



Potential Impacts of Crayfish on Native Amphibians

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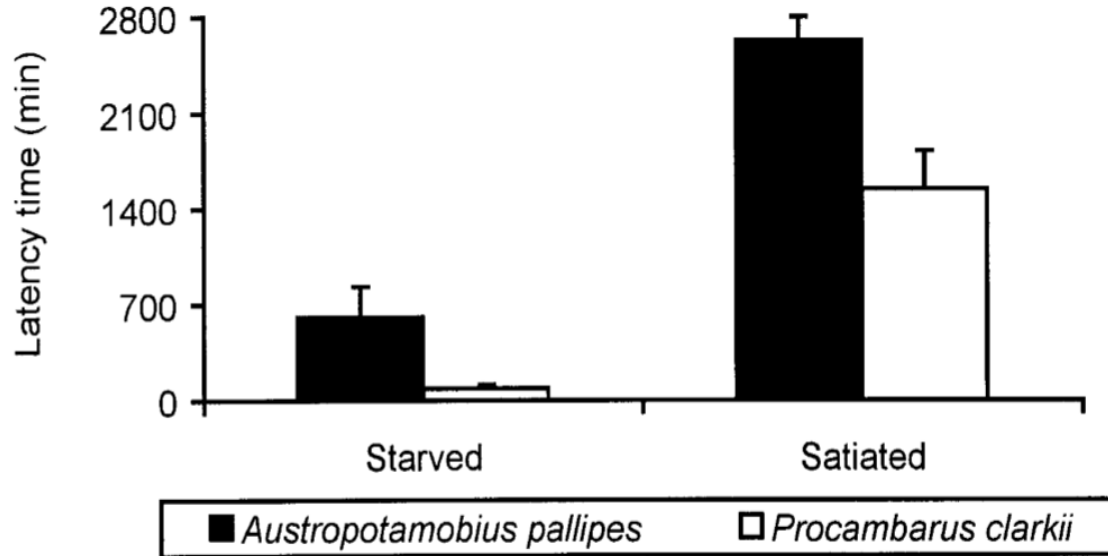


General Background

- Invasive species are one of the major threats to biological diversity.
- Some native crayfish species are being negatively impacted by invasive species of crayfish (Magoulick and DiStefano, 2007).

Previous Studies

- The invasive red swamp crayfish fed on the tadpoles faster than the native species (Gherardi et al, 2001).



Research Question

What will be the difference in survival rates of tadpoles when present with native and invasive crayfish?

H₀=There will be no difference in the survival rates of the tadpoles when living with the invasive and native crayfish species.



Invasive Crayfish

Study Organisms

Type of Tadpole

Rana catesbiana (Bull Frog Tadpole)

Two groups of Crayfish

Native

Cambarus sp. c (Piedmont Crayfish)

Invasive

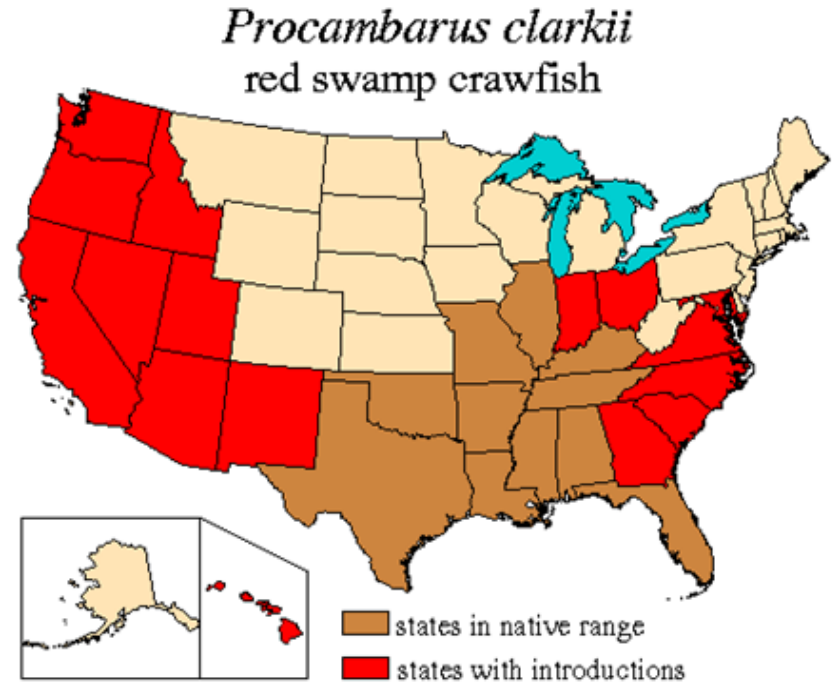
Procambarus clarkii (Red-Swamp Crayfish)



Native Crayfish

Red-swamp Crayfish

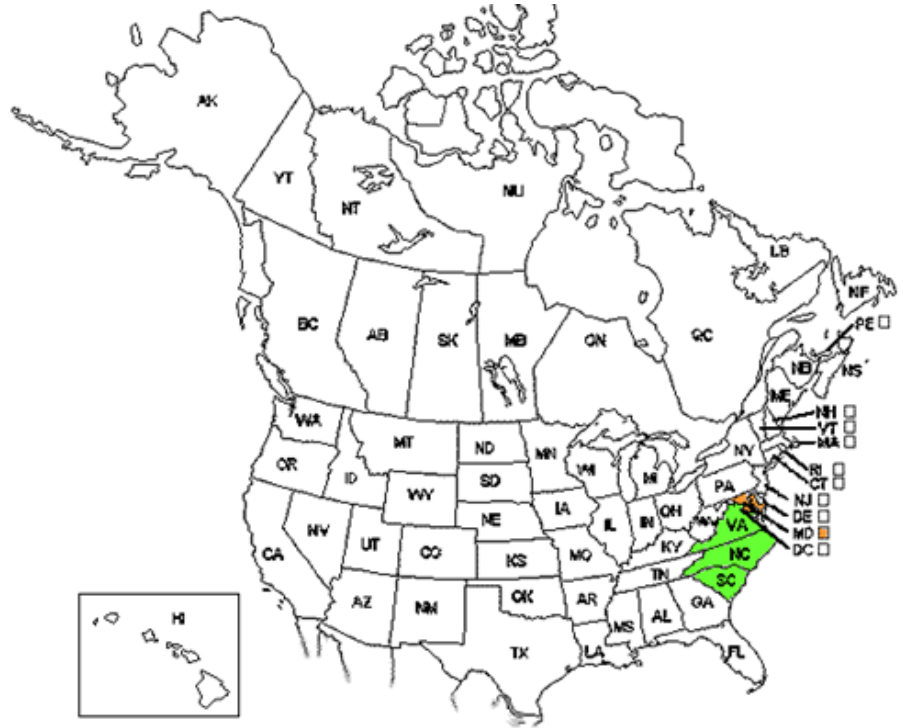
- The Red-Swamp Crayfish territory expands from Mid southern and midwestern United States.
- But was introduced along the west coast and the southern east coast.



(Source: https://nas.er.usgs.gov/taxgroup/Crustaceans/maps/pr_clarkii.gif)

Piedmont Crayfish

- Patapsco Basin in Maryland southward to the Saluda drainage system in South Carolina.
- Most common crayfish species in the Farmville area



(Source:

<http://explorer.natureserve.org/servlet/NatureServe?searchName=Cambarus+acuminatus>)

Bullfrog

- Ranging from a majority of the eastern coast, midwest and even some of the west coast.



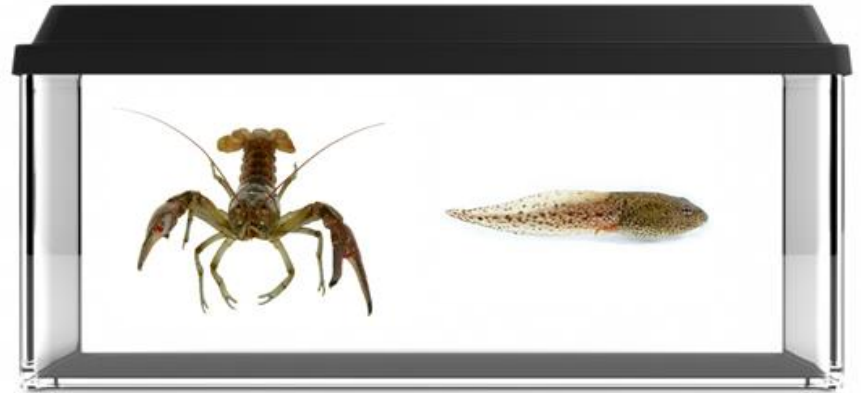
Source:
<http://www.californiaherps.com/frogs/images/rcatesbeianasd410.jpg>



(Source: http://www.columbia.edu/itc/cerc/danoff-burg/invasion_bio/inv_spp_summ/Rana_catesbeiana_files/image005.gif)

Experimental Design

- Control Group:
 - Tadpoles only
- Treatment Groups:
 - Tadpoles + native crayfish
 - Tadpoles + invasive crayfish
- Response Variable:
 - Survival rates of the Tadpoles

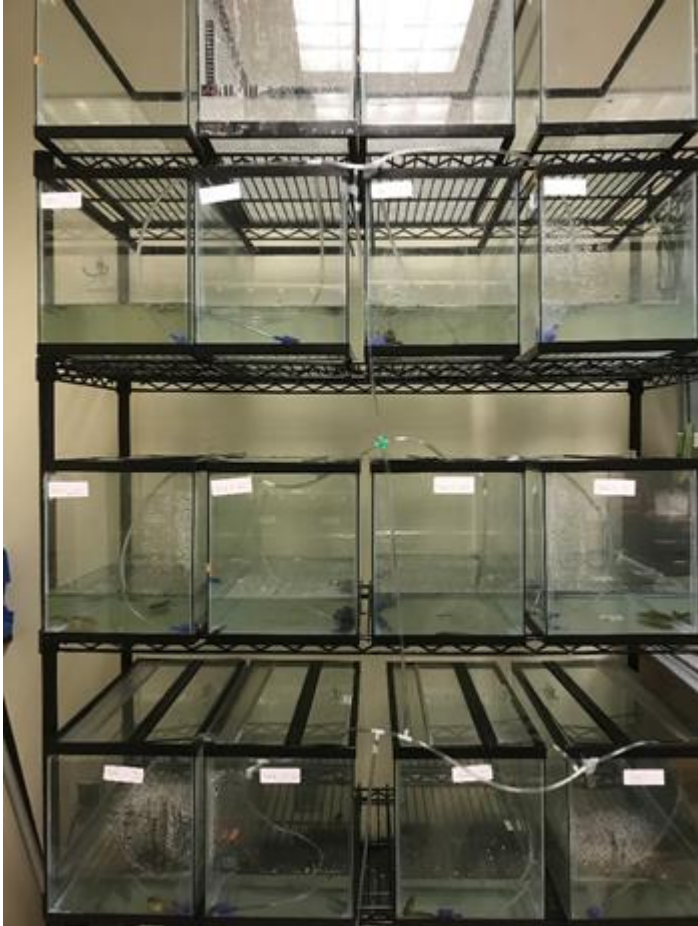


source:(<http://www.seagrant.umn.edu>, <http://yourhomewizards.com>,
<https://upload.wikimedia.org>)

Methodology

Treatment	Native per tank (4 tanks)	Invasive per tank (4 tanks)	Tadpole per tank(4 tanks)
Native crayfish + Tadpole	1	0	3
Invasive crayfish + Tadpole	0	1	3
Tadpole only	0	0	3
Total Amount	4	4	36

- There was 4 tanks for the Native + Tadpoles and 4 for the Invasive + Tadpoles, and 4 tanks for control.



Methodology

- Experimental Unit- Twelve 38 L tanks.
- Aged tap water
- Aeration system
- Crayfish measurements:
 - weight (g),
 - carapace length (mm)
 - claw length (mm)

Methodology

- Observations: Hourly observations on tadpole survival
- Data analysis: one-way ANOVA and TukeyHSD for post hoc comparisons.

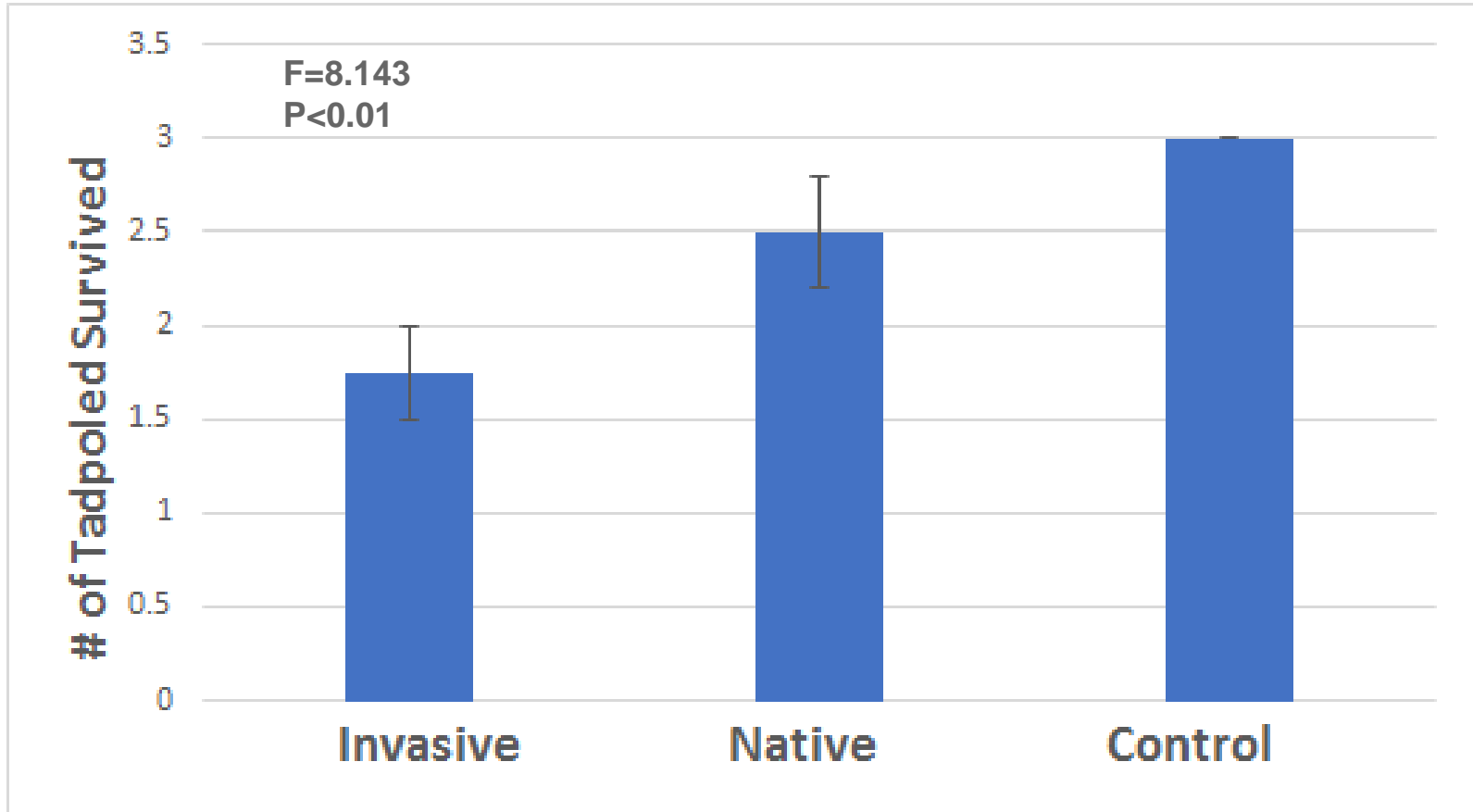
Response variable: tadpole survival rate

Predictor variable: type of crayfish

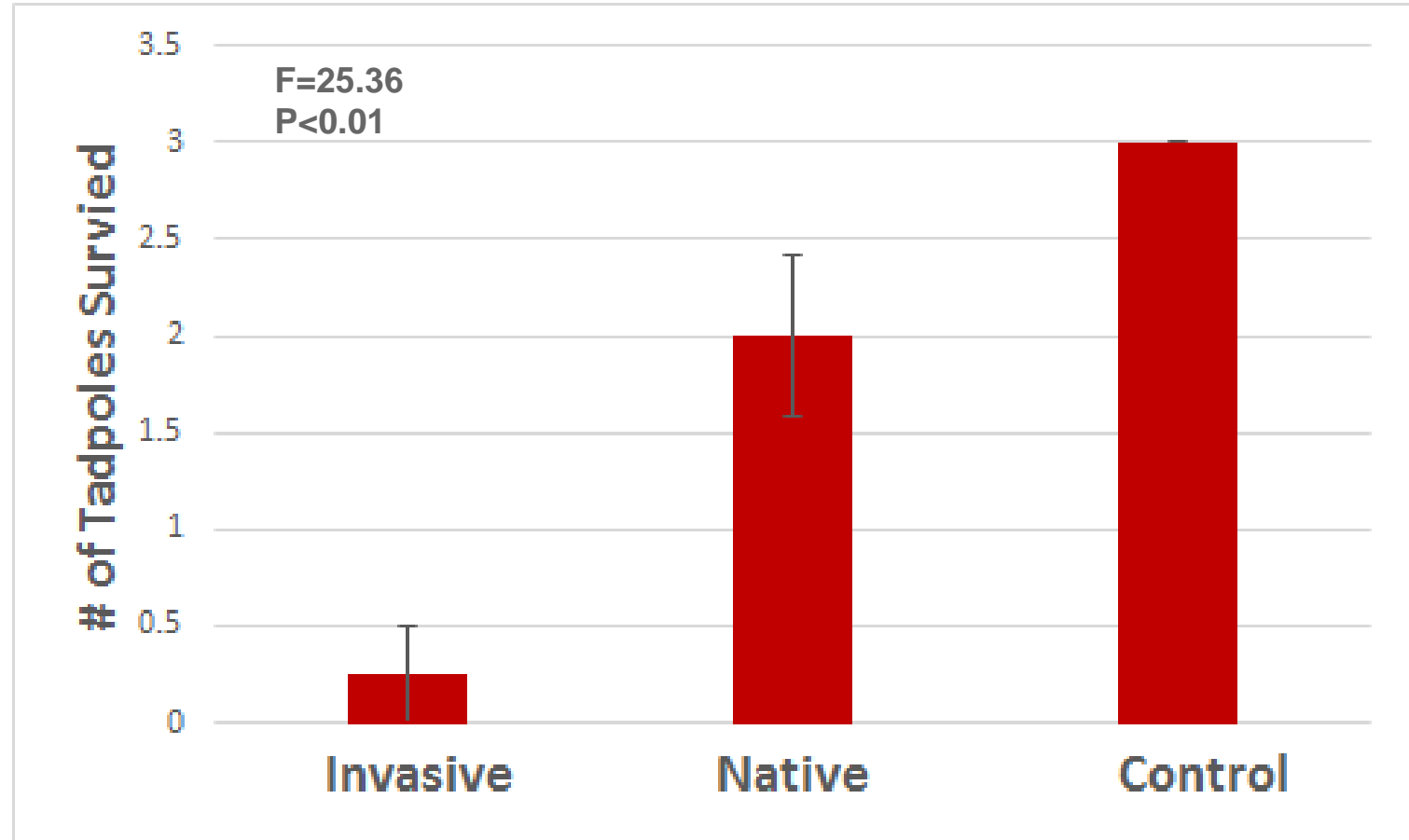
Average size comparisons of native and invasive crayfish

Measurements	Native	Invasive
Mass (g)	14.25 (± 0.805)	38.6 (± 5.412)
Carapace length (mm)	36.375 (± 0.728)	52.35 (± 2.770)
Claw length (mm)	24.025 (± 0.256)	43.125 (± 1.171)

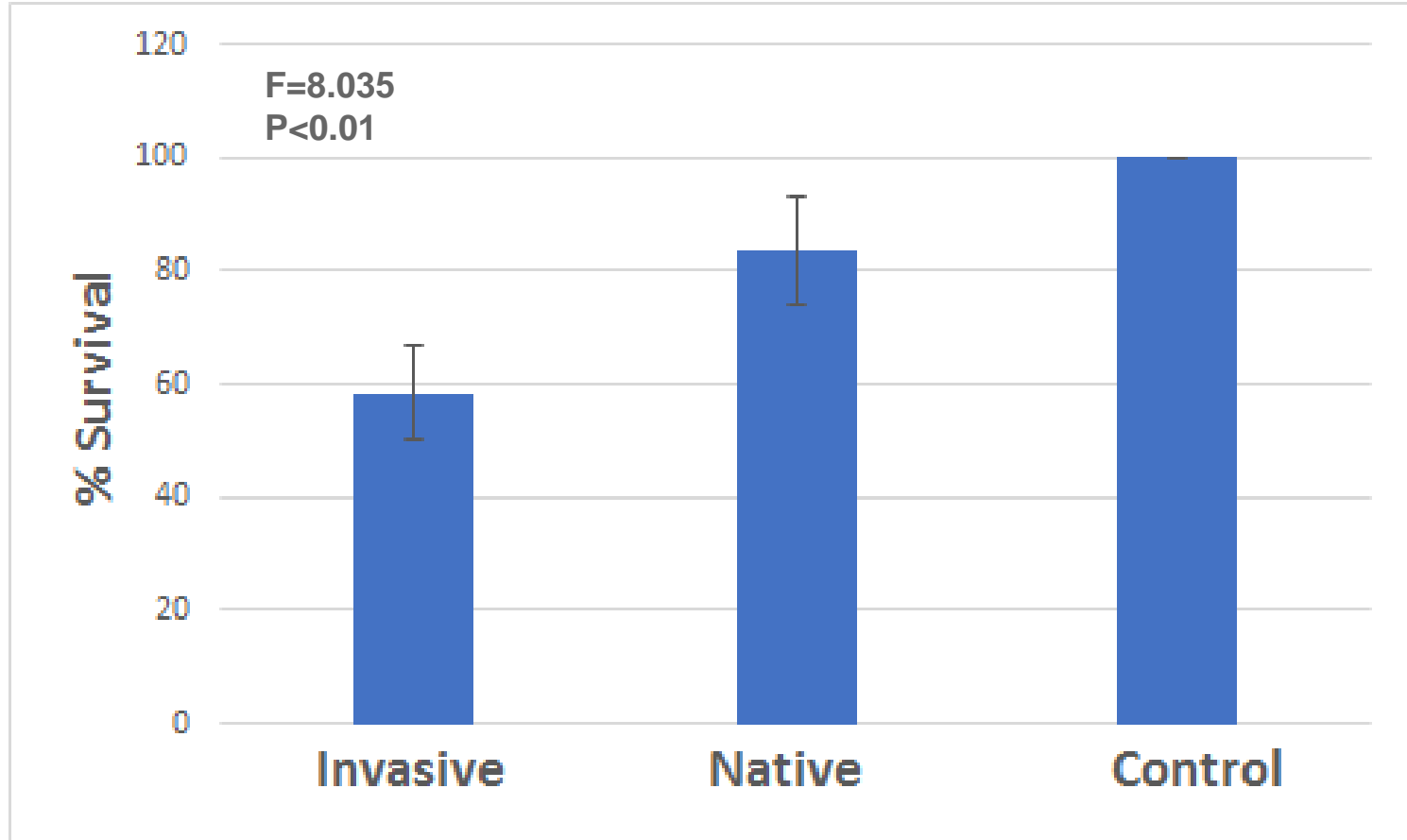
Tadpoles survival after 10 hours



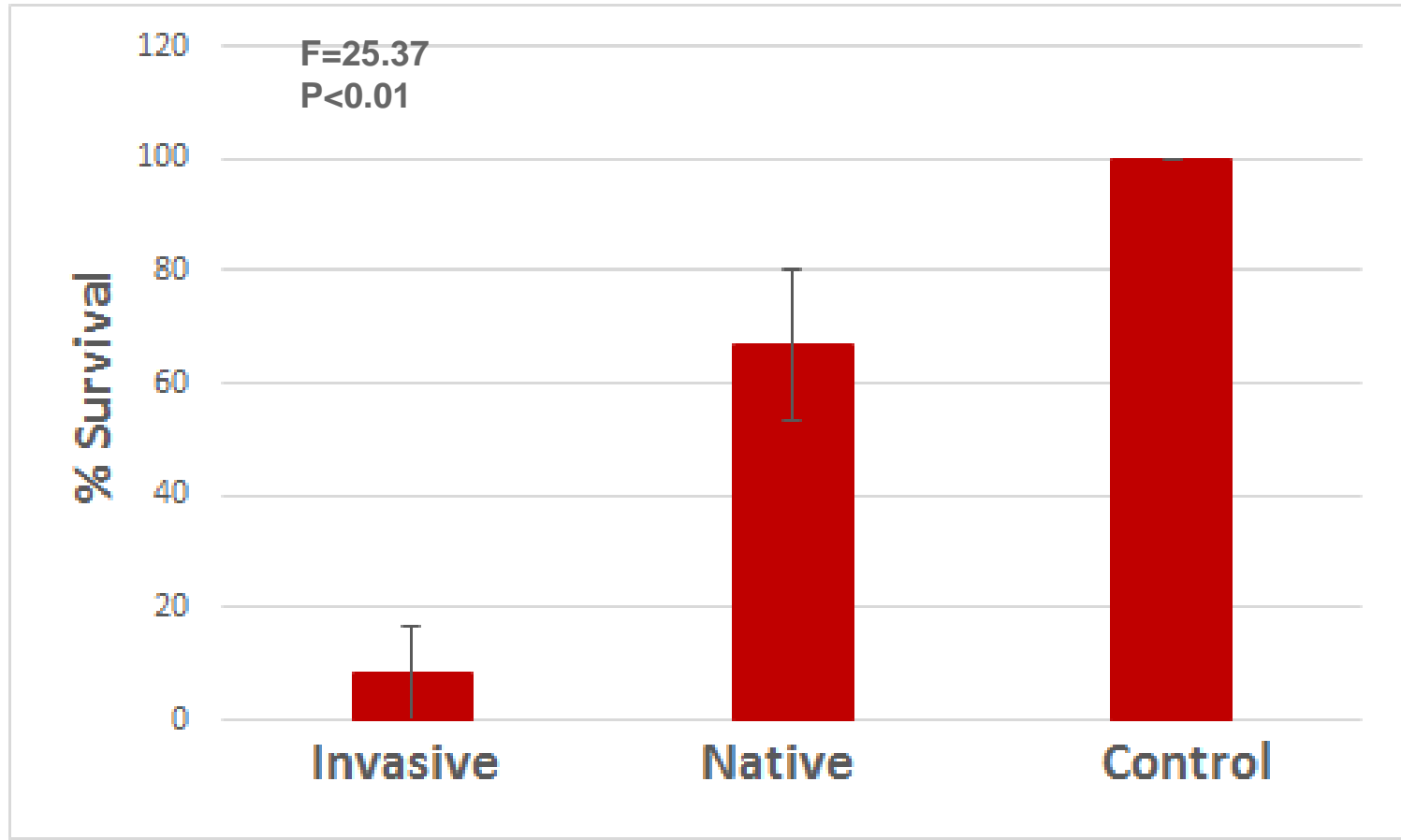
Tadpoles survived after 24 hours



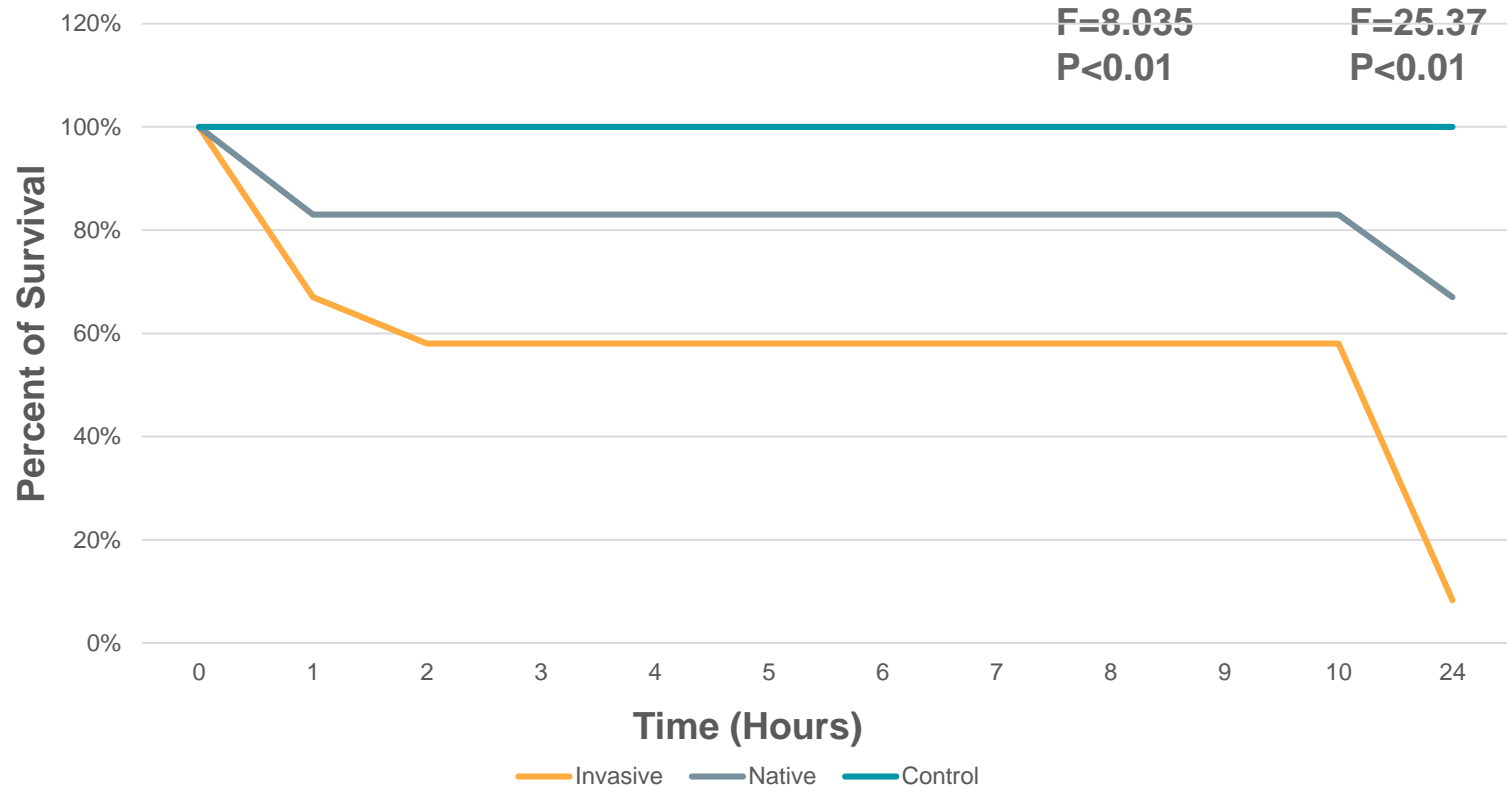
Percent of Survival of Tadpoles after 10 Hours



Percent of Survival of Tadpoles after 24 Hours



Percent of Survival after 10 and 24 hours



Discussion

- Our null hypothesis was not supported.
- The Red-swamp crayfish ate at a faster rate than Piedmont crayfish.
- There was a significant difference between survival rates of tadpoles between the native and invasive crayfish.
- The Invasive crayfish had a significant impact compared to the native crayfish.

Discussion

- Some future experiments that could be done could be increasing the tadpole count and amount of observations.
- We could also weigh out the tadpoles and give each crayfish about the same size tadpoles.

References

- Gherardi, F., Renai, C., *et al.* 2001. Crayfish Predation on Tadpoles: A Comparison Between a Native (*Austropatamobius Pallipes*) and an Alien Species (*Procambarus Clarkii*). *Bull. Fr. Pêche Piscic.* (361):559-668.
- Magoulick et al. 2007. Invasive Crayfish *Orconectes neglectus* Threatens Native Crayfishes in the Spring River Drainage of Arkansas and Missouri. *Southeastern Naturalist.* 6(1):141-150.



Thank you