ALFALFA WEEVILS ACROSS THE WESTERN UNITED STATES ARE RESISTANT TO MULTIPLE TYPE II PYRETHROID INSECTICIDES

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ABSTRACT

Forage alfalfa (*Medicago sativa* L.) is an important agricultural component of the western United States. However, the primary insect pest of alfalfa, alfalfa weevil, *Hypera postica* Gyllenhal (Coleoptera: Curculionidae), has developed resistance to lambda-cyhalothrin. In 2021 and 2022, alfalfa weevil samples collected from forage alfalfa fields in Arizona, California, Montana, Oregon, and Washington were assayed for susceptibility to both type I and type II pyrethroid active ingredients, using laboratory bioassays. Our findings indicate likely multiple resistance amongst type II pyrethroids and variable and/or limited multiple resistance to permethrin (type I pyrethroid) and lack of multiple resistance to bifenthrin (type I pyrethroid). In 2022, insecticide field trials and alfalfa weevil strain identifications were conducted in Arizona, Montana, and Washington, corroborating our laboratory findings from samples collected from the same locations. Indicating, that regardless of strain, alfalfa weevil populations in the western United States with resistance to lambda-cyhalothrin will also be resistant to other type II pyrethroid active ingredients. However, bifenthrin (type I pyrethroid) and indoxacarb (MoA22A) were the most efficacious active ingredients tested in our laboratory bioassays and field trials. Indicating limited or no multiple resistance between pyrethroid types regardless of alfalfa weevil strain.

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