Table 1. Mean number of boll weevil adults caught per grandlure baited trap in Yuma County during the period. January 1 to April 30, 1982. Results are adjusted for the number of days each trap was in the field. All trapping areas are in approximately 8.0 Km (5 mi.) increments except where noted; actual trapping area differs in each increment.

Trapping Area	Mean Number Weevils/Trap/Trap Day ± S. D. ($X\ 10^{-3}$)
WELLTON-MOHAWK, DOME, GILA VALLEY	
Avenue 60E - 55E	15.7 ± 5.10
55E - 50E	1.6 ± 0.26
50E - 45E	9.6 ± 4.37
45E - 40E	13.2 ± 2.21
40E - 35E	4.6 ± 1.14
35E - 30E	0
30E - 25E	No traps here
25E - 20E	0
20E - 15E	0
15E - 10E	0
10E - 5E	0
5E - Arizona Avenue	0
YUMA VALLEY, MESA	
North Valley Levee - Co. 10th St.	0
Co. 10th St. - Co. 15th St.	0
Co. 15th St. - Co. 20th St.	0.1 ± 0.04
Co. 20th St. - Co. 23rd St.*	0
PARKER VALLEY	
Parker Town - Indian School Rd.	0.3 ± 0.05
Indian School Rd. - Scott Rd.	0.5 ± 0.08
Scott Rd. - Peterson Rd.	0.5 ± 0.18
Peterson Rd. - Tsosie Rd.	0.3 ± 0.03
Tsosie Rd. - 1.6 KM (1 mi.) North Welsh Rd.	0
1.6 Km (1 mi.) North Welsh Rd. - South end of Valley	0

*4.8 Km (3 mi.) increment

Drift and Foliage Deposits from ULV Cottonseed Oil and Emulsion Sprays

George W. Ware, Betty J. Estesen, and Norman A. Buck
Entomologist and Chemists, respectively

Summary

Drift and target deposits of aerially applied ULV Pydrin in either 2 or 3 pints of cottonseed oil per acre using the Micronair and fan nozzles were compared with the conventional 3-gal per acre emulsion. Two-pint ULV resulted in more drift and less canopy deposit than 3-gal emulsion. By increasing ULV to 3 pints per acre, drift was less than the 2-pint rate and 3-gal emulsion.

****

Two separate studies were conducted in September, 1982, comparing the drift and deposit of 3-gal emulsion with 2 pints and 3 pints per acre of ULV cottonseed oil. The test insecticide was Pydrin applied at 0.1 lb per acre. The tests were conducted on cotton belonging to Bill Scott, located at Stanfield, AZ.

The plane used to make all test applications was a 1978 Cesna Ag-Truck equipped with a digital flow meter, which enabled the pilot to monitor precisely the application rate. For the 3-gal emulsion, a total of 42 D-6 and D-8 nozzles with 46 whirlplates were used. For the ULV, either 12 8003 fan nozzles were used at 30 PSI for the 2-pint rate, or 18 8003's at 35 PSI for the 3-pint rate. For the second type of ULV application, 8 Micronair nozzles were attached to the boom and operated at 29 PSI for 2 pints or 37 PSI for the 3-pint rate.

Because of inconsistent wind and weather conditions, all tests were not conducted at the same time or under the same meteorological parameters. On September 2, the plane, equipped with Micronair nozzles, applied Pydrin in 2 pints of cottonseed oil per acre to a 9-acre block of short staple cotton. Within the field were a series of glass plates spaced at 20-foot intervals atop an irrigation border dike at 90^{o} to the path of the plane. From these we measured on-target deposits.

Downwind were multiple 2-square-foot aluminum foil panels and high-volume air samplers at intervals out to one-half mile to measure drift. The aluminum foil panels measured impinging or falling droplets drifting off-target. The high volume air samplers measured impinging droplets plus those droplets too small to impinge and which could remain airborne indefinitely.

Separate 5-acre plots in another field were treated immediately after the drift application for measurement of foliage deposits and spray distribution within the canopy. This cotton averaged 55" to 60" in height.

Because of wind shifts, the subsequent 2 applications of 2 pints ULV using 12 8003 fan nozzles and 3-gal emulsion were applied only to their respective 5-acre plots for foliage distribution and deposit measurement. No drift information was obtained.

The following day, the 3-gal emulsion was successfully applied to obtain on-target deposits and downwind drift information. Because of wind shift, we were able to obtain only on-target deposits with the 2-pint fan nozzle ULV application.

On September 21, 3-pint per acre ULV applications were successfully made with the fan and Micronair nozzles. Downwind panel and high volume air sampler drift collections were completed.

Results. Deposits on glass plates in the target zone indicated the highest deposits from the 2-pint Micronair , 87%, followed by the 3-gal emulsion, 73%. The least was 67% from the 2-pint fan nozzles. The Micronair gave the greatest deposit partly because the air movement was down-row, parallel with the glass plate arrangement. The other two applications were made the next day when wind direction was 30^{o} off parallel. The emulsion and ULV fan applications were made under similar conditions and indicate greater target deposit from the emulsion, which is consistent with the deposits seen in the separate canopy applications (Fig. 1).

The results shown in Figures 1-3 should be used only for general comparisons, since they were not made under the same meteorological conditions.

Figure 1 illustrates the distribution of the sprays within the canopy of the 5-acre plots. These applications were made consecutively on the same day and show accurately the relative deposits. These data were obtained by extracting leaf samples from the 3 levels of the plant, top, middle, and bottom. The greatest deposit at all levels was from the 3-gal emulsion, followed by the 2-pint fan nozzles, and least from the 2-pint Micronair .

Figure 2 illustrates drift from these applications as deposited on aluminum foil panels downwind. These panels collect droplets that are large enough to fall and impinge on any article downwind. The Micronair at 2-pints gave the greatest amount of drift, much greater than the emulsion, in the order of 10 fold. (Note: Deposits are on log scale.) By increasing the volume to 3 pints per acre, drift is reduced substantially. both Micronair and fan nozzle ULV at 3 pints per acre were generally about the same and resulted in less drift than the 3-gal emulsion.

Figure 3 shows the results of the high volume air samplers, which agree closely with the aluminum foil panel data (Fig. 2). With high volume air samplers, all material suspended in the air is captured, in addition to the impinging droplets. Again, the Micronair at 2 pints resulted in about 4-fold the drift of the 3-gal emulsion at 1/2 mile. However, by increasing the volumes of ULV to 3 pints, drift was reduced substantially, to less than the emulsion.

Conclusions. It is evident that drift occurs from all applications. It cannot be prevented, but it can be reduced. Our 1981 studies indicated that 2 pints of ULV resulted in more drift than 3 gallons emulsion. Our work in 1982 confirms these results. However, by increasing the ULV to 3 pints, larger droplets are produced that result in much less drift than 2 pints ULV, and even less than 3 gallons emulsion. Consequently, in developing the 1983 cotton insect control recommendations, we are going to suggest that when ULV cottonseed oil applications are made, not less than 3 pints per acre be used.

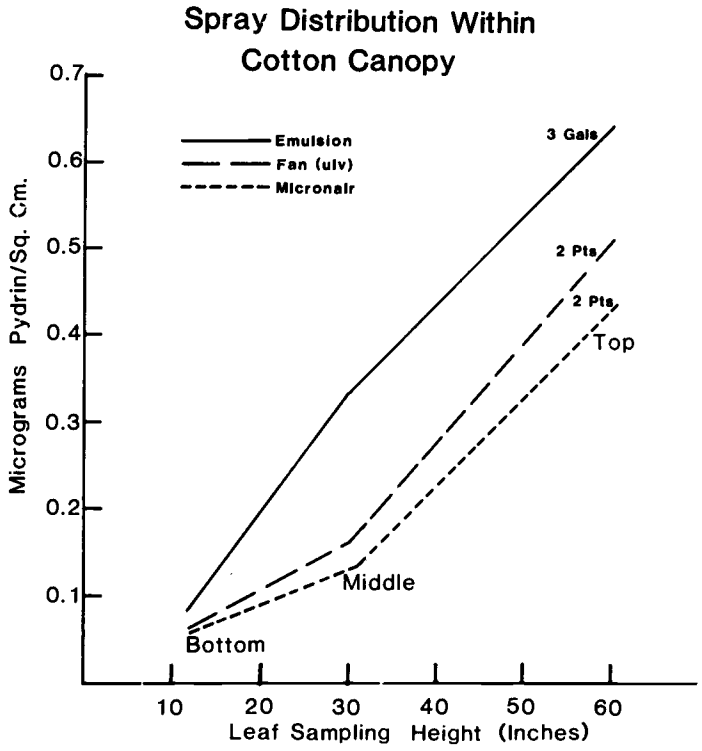

Figure 1. Spray distribution within the cotton canopy from emulsion and two forms of ULV cottonseed oil.

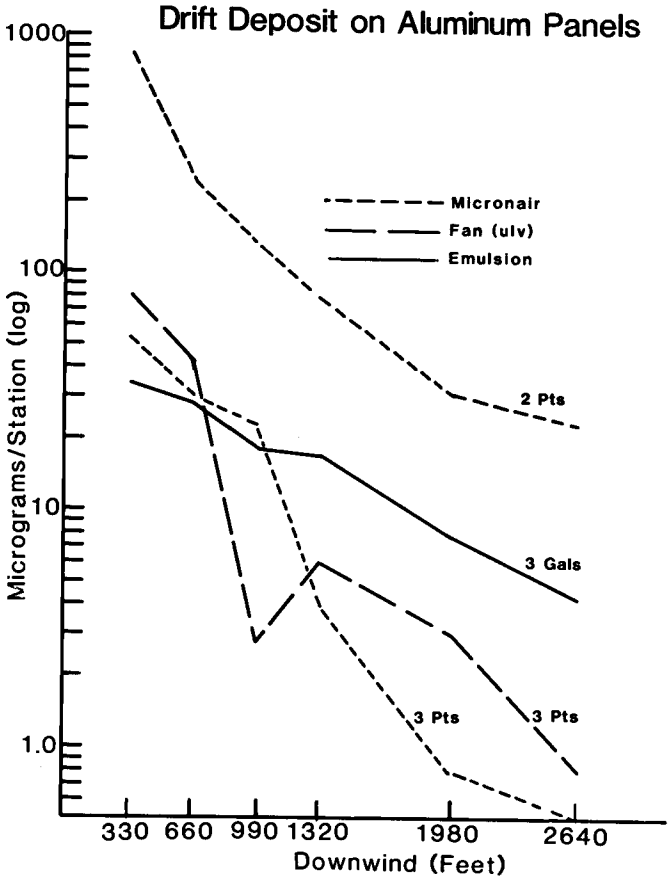

Figure 2. Drift deposits on aluminum foil panels from emulsion and two forms of ULV cottonseed oil.

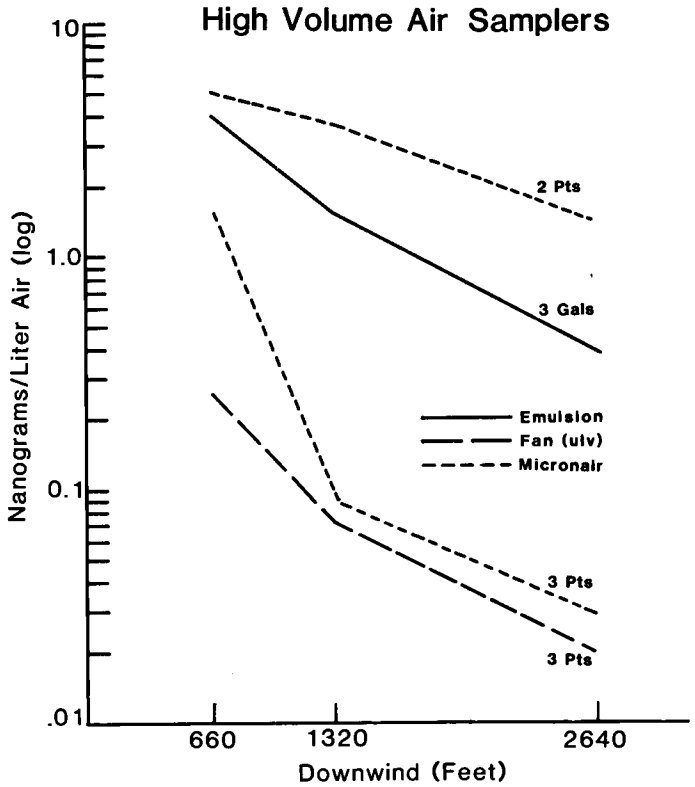

Figure 3. Drift air concentrations by high volume air samplers from emulsion and two forms of ULV cottonseed oil.