

A biological alternative for pollen beetle control with the entomopathogenic fungus *Beauveria bassiana*

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Pollen beetles (*Brassicogethes* spp., Coleoptera: *Nitidulidae*) are a main insect pest in colza throughout Europe and cause substantial yield loss when present in large numbers. Their increasing resistance to pyrethroids, coupled with deficient pest control possibilities in organic colza cultivation, reinforces the demand for alternative control strategies. *Beauveria bassiana* is a known pathogen of pollen beetles and previous field trials had shown potential, but insufficient effect on yield. To increase the field efficacy, natural substances were evaluated for their potential to improve infectivity and persistence of *B. bassiana* spores upon application.

Colza oil was found to interact synergistically with *B. bassiana* spores. Pollen beetles treated with *B. bassiana* spores formulated in colza oil showed a mortality of up to 71% in the laboratory, whereby the synergistic effect accounted for additional 28%. Stone dust was shown to have an antagonistic effect on pollen beetle mortality when co-formulated with *B. bassiana* spores. Humic acid was discovered as new natural UV-protective substance, that caused total protection of *B. bassiana* spores when exposed to artificial UV radiation. In field trials, the addition of humic acid to *B. bassiana* spores increased their survival significantly with up to four times more viable spores seven days after application.

Six years of field trials revealed a potential of our optimized *B. bassiana* formulation with colza oil and humic acid to reduce pollen beetle numbers. Although the formulation increased pod numbers on main branches up to 40%, no significant effect on yield was seen. The chemical insecticide included as positive control caused a significant yield increase of 14.6% only. Such low effects were also noted by other researchers which led to an increase in the official threshold levels for pollen beetles in Switzerland.

Jury

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