

# **Examination of Repetitive Overseeding And Four Herbicide Regimes To Improve Low-Input Turfgrass Areas In Autumn**

## **A Report To The New York State Turfgrass Association**

Principle Investigator: David Chinery, Senior Resource Educator, Cornell Cooperative Extension of Rensselaer County, 61 State Street, Troy, NY 12180, (518) 272-4210, [dhc3@cornell.edu](mailto:dhc3@cornell.edu)

Cooperator: Dr. Frank Rossi, State Turfgrass Extension Specialist, 20 Plant Science, Cornell University, Ithaca, NY 14853, [fsr3@cornell.edu](mailto:fsr3@cornell.edu)

Introduction: Turfgrass managers are constantly faced with the need to improve the turfgrass density and quality in sports fields, golf courses, and commercial and home lawns. Due to increased environmental concerns (real and perceived) and stricter laws regarding the use of pesticides, the options for maintaining and improving turf density and quality are diminishing. Concurrently, the call for “organic” lawn care continues to increase. Many turfgrass managers are searching for organic ways to suppress weeds, and currently extremely few possibilities exist.

Dr. Frank Rossi has recently demonstrated that heavy overseeding with perennial ryegrass (*Lolium perenne*) in fall can dramatically increase turfgrass density on sports fields (*Proceedings of the Cornell Turfgrass Field Day, 2003*). Research conducted by Cornell Cooperative Extension of Rensselaer County on two Capital District sports fields, funded by the New York State Turfgrass Association (NYSTA), has also shown this to be a very effective method (“*Heavy Repetitive Fall Overseeding To Improve Low-Input Sports Fields: A Report To The New York State Turfgrass Association,*” November 2003).

While repetitive overseeding has been demonstrated on sports fields, it has not been explored for use in fall home lawn renovation. Traditional “partial renovation” techniques for home lawns include the use of a selective herbicide to reduce broadleaf weeds, followed by core cultivation, and a single overseeding. These methods are time consuming, expensive, and sometimes beyond the means of turfgrass professionals and homeowners managing low-input areas. The results of one-time overseeding are often variable, according to anecdotal information from turfgrass professionals. This project examined the effectiveness of heavy, repetitive overseeding to improve turfgrass density when initiated in autumn on a home lawn site using various combinations of seed application timing, herbicide, and seed rate.

## Objective:

To determine any increase in turfgrass density achieved by overseeding with perennial ryegrass at four rate/timing schedules and with four herbicide regimes in autumn on a home lawn site.

Procedures: The study site was a residential lawn in Castleton, NY, containing a perennial ryegrass/Kentucky bluegrass/fine fescue turf with a large population of broadleaf plantain and ground ivy. The plots received no fertilizer or irrigation during the study. Each plots measured 9 square feet (3' x 3'), and each treatment had three replicates. Untreated check plots were also included.

Four herbicides were selected for this study. Each herbicide represented a different approach to renovating a weedy home lawn.

- A selective herbicide (containing 2,4-D, mecoprop, and dicamba\*) was chosen to represent the traditional partial renovation scenario.
- The broad spectrum herbicide glyphosate (RoundUp\*\*) was used to kill all weeds and turfgrass entirely, then the overseeding was done to re-establish the turfgrass.
- Two rates of acetic acid herbicide were used to study the effectiveness of a “reduced-risk” herbicide. In previous studies, acetic acid was noted to be an effective broad spectrum herbicide initially, but Kentucky bluegrass re-grew in some conditions (*Using Acetic Acid (Vinegar) As A Broad-Spectrum Herbicide*, fact sheet produced by Cornell Cooperative Extension of Rensselaer County, 2002). Acetic acid was used in this study at the 5% (low) and 20% (high) rates. While products containing acetic acid at the 5% and 20% concentrations are available commercially, laboratory-grade acetic acid was used in this study.

Four seed rates and timing schedules were used, as described in Table 1. The “6-Once” treatment represented traditional partial renovation techniques, where seed would be applied to the site one time. Three other treatments used repetitive overseeding, with the timing and rates based on previous studies. ‘Pizzazz’ perennial ryegrass was used in this study.\*\*\* A highly accurate Gandy drop spreader was used to apply the perennial ryegrass seed according to the treatment schedule listed in Table 1. All herbicides were applied on August 5, 2004. Overseeding started on August 26, 2004. The treatments found in Table 1 were made to plots treated with one of the four herbicides listed above, for a total of sixteen different treatments.

Table 1: Seeding rate, timing, total number of applications and total pounds of seed applied for four treatments

Treatment Name	Seeding rate (lbs./M)	Timing	Total number of applications	Total lbs. of seed/M
6-Once	6	One application on August 26	1	6
6-Alternate	6	Alternate weeks	3	18
2-Alternate	2	Alternate weeks	3	6
2-Sequential	2	Sequential (3 weeks in a row)	3	6

A four foot by four foot “weed square” was used to estimate turfgrass and weed populations, and the proportional area bare of vegetation, at the conclusion of the study.

Results: Untreated check plots had an average of 16.7% turfgrass, with the remainder weeds, throughout the study. Other plots used in the study initially had between 10 to 30% turfgrass, with the remainder weeds.

The low rate of acetic acid plots showed the smallest increase in turfgrass during the study. Increase in turfgrass ranged from 57.0% for the 2-Sequential plots to 64.3% for the 2-Alternate plots. Average final turfgrass ranged from 80.3% for the 2-Sequential plots to 87.3% for the 6-Once plots. Weeds in these plots were not killed outright by the low concentration of acetic acid, and were able to re-grow and competed successfully with the new turfgrass seedlings. There was no bare ground visible in these plots, as all space was occupied by either weeds or turfgrass. Data is presented in Table 2.

Table 2: Average initial turfgrass, average final turfgrass, and average increase in turfgrass for plots treated with acetic acid herbicide at the low rate

Treatment Name	Average initial turfgrass (%)	Average final turfgrass (%)	Average increase in turfgrass (%)
6-Once	26.7	87.3	60.7
6-Alternate	20.0	82.0	62.0
2-Alternate	20.0	84.3	64.3
2-Sequential	23.3	80.3	57.0

Data for the high rate of acetic acid treatments is presented in Table 3. Average increase in turfgrass ranged from 65.7% for the 6-Once plots to 71.3% for the 2-Alternate plots. Average final turfgrass ranged from 85.0% in the 2-Sequential plots to 91.3% in the 2-Alternate plots. The acetic acid used at the high rate in these treatments reduced the weed population more effectively than the low rate, allowing more seedling turfgrass to germinate and develop. As with the low rate acetic acid treatments, there was no bare ground visible in these plots, as all space was occupied by either turfgrass or weeds.

Table 3: Average initial turfgrass, average final turfgrass, and average increase in turfgrass for plots treated with acetic acid high herbicide at the high rate

Treatment Name	Average initial turfgrass (%)	Average final turfgrass (%)	Average increase in turfgrass (%)
6-Once	21.7	87.3	65.7
6-Alternate	16.7	87.5	70.8
2-Alternate	20.0	91.3	71.3
2-Sequential	18.3	85.0	66.7

The data for the plots treated with glyphosate is presented in Table 4. While the average initial turfgrass data is presented, all of the vegetation in these plots (weeds and turfgrass) was killed with the herbicide. Essentially, all of the turfgrass measured in the plots at the end of the study was comprised of new seedlings. Because of this, measuring the average increase in turfgrass for these treatments would have been meaningless. Average final turfgrass ranged from 90.0% in the 2- Sequential plots to 96.0% for the 6-Alternate plots. There were very few weeds in these plots, with some of the space not filled in with new seedlings remaining bare.

Table 4: Average initial turfgrass, average final turfgrass, and average increase in turfgrass for plots treated with glyphosate (Roundup) herbicide

Treatment Name	Average initial turfgrass (%)	Average final turfgrass (%)
6-Once	25.0	91.7
6-Alternate	21.7	96.0
2-Alternate	21.7	93.3
2-Sequential	20.0	90.0

The 2,4-D treatments had the highest average increase in turfgrass and the highest final turfgrass measurements in the study. Average increase in turfgrass ranged from 73.0% for the 6-Once treatments to 84.7% for the 2-Alternate treatments. All treatments had more than 98.0% turfgrass at the end of the study. Virtually no weeds or bare ground was present in these plots at the end of the study. Data for these plots is presented in Table 5.

Table 5: Average initial turfgrass, average final turfgrass, and average increase in turfgrass for plots treated with 2,4-D herbicide

Treatment Name	Average initial turfgrass (%)	Average final turfgrass (%)	Average increase in turfgrass (%)
6-Once	26.7	99.7	73.0
6-Alternate	25.0	100.0	75.0
2-Alternate	15.0	99.7	84.7
2-Sequential	20.0	98.3	78.3

Conclusions: The four herbicide treatments representing various lawn renovation programs provided a variety of results. The low rate of acetic acid combined with

overseeding resulted in a significantly better quality lawn than the untreated plots, with 57.0 to 64.3% more turfgrass. However, these plots still contained 13 to 20% weeds. The high rate of acetic acid performed better, increasing turfgrass by 65 to 71%, and resulting in a lawn with 9 to 15% weeds. These alternatives may prove attractive to a homeowner who does not want to use traditional herbicides, but who would be willing to use a “reduced risk” herbicide and would be interested in having a less weedy, but not weed-free, lawn.

The glyphosate treatments resulted in an entirely new stand of seedling turfgrass. While final turfgrass density was high for all seeding regimes (90.0% or greater), biodiversity was lost, since the former lawn of three turfgrass species was replaced with a lawn entirely of perennial ryegrass.

The plots treated with 2,4-D provided the greatest average increase in turfgrass density and greatest average final turfgrass density. This is not surprising, since 2,4-D allowed the existing turfgrass to remain while managing the broadleaf weeds very effectively. The overall appearance of these plots at the end of the study would be acceptable to a homeowner desiring a very high quality lawn.

There were some small differences among the seeding rates and timing schedules. For both of the acetic acid herbicides and the 2,4-D herbicide, 2-Alternate seeding outperformed all other regimes. For the glyphosate treatments, 2-Alternate seeding was second in performance only to 6-Alternate, which used three times more seed. 6-Once represented what many consider the standard approach to overseeding turfgrass. The 6-Once plots were the least successful with 2 of the 4 herbicide treatments, and came in a close second to last in the remaining two treatments. While the differences are small, and the data pool is limited, there is some indication that stretching the application dates of seeding over several weeks increases the eventual density of a turfgrass stand.

Additionally, timing of seed application seems more critical than total amount of seed used. The 6-Alternate plots (with a total of 18 lbs./M applied) produced turfgrass of the greatest density only in the glyphosate treatments. Under these conditions, a total of 6 lbs./M of seed applied was adequate to provide good results. Applying more seed would be wasteful and not cost effective.

Core cultivation, which is recommended as part of standard partial renovation practice, was not used in this study, and good results were achieved. It appears that repetitive overseeding without core cultivation is a method worthy of more research.

\* “Green Thumb Lawn Weed Killer” containing 7.59% 2,4-D dimethylamine salt, 3.66% mecoprop dimethylamine salt, and 0.84% dicamba dimethylamine salt

\*\* “Roundup Weed and Grass Killer” concentrate containing 50.2% glyphosate

\*\*\* 'Pizzazz' perennial ryegrass seed supplied courtesy of Preferred Seed Company, Inc.,  
575 Kennedy Road, Buffalo, NY

Photos of treatments at the end of the study

## Untreated check plot



Vinegar Low, 2 lbs.,  
Alternate Weeks



Vinegar High, 2 lbs.,  
Alternate Weeks



Roundup, 2 lbs.,  
Alternate Weeks



2,4-D, 2 lbs.,  
Alternate Weeks

