

# Temperature-induced changes in the feeding mechanism of the invasive Florida fish *Cichlasoma urophthalmus*

Taylor Jones and Molly Wightman

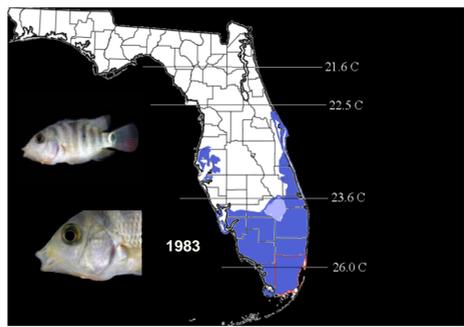
Faculty Advisor: Dr. Ralph G. Turingan, Department of Biological Sciences, Florida Institute of Technology

## Background and Rationale

- Climate change has caused an increase in global water temperatures, leading to increased ranges of previously tropical fish.
- Generalist, invasive species are capable of adapting to new environments by utilizing a wide range of resources in the invaded ecosystem.
- A number of non-native fish species, including *Cichlasoma urophthalmus*, can now be found in Florida, however, their ecological and evolutionary implications are unknown.
- The impact of colder waters on the morphological features of generalist, invasive species is also unknown.

### *Cichlasoma urophthalmus*

- Generalist predator
- Small-manipulating jaws
- Generalized-fish feeding mechanism
- Eats fish, algae, crustaceans, mollusks....etc.

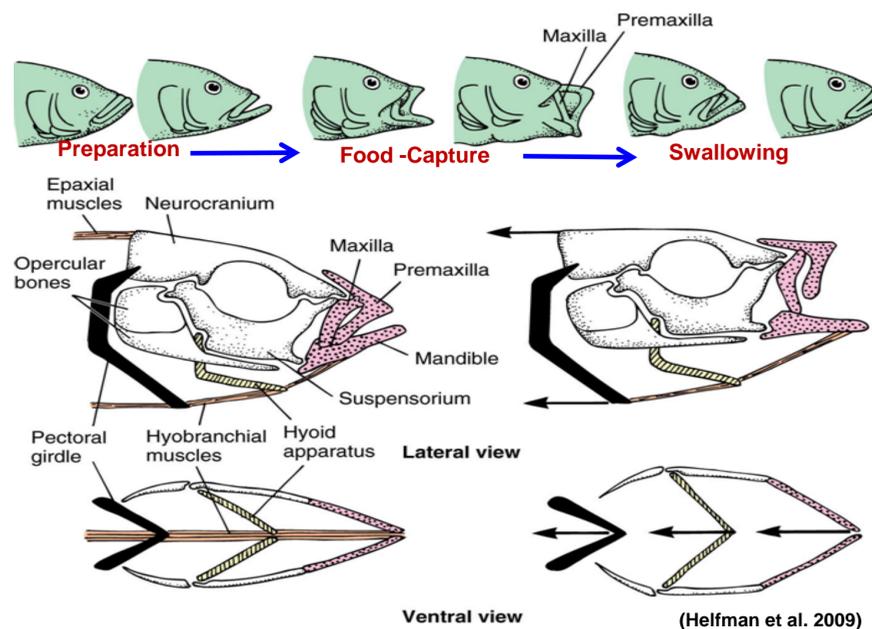
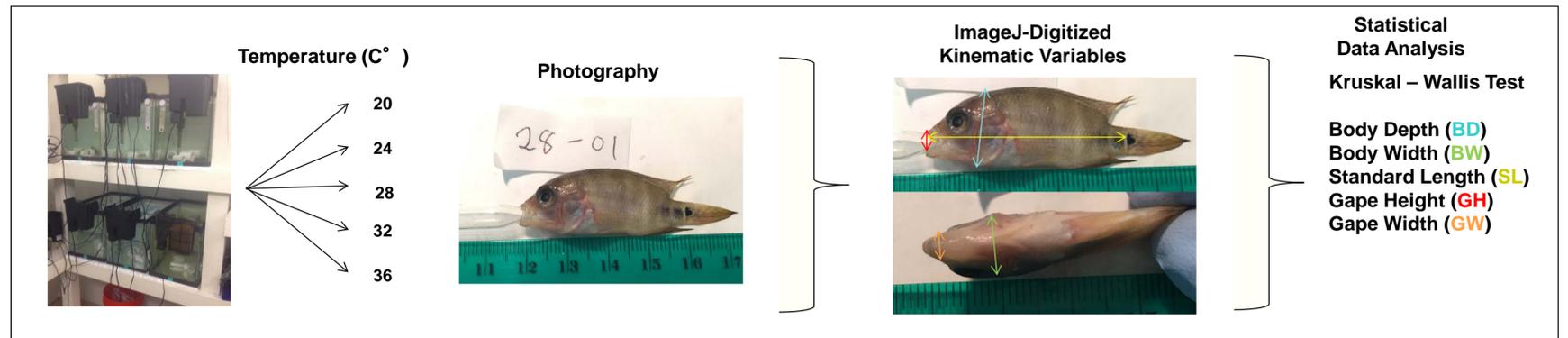


## Research Question and Hypotheses

How do generalist, invasive species respond to changes in environmental temperature?

- (1) As temperature increases, the morphological features used for feeding in *Cichlasoma urophthalmus* will increase in size.
- (2) The size of morphological features of *Cichlasoma urophthalmus* will vary across temperatures.

## Experimental Design



Kinematic events during prey-capture in fishes and the key muscles and bones used for feeding performance.

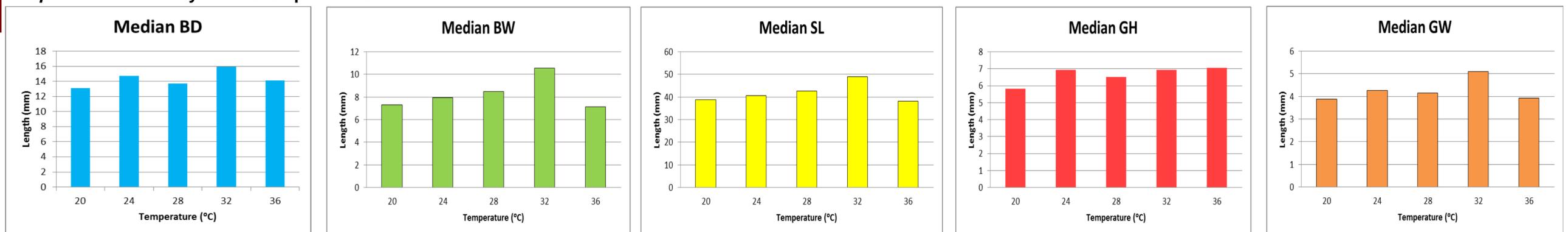
| °C      | BD (mm) | BW (mm) | SL (mm) | GH (mm) | GW (mm) |
|---------|---------|---------|---------|---------|---------|
| 20      | 13.075  | 7.2975  | 38.737  | 5.833   | 3.887   |
| 24      | 14.757  | 7.943   | 40.667  | 6.932   | 4.277   |
| 28      | 13.743  | 8.505   | 42.566  | 6.526   | 4.147   |
| 32      | 15.939  | 10.5595 | 48.9655 | 6.935   | 5.1105  |
| 36      | 14.129  | 7.132   | 38.189  | 7.044   | 3.938   |
| P-value | 0.6653  | 0.1738  | 0.5349  | 0.5793  | 0.7648  |

- The size of morphological features is not significantly different among the different temperatures.

## Conclusion and the Big Picture

- Morphological growth in generalist, invasive fishes does not change in response to varying temperature.
- The resilience of invasive fish may drive their ability to adapt to new environments and overtake native species that are more impacted by temperature change.
- Future rising temperatures may lead to an increased problem with invasive species in colder temperate regions.

## Results



**NORTHROP GRUMMAN**



Engineering & Science  
Student Design Showcase  
at Florida Institute of Technology

