

Project Title: Soil Fertility and Nutrient Management

Project Leader: Tracy Allen

Project Overview

Vigorously growing plants require adequate, but not excessive, essential nutrients. Nutrients must be provided in the right form, at the right time, and at the right place. Management of all nutrients sources (i.e., soil, commercial fertilizer, compost, and animal and green manure) within the constraints of the production system is fundamental to both economic viability and environmental quality. Poor management of plant nutrients can lead to economic losses and environmental degradation of soil, air, and water quality.

The overall objective of the Soil Fertility and Nutrient Management project is to develop and promote practical, innovative, and affordable solutions to existing and emergent issues related to soil fertility and nutrient management in the Commonwealth and beyond. This is accomplished through applied laboratory and field research used to support ongoing extension and outreach activities. The primary outreach vehicle for the project is the University of Massachusetts Soil and Plant Tissue Testing Laboratory.

The University of Massachusetts Soil and Plant Nutrient Testing Laboratory offers accurate and affordable analytical testing of nutrients in soils, plant tissue, compost, and soilless greenhouse media. We also offer analysis of heavy metals in soil, plant tissue, and compost. The lab promotes sustainable management practices by providing research-based interpretation of analytical results, and fertilizer and lime recommendations. These services help clients manage soil and soil amendments more profitably while protecting environmental quality. Lab clientele include backyard gardeners, green industry professionals and commercial growers, as well as engineers, crop consultants, and research scientists.

Activity Summary 2016

- Routine Soil Analysis: soil test reports 7,510 included organic matter, 2,481 included soluble salts, and 2,201 included nitrate testing. This represents 6,984 orders logged in by 5,170 customers over the course of the year. (17,375)
- Pre-Sidedress Soil Nitrate test: 48 samples for 18 orders and 12 customers. (48)
- Particle Size Analysis - broken into three categories: Comprehensive - 805 test results for 414 orders and 187 customers. 63 of those samples included extra sieves, and 152 included a particle size distribution graph. Basic - 254 test results for 131 orders and 80 customers. Title V Sand - 15 samples for 11 orders and 11 customers (14). (1074)

- Compost analysis is broken into two categories: Comprehensive - 222 test results with 149 orders and 102 customers. Of those test results, 109 included micronutrient testing, and 95 included metals. Basic - 37 test results from 28 orders and 27 customers. (259)
- Greenhouse Media Testing - There were 245 test results delivered for 81 orders and 44 customers. 48 of those test results included organic matter and 137 included sodium and sulfur measurement. An additional 18 test results for 11 orders and 4 customers requested pH and soluble salt measurement only for Greenhouse Media. (263)
- Plant Tissue Nutrient Analysis – There were 380 test results delivered for 78 order and 70 customers which included Total Nitrogen. Additionally, there were 154 test results and 5 orders for 4 customers which did not include Total Nitrogen. (534)
- Total Sorbed Metals testing: for total lead, nickel, copper, chromium, cadmium, and nickel. There were a total of 342 test results delivered. Of that number 256 also tested for arsenic, 120 tested for selenium, and 118 tested for molybdenum. There were a total of 235 orders for 221 customers. (342)
- Miscellaneous testing from 37 orders and 24 customers, which included total carbon and nitrogen, organic matter only and research projects. (565)
- Website Maintenance: The lab's website, <http://soiltest.umass.edu/>, includes information about the lab, available services, fact sheets, downloadable order forms, as well as links to relevant information within UMass Extension, and beyond. The website is updated regularly, and is used to keep clients informed about such things as current turnaround time, holiday closings, and changes within the lab. (1)
- Tours: were given by the lab to UMass students, Massachusetts Envirothon, students from Greenfield Community College, and the Western Mass. Master Gardeners group. Information about the lab, procedures, equipment used, as well as test results and their interpretation were covered. (5)
- North American Proficiency Testing (NAPT) program: During the 2nd and 4th quarters, analyzing soil samples. Results are compared to results submitted by other labs participating nationally. (2)
- Agriculture Laboratory Proficiency (ALP) program: During the 1st and 3rd quarters, analyzing plant tissue samples. Samples are analyzed and results submitted and compared to results submitted by other labs participating nationally. (2)

Total educational contacts

	Youth Contacts	Adult Contacts
Direct Contact	60	5500
Indirect Contacts (Print, Web, etc...)		254508

Narrative Summary and Impact

FY16 was a successful year despite increasing equipment maintenance and technical support expenses, as well as staffing struggles.

The lab currently has two ICP spectrometers. One of those instruments is over 15 years old. The cost of maintaining the older instrument is becoming prohibitive. The manufacturer, Spectro Analytical Instruments, has informed us that repair parts for that instrument may not be available in the future.

In 2013, we contracted with a computer programmer to create a system that collects biographical, analytical, and payment information, maintains a database, and generates test results for clients and various reports for administrative and data collection purposes. This critical system has been upgraded several times. The cost of maintenance has increased dramatically over the past few years due to a rate increase by the programmer.

The one-year appointment of the Departmental Assistant position created in FY16 expired. This necessitated the renegotiation of the Technical Assistant II position (vacated in December 2015). A compromise was met which increased expenditure slightly and decreased staffing levels by 0.3 FTE.

We face significant challenges in the near future. We must find creative ways to increase revenue while decreasing expenditures. We must either replace aging equipment, or find less expensive means of maintaining it. We must obtain affordable programming support for the lab's database and report generating system. Additionally, inexpensive or no cost means of promoting the lab must be pursued.

In spite of these challenges, our trust fund balance has grown significantly over the past year. Our current staff, which is efficient, reliable, and hardworking, deserves the credit for this growth. Their dedication to excellence is commendable.

The lab provides an essential service to the region's agricultural and horticultural community, as well as to thousands of home and community gardeners. Our influence reaches not only to Massachusetts and New England, but also across the country to Washington and California, and many places in between. I have confidence in the continued success of the lab, and look forward to meeting the challenges ahead of us.

Collaborating Organizations

- **Agricultural Laboratory Proficiency (ALP) Program**
- **North American Proficiency Testing (NAPT) Program.**
- **US Composting Council**

