Management of Climbing Cutworm (*Abagrotis orbis* and *Noctua comes*) on Wine Grapes Using Native Entomopathogenic *Beauveria bassiana* Isolates

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Abstract

Residual toxicity of *Beauveria bassiana* isolates against wine grape cutworm, *Abagrotis orbis* and *Noctua comes,* at temperatures 15°C, 20°C, and 25°C was carried out at the Institute for Sustainable Horticulture (ISH), at Kwantlen Polytechnic University (KPU), Langley campus, BC. The results indicated all *B. bassiana* isolates were able to infect and kill 2nd instar larvae of *N. comes* and *A. orbis* at different temperatures but some were better adapted to low or high temperatures. At 15°C and 20°C, ISH-252 was the most officious isolate, with the lowest LT_{50} and the highest rate of sporulation. Efficacy at these lower temperatures for ISH-190 were very similar to ISH-252. The next most efficacious isolates were OK-373 and BotaniGard. At 25°C, all the isolates were highly efficacious against larvae, and all sporulated within 5 days. The Petri dish trial results showed that ISH-252, ISH-190, OK-373, and ISH-189 grew similarly at all temperatures. ISH-171 and ISH-272 demonstrated a preference for warmer temperatures and grew more slowly at 15°C.

Introduction

Abagrotis orbis and *Noctua comes* are two winter cutworms which extensively damage wine grape buds in early spring.

Beauveria bassiana is one of the most promising fungi, that controls cutworm larvae population alone or in combination with entomopathogenic nematodes.

Beauveria spores remain in the environment and spread to infect other pests.

Methods

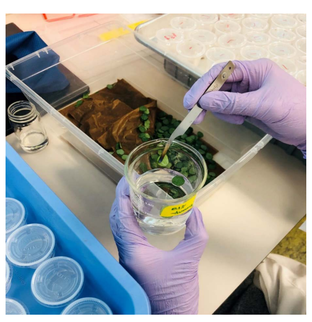
Treatments							
BC Coastal isolates				BC Okanagan isolate	International isolate	Positive control	Negative control
ISH-189	ISH-190	ISH-252	ISH-272	OK-373	ISH-171	BotaniGard	0.1% Tween 20

Broccoli leaf discs were immersed in the suspensions of 4.0 X 10^8 spores/ml for 30 seconds and set on paper towel to dry. Each leaf disc was placed into one 1-oz Solo cup with one larva. The cups were kept at 15°C, 20°C, and 25°C and the numbers of live, dead and sporulated larvae were recorded daily.

Live

Dead

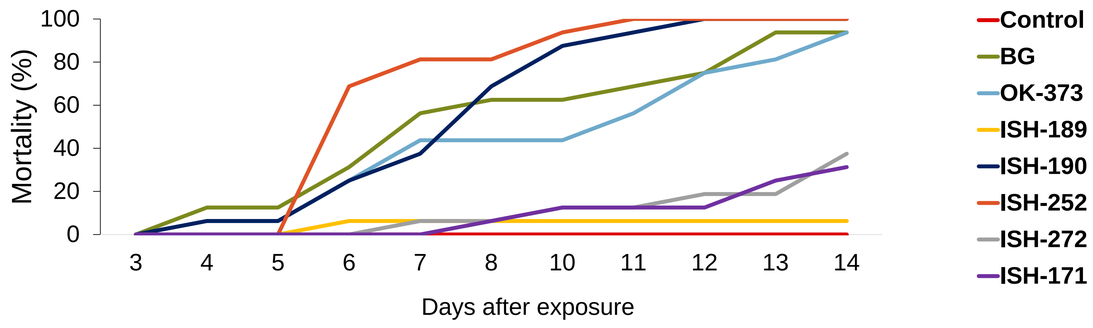
Sporulated

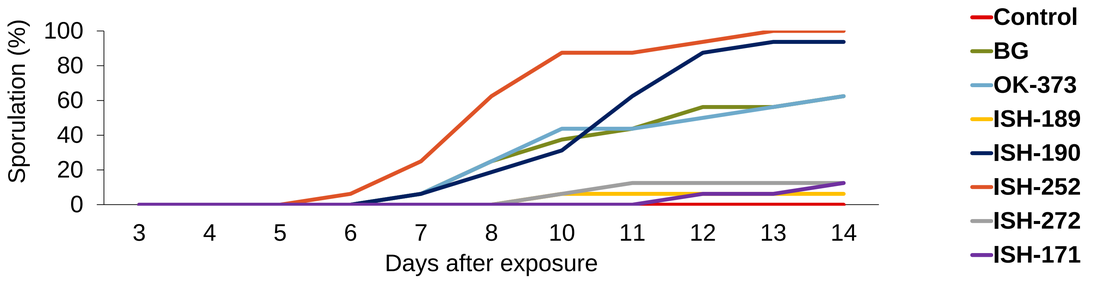


On the same day as the residual toxicity trial, 30 µl of each isolate suspension at a concentration of 1.2 × 10^3 spores/ml was spread onto the surface of PDA in Petri dishes. The Petri dishes were kept at 15°C, 20°C, 25°C, and 30°C. The number of fungal colonies formed was counted daily.

Results

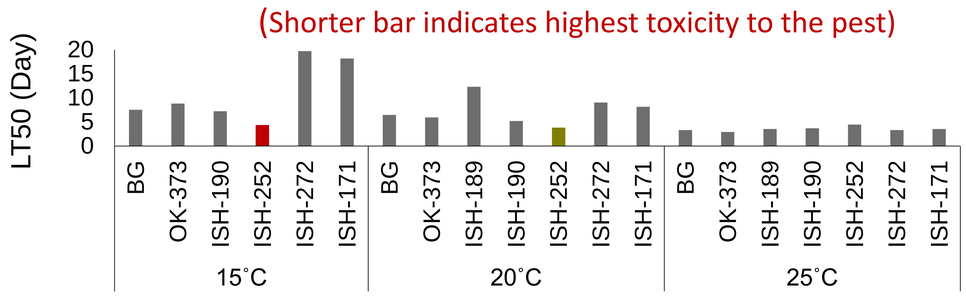
Mortality and sporulation of 2nd instar *N. comes* exposed to *B. bassiana* isolates at 15˚C





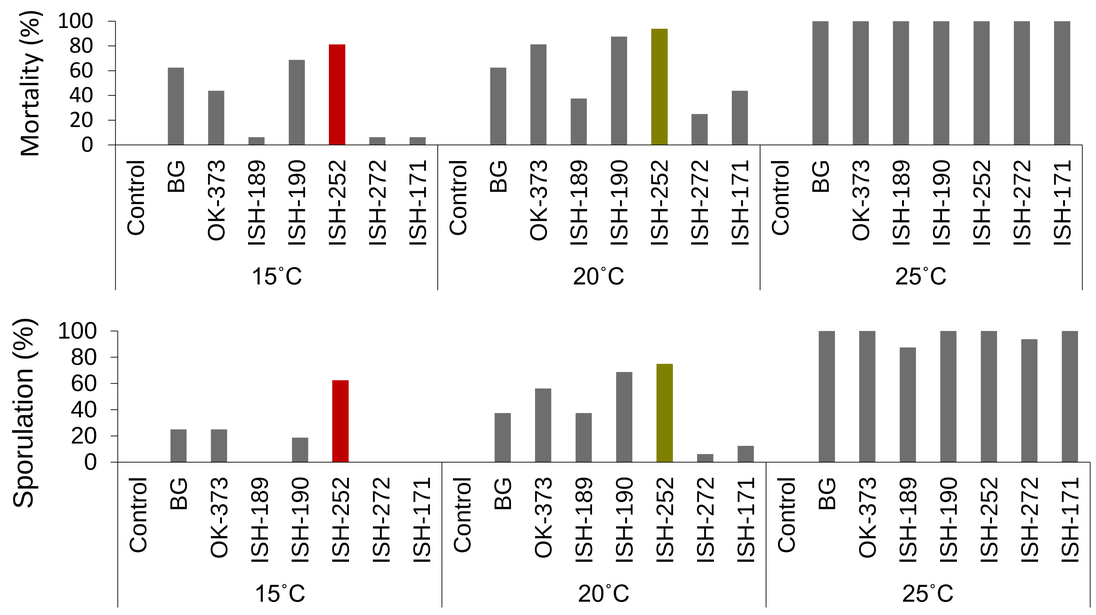
LT_{50} of *B. bassiana* isolates against *N. comes* larvae

(Shorter bar indicates highest toxicity to the pest)

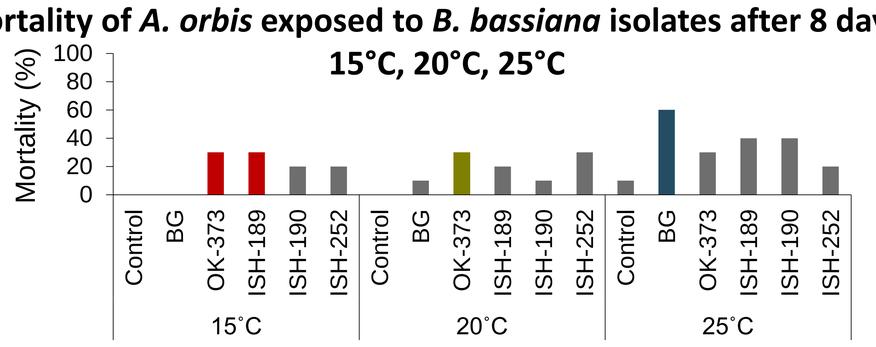


Results

Mortality and sporulation of *N. comes* larvae exposed to *B. bassiana* isolates after 8 days at 15°C, 20°C and 25°C

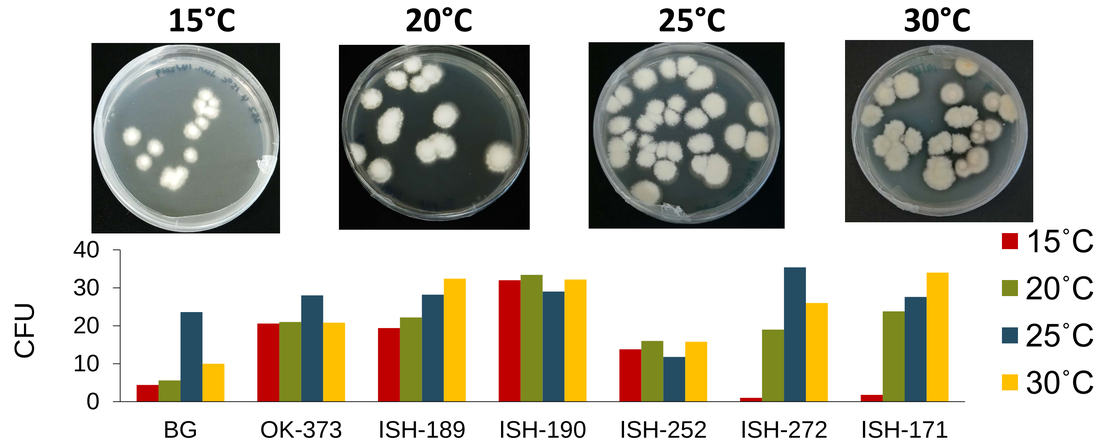


Mortality of *A. orbis* exposed to *B. bassiana* isolates after 8 days at 15°C, 20°C, 25°C



Colony formed 7 days after incubation at different temperatures

15°C **20°C** **25°C** **30°C**



Conclusion

- ✓ At 15°C and 20°C, ISH-252 was the most efficacious isolate, with the lowest LT_{50} and the highest rate sporulation and followed by ISH-190, OK-373 and BotaniGard.
- ✓ At 25°C, all the isolates were highly efficacious against cutworm larvae.
- ✓ In the Petri dish trial, ISH-252, ISH-190, OK-373, and ISH-189 grew similarly at all temperatures.
- ✓ ISH-171 and ISH-272 prefer warmer temperatures and grew more slowly at 15°C.

Acknowledgements

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