ABUNDANCE AND DISTRIBUTION OF EGGS AND LARVAE OF A STERNOPTYCHID FISH, *MAURO LICUS MUELLERI*, IN THE JAPAN SEA, WITH COMMENTS ON THE STRATEGY FOR SUCCESSFUL LARVAL LIFE

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Peculiar faunal characteristics of the Japan Sea provided the opportunity to study the early life history of a sternoptychid fish, *Maurolicus muelleri*, in the absence of multispecies interaction. Based on the extensive ichthyoplankton surveys recently carried out in the warm season from August or September to November, 1973–77, the seasonal change of the distribution patterns of spawning activity, and a preliminary estimate of the spawning stock size of this deep sea micronektonic fish were studied. Available information from the literature also was consulted (Nishimura, 1959; Ito, 1966; Kawaguchi, 1969; Okiyama, 1971; Williams and Hart, 1974; Blackburn and Nellen, 1976; Robertson, 1976).

Spawning occurs throughout the year except for several months during the severe winter season, with the peak level of activity in late August and early September when the geographical range of the egg distribution becomes most extensive (Table 1, Fig. 1). A rich spawning was observed in the coastal region around, or just outside, the shelf edge as well as in the offshore warm areas. It is suggested that spawning activity of this deep sea form is closely associated with the developing patterns of the Warm Tsushima Current, a branch of Kuroshio.

Assuming that the egg production in the earlier half of the spawning season (April–July) is about half of that in the remaining season, the spawning stock size in 1973 is estimated to be about 2.20 x 10^12 individuals. This figure is computed in terms of weight as about 3.3

<table>
<thead>
<tr>
<th>Month</th>
<th>Monthly spawning estimate</th>
<th>Estimated spawning area</th>
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<tbody>
<tr>
<td>Aug</td>
<td>6.08 x 10^13</td>
<td>3.21 x 10^4 km^3</td>
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<tr>
<td>Sep</td>
<td>9.51 x 10^13</td>
<td>3.70 x 10^4</td>
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<tr>
<td>Oct</td>
<td>3.72 x 10^13</td>
<td>2.35 x 10^4</td>
</tr>
<tr>
<td>Nov</td>
<td>2.78 x 10^13</td>
<td>2.59 x 10^4</td>
</tr>
<tr>
<td>Total</td>
<td>22.09 x 10^13</td>
<td></td>
</tr>
<tr>
<td>Apr^a</td>
<td>6.81 x 10^12</td>
<td>1.51 x 10^4</td>
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</tbody>
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Table 1. Monthly egg production of *M. muelleri* in the Japan Sea from August to November of 1973.

^a After Nishimura (1959)
x $10^6$ metric tons which amounts to three times the annual fisheries production of the Japan Sea. Estimating errors appear to be largely due to the smaller estimate of fecundity ($F = 300$) along with the oversimplified techniques. Nevertheless, the productive potential of this single species is quite impressive, emphasizing its important role in the overall production or bio-economy of this marginal sea.

Apart from the absence of multispecies interaction, several ecological aspects which could be responsible for the successful life of this fish in this peculiar body of waters are discussed from the standpoint of life history strategy. The indistinct feeding chronology with constantly high feeding activity, wider food spectrum in early larvae, and a certain ecological plasticity such as the shallow as well as narrow bathymetric range of habitats are considered to be the promising facets in question. It is emphasized that none of these are peculiar to the Japan Sea specimens; but these strategies are not only well-pronounced but are also more effectively utilized in this marginal sea population as a whole.

REFERENCES


