

Insecticide resistance in alfalfa weevil

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What is insecticide resistance?

- Insecticide resistance is when an insect pest can tolerate typically lethal doses of an insecticide. This can result in control failures!
- Resistance occurs at the intersection between management practices and pest genetics; a combination of frequent insecticide use and the “right” mutation(s) in a pest.



Pyrethroid resistance in alfalfa weevils

- There are very few insecticides labeled for alfalfa weevil. Most are either pyrethroids, or are just not very effective. Indoxacarb is a highly effective “alternative” option.
- Studies in 2016 and 2018 identified Scott Valley and Palo Verde Valley as pyrethroid resistance hotspots in CA. Work done in 2020-2022 has corroborated this, as well as identified Merced County and possibly other areas in the San Joaquin Valley as areas of concern.
- There are still plenty of susceptible populations in California, but insecticide resistance management tactics need to be employed to preserve the materials we have, like indoxacarb.



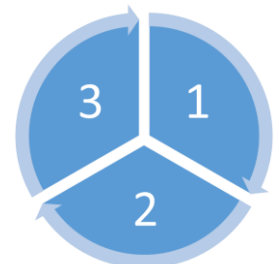
RESISTANT ALFALFA WEEVIL

What can we do about insecticide resistance?

- **First, make sure you are using good agronomic practices.**
Making sure that you have a healthy, vigorous stand will help your fields tolerate damage somewhat more, reducing the need for insecticide applications.
- **Consider using cultural control practices.**
Harvesting alfalfa early if pest pressure is high near harvest or having sheep graze fields over winter can reduce pest pressure without insecticide applications.
- **Pay attention to economic thresholds, spray only when necessary, and follow best practices.**
By evaluating the severity of pests in your field and spraying based on the UCIPM guidelines, you can avoid adding extra, *unnecessary*, insecticide selection pressure to your field. Pay attention to application timing. Applying insecticides too early can risk missing the peak of pest pressure.

The worst application you can make is one that does not work.

- **Try to protect populations of natural enemies, such as parasitoid wasps, whenever possible.**
There are many insects out there that will feed on or parasitize pest insects in your fields. If these natural enemy populations are protected and preserved, they can help suppress pests. Using more selective insecticides that target pests when you do spray can keep these natural enemy populations healthy.
- **Rotate Modes of Action for insecticides when possible!**
Insecticides are all grouped based on how they affect a pest, otherwise called their Mode of Action (MoA), or group number. The best practice is to rotate between MoA's for successive generations of a pest. For alfalfa weevil, this means between years. Repeatedly using insecticides in the same group increases selective pressure and favors resistant genetics. However, using different modes of action provides a break from this selection pressure.



Interested in alfalfa weevil insecticide resistance? Contact Ian at imgrettenberger@ucdavis.edu