

Genetic Variability in *Acropora*

Nikolaos V. Schizas

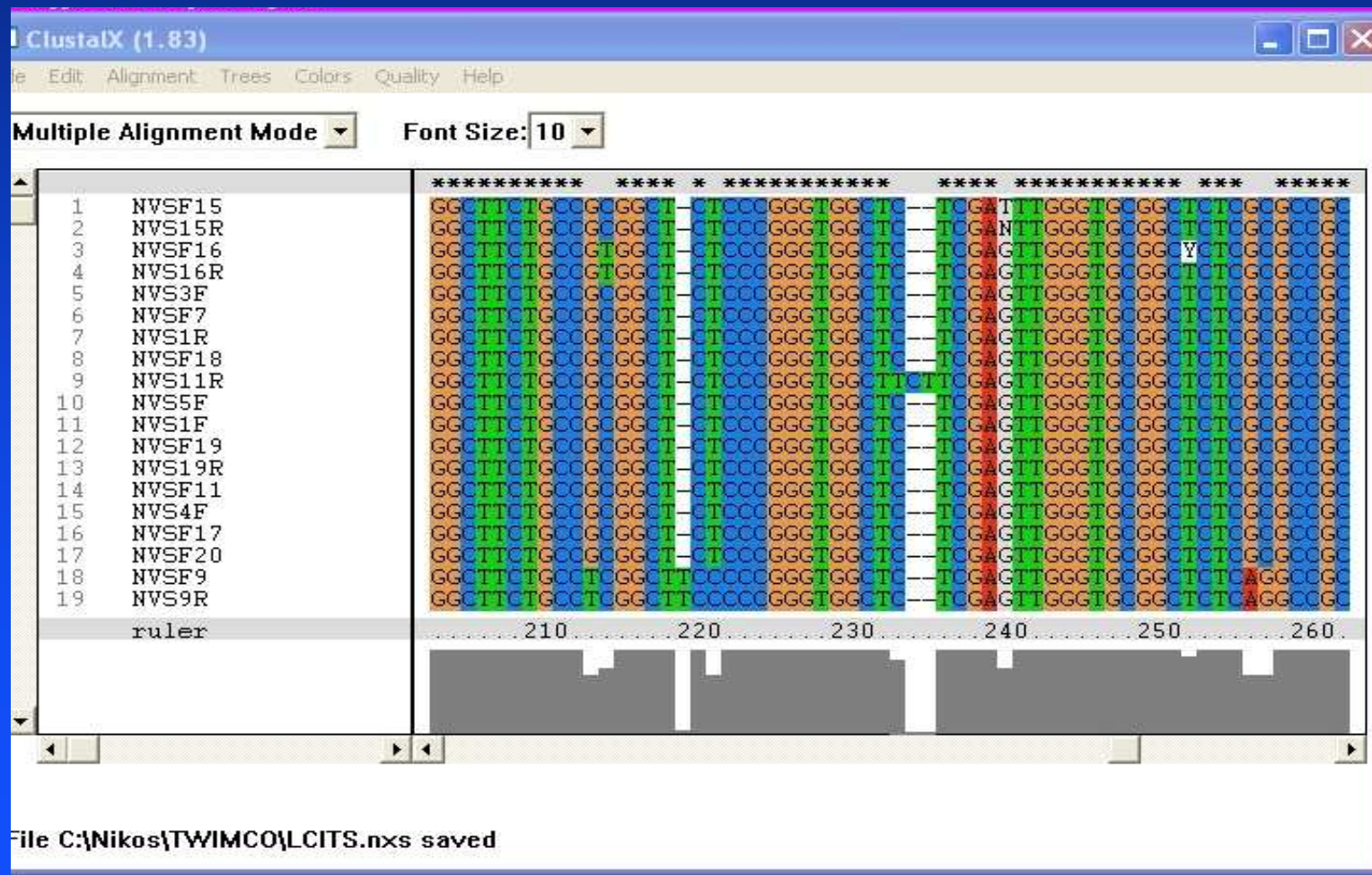
Department of Marine Sciences

University of Puerto Rico, Mayagüez



- Fact: genetic variation is the raw material of evolution

Visualizing DNA variation at the ITS-1 region



Observation

Primary mode of reproduction → colony fragmentation (low rates of sexual reproduction)

Prediction

Asexual reproduction will result in reduced (local) genetic diversity

Acropora cervicornis



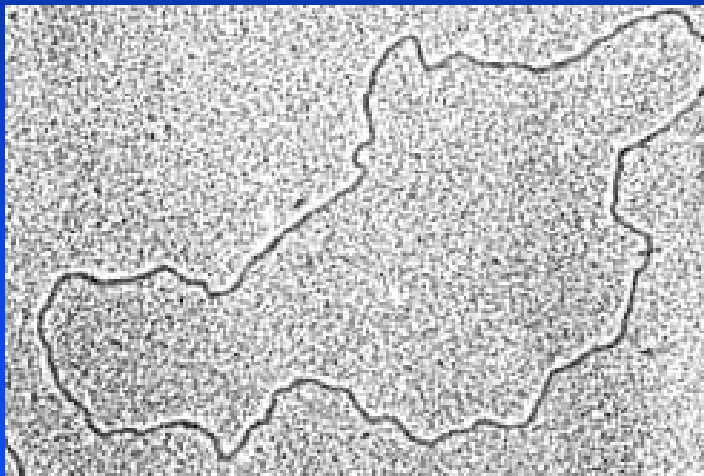
A. palmata



Goal of this proposal

- Evaluate the genetic variability of *A. cervicornis* and *A. palmata* at different levels of tissue organization

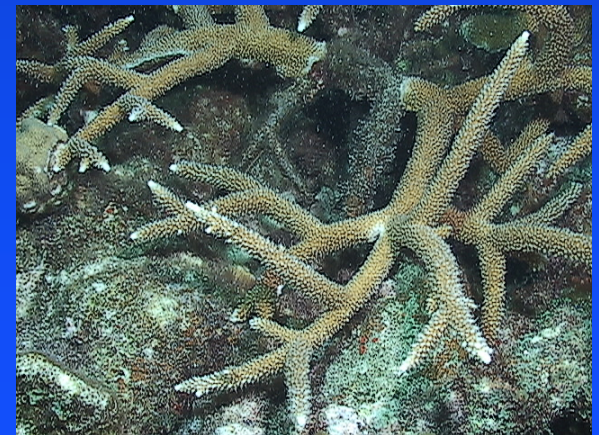
mtDNA



A. palmata



A. cervicornis

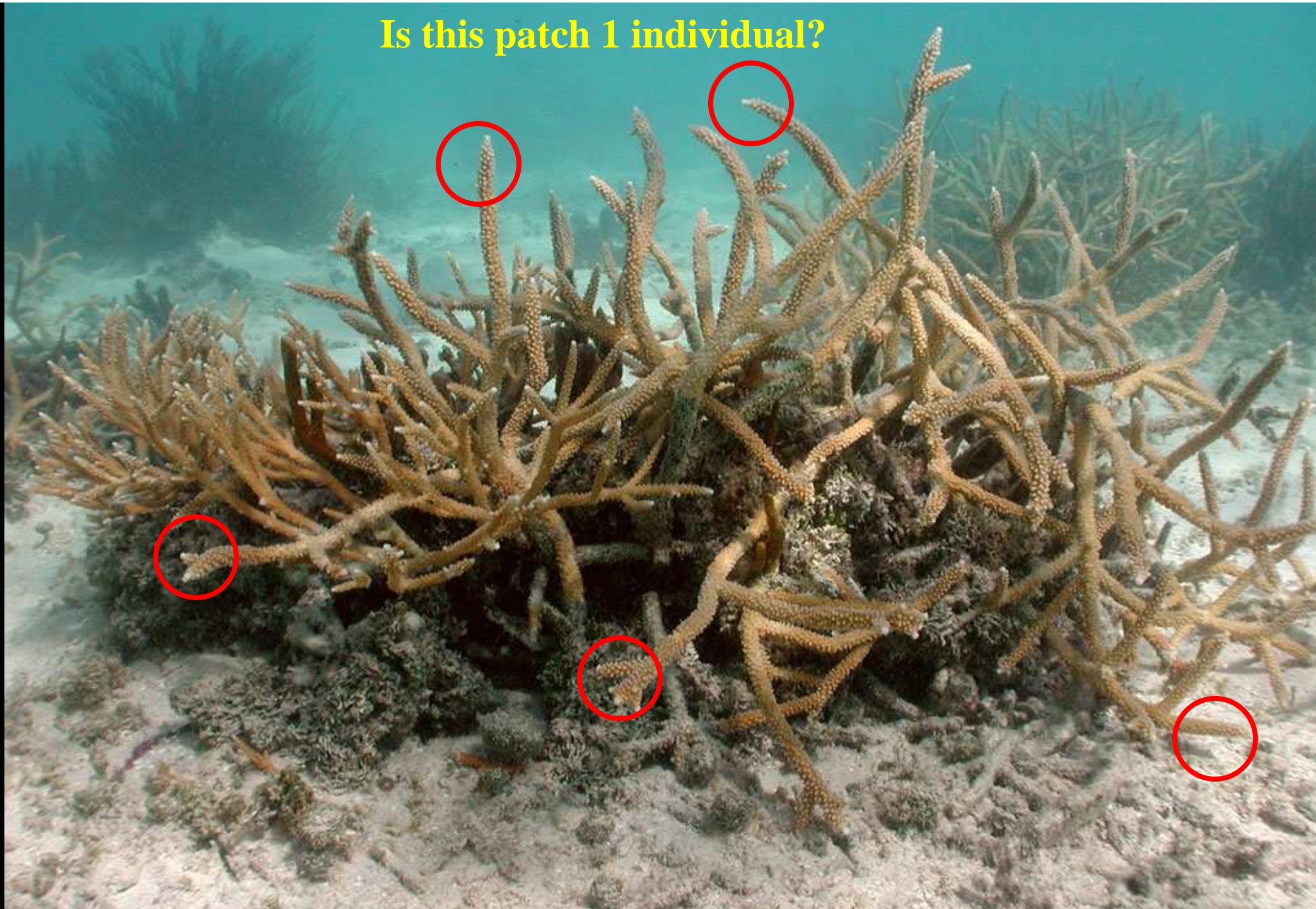


Hierarchical Design

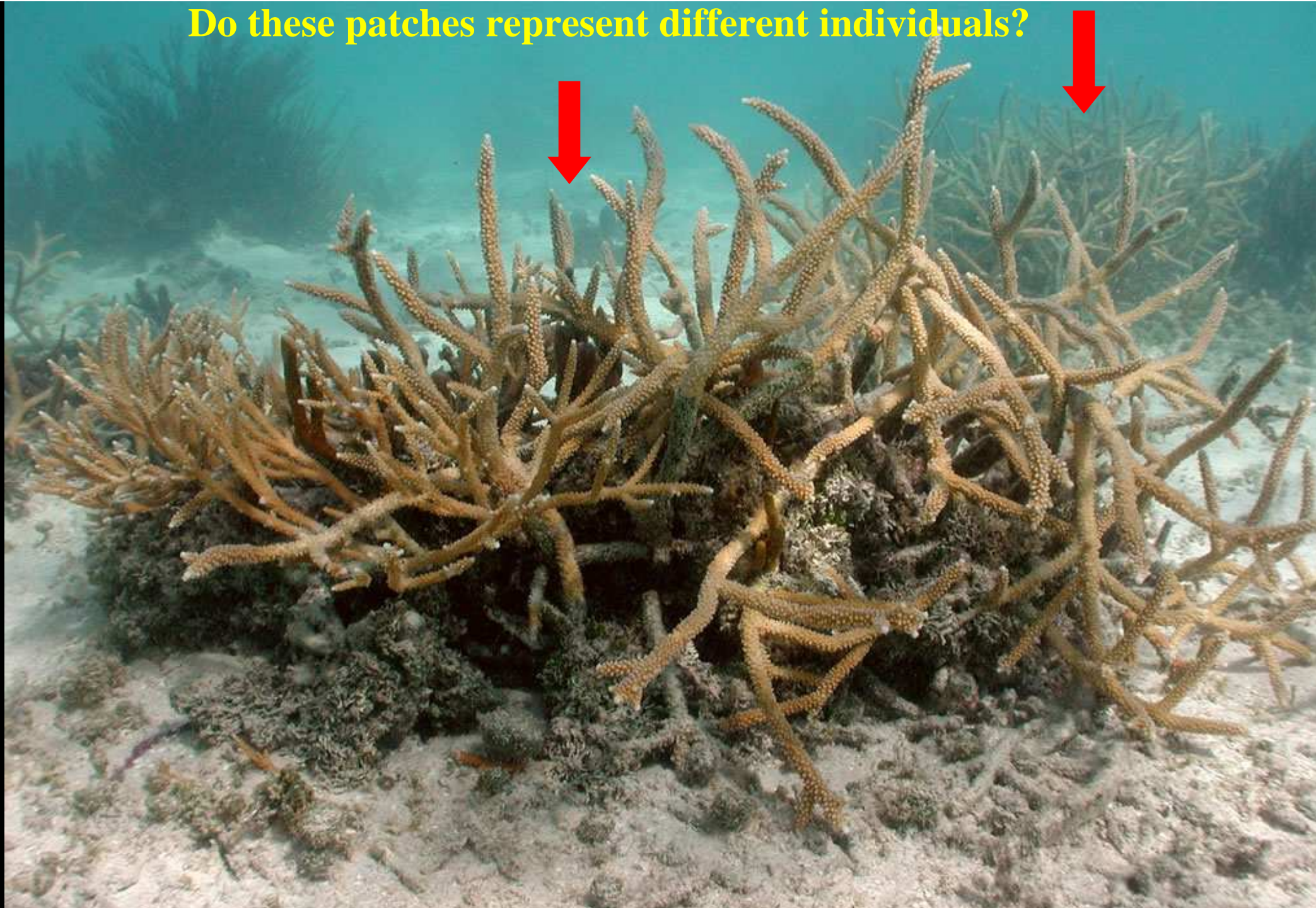
We will evaluate levels of genetic diversity:

- 1) Within discrete patches of *Acropora***
- 2) Among discrete patches of *Acropora* within sampling locations**
- 3) Among sampling locations within islands**
- 4) Among different islands**

Is this patch 1 individual?

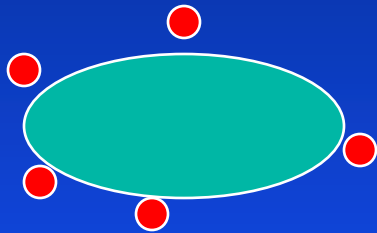


Do these patches represent different individuals?

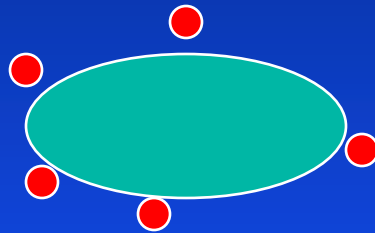


Genetic diversity of *Acropora* between sampling locations

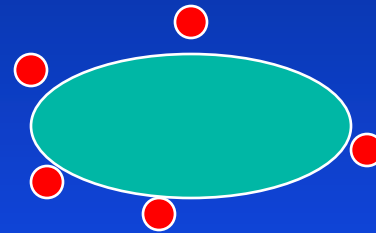
Enrique



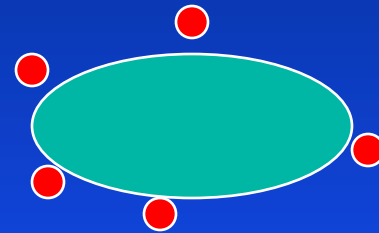
Collado



Laurel



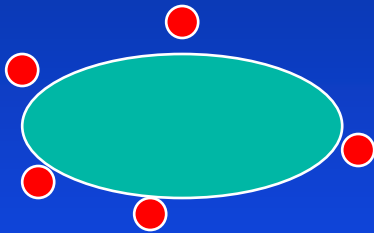
Ponce



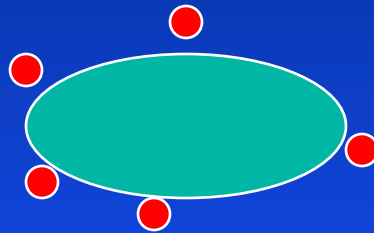
 *Acropora* patch

Genetic diversity of *Acropora* between islands

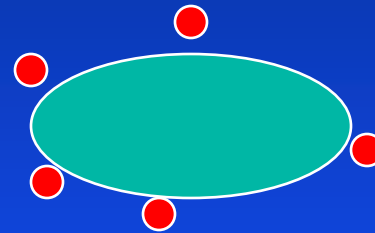
Mona Is.



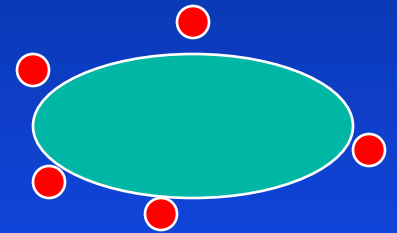
Desecheo Is.



Puerto Rico



Culebra Is.



Proposed Sampling Locations of *Acropora*



Sampling Locations

Disturbed: Media Luna, Turrumote, Laurel, Enrique, Margarita, Collado, Guanica, Ponce, Rincon.

Non-disturbed: Desecheo Is., Mona Is., Culebra Is.

Materials and Methods

Candidate Genes:

MtDNA: Cytochrome b, putative control region.

Nuclear DNA: ITS-1, and introns from *Pax-C*, calmodulin, and minicollagen

Course of Action

- Develop a reliable DNA extraction technique in *Acropora*
- Optimize PCR amplification conditions for 4-6 genes per specimen
- Expand collection of *Acropora* to other locations
- Analyze data

Proposed Schedule

■ January 2005-Summer 2005

Training of graduate student

Primer ordering

Collection of fresh coral tissue (local)

DNA extraction

PCR optimization

■ Fall 2005-Summer 2006

Collection of *Acropora* from all locations

Collection of data

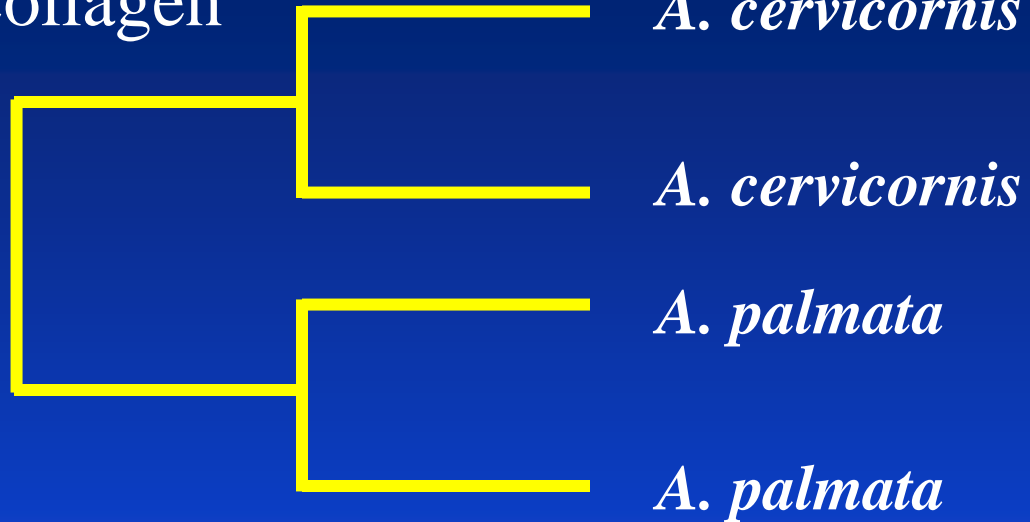
Data Analysis

Manuscript Preparation

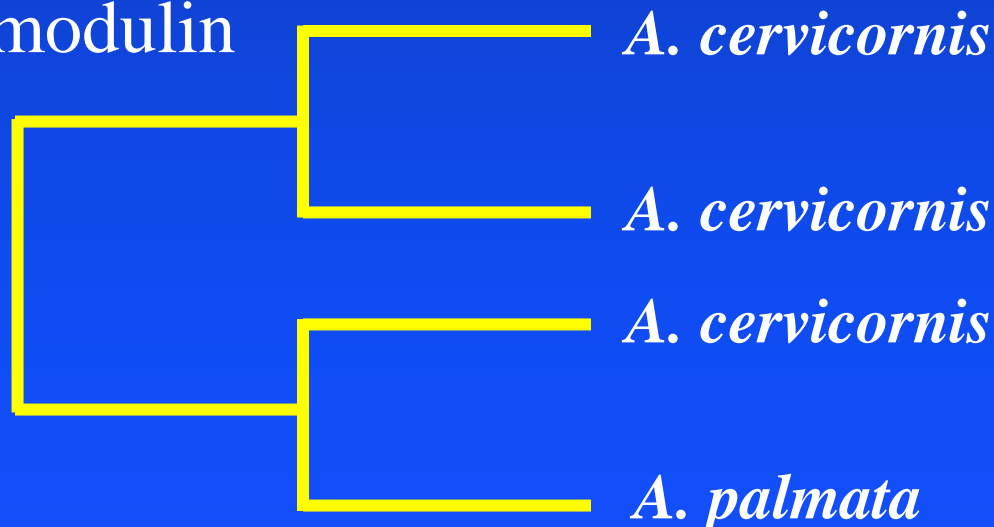
People involved with this project

Joselyd Garcia: molecular work, field samples

Minicollagen



Calmodulin



Sequence divergence in minicollagen, calmodulin, and PaxC (0.6%-2.1%). In ITS-1 is up to 13.2%.

