

## JIMAR Annual REPORT FOR FY 2000

P.I. Name: Dr. E. Gordon Grau

### PROJECT PROPOSAL TITLE:

*"Developing Tools to Assess Sex and Maturation Stage of Bigeye Tuna (Thunnus obesus) and Swordfish (Xiphias gladius)."*

#### 1. Purpose of the Project:

The central aim of this project is to develop accurate, simple to use and economical tests to determine sex and maturational stage of bigeye tuna and swordfish so that populations can be monitored on a regular basis and at low cost. This will be achieved through the following objectives:

- i) Develop and modify existing biotechnology to identify the sex and maturational status of individual fish in two species: bigeye tuna (*Thunnus obesus*) and swordfish (*Xiphias gladius*). Our approach will focus on developing genetic and immunoassays to detect sex and maturation specific compounds present in blood and muscle tissue samples.
- ii) Validate the accuracy of this approach by 'ground truthing' the results with the standard method of staging maturity based on histological examination of the gonads.
- iii) Transfer the new technologies to fishery biologists throughout the Pacific for use in constructing and monitoring maturity schedules for bigeye tuna and swordfish.

#### 2. Progress during FY 2000:

Field Collections: During the FY 2000, we have worked closely with OBSERVERS from the Longliners Commercial operation to obtain swordfish muscle biopsies and corresponding gonadal samples. We have also worked closely with scientists from NMFS on Cromwell expeditions to obtain bigeye tuna serum, muscle and gonadal samples. The collections will be ongoing part of the project, as large numbers are needed to confirm and validate our assays.

Laboratory assays: A vitellogenin-specific Western blot assay has been optimized for the swordfish and a closely related tuna, the yellowtail. Unfortunately, this assay is expensive and time-consuming. Work is in progress to transition the assay into an ELISA, a faster and more economical format, in order to screen larger numbers of fish. A DNA fingerprinting technique, called the RAPD (randomly amplified polymorphic DNA) is currently being tested on bigeye tuna genomic DNA to determine whether sex-specific difference can be detected. Preliminary results have shown that the method is quick and reliable and can detect species differences. Ongoing work is necessary to fine-tune the assay to determine whether it will be informative to distinguish sex in juvenile and adult fish.

#### 3. Plans for the next Fiscal Year: (One Paragraph)

Field Collections: A more concerted effort will be made to develop relationships with fishermen to obtain samples. This will save both time and money and also enable us to benefit from their extensive and valuable knowledge of the fish, their habitat and their annual

spawning season.

Laboratory Assays: Optimize the ELISA assay and transfer the technology to fishery management agencies. Establish hormonal profiles for the annual reproductive cycle of both tuna and swordfish and correlate these with vitellogenin levels obtained from a muscle biopsy. Screen for nuclear loci that have previously been reported to be sex-specific in other teleost species (e.g. Growth hormone in salmon).

**4. List of Papers Published in Referred Journals during FY 2000**

(0)

**5. Other Papers, Technical Reports, Etc**

(0)

**6. Names of Students Graduating with MS or Ph.D. Degrees during FY 2000; Titles of their Thesis or Dissertation.**

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