New Project Addressing Alfalfa Weevil Insecticide Resistance

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As we start a new alfalfa growing season, I would like to introduce a new project looking at alfalfa weevil (AW) insecticide resistance across Oklahoma.

OKLAHOMA ALFALFA WEEVIL INSECTICIDE RESISTANCE STUDY

The Problem?

Across the western U.S. alfalfa weevil resistance to pyrethroid-based insecticides has developed. These products, specifically Lambda-cyhalothrin, currently provide the cornerstone of weevil management. Once resistance is established, it continues to expand with the use of the same insecticide products. Alfalfa weevil developing resistance to a given pyrethroid runs the risk of developing cross-resistance to all MoA group 3 insecticides. This could render our most utilized and economical insecticide class ineffective. In Oklahoma, our research has started to see increased incidences of resistance to pyrethroid products (Lambda-cyhalothrin). Uncertainty over AW insecticide resistance has warranted development of this new project addressing grower and industry concerns.

With implementation occurring this spring, the Oklahoma Alfalfa Weevil Insecticide Resistance Study (OAWIRS) is envisioned as a statewide collaboration working to:

- Identify the level of resistance to pyrethroid and other insecticides in locations where it has established.
- Map the spread of resistance throughout Oklahoma.
- Identify risk factors for the development of insecticide resistant alfalfa weevil.
- Develop resistance management recommendations for alfalfa producers and stakeholders to mitigate economic impacts of insecticide resistance.

What is Resistance?

Insecticide resistance is generally considered to be a heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve the expected level of control when used according to label recommendation for that pest species (IRAC, Insecticide Resistance Action Committee, 2021).

Program Goal:

The short-term goal of the OAWIRS program is collection of larvae and analysis of insecticide resistance throughout the state, particularly as it relates to Lambda-cyhalothrin. As stated above, we want to gather baseline data showing detection of resistance as it develops, map the spread, and identify strategies for control.

In addition to field efficacy trials, collection of alfalfa weevil larvae (Fig. 1 and 2) from fields across the state will support dose-response bioassays to evaluate insecticide efficacy. Vial bioassays (Fig. 3) are a globally recognized process for quick and economical determination of insecticide resistance. The OAWIRS project will rely heavily on grower and extension educator cooperators and encourages those with resistant weevil populations in their fields to contact the project leader.

Figure 1. Sweeping for Alfalfa Weevil Larvae. Sustainable Ag, 2021.

Figure 1. Photo credit C.D. Difonzo, retrieved from Bug Guide, 2021.

Figure 3. Vial Bioassay

Any issues with resistance we want to hear about, especially as it pertains to pyrethroids. A new fact sheet, EPP- 7102, Managing Alfalfa Weevil Insecticide Resistance, is now available. Survey instruments will also be developed to gain additional information. As we dive deeper into resistance progression, investigation of different chemical MoA and insects will ensue. For collections, we just need

access to fields before they're sprayed with AW control materials in the spring, usually mid-late March.

If you have any questions or would like to coordinate a site for collection you can contact Kelly Seuhs at 405-744-6456 or k.seuhs@okstate.edu