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

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ABSTRACT

This is the second and concluding paper dealing with kinds and abundance of fish larvae in the eastern tropical Pacific based on collections made on EASTROPAC survey cruises. Main emphasis is placed on the composition and abundance of fish larvae on the second multivessel EASTROPAC cruise, occupied by three research vessels during August-September 1967. This cruise, spaced 6 months after EASTROPAC I, affords interesting comparisons of composition and relative abundance of fish larvae during two contrasting periods of the year. Counts of fish larvae per haul on EASTROPAC II were about 50% greater than on EASTROPAC I; species composition, however, was strikingly similar in the two surveys.

A portion of the EASTROPAC pattern, lying between long 119° to 98°W and lat 20°N to 3°S, was covered on four additional monitoring cruises—providing coverage of this more restricted area on six cruises, spaced at 2-month intervals, between February 1967 and January 1968. Essentially the same kinds of fish larvae were taken on each of the six coverages of the monitoring pattern, and for most species the range in relative abundance during the annual cycle was 3× or less.

This report deals with the composition and relative abundance of fish larvae in the eastern tropical Pacific Ocean collected on the second multivessel survey cruise made as part of EASTROPAC, during August-September 1967. For brevity, the cruise is referred to in this report as EASTROPAC II (ETP II). This cruise, conducted 6 months after EASTROPAC I (ETP I), deals with the composition of fish larvae at a contrasting period of the annual spawning cycle in tropical waters (Ahlstrom, 1971).

Three research vessels participated in ETP II: *Washington* operated by the Scripps Institution of Oceanography occupied the outer pattern, *Undaunted* of the National Marine Fisheries Service occupied the middle pattern, and *Rockaway* operated by the Coast Guard took the inner pattern (Figure 1).

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The coverage during ETP II was less extensive than that of the four vessels of ETP I. One major line of stations of ETP I was omitted from ETP II, that along long 126°W, and the coverage below the equator was abbreviated in the two outer patterns, with lines ending at lat 10°S or 5°S.

Comparison of the composition, relative abundance, and distributions of fish larvae at different periods of the year in tropical waters is a primary objective of this report. The major comparison is with fish larvae obtained on ETP I (Ahlstrom, 1971); all of the 355 ETP II collections and an equivalent number of ETP I collections can be used to show similarities and differences in the composition of the larval fish fauna during two contrasting periods of the year.

A portion of the EASTROPAC pattern was occupied by the National Marine Fisheries Service research vessel, *David Starr Jordan*, on

Manuscript accepted February 1972.
FISHERY BULLETIN: VOL. 70, NO. 4, 1972.

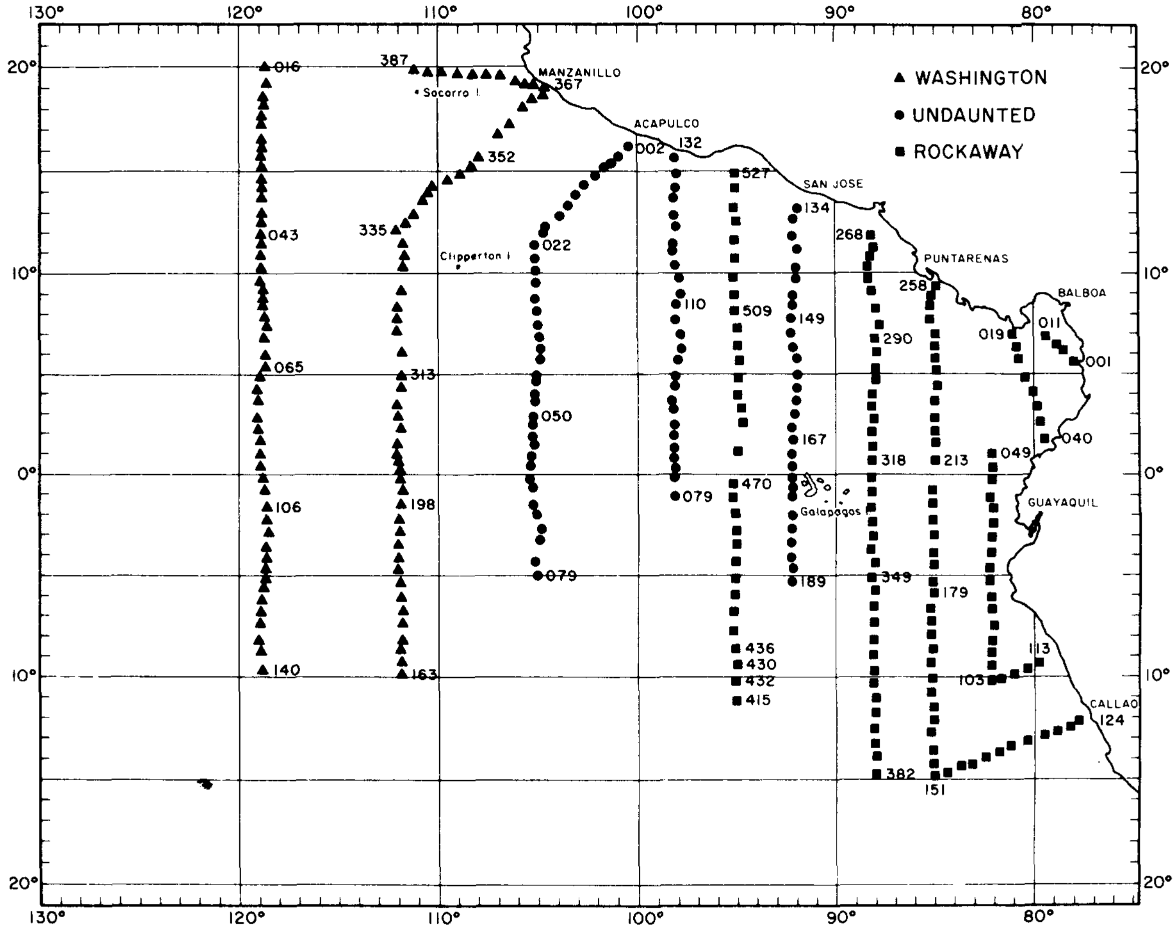

FIGURE 1.—Location of plankton stations occupied by three research vessels participating in the second multivessel EASTROPAC survey (ETP II). Symbols for vessels indicated in legend above. Samples collected by *Washington* are numbered as 45.000 series (for example 45.016, 45.140, 45.387), samples from *Undaunted* as 46.000 series, from *Rockaway* as 47.000 series.

monitoring cruises, spaced at bimonthly intervals between the multivessel cruises; coverages equivalent to the monitoring pattern were summarized for ETP I and ETP II, in order to compare the results of six bimonthly coverages of the same area (Figure 2). The monitoring pattern lacked coverage in the nearshore portion of the EASTROPAC pattern that was occupied by the inner vessel on multivessel surveys. Additional seasonal information about composition and relative abundance of fish larvae in this area was supplied by a "zig-transect" of 50 stations occupied by the RV *Oceanographer* of the Environmental Science Services Administration during November 1967—2 to 3 months after ETP II coverage of this area (Figure 2).

The methods of making zooplankton hauls on ETP II were identical to those previously described for ETP I (Ahlstrom, 1971). This paper deals solely with collections obtained from oblique hauls made with a net, 1-m mouth diameter, constructed of 505 μ nylon (Nitex) cloth, with approximately a 5:1 ratio of effective straining surface, i.e., pore area to mouth area.

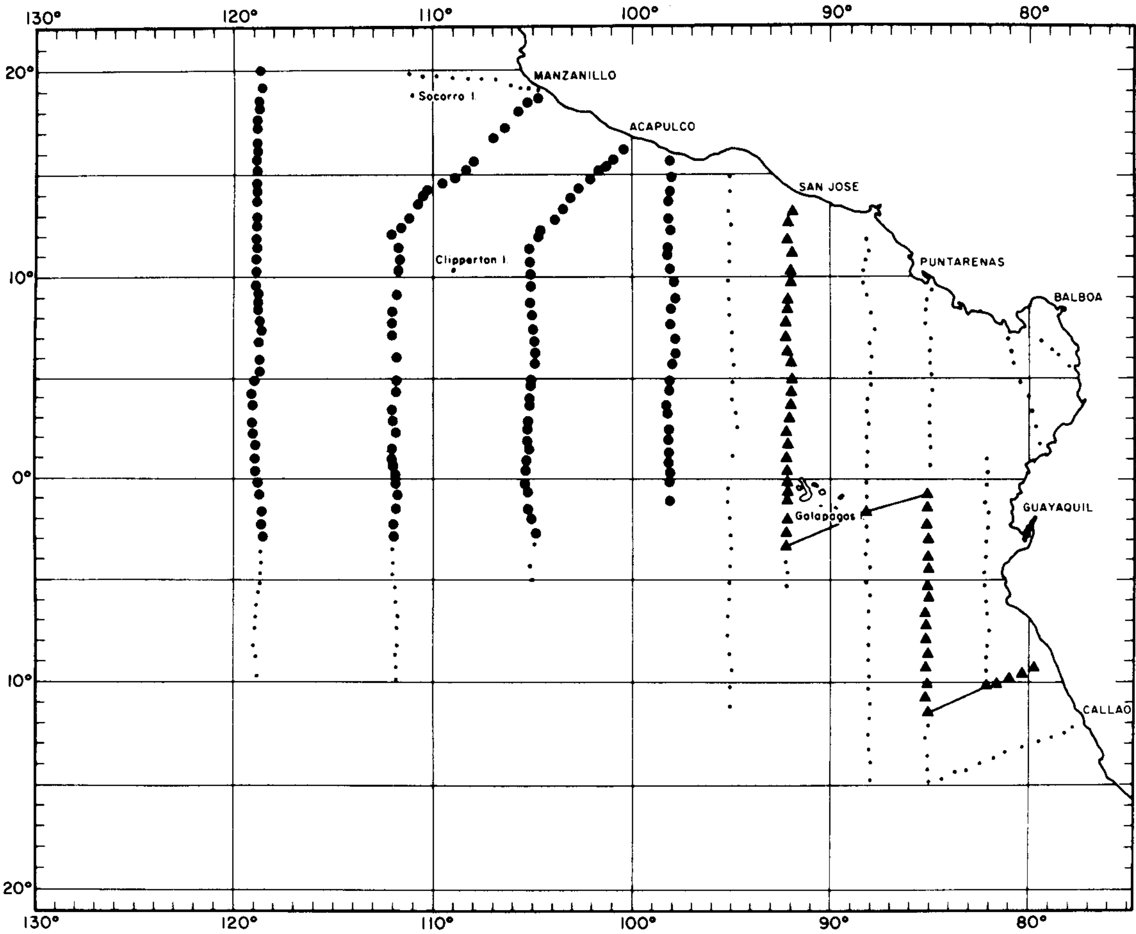

FIGURE 2.—Location of monitoring pattern (large solid circles), occupied between multivessel EASTROPAC cruises at 2-month intervals by *David Starr Jordan*, and of zig-transect pattern (triangles) occupied by *Oceanographer* during November 1967, superimposed on ETP II pattern.

As on ETP I, this net was paired in an assembly frame with a finer-meshed 0.5-m net. Each tow attempted to obtain a uniform sampling of zooplankton in the water column between the surface and approximately 200-m depth. The net assembly was lowered to depth by paying out 300 m of towing cable and then retrieved at a uniform rate. The depth reached by the net was estimated from the angle of stray (departure from the vertical) of the towing cable. The average depths of haul taken by the three research vessels are summarized in Table 1. Only slightly over two-thirds of the hauls were lowered to depths of 200 m or more and about one-eighth were taken at depths shallower than 180 m. Based on variation in depths sampled, speed of hauling was controlled less consistently on ETP II as compared with ETP I.

Four plankton collections were made each day with the paired net-assembly, at about 6-hr intervals. Timing of hauls was not coordinated between research vessels (Table 2). Usually *Rockaway* spaced the four hauls at approximately 0500, 1030, 1700, and 2300; hauls from *Wash-*

TABLE 1.—Depths of paired oblique pankton hauls taken by the three research vessels in EASTROPAC II (net lowered by paying out 300 m of towing cable).

Average depth of haul (m)	Number of hauls taken at each depth interval from			
	Washington 45.000 Series	*Undaunted* 46.000 series	*Rockaway* 47.000 Series	All vessels
80.1- 90.0	--	1	--	1
90.1-100.0	--	--	--	--
100.1-110.0	--	--	--	--
110.1-120.0	--	1	--	1
120.1-130.0	--	2	--	2
130.1-140.0	1	--	--	1
140.1-150.0	1	--	3	4
150.1-160.0	2	4	1	7
160.1-170.0	--	5	4	9
170.1-180.0	7	4	6	17
180.1-190.0	6	4	3	13
190.1-200.0	24	16	14	54
200.1-210.0	36	22	52	110
210.1-220.0	28	28	56	112
220.1-230.0	5	6	7	18
230.1-240.0	1	--	1	2
240.1-250.0	--	--	1	1
250.1-260.0	--	--	1	1
260.1-270.0	--	2	--	2
Total	111	95	149	355

TABLE 2.—Hour of day that paired oblique plankton hauls were made from the three research vessels participating in EASTROPAC II (midtime of haul used).

Hour of day	Number of hauls taken during each hour of the day			
	Washington	*Undaunted*	*Rockaway*	All vessels
0001-0100	10	10	8	28
0101-0200	4	0	1	5
0201-0300	1	0	3	4
0301-0400	0	1	3	4
0401-0500	0	10	14	24
0501-0600	5	8	15	28
0601-0700	12	3	4	19
0701-0800	5	1	0	6
0801-0900	2	0	1	3
0901-1000	1	0	6	7
1001-1100	1	0	21	22
1101-1200	10	14	6	30
1201-1300	11	11	1	23
1301-1400	3	0	1	4
1401-1500	3	0	2	5
1501-1600	2	0	12	14
1601-1700	0	0	16	16
1701-1800	10	22	4	36
1801-1900	9	3	1	13
1901-2000	5	0	0	5
2001-2100	2	0	3	5
2101-2200	1	0	5	6
2201-2300	0	0	11	11
2301-2400	14	12	11	37
Total	111	95	149	355

ington usually were taken at approximately 0630, 1200, 1800, and 2400; and hauls from *Undaunted* at 0500, 1200, 1730, and 2400. At least some hauls were taken during every hour of the day.

EFFECTIVENESS OF SAMPLING FISH LARVAE IN DAYLIGHT HAULS AS COMPARED WITH NIGHT HAULS

Catches of fish larvae for selected families in day hauls compared to night hauls or to hauls taken within ± 1 hr of sunrise or sunset are summarized in Table 3. For all categories of larvae combined, the catch was 212.0 larvae per daytime haul and 480.4 larvae per night haul, a difference in catch of 2.27×. Hauls taken within ± 1 hr of sunrise or sunset had an average catch of 347.0 larvae, intermediate between day and night catches.

Difference between day and night collections was somewhat less than for ETP I; on that survey the average count of larvae in night hauls was 2.76× as many as in day hauls (Ahlstrom 1971, Table 4). On both surveys gonostomatid larvae had the most marked differences in catches between night hauls and day hauls: 4.3× as many, on the average, in night collections compared with day on ETP I, 2.9× as many in night collections on ETP II. Night-day differences in catch per haul of myctophid larvae were less marked between the two surveys: 3.0× on ETP I as compared with 2.6× on ETP II. Night-day differences in average catches of bathylagid larvae were similar on the two multivessel surveys: 1.5× as many per haul on the average, in night collections compared with day collections. Sternoptychid larvae, which were sampled almost as well in day hauls as in night hauls on ETP I, showed a somewhat greater night-day difference on ETP II: 1.7× for ETP II as compared with 1.2× for ETP I.

Scombrid larvae were taken in lesser numbers per haul in both day and night hauls on ETP II compared with ETP I; in contrast to ETP I, however, (where a night-day difference of 3.7× was observed) no difference was obtained in night and day collections on ETP II.

TABLE 3.—Comparison of occurrences (positive hauls) and catches (original counts) of fish larvae in day hauls, night hauls, and hauls taken within 1 hr of sunrise or sunset, summarized for selected families.

Family or group	Day hauls			Night hauls				Hauls within ± 1 hr of sunrise or sunset			Total hauls		
	Number positive hauls	Total larvae	Average number per occupancy ($\bar{D}$)	Number positive hauls	Total larvae	Average number per occupancy ($\bar{N}$)	$\bar{N}/\bar{D}$	Number positive hauls	Total larvae	Average number per occupancy	Number positive hauls	Total larvae	Average number per occupancy
Bathylagidae	114	1,802	13.1	110	2,607	20.2	1.5	74	1,482	16.8	298	5,891	16.6
Gonostomatidae	131	4,896	35.5	125	13,264	102.8	2.9	86	6,095	69.3	342	24,255	68.3
Sternoptychidae	104	2,005	14.5	104	3,136	24.3	1.7	69	2,244	25.5	277	7,385	20.8
Chauliodontidae	18	68	0.5	23	86	0.7	1.4	15	53	0.6	56	207	0.6
Idiacanthidae	58	211	1.5	70	307	2.4	1.6	53	277	3.1	181	795	2.2
Other stomiatoidei	78	412	3.0	83	447	3.5	1.2	54	248	2.8	215	1,107	3.1
Myctophidae	136	13,847	100.3	128	33,167	257.1	2.6	88	16,995	193.1	352	64,009	180.3
Paralepididae	84	851	6.2	95	1,110	8.6	1.4	68	574	6.5	247	2,535	7.1
Scopelarchidae	47	83	0.6	53	139	1.1	1.8	34	76	0.9	134	298	0.8
Melamphaidae	112	463	3.4	105	581	4.5	1.3	67	321	3.6	284	1,365	3.8
Bregmacerotidae	59	847	6.1	59	1,138	8.8	1.4	42	1,077	12.2	160	3,062	8.6
Exocoetidae	27	104	0.8	18	22	0.2	0.2	14	20	0.2	59	146	0.4
Trachypteridae	13	14	0.1	22	27	0.2	2.0	11	18	0.2	46	59	0.2
Apogonidae	21	112	0.8	26	94	0.7	0.9	19	77	0.9	66	283	0.8
Bramidae	20	29	0.2	28	43	0.3	1.5	19	24	0.3	67	96	0.3
Chiasmodontidae	31	60	0.4	43	106	0.8	2.0	26	71	0.8	100	237	0.7
Coryphaenidae	43	60	0.4	40	75	0.6	1.5	26	50	0.6	109	185	0.5
Nomeidae	83	483	3.5	85	642	5.0	1.4	61	335	3.8	229	1,460	4.1
Scombridae	14	92	0.7	25	94	0.7	1.0	16	62	0.7	55	248	0.7
Other identified	114	1,278	9.3	120	3,649	28.3	3.0	79	959	10.9	313	5,886	16.6
Unidentified	69	260	1.9	65	426	3.3	1.7	48	176	2.0	182	862	2.4
Disintegrated larvae	118	1,272	9.2	98	814	6.3	0.7	72	728	8.3	288	2,814	9.8
Total fish larvae	138	29,249	212.0	129	61,974	480.4	2.27	88	31,962	363.1	355	123,185	347.0

WATER TEMPERATURES ON EASTROPAC II

Water temperatures were available at 1-m intervals from the surface to about 750-m depth for each station at which an STD was used for determination of salinity and temperature. I selected three depths for tabulation and study: surface, 10 m, and 50 m. STD readings were available for 347 of the 355 plankton stations taken on ETP II. A chart of surface temperature for ETP II will be included in the EASTROPAC Atlas.

To facilitate discussion of distributions of fish larvae, I have found it convenient to divide the EASTROPAC area into quadrants with the north-south division at the equator and the east-west division at long 100°W. I will use these divisions when discussing distribution of temperatures on ETP II, except for separating out a narrow band of water at the equator (lat 2°N to 2°S). Within a quadrant the temperatures are summarized by 5° latitude, except near the equator (Table 4).

In some parts of the ETP II pattern, the thermocline was considerably deeper than 50 m, so that the temperature at 50 m was similar to that at the surface. At a few stations in the northeast quadrant, where the thermocline was almost at the surface, the temperature at 10 m was 5° to 10°C lower than at the surface. At most stations in this quadrant the thermocline was considerably shallower than 50-m depth, as attested by marked differences in temperature between the surface and 50 m (Table 5). Mixed layer depths on ETP II were illustrated in Blackburn, Laurs, Owen, and Zeitzschel (1970)—Figure 7 on page 27. A brief summary of the temperature structure is given by quadrant.

NORTHEAST QUADRANT, EXCEPT WITHIN 2° LATITUDE OF EQUATOR

Surface temperatures in this quadrant were high, ranging between 25.4° and 29.8°C (average 27.2°C). Temperatures at 10 m were usually the same or within ±0.5°C of the surface, although 10 stations showed differences of more than 1°C and 7 of those were 4.6° to 10.1°C lower. These marked differences are indications of very shallow thermoclines; five contiguous stations along long 88°W offshore from Puntarenas, Costa Rica, had such near-surface thermoclines.

At most stations the thermocline was shallower than 50 m; at 79 of 91 stations, the temperature at 50 m was 5° to 15°C lower than at the surface, and at half of these the temperature was between 10° to 15°C lower at 50 m.

NORTHWEST QUADRANT, EXCEPT WITHIN 2° LATITUDE OF EQUATOR

Surface temperatures in this quadrant, 24.8° to 29.7°C (average 27.6°C), were similar to those of the inshore quadrant. Highest surface temperatures, averaging 28.3°C, were encoun-

TABLE 4.—Range of temperatures at surface, 10 m, and 50 m summarized by 5° latitude or smaller intervals for both offshore (long 100°-119°W) and inshore (coast to long 98°W) for EASTROPAC II.

Latitude	Offshore: long 100°-119°W				Inshore: coast to long 98°W			
	No. stn.	Range in temperature (°C) at:			No. stn.	Range in temperature (°C) at:		
		Surface	10 m	50 m		Surface	10 m	50 m
15°-20°N	32	25.7-29.7	25.5-29.6	17.7-28.6	1	29.8	29.6	23.1
10°-15°N	30	26.3-29.8	26.0-29.4	16.7-27.9	23	26.4-29.7	19.7-29.6	14.0-26.7
5°-10°N	20	25.8-27.7	25.8-27.8	16.5-27.4	42	25.8-28.9	16.3-28.9	13.5-23.6
2°- 5°N	15	24.8-26.6	24.8-26.4	20.3-26.2	25	25.2-26.8	25.3-27.0	15.2-25.9
Total 2°-20°N	97	24.8-29.7	24.8-29.6	16.5-28.6	91	25.2-29.8	16.3-29.6	13.5-26.7
Equator 2°N-2°S	20	19.5-25.0	19.0-25.0	15.7-22.4	30	16.4-25.9	15.6-25.9	13.7-17.4
2°- 5°S	14	20.6-23.0	20.5-23.0	14.0-22.6	19	18.4-22.2	17.4-21.9	14.2-20.2
5°-10°S	16	22.9-24.9	22.7-24.9	22.4-24.9	30	16.3-21.5	16.3-21.5	14.6-21.4
10°-15°S	0	--	--	--	30	15.4-21.4	15.1-21.4	13.9-21.2
Total 2°-15°S	30	20.6-24.9	20.5-24.9	14.0-24.9	79	15.4-22.2	15.1-21.9	13.9-21.4

TABLE 5.—Summary of temperature differences within upper 50 m depth (differences in temperature at the surface and at two selected depths—10 m and 50 m) summarized by quadrants.

Area	No. stn.	Difference in temperature at the surface and at 10-m depth					Difference in temperature at the surface and at 50-m depth				
		0°C	0.1°-0.5°C	0.6°-1.0°C	1.1°-5.0°C	5.1°-10.1°C	0°C	0.1°-1.0°C	1.1°-5.0°C	5.1°-10.0°C	10.1°-15.0°C
NE Quadrant (lat 2°-16°N, coast to long 98°W)	90	38	39	3	4	6	0	2	9	40	39
NW Quadrant (lat 2°-20°N, long 100-119°W)	97	65	26	5	1	0	6	14	46	27	4
Equator (lat 2°N-2°S, coast to long 98°W)	30	19	8	1	2	0	0	0	10	19	1
Equator (lat 2°N-2°S, long 100-119°W)	20	9	9	2	0	0	0	1	13	6	0
SE Quadrant (lat 2°-15°S, coast to long 98°W)	79	61	15	2	1	0	20	31	27	1	0
SW Quadrant (lat 2°-10°S, long 100-119°W)	30	17	12	1	0	0	9	15	5	1	0

tered between lat 15° and 20°N. Temperatures at 10 m were usually the same as at the surface, and in only one instance was the difference as great as 1.3°C. Temperatures at 50 m were identical to, or within 1°C of, the surface temperatures at about 20% of the stations, all located between lat 2° and 10°N—these were stations with deep thermoclines. Temperature differences between the surface and 50 m exceeded 5°C at about 35% of the stations.

EQUATOR, LAT 2°N TO 2°S

Surface temperatures were variable, with 9.5°C range (16.4° to 25.9°C). Lowest surface temperatures, undoubtedly resulting from upwelling, were encountered seaward of the Galapagos Islands, between long 92° and 98°W, lat 0.5°N to 2.0°S, but cold water was also encountered farther offshore. Thermoclines were shallow at most stations inshore from the Galapagos Islands, the difference between surface and 50 m exceeded 5°C at about 63% of the stations, but the surface water was warmer than offshore.

SOUTHEAST QUADRANT, EXCEPT WITHIN 2° LATITUDE OF EQUATOR

Water temperatures were much lower in this quadrant than in the northeast quadrant. Few surface temperatures were as high as 20°C, and the average surface temperature was 18.7°C. The thermocline was usually deep. At 65% of the stations the temperature at 50 m was the same as that at the surface or was not more than 1°C colder.

SOUTHWEST QUADRANT, EXCEPT WITHIN 2° LATITUDE OF EQUATOR

Surface temperatures ranged from 20.6° to 24.9°C (average 21.0°C). Temperatures at 10 m were usually the same as that at surface or within 0.5°C. Temperatures at 50 m were identical to the surface at 30% of stations and within 1°C of the surface temperature at 80% of stations, indicative of a region of deep thermocline.

In summary, water temperatures were much higher north of the equator, than south of the equator. Surface temperatures averaged 8.5°C higher in the northeast quadrant than in the southeast quadrant. Offshore the differences were almost as great; surface temperatures averaged 6.6°C higher in the northwest quadrant than in the southwest quadrant.

As noted in the paper dealing with ETP I collections, information is mostly lacking on depth distribution of fish larvae in the eastern tropical Pacific. Because of the marked variation in depth of thermocline encountered in different parts of the EASTROPAC pattern, ranging from near-surface to deep, it is anticipated that depth distribution of larvae will be markedly affected by the temperature structure. A carefully planned study of depth distribution of larvae in the eastern tropical Pacific in relation to temperature and thermocline depth is badly needed. Lacking this, it is difficult to meaningfully relate larval distributions to temperature.

A REVIEW OF SIGNIFICANT PAPERS DEALING WITH ADULT FISHES OF THE EASTROPAC AREA

A working knowledge of the adult fishes of an oceanic region is a necessary prerequisite to meaningful study of the fish larvae of that region. Most larval series, initially, are established by working backwards from larger identified specimens (late-larvae or early juveniles) to early-stage larvae. Until recently shore fishes of the eastern tropical Pacific were much better known than deep-sea fishes, e.g., studies by Meek and Hildebrand (1923, 1925, 1928) for Panama and Hildebrand (1946) for Peru. Shore fishes, however, were not an important element of the EASTROPAC ichthyoplankton.

A major contribution to our knowledge of eastern Pacific fishes was made by Garman (1899), who worked up the fishes collected on the *Albatross* Expedition of 1891 to the west coasts of Mexico, Central and South America, and off the Galapagos Islands. Garman dealt with 180 species of fish, most new to science; about a third of these were pelagic, oceanic fishes. Included among the latter are the two most common pelagic fishes, *Diogenichthys laternatus* and *Vinciguerria lucetia*, in the eastern tropical Pacific, based on their abundance as larvae.

The second oceanographic expedition of the *Pawnee* to the eastern Pacific in 1926 added materially to our knowledge of the deep-sea fishes. Several of the species described by Parr (1931) from these collections are common as larvae in EASTROPAC plankton hauls, including *Bathylagus nigrigenys, Diaphus pacificus, Lampanyctus idostigma, L. parvicauda*, and *Scopelarchoides nicholsi*.

The New York Zoological Society sponsored several expeditions to the eastern Pacific which stimulated papers on Pacific Myctophidae by Beebe and Vander Pyle (1944) and on ceratioid fishes by Beebe and Crane (1947). The paper on myctophids contains information on taxonomy, biology, and zoogeography of 24 species of myctophids of which none were new. The paper by Beebe and Crane on deep-sea ceratioid fishes dealt with 24 species belonging to six families, of which 10 were new.

The ceratioid fishes of the Gulf of Panama had received attention previously: the Danish research vessel *Dana* had occupied several very productive stations in the Gulf of Panama in 1922, from which Regan (1926) described 18 species of ceratioids, mostly new. Bertelsen (1951) reported taking early life history stages of 23 kinds of ceratioids from the Gulf of Panama in *Dana* collections from its round-the-world expedition of 1928-30.

Information on fishes off Peru was obtained on the Yale South American Expedition of 1953. Morrow (1957a) gave an annotated list of 104 shore fishes, 21 new to the Peruvian fauna, and Morrow (1957b) gave an annotated list of 18 mid-depth fishes.

Bussing (1965) reports on 15 pelagic trawl hauls made on *Eltanin* cruises taken off the South American coast in 1962 and 1963 between lat 3° and 35°S. The collections contained 100 species, representing 33 families. Four trawl hauls were made within the EASTROPAC area; only one yielded substantial numbers of specimens. This was *Eltanin* Station 34 at lat 7°45′ to 7°48′S, long 81°23′W, from which 45 species were obtained.

Haedrich and Nielsen (1966) provided annotated identifications of 32 species (21 families) of fishes from stomachs of *Alepisaurus* collected at 19 stations by exploratory longline fishing from the Japanese RV *Shoyo Maru*. Four collections were obtained within the EASTROPAC area, and the other 15 between lat 20° and 40°S.

Craddock and Mead (1970) reported on collections made along two transects through the southern portion of the Peru Current off Chile at lat 34°S. They provide annotated identifications of 133 species. Although these transects were south of the EASTROPAC area, many of the species also occur in the EASTROPAC area.

Parin (1971) reports on collections of midwater fishes of the Peru Current zone collected on the fourth cruise of RV *Akademik Kurchatov*. He lists about 150 species representing 33 families. Collections were obtained between lat 5°N and 30°S, in a broad coastal band, extending offshore to long 90°W. Distributions are illustrated for 24 species.

In addition to the above, a number of references dealing with particular species of genera or families of eastern Pacific fishes are cited in the body of the text, or were referred to in Ahlstrom (1971).

NUMBER OF FISH LARVAE OBTAINED ON EASTROPAC II

Fish larvae were obtained in all collections (355) made with the 1-m plankton net on ETP II; counts of larvae per haul ranged from 1 to 2,864, and averaged 347. Four collections contained 10 or fewer larvae, and 22 collections contained 1,000 or more specimens in each (Table 6).

Abundance of fish larvae according to latitude and proximity to shore within the EASTROPAC pattern is summarized in Table 7. The same grouping of stations by latitude (5° except near the equator) and longitude (inshore-offshore) is used as in Table 4 (temperature summary table). Subtotals provide a rough separation into quadrants.

Larvae were taken in greatest abundance in the northeast quadrant, particularly between lat 5° and 10°N; in this latter area, with an average surface temperature of 27.1°C, larvae averaged 639 per haul. Larvae were less abundant in the southeast quadrant, with numbers decreasing southward and averaging only 118 larvae per haul between lat 10° and 15°S (average surface temperature, 18.1°C).

Larvae were much less abundant offshore, in the northwest quadrant, averaging slightly over 40% as many per haul as in the inshore (northeast) quadrant. Surface temperatures, however, were quite similar.

Near the equator (lat 2°N to 2°S), larvae were moderately abundant inshore (434 per haul), and the decrease in the abundance offshore was not as marked as in other areas (362 per haul). This is not surprising, since this was an area of upwelling.

In the southwest quadrant (lat 2° to 10°S, long 110° to 119°W), there was a decrease in abundance toward the south. However, this quadrant was poorly sampled on ETP II. When compared to inshore coverage of the same latitude (lat 2° to 10°S), abundance of larvae per haul averaged about 62% as many.

Fish larvae averaged more per haul on ETP II as compared with comparable coverage on ETP I, 347.0 versus 231.9 larvae per haul; the increase in abundance was reflected in all parts of the EASTROPAC pattern.

The majority of large collections of fish larvae were made at stations with shallow thermoclines and relatively high mixed layer water

TABLE 6.—Relative numbers of fish larvae obtained over the three vessel patterns occupied on EASTROPAC II; last column gives comparable counts for EASTROPAC I.

No. of fish larvae per haul	*Washington* 45.000 Series	*Undaunted* 46.000 Series	*Rockaway* 47.000 Series	All patterns — EASTROPAC II	Comparable Coverage — EASTROPAC I
0	0	0	0	0	4
1-10	1	0	3	4	6
11-100	29	16	27	72	122
101-1,000	78	72	107	257	214
1,001 and over	3	7	12	22	9
Total	111	95	149	355	355
Average no. larvae per haul	224.0	400.3	404.7	347.0	231.9

TABLE 7.—Total catches of fish larvae (actual counts) taken on EASTROPAC II summarized by latitude (5° except near equator) and longitude (offshore or inshore).

Latitude	Offshore: long 100°-119°W			Inshore: coast to long 98°W		
	Number stations occupied	Number of larvae per haul		Number stations occupied	Number of larvae per haul	
		Range	Mean		Range	Mean
15°-20°N	32	31-1,048	219.0	1	130	130.0
10°-15°N	30	58- 481	159.1	23	37-2,242	435.4
5°-10°N	21	21-1,128	237.4	42	61-2,864	639.1
2° -5°N	16	93-1,217	359.6	28	141-1,975	555.1
Total 2°-20°N	99	21-1,128	227.5	94	37-2,864	558.8
Equator 2°N-2°S	21	30-1,506	361.5	30	1-1,513	434.4
2°- 5°S	14	79- 817	268.5	20	6-1,061	431.4
5°-10°S	16	8- 472	178.2	30	27-1,002	287.3
10°-15°S	--	--	--	31	4- 579	118.0
Total 2°-15°S	30	8- 817	220.4	81	4-1,061	258.1
Grand total	150	8-1,506	244.8	205	1-2,864	421.8

temperatures. Over 60% of the larger collections of fish larvae (750 or more larvae) were taken at stations with mixed layer temperatures in excess of 26°C and mixed layer depths of 35 m or less.

Unfortunately, information is lacking on the depth distribution of fish larvae in the eastern tropical Pacific in relation to thermocline depth, hence it is not known whether most kinds were limited in depth distribution to the upper mixed layer, as reported for California Current waters (Ahlstrom, 1959).

KINDS OF FISH LARVAE OBTAINED ON EASTROPAC II

With some interesting exceptions, the same kinds of larvae were obtained on ETP II as on ETP I, and Table 8, the principal summary table covering ETP II larvae, contains essentially the same families as its counterpart for ETP I. The table lists 53 families and 6 composite categories including 3 orders or suborders and a catchall category—other identified. For the latter, composition by families is given in subsequent tables or in text discussions. Altogether, fish larvae of 82 families were represented in ETP II collections. As on ETP I, larvae of 10 families contributed over 90% (91.0 on ETP II) of the total; 9 of these families were among the first 10 on both EASTROPAC surveys and had similar rankings. The first 10 families on ETP II were as follows: Myctophidae, 52.0%; Gonostomatidae, 19.7%; Sternoptychidae, 6.0%; Bathylagidae, 4.8%; Bregmacerotidae, 2.5%; Paralepididae, 2.0%; Nomeidae, 1.2%; Melamphaidae, 1.1%; Engraulidae, 1.1%; and Idiacanthidae, 0.6%. Engraulidae is the only family on this list that did not rank among the first 10 on ETP I. The sole displacement from the previous list is the family Scombridae, which slipped in ranking from fifth in ETP I to twentieth in ETP II. Of the remaining 9%, 2.3% were too damaged (disintegrated) to identify, 0.7% could not be identified (these were mostly very small larvae), and the remainder, about 6%, belonged to the other 72 families.

The displacement of Scombridae from among the 10 most abundant families on ETP II left only one perciform family, Nomeidae, among those contributing 1% or more of the total. Only a moderate number of perciform families have become widely distributed in offshore oceanic waters. Among these, larvae of Gempylidae contributed 0.3% of the total on ETP II; Apogonidae, 0.2%; Chiasmodontidae, 0.2%; Coryphaenidae, 0.1%; Trichiuridae, 0.1%; and Bramidae, 0.1%.

The basic data on the kinds and number of fish larvae obtained in the 355 ETP II collections are contained in Appendix Tables 1 to 6. These are keyed to Table 8 and to other tables in this report.

The data presented in this paper represent but the first step in utilizing eggs and larvae collections for resource evaluation.

TABLE 8.—Occurrences and counts of fish larvae taken in oblique 1.0-m plankton hauls on the second multivessel EASTROPAC survey (EASTROPAC II), summarized by family or larger grouping and by research vessel.

Family or larger grouping[1]	Basic station data contained in Appendix Table no.		Distribution shown in Figure no.	*Washington* 45.000 Series		*Undaunted* 46.000 Series		*Rockaway* 47.000 Series		Total EASTROPAC II	
	By family or larger grouping	By genus or species		No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae
1 Albulidae		4		0	0	0	0	2	9	2	9
*2 Clupeidae		4	3	0	0	7	185	2	85	9	270
*3 Engraulidae		4	3	4	15	2	3	29	1,342	35	1,360
*4 Argentinidae		3		14	21	14	32	4	5	32	58
*5 Bathylagidae	1	3	4	74	352	90	1,277	134	4,262	298	5,891
*6 Gonostomatidae	1	3	5-7	108	9,079	94	7,095	140	8,081	342	24,255
*7 Sternoptychidae	1			75	1,882	74	1,941	128	3,562	277	7,385
*8 Astronesthidae	3		5	10	16	15	30	17	28	42	74
*9 Chauliodontidae	1		8	10	25	10	15	36	167	56	207
*10 Idiacanthidae	1		9	49	275	62	219	70	301	181	795
*11 Other Stomiatoidei	1	3		60	245	64	219	86	570	210	1,034
12 Chlorophthalmidae				0	0	3	5	1	3	4	8
*13 Evermannellidae	3		10	9	47	7	19	1	1	17	67
*14 Myctophidae	1	2	3, 8, 11-14	111	9,546	95	21,082	146	33,381	352	64,009
15 Neoscopelidae				5	5	2	3	5	7	12	15
*16 Paralepididae	1	3		91	497	80	1,002	76	1,036	247	2,535
*17 Scopelarchidae	1			39	103	45	92	50	103	134	298
*18 Scopelosauridae	3		10	0	0	11	46	29	344	40	390
*19 Synodontidae	4		5	1	1	2	6	11	53	14	60
20 Alepisauridae				1	1	1	2	2	2	4	5
*21 Anguilliformes	5		14, 15	16	33	30	42	35	76	81	151
*22 Melamphaidae	1		16	79	262	83	408	122	695	284	1,365
*23 Trachichthyidae	3			0	0	0	0	11	70	11	70
24 Holocentridae				3	10	0	0	0	0	3	10
*25 Bregmacerotidae	1			63	379	47	1,624	50	1,059	160	3,062
26 Macrouridae				1	1	3	3	5	5	9	9
*27 Scomberesocidae	3		14	0	0	0	0	27	153	27	153
28 Exocoetidae	1			15	26	22	33	22	87	59	146
29 Trachypteridae	1			10	10	16	20	20	29	46	59
*30 Apogonidae	1			28	178	24	73	14	32	66	283
31 Balistidae	3			1	1	3	6	1	1	5	8
32 Blenniidae				0	0	0	0	5	6	5	6
33 Bramidae	1			21	31	17	24	29	41	67	96
*34 Carangidae	4		17	8	28	8	59	20	137	36	224
35 Carapidae	4			0	0	0	0	7	7	7	7
36 Chiasmodontidae	1			25	46	25	45	50	146	100	237
*37 Coryphaenidae	1			37	56	34	62	38	67	109	185
*38 Gempylidae		3	4	36	59	30	64	46	247	112	370
*39 Gobiidae	4			5	65	11	33	37	286	53	384
40 Labridae	4		10	9	21	9	10	14	26	32	57
41 Mugilidae	4			0	0	0	0	5	16	5	16
*42 Nomeidae	1			68	357	64	391	97	712	229	1,460
*43 Ophidiidae				0	0	7	9	31	72	38	81
44 Polynemidae	4			2	21	2	5	3	5	7	31
45 Pomacentridae	4			1	6	0	0	4	5	5	11
46 Sciaenidae	4			0	0	2	93	8	34	10	127
*47 Scombridae	1			15	70	24	89	16	89	55	248
48 Scorpaenidae	4			5	18	16	93	37	133	58	244
49 Serranidae	4			3	13	6	13	17	54	26	80
50 Sphyraenidae				0	0	1	2	1	8	2	10
*51 Tetragonuridae[2]		3	17	5	5	5	6	1	1	11	12
*52 Trichiuridae		3	4, 17	3	3	2	2	44	181	49	186
*53 Bothidae		4	8	7	19	28	307	35	364	70	690
*54 Cynoglossidae		4		2	5	16	109	38	248	56	362
55 Ostraciontidae	3			14	49	1	1	0	0	15	50
*56 Lophiiformes	6		18	25	42	33	56	56	145	114	243
*57 Other identified				7	11	3	3	13	37	23	51
58 Unidentified larvae	1			48	171	56	265	78	426	182	862
59 Disintegrated larvae	1			96	753	77	809	115	1,252	288	2,814
Total				111	24,859	95	38,032	149	60,294	355	123,185

[1] Categories preceded by an asterisk are discussed in the text.
[2] Discussed in text under 42, Nomeidae.

TABLE 9.—Standardized counts of fish larvae compared with unstandardized (original) counts, summarized for selected families (see Appendix Table 8 for standardized haul factors).

Family or larger grouping	Standardized counts					Unstandardized counts	
	45.000 series	46.000 series	47.000 series	Total standardized counts	Percentage of total	Total unstandardized counts	Percentage of total
Bathylagidae	1,132	3,569	14,427	19,128	4.8	5,891	4.8
Gonostomatidae	31,525	19,347	26,717	77,589	19.5	24,255	19.7
Sternoptychidae	6,529	5,977	12,321	24,827	6.3	7,385	6.0
Chauliodontidae	97	43	589	729	0.2	207	0.2
Idiacanthidae	901	699	996	2,596	0.7	795	0.6
Other Stomiatoidei	914	732	2,061	3,707	0.9	1,107	0.9
Myctophidae	31,015	62,775	111,787	205,577	51.8	64,009	52.0
Paralepididae	1,712	2,724	3,511	7,947	2.0	2,535	2.1
Scopelarchidae	350	281	342	973	0.2	298	0.2
Melamphaidae	818	1,227	2,223	4,268	1.1	1,365	1.1
Bregmacerotidae	1,259	5,772	3,210	10,241	2.6	3,062	2.5
Exocoetidae	78	104	245	427	0.1	146	0.1
Trachypteridae	32	63	93	188	<0.1	59	<0.1
Apogonidae	636	228	110	974	0.2	283	0.2
Bramidae	99	77	138	314	0.1	96	0.1
Chiasmodontidae	161	123	501	785	0.2	237	0.2
Coryphaenidae	185	194	227	606	0.2	185	0.2
Nomeidae	1,132	1,235	2,345	4,712	1.2	1,460	1.2
Scombridae	237	296	284	817	0.2	248	0.2
Other identified	1,704	3,893	13,204	18,801	4.7	5,886	4.8
Unidentified	590	827	1,274	2,691	0.7	862	0.7
Disintegrated larvae	2,604	2,405	4,255	9,264	2.3	2,814	2.3
Total fish larvae	83,710	112,591	200,860	397,161	100.0	123,185	100.1

Relative abundance of fish as larvae is not necessarily proportional to their relative abundance as adults. A number of parameters would have to be evaluated if counts of eggs and larvae of a species are to be used in determining the biomass of adult populations. These include fecundity (preferably given as number of eggs spawned in relation to fish weight—such as number of eggs spawned per gram of female weight); egg size, which influences size and state of development at hatching; duration of time spent in plankton both as egg stage and as larva as related to temperature of development; mortality rates during embryonic and larval stages; size at transformation; length of spawning season; age structure of population; etc.

I am assuming that the relative abundances of larvae of a given species are comparable from cruise to cruise in the EASTROPAC area. I am further assuming that comparisons of relative abundance within a family, as for example among myctophid or among scombrid larvae, will reflect their relative abundance as adults within reasonable limits. I, however, would caution against taking comparisons between families too literally until essential parameters are evaluated for each.

Actual counts of larvae rather than standardized values are used in tabulations throughout the paper, except Table 9. Table 9 compares summations of larvae of selected families based on standardized values with summations based on actual counts. These families make similar percentage contributions to the larval catch whether based on standardized counts or actual counts.

COMPARISON OF COMPOSITION AND RELATIVE ABUNDANCE OF LARVAE IN EASTROPAC II AND EASTROPAC I COLLECTIONS

In order to keep comparisons between the two EASTROPAC multivessel cruises completely relevant, the following stations lacking counterparts in ETP II were omitted from ETP I summations: Stations 11.146 to 11.328 of the outer pattern occupied by *Argo*, Stations 12.122 to 12.164 of the adjacent pattern occupied by *David Starr Jordan*, and Stations 13.095 to 13.155 of the next to inner pattern occupied by *Rockaway*. The remaining stations, by happy coincidence, total 355, are identical to the

TABLE 10.—Comparison of occurrences and relative abundance of fish larvae on EASTROPAC II (355 stations) with comparable coverage on EASTROPAC I (355 stations) summarized by family or larger grouping.

Family or larger grouping	EASTROPAC II			EASTROPAC I		
	No. positive hauls	No. larvae	Average no. per haul	No. positive hauls	No. larvae	Average no. per haul
Clupeidae	9	270	0.8	10	81	0.2
Engraulidae	35	1,360	3.8	10	205	0.6
Argentinidae	32	58	0.2	38	81	0.2
Bathylagidae	298	5,891	16,6	275	4,742	13.4
Gonostomatidae	342	24,255	68.3	333	18,380	51.8
Sternoptychidae	277	7,385	20.8	240	4,923	13.9
Astronesthidae	42	74	0.2	11	12	<0.1
Chauliodontidae	56	207	0.6	59	124	0.3
Idiacanthidae	181	795	2.2	132	855	2.4
Other Stomiatoidei	210	1,034	2.9	157	428	1.2
Chloropthalmidae	4	8	<0.1	1	4	<0.1
Evermannellidae	17	67	0.2	10	13	<0.1
Myctophidae	352	64,009	180.3	346	39,249	110.6
Paralepididae	247	2,535	7.1	218	1,456	4.1
Scopelarchidae	134	298	0.8	109	273	0.8
Scopelosauridae	40	390	1.1	6	13	<0.1
Synodontidae	14	60	0.2	10	41	0.1
Anguilliformes	81	151	0.4	66	138	0.4
Melamphaidae	284	1,365	3.8	235	703	2.0
Trachypteridae	11	70	0.2	0	0	0
Bregmacerotidae	160	3,062	8.6	132	1,587	4.5
Scomberesocidae	27	153	0.4	1	1	<0.1
Exocoetidae	59	146	0.4	66	164	0.5
Trachypteridae	46	59	0.2	33	35	0.1
Apogonidae	66	283	0.8	37	135	0.4
Balistidae	5	8	<0.1	2	3	<0.1
Bramidae	67	96	0.3	40	49	0.1
Carangidae	36	224	0.6	31	183	0.5
Carapidae	7	7	<0.1	3	3	<0.1
Chiasmodontidae	100	237	0.7	48	97	0.3
Coryphaenidae	109	185	0.5	67	97	0.3
Gempylidae	112	370	1.0	59	110	0.3
Gobiidae	53	384	1.1	60	530	1.5
Labridae	32	57	0.2	28	40	0.1
Mugilidae	5	16	<0.1	5	9	<0.1
Nomeidae	229	1,460	4.1	159	900	2.5
Polynemidae	7	31	0.1	5	11	<0.1
Sciaenidae	10	127	0.4	4	12	<0.1
Scombridae	55	248	0.7	163	1,840	5.2
Scorpaenidae	58	244	0.7	47	162	0.5
Serranidae	26	80	0.2	26	252	0.7
Sphyraenidae	2	10	<0.1	3	3	<0.1
Tetragonuridae	11	12	<0.1	2	3	<0.1
Trichiuridae	49	186	0.5	19	48	0.1
Bothidae	70	690	1.9	56	199	0.6
Cynoglossidae	56	362	1.0	63	304	0.9
Lophiiformes	114	243	0.7	108	214	0.6
Other identified	76	247	0.7	--	159	0.4
Unidentified larvae	182	862	2.4	170	723	2.0
Disintegrated larvae	288	2,814	7.9	291	2,725	7.7
Total larvae	355	123,185	347.0	351[1]	82,319	231.9

[1] Total stations 355 of which 351 contained larvae (positive hauls), 4 were negative.

count of stations occupied on ETP II. Hence, comparisons between the two cruises can be based on either the average number of larvae per haul or on "total numbers of larvae" of each category inasmuch as equal numbers of stations contributed to the totals.

Comparisons of occurrence and relative abundance of fish larvae in the ETP II pattern (all stations) with comparable coverage for ETP II are summarized by family or larger groupings in Table 10.

Nearly 50% more fish larvae were obtained per haul, on the average, in ETP II (347.0 larvae) as compared with ETP I (231.9 larvae). The larvae of most families of fishes were taken in larger numbers on ETP II than on ETP I, and larvae of several families were taken in markedly larger numbers. The striking exception to this trend was afforded by scombrid larvae; only 13.5% as many scombrid larvae were obtained in ETP II collections as in similar coverage of ETP I.

Families showing the largest increase in total numbers of larvae on ETP II compared with ETP I included Engraulidae (1,360 to 205 larvae), Scomberesocidae (153 to 1 specimen), Scopelosauridae (390 to 13 larvae), Evermannellidae (67 to 13 larvae), Astronesthidae (75 to 13 larvae), Trachichthyidae (70 to 0 larvae), Sciaenidae (127 to 12 larvae), Trichiuridae (186 to 48 larvae), Gempylidae (370 to 110 larvae), and Clupeidae (270 to 81 larvae). For the majority of these, the increase in relative abundance of larvae was most marked in the inner pattern occupied by *Rockaway*. The species compositions involved in these increases, when known, are discussed later under the respective families.

For the majority of families, however, the increase in abundance of larvae on ETP II was moderate, seldom as much as double; for a third of the families, counts of larvae were not much different during the two contrasting periods of the year; thus the similarity in abundance of larvae during the two periods is the striking feature of this comparison.

COMPARISON WITH EASTROPAC MONITORING CRUISES

The portion of the eastern tropical Pacific pattern that could be covered by a single research vessel on surveys averaging 45 days was occupied at bimonthly intervals on four monitoring cruises by *David Starr Jordan*. The cruises were numbered as follows: 20.000 series for the April-May 1967 monitoring cruise, 30.000 series for the June-July monitoring cruise, 50.000 for the October-November 1967 monitoring cruise, and 60.000 for the December 1967-January 1968 monitoring cruise. The monitoring pattern is shown superimposed on ETP II stations in Figure 2; it consisted of four station lines all ending at lat 3°S. The outer line along long 119°W extended from lat 20°N, the inner line along long 98°W, off the Mexican coast (ca. lat 17°N). The two middle lines along long 105° and 112°W were doglegs veering coastward from about lat 12° or 13°N—one line ending up off Manzanillo, Mexico, and the other off Acapulco, Mexico.

Coverage equivalent to the monitoring pattern was determined for ETP I and II. For ETP I the following stations were occupied: 11.022 to 11.118 (35), 12.002 to 12.109 (50), 12.209 to 12.264 (24), and 13.187 to 13.265 (28); total 137 stations. For ETP II comparable coverage was obtained from Stations 45.016 to 45.114 (41), 45.191 to 45.365(37), 46.002 to 46.069 (36), and 46.079 to 46.132(27); total 141 stations.

COMPARISON OF LARVAL COMPOSITION IN MONITORING PATTERN VERSUS LARGER EASTROPAC PATTERN

In Table 11 a comparison is made for both ETP I and ETP II of the average number of larvae per haul and percentage contribution of larvae of the more important fish families in the monitoring pattern as compared with the total pattern occupied on ETP II.

The correspondence between relative abundance and composition of larvae in the monitoring pattern as compared with the larger ETP pattern is closer for ETP I collections than ETP II. The average abundance of larvae in the monitoring pattern on ETP I was 92% as large as for the larger ETP I pattern (equivalent to the coverage obtained on ETP II). The more abundant kinds of larvae—myctophids, gonostomatids, and sternoptychids—had similar average abundances per haul and similar percentage contributions in the monitoring pattern as compared with the more extensive ETP I coverage. Of the remaining seven families used in this com-

TABLE 11.—Comparison of relative abundance of fish larvae (average number per haul) in the monitoring pattern as compared with the total pattern occupied on EASTROPAC II and equivalent EASTROPAC I for more abundant families.

Family	EASTROPAC II						EASTROPAC I					
	Monitoring pattern (141 hauls)			Total pattern (355 hauls)			Monitoring pattern (137 hauls)			Pattern equivalent to total EASTROPAC II (355 hauls)		
	Average no. per haul	%	Rank	Average no. per haul	%	Rank	Average no. per haul	%	Rank	Average no. per haul	%	Rank
Myctophidae	116.4	45.6	1	180.3	52.0	1	104.9	49.0	1	110.6	47.7	1
Gonostomatidae	77.9	30.5	2	68.3	19.7	2	48.6	22.7	2	51.8	22.3	2
Sternoptychidae	12.8	5.0	3	20.8	6.0	3	14.2	6.6	3	13.9	6.0	3
Bathylagidae	4.9	1.9	5	16.6	4.8	4	6.4	3.0	5	13.4	5.8	4
Bregmacerotidae	3.4	1.3	7	8.6	2.5	5	6.6	3.1	4	4.5	1.9	6
Paralepididae	8.2	3.2	4	7.1	2.0	6	4.8	2.3	6	4.1	1.8	7
Nomeidae	4.2	1.7	6	4.1	1.2	7	3.6	1.7	7	2.5	1.1	8
Melamphaidae	2.9	1.1	9	3.8	1.1	8	1.5	0.7	10	2.0	0.9	10
Idiacanthidae	3.0	1.2	8	2.2	0.6	10	2.8	1.3	8	2.4	1.0	9
Scombridae	0.6	0.2	10	0.7	0.2	ca. 20	2.4	1.1	9	5.2	2.2	5
Other	20.8	8.2		34.5	9.9		18.1	8.5		21.5	9.3	
Total	255.1	99.9		347.0	100.0		213.9	100.0		231.9	100.0	

parison, four were taken in somewhat higher numbers in the monitoring pattern and three in the more extensive ETP I coverage. Among the latter, less than half as many scombrid larvae were taken per haul in the smaller pattern as compared with the larger.

The average abundance of larvae in the monitoring pattern on ETP II was only 73.5% as many as for the total ETP II pattern. Larvae of three families were slightly more abundant in the monitoring pattern than in the total ETP II pattern, including Gonostomatidae, Paralepididae, and Idiacanthidae; larvae of Scombridae and Nomeidae were about equally abundant in the two patterns. Four families of fishes, however, including Myctophidae and Sternoptichidae, were less abundant in the monitoring pattern as compared with the total ETP II pattern. Caution has to be exercised in the applications made of data from the monitoring pattern alone.

TEMPORAL CHANGES IN ABUNDANCE IN MONITORING PATTERN

Data from six successive bimonthly coverages of the monitoring patterns are exceptionally useful for determining the annual reproductive cycles of fishes in tropical waters. Data on relative abundance (average number per haul) are summarized for the 10 most common families in Table 12 and for selected genera and species in Table 13. The time period covered by each of the six surveys is indicated in these tables, and will be used for identifying cruises in the discussion.

The first thing to note is the range in abundance of total larvae on the six cruises: the highest abundance, 255.1 larvae per haul (August-September) was slightly less than double the lowest abundance, 133.1 larvae per haul in December-January. Range in abundance of larvae of each of the 10 families during the yearly cycle will be briefly discussed.

Myctophidae ranked first in all cruises, although barely so in the cruise made during June-July. The highest average number of larvae per haul, 116.4, obtained in August-September was almost double the lowest value, 58.7 larvae obtained in December-January. Myctophid larvae were as low as 37.9% of the total larvae (June-July), as high as 57.1% (October-November), and had an overall percentage contribution of 47.5%.

Gonostomatidae ranked second in all cruises; the lowest abundance per haul, 32.6 larvae in October-November, was less than half the highest value, 77.9 larvae per haul in August-September. Percentage contribution ranged between 18.5% (October-November) and 37.7% (June-July) and averaged 26.9%.

Sternoptychidae ranked third in abundance

TABLE 12.—Relative abundance and percentage contribution of fish larvae of the 10 most common families within that portion of EASTROPAC area covered on six successive bimonthly cruises between February 1967 and January 1968.

Family	ETP multivessel I[1] (Feb.-Mar.)		ETP monitoring cruise #20 (Apr.-May)		ETP monitoring cruise #30 (June-July)		ETP multivessel II[2] (Aug.-Sept.)		ETP monitoring cruise #50 (Oct.-Nov.)		ETP monitoring cruise #60 (Dec.-Jan.)		Six cruises - ETP monitoring area	
	Average no. per haul	%	Average no. per haul	%	Average no. per haul	%	Average no. per haul	%	Average no. per haul	%	Average no. per haul	%	Average no. per haul	%
Myctophidae	104.9	49.0	100.4	50.7	67.6	37.9	116.4	45.6	100.7	57.1	58.7	44.1	91.2	47.5
Gonostomatidae	48.6	22.7	50.6	25.6	67.3	37.7	77.9	30.5	32.6	18.5	33.7	25.3	51.6	26.9
Sternoptychidae	14.2	6.6	17.1	8.6	9.5	5.3	12.8	5.0	13.5	7.6	12.9	9.7	13.3	7.0
Bathylagidae	6.4	3.0	3.9	2.0	2.9	1.6	4.9	1.9	3.2	1.8	2.6	2.0	4.0	2.1
Paralepididae	4.8	2.3	4.1	2.1	5.3	3.0	8.2	3.2	3.2	1.8	4.8	3.6	5.1	2.7
Nomeidae	3.6	1.7	3.5	1.8	5.1	2.9	4.2	1.7	1.5	0.9	2.4	1.8	3.4	1.8
Bregmacerotidae	6.6	3.1	1.3	0.7	2.6	1.4	3.4	1.3	3.1	1.7	2.4	1.8	3.2	1.7
Idiacanthidae	2.8	1.3	2.9	1.5	2.0	1.1	3.0	1.2	1.1	0.6	1.5	1.1	2.2	1.1
Melamphaidae	1.5	0.7	1.8	0.9	1.6	0.9	2.9	1.1	1.7	1.0	1.3	1.0	1.8	0.9
Scombridae	2.4	1.1	1.4	0.7	1.0	0.6	0.6	0.2	1.3	0.8	1.4	1.1	1.4	0.7
Other	18.1	8.5	10.8	5.4	13.5	7.6	20.8	8.2	14.5	8.2	11.4	8.5	14.8	7.7
Total	213.9	100.0	197.8	100.0	178.4	100.0	255.1	99.9	176.4	100.0	133.1	100.0	192.0	100.1

[1] ETP I —stations 11.022-11.118 (35), 12.002-12.109 (50), 12.209-12.264 (24), and 13.187-13.265 (28).
[2] ETP II — stations 45.016-45.114 (41), 45.191-45.365 (37), 46.002-46.069 (36), and 46.079-46.132 (27).

in all cruises. The average abundance per haul ranged from 9.5 larvae (June-July) to 17.1 (April-May), a range of less than two times.

Bathylagid smelts were represented in the monitoring pattern by a single species, *Bathylagus nigrigenys* Parr. Average abundance of larvae per haul ranged from 2.6 (December-January) to 6.4 (February-March) and averaged 4.0 larvae. Larvae of Bathylagidae usually ranked fifth in abundance.

Paralepididae usually ranked fourth in relative abundance; the lowest average abundance per haul was 3.2 larvae in October-November, and the highest was 8.2 larvae in August-September.

Nomeidae ranked variously fifth to eighth in relative abundance, with an overall ranking of sixth. The range in average abundance per haul was from 1.5 (October-November) to 5.1 larvae (June-July) and averaged 3.4 larvae.

Bregmacerotidae showed the widest variation in abundance, 1.3 larvae (April-May) to 6.6 larvae (February-March); consequently they ranked variously between fourth and tenth in relative abundance. Larvae of the most common species of *Bregmaceros* within the monitoring pattern, *B. bathymaster,* tend to cluster with occasional samples having rather large numbers of larvae. Variability in sampling due to chance encounters of clusters of larvae could be of greater magnitude than that resulting from actual changes in reproductive activity during the year.

Idiacanthidae, usually ranked eighth in abundance per haul from 1.1 (October-November) to 2.9 larvae (April-May), with an overall average of 2.2 larvae per haul.

Melamphaidae ranked variously between seventh and tenth, with an overall rank of ninth. The lowest abundance, 1.3 larvae per haul in December-January, was less than half the highest, 2.9 larvae in August-September.

Scombridae in the monitoring area ranked either ninth or tenth in relative abundance of larvae on all cruises; the lowest average abundance, 0.6 larvae per haul in August-September, is only a fourth of the highest average value, 2.4 larvae in February-March.

Larvae of these 10 families made up over 92% of the fish larvae in the monitoring pattern. In all instances, larvae of all principal families were taken throughout the year. The spread between the highest and lowest abundance values for larvae of these principal families of fishes was usually less than three times, and for Myctophidae and Sternoptychidae, was less than double.

A similar seasonal pattern of abundance was observed for individual genera or species (Table 13). I found it helpful to arrange the 18 ge-

TABLE 13.—Relative abundance (average number per haul) of pelagic fish larvae of selected genera and species within that portion of EASTROPAC area covered on six successive bimonthly cruises between February 1967 and January 1968.

Genus or species	ETP multi-vessel I (Feb.-Mar.)	ETP monitor cruise #20 (Apr.-May)	ETP monitor cruise #30 (June-July)	ETP multi-vessel II (Aug.-Sept.)	ETP monitor cruise #50 (Oct.-Nov.)	ETP monitor cruise #60 (Dec.-Jan.)	Range	Average six cruises
	Average number per haul							
Bathylagus nigrigenys	6.4	3.9	2.9	4.9	3.2	2.6	2.6- 6.4	4.0
Cyclothone spp.	3.7	3.0	3.7	3.0	1.2	2.7	1.2- 3.7	2.9
Diplophos taenia	0.6	0.4	0.6	0.6	0.7	0.4	0.4- 0.7	0.6
Vinciguerria lucetia	43.3	45.8	62.5	71.9	30.3	30.0	30.0- 71.9	47.3
Chauliodus sp.	0.4	0.1	0.1	0.2	0.2	0.2	0.1- 0.4	0.2
Idiacanthus sp.	2.8	2.9	2.0	3.0	1.1	1.5	1.1- 3.0	2.2
Bathophilus filifer	0.9	0.6	0.6	1.3	0.6	0.9	0.6- 1.3	0.8
Diogenichthys laternatus	51.1	63.0	37.4	68.6	62.2	31.8	31.8- 68.6	52.4
Gonichthys tenuiculus	0.7	0.8	0.3	0.7	0.5	0.2	0.2- 0.8	0.5
Hygophum atratum	2.5	1.0	1.5	1.5	1.4	1.1	1.0- 2.5	1.5
Hygophum proximum	3.0	2.7	2.0	2.7	3.0	1.1	1.1- 3.0	2.4
Notolychnus valdiviae	2.8	2.4	2.0	2.0	1.6	1.5	1.5- 2.8	2.0
Notoscopelus resplendens	0.9	0.9	0.5	1.1	0.6	1.0	0.5- 1.1	0.8
Symbolophorus evermanni	1.4	0.4	1.0	1.9	1.2	1.0	0.4- 1.9	1.2
Triphoturus sp.	0.9	0.8	0.5	0.8	0.3	0.3	0.3- 0.9	0.6
Auxis spp.	2.2	1.1	0.7	0.5	1.1	1.1	0.5- 2.2	1.1
Coryphaena spp.	0.3	0.5	0.7	0.7	0.3	0.2	0.2- 0.7	0.4
Howella pammelas	0.8	1.1	1.3	1.6	0.6	0.4	0.4- 1.6	1.0
All others	89.2	66.4	58.1	88.1	66.3	55.1	55.1- 89.2	70.5
Total	213.9	197.8	178.4	255.1	176.4	133.1	133.1-255.1	192.4

nera and species of this table according to the magnitude of the seasonal change in abundance that each displayed.

Seasonal range in relative abundance between highest and lowest average number of larvae per haul:

Less than 2×:	*Notolychnus valdiviae*
2.1 to 3×:	*Bathylagus nigrigenys*, *Diplophos taenia*, *Vinciguerria lucetia*, *Idiacanthus* sp., *Bathophilus filifer*, *Diogenichthys laternatus*, *Hygophum atratum*, *Hygophum proximum*, *Notoscopelus resplendens*, *Triphoturus* sp.
3.1 to 4×:	*Cyclothone* spp., *Chauliodus* sp., *Gonichthys tenuiculus*, *Coryphaena* spp., *Howella pammelas*
4.1 to 5×:	*Symbolophorus evermanni*, *Auxis* spp.

Larvae of the above 18 genera and species were taken on all cruises throughout the year. Obviously, reproduction is a continuous process for all of these, varying in amount at different seasons of the year and at different latitudes, but never stopping entirely.

Larvae of two species dominated the collections from the monitoring pattern: those of the myctophid *Diogenichthys laternatus* and of the gonostomatid, *Vinciguerria lucetia*. Together these two species made up 44 to 56% of the total larvae in the monitoring pattern (Table 14).

The highest average abundance of larvae of the lanternfish, *Diogenichthys laternatus*, 68.6 larvae in August-September, was 2.5× as much as the lowest average abundance, 31.8 larvae in December-January. Larvae of this species ranked first in abundance between October and May, but were less abundant than larvae of *Vinciguerria lucetia* during June-September. Larvae of *Vinciguerria lucetia* had a range of 2.4× between their highest average abundance per haul, 71.9 larvae in August-September, and lowest, 30.0 larvae in December-January. A small but consistent change in abundance with season is evident for this species, with the peak period in June-September, the minimal period in October-January, and intermediate abundance of larvae in February-May.

The monitoring cruises were valuable in permitting us to establish the seasonal patterns of

TABLE 14.—Percentage contributions of larvae of the two most abundant species to the total catch of larvae in the monitoring pattern.

Cruise designation	Time of survey	Percentage contribution of larvae of *Vinciguerria lucetia*	*Diogenichthys laternatus*	Combined
EASTROPAC I	Feb.-Mar.	20.2	23.9	44.1
20.000 series	Apr.-May	23.2	31.8	55.0
30.000 series	June-July	35.0	21.0	56.0
EASTROPAC II	Aug.-Sept.	28.6	26.9	55.1
50.000 series	Oct.-Nov.	17.2	35.3	52.5
60.000 series	Dec.-Jan.	22.5	23.9	46.4
	Annual	24.6	27.2	51.8

reproduction in oceanic, tropical fishes. Except for this, little more was gained from the repeated coverages that was not evident from any one of the six coverages. The same species composition was observed in all six cruises, and even the relative abundance of the various constituents did not change much. The similarity between cruises also extended to the geographic distributions of the various constituents which changed but little over time.

COMPARISON WITH RV *OCEANOGRAPHER* ZIG-TRANSECT

Although the average number of larvae per haul was almost identical for the *Oceanographer* collections and equivalent ETP II collections, 488.5 versus 487.8 larvae, and the kinds of larvae obtained were strikingly similar, the relative abundance of several categories was somewhat more variable than in the monitoring pattern (Table 15).

Similarities and differences in relative abundance of larvae during the two coverages can be shown from a consideration of the 10 families with highest abundance in the *Oceanographer* collections (Table 16).

Myctophidae.—The difference in relative abundance of Myctophidae larvae between *Oceanographer* and ETP II collections, 194.1 versus 273.9 larvae per haul, is almost entirely due to difference in relative abundance of larvae of *Diogenichthys laternatus.* Over 50% of *D. laternatus* larvae on ETP II were taken in four contiguous stations between lat 5°40′ and 7°44′N, with three collections exceeding 1,000 larvae and the largest with 2,505 larvae. Interestingly, the two *Oceanographer* collections containing more than 1,000 *D. laternatus* larvae were taken between lat 6° and 7°N; these were the only two stations occupied between lat 5°40′ and 7°44′N by *Oceanographer* in contrast to four collections from this rich area on ETP II.

Gonostomatidae.—The difference in relative abundance of Gonostomatidae larvae in the two occupancies of the zig-transect was again due principally to a single species, *Vinciguerria lucetia.* Although twice as many larvae of this species were taken in *Oceanographer* collections, an examination of the station record revealed that one collection, OP.036 with 2,046 larvae, accounted completely for the difference.

Clupeidae.—It is necessary to examine the species composition to evaluate differences between the two coverages (Table 17). Larvae of the sardine, *Sardinops sagax,* were taken in six contiguous stations near the Galapagos on ETP II, and averaged 29 larvae per positive haul, whereas only 1 sardine larva was obtained from the same area by *Oceanographer.* This species appears to have a period of peak spawning with reduced reproduction at other periods of the year. The contrast between the two collections of thread herring, *Opisthonema* sp., made at the station nearest the Mexican coast along long 92°W is the largest observed in EASTROPAC collections—2,730 larvae in the *Oceanographer* sample versus one larva in the ETP II collection. The larvae in the *Oceanographer* collection were intermediate-sized, 6 to 12.5 mm. Even allowing for the circumstance that clupeid larvae often occur in patches, this exceptionally large collection of larvae must have been obtained at a peak period of spawning of thread herring.

Bathylagidae.—Larvae of the two species of bathylagid smelts that occur in the area covered by the zig-transect, were similar in distribution and relative abundance in the two coverages. Larvae of *Bathylagus nigrigenys* were taken in all but three collections on each coverage, and average abundance per haul was almost identical, 26.3 versus 26.6 larvae (Table 17). Larvae of *Leuroglossus stilbius urotranus* had a more restricted distribution on both coverages, occurring between about 7°S and the equator, at sta-

TABLE 15.—Comparison of composition of catches of fish larvae in *Oceanographer* zig-transect, occupied in November-December 1967, with equivalent coverage by EASTROPAC II vessels during August-September 1967.

Family or larger grouping	*Oceanographer* (50 stations)			Equivalent ETP II coverage (48 stations)		
	No. positive hauls	No. larvae	Average no. per haul	No. positive hauls	No. larvae	Average no. per haul
Clupeidae	2	2,737	54.7	7	185	3.9
Engraulidae	6	760	15.2	15	381	7.9
Argentinidae	0	0	0	2	2	<0.1
Bathylagidae	47	2,308	46.2	45	2,005	41.8
Gonostomatidae	47	4,386	87.7	45	2,386	49.7
Sternoptychidae	39	976	19.5	40	1,093	22.8
Chauliodontidae	16	47	0.9	9	19	0.4
Idiacanthidae	15	27	0.5	28	58	1.2
Other stomiatoidei	28	209	4.2	32	274	5.7
Myctophidae	50	9,706	194.1	47	13,149	273.9
Paralepididae	28	556	11.1	25	320	6.7
Scopelarchidae	15	138	2.8	9	36	0.8
Scopelarsauridae	11	14	0.3	19	32	0.7
Synodontidae	1	3	0.1	3	7	0.1
Anguilliformes	10	18	0.4	16	23	0.5
Melamphaidae	43	243	4.9	40	274	5.7
Bregmacerotidae	1	470	9.4	9	1,455	30.3
Macrouridae	3	3	0.1	4	4	0.1
Exocoetidae	5	16	0.3	6	11	0.2
Scomberesocidae	1	1	<0.1	6	7	0.1
Trachypteridae	7	11	0.2	8	11	0.2
Apogonidae	1	1	<0.1	5	14	0.3
Bramidae	13	22	0.4	7	10	0.2
Carangidae	2	354	7.1	5	56	1.2
Chiasmodontidae	27	65	1.3	13	38	0.8
Coryphaenidae	8	8	0.2	8	13	0.3
Gempylidae	7	21	0.4	9	30	0.6
Gobiidae	6	42	0.8	12	35	0.7
Labridae	3	3	0.1	3	3	0.1
Nomeidae	37	185	3.7	27	155	3.2
Ophidiidae	6	10	0.2	5	6	0.1
Sciaenidae	4	34	0.7	4	96	2.0
Scombridae	7	82	1.6	10	41	0.9
Scorpaenidae	9	14	0.3	11	86	1.8
Serranidae	2	28	0.6	6	9	0.2
Sphyraenidae	1	1	<0.1	1	2	<0.1
Trichiuridae	4	4	0.1	8	10	0.2
Bothidae	14	67	1.3	17	227	4.7
Cynoglossidae	7	164	3.3	10	99	2.1
Lophiiformes	20	39	0.8	13	23	0.5
Other identified	6	104	2.1	12	23	0.5
Unknown larvae	21	53	1.1	21	100	2.1
Disintegrated larvae	42	488	9.8	42	606	12.6
Total larvae	50	24,417	488.5	48	23,414	487.8

tions occupied shoreward of the Galapagos Islands; the average abundance per haul was slightly higher in *Oceanographer* collections—19.9 versus 15.1 larvae.

Engraulidae—Larvae of *Engraulis ringens* were taken in more collections on ETP II (Table 17), but in lesser numbers per positive haul than in *Oceanographer* collections. The spawning period of the Peruvian anchovy is mostly between August and February (Einarsson and Rojas de Mendiola, 1967); both coverages were within this period of the year. Larvae of other engraulids were taken at the inner station off Mexico in both coverages, but in markedly larger numbers by *Oceanographer*. Larvae of Sternoptychidae, Melamphaidae, and Paralepididae had similar frequency of occurrence in the two coverages (Table 16); differences in relative abundance were small to moderate.

Carangid larvae were taken in more collec-

TABLE 16.—Comparison of occurrence and average abundance per haul of larvae of 10 families with highest relative abundance on *Oceanographer* zig-transect with equivalent coverage on ETP II.

Family	*Oceanographer* (50 stations)			Equivalent ETP II (48 stations)		
	No. positive hauls	Average no. per haul	Rank	No. positive hauls	Average no. per haul	Rank
Myctophidae	50	194.1	1	47	273.9	1
Gonostomatidae	47	87.7	2	45	49.7	2
Clupeidae	2	54.7	3	7	3.9	11
Bathylagidae	47	46.2	4	45	41.8	3
Sternoptychidae	39	19.5	5	40	22.8	5
Engraulidae	6	15.2	6	15	7.9	6
Paralepididae	28	11.1	7	25	6.7	7
Bregmacerotidae	1	9.4	8	9	30.3	4
Carangidae	2	7.1	9	5	1.2	--
Melamphaidae	43	4.9	10	40	5.7	8

tions on ETP II, 5 versus 2 (Table 16), but one of the two positive hauls at *Oceanographer* stations contained 353 larvae. This is considered a chance collection of a patch of larvae. Larvae of Bregmacerotidae were taken in only one *Oceanographer* collection, compared to nine on ETP II. Larvae of two species of *Bregmaceros* were represented in ETP II stations but only larvae of *B. bathymaster* were taken in large numbers. The single *Oceanographer* collection of 470 larvae of this species was made at the inner station off Mexico; two large collections of *B. bathymaster* larvae were made at the two inner stations off Mexico on ETP II (511 and 927 larvae). The principal difference in abundance of *Bregmaceros* larvae between the two coverages appears to be the chance collection of two patches versus one patch of *B. bathymaster* larvae.

I have gone into some detail in order to point up the influence of one or a few larger collections of larvae on the estimates of relative abundance (average number of larvae per haul) of several of the more abundant kinds of larvae in the zig-transect. Larvae of most kinds of fishes are patchily distributed, rather than randomly distributed. Variability associated with patchiness in distribution of larvae may be greater than variability due to temporal changes in reproductive activity. In this comparison, an example of temporal differences in reproductive activity is afforded by the sardine. The exceptionally large collection of thread herring larvae is certainly indicative of very heavy spawning off Mexico in late November; the single larva taken in the same area on ETP II (September 15) may actually be indicative of low reproductive activity or, contrariwise, may simply reflect the circumstance that most hauls of patchily distributed species contain few or no larvae. Striking examples of the influence of one or a few collections on the estimates of abundance of larvae in the two coverages of the zig-transect are afforded by larvae of the two most common species, *Vinciguerria lucetia* (one collection) and *Diogenichthys laternatus* (two collections). I interpret difference in abundance of both species in the two time periods involved to be due primarily to variability associated with patchy distribution of larvae rather than to temporal differences in reproductive activity.

COMMENTS ON LARVAE OF THE MAJOR FISH FAMILIES COLLECTED ON EASTROPAC II

As mentioned in an earlier section, the kinds of larvae obtained on the second multivessel EASTROPAC cruise are summarized in Table 8 by family or larger grouping and by research vessel. This table contains 59 categories: 53 families and 6 composite categories including 3 orders or suborders and those labelled "other identified," "unidentified larvae," and "disintegrated larvae." Only those categories preceded by an asterisk are commented upon in the text discussion that follows; these include 31 families and 4 composite categories. Each category retains the sequential number given to it in this table.

The number of families included in the four composite categories are as follows: other Stomiatoidei (2), Anguilliformes (7), Lophiiformes (10), and "other identified" (10). Hence a total of 82 families were identified from ETP II collections.

Basic data on the kinds and numbers of fish larvae obtained in the 355 ETP II stations are contained in Appendix Tables 1-6, and station data including location, date and time of collection, depth of haul, and standardized haul factors for these stations are given in Appendix Table 8.

TABLE 17.—Comparison of composition of selected families and orders of fish larvae in *Oceanographer* zig-transect versus equivalent ETP II collections.

Categories	*Oceanographer* (50 stations) No. positive hauls	No. larvae	Average no. per haul	Equivalent ETP II coverage (48 stations) No. positive hauls	No. larvae	Average no. per haul
Clupeidae						
Etrumeus acuminatus	1	6	0.1	3	7	0.1
Opisthonema sp.	1	2,730	54.6	1	1	<0.1
Sardinops sagax	1	1	<0.1	6	177	3.7
Engraulidae						
Engraulis ringens	5	283	5.7	13	378	7.9
Other Engraulidae	1	477	9.5	2	3	0.1
Bathylagidae						
Bathylagus nigrigenys	47	1,315	26.3	45	1,278	26.6
Leuroglossus stilbius urotranus	13	993	19.9	12	727	15.1
Gonostomatidae						
Cyclothone spp.	26	90	1.8	24	75	1.6
Ichthyococcus irregularis	10	19	0.4	12	16	0.3
Maurolicus muelleri	16	177	3.5	12	282	5.9
Vinciguerria lucetia	47	4,085	81.7	45	2,000	41.7
Other Gonostomatidae	8	15	0.3	6	13	0.3
Myctophidae						
Benthosema panamense	1	43	0.9	2	88	1.8
Diaphus spp.	22	57	1.1	11	37	0.8
Diogenichthys laternatus	47	7,314	146.3	43	11,317	235.8
Gonichthys tenuiculus	24	63	1.3	16	52	1.1
Hygophum atratum	6	15	0.3	1	5	0.1
Hygophum proximum	2	2	<0.1	3	3	0.1
Lampanyctus spp.	49	1,041	20.8	38	610	12.7
Myctophum aurolaternatum	19	65	1.3	8	43	0.9
Myctophum nitidulum	27	445	8.9	24	314	6.5
Notolychnus valdiviae	9	24	0.5	10	71	1.5
Notoscopelus resplendens	24	75	1.5	10	80	1.7
Protomyctophum sp.	6	9	0.2	5	10	0.2
Symbolophorus evermanni	20	96	1.9	19	49	1.0
Triphoturus spp.	35	205	4.1	26	321	6.7
Other incl. unidentified myctophids	17	44	0.9	17	73	1.5
Disintegrated myctophids	32	208	4.2	21	76	1.6
Anguilliformes						
Congridae	2	3	0.1	2	3	0.1
Nemichthyidae	3	4	0.1	5	5	0.1
Nettastomidae	1	1	<0.1	0	0	0
Ophichthidae	5	8	0.2	7	11	0.2
Xenocongridae	0	0	0	1	1	<0.1
Family uncertain	2	2	<0.1	2	3	0.1
Lophiiformes						
Caulophrynidae	0	0	0	1	1	<0.1
Ceratiidae	3	3	0.1	1	2	<0.1
Gigantactinidae	1	1	<0.1	2	2	<0.1
Linophrynidae	5	8	0.2	3	3	0.1
Melanocoetidae	7	8	0.2	5	6	0.1
Oneirodidae	5	8	0.2	6	8	0.2
Lophiidae	1	1	<0.1	1	1	<0.1
Family uncertain	7	10	0.2	0	0	0

A summary of these tables follows.

Appendix Table 1.—Counts of fish larvae, tabulated by family, for all stations occupied on EASTROPAC II. This table contains 22 categories including 18 families, 1 suborder, and 3 composite categories for "other identified larvae," "unidentified larvae," and "disintegrated larvae." The latter category includes larvae too damaged or disintegrated to identify with any certainty.

Appendix Table 2.—Counts of myctophid larvae, tabulated by genus or species, for all stations occupied on the second multivessel EASTROPAC cruise (ETP II). Myctophid larvae are tabulated by species for 13 kinds, by genus for 6 kinds, and 3 composite categories—"other identified myctophids," "unidentified myctophids," and "disintegrated myctophids." A summary of this appendix table is contained in Table 19.

Appendix Table 3.—Counts of selected categories of fish larvae, tabulated by station, for all stations occupied on ETP II. Table contains 23 categories including 11 species, 5 genera, and 7 families. Of these, 12 were included in the category "other identified larvae" in Appendix Table 1, the remainder provide information on counts of larvae at the generic or specific level for several families listed in Appendix Table 1.

Appendix Table 4.—Summary of occurrences and numbers of larvae of 23 categories, limited in distribution to a broad coastal band or around offshore islands or banks. Only positive stations are included. These 23 categories were included under "other identified larvae" in Appendix Table 1.

Appendix Table 5.—Numbers and kinds of eel leptocephali (Anguilliformès) obtained on the second multivessel EASTROPAC cruise (ETP II), tabulated by family for all positive hauls. A summary of this table is given in Table 20.

Appendix Table 6.—Numbers and kinds of lophiiform larvae obtained on the second multivessel EASTROPAC cruise (ETP II) tabulated by family for all positive hauls. A summary of this table is given in Table 23.

Appendix Table 7.—7A contains counts of fish larvae, tabulated by family or larger grouping, for all stations occupied by *Oceanographer* on zig-transect; 7B contains station counts of myctophid larvae for same cruise, tabulated by genus or species; and 7C contains station counts of selected categories of fish larvae on same cruise.

Appendix Table 8.—Station data and standardized haul factors for second multivessel EASTROPAC cruise and for *Oceanographer* zig-transect. Included for each station are locality, date and time of collection, depth of haul, and standardized haul factor. The standardized haul factors are used to adjust original counts of larvae to the comparable standard of numbers of larvae in 10 m^3 of water strained per meter of depth fished. It should be noted that the mid-time of haul for each station is recorded as Pacific Standard Time. However, the symbols D (Daylight), N (Night), DT (Day Twilight), NT (Night Twilight) accurately reflect the local condition at each station. Twilight hauls were taken within 1 hr of local sunrise or sunset.

2. CLUPEIDAE

(9 occurrences, 270 larvae)

As on ETP I, three species of Clupeidae larvae were obtained. Larvae of the sardine, *Sardinops sagax* (Jenyns), (7 occurrences, 179 larvae) and round herring, *Etrumeus acuminatus* Gilbert, (3 occurrences, 7 larvae) were taken in the vicinity of the Galapagos Islands while larvae of the thread herring, *Opisthonema* sp., (2 occurrences, 84 larvae) were taken at two coastal stations off southern Mexico, with surface water temperatures of 28.7° and 29.3°C. Six of the occurrences of sardine larvae were at contiguous stations, along long 92°W, between lat 1°N and 3°S, just seaward of the Galapagos Islands (Figure 3). Surface water temperatures at these stations ranged between 16.4° and 19.3°C. We sampled the Galapagos sardine population on ETP II, at a period of rather high reproductive activity.

3. ENGRAULIDAE

(35 occurrences, 1,360 larvae)

The Peruvian anchovy, *Engraulis ringens* Jenyns, (25 occurrences, 1,307 larvae) also was sampled on ETP II during a period of high reproductive activity (Figure 3). Einarsson and Rojas de Mendiola (1967) determined that the spawning season of the Peruvian anchovy extended from August to March, hence the early part of the 1967-68 spawning season was sampled on ETP II and the close of the previous spawning season on ETP I. Surface temperatures at positive stations ranged between 15.4° and 18.8°C. Larvae of other engraulids (10 occurrences, 53 larvae) were taken at nearshore stations over a wide area between lat 20°N and the equator.

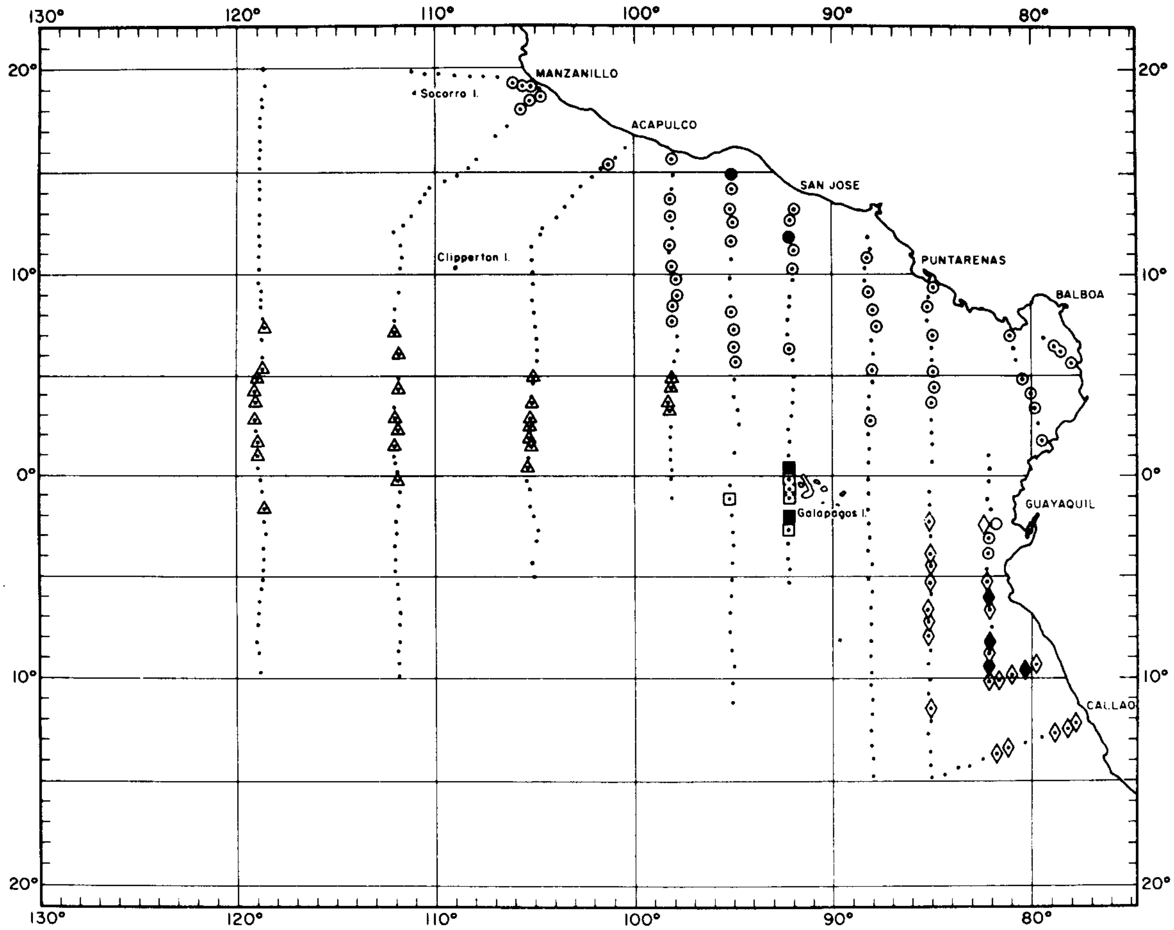

FIGURE 3.—Distribution of larvae of the clupeid, *Sardinops sagax* (open square with dot, 1-50 larvae; closed square, 51 or more larvae), of the engraulid, *Engraulis ringens* (open diamond with dot, 1-100 larvae; closed diamond, 101 or more larvae), of the myctophid, *Myctophum asperum* (open triangle with dot), and of the bothid flatfish, *Syacium ovale* (open circle with dot, 1-100 larvae; large solid circles, 101 or more larvae). Small solid circles represent other stations occupied on ETP II.

4. ARGENTINIDAE

(32 occurrences, 58 larvae)

In contrast to ETP I, from which three kinds of argentinid larvae were obtained, only one kind, *Nansenia* sp. A, was obtained on ETP II. Larvae of *Nansenia* were taken in an offshore equatorial band, between lat 8°N and 7°S. This distribution is closely similar to that illustrated for ETP I (Ahlstrom, 1971, Figure 2).

5. BATHYLAGIDAE

(298 occurrences, 5,891 larvae)

Larvae of two species of bathylagid smelts were taken on ETP II: *Bathylagus nigrigenys* Parr (293 occurrences, 3,787 larvae) and *Leuroglossus stilbius urotranus* (Bussing) (29 occurrences, 2,104 larvae).

In comparable coverage on ETP I, 2,852 larvae of *B. nigrigenys* were taken in 269 collections. The distribution of larvae on the two coverages was strikingly similar (Ahlstrom, 1971, Figure 3). On the two outer lines, occu-

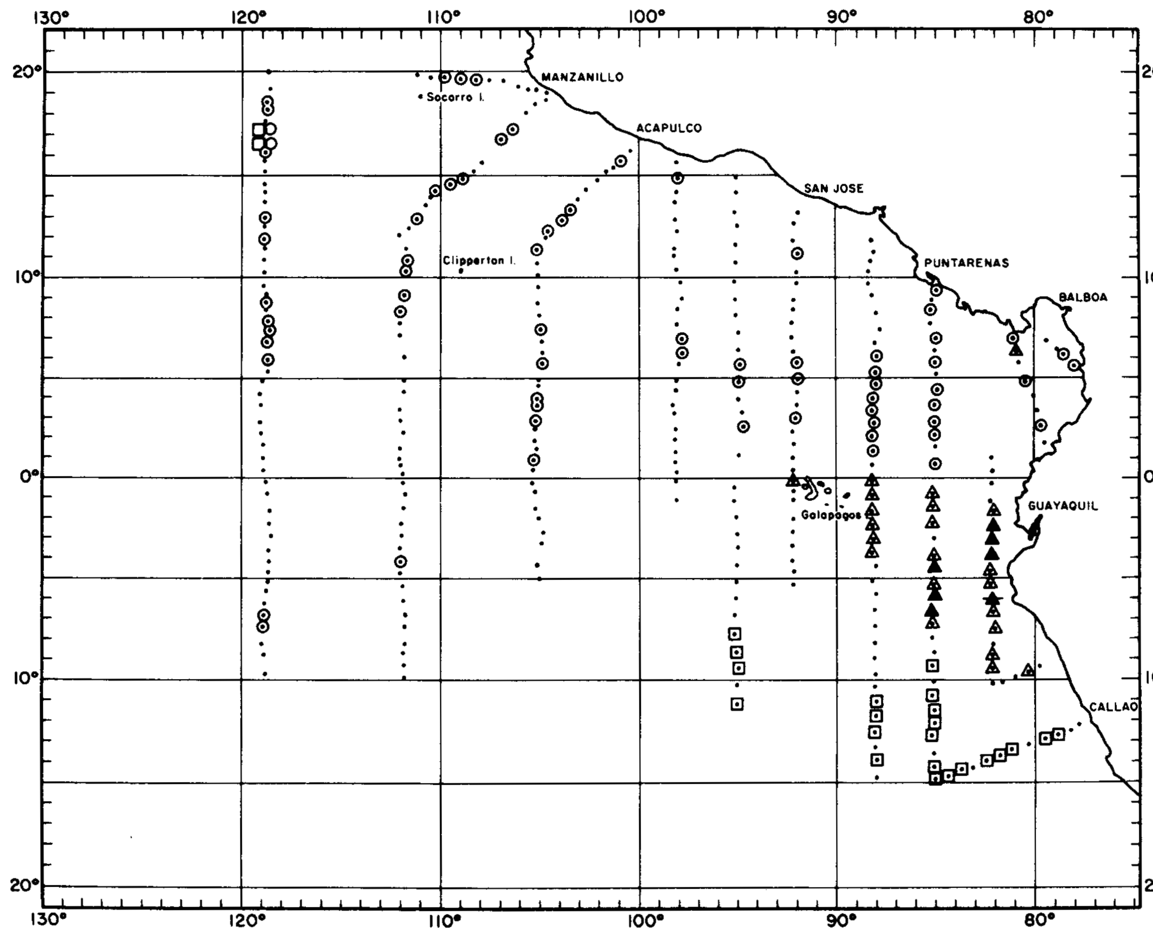

FIGURE 4.—Distribution of larvae of the bathylagid, *Leuroglossus stilbius urotranus* (open triangle with dot, 1-100 larvae; closed triangle, 101-500 larvae, and triangle with bisecting line, 501 or more), of the gempylid, *Gempylus serpens* (open circle with dot), and of the trichiurid, *Diplospinus multistriatus* (open square with dot). Small solid circles represent other stations occupied on ETP II.

pied by *Washington*, no larvae of *B. nigrigenys* were taken below ca. lat. 4°S. Absence of larvae of this species from the South Pacific central water mass was not as conclusively documented as on ETP I, primarily because of the paucity of coverage within the central water mass on ETP II. Counts of larvae exceeded 100 specimens per haul in five samples, taken between 0° and lat 3°S and long 85° to 92°W.

Larvae of *Leuroglossus stilbius urotranus* were taken in 29 collections; all but 2 of which were obtained in a compact area shoreward of the Galapagos Islands between 0° and lat 10°S (Figure 4). The distribution of larvae of this species is one of the few that shows a striking contrast between ETP I and ETP II. On ETP I about half of the occurrences were to the north of the equator between 0° and lat 8°N (18 occurrences, 218 larvae—Ahlstrom, 1971, Figure 2), compared with only one occurrence, one larva in this area on ETP II. The distribution south of the equator was essentially similar on both surveys; on ETP I, 1,672 larvae were taken in 19 collections between 0° and lat 14°S, with the heaviest concentration of larvae in hauls taken between lat 3° and 6°S.

6. GONOSTOMATIDAE
(342 occurrences, 24,255 larvae)

Gonostomatid larvae, exceeded in abundance only by myctophid larvae, were obtained in 97% of the ETP II collections and contributed 19.7% of the total fish larvae. The relative abundance and frequency of occurrences of larvae belonging to 10 genera of gonostomatids are summarized by vessel patterns in Table 18. The last two columns of this table give information concerning occurrence and relative abundance of gonostomatid larvae of the same genera for comparable coverage on ETP I.

Little change in abundance, distribution, or frequency of occurrence was shown by larvae of *Cyclothone* spp. and *Diplophos taenia* Günther, although both were slightly more abundant on ETP I. Average abundance of larvae of *Vinciguerria* spp. was about one-third greater than on equivalent ETP I, and almost three times as many larvae of *Maurolicus muelleri* (Gmelin) were obtained on ETP II. An interesting instance of a marked difference in seasonal abundance of larvae of a gonostomatid fish was found for larvae of *Yarrella argenteola* (Garman). Larvae of this species were taken in 17 collections on ETP II (Figure 6), whereas only one specimen was obtained on ETP I.

Araiophos eastropas Ahlstrom and Moser
(1 occurrence, 35 larvae)

The single record on ETP II is from the southernmost station occupied by *Washington* on its outer line at lat 9°45′S, long 118°59′W. On ETP I, all occurrences of larvae of this species were taken between lat 10° and 18°S along long 119° and 126°W (Ahlstrom, 1971, Figure 4). Hence, it was exciting to obtain the single ETP II collection of larvae of *Araiophos* at the only station in the pattern that bordered on the distributional limits of this species as determined from ETP I collections.

Cyclothone spp.
(187 occurrences, 972 larvae)

Larvae of *Cyclothone* spp. were taken in about an equal number of collections in the two surveys, 187 on ETP II versus 190 on equivalent coverage of ETP I, and in rather similar abundance—2.7 larvae per haul on ETP II as compared with 3.1 on equivalent ETP I. The distribution of larvae of *Cyclothone* on ETP II was similar to that illustrated for equivalent ETP I. As on ETP I, the fewest occurrences (19 of 68 collections) were obtained between lat 10° and 20°N, and the Peruvian coastal waters were almost as poor. However, *Cyclothone* larvae were more abundant in the portion of ETP I that was

TABLE 18.—Frequency of occurrence and relative abundance of the kinds of gonostomatid larvae on EASTROPAC II, and for equivalent coverage on EASTROPAC I.

Gonostomatid genera or species	*Washington* 45.000 series		*Undaunted* 46.000 series		*Rockaway* 47.000 series		EASTROPAC II total (355 hauls)		Equivalent EASTROPAC I total (355 hauls)	
	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae
Araiophos eastropas	1	35	0	0	0	0	1	35	0	0
Cyclothone spp.	64	358	54	331	69	283	187	972	190	1,106
Danaphos oculatus	1	1	0	0	0	0	1	1	0	0
Diplophos taenia	44	114	11	20	2	2	57	136	57	156
Gonostoma spp.	2	3	1	1	8	18	11	22	10	39
Ichthyococcus sp.	3	3	25	38	18	35	46	76	34	53
Maurolicus muelleri	4	11	24	551	19	211	47	773	43	264
Vinciguerria spp.	107	8,553	94	6,148	140	7,497	341	22,198	320	16,746
Woodsia sp.	0	0	2	3	2	2	4	5	3	3
Yarrella argenteola	0	0	1	1	17	32	18	33	1	1
Other gonostomatids	1	1	2	2	1	1	4	4	12	12
Total gonostomatids	108	9,079	94	7,095	140	8,081	342	24,255	333	18,380

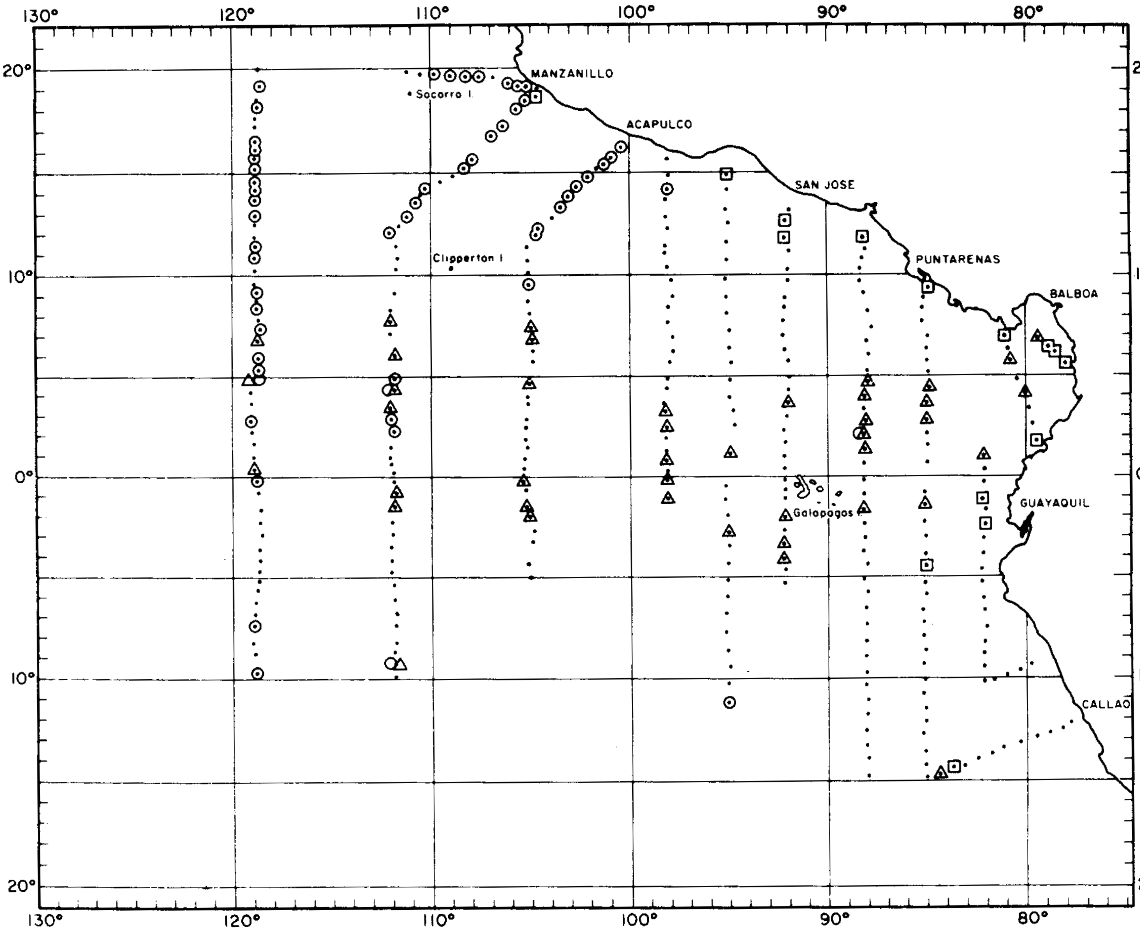

FIGURE 5.—Distribution of larvae of the gonostomatid, *Diplophos taenia* (open circle with dot), of the stomiatoid family, Astronesthidae (open triangle with dot), and of the synodontid genus, *Synodus* spp. (open square with dot). Small solid circles represent other stations occupied on ETP II.

not replicated on ETP II. In these collections *Cyclothone* larvae occurred in 111 of 127 collections, with an average abundance per collection of 8.7 larvae.

Danaphos oculatus **(Garman)**
(1 occurrence, 1 larva)

A single large larva was taken at the northern end of the *Washington* pattern at lat 19°16′N, long 118°56′W. Information obtained from California Current and NORPAC collections indicates that *Danaphos* is a temperate water species, occurring most commonly in collections obtained from the central water mass of the North Pacific in hauls which sampled to depths greater than 140 m.

Diplophos taenia **(Günther)**
(57 occurrences, 136 larvae)

Larvae of *Diplophos taenia* afford a striking example of similarities in distribution, frequency of occurrences, and relative abundance in the

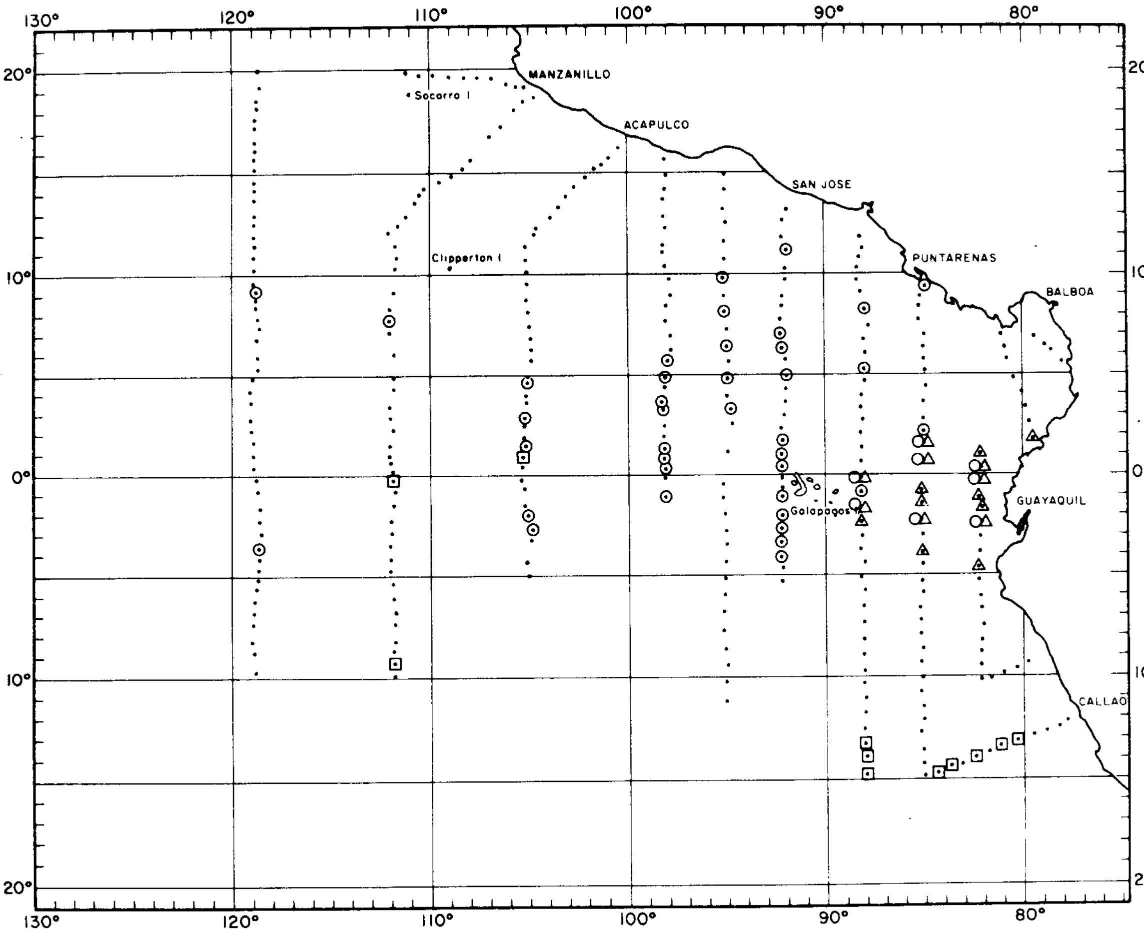

FIGURE 6.—Distribution of larvae of three kinds of gonostomatids. Records of occurrence of larvae of *Gonostoma* spp. shown as open square with dot, of *Ichthyococcus irregularis* as open circle with dot, and of *Yarrella argenteola* as open triangle with dot. Small solid circles represent other stations occupied on ETP II.

two EASTROPAC multivessel cruises. Larvae were obtained in 57 collections from both ETP II and equivalent ETP I; on both surveys the majority of larvae were taken to the north of lat 10°N, particularly on the coastward-oriented portion of the station line terminating off Acapulco, Mexico, and that terminating off Manzanillo, Mexico (Figure 5, and Ahlstrom, 1971, Figure 4). Larvae of this species were taken in moderate numbers, seldom more than 5 per haul; the average number per haul on ETP II was 0.38 larva versus 0.44 larva on equivalent ETP I.

***Gonostoma* sp.**
(11 occurrences, 22 larvae)

At least two kinds of gonostomatid larvae have been referred to *Gonostoma*, the more common being larvae of *G. elongatum* Günther. The distribution of *Gonostoma* larvae on ETP II is shown in Figure 6; 8 of 11 occurrences were in a compact group in the southern, inshore portion of the ETP pattern (between lat 13° and 15°S, offshore to long 88°W).

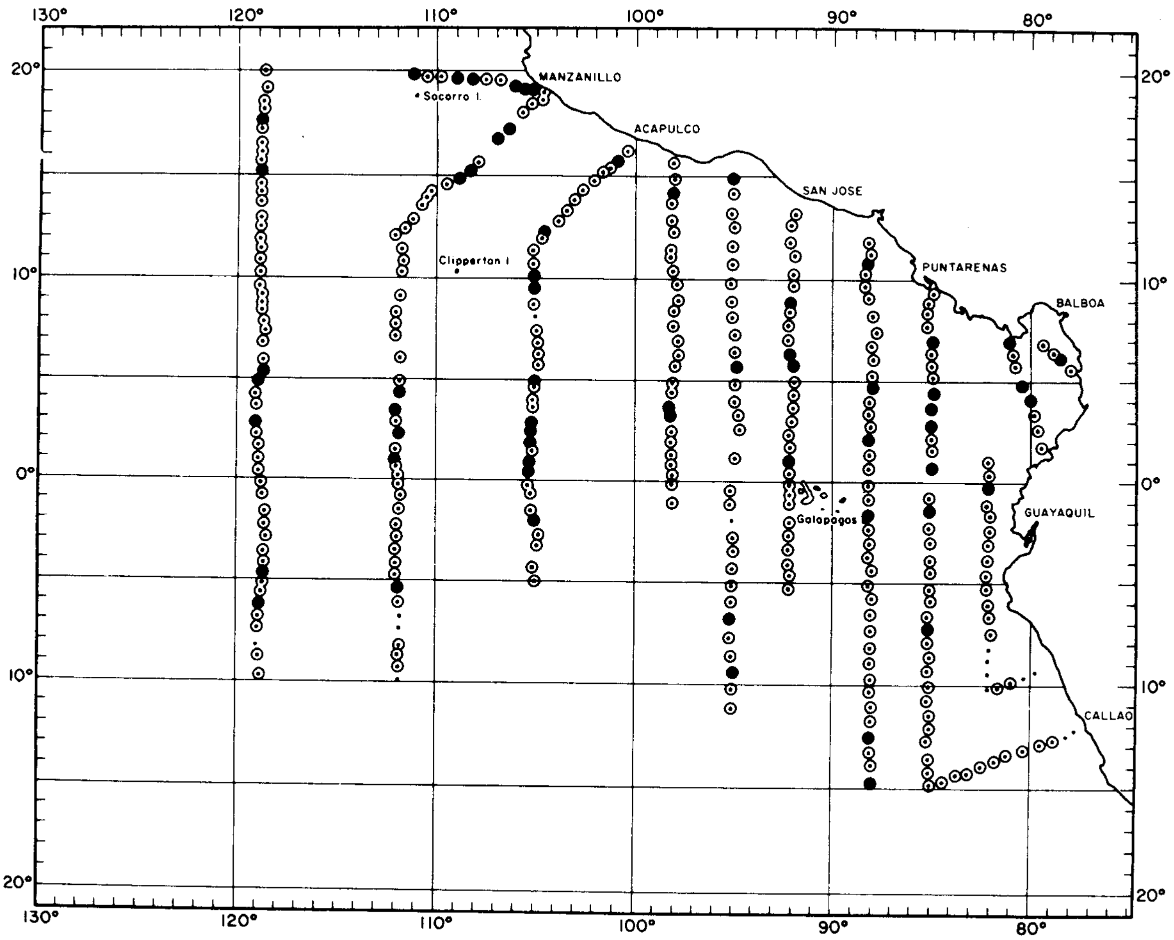

FIGURE 7.—Distribution of larvae of the gonostomatid, *Vinciguerria* spp. on ETP II. Collections of 1-100 larvae are shown as open circles with dot in center, collections of 101 or more larvae as large solid circles; negative hauls are shown as small solid circles.

***Ichthyococcus* sp.**
(46 occurrences, 76 larvae)

All *Ichthyococcus* larvae taken on ETP II were similar in appearance and have been referred to *I. irregularis* Rechnitzer and Böhlke. Although widely distributed (Figure 6), all larvae were obtained between lat 12°N and 4°S; only three collections of *Ichthyococcus* larvae were taken in the outer pattern occupied by *Washington.*

***Maurolicus muelleri* (Gmelin)**
(47 occurrences, 773 larvae)

Larvae of *M. muelleri* ranked third in abundance among gonostomatid larvae. As on ETP I, (Ahlstrom, 1971, Figure 4) larvae of this species were sampled in a rather narrow equatorial belt, and none were taken seaward of long 112°W. This again is a striking instance of the similarity in distribution of larvae on the two multivessel cruises. Although the incidence of occurrences of *Maurolicus* larvae was almost as high in ETP I as in ETP II, 43 positive hauls as compared with 47, the average number of larvae per positive haul was much higher on ETP II—16.4 larvae versus 6.1 larvae.

Vinciguerria spp.
(341 occurrences, 22,198 larvae)

As in ETP I, larvae of *Vinciguerria* spp. ranked second in overall abundance, exceeded only by larvae of the myctophid, *Diogenichthys laternatus* (Garman). They were obtained throughout the EASTROPAC pattern, occurring in 96% of the collections (Figure 7). Average abundance of larvae per haul was about one-third greater than in ETP I: 62.5 versus 47.2 larvae.

Larvae of two species of *Vinciguerria* occur within the ETP II pattern, although most were those of *V. lucetia* Garman. As commented upon for ETP I, larvae of *V. nimbaria* (Jordan and Williamson) were taken principally in the South Pacific central water mass, to the south of about lat 5°S. On ETP II this distribution involves about 20 collections only.

Yarrella argenteola (Garman)
(18 occurrences, 33 larvae)

Larvae of *Y. argenteola* were taken in a limited area shoreward or immediately south of the Galapagos Islands between lat 2°N and 5°S (Figure 6). No metamorphosing specimens were observed, although larvae as large as 16 mm were represented in the collections. As noted in the introductory section, only one specimen of *Yarrella* was obtained on ETP I, in contrast to the 18 occurrences on ETP II. Adults of this species were recorded from within the area covered on ETP II by Morrow (1957b), Grey (1960), Bussing (1965), and Parin (1971).

7. STERNOPTYCHIDAE
(277 occurrences, 7,385 larvae)

As in ETP I, hatchetfish larvae ranked third in abundance. Although hatchetfish larvae contributed almost identical percentages of the total larvae in ETP II as in comparable ETP I (5.99% versus 5.98%), the average number of larvae per haul, 20.8 versus 13.9, reflected the greater relative abundance of larvae on ETP II. As noted for ETP I, hatchetfish larvae are more fragile than most kinds, and a portion of the larvae are too damaged to identify, except to family. Even so, identification to genus was made for most ETP II collections, and in these, larvae of *Sternoptyx* sp. contributed about 85% of the total and larvae of *Argyropelecus* (mostly *A. lychnus* Garman), the remainder. Baird (1971) in his revision of the family Sternoptychidae recognized three species of *Sternoptyx*, with *S. obscura* Garman the common species in the eastern tropical Pacific; however, he included one record of *S. diaphana* Hermann from within the area surveyed on ETP II.

8. ASTRONESTHIDAE
(42 occurrences, 74 larvae)

Astronesthid larvae were taken in about four times as many collections as on equivalent ETP I. Most larvae had an equatorial distribution between lat 8°N and 5°S; only two larvae occurred elsewhere (Figure 5). Three distinctive kinds of astronesthid larvae were taken.

9. CHAULIODONTIDAE
(56 occurrences, 207 larvae)

Although larvae of *Chauliodus* sp. were taken in a comparable number of hauls on ETP II and ETP I (56 versus 59 occurrences), more larvae were obtained on ETP II (207 versus 134 larvae). The majority of *Chauliodus* larvae on ETP II were taken in the inner half of the ETP pattern, below the equator—34 collections containing 165 specimens were obtained from this quadrant (Figure 8). In other parts of the ETP pattern somewhat fewer larvae were taken than on ETP I. As on ETP I, the majority of positive hauls contained 1 to 3 larvae (41 of 56 hauls); even so, a higher proportion of the hauls on ETP II contained somewhat larger numbers of *Chauliodus* larvae, i.e., 6 to 26 larvae per haul.

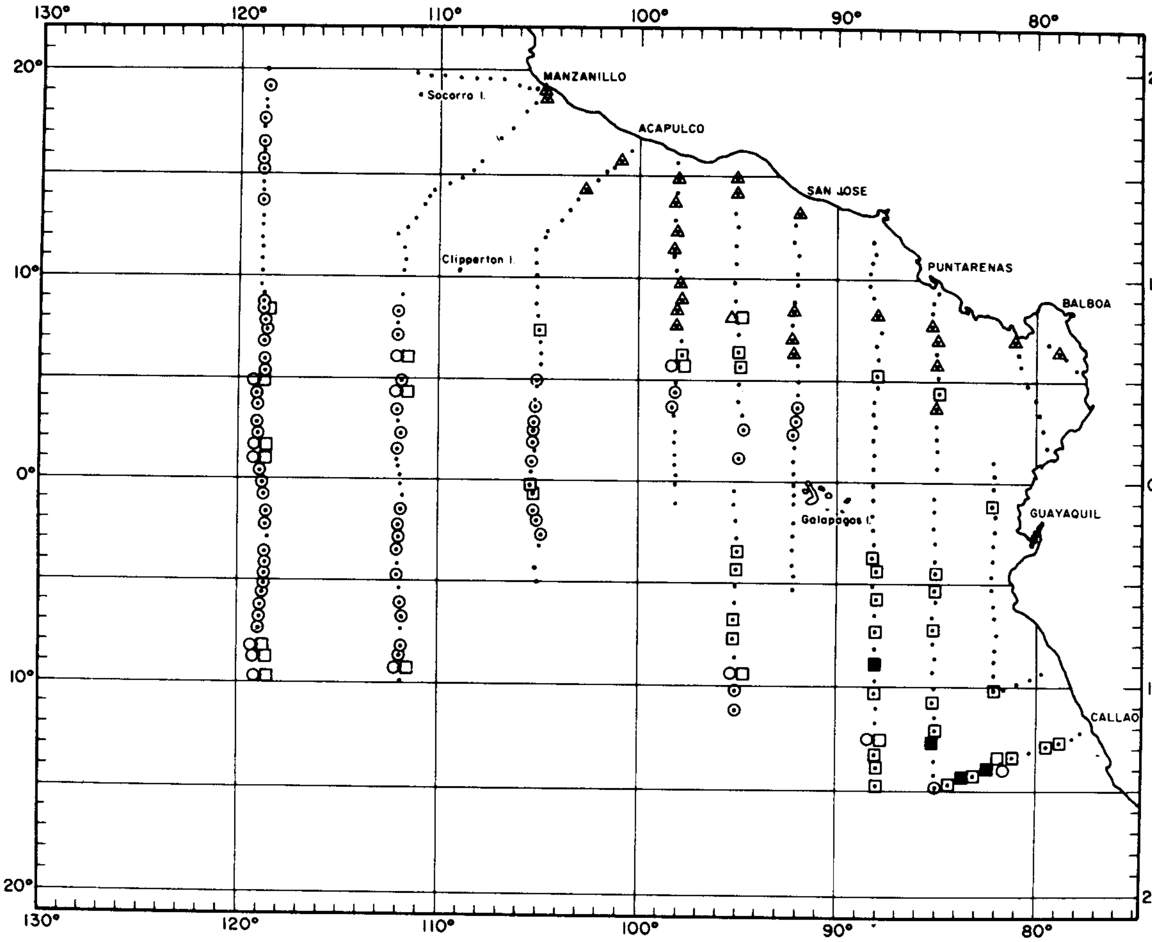

FIGURE 8.—Distribution of larvae of the stomiatoid genus *Chauliodus* sp. (open square with dot, 1-10 larvae, closed square, 11 or more larvae), of the myctophid, *Hygophum proximum* (open circle with dot), and of the bothid flatfish, *Bothus leopardinus* (open triangle with dot). Small solid circles represent other stations occupied on ETP II.

10. IDIACANTHIDAE
(181 occurrences, 795 larvae)

Larvae of *Idiacanthus* sp. were taken in over half of the plankton hauls made on ETP II; there was an increase in frequency of occurrence of *Idiacanthus* larvae as compared to equivalent ETP I, but not in actual abundance of larvae. Larvae of *Idiacanthus* were most abundant in the inshore quadrant to the north of the equator and least abundant in the offshore quadrant south of the equator (Figure 9). All larger collections of larvae (11 to 43 larvae per haul) were taken to the north of the equator, usually within 600 miles of the coast.

11. OTHER STOMIATOIDEI
(210 occurrences, 1,034 larvae)

Included under other Stomiatoidei in Table 9 are larvae of two stomiatoid families: Stomiatidae and Melanostomiatidae. In Appendix Table 1, the category "other Stomiatoidei" also includes the family Astronesthidae. In Appendix Table 3, counts are given for three principal

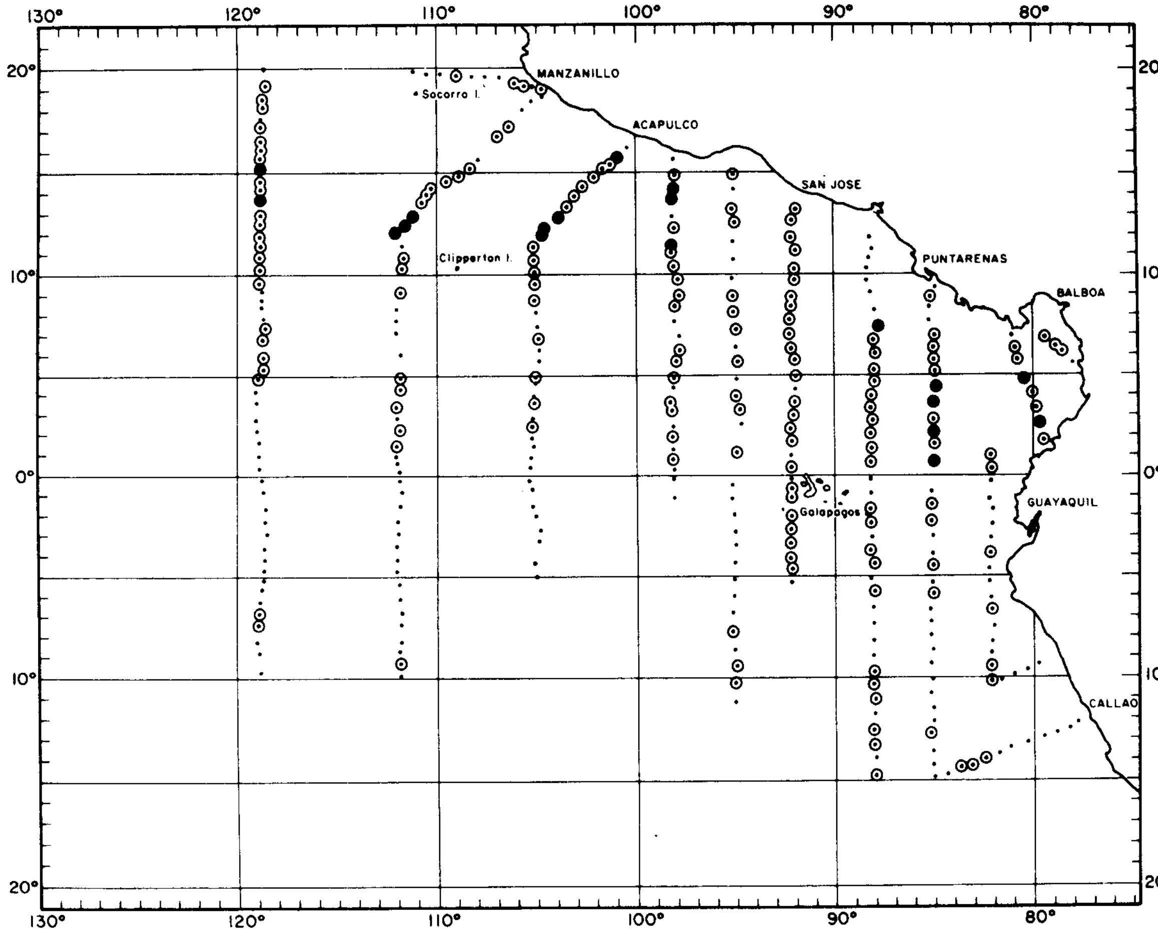

FIGURE 9.—Distribution of larvae of the stomiatoid genus *Idiacanthus* sp. on ETP II. Collections of 1-10 larvae are shown as open circles with dot in center, collections of 11 or more larvae as large solid circles; negative hauls are shown as small solid circles.

constituents: Astronesthidae, *Bathophilus filifer* (Garman), and *Stomias* sp.

Stomias larvae (43 occurrences, 177 larvae) were most abundant in the inner pattern. Larvae of three categories of Melanostomiatidae were identified to the genus or species level. The most common of these were larvae of *Bathophilus filifer* (Garman) (104 occurrences, 310 larvae). Larvae of *Eustomias* spp. (10 occurrences, 19 larvae) represented several species, whereas larvae of *Leptostomias* sp. (8 occurrences, 17 larvae) were those of a single species.

Approximately half of the stomiatoid larvae (140 occurrences, 511 larvae) were not identified below the subordinal level. These were mostly small or damaged specimens; some of the unidentified stomiatoid larvae possibly are those of Malacosteidae.

13. EVERMANNELLIDAE
(17 occurrences, 67 larvae)

The majority of evermannellid larvae were

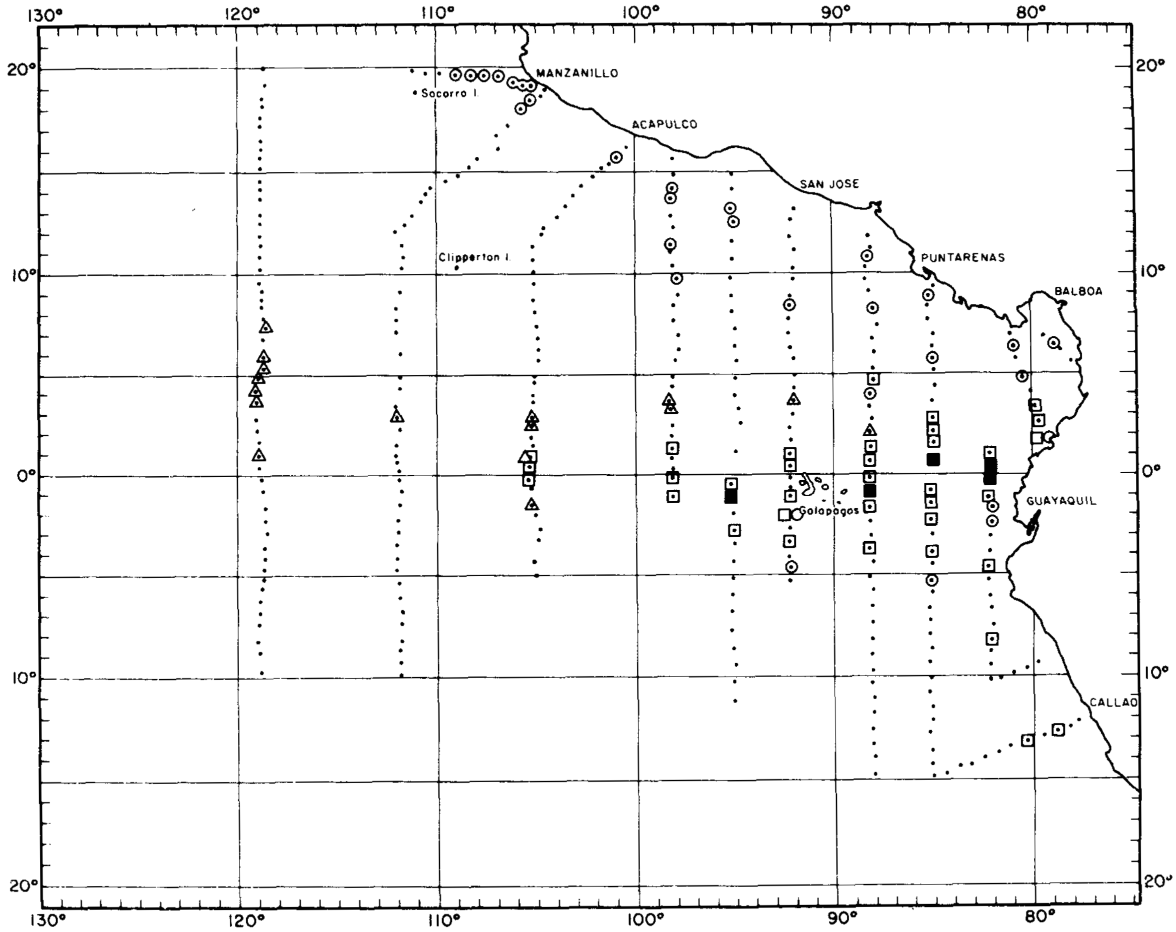

FIGURE 10.—Distribution of larvae of the myctophiform families Evermannellidae (open triangle with dot), and Scopelosauridae (open squares with dot, 1-25 larvae, closed squares, 26 or more larvae) and of the perciform family, Labridae (open circle with dot); negative hauls are shown as small solid circles.

taken on the outer line of stations along long 119°W; the remainder were taken in an equatorial band between lat 2°S and 4°N (Figure 10). This distribution is less widespread than that encountered on ETP I; however, 17 of the records of occurrence on ETP I were in the southern portion of the pattern not covered on ETP II.

14. MYCTOPHIDAE
(352 occurrences, 64,009 larvae)

Larvae of Myctophidae were more abundant on ETP II than on ETP I; the increase in abundance of myctophid larvae per haul in ETP II over ETP I was 1.63×. Much of the increase was due to the greater abundance of larvae of the dominant species, *Diogenichthys laternatus* (Garman), although a number of kinds of myctophid larvae were taken in somewhat greater abundance, and only a few kinds were taken in lesser numbers per haul (Table 19). To show changes in relative abundance of myctophid larvae between the two multivessel cruises, I have arranged the more common kinds in order of their relative abundance on ETP II as compared

TABLE 19.—Frequency of occurrence and relative abundance of the kinds of myctophid larvae on EASTROPAC II, and for equivalent coverage on EASTROPAC I.

Myctophid genera or species	*Washington* 45.000 series		*Undaunted* 46,000 series		*Rockaway* 47.000 series		EASTROPAC II total		Equivalent EASTROPAC I total	
	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae
• *Benthosema panamense*	3	72	2	88	8	971	13	1,131	7	1,027
Benthosema suborbitale	1	1	1	1	0	0	2	2	7	7
Centrobranchus sp.	1	2	0	0	0	0	1	2	0	0
• *Ceratoscopelus townsendi* complex	12	365	0	0	1	24	13	389	37	349
* *Diaphus* spp.	73	938	53	1,113	51	382	177	2,433	168	1,931
• *Diogenichthys atlanticus*	1	1	0	0	3	9	4	10	6	7
* *Diogenichthys laternatus*	92	4,661	90	16,440	138	25,865	320	46,966	302	24,315
Diogenichthys sp.	0	0	0	0	2	4	2	4	0	0
• *Gonichthys tenuiculus*	15	25	27	99	64	169	106	293	88	226
• *Hygophum atratum*	38	335	10	46	18	140	66	521	85	629
• *Hygophum proximum*	54	499	15	75	8	50	77	624	55	448
* *Lampadena* spp.	7	8	3	6	0	0	10	14	15	27
Lampanyctus spp.	84	1,013	72	1,629	135	2,692	291	5,334	271	5,262
• *Lepidophanes pyrsobolus* complex	16	53	12	73	8	12	36	138	13	41
• *Lobianchia* sp.	5	8	2	2	3	5	10	15	10	26
• *Loweina laurae*	10	15	10	14	5	8	25	37	31	41
• *Myctophum aurolaternatum*	37	85	41	144	70	445	148	674	145	529
• *Myctophum asperum*	16	118	10	62	0	0	26	180	(1)	(1)
• *Myctophum nitidulum*	25	300	43	274	66	717	134	1,291	(1)	(1)
• *Myctophum* other	11	27	6	13	0	0	17	40	117	1,042
• *Notolychnus valdiviae*	36	147	31	247	33	140	100	534	106	605
• *Notoscopelus resplendens*	14	28	29	198	35	156	78	382	54	231
• *Protomyctophum* sp.	5	7	12	22	8	15	25	44	33	74
• *Symbolophorus evermanni*	43	248	38	140	74	434	155	822	132	906
* *Triphoturus* spp.	23	40	27	132	94	652	144	824	111	356
Unidentified myctophid larvae	33	86	33	94	50	217	116	397	115	295
Disintegrated myctophid larvae	79	464	42	170	84	274	205	908	155	876
Total myctophid larvae	111	9,546	95	21,082	146	33,381	352	64,009	346	39,249

[1] Not separately tabulated.

to ETP I (comparable coverage, identical number of samples).

Genus or species of myctophid	*No. in ETP II* / *No. in ETP I*
Hygophum atratum-reinhardti	0.83
Notolynchus valdiviae	0.88
Symbolophorus evermanni	0.91
Lampanyctus spp.	1.01
Benthosema panamense	1.10
Ceratoscopelus townsendi-complex	1.11
Diaphus spp.	1.26
Myctophum aurolaternatum	1.27
Gonichthys tenuiculus	1.30
Hygophum proximum	1.39
Myctophum spp. (other than *M. aurolaternatum*)	1.45
Notoscopelus resplendens	1.66
Diogenichthys laternatus	1.93
Triphoturus spp.	2.31

Benthosema panamense **(Tåning)**
(13 occurrences, 1,131 larvae)

Although larvae of this species ranked fifth in abundance among myctophid larvae, they were collected in a relatively narrow coastal band, no wider than 200 miles (Figure 11). A similar pattern of inshore, clumped distribution was encountered on ETP I (Moser and Ahlstrom, 1970, Figure 45).

Benthosema suborbitale **(Gilbert)**
(2 occurrences, 2 larvae)

Only two specimens of the larvae of *Benthosema suborbitale* were taken on ETP II. Larvae of this species only recently have been positively identified. The larval series was initially established by Dr. H. G. Moser from *Dana* material. Larvae are strikingly similar to *Electrona*

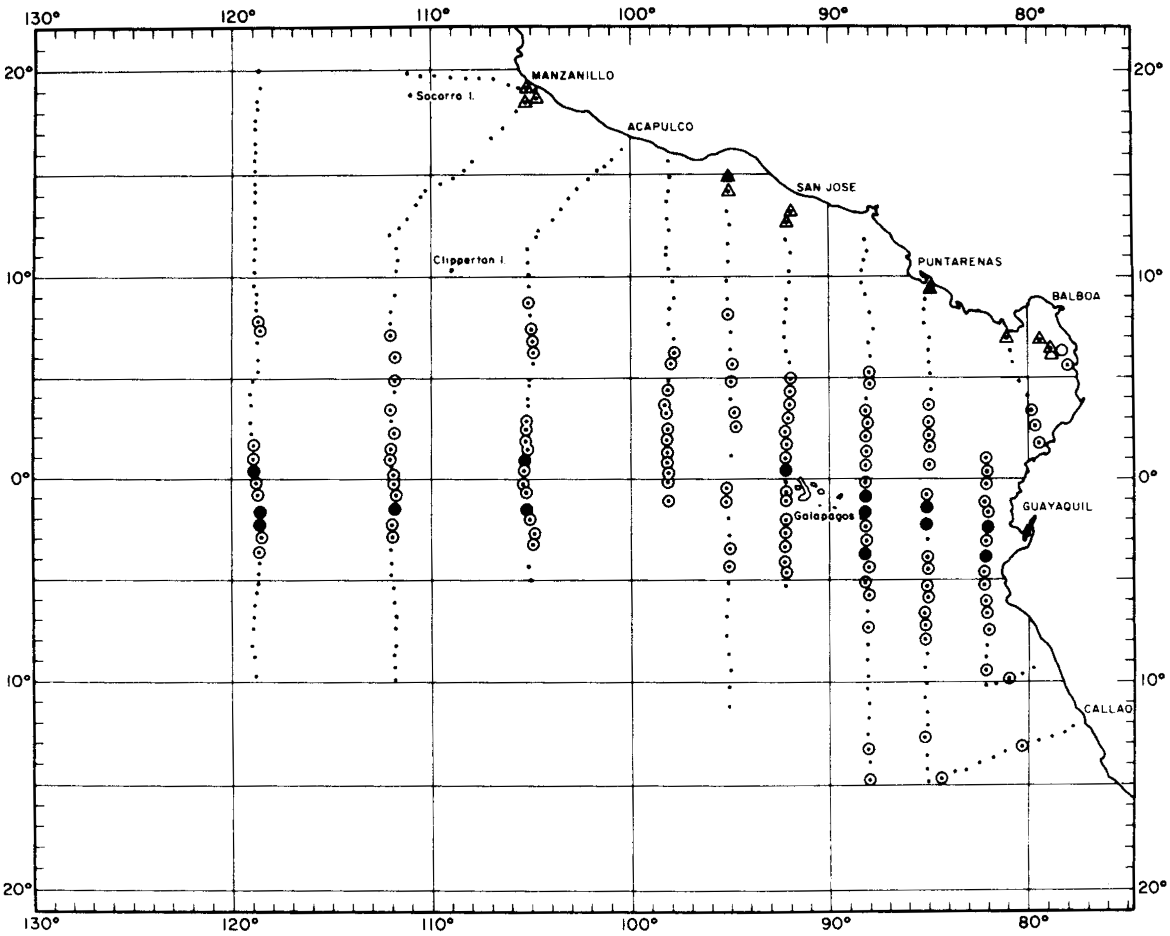

FIGURE 11.—Distribution of larvae of two species of myctophid lanternfishes. Records of occurrence of larvae of *Benthosema panamense* are shown as open triangles with dot for collections of 1-100 larvae, and as closed triangles for collections containing 101 or more larvae; records of occurrence of larvae of *Myctophum nitidulum* are shown as open circles with dot for collections of 1-25 larvae, and as large solid circles for collections containing 26 or more larvae; negative hauls are shown as small solid circles.

larvae, and earlier were confused with larvae of this genus. Most larvae included in *Electrona* sp. in the ETP I compilation were those of this species. The majority of occurrences of the larvae of this species on ETP I was in the southern, offshore portion of the ETP pattern, not covered on ETP II.

***Ceratoscopelus townsendi*-complex**
(13 occurrences, 389 larvae)

Abbreviated coverage of the southern portion of the EASTROPAC pattern, with coverage limited to lat 10°S or 5°S on offshore lines, cut down markedly on the occurrences of larvae of *Ceratoscopelus,* as compared with ETP I: 13 occurrences as compared with 110. All occurrences but one of *Ceratoscopelus* larvae on ETP II were obtained in the outer pattern, occupied by *Washington*: 2 at the two northernmost stations along long 119°W, and 10 in the southern portion of the pattern between lat 6° and 10°S along long 119° and 112°W (Figure 12). Both clus-

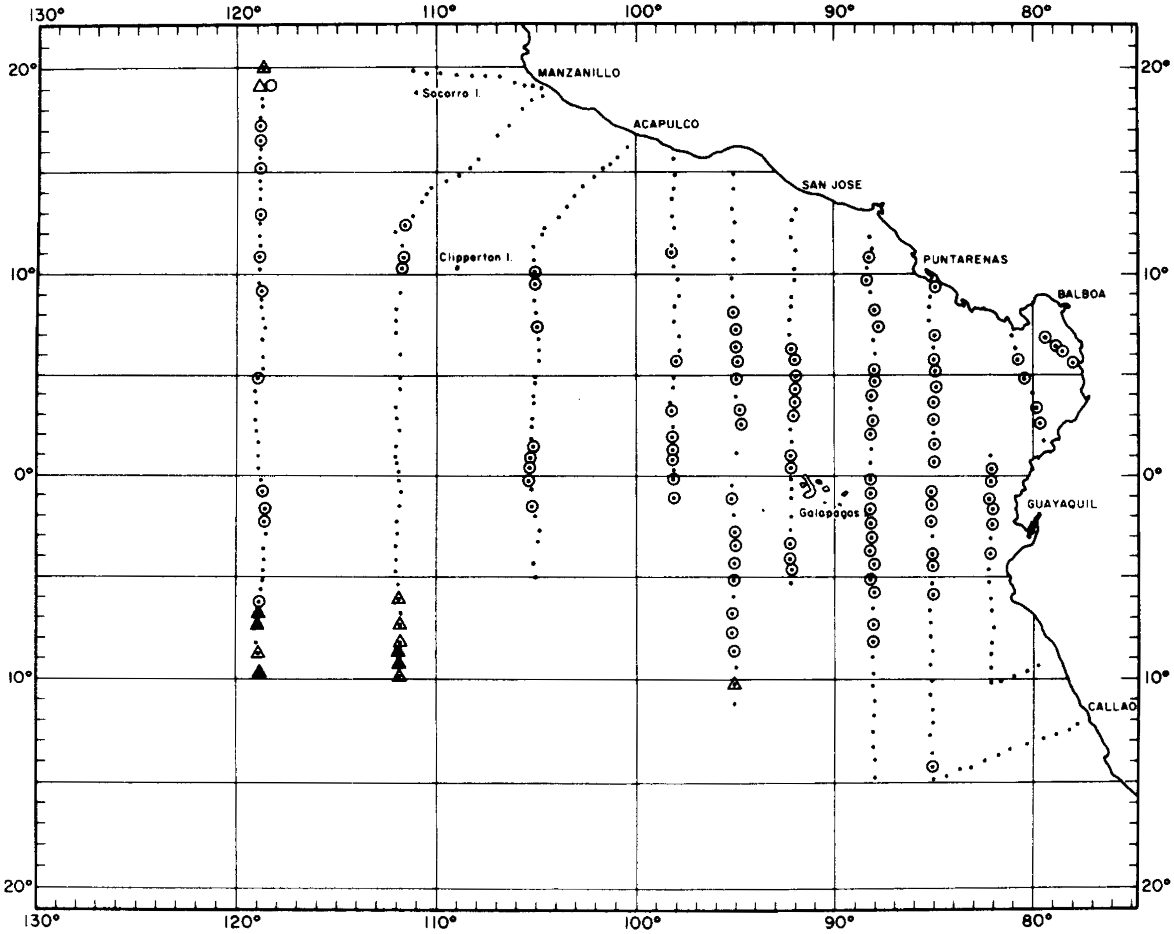

FIGURE 12.—Distribution of larvae of two species of myctophid lanternfishes. Records of occurrence of larvae of *Ceratoscopelus townsendi*-complex are shown as open triangles with dot for collections of 1-25 larvae and as closed triangles for collections of 26 or more larvae; records of occurrence of larvae of *Gonichthys tenuiculus* are shown as open circles with dot; negative hauls are shown as small solid circles.

ters of larvae occurred in the central water masses of the North and South Pacific.

***Diaphus* spp.**
(**177 occurrences, 2,433 larvae**)

Larvae of *Diaphus* rank third in abundance among myctophid genera, exceeded only by *Diogenichthys* and *Lampanyctus*. Although *Diaphus* larvae were taken in half the collections made on ETP II, occurrences and nonoccurrences tended to be clustered. Almost two-thirds of *Diaphus* larvae were obtained to the north of lat 10°N on the four outer station lines; these were predominantly larvae of *D. pacificus* Parr. The largest area of nonoccurrence was off Peru, between lat 5° and 15°S; here *Diaphus* larvae were absent from 42 consecutive stations, 47.081 to 47.197. Larvae of the subgenus *Diaphus*, which are quite distinctive, made up about 10% of the total.

Juveniles and adult *Diaphus*, separated from micronekton hauls made on ETP I, have been identified, with the cooperation of Robert Wisner of Scripps Institution of Oceanography: 15 species were represented in the collection made by *Argo*, *David Starr Jordan*, and *Alaminos* on ETP I. *D. pacificus* was, by far, the most abundant species, occurring in more collections and in larger numbers than other species of *Diaphus*. This species occurs in a broad coastal belt, 600 to 800 miles wide, from lat 20°N to the vicinity of the equator. Six species were taken offshore, between lat 5° and 20°S, in the South Pacific central water mass, including *D. rolfbolini* Wisner, *D. brachycephalus* Tåning, *D. fragilis* Tåning, *D. jenseni* Tåning, *D. schmidt* Tåning, and *D. splendidus* (Brauer). Five species were taken in an offshore equatorial belt, between lat 10°N and 5°S, including *D. garmani* Gilbert, *D. malayanus* Weber, *D. termophilus* Tåning, *D. lucidus* Goode and Bean, and *D. lutkeni* Brauer, the latter showing some admixture with central water mass species. Species belonging to subgenus *Diaphus*, tentatively identified by Wisner as *D. longleyi* Fowler and *D. mollis-nanus* complex had quite widespread distributions.

Now that the species composition of adult *Diaphus* has been clarified, life history series can be determined for the more common kinds.

Diogenichthys laternatus **(Garman)**
(320 occurrences, 46,966 larvae)

Larvae of *D. laternatus* were outstandingly abundant, making up 38.1% of the total fish larvae obtained on ETP II. Almost twice as many *D. laternatus* larvae were taken in equivalent coverage of the EASTROPAC region on ETP II as on ETP I; 46,966 versus 24,315 larvae. The number of collections that contained *D. laternatus* larvae, however, was not much different: 302 of 355 in ETP I as compared with 320 of 355 in ETP II. Almost one collection in three from ETP II contained over 100 *D. laternatus* larvae, and 19 collections contained over 500 larvae. Of these larger collections, 13 of 19 were taken between lat 5° and 10°N. As on ETP I, larvae of *D. laternatus* were *not* taken in collections made within the central water mass of the South Pacific (Figure 13).

Diogenichthys atlanticus **(Tåning)**
(4 occurrences, 10 larvae)

Larvae of this species were taken more frequently on ETP I (29 occurrences, 92 larvae); however, all but six of these occurrences were in the portion of the ETP I pattern that was not covered on ETP II. The four records on ETP II were taken between lat 9° and 15°S, with two occurrences in the transitional waters of the Humboldt Current and only one occurrence offshore in the central water mass. Larvae of this species were commonly taken on MARCHILE VI off Chile (12 occurrences, 100 + larvae).

Gonichthys tenuiculus **(Garman)**
(106 occurrences, 293 larvae)

Larvae of *Gonichthys* had rather similar distributions and frequency of occurrences in the two multivessel EASTROPAC surveys. The majority of larvae were obtained in the inner pattern occupied by *Rockaway*, with highest frequency of occurrences in an equatorial belt between lat 5°N and 5°S (Figure 12).

Hygophum atratum **(Garman)**
(66 occurrences, 521 larvae)

The less extensive coverage on ETP II eliminated the area in which *H. reinhardti* (Lütken) larvae were taken on ETP I, and only larvae of *H. atratum* were observed in ETP II collections. Larvae of *H. atratum* were spottily distributed, occurring mostly in three clusters of stations: 1) between lat 15° and 20°N in the *Washington* pattern, 2) between lat 10° to 15°S in the *Rockaway* pattern, and 3) an equatorial band between lat 5°N and 5°S along long 119°, 112°, and 105°W.

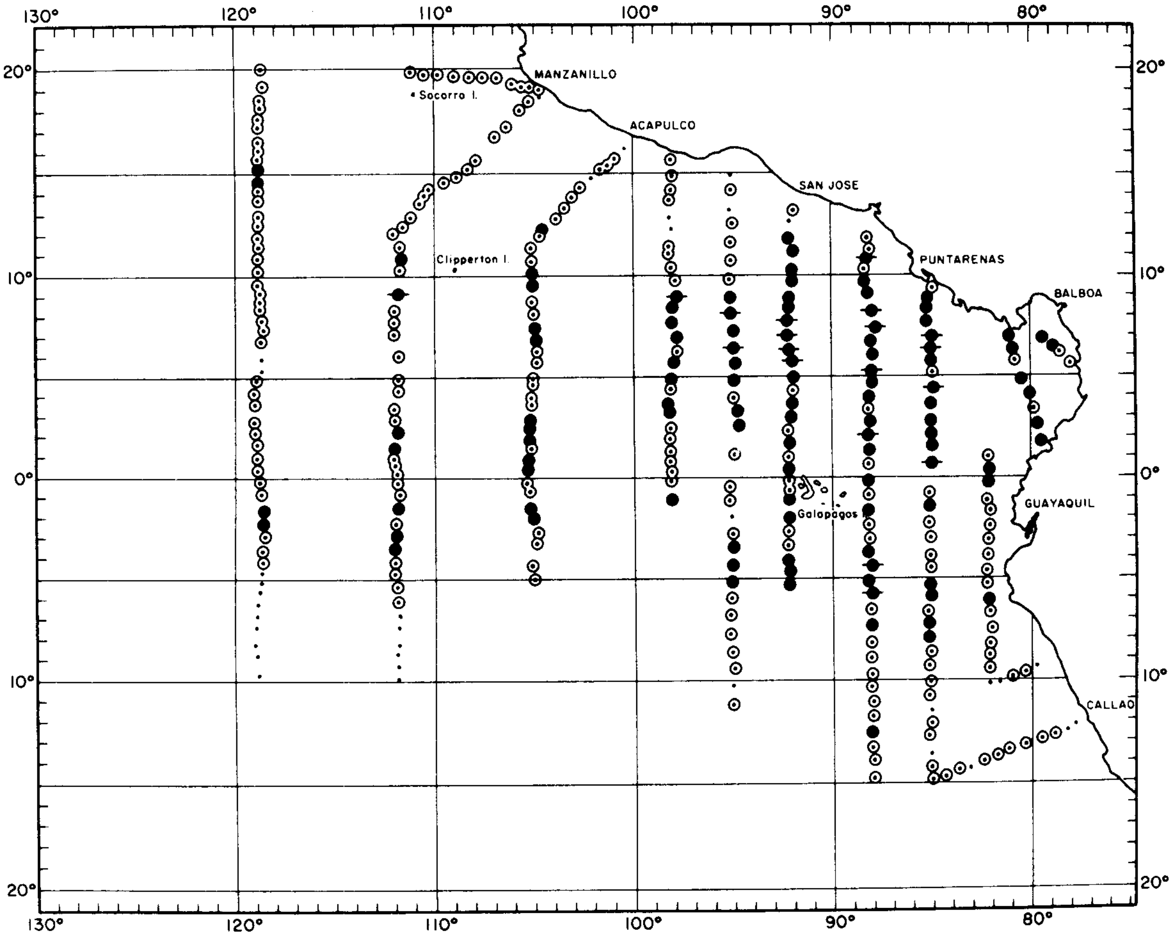

FIGURE 13.—Distribution of larvae of the myctophid *Diogenichthys laternatus* on ETP II. Three orders of abundance are shown. Open circles with dot represent counts of 1-100 larvae, large solid circles represent counts of 101-500 larvae, and large solid circles with bisecting line represent counts of 501 or more larvae; negative hauls are shown as small solid circles.

Hygophum proximum (Becker)
(77 occurrences, 624 larvae)

The distribution of larvae of *H. proximum* again is illustrated (Figure 8) to show the marked similarity in distribution to ETP I (Ahlstrom, 1971, Figure 10). Larvae of this species were decidedly more abundant in the offshore pattern occupied by *Washington* (55 occurrences, 499 larvae). As noted earlier, larvae of *H. proximum* were taken in somewhat greater abundance in ETP II as compared to equivalent ETP I (1.39×). Fully half of the occurrences and specimens of *H. proximum* larvae on ETP I was in the unreplicated portion of ETP I coverage, i.e., on the offshore line of stations along long 126°W and in the offshore southern portion of the pattern. There were three occurrences of larvae on ETP II in the southern part of the *Rockaway* pattern in transitional waters of the Humboldt Current; larvae were not obtained from this area on ETP I.

***Lampadena* sp.**
(10 occurrences, 14 larvae)

Larvae of *Lamapadena* sp. were taken on the three offshore lines in two groups—one occurring between lat 3° and 8°N and the other in the central water mass of the South Pacific between lat 7° and 10°S. A similar distributional pattern was obtained on ETP I; however, the more extensive coverage of the South Pacific central water mass on the earlier survey provided better distributional information for the southern component.

***Lampanyctus* spp.**
(291 occurrences, 5,334 larvae)

Lampanyctus larvae rank second in abundance and in frequency of occurrence among the myctophid genera represented in the eastern tropical Pacific. *Lampanyctus* larvae were most abundant between lat 5°N and 5°S and least common between lat 10° and 20°N. The six collections of *Lampanyctus* larvae that contained over 100 specimens per collection were taken between the equator and lat 5°N. Three kinds of *Lampanyctus* larvae dominated over most of the EASTROPAC pattern. Although identification to the species level are tentative as yet, these three kinds of larvae are almost certainly those of *L. idostigma* Parr, *L. omostigma Gilbert*, and *L. parvicauda* (Parr)—three widespread tropical species of *Lampanyctus*. A quite different assemblage of *Lampanyctus* larvae was taken in the moderate number of stations occupied in the South Pacific central water mass.

***Lepidophanes pyrsobolus* complex**
(36 occurrences, 138 larvae)

An examination of the juvenile and adult specimens of *Lepidophanes* collected on ETP I has shown that two closely related species are present—one with a very restricted distribution and the other with a widespread distribution. Nafpaktitis and Nafpaktitis (1969) found three species of *Lepidophanes* from the Indian Ocean with common characteristics attributed to *L. pyrsobolus*. These workers considered Alcock's poorly described *L. pyrsobolus* as unidentifiable. Instead they identified their material with *L. photothorax* (Parr), *L. longipes* (Brauer), and *L. indicus* Nafpaktitis and Nafpaktitis. *L. photothorax* was taken in four ETP I collections between lat 15° and 20°S in the offshore pattern occupied by *Argo*. The specimens from the eastern Pacific agree closely with the description and illustration of this species in Nafpaktitis and Nafpaktitis (1969). These workers gave 7 + 4 as the usual combination of AO photophores on specimens from Indian Ocean material. In the EASTROPAC area all specimens examined had 6 + 4 AO photophores.

The widely distributed species in the EASTROPAC area is either *L. longipes* (Brauer) or a species closely related to *L. longipes*. The eastern Pacific form has similar luminous patches to those described for *L. longipes* from the Indian Ocean except for the luminous tissue on the head of males and the size of the infracaudal gland on some larger specimens. Luminous patches developed on the head were restricted to a single wide pair of luminous patches. On some larger specimens the infracaudal gland began under the last AO photophore and was conspicuously larger than those observed by Nafpaktitis and Nafpaktitis (1969) on Indian Ocean material. AO photophores were usually 5 + 4; gill raker counts were 5 + 1 + 11 to 13.

Two kinds of *Lepidophanes* have been observed in the EASTROPAC area, although only one kind was taken commonly. Larvae of the latter have been assigned to *L. longipes* (?).

***Lobianchia* spp·**
(10 occurrences, 15 larvae)

Larvae of *Lobianchia,* although uncommon in the eastern tropical Pacific, have a fairly widespread distribution in two separated areas: 1) in an equatorial belt between lat 3°S and 6°N (8 occurrences) and 2) in the transitional waters of the Humboldt Current. In the latter area, two occurrences were recorded at about lat 12°

to 13°S along long 88°W, and three additional records were obtained at MARCHILE VI stations (not included in above totals). At least two species, *L. gemellari* (Cocco) and *L. dumerili* (Bleeker), and perhaps a third, are involved.

Loweina laurae **(Wisner)**
(25 occurrences, 37 larvae)

Wisner (1971) has separated the eastern Pacific species of *Loweina* from *L. rara* (Lütken). Although the two species are basically quite similar, Wisner points out that *L. laurae* has a somewhat longer head, 27.3 to 30.7% of SL versus about 25.7%, and a somewhat larger eye, averaging about 8% of SL versus about 6%. Wisner gave the distribution of *L. laurae* in the eastern Pacific as between lat 30°N and 30°S and westerly to long 150°W.

Of the 25 occurrences of larvae of *L. laurae* on ETP II, all but one occurred in a broad equatorial band between lat 7°N and 6°S (Figure 14). The isolated record was on the southernmost line of stations oriented normal to the coast occupied by *Rockaway*. This distribution is similar to that illustrated for ETP I (Moser and Ahlstrom, 1970, Figure 51). In equivalent coverage on ETP I, 31 stations yielded 41 larvae. It should be noted that larvae of *Loweina* from EASTROPAC appear to be identical with those identified as *L. rara* from other oceans; hence larval evidence does not support the separation of the eastern Pacific form as a separate species.

Myctophum **spp.**
(217 occurrences, 2,185 larvae)

Larvae of the genus *Myctophum* ranked fourth in abundance and third in frequency of occurrence. Larvae of *M. aurolaternatum* Garman (148 occurrences, 674 larvae) were taken more frequently but in lesser amounts than larvae of *M. nitidulum*-complex (134 occurrences, 1,291 larvae). Larvae of *M. aurolaternatum* were taken in all parts of the EASTROPAC pattern, but in largest numbers between the equator and lat 5°N. Most larvae of *M. nitidulum*-complex were taken in a broad equatorial band between lat 8°N and 5°S (Figure 11). The distribution, however, had a southerly extension to the bottom of the pattern in the area of the Humboldt Current. Larvae of *M. asperum* Richardson (26 occurrences, 180 larvae) were taken in an offshore equatorial tongue, extending seaward from long 98°W to its widest extent (lat 2°S to 7°N) along long 119°W (Figure 3). The remainder of *Myctophum* larvae (17 occurrences, 40 larvae) belong to two and possibly three species. One group of these occurred in the offshore equatorial tongue, along with larvae of *M. asperum;* the other group occurred between lat 7° and 10°S in the offshore *Washington* pattern. The latter group includes larvae of both *M. lychnobium* Bolin and *M. brachygnathos* (Bleeker).

Only larvae of *M. aurolaternatum* were separately tabulated for equivalent ETP I coverage (145 occurrences, 529 larvae). Both the distribution of *M. aurolaternatum* larvae and their frequency of occurrence were similar for the two multivessel surveys, although abundance was moderately greater on ETP. II, 1.9 versus 1.5 larvae per haul. This pattern of greater abundance on ETP II also held for the remainder of the larvae of *Myctophum*, 4.3 versus 2.9 larvae per haul.

Notolychnus valdiviae **(Brauer)**
(100 occurrences, 534 larvae)

Larvae of the wide-ranging oceanic species are seldom taken closer to shore than 200 miles. On ETP II, the majority of records were from an equatorial tongue that extended between lat 10°S and 10°N in the offshore *Washington* pattern, but shoreward of this (long 105° to 85°W) the distribution narrowed to between lat 2°S and 8°N, with the majority of occurrences between lat 2° and 6°N. A second group of larvae were sampled in the southern portion of the *Rockaway* pattern between lat 9° and 15°S. Only two occurrences of *Notolychnus* larvae were noted in 85 stations occupied by all vessels between lat 20° and 10°N. Distribution of *Notolychnus*

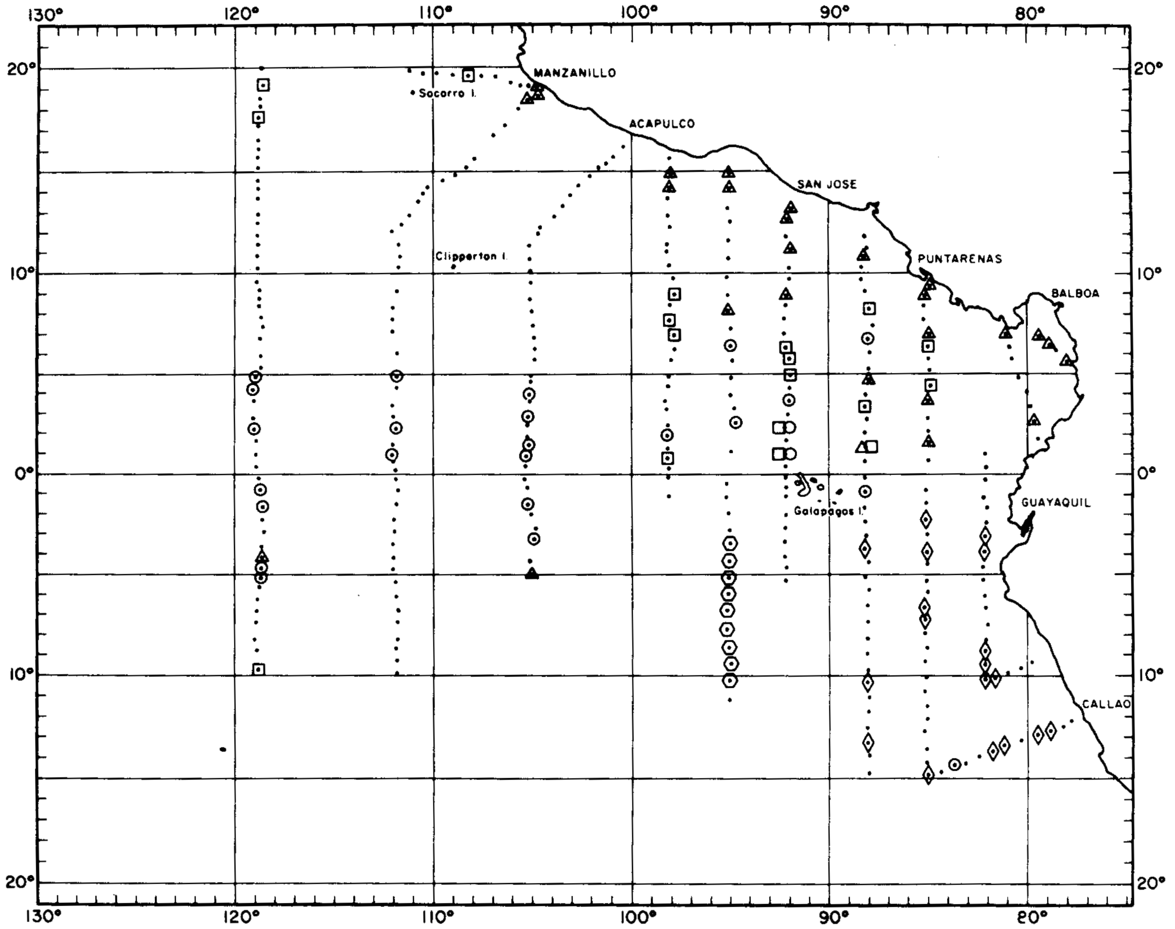

FIGURE 14.—Distribution of larvae of the myctophid, *Loweina laurae* (open circle with dot), of the scomberesocids, *Scomberesox saurus* (open diamond with dot), and *Cololabis adocetus* (open hexagon with dot) and of the anguilliform families Congridae (open triangle with dot) and Nemichthyidae (open square with dot); negative hauls are shown as small solid circles.

larvae was illustrated for ETP I coverage (Ahlstrom, 1971, Figure 11). In the portion of ETP I pattern also covered on ETP II, frequency of occurrence and distribution of *Notolychnus* larvae were quite similar: 1.7 versus 1.5 larvae.

Notoscopelus resplendens (Richardson)
(78 occurrences, 382 larvae)

As on ETP I, most larvae of *N. resplendens* were taken in an equatorial belt, between lat 5°N and 5°S (65 occurrences, 364 larvae). A second center of occurrence was at the southern portion of the *Rockaway* pattern between lat 9° and 15°S. Except that the distribution of the main group of *Notoscopelus* larvae is more definitely centered on the equator, the distribution of larvae of *Notoscopelus* and *Notolychnus* are quite similar. No larvae of *Notoscopelus* were taken north of lat 6°N. Moderately more larvae of *Notoscopelus* were taken on ETP II, 1.1 versus 0.7 larvae per haul.

***Protomyctophum* sp.**
(25 occurrences, 44 larvae)

For most kinds of myctophids, the distributional patterns of larvae are so similar in the two multivessel EASTROPAC survey cruises that distributional information from ETP II merely reinforced that obtained on ETP I. Distribution of *Protomyctophum* larvae affords another example of this. All but two of the occurrences lie between lat 10°N and 5°S, the zone in which all *Protomyctophum* larvae were obtained on ETP I. As noted in Ahlstrom (1971), the larvae were all of a kind, belonging to a perhaps undescribed species of *Protomyctophum*, subgenus *Hierops*. Wisner (1971) described two new species of *Protomyctophum*, subgenus *Hierops* from the eastern Pacific: *P. chilensis* from off Chile about lat 33°S and *P. beckeri* from the vicinity of the Hawaiian Islands. It is not known as yet whether the form from EASTROPAC is referable to either of these.

***Symbolophorus evermanni* (Gilbert)**
(155 occurrences, 822 larvae)

Larvae of *Symbolophorus* were absent from a wide coastal strip off Mexico and a narrower coastal strip off Peru, but were taken at most stations in the remainder of the ETP II pattern. The distribution was rather similar to that illustrated for ETP I (Ahlstrom, 1971, Figure 12); the frequency of occurrence was slightly lower on equivalent ETP I (37% positive hauls versus 44%), but the average abundance per haul was slightly higher (2.6 versus 2.3 larvae). However, in the ETP I stations without counterparts in ETP II, frequency of occurrence was higher than in the remainder of the ETP I pattern (63% versus 37%) and average abundance per haul was higher (4.5 versus 2.6 larvae).

***Triphoturus* spp.**
(144 occurrences, 824 larvae)

Larvae of *Triphoturus oculeus* (Garman) were taken in most hauls made between lat 5°N and 15°S off Ecuador and Peru and offshore to the vicinity of the Galapagos Islands. Larvae of this species, which appear to be more exclusively restricted to the transition waters of the Humboldt Current than are those of other myctophids sampled in the EASTROPAC pattern, also may exhibit the most marked seasonal change in relative abundance. Other *Triphoturus* larvae, sampled mostly offshore, were taken in slightly lesser abundance than on ETP I.

16. PARALEPIDIDAE
(247 occurrences, 2,535 larvae)

Larvae of Paralepididae ranked sixth in abundance and contributed over 2% of the total. Larvae were taken throughout the ETP II pattern, but most commonly in an equatorial band between lat 5°N and 5°S; all collections of larvae exceeding 25 larvae per haul were obtained from this band. Fewest larvae were taken in the southern portion of the inner pattern, below about lat 7°S. Because of limited coverage of the South Pacific central water mass on ETP II, no material was obtained of *Sudix atrox* Rofen (see Ahlstrom, 1971, Figure 7 for distribution of larvae of this species on ETP I). A detailed study of the species composition of the paralepidid material from EASTROPAC surveys has not been made.

17. SCOPELARCHIDAE
(134 occurrences, 298 larvae)

Larvae of Scopelarchidae were taken throughout the area surveyed on ETP II. As noted for ETP I (Ahlstrom, 1971, p. 32-33), larvae of five or six kinds of scopelarchids were obtained, usually in small numbers per haul. On ETP II, only 6 of 133 positive hauls contained over 5 larvae (6 to 12 larvae), and over 80% of the hauls contained 1 to 3 larvae per haul.

18. SCOPELOSAURIDAE
(40 occurrences, 390 larvae)

Larvae of Scopelosauridae were taken in more hauls and in much larger numbers than on equivalent ETP I (6 occurrences, 13 larvae). As shown in Figure 10, most occurrences were in an equatorial band between lat 5°N and 5°S and offshore to long 105°W; the five hauls containing 25 or more larvae were obtained within 2° of the equator. Only one kind of *Scopelosaurus* larva was obtained on ETP II. Larvae of *Scopelosaurus* superficially resemble paralepidid larvae—both have elongate larvae with a short gut that increases in relative length in older larvae. However, *Scopelosaurus* larvae differ in several significant ways from paralepidid larvae. *Scopelosaurus* larvae never develop patches of pigment above the intestinal tract, whereas these patches are a striking feature of paralepidid larvae; the eyes of *Scopelosaurus* larvae are narrowed, whereas they are round in most paralepidid larvae; also the intestinal tract does not increase in relative length nearly as much in older stage *Scopelosaurus* larvae as in paralepidid larvae.

19. SYNODONTIDAE
(14 occurrences, 60 larvae)

Larvae of *Synodus* spp. occurred in a coastal band along the extent of the ETP II pattern (Figure 5). Six species of *Synodus* are known to occur in the eastern Pacific. Several kinds of *Synodus* larvae were taken in the EASTROPAC collections, mostly small specimens. Until more older-stage larvae are obtained, it will not be possible to work out life history series.

21. ANGUILLIFORMES (EEL LEPTOCEPHALI)
(81 occurrences, 151 larvae)

Eel leptocephali, although conspicuous members of the larval fish fauna, are not common in the EASTROPAC pattern: they contributed only 0.12% of the total ETP II larvae. Leptocephali of seven families of true eels of the order Anguilliformes, suborder Anguilloidei, were identified from the micronekton net collections of ETP II. The micronekton net collections from ETP I contributed three times as many leptocephali as the regular net hauls; a total of 10 families was represented in the combined ETP I collections, including the 7 discussed below and in addition Derichthyidae, Muraenesocidae, and Nettastomidae. The record of occurrence and counts by family of eel leptocephali on all positive stations is contained in Appendix Table 5, and summarized in Table 20. The distributions of larvae of the seven families taken in ETP II collections are shown in Figures 14 and 15.

Congridae
(28 occurrences, 42 larvae)

This family ranked first in frequency of occurrence among eel leptocephali and second in relative abundance. Most congrid larvae were identifiable to genus. The breakdown was as follows: *Ariosoma* sp. (5 occurrences, 8 larvae), *Bathyconger* sp. (3 occurrences, 4 larvae), *Gnathopis* sp. (1 occurrence, 1 larva), *Hildebrandia* (10 occurrences, 18 larvae), *Paraconger* (4 occurrences, 5 larvae), and genus uncertain (6 occurrences, 6 larvae). All but two occurrences were from north of the equator, and most specimens were taken in a broad coastal band. However, offshore oceanic occurrences of congrid leptocephali were more frequent on ETP I than on ETP II.

Moringuidae
(3 occurrences, 3 larvae)

One occurrence of leptocephali of the moringuid genus *Neoconger* was off Manzanillo, Mexico, the other two near Panama Bay.

Muraenidae
(5 occurrences, 6 larvae)

Although adults of Muraenidae are known to have a wide distribution in the eastern Pacific, the few leptocephali taken on ETP II were confined to a narrow tongue extending offshore between lat 7° and 10°N in the northeast quadrant.

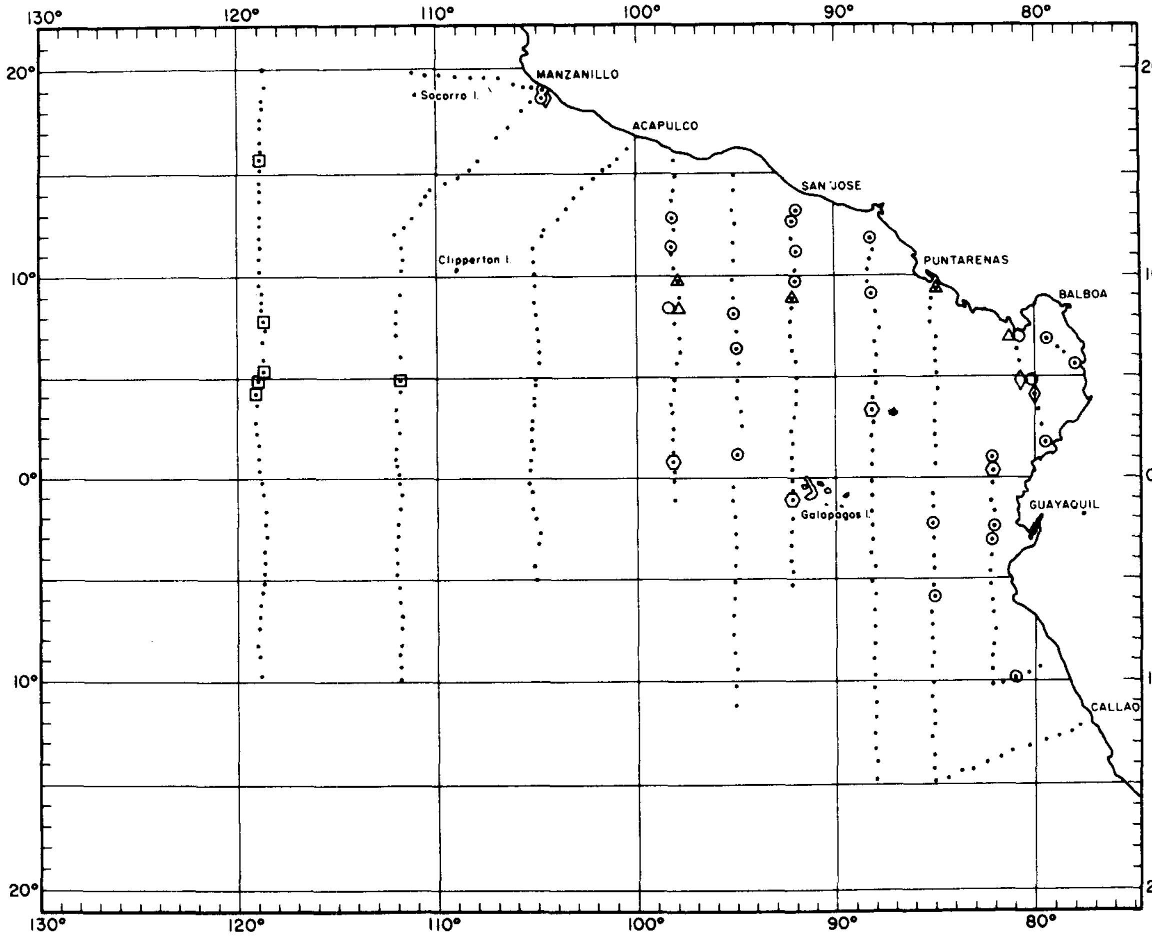

FIGURE 15.—Distribution of eel leptocephali of the anguilliform families: Moringuidae (open diamond with dot), Muraenidae (open triangle with dot), Opichthidae (open circle with dot), Serrivomeridae (open square with dot), and Xenocongridae (open hexagon with dot); negative hauls are shown as small solid circles.

TABLE 20.—Familial composition of eel leptocephali taken on the second multivessel EASTROPAC survey, summarized by vessel pattern.

Family	*Washington* 45.000 series		*Undaunted* 46.000 series		*Rockaway* 47.000 series		Total EASTROPAC II	
	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae
Congridae	3	6	9	11	16	25	28	42
Moringuidae	1	1	0	0	2	2	3	3
Muraenidae	0	0	3	3	2	3	5	6
Nemichthyidae	4	5	9	9	6	7	19	21
Ophichthidae	2	8	7	12	17	29	26	49
Serrivomeridae	6	8	0	0	0	0	6	8
Xenocongridae	0	0	2	2	2	2	4	4
Family unknown	4	5	4	5	5	8	13	18
Total	16	33	30	42	35	76	81	151

Nemichthyidae
(19 occurrences, 21 larvae)

Although eels of this family are widely distributed in offshore oceanic waters, most occurrences of leptocephali (14 of 19) were in the northeast quadrant, between lat 0° and 10°N.

Ophichthidae
(26 occurrences, 49 larvae)

Ophichthid leptocephali were taken in a broad coastal band between Manzanillo, Mexico, and Central Peru (lat 10°S). They ranked first in relative abundance among eel leptocephali and second in frequency of occurrence.

Serrivomeridae
(6 occurrences, 8 larvae)

Most occurrences of serrivomerid leptocephali (5 of 6) were on the outer line of the ETP II pattern, along long 119°W, and the remaining occurrence was along long 112°W. In contrast to nemichthyid leptocephali which may grow to 300 or 400 mm long, leptocephali of Serrivomeridae rarely exceed about 60 mm.

Xenocongridae
(4 occurrences, 4 larvae)

The few occurrences of leptocephali of *Chlopsis*, the sole representative of this family, were within 4° of the equator.

22. MELAMPHAIDAE
(284 occurrences, 1,365 larvae)

Larvae of Melamphaidae ranked fourth in frequency of occurrence, eighth in relative abundance. Larvae were distributed throughout the ETP II pattern (Figure 16), and occurred in 80% of the collections. Most collections contained only moderate numbers of larvae—the average number of larvae per positive haul was only 4 to 8. The majority of hauls containing larger numbers of larvae (11 or more per haul) were taken within 5° of the equator (Figure 16). Melamphaid larvae were represented by four genera: *Melamphaes*, *Scopelogadus*, *Scopeloberyx*, and *Poromitra*.

23. TRACHICHTHYIDAE
(11 occurrences, 70 larvae)

The big-headed larvae of a representative of this family were taken at 11 stations on the two inner lines of the *Rockaway* pattern, between about lat 2° to 8°S (Appendix Table 3). They appear to be larvae of *Trachichthys mento* Garman, initially described from the Gulf of Panama. Bussing (1965) supplemented Garman's description, utilizing 53 specimens (55 to 104 mm) collected at *Eltanin* Station 34 at lat 07°45′ to 07°48′S, long 81°23′W. Parin (1971) also obtained material of this species in the eastern tropical Pacific from off South America.

25. BREGMACEROTIDAE
(160 occurrences, 3,062 larvae)

Larvae of Bregmacerotidae ranked fifth in abundance and contributed 2.5% of fish larvae on ETP II. The majority of larvae was taken to the north of the equator, with three inshore collections contributing over 70% of the total. These collections of 927, 753, and 511 larvae were exclusively *Bregmaceros bathymaster* Jordan. Larvae of this species were distributed in a broad coastal band in the northern half of the EASTROPAC pattern. As noted in the ETP I report, larvae of five species of *Bregmaceros* are distributed in the eastern tropical Pacific.

27. SCOMBERESOCIDAE
(27 occurrences, 153 specimens)

Two species of Scomberescocidae were taken on ETP II—*Scomberesox saurus* L. (18 occurrences, 52 specimens) and *Cololabis adocetus* Böhlke (9 occurrences, 101 specimens). The

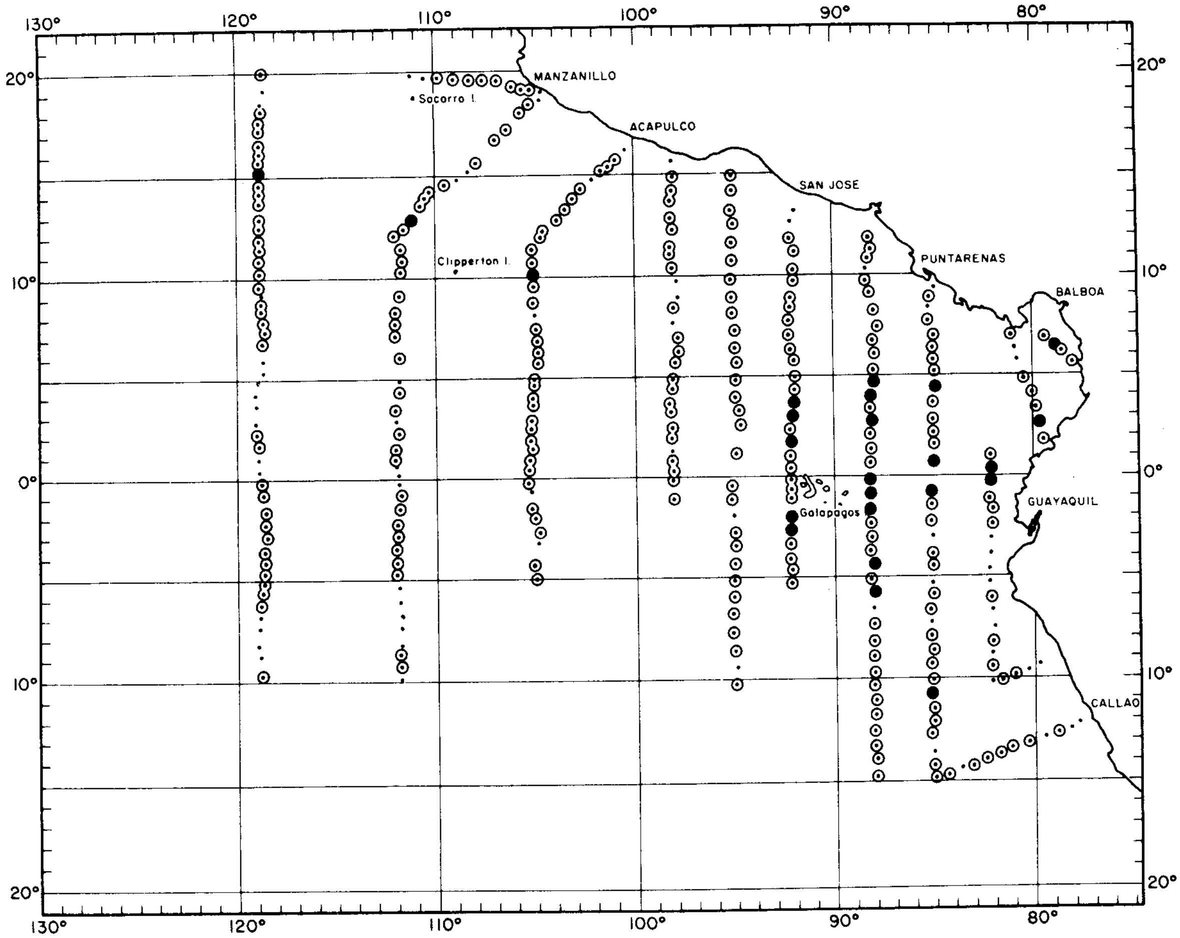

FIGURE 16.—Distribution of larvae of the beryciform family Melamphaidae on ETP II. Collections of 1-10 larvae are shown as open circles with dot, collections of 11 or more larvae as large solid circles; negative hauls are shown as small solid circles.

word "specimen" is used intentionally because some juveniles as well as larvae are included in the above counts. A number of the specimens were x-rayed in order to obtain vertebral counts to verify identification. All occurrences of the small tropical saury, *Cololabis adocetus,* were along long 95°W at nine contiguous. stations (Figure 14); surface temperatures ranged between 19.5° and 21.5°C at these stations. *Scomberesox* larvae occurred in a broad coastal belt, shoreward of *C. adocetus,* extending from near the equator to the southernmost line occupied on ETP II (Figure 14); surface temperatures ranged between 15.8° and 19.5°C at these stations. Actually *Scomberesox* eggs and larvae were commonly taken in the pattern occupied by *Yelcho* off Chile as part of ETP II—MARCHILE VI. Collections obtained from surface tows as well as from oblique net hauls were available from MARCHILE VI. Five short lines of stations normal to the trend of the Chilean coastline were occupied on MARCHILE VI, between lat 18°30′ and 33°S. *Scomberesox* eggs and larvae were sampled best in surface hauls. *Scomberesox* eggs were taken in 17 of 20 surface hauls and *Scomberesox* larvae in 10 surface

TABLE 21.—Measurements of eggs of *Scomberesox saurus* collected on EASTROPAC II, including collections made off Chile by *Yelcho* (MARCHILE VI).

Collection	Type of haul	Locality of collection		Number eggs measured	Range in egg diameter (mm)	Average diameter (mm)	Surface water temperature (°C)
		Lat S	Long W				
MAR. 5.4	Surface	33°05.3′	73°20.5′	25	2.41-2.67	2.52	12.50
MAR. 4.4	Oblique	28°30.6′	72°43.2′	23	2.39-2.65	2.52	12.09
ETP 47.177	Oblique	06°35.0′	85°08.5′	31	2.31-2.60	2.44	18.14
MAR. 4.1	Surface	28°30.2′	71°40.1′	30	2.26-2.62	2.43	11.93
MAR. 3.2	Surface	23°42.5′	71°35.0′	25	2.24-2.45	2.36	14.59
ETP 47.145	Oblique	14°17.8′	83°03.7′	14	2.26-2.43	2.35	18.28
MAR. 1.8	Surface	18°27.6′	73°06.1′	25	2.24-2.51	2.34	15.81 (10 m)
ETP 47.134	Oblique	12°56.5′	79°27.8′	16	2.21-2.48	2.34	16.62
ETP 47.103	Oblique	10°09.0′	82°08.5′	25	2.26-2.45	2.34	18.32
ETP 47.107	Oblique	09°50.0′	80°53.0′	16	2.26-2.46	2.34	17.74
MAR. 2.1	Surface	20°09.0′	70°31.8′	25	2.15-2.45	2.33	15.77 (10 m)
MAR. 1.4	Surface	18°32.0′	71°42.0′	25	2.17-2.45	2.32	15.92 (10 m)
MAR. 2.4	Surface	20°10.8′	71°33.2′	25	2.19-2.45	2.32	15.74 (10 m)

hauls on MARCHILE VI. Hence young of *Scomberesox* have a north-south extent off South America of at least 1,860 miles.

Scomberesox eggs are approximately round and occur singly—lacking the attachment filaments characteristic of most eggs of fishes in the suborder Exocoetoidei (see in this regard Orton, 1964). The egg shell, however, is ornamented with minute closely spaced swellings. Eggs from 13 collections were measured (eggs measured in widest dimensions as they were not truly spherical); the data are summarized in Table 21. The range in egg size was from 2.15 to 2.67 mm; the range in egg diameter means for the 13 collections was from 2.32 to 2.52 mm. Eggs in the majority of collections (9 of 13) were quite similar in average diameters, ranging between 2.32 and 2.36 mm. Three of the four collections of eggs with larger average diameters were taken on the southernmost two lines of the *Yelcho* pattern. However, the collection of eggs made nearest to the equator (lat 6°35′) also was in this group of larger eggs.

30. APOGONIDAE

(66 occurrences, 283 larvae)

This family contains both oceanic and coastal species. Larvae of coastal apogonids were taken in four hauls off Central America and northern South America. The remainder of the larvae (62 occurrences, 278 larvae) were those of *Howella pammelas* (Heller and Snodgrass). Larvae of this species were most common to the north of the equator in a broad band extending offshore between 0° and lat 9°N. Only three occurrences were found to the north of this band and 11 to the south. This species was not limited in its distribution to particular water masses.

34. CARANGIDAE

(36 occurrences, 224 larvae)

Larvae of the pilotfish, *Naucrates ductor* (L.), with 18 occurrences, 27 larvae (Figure 17), was the most widely distributed carangid on ETP II. Over half of the carangid larvae were obtained at two coastal stations—45 larvae at 46.135 and 69 larvae at 47.527. As on ETP I, a number of kinds of carangid larvae were taken, including *Chloroscombrus orqueta* Jordan and Gilbert, *Selene brevoorti* (Gill), and *Caranx* spp.

37. CORYPHAENIDAE

(109 occurrences, 185 larvae)

Larvae of the dolphin, *Coryphaena* spp., were taken almost exclusively to the north of the equator (105 occurrences, 180 larvae) on ETP II; three of the four occurrences to the south of the equator were at stations immediately adjacent to the equator. *Coryphaena* larvae were

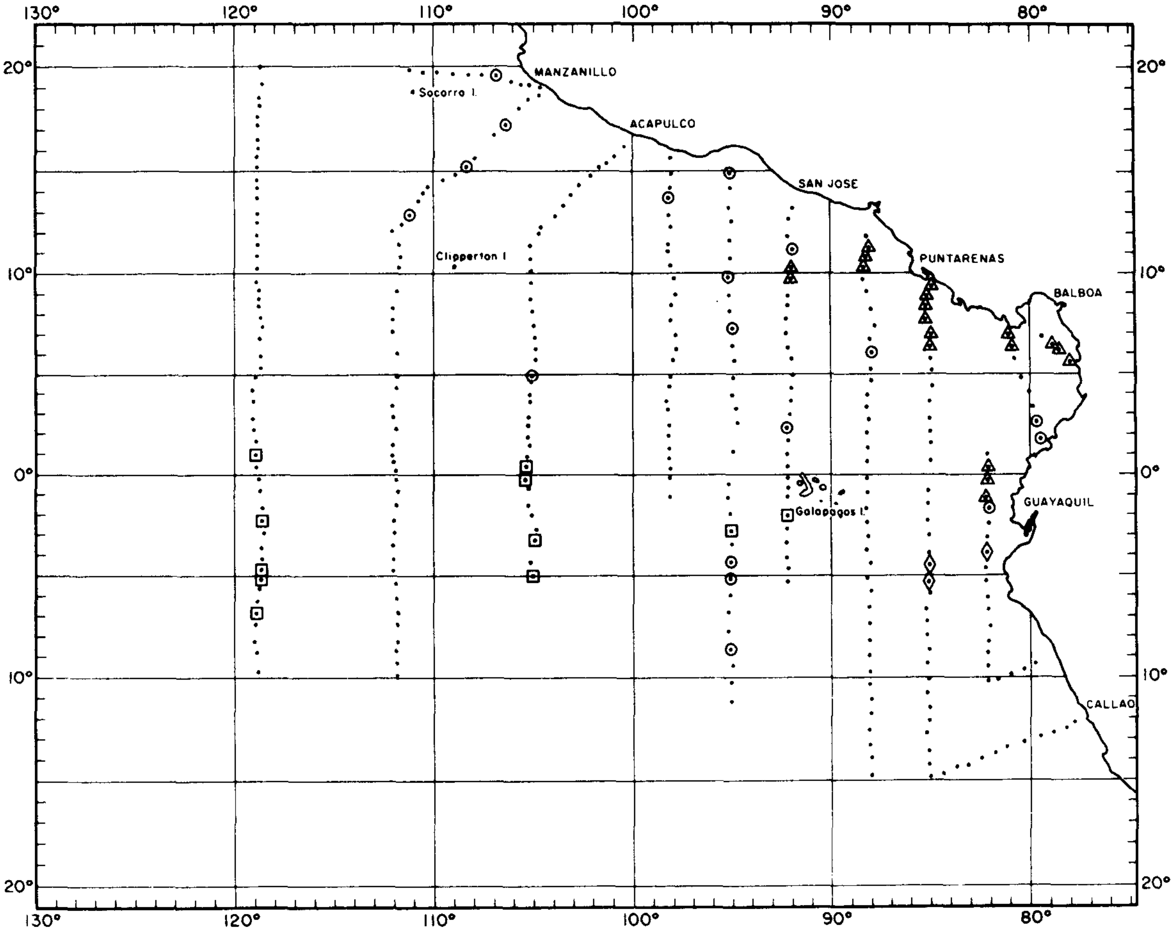

FIGURE 17.—Distribution of larvae of the carangid, *Naucrates ductor* (open circle with dot), of the tetragonurid, *Tetragonurus* spp. (open square with dot), and of the trichiurids, *Lepidopus* sp. (open diamond with dot) and *Trichiurus lepturus* (open triangle with dot); negative hauls are shown as small solid circles.

taken throughout the coverage on ETP I but at a lesser proportion of the stations; in equivalent coverage, 97 larvae were taken in 67 collections on ETP I. Dolphin larvae provide one of the more striking examples of a marked difference in the distributional pattern of larvae as between ETP I and ETP II.

Eggs and newly hatched larvae have been described for *Coryphaena hippurus* L. by Mito (1960). The eggs are 1.2 to 1.6 mm, with a single oil globule 0.3 to 0.4 mm. The larvae are heavily pigmented, even at hatching. We have not found distinguishing characters to separate the larvae of *C. hippurus* from those of *C. equiselis,* hence have labelled our material as *Coryphaena* spp. After the vertebral column is developed, definitive identification can be made: *C. hippurus* has 31 vertebrae, *C. equiselis* has 33 (Collette, Gibbs, and Clipper, 1969). Parin (1968) reports that *C. hippurus* reproduces only in the littoral zone and that *C. equiselis* is the offshore spawner. If this pattern of spawning holds for the eastern Pacific, then the majority of larvae taken on EASTROPAC cruises were those of *C. equiselis.* As noted for this family in the first EASTROPAC paper (ETP I, 38) the majority of the specimens obtained were early stage larvae, hence spawned in the area of collection.

38. GEMPYLIDAE

(112 occurrences, 370 larvae)

Two kinds of gempylid larvae were widely distributed in the EASTROPAC area on ETP II: larvae of *Gempylus serpens* Cuvier and Valenciennes (71 occurrences, 152 larvae) and *Nealotus tripes* Johnson (66 occurrences, 218 larvae).

Larvae of both species had a higher frequency of occurrence and greater abundance on ETP II. Distribution within the EASTROPAC area also was different in the two multivessel surveys. The more widespread distributional pattern for *Gempylus serpens* was observed from the wider-ranging ETP I survey. Over a third of the occurrences of *Gempylus* larvae were in the portion of the ETP I pattern not replicated on ETP II (Ahlstrom, 1971, Figure 13). Larvae were taken throughout the ETP I pattern with as many records from south of the equator as to the north. In contrast, only three collections were made to the south of the equator on ETP II (Figure 4), but many more collections of *Gempylus* larvae were obtained to the north of the equator, particularly in the inner pattern occupied by *Rockaway.*

Changes in distribution of larvae of *Nealotus tripes* in the two surveys were not as marked as for *G. serpens.* On both surveys the majority of the occurrences of *Nealotus* larvae were in the inner half of the ETP pattern; heaviest concentration of larvae on ETP II was in an equatorial band between circa lat 5°N and 3°S. Fewer *Nealotus* larvae were taken in the inner pattern off Peru, between circa lat 3° and 15°S, as compared with ETP I (ETP I, Figure 7).

39. GOBIIDAE

(53 occurrences, 384 larvae)

Larvae of several families of shore or bottom fishes have a much more widespread oceanic distribution than would be anticipated from the distribution of adults. In the EASTROPAC area this applies particularly to larvae of Gobiidae, Scorpaenidae, Labridae, Bothidae, and Cynoglossidae. Based on pigmentation and meristics a minimum of eight kinds of goby larvae were taken.

42. NOMEIDAE

(229 occurrences, 1,460 larvae)
And other Stromateiodei (14 occurrences, 16 larvae)

Four families of stromateoid, fishes were taken on EASTROPAC cruises: Amarsipidae, Nomeidae, Stromateidae, and Tetragonuridae. Three of these families contain oceanic species that are widely distributed in offshore waters; only fishes of the family Stromateidae are confined to coastal waters. Important papers dealing with stromateoid fishes include Grey (1955), Haedrich (1967, 1969), Haedrich and Horn (1969),[2] and Horn (1970).

In the EASTROPAC area, only the nomeids were common, occurring in about two-thirds of the collections made on ETP II. Larvae were obtained of two genera, *Cubiceps* and *Psenes;* larvae of the former were the more abundant, larvae of the latter were more diversified as to species represented.

Larvae of a species in the family Stromateidae, *Peprilus medius* (Peters), were taken at a single station on ETP II, 46.135 (2 larvae), but a larger collection was obtained at *Oceanographer* Station OP 168 (16 larvae).

Larvae of Tetragonuridae (11 occurrences, 12 larvae) occurred in an equatorial band between lat 2°N and 7°S, seaward of the Galapagos Islands (Figure 17). As noted in the first EASTROPAC report, larvae of two species were taken: *T. cuvieri* Risso and *T. atlanticus* Lowe.

Two specimens of *Amarsipus carlsbergi,* described by Haedrich (1969) as a monotypic representative of a new family Amarsipidae, were

[2] Haedrich, R. L., and M. H. Horn. 1969. A key to the stromateoid fishes. Woods Hole Oceanogr. Inst. Ref. #69-70, 46 p. (Unpublished manuscr.)

obtained on ETP II, and five specimens previously had been taken on ETP I. These had been identified as *Centrolophus*-like with the notation that they probably represented an undescribed form. Identification of the material as *Amarsipus carlsbergi* was made by Dr. Michael H. Horn. Since little is known about this species in the eastern Pacific, I am listing all catch localities.

ETP II = Station 45.346 at lat 14°38.2′N, long 109°37.1′W, Sept. 8, 1967, 1 specimen, 26.2 mm; Station 47.272 at lat 11°20.8′N, long 88°00.5′W, Aug. 31, 1967, 1 specimen, 15.0 mm.

ETP I = Station 11.066 at lat 06°49.8′N, long 118°55.5′W, Feb. 3, 1967, 1 specimen, 10.3 mm; Station 11.114 at lat 02°37.8′S, long 119°02.3′W, Feb. 7, 1967, 1 specimen, 30.0 mm; Station 11.306 at lat 12°03.5′N, long 126°00′W, Feb. 27, 1967, 1 specimen, 16.0 mm; Station 12.059 at lat 09°31.5′N, long 105°02.0′W, Feb. 22, 1967, 1 specimen, 7.2 mm; Station 12.246 at lat 06°12.0′N, long 112°00.5′W, Mar. 16, 1967, 1 specimen, 7.3 mm.

43. OPHIDIIDAE

(38 occurrences, 81 larvae)

A number of kinds of larvae of this complex family were taken on ETP II, mostly in a coastal band between Acapulco, Mexico, and central Peru, but six occurrences were in a loose cluster about the Galapagos Islands. Only one kind has been identified to genus as yet; this is a form with conspicuously large pectorals (11 occurrences, 15 larvae) whose larvae were clustered in the Gulf of Panama or immediately seaward. Dr. Daniel Cohen of the National Marine Fisheries Service has identified larger specimens (small juveniles) as *Brotula* sp. A characteristic of this genus observed on several specimens was the presence of two ural centra in the "urostyle." Garman (1899) described 22 species of ophidiid-brotulids from the eastern tropical Pacific, few of which have been retaken subsequently. However, the variety of kinds of ophidiid larvae in our material attests to a speciose fauna.

47. SCOMBRIDAE

(55 occurrences, 248 larvae)

Scombrid larvae were markedly less abundant in ETP II as compared with similar coverage on ETP I (163 occurrences, 1,840 larvae).

The majority of scombrid larvae from ETP II were those of *Auxis* sp. (34 occurrences, 151 larvae) or were too small to identify with certainty (30 occurrences, 84 larvae). The remaining scombrid larvae included the wahoo, *Acanthocybium solanderi* (Cuvier) (2 occurrences, 3 larvae) from Stations 45.065 and 46.004; the mackerel, *Scomber japonicus* Hottuyn, (2 occurrences, 4 larvae) from near the Galapagos Islands; bigeye tuna, *Thunnus obesus* Lowe, (1 occurrence, 1 larva); skipjack, *Katsuwonus pelamis* (Linnaeus), (2 occurrences, 2 larvae); yellowfin tuna, *Thunnus albacares* (Bonnaterre), (2 occurrences, 2 larvae). Scombrid larvae were given to W. Klawe of the Inter-American Tropical Tuna Commission for identification.

52. TRICHIURIDAE

(49 occurrences, 186 larvae)

In the ETP I contribution, I pointed out the similarity in appearance of larvae of *Diplospinus multistriatus* Maul and those of *Gempylus serpens*, and the problems this raised about the distribution of genera between Gempylidae and Trichiuridae and perhaps about the need for two families. Treating larvae of the two families separately in this paper was done only for convenience. The problems raised in the first ETP contribution still need to be solved.

Three kinds of trichiurid larvae were obtained on ETP II: larvae of *D. multistriatus* Maul, *Trichiurus lepturus* (L.), and *Lepidopus* sp.

The distribution of larvae of *D. multistriatus* (25 occurrences, 69 larvae) was strikingly similar on the two multivessel cruises (Figure 4 and Ahlstrom, 1971, Figure 14). On ETP II, all but two occurrences were in a compact group at the southern inner half of the ETP pattern between circa lat 8° and 15°S and offshore to long 95°W. Most ETP I collections of larvae of this species were obtained from this same general area. The remaining two occurrences on ETP II were obtained at the northern, outer end of the pattern, again similar to the distribution of *Diplospinus* larvae on ETP I. On ETP II, there were no occurrences of *Diplospinus* larvae between these two widely separated groups; on ETP I two specimens were taken at intermediate localities. Larvae of this species have been obtained in a number of collections made in the North Pacific central water mass, with best distributional information from the NORPAC Expedition of August 1955. It is not taken in California Current waters, hence the distribution in the Humboldt Current waters off Peru does not have a mirror-image replication in the California Current, as has been found for a number of species.

Larvae of *Trichiurus lepturus* (20 occurrences, 106 larvae) were taken in a coastal band on ETP II (Figure 17). Eggs of this species are readily identified and occurred in many of the hauls containing *Trichiurus* larvae and in some additional hauls. Interestingly enough, larvae of this species were not obtained in ETP I collections, hence this is another exception to the general pattern of year-long reproduction by tropical pelagic fishes. Unlike larvae of *Gempylus* or *Nealotus*, which were widely distributed in the EASTROPAC area, larvae of this species appear to have a restricted, coastal distribution.

Larvae of *Lepidopus* sp. (3 occurrences, 9 larvae) were taken in contiguous stations at about lat 5°S off Peru (Figure 17). Larvae of *Lepidopus* were taken in more hauls on ETP I (7 occurrences, 25 larvae, Ahlstrom, 1971, Figure 14), all located between the equator and lat 5°N and offshore to long 92°W.

This change in area of spawning of *Lepidopus* from north of the equator on ETP I to the south of the equator on ETP II may not be significant, because of the paucity of positive hauls. If real, one can only surmise as to whether the two populations were discrete, with separate spawning seasons on the two sides of the equator.

53. BOTHIDAE

(70 occurrences, 690 larvae)

Bothid larvae occurred in more hauls than on ETP I (70 versus 56 occurrences) and in larger numbers (690 versus 199 larvae). The species composition, however, was similar (Table 22). A short section will be devoted to each of the forms listed in this table.

Bothus leopardinus (Günther)

(27 occurrences, 97 larvae)

Only larvae of *B. leopardinus* have been ob-

TABLE 22.—Frequency of occurrence and relative abundance of larvae of flatfishes, Pleuronectiformes, on the second multivessel EASTROPAC survey, summarized by vessel pattern.

Flatfish larvae	*Washington* 45.000 series		*Undaunted* 46.000 series		*Rockaway* 47.000 series		Total EASTROPAC II	
	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae
BOTHIDAE								
Bothus leopardinus	2	2	15	45	10	50	27	97
Citharichthys-Etropus	1	1	5	35	11	34	17	70
Cyclopsetta sp.	0	0	4	26	9	12	13	38
Engyophrys sancti-laurentii	0	0	0	0	3	3	3	3
Monolene sp.	0	0	0	0	1	1	1	1
Syacium ovale	6	15	17	201	32	264	55	480
Other Bothidae	1	1	0	0	0	0	1	1
Total Bothidae	7	19	28	307	35	364	70	690
CYNOGLOSSIDAE								
Symphurus spp.	2	5	16	109	38	248	56	362
Total Pleuronectiformes	7	24	30	416	46	612	83	1,052

tained in EASTROPAC collections. Although *B. mancus* (Broussonet) has been recorded from Clarion Island, off the west coast of Mexico (Norman, 1934), larvae of this species have not been obtained. Larval material of *B. mancus* has been examined from the vicinity of the Hawaiian Islands, and it differs from *B. leopardinus* in developing pigment on late stage larvae.

Larvae of *B. leopardinus* were distributed in a broad coastal band between Manzanillo, Mexico, and lat 4°N (Figure 8). This distribution is more restricted than that found on ETP I (Ahlstrom, 1971, Fig. 10). On ETP I, there were nine occurrences between lat 5°N and 6°S, as compared with a single occurrence on ETP II.

Citharichthys-Etropus
(17 occurrences, 70 larvae)

Although labeled *Citharichthys-Etropus* as for ETP I, the larvae taken on ETP II probably represent two species of *Citharichthys*, one with three elongated dorsal rays, the other with two elongated rays. Larvae of the latter were taken below the equator, either off Ecuador or near the Galapagos Islands (9 occurrences, 48 larvae). The form with three elongated dorsal rays was distributed in a coastal band between Manzanillo, Mexico, and Ecuador (8 occurrences, 22 larvae).

***Cyclopsetta* sp.**
(13 occurrences, 38 larvae)

Larvae of *Cyclopsetta* sp. occurred in a broad coastal band between lat 15°N and circa lat 5°S. The larvae have been identified tentatively as *C. querna* (Jordan and Bollman). A developmental series was recently described by Gutherz (1970) for an Atlantic species of this genus, *C. fimbriata* (Goode and Bean). The Pacific and Atlantic species are similar in having opercular spination, a pair of sphenotic spines on the head, and nine or so elongated dorsal rays. They differ in several interesting respects. *C. fimbriata* transforms at a much smaller size, 14.0 mm, whereas the Pacific species can attain a length of at least 32 mm before transformation. The opercular spination is more strikingly developed on the Pacific form, and the pelvic fins become markedly more elongate, extending almost to the base of the caudal fin, whereas the fins attain only about 40% of this length proportionately in *C. fimbriata.*

Engyrophrys sancti-laurentii **(Jordan and Bollman)**
(3 occurrences, 3 larvae)

Only three larvae of this species were obtained on ETP II, two from the vicinity of the Gulf of Panama and one from near Puntarenas, Costa Rica.

***Monolene* sp.**
(1 occurrence, 1 larva)

A 16-mm specimen was obtained at Station 47.520. Larvae of *Monolene* develop a single, prominent elongated dorsal ray (2nd fin ray)—this ray was 6 mm long. Its meristics—D.82, A.63, Vert. 39—would fit *Monolene asaedai* Clark (Perkins, 1963) and possibly *M. dubiosa* Garman. The other two eastern Pacific species, *M. maculipinna* Garman and *M. danae Bruun,* have higher fin ray counts. Morrow (1957b) reported taking a 65-mm larva of *M. maculipinna* off Peru in a pelagic trawl fishing to 152-fm depth over rather deep water (1,300 fm). Morrow's specimen had the following meristics: D.98, A.79, Vert. 43. *Monolene danae* Bruun (1937) was described from a juvenile taken in a pelagic trawl off Panama by the *Dana* in 1922.

Syacium ovale **(Günther)**
(55 occurrences, 480 larvae)

Although larvae of *S. ovale* were the most common bothid flatfish collected on both ETP I and ETP II, it was decidedly more abundant in ETP II as compared with ETP I (24 occurrences, 84 larvae). Larvae of *Syacium* occurred in a broad coastal band between Manzanillo, Mexico, and Ecuador (Figure 3); only three collections were obtained to the south of the

TABLE 23.—Familial composition of Lophiiform larvae taken on the second multivessel EASTROPAC survey, summarized by vessel pattern.

Family	*Washington* 45.000 series		*Undaunted* 46.000 series		*Rockaway* 47.000 series		Total EASTROPAC II	
	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae	No. positive hauls	No. larvae
Caulophrynidae	0	0	2	2	0	0	2	2
Centrophrynidae	1	1	0	0	0	0	1	1
Ceratiidae	0	0	2	3	3	5	5	8
Gigantactinidae	8	9	5	5	5	13	18	27
Himantolophidae	4	5	1	1	3	3	8	9
Linophrynidae	2	2	0	0	19	32	21	34
Melanocetidae	3	3	13	18	17	23	33	44
Oneirodidae	11	11	13	18	23	53	47	82
Unidentified ceratiods	9	11	7	7	10	16	26	34
Antennariidae	0	0	1	1	0	0	1	1
Lophiidae	0	0	1	1	0	0	1	1
Total Lophiiform	25	42	33	56	56	145	114	243

equator. Most larvae of *Syacium* were under 5 mm in standard length, and few were as large as 9 mm. At the latter size, the adult complement of fin rays were present in all fins except the pectoral, and the vertebral column was completely ossified. The vertebral count in specimens examined was 10 + 25.

54. CYNOGLOSSIDAE

(56 occurrences, 362 larvae)

Larvae of *Symphurus* spp. were taken in a broad coastal band between Manzanillo, Mexico, and northern Peru. *Symphurus* larvae were taken in slightly less hauls than on ETP I (56 versus 63 occurrences), but in slightly larger numbers (362 versus 304 larvae). Two kinds of *Symphurus* larvae were widely distributed, and three or four additional kinds occurred sparingly. Of the two common forms, one developed two elongated dorsal rays and the other six elongated dorsal rays.

56. LOPHIIFORMES

(114 occurrences, 243 larvae)

Lophiiform larvae were accumulated during the identification and enumeration of ETP II larvae, and then studied as a unit. Ten families were represented (Table 23). All but two of the specimens belonged to the subfamily Ceratioidei, a group of fishes whose ontogeny and taxonomy were dealt with in the impressive contribution of Bertelsen (1951). Ceratioid fishes have the most striking sexual dimorphism found in fishes. The males are parasitic in some ceratioids, free-living in others, but always quite small. Bertelsen showed that sex can be determined in the late larval stage; a papilliform illicium develops on the head of the female, but not on the male. A major achievement of Bertelsen was defining the distinguishing characteristics of larvae of all 10 ceratioid families. His work makes it possible to identify larger ceratioid larvae to the family level with assurance; however, small ceratioid larvae are much more difficult to identify because they have few distinguishing characters. Although Bertelsen worked out life history series to the generic or species level within all ceratioid families, ontogeny of the less common genera and species still remains unknown.

The ceratioids are a particularly difficult group in which to work out new developmental series. These cannot be based on larvae alone but must include transforming and adolescent specimens, preferably of both sexes, as well as adults. The EASTROPAC material, almost exclusively larvae, is inadequate for this purpose. Distributions of larvae are shown for five ceratioid families (Figure 18), as noted in the discussion of families. Most kinds of ceratioid larvae are quite rotund, hence aptly described as butterballs.

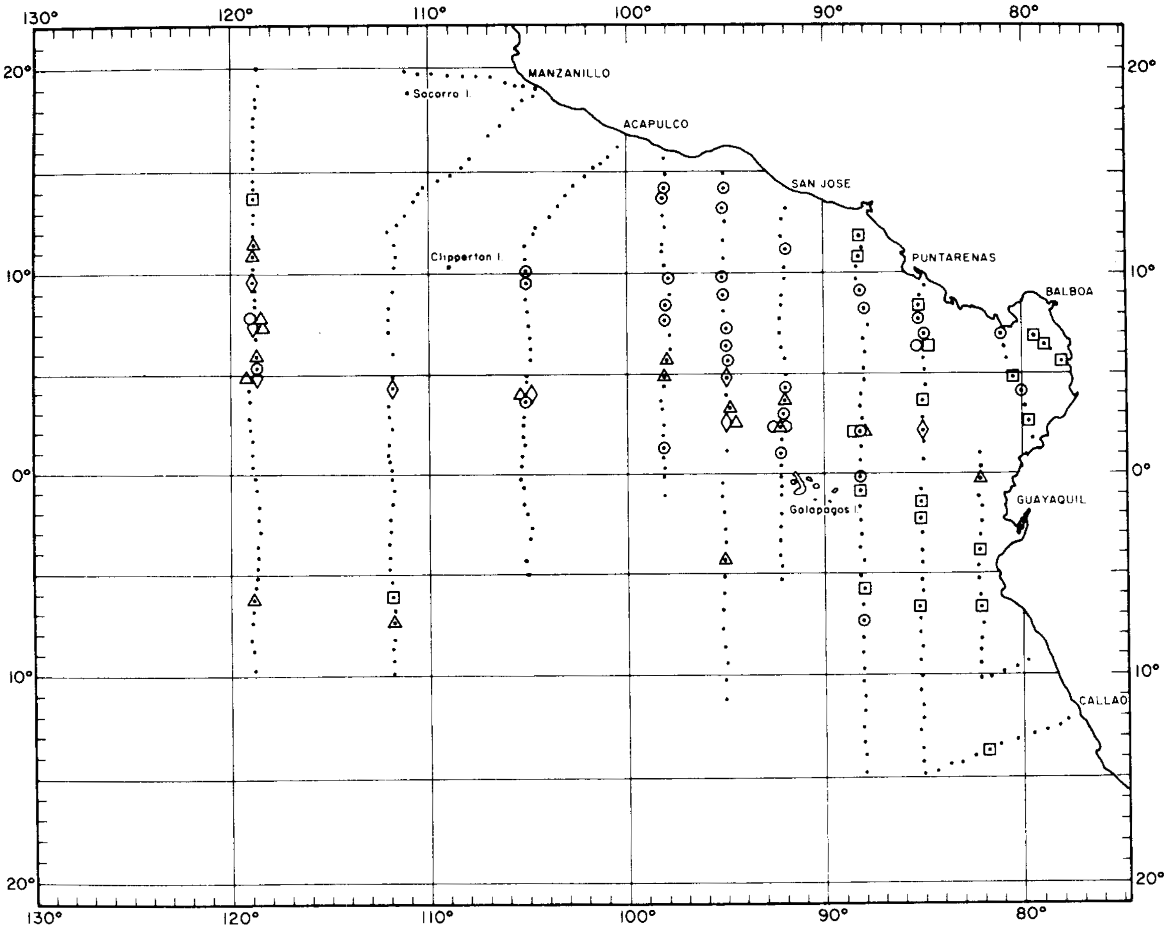

FIGURE 18.—Distribution of larvae of the lophiiform families Caulophrynidae (*Caulophryne jordani*) (open hexagon with dot), Gigantactinidae (*Gigantactis* sp.) (open triangle with dot), Himantolophidae (*Himantolophus* sp.) (open diamond with dot), Linophrynidae (2 or more genera represented) (open square with dot), and Melanocetidae (*Melanocetus* spp.) (open circle with dot); negative hauls are shown as small solid circles.

Caulophrynidae
(2 occurrences, 2 larvae)

Bertelsen referred all material of Caulophrynidae to a single species, *Caulophryne jordani* Goode and Bean. This is the only ceratioid fish known to develop pelvic fins. The two occurrences (Figure 18) were north of the equator in the pattern occupied by the middle vessel.

Centrophrynidae
(1 occurrence, 1 larva)

A single specimen was obtained of *Centrophyrne spinulosa* Regan and Trewavas in the offshore pattern (Station 45.325). Larvae of this species develop a digitiform barbel on the throat, a character unique to the species.

Ceratiidae
(5 occurrences, 8 larvae)

Larvae were obtained of two species of Ceratiidae, *Cryptopsaras couesi* Gill and *Ceratias holboelli* Kroyer. Bertelsen had previously recorded larvae of *C. couesi* from the eastern tropical Pacific, but not of *C. holboelli*. Ceratiid larvae are peculiarly "humpbacked," and the larger larvae of females develop "caruncles" on their backs. The caudal ray count in ceratioid fishes is constant at nine, except for two species that develop only eight caudal rays—*C. couesi* is one of these.

Gigantactinidae
(18 occurrences, 27 larvae)

Larvae of *Gigantactis* sp. were taken in a triangular-shaped wedge, broadest offshore (Figure 18). Even small larvae of this family can be identified with certainty, because of the large size of the pectoral fins.

Himantolophidae
(8 occurrences, 9 larvae)

Larvae of Himantolophidae were taken to the north of the equator, between lat 2° and 10°N in all vessel patterns (Figure 18). Larvae are similar to Bertelsen's series for *Himantolophus groenlandicus* Reinhardt, and he recorded specimens from Panama. Two additional species of *Himantolophus* have been described from Panama or vicinity: *H. azuerlucens* Beebe and Crane and *H. rostratus* Regan. I have recorded the EASTROPAC larvae simply as *Himantolophus* sp.

Linophrynidae
(21 occurrences, 34 larvae)

Several kinds of linophrynid larvae were taken, of which three were common—larvae of *Borophryne apogon* Regan, of the *Linophryne macrorhinus* group, and of the type designated by Bertelsen as *"Hyaloceratis."* All but two occurrences of linophrynid larvae were in the inner pattern shoreward of the Galapagos Islands (Figure 18). Most linophrynid larvae are more elongate than other ceratioid larvae and also have the lowest D and A counts, usually D3 and A3.

Melanocetidae
(33 occurrences, 44 larvae)

At least two kinds of *Melanocetus* larvae were obtained on ETP II, with most specimens referable to *M. polyactis* Regan and the remainder to *M. johnsoni* Günther. Most records of *Melanocetus* were from the northeast quadrant of the EASTROPAC pattern (Figure 18).

Oneirodidae
(47 occurrences, 82 larvae)

At least one-third of the ceratioid larvae taken on ETP II were referable to the family Oneirodidae. Bertelsen (1951) recorded seven kinds of oneirodid larvae belonging to six genera from collections made off Panama. All but one of these were taken in ETP II, together with a new record for the eastern Pacific. Oneirodid larvae sampled on ETP II included *Chaenophryne draco*-group, *Chaenophryne longiceps*-group, *Dolopichthys* sp., *Micropolichthys microlophus* (Regan), *Oneirodes eschrichti*-group, *Oneirodes melanocauda* Bertelsen, and *Pentherichthys* sp. Bertelsen could identify some oneirodid larvae only to species groups, including the three listed above. Bertelsen included 24 nominal species in the *Oneirodes eschrichti*-group, most of which were possibly synonyms.

Perhaps the most interesting record of an oneirodid larva from ETP II was of *Oneirodes melanocauda* from Station 47.008, off Panama. A male, 9.5 mm TL (6.5 mm SL), agreed in all essential characters with Bertelsen's description. This is one of the more heavily pigmented ceratioid larvae. The fin counts were D6, A4, P19, C9. Bertelsen based his description of *O. melanocauda* on four specimens, 8 to 21 mm TL, the largest a metamorphosing female. These were obtained in the South China Sea, Indian Ocean, and Caribbean Sea. The EASTROPAC record is the first from the Pacific.

The caudal fin is usually unpigmented in ceratioid larvae, but caudal pigment is developed on several kinds of oneirodid larvae. Larvae of *O. melanocauda* have stippled pigment near the outer margin of the caudal rays. Larvae of *Penthrichthys* sp. have pigment sprinkled over much of the caudal fin rays. A third kind of oneirodid larva with streaks of caudal pigment between the rays was taken at Station 47.250 (ontogenetic series yet to be worked out).

The larvae of *Pentherichthys* from the eastern Pacific are probably referable to *P. atratus* (Regan and Trewavas). Collections were made at six stations in the inner pattern between lat 2° and 8°N. The 10 specimens ranged in total length from 3.2 to 7.0 mm. Bertelsen remarked on the paucity of small specimens of *Pentherichthys* in the *Dana* material; only 2 of 19 specimens were under 7.5 mm in total length.

Antennariidae
(1 occurrence, 1 larva)

The specimen, taken at an inshore Station, 46.132, on the middle pattern, was 7.5 mm SL and had fin counts of D-II + I-13, A7, P10, V5, C9. These counts could apply equally to species in the genera *Histrio* or *Antennarius.*

Lophiidae
(1 occurrence, 1 larva)

A specimen of a lophiid larvae was obtained in the middle pattern at Station 46.145. This specimen, 15.5 mm SL (25.0 mm TL), had the following counts: D-II + I + III — 8, A6, P16/17, V6, C8. This specimen is referable to the genus *Lophiomus*. Garman described two species of *Lophiomus* from the eastern Pacific with identical counts to the above. Norman in his unpublished synopsis considered the genus monotypic with Garman's species as junior synonyms of *L. setigerus* Vahl. The third dorsal spine is rather widely separated from an anterior group of two spines and a posterior group of three. The last ray in both the dorsal and anal fins was bifurcate to the base, differing in this respect from the last ray in ceratioid fishes, which is single. The larvae had two spines above the eye on either side of the head, differing in this character from the published larval series for *Lophius piscatorius* and *L. americanus* (Tåning, 1923); the pectoral fins were considerably smaller and compact.

57. OTHER IDENTIFIED
(23 occurrences, 51 larvae)

Two of the families, Amarsipidae and Stromateidae, have been discussed in the section dealing with Nomeidae and other Stromateiodei (No. 42). Other families included under "other identified" include Eutaeniophoridae (2 occurrences, 2 larvae), Gadidae (7 occurrences, 10 larvae), Callionymidae (2 occurrences, 2 larvae), Fistulariidae (1 occurrence, 1 larva), Gerridae-*Eucinostomus* sp. (4 occurrences, 15 larvae), Microdesmidae (4 occurrences, 6 larvae), Pomadasyidae-*Anisotremus* sp. (2 occurrences, 7 larvae), and Tetradontidae (1 occurrence, 1 larva).

ACKNOWLEDGMENTS

I wish to thank the many scientists who participated on EASTROPAC cruises for their care in collection and preservation of the plankton collections, and the technicians who laboriously sorted out fish eggs and larvae from the 1.0-m oblique plankton hauls for their thoroughness and patience. I especially wish to thank Elizabeth Stevens for her careful identification of the fish larvae obtained on the four EASTROPAC monitoring cruises made by the *David Starr Jordan*, Kenneth Raymond for preparing the distribution charts, Elaine Sandknop and Amelia Gomes for their aid in many aspects of the work, such as preparation of cleared and stained specimens and x-raying of juvenile and adult specimens. H. Geoffrey Moser worked closely in

APPENDIX TABLE 1.—Counts of fish larvae, tabulated by family, for all stations occupied on the second multivessel EASTROPAC survey (EASTROPAC II).

STATION NUMBER	Myctophidae	Gonostomatidae	Sternoptychidae	Chauliodontidae	Idiacanthidae	Other Stomiatoidei	Bathylagidae	Paralepididae	Scopelarchidae	Melamphaidae	Bregmacerotidae	Exocoetidae	Trachypteridae	Apogonidae	Bramidae	Chiasmodontidae	Coryphaenidae	Nomeidae	Scombridae	Other identified larvae	Unidentified larvae	Disintegrated larvae	Total fish larvae
45.016	12	14	.	.	.	2	.	2	2	2	.	.	.	.	.	.	.	.	.	.	2	1	37
45.018	35	86	2	.	2	1	.	3	2	.	.	.	.	.	.	2	1	.	.	2	.	.	136
45.020	14	5	3	.	1	1	.	.	.	.	4	.	.	.	.	.	.	1	.	1	.	1	31
45.021	13	17	2	.	1	6	.	3	.	1	4	.	.	.	.	3	1	.	.	2	.	1	54
45.023	61	106	.	.	.	3	.	2	.	2	8	.	.	.	.	1	2	1	.	2	1	.	189
45.024	86	96	1	.	1	3	.	3	.	2	2	.	.	.	.	.	1	1	.	3	.	5	204
45.026	40	30	.	.	9	.	4	4	.	10	3	.	.	.	.	.	2	3	1	2	2	2	112
45.028	24	22	.	.	2	5	9	4	3	1	3	.	.	.	.	.	.	8	.	1	1	1	84
45.030	34	60	.	.	8	.	.	2	1	2	.	.	.	.	.	.	.	9	.	2	.	3	121
45.032	158	111	.	.	14	1	7	3	1	12	5	.	.	.	.	2	2	17	.	10	.	10	353
45.034	146	37	.	.	8	2	1	1	4	2	9	.	.	.	.	1	.	1	.	1	2	9	224
45.035	40	29	.	.	7	.	2	.	3	4	4	1	.	.	.	.	.	9	.	3	4	1	107
45.037	41	25	1	.	18	4	10	1	.	2	11	.	.	.	.	1	.	2	.	1	4	3	124
45.039	77	82	.	.	7	3	1	4	12	4	11	.	.	.	.	2	.	2	.	5	5	1	216
45.041	29	49	.	.	2	4	8	1	4	4	9	.	.	.	.	.	.	1	.	.	10	1	122
45.043	17	16	.	.	2	.	5	3	1	5	4	.	.	.	.	1	.	6	.	3	3	1	67
45.044	50	41	1	.	3	.	4	4	5	2	4	.	.	.	.	.	.	4	.	1	3	5	127
45.046	43	57	23	.	43	.	2	1	6	6	8	.	.	.	1	5	2	5	.	2	.	1	205
45.048	25	21	12	.	9	.	2	1	1	6	1	2	.	.	1	1	1	3	.	2	.	4	92
45.050	19	3	6	.	1	.	1	2	.	2	.	.	.	.	.	.	.	1	.	2	2	1	40
45.051	87	15	14	.	.	.	4	1	.	.	1	.	.	.	.	.	1	.	.	2	.	.	125
45.053	75	19	31	.	.	.	.	2	.	3	11	.	.	2	1	.	.	.	.	4	.	3	151
45.054	44	3	16	1	.	.	1	.	.	4	24	.	.	1	.	.	.	.	.	1	1	1	97
45.056	22	6	20	.	.	.	.	1	.	2	23	.	1	.	.	.	2	1	.	5	.	7	90
45.058	146	18	13	.	2	1	1	6	.	2	11	.	1	11	1	.	.	.	.	8	2	5	228
45.060	82	4	2	.	5	8	1	3	2	5	29	.	.	13	1	.	.	1	.	3	2	7	168
45.063	29	46	2	.	2	14	1	3	.	.	9	.	.	10	2	2	2	.	.	6	1	9	138
45.065	116	374	9	.	6	26	.	25	.	.	1	.	.	29	1	2	3	5	3	11	.	23	634
45.067	185	584	37	9	2	48	3	56	.	.	.	.	1	12	3	.	1	5	1	31	3	11	992
45.071	42	45	7	.	.	3	.	5	.	.	2	.	.	11	1	.	1	3	.	5	.	1	121
45.073	65	68	14	.	.	2	2	5	.	.	1	.	.	22	.	.	.	3	.	4	1	16	203
45.078	71	107	10	.	.	.	1	6	2	.	3	.	.	3	1	.	.	4	.	2	.	2	212
45.083	37	26	13	.	.	1	.	5	.	1	.	.	.	11	.	.	2	4	.	1	.	4	105
45.086	65	77	2	1	.	2	3	9	.	5	3	.	.	1	.	.	.	2	.	.	.	21	191
45.090	47	67	3	1	.	3	8	5	.	.	.	.	.	1	.	1	.	2	.	6	.	12	156
45.094	150	107	12	.	.	3	6	27	.	.	1	.	.	2	.	2	1	2	.	.	.	33	346
45.098	43	16	3	.	.	.	2	8	.	1	.	.	.	1	.	.	1	.	.	.	.	10	85
45.102	136	82	12	.	.	5	1	24	.	7	.	.	.	2	.	1	.	1	.	1	.	16	288
45.106	265	21	21	.	.	2	5	4	1	5	.	1	.	.	.	1	.	2	.	1	3	22	354
45.110	545	32	188	.	.	5	12	5	1	4	.	.	.	.	.	7	.	5	.	4	.	9	817
45.114	40	20	51	.	.	.	2	2	.	1	.	.	.	.	.	.	.	5	.	.	1	16	138
45.117	92	49	86	.	.	.	1	4	.	2	.	.	.	.	.	.	.	6	.	2	1	20	263
45.121	55	98	209	.	.	.	4	3	.	2	.	.	.	1	.	.	.	.	.	2	.	25	399
45.125	41	325	39	.	.	.	.	1	.	1	.	.	.	.	1	.	.	6	.	2	.	.	416
45.127	21	39	31	.	.	.	.	.	.	6	.	.	.	7	2	.	.	.	.	3	3	10	122
45.129	22	3	24	.	.	.	.	.	.	4	.	.	.	3	.	.	.	.	.	.	1	6	63
45.131	73	337	23	.	.	.	.	.	.	2	.	.	.	2	1	.	.	2	.	3	4	25	472
45.133	323	33	23	.	9	4	.	5	5	.	7	.	.	.	.	.	.	.	1	3	.	3	416
45.135	165	17	19	.	2	.	.	2	1	.	3	2	.	.	.	.	.	.	1	1	4	10	227
45.137	11	.	12	1	.	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	27
45.139	24	2	3	1	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	3	36
45.146	106	87	49	8	.	.	.	11	10	1	.	.	.	.	.	.	-	.	.	2	20	44	338

APPENDIX TABLE 1.—Counts of fish larvae, tabulated by family, for all stations occupied on the second multivessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Myctophidae	Gonostomatidae	Sternoptychidae	Chauliodontidae	Idiacanthidae	Other Stomiatoidei	Bathylagidae	Paralepididae	Scopelarchidae	Melamphaidae	Bregmacerotidae	Exocoetidae	Trachypteridae	Apogonidae	Bramidae	Chiasmodontidae	Coryphaenidae	Nomeidae	Scombridae	Other identified larvae	Unidentified larvae	Disintegrated larvae	Total fish larvae
45.163	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8
45.165	152	65	212	1	6	3	.	1	4	2	8	.	.	.	.	.	.	.	.	3	2	12	471
45.167	86	6	10	.	.	.	.	.	2	2	.	.	.	.	2	.	.	1	.	.	.	10	119
45.169	56	15	1	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	8	82
45.171	26	1	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	9	50
45.173	10	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13
45.175	62	27	29	.	.	.	.	1	.	.	.	.	.	1	1	.	.	1	.	2	.	3	127
45.177	70	146	46	.	.	.	.	5	.	.	.	.	.	.	1	.	.	7	.	3	.	1	281
45.179	59	33	8	.	.	.	.	1	1	1	.	.	.	.	.	.	.	1	.	.	.	9	113
45.183	26	14	70	.	.	.	4	4	.	2	.	.	.	.	.	.	.	.	.	1	.	2	123
45.187	255	14	87	.	.	.	16	3	.	2	.	.	.	.	.	.	.	.	.	3	.	2	382
45.191	144	15	80	.	.	.	5	17	.	5	.	.	.	.	.	1	.	.	.	1	.	4	272
45.194	49	4	40	.	.	.	3	11	.	1	.	.	.	.	.	.	.	1	.	.	.	4	113
45.198	251	21	31	.	.	3	7	22	.	1	.	.	.	.	.	1	.	.	.	2	.	11	350
45.202	53	19	5	.	.	1	2	9	.	1	.	.	.	.	.	.	.	.	.	2	.	.	92
45.206	22	3	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	30
45.283	102	13	7	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	2	.	3	129
45.287	25	82	1	.	.	.	2	3	.	.	.	.	.	.	.	.	.	.	.	.	1	.	114
45.289	157	125	1	.	.	.	2	16	.	1	.	.	.	.	.	1	.	.	.	1	.	2	306
45.293	157	58	13	.	2	4	4	11	1	2	2	.	1	2	1	1	.	.	.	2	2	2	265
45.297	231	107	14	.	1	15	7	17	2	6	11	.	.	19	.	.	1	.	.	.	1	8	440
45.301	24	26	13	.	.	4	8	5	.	.	3	.	1	2	.	1	1	1	.	4	.	.	93
45.305	119	1040	17	.	1	3	2	.	1	1	6	.	1	.	.	.	6	10	.	1	.	9	1217
45.309	44	150	22	1	1	8	.	4	1	1	2	.	.	3	.	.	3	2	.	2	.	7	251
45.313	49	35	5	.	1	4	2	6	.	.	2	.	.	4	.	.	1	.	.	1	.	9	119
45.316	41	34	8	1	.	3	1	2	.	1	4	.	.	.	1	.	.	.	.	1	.	2	99
45.319	32	46	17	.	.	2	.	3	.	3	4	.	.	1	.	.	.	.	.	2	.	1	111
45.321	45	13	20	.	.	.	2	.	.	7	4	.	.	.	.	.	.	.	.	1	1	1	94
45.323	51	4	1	.	.	3	1	2	.	7	1	.	.	.	.	1	.	.	.	1	1	1	74
45.325	1002	28	19	.	1	.	42	3	1	7	1	.	1	.	6	.	1	8	1	4	.	3	1128
45.329	69	4	11	.	8	.	3	1	.	3	.	1	.	.	1	.	1	4	.	1	.	3	110
45.331	235	5	11	.	1	1	13	.	.	6	3	.	.	.	1	.	.	10	.	1	2	1	290
45.333	108	28	10	.	.	2	5	1	.	4	3	1	.	.	.	.	1	25	.	13	.	.	201
45.335	65	32	2	.	14	5	8	3	3	1	1	.	.	.	.	.	1	9	.	8	1	2	155
45.337	49	12	6	.	21	12	1	3	1	12	6	.	.	.	.	2	2	14	.	1	.	16	158
45.339	26	8	.	.	15	4	2	.	.	7	8	1	.	.	.	3	1	5	.	9	2	9	100
45.341	47	70	.	.	7	1	3	4	4	3	2	.	.	.	.	.	1	1	.	1	.	.	144
45.343	17	32	.	.	8	1	2	2	.	2	2	3	.	.	.	.	1	4	.	2	.	1	77
45.344	21	37	.	.	6	2	1	3	1	3	3	1	1	.	.	.	1	11	.	4	.	4	99
45.346	19	19	.	.	2	1	.	4	.	3	2	.	.	.	.	.	1	4	.	2	.	1	58
45.348	30	120	.	.	3	.	.	4	4	.	.	.	.	.	.	.	.	2	.	3	.	.	166
45.350	70	297	.	.	1	2	.	1	.	.	.	.	.	.	.	.	.	6	.	1	.	5	383
45.352	29	66	.	.	.	.	3	2	.	1	1	1	.	.	.	.	.	3	.	.	.	10	116
45.356	69	153	.	.	5	.	11	6	1	1	.	3	.	.	.	.	2	19	9	1	2	.	282
45.358	98	107	.	.	1	.	1	.	.	4	2	4	1	.	.	.	1	6	5	2	3	7	242
45.360	18	37	.	.	.	1	7	2	.	1	.	.	.	.	.	.	.	9	5	4	3	4	91
45.362	36	31	.	.	.	.	6	8	.	4	2	.	.	.	.	.	1	8	6	17	8	1	128
45.365	99	55	.	.	.	.	1	1	.	.	27	.	.	.	.	.	.	.	4	103	15	6	311
45.367	23	10	.	.	1	1	7	1	.	.	3	.	.	.	.	.	.	.	.	19	.	73	138
45.369	101	106	.	.	.	2	3	10	1	2	25	.	.	.	.	.	1	7	12	61	11	15	357
45.371	120	239	.	.	1	2	13	4	3	10	13	.	1	.	.	.	.	7	6	10	6	11	446
45.373	117	149	.	.	1	.	14	1	.	2	.	2	.	.	.	.	.	13	9	10	3	.	321

APPENDIX TABLE 1.—Counts of fish larvae, tabulated by family, for all stations occupied on the second multivessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Myctophidae	Gonostomatidae	Sternoptychidae	Chauliodontidae	Idiacanthidae	Other Stomiatoidei	Bathylagidae	Paralepididae	Scopelarchidae	Melamphaidae	Bregmacerotidae	Exocoetidae	Trachypteridae	Apogonidae	Bramidae	Chiasmodontidae	Coryphaenidae	Nomeidae	Scombridae	Other identified larvae	Unidentified larvae	Disintegrated larvae	Total fish larvae
45.375	34	39	.	.	.	1	3	1	.	1	2	2	.	.	.	.	.	2	.	4	.	2	91
45.377	67	86	.	.	.	2	8	3	1	3	1	.	.	.	.	.	2	18	6	11	.	18	226
45.379	199	805	.	.	.	1	2	6	2	3	3	1	.	.	.	.	.	3	.	10	12	1	1048
45.381	98	246	.	.	1	.	4	3	.	2	3	.	.	.	.	.	.	2	.	3	2	5	371
45.383	40	20	.	.	.	.	4	.	.	4	.	.	.	.	.	.	.	.	.	2	5	3	78
45.385	19	63	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	83
45.387	26	429	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	461
CRUISE	46																						
46.002	14	19	.	.	.	.	2	1	.	.	.	2	.	.	.	.	1	14	.	2	2	1	58
46.004	103	122	.	.	11	3	4	13	2	5	3	.	.	.	.	.	7	21	2	3	2	3	309
46.006	30	19	.	.	5	1	1	2	.	1	5	.	1	.	.	1	.	9	.	1	4	1	81
46.007	10	28	.	.	1	.	.	2	.	4	1	.	.	.	.	.	.	14	.	1	.	6	67
46.009	17	23	.	.	2	.	1	2	.	.	1	.	.	1	.	.	2	8	.	2	.	3	62
46.011	60	72	.	.	4	2	1	5	3	5	1	1	.	.	.	1	3	16	.	2	1	.	177
46.013	89	51	.	.	2	5	.	2	5	1	2	.	.	.	.	.	1	7	.	1	.	.	166
46.015	18	17	.	.	2	.	1	11	.	4	7	.	.	.	.	.	1	8	.	1	.	.	70
46.017	25	4	.	.	11	.	5	.	1	1	9	.	.	.	.	.	2	1	.	2	1	.	62
46.019	285	148	.	.	17	2	1	2	9	1	9	.	1	1	.	.	2	.	.	3	.	.	481
46.020	160	80	.	.	16	2	10	3	4	2	2	1	.	.	.	.	2	1	1	.	1	.	285
46.022	38	14	11	.	4	.	1	2	1	8	1	2	.	.	1	1	1	8	3	1	1	2	100
46.024	64	27	2	.	3	1	5	1	3	2	2	1	.	.	2	.	.	7	1	2	2	.	125
46.026	206	140	2	.	2	.	5	6	4	11	3	1	.	1	.	4	.	13	3	.	2	.	403
46.028	412	157	10	.	9	2	12	6	1	10	4	.	.	.	1	.	3	15	2	2	1	8	655
46.030	85	7	12	.	3	2	8	.	.	2	2	.	.	.	.	.	1	2	.	.	.	7	131
46.032	9	.	3	.	.	.	1	.	.	.	.	.	.	.	.	1	.	1	.	1	.	.	21
46.034	152	40	17	1	.	3	5	3	1	1	9	.	.	.	1	1	1	1	.	7	2	[illegible]	248
46.036	436	127	28	.	2	1	7	8	1	4	4	1	.	1	.	1	3	.	1	3	.	6	634
46.038	20	7	10	.	.	.	3	1	1	2	.	1	.	.	.	.	.	1	.	.	.	3	49
46.040	25	20	8	.	.	1	.	4	.	1	.	.	.	1	2	.	.	.	.	3	.	4	69
46.042	62	133	5	.	1	.	4	.	.	2	1	2	.	1	.	.	.	.	1	1	1	4	218
46.044	89	96	21	.	.	1	1	1	.	5	1	1	.	1	.	.	.	1	.	1	2	11	232
46.046	78	57	22	.	.	2	1	2	3	3	.	.	.	2	1	.	.	.	1	8	.	11	191
46.048	63	54	24	.	1	.	10	3	.	5	4	1	.	4	1	.	1	.	.	3	3	4	181
46.050	250	184	16	.	.	1	12	24	1	7	11	.	.	11	1	1	.	4	.	3	4	15	547
46.052	319	217	23	.	3	.	7	18	1	3	4	.	.	11	1	.	1	2	.	13	3	5	631
46.054	211	181	22	.	.	3	20	23	1	6	9	.	.	.	.	2	.	.	.	2	3	14	497
46.055	100	73	10	.	1	1	5	18	4	4	4	.	.	3	3	4	.	3	.	.	.	16	249
46.057	751	649	5	.	.	2	10	70	2	3	.	.	.	2	.	3	.	3	.	6	2	.	1506
46.059	494	504	.	.	.	5	2	59	2	1	1	.	.	.	.	1	.	2	.	22	.	5	1098
46.061	148	98	5	1	.	1	3	23	.	1	.	.	.	.	.	.	.	.	.	14	.	72	366
46.063	48	19	6	3	.	.	2	10	.	.	.	.	.	.	.	.	.	1	.	.	5	20	116
46.065	404	97	14	.	.	5	4	50	.	2	.	.	.	.	.	6	.	.	.	2	.	8	592
46.067	269	121	20	.	.	2	5	18	.	1	.	.	.	.	.	.	.	.	.	2	3	20	461
46.069	116	55	23	.	.	.	22	53	.	4	.	.	.	.	.	.	.	.	.	5	33	20	331
46.071	72	27	34	.	.	.	14	22	.	.	.	.	.	.	.	.	.	.	.	4	3	16	192
46.075	35	21	32	.	.	.	5	17	.	4	.	.	.	.	.	.	.	.	.	.	.	6	120
46.077	36	19	12	.	.	1	1	3	.	1	.	.	1	1	.	1	.	.	.	3	.	.	79
46.079	408	30	14	.	.	22	23	31	.	2	.	.	.	.	.	.	.	1	.	4	.	1	536
46.082	61	46	13	.	.	5	17	15	.	2	.	.	.	.	.	.	.	1	.	8	.	8	176

APPENDIX TABLE 1.—Counts of fish larvae, tabulated by family, for all stations occupied on the second multivessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Myctophidae	Gonostomatidae	Sternoptychidae	Chauliodontidae	Idiacanthidae	Other Stomiatoidei	Bathylagidae	Paralepididae	Scopelarchidae	Melamphaidae	Bregmacerotidae	Exocoetidae	Trachypteridae	Apogonidae	Bramidae	Chiasmodontidae	Coryphaenidae	Nomeidae	Scombridae	Other identified larvae	Unidentified larvae	Disintegrated larvae	Total fish larvae
46.084	45	39	13	.	.	2	21	21	.	3	.	.	.	.	.	.	.	.	.	6	1	8	159
46.086	102	233	25	.	1	2	33	26	.	3	.	.	.	.	.	.	.	4	.	8	.	1	443
46.088	124	60	16	.	.	6	8	27	.	.	.	.	.	.	.	.	.	3	.	4	1	9	258
46.090	99	24	47	.	1	5	4	28	3	6	.	.	.	.	.	1	.	7	.	.	.	143	369
46.092	100	29	36	.	.	4	3	10	2	4	.	.	.	1	.	.	1	4	.	.	4	2	200
46.094	300	156	87	.	2	7	3	21	.	8	3	.	2	.	.	1	.	.	.	3	1	1	595
46.096	240	249	54	.	3	2	13	24	1	5	3	3	.	7	.	.	3	2	.	7	8	4	628
46.098	73	42	35	.	.	8	2	4	.	3	.	.	.	7	1	1	.	1	.	2	3	15	197
46.100	125	6	41	.	3	.	2	1	3	2	9	.	.	.	.	.	.	.	.	1	1	6	202
46.102	334	56	69	1	1	4	3	10	.	9	7	.	.	1	.	2	.	.	.	4	3	4	508
46.104	109	46	36	1	2	4	.	10	1	1	.	.	.	2	.	.	1	2	.	2	1	12	232
46.106	115	41	19	.	.	1	9	1	.	2	.	1	1	.	.	.	2	7	1	2	4	4	210
46.108	250	36	45	.	.	7	27	.	.	.	.	.	.	.	.	.	.	20	4	5	1	18	415
46.110	162	10	22	.	1	.	5	.	5	3	.	1	.	.	.	.	.	2	3	15	1	.	230
46.112	562	75	14	.	1	1	16	3	.	.	.	.	.	.	.	.	.	3	14	49	.	.	738
46.114	31	6	2	.	1	1	3	.	2	.	3	2	.	.	.	.	.	3	.	7	.	.	61
46.116	14	5	3	.	1	.	.	1	.	3	.	.	.	.	.	.	.	7	.	1	.	2	37
46.118	176	85	6	.	8	1	3	7	2	5	1	1	1	.	.	.	4	13	.	1	4	3	321
46.120	80	109	.	.	13	2	1	9	1	1	2	1	3	.	.	.	2	12	.	10	.	.	237
46.122	17	29	.	.	2	2	4	4	2	2	3	.	1	.	.	.	1	10	.	8	.	.	85
46.124	19	22	.	.	.	.	2	3	1	4	3	.	.	.	.	.	1	12	.	6	3	3	79
46.126	63	98	.	.	13	1	10	7	1	7	1	1	1	.	.	.	.	4	.	20	10	.	237
46.128	113	131	.	.	11	9	8	11	2	9	19	.	.	.	.	.	1	12	.	7	7	3	343
46.130	46	55	.	.	1	5	11	6	1	6	10	.	.	.	.	.	1	9	.	5	20	9	183
46.132	26	26	.	.	.	.	5	9	.	.	4	.	.	.	.	.	.	17	11	12	19	1	130
46.134	9	12	.	.	3	.	8	.	.	.	511	.	.	.	.	.	2	.	20	93	18	8	684
46.135	81	12	.	.	1	.	8	.	.	.	927	.	.	.	.	.	1	5	6	149	24	4	1218
46.137	201	28	1	.	1	1	24	.	.	7	9	.	.	.	.	.	.	4	.	278	.	7	561
46.139	175	52	1	.	1	.	11	1	1	6	1	.	.	.	.	.	.	15	3	15	.	1	283
46.141	438	20	4	1	1	2	18	1	1	4	.	4	1	.	2	.	1	6	.	8	3	3	518
46.143	113	15	30	.	1	.	10	.	1	2	1	.	.	.	1	.	.	7	1	3	2	5	201
46.145	282	119	24	.	3	2	38	3	.	2	.	.	1	.	.	.	2	4	2	4	2	1	489
46.147	484	41	49	.	2	1	41	1	3	4	.	.	.	.	.	.	.	5	1	4	.	6	642
46.149	1333	14	30	.	1	10	22	.	.	7	1	.	.	.	.	.	.	6	.	4	2	2	1432
46.151	1358	9	24	.	1	4	13	.	.	8	.	.	.	.	.	2	.	.	.	1	.	.	1420
46.153	2561	165	81	.	2	3	4	.	1	7	.	1	1	.	.	.	.	4	.	18	.	16	2864
46.155	973	140	67	.	4	9	6	1	.	8	1	.	.	.	2	1	2	3	3	11	.	3	1234
46.157	490	27	73	1	1	7	6	5	1	8	3	.	1	7	2	.	2	.	.	7	2	12	660
46.159	71	11	32	.	.	2	2	1	.	2	.	.	.	3	1	.	2	.	.	6	.	1	134
46.161	350	47	73	.	4	2	8	12	2	15	.	.	.	.	.	1	.	.	1	12	1	3	531
46.163	290	88	64	.	7	4	10	12	1	13	.	.	1	1	.	.	.	.	.	6	2	41	540
46.165	90	36	60	.	5	.	18	15	.	7	.	3	1	1	.	1	1	.	.	9	5	9	261
46.167	195	40	49	.	3	1	37	7	.	11	.	.	2	2	.	.	.	5	.	7	2	25	386
46.169	163	236	30	.	.	4	52	46	.	10	.	1	.	.	.	2	.	1	.	4	4	10	563
46.171	255	55	15	.	1	2	44	28	.	7	.	.	.	.	.	.	.	.	.	72	.	60	545
46.173	33	15	6	.	.	.	10	6	.	1	.	.	.	.	.	.	.	.	.	5	.	2	78
46.175	52	76	4	.	1	.	21	3	.	2	.	.	.	.	.	.	.	.	.	2	.	1	162
46.177	124	33	17	.	1	2	45	16	.	10	.	.	.	.	.	.	.	.	1	26	.	6	281
46.179	213	110	54	.	1	4	135	19	.	22	.	.	.	.	.	.	.	.	3	110	3	14	688
46.181	52	58	13	3	2	8	132	13	.	14	.	.	.	.	.	.	.	1	.	21	18	4	339
46.183	85	21	29	2	4	11	47	11	1	9	2	.	.	.	.	2	.	2	.	5	.	4	235
46.185	262	97	54	.	2	10	45	12	.	9	.	.	.	.	.	3	.	2	.	6	.	3	505

APPENDIX TABLE 1.—Counts of fish larvae, tabulated by family, for all stations occupied on the second multivessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Myctophidae	Gonostomatidae	Sternoptychidae	Chauliodontidae	Idiacanthidae	Other Stomiatoidei	Bathylagidae	Paralepididae	Scopelarchidae	Melamphaidae	Bregmacerotidae	Exocoetidae	Trachypteridae	Apogonidae	Bramidae	Chiasmodontidae	Coryphaenidae	Nomeidae	Scombridae	Other identified larvae	Unidentified larvae	Disintegrated larvae	Total fish larvae
46.187	516	42	23	.	1	1	17	7	2	2	.	.	.	.	1	.	.	2	.	6	3	6	629
46.189	236	5	19	1	.	1	8	.	1	4	.	.	.	.	.	.	.	.	.	1	1	1	278
CRUISE	47																						
47.001	97	63	6	.	.	.	4	2	.	2	15	.	.	.	1	.	1	1	.	42	.	.	234
47.005	287	206	21	.	3	.	6	6	1	8	22	.	.	1	.	.	1	2	.	81	6	17	668
47.008	257	49	5	.	9	2	7	2	3	13	4	.	.	.	.	.	.	.	.	70	1	7	429
47.011	161	26	4	.	2	1	3	1	1	5	21	.	.	.	.	.	.	2	.	32	2	2	263
47.019	370	234	2	.	.	.	5	8	.	3	.	.	.	2	1	.	.	.	.	145	63	10	843
47.022	169	29	26	.	1	5	3	.	.	.	.	.	.	.	.	.	.	3	.	17	2	10	265
47.025	83	58	5	.	3	1	4	3	.	.	4	1	.	.	.	.	.	1	.	10	1	2	176
47.028	264	118	40	.	16	.	14	15	2	9	5	.	.	.	.	.	1	1	.	52	15	10	562
47.032	208	141	72	.	4	2	15	10	2	8	5	.	1	.	1	.	1	7	.	22	2	8	509
47.034	139	36	8	.	3	1	7	27	.	3	5	.	.	.	1	.	.	2	.	45	7	18	302
47.035	223	73	23	.	16	2	20	43	.	11	7	1	.	.	.	.	.	4	.	29	1	10	463
47.040	205	85	29	.	5	2	8	24	.	4	34	.	.	.	.	.	1	3	.	127	18	22	567
47.049	64	109	20	.	1	8	26	50	.	6	.	2	.	.	.	.	1	11	.	12	2	35	347
47.053	265	102	9	.	2	8	27	27	.	12	.	.	1	.	.	.	.	17	.	82	7	21	580
47.057	300	116	5	.	.	13	50	29	.	11	.	1	.	.	1	.	2	33	.	114	6	50	731
47.061	79	20	9	1	.	4	11	17	.	7	22	.	.	.	.	3	.	12	.	33	4	9	231
47.065	99	93	7	.	.	11	30	5	.	4	8	54	.	.	.	.	.	8	.	22	5	19	365
47.069	140	51	64	.	.	8	143	10	.	5	.	.	.	1	1	3	.	1	.	38	6	9	480
47.070	90	18	13	.	.	11	188	8	.	.	.	.	.	.	.	1	.	5	.	34	2	.	370
47.074	138	14	19	.	1	8	301	5	.	.	.	.	.	.	.	.	.	2	.	65	11	23	587
47.078	11	5	5	.	.	.	64	2	.	.	.	.	.	.	.	.	.	.	.	9	.	6	102
47.082	119	6	13	.	.	.	80	7	.	.	.	.	.	.	.	.	.	.	.	29	1	2	257
47.086	248	11	59	.	.	.	530	.	3	2	.	.	.	.	.	.	.	.	.	127	2	20	1002
47.090	57	5	6	.	1	2	83	.	.	.	.	.	.	.	.	.	.	.	.	3	.	5	162
47.094	100	2	17	.	.	.	8	.	1	.	.	.	.	.	.	.	.	.	.	1	.	3	132
47.097	16	.	6	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	258	1	1	283
47.099	16	.	2	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	62	.	2	84
47.101	48	.	1	.	2	.	1	.	.	2	.	.	.	.	.	.	.	.	.	227	.	1	282
47.103	2	.	4	2	1	1	2	.	.	.	.	.	.	.	.	.	.	.	.	2	.	1	15
47.105	4	5	1	.	.	.	5	.	.	2	.	.	.	.	.	.	.	.	.	4	.	.	21
47.107	109	7	1	.	.	.	4	.	.	4	.	.	.	.	.	.	.	.	.	9	.	.	134
47.109	6	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	293	.	4	305
47.113	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	35	.	2	38
47.124	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	99	.	1	110
47.128	35	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	96	6	.	137
47.132	85	9	1	7	.	.	3	.	3	4	.	.	.	.	.	.	.	.	.	46	.	.	158
47.134	21	9	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20	.	.	52
47.137	17	12	4	.	.	.	3	.	2	5	1	.	.	.	.	1	.	.	.	1	.	2	48
47.139	16	11	.	2	.	.	5	.	.	4	.	.	.	.	.	.	.	.	.	9	.	.	47
47.141	24	17	.	4	.	.	13	.	2	3	.	.	.	.	.	.	.	.	.	18	.	9	90
47.143	23	2	1	26	4	.	16	.	.	1	.	.	.	.	.	.	.	.	.	4	3	9	89
47.145	15	14	1	4	1	.	5	.	3	3	1	.	.	.	.	3	.	.	.	.	.	2	52
47.147	44	78	3	13	2	1	16	.	.	.	3	.	.	.	2	4	.	.	.	5	1	4	181
47.149	40	28	3	7	.	4	15	.	.	3	1	.	.	.	.	6	.	.	.	3	1	8	119
47.151	22	3	.	.	.	.	4	.	.	1	2	.	.	.	.	1	.	.	.	6	.	11	50
47.153	30	13	.	.	.	1	17	.	5	5	1	.	.	.	.	9	.	.	.	6	8	5	100

APPENDIX TABLE 1.—Counts of fish larvae, tabulated by family, for all stations occupied on the second multivessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Myctophidae	Gonostomatidae	Sternoptychidae	Chauliodontidae	Idiacanthidae	Other Stomiatoidei	Bathylagidae	Paralepididae	Scopelarchidae	Melamphaidae	Bregmacerotidae	Exocoetidae	Trachypteridae	Apogonidae	Bramidae	Chiasmodontidae	Coryphaenidae	Nomeidae	Scombridae	Other identified larvae	Unidentified larvae	Disintegrated larvae	Total fish larvae
47.155	.	3	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
47.157	109	77	8	16	3	.	27	.	1	2	1	.	.	.	.	11	.	.	.	8	3	8	274
47.159	17	11	.	7	.	.	14	.	1	5	.	1	.	.	.	.	.	.	.	1	1	4	62
47.162	11	5	.	.	.	.	6	.	.	3	.	.	.	.	.	.	.	1	.	2	.	1	29
47.164	25	37	.	1	.	.	10	.	.	12	.	.	.	.	.	.	.	2	.	2	.	5	94
47.166	28	21	4	.	.	.	1	.	1	3	.	.	3	.	.	1	.	2	.	.	.	.	64
47.168	6	1	1	.	.	.	3	.	1	3	.	.	.	.	1	3	.	1	.	1	3	3	27
47.171	66	39	15	.	.	3	9	.	.	4	.	.	.	.	.	.	.	8	.	.	1	4	149
47.173	251	166	31	.	.	8	17	.	6	3	.	.	.	.	.	.	.	23	.	2	.	11	518
47.175	327	95	4	2	.	4	16	.	1	.	.	.	.	.	.	.	.	5	.	15	1	.	470
47.177	119	100	10	.	.	69	157	4	1	1	.	.	.	.	.	.	.	19	.	12	.	40	532
47.179	228	14	1	.	2	11	139	.	3	2	.	.	.	.	.	1	.	3	.	3	.	42	499
47.181	150	32	7	1	.	12	59	.	1	.	.	.	.	.	.	.	.	.	.	11	.	3	276
47.185	350	31	45	1	3	12	140	23	4	5	.	.	.	.	.	2	.	1	.	27	.	14	658
47.189	28	5	8	.	.	8	97	3	1	4	.	.	.	.	.	.	.	.	.	5	.	26	185
47.193	2	2	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6
47.197	97	9	13	.	2	23	123	4	.	5	.	.	.	.	.	1	.	2	.	17	2	8	306
47.201	392	152	24	.	1	12	140	20	.	10	.	.	.	.	.	9	.	2	.	8	.	54	824
47.205	109	48	27	.	.	23	152	20	.	17	1	1	.	.	1	2	.	4	.	8	3	125	541
47.213	769	440	43	.	14	3	58	26	.	25	.	2	2	.	.	.	.	43	.	43	5	40	1513
47.217	440	90	44	.	3	4	33	20	.	4	.	1	.	.	.	.	.	5	.	20	.	11	677
47.221	452	36	54	.	13	2	30	43	.	9	.	.	.	.	.	2	1	3	.	17	.	14	676
47.225	512	151	53	.	5	7	34	31	5	6	2	.	2	1	1	.	4	15	.	16	2	13	860
47.229	496	272	83	.	14	5	17	11	1	9	2	.	1	.	.	1	1	5	.	21	.	3	942
47.233	1441	249	95	2	42	6	14	31	5	18	2	1	1	.	2	1	3	3	1	16	5	37	1975
47.237	100	17	18	.	4	.	8	2	1	3	.	.	.	.	.	.	1	1	.	7	.	3	165
47.240	201	46	51	.	5	.	3	3	.	1	.	2	.	.	2	1	3	16	.	13	.	1	348
47.242	953	94	18	.	2	2	20	3	.	6	9	.	.	.	.	2	.	8	1	14	.	6	1138
47.244	905	129	16	.	1	7	22	.	2	5	2	.	1	.	.	1	3	12	1	26	2	.	1135
47.246	111	8	6	.	.	1	2	.	.	1	.	.	.	.	.	.	1	12	.	4	.	2	148
47.250	297	18	.	.	.	6	3	.	.	.	1	.	.	.	.	.	.	5	.	15	3	1	349
47.254	245	27	11	.	1	2	8	1	.	3	2	.	.	.	.	1	.	8	.	15	2	.	326
47.258	516	38	6	.	.	.	3	.	.	.	9	.	.	.	.	.	1	6	1	109	37	26	752
47.268	55	15	1	.	.	.	1	.	.	6	72	.	1	.	1	.	1	.	6	29	3	.	191
47.272	21	6	5	.	.	.	.	.	.	2	.	.	.	.	.	.	1	11	1	18	12	9	86
47.276	1935	208	6	.	.	2	45	2	.	3	1	.	.	.	1	.	3	5	2	29	.	.	2242
47.278	54	38	.	.	.	.	6	.	.	.	.	.	1	.	1	.	.	1	2	8	.	.	111
47.280	175	8	3	.	.	2	14	.	.	5	.	.	.	.	.	.	.	1	.	1	.	.	209
47.283	184	6	6	.	.	.	4	.	.	2	.	.	.	.	.	.	.	3	.	5	.	2	212
47.286	1272	15	70	.	.	3	18	1	1	3	.	.	.	1	.	1	.	1	.	12	.	5	1403
47.288	1311	44	17	.	13	2	11	.	.	2	1	.	.	.	.	.	.	2	.	5	1	5	1414
47.290	186	11	93	.	2	3	4	.	.	10	2	.	.	.	2	.	1	.	.	2	.	3	319
47.292	276	30	46	.	6	.	7	4	.	9	2	.	.	.	2	.	.	5	.	9	3	3	402
47.295	702	101	103	1	4	6	7	15	.	8	1	1	1	2	1	.	1	4	2	17	4	4	985
47.297	552	136	64	.	4	16	17	11	.	16	3	1	2	5	.	.	4	13	.	26	1	11	882
47.301	438	54	71	.	5	8	8	10	2	15	2	1	.	.	1	.	3	6	.	8	2	.	634
47.304	92	21	27	.	1	1	4	7	.	9	2	.	2	.	.	.	1	2	.	6	2	3	180
47.306	309	68	70	.	5	16	15	10	2	12	1	.	1	1	1	1	3	13	.	18	4	18	570
47.310	780	154	54	.	9	33	18	51	2	8	10	.	.	2	5	3	2	36	.	42	22	18	1249
47.314	241	83	18	.	6	11	24	14	.	2	.	1	1	2	1	5	4	13	.	24	5	1	456
47.318	73	58	17	.	4	10	23	22	.	2	.	.	.	.	.	2	1	17	.	4	.	15	248
47.322	152	33	14	.	.	5	61	3	3	24	.	.	.	.	.	.	1	13	.	14	11	4	338

APPENDIX TABLE 1.—Counts of fish larvae, tabulated by family, for all stations occupied on the second multivessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Myctophidae	Gonostomatidae	Sternoptychidae	Chauliodontidae	Idiacanthidae	Other Stomiatoidei	Bathylagidae	Paralepididae	Scopelarchidae	Melamphaidae	Bregmacerotidae	Exocoetidae	Trachypteridae	Apogonidae	Bramidae	Chiasmodontidae	Coryphaenidae	Nomeidae	Scombridae	Other identified larvae	Unidentified larvae	Disintegrated larvae	Total fish larvae
47.326	217	40	11	.	.	2	152	15	1	58	.	.	2	.	1	4	.	26	.	50	.	3	582
47.330	436	148	80	.	2	11	137	56	1	14	.	.	.	.	.	12	.	16	.	18	1	15	947
47.334	165	29	32	.	1	9	53	21	.	3	.	.	.	.	.	2	.	4	.	1	.	1	321
47.338	78	19	51	.	.	8	24	8	.	4	.	.	.	.	.	.	.	7	.	.	.	.	199
47.342	302	24	62	3	1	2	19	32	1	3	.	.	.	.	.	4	.	4	.	10	.	.	472
47.345	856	45	78	2	2	11	26	6	.	11	.	.	.	.	.	.	.	15	.	.	.	9	1061
47.349	288	61	49	.	.	5	16	.	1	1	.	.	.	.	.	1	.	2	.	1	.	1	426
47.351	684	66	85	5	1	10	60	3	5	11	.	.	.	.	.	6	.	13	.	2	6	9	966
47.354	71	87	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	7	.	.	.	1	168
47.357	239	67	27	1	.	4	14	4	5	5	.	.	.	.	1	2	.	15	.	2	2	2	390
47.359	68	56	23	.	.	2	10	1	1	2	.	.	.	.	.	.	.	5	.	.	1	7	176
47.362	81	4	34	11	.	.	3	.	3	1	.	.	.	.	.	.	.	.	.	.	1	1	139
47.364	96	7	4	.	1	.	3	.	.	2	.	.	.	.	.	.	.	3	.	.	.	.	116
47.367	97	24	22	6	1	.	11	.	1	3	.	.	.	.	.	1	.	8	.	3	.	3	180
47.369	13	4	1	.	1	.	3	.	.	1	.	.	.	.	.	.	.	1	.	2	.	.	26
47.371	49	12	1	.	.	1	2	.	.	2	.	.	.	.	.	1	.	.	.	2	.	.	70
47.373	260	239	49	1	3	.	2	3	2	1	1	.	.	.	.	.	.	.	.	16	1	2	579
47.376	52	76	16	3	5	.	9	.	.	5	.	.	.	.	.	.	.	1	.	1	.	5	173
47.379	7	56	9	3	.	.	8	.	.	1	1	.	.	.	2	4	.	.	.	3	1	.	95
47.382	35	114	20	7	3	3	4	.	.	4	4	.	.	.	.	5	.	.	.	1	1	4	205
47.415	30	10	4	.	.	2	.	.	.	.	1	.	.	.	.	.	.	.	.	2	.	.	49
47.430	82	109	7	1	1	1	.	1	.	.	1	.	.	.	.	.	.	.	.	7	.	.	210
47.432	142	101	21	.	3	.	.	2	.	1	2	.	.	.	.	.	.	.	.	2	.	2	276
47.436	10	2	11	.	.	3	2	.	2	1	.	1	.	.	2	.	.	2	.	25	1	2	64
47.438	100	35	14	1	1	3	1	2	.	6	.	.	.	8	1	.	1	11	.	28	2	1	215
47.440	34	109	30	3	.	10	.	1	.	1	.	.	.	1	.	3	.	.	.	12	8	.	212
47.443	56	17	57	.	.	2	1	1	.	3	.	1	.	.	.	.	.	1	.	6	.	1	146
47.446	152	4	2	.	.	1	2	.	.	4	.	.	.	.	.	.	.	.	.	8	.	.	173
47.450	570	85	126	10		12	20	41	.	10	.	.	.	.	.	2	.	4	.	41	3	12	936
47.454	200	24	75	1	.	6	41	40	.	6	.	.	.	.	.	3	.	1	.	4	1	5	407
47.458	32	5	6	.	.	3	42	37	.	3	.	.	.	.	.	1	.	1	.	3	.	8	141
47.462	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1
47.466	84	8	3	.	.	3	7	14	.	2	.	.	.	.	.	.	.	.	.	30	.	1	152
47.470	81	110	7	.	.	.	6	4	.	1	.	.	.	.	.	.	.	.	.	5	1	.	215
47.478	38	36	34	.	2	3	6	4	.	1	.	.	.	.	.	3	.	2	.	1	.	.	130
47.486	194	38	29	.	.	1	11	12	.	2	1	.	3	3	1	2	4	7	.	11	1	4	324
47.490	238	24	25	.	1	1	13	20	.	7	.	.	.	2	2	2	1	1	.	7	3	17	364
47.494	77	10	40	.	1	.	2	.	1	7	.	.	.	.	.	.	.	.	.	.	1	2	141
47.498	366	75	111	.	.	7	1	6	2	6	2	.	1	.	.	.	1	.	.	3	5	6	592
47.501	454	165	60	2	2	8	13	.	.	3	.	.	.	.	.	1	3	4	1	7	1	28	772
47.504	628	59	91	1	.	7	20	.	1	4	.	1	.	.	.	.	2	44	.	4	5	28	895
47.507	305	77	33	.	2	6	6	2	.	3	.	9	1	.	.	3	1	3	33	7	1	26	518
47.509	986	65	186	2	2	2	26	.	.	5	.	.	.	.	.	2	.	8	2	10	.	35	1331
47.511	346	2	4	.	2	.	11	.	.	1	.	1	.	.	.	.	.	1	.	3	1	.	372
47.513	80	4	.	.	.	.	.	.	.	3	.	2	1	.	.	.	.	2	.	2	.	.	94
47.515	35	11	14	.	.	.	7	.	.	3	.	.	.	.	.	.	.	2	.	1	1	6	80
47.517	34	36	1	.	.	.	1	.	.	3	.	.	.	.	.	.	.	3	2	4	.	1	85
47.520	55	80	.	.	4	.	3	3	1	6	.	.	.	.	.	.	.	4	.	44	.	1	201
47.523	4	30	.	.	1	.	7	.	1	3	.	.	.	.	.	.	.	3	5	8	.	1	63
47.525	7	10	.	.	.	.	6	.	1	2	3	.	.	.	.	.	1	.	4	13	1	4	52
47.527	550	132	.	.	2	.	3	.	.	3	753	.	.	.	.	.	1	5	25	580	52	12	2118

APPENDIX TABLE 2.—Myctophid larvae, tabulated by genus or species, for all stations occupied on the second multi-vessel EASTROPAC survey (EASTROPAC II).

STATION NUMBER	Diogenichthys laternatus	Lampanyctus spp.	Benthosema panamense	Ceratoscopelus townsendi	Diaphus spp.	Gonichthys tenuiculus	Hygophum atratum	Hygophum proximum	Lampadena spp.	Lepidophanes pyrsobolus	Loweina laurae (rara)	Myctophum aurolaternatum	Myctophum nitidulum	Myctophum spp. (other)	Notolychnus valdiviae	Notoscopelus resplendens	Protomyctophum sp.	Symbolophorus evermanni	Triphoturus spp.	Other identified[1] myctophids	Unidentified myctophids	Disintegrated myctophids	Total myctophids
45.016	2	5	.	1	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	12
45.018	9	10	.	1	.	1	10	1	.	2	.	.	.	.	.	.	.	.	.	.	.	1	35
45.020	10	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	1	1	.	.	.	.	14
45.021	7	1	.	.	.	.	4	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	13
45.023	13	6	.	.	5	.	35	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	61
45.024	20	6	.	.	4	2	52	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	86
45.026	27	1	.	.	3	1	4	1	.	2	.	.	.	.	1	.	.	.	.	.	.	.	40
45.028	22	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24
45.030	9	1	.	.	10	.	7	3	.	.	.	.	.	.	.	.	.	.	.	.	3	1	34
45.032	109	1	.	.	32	1	5	1	.	.	.	3	.	.	.	.	.	4	.	.	1	1	158
45.034	138	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	5	146
45.035	36	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	40
45.037	36	.	.	.	2	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	41
45.039	52	.	.	.	12	1	.	.	.	.	.	.	.	.	.	.	.	8	.	.	.	4	77
45.041	22	1	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	29
45.043	14	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	17
45.044	28	1	.	.	19	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	50
45.046	23	1	.	.	16	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	43
45.048	20	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	25
45.050	16	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	19
45.051	70	6	.	.	.	1	.	.	.	.	.	1	.	.	5	.	.	3	1	.	.	.	87
45.053	36	.	.	.	3	.	.	9	.	.	.	.	.	.	9	.	.	16	.	.	.	2	75
45.054	26	.	.	.	.	.	.	2	.	.	.	.	.	.	2	.	.	9	.	.	.	5	44
45.056	7	1	.	.	.	.	.	2	.	.	.	.	1	.	4	.	.	5	1	.	.	1	22
45.058	51	4	.	.	11	.	.	14	.	3	.	1	2	20	8	.	.	21	.	.	2	9	146
45.060	13	1	.	.	13	.	.	12	.	1	.	.	.	.	11	.	1	25	1	.	.	4	82
45.063	.	.	.	.	2	.	.	6	1	.	.	2	.	.	.	.	.	6	1	.	1	10	29
45.065	.	31	.	.	14	.	.	16	.	.	.	7	.	8	7	2	.	2	2	.	.	27	116
45.067	12	46	.	.	35	1	.	17	.	1	3	12	.	31	3	3	.	4	6	.	4	7	185
45.071	5	14	.	.	3	.	.	5	.	.	1	2	.	8	1	2	.	.	.	.	.	1	42
45.073	11	6	.	.	14	.	.	6	.	.	.	2	.	12	1	.	.	.	.	.	2	11	65
45.078	15	33	.	.	7	.	.	5	.	.	.	1	.	7	.	2	.	.	.	.	.	1	71
45.083	23	4	.	.	.	.	.	1	2	.	1	.	.	.	.	.	.	.	.	.	1	5	37
45.086	15	8	.	.	.	.	.	2	1	.	.	.	9	12	5	2	.	2	1	.	.	8	65
45.090	16	5	.	.	.	.	.	4	.	.	.	1	7	1	.	.	.	2	.	.	1	10	47
45.094	42	28	.	.	1	.	2	15	.	.	.	.	28	.	.	.	.	.	.	.	.	34	150
45.098	15	1	.	.	1	.	1	3	.	.	.	3	12	.	.	.	.	.	.	.	2	5	43
45.102	20	48	.	.	7	4	.	16	.	.	2	.	18	.	.	.	.	.	2	.	.	19	136
45.106	166	10	.	.	2	1	1	13	.	.	2	.	55	1	.	3	.	1	.	.	2	8	265
45.110	298	38	.	.	9	1	9	116	.	.	.	2	51	.	5	.	2	4	2	3	1	4	545
45.114	13	9	.	.	.	.	.	.	.	.	.	.	10	.	1	.	.	.	.	.	.	7	40
45.117	53	6	.	.	1	.	.	4	.	.	.	.	2	.	8	.	.	1	.	.	.	17	92
45.121	25	16	.	.	.	.	1	1	.	1	.	.	.	.	1	.	.	.	1	.	.	9	55
45.125	.	19	.	.	.	.	1	2	.	1	2	1	.	.	6	1	.	2	1	.	1	4	41
45.127	.	9	.	.	.	.	.	2	.	.	1	.	.	.	1	1	.	.	2	.	5	.	21
45.129	.	8	.	.	.	.	.	3	.	1	.	.	.	.	4	.	.	1	1	.	4	.	22
45.131	.	26	.	.	8	1	.	3	.	.	.	.	.	.	14	.	.	7	.	.	1	13	73
45.133	.	21	.	145	35	.	.	42	.	26	.	.	.	3	4	.	.	13	2	.	7	25	323
45.135	.	8	.	77	20	.	.	30	1	.	.	.	.	1	.	2	.	12	1	2	6	5	165
45.137	.	1	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	3	5	11
45.139	.	3	.	2	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	16	.	24
45.140	.	25	.	26	15	.	.	5	1	.	.	.	.	.	2	.	.	27	.	.	.	5	106

APPENDIX TABLE 2.—Myctophid larvae, tabulated by genus or species, for all stations occupied on the second multi-vessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Diogenichthys laternatus	Lampanyctus spp.	Benthosema panamense	Ceratoscopelus townsendi	Diaphus spp.	Gonichthys tenuiculus	Hygophum atratum	Hygophum proximum	Lampadena spp.	Lepidophanes pyrosobolus	Loweina laurae (rara)	Myctophum aurolaternatum	Myctophum nitidulum	Myctophum spp. (other)	Notolychnus valdiviae	Notoscopelus resplendens	Protomyctophum sp.	Symbolophorus evermanni	Triphoturus spp.	Other identified[1] myctophids	Unidentified myctophids	Disintegrated myctophids	Total myctophids
45.163	.	1	.	5	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	8
45.165	.	23	.	48	20	.	.	36	.	.	.	1	.	7	4	.	.	6	.	1	2	4	152
45.167	.	6	.	43	2	.	.	15	.	.	.	.	.	1	.	.	.	7	.	.	.	12	86
45.169	.	7	.	9	7	.	.	17	.	.	.	.	.	7	1	.	.	1	.	.	.	7	56
45.171	.	5	.	5	5	.	.	.	.	1	.	.	.	1	2	.	.	2	.	.	2	3	26
45.173	.	1	.	.	.	.	.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10
45.175	32	12	.	3	.	.	.	11	.	.	.	.	.	.	.	.	.	2	.	.	.	2	62
45.177	23	43	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	70
45.179	39	12	.	.	.	.	.	2	.	.	.	1	.	.	.	.	.	.	.	.	.	5	59
45.183	14	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	26
45.187	244	8	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	.	.	.	255
45.191	115	13	.	.	.	.	1	2	.	.	.	.	1	.	2	.	2	.	3	.	.	5	144
45.194	27	3	.	.	.	.	.	3	.	.	.	.	4	.	.	.	.	.	2	.	.	10	49
45.198	116	35	.	.	1	.	10	3	.	.	.	.	44	.	1	.	1	.	1	.	.	39	251
45.202	10	24	.	.	1	.	.	.	.	.	.	.	16	.	.	1	.	.	.	.	.	1	53
45.206	4	10	.	.	.	.	.	.	.	.	.	.	3	1	.	.	.	.	.	.	.	4	22
45.283	26	56	.	.	.	.	.	.	.	.	.	.	14	.	.	.	.	.	.	.	1	5	102
45.287	.	22	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	25
45.289	68	74	.	.	.	.	1	.	.	1	1	3	1	.	.	3	.	.	.	.	.	5	157
45.293	127	13	.	.	.	.	1	1	.	.	.	.	5	1	1	3	.	4	.	1	.	.	157
45.297	163	18	.	.	4	.	.	1	.	5	1	1	8	12	6	.	.	7	.	.	.	5	231
45.301	6	5	.	.	5	.	.	.	.	.	.	1	.	2	1	.	.	.	.	1	2	1	24
45.305	15	29	.	.	30	.	.	18	.	.	.	2	2	.	12	2	.	2	3	.	.	4	119
45.309	10	6	.	.	.	.	2	1	.	3	.	.	.	2	4	.	.	13	.	1	1	1	44
45.313	33	.	.	.	.	.	3	1	.	.	1	.	1	.	.	.	.	2	.	2	.	6	49
45.316	10	2	.	.	9	.	.	3	.	2	.	5	.	2	.	1	.	.	2	.	1	4	41
45.319	14	.	.	.	4	.	.	4	.	.	.	2	1	3	1	.	.	.	.	.	1	2	32
45.321	19	.	.	.	2	.	.	.	1	2	.	1	4	2	5	.	.	1	.	.	.	8	45
45.323	32	.	.	.	.	.	.	3	.	.	.	1	.	.	1	.	.	11	.	.	.	3	51
45.325	967	29	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	3	.	.	.	.	1002
45.329	49	16	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	69
45.331	218	13	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	235
45.333	84	12	.	.	9	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	1	108
45.335	47	.	.	.	16	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	65
45.337	37	1	.	.	4	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	49
45.339	9	.	.	.	15	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	26
45.341	17	2	.	.	26	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	47
45.343	6	.	.	.	9	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	17
45.344	3	1	.	.	15	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	21
45.346	6	2	.	.	10	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	19
45.348	12	5	.	.	9	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	30
45.350	39	1	.	.	25	.	3	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	70
45.352	17	.	.	.	4	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	29
45.356	40	.	.	.	24	.	1	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	69
45.358	46	.	.	.	49	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	98
45.360	9	1	.	.	5	.	1	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	18
45.362	1	.	5	.	26	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	3	36
45.365	.	.	58	.	39	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	99
45.367	5	.	.	.	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	5	23
45.369	53	2	9	.	34	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2-	1	101
45.371	32	1	.	.	50	.	28	.	.	.	.	5	.	.	.	.	.	.	.	.	1	3	120
45.373	59	1	.	.	36	.	20	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	117

APPENDIX TABLE 2.—Myctophid larvae, tabulated by genus or species, for all stations occupied on the second multi-vessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Diogenichthys laternatus	Lampanyctus spp.	Benthosema panamense	Ceratoscopelus townsendi	Diaphus spp.	Gonichthys tenuiculus	Hygophum atratum	Hygophum proximum	Lampadena spp.	Lepidophanes pyrsobolus	Loweina laurae (rara)	Myctophum aurolaternatum	Myctophum nitidulum	Myctophum spp. (other)	Notolychnus valdiviae	Notoscopelus resplendens	Protomyctophum sp.	Symbolophorus evermanni	Triphoturus spp.	Other identified[1] myctophids	Unidentified myctophids	Disintegrated myctophids	Total myctophids
45.375	20	.	.	.	8	.	2	.	.	.	.	1	.	.	.	.	.	.	.	.	1	2	34
45.377	42	.	.	.	22	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	67
45.379	42	8	.	.	63	.	85	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	199
45.381	59	.	.	.	13	.	19	.	.	.	.	5	.	.	.	.	.	.	.	.	.	2	98
45.383	37	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	40
45.385	7	.	.	.	1	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	19
45.387	6	12	.	.	2	.	2	.	.	.	.	.	.	.	.	.	.	.	1	.	1	2	26
CRUISE	46																						
46.002	.	.	.	.	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	14
46.004	7	1	.	.	94	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	103
46.006	2	.	.	.	27	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	30
46.007	1	.	.	.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10
46.009	.	1	.	.	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	17
46.011	26	.	.	.	33	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	60
46.013	31	2	.	.	55	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	89
46.015	1	.	.	.	17	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	18
46.017	1	.	.	.	23	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	25
46.019	114	4	.	.	163	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	1	285
46.020	75	3	.	.	76	.	.	.	.	.	.	2	.	.	.	.	.	3	.	.	.	1	160
46.022	38	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	38
46.024	60	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	64
46.026	150	53	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	206
46.028	343	32	.	.	30	3	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	3	412
46.030	80	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	.	3	85
46.032	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	1	1	9
46.034	117	8	.	.	6	1	.	.	.	.	.	.	2	.	11	.	.	5	.	.	1	1	152
46.036	357	20	.	.	.	.	.	.	.	.	.	3	2	.	36	.	.	14	1	.	.	3	436
46.038	12	1	.	.	.	.	.	.	.	.	.	.	1	.	3	.	.	1	.	.	1	1	20
46.040	19	2	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	2	.	25
46.042	31	1	.	.	2	.	.	3	2	8	.	4	.	1	2	.	1	4	2	.	1	.	62
46.044	69	3	.	.	6	.	.	.	.	.	.	.	.	.	3	.	.	4	.	.	.	4	89
46.046	51	1	.	.	16	.	.	.	3	1	.	2	.	1	.	.	.	.	.	.	.	3	78
46.048	50	1	.	.	5	.	.	1	.	.	1	.	.	3	.	.	.	1	1	.	.	.	63
46.050	163	13	.	.	8	.	.	14	1	2	.	4	4	12	8	.	1	9	2	1	.	8	250
46.052	207	21	.	.	5	.	2	9	.	10	1	3	2	23	13	2	1	9	.	.	11	.	319
46.054	126	23	.	.	.	.	.	1	.	.	.	3	5	11	16	1	.	15	.	.	.	10	211
46.055	65	15	.	.	.	2	1	.	.	.	2	.	4	1	6	.	.	1	.	.	.	3	100
46.057	366	241	.	.	4	11	3	17	.	17	2	8	31	.	5	13	.	8	22	.	3	.	751
46.059	133	250	.	.	.	9	11	.	.	8	.	5	10	3	6	16	.	3	17	.	3	20	494
46.061	71	36	.	.	.	1	.	.	.	.	.	.	11	.	1	2	.	.	1	.	.	25	148
46.063	14	27	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	3	48
46.065	189	84	.	.	7	5	18	14	.	.	1	.	56	.	.	24	.	1	3	.	.	2	404
46.067	164	73	.	.	3	.	7	4	.	.	.	.	7	.	.	3	1	.	1	.	3	3	269
46.069	46	64	.	.	2	.	.	1	.	.	.	1	2	.	.	.	.	.	.	.	.	.	116
46.071	21	34	.	.	2	.	.	.	.	.	2	.	1	.	.	1	.	.	.	.	1	10	72
46.075	19	14	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	35
46.077	30	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	36
46.079	285	28	.	.	4	21	.	.	.	.	.	2	18	.	.	33	.	1	13	.	1	2	408
46.082	35	2	.	.	1	6	.	.	.	.	.	1	4	.	.	5	.	.	.	.	5	2	61

APPENDIX TABLE 2.—Myctophid larvae, tabulated by genus or species, for all stations occupied on the second multi-vessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Diogenichthys laternatus	Lampanyctus spp.	Benthosema panamense	Ceratoscopelus townsendi	Diaphus spp.	Gonichthys tenuiculus	Hygophum atratum	Hygophum proximum	Lampadena spp.	Lepidophanes pyrsobolus	Loweina laurae (rara)	Myctophum aurolaternatum	Myctophum nitidulum	Myctophum spp. (other)	Notolychnus valdiviae	Notoscopelus resplendens	Protomyctophum sp.	Symbolophorus evermanni	Triphoturus spp.	Other identified[1] myctophids	Unidentified myctophids	Disintegrated myctophids	Total myctophids
46.084	23	9	.	.	.	.	.	.	.	.	.	1	3	.	.	5	.	.	.	.	4	.	45
46.086	68	20	.	.	.	3	.	.	.	1	.	2	2	.	.	4	.	.	1	.	.	1	102
46.088	69	23	.	.	.	2	.	.	.	.	.	6	3	.	.	16	.	2	.	.	.	3	124
46.090	72	10	.	.	5	1	.	.	.	.	1	.	2	.	.	1	.	.	.	.	.	7	99
46.092	88	4	.	.	1	.	.	.	.	1	.	.	1	.	.	2	.	.	2	.	1	.	100
46.094	196·	25	.	.	8	1	.	.	.	3	.	5	13	3	25	3	1	1	9	1	4	2	300
46.096	144	37	.	.	9	.	.	4	.	8	.	8	4	7	6	1	.	3	8	.	1	.	240
46.098	50	.	.	.	1	.	.	3	.	.	.	1	3	5	3	1	.	3	1	.	.	2	73
46.100	105	.	.	.	3	.	.	.	.	.	.	.	.	5	4	6	.	.	2	.	.	.	125
46.102	273	27	.	.	.	3	.	1	.	.	.	3	1	.	10	.	5	7	.	.	1	3	334
46.104	70	15	.	.	.	.	.	.	.	.	.	2	2	.	15	.	.	1	.	.	1	3	109
46.106	110	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	115
46.108	241	8	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	250
46.110	151	10	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	162
46.112	530	13	.	.	16	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	1	.	562
46.114	12	.	.	.	16	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	31
46.116	9	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	14
46.118	50	6	.	.	111	1	1	.	.	.	.	7	.	.	.	.	.	.	.	.	.	.	176
46.120	19	.	.	.	56	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	80
46.122	.	.	.	.	11	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	3	2	17
46.124	.	.	.	.	19	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	19
46.126	11	4	.	.	46	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	63
46.128	1	1	.	.	97	.	.	.	.	.	.	6	.	.	.	.	.	.	.	.	6	2	113
46.130	9	.	.	.	37	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	46
46.132	3	1	.	.	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	26
46.134	2	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9
46.135	.	.	81	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	81
46.137	201	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	201
46.139	160	14	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	175
46.141	435	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	438
46.143	112	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	113
46.145	269	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1	282
46.147	480	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	484
46.149	1328	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1333
46.151	1358	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1358
46.153	2505	49	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	3	2561
46.155	939	20	.	.	1	5	.	.	.	.	.	3	.	.	1	.	.	4	.	.	.	.	973
46.157	474	3	.	.	.	2	.	.	.	.	.	3	1	.	4	.	.	1	.	.	1	1	490
46.159	59	1	.	.	4	2	.	.	.	.	.	.	1	.	1	.	1	.	1	.	1	.	71
46.161	268	17	.	.	.	3	.	1	.	.	2	3	2	.	39	2	.	3	6	1	3	.	350
46.163	214	28	.	.	1	4	.	1	.	3	.	3	2	.	12	.	5	7	4	.	1	5	290
46.165	48	7	.	.	.	.	.	1	.	11	1	5	4	.	6	1	.	4	.	.	1	1	90
46.167	131	25	.	.	.	.	.	.	.	.	.	23	5	.	3	3	.	2	.	.	1	2	195
46.169	89	34	.	.	2	2	.	.	.	.	1	.	3	.	3	13	1	6	1	.	4	4	163
46.171	182	8	.	.	1	1	.	.	.	.	.	.	30	.	.	14	.	3	5	.	.	11	255
46.173	27	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	33
46.175	44	4	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	2	52
46.177	105	8	.	.	1	.	.	.	.	.	.	.	1	.	.	4	.	.	5	.	.	.	124
46.179	182	14	.	.	1	.	.	.	.	.	.	.	1	.	.	6	1	1	3	.	.	4	213
46.181	20	5	.	.	1	1	.	.	.	.	.	.	5	.	.	.	.	1	2	.	17	.	52
46.183	50	9	.	.	4	1	1	.	.	.	.	.	9	.	.	4	.	1	6	.	.	.	85
46.185	178	36	.	.	8	2	.	.	.	.	.	2	8	.	.	11	.	4	11	.	1	1	262

APPENDIX TABLE 2.—Myctophid larvae, tabulated by genus or species, for all stations occupied on the second multivessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Diogenichthys laternatus	Lampanyctus spp.	Benthosema panamense	Ceratoscopelus townsendi	Diaphus spp.	Gonichthys tenuiculus	Hygophum atratum	Hygophum proximum	Lampadena spp.	Lepidophanes pyrsobolus	Loweina laurae (rara)	Myctophum aurolaternatum	Myctophum nitidulum	Myctophum spp. (other)	Notolychnus valdiviae	Notoscopelus resplendens	Protomyctophum sp.	Symbolophorus evermanni	Triphoturus spp.	Other identified[1] myctophids	Unidentified myctophids	Disintegrated myctophids	Total myctophids
46.187	468	40	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	2	2	.	.	1	516
46.189	234	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	236
CRUISE	47																						
47.001	68	13	.	.	8	2	.	.	.	.	.	2	1	.	.	1	.	1	1	.	.	.	97
47.005	161	33	9	.	33	1	.	.	.	.	.	19	6	.	.	.	.	17	1	.	.	7	287
47.008	205	31	5	.	4	2	.	.	.	.	.	4	.	.	.	.	.	3	1	.	.	2	257
47.011	117	22	13	.	2	.	.	.	.	.	.	3	.	.	.	.	.	3	1	.	.	.	161
47.019	287	37	2	.	39	.	.	.	.	.	.	1	.	.	.	.	.	2	2	.	.	.	370
47.022	148	11	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	1	2	.	5	.	169
47.025	73	5	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	2	83
47.028	175	66	.	.	5	1	.	.	.	.	.	7	.	.	.	.	.	9	.	.	1	.	264
47.032	148	38	.	.	12	.	.	.	.	.	.	3	.	.	.	.	.	6	1	.	.	.	208
47.034	95	23	.	.	.	1	.	.	.	.	.	7	4	.	.	.	.	6	.	.	.	3	139
47.035	171	21	.	.	1	3	.	.	.	.	.	9	12	.	.	.	.	3	1	.	1	1	223
47.040	129	38	11	.	3	.	.	.	.	.	.	10	6	.	.	.	.	.	.	.	6	2	205
47.049	42	9	.	.	1	.	.	.	.	.	.	4	3	.	.	.	.	1	2	.	1	1	64
47.053	105	89	.	.	1	4	.	.	.	.	.	19	18	.	.	11	.	2	3	.	9	4	265
47.057	192	50	.	.	.	1	.	.	.	.	.	23	1	.	.	6	.	1	12	.	11	3	300
47.061	22	12	.	.	3	2	.	.	.	.	.	4	23	.	.	1	.	.	9	.	.	3	79
47.065	31	22	.	.	1	3	.	.	.	.	.	2	12	.	.	.	.	.	22	.	.	6	99
47.069	29	6	.	.	2	3	.	.	.	.	.	.	35	.	.	28	.	2	5	.	30	.	140
47.070	50	11	.	.	.	.	.	.	.	.	.	1	17	.	.	.	.	1	10	.	.	.	90
47.074	98	4	.	.	1	1	.	.	.	.	.	.	26	.	.	1	.	.	5	.	2	.	138
47.078	5	.	.	.	1	.	.	.	.	.	.	.	3	.	.	.	.	.	2	.	.	.	11
47.082	70	10	.	.	.	.	.	.	.	.	.	.	11	.	.	.	.	.	6	.	15	7	119
47.086	212	10	.	.	.	.	.	.	.	.	.	.	6	.	.	.	.	.	18	.	1	1	248
47.090	33	17	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	2	.	.	3	57
47.094	96	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	1	100
47.097	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	6	16
47.099	6	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	16
47.101	39	6	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	2	48
47.103	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2
47.105	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
47.107	30	70	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	6	.	.	1	109
47.109	1	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	6
47.113	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
47.124	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	10
47.128	.	31	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	35
47.132	15	53	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	12	.	.	3	85
47.134	5	10	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1	1	.	1	1	21
47.137	4	4	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	2	3	1	1	17
47.139	3	7	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	3	1	.	.	.	16
47.141	12	5	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	1	1	.	1	1	24
47.143	19	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	23
47.145	.	2	.	.	.	.	6	.	.	.	.	1	.	.	.	2	.	1	1	.	2	.	15
47.147	2	2	.	.	.	.	16	.	.	.	1	4	.	.	.	1	.	3	8	5	1	1	44
47.149	12	7	.	.	.	.	10	.	.	.	.	.	1	.	.	.	.	.	6	.	3	1	40
47.151	6	1	.	.	.	.	5	3	.	.	.	1	.	.	.	.	.	1	4	.	.	1	22
47.153	6	3	.	.	.	1	11	.	.	.	.	1	.	.	.	.	.	1	3	.	3	1	30

APPENDIX TABLE 2.—Myctophid larvae, tabulated by genus or species, for all stations occupied on the second multi-vessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Diogenichthys laternatus	Lampanyctus spp.	Benthosema panamense	Ceratoscopelus townsendi	Diaphus spp.	Gonichthys tenuiculus	Hygophum atratum	Hygophum proximum	Lampadena spp.	Lepidophanes pyrsobolus	Loweina laurae (rara)	Myctophum aurolaternatum	Myctophum nitidulum	Myctophum spp. (other)	Notolychnus valdiviae	Notoscopelus resplendens	Protomyctophum sp.	Symbolophorus evermanni	Triphoturus spp.	Other identified[1] myctophids	Unidentified myctophids	Disintegrated myctophids	Total myctophids
47.155	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
47.157	72	8	.	.	.	.	16	.	.	.	.	.	1	.	1	.	.	2	6	.	3	.	109
47.159	9	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	1	17
47.162	.	2	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	11
47.164	9	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	4	.	25
47.166	11	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	7	.	6	.	28
47.168	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	6
47.171	50	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.	.	66
47.173	179	35	.	.	.	.	.	.	.	.	.	2	4	.	.	.	.	.	30	.	1	.	251
47.175	265	15	.	.	.	.	.	.	.	.	.	.	9	.	.	.	.	1	37	.	.	.	327
47.177	60	13	.	.	.	.	.	.	.	.	.	1	13	.	.	.	.	1	27	.	.	4	119
47.179	190	4	.	.	.	1	.	.	.	.	.	.	4	.	.	.	.	.	21	.	.	8	228
47.181	126	6	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1	12	.	1	2	150
47.185	281	16	.	.	.	2	.	.	.	.	.	.	13	.	.	3	.	1	34	.	.	.	350
47.189	20	.	.	.	.	2	.	.	.	.	.	.	2	.	.	.	.	.	4	.	.	.	28
47.193	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
47.197	56	.	.	.	.	2	.	.	.	.	.	.	28	.	.	.	.	.	10	.	.	1	97
47.201	148	75	.	.	11	1	.	.	.	.	.	.	89	.	.	4	.	8	38	.	2	16	392
47.205	51	28	.	.	1	1	.	.	.	.	.	.	19	.	.	.	.	.	3	.	.	6	109
47.213	595	121	.	.	5	2	.	.	.	.	.	14	6	.	.	4	1	.	9	.	.	12	769
47.217	360	36	.	.	3	3	.	.	.	.	.	19	4	.	.	5	.	.	6	.	1	3	440
47.221	425	6	.	.	.	.	.	.	.	.	.	5	6	.	2	.	.	.	3	.	.	5	452
47.225	416	54	.	.	2	5	.	.	.	2	.	15	8	.	1	.	.	3	6	.	.	.	512
47.229	265	145	.	.	3	6	.	.	.	.	.	30	10	.	4	.	.	20	4	.	6	3	496
47.233	1206	146	.	.	12	6	.	.	.	.	.	23	.	.	3	1	.	33	2	.	2	7	1441
47.237	86	5	.	.	2	2	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	100
47.240	182	8	.	.	4	2	.	.	.	.	.	4	.	.	1	.	.	.	.	.	.	.	201
47.242	931	16	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	953
47.244	837	58	.	.	2	2	.	.	.	.	.	3	.	.	.	.	.	2	.	.	1	.	905
47.246	103	6	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	111
47.250	295	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	297
47.254	224	3	.	.	17	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	245
47.258	11	19	402	.	67	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	12	3	516
47.268	55	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	55
47.272	21	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	21
47.276	1904	17	.	.	13	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1935
47.278	45	8	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	54
47.280	170	3	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	175
47.283	177	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	184
47.286	1260	10	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1272
47.288	1297	10	.	.	.	1	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	1311
47.290	172	6	.	.	.	.	.	.	.	.	1	4	.	.	.	.	.	2	.	.	.	1	186
47.292	266	4	.	.	.	.	.	.	.	.	.	3	.	.	1	.	.	.	1	.	.	1	276
47.295	627	28	.	.	.	2	.	.	.	.	.	8	1	.	13	.	.	16	.	1	2	4	702
47.297	432	51	.	.	.	2	.	.	.	.	.	12	4	.	17	.	.	27	2	.	.	5	552
47.301	382	25	.	.	.	8	.	.	.	.	.	7	.	.	6	.	.	10	.	.	.	.	438
47.304	56	16	.	.	.	.	.	.	.	.	.	4	2	.	4	.	1	7	1	.	.	1	92
47.306	241	16	.	.	.	3	.	.	.	.	.	19	5	.	11	.	.	13	.	.	.	1	309
47.310	552	116	.	.	.	5	.	.	.	1	.	44	3	.	11	.	.	19	4	.	16	9	780
47.314	145	62	.	.	.	.	.	.	.	1	.	18	2	.	1	4	.	.	3	.	5	.	241
47.318	49	8	.	.	.	.	.	.	.	.	.	4	6	.	.	.	.	2	1	.	.	3	73
47.322	111	11	.	.	2	1	.	.	.	.	.	2	19	.	.	2	.	.	3	.	1	.	152

APPENDIX TABLE 2.—Myctophid larvae, tabulated by genus or species, for all stations occupied on the second multivessel EASTROPAC survey (EASTROPAC II).—*Continued.*

STATION NUMBER	Diogenichthys laternatus	Lampanyctus spp.	Benthosema panamense	Ceratoscopelus townsendi	Diaphus spp.	Gonichthys tenuiculus	Hygophum atratum	Hygophum proximum	Lampadena spp.	Lepidophanes pyrsobolus	Loweina laurae (rara)	Myctophum aurolaternatum	Myctophum nitidulum	Myctophum spp. (other)	Notolychnus valdiviae	Notoscopelus resplendens	Protomyctophum sp.	Symbolophorus evermanni	Triphoturus spp.	Other Identified[1] myctophids	Unidentified myctophids	Disintegrated myctophids	Total myctophids
47.326	60	42	.	.	16	3	3	.	.	.	1	2	52	.	.	5	.	.	20	.	11	2	217
47.330	193	53	.	.	13	20	.	.	.	.	.	.	72	.	.	30	.	2	51	.	2	.	436
47.334	92	10	.	.	6	2	.	.	.	.	.	1	19	.	.	13	.	4	16	.	1	1	165
47.338	42	15	.	.	.	1	.	.	.	.	.	1	2	.	.	.	.	.	16	.	.	1	78
47.342	227	8	.	.	.	2	.	.	.	.	.	2	57	.	.	1	.	.	5	.	.	.	302
47.345	813	15	.	.	.	1	.	.	.	.	.	1	12	.	.	2	.	1	8	.	.	3	856
47.349	271	2	.	.	1	2	.	.	.	.	.	2	5	.	.	.	.	2	3	.	.	.	288
47.351	662	7	.	.	1	5	.	.	.	.	.	.	5	.	.	.	.	4	.	.	.	.	684
47.354	1	66	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	2	71
47.357	179	21	.	.	.	8	.	.	.	.	.	12	1	.	.	.	.	14	3	.	.	1	239
47.359	60	3	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	68
47.362	69	2	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	1	2	81
47.364	76	7	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	7	.	2	2	96
47.367	71	12	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	7	.	4	1	97
47.369	11	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	13
47.371	31	4	.	.	.	.	4	.	.	.	.	.	.	.	1	1	.	.	5	3	.	.	49
47.373	155	15	.	.	3	.	44	23	.	.	.	1	.	.	1	2	.	7	2	1	.	6	260
47.376	32	3	.	.	.	.	3	.	.	.	.	1	1	.	4	.	.	3	4	.	.	1	52
47.379	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	1	7
47.382	5	2	.	.	.	.	4	.	.	.	.	.	4	.	5	.	.	6	1	.	7	1	35
47.415	6	4	.	.	5	.	.	1	.	.	.	.	.	.	2	1	.	7	.	.	4	.	30
47.430	3	23	.	.	.	.	1	6	.	.	.	.	.	.	4	2	.	35	.	.	8	.	82
47.432	.	34	.	24	12	.	7	14	.	2	.	.	.	.	1	1	1	29	.	5	10	2	142
47.436	5	1	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	1	10
47.438	31	49	.	.	.	1	.	.	.	.	.	4	.	.	.	.	.	14	.	.	.	1	100
47.440	10	9	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	10	.	.	2	1	34
47.443	54	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	56
47.446	139	1	.	.	.	4	.	.	.	.	.	4	.	.	.	.	.	2	2	.	.	.	152
47.450	500	19	.	.	.	6	.	.	.	.	.	5	3	.	.	1	.	17	11	.	2	6	570
47.454	153	25	.	.	1	2	.	.	.	.	.	2	1	.	.	2	.	4	9	.	.	1	200
47.458	10	7	.	.	3	1	.	.	.	.	.	1	.	.	.	3	.	.	5	.	.	2	32
47.462	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
47.466	60	5	.	.	2	1	.	.	.	.	.	.	4	.	1	6	.	1	4	.	.	.	84
47.470	39	16	.	.	3	.	.	.	.	.	.	.	14	.	.	2	.	.	6	.	1	.	81
47.478	19	10	.	.	.	.	.	1	.	.	.	4	.	.	1	1	.	.	1	.	1	.	38
47.486	150	12	.	.	.	1	.	1	.	1	2	1	1	.	9	2	.	2	3	.	.	9	194
47.490	199	.	.	.	.	2	.	.	.	2	.	5	2	.	5	5	.	.	6	.	.	12	238
47.494	63	4	.	.	.	.	.	.	.	.	.	1	.	.	3	.	1	.	1	.	.	4	77
47.498	296	16	.	.	1	2	.	.	.	2	.	2	4	.	13	1	8	12	2	.	.	7	366
47.501	401	33	.	.	.	3	.	.	.	.	.	5	2	.	.	.	1	3	.	.	.	6	454
47.504	568	15	.	.	.	1	1	.	.	.	3	6	.	.	9	.	1	3	.	.	.	21	628
47.507	272	23	.	.	.	4	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	3	305
47.509	955	24	.	.	.	3	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	2	986
47.511	344	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	346
47.513	80	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	80
47.515	34	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	35
47.517	32	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	34
47.520	26	9	.	.	18	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	55
47.523	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
47.525	1	1	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7
47.527	.	.	524	.	24	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	550

APPENDIX TABLE 3.—Counts of selected categories of fish larvae, tabulated by station, EASTROPAC II.

STATION NUMBER	Vinciguerria spp.	Cyclothone spp.	Bathylagus nigrigenys	Leuroglossus stilbius urotranus	Nansenia sp.	Diplophos taenia	Ichthyococcus irregularis	Maurolicus muelleri	Astronesthidae	Bathophilus filifer	Stomias sp.	Evermannellidae	Macroparalepis macrurus	Scopelosauridae	Scomberesocidae	Gempylus serpens	Nealotus tripes	Diplospinus multistriatus	Trichiurus lepturus	Tetragonurus spp.	Trachichthyidae	Balistidae	Ostraciontidae	Total; selected categories
45.016	12	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	14
45.018	77	6	.	.	.	2	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	87
45.020	5	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	7
45.021	15	1	.	.	.	1	.	.	.	4	1	.	1	.	.	2	.	.	.	.	.	.	.	25
45.023	101	5	.	.	.	.	.	.	.	2	1	1	.	.	.	.	.	.	.	.	.	.	.	110
45.024	95	1	.	.	.	.	.	.	.	.	1	.	.	.	.	2	.	1	.	.	.	.	.	100
45.026	27	.	4	.	.	3	.	.	.	.	.	.	1	.	.	1	.	1	.	.	.	.	1	38
45.028	21	.	9	.	.	1	.	.	.	3	1	.	.	.	.	1	.	.	.	.	.	.	.	36
45.030	54	1	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	61
45.032	108	.	7	.	.	3	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	10	129
45.034	35	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	39
45.035	27	.	2	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	34
45.037	24	.	10	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	35
45.039	77	3	1	.	.	2	.	.	.	2	.	.	1	.	.	1	3	.	.	.	.	.	.	90
45.041	49	.	8	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	58
45.043	16	.	5	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	23
45.044	38	1	4	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	45
45.046	56	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	59
45.048	21	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	23
45.050	2	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
45.051	8	5	4	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	19
45.053	7	12	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	22
45.054	2	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
45.056	4	2	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	8
45.058	11	4	1	.	.	3	.	.	.	.	.	3	1	.	.	1	.	.	.	.	.	.	.	24
45.060	1	3	1	.	.	.	.	.	3	2	.	.	.	.	.	2	.	.	.	.	.	.	.	12
45.063	43	2	1	.	.	1	.	.	.	7	.	2	1	.	.	1	.	.	.	.	.	.	.	58
45.065	368	9	.	.	.	1	.	.	.	12	4	4	3	.	.	.	.	.	.	.	.	.	.	397
45.067	560	23	3	.	.	1	.	.	1	39	6	24	28	.	.	.	.	.	.	.	.	.	.	685
45.071	39	1	.	.	.	.	.	.	.	1	1	4	1	.	.	.	.	.	.	.	.	.	.	47
45.073	65	3	2	.	.	.	.	.	.	.	.	1	1	.	.	.	1	.	.	.	.	.	.	73
45.078	105	1	1	.	.	1	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	110
45.083	26	.	.	.	1	.	.	.	.	.	1	.	2	.	.	.	.	.	.	.	.	.	.	30
45.086	77	.	3	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	81
45.090	65	2	8	.	.	.	.	.	.	3	.	5	.	.	.	.	.	.	.	1	.	.	.	84
45.094	100	7	6	.	.	.	.	.	1	.	1	.	1	.	.	.	.	.	.	.	.	.	.	116
45.098	15	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	18
45.102	78	4	1	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.	.	.	86
45.106	21	.	5	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	28
45.110	27	5	12	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	47
45.114	15	5	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22
45.117	43	5	1	.	.	.	1	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	52
45.121	91	7	4	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	104
45.125	301	24	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	327
45.127	38	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	41
45.129	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
45.131	325	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	339
45.133	3	30	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	36
45.135	6	10	.	.	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	18
45.137	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
45.139	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
45.140	12	38	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	52

APPENDIX TABLE 3.—Counts of selected categories of fish larvae, tabulated by station, EASTROPAC II.—*Continued.*

STATION NUMBER	*Vinciguerria* spp.	*Cyclothone* spp.	*Bathylagus nigrigenys*	*Leuroglossus stilbius urotranus*	*Nansenia* sp.	*Diplophos taenia*	*Ichthyococcus irregularis*	*Maurolicus muelleri*	Astronesthidae	*Bathophilus filifer*	*Stomias* sp.	Evermannellidae	*Macroparalepis macrurus*	Scopelosauridae	Scomberesocidae	*Gempylus serpens*	*Nealotus tripes*	*Diplospinus multistriatus*	*Trichiurus lepturus*	*Tetragonurus* spp.	Trachichthyidae	Balistidae	Ostraciontidae	Total: selected categories
45.163	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
45.165	33	29	.	.	.	2	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	66
45.167	3	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6
45.169	5	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15
45.171	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
45.173	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
45.175	20	7	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	28
45.177	141	7	.	.	1	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	151
45.179	32	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33
45.183	13	1	4	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	20
45.187	13	1	16	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33
45.191	10	.	5	.	1	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20
45.194	4	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7
45.198	16	5	7	.	2	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	32
45.202	15	4	2	.	2	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24
45.206	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
45.283	8	.	2	.	2	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	17
45.287	79	3	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	84
45.289	114	10	2	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	127
45.293	55	2	4	.	.	.	.	1	.	4	.	.	.	.	.	.	1	.	.	.	.	.	.	67
45.297	103	3	7	.	.	1	.	.	.	15	.	.	.	.	.	.	.	.	.	.	.	.	.	129
45.301	24	1	8	.	1	1	.	.	.	3	.	3	.	.	.	.	.	.	.	.	.	.	.	41
45.305	1035	5	2	.	1	.	..	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1046
45.309	148	1	.	.	1	1	.	.	3	4	.	.	.	.	.	.	.	.	.	.	.	.	.	158
45.313	34	.	2	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	38
45.316	31	3	1	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	38
45.319	45	1	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	48
45.321	9	3	2	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15
45.323	2	2	1	.	.	.	.	.	2	1	.	.	.	.	.	1	.	.	.	.	.	.	.	9
45.325	17	11	42	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	72
45.329	2	2	3	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	8
45.331	2	3	13	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	20
45.333	27	1	5	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	13	47
45.335	27	2	8	.	.	3	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	8	51
45.337	12	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	14
45.339	5	.	2	.	.	3	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	5	18
45.341	69	.	3	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	74
45.343	32	.	2	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	36
45.344	34	.	1	.	.	3	.	.	.	2	.	.	1	.	.	2	.	.	.	.	.	.	2	45
45.346	19	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	21
45.348	120	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	1	123
45.350	296	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	298
45.352	65	.	3	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	69
45.356	147	.	11	.	.	6	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	165
45.358	102	.	1	.	.	5	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	109
45.360	32	.	7	.	.	5	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	45
45.362	28	.	6	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	37
45.365	55	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	56
45.367	10	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	17
45.369	103	.	3	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	108
45.371	230	.	13	.	.	9	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	253
45.373	146	.	14	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	164

APPENDIX TABLE 3.—Counts of selected categories of fish larvae, tabulated by station, EASTROPAC II.—*Continued.*

STATION NUMBER	*Vinciguerria* spp.	*Cyclothone* spp.	*Bathylagus nigrigenys*	*Leuroglossus stilbius urotranus*	*Nansenia* sp.	*Diplophos taenia*	*Ichthyococcus irregularis*	*Maurolicus muelleri*	Astronesthidae	*Bathophilus filifer*	*Stomias* sp.	Evermannellidae	*Macroparalepis macrurus*	Scopelosauridae	Scomberesocidae	*Gempylus serpens*	*Nealotus tripes*	*Diplospinus multistriatus*	*Trichiurus lepturus*	*Tetragonurus* spp.	Trachichthyidae	Balistidae	Ostraciontidae	Total: selected categories
45.375	39	.	3	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	43
45.377	75	.	8	.	.	11	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	95
45.379	797	1	2	.	.	7	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	1	.	812
45.381	244	.	4	.	.	4	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	253
45.383	18	.	4	.	.	2	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	26
45.385	60	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	61
45.387	428	1	.	.	.	.	.	.	.	3	1	.	.	.	.	.	.	.	.	.	.	.	.	433
CRUISE	46																							
46.002	18	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	21
46.004	116	.	4	.	.	4	.	.	.	3	.	.	.	.	.	1	.	.	.	.	.	.	.	130
46.006	18	.	1	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	21
46.007	28	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	28
46.009	22	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24
46.011	69	.	1	.	.	3	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	75
46.013	47	.	.	.	.	4	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	1	57
46.015	16	.	1	.	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	19
46.017	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	11
46.019	147	.	1	.	.	1	.	.	.	2	.	.	.	.	.	2	1	.	.	.	.	.	.	154
46.020	78	.	10	.	.	2	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	92
46.022	14	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	16
46.024	21	6	5	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	33
46.026	131	9	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	145
46.028	154	2	12	.	.	1	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	171
46.030	7	.	8	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	16
46.032	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
46.034	35	5	5	.	.	.	.	.	1	.	.	.	.	.	.	3	.	.	.	.	.	.	.	49
46.036	91	36	7	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	136
46.038	4	3	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10
46.040	19	1	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	23
46.042	129	4	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	137
46.044	95	.	1	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	98
46.046	56	1	1	.	1	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	61
46.048	53	1	10	.	.	.	.	.	.	.	.	.	1	.	.	2	.	.	.	.	.	.	.	67
46.050	175	6	12	.	.	.	1	1	.	.	.	1	3	.	.	2	.	.	.	.	.	.	.	201
46.052	206	9	7	.	.	.	.	2	.	.	.	8	2	.	.	.	1	.	.	.	.	.	.	235
46.054	177	2	20	.	.	.	.	.	.	.	.	.	1	.	.	.	2	.	.	.	.	.	.	202
46.055	66	4	5	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	78
46.057	610	38	10	.	.	.	.	.	.	1	.	2	1	2	.	1	.	.	.	.	.	.	.	665
46.059	480	23	2	.	.	.	.	.	.	1	2	.	.	14	.	.	3	.	.	1	.	.	.	526
46.061	85	7	3	.	3	.	.	6	1	.	.	.	.	10	.	.	.	.	.	1	.	.	.	116
46.063	16	.	2	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	21
46.065	76	18	4	.	.	.	.	3	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	103
46.067	104	13	5	.	2	.	2	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	129
46.069	52	1	22	.	5	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	82
46.071	26	.	14	.	3	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	45
46.075	20	1	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	26
46.077	17	2	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	2	.	.	.	23
46.079	23	.	23	.	1	.	1	6	6	.	.	.	.	3	.	.	.	.	.	.	.	.	.	65
46.082	10	.	17	.	.	.	.	36	4	.	.	.	.	7	.	.	.	.	.	.	.	.	.	74

APPENDIX TABLE 3.—Counts of selected categories of fish larvae, tabulated by station, EASTROPAC II.—*Continued.*

STATION NUMBER	Vinciguerria spp.	Cyclothone spp.	Bathylagus nigrigenys	Leuroglossus stilbius urotranus	Nansenia sp.	Diplophos taenia	Ichthyococcus irregularis	Maurolicus muelleri	Astronesthidae	Bathophilus filifer	Stomias sp.	Evermannellidae	Macroparalepis macrurus	Scopelosauridae	Scomberesocidae	Gempylus serpens	Nealotus tripes	Diplospinus multistriatus	Trichiurus lepturus	Tetragonurus spp.	Trachichthyidae	Balistidae	Ostraciontidae	Total: selected categories
46.084	17	1	21	.	6	.	2	19	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	67
46.086	66	2	33	.	2	.	1	169	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	274
46.088	27	7	8	.	1	.	2	24	.	1	.	.	.	1	.	.	1	.	.	.	.	.	.	72
46.090	17	4	4	.	.	.	.	3	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	29
46.092	13	5	3	.	.	.	.	11	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	36
46.094	145	9	3	.	.	.	2	.	1	.	.	2	1	.	.	.	.	.	.	.	.	.	.	163
46.096	226	21	13	.	.	.	2	.	.	.	.	3	3	.	.	.	2	.	.	.	.	.	.	270
46.098	40	2	2	.	.	.	.	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	52
46.100	6	.	2	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10
46.102	48	6	3	.	1	.	2	.	.	4	.	.	3	.	.	.	.	.	.	.	.	.	.	67
46.104	46	2	.	.	.	.	.	.	.	1	.	.	1	.	.	1	.	.	.	.	.	.	.	51
46.106	34	7	9	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	52
46.108	36	2	27	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	69
46.110	10	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15
46.112	75	.	16	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	93
46.114	6	.	3	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	10
46.116	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5
46.118	85	.	3	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	89
46.120	100	.	1	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	103
46.122	29	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33
46.124	22	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24
46.126	98	.	10	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	109
46.128	130	.	8	.	.	1	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	142
46.130	53	.	11	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	66
46.132	26	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	35
46.134	12	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20
46.135	12	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20
46.137	28	.	24	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	54
46.139	50	1	11	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	64
46.141	20	.	18	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	1	.	.	.	.	41
46.143	14	1	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	27
46.145	118	1	38	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	157
46.147	41	.	41	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	83
46.149	11	3	22	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	37
46.151	4	4	13	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22
46.153	163	1	4	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	169
46.155	132	8	6	.	.	.	.	.	.	2	.	.	.	.	.	2	6	.	.	.	.	.	.	156
46.157	24	2	6	.	.	.	1	.	.	.	.	.	2	.	.	4	1	.	.	.	.	.	.	40
46.159	10	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	15
46.161	35	12	8	.	1	.	.	.	2	.	.	2	.	.	.	.	4	.	.	.	.	.	.	64
46.163	80	4	10	.	.	.	.	4	.	3	.	.	.	.	.	1	1	.	.	.	.	.	.	103
46.165	22	7	18	.	.	.	.	7	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	56
46.167	25	4	37	.	.	.	1	10	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	82
46.169	149	1	52	.	.	.	1	85	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	290
46.171	13	.	44	.	.	.	1	41	.	1	.	.	.	3	.	.	.	.	.	.	.	.	.	103
46.173	1	.	9	1	.	.	.	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	25
46.175	1	.	21	.	.	.	.	74	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	96
46.177	20	5	45	.	.	.	3	5	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	80
46.179	82	1	135	.	.	.	2	24	1	.	.	.	.	1	.	.	.	.	.	1	.	.	.	247
46.181	53	4	132	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	191
46.183	17	3	47	.	4	.	1	.	3	.	2	.	.	1	.	.	.	.	.	.	.	.	.	78
46.185	90	5	45	.	1	.	2	.	3	.	2	.	.	.	.	.	.	.	.	.	.	.	.	148

APPENDIX TABLE 3.—Counts of selected categories of fish larvae, tabulated by station, EASTROPAC II.—*Continued.*

STATION NUMBER	*Vinciguerria* spp.	*Cyclothone* spp.	*Bathylagus nigrigenys*	*Leuroglossus stilbius urotranus*	*Nansenia* sp.	*Diplophos taenia*	*Ichthyococcus irregularis*	*Maurolicus muelleri*	Astronesthidae	*Bathophilus filifer*	*Stomias* sp.	Evermannellidae	*Macroparalepis macrurus*	Scopelosauridae	Scomberesocidae	*Gempylus serpens*	*Nealotus tripes*	*Diplospinus multistriatus*	*Trichiurus lepturus*	*Tetragonurus* spp.	Trachichthyidae	Balistidae	Ostraciontidae	Total: selected categories
46.187	39	3	17	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	60
46.189	5	.	8	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	15
CRUISE	47																							
47.001	61	2	4	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	11	.	.	.	.	79
47.005	203	3	6	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	5	.	.	.	.	219
47.008	49	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	.	.	.	.	62
47.011	26	.	3	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	30
47.019	221	13	5	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	18	.	.	.	.	258
47.022	27	2	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13	.	.	.	.	45
47.025	58	.	4	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	63
47.028	117	1	14	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	133
47.032	137	4	15	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	1	.	159
47.034	36	.	7	.	.	.	.	.	.	.	.	.	.	10	.	.	4	.	.	.	.	.	.	57
47.035	70	3	20	.	.	.	.	.	.	1	.	.	.	8	.	3	1	.	.	.	.	.	.	106
47.040	76	.	8	.	.	.	.	7	.	.	.	.	1	2	.	.	7	.	.	.	.	.	.	101
47.049	92	1	26	.	.	.	.	14	2	2	.	.	.	5	.	.	3	.	.	.	.	.	.	145
47.053	94	1	27	.	.	.	1	5	.	6	.	.	1	59	.	.	8	.	3	.	.	.	.	205
47.057	106	3	50	.	.	.	3	3	.	.	.	.	.	55	.	.	47	.	4	.	.	.	.	271
47.061	18	.	11	.	.	.	.	1	.	.	.	.	.	6	.	.	16	.	3	.	.	.	.	55
47.065	91	.	26	4	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	122
47.069	49	.	21	122	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	14	.	.	207
47.070	17	.	12	176	.	.	.	1	.	.	4	.	.	.	1	.	1	.	.	.	21	.	.	233
47.074	14	.	7	294	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	20	.	.	337
47.078	4	.	3	61	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	2	.	.	71
47.082	6	.	1	79	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	86
47.086	11	.	3	527	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	541
47.090	5	.	6	77	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	89
47.094	2	.	1	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	11
47.097	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
47.099	.	.	.	2	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	3
47.101	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	3
47.103	.	.	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	3
47.105	5	.	5	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	11
47.107	7	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11
47.109	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
47.113	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
47.124	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
47.128	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
47.132	8	1	3	.	.	.	.	.	.	.	.	.	.	1	1	.	.	1	.	.	.	.	.	15
47.134	8	.	.	.	.	.	.	.	.	.	.	.	.	.	19	.	.	1	.	.	.	.	.	28
47.137	9	1	3	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	14
47.139	11	.	5	.	.	.	.	.	.	.	.	.	.	.	4	.	.	1	.	.	.	.	.	21
47.141	16	.	13	.	.	.	.	.	.	.	.	.	.	.	4	.	.	1	.	.	.	.	.	34
47.143	2	.	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	22
47.145	14	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	19
47.147	76	1	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	97
47.149	27	.	15	.	.	.	.	.	2	1	.	.	.	.	.	.	.	3	.	.	.	.	.	48
47.151	3	.	4	.	.	.	.	.	.	.	.	.	.	.	1	.	.	5	.	.	.	.	.	13
47.153	9	4	17	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.	.	.	35

APPENDIX TABLE 3.—Counts of selected categories of fish larvae tabulated by station, EASTROPAC II.—*Continued.*

STATION NUMBER	Vinciguerria spp.	Cyclothone spp.	Bathylagus nigrigenys	Leuroglossus stilbius urotranus	Nansenia sp.	Diplophos taenia	Ichthyococcus irregularis	Maurolicus muelleri	Astronesthidae	Bathophilus filifer	Stomias sp.	Evermannellidae	Macroparalepis macrurus	Scopelosauridae	Scomberesocidae	Gempylus serpens	Nealotus tripes	Diplospinus multistriatus	Trichiurus lepturus	Tetragonurus spp.	Trachichthyidae	Balistidae	Ostraciontidae	Total selected categories
47.155	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
47.157	74	3	27	.	.	.	.	.	.	.	.	.	.	.	.	.	1	7	.	.	.	.	.	112
47.159	11	.	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	26
47.162	5	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	12
47.164	37	.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	49
47.166	19	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22
47.168	1	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	5
47.171	38	1	9	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	50
47.173	165	1	17	.	.	.	.	.	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	189
47.175	95	.	15	1	.	.	.	.	.	.	1	.	.	.	2	.	.	.	.	.	.	.	.	114
47.177	100	.	34	123	.	.	.	.	.	.	69	.	.	.	1	.	.	.	.	.	.	.	.	327
47.179	14	.	28	161	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	1	.	.	207
47.181	31	.	15	44	.	.	.	1	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	97
47.185	30	1	21	119	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	.	.	177
47.189	4	.	27	70	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	1	.	.	104
47.193	2	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	4
47.197	7	.	31	92	.	.	1	.	.	.	.	.	.	2	1	.	.	.	.	.	1	.	.	135
47.201	142	4	66	74	.	.	.	.	2	.	.	.	.	2	.	.	.	.	.	.	2	.	.	292
47.205	38	1	125	27	.	.	.	6	.	1	1	.	.	7	.	.	1	.	.	.	.	.	.	207
47.213	415	12	58	.	.	.	2	7	.	1	.	.	.	36	.	1	2	.	.	.	.	.	.	534
47.217	84	1	30	.	.	.	1	3	.	.	.	.	1	13	.	.	2	.	.	.	.	.	.	135
47.221	30	1	30	.	.	.	5	.	.	.	.	.	1	13	.	1	2	.	.	.	.	.	.	83
47.225	146	4	34	.	.	.	.	.	2	.	.	.	.	2	.	3	6	.	.	.	.	.	.	197
47.229	256	16	17	.	.	.	.	.	1	2	.	.	1	.	.	1	4	.	.	.	.	.	.	298
47.233	241	8	14	.	.	.	.	.	1	.	.	.	2	.	.	2	6	.	.	.	.	.	.	274
47.237	16	1	8	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	26
47.240	44	2	3	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	50
47.242	91	3	20	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	115
47.244	124	5	22	.	.	.	.	.	.	.	5	.	.	.	.	1	2	.	7	.	.	.	.	166
47.246	7	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	11
47.250	18	.	3	.	.	.	.	.	.	3	3	.	.	.	.	1	1	.	7	.	.	.	.	36
47.254	27	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	39
47.258	36	1	3	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	5	.	.	.	.	47
47.268	15	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	16
47.272	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	8
47.276	208	.	45	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	9	.	.	.	.	264
47.278	33	5	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	47
47.280	7	1	14	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	24
47.283	4	2	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10
47.286	12	2	18	.	.	.	1	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	36
47.288	44	.	11	.	.	.	.	.	.	1	.	.	.	.	.	.	2	.	.	.	.	.	.	58
47.290	11	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	16
47.292	29	1	7	.	.	.	.	.	.	.	.	.	.	.	.	7	.	.	.	.	.	.	.	44
47.295	91	9	7	.	.	.	1	.	.	5	.	.	.	.	.	8	4	.	.	.	.	.	.	125
47.297	122	14	17	.	.	.	.	.	1	8	3	.	.	3	.	13	6	.	.	.	.	.	.	187
47.301	53	1	8	.	.	.	.	.	1	5	.	.	1	.	.	6	1	.	.	.	.	.	.	76
47.304	17	4	4	.	.	.	.	.	.	1	.	.	.	.	.	1	1	.	.	.	.	.	.	28
47.306	60	8	15	.	.	.	.	.	1	6	1	.	.	.	.	8	1	.	.	.	.	.	.	100
47.310	142	11	18	.	.	.	.	.	4	22	.	.	2	.	.	10	10	.	.	.	.	.	.	219
47.314	75	4	24	.	.	.	.	4	2	5	.	1	1	12	.	1	4	.	.	.	.	.	.	133
47.318	45	.	23	.	.	.	.	13	.	2	.	.	.	4	.	.	.	.	.	.	.	.	.	87
47.322	22	1	59	2	.	.	2	5	.	2	.	.	.	8	.	.	.	.	.	.	.	.	.	101

APPENDIX TABLE 3.—Counts of selected categories of fish larvae, tabulated by station, EASTROPAC II.—*Continued.*

STATION NUMBER	Vinciguerria spp.	Cyclothone spp.	Bathylagus nigrigenys	Leuroglossus stilbius urotranus	Nansenia sp.	Diplophos taenia	Ichthyococcus irregularis	Maurolicus muelleri	Astronesthidae	Bathophilus filifer	Stomias sp.	Evermannellidae	Macroparalepis macrurus	Scopelosauridae	Scomberesocidae	Gempylus serpens	Nealotus tripes	Diplospinus multistriatus	Trichiurus lepturus	Tetragonurus spp.	Trachichthyidae	Balistidae	Ostraciontidae	Total: selected categories
47.326	33	1	143	9	.	.	6	.	.	.	1	.	.	43	.	.	.	.	.	.	.	.	.	236
47.330	129	5	123	14	.	.	2	11	1	.	10	.	.	16	.	.	.	.	.	.	.	.	.	311
47.334	28	.	45	8	.	.	.	.	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	89
47.338	19	.	19	5	.	.	.	.	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	51
47.342	24	.	17	2	.	.	.	.	.	.	1	.	.	3	7	.	.	.	.	.	.	.	.	54
47.345	44	1	26	.	.	.	.	.	.	1	5	.	.	.	.	.	.	.	.	.	.	.	.	77
47.349	61	.	16	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	79
47.351	66	.	60	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	127
47.354	87	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	87
47.357	66	1	14	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	85
47.359	56	.	10	.	.	.	.	.	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	69
47.362	4	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7
47.364	7	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10
47.367	22	2	11	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	38
47.369	3	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	8
47.371	7	5	2	.	.	.	.	.	.	1	.	.	.	.	.	.	.	2	.	.	.	.	.	17
47.373	237	2	2	.	.	.	.	.	.	.	.	.	2	.	.	.	.	16	.	.	.	.	.	259
47.376	72	3	9	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	85
47.379	55	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	66
47.382	103	1	4	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	111
47.415	7	2	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	11
47.430	108	1	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	1	.	.	.	.	.	114
47.432	69	32	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	103
47.436	2	.	2	.	.	.	.	.	.	1	.	.	.	.	22	.	1	1	.	.	.	.	.	29
47.438	34	1	1	.	.	.	.	.	.	2	.	.	.	.	15	.	8	3	.	.	.	.	.	64
47.440	107	2	.	.	.	.	.	.	.	10	.	.	.	.	7	.	3	.	.	.	.	.	.	129
47.443	17	.	1	.	.	.	.	.	.	2	.	.	.	.	6	.	.	.	.	.	.	.	.	26
47.446	4	.	2	.	.	.	.	.	.	1	.	.	.	.	7	.	.	.	.	.	.	.	.	14
47.450	76	9	20	.	.	.	.	.	.	5	.	.	.	.	37	.	2	.	.	.	.	.	.	149
47.454	21	3	41	.	1	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	68
47.458	5	.	42	.	.	.	.	.	1	.	2	.	.	1	.	.	.	.	.	1	.	.	.	52
47.462	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
47.466	6	.	7	.	1	.	.	2	.	.	.	.	.	26	.	.	.	.	.	.	.	.	.	42
47.470	3	.	6	.	.	.	.	107	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	119
47.478	26	1	6	.	.	.	.	9	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	45
47.486	30	2	11	.	.	.	.	5	.	.	.	.	.	.	.	2	3	.	.	.	.	.	.	53
47.490	14	.	13	.	.	.	3	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	37
47.494	10	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12
47.498	65	6	1	.	1	.	2	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	78
47.501	148	17	13	.	.	.	.	.	.	1	.	.	.	.	.	2	3	.	.	.	.	.	.	184
47.504	49	9	20	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	79
47.507	75	2	6	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	85
47.509	64	.	26	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	93
47.511	2	.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13
47.513	3	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
47.515	9	2	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	18
47.517	36	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	37
47.520	80	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	83
47.523	30	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	37
47.525	10	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	16
47.527	132	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	135

APPENDIX TABLE 4.—Summary of occurrences and numbers of larvae of 23 categories, limited in distribution to a broad coastal band or around offshore islands or banks.

STATION NUMBER	*Engraulis ringens*	Gobiidae	*Albula vulpes*	*Etrumeus acuminatus*	*Opisthonema* sp.	*Sardinops sagax*	Engraulidae (other)	Synodontidae	*Bothus leopardinus*	*Citharichthys* spp.	*Cyclopsetta* sp.	*Syacium ovale*	*Symphurus* spp.	Carangidae	*Eucinostomus* sp.	Labridae	Mugilidae	Polynemidae	Pomacentridae	Sciaenidae	Scorpaenidae	Serranidae	Carapidae	Total: 23 categories
45.339	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
45.343	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1
45.350	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
45.358	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
45.360	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	1	.	.	.	.	1	.	.	4
45.362	.	8	.	.	.	.	1	.	.	.	.	2	.	1	.	1	.	2	.	.	.	1	.	16
45.365	.	31	.	.	.	.	11	1	1	.	.	2	4	11	.	.	.	19	.	.	10	.	.	90
45.367	.	5	.	.	.	.	2	.	1	.	.	.	.	2	.	.	.	.	.	.	.	3	.	13
45.369	.	20	.	.	.	.	1	.	.	.	.	4	1	10	.	2	.	.	6	.	.	9	.	53
45.371	.	1	.	.	.	.	.	.	.	.	.	4	.	.	.	2	.	.	.	.	.	.	.	7
45.373	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	5	.	.	.	.	1	.	.	8
45.375	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	2
45.377	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	.	.	.	.	5	.	.	11
45.379	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1
45.381	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	2
CRUISE	46																							
46.002	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1
46.004	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	2
46.006	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1
46.007	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1
46.009	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	2
46.011	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	2
46.042	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
46.052	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	3
46.059	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1
46.082	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1
46.108	.	.	.	.	.	.	.	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	.	3
46.110	.	.	.	.	.	.	.	.	4	.	.	8	.	.	.	.	.	.	.	.	.	.	.	12
46.112	.	2	.	.	.	.	.	.	22	.	.	18	3	.	.	.	.	.	.	.	.	.	.	45
46.114	.	.	.	.	.	.	.	.	2	.	.	1	1	.	.	1	.	.	.	.	.	.	.	5
46.116	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1
46.118	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1
46.120	.	1	.	.	.	.	.	.	1	.	.	3	1	.	.	2	.	.	.	.	.	.	.	8
46.122	.	.	.	.	.	.	.	.	1	.	.	.	2	.	.	.	.	.	.	.	2	.	.	5
46.124	.	.	.	.	.	.	.	.	.	.	1	1	2	.	.	.	.	.	.	.	.	.	.	4
46.126	.	4	.	.	.	.	.	.	5	.	.	3	.	1	.	1	.	1	.	.	.	.	.	15
46.128	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	3
46.130	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	2
46.132	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	.	.	.	1	.	.	4
46.134	.	.	.	.	1	.	2	.	1	.	.	10	6	7	.	.	.	.	.	45	18	1	.	91
46.135	.	2	.	.	.	.	1	1	1	.	11	1	6	45	.	.	.	4	.	48	23	.	.	143
46.137	.	12	.	.	.	.	.	5	.	.	13	132	76	2	.	.	.	.	.	.	32	4	.	276
46.139	.	2	.	.	.	.	.	.	.	.	.	2	3	1	.	.	.	.	.	.	1	.	.	9
46.141	.	.	.	.	.	.	.	.	.	.	.	2	2	.	.	.	.	.	.	.	3	.	.	7
46.147	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	2	.	.	4
46.149	.	.	.	.	.	.	.	.	2	.	.	.	2	.	.	.	.	.	.	.	.	.	.	4
46.151	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1
46.153	.	1	.	.	.	.	.	.	1	.	.	14	.	.	.	.	.	.	.	.	.	.	.	16
46.155	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
46.157	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1
46.163	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1
46.165	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	1	.	.	3

APPENDIX TABLE 4.—Summary of occurrences and numbers of larvae of 23 categories, limited in distribution to a broad coastal band or around offshore islands or banks.—*Continued.*

STATION NUMBER	*Engraulis ringens*	Gobiidae	*Albula vulpes*	*Etrumeus acuminatus*	*Opisthonema* sp.	*Sardinops sagax*	Engraulidae (other)	Synodontidae	*Bothus leopardinus*	*Citharichthys* spp.	*Cyclopsetta* sp.	*Syacium ovale*	*Symphurus* spp.	Carangidae	*Eucinostomus* sp.	Labridae	Mugilidae	Polynemidae	Pomacentridae	Sciaenidae	Scorpaenidae	Serranidae	Carapidae	Total: 23 categories
46.171	.	2	.	3	.	64	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	69
46.173	.	2	.	.	.	2	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	5
46.175	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
46.177	.	.	.	.	.	20	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	21
46.179	.	3	.	1	.	81	.	.	.	21	.	.	.	.	.	1	.	.	.	.	.	.	.	107
46.181	.	.	.	3	.	8	.	.	.	8	.	.	1	.	.	.	.	.	.	.	.	.	.	20
46.185	.	.	.	.	.	.	.	.	.	4	.	.	1	.	.	.	.	.	.	.	.	.	.	5
46.187	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	5	.	6
CRUISE 47																								
47.001	.	9	.	.	.	.	.	4	.	.	.	3	3	4	.	.	.	.	.	.	1	.	.	24
47.005	.	46	.	.	.	.	.	5	.	.	.	11	2	2	.	.	.	.	.	.	3	.	.	69
47.008	.	35	.	.	.	.	.	2	3	5	.	2	3	1	1	.	.	.	.	.	3	.	1	56
47.011	.	11	.	.	.	.	.	.	.	.	1	.	1	11	.	.	.	.	.	.	1	.	.	25
47.019	.	36	2	.	.	.	5	7	1	.	3	5	9	5	4	4	7	2	2	.	4	7	.	103
47.022	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	2	.	3
47.025	.	5	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	1	.	.	.	.	8
47.028	.	24	.	.	.	.	.	.	.	.	.	3	12	.	.	.	.	.	.	.	1	.	.	40
47.032	.	6	.	.	.	.	.	.	.	.	.	4	2	.	.	.	.	.	.	.	5	.	.	17
47.034	.	2	.	.	.	.	.	.	.	.	.	3	9	3	.	.	.	.	.	.	10	.	.	27
47.035	.	.	.	.	.	.	.	.	.	.	.	.	1	5	.	.	.	.	.	.	6	.	.	12
47.040	.	19	.	.	.	.	28	3	.	2	.	3	1	6	7	6	3	.	1	1	10	17	.	107
47.049	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
47.053	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2
47.057	.	5	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	7
47.061	.	2	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	2	.	.	6
47.065	.	3	.	.	.	.	.	.	.	1	1	.	4	4	.	1	2	.	1	.	1	.	1	19
47.069	1	6	.	.	.	.	.	1	.	.	1	3	2	.	.	1	.	.	.	.	.	.	.	15
47.070	.	2	.	.	.	.	.	.	.	2	.	1	1	.	.	.	2	.	.	.	.	.	.	8
47.074	.	13	.	.	.	.	.	.	.	9	.	1	1	.	.	.	.	.	.	1	1	3	.	29
47.078	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	2
47.082	26	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	26
47.086	127	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	127
47.090	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
47.097	250	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	252
47.099	48	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	.	.	.	59
47.101	222	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	222
47.103	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
47.105	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
47.107	4	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	7
47.109	293	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	293
47.113	35	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	35
47.124	99	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	99
47.128	96	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	96
47.132	43	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	43
47.139	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
47.141	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12
47.147	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
47.162	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
47.173	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
47.175	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13
47.177	4	5	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	10

APPENDIX TABLE 4.—Summary of occurrences and number of larvae of 23 categories, limited in distribution to a broad coastal band or around offshore islands or banks.—*Continued.*

STATION NUMBER	*Engraulis ringens*	Gobiidae	*Albula vulpes*	*Etrumeus acuminatus*	*Opisthonema* sp.	*Sardinops sagax*	Engraulidae (other)	Synodontidae	*Bothus leopardinus*	*Citharichthys* spp.	*Cyclopsetta* sp.	*Syacium ovale*	*Symphurus* spp.	Carangidae	*Eucinostomus* sp.	Labridae	Mugilidae	Polynemidae	Pomacentridae	Sciaenidae	Scorpaenidae	Serranidae	Carapidae	Total: 23 categories
47.179	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
47.181	1	3	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	3	1	.	10
47.185	13	1	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	1	1	1	.	19
47.189	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	2
47.197	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	11
47.201	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	2
47.229	.	3	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	2	.	.	7
47.233	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	4	.	.	6
47.237	.	1	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	2	.	.	5
47.240	.	5	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.	1	.	.	9
47.242	.	4	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	1	.	.	7
47.244	.	.	.	.	.	.	.	.	1	.	.	2	1	.	.	.	.	.	.	.	.	1	.	5
47.246	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
47.250	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	.	.	.	.	.	.	3
47.254	.	3	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	2	.	.	.	1	.	8
47.258	.	5	.	.	.	.	.	4	.	10	.	3	4	16	.	.	2	.	.	1	36	3	.	84
47.268	.	.	.	.	.	.	.	1	.	1	2	.	9	.	.	.	.	.	.	.	5	3	.	21
47.272	.	1	.	.	.	.	.	.	.	.	1	.	4	3	.	.	.	.	.	.	2	2	.	13
47.276	.	8	.	.	.	.	.	.	.	.	.	4	2	.	.	3	.	.	.	.	.	.	.	17
47.278	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	2	.	3
47.283	.	1	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	3
47.286	.	1	.	.	.	.	.	.	1	.	.	1	5	.	.	1	.	.	.	.	.	.	.	9
47.288	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	3
47.290	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1
47.292	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
47.295	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1
47.301	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1
47.304	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	2
47.306	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	4	.	5
47.310	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	3	.	5
47.314	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	2
47.322	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
47.330	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
47.334	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
47.349	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1
47.357	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1
47.436	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
47.446	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
47.450	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
47.466	.	.	.	.	.	2	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	3
47.470	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	2
47.501	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1
47.504	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	2
47.507	.	.	.	.	.	.	.	.	.	.	.	3	1	1	.	.	.	.	.	.	.	.	.	5
47.509	.	.	.	.	.	.	.	.	3	.	.	2	.	.	.	.	.	.	.	.	.	.	.	5
47.511	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	2
47.513	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
47.515	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1
47.517	.	1	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	3
47.520	.	8	.	.	.	.	.	.	.	.	.	13	8	.	.	1	.	.	.	.	13	.	.	43
47.523	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	1	.	.	.	.	2	1	.	7
47.525	.	.	.	.	.	.	.	.	1	.	.	3	4	.	.	.	.	.	.	.	1	.	.	9
47.527	.	7	7	.	83	.	1	23	36	.	1	180	142	69	3	.	.	.	.	15	1	.	.	568

APPENDIX TABLE 5.—Numbers and kinds of eel leptocephali (Anguilliformes) obtained on the second multivessel EASTROPAC survey (EASTROPAC II), tabulated by family for all positive hauls.

STATION NUMBER	Eel leptocephali	Congridae	Moringuidae	Muraenidae	Nemichthyidae	Ophichthidae	Serrivomeridae	Xenocongridae	Family unknown
45 .018	2	.	.	.	2	.	.	.	.
45 .023	1	.	.	.	1	.	.	.	.
45 .030	1	.	.	.	.	.	1	.	.
45 .058	1	.	.	.	.	.	1	.	.
45 .063	1	.	.	.	.	.	.	.	1
45 .065	2	.	.	.	.	.	2	.	.
45 .067	2	.	.	.	.	.	2	.	.
45 .071	1	.	.	.	.	.	1	.	.
45 .073	1	.	.	.	.	.	.	.	1
45 .140	2	.	.	.	1	.	.	.	1
45 .313	1	.	.	.	.	.	1	.	.
45 .362	1	1	.	.	.	.	.	.	.
45 .365	12	4	1	.	.	7	.	.	.
45 .367	3	1	.	.	.	.	.	.	2
45 .371	1	.	.	.	.	1	.	.	.
45 .379	1	.	.	.	1	.	.	.	.
46 .032	1	1	.	.	.	.	.	.	.
46 .034	1	.	.	.	.	.	.	.	1
46 .046	2	.	.	.	.	.	.	.	2
46 .065	1	1	.	.	.	.	.	.	.
46 .077	1	1	.	.	.	.	.	.	.
46 .086	2	.	.	.	1	.	.	1	.
46 .098	1	.	.	.	.	.	.	.	1
46 .106	1	.	.	.	1	.	.	.	.
46 .108	1	.	.	.	1	.	.	.	.
46 .110	2	.	.	1	.	1	.	.	.
46 .112	1	.	.	.	1	.	.	.	.
46 .114	1	.	.	1	.	.	.	.	.
46 .120	1	.	.	.	.	1	.	.	.
46 .122	1	1	.	.	.	.	.	.	.
46 .124	2	.	.	.	.	2	.	.	.
46 .128	1	1	.	.	.	.	.	.	.
46 .130	2	2	.	.	.	.	.	.	.
46 .134	2	.	.	.	.	2	.	.	.
46 .135	3	.	.	.	.	3	.	.	.
46 .137	1	1	.	.	.	.	.	.	.
46 .139	4	2	.	.	.	2	.	.	.
46 .143	1	.	.	.	.	1	.	.	.
46 .145	2	1	.	1	.	.	.	.	.
46 .153	1	.	.	.	1	.	.	.	.
46 .155	1	.	.	.	1	.	.	.	.
46 .157	1	.	.	.	1	.	.	.	.
46 .161	1	.	.	.	.	.	.	.	1
46 .165	1	.	.	.	1	.	.	.	.
46 .169	1	.	.	.	1	.	.	.	.
46 .177	1	.	.	.	.	.	.	1	.
47 .001	3	1	.	.	.	2	.	.	.
47 .008	1	1	.	.	.	.	.	.	.
47 .011	3	2	.	.	.	1	.	.	.
47 .019	11	4	.	2	.	5	.	.	.
47 .028	2	.	1	.	.	1	.	.	.
47 .032	1	.	1	.	.	.	.	.	.
47 .035	1	1	.	.	.	.	.	.	.
47 .040	6	.	.	.	.	3	.	.	3
47 .049	2	.	.	.	.	2	.	.	.
47 .053	2	.	.	.	.	.	.	1	1
47 .069	1	.	.	.	.	1	.	.	.
47 .070	1	.	.	.	.	1	.	.	.
47 .107	1	.	.	.	.	1	.	.	.
47 .179	1	.	.	.	.	1	.	.	.
47 .197	1	.	.	.	.	1	.	.	.
47 .217	1	1	.	.	.	.	.	.	.
47 .229	1	1	.	.	.	.	.	.	.
47 .233	1	.	.	.	1	.	.	.	.
47 .242	1	.	.	.	1	.	.	.	.
47 .244	1	1	.	.	.	.	.	.	.
47 .254	1	1	.	.	.	.	.	.	.
47 .258	4	2	.	1	.	.	.	.	1
47 .268	1	.	.	.	.	1	.	.	.
47 .276	1	1	.	.	.	.	.	.	.
47 .283	1	.	.	.	.	1	.	.	.
47 .286	1	.	.	.	1	.	.	.	.
47 .297	3	1	.	.	.	.	.	.	2
47 .304	2	.	.	.	1	.	.	1	.
47 .314	3	2	.	.	1	.	.	.	.
47 .438	2	.	.	.	2	.	.	.	.
47 .478	1	.	.	.	.	1	.	.	.
47 .504	1	.	.	.	.	1	.	.	.
47 .509	1	1	.	.	.	1	.	.	1
47 .525	3	3	.	.	.	.	.	.	.
47 .527	7	2	.	.	.	5	.	.	.

APPENDIX TABLE 6.—Numbers and kinds of lophiiform larvae obtained on the second multivessel EASTROPAC survey (EASTROPAC II), tabulated by family for all positive hauls.

STATION NUMBER	Caulophrynidae	Centrophrynidae	Ceratiidae	Gigantactinidae	Himantolophidae	Linophrynidae	Melanocoetidae	Oneirodidae	Unidentified Ceratioidei	Antennariidae	Lophiidae
45 .037	.	.	.	.	.	1	.	.	.	.	.
45 .039	.	.	.	.	.	.	.	.	1	.	.
45 .044	.	.	.	1	.	.	.	.	.	.	.
45 .046	.	.	.	1	.	.	.	.	.	.	.
45 .048	.	.	.	.	.	.	.	1	1	.	.
45 .050	.	.	.	.	1	.	.	.	1	.	.
45 .051	.	.	.	.	.	.	.	1	1	.	.
45 .053	.	.	.	.	.	.	.	1	.	.	.
45 .054	.	.	.	.	.	.	.	1	.	.	.
45 .056	.	.	.	1	.	.	1	1	.	.	.
45 .058	.	.	.	1	1	.	.	1	.	.	.
45 .060	.	.	.	.	.	.	.	1	.	.	.
45 .063	.	.	.	1	.	.	1	.	.	.	.
45 .065	.	.	.	.	.	.	1	.	3	.	.
45 .067	.	.	.	2	2	.	.	.	1	.	.
45 .078	.	.	.	.	.	.	.	1	.	.	.
45 .110	.	.	.	.	.	.	.	1	.	.	.
45 .127	.	.	.	.	.	.	.	1	.	.	.
45 .131	.	.	.	1	.	.	.	.	.	.	.
45 .171	.	.	.	1	.	.	.	.	.	.	.
45 .175	.	.	.	.	.	1	.	.	.	.	.
45 .309	.	.	.	.	1	.	.	.	.	.	.
45 .319	.	.	.	.	.	.	.	1	1	.	.
45 .321	.	.	.	.	.	.	.	.	1	.	.
45 .325	.	1	.	.	.	.	.	.	1	.	.
46 .028	1	.	.	.	.	.	1	.	.	.	.
46 .034	.	.	.	.	.	.	.	1	1	.	.
46 .044	.	.	.	.	.	.	.	.	1	.	.
46 .046	.	.	.	1	1	.	.	2	.	.	.
46 .048	.	.	.	.	.	.	1	.	.	.	.
46 .052	.	.	.	.	.	.	.	1	.	.	.
46 .057	.	.	.	.	.	.	.	1	.	.	.
46 .059	.	.	.	.	.	.	.	.	1	.	.
46 .086	.	.	.	.	.	.	.	1	.	.	.
46 .088	.	.	.	.	.	.	1	.	.	.	.
46 .094	.	.	.	.	.	.	.	.	1	.	.
46 .098	.	.	1	.	.	.	.	.	.	.	.
46 .100	.	.	.	1	.	.	.	.	.	.	.
46 .102	.	.	.	1	.	.	.	2	.	.	.
46 .104	.	.	.	.	.	.	.	.	1	.	.
46 .108	.	.	.	.	.	.	1	.	.	.	.
46 .110	.	.	.	.	.	.	1	.	.	.	.
46 .112	.	.	.	.	.	.	.	2	.	.	.
46 .114	.	.	.	.	.	.	1	.	.	.	.
46 .122	.	.	.	.	.	.	.	.	1	.	.
46 .126	.	.	.	.	.	.	4	.	.	.	.
46 .128	.	.	.	.	.	.	2	.	1	.	.
46 .132	.	.	.	.	.	.	.	.	.	1	.
46 .139	.	.	.	.	.	.	1	.	.	.	.
46 .145	.	.	.	.	.	.	.	.	.	.	1
46 .153	.	.	.	.	.	.	.	1	.	.	.
46 .155	.	.	.	.	.	.	.	1	.	.	.
46 .159	.	.	.	.	.	.	1	3	.	.	.
46 .161	.	.	2	1	.	.	.	1	.	.	.
46 .163	.	.	.	.	.	.	2	1	.	.	.
46 .165	1	.	.	1	.	.	1	.	.	.	.
46 .167	.	.	.	.	.	.	.	1	.	.	.
46 .169	.	.	.	.	.	.	1	.	.	.	.
47 .001	.	.	.	.	.	1	.	.	.	.	.
47 .005	.	.	.	.	.	.	.	1	1	.	.
47 .008	.	.	.	.	.	2	.	1	.	.	.
47 .011	.	.	.	.	.	3	.	.	.	.	.
47 .019	.	.	.	.	.	.	2	2	.	.	.
47 .025	.	.	.	.	.	.	.	2	.	.	.
47 .028	.	.	.	.	.	4	.	2	.	.	.
47 .032	.	.	.	.	.	.	2	.	.	.	.
47 .034	.	.	.	.	.	.	.	1	.	.	.
47 .035	.	.	.	.	.	1	.	.	2	.	.
47 .040	.	.	1	.	.	.	.	.	.	.	.
47 .049	.	.	.	.	.	.	.	1	.	.	.
47 .053	.	.	1	.	.	.	.	5	.	.	.
47 .057	.	.	.	1	.	.	.	.	.	.	.
47 .061	.	.	.	.	.	.	.	1	.	.	.
47 .074	.	.	.	.	.	2	.	.	.	.	.
47 .090	.	.	.	.	.	1	.	.	.	.	.
47 .141	.	.	.	.	.	1	.	.	.	.	.
47 .177	.	.	.	.	.	1	.	.	.	.	.
47 .197	.	.	.	.	.	1	.	.	.	.	.
47 .201	.	.	.	.	.	1	.	.	.	.	.
47 .213	.	.	.	.	.	.	.	4	.	.	.
47 .217	.	.	.	.	.	.	.	4	.	.	.
47 .225	.	.	.	.	.	.	.	3	2	.	.
47 .229	.	.	.	.	1	1	.	1	1	.	.
47 .240	.	.	.	.	.	.	.	.	1	.	.
47 .242	.	.	.	.	.	2	1	.	.	.	.
47 .244	.	.	.	.	.	.	4	6	.	.	.
47 .246	.	.	.	.	.	.	1	1	.	.	.
47 .250	.	.	.	.	.	1	.	2	.	.	.
47 .254	.	.	.	.	.	.	.	.	1	.	.
47 .268	.	.	.	.	.	1	.	.	.	.	.
47 .276	.	.	.	.	.	1	.	.	.	.	.
47 .283	.	.	.	.	.	.	1	.	.	.	.
47 .286	.	.	.	.	.	.	2	.	.	.	.
47 .292	.	.	.	.	.	.	.	1	.	.	.
47 .295	.	.	.	.	.	.	.	4	.	.	.
47 .297	.	.	.	.	.	.	.	1	.	.	.
47 .306	.	.	.	.	.	.	.	.	4	.	.
47 .310	.	.	.	6	.	2	1	5	2	.	.
47 .322	.	.	3	.	.	.	1	1	.	.	.
47 .326	.	.	.	.	.	4	.	.	.	.	.
47 .351	.	.	.	.	.	2	.	.	.	.	.
47 .357	.	.	.	.	.	.	1	.	.	.	.
47 .450	.	.	.	1	.	.	.	.	.	.	.
47 .454	.	.	.	.	.	.	.	.	1	.	.
47 .486	.	.	.	1	1	.	.	2	.	.	.
47 .490	.	.	.	4	.	.	.	2	1	.	.
47 .498	.	.	.	.	1	.	.	.	.	.	.
47 .501	.	.	.	.	.	.	1	.	.	.	.
47 .504	.	.	.	.	.	.	1	.	.	.	.
47 .507	.	.	.	.	.	.	1	.	.	.	.
47 .511	.	.	.	.	.	.	1	.	.	.	.
47 .513	.	.	.	.	.	.	1	.	.	.	.
47 .523	.	.	.	.	.	.	1	.	.	.	.
47 .525	.	.	.	.	.	.	1	.	.	.	.

APPENDIX TABLE 7A.—Counts of fish larvae, tabulated by family, for all stations occupied by *Oceanographer* on zig-transect.

STATION NUMBER	Myctophidae	Gonostomatidae	Bathylagidae	Clupeidae	Engraulidae	Sternoptychidae	Chauliodontidae	Idiacanthidae	Other Stomiatoidei	Paralepididae	Scopelosauridae	Melamphaidae	Bregmacerotidae	Exocoetidae	Bramidae	Chiasmodontidae	Coryphaenidae	Nomeidae	Scombridae	Other Identified Larvae	Unidentified Larvae	Disintegrated Larvae	Total Fish Larvae
OP .001	8	.	.	.	7	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	17
OP .002	2	.	.	.	200	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	202
OP .003	4	.	.	.	74	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	79
OP .005	32	9	3	.	.	.	1	.	.	.	.	2	.	.	.	.	.	3	.	.	.	2	52
OP .007	50	19	11	.	.	.	1	.	.	.	.	.	.	.	.	2	.	3	.	.	.	2	88
OP .009	41	9	12	.	.	1	1	.	.	.	.	18	.	.	.	8	.	1	.	.	.	.	91
OP .011	50	19	6	.	.	.	3	.	.	.	.	4	.	.	.	2	.	7	.	5	1	9	106
OP .013	70	22	20	.	.	.	11	.	.	.	.	3	.	.	.	2	.	3	.	1	.	.	132
OP .015	46	15	24	.	.	.	5	.	.	.	.	1	.	.	2	1	.	.	.	.	2	2	98
OP .017	13	1	1	.	.	5	.	.	.	.	.	2	.	.	.	2	.	1	.	2	.	2	29
OP .019	20	10	8	.	.	16	1	.	1	.	.	1	.	.	1	.	.	3	.	.	3	.	64
OP .021	10	7	4	.	.	6	.	.	.	.	.	2	.	.	.	.	.	4	.	.	1	2	36
OP .023	251	53	15	.	.	61	2	.	1	.	.	5	.	.	.	3	.	.	.	.	.	2	393
OP .025	206	31	8	.	.	19	.	.	2	.	.	3	.	.	.	1	.	3	.	1	.	1	275
OP .027	248	110	111	.	.	41	.	3	8	14	.	9	.	.	.	1	.	13	.	1	.	30	589
OP .029	168	146	153	.	.	26	.	1	18	34	.	5	.	.	1	.	.	12	.	2	1	56	623
OP .032	321	154	213	.	1	54	2	3	17	79	2	16	.	.	.	3	.	7	.	1	1	12	886
OP .036	543	2047	487	.	1	36	.	.	18	57	.	12	.	.	.	.	.	10	.	2	.	25	3238
OP .040	113	126	176	.	.	6	.	.	14	9	.	3	.	.	.	1	.	11	.	1	.	8	468
OP .044	100	64	38	.	.	5	.	1	12	7	.	5	.	.	.	8	.	7	.	17	.	1	265
OP .048	230	103	119	.	.	47	.	.	24	54	20	13	.	.	2	1	.	4	.	18	.	97	732
OP .052	101	52	51	.	.	12	.	.	1	6	34	3	.	.	.	3	1	12	.	14	5	20	315
OP .056	62	20	108	.	.	4	.	1	5	40	26	10	.	.	1	.	1	3	.	5	5	30	321
OP .060	43	26	65	.	.	8	.	1	8	8	5	7	.	3	.	2	1	1	.	2	2	3	185
OP .064	387	51	96	.	.	17	.	.	17	26	21	17	.	.	.	2	1	3	.	7	.	10	655
OP .068	119	40	54	.	.	34	.	.	4	16	11	7	.	.	.	6	.	.	.	12	.	3	306
OP .072	109	7	30	.	.	13	.	1	.	9	1	4	.	.	1	4	.	.	.	4	.	4	187
OP .076	86	22	18	.	.	8	.	.	7	18	1	6	.	.	3	1	.	1	.	3	1	5	180
OP .080	127	67	49	.	.	20	.	.	5	13	2	8	.	.	1	2	.	8	.	1	.	4	307
OP .084	105	12	46	.	.	7	.	1	5	19	.	8	.	.	.	1	.	1	.	3	.	14	222
OP .088	70	28	34	.	.	29	.	1	2	38	.	3	.	.	.	3	.	2	.	3	1	7	221
OP .092	17	6	28	.	.	2	.	.	2	7	.	1	.	.	.	1	.	1	.	9	.	1	75
OP .096	64	7	6	.	.	15	.	.	2	19	2	.	.	.	.	.	.	.	.	2	5	2	124
OP .100	92	4	6	.	.	.	.	.	2	5	4	.	.	.	.	.	.	.	.	1	.	.	114
OP .104	60	16	2	7	.	3	.	2	7	3	.	1	.	.	.	.	.	.	.	2	3	3	109
OP .108	95	44	31	.	.	7	.	7	6	28	3	2	.	.	1	.	.	.	.	1	4	6	235
OP .112	320	100	75	.	.	6	.	.	1	11	4	15	.	.	1	1	.	4	.	8	.	6	552
OP .116	383	123	43	.	.	18	.	.	.	23	2	11	.	.	3	.	.	2	.	7	1	5	621
OP .120	110	6	6	.	.	27	.	1	.	2	.	5	.	.	.	.	.	.	.	3	2	3	165
OP .124	296	3	4	.	.	67	2	1	1	.	.	3	.	.	.	.	1	4	.	4	.	.	386
OP .128	1325	181	20	.	.	133	3	2	4	5	.	4	.	1	.	.	.	2	.	5	1	11	1697
OP .132	1454	229	15	.	.	115	3	.	5	5	.	3	.	.	.	.	1	8	.	7	1	10	1856
OP .136	343	14	4	.	.	17	.	1	1	.	.	.	.	5	.	.	.	5	3	3	.	12	408
OP .138	411	9	15	.	.	54	3	.	3	.	.	5	.	.	.	.	.	4	2	1	.	3	510
OP .155	372	37	52	.	.	20	1	.	2	.	.	5	.	.	.	1	1	1	2	3	.	25	522
OP .160	220	152	27	.	.	11	7	.	4	.	.	2	.	5	3	2	1	5	3	33	.	35	510
OP .162	255	155	6	.	.	.	.	.	.	1	.	4	.	2	2	.	.	15	48	31	1	5	525
OP .164	19	10	1	.	.	3	.	.	.	.	.	1	.	.	.	1	.	9	11	2	.	4	61
OP .166	4	2	1	.	.	3	.	.	.	.	.	2	.	.	.	.	.	2	.	3	.	1	18
OP .168	131	18	6	2730	477	.	.	.	.	.	.	2	470	.	.	.	.	.	13	704	11	5	4567

APPENDIX TABLE 7B.—Myctophid larvae, tabulated by genus or species, stations occupied by *Oceanographer* on zig-transect.

STATION NUMBER	Benthosema pterota panamense	Ceratoscopelus townsendi	Diaphus spp.	Diogenichthys laternatus	Gonichthys tenuiculus	Hygophum atratum	Hygophum proximum	Lampadena spp.	Lampanyctus spp.	Lepidophanes sp.	Lobianchia sp.	Loweina rara	Myctophum aurolaternatum	Myctophum nitidulum	Myctophum sp.	Notolychnus valdiviae	Notoscopelus resplendens	Protomyctophum sp.	Symbolophorus evermanni	Triphoturus spp.	Unidentified Myctophids	Disintegrated Myctophids	Total Myctophids
OP .001	.	.	.	.	.	.	.	.	6	.	.	.	.	.	.	.	.	.	.	1	.	1	8
OP .002	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	2
OP .003	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	2	4
OP .005	.	.	.	2	.	.	.	.	21	.	.	.	.	.	.	.	.	.	1	7	.	1	32
OP .007	.	.	1	8	.	.	.	.	12	.	.	.	.	.	.	.	1	.	16	12	.	.	50
OP .009	.	.	1	8	.	.	.	.	15	.	.	.	.	.	.	.	.	.	4	3	4	6	41
OP .011	.	.	.	10	.	.	.	.	11	.	.	.	.	.	.	.	.	.	7	13	2	7	50
OP .013	.	2	3	15	.	.	.	.	18	.	.	.	.	.	.	.	5	.	8	13	5	1	70
OP .015	.	.	.	5	1	2	.	.	5	.	.	.	.	.	.	.	2	.	19	5	5	2	46
OP .017	.	.	.	3	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	1	.	5	13
OP .019	.	.	.	5	.	1	.	.	3	.	.	.	.	.	.	.	.	.	7	3	1	.	20
OP .021	.	.	.	1	.	.	.	.	8	.	.	.	.	.	.	.	.	.	.	1	.	.	10
OP .023	.	.	.	188	1	.	.	.	47	.	.	.	.	.	.	.	.	.	1	10	4	.	251
OP .025	.	.	.	180	.	.	.	.	21	.	.	.	.	.	.	.	.	.	.	5	.	.	206
OP .027	.	.	.	213	1	6	.	.	16	.	.	.	.	2	.	.	.	.	2	.	.	8	248
OP .029	.	.	.	113	1	4	.	.	12	.	.	.	.	10	.	.	1	.	2	1	4	20	168
OP .032	.	.	2	229	4	.	.	.	12	.	.	.	3	25	.	.	1	.	5	27	.	13	321
OP .036	.	.	.	487	1	.	.	.	19	.	.	.	.	7	.	.	.	.	.	24	.	5	543
OP .040	.	.	.	65	.	.	.	.	25	.	.	.	.	17	.	.	.	.	.	4	.	2	113
OP .044	.	.	1	43	3	.	.	.	4	.	.	.	4	42	.	.	3	.	.	.	.	.	100
OP .048	.	.	1	51	5	.	.	.	91	.	.	.	5	47	.	.	3	.	.	9	2	16	230
OP .052	.	.	2	51	.	1	.	.	27	.	.	.	.	11	.	.	.	.	.	2	1	6	101
OP .056	.	.	1	18	1	.	.	.	5	.	.	.	.	15	.	1	.	.	.	2	5	14	62
OP .060	.	.	3	11	.	.	.	.	7	.	.	.	.	18	.	.	.	.	.	2	.	2	43
OP .064	.	.	5	253	3	.	.	.	65	.	.	.	1	38	.	.	6	.	.	11	.	5	387
OP .068	.	.	4	74	5	.	.	.	24	.	.	.	5	27	1	.	14	1	1	3	2	8	119
OP .072	.	.	.	16	5	.	.	.	23	.	.	.	1	47	.	.	3	.	.	1	.	13	109
Op .076	.	.	5	24	3	.	.	.	3	.	.	.	.	31	.	.	7	.	.	5	.	8	86
OP .080	.	.	5	46	1	.	.	.	32	.	.	.	1	30	.	.	7	.	.	5	.	.	127
OP .084	.	.	.	55	3	.	.	.	15	.	.	.	1	15	.	1	1	1	.	1	.	12	105
OP .088	.	.	5	26	1	.	.	.	20	.	.	.	1	5	.	.	4	.	4	2	.	2	70
OP .092	.	.	.	6	.	.	.	.	6	.	.	.	.	2	.	.	2	.	.	.	1	.	17
OP .096	.	.	3	41	2	.	.	.	5	.	.	.	.	3	.	.	2	1	.	7	.	.	64
OP .100	.	.	2	77	.	.	.	.	7	.	.	.	.	.	.	.	1	.	.	5	.	.	92
OP .104	.	.	1	20	.	.	.	.	15	.	.	.	.	14	.	.	1	.	1	7	.	1	60
OP .108	.	.	4	32	4	1	.	.	11	.	1	.	1	26	.	2	4	.	.	4	.	5	95
OP .112	.	.	4	256	.	.	1	.	39	.	.	.	3	1	.	2	2	.	3	4	.	5	320
OP .116	.	.	.	347	.	.	1	.	16	.	.	.	6	5	.	3	1	.	1	.	3	.	383
OP .120	.	.	.	97	1	.	.	.	1	.	.	.	2	3	.	2	1	.	1	1	.	1	110
OP .124	.	.	.	265	.	.	.	.	14	.	.	.	3	2	.	6	2	1	1	2	.	.	296
OP .128	.	.	1	1188	9	.	.	.	88	.	.	.	9	1	.	5	.	1	9	2	1	11	1325
OP .132	.	.	1	1300	2	.	.	.	122	.	.	.	15	1	.	2	1	4	3	.	.	3	1454
OP .136	.	.	.	338	1	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	343
OP .138	.	.	.	403	.	.	.	.	7	.	.	.	1	.	.	.	.	.	.	.	.	.	411
OP .155	.	.	.	346	.	.	.	.	18	.	.	.	1	.	.	.	.	.	.	.	.	7	372
OP .160	.	.	2	135	3	.	.	.	65	.	.	.	.	.	.	.	.	.	.	.	.	15	220
OP .162	.	.	.	206	2	.	.	.	45	.	.	.	2	.	.	.	.	.	.	.	.	.	255
OP .164	.	.	.	19	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	19
OP .166	.	.	.	2	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	4
OP .168	43	.	.	86	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	131

APPENDIX TABLE 7C.—Counts of selected categories of fish larvae, tabulated by station, for *Oceanographer* on zig-transect.

STATION NUMBER	Bathylagus nigrigenys	Leuroglossus stilbius urotranus	Cyclothone spp.	Ichthyococcus irregularis	Maurolicus muelleri	Vinciguerria lucetia	Bathophilus sp.	Stomias sp.	Scopelarchidae	Trachypteridae	Diplospinus multistriatus	Lepidopus sp.	Nealotus tripes	Carangidae	Gobiidae	Labridae	Sciaenidae	Scorpaenidae	Serranidae	Bothus leopardinus	Citharichthys spp.	Syacium ovale	Symphurus spp.	Total: selected categories
OP .001	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1
OP .002	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
OP .003	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
OP .005	3	.	1	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12
OP .007	11	.	1	.	.	18	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	30
OP .009	12	.	1	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	21
OP .011	6	.	2	.	.	17	.	.	4	.	1	.	.	.	.	.	.	.	.	.	.	.	.	30
OP .013	20	.	3	.	.	19	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	43
OP .015	24	.	6	.	.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	39
OP .017	1	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	3
OP .019	8	.	1	.	.	9	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	19
OP .021	4	.	.	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11
OP .023	15	.	2	.	.	51	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	69
OP .025	8	.	1	.	.	30	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	42
OP .027	44	67	.	.	.	110	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	225
OP .029	52	101	2	.	.	144	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	302
OP .032	69	144	1	.	.	152	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	368
OP .036	36	451	.	.	1	2046	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2535
OP .040	11	165	.	.	.	125	.	4	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	306
OP .044	24	14	.	.	.	60	.	2	1	.	.	1	1	.	2	1	1	4	.	1	.	.	3	115
OP .048	93	26	1	3	54	41	.	3	.	.	.	.	7	.	3	.	1	1	.	.	1	.	2	236
OP .052	50	1	1	2	5	43	.	.	.	1	.	.	6	.	1	.	.	1	1	.	.	.	.	112
OP .056	102	6	.	1	6	13	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	130
OP .060	65	.	.	.	17	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	91
OP .064	94	2	2	2	6	40	2	4	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	155
OP .068	44	10	1	.	.	38	.	1	.	.	.	.	4	.	.	.	.	1	.	1	.	.	.	100
OP .072	25	5	.	.	2	3	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	.	37
OP .076	18	.	2	1	2	17	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	41
OP .080	49	.	1	.	.	66	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	118
OP .084	45	1	3	.	4	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	61
OP .088	34	.	6	.	.	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	62
OP .092	28	.	3	.	2	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	6	.	.	41
OP .096	6	.	.	2	4	1	.	1	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	16
OP .100	6	.	.	.	1	3	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12
OP .104	2	.	.	.	7	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	18
OP .108	31	.	1	2	19	22	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	76
OP .112	75	.	10	.	35	55	.	.	.	3	.	.	1	.	.	.	.	.	.	.	.	.	.	179
OP .116	43	.	9	2	12	100	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	169
OP .120	6	.	.	.	.	6	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	14
OP .124	4	.	.	.	.	3	.	.	1	.	.	.	1	.	.	1	.	.	.	.	.	.	.	10
OP .128	20	.	14	1	.	166	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	204
OP .132	15	.	12	3	.	214	.	4	1	.	.	.	.	.	.	.	.	.	.	1	.	2	.	252
OP .136	4	.	.	.	.	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	20
OP .138	15	.	.	.	.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24
OP .155	52	.	.	.	.	37	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	1	92
OP .160	27	.	.	.	.	152	.	.	1	.	.	.	.	.	16	.	.	.	.	4	.	4	3	207
OP .162	6	.	3	.	.	152	.	.	1	.	.	.	.	1	18	.	.	1	1	1	.	.	5	189
OP .164	1	.	.	.	.	10	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	12
OP .166	1	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
OP .168	6	.	.	.	.	18	.	.	.	.	.	.	.	353	2	.	31	3	24	.	5	31	149	622

APPENDIX TABLE 8.—Station data: latitude and longitude, date of collection, time of day, depth of haul, and standardized haul factor.

STATION NUMBER	Latitude	Longitude (W)	Date - Month and Day of 1967	Hour *	Depth of Haul	Standardized Haul Factor
CRUISE	45					
45 .016	20 00.0N	118 57.2	VIII- 7	1416-D	204	3.16
45 .018	19 15.7N	118 56.0	VIII- 8	0127-N	214	3.41
45 .020	18 34.8N	118 59.0	VIII- 8	0835-D	197	3.02
45 .021	18 14.8N	118 58.3	VIII- 8	1216-D	212	3.54
45 .023	17 41.0N	119 01.8	VIII- 8	2110-N	214	3.48
45 .024	17 19.9N	119 01.5	VIII- 9	0115-N	213	2.95
45 .026	16 31.0N	119 02.8	VIII- 9	0904-D	175	2.51
45 .028	16 11.3N	119 03.3	VIII- 9	1349-D	179	2.80
45 .030	15 48.5N	119 05.3	VIII- 9	1830-NT	201	3.35
45 .032	15 10.5N	119 04.0	VIII-10	0020-N	194	3.15
45 .034	14 34.2N	119 03.2	VIII-10	0636-DT	210	3.44
45 .035	14 11.2N	119 03.8	VIII-10	1255-D	183	2.79
45 .037	13 47.0N	119 04.0	VIII-10	1755-DT	198	3.53
45 .039	13 00.0N	119 03.6	VIII-10	2400-N	193	3.12
45 .041	12 31.0N	119 03.5	VIII-11	0534-NT	203	3.83
45 .043	11 54.5N	119 02.7	VIII-11	1338-D	177	2.74
45 .044	11 29.0N	119 00.5	VIII-11	1820-NT	207	3.56
45 .046	10 51.7N	119 02.2	VIII-11	0005-N	216	3.78
45 .048	10 15.7N	119 03.3	VIII-12	0601-DT	177	2.67
45 .050	09 34.3N	119 03.0	VIII-12	1446-D	201	3.54
45 .051	09 10.2N	118 59.5	VIII-12	2051-N	201	3.31
45 .053	08 46.6N	118 58.3	VIII-13	0105-N	203	3.19
45 .054	08 28.2N	118 57.0	VIII-13	0716-D	209	3.38
45 .056	07 53.2N	118 51.3	VIII-13	1505-D	203	3.28
45 .058	07 24.8N	118 47.2	VIII-13	2030-N	191	2.97
45 .060	06 50.0N	118 55.3	VIII-14	0151-N	211	3.40
45 .063	05 55.5N	118 56.5	VIII-14	1053-D	209	3.46
45 .065	05 23.2N	118 51.2	VIII-14	1901-NT	224	3.90
45 .067	04 53.5N	119 06.8	VIII-14	2345-N	222	3.88
45 .071	04 06.0N	119 15.3	VIII-15	0730-D	219	3.61
45 .073	03 34.2N	119 14.7	VIII-15	1536-D	210	3.79
45 .078	02 48.5N	119 11.0	VIII-15	0001-N	201	3.71
45 .083	02 02.0N	119 03.2	VIII-16	0640-DT	213	3.64
45 .086	01 33.8N	119 02.2	VIII-16	1229-D	212	4.18
45 .090	00 57.2N	119 04.5	VIII-16	1901-NT	209	4.15
45 .094	00 23.5N	119 01.5	VIII-17	0051-N	201	3.81
45 .098	00 13.5S	118 58.0	VIII-17	0740-D	205	3.50
45 .102	00 56.0S	118 51.0	VIII-17	1253-D	171	1.96
45 .106	01 42.2S	118 43.8	VIII-17	1901-NT	202	3.02
45 .110	02 22.0S	118 43.5	VIII-17	0036-N	196	4.02
45 .114	03 12.0S	118 43.2	VIII-18	0800-D	212	3.26
45 .117	03 38.0S	118 48.5	VIII-18	1237-D	222	3.52
45 .121	04 14.3S	118 50.0	VIII-18	1841-NT	191	2.86
45 .125	04 45.8S	118 53.0	VIII-19	0243-N	216	4.20
45 .127	05 10.0S	118 54.5	VIII-19	0745-D	192	3.31
45 .129	05 41.8S	118 54.9	VIII-19	1231-D	215	3.91
45 .131	06 19.5S	118 58.0	VIII-19	1831-NT	205	3.83
45 .133	06 57.8S	119 01.5	VIII-19	2344-N	219	3.47
45 .135	07 26.8S	119 04.0	VIII-20	0535-NT	199	3.56
45 .137	08 12.0S	119 06.3	VIII-20	1125-D	214	3.79
45 .139	08 47.8S	119 00.0	VIII-20	1718-DT	200	4.19
45 .140	09 44.7S	118 59.0	VIII-21	0016-N	217	3.95
45 .163	09 56.9S	111 59.5	VIII-23	1153-D	217	3.82
45 .165	09 17.0S	111 59.0	VIII-23	1758-NT	196	3.46
45 .167	08 38.0S	111 57.4	VIII-23	2346-N	211	3.80
45 .169	08 01.3S	111 54.3	VIII-24	0641-D	208	3.76
45 .171	07 22.4S	111 51.0	VIII-24	1211-D	208	3.00
45 .173	06 47.5S	111 53.5	VIII-24	1750-NT	201	3.18
45 .175	06 01.6S	111 56.7	VIII-24	2356-N	218	3.84
45 .177	05 21.1S	111 59.5	VIII-25	0607-DT	197	3.33
45 .179	04 44.3S	112 02.0	VIII-25	NOT QUANTITATIVE		
45 .183	04 10.0S	112 05.8	VIII-25	1757-NT	195	4.20
45 .187	03 30.0S	112 01.5	VIII-25	2336-N	208	3.70
45 .191	02 56.3S	111 57.5	VIII-26	0611-DT	185	3.12
45 .194	02 17.9S	111 59.0	VIII-27	1752-NT	208	3.44
45 .198	01 30.7S	111 53.1	VIII-27	2341-N	196	3.50
45 .202	00 48.6S	111 46.6	VIII-28	0625-DT	181	2.86
45 .206	00 17.2S	111 56.5	VIII-28	1203-D	212	3.66
45 .283	00 04.2N	111 59.3	IX- 2	1321-D	174	2.49
45 .287	00 32.5N	112 04.5	IX- 2	1926-N	237	4.99
45 .289	00 53.8N	112 03.3	IX- 2	0001-N	194	4.02
45 .293	01 26.2N	112 01.4	IX- 3	0621-DT	202	3.81
45 .297	02 07.9N	111 58.3	IX- 3	1209-D	207	3.30
45 .301	02 47.3N	112 02.0	IX- 3	1811-NT	217	3.95
45 .305	03 25.8N	112 00.3	IX- 3	2335-N	209	3.60
45 .309	04 08.6N	111 56.3	IX- 4	0601-DT	222	3.82
45 .313	04 55.0N	111 53.5	IX- 4	1154-D	192	2.93
45 .316	05 58.7N	111 57.8	IX- 4	1746-NT	215	3.53
45 .319	07 01.8N	112 05.4	IX- 5	0620-D	217	3.35
45 .321	07 40.2N	112 06.8	IX- 5	1149-D	194	2.77
45 .323	08 18.0N	112 01.0	IX- 5	1756-NT	194	2.58
45 .325	09 01.8N	111 54.8	IX- 5	0007-N	156	2.02
45 .329	10 18.7N	111 44.0	IX- 6	1150-D	202	2.86
45 .331	10 49.5N	111 39.5	IX- 6	1805-NT	175	2.45
45 .333	11 27.0N	111 57.0	IX- 6	2341-N	156	2.52
45 .335	12 05.7N	112 09.0	IX- 7	0605-DT	215	3.95
45 .337	12 27.8N	111 36.1	IX- 7	1146-D	207	3.17
45 .339	12 58.4N	111 14.3	IX- 7	1757-NT	216	3.11
45 .341	13 33.4N	110 50.0	IX- 8	0006-N	187	3.01
45 .343	13 56.3N	110 34.0	IX- 8	0805-D	193	2.79
45 .344	14 12.5N	110 23.0	IX- 8	1146-D	144	1.80
45 .345	14 38.2N	109 37.1	IX- 8	1841-N	135	1.71
45 .348	14 57.4N	109 04.3	IX- 8	2345-N	199	3.16
45 .350	15 16.0N	108 37.5	IX- 9	0535-DT	206	3.22
45 .352	15 45.0N	108 08.5	IX- 9	1141-D	217	3.56
45 .356	16 53.0N	107 03.0	IX- 9	2334-N	186	2.87
45 .358	17 20.5N	106 29.8	IX-10	0536-DT	208	3.40
45 .360	18 01.0N	105 41.0	IX-10	1248-D	216	3.68
45 .362	18 16.5N	105 20.5	IX-10	1828-N	199	3.27
45 .365	18 48.5N	104 44.0	IX-10	2351-N	207	3.48
45 .367	19 00.0N	104 50.0	IX-13	1455-D	212	3.57
45 .369	19 05.3N	105 09.2	IX-13	1925-N	209	3.53
45 .371	19 12.5N	105 40.5	IX-14	0024-N	203	3.33
45 .373	19 19.5N	106 13.8	IX-14	0601-D	221	3.63
45 .375	19 34.3N	106 57.2	IX-14	1148-D	184	2.74
45 .377	19 36.2N	107 37.6	IX-14	1810-NT	195	3.31
45 .379	19 38.5N	108 24.0	IX-14	2351-N	204	3.27
45 .381	19 41.7N	109 08.0	IX-15	0520-DT	192	2.82

APPENDIX TABLE 8.—Station data: latitude and longitude, date of collection, time of day, depth of haul, and standardized haul factor.—*Continued.*

STATION NUMBER	Latitude	Longitude (W)	Date - Month and Day of 1967	Hour*	Depth of Haul	Standardized Haul Factor
45 .383	19 48.0N	109 56.7	IX-15	1126-D	212	3.37
45 .385	19 53.0N	110 46.2	IX-15	1755-NT	200	3.07
45 .387	19 58.7N	111 25.2	IX-15	2328-N	206	3.22
CRUISE	46					
46 .002	16 14.0N	100 27.5	VIII-16	1801-NT	214	3.53
46 .004	15 48.5N	100 53.8	VIII-17	0032-N	195	2.60
46 .006	15 28.0N	101 18.0	VIII-17	0730-D	209	3.31
46 .007	15 13.0N	101 35.5	VIII-17	1150-D	262	3.91
46 .009	14 50.5N	102 02.0	VIII-17	1750-NT	202	2.98
46 .011	14 19.2N	102 38.0	VIII-17	2352-N	198	2.90
46 .013	13 56.0N	103 01.0	VIII-18	0541-D	211	3.39
46 .015	13 20.0N	103 27.0	VIII-18	1141-D	211	3.34
46 .017	12 53.0N	103 56.0	VIII-18	1741-NT	214	3.51
46 .019	12 16.0N	104 32.0	VIII-19	0052-N	208	2.99
46 .020	12 03.0N	104 46.0	VIII-19	0601-D	217	3.45
46 .022	11 26.0N	105 04.0	VIII-19	1136-D	192	2.39
46 .024	10 46.0N	105 08.0	VIII-19	1748-NT	216	3.37
46 .026	10 03.5N	105 02.0	VIII-19	2351-N	195	3.10
46 .028	09 31.0N	105 05.0	VIII-20	0551-D	211	3.65
46 .030	08 43.0N	105 03.0	VIII-20	1159-D	187	3.35
46 .032	08 07.0N	105 00.0	VIII-20	1733-NT	215	3.61
46 .034	07 22.0N	104 57.0	VIII-20	2351-N	216	3.58
46 .036	06 50.0N	104 54.0	VIII-21	0551-DT	126	1.85
46 .038	06 13.0N	104 47.0	VIII-21	1208-D	208	3.45
46 .040	05 39.0N	104 53.0	VIII-21	1749-NT	216	3.59
46 .042	04 52.0N	105 00.0	VIII-22	0041-N	208	3.57
46 .044	04 34.0N	105 02.0	VIII-22	0551-DT	214	3.56
46 .046	03 57.0N	105 04.0	VIII-22	1153-D	204	3.29
46 .048	03 33.0N	105 11.0	VIII-22	1748-NT	213	3.58
46 .050	02 50.0N	105 16.0	VIII-23	0011-N	204	3.35
46 .052	02 28.0N	105 15.0	VIII-23	0551-DT	210	3.28
46 .054	01 47.0N	105 12.0	VIII-23	1227-D	157	2.05
46 .055	01 29.0N	105 14.0	VIII-23	1809-N	159	2.09
46 .057	00 53.0N	105 19.0	VIII-23	2346-N	112	1.18
46 .059	00 24.0N	105 25.0	VIII-24	0606-D	84	.84
46 .061	00 20.0S	105 20.0	VIII-24	1159-D	161	2.36
46 .063	00 42.0S	105 15.0	VIII-24	1738-NT	219	3.73
46 .065	01 34.0S	105 08.0	VIII-25	0001-N	194	3.09
46 .067	02 00.0S	105 01.0	VIII-25	0541-DT	202	3.49
46 .069	02 47.7S	104 48.0	VIII-25	1204-D	261	3.43
46 .071	03 17.0S	104 55.0	VIII-25	1750-NT	199	3.16
46 .075	04 27.0S	105 00.0	VIII-28	1203-D	165	2.34
46 .077	05 01.0S	105 03.0	VIII-28	1750-NT	219	3.49
46 .079	01 04.0S	098 03.0	VIII-31	0321-N	170	2.19
46 .082	00 10.9S	098 02.0	VIII-31	1218-D	196	3.06
46 .084	00 10.0N	098 03.0	VIII-31	1808-N	208	3.41
46 .086	00 47.0N	098 04.0	IX- 1	0001-N	179	2.64
46 .088	01 12.0N	098 04.0	IX- 1	0546-D	217	3.96
46 .090	01 55.0N	098 05.0	IX- 1	1200-D	170	2.45
46 .092	02 21.0N	098 07.0	IX- 1	1729-NT	210	3.49
46 .094	03 08.0N	098 12.0	IX- 2	0001-N	196	2.97
46 .096	03 32.5N	098 14.5	IX- 2	0531-D	198	3.12
46 .098	04 20.0N	098 00.0	IX- 2	1208-D	198	3.14
46 .100	04 48.0N	098 04.0	IX- 2	1745-N	223	3.50
46 .102	05 36.0N	097 54.0	IX- 2	2341-N	210	3.21
46 .104	06 09.0N	097 45.0	IX- 3	0611-D	199	2.81
46 .106	06 56.4N	097 48.0	IX- 3	1211-D	213	3.45
46 .108	07 35.0N	098 00.0	IX- 3	1742-N	215	3.29
46 .110	08 25.0N	097 56.0	IX- 3	2351-N	209	3.94
46 .112	08 57.5N	097 51.0	IX- 4	0411-NT	212	3.93
46 .114	09 45.0N	097 48.0	IX- 4	1206-D	216	3.53
46 .116	10 25.0N	098 01.0	IX- 4	1742-N	221	3.86
46 .118	11 02.5N	098 04.5	IX- 5	0011-N	204	3.08
46 .120	11 28.0N	098 07.0	IX- 5	0422-NT	218	3.44
46 .122	12 17.9N	097 59.0	IX- 5	1238-D	201	3.10
46 .124	12 53.0N	098 03.0	IX- 5	1734-NT	220	3.68
46 .126	13 41.0N	098 03.0	IX- 6	0021-N	206	3.16
46 .128	14 09.0N	098 01.0	IX- 6	0416-NT	225	3.82
46 .130	14 56.0N	097 57.0	IX- 6	1211-D	199	3.11
46 .132	15 38.0N	098 01.0	IX- 6	1740-NT	213	2.60
46 .134	13 12.5N	091 51.0	IX-15	1141-D	214	3.54
46 .135	12 40.0N	092 03.0	IX-15	1701-NT	218	3.63
46 .137	11 48.0N	092 03.0	IX-15	2340-N	206	3.31
46 .139	11 08.0N	091 58.0	IX-16	0418-DT	199	2.90
46 .141	10 19.2N	091 54.0	IX-16	1151-D	204	3.23
46 .143	09 42.0N	091 58.0	IX-16	1732-N	218	3.57
46 .145	08 55.0N	092 02.0	IX-16	2349-N	177	2.55
46 .147	08 28.0N	092 05.0	IX-17	0419-DT	170	2.45
46 .149	07 44.0N	092 08.0	IX-17	1141-D	182	2.74
46 .151	07 01.0N	092 08.0	IX-17	1731-N	204	3.19
46 .153	06 13.0N	092 03.0	IX-17	2338-N	183	2.86
46 .155	05 40.0N	091 58.0	IX-18	0418-DT	224	3.88
46 .157	04 54.0N	091 52.0	IX-18	1141-D	205	3.17
46 .159	04 19.0N	091 56.0	IX-18	1731-N	219	3.58
46 .161	03 34.0N	091 56.0	IX-18	2339-N	217	3.47
46 .163	02 59.0N	092 00.0	IX-19	0418-DT	228	3.67
46 .165	02 13.0N	092 07.0	IX-19	1141-D	195	2.64
46 .167	01 39.0N	092 04.0	IX-19	1748-N	189	2.48
46 .169	00 54.0N	092 04.0	IX-20	0001-N	156	2.10
46 .171	00 23.0N	092 04.0	IX-20	0418-DT	216	3.71
46 .173	00 14.2S	092 03.0	IX-20	1141-D	194	2.95
46 .175	00 47.0S	092 03.0	IX-20	1731-N	207	3.45
46 .177	01 32.0S	092 06.0	IX-20	2339-N	197	3.33
46 .179	02 03.5S	092 07.0	IX-21	0416-DT	159	2.44
46 .181	02 49.6S	092 10.0	IX-21	1141-D	128	1.57
46 .183	03 27.0S	092 08.5	IX-21	1731-N	171	2.45
46 .185	04 09.5S	092 07.0	IX-21	2337-N	176	3.12
46 .187	04 46.0S	092 06.0	IX-22	0418-DT	222	3.42
46 .189	05 27.0S	092 05.0	IX-22	1211-D	205	3.42
CRUISE	47					
47 .001	05 36.0N	077 51.0	VII-31	1722-N	181	2.86
47 .005	06 03.0N	078 20.0	VIII- 1	2319-N	214	3.53
47 .008	06 24.0N	078 41.0	VIII- 2	0213-NT	164	2.33
47 .011	06 50.0N	079 16.0	VIII- 2	1046-D	175	2.60
47 .019	06 58.0N	080 54.0	VIII- 2	2306-N	156	1.88
47 .022	06 21.0N	080 41.0	VIII- 3	0331-DT	215	3.66
47 .025	05 41.0N	080 32.0	VIII- 3	0943-D	203	3.10
47 .028	04 51.0N	080 15.0	VIII- 3	1840-N	175	2.42

APPENDIX TABLE 8.—Station data: latitude and longitude, date of collection, time of day, depth of haul, and standardized haul factor.—*Continued.*

STATION NUMBER	Latitude	Longitude (W)	Date - Month and Day of 1967	Hour *	Depth of Haul	Standardized Haul Factor
47 .032	04 01.0N	079 54.0	VIII- 4	0136-N	195	2.77
47 .034	03 11.0N	079 41.0	VIII- 4	0730-D	196	2.77
47 .035	02 57.0N	079 39.0	VIII- 4	1351-D	205	3.13
47 .040	01 41.0N	079 22.0	VIII- 4	2010-N	202	2.69
47 .049	01 00.0N	082 00.0	VIII- 5	1239-D	215	3.67
47 .053	00 18.0N	081 57.0	VIII- 5	2104-N	193	2.91
47 .057	00 22.0S	082 00.0	VIII- 6	0211-N	210	3.38
47 .061	01 11.0S	082 02.0	VIII- 6	0748-D	193	3.09
47 .065	01 46.0S	081 58.0	VIII- 6	1333-D	202	2.48
47 .069	02 27.0S	081 50.0	VIII- 6	2006-N	148	1.94
47 .070	03 06.0S	082 01.0	VIII- 9	2103-N	193	2.53
47 .074	03 58.0S	082 02.0	VIII-10	0305-NT	203	3.35
47 .078	04 39.0S	082 03.0	VIII-10	NOT QUANTITATIVE		
47 .082	05 21.0S	082 02.5	VIII-10	1358-D	204	3.09
47 .086	06 04.0S	082 00.0	VIII-10	1941-N	208	3.06
47 .090	06 47.0S	081 58.0	VIII-11	0211-N	217	3.79
47 .094	07 28.0S	081 56.5	VIII-11	0756-D	218	3.40
47 .097	08 11.0S	082 01.0	VIII-11	1314-D	205	3.20
47 .099	08 48.0S	082 04.0	VIII-11	2111-N	214	3.39
47 .101	09 29.0S	082 05.0	VIII-12	0211-N	220	3.63
47 .103	10 09.0S	082 09.0	VIII-12	0751-D	213	3.51
47 .105	10 02.0S	081 34.0	VIII-12	1246-D	204	3.20
47 .107	09 50.0S	080 53.0	VIII-12	2042-N	196	2.81
47 .109	09 35.0S	080 15.0	VIII-13	0215-N	205	3.23
47 .113	09 22.0S	079 39.0	VIII-13	0733-D	216	3.61
47 .124	12 13.0S	077 39.0	VIII-16	1340-D	200	3.05
47 .128	12 29.0S	078 04.0	VIII-16	2216-N	200	3.00
47 .132	12 44.0S	078 52.0	VIII-17	0304-NT	213	2.50
47 .134	12 56.0S	079 28.0	VIII-17	0746-D	211	3.27
47 .137	13 10.0S	080 13.0	VIII-17	1341-D	210	3.17
47 .139	13 27.0S	081 01.0	VIII-17	1922-N	209	3.24
47 .141	13 38.0S	081 45.0	VIII-18	0107-N	211	3.38
47 .143	13 58.0S	082 25.0	VIII-18	0719-D	213	3.53
47 .145	14 18.0S	083 05.0	VIII-18	1232-D	213	3.47
47 .147	14 33.0S	083 41.0	VIII-18	2121-N	217	3.70
47 .149	14 43.0S	084 21.0	VIII-19	0235-N	214	3.61
47 .151	14 56.0S	085 00.0	VIII-19	0806-D	216	3.75
47 .153	14 17.0S	085 03.0	VIII-19	1259-D	210	3.53
47 .155	13 35.0S	085 00.0	VIII-19	1857-N	214	3.60
47 .157	12 44.0S	085 07.0	VIII-20	0335-NT	209	3.38
47 .159	12 06.5S	084 59.0	VIII-20	0756-D	214	3.82
47 .162	11 30.0S	085 01.3	VIII-20	1349-D	207	3.60
47 .164	10 43.2S	085 04.0	VIII-20	2146-N	215	3.65
47 .166	10 01.0S	085 05.3	VIII-21	0258-NT	211	3.57
47 .168	09 16.8S	085 07.3	VIII-21	0817-D	209	4.06
47 .171	08 35.0S	085 02.3	VIII-21	1325-D	212	3.61
47 .173	07 54.8S	085 06.0	VIII-21	1945-N	216	3.61
47 .175	07 16.0S	085 07.3	VIII-22	0123-N	211	3.80
47 .177	06 35.0S	085 08.5	VIII-22	0754-D	217	2.79
47 .179	05 49.7S	085 00.0	VIII-22	1301-D	221	4.39
47 .181	05 17.0S	085 01.0	VIII-22	2101-N	213	3.85
47 .185	04 28.5S	085 00.0	VIII-23	0309-NT	212	3.82
47 .189	03 51.0S	085 01.0	VIII-23	0837-D	211	3.57
47 .193	02 58.8S	085 01.0	VIII-23	1456-DT	220	4.15
47 .197	02 10.0S	085 03.0	VIII-23	2055-N	222	3.97
47 .201	01 26.0S	085 03.5	VIII-24	0249-NT	209	3.64
47 .205	00 39.5S	085 04.0	VIII-24	0835-D	207	3.61
47 .213	00 47.0N	084 55.0	VIII-24	2141-N	192	3.03
47 .217	01 31.0N	084 55.0	VIII-25	0326-NT	211	3.51
47 .221	02 08.0N	084 57.2	VIII-25	0836-D	211	3.44
47 .225	02 47.0N	084 58.5	VIII-25	1500-DT	200	3.22
47 .229	03 33.0N	084 54.0	VIII-25	2053-N	209	3.63
47 .233	04 21.0N	084 49.0	VIII-26	0248-NT	207	3.26
47 .237	05 06.5N	084 45.0	VIII-26	0835-D	213	3.76
47 .240	05 41.0N	084 56.5	VIII-26	1336-D	205	3.51
47 .242	06 21.0N	084 54.5	VIII-26	1957-N	146	2.10
47 .244	06 59.0N	084 54.0	VIII-27	0156-N	207	3.58
47 .246	07 42.5N	085 04.0	VIII-27	0825-D	204	3.52
47 .250	08 26.5N	085 05.0	VIII-27	1430-D	210	3.61
47 .254	08 56.5N	085 01.0	VIII-27	1946-N	224	4.26
47 .258	09 26.5N	084 52.0	VIII-28	0055-N	213	3.27
47 .268	11 58.0N	088 02.0	VIII-31	0919-D	191	3.30
47 .272	11 20.8N	088 00.0	VIII-31	1441-D	195	3.10
47 .276	10 54.0N	088 10.0	VIII-31	2201-N	183	3.20
47 .278	10 21.0N	088 18.0	IX- 1	0345-DT	219	3.69
47 .280	09 44.5N	088 14.0	IX- 1	0941-D	201	3.46
47 .283	09 04.0N	088 04.0	IX- 1	1512-DT	209	3.80
47 .286	08 15.0N	087 52.0	IX- 1	2117-N	215	3.81
47 .288	07 29.0N	087 44.0	IX- 2	0330-NT	215	3.91
47 .290	06 47.0N	087 57.0	IX- 2	0949-D	207	3.32
47 .292	06 20.0N	087 57.0	IX- 2	1514-DT	207	3.48
47 .295	05 16.0N	087 57.0	IX- 2	2201-N	208	3.53
47 .297	04 38.0N	087 57.0	IX- 3	2246-N	213	3.39
47 .301	04 00.0N	088 02.0	IX- 4	0353-DT	212	3.50
47 .304	03 22.0N	088 04.0	IX- 4	0847-D	211	3.46
47 .306	02 44.8N	087 59.0	IX- 4	1407-D	211	3.52
47 .310	02 02.0N	088 03.0	IX- 4	2027-N	204	3.32
47 .314	01 18.0N	088 06.0	IX- 5	0201-N	220	3.95
47 .318	00 33.5N	088 02.0	IX- 5	0829-D	216	3.90
47 .322	00 13.5S	088 07.0	IX- 5	1446-D	177	2.37
47 .326	00 59.0S	088 06.5	IX- 5	2053-N	150	2.01
47 .330	01 44.5S	088 08.2	IX- 6	0255-NT	185	3.10
47 .334	02 23.5S	088 02.3	IX- 6	0837-D	222	4.51
47 .338	03 04.0S	088 03.5	IX- 6	1421-D	212	4.21
47 .342	03 47.5S	088 03.5	IX- 6	2139-N	215	4.06
47 .345	04 29.0S	087 57.0	IX- 7	0334-NT	209	3.77
47 .349	05 09.5S	088 02.0	IX- 7	0923-D	217	3.95
47 .351	05 53.0S	087 59.0	IX- 7	1513-DT	174	2.60
47 .354	06 36.5S	087 59.0	IX- 7	2057-N	207	3.35
47 .357	07 18.0S	088 01.0	IX- 8	0207-N	205	3.32
47 .359	08 07.0S	088 03.0	IX- 8	0846-D	211	3.65
47 .362	08 55.0S	088 04.0	IX- 8	1421-D	206	3.34
47 .364	09 40.0S	088 02.0	IX- 8	2011-N	163	2.93
47 .367	10 22.0S	088 02.0	IX- 9	0207-N	209	3.23
47 .369	11 02.0S	087 58.0	IX- 9	0756-D	215	3.61
47 .371	11 48.0S	088 00.0	IX- 9	1346-D	205	3.18
47 .373	12 31.0S	088 03.0	IX- 9	2136-N	225	4.02
47 .376	13 13.8S	088 01.0	IX-10	0311-NT	209	3.40
47 .379	13 57.0S	087 57.0	IX-10	0902-D	211	3.69
47 .382	14 47.0S	087 59.0	IX-10	1451-DT	205	3.26

APPENDIX TABLE 8.—Station data: latitude and longitude, date of collection, time of day, depth of haul, and standardized haul factor.—*Continued.*

STATION NUMBER	Latitude	Longitude (W)	Date - Month and Day of 1967	Hour*	Depth of Haul	Standardized Haul Factor
47 .415	11 06.5S	095 01.5	IX-13	0745-D	211	3.14
47 .430	09 27.0S	094 59.0	IX-14	2100-N	209	3.04
47 .432	10 14.7S	095 02.0	IX-15	0253-N	229	3.41
47 .436	08 32.0S	095 01.5	IX-15	1225-D	237	4.51
47 .438	07 39.5S	095 08.5	IX-15	2040-N	214	3.80
47 .440	06 41.0S	095 09.0	IX-16	0258-N	256	4.84
47 .443	05 55.0S	095 08.3	IX-16	0908-D	249	4.26
47 .446	05 01.5S	095 05.5	IX-16	1510-D	173	2.99
47 .450	04 14.0S	095 01.0	IX-16	2036-N	216	4.54
47 .454	03 27.3S	095 00.5	IX-17	0242-N	215	4.08
47 .458	02 40.5S	095 00.5	IX-17	0817-D	161	2.31
47 .462	01 54.0S	095 04.0	IX-17	1356-D	180	2.68
47 .466	01 01.0S	095 08.5	IX-17	2101-N	210	5.19
47 .470	00 24.0S	095 09.2	IX-18	0424-DT	166	1.98
47 .478	01 05.2N	094 57.7	IX-19	1601-DT	205	3.43
47 .486	02 32.5N	094 42.0	IX-19	0313-NT	205	3.00
47 .490	03 16.3N	094 40.8	IX-19	0835-D	222	3.61
47 .494	03 58.0N	094 59.0	IX-19	1349-D	216	3.65
47 .498	04 44.0N	094 55.0	IX-19	2207-N	213	3.51
47 .501	05 36.0N	094 55.5	IX-20	0319-NT	206	3.90
47 .504	06 26.5N	094 58.5	IX-20	0853-D	219	3.39
47 .507	07 19.0N	094 57.5	IX-20	1427-D	209	3.19
47 .509	08 05.0N	095 02.0	IX-20	1955-N	207	2.87
47 .511	08 56.5N	095 04.0	IX-21	0142-N	200	2.83
47 .513	09 49.0N	095 05.0	IX-21	0722-D	193	2.44
47 .515	10 45.5N	095 04.0	IX-21	1321-D	217	3.58
47 .517	11 36.0N	095 00.5	IX-21	2101-N	211	3.48
47 .520	12 33.2N	094 57.0	IX-22	0249-N	205	3.13
47 .523	13 16.0N	095 00.0	IX-22	0748-D	210	3.72
47 .525	14 11.0N	095 01.0	IX-22	1330-D	204	2.92
47 .527	15 00.3N	094 59.0	IX-22	1858-N	204	3.01
CRUISE	OP					
OP .001	09 17.4S	079 41.9	XI-14	0228-NT	198	3.00
OP .002	09 41.9S	080 28.4	XI-14	0836-D	255	3.88
OP .003	09 53.6S	080 50.6	XI-14	1231-D	206	3.06
OP .005	10 14.0S	081 26.0	XI-14	1818-N	192	3.41
OP .007	10 40.0S	082 20.5	XI-14	0008-N	191	3.28
OP .009	10 58.4S	082 59.4	XI-15	0626-D	191	2.63
OP .011	11 26.2S	083 51.6	XI-15	1216-D	179	2.87
OP .013	11 58.1S	084 54.6	XI-15	1948-N	205	2.68
OP .015	11 18.9S	084 54.4	XI-15	0001-N	194	3.37
OP .017	10 31.0S	084 54.0	XI-16	NOT QUANTITATIVE		
OP .019	09 40.5S	084 52.8	XI-16	1225-D	214	3.98
OP .021	08 57.1S	084 52.7	XI-16	1827-N	240	4.09
OP .023	07 57.8S	084 53.6	XI-16	0008-N	193	3.38
OP .025	07 13.1S	084 52.7	XI-17	0611-D	205	3.41
OP .027	06 07.8S	084 55.1	XI-17	1153-D	206	3.65
OP .029	05 15.9S	084 53.3	XI-17	1801-N	208	3.32
OP .032	04 12.9S	084 55.8	XI-17	0002-N	216	4.01
OP .036	03 34.3S	084 56.1	XI-18	0601-D	230	4.03
OP .040	02 30.7S	084 57.9	XI-18	1141-D	201	3.44
OP .044	01 57.0S	084 58.0	XI-18	1722-N	218	4.19
OP .048	00 41.1S	084 57.9	XI-18	2331-N	174	2.77
OP .052	00 04.1N	084 57.9	XI-19	0619-D	204	3.60
OP .056	00 17.8S	085 37.8	XI-19	1141-D	223	4.16
OP .060	00 30.6S	086 12.8	XI-19	1753-N	209	3.75
OP .064	00 54.2S	087 09.3	XI-19	2329-N	227	4.29
OP .068	01 10.4S	087 52.2	XI-20	0532-D	216	3.78
OP .072	01 37.8S	088 47.9	XI-20	1123-D	216	3.66
OP .076	01 56.8S	089 26.0	XI-20	1743-N	213	3.87
OP .080	02 20.7S	090 24.7	XI-20	2331-N	226	3.99
OP .084	02 36.6S	091 08.8	XI-21	0518-D	211	4.17
OP .088	02 59.5S	092 02.8	XI-21	1056-D	216	3.00
OP .092	02 11.6S	092 06.1	XI-21	1747-N	211	3.73
OP .096	01 07.5S	092 03.9	XI-21	2329-N	219	3.99
OP .100	00 24.0S	092 05.0	XI-22	0527-D	199	2.89
OP .104	00 46.5N	092 05.8	XI-22	1140-D	214	3.63
OP .108	01 24.8N	092 08.2	XI-22	1730-N	215	4.07
OP .112	02 35.5N	092 03.7	XI-22	2330-N	216	3.96
OP .116	03 15.0N	092 00.3	XI-23	0517-D	205	3.63
OP .120	04 23.6N	091 58.8	XI-23	1139-D	217	3.60
OP .124	05 08.7N	091 56.7	XI-23	1733-N	203	3.50
OP .128	06 08.4N	091 58.9	XI-23	2333-N	203	3.40
OP .132	06 48.3N	092 00.4	XI-24	0515-D	184	2.92
OP .136	07 57.4N	092 02.8	XI-24	1157-D	225	4.03
OP .138	08 12.3N	092 03.2	XI-24	1716-N	193	3.10
OP .155	09 03.1N	092 00.4	XI-25	1153-D	216	3.78
OP .160	10 14.9N	091 59.5	XI-25	2335-N	203	3.51
OP .162	11 09.5N	092 00.3	XI-26	0517-D	181	3.09
OP .164	11 43.5N	091 59.6	XI-26	1242-D	216	4.24
OP .166	12 24.0N	092 01.1	XI-26	1713-N	204	3.40
OP .168	13 21.2N	091 59.4	XI-26	2157-N	212	3.63