

Fish blood groups

April 21, 1960

The science of genetics has answered one of the basic questions in the study of why sardine catches off California fluctuate from year to year.

During the past 20 years, the catch has reached as high as 500,000 tons, dropped as low as 4,000. Last season it was a disappointing 30,000 tons.

Scientists investigating the phenomenon have been uncertain whether all the sardines came from a single stock.

They do not, says Lucian Sprague, geneticist with the U. S. Bureau of Commercial Fisheries Biological Laboratory, La Jolla, and Research Fellow at the University of California's Scripps Institution of Oceanography. He has found that at least two genetically distinct stocks contribute to the California catch. He calls them the "northern" and "southern" stocks. In most years, the "southern" stock spawns off Mexico, the "northern" off California.

That separate spawning areas exist has been known for ten years; that Mexican-bred fish are shorter and stubbier than Californian has been known to fishermen for generations. What makes Sprague's contribution important is that it affords positive evidence that there are at least two separate stocks along the coast. This means the two stocks do not replenish each other. They mingle in the catch during the fall and winter months, but in the spring spawning season there is little mixing.

Sprague discovered the difference by patiently blood-typing several thousand living sardines.

His work resembles research on human blood groups. The four types of human blood are found in all communities, but distinctive populations, such as some isolated South American Indian tribes, often show percentages of the various types that differ from the averages throughout the world. There will be more type "A"s, for example, than chance would allow. Sprague distinguishes his two groups of sardines by observing in a sample of a hundred or more fish the percentage of those that react positively to a specific antigen. He finds the percentages vary markedly and consistently between sardines from the south and the north.

Sprague's work has been conducted as a part of the California Cooperative Oceanic Fisheries Investigations, a long-term, State-sponsored study of the sardines and other pelagic fishes off California.

According to Garth I. Murphy, Coordinator of the program, "Sprague's determination of genetic races will permit oceanographic and other studies in the program to focus on the important segments of the population, rather than the population as a whole."