2014-15 Insecticide Usage on Arizona Lettuce

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Introduction: The development of accurate data on insecticide usage is important to the assessment of IPM programs in Arizona. A reliable estimate of insecticide use patterns is one of our most objective tools for assessing changes 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 estimates of insecticide use trends on lettuce over the past 10 years.

Methods: Growers and PCAs attended a Head Lettuce Insect Losses and Impact Assessment Workshops in Yuma on April 8, 2015 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 surveys for lettuce produced in Yuma County, AZ and Imperial County, CA. Data was generated by requesting that PCAs estimate the frequency of use of various products and the percentage of treated acres for each product. Estimates of total treated acreage were generated using the acreage reported from each survey participant. This data has allowed us to track changes in insecticide use patterns over time in greater detail in both fall and spring head lettuce.

Summary: A total of 19 surveys were completed in the 2015 workshop, representing an estimated total of 25,905 fall acres and 26,255 spring acres from Yuma and neighboring Imperial County (Bard/ Winterhaven) . 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 through chemigation, are by far been the most commonly used insecticide class used in desert lettuce (Tables 1 and 2). The reason for this is quite clear: pyrethroids are one of the few inexpensive and safest broad spectrum insecticides still available for use in tank-mixtures for effective control of flea beetles, crickets, plant bugs and some Lep larvae (looper and earworm). Over the past 11 years, pyrethroid usage has remained steady (Fig 5 and 6). The overall use of OP/carbamates continues to decline and Lannate (methomyl) and acephate remain important products for thrips management (Fig 5 and 6). Their usage for Lep control is being displaced primarily by several reduced-risk chemistries. The spinosyns remain the second most commonly used class of insecticides, where greater than 95% of the lettuce acreage was treated with Radiant or Success in 2014-2015 (Table 1 and 2). Their use against both lepidopterous larvae (Figure 1) and thrips (Figure 5) has remained steady over the past 11 years. Foliar uses of Diamides (Coragen, Voliam Xpress, Vetica, Belt) were the third most commonly chemistry used in lettuce in 2014-2015 (Table 1 and 2). Since they were first registered in 2008, PCAs have steadily incorporated this new chemical class into their management programs, where in fall 2014 more diamides were used for Lep management than spinosyns (Fig 1). The use of Belt increased significantly, whereas soil uses of Coragen continue to decline (Fig 2). Ketoenol usage (Movento) on fall and spring lettuce increased this season due to heavier whitefly and aphid pressure (Figure 4). Another important class of chemistry used in fall and spring lettuce is the neonicotinoids driven primarily by soil-applied imidacloprid for whiteflies and aphids (Figures 3 and 4). The usage of imidacloprid on both fall and spring lettuce has increased markedly since 2009 and is used on almost 90% of the acreage, albeit at top of the label rates.

Foliar neonicotinoid usage also increased last season, again due to heavier whitefly/aphid infestations in 2014-15. Two newer products, Sequoia and Torac, were used more frequently this season.

From an IPM perspective, the local produce industry has made great strides in minimizing environmental impacts in lettuce production by continuing to incorporate the newer reduced-risk insecticides into their insect management programs. Furthermore, to date there have been no been no major incidents of field failures or measurable lack of insect susceptibility with these compounds due largely to the judicious usage of the key products (e.g., rotation of chemistries). And for the fifth season in a row, PCAs treated a greater percentage of their acreage with selective, reduced-risk products than with the broadly toxic, older chemistries (Fig 6). Of the broadly toxic products used, the pyrethroids were by far the predominant insecticide applied to lettuce.

Table 1. The top insecticide chemistries used on Lettuce, 2014-2015

Chemistry	Fall Lettuce, 2014			
	IRAC group	% treated acres	No. sprays	Sprayed[1] acres
Pyrethroids - Foliar	3	98.1	3.7	94,207
Spinosyns	5	92.6	2.5	59,970
Diamides- Foliar	28	100	1.1	38,098
Neonicotinoids -Soil	4A	83.9	1.0	21,734
Pyrethroids - Chemigation	3	81.3	1.0	21,601
Chitin Synthesis inhibitor	16	36.9	1.3	12,427
Neonicotinoid -Foliar	4A	40.9	1.1	11,655
OP/Carbamates	1	34.6	1.2	10,308
Avermectins	6	29.8	1.1	8492
Ketoenols	23	27.0	1.1	7694
Diamides -Soil	28	13.8	1.0	3575
Ecdysone agonsists	18	13.4	1.0	3471
Selective feeding blockers	9	6.0	1.8	2798
Sulfoxamine	4C	6.8	1.0	1762
Indoxacarb	22	0.3	1.0	78
METI I	21	0.1	1	26

Chemistry	Spring Lettuce, 2015			
	IRAC group	% treated acres	No. sprays	Sprayed acres
Pyrethroids - Foliar	3	97.7	3.3	84,649
Spinosyns	5	98.0	2.3	59,179
Diamides- Foliar	28	72.4	1.1	22,180
Neonicotinoids -Soil	4A	83.3	1.0	21,870
Ketoenols	23	46.2	1.1	13,343
OP/Carbamates	1	37.3	1.1	10,772
Neonicotinoid -Foliar	4A	30.0	1.2	9452
Pyrethroids - Chemigation	3	25.6	1.0	6721
Chitin Synthesis inhibitor	16	17.5	1	4595
Sulfoxamine	4C	14.7	1.1	4245
Selective feeding blockers	9	11.9	1.1	3437
Ecdysone agonsists	18	6.2	1	1628
Avermectins	6	5.9	1	1549
METI I	21	5.3	1.1	1531
Diamides -Soil	28	0.0	0.0	0.0
Indoxacarb	22	0.0	0.0	0.0

[1] Total acres treated estimated by multiplying : % acres treated * number of times treated * acreage estimated by participating PCAs in the 2015 survey.

Table 2. The top 12 insecticides applied to lettuce, 2014-2015

		Fall Lettuce, 2014			
	Product	**IRAC group**	**% treated acres**	**No. sprays**	**Sprayed acres**
1	**Pyrethroids -** Foliar	3	98.1	3.7	94,027
2	**Radiant**	5	89.2	2.3	53,147
3	**Imidacloprid**	4A	83.9	1.0	21,734
4	**Pyrethroids -** Chemigation	3	81.3	1.0	21,061
5	**Vetica**	28+16	36.9	1.3	12,427
6	**Voliam Xpress**	28	41.8	1.1	11,911
7	**Proclaim**	6	29.8	1.1	8492
8	**Coragen** - Foliar	28	30.5	1.0	7901
9	**Movento**	23	26.6	1.1	7580
10	**Lannate**	1	20.2	1.0	5233
11	**Belt**	28	18.3	1.1	5215
12	**Orthene (acephate)**	1	14.4	1.3	4849

		Spring Lettuce, 2015			
	Product	**IRAC group**	**% treated acres**	**No. sprays**	**Sprayed acres**
1	**Pyrethroids -** Foliar	3	97.7	3.3	86,649
2	**Radiant**	5	93.6	2.3	56,522
3	**Imidacloprid**	4A	83.3	1.0	21,870
4	**Movento**	23	46.2	1.1	13,343
5	**Voliam Xpress**	28	30.2	1.4	11,101
6	**Pyrethroids -** Chemigation	3	25.6	1	6721
7	**Orthene (acephate)**	1	17.8	1.2	5608
8	**Belt**	28	18.9	1.0	4962
9	**Lannate**	1	18.3	1.0	4805
10	**Endigo**	4A+3	11.1	1.6	4663
11	**Assail**	4A	17.5	1.0	4595
12	**Vetica**	28+16	17.5	1.0	4595

[1] Total acres treated estimated by multiplying : % acres treated * number of times treated * acreage estimated by participating PCAs in the 2015 survey.

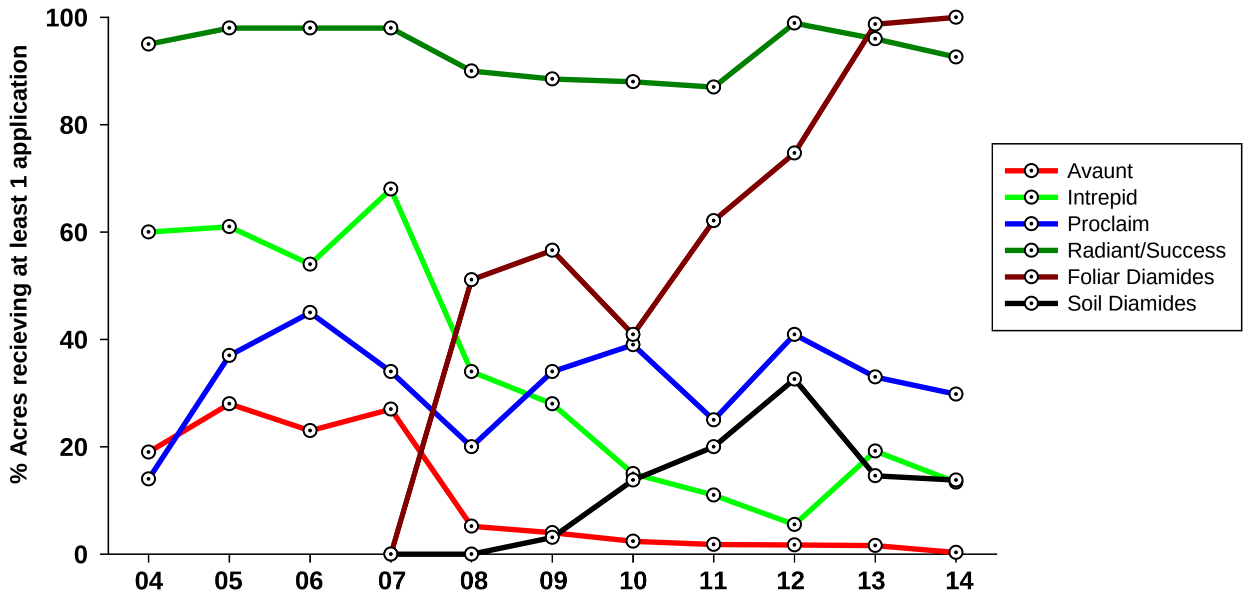

Figure 1. Trends in insecticide use for control of Lepidopterous larvae in fall lettuce, 2004-2014

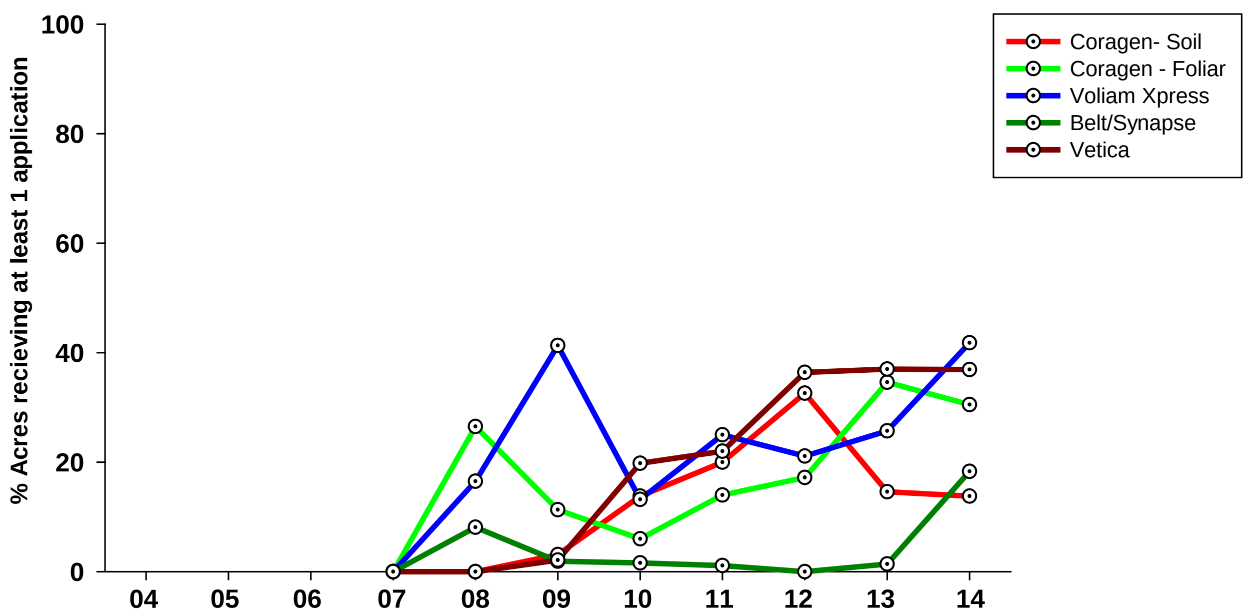

Figure 2. Trends in diamide insecticide use for control of Lepidopterous larvae in fall lettuce, 2004-2014

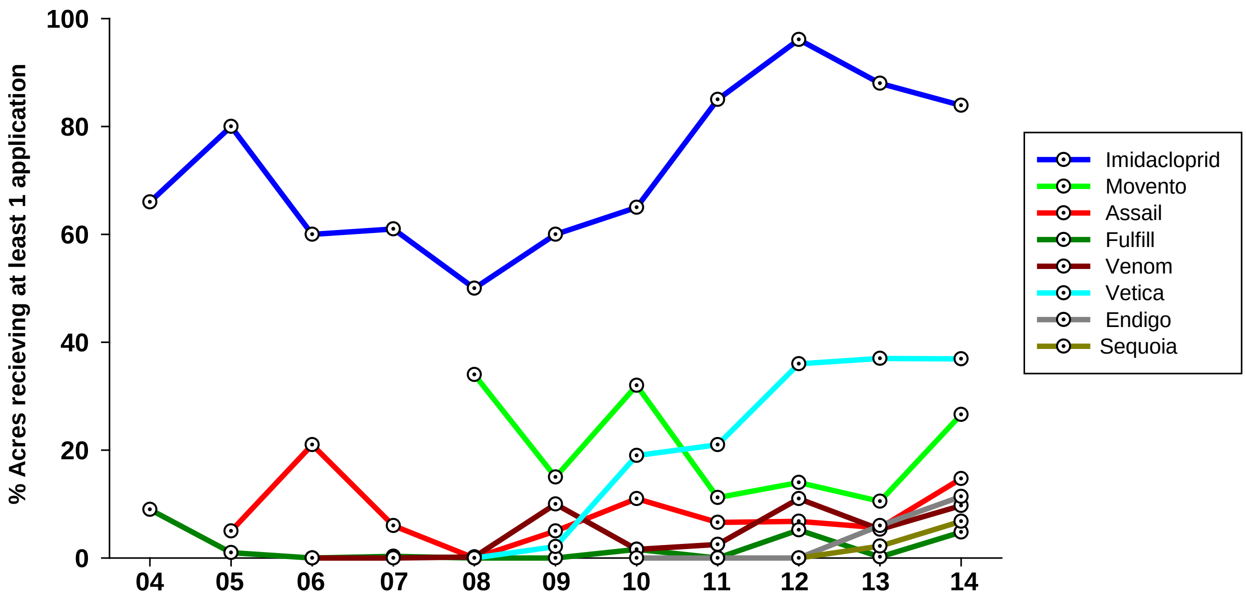

Figure 3. Trends in insecticide use for control of whiteflies in fall lettuce, 2004-2014

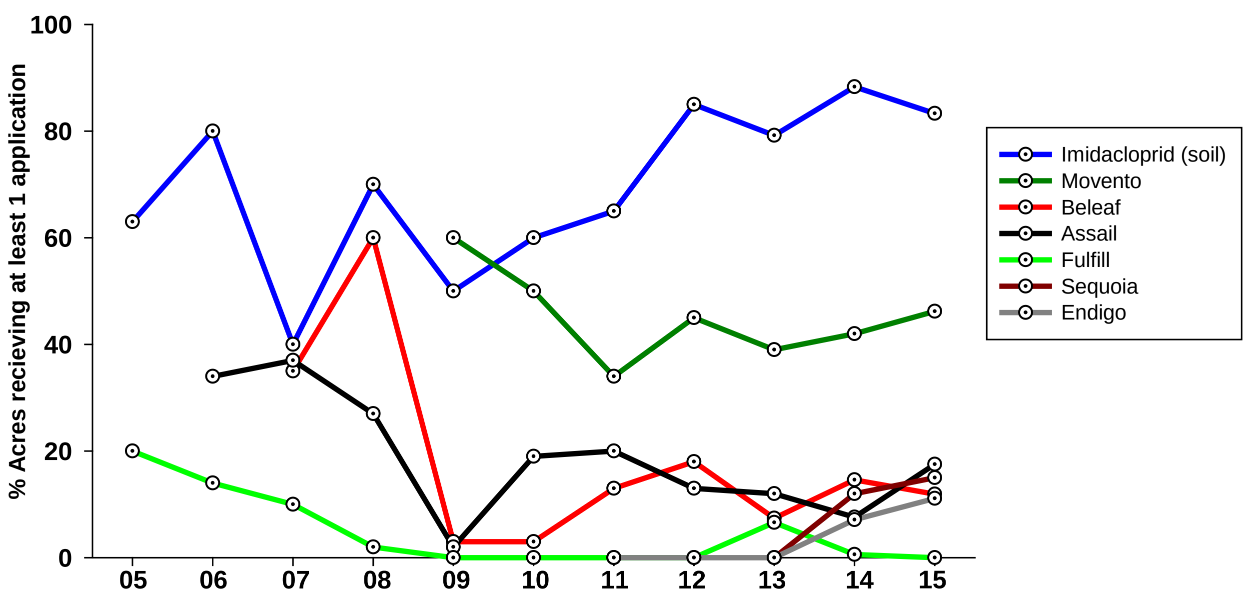

Figure 4. Trends in insecticide use for control of aphids in spring lettuce, 2005-2015

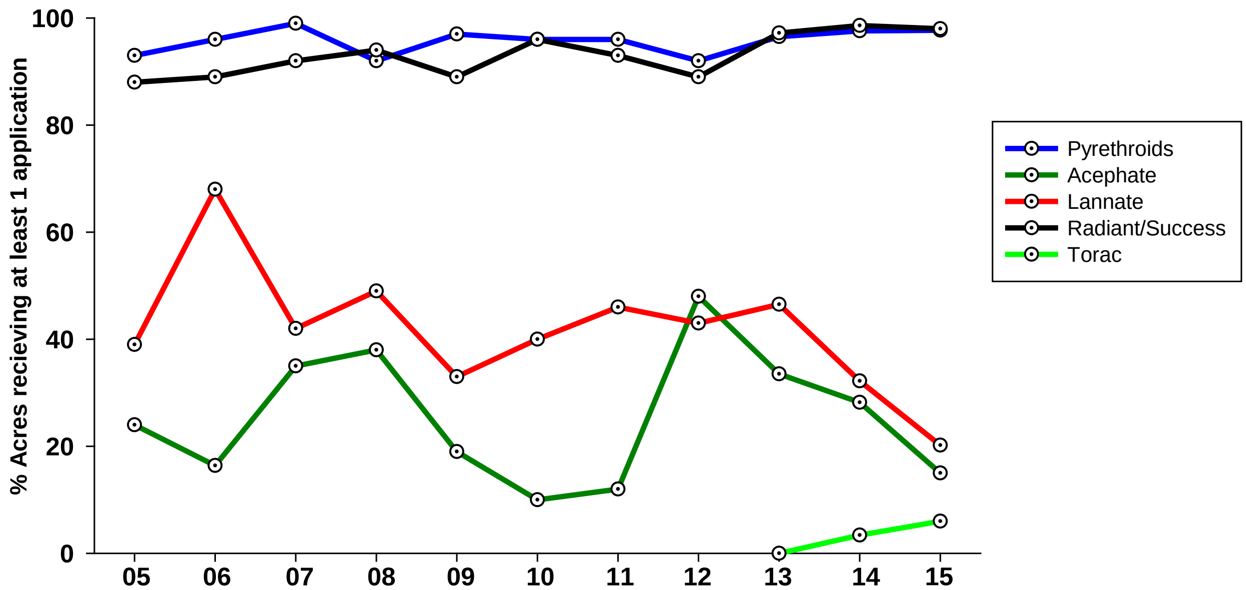

Figure 5. Trends in insecticide use for control of thrips in spring lettuce, 2005-2015

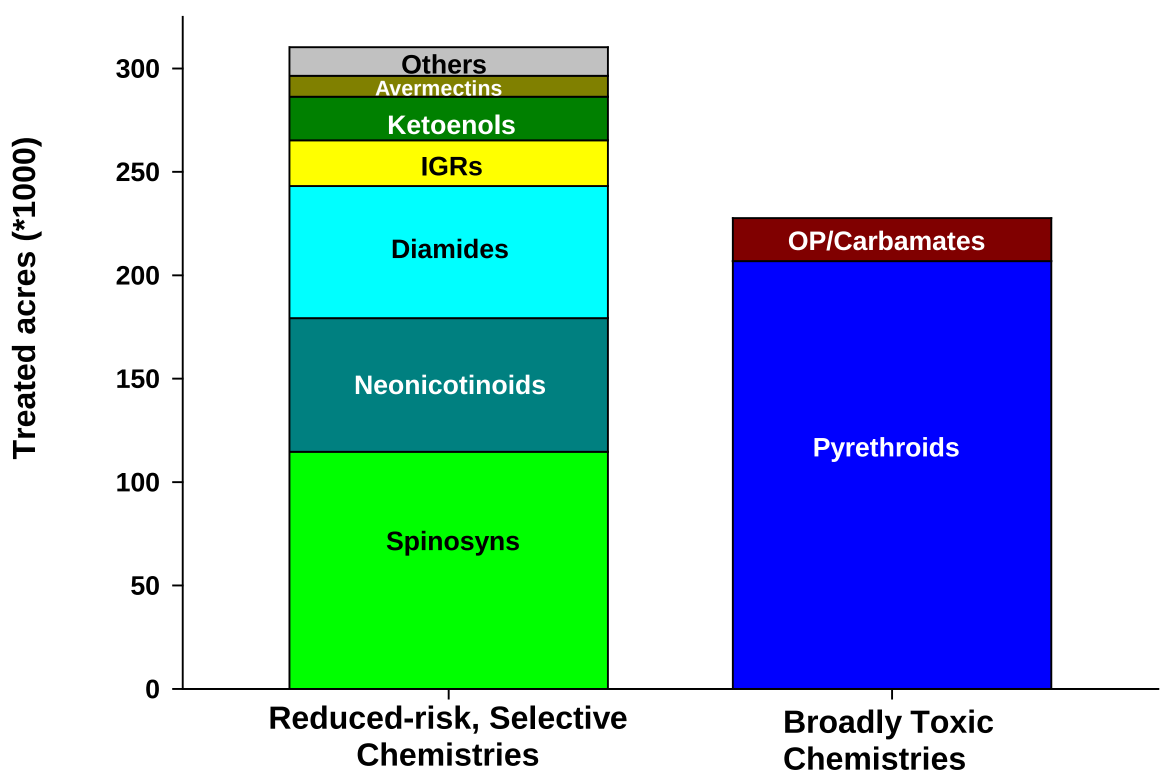

Figure 6. Total estimates of insecticide use for insect control on Lettuce , 2014-2015