

**REPRINTED FROM THE
PROCEEDINGS OF**

SIXTH ANNUAL WORKSHOP

WORLD MARICULTURE SOCIETY



PROCEEDINGS
of the
SIXTH ANNUAL MEETING
WORLD MARICULTURE SOCIETY

Held at

Seattle, Washington
January 27-31, 1975

in cooperation with

University of Washington, Seattle
National Marine Fisheries Service

Published by the

Louisiana State University
Division of Continuing Education

through the academic direction of the

Louisiana State University
School of Forestry and Wildlife Management
and
Center for Wetland Resources

Society Officers

James Avault, President
Baton Rouge, Louisiana

Harold Webber, Vice President
Groton, Massachusetts

Paul Sandifer, Secretary-Treasurer
Charleston, South Carolina

James W. Avault, Jr., Editor
Roger Miller, Associate Editor

BRACKISH WATER POND CULTURE EXPERIMENTS WITH ATLANTIC CROAKER,
STRIPED MULLET, CHANNEL CATFISH, AND RAINBOW TROUT

W. Guthrie Perry
Louisiana Wildlife and Fisheries Commission
Grand Chenier, Louisiana 70643

ABSTRACT

Brackish water pond culture studies have been conducted by the Louisiana Wildlife and Fisheries Commission at the Rockefeller Wildlife Refuge, Grand Chenier, Louisiana, since 1966. Atlantic croaker (Micropogon undulatus) and striped mullet (Mugil cephalus) were among the first species stocked. Various stocking rates and sizes have been tested to determine production without supplemental feed. Polyculture experiments were conducted with striped mullet-channel catfish (Ictalurus punctatus) combinations and striped mullet-Atlantic croaker combinations.

Growth data for Atlantic croaker were highly variable; however, striped mullet results were promising, especially for polyculture with catfish. Results from two winter stockings of rainbow trout (Salmo gairdneri) indicate that warmer temperatures and marginal water quality may limit rainbow trout production in southwest Louisiana.

INTRODUCTION

Since 1966, the Louisiana Wildlife and Fisheries Commission has been screening various fish species for mariculture. Brackish water pond studies at the Rockefeller Wildlife Refuge demonstrated that blue (Ictalurus furcatus), channel (I. punctatus), and white catfish (I. catus) will grow in salinities up to 11 ppt (Perry and Avault, 1968). Blue and channel catfish have spawned in pond salinities up to 2 ppt (Perry, 1973), and production has reached 3,006 kg/ha/yr (Perry and Avault, 1973). Initial studies with Atlantic croaker were conducted in 1966 and 1968 (Avault et al.,

1969). Production in 1968 ranged up to 336 kg/ha with little supplemental feed. These pond-reared croaker averaged 215 mm in total length, somewhat in excess of the 150 mm reported for wild croaker in Texas (Pearson, 1929).

This paper describes studies with Atlantic croaker and striped mullet to determine production at various stocking densities without supplemental feed. Growth, survival, and general desirability for pond culture were evaluated. Polyculture experiments of these species with channel catfish and winter culture of rainbow trout are also discussed.

EXPERIMENTAL PROCEDURES AND RESULTS

Atlantic Croaker

On April 30, 1970, four 0.04 ha ponds were each stocked with Atlantic croaker at 7, 14, 50, and 60 kg/ha. Total length of the fish ranged from 80 to 91 mm, and the weights averaged 8 g.

Juvenile croaker were captured by cast netting and held overnight in concrete vats before stocking. Water salinity at the collection site was 4.5 ppt. Pond salinities ranged from 4.2 (B-41) to 11.2 ppt (B-16).

After 181 days, the ponds were drained to determine production without supplemental feed (production refers here to total weight recovered uncorrected for weight at stocking; Table 1). Survival and growth were best in pond B-41 which was stocked at 7 kg/ha. This pond had 72% survival and 130 kg/ha of fish averaging 233 mm (194 g). Pond B-40, which was stocked at the highest rate (60 kg/ha), recorded the poorest production, 92 kg/ha. Although there were no replications of stocking rates, the data strongly suggest an inverse relationship between the stocking density of Atlantic croaker and production in unfed ponds.

Striped Mullet

Eight ponds were stocked with striped mullet May 4, 1970, to determine the effects of stocking density and initial size on production without supplemental feed. Two ponds were each stocked with mullet averaging 8 g at a density of 247 fish/ha. Three other ponds were each stocked with mullet averaging 6 g at a density of 4,940 fish/ha. Against these were compared three additional ponds each stocked with mullet averaging 33 g at a density of 4,940 fish/ha.

Harvest data indicate that stocking larger fingerlings at the highest rate definitely had its advantages (Table 2). After 181 days, ponds stocked with 33 g fish at 4,940/ha yielded an average

production of 454 kg/ha, which was 263 kg/ha greater than ponds stocked with 6 g fish at the same density. Survival had a slight adverse effect on production; however, the production figures were consistent among the replicated ponds. Ponds stocked at 247 fish/ha had an average production of 60 kg/ha. The fish averaged 380 g (330 mm), and these were the only ponds producing fish of a harvestable size. Approximately 65% exceeded 340 g.

Atlantic Croaker-Striped Mullet Polyculture

Polyculture studies were attempted with Atlantic croaker and striped mullet in 1969 and 1973.

On April 7, 1969, a 0.04 ha pond was stocked at 1,235 croaker/ha and 4,940 mullet/ha. This was compared to two ponds stocked with mullet only at 247 mullet/ha and 4,940 mullet/ha. Mullet stocked were relatively uniform, averaging approximately 13 g, and the croaker averaged approximately 4 g. Supplemental feed was not added to the ponds.

The ponds were drained after 271 days, and croaker survival was so poor that it was difficult to draw conclusions on the effect of croaker upon mullet growth and survival (Table 3). This did indicate, however, that mullet were hardier than croaker. The pond stocked with mullet only at 247/ha experienced tremendous fish growth, producing 138 kg/ha with fish averaging 622 g. The pond stocked with mullet only at 4,940/ha yielded fish averaging 91 g. Total fish production of 642 kg/ha was obtained in the pond which contained both species. Atlantic croaker experienced 10% survival and contributed 63 kg/ha to production. Croaker averaged 499 g. The mullet averaged 77 g more (168 g) than those cultured alone at the same density. Mullet survival was 18% better in the densely stocked monoculture pond (88%) than in the polyculture pond.

After the 1969 harvest data were obtained, a pond was stocked with 2,519 mullet/ha to determine survival and growth during winter. The pond was harvested after 317 days (October 2, 1970). The mullet experienced water temperatures down to 11 C. Survival was 87% and production was 352.8 kg/ha.

In 1973, Atlantic croaker and striped mullet studies were continued. Two 0.04 ha ponds were each stocked with 4,940 croaker and 247 mullet/ha, and two ponds were each stocked with croakers only at 4,940/ha. The mullet averaged 176 mm when they were stocked March 30, 1973. The croaker were stocked April 14, 1973, and ranged from 60-80 mm. The ponds were drained after 370 days. Total production in the ponds stocked with 4,940 croaker and 247 mullet/ha was largely influenced by mullet which had a higher average survival (90%) than croaker (35%; Table 3). Mullet accounted for an average of 136 kg of the 315 kg/ha produced in these ponds. Mullet averaged 603 g each. The two ponds stocked with croaker only at a density of 4,940/ha produced an average of 123 kg/ha. However,

