

Pond Culture Experiments of South American Catfish, *Rhamdia sapo*, Fingerlings

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Production techniques for South American catfish, *Rhamdia sapo*, a fish esteemed for the quality of its flesh, have been developed in Argentina, since 1979. The preliminary tests of growing the fingerlings to marketable size with supplemental feeding in pondculture resulted in production levels up to 1,500 kg/ha/year (Luchini and Avendaño, in press). The species demonstrated good conversion of feed to flesh; creating expectations of its suitability for commercial fish farming.

With the aim of obtaining large numbers of fingerlings of desirable size and quality for growing to food size, a series of experiments were carried on to determine the best technology for rearing them in ponds.

During the summer of the 1982-83 (December to March) 10 experiments were performed. The data presented belong to three of them, which were carried on with available fry from a single spawn in ponds with similar treatment.

During the breeding season of 1982 when the water reached a temperature or about 22 C (71.6 F) (by mid December) the spawning of a 1.1 kg (2.4 lb) catfish was induced through exogenous stimulation with HCG (Luchini und Cruz, 1983). The spawning and fertilization took place in aquaria, the eggs were incubated in Chase jars (Zoug type). Hatching time was forty-eight hours. Egg mortality was very low (5 to 8%).

To reduce the losses due to the action of predaceous insects, snakes and frogs, the fry were reared indoors in troughs with continuous water flow, or in bags suspended inside aquaria (Luchini and Avendaño, 1984). The fish were offered formulated feeds, and cultured for a period of 15 days.

Fifteen days before stocking, the three 0.055 ha (0.12 acre) ponds were fertilized, with organic (horse dry manure) and inorganic (superphosphate and potassium nitrate, 1:1) fertilizers, and were managed so as to obtain a moderate phytoplankton bloom and large

Table, Composition of balanced dry diet fed to Rhamdia sapo stock

Component	Weight (%)
Fish meal	30.000
Meat flour	19.11
Soybean meal	15.04
Corn meal	21.03
Rice Bran	12.32
Vitamins	0.50
Minerals	1.00
Ci Na	1.00
Terramycin	1.50

amounts or fish food organisms (mainly cladocerans and copepods zooplankton, and benthos quironomid larvae). The ponds drain pipes were covered with screen mesh to prevent; the escape or the small catfishes, and the water-supply pipes were screened with saran (sock- filters) to remove wild fish and eggs.

The oxygen level was measured each morning (with an 51B, YSI model oxymeter). The phytoplankton bloom was regulated by adding freshwater (1 to 8 L/minute) (0.25 to 2 gal/min) and reducing the amount or fertilizer, according to the visibility of the Secchi disk (the visibility was maintained at 0.30 m) (0,9 ft.).

The fry were stocked at a rate or 100,000/ha (1,500; 1,000 and 3,000 fish per pond). They averaged 1.5 cm (0.6 in) (total length), Supplemental feeding was begun in the ponds four days after the fish were stocked. Feed offered was initially a 40% protein formulation in finely ground form (Table 1). Later, this formulation was offered in sinking-type pellets of -2 mm, 3 mm and finally 5 mm diameter.

Fish were fed, 6 days a wee, once a day. No food was offered on rainy, low pressure days or after 3 consecutive cloudy days had occurred. In the seventy-six day experiment, the fish were fed only 56 days.

The amount of the feed to be offered was determined by observation. Amount of feed increased until uneaten feed was observed on the feeding trays placed at the piers and hung at about 0.30 m (0.9 ft) under the water surface.

External parasites, when they occurred, were controlled with malachite green and formalin. Water quality was managed primarily by water exchange. The bacterial fish diseases were controlled by including Terramycin in the feed formulation and offering it during the first week after stocking.

On day 76 of the study, the fish were harvested by seining and draining the ponds.

The total crop obtained in the three ponds (0.55 ha) under experiment was of 3.775 fingerlings, weighting 186.6 kg. The average individual weight and length of the fish (49.6 g and 16.4 cm; respectively) were sufficient to proceed with their growing to market size (Table 2). The mean production was 3,411 kg/ha (Table 3). Occasional tests showed that the fishes ingested amounts of natural food (quironomid larvae and small gastro-pods).

The conversion "S" values (Swingle, 1958) were 0.57, 0.65 and 0.79. The survival ranged from 48 to 80% and the average of three populations was 71.4%. The highest losses, occurred in pond N° 1 (52%). Of this mortality,

Table 2. Results obtained breeding fry to fingerlings of Rhamdia sapo in semi-intensive pondculture (Dec. 1982-Mar. 1983).

Experiment	1	2	3	Average
Days of culture	78	75	76	76
Average weight (g)	50.9	58.1	47	49.6
Average length (cm)	16.8	17.3	16.1	16.4
Individual harvested	720	661	2934	—
Losses (%)	52	34	20	28.6

Experiment	1	2	3
Surface (ha)	0.015	0.010	0.030
Initial density			
Individuals/ha	100,000	100,00	100,000
Days of culture	78	75	76
Amount of food offered kg/ha			
/day	18.9	40.4	31.6
Number of fingerlings recovered			
/ha	48,000	66,100	79,800
Yield (kg/ha)	2,443	3,840	3,751
Losses (%)	52	34	20

20% was considered a result of “ich disease”. This South American catfish is very sensitive to “ich”. The treatment applied (Hoffman and Mitchell, 1977) gave good results. The infection could be controlled in five days and the population behaviour returned to normality by the tenth day

No dead fish were detected in the other ponds during the study, thus losses counted on cropping must have happened during the first two weeks after stock.

The cultural techniques used showed much promise for rearing fingerling fish to a suitable size for subsequent growth to marketable size in production ponds. The modification of these techniques, accompanied with those developed to rear fry indoors, will permit us to reduce the losses, from predaceous animals, from cannibalism or from diseases, during the first week or rearing. At the same time the fingerlings, thus obtained, are of the quality needed to reach the market in the shortest possible time.

The technique used here was relatively simple with little labor expenditure, similar to that used for channel catfish. The rearing of fry to fingerlings is better carried

on in small ponds, where water quality can be regulated, and where epizootic diseases can be controlled as soon as they are detected. The use of feeding trays permits frequent observations, continuous and better adjustment of the food offered. Feeding trays also permit daily observation of the behaviour of the fishes, thus allowing a rapid detection of any signs of disease or stress. If the production data for fingerling *Ictalurus punctatus* given by several authors (Snow, 1962; Bryan and Allen, 1968 and Tiemeier and Deyoe, 1980) are taken into account, a yield of *Rhamdia sapo* of 3,411 Kg/ha during 76 days is quite acceptable.

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