

## **Agronomic Division — 2009 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 2009 include

- 1) the hiring of the firm Blue Lizard to program a new laboratory information management system (LIMS),
- 2) many upgrades and improvements to our public access laboratory-information-management system (PALS),
- 3) the switch from mailing paper copies of reports to electronic delivery via PALS exclusively and
- 4) an intensive safety awareness and training effort to prepare the Division for becoming designated as a NCDOL Public Sector STAR site.

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. Blue Lizard was awarded the contract for this job in October 2009, and its team of programmers reported for work on this project in November. Completion is expected by March 2011.

Over the year, our computer analyst Jingqing Ren has made many improvements to PALS to render it more user friendly. These upgrades were particularly necessary as the Division ceased the printing and mailing of paper reports. As clients were forced to go online to access their reports, the Division made an effort to revise the site to make its use as intuitive as possible.

Although budgetary constraints were the main impetus for ceasing to print and mail reports, the change to electronic reports had long been anticipated. Reports have been provided to clients online since 1995, and since that time, use of the Internet has become pervasive throughout society. For all intents and purposes, everyone now has access to online information, even if it is only through a public library.

In preparation for qualification as a NCDOL Public Sector STAR, small, specialized teams were established to train employees, evaluate safety procedures, identify and remediate hazards, and improve communication. All Raleigh-based division employees actively participated in at least one of the new safety teams, which included 1) Chemical

Storage, 2) Hazard Communication, 3) Signs & Labeling, 4) Safety Inspection, 5) Job Safety Analysis, 6) Compliance, 7) Housekeeping/Organization, 8) STAR Education and 9) Safety Training.

In fiscal year 2009, Agronomic Division laboratories set another all-time workload record, surpassing the previous year's record workload by nearly 3%. The labs processed more than 423,500 soil, nematode, plant, waste and solution samples and issued more than 52,500 advisory reports. The greatest increase (24%) was in the number of solution samples processed.

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 366,839 soil samples and issued 46,058 reports with fertilizer and/or lime recommendations. This workload set an all-time record for the Soil Testing Section, surpassing last year's record of 353,848 by 4%. Turn-around time never exceeded 6 weeks, and for much of the peak, samples were processed in about 3 to 4 weeks or less.

The Soil Testing Section placed a new Spectro Arcos ICP online in January 2009 and purchased another Arcos ICP in December 2009; these purchases replaced two of the original Thermo 61E that were placed in service in 1995.

The Soil Testing Section began working on a new report format for homeowners. The development of the format was done in conjunction with NC Cooperative Extension Agent Carl Matyac and a representative from Burke Brothers Hardware Store. A draft of the new design should be released as a pilot study to selected extension agents and homeowners in 2010 with implementation planned for in late 2010 or early 2011.

The **Plant/Waste/Solution/Media (PWSM) Section**, under the direction of Brenda R. Cleveland, analyzed 10,370 plant tissue samples; 16,586 waste samples; and 3,444 solution samples. Overall, this workload is about 2% higher than that of fiscal year 2008, due largely to a 24% increase in the number of solution samples processed. Fiscal year 2009 marked the first entire year that the lab analyzed soilless media samples, which for the time being are categorized as solution samples. Soilless media analysis is particularly important for the floriculture and landscaping industries, which grow container plants in artificial or bark substrates.

The **Nematode Assay Section**, under the direction of Weimin Ye, Ph.D., processed 25,737 samples and issued 3,724 reports in fiscal year 2009, including 467 research samples, 243 diagnostic samples, 485 out-of-state samples, 121 samples from the NCSU Plant Disease and Insect Clinic and 256 regulatory samples from the NCDA&CS Plant Industry Division. This sample volume was down about 8% from fiscal year 2008. From April through September, samples were processed in about 5 business days. During the busy season of October through March, turn-around time averaged about 20 days.

With regard to regulatory efforts, the lab conducted 600 pinewood nematode assays for USDA-APHIS. These tests were done on wood chips for export to Turkey. The lab also joined a national project to develop a plan to survey the existence of pinewood nematodes in wooden packaging stored by the U.S. Department of Defense in various locations in the USA. Project goals include the ability to identify pinewood nematode by means of morphology, DNA sequencing and real-time PCR.

Dr. Ye developed two new NemaNotes (15 & 16) that address the management of plant-parasitic nematodes on peach and peanut. He was also appointed as an adjunct assistant professor in the NCSU Plant Pathology Department.

**Field Services Section** personnel, under the direction of J. Kent Messick, made 9,890 grower visits, primarily to help diagnose nutrient and/or nematode problems. Regional agronomists handled 715 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)**

Agronomic Division staff, especially the **Field Services Section**, reach thousands of growers, homeowners and agricultural professionals each year through a wide range of educational activities. In 2009, outreach included 12 news releases in addition to articles in publications such as the *Agricultural Review*, *Southeast Farm Press* and *Nursery Notes*. Information on agronomic services was disseminated through more than 21 educational exhibits displayed at farm shows, field days, training events and professional meetings.

In-house staff conducted 19 laboratory tours for farmers, master gardeners, agribusiness groups, scientists and students. In addition, the NCDA&CS Public Affairs Division filmed a video tour of the soil testing lab narrated by our agronomist Jeana Myers, Ph.D. This tour will be posted on the department's Web site.

Division staff actively participated in events such as the Small Fruit Field Day held at the Piedmont Research Station (June 4, 2009); the 2009 FFA Career Development Convention (June 23–24, 2009); Landscape Color Field Day (July 15, 2009); Small Fruit Agent Training (August 4–5, 2009); the N.C. and S.C. Southern States Growmaster Program training held in Raleigh (August 11, 2009); the Agronomic Services for Lawns and Gardens presentation held at J. Raulston Arboretum (September 23, 2009); a hops informational meeting in Waynesville (November 18, 2009); and the Eastern NC CCA School in Jacksonville (December 2, 2009).

Agronomic Division staff also participated in several, live, Web-based training (Elluminate) events coordinated by N.C. Cooperative Extension for county agents and other agricultural professionals. Topics presented by our staff included Understanding the Plant Analysis Report (March 9, 2009); Understanding the Waste Analysis Report (March 9, 2009); Plant Tissue Analysis – A Tool to Optimize Cotton Production (May 19, 2009); several presentations addressing various aspects of the use of agronomic testing services for lawns and gardens (October 15, 2009); Soil pH and Acidity (November 18, 2009).

Division personnel participated in regional, national and international meetings, including

- Soil Science Society of N.C., 52nd annual meeting (Raleigh; January 20–21, 2009)
  - presentation: *Current fertilization and nutrient concerns in N.C. blueberry production*;
  - presentation: *Evaluating a failing urban site using soil science principles*;
  - presentation: *Status of local food production in North Carolina*;
  - presentation: *Using NCDA&CS tissue analysis to monitor nutritional status in new blackberry cultivars*;
- Mid-Atlantic Soil Test and Plant Analysis Work Group Annual Meeting (Richmond, VA; February 17–18, 2009)
  - presentation: *Bramble Fertility*;
- International Society of Horticultural Science (Charlotte; June 4, 2009)
  - presentation: *Vermicompost amended pine bark provides most plant nutrients for Hibiscus moscheutos ‘Luna Bush’*;
- SERA Annual Meeting (College Station, TX; June 23, 2009)
  - presentation: *Soil test calibration*;
- NCSU’s 9<sup>th</sup> Annual Worm Farming Conference (Durham; June 5, 2009)
  - presentation: *Understanding laboratory results of vermicompost*;
- SE Strawberry Expo (Raleigh; November 8–10, 2009)
  - presentation: *Months of money: a calendar-based approach to strawberry costs & savings*;
  - presentation: *Soil and tissue testing for optimum strawberry production*

- SE Vegetable and Fruit Expo (Myrtle Beach; December 1–2, 2009)  
— presentation: *Trellised tomatoes and drip irrigation*;

Division staff authored, or co-authored, 26 professional articles.

## Research (fiscal year summary)

Division staff routinely conduct cooperative studies with university personnel, farmers and industry specialists. This year, cooperative research involved the processing of 1,946 soil samples; 845 plant tissue samples; and 467 nematode assays.

The **Soil Testing Section** continued its field work on vinifera grape fertilization (begun in spring 2007 and conducted jointly with John Havlin, Ph.D., NCSU Soil Science Department). In 2009, the focus was on rate studies for lime, P and K at various sites. The section continued collaboration with Eric Hinesley, Ph.D., NCSU Horticulture Department, to further study potassium needs of Leyland cypress. Through funding obtained from the N.C. Blueberry Council, the section initiated a nitrogen study on blueberry at Castle Hayne in conjunction Bill Cline, NCSU Plant Pathology Department, and Mike Mainland, Ph.D., NCSU Horticulture Department.

The **Plant/Waste/Solution/Media Section** continued two previously established studies: 1) determination of sufficiency ranges for petiole phosphorus and potassium (Keith Edmisten, Ph.D., NCSU Crop Science Department, cooperating); and 2) evaluation of bramble crop tissue sample data to fine-tune nutrient recommendations and develop specific sufficiency ranges for new cultivars under new production practices. In addition, the Section worked with Randy Weisz, Ph.D., NCSU Crop Science Department, to test the benefit of his new wheat nitrogen recommendations by determining both biomass and N% in plant tissue; cooperated with Honeywell to determine sulfur response in cotton; and contributed to an evaluation of nitrogen fertilization in highbush blueberries.

The **Nematode Assay Section**, in conjunction with NCSU, conducted a distribution survey of soybean cyst nematodes (SCN) in eastern North Carolina. It worked with regional agronomist David Dycus to carry out a variety trial for SCN management.

The **Field Services Section** conducted or participated in about 12 research and demonstration projects in fields throughout the state. These projects were designed primarily to optimize crop fertilization and nematode management efforts.

During 2009, division staff engaged in the following field studies:

- soybean cyst nematode control variety trial (Dycus & Ye);
- comparison of Novozymes Nature's GREEN-RELEAF compost/aged pine bark mixture and Greenleaf Nursery's aged pine bark/sand mixture as potting substrates for growing annual nursery crops (Mitchell & McGinnis);

- comparison of Novozymes Nature's GREEN-RELEAF compost/aged pine bark mixture and Cedar Creek Nursery's aged pine bark/sand mixture as potting substrates for growing nursery container crops (Mitchell & McGinnis);
- blackberry/raspberry baseline fertilization (Mitchell & Dillon);
- nutrient uptake observations on in-ground nursery stock with fertigation (Farrer);
- new nitrogen protocol in small grain (Knox & Nicholson);
- nitrogen rate test in lettuce (Farrer);
- efficacy of fertilizer additives Avail, Nutrisphere & RH-77 (Nicholson);
- response of cotton to fertilization with ammonium sulfate (Nixon & K. Yarborough);
- molybdenum/Headline application on cotton (Nicholson);
- pre-sidedress nitrogen fertilization of corn (Knox & Howard);
- Nutrisphere research summary (Morris, Dycus & Nicholson).