FINAL PROJECT REPORT TO THE NYS IPM PROGRAM, AGRICULTURE IPM 2002-2003

Title: Roughstalk Bluegrass Suppression in Alfalfa-Grass Seedings

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Cooperators: None

Type of Grant: Cultural methods; sanitation; physical controls

Project locations: Findings might be applied throughout the Northeast

Abstract:

A field experiment was established April 30, 2001 at Caldwell Field, Tompkins County, NY to evaluate the value of using recommended and double seeding rates of timothy or orchardgrass for suppression of roughstalk bluegrass (*Poa trivialis* L.) in alfalfa / timothy and alfalfa / orchardgrass seedings. No data on the effectiveness of the treatments was collected in 2001 since the bluegrass was not present during the establishment year. Bluegrass did invade the plot area in the fall of the 2001 growing season. The plots were harvested four times during the 2002 growing season with cuttings on May 29, July 11, August 28, and October 24. Total forage yields and the percent of the botanical components (alfalfa, timothy or orchardgrass, bluegrass, and forbs) were determined for each harvest date. Roughstalk bluegrass was responsible for 46, 12, 3, and 5% of the total forage yield for the first, second, third, and fourth

cuttings respectively. Since the bluegrass was mainly a problem in the first cutting, forage quality analysis was conducted on the botanical components for that cutting only. First cutting forage yield from the alfalfa check was 2.51 tons dry matter/acre (T DM/A) with 40, 4, 46, and 10% of that yield from alfalfa, timothy, bluegrass, and forbs respectively. The use of Select herbicide provided 100% bluegrass control but reduced forage yield to 1.39 T DM/A. Forage yields for the alfalfa/timothy and alfalfa/orchardgrass treatments ranged from 2.36 to 2.97 T DM/A and were similar to the alfalfa check. Each of these alfalfa/grass mixtures effectively suppressed the bluegrass with less than 4% bluegrass in each of the four alfalfa/grass mixtures. Forage from the alfalfa check, which had only 40% alfalfa, had a crude protein (CP) value of 16.6% due to the bluegrass in this treatment, while the alfalfa/Select herbicide treatment, which was 77% alfalfa, had 22.1% CP. The alfalfa/timothy treatments averaged 14.8% CP and the alfalfa/orchardgrass treatments averaged 12.8% CP. Milk yield in 16/T DM and in lb/A were calculated using the yield and forage quality data. Although the milk yield/T DM was highest for the alfalfa/Select herbicide treatment, this treatment would produce less milk/acre than either of the alfalfa/timothy mixtures which were favored by higher yields and with moderate CP values (14.8%). The alfalfa check and the alfalfa/orchardgrass treatments would be expected to produce milk yields/acre between the low for the alfalfa Select herbicide treatment and the high yield for the alfalfa/timothy treatments but not statistically different from either. The reduced milk yield from the alfalfa/orchardgrass treatments can be attributed to lower CP values than with the alfalfa/timothy treatments. The results demonstrate the value of perennial forage grasses, either timothy or orchardgrass, for suppression of roughstalk bluegrass compared with chemical control of this weedy grass.

Background and Justification

It is estimated that at least two-thirds of the alfalfa seedings in New York State include a perennial forage grass, most often timothy. Alfalfa producers make these mixed seedings for a

couple of reasons. First, clear seeded alfalfa will not persist on moderately to poorly drained soils that are common in New York. In addition, many producers include a grass in the mixture to speed hay drying. Roughstalk bluegrass is increasingly problematic in these mixed seedings. This weedy grass is problematic because it matures prior to first cutting harvest and the woody stems reduce the palatability and quality of the first cutting hay or haylage. Postemergence grass herbicides such as Select (clethodim) can be used to suppress/control this weedy grass in clear alfalfa seedings. Unfortunately, Select applications will also control the desirable perennial grasses in mixed seedings. Observations suggest that recommended seeding rates (4-6 lb/A) of timothy may not be adequate to prevent this weedy grass from infesting the alfalfa/timothy seedings. It is possible that an increased seeding rate of timothy might minimize these bluegrass infestations by eliminating the niche that this invasive species occupies.

Objectives:

1) Determine the value of increasing the seeding rate of timothy and orchardgrass in alfalfa/grass seedings as a cultural suppression/control measure for roughstalk bluegrass from plots established in 2001.

2) Project evaluation will be done by analyzing forage quality on botanical separates from first cutting. Combining this information with yield components should provide an estimate of the value of the various treatments.

Procedures:

A field experiment was established at Caldwell Field in Tompkins County, NY on April 30, 2001. Alfalfa 'Pioneer 5347 LH', timothy 'Mariposa', and orchardgrass 'Shawnee' were the

varieties selected for this experiment. The following treatments were included:

1. Alfalfa at 12 lb/A as an untreated check.
2. Alfalfa at 12 lb/A for Select herbicide control of bluegrass.
3. Alfalfa at 12 lb/A plus timothy at 5 lb/A.
4. Alfalfa at 12 lb/A plus timothy at 10 lb/A.
5. Alfalfa at 12 lb/A plus orchardgrass at 5 lb/A.
6. Alfalfa at 12 lb/A plus orchardgrass at 10 lb/A.

The treatments were established in a randomized complete block design with four replications. The entire plot area was sprayed with 2 qt/A of Butyrac 200 (2,4-DB) on June 25, 2001 to control annual broadleaf weeds. Individual plots were harvested on September 5, and the plot area topdressed with 350 lb/A of 2-10-40 on September 14, 2001. On April 16, 2002, the entire plot area was once again sprayed with 2 qt/A of Butyrac to control a variety of broadleaf weeds. On that same date, 12 fluid oz/A of Select (clethodim) herbicide was applied to the alfalfa/Select herbicide plots for roughstalk bluegrass control. The plots were harvested four times during the 2002 growing season with cuttings on May 29, July 11, August 28,and October 24. In addition to measuring total forage yield in tons dry matter per acre (T DM/A), botanical separation of representative samples was done to determine the percent alfalfa, perennial forage grass (timothy or orchardgrass), roughstalk bluegrass, and forbs other than alfalfa in each plot. Forage quality analysis and milk yield calculations for each botanical component were done by Dairy One Forage Laboratory. These results were used to calculate crude protein (CP), milk yield/T DM, and milk yield in lb/A for each treatment. The results were subjected to an analysis of variance.

Results and Discussion:

The percent of roughstalk bluegrass in the alfalfa check ranged from 3 to 46% for the four cuttings. Since roughstalk bluegrass was mainly a problem in the first cutting (46% of the total

yield in the alfalfa check) forage quality analysis was conducted on the botanical components for that cutting only and the discussion will focus on the results from that cutting. Total forage yields and the percent of the botanical components for the first cutting (harvest) are shown in Table 1. First cutting forage yield from the alfalfa check was 2.51 tons dry matter/acre (T DM/A) with 40, 4, 46, and 10% of that yield from alfalfa, timothy, bluegrass and forbs respectively. The use of Select herbicide provided 100% bluegrass control but reduced forage yield to 1.39 T DM/A (77% alfalfa and 23% forbs) which was significantly less than the yield from the alfalfa check. Forage yields for the two alfalfa/timothy and the two alfalfa/orchardgrass treatments ranged from 2.36 to 2.97 T DM/A and were similar to the alfalfa check. Each of these alfalfa/grass mixtures was effective in suppressing the roughstalk bluegrass with an average of 3.8% bluegrass with the two alfalfa/timothy and less than 1% bluegrass with the two alfalfa/orchardgrass. The orchardgrass was also more effective in suppressing alfalfa than the timothy. Alfalfa contributed an average of 15% of the total forage in the two alfalfa/timothy treatments while contributing only 3.6% of the yield in the two alfalfa/orchardgrass treatments.

Crude protein (CP) and calculated milk yields as the pounds of milk per ton of dry matter (lb/T DM) and as pounds of milk per acre (lb/A) for the treatments are shown in Table 2. Forage from the alfalfa check had a CP value of 16.6% while the alfalfa/Select herbicide treatment had 22.1% CP. The alfalfa/timothy treatments averaged 14.8% CP and the alfalfa/orchardgrass treatments averaged 12.8% CP. Although these values are of interest, expected/calculated milk yields are of greater interest to Northeast dairy farmers. The alfalfa/Select herbicide treatment, with 77% of the forage from alfalfa with a CP of 22.5% would be expected to produce 3159 lb of milk/T DM. This was significantly greater than the expected production from the other treatments. There was no difference in the expected milk yield/T DM among the alfalfa check (2871 lb) and the two alfalfa/timothy treatments with an average of 2833 lb. The alfalfa/orchardgrass treatments not only had the lowest % CP, they

were the lowest in expected milk/T DM.

Although the expected milk yields/ T DM are of great interest and are a reflection of forage quality, the expected milk yield/A is the measure that combines forage yield as well as quality and is perhaps of greatest interest. Although the alfalfa/Select herbicide treatment had the highest CP (22.1%), it also had the lowest forage yield (2776 lb DM/A) because the herbicide effectively removed the grass component. As a result, the calculated milk yield was only 4379 lb/A. This was not significantly greater than the milk yield from the alfalfa check which had 16.6% CP and an expected milk yield of 4041 lb/A. Although the alfalfa/orchardgrass seeded at 10 lb/A produced a calculated milk yield of 6330 lb/A, this value was not significantly greater than the alfalfa check or the alfalfa/Select herbicide treatments. The two alfalfa/timothy and the alfalfa/orchardgrass seeded at 5 lb/A treatments all produced an expected milk yield greater than the alfalfa/Select herbicide and alfalfa check treatments.

These results demonstrate the value of using a perennial forage grass, either timothy or orchardgrass, for suppression of roughstalk bluegrass compared with chemical control of this weedy grass. The results also suggest that there was little advantage of using double the seeding rate recommended in the "Cornell Guide for Integrated Field Crop Management."

Table 1. Total forage yields and percent composition of alfalfa, timothy/orchardgrass, roughstalk bluegrass, and forbs from first cutting, May 29, 2002.

Forage Treatments	Yield (T DM/A)	Botanical Components (%)				
		Alfalfa	Timothy	Orchard	Bluegrass	Forbs
1. Alfalfa 12 lb/A Check	2.51	40	4	0	46	10
2. Alfalfa 12 lb/A Select	1.39	77	0	0	0	23
3. Alfalfa 12 lb/A Timothy	2.97	13	82	0	5	0
4. Alfalfa 12 lb/A Timothy 10 lb/A	2.81	17	79	0	3	1
5. Alfalfa 12 lb/A Orchard 5 lb/A	2.72	5	0	94	0	0
6. Alfalfa 12 lb/A Orchard 10 lb/A	2.36	2	0	98	0	0
LSD (P = 0.05)	1.1	18	7	1	9	13

Table 2. Crude protein (CP) and calculated milk yields per ton of dry matter (lb/T DM) and per acre (lb/A) for the first cutting, May 29, 2002.

Forage	Crude Protein	Milk Yield	
Treatments	(%)	lb/T DM	lb/A
1. Alfalfa 12 lb/A Check	16.6	2871	7198
2. Alfalfa 12 lb/A Select	22.1	3159	4382
3. Alfalfa 12 lb/A Timothy 5 lb/A	14.7	2844	8460
4. Alfalfa 12 lb/A Timothy 10 lb/A	15.0	2822	7946
5. Alfalfa 12 lb/A Orchard 5 lb/A	13.0	2729	7424
6. Alfalfa 12 lb/A Orchard 10 lb/A	12.7	2719	6338
LSD (P = 0.05)	2.3	124	3071