The Progressive Fish-Culturist 51:171–173, 1989

Method for the Production of Channel Catfish Fingerlings in Kentucky

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Abstract.—Eggs of channel catfish (*Ictalurus punctatus*) were transported from Alabama to Kentucky to evaluate the feasibility of producing 27–64-g fingerlings. Fry were stocked in early June at densities of 74,130 fish/hectare (treatment 1) and 123,550/hectare (treatment 2) in six 0.04-hectare ponds for production. Net fish production was greater ($P < 0.01$) and more target-size fish ($P < 0.01$) were produced in treatment 2 than treatment 1. This method eliminates brood stock and brood ponds, functionally extends the production season, provides efficient use of fingerling pond space, and produces large numbers of target-size (27–64 g) fingerlings in one growing season.

Commercial production of channel catfish fingerlings (*Ictalurus punctatus*) has not yet developed in Kentucky. Natural spawning of channel catfish does not occur in this area until mid-June to mid-July. Because Kentucky has a restricted growing season (155–180 d; Busch 1985), production of market-size fish during second-year growth requires stocking of 27–64-g fingerlings (Martin 1983). Most fingerlings currently being stocked for cage and pond rearing are live-hauled from Mississippi, Alabama, Georgia, and Arkansas. However, large fingerlings are expensive and have become more difficult to obtain from southern states as the demand for these fish has increased. A dependable supply of economical fingerlings is required before channel catfish culture can prosper in Kentucky. We examined egg transport from more southern states as a method of functionally extending the first-year growing season by 28–56 d. We evaluated two stocking densities of resulting fry for production of large fingerlings (27–64 g) in one season in Kentucky.

Ten egg masses were collected 15 May 1985 in Greensboro, Alabama, and were transported to the Kentucky State University Aquaculture Research Center in Frankfort. Eggs were transported in oxygen-filled plastic bags at 24°C (pond temperature). Styrofoam boxes containing the eggs were placed in an insulated fish hauling tank packed with ice. Water temperatures in individual bags ranged from 24 to 27°C upon arrival in

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TABLE 1.—Comparisons of mean survival, harvest weight, net production, and feed conversion[a] of channel catfish fingerlings reared at two densities in 0.04-hectare ponds for 137 d. An asterisk within a column indicates that the two means are significantly different (Student's t-test, $P < 0.05$). Values in parentheses are SEs.

Treatment	Fish per hectare	Survival Number	Survival Percent	Weight (g)	Net production (kg)	Feed conversion
1	74,130	2,697 (25.0)	89.9 (0.85)	83.7 (2.31)*	222.7 (3.55)	1.08 (0.045)
2	123,550	4,740 (72.9)*	94.8 (1.44)	53.7 (6.24)	288.8 (4.32)*	1.04 (0.017)

[a] Feed conversion = weight of feed fed/fish weight gain.

Frankfort, Kentucky, 17.5 h later. Approximately 15 kg of eggs produced 148,000 sac fry 4 d later at 25–26°C. Swim-up fry were fed a 50% protein trout feed at a rate of 15% of estimated biomass per day for 14 d at 4-h intervals. Nineteen-day-old fry (estimated weight and length, 100 mg and 22 mm) were counted and stocked into six ponds on 6 June 1985. Three 0.04-hectare ponds fertilized with distillers grain (224 kg/hectare) and 8–28–0 (N–P–K) liquid fertilizer (24 L/hectare) were stocked with 74,130 fry/hectare and three with 123,550/hectare. Fish in ponds were fed 15% of estimated total biomass divided into two daily feedings for 2 d; thereafter, feed amount was increased by 10% every 3 d. Fish were sampled by seining every 2 weeks. After fish reached 4.5 g, feed was increased according to water temperature and weight of fish (Stickney and Lovell 1977); maximum feeding was 78.5 kg feed/hectare. One pond stocked with 74,130 fish/hectare suffered an oxygen depletion causing a partial fish kill. This replicate was not included in the treatment means or statistical analyses. Fish were harvested 137 d after stocking and were size-graded with bar graders into two groups (>64 g and 64–27 g). Student's t-test was used for two-mean comparisons (Steel and Torrie 1960).

After 137 d, ponds stocked at 123,550 fish/hectare (treatment 2) had significantly greater ($P < 0.01$) net production than ponds stocked at 74,130/hectare (treatment 1; Table 1). Both treatments had similar survival and feed conversions. Mean fish weight at harvest for treatment 1 (83.7 g) was significantly higher ($P < 0.01$) than that for treatment 2 (53.7 g) probably due to the lower stocking density (Snow 1981). Treatment 1 produced larger fingerlings than are required for single-season growout conditions in Kentucky, indicating less-than-optimum use of pond space. The number of fish grading into the target size (27–64 g) was significantly greater ($P < 0.01$) in treatment 2 than in treatment 1 (Table 2). In treatment 2, over 60% more target-size fish per unit surface area were produced than in treatment 1. Neither treatment produced fish smaller than 27 g, and treatment 2 provided more efficient use of pond space by producing twice as many target size fish per unit surface acre.

We conclude that, in the initial phases of developing fingerling channel catfish production in Kentucky, transportation of eggs from more southern states, which functionally extends the production season, and stocking resulting fry at 123,550/hectare is an efficient method of producing large numbers of required size fingerlings. This method also eliminates the risks inherent in maintaining brood stock and the water acreage needed for brood-stock ponds.

Acknowledgments.—We thank Mike Larimore, Keith Crabtree, and Danny Yancey for technical assistance. This project was supported by a grant from U.S. Department of Agriculture, Cooperative State Research Service, to Kentucky State University under agreement KY.X1283000009.

References

Busch, R. T. 1985. Channel catfish culture in ponds. Pages 13–84 *in* C. S. Tucker, editor. Channel catfish culture. Elsevier, Amsterdam.

Martin, R. J. 1983. A comparison of three sizes of

TABLE 2.—Mean numbers and weights of graded channel catfish fingerlings reared at two densities. An asterisk within a column indicates that the two means are significantly different (Student's t-test, $P < 0.05$). Values in parentheses are SEs.

Treatment	Fish per hectare	Group 1 (>64.0 g) Number	Group 1 (>64.0 g) Weight (g)	Group 2 (27.0–64.0 g) Number	Group 2 (27.0–64.0 g) Weight (g)
1	74,130	1,556 (20.0)	105.3 (4.04)*	1,140 (5.0)	54.1 (0.25)
2	123,550	1,776 (62.2)*	90.7 (1.15)	2,974 (92.6)*	48.7 (2.49)

fingerlings for stocking catfish ponds. For Fish Farmers (December 6):1–5. (Mississippi State University, Mississippi Cooperative Extension Service Newsletter, Starkville.)

Snow, J. R. 1981. Size control of catfish fingerlings by varying the stocking density. Highlights of Agricultural Research 28:18. Alabama Agricultural Experiment Station, Auburn University.

Steel, R. G. D., and L. H. Torrie. 1960. Principles and procedures of statistics. McGraw-Hill, New York.

Stickney, R. R., and R. T. Lovell, editors. 1977. Nutrition and feeding of channel catfish. Alabama Agricultural Experiment Station, Southern Cooperative Series 218, Auburn University.