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Cross-species Sterile Insect Technique to control the agricultural pest *Drosophila suzukii*

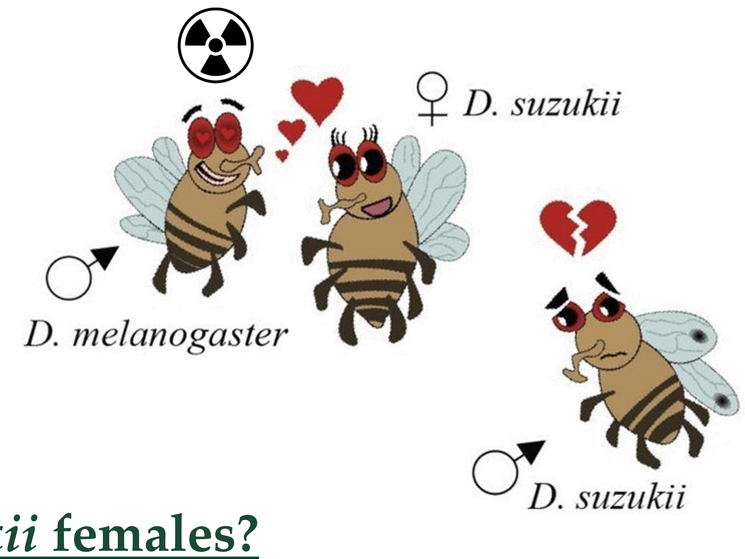
Flavia Cerasti, Valentina Mastrantonio, Daniele Porretta

Department of Environmental Biology, Sapienza University of Rome, Rome, Italy

The **cross-species Sterile Insect Technique (cs-SIT)** consists of releasing irradiated heterospecific males into the target pest population. Unfertile mating between heterospecific males and wild females leads to a progressive decline in the pest population.
Drosophila suzukii is one of the major agricultural pests worldwide because it can lay eggs in unripe and healthy fruits, causing severe economic losses for fruit industries.

GOAL

Using **reproductive interference** between *Drosophila melanogaster*, the control species, and the pest *D. suzukii* by integrating it into the cross-species SIT.



1. Do irradiated *D. melanogaster* males court *D. suzukii* females?

We compared the time the males of the two species spent courting *D. suzukii* females when they were alone (Figure 1a) or when the males of the other species co-occurred (Figure 1b).

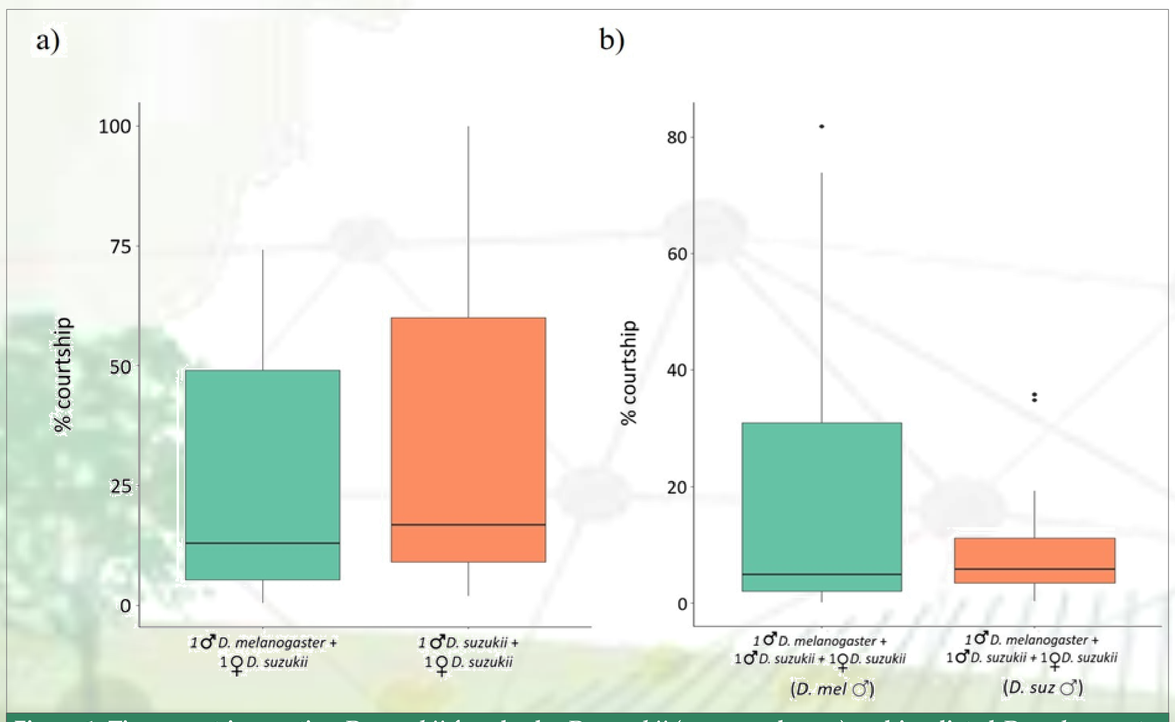


Figure 1. Time spent in courting *D. suzukii* females by *D. suzukii* (orange columns) and irradiated *D. melanogaster* males (green columns).

RESULTS

No significant differences were observed between the two conditions alone (Wilcoxon Mann–Whitney test W = 118, p-value = 0.2673) (Figure 1a) and between the two conditions with another male (Wilcoxon Mann–Whitney test W = 194.5, p-value = 0.9105) (Figure 1b).

Irradiated *D. melanogaster* males successfully courted *D. suzukii* females as much as *D. suzukii* males.

2. Do irradiated *D. melanogaster* males affect *D. suzukii* fertility?

We compared the number of newborn individuals that emerged from cages with only *D. suzukii* pairs (Figure 2, green column) and from cages where *D. suzukii* pairs plus 40 (Figure 2, orange column) and 60 (Figure 2, blue column) of *D. melanogaster* irradiated males co-occurred.

RESULTS

The Tukey Multiple Comparison tests showed a significant reduction of *D. suzukii* offspring when 40 (z = -2.758, p = 0.01601) and 60 (z = -3.218, p = 0.00376) *D. melanogaster* males were placed with *D. suzukii* couples.

Irradiated *D. melanogaster* males significantly reduce the offspring of *D. suzukii* females under different species ratios.

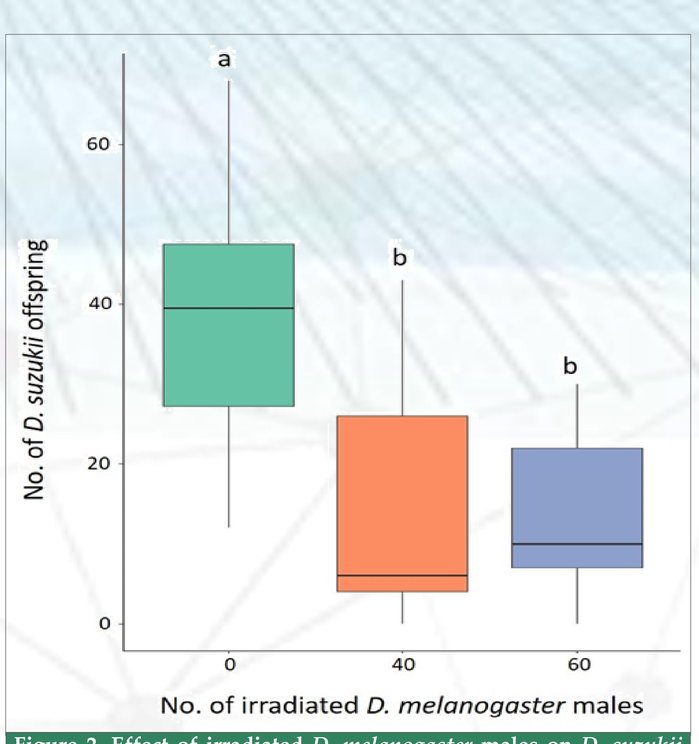


Figure 2. Effect of irradiated *D. melanogaster* males on *D. suzukii* fitness.

CONCLUSIONS

Our results showed that *D. melanogaster* males irradiated at 80 Gy can be effective in courtship behavior and in reducing *D. suzukii* offspring. Therefore, we highlight the potential use of reproductive interference in pest management by cross-species SIT.