RELATIONSHIP OF THRIPS AND MITE POPULATION LEVELS TO YIELD AND DAMAGE IN TIMOTHY.

Dominic D. Reisig, Larry D. Godfrey, Daniel B. Marcum[1]

ABSTRACT

Timothy is grown as a high value forage crop in California. Thrips (*Anaphothrips obscurus* Müller) have recently been implicated causing damage and lowering the value of this crop. Current studies of pest management in timothy are minimal. Furthermore, management options for this pest are extremely limited. We performed studies in 2006, manipulating thrips levels with insecticides and exploring the timing of insecticide applications. Thrips levels were documented and yield and damage were assessed. During the study, there was a significant range of thrips levels among treatments and, although there was no significant impact of thrips levels on yield, damage was visible between treatments in the first cutting. Mites had an impact on both yield and damage during the second cutting. Plots that were treated with a pyrethroid were, relatively, thrips-free in the first and second cutting, 2006. However, during the second cutting, mite population levels were flared by as little as one pyrethroid application. Timothy hay that received high mite pressure was significantly more damaged than hay with lower mite populations. This information is directly applicable to timothy producers in California to establish an economic threshold.

INTRODUCTION

Timothy is grown as a high value forage crop in California and the hay is largely purchased on aesthetic appearance. The most important characteristic for export buyers is hay free of weeds and dirt, followed by hay that is free of "brown leaf" and hay with large inflorescences (Kugler 2004). "Brown leaf" is a condition that refers to dead leaves, usually in the lower canopy of timothy stands. These brown leaves are harvested with green-colored leaves, are very obvious in a bale of hay and cause a significant loss in marketability for the producer.

Thrips (*Anaphothrips obscurus* Müller) have recently been implicated causing damage and lowering the value of this crop. Minimal studies have explored the relation of thrips levels to yield and damage in timothy and the economic threshold of this pest is unknown. Furthermore, management options for this pest are extremely limited. Current control measures include insecticide applications of methidathion (Supracide 2E), which is a restricted use pesticide, or malathion, which has limited efficacy. A pyrethroid (Baythroid) is currently undergoing registration for timothy, so this insecticide was utilized in this research. This study is part of the larger overall project examining pest management options for cool-season grasses in Nevada (in

[1] D.D. Reisig, Graduate Student Researcher, Department of Entomology, University of California, Davis, One Shields Ave., Davis, CA 95616; L.D. Godfrey, Extension Entomologist, Department of Entomology, University of California, Davis, One Shields Ave., Davis, CA 95616; D.B. Marcum, Shasta-Lassen Co. Farm Advisor, UC Cooperative Extension, P.O. Box 9, 44218 A Street McArthur, CA 96056-0009; E-mail: ddreisig@ucdavis.edu; ldgodfrey@ucdavis.edu; dbmarcum@ucdavis.edu. **In**: Proceedings, 2006 Western Alfalfa & Forage Conference, December 11-13, 2006, Reno, Nevada Sponsored by the Cooperative Extension Services of AZ, CA, CO, ID, MT, NV, NM, OR, UT, WA, WY. Published by: UC Cooperative Extension, Agronomy Research and Extension Center, Plant Sciences Department, University of California, Davis 95616. (See http://alfalfa.ucdavis.edu for this and other alfalfa proceedings.)

cooperation with Willie Riggs and Jay Davison) and in Washington (in cooperation with Doug Walsh) (see adjacent poster on this project).

PROCEDURES

Thrips levels were manipulated in 2006 with disruptive insecticides. One trial consisted of four insecticides that were applied monthly from February to August 2006. Malathion (Malathion 8 Aquamul at 1 ¼ pt/A, Loveland Products, Inc., Greeley, CO) was applied on 10 and 24 February, 28 March, 26 April, 24 May, 4 July, and 3 August 2006; cyfluthrin (Baythroid 2 at 1.9 fl. oz/A, Bayer CropScience LP, Research Triangle Park, NC) was applied on 24 February, 28 March, 26 April, 24 May, 4 July, and 3 August 2006; spinosad (Success at 10 fl. oz/A, Dow AgroSciences, Indianapolis, IN) was applied on 28 March, 26 April, 24 May, 4 July, and 3 August 2006. Two applications of malathion were made in February because the weather became very cold after application. Hence, the first chemical application was ineffective because the product did not volatilize properly. No applications were made in June, because the timothy was cut in the middle of the month.

Timing of a pyrethroid application was also explored in both the first and second cuttings. Four treatments consisted of a single cyfluthrin application, applied at different time. In the first cutting, cyfluthrin applications were made on 3, 10, 19 and 24 May 2006. Cyfluthrin applications were made on 20 and 27 July and 3 and 10 August 2006.

Thrips levels were documented on a weekly basis, as well as other economically important pests. Yield and damage samples were assessed in the first cutting on 12 June 2006 and in the second cutting on 7 September 2006. A sickle bar mower was used to cut subsample from all the plots and this was weighed for yield. In addition, a square half meter sample from each plot was cut and taken back to the lab for damage analysis. From this, leaves were separated from individual tillers based on the percent of the leaf that was brown versus green. Five categories were used: 0-20, 20-40, 40-60, 60-80 and 80-100% damaged. These samples were then dried, weighed, and compared for damage analysis among treatments.

RESULTS AND DISCUSSION

In both studies, there was a significant range of thrips levels among treatments in the first study. At their highest point, populations ranged from ~3 to 0 thrips/tiller on 3 May 2006, in the first cutting, and ~8 to 1 thrips/tiller on 12 July 2006, in the second cutting among treatments. Furthermore, mites, although they were not the focal organism of study, were significantly abundant in pyrethroid-treated plots for both studies. The species of mites that is/are involved is unknown, but they are in the family Tetranychidae.

We found that there was no significant impact of thrips levels on yield, but that damage was visible between treatments. Mites had an impact on both yield and damage in the second cutting. Plots that were treated with a pyrethroid were, relatively, thrips-free in the first and second cutting, 2006. However, during the second cutting, mite population levels were flared by as little as one pyrethroid application, with populations as high as ~85 mites per tiller, in contrast to ~3 mites per tiller in the untreated plots on 23 August 2006. High mite population levels translated

into hay that was significantly more damaged than hay lower mite populations. This information is directly applicable to timothy producers in California to establish an economic threshold.

REFERENCES

Kugler J. 2004. Producing high quality orchardgrass and timothy hay. pp. 131-140 *In:* Proceedings, National Alfalfa Symposium, 13-15 December, 2004, San Diego, CA. UC Cooperative Extension, Agronomy Research and Extension Center, Plant Sciences Department, University of California, Davis, CA.