Lily Calderwood to join CAAHP Team

The Capital Area Agriculture and Horticulture Program is pleased to announce that Lily Calderwood will join the team as Senior Commercial Horticulture Educator on January 19, 2016.

Lily recently received her PhD in Plant and Soil Science from the University of Vermont, where she studied integrated pest management (IPM) tools for hop production in the northeast. She is currently an IPM Specialist working as a member of the UVM Extension Northwest Crops and Soils Team. Lily has strived to develop sustainable and practical IPM practices for locally produced hops, dry beans, wheat, and barley.

Lily comes to CAAHP with an ecology background, a passion for sustainable agriculture and an interest in growers’ needs. She is excited to learn about the commercial horticulture industries in the Capital Area, to listen to grower challenges, and to work collaboratively to develop a research and outreach program.

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Homeowners often feel that their trees have become too large and now pose a hazard to their house or other structures, so they have their trees topped, believing this will not only reduce the tree's size but that it will also decrease potential hazards. What they do not realize is that though they now have a smaller tree, it is probably a greater hazard than before it was cut. The all-too-common practice of topping is the most destructive pruning cut made to trees. Tree topping is also referred to as "tipping", "heading", "hat racking" and "rounding over". The most common reason topping is considered is to reduce the size of a tree. While topping accomplishes this task, it is the wrong means to that end.

A topped tree is under a great deal of stress. When a tree is topped, a large portion of its food manufacturing leaves are removed. These must be replaced. To do this, the tree must rapidly mobilize its latent buds in order to refoliate the large portion of the crown which has been removed. These mobilized buds will produce weak, quick-growing shoots needed by the tree in order to photosynthesize enough food to keep the tree from starvation. The tree will be functioning with less food than is required for optimal strength and health.
Next the tree must allocate its now-scarce resources to heal the indiscriminately spaced open wounds caused by topping. Its sapwood and heartwood are exposed and susceptible. Stressed trees are chemically attractive to insect and disease infestations. Normally a tree will chemically wall off or compartmentalize decay occurring in newly exposed wood but very few trees are able to withstand the multiple wounds caused by topping. This often leads to decay organisms being able to move down the tree's branches unimpeded.

Topping often causes sunburn in trees. The leaves produced within the canopy of the tree are not acclimated to the full sun condition that topping exposes them to. This exposure leads to burnt foliage that becomes necrotic and drops from the tree, further decreasing the photosynthetic capacity of the tree. The tree's interior branches and bark are also suddenly exposed to higher light levels that may lead to cankers, splitting of the bark and the death of branches.

Topped trees are hazardous. Quick-growing new shoots resulting from topping are anchored only in the outermost layers of the parent branches and are not as strong as naturally developed branches. Under normal growing conditions, branches arise from a "socket" of overlapping wood tissues securely attached to the parent branch or trunk. The weak branches developing from shoots resulting from topping are at higher risk for breakage and falling.

Ironically, the goal of making the tree safer by reducing its height has been reversed; topping the tree has made it more hazardous than before.

If a tree must be reduced in size, there are proper pruning cuts to accomplish this task. If practical, branches should be removed back to their point of origin. When a branch must be shortened, it should be cut back to a lateral large enough to assume the terminal role. The lateral should be at least 1/3 the diameter of the branch being removed. If large cuts must be made on older trees, the tree may not be able to compartmentalize and heal. It may be best to remove an overgrown older tree and replace it with a smaller growing species.

Pruning large trees should be left to a trained professional arborist. An arborist can advise you on what type of pruning is necessary to improve the health, appearance and safety of your trees.
Gardeners are keenly aware of seasonal effects of temperature, particularly freezing temperatures, on the growth of landscape crops. Woody plants are able to survive freezing temperatures because of metabolic changes that occur in the plant between summer and winter. Terms such as cold hardy, frost hardy and winter hardy are used to describe woody plants that can survive freezing temperatures without injury during winter dormancy.

Cold hardiness is determined by the genetic capacity of a plant to acclimate (transformation from a non-hardy to hardy condition) to freezing temperatures. This capacity can be influenced by plant care practices. While the cold hardiness of a species is usually considered to be the lowest midwinter temperature plant tissues can endure, injury frequently occurs during autumn or spring when the plant is not at its maximum hardiness. Thus, injury can occur during the autumn, winter, or spring seasons depending on the extent of acclimation or de-acclimation (process of transforming from hardy to non-hardy condition). Winter injury may be manifested as excessive browning of evergreen foliage, injury or death of flower buds, splitting of bark, or death of roots. The extent of injury is often difficult to determine, and may only be exhibited as delayed bud development or slightly reduced growth.

**Low Temperature Injury**

Low temperature injury, often called freeze damage, can be caused by intra- or extra-cellular ice formations within the plant. When intra-cellular ice is formed, crystals originate within the protoplasm of plant cells. This type of ice formation occurs infrequently and only when the temperature decreases very rapidly. If the ice formation is extensive or ice remains for a long period of time, cells rupture and die.

The second type of freeze damage occurs when extra-cellular ice forms during normal winter conditions. When freezing conditions exist, water moves out of plant cells in response to the low temperature and back into cells when the temperature rises above freezing. This type of freeze damage is not lethal to most woody plant species that have been properly acclimated. Injury can occur; however, if the cells are dehydrated for relatively long periods of time, or subjected to very low temperatures.
**Desiccation Injury**

Desiccation injury occurs when water is lost from evergreen plants to the atmosphere faster than it can be replaced through absorption of water by roots.

Injury is a function of the degree and length of time that stress is imposed. When leaf and air temperatures are low and the relative humidity high, little moisture loss occurs. However, when leaf and air temperatures are high and relative humidity is low (as often occurs in winter), moisture loss can be excessive and injury extensive. Further injury can occur if water cannot move within the plant to replenish desiccated leaf and stem tissues or when insufficient water is absorbed by roots from cold or frozen soil. Wind movement across plants may increase the rate of moisture loss.

**Environmental Effects**

Most landscape plants acclimate or develop hardiness to freezing temperature in response to changes in light duration and temperature. Acclimation is a two-stage process. The first stage is initiated by decreasing day length and results in partial hardiness. The second stage is initiated by subfreezing temperatures and results in full hardiness and acclimation.

**Light Duration**

For many species, the shortened photoperiod (hours of daylight) of late summer initiates the hardening process by slowing vegetative growth. The time it takes for plant growth to stop differs widely. Some plants stop growing in July or August and others continue to grow into autumn. These differences are due to hormonal balances in the plants controlled by day length and modified by temperature.

Leaves are the receptors of the short-day signal. After growth stops, the short-day photoperiod triggers a hardening signal that is transferred from the leaves to the stems and branches. The short-day signal results in partial cold hardiness. The timing and rate of hardening can be altered by temperature, while day length is predictable by calendar dates. The hardening response in a single plant may vary from year to year because of temperature differences.

**Temperature**

Cool temperature initiates the accumulation of sugars, modification of proteins and changes in cell membrane permeability that are associated with an increase in cold hardiness. While most plants require short photoperiods and lower temperatures to develop full hardiness, some harden only in response to low temperature regardless of photoperiod.
Freezing alone contributes to hardiness. Once leaves and stems of evergreens harden enough to withstand freezing, being frozen makes them hardier. The freezing response is strictly localized and is not translocated. In other words, if lower leaves are acclimated to freezing, that does not necessarily mean the upper leaves are also hardened.

Although autumn temperature above 60 degrees F reduces root hardiness, it appears that cool temperature contributes to slowing or stopping root growth. Roots cannot acclimate to the same extent as shoots, so it is fortunate they are protected by a large volume of soil which serves as insulation.

**Moisture**

The water content of woody tissues decreases as acclimation to winter conditions proceeds. Most research, however, supports the practice of irrigation late in the growing season to assure the normal rate of cold acclimation. This practice is especially beneficial for plants, such as rhododendron, which continue growth late into the season and are susceptible to early freeze damage. Since woody plants appear to have a built-in mechanism to reduce water levels when they acclimate, reducing soil water may not benefit the development of maximum midwinter cold hardiness.

**Acclimating Plants for Overwintering**

Gardeners can assist, to some degree, in plant acclimation to winter conditions. The amount of nitrogen fertilizer applied should be reduced after mid-July and stopped by late summer. Commercial growers decrease the rate of nitrogen fertilizer by approximately one-half and double the rate of potassium application in late summer. Plants should enter the autumn season as healthy as possible, but not rapidly growing, or acclimation may be affected.

Tissue desiccation during the winter, especially with evergreens, is one of the most common forms of winter injury. The soil in which evergreens are being grown should be well-irrigated in mid-to-late autumn, before the soil freezes. If the landscape where evergreens are located is in a dry site, sandy soil, or under the overhang of a roof, the soil should be irrigated in midwinter when the temperature is above freezing.

**Protecting Plants in the Landscape**

**Mulching**

Apply a layer of mulch, 2 to 2.5 inches deep, after the soil freezes to keep the soil cold rather than protect the soil from becoming cold. This practice will reduce injury from plant roots heaving (coming out of the soil) because of alternate freezing and thawing. Plants that benefit from this practice include perennials, alpine, rock garden plants, strawberries and other shallow-rooted species. A mulch maintains a more even soil temperature and retains soil moisture.
Apply bark products, composts, peat moss, pine needles, straw, hay, or any one of a number of readily available materials from the local garden center. Pine boughs or remains from Christmas trees can be propped against and over evergreens to help protect against damage by wind and sun.

**Tying**

Multiple leader (branched) plants such as arborvitae, juniper and yew may be damaged by the weight of snow or ice. Prevent plant breakage by fastening heavy twine at the base of the plant and winding it spirally around and upward to the top and back down in a reverse spiral. This technique is needed more as plants become larger and begin to open at the top.

**Anti-transpirants**

Narrow and broadleaf evergreens lose moisture through leaves in winter. Since the soil moisture may be frozen, plant roots cannot absorb what is lost and the foliage desiccates, turns brown, and may drop. This can be serious with evergreen azalea, holly, boxwood and rhododendron.

Applying an anti-transpirant, also called anti-desiccant, reduces transpiration, and hence, damage to the foliage. At least two applications per season, one in December and another in February, are usually necessary to provide protection all winter. A number of products are available in most garden centers for this use.

**Wrappings**

A wrap of burlap or canvas can offer protection to plants against desiccation from sun and wind and drift from de-icing salts applied to drives and streets. Wrap the "body" of the evergreens, but do not cover the top of the plant as some light is necessary during the winter.

**Rodents**

Some landscape plants, especially during a time when there is an extended period of snow cover, become a food source for rabbits, mice, or moles. When their normal food supply is covered with ice or snow, rodents turn to the bark and young stems of apple, flowering crabapple, mountain ash, hawthorn, euonymus and viburnum, among others. Complete girdling of stems by rodents will kill the plants and partial girdling creates wounds for borers and disease organisms to enter, as well as weakening the plant itself.

Protect stems and trunks of these plants in late autumn with plastic collars cut in a spiral fashion so they can be slipped around tree trunks. Hardware cloth can also be used as a stem wrap along with aluminum foil.

Trunks, stems and lower limbs can be sprayed or painted with rodent repellents. A number of these materials are available in most garden centers. Repeat the application at least once during a warm period in midwinter. Mixing the repellents with an anti-transpirant often results in extended effectiveness of these products.
# Websites of Interest — All links are active

| Cornell Cooperative Extension Albany County | NYS DEC Emerald Ash Borer Information |
| Cornell Cooperative Extension Schenectady County | NYS Nursery Landscape Association |
| Cornell Cooperative Extension Rensselaer County | NYS DEC Firewood and Invasive Insects Information |
| Cornell University Department of Horticulture | NY Forest Owners Association |
| Cornell Cooperative Extension Capital District Region | USDA Agricultural Marketing Service |
| Capital Area Agriculture & Horticulture Program | Managing Turfgrass Diseases |
| Pesticide Management Education Program | Partnership for Invasive Species Management (PRISM) |
| NYS Department of Environmental Conservation | Northeastern New York Nursery and Landscape Association |
| NYS Department of Agriculture and Markets | New York Invasive Species |
| NYS Integrated Pest Management | NY Tree Farm |
| | Sports Turf Managers of New York |
Fabulous Ferns

Susan Pezzolla, Community Educator for Horticulture, Albany County

Ferns have been around a long time. Fossil evidence links them to an early Carboniferous period, a time when Mother Nature was the only garden designer. In recent times gardeners have used ferns to help replicate woodland settings and naturalized areas. Ferns are found over much of the earth except for areas of arctic or desert; they are masters of survival in marginal areas where flowering plants have limited success. There are ferns that favor moist, shady areas as well as those who thrive in dry desert rock faces, mountain elevations, open fields, and bodies of water. Some have strict pH requirements like the acid loving climbing fern of eastern North America, Lygodium. Many prefer the acid nature of the bogs and swamps of wetland environments and others depend on fungal relationships with mycorrhizal fungi. Each has a story, a part in the ecosystem.

Classified in the phylum (division) Pteridophyta, a fern is any one of the group of about 20,000 species of plants. The main characteristic of this group is that they are seedless thus lacking flowers. Ferns have stems and often underground creeping rhizomes or above the ground creeping stolons. Fern leaves are often called fronds and they uncurl by expanding a tight spiral called a fiddlehead. There are three types of leaves: trophophylls that do not produce spores but do produce sugars by photosynthesis, sporophylls that do produce spores and are more like the scales of pine cones, and brophophylls that do produce large amounts of spores. The roots are fibrous and structurally similar to the roots of seed plants.

The economic importance of ferns is not as great as seed plants but they do have value other than floral and landscape use. An epicurean delight, fiddleheads are valued by many as a springtime delicacy and the leaves of cinnamon and ostrich ferns are used as food by tropical peoples. The fossil fuel coal is the highly compressed remains of plants, including ferns. Ferns have some medicinal value as an ingredient in medicines that treat cuts or they can be used as bandages if you are out in the wilderness. Ferns have been found to have the ability to remove heavy metals from soil, especially arsenic. Some ferns are considered to be weeds, such as the Japanese
climbing fern, the mosquito fern and the sensitive fern but the Giant water fern (*Salvinia molesta*) is a world-wide aquatic pest.

Fern depictions are a part of botanical art and the Victorians were especially keen on collecting all things fern, so much so that the term “Pteridomania” was coined to describe the craze. Fern motifs appeared everywhere during this era and have been found adorning christening gifts, pottery, textiles, paper, and gravestones—literally from cradle to grave, the Victorians loved their ferns! They were also the first ones to enjoy growing ferns indoors in “Wardian cases” an oversized terrarium of sorts that would maintain the necessary humidity for the ferns in a highly decorative container.

There are many plants that are called ferns but they are not true ferns. “Asparagus fern” is a good example of this as it is a member of the asparagus family and is a flowering plant. The “Air fern” is actually the skeleton of a group of aquatic animals called hydrozoan that are related to corals and jellyfish. They are harvested and dried and then dyed green and sold as a fern-like plant that can “live on air.”

If you are interested in using ferns in your New York State landscape, here is a list of those ferns that will grow well:

- **Adiantum pedatum** (northern maidenhair fern)
- **Asplenium platyneuron** (ebony spleenwort)
- **Asplenium trichomanes** (maidenhair spleenwort)
- **Athyrium filix-femina** (lady fern)
- **Botrychium virginianum** (rattlesnake fern)
- **Cystopteris bulbifera** (bladder fern)
- **Cystopteris fragilis** (fragile fern)
- **Dryopteris carthusiana** (shield fern, toothed wood fern, spinulose shield fern)
- **Dryopteris cristata** (crested wood fern, buckler fern)
- **Dryopteris marginalis** (marginal wood fern)
- **Gymnocarpium dryopteris** (oak fern)
- **Matteuccia struthiopteris** (ostrich fern)
- **Onoclea sensibilis** (sensitive fern, bead fern)
- **Osmunda cinnamonomea** (cinnamon fern)
- **Osmunda claytoniana** (interrupted fern)
- **Osmunda regalis** (royal fern)
- **Phegopteris hexagonoptera** (broad beech fern)
- **Polystichum acrostichoides** (Christmas fern)
- **Thelypteris novaboracensis** (New York fern, tapering fern)
- **Thelypteris simulata** (Massachusetts fern)
- **Woodsia ilvensis** (rusty woodsia)
- **Woodwardia areolata** (netted chain fern)
EDUCATIONAL OPPORTUNITIES:
January 3 - 7, 2016, Northeastern Plant, Pest, and Soils Conference

Sheraton Society Hills Hotel, One Dock Street, Philadelphia, PA 19106

The first Northeastern Plant, Pest, and Soils Conference (NEPPSC 2016) will be hosted by the Northeastern Weed Science Society.

The goal of this meeting is provide a venue to bring together people with interests in entomology, plant pathology, weeds, horticulture, agriculture, agronomy, and soil science for the purpose of sharing of ideas and the presentation of the results of scientific studies and outreach programs. More information: NEPPSC 2016

January 26, 2016, Snow Date January 28, 2016
Capital District Bedding Plant Nurserymen's Education Day and Trade Show

Learn about greenhouse crop disease management with biofungicides, providing pest management information to your customers and how agricultural statistics can benefit horticulture. We will review regulations and programs which fall under the jurisdiction of the NYS Department of Agriculture and Markets and how they pertain to greenhouses, garden centers and nurseries. Updates will be given on NYS DEC regulations which pertain to the greenhouse, garden center and nursery industry, as well as updates on the new Worker Protection Standards. DEC Pesticide applicator credits have been applied for.

Speakers include Dr. Elizabeth Lamb, Ornamentals IPM Coordinator and Greenhouse Vegetable IPM Specialist at Cornell University; Brian Eshenaur, Senior Extension Associate with the NYS Integrated Pest Management Program; John Sanderson, Associate Professor, Department of Entomology at Cornell University; Mark Solan, Chief Pesticide Inspector, NYS DEC Bureau of Pesticides Management; Blair Smith, State Statistician, National Agricultural Statistic Service and Margaret K. Kelly, Assistant Director NYS Department of Agriculture & Markets.

The conference fee is $50.00 and includes lunch buffet, morning break, and all other meeting expenses. Pre-registration is required.

Register online: https://reg.cce.cornell.edu/bedding-plant-nurserymen_201
To pay by credit card, contact Tove Ford at tff24@cornell.edu or 518-765-3518.

Pest Management Guidelines

Available upon request
Guidelines for Commercial Turfgrass
Guidelines for the Integrated Management of Greenhouse Floral Crops
Guidelines for Commercial Production and Maintenance of Trees and Shrubs
Guidelines for Production and Maintenance of Herbaceous Perennials

Guides for:
Berry Crops
Grapes
Vegetables
Tree Fruit
Field Crops

To order online:
Cornell University Bookstore

Have an idea for this newsletter or need additional information? Please contact

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Emergency Responder Information On Pesticide Spills and Accidents

CHEMTREC:
800-424-9300

For pesticide information
National Pesticide Information Center:
800-858-7378

To Report Oil and Hazardous Material Spills in New York State
NYS Department of Environmental Conservation Spill Response:
800-457-7362
(in NYS)
518-457-7362
(outside NYS)

Poison Control Centers
Poison Control Centers nationwide:
800-222-1222

If you are unable to reach a Poison Control Center or obtain the information your doctor needs, the office of the NYS Pesticide Coordinator at Cornell University, 607-255-1866, may be able to assist you in obtaining such information.

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Individuals with questions or special needs requiring accommodation should Contact Cornell Cooperative Extension of Albany County at (518- 765-3500)