Progress report on an IATTC yellowfin tuna life history project

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Inter-American Tropical Tuna Commission

TOPICS

- **Introduction**
- **Objectives**
- **Experimental design**
- **Methodology**
- **Progress and Proposed Timeline**

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- Age and growth of yellowfin in the EPO was investigated, based on otolith samples collected about 40 years ago, with the resulting growth model being used in the current assessment
- Reproductive biology of yellowfin was investigated in the EPO, based on gonad samples collected about 30 years ago, from which maturity and fecundity estimates are being used in the current assessment

OBJECTIVES

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- Evaluate the temporal and spatial variability in these life history characteristics, and their application in spatially explicit yellowfin stock assessment models

EXPERIMENTAL DESIGN

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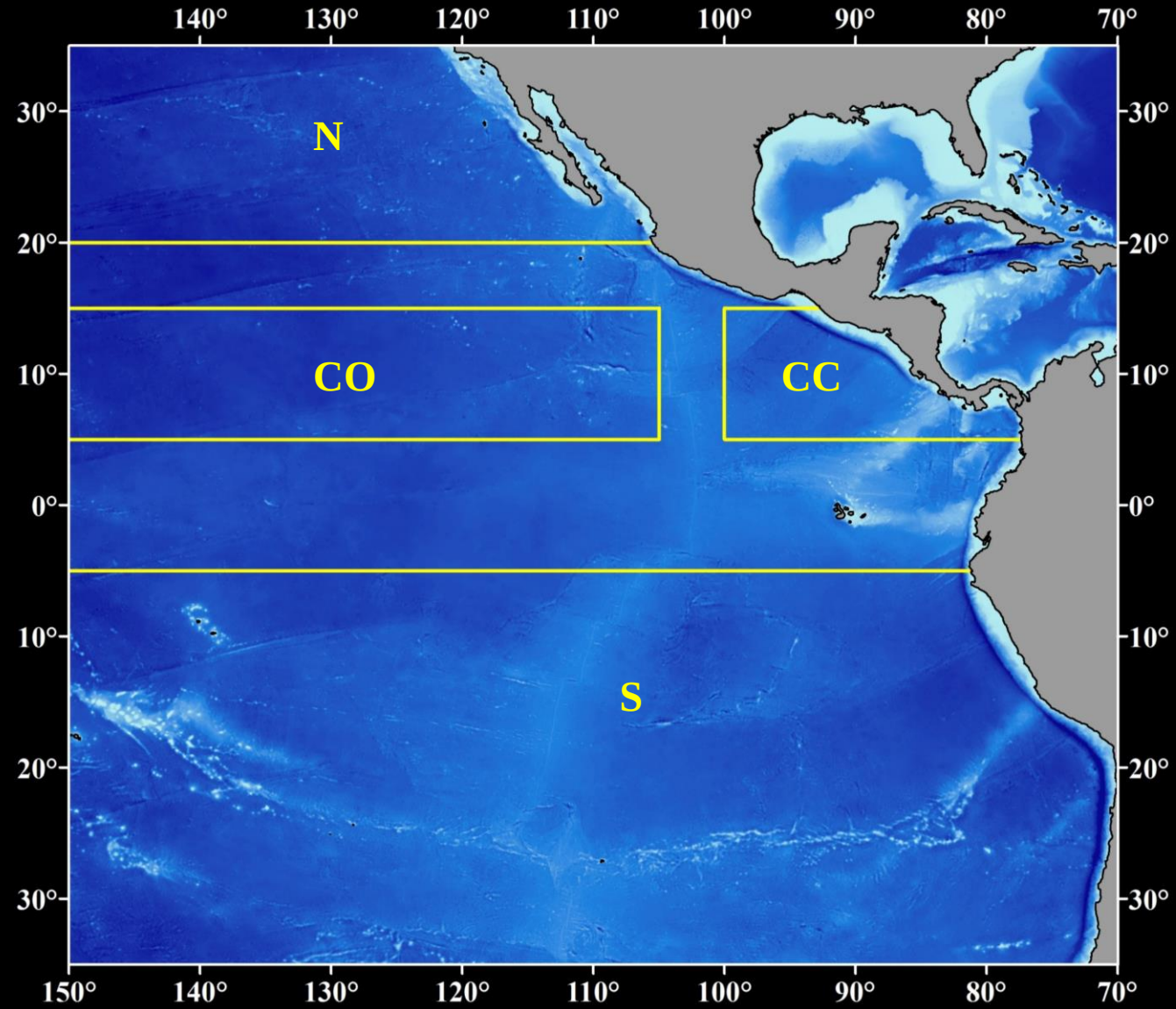
4 Sampling areas: North of 20° N, Between 15° N and 5° N from the coast to 100° W, Between 15° N and 5° west of 105° W, and South of 5° S



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- Fish from which ovaries were sampled were tagged, for locating during the unloading process, for collections of heads and extraction of otoliths by IATTC field office staff. Fish lengths were re-measured and their weights recorded at that time.

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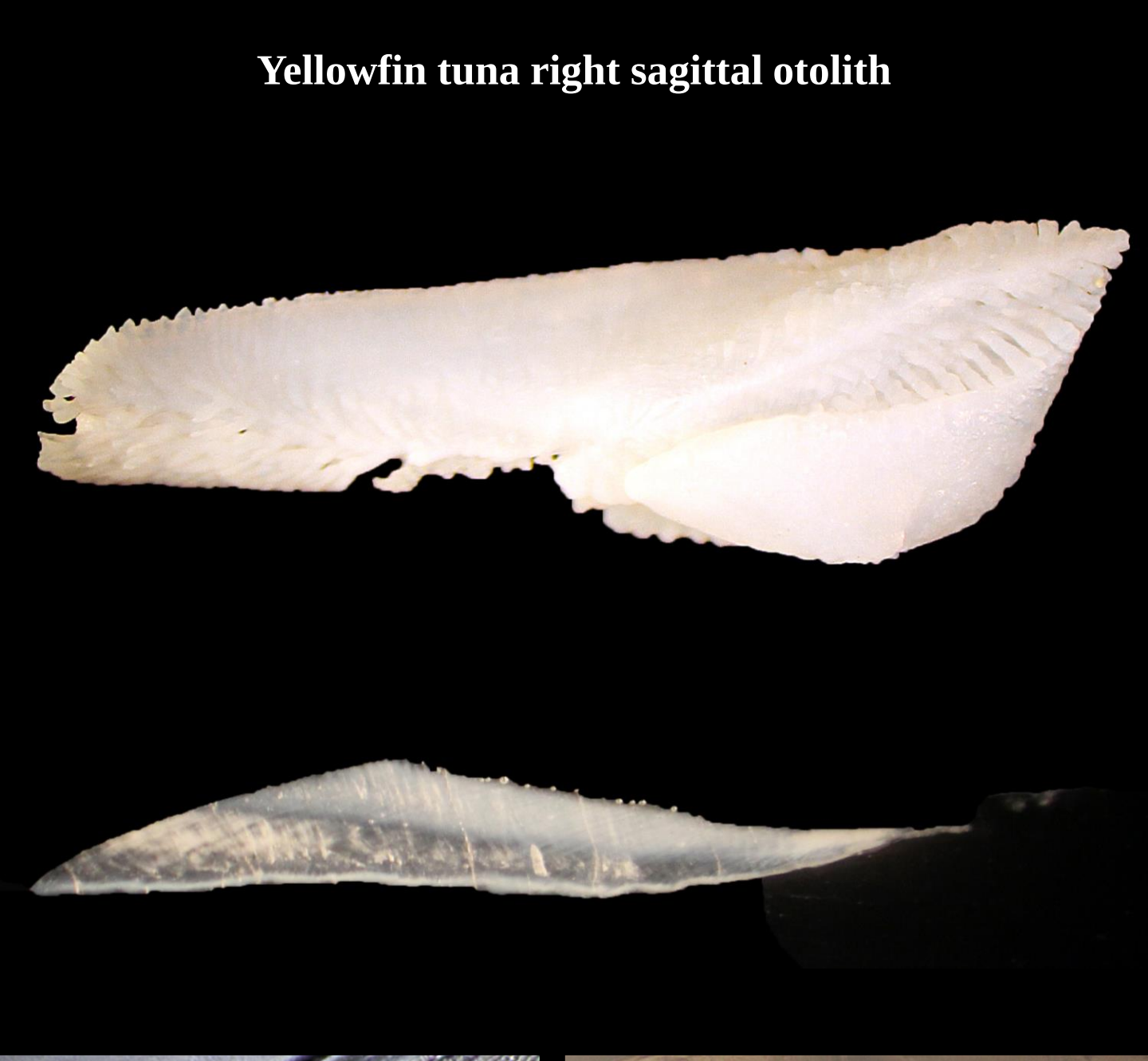
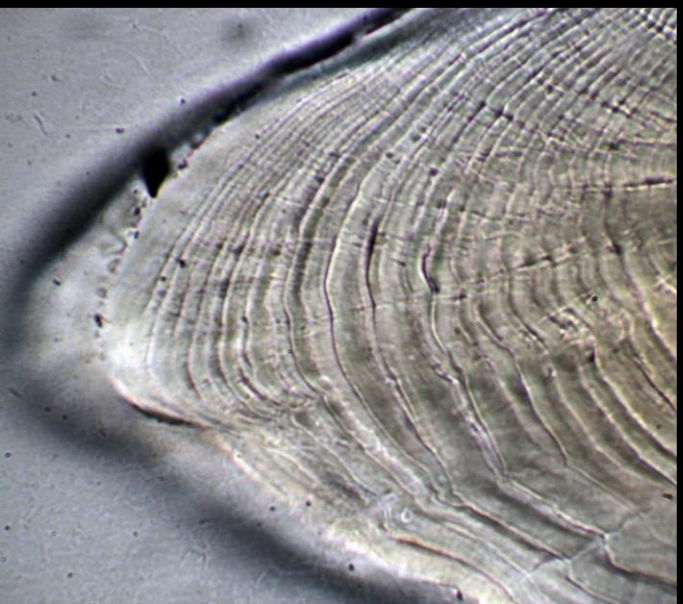
- Otolith preparation consists of embedding sagittal otoliths in epoxy resin, and cutting frontal sections along the primordium to post-rostral axis, using a low speed saw. Sections are then mounted on microscopic slides, polished to approximately 5 microns in thickness, and then etched with a dilute acid solution to obtain highly visible increments along the optimal counting path

Yellowfin tuna right sagittal otolith





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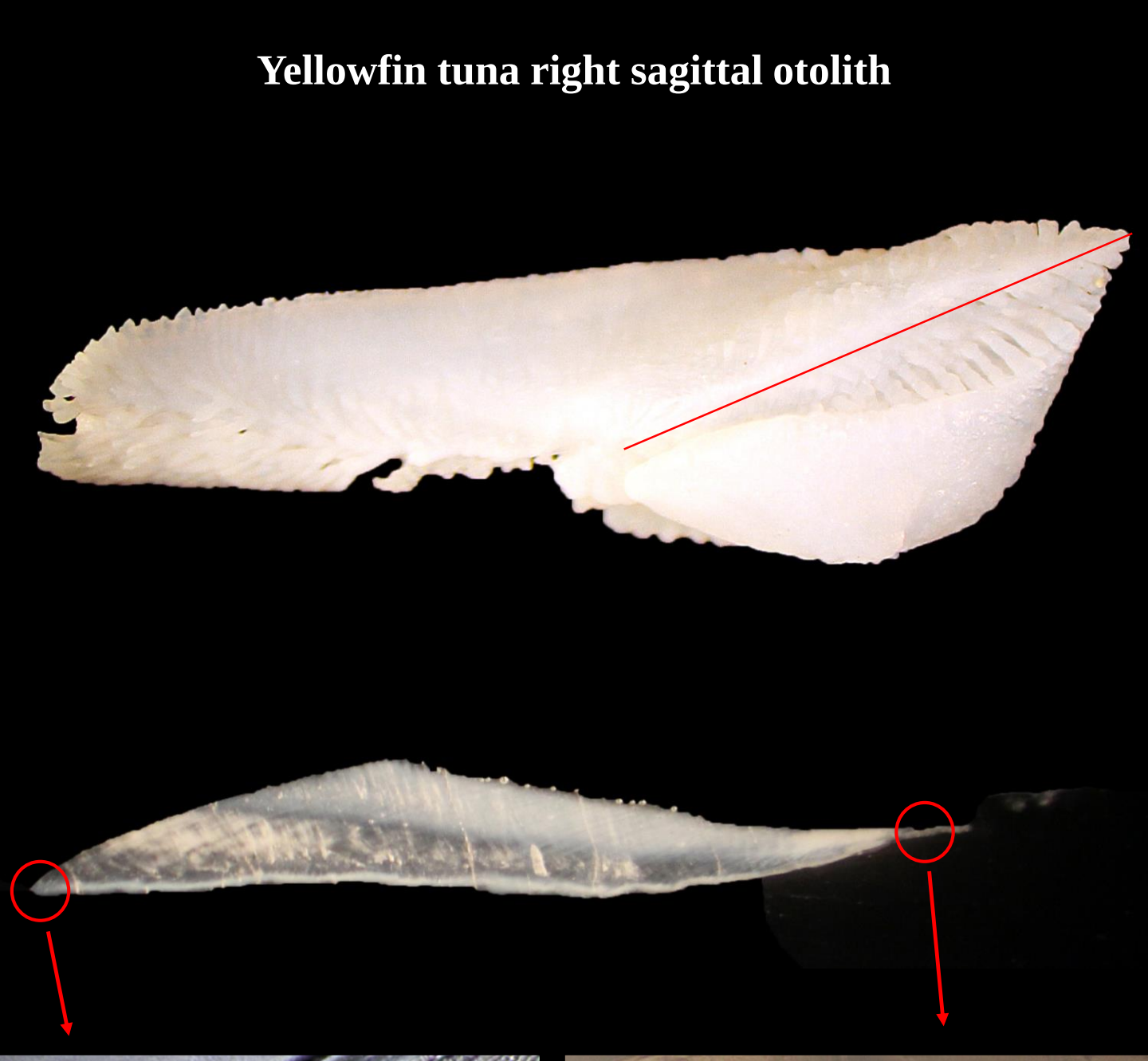

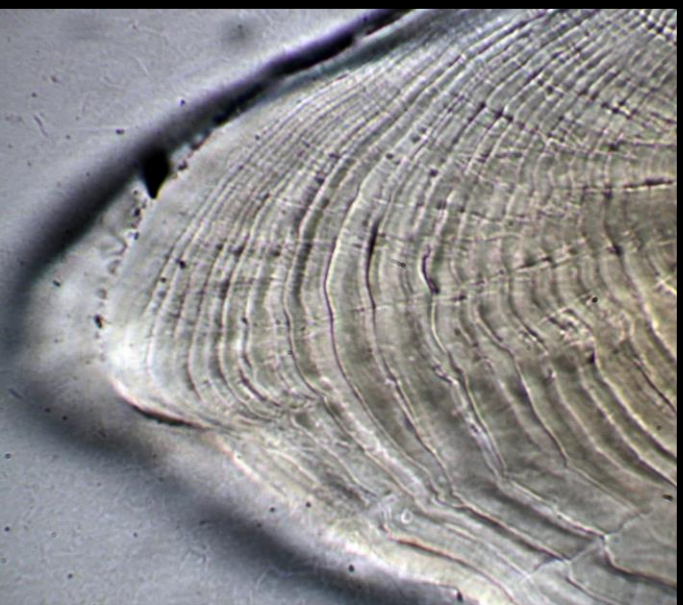

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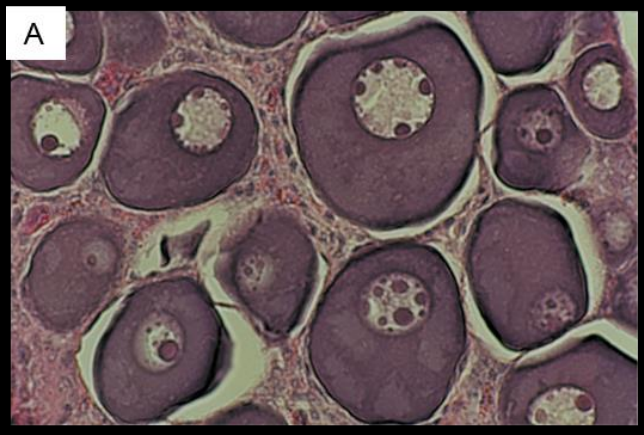
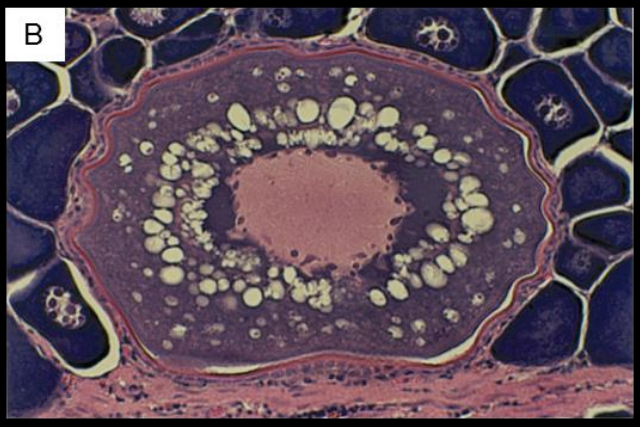
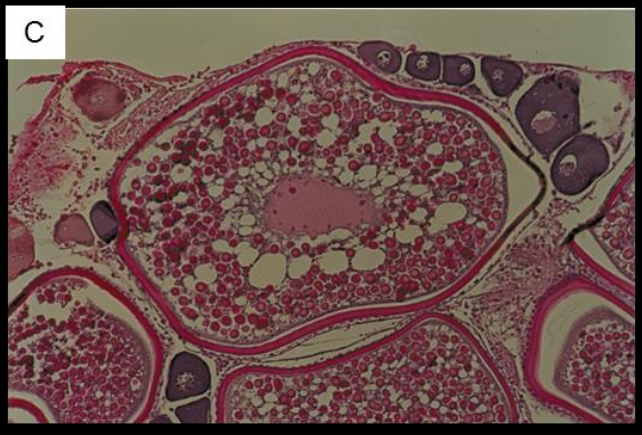
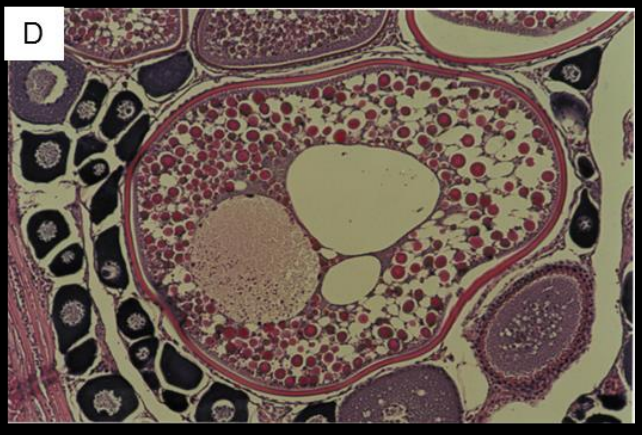
- For each microscopic slide the histological classification system of Schaefer (1998) will be employed to identify the oocytes in the most-developed mode, absence or presence and age of postovulatory follicles, atretic structures, and additional maturity markers. The histological analyses of ovaries provides accurate evaluations of the maturity and reproductive activity stages for individual females

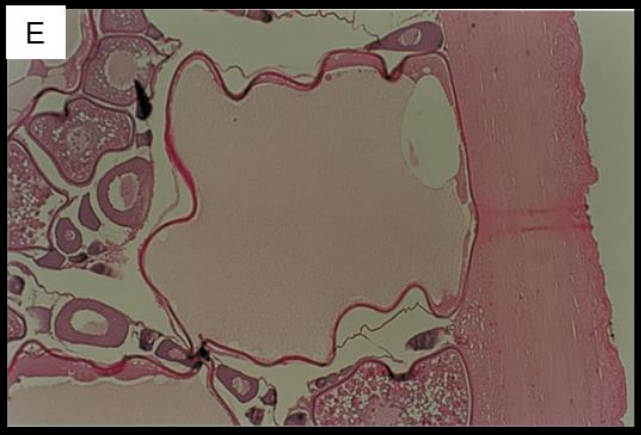
Developmental stages and oogenic cells observed in yellowfin ovaries. (A) Unyoked oocyte. (B) Early yoked oocyte. (C) Advanced yoked oocyte. (D) Migrtory-nucleus-stage oocyte. (E) Hydrated oocyte. (F) Postovulatory follicle less than 12 h after ovulation

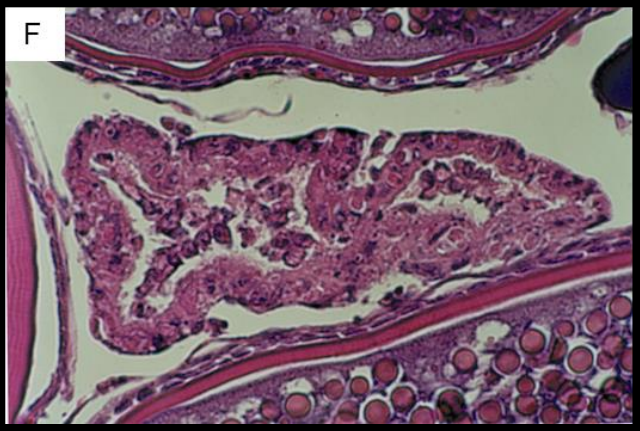




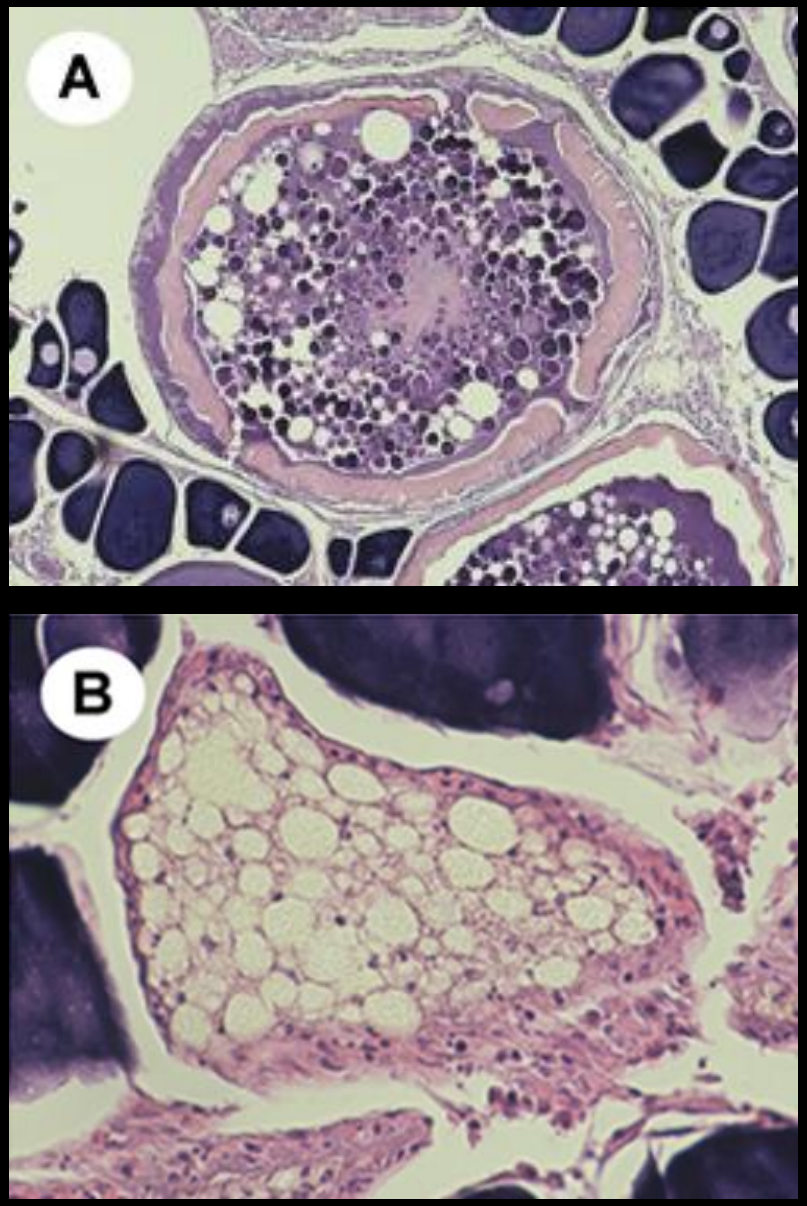








Alpha (A) and beta (B) stage atresia in yolked oocytes



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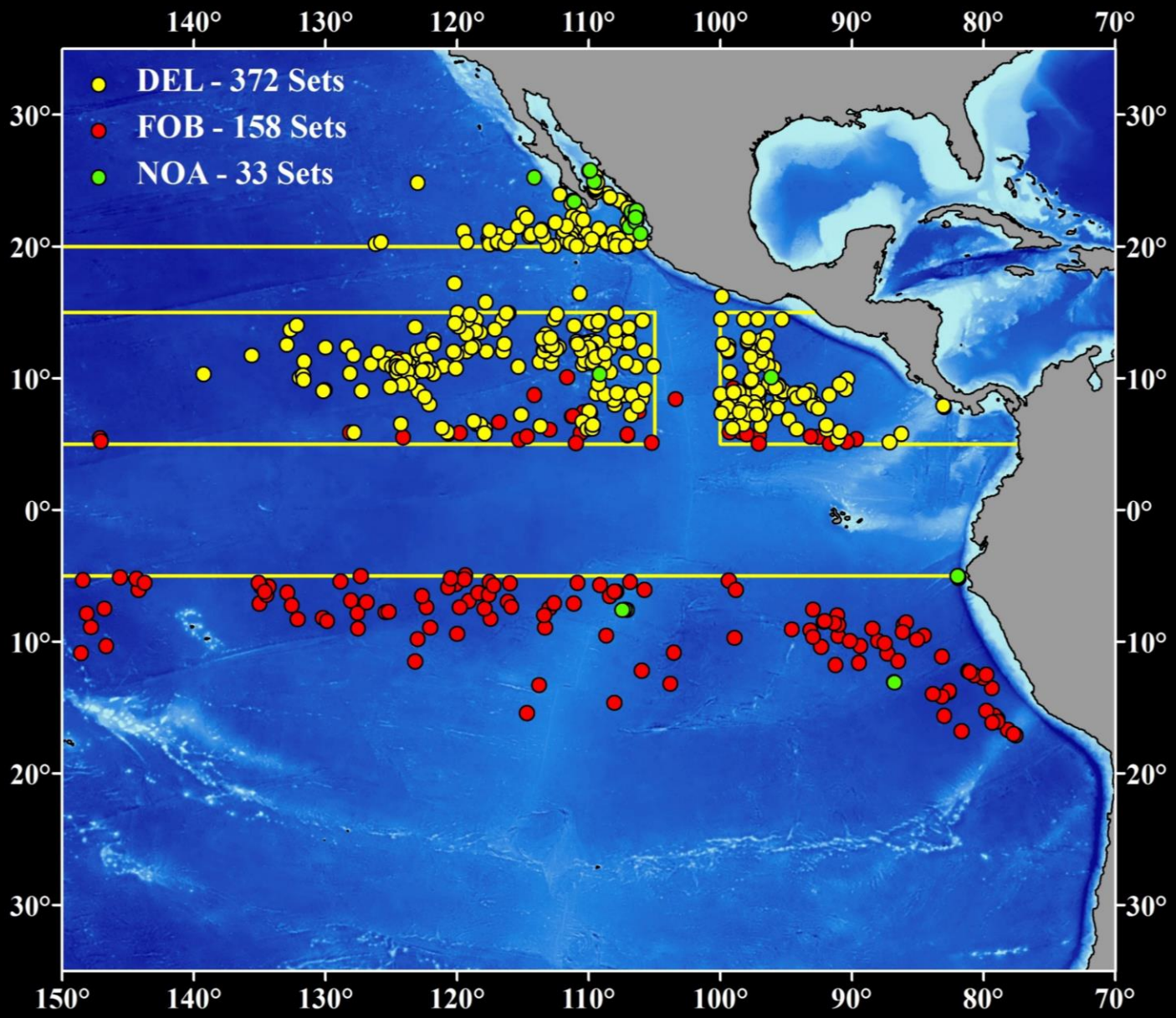
- Statistical comparisons of the growth, maturity, and fecundity functions obtained from the four spatial strata will be conducted, along with statistical comparisons of those functions derived in the earlier studies

PROGRESS AND PROPOSED TIMELINE

- The sampling phase of this project took years longer than expected, but the required samples from the 4 spatial strata and length classes have been obtained and sampling discontinued in 2016

Position of 563 sets from which ovaries and otoliths were collected



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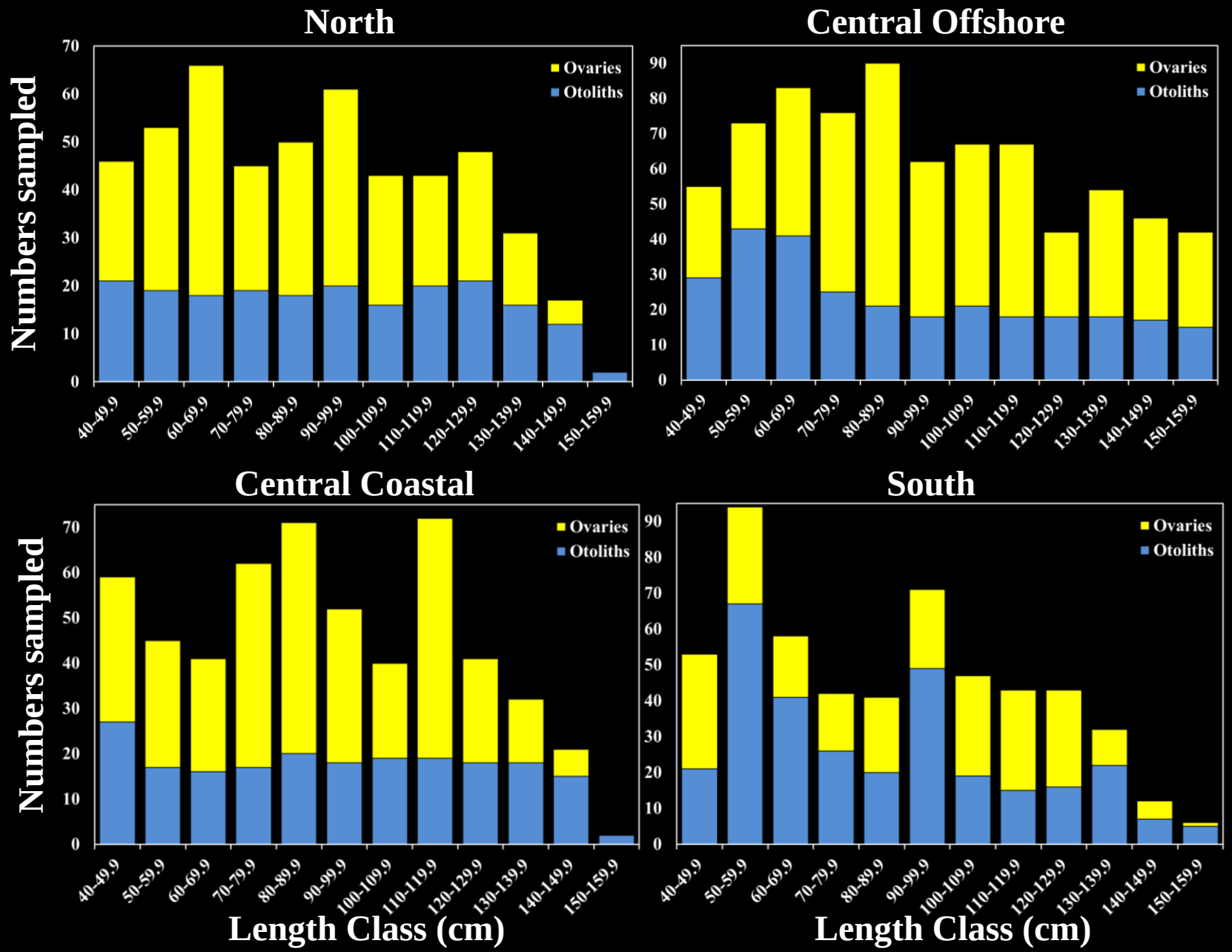
Numbers of ovaries and otoliths sampled within the 4 spatial strata



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- Will present an update and results at IATTC SAC9