Understanding winegrape weed management practices of a biologically integrated farming system in San Joaquin County, California

S. Steve Arounsack1, Minghua Zhang1, and Jenny Broomie1
Land, Air, and Water Resources, UC DAVIS University of California Sustainable Agriculture Research and Education Program (UC SAREP)

ABSTRACT
Many inexpensive and highly effective herbicides used on vineyards such as simazine have been detected in California’s groundwater. To reduce the risk of this contamination, a Biologically Integrated Farming Systems (BIFS) program in San Joaquin County, California, employed a weed management approach between 1996 and 1998. We used California’s unique Pesticide Use Records (PUR) database to investigate whether BIFS growers reduced their use of pre-emergent and attempt to gain a better understanding of herbicide use patterns during and after BIFS program years based on economic, efficacy, and rainfall data. Results showed that simazine use decreased significantly in the first year of the program. The initial decrease in simazine use in the inaugural year may have been due to initial enthusiasm for a locally grown-driven program, low weed pressure, and a shift in weed management strategies.

1.OBJECTIVES
- Investigate whether BIFS growers reduced their use of pre-emergent herbicides
- Gain a better understanding of herbicide use patterns during and after program years based environmental, efficacy, and economic data

2. MATERIALS AND METHODS
2.1 Study site and participants
- 49 winegrape BIFS fields in San Joaquin County, California, representing approximately 3000 acres during program years (1996-98)
- 1100 conventional fields representing roughly 75,000 acres

2.2 Data source
- Pesticide use reports (1993-2001) from California’s Dept. of Pesticide Regulations
- Rainfall data (1992-2000) from California Irrigation Management Information System (CIMIS) for Lodi, California (station 42)
- Economic and pesticide price data from California Grape Advisory Team and FOPA Grape Partnership and Ohmart (1998)
- Pesticide efficacy data from University of Virginia (Pfeiffer et al., 2003)

2.3 Data analysis
- Applied the Statistic(1997, version 5.1) to perform t-tests on simazine and glyphosate use between and among groups from 1993-2001.

3. RESULTS
Table 1. Simazine use (lbs of active ingredient) per-planted by time period (pre-, during-, and post-program).

4. CONCLUSIONS
-Winegrape BIFS fields lowered their use of pre-emergent herbicides in the first year of the program, most notably simazine. Increases in simazine use during 1997 and 98 could be attributed to higher weed pressure.
-The successes of the BIFS program may be attributed to amenable environmental and social conditions: low weed pressure as measured by low.

REFERENCES

Fig. 1. BIFS monitoring techniques include hand-held computers that efficiently transfer field data to the lab for analysis.

Fig. 2. Rainfall and simazine use on BIFS fields. BIFS correlation coefficient between rainfall and simazine use: pre-program (.13), during (.38), and post (.05). Conventional correlation coefficient between rainfall and simazine use: pre-program (.08), during (.19), and post (.09).

Fig. 3. Pesticide use on BIFS fields and price-efficacy index. Efficacy data is only for annual grasses and pesticide use data is for BIFS programs year 1996-1998.

Fig. 4. Pounds of active ingredient per acres planted for pre-emergent and contact herbicides on BIFS fields.

Table 2. BIFS and conventional acreage composition for pre-, during, and post-program years. The total value is provided in acreage while field proportions are calculated in percentages for each field profile. Values in bold denote highest percentage for that particular year. SMZ: fields that used simazine and no glyphosate. GLY: fields that used glyphosate and no simazine. BSG: fields that used both simazine and glyphosate. NSG: fields that used neither simazine or glyphosate. NR: fields that had no reported use of herbicides. NMS: fields that did not use simazine. (The sum of groups GLY, NSG, and NR).

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TOTAL acres 3008 3105 3082 3256 3172 2699 3272 3032 3204

NMS 58.7 51.8 51.7 69.1 58.6 39.9 52.8 49.7 83.1

Conventional

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TOTAL acres 2906 2885 2924 2915 2916 2836 2916 2966 2906

NMS 54.4 54.4 51.9 56.9 54.9 44.0 42.5 43.7 36.6

CORRESPONDENCE
S. Steve Arounsack, mzhanga@ucdavis.edu, Minghua Zhang, shfang@ucdavis.edu
AGS Lab, LCDr. J. and Anna Water Resources, UC Davis, One Shields Ave., University of California, Davis, CA 95616, Phone (503) 794-9292