

# Summary of Insecticide Use on Arizona Head Lettuce, 2005-2011



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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. The three part survey instrument collected information on insect management costs, insect crop losses and insecticide usage. This summary presents results from the insecticide use survey. Data on insecticide use patterns was generated by requesting that PCAs estimate the frequency of use of various chemistries (identified by both product name and IRAC mode-of-action classification) 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 2011 Lettuce Insect Losses Workshop reveal some interesting trends in insecticide usage on desert head lettuce. Data were summarized from PCA and grower surveys completed over the past 7 years. When compared by class of chemistry using the IRAC mode of action classification system, the pyrethroids, applied both as foliar sprays and chemigations, have consistently been the most commonly used insecticide class by far (Table 1). Over the past few years their usage has been declining, but only slightly. The spinosyns (Radiant and Success) are the second most commonly used class of insecticides, where usage increased this season. In contrast, estimates of diamide usage (Coragen, Voliam Xpress, Vetica) showed that PCAs applied almost 20% less product in 2010-2011. Not surprising, Ketoenol usage (Movento) was up about 40% compared to 2010, whereas neonicotinoid usage remained about the same. The usage of the broadly toxic, old chemistry (organophosphates /carbamate/endosulfan) on head lettuce acreage continued to decline in 2010-2011, relative to the newer, selective reduced-risk products, where overall, usage increased considerably this season. In general, the most commonly used insecticides in fall and spring lettuce correspond directly to the key pest that typically occur during these growing periods (Table 2).



Table 1. Estimated Insecticide Usage on Head Lettuce in Arizona from 2005-2011 based on PCA and grower surveys.

			Estimated no. of Head Lettuce Acres Treated <sup>1</sup>						
			(total acres in production based on NASS figures)						
Chemistry or A.I.	Primary products	IRAC MOA	2005 (50000)	2006 (48000)	2007 (45500)	2008 (46000)	2009 (46000)	2010 (42000)	2011 (42000)
<b>Old chemistry , Non-selective and Broadly Toxic</b>									
Pyrethroids	<i>various</i>	3A	182,030	169,894	148,376	150,739	147,726	141,971	138,976
Carbamates	<i>Lannate</i>	1A	45,150	48,114	30,986	22,523	16,555	17,625	20,684
Organophosphates	<i>Orthene</i>	1B	39,889	36,184	24,861	29,765	14,471	11,907	8,597
Cyclodienes	<i>Endosulfan</i>	2A	17,760	17,566	20,020	16,480	8,118	1,617	3,047
			<b>284,829</b>	<b>271,758</b>	<b>224,243</b>	<b>219,507</b>	<b>186,870</b>	<b>173,120</b>	<b>171,304</b>
<b>Newer Chemistry, Selective and Reduced risk</b>									
Spinosyns	<i>Radiant</i>	5	114,438	103,144	82,257	98,382	85,590	72,356	85,958
Neonicotinoids	<i>Imidacloprid</i>	4A	36,443	51,142	42,781	39,091	21,128	37,673	37,187
Diamides	<i>Coragen, Vetica</i>	28	0	0	0	0	21,009	20,149	16,620
Diacylhydrazines	<i>Intrepid</i>	18	32,728	33,926	28,494	27,141	16,740	12,112	6,340
Ketoenols	<i>Movento</i>	23	0	1,272	0	0	34,538	11,292	19,011
Flonicamid	<i>Beleaf</i>	9C	0	0	10,385	17,738	3,420	1,428	3,208
Indoxacarb	<i>Avaunt</i>	22	6,363	10,609	8,395	9,994	2,475	1,407	748
Buprofezin	<i>Vetica</i>	16	0	0	0	0	0	987	2,509
Avermectins	<i>Proclaim</i>	6	4,483	11,928	16,124	10,670	6,989	8,820	17,210
Pymetrozine	<i>Fulfill</i>	9B	7,508	3,755	1,081	432	0	0	425
<i>B. thuringiensis</i>	<i>Dipel</i>	11	1,125	288	0	0	0	0	0
			<b>203,088</b>	<b>216,064</b>	<b>189,517</b>	<b>203,448</b>	<b>191,889</b>	<b>166,224</b>	<b>189,216</b>

<sup>1</sup> totals estimated by multiplying : % reported acres treated\*number of times treated \* NASS acreage estimated in each year



**Table 2. The 15 Most Commonly Applied Insecticides in Head Lettuce, 2010-2011.**

<b>Fall Lettuce (21,542 ac reported)</b>					<b>Spring Lettuce (17,280 ac reported)</b>			
<b>Insecticide</b>	<b>% acres treated</b>	<b>Avg. no. applied</b>	<b>Total<sup>1</sup> acres treated</b>		<b>Insecticide</b>	<b>% acres treated</b>	<b>Avg. no. applied</b>	<b>Total<sup>1</sup> acres treated</b>
Pyrethroid_Foliar	99.6	3	64,367	1	Pyrethroid_Foliar	99.5	2.6	44,703
Radiant	85.4	2.1	38,633	2	Radiant	90	2	31,104
Generic Imidacloprid	54.8	1	11,805	3	Lannate	47.1	1.3	10,581
Proclaim	44.6	1.1	10,569	4	Movento	42.7	1.3	9,592
Lannate	33.5	1.4	10,103	5	Generic Imidacloprid	46.6	1	8,052
Pyrethroid_Chemigated	43.8	1	9,435	6	Pyrethroid_Chemigated	32.1	1	5,547
Movento	28.4	1.2	7,342	7	Proclaim	30.9	1	5,340
Success	19.3	1.2	4,989	8	Assail	23.7	1.2	4,914
Vetica	14.4	1.1	3,412	9	Success	22.8	1.2	4,728
Intrepid	13.5	1.1	3,199	10	Orthene	24.4	1.1	4,638
Admire_Pro	14.6	1	3,145	11	Admire_Pro	17.5	1	3,024
Orthene	13.1	1.1	3,104	12	Beleaf	13.2	1.3	2,965
Voliam Xpress	13.8	1	2,973	13	Intrepid	15.4	1	2,661
Assail	12.3	1.1	2,915	14	Vetica	12.2	1.1	2,319
Coragen_Soil	9.0	1	1,939	15	Voliam Xpress	8.3	1	1,434

<sup>1</sup> Total acres treated estimated by multiplying : % acres treated \* number of times treated \* acreage estimated by participating PCAs in the 2011 survey.