JOURNAL

of the

WORLD MARICULTURE SOCIETY

VOLUME 12, NUMBER 2

J. World Maricul. Soc. 12(2):214-222 (1981)

MALAYSIAN PRAWN CULTURE IN BRACKISH WATER PONDS IN LOUISIANA

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ABSTRACT

Beginning on May 13, 1980, prawns were cultured at the Rockefeller Wildlife Refuge for 140 days from postlarvae and fed. Production in ponds receiving Ralston Purina Experimental Marine Ration #25 averaged 408 kg/ha, 619 kg/ha and 510 kg/ha for the respective replicated stocking densities of 2.5/m^2, 4.9/m^2 and 7.4/m^2. Average feed conversion factors were 1.0, 1.0 and 1.5. Average prawn weights at harvest decreased with increased stocking density and were 21 g, 17 g and 12 g, respectively. Production per pond ranged from 390 kg/ha to 832 kg/ha. An average of 77% of prawns stocked at 2.5/m^2 exceeded 115 mm TL whereas the stocking densities of 4.9/m^2 and 7.4/m^2 yielded only 32% and 31% over 115 mm.

Extra postlarvae remaining after the stocking requirements for the feeding study were met permitting additional tests. Stocking rates selected for these additional studies were 1.2/m^2, 2.5/m^2 and 3.7/m^2. Prawns in these ponds received no supplemental feed and yielded harvests of 124 kg/ha, 224 kg/ha and 292 kg/ha, respectively. These treatments, the first two of which were not replicated, resulted in production similar to that of an earlier study of prawn production on natural forage in brackish ponds at this facility. Average prawn sizes at harvest were 18 g, 15 g and 12 g, and were inversely related to stocking densities.

INTRODUCTION

Culture of giant Malaysian prawns, *Macrobrachium rosenbergii*, is steadily developing into a major aquaculture industry. One United States based firm in Honduras is marketing its product in the United States and another is developing in Costa Rica. Other corporations are establishing production facilities in Central and South America.

In the United States commercial prawn culture is most significant in Hawaii, although experiments and pilot scaled projects have been conducted in several states (Hanson and Goodwin 1977). Hawaiian culturists usually harvest the larger prawn from outdoor ponds year round. Annual production levels up to 3,000 kg/ha of whole prawns are reported. In the continental United States seasons are restricted necessitating har-

vest after 5 to 10 months depending upon climatic conditions. Seasonal trials in South Carolina and Florida have recorded up to 1,300 kg/ha (Smith et al. 1978; Willis and Berrigan 1977).

Experiments with stocking strategies have demonstrated prawn production like other organisms to be influenced by stocking size, density and water quality (Smith et al. 1981; Willis and Berrigan 1977). With limited culture periods researchers envision a potential in temperate areas in certain situations. Culturists already possessing specific facilities and equipment and who were already in agriculture or fish farming have the advantage.

In accord with increasing demands for culture data in the southeastern United States, Louisiana initiated a series of tests in 1979. The initial project evaluated various stocking densities of postlarvae prawn in brackish water ponds without supplemental feed (Perry et al. 1980). Maximum production attained was in ponds stocked at a rate of $3.75/m^2$ and averaged 220 kg/ha at harvest after 163 days. A polyculture study with a mixture of channel catfish fry, *Ictalurus punctatus*, and prawn postlarvae was also conducted. This illustrated that ponds stocked with catfish fry ($5/m^2$) and prawns ($2.5/m^2$) did not approach carrying capacity as the growth of neither was restricted (Huner et al. 1980). With supplemental feed prawn harvest averaged 440 kg/ha and catfish yielded 530 kg/ha regardless of monoculture or polyculture.

Little production data exist from outside the research community in the continental United States. In Louisiana, four individuals have attempted to rear prawns (Huner 1981). The first was in 1978 when a landowner stocked a 0.8 ha pond at an unknown density. A harvest of 560 kg/ha of 20-45 g prawns was reported without feed. This encouraged a second landowner to stock a 13 ha pond in 1979 and 1980. In 1979 prawn were stocked at $1.9/m^2$ and production was approximately 65 kg/ha; average individual weight was 14 g without supplemental feed. A reduced stocking rate of $1.2/m^2$ in 1980 yielded approximately 70 kg/ha with individuals averaging 33 g. Also, in 1980, a third landowner stocked $1.6/m^2$ into a 1.2 ha pond with no supplemental feed. His yield was reported as approximately 128 kg/ha of prawns with an average size of 38 g. A 0.3 ha pond stocked with $3.3/m^2$ and fed, produced 134 kg/ha. Average size was 14 g.

These variable results of prawn culture as illustrated by attempts in Louisiana are not unique to the species and every instance of poor production can be attributed to either poor water quality or mismanagement.

This report describes the continued efforts to evaluate the potential for prawn aquaculture in Louisiana. The objectives of the study were: 1) to obtain production data on prawns stocked as postlarvae in brackish water ponds and fed a supplemental ration, 2) to compare unfed prawn production with data obtained in 1979, and 3) to determine if the selected stocking densities affected the length frequencies of gravid females.

MATERIALS AND METHODS

Eleven 0.04 ha and two 0.13 ha earthen ponds at the Rockefeller Wildlife Refuge, Grand Chenier, Louisiana, were used for this study. The research ponds are arranged in rows of 10. Ponds on the east side of the complex are slightly deeper and contain harvest basins. The effect of pond depth on a particular treatment was lessened by randomly assigning only one replication of each stocking density to a row. Filtered, slightly brackish water from a tidal bayou complex was used in the ponds; pumping was necessary to fill and drain the ponds.

Ponds were stocked May 13, 1980, with 40-day-old postlarvae obtained from the Weyerhaeuser Prawn Hatchery, Homestead, Florida. Each pond's stock was hand counted to insure accuracy. Stocking rates for the prawns receiving supplemental feed were 2.5/m^2, 4.9/m^2 and 7.4/m^2 (24,700/ha, 49,400/ha and 74,000/ha). There were three replications (ponds) per treatment. Pond water temperature at stocking was 36°C.

Postlarvae remaining after the stocking requirements of the feeding study were met were stocked in additional ponds so comparisons of the preceding year's production without supplemental feed could be determined. The rates selected and pond size were 1.2/m^2 in a 0.13 ha pond, 2.5/m^2 in a 0.04 ha pond and 3.7/m^2 each in a 0.04 ha and a 0.13 ha pond.

Growth was monitored monthly beginning in May be seining. Measurements from tip of the rostrum to the tip of the telson were taken and used to calculate weight based upon Log W = -5.411 + 3.177 Log L for samples less than 100 mm total length. Once prawn exceed 100 mm the equation Log W = -5.867 + 3.410 Log L was used (Perry et al. 1980).

Feeding commenced May 21, 1980, and continued 5 days per week for 74 feeding days. Feeding was discontinued in the ponds during periods of extremely low oxygen or heavy rainfall.

Feeding rates were calculated using estimated biomass as determined for expected mortality per day and mean size measurements (Paul Sandifer, Charleston, S.C., personal communication). A 30% mortality rate was selected based on 1979 data (Perry et al. 1980). Initially feeding rates were approximately 35% body weight per day. This was gradually decreased to 3% body weight during August and September. All prawns were fed Purina Experimental Marine Ration 25% protein, broadcast by hand.

At the termination of the study, each pond was seined twice, pumped down and the remaining prawns harvested. Prawns from each pond were placed in separate concrete holding vats until harvest data could be obtained. A random subsample composed of at least 10% was taken from each pond harvest for total length (tip of rostrum to tip of telson) measurements and weights. The remainder of the prawns were counted and weighed.

Food conversions, S-factors, were calculated using the method described by Swingle (1958). Percent survival, length-frequency, length-frequency of gravid females, average total length and average weight were determined for each treatment.