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EFFECT OF CROWDING ON STOCK AND CATCH IN *TILAPIA MOSSAMBICA*

In a previous report (Silliman 1972) I described the effect of crowding on the relation between exploitation and yield in *Tilapia macrocephala*. Subsequently I performed a similar experiment with *T. mossambica*. Since the results were somewhat different for the latter species and because of its wide use in pond culture, a brief report of the second experiment seems justifiable.

Apparatus and Procedures

Most of the procedures and apparatus were identical with those reported by Silliman (1972). Essentially the approach was to raise the populations in two conventional aquariums, one (L) with a volume of 155.2 liters and the other (S) with 77.6 liters so that S had exactly one-half the capacity of L. Aeration was by airstones and illumination by overhead fluorescent lamps. Rectangular spaces at the ends of the aquariums were fenced off with rods placed 3 mm apart, providing refuges for the young. Further shelter was provided by floats with suspended cords and by fiber brush shelters. Covering part of the aquarium walls with black plastic furnished shaded areas for spawning. Water condition was maintained by filtration and weekly partial water changes. Water temperature was 24° ± 2°C to month 5.7 and 30° ± 2°C thereafter. Feeding details are given in Table 1.

Populations were counted and weighed at approximately 2-mo intervals. Since *T. mossambica* is a mouthbreeder, it was desirable not to handle the fish more often than this. The 2-mo period includes 1.0 to 2.6 of the brood intervals reported by various authors (Kelly 1957, 30-40 days; Swingle 1960, 30-40 days; Uchida and King 1962, 23-61 days). Exploitation consisted of removing each 10th fish. In weighing, fish were drained in a net and placed in a previously weighed container of water; fish weight was total weight less the tare.

Table 1.—Food (in g) placed in tanks.

Day of week	Trout pellets		Tropical fish food		Total
	Moist	Dry	A[1]	B[1]	
Sun.	4.0	1.5	0.5	1.0	7.0
Mon.	5.5	1.5	0.5	1.5	9.0
Tues.	5.5	1.5	0.5	1.5	9.0
Wed.	5.5	1.5	0.5	1.5	9.0
Thurs.	5.5	1.5	0.5	1.5	9.0
Fri. A.M.	5.5	1.5	0.5	1.5	9.0
Fri. P.M.[2]	5.5	1.5	0.5	1.5	9.0
Total	37.0	10.5	3.5	10.0	61.0

[1]Commercial makes of dry food.
[2]This was combined with the Friday A.M. feeding in 35 out of 131 wk and with the Sunday feeding once.

Results and Conclusions

The two populations were started 10 July 1970 (Table 2, Figure 1). Recruitment (estimated from counts as in Silliman 1972) occurred after the temperature increase at month 5.7 and readjustment of the sex ratios at month 6.9 (Table 2). As was true for *T. macrocephala*, recruitment was greater in tank L (62) than in tank S (20). Some

TABLE 2.–Population and catch, *Tilapia mossambica*, in two sizes of tanks. Target exploitation rate was 10% per 2 mo.

	S—77.6-liter tank				L—155.2-liter tank			
	Number		Weight (g)		Number		Weight (g)	
Month[1]	Stock	Catch	Stock	Catch	Stock	Catch	Stock	Catch
0.3	[2]11	—	—	—	[2]11	—	—	—
0.5	[3]16	—	—	—	[3]16	—	—	—
4.1	[4]9	—	650	—	[4]9	—	593	—
6.9	[5]4	—	282	—	[5]4	—	303	—
9.2	20	—	372	—	50	—	529	—
11.1	20	—	641	—	49	—	571	—
13.1	20	—	831	—	46	—	754	—
15.2	20	—	983	—	44	—	900	—
17.0	20	—	1,088	—	46	—	1,006	—
19.1	20	2	1,154	119	46	5	1,081	115
21.2	18	2	1,121	108	41	4	1,047	113
23.0	16	1	1,120	146	36	4	1,071	100
25.1	14	1	987	89	34	3	1,070	100
27.1	12	1	912	90	31	3	1,083	198
29.2	10	1	861	114	29	3	1,043	119

[1]0 = 1 July 1970.
[2]Initial stocks were: S-6 immatures, 2 males, 3 females; L-4 immatures, 4 males, 3 females.
[3]To each stock, 5 immatures were added.
[4]Stocks were adjusted to 3 immatures, 2 males, and 4 females each.
[5]Stocks readjusted to 1 male and 3 females each. Temperature was increased from 24° to 30°C at month 5.7.

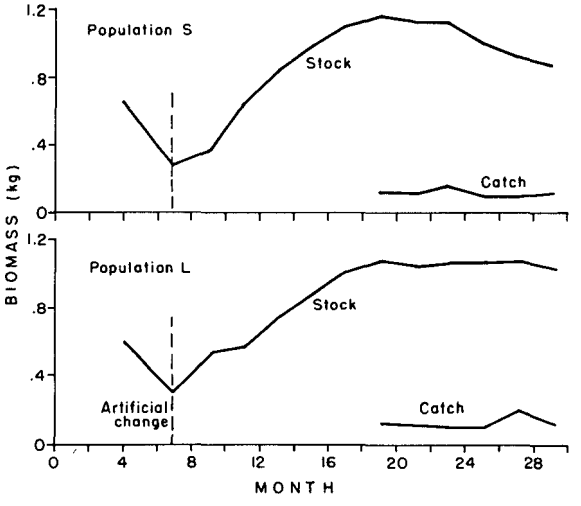

FIGURE 1.–Course of biomass and catch.

recruitment occurred throughout the experiment after month 6.9 in L but was limited to 2-mo period 6.9-9.2 in S.

Exploitation began at month 19.1 for both populations, at a target rate of 10% per 2 mo. Because of the small numbers of fish in the populations, actual percentages removed (Table 2) varied considerably from 10%. Populations differed in their response, S declining while L remained almost constant (Figure 1). Mean values of catch were S, 111 g; L, 124 g. Although the exploitation data were too few for firm conclusions, they suggest a greater yield from the larger tank, under the same catch rate and food amount. Here the response for *T. mossambica* was reversed from that found by Silliman (1972) for *T. macrocephala*. If significant, this difference may be due to the fact that *T. mossanbica* reaches larger ultimate size than *T. macrocephala*. The presence of a few large individuals in a population of small numbers (Table 2) could lead to a different response of the population to space available.

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