

Agronomic Division — 2011 Annual Report

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

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 2011 include

- 1) near-completion of Phase II of the programming of a new laboratory information management system (LIMS),
- 2) design progress on an upgrade to our public access laboratory-information-management system (PALS),
- 3) planning and implementation of a third plasticulture workshop with funding from the N.C. Tobacco Trust Fund Commission,
- 4) hosting of the Southern Extension and Research Activity Information Exchange Group 6 (SERA-IEG-6) annual meeting, June 19–21, 2011,
- 5) setting of a new all-time record for number of soil samples analyzed in a single fiscal year;
- 6) implementation of a fee-based, expedited-analysis option for high-volume, ag-related soil samples, and
- 7) reception of \$48,500 in grant funding from N.C. Tobacco Trust Fund Commission to initiate a service for the identification of root-knot nematode species through PCR molecular diagnosis (Oct 2011–Dec 2012).

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 worked throughout 2011 on Phase II of the project. At the close of the year, the bulk of this programming effort is essentially complete. Implementation is expected July 2012.

To accompany the LIMS redesign, computer analyst Jingqing Ren revised and updated PALS, the client's Web interface to LIMS, to render it more functional and user friendly. The new site will be multifunctional, enabling clients to enter and submit sample information, track package arrival with barcodes, search for reports, download data and manage user accounts. This upgrade will be available to clients as soon as the new LIMS is finalized and placed into operation.

In accordance with its designation as a Public Sector STAR site, the Agronomic Division conducted monthly building inspections; issued a quarterly safety newsletter; presented benchtop training on more than a dozen safety topics; and sent representatives to attend NCDOL's annual Carolina STAR safety conference. All in-house employees met regularly and served on one of eight safety teams: Safety Inspection & Compliance, Sign & Chemical Storage, Safety Program & Policy, Safety Education & Training, Job Safety Analysis, Housekeeping/Landscaping, Wellness, and Mentoring.

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. In addition, the waste analysis laboratory received Manure Analysis Proficiency (MAP) certification from the Minnesota Department of Agriculture. The soil testing and plant analysis laboratories continue to meet the requirements of the North American Proficiency Testing program.

Three Agronomic Division employees received department recognition as Employee of the Month in 2011: maintenance mechanic Louis DeLozier (February); regional agronomist J. Ben Knox (August); and shipping & receiving coordinator Jason Pleasant (October).

Workload Summaries

The **Soil Testing Section**, under the direction of David H. Hardy, Ph.D., analyzed 373,532 soil samples and issued 43,409 reports with fertilizer and/or lime recommendations in FY2011. This workload is a new record, beating the previous record set in 2009 by about 7000 samples. This trend seems likely to continue since the lab processed 16 percent more samples by the end of calendar year 2011 than it did in 2010. Due to the heavy workload, turn-around time slowed to 9 weeks in December.

The **Plant/Waste/Solution/Media (PWSM) Section**, under the direction of Brenda R. Cleveland, analyzed 11,621 plant tissue samples; 16,943 waste samples; 2,235 solution samples; and 347 soilless media samples in FY2011. It issued a total of 12,439 reports. This workload exceeds that of the previous year by about 2,000 samples.

The **Nematode Assay Section**, under the direction of Weimin Ye, Ph.D., processed 31,193 samples and issued 4,120 reports in FY2011, including 2,015 research samples, 286 diagnostic samples, 37 out-of-state samples, 90 samples from the NCSU Plant Disease and Insect Clinic and 328 regulatory samples from the NCDA&CS Plant Industry Division. This workload is about 2,700 samples greater than last year's. 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 10,409 grower visits, primarily to help diagnose nutrient and/or nematode problems. Regional

agronomists handled 543 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 Don Nicholson received an Extension Service Award from the Tobacco Growers Association of North Carolina at the TGANC 29th Annual Meeting in Raleigh on 4 February 2011. Regional agronomist J. Ben Knox was named NCDA&CS Employee of the Month in August 2011. Significant personnel changes included the retirement of Lynn Howard from Region 12 (upper mountains) after 31 years of service and his replacement by Dwayne Tate, the lateral transfer of Kent Yarborough from Region 2 (Tidewater) to Region 6 (upper coastal plain), and the continuing search for an agronomist to fill the vacancy in Region 2 following the transfer.

Education & Outreach (calendar year summary)

Agronomic Division staff, especially the **Field Services Section**, reach thousands of growers, homeowners and agricultural professionals through a wide range of educational activities. In-house staff conducted 24 laboratory tours for farmers, master gardeners, agribusiness groups, scientists and students. Information on agronomic services was disseminated through more than 17 educational exhibits displayed at farm shows, field days, training events and professional meetings (see appendix).

Outreach also included 19 news releases in addition to articles in publications such as the *Agricultural Review*, *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, national and international meetings, including

- Cooperative Extension meetings in Duplin, Union, Iredell, Lenoir, Wayne counties (January–April, 2011)
— presentation: *Poultry litter — waste analysis*; B. Cleveland
- Caldwell County Cattlemen’s Association (February 8, 2011)
— presentation: *Soil testing & fertility*; L. Howard
- Southern Association of State Departments of Agriculture (SASDA) meeting (Greensboro; June 13, 2011)
— presentation: *Agronomic Division overview*, C. Hudak-Wise
- Southern Extension & Research Activities Information Exchange Group [SERA-IEG] (Raleigh; June 20–21, 2011)
— presentation: *Organic production and recommendations in NC*, J. Myers
— presentation: *Vermicompost amended pine bark provides plant nutrients for Hibiscus moshceutos ‘Luna Bush’*, M. McGinnis

- presentation: *Overview of sulfur management and related usefulness of soil testing*, D. Hardy
- presentation: *Microwave calibration*, B. Cleveland
- Society of Nematologists 50th Annual Meeting (Corvallis, Oregon; July 17–21, 2011)
 - presentation: *Development of real-time PCR for species identification of soybean cyst nematode in North Carolina*, W. Ye
- N.C. Drought Management Advisory Council meeting (Williamston; July 21, 2011)
 - presentation: *Drought Impact on N.C. Crops*, J. Kent Messick
- Plant Food Association of N.C. (PFANC) summer meeting (Asheville; August 8, 2011)
 - presentation: *Agronomic Division overview*, C. Hudak-Wise
- NCSU’s 12th Vermiculture Conference (Chapel Hill; October 11, 2011)
 - presentation: *Understanding vermicompost lab analyses*; M. McGinnis
- 2011 Tri-County MGV “Utmost Compost” Conference (Dunn; October 19, 2011)
 - presentation: *Nutrient composition*; M. McGinnis
- Tobacco Day (Smithfield; December 1, 2011)
 - presentation: *Results of root-knot nematode survey*; W. Ye
- NC Agricultural Consultants Association (Raleigh; December 1, 2011)
 - presentation: *Agronomic Services update*; C. Hudak-Wise

Division staff authored, or co-authored, 10 professional articles (see appendix).

Research

Division staff routinely engage in cooperative studies with university personnel, farmers and industry specialists. In FY2011, cooperative research involved the processing of 3,166 soil samples; 4,392 plant/waste/solution/media samples; and 2,015 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 two cooperative studies:

- 1) Evaluation of fertilizer rates in greenhouse production of Beauregard, Covington and Evangeline sweet potatoes with J. Schultheis, Ph.D., NCSU Horticultural Science; &
- 2) Mineralization, plant availability and water quality consequences of nitrogen and phosphorus in land-applied municipal biosolids with Jeffery White, Ph.D., NCSU Soil Science and David Hardy, Ph.D., NCDA&CS Agronomic Division.

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** received \$48,500 from the N.C. Tobacco Trust Fund Commission in the fall of 2011 to purchase real-time PCR equipment needed to implement molecular diagnosis of root-knot nematode species. Much preliminary work, including a statewide survey of root-knot populations, was accomplished before notification of the grant was received. The new project is set to begin in earnest in 2012.

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 the USDA Animal and Plant Health Inspection Service;
- 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;
- 5) identification of *Ascaridia numidae* in guinea fowl and its association with elevated mortality with Drs. K.M. Robbins & O.J. Fletcher, NCSU College of Veterinary Medicine;
- 6) survey of tobacco root-knot nematodes in N.C. with Dr. Mina Mila, NCSU; and
- 7) survey of soybean root-knot nematodes in N.C. with Dr. Steve Koenning, NCSU.

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 2011, division staff engaged in the following field studies:

- 1) sweetpotato tissue sampling project with NCSU, K. Yarborough;
- 2) pre-sidedress nitrogen test evaluation, B. Knox;
- 3) lettuce fertility test (two locations), D. Farrer & T. Hall;
- 4) field-grown nursery stock study under fertigation, D. Farrer;
- 5) seeded and hybrid bermudagrass evaluations (four locations), R. Morris & T. Hall;
- 6) evaluation of calcium sufficiency levels in the soil, D. Dycus & D. Nicholson;
- 7) evaluation of corn stalk nitrate levels, B. Knox & D. Farrer; and
- 8) cotton baseline environmental study (5 locations), K. Yarborough, W. Nixon, D. Farrer, R. Morris & D. Nicholson.