

La complémentarité des ennemis naturels, un potentiel de contrôle efficace de la drosophile à ailes tachetées

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Introduction

- Complementarity
- Negative, Neutral and Positive Effects
- Biological Control

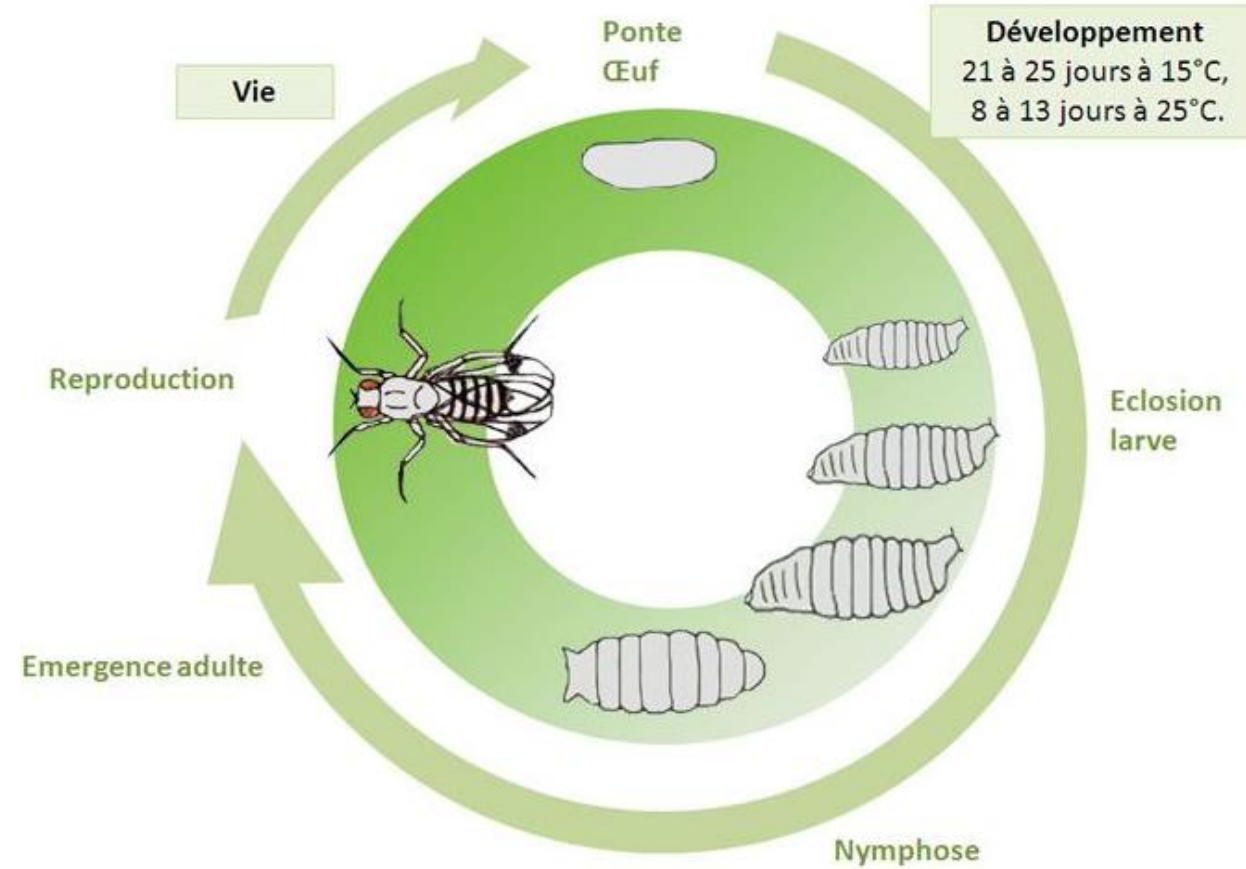


- Natural Enemies Diversity = Parasitoid Wasps + Predators



Introduction

- Spotted Wing Drosophila (SWD)
- Invasive Exotic Species
- Economic Threat



Current Issue

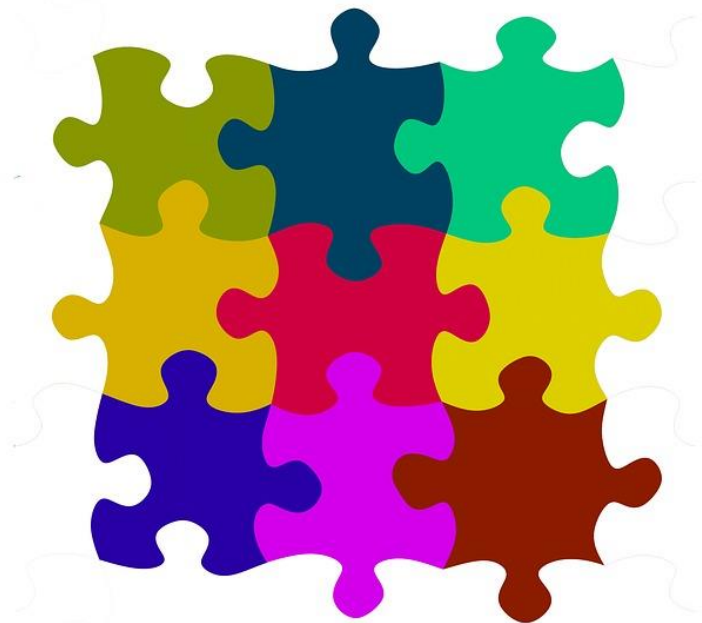
- Biopesticide = Only one homologation in Quebec
- Toxic for pollinators
- Resistance Risk

- Biological Control = Sustainable solution
- Promising
- Results not concluding for individual natural enemies



Research Hypothesis

- The complementary action of a predator-parasitoid assemblage will provide better control of the SWD than the natural enemies taken individually



Predators

Selected because of their commercial availability for the growers

- *Podisus maculiventris* (Hemiptera: Pentatomidae)
- *Chrysoperla carnea* (Neuroptera: Chrysopidae)
- *Dicyphus hesperus* (Heteroptera: Miridae)
- *Orius insidiosus* (Heteroptera: Anthocoridae)



Parasitoid Wasps

Selected because of their commercial availability for the growers

- *Diglyphus isaea* (Hymenoptera: Eulophidae)
- *Muscidifurax raptorellus* (Hymenoptera: Pteromalidae)



- *Pachycrepoideus vindemmiae* (Hymenoptera: Pteromalidae)



Objectives

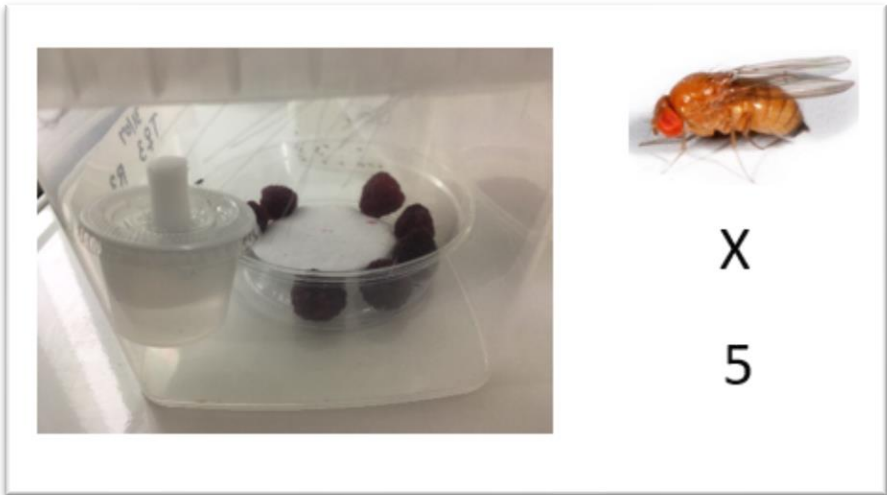
Part 1:

Compare the biological control potential of the four selected predators and the three selected parasitoid wasps against SWD

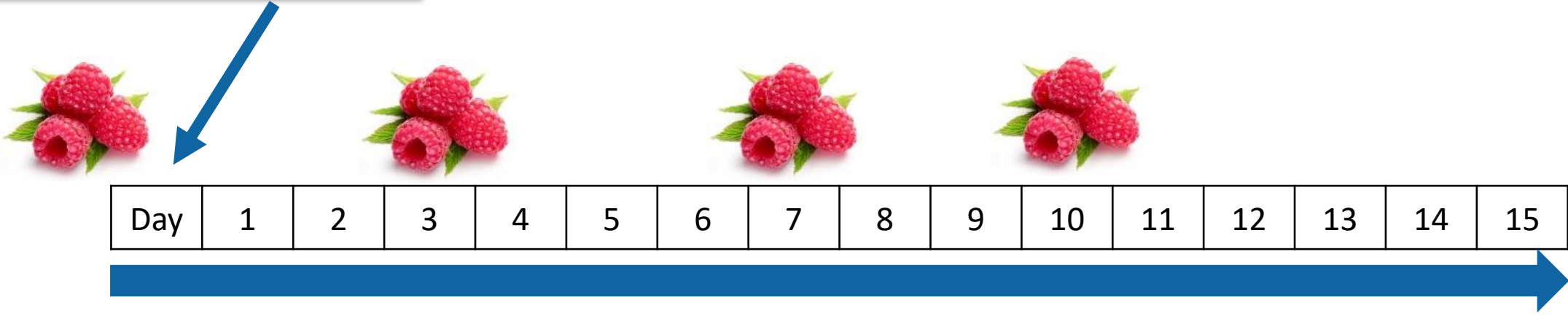
Part 2:

Select the most effective natural enemies from Part 1 and evaluate the different combinations to establish a complementary natural enemy assemblage

Methodology Part 1



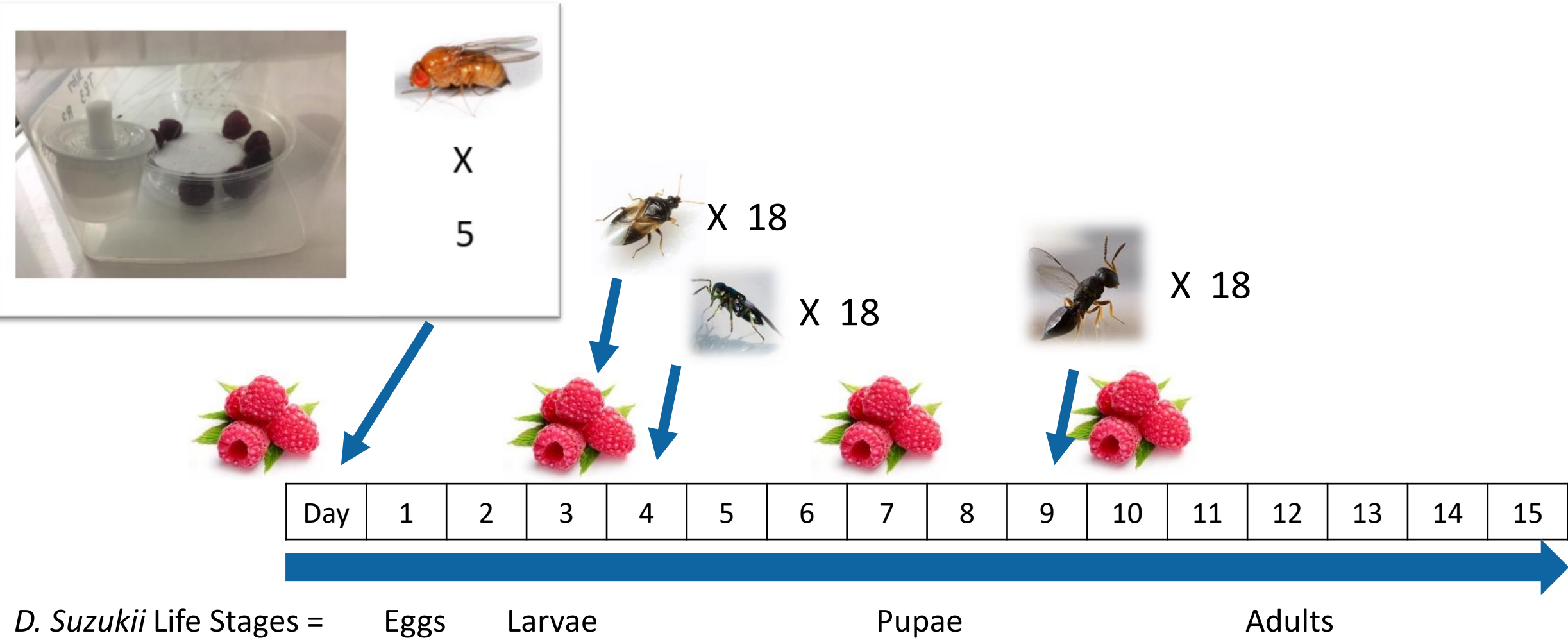
- 4 treatments (predators) and 3 treatments (parasitoid wasps) + 1 control
- 8 rep



Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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D. Suzukii Life Stages = Eggs Larvae Pupae Adults

Methodology Part 1



Conditions 22°C; 16 L : 8 D; 55% RH

Methodology Part 1

- Counting of larvae, pupae and adults of SWD after 15 days

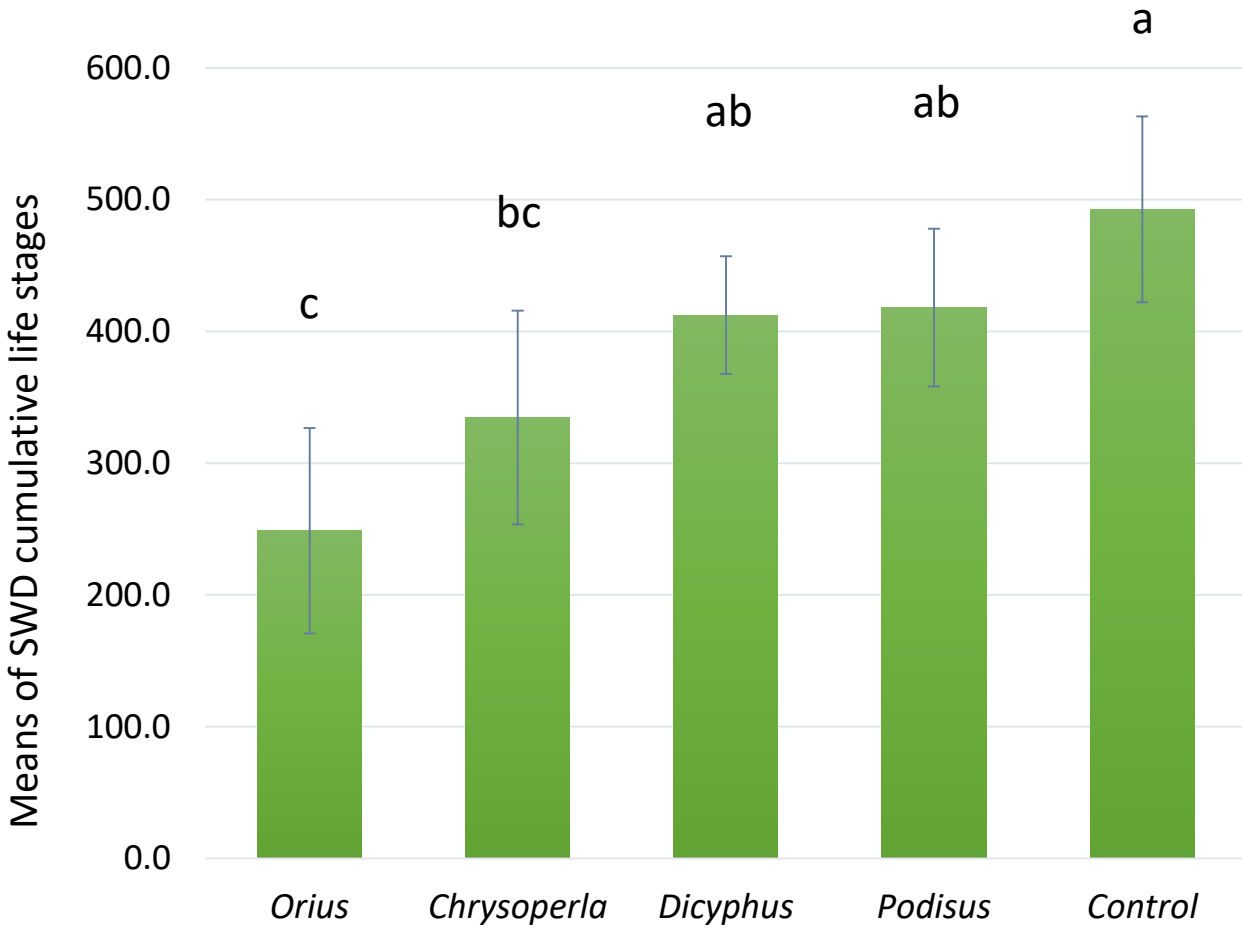


Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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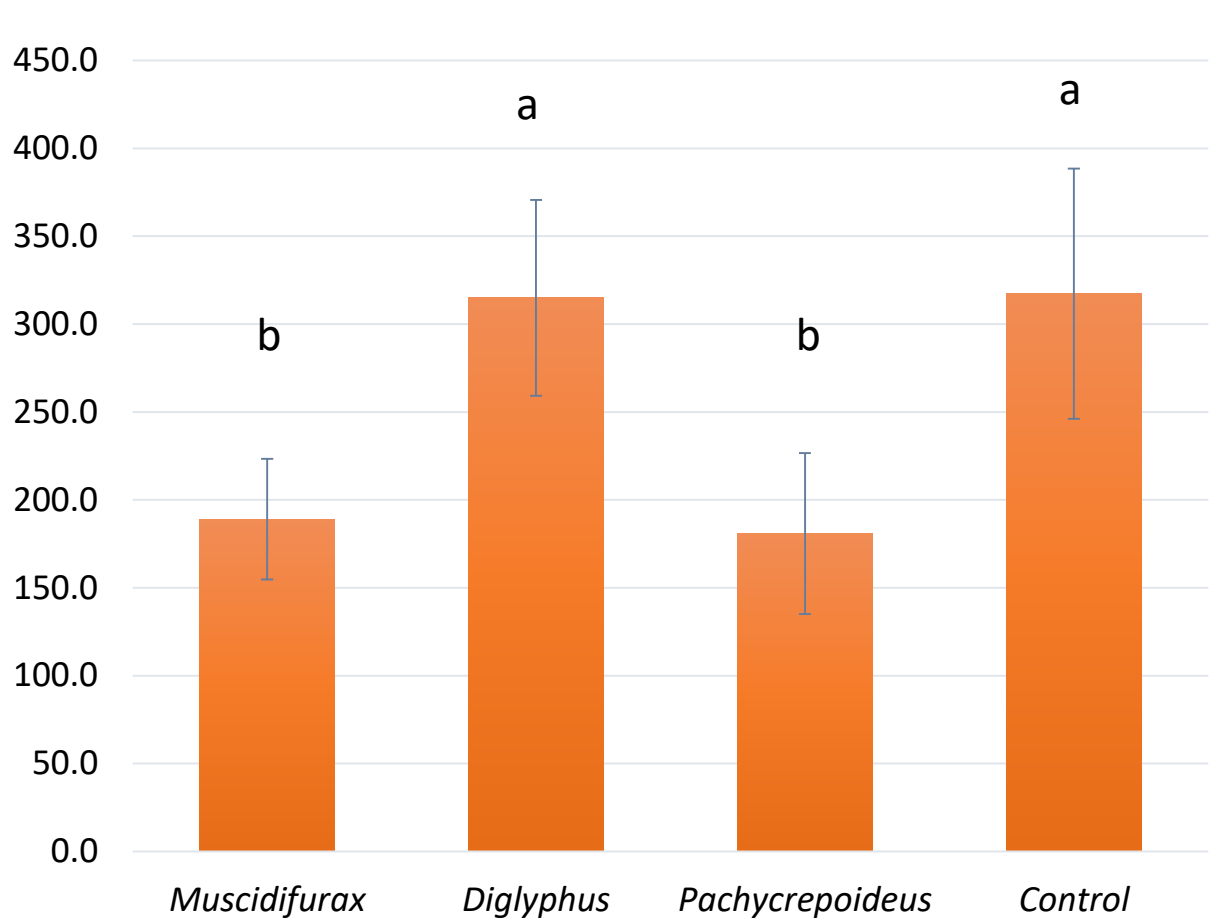


Results Part 1

• Predators



• Parasitoid Wasps



Tukey-Kramer's HSD 0,05

Objectives

Part 1:

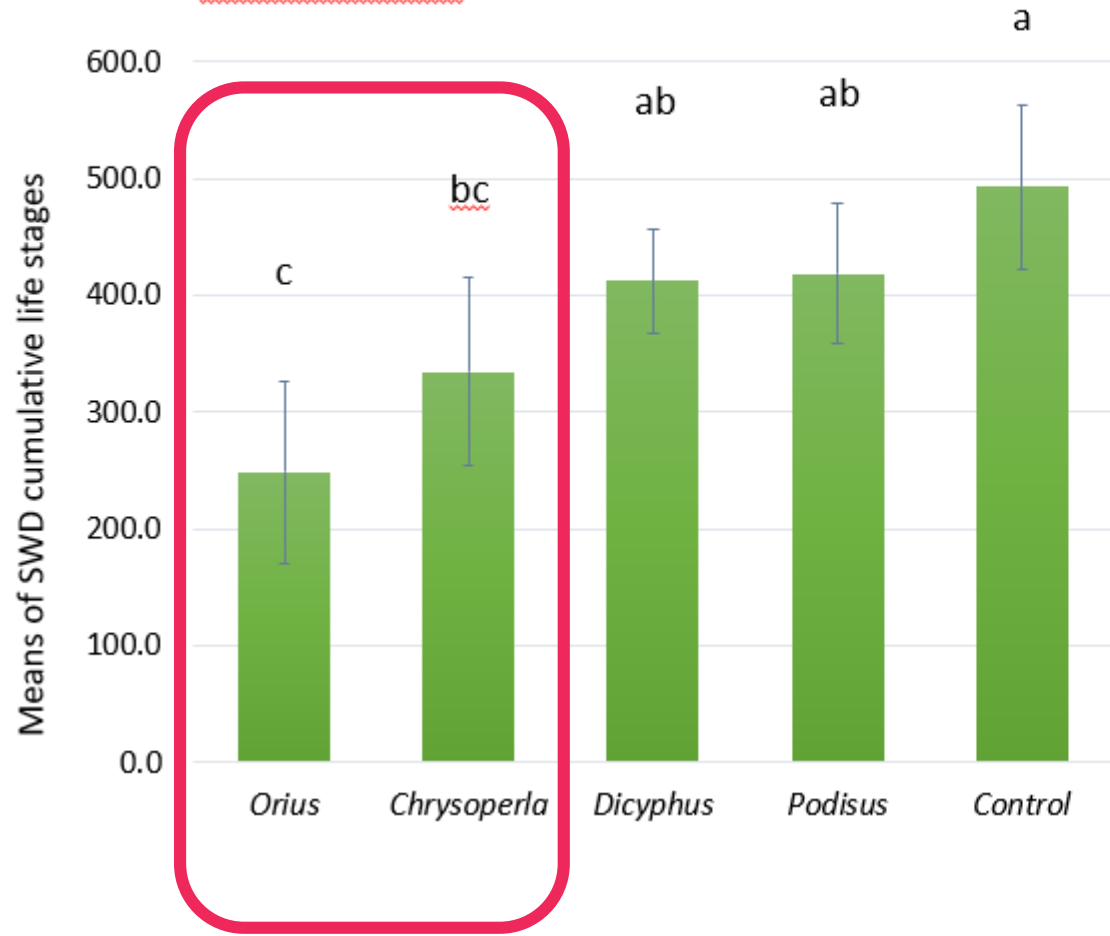
Compare the biological control potential of the four selected predators and the three selected parasitoid wasps against SWD

Part 2:

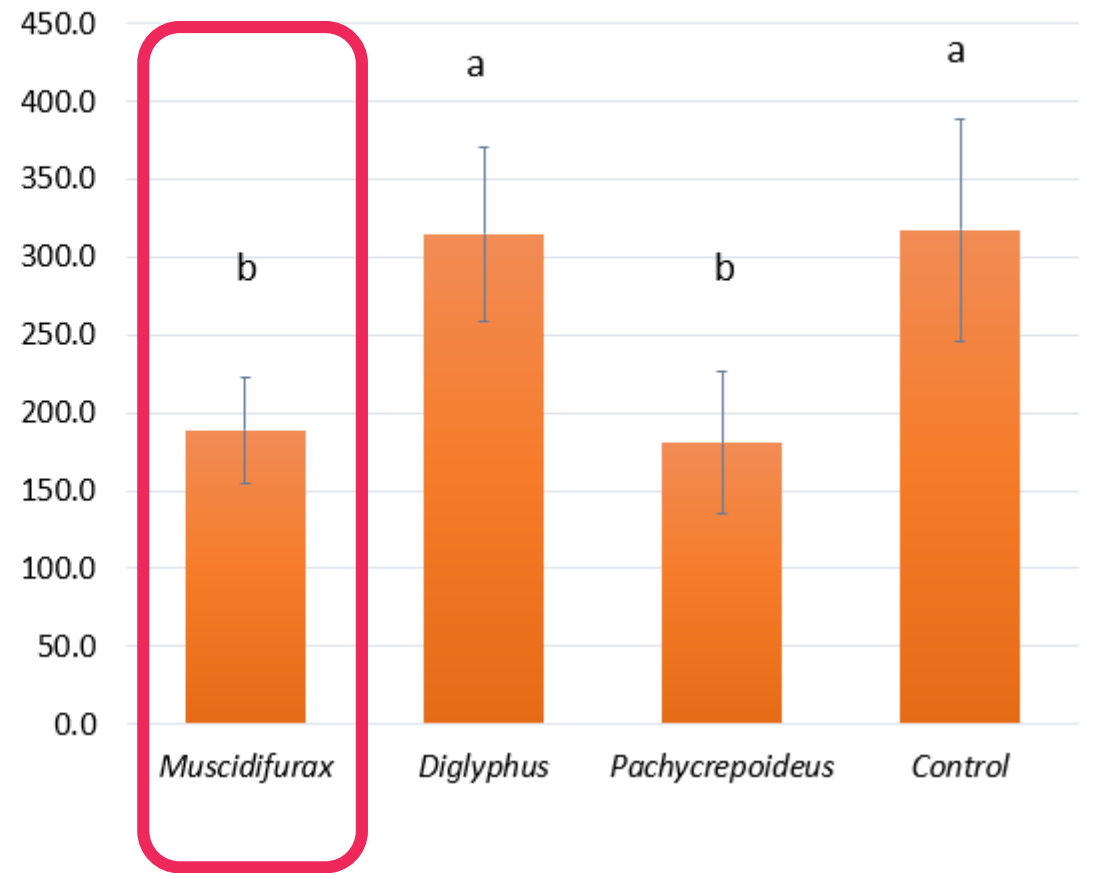
Select the most effective natural enemies from Part 1 and evaluate the different combinations to establish a complementary natural enemy assemblage

Methodology Part 2

• Predators



• Parasitoid Wasps



Methodology Part 2

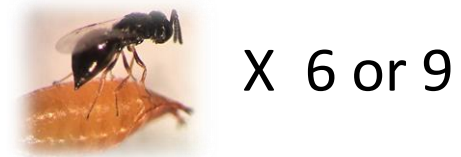
- Combinations:

Species richness	Muscidifurax	Orius	Chrysoperla	Abundance	Treatment	# Treatment
3	6	6	6	18	3MOC	1
2	9	9	0	18	2MO	2
2	9	0	9	18	2MC	3
2	0	9	9	18	2OC	4
0	0	0	0	0	Control	5

Methodology Part 2



- 4 treatments (combinations) + 1 control
- 8 rep



Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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D. Suzukii Life Stages =

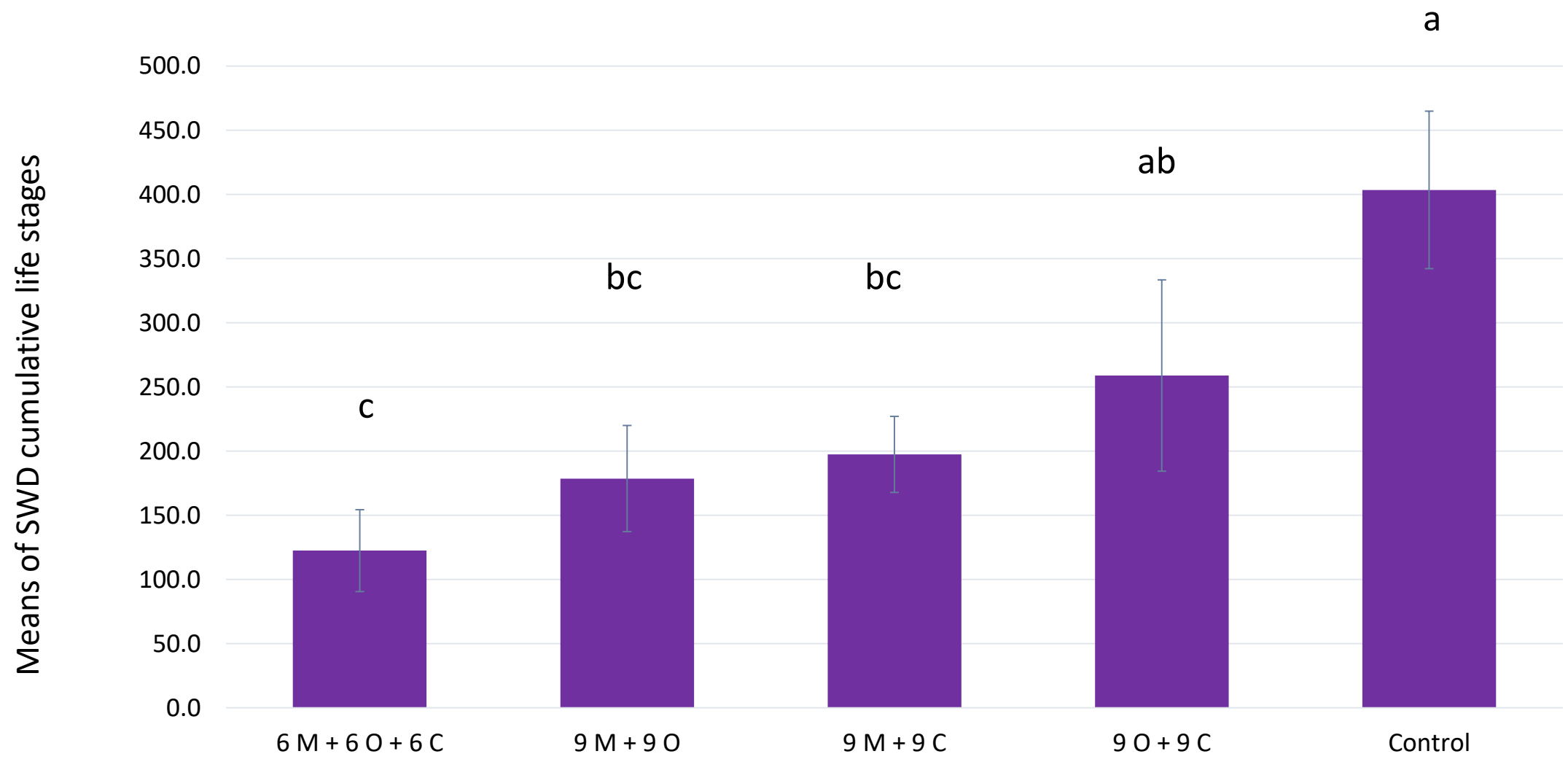
Eggs

Larvae

Pupae

Adults

Results Part 2



Conclusion

- Natural enemies capable of reducing the number of SWD
- The greater the diversity, the more effective the combination
- **IN LABORATORY!**
- Same results in the field?



Acknowledgment

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Questions ?

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