

TIME SERIES OF ANCHOVY LARVA AND JUVENILE ABUNDANCE

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Good year-classes of anchovy, defined here as large contributors to catch, have been detected by the disproportionate entry of 0-group fish into the fishery. In a 9 year series of sea surveys (1969-77) conducted with a 15 m midwater trawl and sonar-mapping, the two best year-classes (1970, 1976) were characterized by the trawl catch of immediate post-larval fish in the spring of the year in which they were spawned. In a 12 year series (1966-77) the rank of a year-class contribution to the commercial catch and to the trawl catch agreed exactly in five cases, agreed within two ranks of twelve in six cases, and agreed as closely as four ranks in the remaining year.

Ahlstrom (1965) stated, "... we have found an unanticipated uniformity in the survival pattern of sardine and anchovy larvae from year to year." Since the data available then were the years 1951-59, I have examined the years 1951-75 to determine whether the estimates of the number of largest larvae sampled in the spawning biomass surveys foretold small and large year-classes of the central subpopulation of northern anchovy. Of the 9 years examined for immediate post-larvae in trawl surveys, only four (1966, 1969, 1972, 1975) had simultaneous ichthyoplankton spawning surveys. No larval surveys were conducted during the outstanding year-classes of 1970 and 1976. The year 1975 is classed as a failure by sea surveys and catch data: the 15 mm larva interpolation indicates a low abundance in spring. The projection of 15 mm larvae

from embryonic and early larvae is also low in spring. Spring (April-June) is usually the major producer of 15 mm larvae. The 1972 year-class was moderate, but arose from a greater-than-usual abundance of 15 mm larvae in all seasons. The 1969 year-class was judged to be similarly moderate, but arose from less-than-usual abundance of 15 mm larvae. As in 1975, the 1966 year-class failed and also had a low abundance of 15 mm larvae.

A 21 year series (1951-69; 1972; 1975) of estimates of the abundance of 15 mm larvae and 0-group catch from bait and reduction fisheries from 1952 to 1977, and estimates of mortality rates in the embryonic, early, and late larval periods, has been compared with 0-group contribution to catch in the ensuing fishing season. There is a weak tendency (not significant at 5%) for embryonic (yolk sac) to early larval (9 mm) mortality rates to match year-class size. There is also a weak tendency for the abundance of 15 mm larvae to match year-class size. Exceptionally small recruitment can be seen from ichthyoplankton surveys, but moderate and large year-classes will not be discriminated by monitoring the first month of life of the northern anchovy.

REFERENCES

- Ahlstrom, E. H. 1965. A review of the effects of the environment on the Pacific sardine. ICNAF Spec. Pub. 6: 53-74.