

## JIMAR ANNUAL REPORT FOR FY 1999

**P.I. NAME:** Barbara A. Block and Carol A. Reeb

**PROJECT PROPOSAL TITLE:** Using microsatellite loci to detect population subdivision in Pacific swordfish, *Xiphias gladius*.

**FUNDING AGENCY:** Joint Institute for Marine and Atmospheric Research

**1. Purpose of Project:** We developed eleven microsatellite loci and had used them to detect population subdivision in Pacific swordfish at the end of FY '98. For FY '99, we continued working on analyzing our large data set and writing two manuscripts entitled:

Reeb, CA, L Arcangeli, and B.A. Block. Population structure and migration corridors in the Pacific swordfish, *Xiphias gladius*, as inferred through analysis of mitochondrial DNA. *submitted. Marine Biology.*

Reeb, CA, L Arcangeli, and B.A. Block. The genetic structure of Swordfish (*Xiphias gladius*) populations as inferred through the analysis of eleven microsatellite loci. *in prep for submission to Molecular Ecology.*

In addition, we intended to collect and analyze additional swordfish along the eastern Pacific where an apparent migration corridor had been discovered with our data.

**2. Progress during FY 1999:** In November, 1998 we submitted one paper to Marine Biology describing the first evidence that Pacific swordfish are not composed of a single population. The paper was revised and resubmitted in early May. This data was from 281 individuals sequenced for 624 base pairs in the control region of mitochondrial DNA. Our analysis included a novel use of linear regressions to support a migration corridor amongst these populations that resembles a U-shape. That is, northern and southern populations are subdivided in the western Pacific but in the east they overlap. The second

paper, to be submitted at the end of July to Molecular Ecology on our microsatellite data from 471 fish collected in the Pacific, Atlantic and Mediterranean, shows basin wide population subdivision reiterating what the mtDNA data sets acquired by other studies have told us. In addition, this data has revealed one corridor of migration from Chile into California and another from Japan and Hawaii into California. A third paper presented at the Evolution meetings again uses the application of regressions on both microsatellites and mtDNA to show a historical corridor of gene flow connecting the Pacific and Atlantic basins around Africa. This is the first time genetic data has been used to show a migratory connection in swordfish between these two basins around Africa. This paper will be submitted later in the year.

Finally, we have acquired new samples from Ecuador and now have an additional 180 fish from California allowing us to compare 3 years ('94, 95, 98). Analysis of these samples awaits additional samples from Chile and Mexico. Sadly, a well respected California fisherman, John "Whity" Rendernick, III, who was assisting us in collecting northern California samples, was lost at sea in October. Whity's boat went down off the coast of Oregon on the way back from a fishing trip.

**3. Plans for next Fiscal Year:** We do not expect funding for the next fiscal year from JIMAR. However, we have acquired funding in collaboration with Bob Ward and CISRO in Australia to look for genetic differentiation between swordfish in Australian waters and those in the Indian Ocean.

**4. List of papers published in referred journals during FY 1999:**

Population structure and migration corridors in the Pacific swordfish, *Xiphias gladius*, as inferred through analysis of mitochondrial DNA. submitted. Marine Biology

**5. Other papers, technical reports, etc.:**

"Likely corridors of migration revealed in a highly migratory fish". Presented in June at the 1999 Evolution meetings in Madison, Wisconsin.