Cultural Control of Established Dandelion in Turf

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Summary

This trial was developed in order to study the effects of various cultural practices on the control of dandelion in turf. This trial was conducted over two years and examined aerification and topdressing, as well as mowing height and fertilizer applications. The higher rate of the synthetic fertilizer, Scott's Contec 21-3-11, showed a reduction in dandelion and improved quality. In year one, dandelion populations increased when plots were aerified and topdressed. None of the other treatments had an effect on dandelion populations.

Introduction

Dandelion can be a major weed problem in turf. It forms dense clumps which affects the footing and the overall playability on sports fields and golf courses. The texture and colour of its leaves does not blend harmoniously with the surrounding grasses. When in bloom, its yellow flowers are yet a further detractor from the aesthetics of the turf.

Dandelion seed is spread on the wind, and as this seed can be carried great distances, prevention of new infestation is difficult. Once a dandelion becomes established and supported by its large taproot, they are even harder to control.

The foundation of cultural dandelion control in turf has always been to create a growing environment in which the turf grass had the competitive vigor to repel the establishment of new dandelion seedlings. However, when it came to dealing with established dandelion, many of the cultural methods were abandoned, opting to solely rely on chemical control. As concerns over the use of herbicides for aesthetic purposes increase the turf manager must make adjustments, explore new strategies and rethink the whole dandelion control process.

Methodology

The effect of three cultural turf management practices on an established dandelion population was tested at e Prairie Turfgrass Research Centre on a site located at Olds College, Olds, Alberta.

Test plots measuring 1x 1 meter were laid out on an unirrigated Kentucky bluegrass/creeping red fescue site with a uniform stand of established dandelion. Despite the high dandelion infestation, the turf stand was consistent and even. Each treatment was replicated four times within a three factor randomized complete block trial design (RCBD) (Table1).

On June 8, 2005, the herbicide Trillion was applied to the site at the rate of 60ml/100m^2 in an attempt to eradicate the dandelion population. Seven days after the herbicide had been applied the level of control was assessed.

The trial was initiated on June 22. In order to determine if soil aerification was a factor in dandelion control, half of the plots were aerified, while the other half was left untreated. A Ryan GA30 aerator, equipped with 1.6cm hollow tines and set for a 7.6 by 7.6cm spacing, effectively opened up the turf. The soil cores were harvested and removed from the site. USGA specification sand was spread over the aerified turf at the rate of 0.35 m^3/100m^2. Several passes with a drag mat were made to fill the core holes and to evenly distribute the sand over the aerated area.

On the same date the plots received the initial application of fertilizer, corn gluten and soybean meal at the rates specified in table 1. The treatments were individually weighed into plot sized lots and applied by hand using a simple shaker bottle. A second application of the fertilizer was applied ten weeks later on August 31.

Mowing took place on a weekly basis. This process was accomplished by first mowing the entire experiment at the higher cutting height of 6.25cm (2.6"), then using a push mower, selectively re-cut specific plots at the lower height of 1.9cm (3/4"). These same plots were cut a second time later in the week.

Table 1- Treatment list for cultural dandelion control trial.

Factor A

Mowing Height

	Height of Cut
High mowing height	6.35cm (2.5")
Low mowing height	1..9cm (3/4")

Factor B (a split of Factor A)

Turf Aeration

	Aeration Specifications	
Soil cored and top dressed	1.6 cm (5/8") tines, 7.6 X 7.6cm (3"x3") spacing	Top dressing: USGA specification sand
Untreated (not cored)		

Factor C (a split of Factor B)

Fertilizer Treatments

	Product	*Analysis*	*Nitrogen Source*	*Rate(s)*
Corn gluten	Turf Maize Pro	10-0-0	Corn gluten meal	97g/100m^2
				194g/100m^2
Soybean meal	Unifeed Soybean meal	7.5-0-0	Dehulled soybean meal	100g/100m^2
				200g/100m^2
Controlled release synthetic	Scotts Contec 8311	21-3-11	Methylene urea	83g/100m^2
				166g/100m^2
Untreated control	No fertilizer			

Plots were evaluated three times per season beginning on August 31,2005. In order to determine weed populations, the dandelions were physically counted in each of the plots. In addition the plots were visually evaluated for overall turf quality. Following National Turfgrass Evaluation Program (NTEP) protocols, three turf factors: colour, density and area coverage were assessed.

The colour of the turf was subjectively rated using a 1 to 9 scale. Treatments which stimulated a uniform dark green colour received scores ranging from 6 for an acceptable colour to 9 for turf with outstanding colour. Plots that produced a lighter turf colour were scored lower.

Density, the second quality factor, was subjectively evaluated for the impact of the treatments on the turf to produce more shoots and tillers. The 1 to 9 scale was again used to rate each plot.

Treatments which showed a tightly knit turf received scores ranging from 6 for an acceptable density to 9 for superior turf. Treatments associated with a weak or thin turf stand were scored lower.

The final quality factor, area cover, subjectively evaluated the vigor of turf. Once again a 1 to 9 scale was used to rate each plot. Treatments which stimulated a thick competitive turf cover received scores ranging from 6 for an acceptable area cover to 9 for a superior area cover. Treatments producing a weak turf, affected by weed encroachment and/or the presence of bare patches, were scored lower.

Results

Control of Dandelions

One week after the initial herbicide application, the dandelions showed classic signs of phenoxy herbicide damage through out the trial site, as the top growth was twisted and beginning to turn brown (data not shown). However, when the plots were rated on August 31, it was obvious that there was little or no control of the dandelions as population numbers were still very high (Table 1).

In a related study Killex 500 was applied at the rate of 32 ml/100m^2, which also showed ineffective control. Only when a second application of Killex 500 was applied one week after the first application was there effective control. This would indicate that a single application of either Trillion or Killex at the rates applied was insufficient to give good control of dandelion in turf.

Mowing Height

An analysis of the data indicates that there was no statistical difference in the dandelion population when the two mowing heights were compared in either year of the study (Tables 2 and 3). Even though the turf mowed at the higher height scored better than the turf mowed at the lower height for colour, density and area cover, it was not statistically better (Table 2).

Turf Aeration

At the ninety percent confidence level the turf which was cored and top dressed had a significantly higher dandelion population than the non-aerated turf in year one (Table 2). The turf was not aerated or topdressed in year two and there were no significant differences as a result of the treatments in year one (Table 3). The turf colour and turf density of the non-aerated turf was significantly better than that of the aerated turf in year one. There was no difference in area cover between the treatments as their scores were not significantly different (Table 2). There were no differences in year two.

Fertilizer

The high rate of the controlled release synthetic fertilizer had significantly fewer dandelions than the other fertilizer treatments (Table 2 and 3). The summer rating in year two showed that the low rate of controlled release synthetic also had significantly lower dandelion counts. The turf colour stimulated by the high rates of the corn gluten and the controlled release synthetic was significantly better than the turf colour of the unfertilized treatment and the lower rates of either the soybean meal or the controlled release synthetic fertilizer (Tables 2 and 3).

Table 2- Dandelion counts and turf quality ratings, August 31, 2005.

		Dandelions per sq.metre	Turf Colour	Turf Density	Turf Area Cover
			1-9 scale		
Mowing Height					
High height 6.25cm (2 1/2")		25a	6.1a	5.2a	5.6a
Low height 1.88cm (3/4")		26a	5.4a	4.8a	5.5a
Turf Aeration					
Soil cored and top dressed		29b	5.6b	4.9b	5.5a
Untreated not cored		22a	5.9a	5.1a	5.6a
Fertilizer					
No fertilizer		27b	5.4d	4.7d	5.4a
Corn gluten	97g/100m^2	26b	5.8bc	4.9c	5.6a
Corn gluten	197g/100m^2	26b	5.9ab	5.1ab	5.6a
Soybean meal	100g/100m^2	26b	5.6cd	4.9c	5.5a
Soybean meal	200g/100m^2	27b	5.8bc	5.1ab	5.5a
Controlled release synthetic	83g/100m^2	26b	5.6cd	5.0bc	5.6a
Controlled release synthetic	166g/100m^2	22a	6.1a	5.2a	5.6a
	$LSD_{0.10}$ =	*3*	*0.2*	*0.1*	*n/s*

* Values that have the same letter as a suffix are not significant from each other.

Table 3- Dandelion counts and turf quality ratings, 2006.

		Seasonal Turf Quality	Dandelion counts Spring	Summer	Fall
		1-9 scale	Plants per m^2		
Mowing Height					
High height 6.25cm (2 1/2")		5.3a	24a	24a	25a
Low height 1.88cm (3/4")		5.3a	22a	26a	24a
Turf Aeration					
Soil cored and top dressed		5.3a	20a	23a	22a
Untreated not cored		5.3a	26a	27a	27a
Fertilizer					
No fertilizer		5.3c	26c	27d	27b
Corn gluten	97g/100m^2	5.3c	26c	28d	27b
Corn gluten	194g/100m^2	5.3c	23bc	23bc	24b
Soybean meal	100g/100m^2	5.3c	25bc	26cd	27b
Soybean meal	200g/100m^2	5.3c	23bc	26cd	24b
Controlled release synthetic	83g/100m^2	5.4b	22b	22b	23b
Controlled release synthetic	166g/100m^2	5.5a	16a	18a	18a
	$LSD_{0.05}$ =	0.02	3	3	4

* Values that have the same letter as a suffix are not significant from each other.

Discussion

Results of this study would indicate that a study to look at rate and timing of herbicide applications would be warranted. Over the years a number of herbicide studies have been conducted which have had inconsistent control. Three factors might be looked at in such a study: rate of application, timing of successive applications, and timing of seasonal applications.