



RUTGERS

New Jersey Agricultural
Experiment Station

2021

Turfgrass Proceedings

The New Jersey Turfgrass Association

In Cooperation with
Rutgers Center for Turfgrass Science
Rutgers Cooperative Extension

2021 RUTGERS TURFGRASS PROCEEDINGS

of the

GREEN EXPO Turf and Landscape Conference

December 7-9, 2021

Borgata Hotel

Atlantic City, New Jersey

The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public.

This publication includes lecture notes of papers presented at the 2021 GREEN EXPO Turf and Landscape Conference. Publication of these lectures provides a readily available source of information

covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

Special thanks are given to those who have submitted papers for this proceedings, to the New Jersey Turfgrass Association for financial assistance, and to Anne Diglio and Barbara Fitzgerald for administrative support.

Deborah Spinella, Proceedings Layout Editor
Dr. James A. Murphy, Coordinator

SOIL TESTING FOR LANDSCAPE TURFGRASS

James A. Murphy and Stephanie Murphy¹

WHY SHOULD I TEST SOIL?

A routine soil testing program is an essential service of landscape managers. Most immediately, it's necessary for assuring balanced soil fertility, leading to good plant health, vigor, and resiliency. Following the recommendations on a soil test report will provide availability of nutrients in balance with plant need, adjust the soil pH for efficient utilization of nutrients and avoidance of toxicity, and maximize plants' defenses against disease or insect attack.

Also important is the aspect of environmental protection. Dense vigorous turfgrass is an asset to suburban landscapes as it protects soil from erosion and promotes soil structure development to allow good infiltration and drainage. Excess application of nutrients, however, may lead to leaching or runoff of soil and nutrients into water bodies, where they are pollutants causing eutrophication and death of aquatic organisms. The New Jersey Turf Fertilizer Law (2011) was a response to the perception and sometimes reality of overfertilization or careless application of nitrogen and phosphate fertilizer to turfgrass. In fact, in some cases, soil testing is required by law to allow P fertilization to turfgrass. Soil testing to obtain most appropriate fertilizer recommendations demonstrates care for the community and environment.

Economics should also be a motivation to perform regular soil tests. The relatively small cost of soil testing will provide the knowledge to invest in those products that will make a difference and avoid expensive applications that provide no beneficial response or even cause problems to the turfgrass ecosystem.

CASE STUDIES

Several case studies were examined; soil test reports provided data from which best fertilizer management recommendations could be derived. Case #1 was a soil that had optimum pH (slightly acidic) with optimum levels of phosphorus, potassium, and magnesium. This soil required minimal (zero would be acceptable until the next soil test) maintenance applications of fertilizer phosphorus and potassium. The recommended nitrogen application(s) would be determined by existing turf vigor, management, and site conditions (sunlight, irrigation, clippings) or the need to establish a new seeding/sodding.

Case #2 showed an alkaline pH, possibly from over-liming, such as might happen with routine applications without a soil test to guide management. Very high calcium levels shown in the soil test report also suggested over-liming. Furthermore, the phosphorus level was very high. Acidifying amendments and nitrogen fertilizer with zero-Phosphorus were recommended for this soil. Conditions shown in this soil test report (high pH) are known to promote Summer Patch – a root disease that thrives in alkaline soil – and should be corrected to minimize risk of turf failure.

Case #3 had a strongly acidic pH and predictably low calcium level. Phosphorus, potassium, and magnesium levels were moderate. Limestone was recommended to adjust pH, and the nutrient analysis suggests that dolomitic limestone should be used to fortify magnesium levels in the soil (as well as calcium). The specific amount needed was approximated from the Lime Requirement Index as well as the difference between the existing and target pH values. Fertilizer to build up the potassium level as well as providing plants' immediate need for nitrogen

¹ Extension Specialist in Turfgrass Management, and Director of Soil Testing Laboratory, respectively; New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey, New Brunswick, NJ 08901-8520.

was also recommended. No phosphorus was necessary; this was another perfect situation for a zero-P fertilizer. Individual single-nutrient fertilizers for N and K are another option for this situation.

Case #4 A & B demonstrated a front yard/back yard situation where the back yard had been managed differently than the front. The soil test results demonstrated the importance of proper sampling protocol. The difference in pH between the front and back yards emphasized the complicating effect of pH on nutrient availability; having pH too high will make certain nutrients more or less available, and pH too low can have similar effects on other nutrients. Complex variations in soil pH and nutrient availability create a real management challenge; for example, sport turfs often exhibit different “field within the field” variations due to concentration of activity/traffic: midfield wear versus non-worn areas. Similarly, there can be “lawn within the lawn” variation due to differences in slope, sun/shade, or adjacent vegetation effects. Soil testing can help to identify what amendments and fertilizer are useful in these situations.

Case #5 was considered a “high maintenance” lawn due to frequent irrigation and removal of mower clippings. These management practices have a strong influence on soil potassium fertility because of the high potassium content of grass leaves being lost/removed from the system. Mulching clippings recycles nutrients back into the lawn and is strongly encouraged, but meanwhile fertilization that includes higher rates of potassium fertilizer as well as nitrogen would be useful to compensate for previous loss from clipping removal. Soil phosphorus level is not as strongly affected by clipping removal, at least in the short term. Adequate potassium is needed by plants for better heat and drought stress tolerance. Furthermore, depleted potassium levels have been associated with higher incidence of Anthracnose (leaf & crown disease) whereas excess potassium is correlated with greater Dollar Spot (a leaf disease) as well as infestations of dandelions – more reasons to manage nutrients carefully.

PROCEDURES FOR SAMPLING AND ANALYSIS AT RUTGERS SOIL TESTING LABORATORY

To obtain the most accurate data and appropriate recommendations, a soil area must be properly sampled, so any staff assigned to sampling should be suitably trained. For easy and quick sampling (time and labor savings), use of a soil sampling probe is recommended along with a clean plastic bucket. Follow

sampling instructions provided by the lab, including specifying the “crop” and other management factors associated with the sampled soil/area; collecting multiple subsamples (about 3 per 1,000 square feet, usually to the 4- or 6-inch depth for lawns) throughout the defined area and combining in the bucket; then breaking-up/crumbling the subsample cores and mixing thoroughly to create a homogenous composite sample. Submit about 1 pint of the well-mixed composite soil sample to the laboratory in a paper or plastic bag with legible label (sample ID).

Submit paperwork (completed questionnaire) with the sample; the sample ID that you provide on the questionnaire should match the label on the sample bag. Indicate the specific test(s) you are requesting; the standard fertility test is usually sufficient since it provides soil pH and nutrient data and the resulting recommendations for soil pH amendments and fertilizer. Make sure to check the “crop” (cool-season or warm-season turf) and indicate whether the turf is new or established. Also, for best recommendations, check the appropriate category for the management factors that apply to your lawn: clippings management; irrigation frequency; sunlight condition. When submitting many samples with the same crop and management factors, one soil test questionnaire can be supplied with a list of sample IDs (usually client names or locations), or individual questionnaires can be supplied for each sample.

FINAL BENEFITS

Since soil testing demonstrates professional competence and care, advertising this practice can be an important part of your marketing plan. Include soil testing in all your service packages for new clients, and then repeat testing every 2-3 years on a rolling basis. Make clients aware that this is a valid & valuable “green” service that your company provides. Furthermore, since sampling can be performed during off-season, it provides work for staff into the winter months (a billable service visit) and still allows you time to receive results and determine appropriate management actions for each property before the fertilizer “blackout” period ends in March. You may find it valuable to provide a copy of soil test reports to clients to document your effort in managing their property. Soil testing distinguishes your company as agronomically knowledgeable and environmentally sensitive and promotes the lawncare/landscaping industry as professional and responsible.