

# How does the proportion of sugar fed *Aedes albopictus* mosquitoes vary across land use?

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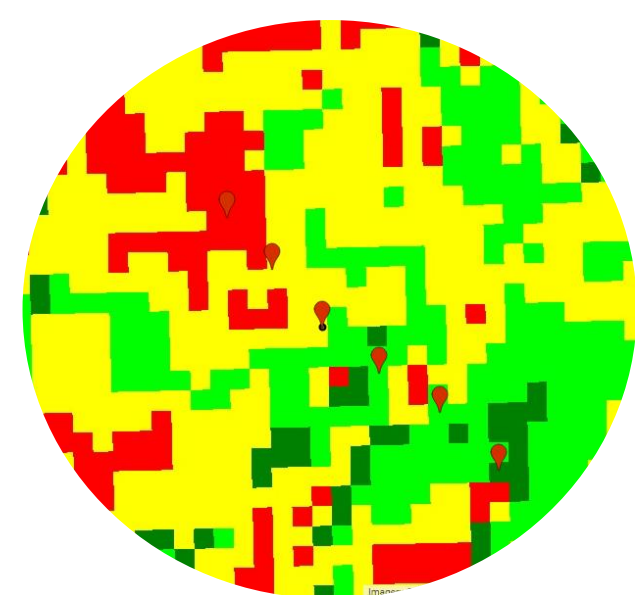
## Introduction

The Asian tiger mosquito, *Aedes albopictus*, is a non-native species to North America and is known to be highly invasive with an ability to vector up to 27 different arboviruses. Since female mosquitoes feed on both sugar and blood to survive, understanding the tendencies for sugar feeding could explain the differences in the abundance of invasive mosquito populations. Past studies have shown that temperature plays an important role in the distribution of vector borne diseases<sup>1</sup>, but it has not been discovered whether other environmental factors such as sugar availability is a limiting resource for mosquito populations.<sup>2</sup>

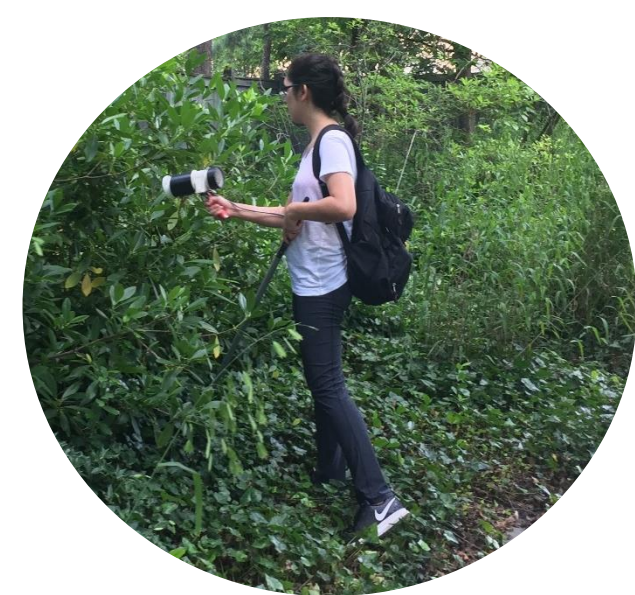
## Objectives

1. Do mosquitoes in Athens feed on sugar?
2. Does the proportion of mosquitoes sugar feeding vary across land use?

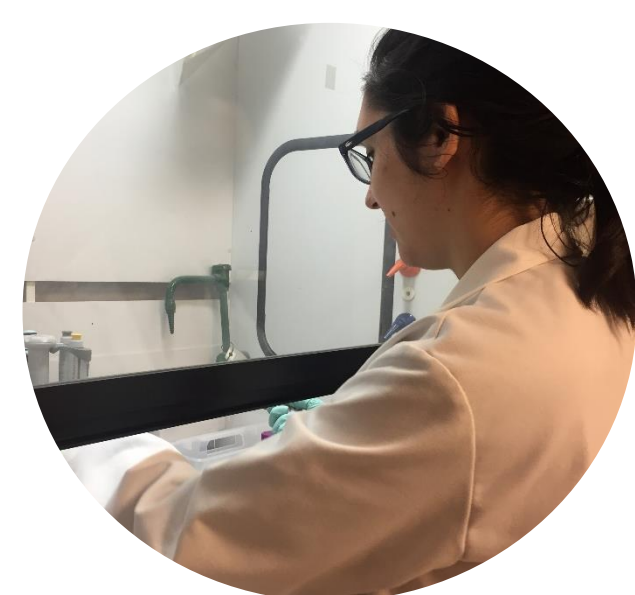
## Methods



- 9 field sites classified as suburban, urban and rural based on percentage of impervious surface



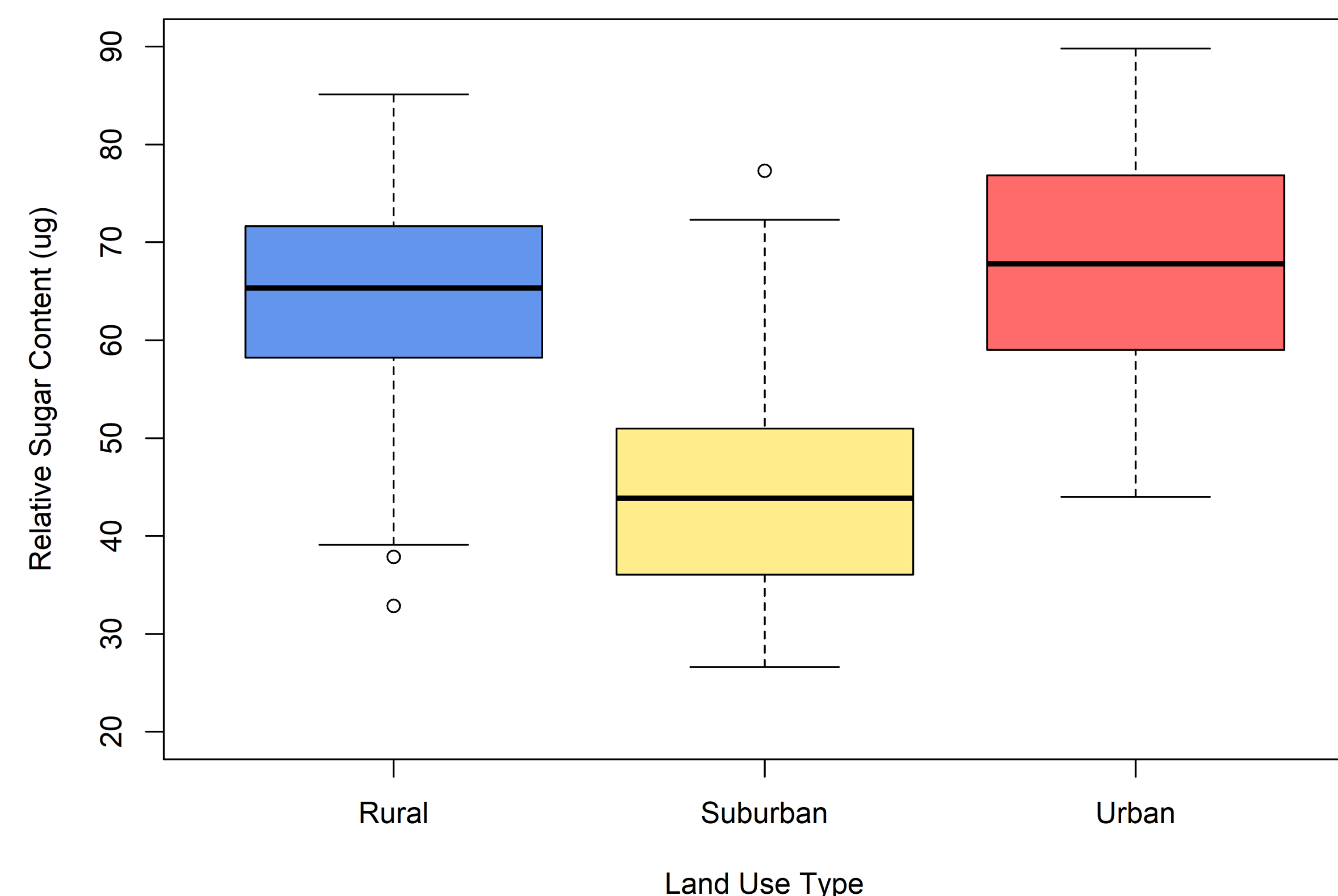
- Backpack aspirator used to trap mosquitoes
- Froze mosquitoes and identified them. Placed female and male *Aedes albopictus* in individual microfuge tubes



- Collected a total of 90 female *Aedes albopictus*, 30 from each type of land use
- Performed sugar assays to determine relative sugar content per mosquito by reading absorbance values through a spectrophotometer

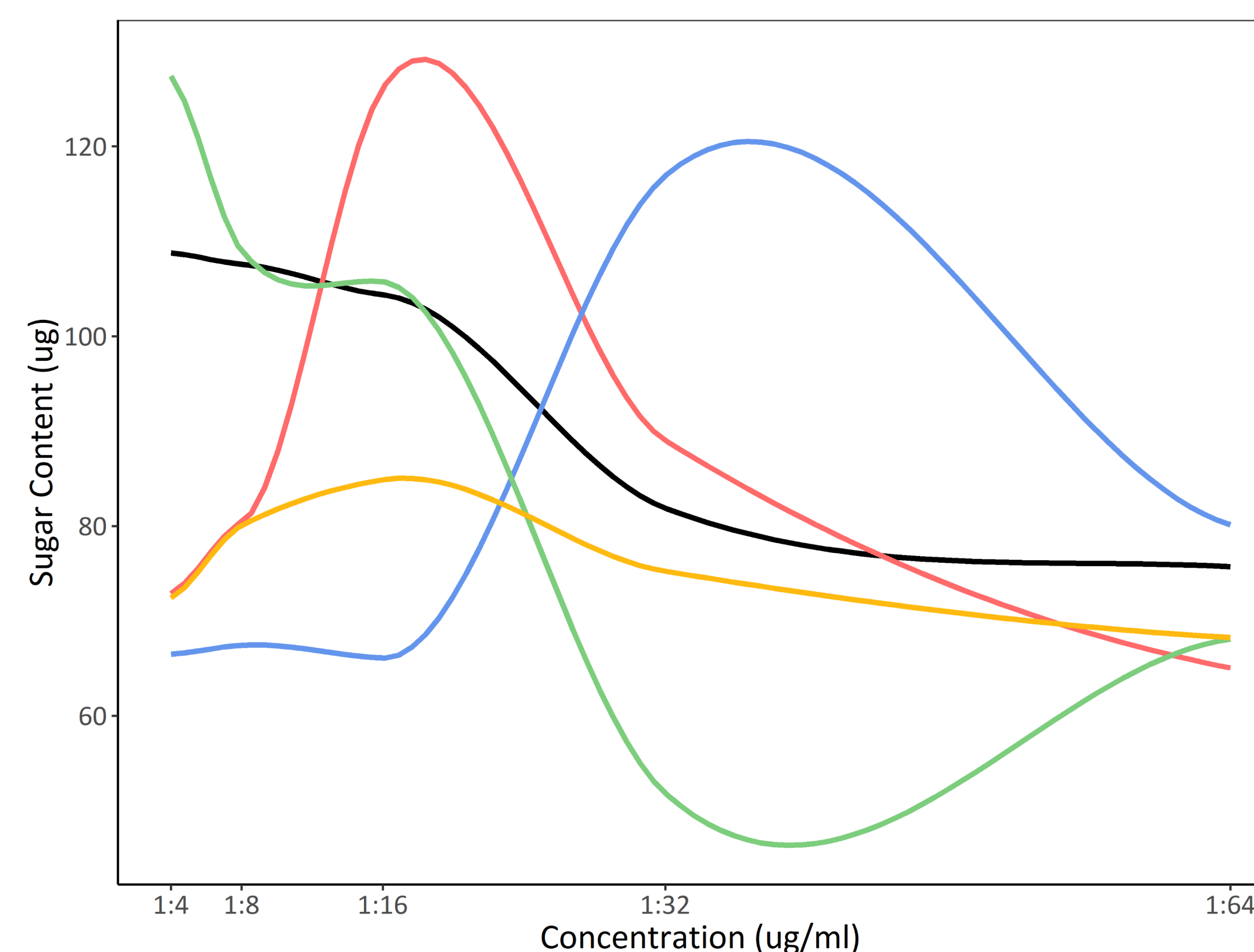
## Results

### Sugar Content by Land Use



**Fig. 1** At the 1:4 dilution values, urban sites have the least amount of variation of sugar content values and the greatest overall amount of sugar followed by rural and suburban land uses.

### Sugar Content in Lab Fed Mosquitoes



**Fig. 2** Control test of five sugar-fed lab mosquitoes with dilutions up to 1:64 shows significant variation prior to dilution 1:32.

## Conclusions

- There is evidence that mosquitoes in *Aedes albopictus* females do sugar-feed and that there are differences between sugar contents across land use types
- Potential chemical inhibitor formed with highly concentrated mosquito dilutions not allowing complete reading of absorbance values and determination of sugar content

## Future Directions

- Measure sugar content in male mosquitoes and compare that data to females as a control
- Measure glycogen and lipid content to gain further understanding on sugar-feeding habits and energy reserves
- Focus on how chemical inhibition may impact the absorbance values of sugar assays
- Determine the concentration required to calculate sugar content accurately

## Acknowledgements

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## References

1. Murdock, C. C., et al. (2017). Fine-scale variation in microclimate across an urban landscape shapes variation in mosquito population dynamics and the potential of *Aedes albopictus* to transmit arboviral disease. *PLOS Neglected Tropical Diseases*, 11(5), e0005640.
2. Foster, W. A. (1995). Mosquito Sugar Feeding and Reproductive Energetics. *Annual Review of Entomology*, 40, 443–474.