

Abstract

The Caribbean fruit fly (CFF), *Anastrepha suspensa* (Loew), is a major pest for tropical fruits in Florida and many regions in Central America. To better understand the preference of ovipositional behavior of wild and lab-reared (LR) *A. suspensa*, laboratory study was conducted to quantify the oviposition rates and fecundity of wild Caribbean fruit flies, *Anastrepha suspensa*, for both wild and lab flies. Wild *A. suspensa* were reared from pupae collected from infested Surinam cherries, *Eugenia uniflora*, with adult mating pairs being placed into individual cages. Different oviposition sites were provided within each cage, consisting of a vertical, flat surface covered in yellow paraffin wax and a domed, green waxed surface, resembling that of an unripe guava fruit, *Psidium guajava*, a preferred host fruit for *A. suspensa*. Preliminary results showed that wild females deposited significantly more eggs on the domed, green structure, whereas the lab reared female *A. suspensa* deposited significantly more eggs on the flat, yellow wax panel. It is speculated that the pre-imaginal effects of fruit-resembled dome structure may affect their oviposition behavior. While more study is needed to elucidate the mechanism behind this behavioral variation between wild and lab populations, current observations suggest that a green, domed surface enhanced the oviposition for wild *A. suspensa* female adults.

Introduction

A. suspensa are a continued focus of entomological research in order to manage and monitor current populations in South Florida. This study aims to determine the ovipositional behavior of wild flies compared to lab-reared (LR) *A. suspensa*, and to assess the survivability of the eggs produced by each population. During this project, new observations have been made regarding the oviposition preferences of wild *A. suspensa* females.

Materials and Methods

Wild *A. suspensa* larvae were reared from Surinam cherries, *Eugenia uniflora*, harvested from the SHRS USDA-ARS Station in Miami, FL. When the flies reached the adult stages, eleven mating pairs were placed into 6" x 6" x 6" cages to individually monitor oviposition rates. One side of the screened cage was replaced with a cheesecloth panel coated with yellow paraffin wax and a green paraffin wax dome was placed inside the cage. Domes were made by covering a tea filter (ranging from 1" to 2.5" in diameter) with a cheesecloth and coating it in green wax. A water-soaked cotton wick was set under the dome and black filter paper was set under the dome to catch any eggs that fell off the dome. For the wax paneled side of the cage, a wet sponge was propped against the cage to maintain moisture. The green dome resembles a guava fruit, *Psidium guajava*, as previous research has suggested that wild *A. suspensa* prefer to oviposit on a domed structure rather than a flat surface.¹ The inclusion of the yellow wax panel was based on current colony rearing protocol, where LR *A. suspensa* accept the panel as an acceptable oviposition substrate.



Fig. 1 *A. suspensa* (Loew)



Fig. 2 Yellow wax panel

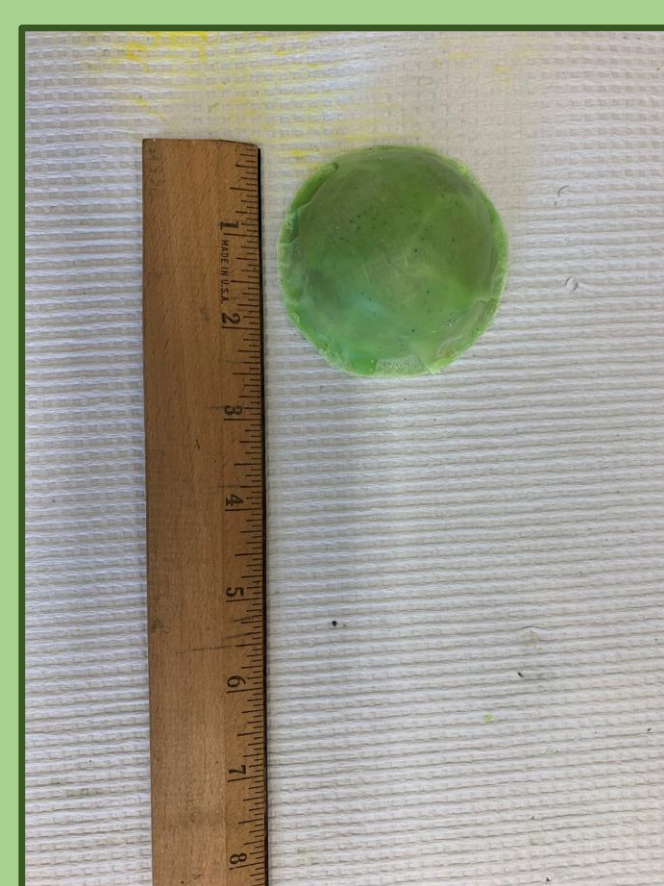


Fig. 3 Green wax dome

Cages were checked daily for the number of eggs laid, with the location and quantity of eggs being recorded. The eggs were collected using a synthetic hair brush, placed into petri dishes filled with artificial larvae diet, and checked daily for signs of hatching. Eggs were continually collected until the female died.



Fig. 3 Wild female ovipositing onto a dome



Fig. 4 Wild female on a guava fruit

Results and Discussion

All eleven wild females oviposited on the wax panel, dome, as well as within the cage, protein block and agar. The females' preferred oviposition site was the green dome, with the metal interior of the cage being the second-most preferred site. Three female adults repeatedly laid eggs onto the domes, ovipositing >10 eggs onto the dome multiple days in a row, while the other females would alternate between laying eggs on the dome and another site, or lay eggs on multiple different sites. Females also preferred the larger domes compared to the smaller domes. Currently, the hatch rate of the eggs is still being documented. However, it is speculated that placing the eggs into the diet did not provide enough moisture for the eggs to hatch. Overall, the eggs oviposited onto the dome were often the most viable, while the ones in the cages were often unviable (personal observation).

Oviposition Site	Total Egg Count	Percentage of Total Eggs Deposited
Green Wax Dome	240	53.3%
Yellow Wax Panel	17	3.8%
Cage	152	33.8%
Protein Diet	39	8.7%
Agar Block	2	0.4%

Fig. 5

Conclusion

Oviposition of LR *A. suspensa* are currently being monitored to determine their ovipositional behavior. Establishing the preferred oviposition site of both wild and LR *A. suspensa* will allow future studies to optimize substrate for *A. suspensa* oviposition and may also facilitate behavioral bioassay projects determining the attractiveness of certain chemicals. Future study is needed to determine if differing the color of the domed structure will produce similar results, as the color of other host fruits vary from the green used in this study.

Acknowledgements

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References

- ¹Szentesi, A., Greany, P. D., & Chambers, D. L. (1979). Oviposition behavior of laboratory-reared and wild Caribbean fruit flies (*Anastrepha suspensa*; Diptera: Tephritidae): I. Selected chemical influences. *Entomologia Experimentalis et Applicata*, 26(3), 227-238.