institute for sustainable horticulture

KWANTLEN POLYTECHNIC UNIVERSITY

Efficacy of two native *Beauveria bassiana* isolates from climbing cutworm pests of grapes against common lepidopteran pests

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Introduction

Two Okanagan isolates of the beneficial fungus, *Beauveria bassiana* have shown efficacy in the lab against climbing cutworm pests of grape (Lowery and DeLury, 2013). Screening trials will determine the potential of these native isolates as bioinsecticides for other common lepidopteran pests.

(1) Diamondback Moth (**DBM**), *Plutella xylostella* - resistant to the majority of insecticides
(2) Cabbage Looper (**CL**), *Trichoplusia ni* - polyphagous leaf feeder
(3) *Abagrotis orbis* (***A. orbis***) - grape climbing cutworm

Objective

To compare the efficacy of two new Okanagan **(OKA)** isolates and coastal **(ISH)** isolates of *Beauveria bassiana* against common lepidopteran pests.

Methods

Research was carried out from June to December 2016.

B. bassiana isolates were pre-screened. Based on pre-screening the treatments were as follows:

1. OKA-372
2. OKA-373
3. ISH-189
4. ISH-190
5. ISH-252
6. BotaniGard (positive control)
7. Tween 20 (0.1%, negative control)

Three measures of potency were collected:

1. Speed of kill (Mortality over time)
   - ✓ Contact: direct exposure on the surface of larva's body
   - ✓ Residual: larva exposed on dry treated leaves
2. Quantity required to kill ($4 \times 10^5 - 4 \times 10^8$ spores/ml)
3. Sporulation

Results

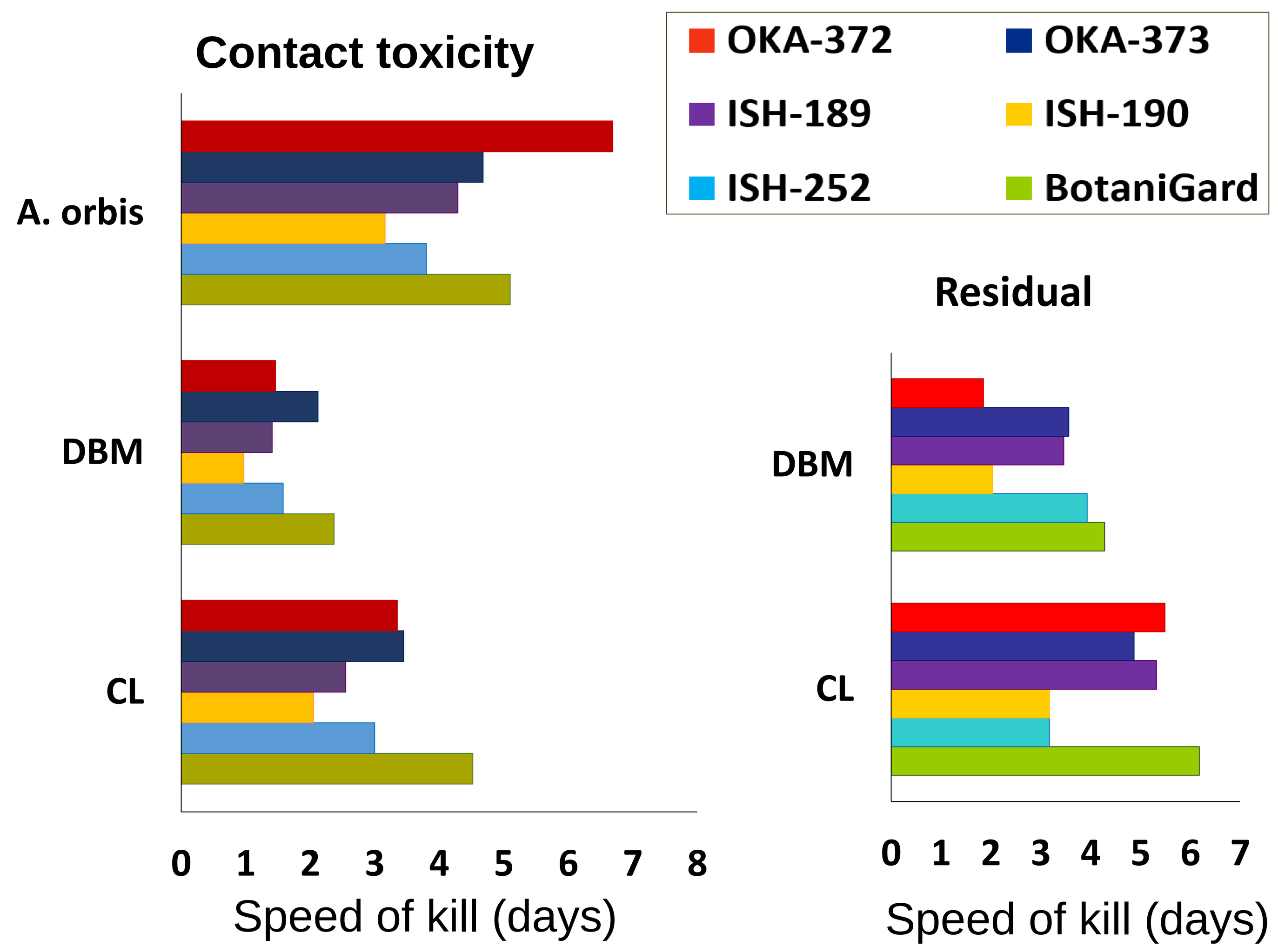

Fig. 1. Speed of kill for larvae exposed to *B. bassiana* isolates using contact and residual toxicity (shorter bar indicate highest toxicity to the pest).

Results

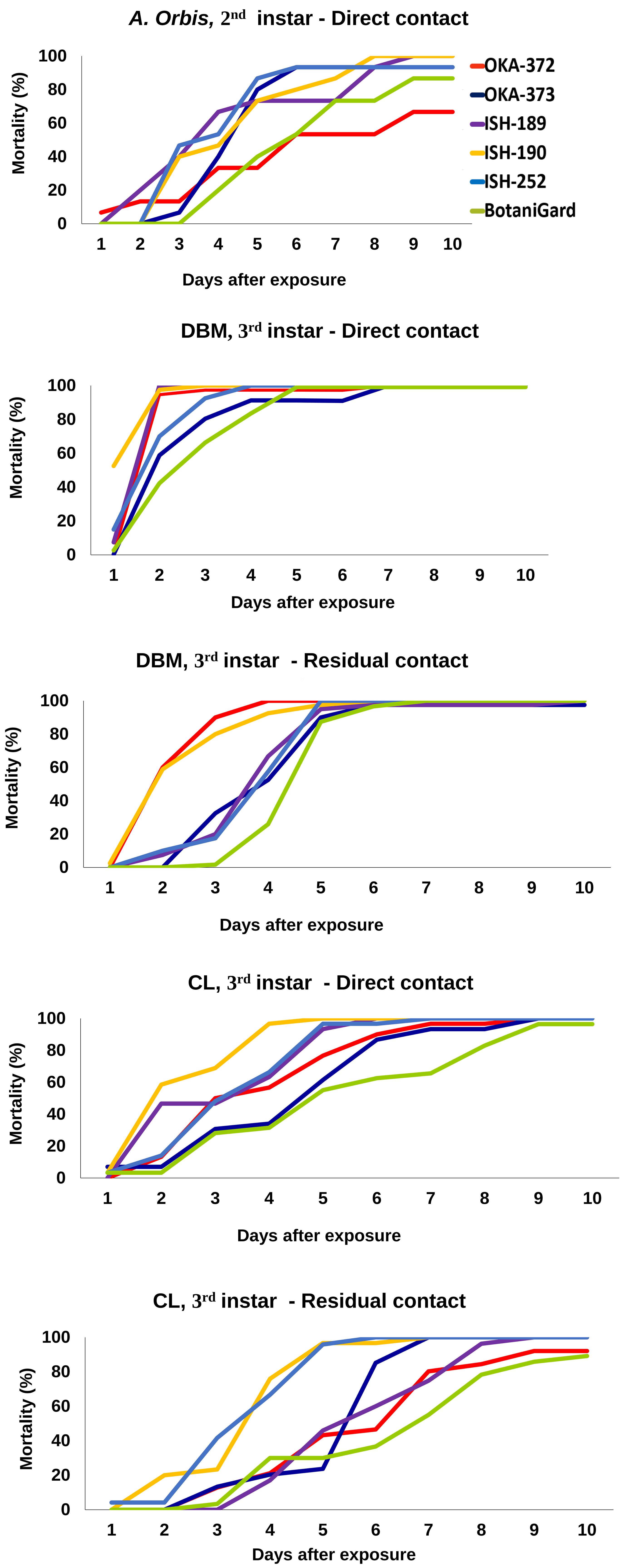

Fig. 2. Mortality (%) of larvae exposed to *B. bassiana* isolates at a concentration of 4×10^8 spores/ml using contact and residual tests.

Results

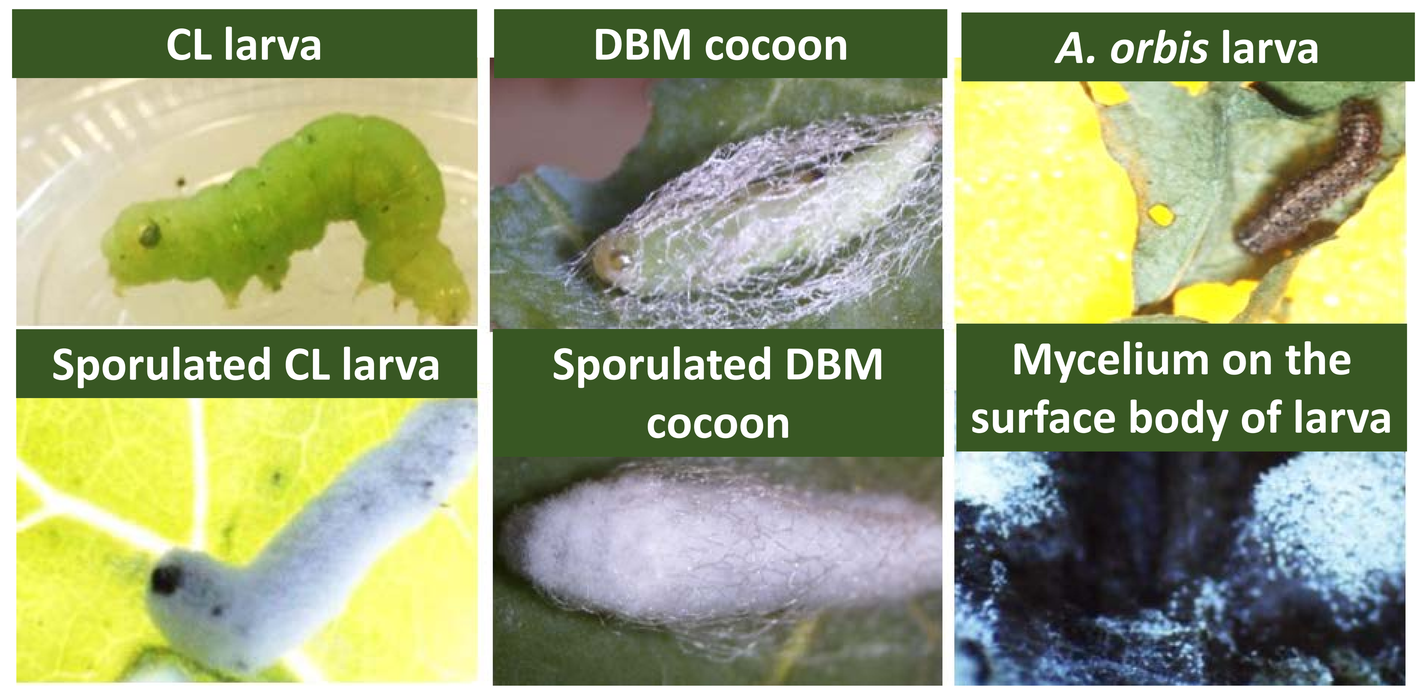

Fig. 3. Healthy and sporulated pests by *B. bassiana*

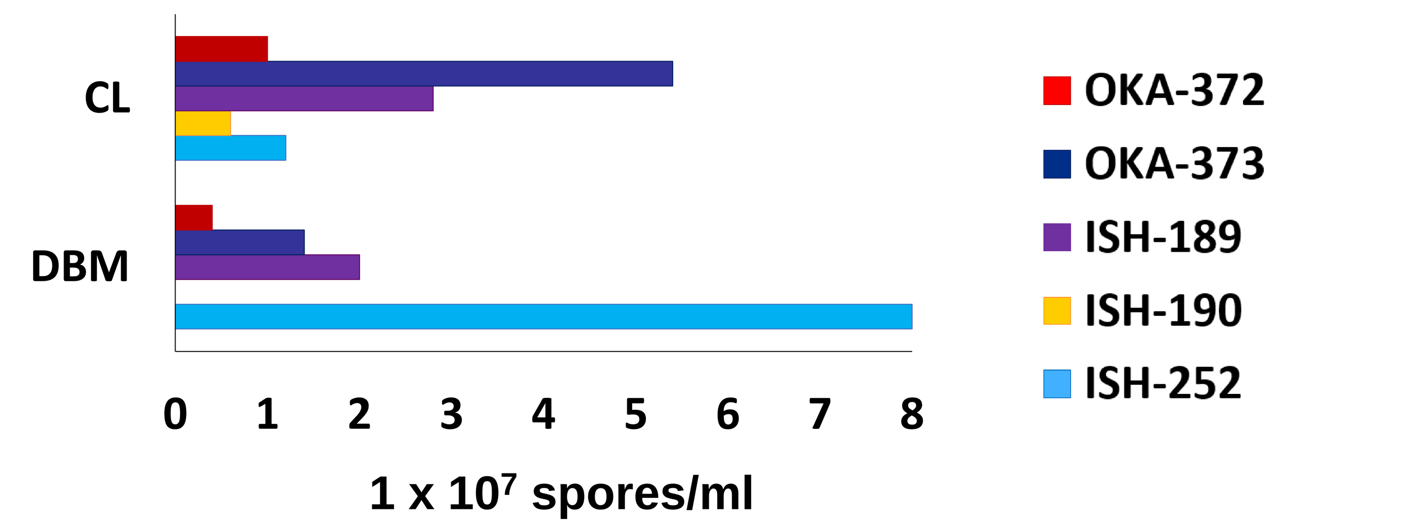

Fig. 4. Quantity of *B. bassiana* isolates required to kill the pests using direct tests (shorter bar indicates greater toxicity to the pest)

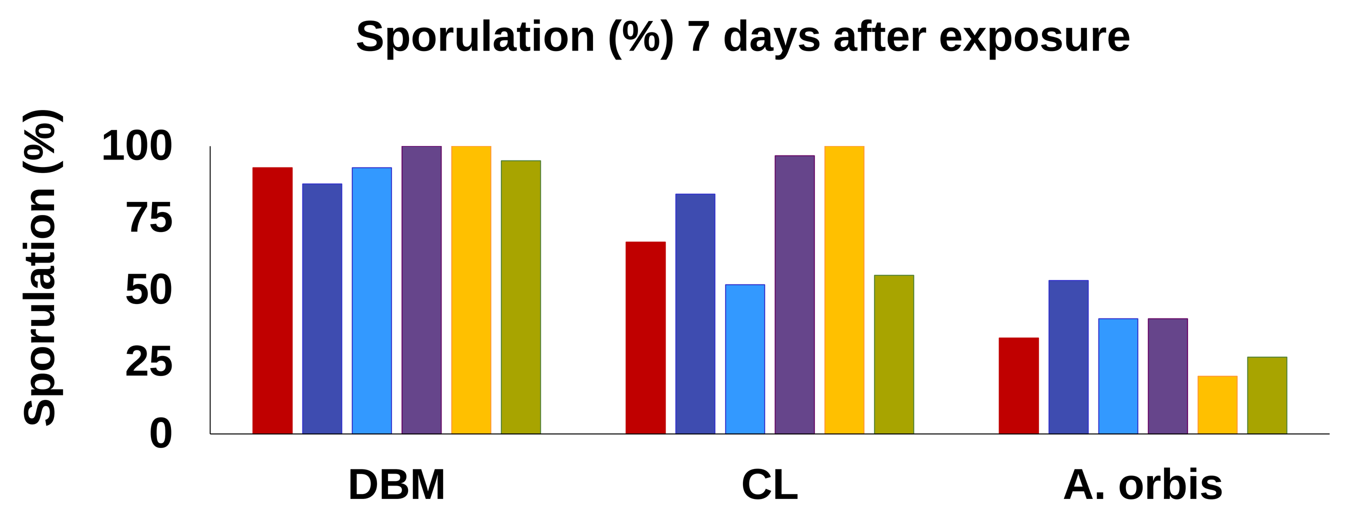

Fig. 5. Comparison of sporulation of *B. bassiana* isolates in infected larvae

Conclusion

- All isolates were efficacious against CL, DBM, and *A. orbis.*
- ISH-190 had the fastest speed of kill for all three pests.
- ISH-190 and OKA-372 required the smallest quantity to induce mortality for all pests.
- ISH-189 and ISH-190 had the highest sporulation for DBM and CL, while OKA-373 had the highest sporulation for *A. orbis.*
- Future work will include the 2 Okanagan (OKA-372, OKA-373) and 2 coastal isolates (1SH-189, ISH-190).

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