BIOCONTROL POTENTIAL OF ENTOMOPATHOGENIC FUNGI FOR GRAPE MEALYBUG IN CANADIAN VINEYARDS

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INTRODUCTION: Grape mealybug (GMB) and grapevine viruses

Grape mealybugs (GMB), *Pseudococcus maritimus* (Ehrhorn) (Hemiptera: Pseudococcidae) are soft-bodied insects with a waxy coating on their bodies[1]. GMB spend most of their lives under the bark of vines where their piercing and sucking mouth parts are used to feed on vine sap (phloem)[1]. The instars and adult females feed, while adult males do not have mouthparts and live only a few days[2]. GMB overwinter as eggs or first instars under the bark of the vine trunks and emerge in the spring as temperatures rise[2]. GMB are vectors of the Grapevine Leafroll-associated viruses 1 and 3, significant viral diseases affecting grapevines[3]. The disease causes uneven ripening of berries and thin clusters leading to poor quality of grapes and reduced yields, resulting in significant economic losses[4]. Currently, there is one systemic insecticide used to control GMB in Canada. In this study, we propose a laboratory trial with two commercial entomopathogenic fungi (EPF), *Beauveria bassiana* strain GHA (BotaniGard) and *Metarhizium brunneum* strain F52 (Lalguard) to test its efficacy on GMB 2nd instars.

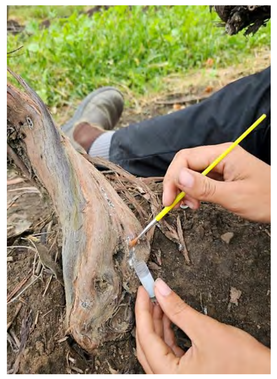
OBJECTIVES

- To establish a Grape mealybug rearing methodology for treatment trials
- To test two commercial entomopathogenic products against Grape mealybug in laboratory trials

METHODS: GMB Rearing

- GMB were collected late summer from a vineyard in Beamsville, Ontario.
- Potted vines and various vegetables were infested with the GMB collected from the vineyard and placed in incubators at 27°C with 60-75% humidity and 9 hours of light and 15 hours of dark conditions.
- The number of live instars was counted on each host over a six-month period.

GMB under bark of vine trunk



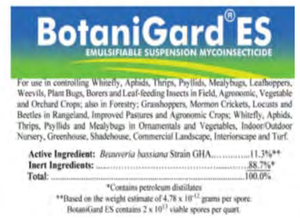
collecting GMB for rearing

adult female GMB

adult male GMB

METHODS: EPF Treatments

- Five 2nd instar GMB were placed on each sprouted potato.
- Potatoes were sprayed with a control and different treatments.
- GMB mortality was observed and recorded daily for 10 days post treatment.
- Each treatment was repeated three times.



Beauveria bassiana strain GHA

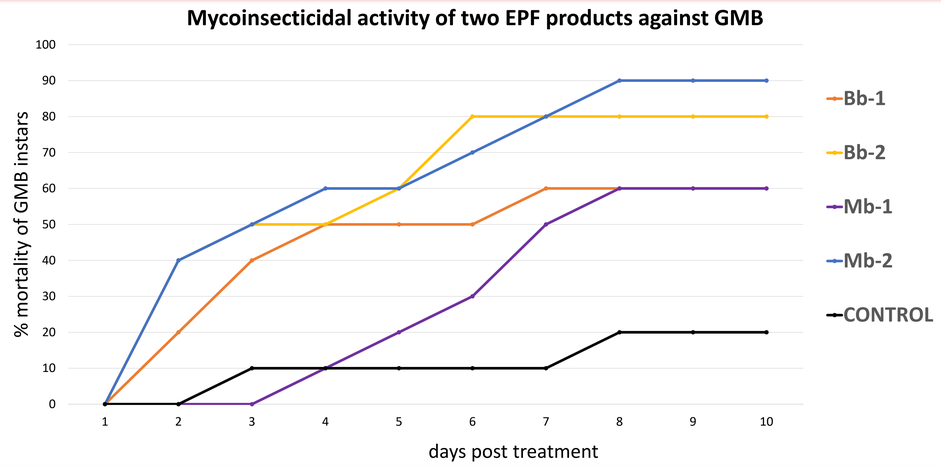
Metarhizium brunneum strain F52

Bbl= *Beauveria bassiana,* 62 µL/50 ml distilled water
Bb2= *B. bassiana,* 125 µL/50 ml distilled water
Mb1= *Metarhizium brunneum,* 25 µL/50 ml distilled water
Mb2= *M brunneum,* 250 µL/50 ml distilled water
Control= 50 ml distilled water

RESULTS: EPF Treatments

live 2nd instar GMB before EPF treatment

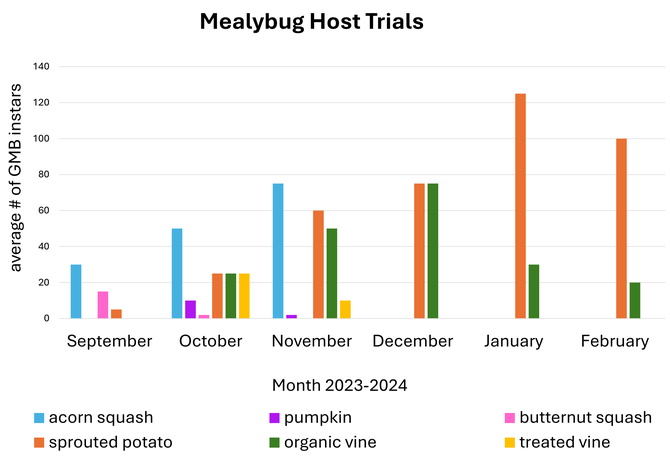
dead 2nd instar GMB after EPF treatment



RESULTS: GMB Rearing

potted vines in incubator

different host trials for GMB



CONCLUSIONS

- Both EPF products showed mycoinsecticidal activity on the GMB tested.
- The higher application dosage showed a higher mortality percentage observed seven days on average after application.
- Higher concentrations of both products (Bb2+Mb2) were more effective than the lower concentrations (Bb1+Mb1) from the second day.
- Lalguard had 90% mortality compared to Botanigard with 80% at high concentrations.
- Further trials using the same treatments on other life stages of GMB are recommended.
- Vineyard trials should be considered with both products.

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