Using Spray Drones to Control Insect Pests in Alfalfa

Rachel Long[1], Xuan Li[2], Ken Giles[3]

Keywords: drones, UAV, pesticides, insect pest control

Integrating drones (unmanned aerial vehicles, UAV) as a new method of pesticide application into existing commercial crop protection systems requires extensive research and comparison to conventional, proven application technology. Pest control expressed as efficacy against target pests, spray quality expressed as coverage, and chemical residue are three key criteria. We investigated and compared these quantitative parameters between a multi-rotor UAV, conventional piloted airplanes, and a ground rig in three commercial alfalfa fields in California. Effective and equivalent control of leaf-feeding insect pests was achieved with all three methods when delivering Prevathon® and Vantacor™ insect control (active ingredient chlorantraniliprole) at the same active ingredient labelled use rate in different spray volumes (2, 5, and 10 gpa) on alfalfa. Residue levels and spray coverage were also comparable and consistent between the UAV and airplane applications across three sampling techniques as measured by residue levels on alfalfa, insecticide recovery from filter paper, and spray coverage on water sensitive cards. Differences in droplet size and deposit characteristics were more variable for the UAV than airplanes based on analysis of deposition images. The results of this study provide confidence supporting the use of drones for pesticide application on agricultural crops. According to the parameters tested, UAV application quality and crop protection performance were comparable to that of the conventional fixed wing airplane and ground applications. However, the droplet spectrum and the short-term fate of droplets from unmanned aerial spray system require further optimization for best crop protection.

---

[1]RF Long, UCCE Farm Advisor, Yolo County, 70 Cottonwood St., Woodland, CA 95695; [2]Stine Research Center, FMC Corporation, Newark, USA; [3]Biological & Ag Engineering, University of California-Davis.