

# FURTHER EXPERIMENTS WITH TILAPIA MOSSAMBICA AS A PONDFISH

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## ABSTRACT

Ponds stocked April 30 with 80 *Tilapia mossambica* per acre and drained October 16 produced in the 170-day experiment 1,480.9 pounds tilapia per acre in a fertilized pond and 3,224 pounds per acre where feeding was added. Tilapia (1- to 2-inch) stocked into ponds June 13 reached 5 to 8 inches in size in 126 days.

A 2.6-acre pond was stocked April 18-20 with 80 brood tilapia per acre. The pond was fertilized and the fish fed. Tilapia hatching in this pond grew large enough to provide fishing by August 1. In the first 2-week period of fishing, the catch per acre was 1,222 fish weighing 226 pounds.

These fish feed upon plankton and filamentous algae and may be of value in ponds for the control of the latter.

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The Asiatic pondfish, *Tilapia mossambica* Peters, has been raised experimentally in ponds at Auburn for the past three years. A preliminary report on this fish was presented by Kelley (1957). He reported that this fish died at temperatures below 50° F. and consequently could not live through winters in Alabama. He also presented the results of experiments in which the tilapia proved to be a much more efficient fish than the bluegill (*Lepomis macrochirus* Raf.) in ponds receiving fertilization with either manure or inorganic fertilizers, and where the fish were fed a dry trout feed.

Because of its lack of winter-hardiness, it was at first believed that this species of tilapia would not be useable in Alabama ponds. However, in 1955, it was found that this fish grew extremely rapidly and also fed upon the filamentous alga, *Pithophora* sp., for which no effective control was known. This stimulated further research, and several hundred fingerlings were carried over the winter of 1955-1956 in feeding troughs in a heated building. During the following winter about 2,000 fish were carried over in a similar manner. Experiments were conducted on production, on the use of this species for weed control, and on its use as a sport fish. While several more years will be required to explore various methods of using this species, the results are sufficiently interesting to warrant the submission of a progress report.

## OVERWINTERING TILAPIA INDOORS

Tilapia 3 to 8 inches in length were carried through the winter, from November until the following April, in feeding troughs in the Fisheries Building, which was kept at approximately 70-75° F. A 7-foot trough, 1 foot wide carried from 5 to 10 pounds of tilapia. A small flow of water ran constantly through the troughs. Fish were fed Auburn No. 1 dry fish feed,\* at the rate of 1 percent of their body weight daily except for those groups used to study rates of feeding. It was found necessary to supplement this dry feed with living filamentous algae about once a week to keep the fish in good condition.

## PRODUCTION OF TILAPIA IN PONDS

Two sizes of tilapia were used in stocking, brood fish that had overwintered indoors, and young-of-the-year fingerlings 1 to 2 inches in length.

*Production in Ponds Stocked with Brood Fish:* In 1956, two ponds were each stocked with 80 brood fish (4- to 7-inch) per acre on April 30, when the outdoor water temperature had risen to 76° F. and further cold spells did not appear likely. Reproduction apparently occurred shortly after stocking, as young 1- to 2-inch tilapia were found May 11. Subsequent hatches were produced every few weeks until October.

\* Auburn No. 1 fish feed is composed of 35 percent soybean meal, 35 percent peanut meal, 15 percent fish meal, and 15 percent distillers dry solubles.

One of the two ponds received inorganic fertilization only, consisting of seven applications of 100 pounds 8-8-2 per acre. The experiment lasted 169 days and the pond was drained October 16. The total production (Table I) was 1,480 pounds tilapia per acre of which only 139.2 pounds was fish of harvestable size (6- to 9-inch).

TABLE I

PRODUCTION OF *Tilapia mossambica* PER ACRE WITH DIFFERENT METHODS OF STOCKING IN PONDS RECEIVING FERTILIZATION AND FEEDING

Items Per Acre	Stocked Per Acre With			
	Brood Fish (4-7")		Fingerlings (1-2")	
	80	80	2,000	4,000
Days in Experiments.....	170 <sup>a</sup>	169 <sup>b</sup>	126 <sup>c</sup>	119 <sup>d</sup>
Total Pounds Fish Produced.....	3,224.0	1,480.9	283.2	360.0
Average Gain, Pounds/Acre/Day....	19.0	8.7	2.2	3.0
Pounds Harvestable Fish (6"-9")....	986.4	139.2	278.3	181.6
Percent Survival Stocked Fish.....	.....	.....	76.6	94.1
Treatment .....	Fertilized & Fed <sup>e</sup>	Fertilized	Fertilized	Fertilized
Cost of Treatments.....	\$184.84	\$14.00	\$10.00	\$6.00
Cost of All Fish Per Pound, Cents....	5.7	0.9	3.5	1.7
Cost of Harvestable Fish Per Lb., Cts.	18.8	10.1	3.6	3.3

<sup>a</sup> April 30-October 17, 1956.

<sup>b</sup> April 30-October 16, 1956.

<sup>c</sup> June 13-October 17, 1956.

<sup>d</sup> June 28-October 25, 1956.

<sup>e</sup> Pond received, in addition to regular fertilization, Auburn No. 1 fish feed at following rates per acre: 20 pounds per day July 19-August 14; 40 pounds per day August 15-August 29; and 60 pounds per day August 30-October 15; total 3,580 pounds.

The other pond was fertilized in the same manner, but in addition received a total of 3,580 pounds of Auburn No. 1 fish feed during the period of July 19 to October 15. The tilapia were fed daily except Sundays at rates varying from 20 to 60 pounds feed per acre per day (Table I). These heavy rates of feeding were used to determine the maximum production that might be expected for this species. The experiment ran 170 days and the pond was drained October 17. The total production was 3,224 pounds per acre, of which 986 pounds was fish 6 to 8 inches in length.

The productions obtained under both conditions were extremely high and there are no native fish that can equal or approach this record. However, a large percentage of the total weight in each pond was in the form of 1-inch to 5-inch fish. This indicated that this species may have use as a forage fish for raising various predatory fishes, and that prevention of overcrowding would be a problem in its management. It is remarkable, however, that even under such crowded conditions much higher poundages of harvestable fish were produced than can be obtained within a similar period with the bluegill-bass combination.

*Production in Ponds Stocked with Fingerling Fish:* As soon as sufficient young fish 1 to 2 inches in length were available from brood ponds, one pond was stocked July 17 with 2,000 and another July 28 with 4,000 fingerling tilapia per acre. These ponds received inorganic fertilization only (Table I). They were drained in October, after periods of 126 and 110 days, respectively, and the fish counted and weighed.

In the pond stocked with 2,000 fingerlings per acre, the total production was 283.2 pounds per acre, of which 258 pounds was fish 6 to 7 inches in length. In the pond stocked with 4,000 fingerlings, the total production was 360 pounds tilapia per acre of which 181.6 pounds was 6- to 7-inch fish.

Under conditions of rapid growth in these ponds, the tilapia reproduced at the age of 3 to 4 months, producing 4,288 young fish at the lower rate of stocking and 60 young at the higher rate.

The stocking rate of 2,000 fingerlings per acre appeared adequate for fertilized ponds, and produced in 126 days as high a poundage of harvestable fish as is produced by the bluegill-bass combination in about 18 months.

## USE OF TILAPIA AS A SPORT FISH

These results indicated that tilapia could be stocked in the spring to provide fishing in August, September and October. Those not removed by fishing would in normal years die of cold in mid-November. Tests with pole and line demonstrated that the fish could be caught readily using earthworms for bait.

In 1957, a 2.6-acre pond was stocked with 80 brood tilapia (4- to 6-inch) per acre April 18-20. It received regular fertilization and in addition periodic feeding. In the month of June, a total of 40 pounds feed per acre of Auburn No. 1 fish feed was added and during July the rate of feeding was 20 pounds feed per acre per day, except Sundays. In August this was increased to 40 pounds per acre per day.

The pond was opened to public fishing August 1. Tilapia of all sizes from 3 to 9 inches in length were caught. No size limit restriction was applied and fishermen kept fish 5 inches or more in length. In the first 2-week period, fishermen caught and kept per acre of water 1,222 fish weighing 226 pounds. Fishing permits were \$1.00 and entitled the holder to catch up to 15 fish. The average fisherman caught 14 fish, weighing 2.5 pounds; thus the fish cost him 40 cents per pound. Up to this point, it had cost for feed and fertilizer approximately 24 cents per pound of fish harvested.

This experiment is still in progress and will be terminated in November. Up to this time, it is only possible to say that tilapia definitely has possibilities as a sport fish. Further experimentation will be necessary to develop proper management methods.

## USE OF TILAPIA FOR WEED CONTROL IN PONDS

Tilapia appear promising for the control of filamentous algae in ponds (Swingle, 1957). They will eat the leaves of *Potamogeton* and other underwater weeds, but it is not known if they can keep any of this group of plants under control.

In ponds stocked only with this species of tilapia (Table I), a dwarf sedge and the filamentous alga *Pithophora* were eliminated within about one month. In an acre pond containing speckled bullheads, a heavy growth of *Pithophora* was eliminated within three weeks after stocking 200 brood tilapia. They reproduced in this pond and the control obtained was probably the result of both young and old fish.

Additional experiments are now in progress on the use of tilapia for weed control and also to determine the effects of stocking them into ponds containing the bluegill-bass combination.

*Question:* What bait was used to catch *Tilapia*?

*Answer:* Earthworms.

*Question:* How were the fish overwintered?

*Answer:* In tanks located inside a heated building.

*Question:* Do you know of any *Tilapia* dealers in Florida?

*Answer:* No, but there probably are some as this species is a common aquarium item.

*Question:* Are *Tilapia* easily sexed?

*Answer:* Yes.

*Question:* Would it be possible to stock one sex in a pond and get weed control without any reproduction?

*Answer:* Possibly this could be done. No difficulty has been encountered with overpopulation in established fish populations however.