1. Title:

Promoting Adoption of IPM Strategies in Plant Selection and Design of Lawns, Gardens and Landscapes

2. Project Leaders:

Lori Brewer, Senior Extension Associate, Department of Horticulture

3. Cooperators:

Steve Gabriel, Program Assistant, Department of Horticulture
Cornell Cooperative Extension Master Gardener Volunteers and County Program Leaders

4. Abstract:

CCE educators and volunteers expressed a need for enhanced literacy in many areas to aid understanding and promotion of IPM strategies in the management of lawns, gardens and landscapes. We propose a statewide educational campaign focused on plant ecology and botany and creating plant communities in designs to maximize plant health and preventative pest management. IPM priorities include: developing innovative educational materials inclusive of multiple media and languages in collaboration with Cornell experts and students; regional train-the-trainer workshops for county-based educators and volunteers; and support for CCE county programs to raise public awareness and adoption of IPM strategies among gardeners.

5. Background and Justification:

In 2011 the Cornell Garden-Based Learning (CGBL) team in the Department of Horticulture visited 55 Cornell Cooperative Extension (CCE) county offices to assess needs of community horticulture staff members and Master Gardener Volunteers (MGV) who are leading programs and responding to questions related to management of residential environments. CCE educators and MGV expressed a need for enhanced literacy in many areas to aid understanding and promotion of IPM strategies in the management of lawns, gardens and landscapes.

An annual statewide educational campaign was thought to be a manageable strategy to systematically tackle educational needs deemed highest priority by CCE educators and MGV. Regional face-to-face trainings with CCE educators and MGV would be the campaign centerpiece as well as webinars, fact sheet and additional resource development by experts in NYSIPM and Cornell programs. For the 2012 growing season we launched the first statewide educational campaign around "Soil and Compost" followed by "Natural Enemies and Beneficial Insects" for this 2013 growing season. CGBL has received an overwhelmingly positive response for this effort from CCE educators and MGV. Moreover, 36 counties and 336 educators and volunteers attended the regional trainings for this year's insect educational campaign.

CGBL would like to build on this success by implementing a 2014 statewide educational campaign around the theme "Lawn, Garden and Landscape Design." This educational campaign would follow the proven effective format of regional trainings, webinars and resource development. The content would focus on enhancing literacy among all CCE educators and

volunteers in plant ecology and botany for identification and creating plant community in lawn, garden, and landscape designs to maximize plant health and preventative pest management. As with our previous campaigns it will facilitate access across the state to CCE educators and volunteers access and use of the same highest quality resources to promote adoption of IPM strategies in school, community, and backyard lawns, gardens and landscapes.

6. Objectives:

1. Develop innovative educational materials to be featured on gardening.cornell.edu that include multiple media formats related to plant botany and ecology strategies in creating designs of plant communities in lawns, gardens and landscapes that promote plant health and preventative pest management.
2. Develop and implement a one-day train-the-trainer workshop for CCE educators and Master Gardener Volunteers (MGV) that will:
   a. Enhance understanding and confidence in ecology, botany and strategies in design that promote plant health and preventative pest management.
   b. Reinforce and practice how educators can promote awareness and adoption of IPM principles and strategies in lawns, gardens and landscapes among gardeners.
   c. Lay the groundwork for a plan (logic model) for county program to implement at least one community outreach activity in 2014 about IPM strategies for plant health and preventative pest management.
3. Raise awareness about the availability of educational materials for distribution to their audiences among our CCE, Ag in the Classroom and nursery professionals networks.
4. Conduct an evaluation to determine how CCE educators and MGV are incorporating new knowledge and materials in efforts to raise awareness and adoptions of IPM strategies in their communities. Gather observations to note changes in knowledge and behaviors.

7. Procedures:

1. Develop innovative educational materials by evaluating current resources to identify areas where additional materials or delivery approaches could improve:
   a. Understanding and confidence in ecology, botany and IPM concepts.
   b. Promotion of plant health and preventative pest management strategies.
   c. Public awareness and adoption of related IPM strategies.
   d. Public education pieces that our CCE programs as well as other educators and nursery people might use and distribute to clients.
2. Consult with experts on current recommendations and research-based accuracy of all educational resources.
3. Develop a one-day train-the-trainer workshop to address objective 2 above and share educational resources as drafts open to further changes based on participant feedback.
4. Develop a toolkit on creating plant communities in lawn, garden, and landscape designs to maximize plant health and preventative pest management to use in above workshop and for counties to use in their community outreach.
5. Recruit CCE educators and volunteers for one-day workshops to be held in October, November and December in 9 locations across the state.
6. Complete educational materials development by February 2013.

7. To maximize distribution of educational materials emerging from this statewide educational campaign we will use e-lists, social media and personal communications to network with our CCE educators and volunteers in youth development, horticulture and related areas; Ag in the Classroom educators; and retail nursery outlets.
8. A follow-up survey will be sent to counties in early spring 2014 to help determine if and how the county program has incorporated the new educational materials into program plans for the coming growing season. Additional follow up interviews will be conducted with counties during the growing season to obtain feedback on how the education and materials were received by local audiences. After the 2014 growing season we will ask participating counties to offer additional anecdotal evidence data on their success in raising awareness and enhancing adoption of IPM strategies.

8. Results:

A one-day training focused around *Designing for Garden Ecosystems* was implemented in 9 regions in the fall of 2013. A total 361 participants from 43 Cornell Cooperative Extension Master Gardener Volunteer programs attended. About 15% in attendance were male while 85% were female and 99% were white non-Hispanic. This training provided opportunity for participants to gain knowledge and develop skills for plant identification and for designing of lawns, gardens and landscapes with ecological principles that emphasize right plant right place and the value of observations in management. Here is a list of the materials developed to lead training activities and some samples are included at the end.

Factsheet:
        Botany Language Basics for Identification of Flowering Plants
        Sampling of plant identification dichotomous key and manuals
Activity:
        A Close Look: Observation Skills for Plant Identification
        Navigating Plant Identification Resources
        Design Polycultures for the Garden Setting including plant list table and cards featuring
            key characteristics
Presentation and Notes:
        Ecology for Garden Design
        Pulling Together the Parts to Design Ecosystems in Garden Settings

In leading these trainings we emphasized to participants that they were our peers and a goal of the training included modeling activities they could easily replicated in their local outreach efforts as well as gathering their feedback on training materials and content prior to creating final drafts. Feedback from participants on the materials, content and activities was overwhelming positive with every session indicating an appreciation for the group activities interspersed with the lectures as well as providing an opportunity to apply some of the material delivered in the lecture. Participants shared ways in which they plan to adopt new practices in their own gardens to enhance their environmental stewardship including diversifying plantings and managing weeds with cover cropping and barriers such as layers of cardboard and wood chips. Reaching beyond their garden gates participants indicate using materials and activities in their work with

school and community gardens as well as returning to their fellow CCE MGV to provide them with information to spread to new audiences.

Participants did offer some modification in Botany factsheets including adding an introduction as to why it is important as well as including a section about smelling the plant material to aid identification. Participants also brought in a numerous resources so the factsheet of resources will be modified after we seek CCE MGV help in categorizing the resources by skill level and type of plant material. The presentation and notes will also be packaged as narrated presentation with discussion questions and accompany notes for ease of volunteers use in their educational outreach. We aim to post on line for public access all education products and content. After March 1, 2014 look for the content at www.gardening.cornell.edu/polyculture. We also still plan to translate some of the resources into Spanish language and link to resources in Spanish language on this University of Illinois website: http://urbanext.illinois.edu/espanol/hort_es.cfm

We will be following up with the 43 participating counties in late winter 2014 to identify last impacts on program plans for the growing season ahead. After the 2014 growing season we plan to follow up again to gather additional insight into actions actually taken in own gardens and in education of peers.

9. Project location(s):

Nine daylong regional trainings at the following locations with participants from **43** counties which are listed after the location.

Cornell Cooperative Extension Tioga County (56 Main St., Owego)
Broome, Chemung, Chenango, Cortland, Tompkins, Tioga

Cornell Cooperative Extension Chautauqua County (3542 Turner Rd., Jamestown)
Allegany, Cattaraugus, Chautauqua

Cornell Cooperative Extension Niagara County (4487 Lake Ave., Lockport)
Erie, Genesee, Niagara, Orleans, Wyoming

Cornell Cooperative Extension Oneida County (2nd St., Oriskany)
Herkimer, Oneida, Onondaga, Otsego

Cornell Cooperative Extension Westchester County (3 West Main St., Elmsford)
Dutchess, Orange, Putnam, Rockland, Suffolk, Westchester

Cornell Cooperative Extension Columbia and Greene Counties (479 Route 66, Hudson)
Columbia, Greene, Dutchess, Rensselaer, Sullivan, Ulster

Cornell Cooperative Extension Saratoga County (50 West High St, Ballston Spa)
Albany, Clinton, Essex, Greene, Rensselaer, Saratoga, Schenectady, Washington, Warren

Cornell Cooperative Extension Yates County (417 Liberty St., Penn Yan)

Allegany, Ontario, Seneca, Wayne, Yates, Livingston

Cornell Cooperative Extension Jefferson County (203 N. Hamilton St., Watertown)
Jefferson, St. Lawrence

10. Samples of resources developed:

Attached is the one-day training agenda as well as the A Close Look: Observation Skills for Plant Identification activity and Botany Language Basics for Identification of Flowering Plants factsheet. After March 1, 2014 look for the content at www.gardening.cornell.edu/polyculture.

Cornell Garden-Based Learning Regional Training for CCE Educators and Master Gardener Volunteers

Garden design is favorite topic for new as well as seasoned gardeners. Whether simple or elaborate, garden design is critical for setting the stage for garden success and environmental stewardship. In this training we consider a **polycultures** approach to garden design. The name might not be familiar but the concept embraces growing multiple crops in the same space, in imitation of the diversity of natural ecosystems.

2014 Growing Season Educational Campaign:
Designing for Garden Ecosystems

10:00 a.m.   **Welcome and Overview**

10:10 a.m.   **Observation Skills for Plant Identification**
- Structuring the observing plant characteristics
- Using identification manuals and keys

11:10 a.m.   **Quick 5 Minute break**

11:15 a.m.   **Ecology for Garden Design**
- Understanding and working with your garden's producers, consumers, decomposers & abiotic factors

12:45 p.m.   BROWN BAG LUNCH ON YOUR OWN (not provided)

1:15 p.m.   **Pulling Together the Parts to Design Ecosystems in Garden Settings**
- Defining polycultures with a focus on plants
- Examples of garden polycultures
- Steps in designing polycultures for garden settings

2:30 p.m.   **Design Polycultures for the Garden Setting**
- Participant team up to design garden polycultures

3:15 p.m.   **Design Gallery Review**

3:30 p.m.   **Feedback Discussion**
Q & A Session

3:45 p.m.   **Design Challenge**
- 2014 CCE Vegetable Variety Trial Demo Gardens

4:00 p.m.   *Safe travels home*

Training facilitators:
Steve Gabriel & Lori Brewer – Horticulture Dept., Cornell Garden-Based Learning Program

A Close Look: Observation Skills for Plant Identification

Prep time: 15 to 30 minutes   **Activity Time:** 45 minutes

Guiding Question: How can knowledge of botany terms enhance our ability to notice and describe plant characteristics needed for success plant identification?

Materials:

- ☐ Collected one vascular plant sample per participant or ask participants to collect and bring a sample. The samples can be from any indoor or outdoor plant; herbaceous or woody plant; annuals or perennials; etc. Do not collect materials that are poisonous to touch. Place each plant sample in its own paper or plastic bag that cannot be seen through.
- ☐ Paper and pencils for sketching
- ☐ The Cornell fact sheet: **Botany Language Basics for Plant Identification**
- ☐ A sampling of plant identification dichotomous key and or manuals for woody trees and shrubs, herbaceous ornamentals, wildflowers, grass or other plant group of interest. Participants might bring in books they have used. If access to the Internet is available as well as laptops or tablet devices consider online resources.

Activity:

1. Given each participant a bagged plant sample. Instruct them to keep what is in their bag secret as they find a partner in the room (preferably someone they do not know).
2. Partners take turns using sight, smell and touch to share the characteristics of the plant hidden in their bag while the other sketches an image/diagram based on the verbal description. The sketcher can keep the picture private or share with describer in further clarification discussion. Each partner takes no more than 3 to 5 minutes to describe plant material. Once complete participants continue to keep plant material secret.
Note: The goal is not to identify the plant. It is to observe characteristics and describe those clearly enough that another can create a sketch without looking at the plant.
3. Distribute **Botany Language Basics** fact sheet. Partners consider how each might revise their plant characteristic descriptions based on a quick review of the sheet.
4. As a whole group consider how participants" plant descriptions and sketches changed between the first and second iteration. How familiar are the basic botany terms? How is a common language valuable? In addition to observing plant feature what other observations and information will aid plant identification? For example, time of year of flowering, where was the plant found growing, or plant tags. Consider discussing creating collections of plant materials, sketches or images.

Learn more:
Published: November 2013
Author: Lori Brewer, Department of Horticulture, Cornell Garden-Based Learning Program
Reviewers:
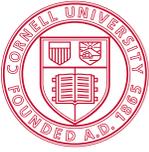
Botany Language Basics for Identification of Flowering Plants

Duration of vegetative parts
Annual: completes life cycle in one year
Biennial: completes life cycle in two years
Perennial: life cycle extends three or more years
Deciduous: plants that shed their leaves at the end of the season and become dormant
Evergreen: plants that are never without leaves attached (**broadleaf evergreens** include all evergreens except conifers which have needle or scale-like leaves)

Plant appearance or habit
Herbs (Herbaceous plant): plants with non-woody stems
Shrub: **woody** perennial with more than one main stem
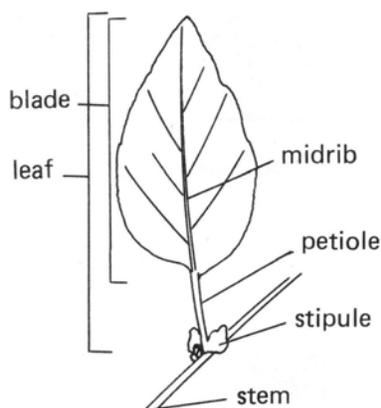**Tree**: **woody** perennial with a single main stem
Vine: herbaceous plants with elongate, flexible, non-self-supporting stems
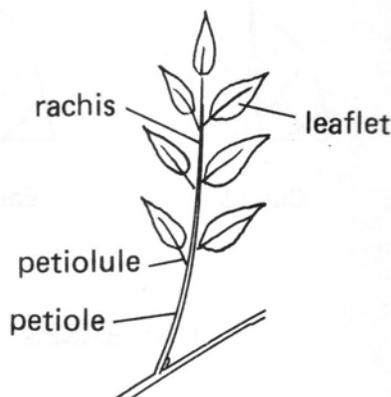**Liana**: a woody vine

Leaf composition

Simple

Compound

Pinnate

Palmate

Blade composed of a single segment of tissue
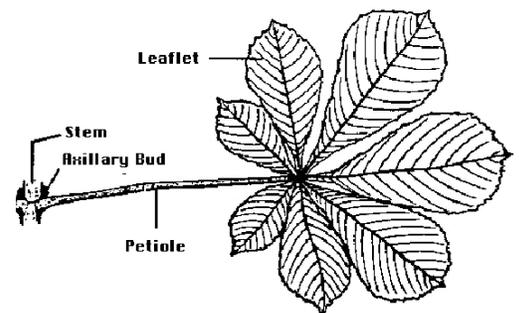
Feather-like with similar parts (leaflets) arranged along a common axis (rachis)

Hand-like with three or more similar parts (leaflets) radiating from one point

Bipinnate: leaflets on a pinnate leaf that are further subdivided
Internode: region of stem between consecutive nodes
Leaflet: resembles an entire leaf but is actually part of a compound leaf as it is attached to the rachis NOT the main plant stem or branch
Node: point where the petiole attaches to the stem
Petiole: stalk supporting the blade; absent in sessile leaves