FOLIAR FUNGICIDES ON ALFALFA: 2012 University Extension Field Trial Results from Minnesota and Wisconsin

Bill Halfman, Greg Blonde, Bryan Jensen, Deborah Samac, Lisa Behnken, Fritz Breitenbach, Dan Undersander

For additional information contact: Dr. Damon Smith, UW Extension Plant Pathologist, dsmith@plantpast.wisc.edu, website: http://fyi.uwex.edu/fieldcroppathology/

Introduction: To help address the growing number of questions about applying foliar fungicide to alfalfa, Extension educators in Wisconsin and Minnesota conducted field research trials in 2012 to examine alfalfa's response of using a foliar fungicide, alone or in combination with foliar insecticide, on alfalfa. Smaller scale trials conducted by the group in 2011 found inconsistent response to the application of Headline on alfalfa. Headline is just one foliar fungicide labeled for use on alfalfa, and the product used in this study. It is not labeled for clovers, grasses used for forage, or other perennial forage crops at this time, so cannot be applied to mixed stands. The label also states a limit to three applications per year, with a rate of 6 to 9 oz/acre per application with a maximum total application of 27 oz/a per year.

Results Summary: Although the addition of alfalfa fungicide significantly reduced defoliation at all locations during most cuttings in 2012, significant differences in yield and quality were inconsistent. Moreover, return on the added investment was often negative, even when subtracting a cost for application. Clearly, more research is needed to help determine if and when growers can expect a consistent response and return when spraying foliar fungicide on their alfalfa (additional site data and explanation attached).

Research Design: The 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 (applications ranged from 23.7 to 24.7 gal/a at 49 psi 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. Wisconsin plots were harvested on a dairy quality cutting schedule, while Minnesota plots were harvested on a delayed schedule for heifer and beef quality forage.

Methodology: 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, USDA– ARS in St. Paul, MN, for foliar disease rating and subsequent pathogen isolation. At the time of application there was little or no evidence of fungal disease on the alfalfa growth.

To evaluate return on investment, a procedure was developed with Dr. Victor Cabrera, UW Extension Dairy Management Specialist and Dr. Randy Shaver, UW Extension Dairy Nutrition Specialist, which utilized Milk 2006 and FeedVal 2012 spreadsheet tool to determine dollar values of the alfalfa harvested from the plots only if statistically significant feed and or yield differences (α=0.10) were measured between treatments at each location.

Corn grain, soybean meal, good quality alfalfa hay, poor quality alfalfa hay and corn silage were used as benchmark feeds for pricing. Alfalfa hay prices were obtained from records of actual sales of known quality tested hay from Ken Barnett, UW Extension Center for Dairy Profitability.

Statistically significant yield and/or quality differences (α=0.10) were used to calculate total forage value harvested and then adjusted for average application costs from agronomy dealers in that area. Return on investment was calculated for all treatment observations, using average feed prices from Jan-Nov 2012 as the benchmark.

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®. Return on investment ranged from -$104 per acre to $93.91 per acre.

First Cutting Results

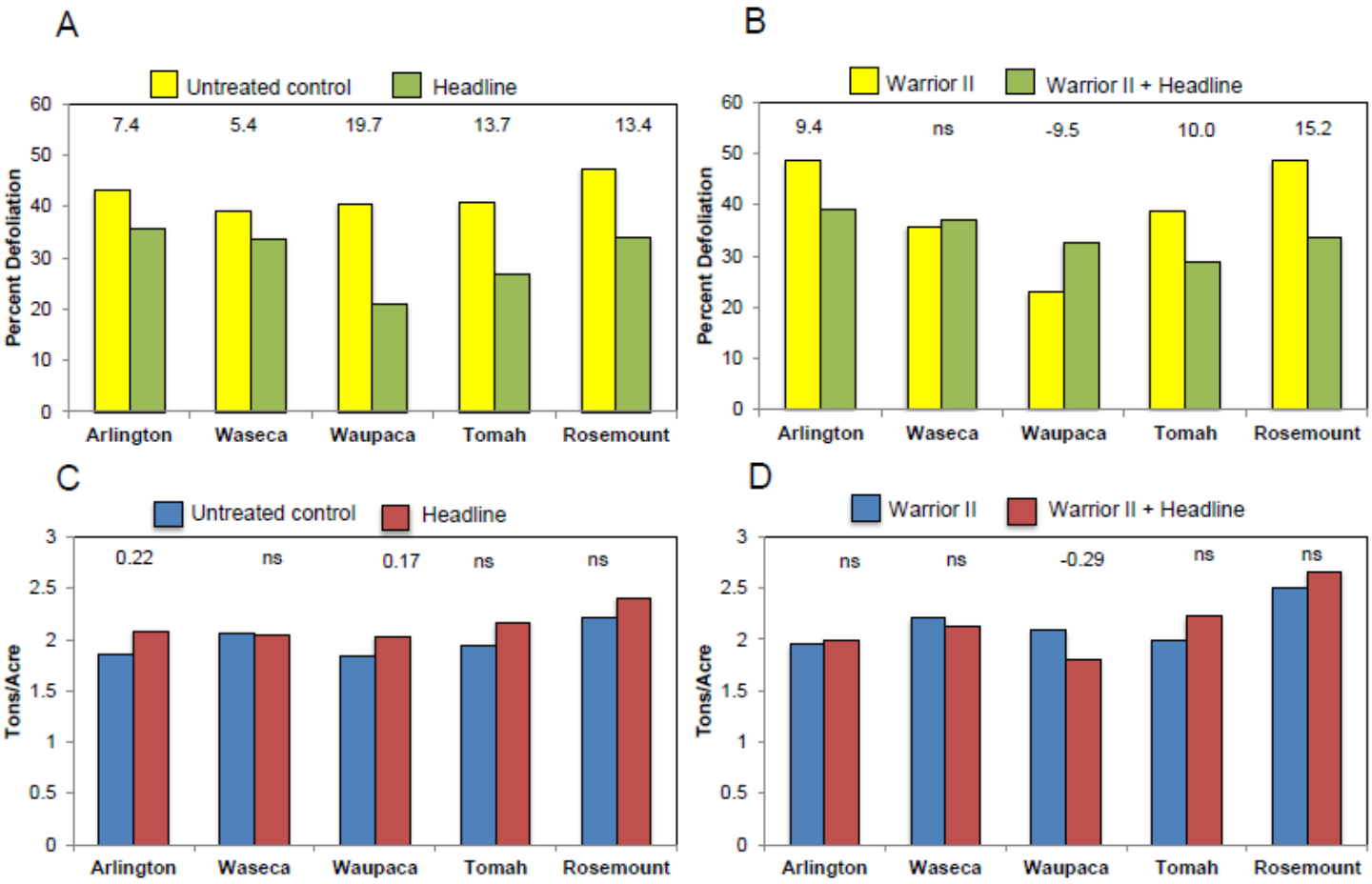

Figure 1. First cutting percent defoliation and dry matter tons per acre yield data. Numbers above bars are the difference in percent for defoliation between treatments, and tons of dry matter per acre for yield. ns=not significantly different. (A) Defoliation untreated control –vs- Headline treatment. (B) Defoliation Warrior II –vs- Warrior II + Headline treatment. (C) Dry matter yield untreated check -vs- Headline treatment. (D) Dry matter yield Warrior II –vs- Warrior II + Headline treatment.

	Arlington		Waseca		Waupaca		Tomah		Rosemount	
	%CP	NE_L	%CP	NE_L	%CP	NE_L	%CP	NE_L	%CP	NE_L
UTC	26.5	0.73	19.3	0.65	24.7	0.72	22.8	0.70	17.8	0.66
Headline	26.1	0.72	19.5	0.66	24.6	0.72	22.6	0.70	19.2	0.67
difference	-0.4	-0.01	0.2	0.01	nsd	nsd	nsd	nsd	0.4	0.01
Insecticide	26.0	0.71	20.9	0.67	24.8	0.72	22.7	0.74	17.5	0.67
Ins + Hdln	25.9	0.71	18.2	0.65	24.5	0.72	22.6	0.74	18.6	0.70
difference	nsd	nsd	-2.7	-0.02	nsd	nsd	nsd	nsd	1.1	0.03

Table 1. First cutting forage quality. %CP is percent crude protein. NEL is Net Energy for Lactation, presented as MCal per pound of dry matter, UW Milk 2006. nsd is no significant difference.

Second Cutting Results

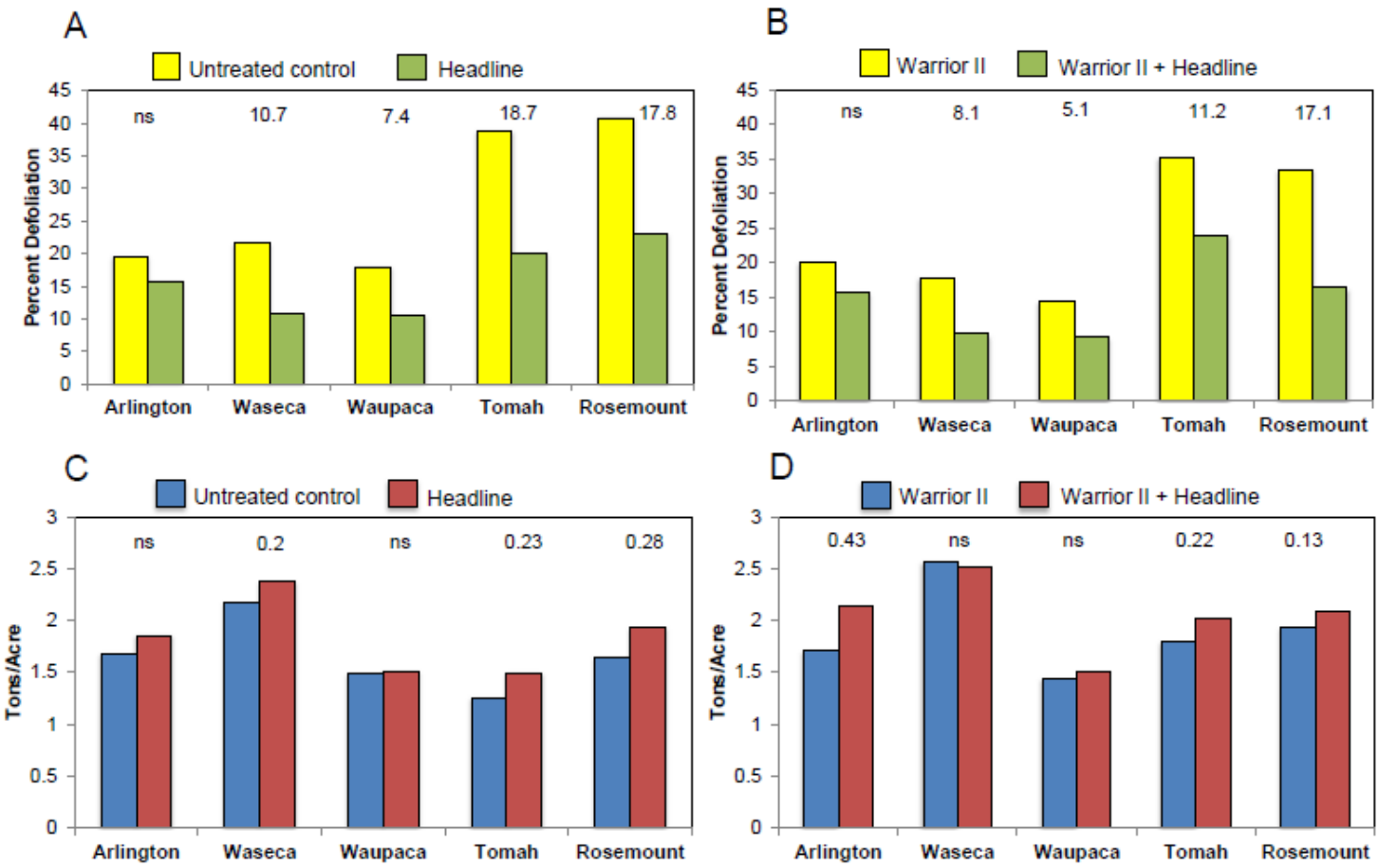

Figure 2. Second cutting percent defoliation and dry matter tons per acre yield data. Numbers above bars are the difference in percent for defoliation between treatments, and tons of dry matter per acre for yield. ns=not significantly different. (A) Defoliation untreated control –vs- Headline treatment. (B) Defoliation Warrior II –vs- Warrior II + Headline treatment. (C) Dry matter yield untreated check -vs- Headline treatment. (D) Dry matter yield Warrior II –vs- Warrior II + Headline treatment.

	Arlington		Waseca		Waupaca		Tomah		Rosemount	
	%CP	NE_L	%CP	NE_L	%CP	NE_L	%CP	NE_L	%CP	NE_L
UTC	27.3	0.67	22.1	0.65	24.1	0.66	25.0	0.70	23.9	0.68
Headline	27.4	0.67	21.6	0.66	24.7	0.66	24.5	0.70	24.7	0.67
difference	**nsd**	**nsd**	**-0.5**	**0.01**	**nsd**	**nsd**	**nsd**	**nsd**	**0.8**	**-0.01**
Insecticide	27.0	0.71	21.9	0.65	24.2	0.66	24.7	0.70	25.1	0.66
Ins + Hdln	26.8	0.71	22.5	0.66	24.3	0.66	24.9	0.70	25.6	0.67
difference	**nsd**	**nsd**	**0.6**	**nsd**	**nsd**	**nsd**	**nsd**	**nsd**	**0.5**	**0.01**

Table 2. Second cutting forage quality. %CP is percent crude protein. NE_L is Net Energy for Lactation, presented as MCal per pound of dry matter, UW Milk 2006. nsd is no significant difference.

Fourth Cutting Results

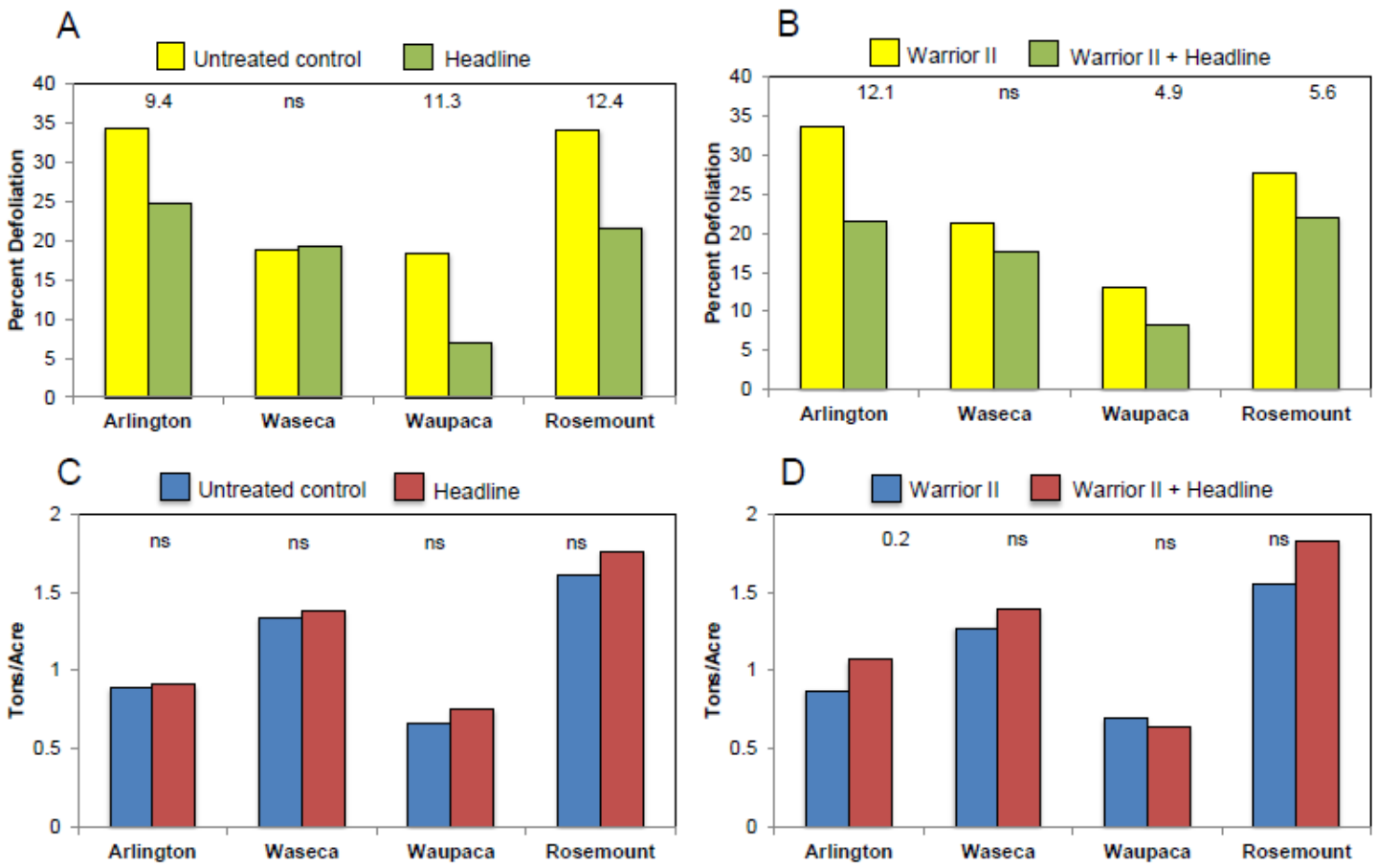

Figure 3. Fourth cutting percent defoliation and dry matter tons per acre yield data. Numbers above bars are the difference in percent for defoliation between treatments, and tons of dry matter per acre for yield. ns=not significantly different. (A) Defoliation untreated control –vs- Headline treatment. (B) Defoliation Warrior II –vs- Warrior II + Headline treatment. (C) Dry matter yield untreated check -vs- Headline treatment. (D) Dry matter yield Warrior II –vs- Warrior II + Headline treatment.

	Arlington		Waseca		Waupaca		Tomah		Rosemount	
	%CP	NE_L	%CP	NE_L	%CP	NE_L	%CP	NE_L	%CP	NE_L
UTC	26.8	0.68	24.2	0.72	27.7	0.69			23.5	0.73
Headline	27.8	0.68	23.3	0.71	27.9	0.69			23.7	0.71
difference	**nsd**	**nsd**	**-0.9**	**-0.01**	**nsd**	**nsd**			**nsd**	**-0.02**
Insecticide	27.4	0.71	23.0	0.70	27.9	0.69			24.9	0.72
Ins + Hdln	27.0	0.71	22.9	0.70	27.6	0.69			24.3	0.74
difference	**nsd**	**nsd**	**nsd**	**nsd**	**nsd**	**nsd**			**-0.6**	**0.02**

Table 3. Fourth cutting forage quality. %CP is percent crude protein. NE_L is Net Energy for Lactation, presented as MCal per pound of dry matter, UW Milk 2006. nsd is no significant difference.

Return on Investment

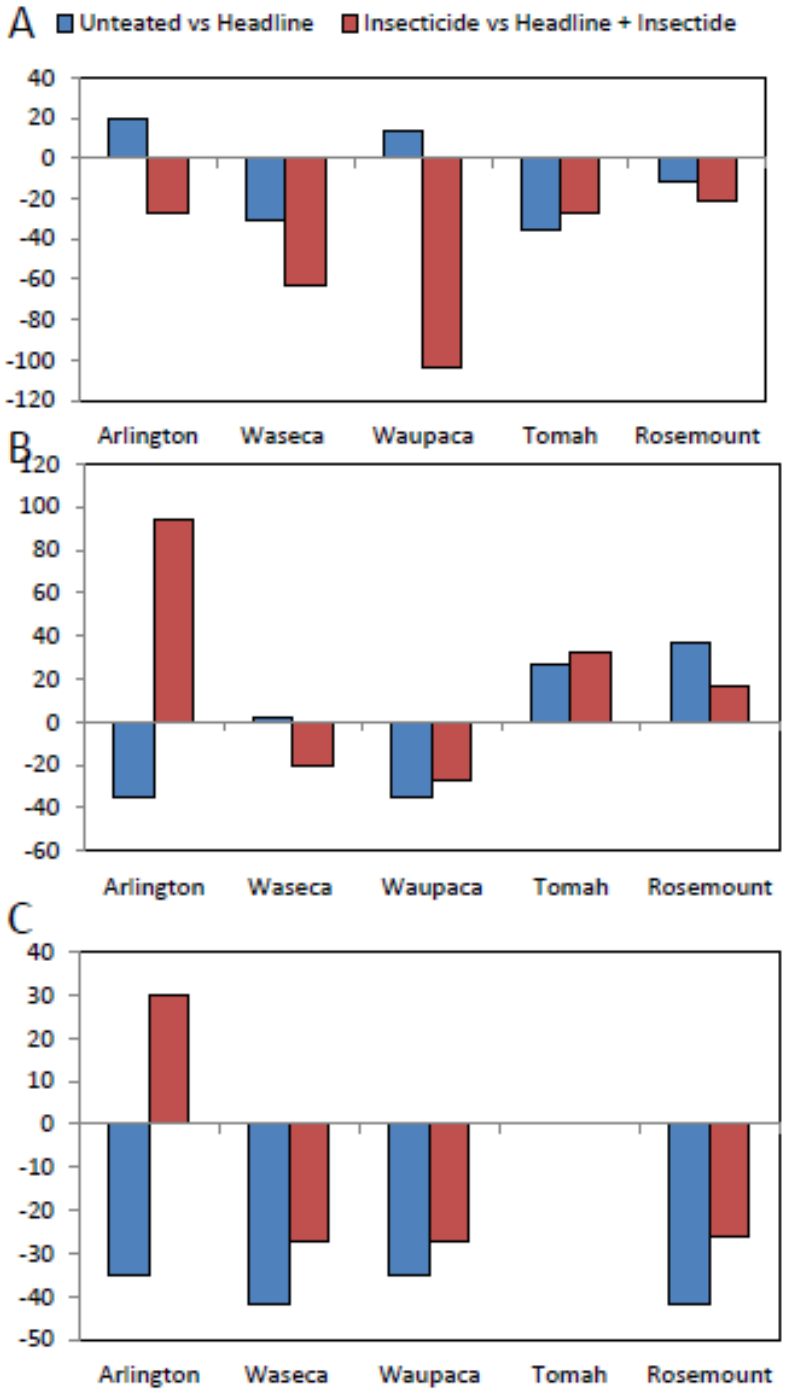

Table 4. Feed Prices used for benchmark numbers for Return on Investment calculations.

Feed	Price
Dry shell corn	$6.42/bu
48% soybean meal	$433.74/ton
Good Hay (150 RFV)	$215.37/ton
Poor Hay (110 RFV)	$79.05/ton
Corn Silage	$51.32/ton

Prices are average prices for feedstuffs from January 2012 through 2013

Figure 4. 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®. (A) First cutting. (B) Second cutting. (C) Fourth Cutting.