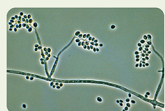


INTRODUCTION & AIM

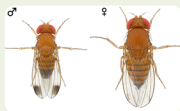
Beauveria bassiana



Kingdom: Fungi
Phylum: Ascomycota
Class: Sordariomycetes
Order: Hypocreales
Family: Cordycipitaceae

- Entomopathogenic fungus (5).
- The penetration of the host cuticle is the first step in the infectious process (5) and its success will determinate the efficacy of the whole pathogenesis (4).

Drosophila suzukii



Kingdom: Animalia
Phylum: Arthropoda
Class: Insecta
Order: Diptera
Family: Drosophilidae

COLONIZATION

- Originally described from **Japan**.
- Found in California in 2008 and later in France, Italy and Spain.
- First time in **Catalunya** (Tarragona) in **2010**.
- Currently **pest** in several crops of berries in Catalunya. (3)

EMERGENT INVASIVE SPECIE



CAUSES

- Alter the environments when settles (6).
- Affect on fresh berries (serrated ovipositor (7)) → Enormous costs on agriculture (3).

- B. bassiana* is a promising **biological control** agent for **arthropods pests**. Several studies demonstrate the effectiveness of this fungus in many dipteran species (1).
- The only study about this topic suggests that this fungus has a low effectiveness in the dipteran specie *D. suzukii* (2).

AIM

Determine the effectiveness of *B. bassiana* as a biological control method for *D. suzukii*.

Hypothesis

Inoculation of *B. bassiana* increases the mortality of *D. suzukii* adults.

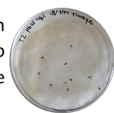
MATERIALS & METHODS

- Sample size**= 100 treated *D. suzukii* adults (females) + 100 control *D. suzukii* adults (females).
- Environmental conditions:** 90% RH and 25°C±2°C of temperature.
- Preparation of *B. bassiana* inoculum:** Solution of 1mL of Naturalis® per 500mL of water (2,7x10⁷ viable conidia of *B. bassiana*/ 1mL Naturalis®).
- D. suzukii* breeding:** Males and females of this specie were placed in a plastic pot, with a base of culture medium. Females oviposited the eggs on the culture medium. Then, the larvae emerged and pupated, and finally the adults emerged.
 - The flies were put to sleep with a CO₂ tank.
 - The solution (treatment) or the raindrop (control) were applied → 8μL (micropipette).
 - The flies were put into a plastic can with ventilation and with water and honey as a food source.
- Infection process:**
- Monitor survival:** After the application of the treatment or the control, the survival of the flies of each repetition was looked every day.
- Statistical analysis:** t' student using SPSS program.

In order to check if the cause of the flies' death was the action of *B. bassiana*, the following methodology was adopted:

B. bassiana proliferation on *D. suzukii* adults:

- Once the 10 individuals died, each repetition was placed in a petri dish with a damp base to increase humidity and encourage the proliferation of the fungus.
- The number of flies with *B. bassiana* proliferation was checked after 48h.



Proliferation of *B. bassiana* on *D. suzukii*

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RESULTS & DISCUSSION

Mortality of *D. suzukii* adults:

- Infected *D. suzukii* adults present a significant ($p < 0,05$) higher mortality than the control adults on days 1 to 8 (included). From the 10th day, the average percentage of the control and treated individuals begins to approach the 100% (figure 1).
- The fact of approaching the 100% may be due to other death causes unrelated to the *B. bassiana* action, as could be the lack of food or natural causes (8).
- The difference between our study and Arnó et al., 2013 could be due to the method of application of the fungal product. Arnó et al., 2013 applied the product on leaves and fruits infested with *D. suzukii*, whereas we directly did on the adults of *D. suzukii*. The highest efficacy was achieved when applied directly to adults (1).

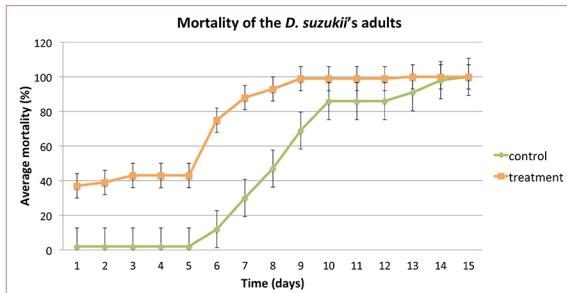


Fig. 1: Average of the mortality (%) of the control (green) and treated (orange) individuals from day 1 to 15 of life. The standard error is represented.

B. bassiana proliferation on *D. suzukii* adults:

- After placing the dead flies in the petri dishes, there are differences statistically significant ($p < 0,05$) between the presence and absence of *B. bassiana* in the control and treated individuals (figure 2).

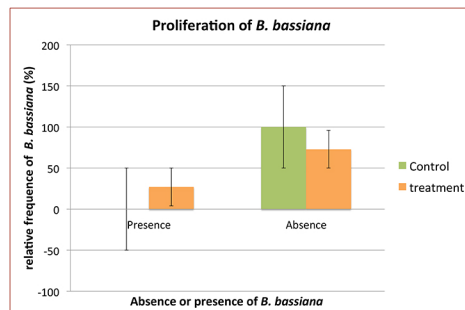


Fig. 2: Proliferation of *B. bassiana* once the control and treated individuals have died. The standard error is represented.

LIMITATIONS

- This study should be complemented with some complementary studies comparing:
 - Some **relative humidity**
 - Doses:** know what dose is the best one to control the pest.
 - Stage:** study *B. bassiana* effect in eggs, larvae, pupae and adults.
 - Kind of treatments:** study what product is the most effective in *D. suzukii*.

CONCLUSIONS

- B. bassiana* increases the mortality of *D. suzukii* adult.
- B. bassiana* could be one of the methods for biological control of *D. suzukii*, but would require additional studies and other methods to make a more effective control.
- An **integrated control** could be the best option for the pests control.
- Dissemination plan:** additional studies would be necessary to obtain publishable results.

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