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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. mossam-
bica 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.

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 readjust-
ment 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 1.—Food (in g) placed in tanks.

<table>
<thead>
<tr>
<th>Day of Week</th>
<th>Trout pellets</th>
<th>Tropical fish food</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Moist</td>
<td>Dry</td>
</tr>
<tr>
<td>Sun.</td>
<td>4.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Mon.</td>
<td>5.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Tues.</td>
<td>5.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Wed.</td>
<td>5.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Thurs.</td>
<td>5.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Fri. A.M.</td>
<td>5.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Fri. P.M.²</td>
<td>5.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>37.0</td>
<td>10.5</td>
</tr>
</tbody>
</table>

¹Commercial makes of dry food.
²This was combined with the Friday A.M. feeding in 35 out of
131 wk and with the Sunday feeding once.
Table 2.—Population and catch, *Tilapia mossambica*, in two sizes of tanks. Target exploitation rate was 10% per 2 mo.

<table>
<thead>
<tr>
<th>Month</th>
<th>Stock</th>
<th>Catch</th>
<th>Stock</th>
<th>Catch</th>
<th>Stock</th>
<th>Catch</th>
<th>Stock</th>
<th>Catch</th>
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<tbody>
<tr>
<td>0.3</td>
<td>11</td>
<td>—</td>
<td>11</td>
<td>—</td>
<td>11</td>
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<td>—</td>
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<tr>
<td>0.5</td>
<td>16</td>
<td>—</td>
<td>16</td>
<td>—</td>
<td>16</td>
<td>—</td>
<td>16</td>
<td>—</td>
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<tr>
<td>1</td>
<td>9</td>
<td>650</td>
<td>9</td>
<td>593</td>
<td>9</td>
<td>593</td>
<td>9</td>
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<tr>
<td>1.1</td>
<td>20</td>
<td>372</td>
<td>49</td>
<td>571</td>
<td>46</td>
<td>704</td>
<td>46</td>
<td>704</td>
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<tr>
<td>1.3</td>
<td>20</td>
<td>831</td>
<td>49</td>
<td>571</td>
<td>46</td>
<td>704</td>
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<td>983</td>
<td>49</td>
<td>571</td>
<td>46</td>
<td>704</td>
<td>46</td>
<td>704</td>
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<tr>
<td>1.7</td>
<td>20</td>
<td>1,088</td>
<td>46</td>
<td>1,066</td>
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<tr>
<td>1.9</td>
<td>20</td>
<td>1,154</td>
<td>46</td>
<td>1,081</td>
<td>115</td>
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<td></td>
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<tr>
<td>2.1</td>
<td>18</td>
<td>1,121</td>
<td>41</td>
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<td>113</td>
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<td></td>
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</tr>
<tr>
<td>2.3</td>
<td>16</td>
<td>1,120</td>
<td>36</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>2.5</td>
<td>14</td>
<td>987</td>
<td>34</td>
<td>1,076</td>
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<td></td>
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<td>2.7</td>
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<td>31</td>
<td>1,083</td>
<td>198</td>
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<td></td>
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</tr>
<tr>
<td>2.9</td>
<td>10</td>
<td>861</td>
<td>29</td>
<td>1,043</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*0 = 1 July 1970.*

*1Initial stocks were: S-6 immatures, 2 males, 3 females; L-4 immatures, 4 males, 3 females.*

*2To each stock, 5 immatures were added.*

*3Stocks were adjusted to 3 immatures, 2 males, and 4 females each.*

*4Stocks readjusted to 1 male and 3 females each. Temperature was increased from 24° to 30°C at month 5.7.*

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. mossambica* 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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