

Dandelion Germination Trial

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Summary

This objective of this trial was to observe and record the timing of dandelion germination in a creeping red fescue/Kentucky bluegrass turf and also to determine the best method for counting dandelions. This study was conducted in Olds, AB within the black soil zone. In year one, two treatments were evaluated to determine the best method for counting dandelions. In order to facilitate the weekly counting process, four 0.25m² plots were sprayed with Roundup® (Glyphosphate). This was compared with unsprayed plots that had existing dandelions completely removed. Initial counts of mature dandelion were taken prior to the Roundup application. Following spraying, weekly dandelion counts were taken between June and October 2005. Moisture and temperature data was taken from the Olds College weather station reports. Significantly more dandelions germinated in the untreated plots than the Roundup treated plots and the spraying did not assist in the counting process. Total dandelion emergence for the whole year was 415 dandelions per m² for the untreated plots and 158 dandelions per m² for the Roundup treated plots. Trial results indicate that 65% of dandelion emergence occurred between July 7 and August 3 in the non-herbicide plots and 81% in the Roundup applied plots. Moisture was not limiting during the trial.

In year two, two treatments were again assessed. Initial weed counts were conducted on May 23 in one treatment but did not begin until spring seed dispersal was complete in the second treatment. The thought was that there may not be sufficient seed from spring seed dispersal in those plots that were started early. Total dandelion emergence was 429 plants for the early initiated treatment and 331 for the later initiated treatment. There was no need to wait for complete seed dispersal before initiating the study. In the eight week period from May 23 to July 11, 92% of the seed had germinated in the early initiated treatment versus 80% germination over the six week period for the later initiated treatment.

The majority of dandelion germination occurred in early summer and mid-summer in year one of the study and in spring and early summer in year two of the study.

Introduction

Dandelions are a common, widespread problem in turfgrass throughout Alberta. This non-native, perennial weed will propagate through air borne seed dispersal, dormant seed germination from the seed bank, and regeneration from root stock if cropped above the crown region. Dandelions can compete with turfgrass, perennial forages, and other plant species for vital nutrients and space. The objective of this study was to determine timing of dandelion germination with respect to their temperature and moisture requirements and to establish a methodology for effective enumeration of dandelions. Understanding dandelion biology with respect to germination will aid in the effective use of pre-emergent herbicide applications.

Materials and Methods

Stage																				30		
Plot #																						
101		2	2	9	6	2	3	6	1	2		2								4*	4*	44
*102		2	1	3		3		2														11
201		6	2	3	1	3		7	1	1	1	3	2	1				1			1*	33
*202		3	1	1	1	3		2	1													12
*301	1	2		1		2		2		1												9
302		1	4	3		4		7		2		1		1								23
*401	1					2	3	2	2	1		1										12
402			1		1	2	1	6	2	3				1								17

*Single dandelions appeared to have multiple crowns

**Bold text indicates Roundup applied plots

In year one, analysis of the data showed that there was a significant difference for germination counts between the Roundup treated and the untreated plots (Figure 1). Total germination over the entire rating period was 415 dandelions per m² for the untreated area while 158 dandelions per m² germinated in the Roundup treated area. This difference may have been due to moisture retention within the untreated plots due to the vegetative cover which provided better conditions for germination or recalcitrant compounds left from the Roundup may have been toxic to the seedlings.

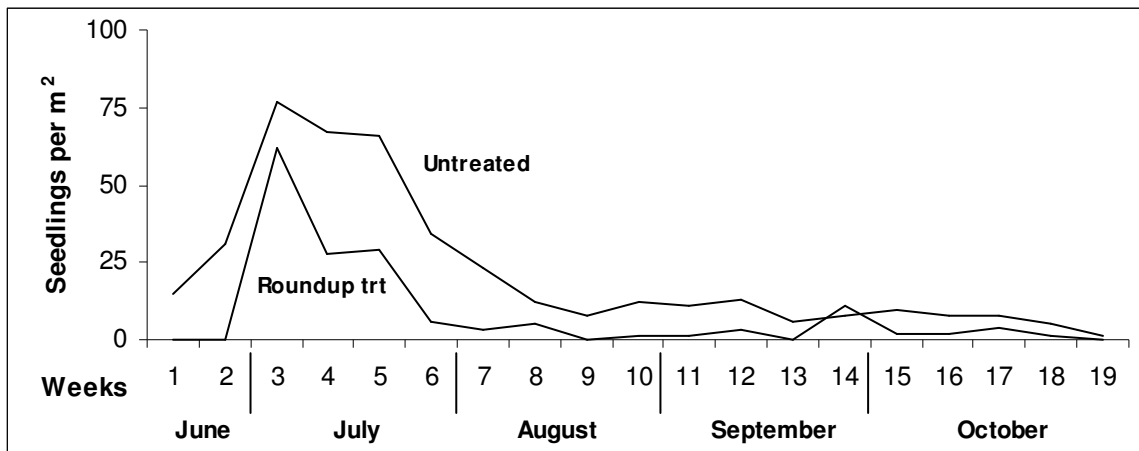


Figure 1.0 – Year one dandelion germination counts June – Oct 2005

Results indicated that a large percentage of germination occurred over a five week period between July 7 and August 3. In the Roundup treated area 81% of dandelion emerged in this period while 65% emergence occurred within untreated plots (Figure 1.0).

Moisture and temperature data showed a significant impact on initial germination. Prior to the initiation of the study, conditions had been very dry with much below soil moisture conditions. Heavy rainfall events on June 7 and on June 18 increased soil moisture levels allowing for a greater seedling moisture absorption rate. Through the peak germination period, increased temperatures proved to be a factor as well (Figure 2.0). A direct correlation between germination and rainfall occurred as germination increased after each

rainfall (Figure 1.0 & 2.0). At the end of the growing season germination dramatically declined as temperatures dropped.

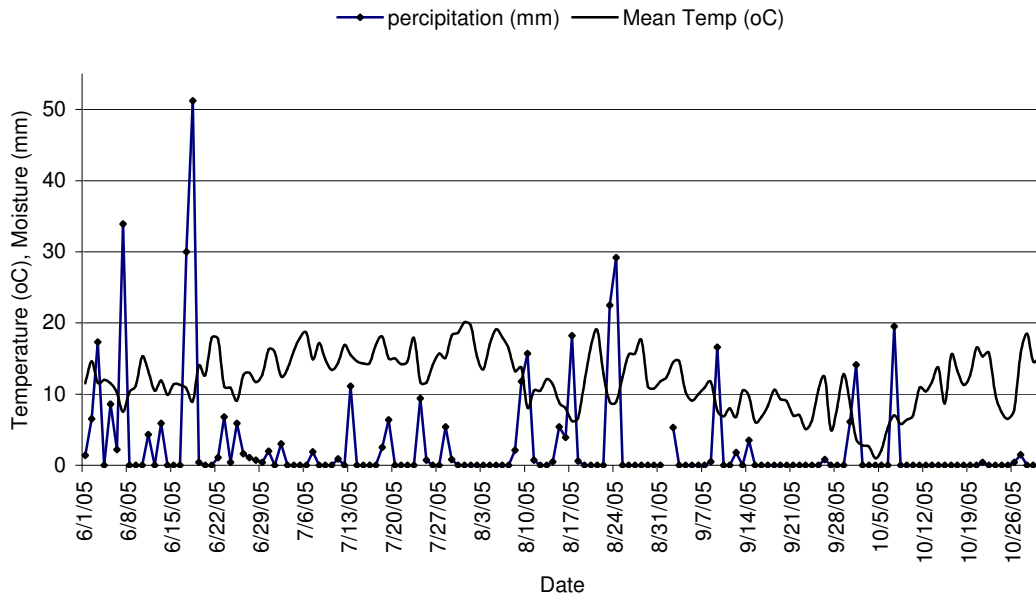


Figure 2.0 – Moisture and temperature data Olds, AB June – October, 2005

In year two (2006), germination occurred earlier than the previous year which was no doubt related to moisture and temperature. Daily maximum temperatures recorded between 14 May and 23 May ranged from 19.0 to 30.8°C. Precipitation recorded between 20 May and 30 May was 64.9mm. As significant germination was evident on 23 May, soil moisture was obviously not limiting prior to this date.

For the initial treatment, 92% of the dandelions germinated between 23 May and 11 July. For the delayed treatment 80% of the germination occurred between 6 June and 11 July.

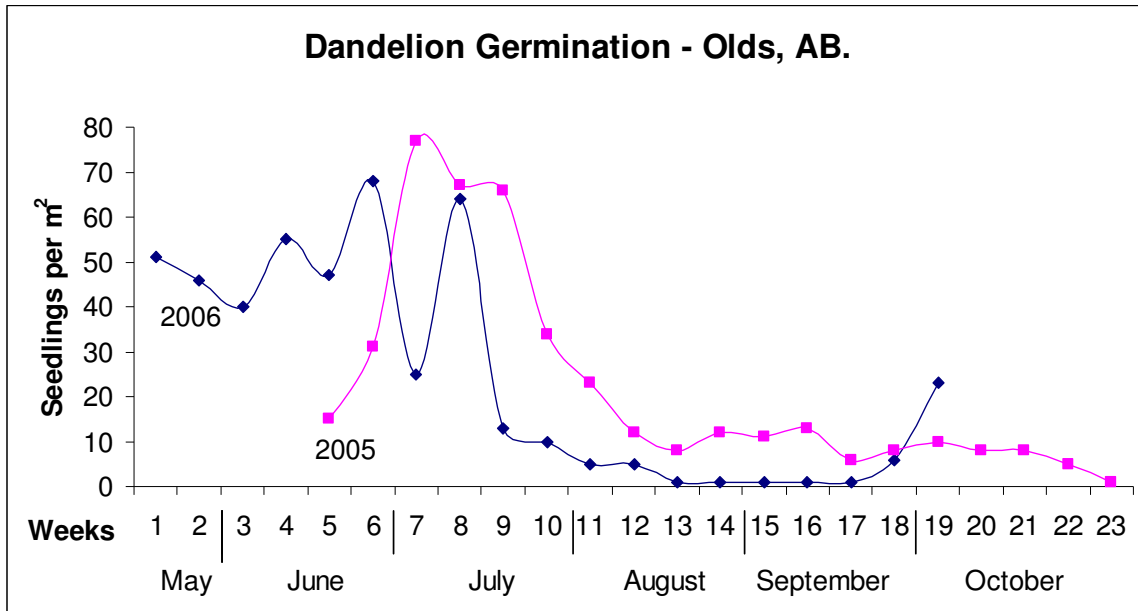


Figure 3.0 – Dandelion germination counts for two years, 2005 and 2006. Week one corresponds to 23 May.

Data from Figure 3.0 shows that minimal germination occurs after August 1 and that if moisture and temperature is not limiting, the majority of germination will occur soon after spring seed dispersal. From our observations the peak of spring seed dispersal in Olds typically occurs from mid until the end of May. It would also appear that germination occurs soon after seed dispersal which would indicate that a dormancy period does not occur. Our findings show a decline in germination after the initial surge, which could be the result of seed bank depletion after spring seed dispersal.

Clover and dandelion removal may have influenced the germination process. By reducing competition through the extraction of mature weeds and seedlings, this may have made resources more available for growth (sunlight, nutrients, moisture).

Recommendations for future emergence trials are that initial counts should start when moisture and temperature conditions create ideal conditions for germination, possibly as early as mid May. In addition, dates of dandelion seed dispersal should be noted. It does not appear necessary to make an initial application of Roundup to facilitate the counting process. Close clipping of the turf is all that is necessary.