# INDUCED SPAWNING OF EASTERN OYSTERS

by

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## ABSTRACT

Eastern oysters (Crassostrea virginica) were collected from South Bay, Texas and induced to spawn in the laboratory. These oysters were conditioned for 12 weeks on continuous flow using Matagorda Bay water. Spawning procedures used resulted in approximately two million larvae. Results indicate that Eastern oysters from South Bay, Texas can be successfully spawned in the laboratory using established procedures.

## INTRODUCTION

The Eastern oyster (Crassostrea virginica) is commercially harvested from public reefs in most bay systems along the Texas gulf coast, with Galveston, Matagorda, and San Antonio Bays containing approximately 93% of the public reef areas. No commercially harvestable reefs exist south of Nueces Bay except in South Bay, and these reefs account for less than 1% of the commercial landings (Quast et al. 1988).

Commercially harvestable Eastern oyster populations in Corpus Christi Bay have been absent since the late 1950's (Martinez 1963, 1964). A small number of live reefs are located within Corpus Christi Bay, and some larger reefs are located in Nueces Bay. However, there is no evidence these oysters are repopulating the bay (Hammerschmidt et al. 1988). Reasons why oysters have not re-established themselves throughout the bay are unknown; it has been suggested the population decline was partially due to persistent salinities > 25 o/oo, inadequate substrate, and overfishing (Martinez 1963, 1964). If Eastern oysters from Corpus Christi Bay are unable to survive in harvestable numbers because of environmental conditions, it may be possible to repopulate the bay by stocking oysters preadapted to similar conditions. Oyster populations in South Bay, Texas apparently tolerate, spawn, and grow rapidly in salinities > 40 o/oo (Breuer 1962). Additionally, these oysters represent a biochemically distinct race from Eastern oyster populations north of the upper Laguna Madre (Burroker 1983, King and Gray 1989). If South Bay oysters can be consistently spawned in the laboratory, it may be feasible to implement a stocking program to replenish depleted oyster populations within Corpus Christi Bay.

The purpose of the present study is to determine if Eastern oysters from South Bay, Texas can be spawned in the laboratory using established procedures.

## MATERIALS AND METHODS

Approximately 500 Eastern oysters > 40 mm were collected from South Bay, Texas on 16 November 1988. All specimens were transported in ice chests to the Perry R. Bass Marine Fisheries Research Station near Palacios, Texas on 18 November 1988. Eastern oysters were placed in 6-mm mesh plastic cages and suspended in a 0.8-ha pond filled with unfiltered Matagorda Bay water until 30 April 1989. Three hundred Eastern oysters were then removed from the pond and placed into a conditioning apparatus similar to that described by Gray et al. (In Press). Eastern oysters were maintained on continuous flow using Matagorda Bay water until 20 June 1989. The temperature of the incoming water was maintained at about 20 C using quartz immersion heaters (Model TH-1000, Sethco Division, Hauppauge, New York) water chillers (Model BHL-842D, Frigid Units, Toledo, Ohio), and a temperature controller (Model 74, Yellow Springs Instrument Company, Yellow Springs, Ohio). The water temperature was increased to 23 C on 20 June 1989 and maintained for 6 weeks to promote development of sexual products.

On 13 July 1989, six randomly selected Eastern oysters plus one known male and one female Eastern oyster were sacrificed. Sexual products were removed using methods similar to Dupuy et al. (1977). The gametes were placed

in two separate 4-liter glass aquaria and aerated for 6 h to allow complete fertilization. Gametes were then placed in a 100-liter incubator for 24 h. The incubator contents were drained through a 50- sieve and preserved in 4% buffered formalin. The total number of larvae was determined by the volumetric method (Bonn et al. 1976).

On 17 July 1989, 10 Eastern oysters were removed from the holding apparatus and placed into a 100-liter tank containing 30.5 C filtered Matagorda Bay water. Stripped sexual products from two sacrificed male oysters were added to the tank to hormonally induce spawning (Dupuy et al. 1977). Six hours were allowed for complete fertilization, after which gametes were placed in a 100-liter incubator. The incubator was drained through a 50- sieve and resulting larvae preserved in 4% buffered formalin on 18 July 1989. The total number of larvae was determined using the previously described method.

## RESULTS

The randomly spawned Eastern oysters produced approximately 242,000 fertilized eggs whereas the known male and female produced about 120,000 fertilized eggs. The hormonally induced spawn resulted in approximately 1.5 million larvae.

## DISCUSSION

Eastern oysters from South Bay, Texas can be successfully spawned in the laboratory using established procedures. One current management strategy used to restore depleted oyster fisheries is to re-seed with artificially planted juveniles (Malinowski and Whitlatch 1988). If South Bay oysters can adapt to conditions in Corpus Christi Bay, it may be possible to enhance the Eastern oyster population by stocking laboratory produced larvae.

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