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NOAA Technical Report NMFS 6

Ichthyoplankton Survey of the Estuarine and Inshore Waters of the Florida Everglades, May 1971 to February 1972

L. Alan Collins and John H. Finucane

July 1984

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

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Ichthyoplankton Survey of the Estuarine and Inshore Waters of the Florida Everglades, May 1971 to February 1972

L. ALAN COLLINS and JOHN H. FINUCANE[1]

ABSTRACT

Quarterly ichthyoplankton sampling was conducted at 16 estuarine and 24 inshore stations along the Florida Everglades from May 1971 to February 1972. The area is one of the most pristine along the Florida coast. The survey provided the first comprehensive information on seasonal occurrence, abundance (under 10 m^2 of surface area), and distribution of fish eggs and larvae in this area. A total of 209,462 fish eggs and 78,865 larvae was collected. Eggs were identified only as fish eggs, but among the larvae, 37 families, 47 genera, and 37 species were identified. Abundance of eggs and larvae, and diversity of larvae, were greatest in the inshore zone. The 10 most abundant fish families which together made up 90.7% of all larvae from the study area were, in descending order of abundance: Clupeidae, Engraulidae, Gobiidae, Sciaenidae, Carangidae, Pomadasyidae, Cynoglossidae, Gerreidae, Triglidae, and Soleidae. Clupeidae, Engraulidae, and Gobiidae made up 59.9% of all larvae. The inshore zone (to a depth of about 10 m) was a spawning ground and nursery for many fishes important to fisheries. The catch of small larvae (≤3.5 mm SL) indicated that most fishes identified from the 10 most abundant families spawned throughout the inshore zone at depths of ≤10 m, but *Orthopristis chrysoptera*, Gerreidae, and *Prionotus* spp. spawned at depths of ≥10 m, with offshore to inshore (eastward) larval transport. Salinity was one of several environmental factors that probably limited the numbers of eggs and larvae in the estuarine zone. Abundance of eggs and larvae at inshore stations was usually as great as, and sometimes greater than, the abundance of eggs and larvae at offshore stations (due west of the Everglades).

INTRODUCTION

The National Marine Fisheries Service (NMFS) conducted studies of the Everglades National Park during 1971 and 1972 as part of a multiagency program to assess various aspects of the south Florida ecosystem. The objective of NMFS was to determine the distribution and abundance of eggs, larvae, and juveniles of fishes within the estuarine and inshore waters of the park. Lindall et al. (1973) reported on juvenile fishes in the study area. This paper reports the distribution and abundance of fish eggs and larvae.

Everglades National Park is one of the most pristine and biologically productive coastal regions of the Gulf of Mexico. Federal protection has left the park essentially unaltered by dredging, filling, bulkheading, and pollution. The region is subtropical in climate, fauna, and flora. The park includes a complex series of ecosystems including some of the last remaining wilderness area in south Florida. Approximately 59,896 ha (148,000 acres) are estuarine (McNulty et al. 1972) and are characterized by mangrove-covered islands interspaced by open water. Mangroves are active land builders and protect the lowlands from erosion during storms. Mangrove leaves are a major source of organic detritus used as food by some invertebrates and fishes (Odum 1971). The mangrove zone forms the transition between the estuary and upland. Tides are semidiurnal or diurnal and range from 0.2 to 1.4 m (U.S. Coast and Geodetic Survey 1970). Variation of the freshwater flow through the park is sometimes great. During periodic floods, the "river of fresh-water discharge through the Everglades becomes an important factor in the inshore circulation" which is normally a wind-dependent surface current moving west to southwesterly where depths are >10 m (Jones et al. 1973).

The estuary and adjacent inshore zone provide spawning and nursery grounds for many species of fish and shellfish. Studies of adult and juvenile fish have shown that these areas possess an abundant and diverse fish fauna. Tabb and Manning (1961) and Roessler (1970) reported 138 species in 55 families and 103 species in 49 families, respectively, in the south Everglades estuary. In 1972, 96 species in 41 families of fishes were collected in a northern Everglades area (U.S. Environmental Protection Agency 1973). Lindall et al. (1973) took juveniles representing 114 species in 44 families from estuarine and inshore waters within the area covered by our study. They found that the estuary was more important than the inshore zone of the Gulf of Mexico as a nursery area.

Little is known about the ichthyoplankton of the Everglades region. The only larval fish study in this area was confined to the family Sciaenidae (Jannke 1971). Houde and Chitty (1976), Houde et al. (1976, 1979), and Leak (1977) reported information on fish eggs and larvae from the continental shelf area adjacent to our study area. Nakamura et al. (1980) listed life stages of recreationally important marine fishes that have been collected from estuarine waters between Cape Romano and Florida Bay. An ichthyoplankton survey to assess spawning areas for sport fishes in the park was recently begun (Leak[2]).

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STATIONS AND METHODS

Three aquatic zones are recognized in this report. These are the estuarine, inshore, and offshore zones among which only the estuarine and inshore zones were sampled. The estuarine zone was defined as the semienclosed body of water where freshwater and saltwater mix. The boundary between the estuarine and inshore zones was an imaginary line connecting points of land marking entrances to embayments. The inshore zone was the aquatic zone adjacent to and seaward of the estuarine zone extending 39 km offshore. The offshore zone is the area beyond 39 km offshore which was sampled by Houde et al. (1979) during their 1971-74 survey.

Forty stations were sampled quarterly in our study. Sixteen estuarine stations were located in bays and at the mouths of major rivers from Caxambas Pass south to Buttonwood Canal near Flamingo (Fig. 1). Twenty-four inshore stations were located along eight east-west transects evenly spaced between Cape Romano and Cape Sable. Each of these transects was 9 km apart and consisted of three stations, each 19 km apart. A description of most of our estuarine stations, and all inshore stations, was given by Lindall et al. (1973).

At each estuarine and inshore station three hydrographic parameters were measured. Salinity and temperature were measured with an induction salinometer. Dissolved oxygen was measured by a modified Winkler method (Strickland and Parsons 1968).

Because estuarine and inshore stations had substantially different water depths, ichthyoplankton sampling methods differed in the two zones. All estuarine stations had water depths of 2.5 m or less (Table 1) and were sampled with a 0.5 m plankton net (505 μm mesh), which was towed on the surface at all 16 stations from off the side of a 4.9 m outboard motorboat. Most inshore stations were deeper (Table 1) and were sampled with a 1 m net (505 μm mesh) from the RV *Bellows*, a 19.8 m, diesel-powered boat. Nine of the inshore stations had water depths of 2.5 m or less and were sampled with surface tows. The middle stations on Transects II to VIII had an average depth of 5.4 m; those seven stations, and the eight most seaward stations on each of the eight transects, were sampled with step-oblique tows. Step-oblique tows began near the bottom and covered approximately 80% of the water column.

Estimates of volumes of filtered water and of egg and larval abundances were made from all tows. A flowmeter was mounted approximately 20% off-center in the mouth of the nets. The nets were pulled at 2-3 kn for 10 min in the estuarine zone and for 5 min in the inshore zone. From the number of revolutions of the meter during tows, the volume of filtered water was calculated (Tables 2 to 5). The tables also show abundance according to the formula $A = \frac{N \times D \times 10}{V}$, where A = abundance under 10 m^2 of sea surface, N = number of collected eggs or larvae, D = depth (station or tow), and V = volume of filtered water. To estimate abundance from surface tows, we assumed that eggs and larvae were uniformly distributed from surface to bottom at the stations where depth was $\leq$2.5 m. Thus, to calculate abundance, the station depth was used for surface tows, and the tow depth was used for oblique tows.

Both day and night samplings were conducted. All estuarine samples were taken during daylight hours due to navigational problems. During the first 3 mo, stations from the inshore area were also sampled by daylight in order initially to ensure that the large vessel could safely navigate the shallowest stations; all other inshore cruises were made at night. No day or night sampling was done for comparative purposes. The average duration of seasonal cruises was 6 d for the two zones.

All plankton samples were preserved in a 5% Formalin-seawater solution buffered with marble chips. All fish eggs and larvae were removed from the samples and counted. Settled plankton volumes were estimated to the nearest milliliter after removal of ctenophores, seagrasses, algal clumps, mangrove detritus, and debris (Tables 2 to 5). Volumes of neither the latter particles nor of the fish eggs and larvae were measured. Fish <10 mm were measured to the nearest 0.1 mm standard length (SL) with the aid of an ocular micrometer. Specimens >10 mm were measured to the nearest millimeter SL with a ruler.

Eggs were identified only as fish eggs, but larvae and juveniles were identified to the lowest possible taxon. Meristics, morphology, and pigmentation were used to identify fishes. Many larvae <5 mm were listed as unknown or were identified only to family, although identification was sometimes possible when good series were found. We used the serial or dynamic method of tracing certain characters back from juvenile to larval specimens (Moser and Ahlstrom 1970). Most identifications were verified by comparisons with specimens in our reference collection from the Tampa Bay area and with the collections of the NMFS Southeast Fisheries Center Laboratory at Miami, Fla., and the Florida Department of Natural Resources Marine Laboratory at St. Petersburg. The sciaenid larvae were compared with illustrations of previously identified specimens from the same general area (Jannke 1971). The nomenclature of Robins et al. (1980) was used.

The distribution and abundance of fish eggs and larvae indicated productivity (Houde and Chitty 1976) and spawning at estuarine and inshore stations. In some instances, specific identification of small ($\leq$3.5 mm) larvae permitted inferences on spawning of a particular fish.

Our catches were compared spatially and temporally with those from the offshore zone made by Houde et al. (1976, 1979). For some comparisons we used data from the offshore stations that were sampled due west of the Everglades during the same months and year(s) that we sampled in the estuarine and inshore zones. For other comparisons we used the summarized data from the entire offshore zone that was sampled seasonally from 1971 to 1974.

RESULTS

Hydrography

As expected, salinity values were more stable in the inshore zone than in the estuarine zone (Table 6). Inshore salinities ranged from 26.2 to 38.4 ppt, while estuarine salinities ranged from 1.8 to 41.2 ppt. Seasonally, inshore salinities never varied more than 9.1 ppt, while estuarine values varied by at least 24.6 ppt. Hypersaline conditions were noted during May 1971 in nearly all estuarine and inshore waters and were the result of a severe drought throughout most of south Florida. In Table 7 we list ranges of salinity, as well as of temperature, within which dominant larval fishes were collected.

Water temperatures were about the same for the estuarine and inshore zones (Table 6). The 16 estuarine stations had a range of 18.6° to 31.5°C. The 24 inshore stations had a range of 19.5° to 30.0°C.

Most dissolved oxygen values were near saturation (Table 6). Only 3 of the 229 water samples had values <3.0 ml/l.

General Distribution and Abundance of Ichthyoplankton

During this survey, 209,462 eggs and 78,865 larvae were collected from all tows. Numbers of eggs and larvae taken at all stations for each of the four quarters are given in Tables 2 to 5. Seasonal abundances are illustrated for each of the 40 stations in Figures 2 and 3.

May. — Egg abundances indicated that spawning during May 1971 was heaviest near the center of the inshore zone (Fig. 2, Table 2). The intermediate station on Transects III and IV had high egg abundances: 4,441 and 1,334 eggs under 10 m^2, respectively. In May 1971, total egg abundances from stations in the inshore and offshore zones (Houde et al. 1976) indicated that the waters <30 m deep west of the Everglades were a major spawning area for species with pelagic eggs. Eggs in the estuarine zone occurred mainly at Stations 7, 8, and 15. Most of the estuarine stations had fewer eggs under 10 m^2 than the inshore stations.

The greatest abundance of larval fish in the inshore and offshore zones was found at our Station II-3 during this month (Fig. 3, Table 2, and Houde et al. 1976). In general, however, the offshore stations sampled by Houde et al. (1976) had a greater average larval abundance than did our inshore stations.

August. — Most inshore and estuarine spawning in August 1971 seemed to have occurred in the area of our two most-seaward stations (Fig. 2). Four inshore stations and one estuarine station had egg abundances >1,000 under 10 m^2. Only 1 of the 26 offshore stations due west of the Everglades had as great an egg abundance (Houde et al. 1976). Stations 8, 14, and 15 were the estuarine locations where fish eggs were most abundant.

Our most-seaward stations on Transects I, II, III, and IV had the most fish larvae (>1,000 under 10 m^2). Only one offshore station had as high a larval abundance. Abundance of fish larvae ranged from 0 to 3 under 10 m^2 at the 16 estuarine stations during August (Fig. 3, Table 3).

November. — The third-quarter egg data (Table 4, Fig. 2) indicated that spawning was considerably less than in the previous two quarters. Values exceeding 100 eggs under 10 m^2 were found only at seven inshore stations. Samples near the Everglades were not collected by Houde et al. (1976) in November 1971. In the estuarine zone, eggs were most abundant at Stations 1, 14, and 15.

Larvae were in low abundance (0 to 158 under 10 m^2) compared with the previous two quarters (Fig. 3). The highest larval numbers under 10 m^2 were found at either Station 2 or Station 3 on all transects.

February. — In February 1972, egg abundances were high, especially in our northern, inshore zone (Table 5, Fig. 2). Five inshore stations had >1,000 eggs under 10 m^2, while only one of seven offshore stations equaled this abundance (Houde et al. 1976). Stations 1 and 15 had the most eggs in the estuarine zone, where the abundance ranged from 0 to 193 under 10 m^2.

Larval fish abundances in both the estuarine and inshore zones for February were about the same as for November. Values were from 0 to 186 under 10 m^2 in February and from 0 to 158 in November. The data from Houde et al. (1976) from farther west on the continental shelf indicated greater abundances of larvae, ranging from 10 to 1,131 under 10 m^2. Our southern transects had the highest inshore abundance of larvae, while Station 15 had the highest estuarine abundance (Table 5).

Ten Most Abundant Families of Larvae

Thirty-seven families, 47 genera, and 37 species of larvae were identified in our survey. Ten families constituted 90.7% (three families constituted 59.9%) of all larvae (Table 8). Of the 10 most abundant families for the entire four quarters of sampling, only the engraulids, gobiids, sciaenids, and triglids each made up at least 1.5% of the total catch in all sampling periods. Summaries of occurrence of the 10 most abundant families in the estuarine and inshore zones are given in Tables 9 and 10. Results for the 10 most abundant families in decreasing order of abundance follow.

Clupeidae. — The clupeids in the inshore zone were most abundant at depths of 5.5 to 12.0 m in August, while very few fish were ever collected in the estuarine zone (Fig. 4). Most clupeids in our catch were too small to identify to genus, although we recorded 4 genera and 3 species: *Opisthonema oglinum, Harengula jaguana, Sardinella brasiliensis,* and *Brevoortia* sp. The majority of our smallest (≤3.5 mm) larvae were collected during May and August at the most seaward stations (Tables 11-14). Houde et al. (1979) reported that most of their clupeid larvae were collected from waters <30 m deep during spring and summer months. The offshore catch consisted of 5 genera and 4 species, including all of the species that we identified, except *S. brasiliensis*. They also recorded *S. anchovia* and *Etrumeus teres*.

Opisthonema oglinum was the most abundant clupeid; most were found at inshore stations of 5.5 to 8.0 m depth during August (Fig. 5). This was the second most common clupeid in the offshore zone, where the majority was taken at the most landward stations (Houde et al. 1979). This species seemed to spawn offshore during spring and summer in waters <30 m deep.

Harengula jaguana was most abundant during May and August at inshore stations from 5.5 to 9.0 m deep (Fig. 6). Most offshore *H. jaguana* were collected at stations <30 m deep (Houde et al. 1979).

Sardinella spp. were usually found during August and February at the same stations and depths where most *O. oglinum* and *H. jaguana* were collected (Fig. 7). Although we identified *S. brasiliensis,* nearly all of our *Sardinella* could be identified only to genus. Most *S. anchovia* in the offshore zone were collected during late summer in waters <50 m deep (Houde et al. 1979).

Brevoortia sp. was most abundant in February at inshore stations of 1.5 to 2.5 m depth (Fig. 8). This was the only clupeid identified to genus in the estuarine zone (Table 10). Twice as many *Brevoortia* were collected in the inshore zone than in the offshore zone; most larvae in waters <30 m deep were collected during fall and winter cruises (Houde et al. 1979).

Engraulidae. — Anchovies were most abundant during August at inshore stations of 8.0 to 12.0 m and during May at estuarine stations (Fig. 9). Although we could not positively identify anchovies to genus, most of our specimens were probably *Anchoa hepsetus* or *A. mitchilli*. These two species were found to be abundant in the sampling area by Lindall et al. (1973). Anchovy larvae ≤3.5 mm were collected during every sampling period in both zones with the exception of November in the estuarine zone (Tables 11-18). Most of these small larvae occurred during August and May in the inshore and estuarine zones, respectively. Offshore, most engraulid larvae were caught at stations <50 m deep during spring and summer. No genera or species were identified by Houde et al. (1979).

Gobiidae. — Gobies were most abundant in the inshore zone during August at depths of 8.0 to 12.0 m and in the estuarine zone during May and February (Fig. 10). We identified three genera and no species. Larval gobies ≤3.5 mm occurred during every sampling period (Tables 11-18). These small larvae were usually collected during August and May in the inshore and estuarine zones, respectively. In the offshore zone, most gobies were caught in stations <50 m deep during the spring and summer (Houde et al. 1979). The offshore gobies were not identified to genus or species nor were their abundances given by station.

The dominant goby was *Microgobius* spp., which was most abundant at inshore stations during August and at estuarine stations during February (Fig. 11). Most of the smallest *Microgobius* also occurred during August inshore, while small larvae mainly occurred during May in the estuarine zone (Tables 11-18).

Gobiosoma spp. were also most abundant during August, but these were mainly found at two inshore stations that were 8.0 m deep (Fig. 12). The smallest *Gobiosoma* larvae were among those caught inshore in August, while no *Gobiosoma* larvae ≤3.5 mm were collected in the estuarine zone.

Low abundances of the third goby genus, *Gobionellus*, were found only at two inshore stations (Tables 11, 12).

Sciaenidae. — Larval sciaenids were most abundant during August at inshore stations 8.0 to 12.0 m deep and during February at estuarine stations (Fig. 13). Five genera and four species (*Bairdiella chrysura, Cynoscion nebulosus, Menticirrhus* spp., *Pogonias cromis*, and *Sciaenops ocellatus*) were identified (Tables 9, 10). Small (≤3.5 mm) sciaenid larvae usually occurred during August inshore; very few were found in the estuarine zone. Sciaenid larvae in the offshore zone were most abundant at stations <10 m deep during spring and summer (Houde et al. 1979). The sciaenids listed above, with the exception of *S. ocellatus*, were identified from the offshore zone. *Cynoscion arenarius, C. nothus, M. saxatilis, Leiostomus xanthurus*, and *Micropogonias undulatus* were also recorded in the offshore zone.

Most *B. chrysura* were caught during August at inshore stations that were 4.0 to 12.0 m deep and during February at estuarine stations (Fig. 14). Many of the small larvae were found inshore during August, although these larvae were found in both zones in all sampling periods with the exception of the estuarine zone in November (Tables 11-18). Most of the smallest sciaenid larvae found in the estuarine zone were *B. chrysura*. Larval *B. chrysura* were usually taken during June at offshore stations <10 m deep (Houde et al. 1979).

Cynoscion nebulosus was mostly found during May at some inshore and estuarine stations 1.0 to 6.0 m deep (Fig. 15). Larvae ≤3.5 mm were found during all four sampling periods inshore, but were found only during May in the estuarine zone (Tables 11-18). Offshore collections of *C. nebulosus* were usually made in the spring at depths <10 m (Houde et al. 1979).

Cynoscion spp. were about equally abundant in August, November, and February at inshore stations of 2.0 to 12.0 m depth, while no larvae were found in the estuarine zone (Fig. 16). Most *Cynoscion* spp. were probably *C. arenarius*, but *C. nothus* and *C. regalis* have also been reported from south Florida, so a definite species identification of our larvae was not possible (Stender 1980). Many larvae <3.5 mm were found inshore during each sampling period. Houde et al. (1979) recorded most *C. arenarius* in the winter, spring, and summer at depths <20 m. They recorded only one *C. nothus* at a 25 m depth.

Menticirrhus spp. were most abundant at some inshore stations 4.0 to 12.0 m deep during August and were almost nonexistent in the estuarine zone (Fig. 17). Many of the smallest larvae were found inshore in May, August, and November and lesser numbers occurred inshore in February (Tables 11-18). February was the only month in which such a small larva was found in the estuarine zone. Offshore, *Menticirrhus* (*saxatilis* and sp.) were usually collected during the winter, spring, and summer at stations <20 m deep (Houde et al. 1979).

Pogonias cromis was most abundant during November in the inshore zone at two stations that were 5.5 to 8.0 m deep; only a few of the fish occurred in the estuarine zone, all during February (Fig. 18). Inshore larvae ≤3.5 mm were mostly found during November, but a few were also found in May and February, while no such small larvae were found in the estuarine zone (Tables 11-18). Only two *P. cromis* larvae were collected offshore in shallow water during a spring cruise by Houde et al. (1979).

Sciaenops ocellatus was collected only during August and November at three inshore stations that were 4.0 to 6.0 m deep (Tables 1, 12, 13). All of the larvae ≤3.5 mm were collected during August (Tables 12, 13).

Two sciaenids that were collected only offshore (*M. undulatus* and *L. xanthurus*) were rarely collected west of the Everglades by Houde et al. (1979). They caught only one specimen of each of these sciaenids near our inshore stations.

Carangidae. — Larval jacks mostly occurred at some inshore stations of 4.0 to 12.0 m depth during August and were far less abundant in the estuarine zone (Fig. 19). Only *Chloroscombrus chrysurus* and *Oligoplites saurus* were identified. Many larvae ≤3.5 mm were found inshore during both May and August and fewer such larvae were found in the estuarine zone in May only (Tables 11-18). Offshore carangids had greatest abundances at stations <35 m deep during spring and summer (Leak 1977). Many larvae of the latter two species were collected at offshore stations closest to the Everglades, while 10 other species of jacks were found in waters >35 m deep.

Chloroscombrus chrysurus was most abundant at inshore stations of 8.0 to 12.0 m depth during August while no larvae were found in the estuarine zone (Fig. 20). Many small larvae of this species were collected inshore during both May and August (Tables 11, 12). Most offshore *C. chrysurus* were collected during spring and summer in water <35 m deep (Leak 1977).

Oligoplites saurus larvae were found in greatest abundance during May at inshore stations of 8.0 m depth and were also found at most estuarine stations of much shallower depth (Fig. 21). Larvae ≤3.5 mm were more abundant in May than August in both zones; such larvae occurred in the estuarine zone during May only (Tables 11-18). Offshore abundance of *O. saurus* was greatest in waters <20 m deep during spring and summer (Leak 1977).

Pomadasyidae. — The majority of the pomadasyids were *Orthopristis chrysoptera,* which had greatest abundance in both zones in February; most pigfish larvae were found at depths of 5.5 to 12.0 m inshore (Fig. 22). The smallest larvae were found at our most seaward stations during all sampling periods (Tables 11-14). Only two larvae ≤3.5 mm were found during May and February in the estuarine zone (Tables 15-18). Offshore, *O. chrysoptera* was usually caught in winter and spring at stations <20 m deep (Houde et al. 1979).

Cynoglossidae. — Greatest tonguefish abundance was found at inshore stations 8.0 to 12.0 m deep during August and no larvae occurred in the estuarine zone (Fig. 23). Only *Symphurus* spp. was identified but most of these larvae were probably *S. plagiusa.* Most small (≤3.5 mm) larvae occurred during May and August (Tables 11-14). Offshore, *Symphurus* spp. were mostly obtained at stations <50 m deep in the spring and summer (Houde et al. 1979).

Gerreidae. — Gerreids were most abundant at inshore stations 8.0 to 12.0 m deep during May and were found only during May in the estuarine zone (Fig. 24). Most of the gerreids that we collected were probably *Eucinostomus argenteus* or *E. gula.* Smallest (≤3.5 mm) larvae usually occurred at the most seaward stations in May and August and were not found during any other months (Tables 11-14). Such larvae in the estuarine zone were found during May only (Tables 15-18). Offshore larvae were most abundant at stations <50 m deep in the spring and summer and were not identified to genus or species (Houde et al. 1979).

Triglidae. — *Prionotus* spp. were most abundant at inshore stations with depths of 8.0 to 12.0 m during August; only two larvae were caught at estuarine stations, both during February (Fig. 25). The smallest larvae occurred at the most seaward stations during all four sampling periods (Tables 11-14). Offshore triglids were usually caught at depths of <50 m during all seasons and were not identified to genus (Houde et al. 1979).

Soleidae. — Most sole larvae were *Achirus lineatus,* which had its greatest abundance at inshore stations 4.0 to 9.0 m deep during August; only a few larvae were present in the estuarine zone during each quarter (Fig. 26). Larvae ≤3.5 mm were common in the inshore zone in May and August, while such larvae were uncommon there in November and February (Tables 11-14). A few of these small larvae occurred in the estuarine zone in May, August, and February (Tables 15-18). Offshore, *A. lineatus* was most abundant in depths of <15 m during the spring and summer (Houde et al. 1979).

SUMMARY

The inshore zone between Cape Romano and Cape Sable, Fla., was a spawning ground and nursery for a variety of fishes important to fisheries during our study. Larvae of recreationally and commercially important species present in the inshore zone were *Paralichthys albigutta, Elops saurus, Mugil cephalus, Bairdiella chrysura, Cynoscion nebulosus, Pogonias cromis, Sciaenops ocellatus, Scomberomorus maculatus, Archosargus probatocephalus,* and *Lagodon rhomboides.* Larvae of 27 other species were also identified.

The occurrence of larvae ≤3.5 mm from the 10 most abundant families indicated the location and time that some of these fishes spawned, as well as the direction of larval transport. Some of these small larvae were distributed about equally among the most-seaward, middle, and most-landward stations in the inshore zone (which suggested spawning throughout the ≤10 m depths), while the smallest larvae of other fishes were caught mainly at the most seaward stations (which suggested spawning in the ≥10 m depths). Fishes that seemed to spawn somewhere in the inshore zone during a certain period (months indicated in parentheses) were: Clupeids (May and August), engraulids (August), *Gobiosoma* spp. (August), *Microgobius* spp. (August and November), *Bairdiella chrysura* (May and August), *Cynoscion nebulosus* (May and August), *Cynoscion* spp. (May, August, November, and February), *Menticirrhus* spp. (May, August, and November), *Pogonias cromis* (November), *Sciaenops ocellatus* (August), *Chloroscombrus chrysurus* (May and August), *Oligoplites saurus* (May and August), *Symphurus* spp. (May and August), and *Achirus lineatus* (May, August, November, and February). Fishes that seemed to spawn near the most seaward stations during certain months were: *Orthopristis chrysoptera* (May, August, November, and February), gerreids (May and August), and *Prionotus* spp. (May, August, November, and February). The occurrence of 1) the smallest larvae at the most seaward stations, and 2) larger larvae at the more landward stations indicated eastward (offshore to inshore) larval transport.

There were great differences in the total number of eggs and larvae and in diversity of larvae between our two zones. Most eggs (95.9%) and larvae (97.9%) were collected at the 24 inshore stations. Larvae of 37 families, 47 genera, and 37 species were collected in the inshore zone (Tables 11-14). Larvae from only 20 families, 21 genera, and 14 species were collected in the estuarine zone (Tables 15-18). All larvae that were found at estuarine stations were also found at inshore stations.

Salinity was one of several environmental factors that probably limited the numbers of eggs and larvae in the estuarine zone. Of the three parameters we measured, salinity was the most variable, especially in the estuarine zone. When estuarine abundance of eggs or larvae, or both, was highest, salinity was moderately high. Nine of the 16 estuarine stations (1, 2, 5, 7, 8, 11, 14, 15, and 16) produced abundances of >10 eggs or larvae under 10 m^2; salinity ranged from 20.7 to 37.6 ppt during the periods of this highest estuarine abundance (Table 6, Figs. 2, 3). Station 13 produced no eggs and very few larvae and had the lowest average salinity in the estuarine zone. The 10 most abundant families were usually collected at stations with moderately high salinities (Table 7). During a drought in May 1971, high-salinity waters which intruded into the estuarine

zone probably carried some larval fish into that zone from inshore waters.

For the 3 mo of the 1-yr period when our egg and larval catches could be compared with those from the offshore stations, our inshore stations had as high, and usually higher, abundances of eggs and larvae. The only identified fishes for which catch comparisons could be made were the clupeids, sciaenids, and carangids. In general, the larval catches of these three families from Houde et al. (1979) were similar to ours; most of these fishes had apparently spawned within 93 km of the beach at depths <30 m during May and August of 1971 and February of 1972.

Our results indicate the value of the inshore zone as an important spawning area for many species of fishes. Houde et al. (1979) concluded similarly for the offshore area. Lindall et al. (1973) showed the importance of the estuarine zone as a nursery for juvenile fishes. Thus, the entire aquatic region adjacent to the Florida Everglades is of vital importance to the well-being of numerous species of fishes.

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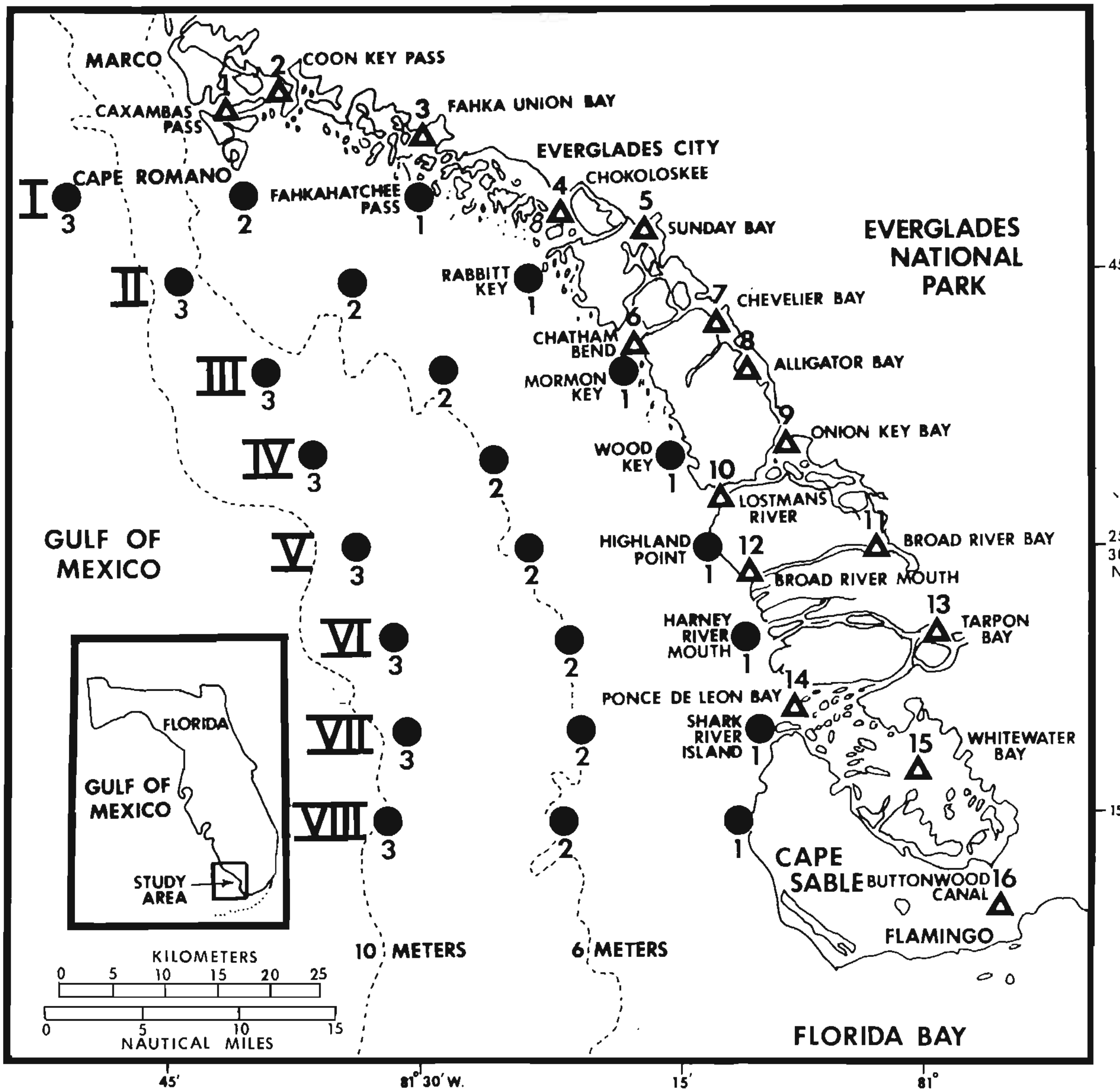

Figure 1.—Location of Everglades ichthyoplankton stations. (Triangles indicate estuarine stations; dots indicate inshore stations; Roman numerals indicate east-west transects.)

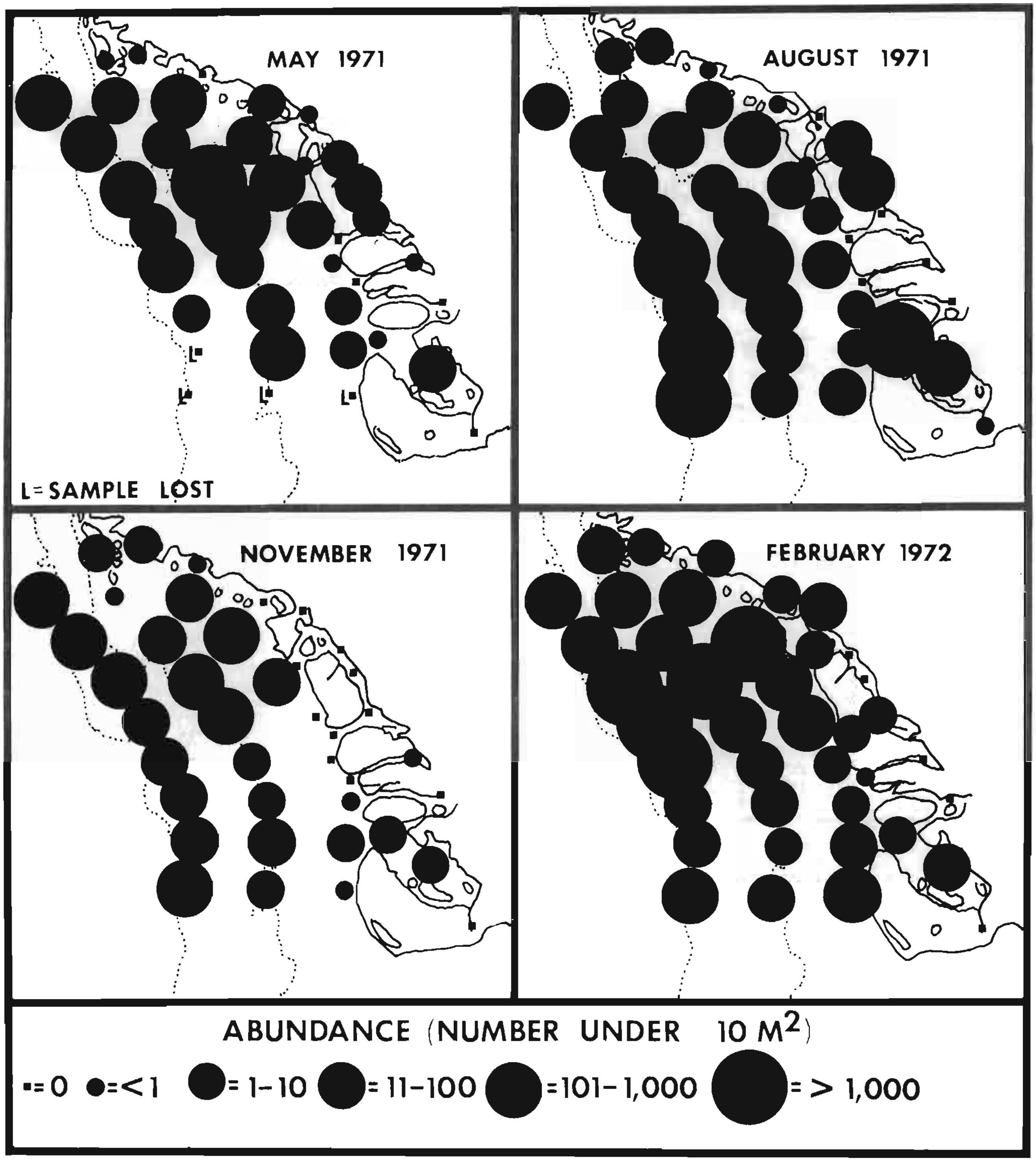

Figure 2.—Distribution and abundance of all fish eggs in the estuarine and inshore zones.

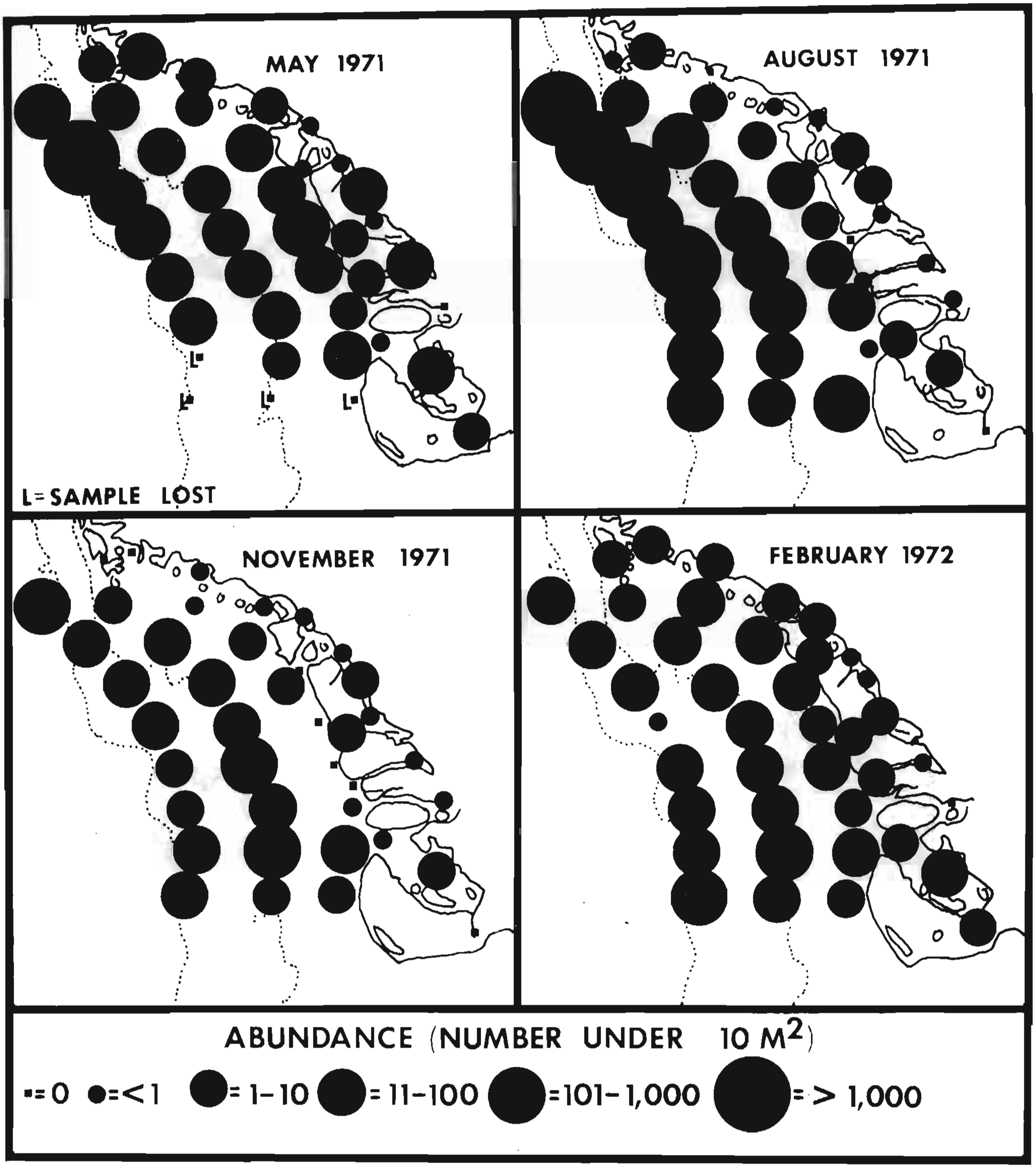

Figure 3.—Distribution and abundance of all fish larvae in the estuarine and inshore zones.

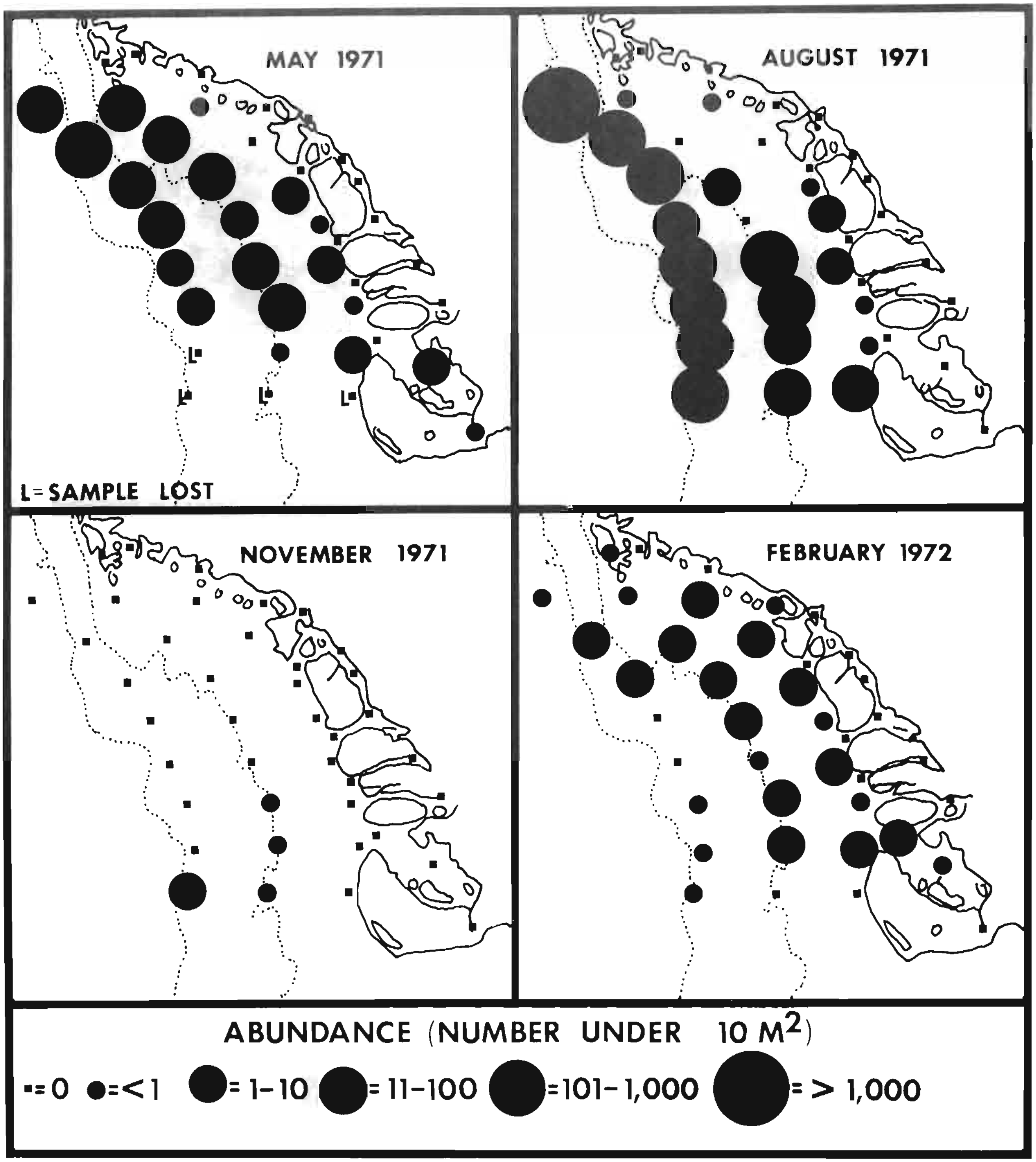

Figure 4.—Distribution and abundance of clupeid larvae in the estuarine and inshore zones.

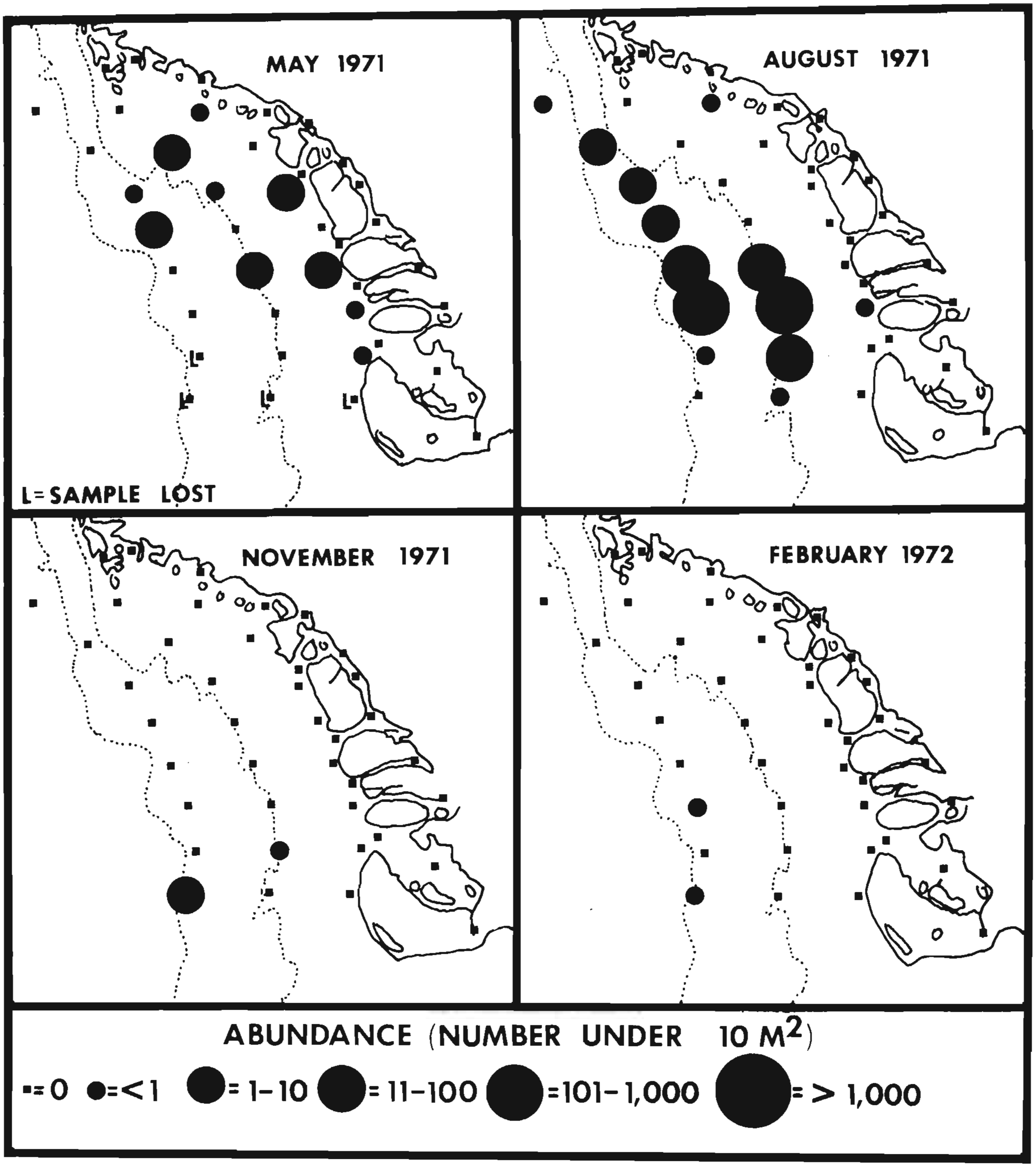

Figure 5.—Distribution and abundance of *Opisthonema oglinum* larvae in the estuarine and inshore zones.

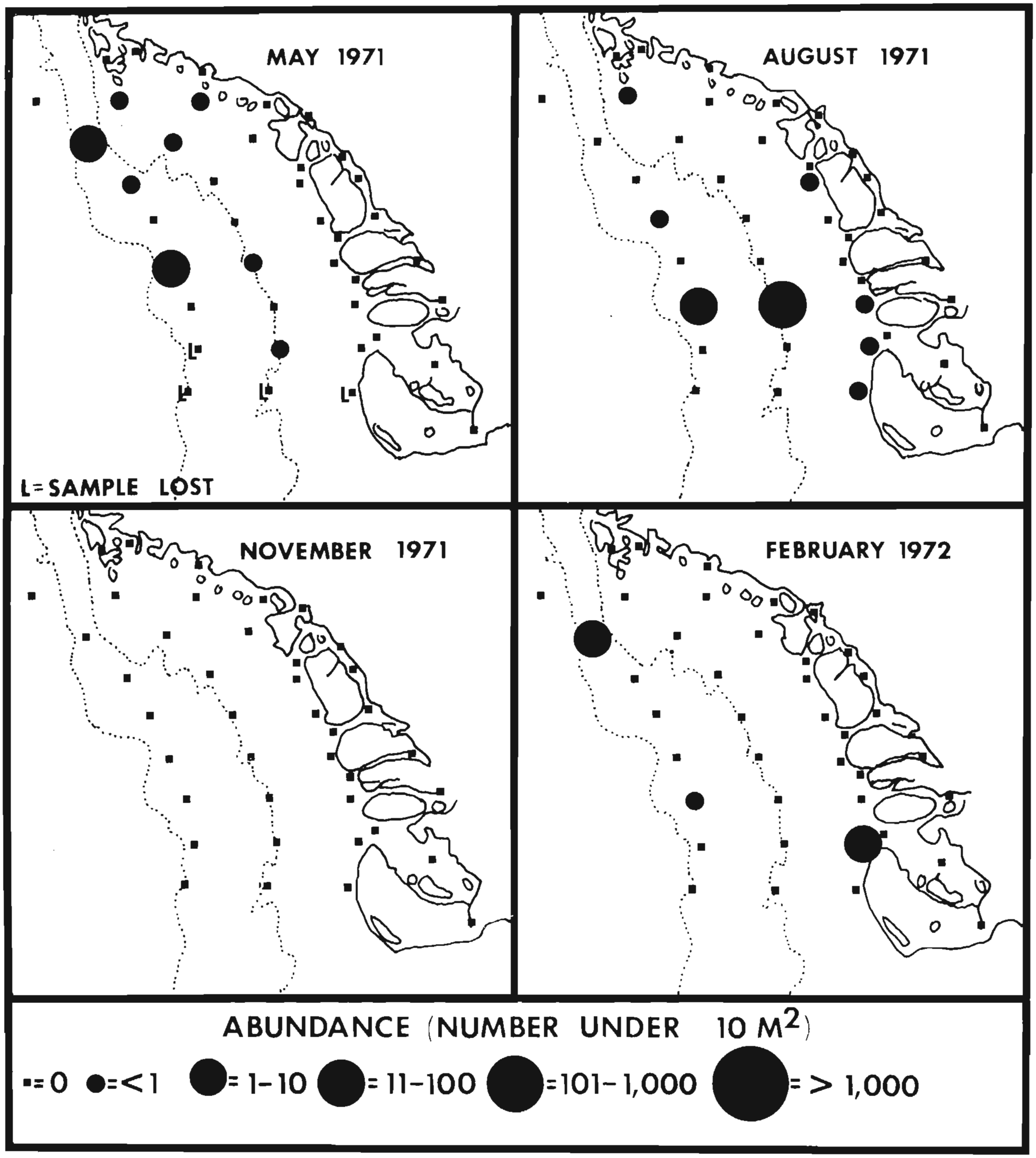

Figure 6.—Distribution and abundance of *Harengula jaguana* larvae in the estuarine and inshore zones.

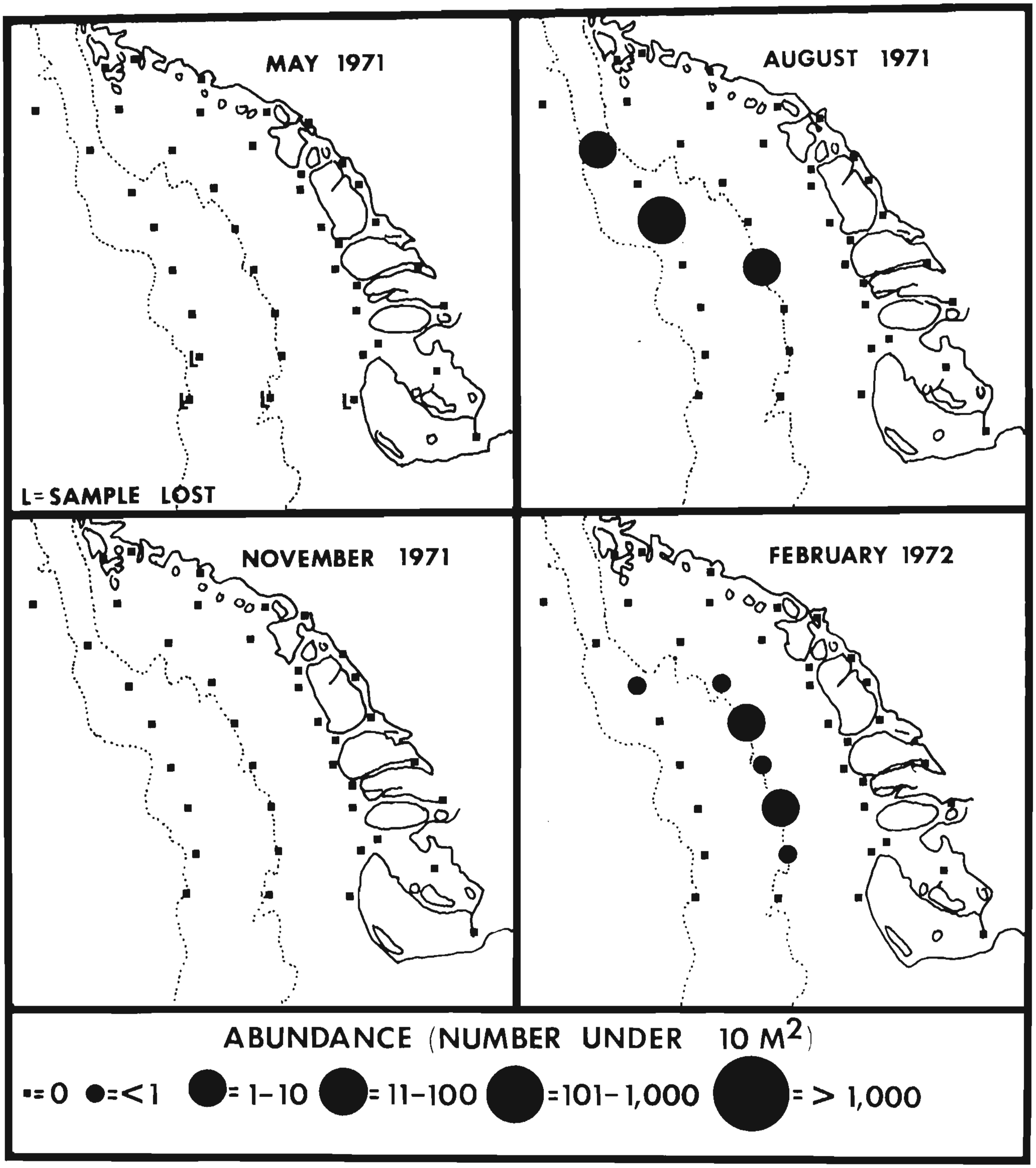

Figure 7.—Distribution and abundance of *Sardinella* spp. larvae in the estuarine and inshore zones.

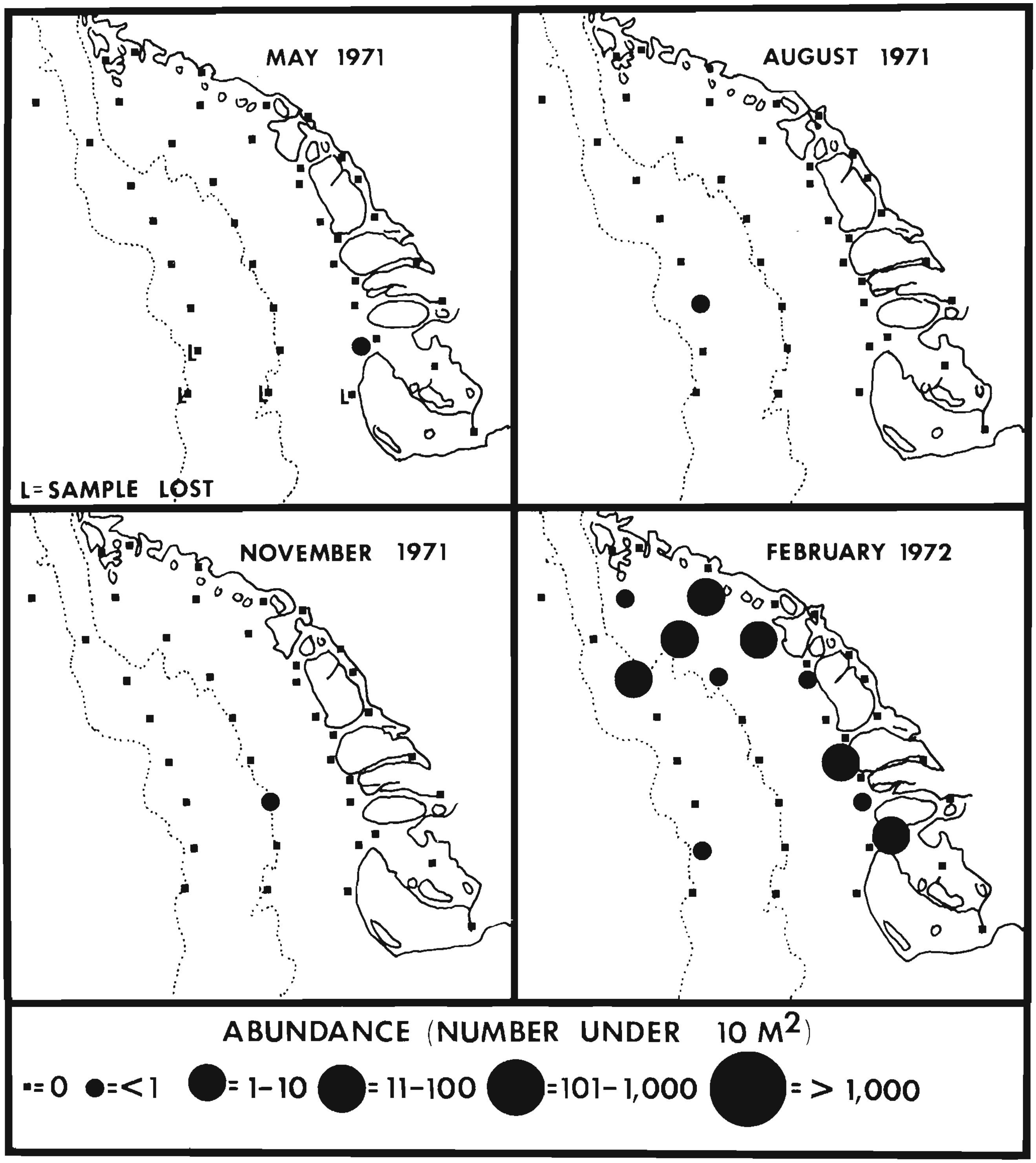

Figure 8.—Distribution and abundance of *Brevoortia* spp. larvae in the estuarine and inshore zones.

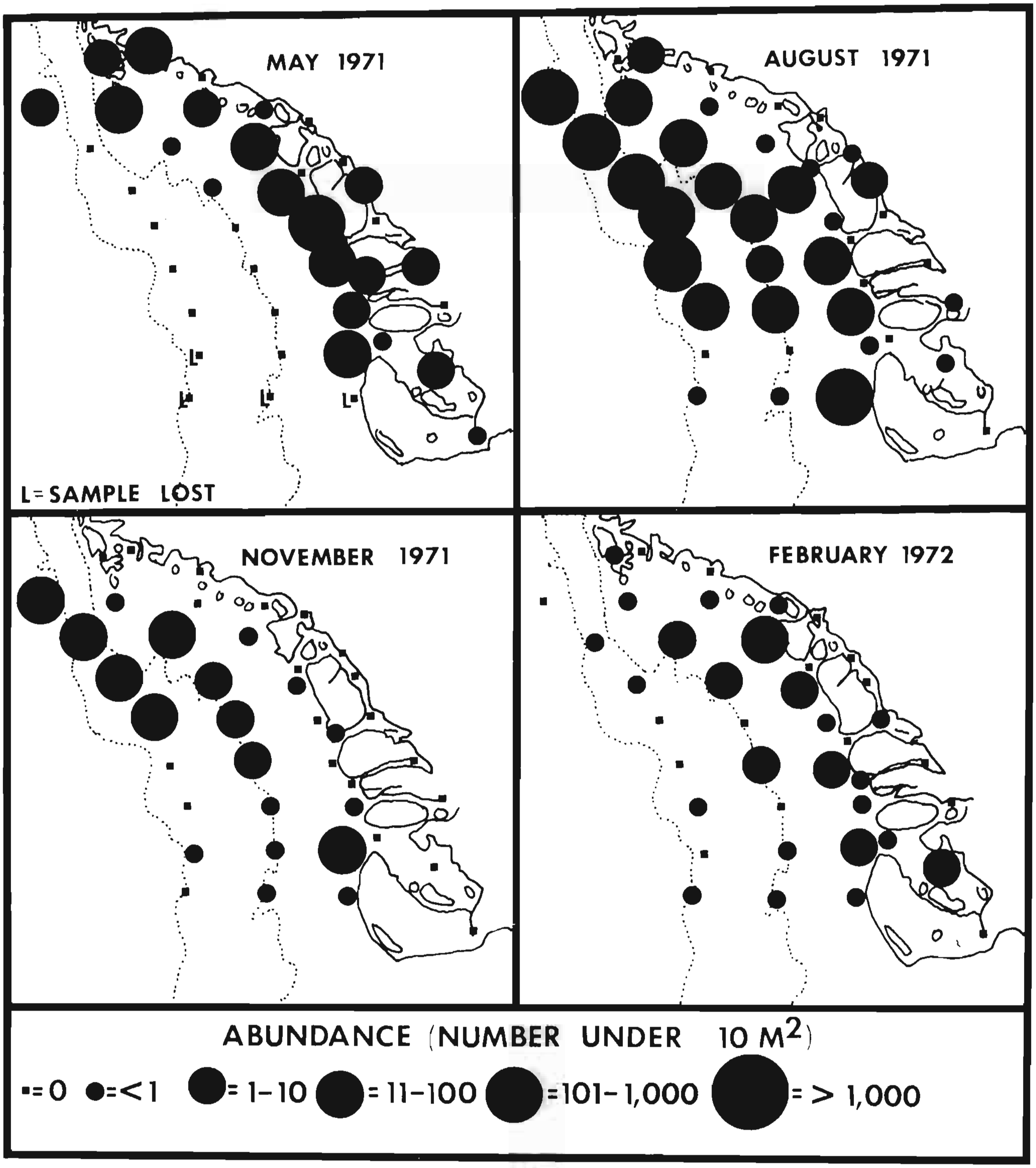

Figure 9.—Distribution and abundance of engraulid larvae in the estuarine and inshore zones.

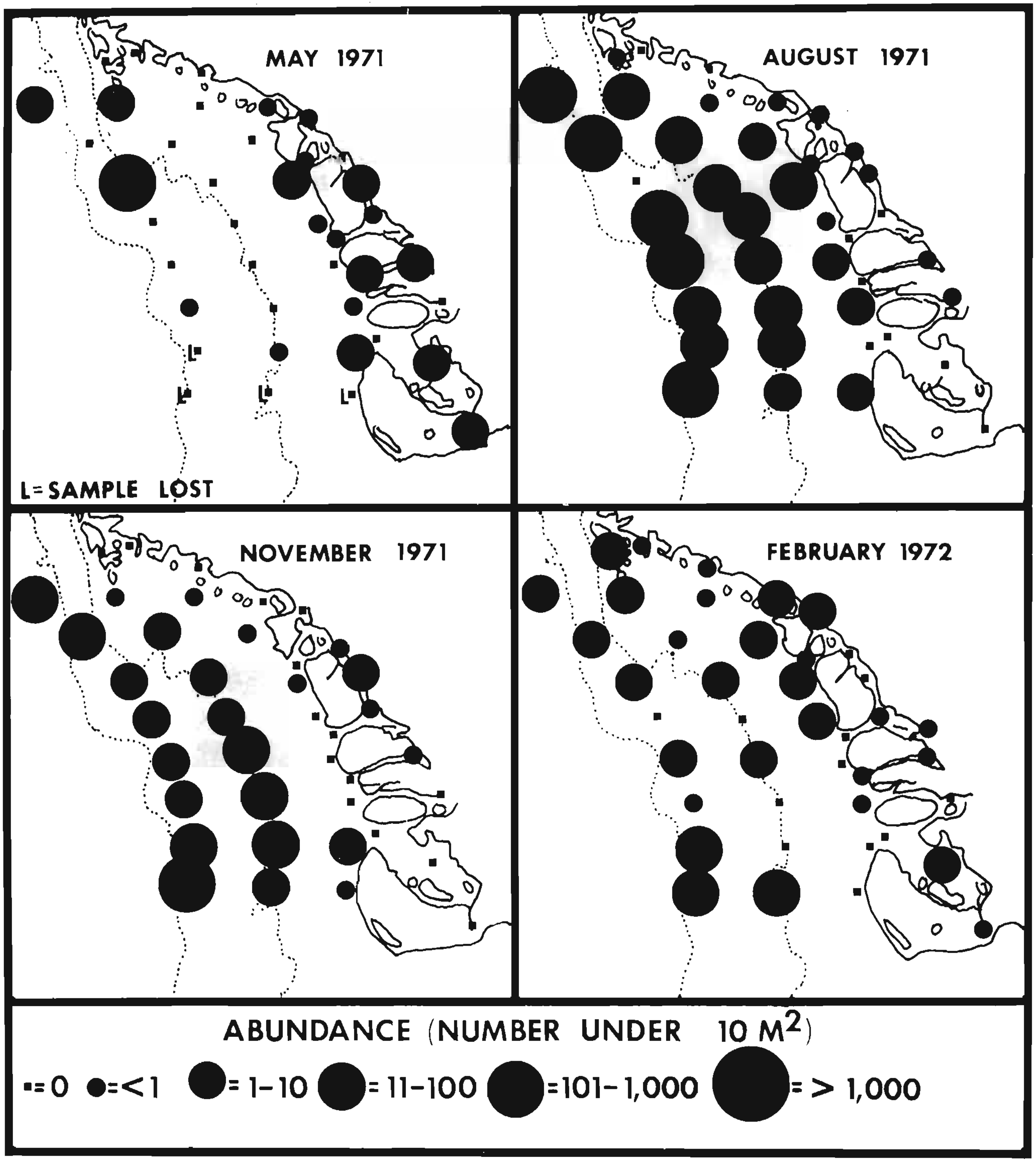

Figure 10.—Distribution and abundance of gobiid larvae in the estuarine and inshore zones.

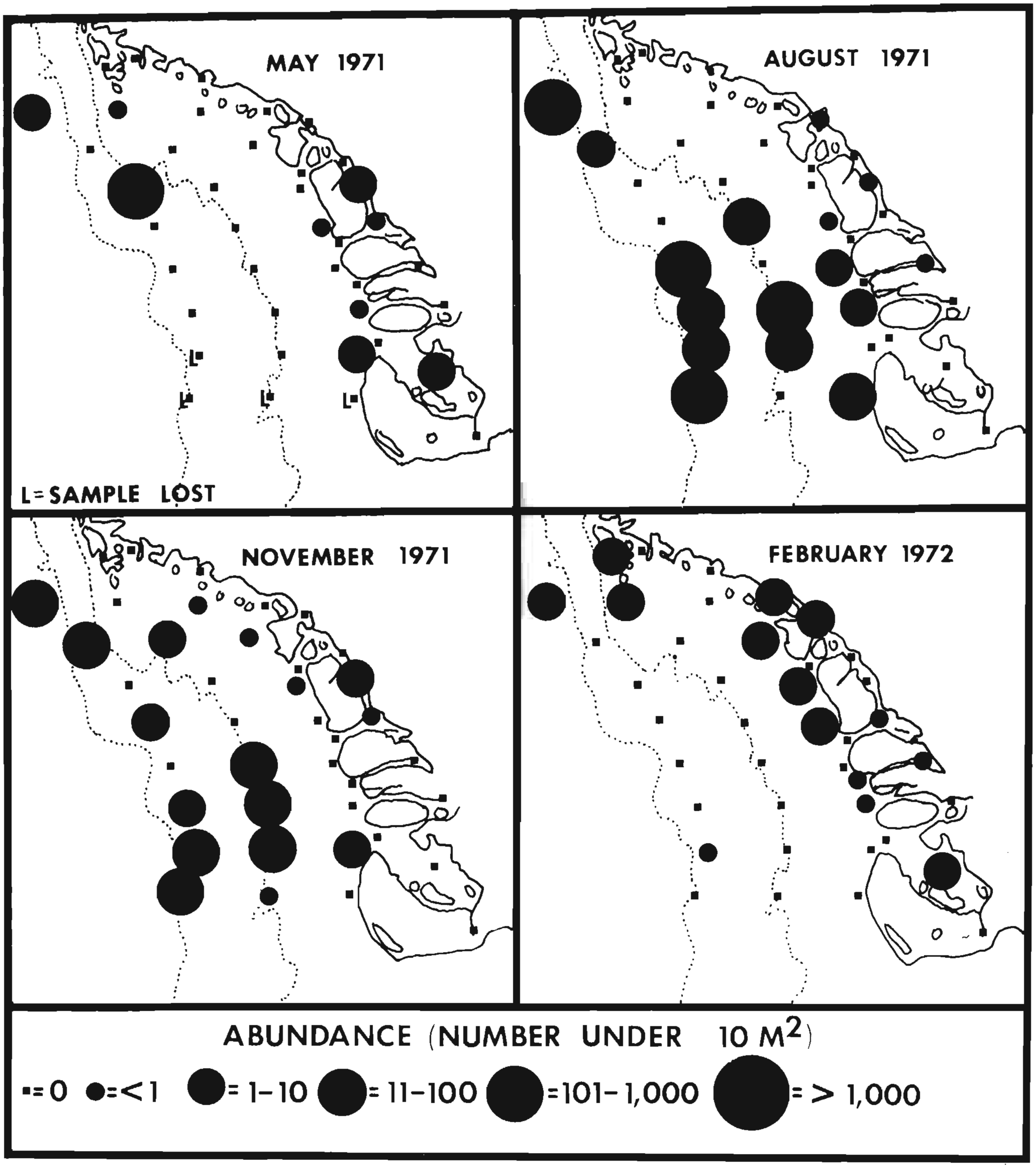

Figure 11.—Distribution and abundance of *Microgobius* spp. larvae in the estuarine and inshore zones.

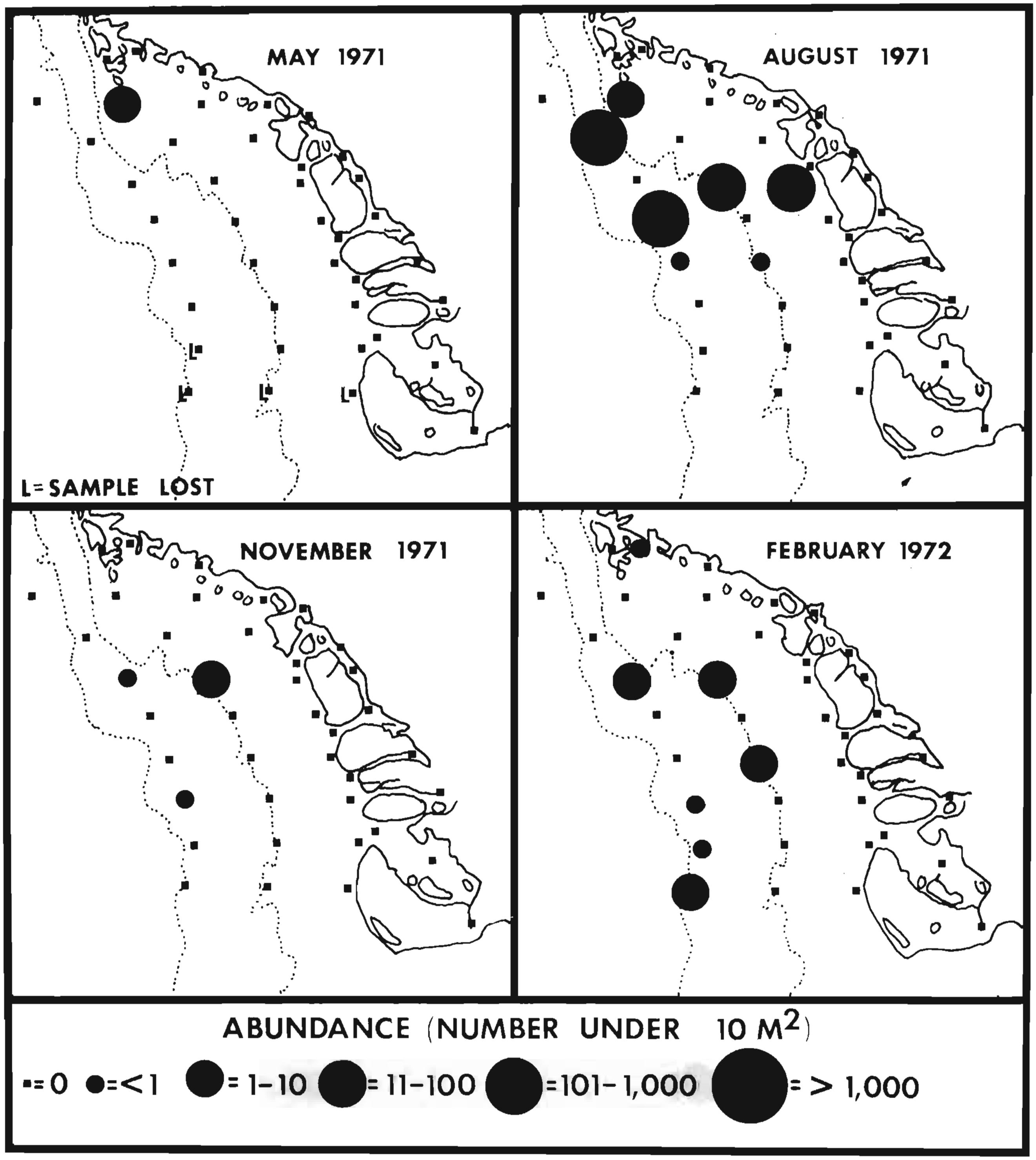

Figure 12.—Distribution and abundance of *Gobiosoma* spp. larvae in the estuarine and inshore zones.

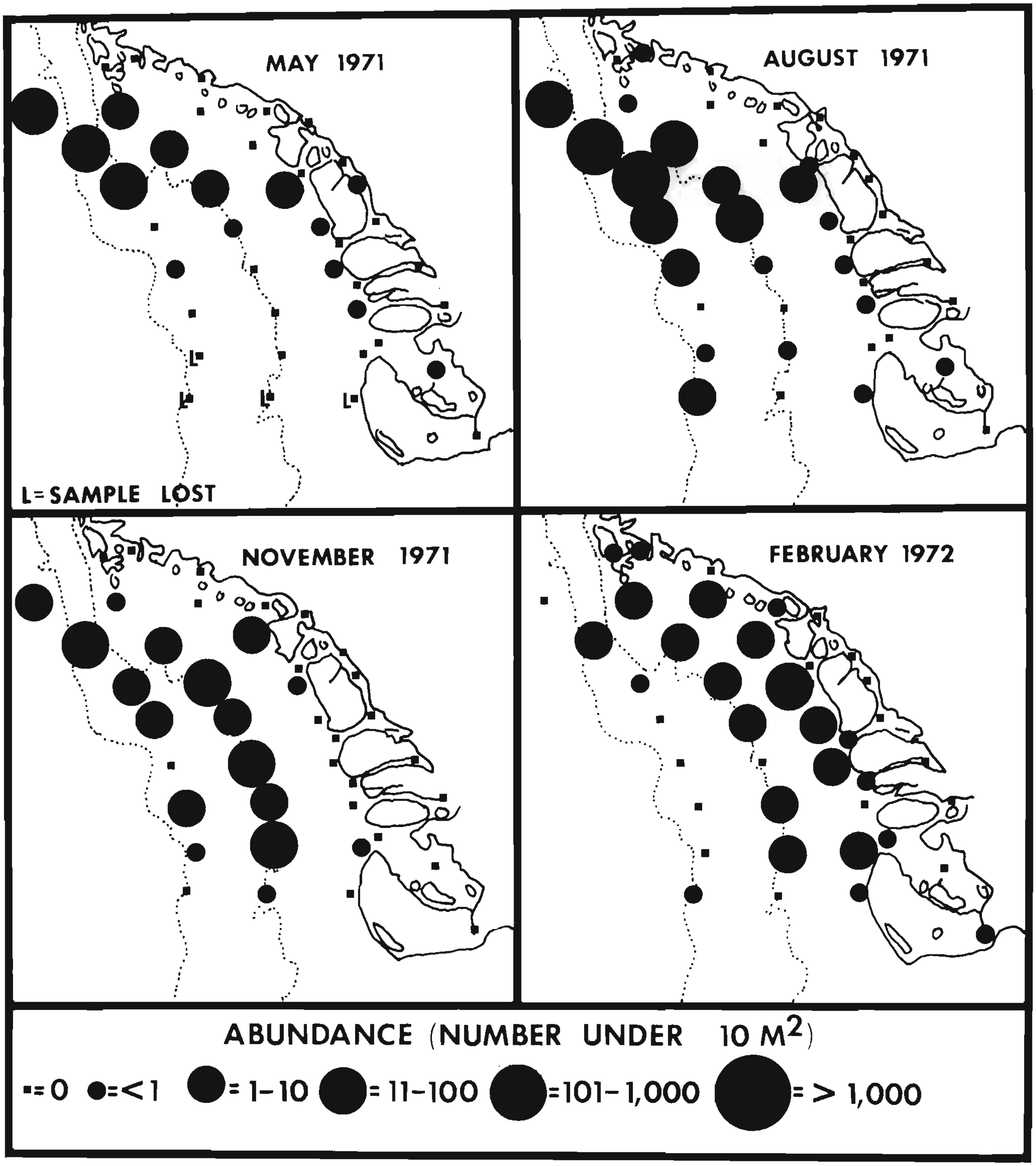

Figure 13.—Distribution and abundance of sciaenid larvae in the estuarine and inshore zones.

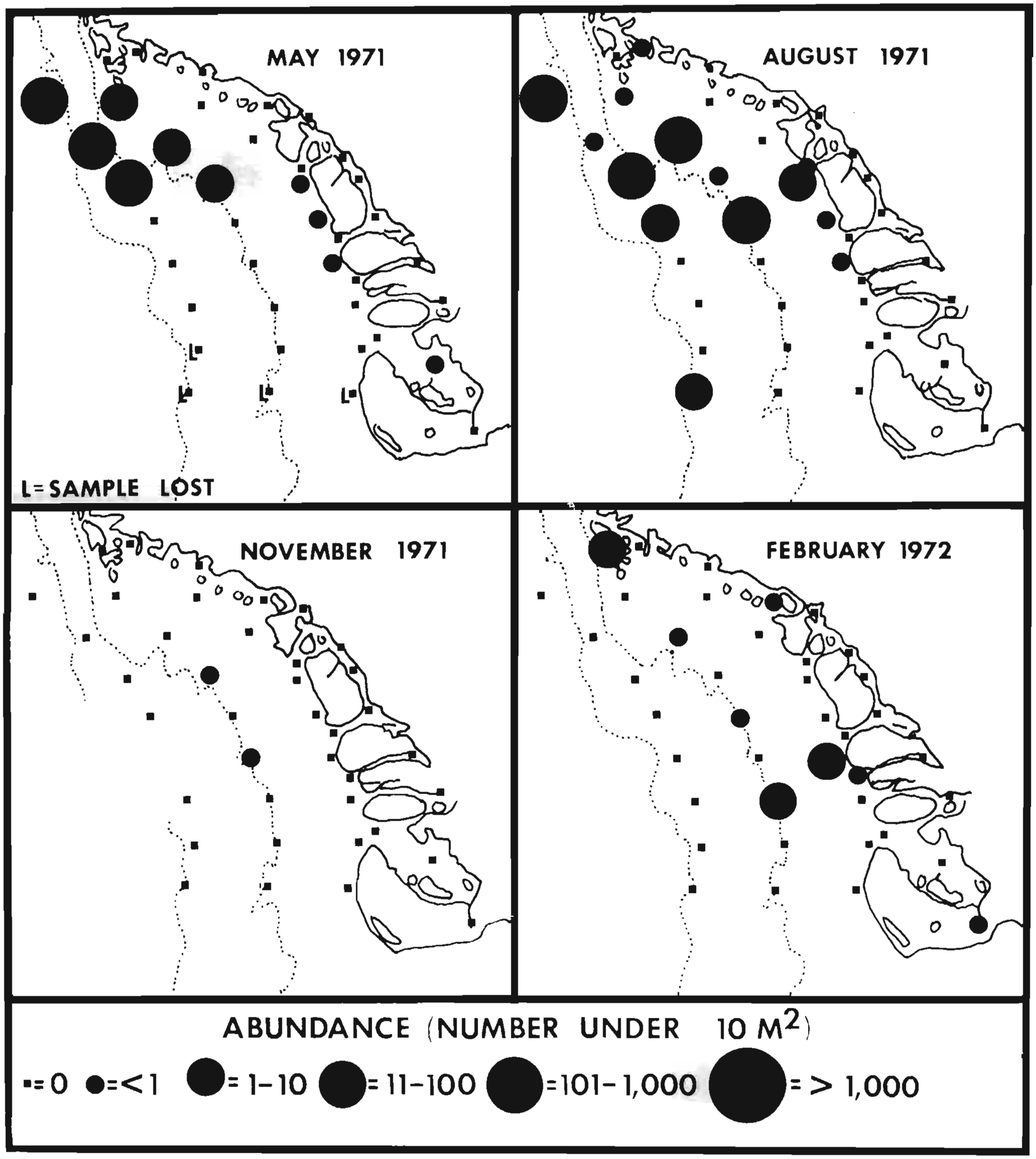

Figure 14.—Distribution and abundance of *Bairdiella chrysura* larvae in the estuarine and inshore zones.

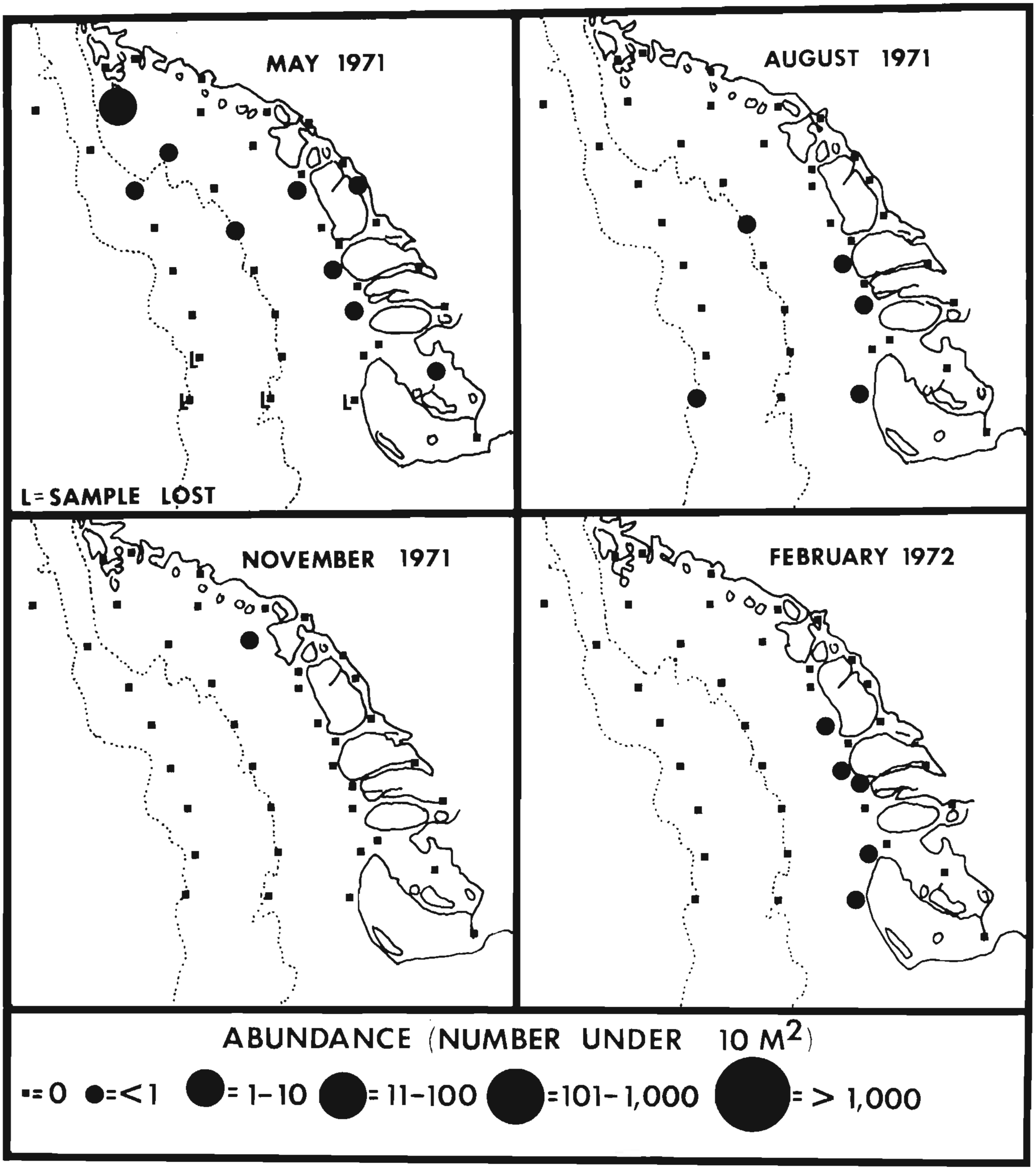

Figure 15.—Distribution and abundance of *Cynoscion nebulosus* larvae in the estuarine and inshore zones.

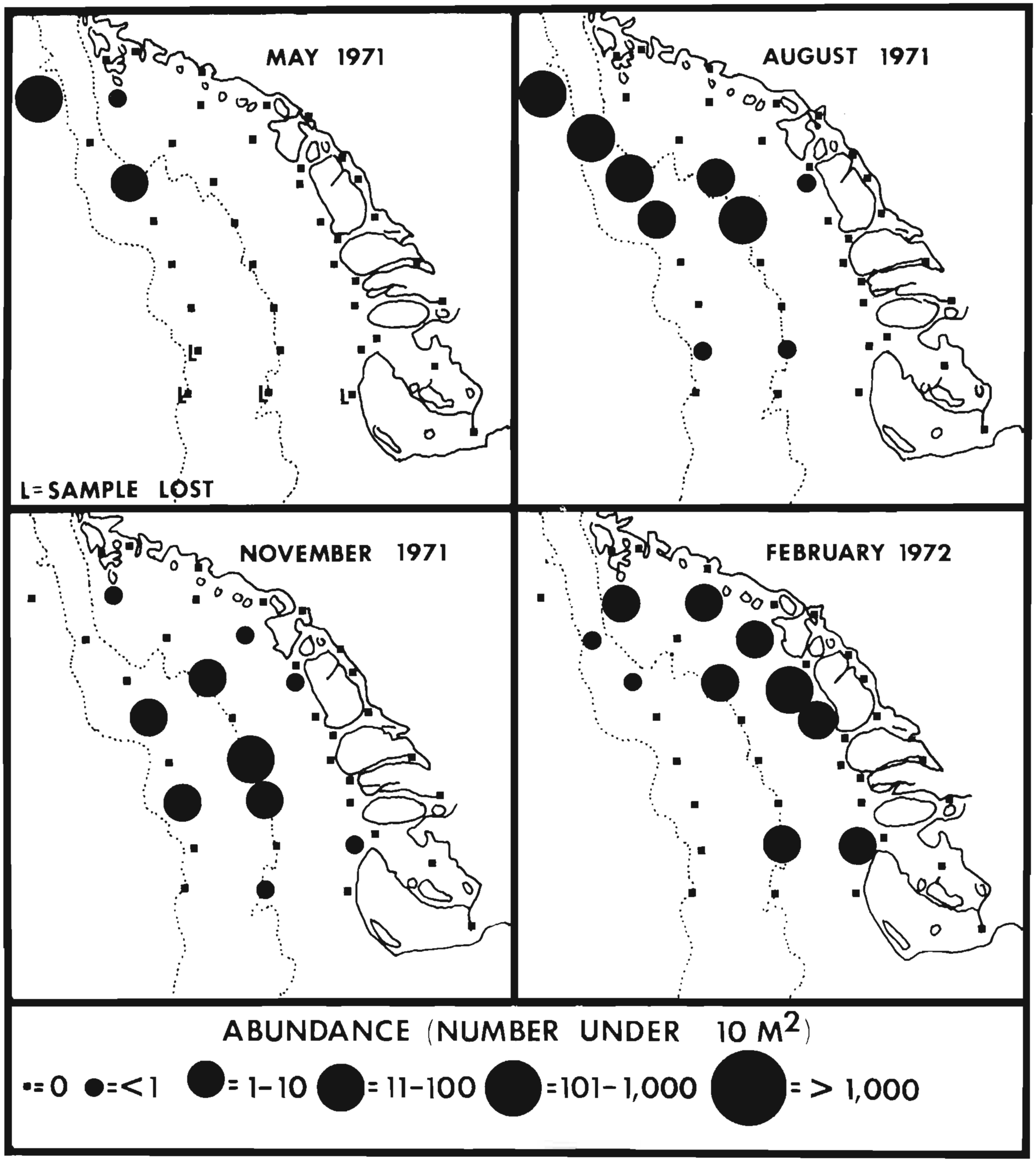

Figure 16.—Distribution and abundance of *Cynoscion* spp. larvae in the estuarine and inshore zones.

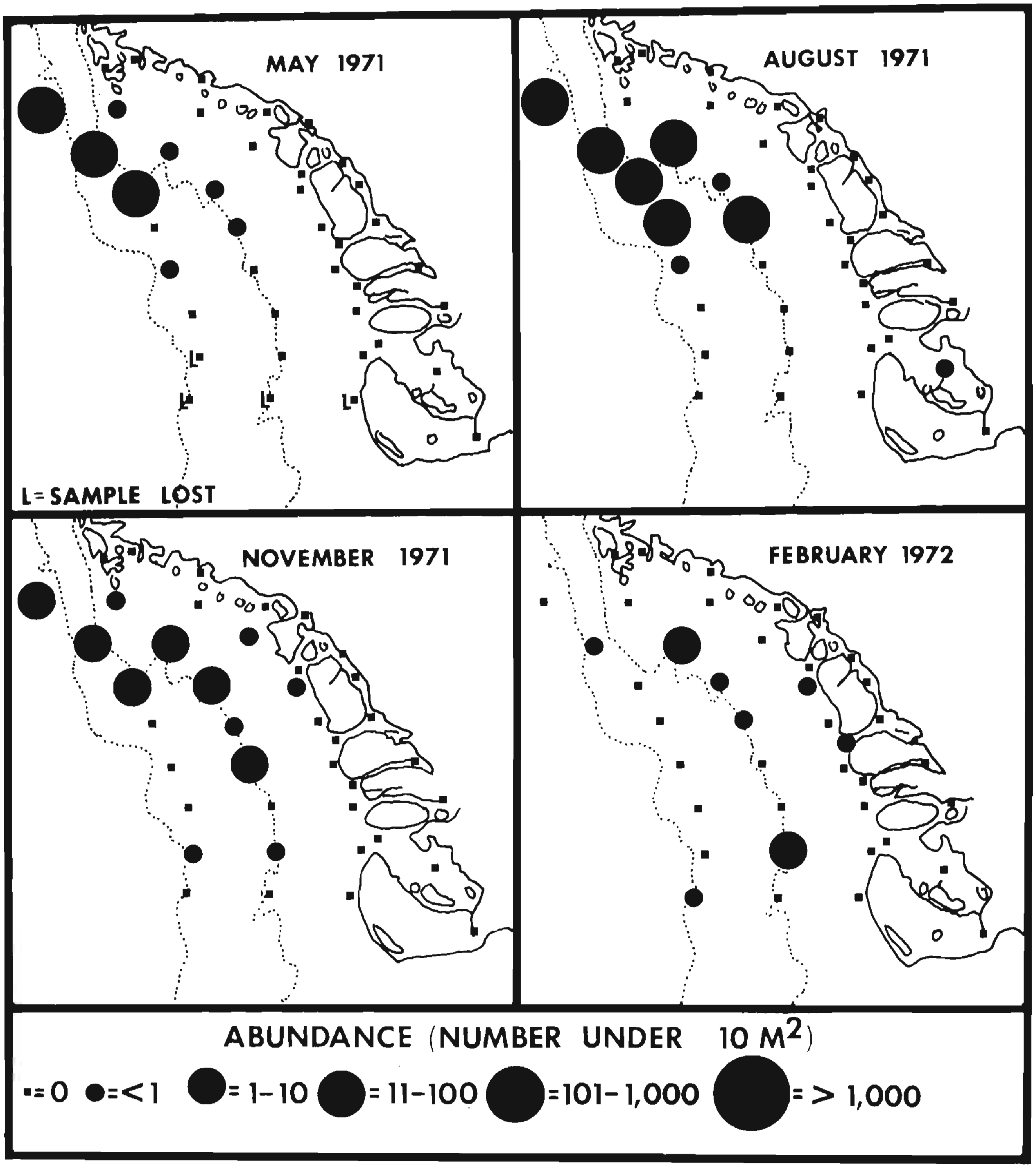

Figure 17.—Distribution and abundance of *Menticirrhus* spp. larvae in the estuarine and inshore zones.

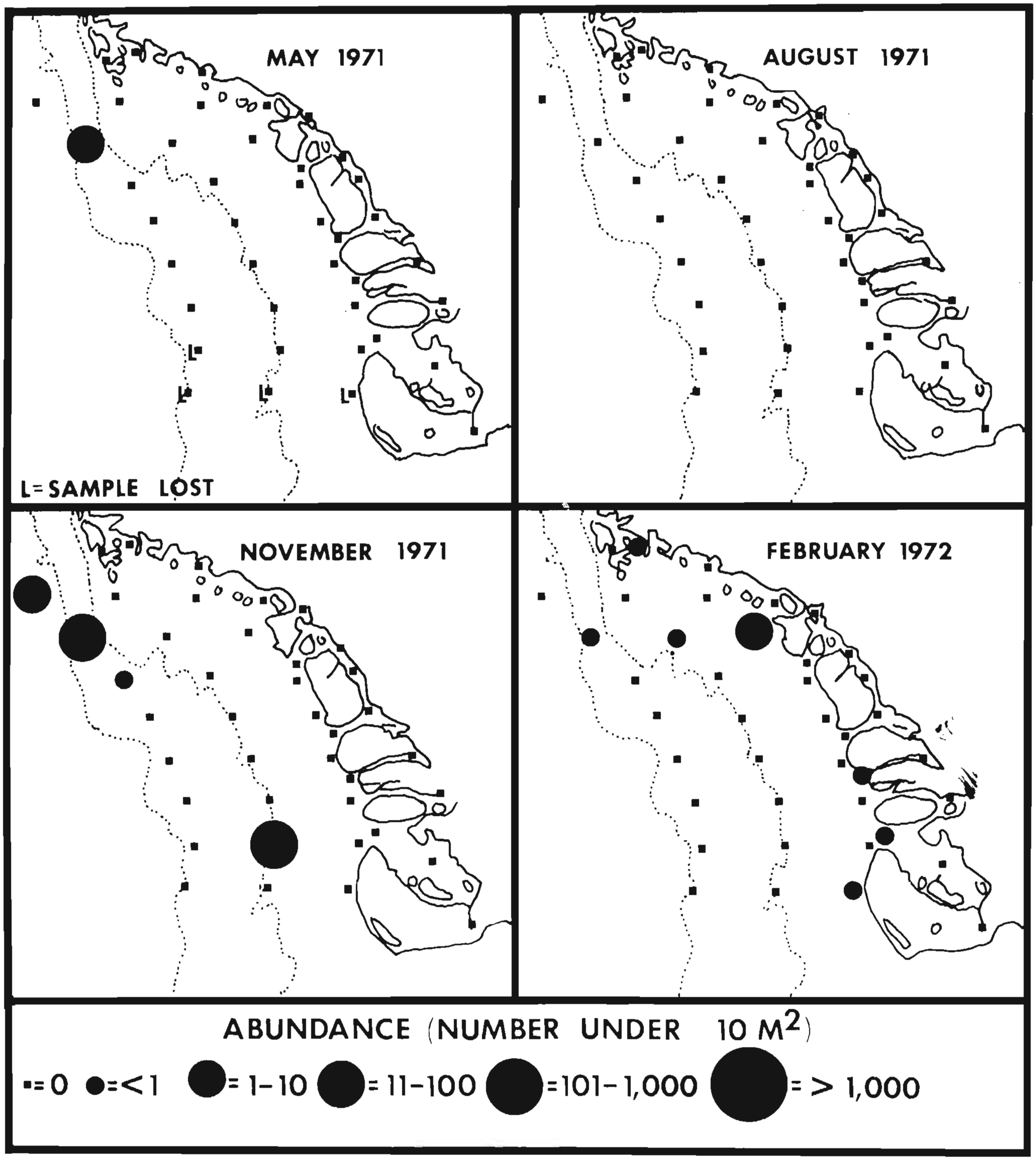

Figure 18.—Distribution and abundance of *Pogonias cromis* larvae in the estuarine and inshore zones.

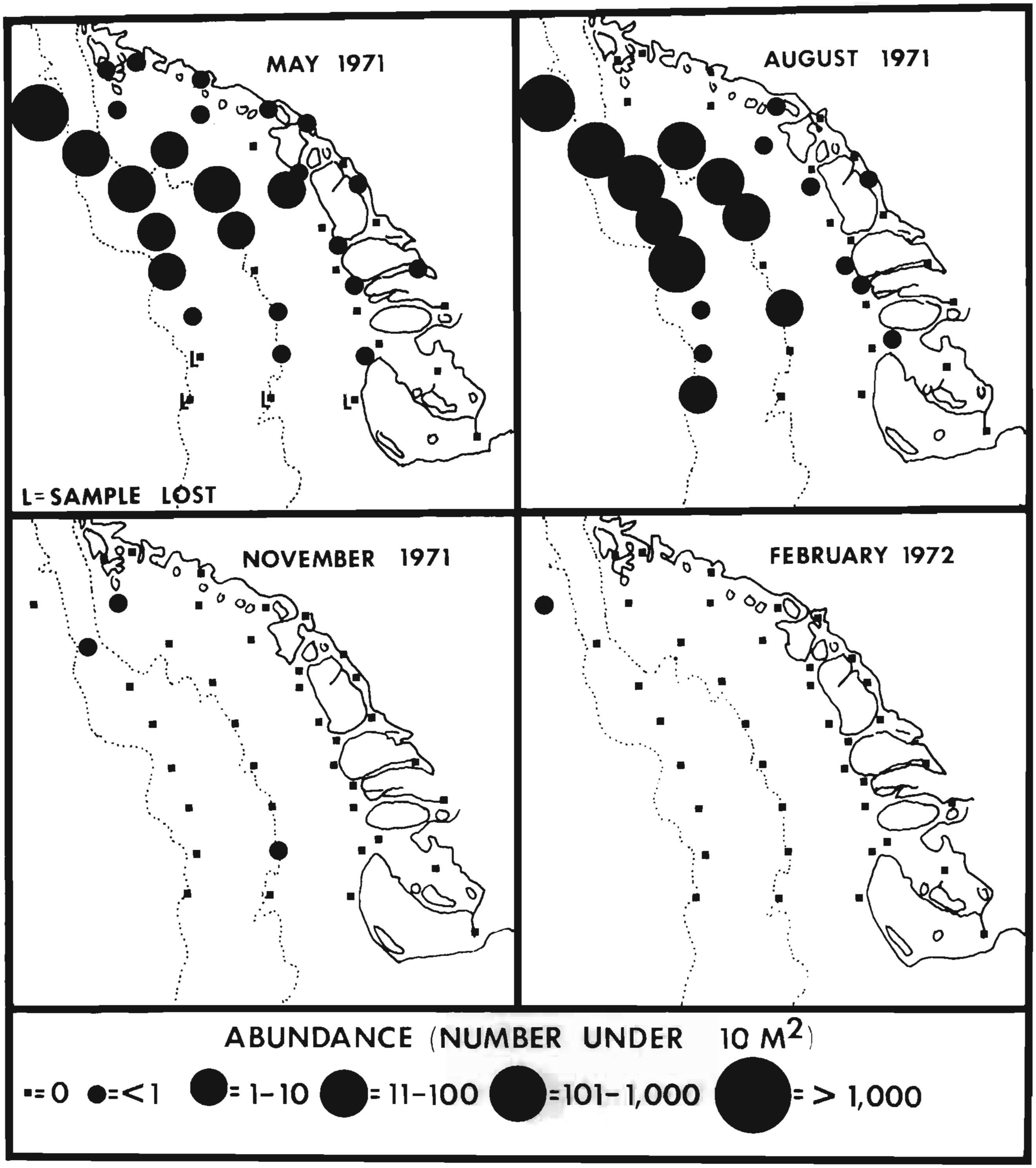

Figure 19.—Distribution and abundance of carangid larvae in the estuarine and inshore zones.

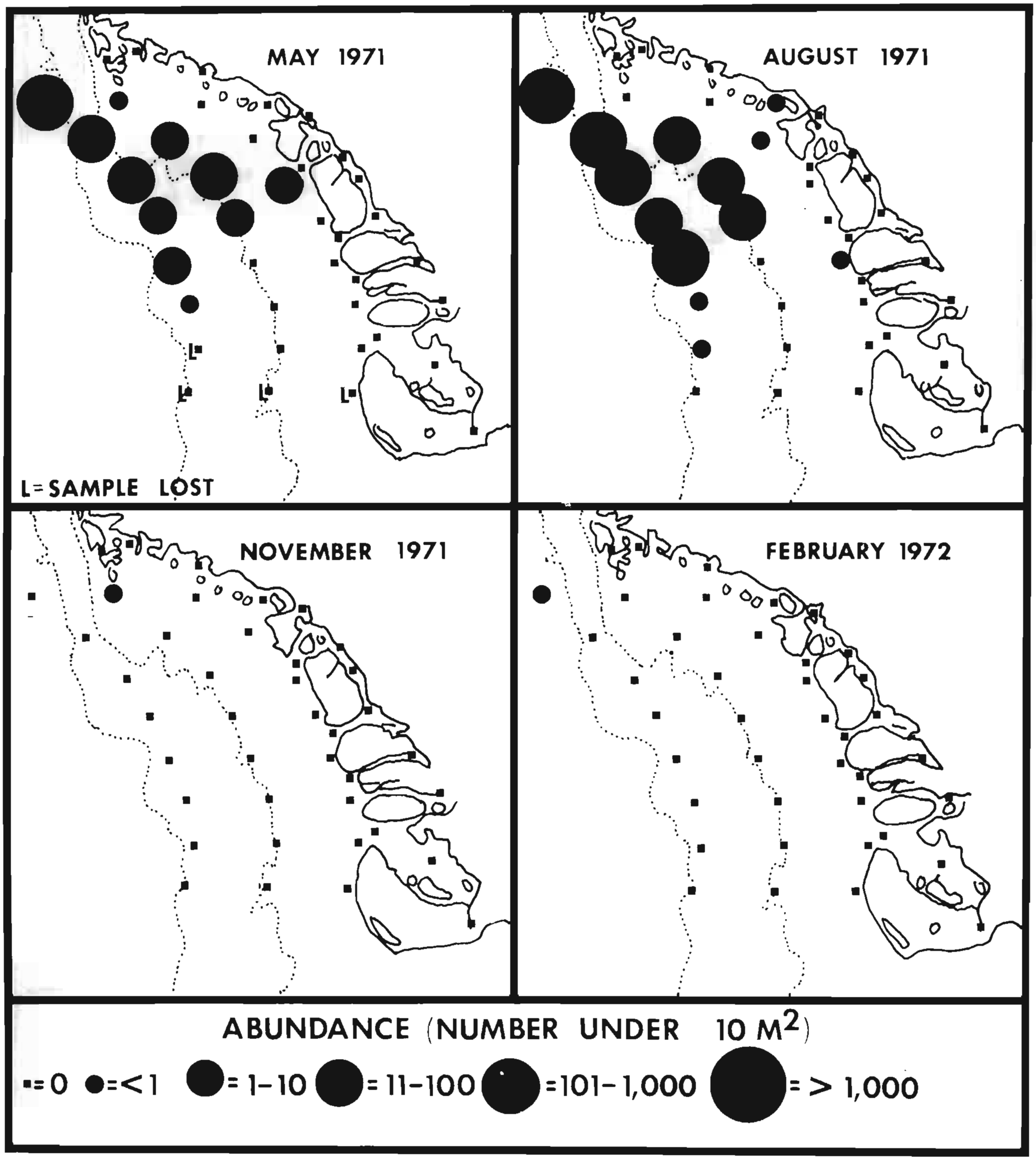

Figure 20.—Distribution and abundance of *Chloroscombrus chrysurus* larvae in the estuarine and inshore zones.

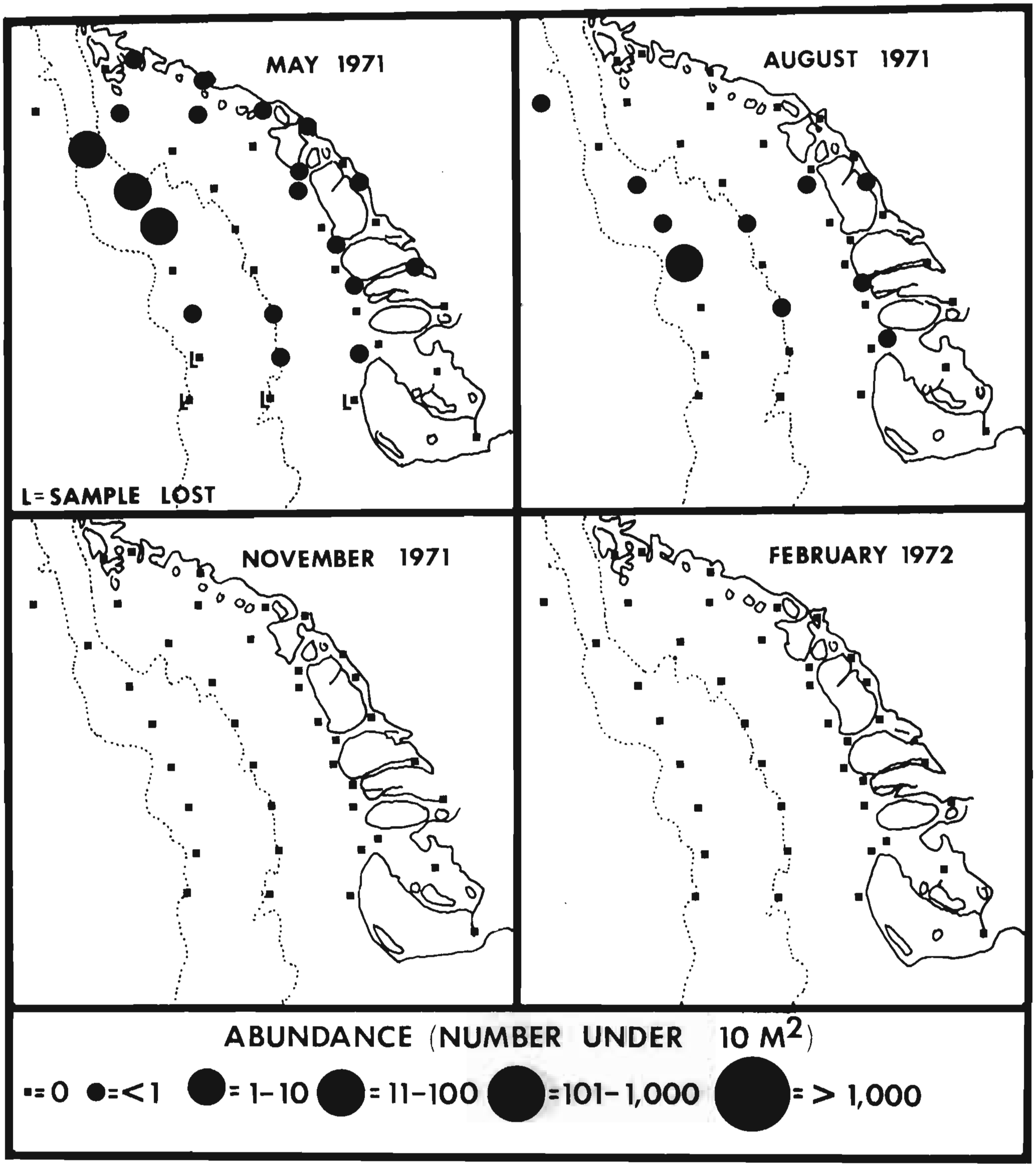

Figure 21.—Distribution and abundance of *Oligoplites saurus* larvae in the estuarine and inshore zones.

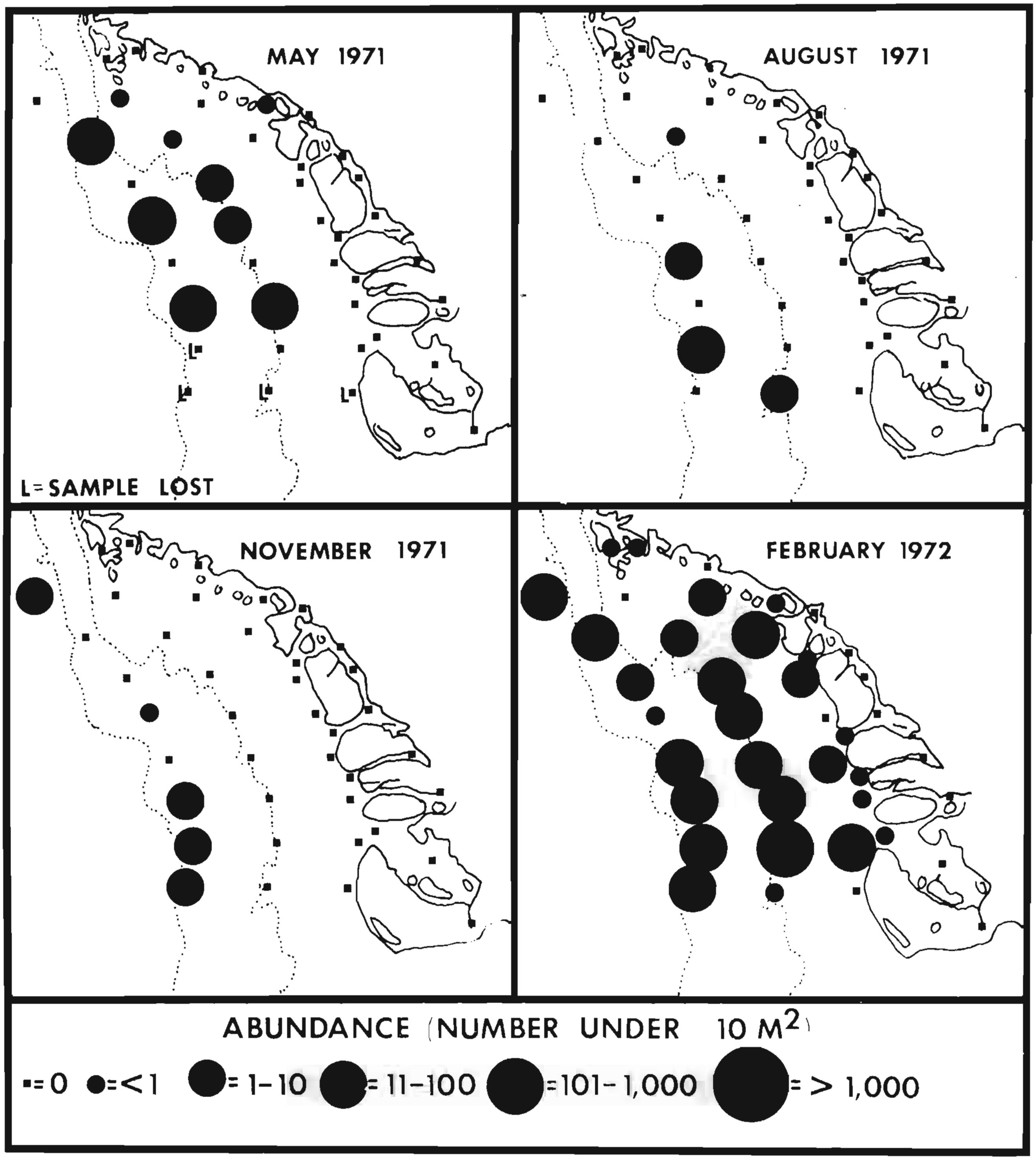

Figure 22.—Distribution and abundance of *Orthopristis chrysoptera* larvae in the estuarine and inshore zones.

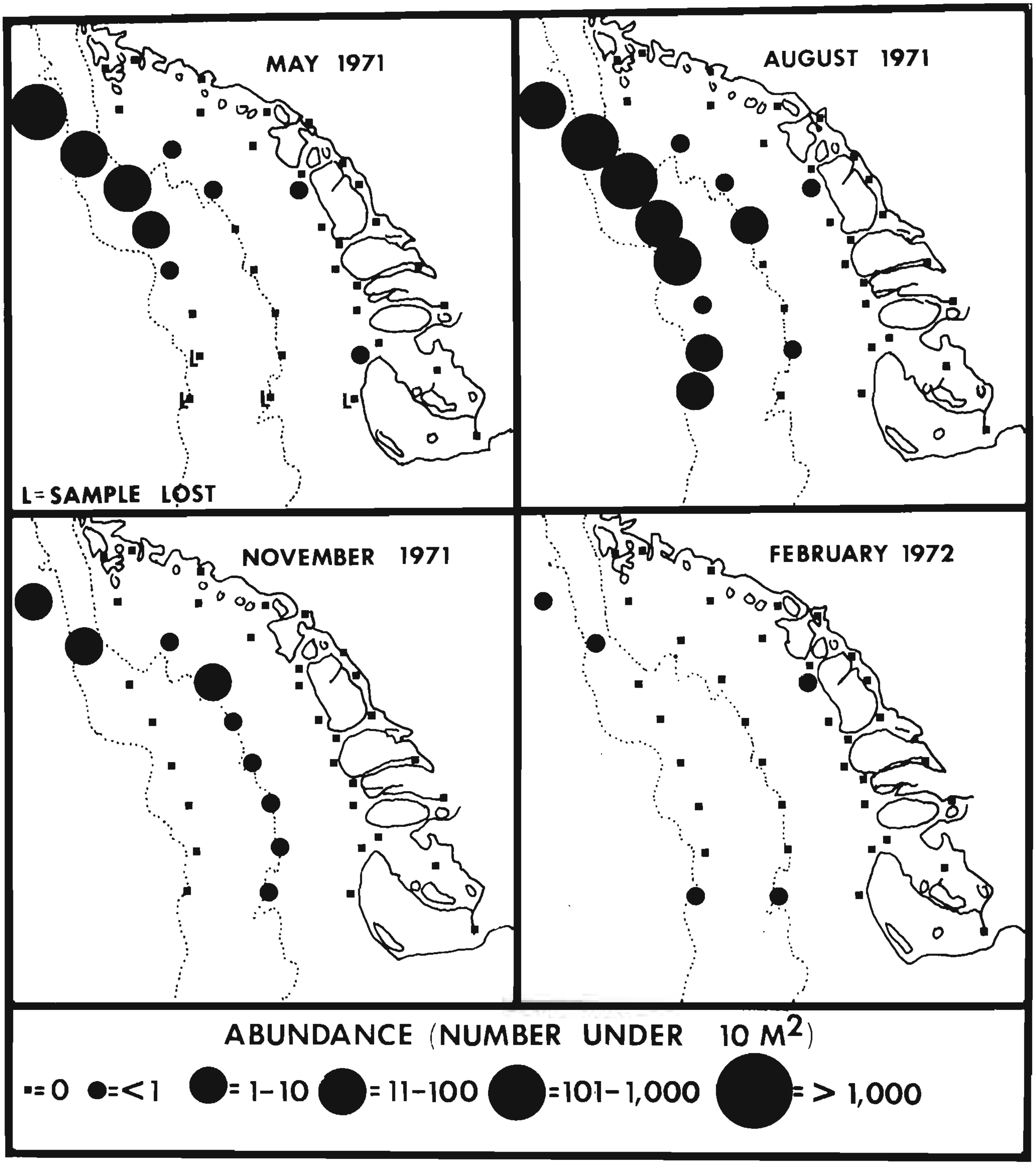

Figure 23.—Distribution and abundance of *Symphurus* spp. larvae in the estuarine and inshore zones.

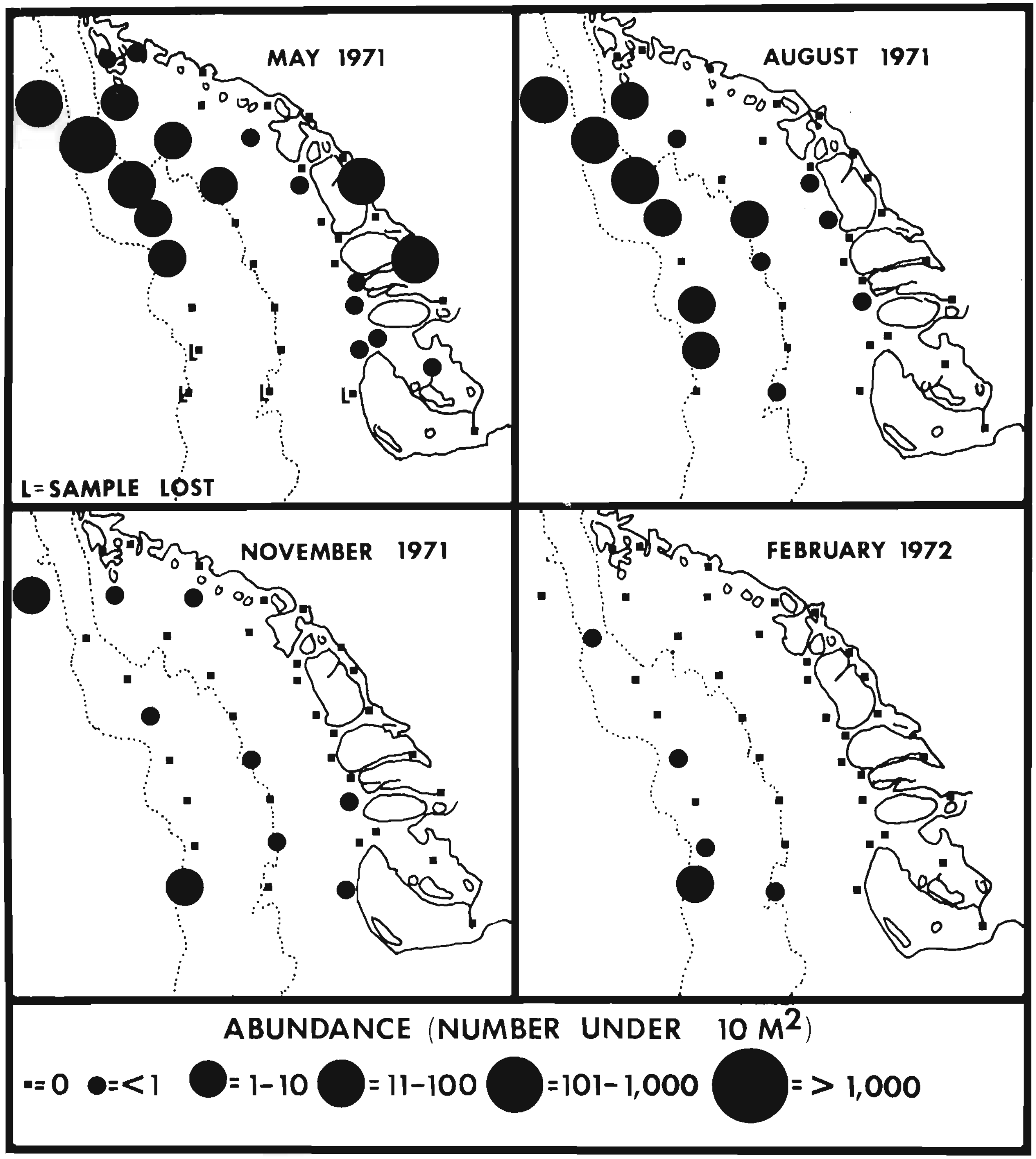

Figure 24.—Distribution and abundance of gerreid larvae in the estuarine and inshore zones.

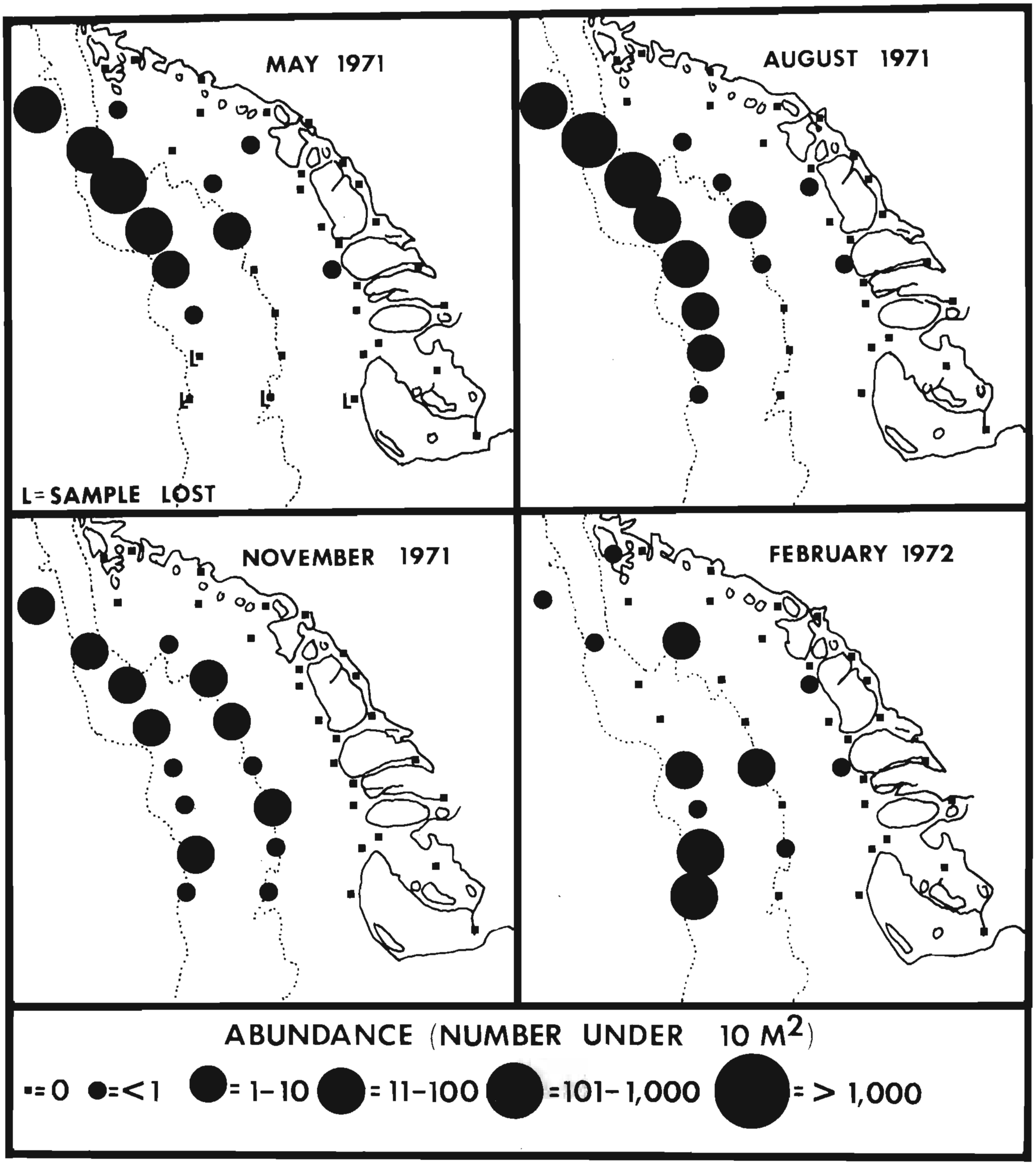

Figure 25.—Distribution and abundance of *Prionotus* spp. larvae in the estuarine and inshore zones.

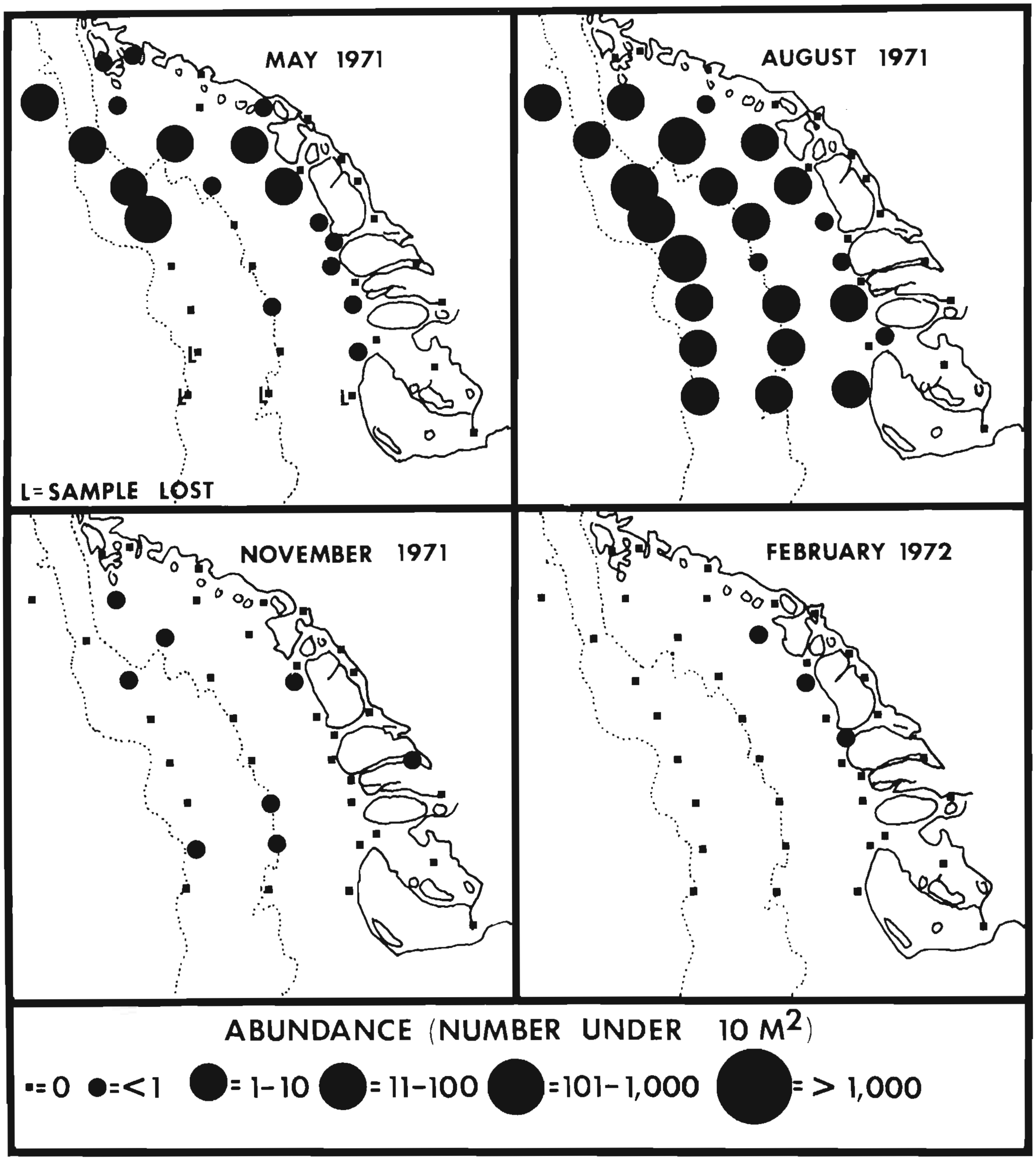

Figure 26.—Distribution and abundance of *Achirus lineatus* larvae in the estuarine and inshore zones.

Table 1. Locations and depths of ichthyoplankton stations in the Everglades area.

Station no.	Location	North latitude	West longitude	Depth (m)
Estuarine				
1	Caxambas Pass	25°54'05"	81°42'00"	2.0
2	Coon Key Pass	25°55'12"	81°38'30"	2.3
3	Fahka Union Bay	25°53'37"	81°31'13"	1.7
4	Chokoloskee	25°48'25"	81°21'04"	1.0
5	Sunday Bay	25°47'40"	81°16'55"	1.0
6	Chatham Bend	25°40'40"	81°17'20"	1.5
7	Chevelier Bay	25°42'40"	81°12'20"	1.0
8	Alligator Bay	25°40'20"	81°10'12"	1.0
9	Onion Key Bay	25°36'15"	81°08'10"	1.0
10	Lostman's River	25°32'30"	81°12'28"	1.0
11	Broad River Bay	25°30'00"	81°02'40"	2.0
12	Broad River Mouth	25°28'00"	81°10'30"	1.5
13	Tarpon Bay	25°25'00"	81°00'15"	2.0
14	Ponce de Leon Bay	25°21'50"	81°07'30"	2.5
15	Whitewater Bay	25°16'30"	80°58'50"	1.0
16	Buttonwood Canal	25°11'00"	81°54'40"	1.8
Inshore				
I-1	Fahkahatchee Pass	25°50'00"	81°31'50"	2.0
I-2	Cape Romano	25°50'00"	81°43'00"	2.5
I-3	---	25°50'00"	81°54'00"	12.0

Table 1. Continued

Station no.	Location	North latitude	West longitude	Depth (m)
II-1	Rabbitt Key	25°45'00"	81°23'15"	2.5
II-2	---	25°45'00"	81°33'50"	4.0
II-3	---	25°45'00"	81°45'00"	8.0
III-1	Mormon Key	25°40'00"	81°19'00"	2.0
III-2	---	25°40'00"	81°25'25"	5.5
III-3	---	25°40'00"	81°36'28"	8.0
IV-1	Wood Key	25°35'00"	81°15'15"	1.5
IV-2	---	25°35'00"	81°25'25"	6.0
IV-3	---	25°35'00"	81°36'28"	8.0
V-1	Highland Point	25°30'00"	81°14'00"	1.5
V-2	---	25°30'00"	81°23'08"	5.5
V-3	---	25°30'00"	81°34'15"	9.0
VI-1	Harney River Mouth	25°25'00"	81°11'00"	1.0
VI-2	---	25°25'00"	81°21'10"	5.5
VI-3	---	25°25'00"	81°31'12"	8.0
VII-1	Shark River Island	25°20'00"	81°09'25"	2.0
VII-2	---	25°20'00"	81°19'51"	5.5
VII-3	---	25°20'00"	81°30'00"	9.0
VIII-1	Cape Sable	25°15'00"	81°10'44"	2.0
VIII-2	---	25°15'00"	81°21'00"	5.5
VIII-3	---	25°15'00"	81°32'00"	11.0

Table 2. Sampling and ichthyoplankton data for May 1971.

Station/ transect-station	Date (1971)	Time (EDT)	Volume filtered (m^3)	Zooplankton volume (ml/100 m^3)	Depth of tow (m)	Fish eggs No.	Fish eggs No. under 10 m^2	Fish larvae No.	Fish larvae No. under 10 m^2
1	5/16	1200	194.4	*	0.5	1	0.1	43	4.4
2	5/16	1330	163.3	31.8	0.5	1	0.1	176	24.8
3	5/16	0930	123.4	*	0.5	0	0.0	7	1.0
4	5/17	0805	69.7	5.7	0.5	8	1.2	26	3.7
5	5/17	0925	185.0	20.5	0.5	5	0.2	4	0.2
6	5/17	1230	116.9	21.4	0.5	4	0.6	5	0.6
7	5/18	1000	107.5	37.2	0.5	111	10.4	1	0.1
8	5/18	1045	128.2	9.4	0.5	1,016	79.2	343	26.8
9	5/18	1134	116.2	8.6	0.5	14	1.2	7	0.6
10	5/18	1227	110.2	25.4	0.5	0	0.0	27	2.5
11	5/18	1355	112.2	6.2	0.5	1	0.2	104	18.5
12	5/18	1451	105.6	3.8	0.5	0	0.0	43	6.1
13	5/19	1500	107.0	28.0	0.5	0	0.0	0	0.0
14	5/20	1048	110.1	3.6	0.5	2	0.5	3	0.7
15	5/19	0925	104.3	3.8	0.5	152	14.6	135	12.9
16	5/19	1700	114.7	3.5	0.5	0	0.0	11	1.7
I-1	5/17	1004	553.9	167.9	1.0	3,763	135.8	282	10.2
I-2	5/16	1330	457.0	161.9	1.0	323	17.8	1,101	60.2
I-3	5/21	1649	189.0	169.3	9.6	1,445	734.0	1,688	857.4
II-1	5/17	1736	214.9	186.1	1.0	244	28.3	348	40.5
II-2	5/17	1713	513.5	74.0	3.2	586	36.5	628	39.1
II-3	5/17	1445	496.5	43.3	6.4	1,677	216.2	7,870	1,014.5
III-1	5/18	1615	143.9	218.9	1.0	973	135.2	577	80.2
III-2	5/18	1310	216.1	60.2	4.4	21,809	4,440.5	424	86.3
III-3	5/18	1027	127.8	133.0	6.4	536	268.4	889	445.2
IV-1	5/19	0712	222.3	58.5	1.0	300	20.3	1,659	111.9
IV-2	5/19	0931	229.3	39.3	4.8	6,372	1,333.9	83	17.4
IV-3	5/19	1157	128.4	140.2	6.4	196	97.7	275	137.1
V-1	5/19	1847	294.2	71.4	1.0	63	0.5	645	32.9
V-2	5/19	1611	360.9	22.2	4.4	494	60.2	689	84.0
V-3	5/19	1215	295.4	10.2	7.2	1,044	254.5	117	28.5
VI-1	5/21	0746	258.1	7.8	1.0	39	1.5	190	7.4
VI-2	5/21	0952	339.1	32.4	4.4	433	56.2	520	67.5
VI-3	5/21	1209	302.6	6.0	6.4	116	3.8	139	29.4
VII-1	5/20	0729	277.3	137.0	1.0	78	5.6	886	63.9
VII-2	5/20	1019	343.3	2.3	4.4	1,608	206.1	22	2.8
VII-3	5/20	1242	295.2	---	7.2	---------- Sample lost ----------			
VIII-1	5/20	1750	248.2	---	1.0	---------- Sample lost ----------			
VIII-2	5/20	1556	313.7	---	4.4	---------- Sample lost ----------			
VIII-3	5/20	1347	354.5	---	8.8	---------- Sample lost ----------			

*Negligible value.

Table 3. Sampling and ichthyoplankton data for August 1971.

Station/ transect-station	Date (1971)	Time (EDT)	Volume filtered (m^3)	Zooplankton volume (ml/100 m^3)	Depth of tow (m)	Fish eggs No.	Fish eggs No. under 10 m^2	Fish larvae No.	Fish larvae No. under 10 m^2
1	8/2	1023	116.8	51.4	0.5	29	4.8	3	0.5
2	8/2	1056	123.5	16.2	0.5	44	8.3	15	2.8
3	8/2	1300	135.1	18.5	0.5	4	0.7	0	0.0
4	8/1	0920	127.8	3.9	0.5	1	0.1	7	0.5
5	8/1	1050	117.3	8.5	0.5	0	0.0	3	0.3
6	8/1	1415	111.8	31.3	0.5	2	0.3	6	0.8
7	8/1	1210	134.2	8.9	0.5	161	12.0	15	1.1
8	8/2	1424	114.0	24.6	0.5	2,078	182.2	31	2.7
9	8/3	1319	123.2	13.8	0.5	0	0.0	2	0.2
10	8/3	0955	127.8	3.9	0.5	0	0.0	0	0.0
11	8/4	1212	132.4	18.9	0.5	0	0.0	1	0.2
12	8/4	1050	140.0	4.3	0.5	0	0.0	3	0.3
13	8/4	1422	120.0	4.2	0.5	0	0.0	2	0.3
14	8/5	1145	133.6	44.9	0.5	40	1,359.5	5	0.9
15	8/5	1005	98.5	15.2	0.5	1,098	111.4	31	3.1
16	8/5	0845	117.1	25.6	0.5	3	0.4	0	0.0
I-1	8/2	2120	200.5	54.9	1.0	379	37.8	28	2.8
I-2	8/1	2115	342.9	17.5	1.0	203	14.8	598	43.6
I-3	8/1	2253	214.9	330.4	9.6	135	60.3	6,431	2,872.9
II-1	8/2	0631	162.7	1,665.6	1.0	1,129	173.5	27	4.1
II-2	8/2	0435	227.8	122.9	3.2	6,899	969.1	1,014	142.4
II-3	8/2	0253	239.2	158.9	6.4	1,763	471.7	7,317	1,957.7
III-1	8/3	0512	306.3	32.7	1.0	732	47.8	1,288	84.1
III-2	8/3	0317	214.5	51.3	4.4	381	78.2	441	90.5
III-3	8/3	0056	295.3	210.0	6.4	4,304	932.8	8,724	1,890.7
IV-1	8/3	2110	226.7	11.9	1.0	27	1.8	39	2.6
IV-2	8/3	2254	227.8	87.8	4.8	1,743	367.3	904	190.5
IV-3	8/4	0110	308.0	97.4	6.4	100	20.8	2,665	553.8
V-1	8/4	0634	216.8	85.3	1.0	598	35.4	372	25.7
V-2	8/4	0441	256.2	82.0	4.4	14,125	2,425.8	2,634	452.4
V-3	8/4	0251	204.6	205.3	7.2	4,151	1,460.8	3,433	1,208.1
VI-1	8/4	2056	207.5	79.5	1.0	124	6.0	460	22.2
VI-2	8/4	2316	208.1	192.2	4.4	851	179.9	1,952	412.7
VI-3	8/5	0117	290.6	91.2	6.4	3,014	663.8	2,201	484.7
VII-1	8/5	2029	270.5	44.4	1.0	34	2.6	5	0.4
VII-2	8/5	0429	234.8	174.6	4.4	212	39.7	464	87.0
VII-3	8/5	0249	246.4	121.8	7.2	6,218	1,817.0	1,538	449.4
VIII-1	8/5	2225	226.3	240.8	1.0	1,085	96.0	1,856	164.0
VIII-2	8/6	0028	262.1	124.0	4.4	150	25.2	190	31.9
VIII-3	8/6	0240	259.2	30.9	8.8	6,218	2,111.1	1,876	636.9

Table 4. Sampling and ichthyoplankton data for November 1971.

Station/ transect-station	Date (1971)	Time (EST)	Volume filtered (m^3)	Zooplankton volume (ml/100 m^3)	Depth of tow (m)	Fish eggs No.	Fish eggs No. under 10 m^2	Fish larvae No.	Fish larvae No. under 10 m^2
1	11/1	1000	133.4	9.0	0.5	49	7.2	0	0.0
2	11/1	0830	115.8	7.8	0.5	7	1.4	0	0.0
3	11/1	1117	133.8	38.9	0.5	1	0.1	6	0.8
4	11/3	1657	105.2	10.5	0.5	0	0.0	5	0.4
5	11/2	0845	109.7	16.4	0.5	0	0.0	1	0.1
6	11/3	1520	114.4	480.8	0.5	0	0.0	0	0.0
7	11/3	1412	150.8	1.3	0.5	0	0.0	2	0.1
8	11/3	1340	104.2	1.9	0.5	0	0.0	36	3.5
9	11/3	1244	124.4	9.7	0.5	0	0.0	2	0.2
10	11/3	1000	108.4	156.8	0.5	0	0.0	21	1.9
11	11/4	1240	123.3	3.2	0.5	1	0.2	2	0.3
12	11/4	1050	132.6	184.8	0.5	0	0.0	0	0.0
13	11/4	1515	119.5	3.4	0.5	0	0.0	1	0.2
14	11/5	1003	108.3	230.8	0.5	15	3.5	3	0.7
15	11/5	0819	140.2	4.3	0.5	59	4.2	34	2.4
16	11/5	0655	107.5	1.9	0.5	0	0.0	0	0.0
I-1	11/1	1830	175.4	45.6	1.0	412	47.0	5	0.6
I-2	10/31	1851	238.4	31.5	1.0	5	0.5	38	4.0
I-3	10/31	2108	176.1	195.9	9.6	323	176.1	215	117.2
II-1	11/1	0407	142.1	56.3	1.0	785	138.0	16	2.8
II-2	11/1	0133	222.4	213.6	3.2	464	66.8	214	30.8
II-3	10/31	2327	242.8	86.5	6.4	600	158.2	356	93.8
III-1	11/2	0117	344.7	40.6	1.0	1,573	91.2	16	0.9
III-2	11/1	2310	287.9	173.7	4.4	827	126.4	195	29.8
III-3	11/1	2052	296.5	155.1	6.4	1,178	254.3	112	24.2
IV-1	11/1	1840	330.5	154.3	1.0	0	0.0	0	0.0
IV-2	11/4	2036	305.2	190.0	4.8	2,663	418.8	130	20.4
IV-3	11/4	2257	299.0	317.7	6.4	459	98.3	204	43.7
V-1	11/4	0611	226.1	181.3	1.0	0	0.0	0	0.0
V-2	11/4	0409	385.5	57.1	4.4	58	6.6	1,222	139.5
V-3	11/4	0215	320.0	56.3	7.2	133	29.9	12	2.7
VI-1	11/3	1900	181.6	33.0	1.0	16	0.9	9	0.5
VI-2	11/3	2142	343.5	93.2	4.4	41	5.3	277	35.5
VI-3	11/4	0029	326.2	38.3	6.4	90	17.7	45	8.8
VII-1	11/3	0450	303.9	41.1	1.0	53	3.4	233	15.3
VII-2	11/3	0251	384.2	65.1	4.4	107	12.3	1,382	158.3
VII-3	11/3	0048	339.7	53.0	7.2	214	45.4	379	80.3
VIII-1	11/2	1911	243.1	168.7	1.0	2	0.2	14	1.2
VIII-2	11/2	2153	315.0	41.3	4.4	25	3.5	28	3.9
VIII-3	11/2	2305	233.5	192.7	8.8	324	122.1	210	79.1

Table 5. Sampling and ichthyoplankton data for February 1972.

Station/ transect-station	Date (1972)	Time (EST)	Volume filtered (m^3)	Zooplankton volume ($ml/100\ m^3$)	Depth of tow (m)	Fish eggs		Fish larvae	
						No.	No. under 10 m^2	No.	No. under 10 m^2
1	2/14	0905	112.2	44.6	0.5	781	139.2	34	6.1
2	2/14	0937	115.8	73.4	0.5	13	2.8	6	1.2
3	2/14	1110	138.1	29.0	0.5	7	1.0	11	1.4
4	2/14	1420	112.2	26.7	0.5	76	6.8	64	5.7
5	2/15	0842	148.7	8.1	0.5	227	15.2	99	6.7
6	2/15	1207	115.8	43.2	0.5	69	9.0	18	2.3
7	2/15	1000	96.9	*	0.5	0	0.0	1	0.1
8	2/15	1055	111.0	189.2	0.5	0	0.0	6	0.5
9	2/16	1443	114.5	183.4	0.5	11	1.0	17	1.5
10	2/16	1330	110.7	31.6	0.5	68	6.2	44	4.0
11	2/16	1150	129.0	135.7	0.5	0	0.0	5	0.8
12	2/16	1035	123.0	487.8	0.5	8	0.9	16	2.0
13	2/17	1412	97.1	9.3	0.5	0	0.0	0	0.0
14	2/17	1135	119.6	66.9	0.5	35	7.5	13	2.7
15	2/17	1545	120.5	149.4	0.5	2,323	192.8	139	11.5
16	2/17	1650	99.1	787.1	0.5	0	0.0	7	1.3
I-1	2/13	2131	203.9	31.9	1.0	2,331	228.6	138	13.5
I-2	2/17	1840	265.6	67.8	1.0	2,533	238.5	100	9.4
I-3	2/17	2037	318.7	43.9	9.6	1,561	470.2	133	40.1
II-1	2/14	0220	285.4	70.1	1.0	15,375	1,346.8	511	44.8
II-2	2/13	0020	299.6	45.1	3.2	2,788	297.8	170	18.2
II-3	2/14	1945	324.9	29.2	6.4	3,019	594.7	246	48.5
III-1	2/15	0106	118.0	148.3	1.0	4,895	829.6	407	69.0
III-2	2/14	2344	352.1	35.5	4.4	23,845	2,979.8	180	22.5
III-3	2/14	2134	349.6	15.7	6.4	7,987	1,462.2	62	11.4
IV-1	2/15	0232	343.5	30.6	1.0	4,488	196.1	105	4.6
IV-2	2/15	0507	321.2	62.3	4.8	3,481	520.2	242	36.2
IV-3	2/15	0653	240.9	12.5	6.4	4,031	1,070.9	3	0.8
V-1	2/17	0437	147.0	95.2	1.0	37	3.8	314	32.0
V-2	2/17	0227	257.6	48.5	4.4	248	42.4	133	22.7
V-3	2/16	0016	271.8	31.3	7.2	7,227	1,914.4	62	16.4
VI-1	2/16	1834	201.4	12.4	1.0	71	3.5	50	2.5
VI-2	2/16	2029	318.7	81.6	4.4	347	47.9	553	76.3
VI-3	2/16	2234	276.1	45.3	6.4	250	58.0	237	54.9
VII-1	2/16	0344	143.3	83.7	1.0	85	11.8	185	25.8
VII-2	2/16	0140	311.3	70.7	4.4	41	5.8	1,313	185.6
VII-3	2/15	2344	250.8	61.8	7.2	275	79.0	291	83.5
VIII-1	2/15	1855	154.4	13.0	1.0	1,554	201.4	13	1.7
VIII-2	2/15	2035	321.2	18.3	4.4	205	28.1	344	47.1
VIII-3	2/15	2233	357.0	61.6	8.8	917	226.0	620	152.8

*Negligible value.

Table 6. Surface (S) and bottom (B) hydrological factors measured quarterly from May 1971 to February 1972.

Station		Salinity (ppt) May	Aug	Nov	Feb	Temperature (°C) May	Aug	Nov	Feb	Oxygen (ml/l.) May	Aug	Nov	Feb
1	S	37.5	36.8	33.0	33.7	27.8	29.3	27.3	18.6	4.99	3.63	4.27	5.07
2	S	37.6	37.0	29.8	33.0	28.1	29.4	26.5	19.7	5.23	4.91	4.19	5.39
3	S	39.6	18.6	19.4	18.8	28.1	30.3	27.8	20.8	3.87	4.51	4.51	5.63
4	S	40.3	21.5	21.9	27.6	28.5	28.7	28.4	21.2	3.22	4.03	4.83	6.60
5	S	41.2	29.6	1.8	22.6	26.6	28.9	26.4	20.6	4.83	3.70	4.43	5.47
6	S	39.8	33.7	27.5	29.0	28.8	30.3	28.6	20.8	3.87	4.51	5.07	6.12
7	S	39.7	28.2	5.0	22.4	27.8	29.3	29.1	21.5	4.83	3.95	4.99	5.55
8	S	34.0	23.3	2.3	10.5	28.2	31.5	28.5	21.5	4.51	4.59	4.19	6.28
9	S	32.8	7.9	3.5	20.8	28.8	29.5	27.9	25.0	4.19	3.06	4.19	5.63
10	S	36.1	22.6	17.4	29.7	28.5	28.7	27.3	23.8	4.51	3.46	3.63	5.80
11	S	32.5	4.5	4.3	10.5	29.3	30.0	26.7	23.5	4.27	3.38	3.46	4.99
12	S	34.4	30.9	23.3	28.1	29.6	29.6	26.6	22.4	1.45	4.19	2.90	5.31
13	S	16.6	2.3	2.0	9.1	29.6	29.7	26.3	24.1	3.95	2.66	4.67	4.51
14	S	34.8	32.2	26.0	29.6	27.6	29.3	26.4	22.5	4.67	3.79	3.30	----
15	S	35.4	24.3	15.4	20.7	26.7	28.9	25.7	24.3	----	4.35	4.99	6.44
16	S	39.8	35.3	32.2	28.2	29.4	28.7	25.9	25.0	7.08	3.46	3.46	5.23
I-1	S	38.0	35.1	26.2	31.9	26.9	30.0	27.3	21.2	4.27	4.59	5.15	5.80
	B	38.0	35.2	----	----	26.9	29.9	----	----	4.59	5.07	----	----
I-2	S	37.3	36.7	31.9	35.8	27.7	29.2	26.8	21.8	5.39	5.39	6.32	5.31
	B	37.3	36.8	----	----	27.6	29.2	----	----	5.31	----	----	----
I-3	S	36.3	36.3	35.3	36.0	27.7	29.9	27.3	20.8	5.31	5.07	5.47	5.71
	B	36.3	36.3	35.2	36.0	27.6	29.9	27.2	20.7	4.75	5.03	5.15	5.63
II-1	S	38.2	36.4	28.7	30.6	28.5	28.6	26.7	20.5	5.39	4.51	4.67	5.55
	B	38.2	36.4	----	----	28.5	28.6	----	----	5.47	4.43	----	----
II-2	S	36.7	36.2	34.3	35.0	28.8	29.0	26.7	20.4	5.31	4.67	3.30	5.80
	B	36.7	36.3	34.2	35.0	28.5	29.0	26.7	20.4	3.55	4.59	4.99	5.63
II-3	S	36.1	36.2	34.5	35.6	28.1	29.6	27.0	20.1	5.31	4.83	5.15	5.47
	B	36.1	36.2	34.7	35.6	27.7	29.6	27.1	20.1	5.23	4.83	4.75	5.63
III-1	S	38.4	35.4	30.0	30.5	27.9	28.6	26.6	19.7	5.55	4.43	4.35	5.71
	B	38.4	35.4	----	----	27.9	28.6	----	----	5.55	4.19	----	----
III-2	S	36.4	36.2	33.0	34.6	27.8	29.2	26.7	20.0	5.55	5.23	4.75	6.04
	B	36.3	36.2	32.9	34.6	27.7	29.2	26.6	20.1	5.63	4.67	5.31	5.96

Table 6. Continued

Station		Salinity (ppt)				Temperature (°C)				Oxygen (ml/l.)			
		May	Aug	Nov	Feb	May	Aug	Nov	Feb	May	Aug	Nov	Feb
III-3	S	36.1	36.6	34.5	35.5	27.5	25.6	27.1	20.3	4.99	4.99	4.91	5.39
	B	36.0	36.6	34.5	35.5	27.6	29.6	27.1	20.3	4.99	4.91	4.99	5.96
IV-1	S	36.7	34.2	30.7	30.7	26.5	29.6	26.4	19.5	4.64	5.23	4.99	5.39
	B	36.7	34.2	----	----	26.6	29.6	----	----	4.59	5.80	----	----
IV-2	S	36.4	36.7	34.9	35.2	27.4	29.4	26.6	20.1	5.23	4.99	5.15	5.71
	B	36.1	36.7	34.9	35.2	27.4	29.4	26.6	20.1	5.07	4.91	----	5.63
IV-3	S	36.0	36.7	35.3	35.7	27.6	30.0	26.5	20.4	5.15	4.91	5.39	5.88
	B	36.0	36.7	35.3	35.7	27.7	30.0	26.6	20.4	5.23	5.15	4.99	5.96
V-1	S	34.8	34.8	31.5	31.9	28.4	28.5	26.5	21.8	5.15	4.59	4.99	5.47
	B	34.9	34.8	----	----	28.4	28.5	----	----	5.15	----	----	----
V-2	S	36.1	36.7	34.3	35.2	27.9	29.2	26.7	21.4	5.63	4.69	4.51	5.63
	B	36.0	36.7	34.1	35.2	27.9	29.2	26.7	21.4	5.63	4.59	4.83	5.71
V-3	S	36.2	36.9	35.8	35.6	27.7	29.6	26.8	21.1	5.07	5.15	4.75	5.71
	B	36.3	36.9	35.8	35.6	27.6	29.6	26.9	21.1	5.15	5.15	4.51	5.63
VI-1	S	33.4	35.1	27.2	28.7	26.6	29.9	26.7	23.0	4.43	4.59	4.59	5.31
	B	33.4	35.1	----	----	26.7	29.9	----	----	4.27	----	----	----
VI-2	S	36.2	36.9	34.1	35.1	27.5	29.3	26.7	21.6	5.07	4.35	5.07	5.80
	B	36.2	36.9	34.1	35.1	27.5	29.3	26.7	21.6	4.91	4.35	4.83	5.80
VI-3	S	36.2	36.5	35.7	35.3	27.8	29.7	26.7	21.2	5.15	4.43	4.99	5.88
	B	36.2	36.6	35.7	35.3	27.6	29.7	26.7	21.2	5.15	4.67	3.30	5.63
VII-1	S	36.3	36.2	30.5	32.0	26.9	29.5	25.8	21.0	4.67	4.43	3.30	5.55
	B	36.3	36.2	----	----	26.9	29.5	----	----	4.67	----	----	----
VII-2	S	36.6	36.8	35.2	35.2	27.3	29.4	26.6	20.7	5.47	4.03	5.15	5.63
	B	36.5	36.9	35.2	35.2	27.3	29.4	26.6	20.7	5.15	3.95	4.67	5.63
VII-3	S	35.9	36.5	36.2	35.4	27.4	29.8	26.8	21.0	5.07	4.59	4.67	5.88
	B	35.9	36.6	36.2	35.2	27.3	29.8	26.8	21.0	5.07	4.35	4.91	5.71
VIII-1	S	36.3	36.9	35.3	30.9	28.0	29.1	26.3	21.2	5.39	3.95	4.59	5.80
	B	36.3	36.9	----	----	28.0	29.1	----	----	5.39	----	----	----
VIII-2	S	36.5	36.9	36.1	35.3	27.8	29.6	26.5	20.7	5.55	4.11	4.67	5.88
	B	36.5	36.8	36.1	35.7	27.8	29.6	26.5	20.7	5.07	4.19	4.67	6.20
VIII-3	S	36.0	36.8	36.4	36.3	27.7	29.8	27.0	21.1	5.23	4.43	----	5.71
	B	36.1	36.8	36.3	36.3	27.5	29.8	27.0	21.1	5.55	4.35	4.83	5.96

Table 7. Ranges of temperature and salinity for all collections involving the ten most abundant families.

Taxon	Temperature range (°C)	Salinity range (ppt)
CLUPEIDAE		
Brevoortia spp.	19.7-29.7	28.7-36.5
Harengula jaguana	20.1-30.0	32.0-38.0
Opisthonema oglinum	21.1-30.0	34.8-38.4
Sardinella brasiliensis	30.0	36.7
Sardinella spp.	20.0-29.6	34.6-36.7
Unid. spp.	18.6-30.0	18.8-39.8
ENGRAULIDAE		
Unid. spp.	18.6-31.5	2.3-40.3
GOBIIDAE		
Gobionellus spp.	27.7-29.7	36.5-37.3
Gobiosoma spp.	19.7-30.0	33.0-37.3
Microgobius spp.	18.6-31.5	2.3-37.3
Unid. spp.	19.7-30.3	2.3-41.2
SCIAENIDAE		
Bairdiella chrysura	18.6-30.3	27.6-38.4
Cynoscion nebulosus	19.5-29.9	28.1-38.4
Cynoscion spp.	19.5-30.0	28.7-37.3
Menticirrhus spp.	19.7-30.0	24.3-37.3
Pogonias cromis	19.7-28.1	28.1-36.1
Sciaenops ocellatus	29.0	35.2
Unid. spp.	19.7-29.9	24.3-37.3
CARANGIDAE		
Chloroscombrus chrysurus	20.8-30.0	31.9-38.4
Oligoplites saurus	26.6-29.6	32.5-41.2
Unid. spp.	25.6-29.9	36.1-37.6
POMADASYIDAE		
Orthopristis chrysoptera	18.6-29.8	27.6-40.3
Unid. spp.	21.2-29.8	31.9-36.8
CYNOGLOSSIDAE		
Symphurus SPP.	19.7-30.0	30.5-38.4
GERREIDAE		
Unid. spp.	20.1-30.0	26.2-39.8
TRIGLIDAE		
Prionotus SPP.	18.6-30.0	31.9-38.2
SOLEIDAE		
Achirus lineatus	19.7-30.0	4.3-39.6
Trinectes maculatus	25.8-27.7	30.5-37.3
Unid. spp.	20.5-29.6	30.6-37.3

Table 8. Percentage of total larval catches for the ten most abundant families.

Family	May 1971	Aug 1971	Nov 1971	Feb 1972	All Cruises
CLUPEIDAE	23.8	30.0	(<0.5)	4.5	24.1
ENGRAULIDAE	24.6	24.9	14.1	7.6	22.5
GOBIIDAE	1.5	15.4	41.7	11.4	13.3
SCIAENIDAE	5.3	4.7	26.3	10.6	6.9
CARANGIDAE	7.7	7.0	(<0.5)	(<1.3)	6.1
POMADASYIDAE	2.1	(<0.5)	0.5	47.8	4.9
CYNOGLOSSIDAE	5.3	4.9	0.8	(<1.3)	4.3
GERREIDAE	14.3	0.5	(<0.5)	(<1.3)	4.0
TRIGLIDAE	6.2	2.9	2.4	2.2	3.6
SOLEIDAE	(<1.2)	1.3	(<0.5)	(<1.3)	1.0

Table 9. Occurrence of the ten most abundant families of larvae in the inshore zone, May 1971 to February 1972.

Species	Size range (mm)	Occurrence (No. of larvae)				
		May*	Aug	Nov	Feb	Total
CLUPEIDAE						
Brevoortia spp.	3.9-17	10	1	1	174	186
Harengula jaguana	1.9-30	123	104	0	16	243
Opisthonema oglinum	2.8-43	225	3,337	4	2	3,568
Sardinella brasiliensis	19-21	0	2	0	0	2
Sardinella spp.	4.2-17	0	48	0	44	92
Unid. spp.	1.3-16	4,325	10,613	4	68	15,010
ENGRAULIDAE						
Unid. spp.	1.5-42	4,540	12,926	766	491	18,723
GOBIIDAE						
Gobionellus spp.	4.0-6.3	10	3	0	0	13
Gobiosoma spp.	1.5-9.8	43	2,024	26	58	2,151
Microgobius spp.	1.3-10	88	4,615	2,102	194	6,999
Unid. spp.	1.7-9.5	20	704	95	484	1,303
SCIAENIDAE						
Bairdiella chrysura	1.3-5.0	495	558	6	125	1,184
Cynoscion nebulosus	1.8-4.2	30	10	4	7	51
Cynoscion spp.	1.6-7.0	39	566	538	526	1,669
Menticirrhus spp.	1.2-6.5	454	871	94	27	1,446
Pogonias cromis	1.6-4.5	21	0	771	17	809
Sciaenops ocellatus	1.6-4.3	0	15	2	0	17
Unid. spp.	1.2-3.5	12	157	15	7	191
CARANGIDAE						
Chloroscombrus chrysurus	1.2-13	1,298	2,450	2	1	3,751
Oligoplites saurus	1.9-18	46	15	0	0	61
Unid. spp.	1.5-5.0	150	632	1	0	783
POMADASYIDAE						
Orthopristis chrysoptera	1.8-13	412	84	31	3,267	3,794
Unid. spp.	2.0-5.2	7	22	0	4	33
CYNOGLOSSIDAE						
Symphurus plagiusa	1.1-9.5	1,057	2,289	43	7	3,396
TRIGLIDAE						
Prionotus spp.	1.4-8.6	1,249	1,458	127	169	3,003
GERREIDAE						
Unid. spp.	1.2-14	2,618	266	20	11	2,915
SOLEIDAE						
Achirus lineatus	1.0-3.8	159	573	17	4	753
Trinectes maculatus	1.9-3.3	1	0	1	0	2
Unid. spp.	1.4-2.6	13	36	0	1	50

* Samples from four stations in May 1971 were lost.

Table 10. Occurrence of the ten most abundant families of larvae in the estuarine zone, May 1971 to February 1972.

Species	Size range (mm)	Occurrence (No. of larvae)				
		May	Aug	Nov	Feb	Total
ENGRAULIDAE						
Unid. spp.	1.9-7.7	357	63	1	37	458
GOBIIDAE						
Gobiosoma spp.	4.8	0	0	0	1	1
Microgobius spp.	1.8-9.7	107	12	38	115	272
Unid. spp.	1.6-5.2	26	15	2	12	55
GERREIDAE						
Unid. spp.	1.5-7.9	244	0	0	0	244
GOBIESOCIDAE						
Gobiesox strumosus	2.0-8.3	5	0	30	128	163
BLENNIIDAE						
Hypsoblennius hentzi	2.0-6.2	43	12	2	84	141
CLUPEIDAE						
Brevoortia spp.	7.5-10	0	0	0	5	5
Unid. spp.	1.7-7.3	59	0	0	3	62
SCIAENIDAE						
Bairdiella chrysura	1.9-36	2	3	0	15	20
Cynoscion nebulosus	2.1-4.6	15	0	0	1	16
Menticirrhus spp.	3.3-3.7	0	1	0	1	2
Pogonias cromis	4.3-5.5	0	0	0	6	6
Unid. spp.	1.8	0	1	0	0	1
SYNGNATHIDAE						
Hippocampus erectus	15-16	0	0	0	2	2
Syngnathus louisianae	14-42	0	0	0	7	7
Syngnathus scovelli	12-38	4	2	1	6	13
Syngnathus spp.	9.5-25	8	2	2	1	13
CARANGIDAE						
Chloroscombrus chrysurus	14	0	1	0	0	1
Oligoplites saurus	2.3-13	25	3	0	0	28
Unid. spp.	2.7-3.5	2	0	0	0	2
TETRAODONTIDAE						
Sphoeroides spp.	1.4-6.2	11	0	0	8	19

Table 11. Number, abundance under 10 m² (in parentheses) and length range (mm SL) of all larvae and juveniles collected in the inshore zone during May 1971.

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Atherinidae																									
Unid. spp.		18 (1.0) 2.8- 10								1 (0.1) 14						3 (0.1) 3.4- 13									22 (-) 2.8-14
Balistidae																									
Aluterus spp.		3 (0.2) 4.3																1 (0.2) 8.8							4 (-) 4.3-8.8
Monacanthus ciliatus					2 (0.1) 13-14																				2 (-) 13-14
Monacanthus spp.	1 (*) 10		2 (1.0) 4.7- 4.8		1 (0.1) 2.3	2 (0.3) 7.7			4 (2.0) 2.3- 6.1		2 (0.4) 2.5- 13	7 (3.5) 2.6- 6.3	4 (0.2) 2.5- 3.0	5 (0.6) 2.1- 3.6			41 (5.3) 2.2- 5.2		1 (0.1) 2.1	1 (0.1) 4.0					71 (-) 2.1-13
Unid. spp.																		10 (2.1) 2.1- 3.1							10 (-) 2.1-3.1
Belonidae																									
Strongylura timucu		1 (0.1) 43																							1 (-) 43
Blenniidae																									
Hypsoblennius hentzi	4 (0.1) 2.8- 4.1	11 (0.6) 2.1- 4.6		5 (0.6) 1.8- 3.3		10 (1.3) 1.7- 3.1	5 (0.7) 2.1- 3.3			3 (0.2) 2.4- 3.8			1 (0.1) 3.3						16 (1.2) 2.4- 4.9						55 (-) 1.7-4.9
Unid. spp.	37 (1.3) 2.0- 3.0	2 (0.1) --										1 (0.5) 1.8					6 (0.8) 1.7- 3.0								46 (-) 1.7-3.0
Bothidae																									
Unid. spp.			86 (43.7) 1.6- 8.5	1 (0.1) 2.7																					87 (-) 1.6-8.5

Table 11. Continued

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Callionymidae																									
Callionymus spp.			3 (1.5) 1.2-1.7									2 (1.0) 1.8-2.5													5 (-) 1.2-2.5
Carangidae																									
Chloroscombrus chrysurus		12 (0.7) 2.0-2.6	504 (256.0) 2.1-6.9		72 (4.5) 1.5-7.9	549 (70.8) 1.7-4.5	9 (1.3) 1.5-3.3	82 (16.7) 1.5-4.6	37 (18.5) 1.9-5.3		18 (3.8) 2.0-3.2	6 (3.0) 1.8-9.5			6 (1.5) 1.9-2.5			3 (0.6) 2.0-2.2							1,298 (-) 1.5-9.5
Oligoplites saurus	4 (0.1) 5.2-10	2 (0.1) 2.5				29 (3.7) 2.0-5.1	1 (0.1) 2.2		3 (1.5) 2.3-3.8			3 (1.5) 2.6-3.6					1 (0.1) 2.6	1 (0.2) 2.5	1 (0.1) 2.9	1 (0.1) 4.6					46 (-) 2.0-10
Unid. spp.		2 (0.1) --	14 (7.[illegible]) 2.0-4.3		10 (0.6) 1.5-4.0	124 (16.0) 2.0-3.5																			150 (-) 1.5-4.3
Clupeidae																									
Brevoortia spp.																			10 (0.7) 11-17						10 (-) 11-17
Harengula jaguana	10 (0.4) 13-18	7 (0.4) 12-20			61 (3.8) 8.7-20	15 (1.9) 6.1-19			1 (0.5) 8.3					3 (0.4) 9.0-10	25 (6.[illegible]) [illegible].9-11					1 (0.1) 9.2					123 (-) 1.9-20
Opisthonema oglinum	1 (*) 18				90 (5.6) 5.8-16		13 (1.8) 6.1-11	4 (0.8) 7.0-9.3	1 (0.5) 8.0			10 (5.0) 5.8-9.3	79 (4.0) 5.5-12	17 (2.1) 5.0-10			5 (0.6) 7.6-8.5		5 (0.4) 13-15						225 (-) 5.0-18
Unid. spp.	3 (0.1) 10	225 (12.3) 3.7-12	54 (27.4) 3.5-8.2		108 (6.7) 2.6-4.8	2691 (346.9) 2.5-7.2	30 (4.2) 3.0-10	253 (51.5) 1.3-5.0	154 (77.1) 2.7-7.0	3 (0.2) 5.5-10	38 (8.0) 5.0-11	48 (23.9) 2.5-9.2	19 (1.0) 3.4-8.5	472 (57.9) 1.5-8.5			199 (25.8) 3.3-7.2	25 (5.3) 2.2-4.8		3 (0.4) 6.0-9.0					4,325 (-) 1.3-12

Table 11. Continued

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Cynoglossidae																									
Symphurus spp.			354 (179.8) 1.7- 9.5		3 (0.2) 2.8- 3.2	610 (78.6) 1.4- 5.0	1 (0.1) 2.4	5 (1.0) 1.6- 2.5	69 (34.6) 1.5- 7 8			12 (6.0) 2.0- 9.2			2 (0.5) 1.9- 9.0				1 (0.1) 1.2						1,057 (-) 1.2-9.5
Engraulidae																									
Unid. spp.	211 (7.6) 5.0- 16	569 (31.1) 4.8- 28	4 (2.0) 4.5- 5.3	317 (36.9) 5.8- 14	8 (0.5) 1.5- 7.0		380 (52.8) 2.0- 11	3 (0.6) 2.0- 2.5		1635 (110.3) 2.3- 18			467 (23.8) 2.6- 15			175 (6.8) 4.0 14			771 (55.6) 2.7- 14						4,540 (-) 1.5-28
Ephippidae																									
Chaetodipterus faber			2 (1.0) 2.8- 4.4		1 (0.1) 2.8	3 (0.4) 1.8- 3.4			5 (2.5) 2.1- 2.5		1 (0.2) 3.9						1 (0.1) 2.8								13 (-) 1.8-4.4
Exocoetidae																									
Hemiramphus balao		1 (0.1) 21																							1 (-) 21
Hemiramphus brasiliensis		1 (0.1) 24																							1 (-) 24
Hemiramphus spp.														2 (0.2) 7.7- 15	1 (0.2) 8.9										3 (-) 7.7-15
Hyporhamphus unifasciatus														1 (0.1) 5.0				2 (0.4) 7.6- 11							3 (-) 5.0-11
Unid. spp.					1 (0.1) 11												9 (1.2) 3.0- 6.5								10 (-) 3.0-11
Gerreidae																									
Unid. spp.		43 (2.4) 2.8- 33	195 (99.0) 1.7- 4.5	1 (0.1) 3.0	118 (7.4) 1.6- 7.6	2177 (280.6) 1.4- 5.4	1 (0.1) 7.0	8 (1.6) 2.1- 2.5	48 (24.0) 2.2- 3.8			9 (4.5) 1.6- 4.5			4 (1.0) 3.4- 5.7	5 (0.2) 8.4- 9.3		2 (0.4) 2.3- 3.6	7 (0.5) 8.2- 8.6						2,618 (-) 1.4-11

Table 11. Continued

Taxon	I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Gobiesocidae																									
Gobiesox strumosus	3 (0.1) 2.5-3.0	2 (0.1) 2.5-3.5																							5 (-) 2.5-3.5
Gobiidae																									
Gobionellus spp.		10 (0.5) 4.0-6.3																							10 (-) 4.0-6.3
Gobiosoma spp.		43 (2.4) 2.5-6.5																							43 (-) 2.5-6.5
Microgobius spp.		10 (0.5) 7.0-9.3	4 (2.0) 2.6-3.7							4 (0.3) 3.7-9.5						1 (-) 3.2			69 (5.0) 2.6-3.9						88 (-) 2.6-9.5
Unid. spp.		10 (0.5) [illegible]					7 (1.0) 2.2-6.9													3 (0.4) 3.0-4.0					20 (-) 2.2-6.9
Microdesmidae																									
Microdesmus spp.			55 (27.9) 1.5-4.0			178 (22.9) 2.4-5.0		5 (1.0) 2.5-2.9	1 (0.5) 2.5			3 (1.5) 2.1-3.4													242 (-) 1.5-5.0
Mugiiidae																									
Mugil spp.									1 (0.5) 5.9	1 (0.1) 16															2 (-) 5.9-16
Ophidiidae																									
Unid. spp.			2 (1.0) 3.9-4.3						1 (0.5) 1.8																3 (-) 1.8-4.3
Ostraciidae																									
Lactophrys spp.								1 (0.2) 2.3	2 (1.0) 2.2-2.7				1 (0.1) 2.4							1 (0.1) 3.0					5 (-) 2.2-3.0

Table 11. Continued

Taxon	I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Pomadasyidae																									
<u>Orthopristis chrysoptera</u>		3 (0.2) 8.4- 9.0			1 (0.1) 5.8	124 (16.0) 2.1- 3.0		20 (4.1) 2.3- 3.7				29 (14.5) 2.0- 5.3					165 (21.4) 1.8- 5.2	70 (14.8) 1.9- 3.8							412 (-) 1.8-9.0
Unid. spp.											7 (1.5) 2.2- 4.2														7 (-) 2.2-4.2
Sciaenidae																									
<u>Bairdiella chrysura</u>		45 (2.5) 2.3- 4.0	26 (13.2) 1.9- 2.7		91 (5.7) 1.3- 3.5	253 (32.6) 1.6- 2.5	6 (0.8) 4.2- 5.0	10 (2.0) 1.7- 2.0	59 (29.5) 1.9- 2.6	1 (0.1) 4.8			4 (0.2) 2.0- 2.8												495 (-) 1.3-5.0
<u>Cynoscion nebulosus</u>		18 (1.0) 2.2- 4.0			2 (0.1) 1.8- 2.8		3 (0.4) 2.0- 2.8		1 (0.5) 2.8		1 (0.2) 2.0		3 (0.2) 2.3- 3.0			2 (0.1) 3.0- 4.2									30 (-) 1.8-4.2
<u>Cynoscion</u> spp.		2 (0.1) 2.1- 2.2	35 (17.8) 2.0- 3.5						2 (1.0) 2.5- 2.8																39 (-) 2.0-3.5
<u>Menticirrhus</u> spp.		4 (0.2) 2.5- 3.8	38 (19.3) 2.4- 4.9		1 (0.1) 2.8	337 (43.4) 1.2- 4.1		1 (0.2) 2.2	69 (34.6) 2.3- 4.0		3 (0.6) 2.9- 3.2				1 (0.2) 3.2										454 (-) 1.2-4.9
<u>Pogonias cromis</u>						21 (2.7) 1.9- 4.0																			21 (-) 1.9-4.0
Unid. spp.		11 (0.6) --														1 (*) 2.0									12 (-) --
Soleidae																									
<u>Achirus lineatus</u>		10 (0.5) 1.8- 3.1	2 (1.0) 1.8- 2.0	9 (1.0) 1.2- 2.4	57 (3.6) 1.3- 2.7	20 (2.6) 1.8- 3.4	8 (1.1) 1.5- 2.8	3 (0.6) 1.4- 2.3	6 (3.0) 1.8- 2.4	3 (0.2) 1.6- 3.7		27 (13.5) 1.6- 3.1	4 (0.2) 1.6- 3.6			1 (*) 3.4	7 (0.9) 1.7- 3.8		2 (0.1) 1.8- 2.7						159 (-) 1.2-3.8

Table 11. Continued

Taxon	I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Trinectes maculatus		1 (0.1) 3.3																							1 (-) 3.3
Unid. spp.		2 (0.1) --										11 (5.5) 1.6- 2.5													13 (-) 1.6-2.5
Sparidae																									
Archosargus probatocephalus															1 (0.2) 4.1										1 (-) 4.1
Lagodon rhomboides													1 (0.1) 8.0												1 (-) 8.0
Stromateidae																									
Peprilus spp.															9 (2.2) 2.5- 2.7		9 (1.2) 2.5- 2.6	2 (0.2) 2.1- 2.6							20 (-) 2.1-2.7
Syngnathidae																									
Hippocampus erectus	3 (0.1) 6.0- 8.3	4 (0.2) 7.0- 8.5		1 (0.1) 12			7 (1.0) 10-14			3 (0.2) 8.5- 10															18 (-) 6.0-14
Syngnathus louisianae		10 (0.5) 7.5- 32	7 (3.6) 28-43															1 (0.2) 6.4							18 (-) 6.4-43
Syngnathus scovelli		1 (0.1) 15								1 (0.1) 29															2 (-) 15-29
Syngnathus spp.	3 (0.1) 9.0- 15	10 (0.5) 7.0- 15				1 (0.1) 10	5 (0.4) 8.5- 21	1 (0.2) 20		1 (0.1) 8.2			1 (0.1) 11		1 (0.2) 8.0	1 (-) 20	2 (0.3) 6.2- 6.8								24 (-) 6.2-21
Unid. spp.		4 (0.2) --																							4 (-) --

Table 11. Continued

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Synodontidae *Synodus foetens*		1 (0.1) 36																							1 (-) 36
Tetraodontidae *Sphoeroides* spp.	1 (*) 3.6	1 (0.1) 2.1	2 (1.0) 1.6- 1.7	7 (0.8) 1.5- 2.2	1 (0 1) 2.2	4 (0.5) 1.4- 2.2	2 (0.3) 1.8- 3.1		4 (2.0) 1.8- 4.6	2 (0.1) 2.1- 3.7		16 (8.0) 2.3- 2.5	6 (0.3) 1.5- 2.4	1 (0.1) 1.5			9 (1.2) 1.7- 3.8	1 (0.2) 3.2							57 (-) 1.4-4.6
Triglidae *Prionotus* spp.		1 (0.1) 5.9	197 (100.1) 2.1- 6.0	2 (0.2) 2.7		609 (78.5) 2.5- 3.8		4 (0.8) 1.4- 2.5	350 (175.3) 1.8- 5.0		8 (1.7) 1.5- 3.0	71 (35.4) 1.6- 5.5	1 (0.1) 2.1		5 (1.2) 1.8- 4.2			1 (0.2) 2.2							1,249 (-) 1.4-6.0
Unknown	1 (*) --	1 (0.1) --	102 (51.8) 1.2- 4.8	5 (0.6) 1.8- 2.0		113 (14.6) 1.6- 7.0	101 (14.0) 1.0- 6.7	24 (4.9) 1.3- 3.8	71 (35.6) 1.8- 4.0	1 (0.1) 2.0	5 (1.0) 2.0- 18	20 (10.0) 1.9- 5.5	54 (2.8) 1.6- 5.0	188 (22.9) 1.0- 6.5	62 (15.1) 1.6- 5.4	1 (*) 3.6	66 (8.6) 2.6- 6.8	20 (4.2) 1.3- 4.3	3 (0.2) 1.8- 3.5	12 (1.5) 1.5- 10					850 (-) 1.0-18
TOTAL	282 (10.2) --	1,101 (60.2) --	1,688 (857.4) --	348 (40.5) --	628 (39.1) --	7,870 (1014.5) --	577 (80.2) --	424 (86.3) --	889 (445.2) --	1,659 (111.9) --	93 (17.4) --	275 (137.1) --	645 (32.9) --	689 (84.0) --	117 (28.5) --	190 (7.4) --	520 (67.5) --	139 29.4) --	886 (63.9) --	22 (2.8) --					19,032 (-) --

*Negligible value.

Table 12. Number, abundance under 10 m² (in parentheses) and length range (mm SL) of all larvae and juveniles collected in the inshore zone during August 1971.

	Station																								
	I			II			III			IV			V			VI			VII			VIII			
Taxon	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	Total
Atherinidae																									
Membras martinica																						1 (0.1) 16			1 (-) 16
Unid. spp.		2 (0.1) 3.1-3.2					6 (0.4) 2.8-3.[illegible]						1 (0.1) 4.2							8 (1.5) 5.5-11		6 (0.5) 3.0-5.[illegible]	1 (0.2) 5.5	1 (0.3) 5.5	25 (-) 2.8-11
Balistidae																									
Monacanthus ciliatus																				1 (0.2) 25					1 (-) 25
Monacanthus spp.			15 (8.0) 2.2-3.1											2 (0.3) 2.6-2.9	3 (1.1) 1.6-2.1		8 (1.7) 1.8-2.4	5 (1.1) 1.7-2.3		5 (0.9) 1.7-2.1	51 (14.9) 1.8-3.5			138 (46.9) 1.6-3.5	230 (-) 1.6-3.5
Blenniidae																									
Hypsoblennius hentzi		1 (0.1) 2.5			1 (0.1) 3.4																				2 (-) 2.5-3.4
Unid. spp.						1 (0.3) 3.5				1 (0.1) 2.6							2 (0.4) 2.2								4 (-) 2.2-3.5
Bothidae																									
Unid. spp.												1 (0.2) 2.3													1 (-) 2.3
Callionymidae																									
Callionymus spp.			15 (6.7) 1.1-2.6			[illegible] (0.3) 2.2			[illegible]5 (18.4) 1.2-3.6			81 (16.3) 1.2-4.1		2 (0.3) 2.0-2.8	149 (52.4) 1.1-2.8		2 (0.4) 2.5-2.7	20 (4.4) 1.7-2.6			37 (10.8) 2.0-3.0		1 (0.2) 2.1	22 (7.5) 1.6-2.4	415 (-) 1.1-4.1
Carangidae																									
Chloroscombrus chrysurus			511 (228.3) 1.8-3.7	1 (0.2) 1.2	186 (26.1) 1.8-5.0	254 (68.0) 2.1-5.0		78 (16.0) 1.7-3.9	493 (106.8) 1.5-5.3		143 (30.1) 1.6-5.2	316 (65.7) 1.5-4.3	2 (0.1) 1.7-2.2		463 (162.9) 1.6-4.5			2 (0.4) 1.4-1.7			1 (0.3) 3.0				[illegible],450 (-) 1.2-5.3
Oligoplites saurus			1 (0.4) 3.3				1 (0.1) 18		2 (0.4) 3.7-4.2		3 (0.6) 2.3-4.3	1 (0.2) 2.2			5 (1.8) 1.9-2.3		2 (0.4) 2.1-2.5								15 (-) 1.9-18

Table 12. Continued

Taxon	I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Unid. spp.			20 (8.9) 1.8- 3.0		73 (10.3) 2.6	392 (104.9) 1.6- 5.0		2 (0.4) 2.5- 2.7	122 (26.4) 1.8- 4.0						14 (4.9) 1.7- 4.4		5 (1.1) 1.8- 2.2							4 (1.4) 2.0- 3.0	632 (-) 1.6-5.0
Clupeidae																									
<u>Brevoortia</u> spp.																		1 (0.2) 13							1 (-) 13
<u>Harengula jaguana</u>		5 (0.4) 17-20					1 (0.1) 15					2 (0.4) 23-30				3 (0.1) 18-19	84 (17.8) 11-17	6 (1.3) 9.5- 19	1 (0.1) 17			2 (0.2) 15-19			104 (-) 9.5-30
<u>Opisthonema oglinum</u>	1 (0.1) 43		2 (0.9) 13-15			26 (7.0) 12-19			15 (3.3) 8.0- 16			14 (2.9) 14-23		173 (29.7) 10-20	98 (34.5) 5.5- 18	7 (0.3) 5.6 26	1,148 (242.7) 4.5- 20	1,760 (387.6) 2.8- 19		90 (16.9) 9-24	2 (0.6) 16		1 (0.2) 24		3,337 (-) 2.8-43
<u>Sardinella brasiliensis</u>												2 (0.4) 19-21													2 (-) 19-21
<u>Sardinella</u> spp.						35 (9.4) 11-17								13 (2.2) 11-16											48 (-) 11-17
Unid. spp.			4,368 (1951.3) 3.1- 12			713 (190.8) 3.2- 11		12 (2.5) 5.0- 11	842 (182.5) 2.2- 13		70 (14.7) 1.5- 12	150 (31.2) 3.1- 15	18 (1.2) 2.0- 7.4	2,034 (349.3) 2.8- 10	263 (92.6) 2.6- 6.5					134 (25.1) 3.5- 9.8	1,006 (294.0) 3.1- 12	216 (19.1) 5.0- 11	102 (17.1) 3.1- 16	685 (232.6) 3.2- 7.4	10,613 (-) 1.5-16
Cynoglossidae																									
<u>Symphurus</u> spp.			93 (41.5) 1.4- 8.3		3 (0.4) 1.5- 1.8	763 (204.1) 1.8- 6.8	1 (0.1) 2.[illegible]	1 (0.2) 2.4	1,080 (234.1) 1.3- 6.7		33 (7.0) 1.1- 3.3	201 (41.8) 1.4- 5.5			74 (26.0) 1.2- 5.0			3 (0.7) 1.7- 2.2		1 (0.2) 2.4	25 (7.3) 2.1- 5.0			11 (3.7) 2.0- 3.5	2,289 (-) 1.1-8.3
Diodontidae																									
<u>Chilomycterus schoepfi</u>												2 (0.4) 2.1- 4.5													2 (-) 2.1-4.5
Unid. spp.						1 (0.3) 4.2																			1 (-) 4.2

Table 12. Continued

Taxon	I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Engraulidae																									
Unid. spp.	16 (1.6) 1.8- 41	293 (21.4) 3.2- 21	594 (265.4) 1.8- 13	1 (0.2) 15	208 (29.2) 2.1- 15	3,700 (990.0) 3.5- 18	290 (18.9) 2.0- 18	178 (36.5) 2.1- 19	3,399 (736.7) 1.8- 13	10 (0.7) 4.7- 42	210 (44.2) 1.7- 7.5	894 (185.8) 1.9- 8.9	310 (21.4) 1.6- 15	11 (1.9) 2.8- 16	949 (334.0) 1.7- 9.4	232 (11.2) 3.5- 11	67 (14.2) 3.6- 14	88 (19.4) 1.8- 22	4 (0.3) 11-15			1,468 (129.7) 3.8- 15	3 (0.5) 5.0- 7.5	1 (0.3) 16	12,926 (-) 1.6-42
Ephippidae																									
Chaetodipterus faber	2 (0.2) 2.2		2 (0.9) 2.4- 3.4		4 (0.6) 2.5- 3.0	4 (1.1) 2.2- 2.6			4 (0.9) 2.5- 3.1		9 (1.9) 2.7- 5.1	2 (0.4) 2.4			1 (0.4) 2.8		10 (2.1) 2.1- 4.0								38 (-) 2.1-5.1
Exocoetidae																									
Hyporhamphus unifasciatus												2 (0.4) 9.4- 18			1 (0.4) 6.0			1 (0.2) 19			2 (0.6) 8.6- 14	1 (0.1) 5.2		9 (3.1) 4.0- 9.4	16 (-) 4.0-19
Unid. spp.																				5 (0.9) 3.7- 4.8			1 (0.2) 4.5		6 (-) 3.7-4.8
Gerreidae																									
Unid. spp.		22 (1.6) 7.7- 11	31 (13.8) 1.7- 7.5		1 (0.1) 8.8	83 (22.2) 1.8- 5.7	1 (0.1) 8.4		57 (12.4) 1.2- 8.4	3 (0.2) 7.0- 9.2	9 (1.9) 2.0- 3.4	35 (7.3) 1.5- 3.3		1 (0.2) 7.4		1 (-) 7.8		15 (3.3) 2.0- 4.8			4 (1.2) 4.0- 5.0		2 (0.5) 7.0- 7.5		266 (-) 1.2-11
Gobiidae																									
Gobionellus spp.																		3 (0.7) 4.3- 4.7							3 (-) 4.3-4.7
Gobiosoma spp.		34 (2.5) 3.5- 7.0				400 (107.0) 1.8- 8.3	905 (59.1) 2.1- 6.6	131 (26.9) 2.6- 7.8				551 (114.5) 1.5- 6.5		2 (0.3) 6.3- 6.4	1 (0.4) 7.0										2,024 (-) 1.5-8.3
Microgobius spp.			316 (141.2) 1.9- 6.8			23 (6.2) 2.0- 7.7			1,043 (226.0) 1.8- 6.6	8 (0.5) 3.4- 4.3	70 (14.7) 1.5- 7.4				916 (322.3) 1.3- 6.0	190 (9.2) 2.5- 4.0	492 (104.0) 2.7- 6.2	242 (53.3) 1.7- 6.7		187 (35.0) 2.0- 8.0	189 (55.2) 2.7- 4.8	122 (10.8) 2.5- 6.0		817 (277.4) 2.0- 7.5	4,615 (-) 1.3-8.0

Table 12. Continued

	Station																								
	I			II			III			IV			V			VI			VII			VIII			
Taxon	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	Total
Unid. spp.	7 (0.7) 2.4-4.2	221 (16.1) 2.0-3.5		16 (2.5) 2.1-2.5	80 (11.2) 3.0-6.5								8 (0.6) 1.9-3.6	350 (60.1) 1.7-8.6									22 (3.7) 2.0-5.9		704 (-) 1.7-8.6
Lutjanidae																									
Unid. spp.						8 (2.1) 2.7-6.5																		6 (2.0) 3.0-3.5	14 (-) 2.7-6.5
Microdesmidae																									
Microdesmus spp.											1 (0.2) 4.9														1 (-) 4.9
Mugilidae																									
Mugil cephalus						2 (0.5) 2.2-5.0																			2 (-) 2.2-5.0
Ostraciidae																									
Lactophrys spp.					1 (0.1) 2.7	3 (0.8) 2.0-3.0			6 (1.3) 2.0-2.9		1 (0.2) 4.0	1 (0.2) 2.9			1 (0.4) 2.6			3 (0.7) 1.9-2.8		8 (1.5) 2.1-2.7					24 (-) 1.9-4.0
Pomadasyidae																									
Orthopristis chrysoptera															19 (6.7) 2.4-4.2						51 (14.9) 1.8-3.5			14 (4.8) 3.0-3.8	84 (-) 1.8-4.2
Unid. spp.					6 (0.8) 2.0-2.7																			16 (5.4) 2.5-5.2	22 (-) 2.0-5.2
Sciaenidae																									
Bairdiella chrysura		1 (0.1) 3.8	134 (59.9) 1.5-2.4		78 (11.0) 2.0-3.5	3 (0.8) 2.5-3.0	29 (1.9) 2.1-3.5	2 (0.4) 2.0-2.1	147 (31.9) 1.3-3.5	14 (0.9) 2.6-4.2	96 (20.2) 1.8-4.1	47 (9.8) 1.7-2.5		1 (0.2) 1.7	3 (1.1) 1.7-2.8									3 (1.0) 2.3-2.7	558 (-) 1.3-4.2

Table 12. Continued

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Cynoscion nebulosus			1 (0.4) 3.4								4 (0.8) 2.5-3.2			1 (0.2) 2.0		2 (0.1) 2.4-3.2						1 (0.1) 3.0		1 (0.3) 3.1	10 (-) 2.0-3.4
Cynoscion spp.			34 (15.2) 2.4-3.2			90 (24.1) 1.8-4.3	3 (0.[illegible]) 3.2-3.3	5 (1.0) 2.5-[illegible]	290 (62.9) 1.6-3.7		88 (18.5) 1.6-6.4	50 (10.4) 1.8-4.7			2 (0.7) 1.7-2.5					1 (0.2) 2.7	3 (0.9) 2.0-2.9				566 (-) 1.6-6.4
Menticirrhus spp.			25 (11.2) 2.4-3.2		149 (20.9) 2.1-4.[illegible]	298 (79.7) 1.6-5.5		2 (0.4) 2.5-3.1	182 (39.4) 1.8-3.3		103 (21.7) 2.2-4.5	101 (21.0) 1.5-3.6	1 (0.1) 2.3		10 (3.5) 1.6-2.2										871 (-) 1.5-5.5
Sciaenops ocellatus					15 (2.1) 1.6-3.2																				15 (-) 1.6-3.2
Unid. spp.					91 (12.8) 1.2-3.5	1 (0.3) 3.5	9 (0.6) 1.7-3.0		53 (11.5) 1.6-3.2							1 ([illegible]) 2.3						2 (0.2) 1.8-2.2			157 (-) 1.2-3.5
Scombridae																									
Scomberomorus maculatus			1 (0.4) 3.0																						1 (-) 3.0
Serranidae																									
Diplectrum spp.						1 (0.3) 5.5																			1 (-) 5.5
Serraniculus pumilio			32 (14.3) 2.1-2.9			8 (2.1) 2.7-4.1																			40 (-) 2.1-4.1
Soleidae																									
Achirus lineatus	2 (0.2) 2.9-3.2	14 (1.0) 1.9-3.2	20 (8.[illegible]) 1.8-3.0	7 (1.1) 2.0-3.0	81 (11.4) 1.3-3.3	27 (7.2) 1.6-3.2	21 (1.[illegible]) 1.2-3.3	24 (4.9) 1.6-3.3	82 (17.8) 1.3-3.3	2 (0.1) 3.1-3.3	26 (5.5) 1.2-3.3	58 (12.1) 1.4-2.5	7 (0.5) 1.3-2.4	4 (0.7) 1.2-2.3	37 (13.0) 1.0-3.1	24 (1.2) 1.2-3.7	49 (10.4) 1.5-3.0	22 (4.8) 1.5-3.4		4 (1.7) 1.6-3.0	17 (5.0) 1.7-2.8	23 (2.9) 1.8-3.2	12 (2.0) 1.7-3.5	5 (1.7) 2.0-[illegible]	573 (-) 1.0-3.7
Unid. spp.					31 (4.4) --										5 (1.8) 1.4-1.5										36 (-) --

Table 12. Continued

Taxon	I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Syngnathidae																									
Hippocampus erectus			1 (0.4) 8.0				1 (0.1) 12																		2 ( ) 8.0-12
Micrognathus crinigerus																						1 (0.1) 43	1 (0.2) 55		2 (-) 48-55
Syngnathus louisianae				1 (0.2) 27																					1 (-) 27
Syngnathus spp.		3 (0.2) 15-28			1 (0.1) 17	11 (2.9) 11-30	8 (0.5) 6.5-15		2 (0.4) 18-20	1 (0.1) 12	1 (0.2) 22	3 (0.6) 14-22			3 (1.1) 7.0-13		1 (0.2) 9.2				1 (0.3) 14			1 (0.3) 8.0	36 (-) 6.5-30
Tetraodontidae																									
Sphoeroides spp.			2 (0.9) 1.8-2.3								2 (0.4) 2.0-2.4	3 (0.6) 1.2-2.9			4 (1.4) 1.4-2.0			2 (0.4) 1.2-1.8			3 (0.9) 2.3-2.8	1 (0.1) 2.2		2 (0.7) 1.8-1.9	19 (-) 1.2-2.9
Triglidae																									
Prionotus spp.			31 (13.8) 1.6-3.1		1 (0.1) 3.5	421 (112.6) 1.4-5.2	1 (0.1) 1.9	3 (0.6) 1.8-2.8	678 (146.9) 1.4-5.5		34 (7.2) 2.6-5.9	115 (23.9) 1.5-5.0	1 (0.1) 2.5	1 (0.2) 1.9	[illegible] ([illegible]8.2) [illegible].4- [illegible].5			15 (3.3) 1.8-3.2			18 (5.3) 1.8-3.0			2 (0.7) 2.0	1,458 (-) 1.4-5.9
Unknown		2 (0.1) 2.3-2.5	179 (80.0) 1.0-3.8	1 (0.2) --	4 (0.6) 2.3-3.0	48 (12.8) 1.5-6.8	11 (0.7) 1.3-2.3	3 (0.6) 1.8-2.4	142 (30.8) 1.4-6.0		1 (0.2) 1.8	33 (6.9) 1.2-4.1	24 (1.7) 1.3-4.0	39 (6.7) 2.0-5.6	275 (96.8) 1.0-6.0		82 (17.3) 2.3-5.8	13 (2.9) 1.7-5.3		15 (2.8) 1.5-5.0	128 (37.4) 2.0-5.7	12 (1.1) 1.7-3.5	43 (7.2) 2.0-5.0	138 (46.9) 2.0-5.3	1,193 (-) 1.0-6.8
Total	28 (2.8) --	598 (43.6) --	6,431 (2872.9) --	27 (4.1) --	1,014 (142.4) --	7,317 (1957.7) --	1,288 ([illegible]) --	441 (90.5) --	8,724 (1890.7) --	39 (2.6) --	904 (190.5) --	2,665 (553.8) --	372 (25.7) --	2,634 (452.4) --	3,433 (1208.1) --	460 (22.2) --	1,952 (412.7) --	2,201 (484.7) --	5 (0.4) --	464 (87.0) --	1,538 (449.4) --	1,866 (164.9) --	190 (31.9) --	1,876 (636.9) --	46,457 (-) --

Table 13. Number, abundance under 10 m^2 (in parentheses) and length range (mm SL) of all larvae and juveniles collected in the inshore zone during November 1971.

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Apogonidae																									
Unid. spp.																								2 (0.8) 5.3- 6.0	2 (-) 5.3-6.0
Atherinidae																									
Unid. spp.																					1 (0.2) 4.5				1 (-) 4.5
Balistidae																									
Monacanthus spp.			[illegible] (2.[illegible]) 2.0- 5.[illegible]			[illegible] ([illegible].3) [illegible]		[illegible] ([illegible].2) [illegible]			[illegible] (0.[illegible]) 13	1 (0.2) 3.3					1 (0.1) 4.1				10 (2.[illegible]) 2.[illegible]- [illegible].6			6 (2.3) 1.9- 5.5	26 (-) [illegible]-13
Blenniidae																									
Hypsoblennius hentzi		1 (0.1) 2.6			1 (0.1) 4.6		1 (0.1) [illegible].3																		3 (-) 2.6-4.6
Bothidae																									
Paralichthys spp.			[illegible] ([illegible]) 3.[illegible]																						1 (-) 3.5
Unid. spp.														1 (0.1) 2.2											1 (-) 2.2
Callionymidae																									
Callionymus spp.			2 (1.[illegible]) 1.5- 2.7									1 (0.2) 1.8									3 (0.6) 1.8- 2.1			1 ([illegible].4) 2.0	7 (-) 1.8-2.7
Carangidae																									
Chloroscombrus chrysurus		1 (0.1) 3.0																		1 (0.1) [illegible]					2 (-) 3.0-13
Unid. spp.						1 (0.3) 1.9																			1 (-) 1.9

Table 13. Continued

Taxon	I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Clupeidae																									
Brevoortia spp.																	1 (0.1) 5.6								1 (-) 5.6
Opisthonema oglinum																				1 (0.1) 18				3 (1.1) 17-22	4 (-) 17-22
Unid. spp.																				2 (0.2) 6.0- 9.5			2 (0.3) 4.8- 6.8		4 (-) 4.8-9.5
Cynoglossidae																									
Symphurus spp.			11 (6.0) 2.3- 5.7		1 (0.1) 4.7	16 (4.2) 2.9- 8.0		7 (1.1) 2.5- 5.7			1 (0.2) 2.6			3 (0.3) 2.7- 4.7			2 (0.3) 2.8- 3.8			1 (0.1) 3.0			1 (0.1) 3.7		43 (-) 2.3-8.0
Diodontidae																									
Chilomycterus schoepfi	1 (0.1) 6.5																								1 (-) 6.5
Unid. spp.																				1 (0.1) 3.9					1 (-) 3.9
Engraulidae																									
Unid. spp.		3 (0.3) 7.7- 12	111 (60.5) 3.6- 14	3 (0.5) 13-16	152 (2[illegible].9) 6.2- 15	86 (22.7) 1.5- 11	1 (0.1) 2.8	24 (3.7) 4.0- 15	59 (10.8) 2.2- 13		53 (8.3) 3.8- 21	[illegible]3 ([illegible]1.3) 4.0- 8.5		10 ([illegible].1) 3.8- 14		8 (0.4) 5.5- 16	4 (0.5) 16-21		196 (12.9) 2.7- 20	7 (0.8) 3.5- 16	2 (0.4) 4.4- 16	2 (0.2) 3.7- 15	1 (0.1) 7.2		766 (-) 1.5-21
Exocoetidae																									
Hyporhamphus unifasciatus																					8 (1.7) 4.1- 13			2 (0.8) 12	10 (-) 4.1-13
Unid. spp.																			1 (0.1) 4.0	3 (0.3) 4.5- 4.6				1 (0.4) 4.5	5 (-) 4.0-4.6

Table 13. Continued

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Gerreidae																									
Unid. spp.	1 (0.1) 11	1 (0.1) 11	3 (1.6) 11-12									4 (0.9) 4.3-4.5		1 (0.1) 5.0		1 (0.1) 9.2				2 (0.2) 4.0-5.0		1 (0.1) 8.7		6 (2.3) 3.7-4.5	20 (-) 3.7-12
Gobiesocidae																									
Gobiesox strumosus																			1 (0.1) 4.8						1 (-) 4.8
Gobiidae																									
Gobiosoma spp.								24 (3.7) 2.6-5.7	1 (0.2) 7.0									1 (0.2) 7.4							26 (-) 2.6-7.4
Microgobius spp.	1 (0.1) 5.0		36 (19.6) 2.5-7.0	2 (0.4) 3.5-4.0	30 (4.3) 2.2-6.6	65 (17.1) 2.6-8.5	5 (0.3) 3.3-7.8					34 (7.3) 2.0-5.0		723 (82.5) 2.4-10			183 (23.4) 2.1-7.5	26 (5.1) 3.2-6.8	23 (1.5) 1.7-6.6	620 (71.0) 2.5-8.4	187 (39.6) 2.0-5.5		1 (0.1) 7.5	166 (62.6) 2.4-8.3	2,102 (-) 1.7-10
Unid. spp.		5 (0.5) 1.7-2.4			1 (0.1) 3.3				14 (3.0) 2.5-6.8		34 (5.3) 2.0-5.5			11 (1.3) 2.2-5.2	9 (2.0) 2.6-6.5							10 (0.8) 3.5-5.6	11 (1.5) 2.4-5.5		95 (-) 1.7-6.8
Microdesmidae																									
Microdesmus spp.														1 (0.1) 15											1 (-) 15
Mugilidae																									
Mugil cephalus			2 (1.1) 7.2-7.6																			1 (0.1) 14			3 (-) 7.2-14
Mugil spp.					2 (0.3) 5.6-5.8		3 (0.2) 2.8					1 (0.2) 2.2								3 (0.3) 2.5-2.6	1 (0.2) 2.5				10 (-) 2.2-5.8
Ophichthidae																									
Unid. spp.			2 (1.1) 3.8-5.2			6 (1.6) 6.5-8.8								1 (0.1) 7.9											9 (-) 3.8-8.8

Table 13. Continued

	Station																								
	I			II			III			IV			V			VI			VII			VIII			
Taxon	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	Total
Ophidiidae																									
Unid. spp.			3 (1.6) 5.0-5.5									1 (0.2) 5.0													4 (-) 5.0-5.5
Pomadasyidae																									
Orthopristis chrysoptera			2 (1.1) 6.0-7.0									1 (0.2) 7.5						9 (1.8) 2.2-3.9			14 (3.0) 2.6-3.7			5 (1.9) 2.6-5.7	31 (-) 2.2-7.5
Sciaenidae																									
Bairdiella chrysura								2 (0.3) 2.0-2.5						4 (0.5) 2.1-2.3											6 (-) 2.0-2.5
Cynoscion nebulosus				4 (0.7) 2.3-3.1																					4 (-) 2.3-3.1
Cynoscion spp.		1 (0.1) 2.7		4 (0.7) 2.6-3.7			1 (0.1) 2.3	59 (9.0) 1.7-4.1				47 (10.1) 2.1-3.6		370 (42.2) 2.3-4.6			41 (5.3) 1.7-3.9	6 (1.2) 1.8-3.0	8 (0.5) 1.9-2.7				1 (0.1) 3.2		538 (-) 1.7-4.6
Menticirrhus spp.		4 (0.4) 2.7-5.4	13 (7.1) 2.4-6.5	2 (0.4) 2.2	7 (1.0) 2.2-3.5	8 (2.1) 2.2-4.9	1 (0.1) 2.8	26 (4.0) 2.0-4.0	21 (4.5) 2.2-6.5		1 (0.2) 4.0			9 (1.0) 2.3-3.2						1 (0.1) 3.7	1 (0.2) 3.2				94 (-) 2.0-6.5
Pogonias cromis			2 (1.1) 2.2-3.8			126 (33.2) 1.6-2.8			4 (0.9) 3.0-3.9											639 (73.2) 2.4-4.5					771 (-) 1.6-4.5
Sciaenops ocellatus											1 (0.2) 4.3						1 (0.1) 4.1								2 (-) 4.1-4.3
Unid. spp.					2 (0.3) 2.3-2.4						11 (1.7) 2.0-3.5						2 (0.3) 2.6-3.2								15 (-) 2.0-3.5

Table 13. Continued

Taxon	Station I			II			III			IV			V			VI			VII			VIII			Total
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Soleidae																									
Achirus lineatus		5 (0.5) 1.9- 3.4			2 (0.3) 2.2- 2.8		1 (0.1) 2.7		3 (0.6) 2.8- 3.2								1 (0.1) 3.2			1 (0.1) 2.7	4 (0.8) 2.0- 2.8				17 (-) 1.9-3.4
Trinectes maculatus																			1 (0.1) 1.9						1 (-) 1.9
Sparidae																									
Lagodon rhomboides																	1 (0.1) 9.3								1 (-) 9.3
Syngnathidae																									
Hippocampus erectus																	1 (0.1) 11				1 (0.2) 7.0		2 (0.3) 14		4 (-) 7.0-14
Syngnathus louisianae	2 (0.2) 50-52		1 (0.5) 41																						3 (-) 41-52
Syngnathus spp.				1 (0.2) 7.8	9 (1.3) 11-25			9 (1.4) 12-48				3 (0.6) 11-28							2 (0.1) 6.2- 7.7	3 (0.3) 7.0- 26			1 (0.1) 15		28 (-) 6.2-48
Unid. spp.																	2 (0.3) 11								2 (-) 11
Tetraodontidae																									
Sphoeroides spp.					2 (0.3) 2.6- 3.2	2 (0.5) 2.1- 2.2	1 (0.1) 12		3 (0.6) 2.6- 3.5		1 (0.2) 2.1			4 (0.5) 1.4- 3.4			7 (0.9) 1.2- 3.0	2 (0.4) 2.3- 3.4	1 (0.1) 1.6	8 (0.9) 1.8- 4.3	1 (0.2) 1.5		1 (0.1) 2.2	1 (0.4) 3.2	34 (-) 1.2-12
Triglidae																									
Prionotus spp.			6 (3.3) 3.0- 8.6		1 (0.1) 3.8	27 (7.1) 2.1- 6.0		17 (2.6) 1.9- 4.1	11 (2.4) 1.8- 6.3		5 (0.8) 2.4- 3.2	13 (2.8) 2.7- 4.0		3 (0.9) 2.9- 3.5	1 (0.2) 2.6		14 (1.8) 2.3- 5.7			3 (0.3) 3.4- 4.5	11 (2.3) 2.0- 4.0		2 (0.3) 2.2- 2.8	8 (3.0) 1.6- 5.7	127 (-) 1.6-8.6

Table 13. Continued

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Uranoscopidae Unid. spp.												1 (0.2) 3.8													1 (-) 3.8
Unknown		17 (1.8) 1.5- 4.8	15 (8.2) 1.9- 3.5		4 (0.6) 2.1- 4.2	18 (4.7) 1.5- 8.5	2 (0.1) 1.9- 2.1	26 (4.0) 1.4- 4.6	5 (1.1) 1.8- 3.2		22 (3.5) 2.0- 3.2	44 (9.4) 1.5- 4.0		76 (8.7) 2.0- 6.2	2 (0.5) 2.6- 3.2		16 (2.0) 2.5- 6.5	1 (0.2) 2.2		86 (9.8) 1.5- 8.5	135 (28.6) 2.0- 6.5		5 (0.7) 3.0- 6.0	9 (1.4) 2.2- 7.2	483 (-) 1.4-8.5
Total	5 (0.6) --	38 (4.0) --	215 (117.2) --	16 (2.8) --	214 (30.8) --	356 (93.8) --	16 (0.3) --	195 (29.8) --	112 (24.2) --		130 (20.4) --	204 (43.7) --		1,222 (139.5) --	12 (2.7) --	9 (0.5) --	277 (35.5) --	45 (8.8) --	233 (15.3) --	1,382 (158.3) --	379 (80.3) --	14 (1.2) --	28 (3.9) --	210 (79.1) --	5,312 (-) --

Table 14. Number, abundance under 10 m^2 (in parentheses) and length range (mm SL) of all larvae and juveniles collected in the inshore zone during February 1972.

Taxon	I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Atherinidae Unid. spp.				2 (0.2) 4.5			3 (0.5) 4.1- 4.2						2 (0.2) 3.8- 4.1			17 (0.[illegible]) 4.2- 8.9			4 (0.6) 4.0- 8.2			5 (0.6) 3.1- 9.8			33 (-) 3.1-9.8
Balistidae *Monacanthus* spp.																					2 (0.6) 3.0- 4.9			10 (2.5) 2.2- 4.9	12 (-) 2.2-4.9
Blenniidae *Hypsoblennius hentzi*				3 (0.3) 2.7- 4.2	7 (0.7) 2.1- 3.2		3 (0.5) 2.5- 3.5	4 (0.5) [illegible]- 3.3				1 (0.3) 6.0	3 (0.3) 4.4- 6.0										1 (0.1) 5.2		22 (-) 2.1-6.0
Unid. spp.																		1 (0.2) 5.2							1 (-) 5.2
Bothidae *Paralichthys albigutta*																								2 (0.5) 3.9- 5.9	2 (-) 3.9-5.9
Paralichthys spp.					2 (0.2) 2.6- 3.0	3 (0.6) 3.0- 3.5					2 (0.3) 2.3- 4.5			1 (0.2) 3.4			4 (0.6) 2.8- 4.5	5 (1.2) 2.5- 3.0							17 (-) 2.3-5.0
Unid. spp.								3 (0.4) 2.3- 2.4						1 (0.2) 2.0						4 (0.6) 2.5- 2.6	8 (2.1) 2.8- 12			51 (12.6) 2.6- 5.2	67 (-) 2.3-12
Callionymidae *Callionymus* spp.						[illegible] (0.4) 1.8											1 (0.1) 1.5							1 (0.2) 2.0	6 (-) 1.5-2.0
Carangidae *Chloroscombrus chrysurus*			1 (0.3) 3.0																						1 (-) 3.0

Table 14. Continued

	Station																								
	I			II			III			IV			V			VI			VII			VIII			
Taxon	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	Total
Clupeidae																									
Brevoortia spp.	15 (1.5) 6.3-15	1 (0.1) 15		98 (8.6) 3.9-15	14 (1.5) 6.9-11		3 (0.5) 10	3 (0.4) 11-12	6 (1.1) 11-14				24 (2.4) 8.5-16			7 (0.3) 14-15					3 (0.9) 11				174 (-) 3.9-16
Harengula jaguana						3 (1.6) 10-12												1 (0.2) 13	7 (1.0) 11-13						16 (-) 10-16
Opisthonema oglinum																		1 (0.2) 13						1 (0.2) 14	2 (-) 13-14
Sardinella spp.								4 (0.5) 9-12	2 (0.4) 11-13		10 (1.5) 4.2-12			1 (0.2) 13			23 (3.2) 4.2-12			4 (0.6) 9.4-12					44 (-) 4.2-13
Unid. spp.		4 (0.4) 5.4-8.2	1 (0.3) 4.5				[illegible] (0.[illegible]) 3.5-8.[illegible]	2 (0.2) 5.0-11		6 (0.3) 3.2-7.0			18 (1.8) 2.2-10						9 (1.3) 4.5-8.0	25 (3.5) 7.2-8.5					68 (-) 2.2-11
Cynoglossidae																									
Symphurus spp.			1 (0.3) 2.3			1 (0.2) 4.5	2 (0.3) 1.2-2.2																1 (0.1) 4.0	2 (0.5) 4.6-4.8	7 (-) 1.8-4.8
Elopidae																									
Elops saurus				1 (0.1) 38									1 (0.1) 37	1 (0.2) 31											3 (-) 31-38
Engraulidae																									
Unid spp.	3 (0.3) 13-25	5 (0.5) 5.5-11		256 (22.4) 7.8-21	21 (2.2) 3.8-9.5	1 (0.2) 4.9	33 (5.6) 2.6-5.8	10 (1.2) 3.9-11	5 (0.9) 9.2-26	6 (0.3) 3.4-30			67 (6.8) 4.5-27	1 (0.2) 15		12 (0.6) 6.3-15		1 (0.2) 30	59 (8.2) 2.5-14	6 (0.8) 6.3-20		1 (0.1) 5.7	2 (0.3) 11-14	2 (0.5) 5.0-5.2	491 (-) 2.5-27
Exocoetidae																									
Hyporhamphus unifasciatus													1 (0.1) 7.2							2 (0.3) 6.5-8.9					3 (-) 6.5-8.9

Table 14. Continued.

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Gerreidae																									
Unid. spp.						1 (0.2) 5.0									2 (0.5) 12-13						2 (0.6) 4.7-12		2 (0.3) 12	4 (1.0) 13-14	11 (-) 4.7-14
Gobiesocidae																									
Gobiesox strumosus																1 (-) 3.8			1 (0.1) 6.3						2 (-) 3.8-6.3
Gobiidae																									
Gobiosoma spp.								16 (2.0) 3.2-6.7	20 (3.7) 3.8-[illegible]					14 (2.4) 2.7-5.4				2 (0.5) 5.0-6.0			1 (0.3) 9.8			5 (1.2) 6.[illegible]-9.[illegible]	58 (-) 2.7-9.8
Microgobius spp.		59 (5.6) 3.0-8.2	28 (8.4) 3.2-9.0	18 (1.6) 2.2-4.3			28 (4.7) 1.5-4.3			23 (1.0) 2.3-5.0			30 (3.1) 2.6-5.0			5 (0.2) 2.8-4.0					3 (0.9) 6.0-6.2				194 (-) 1.5-9.0
Unid. spp.	4 (0.4) 3.2-4.0				2 (0.2) 3.5-7.4	26 (5.1) 2.4-7.2					3 (0.4) 3.2-4.5				6 (1.6) 2.3-9.5		6 (0.8) 3.2-4.5				49 (14.[illegible]) 2.[illegible]-[illegible]		316 (45.3) 2.2-6.5	72 (17.7) 2.5-5.6	484 (-) 2.2-9.5
Microdesmidae																									
Midrodesmus spp.							3 (0.5) 2.1-2.6				1 (0.1) 2.5		1 (0.1) 2.6	1 (0.2) 3.3			1 (0.1) 3.5						2 (0.3) 3.5-4.0		9 (-) 2.1-4.0
Mugilidae																									
Mugil cephalus																					2 (0.6) 5.3-6.5				2 (-) 5.3-6.5
Mugil spp.				12 (1.1) 2.2-4.1			2 (0.3) 3.[illegible]-23			1 (-) 4.5						1 (-) --								1 (0.2) 3.5	17 (-) 2.2-23
Ophichthidae																									
Myrophis punctatus							1 (0.2) 50		1 (0.2) 57					1 (0.2) 53											3 (-) 50-57

Table 14. Continued

Taxon	I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Ophidiidae																									
Unid. spp.						1 (0.2) 7.0																			1 (-) 7.0
Pomadasyidae																									
Orthopristis chrysoptera	7 (0.7) 8.7-13		94 (28.3) 1.8-5.2	60 (5.3) 3.2-12	81 (8.7) 3.1-6.4	151 (29.7) 2.0-7.3	19 (3.2) 3.6-5.7	112 (14.0) 2.0-6.7	24 (4.4) 2.8-8.3		203 (30.3) 2.2-6.0	1 (0.3) 3.5	62 (6.3) 2.3-7.2	90 (15.4) 2.0-5.7	44 (11.7) 2.2-3.9	4 (0.2) 5.2-8.0	472 (65.2) 2.2-6.0	213 (49.4) 2.7-8.0	59 (8.2) 2.6-5.1	1,199 (167.8) 2.8-7.2	62 (17.8) 2.8-7.8		1 (0.1) 3.5	309 (76.2) 2.2-8.6	3,267 (-) 1.8-13
Unid. spp.	4 (0.4) 4.5-5.0																								4 (-) 4.5-5.0
Scaridae																									
Unid. spp.																							1 (0.1) 9.5		1 (-) 9.5
Sciaenidae																									
Bairdiella chrysura					3 (0.3) 2.6-2.8						6 (0.9) 2.3-3.2		101 (10.3) 2.2-4.2	1 (0.2) 3.0			14 (1.9) 2.3-3.2								125 (-) 2.2-4.2
Cynoscion nebulosus										1 (') 2.7			1 (0.1) 2.9						4 (0.6) 2.3-3.2			1 (0.1) 3.8			7 (-) 2.3-3.8
Cynoscion spp.	85 (8.3) 3.0-7.0	22 (2.1) 2.3-4.3		25 (2.2) 2.5-3.5		1 (0.2) 2.5	261 (44.2) 2.3-3.7	14 (1.7) 2.2-4.0	1 (0.2) 3.5	41 (1.8) 2.2-3.7									42 (5.9) 2.0-3.2	34 (4.8) 2.6-3.4					526 (-) 2.0-7.0
Menticirrhus spp.					10 (1.1) 2.1-3.9	2 (0.4) 2.8-3.0	4 (0.7) 1.9-2.3	1 (0.1) 2.9			1 (0.1) 3.0									8 (1.1) 2.8-4.2				1 (0.2) 3.2	27 (-) 1.9-4.2
Pogonias cromis				11 (1.0) 3.1-4.3	2 (0.2) 2.7-2.8	2 (0.4) 3.5-4.2																2 (0.3) 3.8-4.2			17 (-) 2.7-4.3
Unid. spp.							1 (0.2) 3.0													5 (0.7) 2.5		1 (0.1) 3.0			7 (-) 2.5-3.0

Table 14. Continued

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Soleidae																									
Achirus lineatus				1 (0.1) 2.1			3 (0.6) 2.0-2.2																		4 (-) 2.0-2.2
Unid. spp.				1 (0.1) 2.6																					1 (-) 2.6
Sparidae																									
Archosargus probatocephalus															1 (0.3) 5.1	3 (0.1) 6.3-6.5		3 (0.7) 5.0-6.2							7 (-) 5.1-6.5
Lagodon rhomboides	11 (1.1) 9.0-14				5 (0.5) 11-12	5 (1.0) 3.7-5.2			1 (0.2) 4.1		2 (0.3) 2.5-4.1			5 (0.9) 3.1-12	2 (0.5) 13		4 (0.6) 2.5-4.1	2 (0.5) 9.8		2 (0.3) 12	9 (1.6) 2.8-12		5 (0.7) 3.5-13	19 (4.7) 2.0-14	72 (-) 2.0-14
Unid. spp.																				8 (0.6) 3.5-5.6	3 (0.9) 4.2-5.0			7 (1.7) 2.6-5.0	18 (-) 2.6-5.6
Syngnathidae																									
Hippocampus erectus	1 (0.1) 19			5 (0.4) 9.0-14			1 (0.2) 18											1 (0.2) 7.0							8 (-) 7.0-19
Syngnathus floridae							1 (0.2) 34																		1 (-) 34
Syngnathus spp.	1 (0.1) 19	8 (0.8) 2.8-15		3 (0.3) 11-19	5 (0.5) 9.4-13	2 (0.4) 4.2-14	3 (0.5) 12	2 (0.2) 4.0-15		6 (0.3) 10-11	1 (0.1) 26				1 (0.3) 7.2		2 (0.3) 9.5-30	1 (0.2) 13		4 (0.6) 6.5-15				3 (0.7) 13-15	42 (-) 6.5-26
Synodontidae																									
Synodus foetens	1 (0.1) 30			1 (0.1) 27	2 (0.2) 29-32				2 (0.4) 27-29	1 ( ) 26								1 (0.2) 32					1 (0.1) 33		9 (-) 26-33
Tetraodontidae																									
Sphoeroides spp.	2 (0.2) 2.6-3.6					2 (0.4) 1.8															5 (1.3) 2.0-9.6			5 (1.2) 1.8-5.2	14 (-) 1.8-9.6

Table 14. Continued

Taxon	Station I 1	I 2	I 3	II 1	II 2	II 3	III 1	III 2	III 3	IV 1	IV 2	IV 3	V 1	V 2	V 3	VI 1	VI 2	VI 3	VII 1	VII 2	VII 3	VIII 1	VIII 2	VIII 3	Total
Triglidae																									
Prionotus spp.			3 (0.9) 2.5-3.2		13 (1.4) 2.3-5.0	3 (0.6) 2.2-4.1					5 (0.7) 2.0-3.5		1 (0.1) 2.6	6 (1.0) 2.2-3.2	4 (1.1) 2.1-2.4		11 (1.5) 2.0-3.5	2 (0.5) 2.8		6 (0.8) 2.7-6.0	54 (15.5) 2.6-7.0			61 (15.0) 2.5-6.8	169 (-) 2.0-7.0
Unknown	4 (0.4) 2.5-3.9	1 (0.1) 2.4	5 (1.5) 1.8-3.5	14 (1.2) 2.0	3 (0.3) 2.0-3.5	35 (6.9) 1.8-6.5	33 (5.6) 1.1-3.5	9 (1.1) 2.2-25		20 (0.9) 2.0-3.2	8 (1.2) 2.0-4.0	1 (0.3) 3.2	2 (0.2) 2.6-4.5	10 (1.7) 2.4-4.0	2 (0.5) 2.8-4.3		15 (2.1) 2.0-4.0	3 (0.7) 2.5-2.6		6 (0.8) 2.5-4.0	88 (25.3) 2.0-5.1	3 (0.4) 1.0-2.8	12 (1.6) 2.2-5.2	64 (15.8) 2.4-8.7	338 (-) 1.1-25
Total	138 (13.5) --	100 (9.4) --	133 (40.1) --	511 (44.8) --	170 (18.2) --	246 (48.5) --	407 (69.0) --	180 (22.5) --	62 (11.4) --	105 (4.6) --	242 (36.2) --	3 (0.8) --	314 (32.0) --	133 (22.7) --	62 (16.4) --	50 (2.5) --	553 (76.3) --	237 (54.9) --	185 (25.8) --	1,313 (185.6) --	291 (83.5) --	13 (1.7) --	344 (47.1) --	620 (152.8) --	6,412 (-) --

Table 15. Number, abundance under 10 m^2 (in parentheses) and length range (mm SL) of all larvae and juveniles collected in the estuarine zone during May 1971.

Taxon	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Atherinidae																	
Unid. spp.		1 (0.1) 7.5						2 (0.2) 3.5- 4.8									3 (-) 3.5- 7.5
Blenniidae																	
Hypsoblennius hentzi	1 (0.1) 2.2	3 (0.3) 2.6- 3.0	1 (0.1) 3.3	17 (2.4) 2.5- 3.0		1 (0.1) 2.8		1 (0.1) 5.0		11 (1.0) 2.4- 2.8				1 (0.2) 3.4	5 (0.5) 6.0- 6.2	2 (0.3) 2.6- 2.7	43 (-) 2.2- 6.2
Carangidae																	
Oligoplites saurus		1 (0.1) 2.9	3 (0.4) 4.7- 5.9	3 (0.4) 2.9- 13	1 (0.1) 10	1 (0.1) 7.1		11 (0.9) 2.3- 8.7		1 (0.1) 2.6	1 (0.2) 6.0	3 (0.4) 2.3- 3.0					25 (-) 2.3- 13
Unid. spp.	1 (0.1) 3.5	1 (0.1) 2.7															2 (-) 2.7- 3.5
Clupeidae																	
Unid spp.															58 (5.6) 3.8- 7.3	1 (0.2) 3.7	59 (-) 3.7- 7.3
Engraulidae																	
Unid spp.	28 (2.8) 2.5- 6.0	164 (23.0) 3.0- 6.0		1 (0.1) 3.1				63 (4.9) 1.9- 6.3		2 (0.2) 2.5- 3.0	31 (5.5) 2.3- 4.5	18 (2.6) 2.2- 6.0		1 (0.2) 5.0	48 (4.6) 2.0- 7.1	1 (0.2) 2.0	357 (-) 1.9- 7.1
Gerreidae																	
Unid. spp.	2 (0.2) 5.0- 6.3	2 (0.3) 3.4- 4.6						167 (13.0) 1.6- 3.7			64 (11.4) 1.5- 3.8	7 (1.0) 2.0- 3.8		1 (0.2) 7.9	1 (0.1) 4.3		244 (-) 1.5- 7.9
Gobiesocidae																	
Gobiesox strumosus			2 (0.3) 3.6- 3.8												3 (0.3) 2.0- 2.5		5 (-) 2.0- 3.8
Gobiidae																	
Microgobius spp.								80 (6.2) 3.1- 4.4	6 (0.5) 2.5- 3.6						12 (1.2) 1.8- 4.0		98 (-) 1.8- 4.4
Unid. spp.				1 (0.1) 3.9	3 (0.2) 3.1- 3.3	1 (0.1) 2.7		4 (0.3) 1.6- 3.0		5 (0.5) 2.1- 4.0	6 (1.1) 2.9- 4.1	8 (1.1) 1.9- 3.4				7 (1.1) 2.0- 2.7	35 (-) 1.6- 4.1
Pomadasyidae																	
Orthopristis chrysoptera				1 (0.1) 1.6													1 (-) 1.6
Sciaenidae																	
Bairdiella chrysura															2 (0.2) 2.3- 2.7		2 (-) 2.3- 2.7
Cynoscion nebulosus								11 (0.9) 2.1- 3.9							4 (0.4) 2.2- 3.3		15 (-) 2.1- 3.9

Table 15. Continued

Taxon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
								Station									
Soleidae																	
Achirus lineatus	1 (0.1) 2.2	1 (0.1) 1.7		1 (0.1) 2.1						1 (0.1) 2.7							4 (-) 1.7- 2.7
Stromateidae																	
Peprilus spp.		1 (0.1) 2.2															1 (-) 2.2
Syngnathidae																	
Syngnathus scovelli				1 (0.1) 14		1 (0.1) 38		2 (0.2) 12-15									4 (-) 12-38
Syngnathus spp.	4 (0.4) 13-24									3 (0.3) 9.5- 20					1 (0.1) 10		8 (-) 9.5- 24
Tetraodontidae																	
Sphoeroides spp.	6 (0.6) 1.4- 2.5	1 (0.1) 2.6	1 (0.1) 2.4	1 (0.1) 6.2						2 (0.2) 1.7- 2.4							11 (-) 1.4- 6.2
Unknown		1 (0.1) 2.2				1 (0.1) --	1 (0.1) 3.5	2 (0.2) 0.9	1 (0.1) 1.8	2 (0.2) --	2 (0.4) 1.4- 1.7	7 (1.0) --			1 (0.1) 2.3		18 (-) 0.9- 3.5
TOTAL	43 (4.4)	176 (24.8)	7 (1.0)	26 (3.7)	4 (0.2)	5 (0.6)	1 (0.1)	343 (26.8)	7 (0.6)	27 (2.5)	104 (18.5)	43 (6.1)		3 (0.7)	135 (12.9)	11 (1.7)	935 (-)

Table 16. Number, abundance under 10 m² (in parentheses) and length range (mm SL) of all larvae and juveniles collected in the estuarine zone during August 1971.

Taxon	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Atherinidae																	
Unid. spp.					1 (0.1) 4.5				1 (0.1) 4.3								2 (-) 4.3- 4.5
Blenniidae																	
Hypsoblennius hentzi				4 (0.3) 2.4- 3.4	1 (0.1) 3.4	1 (0.1) 2.0	5 (0.4) 2.7- 3.0					1 (0.1) 2.6					12 (-) 2.0- 3.4
Carangidae																	
Chloroscombrus chrysurus				1 (0.1) 14													1 (-) 14
Oligoplites saurus								1 (0.1) 4.6				1 (0.1) 13		1 (0.2) 5.4			3 (-) 4.6- 13
Engraulidae																	
Unid. spp.		14 (2.6) 2.0- 4.0				1 (0.1) 3.5	1 (0.1) 2.5	20 (1.8) 2.5- 6.6					1 (0.2) 4.7		26 (2.6) 2.5- 5.0		63 (-) 2.0- 6.6
Gobiidae																	
Microgobius spp.					1 (0.1) 4.8			10 (0.9) 3.7- 4.6			1 (0.2) 4.6						12 (-) 3.7- 4.8
Unid. spp.	1 (0.2) 3.6			2 (0.2) 2.0- 3.6		2 (0.3) 2.5- 3.5	9 (0.7) 2.4- 3.4						1 (0.2) 3.2				15 (-) 2.0- 3.6
Sciaenidae																	
Bairdiella chrysura		1 (0.2) 1.9				2 (0.3) 5.6- 36											3 (-) 1.9- 36
Menticirrhus spp.															1 (0.1) 3.7		1 (-) 3.7
Unid. spp.															1 (0.1) 1.8		1 (-) 1.8
Soleidae																	
Achirus lineatus														4 (0.7) 2.5- 3.1			4 (-) 2.5- 3.1
Syngnathidae																	
Syngnathus scovelli	1 (0.2) 14														1 (0.1) 12		2 (-) 12-14
Syngnathus spp.									1 (0.1) 16						1 (0.1) 14		2 (-) 14-16
Unknown	1 (0.2) 1.8											1 (0.1) --			1 (0.1) 2.8		3 (-) 1.8- 2.8
TOTAL	3 (0.5)	15 (2.8)		7 (0.5)	3 (0.3)	6 (0.8)	15 (1.1)	31 (2.7)	2 (0.2)		1 (0.2)	3 (0.3)	2 (0.3)	5 (0.9)	31 (3.1)		124 (-)

Table 17. Number, abundance under 10 m^2 (in parentheses) and length range (mm SL) of all larvae and juveniles collected in the estuarine zone during November 1971.

Taxon	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Blenniidae																	
Hypsoblennius hentzi			1 (0.1) 3.5											1 (0.2) 2.8			2 (-) 2.8- 3.5
Engraulidae																	
Unid. spp.										1 (0.1) 4.4							1 (-) 4.4
Gobiesocidae																	
Gobiesox strumosus			5 (0.6) 2.2- 2.7	5 (0.4) 2.6- 3.7						18 (1.7) 2.5- 2.8			1 (0.2) 3.0	1 (0.2) 2.7			30 (-) 2.2- 3.7
Gobiidae																	
Microgobius spp.								36 (3.5) 2.5- 5.9	1 (0.1) 4.9								37 (-) 2.5- 5.9
Unid. spp.							2 (0.1) 5.0- 5.2				1 (0.2) 3.6						3 (-) 3.6- 5.2
Ostraciidae																	
Lactophrys spp.										1 (0.1) 3.9							1 (-) 3.9
Soleidae																	
Achirus lineatus											1 (0.2) 3.8						1 (-) 3.8
Syngnathidae																	
Syngnathus scovelli									1 (0.1) 17								1 (-) 17
Syngnathus sp.										1 (0.1) 25				1 (0.2) 24			2 (-) 24-25
Unknown					1 (0.1) 2.0										34 (2.4) --		35 (-) --
TOTAL			6 (0.8)	5 (0.4)	1 (0.1)		2 (0.1)	36 (3.5)	2 (0.2)	21 (1.9)	2 (0.3)		1 (0.2)	3 (0.7)	34 (2.4)		113 (-)

Table 18. Number, abundance under 10 m^2 (in parentheses) and length range (mm SL) of all larvae and juveniles collected in the estuarine zone during February 1972.

Taxon	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Atherinidae																	
Unid. spp.										1 (0.1) 7.0							1 (-) 7.0
Blenniidae																	
Hypsoblennius hentzi		1 (0.2) 2.8		9 (0.8) 2.4- 3.3	12 (0.8) 2.7- 4.7	4 (0.5) 3.4- 3.8			8 (0.7) 3.5- 4.5	22 (2.0) 3.3- 5.6				2 (0.4) 4.6- 5.0	25 (2.1) 2.8- 5.3	1 (0.2) 4.7	84 (-) 2.2- 5.6
Bothidae																	
Unid. spp.				1 (0.1) 2.1													1 (-) 2.1
Clupeidae																	
Brevoortia spp.														5 (1.0) 7.5- 10			5 (-) 7.5- 10
Unid. spp.	1 (0.2) 3.5			1 (0.1) 4.7											1 (0.1) 1.7		3 (-) 1.7- 4.7
Engraulidae																	
Unid. spp.	1 (0.2) 6.7			3 (0.3) 4.0- 6.7					1 (0.1) 6.9			1 (0.1) 5.5		1 (0.2) 5.0	30 (2.5) 2.4- 7.7		37 (-) 2.4- 7.7
Exocoetidae																	
Unid. spp.				1 (0.1) 14													1 (-) 14
Gobiesocidae																	
Gobiesox strumosus			3 (0.4) 2.5- 2.8	17 (1.5) 2.5- 4.5	64 (4.3) 2.8- 3.5	8 (1.0) 2.7- 3.5		6 (0.5) 5.0- 8.3	2 (0.2) 2.6- 4.8	14 (1.3) 2.7- 4.0	1 (0.2) 4.7	2 (0.2) 2.5- 3.1		1 (0.2) 5.2	9 (0.7) 2.3- 3.3	1 (0.2) 4.0	128 (-) 2.3- 8.3
Gobiidae																	
Gobiosoma spp.		1 (0.2) 4.8															1 (-) 4.8
Microgobius spp.	7 (1.2) 8.0- 9.7			21 (1.9) 2.2- 5.2	18 (1.2) 2.6- 5.0				6 (0.5) 3.2- 4.7		3 (0.5) 3.5- 5.0	1 (0.1) 5.7			59 (4.9) 3.3- 5.9		115 (-) 2.2- 9.7
Unid. spp.	4 (0.7) 2.5- 3.0		1 (0.1) 4.3			4 (0.5) 2.3- 2.5						1 (0.1) 2.3				2 (0.4) 2.3- 3.5	12 (-) 2.3- 4.3
Pomadasyidae																	
Orthopristis chrysoptera	1 (0.2) 16	2 (0.4) 8.4- 3.9		2 (0.2) 2.0- 12		2 (0.3) 11				1 (0.1) 11		2 (0.2) 8.9- 9.9		3 (0.6) 5.0- 7.4			13 (-) 2.0- 16
Sciaenidae																	
Bairdiella chrysura	11 (2.0) 3.0- 4.3			1 (0.1) 3.0								2 (0.2) 4.3- 4.9				1 (0.2) 5.2	15 (-) 3.0- 5.2
Cynoscion nebulosus												1 (0.1) 4.6					1 (-) 4.6

Table 18. Continued

Taxon	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Menticirrhus spp.										1 (0.1) 3.3							1 (-) 3.3
Pogonias cromis		1 (0.2) 5.5										4 (0.5) 4.4- 5.2		1 (0.2) 4.3			6 (-) 4.3- 5.5
Soleidae																	
Achirus lineatus										1 (0.1) 2.9							1 (-) 2.9
Sparidae																	
Lagodon rhomboides	4 (0.7) 8.5- 11	1 (0.2) 11	6 (0.7) 10-18							2 (0.2) 6.0- 6.2						1 (0.2) 11	14 (-) 6.0- 18
Syngnathidae																	
Hippocampus erectus												1 (0.1) 16			1 (0.1) 15		2 (-) 15-16
Syngnathus louisianae	2 (0.4) 40-42				1 (0.1) 22		1 (0.1) 36			1 (0.1) 29					1 (0.1) 14	1 (0.2) 17	7 (-) 14-42
Syngnathus scovelli				2 (0.2) 13-15						1 (0.1) 15	1 (0.2) 19	1 (0.1) 14			1 (0.1) 14		6 (-) 13-19
Syngnathus spp.			1 (0.1) --														1 (-) --
Synodontidae																	
Synodus foetens	1 (0.2) 27																1 (-) 27
Tetraodontidae																	
Sphoeroides spp.				3 (0.3) 1.9- 2.2	4 (0.3) 1.9- 4.4										1 (0.1) 1.8		8 (-) 1.8- 4.4
Triglidae																	
Prionotus spp.	2 (0.4) 3.2- 3.8																2 (-) 3.2- 3.8
Unknown				3 (0.3) 3.2- 3.9											11 (0.9) 2.1- 2.6		14 (-) 2.1- 3.9
Total	34 (6.1)	6 (1.2)	11 (1.4)	64 (5.7)	99 (6.7)	18 (2.3)	1 (0.1)	6 (0.5)	17 (1.5)	44 (4.0)	5 (0.8)	16 (2.0)		13 (2.7)	139 (11.5)	7 (1.3)	480 (-) --