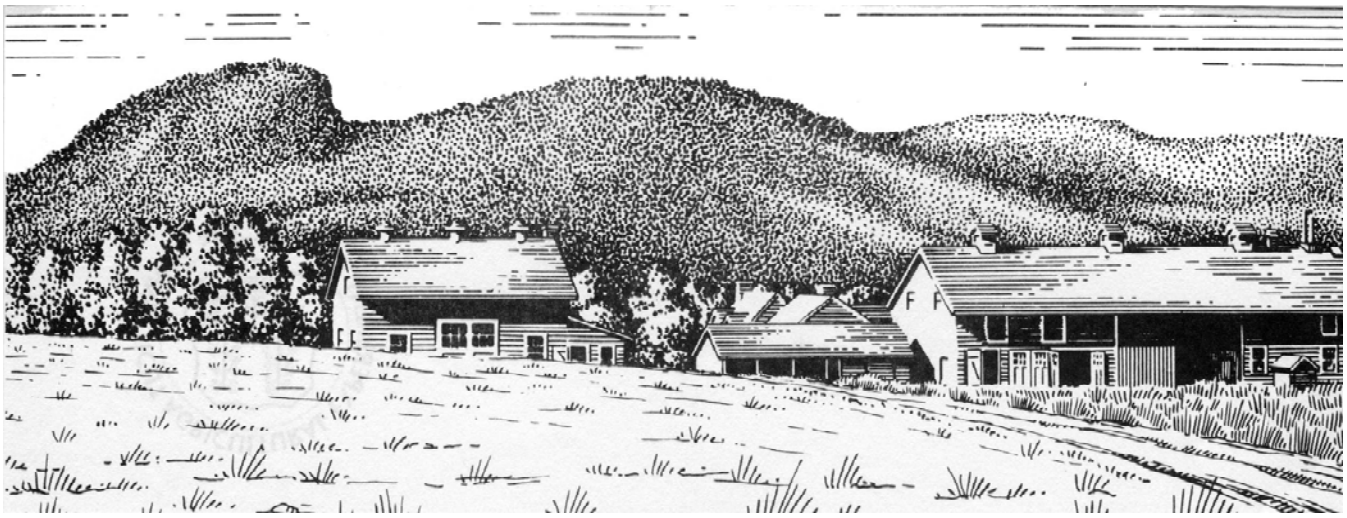
Plant Science Day

- The Annual Samuel W. Johnson Lecture
- Presentations on Research • Technical Demonstrations
- Field Experiments • Passport for Children
- Connecticut Pesticide Credits
- Century Farm Award • Barn Exhibits



Lockwood Farm, Hamden

Wednesday, August 5, 2009

History of Lockwood Farm, Hamden

Lockwood Farm is a research facility of The Connecticut Agricultural Experiment Station. Historically, the farm was purchased in 1910 with monies provided by the Lockwood Trust Fund, a private endowment. The original farm was 19.6 acres with a barn and a house. Since then, several adjacent tracts of land were purchased, enlarging the property to 75.0 acres.

The farm is located in the extreme southern portion of the Central Lowland Physiographic Province. This lowland region is underlain by red stratified sandstone and shale of Triassic age from which resistant lava flows project as sharp ridges. One prominent ridge, observed from the farm, is Mount Carmel, which lies to the north. The mountain is composed of basalt, a dense igneous rock commonly used as a building material and ballast for railroad tracks.

The topography of the farm is gently rolling to hilly and was sculpted by the Wisconsin glacier that overrode the area some 10,000 years ago and came to rest in the vicinity of Long Island. A prominent feature of the farm is a large basaltic boulder that was plucked from Sleeping Giant by the advancing glacier and came to rest on the crest of a hillock to the south of the upper barns. From this hillock, Sleeping Giant State Park comes into full view and is a favorite spot for photographers and other artists.

The soils of the farm developed on glacial drift are composed primarily of the underlying reddish brown sedimentary rocks. The soils, characterized by reddish-brown profiles, are the well-drained Cheshire fine sandy loam (67%), the moderately well-drained Watchaug loam (10%) and the shallow-to-bedrock Sunderland fine sandy loam (16%). Along the western edge of the farm, adjacent to the Farmington Canal Greenway, lies a level terrace of stratified glacial drift. There, the well-drained Branford loam and the moderately well-drained Ellington loam (7%) dominate. Elevations on the farm range from 140 to 220 feet above mean sea level.

The farm lies in the Coastal Plain Climatological District. The local climate is influenced by its proximity to Long Island Sound that lies 9 miles to the south. The average frost-free season is 190 days, compared to 180 days at the inland Valley Laboratory in Windsor.

In 1936, a fully instrumented weather station was established on the farm. The weather data are reported to and published by the U.S. Weather Service in their cooperative observer program. The mean annual temperature for the farm is 49.0 F. A record high temperature, 104.0 F, was observed on July 4, 1949. A record low temperature, -24.0 F was recorded on February 16, 1943. The mean annual precipitation for the farm is 52.6 inches. The greatest total precipitation, 71.2 inches, was recorded in 1983. The least precipitation, 30.4 inches, was recorded in 1965. The mean annual snowfall for the farm is 32.3 inches. The greatest total snowfall, 78.5 inches, was recorded during the winter of 1995-1996. The least total snowfall, 11.3 inches, was recorded in 1972-1973.

The farm provides a field laboratory for many Experiment Station scientists who learn how to control the pathogens and insects that attack trees, fruit, and vegetables. In some experiments, scientists learn how crops grow and develop strategies for efficient crop production. All field research can be observed at Plant Science Day, held on the first Wednesday in August.

CENTURY FARM AWARD

The Century Farm Award goes to a farm that has been in family operation for more than 100 years. The recipient is selected by the Connecticut Agricultural Information Council.

CENTURY FARM CITATION

Davis-Stanton Homestead
Stonington, Connecticut

The Davis-Stanton Homestead is located in Lower Pawcatuck (part of the town of Stonington, Connecticut). Thomas Stanton started the first business in 1654, which consisted of a grist mill and later a sawmill. Surrounding an historic mid-17th century farmhouse are more than 300 acres of prime farmland, which has been cultivated for at least 355 years. This property has great historic value spanning thousands of years.

John Davis married Sally Stanton, who was Robert Stanton's granddaughter, and bought the farm from the Stanton family in 1772. The farm provided hay to the Continental Army and salt pork, bacon, cider, cheese, and other products to the Stonington whaling ships.

John "Whit" Davis began farming at the age of 11. He had a garden plot, pony, and a cart for his first growing season. For several decades, he planted several acres of Indian white flint corn, which has been passed from one generation to the next. Strong ties exist between Whit Davis and Native American tribes. Having strong interests in conservation, he has served on the Stonington Conservation and Inland Wetland Commission and has sold development rights to the State of Connecticut.

Today, Whit Davis and his son Larry grow sweet corn, tomatoes, peppers, and broccoli, but their main crops are upland hay and salt hay cut on the "Continental Marsh". The salt hay is cut during the winter to prevent damaging the marsh. Chickens are raised to produce eggs for local farm markets.

As Governor, I am happy to join The Connecticut Agricultural Experiment Station and the Connecticut Agricultural Information Council in presenting this Century Farm Award to family members working on the Davis-Stanton Farm and who are most deserving of this honor.

THE SAMUEL W. JOHNSON MEMORIAL LECTURE (Main Tent)

The Experiment Station Board of Control established the lectureship to further discuss issues of concern to Connecticut residents and the Station. Professor Johnson was director of the Experiment Station from 1877 to 1900 and was a leader in the establishment of American agricultural experiment stations.

ANSWERS TO YOUR QUESTIONS (Plot 27)

Staff members in the "question-and-answer" tent are prepared to give information on identification of insects, plant disorders, soils and their management, and other problems of growers and gardeners.

PASSPORT FOR CHILDREN (Plot K & 53)

This is a special event for children to enjoy and explore Plant Science Day. There are six different stations located throughout Lockwood Farm that they can visit and receive a special stamp for their passport. Once the passport is filled, they can go to the Kid's Korner tent (K) and receive a prize. Brownies can use this to earn the "Plants Try-It!" Once the passport is complete, they can go to the Girl Scout table (Plot 53) to collect their "Try-It!"

ACTIVITY FOR CHILDREN (Plot K & 53)

This is a self-guided activity. Once the activity is complete, they can go to the Kid's Korner tent (K) and receive a prize. Junior Girl Scouts can use this activity to earn the Earth Connections badge. Once this activity is complete, they can collect their badge at the Girl Scout table (Plot 53).

CONNECTICUT PESTICIDE CREDITS (Barn A)

Connecticut pesticide credits will be offered for attending Plant Science Day. If you are interested in obtaining pesticide credits, you must sign-in at the registration desk (Barn A) at the start of the day, between 9:30 a.m.-10:00 a.m., collect signatures for the talks, demonstration, and tours you attended, and sign-out to pick up your pesticide credit form between 2:45 p.m.-4:00 p.m.

Connecticut Pesticide Credits Offered: All Categories and Private Applicators (PA): 3.5 hours. Applicators can assign 3.5 credit hours to one category or split hours among more than one category.

Visit The Connecticut Agricultural Experiment Station's web page at: www.ct.gov/caes

After the lecture, visitors may remain in the tent for lunch. Coffee and cold drinks are free.

THE 99th ANNUAL PLANT SCIENCE DAY

10:00 a.m.—GREETING

MAIN TENT, 11:20 A.M.

Louis A. Magnarelli, Director—PRESIDING

CENTURY FARM AWARD

REMARKS

Pamela Weil
President, Experiment Station Associates

THE SAMUEL W. JOHNSON MEMORIAL LECTURE

Margery Winters
Senior Educator, Roaring Brook Nature Center, Canton
"Saving our Wild Areas, One Yard at a Time"

PRESENTATIONS ON RESEARCH AND TECHNICAL DEMONSTRATIONS

10:00 a.m. **TECHNICAL DEMONSTRATION TENT Dr. Claire E. Rutledge, Entomologist, Department of Entomology**

Do I Have the Asian Longhorned Beetle? How to Identify this Major Threat to Connecticut's Trees

(15-minute demonstration, repeated twice during the day, 10:00 a.m. & 1:35 p.m.)

The Asian Longhorned Beetle is an unwelcome newcomer to the United States. This big black beetle with white spots probably came here as a hitchhiker in solid wood packing material carrying imports from Asia. The beetle's larvae are borers, eating the wood and living tissues of branches and trunks of otherwise healthy trees. Among the beetles' favorite hosts are maple, birch, and willow--all important trees in Connecticut's forests and landscapes. The recent discovery of a large infestation in Worchester, Massachusetts has raised new concerns that the beetle may enter Connecticut. In this demonstration, we will learn how to identify the beetle, and how to distinguish it from native look-alikes. We will also learn to identify some of the major tree hosts of the beetle. We will examine the damage the beetles cause to trees, learn the tell-tale signs of beetle activity, and how to distinguish them from other common tree injuries.

10:20 a.m. **MAIN TENT Dr. Victoria L. Smith, Deputy State Entomologist, Department of Entomology**

Asian Longhorned Beetle: A Threat to our Forests

The Asian Longhorned Beetle (ALB) is an exotic invader from China that is a major threat to the forest resource of Connecticut and New England. Our forests are prized for their scenic beauty, ecological diversity, and economic value. The ALB has infested cities in states surrounding Connecticut, including New York, New Jersey, and Massachusetts. The ALB moves into new areas by transport in wood, including pallets, firewood, and wood-packing materials. In short, we accidentally help move this insect around. Unfortunately, this beetle remains well hidden until large populations have developed, making eradication and control very difficult. The consequences of infestation are damaged and weakened trees, loss of the trees through eradication efforts, and a drastically changed landscape in the infested areas. By learning how to recognize this insect, what to do if you find one, and ways to prevent its movement into new areas, you can help in the efforts to detect and control this potentially-devastating introduced pest.

10:50 a.m. **MAIN TENT Dr. Douglas W. Dingman, Microbiologist, Department of Biochemistry and Genetics**

Honeybees and American Foulbrood

In 2007, Connecticut had 295 registered beekeepers who manage 2,587 beehives. Concern about the health of these honeybees has increased because of the alarming reports of honeybee colony losses nation-wide. American foulbrood (AFB) is a disease of honeybees that is caused by the endospore-forming bacterium *Paenibacillus larvae*. AFB can devastate colony health and may result in complete loss of the colony. The lack of observable disease symptoms is considered by beekeepers as being free of the disease. However, AFB can propagate within a hive on the level of an unseen factor (i.e., a sub-clinical infection). An initial survey for AFB in Connecticut identified approximately 10% of the apiaries visited as containing hives with observable cases of AFB. However, testing for sub-clinical cases of AFB identified another 40% of the apiaries with infections. This finding (approximately 50% of Connecticut apiaries testing positive for *P. larvae* spores) indicates that health of many honeybee colonies is being suppressed due to a continual low level bacterial infection. By understanding the prevalence and distribution of AFB in Connecticut, a focused approach to limit the disease spread and suppress its presence can be developed.

11:05 a.m. **TECHNICAL DEMONSTRATION TENT Mr. Thomas M. Rathier, Soil Scientist, Valley Laboratory**

Gardening with Containers

(15-minute demonstration, repeated twice during the day, 11:05 a.m. & 2:05 p.m.)

Ornamental plants and vegetables growing in containers can provide interesting accents to in-ground landscapes. They can also be landscapes unto themselves for gardeners with no tillable soils or physical limitations. Scientists have made many discoveries over the years about how plants grow in containers. This demonstration will highlight those discoveries and how they relate to successful container gardening.

11:20 a.m. **MAIN TENT Introductions, Award Presentations, Century Farm Award, and The Samuel W. Johnson Memorial Lecture**

11:45 a.m. **MAIN TENT Guest Speaker, Margery Winters, Senior Educator, Roaring Brook Nature Center, Canton**

"Saving our Wild Areas, One Yard at a Time"

Margery has a longstanding interest in how every citizen can be a good steward of the environment, whether in their yard, garden or the community. She communicates her interests in ecology in talks to garden clubs, workshops and outreach programs throughout the state. Margery is an instructor at Roaring Brook Nature Center in Canton and manages their native plant gardens. She is a Past President of the Simsbury Garden Club, past Chairman of the Federated Garden Club Landscape Design Study Program, and is a Master Landscape Design Critic.

Margery also brings her interest to private and public sectors on how to work together to promote the natural environment. She serves as the Vice Chairman on the Simsbury Inland Wetland / Conservation Commission, a member the Simsbury Open Space Committee, and as a board member of the Simsbury Land Trust. Margery has been actively involved in Connecticut's river and land issues and is the former Director of Programs and Research with the statewide river advocacy organization, Rivers Alliance of Connecticut. Before moving to Connecticut in the mid-1980s, she was an Environmental Scientist with Argonne National Laboratory in Chicago.

Margery holds a Masters of Science degree in Physical Geography (Queen's University, Canada) and a BA in Geology/Physical Geography (Miami University, Ohio).

1:20 p.m. **MAIN TENT Dr. Francis J. Ferrandino, Epidemiologist, Department of Plant Pathology and Ecology**

Weather Monitoring, Pathogen Biology, and Disease Management for Winegrapes in Connecticut

Winegrapes and wineries are a relatively new industry in Connecticut. In the past decade, acreage planted to winegrapes has gone from 160 acres to 340 acres and the number of wineries has increased from 15 to 30. These wineries produce about 300,000 gallons of wine valued at between 8-10 million dollars per year. The climate in Connecticut is considerably wetter and cooler than the climate found in most other winegrape-growing regions of the United States. As a consequence, the impact of our local weather patterns on diseases of winegrape needs to be investigated in both research and commercial vineyards. A disease of particular concern to the local vineyard industry is powdery mildew. Remote access weather stations have been installed in numerous vineyards and plants are monitored weekly for the presence of inoculum and symptoms of powdery mildew. Weather data are used to generate weekly disease warnings that are then communicated

to growers. This information should reduce the number of fungicide applications without threatening the quality and quantity of the winegrape crop.

1:35 p.m. **TECHNICAL DEMONSTRATION TENT Dr. Claire E. Rutledge, Entomologist, Department of Entomology**

Do I Have the Asian Longhorned Beetle? How to Identify this Major Threat to Connecticut's Trees

(15-minute demonstration, repeated twice during the day, 10:00 a.m. & 1:35 p.m.)

The Asian Longhorned Beetle is an unwelcome newcomer to the United States. This big black beetle with white spots probably came here as a hitchhiker in solid wood packing material carrying imports from Asia. The beetle's larvae are borers, eating the wood and living tissues of branches and trunks of otherwise healthy trees. Among the beetles' favorite hosts are maple, birch, and willow--all important trees in Connecticut's forests and landscapes. The recent discovery of a large infestation in Worchester, Massachusetts has raised new concerns that the beetle may enter Connecticut. In this demonstration, we will learn how to identify the beetle, and how to distinguish it from native look-alikes. We will also learn to identify some of the major tree hosts of the beetle. We will examine the damage the beetles cause to trees, learn the tell-tale signs of beetle activity, and how to distinguish them from other common tree injuries.

1:50 p.m. **MAIN TENT Dr. John F. Anderson, Medical Entomologist, Department of Entomology**

Detection and Control of Bed Bugs

Bed bugs were brought to North America from Europe in early colonial times on sailing ships. They hide in beds, furniture, and belongings and feed on humans. They were prevalent in Connecticut in the early 1900's, but were scarce from the mid 1940's through the late 1990's. They are now reappearing in relatively large numbers in many Connecticut communities. Their proliferation has been attributed to increased travel, the exchange of used bedding and furniture, limited availability of effective and approved insecticides, and insecticide resistance. We have tested and described a trap using carbon dioxide, heat, and a chemical lure for the detection of infestations in apartments. We are currently evaluating the efficacy of various pesticides for control of bed bugs. Methods of reducing bed bug infestations will be discussed.

2:05 p.m. **TECHNICAL DEMONSTRATION TENT Mr. Thomas M. Rathier, Soil Scientist, Valley Laboratory**

Gardening with Containers

(15-minute demonstration, repeated twice during the day, 11:05 a.m. & 2:05 p.m.)

Ornamental plants and vegetables growing in containers can provide interesting accents to in-ground landscapes. They can also be landscapes unto themselves for gardeners with no tillable soils or physical limitations. Scientists have made many discoveries over the years about how plants grow in containers. This demonstration will highlight those discoveries and how they relate to successful container gardening.

Pesticide Credit Tour (meet at Barn A)

12:15 p.m. – 1:15 p.m.

12:15 p.m. **MEET AT REGISTRATION DESK (BARN A) Mr. Thomas M. Rathier, Soil Scientist, Valley Laboratory, Windsor**

A 1-hour guided tour of selected field plots will be conducted by Mr. Thomas M. Rathier, Soil Scientist, Valley Laboratory. Participants can discuss experiments and topics with scientists at each station on the tour.

Stops on tour:

- **Dr. Hugh Smith, Entomologist, Valley Laboratory**
  Management of Strawberry Sap Beetle (Stelidota geminata) (Plot 44)
- **Dr. Sandra L. Anagnostakis, Mycologist, Department of Plant Pathology and Ecology**
  Control of Blight on American Chestnuts (Plot 23)
- **Dr. James A. LaMondia, Plant Pathologist, Valley Laboratory**
  Biodiesel Oilseed Crops for Biological Control of Soilborne Pathogens (Plot 43)
- **Dr. Chris Maier, Entomologist, Department of Entomology**
  Invasive Alien Insects in Connecticut (Plot 28)

2:45 p.m.–4:00 p.m. **SIGN-OUT (for those requesting pesticide credits) (BARN A)**
Attendees pick up Pesticide Credit forms at the registration table in Barn A.

LOCKWOOD FARM WALKING TOURS (meet at BARN A)

9:15 a.m. – 10:15 a.m. & 2:15 p.m. – 3:15 p.m.

9:15 a.m. & 2:15 p.m. **MEET AT REGISTRATION DESK (BARN A)** **Dr. Robert E. Marra, Forest Pathologist, Department of Plant Pathology and Ecology**
A 1-hour guided tour of selected Barn Exhibits and Field Plots will be conducted by Dr. Robert E. Marra, Forest Pathologist, Department of Plant Pathology and Ecology. Participants can discuss experiments and topics with scientists at each station on the tour.

9:15 a.m. – 10:15 a.m. **MORNING WALKING TOUR**, Approximately ½-mile, moderately hilly
Stops on Tour:

- **Dr. Sandra L. Anagnostakis, Department of Plant Pathology and Ecology**
  Ms. Pamela Sletten, Department of Plant Pathology and Ecology
  Chestnut Species and Hybrids (Plot 80)
  Dense Planting of American Chestnuts (Plot 81)
  Dwarf Hybrid Chestnut Trees (Plot 82)
- **Dr. Abigail A. Maynard, Department of Forestry and Horticulture**
  Pawpaw and Beach Plum Trials (Plot 87)
  Japanese Plum Variety Trials (Plot 88)
- **Dr. Sandra L. Anagnostakis, Department of Plant Pathology and Ecology**
  SIGNS ONLY
  Rocky Hill American Chestnut Trees (Plot 84)
- **Dr. Kimberly Stoner, Department of Entomology**
  Dr. Brian Eitzer, Department of Analytical Chemistry
  Measuring Pesticide Residues in Pollen and Nectar of Squash (Plot 76)
- **Dr. Wade H. Elmer, Department of Plant Pathology and Ecology**
  Inducing Fusarium Disease Resistance in Gladiolus (Plot 77)
- **Dr. Abigail A. Maynard, Department of Forestry and Horticulture**
  Specialty Pumpkin Trials (Plot 79)
- **Ms. Lisa Kaczenski, Business Office**
  Eastern Bluebird Sialia sialis *Nest Box Trail* (Plot 71)

2:15 p.m. – 3:15 p.m. **AFTERNOON WALKING TOUR**, Approximately ½ mile, moderately hilly
Stops on Tour:

- **Dr. Abigail A. Maynard, Department of Forestry and Horticulture**
  Using Soybean Meal and Corn Gluten on Turf (Plot 11)
  Sheet Composting with Oak and Maple Leaves (Plot 2)
  Sweet Potato Trials (Plot 3)
  Pak Choi Trials (Plot 4)
  Personal-Sized Watermelon Variety Trials (Plot 5)
  Vegetable Amaranth Trials (Plot 6)
  Edamame Trials (Plot 7)
  Calabaza Squash (Plot 8)
- **Dr. Sandra Anagnostakis, Department of Plant Pathology and Ecology**
  Butternuts and Heartnuts (Plot 9)
- **Dr. Wade H. Elmer, Department of Plant Pathology and Ecology**
  Use of Earthworms to Suppress Fusarium Crown Rot of Asparagus (Plot 10)
- **Mr. Michael Short, Department of Forestry and Horticulture**
  Cultivar Trial of Greenhouse Tomato Grown in Coir Dust (Plot 12)
- **Dr. Francis J. Ferrandino, Department of Plant Pathology and Ecology**
  Environmentally-Friendly Control of Powdery Mildew on Landscape Plants (Plot 14)
  Powdery Mildew on Chardonnay Winegrapes (Plot 15)
- **Dr. Carole A. Cheah, Department of Entomology, Valley Laboratory**
  Biological Control of Hemlock Wooly Adelgid (Plot 16)

- **Dr. Richard S. Cowles, Department of Entomology, Valley Laboratory**
  Advances in Chemical Control of Hemlock Woolly Adelgid (Plot 17)

Tour of Native Woody Shrubs (Plot 73)
12:00 p.m. – 12:30 p.m.

12:00 p.m.-12:30 p.m. MEET AT THE WOOD ARBOR OF THE NATIVE WOODY SHRUBS Dr. Jeffrey S. Ward, Station Forester, Department of Forestry and Horticulture
A ½-hour guided tour of our native shrub planting to be conducted by Dr. Jeffrey S. Ward, Station Forester, Head Department of Forestry and Horticulture. Learn about using native shrubs for naturalistic landscapes without the use of pesticides and fertilizers.

Bird and Butterfly Garden Events (Plot 72)
11:00 a.m. & 2:00 p.m.

11:00 a.m. MEET AT THE BIRD AND BUTTERFLY INFORMATION TABLE Mr. Jeffrey Fengler, Department of Entomology
Mr. Jeffrey Fengler will lead a "Butterfly Identification Walk".

2:00 p.m. MEET AT THE BIRD AND BUTTERFLY INFORMATION TABLE Ms. Jane Canepa-Morrison, Valley Laboratory
Ms. Jane Canepa-Morrison will demonstrate "Deadheading Perennials: "The Why, When, and Where".

BARN EXHIBITS (Barn B)

FEPS - The Food, Environmental, and Product Safety Laboratory
Department: Analytical Chemistry
Investigators: Dr. MaryJane Incorvia Mattina, Dr. Walter J. Krol, Dr. Christina S. Robb, Dr. Brian D. Eitzer, Mr. John F. Ranciato, Mr. Craig L. Musante, Ms. Terri Arsenault, and Mr. William A. Berger
Abstract: The Department of Analytical Chemistry at The Connecticut Agricultural Experiment Station conducts numerous analyses that impact the quality of life for Connecticut citizens. To underscore this work, we have designated our laboratory as Connecticut's Food, Environmental and Product Safety Laboratory. Examples of our work which we highlight in this presentation include: agrochemicals in fruits and vegetables, melamine in imported foods, pesticide residues in honey bee pollen, volatile organic emissions from crumb rubber made from recycled tires, and lead paint in children's toys.

Photosystem II: Origin of Plant Growth
Department: Biochemistry and Genetics
Investigator: Dr. Richard B. Peterson
Abstract: Photosystem II is the initial step in higher plant photosynthesis; our ultimate source of food, fiber, and renewable fuel. This is a multiprotein complex that extracts electrons from water and releases oxygen into the atmosphere. This exhibit will summarize some of what is known about the composition and function of this molecular machine. We will also show some of the experimental approaches used to study its properties.

Natural & Biological Tick Control
Department: Entomology
Investigators: Dr. Anuja Bharadwaj and Dr. Kirby C. Stafford, III
Assisted by Ms. Heidi R. Stuber, Ms. Lindsley Colligan, and Ms. Foeleana Sansevero
Abstract: There is increasing interest in natural and organic alternatives for the control of the blacklegged tick, *Ixodes scapularis*. Over the past several years, we have been evaluating an entomopathogenic fungus, *Metarhizium anisopliae,* and nootkatone, an essential oil extract from Alaska yellow cedar, for the control of *I. scapularis*, both of which have provided relatively good control in the laboratory and field.

How to Control Barberry and Reduce Ticks
Department: Forestry and Horticulture
Investigators: Dr. Jeffrey S. Ward, Dr. Scott C. Williams, Mr. Thomas E. Worthley (University of Connecticut), and Dr. Kirby C. Stafford, III
Abstract: In Connecticut's forests, Japanese barberry (*Berberis thunbergii*) is an invasive species of concern that inhibit forest regeneration and native herbaceous plant populations, and harbors greatly enhanced levels of blacklegged ticks (*Ixodes scapularis*) which transmit the causal agents of several diseases including Lyme disease. We have developed a two-step process that controls Japanese barberry and simultaneously reduces the number of ticks with the spirochete *Borrelia burgdorferi*, the causal agent of Lyme disease in humans, by over 80%.

Controlling Bacterial Plant Diseases with Bacteriophages
Department: Plant Pathology and Ecology
Investigator: Dr. Botond Balogh
Abstract: Bacteria cause a number of devastating plant diseases that can result in serious economic losses. These infections are extremely hard to control when the environmental conditions are favorable for disease development. Unfortunately, traditional chemical using copper and antibiotic sprays often fail to contain disease spread. Bacteriophages (phages) are viruses that attack bacteria. They are natural enemies of bacteria and are frequently present in bacterial infections of plants, animals, and humans. Phages are excellent candidates for biological control, because they are natural bacteria killers, safe to humans and animals, environmentally friendly, and target-specific since they only affect target species or subspecies. They can also be applied as sprays and may be used in concert with other means of control (such as plant activators, other biocontrol agents, and chemical bactericides) as a part of an integrated pest management strategy. We are currently working on evaluating bacteriophage-therapy for controlling two important diseases in Connecticut: bacterial spot on stone fruits and pepper bacterial spot.

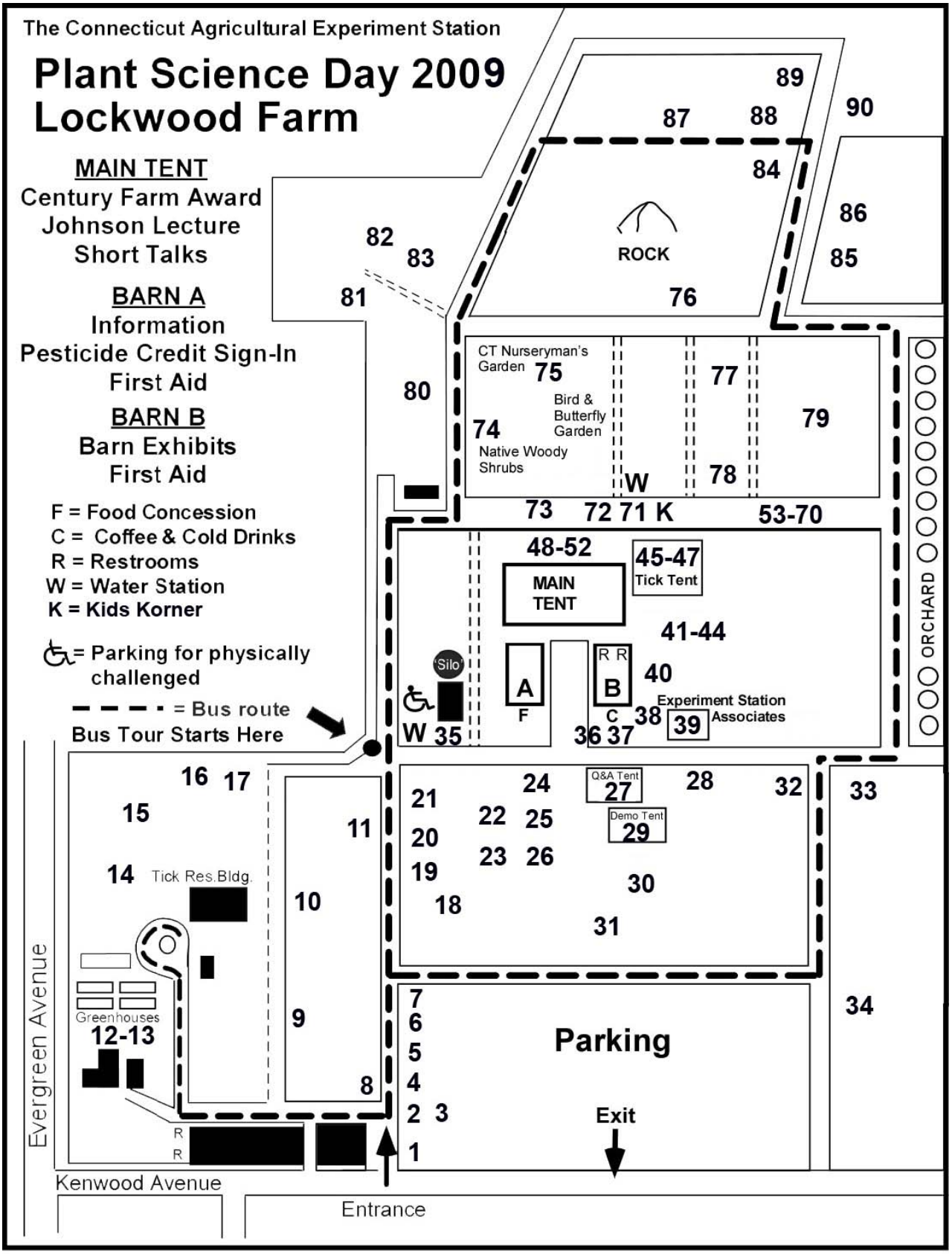
Detection and Identification of Mosquito-Borne Viruses in Connecticut
Department: Soil and Water
Investigators: Dr. Philip M. Armstrong, Dr. Theodore G. Andreadis, Ms. Shannon L. Finan, Mr. John J. Shepard, and Mr. Michael C. Thomas
Abstract: Mosquitoes transmit a number of distinct viruses in the northeastern U.S., including West Nile virus and eastern equine encephalitis virus, which are the most important mosquito-borne pathogens in this region. In response to ongoing threats of mosquito-borne disease, the Experiment Station established a surveillance program in 1997 that monitors virus activity by trapping and testing mosquitoes collected throughout Connecticut. In this presentation, we review how mosquitoes are tested for virus infection in the new state-of-the-art virus laboratory at the Experiment Station. Mosquitoes are initially screened in cell cultures that support virus growth and viruses isolated in cell culture are then identified using molecular genetic techniques. To date, we have isolated 9 different virus species from mosquitoes and among these, 5 viruses are known to cause human disease. Three of these viruses (West Nile virus, Potosi virus, and La Crosse virus) represent new records for North America or New England. Our ability to detect a wide diversity of virus species is critical to monitoring both established and newly emerging viruses in the mosquito population.

THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION
The experiments exhibited here depict only a portion of the work performed by Station scientists. In addition to Lockwood Farm, Griswold Research Center, and laboratories in New Haven and Windsor, Station scientists use state forests, private orchards, lakes, and farms for their experiments. Experiments and surveys are conducted in many widely separated towns of the state.

THE EXPERIMENT STATION HAS A WEB PAGE: WWW.CT.GOV/CAES.

TO RECEIVE A COMPLETE LIST OF STATION SPEAKERS: inquire at the publications table in barn A, write to: Publications; The Connecticut Agricultural Experiment Station; P.O. Box 1106; New Haven, CT 06504-1106, phone 203-974-8447, fax 203-974-8502, e-mail Vickie.Bomba-Lewandoski@ct.gov, or on the web at http://www.ct.gov/caes/cwp/view.asp?a=2812&q=345128.

TO RECEIVE A COMPLETE LIST OF AVAILABLE STATION PUBLICATIONS: Inquire at the publications table in barn A, write to: Publications; The Connecticut Agricultural Experiment Station; P.O. Box 1106; New Haven, CT 06504-1106, phone 203-974-8447, fax 203-974-8502, e-mail Vickie.Bomba-Lewandoski@ct.gov, or on the web at http://www.ct.gov/caes/cwp/view.asp?a=2826&q=378184.



Map Not to Scale

FIELD PLOTS

Outside Organizations (#35, #38, #53-#70, and #78) invited to participate

1. Chinese Chestnut Trees
2. Sheet Composting with Oak and Maple Leaves
3. Sweet Potato Trials
4. Pak Choi Trials
5. Personal-Sized Watermelon Variety Trials
6. Vegetable Amaranth Trials
7. Edamame Trials
8. Calabaza Squash
9. Butternuts and Heartnuts
10. Use of Earthworms to Suppress Fusarium Crown Rot of Asparagus
11. Using Soybean Meal and Corn Gluten on Turf
12. Cultivar Trial of Greenhouse Tomato Grown in Coir Dust
13. Factors Affecting Composition of Hydroponic Spinach
14. Environmentally-Friendly Control of Powdery Mildew on Landscape Plants
15. Powdery mildew on Chardonnay Windegrapes
16. Biological Control of Hemlock Woolly Adelgid
17. Advances in Chemical Control of Hemlock Woolly Adelgid
18. Commercial Chestnut Cultivars
19. Table Grape Demonstration Plot
20. Hybrid Winegrape Cultivar and Pruning Trial
21. Comparison of Graft Union Height on Chardonnay Grapevines
22. Seedlings of Old Surviving American Chestnuts
23. Control of Blight on American Chestnuts
24. Biochar Reduces the Biological Availability of Some Agriculturally Important Chemicals in Soil
25. Wild Chestnuts from Turkey
26. New Hybrid Chestnut Orchard
27. Question & Answer Tent
28. Invasive Alien Insects in Connecticut
29. Technical Demonstration Tent
30. Biocontrol for Bacterial Leaf Spot on Peppers
31. CAES Weather Station
32. Composting Leaves Using the Static Pile Method
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56. Connecticut Green Industries
57. Connecticut Invasive Plant Working Group
58. Connecticut Chapter of The Society of American Foresters
59. Connecticut Department of Environmental Protection: Division of Forestry
60. Connecticut Tree Protective Association
61. United States Department of Labor/ OSHA
62. United States Department of Agriculture/ Animal and Plant Health Inspection Service, Plant Protection and Quarantine
63. Connecticut Farmland Trust
64. Connecticut Northeast Organic Farming Association
65. USDA, National Agricultural Statistics Service, New England Field Office
66. Connecticut Agricultural Education Foundation
67. Milford Tree, Inc.
68. Connecticut Farm Bureau Association
69. Connecticut Professional Timber Producers Association
70. Connecticut Groundskeepers Association and Connecticut Environmental Council
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72. The Bird & Butterfly Garden
73. Native Woody Shrubs
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78. The Sound School Agricultural Science Program
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80. Chestnut Species and Hybrids
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87. Beach Plum Trials
88. Japanese Plum Variety Trials
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FIELD PLOTS

The plots at Lockwood Farm are planted and maintained by Experiment Station scientists with the help of Farm Manager R. Cecarelli and his assistants, R. Hannan and M. McHill and the following summer workers: L. Bespuda and C. Remetz.

1. CHINESE CHESTNUT TREES
S. Anagnostakis *Assisted by* P. Sletten
These Chinese chestnut trees, planted by Donald F. Jones in 1941, were selected by chestnut grower W.C. Deming of Litchfield and grafted by the Hartford Park Department. The second tree from the gate is a graft of the cultivar Bartlett that was developed by the Bartlett Tree Co. in Stamford. All have been used by The Connecticut Agricultural Experiment Station and the American Chestnut Foundation in crosses with American chestnut trees to produce blight-resistant forest and orchard trees.

2. SHEET COMPOSTING WITH OAK AND MAPLE LEAVES
A. Maynard and D. Hill *Assisted by* C. Peterson
Many homeowners have a predominance of oak trees in their backyards. Oak leaves are known to be more resistant to decomposition than maple leaves. This experiment is investigating whether this difference in the rate of decomposition leads to decreased yields in soils amended with oak leaves compared to maple leaves and unamended controls. Undecomposed oak and maple leaves were layered about 6 inches thick in the falls of 1995-2006 and incorporated into the soil by rototilling. Last year, lettuce, peppers, rutabaga, and leeks were grown with all plots receiving the same amount (1300 lb/A) of 10-10-10 fertilizer. Yields from plots amended with oak leaves were compared to plots amended with maple leaves and the unamended controls. In 2007, lettuce yields were virtually the same for all the treatments. The greatest pepper yields were from the plots amended with oak leaves (6.8 lbs/plant) followed by plots amended with maple leaves (6.0 lbs/plant). The control plots averaged 5.6 lbs/plant. The plots amended with maple leaves averaged the greatest leek yields (9.3 oz/plant) compared to the control plot (9.1 oz/plant) and plots amended with oak leaves (8.3 oz/plant). The greatest rutabaga yields were from the control plot (11.6 oz/plant) followed by plots amended with oak leaves (10.2 oz/plant) and plots amended with maple leaves (9.2 oz/plant).

3. SWEET POTATO TRIALS
A. Maynard and D. Hill *Assisted by* C. Peterson
A 1998 Connecticut Department of Agriculture survey showed that sweet potato is one of the most popular specialty vegetables. In the South, the sweet potato is also called yam, but both are identical species. In the United States, North Carolina and Louisiana are the leading producers, but we have found that they can easily be grown in Connecticut. In this trial, we are looking at several cultivars that have short maturities (90 days). The cultivars will be evaluated on yield and quality. This experiment is also repeated at our Valley Laboratory in Windsor. Last year, Beauregard had the greatest yields (5.2 lbs/plant) followed by Carolina Ruby (3.8 lbs/plant) and Hernandez (3.4 lbs/plant).

4. PAK CHOI TRIALS
A. Maynard and D. Hill *Assisted by* C. Peterson
From 2000 to 2006, the Asian population in Connecticut grew 42%. This and other ethnic groups wish to continue consumption of vegetables that are customarily in their diets, thereby giving farmers opportunities for production of crops with a ready market. Ethnic vegetables also appeal to high-end buyers for whom ethnic vegetables are not everyday fare, but who enjoy gourmet produce and culinary variety. Many farmers wish to diversify their operations by growing ethnic vegetables but there is little information on the culture of these vegetables in Connecticut. It is important that cultural techniques for these vegetables be adapted to Connecticut's soils and climate. In this trial, we are evaluating 6 varieties of pak choi here and at our Valley Laboratory in Windsor. The spring planting was harvested in June and this fall planting will be harvested in September.

5. PERSONAL-SIZED WATERMELON VARIETY TRIALS
A. Maynard and D. Hill *Assisted by* C. Peterson

The newest watermelons in the marketplace are seedless mini "personal" watermelons. They offer an attractive alternative for the consumer who has limited refrigerator space or for small families. These melons, weighing 3-7 pounds each, first became widely available in markets in 2003. They generally have a thinner rind which means more edible flesh. Tests in Oklahoma have discovered these watermelons are an excellent source of lycopene and beta-carotene. Last year Mielhart (8.2 fruit/plant) and Wonder (6.3 fruit/plant) had the greatest yields. Sidekick provided an excellent supply of pollen throughout the growing season and its distinctive fruit made harvesting easier. This year we are testing 5 new varieties and comparing them to Mielhart, Wonder, Extazy, and Vanessa. We are also evaluating a new pollinator (Minipool). These trials are also being conducted at our Valley Laboratory in Windsor.

6. VEGETABLE AMARANTH TRIALS

A. Maynard and D. Hill *Assisted by* C. Peterson

Vegetable Amaranth (Callaloo) is an annual that is native to central Mexico. In Asia and the West Indies, amaranth is widely used in soup. Although it is relatively unknown as a vegetable crop in the United States, it has traditionally been cultivated throughout the humid tropics and is consumed extensively in Africa, Asia, the Caribbean, and Latin America. The greens are of considerable nutritional value being high in calcium, magnesium, iron, vitamins A and C as well as protein. Last year, All Red had the greatest yields (4.2 lbs/plant) with Red Striped Leaf averaging 3.5 lbs/plant. We are repeating the trial this year with the same 8 cultivars planted here and at our Valley Laboratory in Windsor.

7. EDAMAME TRIALS

A. Maynard and D. Hill *Assisted by* C. Peterson

Edamame cultivars are specialty varieties of soybeans that are harvested in the green stage. The word "edamame" means "beans on branches", and it grows in clusters on bushy branches. Edamame is consumed as a snack, a vegetable dish, used in soups or processed into sweets. As a snack, the pods are lightly boiled in salted water, and then the seeds are squeezed directly from the pods into the mouth with the fingers. Outside East Asia, edamame is most often found in Japanese restaurants and some Chinese restaurants, but it has also found popularity elsewhere as a healthy food item. We are conducting variety trials here and at our Valley Laboratory in Windsor. Varieties will be evaluated on yield and quality.

8. CALABAZA SQUASH

A. Maynard and D. Hill *Assisted by* C. Peterson

Calabaza squash, also known as tropical pumpkin, is mostly grown in tropical and semi tropical climates. Calabaza is highly prized by consumers of Hispanic origin. It was identified by the Connecticut Department of Agriculture as one of the most sought-after vegetables at Connecticut's 88 farmers' markets. We are developing a cultivar that produces fruit on shorter vines by saving seeds from plants that have produced fruit within 2 feet of the plant. These seeds are planted at Lockwood Farm and Windsor and selections are again made. Fruit that mature on short vines is appealing to northern growers because the majority of fruit can mature before frost. Fruit that form on longer vines do not always reach maturity. Last year, 86% of the plants at Lockwood Farm produced fruit within 2 feet of the plant, compared to 75% of the plants at Windsor. Selections will continue for several more years.

9. BUTTERNUTS AND HEARTNUTS

S. Anagnostakis *Assisted by* P. Sletten

Seedling butternut (*Juglans cinerea*) and heartnut (*J. ailantifolia*, Japanese walnut) were planted at Lockwood Farm in 2008 to test their resistance to the serious diseases that are eliminating American butternuts from their habitat. Most of the "butternut" trees in Connecticut that we have examined are, in fact, hybrids of butternut with heartnut, including the former National Champion Butternut. These small trees came from Tennessee, and will be checked for species as well as for disease resistance.

10. USE OF EARTHWORMS TO SUPPRESS FUSARIUM CROWN ROT OF ASPARAGUS

W. Elmer *Assisted by* P. Thiel

Greenhouse trials have shown that when earthworms were added to pots filled with soil infested with *Fusarium* pathogens, asparagus plants had less disease and were larger than the plants in pots not amended with earthworms. These plots were planted the spring of 2007 to determine if earthworm activity can enhance yield under field conditions. These plots are being monitored for growth, disease, and yield.

11. USING SOYBEAN MEAL AND CORN GLUTEN ON TURF

A. Maynard and D. Hill *Assisted by* C. Peterson

Soybean meal is a byproduct in the production of biodiesel fuel from soybeans. It is about 7% nitrogen and can be used for animal feed and as an organic fertilizer. Corn gluten meal is a byproduct in the production of cornstarch. It can also be used for animal feed and as an organic fertilizer. Corn gluten meal has also been found to be an effective preemergent natural herbicide. In this demonstration plot, we are evaluating the effectiveness of these organic fertilizers in the growth of turf compared to conventional lawn fertilizer. All plots received the same amount of nitrogen (1 lb/1000 sq. ft.). Last year, the weight of the grass clippings averaged 82% greater from plots fertilized with lawn fertilizer, compared to the unfertilized control. Plots fertilized with soybean meal averaged 32% greater and plots fertilized with corn gluten averaged 30% greater than the unamended control plots.

12. CULTIVAR TRIAL OF GREENHOUSE TOMATO GROWN IN COIR DUST

M. Gent *Assisted by* M. Short and K. Kalapos

Coir is a byproduct of coconuts (the shell and husk) that can be used as a potting medium. This renewable resource could replace peat as the primary ingredient of plant growth media. Coir can support growth of potted ornamentals for one to two months, but there have been no studies of its use for growing a crop of greenhouse tomatoes for six months or more. This is the second year of a study of eight varieties of tomato that are popular with commercial growers. The study will determine which of these varieties are most suitable when grown in Coir medium. In addition, we are testing the effect of recycling the nutrient solution, in order to reduce effluent from greenhouse facilities. This would abate concerns related to pollution of land and groundwater by agricultural operations. A system in which solution is passed once through the crop is compared to one that completely recycles the nutrient solution. There was a slightly greater yield and fruit size with discharged solution compared to recycled solution. Rapsodie and Cobra were the cultivars with the highest total yield, but Geronimo had the highest marketable yield. Caruso had the lowest marketable yield due to many fruit with cracked skin.

13. FACTORS AFFECTING COMPOSITION OF HYDROPONIC SPINACH

M. Gent *Assisted by* M. Short and K. Kalapos

The composition of salad greens is affected by environment, sunlight and temperature, and by the nature of the fertilizer used to grow the plants, such as the concentration of nitrate. Thus, the nutritional value changes with time of year and fertilization practices. We set up a continuous-recirculation hydroponics system to grow spinach. Crops were planted and harvested at various times during the year, to compare results under conditions that differ in light and temperature, or nitrate availability. The rate of growth, dry matter content and leaf area are determined when plants are harvested. Sub-samples of plant material are freeze-dried to analyze the tissue for mineral elements, nitrate, sugars, and other metabolites. These studies will determine how environment changes composition and dietary value of greenhouse-grown spinach. We will compare these results to those of an earlier experiment with lettuce.

14. ENVIRONMENTALLY-FRIENDLY CONTROL OF POWDERY MILDEW ON LANDSCAPE PLANTS

F. J. Ferrandino

Many ornamental plants commonly used around Connecticut homes are subject to powdery mildew. This disease is caused by a fungus that grows on the surface of plant tissue giving the foliage a white powdery appearance. The result is relatively unsightly and the fungus weakens infected plants by feeding on the sugar the plant produces and by blocking sunlight, which limits the ability of the plant to produce more sugar. This plot is planted to a number of common perennial landscape plants (lilac, deciduous azalea, bee balm, peony and phlox) as well as common annual flowers (zinnia and rudbeckia, commonly called “black-eyed susans”) which are susceptible to powdery mildew. Environmentally-friendly foliar sprays, including milk (20% in water), Potassium bicarbonate (1% in water) and light horticultural oil (1% in water), will be compared to chemical fungicides for their ability to control the disease.

15. POWDERY MILDEW ON CHARDONNAY WINEGRAPES

F. J. Ferrandino

Wine grapes and wineries are a relatively new industry in Connecticut. In the past decade, acreage planted to winegrapes has gone from 160 A to 340 A and the number of wineries has gone from 15 to 30, producing about 300,000 gallons of wine valued at between 8-10 million dollars per year. In our climate, powdery mildew has the greatest impact on wine-grape yield of all pathogens and pests. This plot is planted with Chardonnay vines which are prized for the quality of the wine they produce but are very susceptible to powdery mildew. Over the next few years, the relation between the onset of powdery mildew and climate will be closely followed in order to attune disease-risk models to our local weather conditions.

16. BIOLOGICAL CONTROL OF HEMLOCK WOOLLY ADELGID

C. Cheah

Connecticut's eastern hemlocks, *Tsuga canadensis*, have been under siege since the first detection of *Adelges tsugae*, hemlock woolly adelgid (HWA) in southern Connecticut in 1985. From 1986-2000, the adelgid spread to infest every one of the 169 towns in Connecticut. There has been no large-scale chemical intervention in the state's forests and state parks to combat HWA in Connecticut. In response to the HWA threat, the Station and the USDA Forest Service discovered, reared and released *Sasajiscymnus tsugae* (origin: Japan) for biological control evaluations in Connecticut, starting in 1995. To date, > 176,000 *S. tsugae* have been released in 26 sites statewide in Connecticut, with 80% of releases occurring between 1995 and 2001. Starting in 2005, dramatic recovery of adelgid-impacted, previously declining hemlocks was recorded in many of the older established release sites, in all types of soil types, sites and hemlock habitats. This hemlock recovery has persisted in recent years while hemlock mortality has been negligible in *S. tsugae* release sites since 2001. While HWA winter mortality was low from 2006-2008 resulting in patchy resurgence of HWA, an extreme cold spell in January 2009 has significantly reduced adelgid populations by >90% throughout CT. Coupled with a very wet summer in 2008, hemlocks throughout the state are showing excellent recovery.

17. ADVANCES IN CHEMICAL CONTROL OF HEMLOCK WOOLLY ADELGID

R. Cowles

Systemic insecticides have protective and therapeutic value for managing hemlock woolly adelgid in forests. Although use of insecticides in forests for managing this pest cannot be considered a sustainable long-term strategy, systemic insecticides are an effective option for maintaining the health of hemlock trees so that they can continue to provide ecosystem and aesthetic functions until such time that biocontrol or plant resistance becomes established. Multiple years of field tests using standard application practices for imidacloprid provided an opportunity to explore the long-term metabolism of imidacloprid within hemlocks. Trees treated with soil injections of imidacloprid in 1999, and consecutive years from 2002 to 2006 in Connecticut and Pennsylvania were sampled during the autumn of 2007. Foliage from new growth was dried, pulverized, extracted with acetonitrile, and analyzed by LC/MS/MS in the laboratory of Dr. Anthony Lagalante, Villanova University. Analyses revealed that imidacloprid titers peaked approximately 2 – 6 months after trunk injection and 18 – 20 months after soil injection. Titers fell below ~100 ppb in about 3 years, but remained detectable 8 years after treatment. Imidacloprid metabolized readily to its olefin, previously known to be 10 – 16× as active as the parent compound. The concentrations of this metabolite parallel and are equivalent to those of imidacloprid until about 5 years after treatment, at which time the imidacloprid residues decreased while the olefin metabolite remained stable. Therefore, we conclude that the high degree of adelgid suppression is due to the continued presence of imidacloprid and imidacloprid olefin, which continued to translocate to new growth over several years. Mortality is compounded over multiple generations, so that a single soil application can provide 5 – 7 years of protection. Trunk injected trees have average insecticide and metabolite titers similar to trees treated through soil injection. Therefore, poorer efficacy resulting from trunk injection methods is due to uneven distribution uniformity. Dinotefuran is a highly water soluble and extremely upwardly systemically mobile compound, compared to imidacloprid. It was first registered for use in the landscape in 2005. A test of this product for hemlock woolly adelgid in Connecticut compared application of 0.75 g active ingredient per inch dbh, applied either through shallow subsurface soil injection or applied with the organosilicone surfactant PentraBark® as a spray to the lower 1.5 m of the trunk. Application in early October, 2007, resulted in adelgids dying at branch tips on new growth within 2 weeks. Those adelgids developing on 1-year old growth required a longer time to die, as evident from a greater amount of wool. Mortality of sistens in 2007 was approximately 80% with each of these two application methods. One year later, the populations of sistens were reduced by 100 and 96%, respectively, for soil vs. trunk spray application methods for Safari when compared with untreated controls; the results from these application methods do not significantly differ.

18. COMMERCIAL CHESTNUT CULTIVARS

S. Anagnostakis *Assisted by* P. Sletten

These grafted trees are cultivars 'Colossal,' 'Nevada,' and 'Bouche de Betizac'. 'Colossal' is the most frequently planted commercial cultivar in the U.S., with large acerages on the west coast. Cultivar 'Nevada' is the pollinizer usually planted to provide pollen for 'Colossal'. We are evaluating the potential of these kinds of chestnut trees for Connecticut.

19. TABLE GRAPE DEMONSTRATION PLOT

W. Nail *Assisted by* C. Peterson

The row to the south and the two rows to the north of the hybrid winegrape trials consist of the seedless table grapes Canadice and Vanessa (red), Himrod (green), and Jupiter (black). The vines were planted in 2006 and bore their first (small) crop in 2008. Each row will be pruned to a different training system beginning in 2009: Vertical Shoot Positioning, Hudson River Umbrella, and Smart-Dyson.

20. HYBRID WINEGRAPE CULTIVAR AND PRUNING TRIAL

W. Nail *Assisted by* C. Peterson
Connecticut's mild, humid growing seasons and cold winters prevent the successful cultivation of many well-known winegrape cultivars. Many varieties fail to ripen properly in most years. Less cold-hardy cultivars suffer extensive damage or death during and after severe winter freeze events. The hybrid cultivars Chambourcin, Seyval, Villard Blanc, and Villard Noir are being evaluated for yield and fruit quality. Comparisons of cane and cordon pruning are also being evaluated.

21. COMPARISON OF GRAFT UNION HEIGHT ON CHARDONNAY GRAPEVINES
W. Nail *Assisted by* C. Peterson
The coldest layer of air during a radiation freeze is immediately above the soil or snow level. By elevating the graft union, the labor and expense of burying the graft union might be avoided. Chardonnay vines, Dijon clone 95 on C3309 rootstock, were transplanted to the vineyard in spring, 2007. Half are of standard grafting height and half have the graft union 26 inches above ground. Comparisons for yield, fruit quality, and winter damage began this year.

22. SEEDLINGS OF OLD SURVIVING AMERICAN CHESTNUTS
S. Anagnostakis *Assisted by* P. Sletten
In the southern U.S., large surviving American chestnut trees have been found scattered through the range. When we checked the blight fungi in the cankers on these old trees, we found several new kinds of hypovirulence viruses. We believe that these trees have a little more resistance than surrounding trees, which all died of blight, and that allowed viruses from other fungi in the area to infect the blight fungus. The American Chestnut Cooperators Foundation (www.ppws.vt.edu/griffin/accf.html) has been collecting cuttings from these survivors and grafting them together in orchards where they can cross with each other. This will allow any resistance genes present in individuals to be joined together in the resulting seedlings. The ACCF sent us this collection of seedlings that we have interplanted with seedlings from crosses of American trees here at Lockwood Farm. We will compare their winter hardiness and blight resistance with that of the European chestnut trees from Turkey and the old American chestnut trees north of them.

23. CONTROL OF BLIGHT ON AMERICAN CHESTNUTS
S. Anagnostakis *Assisted by* P. Sletten
These American chestnut trees were planted in 1976 when they were 3 years old. Chestnut blight cankers were treated for 4 years, from 1978 to 1981, with our biological control using hypovirulent strains of the blight fungus. The control is working well to keep the trees alive and fruiting. Some of the trees are growing better than others. We do not know which trees were from seed collected in Wisconsin and which were from Michigan. It is possible that the difference in their ability to thrive in the presence of blight and hypovirulence indicates genetic differences in resistance. The grafted tree in the center of the east row is from an "American" chestnut in Scientist's Cliffs, MD, and the original tree resisted blight for many years (it may be a European hybrid). It definitely has some resistance, and is the best looking tree in the plot. Two grafted trees at the southeast corner are (Chinese X American) X American (cultivar 'Clapper') and have intermediate resistance to blight.

24. BIOCHAR REDUCES THE BIOLOGICAL AVAILABILITY OF SOME AGRICULTURALLY IMPORTANT CHEMICALS IN SOIL
J. Pignatello, J. White, and W. Elmer
Biochar is a coined term for the carbonaceous byproduct of high-temperature technologies that convert biomass waste into liquid or gaseous fuels. It is similar in properties to pulverized charcoal briquettes. Biochar has recognized potential value as a soil amendment because it appears to increase soil fertility in some cases. Also, due to its inherent stability in the environment, biochar may serve as a form of 'sequestered carbon' that, if it were produced on a large scale, can reduce carbon dioxide emissions and help mitigate climate change. However, charcoal in general is a powerful adsorbent of organic chemicals. This adsorbent capability can reduce the *biological availability* of chemicals such as pesticides, existing soil contaminants, and natural plant signaling chemicals called *allelochemicals* that play a role in the health of many crops. Such a reduction can be beneficial or not, depending on the circumstance. Thus, a prerequisite to the wide-scale use of biochar in agriculture is a thorough evaluation of its effects on the biological availability of agriculturally important chemicals.

Here we report preliminary results of two studies consistent with the hypothesis that biochar reduces biological availability. In the first study, a soil historically-contaminated with DDE (a metabolite of the legacy pesticide, DDT) was amended with biochar and planted with zucchini. The uptake of DDE in both the stems and roots decreased significantly with increasing biochar addition up to 10%. The second example involves the "replant problem" in asparagus — asparagus roots produce allelochemicals that inhibit growth of young asparagus and make plants more susceptible to a fungal disease ("*Fusarium* wilt"), preventing fields from being replanted. We found that plant weights increased and the percentage of diseased roots

declined with increasing biochar amendment. Biochar amendment also reduced the number of *Fusarium* colonies that grew on agar plates from plant roots.

25. WILD CHESTNUTS FROM TURKEY

S. Anagnostakis *Assisted by* P. Sletten

These seedling trees are from six wild populations along the Black Sea in Turkey. Those from the eastern border are near the population in the Caucasus Mountains where European chestnuts (*Castanea sativa*) survived the ice ages, and are genetically quite diverse. Those from the western border are much less diverse. We are growing these here at Lockwood Farm to compare their winter hardiness and resistance to chestnut blight disease with that of American chestnut trees and with the seedlings from "old survivors" planted next to them.

26. NEW HYBRID CHESTNUT ORCHARD

S. Anagnostakis *Assisted by* P. Sletten

These small trees are from some of our hand-pollinated crosses done in previous years, and were planted as seedlings. All are hybrids of American chestnut trees and blight-resistant Chinese, Japanese, or hybrid trees. They will be grown to evaluate their blight resistance in the presence of the biological control that we assume will move over from the adjoining plot. The trees that look most like American chestnut trees and have good blight resistance will be used in future crosses for timber trees. Others will be developed as orchard trees for Connecticut growers. The paper bags on the trees cover hand-pollinated flowers from this year's crosses.

27. QUESTION AND ANSWER TENT

B. Balogh, R. Hiskes, M. Inman, T. Rathier, and G. Ridge

This is a great opportunity to ask the experts about growing plants, testing soil and identifying plants, plant diseases, and insects. Bring samples of soil, symptomatic plants, and insects for testing and identification. Visit the displays and pick up fact sheets about current insect and disease problems.

28. INVASIVE ALIEN INSECTS IN CONNECTICUT

C.T. Maier *Assisted by* T. Zarrillo, M. Lowry, and E. Bulger

Invasive alien insects have a significant negative impact upon the economy and the biodiversity of Connecticut. Annually, agencies, such as The Connecticut Agricultural Experiment Station and the United States Department of Agriculture, conduct surveys to detect new foreign insects and to determine the distributional range of established ones. Early detection, in particular, greatly decreases the cost of coping with alien invaders. The cost of foreign insects can be reduced even further by conducting research on their behavior and ecology to develop effective strategies to eradicate them or to slow their spread.

29. TECHNICAL DEMONSTRATION TENT

See the Program page 5-7 for a schedule of Technical Demonstrations.

30. BIOCONTROL FOR BACTERIAL LEAF SPOT ON PEPPERS

B. Balogh and W. Elmer

Bacterial leaf spot is serious disease of peppers in New England. It is caused by the plant pathogenic bacterium, *Xanthomonas* spp.. We are looking at different approaches to manage this disease in an environment-friendly manner. We are evaluating natural enemies, such as bacteria-infecting viruses called bacteriophages, antagonistic bacteria, earthworms, and plant inducers.

31. CAES WEATHER STATION

We are a participant in the National Oceanic and Atmospheric Administration's (NOAA) Cooperative Weather Observer Network. It is the nation's largest and oldest weather network. We have been making observations since 1936. The network was established under the Organic Act of 1890 to formalize the collection of meteorological observations and establish/record climate conditions in the United States – primarily for agricultural purposes. Many people recorded weather observations long before that time. John Campanius Holm's 1644-45 weather records, for example, are the earliest known climate records in the United States. Subsequently, many others –including George Washington, Thomas Jefferson, and Benjamin Franklin, also maintained weather records. Today, more than 11,000 Cooperative Weather Observations across the United States donate more than one million hours each year to collect daily hydro-meteorological data. The network of 11,000 volunteer weather observers are located at non-airport locations where people live, work, play and grow their food (i.e. locations include urban, suburban and rural areas, farms, mountaintops, national state and local park settings).

32. COMPOSTING LEAVES USING THE STATIC PILE METHOD

A. Maynard and D. Hill *Assisted by* C. Peterson

Since the 1991 ban on disposing leaves in landfills, large-scale leaf composting has spread throughout Connecticut. Some 84 municipalities are currently composting their leaves. In static pile composting, leaves are piled and the internal temperature of the pile is monitored. As the leaves decompose, the temperature in the center of the pile reaches a temperature of about 140°F. When the temperature decreases, the pile is turned and fresh material is introduced to the center of the pile. Turning also aerates the pile. Leaf compost is seen here in various stages of decomposition. The finished compost is used in experiments here at Lockwood Farm and at the Valley Laboratory in Windsor.

33. PHYTOREMEDIATION: USING PLANTS TO CLEAN CONTAMINATED SOIL

J. White *Assisted by* J. Hawthorne and T. Arsenault

Phytoremediation is a novel technique in which plants are used to remove inorganic and organic pollutants from contaminated soils and sediments. The plant species used depends very much on the pollutant. Some effective plants have been found for heavy metals, such as arsenic and cadmium, as well as for organic solvents, such as trichloroethylene. Persistent organic pollutants (POPs) such as DDT/DDE and PCBs are much more problematic. Phytoremediation research at CAES has focused on developing a plant-based remedial approach for these and other recalcitrant organic contaminants. The current experiments are evaluating hybrid crosses of cucurbits known to accumulate weathered DDE (in roots and stems) with closely related plants known not to take up the pollutant.

34. NUT ORCHARD

S. Anagnostakis *Assisted by* P. Sletten

This orchard of grafted nut trees was planted by Richard Jaynes in the spring of 1981. There are several named cultivars of chestnut and other nut trees included. Last year and this year we planted several new nut cultivars that we want to test for their production potential in Connecticut.

35. VERIZON TELEPHONE TRANSMISSION SILO

Learn about the cellular transmission tower.

36. MOSQUITO TRAPPING AND TESTING PROGRAM FOR WEST NILE AND EASTERN EQUINE ENCEPHALITIS VIRUSES

T. Andreadis and P. Armstrong *Assisted by* J. Shepard, M. Thomas, and S. Finan

West Nile and Eastern Equine Encephalitis viruses are firmly established in Connecticut and continue to be significant public health and veterinary threats with annual re-emergence throughout the state. The surveillance and research activities undertaken by The Connecticut Agricultural Experiment Station are integral to the public health response to these mosquito-borne viruses in Connecticut and have provided critical information on the epidemiology of the viruses and the ecology of the mosquito vectors in the northeastern US. This information is used by the State Department of Public Health in the issuance of health alerts and to direct preemptive and emergency mosquito control activities by the State Department of Environmental Protection. Trapping is conducted daily from June through October at 91 locations statewide. The objectives of the program are to provide: 1) early evidence of local virus activity; 2) information on the abundance, distribution, identity and infection rates of potential mosquito vectors; 3) data that are used to assess the threat of WNV and EEE to the public and; 4.) guide the implementation of mosquito control measures. Since 1996, The Connecticut Agricultural Experiment Station has trapped and tested over 1.4 million mosquitoes. A total of 556 isolations of WNV have been made from 17 different species of mosquitoes, and a total of 202 isolations of EEE have been made from 18 species of mosquitoes. The principal foci of WNV activity in Connecticut have been identified as densely populated residential communities in coastal Fairfield and New Haven Counties. The principal foci for EEE activity are in more rural locales located in the southeastern corner of the state. We have observed a correlation both temporally and spatially between the isolation of WNV and EEE from field-collected mosquitoes and the elevated risk of human infection that typically extends from late July through September in Connecticut.

37. THE SPIDERS OF CONNECTICUT

C. Vossbrinck

Connecticut has a wide array of native spider species from hunting spiders like wolf spiders to orb weaving spiders which build elaborate webs in forests and fields. There are three spiders commonly found in the home; the comb footed spider *Archaearanea tepidariorum* (the house spider) responsible for the “cob webs” in your house, a greenish-yellowish hunting spider *Chiracanthium mildei* which may, on rare occasion, be responsible for spider bites and the long legged cellar spider

Pholcus phalangoides seen in basements and garages. While we all have a certain amount of "Arachnaphobia", the spiders of Connecticut are really harmless and helpful creatures. Photographs and specimens of Connecticut spiders will be featured.

38. THE FARMER'S COW

The Farmer's Cow is an innovative, premium milk brand produced and marketed by Connecticut family-owned dairy farms. The Farmer's Cow was formed in response to consumers' interest in purchasing fresh, naturally produced, local products. Collectively, The Farmer's Cow member farms milk 2,300 cows and manage over 6,000 acres of Connecticut farmland. The Farmer's Cow milk is currently available in over 100 grocery stores throughout the state. A complete listing of retailers is shown at www.thefarmerscow.com. The Farmer's Cow is sold in half gallon cartons in whole, 2 percent, 1 percent, and skim varieties. Chocolate milk and single-serve packaging are under development. The owners of The Farmer's Cow are active members in The Connecticut Farmland Trust and The Working Lands Alliance who are working to protect and preserve Connecticut farmland. They were also the founding members of "Very Alive," a non-profit organization dedicated to the promotion of Connecticut Agriculture. Connecticut farms contribute $2 billion annually to the local economy[1]. 51 percent of Connecticut farmland is in dairy or dairy support. In 2003, there were 191 dairy farms remaining in Connecticut[2]. The Farmer's Cow owners are: Paul and Diane Miller, Fairvue Farms, Woodstock; Bill, Tom and Greg Peracchio, Hytone Farm, Coventry; Ned and Renee Ellis, Mapleleaf Farm, Hebron; Jim and Don Smith, and Nate Cushman, Cushman Farms, Franklin; Peter Orr and Family, Fort Hill Farms, Thompson; Robin and Lincoln Chesmer, Graywall Farms, Lebanon. Further information can be found at www.thefarmerscow.com, www.ctfarmland.org, and www.workinglandsalliance.org.

39. EXPERIMENT STATION ASSOCIATES

Information is available on this organization formed to help promote scientific advances at The Connecticut Agricultural Experiment Station.

40. HEIRLOOM TOMATO TRIALS

A. Maynard and D. Hill *Assisted by* C. Peterson

Interest and sales of heirloom tomatoes have increased dramatically in the past 10 years. More and more consumers are willing to forego appearance for that real old-fashioned tomato taste. But growing heirloom tomatoes can be a challenge. Heirlooms tend to have poor disease resistance and have lower yields when compared to hybrid tomatoes. They are also more susceptible to cracking due to their tender skin. In this trial, we are evaluating 10 varieties at Lockwood Farm and at our Valley Laboratory in Windsor. We are comparing yields, disease resistance, and timing of harvest. Last year, Reif Red Heart (25.7 lb/plant) and Rose (25.6 lb/plant) had the greatest yields for the 10 cultivars evaluated.

41. DO CHRISTMAS TREES INCREASE AIRBORNE FUNGI IN RESIDENCES?

D. Li

A study was conducted to determine the effects of Fraser fir Christmas trees on airborne fungi during the 2008 Christmas season. The air samples were taken on a daily basis in the residences simultaneously. Samples were taken before, during, and after the Christmas tree was placed in the residences. Each sample was taken at 15L/min for 10 min between 6 and 7 pm using Allergenco MK III samplers. Three Fraser fir trees were used in the experiment. For the third tree, samples were taken from the living room, kitchen, and recreation room simultaneously. Results showed that fungal spore populations varied in the residences quite dramatically from day to day ranging from 0 to 24791 spores/m^3. Airborne fungal spore populations in the living room with the Christmas tree were not significantly different from the ones in the kitchen and recreation room. Correlation analysis indicated that fireplace use, water damage, and dust load, but not the Christmas trees were significantly correlated with fungal populations in the air. Causal analysis found that the major causal factors for airborne fungi were fireplace use and dust load. The causal effect from the Christmas trees on airborne fungi was found to be insignificant.

42. CONNECTICUT WEEDS AND WILD PLANTS

T. Mervosh *Assisted by* D. Reiss and Z. Donais

Plants found growing wild in fields and landscapes of Connecticut are displayed. Taxonomy, life cycles, and toxicity/edibility information will be presented. Special emphasis will be placed on non-native, invasive plant species. Weed control questions will be addressed.

43. BIODIESEL OILSEED CROPS FOR BIOLOGICAL CONTROL OF SOILBORNE PATHOGENS.

J. LaMondia *Assisted by* Michelle Salvas

Biodiesel is an alternative fuel, produced from either vegetable oils (such as soybean or canola) or from waste greases. Typically, biodiesel blends, ranging from 5% biodiesel with 95% diesel up to 20% biodiesel with 80% diesel, are being used in the Northeastern U.S. in compression-ignition (diesel) engines and as a replacement or supplement for home heating oil.

Canola and soybean rotation crops can be used to control weeds and pests. The seed meals remaining after oil extraction also have utility as plant fertilizers. Brassica seed meals contain chemicals which can be toxic to pests, such as plant parasitic nematodes and fungi. We are conducting research to evaluate the effects of plant growth, residues and seed meal amendments on biofumigation of plant pathogens in soil.

44. MANAGEMENT OF STRAWBERRY SAP BEETLE

H. Smith

The strawberry sap beetle (*Stelidota geminata*) is a significant pest of strawberries in the northeastern United States, particularly on U-Pick operations. Research is being carried out to develop an early monitoring system so that growers can determine when the beetles first arrive on-farm. Less toxic materials are being evaluated as alternatives to the broad spectrum pyrethroids commonly used to suppress the beetle. The availability of overwintering habitats on-farm, particularly blueberry fields, may contribute to strawberry sap beetle problems for growers.

45. ANALYSES OF HORSE SERA FOR ANTIBODIES TO WEST NILE VIRUS

L. Magnarelli, S. Bushmich (UConn-Storrs), J. Anderson, M. Ledizet (L^2 Diagnostics), and R. Koski (L^2 Diagnostics) *Assisted by* T. Blevins, B. Hamid, Dr. N. Bonafe (L^2 Diagnostics), and Dr. L. Kramer (New York State Department of Health)

West Nile virus (WNV) is widely distributed in Africa, the Middle East, Europe, and North America. Transmitted by mosquitoes, this flavivirus first entered the northeastern United States in 1999. In earlier work, a newly developed enzyme-linked immunosorbent assay (ELISA) detected antibodies to WNV in naturally exposed and vaccinated horses. During those studies, there were 4 horse sera positive for WNV antibodies that attracted special interest because these samples were taken from non-vaccinated animals in Connecticut prior to 1999. Since other more specific test methods did not confirm the presence of West Nile virus antibodies in these 4 sera, it was suspected that the positive ELISA reactions were due to other flavivirus infections, such as St. Louis Encephalitis (SLE) virus or Powassan virus. Further analyses, however, revealed that the antibodies detected were not specific for SLE or Powassan virus. The current hypothesis is that the 4 positive reactions may have been due to horse immune responses to another unknown flavivirus or possibly to the "deer tick virus", a subtype of Powassan virus.

46. LYME DISEASE IN TICKS FROM CONNECTICUT CITIZENS

J. Anderson *Assisted by* B. Hamid and E. Alves

2009 is the fourth year that we have selectively tested deer ticks, based on blood engorgement. All ticks submitted by municipal health departments are identified to species and degree of engorgement, but only engorged ticks are tested for the presence of the Lyme disease bacterium, *Borrelia burgdorferi*. Studies by other researchers have shown that ticks that have not become engorged with blood do not transmit the disease organism.

In 2008, 3120 black-legged (deer) ticks (*Ixodes scapularis*) were received, as well as 207 American dog ticks (*Dermacentor variabilis*) and 62 lone star ticks (*Amblyomma americanum*). 23% (340 of 1,470) of the black-legged ticks tested were infected with the Lyme disease organisms. The average time between receipt of a tick and reporting results of tick analysis to the senders was 9.4 days.

47. THE "DEER" TICK IXODES SCAPULARIS

K. Stafford and A. Bharadwaj *Assisted by* H. Stuber, L. Colligan, and F. Sansevero

The blacklegged tick or "deer" tick *Ixodes scapularis* transmits the agents of Lyme disease, babesiosis, and granulocytic anaplasmosis. Observe live and preserved ticks under the microscope. Lyme disease continues to be an important public health concern in Connecticut with 3,896 reported human cases in 2007. An updated Tick Management Handbook is available.

48. EFFECTIVENESS OF DEER REPELLENTS ON YEWS IN CONNECTICUT

S. Williams and J. Ward *Assisted by* G. Picard

Browsing by overabundant herds of white-tailed deer (*Odocoileus virginianus*) can cause significant economic damage to agricultural crops and landscape plantings. In many instances, commercially available repellents may be an appealing alternative to physical exclusion of animals for both commercial growers and homeowners. We tested 10 different commercially available repellents (Chew-Not®, Deer Off®, Deer-Away® Big Game Repellent, Plantskydd®, Bobbex®, Liquid Fence®, Deer Solution®, Hinder®, Repellex® systemic tablets, and coyote urine) on yews (*Taxus cuspidata* 'Densiformis') at two different locations in Connecticut. The study included both positive (fence) and negative (no treatment) controls in a 2-block formation. Each group within each block was randomly assigned one of the 12 treatments.

Repellents were applied based on manufacturers' label recommendations for the 2006 and 2007 growing seasons and application costs were recorded. A Protection Index was derived based on plant size and dry needle weights at the end of the 2007 growing season. In general, repellents that required more frequent application performed better. Bobbex® ranked highest, but was the most expensive repellent treatment. Hinder® performed nearly as well at a fraction of the cost. Yews protected by Repellex®, Deer Solution®, coyote urine, and Plantskydd® were the same size as unprotected controls at both sites and did not have significantly more needles. Repellents alone cannot prevent 100% of browse damage and the choice of repellent usage is a trade-off between effectiveness, costs, ability to follow recommended reapplication interval, and crop/plant to be protected.

49. CONTROL OF JAPANESE BARBERRY REDUCES BOTH TICK ABUNDANCES AND LYME DISEASE RISK

S. Williams and J. Ward *Assisted by* G. Picard

In many Connecticut forests with an overabundance of white-tailed deer (*Odocoileus virginianus*), Japanese barberry (*Berberis thunbergii*) has become the dominant understory shrub, which provides favorable habitat for blacklegged ticks (*Ixodes scapularis*) and white-footed mouse (*Peromyscus leucopus*) survival. Mice were trapped in unmanipulated dense barberry infestations, areas where barberry was controlled, and areas where barberry was absent at three locations throughout Connecticut. The number of feeding larval ticks/mouse was recorded. Adult and nymphal ticks were sampled along draglines in each treatment and were tested for *Borrelia burgdorferi* (the causal agent of Lyme disease in humans and pets) presence.

Mouse populations were similar between treatments. The average number of larval ticks feeding on mice was highest in dense barberry. Adult tick densities in dense barberry were higher than in both controlled barberry and no barberry areas. Ticks sampled from full barberry infestations and controlled barberry areas had similar infection prevalence with *B. burgdorferi* the first year. In areas where barberry was controlled, infection prevalence was reduced to equal that of no barberry areas the second year of the study. Results indicate that managing Japanese barberry will have a positive effect on public health by reducing the number of *B. burgdorferi* infected blacklegged ticks that commonly feed on humans.

50. RECONSTRUCTION OF LONG TERM FOREST RESEARCH DATA: "THE OLD SERIES"

J. Barsky and J. Ward

During 1926 and 1927, a research study was initiated in Connecticut to examine the influence of soil type on the distribution and growth of forest vegetation. To record the data, scale maps were prepared for each strip which included: species, diameter at breast height, crown class, and location. Data on nearly 20,000 stems were recorded during the first survey. Maps were also prepared in 1937 and 1957. Subsequent inventories from 1967 through 2007 were recorded on paper datasheets (1967, 1977, 1987, 2007) or field computers (1997). The total dataset now contains information on over 43,500 stems.

A challenge in effectively analyzing the dataset is that unlike modern computers, memory space was at a premium when the data were converted to digital format in the mid-1960s. The limited space on the original punch cards mandated that only the most pertinent information be transferred. Some information was never entered, such as the precise location and whether or not each stem was part of a sprout clump designation. The scope of this project has focused on scanning in the original paper strip maps, decoding the early dataset, re-establishing coordinates for those initial trees, identifying sprout clumps, and finally reconciling them in the modern dataset. Completion of this study may lead to a better understanding of the ecological pathways in forest communities, such as the role of sprouting as a form of persistence, or improving our understanding of spatial relationships between plant communities.

51. INVASIVE AQUATIC PLANT PROGRAM

G. Bugbee, J. White and C. Vossbrinck *Assisted by* M. Balfour, M. Cavadini, A. Russell, J. Hawthorne, and R. Soufrine

Connecticut lakes and ponds face an imminent threat from non-native invasive plants. Recently introduced plants such as Eurasian milfoil, variable milfoil and fanwort are of great concern. Their dense stands often reach the surface and interfere with recreational uses. Invasive species drastically alter native ecosystems leading to the decline in native plants, fish and other beneficial organisms. Researchers, in the Department of Soil and Water, are documenting our states invasive aquatic plant problem and studying management options. We are continuing a statewide inventory of freshwater aquatic vegetation. From 2004 - 2008 all invasive and native vegetation in 138 lakes and ponds were surveyed and mapped. We documented over 100 plant species with 11 of them being invasive. Approximately two-thirds of the water bodies contained one or more invasive species. Requests for station assistance in managing unwanted aquatic vegetation are frequent. A search is underway to discover novel ways to control invasive aquatic plants. These include reduced risk herbicides and biological

agents such as the Eurasian water milfoil weevil and grass carp. At this plot, you will see our aquatic plant surveillance and control boats and underwater video equipment. A researcher will be available to discuss our program answer questions about lakes and ponds.

52. USING LEAF COMPOST IN HOME GARDENS

A. Maynard and D. Hill *Assisted by* C. Peterson

Annual amendment of soil with leaf compost prevents compacting and crusting of the soil surface and promotes root growth and infiltration of rain. In these plots, the addition of 1-inch of leaf compost annually since 1982 increased organic matter from 5.9 to 12.6%. Increased root growth in the amended soil allows plants to utilize nutrients in a greater volume of soil than plants in untreated soil of greater density. We are measuring the effect of reduced rates of fertilization (2/3, 1/3, 0 of normal rates) and compost amendments on the yields of several vegetables by comparing them with yields from unamended controls. We are also measuring the nutrient status of the soils in each plot throughout the growing season. Each year since 1982, yields on the leaf compost amended plots fertilized at 2/3 and 1/3 the normal rate have been consistently greater than on unamended plots with full fertilization.

53. GIRLS SCOUTS OF CONNECTICUT

T. Arsenault

Established on March 12, 1912 by Juliette Gordon Low, the mission of Girl Scouts is to build girls of courage, confidence, and character, who make the world a better place. Today there are 3.6 million Girl Scouts, consisting of 2.7 million girls and 928,000 adult members. In Girl Scouts, girls discover the fun, friendship, and power of girls together. Through a myriad of enriching experiences, such as extraordinary field trips, sports skill-building clinics, community service projects, cultural exchanges, and environmental stewardships, girls grow courageous and strong. For more information contact our local Girl Scout council at http://www.gsofct.org/.

54. CONNECTICUT DEPARTMENT OF AGRICULTURE

R. Olsen

A photo exhibit will highlight Connecticut agriculture. Brochures and pamphlets will be available, along with information on Farm Reinvestment Program grants, Public Act 490 and farming, and agriculture and taxes. www.ct.gov/doag.

55. UNIVERSITY OF CONNECTICUT MASTER GARDENERS

J. Hsiang

The Master Gardener Program is an Educational Outreach Program that is part of the University of Connecticut Cooperative Extension System. The program started in 1978 and consists of horticulture training and an outreach component that focus on the community at large. Master Gardeners are enthusiastic, willing to learn and share their knowledge and training with others. What sets them apart from other home gardeners is their special horticultural training. In exchange for this training, Master Gardeners commit time as volunteers working through their local Cooperative Extension Center and the Bartlett Arboretum in Stamford to provide horticultural-related information to the community.

56. CONNECTICUT GREEN INDUSTRIES

B. Heffernan

The Connecticut Green Industries represents The Connecticut Greenhouse Growers Association (CGGA) and The Connecticut Nursery and Landscape Association (CNLA). CGGA is the trade association for Connecticut's great Greenhouse Industry, representing nearly 200 growers of potted plants. http://www.flowersplantsinct.com/cgga/cggaindex.htm. CNLA is Connecticut's Trade Association for Growers of Trees, Shrubs, Perennial-Annual Flowers, and Nurseries, Garden Centers, Landscapers and Landscape designers. http://www.flowersplantsinct.com/cnla/cnlaindex.htm.

57. CONNECTICUT INVASIVE PLANT WORKING GROUP

D. Ellis

The Connecticut Invasive Plant Working Group (CIPWG) is a statewide organization whose members gather and convey information on the presence, distribution, ecological impacts, and management of invasive plant species. We promote the use of native or non-invasive ornamental alternatives throughout Connecticut and work cooperatively with researchers, conservation organizations, government agencies, the green industries, and the general public to identify and manage invasive species pro-actively and effectively. The CIPWG website, www.hort.uconn.edu/cipwg provides timely information on non-native invasive plants, including a list of Connecticut invasive species, management information, invasive plant alerts, fact sheets, invasive plant legislation, photos, and a calendar of events. For additional information, or to join the CIPWG electronic mailing list, contact Donna Ellis 860-486-6448; email donna.ellis@uconn.edu.

58. CONNECTICUT CHAPTER OF THE SOCIETY OF AMERICAN FORESTERS
J. Orefice
The Society of American Foresters (SAF) is the national scientific and educational organization representing the forestry profession in the United States. Founded in 1900 by Gifford Pinchot, it is the largest professional society for foresters in the world. The mission of the Society of American Foresters is to advance the science, education, technology, and practice of forestry; to enhance the competency of its members; to establish professional excellence; and, to use the knowledge, skills, and conservation ethic of the profession to ensure the continued health and use of forest ecosystems and the present and future availability of forest resources to benefit society. SAF is a nonprofit organization meeting the requirements of 501 (c) (3). SAF members include natural resource professionals in public and private settings, researchers, CEOs, administrators, educators, and students. www.safnet.org.

59. THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION: DIVISION OF FORESTRY
C. Donnelly
The CT Department of Environmental Protection Division of Forestry performs a range of services for the citizens of Connecticut, who live in a state that is 60 percent forested. Among its responsibilities, DEP Forestry manages nearly 162,000 acres of state-owned forestlands for the health and diversity of the forest and the benefit of those who live in Connecticut. We also work with private forestland owners, who own 1.54 million acres of forest, and municipalities on matters relating to proper forest management, forest health, wildland fire control, the certification of forestry professionals and general technical support and outreach regarding CT's 1.86 million total acres of forest.

At Plant Science Day, the DEP Forestry program will have representatives of the Private and Municipal Lands program, which focuses its efforts on outreach to the public regarding private forestlands and municipal tree programs, and from the Forest Practices group, which focuses its efforts on certification of forestry professionals and the quality of work performed on forestlands throughout the state. Questions regarding forests, trees, and forest and tree professionals are all fair game for this group.

60. CONNECTICUT TREE PROTECTIVE ASSOCIATION
R. Smith
CTPA is a non-profit, non-partisan association, made up largely of tree care professionals from Connecticut. CTPA promotes the protection and care of trees in Connecticut, and encourages the ongoing improvement of tree care practices among tree workers. www.ctpa.org.

61. UNITED STATES DEPARTMENT OF LABOR/ OSHA
L. May
Our agency's purpose is to assure safe and healthy working conditions for working men and women. Our Federal website is: www.osha.gov. Our local office is located in Bridgeport, CT. Our phone number is 203-579-5581. Our exhibit will have literature available on topics including, but not limited to: chemical safety, tree trimming, chain saws, wood chippers, heat stress, teen worker safety, and construction.

62. USDA, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, PLANT PROTECTION AND QUARANTINE
N. Campell
The mission of Plant Protection and Quarantine: APHIS-PPQ safeguards agriculture and natural resources from the risks associated with the entry, establishment, or spread of animal and plant pests and noxious weeds. Fulfillment of its safeguarding role ensures an abundant, high-quality, and varied food supply, strengthens the marketability of U.S. agriculture in domestic and international commerce, and contributes to the preservation of the global environment.
http://www.aphis.usda.gov.

63. CONNECTICUT FARMLAND TRUST
K. Matus
The Connecticut Farmland Trust (CFT), established in 2002, is a statewide private non-profit conservation organization dedicated to protecting Connecticut's farmland. CFT's mission is to: 1.) Protect Connecticut's prime farmland for agricultural use by acquiring agricultural conservation easements and farmland; 2.) Assist landowners, local land trusts, town officials, and state agencies in identifying and protecting threatened agricultural land; and 3.) Enhance agricultural diversity, agricultural economic development, environmental quality, and rural character. The Connecticut Farmland Trust accepts

donations of farmland and agricultural conservation easements as well as purchases farmland and agricultural conservation easements. In its first three years, CFT has protected 7 active farms, totaling more than 675 acres. For more information about CFT or options for protecting farmland, please contact Elisabeth Moore, Director of Projects, Connecticut Farmland Trust, 77 Buckingham Street, Hartford, CT 06106, phone: 860-247-0202, fax: 860-247-0236, email: emoore@ctfarm.org website: www.ctfarmland.org.

64. CONNECTICUT NORTHEAST ORGANIC FARMING ASSOCIATION

D. Legge

CT NOFA is the Connecticut Chapter of the Northeast Organic Farming Association. CT NOFA is an independent non-profit organization dedicated to strengthening the practices of ecologically sound farming and gardening, and to the development of local sustainable agriculture. Our efforts give consumers increased access to safe and healthy food. CT NOFA is a growing community of farmers, gardeners, land care professionals, businesses and consumers that encourages a healthy relationship to the natural world. http://www.ctnofa.org/.

65. USDA, NATIONAL AGRICULTURAL STATISTICS SERVICE, NEW ENGLAND FIELD OFFICE

G. Keough

Agricultural statistics are important because they provide an accurate, unbiased picture of the New England region and U.S. agriculture. Measurement of present and prospective supplies furnishes a sound basis for judgment and action by farmers, agri-businesses, researchers, marketing programs, and agencies which service farmers who take the time to provide the data to make these reports possible.

USDA's National Agricultural Statistics Service (NASS) is a network of 46 field offices (including the New England office in Concord, NH) serving all 50 states and Puerto Rico through cooperative agreements with state departments of agriculture or universities. These field offices regularly survey thousands of farm operators, ranchers, and agri-businesses who voluntarily provide information on a confidential basis. Consolidating these reports with field observations, objective yield measurements, and other data, statisticians then produce state statistics. These statistics are forwarded to NASS headquarters in Washington, D.C., where they are combined and released to the public.

The Internet site contains agricultural statistics, an online data base, all reports, links to other pertinent sites, and even to Kids Page that is targeted to education on agricultural topics. The national website is at http://www.usda.gov/nass while the homepages for New England and each of the six states are at http://www.nass.usda.gov/Neng (CT, NH, ME, MA, RI, VT). For more information, contact us via email at nass-nh@nass.usda.gov or 603-224-9639.

As part of the USDA, the federal program includes the Census of Agriculture conducted every five years and Annual Statistics Program. The Ag Census publishes all agricultural commodities at the state and county level. The Annual Statistics Program provides timely state level statistics limited to major crop and livestock commodities and a few data series at the county level. Confidentiality is guaranteed to anyone providing information to NASS regardless if it is acting in the federal or state capacity. According to federal law, the mail list is confidential and can never be given or sold to any other entity, public or private (this includes other government agencies). Individual data are exempt from requests under the Freedom of Information Act and exempt from subpoena. Data are only published at an aggregate level so that no one can derive information about any single operation. http://www.nass.usda.gov.

66. CONNECTICUT AGRICULTURAL EDUCATION FOUNDATION

E. Provencal

The mission of the Connecticut Agricultural Education Foundation is to seek and administer funds for the benefit of programs that promote Connecticut agriculture through education. Distressingly, agricultural illiteracy is a reality in Connecticut. Too many people just don't know where their food and plants come from or how they are produced. Too many people don't have the basic agricultural knowledge needed to make wise and thoughtful choices about the issues facing farms today. The consequences of this lack of awareness can be disastrous for all of us connected to the agricultural community.

67. MILFORD TREES, INC.

M. Ludwig

Our mission is to increase and enhance our urban forest canopy by planting diverse tree species predominantly through partnerships with schools, organizations, businesses and the City of Milford so that we will create a healthier environment and a better quality of life for residents. With our partners, we promote the preservation of healthy trees and the proper planting, maintenance and replacement of public trees. We maintain trees at Shadyside Nursery, educate the public about the

importance of trees, periodically update the Tree Inventory and manage both the Legacy Arboretum and the Memorial Tree Program. Our outreach program to other communities has been ongoing since 2001. ludwigsmail@snet.net, www.milfordtrees.blogspot.com.

68. CONNECTICUT FARM BUREAU ASSOCIATION

C. Melmer

Farm Bureau is a non-governmental, voluntary organization of farm families united to find solutions for concerns facing production agriculture in our counties, state and nation. Connecticut Farm Bureau provides farmers with a strong clear voice in state and national issues. Volunteer leaders and staff work closely with state and federal regulatory agencies and elected officials on issues ranging from economic viability, property rights, taxation, land use planning to labor laws and farmland preservation. One of our goals is to elevate the stature of agriculture in our state. Through education, market promotion and legislative advocacy, we strive to increase farm income and to improve the quality of life not only for Connecticut farmers, but also for their consumers. www.cfba.org.

69. CONNECTICUT PROFESSIONAL TIMBER PRODUCERS ASSOCIATION

J. Nichols

The Connecticut Professional Timber Producers Association, Inc. (CTPTPA) was formed in 2007 from the old Connecticut Wood Producers Association (Woodpac) of the 1970s. The mission of CTPTPA is to address the growing need for an organization to represent the vital interests of the harvesters and sawmills of Connecticut, to promote the use of Connecticut's renewable forest resources, and to enhance the image of the Connecticut forest products industry throughout the state by way of the following activities: A. Communicate information to the membership; B. Institute ethical guidelines and demand a high degree of professional ethics among its members. Establish Forest Practice Standards for the timber harvesting and forest products profession; C. Promote safety within the profession; D. Promote Best Management Practices (also known as BMP's) for the timber harvesting profession; E. Promote education in the fields of forestry, timber harvesting, and forest products both within the Association and outside; F. Promote superior utilization of forest products; G. Promote the use of Connecticut wood products; and H. Publish a Connecticut Forest Profession directory and publish periodically an industry newsletter. www.timproct.org.

70. CONNECTICUT GROUNDSKEEPERS ASSOCIATION and CONNECTICUT ENVIRONMENTAL COUNCIL

E. Fearn

The Connecticut Grounds Keepers Association provides members with exceptional educational programming, provides a medium for exchanging ideas and through advocacy, shapes positions and view points that impact the green industry and the environment.

The Connecticut Environmental Council is a coalition of business owners, organizations and individuals that promote and maintain high standards of public service and conduct in the professional pesticide application industry.

71. EASTERN BLUEBIRD *SIALIA SIALIS* NEST BOX TRAIL

L. Kaczenski

A Bluebird trail consists of a minimum of 6 nesting boxes spaced a hundred yards or more apart. Here at Lockwood Farm we have 16 nesting boxes located along the fencing beginning at the entrance of the cottage, along the Christmas tree farm, the vineyard then across the farm between the orchard and the weather station. Success of a trail greatly depends on weekly monitoring of the nesting boxes; close monitoring is needed to prevent House Sparrows from nesting in them. House Sparrows and the European Starling are a non-native invasive species introduced to North America in the 1800's; both of which are cavity nesters and both are very aggressive and have contributed greatly to the decline of Bluebirds. There is also nesting competition with Tree Swallows, House Wrens, Tufted Titmice and Chickadees. The population decrease of the Eastern Bluebird declined seriously enough to reach a critical status by the mid 1900's due to habitat destruction, over use of pesticides and nest predation by the House Sparrow and Starling. Bluebird trails across North America have greatly increased their numbers and due to this increase they are not protected under the U.S. Endangered Species Act. This trail is registered with The Birdhouse Network; the data collected during the weekly monitoring (inhabitants, clutch size, predation, successful fledging, etc.) are submitted to the Cornell Laboratory of Ornithology helping scientists' with their research of the Eastern Bluebird.

72. BIRD AND BUTTERFLY GARDEN

J. Canepa-Morrison and J. Fengler

The Bird and Butterfly Garden is a partnership of The Connecticut Agricultural Experiment Station and the Federated Garden Clubs of CT/Spring Glen Garden Club. This garden creates several favorable habitats for our native birds, butterflies, and pollinating insects and helps us determine which plants may work best in Southern Connecticut gardens. At this time of year, the garden is at its peak performance with plants thriving in the garden and meadow. Plant labels are placed near the plants in the garden to provide the botanical and common name. Throughout the day, we update our list of birds, butterflies and moths spotted in the garden. The Bird & Butterfly Garden at Lockwood Farm is listed in the 'Nature Conservancy Open Days Directory for New England'.

Do you have a butterfly garden or would you like to start one? The Experiment Station can provide you support by answering your questions and suggesting ways for you to enjoy a butterfly garden small or large on your patio or in your yard.

73. NATIVE WOODY SHRUBS

J. Ward

Native woody shrubs offer an alternative to exotics commonly used in landscaping. This collection of shrubs was assembled in 1962 and in 1976 it was arranged in its present form with a dry site on the gravel mound and moist site in the shallow, plastic-lined depression. Many of these shrubs flower in the spring; their flowers can be seen in the photographs. Others, such as sweet pepperbush, spirea, and buttonbush, flower in summer. Witch-hazel flower in early autumn. Birds are frequent visitors to the garden and quickly eat the mature fruit. These shrubs survive with minimal maintenance. Occasional mowing, annual removal of dead stems, and replenishment of mulch are performed. These shrubs have never been fertilized, watered, or treated for disease.

74. BEES, TREES, AND COMMODITIES: THE SURVEY AND INSPECTION TEAM

V. Smith, T. Blevins, J. Fengler, I. Kettle, S. Sandrey, and P. Trenchard *Assisted by* K. Dugas and L. Esposito

Our personnel uphold state laws enacted to protect Connecticut's vegetation from injurious insects and diseases. Each year we inspect 8,500 acres of nursery stock grown in over 300 nurseries for insects and diseases. When problems are found, control remedies are suggested. We inspect agricultural products to be shipped to foreign or interstate destinations, and we survey Connecticut's woodlands to find troublesome pests such as the gypsy moth, forest tent caterpillar, and the hemlock wooly adelgid, and diseases such as anthracnose and Septoria leaf spot. Examples of insect pests and plant diseases are exhibited. Insect survey maps are shown. Connecticut is also participating in a regional survey and educational program for the Asian longhorned beetle, which was found in Worcester, MA last August and is a potential threat to Connecticut's trees and forests. Examples of the beetle and its damage will be on display. Connecticut has over 500 beekeepers tending over 3,600 colonies of honey bees. A task of the Experiment Station is to seek out and eliminate contagious bee diseases and parasitic mites. There will be displays of insects that attack ornamentals, live honey bees, a beehive and various beekeeping equipment, as well as wasps and hornets and their nests. Forest Health Highlights will be available as handouts to the public.

75. CONNECTICUT NURSERYMEN'S GARDEN

The Connecticut Nurserymens' Gardens are showcases of plants discovered or hybridized and introduced to the horticultural trade by Connecticut nurserymen. Similar gardens are at the Valley Laboratory in Windsor and the Main Laboratories in New Haven. All plants were donated by members of the Connecticut Nurserymens' Association and planted in 1986-87. Introductions feature evergreen and deciduous azaleas, mountain laurel, maple, pine, hosta, iris, and other flowering and foliage plants. A brochure containing maps of all three gardens and a brief description of the plants are available.

76. MEASURING PESTICIDE RESIDUES IN POLLEN AND NECTAR OF SQUASH

K. Stoner and B. Eitzer *Assisted by* T. Zarrillo and M. Lowry

There is great controversy in Europe and among beekeepers in the U.S. about whether a certain class of insecticides called neonicotinoids are playing a role in the unusual mortality of honey bees (*Apis mellifera*) in recent years. The neonicotinoid insecticides are systemic, which means that they are taken up by the roots and distributed throughout the plant. In this field, we have applied two neonicotinoid insecticides, imidacloprid and thiamethoxam by two different methods (in the seed furrow and in drip irrigation), and we are measuring the amount of insecticide in the pollen, nectar, and other parts of the squash flowers. Information on the levels of concentration of these insecticides in resources used by bees will set the parameters for other researchers studying the effects of these insecticides on the behavior, colony development, and health of honey bees.

77. INDUCING FUSARIUM DISEASE RESISTANCE IN GLADIOLUS

W. Elmer *Assisted by* P. Thiel

Fusarium corm rot of gladiolus is found wherever gladioli are grown. Specific strains of a soil fungus called *Fusarium* cause the disease. Corms were soaked for 20 min in different rates of a chemical called Actigard. This chemical induces plants to become more resistant to disease. Corms were also soaked in spore suspensions of a different strain of *Fusarium* that is used to protect plants from infection. In our 2007 study, we found both treatments provided season long protection from the damage caused by the disease.

78. SOUND SCHOOL AGRICULTURAL SCIENCE PROGRAM

Students from the Sound School

This is a unique opportunity for students from New Haven who are interested in studying/pursuing a career in Agricultural Science. This is a public high school within the City of New Haven. Our program operates on a 12-month basis in partnership with The Connecticut Agricultural Experiment Station. Today you see an example of students planting, growing, caring and eating fresh vegetables and herbs from their garden, which they have taken care of this summer. Excess produce is used in local soup kitchens.

Our Partnership with the City of New Haven "Youth @ work" program assists in the development of work-based skills under the direct supervision and instruction of a certified Vocational Agriculture Teacher. Please visit our web site: www.soundschool.com.

79. SPECIALTY PUMPKIN TRIALS

A. Maynard and D. Hill *Assisted by* C. Peterson

The typical predominant market for pumpkins is for jack-o'-lantern types (12 lbs to 20 lbs). However, small pumpkins are often needed for operations specializing in school tours where each child receives a pumpkin to take home. Smooth pumpkins are preferred for painting or coloring. Specialty pumpkins come in a wide range of colors and color combinations including white, pale green, tan, burnt orange, and yellow. Shape also varies from the ideal round, to squatty with a flattened or concave top, to oval, to tall and elongated. This trial, which is also repeated at the Valley Laboratory in Windsor, is evaluating 13 different varieties of specialty pumpkins on yield and quality.

80. CHESTNUT SPECIES AND HYBRIDS

S. Anagnostakis *Assisted by* P. Sletten

These trees are part of the large collection of species and hybrids of chestnut maintained by The Connecticut Agricultural Experiment Station. Great differences can be seen in chestnut blight resistance, form, and nut production. Hypovirulent strains of the blight fungus help protect them from lethal cankers (see CONTROL OF BLIGHT ON AMERICAN CHESTNUTS, plot 23). Plants of all seven species of chestnut are growing here. In 1994, two seedlings from the Caucasus Mountains of Russia that are true European chestnut were planted, but only one has survived our Connecticut winters. European chestnut trees from Turkey have also done poorly. Two trees of the chinquapin, native to Florida, are planted across the road from an Allegheny chinquapin from Pennsylvania. The cultivar 'Lockwood' is at the southwest corner of the plot.

81. DENSE PLANTING OF AMERICAN CHESTNUTS

S. Anagnostakis *Assisted by* P. Sletten

In 1982, 300 seedling American chestnut trees from Michigan were planted in two dense plots. We treated the north plot with hypovirulence for blight control (see CONTROL OF BLIGHT ON AMERICAN CHESTNUTS, plot 23), and it looks slightly better than the south plot.

82. DWARF HYBRID CHESTNUT TREES

S. Anagnostakis *Assisted by* P. Sletten

These hybrid trees are the results of crosses done in 1934 by Arthur Graves followed by intercrossing by Hans Nienstadt in 1951 and selection by Richard Jaynes from 1970 to 1973. One of the parents in the hybrids was the dwarf species *Castanea seguinii*, and the selected trees that remain produce abundant nut crops and have remained small. These are important parents in our selections of orchard-type trees for Connecticut. The cultivar 'Little Giant' was released to the nursery industry in 1999, 'Hope' in 2003, and 'King Arthur' in 2005 (see signs). New hybrid and species trees are planted next to these dwarf hybrids.

83. OZARK CHINQUAPIN TREES

S. Anagnostakis *Assisted by* P. Sletten

Ozark chinquapins are *Castanea ozarkensis*, native to the Ozark Plateau in Arkansas and Oklahoma. They are now threatened by both chestnut blight disease, fires, and land use changes in their native habitat. These are timber trees, unlike the shrub-like Allagheny chinquapins in the east (there is one in the Chestnut Species and Hybrids plot). We have been checking this collection of seedlings from the Ouachita National Forest for resistance to blight, and using them as female parents in crosses to produce Ozark chinquapins with more resistance to blight.

84. ROCKY HILL AMERICAN CHESTNUT TREES

S. Anagnostakis *Assisted by* P. Sletten

Seed collected from selected American chestnut trees in Rocky Hill in 1985 grew into the trees planted here. They are used as female parents in our crosses and are being treated with hypovirulence (see CONTROL OF BLIGHT ON AMERICAN CHESTNUTS, plot 23) to keep them alive.

85. PINOT GRIS CULTURAL TRIALS

W. Nail *Assisted by* C. Peterson

A planting of 288 Pinot Gris vines was established in 2004. Half of the vines are on 101-14 rootstock, and the other half are on C3309. Vines on C3309 have had greater winter mortality and increased incidence of crown gall. Horticultural oil was applied at bloom in 2006-2008. Application of oil reduced photosynthesis and fruit set, resulting in less compact clusters that may be more resistant to late-season fruit rot diseases. Beginning in 2007, comparisons between fruit zone leaf removal on both sides and only on the east side were done.

86. HYBRID AND VINIFERA WINEGRAPE CULTIVAR TRIAL

W. Nail *Assisted by* C. Peterson

The Connecticut component of NE-1020: Multi-State Evaluation of Winegrape Cultivars and Clones consists of 24 hybrid and vinifera cultivars. The vineyard was planted in late spring, 2008. Some of the new cultivars are unreleased selections from breeding programs at Cornell University and the University of Minnesota, while others are newly available cultivars from cool and cold climate areas of Europe. The new cultivars are being compared to established cultivars, which are the same for all states with similar climatic conditions. This planting is the second largest NE-1020 planting in the eastern states. Another, smaller, cultivar evaluation plot has been established at the Windsor station.

87. BEACH PLUM TRIALS

A. Maynard and D. Hill *Assisted by* C. Peterson

Beach plum (*Prunus maritime* Marsh.) is a fruiting shrub native to the coastal dunes of the northeastern United States. Beach plum jam has become a premium product especially in the Cape Cod region. Currently, consumer demand for beach plums is greater than the supply. Commercial production is the only way to meet the demand for beach plums and its relatively low growth habit makes it ideal for a pick-your-own operation. In its native seaside habitat, beach plums grow very slowly and bear fruit sporadically. Growth in more fertile soil should be more vigorous and crop size will be improved. In spring 2003, 210 beach plum seedlings were planted at Lockwood Farm and 96 at the Valley Laboratory. These seedlings were raised at Cornell University from seeds collected from 35 sites from Maine to Delaware. The trees are evaluated annually and select elite individuals will be propagated as possible cultivars in the future. In 2008, total production from Windsor was estimated to be 742 lbs from 82 plants (94%). Estimated total yield at Lockwood Farm was 1,286 lbs from 134 plants (69%). Heavy yielding plants produced as much as 22 lb/plant.

88. JAPANESE PLUM VARIETY TRIALS

A. Maynard and D. Hill *Assisted by* C. Peterson

As wholesale marketing of major tree fruits becomes unprofitable, many Connecticut growers are turning to retail sales of their fruit. For a retail operation to be successful there must be a diversity of products. Thus, many growers are interested in adding minor specialty fruits to their operations. Consequently, we have expanded our New Crops Program to include fruits. This trial, also repeated at the Valley Laboratory in Windsor, includes 12 cultivar/rootstock combinations of Japanese plum. In 2008, the greatest yields were from Shiro (60 lb/tree) and Beauty (52 lb/tree). Many trees, with the exception of the cultivar Obilnaja, have been damaged by black knot disease.

89. WHITE BIRCH RESEARCH ORCHARD

C. Rutledge *Assisted by* M. Scott

Non-native white birches in landscape and nursery settings in Connecticut are vulnerable to a number of insect pests. These include the bronze birch beetle, which attacks the vasculature of the tree's trunk, and birch sawflies and birch leafminers which attack the foliage of the trees. Together these insects are responsible for killing many white birch trees causing

substantial financial losses to nurseries, landscapers and homeowners. The orchard was established in the spring of 2005 with the assistance of 5 Connecticut Nurseries; Millane Nurseries, Inc. in Cromwell, Young's Nurseries, Inc. in Wilton, Planters' Choice in Newton, Robert W. Baker Nursery in West Suffield, and Pride's Corner Farms, Inc. in Lebanon. The orchard will allow future research into the biology, ecology, and management techniques for these important pests.

90. HYBRID ELM TREES

S. Anagnostakis *Assisted by* P. Sletten

The late Eugene Smalley spent his whole career at the University of Wisconsin breeding elm trees for resistance to Dutch Elm Disease and for the tall, vase-shaped form of American elm trees (*Ulmus americana*). The problem with this kind of breeding is that American elms have four sets of chromosomes, and all the other species of elm have two sets. They bloom at different times, but stored pollen can be used to make crosses. In 1992, Dr. Smalley sent us trees of Chinese elm (*Ulmus parvifolia*) and some of his successful crosses. Mortality has been high, but some of the trees still survive. Unfortunately, none look like good replacements for American elms as street trees.

Index of Scientists' Names and their Field Plot Numbers

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History of The Connecticut Agricultural Experiment Station

The Connecticut Agricultural Experiment Station is one of a national network of state agricultural experiment stations. Experiment Stations are a cooperative research effort of the states and federal government to solve with local, regional, and national problems. The Station has existed for 134 years.

The Connecticut Agricultural Experiment Station, the first agricultural Experiment Station in the United States, grew out of the efforts of Samuel W. Johnson, a professor of agricultural chemistry at Yale University. Johnson had seen an agricultural experiment station when he did post graduate studies in Germany during the 1850s. He saw how the science of chemistry could be used to aid farmers and campaigned for 20 years until one was established by the Connecticut legislature in 1875. Initially opened as a chemistry laboratory at Wesleyan University in Middletown, the Station was moved to Yale in 1877, where its first bulletin reported on analysis of a fertilizer that had little agricultural value. In 1882, the Station moved to its present location on Huntington Street in New Haven. Besides Lockwood Farm, its outdoor laboratory in Hamden, the Station also has a research farm and laboratories in Griswold and Windsor.

Through the years, many important discoveries have been made by researchers at The Connecticut Agricultural Experiment Station. For example, vitamin A was discovered as an outgrowth of studies of the chemical composition of foods. The first practical hybrid of corn was developed, and many experiments in increasing the yield of corn were conducted at Lockwood Farm by Donald F. Jones. This discovery led to the doubling of yields of corn crops throughout the nation and led to more abundant and lower cost of food for mankind. Also, at Lockwood Farm, experiments were conducted which led to the development of organic fungicides, some of which are still in use to combat plant diseases. These fungicides replaced toxic heavy metals previously used to control plant pathogens. The first culture of the West Nile virus in North America was made at the main campus in New Haven.

Research at the Station covers plants and their pests, such as diseases and insects, the pests of man and animals such as mosquitoes and ticks, growth of the state's forests, methods of enhancing the growth of plants by protecting them from pests and increasing crop yields through cloning of genes, and studies of environmental contamination and ways to reduce application of pesticides or their impact on the environment. New research has been started on crops for biodiesel fuel production. Staff at the Station also analyze fresh fruits and vegetables for excess pesticide residues, test fertilizers and animal feeds for compliance with label claims, and screen a wide variety of foods as a part of the federal and state's food safety monitoring programs.

Some current research includes:

- Release of a lady beetle to control the hemlock woolly adelgid, which is killing hemlocks throughout the state.
- Studies of the pathogen that causes Lyme disease and means of controlling the tick vector.
- Treatments to reduce the toxicity of organic contaminants in water.
- Studies of natural changes in Connecticut's forests.
- Ways to control insect pests of plants using non-chemical means.
- Surveys and studies of the eastern equine encephalitis virus, West Nile virus, and other encephalitis viruses in mosquitoes.
- Enhancing growth of crops through the use of compost as a substitute for fertilizer.
- Finding new crops for Connecticut farmers and studying the best varieties of existing crop plants for Connecticut conditions.
- Studies of invasive aquatic plants and methods of control.
- Finding the cause of salt marsh grass dieback.

The experiments at Lockwood Farm are only a portion of these conducted by Station scientists. Scientists also perform experiments in New Haven, Griswold, and Windsor and carry out other experiments in state forests and on private lands.

PLANT SCIENCE DAY is held annually in August at Lockwood Farm, 890 Evergreen Avenue, Mt. Carmel, Hamden. Friends of the Experiment Station are invited to an *Open House* held in April at our New Haven laboratories on 123 Huntington Street.

THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION, founded in 1875, is the first state agricultural experiment station in America. It is chartered by the General Assembly to make scientific inquiries and experiments regarding plants and their pests, insects, soil and water, and to perform analyses for State agencies.

OFFICE AND MAIN LABORATORIES
123 Huntington Street; New Haven, CT 06511-1106, (203)-974-8500, toll free, statewide, 1-(877)-855-2237

VALLEY LABORATORY
153 Cook Hill Road; Windsor, CT 06095-0248, (860)-683-4977

LOCKWOOD FARM
890 Evergreen Avenue; Hamden, CT 06518-2361, (203)-974-8618

GRISWOLD RESEARCH CENTER
190 Sheldon Road; Griswold, CT 06351-3627, (860)-376-0365

THE EXPERIMENT STATION'S WEB PAGE AT: WWW.CT.GOV/CAES

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