Efficacy of Selected Acaricides on Spider Mites in Corn – 2010

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Objectives: To compare the efficacy of selected registered and experimental acaricides against spider mites in silage corn

Planting Date: early May 2010

Application Date: 7 July 2010

Study Location: UC West Side Research and Extension Center near Five Points, CA; Fresno County

Environmental Conditions at Application: temperature 85-90^{0}F, full sun, winds calm

Application Equipment: John Deere high clearance sprayer

Application Parameters: 25 GPA, 40 p.s.i., 3.5 MPH

Plot Size: 6 rows x 140' feet, 4 replications; 38" row spacing

Plot Design: Randomized Complete Block

Plot Condition: irrigated corn ('X9015RR')

Sample Dates:
Pretreatment – 7 July 2010; number of mite-damaged leaves and number of leaves with living mites, arthropods (spider mites, cotton aphid, thrips) density
1 week after treatment (WAT) – 14 July; number of mite-damaged leaves and number of leaves with living mites, arthropods (spider mites, cotton aphid, thrips) density
2 WAT –20 July; number of mite-damaged leaves and number of leaves with living mites, arthropods (spider mites, cotton aphid, thrips) density
3 WAT –27 July; number of mite-damaged leaves and number of leaves with living mites, arthropods (spider mites, cotton aphid, thrips) density
4 WAT –3 Aug.; number of mite-damaged leaves and number of leaves with living mites, arthropods (spider mites, cotton aphid, thrips) density
5 WAT –10 Aug.; number of mite-damaged leaves and number of leaves with living mites, arthropods (spider mites, cotton aphid, thrips) density
6 WAT –17 Aug.; arthropods (spider mites, cotton aphid, thrips) density
7 WAT –24 Aug.; arthropods (spider mites, cotton aphid, thrips) density

Sample Method:
Spider Mites, Thrips, & Cotton Aphids - number per 20-leaf sample (lowest leaf nearest the soil that was 50% or greater still green) per plot; mites, thrips, and aphids recovered with a leaf washing technique; count specimens with aid of microscope; individuals separated into immatures and adults;

on 24 Aug. 10 bottom leaves and 10 upper leaves (ear leaf) were sampled per plot

Target Pest: Spider Mites - two-spotted spider mite (*T. urticae*)
Secondary Pests: Aphids (*species not determined*)
Western Flower Thrips (*Frankliniella occidentalis)*

Environmental Conditions during Test: see attached page

Phytotoxicity Noted: none noted

Data Analyses: ANOVA of arthropod densities and Least Significant Differences Multiple Range Test ($p < 0.05$).

Treatments:
Treatment list for corn spider mite test in 2010, California.

		Product per A
1	Untreated	---
2	Oberon SC*	12.8 fl. oz.
3	Oberon SC*	16 fl. oz.
4	Onager EC*	16 fl. oz.
5	Comite 6.55EC	48 fl. oz.
6	Zeal*	2 oz.
	* 0.25% v/v NIS added	

Summary:

Mite populations were very slow to develop in 2010 and but eventually increased and rapidly so. On the day of application, we actually sampled no mites with our random samples although mites were seen in the plot. Populations in the untreated increased slowly until about 5 weeks after treatment (WAT) when the rate of increase expanded.

Data for percentage mite-damaged leaves and percentage mite-infested leaves are shown below. There were few significant differences but generally the higher values were in the untreated plots and the lowest values were in the Zeal treatment.

Populations of thrips and aphids were very low and never exceeded 0.3 per leaf; data are not shown.

For 1 and 2 WAT, mite levels were extremely low and it was difficult to draw any conclusions. Population in the untreated increased slightly at 3 WAT and all the miticide treatments provided at least 50% control. Populations remained fairly steady in the untreated at 4 WAT and levels increased significantly in several of the treated plots (including a 17x increase in Comite). As mentioned previously, populations in the untreated started increasing at 5 WAT (10 Aug.) and Zeal and Oberon – 16 oz. provided at least 80% control. Although there were no significant differences, Comite and Oberon – 12.8 oz. also resulted in a reduction in levels in the range of 50%. At 6 WAT,

all the miticide treatments provided significant control ranging from 78% (Oberon – 12.8) to 95% (Zeal). There were no trends in mite populations from the low leaf position. Mite levels were overall very high on the ear leaf; however, levels in the Zeal treatment were significantly lower than in the untreated, both Oberon rates, and Comite. On the final sample date, leaves were collected from the lowest position and from the ear location. Yield data were not collected as the corn in all treatments looked "normal" and I'm sure there would not have been any differences.

			Number per 20 Leaves					
			7 July		**14 July**		**20 July**	
		Rate per A (fl. oz. or oz.)	**Number Mite-Damaged Leaves**	**Number Leaves with Mites**	**Number Mite-Damaged Leaves**	**Number Leaves with Mites**	**Number Mite-Damaged Leaves**	**Number Leaves with Mites**
1	Untreated	---	0.0	0.0	0.25	0.25	2	1.5
2	Oberon SC*	12.8			0	0	1.25	1.25
3	Oberon SC*	16			0	0	1.25	1
4	Onager EC*	16			0.5	1	0.75	0.75
5	Comite 6.55EC	48			0.75	0.75	2	2
6	Zeal*	2			0.25	0.25	1.25	1.25
	* 0.25% v/v NIS added			*lsd value*	*0.9*	*1.4*	*1.1*	*1.2*

			Number per 20 Leaves					
			27 July		**3 August**		**10 August**	
		Rate per A (fl. oz. or oz.)	**Number Mite-Damaged Leaves**	**Number Leaves with Mites**	**Number Mite-Damaged Leaves**	**Number Leaves with Mites**	**Number Mite-Damaged Leaves**	**Number Leaves with Mites**
1	Untreated	---	2.5	2.5	9.75	9.5	17	17.75
2	Oberon SC*	12.8	0.5	1	6.5	6	13.75	14.5
3	Oberon SC*	16	1.75	1.5	7.75	6.25	14	12.5
4	Onager EC*	16	0.25	0.25	7.5	7.5	16.5	16
5	Comite 6.55EC	48	1.5	1.5	7.75	8	11.75	11.5
6	Zeal*	2	0.25	0.75	4.25	3	12.75	8.75
	* 0.25% v/v NIS added	*lsd value*	*3.1*	*3.0*	*7.3*	*7.3*	*6.4*	*6.6*

			Spider Mites per Lowest Green Leaf						
		Rate per A (fl. oz. or oz.)	**7/7**	**7/14**	**7/20**	**7/27**	**8/3**	**8/10**	**8/17**
1	Untreated	---	0.0 **	0.5	2.4	7.8	7.6	45.5	491.2
2	Oberon SC*	12.8		0.0	0.8	3.7	4.0	24.9	109.7
3	Oberon SC*	16		0.0	1.0	2.0	11.7	9.9	89.1
4	Onager EC*	16		2.3	1.1	0.0	7.5	51.9	80.5
5	Comite 6.55EC	48		2.4	2.6	1.4	24.3	15.8	105.7
6	Zeal*	2		0.1	1.3	0.6	4.3	7.9	21.5
	* 0.25% v/v NIS added		*lsd value*	*3.8*	*4.1*	*8.6*	*21.5*	*52.5*	*49.2*
	** some mites were seen but not found in random samples								

			Spider Mites per Leaf	
		Rate per A (fl. oz. or oz.)	**24 Aug. - Lowest Leaf**	**24 Aug. - Ear Leaf**
1	Untreated	---	329.7	4044.2
2	Oberon SC*	12.8	360.5	3621.5
3	Oberon SC*	16	330.0	3300.1
4	Onager EC*	16	282.9	2777.4
5	Comite 6.55EC	48	192.8	3777.2
6	Zeal*	2	200.8	1447.3
	* 0.25% v/v NIS added	*lsd value*	*176.2*	*1754*

University of California Statewide Integrated Pest Management Program										
How to Manage Pests: California Weather Data										
Variable Description Units										
1 Database name										
2 Date: year,month,day yyyymmdd										
3 Observation time hhmm										
4 Precipitation, amount Inches										
5 Precipitation, type (coded)										
6 Air temperature, maximum Fahrenheit										
7 Air temperature, minimum Fahrenheit										
8 Air temperature, observed Fahrenheit										
9 Weather conditions (coded)										
10 Wind, direction N,NE,E,SE,S,SW,W,NW, 0=calm										
11 Wind, speed Miles per hour										
12 Bulb temperature, wet Fahrenheit										
13 Bulb temperature, dry Fahrenheit										
14 Soil temperature, maximum Fahrenheit										
15 Soil temperature, minimum Fahrenheit										
16 Pan evaporation Inches										
17 Solar radiation Langleys										
18 Reference evapotranspiration Inches										
19 Relative humidity, minimum Percent										
20 Relative humidity, maximum Percent										
Station	Date	Precip	Air max	min	Wind dir	speed	Solar	ETo	RH max	min
FIVE_PTS.A	20100701	0	91	52	NW	6	730	0.31	54.7	15.5
FIVE_PTS.A	20100702	0	90	53	NW	6	707	0.3	63.1	25.5
FIVE_PTS.A	20100703	0	92	55	NW	8	714	0.34	65.5	15.7
FIVE_PTS.A	20100704	0	96	57	NW	5	718	0.31	57.3	18.3
FIVE_PTS.A	20100705	0	98	59	NW	6	709	0.33	57.5	15.9
FIVE_PTS.A	20100706	0	94	59	NW	7	697	0.32	69.6	22.2
FIVE_PTS.A	20100707	0	93	59	NW	7	701	0.31	73.2	16.9
FIVE_PTS.A	20100708	0	94	59	NW	7	693	0.31	73.3	23.2
FIVE_PTS.A	20100709	0	97	60	NW	6	702	0.3	68.1	20.5
FIVE_PTS.A	20100710	0	100	62	NW	6	696	0.32	74	20.2
FIVE_PTS.A	20100711	0.06	99	67	NW	5	639	0.29	75.3	21
FIVE_PTS.A	20100712	0	98	66	NW	5	656	0.29	63	22.8
FIVE_PTS.A	20100713	0	94	64	NW	6	679	0.29	69.5	21
FIVE_PTS.A	20100714	0	97	61	NW	6	682	0.32	72	21.2
FIVE_PTS.A	20100715	0	100	68	NW	7	667	0.34	55.4	22.1
FIVE_PTS.A	20100716	0	103	71	NW	6	656	0.34	57.6	19.5

FIVE_PTS.A	20100717	0	103	74	NW	6	670	0.34	53.8	18.1
FIVE_PTS.A	20100718	0	104	66	NW	5	683	0.33	57.5	14.8
FIVE_PTS.A	20100719	0	102	61	NW	5	703	0.31	53.7	14.6
FIVE_PTS.A	20100720	0	98	61	NW	5	686	0.29	65.8	20
FIVE_PTS.A	20100721	0	98	59	NW	5	688	0.29	65.8	18
FIVE_PTS.A	20100722	0	95	57	NW	5	689	0.27	74.2	22.1
FIVE_PTS.A	20100723	0	99	61	NW	6	680	0.31	70.2	16.4
FIVE_PTS.A	20100724	0	100	65	NW	6	671	0.31	64.6	17.7
FIVE_PTS.A	20100725	0	98	64	NW	6	660	0.31	66.5	20.3
FIVE_PTS.A	20100726	0	94	61	NW	6	662	0.29	67.2	26.8
FIVE_PTS.A	20100727	0	92	55	NW	6	679	0.27	78.6	25.8
FIVE_PTS.A	20100728	0	90	56	NW	7	677	0.27	76.4	28.1
FIVE_PTS.A	20100729	0	93	57	NW	6	672	0.29	77.6	22.5
FIVE_PTS.A	20100730	0	96	58	NW	6	674	0.3	73.5	21.7
FIVE_PTS.A	20100731	0	97	59	NW	6	667	0.31	66.2	21.9
FIVE_PTS.A	20100801	0	95	57	NW	5	674	0.3	65.3	18.8
FIVE_PTS.A	20100802	0	97	58	NW	5	676	0.3	54.1	16.7
FIVE_PTS.A	20100803	0	97	59	NW	5	670	0.3	58	17.4
FIVE_PTS.A	20100804	0	98	58	NW	5	663	0.29	62.6	16.4
FIVE_PTS.A	20100805	0	92	59	NW	6	657	0.29	74.2	27.3
FIVE_PTS.A	20100806	0	95	56	NW	5	657	0.27	71.6	22.9
FIVE_PTS.A	20100807	0	95	59	NW	5	648	0.27	62.4	22.9
FIVE_PTS.A	20100808	0	92	59	NW	5	635	0.26	64.9	26.9
FIVE_PTS.A	20100809	0	93	57	NW	5	641	0.26	76.2	20.6
FIVE_PTS.A	20100810	0	95	61	NW	5	633	0.27	68.8	19.8
FIVE_PTS.A	20100811	0	87	55	NW	6	634	0.25	73.3	26.1
FIVE_PTS.A	20100812	0	89	57	NW	5	632	0.24	82.8	26.8
FIVE_PTS.A	20100813	0	94	61	NW	6	630	0.27	71.1	24.1
FIVE_PTS.A	20100814	0	94	60	NW	6	631	0.27	75.6	24.7
FIVE_PTS.A	20100815	0	93	60	NW	7	629	0.27	74.5	25.4
FIVE_PTS.A	20100816	0	97	56	NW	4	642	0.26	75	17.9
FIVE_PTS.A	20100817	0	101	60	NW	6	625	0.29	64	19
FIVE_PTS.A	20100818	0	96	61	NW	7	614	0.27	71.8	19.5
FIVE_PTS.A	20100819	0	94	59	NW	5	630	0.26	68.1	18.7
FIVE_PTS.A	20100820	0	98	57	N	4	614	0.27	64.5	16.5
FIVE_PTS.A	20100821	0	96	59	NW	7	595	0.27	69.4	17.5
FIVE_PTS.A	20100822	0	88	52	NW	7	619	0.28	74.3	17
FIVE_PTS.A	20100823	0	94	53	NW	5	609	0.27	56.9	20.3
FIVE_PTS.A	20100824	0	103	57	NW	4	595	0.27	56.3	15.8
FIVE_PTS.A	20100825	0	109	70	S	4	569	0.27	49.2	15.2
FIVE_PTS.A	20100826	0	99	67	NW	5	587	0.29	54.6	18.3
FIVE_PTS.A	20100827	0	96	56	N	4	600	0.26	62.5	16.9
FIVE_PTS.A	20100828	0	79	44	NW	7	588	0.24	74.6	24.6

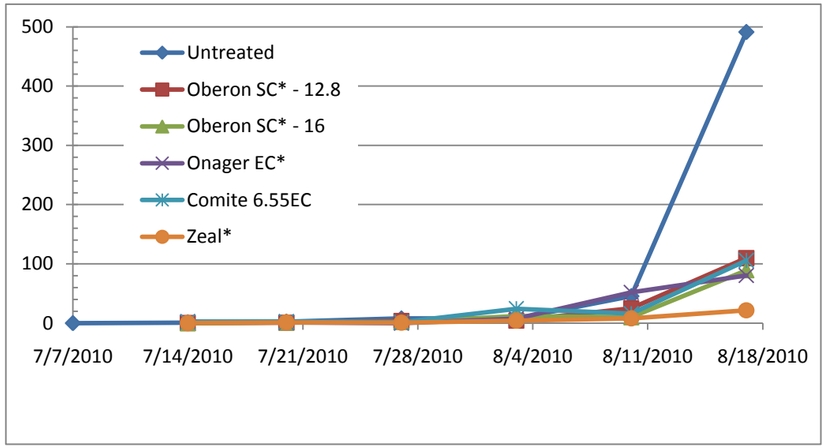
FIVE_PTS.A	20100829	0	78	51	NW	5	581	0.22	72.5	30.6
FIVE_PTS.A	20100830	0	83	51	NW	5	574	0.22	75.2	22.1
FIVE_PTS.A	20100831	0	87	50	NW	6	577	0.25	83.1	24.2
FIVE_PTS.A	20100901	0	92	53	NW	4	572	0.24	64.7	21.7
FIVE_PTS.A	20100902	0	101	58	SW	4	574	0.25	65.7	17.7
FIVE_PTS.A	20100903	0	101	59	NW	4	571	0.26	58	16.5
FIVE_PTS.A	20100904	0	99	63	NW	6	563	0.27	61.5	18.6
FIVE_PTS.A	20100905	0	94	57	NW	6	576	0.28	58.8	15.1
FIVE_PTS.A	20100906	0	92	54	NW	6	569	0.27	55.5	15.9
FIVE_PTS.A	20100907	0	96	65	NW	9	450	0.27	52.4	13.8
FIVE_PTS.A	20100908	0	76	54	NW	7	429	0.17	75	45.9
FIVE_PTS.A	20100909	0	76	45	NW	4	556	0.18	81.4	34.7
FIVE_PTS.A	20100910	0	83	49	NW	4	546	0.2	76	28.9
FIVE_PTS.A	20100911	0	91	51	NW	4	542	0.21	71	21.4
FIVE_PTS.A	20100912	0	92	53	SW	4	543	0.22	63.2	12.6
FIVE_PTS.A	20100913	0	93	54	NW	5	541	0.22	63.7	15.5
FIVE_PTS.A	20100914	0	89	51	NW	4	535	0.2	70.5	19.3
FIVE_PTS.A	20100915	0	89	52	NW	5	523	0.22	58.9	19.7

		Spider Mites per Lowest Green Leaf						
	Rate per A (fl. oz. or oz.)	7/7/2010	7/14/2010	7/20/2010	7/27/2010	8/3/2010	8/10/2010	8/17/2010
1 Untreated	---	0.0 **	0.5	2.4	7.9	7.6	45.5	491.2
2 Oberon SC* - 12.8	12.8		0.0	0.8	3.7	4.0	24.9	109.7
3 Oberon SC* - 16	16		0.0	1.0	2.0	11.7	9.9	89.1
4 Onager EC*	16		2.3	1.1	0.0	7.5	51.9	80.5
5 Comite 6.55EC	48		2.4	2.6	1.4	24.3	15.8	105.7
6 Zeal*	2		0.1	1.3	0.6	4.3	7.9	21.5

treated on 7/7/10

* 0.25% v/v NIS added

** some mites were seen but not found in random samples



		Spider Mites per Leaf	
	Rate per A (fl. oz. or oz.)	8/24/2010 - Lowest leaf	8/24/2010 - Ear Leaf
1 Untreated	---	4044.2	329.7
2 Oberon SC* - 12.8	12.8	3621.5	360.5
3 Oberon SC* - 16	16	3300.1	282.9
4 Onager EC*	16	2777.4	343.9
5 Comite 6.55EC	48	3777.2	192.8
6 Zeal*	2	1447.3	200.8

* 0.25% v/v NIS added