Beauveria bassiana Basl.-Criv.
(Hypocreales; Clavicipitaceae)

• Fungal parasite that causes White Muscardine Disease in insects.

• Microscopic spores of fungi come into contact with insect host, which germinate and penetrate the cuticle.

• Fungus then grows inside of insect, killing it within a matter of days.

• White fruiting bodies emerge from insect, releasing spores.

• Anamorph of Cordyceps bassiana.
The in vivo development cycle of the entomopathogenic fungi Beauveria bassiana

- Conidia (spores) adhere to the host cuticle, then the conidia germinate and the germ tube and appressorium (penetration structure) are produced.
- The cuticle is penetrated by a combination of mechanical pressure and the action of cuticle-degrading enzymes.
- The fungus grows by vegetative growth in the host haemocoel and external conidia are produced upon the death of the host.

Plates of *B. bassiana*

A. Dorsal surface
B. Ventral surface
C. Fruiting structures
D. Fruiting structures
E. Conidia
Objectives:

- Determine the lethality of *B. bassiana* on SWD adults, larvae, and pupae.

- Determine the effect of *B. bassiana* on oviposition.

- Determine if transfer between gravid females and offspring occurs, and if so, does it affect the next generation’s size?

- Determine if generalized strain (GHA) performs as well as Diptera-specific strain (HF23 - BalEnce).
• Insects were **reared** in test tubes with 1 Tbs *Drosophila* media, 1.5 Tbs Distilled Water, and 0.5 tsp Active Dry Yeast at 23° C for up to 14 days.

• F2 Adults were removed for experimentation at or before 24 hours of pupal eclosion. **Healthy adults were selected** at random for experimentation after removal from colonies.

• **Washed and dried blueberries were sprayed** at highest labeled rates (Mycotrol O=2 qt/A, BalEnce=1 qt/A). Using airbrush at 20 psi air pressure, sprayed until point of drip on surface of fruit.

• Berries **allowed 2 hours to dry** under fume hood (reentry interval of both materials).

• 25 random male SWD and 25 random females SWD removed from colony and introduced to berries (**50 flies/treatment/rep.**).
At 48 hours, insects removed and **eggs were counted**. Live insects were counted and placed in isolation. **All dead insects separated into isolation** to observe potential fungal growth.

**Isolation chambers** kept at 23° C and 100% humidity to encourage visible fungal growth.

After 10 days, insects examined for *B. bassiana*, positive ID’s attained through spore microscopy.

Photo: Svetlana Y. Gouli, University of Vermont, Bugwood.org
Advanced stage of fungal growth (~10 days of exposure). Most of the spores have already detached.

Mycotrol-O mycopesticide. (*Beauveria bassiana*) to control *D. suzukii* adults
Mycotrol-O mycopesticide. (*Beauveria bassiana*) to control *D. suzukii* adults

Recently deceased SWD adult (~5 days of exposure). Signs of fungal growth present on head (around antennae) and abdomen.
(Beauveria bassiana) Infesting *D. suzukii* larvae

Advanced stage of fungal growth (~10 days of exposure) completely engulfing a cluster of 3rd instar Larvae.
**Results:** Significant increase in **mortality of adults on treated berries** compared to untreated check. BalEnce provided higher mortality when compared to Mycotrol O.

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**% Insects Mortality after 48 Hours**

- **Control**
- **Mycotrol O**
- **BalEnce**

**P Value <0.001**

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*Beauveria bassiana to manage the D. suzukii adult*
Results: Numeric decrease in ovipositional activity (NS).

Eggs per gram after 48 Hours of SWD Adult Exposure

- Control
- Mycotrol O
- BalEnce

P Value 0.1687
Results: SWD larva exposed to *B. bassiana* developed disease significantly more than untreated check. Mycotrol O appeared more virulent.
Results: Eggs laid in berries exposed to *B. bassiana* were somewhat less likely to mature to adulthood than those laid in untreated berries.
Breakdown of Untreated (UTC) Fruit at 14 d. relative to *B. bassiana* treated fruit
Conclusions

• Both *B. bassiana* formulations cause mortality within 48 hrs.

• Neither formulation works quickly enough to decrease egg-laying significantly.

• Insects exposed to Mycotrol O appear to express mature *B. bassiana* more readily than those exposed to BalEnce.

• Eggs that are laid on *B. bassiana* exposed berries are less likely to mature.
Thank You

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