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The Western Kentucky University Teaching Gardens: Landscape Design and Establishment Plan

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THE WESTERN KENTUCKY UNIVERSITY TEACHING GARDENS: LANDSCAPE DESIGN AND ESTABLISHMENT PLAN

A Thesis
Presented to
The Faculty of the Department of Agriculture
Bowling Green, Kentucky

In Partial Fulfillment
Of the Requirements for the Degree
Master of Science

By
Claudia Stetter
May 2011
THE WESTERN KENTUCKY UNIVERSITY TEACHING GARDENS:
LANDSCAPE DESIGN AND ESTABLISHMENT PLAN

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THE WESTERN KENTUCKY UNIVERSITY HORTICULTURAL TEACHING GARDENS: LANDSCAPE DESIGN AND ESTABLISHMENT PLAN

Claudia Stetter May 2011 65 Pages

Directed by: Dr. Todd Willian, Mr. Roger Dennis, Dr. Elmer Gray, and Dr. Becky Gilfillen

Department of Agriculture Western Kentucky University

The purpose of this thesis is to design a landscape plan for Teaching Gardens at the Western Kentucky University Agriculture Research and Education Center. The landscape plans were selected based upon the available 5.3 acres surrounding the greenhouse, vineyard, and Exposition Center. Planning included goals and objectives, analysis of the available site, landscape design plans, and connecting the Teaching Gardens to the current curriculum. This thesis also includes related areas to the development of Teaching Gardens such as: summary of courses with related topics to Teaching Gardens, programs that will be used throughout the community, and a listing of current and estimated future costs/expenses plus funding avenues to support this endeavor.

The implementation of the Gardens in this thesis has created an area of learning for the Agriculture Department, university, and local community. The Teaching Gardens are an extension of the classroom learning experience, which provide research opportunities, harvest/care information, and promote healthy nutrition. The Teaching Gardens provide a naturally beautiful atmosphere for the enjoyment of students, faculty and staff, and the local community.
INTRODUCTION

A teaching garden is part of an ecosystem that includes students and the school community. Like an ecosystem, it is a complex combination of different life forms: a class of Horticulture students, instructors, soil bacteria, plant material, Japanese beetles, butterflies, and the climate (14). An ecosystem is a complex series of relationships among the living resources, habitats, and residents of an area. It includes plants, trees, animals, fish, birds, micro-organisms, water, soil, and people. Teaching gardens provide many important purposes including horticultural education, environmental conservation and enhancement of the University Farm.

The present implementation of the Teaching Gardens was begun in June 2009 at the Western Kentucky University Agriculture Research and Education Center. The purpose of the project is to inform the general public of the available types of gardens that can be grown in western Kentucky. The Gardens will be open to the public and general information about the gardens will be provided in a self-guided tour. Brochures and billboards containing the layout and guides to the gardens will be available. Some of the gardens that will be on display are French kitchen gardens (potagers), vegetable gardens, butterfly gardens, medicinal and herbal gardens, and a display of annual and perennial beds. Preparation of the gardens entailed plots being marked, tilled, covered with a black plastic, and mulched with leaves. Various plants grown in these gardens are marigolds (*Tagetes erecta*), salvia (*Salvia sp.*), impatiens (*Impatiens sp.*), hydrangea (*Hydrangea sp.*), peony (*Paeonia sp.*), tomatoes (*Solanum lycopersicum sp.*), green beans (*Phaseolus vulgaris*), and nasturtium (*Tropaeolum sp.*).
The ultimate goal of the Teaching Gardens is to provide an educational based garden for the Agriculture Department students, along with the rest of WKU and the local public, where they can learn and explore. A teaching garden complements the classroom learning experience and serves as an outdoor living laboratory where students in disciplines such as Horticulture, Agriculture, and Botany/Biology can actually work with many of the species they have learned in class. Horticulture students can also gain valuable work experience in a university garden (12).

This project has been proposed several times in the past, but has never been implemented until now. The beginnings of this project were established with hopes that the Teaching Gardens are the first step in developing a long-term landscape plan at the Western Kentucky University Agriculture Research and Education Center.
REVIEW OF LITERATURE

History of University Teaching Gardens

A teaching garden is an educational facility created to provide a destination for local communities. This garden should be educational and provide a calm and relaxing environment for visitors. A garden, as a noun, is expressed as an area designed with flowers, trees, and ornamental shrubs used for recreation or display (17). A garden is usually placed outside, but not always, for enjoyment of plants and other forms of nature (15). A garden can be filled with natural materials or man-made materials, which can add year round interest to the garden. The basis for teaching gardens is not a new concept. In the 16th century, John Amos Comenius, teacher, educator and writer stated: "A school garden should be connected with every school where children can have opportunities for leisurely gazing upon trees, flowers and herbs and are taught to enjoy them." (16). In the 17th century, school gardens were first established in Europe. By 1869, there was an Austrian mandate that all schools must have a garden; similar mandates followed in other European countries. The first official school garden in the United States was at the George Putnam School of Roxbury, Massachusetts, where, beginning around 1890, the children grew wildflowers and vegetables. In 1897, the National Cash Register Company established a Boy's Garden to instill good work ethics. By the early 20th century, school gardens became popular throughout Europe. By World War I and through World War II, a school garden was viewed as a sign of patriotism (4). In 1914, the Superintendent of Public Instruction for North Carolina published a booklet on Plans for Public Schoolhouses and School Grounds. In it are included plans for planting the school grounds and a list of suitable plants, from trees to annuals. The
instructions stated that “no school ground should have less than two acres, and where there is a school garden twice that area is none too large.” (5).

The Rutgers Gardens, located in New Brunswick, New Jersey is comprised of a series of horticultural collections arranged in garden settings and spread over 50 acres. These collections and garden areas, the oldest of which dates to 1927, feature a diverse variety of landscape plants with global origins. The future of the Rutgers Gardens is the development of designed gardens. Landscape architects, design professionals, and home owners will be able to see and learn different methods of combining plants that will provide four seasons of color, texture and form. The Gardens will also be evaluating various cultivars, for their performance in central New Jersey (3).

It is a good idea to recognize the deep history to the teaching garden concept. This project is a continuation to promote a method of teaching that incorporates many useful values such as hard work, discipline, and cooperation. Also the promotion of environmental practices, agriculture and nutrition, and community togetherness is practiced in the garden. Motivating action behind this project will be seen for many years to come.

**Benefits Provided by Teaching Gardens**

Teaching gardens provide a space where students can interact with nature. Gardens teach us about agriculture, how to grow healthy food, the importance of sustainability, and an appreciation of natural resources. Learning in the garden happens through experience and experimentation. Teaching gardens are outdoor classrooms that
extend the theory of learning. Garden-based learning can be minimally defined as “an instructional strategy that utilizes a garden as a teaching tool.” (7). The benefits of teaching gardens are abundant and show great potential for learning in many generations. To point out a few benefits, teaching gardens are a means to enhance academic achievement, promote healthy nutrition, motivate community and social development, and quite simply a relaxing place to escape.

Teaching gardens enhance academic achievement, especially when it comes to hands on learning. As a form of environmental education, these gardens have been shown to improve knowledge and test scores in related horticulture classes (6). Teaching gardens are living laboratories, educational libraries, and tranquil escapes from the busy world. They provide a sense of direction for various research projects and supply data for charts and graphs that are used for research on plant height. Gardens provide tools to help instructors with lesson plans for different learning styles among various groups of students. Teaching gardens make it easy to escape from the everyday on campus learning experience.

Today one of the most sought after lifestyle is a healthy one. Working in teaching gardens will help students gain an appreciation for healthy, fresh produce. With this experience, hopefully the student’s attitude toward eating healthy nutritious foods will change. Spending hot days doing manual labor to maintain these gardens, students will value the importance of sustaining gardens. Whether it be pulling weeds or spreading leaf mulch, gardens encourage outdoor activity and exercise.
By involving the university and community, a stronger sense of togetherness can be achieved in the Teaching Gardens. Many skills can be learned in teaching gardens, such as teamwork, leadership, and communication skills. The gardens can become the centerpiece for outdoor gatherings of friends, weddings, community meetings, and Agriculture Department functions.

Factors to Consider When Developing Teaching Gardens

Teaching gardens are designed with all landscape design techniques at hand. Site selection is created by considering the space and framework of the garden--how one wants to feel in the garden, where one wants to build the garden, and where the garden begins and ends (1). Whether planning a large open plot or a small container garden, planning ahead helps make the most of the available space. By choosing the proper site for a specific garden, sun or shade accommodations can be made for different species. Positioning the garden close to a water source makes watering much easier. When designing a garden, important considerations include the varieties among the edible plants, flowers, and shrubs in the landscape, mixing and arranging based on texture, color, fragrance, height, depth, and how the plants complement the entire picture. The elements of garden design include the layout of hard landscapes, as well as plants themselves, with consideration for their horticultural requirements, their season-to-season appearance, lifespan, growth habits, size, rate of growth, and combinations with other plants and landscape features (11). Regardless of the design, include walking space that will allow for movement among the plants for weeding and harvesting. Choosing the correct species may become a problem if site location and garden design are not
completed first. The best thing to do is to choose disease-and-pest resistant cultivars that perform well in the area. When beginning to plant, a timeline needs to be created. Rather than planting all at once and harvesting more produce than is needed, stage planting times over several weeks to ensure a steady harvest and abundant amount of color throughout the summer and early fall (8). Warm season plants should be planted after the last average frost date for the specific area. For effective use of garden space, plant cool season and warm season crops in succession.

Gardens can have many different uses. Some are planted for aesthetics, others for functionality, and some for recreational purposes (2). Some gardens will incorporate nature with plant cultivation. Others are designed more to observe nature, by bird or butterfly watching and to reflect on the changing seasons. Some gardens are simply designed to be relaxing. They can be a site for meditation, dinners on the terrace, reading in a hammock, or just basking in the sunshine. Most commonly, gardens are used to grow produce. This not only means growing vegetables, but also growing flowers for their beauty and using them in table arrangements.

Vegetable gardening allows for enjoyment of produce picked at the peak of ripeness. Bountiful harvests can supplement a family’s food supply as well as provide gourmet vegetable cultivars available only in specialty markets. Though vegetable gardening need not be time consuming, the more time spent in a garden, the more productive the harvest. Planting annuals brighten the landscape with dependable color that often lasts throughout the fall. Annuals, unlike biennial and perennial plants, grow from seed each year and complete their life cycle in one growing season. Herbs are garden plants that are grown and harvested for culinary, aromatic, medicinal, and fibrous
uses. In the garden, herbs are planted for their unmistakable fragrances, attractive textures, appealing colors, and variety of home uses.
MATERIALS AND METHODS

The Teaching Garden’s Mission and Vision

Before employing the shovel and rake, there are several things that need to be developed. One is the mission and vision statement of the newly implemented Teaching Gardens. In developing these statements, it is important to understand key phrases such as “outdoor classroom” and “school garden.” This gives better understanding to the idea of creating teaching gardens. By visiting other teaching gardens, such as Botanical Gardens created by the Master Gardeners of Vanderburgh County, IN, most well-developed gardeners are delighted to share their experience, curriculum, and strategies with new and developing garden programs. Connecting to existing networks will help avoid redundancy and save time in creating the mission and vision statement. The mission and vision statement of the Teaching Gardens is related to the university mission and features plants and growing techniques applicable to the region of western Kentucky.

Mission and Vision Statement

The purpose of the Western Kentucky University Teaching Gardens is to develop, maintain and display a collection of woody and herbaceous plant species for teaching, research, public service/education and enjoyment. The Teaching Gardens will enhance the natural beauty of the university farm as well as provide an outdoor living laboratory where students will obtain first hand experience with planning, production, installation and maintenance practices. The Western Kentucky University Teaching Gardens shall be dedicated to the culture and use of native and introduced plants which are particularly suited to the environment of south central Kentucky. It shall be a place for the study of
herbaceous and woody plant species in their natural environment and shall give primary focus to their use in urban and residential landscape. The Western Kentucky University Teaching Gardens shall, in all of its activities, be concerned with the enhancement, protection and conservation of native flora.

**Goals and Objectives of the Teaching Gardens**

Each teaching garden may have a different set of goals and objectives. These goals and objectives will aid in the overall mission and vision of the gardens. Having a well-crafted goal will help communicate effectively to others the benefits of a teaching garden.

**Goals of the Teaching Gardens:**

--To expose students to hands-on environmental education

  -to maintain and display plant materials labeled with scientific and common names

--To enhance the curriculum by connecting it to the natural world

  -to create an outdoor classroom

  -to provide job related experience for students in Agriculture and Horticulture

--To provide students with the opportunity to do research

  -to utilize field trials and introduce new plant materials into this area

--To build a school-based ecosystem

--To offer the local community an opportunity to engage with the academic community

--To develop a project that will sustain itself for many years

--To make the Horticulture area on the WKU farm more attractive and welcoming
-to develop ongoing maintenance which results in healthy plants and an attractive setting

Site Analysis

Analysis of the garden site should be time well spent. The three chief factors determining what will grow in a particular area are sunlight intensity, the composition of the soil, and soil moisture. Considering the topography is crucial to the planning process of the gardens. An important key factor is determining the soil type. The available site that was chosen is approximately 5.3 acres, which covers the area from Elrod Road on the south to the Agriculture Exposition Center (AEC) parking lot on the north. The eastern and western boundaries include the horse pasture fence to the entrance drive of the Agriculture Exposition Center. Sketches of the garden designs have been accurately measured and drawn to scale. These sketches can be found in the Appendix.

Inventory of Existing Plantings

A visual survey the 5.3 acre area was accomplished to evaluate the number of existing trees and shrubs. The valley and pond area is where most of the existing trees stand. These existing trees are primarily *Quercus imbricaria* (shingle oak) which shade some of the newly implemented beds. There are a few *Malus angustifolia* (crabapple), *Salix discolor*, (pussy willow) and native grasses surrounding the pond. Although there are many existing trees in the woodland area, some of them are damaged and need to be removed. This issue has been addressed and proper disposal will be carried out in the future.
The area that encloses the greenhouse was formerly a plant nursery. It still serves as a place to store extra plants before time to plant them. Currently this area is utilized as a vineyard. There are two vineyards, situated east and west of the greenhouse. V1, to the west of the greenhouse, is a display/ production vineyard that demonstrates different trellising techniques and cultivars and V2, to the east of the greenhouse, is a research vineyard. The vineyards contain many varietals such as ‘Chambourcin’, ‘Concord’, ‘Niagara’, ‘Villard Blanc’, ‘Reliance’, and ‘Petite Sirah’. The fence that encloses the vineyard and borders the AEC entrance drive, is lined with 27 sections (270 feet) of annual, biennial, and perennial flowers.

**Soil Types**

A Web Soil Survey was utilized to characterize soil type (13). The three main constituents of soil are sand, silt and clay. An ideal soil for the garden would be around 40% sand, 40% silt and 20% clay. In Warren County, Kentucky, the soil map states that 15.1 % (52,917.4 acres) is Crider silt loam with a 2-6% slope. In the 5.3 acre area of the Teaching Gardens, the valley and pond area (1.4 acres) is a Vertrees silty clay loam on a 6-12% slope. There is a rather large sink hole in this area, which has a steep slope that makes this area severely eroded and highly erodable. The garden design has been created around it. In the future there are plans for further plantings around the sink hole to reduce erosion. According to the soil map, the woodland area and the area surrounding the greenhouse is a Crider silt loam on a 2-6% slope.
Environmental Factors

One important environmental factor is the direct sunlight that hits the valley area. Careful planning of the annual beds should prevent sun scorch and wilting. Since most of the garden area is in direct sunlight most of the day, it was important to select “full sun” plants. These plants will generally require at least 6 hours of sunlight each day. The other area of the valley where the existing *Quercus imbricaria* (shingle oak) are has plenty of shade. In this area “half sun” plants were selected, meaning they only need a few hours of sunlight a day. Ericaceous beds have been planted beneath the trees along with some *Heuchera micrantha* (coral bells), *Athyrium niponicum* ‘Pictum’ (Japanese painted ferns) and *Hosta sp.* (hostas). The 270 foot bed is in direct sunlight in the center of the day. Heat and direct sun tolerant plants were selected and a irrigation system was established in the middle of this bed to keep plants regularly hydrated. In the future it would be ideal to plant some trees along this bed for additional shade.

Perceptual Factors

There are several attractive views which can be seen from this area. By standing in the Agriculture Exposition Center parking lot, the view of the valley and woodland area is breathtaking when the plants are in full maturity. Future plans of adding a water feature to the pond, such as a fountain, are being considered. The horse pastures and rolling hills can also be seen from this area. Near the greenhouse, the vineyard flourishes with ripe red, purple, and white grapes during August, September, and October.
Miscellaneous Factors

An effective teaching garden needs a gathering area. This place will accommodate seating for the entire class. This gathering place may consist of stumps, benches, hay bales, or anything that students can sit on. This gathering place will help students listen to instruction, complete a task, or to reflect as a whole at the end of lecture. This then becomes the outdoor classroom.
RESULTS

Description of Landscape Design Plans

The Teaching Gardens are located in various areas along the 5.3 acre designated area. Several kidney shaped display beds fill the valley and a large perennial border adjacent to the horse pasture illustrate the different types of gardens and the many varieties of plants placed within them. Since this area has been underdeveloped, there is room for improvement and additions to the Teaching Gardens. The plan is to gradually add new beds each year as the older beds mature and flourish.

When entering the WKU farm from Elrod Road, the Exposition Center sign is located to the east. Underneath this red brick sign, a circular planting of *Dianthus barbatus* (Dianthus—D. B.) and *Pelargonium x hortorum* (Geranium—P. H.) encompass the signs image (Figure 1). While driving down the AEC entrance drive, a 270 foot annual and perennial bed borders the vineyard fence. This bed is full of bright colors and coarse textures. Plants in this bed include full sun tolerant plants, such as *Achillea x ‘Pretty Belinda’* (Pretty Belinda Yarrow—P. P.), *Agastache foeniculum* (Golden Jubilee Anise Hyssop—A. F.), *Angelonia angustifolia* (Angelonia—A. A.), *Coreopsis grandiflora ‘Baby Sun’* (Baby Sun Tickseed—C. G.), *Coreopsis verticillata ‘Zagreb’* (Zagreb Coreopsis—C. V.), *Dianthus barbatus* (Dianthus—D. B.), *Echinacea purpurea ‘Magnus’* (Magnus Purple Coneflower—E. P. M.), *Echinacea purpurea* (White Swan Coneflower—E. P. W.), *Gaura lindheimeri ‘Walgaupf’* (Pink Fountain Gaura—G. L.), *Helianthus annuus* (Sunflower—H. A.), *Hemerocallis x ‘Happy Returns’* (Happy Returns Daylily—H. H.), *Hemerocallis x ‘Mauve Mini’* (Mauve Mini Daylily—H. M.),

After passing this border of plants, to the east, is the gravel entrance drive to the greenhouse. At the greenhouse entrance, two display beds lie on either side of the main door. These beds are filled with Dianthus barbatus (Dianthus—D. B.), Ligustrum x vicaryi (Golden Vicary Privet—L. V.), Sedum telephium ‘Autumn Joy’ (Autumn Joy Sedum—S. T.) and a variety of different Viola x wittrockiana (Pansy—V. W.) (Figure 4). From the front of the greenhouse, the vineyards can be found on the east and west sides. The educational vineyard is west of the greenhouse and contains grape varietals such as ‘Reliance’, ‘Concord’, and ‘Petite Sirah’ (Figure 5). To the east of the research vineyard is the horse pasture lined with a border of mature shade trees (Figure 6). Underneath
these trees is a small nursery with an assortment of perennials and shrubs that are used for propagation.

Near the entrance to the greenhouse, a bulletin board will be constructed to display a copy of a poster on this project, brochures on plants and upcoming events, and a self-guided tour map of the gardens. A poster of this project includes an introduction, objective, materials and methods, and results and conclusions. The brochures will include information on specific plants in the garden with additional instructions and care for them. Also there will be fliers and handouts on upcoming events and workshops located at the Teaching Gardens. Since the entrance is centrally located, it is convenient for guests to visit any area of the gardens they wish (Figure 7).

Next, guests may move toward the open grass area on the north side of the entrance drive to the greenhouse. This area has not yet been developed, but plans have been prepared and considered. This area is a triangle approximately 177 ft. X 141 ft. X 101 ft. This large area will contain French kitchen gardens (potagers), vegetable gardens, butterfly gardens, and medicinal and herbal gardens. This area will also display different trellising systems used in a vineyard. This area has been designed with a very formal lay-out in mind. The herbal, medicinal, vegetable and potager gardens will be planted in raised beds built of stone. The walkways within the garden will be brick with a herring bone pattern. A possible idea to fund these brick walkways would be to have alumni and visitors donate inscribed bricks. There will be a perennial border enclosing this area creating a vibrant color pallet. Tall shrubs and perennials bordering these beds will create a living fence for the border (Figure 8).
The next location for visitors to explore is the valley area where the display beds are positioned. There are currently 11 of these beds. The first bed, moving north toward the Agriculture and Exposition Center, is the Shade bed, which is shaped around three *Quercus imbricaria* (Shingle Oak—Q. I.). In this bed, a combination of shade and sun tolerant plants reside. *Angelonia angustifolia* (Angelonia—A. A.), *Begonia x semperflorens-cultorum* (Fibrous-Rooted Begonia—B. S.), *Cyclamen persicum* (Cyclamen—C. P.), *Hydrangea macrophylla* ‘Pink Beauty’ (Pink Beauty Hydrangea—H. M.), *Pachysandra procumbens* (Pachysandra—P. P.) are the plants in this bed (Figure 9). North of this bed, is the Woodland Shade Bed which is placed under four *Quercus imbricaria* (Shingle Oak—Q. I.). Plants in this bed belong or are related to the heath family, a group of evergreen bushes and small trees that includes heath, heather, blueberry, rhododendron, azalea, and arbutus. This bed contains an assortment of rhododendrons and azaleas; *Rhododendron x Glenn Dale* 'Prudence Pink' (Prudence Pink Glenn Dale Rhododendron—R. G. D.), *Rhododendron x ‘Girard Christina’* (Girard Christina Azalea—R. G. C.), *Rhododendron x ‘Girard Hot Shot’* (Girard Hot Shot Azalea—R. G. H.), *Rhododendron x ‘Girard Rose’* (Girard Rose Azalea—R. G. R.), *Rhododendron x ‘Minnetonka’* (Minnetonka Rhododendron—R. M.), *Rhododendron x ‘PJM’* (PJM Rhododendron—R. P.), *Rhododendron x PJM ‘Elite’* (PJM Elite Rhododendron—R. P.), *Rhododendron x ‘Yaku Princess’* (Yaku Princess Rhododendron,—R. Y.), *Rhododendron kurume* ‘Hershey’s Orange’ (Hershey’s Orange Azalea—R. K.) (Figure 10).

Along with theses shrubs, a variety of *Heuchera micrantha* ‘Palace Purple’ (Purple Palace Coral Bells—H. M. P.), *Heurchera ‘Melting Fire’* (Melting Fire Coral
Bells—H. M. F.) and *Athyrium niponicum ‘Pictum’* (Japanese Painted Fern—A. N.) have been added for color (Figure 10). To the north of the Ericaceous bed, is the Hosta bed, a shaded bed which includes three large *Quercus imbricaria* (Shingle Oak—Q. I.) and different varieties of hostas: *Hosta sieboldiana ‘Elegans’* (Elegans Hosta—H. S. E.), *Hosta x ‘Bright Lights’* (Bright Lights Hosta—H. B.), *Hosta x ‘Brim Cup’* (Brim Cup Hosta—H. C.), *Hosta x ‘Color Glory’* (Color Glory Hosta—H. C. G.), *Hosta x ‘Patriot’* (Patriot Hosta—H. P.), *Hosta x ‘Seaboat’* (Seaboat Hosta—H. S.), *Hosta x ‘Tokudoma’* (Tokudoma Hosta—H. T.), *Hosta x ‘Thunderbolt’* (Thunderbolt Hosta—H. T. B.) arranged in a spiral pattern (Figure 11).

The next eight beds in the valley are kidney shapes arranged in a puzzle piece pattern. When facing south from the Exposition Center, the view of these annual beds add color to attract attention to the gardens. A rolling display of annuals and a few perennials fill the valley. The plants located in this area are a mixture of sun and shade tolerant plants. The design and colors for these beds have been created with many different color pallets in mind. Working with different textures and styles of plants help add much needed interest in this area that was once a valley of grasses. Plants in these areas include: *Ageratum houstonianum* (Ageratum—A. H.), *Angelonia angustifolia* (Angelonia—A. A.), *Begonia x semperflorens-cultorum* (Fibrous-Rooted Begonia—B. S.), *Buddleia davidii* (Butterfly Bush—B. D.), *Celosia cristata* (Cockscomb—C. C.), *Dahlia pinnata* (Dahlia—D. P.), *Gerbera jamesoni* (Gerbera—G. J.), *Hydrangea macrophylla ‘Pink Beauty’* (Pink Beauty Hydrangea—H. M.), *Impatiens walleriana* (Impatiens—I. W.), *Lantana camara* (Lantana—L. C.), *Penta lanceolata* (Penta—P. L.), *Pelargonium x hortorum* (Geranium—P. H.), *Petunia x hybrid* (Petunia—P. H. Y.),
Portulaca grandiflora (Portulaca—P. G.), Solenostemon scutellarioides (Coleus—S. S.), Tagetes erecta (Marigold—T. E.) (Figure 12). These beds attracted butterflies and other interesting creatures, such as groundhogs and squirrels. Next to the display beds is the pond area. There is a beautiful view of the horse pasture and rolling hills of the farm that can be seen from the pond. Nothing to date has been developed around this area (Figure 13).

South of the pond is the meadow area along the horse pasture. This area features the edge of the perennial border. This border has been designed to wrap around the whole 5.3 acre area. The meadow area is sunny and flat, which makes a great place to plant perennials. A large section of this bed is shaded half of the day by a large Carya ovata (Shagbark Hickory—C. O.). This border will add much needed color to an area which was once meadow. A list of plants in this bed include: Bergenia cordifolia (Bergenia—B. C.), Coreopsis verticillata ‘Moonbeam’ (Moonbeam Coreopsis—C. V.), Cornus alba ‘Elegantissima’ (European Variegated Dogwood—C. A.), Cornus sericea ‘Flaviramea’ (Yellow Twig Dogwood—C. S.), Penstemon smallii ‘Violet Dusk’ (Violet Dusk Bearded Tongue—P. S.), Penstemon barbatus ‘Rondo’ (Rondo Bearded Tongue—P. B.), Phlox paniculata ‘Barthirtyfive’ (Volcano Pink with White Eye Phlox—P. G. B.), Platycodon grandiflorus ‘Sentimental Blue’ (Sentimental Blue Balloon Flower—P. G. S.), Prunus glandulosa (Flowering Almond—P. G.), Salvia pratensis ‘Pink Delight’ (Pink Delight Salvia—S. P.), Spiraea japonica ‘Lemon Princess’ (Lemon Princess Spirea—S. J.), Spiraea x bumalda ‘Goldflame’ (Goldflame Spirea—S. B.), Syringa x chinensis (Chinese Lilac—S. C.), Syringa x prestoniae ‘Donald Wyman’ (Donald Wyman Lilac—S. P. D.) (Figure 14).
To the west of the meadow is the woodland area. This area consists of existing mature oaks and an underlying layer of *Cornus florida* (dogwoods), *Cercis canadensis* (redbuds), and *Amelanchier sinica* (serviceberries). The woodland area has not yet been developed. There are many options for improving this area, such as adding herbaceous native shade plants, a water fall and a picnic area (Figure 15).

With the garden design plan being on such a large area, it makes it easy to designate certain areas that need more help. Since the display beds and most of the other existing beds are established, the pond and woodland area are of most importance. Clean-up of these areas will help the surrounding display beds flourish to their full potential. This makes the whole garden design come together as a whole, making the garden complete.

By establishing the Teaching Gardens, the Western Kentucky University Agriculture Department will have a showcase area on the farm for future students and parents to observe and enjoy. These gardens will display the knowledge, skills and experience gained by WKU Horticulture students. This area will help make the entrance into the Agricultural Exposition Center visually pleasing to the eye and create a point of interest.

**Educational Role of the Teaching Gardens**

Now that the garden design plan has been implemented, the educational role of the Teaching Gardens must be developed around it. The educational role reveals the curriculum used by instructors in the garden, scheduling regular classes, and plants that
are grown in the greenhouse. The students should establish the plants by seed and/or plugs toward the end of February. Transplanting into cell packs will follow in late March, as well as installation and mulching of the beds towards the beginning of May. Each student will be designated to their own display bed, which will allow for an important learning experience for both commercial and residential plant production.

As part of this group effort of establishing and maintaining the Teaching Gardens, student involvement will be critical to success. Some independent tasks might include: watering, weeding, picking up trash, mapping the garden, observing habitats, sketching and journaling. These are tasks that can be accomplished daily at their own pace. There is also a great opportunity for the Horticulture Club to volunteer their time, as well as a great location to host meetings and events.

Various topics can be studied to connect the curriculum directly to the gardens. Some specific subjects related to the garden are compost and recycling; planting and seasons; water and nutrients; seeds and germination; insects and animals; native plants and farming; soil and bed preparation. To demonstrate how such topics taught in classes at WKU connect to the Teaching Gardens, below is an outline of pertinent courses available.

Courses marked as * are required to complete the Horticulture Requirements and the courses marked # are Horticulture Recommended Electives. The “G” component indicates that this course is also available for graduate degree credit.
Intro to Landscape Plants/Laboratory, HORT 301/302*. Identification, recognition and use of deciduous trees, shrubs and herbaceous plants in the landscape. Introduction to evergreen shrubs and trees as well as fall flowering bulbs and perennials are included.

Greenhouse Production/Laboratory, HORT 316/317*. Structures, equipment, and cultural techniques for growing floriculture crops with special emphasis on the production of container plants, foliage crops and bedding plants.

Soils/Laboratory, AGRO 350/351*. A basic study of soil properties and processes emphasizing soil management and its application to agriculture.

Plant Propagation/Laboratory, HORT 407/408G*. Plant propagation is studied and practiced as an art and a science. Sexual and asexual techniques include propagation by seed, cuttings, grafting, layering, division and tissue culture.

Turfgrass Management, HORT 313*. A study of turfgrass, including adaption, identification, uses and fundamental principles essential for establishing and maintaining quality turf in lawns and recreation areas.

Plant Science/Laboratory, AGRO 110/111*. Principles of plant growth and development are applied to agriculture.

Lawn and Garden Equipment/Laboratory, AGMC 172/173#. Instruction in the selection, economic management and operation of turf equipment. Including safety, pesticide certification, adjustments, basic operation, and cost analysis.
Basic Floral Design, HORT 209#. Principles and elements of floral design; the use of floral materials, design techniques, and elements including line, form, texture, and color; emphasis on the history and use of floral art in business and society.

Landscape Maintenance/Laboratory, HORT 304/305#.

Advanced Floral Design, HORT 309#. Advanced principles of floral design as applied to a commercial floral shop enterprise. Production cost and profit analysis, selling techniques, and customer relations are considered concurrently with design.

Pest Management, AGRO 310#. Identification and management of insects, diseases and weeds of major importance in agronomic crops, turfgrasses and landscape plantings.

Introduction to Horticulture, HORT 312#. Emphasis is given to principles of growth, development and management of major horticulture plants. Special consideration is given to major horticultural crops of Kentucky.

Soil Fertility and Fertilizers, AGRO 352#. Soil reactions of elements essential for plant growth and development, sources and manufacture of fertilizer materials, use of fertilizers and lime, use of sound management practices are stressed.

Turf Irrigation/Laboratory, AGMC 392/393#

Landscape Plants II/Laboratory, HORT 401/402G#
Landscape Design and Construction/Laboratory, HORT 403/404G#. Design of residential and commercial landscapes; techniques and materials for construction of landscape features such as decks, patio covers, walls, patios, pools, and irrigation are presented.

Nursery Management/Laboratory, HORT 405/406G#. An introduction to the organization and management of a landscape plant nursery for container and field grown stock. Students will design and plan a working nursery for south central Kentucky.

Weed Science/Laboratory, AGRO 409/410G#. Identification of prominent weed species; relationship of weeds to crop production problems; control measures, both physical and chemical, are presented.

Modern Fruit Production, HORT 412G#

Vegetable Production, HORT 419G#. Production of vegetables that are particularly suited for Kentucky, considering variety selection, culture, harvesting, processing, and marketing.

Commercial Flower Production/Laboratory, HORT 475G#

Introduction to Viticulture, HORT 475G#

Professional Lawn and Landscape, HORT 475G#

This list of courses is quite long, though not limited to related topics that are taught in the WKU Agriculture Department. With the development of these gardens,
undergraduate and graduate students could utilize this area for research or special assignments needed to complete a certain area of coursework.

Another form of the Teaching Garden’s educational role would be promoting it to the community. The considerable excitement that these gardens have already created positively impacts feedback from the students. Many universities have a monthly newspaper or bulletin, and an article about their garden. Each year the Agriculture Department at WKU creates a newsletter for the alumni homecoming banquet in the fall. In the HORT NEWS section the Teaching Gardens are featured and new ideas are revealed. Keeping the plant material bright and energized will continue to draw community advocates.

**Costs and Funding Avenues for the Gardens**

**Budgeting for the Gardens**

When creating any type of garden, the groundbreaking portion requires much initial planning. This is both a celebration and workday, building the community and the infrastructure of the gardens. Understanding and articulating the financial needs of the groundbreaking will help find resources to support it (10). When developing teaching gardens, budget for equipment, plants, community outreach, publicity, and possibly for full-time staff services. This funding includes all one-time expenses to build the garden, and may include tasks such as removing asphalt, installing water lines and irrigation, purchasing tools, costs associated with publicizing the project, and salary and benefits for a full-time staff member.
Since a large part of the garden design has been implemented and the up-front costs of construction materials and the purchase of a few tools have been accounted for, it is wise to take a closer look at what ongoing expenditures the garden will incur. It would be helpful to create a yearly budget to present to the department to ensure that the garden costs are understood. Once a yearly budget is established, it will be clear how much fundraising will be required to support the garden as it moves forward (9).

Each year there will inevitably be a few repairs that will not be planned for. Signs may be stolen or damaged and the pond pump may no longer work; the shade cloth on the greenhouse may be torn; the hose may crack and begin to leak. Whatever the case may be, planning for repairs and upgrades in the infrastructure should be considered. Garden trowels and shovels will be the most frequently used, eventually they will need replacing. Plans should be made to replace them every couple of years.

Many improvements to the garden infrastructure will be required over the years and planning for these projects is wise. Decisions to expand certain areas that could use improvement are imperative in creating a native demonstration garden as a tool for teaching. A new and improved irrigation system may be installed and new technology for timers may be purchased. The legs on the benches, upon which the newly propagated plants rest, have rotted or come unscrewed. The large tiller used to till the display beds breaks and a new one needs to be purchased. Setting aside funds each year for various improvements will help with the garden’s budget.
Eventually the departmental class ideas will change. New plants, lessons, and books will need to be purchased, in accordance with these changes. Though this is not a yearly expense, these occasional upgrades should be considered in the budget.

Each class provides at least 20 pairs of eager hands to help maintain the Teaching Gardens. It will be the students’ job to do the weeding, mulching, watering, composting, and harvesting. The hard work created by enlisting the students and community volunteers in the maintenance of the garden will build a sense of ownership and pride in the WKU Agriculture Department.

Fundraising for the Gardens

A successful teaching garden begins small and grows over time. A university’s community consists of several entities: neighbors who live nearby, local businesses, local clubs, parents, faculty, staff, and students. A teaching garden is often the element that draws these sometimes disparate groups together, transforming a school into a community hub. By forging relationships with these neighborhood groups and businesses, encouragement will support the garden project through volunteer hours or perhaps financial donations. A teaching garden will be sustained by many layers of support to cultivate the community and ensure a thriving garden.

The department should invest money to support the Teaching Gardens. An annual garden fund needs to be created for the garden. Creating a tradition in the garden by expecting 100% volunteer participation each year, from the Commercial Flower Production class, Horticulture students, and the local community, will reduce the annual budget. To build onto this investment, having a spring plant sale, selling heirloom seed
packs and garden produce will enhance the garden funds. No matter how small or large the amount, some investment from the immediate community is necessary to build and ensure the garden’s financial sustainability.

Teaching Garden Expenses

As the gardens grow, many expenses will arise unexpectedly. In order to keep things running smoothly all aspects of the Teaching Gardens expenses need to be considered. To summarize the expenses for the Teaching Gardens, five main categories can be defined: plant materials, equipment, site preparation and planting, maintenance, and staffing.

Plant Materials

Plants used in the Teaching Gardens were acquired through plant propagation in the greenhouse, purchase, and donation. Every spring semester the Commercial Flower Production class seeds and plugs annuals for the annual spring sale that is held at the university farm greenhouse. Each year around $4,000 worth of seeds and plugs are ordered. Since this is such an abundant supply, there is usually a large amount of annuals not sold. These unsold annuals will be used in the display beds in the valley area of the Teaching Gardens. Any additional plants will be planted in areas that could use a splash of color. There is a small collection of perennials in the greenhouse that are propagated yearly to increase plant production and save money.
Equipment

Many types of equipment are needed to maintain the gardens. A tiller has been purchased by the university that is available to be used. The greenhouse supplies the shovels and hand diggers used to install the plants. Two wheelbarrows, a push mower, a weed eater, and a chainsaw have been recently purchased for the Horticulture program. Large tractor and lawn mower use is obtained from the Agronomy group. Future plans have been made to invest in a storage barn to house all of the equipment, which will allow more room for plant growth in the greenhouse.

Site Preparation and Planting

Site preparation and planting was accomplished by two student workers and by students in the Commercial Flower Production class. Site preparation was completed utilizing equipment already available on the farm. Plants were installed by using equipment already available in the greenhouse. Future planting by Horticulture students and student workers will occur during the spring and summer.

Maintenance

As the gardens develop over the next several years, more and more areas will evolve and need more attention. The horticulture program currently has one graduate student and one undergraduate student working in the gardens up to 40 hours per week in the summer. During the school year one undergraduate student works up to 20 hours a week in the greenhouse and beds. As an extension to these workers, there is also a crew that mows around the beds and vineyard once or twice a week as needed.
Staffing

The Teaching Gardens will need a full time staff member to be in charge of the gardens as they begin to grow in size and scale. Someone will need to be hired who will oversee the project and carry out the goals and objectives of the gardens. Duties will include building a relationship with the community and gaining support from area businesses. Sufficient plans to organize the work of students and volunteers must be coordinated and supervised. The department has allocated two student positions, but as the gardens grow future help will be needed. By getting the community involved, volunteer hours will be abundant and help fulfill the needs of the gardens. The Teaching Gardens have been gradually developed, meaning that not all of the expenses have occurred at the same time. This will allow more time to seek other avenues for funding.
SUMMARY AND CONCLUSIONS

This thesis project was created to supply information on teaching gardens to the university and local community. The project displays available types of gardens that can be grown in western Kentucky. The Teaching Gardens serve many important purposes including horticultural education, environmental conservation and enhancement of the university farm. This thesis is aimed to act as a research tool for future generations continuing the work of the Teaching Gardens. The purpose of the Western Kentucky University Teaching Gardens is to develop, maintain and display a collection of woody and herbaceous plant species for teaching, research, public service/education and enjoyment. The ultimate goal of the Teaching Gardens is to provide an educational based garden for the Agriculture Department students, along with the remainder of WKU and the local public. The mission and vision statement of the Teaching Gardens is related to the university mission and features plants and growing techniques applicable to the region of western Kentucky. By having well-crafted goals and objectives, the benefits of the Teaching Gardens will be easily implemented. Site analysis, inventory of existing plants, and soil types were analyzed prior to the installation of the new beds and plants.

The establishment of the Teaching Gardens was time consuming. The current Commercial Flower Production class has been related to the education the Teaching Gardens provide. By revealing the curriculum used by instructors in the garden, scheduling regular classes, and providing plants that are grown in the greenhouse, student involvement will be crucial to the success of the gardens. Budgeting and fundraising efforts have been discussed in this document. A large part of the garden design has been implemented and the initial costs of construction materials have already been accounted
for. Fundraising avenues discussed will not only benefit the garden but will provide hands-on learning for the Horticulture program students. Expenses for plants, equipment, preparation, maintenance, and staffing contribute to the majority of this thesis. As the gardens grow, many expenses will arise unexpectedly.

The Teaching Gardens will enhance the natural beauty of the university farm as well as provide an outdoor living laboratory where students will obtain first hand experience with planning, production, installation and maintenance practices. The development of the Teaching Gardens has been quite a success and future ideas are being put into action.

In conclusion, the Western Kentucky University Teaching Gardens has created an area of learning for the Agriculture Department, university, and local community. The Teaching Gardens are an extension of the classroom learning experience, which provide research opportunities, harvest/care information, and promote healthy nutrition. They provide a naturally beautiful atmosphere for the enjoyment of students, faculty and staff, and the local community.
APPENDIX

TEACHING GARDEN PLANT LIST

Exposition Center Sign (Figure 1)

D. B.-- *Dianthus barbatus*, Dianthus, Caryophyllaceae

P. H.-- *Pelargonium x hortorum*, Geranium, Geraniaceae

Annual/Perennial Border (Figures 2&3)

A. P.-- *Achillea x ‘Pretty Belinda’*, Pretty Belinda Yarrow, Asteraceae

A. F.-- *Agastache foeniculum*, Golden Jubilee Anise Hyssop, Lamiaceae

A. A.-- *Angelonia angustifolia*, Angelonia, Scrophulariaceae

C. G.-- *Coreopsis grandiflora ‘Baby Sun’*, Baby Sun Tickseed, Asteraceae

C. V.-- *Coreopsis verticillata ‘Zagreb’*, Zagreb Coreopsis, Asteraceae

D. B.-- *Dianthus barbatus*, Dianthus, Caryophyllaceae

E. P. M.-- *Echinacea purpurea ‘Magnus’*, Magnus Purple Coneflower, Asteraceae

E. P. W.-- *Echinacea purpurea*, White Swan Coneflower, Asteraceae

G. L.-- *Gaura lindheimeri ‘Walgaupf’*, Pink Fountain Gaura, Onagraceae

H. A.-- *Helianthus annuus*, Sunflower, Asteraceae

H. H.-- *Hemerocallis x ‘Happy Returns’*, Happy Returns Daylily, Hemerocallidaceae

H. M.-- *Hemerocallis x ‘Mauve Mini’*, Mauve Mini Daylily, Hemerocallidaceae

H. S. D.-- *Hemerocallis x ‘Stella de Oro’*, Stella de Oro Daylily, Hemerocallidaceae

K. U.-- *Kniphofia uvaria ‘Flamenco’*, Flamenco Torch Lily, Asphodelaceae
L. C.-- *Lantana camera*, Lantana, Verbenaceae

L. A.-- *Lavandula angustifolia*, Lavender, Lamiaceae

L. V.-- *Ligustrum x vicaryi*, Golden Vicary Privet, Oleaceae

P. L.-- *Penta lanceolata*, Penta, Rubiaceae

P. A.-- *Perovskia artriplicifolia ‘Little Spire’*, Little Spire Russian Sage, Lamiaceae

P. P. B. F.-- *Phlox paniculata ‘Barfourteen’*, Purple Flame Garden Phlox, Polemoniaceae

P. C.-- *Prunus x cistena*, Purple Leaf Sand Cherry, Rosaceae


S. N.-- *Salvia nemerosa ‘Mainacht’*, May Night Salvia, Lamiaceae

S. P.-- *Syringa patula ‘Miss Kim’*, Miss Kim Lilac, Oleaceae

T. E.-- *Tagetes erecta*, Marigold, Asteraceae

T. C.-- *Trollius chinensis ‘Golden Queen’*, Golden Queen Globeflower, Ranunculaceae

W. F. C.-- *Weigela florida ‘Champagne and Strawberries’*, Champagne and Strawberries Weigela, Caprifoliaceae

W. F. W.-- *Weigela florida ‘Wine and Roses’*, Wine and Roses Weigela, Caprifoliaceae

W. F. V.-- *Weigela florida ‘Variegata’*, Variegated Weigela, Caprifoliaceae

Z. A.-- *Zinnia angustifolia*, Zinnia, Asteraceae

Greenhouse Entrance Beds (Figure 4)

D. B.-- *Dianthus barbatus*, Dianthus, Caryophyllaceae

L. V.-- *Ligustrum x vicaryi*, Golden Vicary Privet, Oleaceae
S. T. -- *Sedum telephium 'Autumn Joy*', Autumn Joy Sedum, Crassulaceae

V. W. -- *Viola x wittrockiana*, Pansy, Violaceae

**Teaching Gardens** (Figure 8)

*Abelmoschus esculentus*, Okra, Malvaceae

*Achillea millefolium*, Yarrow, Asteraceae

*Alchemilla vulgaris*, Lady’s Mantle, Rosaceae

*Allium schoenoprasum*, Chives, Alliaceae

*Anethum graveolens*, Dill, Apiaceae

*Armoracia rusticana*, Horseradish, Brassicaceae

*Artemisia dracunculus*, Tarragon, Asteraceae

*Beta vulgaris*, Beet, Chenopodiaceae

*Brassica juncea*, Brown Mustard, Brassicaceae

*Brassica oleracea*, Cabbage, Brassicaceae

*Calendula officinalis*, Calendula, Asteraceae

*Capsicum sp.*, Pepper, Solanaceae

*Coriandrum sativum*, Coriander, Apiaceae

*Cucumis sativus*, Cucumber, Cucurbitaceae

*Cucurbita pepo*, Zucchini, Cucurbitaceae

*Cymbopogon citratus*, Lemongrass, Poaceae

*Foeniculum vulgare*, Fennel, Apiaceae
Galium odoratum, Sweet Woodruff, Rubiaceae

Indigofera tinctoria, Indigo, Fabaceae

Lactuca sativa, Lettuce, Asteraceae

Lavandula stoechas, Spanish Lavender, Lamiaceae

Nepeta faassenii, Catmint, Lamiaceae

Mentha pulegium, Pennyroyal, Lamiaceae

Origanum hermeticum, Greek Oregano, Lamiaceae

Perilla frutescens, Perilla, Lamiaceae

Petroselinum crispum, Parsley, Apiaceae

Raphanus sativus, Radish, Brassicaceae

Rosmarinus officinalis, Rosemary, Lamiaceae

Salvia elegans, Pineapple Scented Sage, Lamiaceae

Solanum lycopersicum, Tomato, Solanaceae

Solanum melongena, Eggplant, Solanaceae

Solanum tuberosum, Potato, Solanaceae

Teucrium chamaedrys, Germander, Lamiaceae

Thmus x citriodora, Lemon Thyme, Lamiaceae

Zea mays, Corn, Poaceae
Shade Bed (Figure 9)

A. A.-- *Angelonia angustifolia*, Angelonia, Scrophulariaceae

B. S.-- *Begonia x semperflorens-cultorum*, Fibrous-Rooted Begonia, Begoniaceae

C. P.-- *Cyclamen persicium*, Cyclamen, Myrsinaceae

H. M.-- *Hydrangea macrophylla ‘Pink Beauty’*, Pink Beauty Hydrangea, Hydrangeaceae

P. P.-- *Pachysandra procumbens*, Pachysandra, Buxaceae

Q. I. -- *Quercus imbricaria*, Shingle Oak, Fagaceae

Woodland Shade Bed (Figure 10)

A. N.-- *Athyrium nipponicum ‘Pictum’*, Japanese Painted Fern, Athyriaceae

H. M. P.-- *Heuchera micrantha ‘Palace Purple’*, Purple Palace Coral Bells, Saxifragaceae

H. M. F.-- *Heuchera ‘Melting Fire’*, Melting Fire Coral Bells, Saxifragaceae

Q. I. -- *Quercus imbricaria*, Shingle Oak, Fagaceae

R. G. D.-- *Rhododendron x Glenn Dale ‘Prudence Pink’*, Prudence Pink Glenn Dale Rhododendron, Ericaceae

R. G. C.-- *Rhododendron x ‘Girard Christina’*, Girard Christina Azalea, Ericaceae

R. G. H.-- *Rhododendron x ‘Girard Hot Shot’*, Girard Hot Shot Azalea, Ericaceae

R. G. R.-- *Rhododendron x ‘Girard Rose’*, Girard Rose Azalea, Ericaceae

R. M.-- *Rhododendron x ‘Minnetonka’*, Minnetonka Rhododendron, Ericaceae

R. P.-- *Rhododendron x ‘PJM’*, PJM Rhododendron, Ericaceae

R. P. E.-- *Rhododendron x PJM ‘Elite’*, PJM Elite Rhododendron, Ericaceae
R. Y.-- *Rhododendron x 'Yaku Princess'*, Yaku Princess Rhododendron, Ericaceae

R. K.-- *Rhododendron kurume ‘Hershey’s Orange’*, Hershey’s Orange Azalea, Ericaceae

**Hosta Bed** (Figure 11)

*H. S. E.-- Hosta sieboldiana 'Elegans', Elegans Hosta, Liliaceae*

*H. B.-- Hosta x ‘Bright Lights’, Bright Lights Hosta, Liliaceae*

*H. C.-- Hosta x ‘Brim Cup’, Brim Cup Hosta, Liliaceae*

*H. C. G.-- Hosta x ‘Color Glory’, Color Glory Hosta, Liliaceae*

*H. P.-- Hosta x ‘Patriot’, Patriot Hosta, Liliaceae*

*H. S.-- Hosta x ‘Seaboat’, Seaboat Hosta, Liliaceae*

*H. T.-- Hosta x ‘Tokudoma’, Tokudoma Hosta, Liliaceae*

*H. T. B.-- Hosta x ‘Thunderbolt’, Thunderbolt Hosta, Liliaceae*

*H. S. M.-- Hosta sp., Hosta mix, Liliaceae*

*Q. I.-- Quercus imbricaria, Shingle Oak, Fagaceae*

**Annual Beds** (Figure 12)

*A. H.-- Ageratum houstonianum, Ageratum, Asteraceae*

*A. A.-- Angelonia angustifolia, Angelonia, Scrophulariaceae*

*B. S.-- Begonia x semperflorens-cultorum, Fibrous-Rooted Begonia, Begoniaceae*

*B. D-- Buddleia davidii, Butterfly Bush, Buddlejaceae*

*C. C.-- Celosia cristata, Cockscomb, Amaranthaceae*
D. P.-- *Dahlia pinnata*, Dahlia, Asteraceae

G. J.-- *Gerbera jamesonii*, Gerbera, Asteraceae

H. M.-- *Hydrangea macrophylla ‘Pink Beauty’*, Pink Beauty Hydrangea, Hydrangeaceae

I. W.-- *Impatiens walleriana*, Impatiens, Balsaminaceae

*L. C.*-- *Lantana camera*, Lantana, Vernbenaceae

P. L.-- *Penta lanceolata*, Penta, Rubiaceae

P. H.-- *Pelargonium x hortorum*, Geranium, Geraniaceae

P. H. Y.-- *Petunia x hybrida*, Petunia, Solanaceae

P. G.-- *Portulaca grandiflora*, Portulaca, Portulacaceae

Q. F.-- *Quercus falcata*, Southern Red Oak, Fagaceae

S. S.-- *Solenostemon scutellarioides*, Coleus, Lamiaceae

T. E.-- *Tagetes erecta*, Marigold, Asteraceae

**Perennial/Shrub Border** (Figure 14)

B. C.-- *Bergenia cordifolia*, Bergenia, Saxifragaceae

C. O.-- *Carya ovata*, Shagbark Hickory, Juglandaceae

C. V.-- *Coreopsis verticillata ‘Moonbeam’*, Moonbeam Coreopsis, Asteraceae

C. A.-- *Cornus alba ‘Elegantissima’*, European Variegated Dogwood, Cornaceae

C. S.-- *Cornus sericea ‘Flaviramea’*, Yellow Twig Dogwood, Cornaceae

P. S.-- *Penstemon smallii ‘Violet Dusk’*, Violet Dusk Bearded Tongue, Scrophulariaceae

P. B.-- *Penstemon barbatus ‘Rondo’*, Rondo Bearded Tongue, Scrophulariaceae
P. G. B.-- *Phlox paniculata* ‘Barthirtyfive’, Volcano Pink with White Eye Phlox, Polemoniaceae

P.G.S.-- *Platycodon grandiflorus* ‘Sentimental Blue’, Sentimental Blue Balloon Flower, Campanulaceae

P. G.-- *Prunus glandulosa*, Flowering Almond, Rosaceae

S. P.-- *Salvia pratensis* ‘Pink Delight’, Pink Delight Salvia, Lamiaceae; 6—1 gal pots

S. J.-- *Spiraea japonica* ‘Lemon Princess’, Lemon Princess Spirea, Rosaceae

S. B.-- *Spiraea x bumalda* ‘Goldflame’, Goldflame Spirea, Rosaceae

S. C.-- *Syringa x chinensis*, Chinese Lilac, Oleaceae

S. P. D.-- *Syringa x prestoniae* ‘Donald Wyman’, Donald Wyman Lilac, Oleaceae
Figure 1: Exposition Center Sign
Figure 2: Annual/Perennial Border
Figure 2: Annual/Perennial Border
Figure 3: Extension of Annual/Perennial Border
Figure 4: Greenhouse Entrance Beds
Figure 5: Educational Vineyard
Figure 6: Research Vineyard
Establishment of Educational Display Gardens at Western Kentucky University Farm

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INTRODUCTION
An educational display garden is created to provide an educational destination for the local community. The novelty garden is expressed as an area laid out with flowers, trees, and ornamental shrubs and used for recreation or display. The present implementation of the gardens was started in June 2009 at Western Kentucky University Agriculture Research and Education Center. The gardens will be open to the public and general information about the gardens will be provided in a self-guided tour. Brochures and brochures will be available with the layout and guides to the gardens. Some of the gardens that are on display are: kitchen gardens (ontique), vegetable gardens, butterfly gardens, medicinal and herbal gardens, and a beautiful display of annual and perennial beds. This garden should be educational and provide a calm and relaxing environment for visitors. A garden is usually placed outside, not always, for its enjoyment of plants and other forms of nature (wikipedia.com). Not only can a garden be filled with natural materials, but also man-made materials can add a year-round interest to the garden.

OBJECTIVE
The purpose of the project is to inform the general public of the available types of gardens that can be grown in western Kentucky.

DISCUSSION
Some of the gardens that will be on display are: kitchen gardens (ontique), vegetable gardens, butterfly gardens, medicinal and herbal gardens, and a beautiful display of annual and perennial beds. A background picture of a garden is shown in Figure 1.

Gardens can have many different uses. Some are planted for aesthetics, others are to be functional, and some are planted for recreation purposes. Others are designed more to observe nature, by bird or insect watching and to reflect on the changing seasons. Some gardens are simply designed to be relaxing. They can be a site for meditation, dinner on the terrace, reading in a hammock, or just sitting in the sunshine. Most importantly and most commonly, gardens are used to grow produce. This not only means growing vegetables, but also growing flowers for their beauty and using them in flower arrangements.

REFERENCES

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Figure 7: Bulletin Board
Figure 8: Teaching Gardens
Figure 9: Shade Bed
Figure 10: Woodland Shade Bed
Figure 11: Hosta Bed
Figure 12: Annual Beds
Figure 13: Pond Area
Figure 14: Perennial/Shrub Border (meadow area)
Figure 15: Woodland Area
Figure 16: Aerial View
WORKS CITED


