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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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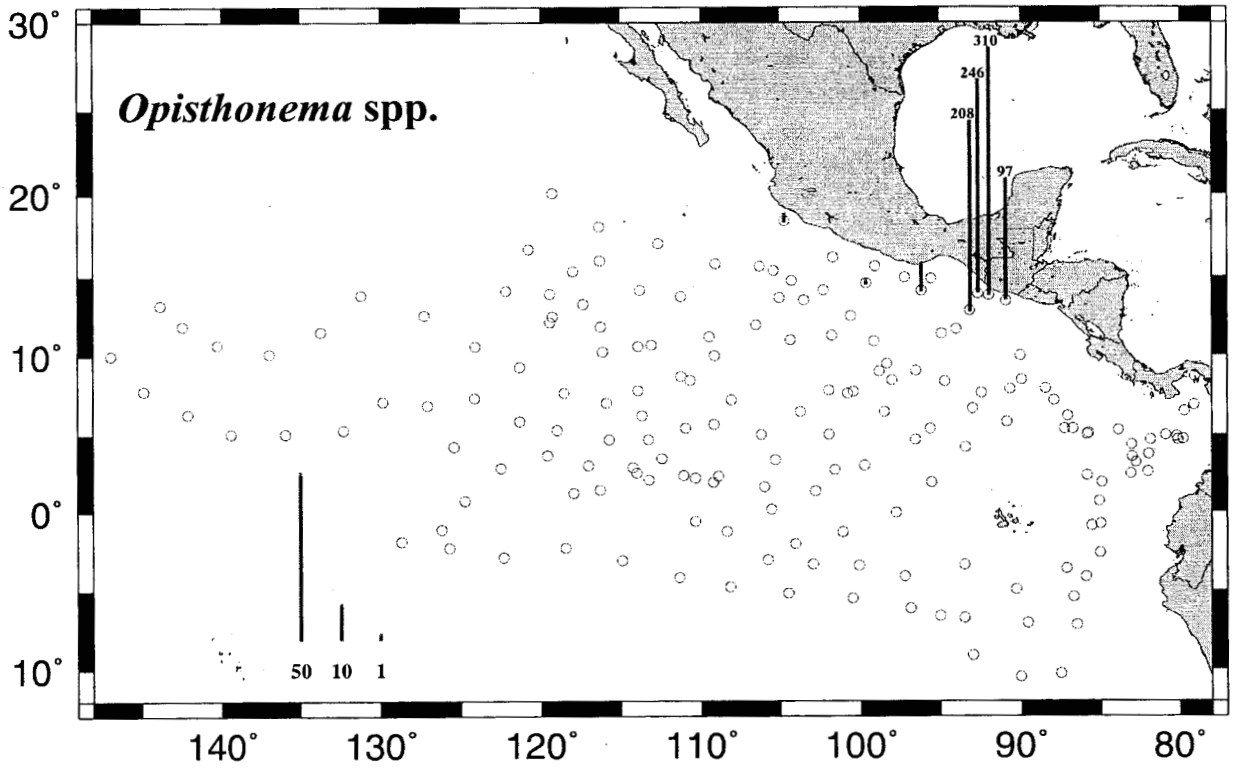


Figure 18. Distribution of *Opisthonema* spp. larvae from Manta net tows: 8710JD & 8710M4.

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

| | | *Cyclothone acclinidens* | | | |
|---|---|---|---|---|---|
| Tow Number | Ship Code | CTD Number | Region | Count | Count per 100m³ |
| 31 | JD | | 4 | 1 | 1.16 |
| 40 | M4 | 2-062 | 8 | 4 | 4.21 |
| 46 | JD | 3-050 | 3 | 2 | 1.96 |
| 63 | M4 | 3-106 | 8 | 1 | 1.07 |
| 64 | M4 | 3-107 | 8 | 1 | 1.06 |
| 75 | M4 | 4-127 | 8 | 3 | 3.51 |

Table 5. Average numbers of larvae (per 100 m³ 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* | - | - | 0.0 | - | - | - | - | - | - | - | - |
| *Opisthonema* spp. | 0.3 | - | 22.6 | 0.2 | - | - | - | - | - | - | - |
| *Anchoa* spp. | - | - | - | - | - | 0.1 | 0.9 | - | - | - | - |
| *Cetengraulis mysticetus* | - | - | 0.1 | - | - | - | - | - | - | - | - |
| *Cyclothone* spp. | - | - | 0.1 | 0.0 | - | - | - | 0.1 | 0.1 | - | - |
| *Cyclothone acclinidens* | - | - | 0.1 | 0.0 | - | - | - | 0.7 | - | - | - |
| *Diplophos proximus* | - | - | 0.0 | - | 0.0 | - | - | - | - | - | - |
| *Vinciguerria lucetia* | 0.2 | 2.1 | 0.9 | 2.1 | 1.9 | 0.2 | - | 23.8 | 2.1 | 0.8 | - |
| *Synodus sechurae* | - | - | - | - | - | - | - | 0.2 | - | - | - |
| *Lestidium* spp. | - | - | - | 0.1 | 0.1 | - | - | - | - | - | - |
| *Stemonosudis macrura* | - | - | 0.0 | - | - | - | - | - | - | - | - |
| Myctophidae | - | - | - | - | 0.0 | - | - | - | - | - | - |
| *Bolinichthys* spp. | - | - | - | 0.0 | - | - | - | - | - | - | - |
| *Diaphus* spp. | - | - | - | 0.0 | 0.0 | - | - | - | - | - | - |
| *Diaphus pacificus* | - | - | 0.0 | - | - | - | - | - | - | - | - |
| *Lampanyctus* spp. | - | - | 0.3 | - | 0.0 | - | - | - | - | - | - |
| *Lampanyctus parvicauda* | - | - | 0.0 | - | - | - | - | 0.5 | - | - | - |
| *Benthosema panamense* | - | - | 4.4 | 0.1 | - | - | - | - | - | - | - |
| *Centrobranchus nigroocellatus* | - | - | - | - | 0.0 | - | - | - | - | - | - |
| *Hygophum atratum* | - | - | - | - | 0.2 | - | - | 0.1 | - | - | - |
| *Hygophum proximum* | - | - | - | - | 0.0 | - | - | - | - | - | - |
| *Symbolophorus evermanni* | - | - | - | - | 0.0 | - | - | 0.1 | - | - | - |
| *Trachipterus fukuzakii* | - | - | - | 0.0 | - | - | - | - | - | - | - |
| *Gigantactis* spp. | - | - | - | - | - | - | - | - | - | - | 0.4 |
| Scomberesocidae | - | - | - | - | - | - | - | 15.5 | 0.2 | - | - |
| *Strongylura exilis* | - | - | 0.0 | - | - | - | - | - | - | - | - |
| Hemiramphidae | - | - | - | - | - | - | - | 0.1 | - | - | - |
| *Hemiramphus saltator* | 0.2 | - | 0.0 | - | - | - | - | - | - | - | - |
| Exocoetidae | 0.1 | - | - | 0.0 | - | - | - | - | - | - | - |
| *Cheilopogon* spp. | - | - | 0.0 | 0.0 | - | - | - | - | - | - | - |
| *Cheilopogon heterurus* | - | - | - | - | 0.0 | - | - | - | - | - | - |
| *Cheilopogon xenopterus* | 0.2 | - | 0.3 | 0.1 | 0.0 | - | - | - | - | - | - |
| *Exocoetus* spp. | - | - | 0.0 | 0.1 | - | 0.2 | - | - | - | - | - |
| *Fodiator acutus* | 0.1 | - | 0.3 | 0.1 | 0.1 | - | - | - | - | - | - |
| *Hirundichthys* spp. | - | - | 0.0 | 0.1 | - | - | - | - | - | - | - |
| *Hirundichthys marginatus* | - | 0.1 | 0.2 | 0.1 | 0.1 | - | 0.2 | - | - | - | - |
| *Oxyporhamphus micropterus* | 3.3 | 0.5 | 2.2 | 4.5 | 0.6 | 0.2 | 0.2 | 0.1 | 0.2 | - | - |
| *Prognichthys* spp. | 6.1 | - | 0.3 | 0.8 | - | - | - | - | - | - | - |
| *Scopelogadus bispinosus* | - | - | 0.0 | - | - | - | - | - | - | - | - |
| *Sargocentron suborbitalis* | - | - | 0.1 | - | - | - | - | - | - | - | - |
| *Scorpaena* spp. | - | - | 0.0 | - | - | - | - | - | - | - | - |
| *Howella pammelas* | - | - | - | 0.0 | 0.2 | - | - | 0.1 | - | - | 0.7 |
| *Alectis ciliaris* | - | - | 0.1 | - | - | - | - | - | - | - | - |
| *Caranx caballus* | - | - | 0.1 | 0.0 | - | - | - | - | - | - | - |

| Taxon | Region 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Naucrates ductor* | - | - | 0.0 | - | - | - | - | 0.1 | - | - | - |
| *Oligoplites saurus* | - | - | 0.0 | - | - | - | - | - | - | - | - |
| *Trachinotus kennedyi* | - | - | 0.1 | - | - | - | - | - | - | - | - |
| *Coryphaena equiselis* | 0.5 | 0.4 | 0.7 | 1.6 | 0.4 | - | 0.5 | - | - | 0.2 | - |
| *Coryphaena hippurus* | 0.2 | - | 0.1 | 0.2 | - | - | - | 0.1 | - | - | - |
| *Brama dussumieri* | - | - | - | - | - | - | - | 0.3 | - | - | - |
| *Lobotes surinamensis* | - | - | 0.0 | - | - | - | - | - | - | - | - |
| Gerreidae | - | - | 0.7 | 0.2 | - | - | - | - | - | - | - |
| Haemulidae | - | - | 0.0 | - | - | - | - | - | - | - | - |
| *Haemulon* spp. | - | - | 0.2 | - | - | - | - | - | - | - | - |
| *Pomadasys* spp. | - | - | 0.0 | - | - | - | - | - | - | - | - |
| Sciaenidae | - | - | 0.1 | 0.0 | - | - | - | - | - | - | - |
| Kyphosidae | 0.1 | - | - | - | - | - | - | - | - | - | - |
| *Mugil* spp. | 0.6 | - | 0.1 | 0.0 | - | - | - | - | - | - | - |
| *Polydactylus approximans* | - | - | 0.6 | 0.0 | - | - | - | - | - | - | - |
| Pomacentridae | 0.1 | - | - | - | - | - | - | - | - | - | - |
| *Microspathodon* spp. | 0.1 | - | - | - | - | - | - | - | - | - | - |
| Gobiidae | - | - | 0.0 | - | - | - | - | - | - | - | - |
| *Lythrypnus* spp. | - | - | - | - | - | - | - | 0.1 | - | - | - |
| *Microdesmus* spp. | - | - | 0.0 | - | - | - | - | - | - | - | - |
| *Gempylus serpens* | - | - | - | - | 0.0 | - | - | - | - | - | - |
| *Auxis* spp. | 2.4 | - | 0.3 | 2.3 | 0.1 | 0.1 | - | - | - | - | 0.3 |
| *Euthynnus lineatus* | - | - | 0.1 | - | - | - | - | - | - | - | - |
| *Katsuwonus pelamis* | - | - | - | 0.1 | 0.0 | - | 0.2 | - | - | - | - |
| *Thunnus* spp. | - | - | 0.0 | - | 0.0 | - | - | - | - | - | - |
| *Amarsipus carlsbergi* | - | - | - | 0.0 | - | - | - | - | - | - | - |
| *Cubiceps baxteri* | - | - | - | - | - | - | - | 0.4 | - | - | - |
| *Cubiceps pauciradiatus* | 0.7 | - | 0.3 | 1.3 | 0.0 | - | - | 0.6 | 0.1 | - | - |
| *Nomeus gronovii* | - | - | - | - | - | - | - | - | 0.1 | - | - |
| *Psenes cyanophrys* | - | - | 0.1 | - | 0.0 | - | - | - | - | - | - |
| *Psenes sio* | - | - | - | - | - | - | - | 0.6 | - | - | - |
| *Tetragonurus cuvieri* | - | - | - | - | - | - | - | 0.1 | - | - | - |
| *Syacium ovale* | - | - | 0.0 | - | - | - | - | - | - | - | 0.7 |
| *Bothus* spp. | - | - | 0.0 | 0.0 | - | - | - | - | - | - | - |
| *Monolene* spp. | - | - | 0.0 | - | - | - | - | - | - | - | - |
| Balistidae | - | - | - | - | 0.0 | - | - | - | - | - | - |
| *Canthidermis maculatus* | 0.6 | - | 0.1 | 0.1 | 0.0 | - | - | - | - | - | - |
| *Diodon hystrix* | 0.1 | - | - | 0.0 | - | - | - | - | - | - | - |
| Disintegrated fish larvae | - | - | - | 0.1 | - | - | - | 0.1 | - | 0.2 | - |
| Unidentified fish larvae | - | - | 0.1 | - | - | - | - | 0.2 | - | - | - |

CONTENTS

Page

List of Figures ..... iii

List of Tables ..... iv

Abstract ..... 1

Introduction ..... 1

Sampling Area and Pattern ..... 1

Ichthyoplankton Sampling Gear and Methods ..... 2

Laboratory Procedures ..... 2

Species Summary ..... 3

Explanation of Figures and Tables ..... 4

Acknowledgments ..... 4

Literature Cited ..... 5

Figures ..... 7

Tables ..... 19

Phylogenetic Index to Tables 4 and 6 ..... 42

Alphabetical Index to Tables 4 and 6 ..... 44

LIST OF FIGURES

Page

Figure 1. Manta net tow stations for *Jordan* cruise 8710JD ..... 7

Figure 2. Manta net tow stations for *McArthur* cruise 8710M4 ..... 7

Figure 3. Sampling regions for 1987 eastern tropical Pacific dolphin survey ..... 8

Figure 4. Distribution of *Oxyporhamphus micropterus* larvae from Manta net tows:8710JD & 8710M4..... 9

Figure 5. Distribution of *Vinciguerria lucetia* larvae from Manta net tows: 8710JD & 8710M4..... 9

Figure 6. Distribution of *Coryphaena equiselis* larvae from Manta net tows:8710JD & 8710M4..... 10

Figure 7. Distribution of *Auxis* spp. larvae from Manta net tows: 8710JD & 8710M4 ..... 10

Figure 8. Distribution of *Cubiceps pauciradiatus* larvae from Manta net tows: 8710JD & 8710M4..... 11

Figure 9. Distribution of *Prognichthys* spp. larvae from Manta net tows: 8710JD & 8710M4 ..... 11

Figure 10. Distribution of *Cheilopogon xenopterus* larvae from Manta net tows: 8710JD & 8710M4 ..... 12

Figure 11. Distribution of *Fodiator acutus* larvae from Manta net tows: 8710JD & 8710M4..... 12

Figure 12. Distribution of *Hirundichthys marginatus* larvae from Manta net tows: 8710JD & 8710M4..... 13

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

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

Figure 15. Distribution of Scomberesocidae larvae from Manta net tows: 8710JD & 8710M4 ..... 14

Figure 16. Distribution of *Canthidermis maculatus* larvae from Manta net tows: 8710JD & 8710M4 ..... 15

Figure 17. Distribution of *Howella pammelas* larvae from Manta net tows: 8710JD & 8710M4 ..... 15

Figure 18. Distribution of *Opisthonema* spp. larvae from Manta net tows: 8710JD & 8710M4..... 16

Figure 19. Distribution of *Cyclothone acclinidens* larvae from Manta net tows: 8710JD & 8710M4..... 16

Figure 20. Distribution of *Exocoetus* spp.larvae from Manta net tows: 8710JD & 8710M4..... 17

Figure 21. Distribution of *Lampanyctus parvicauda* larvae from Manta net tows: 8710JD & 8710M4..... 17

Figure 22. Distribution of *Lestidium* spp. larvae from Manta net tows: 8710JD & 8710M4 ..... 18

Figure 23. Distribution of *Katsuwonus pelamis* larvae from Manta net tows: 8710JD & 8710M4..... 18

LIST OF TABLES

Page

Table 1. Station and Manta net tow data for *Jordan* cruise 8710JD and *McArthur* cruise 8710M4 ..... 19

Table 2. Pooled occurrences of fish larvae taken in Manta net tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4..... 23

Table 3. Pooled counts of fish larvae taken in Manta net tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4..... 25

Table 4. Numbers of fish larvae taken in Manta net tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4 listed by taxon, tow number, and region..... 27

Table 5. Average numbers of larvae (per 100 $m^3$ 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..... 36

Table 6. Numbers (raw counts) and size ranges of juvenile fishes taken in Manta net tows on *Jordan* cruise 8710JD and *McArthur* cruise 8710M4..... 38

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 14$^{th}$ 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 11$^{th}$ 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 28$^{th}$ 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 4$^{th}$, 3$^{rd}$ , 6$^{th,}$ 5$^{th}$ , and tied for 11$^{th}$ 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.

## ACKNOWLEDGMENTS

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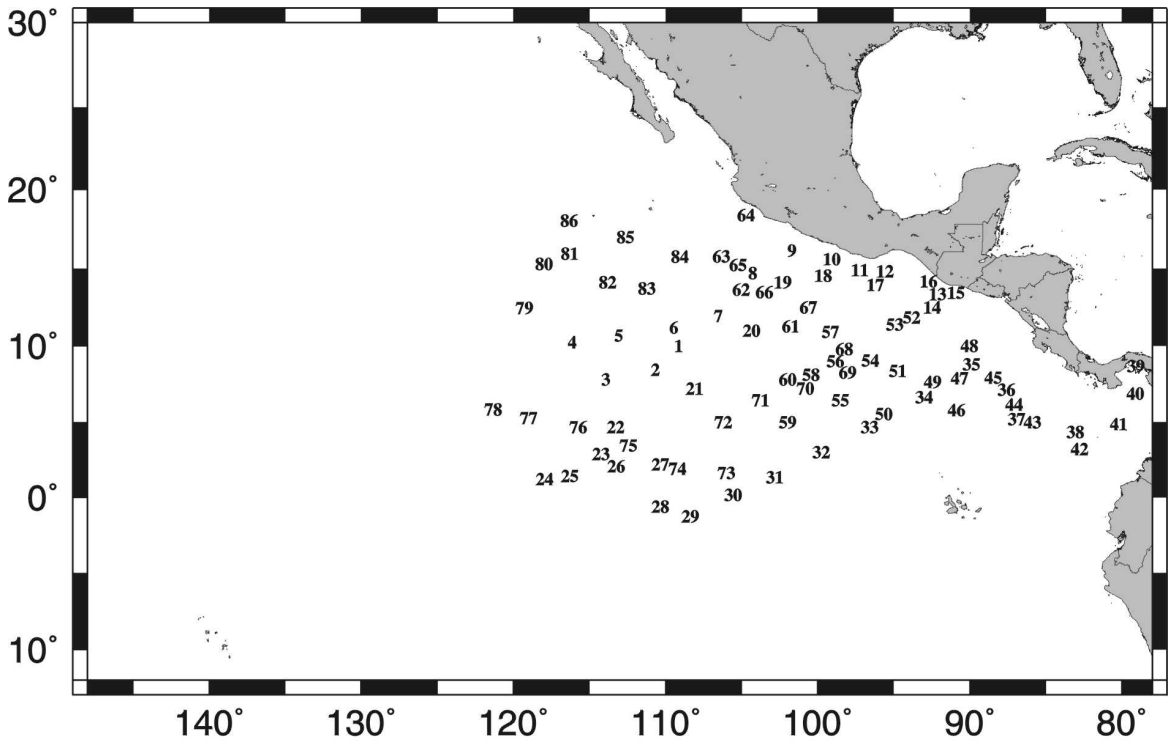


Figure 1. Manta net tow stations for *Jordan* cruise 8710JD.

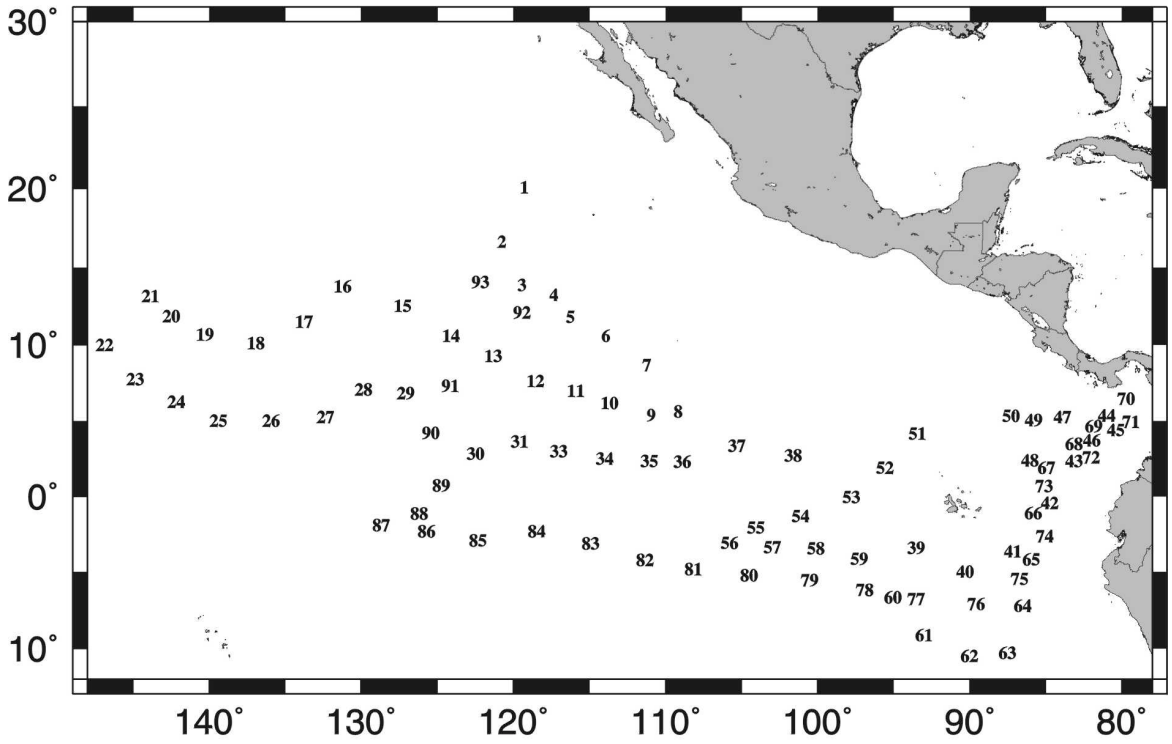


Figure 2. Manta net tow stations for *McArthur* cruise 8710M4.

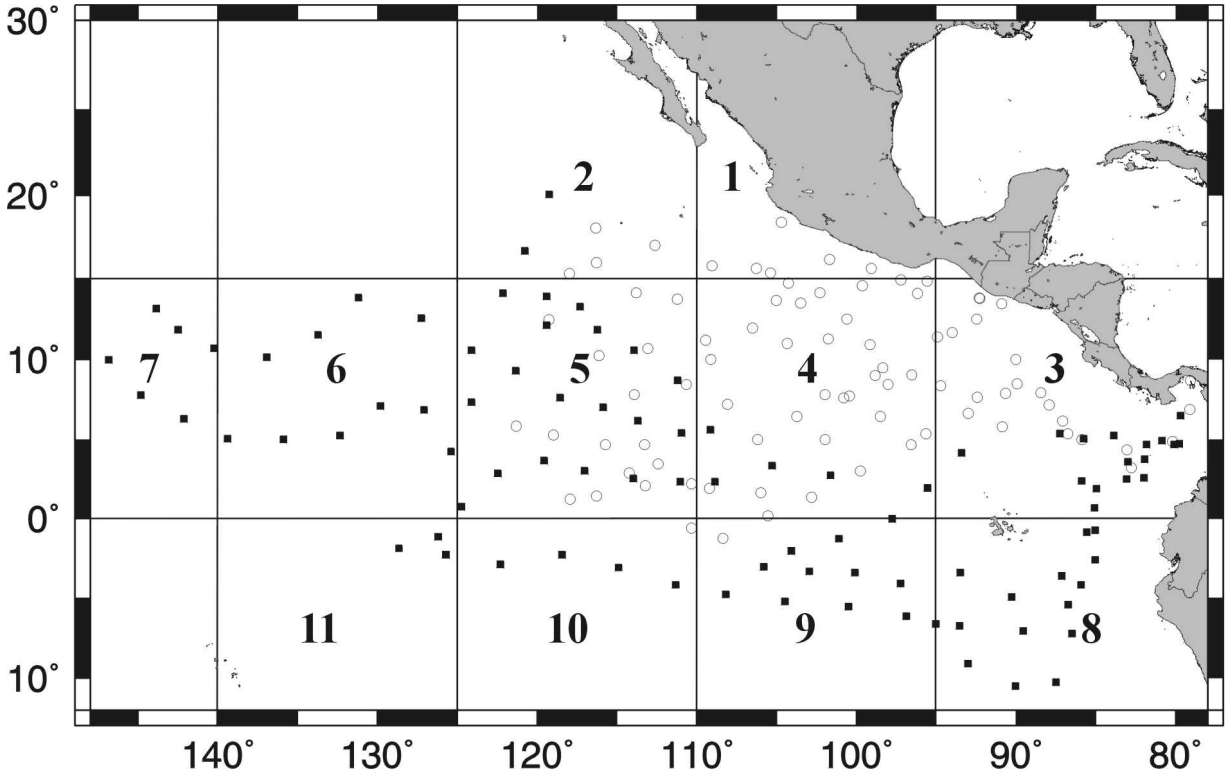


Figure 3. Sampling regions for 1987 eastern tropical Pacific dolphin survey indicated by numbers 1 to 11; Manta net tow stations for *Jordan* cruise 8710JD are indicated by circles and for *McArthur* cruise 8710M4 by solid squares.

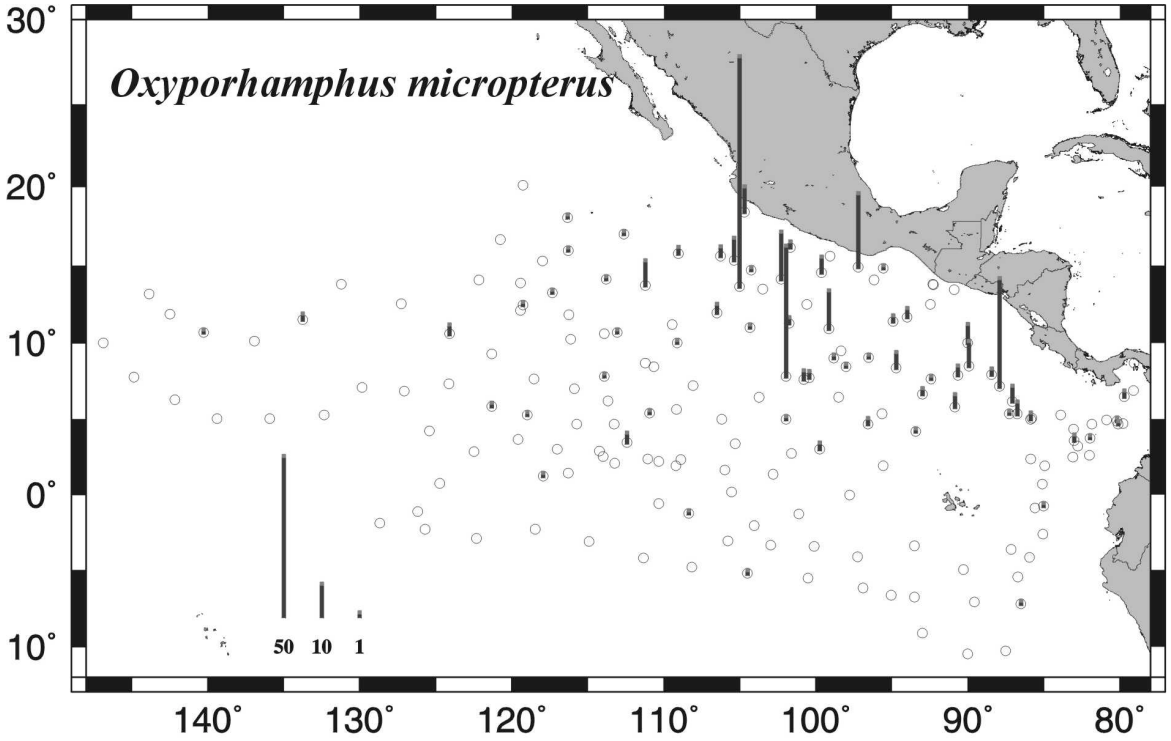


Figure 4. Distribution of *Oxyporhamphus micropterus* larvae from Manta net tows: 8710JD & 8710M4. Lengths of vertical bars are proportional to total larval counts for each station.

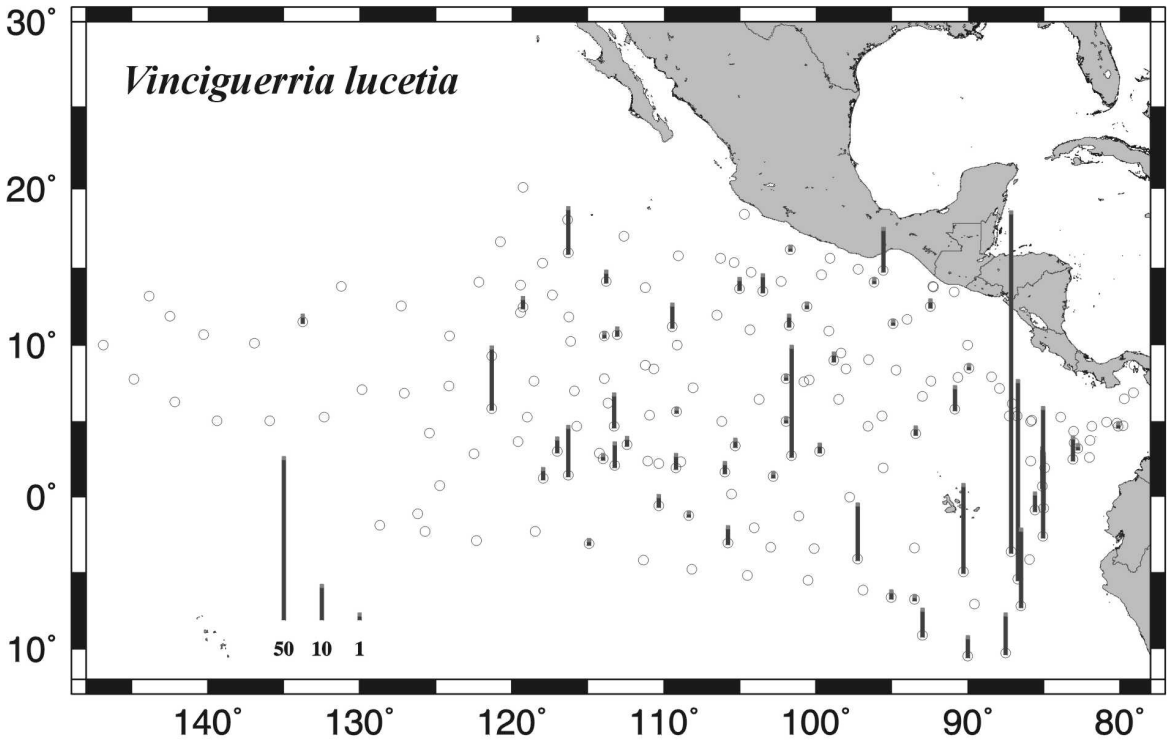


Figure 5. Distribution of *Vinciguerria lucetia* larvae from Manta net tows: 8710JD & 8710M4.

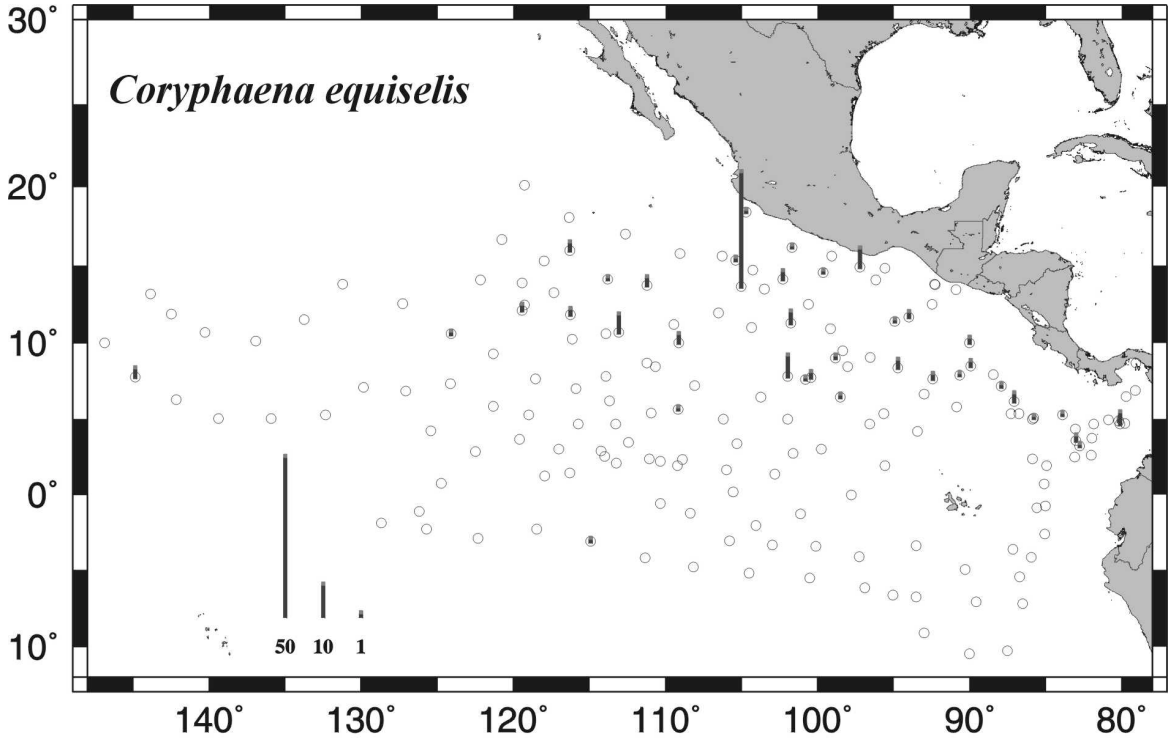


Figure 6. Distribution of *Coryphaena equiselis* larvae from Manta net tows: 8710JD & 8710M4.

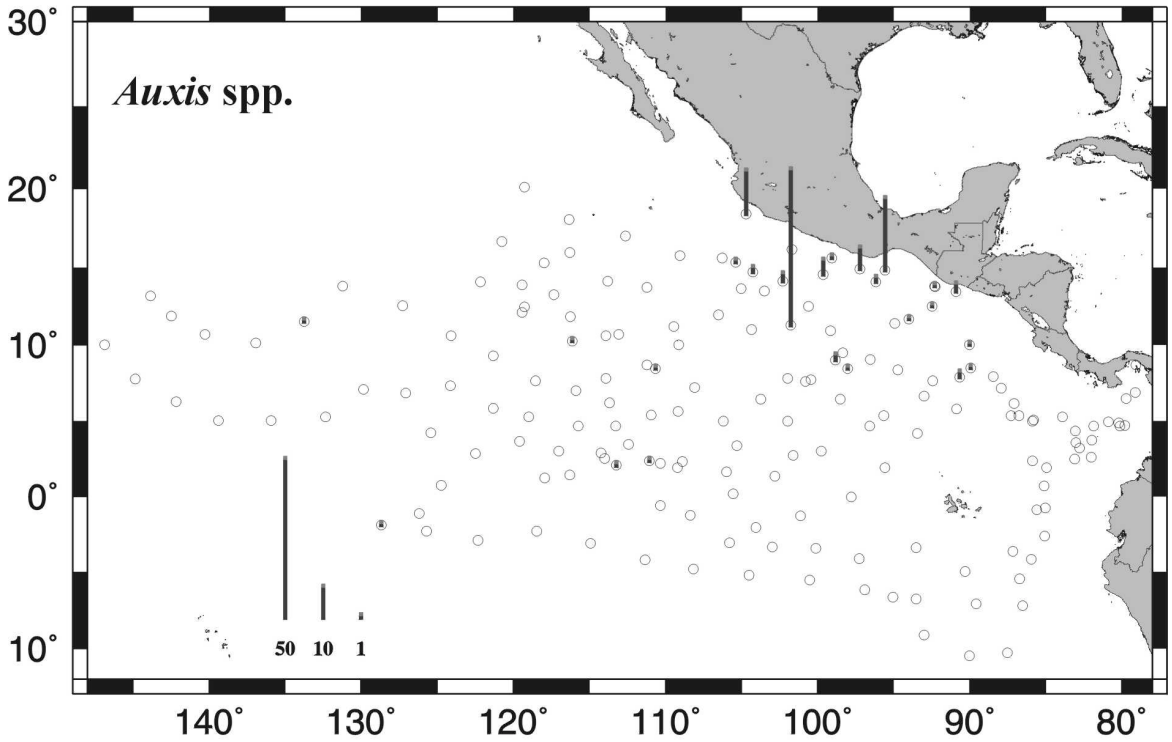


Figure 7. Distribution of *Auxis* spp. larvae from Manta net tows: 8710JD & 8710M4.

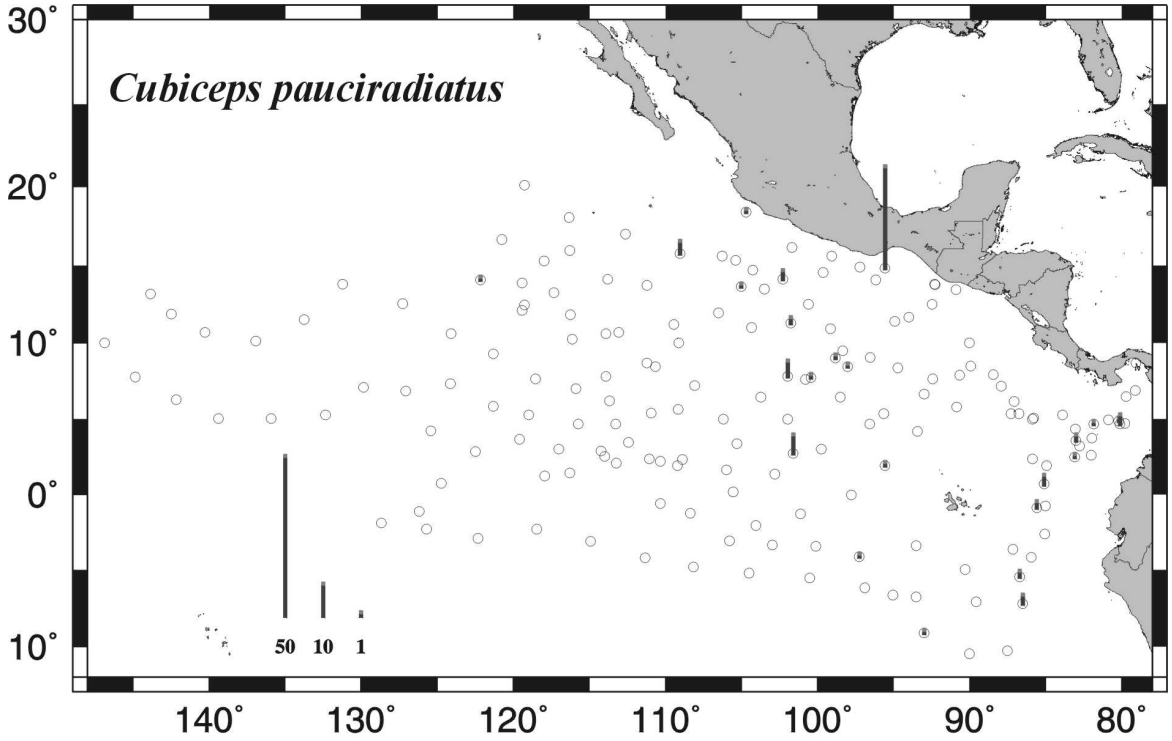


Figure 8. Distribution of *Cubiceps pauciradiatus* larvae from Manta net tows: 8710JD & 8710M4.

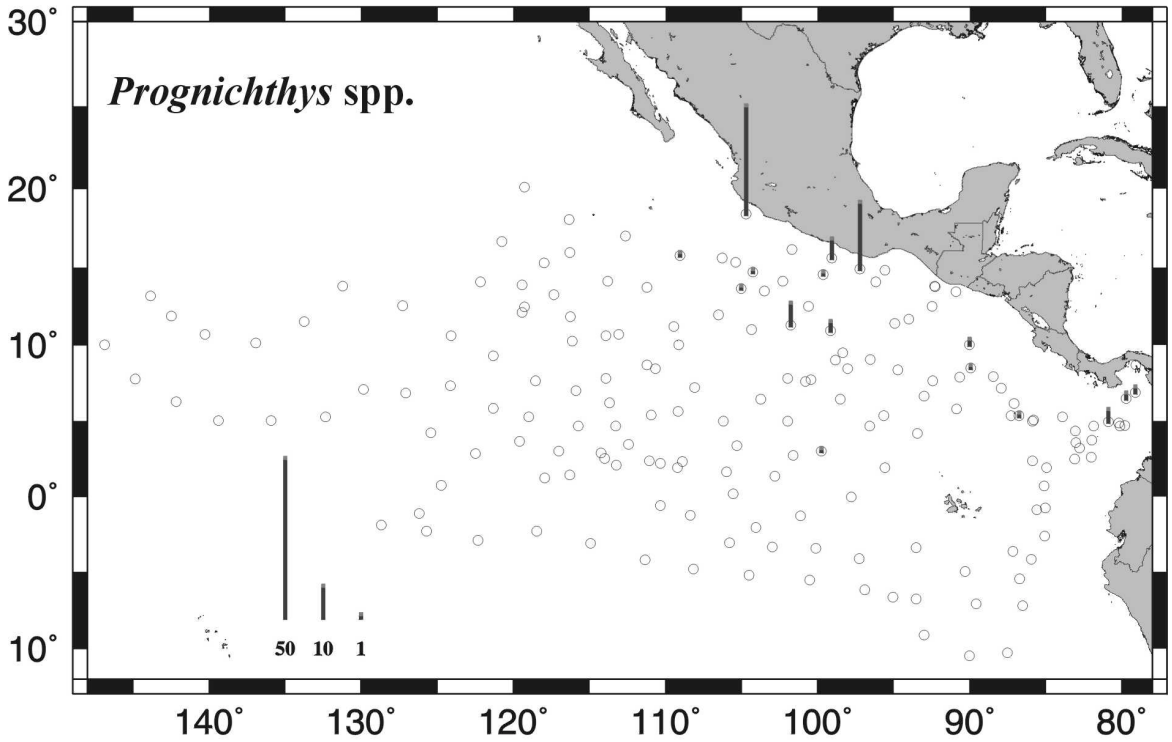


Figure 9. Distribution of *Prognichthys* spp. larvae from Manta net tows: 8710JD & 8710M4.

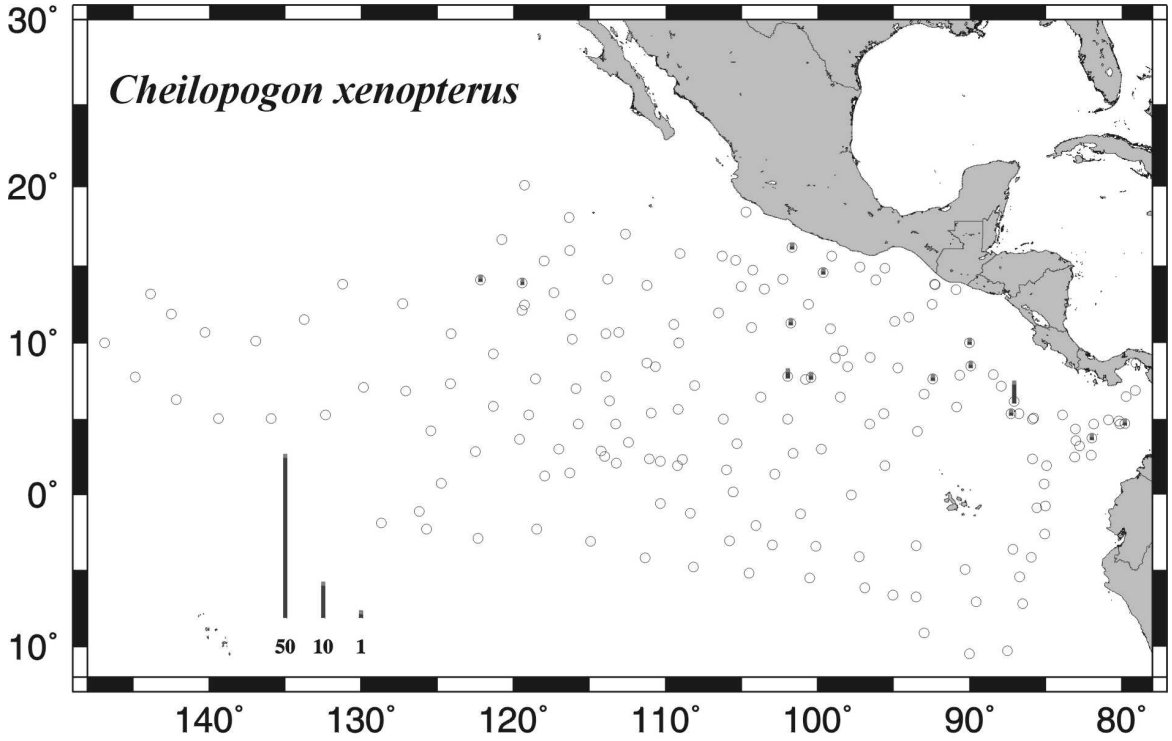


Figure 10. Distribution of *Cheilopogon xenopterus* larvae from Manta net tows: 8710JD & 8710M4.

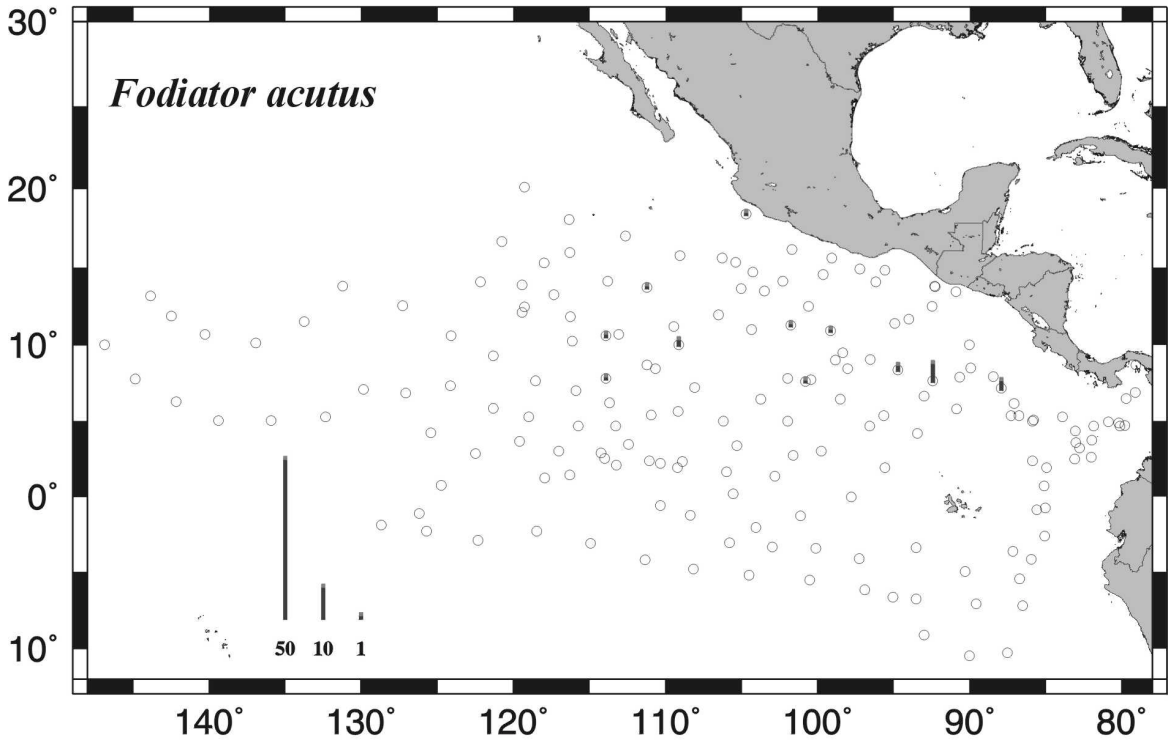


Figure 11. Distribution of *Fodiator acutus* larvae from Manta net tows: 8710JD & 8710M4.

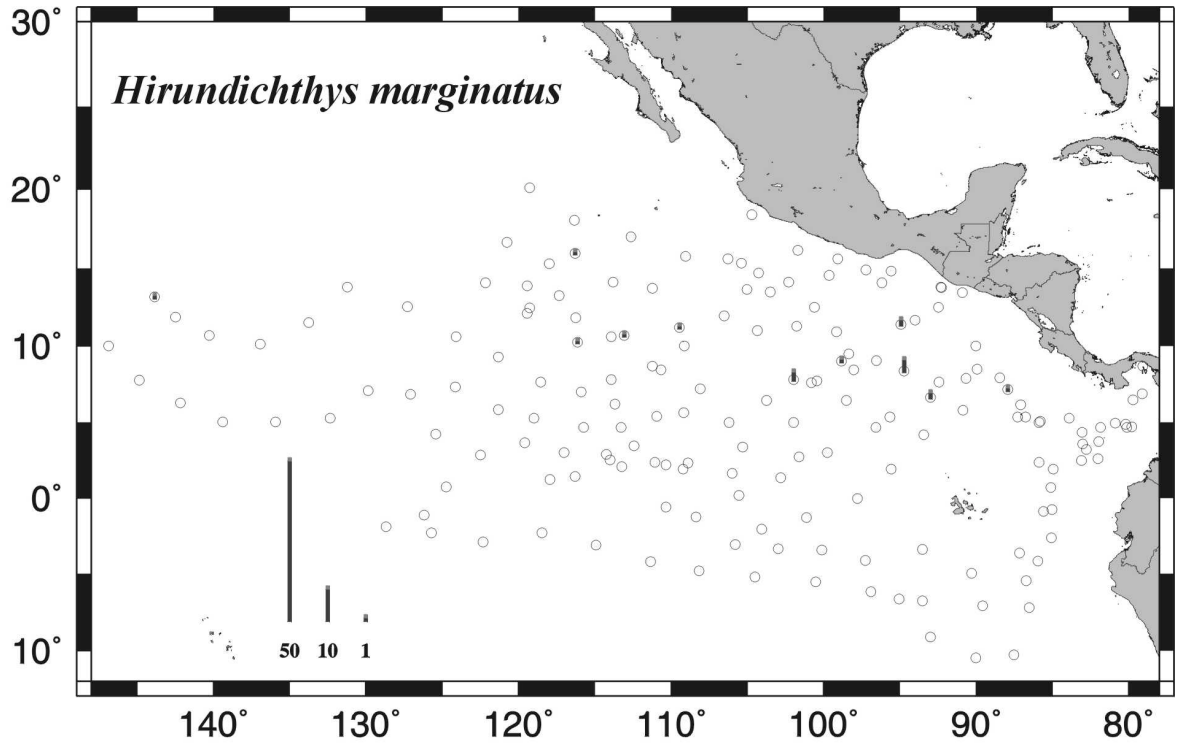

Figure 12. Distribution of *Hirundichthys marginatus* larvae from Manta net tows: 8710JD & 8710M4.

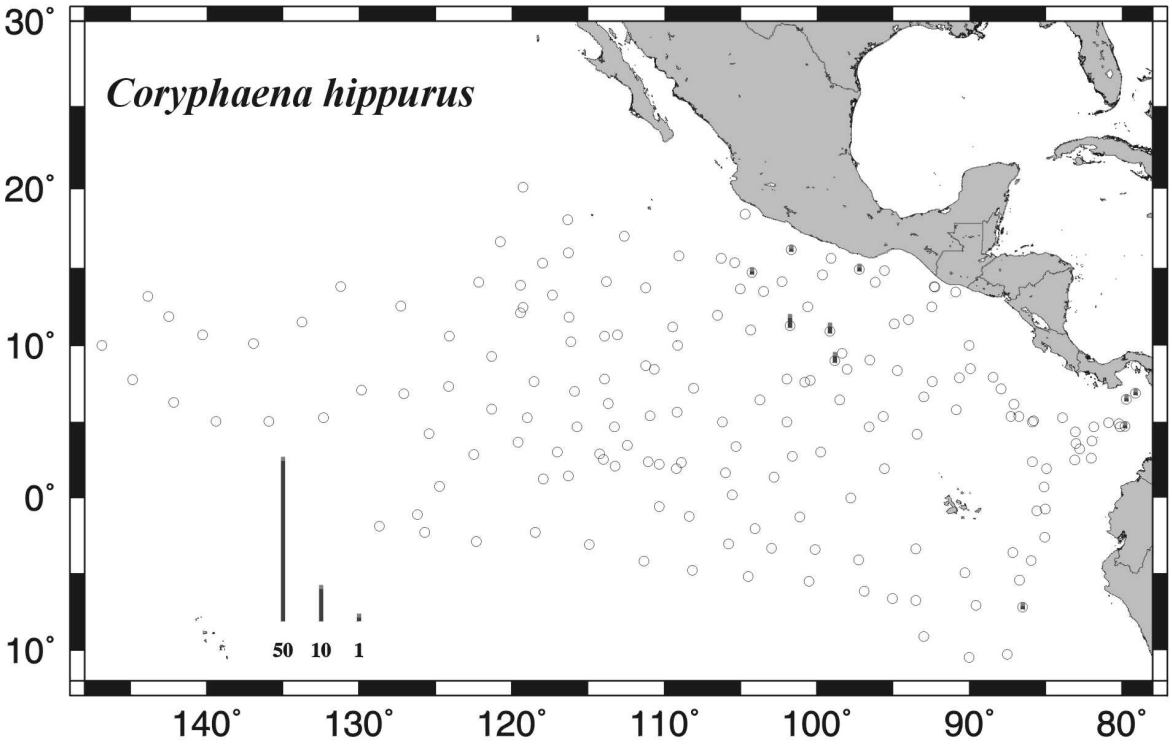

Figure 13. Distribution of *Coryphaena hippurus* larvae from Manta net tows: 8710JD & 8710M4.

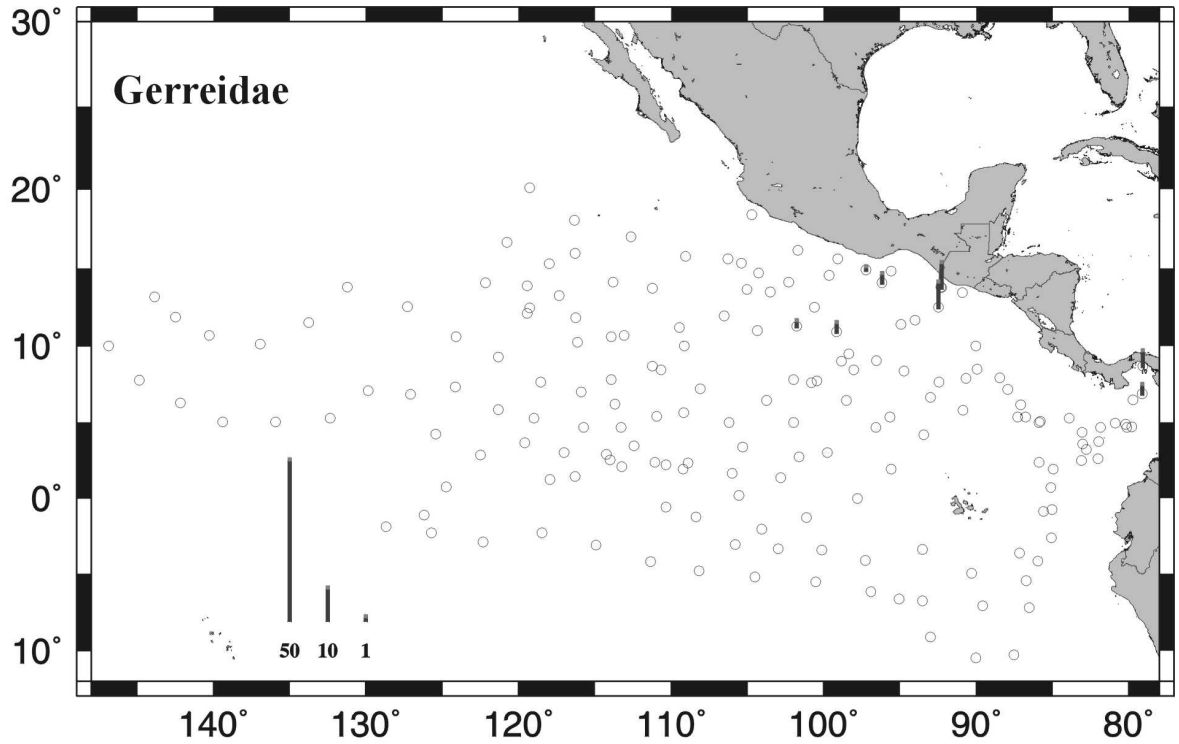

Figure 14. Distribution of Gerreidae larvae from Manta net tows: 8710JD & 8710M4.

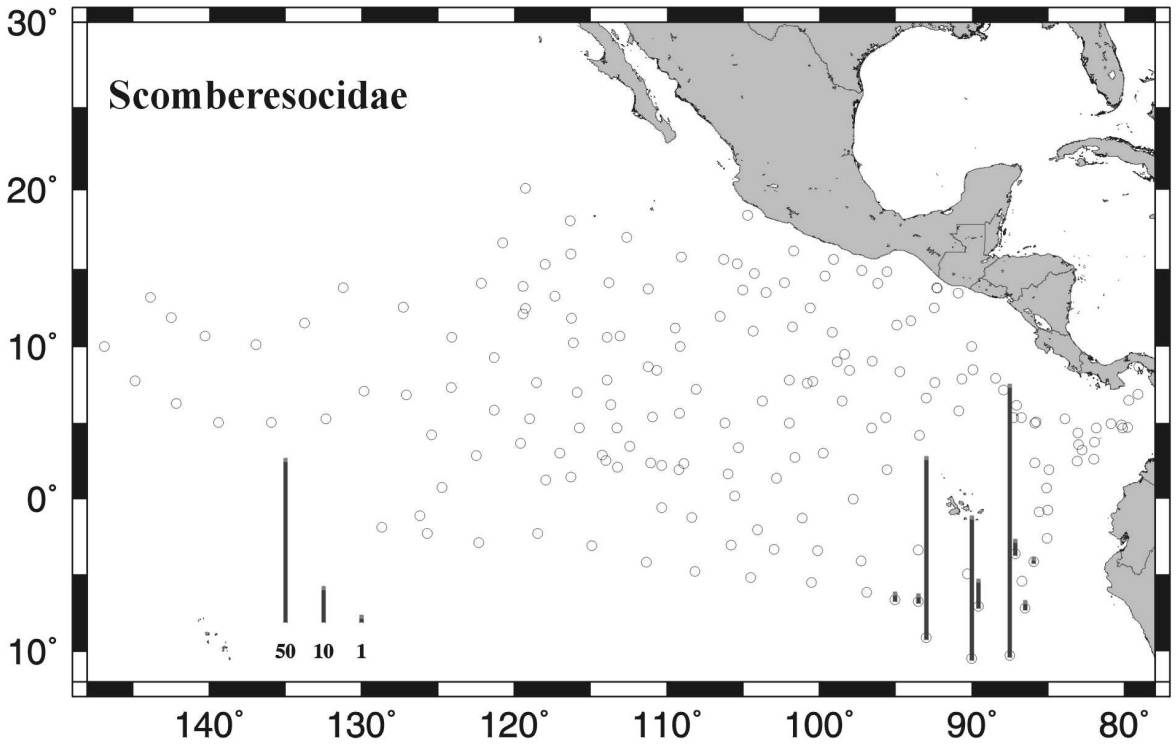

Figure 15. Distribution of Scomberesocidae larvae from Manta net tows: 8710JD & 8710M4.

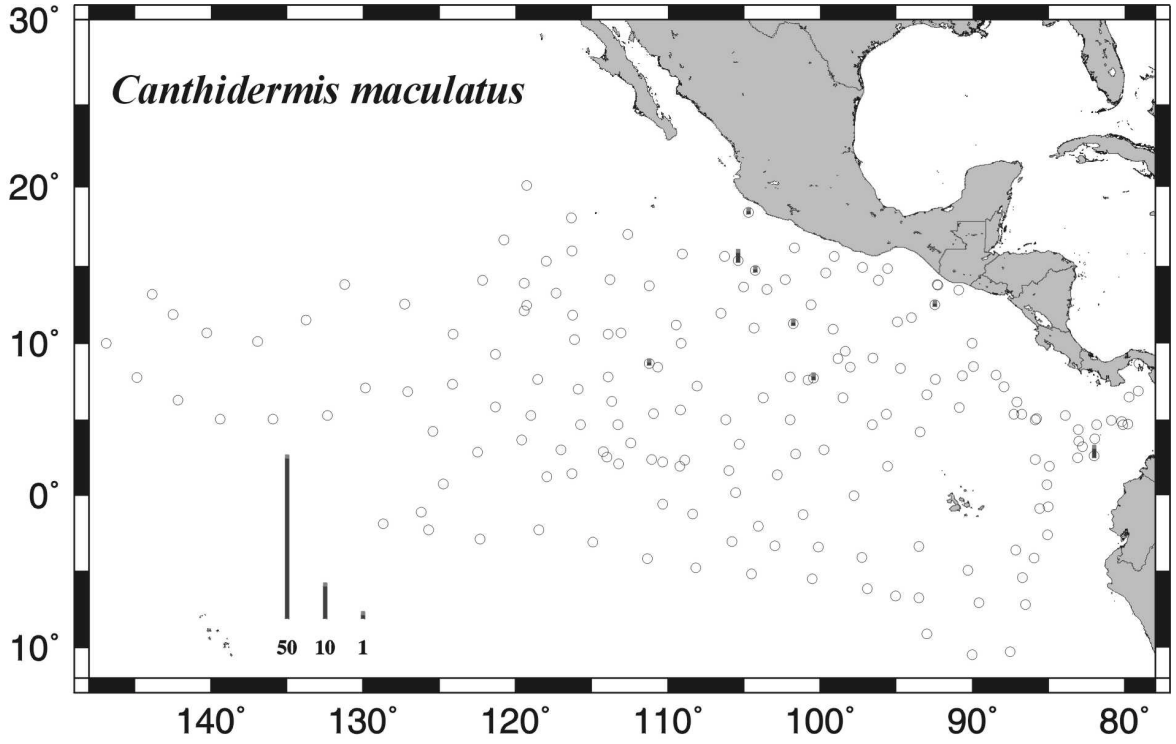


Figure 16. Distribution of *Canthidermis maculatus* larvae from Manta net tows: 8710JD & 8710M4.

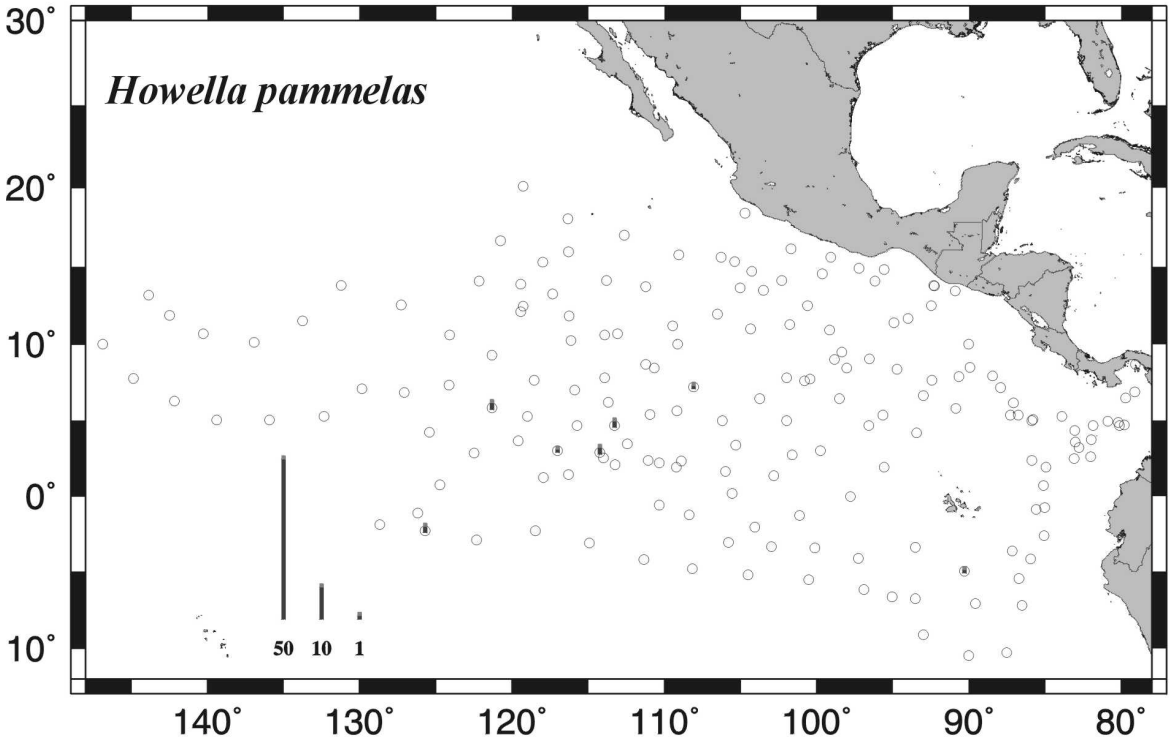


Figure 17. Distribution of *Howella pammelas* larvae from Manta net tows: 8710JD & 8710M4.

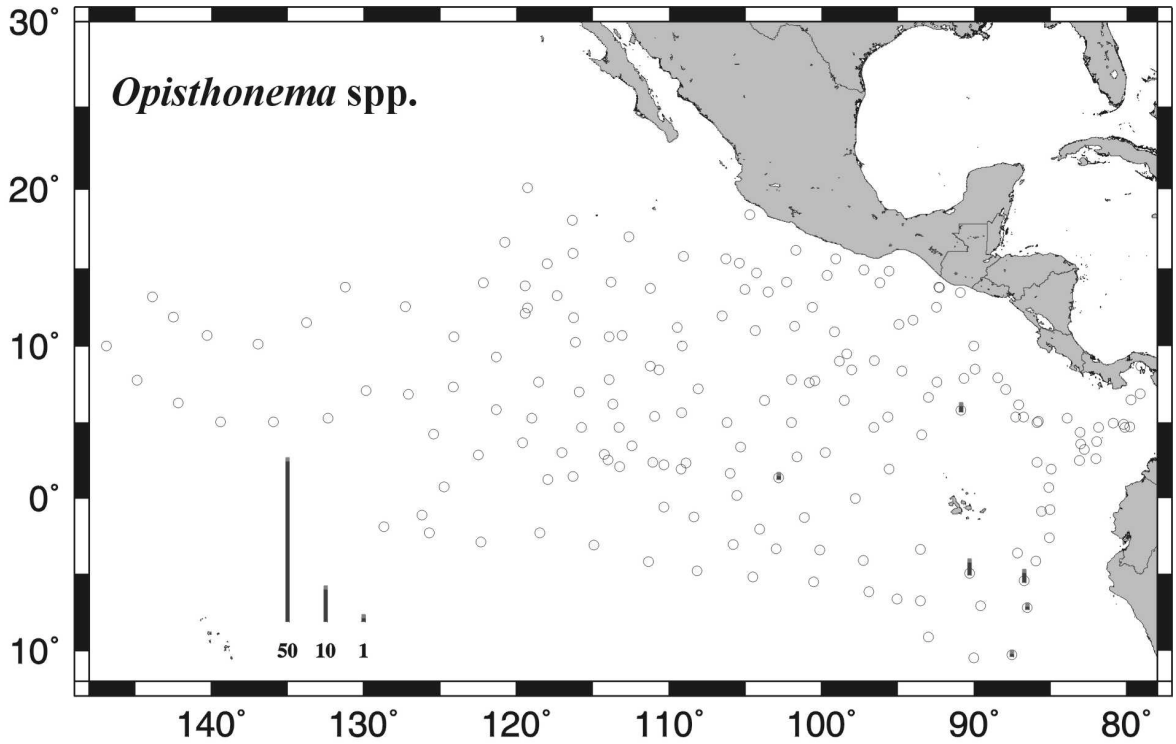

Figure 18. Distribution of *Opisthonema* spp. larvae from Manta net tows: 8710JD & 8710M4.

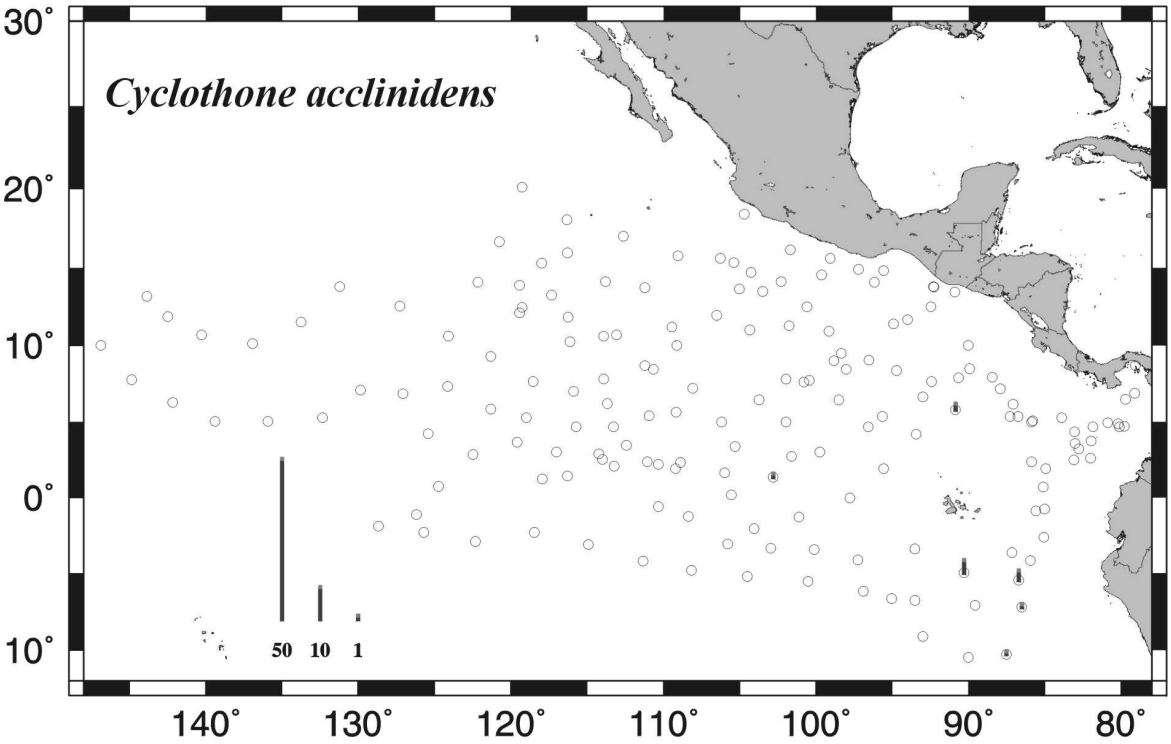

Figure 19. Distribution of *Cyclothone acclinidens* larvae from Manta net tows: 8710JD & 8710M4.

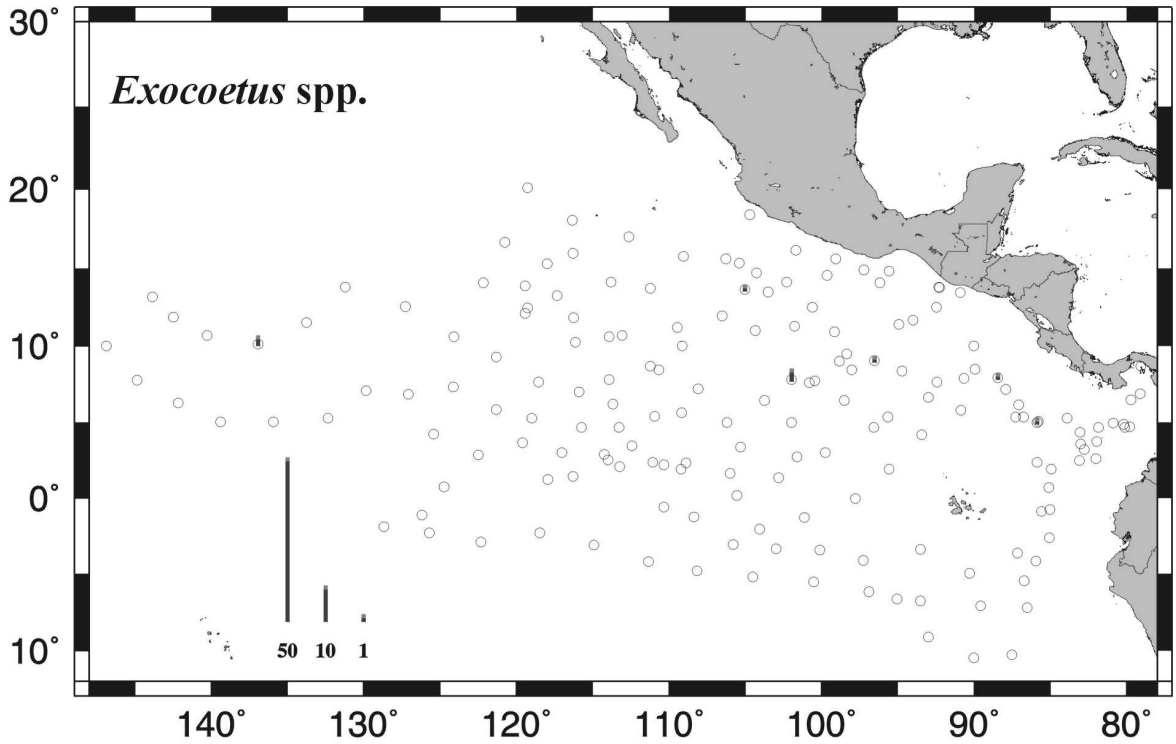

Figure 20. Distribution of *Exocoetus* spp. larvae from Manta net tows: 8710JD & 8710M4.

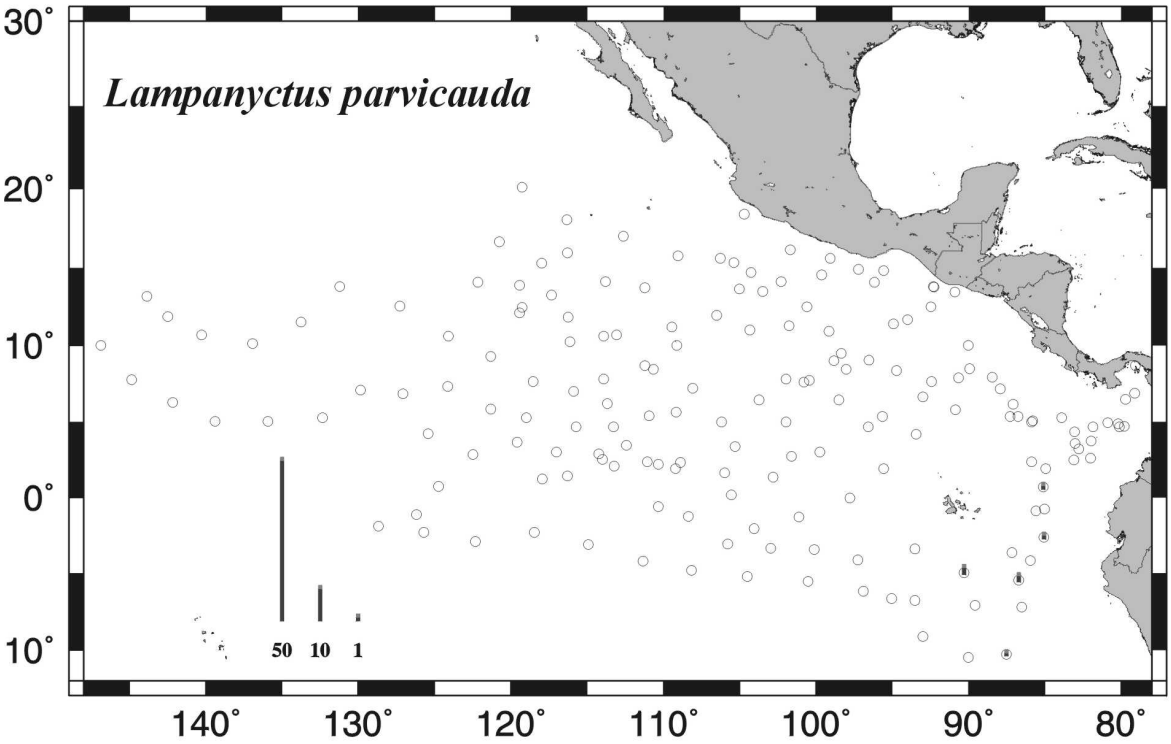

Figure 21. Distribution of *Lampanyctus parvicauda* larvae from Manta net tows: 8710JD & 8710M4.

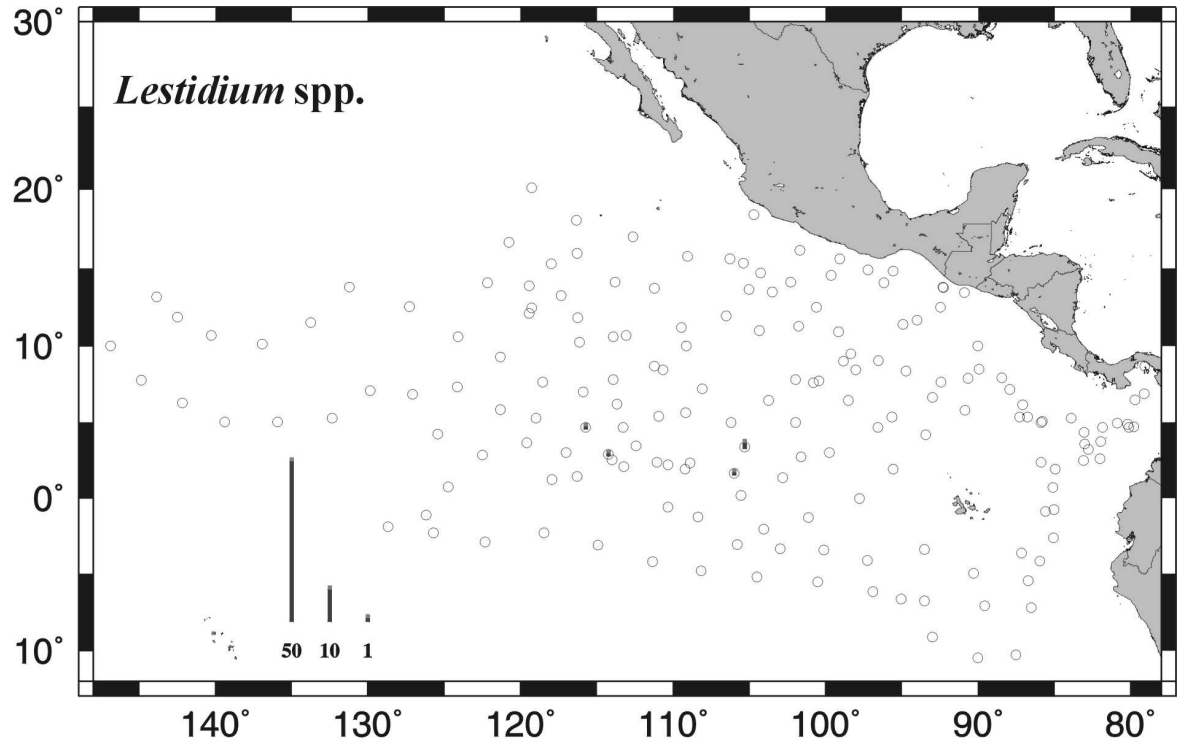

Figure 22. Distribution of *Lestidium* spp. larvae from Manta net tows: 8710JD & 8710M4.

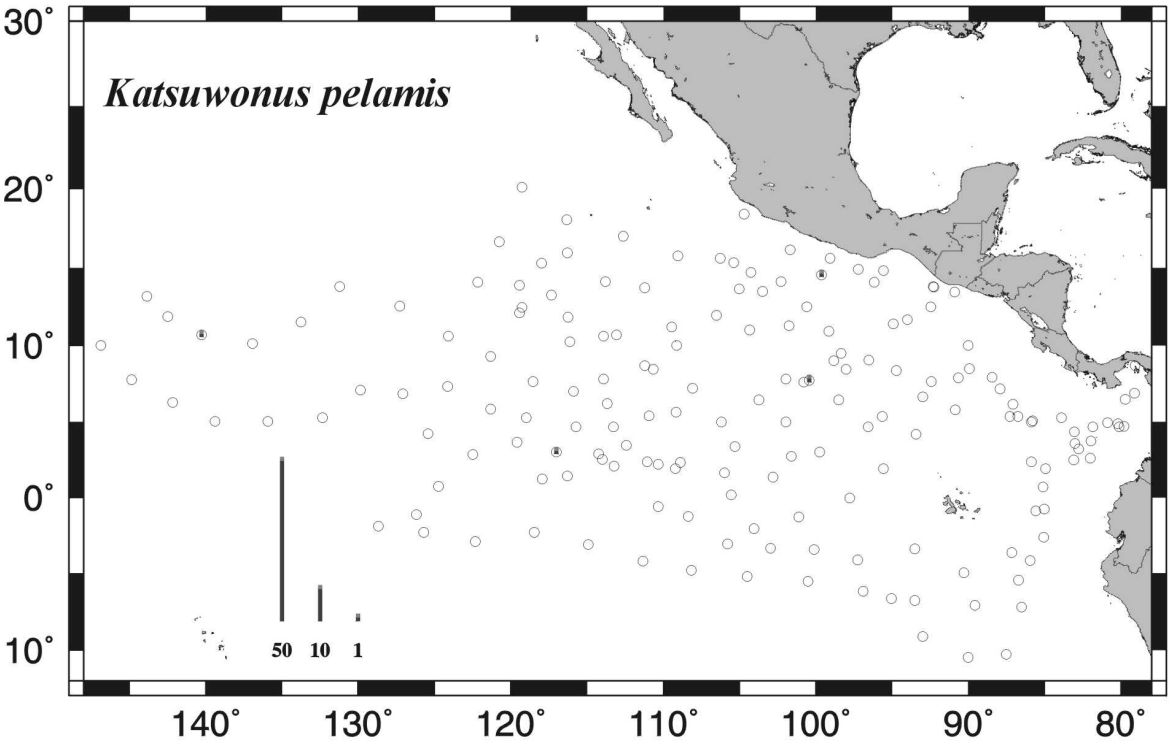

Figure 23. Distribution of *Katsuwonus pelamis* larvae from Manta net tows: 8710JD & 8710M4.

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

| Tow Number | CTD Station | Lat. deg. | min. | | Long.(W) deg | 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. | min. | | Long.(W) deg | 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. | min. | | Long.(W) deg | 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. | min. | | Long.(W) deg | 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.

PHYLOGENETIC INDEX TO TABLES 4 AND 6


Anguilliformes
Congridae
*Ariosoma gilberti*..... 27
Clupeiformes
Clupeidae
*Opisthonema* spp. ..... 27
Engraulidae
*Anchoa* spp. ..... 27
*Cetengraulis mysticetis* ..... 27
Stomiiformes
Gonostomatidae
*Cyclothone* spp. ..... 27
*Diplophos proximus* ..... 27
Phosichthyidae
*Vinciguerria lucetia* .....27, 38
Stomiidae
Astronesthinae
*Astronesthes gibbsi* ..... 38
Aulopiformes
Synodontidae
*Synodus sechurae* ..... 28
Paralepididae
*Lestidium* spp. ..... 28
*Stemonosudis macrura* ..... 28
Myctophiformes
Myctophidae ..... 28
Lampanyctinae
*Bolinichthys* spp. ..... 28
*Diaphus* spp. ..... 28
*Diaphus pacificus* ..... 28
*Lampanyctus* spp. ..... 28
*Lampanyctus omostigma* ..... 38
*Lampanyctus parvicauda* ..... 28
Myctophinae
*Benthosema panamense* .....28, 38
*Centrobranchus nigroocellatus*..... 28
*Gonichthys tenuiculus*..... 38
*Hygophum* spp..... 38
*Hygophum atratum*.....28, 38
*Hygophum proximum*.....28, 38
*Myctophum asperum*..... 39
*Myctophum aurolaternatum* ..... 39
*Myctophum lychnobium* ..... 39
*Myctophum nitidulum* ..... 39
*Myctophum obtusirostrum*..... 39
*Symbolophorus evermanni* .....29, 39
Lampridiformes
Trachipteridae
*Trachipterus fukuzakii*..... 29
Lophiiformes
Gigantactinidae
*Gigantactis* spp..... 29
Beloniformes
Scomberesocidae..... 29
*Elassichthys adocetus* ..... 40
*Scomberesox saurus*..... 40
Beloniformes
*Strongylura exilis* ..... 29
Hemiramphidae..... 29
*Hemiramphus saltator*..... 29
Exocoetidae ..... 29
*Cheilopogon* spp. ..... 29
*Cheilopogon heterurus*.....29, 40
*Cheilopogon pinnatibarbatus* ..... 40
*Cheilopogon xenopterus*.....29, 40
*Exocoetus* spp..... 29
*Exocoetus monocirrhus*..... 40
*Exocoetus volitans* ..... 40
*Fodiator acutus*..... 29
*Hirundichthys* spp. ..... 30
*Hirundichthys marginatus* .....30, 40
*Oxyporhamphus micropterus*.....30, 40
*Prognichthys* spp. ..... 31
*Prognichthys tringa*..... 40
Stephanoberyciformes
Melamphaidae
*Scopelogadus bispinosus*..... 31
Beryciformes
Holocentridae
*Sargocentron suborbitalis* .....31, 40
Scorpaeniformes
Scorpaenidae
*Scorpaena* spp. ..... 31
Perciformes
Percoidei
Howellidae
*Howella pammelas* ..... 31
Carangidae
*Alectis ciliaris* ..... 31
*Caranx caballus* .....31, 41
*Naucrates ductor* ..... 31
*Oligoplites saurus*..... 31
*Trachinotus kennedyi*..... 31
Coryphaenidae

*Coryphaena equiselis*.....32, 41
*Coryphaena hippurus*.....32, 41
Bramidae
*Brama dussumieri*.....32
Lobotidae
*Lobotes surinamensis*.....32
Gerreidae.....32
*Eucinostomus* spp.....41
Haemulidae.....32
*Haemulon* spp.....32
*Pomadasys* spp.....33
Sciaenidae.....33
Polynemidae
*Polydactylus approximans*.....41
Kyphosidae.....33
Mugiloidei
Mugilidae
*Mugil* spp.....33, 41
Labroidei
Pomacentridae.....33
*Microspathodon* spp.....33
Gobioidei
Gobiidae.....33
*Lythrypnus* spp.....33
Microdesmidae
*Microdesmus* spp.....33
Scombroidei
Gempylidae
*Gempylus serpens*.....33
Scombridae
*Auxis* spp.....33
*Euthynnus lineatus*.....33
*Katsuwonus pelamis*.....34
*Thunnus* spp.....34
Stromateoidei
Amarsipidae
*Amarsipus carsbergi*.....34
Nomeidae
*Cubiceps baxteri*.....34
*Cubiceps pauciradiatus*.....34, 41
*Nomeus gronovii*.....34, 41
*Psenes cyanophrys*.....34
*Psenes sio*.....34
Tetragonuridae
*Tetragonurus cuvieri*.....34
Pleuronectiformes
Paralichthyidae
*Syacium ovale*.....34
Bothidae
*Bothus* spp.....34
*Monolene* spp.....34
Tetraodontiformes
Balistidae.....35
*Balistes polylepis*.....41
*Canthidermis maculatus*.....35, 41
Monacanthidae
*Aleuterus scriptus*.....41
Diodontidae
*Diodon hystrix*.....35
Disintegrated fish larvae.....35
Unidentified fish larvae.....35

ALPHABETICAL INDEX TO TABLES 4 AND 6


*Alectis ciliaris* ..... 31
*Aleuterus scriptus* ..... 41
*Amarsipus carsbergi* ..... 34
*Anchoa spp.* ..... 27
*Ariosoma gilberti* ..... 27
*Astronesthes gibbsi* ..... 38
*Auxis* spp. ..... 33
*Balistes polylepis* ..... 41
Balistidae ..... 35
*Benthosema panamense* ..... 28, 38
*Bolinichthys spp.* ..... 28
*Bothus spp.* ..... 34
*Brama dussumieri* ..... 32
*Canthidermis maculatus* ..... 35, 41
*Caranx caballus* ..... 31, 41
*Centrobranchus nigroocellatus* ..... 28
*Cetengraulis mysticetis* ..... 27
*Cheilopogon heterurus* ..... 29, 40
*Cheilopogon pinnatibarbatus* ..... 40
*Cheilopogon* spp. ..... 29
*Cheilopogon xenopterus* ..... 29, 40
*Coryphaena equiselis* ..... 32, 41
*Coryphaena hippurus* ..... 32, 41
*Cubiceps baxteri* ..... 34
*Cubiceps pauciradiatus* ..... 34, 41
*Cyclothone* spp. ..... 27
*Diaphus pacificus* ..... 28
*Diaphus* spp. ..... 28
*Diodon hystrix* ..... 35
*Diplophos proximus* ..... 27
Disintegrated fish larvae ..... 35
*Elassichthys adocetus* ..... 40
*Eucinostomus* spp. ..... 41
*Euthynnus lineatus* ..... 33
Exocoetidae ..... 29
*Exocoetus monocirrhus* ..... 40
*Exocoetus* spp. ..... 29
*Exocoetus volitans* ..... 40
*Fodiator acutus* ..... 29
*Gempylus serpens* ..... 33
Gerreidae ..... 32
*Gigantactis* spp. ..... 29
Gobiidae ..... 33
*Gonichthys tenuiculus* ..... 38
Haemulidae ..... 32
*Haemulon* spp. ..... 32
Hemiramphidae ..... 29
*Hemiramphus saltator* ..... 29
*Hirundichthys marginatus* ..... 30, 40
*Hirundichthys* spp. ..... 30
*Howella pammelas* ..... 31
*Hygophum atratum* ..... 28, 38
*Hygophum proximum* ..... 28, 38
*Hygophum* spp. ..... 38
*Katsuwonus pelamis* ..... 34
Kyphosidae ..... 33
*Lampanyctus omostigma* ..... 38
*Lampanyctus parvicauda* ..... 28
*Lampanyctus* spp. ..... 28
*Lestidium* spp. ..... 28
*Lobotes surinamensis* ..... 32
*Lythrypnus* spp. ..... 33
*Microdesmus* spp. ..... 33
*Microspathodon* spp. ..... 33
*Monolene* spp. ..... 34
*Mugil* spp. ..... 33, 41
Myctophidae ..... 28
*Myctophum asperum* ..... 39
*Myctophum aurolaternatum* ..... 39
*Myctophum lychnobium* ..... 39
*Myctophum nitidulum* ..... 39
*Myctophum obtusirostrum* ..... 39
*Naucrates ductor* ..... 31
*Nomeus gronovii* ..... 34, 41
*Oligoplites saurus* ..... 31
*Opisthonema* spp. ..... 27
*Oxyporhamphus micropterus* ..... 30, 40
*Polydactylus approximans* ..... 41
Pomacentridae ..... 33
*Pomadasys* spp. ..... 33
*Prognichthys* spp. ..... 31
*Prognichthys tringa* ..... 40
*Psenes cyanophrys* ..... 34
*Psenes sio* ..... 34
*Sargocentron suborbitalis* ..... 31, 40
Sciaenidae ..... 33
Scomberesocidae ..... 29
*Scomberesox saurus* ..... 40
*Scopelogadus bispinosus* ..... 31
*Scorpaena* spp. ..... 31
*Stemonosudis macrura* ..... 28
*Strongylura exilis* ..... 29
*Syacium ovale* ..... 34
*Symbolophorus evermanni* ..... 29, 39

*Synodus sechurae*..... 28
*Tetragonurus cuvieri*..... 34
*Thunnus* spp. ..... 34
*Trachinotus kennedyi*..... 31
*Trachipterus fukuzakii*..... 29
Unidentified fish larvae..... 35
Vinciguerria *lucetia* .....27, 38

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