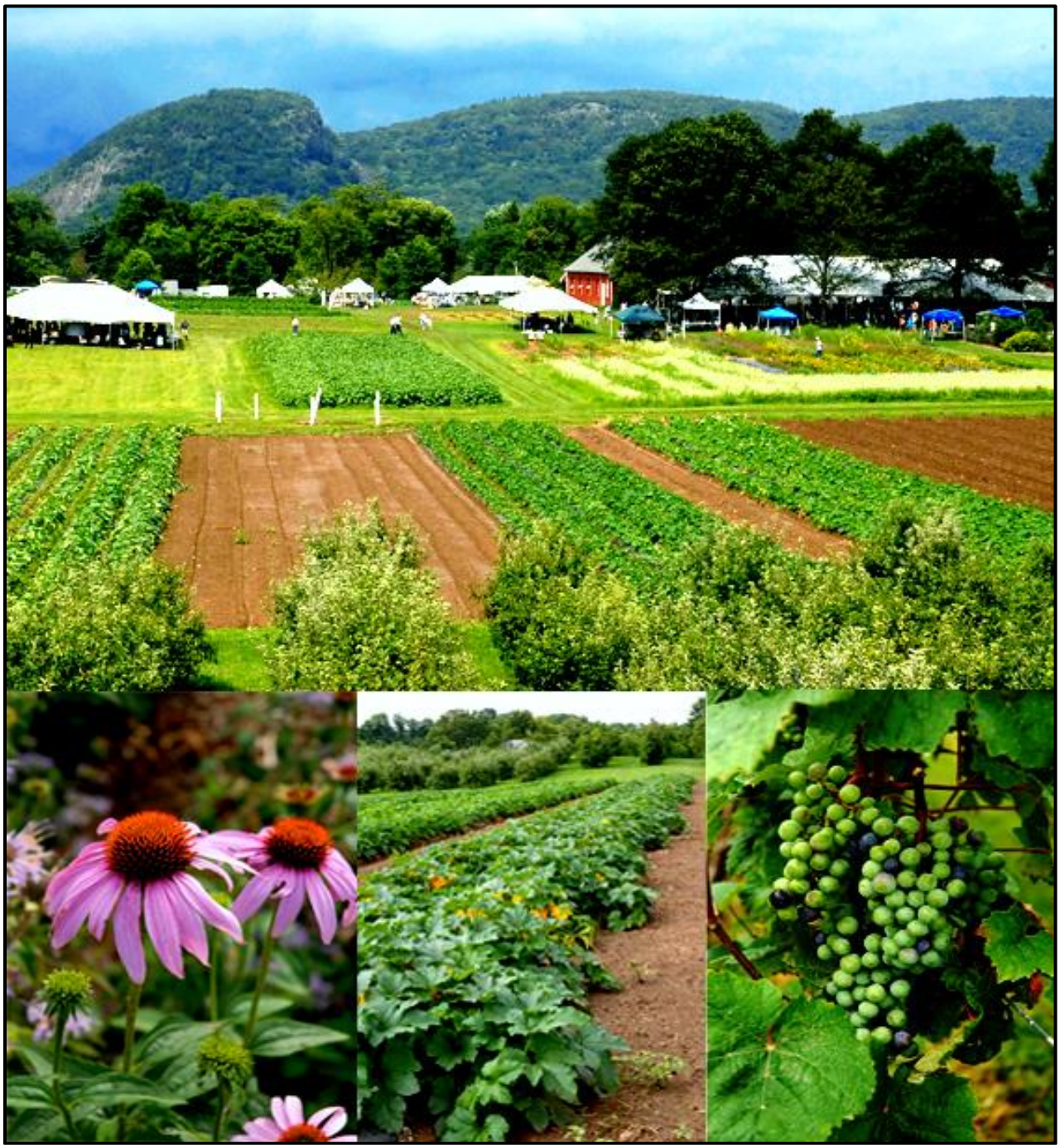
103rd Plant Science Day



Lockwood Farm, Hamden

Wednesday, August 7, 2013

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HISTORY OF LOCKWOOD FARM, HAMDEN

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

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

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

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

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

In 1936, a fully instrumented weather station was established on the farm. The weather data are reported to and published by the U.S. Weather Service in their cooperative observer program. The mean annual temperature for the farm is 49.0 F. A record high temperature, 104.0 F, was observed on July 4, 1949. A record low temperature, -24.0 F was recorded on February 16, 1943. The mean annual precipitation for the farm is 52.6 inches. The greatest total precipitation, 74.36 inches, was recorded in 2011. 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, 10.0 inches, was recorded in 2011-2012.

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

CENTURY FARM AWARD

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

Holmberg Orchards
Gales Ferry, Connecticut

Holmberg Orchards, located in Gales Ferry, was originally purchased in 1896 as a family farm by Adolph and Hulda Holmberg, who came to Connecticut from Sweden. Since that start, there have been four generations of Holmbergs and each has made his or her own mark on the farm. Initially, the farm produced high quality vegetable crops. Second-generation sons Harold and Henry planted apple, peach and pear trees starting in 1935 and also raised chickens as a source of income while the trees were maturing.

Harold's son Richard and his wife Diane expanded the orchard into pick-your-own and retail enterprises, adding a bakery and greenhouse tomato production. The fourth generation on the farm, Amy and Russell, each added their own new direction- Amy further expanded the farm market, adding locally produced gourmet specialty foods. Russell planted wine grapes and produces hard cider, fruit wines, and wine.

For over a century, comprising four generations, Holmberg Orchards has maintained and expanded upon a reputation for quality in fruits and vegetables and a commitment to excellence and dedication to their customers.

As Governor, I am pleased to join The Connecticut Agricultural Experiment Station and the Connecticut Agricultural Information Council in presenting this Century Farm Award to the Holmberg family, who is most deserving of this honor.

THE SAMUEL W. JOHNSON MEMORIAL LECTURE (Main Tent)

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

ANSWERS TO YOUR QUESTIONS (Plot 19)

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

KID'S KORNER (Plot 32)

Come to the Kid's Korner to pick up your child's passport and a goody bag. The passport is a special activity for young children to help them enjoy and explore Plant Science Day. There are six different stations located throughout Lockwood Farm that they can visit, where they can ask questions, learn about the topic featured at the station, and then receive a special stamp for their passport. Once the passport is complete, they can go to the Self-Guided Activity Plot (plot 31) to collect a CAES patch.

SELF-GUIDED ACTIVITY FOR ALL CHILDREN, INCLUDING GIRL SCOUTS (Plot 31)

Girl Scouts and older children should be directed to this plot. A self-guided worksheet is available for all children, and it is better suited for older children than the passport. The activity will guide them to interact with some of the many people here today helping to put science to work for society. In addition, Girl Scouts may use the activity to complete steps towards their Naturalist Legacy badge. Once the activity is completed, all children can return to this plot to collect either a Girl Scout or CAES patch. Children with completed passports should return here to collect their badges as well.

CONNECTICUT PESTICIDE CREDITS (Registration, R)

Connecticut pesticide credits will be offered for attending Plant Science Day. If you are interested in obtaining pesticide credits, you must sign in at the registration desk (R) at the start of the day, between 9:30 a.m.-10:00 a.m., collect signatures for the talks, demonstration, and tours you attended, and sign out to pick up your pesticide credit form at 3:30 p.m. at the registration desk (R).

Connecticut Pesticide Credits Offered: **ALL SUPERVISORY CATEGORIES and PRIVATE APPLICATORS (PA) / 3.75 Credit Hours.**

Keep current with The Connecticut Agricultural Experiment Station by using our SOCIAL MEDIA and E-ALERT resources.

SOCIAL MEDIA LINKS

Facebook (www.facebook.com/CT.CAES),

Twitter (www.twitter.com/CT_CAES),

YouTube (www.youtube.com/user/CTAGEXPSTATION)

(http://en.wikipedia.org/wiki/Connecticut_Agricultural_Experiment_Station)

To visit our webpage, go to www.ct.gov/CAES,
or just scan our QR code below with your smartphone.

E-ALERTS

The Connecticut Agricultural Experiment Station (CAES) E-ALERT service—
We are inviting you to subscribe to our free E-ALERT e-mail service to receive CAES news updates by e-mail. Go to our website, scroll to the bottom left hand corner of our page, and click Receive Updates by e-mail e-ALERTS to get started.
Once you have created your CT.gov profile you can now subscribe to our e-alerts.

NO PETS, PLEASE. SERVICE ANIMALS ONLY.

JUST A REMINDER THAT LOCKWOOD FARM IS A WORKING FARM WITH ACTIVE RESEARCH BEING CONDUCTED, SO PLEASE RESPECT THE SCIENTISTS' WORK.

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

103rd PLANT SCIENCE DAY

Gates open at 9:30 a.m.
Program begins at 10:00 a.m.
Event 10:00 a.m. – 4:00 p.m.

AGENDA

10:00 a.m. – 10:15 a.m. **MORNING GREETING**
Dr. Sharon M. Douglas, Chief Scientist, Head of the Department of Plant Pathology and Ecology

10:00 a.m. – 10:20 a.m. **TECHNICAL DEMONSTRATION TENT**
Mr. Mark H. Creighton, Apiary Inspector, Department of Entomology
Beekeeping Basics
(20 minute demonstration, repeated twice during the day, 10:00 a.m. & 2:45 p.m.)
Raising honeybees has been practiced for thousands of years. Because beekeeping can help improve agricultural production plus results in honey and beeswax production, it is an economically important profession. Additionally, caring for honeybees can be a fun hobby that provides supplemental income. Beekeeping is not a difficult task when one understands the basic techniques and requirements. This demonstration will present the tools needed and the techniques used to get started in beekeeping.

10:15 a.m. - 10:45 a.m. **MAIN TENT**
Dr. Jason C. White, Analytical Chemist, Department of Analytical Chemistry
Food Safety Research in the Department of Analytical Chemistry: Surveillance of Fresh and Manufactured Foods for Chemical Contamination
The Analytical Chemistry Department's Food Safety program began in 1895, 20 years after the institution was founded. Currently, Department scientists work with the US Food and Drug Administration (FDA) and the CT Department of Consumer Protection (DCP) on an active surveillance of the CT food supply for both incidental and intentional contamination. Recent findings from 2011-2013 on the presence of pesticides in fresh and dried herbs will be presented. In addition, concerns and current research related to the presence of arsenic in food will be discussed.

10:45 a.m. – 11:05 a.m. **TECHNICAL DEMONSTRATION TENT**
Mr. Gregory J. Bugbee, Soil Scientist, Department of Environmental Sciences
Soil Testing to Improve Plant Growth
(20 minute demonstration, repeated twice during the day, 10:45 a.m. & 3:10 p.m.)
Developed here at the Connecticut Agricultural Experiment Station, soil tests provide detailed information on soil fertility and nutrient needs. Effectively utilizing soil tests require proper soil sampling and interpretation of the results. This demonstration talk will cover what you should know about soil testing to improve your plants. Feel free to bring your soil samples.

10:45 a.m. - 11:15 a.m. **MAIN TENT**
Dr. Robert E. Marra, Forest Pathologist, Department of Plant Pathology and Ecology
Tropical Storms, Hurricanes, and Superstorms: Their Impact and Influence on Tree Diseases
The combined effects of storm surges and high winds can be devastating to trees. Besides the obvious issues of uprooting and branch and stem failures, numerous diseases, both biotic and abiotic, can result when trees are subjected to the climatic factors associated with tropical storms and hurricanes, particularly flooding, wind abrasion, and salt spray. These issues and concerns will be discussed in the context of Tropical Storm Irene, Hurricane (Superstorm) Sandy, and the unusual weather that occurred between these two major weather events.

11:15 a.m. -11:30 a.m. **GREETING AND DIRECTOR'S REPORT**

11:30 a.m. -11:50 a.m. **CENTURY FARM AWARD**
Holmberg Orchards, Gales Ferry, CT

11:50 a.m. -11:55 a.m. **EXPERIMENT STATION ASSOCIATES**
Mr. Richard Bergmann, *President*
Experiment Station Associates

11:55a.m. – 12:30 a.m. **THE SAMUEL W. JOHNSON MEMORIAL LECTURE**
Captain Michael A. McLaughlin, Ph.D.
Acting Director of Food and Feed Scientific Staff, USFDA
The Food Emergency Response Network: FERN 101 and The Connecticut Agricultural Experiment Station

1:30 p.m. - 2:00 p.m. **MAIN TENT**
Dr. Abigail A. Maynard, Horticulturist, Department of Forestry and Horticulture
The New Crops Program: Helping Connecticut's Vegetable Growers
Small farm sizes in Connecticut have resulted in marketing shifts from wholesale contracts with local supermarkets to direct retail sales. Consumers used to a wide variety of fruits and vegetables in large supermarkets are seeking a greater diversity of ethnic and specialty crops at farmers' markets and roadside stands. To help farmers make informed decisions, The Connecticut Agricultural Experiment Station established The New Crops Program and has studied over 40 different fruits and vegetables including heirloom tomatoes, calabaza, globe artichoke, sweet potatoes, and callaloo.

2:00 p.m.-2:30 p.m. **MAIN TENT**
Dr. Richard S. Cowles, Entomologist, Valley Laboratory
Spotted Wing Drosophila Biology and Management
The spotted wing drosophila arrived in Connecticut in 2011, and already has caused extensive damage to strawberries, blueberries, grapes, and raspberries. Manipulating the fly behavior, especially with attractants in traps and feeding stimulants combined with insecticides, are promising ways to improve our ability to prevent maggot infestations in these crops.

2:30 p.m. **MAIN TENT**
Adjourn Main Talks

2:45 p.m. – 3:05 p.m. **TECHNICAL DEMONSTRATION TENT**
Mr. Mark H. Creighton, Apiary Inspector, Department of Entomology
Beekeeping Basics
(20 minute demonstration, repeated twice during the day, 10:00 a.m. & 2:45 p.m.)
Raising honeybees has been practiced for thousands of years. Because beekeeping can help improve agricultural production plus results in honey and beeswax production, it is an economically important profession. Additionally, caring for honeybees can be a fun hobby that provides supplemental income. Beekeeping is not a difficult task when one understands the basic techniques and requirements. This demonstration will present the tools needed and the techniques used to get started in beekeeping.

3:10 p.m.-3:30 p.m. **TECHNICAL DEMONSTRATION TENT**
Mr. Gregory J. Bugbee, Soil Scientist, Department of Environmental Sciences
Soil Testing to Improve Plant Growth
(20 minute demonstration, repeated twice during the day, 10:45 a.m. & 3:10 p.m.)
Developed here at the Connecticut Agricultural Experiment Station, soil tests provide detailed information on soil fertility and nutrient needs. Effectively utilizing soil tests require proper soil sampling and interpretation of the results. This demonstration talk will cover what you should know about soil testing to improve your plants. Feel free to bring your soil samples.

3:30 p.m. **TECHNICAL DEMONSTRATION TENT**
Adjourn Technical Demonstrations

PESTICIDE CREDIT TOUR
(Meet at Barn A)
12:15 p.m.-1:15 p.m.

12:15 p.m. **MEET AT BARN A Dr. Robert E. Marra, Plant Pathologist, Department of Plant Pathology and Ecology**
A one-hour guided tour of selected field plots will be conducted by Dr. Robert E. Marra. Participants can discuss experiments and topics with scientists at each station on the tour.

Stops on tour:

- **Dr. Sandra Anagnostakis, Mycologist, Department of Plant Pathology and Ecology**
  Asian Chestnut Gall Wasp on Chestnut (Plot 56)
- **Dr. Wade Elmer, Plant Pathologist, Department of Plant Pathology and Ecology and Dr. Jason White, Analytical Chemist, Department of Analytical Chemistry**
  Use of Nanoparticles of Copper, Manganese, or Zinc to Suppress Soil Borne Diseases of Eggplants and Tomatoes (Plot 12)
- **Dr. Francis Ferrandino, Plant Pathologist, Department of Plant Pathology and Ecology**
  Powdery Mildew on Chardonnay Wine Grapes (Plot 25)

3:30 p.m. **SIGN-OUT (for those requesting pesticide credits) (R)**
Attendees pick up Pesticide Credit forms at the registration table (R).

LOCKWOOD FARM WALKING TOUR
(Meet at the Registration Desk, R)
2:35 p.m.-3:35 p.m.

2:35 p.m. **MEET AT REGISTRATION DESK (R) Dr. Robert E. Marra, Forest Pathologist, Department of Plant Pathology and Ecology**
A one-hour guided tour of selected field plots will be conducted by Dr. Robert E. Marra, Forest Pathologist, Department of Plant Pathology and Ecology. Participants can discuss experiments and topics with scientists at each station on the tour.

2:135 p.m. – 3:35 p.m. **WALKING TOUR**, Approximately ½ mile, moderately hilly

Stops on Tour:

- **Dr. Abigail A. Maynard, Horticulturist, Department of Forestry and Horticulture**
  Beach Plum, Paw-Paw, and Japanese Plum Trials (Plots 57-59)
- **Dr. Sandra Anagnostakis, Mycologist, Department of Plant Pathology and Ecology**
  Hybrid Elm Trees (Plot 60)
- **Dr. Kimberly Stoner, Entomologist, Department of Entomology**
  Pumpkin Pollination (Plot 52)

TOUR OF NATIVE WOODY SHRUBS (PLOT 44)

1:00 p.m.-1:30 p.m.

12:30 p.m.-1:00 p.m. **MEET AT THE WOOD ARBOR OF THE NATIVE WOODY SHRUBS (Plot 44)**
Dr. Jeffrey S. Ward, Station Forester, Department of Forestry and Horticulture
A ½-hour guided tour of our native shrub planting to be conducted by Dr. Jeffrey S. Ward, Station Forester and Head, Department of Forestry and Horticulture. Learn about using native shrubs for naturalistic landscapes without the use of pesticides and fertilizers.

BIRD AND BUTTERFLY GARDEN EVENTS (PLOT 45)

ON THE HOUR starting at 10:00 a.m.-3:00 p.m. "Butterfly Identification Walk"

ON THE HOUR
10:00 a.m.-3:00 p.m. **MEET AT THE BIRD AND BUTTERFLY INFORMATION TABLE (Plot 45)**
Mr. Jeffrey M. Fengler, Department of Entomology
Mr. Fengler will lead a "Butterfly Identification Walk"

PLEASE NOTE: We ask that children be supervised by an adult or employee while in the bird and butterfly garden.

BARN EXHIBITS (BARN B)

Transporters are "Gatekeepers" in Plant Biochemistry
Department: Biochemistry and Genetics
Investigator: Dr. Neil P. Schultes
Assisted by: Ms. Regan B. Huntley and Ms. Carol R. Clark
Abstract: Plants make everything from scratch. This includes the thousands of metabolites needed for life starting with assimilated CO2 from photosynthesis and phosphate, nitrogen, sulfur and other important elements absorbed from the soil through the roots. To achieve this end plants have a multifaceted and sophisticated metabolism that relies upon many different compartments within plants. These distinct compartments create unique environments for specialized biochemistry and are separated by lipid membranes. Moving metabolites between these compartments relies upon a large number of membrane "doors" or "transporters" that allow specific chemicals passage across membranes. Transporters are intimately involved in important agricultural processes such as yield, stress and disease resistance. Our research focuses on transporters that move molecules called nucleobases the building blocks of DNA.

Emerald Ash Borer in Connecticut
Department: Entomology
Investigator: Dr. Claire E. Rutledge
Assisted by: Ms. Mioara Scott
Abstract: In 2012 the emerald ash borer was discovered by CAES personnel in Prospect, Connecticut. This invasive Asian beetle attacks and kills healthy ash trees. Learn more about the beetle, what CAES and other state agencies are doing to combat it, and how you can help to slow the spread of emerald ash borer.

Saving Our Lakes from Invasive Plants
Department: Environmental Science
Investigators: Mr. Gregory J. Bugbee
Assisted by: Ms. Jordan Gibbons, Ms. Samantha Wysocki and Mr. Adam Hawkes
Abstract: Connecticut's lakes and ponds face an imminent threat from invasive plants. Their dense stands disrupt native ecosystems, interfere with recreation, and lower property values. The Connecticut Agricultural Experiment Station Invasive Aquatic Plant Program is assessing the severity of the state's invasive aquatic plant problem by conducting vegetation surveys. Approximately two-thirds of the lakes and ponds contained one or more invasive species. We are looking for the causes of the aquatic invasions, including; sources of introductions, favorable water chemistry and other water body characteristics preferred by the plants. We are testing novel control methods such as reduced risk herbicides, biological agents and targeted water level drawdowns. You can visit the Invasive Aquatic Plant Program webpage to find out more at www.ct.gov/caes/iapp.

Crop Tree Release at Canopy Closure Benefits Oak
Department: Forestry and Horticulture
Investigator: Dr. Jeffrey S. Ward
Assisted by: Mr. Joseph P. Barsky
Abstract: The effects of crop tree release on growth and stem quality of red oaks was examined over a 24-year period at seven study areas that were established in 1988. Crop tree release of oak saplings increased upper canopy persistence and diameter growth with no loss of height growth or decreased stem quality. Thus, crop tree release provides a management tool to (1) increase the number of oaks that will form part of the mature forest in sapling stands that have few oaks or (2) focus growth on oaks with quality stems in sapling stands with abundant oak.

Sudden Vegetation Dieback in Connecticut's Salt Marshes
Department: Plant Pathology and Ecology
Investigators: Dr. Wade H. Elmer, Dr. Robert E. Marra, and Dr. James A. LaMondia
Assisted by: Mr. Peter W. Thiel
Abstract: Sudden Vegetation Dieback (SVD) is a phenomenon occurring along the tidal creek banks in Connecticut's salt marshes where there has been a sudden and rapid decline of the marsh grass, *Spartina alterniflora.* Recovery is very slow depending on the site. SVD was first noted in Connecticut in 2002, and has been reported in Delaware, Florida, Georgia, Louisiana, Maine, Massachusetts, New York (Long Island), South Carolina, and Virginia. The cause of SVD is unclear, but most wetland ecologists hold that an abiotic stressor(s) (e.g. global warming, rising sea levels, and/or drought) and biotic agents (e.g. plant pathogens and herbivores) led to SVD.

Strategies to Reduce Fungicide Residues on Tobacco

Department: Valley Laboratory and Analytical Chemistry
Investigators: Dr. James A. LaMondia and Dr. Brian D. Eitzer
Assisted by: Ms. Michelle R. Salvas

Abstract: To maintain their value tobacco plants must be protected from diseases such as Blue Mold. This can be done through the use of fungicides, however, fungicide residues are also undesirable. We are exploring strategies that growers can use to reduce these residues while maintaining control of this disease. These strategies and the methods for detection and quantitation of the fungicide residues will be discussed in this exhibit.

THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION

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

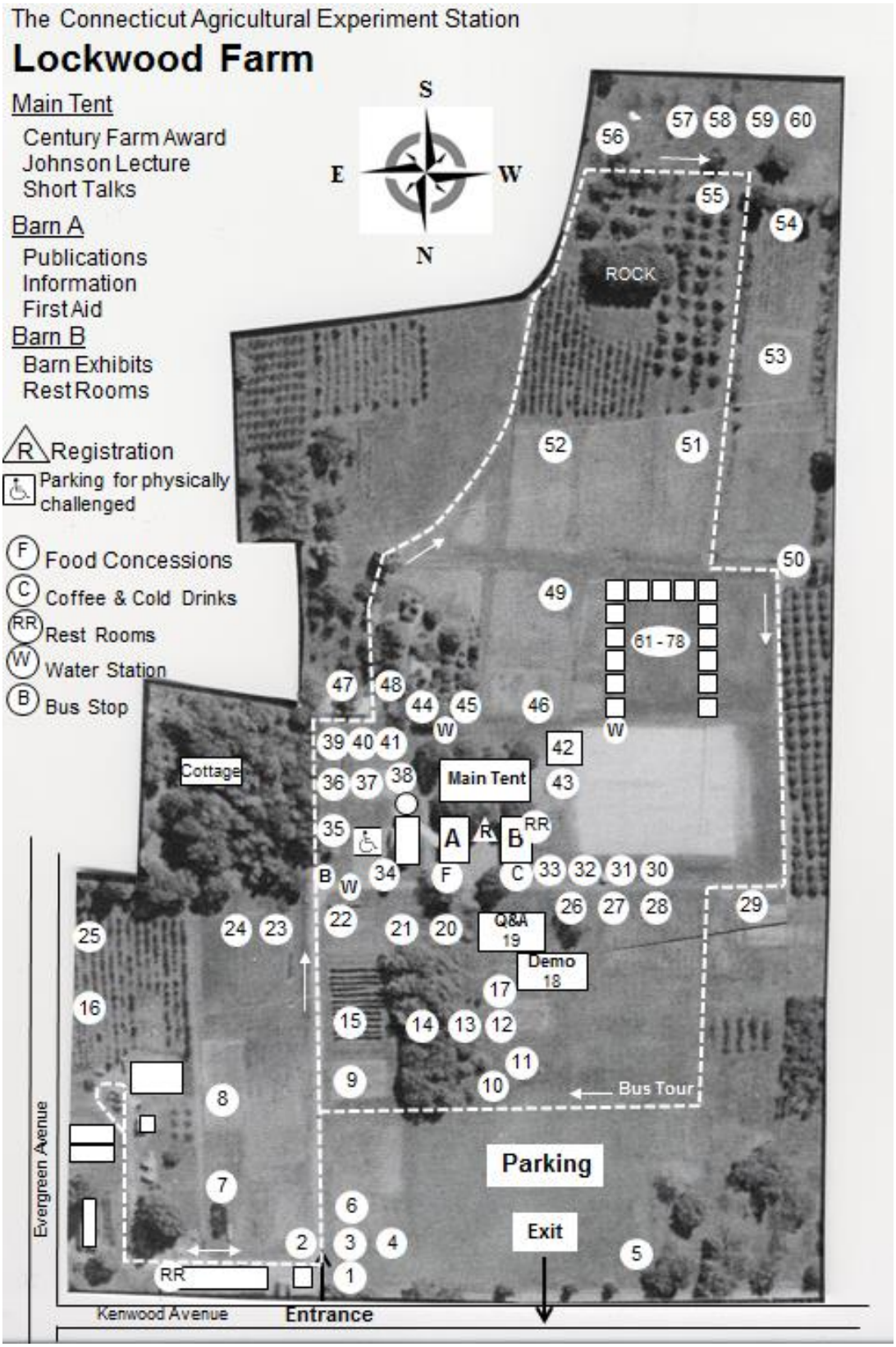
THE EXPERIMENT STATION WEB PAGE: WWW.CT.GOV/CAES

TO RECEIVE A COMPLETE LIST OF STATION SPEAKERS:

inquire at the publications table in BARN A, write to:
Publications; The Connecticut Agricultural Experiment Station; P.O. Box 1106; New Haven, CT 06504-1106, phone 203-974-8447, fax 203-974-8502, e-mail Vickie.Bomba-Lewandoski@ct.gov, or on the web at http://www.ct.gov/caes/speakers

TO RECEIVE A COMPLETE LIST OF AVAILABLE EXPERIMENT STATION PUBLICATIONS:

Inquire at the publications table in barn A, write to: Publications; The Connecticut Agricultural Experiment Station; P.O. Box 1106; New Haven, CT 06504-1106, phone 203-974-8447, fax 203-974-8502, e-mail Vickie.Bomba-Lewandoski@ct.gov, or on the web at http://www.ct.gov/caes/publications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R Registration
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Parking
Exit
Entrance
Evergreen Avenue
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FIELD PLOT LISTING

Outside Organizations (31, 33, 34, 51, 61-78) are invited to participate

1. CHINESE CHESTNUT TREES
2. SPECIALTY PEPPER TRIALS
3. SHEET COMPOSTING WITH OAK AND MAPLE LEAVES
4. SWEET POTATO TRIALS
5. NUT ORCHARD
6. SPECIALTY MELON TRIALS
7. BUTTERNUTS AND HEARTNUTS
8. USE OF EARTHWORMS AND BIOCHAR TO SUPPRESS FUSARIUM CROWN ROT OF ASPARAGUS
9. COMMERCIAL CHESTNUT CULTIVARS
10. PROTECT OUR TREES FROM EXOTIC BEETLES
11. REMOTE ACCESS WEATHER STATIONS
12. USE OF NANOPARTICLES OF COPPER, MANGANESE, OR ZINC TO SUPPRESS SOIL BORNE DISEASES OF EGGPLANTS AND TOMATOES
13. NEW HYBRID CHESTNUT ORCHARD
14. CONTROL OF BLIGHT ON AMERICAN CHESTNUT
15. TABLE GRAPE DEMONSTRATION
16. ENVIRONMENTALLY-FRIENDLY CONTROL OF POWDERY MILDEW ON LANDSCAPE PLANTS
17. NANOPARTICLE INTERACTIONS WITH AGRICULTURAL CROPS
18. TECHNICAL DEMONSTRATION TENT
19. QUESTION & ANSWER TENT
20. WILD CHESTNUTS FROM TURKEY
21. SEEDLINGS OF OLD SURVIVING AMERICAN CHESTNUTS
22. COMPARISON OF GRAFT UNION HEIGHT ON CHARDONNAY GRAPEVINES
23. FIG PRODUCTION IN SELF-WATERING CONTAINERS
24. GROWTH AND CONTROL OF NON-NATIVE BAMBOOS (*PHYLLOSTACHYS* SPP.)
25. POWDERY MILDEW ON CHARDONNAY WINE GRAPES
26. RETURN OF THE 17-YEAR PERIODICAL CICADA: THE 2013 EXPERIENCE
27. HANDS-ON CHEMISTRY
28. INVASIVE AQUATIC PLANT PROGRAM
29. COMPOSTING LEAVES USING THE STATIC PILE METHOD
30. EVALUATION OF EIGHT REPELLENTS IN DETERRING EASTERN COTTONTAIL HERBIVORY IN CONNECTICUT
31. SELF-GUIDED ACTIVITY FOR ALL CHILDREN, INCLUDING GIRL SCOUTS
32. KID'S KORNER

33. THE FARMER'S COW
34. VERIZON TELEPHONE TRANSMISSION SILO
35. BIOLOGICAL CONTROL OF HEMLOCK WOOLY ADELGID AND MILE-A-MINUTE WEED IN CONNECTICUT
36. MANAGEMENT OF BOXWOOD BLIGHT, A NEW DISEASE OF THE BUXACEAE IN CONNECTICUT AND THE UNITED STATES
37. USING LEAF COMPOST IN HOME GARDENS
38. ENVIRONMENTALLY-FRIENDLY CONTROL OF POWDERY MILDEW ON VEGETABLE PLANTS
39. TRAPPING SPOTTED WING DROSOPHILA FOR HOME FRUIT GROWERS
40. COMMON INDOOR MOLDS
41. EXPERIMENT STATION ASSOCIATES
42. PUBLIC HEALTH AND ENTOMOLOGY
    a. LYME DISEASE IN TICKS FROM CONNECTICUT CITIZENS
    b. SERUM ANTIBODIES TO *BORRELIA BURGDORFERI*, *ANAPLASMA PHAGOCYTOPHILUM*, AND *BABESIA MICROTI* IN RECAPTURED WHITE-FOOTED MICE
    c. THE DEER TICK, *IXODES SCAPULARIS*
    d. INTEGRATED TICK MANAGEMENT
    e. MOSQUITO TRAPPING AND TESTING PROGRAM FOR WEST NILE AND EASTERN EQUINE ENCEPHALITIS VIRUSES
43. FIDDLEHEAD TRIALS
44. NATIVE WOODY SHRUBS
45. BIRD AND BUTTERFLY GARDEN
46. DATING HERBACEOUS ROOTS
47. CHESTNUT SPECIES AND HYBRIDS
48. HEALTHY PLANTS – HEALTHY BUSINESS: SUPPORT OF THE GREEN INDUSTRY BY INSPECTION
49. SWEET CORN TRIALS
50. HOP DEMONSTRATION PROJECT
51. THE SOUND SCHOOL
52. PUMPKIN POLLINATION
53. HYBRID AND VINIFERA WINEGRAPE CULTIVAR TRIAL
54. PINOT GRIS CULTURAL TRIALS
55. ROCKY HILL AMERICAN CHESTNUT TREES
56. ASIAN CHESTNUT GALL WASP ON CHESTNUT
57. BEACH PLUM TRIALS
58. PAWPAW TRIALS
59. JAPANESE PLUM VARIETY TRIALS
60. HYBRID ELM TREES
61. CONNECTICUT PROFESSIONAL TIMBER PRODUCERS ASSOCIATION
62. CONNECTICUT INVASIVE PLANT WORKING GROUP
63. CONNECTICUT DEPARTMENT OF LABOR / CONN-OHSA

64. CONNECTICUT FARMLAND TRUST
65. CONNECTICUT ENVIRONMENTAL COUNCIL
66. THE CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION: DIVISION OF FORESTRY
67. CONNECTICUT DEPARTMENT OF AGRICULTURE
68. CONNECTICUT NORTHEAST ORGANIC FARMING ASSOCIATION
69. USDA, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, PLANT PROTECTION AND QUARANTINE
70. USDA, FARM SERVICE AGENCY
71. USDA, NATURAL RESOURCES CONSERVATION SERVICE
72. CONNECTICUT TREE PROTECTIVE ASSOCIATION
73. UNITED STATES DEPARTMENT OF LABOR / OSHA
74. UCONN MASTER GARDENER PROGRAM
75. CONNECTICUT GREEN INDUSTRIES
76. USDA NATIONAL AGRICULTURAL STATISTICS SERVICE
77. THE SLEEPING GIANT PARK ASSOCIATION
78. BUYCTGROWN

FIELD PLOT ABSTRACTS

1. CHINESE CHESTNUT TREES
Sandra Anagnostakis *Assisted by:* Pamela 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.

2. SPECIALTY PEPPER TRIALS
Abigail Maynard and David Hill
Specialty peppers include both hot and sweet varieties of unusual shape, size, or color. Colored peppers have extra flavor, nutrition, and aesthetic appeal, and therefore command a higher market price. Most colored peppers are obtained by leaving the fruits on the bush until they reach mature color (e.g., red, yellow, orange). Others, such as banana pepper, are pale yellow even when immature. Green bell peppers are high in vitamin C (one medium green bell pepper contains 177 percent of the RDA for vitamin C). As they mature and sweeten (turn color), the vitamin A content rises 9-fold while the vitamin C content doubles. This 3-year trial, which is also repeated at the Valley Laboratory in Windsor, is evaluating the yield and quality of 10 colored sweet bell pepper cultivars. Last year, Early Sunsation (yellow) had the greatest yields (7.2 lbs/plant) followed by King Arthur Hybrid (red) (4.6 lbs/plant), and Chablis (red) (3.9 lbs/plant).

3. SHEET COMPOSTING WITH OAK AND MAPLE LEAVES
Abigail Maynard and David Hill
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 1995-2012 and incorporated into the soil by rototilling. Yields from plots amended with oak leaves were compared to plots amended with maple leaves and the unamended controls. In 2012, eggplant was grown with all plots receiving the same amount (1300 lbs/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. The greatest eggplant yields were from plots amended with oak leaves (10.4 lbs/plant) followed by plots amended with maple leaves (9.9 lbs/plant) and the unamended control plots (9.5 lbs/plant).

4. SWEET POTATO TRIALS
Abigail Maynard and David Hill
A 1998 Connecticut Department of Agriculture survey showed that sweet potato is one of the most popular specialty vegetables. In the South, the sweet potato is also called yam, but both are identical species. In the United States, North Carolina and Louisiana are the leading producers but we have found that they can easily be grown in Connecticut. In this trial, we are looking at several cultivars that have short maturities (90 days). The cultivars will be evaluated on yield and quality. Last year, O'Henry (3.9 lbs/plant) and Beauregard (3.2 lbs/plant) averaged the greatest yields.

5. NUT ORCHARD
Sandra Anagnostakis *Assisted by*: Pamela Sletten
This orchard of grafted nut trees was planted by Richard Jaynes in the spring of 1981. There are several named cultivars of chestnut and other nut trees included. Last year and this year we planted several new nut cultivars that we want to test for their production potential in Connecticut.

6. SPECIALTY MELON TRIALS
Abigail Maynard and David Hill
Specialty melons may be defined as members of the cucurbit family whose fruit may be large, have unique flavors, and command a high price in the marketplace. In commercial trade, specialty melons are often referred to as "mixed melons" and include canary, Crenshaw, casaba, Christmas, and Persian melons. This 3-year trial, which is also repeated at the Valley Laboratory in Windsor, is evaluating the yield and quality of eleven cultivars of specialty melons. Included in the trials are three galia cultivars, two canary cultivars, two Crenshaw cultivars, and one charentais cultivar. Three honeydew cultivars are also included because they also demand

higher prices in the marketplace compared to cantaloupe. Last year, Honey Brew (honeydew) (13.4 lbs/plant), Arava (galia) (9.7 lbs/plant), Tweety (canary) (13.2 lbs/plant), Early Hybrid (Crenshaw) (13.9 lbs/plant), and Savor (charentais) (4.6 lbs/plant) had the greatest yields.

7. BUTTERNUTS AND HEARTNUTS

Sandra Anagnostakis *Assisted by:* Pamela Sletten

Seedling butternut (*Juglans cinerea*) and heartnut (*J. ailantifolia*, Japanese walnut) were planted here in 2008 to test their resistance to the serious diseases that are eliminating American butternuts from their habitat Most of the "butternut" trees in Connecticut that we have examined are, in fact, hybrids of butternut with heartnut, including the former National Champion Butternut in Chester, CT. These small trees grew from seed collected in North Carolina. Their species have been identified and they have been tested for disease resistance.

8. USE OF EARTHWORMS AND BIOCHAR TO SUPPRESS FUSARIUM CROWN ROT OF ASPARAGUS

Wade Elmer *Assisted by*: Peter Thiel

Greenhouse trials have shown that when earthworms were added to pots filled with soil infested with Fusarium pathogens; asparagus plants had less disease and were larger than the pots not amended with earthworms. Biochar, a fine ground charcoal product that has a high absorptive capacity, has also been shown to suppress the asparagus disease in the greenhouse. These plots were designed to study the role of earthworms and biochar alone and in combination to determine their effect on asparagus under field conditions. The 2012 and 2013 harvest suggest augmenting field's plots with earthworms provided the greatest increase in yields when compared to untreated plots.

9. COMMERCIAL CHESTNUT CULTIVARS

Sandra Anagnostakis *Assisted by*: Pamela Sletten

These grafted trees are commercial cultivars of orchard chestnut trees. Included is 'Colossal' (Japanese X European) which is the most frequently planted commercial cultivar in the U.S., with large acreages on the west coast. Cultivar 'Eaton' is a Chinese X (Japanese X American) released by CAES, and newly grafted trees of this cultivar were planted this year. We are evaluating the potential of these commercial cultivars of chestnut trees for Connecticut.

10. PROTECT OUR TREES FROM EXOTIC BEETLES

Rose Hiskes *Assisted by:* Katherine Dugas

Connecticut's forests and urban trees are under threat from two exotic beetles: the Asian longhorned beetle (ALB) and the emerald ash borer (EAB). These beetles have wood-boring larvae that kill deciduous trees by their feeding. In 2008, ALB was detected within 30 miles of Connecticut's border in Worcester, MA. In 2010, four ALB-infested red maples were found at a hospital in Boston. Last July EAB was found in Prospect, CT and now has been confirmed in eight other northern New Haven county towns. Learn how to recognize these two invasive species, the host trees they affect, the damage they cause and how to report potential finding to CAES.

11. REMOTE ACCESS WEATHER STATIONS

Francis Ferrandino

Remote-access weather stations are deployed at the three experimental farms operated by The Connecticut Agricultural Experiment Station. These farms are located in Hamden, CT, Windsor, CT, and Griswold, CT. Cumulative precipitation, growing degree days (GDD), frost events, and disease-risk assessments are recorded and/or calculated from the data collected. Also in this enclosure is the remote access weather station operated by the National Weather Service.

12. NANOPARTICLE INTERACTIONS WITH AGRICULTURAL CROPS

Roberto De La Torre-Roche, Craig Musante, Joseph Hawthorne, and Jason White *Assisted by:* Michael Torselli

Nanomaterials (NM) have at least one dimension less than 100 nanometers (one billionth of a meter) and this small size results in unique properties not observed with equivalent bulk particles. For example, at that size range, materials that are normally good insulators actually become conductive (silicon) and other elements that are generally stable actually become chemically reactive (gold). Current nanomaterial use is ubiquitous; over 1000-NM containing products are commercially available in areas such as electronics, health-care, cosmetics, pharmaceuticals, and food processing. We specifically note the recent and increasing use of nanomaterials in agriculture, including pesticides and fertilizers directly applied to food crops. Our research is characterizing the impact of NMs on common agricultural crops, eventually focusing on potential risk posed to humans from exposure to these materials. Our data suggests that exposure to a range of nanoparticles can negatively impact agricultural plants and that this effect is greater than observed with equivalent bulk materials. In addition, certain nanomaterials appear to increase the accumulation of other contaminants present in the environment and may also be transferred through the food chain.

13. NEW HYBRID CHESTNUT ORCHARD

Sandra Anagnostakis *Assisted by:* Pamela Sletten

These 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.

14. CONTROL OF BLIGHT ON AMERICAN CHESTNUT

Sandra Anagnostakis *Assisted by*: Pamela Sletten

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

15. TABLE GRAPE DEMONSTRATION

Francis Ferrandino *Assisted by:* Joan Bravo

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

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

Francis Ferrandino

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

17. USE OF NANOPARTICLES OF COPPER, MANGANESE, OR ZINC TO SUPPRESS SOIL BORNE DISEASES OF EGGPLANTS AND TOMATOES

Wade Elmer and Jason White *Assisted by:* Peter Thiel

When metallic oxides of copper (Cu), manganese (Mn), and zinc (Zn) are manufactured at the nanoscale (<0.000,001 mm) they are called nanoparticles (NP). The particles have unique chemical and physical properties not observed in equivalent bulk materials. The effect and fate of NP in plants has only begun to receive attention, and their role in plant disease management is relatively unknown. These plots will demonstrate the potential for NP or Cu, Mn, and Zn oxides to suppress root diseases or eggplants and tomatoes and to enhance crop productivity. Treatments will be compared to standard bulk forms of each metal to see if the NP has superior effects.

18. DEMONSTRATION TENT

See the program pages 9-10 for a schedule of technical demonstrations.

19. QUESTION & ANSWER TENT

Yonghao Li, Rose Hiskes, Mary Inman, Todd Mervosh, Gale Ridge, and Diane Riddle

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

20. WILD CHESTNUTS FROM TURKEY

Sandra Anagnostakis and Serap Açikgöz *Assisted by:* Pamela Sletten

These seedling trees are from six wild populations along the Black Sea in Turkey. Those from the eastern border are near the population in the Caucasus Mountains where European chestnuts (*Castanea sativa*) survived the ice ages, and are genetically quite diverse. Those from the western border are much less diverse. We are growing these here to compare their winter hardiness and

resistance to chestnut blight disease with that of American chestnut trees and with the seedlings from "old survivors" planted next to them. Paper bags cover flowers that have been pollinized with pollen from trees resistant to Asian chestnut gall wasp. The resulting seed will be sent to Turkey to help commercial orchards there prepare for the invasion of this pest.

21. SEEDLINGS OF OLD SURVIVING AMERICAN CHESTNUTS

Sandra Anagnostakis *Assisted by*: Pamela Sletten

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

22. COMPARISON OF GRAFT UNION HEIGHT ON CHARDONNAY GRAPEVINES

Francis Ferrandino *Assisted by:* Joan Bravo

The coldest layer of air during a radiation freeze is immediately above the soil or snow level. By elevating the graft union, the labor and expense of burying the graft union might be avoided. Chardonnay vines, Dijon clone 95 on C3309 rootstock, were transplanted to the vineyard in spring, 2007. Half are of standard grafting height and half have the graft union 26 inches above ground. Dataloggers are placed at each graft union height. Comparisons for yield, fruit quality, and winter damage began in 2009 and will continue through 2012. High grafted vines had significantly higher yields than low grafted vines in 2009.

23. FIG PRODUCTION IN SELF-WATERING CONTAINERS

Charles Vossbrinck *Assisted by*: Richard Cecarelli

Fresh figs are a delicious, nutritious food but they are not often available in Connecticut. They do not ripen once they are picked and they are not ripe until they are very soft. As a result fresh figs do not travel well. We are in the beginning stages of examining fig tree growth and production in self-watering or sub-irrigation planters followed by overwintering, pot-to-pot, in barns or other enclosed areas for winter protection. Six varieties are being grown in large, 25 gallon planters that have a watering tube extending to a space at the bottom of the planter. A system of hoses automatically waters the trees each day. Growing trees in planters has several advantages including: protection of the roots from pests, no wasted water, protection from rodents, potential for organic production, no wasted pesticide and the ability to move or change the density of the "orchard" as the trees grow.

24. GROWTH AND CONTROL OF NON-NATIVE BAMBOOS (*PHYLLOSTACHYS* SPP.)

Jeffrey Ward *Assisted by*: Joseph Barsky

Running bamboos (*Phyllostachys* spp.) are 15-30 foot tall perennials with canes ranging in color from golden yellow to green to almost black. Properly planted with deep root barriers they can form a gracefully elegant garden focal point or living hedge that is resistant to deer browse. However, without proper root barriers, they can become a nuisance to neighboring properties and form impenetrable thickets in natural areas. We began an experiment in 2012 on our three experimental farms to examine the rate of spread and effectiveness of control options for selected *Phyllostachys* cultivars in Connecticut.

25. POWDERY MILDEW ON CHARDONNAY WINE GRAPES

Francis Ferrandino

Wine grapes and wineries are a relatively new industry in Connecticut. In the past 15 years, acreage planted to wine grapes has gone from 160 A to 550 A and the number of wineries has gone from 15 to 42, producing about 450,000 gallons of wine valued at between 10-12 million dollars per year. In our climate, powdery mildew has the greatest impact on wine-grape yield of all pathogens and pests. This plot is planted with Chardonnay vines which are prized for the quality of the wine they produce but are very susceptible to powdery mildew. Over the next few years the relation between the onset of powdery mildew and climate will be closely followed in order to attune disease-risk models to our local weather conditions.

26. RETURN OF THE 17-YEAR PERIODICAL CICADA: THE 2013 EXPERIENCE

Chris Maier *Assisted by*: Tracy Zarrillo, Morgan Lowry, and many citizen scientists

In spring 2013, one of the most spectacular events in all of nature occurred in central Connecticut—the mass emergence of periodical cicadas. The nymphs of periodical cicadas feed on sap in tree roots for most of their life, but every 17 years they emerge from the soil and transform to adults. The adult males sing in large choruses in trees to attract mates. Once mated, the females lay eggs in pencil-sized twigs. Tiny nymphs hatch from the eggs in late July and August and quickly borrow into the soil to find small roots for feeding. This year we carefully documented the location of colonies by recording latitude and longitude with a hand-held GPS device. We found the widespread 17-year cicada (*Magicicada septendecim*) in 20 of 22 towns known to have had them in 1996, but many of the smaller populations apparently have disappeared. The most exciting find was the discovery of a second species of periodical cicada

(*Magicicada septendecula*) on Totoket Mountain in North Branford. This species was associated with stands of pignut hickory. If you missed the 2013 emergence of periodical cicadas, you will have to wait until 2030 for the next one.

27. HANDS-ON CHEMISTRY

Christina Robb, Kittipath Prapayotin-Riveros, Walter Krol, Terri Arsenault, Michael Cavadini, Brian Eitzer, and Jason White

This display includes a number of "hands-on" experiments and displays that will allow you to get up-close and personal with chemistry in action. You'll get to work with our portable glove box, make slime, and perform paper chromatography. You will not only get to participate in these activities but CAES staff members will explain the mechanisms behind the chemistry.

28. INVASIVE AQUATIC PLANT PROGRAM

Gregory Bugbee *Assisted by:* Jordan Gibbons, Adam Hawkes, and Samantha Wysocki

Connecticut lakes and ponds face an imminent threat from non-native invasive plants. Recently introduced plants such as Eurasian milfoil, variable milfoil and fanwort are of great concern because they disrupt native ecosystems, interfere with recreational uses and reduce property values. Researchers, in the Department of Environmental Sciences, are documenting our State's invasive aquatic plant problem and studying management options. We are continuing a statewide inventory of freshwater aquatic vegetation. From 2004 - 2012, we surveyed and mapped the invasive and native plants over 200 Connecticut lakes and ponds. We documented over 100 plant species, 14 of which are invasive. Approximately two-thirds of the water bodies contained one or more invasive species. In 2010, we began resurveying lakes that were originally done over five years ago to begin documenting the changes. Requests for station assistance in managing unwanted aquatic vegetation are common and we often visit water bodies to help solve imminent problems. We are searching for novel control measures including; reduced risk herbicides, biological agents and winter drawdown. At this plot you will see our aquatic plant surveillance boats, state of the art global positing systems and the underwater video equipment we use to conduct our surveys. A researcher will be available to discuss our program and answer questions about lakes and ponds.

29. COMPOSTING LEAVES USING THE STATIC PILE METHOD

Abigail Maynard and David Hill

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

30. EVALUATION OF EIGHT REPELLENTS IN DETERRING EASTERN COTTONTAIL HERBIVORY IN CONNECTICUT

Scott Williams *Assisted by:* Michael Short and Megan Floyd

Herbivory by eastern cottontail rabbits (*Sylvilagus floridanus*) can be the source of significant agricultural, nursery, and managed landscape damage. Where cottontails cannot be managed by lethal means, or where trap and release is infeasible, repellents may be a reasonable alternative. We tested 8 different repellent formulations (Bobbex Deer Repellent® Canadian formulation concentrate, Bobbex Deer Repellent® Canadian ready-to-use (RTU), Bobbex-R Animal Repellent® concentrate, Bonide Repels All® concentrate, Bonide Deer & Rabbit Repellent® concentrate, Liquid Fence® Deer & Rabbit Repellent concentrate, Plantskydd® soluble powder, and Rabbit Stopper® RTU) on Johnny jump-ups (*Viola tricolor*), lettuce (*Lactuca sativa*), and alfalfa (*Medicago sativa*). Three wild eastern cottontails were trapped and relocated to a 107 m^2 enclosure, resulting in a density of 280 cottontails/ha. We conducted two 2-week trials on each plant genera using 4 repellents in each trial. There were 6 raised beds (4 treated, 2 control) with 4 flats of plant material within each inside the enclosure and one fenced raised bed outside the enclosure. An equal amount of seed was germinated in flats which were watered equally and randomly assigned treatments. After 2 weeks exposure to cottontails, remaining plant material was removed, dried, and weighed. Difference between dried plant mass of treated and untreated vegetation was determined. Daily caloric demand for cottontails was calculated and summed for each 2-week trial. Repellent effectiveness was defined as the sum of the product of caloric demand rank and rank of dry mass difference for each repellent. Physical exclusion performed the best, followed by Plantskydd and Bobbex-R.

31. SELF-GUIDED ACTIVITY FOR ALL CHILDREN, INCLUDING GIRL SCOUTS

Terri Arsenault

All children are encouraged to complete an age appropriate, self-guided activity, to earn a patch of their choosing among the several options. Children are directed to a few of the many exhibits where age appropriate activities and speakers are available just for them. In addition, Girl Scouts will have the option to earn the Naturalist Legacy badge appropriate for their level of scouting. On October 1, 2007, Girl Scouts of Connecticut became the largest organization of women and girls in Connecticut, serving over 47,300 girls. The mission of Girl Scouts is to build girls of courage, confidence, and character, who make the world a better place through a diverse

range of fun, and horizon-stretching experiences. We encourage everyone to use this opportunity to learn something new about the natural world, and use your new knowledge to make the world a better place.

32. KID'S KORNER

Roberta Milano-Ottenbreit *Assisted by:* Kathryn Soleski, Lisa Kaczenski, and Tracy Zarrillo

Come to the Kid's Korner to pick up your child's passport and a goody bag. The passport is a special activity for young children to help them enjoy and explore Plant Science Day. There are six different stations located throughout Lockwood Farm that they can visit, where they can ask questions, learn about the topic featured at the station, and then receive a special stamp for their passport. Once the passport is complete, they can go to the Self-Guided Activity Plot (Plot 31) to collect a CAES patch.

33. THE FARMER'S COW

Kathy Smith

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

34. VERIZON TELEPHONE TRANSMISSION SILO

Learn about the cellular transmission tower.

35. BIOLOGICAL CONTROL OF HEMLOCK WOOLY ADELGID AND MILE-A-MINUTE WEED IN CONNECTICUT

Carole Cheah

Hemlock woolly adelgid (HWA) has been a serious forest, nursery and landscape exotic pest since its first detection in Connecticut in 1985. The Station, with the support of the USDA Forest Service discovered, reared and released the tiny Japanese ladybeetle, *Sasajiscymnus tsugae*, for biological control of HWA between 1995 and 2007. Since 2005, there has been widespread recovery of forest hemlocks. But the recent warm winters of 2012 and 2013 has revived resurgent pest threats for our eastern hemlocks. Similarly, mile-a-minute weed (MAM), an exotic invasive species, initially reported in Connecticut in 2000 and has now spread to 35 towns. In 2009, a tiny weevil, *Rhinoncomimus latipes*, imported from China, was first released in Connecticut as part of the federal biological control program for MAM. To date, approximately 24,000 weevils have been released, from 2009-2012, in the most heavily infested 12 towns to control MAM. Updates on the current pest status of these two invasive species with information on the biological control programs are presented.

36. MANAGEMENT OF BOXWOOD BLIGHT, A NEW DISEASE OF THE BUXACEAE IN CONNECTICUT AND THE UNITED STATES

James LaMondia *Assisted by:* Michelle Salvas and Nathaniel Child

Boxwood blight is a new, introduced disease in Connecticut. The disease is caused by the pathogenic fungus *Cylindrocladium pseudonaviculatum.* The impact of the disease has been staggering; boxwood plant losses have been estimated at $3 million in Connecticut since October 2011. We have conducted research on a wide range of fungicides *in vitro* to determine the concentrations required to achieve 50% or 85% disease suppression. Efficacious fungicides were identified with activity against growth and conidial germination. These fungicides are being applied alone or in combination to boxwood plants in pots in the greenhouse and at the CAES Valley Laboratory container nursery area to evaluate disease control. These data are being used to develop fungicide management programs with different and complementary combinations of active ingredients to manage disease while following recommendations to reduce the development of fungicide resistance.

37. USING LEAF COMPOST IN HOME GARDENS

Abigail Maynard and David Hill

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, addition of 1-inch of leaf compost annually since 1982 increased organic matter from 5.9 to 12.6%. Increased root growth in the amended soil allows plants to utilize nutrients in a greater volume of soil than plants in untreated soil of

greater density. We are measuring the effect of reduced rates of fertilization (2/3, 1/3, 0 of normal rates) and compost amendments on the yields of several vegetables by comparing them with yields from unamended controls. We are also measuring the nutrient status of the soils in each plot throughout the growing season. Each year since 1982, yields on the leaf compost amended plots fertilized at 2/3 and 1/3 the normal rate have been consistently greater than on unamended plots with full fertilization.

38. ENVIRONMENTALLY-FRIENDLY CONTROL OF POWDERY MILDEW ON VEGETABLE PLANTS

Francis Ferrandino

Many vegetable plants commonly used in Connecticut gardens are subject to powdery mildew. This disease is caused by a fungus that grows on the surface of plant tissue giving the foliage a white powdery appearance. The result is relatively unsightly and the fungus weakens infected plants by feeding on the sugar the plant produces and by blocking sunlight, which limits the ability of the plant to produce more sugar. This plot is planted to a number of common vegetables (tomato, pepper, eggplant, Pumpkin, and muskmelon) which are susceptible to powdery mildew. Environmentally-friendly foliar sprays, including milk (20% in water), Potassium bicarbonate (1% in water) and light horticultural oil (1% in water), will be compared to chemical fungicides in their ability to control the disease

39. TRAPPING SPOTTED WING DROSOPHILA FOR HOME FRUIT GROWERS

Richard Cowles *Assisted by*: Elizabeth Young

Back yard plantings of blueberries, raspberries, cherries, and strawberries, plus landscape fruiting plants such as Kousa dogwood, are important hosts for our new exotic pest, the spotted wing drosophila. Research has rapidly advanced to improve trap chemical and visual attractants. These traps be used for monitoring the fly populations, and also may be useful for directly reducing the fly populations to protect fruit. The attract-and-kill traps can kill the flies by drowning them in the bait, or by having them contact insecticide on the exterior of the trap.

40. COMMON INDOOR MOLDS

DeWei Li

Indoor molds often develop as a result of water damage or dampness occurred in indoor environments. The presence of indoor molds can diminish indoor air quality by releasing fungal spores into the air and subsequently have detrimental effects on the health of occupants. Over six hundreds of molds have been found in indoor environments in North America. Among these molds, *Cladosporium* spp., *Alternaria* spp., *Aspergillus* spp., *Penicillium* spp. *Epicoccum nigrum*, *Acremonium* spp., *Paecilomyces variotii*, *Mucor* spp., *Phoma* spp., *Stachybotrys chartarum*, *Chaetomium globosum*, and *Ulocladium* spp. are common in indoor environments.

41. EXPERIMENT STATION ASSOCIATES

Richard Bergmann

Information is available on this organization formed to help promote scientific advances at The Connecticut Agricultural Experiment Station. Visit their webpage at: http://www.ct.gov/caes/ESA.

42. PUBLIC HEALTH AND ENTOMOLOGY

a. LYME DISEASE IN TICKS FROM CONNECTICUT CITIZENS

John Anderson *Assisted by*: Bonnie Hamid, Elizabeth Alves, and Micaela Ferreira

In 2012, 1,958 black-legged (deer) ticks (*Ixodes scapularis*) were received, as well as 327 American dog ticks (*dermacentor variabilis*) and 70 lone star ticks (*Amblyomma americanum*). Of the test black-legged ticks, 19% (189 of 971) were infected with the Lyme disease organism, *Borrelia burgdorferi*. The average time between receipt of and reporting on tested ticks was 15.9 days. All ticks submitted by municipal health departments are identified to species and degree of engorgement, but only engorged deer ticks are tested for the presence of Lyme disease bacterium. Studies by other researchers have shown that ticks that have not become engorged with blood do not transmit the disease organism.

b. SERUM ANTIBODIES TO *BORRELIA BURGDORFERI*, *ANAPLASMA PHAGOCYTOPHILUM*, AND *BABESIA MICROTI* IN RECAPTURED WHITE-FOOTED MICE

Louis Magnarelli and Scott Williams, *Assisted by:* Tia Blevins

A mark-release-recapture study was conducted during 2007 through 2010 in six tick-infested sites throughout Connecticut to assess changes in antibody titers for *Borrelia burgdorferi*, *Anaplasma phagocytophilum*, and *Babesia microti* (the causal agents of Lyme disease, anaplasmosis, and babesiosis in humans, respectively) in white-footed mice (*Peromyscus leucopus*). There was an overall recapture rate of 40%, but only four tagged mice were caught in two or more years. Whole-blood samples were obtained from 557 mice. Sera were analyzed for total antibodies to *B. burgdorferi* and *A. phagocytophilum* by using whole-cell or recombinant (VlsE or protein 44) antigens in a solid-phase enzyme-linked immunosorbent assay (ELISA) or to whole-cell *B. microti* by indirect fluorescent antibody staining methods. Seropositivity rates were highly variable for *B. burgdorferi* (56% to 98%), *A. phagocytophilum* (11% to 85%),

and *B. microti* (11% to 84%), depending on the site and time of sampling. Of the 463 seropositive mice, 206 (45%) had antibodies to all three pathogens. There were changes in antibody status for some mice from negative to positive (117 seroconversions) or from positive to negative (55 reversions). Prevalence of seroconversions was 10.1% of 417 mice for *B. burgdorferi*, 18% of 306 mice for *A. phagocytophilum*, and 6.6% of 304 mice for *B. microti*; reversion rates were 5.3%, 5.9%, and 4.9%, respectively. Antibodies to all pathogens tended to persist in some mice over several weeks, suggesting possible continued infections. In other individuals, the marked declines in titration end points to negative status may indicate possible elimination of a certain pathogen, such as *A. phagocytophilum*, or that mouse immune systems ceased to produce antibodies despite an existing patent infection.

c. THE DEER TICK, *IXODES SCAPULARIS*

Kirby Stafford *Assisted by:* Heidi Stuber

The blacklegged tick or "deer" tick *Ixodes scapularis* transmits the agents of Lyme disease, human babesiosis, and human granulocytic anaplasmosis in Connecticut. Observe live and preserved ticks under the microscope. The latest information on natural and biological control are available.

d. INTEGRATED TICK MANAGEMENT

Kirby Stafford, Scott Williams, Goudarz Molaei, Laura Estep *Assisted by:* Heidi Stuber, Megan Floyd, Benjamin DeMasi-Sumner, and Mark Morris

With funding by the Centers for Disease Control and Prevention (CDC), an integrated tick management project was begun this year to examine a combination of biopesticides (entomopathogenic fungus *Metarhizium anisopliae*), fipronil-based rodent bait boxes, and deer reduction to reduce the risk of Lyme disease in select neighborhoods in Redding, CT. The initial results of this first year's interventions are presented.

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

Theodore Andreadis and Philip Armstrong *Assisted by:* John Shepard, Michael Thomas, Angela Bransfield, Michael Misencik, Edward Calandrella, Joshua Dickman, Emilie Frank, Demerise Johnston, Michael Olsen, Tanya Petruff, Gerald Piscitelli, Shannon Thibodeau, Rebecca Wright, and Eric Zagorski

West Nile and Eastern Equine Encephalitis viruses are firmly established in Connecticut and continue to be significant public health and veterinary threats with annual re-emergence throughout the state. The surveillance and research activities undertaken by scientists at the Center for Vector Biology & Zoonotic Diseases, The Connecticut Agricultural Experiment Station are integral to the public health response to these mosquito-borne viruses in Connecticut and have provided critical information on the epidemiology of the viruses and the ecology of the mosquito vectors in the northeastern US. This information is used by the State Department of Public Health in the issuance of health alerts and to direct preemptive and emergency mosquito control activities by the State Department of Environmental Protection. Trapping is conducted daily from June through October at 91 locations statewide. The objectives of the program are to provide: 1) early evidence of local virus activity; 2) information on the abundance, distribution, identity and infection rates of potential mosquito vectors; 3) data that is used to assess the threat of WNV and EEE to the public and; 4.) guide the implementation of mosquito control measures. Since 1997, The Connecticut Agricultural Experiment Station has trapped and tested over 2.5 million mosquitoes. A total of 1,402 isolations of WNV have been made from 21 different species of mosquitoes, and a total of 341 isolations of EEE have been made from 18 species of mosquitoes. There have been 110 human cases of WNV in the state with 3 fatalities. The principal foci of WNV activity in Connecticut have been identified as densely populated residential communities in coastal Fairfield and New Haven Counties. The principal foci for EEE activity are in more rural locales located in the southeastern corner of the state. We have observed a correlation both temporally and spatially between the isolation of WNV and EEE from field-collected mosquitoes and the elevated risk of human infection that typically extends from late July through September in Connecticut.

43. FIDDLEHEAD TRIALS

Abigail Maynard and David Hill

Fiddleheads are the furled fronds of a young fern, harvested in spring for use as a vegetable. Ultimately, each fiddlehead would unroll into a mature frond. The most popular fiddlehead is that of the ostrich fern (*Metteuccia struthiopteris),* often called the fiddlehead fern. The ferns are available commercially either canned of frozen, but since the early 1980's, farmers' markets and supermarket chains have sold fresh ferns in season. Its flavor is similar to asparagus with a pleasantly crunchy, tender-firm texture. In this experiment, data will be collected on the growth and vigor of these newly planted ferns grown under different cultural conditions. Once established, experiments will then be conducted to determine the number of fiddleheads that can be harvested from each clump to optimize both the yield of fiddleheads and growth and health of the fern plant.

44. NATIVE WOODY SHRUBS

Jeffrey Ward *Assisted by:* Joseph 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 flower in early autumn. Birds are frequent visitors to the garden and quickly eat the mature fruit. These shrubs survive with minimal maintenance. Occasional mowing, annual removal of dead stems, and replenishment of mulch are performed. These shrubs have never been fertilized, watered, or treated for disease.

45. BIRD AND BUTTERFLY GARDEN

Jane Canepa-Morrison and Jeffrey Fengler

The Bird and Butterfly Garden is a partnership of the CAES and the Federated Garden Clubs of CT/Spring Glen Garden Club. This garden creates several favorable habitats for our native birds, butterflies, and pollinating insects and helps us determine which plants may work best in southern Connecticut gardens. At this time of year, the garden is at its peak performance with plants thriving in the garden and meadow. Plant labels are placed near the plants in the garden to provide the botanical and common name. Throughout the day, we update our list of birds, butterflies and moths spotted in the garden. The Bird & Butterfly Garden at Lockwood Farm is listed in the 'Nature Conservancy Open Days Directory for New England'. Do you have a butterfly garden or would you like to start one? Experiment Station staff members can provide you support by answering your questions and suggesting ways for you to enjoy a butterfly garden small or large on your patio or in your yard.

46. DATING HERBACEOUS ROOTS

Jeffrey Ward

While it is commonly known that growth rings can be used to determine tree ages, recent European research has found that roots of many herbaceous garden plants and wildflowers also have annual growth rings. Determining the age of herbaceous plants could be useful for aging crime scenes such as clandestine graves, determining the rate of spread of invasive species, and studying natural succession. In 2012, we began an experiment to determine which species commonly found in North American gardens and forests have root systems with annual growth rings.

47. CHESTNUT SPECIES AND HYBRIDS

Sandra Anagnostakis *Assisted by:* Pamela 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 Plot 14). Plants of all seven species of chestnut are growing here. In 1994, one seedling from the Caucasus Mountains of Russia that is a true European chestnut were planted, and has not easily survived our Connecticut winters. Commercial European chestnut trees from Northern Turkey have also done poorly. Two trees of the chinquapin native to Florida are planted across the road from an Allegheny chinquapin from Pennsylvania. The cultivar 'Lockwood' is at the southwest corner of the plot.

48. HEALTHY PLANTS – HEALTHY BUSINESS: SUPPORT OF THE GREEN INDUSTRY BY INSPECTION

Tia Blevins, Mark Creighton, Jeffrey Fengler, Stephen Sandrey, Victoria Lynn Smith, and Peter Trenchard

We work to assure the quality of the agricultural products leaving the state and to maintain the health of forests and Connecticut's agricultural industry. In 2012, the Office of the State Entomologist completed registration and inspections for over 300 nursery growers and dealers of plants and plant products. Over 560 certificates of export were issued for plant commodities moving out of state or out of country. Over 600 beekeepers registered 4,400 hives, and nearly 400 of these were inspected for diseases of honeybees. In addition, surveys were conducted for a variety of exotic pests and diseases, and health of our forests was assessed by aerial survey. Our goal is to safeguard agriculture and forests of Connecticut through surveys to detect infestations, through monitoring of the health and vitality of the forests, and through inspection and registration of commodities and producers to assure their fine quality.

49. SWEET CORN TRIALS

Abigail Maynard and David Hill

Among all vegetables grown in Connecticut, sweet corn ranks first in acres grown and cash value with over half of all vegetable farms including sweet corn as a crop. Supersweet corn trials were conducted from 1995 to 1998 at CAES. Of the 22 cultivars evaluated, only 5 remain for sale. Trials including new varieties developed in the last 15 years would provide important information to the over 300 Connecticut farms who grow sweet corn. This 3-year trial, which is also repeated at the Valley Laboratory in Windsor, is evaluating the yield and quality of five cultivars of sweet corn planted May 1 and June 1. In addition, cool soil percent germination will be determined from the early (May 1) planting.

50. HOP DEMONSTRATION PROJECT

Victor Triolo

Many of the beer-making, ornamental and tea cultivars are planted here and examined for their adaptability to the local soil and climate, as well as their response to disease, pest, growth-rate, yield and productivity factors under low-trellis (hedgerow) cultivation, with a projected emphasis on the recent introduction of dwarf and semi-dwarfing accessions. Instruction on hop yard development and maintenance will be provided.

51. SOUND SCHOOL AGRICULTURAL SCIENCE PROGRAM

Chaz Mavrelion and Students from the Sound School

This program is a unique opportunity for students from New Haven who are interested in studying/pursuing a career in Agricultural Science. The Sound School is a public high school within the City of New Haven. Our program operates on a 12-month basis in partnership with The Connecticut Agricultural Experiment Station. Today you see an example of students planting, growing, and eating fresh vegetables and herbs from their garden, which they have taken care of this summer. Excess produce is used in local soup kitchens. Our Partnership with the City of New Haven "Youth @ work" program assists in the development of work-based skills under the direct supervision and instruction of a certified Vocational Agriculture Teacher. Please visit our web site: www.soundschool.com.

52. PUMPKIN POLLINATION

Kimberly Stoner *Assisted by*: Tracy Zarrillo, Morgan Lowry, Erica Carbone, Jessica Gambel, and Amelia Tatarian

Pumpkins, squashes, and most other cucurbits require insect pollination in order to set fruit. In Connecticut, nearly all the pollination of pumpkins and squash is carried out by three species of bees: honey bees (*Apis mellifera*), bumble bees (*Bombus impatiens*), and squash bees (*Peponapis pruinosa*). With the serious losses of honey bees in recent years, there is concern that pumpkin and squash growers may be losing yield due to inadequate pollination. We are working with farmers across the state counting numbers of bees on pumpkin and squash flowers and measuring pollen deposition on the stigmas of female flowers. In this plot, and in similar plots in Windsor and Griswold, we are comparing natural pollination and supplemental hand pollination to see if natural pollination is adequate or if additional pollination will increase fruit set or fruit size. This project will be continuing for three more years.

53. HYBRID AND VINIFERA WINEGRAPE CULTIVAR TRIAL

Francis Ferrandino *Assisted by:* Joan Bravo

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

54. ROCKY HILL AMERICAN CHESTNUT TREES

Sandra Anagnostakis *Assisted by:* Pamela Sletten

Seeds 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 PLOT 14) to keep them alive.

55. PINOT GRIS CULTURAL TRIALS

Francis Ferrandino *Assisted by:* Joan Bravo

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

56. ASIAN CHESTNUT GALL WASP ON CHESTNUT

Sandra Anagnostakis *Assisted by*: Pamela Sletten

The large tree at the corner of this planting is heavily infested with Asian chestnut gall wasp (*Dryocosmus kuriphyllis*). The insect was first detected in Connecticut two years ago, but has done serious damage to commercial orchards in the mid-west and in Italy. We have planted species and hybrid seedlings that may have resistance to this insect in a close formation under this tree to see whether they will become infested.

57. BEACH PLUM TRIALS

Abigail Maynard and David Hill

Beach plum (*Prunus maritime* Marsh.) is a fruiting shrub native to the coastal dunes of the Northeastern United States. Beach plum jam has become a premium product especially in the Cape Cod region. Currently, consumer demand for beach plums is greater than

the supply. Commercial production is the only way to meet the demand for beach plums and its relatively low growth habit makes it ideal for a pick-your-own operation. In its native seaside habitat, beach plums grow very slowly and bear fruit sporadically. Growth in more fertile soil should be more vigorous and crop size will be improved. In spring 2003, 210 beach plum seedlings were planted at Lockwood Farm and 96 at the Valley Laboratory. These seedlings were raised at Cornell University from seeds collected from 35 sites from Maine to Delaware. The trees are evaluated annually and select elite individuals will be propagated as possible cultivars in the future.

58. PAWPAW TRIALS

Abigail Maynard and David Hill

Pawpaws are shrubby trees that are native to the temperate woodlands of the eastern United States. The American Indian is credited with spreading pawpaws across the eastern U.S. to eastern Kansas and Texas, and from the Great Lakes almost to the Gulf. They are woodland understory plants that need shade to protect the seedlings but once established prefer full sun. They produce maroon, upside-down flowers which are self-incompatible, requiring cross pollination from another unrelated pawpaw tree. They are not pollinated by bees but by flies and beetles. The pawpaw is the largest edible fruit native to America. Individual fruits weigh 5 to 16 ounces and are 3 to 6 inches in length. The tasty fruit has a smooth, custard texture. In this trial, 4 cultivars of pawpaws were planted in 2002.

59. JAPANESE PLUM VARIETY TRIALS

Abigail Maynard and David Hill

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. Many trees were severely damaged by black knot disease and were removed from the orchard. However, the cultivar Obilinaja (planted in the first row) has been free of the disease.

60. HYBRID ELM TREES

Sandra Anagnostakis *Assisted by:* Pamela Sletten

The late Eugene Smalley spent his whole career at the University of Wisconsin breeding elm trees for resistance to Dutch Elm Disease and for the tall, vase-shaped form of American elm trees (*Ulmus americana*). The problem with this kind of breeding is that American elms have four sets of chromosomes, and all the other species of elm have two sets. They bloom at different times, but stored pollen can be used to make crosses. In 1992, Dr. Smalley sent us trees of Chinese elm (*Ulmus parvifolia*) and some of his successful crosses. Mortality has been high, but some of the trees still survive. A few of them look like good replacements for American elms as street trees.

61. CONNECTICUT PROFESSIONAL TIMBER PRODUCERS ASSOCIATION

Joan Nichols

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

62. CONNECTICUT INVASIVE PLANT WORKING GROUP

Donna Ellis and Penni Sharp, Co-Chairs

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 other non-invasive ornamental alternatives throughout Connecticut and work cooperatively with researchers, conservation organizations, government agencies, the green industry, and the general public to identify and manage invasive species pro-actively and effectively. The CIPWG website, www.cipwg.uconn.edu provides timely information on non-native invasive plants and their alternatives, including a list of Connecticut invasive species, management information, invasive plant alerts, fact sheets, invasive plant legislation, photos, alternative replacements for invasives, and a calendar of events. For additional information, or to become a member of CIPWG and subscribe to the list serve, please contact Donna Ellis at 860-486-6448; email donna.ellis@uconn.edu.

63. CONNECTICUT DEPARTMENT OF LABOR/CONN-OHSA

Catherine Zinsser

Our mission at the Connecticut Department of Labor, OSHA Division, is to assist employers, in both public and private sectors, in developing and maintaining workplaces free from recognized hazards. This is accomplished through our no-cost on-site consultation program. The state offers the expertise of highly qualified occupational safety and health professionals to employers who request help in establishing and maintaining a safe and healthful workplace.

64. CONNECTICUT FARMLAND TRUST

Collette Roy

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: a.) Protect Connecticut's prime farmland for agricultural use by acquiring agricultural conservation easements and farmland; b.) Assist landowners, local land trusts, town officials, and state agencies in identifying and protecting threatened agricultural land; and c.) 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. To date CFT has protected 27 active farms, totaling nearly 2,200 acres. For more information about CFT visit www.ctfarmland.org or contact Elisabeth Moore, Director of Conservation, Connecticut Farmland Trust, 77 Buckingham Street, Hartford, CT 06106, phone: 860-247-0202, fax: 860-247-0236, email: emoore@ctfarm.org.

65. CONNECTICUT ENVIRONMENTAL COUNCIL

Erica Fearn

Making Connecticut's spaces and places beautiful, safe and pest-free. Connecticut Environmental council unites individuals, businesses and industry associations that engage in the responsible use of pesticides and fertilizers to beautify, protect and provide healthy spaces and places. CTEC works to improve the quality of life for Connecticut families through leadership, stewardship, sustainability and compliance. CTEC is dedicated to clarifying facts and myths on fertilizer, pesticide and water use in our state. Active in government regulation, CTEC works with policy makers and regulators to be able to provide the best service and products to Connecticut residents. CTEC offers professional development and education opportunities to member businesses.

66. THE CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION: DIVISION OF FORESTRY

Chris Donnelly

The CT Department of Energy and Environmental Protection Division of Forestry performs a range of services for the citizens of Connecticut. Our state is about 60 percent forested, making it both one of the mostly forested and densely populated states in the country. Among its responsibilities, DEEP Forestry manages nearly 162,000 acres of state-owned forestlands, for the health of the forest and for the benefit of those who live in state. We also work with private forestland owners and municipalities, providing assistance with proper forest management, forest health, wildland fire control, the certification of forestry professionals and general technical support. Of the 1.86 million total acres of forest in Connecticut, private landowners own 1.54 million acres. Recent storms and the outbreak of the emerald ash borer have pointed out, again, how important our trees and forests are. At Plant Science Day, the DEEP Forestry program will have representatives of the Private and Municipal Lands program, which focuses its efforts on outreach to the public regarding private forestlands and municipal tree programs, and from the Forest Practices group, which focuses on the certification of forestry professionals and the standards regarding the work performed on forestlands throughout the state. Questions regarding forests, trees, and forest and tree professionals are all fair game for this group.

67. CONNECTICUT DEPARTMENT OF AGRICULTURE

Ronald Olsen

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

68. CONNECTICUT NORTHEAST ORGANIC FARMING ASSOCIATION

Deb Legge

CT NOFA is the Connecticut Chapter of the Northeast Organic Farming Association. CT NOFA is an independent non-profit organization dedicated to strengthening the practices of ecologically sound farming and gardening, and to the development of local sustainable agriculture. Our efforts give consumers increased access to safe and healthy food. CT NOFA is a growing community of farmers, gardeners, land care professionals, businesses and consumers that encourages a healthy relationship to the natural world. For more information, visit us at www.ctnofa.org, www.facebook.com/ctnofa, www.organiclandcare.net or call 203-888-5146.

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

70. USDA, FARM SERVICE AGENCY
Debbie Castle
The Farm Service Agency ensures the wellbeing of American agriculture, the environment, and the American public through the administration of farm commodity programs; farm ownership, operating, and emergency loans; conservation and environmental programs; emergency and disaster assistance; and domestic and international food assistance. FSA programs are delivered through an extensive network of field offices in 2,119 USDA County Service Centers and 51 State Offices. To get more information on FSA, visit: http://www.fsa.usdagov.

71. USDA, NATURAL RESOURCES CONSERVATION SERVICE
Carol Donzella
The Natural Resources Conservation Service (NRCS) is an agency of the United States Department of Agriculture with offices at six locations in Connecticut. For over 75 years, we have worked cooperatively with landowners, conservation districts, federal, state, and local governments, and citizens from urban and rural communities to restore, enhance, and protect natural resources. NRCS conservation specialists promote land stewardship by providing technical and financial assistance to agricultural and forest landowners and producers to address water quality and quantity; restore and protect habitat; improve air quality and energy conservation, and protect farmland from development. NRCS also provides soils and other natural resource information and analysis to help land owners and managers make informed decisions. For more information visit us at: http://www.ct.nrcs.usda.gov.

72. CONNECTICUT TREE PROTECTIVE ASSOCIATION
Rita Smith
The Connecticut Tree Protective Association, Inc. (CTPA) is an educational non-profit established for the following purposes: a.) to promote the protection and care of trees in Connecticut by encouraging the practice of proper and efficient methods by tree workers; b.) to advocate beneficial arboreal legislation and adequate tree planting and care appropriations by the state, cities, towns and boroughs of Connecticut; c.) to bring about closer cooperation among all parties interested in the protection of trees; d.) to sponsor meetings devoted to the presentation and exchange of scientific data and general information helpful to tree preservation practices; e.) to foster research in the field of arboriculture; f.) to encourage a greater interest in the planting of trees; g.) to promote good fellowship and ethical practices in the arboricultural profession. Currently there are over 800 members in the CTPA. (See www.CTPA.org)

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

74. UCONN MASTER GARDENER PROGRAM
Jude Hsiang
The UConn Master Gardener Program is an Educational Outreach Program of the University of Connecticut Co-operative Extension. Following their special training course, Master Gardeners commit time as volunteers to provide horticultural-related information to the community. Master Gardeners in New Haven County collaborate with park departments, land trusts, community groups, and educational institutions at all levels to increase environmental awareness through hands-on programs.

75. CONNECTICUT GREEN INDUSTRIES
Bob Heffernan, Executive Director
The Connecticut Green Industries represents the Connecticut Greenhouse Growers Association (CGGA), the Connecticut Nursery and Landscape Association (CNLA), and the Connecticut Florists Association (CFA). CGGA is the trade association for Connecticut's great Greenhouse Industry, representing nearly 200 growers of potted plants. CNLA is Connecticut's Trade Association for Growers of Trees, Shrubs, Perennial-Annual Flowers, and Nurseries, Garden Centers, Landscapers and Landscape designers. CFA is the state's association for retail and wholesale florists, and those companies that grow fresh cut flowers. All green industry groups can be accessed on the internet at www.FlowersPlantsInCT.com.

76. USDA NATIONAL AGRICULTURAL STATISTICS SERVICE

Gary Keough

Agricultural statistics are important because they provide an accurate, unbiased picture of the New England region and U.S. agriculture. Measurement of present and prospective supplies furnishes a sound basis for judgment and action by farmers, agri-businesses, researchers, marketing programs, and agencies which service farmers who take the time to provide the data to make these reports possible. USDA's National Agricultural Statistics Service (NASS) is a network of 12 Regional Field Offices 34 Field Offices (including the New England office in Concord, NH) serving all 50 states and Puerto Rico through cooperative agreements with state departments of agriculture or universities. These field offices regularly survey thousands of farm operators, ranchers, and agri-businesses who voluntarily provide information on a confidential basis. Consolidating these reports with field observations, objective yield measurements, and other data, statisticians then produce state statistics. These statistics are forwarded to NASS headquarters in Washington, D.C., where they are combined and released to the public. The national website is at http://www.nass.usda.gov while the homepages for New England and each of the six states are at
http://www.nass.usda.gov Statistics_by_State/New_England (CT, NH, ME, MA, RI, VT).

77. THE SLEEPING GIANT PARK ASSOCIATION

Chuck Schall

The Sleeping Giant Park Association (SGPA) was formed in 1924 to acquire land on and around the series of ridges in Mount Carmel, Connecticut known as the Sleeping Giant for use as a state park. SGPA is an all-volunteer organization whose mission is to protect and enlarge Sleeping Giant State Park. SGPA maintains over thirty miles of trails in the park, sponsors over 15 guided hikes each year, acquires land to add to the park, publishes the *Giant News*, a newsletter about the Giant, prints and distributes trail maps and maintains a self-guided nature trail with printed guide. Links to these and other activities as well as more information about the Giant and SGPA can be found on our webpage, www.sgpa.org. The entrance to Sleeping Giant State Park is opposite Quinnipiac University on Mount Carmel Avenue about 1/2 mile east of Whitney Avenue (Rte. 10) in northern Hamden, Connecticut.

78. buyCTgrown

Ashley Kremser

buyCTgrown is a statewide buy local campaign that connects consumers looking for fresh healthy foods and farm related products in Connecticut. The campaign's website www.buyCTgrown.com includes a searchable database where you can find everything from apples to wool, all produced within CT! Do you buy local? Sign up for the CT 10% pledge and join UCONN Extension and buyCTgrown's new campaign to promote and support Connecticut Grown!

Index of Scientists' & Staff Names and their Field Plot Numbers

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Chen, C.	Registration
Clark, C.	Barn B
Cowles, R.	39, Main Tent
Creighton, M.	18, 48
De La Torre Roche, R.	12
Dingman, D.	18
Douglas, S.	Main Tent
Durgy, R.	Farm Crew
Dugas, K.	10
Eitzer, B.	27, Barn B
Elmer, W.	8, 17, Barn B
Estep, L.	42d
Fengler, J.	45, 48
Ferrandino, F.	11, 15, 16, 22, 25, 38, 53, 55
Gibbons, J.	28, Barn B
Hannan, Jr., R.	Farm Crew
Hill, D.	2, 3, 4, 6, 29, 37, 43, 49, 57, 58, 59
Hiskes, R.	10, 19

Huntley, R.	Barn B
Hawthorne, J.	12
Inman, M.	19
Ives-Parisi, J.	Registration
Kaczenski, L.	32
Krol, W.	27
LaFrazier, R.	Maintenance
LaMondia, J.	36, Barn B
Last, M.	Main Tent
Lattao, C.	Registration
Li, D.	40
Li, Y.	19
Lowry, M.	26, 52
Mach, G.	Maintenance
Maier, C.	26
Marra, R.	Main Tent, Barn B
Maynard, A.	2, 3, 4, 6, 29, 37, 43, 49, 57, 58, 59, Main Tent
McHale, N.	Bus Tour
McHill, M.	Farm Crew
Mervosh, T.	19
Michot III, A.	Passport Station 2 (Plot 43)
Milano-Ottenbreit, R.	32
Misencik, M.	42e
Molaei, G.	42d, Registration
Musante, C.	12, Entrance Gate
Nicholson, B.	Maintenance
Peterson, R.	Bus Tour
Pignatello, J.	Registration
Prapayotin-Riveros, K.	27
Preste, J.	Farm Crew
Ranciato, J.	Entrance Gate
Riddle, D.	19
Ridge, G.	19
Robb, C.	27
Rutledge, C.	Barn B
Salvas, M.	36, Barn B
Sandrey, S.	48
Schultes, N.	Barn B
Scott, M.	Barn B
Scott, M. A.	Maintenance
Shepard, J.	42e
Short, M.	30
Sletten, P.	1, 5, 7, 9, 13, 14, 20, 21, 47, 54, 56

Smith, V.	48
Soleski, K.	32
Stafford, K.	42c, 42d
Stoner, K.	52
Stuber, H.	42c, 42d
Thiel, P.	8, 17, Barn B
Thomas, M.	42e
Trenchard, P.	48
Vasil, M.	
Vossbrinck, C.	23
wa, P.	Barn A
Ward, J.	24, 44, 46, Barn B
White, J.	12, 17, 27, Main Tent
Williams, S.	30, 42b, 42d
Xiao, F.	Barn A
Zarrillo, T.	26, 32, 52

History of The Connecticut Agricultural Experiment Station

The Connecticut Agricultural Experiment Station (CAES) is one of a national network of state agricultural experiment stations. Experiment Station scientists collaborate with researchers in other states and the federal government to solve local, regional, and national problems. CAES has existed for 138 years.

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

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

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

Some current research includes:

- Release of a lady beetle to control the hemlock woolly adelgid, which can kill 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 soil and water.
- Studies of natural changes in Connecticut's forests and control of exotic plant species.
- Ways to control insect pests of plants using non-chemical means.
- Surveys and studies of the eastern equine encephalitis virus, West Nile virus, and other encephalitis viruses in mosquitoes.
- Enhancing growth of crops through the use of compost as a substitute for fertilizer.
- Finding new crops for Connecticut farmers and developing the best growing practices for existing crops in Connecticut.
- Studies of invasive aquatic plants and methods of control.
- Deciphering the cause of Sudden Vegetation Dieback in Connecticut salt marshes.
- Surveys for the emerald ash borer and the release of parasitoids to help control this invasive insect.
- Studies of native pollinators and floral resources for wild bees.

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

NOTES

NOTES

PLANT SCIENCE DAY is held annually the first Wednesday in August at Lockwood Farm, 890 Evergreen Avenue, Mt. Carmel, Hamden.

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

OFFICE AND MAIN LABORATORIES

123 Huntington Street; New Haven, CT 06511-2016, (203)-974-8500,
toll-free, statewide, 1-(877)-855-2237

VALLEY LABORATORY

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

LOCKWOOD FARM

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

GRISWOLD RESEARCH CENTER

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

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

07/11/13