

## **Agronomic Division — 2010 Annual Report**

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### **Service**

The Agronomic Division serves North Carolina residents by providing soil testing, plant tissue analysis, waste analysis, solution analysis, nematode assay and expert advice regarding plant nutrient management. This year, the division made several changes that have improved the quality and scope of these services. Some notable milestones for 2010 include

- 1) completion of Phase I of the programming of a new laboratory information management system (LIMS),
- 2) hiring of new programmers to complete Phase II of the LIMS programming,
- 3) upgrades and improvements to our public access laboratory-information-management system (PALS),
- 4) designation of the Division as a Public Sector STAR site by the N.C. Department of Labor, and
- 5) planning and implementation of two plasticulture workshops with funding from the N.C. Tobacco Trust Fund Commission.

In the fall of 2008, the division received a \$455,600 grant through the N.C. Tobacco Trust Fund Commission for the redesign of its LIMS. Phase I of this project was completed in October 2010. A new team of programmers is being hired with the expectation that they will complete Phase II of the project by December 2011.

Over the year, our computer analyst Jingqing Ren has made many improvements to PALS to render it more user friendly. Meanwhile, an entirely new PALS site is under construction. The new site will be multifunctional, enabling growers to submit sample information data, track package arrival with barcodes, search for reports, download data and manage their user accounts. This upgrade is being designed in conjunction with the reprogramming of LIMS and will be fully implemented when the new LIMS is functional.

On March 23, 2010, the Agronomic Division was designated as a Public Sector STAR worksite by the N.C. Department of Labor. This achievement follows a year and a half of intensive safety training and preparation culminated by a three-day inspection and evaluation of our facility. As a Public Sector STAR, the Division has conducted monthly building inspections; established eight, employee-managed safety teams; issued a

quarterly safety newsletter; presented benchtop training on more than a dozen safety topics; and sent representatives to attend NCDOL's statewide annual safety conference.

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**, under the direction of David H. Hardy, Ph.D., analyzed 332,599 soil samples and issued 41,160 reports with fertilizer and/or lime recommendations in FY2010. This workload is about 9% lower than that of FY2009. A new Spectro Arcos ICP was placed online in January 2010, replacing one of the original three Thermo 61E instruments. In December, however, turn-around time slowed to nine weeks due partially to inclement weather and the mechanical failure of another ICP. New crop codes and associated fertility recommendations were implemented this year for plasticulture strawberries, hops and bioretention cells as related to stormwater issues.

The **Plant/Waste/Solution/Media (PWSM) Section**, under the direction of Brenda R. Cleveland, analyzed 9,747 plant tissue samples; 16,941 waste samples; 2,274 solution samples; and 307 soilless media samples in FY2010. It issued a total of 12,261 reports. This workload is about 4% lower than that of FY2009.

The **Nematode Assay Section**, under the direction of Weimin Ye, Ph.D., processed 28,499 samples and issued 4,105 reports in FY2010, including 1,067 research samples, 301 diagnostic samples, 46 out-of-state samples, 116 samples from the NCSU Plant Disease and Insect Clinic and 266 regulatory samples from the NCDA&CS Plant Industry Division. This sample volume represents nearly an 11% increase over last year. From April through September, samples were processed in about five business days. During the busy season (October–March), turn-around time averaged about 30 days.

**Field Services Section** personnel, under the direction of J. Kent Messick, made about 9,990 grower visits, primarily to help diagnose nutrient and/or nematode problems. Regional agronomists handled 557 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.

## Education & Outreach (calendar year summary)

In-house staff conducted more than 25 laboratory tours for farmers, master gardeners, agribusiness groups, scientists and students. Information on agronomic services was disseminated through more than 16 educational exhibits displayed at farm shows, field days, training events and professional meetings.

The PWSM Section posted three instructional PowerPoints on its Web site to help clients sample correctly and interpret analytical results:

- Collecting plant tissue samples,
- Completing the *Plant Sample Information* form and
- Understanding the NCDA&CS plant analysis report.

Outreach also included 11 news releases in addition to articles in the *Agricultural Review*, *Southeast Farm Press* and *Nursery Notes*. *Carolina Gardener* magazine featured an article on our soil lab in its March 2010 issue. Kent Messick, Field Services Section Chief, was interviewed in October by the Southern Farm Network for a radio segment addressing crop damage due to heavy rain. Staff members made more than 60 presentations on agronomic services to master gardeners, growers, commodity associations, conservation groups, and county and state organizations.

Division staff authored, or co-authored, 22 professional publications.

## Research

Division staff routinely conduct cooperative studies with university personnel, farmers and industry specialists. In FY2010, cooperative research involved the processing of 3,625 soil samples; 4,977 plant/waste/solution/media samples; and 1,061 nematode assays.

The **Soil Testing Section** cooperated in the following research projects:

- 1) P, K and lime rate studies for Vinifera wine grape production with John Havlin, Ph.D., NCSU Soil Science;
- 2) Evaluation of N sources in blueberry production with Bill Cline, NCSU Plant Pathology, and Mike Mainland, Ph.D., NCSU Horticultural Science;
- 3) Nitrogen, copper, and zinc availability to corn and wheat from land-applied anaerobic swine lagoon sludge in the North Carolina Coastal Plain with Jot Smyth, Ph.D.; Carl Crozier, Ph.D.; Dan Israel, Ph.D.; and Deanna Osmond, Ph.D., NCSU Soil Science;
- 4) Soil fertility of high-population, narrow-row corn production with Carl Crozier, Ph.D., NCSU Soil Science; and
- 5) Burley tobacco yield response to potassium fertilizer with Greg Hoyt, Ph.D., & Ron Gehl, Ph.D., NCSU Soil Science; and Bill Yarborough, NCDA&CS regional agronomist.

The **Plant/Waste Solution Section** participated in four cooperative studies:

- 1) Potassium fertilization of blackberries with Ron Gehl, Ph.D., NCSU Soil Science;
- 2) Effect of nitrogen and potassium fertilization on cotton leaf blade and petiole tissue readings with Keith Edmisten, Ph.D., and Seth Holt, NCSU Crop Science;
- 3) Waste analysis of poultry litter with Carl Crozier, Ph.D., NCSU Soil Science; and
- 4) Establishment of baseline data and tissue sampling procedures for hops with Rob Austin, NCSU Soil Science.

In addition, an internal study was conducted to determine the best leaf position and growth stage for lettuce tissue sampling as well as nutrient concentrations typically associated with each.

The **Nematode Assay Section** was able to borrow a PhastSystem from NCSU to analyze esterase for identification of root-knot nematode species. This preliminary work sets the stage for an effort to offer a quicker and more exact method of nematode species identification. A grant proposal was submitted to the N.C. Tobacco Trust Fund Commission in December 2010 for funds to purchase the real-time PCR equipment needed to implement this goal.

In addition, the Nematode Assay Section participated in the following research projects:

- 1) assay of wood packaging material for pine wood nematodes in conjunction with USDA/APHIS;
- 2) distribution and management of plant-pathogenic nematodes through a grant from the Carolinas Golf Course Superintendents Association;
- 3) use of differential hosts to identify races of soybean cyst nematodes with Al Wood, NCSU Cooperative Extension;
- 4) molecular identification of soybean cyst nematodes using real-time PCR in collaboration with Dr. Suzy Spencer, NCDA&CS Plant Industry Division; and
- 5) identification of *Ascaridia numidae* in guinea fowl and its association with elevated mortality.

The **Field Services Section** conducted or participated in at least nine research and demonstration projects in fields throughout the state. These projects were designed primarily to optimize crop fertilization and nematode management efforts.

During 2010, division staff engaged in the following field studies:

- 1) sweetpotato tissue sampling project with NCSU,
- 2) pre-sidedress nitrogen test evaluation,
- 3) lettuce fertility test (two locations),
- 4) field-grown nursery stock study under fertigation,
- 5) boron sufficiency levels in tobacco (three locations),
- 6) development of soil fertility sufficiency levels for *Coleus*,
- 7) seeded and hybrid bermudagrass evaluations (four locations),
- 8) evaluation of calcium sufficiency levels in the soil and
- 9) evaluation of corn stalk nitrate levels.