

# Movement of insect pests

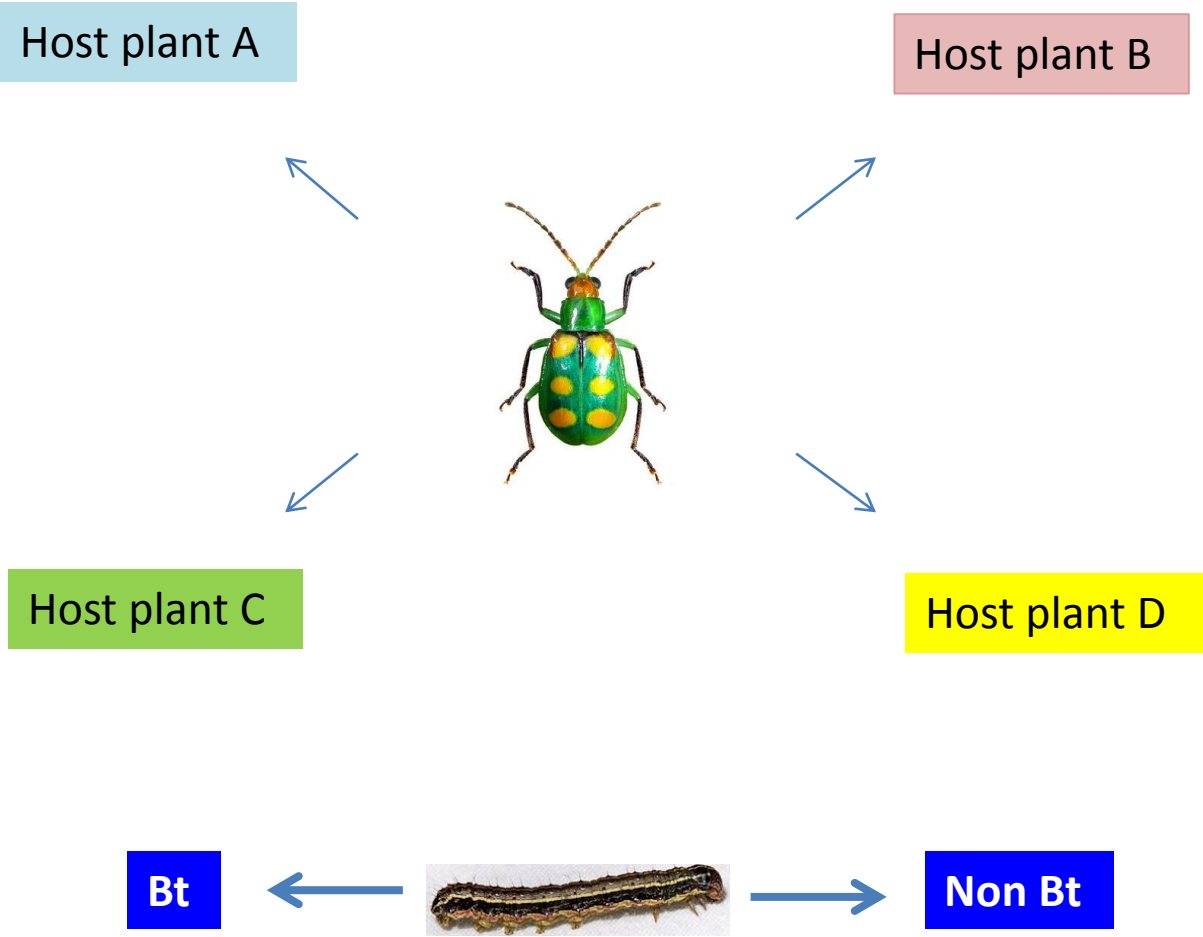
**Wesley Godoy**

wacgodoy@usp.br

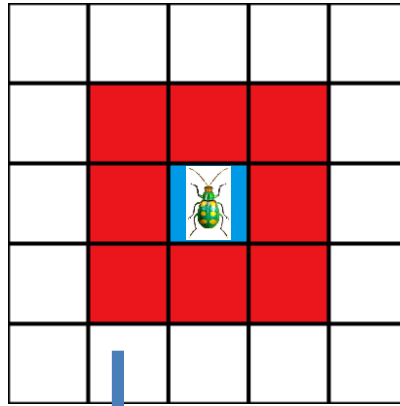
Luiz de Queiroz College of Agriculture

University of São Paulo

# Crop arrangements influences insect movement



# Cellular automata describes insect movement



# There are rules for occupancy of cells

Probabilities:

Occupancy or emptying

Survival of immature

Mortality

Oviposition by a female

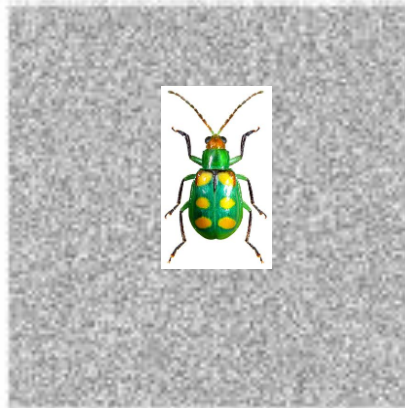


# Crop arrangements can influence the insect spread

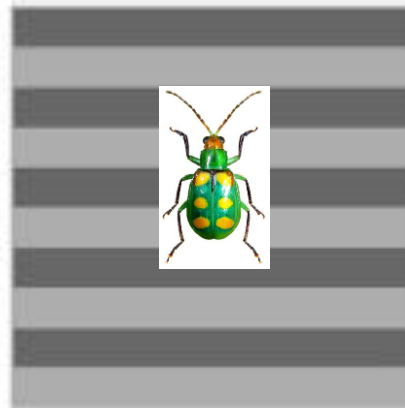
1 habitat



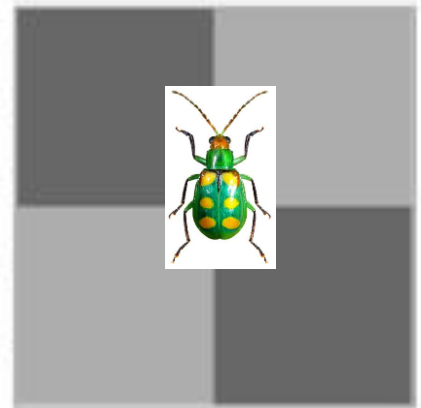
2 habitats  
random distribution



in strips

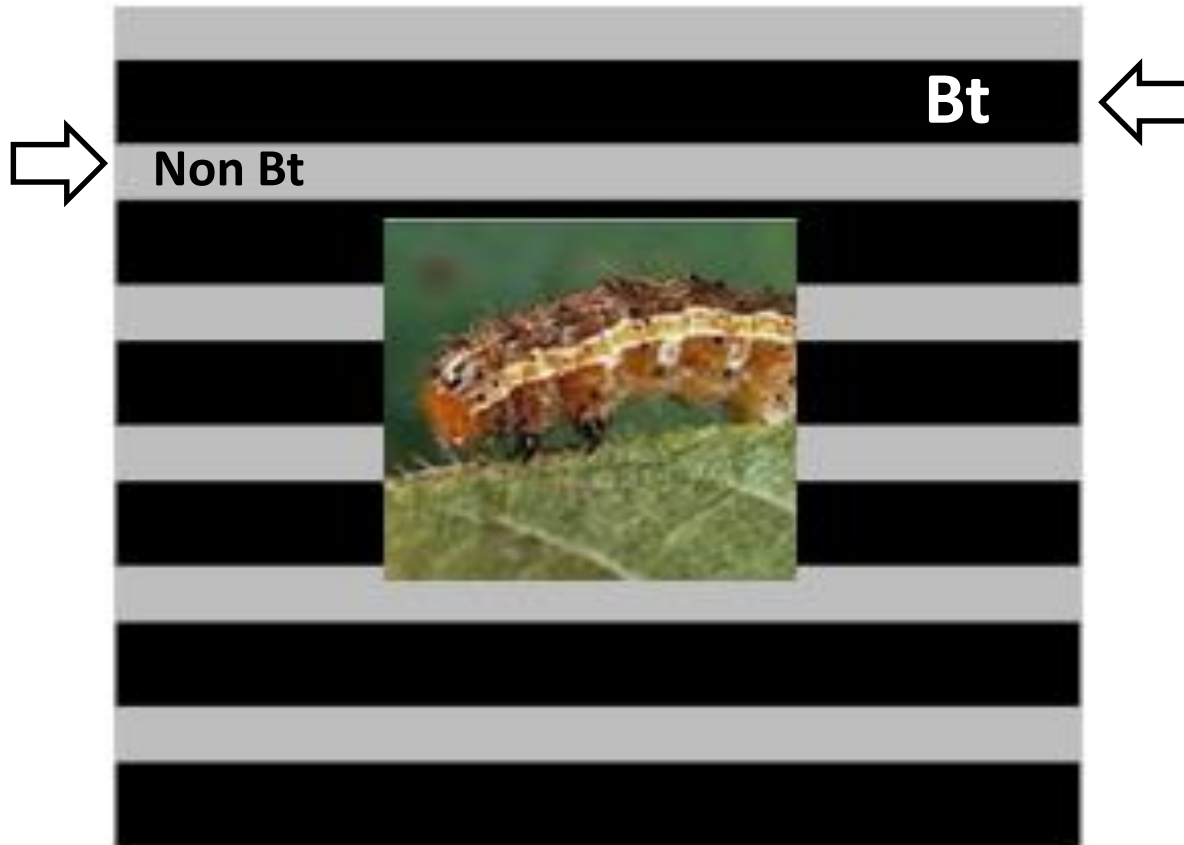


In blocks

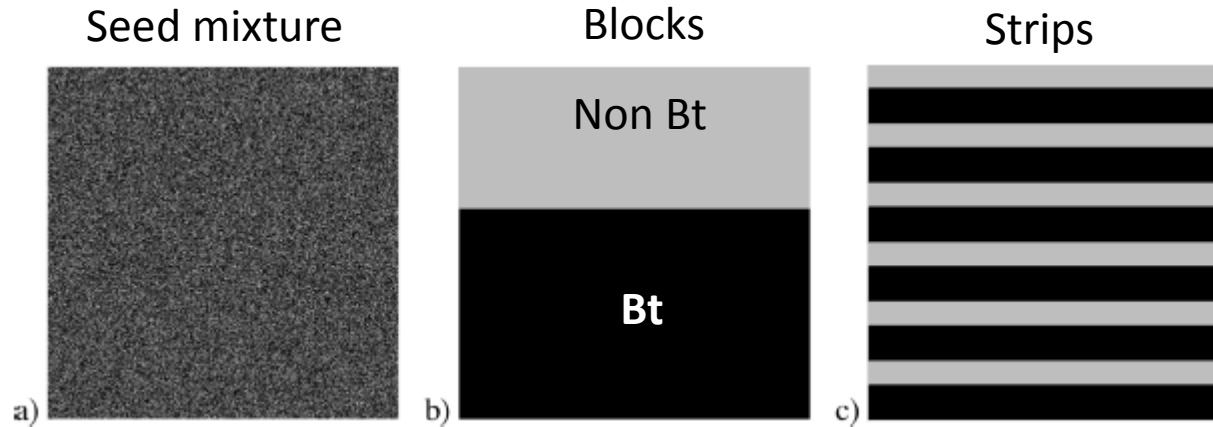


**Insect pest spread decreases as spatial heterogeneity increases**

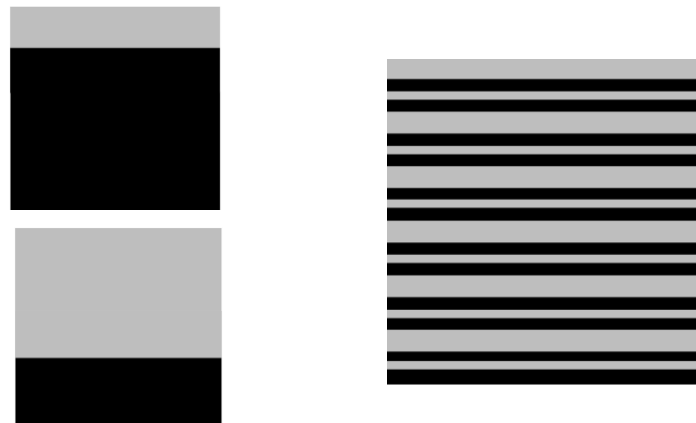
# Arrangements between Bt and non Bt plants also influence the movement



# Arrangement and refuge size influences the resistance



What is the best arrangement and refuge size?



# **This approach can be extended to other systems**

- What is the best crop spatial arrangement to decrease the success of insect pests and attract higher diversity of natural enemies?



# Acknowledgements

Adriano Gomes Garcia – PhD student ESALQ USP

Claudia Pio Ferreira – UNESP – Botucatu SP

Fernando L. Cônsoli – ESALQ – USP – Piracicaba SP

Celso Omoto – ESALQ – USP – Piracicaba SP

FAPESP – 2014/16609-7, 2014/16277-4

ESALQ – USP