

Statewide Demonstration of Heavy Repetitive Overseeding To Improve Low-Input Sports Fields

A Report To The New York State Turfgrass Association

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Project Overview and Justification: Heavy repetitive overseeding has been demonstrated to greatly improve low-input, heavily trafficked sports fields. Dr. Frank Rossi has shown 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 in 2003, funded by the New York State Turfgrass Association (NYSTA), also demonstrated this to be a very effective method. The Rensselaer County report submitted to NYSTA became the basis for numerous newsletter articles, including one in "Turf North" magazine (February 2004), and for talks at the Ontario Turfgrass Conference (January 2004), the NYS Association for Superintendents of School Buildings and Grounds Conference (September 2004) and the NYSTA Annual Conference (November 2004).

While a good deal of publicity was received, the Extension educators named above decided to do more to convince turfgrass managers to adapt this practice, and to examine overseeding under their local conditions.

Methods: Extension educators in four regions of the state (lower Hudson Valley, Southern Tier, western New York and the Adirondacks) agreed to participate in this project. Each educator identified a low-input school sports field in his/her region and established overseeding plots on the field from August to October, 2005.

Plots were located on areas of the field where maximum traffic would develop during the fall sports season. Use of the field by athletes and community groups continued as normal. Each research plot measured 100 square feet. Treated plots were overseeded at rates of one, three and six pounds per thousand. Untreated check plots were also established at each location. Untreated strips were maintained between treated plots to minimize possible interference between plots. A Gandy drop spreader was used to apply the seed. Field managers were urged to follow their usual maintenance practices on each

field. For all the fields in this study, this included no irrigation, overseeding, or fertilizing during the research period. Educators used a four foot by four foot “weed square” to estimate turfgrass and weed populations, and the area bare of vegetation, at least three times during the study.

Results:

Results are summarized by each of the four locations:

Westchester County: The Fox Meadows Elementary School soccer field is a site with historically low populations of perennial lawn grasses and high populations of annual weeds in Scarsdale, NY. This location was identified as a suitable site for the study in the spring of 2005. No supplemental fertilizer or irrigation was applied to this field during the study. Treatments were made once per week from August 18 through October 5. Data for Westchester is summarized in Table 2 below.

Table 1: Average Percent Bare, Weed and Turfgrass Area (in %) For Four Treatments in Westchester County

Lb.seed/ 1,000 s.f.	Bare			Weeds			Turfgrass		
	Initial	Final	Change	Initial	Final	Change	Initial	Final	Change
1	1.3	29.3	28.0	76.3	57.5	-18.8	22.3	13.1	-9.2
3	0.8	21.6	20.8	69.8	59.0	-10.8	29.3	19.3	-10.0
6	4.0	26.5	22.5	70.3	56.6	-13.7	25.6	16.8	-8.8
0 (Check)	0.8	24.1	23.3	64.6	55.6	-9.0	34.5	20.1	-14.4

Percent bare area increased, weeds decreased, and turfgrass decreased for each of the treatments, including the check plots, where no seed was applied. Percent bare area increased dramatically by similar amounts (20.8 to 28.0%) in all treatments, and weeds decreased by similar amounts (9.0 to 18.8%) Turfgrass decreased by the least amount (8.8%) in the 6 lb./1,000 sq ft. plots, but this was not unusual to the decrease in the untreated check plots (14.4%). Despite all the seed applied, there was actually a decrease in turfgrass cover.

While disappointing, this was not an unexpected result. In Westchester, the growing season of 2005 experienced temperature levels much higher than normal. Growing Degree Day information checked on November 7 indicated 3213 accrued heat units for the growing season of 2005 (compared with 2004’s value of only 2900 GDD units). The 2005 GDD value was approximately 287 GDD units above normal. Additionally, while Westchester County had received a total of 38.25” of precipitation, 40% of this rainfall occurred in the month of October. With the exception of October, it was a very dry growing season, which also likely contributed to low perennial ryegrass germination rates.

Photo 1: Few visible signs of overseeding were seen in the Westchester plots



Monroe County: The football practice field at Brighton High School in Brighton, NY, is a highly compacted, overused field with a loam soil. Not only does the football team drill here, but gym classes and community football groups also use the site. There is no irrigation.

The average temperature for the period of the overseeding study was above normal. The rainfall was about average but it came in two major hurricane related rain events each dropping 3 inches of rain. Between these events the soil became dry and compacted. Conditions were not ideal for turfgrass germination and growth. Overseeding started on August 24 and continued through October 12 for a total of eight treatments. Data for Monroe is summarized in Table 3 below.

Table 2: Average Percent Bare, Weed and Turfgrass Area (in %) For Four Treatments in Monroe County

Lb.seed/ 1,000 s.f.	Bare			Weeds			Turfgrass		
	Initial	Final	Change	Initial	Final	Change	Initial	Final	Change
1	28.3	40.0	11.7	30.0	18.3	-11.7	41.6	41.6	0.0
3	31.6	36.6	5.0	26.6	15.0	-11.6	41.6	48.3	6.7
6	28.3	36.6	8.3	23.3	11.6	-11.7	48.3	51.6	3.3
0 (Check)	23.3	33.3	10.0	26.6	20.0	-6.6	50.0	45.6	-4.4

Percent bare area increased, weeds decreased, and turfgrass results were mixed during the study period. Bare area increased from 5.0 to 11.7%, while weeds decreased by 6.6 to 11.7%. There was a 4.4% decrease in turfgrass in the unseeded check plots. Turfgrass remained constant in the 1 lb./1,000 sq. ft. plots, while it increased slightly in the 3 and 6 lb. plots. Although the increases were very modest, enough perennial ryegrass seed germinated to maintain and slightly improve the turfgrass cover. The field was heavily used, and excessive wear as well as difficult weather conditions hampered germination.

Photo 2: Seed is visible in the plots located in the center of the Brighton High School Field in Monroe County



Photo 3: New seedlings are visible in this plot seeded at 6 lbs./1,000 sq. ft.



Clinton County: A soccer practice field at the State University of New York at Plattsburgh was chosen for this study. The site is not irrigated and has a loamy soil. Normally, the field receives a great deal of wear in the fall season. When this study began, there was a very large population of annual weeds, especially crabgrass, on the site. Treatments here were done from August 30 through October 12. Data is summarized below.

Table 3: Average Percent Bare, Weed and Turfgrass Area (in %) For Four Treatments in Clinton County

Lb.seed/ 1,000 s.f.	Bare			Weeds			Turfgrass		
	Initial	Final	Change	Initial	Final	Change	Initial	Final	Change
1	10.0	10.0	0.0	73.3	59.7	-13.6	16.6	30.3	13.7
3	8.3	6.6	-1.7	90.6	56.6	-34.0	1.0	36.6	35.6
6	4.3	3.3	-1.0	94.0	51.6	-42.4	1.6	45.0	43.4
0 (Check)	5.0	16.6	11.6	95.0	82.6	-12.4	0.0	0.7	0.7

The change in the percent bare area was mixed, the area of weeds declined, and the area of turfgrass increased at SUNY-Plattsburgh. In the untreated check plots, bare area increased by 11.6%, while no change was noted in the 1 lb./1,000 sq. ft. plots, and slight decreases for the 3 and 6 lb. treatments. The decline in percent weeds varied greatly, from 12.4% in the untreated plots to 42.4% in the 6 lbs./1,000 sq. ft. Turfgrass increased very slightly in the untreated plots (0.7%) while it increased significantly in the treated plots. The greatest gain was seen in the 6 lb./1,000 sq. ft. treatments, where turfgrass cover increased by an average of 43.4%.

On a very rainy day in October, twelve horticulture professionals, representing school districts, lawn care companies and landscape businesses, met at the site. The demonstration plots received a favorable reaction, and experiences of overseeding in various situations were discussed.

Photo 5. A large area of the SUNY-Plattsburgh soccer field was covered in annual weeds, primarily crabgrass, in August



Photo 6. Study site at SUNY-Plattsburgh in mid-October. From left to right are an untreated plot, and 1, 3, and 6 lbs./1,000 sq. ft. plots, with the 6 lbs. plot being the brightest green stripe



Chemung County: Overseeding at the site in Chemung County ran from August 26 to October 17. Data is summarized in the table below. The site is a village multi purpose sports field complex managed by the local school district. Plots were on a football field. The site receives no supplemental irrigation. The fields receive heavy use and display symptoms characteristic of overuse during the fall sports season. No fertilizer applications were made from July 1 through the fall.

Table 4: Average Percent Bare, Weed and Turfgrass Area (in %) For Four Treatments in Chemung County

Lb.seed/ 1,000 s.f.	Bare			Weeds			Turfgrass		
	Initial	Final	Change	Initial	Final	Change	Initial	Final	Change
1	11.5	4.6	-6.9	9.5	5.3	-4.2	79.0	90.0	11.0
3	14	3.3	-10.7	4.6	4.0	-0.6	81.3	92.7	11.4
6	19.8	2.6	-17.2	4.1	4.7	0.6	76.0	92.7	16.7
0 (Check)	12	2.0	-10.0	7.0	4.0	-3.0	81.0	94.0	13.0

Area bare of vegetation decreased, changes in area in weeds were mixed, and area in turfgrass increased. Bare area changes ranged from a 6.9% decrease in the 1 lbs./1,000 sq. ft. plots to a 17.2% decrease in the 6 lbs. plots. Weeds decreased by between 0.6% in the 3 lbs. plots to 4.2% in the 1 lb. plots, but actually increased by 0.6% in the 6 lbs. plots. Area in turfgrass increased by between 11.0% in the 1 lb. plots to 16.7% in the 6 lbs. plots. Turfgrass also increased in the check plots by 13.0%.

The Southern Tier received very little rain from early June through September. The exception was remnants of Katrina over Labor Day weekend. That rainfall did result in germination of some seeding done prior to that. The existing dormant ryegrass sod rejuvenated with fall rains, overshadowing seed applied in the demonstration. Empirical evidence of the demonstration on the field was not evident at any time.

Photo 7: The Chemung field before the weekly overseeding started



Conclusions: Perennial ryegrass seed has the ability to germinate in just a few days, on compacted soils, and under less than ideal conditions. Harsh conditions on the low input fields used in this study tested the limits of perennial ryegrass. Since none of these fields were irrigated during the study, only natural rainfall was available to supply the needs of the turfgrass and to germinate the new seed. Rainfall was below normal across the state, with some locations much drier than others, although October produced some periods of heavy precipitation. Dry conditions impacted all of the locations, especially Westchester, where very little seed germination was seen. This project clearly indicated that little or sporadic irrigation on a low input field will result in little seed germination, and meager increase in turfgrass density, even if a great deal of seed is supplied.

In previous studies, normal or above normal rainfall produced plots (at the 6 lb. rate) which were up to 100% covered in new perennial ryegrass seedlings in low traffic areas and 78% in high traffic areas on a low input field. The site with perhaps the most favorable weather, Clinton County, had the largest increases in turfgrass density, with a 43% increase in the 6 lbs/1,000 sq. ft. plots. Turfgrass managers working with low input fields may want to use current weather conditions and long-range forecasts to decide whether to start a heavy repetitive overseeding program. Since it is a flexible and easy method to implement, and turfgrass managers are used to having the weather impact their daily tasks, taking predictions into account should not negate the usefulness of repetitive overseeding.

The effects of heavy traffic were also seen in this study, especially on the plots in Monroe County. At that location, the area in turfgrass declined in unseeded plots, and stayed constant at the 1 lb./1,000 sq. ft. seed rate. Interestingly, the biggest gains were not in the 6 lb. plots, but in the 3 lb. plots (increases in turfgrass of 3.3 and 6.7%, respectively). Brian Eschenaur observed that at the midpoint of the study, more turfgrass was seen in the plots, but that numbers declined somewhat by the end of the study, due to the heavy wear that was seen on the field. High rates of seed cannot completely overcome other factors, such as a large volume of traffic, compacted soils, low soil fertility and little irrigation.

Heavy repetitive overseeding builds up the perennial ryegrass seed bank in the soil. In our Rensselaer County study, we observed that overseeded plots had at least 90% perennial ryegrass in them the August after the study, and that crabgrass and other annual weeds were greatly suppressed. The educators in this study will return to each field in 2006 and make further observations about the turfgrass density in the plots from 2005.