Insecticide Use on Arizona Head Lettuce

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Introduction: The development of accurate data on insecticide usage is important to the assessment of our IPM programs in Arizona. Reliable estimates of insecticide use patterns are one of our most objective tools for assessing change in management practices. This information allows us to build relevant databases for measuring user behaviors and adoption of new IPM technologies. For PCAs, it can translate their efforts into economic terms for their clientele and confirms their value to the lettuce industry by showing the importance of their cost-effective management in desert lettuce production. This summary provides real world data on estimates of insecticide usage to prevent key insect pests from reducing yield and quality.

Methods: The data was developed through the administration of a three-part survey that was conducted in an interactive process with stakeholder input. Growers, PCAs, Extension personnel and industry professionals attended Head Lettuce Insect Losses and Impact Assessment Workshops in Yuma and completed surveys in a guided process. The workshops were conducted in an interactive manner where participants were given a presentation that established the incentives for participation, explained the crop insect loss system, and further walked the participants through the estimation process. This summary presents results from the insecticide use survey for head lettuce produced in Yuma, AZ and in the Bard/Winterhaven area of California. Data on insecticide use patterns was generated by requesting that PCAs estimate the frequency of use of various chemistries and the percentage of treated acres for each product. Estimates of total treated acreage were generated using USDA-National Agricultural Statistics Service (NASS) data, and the acreage reported from each survey participant. Ideally, this data will allow us to track changes in insecticide use patterns over time in greater detail in both fall and spring head lettuce.

Summary:

Results from the 2012 Lettuce Insect Losses Workshop reveal some interesting trends in insecticide usage on desert head lettuce. In general, the most commonly used insecticides in fall and spring lettuce correspond directly to the key pests that typically occur during these growing periods. When compared by class of chemistry using the IRAC mode of action classification system, the pyrethroids, applied both as foliar sprays and chemigations, have by far been the most commonly used insecticide class (Tables 1, 2 and 3). This makes sense because they are one of the few inexpensive, broad spectrum insecticides still available for effective control of beetles, crickets and plant bugs. Nonetheless, over the past few years pyrethroid usage has been steadily declining, as has usage of organophospahates, and carbamates where Lannate and Orthene continue to be the primary compounds used in desert lettuce. The spinosyns remain the second most commonly used class of insecticides, where greater than 90% of the lettuce acreage was treated with Radiant and Success in 2011-2012. Their activity against both lepidopterous larvae and thrips make the spinosyns a good fit in desert lettuce. The third most commonly used class of chemistry in fall and spring lettuce are the neonicotinoids driven primarily by at-plant, soil uses for sucking insects. Estimates this season showed that PCAs used generic imidacloprid and Admire Pro on a larger percentage of acres this season compared to last year. Estimates of Diamide usage (Coragen, Voliam Xpress, Vetica) showed that PCAs applied more of this chemistry in 2011-2012 than the previous season, and estimates further suggest that growers are slowly beginning to incorporate at-planting, soil uses of Coragen into their fall programs. Ketoenol usage (Movento) on fall lettuce was down compared to 2010, but usage as an aphicide on spring lettuce remains about the same. From an IPM perspective, the industry has made great strides in minimizing environmental impacts in lettuce production by continuing to incorporate the newer insecticides into their insect management programs. And for the second season in a row, PCAs treated a greater percentage of their acreage with selective, reduced-risk products than with the broadly toxic, older chemistries (pyrethroids, organophosphates, carbamates).

Table 1. Estimated Insecticide Usage on Head Lettuce in Yuma, Arizona in 2011 and 2012 based on PCA surveys.

Chemistry or A.I.	Primary products	IRAC MOA	Estimated no. of Head Lettuce Acres Treated[1] (total acres in production based on NASS figures) 2011 *(46000)*	2012 *(44000)*
Old chemistry , Broad Spectrum and Broadly Toxic				
Pyrethroids	***various***	3A	140,976	123,345
Carbamates	***Lannate***	1A	23,684	17,988
Organophosphates	***Orthene***	1B	9,817	14,512
Cyclodienes	***Endosulfan***	2A	3,847	253
			178,324	**156,098**
Newer Chemistry, Selective and Reduced risk				
Spinosyns	***Radiant***	5	87,958	84,856
Neonicotinoids	***Imidacloprid***	4A	38,187	39,629
Diamides	***Coragen, Vetica***	28	16,980	18,833
Diacylhydrazines	***Intrepid***	18	7,340	2,875
Ketoenols	***Movento***	23	20,511	15,525
Flonicamid	***Beleaf***	9C	3,208	2,059
Indoxacarb	***Avaunt***	22	748	173
Buprofezin	***Vetica***	16	2,509	6,452
Avermectins	***Proclaim***	6	17,210	8,429
Pymetrozine	***Fulfill***	9B	425	0
B. thuringiensis	***Dipel***	11	0	92
			195,076	**178,923**

[1] totals estimated by multiplying : % reported acres treated*number of times treated * NASS acreage estimated in each year for AZ (an additional 10,000 acres were included with NASS estimates for lettuce grown in the Bard/Winterhaven area, of California)

Table 2. The 15 Most Commonly Applied Insecticides in Fall Head Lettuce, 2011

Fall Lettuce

2010 (21,542 ac reported)					2011 (23,245 ac reported)			
Insecticide	% acres treated	Avg. no. applied	Total [1] acres treated		Insecticide	% acres treated	Avg. no. applied	Total [1] acres treated
Pyrethroid (Foliar)	99.6	3	64,367	1	Pyrethroid (Foliar)	97.1	2.5	56,427
Radiant	85.4	2.1	38,633	2	Radiant	87.1	2.1	42,517
Generic Imidacloprid	54.8	1	11,805	3	Generic Imidacloprid	56.4	1	13,110
Proclaim	44.6	1.1	10,569	4	Pyrethroid (Chemigated)	48.9	1	11,367
Lannate	33.5	1.4	10,103	5	Lannate	33.3	1	7,741
Pyrethroid (Chemigated)	43.8	1	9,435	6	Admire Pro	31.1	1	7,229
Movento	28.4	1.2	7,342	7	Proclaim	26.9	1.1	6,878
Success	19.3	1.2	4,989	8	Voliam Xpress	21.4	1.2	5,969
Vetica	14.4	1.1	3,412	9	Vetica	19.7	1.2	5,495
Intrepid	13.5	1.1	3,199	10	Coragen (Soil, at plant)	17.9	1	4,161
Admire_Pro	14.6	1	3,145	11	Movento	10.1	1.4	3,287
Orthene	13.1	1.1	3,104	12	Orthene	11.3	1.2	3,152
Voliam Xpress	13.8	1	2,973	13	Coragen (Foliar)	12.1	1	2,813
Assail	12.3	1.1	2,915	14	Intrepid	9.2	1	2,139
Coragen (Soil, at plant)	9.0	1	1,939	15	Success	5.8	1.5	2,022

[1] Total acres treated estimated by multiplying : % acres treated * number of times treated * acreage estimated by participating PCAs in the 2012 survey.

Table 3. The 15 Most Commonly Applied Insecticides in Spring Head Lettuce, 2012

Spring Lettuce

2011 (17,280 ac reported)					2012 (17,420 ac reported)			
Insecticide	% acres treated	Avg. no. applied	Total [1] acres treated		Insecticide	% acres treated	Avg. no. applied	Total [1] acres treated
Pyrethroid (Foliar)	99.5	2.6	44,703	1	Pyrethroid (Foliar)	93.1	2.1	34,058
Radiant	90.0	2	31,104	2	Radiant	87.5	1.9	28,961
Lannate	47.1	1.3	10,581	3	Generic Imidacloprid	63.6	1	11,079
Movento	42.7	1.3	9,592	4	Orthene	41.2	1.2	8,612
Generic Imidacloprid	46.6	1	8,052	5	Movento	43.9	1.1	8,412
Pyrethroid (Chemigated)	32.1	1	5,547	6	Lannate	37.8	1.2	7,902
Proclaim	30.9	1	5,340	7	Pyrethroid (Chemigated)	22.2	1	3,867
Assail	23.7	1.2	4,914	8	Admire_Pro	21.5	1	3,745
Success	22.8	1.2	4,728	9	Beleaf	17.9	1	3,118
Orthene	24.4	1.1	4,638	10	Assail	12.5	1	2,178
Admire_Pro	17.5	1	3,024	11	Proclaim	7.7	1	1,341
Beleaf	13.2	1.3	2,965	12	Success	7.7	1	1,341
Intrepid	15.4	1	2,661	13	Vetica	5.8	1	1,010
Vetica	12.2	1.1	2,319	14	Voliam Xpress	3.8	1	662
Voliam Xpress	8.3	1	1,434	15	Intrepid	3.3	1	575

[1] Total acres treated estimated by multiplying : % acres treated * number of times treated * acreage estimated by participating PCAs in the 2012 survey.