

**Spawning Frequency of
Matagorda Bay
Female Spotted Seatrout**

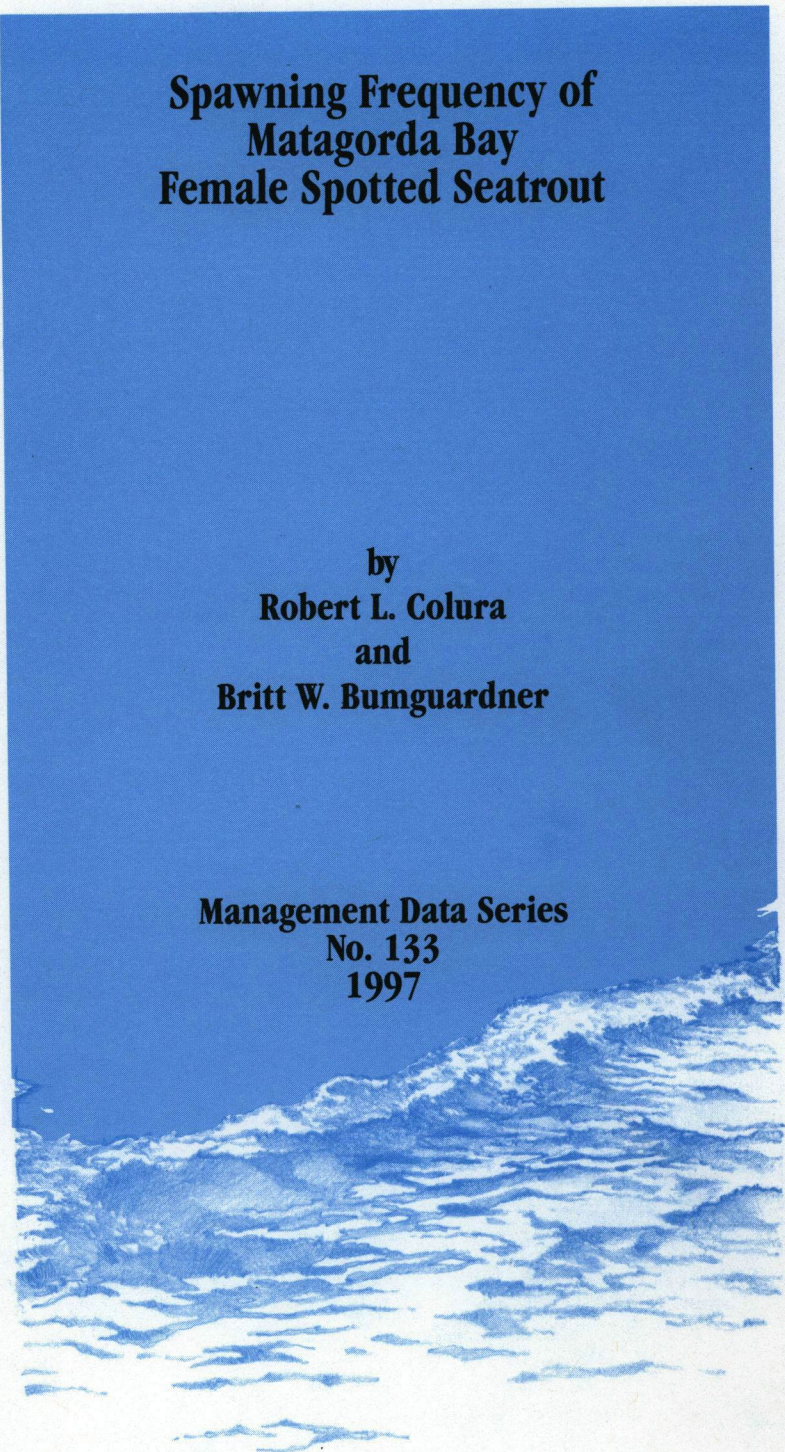
by
**Robert L. Colura
and
Britt W. Bumgardner**

**Management Data Series
No. 133
1997**



COASTAL FISHERIES DIVISION

4200 Smith School Road
Austin, Texas 78744



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ABSTRACT

Female spotted seatrout (Cynoscion nebulosus), collected April through October 1991 from Matagorda Bay, Texas, were examined for evidence of final oocyte maturation to estimate spawning frequency of the population. Percentage of females undergoing final oocyte maturation was 37.7% from April through August and ranged 19.1-44.9% by month. From April through August monthly estimates of percentage of fish undergoing final oocyte maturation was similar among months. No evidence of spawning was found in September or October. The spotted seatrout spawning season appears to vary on the Texas coast possibly due to spatial and temporal differences in environment among bay systems.

INTRODUCTION

Spotted seatrout (*Cynoscion nebulosus*) are fractional spawners (Arnold et al. 1976) which, based on most recent investigations, spawn from April through August in Texas with some spawning reported in September (Brown-Peterson et al. 1988, Colura et al. 1988). Batch fecundity of Texas fish has been reported to be about 450 eggs/g body weight (Brown-Peterson et al. 1988, Colura et al. 1988). Total fecundity (seasonal fecundity), however, has not been fully addressed because spawning frequency has received little attention. Colura et al. (1988) reported that based on limited data 4-29% of female spotted seatrout appeared to be in spawning condition throughout the spawning season. Brown-Peterson et al. (1988) used several different procedures to estimate spawning frequency and reported spawning for individual fish as once every 2.3-7.6 days depending on the method used. However, they noted spawning frequency was probably over-estimated due to sampling bias. Spawning frequency of fish spawned in the laboratory has been reported as one spawn per individual every 2.3-3 weeks (Tucker and Faulkner 1987, Brown-Peterson 1988). It is not clear whether spawning of laboratory fish is less frequent due to confinement in the laboratory.

The purpose of the present investigation is to estimate spawning frequency of female spotted seatrout in a Texas estuary.

METHODS

Spotted seatrout were collected by gill net (Dailey et al. 1991) and by hook and line from April through October 1991. All fish were placed on ice immediately after collection and returned to the Perry R. Bass Marine Fisheries Research Station (PRB). Upon arrival at the PRB, total length was determined and one ovary, selected at random, removed.

A sample of eggs (~1000) was excised from the ovary and examined at 10X for the presence of vitellogenic ova. Presence of vitellogenic ova was presumed to be indicative of the spawning season. A second sample of eggs (~1000) was then removed from the ovary of fish with vitellogenic ova and placed in a clearing solution consisting of ethanol, formalin, and glacial acetic acid mixed at a 6:3:1 ratio and the ooplasm cleared as described by Brown-Peterson et al. (1988). Samples were immediately examined at 10X for evidence of lipid coalescence, germinal vesical migration or hydration, which are stages that denote final oocyte maturation and spawning within about 14 hours (Brown-Peterson et al. 1988). For purposes of this study, fish undergoing final oocyte maturation were classified as spawning; those not exhibiting evidence of final oocyte maturation were classified as not spawning.

A comparison of mean total lengths of female spotted seatrout by month was made using analysis of variance. Comparison of the estimates of the monthly frequency of fish undergoing final oocyte maturation was made using an RXC G-Test of Independence (Sokal and Rohlf 1981). Analysis of variance was performed using the Statistical Analysis System (SAS 1987) and the RXC G-Test of Independence performed using BIOM (Rohlf 1987) statistical software. All statistical tests were considered significant at the $P < 0.05$ level.

RESULTS

Two hundred thirty-seven mature female spotted seatrout were collected from April through October 1991. Average total length by month ranged 385-435 mm (Figure 1) and was similar among months. All fish collected from April through August (n=183) had vitellogenic ova and evidence of final oocyte maturation was found in 37.7% (range 19.1-44.9%/month) of these individuals (Figure 2). No fish exhibiting evidence of final oocyte maturation were found in September; no fish with vitellogenic ova were collected in October. Percentage of individuals undergoing final oocyte maturation was similar among months.

DISCUSSION

Percentage of female spotted seatrout spawning at any given time in Matagorda Bay in 1991 was 37.7%. Based on these results it is estimated females spawned once every 2.6 days or about 51 times from April through August 1991. Assuming batch fecundity is 450 eggs/g body weight (Brown-Peterson et al. 1988, Colura et al. 1988), a one Kg female would have spawned about 23 million eggs during the five month spawning season. This estimate is about 20-57 times greater than total fecundity estimates previously reported for wild spotted seatrout of similar size (Pearson 1929, Sundararaj and Suttkus 1962, Overstreet 1983).

The percentage of fish spawning, based on final oocyte maturation (37.7%), was slightly less than the 42.8% reported by Brown-Peterson et al. (1988) for spotted seatrout collected in Aransas Bay, Texas. Brown-Peterson et al. (1988) also reported the percentage of fish undergoing final oocyte maturation in any one month in Aransas Bay ranged 38-48%. With the exception of July and September, when spawning frequency was estimated to be 19.1% and 0.0%, respectively, monthly estimates of spawning frequency in Matagorda Bay (36.7-44.9%) did not differ greatly from reported estimates of Aransas Bay fish.

The spotted seatrout spawning season appears to vary on the Texas coast. Pearson (1929) reported the spawning season along the mid-Texas coast as March to November based on the presence of gravid females. Brown-Peterson et al. (1988) reported the spawning season in Aransas Bay as April to September based on the presence of running ripe females. Colura et al. (1988) reported that in Matagorda Bay, vitellogenic ova were present in all fish from April through August, but in only a portion of the females in September and October; he suggested a spawning season of April through August. No evidence of spawning in September was found in the present investigation. In sharp contrast, Brown-Peterson et al. (1988) found more running ripe females (45%) in Aransas Bay in September than in any other month. It is not clear why the spawning season appears to vary among bay systems in Texas although it may be in response to spatial and temporal differences in environment.

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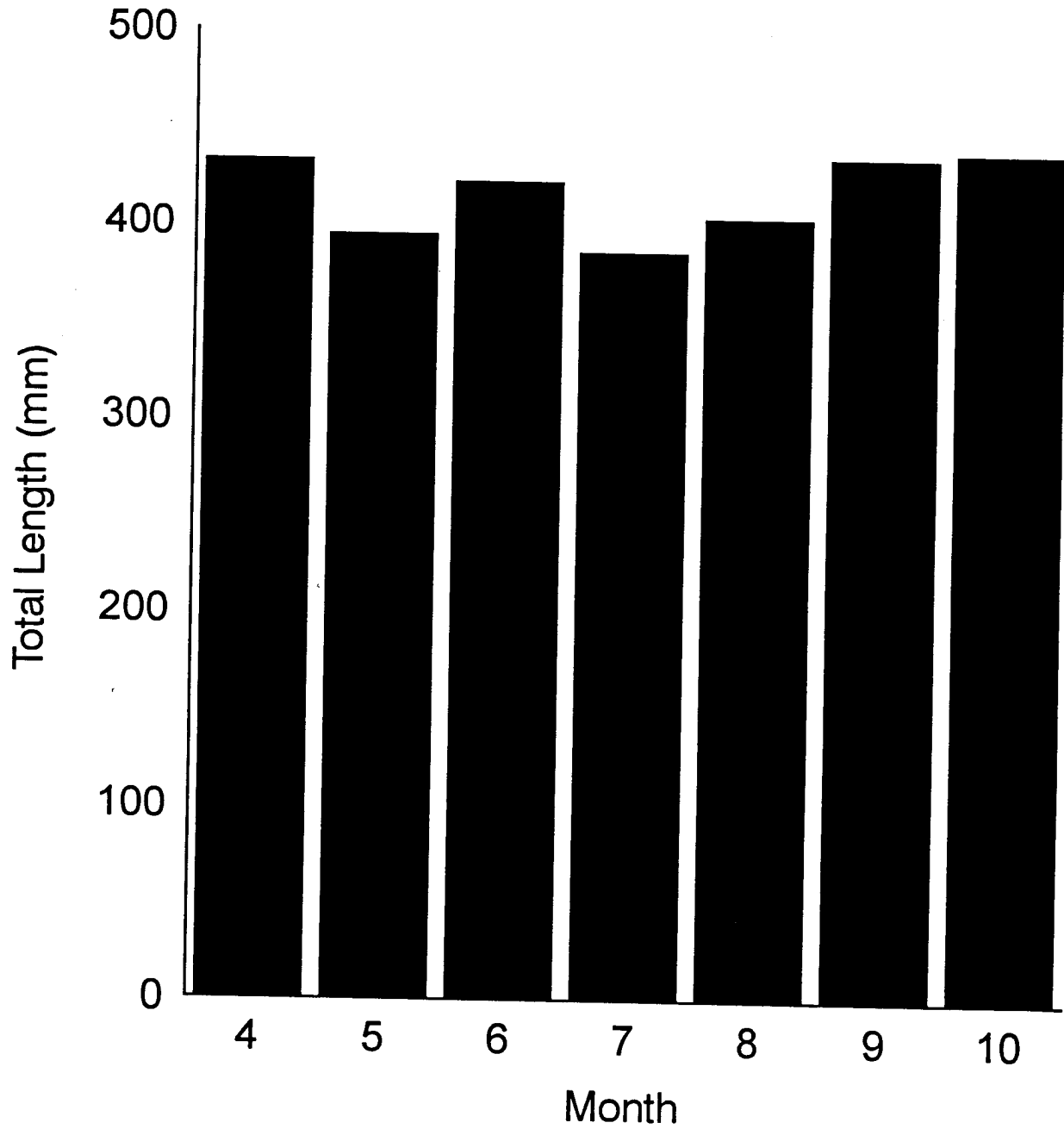


Figure 1. Mean total length by month of female spotted seatrout collected from Matagorda Bay, Texas, April through October 1991.

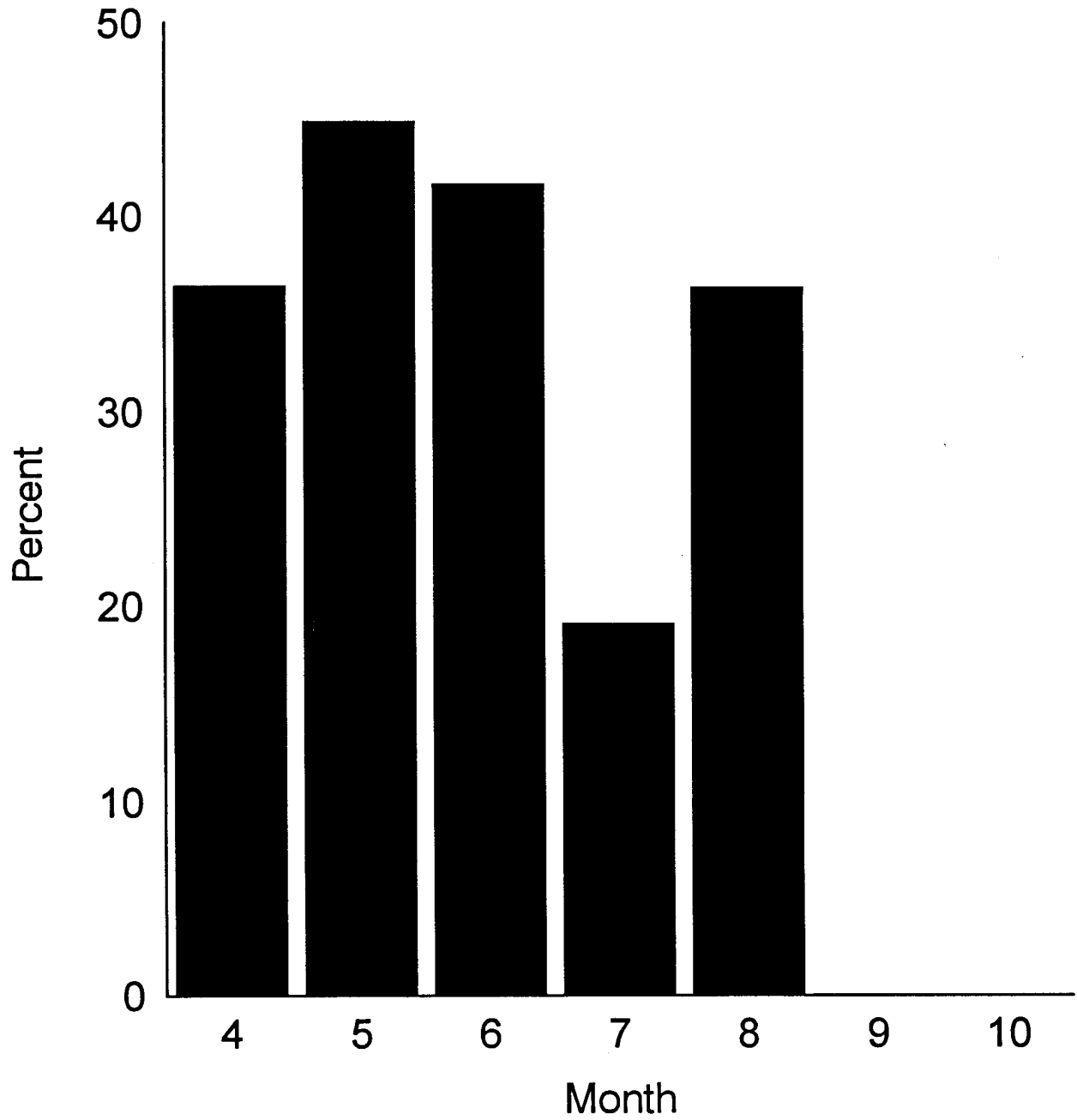


Figure 2. Percentage of female spotted seatrout collected from Matagorda Bay, Texas, April through October 1991, with vitellogenic ova .

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