### Introduction

Residential areas are increasingly being developed adjacent to farms. Residents are thus likely to be exposed to insecticide residues in spray drift. Farmers are required to minimize drift as much as possible. However, specific techniques for reducing drift from orchards have not been well studied. One possibility is the use of chemical retardants to slow drift as much as possible. However, specific techniques for reducing drift from orchards have not been well studied. One possibility is the use of chemical retardants to slow drift as much as possible.

### Objectives

- Measure the potential of the adjuvant Hi-Wett, a proprietary non-ionic organosilicone surfactant blend, to reduce drift from an orchard sprayer.
- Compare Hi-Wett to a conventional adjuvant called Break Thru (a nonionic wetter/spreader/penetrant surfactant).
- Evaluate the drifting insecticide residues that deposit on 20 cm x 10 cm aluminum-backed silica gel plates placed at different distances from the orchard.

### Experimental Design

1. The study was conducted on a 5-acre block of Gala apples at a commercial orchard located west of Prosser, WA.
2. Two treatments were overlaid on the first 60 trees of each row.
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4. Each treatment covered 30 trees.

### Sampling

1. Silica gel deposition plates (20 cm x 10 cm) were placed on wood stakes 3.5 ft above the ground. The plates were held in place with a thumbtack.
2. Three transects were designated for each treatment.
3. The stakes extended 200 ft into the adjacent non-cropped field. The plates were kept cool on ice and then transferred within four hours to a freezer located at the WSU Food and Environmental Quality Lab.
4. After spraying the plates were collected and kept cool on ice. The plates were kept cool on ice and then transferred within four hours to a freezer located at the WSU Food and Environmental Quality Lab.

### Analytical Methods

1. The silica gel plates were cut into small pieces, placed in glass jars, and then mixed in 30 mL of acetone/hexane (1:1) solution. The jars were shaken for 20 minutes at the high speed setting on a mechanical reciprocal shaker.
2. The extracts were vacuum filtered into a 250-mL flask.
3. The extracts were transferred to a standard taper 250-mL flask and then reduced in volume on a rotary evaporator set to 35°C.
4. The extracts were transferred to 1.2-ml vials and then quantified by gas chromatography (GC) with a FPD (pulsed flame photometric detector) using a 15 m x 530 μm i.d. EC-1 column.

### Results

1. Each treatment took about 20 minutes to apply. During this time wind speeds averaged about 2-3 mph and wind direction varied from northwest to southwest.
2. Guthion residues were detected at a distance of 200 ft from the orchard in the adjacent non-cropped field as well as within the orchard.
3. The Guthion residues in the adjacent field decreased to near limits of quantitation (0.001 µg/cm²) with increasing distance from the first tree row.
4. The Guthion residue deposits were greater in the adjacent field when Break Thru was used as the adjuvant than when Hi-Wett was used.

### Conclusions

1. Type of adjuvant seems to influence the potential for spray drift.
2. However, the use of a lower spray volume for Hi-Wett (which is recommended by the manufacturer) and the higher volume for Break Thru precludes making a definitive conclusion about the effect of spray adjuvants.
3. Manipulating both the type of adjuvant and volume of spray may be important for reducing drift and thereby protecting residences nearby orchards from pesticide exposure.

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