NOAA Technical Memorandum NMFS

March 2000

ICHTHYOPLANKTON AND STATION DATA FOR SURFACE TOWS TAKEN DURING THE 1992 EASTERN TROPICAL PACIFIC COMMON DOLPHIN SURVEY ON THE RESEARCH VESSELS *DAVID STARR JORDAN* AND *McARTHUR*

William Watson, Richard L. Charter
H. Geoffrey Moser, Stephen B. Reilly

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla, California 92038

NOAA-TM-NMFS-SWFSC-291

U.S. DEPARTMENT OF COMMERCE
William M. Daley, Secretary
National Oceanic and Atmospheric Administration
D. James Baker, Under Secretary for Oceans and Atmosphere
National Marine Fisheries Service
Penelope Dalton, Assistant Administrator for Fisheries

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 5

Literature Cited 5

Figures 7

Tables 19

Phylogenetic Index to Tables 4 and 6 46

Alphabetical Index to Tables 4 and 6 49

LIST OF FIGURES

Page

Figure 1. Manta net tow stations for *Jordan* cruise 9210JD 7

Figure 2. Manta net tow stations for *McArthur* cruise 9210M4 7

Figure 3. Sampling regions for 1992 eastern tropical Pacific common dolphin survey 8

Figure 4. Distribution of *Oxyporhamphus micropterus* larvae from Manta net tows: 9210JD & 9210M4.. 9

Figure 5. Distribution of *Coryphaena equiselis* larvae from Manta net tows: 9210JD & 9210M4..... 9

Figure 6. Distribution of *Vinciguerria lucetia* larvae from Manta net tows: 9210JD & 9210M4 10

Figure 7. Distribution of *Auxis* spp. larvae from Manta net tows: 9210JD & 9210M4 10

Figure 8. Distribution of *Prognichthys* spp. larvae from Manta net tows: 9210JD & 9210M4 11

Figure 9. Distribution of *Coryphaena hippurus* larvae from Manta net tows: 9210JD & 9210M4 11

Figure 10. Distribution of *Cubiceps pauciradiatus* larvae from Manta net tows: 9210JD & 9210M4 12

Figure 11. Distribution of *Cheilopogon xenopterus* larvae from Manta net tows: 9210JD & 9210M4 12

Figure 12. Distribution of *Exocoetus* spp. larvae from Manta net tows: 9210JD & 9210M4 13

Figure 13. Distribution of *Hirundichthys marginatus* larvae from Manta net tows: 9210JD & 9210M4. . 13

Figure 14. Distribution of Gerreidae larvae from Manta net tows: 9210JD & 9210M4..... 14

Figure 15. Distribution of *Mugil* spp. larvae from Manta net tows: 9210JD & 9210M4 14

Figure 16. Distribution of *Thunnus* spp. larvae from Manta net tows: 9210JD & 9210M4 15

Figure 17. Distribution of *Euthynnus lineatus* larvae from Manta net tows: 9210JD & 9210M4..... 15

Figure 18. Distribution of *Polydactylus approximans* larvae from Manta net tows: 9210JD & 9210M4.. 16

Figure 19. Distribution of *Anchoa* spp. larvae from Manta net tows: 9210JD & 9210M4..... 16

Figure 20. Distribution of *Bothus* spp. larvae from Manta net tows: 9210JD & 9210M4..... 17

Figure 21. Distribution of *Ariosoma gilberti* larvae from Manta net tows: 9210JD & 9210M4 17

Figure 22. Distribution of *Caranx caballus* larvae from Manta net tows: 9210JD & 9210M4..... 18

Figure 23. Distribution of *Canthidermis maculatus* larvae from Manta net tows: 9210JD & 9210M4 18

LIST OF TABLES

Page

Table 1. Station and Manta net tow data for *Jordan* cruise 9210JD and *McArthur* cruise 9210M4 19

Table 2. Pooled occurrences of fish larvae taken in Manta net tows on *Jordan* cruise 9210JD and *McArthur* cruise 9210M4 22

Table 3. Pooled counts of fish larvae taken in Manta net tows on *Jordan* cruise 9210JD and *McArthur* cruise 9210M4 25

Table 4. Numbers of fish larvae taken in Manta net tows on *Jordan* cruise 9210JD and *McArthur* cruise 9210M4 listed by taxon, tow number, and region 28

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 9210JD and *McArthur* cruise 9210M4 40

Table 6. Numbers (raw counts) and size ranges of juvenile fishes taken in Manta net tows on *Jordan* cruise 9210JD and *McArthur* cruise 9210M4 43

ABSTRACT

This report provides ichthyoplankton, juvenile/adult fish, and associated station and tow data from the surface plankton samples collected during the 1992 Southwest Fisheries Science Center eastern tropical Pacific common dolphin survey. It is the fifth in a series of reports that presents these data for all dophin surveys from 1987 to the present. In total, 116 stations were sampled with Manta nets between 8 August and 1 November, 1992, during which two research vessels surveyed within an area extending from about 23°–2° N, and from the Gulf of Panama westward to about 110° 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). 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 1992 survey and all surveys conducted since 1987 (Thayer et al. 1988a, b), Manta (surface) net tows were taken at night in conjunction with the oceanographic operations (1987 survey, Moser et al. 2000; 1988 survey, Ambrose et al. 2000; 1989 survey, Charter et al. 2000; 1990 survey, Sandknop et al. 2000; 1992 survey, this report). 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 provides ichthyoplankton and associated station and tow data from the 1992 eastern tropical Pacific common dolphin survey conducted from July 28 to November 2, 1992.

The survey was conducted aboard the NOAA research vessels *David Starr Jordan* and *McArthur*. Hydrographic and biological data for the *Jordan* and *McArthur* cruises, other than Manta tow data, are reported in Philbrick et al. (1993). Usually a conductivity-temperature-depth instrument (CTD) cast was made each morning to 1000 m to measure temperature, salinity, oxygen, chlorophyll, phaeophytin, and nutrients, and to collect water samples for productivity measurements; mini-CTD casts were made to 200 m each morning and afternoon, and another cast was made to 500 m at the conclusion of marine mammal operations each day. Sea surface temperature and salinity were measured continuously while the ship was underway. Expendable bathythermograph (XBT) casts were made daily at noon and were substituted for mini-CTD casts when the latter could not be made. 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 each night.

SAMPLING AREA AND PATTERN

A total of 116 Manta tows was made on the survey, 57 aboard the *Jordan* (Figure 1) and 59 aboard the *McArthur* (Figure 2). The survey was conducted in three legs for both vessels:

Jordan Leg 1	28 July–26 August	San Diego, California to Puerto Quetzal, Guatemala
Jordan Leg 2	31 August–29 September	Puerto Quetzal, Guatemala to Rodman, Panama
Jordan Leg 3	4 October–2 November	Rodman, Panama to San Diego, California.

McArthur Leg 128 July–26 August	San Diego, California. to Puerto Quetzal, Guatemala
McArthur Leg 231 August–29 September	Puerto Quetzal, Guatemala to Rodman, Panama
McArthur Leg 34 October–2 November	Rodman, Panama to Rodman, Panama.

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 the senior author of this report and E. M. Sandknop 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 118 larval fish categories (including unidentified and disintegrated) was identified: 65 to species, 35 to genus, 14 to family, 1 to subfamily, and 1 to order.

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

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

Cyclothone pseudopallida – Postflexion stage larvae having diagnostic pigmentation characters.

Disintegrated fish larvae – 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. – *E. monocirrhus* and *E. volitans* occur in the study area and their larvae smaller than about 10 mm cannot be reliably distinguished.

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

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

Mugil spp. – Mugilid larvae lacking the full complement of anal fin elements (larvae < ~5–6 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. – *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 in 1992 were predominantly coastal and most (perhaps all) probably are *P. tringa.*

Triphoturus spp. – Larvae of *Triphoturus* in the region of the ETP sampled by this expedition correspond to *Triphoturus oculeus* (Garman 1899), a species Hulley (1986) synonymized with *T. mexicanus* (Gilbert 1890). These larvae share pigment characteristics of *T. mexicanus* and *T. nigrescens* (the other *Triphoturus* species recognized by Hulley 1986).

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

Vinciguerria lucetia – *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 1992 survey, the shortwing flyingfish *Oxyporhamphus micropterus* ranked first in abundance and occurrence with 16.1% of the total larvae and 55.2% positive tows (Tables 2 and 3). The Panama lightfish *Vinciguerria lucetia* ranked second in abundance with 11.1% of the total larvae and was third in occurrence with 31.9% positive tows. The anchovy genus *Anchoa* ranked third in abundance with 10.0% of the total larvae, but tied for 15th in occurrence with only 6.9% positive tows. The pompano dolphinfish *Coryphaena equiselis* ranked fourth in abundance with 8.2% of the larvae and was second in occurrence with 52.6% positive tows. The scombrid genus *Auxis* ranked fifth in abundance with 8.1% of the larvae and fourth in occurrence with 31.0% positive tows. The next five most abundant taxa were the herring genus *Opisthomema* (6.5% of total larvae), the anchoveta *Cetengraulis mysticetis* (5.6%), the blue bobo *Polydactylus approximans* (4.4%), the flyingfish genus *Prognichthys* (4.2%), and the bigeye cigarfish *Cubiceps pauciradiatus* (3.7%). These species were tied for 23rd, tied for 31st, tied for 15th, ranked 5th, and 7th in frequency of occurrence, respectively. The ten most abundant taxa comprised 77.8% of all the larvae collected in the survey area. The remaining 22.2 % was distributed among 108 other taxa (including the "disintegrated" and "unidentified" categories). Of the ten most abundant taxa, three (*Oxyporhamphus micropterus*, *Corypaena equiselis*, *Cubiceps pauciradiatus*) are epipelagic species, one (*Prognichthys*) is a

genus containing both an epipelagic (*P. seali*) and a coastal pelagic species (*P. tringa*), four (*Anchoa*, *Auxis*, *Opisthonema*, *Cetengraulis mysticetus*) are coastal, pelagic taxa, one (*Polydactylus approximans*) is a coastal, primarily epibenthic schooling species, and one (*V. lucetia*) is a midwater species that migrates to the epipelagic zone at night.

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 9210JD and *McArthur* cruise 9210M4. 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 H 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). In 1992 the Manta tows and hydrographic casts were made at different times of the day. The column "CTD station" gives the CTD number where a Manta sample was collected at the same location as the morning hydrographic cast.

Table 2. Pooled occurrences of all larval fish taxa taken in Manta nets on *Jordan* cruise 9210JD and *McArthur* cruise 9210M4. 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 *Jordan* cruise 9210JD and *McArthur* cruise 9210M4. Taxa are listed in rank order.

Table 4. Numbers of fish larvae for each taxon taken in Manta net tows on *Jordan* cruise 9210JD and *McArthur* cruise 9210M4, 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 9210JD and *McArthur* cruise 9210M4.

Table 6. Numbers (raw counts) and size ranges of juvenile fishes taken in Manta net tows on *Jordan* cruise 9210JD and *McArthur* cruise 9210M4. 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

We are indebted to Robert Pitman for his efforts in making a large proportion of the plankton tows and for overseeing the ichthyoplankton work on the expedition. We thank the following members of the scientific crews of the two vessels for their contributions to this work: Michael Force, Elizabeth Mitchell, and Renate Sponer. The samples were sorted by Lucy Dunn and Jean Haddox. Susan Manion and Amy Hays entered the data and Susan Jacobson provided programming assistance. We thank Susan Manion for her excellent work in the production of the tables and distribution maps. The cooperation and assistance provided by the ships' crews were instrumental in making the collections and observations at sea.

LITERATURE CITED

Ahlstrom, E. H. 1971. Kinds and abundance of fish larvae in the eastern tropical Pacific, based on collections made on EASTROPAC I. Fish. Bull. 69:3–77.

Ahlstrom, E. H. 1972. Kinds and abundance of fish larvae in the eastern tropical Pacific on the second multivessel EASTROPAC survey, and observations on the annual cycle of larval abundance. Fish. Bull. 70:1153–1242.

Ambrose, D. A., R. L. Charter, H. G. Moser, and S. B. Reilly. 2000. Ichthyoplankton and station data for surface tows taken during the 1988 eastern tropical Pacific dolphin survey on the research vessels *David Starr Jordan* and *McArthur*. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-SWFC-288. 40 pp.

Brown, D. M. and L. Cheng. 1981. New net for sampling the ocean surface. Mar. Ecol. Prog. Ser.5:224–227.

Charter, S. R., R. L. Charter, H. G. Moser, and S. B. Reilly. 2000. Ichthyoplankton and station data for surface tows taken during the 1989 eastern tropical Pacific dolphin survey on the research vessels *David Starr Jordan* and *McArthur*. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-SWFC-289. 45 pp.

Eschmeyer, W. N. (ed.). 1998. Catalog of fishes. Center for Biodiversity Research and Information. California Academy of Sciences. Spec. Publ. 1. Vols. I-III. 2905 pp.

Fischer, W., F. Krupp, W. Schneider, C. Sommer, K. E. Carpenter, and V. H. Niem, eds. 1995. Guia FAO para la identificación de especies para los fines de la pesca. Pacifico Centro-Oriental. FAO Rome. 1813 pp. [in Spanish].

Holt, R. S., T. Gerrodette, and J. B. Cologne. 1987. Research vessel survey design for monitoring dolphin abundance in the eastern tropical Pacific. Fish. Bull. 86:435–446.

Holt, R. S. and A. Jackson. 1987. Report of a marine mammal survey of the eastern tropical Pacific aboard the research vessel *McArthur* July 29–December 6, 1986. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-SWFC-77. 161 pp.

Moser, H. G. (ed.). 1996. The early stages of fishes in the California Current region. CalCOFI Atlas 33. 1505 pp.

Moser, H. G., R. L. Charter, S. B. Reilly, D. A. Ambrose, S. R. Charter, E. M. Sandknop, and W. Watson. 2000. 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*. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-SWFC-287. 45 pp.

Philbrick, V. A., P. C. Fiedler, S. B. Reilly, R. L. Pitman, and L. T. Ballance. 1993. Report of ecosystem studies conducted during the 1992 eastern tropical Pacific common dolphin survey on the research vessels *David Starr Jordan* and *McArthur*. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-SWFC-180. 74 pp.

Powles, H. and D. F. Markle. 1984. Identification of larvae. Pages 31-33 *in* H. G. Moser, W. J. Richards, D.

M. Cohen, M. P. Fahay, A. W. Kendall, Jr., and S. L. Richardson, eds. Ontogeny and Systematics of Fishes. Am. Soc. Ichthyol. Herpetol. Spec. Publ. 1. 760 pp.

Sandknop, E. M., R. L. Charter, H. G. Moser, and S. B. Reilly. 2000. Ichthyoplankton and station data for surface tows taken during the 1990 eastern tropical Pacific dolphin survey on the research vessels *David Starr Jordan* and *McArthur*. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-SWFC-290. 46 pp.

Thayer, V. G., S. B. Reilly, P. C. Fiedler, C. W. Oliver, and D. W. Behringer. 1988a. Report of ecosystem studies conducted during the 1987 eastern tropical Pacific dolphin survey on the research vessel *McArthur*. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-SWFC-114. 114 pp.

Thayer, V. G., S. B. Reilly, P. C. Fiedler, R. L. Pitman, G. G. Thomas, and D. W. Behringer. 1988b. Report of ecosystem studies conducted during the 1987 eastern tropical Pacific dolphin survey on the research vessel *David Starr Jordan*. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-SWFC-115. 94 pp.

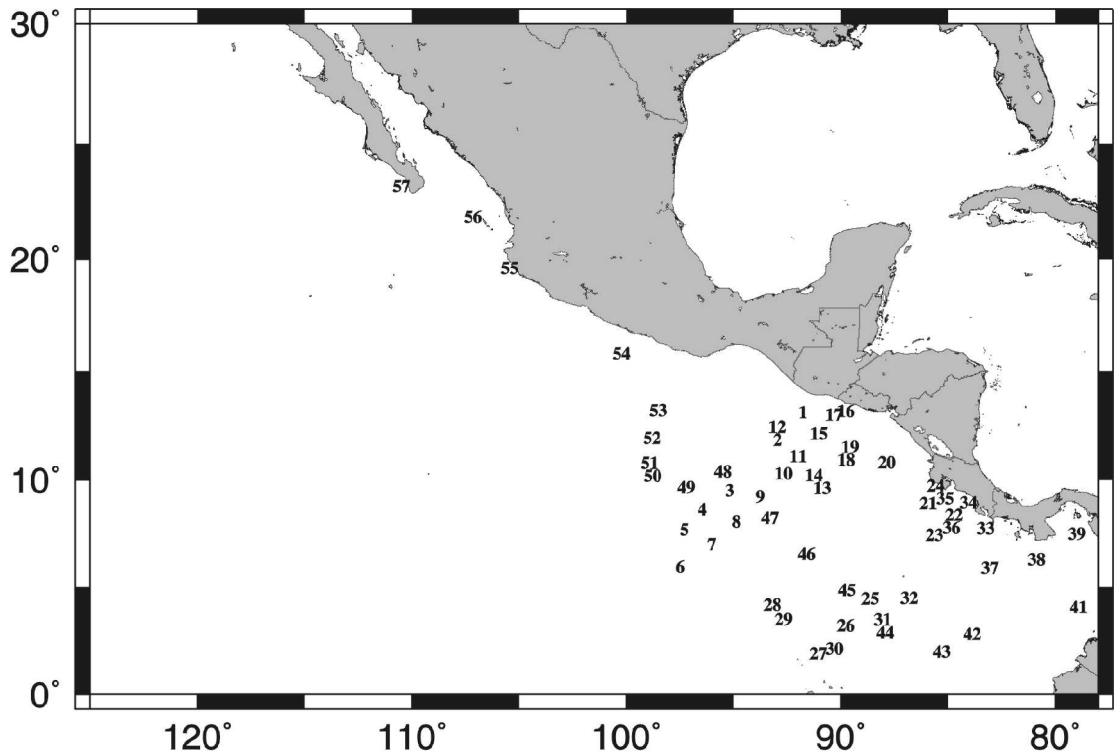

Figure 1. Manta net tow stations for *Jordan* cruise 9210JD.

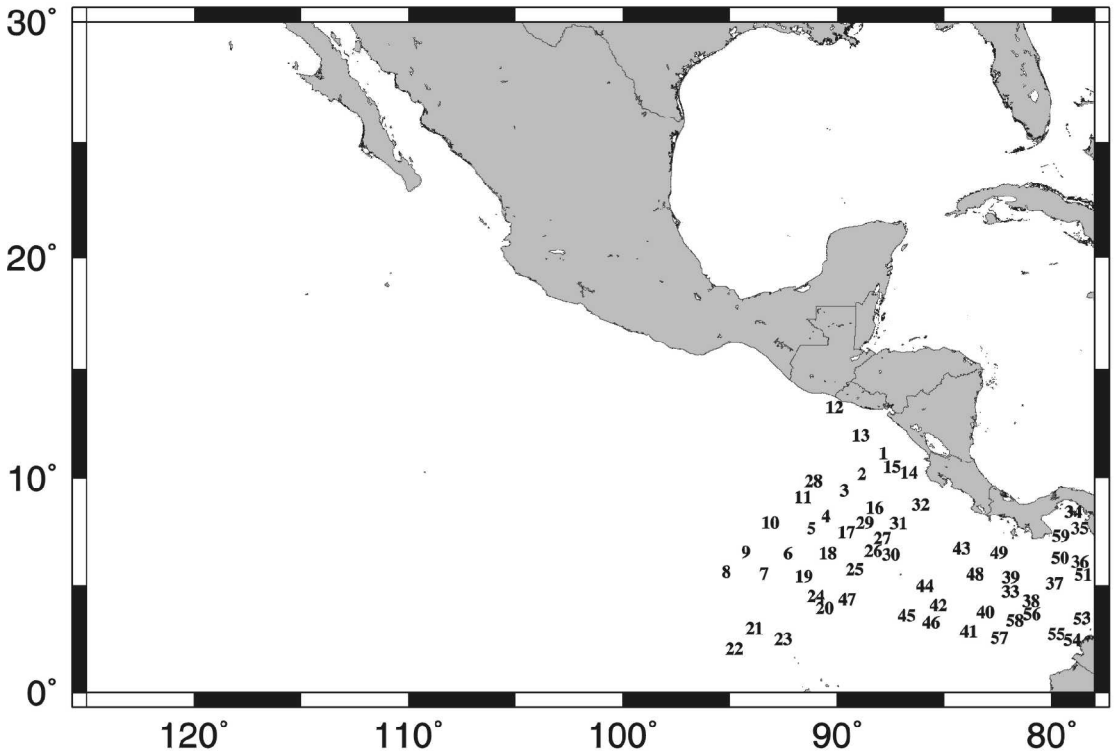

Figure 2. Manta net tow stations for *McArthur* cruise 9210M4.

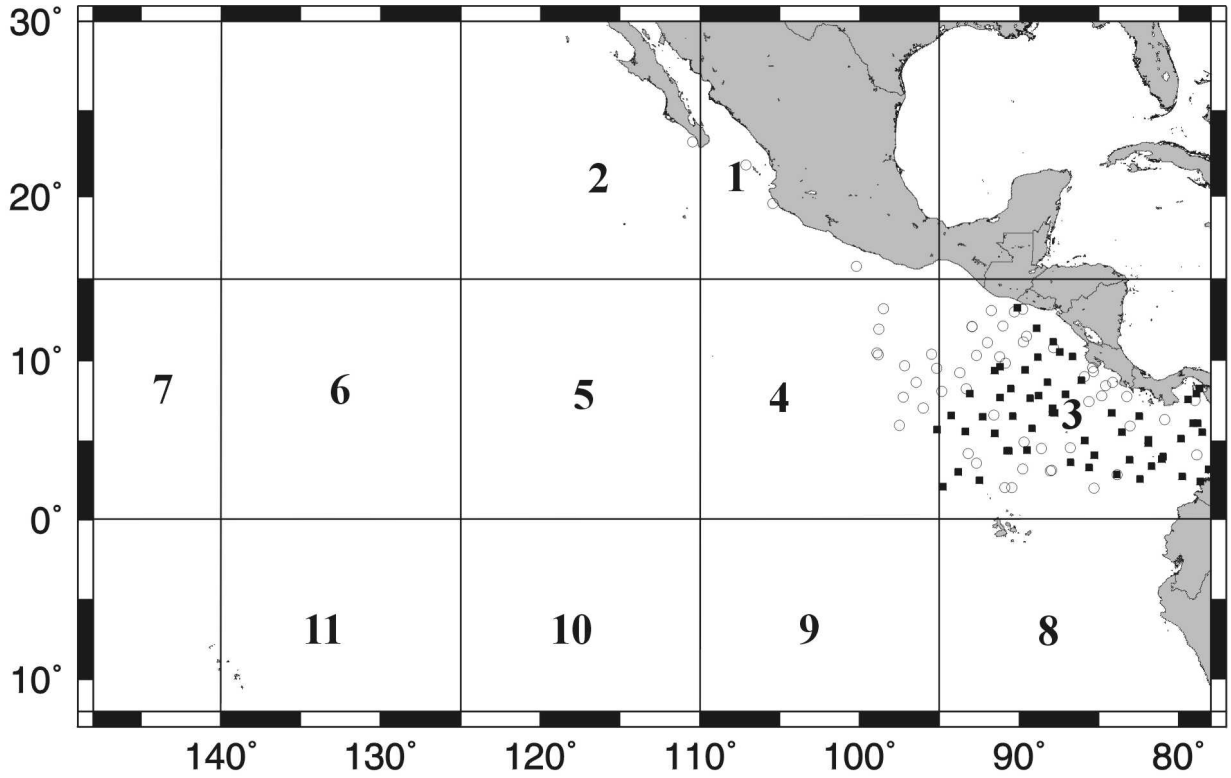

Figure 3. Sampling regions for 1992 eastern tropical Pacific common dolphin survey indicated by numbers 1 to 11; Manta net tow stations for *Jordan* cruise 9210JD are indicated by circles and for *McArthur* cruise 9210M4 by solid squares.

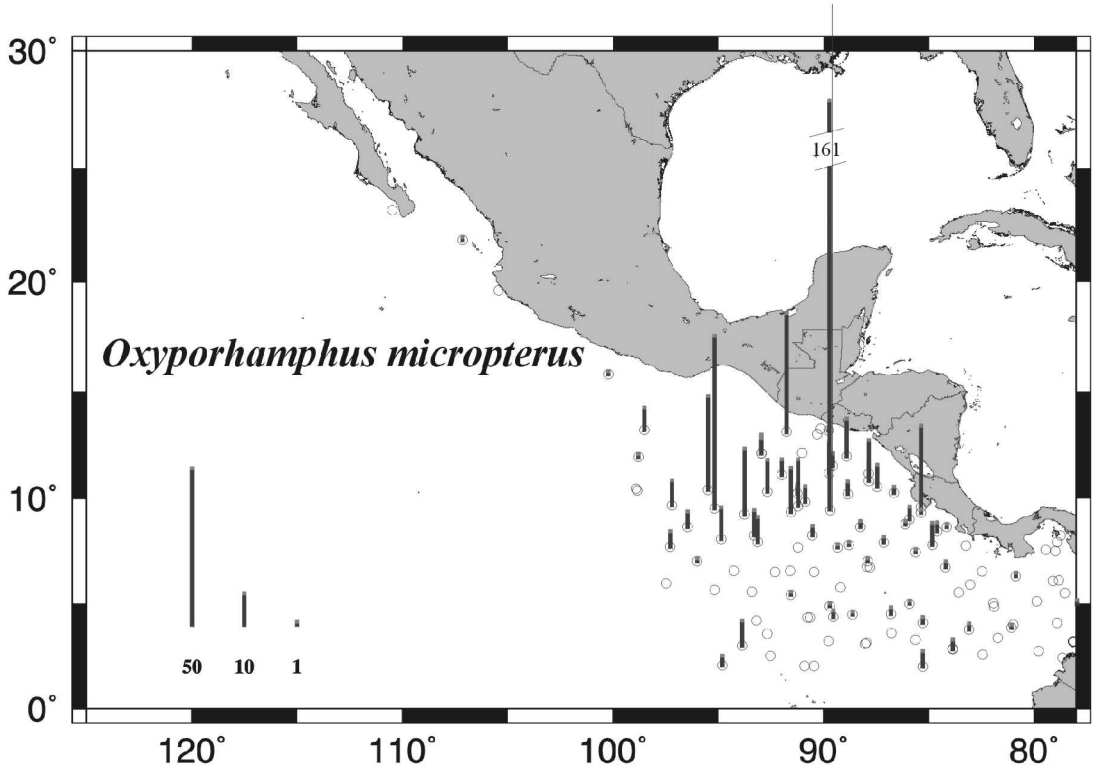

Figure 4. Distribution of *Oxyporhamphus micropterus* larvae from Manta net tows: 9210JD & 9210M4. Lengths of vertical bars are proportional to total larval counts for each station.

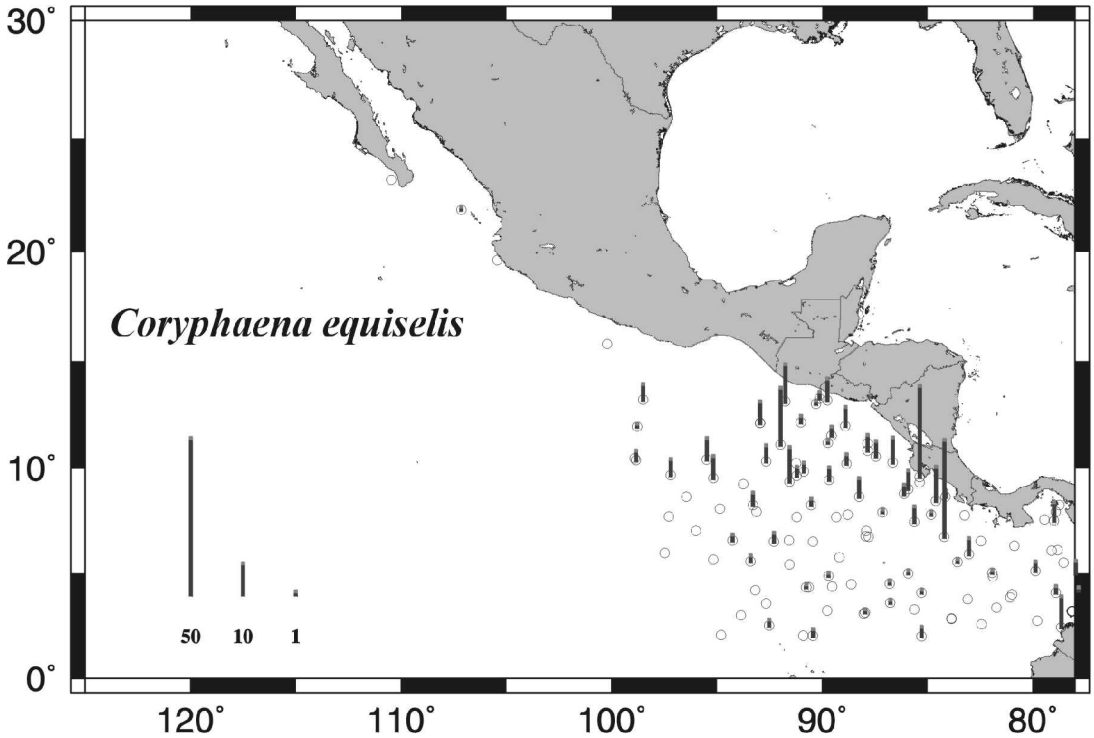

Figure 5. Distribution of *Coryphaena equiselis* larvae from Manta net tows: 9210JD & 9210M4.

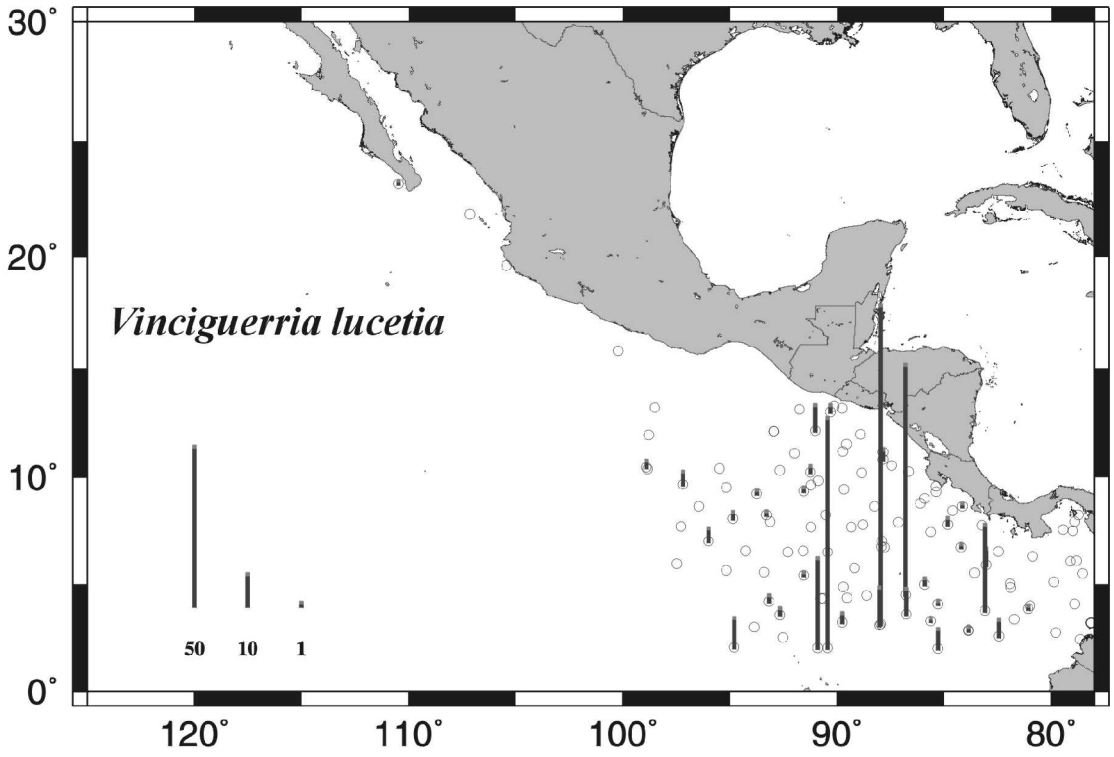

Figure 6. Distribution of *Vinciguerria lucetia* larvae from Manta net tows: 9210JD & 9210M4.

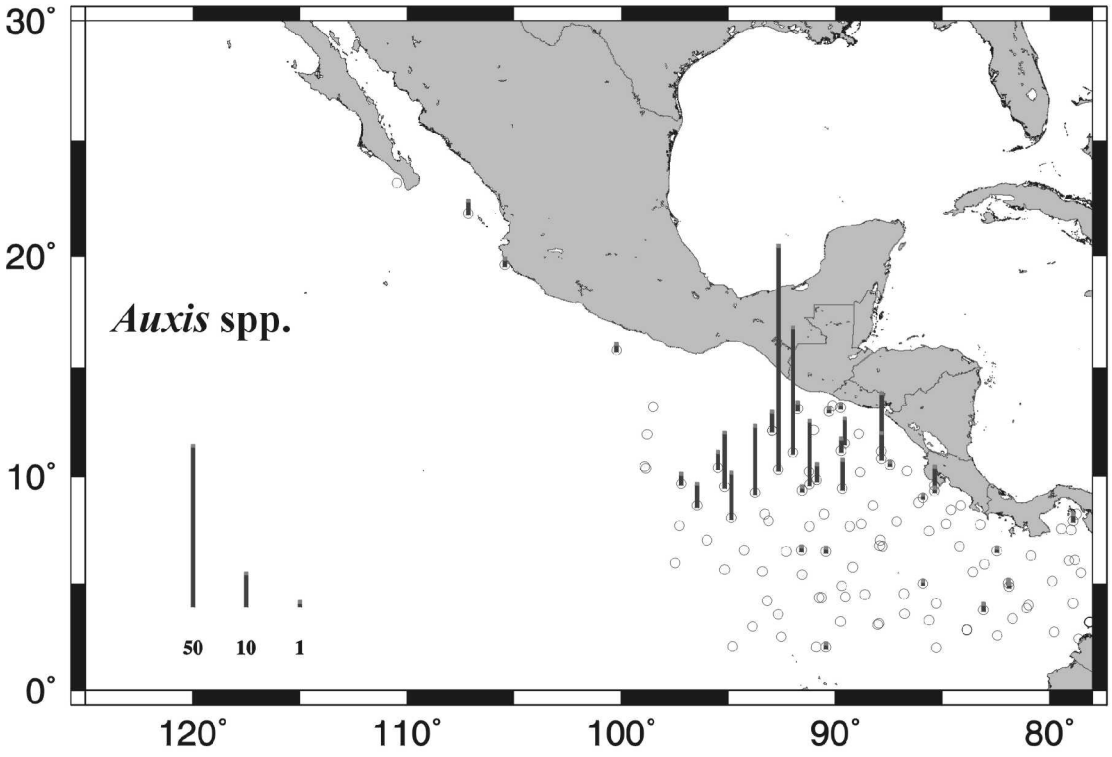

Figure 7. Distribution of *Auxis* spp. larvae from Manta net tows: 9210JD & 9210M4.

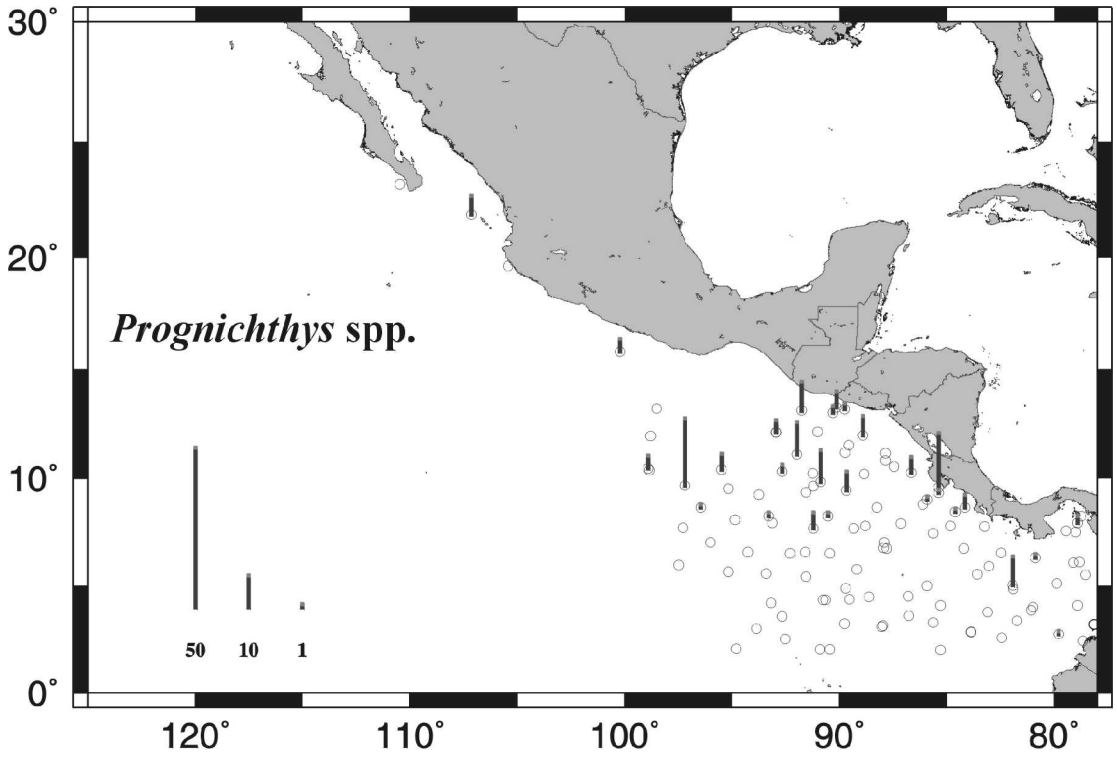

Figure 8. Distribution of *Prognichthys* spp. larvae from Manta net tows: 9210JD & 9210M4.

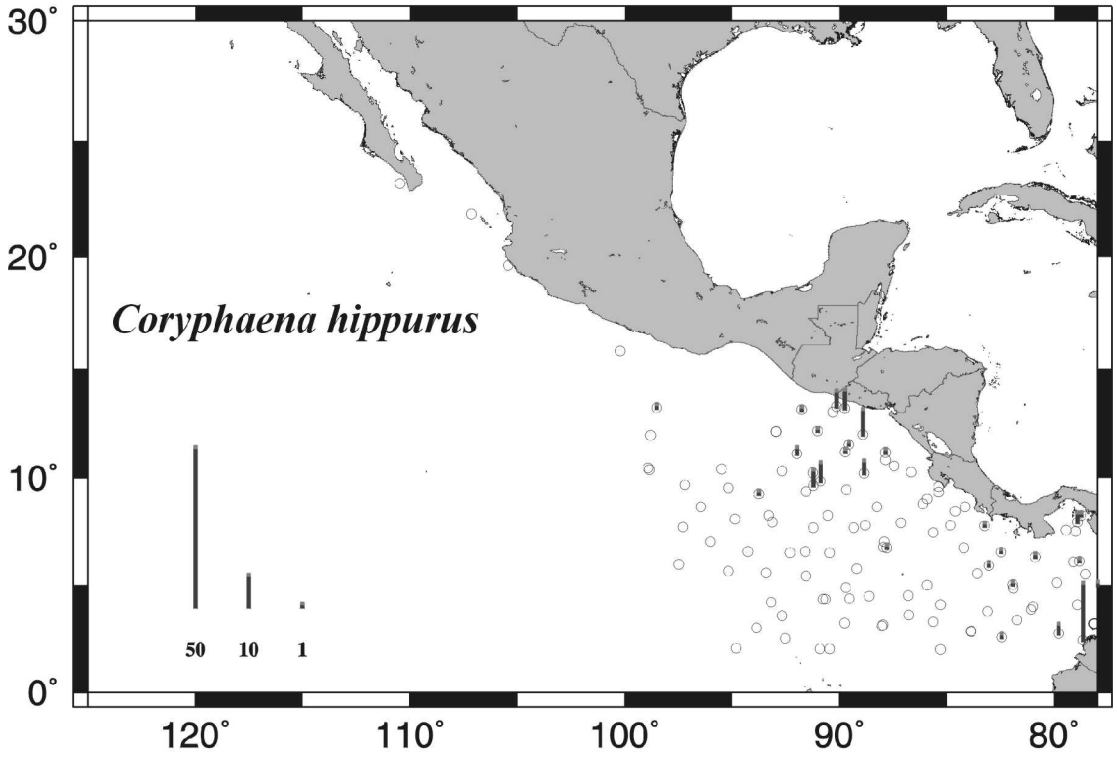

Figure 9. Distribution of *Coryphaena hippurus* larvae from Manta net tows: 9210JD & 9210M4.

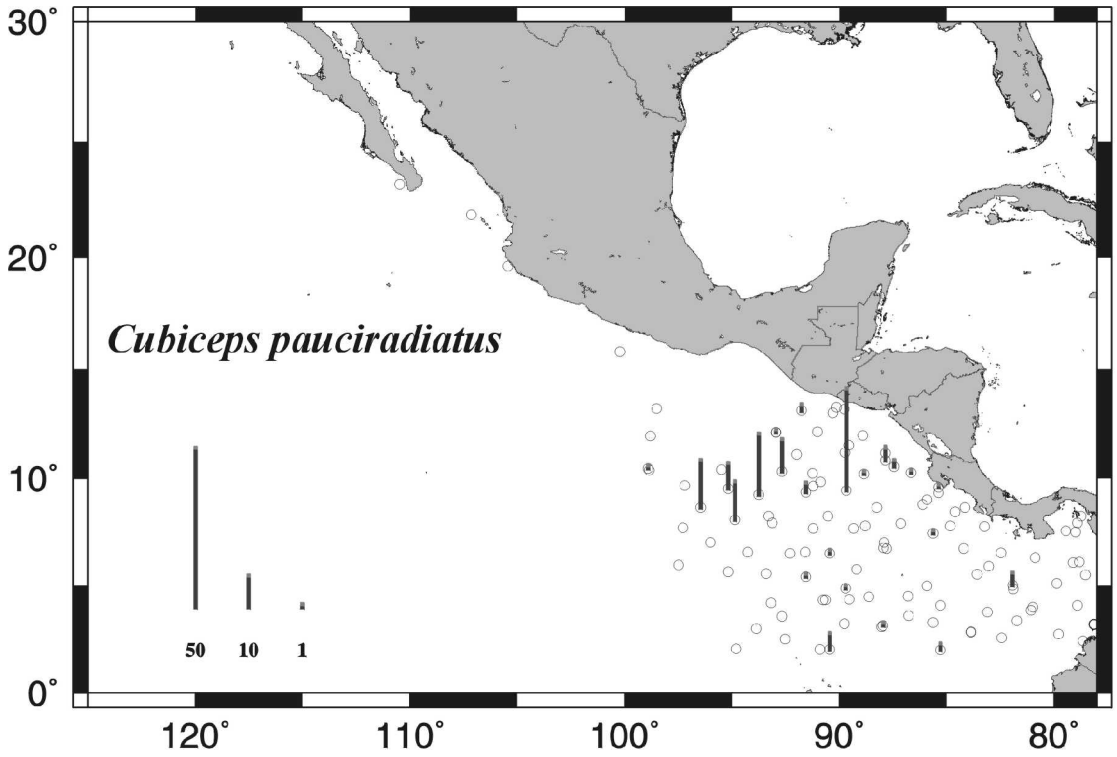

Figure 10. Distribution of *Cubiceps pauciradiatus* larvae from Manta net tows: 9210JD & 9210M4.

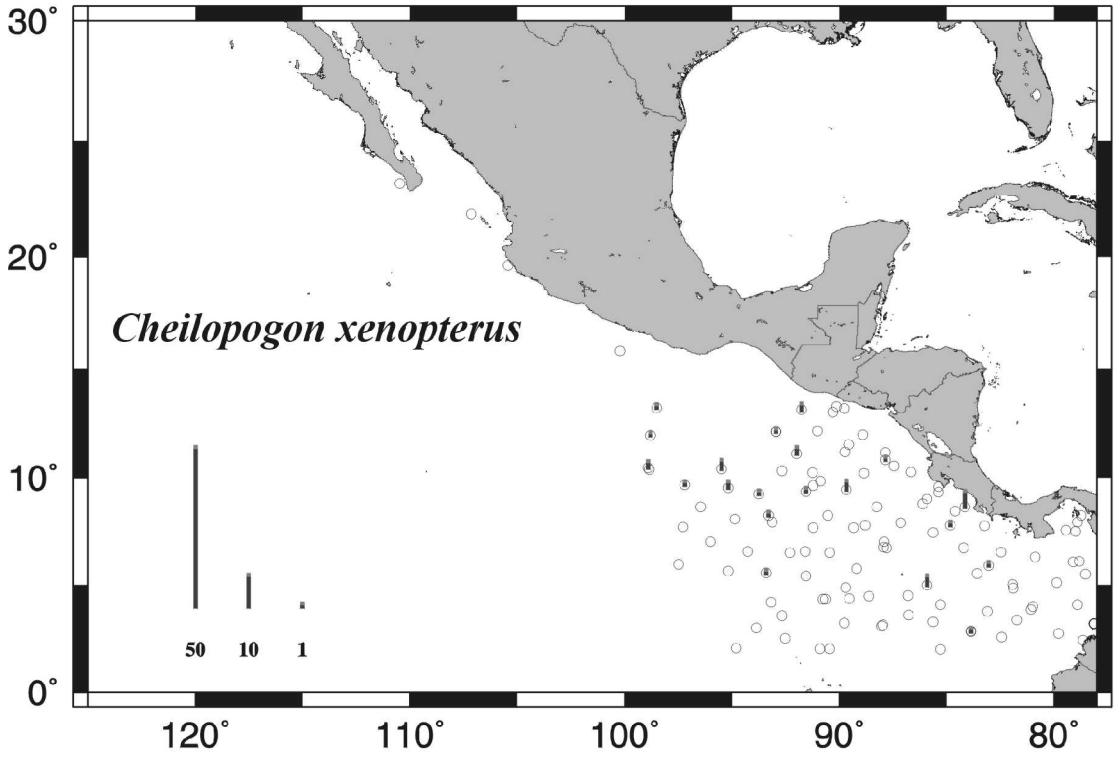

Figure 11. Distribution of *Cheilopogon xenopterus* larvae from Manta net tows: 9210JD & 9210M4.

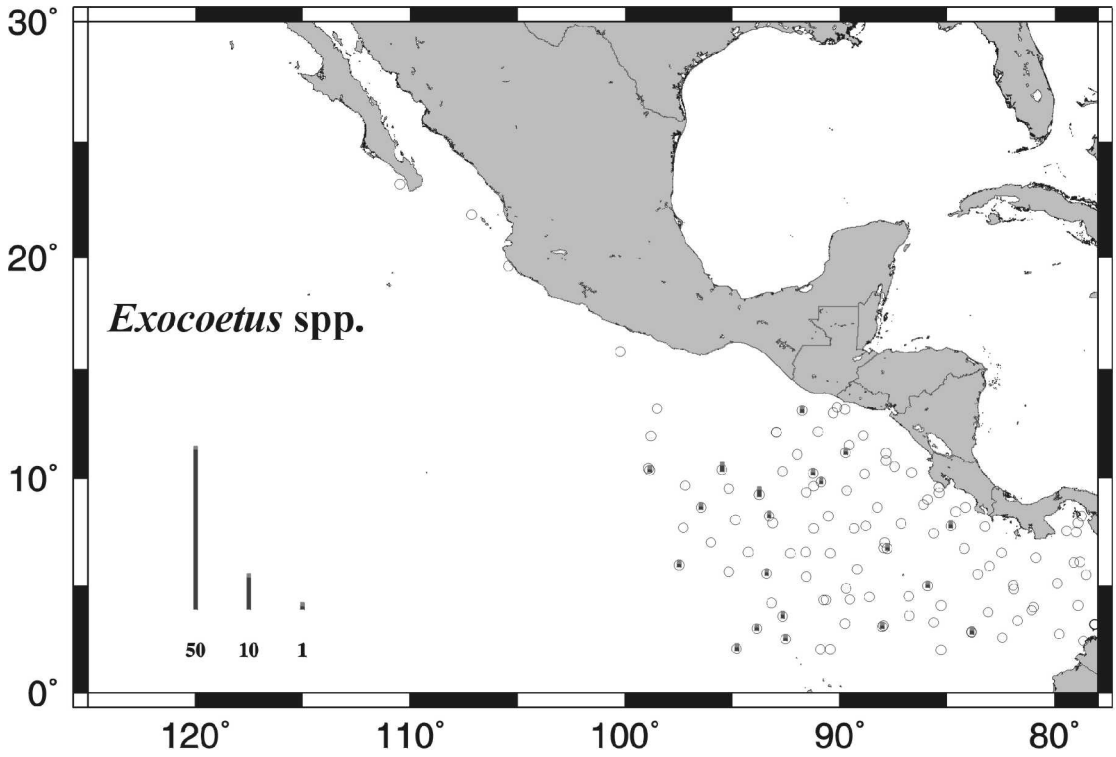

Figure 12. Distribution of *Exocoetus* spp. larvae from Manta net tows: 9210JD & 9210M4.

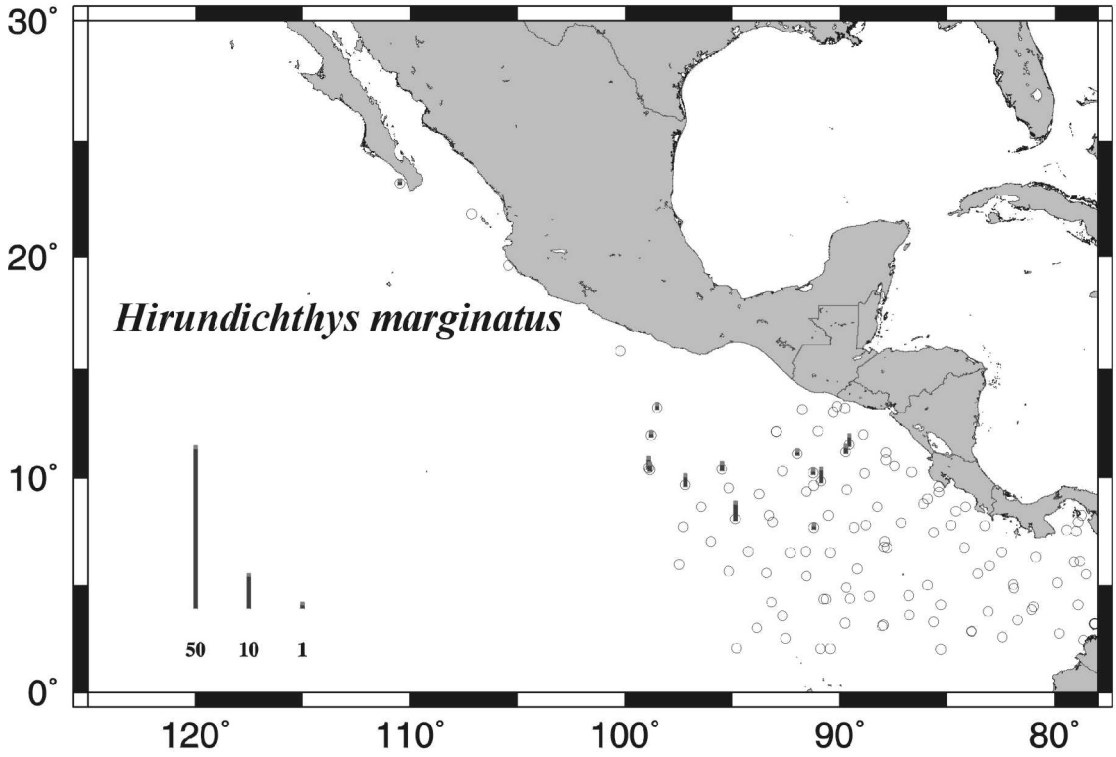

Figure 13. Distribution of *Hirundichthys marginatus* larvae from Manta net tows: 9210JD & 9210M4.

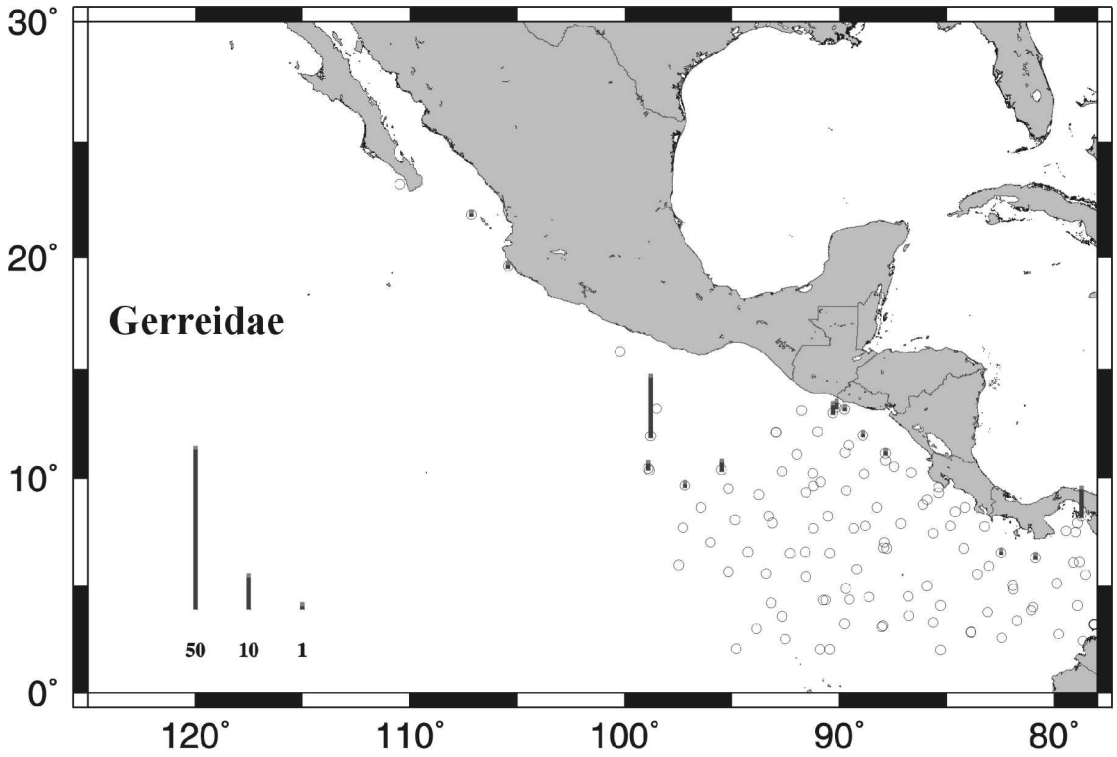

Figure 14. Distribution of Gerreidae larvae from Manta net tows: 9210JD & 9210M4.

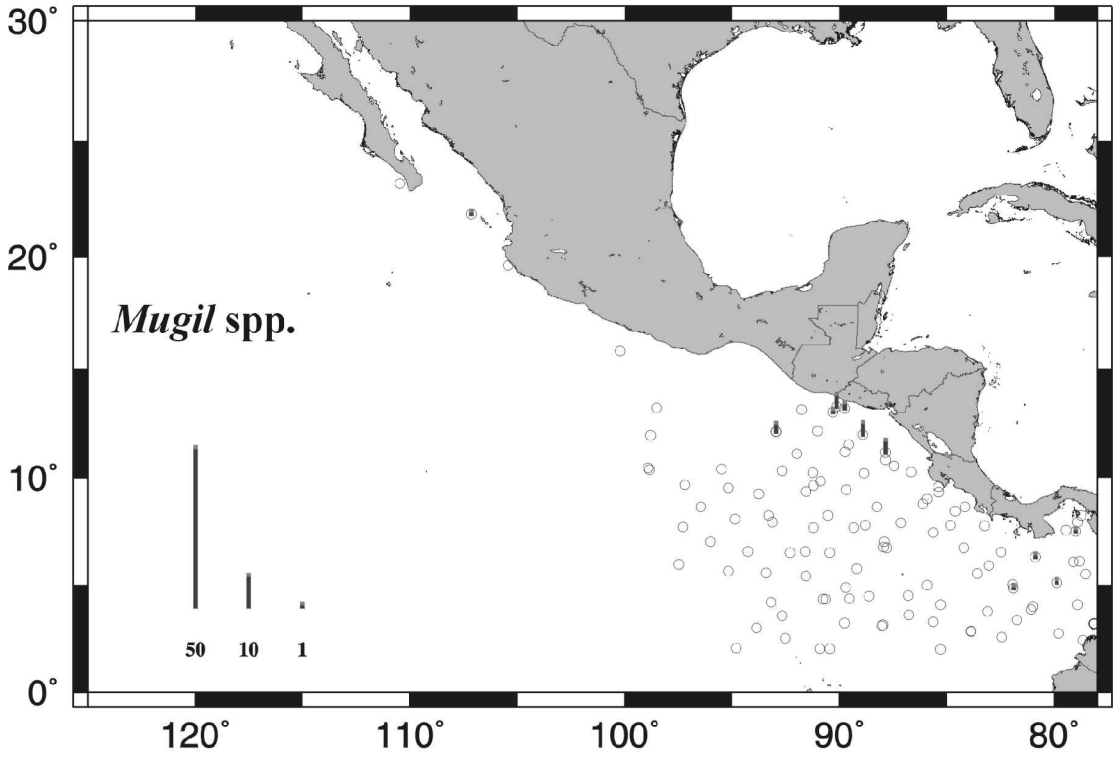

Figure 15. Distribution of *Mugil* spp. larvae from Manta net tows: 9210JD & 9210M4.

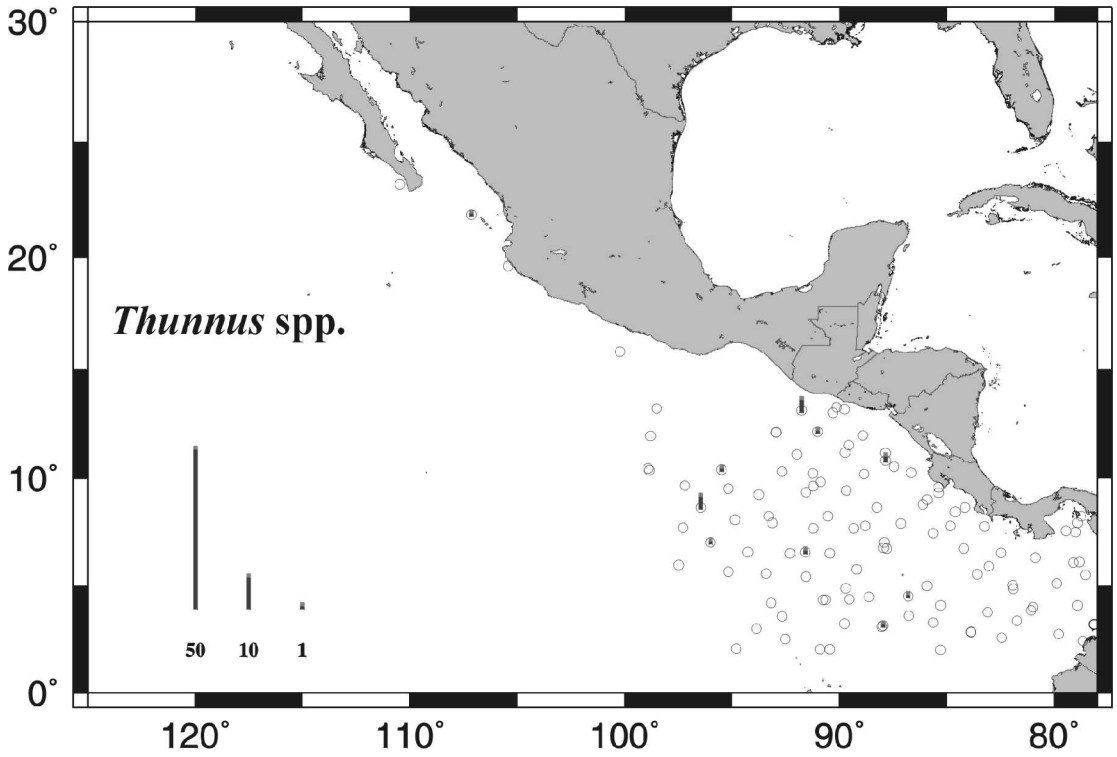

Figure 16. Distribution of *Thunnus* spp. larvae from Manta net tows: 9210JD & 9210M4.

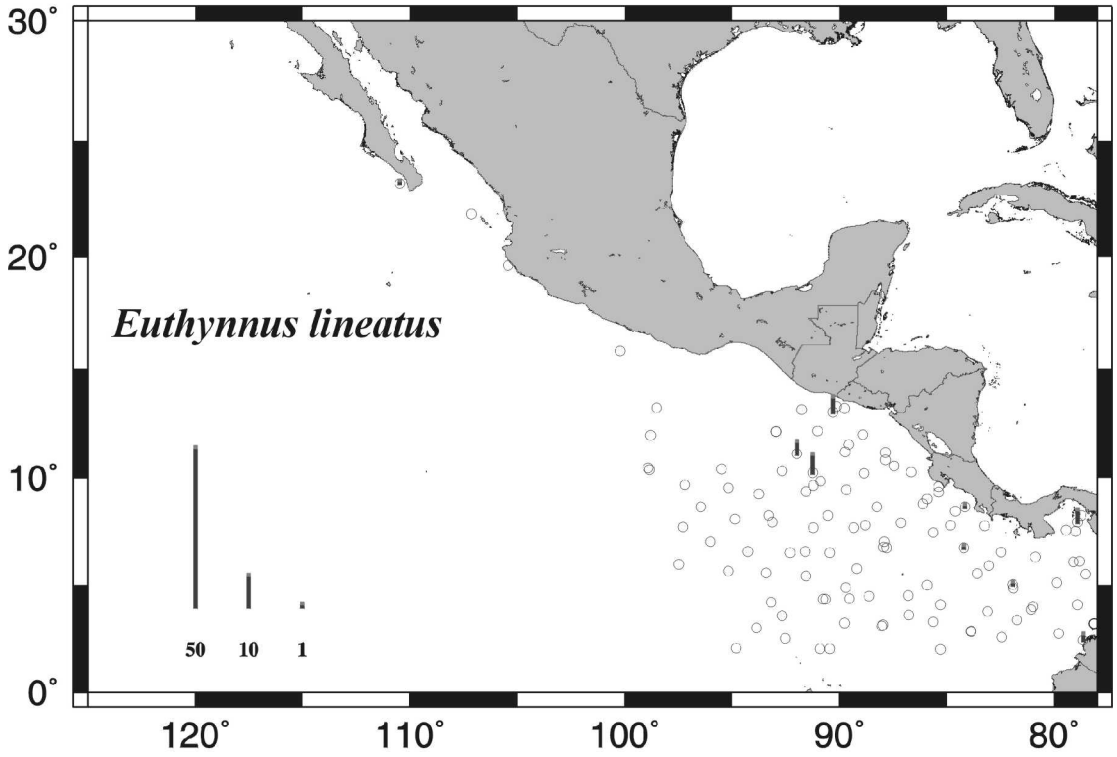

Figure 17. Distribution of *Euthynnus lineatus* larvae from Manta net tows: 9210JD & 9210M4.

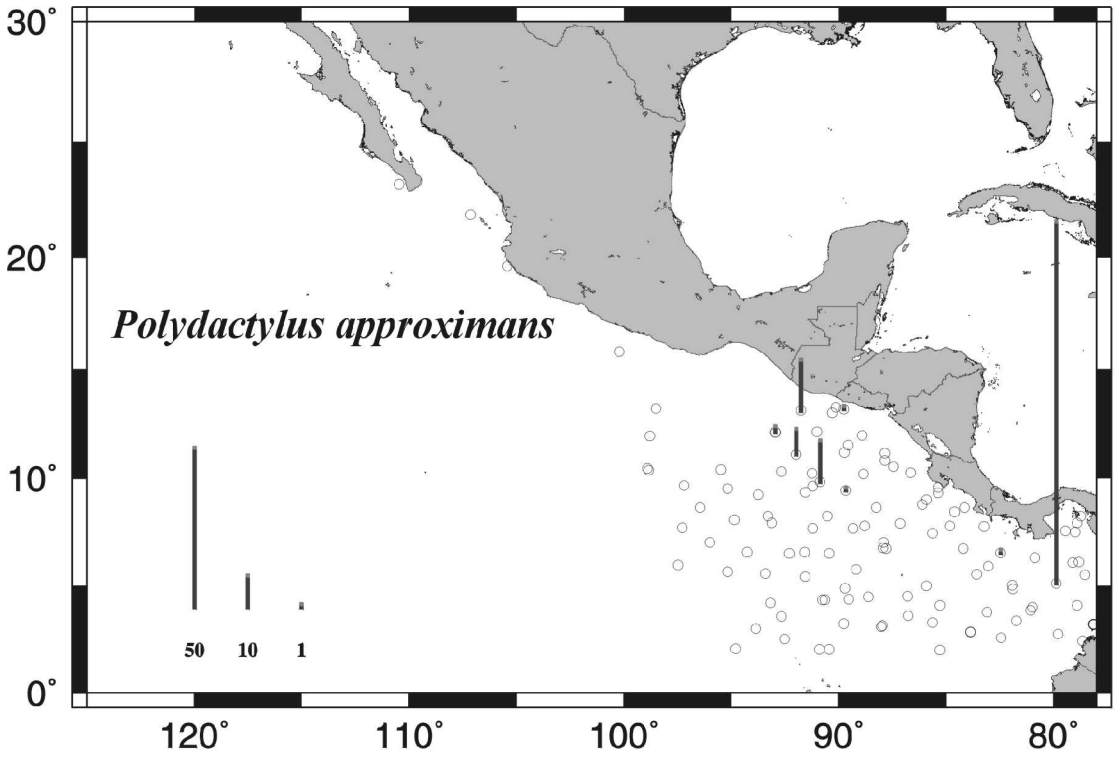

Figure 18. Distribution of *Polydactylus approximans* larvae from Manta net tows: 9210JD & 9210M4.

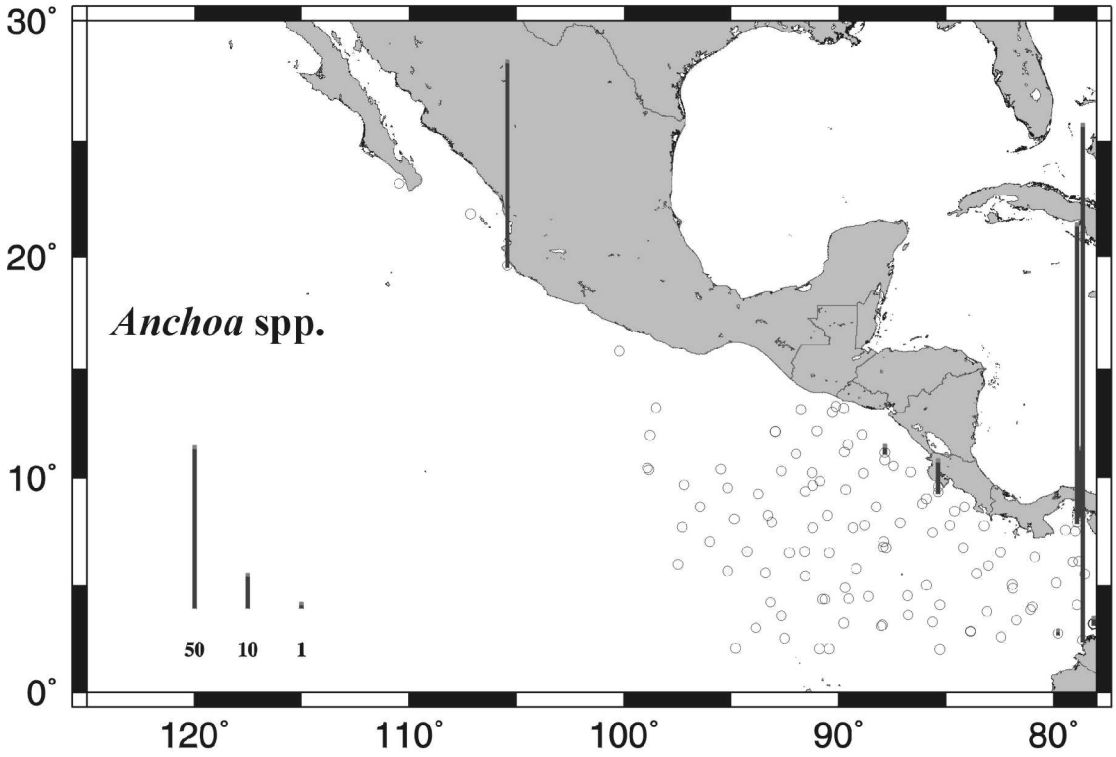

Figure 19. Distribution of *Anchoa* spp. larvae from Manta net tows: 9210JD & 9210M4.

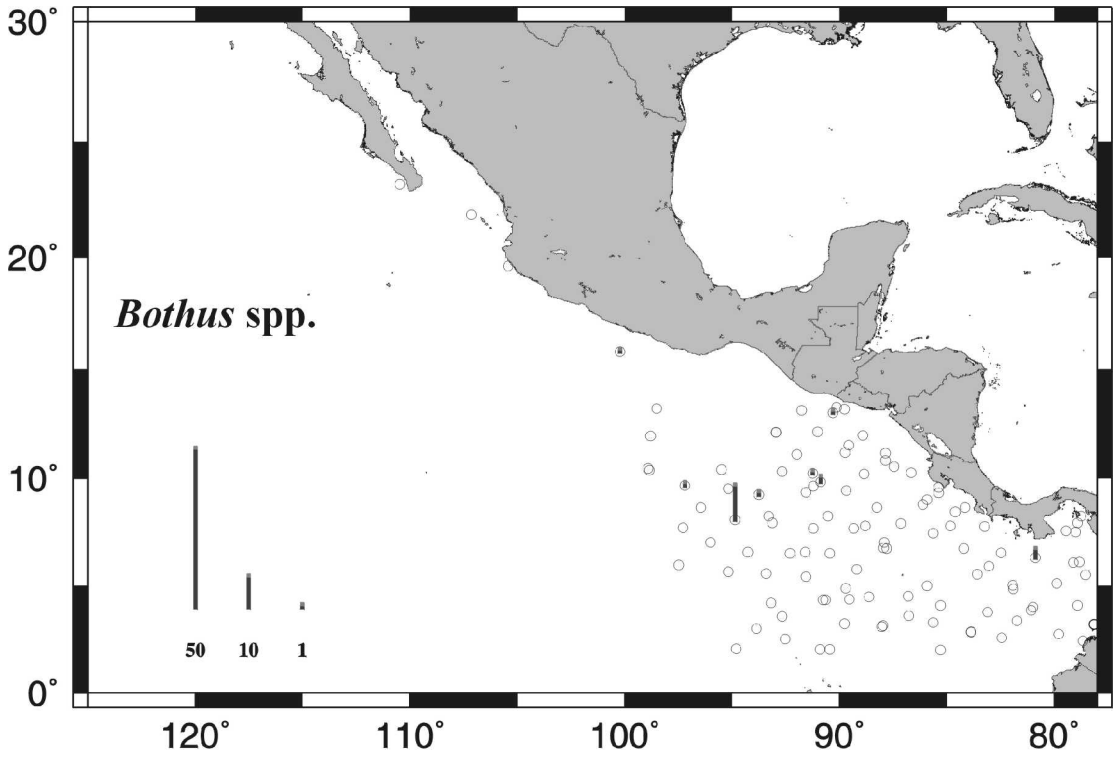

Figure 20. Distribution of *Bothus* spp. larvae from Manta net tows: 9210JD & 9210M4.

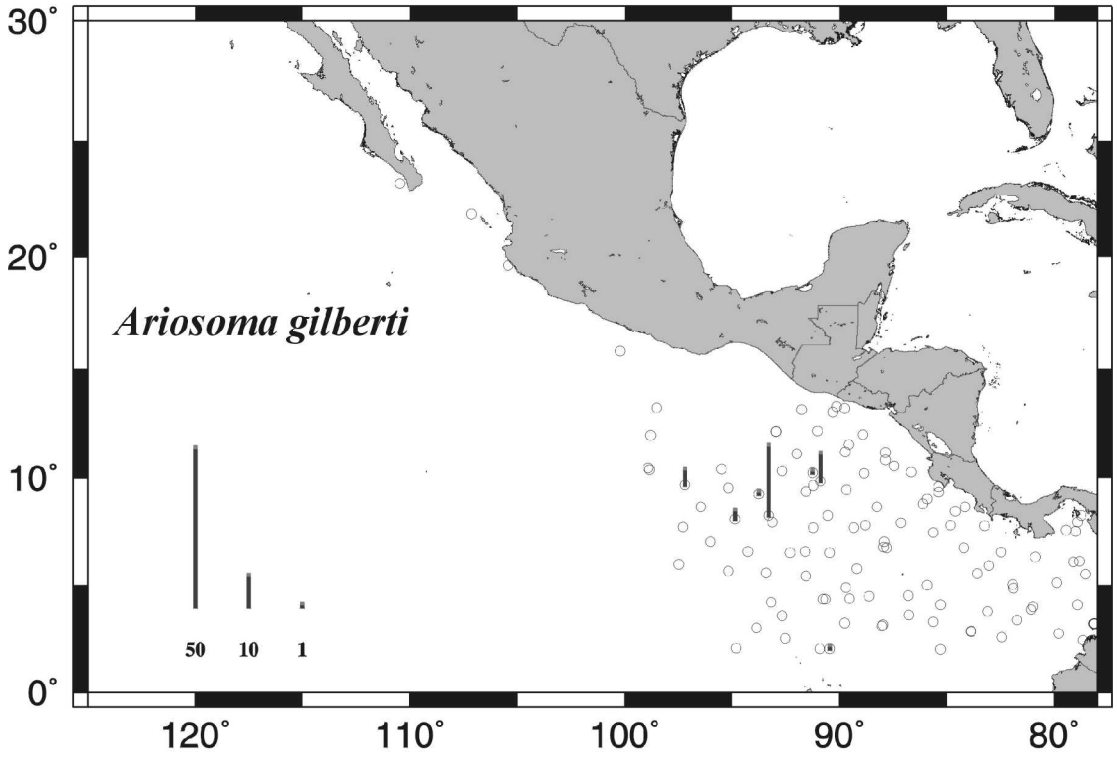

Figure 21. Distribution of *Ariosoma gilberti* larvae from Manta net tows: 9210JD & 9210M4.

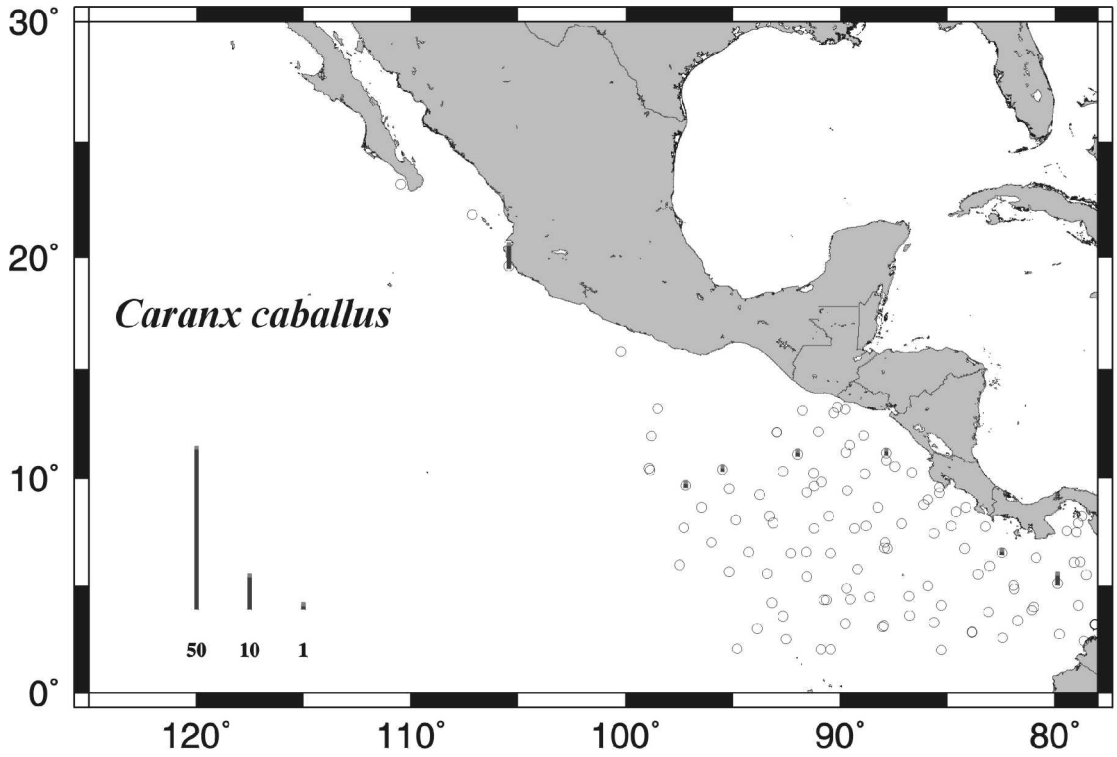

Figure 22. Distribution of *Caranx caballus* larvae from Manta net tows: 9210JD & 9210M4.

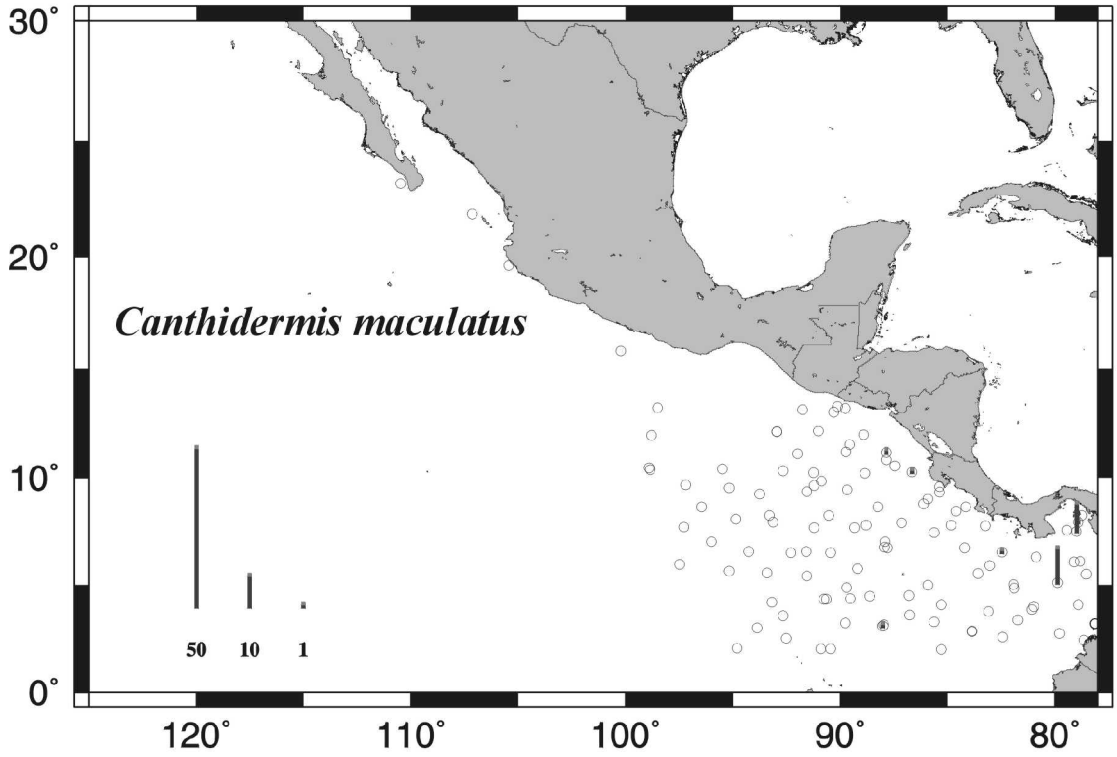

Figure 23. Distribution of *Canthidermis maculatus* larvae from Manta net tows: 9210JD & 9210M4.

Table 1. Station and Manta net tow data for *Jordan* cruise 9210JD and *McArthur* cruise 9210M4.

Tow Number	CTD Station	Lat. deg.	Lat. min.		Long.(W) deg	Long.(W) min.	Region	Ship Code	Tow Date yymmdd	Time (Loc.)	Vol.(m³) Water Strained	Total Larvae	Total Eggs
1		13	07.1	N	91	46.1	3	JD	920808	2050	84.4	88	18
2		12	06.7	N	92	57.3	3	JD	920809	2032	84.8	29	18
3		9	32.8	N	95	10.7	4	JD	920811	2039	83.9	91	1672
4		8	39.0	N	96	27.0	4	JD	920812	2032	78.0	34	283
5		7	42.8	N	97	16.3	4	JD	920813	2032	80.7	5	98
6		5	58.7	N	97	29.5	4	JD	920814	2050	72.8	1	2
7		7	02.1	N	96	00.2	4	JD	920815	2116	81.4	7	5
8		8	06.0	N	94	52.4	3	JD	920816	2021	86.6	58	171
9		9	15.7	N	93	44.8	3	JD	920817	2021	79.7	68	419
10		10	20.2	N	92	41.0	3	JD	920818	2050	103.7	97	283
11		11	07.4	N	91	59.0	3	JD	920819	2042	96.8	96	45
12	1-012	12	07.3	N	92	57.1	3	JD	920820	2032	94.7	10	7
13		9	50.2	N	90	52.3	3	JD	920821	2023	90.8	59	46
14		10	14.0	N	91	14.0	3	JD	920822	2049	94.7	15	139
15		12	09.3	N	91	01.9	3	JD	920823	2107	81.3	12	48
16		13	10.8	N	89	46.7	3	JD	920824	2012	91.3	25	1
17		13	01.4	N	90	18.2	3	JD	920831	2028	78.3	34	57
18		11	11.1	N	89	44.6	3	JD	920901	2031	91.3	22	94
19		11	31.5	N	89	33.9	3	JD	920902	2016	95.3	21	827
20		10	49.7	N	87	50.8	3	JD	920903	2008	89.7	103	359
21		9	01.5	N	85	54.6	3	JD	920904	1748	97.7	13	60
22		8	26.7	N	84	36.5	3	JD	920905	1929	89.4	15	121
23		7	27.1	N	85	37.7	3	JD	920906	1950	103.9	7	107
24		9	35.4	N	85	23.0	3	JD	920909	1947	99.3	79	15
25		4	29.6	N	88	37.3	3	JD	920912	1944	82.0	1	98
26		3	13.8	N	89	46.6	3	JD	920913	1935	86.6	3	213
27		2	02.4	N	90	54.9	3	JD	920914	1947	84.0	30	27
28		4	11.9	N	93	11.7	3	JD	920915	2108	90.4	4	4
29	2-029	3	35.7	N	92	40.0	3	JD	920916	2002	99.0	4	9
30		2	02.8	N	90	27.5	3	JD	920917	2007	94.3	101	31
31		3	09.0	N	87	58.3	3	JD	920918	1943	95.2	130	64
32	2-032	4	31.9	N	86	48.1	3	JD	920919	1947	91.8	81	34
33		7	46.5	N	83	15.0	3	JD	920922	1938	94.5	2	18
34		8	39.8	N	84	08.6	3	JD	920923	1825	88.8	14	0
35		9	20.0	N	85	22.8	3	JD	920924	2138	97.8	14	9
36		7	49.0	N	84	49.4	3	JD	920925	2024	90.3	13	17
37		5	56.2	N	83	03.3	3	JD	920926	2036	88.7	13	67
38		6	20.3	N	80	53.2	3	JD	920927	2009	94.2	10	33
39		7	31.0	N	78	59.8	3	JD	921004	2046	84.9	19	1
40		5	01.3	N	77	57.5	3	JD	921005	2004	92.4	6	19
41		4	06.2	N	78	54.0	3	JD	921006	2011	91.5	2	1158
42		2	50.9	N	83	52.6	3	JD	921010	2040	97.4	6	6
43		2	00.8	N	85	18.3	3	JD	921011	2045	93.4	20	11
44		3	05.1	N	88	02.4	3	JD	921012	1941	87.9	21	8
45		4	54.1	N	89	42.0	3	JD	921013	1949	97.6	3	33
46		6	35.5	N	91	34.8	3	JD	921014	1947	82.0	2	12
47		8	16.3	N	93	18.6	3	JD	921015	2012	95.5	42	67
48		10	23.9	N	95	29.5	4	JD	921016	2000	91.3	68	166

Tow Number	CTD Station	Lat. deg.	Lat. min.		Long.(W) deg	Long.(W) min.	Region	Ship Code	Tow Date yymmdd	Time (Loc.)	Vol.(m³) Water Strained	Total Larvae	Total Eggs
49		9	41.3	N	97	11.7	4	JD	921017	2058	96.1	56	410
50		10	22.8	N	98	51.3	4	JD	921019	2010	92.9	6	8
51		10	28.4	N	98	55.0	4	JD	921022	2028	92.0	16	10
52		11	56.8	N	98	47.7	4	JD	921023	2027	87.8	38	21
53		13	13.5	N	98	31.0	4	JD	921024	2028	100.7	15	13
54		15	47.8	N	100	12.8	1	JD	921026	1910	90.3	8	85
55		19	36.2	N	105	25.1	1	JD	921027	2039	93.7	124	2010
56		21	52.0	N	107	08.7	1	JD	921028	2022	103.1	30	222
57		23	11.6	N	110	27.9	2	JD	921029	2013	92.5	6	173
1		11	10.7	N	87	52.1	3	M4	920808	2000	135.5	42	2
2		10	13.2	N	88	51.7	3	M4	920809	2011	139.0	12	103
3		9	26.3	N	89	40.1	3	M4	920810	2004	134.0	216	401
4		8	16.3	N	90	32.2	3	M4	920811	2002	151.9	6	190
5		7	41.3	N	91	13.1	3	M4	920812	1905	173.4	6	3
6		6	30.9	N	92	17.8	3	M4	920813	1903	150.0	3	2
7		5	34.3	N	93	24.5	3	M4	920814	1902	139.2	5	4
8		5	40.4	N	95	10.4	4	M4	920818	1905	70.9	0	0
9		6	34.9	N	94	16.7	3	M4	920819	1902	116.1	3	13
10		7	57.3	N	93	07.1	3	M4	920820	1900	129.3	9	35
11		9	22.6	N	91	32.7	3	M4	920821	1902	128.8	35	18
12		13	16.6	N	90	08.6	3	M4	920825	1905	79.8	249	119
13		11	59.7	N	88	55.0	3	M4	920901	1858	171.5	39	7
14		10	16.1	N	86	40.0	3	M4	920903	1850	165.7	20	83
15		10	33.5	N	87	28.0	3	M4	920904	1848	157.0	18	542
16		8	38.8	N	88	15.6	3	M4	920905	1906	156.9	8	10
17		7	41.0	N	89	20.5	3	M4	920906	1903	141.3	1	11
18		6	32.2	N	90	26.3	3	M4	920907	1845	147.9	5	19
19		5	26.3	N	91	33.5	3	M4	920908	1850	95.1	3	4
20		4	21.0	N	90	39.0	3	M4	920909	1900	87.3	1	1
21		3	00.6	N	93	51.4	3	M4	920910	1850	202.1	9	0
22		2	04.7	N	94	48.6	3	M4	920911	1850	147.3	16	10
23		2	30.7	N	92	30.9	3	M4	920912	1847	159.3	4	73
24		4	21.7	N	90	45.9	3	M4	920914	1905	143.4	1	25
25		5	46.9	N	89	11.6	3	M4	920915	1850	112.1	0	10
26		6	47.2	N	87	56.3	3	M4	920916	1950	59.9	0	54
27		7	02.0	N	87	55.0	3	M4	920918	1947	88.0	2	13
28		9	38.3	N	91	13.8	3	M4	920920	1955	147.3	44	21
29		7	48.6	N	88	47.6	3	M4	920921	1952	124.5	1	71
30		6	45.2	N	87	47.3	3	M4	920922	1948	153.5	2	96
31		7	54.8	N	87	08.4	3	M4	920923	1948	170.8	3	61
32		8	47.0	N	86	07.2	3	M4	920924	1950	118.9	4	34
33		4	51.9	N	81	54.8	3	M4	920926	1940	119.2	4	51
34		8	15.6	N	78	43.8	3	M4	920928	1928	206.0	102	123004
35		7	57.6	N	78	54.6	3	M4	921004	1848	185.1	116	4
36		6	06.7	N	78	48.9	3	M4	921005	1847	125.2	1	8
37		5	08.4	N	79	52.9	3	M4	921006	1848	157.5	131	140
38		3	59.9	N	80	59.9	3	M4	921007	1913	133.9	3	42
39		5	02.2	N	81	55.7	3	M4	921008	1905	136.0	19	57
40		3	46.6	N	83	05.5	3	M4	921009	1657	86.1	34	10

Tow Number	CTD Station	Lat. deg.	Lat. min.		Long.(W) deg	Long.(W) min.	Region	Ship Code	Tow Date yymmdd	Time (Loc.)	Vol.(m³) Water Strained	Total Larvae	Total Eggs
41		2	52.7	N	83	52.9	3	M4	921010	1959	134.2	4	11
42		4	05.6	N	85	17.6	3	M4	921011	1903	74.9	5	3
43		6	44.9	N	84	12.7	3	M4	921014	1900	165.5	37	33
44		5	00.7	N	85	55.3	3	M4	921015	1915	155.9	9	6
45		3	37.0	N	86	46.9	3	M4	921016	1930	140.4	9	1
46		3	17.5	N	85	37.6	3	M4	921017	1922	99.5	1	12
47		4	23.5	N	89	32.8	3	M4	921018	1905	110.4	2	2
48		5	33.0	N	83	34.3	3	M4	921019	1920	114.5	2	51
49		6	33.0	N	82	29.1	3	M4	921020	1915	139.0	7	75
50		6	05.6	N	79	06.6	3	M4	921022	1855	111.2	0	52
51		5	31.5	N	78	32.4	3	M4	921023	1855	127.1	1	17
52	3-058	4	11.7	N	77	49.5	3	M4	921024	2020	160.9	183	1
53	3-059	3	12.4	N	78	09.0	3	M4	921025	2120	158.1	4	225
54		2	26.3	N	78	39.3	3	M4	921026	1840	129.9	198	26
55		2	45.0	N	79	47.5	3	M4	921027	1857	178.7	6	79
56		3	51.3	N	81	04.7	3	M4	921028	1905	85.9	2	1517
57		2	35.4	N	82	26.4	3	M4	921029	1905	111.6	7	50
58		3	22.5	N	81	43.1	3	M4	921030	1855	100.4	0	18
59		7	35.0	N	79	26.6	3	M4	921101	1905	174.7	0	0

Table 2. Pooled occurrences of fish larvae taken in Manta net tows on *Jordan* cruise 9210JD and *McArthur* cruise 9210M4.

Rank	Taxon	Occurrences
1	*Oxyporhamphus micropterus*	64
2	*Coryphaena equiselis*	61
3	*Vinciguerria lucetia*	37
4	*Auxis* spp.	36
5	*Prognichthys* spp.	30
6	*Coryphaena hippurus*	27
7	*Cubiceps pauciradiatus*	24
8	*Cheilopogon xenopterus*	20
8	*Exocoetus* spp.	20
10	Gerreidae	14
10	*Hirundichthys marginatus*	14
12	*Mugil* spp.	11
13	*Thunnus* spp.	10
14	*Euthynnus lineatus*	9
15	*Polydactylus approximans*	8
15	*Anchoa* spp.	8
15	*Bothus* spp.	8
18	*Caranx caballus*	7
18	*Lampanyctus* spp.	7
18	*Canthidermis maculatus*	7
18	*Hirundichthys* spp.	7
18	*Ariosoma gilberti*	7
23	*Cyclothone* spp.	6
23	*Benthosema panamense*	6
23	*Lampanyctus parvicauda*	6
23	*Opisthonema* spp.	6
27	*Cheilopogon* spp.	5
27	Gobiidae	5
27	*Naucrates ductor*	5
30	*Brama dussumieri*	4
31	Haemulidae	3
31	*Gymnothorax mordax*	3
31	*Symphurus* spp.	3
31	*Cetengraulis mysticetus*	3
31	*Psenes sio*	3
31	*Nomeus gronovii*	3
31	*Istiophorus platypterus*	3
31	*Diaphus* spp.	3
31	*Hygophum proximum*	3
40	*Diplophos proximus*	2
40	*Lestidium* spp.	2
40	*Triphoturus* spp.	2
40	*Oneirodes* spp.	2
40	Engraulidae	2
40	*Melanocetus* spp.	2
40	*Myctophum aurolaternatum*	2
40	Serranidae	2
40	Carangidae	2
40	*Caranx sexfasciatus*	2

Table 2. (cont.)

Rank	Taxon	Occurrences
40	*Decapterus* spp.	2
40	*Cyclothone pseudopallida*	2
40	*Syacium ovale*	2
40	*Caranx* spp.	2
40	*Nealotus tripes*	2
40	Sciaenidae	2
40	*Trachinotus paitensis*	2
40	*Trichiurus nitens*	2
40	*Microspathodon* spp.	2
40	*Trachinotus kennedyi*	2
40	Disintegrated fish larvae	2
40	*Etropus peruvianus*	2
62	*Dormitator latifrons*	1
62	*Lampanyctus ritteri*	1
62	*Hypsoblennius* spp.	1
62	*Entomacrodus chiostictus*	1
62	*Clarkichthys bilineatus*	1
62	*Diaphus pacificus*	1
62	Acanthuridae	1
62	*Bolinichthys* spp.	1
62	*Stemonosudis macrura*	1
62	Dactyloscopidae	1
62	*Synodus evermanni*	1
62	*Synodus* spp.	1
62	*Sternoptyx* spp.	1
62	*Lepophidium* spp.	1
62	*Acanthocybium solandri*	1
62	*Psenes pellucidus*	1
62	Paralichthyidae	1
62	*Cyclopsetta panamensis*	1
62	*Symphurus elongatus*	1
62	Clupeidae	1
62	*Balistes polylepis*	1
62	*Ophichthus zophochir*	1
62	*Ophichthus* spp.	1
62	Anguilliformes	1
62	*Astronesthes* spp.	1
62	*Lutjanus* spp.	1
62	*Selar crumenophthalmus*	1
62	*Oligoplites* spp.	1
62	*Seriola lalandi*	1
62	*Hemicaranx* spp.	1
62	*Seriola peruana*	1
62	Unidentified fish larvae	1
62	*Albula* spp.	1
62	*Alectis ciliaris*	1
62	*Howella pammelas*	1
62	Opistognathidae	1
62	Epinephelinae	1
62	*Coryphaena* spp.	1
62	*Scorpaena* spp.	1

Table 2. (cont.)

Rank	Taxon	Occurrences
62	*Trachipterus fukuzakii*	1
62	Pomacentridae	1
62	*Zu cristatus*	1
62	*Selene* spp.	1
62	Ogcocephalidae	1
62	*Xyrichtys* spp.	1
62	*Dolopichthys* spp.	1
62	*Myripristis leiognathos*	1
62	*Hemiramphus saltator*	1
62	*Scopelogadus bispinosus*	1
62	*Kyphosus* spp.	1
62	Mullidae	1
62	*Fodiator acutus*	1
62	*Lobotes surinamensis*	1
62	*Lutjanus novemfasciatus*	1
62	*Scarus* spp.	1
62	*Ceratias holboelli*	1
	Total	606

Table 3. Pooled counts of fish larvae taken in Manta net tows on *Jordan* cruise 9210JD and *McArthur* cruise 9210M4.

Rank	Taxon	Count
1	*Oxyporhamphus micropterus*	573
2	*Vinciguerria lucetia*	395
3	*Anchoa* spp.	354
4	*Coryphaena equiselis*	291
5	*Auxis* spp.	287
6	*Opisthonema* spp.	230
7	*Cetengraulis mysticetus*	199
8	*Polydactylus approximans*	155
9	*Prognichthys* spp.	148
10	*Cubiceps pauciradiatus*	130
11	*Coryphaena hippurus*	77
12	*Benthosema panamense*	66
13	Gobiidae	53
14	Gerreidae	46
15	*Ariosoma gilberti*	42
16	*Cheilopogon xenopterus*	34
17	*Hirundichthys marginatus*	30
18	*Euthynnus lineatus*	25
18	*Canthidermis maculatus*	25
20	*Mugil* spp.	23
21	*Exocoetus* spp.	22
22	*Bothus* spp.	21
23	*Hemiramphus saltator*	19
24	*Thunnus* spp.	17
25	*Lampanyctus* spp.	16
26	*Caranx caballus*	15
27	*Scarus* spp.	11
28	Sciaenidae	10
28	*Hirundichthys* spp.	10
28	Paralichthyidae	10
31	*Triphoturus* spp.	8
31	Clupeidae	8
31	*Lampanyctus parvicauda*	8
34	*Lobotes surinamensis*	7
34	*Trachinotus kennedyi*	7
34	*Oligoplites* spp.	7
34	*Diaphus* spp.	7
34	*Cyclothone* spp.	7
39	*Naucrates ductor*	6
40	Haemulidae	5
40	*Cheilopogon* spp.	5
42	*Microspathodon* spp.	4
42	*Gymnothorax mordax*	4
42	*Nealotus tripes*	4
42	*Fodiator acutus*	4
42	*Myctophum aurolaternatum*	4
42	*Nomeus gronovii*	4
42	*Brama dussumieri*	4

Table 3. (cont.)

Rank	Taxon	Count
42	*Hygophum proximum*	4
50	*Caranx* spp.	3
50	Engraulidae	3
50	Acanthuridae	3
50	*Synodus* spp.	3
50	*Symphurus* spp.	3
50	*Psenes sio*	3
50	Serranidae	3
50	*Istiophorus platypterus*	3
50	*Lestidium* spp.	3
50	*Clarkichthys bilineatus*	3
50	*Etropus peruvianus*	3
50	*Trichiurus nitens*	3
62	*Astronesthes* spp.	2
62	*Synodus evermanni*	2
62	*Kyphosus* spp.	2
62	*Diplophos proximus*	2
62	*Syacium ovale*	2
62	*Caranx sexfasciatus*	2
62	*Diaphus pacificus*	2
62	*Lutjanus* spp.	2
62	Disintegrated fish larvae	2
62	*Trachinotus paitensis*	2
62	*Psenes pellucidus*	2
62	Unidentified fish larvae	2
62	*Oneirodes* spp.	2
62	Carangidae	2
62	*Cyclothone pseudopallida*	2
62	*Melanocetus* spp.	2
62	*Hemicaranx* spp.	2
62	*Decapterus* spp.	2
80	*Albula* spp.	1
80	Ogcocephalidae	1
80	Dactyloscopidae	1
80	*Ceratias holboelli*	1
80	*Dolopichthys* spp.	1
80	*Hypsoblennius* spp.	1
80	*Lepophidium* spp.	1
80	*Cyclopsetta panamensis*	1
80	*Sternoptyx* spp.	1
80	*Symphurus elongatus*	1
80	*Entomacrodus chiostictus*	1
80	*Myripristis leiognathos*	1
80	Opistognathidae	1
80	*Acanthocybium solandri*	1
80	*Seriola peruana*	1
80	*Selar crumenophthalmus*	1
80	*Seriola lalandi*	1
80	*Selene* spp.	1
80	Mullidae	1
80	*Lutjanus novemfasciatus*	1

Table 3. (cont.)

Rank	Taxon	Count
80	*Howella pammelas*	1
80	Epinephelinae	1
80	Pomacentridae	1
80	*Xyrichtys* spp.	1
80	*Scopelogadus bispinosus*	1
80	*Dormitator latifrons*	1
80	*Zu cristatus*	1
80	*Trachipterus fukuzakii*	1
80	*Ophichthus* spp.	1
80	*Coryphaena* spp.	1
80	*Ophichthus zophochir*	1
80	*Alectis ciliaris*	1
80	Anguilliformes	1
80	*Stemonosudis macrura*	1
80	*Scorpaena* spp.	1
80	*Lampanyctus ritteri*	1
80	*Bolinichthys* spp.	1
80	*Balistes polylepis*	1
	Total	3551

Table 4. Numbers of fish larvae taken in Manta net tows on *Jordan* cruise 9210JD and *McArthur* cruise 9210M4.

Albula spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
49	JD		4	1	1.04

Anguilliformes

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
11	JD		3	1	1.03

Gymnothorax mordax

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
8	JD		3	1	1.15
11	JD		3	1	1.03
47	JD		3	2	2.09

Ophichthus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
49	JD		4	1	1.04

Ophichthus zophochir

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
52	M4	3-058	3	1	0.62

Ariosoma gilberti

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
8	JD		3	3	3.46
9	JD		3	1	1.25
13	JD		3	9	9.91
14	JD		3	1	1.06
30	JD		3	1	1.06
47	JD		3	22	23.04
49	JD		4	5	5.20

Clupeidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
56	JD		1	8	7.76

Opisthonema spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	M4		3	165	206.77
16	JD		3	4	4.38
17	JD		3	14	17.88

Opisthonema spp. (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
48	JD		4	7	7.67
52	JD		4	15	17.08
55	JD		1	25	26.68

Engraulidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
17	JD		3	2	2.55
57	M4		3	1	0.90

Anchoa spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	M4		3	2	1.48
34	M4		3	21	10.19
35	M4		3	93	50.24
35	JD		3	10	10.22
53	M4	3-059	3	2	1.27
54	M4		3	161	123.94
55	M4		3	1	0.56
55	JD		1	64	68.30

Cetengraulis mysticetus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	M4		3	2	1.48
12	M4		3	18	22.56
52	M4	3-058	3	179	111.25

Cyclothone spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
20	JD		3	1	1.11
29	JD	2-029	3	1	1.01
30	JD		3	2	2.12
31	JD		3	1	1.05
32	JD	2-032	3	1	1.09
38	JD		3	1	1.06

Cyclothone pseudopallida

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
36	JD		3	1	1.11
40	M4		3	1	1.16

Diplophos proximus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
7	JD		4	1	1.23
32	JD	2-032	3	1	1.09

Sternoptyx spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
48	M4		3	1	0.87

Vinciguerria lucetia

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
7	JD		4	4	4.91
8	JD		3	2	2.31
9	JD		3	1	1.25
11	M4		3	1	0.78
14	JD		3	2	2.11
15	JD		3	8	9.84
17	JD		3	2	2.55
18	M4		3	1	0.68
19	M4		3	1	1.05
20	JD		3	3	3.34
22	M4		3	9	6.11
26	JD		3	3	3.46
27	JD		3	28	33.33
28	JD		3	2	2.21
29	JD	2-029	3	2	2.02
30	JD		3	72	76.35
31	JD		3	100	105.04
32	JD	2-032	3	72	78.43
34	JD		3	1	1.13
36	JD		3	2	2.21
37	JD		3	5	5.64
40	M4		3	27	31.36
41	M4		3	1	0.75
42	JD		3	1	1.03
42	M4		3	1	1.34
43	JD		3	6	6.42
43	M4		3	1	0.60
44	JD		3	12	13.65
44	M4		3	2	1.28
45	M4		3	8	5.70
46	M4		3	1	1.01
47	JD		3	1	1.05

Vinciguerria lucetia (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
49	JD		4	4	4.16
51	JD		4	2	2.17
56	M4		3	1	1.16
57	JD		2	1	1.08
57	M4		3	5	4.48

Astronesthes spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
30	JD		3	2	2.12

Synodus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	M4		3	3	1.46

Synodus evermanni

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
47	JD		3	2	2.09

Lestidium spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
27	M4		3	1	1.14
31	JD		3	2	2.10

Stemonosudis macrura

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
31	JD		3	1	1.05

Bolinichthys spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
23	M4		3	1	0.63

Diaphus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
30	JD		3	1	1.06
31	JD		3	5	5.25
32	JD	2-032	3	1	1.09

Diaphus pacificus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
31	JD		3	2	2.10

Lampanyctus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
3	JD		4	2	2.38
14	M4		3	1	0.60
27	JD		3	1	1.19
30	JD		3	6	6.36
31	JD		3	4	4.20
32	JD	2-032	3	1	1.09
44	JD		3	1	1.14

Lampanyctus parvicauda

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
18	JD		3	1	1.10
20	JD		3	1	1.11
31	JD		3	3	3.15
40	M4		3	1	1.16
43	JD		3	1	1.07
51	JD		4	1	1.09

Lampanyctus ritteri

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
28	M4		3	1	0.68

Triphoturus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
30	JD		3	4	4.24
31	JD		3	4	4.20

Benthosema panamense

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
11	JD		3	3	3.10
18	JD		3	2	2.19
20	JD		3	58	64.66
27	JD		3	1	1.19
33	JD		3	1	1.06
44	JD		3	1	1.14

Hygophum proximum

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
30	JD		3	2	2.12
43	JD		3	1	1.07
44	JD		3	1	1.14

Myctophum aurolaternatum

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
31	JD		3	3	3.15
44	JD		3	1	1.14

Trachipterus fukuzakii

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
30	JD		3	1	1.06

Zu cristatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
43	JD		3	1	1.07

Lepophidium spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
35	JD		3	1	1.02

Ogcocephalidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
55	JD		1	1	1.07

Melanocetus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
4	JD		4	1	1.28
31	JD		3	1	1.05

Dolopichthys spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
28	JD		3	1	1.11

Oneirodes spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
20	M4		3	1	1.15
44	JD		3	1	1.14

Ceratias holboelli

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
30	JD		3	1	1.06

Hemiramphus saltator

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	M4		3	19	23.81

Cheilopogon spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
7	M4		3	1	0.72
10	M4		3	1	0.77
15	M4		3	1	0.64
55	JD		1	1	1.07
57	JD		2	1	1.08

Cheilopogon xenopterus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	2	2.37
2	JD		3	1	1.18
3	JD		4	2	2.38
3	M4		3	3	2.24
7	M4		3	1	0.72
9	JD		3	1	1.25
11	M4		3	1	0.78
11	JD		3	2	2.07
20	JD		3	1	1.11
34	JD		3	5	5.63
36	JD		3	1	1.11
37	JD		3	1	1.13
42	JD		3	1	1.03
44	M4		3	3	1.92
47	JD		3	1	1.05
48	JD		4	3	3.29
49	JD		4	1	1.04
51	JD		4	2	2.17
52	JD		4	1	1.14
53	JD		4	1	0.99

Exocoetus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	1	1.18
4	JD		4	1	1.28
6	JD		4	1	1.37
7	M4		3	1	0.72
9	JD		3	2	2.51
13	JD		3	1	1.10
14	JD		3	1	1.06
18	JD		3	1	1.10
21	M4		3	1	0.49
22	M4		3	1	0.68

Exocoetus spp. (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
23	M4		3	1	0.63
29	JD	2-029	3	1	1.01
30	M4		3	1	0.65
36	JD		3	1	1.11
42	JD		3	1	1.03
44	JD		3	1	1.14
44	M4		3	1	0.64
47	JD		3	1	1.05
48	JD		4	2	2.19
50	JD		4	1	1.08

Fodiator acutus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	M4		3	4	5.01

Hirundichthys spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
11	M4		3	3	2.33
13	JD		3	1	1.10
15	M4		3	1	0.64
18	M4		3	2	1.35
21	JD		3	1	1.02
22	M4		3	1	0.68
49	JD		4	1	1.04

Hirundichthys marginatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
5	M4		3	1	0.58
8	JD		3	5	5.77
11	JD		3	1	1.03
13	JD		3	4	4.41
14	JD		3	1	1.06
18	JD		3	2	2.19
19	JD		3	3	3.15
48	JD		4	2	2.19
49	JD		4	3	3.12
50	JD		4	2	2.15
51	JD		4	3	3.26
52	JD		4	1	1.14
53	JD		4	1	0.99
57	JD		2	1	1.08

Oxyporhamphus micropterus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	38	45.02
1	M4		3	4	2.95
2	JD		3	5	5.90
2	M4		3	4	2.88
3	JD		4	55	65.55
3	M4		3	161	120.15
4	JD		4	5	6.41
4	M4		3	3	1.97
5	JD		4	5	6.20
7	JD		4	1	1.23
8	JD		3	10	11.55
9	JD		3	21	26.35
10	M4		3	8	6.19
10	JD		3	10	9.64
11	M4		3	14	10.87
11	JD		3	5	5.17
12	JD	1-012	3	6	6.34
13	M4		3	12	7.00
13	JD		3	5	5.51
14	JD		3	3	3.17
14	M4		3	2	1.21
15	M4		3	7	4.46
16	JD		3	1	1.10
16	M4		3	2	1.27
17	M4		3	1	0.71
18	JD		3	10	10.95
19	JD		3	4	4.20
19	M4		3	1	1.05
20	JD		3	13	14.49
21	M4		3	8	3.96
21	JD		3	4	4.09
22	JD		3	3	3.36
22	M4		3	3	2.04
23	JD		3	1	0.96
24	JD		3	26	26.18
25	JD		3	1	1.22
27	M4		3	1	1.14
28	M4		3	15	10.18
29	M4		3	1	0.80
31	M4		3	2	1.17

Oxyporhamphus micropterus (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
32	JD	2-032	3	2	2.18
32	M4		3	1	0.84
34	JD		3	1	1.13
35	JD		3	1	1.02
36	JD		3	7	7.75
38	JD		3	1	1.06
40	M4		3	2	2.32
40	JD		3	1	1.08
41	M4		3	3	2.24
42	JD		3	3	3.08
42	M4		3	2	2.67
43	M4		3	2	1.21
43	JD		3	5	5.35
44	M4		3	1	0.64
45	JD		3	1	1.02
47	JD		3	8	8.38
47	M4		3	2	1.81
48	JD		4	30	32.86
49	JD		4	8	8.32
52	JD		4	1	1.14
53	JD		4	7	6.95
54	JD		1	1	1.11
56	M4		3	1	1.16
56	JD		1	1	0.97

Prognichthys spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	9	10.66
2	JD		3	4	4.72
3	M4		3	6	4.48
4	M4		3	1	0.66
4	JD		4	1	1.28
5	M4		3	5	2.88
10	JD		3	2	1.93
11	JD		3	10	10.33
12	JD	1-012	3	2	2.11
12	M4		3	5	6.27
13	JD		3	10	11.01
13	M4		3	6	3.50
14	M4		3	5	3.02

Prognichthys spp. (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
16	JD		3	2	2.19
17	JD		3	2	2.55
21	JD		3	1	1.02
22	JD		3	1	1.12
24	JD		3	17	17.12
34	JD		3	4	4.50
35	M4		3	2	1.08
35	JD		3	1	1.02
38	JD		3	1	1.06
39	M4		3	9	6.62
47	JD		3	1	1.05
48	JD		4	5	5.48
49	JD		4	21	21.85
51	JD		4	4	4.35
54	JD		1	4	4.43
55	M4		3	1	0.56
56	JD		1	6	5.82

Scopelogadus bispinosus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
9	M4		3	1	0.86

Myripristis leiognathos

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
55	M4		3	1	0.56

Scorpaena spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
35	M4		3	1	0.54

Serranidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	M4		3	2	1.48
43	JD		3	1	1.07

Epinephelinae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
20	JD		3	1	1.11

Opistognathidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
35	M4		3	1	0.54

Howella pammelas

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
30	JD		3	1	1.06

Carangidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	M4		3	1	0.49
54	M4		3	1	0.77

Alectis ciliaris

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
19	JD		3	1	1.05

Caranx spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
35	M4		3	2	1.08
39	JD		3	1	1.18

Caranx caballus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	M4		3	1	0.74
11	JD		3	1	1.03
37	M4		3	3	1.90
48	JD		4	1	1.10
49	JD		4	1	1.04
49	M4		3	1	0.72
55	JD		1	7	7.47

Caranx sexfasciatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
11	JD		3	1	1.03
19	JD		3	1	1.05

Decapterus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
39	M4		3	1	0.74
54	M4		3	1	0.77

Hemicaranx spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	M4		3	2	2.51

Naucrates ductor

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	1	1.18
11	M4		3	1	0.78
14	M4		3	1	0.60
20	JD		3	1	1.11
38	M4		3	2	1.49

Oligoplites spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	M4		3	7	8.77

Selar crumenophthalmus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
17	JD		3	1	1.28

Selene spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
40	M4		3	1	1.16

Seriola lalandi

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
57	JD		2	1	1.08

Seriola peruana

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
35	M4		3	1	0.54

Trachinotus kennedyi

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	M4		3	2	1.48
12	M4		3	5	6.27

Trachinotus paitensis

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	M4		3	1	1.25
13	M4		3	1	0.58

Coryphaena spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
13	M4		3	1	0.58

Coryphaena equiselis

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	12	14.22
2	M4		3	3	2.16
2	JD		3	7	8.25
3	M4		3	4	2.99
3	JD		4	7	8.34
4	M4		3	2	1.32
6	M4		3	3	2.00
7	M4		3	2	1.44
9	M4		3	2	1.72
10	JD		3	5	4.82
11	M4		3	11	8.54
11	JD		3	18	18.60
12	JD	1-012	3	1	1.06
12	M4		3	2	2.51
13	M4		3	6	3.50
13	JD		3	3	3.30
14	M4		3	8	4.83
15	JD		3	2	2.46
15	M4		3	5	3.18
16	JD		3	7	7.67
16	M4		3	6	3.82
17	JD		3	1	1.28
18	JD		3	1	1.10
19	JD		3	3	3.15
20	JD		3	5	5.57
21	JD		3	6	6.14
22	JD		3	11	12.30
23	JD		3	5	4.81
23	M4		3	2	1.26
24	M4		3	1	0.70
24	JD		3	29	29.20
28	M4		3	3	2.04
30	JD		3	2	2.12
31	M4		3	1	0.59
31	JD		3	1	1.05
32	JD	2-032	3	1	1.09
32	M4		3	3	2.52

Coryphaena equiselis (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	JD		3	2	2.25
36	JD		3	1	1.11
37	M4		3	3	1.90
37	JD		3	5	5.64
39	JD		3	6	7.07
39	M4		3	1	0.74
40	JD		3	4	4.33
41	JD		3	2	2.19
42	M4		3	1	1.34
43	JD		3	3	3.21
43	M4		3	31	18.73
44	M4		3	1	0.64
45	JD		3	1	1.02
45	M4		3	1	0.71
47	JD		3	4	4.19
48	JD		4	7	7.67
48	M4		3	1	0.87
49	JD		4	5	5.20
50	JD		4	3	3.23
52	M4	3-058	3	1	0.62
52	JD		4	1	1.14
53	JD		4	5	4.97
54	M4		3	10	7.70
56	JD		1	1	0.97

Coryphaena hippurus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	1	1.18
1	M4		3	1	0.74
2	M4		3	4	2.88
9	JD		3	1	1.25
11	JD		3	2	2.07
12	M4		3	5	6.27
13	M4		3	8	4.66
13	JD		3	6	6.61
15	JD		3	1	1.23
16	JD		3	6	6.57
18	JD		3	1	1.10
19	JD		3	1	1.05
28	M4		3	5	3.39

Coryphaena hippurus (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
30	M4		3	1	0.65
33	JD		3	1	1.06
34	M4		3	1	0.49
35	M4		3	3	1.62
36	M4		3	1	0.80
37	JD		3	1	1.13
38	JD		3	1	1.06
39	M4		3	1	0.74
40	JD		3	1	1.08
49	M4		3	1	0.72
53	JD		4	1	0.99
54	M4		3	18	13.86
55	M4		3	3	1.68
57	M4		3	1	0.90

Brama dussumieri

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
20	JD		3	1	1.11
28	JD		3	1	1.11
31	JD		3	1	1.05
32	JD	2-032	3	1	1.09

Lutjanus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
56	JD		1	2	1.94

Lutjanus novemfasciatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
17	JD		3	1	1.28

Lobotes surinamensis

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	M4		3	7	8.77

Gerreidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	M4		3	1	0.74
12	M4		3	2	2.51
13	M4		3	1	0.58
16	JD		3	1	1.10
17	JD		3	3	3.83

Gerreidae (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	M4		3	9	4.37
38	JD		3	1	1.06
48	JD		4	3	3.29
49	M4		3	1	0.72
49	JD		4	1	1.04
51	JD		4	2	2.17
52	JD		4	19	21.64
55	JD		1	1	1.07
56	JD		1	1	0.97

Haemulidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	M4		3	2	1.48
49	M4		3	1	0.72
52	M4	3-058	3	2	1.24

Sciaenidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
54	M4		3	2	1.54
55	JD		1	8	8.54

Polydactylus approximans

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	16	18.96
2	JD		3	2	2.36
3	M4		3	1	0.75
11	JD		3	8	8.26
13	JD		3	13	14.32
16	JD		3	1	1.10
37	M4		3	113	71.75
49	M4		3	1	0.72

Mullidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
55	JD		1	1	1.07

Kyphosus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
56	JD		1	2	1.94

Mugil spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	M4		3	4	2.95
2	JD		3	3	3.54
12	M4		3	4	5.01
13	M4		3	4	2.33
16	JD		3	2	2.19
17	JD		3	1	1.28
33	M4		3	1	0.84
37	M4		3	1	0.63
38	JD		3	1	1.06
39	JD		3	1	1.18
56	JD		1	1	0.97

Pomacentridae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
35	M4		3	1	0.54

Microspathodon spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
39	JD		3	2	2.36
55	JD		1	2	2.13

Xyrichtys spp.

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

Scarus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	M4		3	11	5.34

Dactyloscopidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
35	M4		3	1	0.54

Entomacrodus chiostictus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
57	JD		2	1	1.08

Hypsoblennius spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
54	M4		3	1	0.77

Dormitator latifrons

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
55	JD		1	1	1.07

Gobiidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	M4		3	1	1.25
33	M4		3	1	0.84
34	M4		3	46	22.33
35	M4		3	4	2.16
39	M4		3	1	0.74

Clarkichthys bilineatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	M4		3	3	1.46

Acanthuridae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	M4		3	3	1.46

Nealotus tripes

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
44	JD		3	2	2.28
56	JD		1	2	1.94

Trichiurus nitens

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
20	JD		3	2	2.23
53	M4	3-059	3	1	0.63

Istiophorus platypterus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	JD	1-012	3	1	1.06
20	JD		3	1	1.11
48	JD		4	1	1.10

Acanthocybium solandri

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
20	JD		3	1	1.11

Auxis spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	M4		3	18	13.28

Auxis spp. (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	2	2.37
2	JD		3	6	7.08
3	M4		3	9	6.72
3	JD		4	17	20.26
4	JD		4	7	8.97
8	JD		3	14	16.17
9	JD		3	21	26.35
10	JD		3	70	67.50
11	JD		3	39	40.29
11	M4		3	1	0.78
13	JD		3	5	5.51
15	M4		3	1	0.64
16	JD		3	1	1.10
17	JD		3	1	1.28
18	JD		3	4	4.38
18	M4		3	1	0.68
19	JD		3	8	8.39
20	JD		3	8	8.92
21	JD		3	1	1.02
24	JD		3	6	6.04
28	M4		3	20	13.58
30	JD		3	1	1.06
33	M4		3	1	0.84
35	M4		3	2	1.08
35	JD		3	1	1.02
39	M4		3	1	0.74
40	M4		3	2	2.32
44	M4		3	1	0.64
46	JD		3	1	1.22
48	JD		4	5	5.48
49	JD		4	3	3.12
49	M4		3	1	0.72
54	JD		1	2	2.21
55	JD		1	2	2.13
56	JD		1	4	3.88

Euthynnus lineatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
11	JD		3	4	4.13
14	JD		3	6	6.34
17	JD		3	5	6.39

Euthynnus lineatus (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	JD		3	1	1.13
35	M4		3	4	2.16
39	M4		3	1	0.74
43	M4		3	1	0.60
54	M4		3	2	1.54
57	JD		2	1	1.08

Thunnus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	4	4.74
4	JD		4	4	5.13
7	JD		4	1	1.23
15	JD		3	1	1.23
20	JD		3	2	2.23
31	JD		3	1	1.05
32	JD	2-032	3	1	1.09
46	JD		3	1	1.22
48	JD		4	1	1.10
56	JD		1	1	0.97

Cubiceps pauciradiatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	JD		3	2	2.37
1	M4		3	2	1.48
2	M4		3	1	0.72
2	JD		3	1	1.18
3	JD		4	8	9.54
3	M4		3	32	23.88
4	JD		4	15	19.23
8	JD		3	12	13.86
9	JD		3	19	23.84
10	JD		3	10	9.64
11	M4		3	3	2.33
14	M4		3	1	0.60
15	M4		3	2	1.27
18	M4		3	1	0.68
19	M4		3	1	1.05
20	JD		3	4	4.46
23	JD		3	1	0.96
24	JD		3	1	1.01

Cubiceps pauciradiatus (cont.)

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
30	JD		3	5	5.30
31	JD		3	1	1.05
39	M4		3	4	2.94
43	JD		3	2	2.14
45	JD		3	1	1.02
51	JD		4	1	1.09

Nomeus gronovii

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
42	M4		3	1	1.34
43	M4		3	2	1.21
51	M4		3	1	0.79

Psenes pellucidus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
22	M4		3	2	1.36

Psenes sio

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
14	M4		3	1	0.60
33	M4		3	1	0.84
51	JD		4	1	1.09

Paralichthyidae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
55	JD		1	10	10.67

Cyclopsetta panamensis

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
54	M4		3	1	0.77

Etropus peruvianus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	M4		3	2	0.97
54	M4		3	1	0.77

Syacium ovale

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
37	JD		3	1	1.13
55	JD		1	1	1.07

Bothus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
8	JD		3	11	12.70
9	JD		3	1	1.25
13	JD		3	2	2.20
14	JD		3	1	1.06
17	JD		3	1	1.28
38	JD		3	3	3.18
49	JD		4	1	1.04
54	JD		1	1	1.11

Symphurus spp.

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	M4		3	1	1.25
15	M4		3	1	0.64
38	JD		3	1	1.06

Symphurus elongatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
53	M4	3-059	3	1	0.63

Balistes polylepis

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
38	M4		3	1	0.75

Canthidermis maculatus

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
1	M4		3	1	0.74
14	M4		3	1	0.60
35	M4		3	1	0.54
37	M4		3	11	6.98
39	JD		3	9	10.60
44	JD		3	1	1.14
49	M4		3	1	0.72

Disintegrated fish larvae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
12	M4		3	1	1.25
48	JD		4	1	1.10

Unidentified fish larvae

Tow Number	Ship Code	CTD Number	Region	Count	Count per 100m³
34	M4		3	2	0.97

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 9210JD and *McArthur* cruise 9210M4.

Taxon	Region 1	2	3	4
Albula spp.	-	-	-	1.0
Anguilliformes	-	-	1.0	-
Gymnothorax mordax	-	-	1.2	-
Ophichthus spp.	-	-	-	1.0
Ophichthus zophochir	-	-	1.6	-
Ariosoma gilberti	-	-	5.7	4.8
Clupeidae	8.2	-	-	-
Opisthonema spp.	23.4	-	48.8	9.8
Engraulidae	-	-	1.3	-
Anchoa spp.	60.0	-	63.1	-
Cetengraulis mysticetus	-	-	101.7	-
Cyclothone spp.	-	-	1.1	-
Cyclothone pseudopallida	-	-	0.9	-
Diplophos proximus	-	-	0.9	0.8
Sternoptyx spp.	-	-	1.1	-
Vinciguerria lucetia	-	0.9	11.1	3.0
Astronesthes spp.	-	-	1.9	-
Synodus spp.	-	-	6.2	-
Synodus evermanni	-	-	1.9	-
Lestidium spp.	-	-	1.4	-
Stemonosudis macrura	-	-	1.0	-
Bolinichthys spp.	-	-	1.6	-
Diaphus spp.	-	-	2.2	-
Diaphus pacificus	-	-	1.9	-
Lampanyctus spp.	-	-	2.3	1.7
Lampanyctus parvicauda	-	-	1.3	0.9
Lampanyctus ritteri	-	-	1.5	-
Triphoturus spp.	-	-	3.8	-
Benthosema panamense	-	-	9.9	-
Hygophum proximum	-	-	1.2	-
Myctophum aurolaternatum	-	-	1.9	-
Trachipterus fukuzakii	-	-	0.9	-
Zu cristatus	-	-	0.9	-
Lepophidium spp.	-	-	1.0	-
Ogcocephalidae	0.9	-	-	-
Melanocetus spp.	-	-	1.0	0.8
Dolopichthys spp.	-	-	0.9	-
Oneirodes spp.	-	-	0.9	-
Ceratias holboelli	-	-	0.9	-
Hemiramphus saltator	-	-	15.2	-
Cheilopogon spp.	0.9	0.9	1.4	-
Cheilopogon xenopterus	-	-	1.8	1.5
Exocoetus spp.	-	-	1.2	1.1
Fodiator acutus	-	-	3.2	-

Taxon	Region 1	2	3	4
Hirundichthys spp.	-	-	2.0	1.0
Hirundichthys marginatus	-	0.9	2.3	1.9
Oxyporhamphus micropterus	1.0	-	10.0	12.2
Prognichthys spp.	4.9	-	5.0	7.3
Scopelogadus bispinosus	-	-	1.2	-
Myripristis leiognathos	-	-	1.8	-
Scorpaena spp.	-	-	1.9	-
Serranidae	-	-	1.8	-
Epinephelinae	-	-	0.9	-
Opistognathidae	-	-	1.9	-
Howella pammelas	-	-	0.9	-
Carangidae	-	-	1.7	-
Alectis ciliaris	-	-	1.0	-
Caranx spp.	-	-	2.3	-
Caranx caballus	6.6	-	2.1	0.9
Caranx sexfasciatus	-	-	1.0	-
Decapterus spp.	-	-	1.3	-
Hemicaranx spp.	-	-	1.6	-
Naucrates ductor	-	-	1.5	-
Oligoplites spp.	-	-	5.6	-
Selar crumenophthalmus	-	-	0.8	-
Selene spp.	-	-	0.9	-
Seriola lalandi	-	0.9	-	-
Seriola peruana	-	-	1.9	-
Trachinotus kennedyi	-	-	3.4	-
Trachinotus paitensis	-	-	1.3	-
Coryphaena spp.	-	-	1.7	-
Coryphaena equiselis	1.0	-	5.7	4.3
Coryphaena hippurus	-	-	3.7	1.0
Brama dussumieri	-	-	0.9	-
Lutjanus spp.	2.1	-	-	-
Lutjanus novemfasciatus	-	-	0.8	-
Lobotes surinamensis	-	-	5.6	-
Gerreidae	1.0	-	3.6	5.6
Haemulidae	-	-	2.4	-
Sciaenidae	7.5	-	2.6	-
Polydactylus approximans	-	-	27.0	-
Mullidae	0.9	-	-	-
Kyphosus spp.	2.1	-	-	-
Mugil spp.	1.0	-	2.5	-
Pomacentridae	-	-	1.9	-
Microspathodon spp.	1.9	-	1.7	-
Xyrichtys spp.	1.0	-	-	-
Scarus spp.	-	-	22.7	-
Dactyloscopidae	-	-	1.9	-
Entomacrodus chiostictus	-	0.9	-	-

Taxon	Region 1	2	3	4
Hypsoblennius spp.	-	-	1.3	-
Dormitator latifrons	0.9	-	-	-
Gobiidae	-	-	21.1	-
Clarkichthys bilineatus	-	-	6.2	-
Acanthuridae	-	-	6.2	-
Nealotus tripes	2.1	-	1.8	-
Trichiurus nitens	-	-	1.7	-
Istiophorus platypterus	-	-	0.9	0.9
Acanthocybium solandri	-	-	0.9	-
Auxis spp.	2.6	-	9.0	6.8
Euthynnus lineatus	-	0.9	3.4	-
Thunnus spp.	1.0	-	1.4	1.6
Cubiceps pauciradiatus	-	-	5.5	6.4
Nomeus gronovii	-	-	1.8	-
Psenes pellucidus	-	-	2.9	-
Psenes sio	-	-	1.4	0.9
Paralichthyidae	9.4	-	-	-
Cyclopsetta panamensis	-	-	1.3	-
Etropus peruvianus	-	-	2.7	-
Syacium ovale	0.9	-	0.9	-
Bothus spp.	0.9	-	2.8	1.0
Symphurus spp.	-	-	1.1	-
Symphurus elongatus	-	-	1.6	-
Balistes polylepis	-	-	1.3	-
Canthidermis maculatus	-	-	4.6	-
Disintegrated fish larvae	-	-	0.8	0.9
Unidentified fish larvae	-	-	4.1	-

Table 6. Numbers (raw counts) and size ranges of juvenile fishes taken in Manta tows on *Jordan* cruise 9210JD and *McArthur* cruise 9210JD. Some larger specimens (e.g., myctophids) may be adults.

STOMIIFORMES
Astronesthidae

Astronesthes gibbsi
M4 31 (1) 60 mm; **M4 49** (1) 40 mm.

MYCTOPHIFORMES
Myctophidae

Lampanyctus omostigma
JD 8 (2) 41-50 mm.
M4 32 (1) 48 mm.

Gonichthys tenuiculus
JD 8 (8) 15-30 mm; **JD 10** (2) 20-21 mm; **JD 18** (2) 16-18 mm; **JD 22** (2) 16-18 mm; **JD 23** (2) 21 mm; **JD 25** (1) 18 mm; **JD 29** (2) 15-16 mm; **JD 30** (2) 15 mm; **JD 32** (1) 16 mm; **JD 33** (1) 17 mm; **JD 36** (10) 15-17 mm; **JD 37** (12) 15-17 mm; **JD 38** (2) 16-23 mm; **JD 46** (2) 19-22 mm; **JD 49** (3) 21-22 mm; **JD 50** (6) 14-23 mm; **JD 51** (3) 15-16 mm; **JD 56** (1) 15 mm; **JD 57** (3) 16-18 mm.

M4 2 (2) 20-21 mm; **M4 4** (26) 17-41 mm; **M4 5** (14) 16-39 mm; **M4 7** (3) 19-21 mm; **M4 9** (10) 20-40 mm; **M4 10** (4) 30-49 mm; **M4 14** (6) 17-20 mm; **M4 15** (2) 19-26 mm; **M4 16** (6) 16-33 mm; **M4 17** (2) 19-31 mm; **M4 18** (2) 40-41 mm; **M4 19** (3) 19-20 mm; **M4 20** (1) 19 mm; **M4 21** (4) 17-38 mm; **M4 22** (1) 20 mm; **M4 23** (5) 20-41 mm; **M4 24** (3) 18-20 mm; **M4 25** (1) 20 mm; **M4 26** (1) 22 mm; **M4 27** (12) 16-38 mm; **M4 28** (9) 15-16 mm; **M4 29** (14) 15-22 mm; **M4 30** (23) 14-39 mm; **M4 31** (18) 14-43 mm; **M4 32** (19) 15-41 mm; **M4 33** (13) 15-18 mm; **M4 37** (2) 17-20 mm; **M4 38** (8) 18-20 mm; **M4 39** (16) 18-42 mm; **M4 42** (1) 24 mm; **M4 43** (16) 21-35 mm; **M4 44** (7) 20-38 mm; **M4 45** (41) 18-42 mm; **M4 47** (4) 14-39 mm; **M4 48** (4) 16-23 mm; **M4 49** (1) 16 mm; **M4 51** (1) 21 mm; **M4 52** (2) 37-41 mm; **M4 53** (2) 17-40 mm; **M4 55** (31) 15-43 mm; **M4 57** (12) 15-39 mm; **M4 58** (4) 15-32 mm; **M4 59** (1) 18 mm.

Loweina rara
M4 44 (2) 27-29 mm.

Myctophum aurolaternatum
JD 8 (1) 29 mm; **JD 27** (1) 61 mm; **JD 38** (1) 25 mm; **JD 47** (1) 74 mm; **JD 51** (1) 24 mm; **JD 53** (3) 23-25 mm; **JD 54** (1) 22 mm.
M4 30 (1) 57 mm; **M4 39** (2) 30-32 mm; **M4 41** (1) 33 mm.

Myctophum nitidulum
JD 13 (1) 14 mm; **JD 27** (1) 25 mm; **JD 30** (1) 15 mm; **JD 31** (1) 15 mm; **JD 32** (1) 14 mm; **JD 33** (1) 15 mm; **JD 36** (1) 15 mm; **JD 37** (6) 14-16 mm; **JD 38** (2) 14-16 mm.

M4 5 (2) 27-29 mm; **M4 6** (3) 19-32 mm; **M4 18** (3) 21-26 mm; **M4 20** (1) 20 mm; **M4 21** (1) 22 mm; **M4 23** (5) 19-25 mm; **M4 25** (1) 20 mm; **M4 33** (3) 16-18 mm; **M4 39** (2) 20-21 mm; **M4 41** (4) 20-52 mm; **M4 43** (6) 19-24 mm; **M4 44** (3) 24-52 mm; **M4 48** (1) 15 mm; **M4 53** (2) 16-32 mm; **M4 57** (1) 17 mm.

Symbolophorus evermanni
JD 31 (2) 18-19 mm; **JD 32** (9) 17-20 mm; **JD 34** (1) 19 mm; **JD 37** (3) 19-20 mm; **JD 38** (1) 20 mm.
M4 25 (1) 45 mm; **M4 29** (2) 19-20 mm; **M4 30** (1) 44 mm; **M4 31** (2) 19-20 mm; **M4 48** (2) 20-57 mm; **M4**

51 (1) 19 mm.

BELONIFORMES
Hemiramphidae

Hemiramphus saltator
M4 36 (1) 52 mm.

Exocoetidae

Cypselurus sp.
M4 36 (1) 34 mm.

Exocoetus monocirrhus
M4 20 (1) 40 mm; **M4 44** (2) 27-28 mm; **M4 48** (1) 29 mm.

Oxyporhamphus micropterus
JD 8 (1) 45 mm.

Prognichthys tringa
JD 1 (1) 16 mm; **JD 16** (1) 19 mm; **JD 53** (2) 13 mm.

PERCIFORMES
Carangidae

Caranx sexfasciatus
JD 14 (1) 22 mm.

Trachinotus rhodopus
M4 36 (1) 21 mm.

Coryphaenidae

Coryphaena equiselis
JD 10 (1) 22 mm; **JD 12** (1) 23 mm; **JD 23** (1) 20 mm; **JD 30** (1) 32 mm; **JD 48** (1) 18 mm.
M4 5 (1) 26 mm; **M4 22** (1) 24 mm; **M4 36** (1) 57 mm; **M4 38** (1) 20 mm.

Coryphaena hippurus
JD 11 (1) 21 mm; **JD 16** (1) 29 mm.

Lobotidae

Lobotes surinamensis
M4 36 (14) 16-25 mm.

Polynemidae

Polydactylus approximans
JD 1 (2) 14-15 mm; **JD 2** (28) 13-26 mm; **JD 33** (1) 17 mm.
M4 37 (6) 18-24 mm; **M4 51** (1) 19 mm; **M4 53** (1) 19 mm.

Kyphosidae

Kyphosus (*elegans*?)
M4 36 (2) 23-23 mm.

Mugilidae

Mugil cephalus
JD 49 (1) 12 mm.
M4 54 (1) 13 mm.

Mugil spp.
JD 2 (1) 15 mm; **JD 54** (2) 10-17 mm; **JD 55** (1) 18 mm; **JD 56** (2) 11-16 mm.
M4 13 (1) 15 mm; **M4 35** (1) 14 mm.

Acanthuridae

Acanthurus triostegus
JD 34 (1) 19 mm.

Istiophoridae

Istiophorus platypterus
M4 49 (1) 62 mm.

Nomeidae

Nomeus gronovii
M4 37 (4) 14-39 mm; **M4 39** (1) 14 mm.

PLEURONECTIFORMES
Cynoglossidae

Symphurus spp.
M4 12 (1) 11 mm.

TETRAODONTIFORMES
Balistidae

Canthidermis maculatus
JD 16 (1) 13 mm; **JD 33** (1) 24 mm; **JD 34** (1) 10 mm; **JD 49** (1) 8 mm.
M4 36 (9) 17-23 mm.

Diodontidae

Diodon eydouxii
JD 52 (2) 5-6 mm.

Diodon holocanthus
JD 56 (1) 7 mm.

PHYLOGENETIC INDEX TO TABLES 4 AND 6

Albuliformes
Albulidae
Albula spp. 28
Anguilliformes 28
Muraenidae
Gymnothorax mordax 28
Ophichthidae
Ophichthus spp. 28
Ophichthus zophochir 28
Congridae
Ariosoma gilberti 28
Clupeiformes
Clupeidae 28
Opisthonema spp. 28
Engraulidae 28
Anchoa spp. 28
Cetengraulis mysticetis 28
Stomiiformes
Gonostomatidae
Cyclothone spp. 28
Cyclothone pseudopallida 28
Diplophos proximus 29
Sternoptychidae
Sternoptyx spp. 29
Phosichthyidae
Vinciguerria lucetia 29
Stomiidae
Astronesthinae
Astronesthes spp. 29
Astronesthes gibbsi 43
Aulopiformes
Synodontidae
Synodus spp. 29
Synodus evermanni 29
Paralepididae
Lestidium spp. 29
Stemonosudis macrura 29
Myctophiformes
Myctophidae
Lampanyctinae
Bolinichthys spp. 29
Diaphus spp. 29
Diaphus pacificus 29
Lampanyctus spp. 30
Lampanyctus omostigma 43
Lampanyctus parvicauda 30
Lampanyctus ritteri 30
Triphoturus spp. 30
Myctophinae
Benthosema panamense 30
Gonichthys tenuiculus 43
Hygophum proximum 30
Loweina rara 43
Myctophum aurolaternatum 30, 43
Myctophum nitidulum 43
Symbolophorus evermanni 43
Lampridiformes
Trachipteridae
Trachipterus fukuzakii 30
Zu cristatus 30
Ophidiiformes
Ophidiidae
Lepophidium spp. 30
Lophiiformes
Ogcocephalidae 30
Melanocetidae
Melanocetus spp. 30
Oneirodidae
Dolopichthys spp. 30
Oneirodes spp. 30
Ceratiidae
Ceratias holboelli 30
Beloniformes
Hemiramphidae
Hemiramphus saltator 30, 44
Exocoetidae
Cheilopogon spp. 31
Cheilopogon xenopterus 31
Cypselurus spp. 44
Exocoetus spp. 31
Exocoetus monocirrhus 44
Fodiator acutus 31
Hirundichthys spp. 31
Hirundichthys marginatus 31
Oxyporhamphus micropterus . . . 32, 44
Prognichthys spp. 32
Prognichthys tringa 44
Stephanoberyciformes
Melamphaidae
Scopelogadus bispinosus 33
Bericiformes
Holocentridae
Myripristis leiognathus 33
Scorpaeniformes

Scorpaenidae
Scorpaena spp. 33
Perciformes
Percoidei
Serranidae 33
Epinephelinae 33
Opistognathidae 33
Howellidae
Howella pammelas 33
Carangidae 33
Alectis ciliaris 33
Caranx spp. 33
Caranx caballus 33
Caranx sexfasciatus 33, 44
Decapterus spp. 33
Hemicaranx spp. 34
Naucrates ductor 34
Oligoplites spp. 34
Selar crumenopthalmus 34
Selene spp. 34
Seriola lalandi 34
Seriola peruana 34
Trachinotus kennedyi 34
Trachinotus paitensis 34
Trachinotus rhodopus 44
Coryphaenidae
Coryphaena spp. 34
Coryphaena equiselis 34, 44
Coryphaena hippurus 35, 44
Bramidae
Brama dussumieri 35
Lutjanidae
Lutjanus spp. 35
Lutjanus novemfasciatus 35
Lobotidae
Lobotes surinamensis 35, 44
Gerreidae 35
Haemulidae 36
Sciaenidae 36
Polynemidae
Polydactylus approximans 36, 44
Mullidae 36
Kyphosidae
Kyphosus spp. 36, 45
Mugilidae
Mugil spp. 36, 45
Mugil cephalus 45
Labroidei
Pomacentridae 36
Microspathodon spp. 36
Labridae
Xyrichtys spp. 36
Scaridae
Scarus spp. 36
Blennioidei
Dactyloscopidae 36
Blenniidae
Entomacrodus chiostictus 36
Hypsoblennius spp. 36
Gobioidei
Eleotridae
Dormitator latifrons 37
Gobiidae 37
Microdesmidae
Clarkichthys bilineatus 37
Acanthuroidei
Acanthuridae 37
Acanthurus triostegus 45
Scombroidei
Gempylidae
Nealotus tripes 37
Trichiuridae
Trichiurus nitens 37
Istiophoridae
Istiophorus platypterus 37, 45
Scombridae
Acanthocybium solandri 37
Auxis spp. 37
Euthynnus lineatus 37
Thunnus spp. 38
Stromateoidei
Nomeidae
Cubiceps pauciradiatus 38
Nomeus gronovii 38, 45
Psenes pellucidus 38
Psenes sio 38
Pleuronectiformes
Paralichthyidae 38
Cyclopsetta panamensis 38
Etropus peruvianus 38
Syacium ovale 38
Bothidae
Bothus spp. 39
Cynoglossidae
Symphurus spp. 39, 45
Symphurus elongatus 39
Tetraodontiformes
Balistidae

Balistes polylepis 39
Canthidermis maculatus 39, 45
Diodontidae
Diodon eydouxii 45
Diodon holocanthus 45
Disintegrated fish larvae 39
Unidentified fish larvae 39

ALPHABETICAL INDEX TO TABLES 4 AND 6

Acanthocybium solandri 37
Acanthuridae 37
Acanthurus triostegus 45
Albula spp. 28
Alectis ciliaris 33
Anchoa spp. 28
Anguilliformes 28
Ariosoma gilberti 28
Astronesthes gibbsi 43
Astronesthes spp. 29
Auxis spp. 37
Balistes polylepis 39
Benthosema panamense 30
Bolinichthys spp. 29
Bothus spp. 39
Brama dussumieri 35
Canthidermis maculatus 39, 45
Carangidae 33
Caranx caballus 33
Caranx sexfasciatus 33, 44
Caranx spp. 33
Ceratias holboelli 30
Cetengraulis mysticetis 28
Cheilopogon spp. 31
Cheilopogon xenopterus 31
Clarkichthys bilineatus 37
Clupeidae 28
Coryphaena equiselis 34, 44
Coryphaena hippurus 35, 44
Coryphaena spp. 34
Cubiceps pauciradiatus 38
Cyclopsetta panamensis 38
Cyclothone pseudopallida 28
Cyclothone spp. 28
Cypselurus spp. 44
Dactyloscopidae 36
Decapterus spp. 33
Diaphus pacificus 29
Diaphus spp. 29
Diodon eydouxii 45
Diodon holocanthus 45
Diplophos proximus 29
Disintegrated fish larvae 39
Dolopichthys spp. 30
Dormitator latifrons 37
Engraulidae 28
Entomacrodus chiostictus 36
Epinephelinae 33
Etropus peruvianus 38
Euthynnus lineatus 37
Exocoetus monocirrhus 44
Exocoetus spp. 31
Fodiator acutus 31
Gerreidae 35
Gobiidae 37
Gonichthys tenuiculus 43
Gymnothorax mordax 28
Haemulidae 36
Hemicaranx spp. 34
Hemiramphus saltator 30, 44
Hirundichthys marginatus 31
Hirundichthys spp. 31
Howella pammelas 33
Hygophum proximum 30
Hypsoblennius spp. 36
Istiophorus platypterus 37, 45
Kyphosus spp. 36, 45
Lampanyctus omostigma 43
Lampanyctus parvicauda 30
Lampanyctus ritteri 30
Lampanyctus spp. 30
Lepophidium spp. 30
Lestidium spp. 29
Lobotes surinamensis 35, 44
Loweina rara 43
Lutjanus novemfasciatus 35
Lutjanus spp. 35
Melanocetus spp. 30
Microspathodon spp. 36
Mugil cephalus 45
Mugil spp. 36, 45
Mullidae 36
Myctophum aurolaternatum 30, 43
Myctophum nitidulum 43
Myripristis leiognathus 33
Naucrates ductor 34
Nealotus tripes 37
Nomeus gronovii 38, 45
Ogcocephalidae 30
Oligoplites spp. 34
Oneirodes spp. 30
Ophichthus spp. 28
Ophichthus zophochir 28
Opisthonema spp. 28

Opistognathidae 33
Oxyporhamphus micropterus 32, 44
Paralichthyidae 38
Polydactylus approximans 36, 44
Pomacentridae 36
Prognichthys spp. 32
Prognichthys tringa 44
Psenes pellucidus 38
Psenes sio 38
Scarus spp. 36
Sciaenidae 36
Scopelogadus bispinosus 33
Scorpaena spp. 33
Selar crumenopthalmus 34
Selene spp. 34
Seriola lalandi 34
Seriola peruana 34
Serranidae 33
Stemonosudis macrura 29
Sternoptyx spp. 29
Syacium ovale 38
Symbolophorus evermanni 43
Symphurus elongatus 39
Symphurus spp. 39, 45
Synodus evermanni 29
Synodus spp. 29
Thunnus spp. 38
Trachinotus kennedyi 34
Trachinotus paitensis 34
Trachinotus rhodopus 44
Trachipterus fukuzakii 30
Trichiurus nitens 37
Triphoturus spp. 30
Unidentified fish larvae 39
Vinciguerria lucetia 29
Xyrichtys spp. 36
Zu cristatus 30