



# THE SOIL PROFILE

A newsletter providing information on issues relating to soils and plant nutrition in New Jersey

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## Use Less Fertilizer and Leave Clippings for a Better Lawn

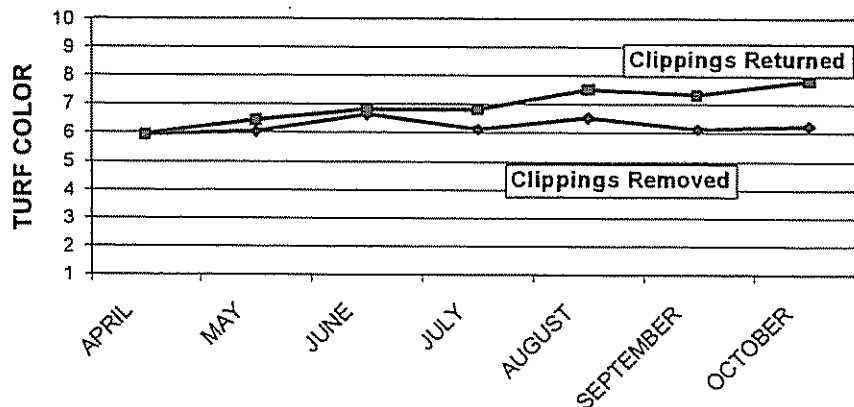
Mowing and fertilizing are two key management practices that, when performed well, can lead to a healthier and greener lawn. By returning clippings to the lawn, turf quality is benefited by recycling nutrients. The choice of mowing practice, therefore, has a large impact on turfgrass quality (Figure 1) and the amount of fertilizer required. Likewise, the soil fertility program has a large impact on turf quality, the amount of clippings produced and the ease and frequency of mowing.

The practice of leaving clippings on the lawn reduces the amount of yard waste and need for disposal. For this reason, the program called "Grass, Cut it and Leave it" is being promoted in many urban areas for source reduction of

municipal solid waste. A major drawback to leaving clippings is that they can be unsightly, especially in the spring when the clippings are produced in large amounts, particularly when proper mowing is neglected. Furthermore, heavy deposits of clippings can also injure turf. Mowing more frequently during periods of rapid growth can reduce the problems associated with clippings left on turfgrass, however, most people are not willing or able to mow more frequently than about once per week. Because the fertilizer program influences turf growth rate and the amount of clippings, the goal of the fertilizer program should be to maintain turf quality while minimizing the amount of clippings.

This issue of The Soil Profile newsletter will present the findings of a recently completed field experiment at the Rutgers Turfgrass Research Center that examines the effects of various nitrogen fertilizer types and application rates on clipping yield and turf quality. Specifically, the research compared application rates of slow-release and quick-release nitrogen fertilizers under two mowing practice regimes where clippings were either recycled on the turf or they were removed.

Figure 1: Turfgrass Color Ratings Following the Initiation of Different Mowing Practices.  
Nitrogen Application Rate = 2 lbs N/1000 sq. ft. /yr.



## Turf Research Methods

**Experiment site:** The four-year study was conducted at the Rutgers University Turfgrass Research Farm. The Kentucky Bluegrass turf was established in 1992 on a loam soil with 2% organic matter and very high soil test levels for phosphorus and potassium.

**Fertilizer treatment:** Fertilizers were applied at 0, 2, and 4 pounds of N/1000 sq. ft. /yr. by applying one quarter of these rates in April, May, September, and October, each year. Both quick-release and slow-release nitrogen fertilizers were compared.

**Mowing practice:** The grass was cut weekly during the growing season. The turf plots were split between two mowing practices where clippings were either returned with a mulching mower or removed using a conventional rotary mower with a bagging attachment.

**Turf quality:** The experiment was irrigated to maintain favorable soil moisture for turfgrass growth. Visual color ratings were taken just prior to mowing each week; a 1 to 10 color scale was used with 1 representing brown turf and 10 representing dark green color.

**Weeds:** Preemergence herbicides were applied each spring to control weeds. The weeds in each plot were counted in August to determine the influence of mowing practice and N rate on weed populations.

## Research Findings

A turfgrass fertilizer program that leads to excessive growth and production of clippings is undesirable whether clippings are removed or recycled. Avoiding heavy applications of nitrogen fertilizer is particularly important to the successful practice of returning and recycling of clippings on the turf. An effective way to control the amount of clippings produced is to reduce the total annual application rate of nitrogen. The combination of returning clippings and reducing the amount of applied nitrogen works effectively together to maintain turf quality because nutrients are mostly being recycled within the turfgrass-soil system.

Our research shows that when 2 lbs N/1000 sq. ft./yr. are applied, 38 lbs of dry clippings were produced versus 58 lbs of dry clippings when 4 lbs N were applied (Figure 2). Because clippings are about 85% water, these yields may be multi-

plied by a factor of six to convert amounts to a fresh weight basis. Thus, the removal of clippings with a bagging mower requires the handling and disposal of large quantities of bulky material. Applying excessive nitrogen fertilizer with either mowing practice increases problems associated with excessive quantities of clippings.

Cool season turfgrasses, such as Kentucky Bluegrass, grow most quickly and produce the greatest amount of clippings in the spring. This is also the season when problems are most likely to occur with returning clippings. The practice of returning clippings may require a more frequent mowing schedule during the spring to avoid the potential buildup of unsightly amounts of clippings.

Our research shows that using slow-release forms of nitrogen helps to control the rate of spring growth and minimizes the amount of clippings produced

Figure 2: Clipping Yield Response to Nitrogen Rate

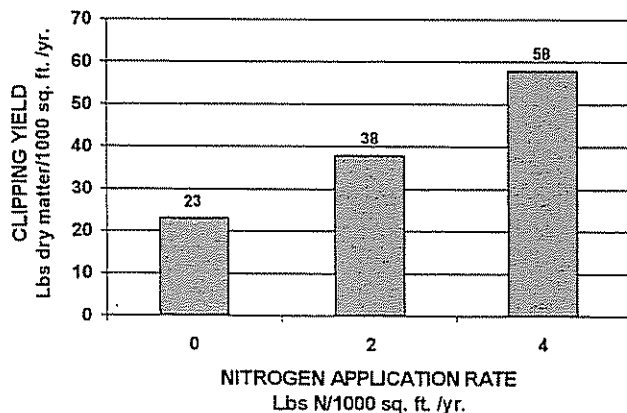
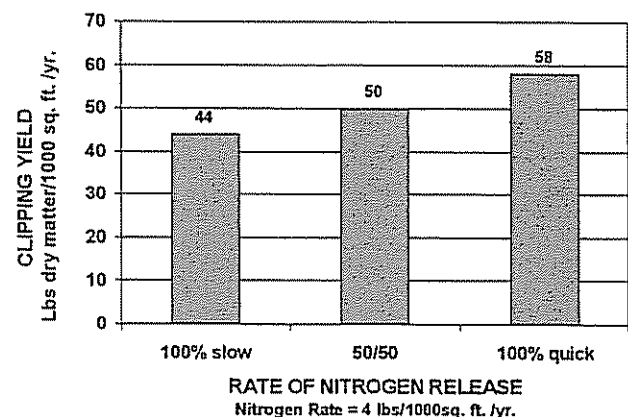


Figure 3: Clipping Yield Response to Fertilizer Type



throughout the year (Figure 3). In addition to reducing the amount of clippings, a slow-release source of nitrogen may help to maintain a more uniform green turf color.

In 1994, the first year the plots with the two different mowing practices were established, turf color improved throughout the growing season where clippings were returned when compared to where they were removed (Figure 1). A darker green, more luxuriant appearance was apparent by August 1994 and continued during the following fall, winter, and spring months. Furthermore, turfgrass color ratings during three years of returning or removing clippings shows that a better turf color is consistently maintained when clippings are returned (Figure 4).

Even with half as much nitrogen fertilizer applied, turf color was generally better where clippings were returned as compared to where they were removed (Figure 5). The higher nitrogen rate (4 lbs N/1000 sq. ft./yr.) where clippings were removed was associated with a better turf color than the lower nitrogen rate (2 lbs N/1000 sq. ft./yr.) where clippings were returned only during May.

Turf color responses to nitrogen rates and mowing practices are shown as season averages in Table 1. Results show that when clippings were returned, acceptable turf color was achieved by using only half the usual application rate of nitrogen. At the 2 lbs N/1000 sq. ft./yr. application rate, the return of clippings recycles an estimated 1 to 2 pounds of nitrogen in the clippings (assumes 38 lbs clippings/1000 sq. ft./yr. and tissue N concentrations of 2.5 to 5.1%).

A healthy vigorous turf should be more competitive against invasion by weeds. Our research shows that mowing practice and nitrogen application rate influence the infestation of the turf with weeds (Figure 6). Weed populations were significantly reduced where clippings were returned. Populations were further reduced as nitrogen

Figure 4: Turfgrass Color Ratings Following Three Years of Returning or Removing Clippings. Nitrogen Application Rate = 2 lbs/1000 sq. ft. /yr.

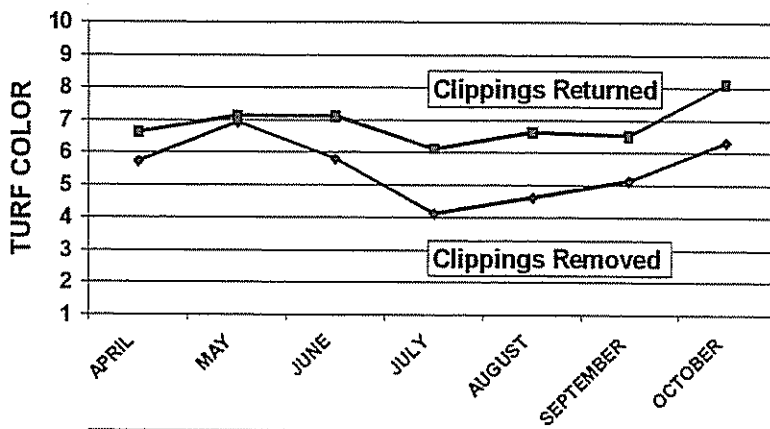


Figure 5: Turfgrass Color Ratings Following Three Years of Returning or Removing Clippings

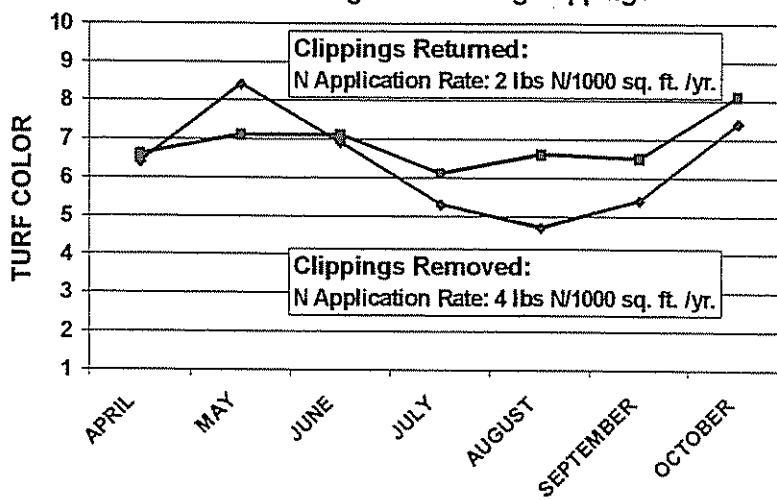
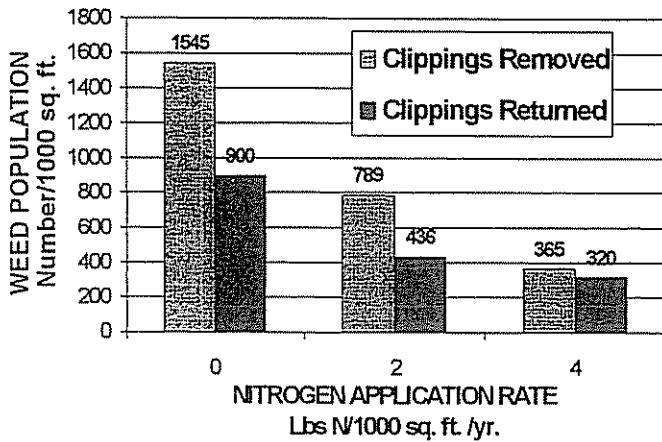


Table 1: Turfgrass color responses to nitrogen application rates and two mowing practices

Nitrogen Rate	Season Average Turf Color Rating	
	Clippings Removed	Clippings Returned
lbs N/1000 sq. ft. /yr.		
0	3.2	5.2
2	5.5	6.9
4	6.4	7.7

applications rates increased. The return of clippings and only 2 lbs N/1000 sq. ft./yr. reduced the weed population to about the same level as 4 lbs N/1000 sq. ft./yr. when clippings were removed.

**Figure 6: August Weed Populations of Turf in Relation to Mowing Practice and Nitrogen Rate**



**Summary**

- Applying excessive nitrogen fertilizer produces excessive growth and yield of clippings.
- Leaving clippings recycles nutrients and results in better turf color than removing clippings.
- The use of slow release forms of nitrogen fertilizer reduced problems associated with clippings.
- Leaving clippings and applying moderate rates of nitrogen fertilizer provides for a healthy vigorous turf that is more competitive against weeds.

**Recommendations for Turf Management When Leaving Clippings**

- Use a slow release fertilizer to reduce surge growth and amount of clipping residue.
- Apply less fertilizer. The nitrogen application rate should not exceed 2 lbs N/1000 sq ft /yr.
- Increase mowing frequency during periods of rapid growth.
- Mulching mowers are not required for switching to the practice of leaving clippings. Conventional rotary mowers may also be used.

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**Published Fact Sheets Available from Rutgers Cooperative Extension**

- FS633 Fertilizing the Home Lawn
- FS635 Managing Soil pH for Turfgrasses
- FS871 Understanding Fertilizer Labels: Grades and Ratios of Nitrogen, Phosphorous, and Potassium
- FS766 Lawn Fertilizer Spreader Calibration
- FS584 Seeding Your Lawn
- FS829 How to Protect Water Quality and Have a Beautiful Lawn
- FS797 Soil Testing for Home Lawns and Gardens
- FS901 Topsoil Suitable for Landscape Use
- FS839 How to Calculate the Amount of Fertilizer Needed for Your Lawn
- FS675 Nutrient Sources for Growing Plants by the Organic Method
- FS719 Soil Fertility Test Interpretation
- FS824 Plant Nutrients in Municipal Leaf Waste

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