Distribution of Common and Pompano Dolphinfish Larvae in the Northern Gulf of Mexico

Distribución de las Larvas de Pez Delfín Común y Pompano en el Norte del Golfo de México

Répartition des Larves de Coryphène Pompano et Commune dans le Nord du golfe du Mexique

LARISSA L. KITCHENS and JAY R. ROOKER
Texas A&M University,
Department or Wildlife and Fisheries Sciences, Department of Marine Biology,
200 Seawolf Parkway, Galveston, Texas 77553 USA.

EXTENDED ABSTRACT

Dolphinfishes are highly migratory, epipelagic species with cosmopolitan distribution in tropical and subtropical oceans (Gibbs and Collette 1959). The family Coryphaenidae is comprised of two species, *Coryphaena hippurus* (common dolphin) and *C. equiselis* (pompano dolphin), and both species support recreational and commercial fisheries worldwide (Oxenford 1999). Adult *C. hippurus* and *C. equiselis* are common throughout the Gulf of Mexico (Gulf), however, little is known regarding this region's role as spawning and/or nursery habitat of either species. The purpose of the present study was to describe the distribution and abundance of *C. hippurus* and *C. equiselis* larvae and early juveniles in the northern Gulf in order to assess the value of this area as early life habitat of these species. Additionally, environmental influences on larval abundance were examined in order to define suitable nursery habitat conditions for dolphinfishes.

Ichthyoplankton surveys were conducted in June and July over a four-year period (2007 to 2010) in the northern Gulf. Our sampling corridor (27 – 28° N and 88 – 94° W) encompassed multiple mesoscale features (Loop Current, Mississippi River plume, and eddies) that are assumed to serve as valuable nursery habitats for marine fishes. For all surveys, stations were spaced approximately 8 nautical miles apart and paired neuston nets of different mesh sizes (500 μm and 1,200 μm) were towed at each station through the upper meter of water for 10-minute intervals. Material captured by the nets was quickly sorted through in the field and fish larvae were preserved in ethanol. Additionally, salinity was recorded at each sampling site using a YSI data sonde. In the lab, larger dolphinfish larvae and juveniles were visually identified to the species level based on distinct morphological characteristics while mitochondrial DNA analysis, following the protocol of Rocha-Olivares and Chavez-Gonzalez (2008), was used for species identification of smaller specimens.

Overall, 1,145 dolphinfish larvae were collected, and *C. hippurus* was the more abundant of the two species accounting for 87% of the total catch. Larvae of both species were collected during all eight surveys, and frequency of occurrence was high overall with *C. hippurus* and/or *C. equiselis* larvae present at 59% of the stations sampled. Percent occurrence of *C. hippurus* ranged from 42% to 76% per survey while occurrence of *C. equiselis* larvae was lower ranging from 9% to 27%. Mean density across the 8 surveys for *C. hippurus* and *C. equiselis* ranged from 0.40 to 1.60 larvae/1,000 m^3 and 0.02 to 0.20 larvae/1,000 m^3, respectively. While density was significantly different among years sampled for both *C. hippurus* and *C. equiselis* (Figure 1), no intra-annual effect was detected for either species. Mean density of *C. hippurus* peaked in 2007 for *C. hippurus* (1.05 larvae/1,000 m^3) and 2008 for *C. equiselis* (0.17 larvae/1,000 m^3), while mean densities were low in 2010 for both species (0.40 *C. hippurus* larvae/1,000 m^3, 0.07 *C. equiselis* larvae/1,000 m^3). Increased densities of *C. hippurus* were observed in the eastern portion of our sampling corridor and the majority of this species was collected east of 91°W, a region largely influenced by the Loop Current and associated eddies. In contrast, *C. equiselis* larvae were more evenly distributed across the sampling corridor. Analysis of mean densities within different salinities indicate a positive relationship for *C. hippurus* abundance (Figure 2A,) with more than 90% of the catch found in waters with salinities > 32. A negative association between *C. hippurus* density and sea surface height anomaly (SSHA) was also observed (Figure 2B), with the majority (> 90%) of larvae collected at stations with SSHA of 12 cm or less. This suggests that *C. hippurus* larvae were abundant in cold core eddies (characterized by negative SSHA), and that larvae rarely occurred within warm core features (regions of high SSHA) in the Gulf. In contrast, no obvious relationship was detected between *C. equiselis* density and salinity or SSHA; however, catches were low overall for this species so additional sampling is necessary in order to elucidate spatial trends in *C. equiselis* abundance. In general, results showed that both species were abundant and broadly distributed across our sampling area, and their distribution and abundance is likely influenced by physicochemical conditions and the geographic position of mesoscale oceanographic features.

KEY WORDS: Dolphinfish, Gulf of Mexico, fish larvae

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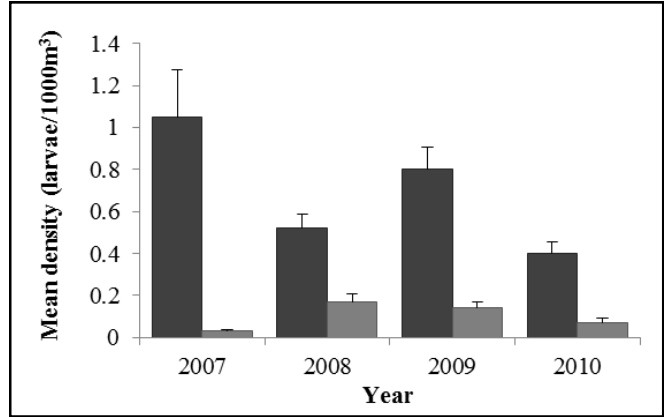
Figure 1. Annual mean density (larvae /1,000 m³) of *Coryphaena hippurus* (dark grey bars) and *C. equiselis* (light grey bars) collected during surveys in the northern Gulf of Mexico from 2007 – 2010. Density estimates are based on a combination of June and July surveys.
Error bars represent +1 standard error.
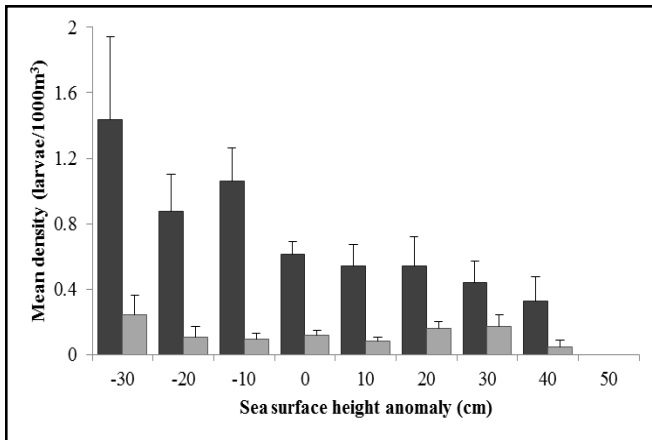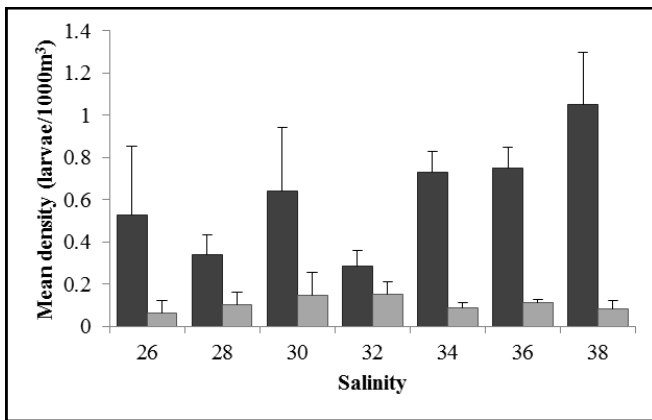
Figure 2. Mean density (larvae /1,000 m³) of *Coryphaena hippurus* (dark grey bars) and *C. equiselis* (light grey bars) collected across the range of (A) salinity and (B) sea surface height anomaly (SSHA) conditions sampled during surveys in the northern Gulf of Mexico. Density estimates are based on a combination of all surveys from 2007 – 2010. SSHA data were obtained from the Aviso database using ArcGIS 9.3. Error bars represent +1 standard error.