



Juvenile Spotted Seatrout Find Abundant Foods at Cedar Keys, Florida

Information on the status of the spotted seatrout (*Cynoscion nebulosus*) and their foods in the Northeast Gulf of Mexico will assist with the maintenance of the fishery in the rapidly developing area near Cedar Keys, Florida. Populations of the spotted seatrout are essential to commercial and recreational fishing in the northeast Gulf of Mexico. Spotted seatrout remain throughout their lives in the general vicinity where spawned and are among the first fish species to suffer when local habitats are disturbed. Past studies of the seatrout in the vicinity of Cedar Keys in the 1940's and elsewhere in the 1970's are a basis for comparison with the present study.

From September 1992 to September 1993 we collected spotted seatrout and their foods from four different habitat zones in a 1.5-km band of seagrass beds along the south shore of Seahorse Key, one of four small islands that compose the Cedar Keys National Wildlife Refuge, Florida. The shoreline sand zone (I), partially exposed during low tide, is followed progressively by a 25-m band of shoal grass *Halodule wrightii* (zone II) at 0.5-m average depth. We sampled the broad 75-to-400-m band of turtle grass (*Thalassia testudinum*) at two depths: at 1 m (zone III) and at 1.5 m (zone IV). Beyond these beds at 2-m average depth is manatee grass (*Syringodium filiforme*) mixed with turtle grass and other seagrasses.

Sampling of fish and their epibenthic and hyperbenthic invertebrate foods was done monthly

in each zone at randomly selected points along 30 transects that are perpendicular to shore and spaced 30 m apart. Spotted seatrout were collected with a 15-m long bag seine, and invertebrates were collected with a sled trawl (18-cm × 53-cm aperture) with a conical net (0.6-mm mesh net). The trawl was winched at 0.3-m/s for 10 m parallel to shore. The water at Seahorse Key is usually clear and well mixed, and the range of annual water temperatures was 11 to 34°C at pH of about 8, dissolved oxygen of about 7–8 mg/L, and total salinities between 17 ppt in winter–spring and 31 ppt in summer.

Diverse and abundant foods were available to the spotted seatrout in late summer, fall, and early summer. Foods were less abundant in winter (January–February) probably because of seasonal die-back of grasses, less habitat, and lower temperatures and salinities. During March and May 1993, diversities averaged about 30 taxa per sample, and densities averaged 2,650 organisms per sample. Key crustacean foods of the seatrout usually exceeded 50% of the total number of organisms in the seagrasses. These were mysids (*Hippolyte zostericola* and *Tozeuma carolinense*), tanaid (*Hargeria rapax*), cumaceans (*Oxyurostylis smithi* and *Almyracuma* sp.), and decapods (grass shrimp [*Palaemonetes* cf. *intermedius*] and pink shrimp (*Penaeus duorarum*)).

Nonfood items of the juvenile seatrout (e.g., gastropods and hermit crabs) were abundant at the Key and often composed 20% of the diversities and densities. In addition, the sled trawls contained several species of fish (including the spotted seatrout). The number of fish per sample averaged 13 in March and 32 in May.

Diurnal sampling (0900–1300 h and 2000–0100 h) in March and May 1993 revealed minor differences in species composition of invertebrates in the four habitat zones. The total taxa in the four zones were more diverse in March than in May (March average 30 taxa per day and 38 taxa per night; May average 22 taxa per day and 28 taxa per night), but the density of organisms in the samples was significantly greater in May than in March ($t = 4.5$; $P = 0.05$; $df = 14$; sig. 2.15). During the 2 months, densities in day and night samples were in fairly close agreement (day average and standard deviation = $2,493 \pm 915$; night average = $2,807 \pm 958$). Standing crops of amphipods, decapods, and mysids increased from 50% of the average total number per sample in March to 75% of the density in May. Unlike other reports from the northeast Gulf, invertebrate densities in the bare sand zone in March and May were comparable to those from collections in the other zones. In the night samples in May, however,

total densities were approximately three times greater in the grasses than on bare sand. Although the density of invertebrates in March and May was moderate, a single sample collected in *Halodule* in September 1992 contained 14,000 organisms per sample, 95% of which were crustacean foods of the seatrout.

Stomachs of seatrout (50- to 150-mm total length) in August 1992 contained relatively whole pink shrimp and grass shrimp that indicated ingestion during the previous night or early morning. Microscopic examination of the gut contents revealed only a few diatoms, and they may have been in the guts of the invertebrate foods or ingested secondarily while feeding. Zooplankton and small cumaceans were absent.

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