

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/289915819>

Comparing *Drosophila suzukii* and *Drosophila melanogaster* : different behaviors towards fresh fruit volatiles?

Conference Paper · September 2015

CITATIONS

0

READS

1,160

3 authors, including:



Irene Castellan

Rothamsted Research

5 PUBLICATIONS 29 CITATIONS

SEE PROFILE

Comparing *Drosophila suzukii* and *Drosophila melanogaster* : different behaviors towards fresh fruit volatiles?

Irene Castellan^{1 2 3}, Laura Zampieri^{1 4}, Gabriele Pedrotti^{1 4}

1. CIMeC, University of Trento 2. University of Bologna 3. Free University of Bolzano 4. Liceo Antonio Rosmini Rovereto

Introduction

Drosophila suzukii Matsumura has become a major problem in agriculture as it lays eggs within ripening undamaged fruits (Revadi et al., 2015). On the contrary, the closely related species *D. melanogaster* feeds and oviposits on fermented fruits (Fig. 1).

Utilizing olfactory information to understand the preferences of the insects could give some important information to support the efforts in the control of *D. suzukii* (Keesely et al., 2015; Revadi et al., 2015). Compounds abundant in fresh fruits, fermented fruits or leaves were chosen for behavioral trials in T-maze according to their electrophysiological responses in *D. melanogaster* and *D. suzukii* (Eriksson, Versace in preparation).

For comparison of behavioral responses between the species, isoamylacetate (IAA) was tested as it has been previously discussed as biological active compound in fresh fruits for *D. suzukii* (Revadi et al., 2015).

The aim of the present study was to investigate the differences in the behavioral responses of *D. suzukii* in comparison to *D. melanogaster* to different concentrations of IAA.

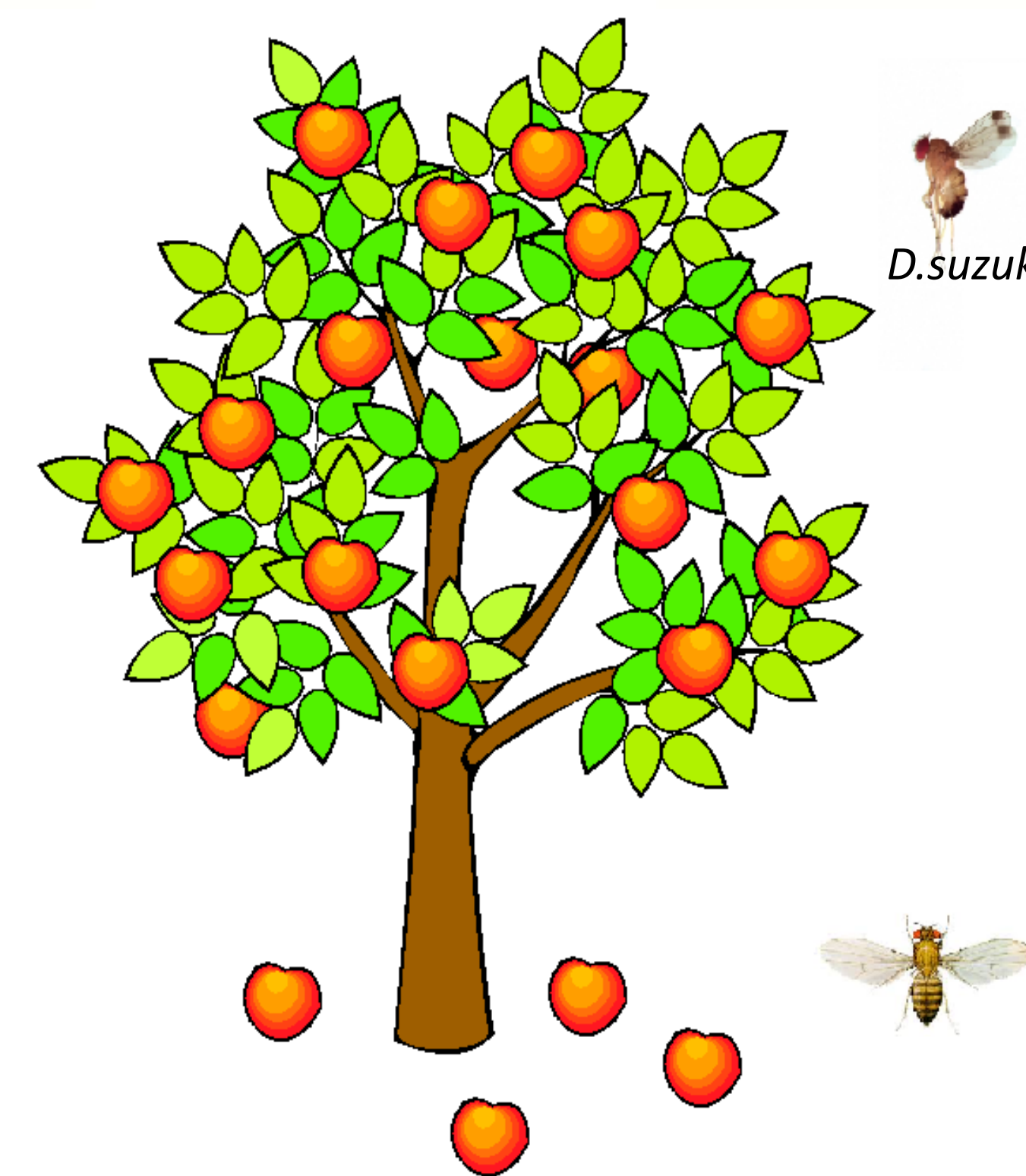


Figure 1. Habitat of *D. melanogaster* e *D. suzukii*

Materials and Methods

T-maze experiments were performed following a defined protocol (tab. 1). The T-maze apparatus (fig. 2) is made of glass and formed by three arms. A vial with 100 flies were released at the end of the main arm and from there they could choose between IAA and blank (water), which were put into the vials at the end of the other two arms.

To stimulate the choice of the insects we deprived them from food for 4 hours (*D. melanogaster*) or 16 hours (*D. suzukii*). We noticed that the deprivation time is crucial for *D. suzukii* because if it is too short the insects will not be stimulated enough to make a choice. The duration of every T-maze experiment session was 60 min.

The odorants were released on a paper dispenser into the vial, and we tested different concentrations: 1, 10, 50, 100 and 200 $\mu\text{g}/\mu\text{l}$.

After the T-maze test, the insects that made a choice and the ones that did not choose neither the odorant or the blank were counted. Afterwards, the choice proportion was calculated and the data analysis was performed to obtain the results.

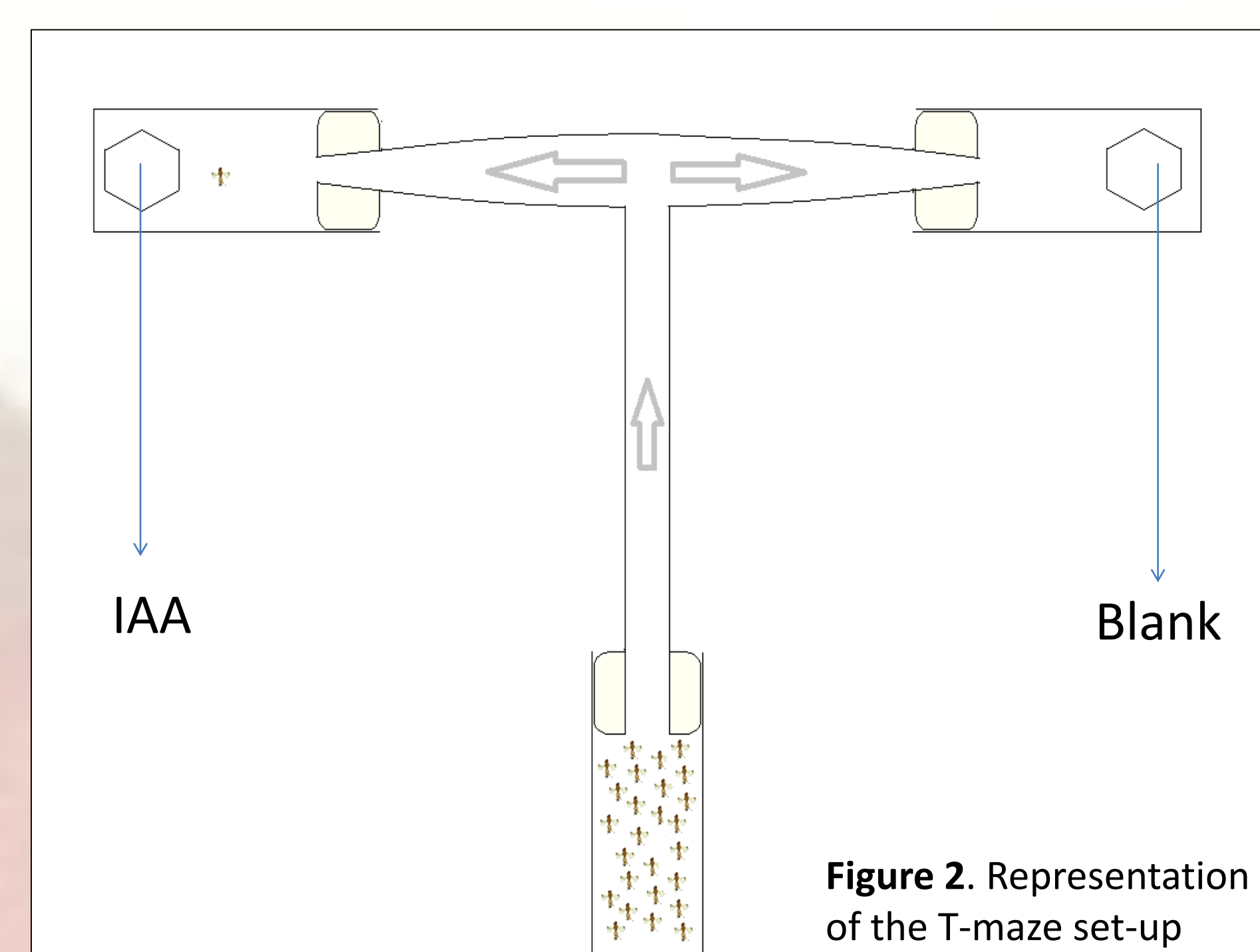


Figure 2. Representation of the T-maze set-up

Tab. 1 scheme representing the procedure of the T-maze experiments



Results

D. melanogaster: IAA vs Blank

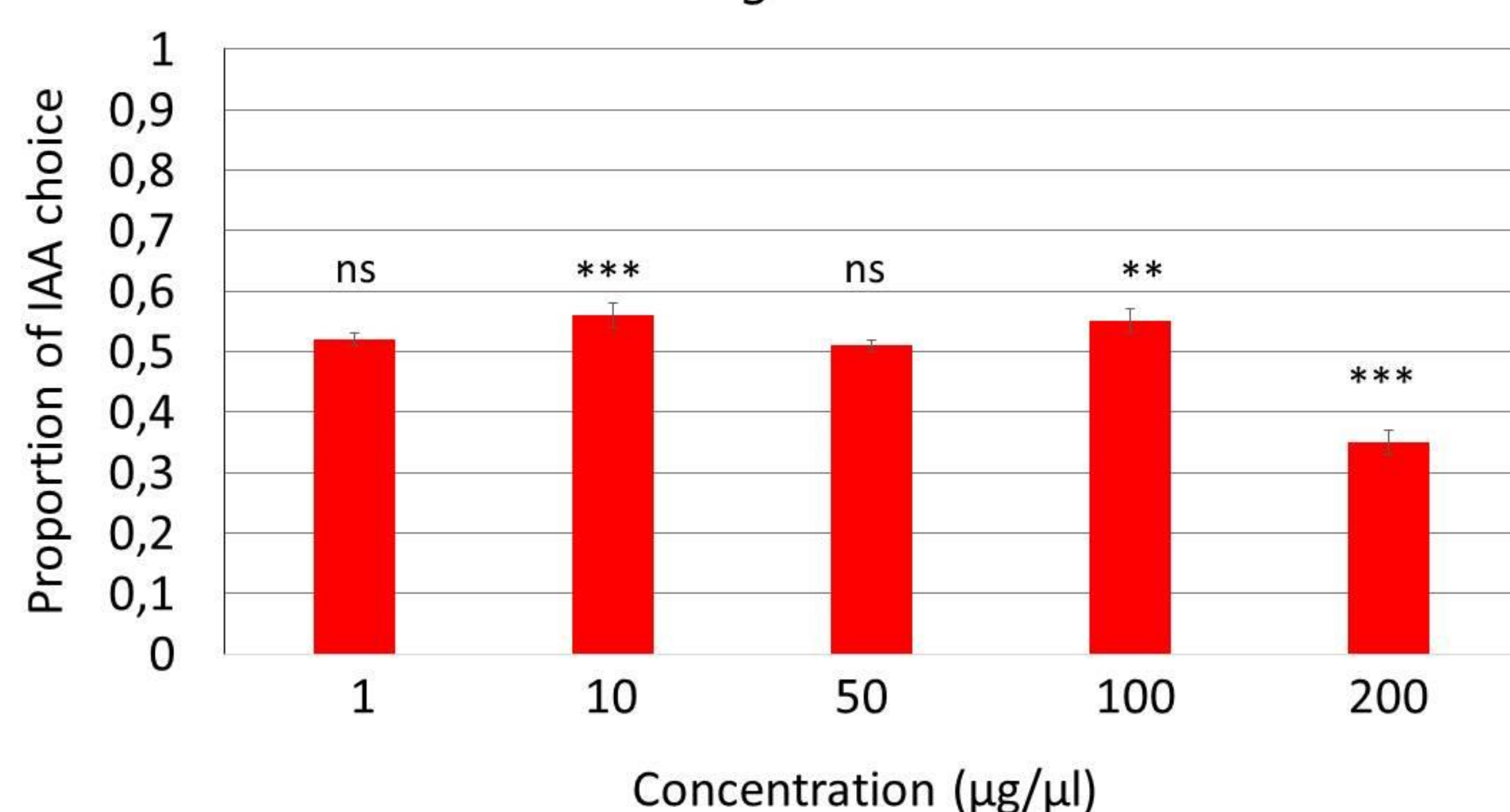


Figure 3A. T-maze test results showing *D. melanogaster* responses to IAA

D. suzukii: IAA vs blank

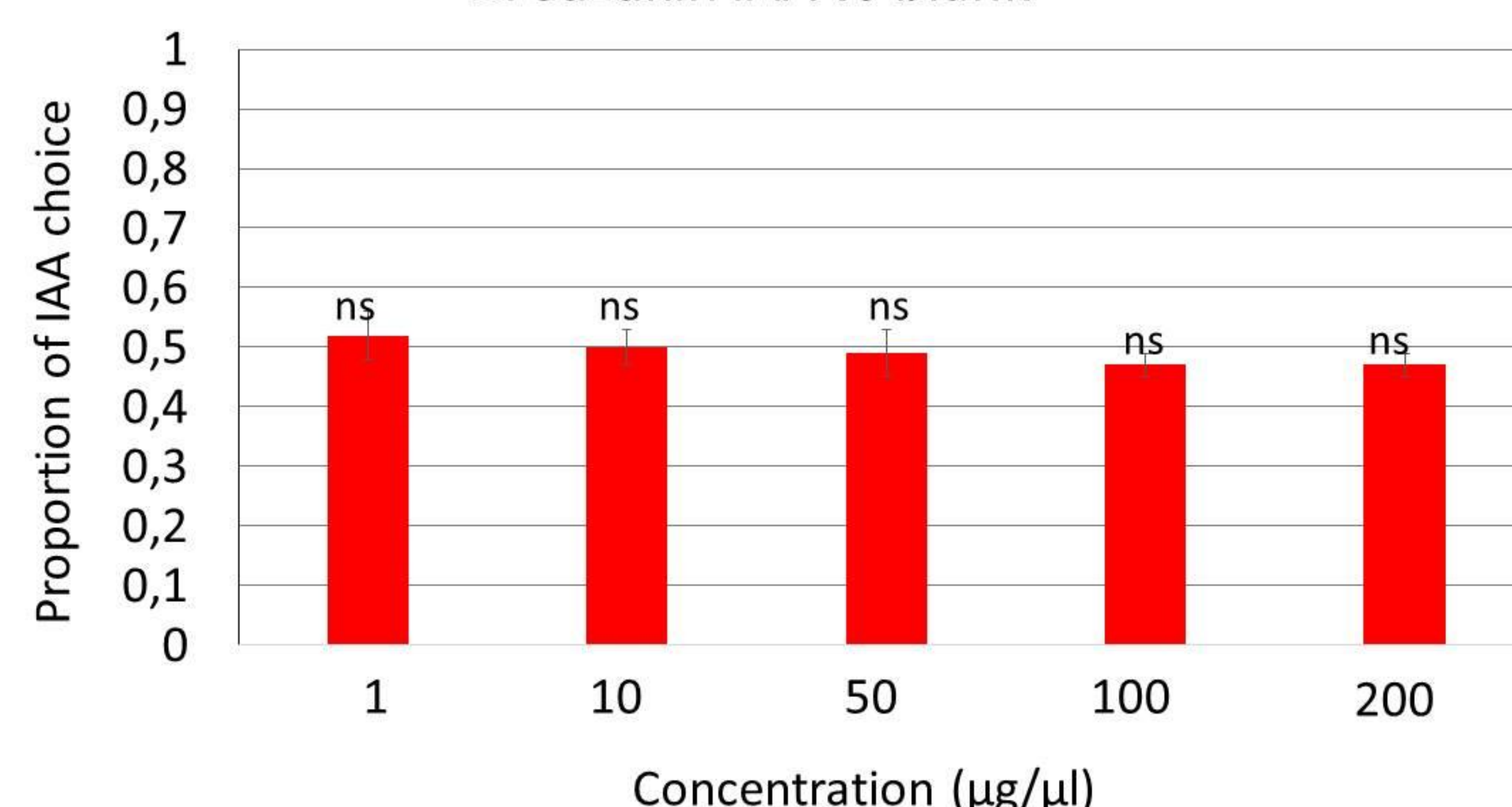


Figure 3B. T-maze test results showing *D. suzukii* responses to IAA

Conclusions

D. melanogaster is attracted to IAA at concentrations 10 and 100 $\mu\text{g}/\mu\text{l}$ and shows an aversive behavior to the highest concentration 200 $\mu\text{g}/\mu\text{l}$ (fig. 3A), suggesting that there is a dose dependent effect of the odor in *D. melanogaster*. Moreover, the lowest concentration (1 $\mu\text{g}/\mu\text{l}$) is not perceived by *D. melanogaster* as the insects show no preference versus water.

Our preliminary data of *D. suzukii* on the other hand showed no preference at any concentration of IAA (fig. 3B). Further studies must be made on other concentrations in order to understand the attraction of *D. suzukii* to odors emitted from fresh fruits, since these are oviposition sites for *D. suzukii* females. Also the difference between the species should be investigated for other volatile compounds.

References

Keesey Ian W., Knaden M., Hansson B. S. (2015). Olfactory Specialization in *Drosophila suzukii* Supports an Ecological Shift in Host Preference from Rotten to Fresh Fruit. *Journal of Chemical Ecology* 41: 121-128

Revadi S., Vitagliano S., Rossi Stacconi M.V., Ramasamy S., Mansourian S., Carlin S., Vrhovsek U., Becher P.G., Mazzoni V., rota-Stabelli O., Angeli S., Dekker T., Anfora G. (2015). *Physiological Entomology* 40: 54-64

Acknowledgements

This work has been supervised by Anna Eriksson, we thank her for her availability and scientific support. Thanks to CIMeC – Center for Mind/Brain Science and UniTn for the laboratory structure and equipment we could utilize for our experiments. We thank Comune di Rovereto for having given us this opportunity.



Figure 4. Male and female of *D. suzukii* feeding on a strawberry fruit