

# **Effects of Long Term Use of Corn Gluten and Soybean Meal on Dandelion in Turf**

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## **Summary**

Evaluation of corn gluten meal and soybean meal was evaluated for the long term control of weeds in turf at four locations across Western Canada. Three sites (Kelowna, Penticton and Regina) did not receive an initial herbicide application, while the fourth site (Calgary) had weeds eradicated prior to the initiation of the study with two applications of the herbicide, Killex. The sites were evaluated for the effect of the products on weed control and turf quality. Applications occurred twice a year over five years at all four locations. Kelowna, Penticton and Regina received applications of corn gluten and soybean meal, whereas the Calgary site received corn gluten only.

After five years of application the high and the mid-rate of both the corn gluten and soybean meal had significantly lower dandelion counts than the untreated control. There were no significant differences between the soybean and the corn gluten meal at similar rates of application. There was no difference between the low rate and the untreated control. When considering percent reduction, the soybean meal reduced the dandelion populations the most. However, when considering that there were ten applications over the years, it is an expensive control option. There were no differences in turf quality between the treatments and the untreated control.

In the Calgary study where an initial application of herbicide was applied only the high rate of application of corn gluten meal had significantly less dandelions than the untreated control. However, there was some reduction with both the low and mid-rate of application. Generally, as rates increased the level of control improved. The turf quality ratings were not considered to be significantly different from the untreated control.

## **Introduction**

Previous studies showed that control of dandelion was possible with applications of corn gluten and soybean meal when applied at high rates of application. However, the best results were achieved when an initial application of herbicide was used to remove dandelion prior to the application of the agricultural by-products.

Dandelions are reported to be a long lived perennial. Pre-emergent control products, such as corn gluten and soybean meal, would only be expected to have a gradual effect on the dandelion population as mature weeds complete their life cycle and die. This study was the continuation of a previous study to determine the long term effects of a pre-emergent control strategy with corn gluten and soybean meal.

## **Methodology**

Evaluation of corn gluten meal and dehulled soybean meal were evaluated for the long term control of weeds in turf at four locations across Western Canada. Three trials, located at Lions Park in Kelowna, Cenotaph Park in Penticton and Kings Road Park in Regina were established in 2002. None of the sites received an initial application of herbicide to eradicate weeds prior to application of the treatments, so this trial evaluated the effect of pre-emergent applications of corn gluten and soybean meal on the long term decline in dandelion populations.

The fourth trial, located at Spring Hill Park in Calgary was established in 2002 to evaluate corn gluten following an initial application of herbicide. Two applications of the herbicide, Killex, was applied one week apart to ensure complete eradication of the weeds.

Individual test plots measured 1 by 3 metres and were replicated four times within a randomized complete block design (Table1). Treatments were applied in May and September and each site was rated three times over the course of the season. The number of dandelions present within each plot as well as overall turf quality was recorded on each of the rating dates.

The plots were evaluated three times per year (spring, summer and fall) for three quality factors, colour density and area cover. These ratings were based on the National Turfgrass Evaluation Program (NTEP) protocols where numeric values are assigned to individual plots where 9 is best and 1 is poorest, and 6 is considered acceptable. Colour was evaluated by 1 is a brown dormant turf and 9 is a very uniform dark green colour. Turf density, a measure of the number of shoots per unit area, was rated based on 1 is a thin, weak turf stand and 9 is a very dense tight-knit stand. The third factor rated was area cover and values ranged from a 1 for a complete absence of turf to a 9 for complete cover with the desired turf. The presence of weeds or voids in the turf reduced this rating. To compare the effect of the treatments on the overall turf quality, the three factors were combined and scores for each plot were determined and statistically analyzed.

Table 1 - Treatment schedule and rate of application.

Treatments	Product		Applied	Rate(s)
Corn gluten meal	Turf Maize Pro	Low rate	Spring	63g/m <sup>2</sup>
			Fall	63g/m <sup>2</sup>
			Spring & Fall	63g/m <sup>2</sup>
		Mid rate	Spring	649g/m <sup>2</sup>
			Fall	649g/m <sup>2</sup>
			Spring & Fall	649g/m <sup>2</sup>
		High rate	Spring	973g/m <sup>2</sup>
			Fall	973g/m <sup>2</sup>
			Spring & Fall	973g/m <sup>2</sup>
Dehulled soybean meal	Unifeed Soybean meal	Low rate	Spring	67g/m <sup>2</sup>
			Fall	67g/m <sup>2</sup>
			Spring & Fall	67g/m <sup>2</sup>
		Mid rate	Spring	665g/m <sup>2</sup>
			Fall	665g/m <sup>2</sup>
			Spring & Fall	665g/m <sup>2</sup>
		High rate	Spring	1000g/m <sup>2</sup>
			Fall	1000g/m <sup>2</sup>
			Spring & Fall	1000g/m <sup>2</sup>
Untreated control				

## Results

Applications occurred twice a year over five years at three locations in western Canada, Kelowna, Penticton and Regina. After five years of application the high and the mid-rate of both the corn gluten and soybean meal had significantly lower dandelion counts than the untreated control (Table 2). There were no significant differences between the soybean and the corn gluten meal at similar rates of application. There was no difference between the low rate and the untreated control.

When considering percent reduction, the soybean meal reduced the dandelion populations the most. However, when considering that there were ten applications over the years, it is an expensive control option. There were no differences in turf quality between the treatments and the untreated control.

Table 2 – Effect of agricultural by-product on dandelion without herbicide pre-treatment, 2006.

Treatments	Product Rate	Application Timing	Turf Quality 1-9 scale	Dandelion Yearly Mean Plants per m <sup>2</sup>	Percent Reduction of Dandelion
Corn gluten meal	63g/m <sup>2</sup>	Spring & Fall	5.8a	18b	5%
Corn gluten meal	649g/m <sup>2</sup>	Spring & Fall	6.0a	10a	47%
Corn gluten meal	973g/m <sup>2</sup>	Spring & Fall	6.0a	8a	58%
Untreated control			5.8a	19b	
		<i>LSD</i> <sub>0.05</sub> =	<i>n/s</i>	6	
Dehulled soybean meal	67g/m <sup>2</sup>	Spring & Fall	5.9a	21b	0%
Dehulled soybean meal	665g/m <sup>2</sup>	Spring & Fall	5.9a	8a	58%
Dehulled soybean meal	1000g/m <sup>2</sup>	Spring & Fall	6.0a	6a	68%
Untreated control			5.8a	19b	
		<i>LSD</i> <sub>0.05</sub> =	<i>n/s</i>	4	

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

In the Calgary study where an initial application of herbicide was applied only the high rate of application of corn gluten meal had significantly less dandelions than the untreated control (Table 3). However, there was some reduction with both the low and mid-rate of application. Generally, as rates increased the level of control improved. The turf quality ratings were not considered to be significantly different from the untreated control.

Table 3 - Effect of corn gluten on dandelion with an herbicide pre-treatment, Calgary 2006.

Treatments	Product Rate	Application Timing	Turf Quality 1-9 scale	Dandelion Yearly Mean Plants per m <sup>2</sup>	Percent Reduction of Dandelion
Corn gluten meal	63g/m <sup>2</sup>	Spring	4.9a	9bcd	31%
Corn gluten meal	63g/m <sup>2</sup>	Fall	4.9a	13d	0%
Corn gluten meal	63g/m <sup>2</sup>	Spring & Fall	4.9a	10cd	23%
Corn gluten meal	649g/m <sup>2</sup>	Spring	5.2a	7abcd	46%
Corn gluten meal	649g/m <sup>2</sup>	Fall	5.2a	8bcd	38%
Corn gluten meal	649g/m <sup>2</sup>	Spring & Fall	5.1a	6abc	54%
Corn gluten meal	973g/m <sup>2</sup>	Spring	4.9a	3ab	77%
Corn gluten meal	973g/m <sup>2</sup>	Fall	5.3a	7abcd	46%
Corn gluten meal	973g/m <sup>2</sup>	Spring & Fall	4.5a	1a	92%
Untreated control			4.6a	13d	
			<i>LSD</i> <sub>010</sub> = n/s	6	

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

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