FOLIAR FUNGICIDES ON ALFALFA: IS IT WORTH IT?

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Introduction

Current trends in agronomic field crop production (corn and soybean) have been towards the use of foliar fungicides to promote "plant health" and increase yield in the absence of disease. Trials to examine this trend have been conducted across the upper Midwest and have resulted in very inconsistent results. Headline (pyraclostrobin, BASF, Research Triangle Park, NC) was approved for use in alfalfa beginning in 2011. We received numerous questions from growers and university researchers regarding the benefits of foliar fungicide use in alfalfa grown for forage. Many of these questions were focused on the use of a fungicide in a tank-mix with an insecticide, with the intent of providing a positive synergistic yield response. Thus, the objective of this study was to conduct field research trials in Wisconsin and Minnesota to examine the benefit of using a foliar fungicide, alone or in combination with foliar insecticide on alfalfa.

Methods

Trials were conducted at three locations in Wisconsin (Arlington, Tomah and Waupaca) and two locations in Minnesota (Waseca and Rosemount) in 2012. Arlington, Waseca and Rosemount locations were conducted on University Research Stations, Tomah and Waupaca were conducted in grower fields.

At each location, a randomized complete block experimental design was used with four replicates. Treatments were: Headline® (9 fl oz/a), Headline® (9 fl oz/a) + Warrior II® (1.2 fl oz/a), Warrior II® (1.2 fl oz/a), and an untreated check (UTC). All plots measured 20 ft wide x a minimum of 30 ft long. Total application volumes ranged from 23.7 to 24.7gallons per acre depending on the equipment used at the location. Application timing was between 6 and 9 inches of growth. Trials were conducted on first, second, and the last cutting before September 1st, except at Tomah, which did not have a last cutting due to drought conditions. Plots in Wisconsin were harvested on a cutting schedule to maximize alfalfa quality for use in dairy forage. The Minnesota plots were harvested on a schedule to mimic good quality heifer and beef cattle forage.

Yields were taken using small plot harvesters. Subsamples for quality analysis were whole plants harvested separately from yield measurements and sent to the University of Wisconsin-Madison, Department of Agronomy for near infrared (NIR) analysis. The following data were collected from each site: yield (T/a), forage quality, insect sweep counts, and stem heights. Individual plant samples were sent to Dr. Samac at the University of Minnesota for foliar disease rating and subsequent pathogen isolation

A procedure was developed with Dr. Victor Cabrera, UW Extension Dairy Management Specialist and Dr. Randy Shaver, UW Extension Dairy Nutrition Specialist, utilizing the UW developed Milk 2006 and the FeedVal 2012 spreadsheet tools to determine dollar values of the alfalfa harvested from the plots when feed value differences (α=0.10) were measured between treatments at

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locations. The FeedVal 2012 spreadsheet uses benchmark feeds of known quality and prices to make economic comparisons with feeds of known nutritional values. Milk 2006 was used to calculate net energy of lactation values (neL) for the alfalfa samples. FeedVal 2012 was then used for calculating economic values of the alfalfa samples using crude protein and neL. Annual average prices for corn grain, soybean meal, good quality alfalfa hay, poor quality alfalfa hay and corn silage were used as benchmark prices. Alfalfa hay prices were obtained from records of actual sales of known quality tested hay from Ken Barnett, UW Extension Center for Dairy Profitability.

If there were yield and/or quality differences (α=0.10) these values were then used to calculate the total value of the forage harvested in that cutting between treatments and then adjusted for the cost difference of the treatments based on average costs obtained from area agronomy dealers.

Results

Fourteen unique comparisons of treatments were possible across locations and cuttings. Response to the application of Headline fungicide either alone or in combination with Warrior II was inconsistent for both yield and quality.

A positive yield response (α=0.10) was observed in five out of 14 observations when using Headline® alone compared to the untreated check. When evaluating the addition of Headline® to an application of Warrior II®, a positive yield response (α=0.10) was observed in four out of 14 observations. A negative yield difference (α=0.10) was observed at one of the locations when comparing Headline® + Warrior II® with Warrior II® alone.

When evaluating forage quality between Headline and the untreated check, Headline positively influenced (α=0.10) crude protein in three out of 14 observations, and had a negative influence on crude protein (α=0.10) in three of 14 comparisons. Observations of neL were influenced positively by Headline® (α=0.10) in three of 14 observations and negatively (α=0.10) in four of 14 observations.

When evaluating forage quality between the Headline® + Warrior II® and Warrior II® alone, Headline® + Warrior II® positively influenced (α=0.10) crude protein in three out of 14 observations, but also had a negative influence on protein (α=0.10) in two of 14 comparisons. Observations of neL were affected positively (α=0.10) by the Headline® + Warrior® treatments in four of 14 observations and a negative influence (α=0.10) in two of 14 observations.

Headline® treatment significantly ($P<0.05$) reduced defoliation and infected leaf area in 12 of 14 observations and Headline® + Warrior® reduced disease significantly in 10 of 14 observations compared to the untreated control. Warrior® reduced disease significantly ($P<0.05$) in 1 of 14 observations. The greatest effect on foliar diseases was in the first forage harvest at all locations.

Return on investment was calculated for all treatment observations, using average feed prices from Jan 2012 through November 2012 for the benchmark feeds. Treatment costs were obtained from a survey of agronomy dealers requesting the costs of Headline® (9 fl. oz/A) and applications fees. A treatment cost of $35/A was assigned to the Headline® treatment and included the application fee ($8/A). It reflects the average cost of applying only the fungicide. A treatment cost of $27 was assigned to the Headline® + Warrior® treatment. It excludes the application fee and the cost of

Warrior®. This figure reflects the cost of adding Headline® to an already planned application of Warrior®. For all treatment observations (positive or negative) the economic gain or loss was determined from using the Milk 2006 and FeedVal 2012 spreadsheets. In cases where there were statistically significant yield or quality responses the return on investment ranged from -$104 per acre to $93.91 per acre.

Conclusion

Additional trial data are needed before economical recommendations can be made regarding foliar fungicide use in alfalfa.