Occurance and Attempts to Control Clover and Winter Grain Mites In Central Oregon Grass Pasture and Hay Fields

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Introduction

Clover mite (*Byobia praetiosa)* is a cool season mite. Populations begin to increase in late September from over-summered eggs. Some of theses mites produced from summer eggs remain active, even through the winter to lay eggs the following spring. Others lay eggs that will overwinter and hatch next spring. Populations of this mite may reach large numbers in March, April, and or May in some years. Populations "crash" in June and usually stay low until the Fall.. A portion of the population oversummers as eggs on grasses. They hatch to produce the Fall generation mentioned iniatially.

This mite probably should be controlled in April to prevent damage in more pastures with a history of imjury. Populations on certain orchardgrass pastures have steadily increased over the past 5 years in central Oregon; 2,000-3,000 mites/6-inch orchardgrass crown have been extracted from some pastures in April and May. Poor growth, chlorotic leaves, and even dead areas in pastures have been attributed to these mites. From a distance pasture grass injured by Clover mite is a more "yellowish" chlorotic than winter grain mite (*Penthaleus major*) damage and may resemble a fertilizer burn. The damage is particular noticeable shortly after spring regrowth should have begun. We began noticing large populations of this mite in orchardgrass pastures and hay fields in the Tumalo, Oregon area in 2000. Serious damage has resulted in the removal of many pastures and hay fields.

Winter grain mite is also a cool season mite common on grasses and cereals in central Oregon in the fall and late winter. One generation occurs in the fall from eggs that oversummered in the field; a second generation occurs in late winter and early spring. The mites are most active at night and on cloudy, overcast days. Cereals, grasses, and many broadleaved plants are hosts. Over-summering eggs hatch in October. Mites have usually matured, mated and begin laying eggs in November. A female can lay 2-3 eggs/day and up to 60 in a lifetime. Ideal temperature for this mite is between 50 and 60°F. Peak activity usually occurs in December and again in February and March. It had been the only pest mite observed in any significant numbers on grasses and cereals up until 2000 in central Oregon. Feeding by this mite causes grasses to silver or turn dull gray. Often the leaf tips brown and die. Winter grain mite has damaged some orchardgrass and timothy hay fields in central Oregon. It seems to cause more damage to the grasses and cereals in the Jefferson County area, although more recently, winter grain mite and imjury has been identified in Deschutes and Crook County.

Because significant damage has been attributed to the clover mite on these pastures, we surveyed chemicals and fertilizers that are registered for use on pasture grass in an attempt to select one or two for control of this mite. There are few products labeled with potential for mite activity based on available literature. Examples of chemicals found include malathion, cinnamaldehyde,

diatomaceous earth, pyrethrins, carbaryl, and methyl parathion. We chose to evaluate sulfur products and Malathion because of their availability and familiarity to fieldmen and producers .

Materials and Methods

A portion of an orchardgrass hay field on the Triple D Ranch near Tumalo, Oregon in Deschtues County was divided into plots measuring 20 by 30 ft. Four rates of elemental sulfur were applied on April 20, 2000. Malathion (1.5 pints/acre), Thiosol (30 lb/acre S) (12-0-0-26), and a mixture of Malathion (1.5 pints/acre) and Thiosol (30 lb/acre S) were applied on April 26. The 3 liquid treatments had an appropriate rate of Activator 90® in the mixture. The liquid treatments were applied at 60°F, on a cloudy afternoon day with no wind. The notes were lost on gallons per acre water applied. Many mites were observed feeding on the leaves. These treatments were not replicated.

On May 4, 2000, 4 orchardgrass crowns, 6 inches in diameter, were dug randomly from each plot, bagged, and driven to Corvallis, Oregon. Only 3 grass crowns were used to extract mites and not all treatments were analyzed. Grass crowns were placed in Berlese funnels and clover mites and other arthropods were extracted into 60 percent ethanol. Numbers of mites were determined by diluting all samples of mites from plots to a standard volume of 200 ml. Jars were thoroughly stirred to evenly disperse mites and 5 2-ml samples were taken and observed under a microscope. All winter grain and clover mites were counted in the 2-ml samples. Total mites extracted per treatment were then determined by simple ratio.

A second pasture was evaluated for presence of mites in two sections that differed because of an escaped fire that burned a portion of the pasture. Two paired sets of 3, 6-inch crown samples were taken approximately 2 ft on each side of the fire line across from each other. These crowns were processed as above.

Results

Effect of Open Field Burn

Winter grain mite was the predominant species in this pasture. Very few clover mites were extracted from the samples. The mean number of winter grain mites, per 6-inch crown were burn: 42, no burn: 270.

Sulfur, Malathion, Thiosol Treatments

Pretreatment numbers of clover mites in plots were similar to those for the check, Malathion, and sulfur treatments. Pretreatment counts of this mite in the thiosol treatment averaged about 1,100 clover mites and 100 winter grain mites per 6-inch crown area. The effect of the thiosol, malathion, and elemental sulfur treatments are presented in Table 1.

Table 1. The effect of Thiosol, Malathion, and elemental sulfur on clover and winter grain mites in an orchardgrass field at the Triple D Ranch, near Tumalo,Oregon in May, 2000.

Treatment	Mean number of live mites/6-inch core of orchardgrass crown	
	Clover mites	Winter grain mites
Untreated check	3,150	250
Thiosol	200	125
Malathion	3,500	150
Malathion + Thiosol	----	----
Elemental Sulfur 90 lb/acre	1,425	200
Elemental Sulfur 60 lb/acre	2,000	300
Elemental Sulfur 30 lb/acre	1,050	325
Elemental Sulfur 15 lb/acre	----	----

Discussion

At the Triple D Ranch, Thiosol was the only treatment that resulted in a dramatic reduction of clover mites compared to the untreated check. It had a only a moderate effect on the winter grain mite, reducing the populations to 50% of the check.
Malathion had little effect on either mite species, which is also confirmed in the literature. Malathion has not been effective on this mite in other states, either.
Miticidal attributes of sulfur compounds have been known for years and certain species of mites are more susceptible to certain forms of sulfur than others. Elemental sulfur at different rates used in this trial appear to have had some effect on clover mite but probably are of little economic value. The sulfur fertilizer in flour/granule form did very little to reduce clover mite numbers. This was perhaps due to the fact the granules generally fell to the soil and did not contact the mites or “fume” sufficiently to kill them.

At the second site, populations of winter grain mite in burned sections of an orchardgrass hay field were substantially reduced in the burned areas of the field. Differences in population numbers probably would have been even more dramatic had samples been taken deeper into the respective plots. However, we felt the close proximity of the burned vs. non burned samples from the field allowed for less potential variability in pretreatment numbers of mites.

Clover mite is a serious dooryard pest throughout the United States. It migrates to houses as host plants dry, and temperatures drop in the fall. The adult mites crawl over floors and walls. When “squashed” they leave orange–reddish stains. They can also become a nuisance in the spring. Adult mites recolonize hosts in late winter and early spring. Populations of clover mite are resistant to most organophosphate and carbamate insecticides that previously controlled this pest.

Sulfur sprays are effective in controlling many related species of mites on many different crops. Thiosul seemed to have effected control of clover mite in this observation trial. Malathion did not.

Spring flaming or burning has been shown to delay spider mite problems by up to a month or more in peppermint. Flaming spring regrowth in the spring kills many prefertilized, overwintering two-spotted spider mite females fefore she begins laying eggs. Two-spotted spider mite populations in burned plots generally take from 4 to 6 weeks to catch up with the unburned checks' populations. We don't know if winter grain mite was the predominant species prior to burning, as pretreatment samples were not taken.

Thiosul and other liquid or powder formulations of sulfur labeled for use on grass pastures and hay fields need to be further evaluated for possible control of mites.

Note: local chemical applicators used Thiosol and Malathion as a mixture in the spring of 2000 to control clover mites, but with little or no economic success.