SECTION III: Field Crops

CONTROL OF MITES IN DRY BEANS

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To evaluate and compare the efficacy of new formulations and standard commercial miticides for the control of spider mites, we planted dry beans on 14 May 2010 at HAREC, Hermiston, Oregon. A randomized complete block design with 4 replications was used to test chemical treatments. Plots were 30 feet long X 5 feet wide with 4 rows of bean plants. Due to a poor stand, a second planting was made on 14 June 2010.

Plants emerged on 4 June 2010 (1st planting), and 23 June 2010 (2nd planting). On 8 June 2010, one fertilizer application of 30 lbs N 30-0-0 N-P_2O_2-K_2O lb/acre was made to the bean field. All plots received an herbicide application of Gramoxone on 14 June 2010. Dry bean seeds were treated on 14 June 2010 with an insecticide/fungicide application of Cruiser (thiamethoxam) at 1.28 fl oz per 100 lbs seed plus Maxim (fludixonil) at 0.16 fl oz per 100 lbs seed. A second herbicide application of Basagran (bentazon) at 1.5 pts per acre was made on 15 July 2010.

Bean plants were irrigated by hand line three times a week for 2 h from planting until 2 Aug 2010. Thereafter, plants were irrigated twice per week (1.5 h) since mites thrive under hot and dry conditions.

To sample mites, ten plants per plot were randomly selected from center rows in each plot. Five leaves per plant were checked with the help of a magnifying lens (15X) and mites present on the leaves were counted (non-destructive method). Sampling began on 1 July 2010 and continued through 2 September

2010. Counts initially were made on a weekly basis. After the application of the miticides on 10 August 2010, counts were made every 3 or 4 days.

Chemical application was made by backpack sprayer with a spray boom composed of four over-lapping XR TeeJet 8002VS nozzles spaced 20 inches apart. The sprayer and boom were calibrated to deliver 20 gallons per acre at 30 psi when the applicator walked at a steady pace of 2.5 miles per hour. Only one chemical application was made to bean plants occurring on 10 August 2010. Depending on the treatment designated to the specific plot by the experimental design, bean plants in each plot received a treatment of Agri-Mek at 2 oz per acre, Agri-Mek at 2.5 oz per acre, Onager at 16 oz per acre, and Acramite at 12 oz per acre. An untreated check was included.

Data was analyzed with SAS GLM procedures, and means were separated by Fisher's protected LSD.

Results

Mite counts were low at the beginning of the season until 2 August 2010. To guarantee mite pressure, bean plots were artificially infested with corn leaves heavily infested with spider mites.

The single miticide application was made on 10 August 2010. Three days after treatment (DAT) there were differences in the average number of mites per plant, but there were no significant differences in the average number of mites per plant between blocks or treatments (Tables 1-2). Significant differences were seen at 6, 9 and 13 DAT (Table 1).

By 6 DAT, Agrimek at 2 oz per acre, Agrimek at 2.5 oz per acre, and Onager reduced the number of spider mites per plant to 5.0 ± 0.8, 4.7 ± 0. 9, and 3.9 ± 0.4.

Nine days after treatment, plants treated with Agrimek at 2 oz per acre had a resurgence of mites. However, plants treated with Agrimek at 2.5 oz per acre and Onager continued with low mite numbers (4.7 ± 0. 9, and 4.7 ± 1.1, respectively). These numbers were significantly lower than the number of mites per plant on untreated plants (Table 2).

Spider mites counts remained at reasonably low 13 DAT on plants treated with Agrimek at 2.5 oz per acre and Onager at 16 oz per acre (Table 2).

Conclusions

Agri-Mek at 2.5 oz per acre had significantly lower number of mites on average than plants in other treated plots including the control. Mean number of mites per plant in plots treated with Acramite had significantly higher mite counts than the average number of mites found on plants treated with the other products.

Table 1. Spatial and treatment effects of plot location and insecticide application on the number of spider mites in dry beans, Hermiston, OR, 2010.

		DAT[@]									
Source		Pre-treatment		3		6		9		13	
of Variation	df	*MS*	*F*	*MS*	*F*	*MS*	*F*	*MS*	*F*	*MS*	*F*
Block	3	171	3.96**	137	0.41	140	2.7*	345	3.9**	3092	5.3**
Treatment	4	190	4.4**	192	0.57	170	3.3*	757	8.58***	2554	4.4**
Error	192										

$P < 0.05$,*; $P < 0.01$,**; $P < 0.001$,***

[@]DAT: Days After Treatment

Table 2. Pre and post treatment spider mites (mean ± SEM) count in dry beans, Hermiston, OR, 2010.

Treatment	Formulation	Rate	Pre-counts	Post-counts			
				DAT			
				3	6	9	13
1	Agri-Mek + NIS	2 oz/a +.25%	3.1±1.4b	10.4±3.0a	5.0±0.8bc	9.5±1.8a	20.3±5.4ab
2	Agri-Mek + NIS	2.5 oz/a + .25%	1.0±0.25b	5.5±1.8a	4.7±1.0c	4.7±0.9b	6.5±1.2c
3	Onager	16 oz/a	1.3±0.5b	9.3±3.6a	3.9±0.4c	4.7±1.1b	9.4±2.1c
4	Acramite	12 oz/a	6.3±1.8a	8.72±3.6a	7.9±1.4ab	3.0±0.7b	26.2±6.1a
5	Untreated	-	1.6±0.4b	5.7±1.8a	8.4±1.7a	13.6±2.5a	14.5±2.3bc

Figure 1. Phenology of mite populations in dry beans, Hermiston, OR, 2010.