

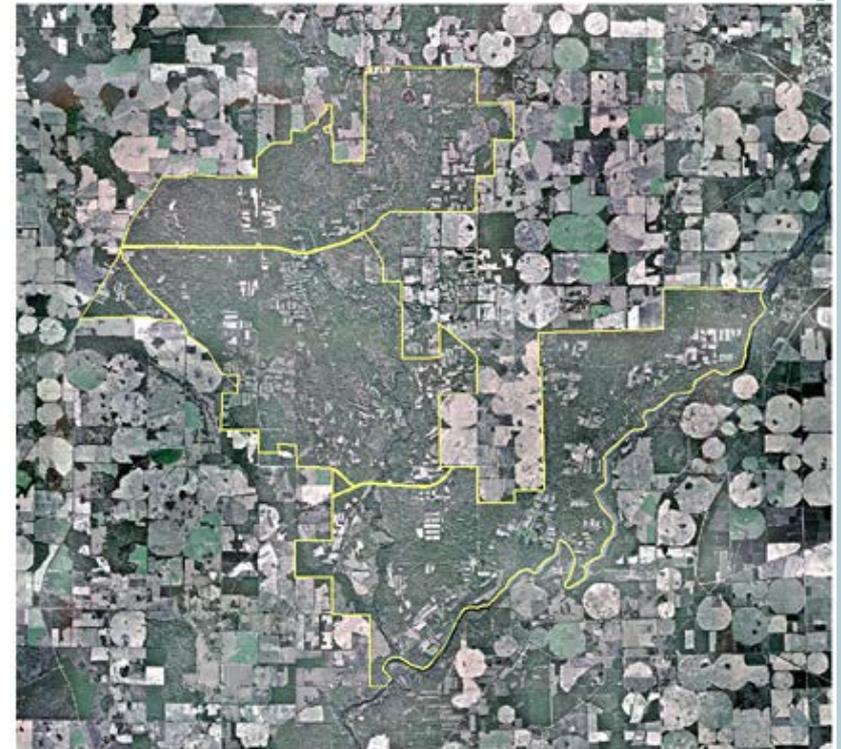
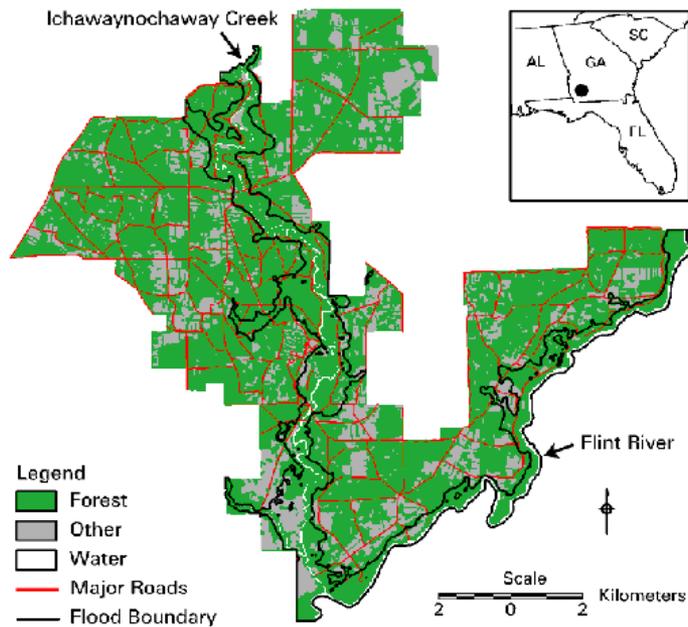
# **MICROHABITAT PREFERENCES OF LARVAL MOSQUITOES**

**Nathalie Smith and Stephen Golladay**

**Joseph W. Jones Ecological Research Center**

# STUDY SITE

- Ichauway Ecological Reserve
- 29,000 acres longleaf pine forest
- Minimally disturbed wetlands



# ISOLATED WETLANDS

- Not connected to surface waters
- Variable periods of flooding and drying
- Small
- Role in landscape is poorly known
- Lack legal protection
- Frequently disturbed by agricultural land use and urbanization



# Isolated wetlands

Significant due to their contribution to regional biodiversity



Plants

Amphibians

Invertebrates



# Reference Wetlands



## Grass-Sedge Marsh

- Open and treeless
  - Groundcover dominated by panic grasses & cutgrass
  - Sandy or sandy soil clays



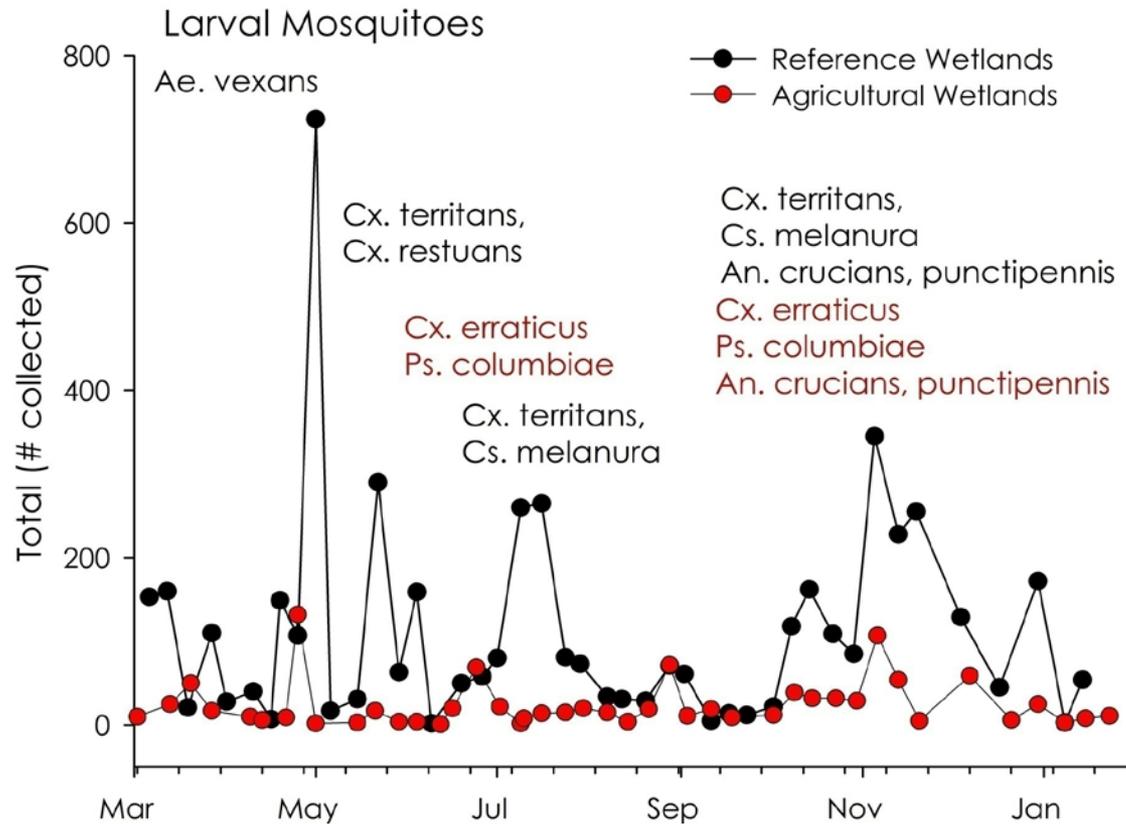
## Cypress-Gum Swamp

- Dense canopy of cypress and gums
- Inundated for longer periods
- Organic soils over clay



# History

-Part of a long term study examining mosquito species within isolated wetlands



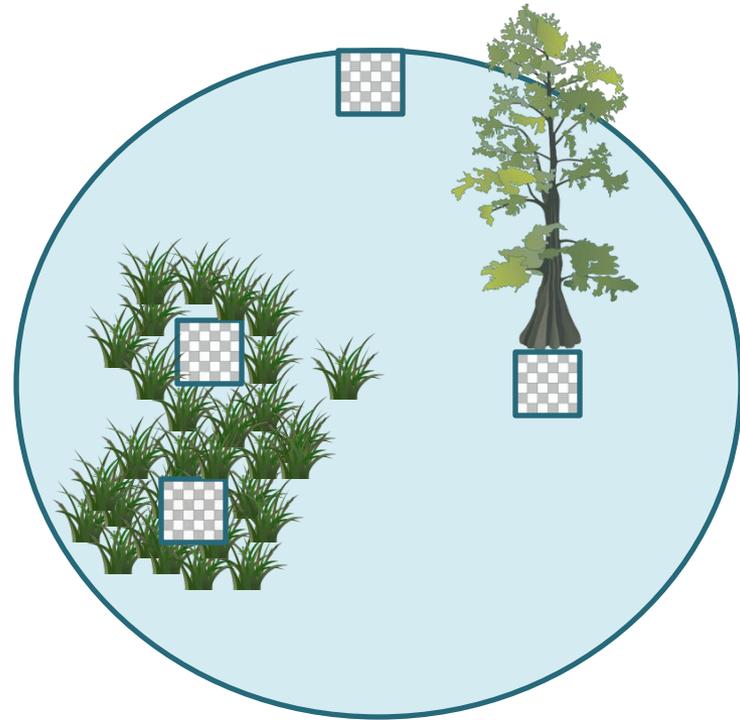
# Objectives

- Improve sampling techniques for larval surveillance
  - Compare suitability of microhabitat characteristics as breeding habitat for larval mosquitoes
  - Examine microhabitat characteristics as predictors of species diversity and abundance



# Microhabitats

1. Edge
2. Vegetation gaps
3. Continuous vegetation coverage
  - *Panicum sp.*
  - *Carex sp.*
4. Cypress
5. Depth (recorded for every individual square within every microhabitat)



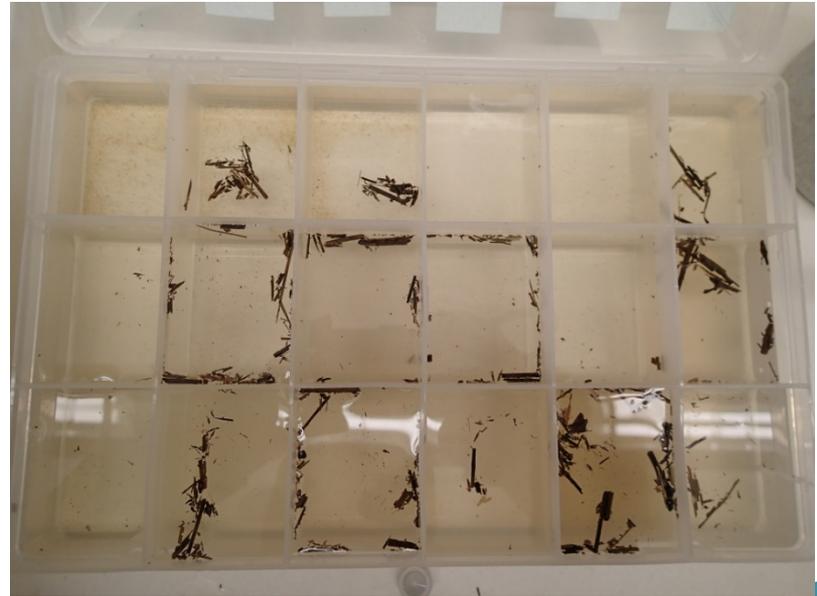
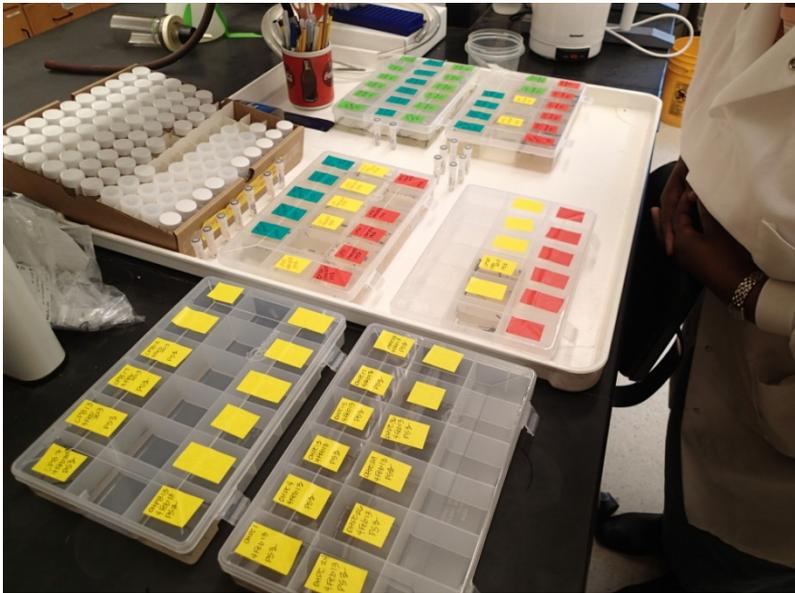
# Methods

- 1m<sup>2</sup> grid
- 36 individual “capture chambers”
- 3 dips per square using standard dipper
- Each microhabitat sampled three times: 108 squares
- January, May and September



# Methods

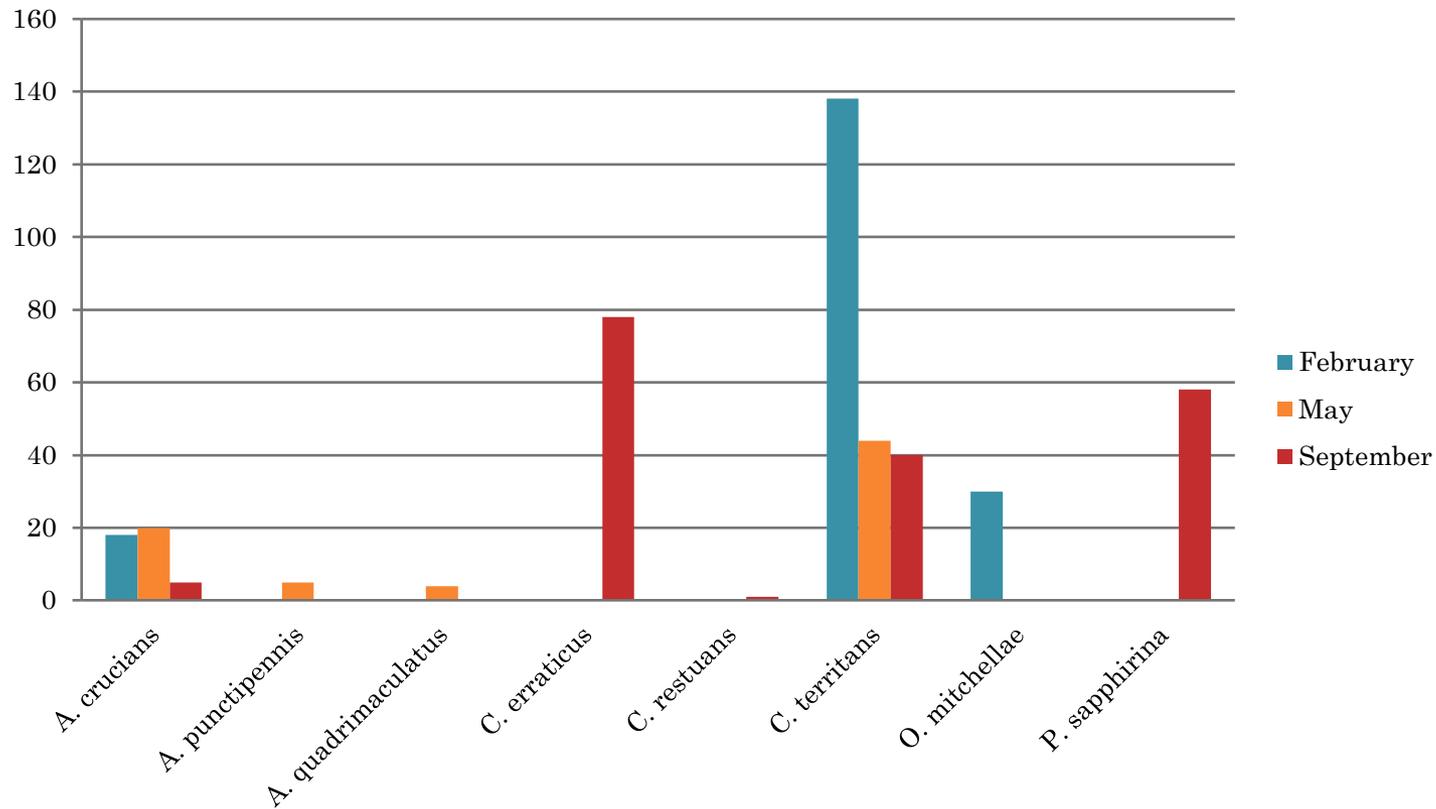
- Captured larvae were raised in rearing chambers
- Preserved once they reached the fourth instar
- Identified to the lowest possible taxonomic level



# Capture Results

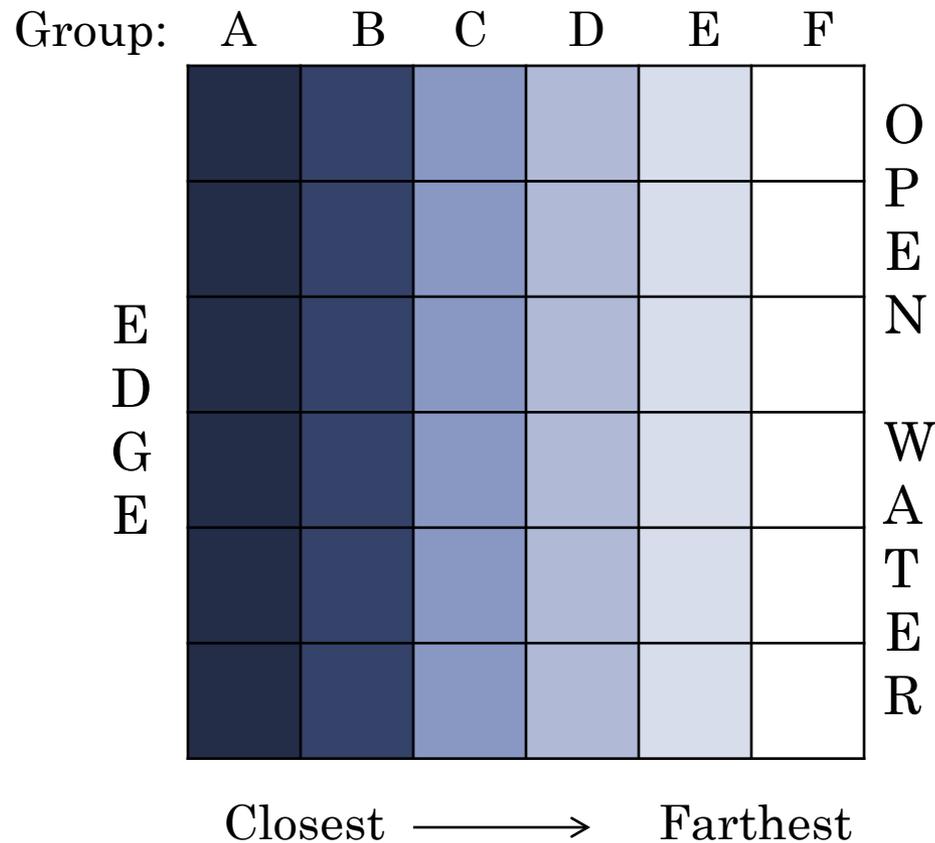
- Eight species were captured representing four genera
- Species capture and abundance differed depending on the time of year

Species Captures/Month



# Results: Edge

We analyzed data based off of proximity to “edge”

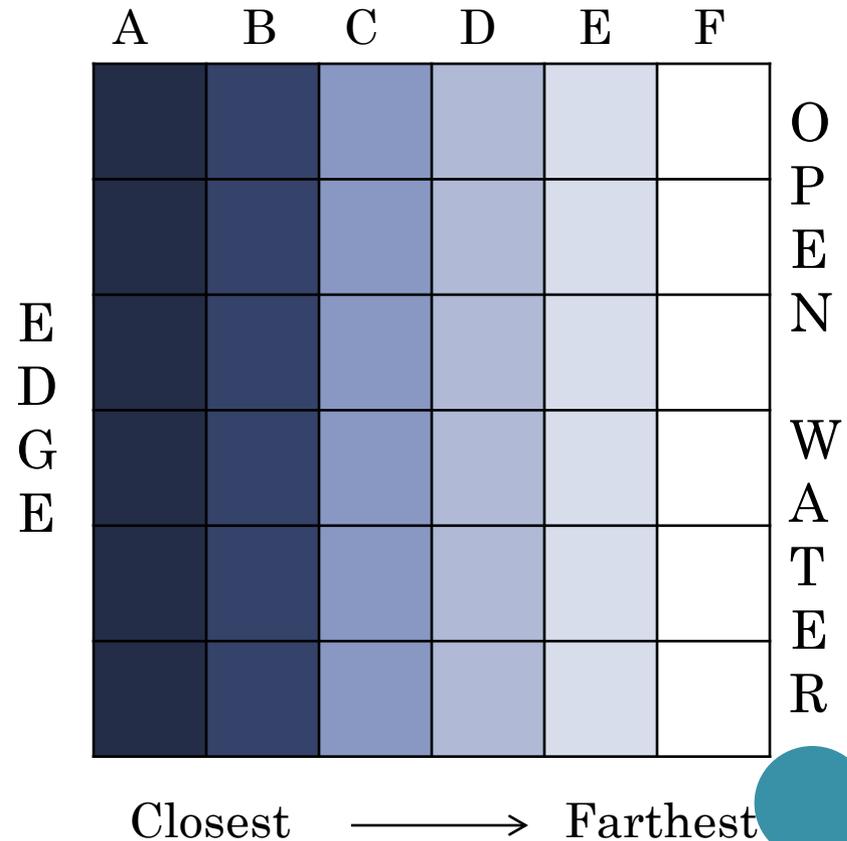
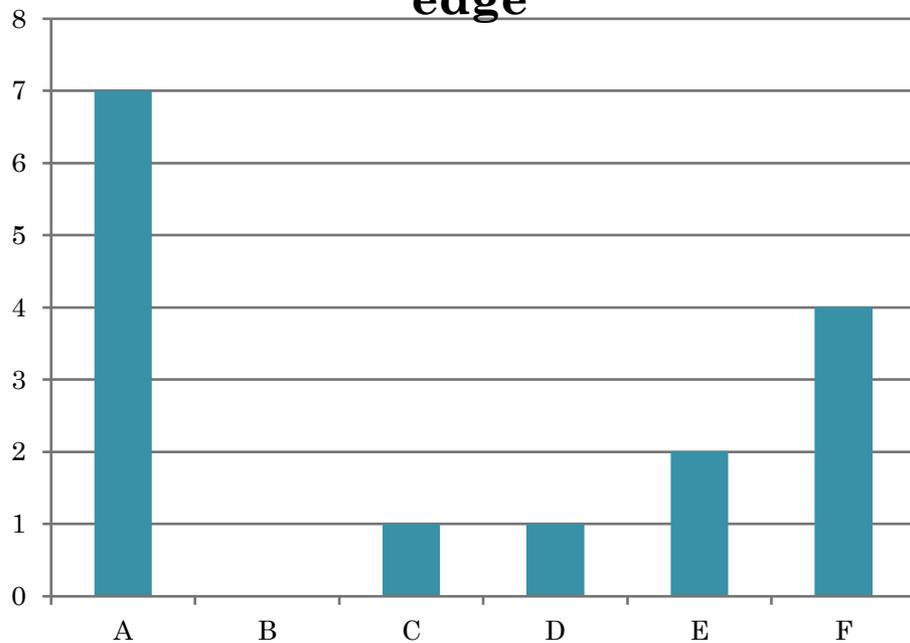


# Results: Edge

We analyzed data based off of proximity to “edge”

ANOVA on Ranks (P=.008)

Captures in relation to “edge”



# Results: Vegetation

## Vegetation vs. Open Water Patches

There are statistically more larvae found within vegetation patches than are found within open water patches

$P = <.001$

Mann-Whitney Rank Sum Test

## Vegetation vs. Edge

There are statistically more larvae found within vegetation patches than are found along the edges of the wetlands

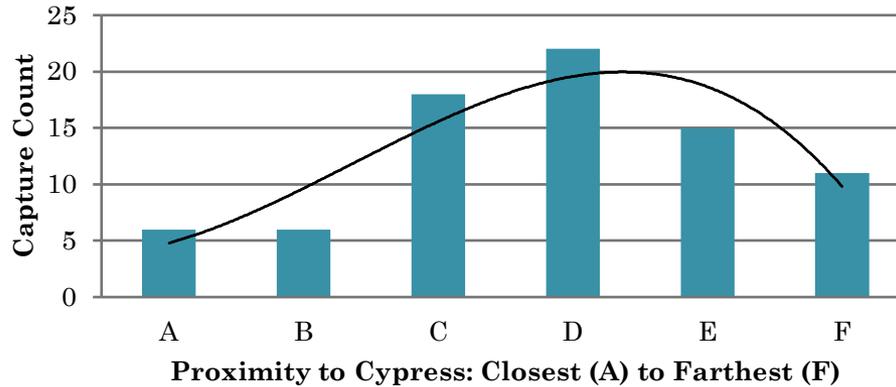
$P = <.001$

Mann-Whitney Rank Sum Test

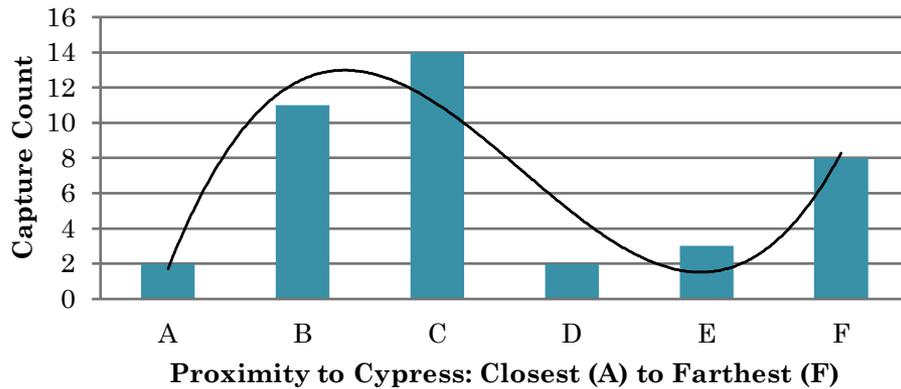


# Results: Cypress

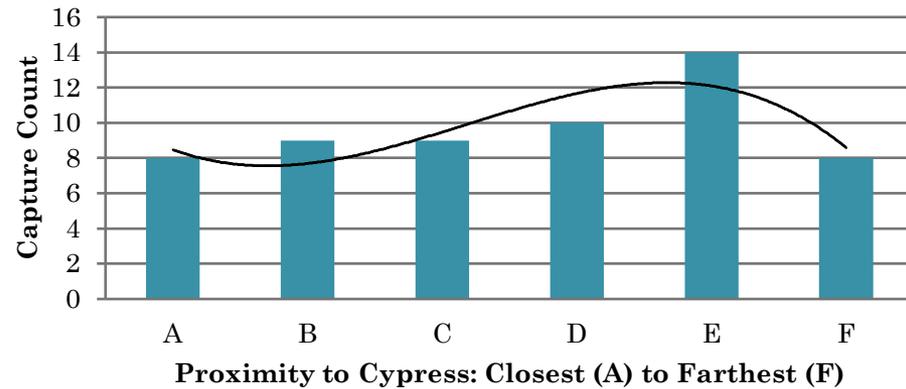
## *C. erraticus* capture success in relation to Cypress tree



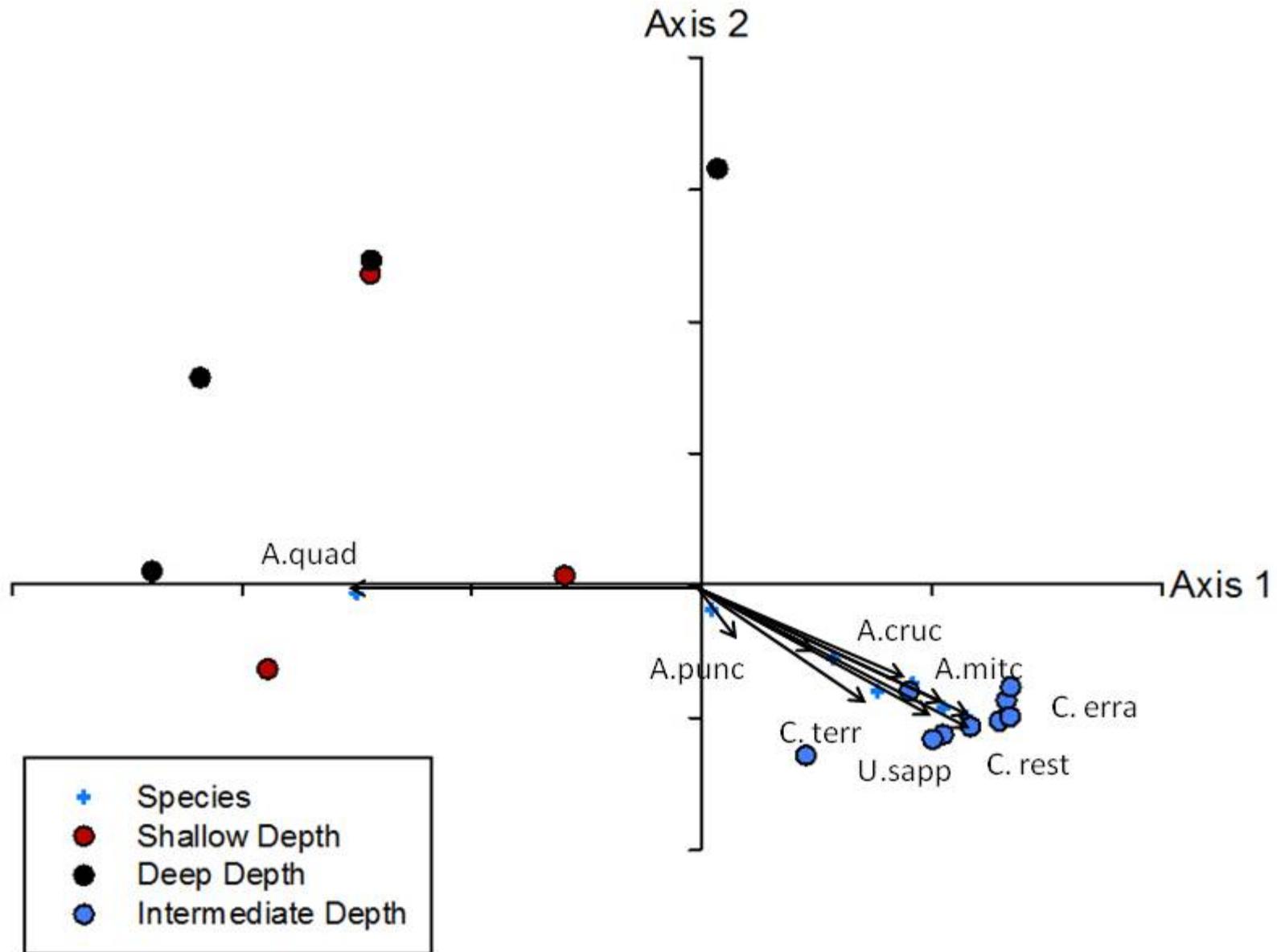
## *C. territans* capture success in relation to Cypress tree



## *U. sapphirina* capture success in relation to Cypress



# Results: Depth



# Conclusions: How can sampling techniques improve for larval surveillance?

-Sampling within an array of microhabitats will improve capture diversity and abundance



-With more research, it may be possible to pinpoint specific microhabitats where target species (i.e. vector species) typically reside.

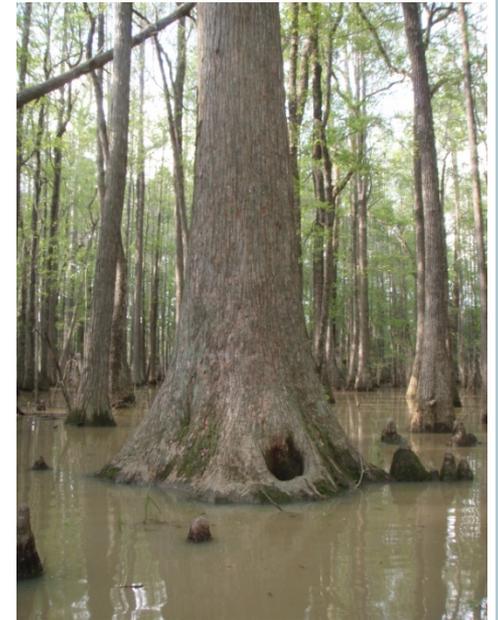


# Conclusions: How do microhabitat characteristics differ as breeding habitat for larval mosquitoes?

-Microhabitats have characteristics that differ as potential breeding habitat

-We have shown that within a specific habitat (i.e. forested swamp) there are microhabitat characteristics that species “select” (i.e. vegetation, distance from edge)

-An interesting question is whether the larvae remain within close proximity to the specific microhabitat where oviposition occurs  
(ex: *A. quadrimaculatus*)



# Conclusions: Can certain microhabitats be used as predictors of species diversity and abundance?



## Within our isolated wetlands:

- Depth: <8cm is an ideal place to find *A. quadrimaculatus*. Depths over 8 cm result in greater species diversity.
- Vegetation: Stands of emergent vegetation are the greatest predictor of diversity and abundance



# Conclusions

Conducting more microhabitat sampling events would:

- allow for a more complete investigation of the 24 other species we have collected in SW Georgia
- allow us to identify microhabitat characteristics of a more diverse set of mosquitoes
- Perhaps make sampling for particular species more efficient by targeting microhabitats.

Many of the mosquitoes we observed can serve as vectors for arboviruses.

- transmission of arboviruses is an emerging public health issue in the southeastern U.S.
- little surveillance has occurred in rural areas of SE U.S.

