



Horizontal Transfer of Beauveria Fungus Between Clover Root Borer Beetle Adults

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Introduction

Red clover (*Trifolium pratense*) seed yields in Oregon are significantly reduced by the Clover Root Borer (CRB), *Hylastinus obscurus*. Since the CRB develops in clover roots and only emerges above ground briefly to mate and disperse, insecticides are ineffective for its control. In contrast, biological control may have potential as the entomopathogenic fungus *Beauveria bassiana* was observed infecting CRB in the field. The objective of this study was to determine whether *B. bassiana* would transfer horizontally between conspecifics. The results indicate that 67% of beetles died when exposed to the higher dose tested under laboratory conditions. Further research is needed to determine the efficacy of *B. bassiana* under field conditions.

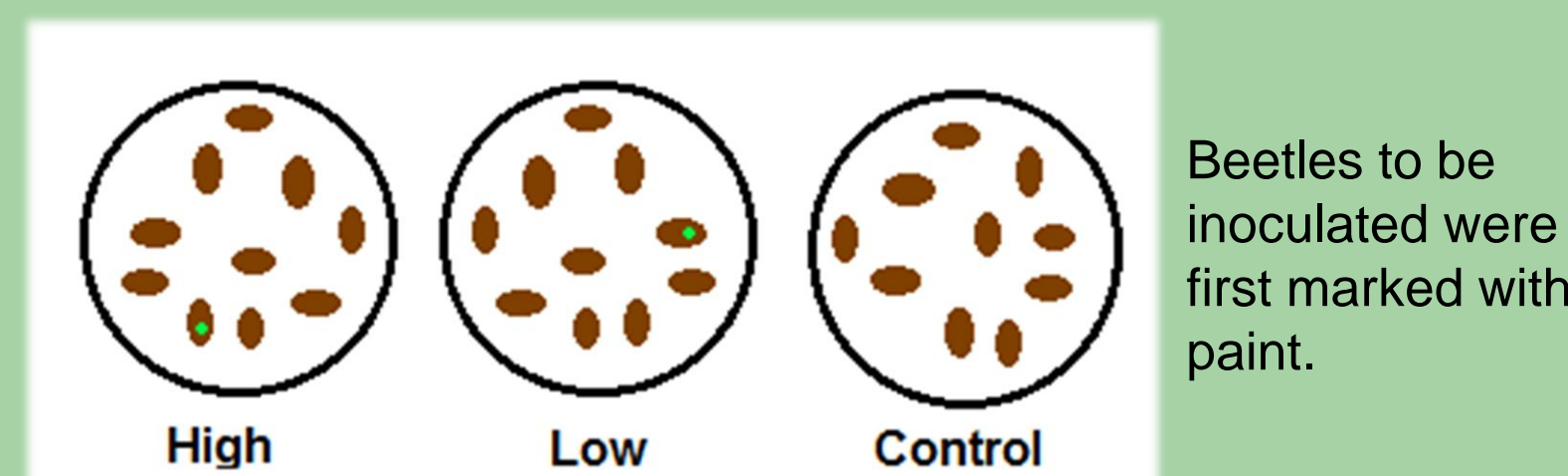
Methods

Specimen Collection:

- CRB adults and *B. bassiana* were collected from a red clover field.

Experimental Set-up:

- *B. bassiana* was cultured in the lab and evaluated at two doses: High ($9.7E^7$ spores per mL) and Low ($1.0E^5$ spores per mL).
- One sterilized CRB was submerged in the Low dose and then exposed to 9 untreated CRB's. The process was repeated with the High dose.
- The Control treatment consisted of 10 sterilized, untreated CRB
- The experiment had 5 replicates.
- All treatments incubated at 24°C and 70%(±5) humidity



Observations:

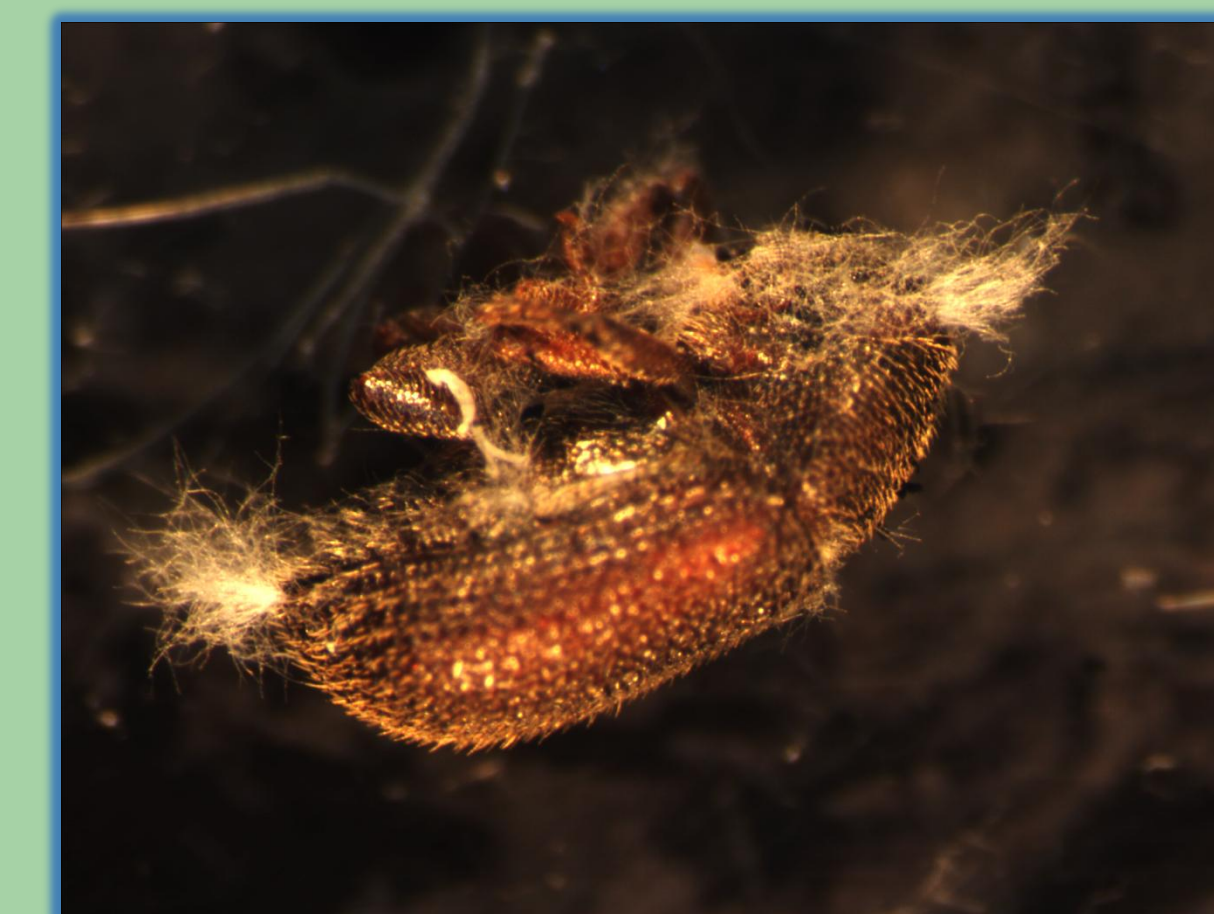
- All treatments were checked daily, and the number of deceased beetles, and the extent of their fungal growth, if any, were recorded.
- Beetles that were dead without external fungal growth were dissected after 3 days to determine the presence of the fungus internally.

Results

Progression of Fungal Growth



24 hours after death



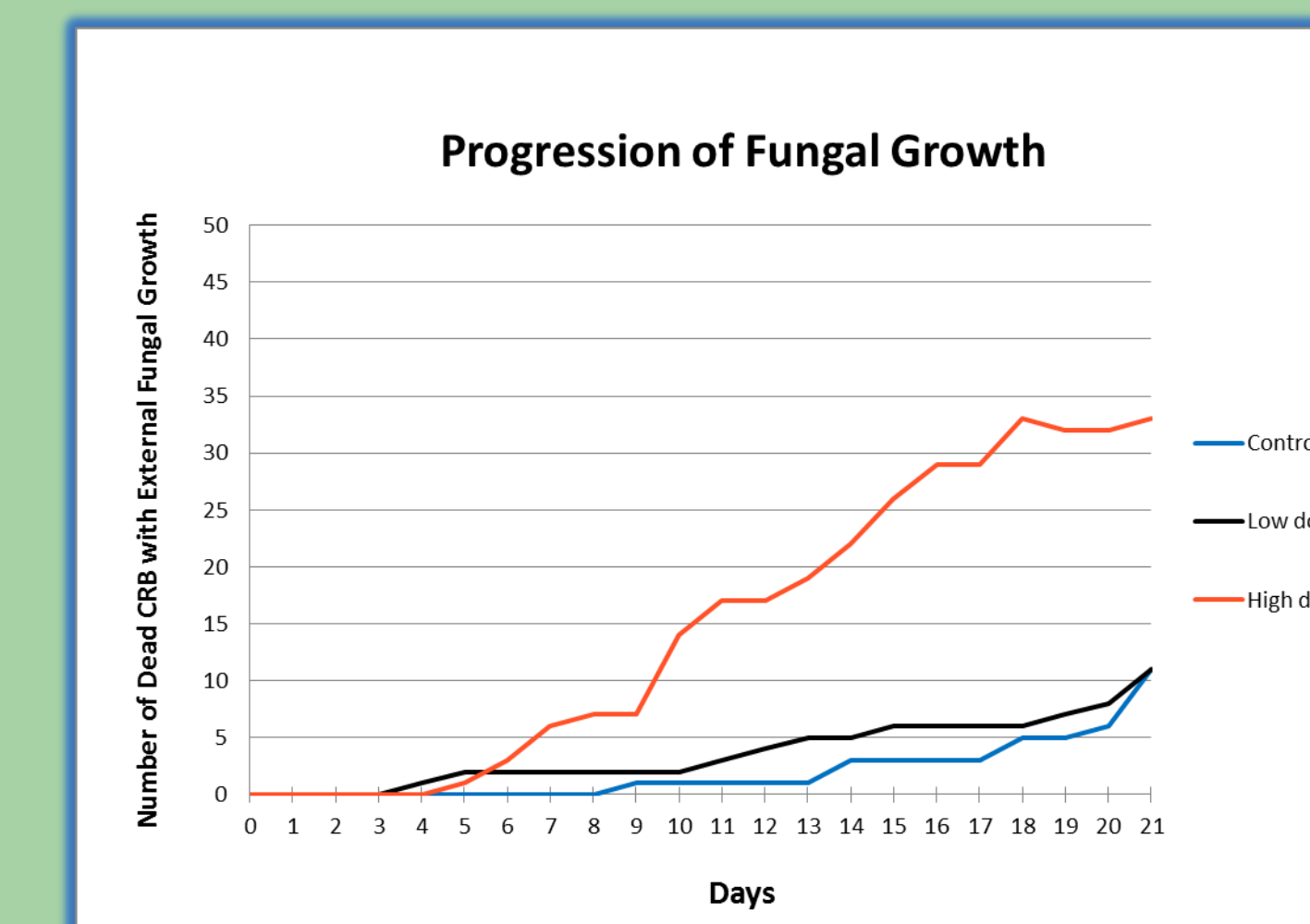
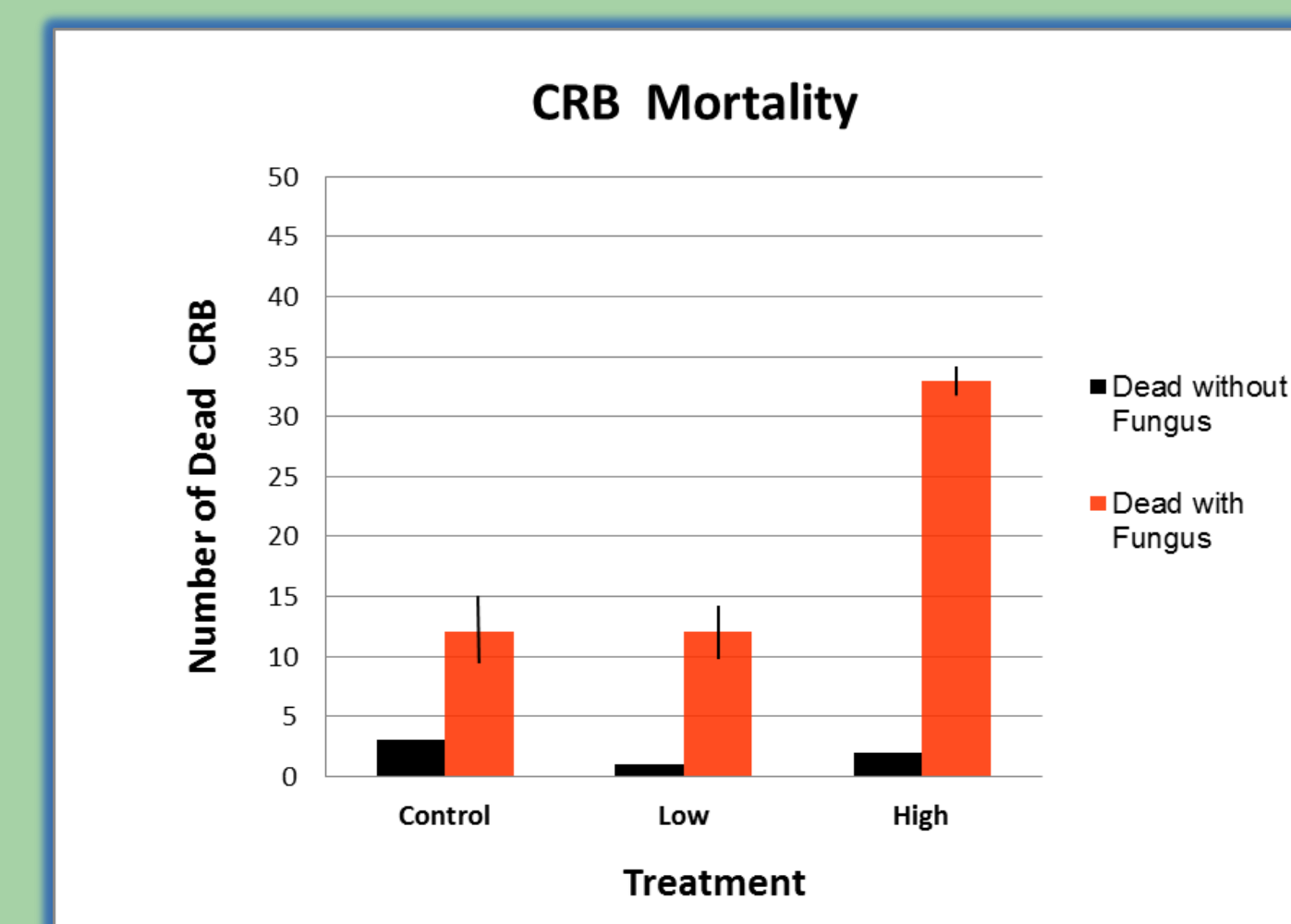
60 hours after death



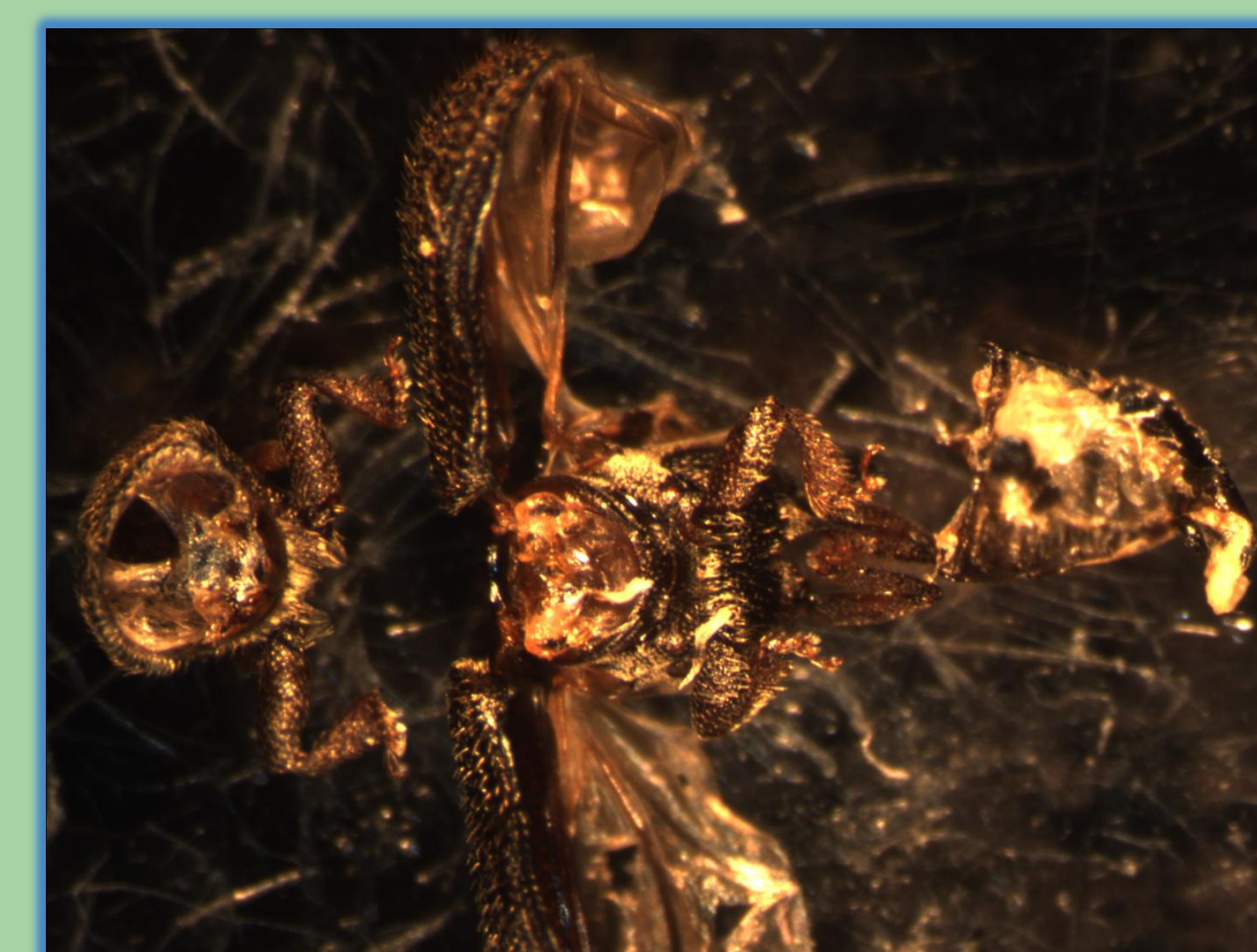
96 hours after death



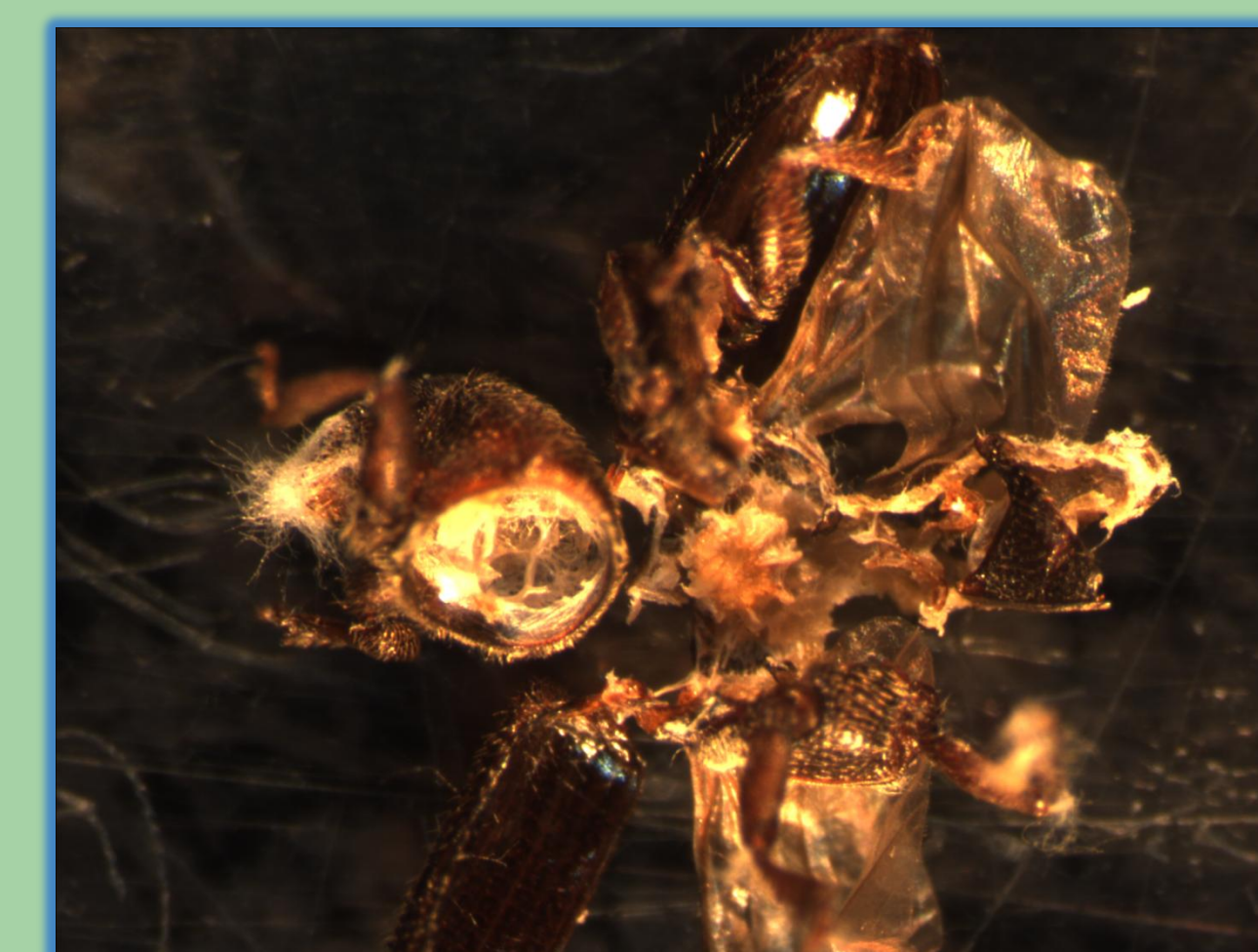
192 hours after death



- After 21 days, mortality due to *B. bassiana* was 67% in the High treatment, 25% in Low and 24% in the Control (3/5 replicates of the Control were contaminated).
- CRB mortality was recorded in 4 of 5 replicates of the High treatment on day 6.
- One replicate of the Low treatment failed to produce any mortality



Healthy CRB, not exposed to fungus, dissected alive. Body cavities full of fluids and clearly defined tissues.



CRB exposed to fungus dissected 24 hours after observed dead. Dry, gray tissues lined cavity walls.

Discussion

Implications of Results:

- *Beauveria bassiana* at the High dose ($9.7E^7$ spores per mL) used in the experiment can be transferred horizontally between conspecifics of CRB under laboratory conditions.
- Further research is needed to determine the impact of *B. bassiana* on CRB under field conditions.
- The efficacy of the naturally occurring isolate needs to be compared with commercial isolates of *B. bassiana* and with other entomopathogenic fungi.
- *Beauveria bassiana* has potential as a biological control agent for CRB. It may also have potential for use in development of an autoinoculation strategy.

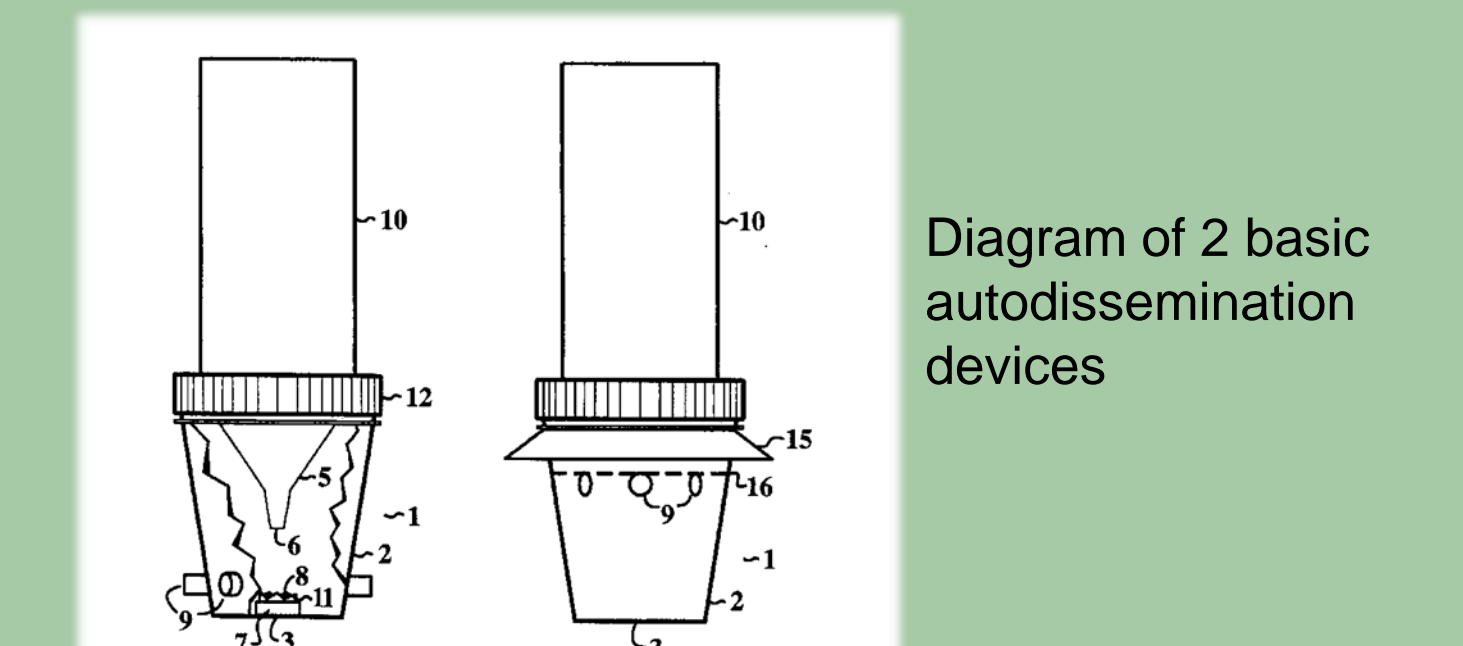


Diagram of 2 basic autodissemination devices

Limitations:

- Contamination of CRB with *B. bassiana* in the Control confounded the results.

References

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