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FISHING SUCCESS FOR CHANNEL CATFISH AND WHITE CATFISH IN PONDS WITH DAILY FEEDING

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ABSTRACT

Channel and white catfish fingerlings, stocked in ponds with largemouth bass at densities of 2,000 to 3,000 catfish per acre separately or in combination and given daily feeding have continued to provide excellent sport fishing. Four-inch fingerling catfish stocked by February and given supplemental feeding at rates of 2 to 3 percent body weight daily reached harvestable size of 0.7 lb. by October at which time the ponds were opened to fishing. Harvest by fishermen in ponds stocked with 2,000 catfish per acre ranged up to 1,292 pounds catfish per acre during a 12-month period following initial opening.

When 7-11 inch channel catfish fingerlings were stock by February at the rate of 3,000 per acre, along with largemouth bass, the catfish reached 0.7 pound average weight by August. During the periods August 1 to October 25 and March 15 to September 7, 1,096 fishermen caught 2,655 pounds catfish per acre.

Agitators run in ponds from spring to fall increased oxygen concentrations and allowed heavier stocking densities and feeding rates without any fish kills. In one pond where 5,000 catfish fingerlings were stocked per acre and given daily feeding the catch reached 2,938 pounds catfish per acre in a 12-month period of fishing.

INTRODUCTION

The first results of experiments conducted at Auburn University Agricultural Experiment Station with channel catfish as a sport fish in ponds where daily feeding was used for high production were presented by Prather (1959). Additional results from experiments with white catfish alone or in combination with channel catfish were presented by Prather (1964, 1968). In these experiments where 2,000 fingerlings were stocked per acre in late winter or early spring and given daily feeding 6 days per week, the fish reached harvestable size by September and the catch per acre by public fishermen during the next year was about 1,300 pounds catfish. When the initial stocking rate was increased to 3,000 catfish fingerlings per acre and the fish fed similarly the catch increased to approximately 1,700 pounds per acre with similar fishing effort. Fishing success was generally better for channel than white catfish. Results of other public fishing experiments with these two species are presented in this paper.

Experiments with 2,000 Channel Catfish Plus, 1,000 White Catfish Per Acre

A 2.5-acre pond was stocked per acre with 2,000 channel catfish fingerlings Dec. 3, 1964, with 1,000 white catfish fingerlings Dec. 22, 1964, with 1,000 fathead minnows Jan. 7, 1965, with 500 each Java tilapia and Nile tilapia April 23, and with 50 largemouth bass on May 3. All fish received treatment with 50 ppm formalin and 5 ppm acriflavine prior to stocking. The pond was fertilized once with triple superphosphate only on Feb. 4, 1965. The fish were fed daily except Sundays with Auburn No. 2 fish feed pellets at rates per acre as shown below, using a total of 5, 175 pounds feed per acre during the experiment.

The pond was open to public fishing daily except Sundays from Oct. 8—Dec. 4, 1965 and March 18—July 30, 1966. Fishing permits were $1 each with a limit of 5 catfish and/or bass plus 10 tilapia per permit. Fishermen had the option of taking an additional 5 catfish at $0.30 each. Fishing success was excellent when the pond was first opened in October,

Dates	Pounds
Dec. 14—Feb. 10, 1965	1.4
Feb. 11—Feb. 27	3.0
March 1—April 7	5.0
April 8—May 1	7.6
May 3—May 29	10.0
May 31—June 30	15.2
July 1—July 31	20.0
Aug. 1—Aug. 31	24.8
Sept. 1—Sept. 18	32.0
Sept. 20—Oct. 30	30.0
Oct. 31—Mar. 13, 1966	0
Mar. 14—Apr. 26	10.0
Apr. 27—June 16	15.0
June 17—Aug. 2	10.0

but declined as the weather got colder during the fall. The numbers and weights of each species caught per acre as well as numbers of fishermen are given in Table I. Fishing success was poor when the pond was reopened to fishing in March but improved as the weather warmed during the spring, but was never as good as during the first month of fishing. On an acre basis, a total of 852.4 fishermen caught a total of 2,440 pounds of fish, including 1790.9 pounds channel catfish, 544.8 pounds white catfish, 14.5 pounds largemouth bass, 85.1 pounds tilapia and 4.7 pounds bluegill and green sunfish. Each fisherman caught 2.86 pounds fish or 0.46 pound per hour.

Of the 2,000 channel catfish stocked per acre, fishermen caught 66.2 percent and 7.2 percent were recovered when the pond was drained, giving a total recovery of 73.4 percent. Average size of those caught was 1.35 pounds. No young channel catfish were found when the pond was drained.

Of the 1,000 white catfish stocked per acre, 79.7 percent were accounted for as fishermen caught 60.1 percent and 19.6 percent were recovered on draining. The average size caught was 0.91 pound. It is known that the white catfish spawned during the summer of 1966 but only 5 young fingerlings were recovered per acre on draining. A total of 85.1 pounds tilapia were caught the first fall of fishing and those remaining died during the winter. Fishing success for bass was poor and few were caught except in the first month of fishing. It is interesting that fishermen caught only 1.7 pounds bass in 1966 but 49 pounds of edible size bass were recovered per acre on draining the pond.

In another test using the same ratio of channel and white catfish, a 22-acre pond was stocked per acre with 2,000 channel catfish fingerlings on Jan. 20, 1967; with 1,000 fathead minnows on Feb. 22; with 1,000 white catfish fingerlings March 1; with 50 largemouth bass on June 14; and with 4.6 Chinese grass carp fingerlings on June 20. This pond received 3 applications of triple superphosphate fertilizer during the spring and the fish were fed daily except Sundays with Auburn No. 2 pellets at rates per acre as shown below using a total of 4,667 pounds of feed per acre during the experiment.

The pond was open to public fishing from Sept. 18-Dec. 23, 1967 and from March 11 through Oct. 7, 1968. Numbers of fishermen and catch per acre by months are given in Table II. Per acre, the total catch was 1,954.1 pounds, including 1,448.4 pounds channel catfish, 442.3 pounds white catfish, 59.4 pounds bass, plus 4.0 pounds miscellaneous species. A total of 715.9 people fished per acre with an average catch of 2.7 pounds each, or 0.47 pound per hour. The fishing effort was somewhat lower than in the above experiment but the fishing success was quite similar. Fishermen caught 85.5 percent of the channel catfish but only 42.0 per cent of the white catfish.

TABLE I. Number of Fishermen and Monthly Catch Per Acre, Stocking Rate 2,000 Channel Catfish Plus 1,000 White Catfish Per Acre

Date	no. Fishermen	Channel catfish no.	Channel catfish lb.	White catfish no.	White catfish lb.	Largemouth bass no.	Largemouth bass lb.	Tilapia no.	Tilapia lb.	Misc. lb.	Total lb.	Total hours
1965												
October	286.8	698.8	913.8	52.4	46.1	16.8	12.4	154.4	82.5	1.1	1,055.9	1,862.6
November	60.4	130.4	149.8	14.4	11.2	0.4	0.4	1.2	0.4	0.4	162.2	322.2
December	7.2	4.4	4.5	0.8	0.8	0	0	3.6	2.2	0	7.5	36.6
1966												
March	40.4	41.6	51.8	34.4	29.4	0	0	0	0	1.4	82.6	272.1
April	28.8	22	24.1	18.8	17.7	0.4	0.4	0	0	0.3	42.5	147.6
May	32.8	61.6	85.2	66.8	69.2	0.8	0.8	0	0	0	155.2	208.6
June	174.4	218.4	327.7	309.6	278.6	0	0	0	0	0	606.3	1,181.6
July	221.6	146.4	234.0	104	91.8	0.8	0.5	0	0	1.5	327.8	1,280.0
Totals	852.4	1,323.6	1,790.9	601.2	544.8	19.2	14.5	159.2	85.1	4.7	2,440.0	5,311.3

Dates	Pounds
March 15—May 3, 1967	5.0
May 4—June 14	10.0
June 15—July 5	15.0
July 6—July 30	20.0
July 31—Sept. 5	25.0
Sept. 6—Oct. 3	30.0
Oct. 4—Oct. 15	25.0
Oct. 16—Nov. 16	20.0
Nov. 17—March 17, 1968	0
March 18—June 3	10.0
June 10—June 17	7.5
June 24—Oct. 7	5.0

Upon draining November 20, 1968, only 2.3 percent of the stocked channel catfish were left while 30.2 percent of the white catfish were left; thus 88.1 per cent and 72.2 per cent, respectively, of the initially stocked catfish were accounted for by both fishing and draining. No losses resulted from parasites, diseases or low oxygen concentrations.

A commercial air blower with a capacity of 36 cfm was run continuously between March 28 and November 20, 1968 to determine its effectiveness in aerating the deep water to lessen the danger of fish kills due to low oxygen levels. All the air was released in a 1.5-inch outlet located 18 inches off the pond bottom in the deepest water near the drain pipe. Oxygen analyses were made twice a week during the summer. Apparently the blower effectively circulated and aerated the majority of the deep water in the pond, thus materially reducing the danger of fish kills due to low oxygen concentrations. Fish were observed in distress only for one short period following an algal dieoff during this experiment, whereas several fish kills had occurred here in similar experiments previously; these were attributed to low oxygen levels that built up in the areas of the pond where the water was 10 to 13 feet deep. The electricity used to operate the blower was 41.56 KWH per day, costing $0.91 daily. It was not possible to determine whether the blower increased production because it was operated only during the second year but it did maintain better water quality throughout the deep areas of the pond.

Experiment with 1,500 Channel Catfish Plus 1,500 White Catfish Per Acre

A 22-acre pond was stocked per acre with 1,500 channel catfish fingerlings Dec. 3, 1964; with 1,500 white catfish fingerlings Dec. 22; with 1,000 fatheads Jan. 7, 1965; with 50 largemouth bass fingerlings May 3; with 250 Java tilapia and 250 Nile tilapia April 23 and with 30 additional largemouth bass fingerlings August 6. Two applications of triple superphosphate only were added in the spring of 1965, and the fish were fed Auburn No. 2 pellets daily except Sunday at rates per acre as show below, using a total of 4,209 pounds per acre during the experiment.

Dates	Pounds
Dec. 7, 1964—Feb. 10, 1965	1
Feb. 11—Feb. 27	3
March 1—April 7	5
April 8—May 1	7.5
May 3—May 29	10
May 31—June 30	15
July 1—July 31	20
Aug. 2—Oct. 30	30
Oct. 31—March 13, 1966	0
Mar. 14—April 26	10
April 27—June 16	15

TABLE II. Number of Fishermen and Monthly Catch Per Acre, Stocking Rate 2,000 Channel Catfish Plus 1,000 White Catfish Per Acre

Date	no. Fishermen	Channel catfish no.	Channel catfish lb.	White catfish no.	White catfish lb.	Largemouth bass no.	Largemouth bass lb.	Misc. lb.	Total lb.	Total hours
1967										
September 13	71.6	238.8	203.8	29.7	25.3	14.3	6.9	0.4	236.5	390.8
October	63.3	201.5	153.3	16.3	14.6	3.0	1.8	0.6	170.3	406.8
November	29.9	59.6	55.3	5.7	6.2	0.8	0.6	0	62.1	174.1
December 23	4.8	9.9	10.2	3.0	3.6	0.0	0.0	0	13.8	26.3
1968										
March 11-30	74.6	183.0	163.4	36.6	40.2	0.8	0.9	0.5	205.0	372.1
April	146.1	549.0	434.2	68.7	67.1	1.3	1.3	0.4	503.0	826.7
May	127.9	306.3	255.2	115.0	115.1	11.0	10.2	0.5	381.0	772.3
June	72.8	112.9	110.4	38.2	43.2	14.3	9.8	0.2	163.6	454.6
July	46.0	38.9	42.6	23.9	28.9	11.0	8.3	0.6	80.4	273.3
August	33.3	11.9	14.3	32.6	39.9	8.0	5.5	0.3	60.0	205.5
September	40.5	3.2	4.8	43.2	49.7	22.5	12.8	0.4	67.7	232.8
October 1-7	5.1	0.5	0.9	6.6	8.5	2.3	1.3	0	10.7	30.2
Totals	715.9	1,715.5	1,448.4	419.5	442.3	89.3	59.4	4.0	1,954.1	4,165.5

The pond was open to public fishing from Sept. 15 through Dec. 4, 1965, and from March 16 to June 16, 1966, using the same charges and catch limits described previously. The catch by months is presented in Table III. For both periods, per acre, 550.2 fishermen caught a total of 1,657.8 pounds of fish, including 1,124.8 pounds of channel catfish, 458.2 pounds of white catfish, 19.7 pounds of largemout bass, 50.5 pounds tilapia, and 4.6 pounds miscellaneous species.

Two fish kills due to low oxygen concentrations occurred during this experiment and thereby reduced overall fishing success. The numbers and weights of dead fish recovered per acre were as follows:

	August 27, 1965		June 17, 1966	
	No.	Lb.	No.	Lb.
Channel catfish	18	17.90	205	333.9
White catfish	0.20	0.05	480	332.9
Bass	14	6.00	7	6.9
Miscellaneous	..	0.40	..	7.8

Feeding was stopped and the pond was closed to fishing after the fish kill on June 17, 1966 because it was believed that insufficient fish were left to provide satisfactory fishing. The pond was drained November 21, 1966 and of the 1,500 channel catfish and 1,500 white catfish stocked the following percentages were accounted for:

	Channel catfish	White catfish
Fish kill, 1965	1.2	Trace
Caught, 1965	46.3	6.3
Fish kill, 1966	13.7	32.0
Caught, 1966	24.5	32.7
Draining	Trace	9.8
Total	85.7	80.8

In this experiment fishermen caught 70.8 percent of the channel catfish stocked but only 39.0 percent of the white catfish, indicating again that channel catfish are more easily caught than white catfish.

It is interesting that white catfish were able to withstand low oxygen concentrations better than channel catfish. Of the numbers left prior to the fish kill, 23.4 percent of whites but only 0.5 percent of the channels survived.

Experiment with 3,000 Channel Catfish (7-11inch) per Acre

Larger size catfish were stocked to determine how much earlier they would reach harvestable size than 4-inch fingerlings used in previous experiments. A 10.7-acre pond was stocked per acre with 3,000 larger channel catfish Dec. 12, 1965; with 1,000 fathead minnows Dec. 17; with 50 largemouth bass fingerlings April 25, 1966; and with 411 Nile tilapia and 159 Congo tilapia fingerlings June 8. The pond received 3 applications of triple superphosphate fertilizer in the spring. The fish were fed Auburn No. 2 pellets daily except Sundays at rates per acre as shown below, using a total of 5,536 pounds per acre during the experiment.

Dates	Pounds
March 14—April 26	15
April 27—May 28	20
May 30—Oct. 1	30
Oct. 7—Nov. 9	25
Nov. 10—March 14	0
March 15—April 17	10
April 25—May 30	5
June 15—Sept. 5	3

TABLE III. Number of Fishermen and Monthly Catch Per Acre, Stocking Rate 1,500 Channel Catfish Plus 1,500 White Catfish Per Acre.

Date	no. of Fishermen	Channel catfish		White catfish		Largemouth bass		Tilapia		Misc. lb.	Total lb.	Total hours
		no.	lb.	no.	lb.	no.	lb.	no.	lb.			
1965												
September	121.7	488.4	431.2	39.1	29.4	16.2	11.0	86.0	42.7	0.1	514.4	613.4
October	72.3	155.3	167.9	39.5	30.4	0.5	0.3	16.8	7.6	0.4	206.6	452.2
November	30.4	46.8	50.5	15.7	12.7	0.1	0.1	0.3	0.1	0.2	63.6	177.2
December	2.2	2.8	2.9	0.3	0.3	0.3	0.0	0.1	0.1	0.2	3.3	18.7
1966												
March	69.3	85.6	102.4	67.0	53.7	3.0	3.1	0	0	1.0	160.2	349.2
April	76.1	102.3	114.6	109.0	80.0	0.6	0.5	0	0	1.0	196.1	426.8
May	107.4	124.1	165.3	221.8	171.8	2.7	2.2	0	0	1.3	340.6	641.7
June	70.8	56.9	90.0	93.9	79.9	2.6	2.5	0	0	0.4	173.0	433.6
Totals	550.2	1,062.4	1,124.8	586.3	458.2	25.7	19.7	103.2	50.5	4.6	1,657.8	3,112.8

The stocking of larger catfish provided earlier fishing as the catfish reached harvestable size by Aug. 1. The pond was open to public fishing from Aug. 1 to Oct. 25, 1966 and March 15 to Sept. 7, 1967 and the catch records are given in Table IV. During both periods, per acre, 1,096 fishermen caught a total of 2,718.3 pounds, including 2,654.5 pounds channel catfish, 30.5 pounds bass, 10.2 pounds tilapia and 23.1 pounds miscellaneous species.

Fishermen caught 84.9 percent of the catfish stocked and 1.6 percent were recovered on draining, thus 86.5 percent were accounted for in this experiment. These data indicate that the stocking of larger size catfish resulted in an increase in fishing success. The average weight of the catfish caught was 1.04 pounds. The channel catfish spawned in 1967 but few escaped predation as only 16 young were recovered per acre on draining.

Experiment with 3,333 Channel Catfish Plus 1,667 White Catfish per Acre

Agitators were used in a 2.5-acre pond stocked with a total of 5,000 catfish per acre in a test to determine if satisfactory oxygen levels could be maintained where higher than normal rates of feeding were used. This pond was stocked per acre with 3,333 channel catfish fingerlings Jan. 20, 1967; with 1,667 white catfish fingerlings March 1; with 1,000 fathead minnows Feb. 22; with 50 largemouth bass fingerlings May 18, and with 8 Chinese grass carp June 16. Three applications of triple superphosphate fertilizer were applied in February and March. The fish were fed daily except Sundays with Auburn No. 2 pellets at rates per acre as shown below, using a total of 10,786 pounds per acre during the experiment.

Dates	Pounds
March 15—May 3, 1967	6.6
May 3—June 14	13.2
June 15—July 5	20
July 6—July 30	25
July 31—Sept. 5	35
Sept. 6—Oct. 3	52
Oct. 4—Nov. 16	60
Nov. 17—March 17, 1968	0
March 18—April 10	10
April 11—May 25	30
May 27—July 3	50
July 4—Aug. 14	25
Aug. 15—Oct. 7	20

A ½ H.P. agitator was run continuously near the center of the pond from June 16 to Nov. 8, 1968 to provide aeration. In 1969 a second ½ H.P. agitator was installed in the deepest water (6 feet) near the dam to provide additional aeration. Each agitator raised water from a depth of 3 feet and sprayed it on the pond surface. The agitators operated from April 8 to Nov. 26, 1968, and only on July 4 following a sudden algal dieoff were oxygen levels sufficiently low to cause distress among the catfish. It appeared that the agitators were of value in maintaining good oxygen levels but more tests are needed to determine if they provide sufficient aeration to prevent low oxygen concentrations following heavy algal kills, as this is one of the principal dangers in ponds where heavy feeding is used.

The pond was open to public fishing from Oct. 10 to Dec. 23, 1967 and March 12 to Oct. 4, 1968, and the catch records each month are given in Table V. For both periods, per acre, 1,088 fishermen caught a total of 3,052.5 pounds, including 2,009.6 pounds channel catfish, 928.3 pounds white catfish, 105.3 pounds bass, 9.1 pounds grass carp and 0.2 pound bluegill. Fishermen caught 67 percent of the channel catfish stocked

TABLE IV. Number of Fishermen and Monthly Catch Per Acre, Stocking Rate 3,000 Larger Catfish Per Acre.

Month	no. Fishermen	Channel catfish		Largemouth bass		Tilapia		Misc.	Total	Total
		no.	lb.	no.	lb.	no.	lb.	lb.	lb.	hours
1966										
August	154.7	498.8	333.0	24.3	11.3	27.5	4.0	0	348.1	747.0
September	142.5	440.3	364.0	3.1	2.1	23.1	4.9	0	371.0	759.0
October	107.1	319.6	331.9	1.0	1.0	4.9	1.3	0	334.2	666.0
1967										
March	158.8	454.7	522.4	1.3	2.0	0	0	3.4	527.8	876.7
April	239.3	551.6	667.1	0.5	0.6	0	0	8.9	676.6	1,400.7
May	115.3	171.2	246.6	0.3	0.4	0	0	2.3	249.3	680.7
June	69.4	70.7	115.7	1.7	2.3	0	0	5.2	123.2	379.4
July	69.6	26.6	44.2	4.0	4.2	0	0	2.3	50.7	360.9
August	30.2	12.4	26.0	11.1	6.2	0	0	0.9	33.1	155.9
September	9.2	1.2	3.6	0.9	0.4	0	0	0.1	4.1	4.1
Totals	1,096.1	2,547.1	2,654.5	48.2	30.5	55.5	10.2	23.1	2,718.3	6,058.9

TABLE V. Number of Fishermen and Monthly Catch Per Acre, Stocking Rate 3,333 Channel Catfish Plus 1,667 White Catfish Per Acre.

Month	No. of Fishermen	Channel Catfish		White Catfish		Largemouth Bass		Misc. Lbs.	Total Pounds	Total Hours
		No.	Lbs.	No.	Lbs.	No.	Lbs.			
1967										
October	130.4	197.2	151.7	138.8	139.6	24.8	21.8	0.7	313.8	820.0
November	50.0	115.6	96.3	26.4	23.9	4.0	2.8	0	123.0	295.2
December	62.0	168.8	151.4	55.2	58.8	0	0	0	210.2	392.1
1968										
March	110.8	265.6	206.8	122.8	121.8	1.6	2.2	0	330.8	634.6
April	107.2	339.2	242.2	115.6	109.3	0	0	0	351.5	663.2
May	254.4	759.2	673.2	223.2	211.2	10.8	9.9	0	894.3	1,532.0
June	87.2	85.2	87.6	55.6	56.7	16.0	12.4	0	156.7	483.6
July	100.8	136.8	161.6	50.4	66.0	36.0	26.4	0.2	254.2	631.2
August	94.8	98.8	128.9	60.4	84.9	18.8	16.3	2.3	232.4	576.3
September	83.2	64.0	107.0	33.6	47.5	16.0	13.1	6.1	173.7	535.2
October	7.6	1.2	2.9	5.2	8.6	0.4	0.4	0	11.9	50.7
Totals	1,088.4	2,231.6	2,009.6	887.2	928.3	128.4	105.3	9.3	3,052.5	6,614.1

but only 53 percent of the white catfish. From catch plus draining a total of 81.2 percent of the channel catfish and 69.9 percent of the white catfish were recovered, giving a 77.4 percent return of the total of 5,000 catfish stocked per acre.

CONCLUSIONS

1. Fishing success was considerably better for channel than white catfish when stocked at both 2:1 and 1:1 ratios although white catfish provided good fishing.

2. Harvest by fishermen increased as the stocking density of catfish was increased.

3. Ponds stocked with 3,000 to 5,000 catfish fingerlings per acre, with daily feeding, provided good fishing success for only 8 to 12 months where number of fishermen per acre varied from 550 to 1,096.

4. The use of larger size catfish in initial stocking provided fishing 2 to 3 months earlier than when 5-inch fingerlings were used and resulted in an increase in pounds caught per acre.

5. At high stocking densities with daily feeding both channel and white catfish spawned when 2 years old, but insufficient young escaped predation where largemouth bass, bluegill and green sunfish were also present.

6. Largemouth bass seldom spawn when in combination with catfish where heavy feeding is used.

7. Aeration provided by agitators appeared to increase oxygen concentrations and allowed heavier stocking density of catfish and heavier feeding rates.

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