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## NCDA&CS Agronomic Services for Turfgrass Management

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**In light of recent research initiatives to investigate the environmental impacts of turfgrass maintenance, the golf course and turf industries in North Carolina are fortunate to have access to a comprehensive range of agronomic testing services to help them monitor nutrient levels, troubleshoot problems and fertilize appropriately. Resources—such as soil testing, nematode assay, plant tissue analysis, solution analysis, waste analysis and on-site consultation services—help professionals manage nutrients and promote turf quality.**

### Soil Testing

- *Routine (predictive) samples* are analyzed for soil class, weight/volume, pH, acidity, % humic matter, phosphorus, potassium, calcium, magnesium, sulfur, manganese, zinc, copper and sodium. Recommendations for fertilization, including nitrogen rates, are based on the kind of turfgrass being grown, management history, soil type and other factors.
- *Problem (diagnostic) samples* are analyzed for all the above, plus soluble salts. Nitrate- and ammonium-nitrogen levels are measured only by special request and approval. Recommendations are given to alleviate any deficiencies, toxicities, salt or pH problems that may be indicated. When taking samples to diagnose a problem, it is a good idea to take samples from areas both where plant growth is good and from where plant growth is poor/abnormal. Matching nematode assay samples and plant tissue samples are also helpful in diagnosing a soil nutrient problem.

### Nematode Assay

- *Routine (predictive) soil samples for nematode assay* are examined for 45 species of plant-parasitic nematodes. Routine samples are generally taken and submitted before grasses or greens are established. Reports provide recommendations for pre-treatment.
- *Problem (diagnostic) samples* are also assayed for 45 species of plant-parasitic nematodes. They are generally collected from established areas to troubleshoot field problems. The report includes recommendations for management.

## **Plant Tissue Analysis**

- *Routine (predictive) tissue analyses* measure levels of nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, manganese, copper, zinc, iron, boron and sodium within plant tissue. The report indicates whether plants have taken up adequate amounts of essential nutrients. Tissue analysis can alert managers to hidden nutrient problems before symptoms appear.
- *Problem (diagnostic) tissue samples* are analyzed for the same nutrients as routine samples. Comparing tissue analyses from good areas and bad areas is helpful in figuring out whether poor nutrition is contributing to the problem. Matching soil samples are also useful.

## **Solution Analysis**

- *Routine (predictive) solution analyses* measure levels of nitrate nitrogen, ammonium nitrogen, urea, phosphorus, potassium, calcium, magnesium, sulfur, manganese, copper, zinc, iron, boron, sodium and chloride plus pH, soluble salts, alkalinity and hardness. This kind of report indicates whether source water is suitable for irrigation and whether nutrient solutions delivered through fertigation systems contain appropriate amounts of nutrients.
- *Problem (diagnostic) solution samples* are analyzed for the same nutrients and chemical properties as routine samples. Reports often help managers troubleshoot problems related to irrigation and/or fertigation.

## **Waste Analysis**

- *Analyses of animal waste and composted materials* measure nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, manganese, zinc, copper, iron, boron, sodium and pH. The report indicates the suitability of the sampled material for use as a nutrient source.
- *Analyses of industrial/municipal waste* measure the same nutrients and chemical properties indicated for animal and composted waste and usually measure cadmium, nickel, lead and calcium carbonate equivalence as well.

## **Field Services**

- Thirteen regional agronomists located throughout the state provide on-site consultation with regard to agronomic sampling, interpretation of agronomic reports and recommendations, and troubleshooting plant nutrient problems.
- For more information or for the name of the regional agronomist for your area, call our office [919-733-2655] or visit [www.ncagr.gov/agronomi](http://www.ncagr.gov/agronomi).

***The NCDA&CS Agronomic Division stands ready to assist N.C. turf professionals with sound nutrient management information. For help in learning how to take and submit samples or to interpret report recommendations, visit the Division's website or contact your local NCDA&CS regional agronomist.***

*Thank you for using agronomic services to manage nutrients and safeguard environmental quality.*  
— Steve Troxler, Commissioner of Agriculture