

CONTRIBUTIONS TO NMFS ANNUAL REPORT

Increased fishing effort expended on the South Pacific albacore, Thunnus alalunga, in the past 10 years has resulted in a decline of over 60% in apparent abundance. Preliminary CPUE estimates for early 1974 are alarmingly low. A further increase in harvesting pressure is proposed. SWFC HL, therefore, has undertaken an assessment of this fishery. Results show that the maximum sustainable "average" yield is estimated to be 33,000-35,000 MT. Based on the generalized production model of Pella and Tomlinson, a 25% increase in fishing effort over the 1971 level could result in a moderate catch increase of 300 MT or a decline of 6,700 MT, depending on the measure of fishing effort used.

The HL, in a search for ways to augment the often-inadequate supply of baitfish used in pole-and-line skipjack tuna fishing in the central and western Pacific Ocean, experimented with transporting the northern anchovy, Engraulis mordax, from California to Hawaii. Holding tanks for acclimatizing the anchovy prior to shipping were set up at the site of the bait supply. Bait density and survival experiments were completed. With various degrees of success several loads of anchovy were carried to Hawaii in a 5,000-gallon baitfish transport tank, constructed from a surplus aircraft fuel transport trailer. At least two more trial shipments, carrying the recently determined optimum capacity of 0.34 pound per gallon, should result in a cost-effective survival rate of 70%.

In a major breakthrough, HL scientists have demonstrated the existence of three fundamental limits defining the extremes of the skipjack tuna habitat. First, these highly active animals require an abundance of oxygen; they cannot live for more than a few minutes in water of less than 3.5 ml/liter oxygen. Second, a lower temperature limit near 16°-18°C places a maximum limit on their depth distribution in higher latitudes wherever dissolved oxygen is not a factor. Third, an upper temperature limit is established by internal muscle temperatures generated by the animals' metabolism. The protein in the fish's muscle suffers irreversible damage at temperatures higher than about 35°C, so that the smallest (1 kg) fish must remain in water cooler than 30°; the largest (13 kg) in water cooler than 20°C.

[transmitted via telecopier to L. Vlymen, 1/10/75, 1200.]

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1/10/75

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