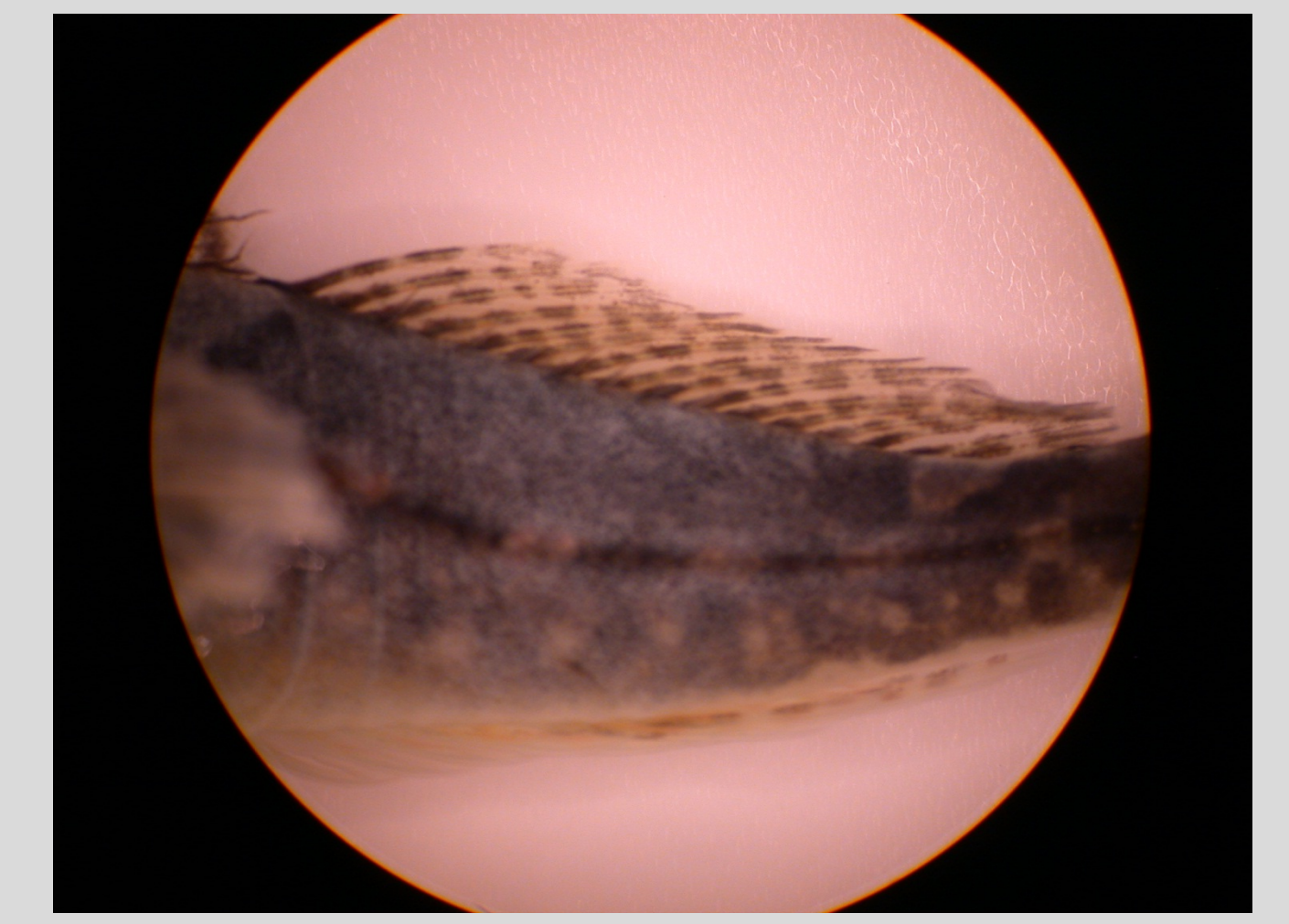
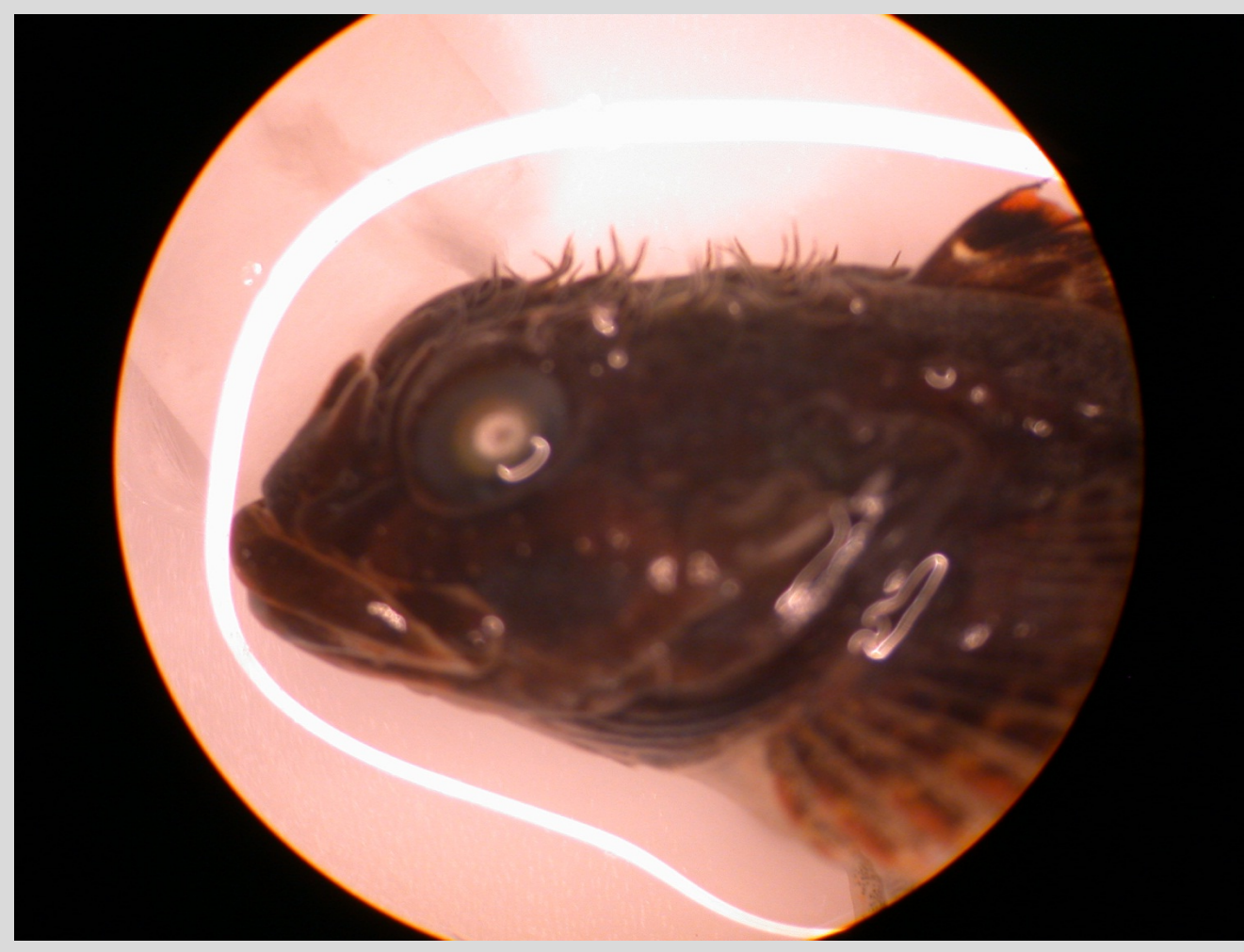


The Phylogeny of Marine Sculpins (*Cottidae*)

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Introduction:

- ❖ My project is the study of the evolution of the ability to change color in marine sculpins (Pisces; Scorpaeniformes; Cottidae).
- ❖ In the study we developed a phylogenetic hypothesis using one mitochondrial and 3 nuclear loci.
- ❖ We then mapped out the color-changing ability of various sculpins into a phylogenetic tree.

What Are Sculpins?

Sculpins are a morphologically diverse species from the *Cottidae* family. There are around 300 different species of sculpin, ranging from California to the Aleutians.

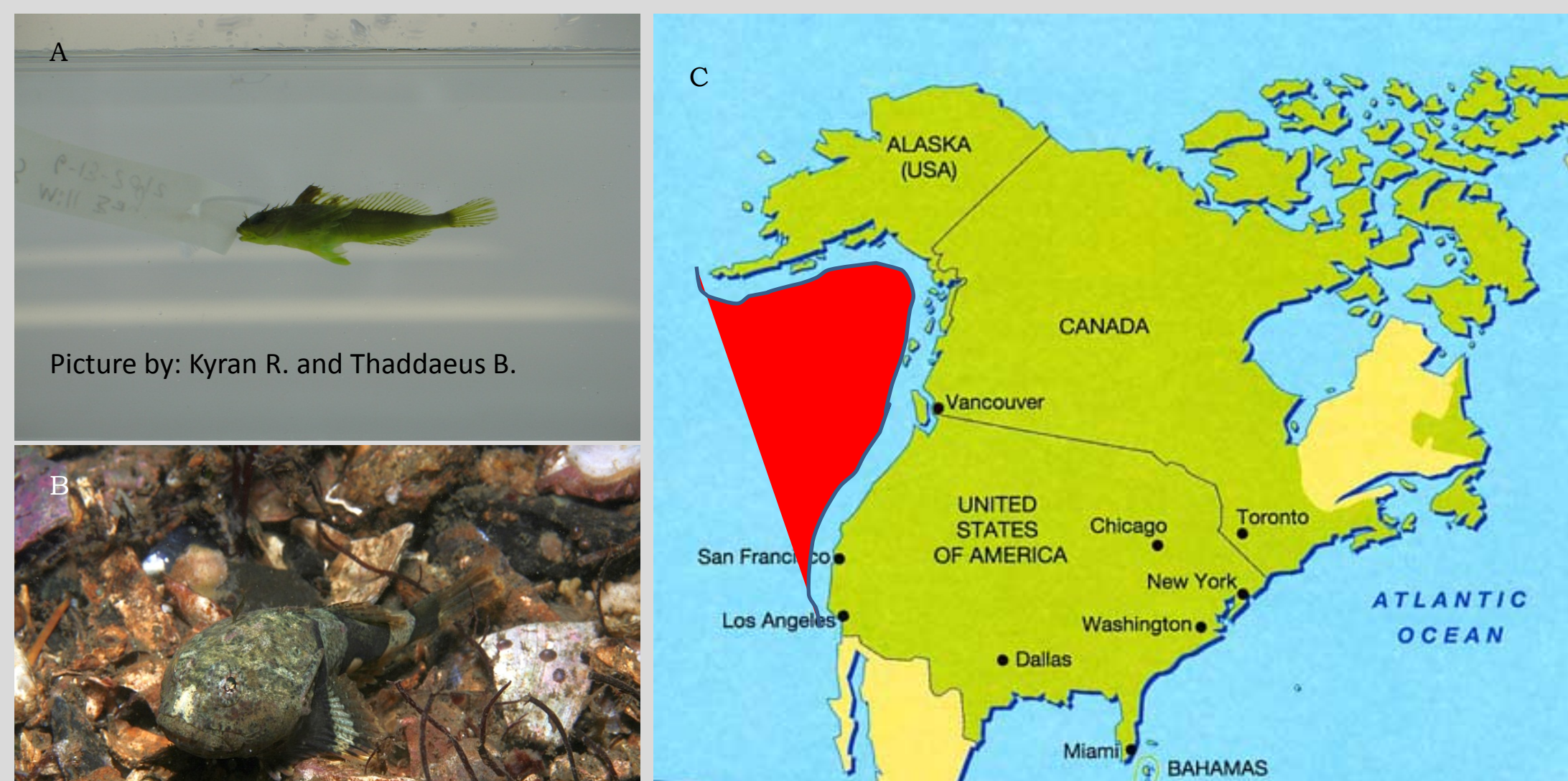


Figure 1. A) *Artedius fenestralis* or sharp nose sculpin B) *Enophrys bison* or Buffalo Sculpin Photo courtesy of Greg Jensen C) Sculpin Range

Figure 2. *Enophrys lucasi* or the Leister Sculpin Photo courtesy of Aaron Galloway



Results:

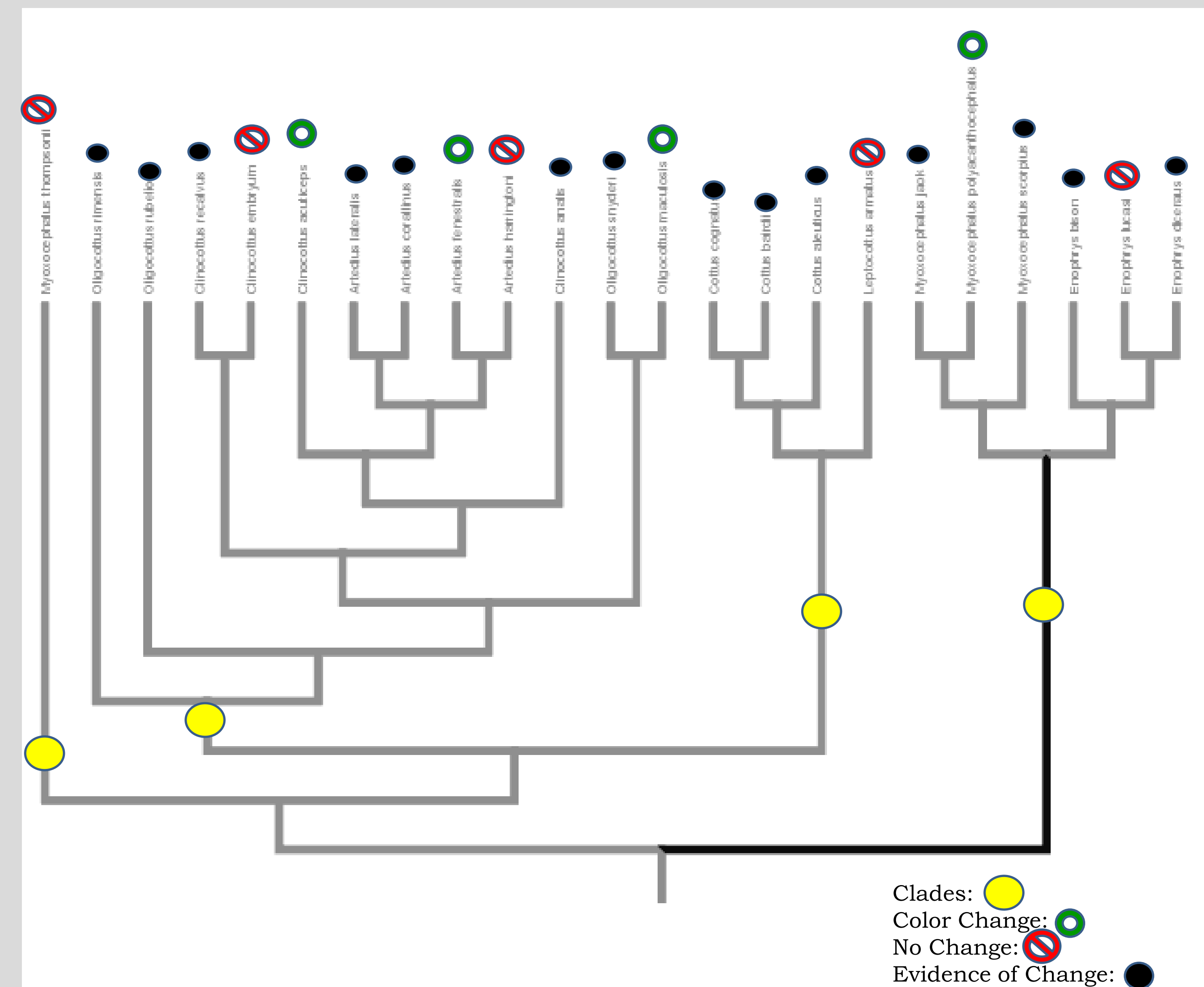
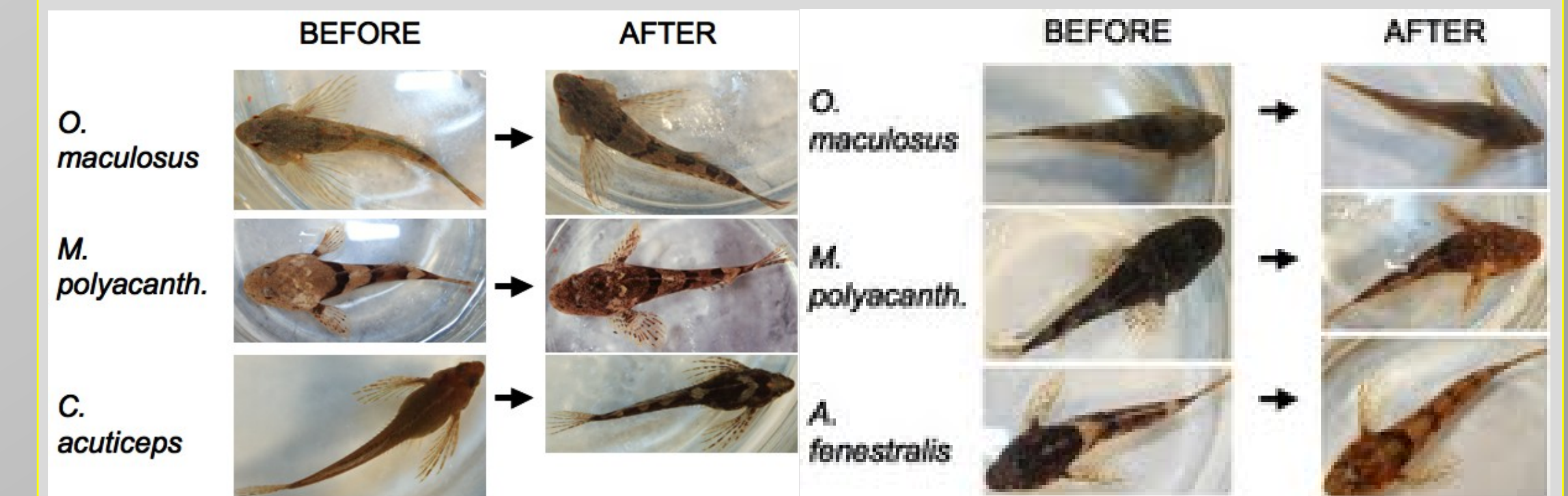


Figure 3. Phylogenetic tree based on COI sequences. Symbols on the tree represent color change ability. Color change ability was determined by T. Buser and from published images.

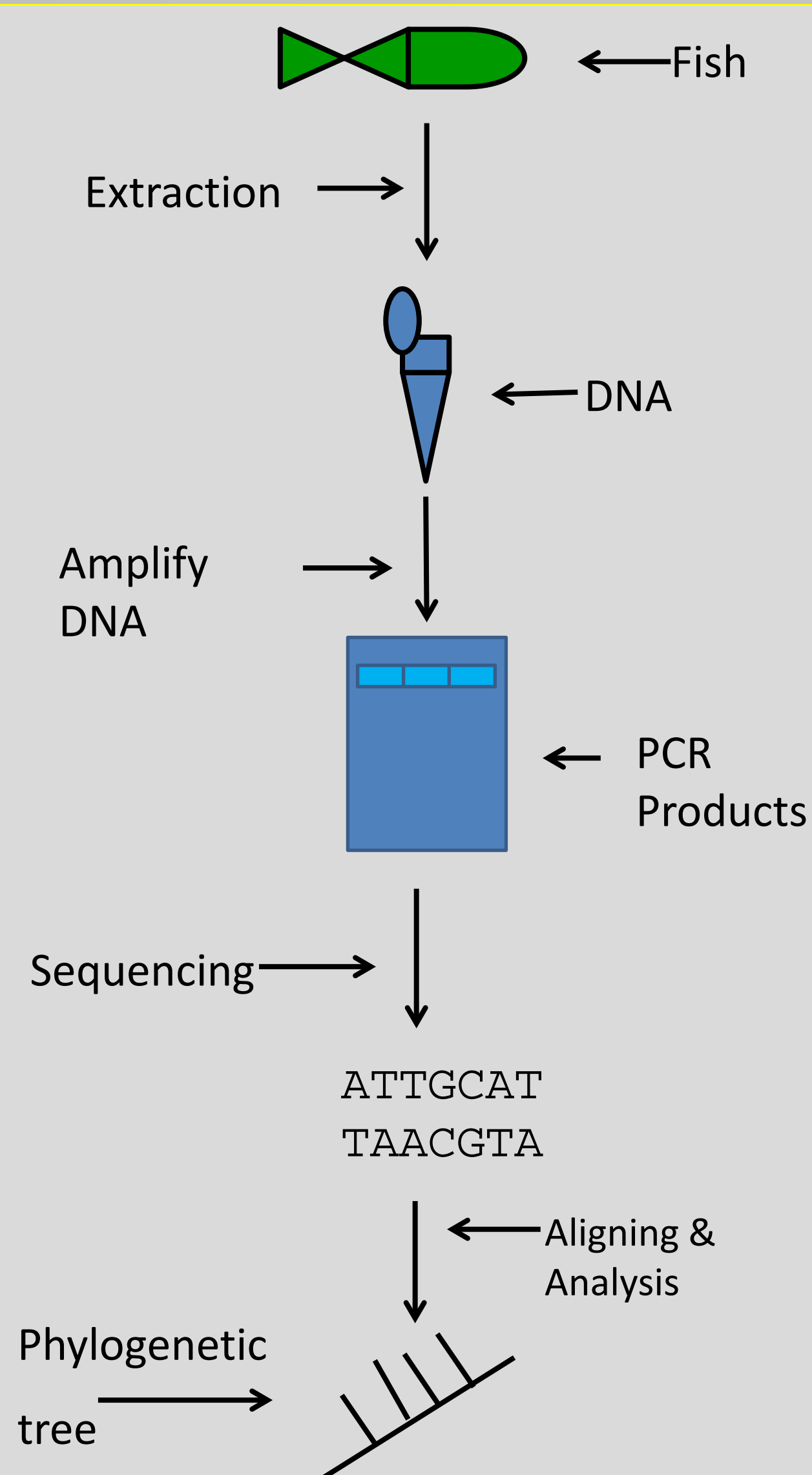
Discussion:

- ❖ In Figure 3, there are four distinct clades.
- ❖ Many of the species only have evidence that they change color, more research is needed.
- ❖ The minimum number of evolutionary losses of the ability to change color is five.
- ❖ Closely related species show a wide variety of color change ability.
- ❖ The widespread evidence of color change suggests that the ancestor of all these sculpins had the ability to color change.
- ❖ Why did these five species lose the ability to change color? Maybe because it was more of a disadvantage to the fish because it used energy that it didn't need to use.



Methods:

- ❖ DNA of 43 different Sculpins was run through a Polymerase Chain Reaction.
- ❖ The yielded product was then analyzed to go to sequencing.
- ❖ The data from sequencing was used to make a phylogenetic tree.
- ❖ The tree in Figure 3. is made up of public data. I will have my own at a later date.



Acknowledgments: This publication was funded by the National Center for Research Resources and the Division of Program Coordination, Planning, and Strategic Initiatives of the National Institutes of Health through grant number 8R25D011159-5.

I would also like to express my gratitude to my mentor, Thaddaeus Buser and my PI Andres Lopez

