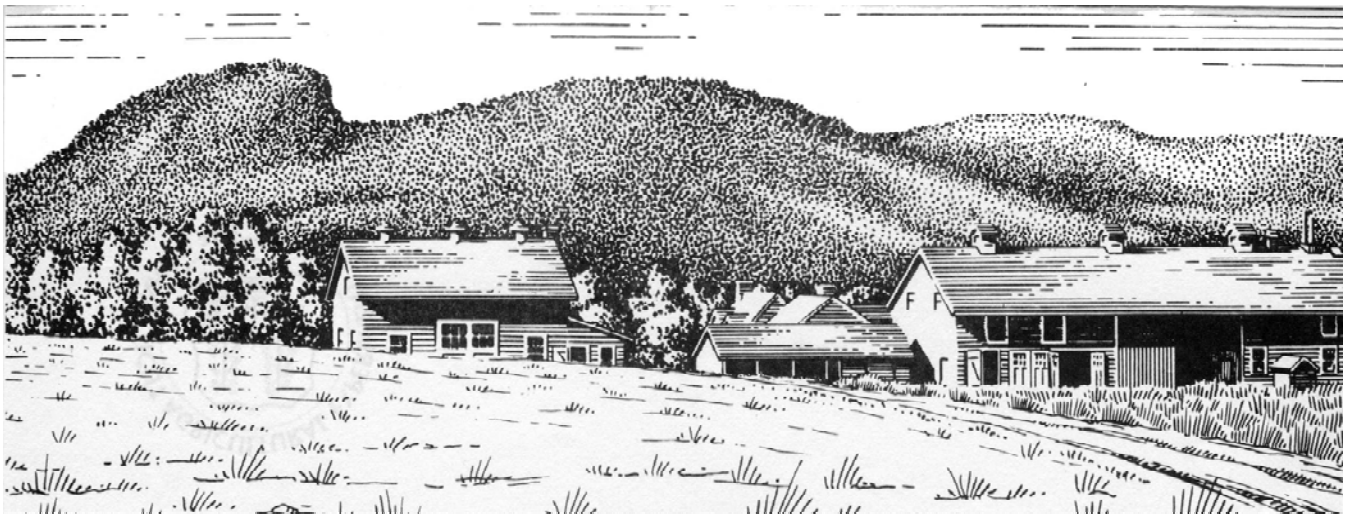
Plant Science Day

The Annual Samuel W. Johnson Lecture • Short Talks •
Demonstrations • Field Experiments • Passport for Kids
Pesticide Credits • Century Farm Award • Barn Exhibits



Lockwood Farm, Hamden
Wednesday, August 3, 2005

History of Lockwood Farm, Hamden

Lockwood Farm is a research farm 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 acres to 75.0.

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 Sleeping Giant Mountain that 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 artists.

The soils of the farm developed on glacial drift 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 F, was observed on July 4, 1949. A record low temperature, -24 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 scientists at the Experiment Station 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 Agriculture and Natural Resources Association.

CENTURY FARM CITATION

Tulmeadow Farm
West Simsbury, Connecticut

Members of the Tuller family have been farming the land in West Simsbury continuously since 1768. Tulmeadow Farm, at 255 Farms Village Road, is currently operated by cousins Oliver "Buzz" Tuller, Jr. and Don Tuller. The 265-acre farm, comprised of fields and woodland, provides rural character to the village of West Simsbury.

Like many New England farms, diversification and changing with the times have been critical to the survival of the Tulmeadow Farm the last 237 years. Dairy production was a major focus until recently. Other past activities included poultry (meat and eggs), broadleaf tobacco, apples, charcoal and cider brandy production, and sand and gravel sales.

Today, sweet corn, tomatoes, greenhouse crops, and other farm-raised produce are marketed at the farm store. In addition, other local fruits, vegetables, food products, plants, and Christmas trees are sold. Premium ice cream is produced and sold at the farm, bringing approximately 90,000 visitors to the farm annually. Hay and beef production are developing product lines.

The Tullers recently sold the development rights on part of the farm to the Simsbury Land Trust. This will enable Tulmeadow Farm to continue for future generations.

The Tullers are active in agricultural organizations, including the Farm Service Agency Board and the Connecticut Farm Bureau, and belong to the Connecticut Greenhouse Growers Association.

As Governor, I am happy to join with the Connecticut Agricultural Experiment Station and Natural Resources Association in presenting this Century Farm Award to the Tullers, who are most deserving of this honor.

THE SAMUEL W. JOHNSON MEMORIAL LECTURE

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

ANSWERS TO YOUR QUESTIONS

Staff 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

This is a special event for children to enjoy and explore Plant Science Day. There are six different stations located throughout the Farm that they can visit and receive a special stamp for their passport. Once the passport is filled, they can go to the registration desk and receive a prize.

PASSPORT FOR BROWNIES

Brownies are invited to complete four activities and receive the Plants Try-It! Once they have visited and received a completed stamp on their passport from the four different stations, they will receive the Plant Try-It! at the Girl Scout tent.

PESTICIDE CREDITS

Pesticide credits will be offered for the first time for attending Plant Science Day. If you are interested in obtaining pesticide credits, you must sign-in at the registration desk at the start of the day, between 9:30-10:00p.m., and sign-out to pick up pesticide credit forms between 3:00-4:00p.m. Pesticide Credits Offered: Private Applicators (PA): 3½ hours; Arborist (ARB): 3 hours; Forest Pest Control (2): 2½ hours; Ornamental and Turf (3A): 3¼ hours.

The Connecticut Experiment Station has a web page at: http://www.caes.state.ct.us

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

THE 95th ANNUAL PLANT SCIENCE DAY

10:00am—Greeting

MAIN TENT, 11:30 A.M.

Louis A. Magnarelli—PRESIDING

CENTURY FARM AWARD

REMARKS

Otto Schaefer
President, Experiment Station Associates

THE SAMUEL W. JOHNSON MEMORIAL LECTURE

Adam Robert Moore
"Connecticut and the Forefront of Forestry"
Executive Director and Secretary-Forester of the Connecticut Forest and Park Association

SHORT TALKS & DEMONSTRATIONS

10:00 a.m. **DEMONSTRATION TENT Gregory J. Bugbee, Soil Scientist, Department of Soil & Water**
Lawn Fertilizer and the Environment
(15-minute demonstration, repeated twice during the day, 10:00 a.m. & 1:30 p.m.)
More lawn fertilizer is applied to Connecticut land than all other fertilizers combined. Misapplication or overuse can cause harmful effects on the environment. This talk will focus on the risks associated with lawn fertilizer and how proper usage provides quality turf without harm to the environment. Techniques, including fertilizing based on soil tests, choosing the right fertilizer, utilizing buffer zones, timing applications to correspond with plant uptake, fertilizing techniques that minimize application to paved areas, and reducing lawn size will be discussed.

10:15 a.m. **MAIN TENT William R. Nail, Horticulturalist, Department of Forestry and Horticulture**
Wine Grape Culture in Connecticut
Many factors need to be considered before planting a vineyard in Connecticut. Site selection is critical to help avoid spring and fall frosts and maximize sunlight. Most soils require preparation prior to planting. Varieties must be selected that are adaptable to our soils, our cold winters, and warm, humid summers. The choice of pruning and training systems should be matched to the varieties being grown.

10:40 a.m. **MAIN TENT Claire E. Rutledge, Entomologist, Department of Entomology**
Biology and Management Strategies for Wood-Boring Insects
The life cycle and ecology of two major wood-boring beetle families, the long-horned beetles (Cerambycidae) and the jewel beetles (Buprestidae), will be discussed. Native beetles to Connecticut will be used as examples. This presentation will include a discussion of management tactics and a demonstration of some techniques used to research these insects. Two exotic species, the Asian Longhorned Beetle and Emerald Ash Borer, which have recently invaded the United States and may soon be found in Connecticut, will also be introduced and discussed.

11:00 a.m. **DEMONSTRATION TENT Brian D. Eitzer, Chemist, Department of Analytical Chemistry**
Chromatography and Spectroscopy: Tools of the Analytical Chemist
(15-minute demonstration, repeated twice during the day, 11:00 a.m. & 2:00 p.m.)

Two primary techniques used in the Department of Analytical Chemistry are chromatography and spectroscopy. These techniques will be explained with simple demonstrations using filter paper to separate different colors in a black ink and using the color of a flame to identify metals.

11:05 a.m. **MAIN TENT Jeffrey S. Ward, Station Forester, Department of Forestry and Horticulture**

Challenges Met in Connecticut Forest Research

Since 1901, The Connecticut Agricultural Experiment Station has been a leader in forestry and tree care research. Early research focused on restoring forests that had been abused by indiscriminate cutting and wildfires. Soon, research branched out into diverse studies including efficient charcoal production, forest stand dynamics, and forest pests such as Dutch elm disease, chestnut blight, and gypsy moth. This research has resulted in innovative methods of forest management, chronicled the control of white pine blister rust and gypsy moth, and holds the promise of returning American chestnut to our forests.

11:30 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, Adam Moore, Executive Director, Connecticut Forest & Park Association**

Connecticut and the Forefront of Forestry

1:15 p.m. **MAIN TENT Francis J. Ferrandino, Plant Pathologist, Department of Plant Pathology & Ecology**

Nectria Canker on Black Birch: The Malformed Future of Connecticut's Forests

During the past 60 years, black birch has gone from being a minor forest species in Connecticut to accounting for more than 50% of the trees less than 14" in diameter. This population shift is due to the periodic gypsy moth defoliations and deer browse. Increased densities of these black birch trees translate to an ever increasing danger of a Nectria canker epidemic.

1:30 p.m. **DEMONSTRATION TENT Gregory J. Bugbee, Soil Scientist, Department of Soil & Water**

Lawn Fertilizer and the Environment

(15-minute demonstration, repeated twice during the day, 10:00 a.m. & 1:30 p.m.)

More lawn fertilizer is applied to Connecticut land than all other fertilizers combined. Misapplication or overuse can cause harmful affects on the environment. This talk will focus on the risks associated with lawn fertilizer and how proper usage provides quality turf without harm to the environment. Techniques such as using fertilizing based on soil tests, choosing the right fertilizer, utilizing buffer zones, timing applications to correspond with plant uptake, fertilizing techniques that minimize application to paved areas, and reducing lawn size will be discussed.

1:45 p.m. **MAIN TENT James A. LaMondia, Plant Pathologist, Valley Laboratory**

Rotation and Green Manure Crops for Nematode Control

Plant pathogenic nematodes are microscopic roundworm parasites that can reduce plant growth and economic value. Chemical nematicides can be expensive, have high toxicity, or threaten environmental quality. We are investigating the use of certain rotation crops and green manure plants (plants turned into soil as an amendment) to reduce nematode populations. While these non-chemical alternatives may be promising, different crop plants may be required for success against different nematode species.

2:00 p.m. **DEMONSTRATION TENT Brian D. Eitzer, Chemist, Department of Analytical Chemistry**

Chromatography and Spectroscopy: Tools of the Analytical Chemist

(15-minute demonstration, repeated twice during the day, 11:00 a.m. & 2:00 p.m.)

Two primary techniques used in the Department of Analytical Chemistry are chromatography and spectroscopy. These techniques will be explained with simple demonstrations using filter paper to separate different colors in a black ink and using the color of a flame to identify metals.

2:15 p.m. **MAIN TENT Timothy M. Abbey, IPM Specialist, Valley Laboratory**

Ecological Landscaping with Native Ornamental Plants

There are a number of Connecticut-grown native plant species that can be used as ornamental landscape plants. Depending on the species planted, the benefits can include interesting plant form, flower color and fall foliage color. Ecological landscaping involves selecting and planting ornamental plants that provide other benefits besides ornamental value. By using native plant species grown in Connecticut, you can provide food for wildlife and slow the spread of invasive plant species.

PESTICIDE CREDIT TOUR

12:15-1:15 p.m. MEET AT REGISTRATION DESK Thomas M. Rathier, Soil Scientist, Valley Laboratory
A 1-hour guided tour of selected Barn Exhibits and Field Plots will be conducted by Tom Rathier, Soil Scientist, Valley Laboratory. Participants can discuss experiments and topics with scientists at each station on the tour.

Stops on Tour:

- **Robert Marra, Plant Pathologist, Department of Plant Pathology and Ecology and Sharon Douglas, Plant Pathologist, Department of Plant Pathology and Ecology**
  Ramorum Blight (Sudden Oak Death): Is Phytophthora ramorum a Risk to Connecticut Forests and Landscapes?
- **Richard Cowles, Entomologist, Department of Entomology, Valley Laboratory**
  Chemical Control of Hemlock Woolly Adelgid
- **Chris Maier, Entomologist, Department of Entomology**
  Alien Insects Recently Discovered in Connecticut
- **Wade Elmer, Plant Pathologist, Department of Plant Pathology and Ecology**
  Fusarium (Cultivar Evaluation of Fusarium Wilt of China Asters, Fusarium Corm Rot of Gladiolus, Fusarium Wilt of Basil, and Influence pf Earthworms on Fusarium Wilt of Tomato)

3:00–4:00 p.m. SIGN-OUT (for those requesting pesticide credits)
Attendees pick up Pesticide Credit forms at the registration table.

BARN EXHIBITS (Barn B)

Using Chromatography and Spectroscopy in the Department of Analytical Chemistry

Department: Analytical Chemistry
Investigators: Brian Eitzer, MaryJane Mattina, Dave Stilwell, and Walter Krol
Assistants: Craig Musante, Terri Arsenault, and William Iannucci-Berger
Abstract: Many different substances (food, soil, water etc.) are analyzed for many different contaminants (pesticides, heavy metals etc.) by the Department of Analytical Chemistry. The final steps in these analyses are instrumental analysis using modern chromatographic and spectroscopic techniques. These techniques will be explained in this display.

Growing Hydroponic Tomatoes

Department: Forestry and Horticulture
Investigators: Martin Gent
Assistants: Michael Short and Jim McDonald
Abstract: Greenhouse tomatoes require a continuous supply of fertilizer in order to grow and produce over a long period. Growers may supply more than required to avoid any problems due to a lack of nutrients. In order to prevent such a wasteful use of water and nutrients, we are investigating exactly how much tomato plants need. We provide a known amount of water and nutrients to each plant in hydroponics solution, and measure the amount of water and nutrients drained from the system. The difference is the amount required by the plants.

Exotic Weeds in Connecticut Lakes

Department: Soil and Water
Investigators: Greg Bugbee, Robert Capers, Kirsten Deeds, Roslyn Selsky, Charles Vossbrinck, and Jason White
Assistants: Alicia Bridgewater, Phil Nista, and Brandon Russell
Abstract: In cooperation with towns, lake associations and the CT Department of Environmental Protection, the Connecticut Agricultural Experiment Station is conducting research on methods for controlling invasive aquatic weeds in lakes and ponds. Research is underway to develop methods to eliminate invasive aquatic plants while minimizing adverse effects on people and native ecosystems. In addition, surveys have started in lakes and ponds in Connecticut. The goad is to establish the geographical distribution of invasive aquatic plants and correlate their presence with watershed characteristics, water chemistry and usage. These efforts will be reported in this exhibit.

Cover Crops and the Insects That Live In Them

Department: Entomology
Investigators: Kimberly Stoner and Wade Elmer
Assistants: Erin Amezzane, Tracy Zarrillo, Morgan Lowry, and Elizabeth O'Dowd
Abstract: Growing cover crops over the winter provides many well-documented benefits to vegetable growers. We looked at a wide array of cover crops grown in the Northeast and measured how well they grew, how well they suppressed weeds, and how they affected populations of pest and beneficial insects.

Ramorum Blight (Sudden Oak Death): Is Connecticut at Risk?

Department: Plant Pathology and Ecology
Investigators: Bob Marra and Sharon Douglas
Abstract: Ramorum Blight, until recently known as Sudden Oak Death, is an emergent and potentially destructive new disease for the United States, which, though currently limited to the West Coast, is of increased concern in Connecticut since rhododendron plants shipped from Oregon in 2004 tested positive for the disease. With a host list that spans more than 70 species, including eastern red oak, rhododendron, azalea, viburnum, and lilac, accidental introduction of the pathogen that causes Ramorum Blight, *Phytophthora ramorum*, into Connecticut or other eastern states could have enormous consequences. This exhibit provides an overview of the disease, how it might impact our forests, landscapes, and nurseries, and the efforts at the Experiment Station to understand the biology and monitor the status of this new pathogen.

Genetic Engineering of Photosynthesis

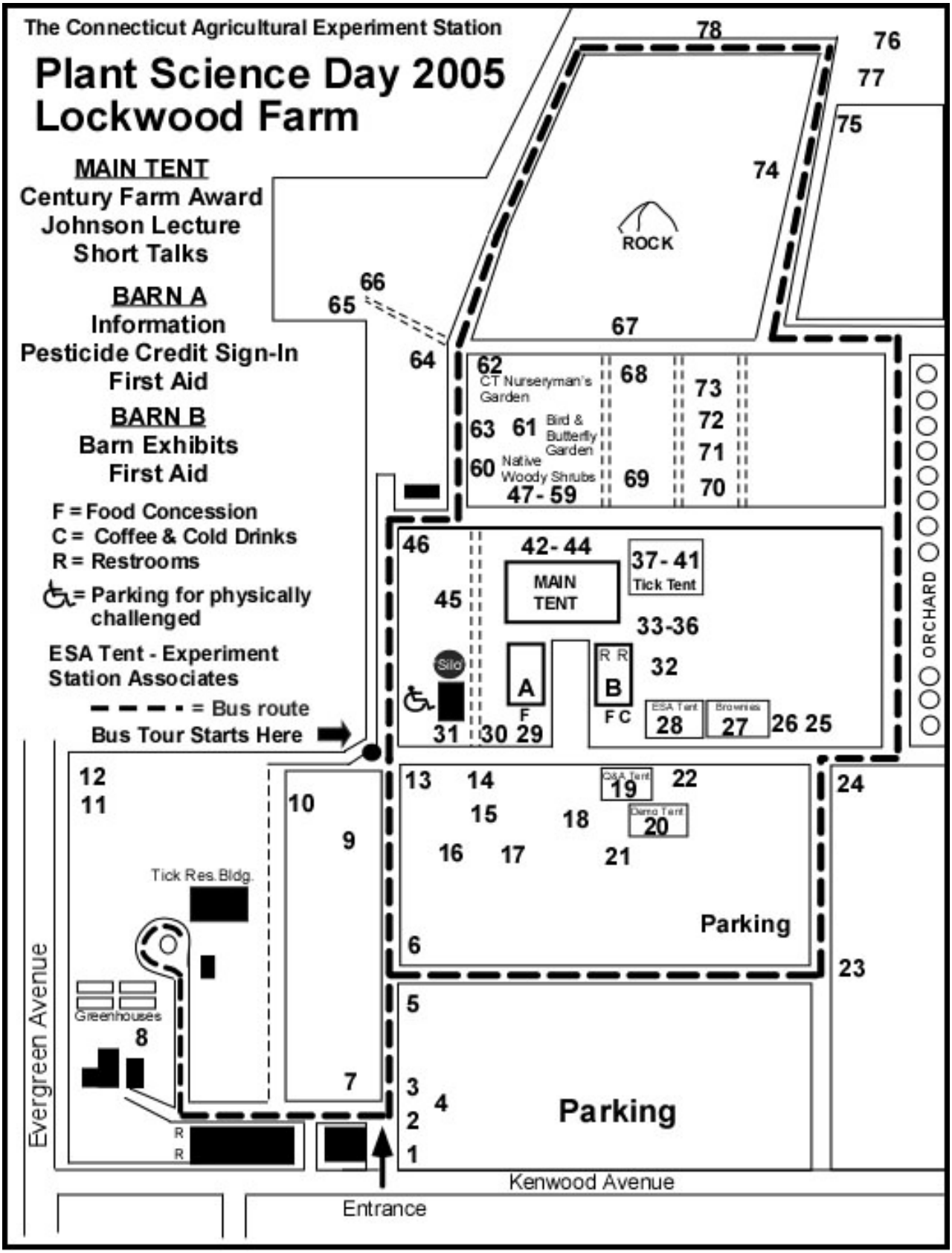
Department: Biochemistry and Genetics
Investigators: Richard B. Peterson, Neil P. Schultes, and Neil A. McHale
Assistants: Carol Clark and Regan Huntley
Abstract: All plants require solar energy to convert carbon dioxide to carbohydrate that fuels growth and yield of harvestable materials. But too much sunlight can be harmful under some circumstances. Introducing new genes to manipulate light capture efficiency may facilitate adaptation of crop plants to diverse environments.

THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION
The experiments exhibited here depict only a portion of the work of Station Scientists. In addition to Lockwood Farm and Laboratories in New Haven and Windsor, Station Scientists use state forests, private orchards, and farms for their experiments. Experiments and surveys of problems are conducted in many towns of the state.

THE EXPERIMENT STATION HAS A WEB PAGE
The address of the web page is http://www.caes.state.ct.us

TO RECEIVE A COMPLETE LIST OF STATION SPEAKERS: inquire at the Publications table in the barn or write to: Publications; The Connecticut Agricultural Experiment Station; P.O. Box 1106; New Haven, CT 06504-1106

TO RECEIVE A COMPLETE LIST OF AVAILABLE STATION PUBLICATIONS: Inquire at the Publications table in the barn or write to: Publications; The Connecticut Agricultural Experiment Station; P.O. Box 1106; New Haven, CT 06504-1106



Map Not to Scale

FIELD PLOTS

Outside Organizations (#6, #31, #47 - #59) invited to participate

1. Chinese Chestnut Trees
2. Sheet Composting With Oak and Maple Leaves
3. Annual Culture of Globe Artichokes
4. Jilo Trials
5. Heirloom Tomato Trials
6. Sound School Agricultural Science Program
7. Calabaza Squash
8. Effect of Shade on Quality of Greenhouse Tomato
9. Utilization of Compost in Onion and Leek Production
10. Monitoring Cabbage Maggot Oviposition in Turnip and Radish
11. Chemical Control of Hemlock Woolly Adelgid
12. Biological Control of the Hemlock Woolly Adelgid
13. Hybrid Wine Grape Variety Trial
14. West Nile Virus in Tree Canopy, Ground Level, and Subterranean Habitats
15. Composting Leaves Using the Static Pile Method
16. Control of Blight on American Chestnuts
17. New Hybrid Chestnut Orchard
18. Effect of Earthworms on Soilborne Disease
19. Question and Answer Tent
20. Demonstration Tent
21. CAES Weather Station
22. Alien Insects Recently Discovered in Connecticut
23. Orchard Chestnuts
24. Phytoremediation of Agricultural Soils Contaminated with DDE
25. Dispersal of Corn Pollen in the Atmosphere
26. Hydrophobic Micropores in Soil Particles go Undetected by the Traditional Molecular Probe, Nitrogen Gas
27. Girl Scout Tent
28. Experiment Station Associates
29. Spiders of Connecticut
30. Mosquito Surveillance for West Nile Virus
31. Verizon Telephone Transmission Silo
32. Personal-Sized Watermelon Variety Trials
33. Release and Dispersal of Basidiospores from Basidiomata of *Amanita muscaria* var. *alba* and their infiltration to a Residence
34. Connecticut Weeds and Wild Plants
35. Plant Health Care for the Connecticut Nursery and Landscaping Industries
36. Non-Chemical Plant Disease Control with Plant Resistance

37. The “Deer” Tick *Ixodes scapularis*
38. Use of a Rodent Baitbox for the Control of the “Deer” Tick
39. Use of an Entomopathogenic Fungus for Control of the “Deer” Tick
40. Improved Diagnostic Tests for Lyme Disease in Cattle
41. Lyme Disease in Ticks from Connecticut Citizens
42. Protecting Connecticut’s Lakes and Ponds from Nonnative Weeds
43. Non-Lethal Reproductive Control of White-Tailed Deer
44. White-Tailed Deer and Invasive Plants
45. Milk as a Control for Powdery Mildew on Pumpkin, Squash, and Muskmelon
46. Minimum Fertilization for Home Gardens Amended by Leaf Compost
47. Organic Agriculture and Land Care in Connecticut (CT NOFA)
48. Connecticut Farmland Trust
49. USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine
50. Invasive Plants of Connecticut
51. New Haven Land Trust
52. USDA Farm Service Agency
53. Connecticut Department of Agriculture – Marketing Bureau
54. Southwest Conservation District
55. USDA Forest Service, Northeast Research Station
56. Connecticut Pre-Engineering Program
57. The Connecticut Forest and Park Association
58. The Connecticut Department of Environmental Protection Division of Forestry
59. Connecticut Tree Protective Association
60. Native Woody Shrubs
61. Bird and Butterfly Garden
62. Connecticut Nurserymen's Garden
63. Nursery and Bee Inspections
64. Chestnut Species and Hybrids
65. Dense Planting of American Chestnuts
66. Dwarf Hybrid Chestnut Trees
67. Insectary Plantings of Flowers to Attract Beneficial Insects
68. Milk as a Control for Powdery Mildew on Tomato and Zinnia
69. Cauliflower Trials
70. Resistance to *Fusarium* Wilt of China Asters
71. *Fusarium* Wilt of Tomato
72. Biological and Chemical Suppression of *Fusarium* Corm Rot of Gladiolus
73. *Fusarium* Wilt of Basil
74. Rocky Hill American Chestnut Trees
75. Planting of Pinot Gris Grapes
76. Pawpaw and Japanese Plum Variety Trials
77. White Birch Research Orchard
78. Beach Plum Trials

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 assistant, R. Hannan, and the following summer workers: J. Gesino, M. Harris, and A. Ferrara.

1. CHINESE CHESTNUT TREES

S. Anagnostakis *Assisted by* P. Sletten

These Chinese chestnut trees, planted by Donald 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 Experiment Station and the American Chestnut Foundation in crosses with American chestnut trees to produce blight-resistant forest and orchard trees. For more information, find Dr. Anagnostakis at plot #16.

2. SHEET COMPOSTING WITH OAK AND MAPLE LEAVES

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

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 1995-2003 and incorporated into the soil by rototilling. Last year, lettuce, peppers, edible soybeans, and rutabaga 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. Last year 32 lbs of rutabaga were harvested from the control plots, compared to 54 lbs from plots amended with maple leaves and 39 lbs from plots amended with oak leaves. There were no significant differences in yields between any of the treatments with the other crops. For more information, find Dr. Maynard at plot #5 or Dr. Hill at plot #7.

3. ANNUAL CULTURE OF GLOBE ARTICHOKES

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

Connecticut lies at the center of one of the largest artichoke-eating populations in the United States. Fully 40% of California's crop is sold through regional markets from New York to Boston. Annual production of Green Globe is triggered by use of vernalization (cool, moist treatment). Green Globe requires 500-600 cumulative hours of below 50ºF temperatures to induce budding compared to Imperial Star which needs only 250 hours of cool temperatures. This year, if plants do not produce buds by late July, we will treat them with gibberellic acid, a natural plant hormone, to induce budding. For more information, find Dr. Maynard at plot #5 or Dr. Hill at plot #7.

4. JILO TRIALS

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

Jilo (Solanum gilo) is a solanaceous plant akin to eggplant. This tropical vegetable is grown principally in Nigeria. Its culture was transported to central and southern Brazil where is became a minor crop. Its

principal use is in vegetable stew (ratatouille) and sweet and sour mixes with chicken and pork. In 1998, a Bethel grower obtained seeds from a member of the Brazilian community in the Waterbury-Danbury area (estimated population 4500). The Connecticut Department of Agriculture obtained some of the seeds and sent them to the Experiment Station for further testing. We found that jilo grows well in Connecticut's climate and can produce up to 11 lb/plant when mulched with black plastic to warm the soil. We also found that jilo flowers abort when subjected to moisture stress. This year we are growing some plants with black plastic mulch while others are being grown with drip irrigation to insure a constant supply of water when droughty periods occur. These will be compared to plants grown on bare soil with water supplied only by natural rainfall. In 2004, total cumulative yield from mulched plants was 10.6 lb/plant, drip-irrigated plants, 9.7 lb/plant compared to 8.6 lb/plant from the controls. Black plastic mulch not only increased total cumulative yield but increased early yields in the first harvest month. We repeat the experiment this year. For more information, find Dr. Maynard at plot #5 or Dr. Hill at plot #7.

5. HEIRLOOM TOMATO TRIALS

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

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 here and at our Valley Laboratory in Windsor. Five varieties are repeated from last year, and there are five new varieties. We are comparing yields, disease resistance, and timing of harvest. Last year, Pineapple, Mortgage Lifter, Giant Belgian, and Old German all averaged over 30 lbs/plant with good consistent quality.

6. 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. Our program operates on a twelve month calendar. Today, you see an example of students growing, caring, and eating fresh vegetables from their garden which they have taken care of this summer. These students are from our "Youth to Work" Program; where they develop work based skills under the direct supervision and instruction of a Vocational Agriculture Teacher. The Sound School Agricultural Science Program. 17 Sea Street, New Haven, CT 06519, telephone number 203-946-6937.

7. CALABAZA SQUASH

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

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 65 farmers' markets. In 2003, one plant of La Estrella produced mature fruit in only 90 days on 12-foot vines. We saved the seeds from the fruit and have planted them here and at Windsor. Early maturing fruit are generally found on the vine within 2 feet of the planting site. At Windsor, 38% of the plants produced early-maturing fruit (90 days), while only 4% produced early fruit at Mt. Carmel. The greater success at Windsor may be due to an adjacent cover crop of buckwheat, a known bee attractant, which helped to pollinate early forming female flowers. At. Mt. Carmel, the adjacent cover crop was soybeans,

which did not attract bees. This year's crop at Mt. Carmel is surrounded by buckwheat hopefully to improve the production of early fruit. Fruit that matures in 90 days is appealing to northern growers because the majority of fruit can mature before frost. With a traditional maturity of 120 days, some fruits that form late on the vine do not reach maturity.

8. EFFECT OF SHADE ON QUALITY OF GREENHOUSE TOMATO

M. Gent *Assisted by* M. Short, J. McDonald

Shade cloth helps to cool a greenhouse, and often improves the quality of horticultural crops. However, shade also lowers the sunlight intensity and reduces yield of greenhouse tomatoes. This year, we compare yield and quality of greenhouse tomatoes when grown simultaneously in identical greenhouses that differ only in the degree of shade. Each half of four greenhouses is shaded to a different degree; none, 15%, 30% or 50% shade, using reflective aluminized shade cloth. Each shade treatment is repeated in two houses. In addition to yield and characteristics of the tomato fruit, we measure the temperature of the air and the plants, humidity, and the ratio of total to photo-synthetically active light. We grow these tomato plants hydroponically to measure the rate of uptake of water and nutrients, and how these are affected by shade. For more information, find Dr. Gent at his barn exhibit.

9. UTILIZATION OF COMPOST IN ONION AND LEEK PRODUCTION

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

Previous studies have shown that soils amended with compost increase onion yields. However, little research has been done determining the effectiveness of compost when used as a mulch. In leek production, soil is usually mounded to blanch the lower portion of the shank. Using compost would blanch the leek and also improve the soil. This experiment will determine the effectiveness of compost (incorporated and surface mulch) in onion and leek production. The 4 treatments include compost incorporated into the soil, compost as a surface mulch, incorporated compost plus compost mulch, and unamended control. All plots received the same amount (1300 lbs/A) of 10-10-10 fertilizer. Yield of both crops from the various compost treatments were compared to the unamended control plots. In addition, the length of the blanched shank in the leeks was measured. Last year, the greatest yields of onions were from plots with only a compost mulch with the greatest leek yields from plots with compost incorporated into the soil and a compost mulch. Leek plots amended with compost mulch (some with incorporated compost, some without) had the longest blanched shank. These mulched plots also had the greatest percentage of Jumbo and Colossal (>3") sized onions. This is the last year of a 3-year experiment. For more information, find Dr. Maynard at plot #5 or Dr. Hill at plot #7.

10. MONITORING CABBAGE MAGGOT OVIPOSITION IN TURNIP AND RADISH

K. Stoner *Assisted by* E. Amezzane, T. Zarrillo, M. Lowry

Cabbage maggots damage roots of a wide variety of crops in the cabbage family (Brassicaceae). Early in the season, they can stunt or kill young plants. They also damage root crops in the cabbage family, such as radishes and turnips, by direct feeding. The control options are limited to: late planting, after the most damaging first oviposition period has passed; row covers, preventing the flies from laying eggs on the plants; biological control with insect-attacking nematodes; and chemical control with chlorpyrifos. Information on timing of oviposition in Connecticut will increase the effectiveness of these control strategies. For more information, see Dr. Stoner at her barn exhibit.

11. CHEMICAL CONTROL OF HEMLOCK WOOLLY ADELDIG

R. Cowles, C. Cheah and M. Montgomery

Northeastern Research Station, USDA Forest Service

Several studies have shown imidacloprid to have excellent activity for controlling hemlock woolly adelgid (HWA) in a landscape environment. This study was undertaken to determine which imidacloprid application method would provide the best control of HWA in forests. The methods compared were Kioritz soil injection with (1) placement near the trunk or (2) placement near the trunk and out to the drip line, (3) drench near the base of the trunk with Bayer Tree and Shrub Insect Control, and trunk injection with the (4) Arborjet, (5) Wedgle, and (6) Mauget systems. Along with the untreated check, these treatments were part of a 7 × 2 factorial design, which included a comparison of fall vs. spring application timing. All of the soil application methods were effective for suppressing HWA populations; resulting in ~70% population reductions in one year and 98% reduction two years following treatment. None of the trunk injection methods were effective. There were no differences between fall and spring application timings. Soil-applied imidacloprid, which only controls HWA but can reach every part of the tree, is complementary to a foliar spray of horticultural oil, which controls a broader array of insect and mite pests, but usually cannot reach every part of the plant. Insecticide treatments should be considered a stop-gap measure to preserve trees that are of exceptional value until such time that biological control becomes established.

12. BIOLOGICAL CONTROL OF THE HEMLOCK WOOLLYADELGID

C. Cheah *Assisted by* J. Preste

Hemlock woolly adelgid (HWA) is a serious pest of native eastern and Carolina hemlocks in 16 eastern states from Maine to Georgia. Research and implementation of biological control of HWA in Connecticut have been ongoing at the Valley Laboratory since the early 1990s. This project reports on 5-year investigations into population trends of HWA as influenced by the severity of winter conditions, and the current status of hemlocks in Connecticut. The impact of releases of the imported predatory ladybeetle, *Sasajiscymnus* (formerly *Pseudoscymnus*) tsugae from Japan in Connecticut forests, and the current status and biological control evaluations of other ladybeetle predators of the genus *Scymnus* from China, are also discussed.

13. HYBRID WINE GRAPE VARIETY TRIAL

W. Nail *Assisted by* C. Maxwell

Cultivars of wine and table grape varieties have been evaluated for their suitability to Connecticut conditions. The current plot, established in 1992, is a replicated planting that compares the hybrid cultivars Chambourcin, Seyval blanc, Villard noir, and Villard blanc. The plants are evaluated based on vine size (estimated by pruning weights), yield, and fruit quality.

14. WEST NILE VIRUS IN TREE CANOPY, GROUND LEVEL, AND SUBTERRANEAN HABITATS

J. Anderson, A. Main, and T. Andreadis *Assisted by* T.Goodman, B. Hamid, M. Vasil, T. Petruff, C. Secker-Walker, L. Cash, and L. Haibi

Studies in Stamford and Stratford have shown *Culex pipiens,* the most important vector of West Nile virus in Connecticut, to be collected in greater numbers in traps placed in tree canopies and in catch basins than at ground level. Larger numbers of *Culex pipiens* were collected in Mosquito Magnet Experimental traps than in Centers for Disease Control miniature light traps baited with dry ice. West Nile virus was isolated in greater numbers from mosquitoes captured in tree canopies than in mosquitoes captured at ground level or in subterranean habitats. These findings have important implications for our understanding of the natural history of West Nile virus and for control strategies.

15. COMPOSTING LEAVES USING THE STATIC PILE METHOD

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

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 140ºF. 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. For more information, find Dr. Maynard at plot #5 or Dr. Hill at plot #7.

16. 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 differences in resistance. The grafted tree in the center of the east row is from an "American" chestnut in Scientist's Cliffs, Maryland, 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.

17. 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.

18. EFFECT OF EARTHWORMS ON SOILBORNE DISEASE

W. Elmer *Assisted by* J. Bravo and K. Evancha

Soilborne diseases, such as *Verticillium* wilt, cause vegetable growers significant crop loss. It is well known that earthworms improve soil by enhancing decomposition of crop residues and improving drainage. However, their role on soilborne disease has not received much attention. These plots are designed to evaluate the effect of earthworms on tomatoes and eggplants that are susceptible to *Verticillium* wilt. The plastic lining is designed to prevent the earthworms from migrating to other plots at night.

19. QUESTION AND ANSWER TENT

S. Douglas, T. Rathier, G. Ridge, M. Inman, R. Hiskes, and J. Winiarski

Ask questions about plants, soils, and insects here.

20. DEMONSTRATION TENT
See the Program page 5 for a schedule of demonstrations.

21. 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).

22. ALIEN INSECTS RECENTLY DISCOVERED IN CONNECTICUT
C. Maier *Assisted by* J. Daigler, M. Lowry, M. Wohstrom, S. Zappulla, and T. Zarrillo
Insects accidentally introduced from foreign countries have a costly impact on agriculture in the United States. Their effect on agriculture can be reduced by early detection and prompt implementation of management programs. During the past decade, we have detected many exotic insects previously unknown in Connecticut and have begun to study their biology. We have investigated the distribution, hosts, and period of adult activity of the small Japanese cedar longhorned beetle (*Callidiellum rufipenne*)—a wood-boring pest of coniferous landscape plants, the Asian apple tortrix (*Archips fuscocupreanus*)—a potential leafroller pest of fruit trees, the European green pug (*Pasiphila rectangulata*)—a blossom-feeding pest of apples and pears, a European needleminer (*Batrachedra pinicolella*)—a pest of spruces, and other exotic insects. Our discovery of the European needleminer represents a new North American record. In our display, we summarize our findings and show specimens of many non-native insects.

23. ORCHARD CHESTNUTS
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 included. Last year and this year we planted several new chestnut cultivars that we want to test for their production potential in Connecticut. For more information, find Dr. Anagnostakis at plot #16.

24. PHYTOREMEDIATION OF AGRICULTURAL SOILS CONTAMINATED WITH DDE
J. White *Assisted by* A. Bridgewater
DDE is the main breakdown product of DDT and both compounds are persistent organic pollutants (POPs). Field experiments previously conducted to investigate the effect of common plants (rye, alfalfa, mustard, vetch, clover, spinach, squash, pumpkin, melon, cucumber) on the fate and behavior of weathered residues of DDE have indicated tremendous species variability in the accumulation of the

pesticide residue from soil. Data have shown that certain species of summer squash may absorb large quantities of the pollutant into their roots and translocate it throughout their shoots. If certain plants can remove enough of the pollutant, phytoremediation, or plant-assisted cleanup of these residues, may be of practical use for field contaminated soils. This study will assess the effects of surfactant amendment and fungal inoculation on enhancing the remediation of weathered DDE by these plants.

25. DISPERSAL OF CORN POLLEN IN THE ATMOSPHERE

D. Aylor and M. Boehm *Assisted by* P. Thiel and E. Lowery

The recent and rapidly accelerating introduction of genetically modified (GM) corn into agricultural production has sparked renewed interest in quantifying the aerial dispersal of corn (*Zea mays*) pollen. Off-site movement of pollen makes possible crosses of GM varieties with corn in non-GM organic and conventional production fields. We are developing a quantitative model of pollen movement in the atmosphere to help evaluate this possibility. Of central importance is the ability of pollen grains, which are shed by the anthers on the tassels above the canopy, to reach the silks at mid-canopy height, be deposited and then fertilize the ovules, which will become kernels of corn. In this plot, we are studying the effect of time differences between pollen production and silk growth on kernel production. These time differences occur naturally because of variation in soil type in a field and are being simulated here by covering and uncovering silks at various times and at various stages of silk growth. We will examine how the number of kernels produced at various locations along a cob is correlated with the amount of pollen produced and with the weather conditions during the times when individual silks were uncovered and exposed to pollen. These data will help determine levels of seed purity under various planting and weather conditions.

26. HYDROPHOBIC MICROPORES IN SOIL PARTICLES GO UNDETECTED BY THE TRADITIONAL MOLECULAR PROBE, NITROGEN GAS

J. Pignatello and S. Kwon

The adsorption behavior of pesticides and other organic chemicals in soils is consistent with the presence of water-repellent (hydrophobic) micropores—2 billionths of a meter or smaller in width—embedded in soil organic matter that provide strong “adsorption sites” for their molecules. Because of a high surface-to-volume ratio, micropore surfaces often contribute appreciably to total surface area even though their volume may be small compared to larger pores. Nitrogen gas is the traditional “yardstick” for measuring surface area and pore size distribution in solids; such properties are calculated from the gas’s molecular dimensions and the amount adsorbed at the boiling point of liquid nitrogen (–321ºF). Yet, based on nitrogen adsorption, soils do not typically show the high surface areas expected for materials with an abundance of micropores. We postulated that soil micropores are plugged by naturally occurring humic substances. At –321ºF, humic substance plugs would be so inflexible they would prevent nitrogen molecules from entering the pore, resulting in a failure to count micropore surface area. We used wood char as the source of hydrophobic microporosity. Char particles were exposed to water solutions of humic acid, fulvic acid, or triglycerides to represent various soil humic components. The char surface area dropped precipitously from about 400 originally to less than 5 square meters per gram, while adsorption of representative pollutants (benzene or toluene) was practically unaffected. The same humic substances also had little effect on adsorption of carbon dioxide gas. This gas is similar in size to nitrogen, but its adsorption can be carried out at 32ºF where humic substances are far more flexible. Therefore, we propose carbon dioxide as the probe gas for surface area and pore size distribution in soil particles.

27. GIRL SCOUT TENT

Brownie Scouts can report here to get the information and materials for their Try-it.

28. EXPERIMENT STATION ASSOCIATES

Information is available on this organization formed to help the Experiment Station.

29. 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. Nearly all spiders have a venom which they can inject into prey insects such as flies, moths and beetles to stun or kill them (they are nearly all venomous). If the venom of a particular spider species is toxic to humans then it is poisonous. There is only one spider found rarely in Connecticut, the Black Widow spider *Lactrodectus mactans*, which is poisonous. The poison, like most all biological agents, effects the humans on a per weight basis and therefore the effect of the spider toxin depends on the amount injected by the spider and the size of the person. Since there is really no chance of being harmed by a spider by those who live in Connecticut, the fear of spiders by the general public is a curious sociological and psychological phenomenon.

30. MOSQUITO SURVEILLANCE FOR WEST NILE VIRUS

T. Andreadis and P. Armstrong *Assisted by* J. Shepard, M. Thomas, S. Finan, T. Burke, E. Calandrella, M. Calandrella, T. Cloherty, R. Duffy, K. Hendrickson, D. Krause, E. McClure, R. O'Neil, C. Pioli, and D. Robertson

Surveillance for West Nile virus (WNV) in mosquitoes has been integral to the public health response to WNV in Connecticut. Trapping is conducted daily from June through October at 91 locations statewide. The objectives are to provide: 1) early evidence of local WNV activity; 2) information on the abundance, distribution, identity and infection rates of potential mosquito vectors and; 3) baseline data that are used to assess the threat of WNV to the public and guide the implementation of mosquito control measures. Since 1999, The Connecticut Agricultural Experiment Station has trapped and tested over one million mosquitoes. West Nile virus has been isolated from 17 species of mosquitoes and 5 species, *Culex pipiens, Culex salinarius, Culex restuans, Culiseta melanura*, and *Aedes vexans* have been implicated as the most likely vectors of WNV in the region. The principal foci of WNV activity in Connecticut have further been identified as densely populated residential communities in coastal Fairfield and New Haven Counties. We have observed a correlation both temporally and spatially between the isolation of WNV from field-collected mosquitoes and subsequent human cases in these locales, and the incidence of human cases has closely paralleled the number of virus isolations made from mosquitoes with both peaks falling in early September. The highest risk of human infection with this virus extends from early August through the end of September in Connecticut.

31. VERIZON TELEPHONE TRANSMISSION SILO

Learn about the cellular transmission tower.

32. PERSONAL-SIZED WATERMELON VARIETY TRIALS

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

The newest watermelons in the marketplace are seedless mini "personal" watermelons. They offer an attractive alternative for the consumer that 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. In the trials here and at Windsor, we are evaluating 6 varieties for yield and quality. In addition, to ensure development of fruit, every third row contains pollinators. To successfully grow these watermelons in Connecticut, early growth was enhanced with Reemay row covers.

33. RELEASE AND DISPERSAL OF BASIDIOSPORES FROM BASIDIOMATA OF *AMANITA MUSCARIA* VAR. *ALBA* AND THEIR INFILTRATION TO A RESIDENCE

D. Li

Fungal spore concentrations in air may be associated with human allergenic responses. Release and dispersal of spores of the allergenic mushroom *Amanita muscaria* and their potential to infiltrate a nearby residence were investigated. Spore release mainly occurred in the first three days following the expansion of the caps. The concentrations of released basidiospores near the mushrooms were 77137, 75062, and 41738 spores/m3 in the first three days, respectively, with the highest concentration at 281738 spores/m3 air. After three days, the concentration dropped by 95%. At a 2nd location, airborne spore concentrations dropped 96 to 99% after 3 days with concentrations of 940, 575, and 1359 spores/m3 in the first three days, respectively. The diurnal pattern showed an extended night peak. The spore release period of *Amanita muscaria* was short, but released a large amount of basidiospores. However only less than 5% of spores released were dispersed to the 2nd location 5.2 m away and 2.7 m above the mushroom. Less than 0.1% of the spores dispersed from the mushrooms were found inside a nearby residence. *Amanita muscaria* spores showed a low potential of infiltrating the residence.

34. CONNECTICUT WEEDS AND WILD PLANTS

T. Mervosh *Assisted by* K. Olszewski

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.

35. PLANT HEALTH CARE FOR THE CONNECTICUT NURSERY AND LANDSCAPING INDUSTRIES

T. Abbey

Plant health care for ornamental plants is a management strategy that includes traditional integrated pest management (IPM) used in production nurseries, and also emphasizes proper plant selection, planting procedures, and plant maintenance (pruning, watering, etc.) in the landscape. Nurseries in Connecticut receive on-site assistance with development of IPM programs to improve pest management.

36. NON-CHEMICAL PLANT DISEASE CONTROL WITH PLANT RESISTANCE

J. LaMondia *Assisted by* J. Canepa-Morrison

Genetic resistance to plant disease is often the most efficient, cost-effective and environmentally sound means of disease management available. We have conducted research to identify and incorporate genes into agriculturally useful breeding lines. A single gene for resistance to the tobacco cyst nematode has

been more effective than soil fumigation, and a single gene for resistance to tobacco mosaic virus greatly reduces the incidence of plant infection and subsequent spread. Multiple-gene resistance to Fusarium wilt and also blue mold have resulted in greatly reduced levels of disease due to those pathogens, which can otherwise result in total crop failure. Breeding lines with resistance to all four diseases will allow the production of healthy crops with reduced pesticide use.

37. THE "DEER" TICK *IXODES SCAPULARIS*

K. Stafford *Assisted by* A. Bharadwaj, H. Stuber, J.P. Barsky, C. Stoehr, T. Borgstrom, G. Dunford, and L. Colligan

The blacklegged tick or "deer" tick *Ixodes scapularis* transmits the agents of Lyme disease, babesiosis, and anaplasmosis (i.e., human granulocytic ehrlichiosis). Observe live and preserved ticks under the microscope. A new Tick Management Handbook is available.

38. USE OF A RODENT BAITBOX FOR THE CONTROL OF THE "DEER" TICK

K. Stafford *Assisted by* A. Bharadwaj, H. Stuber, J.P. Barsky, C. Stoehr, T. Borgstrom, G. Dunford, and L. Colligan

Evaluation of the commercially available fipronil-based rodent bait box (Maxforce® TMS, Bayer ES), was continued in inland residential settings in Westport, Weston, Canaan, Cornwall, and Salisbury, Connecticut. In 2004, for example, mice and chipmunks visited 99% of the boxes in two Westport and Weston neighborhoods, resulting in a 99% reduction of ticks on these hosts. The impact on tick abundance at the treated homes is presented.

39. USE OF AN ENTOMOPATHOGENIC FUNGUS FOR CONTROL OF THE "DEER" TICK

A. Bharadwaj and K. Stafford *Assisted by* H. Stuber

The entomopathogenic fungus *Metarhizium anisopliae* will kill the "deer" tick *Ixodes scapularis* and could provide an alternative to synthetic chemicals in controlling ticks. Laboratory and field tests are being conducted on liquid and granular formulations of the fungus to determine optimum dosage, spore survival, and frequency of application. This information will assist in determining how the commercial products being developed will need to be applied for tick control.

40. IMPROVED DIAGNOSTIC TESTS FOR LYME DISEASE IN CATTLE

L. Magnarelli, S. Bushmich (University of Connecticut), J. IJdo (Yale University), and E. Fikrig (Yale University), *Assisted by* T. Mastrone

The bacterial agent that causes Lyme disease is transmitted by blacklegged ticks. When mammals are infected by this disease organism, they produce antibodies (proteins) in an effort to clear the infection. Detection of antibodies is, therefore, important for diagnosis and treatment. More sensitive and specific antibody tests have been developed for cattle, animals frequently parasitized by ticks in or near forests. As in humans and horses, cattle produce antibodies to several major proteins found on the outer surface of the disease organism. Enzyme-linked immunosorbent assays, containing new reagents produced at Yale University and the University of Texas (Houston), were evaluated at The Connecticut Agricultural Experiment Station and found to be very useful in confirming past or current infections in these animals.

41. LYME DISEASE IN TICKS FROM CONNECTICUT CITIZENS

J. Anderson *Assisted by* B. Hamid, E. Alves, and M. Guidone

Ticks, which fed on humans, were tested for the presence of the Lyme disease bacterium (*Borrelia burgdorferi*) at the request of municipal health departments. In 2004, 4,496 black-legged, or deer, ticks

(*Ixodes scapularis*) were received, along with 327 American dog ticks (*Dermacentor variabilis*) and 56 lone star ticks (*Amblyomma americanum*). Of these, 39% of the black-legged ticks were infected. The infected ticks were collected from people living in more than 100 towns in the state.

42. PROTECTING CONNECTICUT'S LAKES AND PONDS FROM NONNATIVE WEEDS

G. Bugbee, R. Capers, C. Vossbrinck, and J. C. White *Assisted by* R. Selsky, K. Deeds, A. Bridgewater, P. Nista, and B. Russell

Connecticut lakes and ponds face an imminent threat from non-native invasive weeds. 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. Natural aquatic ecosystems are drastically altered leading to the decline in native plants, fish and other beneficial organisms. Requests for station assistance in managing unwanted aquatic vegetation are frequent. Scientists, in the Department of Soil and Water, are documenting the extent of the invasive aquatic plant problem in Connecticut and studying management alternatives. Research includes studies on how water chemistry influences invasive plant problems, strategic placement of herbicides to minimize harmful affects on native plants, drawdown, dredging, underwater cutting and hydroraking. Recently we have begun a statewide inventory of freshwater aquatic vegetation. In 2004, vegetation in 32 lakes and ponds was mapped. This work will continue over the next several years until plants in a large cross section of Connecticut's lakes and ponds is documented. At this plot you will see our aquatic plant surveillance and control boats and underwater video equipment. Scientists will be available to discuss problems you are having with your lake or pond. This plot is offered in conjunction will the barn exhibit entitled "Invasive Aquatic Plant Program."

43. NON-LETHAL REPRODUCTIVE CONTROL OF WHITE-TAILED DEER

S. Williams

The need for non-lethal population control has grown over past decades as a decline in hunting, an increase in forested habitat, and increase in habitat fragmentation have combined to create a large white-tailed deer (*Odocoileus virginianus*) population. We have tested a unique method of reproductive control by permanently sterilizing males. The method was easy to perform and required no surgical equipment. Thirty-seven males have been sterilized since 2001. The effects of the treatment appear to be long lasting as we recaptured numerous treated animals and found them to be sterile both the year of and one year post treatment. Behavioral observations of treated males during the breeding season indicated they continue to engage in mating and mate-guarding behavior. The long-term goal of this sterilization procedure is to be used in cooperation with female reproductive control efforts, where most of the research has been accomplished. By focusing reproductive control efforts on both sexes, the return of fewer reproducing deer should be increased given similar startup costs.

44. WHITE-TAILED DEER AND INVASIVE PLANTS

S. Williams and J. Ward

We examined the role of suburban white-tailed deer (*Odocoileus virginianus*) in dispersal of exotic plants in forests bordered by medium-density housing in southern Connecticut. Estimated deer density was 59 deer/mile2 with higher local densities along the suburban/woodland interface. In 2002, 90 pellet piles were gathered through autumn. In 2003, 236 pellet piles from early June through late December. In 2004, 164 samples were gathered from June through late December. All samples were vernalized at 41°F for 60 days. Pellet piles were then placed in a growing medium in trays in a temperature controlled greenhouse for 6 months. For the 2002 and 2003 samples, seeds germinated in 52% of samples, which

included 701 germinants of 67 species. Thirty-three species (321 germinants) were not native to Connecticut. We estimated that deer had the potential to disperse 1500-2700 viable exotic seeds/day/mile2 during the 2002 sampling period and 1000-1800 viable exotic seeds/day/mile2 during the 2003 sampling period. White-tailed deer have the capacity to transport exotic seeds throughout their range, further altering forest species composition and potentially displacing native forest vegetation.

45. MILK AS A CONTROL FOR POWDERY MILDEW ON PUMPKIN, SQUASH, AND MUSKMELON

F. Ferrandino and V. Smith

A 50% milk/water mixture applied as a foliar spray every 7-10 days is being evaluated as an environmentally-friendly control for powdery mildew. Past years have demonstrated that whole milk works better than skim milk and the use of milk-based foliar sprays reduces postharvest fruit rot by 50%. This year the efficacy of powdered milk solutions is being examined.

46. MINIMUM FERTILIZATION FOR HOME GARDENS AMENDED BY LEAF COMPOST

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

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 under 2/3 and 1/3 fertilization have been consistently greater than on unamended plots with full fertilization. For more information, find Dr. Maynard at plot #5 or Dr. Hill at plot #7.

47. ORGANIC AGRICULTURE AND LAND CARE IN CONNECTICUT

B. Duesing

The Northeast Organic Farming Association of Connecticut (CT NOFA) is a non-profit educational organization whose members include farmers, gardeners, land care professionals and consumers who are interested in organic methods and in local, organic food. Our display features pictures of this state's organic farms and landscapes. Directories of Connecticut's organic farms and organic land care professionals will be available. Announcements of upcoming events and educational literature to help farmers and home gardeners use organic methods effectively will be provided. For more information about its programs, publications, conferences and special events, contact CT NOFA at www.ctnofa.org, www.organiclandcare.net, 203-888-5146 or Box 164, Stevenson, CT 06491-0164.

48. CONNECTICUT FARMLAND TRUST

E. Moore

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@ctfarmland.org, Website: www.ctfarmland.org.

49. USDA, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, PLANT PROTECTION AND QUARANTINE

E. Chamberlain, N. Campbell , and K. Aitkenhead

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.

The mission of Smuggling Interdiction and Trade Compliance: APHIS wants to ensure the availability of domestic and imported foods in the market place, facilitate the exportations of agricultural commodities to foreign countries, and preserve the health and diversity of our agricultural resources. The Smuggling Interdiction and Trade Compliance (SITC) Program seeks to prevent unlawful entry and distribution of prohibited products that may harbor exotic plant and animal pests, diseases, or invasive species. These harmful organisms could seriously damage America's crops, livestock and environment.

50. INVASIVE PLANTS OF CONNECTICUT

D. Ellis and E. Corrigan, Co-Chairs, Connecticut Invasive Plant Working Group

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).

51. NEW HAVEN LAND TRUST

C. Benoit

The New Haven Land Trust promotes land conservation, community gardening, and environmental education in the city of New Haven. For additional information, contact the office at 205 Whitney Avenue, New Haven, CT 06511, phone 203-562-6655.

52. USDA FARM SERVICE AGENCY

J. Breakell

The Mission of the Farm Service Agency is "to equitably serve all farmers, ranchers, and agricultural partners by delivering effective efficient agricultural programs for all Americans."

As a major agency of the U.S. Department of Agriculture, FSA's mission supports the Department's broad goals. FSA's plan focuses on three major goals:

1. Supporting Productive Farms and Ranches – for producer security
2. Supporting Secure and Affordable Food and Fibre – for domestic consumers
3. Conserving Natural Resources and Enhancing the Environment – for all present and future generations

FSA delivers a variety of programs to support these goals through the following categories:

- Farm Loan Programs
- Income Support and Disaster Assistance Programs
- Conservation Programs
- Commodity Operations

The agency is located at 344 Merrow Road, Suite B, Tolland, CT 06084, and the phone number is 860-871-2944.

53. CONNECTICUT DEPARTMENT OF AGRICULTURE – MARKETING BUREAU
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.

54. SOUTHWEST CONSERVATION DISTRICT
J. DeRisi
The Southwest Conservation District, located at 900 Northrop Road, Wallingford, Connecticut is a non-profit conservation agency established in 1946.The primary mission of the Southwest Conservation District is to supply technical assistance, information and education in natural resource conservation and management to agricultural cooperators, landowners and the municipalities in Southwest Connecticut. The Southwest Conservation District provides service Monday through Friday from 8:30 AM to 4:30 PM. Since we are in and out of the office, you are invited to call first (203-269-7509) to be sure someone is in. You can also visit our web site at: www.conservect.org.

55. USDA FOREST SERVICE, NORTHEAST RESEARCH STATION
R. Nisley
The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.

The USDA Forest Service commitment to land stewardship and public service is the framework within which natural resources are managed. Implicit in this statement is the agency's collaboration with partners and the public.

As the lead Federal agency in natural resource conservation, the USDA Forest Service provides leadership in the protection, management, and use of the Nation's forest, rangeland, and aquatic ecosystems. Our ecosystem approach to management integrates ecological, economic, and social factors to maintain and enhance the quality of the environment to meet current and future needs. Through

implementation of land and resource management plans, the agency ensures sustainable ecosystems by restoring and maintaining species diversity and ecological productivity that helps provide recreation, water, timber, minerals, fish, wildlife, wilderness, and aesthetic values for current and future generations of people.

Through technical and financial assistance, the USDA Forest Service assists States and private landowners in practicing good stewardship, promoting rural economic development, and improving the natural environment of cities and communities. The agency continues to develop and use the best available scientific information to facilitate achievement of our goals and objectives. Domestic and international activities are directed at developing values, products, and services in such a way as to maintain ecosystem health.

56. CONNECTICUT PRE-ENGINEERING PROGRAM
M. Coehlo
The Connecticut Pre-Engineering Program's (CPEP) mission is to help underrepresented students discover their potential through science, math and technology. CPEP is designed to identify underrepresented minority and women students who have the potential for college at the upper elementary through the middle/junior high and high schools levels to enter and graduate from quality institutions of higher education. Providing the support system necessary to motivate students to perform well in a pre-college program, CPEP furnishes students with a strong foundation in mathematics, science and English to pursue math, science or engineering based fields a the four-year university/college level.

57. THE CONNECTICUT FOREST AND PARK ASSOCIATION
P. Pendergast
Connecticut's oldest and most respected private nonprofit conservation organization dedicated to preserving and enhancing our natural environment.

Since the first members banded together in 1895 to save Connecticut's forest from runaway fires and excessive timber harvesting, the association's singular blend of vision and persistence has protected the landscapes whose very names mean Connecticut. Peoples State Forest. Mohawk State Forest. Gillette Castle. Rocky Neck. Sherwood Island. Talcott Mountain.

Over the past century, CFPA has been instrumental in the acquisition of more than 100 state parks and forest for public use and enjoyment. Today, CFPA continues to champion the needs of these public recreational facilities to assure that agencies responsible for their stewardship receive the funding, personnel and equipment necessary to maintain these natural treasures.

CFPA's leadership over the years set a national example for successful forest conservation and reversed the damage to Connecticut's natural resources. When the organization began its work, Connecticut was 20% forested: today it is 60% forested. CFPA maintains a vigilant role in the sound management and protection of our land, water and wildlife resources.

In addition, CFPA's visionary leaders established the Blue-Blazed Hiking Trail System in 1929 which traverses public and private lands throughout Connecticut and is enjoyed by thousands of citizens each year. The 700 miles of trails are maintained by hundreds of CFPA volunteers working in cooperation with many public and private landowners.

But the work is never done; there are constant challenges.

- Our public parks require renewed attention and protection.
- The Blue-Blazed Trails require constant monitoring and maintenance.
- Much of Connecticut's forest land is held in private ownership, in need of sound management and subject to competing pressures for other uses.
- Additional open space lands need to be set aside to benefit future generations and maintain the high quality of life residents have come to enjoy in Connecticut.
- The environmental health of urban areas likewise deserves attention.

58. THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION DIVISION OF FORESTRY
C. Donnelly
The CT DEP Division of Forestry provides a variety of services for the citizens of Connecticut. These include the management of about 170,000 acres of state-owned forest land (the State Forests), outreach to the owners of private forest land, the certification of forest practitioners, technical assistance on urban forestry issues and assistance in the monitoring of the overall health of Connecticut's forests. In attendance at Plant Science Day will be a service forester, responsible for outreach to the owners of private forest land, and an urban forester. These individuals will be on hand to answer questions, provide suggestions as to what individuals might do who wish to manage their trees or woodlots, and to provide an overview of the services provided by CT DEP Division of Forestry.

59. CONNECTICUT TREE PROTECTIVE ASSOCIATION
R. Smith and D. Parrott
The CTPA is a non-profit educational association made up of individuals who wish to advance the care of trees in Connecticut. The majority of CTPA's 700 members are licensed, practicing arborists, although the membership also includes tree wardens, scientists, educators and other tree workers.

60. NATIVE WOODY SHRUBS
J. Ward *Assisted by* J.P. Barsky
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 flowers 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.

61. BIRD AND BUTTERFLY GARDEN
Created by Landscape Designer A. Bell, L. Starr, and B. Payton *Assisted by* R. Cecarelli, Lockwood Farm staff, and R. Bonito, maintained by Spring Glen Garden Club.
The garden is a joint project of The Experiment Station and the Federated Garden Clubs of Connecticut. The second stage of a bird and butterfly garden can be viewed as well as a butterfly meadow. Two

bluebird houses have been added to the adjoining meadows. Guided butterfly identification walks will be available as well as literature on butterfly larval and nectar sources.

62. CONNECTICUT NURSERYMEN'S GARDEN

The Connecticut Nurserymen's 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 Nurserymen's 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.

63. NURSERY AND BEE INSPECTIONS

V. Smith, J. Fengler, I. Kettle, S. Sandrey, and P. Trenchard

Our personnel uphold state laws enacted to protect Connecticut's vegetation from injurious insects and disease. Each year we inspect 7,500 acres of nursery stock grown in over 350 nurseries for insects and disease. 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 and the hemlock woolly adelgid. Examples of insect pests and plant diseases are exhibited. Insect survey maps are shown. Connecticut has about 345 beekeepers tending 2,300 colonies of honey bees. A task of the Experiment Station is to seek 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.

64. 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 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 #16). 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. Two trees of the chinquapin native to Florida are planted across the road. The cultivar Lockwood is at the southwest corner. For more information, find Dr. Anagnostakis at plot #16.

65. 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 #16), and it looks slightly better than the south plot. For more information, find Dr. Anagnostakis at plot #16.

66. 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 (see sign) was released to the nursery industry in 1999. For more information, find Dr. Anagnostakis at plot #16.

67. INSECTARY PLANTINGS OF FLOWERS TO ATTRACT BENEFICIAL INSECTS

K. Stoner *Assisted by* E. Amezzane, T. Zarrillo and M. Lowry

It has long been a goal of gardeners and farmers to attract beneficial insects for pollination and for predation and parasitism of insect pests. Many of these beneficials feed on pollen or nectar during some stage of their life cycle. We have planted groups of plants that flower at different times, and we will be sampling them during their flowering periods to assess numbers of bees, wasps (both large predatory wasps and small parasitic wasps), hover flies, lacewings, lady beetles, and other beneficial insects. Among the early blooming annual plants are: corn poppy, baby blue eyes, baby's breath, and candy tuft. Flowering in mid-season are: borage, California poppy, buckwheat, alyssum, and bishop's flower. Late blooming are: nasturtium, cosmos, scarlet flax and a mix called "Autumn Beauty." We also have plantings of perennial flowers, which typically bloom for a shorter time than annuals but carry over from one year to another. Among the perennials are: yarrow, anise hyssop, lovage, Maximilian sunflower and blue flax. For more information, see Dr. Stoner at her barn exhibit.

68. MILK AS A CONTROL FOR POWDERY MILDEW ON TOMATO AND ZINNIA

F. Ferrandino and V. Smith

A 50% milk/water mixture applied as a foliar spray every 7-10 days is being evaluated as an environmentally-friendly control for powdery mildew. Past studies on tomato indicate that a 2.3% lactose solution is also effective against this fungus. This year powdery mildew on zinnia will be included in the study. For more information, find Dr. Ferrandino at plot #45.

69. CAULIFLOWER TRIALS

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

Recent developments in the fast-food industry, to provide low-carbohydrate foods to diet-conscious consumers, prompted a replacement of mashed potatoes with mashed cauliflower. In 1986, 1987, 1988, and 1994, we tested 47 cultivars of cauliflower for yield and quality. Most of the cultivars tested are no longer available from seed companies. Last year we tested 20 new cultivars released since 1994 to find those that grow well in Connecticut's soil and climate. Among the new cultivars Freedom, Minuteman, and Attribute had the highest yields at both sites, averaging 12.6 tons/acre at Windsor and 9.8 tons/acre at Mt. Carmel. These new cultivars have natural tight wrapper leaves which are needed to blanch the curds, thus eliminating the need for tying the leaves, an expensive step in cauliflower production. This year we are repeating evaluation of the 10 best cultivars from last year in spring and fall plantings here and at the Valley Laboratory, Windsor. For more information, find Dr. Maynard at plot #5 or Dr. Hill at plot #7.

70. RESISTANCE TO *FUSARIUM* WILT OF CHINA ASTERS

W. Elmer *Assisted by* J. Bravo and K. Evancha

Fusarium wilt of China asters is a very common disease in Connecticut. It is caused by a seedborne fungus call *Fusarium oxysporum* f. sp. *callistephi*. Sixteen cultivars of China aster are being evaluated in the field. These cultivars were selected from greenhouse trials that examined 46 cultivars. Resistant candidates are being compared to susceptible cultivars.

71. *FUSARIUM* WILT OF TOMATO

W. Elmer *Assisted by* J. Bravo and K. Evancha

Most commonly grown tomato varieties are resistance to *Fusarium* wilt, a disease caused by a soilborne fungus. However, older varieties still get *Fusarium* wilt. These microplots have been designed to study the effect of earthworms on the development of the disease. The plastic liners are to prevent migration of the earthworms.

72. BIOLOGICAL AND CHEMICAL SUPPRESSION OF *FUSARIUM* CORM ROT OF GLADIOLUS

W. Elmer *Assisted by* J. Bravo and K. Evancha

Fusarium corm rot of gladiolus is found wherever gladioli are grown. The disease is caused by a soilborne species of *Fusarium*. These plots are planted with the highly susceptible cultivar 'Purple Passion.' The study is designed to compare different combinations of chemical and biological fungicides for their efficacy in reducing the severity of the disease and for enhancing the quality of the flowers. In 2004, the fungicides Terraguard and Medallion were the most effective.

73. *FUSARIUM* WILT OF BASIL

W. Elmer *Assisted by* J. Bravo and K. Evancha

Basil has become one of the most popular herbs grown in the US. The seedborne disease called *Fusarium* wilt causes major losses of basil globally. These plots were planted to basil and inoculated in 2001, but were rotated out of basil for three years and cropped to non-basil herbs during the summer and planted with cover crops during the winter. This is the final year of the study. Plots are planted to basil to determine which cropping system reduced the disease.

74. 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 #16) to keep them alive. In addition, five of the trees have been pruned heavily and we will harvest all of the nuts by cutting the burs before they have ripened. From the number of these nuts and the size of the sprouts from which they came we will estimate potential yield. For more information, find Dr. Anagnostakis at plot #16.

75. PLANTING OF PINOT GRIS GRAPES

W. Nail, *Assisted by* C. Maxwell

A new planting of 300 Pinot gris vines (half on 3309C and half on 101-14 rootstock) was established in spring, 2004. This planting will be used for cultural experimentation beginning in the 2007 growing season. Additional variety trials will be established in the adjacent area in 2006-2007. For more information, see Dr. Nail at plot #13.

76. PAWPAW AND JAPANESE PLUM VARIETY TRIALS

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

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 and 4 cultivars of pawpaws. Thus far, Japanese plum cultivars Methley and Shiro appear to be most sensitive to black knot. We will be taking our first yields and evaluating fruit from the Japanese plums at both sites later this summer. For more information, find Dr. Maynard at plot #5 or Dr. Hill at plot #7.

77. WHITE BIRCH RESEARCH ORCHARD

C. Rutledge

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 spring 2005 with the kind donations 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. Dr. Rutledge will also be giving a talk about her research under the Main Tent.

78. BEACH PLUM TRIALS

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

Beach plum (*Prunus maritime* Marsh.) is a fruiting shrub native to the coastal dunes of the Northeastern United States. Since colonial times, people have collected wild fruit to make preserves and jelly. 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 Lab. These seedlings were raised at Cornell University from seeds collected from 35 sites from Maine to Delaware. In their second growing season, seedlings from Broadkill Beech, Delaware averaged the greatest growth (24.8 inches) at Lockwood Farm while seedlings from Cape May, New Jersey averaged 22.4 inches. The trees are evaluated annually and select elite individuals will be propagated as possible cultivars in the future. For more information, find Dr. Maynard at plot #5 or Dr. Hill at plot #7.

Tents were set up and other physical arrangements were made by A. Gagliardi, R. Russell, K. Dixon, M. Scott under the supervision of B. Nicholson of the maintenance Department.

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History of The Connecticut Agricultural Experiment Station

The Connecticut Agricultural Experiment Station is one of a national network of agricultural experiment stations. Experiment Stations are a cooperative research effort of the states and federal government to deal with local, regional, and national problems. The Station has existed for 130 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 student 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 in 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. Besides Lockwood Farm, its outdoor laboratory in Hamden, the Station also has a research farm and laboratory in Windsor.

Through the years, many important discoveries have been made by researchers at The Connecticut Agricultural Experiment Station. For example, the first vitamin 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.

Research at the Station covers plant 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. The Station also analyzes fresh fruits and vegetables for excess pesticide residues, tests fertilizers and animal feeds for compliance with label claims, and tests a wide variety of foods as part of the state's food safety monitoring.

Current Research includes:

- Release of a lady beetle which has promise in controlling 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 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.

The experiments at Lockwood Farm are only a portion of the experiments of Station scientists. They do laboratory experiments in New Haven and Windsor, and carry out other experiments in state forests and on private farms.

PLANT SCIENCE DAY is held annually in August at Lockwood Farm, Evergreen Avenue, Mt. Carmel, Hamden. Friends of the Experiment Station are invited to *Plant Science in the Spring* held in April at our laboratories, Huntington Street, New Haven.

THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION, founded in 1875, is the first 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 06504

VALLEY LABORATORY
153 Cook Hill Road; Windsor, CT 06095

LOCKWOOD FARM
890 Evergreen Avenue; Hamden, CT 06518

THE STATION'S WEB PAGE AT: WWW.CAES.STATE.CT.US