

The Connecticut Agricultural Experiment Station



At a Glance

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Established – 1875

Statutory authority – CGS 22-79 – 22-118

Central office – 123 Huntington Street, New Haven, CT 06511

Number of employees – 91

Recurring operating expenses:

General Fund – \$ 6,815,675

Federal Funds – \$ 3,393,044

Other – \$ 960,043

Total – \$ 11,168,762

Organizational structure – Administration, Analytical Chemistry, Entomology, Environmental Sciences, Forestry & Horticulture, Plant Pathology & Ecology, Valley Laboratory (Windsor, CT), Griswold Research Center (Griswold, CT).

Mission

The mission of The Connecticut Agricultural Experiment Station is to develop, advance, and disseminate scientific knowledge, improve agricultural productivity and environmental quality, protect plants, and enhance human health and well-being through research for the benefit of Connecticut residents and the nation. Seeking solutions across a variety of disciplines for the benefit of urban, suburban, and rural communities, Station scientists remain committed to “Putting Science to Work for Society, Protecting Agriculture, Public Health and the Environment” a motto as relevant today as it was at our founding in 1875.

Statutory Responsibility

Statutory responsibilities for The Connecticut Agricultural Experiment Station (CAES) focus on insects, ticks, plants and related diseases, and the development of methods to reduce pesticide use (i.e., integrated pest management). Within available resources, field and laboratory studies are conducted, as determined by the agency's Board of Control, state residents (e.g., growers), or as requested by the General Assembly, pursuant to Connecticut General Statute (CGS Section 22-81). Scientists and technicians analyze food and other items at the request of any state agency; test ticks for the infectious agents that cause Lyme disease, Babesiosis and Anaplasmosis upon request of a state or municipal health officer or for scientific research purposes; test mosquitoes for public health threat from encephalitis viruses (CGS Sec 22-81a); oversee official control, suppression or extermination of insects or diseases, which are or threaten to become serious pests of plants; conduct research on integrated pest management (CGS Section 22-84a); inspect for diseases of honey bees and register beekeepers (CGS Sections 22-89, 22-90); and survey towns for gypsy moth, Asian longhorned beetle, Emerald ash borer, and other insect pests of economic or public health importance. In many instances, there are interactions with scientists or other officials in federal agencies. The Director is in charge of all matters pertaining to serious pests of plants and has regulatory authority (CGS Sections 22-84); responsibilities include the inspection and certification of nurseries, the registration of dealers of nursery stock, and enforcement of federal and state quarantines or regulations. Findings are reported to the public and scientific community by correspondence, lectures, media interviews, the agency's website, or published works. Emphasis is placed on submitting scientific manuscripts to peer-reviewed journals.

Station staff members provide prompt answers to routine and difficult but important agricultural, food safety, forestry, environmental, consumer protection, or public health questions by performing analyses; providing services to state residents; assisting small and large businesses, municipalities, state agencies and the scientific community; and by giving oral and written reports of research findings. Transferring new scientific information to the public and businesses is a high priority. The enhanced agency website (WWW.CT.GOV/CAES) continues to be an efficient means of communicating research findings and reducing operating costs. There were 275,190 sessions, 363,018 page views and 162,487 users during this reporting period. The average session duration was 3:51 minutes. Social media is also being used to reach out to our constituents via Facebook www.facebook.com/CT.CAES, Twitter www.twitter.com/CT_CAES, and YouTube Channel www.youtube.com/user/CTAGEXPSTATION. CAES also maintains a Wikipedia page http://en.wikipedia.org/wiki/Connecticut_Agricultural_Experiment_Station. Staff members gave 770 talks and interviews to civic groups and the media. One open house event was held at our Lockwood Farm facility during the summer; more than 1,157 state residents had an opportunity to meet scientists, hear presentations on scientific progress, see experimental plots and laboratories, and to make comments on research and outreach programs. Tapings of the event are available on the CTN, Connecticut Network, <http://www.ctn.state.ct.us/>

Public Service

Public service remains a high priority. The CAES serves a diverse group of state residents, large and small businesses, municipalities, and the scientific community within its areas of expertise. More than 48,000 jobs in agriculture, wood-products industry, and other business sectors are supported by the services provided by CAES staff members. People bring or mail samples or call with questions to the New Haven or Windsor facilities. Extensive contacts with state residents are particularly important for the early detection of emerging insect or plant disease problems. Global marketing of plants and plant products increases the chances for the introduction of invasive pests, such as the Asian longhorned beetle, Emerald ash borer, Southern pine beetle, and boxwood blight. The Emerald ash borer (EAB) was first detected in Connecticut on July 16, 2012 and has subsequently spread through a large portion of the state. The internal state quarantine for EAB was dropped in 2014 and all of Connecticut became part of the larger federal EAB regulated area. State regulations control the movement of wood and other regulated articles into Connecticut. Expanding its range, the Southern pine beetle was detected in Connecticut on March 17, 2015 and attacks ‘hard’ pines such as red pine, Scotch pine, Austrian pine, and our native pitch pine. More than 41,000 state residents received direct assistance from staff members at the CAES during the past year. Station scientists also visit farms when difficult or unique problems arise and provide information to growers and the media when asked. In addition, scientists served on advisory boards and provided information to more than 150 stakeholder organizations. Employees of other state agencies, such as the Departments of Agriculture, Consumer Protection, Public Health and Energy and Environmental Protection, also requested help from Station staff members when they sent specific samples for chemical, biological or microscopic analyses. All of these activities helped identify emerging problems, facilitated prompt and accurate responses to state residents’ inquiries, and ensured safe foods and other products. Receiving comments from citizens on evaluation or survey forms at public workshops, open house events, and other agency functions helps administrators gauge the effectiveness of research programs and services, and provides opportunities to realign program goals. In addition, there is an annual assessment of whether or not objectives listed in the agency’s 5-year strategic plan are being achieved. This strategic plan and accomplishment reports are requirements for USDA funds. Both documents are reviewed annually by federal officials.

New testing procedures are developed as needed to improve analyses, particularly when samples require more sensitive and specific methods. Scientific research at the CAES involves identifying a problem, investigating existing published knowledge, and designing experiments which will provide new information to help solve the problem, enhance Connecticut’s economy, or improve the well-being of state residents. In many instances, scientific results have impacts nationally.

Specific examples include the following:

- **Food Safety:** Connecticut General Statute [Sec. 22-81(c)] directs the CAES to conduct analyses as requested by other state agencies. In addition, CAES chemists work closely with the US Food and Drug Administration (FDA) in the Food Emergency Response Network (FERN). CAES is now in its 12 year of funding (\$3.89 million through 2020) under this program, with the current funding cycle running for three more years. Separately, CAES is in the final year of a 5-year \$1.5 million FDA grant that enabled the Department of Analytical

Chemistry to achieve ISO 17025 Accreditation (December 2016) as described in the Food Safety Modernization Act (FSMA); the accredited program involves a state surveillance program in which fresh and manufactured foods are tested for pesticides and arsenic. CAES has applied to the FDA for a two-year \$350,000 extension grant to continue this program; notification should come within the next month. Last, in conjunction with the CT Department of Agriculture, CAES has been awarded a third 5-year FDA grant (\$750,000) to bring animal feed chemical analysis under ISO 17025 accreditation as described in FSMA. This project is entering its third year and is focused on measuring mycotoxin contamination in state animal feeds. Recent work with the FDA included a surveillance assignment testing US exports of milk to the European Union for heavy metal contamination. CAES staff have continued work on a new instrument platform, liquid chromatography with high resolution mass spectrometry, for the detection of contaminants in food. This work included involvement in a formal FDA multi-laboratory method validation for one of the agency's primary poison/toxin protocols. CAES chemists are also actively using this new platform in many of our state programs. For example, samples of water from Hamden High School were evaluated on this instrument when a student fell ill after using a water fountain; no chemical contaminants were found. In addition, CAES is currently conducting an FDA surveillance assignment of 100 imported foods in the state; the analysis involves four different FDA methods for poisons, toxins, pesticides and heavy metals and is currently ongoing. Two CAES staff chemists have continued to serve as primary instructors for FDA training courses that deploy FERN food safety methods to both federal and state laboratories across the country. The Analytical Chemistry Department Head is currently serving on the FDA Method Coordination Committee; this committee reviews and approves FDA chemical, microbiological and radiological methods. With increased international food sources and more emphasis on large-scale food processing domestically, there is a greater potential for foods and beverages to be contaminated with toxic chemicals, such as pesticides, melamine, mycotoxins, pharmaceuticals and heavy metals. The Manufactured Food Regulatory Program Standards or MFRPS, which is run in conjunction with the CT Department of Consumer Protection and the FDA, serves as the sole chemical surveillance and monitoring effort in the state, assuring that the food supply within CT is free from adulteration and contamination. Similarly, the AFRPS or Animal Feed Regulatory Program Standard, conducted in conjunction with the CT Department of Agriculture and the FDA, serves as the sole surveillance and monitoring effort in the state for pet and livestock feed. Last, staff continue to work with FBI Weapons of Mass Destruction Directorate, 14th Connecticut National Guard Civil Support Team, CT State Police Emergency Services Unit, and CT Department of Public Health Bioterrorism Coordinator as a part of state-wide counter-terrorism programs.

- **Yale University Poisoning:** In late February 2017, the laboratory was contacted by the FBI Joint Terrorism Task Force (JTTF) and the CT Department of Public Health regarding a potential poisoning case at Yale University. The incident involved a community coffee machine and four staff fell ill (three lost consciousness) over a six hour period. The requested analysis was for sodium azide and other potential poisons; CAES was the only laboratory in the state able to provide azide analysis. Various samples were submitted by the Yale University Police Department for analysis, including coffee, water from several sources, mugs/cups and the coffee machine itself. CAES staff conducted 4 separate FDA toxin/poison/pesticide screening methods on several different analytical platforms. Azide was

detected in several of the liquid samples, with poison concentrations ranging from 10-340 mg/L. Our results were subsequently confirmed by the FBI laboratory in Quantico VA.

- **Mosquito-Borne Disease Surveillance:** Mosquito surveillance for eastern equine encephalitis (EEE) and West Nile virus (WNV) is integral to the public health response to these mosquito-transmitted diseases in Connecticut and provides an effective early warning system for citizens of the State (CGS Section 22-81a). CAES scientists and technicians monitor mosquito and encephalitis virus activity at 91 trapping sites from June through October. In 2016, a total of 173,988 mosquitoes (13,221 pools) representing 41 species were trapped and tested from 91 locations statewide between May 31 and October 13. A total of 122 isolations of WNV were made from 8 mosquito species: *Culex pipiens* =108, *Cx. restuans* = 7, *Aedes albopictus* = 1, *Anopheles punctipennis* = 1, *An. quadrimaculatus* = 1, *An. walkeri* = 1, *Cx. salinarius* = 1, *Culiseta morsitans* = 1, *Ochlerotatus japonicus* = 1 collected at 25 sites in 20 towns in 5 counties (Fairfield, Hartford, Middlesex, New Haven, and New London). The first positive mosquitoes were collected on July 6, and the last on September 28. The majority of WNV activity was detected in densely populated urban and suburban regions in Fairfield, Hartford and New Haven counties. One human case of WNV-associated illness was locally acquired (encephalitis/meningitis). Date of onset was during the third week of August. This human case was temporally and spatially consistent with WNV isolations from mosquito pools. No horse cases of WN virus infection were reported. There was one EEE virus isolation made from mosquitoes: *Culiseta melanura* = 1 in New London county and no equine or human cases have been reported. Other mosquito-borne viruses isolated included: Jamestown Canyon virus = 26 isolates from seven species (June 8 – Sept. 1) and LaCrosse = 1 isolate from 1 species (Sept. 22). CAES continues to closely monitor the expansion in Connecticut of two exotic mosquito species from Asia, *Aedes albopictus* (Asian tiger mosquito) and *Aedes japonicus*, which are aggressive human biters and have been implicated in the transmission of several human pathogens, including dengue, chikungunya, EEE, and WNV.
- **Invasive Aquatic Plants:** CGS Section 22-81(c) directs the CAES to perform experiments on plants. Invasive aquatic plants have been introduced in Connecticut from other parts of the world. With no natural enemies, they spread rapidly and threaten the ecological and recreational value of Connecticut's lakes. Since 2004, the CAES Invasive Aquatic Plant Program (IAPP) has completed aquatic vegetation surveys of 230 Connecticut lakes and has found that 59% contain invasive plants. A total of 56 water bodies have been resurveyed to determine how invasive plants are changing the quality of lakes over time. In fiscal year 2016-17, CAES IAPP surveyed 15 lakes and performed multifaceted research. Lake Candlewood, Connecticut's largest lake, was surveyed for the 10th consecutive year to determine the effects of winter drawdowns and grass carp (*Ctenopharyngodon idella*) the area and abundance of Eurasian watermilfoil (*Myriophyllum spicatum*), minor naiad (*Najas minor*) and curlyleaf pondweed (*Potamogeton crispus*). Lakes Lillinonah, Zoar and Squantz Pond were also surveyed to track changes in the population of invasive species. Upper and Lower Moodus Reservoir were surveyed for the third time and the positive effects of localized herbicide treatment on reducing variable watermilfoil (*Myriophyllum spicatum*) and fanwort (*Cabomba caroliniana*) while increasing native species were documented. Government and local officials request CAES assistance in finding methods to protect their bodies of fresh water. In response to requests from the town of Middlefield and CT DEEP, CAES IAPP surveyed Lake Beseck with particular emphasis on the locations of the state-

listed species Vasey's pondweed (*Potamogeton vaseyi*). Bashan Lake was surveyed and herbicide treatments were performed to eliminate phragmites (*Phragmites australis*) that invaded after a state mandate drawdown for dam repairs. CAES IAPP tested bottom herbicide placement and eliminated Brazilian waterweed (*Egeria densa*) from Fence Rock Lake. The CAES IAPP has extensive public outreach via workshops, speaking engagements and a comprehensive web site available at www.ct.gov/caes/iapp. Results are published in scientific journals, technical reports and in CAES bulletins.

- **Gypsy Moth:** Due to drought conditions in spring and early summer of 2016, the fungus, *Entomophaga maimaiga*, that usually keeps gypsy moth larvae in check did not “kick in”, and there was considerable damage due to larval feeding. We observed defoliation due to gypsy moth on 204,167 acres, mostly in Middlesex, New Haven, and New London counties. In November and December 2016, we conducted the annual gypsy moth egg mass survey at 80-95% favorable host sites on a 7-mile grid (102 sites) throughout Connecticut. Egg mass counts were very high in many locations in eastern CT, which presaged the huge outbreak and forest defoliation in 2017. Spring-summer rains resulted in the eventual massive die-off of gypsy moth caterpillars in late June 2017 by *E. maimaiga*. The Insect Information Office and the State Entomologist handled 7,000 inquiries about the gypsy moth and its control.
- **Honey Bees and Pollination:** A new law concerning pollinator health was enacted by the State of Connecticut in the 2016 legislative session (Public Act 16-17). The Act created a Pollinator Advisory Committee, consisting mainly of staff of the Experiment Station, required a study of the *Varroa* mite attacking honey bees by the State Entomologist, an evaluation of the possibilities of breeding bees resistant to the mites, and required the Experiment Station to create a citizen's guide to model pollinator habitat. Suggestions for updating the Connecticut statutes pertaining to the registration and inspection of honey bees (Sec. 22-89; 22-90) in the *Varroa* mite report were adopted in Public Act 17-21. Colony inspection determined *Varroa* mite infestation and the virus complex associated with *Varroa* infestation as the primary reason for colony mortality. The viral pathogens that cause deformed wing virus, Israeli acute paralysis virus, acute bee paralysis virus, and even the rare chronic bee paralysis virus were detected in Connecticut as part of the USDA Honey Bee Pests and Diseases Survey. CAES began a new research project to develop and rear honey bees resistant to the *Varroa* mite.
- **Tick-Borne Disease Research:** Human cases of Lyme disease are prevalent and other tick-borne diseases are increasing. The fourth year of a CDC-funded integrated tick management project to reduce the abundance of the blacklegged tick and risk of disease using a natural entomopathogenic fungus product (*Metarhizium anisopliae*) and mouse bait boxes in the town of Redding was concluded. A final report will be submitted to the CDC. A new joint integrated tick management project was begun in Guilford, CT supported by and in cooperation with the USDA Agricultural Research Service to evaluate combinations of deer-targeted 4-poster treatment stations, rodent-targeted bait boxes, and acaricide applications to reduce tick abundance and the risk of Lyme disease. A tick overwintering study found leaf litter or snow cover enhanced survival of the blacklegged tick and that the southern lone star tick, *Amblyomma americanum*, can overwinter in Connecticut. There has been a small, but steady increase in lone star tick submissions from state residents to the tick testing program.
- **Tick Testing Program:** Tick testing for infectious agents that cause human disease is freely available to State residents. The objectives are to: 1) examine ticks for evidence of infection in order to better understand the epidemiology of tick-associated diseases in Connecticut, 2)

inform residents of any potential health risk, and 3) assist physicians and residents concerning treatment. In 2015 the Tick Testing Laboratory was expanded to test blacklegged ticks, *Ixodes scapularis*, for two additional pathogens. In the past, testing was limited to *Borrelia burgdorferi*, the Lyme disease agent, but in view of increasing human cases of tick-related illnesses in the state, testing has been expanded to include *Anaplasma phagocytophilum*, the causative agent of Human Granulocytic Anaplasmosis, and *Babesia microti*, the causative agent of Babesiosis. Of the 5,808 ticks submitted by Connecticut residents, health departments and/or physicians' offices during fiscal year 2016-2017, 3,748 were examined, of which 1,164 (31.1%) tested positive for Lyme disease, 227 (6.1%) for babesiosis, and 189 (5.0%) for anaplasmosis. New molecular-based testing methods have additionally been implemented to reduce the average turnaround time to three days or less representing a significant enhancement of the tick testing services. In view of the potential human health risk associated with Powassan virus, preparations are underway to test ticks for this virus in addition to the other pathogens.

Improvements/Achievements 2016-2017

Statutory authority (CGS 22-82a) permits the CAES to seek patents, trademarks, and licensing agreements. License agreements have been established for a new cultivar of strawberry and a disease-resistant tobacco cultivar. Portions of the royalties are being used for operating costs and reinvesting into the crop research programs.

Efforts continue to reduce energy and other operating costs to become more efficient in performing research and delivering services to our residents. The agency has actively participated in the Governor's Lead by Example Energy Efficiency Program over the years. The agency has converted all interior and exterior lighting to LED technology, changed over from heating oil to natural gas to heat out buildings and is in the process of replacing old drafty windows with energy efficient windows to lower heating and other operating costs. Our Jenkins-Waggoner Laboratory building which opened in January, 2015 received a federal LEAD gold energy efficiency certification.

The Experiment Station is utilizing the state's e-licensing software program for the online registration of nursery growers, nursery dealers and beekeepers. The program also allows inspectors to enter and store regulatory inspection data in the online program. The statutorily required registration and inspection process is much more efficient for both the agency and registrant and provides the agency and state with significant cost savings.

Plant pathologists at the CAES continued their research on boxwood blight, a disease caused by the fungus *Calonectria pseudonaviculata*. New to North America, the disease was first detected on boxwoods in nurseries in Connecticut in 2011 and on pachysandra in landscapes in 2012. This disease has continued to spread and is now found in 22 other states in addition to three provinces in Canada. Boxwood is an economically important crop for the Connecticut nursery industry and is a popular ornamental plant in landscapes. With input from the nursery industry, personnel at the CAES responded to industry concerns by researching and developing best management practices (BMPs) in the mitigation of boxwood blight; these BMPs are suitable for use by landscapers, commercial plant producers, as well as homeowners. Research programs at CAES have made advances in developing molecular tools for early detection in plants, soil, and water, understanding survival and longevity of the fungus on hard surfaces in nursery

production, identifying effective sanitizers for disinfecting tools and equipment, identifying effective fungicides and spray programs to prevent new infections, fungicides capable of curative activity for up to 48 hours after infection, boxwood accessions with resistance to infection, susceptibility of pachysandra varieties, and understanding the genetic mechanisms underlying the potential for fungicide resistance. BMPs have been updated whenever new, science-based information from our ongoing research programs becomes available. BMPs and basic information on the fungus (including an identification guide with pictures of infected plants) are posted on the CAES website (www.ct.gov/caes). Unlike other states, there have been no boxwood blight detections in Connecticut nurseries since BMPs were instituted.

Several new programs in Plant Pathology have been initiated. Efforts are underway to advance our understanding of the molecular genetics of plant pathogenic bacteria. By deciphering the pathogen distribution and evolution of virulence factors in plant pathogenic bacteria, CAES scientists are identifying possible areas for disease management. Our forest pathologists are developing new areas of study that employ electrical-resistance tomography to nondestructively detect internal decay and cavities in trees. This technology determines if there is a higher frequency of internal decay in American elms that receive trunk injections for the treatment of Dutch Elm Disease. IT is also being used measure the amount of C in forest trees, thus refining current models of the role that forests play in sequestration of atmospheric carbon. CAES plant pathologists have made significant inroads into demonstrating a role for nanoparticles of metalloids and metallic oxides in suppression of plant diseases of asparagus, chrysanthemums, eggplants, pumpkins, soybeans, strawberries, watermelon, and wine-grapes. This novel strategy utilizes host nutrition of young plants and results in minimal amount of nano-products being applied, which in turn, may increase yields for a negligible costs. Our disease modeling and forecasting efforts continue to advise wine grape growers about disease outbreaks throughout the state. These CAES-web based postings are saving growers unnecessary fungicide applications, thus reducing costs and chemical inputs into our environment

CAES scientists are increasing our knowledge and understanding of the appropriate selection, location, and maintenance of trees in urban and suburban spaces to increase utility reliability, public safety, public health, environmental benefits, and reduce costs and risks for municipalities. Roadside trees and branches that fall during severe weather often cause extended power outages and extensive road blockages. CAES foresters are collaborating with utilities, environmental groups, land owners, and other state agencies to develop practical, cost-effective protocols to proactively foster healthy, storm resistant roadside forests by integrating silvicultural and arboricultural practices. Ten demonstration areas including over 4,300 trees have been established throughout Connecticut. Lessons learned on tree selection and coordination from implementation at nine areas are being incorporated into treatments scheduled at the remaining sites.

Scientists in Department of Environmental Sciences have made progress in a number of areas in FY17. In one study funded by the U.S. Department of Agriculture, they have discovered novel methods for modifying activated carbons to actively assist in chemical breakdown of air and water pollutants. This technology has so far been applied to the treatment of simulated gaseous vent streams containing the ozone-depleting chemical, methyl bromide, a fumigant used internationally in the quarantine and pre-shipment sterilization of produce and lumber. In another study funded by the Centers for Disease Control and Prevention, CAES scientists discovered that mosquitoes infected with the Zika virus more readily transmit the virus to humans when provided with additional non-infectious bloodmeals. Multiple feeding by mosquitoes is

commonplace in nature. This discovery may explain why Zika virus epidemics can be maintained with relatively few infected mosquitoes.

The CAES reaffirms its continuing policy of commitment to affirmative action and equal opportunity employment as immediate and necessary objectives and relies solely on merit and accomplishment in all aspects of the employment process and research programs. The CAES employed 17 white male, 23 white female, and 11 minority seasonal research assistants during the summer as a part of a mentoring program. In addition, CAES scientists were granted funds from a USDA proposal that funded the CAES/SCSU Summer Undergraduate Fellows in Plant Health and Protection program where undergraduate from Connecticut and elsewhere gain valuable experience work in CAES laboratories. The interns included 1 white male, 2 minority males, 5 white females, and 2 minority females. The goals of mentoring programs are to promote interest in science and provide specialized training. Station scientists also participated as judges in science fairs in New Haven and Hamden. Through these and other direct interactions, staff encouraged high school students to further their science education. The CAES continues to comply with diversity training requirements and is also participating in the University of Connecticut’s Employee Assistance Program. The agency’s goals in awarding contracts to small businesses and minority business enterprises were exceeded.

Information Reported as Required by State Statute

Scientists and technicians performed chemical, seed, soil, fertilizer, pesticide, animal feed, mosquito, and tick tests; answered inquiries; conducted plant, nursery, and bee inspections; and surveyed for the gypsy moth and other insect pests as listed below.

Service or Test Number	2016-2017
Inquiries answered (all departments)	27,814
Field visits and diagnostic tests	310
Nematode diagnostics	148
Soil Tests Completed	
New Haven and Windsor	17,355
Samples Tested	
Department of Agriculture	181
Department of Consumer Protection (DCP)	339
Department of Energy & Environmental Protection	113
CAES Departments	746
FDA, Municipal Health Departments, Cities/Towns, and Misc. Foundations	251
UConn Cooperative Extension	29
University Research Collaborations	502
Seed Samples Tested (vegetable, lawn, field crop)	290
Consumer Plant Samples Tested	2,053
Wine Grapes Tested	27
Nursery and Seed Inspections	
Greenhouse plants	1,059
Nursery stock containers and bare root	30,796

Perennial plants	1,637
Nursery inspections	500
Tobacco (bales, boxes, bundles, and cartons)	134,727
Permits to move homeowner plants out of state	186
Seed (cartons and bags)	198
Acres of nursery stock inspected	5,000
Gypsy Moth Survey	
Forest acres surveyed for gypsy moth by air	1.8 million
Bee Inspection	
Beekeepers registered	1,655
Beehives examined for mites and foulbrood	1,300
Tick Identification and Testing	
Ticks identified	3,748
Ticks tested for human pathogens	3,748
Ticks infected with <i>Borrelia burgdorferi</i> (Lyme disease)	1,164 (31.1%)
Ticks infected with <i>Babesia microti</i>	227 (6.1%)
Ticks infected with <i>Anaplasma phagocytophilum</i>	189 (5.0%)
Mosquito Testing	
Mosquitoes trapped, identified, and tested for EEE, West Nile, and other encephalitis viruses	173,988
Number of trapping sites	91