

# NYSTA Funded Projects

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# Improving Turfgrass Soil Test Recommendations

**S**oil testing can be one of the most useful ways to determine the amount of nutrient (phosphorus (P), potassium (K), calcium, and magnesium) and pH modification that is needed to produce healthy turfgrass. Soil testing may also be a best management practice used to reduce the risk of phosphorus runoff. Fertilizer recommendations based on soil testing are developed from years of turf performance and soil test calibration research. There is a lack of current soil test calibration studies with newer varieties and contemporary fertilization practices. The purpose of this project is to improve the Cornell University fertilizer recommendations by conducting soil test-turf response studies with newer varieties managed under various management practices.

## Locations of Project

Three sites, including the Cornell Turfgrass Research and Education Center in Ithaca and several locations around New York (Bethpage, Long Island, and Lake Placid in the Adirondacks) in cooperation with extension field staff and other cooperators.

## Methodology

Selected sites initially had low levels of P and K. Sites had different soil textures (sandy to silt loams) but the same turfgrass species or varieties. On each site, 3 levels (1/2 X, 1X and 2X the soil test recommendation) of P and K were used, coupled with 3 different nitrogen levels, an unfertilized control, and a high rate

of N, P, and K. Turf performance was evaluated by standard measurements of turf quality, density, yield, pest infestation when evident, and other special methods based on turf use. Soil nutrient levels and tissue levels were determined twice during the year. Turf performance vs. soil and tissue nutrient values were correlated to determine the optimum performance based on soil test levels.

The treatment list for the Ithaca site for 2002 is shown in Table 1. The site was seeded in the fall of 2001 with a mixture of 70% Kentucky bluegrass, 20% perennial ryegrass and 10% fine fescue, seeded at a rate of 4 lbs/1000 sq.ft. Urea was applied at 1 lb N/1000 sq. ft and lime at 40 lbs/1000 sq.ft. prior to seeding. Soil samples and clippings (at a height of 2.25", from an area of 52.5 sq.ft.) were collected on July 26 and October 25, 2002. Soils and clippings were analyzed at the Cornell ICP and Nutrient Analysis Laboratories. Visual quality (1-9 scale where 6 is acceptable) ratings were taken monthly from June through October in 2002 (see Table 2).

## Results

The first year of data collection gave us limited information. As seen in the figures on page 9, turf quality was not affected by the soil test level for either phosphorus (P) or potassium (K). Increasing the soil level of either P or K did not increase the percentage of P or K in the clippings. The clipping yields were higher as soil K levels increased for 200 lbs/a to 300 lbs/a. As clipping content (percentage) of P and K in-

**Table 1: Treatment list for Ithaca site, 2002**

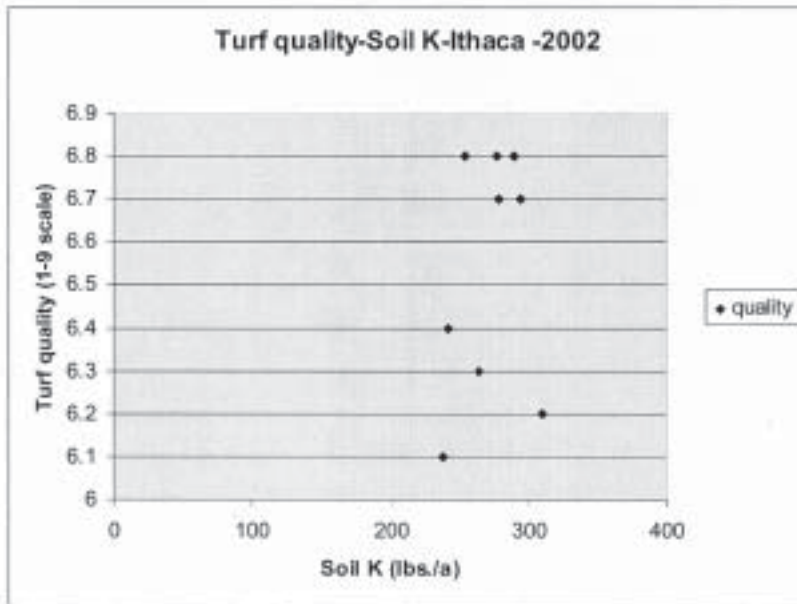
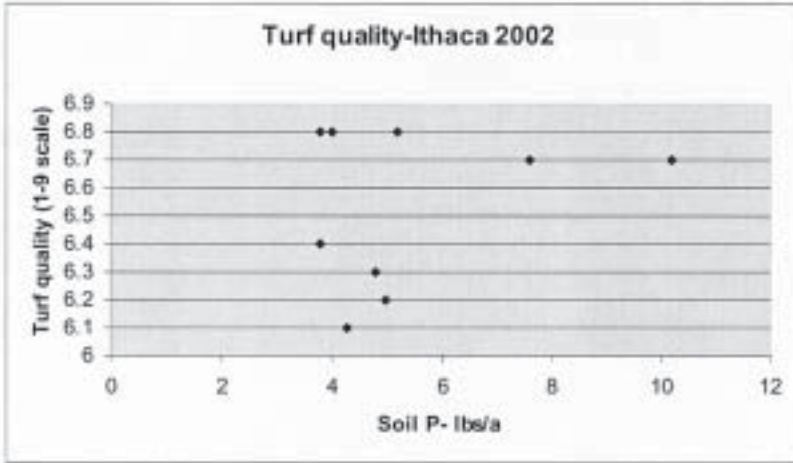
Treatments	Treatment made on, as lbs/1000 sq.ft			
	28 Jun	26 Jul	22 Aug	1 Oct
1. Check				
2. Nitrogen* 1/2 x rate	1		1	
3. Nitrogen 1x rate	1	1	1	1
4. Nitrogen 2x rate	2	2	2	2
5. Phosphorus at 1/2x rate	No P needed			
6. Phosphorus at 1x rate	No P needed			
7. Phosphorus at 2x rate	No P needed			
8. Potassium^ 1/2x rate	0.23		0.23	
9. Potassium 1x rate	0.23	0.23	0.23	0.23
10. Potassium 2x rate	0.45	0.45	0.45	0.45
11. N-P-K at 2x rate	2 N + 0.45 K	2 N + 0.45 K	2 N + 0.45 K	2 N + 0.45 K
12. Nature Safe (1x N rate)	1	1	1	1

\* Polyon SCU (35-0-0), ^ Potassium sulfate (0-0-50), + 8-3-5

creased the clippings yields and quality increased, indicating that tissue levels of P and K may be a better indicator of turf growth and quality than soil test levels. The treatments that

contained nitrogen increased the uptake of P and K in the turf and resulted in more clipping growth and higher quality.

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*Turf quality was not affected by the soil test level for either phosphorus (P) or potassium (K). Increasing the soil level of either P or K did not increase the percentage of P or K in the clippings.*

*The treatments that contained nitrogen increased the uptake of P and K in the turf and resulted in more clipping growth and higher quality.*

**Table 2: Average visual turf quality for 2002, Ithaca Soil Test Calibration Study**

Treatment	Visual Quality
Unfertilized control	6.1b*
Potassium 1/2x rate	6.4a
Potassium 1x rate	6.3b
Potassium 2x rate	6.2bc
Nitrogen 1/2x rate	6.8a
Nitrogen 1x rate	6.8a
Nitrogen 2x rate	6.7ac
Nitrogen 2x + K 2x rate	6.8a
Nature safe (1x N rate)	6.7ac

\* Values not followed by the sample letter are significantly different (P=0.05).