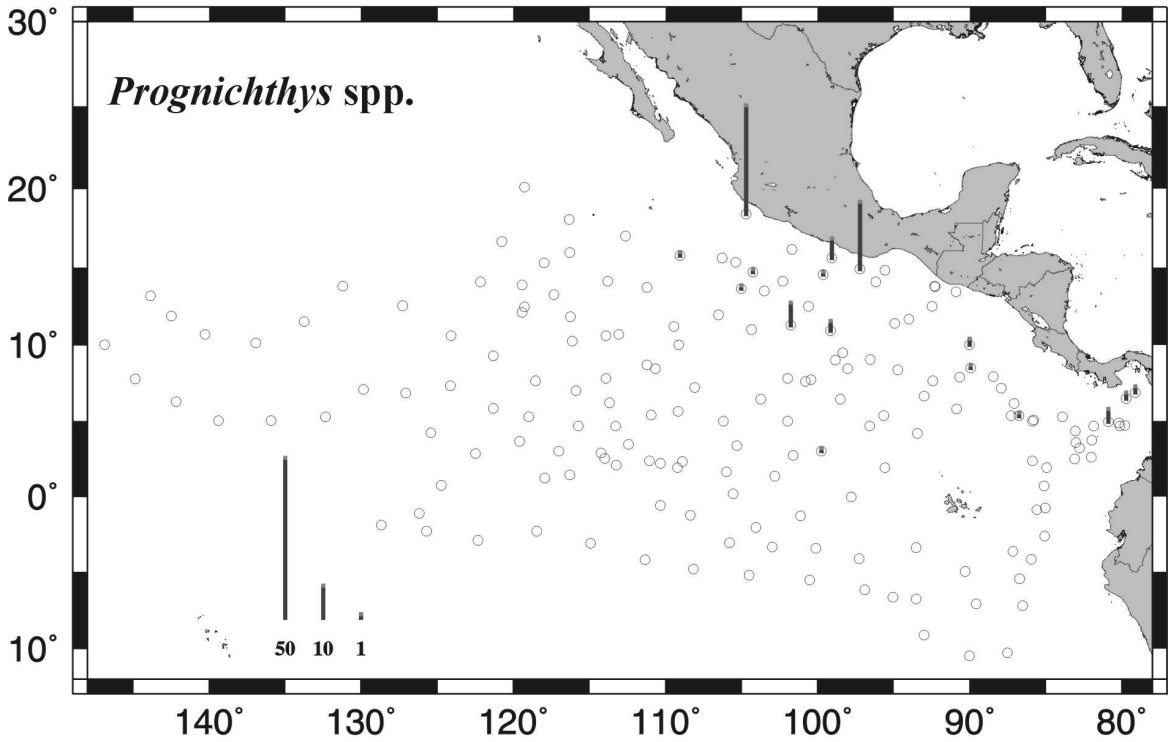

Figure 9. Distribution of *Prognichthys* spp. larvae from Manta net tows: 8710JD & 8710M4.

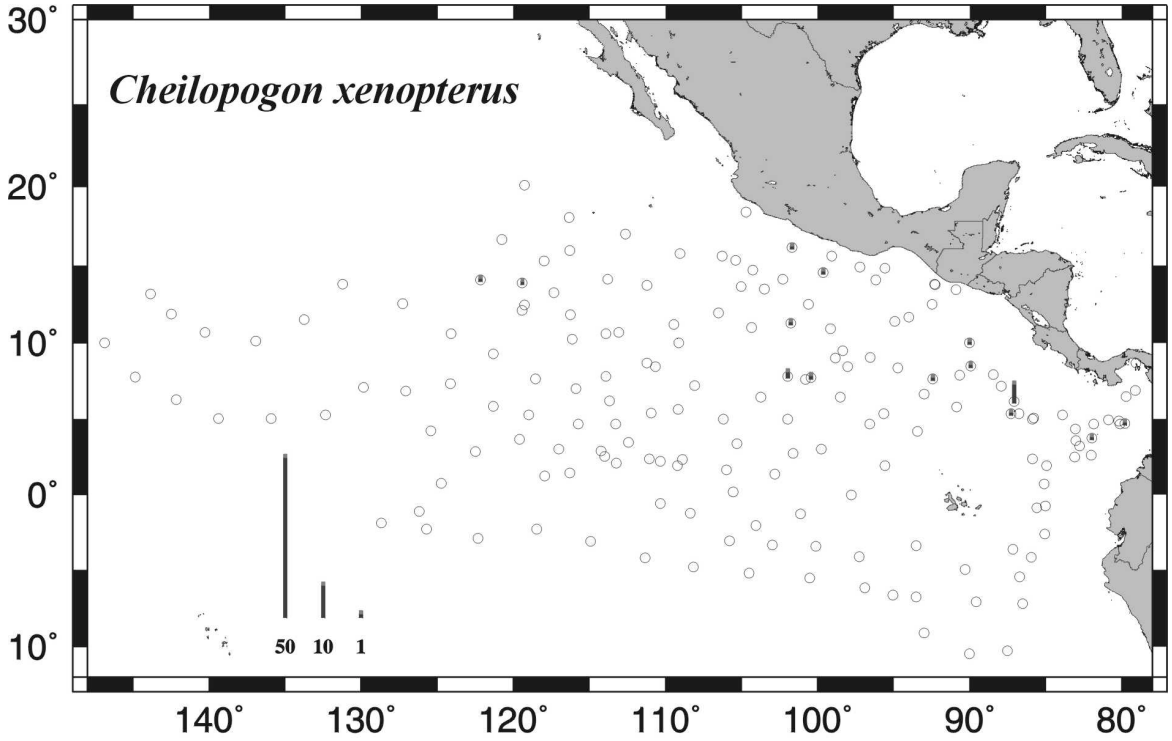

Figure 10. Distribution of *Cheilopogon xenopterus* larvae from Manta net tows: 8710JD & 8710M4.

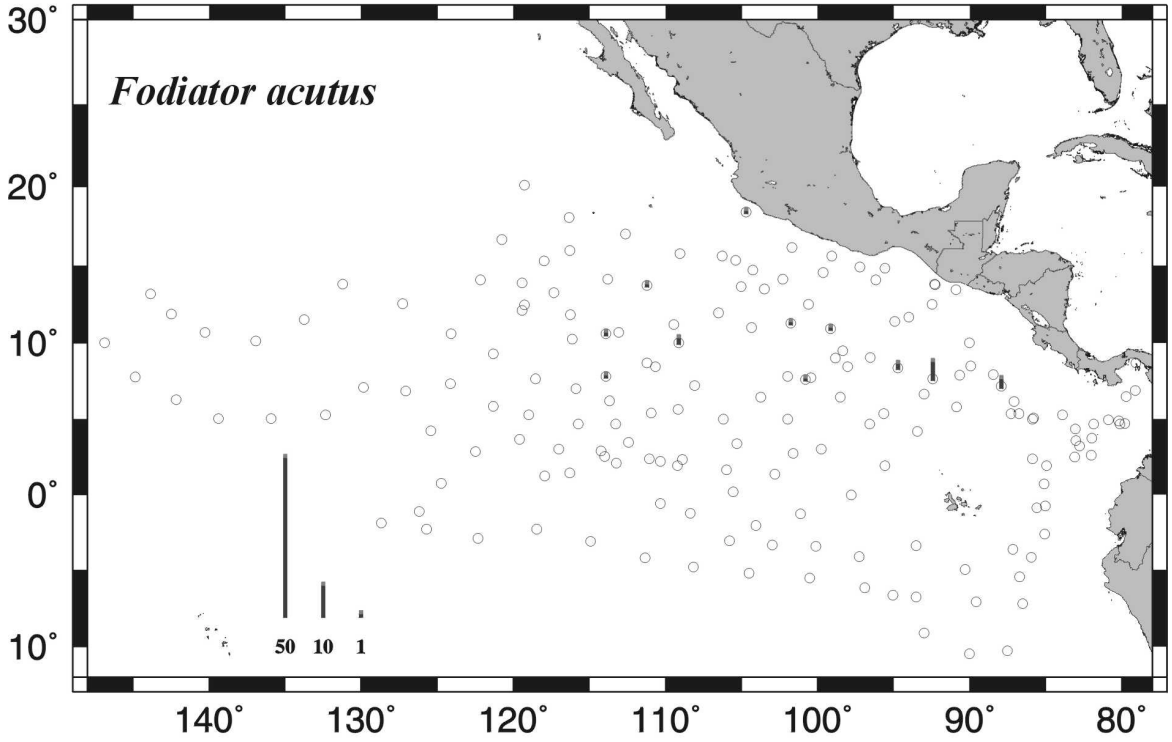

Figure 11. Distribution of *Fodiator acutus* larvae from Manta net tows: 8710JD & 8710M4.

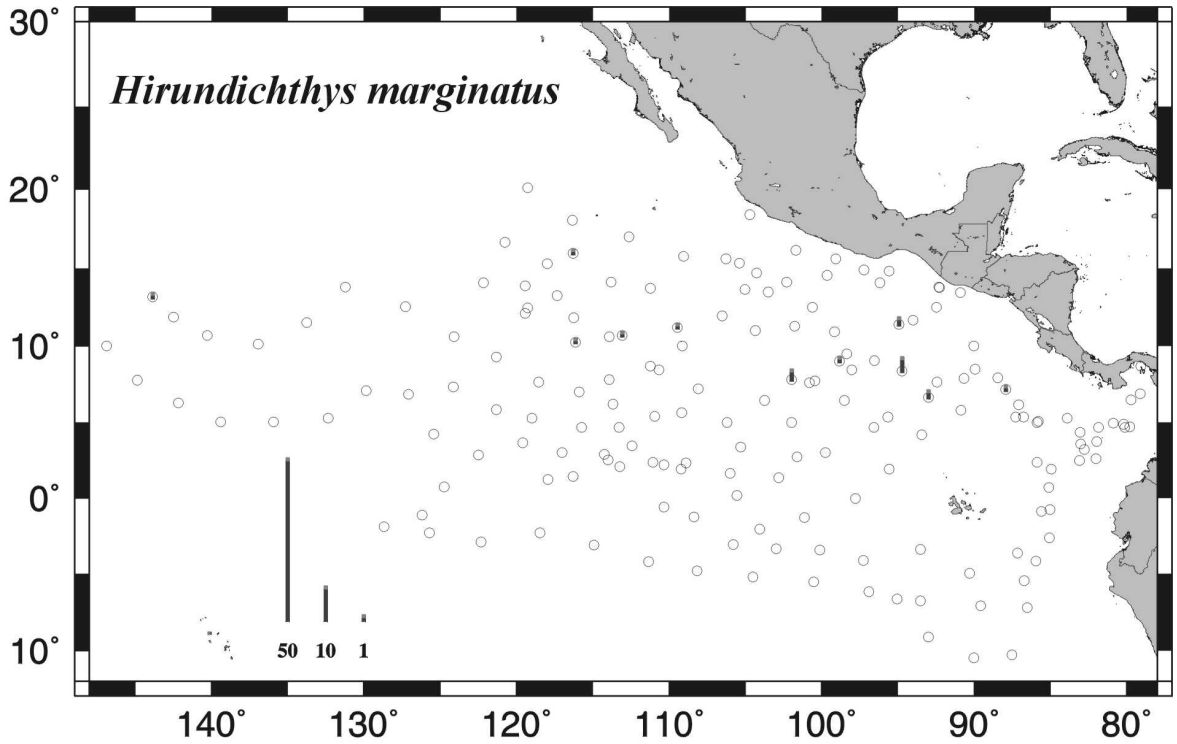

Figure 12. Distribution of *Hirundichthys marginatus* larvae from Manta net tows: 8710JD & 8710M4.

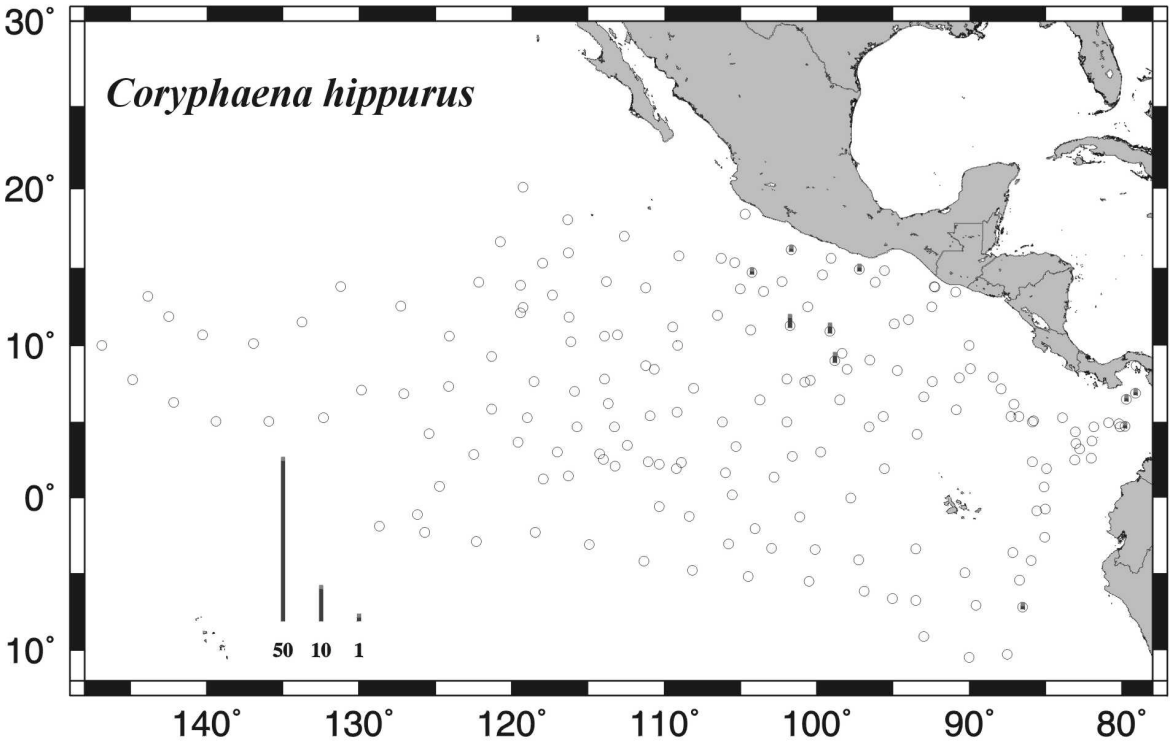

Figure 13. Distribution of *Coryphaena hippurus* larvae from Manta net tows: 8710JD & 8710M4.

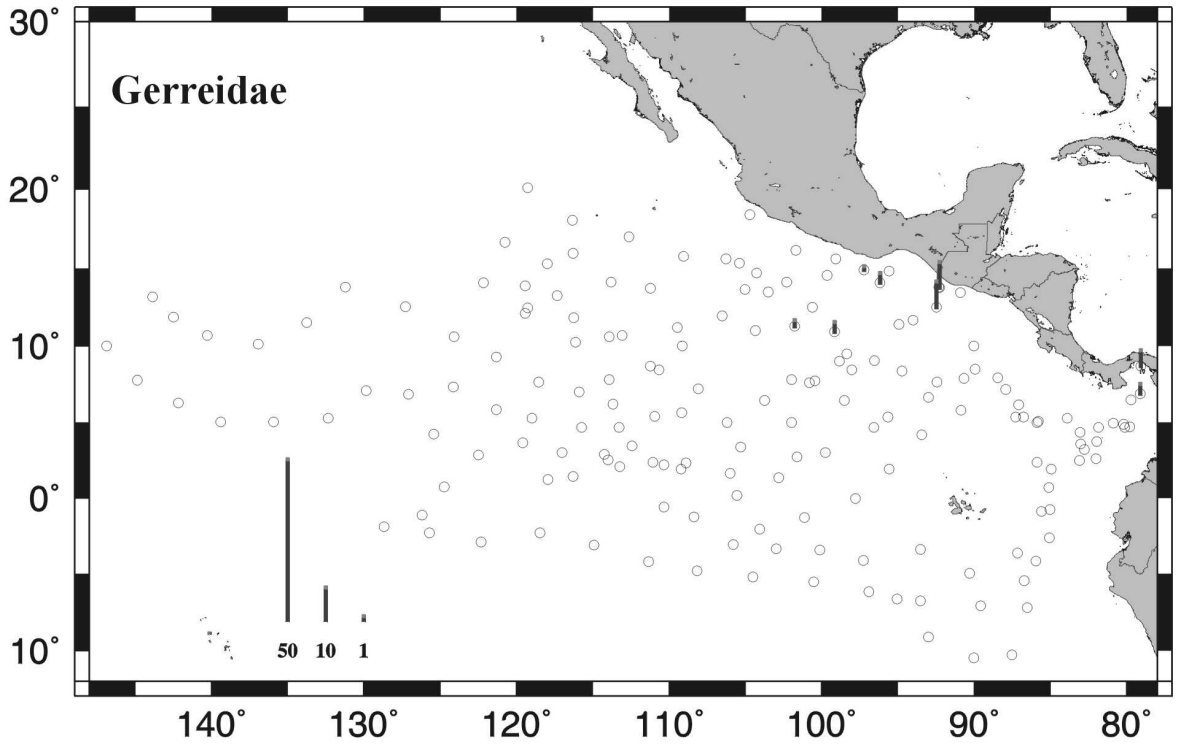

Figure 14. Distribution of Gerreidae larvae from Manta net tows: 8710JD & 8710M4.

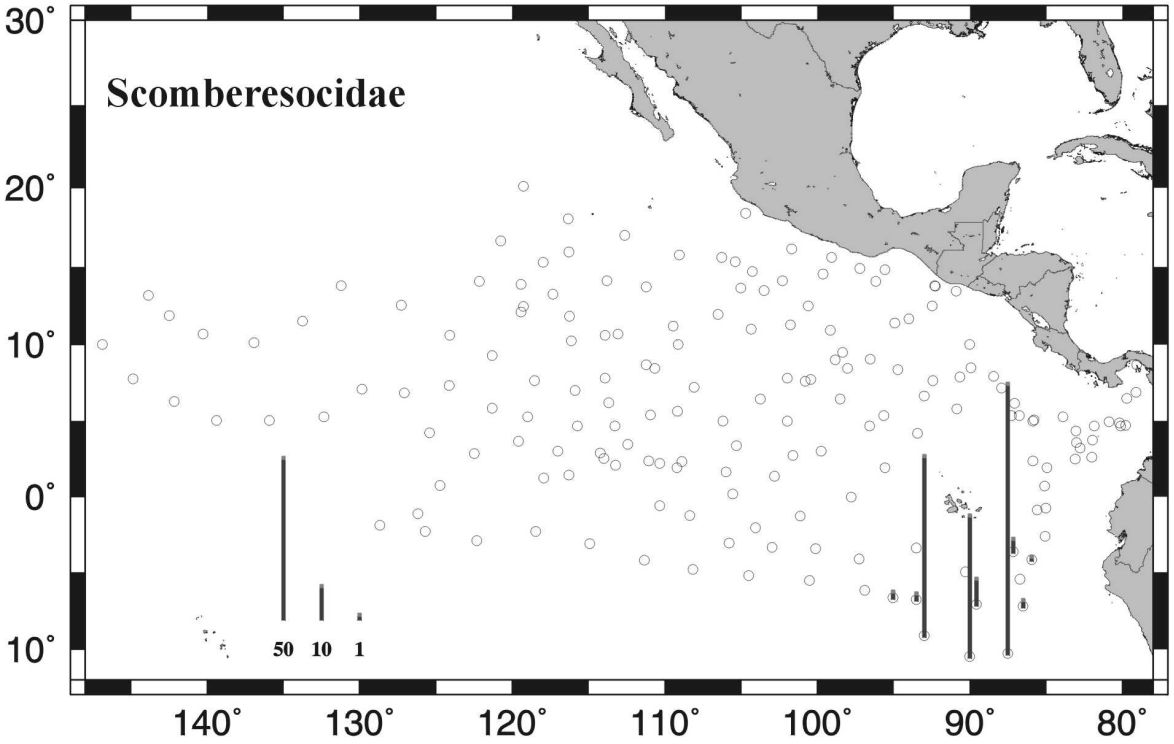

Figure 15. Distribution of Scomberesocidae larvae from Manta net tows: 8710JD & 8710M4.

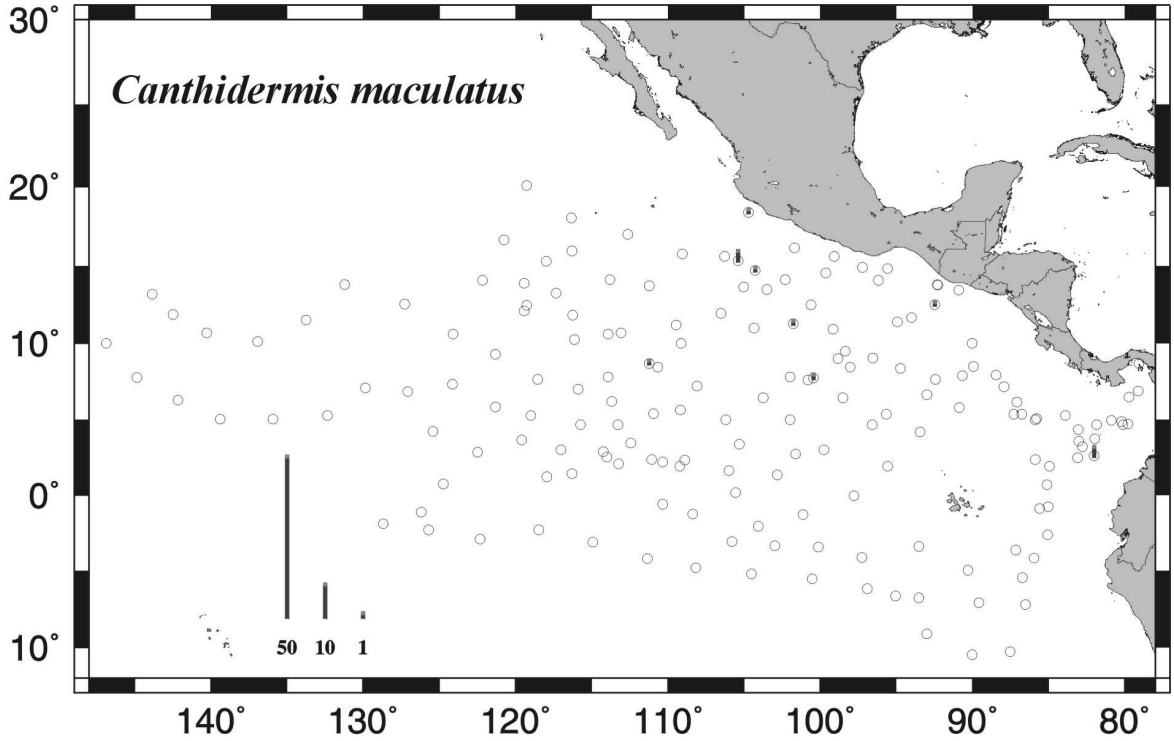

Figure 16. Distribution of *Canthidermis maculatus* larvae from Manta net tows: 8710JD & 8710M4.

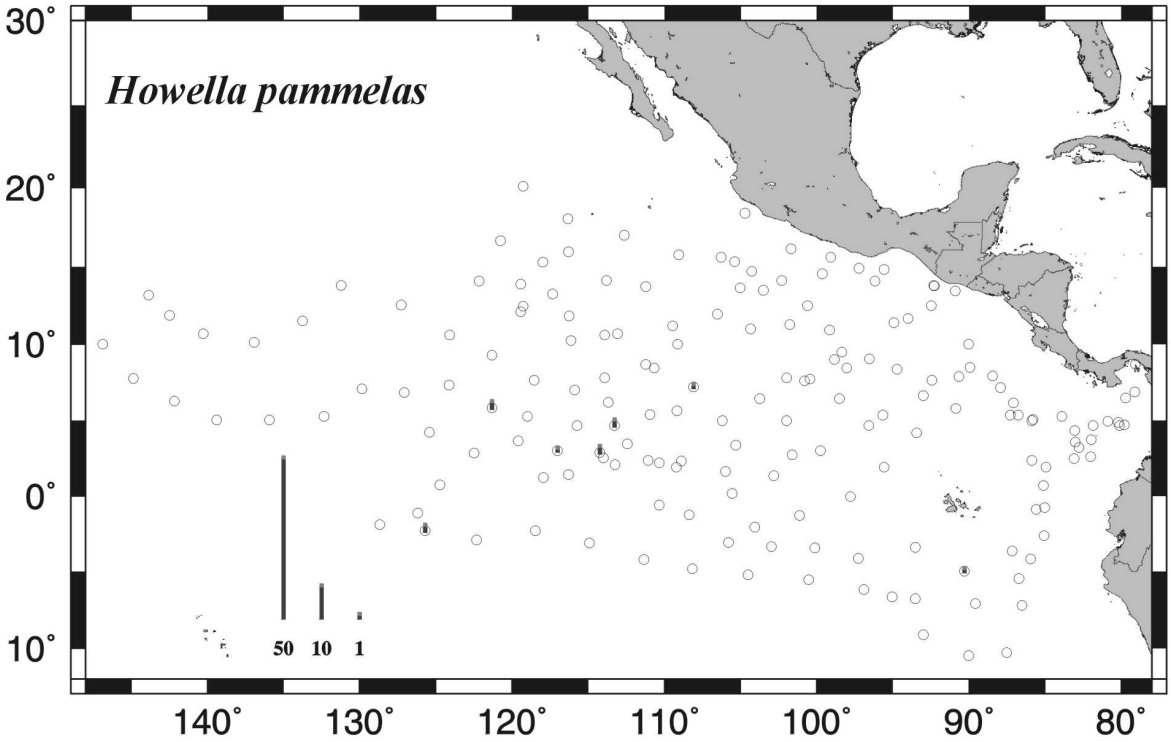

Figure 17. Distribution of *Howella pammelas* larvae from Manta net tows: 8710JD & 8710M4.

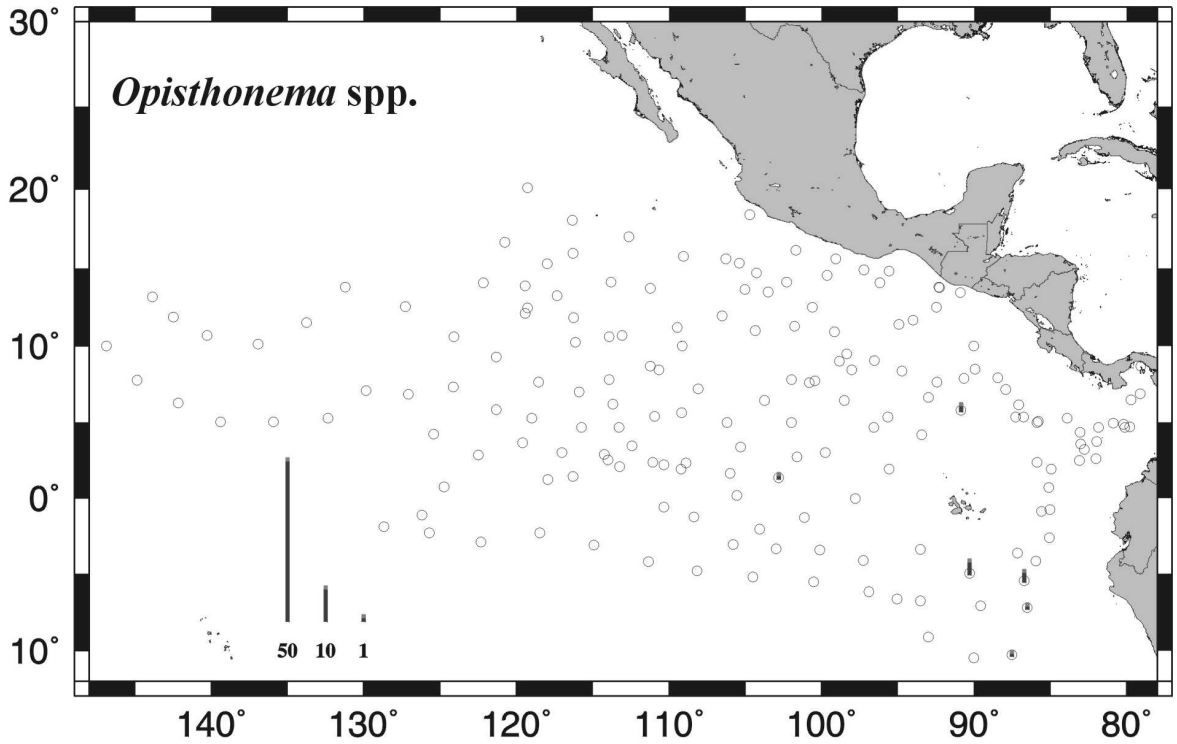

Figure 18. Distribution of *Opisthonema* spp. larvae from Manta net tows: 8710JD & 8710M4.

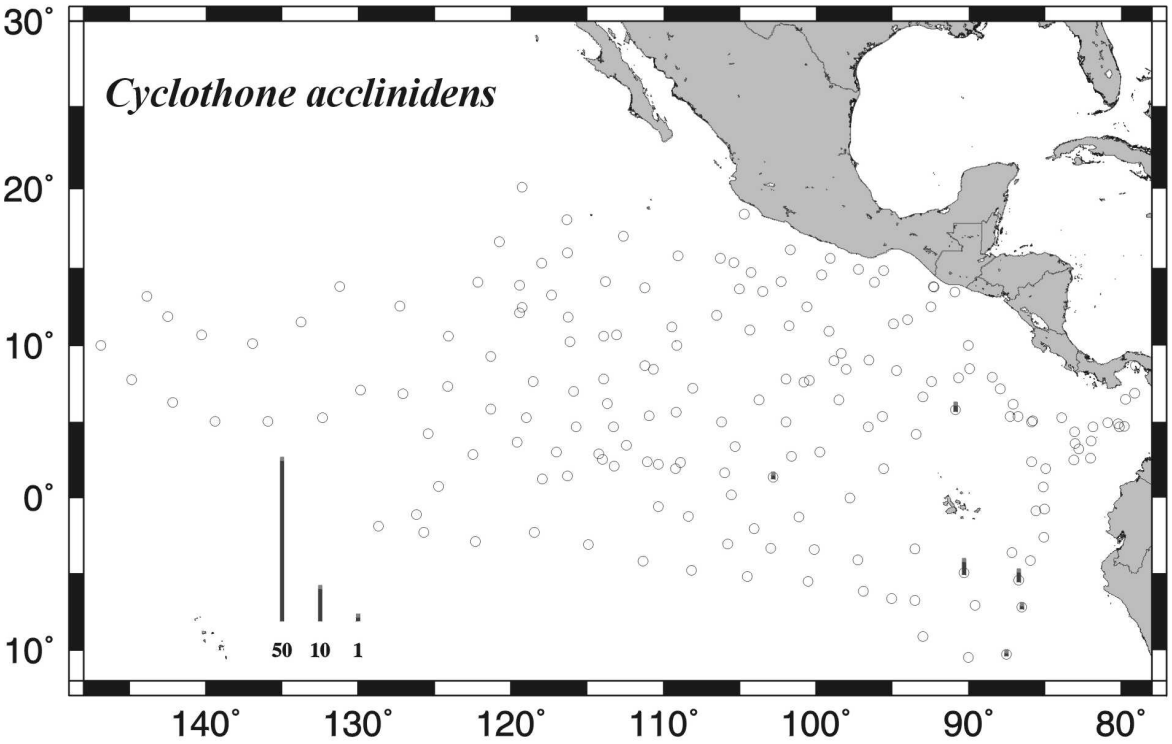

Figure 19. Distribution of *Cyclothone acclinidens* larvae from Manta net tows: 8710JD & 8710M4.

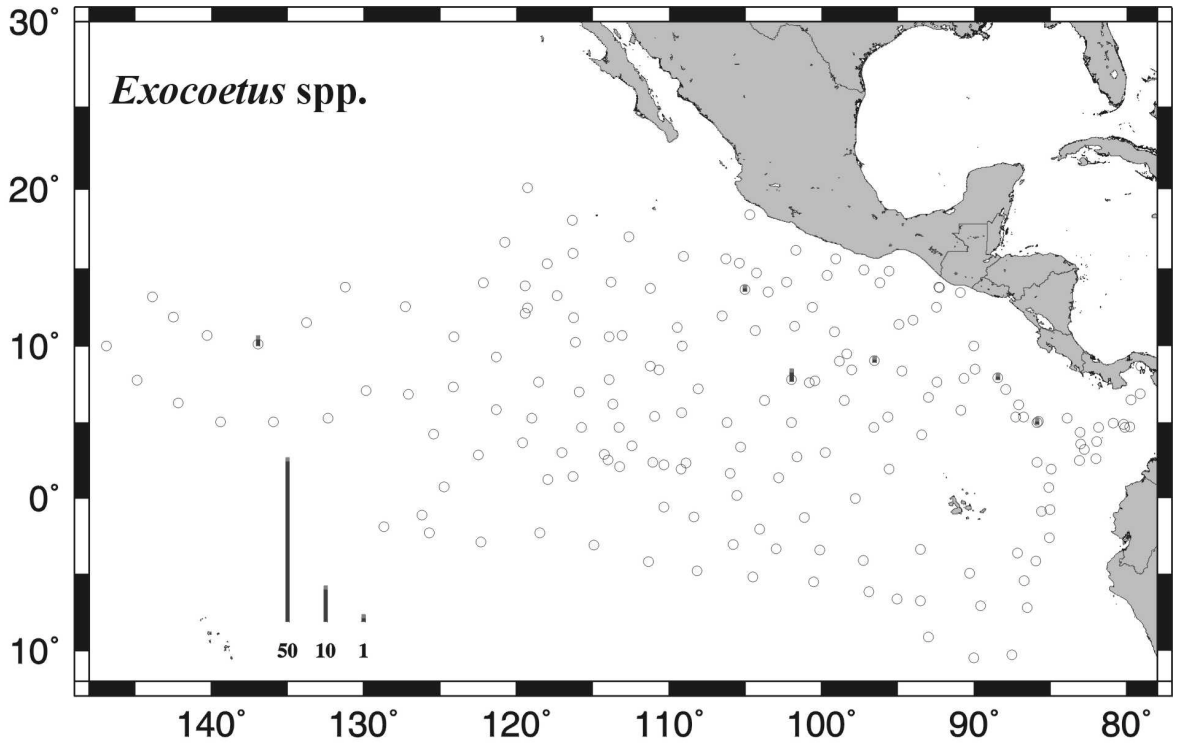

Figure 20. Distribution of *Exocoetus* spp. larvae from Manta net tows: 8710JD & 8710M4.

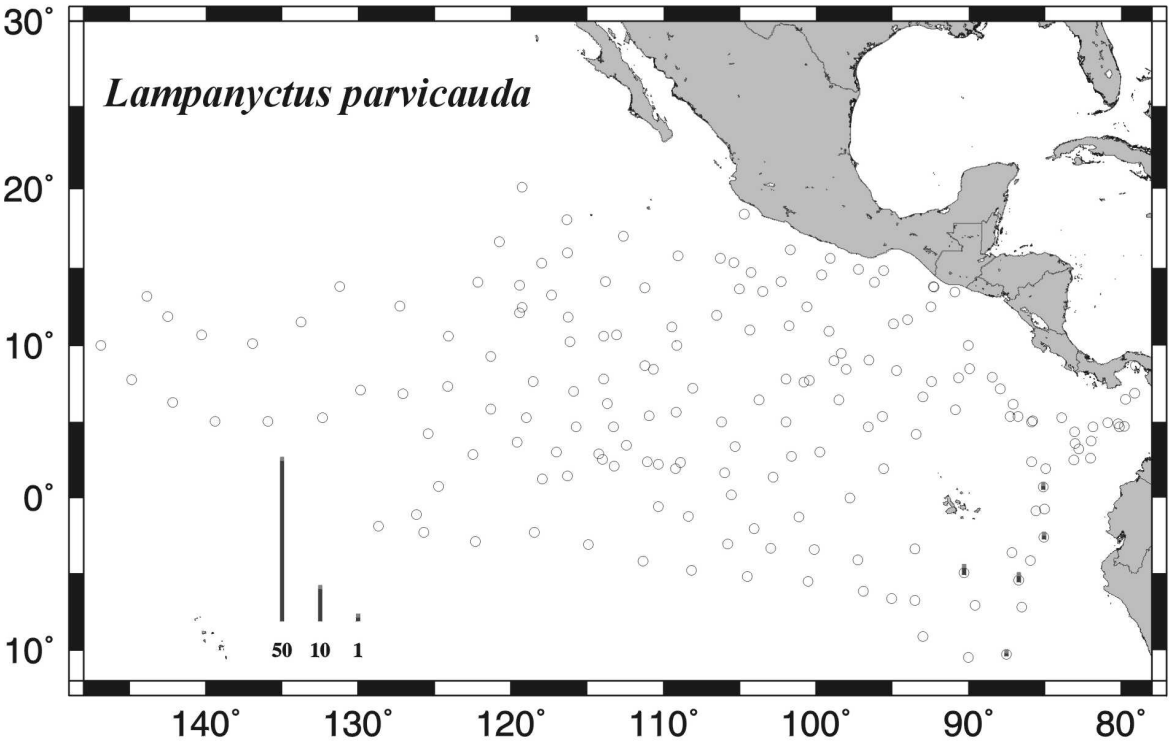

Figure 21. Distribution of *Lampanyctus parvicauda* larvae from Manta net tows: 8710JD & 8710M4.

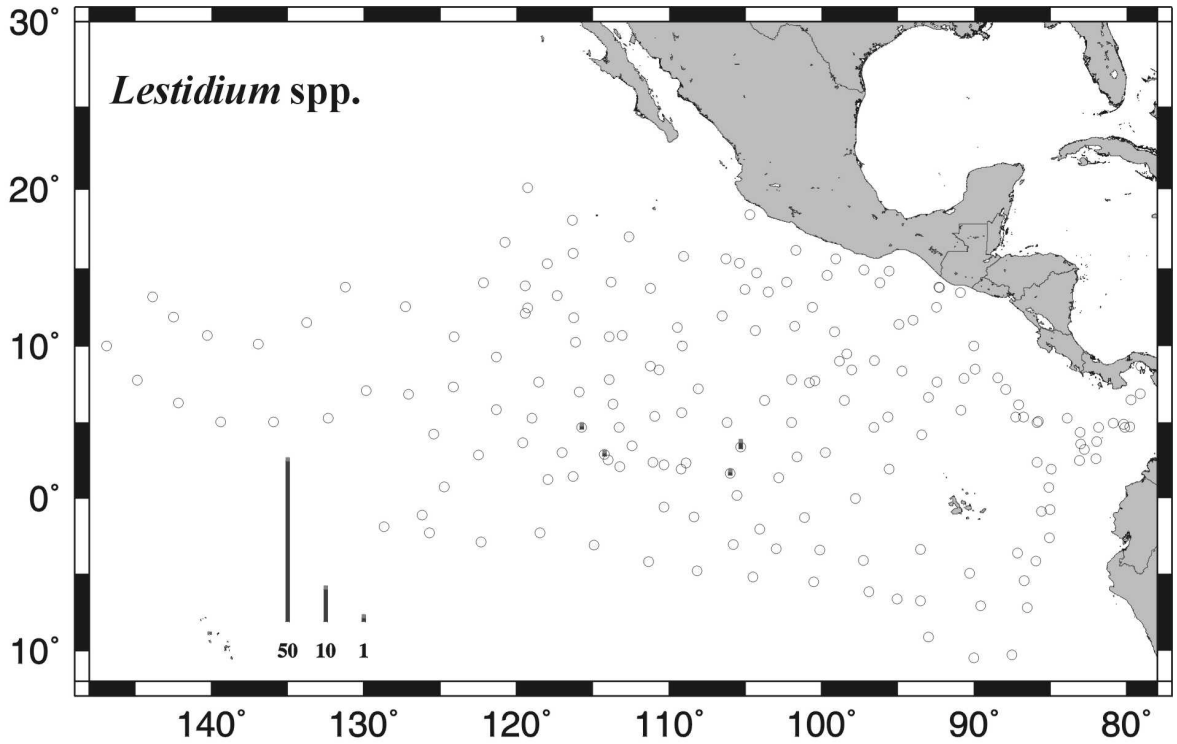

Figure 22. Distribution of *Lestidium* spp. larvae from Manta net tows: 8710JD & 8710M4.

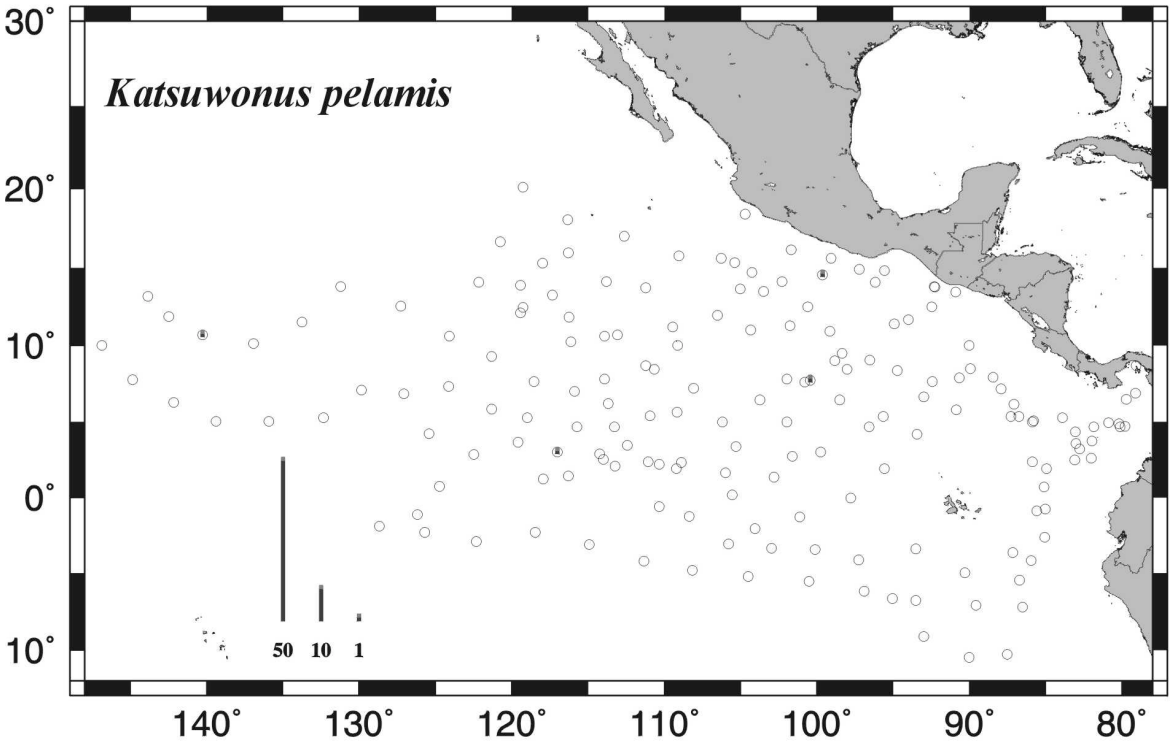

Figure 23. Distribution of *Katsuwonus pelamis* larvae from Manta net tows: 8710JD & 8710M4.

Table 1. Station and Manta net tow data for *Jordan* cruise 8710JD and *McArthur* cruise 8710M4.

Tow Number	CTD Station	Lat. deg.	Lat. min.		Long.(W) deg	Long.(W) min.	Region	Ship Code	Tow Date yymmdd	Time (Loc.)	Vol.(m;) Water Strained	Total Larvae	Total Eggs
1	1-001	10	01.4	N	109	08.9	4	JD	870815	0000	105.8	7	53
2	1-002	8	26.6	N	110	39.2	5	JD	870815	2202	102.5	1	0
3	1-003	7	49.0	N	113	55.0	5	JD	870816	2215	108.4	2	13
4	1-004	10	15.9	N	116	07.2	5	JD	870817	2215	97.9	2	35
5	1-005	10	41.4	N	113	06.0	5	JD	870818	2203	103.2	10	323
6	1-006	11	12.1	N	109	27.9	4	JD	870819	2216	103.7	8	95
7	1-007	11	57.0	N	106	32.0	4	JD	870820	2107	110.3	3	40
8	1-008	14	43.0	N	104	17.0	4	JD	870821	2117	97.9	7	134
9	1-009	16	08.8	N	101	42.1	1	JD	870822	2153	108.1	6	105
10	1-011	15	37.9	N	99	04.0	1	JD	870823	2057	103.0	12	25
11	1-012	14	55.8	N	97	13.7	4	JD	870824	2020	113.3	59	223
12	1-013	14	50.2	N	95	35.2	4	JD	870825	2008	106.7	69	59
13	1-014	13	47.5	N	92	17.8	3	JD	870826	2011	106.8	318	2
14	1-015	12	31.0	N	92	29.9	3	JD	870827	1910	86.1	369	35
15		13	27.0	N	90	56.0	3	JD	870828	2245	103.4	114	85
16		13	48.8	N	92	18.2	3	JD	870905	1912	96.2	256	44
17	1-016	14	05.6	N	96	11.8	4	JD	870906	1920	114.4	21	34
18		14	34.0	N	99	38.0	4	JD	870907	2002	97.1	15	11
19	2-017	14	07.0	N	102	19.0	4	JD	870908	2027	117.9	24	64
20	2-018	11	00.0	N	104	20.0	4	JD	870909	2017	98.3	1	518
21	2-019	7	13.0	N	108	04.8	4	JD	870911	2132	93.4	1	1
22		4	40.4	N	113	17.2	5	JD	870913	2116	86.2	16	2
23	2-021	2	53.9	N	114	13.7	5	JD	870914	2125	91.3	3	5
24	2-022	1	13.4	N	117	57.2	5	JD	870915	2120	86.0	4	22
25		1	26.5	N	116	17.0	5	JD	870916	2107	128.1	15	46
26	2-023	2	04.0	N	113	14.0	5	JD	870917	2109	84.8	9	9
27	2-024	2	12.6	N	110	21.6	5	JD	870918	2109	77.0	0	30
28	2-027	0	35.6	S	110	20.2	10	JD	870919	2130	96.8	4	29
29		1	14.6	S	108	22.8	9	JD	870920	2110	86.0	2	39
30		0	11.0	N	105	33.0	4	JD	870921	2204	100.3	0	4
31		1	22.4	N	102	50.3	4	JD	870922	2040	86.0	2	22
32	2-029	3	01.4	N	99	46.3	4	JD	870923	2005	113.4	6	38
33	2-030	4	39.6	N	96	35.1	4	JD	870924	2006	81.9	2	2
34	2-031	6	38.9	N	92	59.4	3	JD	870925	2011	95.2	5	50
35	2-032	8	28.7	N	89	55.8	3	JD	870926	2010	96.8	15	67
36	2-036	7	09.1	N	87	56.7	3	JD	870927	1905	108.6	39	5
37	2-037	5	20.4	N	86	46.5	3	JD	870928	1907	86.5	5	494
38	2-039	4	20.3	N	83	04.8	3	JD	870929	1906	83.0	0	7
39		8	41.8	N	79	04.7	3	JD	871006	1918	120.7	28	5
40	3-042	6	53.2	N	79	06.7	3	JD	871009	1951	109.0	32	9
41	3-043	4	53.3	N	80	13.6	3	JD	871010	1914	119.3	4	27
42		3	12.6	N	82	47.0	3	JD	871011	1903	122.1	1	21
43	3-045	5	00.3	N	85	52.9	3	JD	871012	1905	126.9	3	89
44	3-046	6	08.8	N	87	05.0	3	JD	871013	1913	116.7	15	14
45	3-048	7	55.1	N	88	27.3	3	JD	871014	1906	115.7	3	27
46	3-050	5	47.6	N	90	51.8	3	JD	871015	1909	102.3	15	22
47	3-052	7	54.0	N	90	40.7	3	JD	871016	1906	102.2	6	4
48	3-054	10	00.8	N	90	02.4	3	JD	871017	1905	102.2	12	398

Tow Number	CTD Station	Lat. deg.	Lat. min.		Long.(W) deg	Long.(W) min.	Region	Ship Code	Tow Date yymmdd	Time (Loc.)	Vol.(m;) Water Strained	Total Larvae	Total Eggs
49	3-056	7	38.8	N	92	25.4	3	JD	871018	1904	102.2	10	20
50	3-060	5	22.6	N	95	39.5	4	JD	871020	1903	94.5	1	13
51	3-062	8	21.9	N	94	44.9	3	JD	871021	1903	108.4	14	41
52	3-064	11	40.6	N	94	01.7	3	JD	871022	1902	107.0	6	109
53	3-066	11	24.5	N	94	56.6	3	JD	871023	1909	101.8	6	142
54	3-068	9	02.5	N	96	33.1	4	JD	871224	2001	101.2	2	106
55	3-070	6	27.8	N	98	32.2	4	JD	871025	2005	108.9	1	8
56	3-072	9	01.7	N	98	50.9	4	JD	871026	2034	97.2	10	30
57	3-074	10	56.4	N	99	09.3	4	JD	871027	2007	105.9	21	295
58	3-075	7	44.9	N	100	27.1	4	JD	871028	2004	107.8	10	904
59	3-076	4	59.3	N	101	59.5	4	JD	871029	2005	104.6	3	3
60	3-078	7	48.1	N	101	58.8	4	JD	871030	2003	105.0	62	549
61	3-079	11	17.4	N	101	45.8	4	JD	871031	2002	102.2	78	66
62	3-081	13	39.8	N	105	01.5	4	JD	871101	2002	109.1	117	231
63	3-083	15	38.1	N	106	16.6	1	JD	871102	2002	102.1	3	4121
64		18	24.2	N	104	43.6	1	JD	871103	1907	114.2	67	26
65	4-084	15	21.7	N	105	24.6	1	JD	871109	2121	109.5	12	146
66	4-086	13	29.9	N	103	30.9	4	JD	871110	1904	93.4	5	33
67	4-087	12	29.8	N	100	36.6	4	JD	871111	1935	91.4	1	0
68	4-088	9	28.8	N	98	21.5	4	JD	871113	1927	94.4	0	3282
69	4-089	8	27.4	N	98	01.0	4	JD	871114	1908	109.2	4	230
70	4-091	7	35.8	N	100	47.9	4	JD	871115	1914	109.8	6	138
71	4-093	6	26.0	N	103	43.7	4	JD	871116	1905	95.1	0	2
72	4-095	5	00.8	N	106	12.6	4	JD	871117	1909	107.4	0	29
73	4-097	1	37.8	N	105	59.2	4	JD	871118	1905	106.0	5	299
74	4-099	1	55.4	N	109	13.6	4	JD	871119	1911	99.9	4	11
75	4-101	3	28.0	N	112	25.1	5	JD	871120	2003	63.0	5	29
76	4-103	4	40.4	N	115	45.3	5	JD	871121	2011	108.0	1	0
77	4-105	5	16.2	N	119	00.3	5	JD	871122	2014	113.5	1	8
78	4-107	5	51.5	N	121	20.0	5	JD	871123	2007	108.4	26	6
79	4-110	12	27.7	N	119	15.5	5	JD	871125	2005	120.4	4	56
80	4-112	15	18.9	N	117	59.5	2	JD	871126	2005	124.0	0	0
81	4-113	15	57.2	N	116	17.3	2	JD	871127	2022	112.2	19	46
82	4-114	14	08.2	N	113	48.9	5	JD	871128	2002	112.2	5	61
83	4-115	13	43.4	N	111	13.2	5	JD	871129	2024	126.8	13	1910
84	4-116	15	47.3	N	109	04.4	1	JD	871130	2004	112.9	7	295
85	4-117	17	01.6	N	112	38.2	2	JD	871201	2002	99.0	1	992
86	4-118	18	03.2	N	116	20.0	2	JD	871202	2006	108.6	1	5
1	1-001	20	04.4	N	119	15.5	2	M4	870803	2119	79.9	0	31
2	1-002	16	40.0	N	120	47.0	2	M4	870804	2124	92.9	0	14
3	1-003	13	54.0	N	119	25.0	5	M4	870805	2110	127.2	3	14
4	1-004	13	15.5	N	117	19.7	5	M4	870806	2144	104.6	4	401
5	1-005	11	51.2	N	116	15.7	5	M4	870807	2147	109.9	2	121
6	1-007	10	35.4	N	113	56.4	5	M4	870808	2122	85.3	2	12
7	1-009	8	42.0	N	111	12.7	5	M4	870809	2101	97.1	1	14
8	1-011	5	37.5	N	109	09.5	4	M4	870810	2145	97.2	2	2
9		5	24.7	N	110	57.8	5	M4	870811	2008	113.1	2	1
10		6	11.2	N	113	42.2	5	M4	870812	2101	108.0	1	1
11	1-013	7	01.0	N	115	53.0	5	M4	870813	2059	94.2	0	3

Tow Number	CTD Station	Lat. deg.	Lat. min.		Long.(W) deg	Long.(W) min.	Region	Ship Code	Tow Date yymmdd	Time (Loc.)	Vol.(m;) Water Strained	Total Larvae	Total Eggs
12	1-015	7	38.0	N	118	34.0	5	M4	870814	2039	95.8	0	1
13	1-017	9	17.2	N	121	20.2	5	M4	870815	2207	88.8	0	20
14	1-019	10	35.5	N	124	07.0	5	M4	870816	2149	98.6	4	2
15	1-021	12	34.0	N	127	16.0	6	M4	870817	2148	108.0	0	94
16	1-022	13	49.2	N	131	12.5	6	M4	870818	2248	91.2	0	8
17	1-023	11	31.0	N	133	45.0	6	M4	870819	2242	112.9	5	27
18	1-025	10	09.0	N	136	57.0	6	M4	870820	2306	121.6	2	252
19	1-027	10	42.0	N	140	17.0	7	M4	870821	2254	85.2	2	23
20	1-029	11	52.0	N	142	30.0	7	M4	870822	2327	96.5	0	5
21	1-031	13	10.0	N	143	52.0	7	M4	870823	2247	106.2	1	2
22	2-032	10	00.0	N	146	51.5	7	M4	870905	2342	103.2	0	0
23	2-033	7	47.2	N	144	52.1	7	M4	870906	2323	95.8	3	0
24	2-034	6	18.0	N	142	10.0	7	M4	870907	0028	97.9	5	2
25	2-036	5	03.0	N	139	24.0	6	M4	870908	2259	98.1	1	4
26		5	01.0	N	135	55.0	6	M4	870909	2243	95.3	0	3
27	2-038	5	16.0	N	132	22.0	6	M4	870910	2257	93.5	0	7
28	2-040	7	05.0	N	129	51.0	6	M4	870911	2318	111.7	0	3
29	2-042	6	51.7	N	127	05.5	6	M4	870912	2327	67.1	0	1
30	2-044	2	52.0	N	122	29.0	5	M4	870914	2206	93.8	0	3
31	2-046	3	40.0	N	119	36.0	5	M4	870915	2223	95.7	0	5
33	2-048	3	01.0	N	117	02.0	5	M4	870916	2213	88.9	6	1
34	2-050	2	32.7	N	113	59.6	5	M4	870917	2247	96.7	1	0
35	2-052	2	21.5	N	111	03.0	5	M4	870918	2104	84.8	1	8
36	2-054	2	20.0	N	108	53.5	4	M4	870919	2112	90.4	0	12
37	2-056	3	22.0	N	105	18.0	4	M4	870920	2053	88.1	4	5
38	2-058	2	43.9	N	101	37.8	4	M4	870921	2131	99.6	41	196
39	2-060	3	24.0	S	93	31.0	8	M4	870924	2002	100.4	0	483
40	2-062	4	56.7	S	90	17.9	8	M4	870925	1850	95.0	46	23
41	2-064	3	36.8	S	87	09.9	8	M4	870926	1955	94.6	117	122
42	2-066	0	45.4	S	85	03.1	8	M4	870927	1852	105.4	18	72
43	2-068	2	29.0	N	83	06.0	3	M4	870928	1947	86.4	10	17
44	3-070	4	56.7	N	80	53.7	3	M4	870929	1906	93.5	5	34
45	3-071	4	41.0	N	80	07.0	3	M4	871007	1901	98.5	13	15
46	3-072	3	44.4	N	81	59.2	3	M4	871008	1924	92.7	2	9
47	3-074	5	16.0	N	83	54.6	3	M4	871009	1859	90.5	1	19
48	3-076	2	23.1	N	85	54.3	3	M4	871010	1954	111.1	0	121
49	3-078	5	03.7	N	85	48.3	3	M4	871011	1920	101.3	1	6188
50	3-080	5	21.2	N	87	16.9	3	M4	871012	1902	100.9	2	101
51	3-084	4	10.3	N	93	26.0	3	M4	871014	1902	68.4	3	18
52	3-086	1	56.5	N	95	35.2	4	M4	871015	2002	79.3	1	109
53	3-088	0	00.7	S	97	47.0	9	M4	871016	1959	75.8	0	16
54	3-090	1	16.9	S	101	07.9	9	M4	871017	2004	74.1	0	81
55	3-092	2	03.0	S	104	05.2	9	M4	871018	2001	79.9	0	159
56	3-094	3	03.6	S	105	49.0	9	M4	871019	2001	90.6	5	215
57	3-096	3	20.0	S	102	58.5	9	M4	871020	2002	76.9	0	305
58	3-098	3	25.5	S	100	07.8	9	M4	871021	2001	93.6	0	1287
59	3-100	4	06.1	S	97	15.1	9	M4	871022	1956	94.1	19	31
60	3-102	6	38.9	S	95	02.3	9	M4	871023	2003	93.6	4	155
61	3-104	9	07.6	S	93	01.3	8	M4	871024	2001	89.8	66	44

Tow Number	CTD Station	Lat. deg.	Lat. min.		Long.(W) deg	Long.(W) min.	Region	Ship Code	Tow Date yymmdd	Time (Loc.)	Vol.(m;) Water Strained	Total Larvae	Total Eggs
62	3-105	10	30.6	S	90	02.3	8	M4	871025	1957	96.0	48	0
63	3-106	10	17.4	S	87	31.2	8	M4	871026	1957	93.6	98	389
64	3-107	7	13.2	S	86	31.0	8	M4	871027	2058	94.7	32	128
65	3-119	4	09.7	S	85	58.4	8	M4	871028	1932	99.0	3	2001
66	3-111	0	51.1	S	85	35.3	8	M4	871029	2057	93.6	10	171
67	3-113	1	54.7	N	84	58.3	3	M4	871030	1902	105.8	0	308
68	3-115	3	34.8	N	83	00.6	3	M4	871031	2058	104.2	6	87
69	3-117	4	40.6	N	81	52.1	3	M4	871101	1902	111.3	1	12
70	4-119	6	29.0	N	79	44.1	3	M4	871102	1900	98.1	25	347
71	4-120	4	42.4	N	79	48.4	3	M4	871110	1902	70.8	2	44
72	4-121	2	36.1	N	82	00.8	3	M4	871111	1915	77.2	4	119
73	4-123	0	41.3	N	85	06.2	3	M4	871112	1901	93.5	25	308
74	4-125	2	35.8	S	85	04.4	8	M4	871113	1903	91.0	45	575
75	4-127	5	26.6	S	86	44.5	8	M4	871114	1902	85.5	70	616
76	4-129	7	05.4	S	89	35.1	8	M4	871115	1911	81.8	8	28
77	4-130	6	46.4	S	93	32.5	8	M4	871116	2001	89.3	3	1647
78	4-132	6	08.7	S	96	54.3	9	M4	871117	2000	94.1	0	285
79	4-134	5	31.9	S	100	31.9	9	M4	871118	2014	95.8	1	10
80	4-136	5	13.0	S	104	30.0	9	M4	871119	2103	96.7	1	0
81	4-138	4	47.0	S	108	11.0	9	M4	871120	2103	92.5	0	1127
82	4-140	4	11.6	S	111	21.0	10	M4	871121	2102	105.1	0	3
83	4-142	3	05.0	S	114	55.8	10	M4	871122	2103	92.6	2	12
84	4-144	2	16.2	S	118	28.0	10	M4	871123	2103	95.5	0	13
85	4-146	2	53.1	S	122	20.4	10	M4	871124	2207	88.7	0	55
86	4-148	2	17.7	S	125	43.6	11	M4	871125	2159	90.6	5	1
87	4-150	1	53.0	S	128	40.7	11	M4	871126	2204	108.1	1	154
88	4-151	1	08.0	S	126	12.2	11	M4	871127	2202	103.8	0	16
89	4-153	0	44.5	N	124	45.5	5	M4	871128	2202	93.0	0	13
90	4-155	4	14.6	N	125	25.9	6	M4	871129	2152	111.4	0	9
91	4-157	7	20.5	N	124	08.2	5	M4	871130	2126	104.4	0	4
92	4-158	12	08.0	N	119	26.0	5	M4	871202	2106	94.3	2	5451
93	4-161	14	05.7	N	122	10.7	5	M4	871204	2101	95.1	5	202

Table 2. Pooled occurrences of fish larvae taken in Manta net tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4.

Rank	Taxon	Occurrences
1	*Oxyporhamphus micropterus*	67
2	*Vinciguerria lucetia*	58
3	*Coryphaena equiselis*	39
4	*Auxis* spp.	25
5	*Cubiceps pauciradiatus*	24
6	*Prognichthys* spp.	16
7	*Cheilopogon xenopterus*	14
8	*Fodiator acutus*	11
8	*Hirundichthys marginatus*	11
10	*Coryphaena hippurus*	10
11	Gerreidae	9
11	Scomberesocidae	9
13	*Canthidermis maculatus*	8
14	*Howella pammelas*	7
14	*Opisthonema* spp.	7
16	*Cyclothone acclinidens*	6
16	*Exocoetus* spp.	6
18	Disintegrated fish larvae	5
18	*Lampanyctus parvicauda*	5
20	*Lestidium* spp.	4
20	*Mugil* spp.	4
20	*Euthynnus lineatus*	4
20	*Katsuwonus pelamis*	4
20	Unidentified fish larvae	4
20	*Cyclothone* spp.	4
20	*Hygophum atratum*	4
20	*Caranx caballus*	4
28	*Benthosema panamense*	3
28	Sciaenidae	3
28	*Polydactylus approximans*	3
28	*Bothus* spp.	3
28	*Psenes sio*	3
28	*Lampanyctus* spp.	3
28	*Psenes cyanophrys*	3
35	*Sargocentron suborbitalis*	2
35	*Hemiramphus saltator*	2
35	*Diodon hystrix*	2
35	Exocoetidae	2
35	*Cheilopogon* spp.	2
35	*Anchoa* spp.	2
35	*Syacium ovale*	2
35	*Hirundichthys* spp.	2
35	*Symbolophorus evermanni*	2
35	*Thunnus* spp.	2
35	*Naucrates ductor*	2
35	*Diaphus* spp.	2
35	*Lobotes surinamensis*	2
35	*Diplophos proximus*	2

Table 2. (cont.)

Rank	Taxon	Occurrences
35	*Brama dussumieri*	2
50	*Stemonosudis macrura*	1
50	*Gigantactis* spp.	1
50	*Bolinichthys* spp.	1
50	*Hygophum proximum*	1
50	Myctophidae	1
50	*Synodus sechurae*	1
50	*Centrobranchus nigroocellatus*	1
50	*Cetengraulis mysticetus*	1
50	*Diaphus pacificus*	1
50	*Trachipterus fukuzakii*	1
50	Kyphosidae	1
50	Balistidae	1
50	*Monolene* spp.	1
50	*Tetragonurus cuvieri*	1
50	*Nomeus gronovii*	1
50	*Cubiceps baxteri*	1
50	*Amarsipus carlsbergi*	1
50	*Gempylus serpens*	1
50	*Microdesmus* spp.	1
50	*Lythrypnus* spp.	1
50	Gobiidae	1
50	*Scorpaena* spp.	1
50	Pomacentridae	1
50	*Strongylura exilis*	1
50	*Pomadasys* spp.	1
50	*Haemulon* spp.	1
50	Haemulidae	1
50	*Trachinotus kennedyi*	1
50	*Oligoplites saurus*	1
50	*Alectis ciliaris*	1
50	*Ariosoma gilberti*	1
50	*Scopelogadus bispinosus*	1
50	*Cheilopogon heterurus*	1
50	Hemiramphidae	1
50	*Microspathodon* spp.	1
	Total	455

Table 3. Pooled counts of fish larvae taken in Manta net tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4.

Rank	Taxon	Count
1	*Opisthonema* spp.	872
2	*Vinciguerria lucetia*	542
3	*Oxyporhamphus micropterus*	335
4	Scomberesocidae	203
5	*Benthosema panamense*	152
6	*Auxis* spp.	126
7	*Coryphaena equiselis*	118
8	*Prognichthys* spp.	88
9	*Cubiceps pauciradiatus*	79
10	Gerreidae	38
11	*Polydactylus approximans*	27
12	*Fodiator acutus*	20
12	*Cheilopogon xenopterus*	20
14	*Hirundichthys marginatus*	18
15	*Coryphaena hippurus*	14
16	*Canthidermis maculatus*	12
16	*Cyclothone acclinidens*	12
18	*Lampanyctus* spp.	11
18	*Haemulon* spp.	11
18	*Howella pammelas*	11
21	*Mugil* spp.	9
21	*Exocoetus* spp.	9
23	*Psenes sio*	8
23	*Hygophum atratum*	8
25	*Lampanyctus parvicauda*	7
26	*Anchoa* spp.	6
26	*Caranx caballus*	6
28	*Cetengraulis mysticetus*	5
28	*Cyclothone* spp.	5
28	*Cubiceps baxteri*	5
28	Disintegrated fish larvae	5
28	*Sargocentron suborbitalis*	5
28	Unidentified fish larvae	5
28	*Lestidium* spp.	5
35	*Hirundichthys* spp.	4
35	*Brama dussumieri*	4
35	Sciaenidae	4
35	*Syacium ovale*	4
35	*Euthynnus lineatus*	4
35	*Katsuwonus pelamis*	4
41	*Alectis ciliaris*	3
41	*Bothus* spp.	3
41	*Trachinotus kennedyi*	3
41	*Diplophos proximus*	3
41	*Synodus sechurae*	3
41	*Psenes cyanophrys*	3
47	*Microdesmus* spp.	2
47	*Diaphus* spp.	2

Table 3. (cont.)

Rank	Taxon	Count
47	Gobiidae	2
47	*Thunnus* spp.	2
47	*Naucrates ductor*	2
47	*Symbolophorus evermanni*	2
47	*Diodon hystrix*	2
47	*Cheilopogon* spp.	2
47	*Lobotes surinamensis*	2
47	Exocoetidae	2
47	*Hemiramphus saltator*	2
58	*Cheilopogon heterurus*	1
58	Hemiramphidae	1
58	*Strongylura exilis*	1
58	*Oligoplites saurus*	1
58	*Monolene* spp.	1
58	*Lythrypnus* spp.	1
58	*Scorpaena* spp.	1
58	Kyphosidae	1
58	*Microspathodon* spp.	1
58	Pomacentridae	1
58	Haemulidae	1
58	*Gempylus serpens*	1
58	*Tetragonurus cuvieri*	1
58	*Scopelogadus bispinosus*	1
58	*Nomeus gronovii*	1
58	Myctophidae	1
58	*Pomadasys* spp.	1
58	*Gigantactis* spp.	1
58	Balistidae	1
58	*Trachipterus fukuzakii*	1
58	*Ariosoma gilberti*	1
58	*Stemonosudis macrura*	1
58	*Bolinichthys* spp.	1
58	*Hygophum proximum*	1
58	*Diaphus pacificus*	1
58	*Centrobranchus nigroocellatus*	1
58	*Amarsipus carlsbergi*	1
	Total	2888

Table 4. Numbers of fish larvae taken in Manta net tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4.

Ariosoma gilberti

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
41	JD	3-043	3	1	0.84

Opisthonema spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
13	JD	1-014	3	310	290.26
14	JD	1-015	3	208	241.58
15	JD		3	97	93.81
16	JD		3	246	255.72
17	JD	1-016	4	8	6.99
18	JD		4	1	1.03
64	JD		1	2	1.75

Anchoa spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
24	M4	2-034	7	5	5.11
25	M4	2-036	6	1	1.02

Cetengraulis mysticetus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
39	JD		3	5	4.14

Cyclothone spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
38	M4	2-058	4	1	1.00
45	M4	3-071	3	2	2.03
66	M4	3-111	8	1	1.07
79	M4	4-134	9	1	1.04

Diplophos proximus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
46	JD	3-050	3	1	0.98
78	JD	4-107	5	2	1.85

Vinciguerria lucetia

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
5	JD	1-005	5	2	1.94
6	M4	1-007	5	1	1.17
6	JD	1-006	4	7	6.75

Vinciguerria lucetia (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
8	M4	1-011	4	1	1.03
9	JD	1-009	1	1	0.93
12	JD	1-013	4	13	12.18
14	JD	1-015	3	2	2.32
17	M4	1-023	6	2	1.77
17	JD	1-016	4	1	0.87
22	JD		5	10	11.60
24	JD	2-022	5	3	3.49
25	JD		5	15	11.71
26	JD	2-023	5	7	8.25
28	JD	2-027	10	3	3.10
29	JD		9	1	1.16
31	JD		4	1	1.16
32	JD	2-029	4	2	1.76
33	M4	2-048	5	4	4.50
34	M4	2-050	5	1	1.03
35	JD	2-032	3	1	1.03
37	M4	2-056	4	2	2.27
38	M4	2-058	4	34	34.14
40	M4	2-062	8	27	28.42
41	M4	2-064	8	106	112.05
42	JD		3	1	0.82
42	M4	2-066	8	17	16.13
43	M4	2-068	3	7	8.10
45	M4	3-071	3	1	1.02
46	JD	3-050	3	7	6.84
51	M4	3-084	3	2	2.92
53	JD	3-066	3	1	0.98
56	M4	3-094	9	5	5.52
56	JD	3-072	4	2	2.06
59	M4	3-100	9	17	18.07
59	JD	3-076	4	1	0.96
60	M4	3-102	9	2	2.14
60	JD	3-078	4	1	0.95
61	M4	3-104	8	8	8.91
61	JD	3-079	4	3	2.94
62	M4	3-105	8	6	6.25
62	JD	3-081	4	3	2.75

Vinciguerria lucetia (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
63	M4	3-106	8	12	12.82
64	M4	3-107	8	24	25.34
66	JD	4-086	4	5	5.35
66	M4	3-111	8	5	5.34
67	JD	4-087	4	1	1.09
73	JD	4-097	4	3	2.83
73	M4	4-123	3	12	12.83
74	M4	4-125	8	40	43.96
74	JD	4-099	4	4	4.00
75	JD	4-101	5	2	3.17
75	M4	4-127	8	62	72.51
77	M4	4-130	8	1	1.12
78	JD	4-107	5	19	17.53
79	JD	4-110	5	3	2.49
81	JD	4-113	2	14	12.48
82	JD	4-114	5	3	2.67
83	M4	4-142	10	1	1.08

Synodus sechurae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
74	M4	4-125	8	3	3.30

Lestidium spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
23	JD	2-021	5	1	1.10
37	M4	2-056	4	2	2.27
73	JD	4-097	4	1	0.94
76	JD	4-103	5	1	0.93

Stemonosudis macrura

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
46	JD	3-050	3	1	0.98

Myctophidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
22	JD		5	1	1.16

Bolinichthys spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
73	JD	4-097	4	1	0.94

Diaphus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
10	M4		5	1	0.93
50	JD	3-060	4	1	1.06

Diaphus pacificus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
39	JD		3	1	0.83

Lampanyctus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
26	JD	2-023	5	1	1.18
43	M4	2-068	3	1	1.16
73	M4	4-123	3	9	9.63

Lampanyctus parvicauda

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
40	M4	2-062	8	2	2.11
63	M4	3-106	8	1	1.07
73	M4	4-123	3	1	1.07
74	M4	4-125	8	1	1.10
75	M4	4-127	8	2	2.34

Benthosema panamense

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
14	JD	1-015	3	148	171.89
15	JD		3	1	0.97
17	JD	1-016	4	3	2.62

Centrobranchus nigroocellatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
22	JD		5	1	1.16

Hygophum atratum

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
3	M4	1-003	5	2	1.57
4	M4	1-004	5	3	2.87
65	M4	3-119	8	1	1.01
93	M4	4-161	5	2	2.10

Hygophum proximum

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
22	JD		5	1	1.16

Symbolophorus evermanni

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
22	JD		5	1	1.16
41	M4	2-064	8	1	1.06

Trachipterus fukuzakii

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
62	JD	3-081	4	1	0.92

Gigantactis spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
86	M4	4-148	11	1	1.10

Scomberesocidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
41	M4	2-064	8	4	4.23
60	M4	3-102	9	2	2.14
61	M4	3-104	8	56	62.36
62	M4	3-105	8	44	45.83
63	M4	3-106	8	84	89.74
64	M4	3-107	8	2	2.11
65	M4	3-119	8	1	1.01
76	M4	4-129	8	8	9.78
77	M4	4-130	8	2	2.24

Strongylura exilis

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
39	JD		3	1	0.83

Hemiramphidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
65	M4	3-119	8	1	1.01

Hemiramphus saltator

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
10	JD	1-011	1	1	0.97
70	M4	4-119	3	1	1.02

Exocoetidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
58	JD	3-075	4	1	0.93
64	JD		1	1	0.88

Cheilopogon spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
32	JD	2-029	4	1	0.88
39	JD		3	1	0.83

Cheilopogon heterurus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
93	M4	4-161	5	1	1.05

Cheilopogon xenopterus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
3	M4	1-003	5	1	0.79
9	JD	1-009	1	1	0.93
18	JD		4	1	1.03
35	JD	2-032	3	1	1.03
44	JD	3-046	3	6	5.14
46	M4	3-072	3	1	1.08
48	JD	3-054	3	1	0.98
49	JD	3-056	3	1	0.98
50	M4	3-080	3	1	0.99
58	JD	3-075	4	1	0.93
60	JD	3-078	4	2	1.90
61	JD	3-079	4	1	0.98
71	M4	4-120	3	1	1.41
93	M4	4-161	5	1	1.05

Exocoetus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
18	M4	1-025	6	2	1.64
43	JD	3-045	3	1	0.79
45	JD	3-048	3	1	0.86
54	JD	3-068	4	1	0.99
60	JD	3-078	4	3	2.86
62	JD	3-081	4	1	0.92

Fodiator acutus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD	1-001	4	2	1.89
3	JD	1-003	5	1	0.92
6	M4	1-007	5	1	1.17
36	JD	2-036	3	3	2.76
49	JD	3-056	3	6	5.87
51	JD	3-062	3	2	1.85

Fodiator acutus (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
57	JD	3-074	4	1	0.94
61	JD	3-079	4	1	0.98
64	JD		1	1	0.88
70	JD	4-091	4	1	0.91
83	JD	4-115	5	1	0.79

Hirundichthys spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
15	JD		3	2	1.93
61	JD	3-079	4	2	1.96

Hirundichthys marginatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
4	JD	1-004	5	1	1.02
5	JD	1-005	5	1	0.97
6	JD	1-006	4	1	0.96
21	M4	1-031	7	1	0.94
34	JD	2-031	3	2	2.10
36	JD	2-036	3	1	0.92
51	JD	3-062	3	4	3.69
53	JD	3-066	3	2	1.96
56	JD	3-072	4	1	1.03
60	JD	3-078	4	3	2.86
81	JD	4-113	2	1	0.89

Oxyporhamphus micropterus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD	1-001	4	1	0.95
3	JD	1-003	5	1	0.92
4	M4	1-004	5	1	0.96
5	JD	1-005	5	1	0.97
7	JD	1-007	4	3	2.72
8	JD	1-008	4	1	1.02
9	M4		5	1	0.88
9	JD	1-009	1	2	1.85
11	JD	1-012	4	23	20.30
12	JD	1-013	4	1	0.94
14	M4	1-019	5	3	3.04
17	M4	1-023	6	2	1.77
18	JD		4	5	5.15

Oxyporhamphus micropterus (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
19	M4	1-027	7	1	1.17
19	JD	2-017	4	15	12.72
20	JD	2-018	4	1	1.02
24	JD	2-022	5	1	1.16
29	JD		9	1	1.16
32	JD	2-029	4	2	1.76
33	JD	2-030	4	2	2.44
34	JD	2-031	3	2	2.10
35	JD	2-032	3	8	8.26
36	JD	2-036	3	34	31.31
37	JD	2-037	3	4	4.62
41	JD	3-043	3	1	0.84
42	M4	2-066	8	1	0.95
43	JD	3-045	3	2	1.58
44	JD	3-046	3	5	4.28
45	JD	3-048	3	2	1.73
45	M4	3-071	3	1	1.02
46	JD	3-050	3	4	3.91
46	M4	3-072	3	1	1.08
47	JD	3-052	3	3	2.94
48	JD	3-054	3	6	5.87
49	JD	3-056	3	1	0.98
50	M4	3-080	3	1	0.99
51	M4	3-084	3	1	1.46
51	JD	3-062	3	5	4.61
52	JD	3-064	3	3	2.80
53	JD	3-066	3	2	1.96
54	JD	3-068	4	1	0.99
56	JD	3-072	4	1	1.03
57	JD	3-074	4	12	11.33
58	JD	3-075	4	2	1.86
59	JD	3-076	4	1	0.96
60	JD	3-078	4	41	39.05
61	JD	3-079	4	2	1.96
62	JD	3-081	4	72	65.99
63	JD	3-083	1	3	2.94
64	M4	3-107	8	1	1.06
64	JD		1	8	7.01
65	JD	4-084	1	7	6.39
68	M4	3-115	3	2	1.92

Oxyporhamphus micropterus (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
69	JD	4-089	4	1	0.92
70	JD	4-091	4	3	2.73
70	M4	4-119	3	2	2.04
75	JD	4-101	5	3	4.76
77	JD	4-105	5	1	0.88
78	JD	4-107	5	1	0.92
79	JD	4-110	5	1	0.83
80	M4	4-136	9	1	1.03
81	JD	4-113	2	1	0.89
82	JD	4-114	5	1	0.89
83	JD	4-115	5	8	6.31
84	JD	4-116	1	2	1.77
85	JD	4-117	2	1	1.01
86	JD	4-118	2	1	0.92

Prognichthys spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
8	JD	1-008	4	1	1.02
10	JD	1-011	1	6	5.83
11	JD	1-012	4	21	18.53
18	JD		4	1	1.03
32	JD	2-029	4	1	0.88
35	JD	2-032	3	1	1.03
37	JD	2-037	3	1	1.16
40	JD	3-042	3	2	1.83
44	M4	3-070	3	4	4.28
48	JD	3-054	3	2	1.96
57	JD	3-074	4	3	2.83
61	JD	3-079	4	7	6.85
62	JD	3-081	4	1	0.92
64	JD		1	34	29.77
70	M4	4-119	3	2	2.04
84	JD	4-116	1	1	0.89

Scopelogadus bispinosus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
35	JD	2-032	3	1	1.03

Sargocentron suborbitalis

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
44	M4	3-070	3	1	1.07
70	M4	4-119	3	4	4.08

Scorpaena spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
40	JD	3-042	3	1	0.92

Howella pammelas

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
21	JD	2-019	4	1	1.07
22	JD		5	2	2.32
23	JD	2-021	5	2	2.19
33	M4	2-048	5	1	1.12
40	M4	2-062	8	1	1.05
78	JD	4-107	5	2	1.85
86	M4	4-148	11	2	2.21

Alectis ciliaris

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
40	JD	3-042	3	3	2.75

Caranx caballus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
15	JD		3	2	1.93
16	JD		3	1	1.04
17	JD	1-016	4	2	1.75
70	M4	4-119	3	1	1.02

Naucrates ductor

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
44	JD	3-046	3	1	0.86
61	M4	3-104	8	1	1.11

Oligoplites saurus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
40	JD	3-042	3	1	0.92

Trachinotus kennedyi

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
40	JD	3-042	3	3	2.75

Coryphaena equiselis

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD	1-001	4	3	2.84
5	M4	1-005	5	2	1.82
5	JD	1-005	5	6	5.81
8	M4	1-011	4	1	1.03
9	JD	1-009	1	1	0.93
11	JD	1-012	4	6	5.30
14	M4	1-019	5	1	1.01
18	JD		4	1	1.03
19	JD	2-017	4	3	2.54
23	M4	2-033	7	3	3.13
35	JD	2-032	3	2	2.07
36	JD	2-036	3	1	0.92
41	JD	3-043	3	1	0.84
42	JD		3	1	0.82
44	JD	3-046	3	3	2.57
45	M4	3-071	3	4	4.06
47	M4	3-074	3	1	1.10
47	JD	3-052	3	1	0.98
48	JD	3-054	3	2	1.96
49	M4	3-078	3	1	0.99
49	JD	3-056	3	2	1.96
51	JD	3-062	3	3	2.77
52	JD	3-064	3	2	1.87
53	JD	3-066	3	1	0.98
55	JD	3-070	4	1	0.92
56	JD	3-072	4	1	1.03
58	JD	3-075	4	2	1.86
60	JD	3-078	4	7	6.67
61	JD	3-079	4	4	3.91
62	JD	3-081	4	36	33.00
64	JD		1	1	0.88
65	JD	4-084	1	1	0.91
68	M4	3-115	3	2	1.92
70	JD	4-091	4	1	0.91
81	JD	4-113	2	3	2.67
82	JD	4-114	5	1	0.89
83	JD	4-115	5	3	2.37
83	M4	4-142	10	1	1.08
92	M4	4-158	5	2	2.12

Coryphaena hippurus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
8	JD	1-008	4	1	1.02
9	JD	1-009	1	1	0.93
11	JD	1-012	4	1	0.88
40	JD	3-042	3	1	0.92
56	JD	3-072	4	2	2.06
57	JD	3-074	4	2	1.89
61	JD	3-079	4	3	2.94
64	M4	3-107	8	1	1.06
70	M4	4-119	3	1	1.02
71	M4	4-120	3	1	1.41

Brama dussumieri

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
40	M4	2-062	8	3	3.16
41	M4	2-064	8	1	1.06

Lobotes surinamensis

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
39	JD		3	1	0.83
40	JD	3-042	3	1	0.92

Gerreidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
11	JD	1-012	4	1	0.88
13	JD	1-014	3	8	7.49
14	JD	1-015	3	8	9.29
16	JD		3	5	5.20
17	JD	1-016	4	3	2.62
39	JD		3	5	4.14
40	JD	3-042	3	3	2.75
57	JD	3-074	4	3	2.83
61	JD	3-079	4	2	1.96

Haemulidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
16	JD		3	1	1.04

Haemulon spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
39	JD		3	11	9.11

Pomadasys spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
39	JD		3	1	0.83

Sciaenidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
15	JD		3	1	0.97
16	JD		3	1	1.04
17	JD	1-016	4	2	1.75

Polydactylus approximans

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
40	JD	3-042	3	15	13.76
61	JD	3-079	4	1	0.98
70	M4	4-119	3	11	11.21

Kyphosidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
64	JD		1	1	0.88

Mugil spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
8	JD	1-008	4	1	1.02
10	JD	1-011	1	4	3.88
40	JD	3-042	3	1	0.92
70	M4	4-119	3	3	3.06

Pomacentridae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
64	JD		1	1	0.88

Microspathodon spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
64	JD		1	1	0.88

Gobiidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
39	JD		3	2	1.66

Lythrypnus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
74	M4	4-125	8	1	1.10

Microdesmus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
15	JD		3	2	1.93

Gempylus serpens

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
9	M4		5	1	0.88

Auxis spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
2	JD	1-002	5	1	0.98
4	JD	1-004	5	1	1.02
8	JD	1-008	4	2	2.04
10	JD	1-011	1	1	0.97
11	JD	1-012	4	7	6.18
12	JD	1-013	4	23	21.56
14	JD	1-015	3	1	1.16
15	JD		3	3	2.90
16	JD		3	1	1.04
17	JD	1-016	4	2	1.75
17	M4	1-023	6	1	0.89
18	JD		4	5	5.15
19	JD	2-017	4	3	2.54
26	JD	2-023	5	1	1.18
35	JD	2-032	3	1	1.03
35	M4	2-052	5	1	1.18
47	JD	3-052	3	2	1.96
48	JD	3-054	3	1	0.98
52	JD	3-064	3	1	0.93
56	JD	3-072	4	2	2.06
61	JD	3-079	4	49	47.95
64	JD		1	14	12.26
65	JD	4-084	1	1	0.91
69	JD	4-089	4	1	0.92
87	M4	4-150	11	1	0.93

Euthynnus lineatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
14	JD	1-015	3	1	1.16
15	JD		3	1	0.97
16	JD		3	1	1.04
40	JD	3-042	3	1	0.92

Katsuwonus pelamis

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
18	JD		4	1	1.03
19	M4	1-027	7	1	1.17
33	M4	2-048	5	1	1.12
58	JD	3-075	4	1	0.93

Thunnus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
45	M4	3-071	3	1	1.02
83	JD	4-115	5	1	0.79

Amarsipus carlsbergi

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
59	JD	3-076	4	1	0.96

Cubiceps baxteri

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
40	M4	2-062	8	5	5.26

Cubiceps pauciradiatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	JD	1-013	4	32	29.99
19	JD	2-017	4	3	2.54
38	M4	2-058	4	6	6.02
41	JD	3-043	3	1	0.84
43	M4	2-068	3	1	1.16
45	M4	3-071	3	3	3.05
52	M4	3-086	4	1	1.26
56	JD	3-072	4	1	1.03
58	JD	3-075	4	1	0.93
59	M4	3-100	9	1	1.06
60	JD	3-078	4	5	4.76
61	JD	3-079	4	2	1.96
61	M4	3-104	8	1	1.11
62	JD	3-081	4	1	0.92
64	JD		1	1	0.88
64	M4	3-107	8	3	3.17
66	M4	3-111	8	2	2.14
68	M4	3-115	3	2	1.92
69	M4	3-117	3	1	0.90
69	JD	4-089	4	1	0.92

Cubiceps pauciradiatus (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
73	M4	4-123	3	3	3.21
75	M4	4-127	8	2	2.34
84	JD	4-116	1	4	3.54
93	M4	4-161	5	1	1.05

Nomeus gronovii

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
59	M4	3-100	9	1	1.06

Psenes cyanophrys

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
43	M4	2-068	3	1	1.16
72	M4	4-121	3	1	1.30
78	JD	4-107	5	1	0.92

Psenes sio

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
40	M4	2-062	8	4	4.21
41	M4	2-064	8	3	3.17
75	M4	4-127	8	1	1.17

Tetragonurus cuvieri

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
66	M4	3-111	8	1	1.07

Syacium ovale

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
15	JD		3	2	1.93
86	M4	4-148	11	2	2.21

Bothus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	JD	2-031	3	1	1.05
58	JD	3-075	4	1	0.93
70	JD	4-091	4	1	0.91

Monolene spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
15	JD		3	1	0.97

Balistidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
78	JD	4-107	5	1	0.92

Canthidermis maculatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
7	M4	1-009	5	1	1.03
8	JD	1-008	4	1	1.02
14	JD	1-015	3	1	1.16
58	JD	3-075	4	1	0.93
61	JD	3-079	4	1	0.98
64	JD		1	1	0.88
65	JD	4-084	1	3	2.74
72	M4	4-121	3	3	3.89

Diodon hystrix

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
62	JD	3-081	4	1	0.92
64	JD		1	1	0.88

Disintegrated fish larvae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD	1-001	4	1	0.95
28	JD	2-027	10	1	1.03
41	M4	2-064	8	1	1.06
62	JD	3-081	4	1	0.92
69	JD	4-089	4	1	0.92

Unidentified fish larvae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
15	JD		3	2	1.93
41	M4	2-064	8	1	1.06
45	M4	3-071	3	1	1.02
66	M4	3-111	8	1	1.07

Table 5. Average numbers of larvae (per 100 m**;** of water filtered) for each taxon taken in Manta net tows in the regions (Figure 3) occupied on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4.

	Region										
Taxon	1	2	3	4	5	6	7	8	9	10	11
Ariosoma gilberti	-	-	1.2	-	-	-	-	-	-	-	-
Opisthonema spp.	2.3	-	211.8	5.1	-	-	-	-	-	-	-
Anchoa spp.	-	-	-	-	-	1.0	4.9	-	-	-	-
Cetengraulis mysticetus	-	-	6.0	-	-	-	-	-	-	-	-
Cyclothone spp.	-	-	2.0	1.0	-	-	-	0.9	1.0	-	-
Diplophos proximus	-	-	1.0	-	2.2	-	-	-	-	-	-
Vinciguerria lucetia	1.1	15.7	3.5	5.0	6.1	2.3	-	26.0	5.8	1.9	-
Synodus sechurae	-	-	-	-	-	-	-	2.7	-	-	-
Lestidium spp.	-	-	-	1.4	1.0	-	-	-	-	-	-
Stemonosudis macrura	-	-	1.0	-	-	-	-	-	-	-	-
Myctophidae	-	-	-	-	0.9	-	-	-	-	-	-
Bolinichthys spp.	-	-	-	1.1	-	-	-	-	-	-	-
Diaphus spp.	-	-	-	0.9	1.1	-	-	-	-	-	-
Diaphus pacificus	-	-	1.2	-	-	-	-	-	-	-	-
Lampanyctus spp.	-	-	4.6	-	0.8	-	-	-	-	-	-
Lampanyctus parvicauda	-	-	0.9	-	-	-	-	1.4	-	-	-
Benthosema panamense	-	-	64.2	3.4	-	-	-	-	-	-	-
Centrobranchus nigroocellatus	-	-	-	-	0.9	-	-	-	-	-	-
Hygophum atratum	-	-	-	-	2.5	-	-	1.0	-	-	-
Hygophum proximum	-	-	-	-	0.9	-	-	-	-	-	-
Symbolophorus evermanni	-	-	-	-	0.9	-	-	0.9	-	-	-
Trachipterus fukuzakii	-	-	-	1.1	-	-	-	-	-	-	-
Gigantactis spp.	-	-	-	-	-	-	-	-	-	-	0.9
Scomberesocidae	-	-	-	-	-	-	-	23.3	1.9	-	-
Strongylura exilis	-	-	1.2	-	-	-	-	-	-	-	-
Hemiramphidae	-	-	-	-	-	-	-	1.0	-	-	-
Hemiramphus saltator	1.0	-	1.0	-	-	-	-	-	-	-	-
Exocoetidae	1.1	-	-	1.1	-	-	-	-	-	-	-
Cheilopogon spp.	-	-	1.2	1.1	-	-	-	-	-	-	-
Cheilopogon heterurus	-	-	-	-	1.0	-	-	-	-	-	-
Cheilopogon xenopterus	1.1	-	1.8	1.3	1.1	-	-	-	-	-	-
Exocoetus spp.	-	-	1.2	1.8	-	2.4	-	-	-	-	-
Fodiator acutus	1.1	-	3.9	1.3	1.1	-	-	-	-	-	-
Hirundichthys spp.	-	-	2.1	2.0	-	-	-	-	-	-	-
Hirundichthys marginatus	-	1.1	2.3	1.7	1.0	-	1.1	-	-	-	-
Oxyporhamphus micropterus	4.9	1.1	4.5	10.3	2.1	2.3	0.9	1.0	0.9	-	-
Prognichthys spp.	15.4	-	2.0	5.5	-	-	-	-	-	-	-
Scopelogadus bispinosus	-	-	1.0	-	-	-	-	-	-	-	-
Sargocentron suborbitalis	-	-	2.4	-	-	-	-	-	-	-	-
Scorpaena spp.	-	-	1.1	-	-	-	-	-	-	-	-
Howella pammelas	-	-	-	0.9	1.7	-	-	1.0	-	-	1.8
Alectis ciliaris	-	-	3.3	-	-	-	-	-	-	-	-
Caranx caballus	-	-	1.3	2.3	-	-	-	-	-	-	-
Naucrates ductor	-	-	1.2	-	-	-	-	0.9	-	-	-

Taxon	Region 1	2	3	4	5	6	7	8	9	10	11
Oligoplites saurus	-	-	1.1	-	-	-	-	-	-	-	-
Trachinotus kennedyi	-	-	3.3	-	-	-	-	-	-	-	-
Coryphaena equiselis	1.1	3.4	1.9	6.0	2.7	-	2.9	-	-	0.9	-
Coryphaena hippurus	1.1	-	0.9	1.8	-	-	-	0.9	-	-	-
Brama dussumieri	-	-	-	-	-	-	-	1.9	-	-	-
Lobotes surinamensis	-	-	1.1	-	-	-	-	-	-	-	-
Gerreidae	-	-	5.9	2.4	-	-	-	-	-	-	-
Haemulidae	-	-	1.0	-	-	-	-	-	-	-	-
Haemulon spp.	-	-	13.3	-	-	-	-	-	-	-	-
Pomadasys spp.	-	-	1.2	-	-	-	-	-	-	-	-
Sciaenidae	-	-	1.0	2.3	-	-	-	-	-	-	-
Polydactylus approximans	-	-	13.6	1.0	-	-	-	-	-	-	-
Kyphosidae	1.1	-	-	-	-	-	-	-	-	-	-
Mugil spp.	4.1	-	2.0	1.0	-	-	-	-	-	-	-
Pomacentridae	1.1	-	-	-	-	-	-	-	-	-	-
Microspathodon spp.	1.1	-	-	-	-	-	-	-	-	-	-
Gobiidae	-	-	2.4	-	-	-	-	-	-	-	-
Lythrypnus spp.	-	-	-	-	-	-	-	0.9	-	-	-
Microdesmus spp.	-	-	2.1	-	-	-	-	-	-	-	-
Gempylus serpens	-	-	-	-	1.1	-	-	-	-	-	-
Auxis spp.	6.0	-	1.4	10.9	0.9	1.1	-	-	-	-	1.1
Euthynnus lineatus	-	-	1.0	-	-	-	-	-	-	-	-
Katsuwonus pelamis	-	-	-	1.0	0.9	-	0.9	-	-	-	-
Thunnus spp.	-	-	1.0	-	1.3	-	-	-	-	-	-
Amarsipus carlsbergi	-	-	-	1.0	-	-	-	-	-	-	-
Cubiceps baxteri	-	-	-	-	-	-	-	4.8	-	-	-
Cubiceps pauciradiatus	2.8	-	1.8	5.6	1.0	-	-	1.8	0.9	-	-
Nomeus gronovii	-	-	-	-	-	-	-	-	0.9	-	-
Psenes cyanophrys	-	-	0.8	-	1.1	-	-	-	-	-	-
Psenes sio	-	-	-	-	-	-	-	2.5	-	-	-
Tetragonurus cuvieri	-	-	-	-	-	-	-	0.9	-	-	-
Syacium ovale	-	-	2.1	-	-	-	-	-	-	-	1.8
Bothus spp.	-	-	1.0	1.1	-	-	-	-	-	-	-
Monolene spp.	-	-	1.0	-	-	-	-	-	-	-	-
Balistidae	-	-	-	-	1.1	-	-	-	-	-	-
Canthidermis maculatus	2.2	-	1.6	1.0	1.0	-	-	-	-	-	-
Diodon hystrix	1.1	-	-	1.1	-	-	-	-	-	-	-
Disintegrated fish larvae	-	-	-	1.1	-	-	-	0.9	-	1.0	-
Unidentified fish larvae	-	-	1.5	-	-	-	-	0.9	-	-	-

Table 6. Numbers (raw counts) and size ranges of juvenile fishes taken in Manta tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4. Some larger specimens (e.g., myctophids) may be adults.

STOMIIFORMES

Phosichthyidae

Vinciguerria lucetia
M4 48 (1) 25mm.

Astronesthidae

Astronesthes gibbsi
JD 32 (1) 28 mm; **JD 44** (1) 35 mm; **JD 77** (1) 24 mm; **M4 17** (1) 28 mm; **M4 18** (1) 32 mm; **M4 60** (1) 62 mm; **M4 63** (1) 29 mm; **M4 73** (1) 32 mm; **M4 78** (2) 39-62 mm; **M4 79** (1) 29 mm.

MYCTOPHIFORMES

Myctophidae

Lampanyctus omostigma
JD 49 (2) 52-54; **JD 50** (3) 45-50.

Benthosema panamense
JD 11 (9) 34-38mm; **JD 13** (16) 32-44mm.

Gonichthys tenuiculus
JD 2 (2) 19-30 mm; **JD 40** (1) 20 mm; **JD 41** (10) 13-40 mm; **JD 42** (3) 15-41 mm; **JD 43** (8) 15-17 mm; **JD 44** (2) 14-44 mm; **JD 45** (5) 15-16 mm; **JD 47** (19) 14-45 mm; **JD 48** (3) 15-17 mm; **JD 49** (4) 15-17 mm; **JD 51** (13) 15-17 mm; **JD 52** (2) 15-16 mm; **JD 56** (15) 16-20 mm; **JD 61** (5) 19-21 mm; **JD 69** (7) 15-16 mm.

M4 3 (2) 19-25 mm; **M4 7** (4) 19-34 mm; **M4 10** (2) 19-25 mm; **M4 12** (5) 16-27 mm; **M4 15** (5) 15-23 mm; **M4 16** (5) 14-37 mm; **M4 17** (24) 16-28 mm; **M4 18** (2) 16-17 mm; **M4 19** (2) 16-17 mm; **M4 22** (7) 28-30 mm; **M4 23** (2) 32-44 mm; **M4 30** (1) 27 mm; **M4 37** (1) 16 mm; **M4 39** (5) 19-21 mm; **M4 40** (15) 19-50 mm; **M4 41** (23) 17-47 mm; **M4 42** (6) 18-43 mm; **M4 47** (9) 19-29 mm; **M4 48** (15) 19-40 mm; **M4 49** (2) 19-22 mm; **M4 50** (2) 14-28 mm; **M4 51** (3) 16-24 mm; **M4 52** (11) 16-35 mm; **M4 53** (2) 16-22 mm; **M4 54** (4) 15-25 mm; **M4 55** (4) 17-19 mm; **M4 57** (1) 28 mm; **M4 58** (1) 21 mm; **M4 59** (3) 17-40 mm; **M4 61** (1) 45 mm; **M4 62** (3) 19-40 mm; **M4 65** (68) 16-46 mm; **M4 66** (35) 18-28 mm; **M4 67** (5) 16-36 mm; **M4 68** (2) 17-24 mm; **M4 69** (15) 16-33 mm; **M4 70** (1) 19 mm; **M4 73** (11) 16-34 mm; **M4 74** (33) 16-45 mm; **M4 75** (3) 16-23 mm; **M4 76** (6) 15-44 mm; **M4 77** (5) 18-45 mm; **M4 78** (5) 16-18 mm; **M4 79** (3) 17-39 mm; **M4 80** (2) 37-39 mm; **M4 81** (2) 29-32 mm; **M4 83** (2) 41 mm; **M4 85** (1) 26 mm; **M4 92** (1) 19 mm; **M4 93** (3) 19-34 mm.

Hygophum spp.(partly disintegrated).
JD 80 (1) 12 mm.

Hygophum atratum
M4 2 (3) 14-26 mm; **M4 3** (2) 16-21 mm; **M4 93** (2) 13 mm.

Hygophum proximum
JD 74 (1) 20 mm.
M4 1 (1) 12 mm; **M4 33** (1) 44 mm; **M4 37** (2) 26-42 mm; **M4 39** (5) 20-51 mm; **M4 40** (1) 44 mm; **M4 42** (1) 37 mm; **M4 53** (1) 26 mm; **M4 54** (2) 45-53 mm; **M4 56** (2) 20-36 mm; **M4 58** (1) 62 mm; **M4 59** (1) 22 mm; **M4 66** (1) 14 mm; **M4 77** (1) 52 mm; **M4 86** (2) 14-21 mm; **M4 87** (23) 13-15 mm; **M4 88** (7) 13-14 mm; **M4 89** (4) 14-15 mm; **M4 90** (1) 21 mm; **M4 92** (1) 13 mm.

Myctophum asperum
JD24 (2) 21-58; **JD 25** (1) 19.
M4 9 (2) 19-22 mm; **M4 10** (2) 24-73 mm; **M4 12** (1) 19 mm; **M4 26** (1) 22 mm; **M4 27** (1) 21 mm; **M4 31** (1) 53 mm; **M4 33** (2) 14-53 mm; **M4 34** (2) 13-52 mm; **M4 35** (4) 13-22 mm; **M4 36** (1) 24 mm; **M4 38** (1) 48 mm; **M4 54** (1) 16 mm; **M4 84** (6) 17-18 mm; **M4 85** (1) 15 mm; **M4 87** (4) 19-24 mm; **M4 88** (2) 16-18 mm; **M4 90** (14) 16-19 mm.

Myctophum aurolaternatum
JD 4 (1) 30 mm; **JD 5** (4) 25-29 mm; **JD 7** (1) 29 mm; **JD 8** (2) 24-35 mm; **JD 9** (9) 24-29 mm; **JD 10** (1) 24 mm; **JD 11** (2) 24-25 mm; **JD 62** (1) 25.
M4 41 (1) 78 mm; **M4 49** (2) 19-22 mm; **M4 58** (1) 43 mm; **M4 61** (1) 28 mm; **M4 65** (1) 26 mm; **M4 73** (1) 33 mm; **M4 75** (1) 78 mm; **M4 78** (2) 36-49 mm; **M4 80** (1) 70 mm; **M4 87** (2) 19-22 mm.

Myctophum lychnobium
JD 59 (1) 19 mm; **JD 72** (3) 15-16 mm; **JD 77** (2) 15-17 mm.

M4 9 (8) 18-77 mm; **M410** (1) 28 mm; **M4 27** (1) 15 mm; **M4 30** (5) 21-76 mm; **M4 34** (2) 25-64 mm; **M4 35** (2) 15-16 mm; **M4 36** (4) 17-71 mm; **M4 39** (1) 73 mm; **M4 56** (5) 15-74 mm; **M4 57** (2) 52-70 mm; **M4 59** (1) 73 mm; **M4 60** (1) 35 mm; **M4 61** (1) 73 mm; **M4 78** (1) 76 mm; **M4 80** (1) 18 mm; **M4 81** (6) 18-73 mm; **M4 82** (2) 33-36 mm; **M4 83** (3) 18-29 mm; **M4 84** (1) 20 mm; **M4 85** (9) 14-89 mm; **M4 86** (6) 17-34 mm; **M4 87** (8) 17-39 mm; **M4 88** (10) 16-21 mm; **M4 90** (13) 18-21 mm.

Myctophum nitidulum
JD 22 (1) 48 mm; **JD 24** (2) 16 mm; **JD 27** (2) 16 mm; **JD 28** (15) 14-16 mm; **JD 30** (10) 15-18 mm; **JD 31** (1) 16 mm; **JD 32** (1) 15 mm; **JD 38** (1) 16 mm; **JD 41** (2) 54-55 mm; **JD 42** (4) 15-51 mm; **JD 43** (2) 14-16 mm; **JD 44** (1) 44 mm; **JD 47** (2) 15-16 mm; **JD 59** (3) 17-28 mm; **JD 73** (1) 16 mm; **JD 75** (6) 16-18.

M4 21 (1) 17 mm; **M4 31** (1) 24 mm; **M4 33** (2) 16-27 mm; **M4 34** (1) 52 mm; **M4 36** (3) 15-16 mm; **M4 37** (2) 17-28 mm; **M4 38** (5) 16-52 mm; **M4 39** (47) 16-36 mm; **M4 40** (7) 17-49 mm; **M4 42** (9) 15-55 mm; **M4 43** (1) 16.5 mm; **M4 47** (1) 24 mm; **M4 48** (2) 24-51 mm; **M4 52** (3) 26-28 mm; **M4 53** (1) 21 mm; **M4 54** (14) 15-26 mm; **M4 55** (15) 16-61 mm; **M4 56** (18) 12-23 mm; **M4 57** (12) 16-27 mm; **M4 58** (9) 16-28 mm; **M4 59** (7) 16-29 mm; **M4 62** (4) 20-21 mm; **M4 63** (1) 21 mm; **M4 64** (1) 18 mm; **M4 65** (50) 14-23 mm; **M4 66** (5) 18-28 mm; **M4 70** (1) 16 mm; **M4 73** (6) 15-44 mm; **M4 74** (80) 14-24 mm; **M4 75** (1) 15 mm; **M4 78** (4) 16-47 mm; **M4 79** (8) 16-37 mm; **M4 81** (9) 16-25 mm; **M4 82** (45) 15-27 mm; **M4 83** (2) 16-56 mm; **M4 84** (1) 17 mm; **M4 85** (1) 17 mm; **M4 87** (5) 20-21 mm; **M4 88** (3) 13-20 mm; **M4 89** (3) 19-21 mm; **M4 90** (3) 18-22 mm.

Myctophum obtusirostrum
M4 88 (2) 13-14.

Symbolophorus evermanni
JD 1 (1) 54 mm; **JD 2** (1) 73 mm; **JD 3** (1) 54 mm; **JD 4** (1) 35 mm; **JD 5** (3) 19-27 mm; **JD 6** (1) 20 mm; **JD 27** (1) 20 mm; **JD 47** (1) 18 mm; **JD 49** (4) 19-48 mm; **JD 52** (1) 53 mm; **JD 70** (2) 18-19 mm; **JD 71** (2) 20-21 mm; **JD 72** (1) 19 mm; **JD 75** (1) 21 mm.

M4 7 (1) 46 mm; **M4 12** (3) 23-63 mm; **M4 15** (1) 20 mm; **M4 16** (2) 19-24 mm; **M4 31** (1) 20 mm; **M4 37** (1) 54 mm; **M4 49** (1) 61 mm; **M4 51** (1) 62 mm; **M4 55** (1) 42 mm; **M4 60** (1) 24 mm; **M4 61** (2) 43-85 mm; **M4 74** (1) 19 mm; **M4 78** (6) 21-32 mm; **M4 82** (1) 21 mm; **M4 83** (2) 22-24 mm.

BELONIFORMES

Scomberesocidae

Elassichthys adocetus
M4 61 (4) 22-35 mm; **M4 62** (2) 45-50 mm; **M4 63** (2) 29 mm; **M4 64** (1) 41 mm; **M4 65** (1) 39 mm; **M4 76** (3) 26-40 mm; **M4 78** (1) 28 mm.

Scomberesox saurus
M4 74 (1) 35 mm.

Exocoetidae

Cheilopogon heterurus (?)
M4 93 (1) 13 mm.

Cheilopogon pinnatibarbatus
JD 15 (1) 33 mm.

Cheilopogon xenopterus
JD 6 (1) 26 mm.
M4 93 (1) 11mm.

Exocoetus monocirrhus
M4 47 (1) 25 mm; **M4 67** (1) 19 mm.

Exocoetus volitans
JD 27 (1) 40.

M4 9 (1) 27 mm; **M4 24** (1) 40 mm; **M4 25** (1) 32 mm; **M4 26** (1) 40 mm; **M4 29** (1) 41 mm; **M4 30** (1) 60 mm; **M4 34** (2) 29-30 mm; **M4 80** (1) 32 mm; **M4 83** (1) 29 mm; **M4 86** (2) 29-72 mm; **M4 87** (2) 27-36 mm; **M4 90** (1) 24 mm.

Hirundichthys marginatus
JD 34 (1) 20mm.
M4 86 (2) 66-72 mm.

Oxyporhamphus micropterus
JD 52 (1) 113 mm.

Prognichthys tringa
JD 1 (10) 29 mm; **JD 11** (1) 21 mm; **JD 15** (1) 24 mm.
M4 22 (1) 15 mm.

BERYCIFORMES
Holocentridae

Sargocentron suborbitalis
JD 10 (1) 29.

PERCIFORMES
Carangidae

Caranx caballus
JD 13 (1) 71 mm; **JD 14** (1) 30 mm.

Coryphaenidae

Coryphaena equiselis
JD 1 (4) 19-28 mm; **JD 8** (1) 72 mm; **JD 56** (1) 39 mm; **JD 60** (1) 19 mm; **JD 80** (1) 20 mm.
M4 5 (1) 21 mm; **M4 69** (2) 18-20 mm; **M4 71** (3) 21-52 mm.

Coryphaena hippurus
JD 15 (2) 51-57 mm; **JD 40** (3) 24-26 mm; **JD 41** (1) 20 mm.

Gerreidae

Eucinostomus spp.
JD 39 (1) 17 mm.

Polynemidae

Polydactylus approximans
JD 10 (5) 23-33 mm; **JD 14** (1) 35 mm.
M4 71 (2) 20-26 mm.

Mugilidae

Mugil spp.
JD 17 (2) 11-12 mm; **JD 40** (3) 9-19 mm; **JD 64** (1) 13 mm.
M4 74 (1) 20 mm.

Nomeidae

Cubiceps pauciradiatus
JD 11 (1) 78 mm.
M4 53 (1) 25 mm; **M4 54** (2) 21-23 mm.

Nomeus gronovii
JD 42 (2) 14-16 mm; **JD 43** (4) 11-17 mm; **JD 50** (1) 22 mm.
M4 26 (3) 13-23 mm; **M4 42** (1) 18 mm; **M4 50** (1) 19 mm; **M4 71** (1) 28 mm.

TETRAODONTIFORMES

Balistidae

Balistes polylepis
JD 40 (1) 8 mm.

Canthidermis maculatus
JD 10 (1) 15 mm; **JD 52** (1) 11 mm; **JD 57** (2) 11-15 mm; **JD 64** (1) 36 mm.

Monacanthidae

Aleuterus scriptus
JD 64 (2) 55-64 mm.

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