

Evaluation of Reduced-Risk Insecticides for the Management of Beet Leafhopper

California Department of Food and Agriculture Grant Proposal

1	Project Title	Reduced Risk Insecticides for Management of Beet Leafhopper and Curly Top Virus
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4	Funding Request	\$78,710 (\$39,355 per year for 2 years)
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Summary

The broad-spectrum insecticides that are widely used against beet leafhoppers to manage Beet curly top virus (BCTV) are increasingly threatened by regulation, negative public perception, and undesirable non-target effects. Alternatives are sorely needed. This proposal builds on over 15 years of team experience and recent preliminary work to test reduced-risk options (buprofezin, an insect growth regulator; SpearT, a spider-venom-derived biopesticide; and jasmonates, a group of plant defense signaling compounds that recruit beneficials), alone and in combination, against current standards (malathion, esfenvalerate) and a non-treated control. Replicated sugar beet field trials, with eight replicates per treatment, will be used to measure control of beet leafhoppers and BCTV as well as effects on beneficial and other non-target arthropods. Treatments will be judged on efficacy comparable to current standards and compatibility with preserving and promoting non-target beneficial insects. The resulting evidence-based recommendations will benefit California growers, pest control advisors, researchers, and policymakers by providing alternatives to malathion for the Beet Curly Top Virus Control Program while reducing environmental and human health risks, protecting beneficial insects, and building resilience to regulatory changes affecting broad-spectrum insecticides.

Objectives

The goal of the proposed project is to evaluate reduced-risk insecticides as alternatives and supplements to conventional chemistries for the management of beet leafhoppers, prevention of the spread of BCTV, and preservation of beneficial insects. Field plots will be established adjacent to a study in which viruliferous beet leafhoppers will be inoculated. This will ensure BCTV pressure in the plots used for the current study.

Compare effects of reduced-risk insecticides and conventional insecticides on:

1. severity of beet curly top virus, yield, and quality in sugar beet
2. densities of beet leafhoppers and other select arthropod pests
3. abundance and richness of beneficial, predatory insects

These objectives focus on evaluating reduced-risk chemistries under field conditions and determining their potential as replacements or supplements to current standards for BCTV management by the BCTVCP. By incorporating both crop protection efficacy and non-target arthropod assessments, the project will generate information critical to advancing sustainable pest management strategies. Findings will contribute to the development of management practices that reduce environmental risk, maintain effectiveness against BCTV, and preserve beneficial insect activity, supporting long-term agricultural resilience in California's production systems susceptible to BCTV.