Chemical Control of Clover Mite in Orchardgrass

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Abstract

Clover mites have been a problem in central Oregon since 2000. The mites, which feed on grass pasture and hay fields, cause yield reductions, and total loss of fields can occur when the infestation is severe. No trials to date have found any product that will control the clover mite. Five treatments were applied in May of 2008 to test their efficacy on clover mites. None of the treatments had any effect on clover mites.

Introduction

Clover mites (CLM), *Bryobia praetiosa*, have been a problem in central Oregon grass pasture and hay fields since 2000. Localized infestations of this mite have injured orchard grass pastures in Deschutes, Jefferson, and Crook counties of Oregon. Populations build in late winter and spring, and the piercing and sucking action of the mites stunts and yellows spring regrowth. Occasionally entire crowns are killed. The mites feed on grass pasture and hay fields, causing yield reductions, and total loss of fields can occur when the infestation is severe. Previous field trials with registered miticides and insecticides have not identified effective products to control this pest. Additional products were evaluated for CLM control in an orchard grass hay field in late spring, 2008, in Central Oregon near Tumalo in Deschutes County.

Materials and Methods

This field trial was initiated on May 6, 2008 for control of CLM in an established orchardgrass hay field on the Steve Wheeler farm. The grass was beginning to break dormancy at this time. Plots measured 20 ft by 20 ft in a randomized complete block design, and were replicated four times. Five treatments were applied on May 6. Liquid products were delivered with a CO_2-powered backpack sprayer using flat fan nozzles (XR 11002). A hand-held boom covering a 10-ft swath was used to apply treatments. Spray pressure was set at 40 psi and delivered an equivalent 20 gal/acre of spray solution. A non-ionic surfactant, SuperSpread 7000, was added to all treatments. An untreated check was included.

Post-treatment evaluation of plots consisted of extracting four, 2.5- inch-diameter grass cores, randomly, to a depth of 2 inches, from each treatment replication on May 12, 2008 (6 days after treatment [DAT]). A 2.5-inch core instrument was used to extract the samples. Cores were placed in paper bags and transported in a cooler back to the Oregon State University lab, Corvallis for evaluation. Each sample of four cores was set under Berlese funnels with 25W bulbs for 4 days. Specimens dropped from samples into jars of 70 percent alcohol below the funnels. Mites were counted under a microscope and numbers were recorded. The mean number of CLM per core was calculated for each treatment.

Additional post-treatment grass core samples (3-, 2.5-inch cores) were collected from each treatment (as described above) on May 20 (14 DAT), May 20 (21 DAT), and June 2, 2008 (28

DAT). Data were subjected to analysis of variance (ANOVA) and means were separated using Tukey's Standardized Range Test at *P*-value = 0.05. All values were transformed using log transformation to equalize variance. Original means (± SEM) are presented in Table 1.

A visual damage rating value from 1 (serious pest injury) to 4 (no injury, healthy appearing grass) was applied to the grass stands in each plot on June 2, 2008. Grass damage ratings are presented in Table 2.

Results and Discussion

None of the treatments significantly reduced CLM numbers below those of the untreated check (UTC) at the first evaluation date (Table 1).

At 14 DAT, Bifenthrin was the only treatment with significantly fewer mites than the UTC. However, note that populations of CLM rapidly declined in all plots, including the UTC, by this sampling date. This phenomenon has been observed in previous trials at this time of year.

By 21 DAT, mites had declined to negligible levels in all plots, and plots with Bifenthrin and Acramite® had significantly fewer mites compared to the rest of the treatments.

At 28 DAT, mites continued to decline in the UTC and none of the treatments had significantly fewer mites than the UTC.

Table 1. Clover mite numbers (per 2.5-inch core) results from insecticides applied in May 2008 for the clover mite insecticide trial at the Steve Wheeler Farm, Tumalo, Oregon.

Treatment[1]	Rate	Mean (± SEM) no. of clover mites per 2.5-inch grass core [2, 3]			
		6 DAT 5/12/08	**14 DAT** 5/20/08	**21 DAT** 5/27/08	**28 DAT** 6/2/08
1. Untreated check	0 lb/acre	266.8 ± 30.8 a	109.4 ± 11.3 a	5.1 ± 1.0 a	2.0 ± 0.59 ab
2. Spiromesifen 2SC -low rate (Oberon)	8 fl oz/acre	208.0 ± 55.6 a	99.7 ± 26.4 ab	3.9 ± 0.49 a	3.2 ± 1.2 ab
3. Spiromesifen 2SC -high rate (Oberon)	12 fl oz/acre	150.0 ± 52.3 a	83.8 ± 9.3 ab	5.3 ± 1.1 a	2.5 ± 1.4 ab
4. B-cyfluthrin 1EC (Baythroid XL)	2.8 fl oz/acre	334.6 ± 46.8 a	118.0 ± 26.1 a	2.5 ± 0.74 a	5.8 ± 1.5 a
5. Bifenthrin 2EC (Brigade)	6.4 fl oz/acre	221.2 ± 42.7 a	43.3 ± 9.1 b	0.4 ± 0.08 b	0.7 ± 0.30 ab
6. Bifenazate 50WS (Acramite)	2 lb/acre	303.3 ± 37.3 a	55.6 ± 11.1 ab	0.4 ± 0.08 b	0.3 ± 0.08 b
	F-Test *P* value	2.14 < 0.1067	4.33 < 0.0092	26.50 < 0.0001	3.26 < 0.0285

[1] All treatments were applied on May 6, 2008.

[2] Each sample consisted of 3 or 4, 2.5-diameter grass cores placed under Berlese funnels in the laboratory. Specimens were extracted in EOH-filled jars.

[3] Counts were transformed using log and separated using Tukey's Standarized Range Test. Means with different letters are significantly different.

Differences in visual damage between plots were difficult to discern (Table 2). The treatments had no effect on economic response to numbers of mites, and we also believe that treatments were applied too late in the spring to have had any noticeable effect on plant injury.

Table 2. Mean visual damage rating of grass stands for each treatment.

Treatment	Mean visual damage rating value 1 (bad) to 4 (good)
1. Untreated check	2.63
2. Spiromesifen 2SC - low rate (Oberon)	2.63
3. Spiromesifen 2SC - high rate (Oberon)	2.25
4. B-cyfluthrin 1EC (Baythroid XL)	2.40
5. Bifenthrin 2EC (Brigade)	2.75
6. Bifenazate 50WS (Acramite)	2.50

The trial was to be repeated in October 2008 if mites were present in other grass pasture or hay fields. However, no clover mites were detected in fields infested the previous winter and spring. We plan to repeat this experiment with some of the same treatments as well as other treatments in spring 2009 if potential for damage from CLM is significant.