

## **Agronomic Division — 2006 Annual Report**

**Colleen Hudak-Wise, Ph.D., director, (919) 733-2655**

### **Service**

In fiscal year 2006, Agronomic Division laboratories processed more than 370,000 soil, nematode, plant, waste and solution samples, and issued more than 54,500 advisory reports. This workload represents a slight decrease from last year. The soil testing and waste analysis laboratories continued to operate under the N.C. Department of Environment and Natural Resources (DENR) Division of Water Quality's laboratory certification program and are qualified to provide critical testing for animal waste permits and nutrient management compliance. The soil testing and plant analysis laboratories remain a part of the North American Proficiency Testing program. Under this program, our laboratory results are compared with those of other laboratories across the country on a quarterly basis.

The **Soil Testing Section** analyzed 306,257 soil samples and issued 33,707 reports with fertilizer and/or lime recommendations. Although sample volume was down about 2% from last year, it was still the third highest in the state's 66-year history of soil testing. Predictive, diagnostic, internal and research samples comprised approximately 96, 1.5, 1.0 and 1.5% of the total sample volume. Turn-around time never exceeded five weeks and, for much of the peak testing period, samples were processed in about four weeks or less. Soil tests continue to be free to N.C. residents, except analyses for heavy metals. The implementation of a \$25 charge for this test helped offset budget constraints.

The laboratory installed a new soil drying system this year. It comprises two independent, walk-in soil dryers with capacity for 7,200 samples. A rolling cart system facilitates the transport of samples into the dryer and throughout the lab. Forty carts were purchased, each capable of holding 720 samples.

The **Plant/Waste/Solution (PWS) Section**, under the direction of Brenda Cleveland, analyzed 15,068 plant tissue samples. Research samples accounted for 51% of the tissue samples processed. Most samples submitted were from the following five crops: cotton (15%), trellis tomato (12%), corn (10%), sweetpotato (10%) and wheat (5%). Strawberry was the most frequently sampled crop in the Fruits and Nuts category; Fraser fir was the most frequently sampled crop in the Conifers category.

The PWS Section also analyzed 18,084 waste samples and 2,128 solution samples. Anaerobic hog lagoon samples accounted for 75% of the total waste samples, followed by poultry house litter at 9%. Most solution samples were either nutrient solutions (29%) or source water (26%).

Improvements in the PWS lab addressed quality control/assurance issues as well as safety awareness and education. The lab now has four stations with self-contained hoods for grinding samples. These hoods filter out dust (and odors) and help maintain a cleaner and safer environment.

The **Nematode Assay Section**, under the direction of Dr. Weimin Ye, processed 29,895 samples in fiscal year 2006, including 3,970 research samples, 474 diagnostic samples, 209 samples from the NCSU Plant Disease and Insect Clinic and 298 regulatory samples from the NCDA&CS Plant Industry Division. This sample volume was down from fiscal year 2005 by about 5,000 samples. From April through September, samples were processed in about 10 business days. During the busy season of October through March, turn-around time averaged about 20 days.

The lab purchased a photo digital Leica microscope with drawing tube and a stereomicroscope to facilitate development of a collection of nematode images. Other new equipment—dry incubator, water bath and freezer—will help preserve important nematode specimens and create permanent slides that will be useful in research projects. The lab's collection now includes 800 slides and an extensive set of digital photos of plant-parasitic nematodes important in North Carolina.

**Field Services Section** personnel made 7,484 grower visits, 908 of which were to help diagnose nutrient and/or nematode problems. Regional agronomists handled 465 inquiries regarding environmental issues — primarily waste management plan clarifications, regulatory updates and river basin oversight reviews — and participated in local advisory committees. Agronomists also provided technical expertise and/or training for several regional and statewide environmental projects in cooperation with DENR, North Carolina State University (NCSU), N.C. Agricultural & Technical State University and USDA-NRCS.

Regional agronomist Bill Yarborough was one of this year's recipients of the prestigious Outstanding State Government Service award.

## **Education & Outreach**

Agronomic Division staff, especially the **Field Services Section**, reach thousands of growers, homeowners and agricultural professionals through a wide range of educational activities. In June, regional agronomists Don Nicholson and Charles Mitchell organized and presented a workshop at the Central Crops Research Station to train Cooperative Extension and other professional staff in appropriate agronomic testing and nutrient management of fish ponds. Tim Hall and Kent Messick were instrumental in carrying out nutrient management training associated with spray irrigation and biosolid application.

In-house staff conducted 32 laboratory tours for farmers, master gardeners, agribusiness groups, scientists and students, including international delegations from Honduras and Moldova. Information on agronomic services was disseminated through 32 educational exhibits displayed at farm shows, field days, training events and professional meetings.

Outreach also included 14 news releases in addition to articles in publications such as *North Carolina Turfgrass*, the Carolina Farm Stewardship Association newsletter, *Feedstuffs* magazine, *Southeast Farm Press* and *Tobacco News*. Many presentations on agronomic services were made to master gardeners, growers, commodity associations, conservation groups, and county and state organizations.

Division personnel participated in local, state, regional and national meetings, including

- Soil Science Society of N.C., 49th annual meeting (Raleigh; January 17–18 2006)  
— poster: *Potassium fertilization in blueberry production—dry or liquid?*;
- American Society of Agronomy, 98th annual meeting (Indianapolis, IN; November 2006)  
— poster: *Evaluating corn response to sulfur by use of Mehlich-3 in North Carolina.*

Division staff authored, or co-authored, eight technical articles and won two first- and two second- place awards for photographs of crop nutrient deficiencies submitted to *Better Crops with Plant Food* magazine. In January 2006, the Soil Science Society of N.C. (SSSNC) elected Dr. David H. Hardy to serve as president of the society for calendar year 2007. His responsibilities included organizing the 50<sup>th</sup> annual meeting of SSSNC.

## Research

Division staff routinely conduct cooperative studies with university personnel, farmers and industry specialists. This year, cooperative research involved the processing of 4,711 soil samples; 8,665 plant/waste/solution samples; and 3,970 nematode assays.

The **Soil Testing Section** conducted field tests to validate soil-test sulfur recommendations for corn and small grains, in cooperation with Drs. Carl Crozier and Greg Hoyt of N.C. State University. Soil testing, along with the **PWS Section**, completed the second year of a pH study on Leyland cypress, in cooperation with Dr. Eric Hinesley of N.C. State University. A baseline fertility study of vinifera grape was conducted jointly with Dr. John Havlin of N.C. State University. Soil Testing continued to monitor a study evaluating the lowering of pH at sites in Pender and Scotland counties. An evaluation of the usefulness of the presidedress soil nitrogen test (PSNT) in corn production was conducted at two Piedmont locations.

The **Plant/Waste Solution Section** assisted Dr. Oviedo of N.C. State University in a project to assess the quality of drinking water used in poultry production. Research was initiated to help validate interpretation indices for leaf blade K determinations and to investigate the usefulness of adding petiole K data to plant tissue analysis reports. Plans were developed for implementation of a fact-finding survey of bramble growers that will be useful in the revision of soil and plant recommendations for this group of crops.

The **Nematode Assay Section** initiated development of a permanent slide collection of economically important, plant-parasitic nematodes. The section collaborated with N.C. State University on a statewide survey of nematode pests of turfgrass and with the **Field**

**Services Section** on a number of field studies (see below). The lab also conducted studies investigating

- the effectiveness of methods of nematode extraction associated with nematicide trials,
- root-knot nematode race/species identification using differential hosts and
- molecular identification of cyst nematodes using real-time polymerase chain reaction.

The **Field Services Section** conducted or participated in about 22 research and demonstration projects in fields throughout the state. These projects were designed primarily to optimize fertilizer rates and improve management of plant-parasitic nematodes.

During 2006, division staff engaged in field studies on

- sulfur fertilization of blueberry, corn and small grain;
- nitrogen fertilization of burley tobacco, corn and onion;
- pH requirements associated with Leyland cypress,
- fertility needs of vinifera grape
- starter phosphorus study on lettuce and
- nematode management in daylily, pickle cucumber, ornamental grasses and Irish potato.