COMPARISON OF A WILD AND A DOMESTIC STRAIN OF CHANNEL CATFISH, *ICTALURUS PUNCTATUS*[1,2]

Marion C. Burnside and James W. Avault, Jr.
Fisheries Division
School of Forestry and Wildlife Management
Louisiana State University
Baton Rouge, Louisiana 70803

and

W. Guthrie Perry, Jr.
Louisiana Wild Life and Fisheries Commission
Grand Chenier, Louisiana 70643

ABSTRACT

Fingerlings from a domestic and a wild population of channel catfish were grown in six freshwater and six brackish water ponds. The two groups were compared for growth, survival, food conversion, condition factor, and dressing percentage. The domestic strain outgrew the wild strain. There was no significant difference between the two strains for dressing percentage. There were conflicts between the results of condition factor and food conversion for the two types of culture.

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[1]Presented at the 4th Annual Convention of the Catfish Farmers of America; February 3-5th, 1972. Dallas, Texas.

[2]Study is a part of Southern States Regional Catfish Research Project, S-83, and supported in part by the LSU Agricultural Experiment Station and the Louisiana Land and Exploration Company.

Introduction

Last year many of you heard a report on the regional breeding project and the start LSU has made. This study was part of LSU's breeding program.

It was noticed that of the five original strains collected by LSU, two had higher survival and grew faster than the others. One of these strains was wild and the other was domesticated by mass selection. It was felt that a comparison of these two strains could help the catfish farmer by determining which grew faster and in general was best adaptable to pond culture.

LSU has also been cooperating with the Louisiana Wild Life and Fisheries Commission to determine the feasibility of brackish water culture of catfish. It was felt that some information could be obtained from an experiment in brackish water with some of the stock for the breeding program.

A study was set up, therefore, to compare domestic and wild strains of channel catfish, in freshwater and brackish water ponds.

Materials and Methods

Domestic fish for the study came from a hatchery that has carried on a 13 year program of mass selection and domestication. The original stock for this program came from the Yazoo River in Mississippi, donated by Thompson-Anderson Enterprises.

Wild fish for the study came from Lake des Allemands in Louisiana. The age difference between the fish in the two groups ranged from one day to three weeks.

Six ponds were used for both experiments, three for the wild strain and three for the domestic strain. The freshwater ponds were located on Ben Hur Farm three miles south of the LSU campus in Baton Rouge. The brackish water ponds were located on Rockefeller Wildlife Refuge, Grand Chenier, Louisiana. The ponds were 0.1 acre in size with an average depth of four feet.

Salinity in the brackish water ponds was controlled by pumping from freshwater or brackish water canals as needed.

Fish were stocked at a rate of 2,000 per acre in both experiments.

Fish were fed 3% of their body weight with a floating catfish chow until the weight fed each day reached three pounds, in the brackish water study. To adjust feeding rates, fish in the brackish water experiment were sampled once a month during the cooler spring months and twice a month from June to September. Fish in the freshwater experiment did not feed

as well and were fed only what they would eat in a ten minute period. The rate was increased when the fish cleaned all of the food up within the ten minute period several days in a row.

Fish in both experiments were harvested 27 weeks after stocking. Total numbers and total weight of the fish for each pond were recorded. A subsample of 50 fish was randomly taken from each pond and each one fish was measured, weighed, dressed, and reweighed.

A T-test was used to analyze the results of food conversion, condition factor, and absolute growth for each experiment. An F-test analysis was performed on total length, standard length, live weight, dressed weight, and dressing percentage. An F-test analysis was performed on combined data from both experiments for total length, standard length, live weight, dressed weight and dressing percentage. An analysis of regression was performed on the data collected to adjust feeding rates in the brackish water experiment.

Results

Growth in the brackish water experiment was good. Domestic fish had production of over one ton per acre in two ponds and almost a ton per acre in the third pond. The wild fish had production values of about 3/4 ton per acre. A T-test for absolute growth showed a highly significant difference ($P < 0.01$) between the two strains in favor of the domestic strain.

The F-test showed a highly significant difference ($P < 0.01$) between the two strains for the parameters of total length, standard length, live weight, and dressed weight.

The analysis of regression produced the growth curves illustrated in Figure 1. The domestic fish grew faster than the wild ones.

There was no significant difference between the two strains for dressing percentage.

Survival was good for both strains in the brackish water experiment, with the wild strain averaging slightly higher. The averages were 95.7% for the domestic and 97.2% for the wild.

Food conversion averaged 1.8 for the domestic and 1.9 for the wild strain.

Condition factor averaged 1.73 for the domestic fish and 1.67 for the wild fish. There was no significant difference between the two strains for condition factor.

Growth in the freshwater ponds was not as good as in the brackish water ponds. Two months feeding time was lost due to poor water quality. Production averages were 625 pounds per acre for the domestic fish and 450 pounds per acre for the wild fish. There was no significant difference between the two strains for absolute growth, total length, standard length, live weight, dressed weight, and dressing percentage.

Survival was poor in all ponds except one containing wild fish. Survival averaged 46.7% for the domestic and 83.2% for the wild fish. Low fish survival was due to low oxygen conditions for two months.

Food conversion for the wild fish was good with an average of 1.4. The average for the domestic fish was 2.1. There was a highly significant difference ($P < 0.01$) between the two strains for food conversion in favor of the wild strain.

Averages for condition factor were 1.67 for the domestic strain and 1.8 for the wild strain. There was a highly significant difference ($P < 0.01$) between the two strains for condition factor in favor of the wild strain.

The F-test of the combined data for both experiments showed a highly significant difference ($P < 0.01$) between the two strains for total length, standard length, live weight, and dressed weight, in favor of the domestic strain. There was no significant difference between the two strains for dressing percentage.

Table 1 gives weight classes by percent. Also given is the percent of fish unacceptable to fish processors, most of whom will refuse fish under 1/2 pound. In the freshwater experiment, 84% of the wild fish were not acceptable and 58.7% of the domestic fish were not acceptable. In the brackish water experiment, 43.3% of the wild fish and 26% of the domestic fish were not acceptable.

Discussion

The domestic fish in both experiments grew faster than the wild fish. The difference between the growth of the fish in the freshwater experiment was not statistically detectable. It was felt that more replications would have given enough degrees of freedom to make the difference significant. The analysis of the combined data indicates that this is probably true.

The wild fish in both experiments had higher survival than the domestic fish. The survival of the wild fish in the freshwater study was almost 50% higher than the domestic fish. It was noticed that in spite

of a 50% higher survival in the freshwater experiment the wild fish still had less production per acre than the domestic fish.

Food conversion and condition factor values conflicted between the two experiments, and it is felt that this is because of the poor water quality in the freshwater experiment.

There was considerable difference in size between the two groups of fingerlings at stocking. It is felt that in order to have used the same size fish for stocking, the domestic fish would have had to have their feed ration cut during the fry to fingerling growth period.

It is felt that a better comparison would have been to use wild fish from the Yazoo River.

We recommend that catfish farmers improve their fish through mass selection and domestication. This simply means breeding the best to the best. It is hoped that through selective breeding - like the regional research project - select strains of channel catfish will one day be made available to the farmer.

Table 1. Weight classes by percent for 50 channel catfish in pond studies

	Weight class (lbs.)	Pond	-½	½ - 3/4	3/4 - 1	1 - 1¼	1¼ - 1½	1½ - 1 3/4	1 3/4 - 2	2+	Percentage of fish unaccept. to processing plants
Brackish Water	Domestic	22	8%	18%	20%	12%	12%	18%	6%	6%	26%
		24	10%	16%	18%	18%	16%	14%	4%	4%	26%
		26	12%	14%	20%	22%	18%	10%	4%		26%
	Wild	21	6%	38%	34%	18%	4%				44%
		23	8%	36%	26%	18%	8%	4%			44%
		25	22%	20%	34%	14%	6%	4%			42%
Freshwater	Domestic	3	36%	34%	12%	12%	4%			2%	70%
		7	44%	14%	24%	10%	8%				58%
		14	28%	20%	36%	10%	6%				48%
	Wild	15	52%	32%	6%	8%					84%
		16	78%	22%							100%
		18	48%	20%	18%	8%	4%	2%			68%

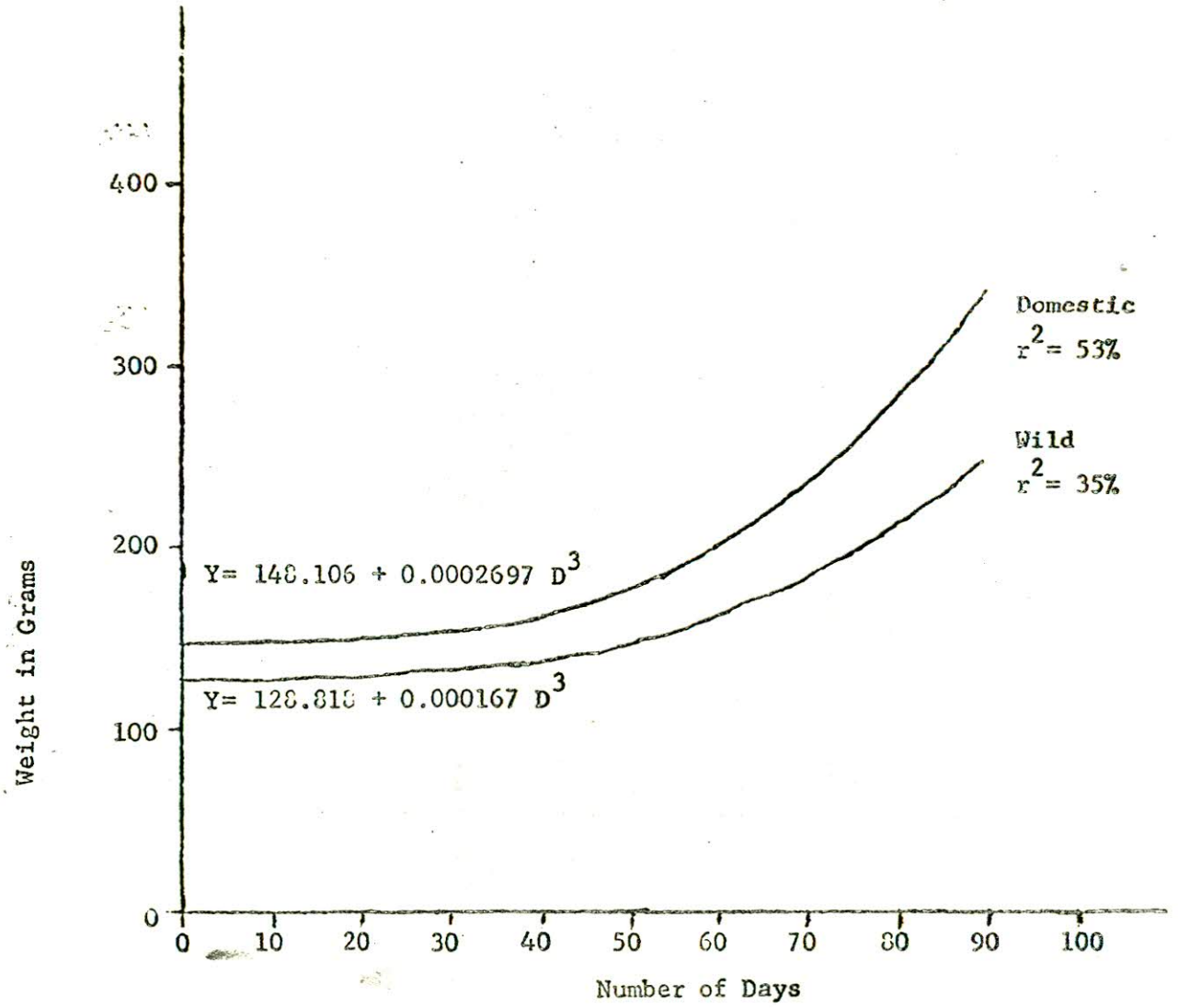

Figure 1. --Growth curves for domestic (Yazoo City, Miss.) fish and wild (Lake des Allemands, La.) fish for a 90 day period, during brackish water experiment.
Days = D^3 in formula