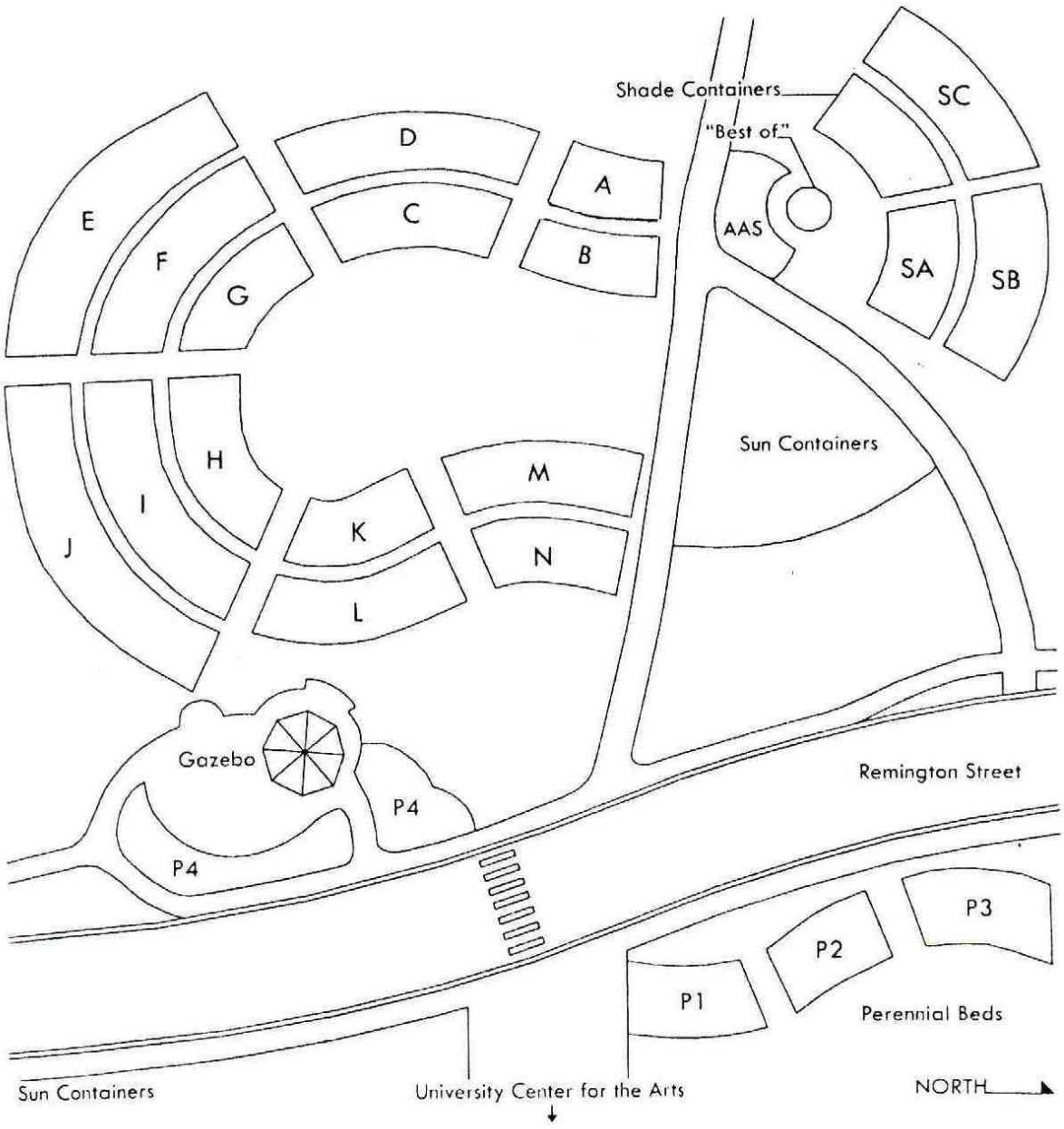
Table of Contents

GARDEN MAP



- Note: The Perennial Trials are part of the Annual Flower Trial Garden program and are located directly across the street in front of the new Center for the Arts.

Colorado State University
2009 Perennial Trial Garden
Performance Report

Dr. James E. Klett, David Staats and Danielle Goris*

Introduction

The W. D. Holley Plant Environmental Research Center (PERC) on the Colorado State University campus has been in operation for 37 years. Dr. James E. Klett is the Director of PERC and the faculty coordinator for the Annual and Perennial Flower Trial Gardens. In 2000, the trial garden was moved from its site at PERC to the park located on Remington and Lake Streets. The relocation of the garden to this more spacious and visible site furthered its mission by more effectively extending education, research and outreach to students, home gardeners, Master Gardeners, community members and Green Industry personnel. In 2007, the Perennial Trials were created in response to increased interest in new perennial cultivars. The Perennial Trials are located directly across the street to the east from the Annual Trial Garden in front of the University Center for the Arts. It is managed by staff from the CSU Department of Horticulture and Landscape Architecture with substantial oversight from the Perennial Trial subcommittee which is part of the Annual Flower Trial Garden committee. Each entry must have been introduced within the past three years and is evaluated for two complete years to determine hardiness and consistent landscape performance.

The outdoor display and test areas at PERC were established to allow students, researchers, industry representatives, homeowners and extension personnel to learn, teach and evaluate horticultural research and demonstration projects in the Rocky Mountain/High Plains region. The gardens are open to students, industry personnel and the public for viewing, gathering ideas about new varieties, studying the different growth habits, tolerances and visual characteristics of many perennial plant cultivars.

The purpose of the trial garden is to evaluate the performance of perennial plant cultivars under our unique Rocky Mountain environmental conditions. Our growing conditions are characterized by high altitude, intense solar radiation, drying winds, severe hailstorms, large fluctuations between day and night temperatures and a season-long need for irrigation. Plants are evaluated for plant vigor, uniformity, floriferousness and tolerance to environmental and biotic stresses. Data (ratings and photos) were collected every two weeks (late April to early October) by the Research Associate. Plants were evaluated once a month by members of the Perennial Trial subcommittee. The Perennial Trial subcommittee met in November to review data and photos to vote on which entries should be designated a “Top Performer”.

* Professor and Extension Landscape Horticulture Specialist; Horticulture Research Associate; Landscape Horticulture undergraduate student and 2009 Garden Coordinator

The project is funded, in most part, by the entry fees collected from the plant breeding companies who have chosen to participate in the trials. Additional financial assistance and supplies for the trial operations are donated by a number of sources. These sources include various state horticulture industry associations, foundations, nurseries, greenhouse growers and plant and seed production companies from across the nation. The trial garden at Colorado State University receives no operating dollars directly allocated from state funds. Some operational and staff dollars have come from the Colorado State Agricultural Experiment Station, Extension, the College of Agricultural Sciences and the Department of Horticulture and Landscape Architecture.

Acknowledgements

The Department of Horticulture and Landscape Architecture at Colorado State University would first like to thank the many plant and seed companies who continue to participate in the trials year after year. Without their cooperation and support, the research done at the trial garden would not be possible. This year, the following 14 plant and seed companies participated in the trials, entering 75 varieties of herbaceous perennial plants:

Blooms of Bressingham
Center Greenhouse
Conard-Pyle Co.
Creek Hill/Eason Horticultural Resources
Dupont Nursery
Darwin Perennials
Eason Horticultural Resources
Gulley Greenhouse
ItSaul Plants
Jelitto
Pacific Plug and Liner
Proven Winners
Skagit Gardens
Walters Gardens

We would like to recognize the companies that have donated supplies to the program. Thanks are extended to Green Care Fertilizers, Inc. for donating the water soluble fertilizer used in both the greenhouses and the garden. We would like to thank Sun Gro Horticulture, Inc. for donating the potting media for all the vegetatively propagated plants grown in our greenhouses. Thank you to Organix Supply, Inc. for the quick release fertilizer that was applied to the ground beds prior to planting. And thank you to Scotts, Inc. for donating the slow release fertilizer that was also used in the ground beds.

We would like to thank our Annual Trial Garden Advisory Committee for their constant advice and feedback on the overall operation of the trials. We are fortunate to have such a diverse group of industry leaders that are willing to volunteer their time for the benefit of our program. Our committee is comprised of the following individuals:

Al Gerace (Welby Gardens), Allen Hammer (Dummen USA), Ann Hartman-Mahr, Celia Tannehill, Charlotte Rose (Benary Seed), Dan Gerace (Welby Gardens), Diana Reavis (Eason Horticultural Resources Inc.), Duane Sinning (Benary Seed), Eric Pitzen (Syngenta Flowers), Frank Yantorno (Center Greenhouse, Inc.), Galen Dokter (Syngenta), Gary Douglas (Denver City Park Greenhouse), Gene Pielin (Gulley Greenhouse), Harvey Lang (Syngenta Flowers), Jim Devereux (Michell's), John Williams (Tagawa Greenhouses), Karl Trellinger (Syngenta Flowers), Keith

Stieduhar (City of Westminster), Maria Bumgarner (Denver Botanic Gardens), Mark Sanford (S&G Flowers), Mark Seguin (Syngenta Flowers), Merle Moore (retired, Denver Zoological Gardens), Natalia Hamill (Sakata Seed), Paul Hammer (Dummen USA), Ron Brum (Ball Seed), Ross Shrigley (Denver Botanic Gardens), Stefan Reiner (Selecta First Class), Susan Stauber (Ball Seed),Wayne Pianta (PanAmerican Seed)

And a special thanks to those who served on the Perennial Trial Sub-Committee.

Ann Hartman (Benary Seed), Charlotte Rose (Benary Seed), Celia Tannehill (Benary Seed), Dan Gerace (Welby Gardens), Diana Reavis (Eason Horticultual Resources Inc.), Eric Pitzen (Syngenta Flowers) Galen Dokter (Syngenta), Gary Douglas (Denver City Park Greenhouse), Gene Pielin (Gulley Greenhouse), Jim Devereux (Michell's), Keith Stieduhar (City of Westminster), Maria Bumgarner (Denver Botanic Gardens) Merle Moore (retired, Denver Zoological Gardens), Ross Shrigley (Denver Botanic Gardens) and Wayne Pianta and/or Ron Brum (Pan American Seed).

Perhaps most importantly, much thanks and appreciation goes to the PERC staff at the university that has worked diligently to prepare and maintain the garden. These people include:

Horticulture Research Associate	David Staats
Graduate Trial Garden Staff	Rich Guggenheim
Undergraduate Trial Garden Coordinator	Danielle Goris
Undergraduate Trial Garden Staff	Travis Byers Kara Crist Mike Honerlaw Iris Davidson Tyler Gettel Guy Kuntz Caitlin Nase Alexander Petit Kati Zybko Sara Harris
Undergraduate PERC Staff	Kyle Bainer

For further information on the Annual Flower Trial Garden at Colorado State University, feel free to write, call or e-mail:

Dr. James E. Klett
PERC Director and Annual Flower Trial Garden Coordinator
Colorado State University
Department of Horticulture and Landscape Architecture
Fort Collins, CO 80523
Office Phone: (970) 491-7179 Mobile Phone: (970) 218-0104
Fax: (970) 491-7745
E-mail: jim.klett@colostate.edu

This report is also available online at:
www.flowertrials.colostate.edu

Cultural Data[2]

Growing

All perennial seeds were sent to Welby Gardens in Denver, CO in January and February 2009 for germination and growing-on in their greenhouses in 3.5" jumbo 4-cell packs. Seed grown varieties were all received on June 9th and planted in the garden shortly thereafter. Vegetative propagated plants did not arrive all at the same time or the same growth stage. See "Comment" section in the following report for specific planting times for 2009 entries. Some vegetative varieties were received as plugs and transplanted into 4.5" pots shortly after arriving at Colorado State University. They were planted into the garden when they filled a 4.5" pot. Some entries arrived in larger containers and were planted directly into the garden.

Fertilization in the Greenhouses

Dosatron® fertilizer injectors rated at 7 GPM were used in the greenhouses to fertilize plants each day they were watered, with the exception of being watered every weekend with clear water. Greencare 14-4-14 water soluble fertilizer was used. They received fertilization at a rate of 200ppm.

Chemicals Used in the Greenhouses

Banrot® was applied to all plugs immediately after arrival and prior to potting. A drench of 6 oz/gallon was delivered to each variety.

Other chemical treatments that were applied in the greenhouse are as follows:

May 8th: Marathon II was applied for aphids throughout the PERC greenhouse.

Soil Amendments and Preparation

All beds were raked clean of old mulch, planting material and weeds prior to planting. Where necessary, RoundUp® was sprayed on weeds.

Planting

Plants are grown in the sun in highly amended beds (see soil analysis table). Beds are fertilized (see fertilization section for details) and roto-tilled prior to planting new varieties.

Bed Spacing

Entries were planted in the ground based on estimated mature plant size and how many were sent. Generally, plants were spaced at one foot centers with two rows of ten plants each. If fewer plants were sent they may have been planted at wider spacing or in just one row instead of two. There were approximately two feet between entries.

[2] No endorsement of products named is intended nor is criticism of products not mentioned.

Watering

All beds in the garden were zoned according to weekly water-use requirements of 1.0" of water per week. An irrigation audit was conducted at the beginning of the season to determine the irrigation rate per bed. This rate, along with the bed's water-use rating, was used to calculate the total length of time to irrigate each bed. Because of the amount of precipitation in June, the irrigation was sometimes decreased depending on how much water the individual beds needed. In the future, plants will be grouped by irrigation requirements and irrigated at different rates.

Fertilization in the Garden

All beds were top-dressed with Pro Rich® Fertilizer (14-5-5) at the rate of 1 pound N per 1000 square feet prior to planting. After planting, Osmocote® (14-14-14) was applied to all beds at the rate of 10 grams/sq. ft. (suggested medium rate on label). Greencare water soluble fertilizer (20-10-20) was dispensed through a 100 GPM Dosatron® twice a week at a rate of 200 ppm.

Maintenance of Flowers

All flowers were deadheaded in late July. After a killing frost in the fall, plants are cut back to the ground. Plants are watered by hose and sprinkler as needed during dry spells throughout the winter.

Weed Control

RoundUp® was applied to all beds prior to tilling in the spring, as well as a spot treatment around the edges of the beds on July 10. Otherwise, all weeding was done by hand throughout the season.

Pest Control in Garden

July 8th – Guara and Oenothera were sprayed for flea beetles with a mixture of Marathon II® at 0.5ml/gal and Pyreth-It® at 0.5 tsp/gal. There were no other major or minor pest problems.

Disease Control in Garden

Phlox paniculata 'Swizzle' arrived as mature plants but also with a significant outbreak of powdery mildew. Plants were cut back to the ground before planting in the beds and they came back strong with a nice show of flowers, however a second outbreak of powdery mildew occurred again around the end of the summer. *Coreopsis* 'Sundancer' also had a severe case of powdery mildew late in season. Due to the late timing in the season, no chemical controls were used for the two outbreaks of powdery mildew.

Dates of Severe Weather

The month of June had more rain than normal and was the second wettest June ever recorded for Fort Collins. On June 7th, the garden suffered a large hail storm (nickel to quarter size) but all plants survived and recovered a normal appearance later in the season. There were three smaller hail storms after that

as well, all in the month of June. On July 20, a heavy downpour of 1-2 inches of rain fell in less than an hour. August and September weather was fairly typical for this region.

Monthly Temperatures and Precipitation for 2009

Month	Avg. Maximum Temperature	Avg. Minimum Temperature	Precipitation (Inches)
May (27^{th} – 31^{st})	78.1° F	44.8° F	0.08
June	76.2° F	51.3° F	5.03
July	83.5° F	56.6° F	3.95
August	83° F	54.2° F	0.22
September	77° F	48° F	0.67

*Weather information for the Fort Collins area provided by the Colorado State University at: http://ccc.atmos.colostate.edu/cgi-bin/summary.pl

Data Collection Methods

Plant Size

Height and width measurements were taken once in September, toward the end of the growing season. This was done to get a feel for the average size of the mature plants and each variety's growth performance. For consistency in bed data collection, the third plant from the front of the left row was measured; however, if that plant was noticeably smaller or larger than average, an alternate plant was selected for measurement. Measurements were taken at the highest and widest parts of the plant, including any flowers.

Soil Samples

Soil samples were taken from individual ground beds on June 15th, July 29th and August 24th and were combined into a single sample per category for each bed.

Soil Analysis

Month	PH	E.C. mmhos/ cm	Lime Estimate	% O.M.	NO_3-N	P	K	Zn	Fe	Mn	Cu	Texture
6/15/09	7.4	0.3	High	21.0	14.4	187	450	27.3	129	15.0	7.1	Loam
7/29/09	7.2	0.4	High	20.3	26.9	202	296	28.6	164	17.6	7.9	Loam
8/24/09	7.0	0.9	High	18.0	134	177	466	26.0	127	6.7	5.7	Loam

Performance Evaluation

Photos and data on plants and flowers were collected on a bi-weekly basis by the Research Associate from late April to early October. Dead plants in the trial were not considered in the bi-weekly evaluation; thus, the ratings given only reflect the live plants. Members from the Perennial Trial subcommittee also came and wrote comments for each plant on at the end of June, July and August. Plants and flowers were rated 1-5 using the following scale:

0 = Dead

1 = Poor: Plants are very sick or dying, no flowering

2 = Below Average: Plants are unattractive in some form, ie – leggy growth habit, chlorotic or low vigor, flowers are extremely few and occurring sporadically

3 = Average: Plant appearance with growth characteristics that would be expected for the time of season; flowers would be few but uniform across the plants

4 = Good: Plants look attractive (foliage, growth habit, etc.,); flowers are blooming strong and showy

5 = Excellent: Plants are very healthy and uniform; flowering is impressive

Selection of "Top Performers"

On December 12, 2009 a conference call was convened with CSU staff and the Perennial Trial Garden Subcommittee. Pictures of entries from 2007 and 2008 were posted to the Perennial Trial website for review. Data from the growing season was compiled and emailed to each evaluator prior to the conference call for review. After discussion and looking at the pictures taken throughout the season, each plant was voted on by each member of the committee as to whether it should be awarded the designation as a "Top Performer".

"Top Performers" for the 2009 Season

Anemone 'Little Princess' (Little Princess Windflower) from Blooms of Bressingham
This compact windflower forms a neat mound and offers exceptional late season color. Flowers are a delicate pink blended with white and with prominent gold stamens. Perfect for a lightly shaded border, or even containers. Prefers moist but well drained sites. Planted in 2008.

Aster 'Vibrant Dome' (Vibrant Dome New England Aster) from Blooms of Bressingham
When in bloom, this plant is simply covered with vibrant lavender-pink flowers. Deserving of a prominent place in any sunny border, growth habit is round and very uniform when used as a mass display. Mildew and deer resistant, does best in fertile, well drained soil. Average water needs. Planted in 2008.

Euphorbia 'Bonfire' (Bonfire Spurge) from Blooms of Bressingham
A very colorful perennial! New growth is a mixture of purple, orange, red, and chartreuse giving a fiery appearance. Leaves quickly turn maroon with undergrowth dark green. Chartreuse flowers and bracts make an impressive combination with the dark foliage. Flowers are self-cleaning and deadheading was never required. Growth habit has excellent uniformity and leaf shape is very attractive. Reliably hardy for this area as opposed to several other Euphorbias entered into the trial. Nice fall color as well. Planted in 2007.

Geranium 'Blue Sunrise' (Blue Sunrise Cranesbill) from Blooms of Bressingham
New leaves have hints of orange upon emergence but turn a startling chartreuse color. This dynamic foliage is a great contrast for the blue-violet flowers throughout most of the growing season. Plant vigor is impressive and will need extra space. Planted in 2007.

Heuchera 'Blackout' (Blackout Coral Bells) from Center Greenhouse
Impressively black foliage is the main drawing point for this Heuchera. Besides the nice dark color it is also very glossy and does not scorch or fade even in full sun. The flowers are ivory colored and prolific but may obscure the foliage. Tolerates variable conditions well. It will even handle the heat better than many other coral bells. Planted in 2008.

Hibiscus 'Summer Storm' (Summer Storm Rose Mallow) from Walter's Gardens
This vigorous hibiscus variety has beautiful deep purple foliage as it emerges and eventually all but veins and leaf petioles turn green. Leaves are deeply cut and are more interesting than the average Hibiscus. Large dark pink flowers with magenta eyes are prevalent for a long period. It is late to emerge in the spring but worth the wait. Does best with plenty of water. Planted in 2008.

Pennisetum 'Piglet' (Piglet Fountain Grass) from Gulley Greenhouse
This fountain grass is smaller than 'Hameln' yet taller and more floriferous than 'Little Bunny'. It caught people's attention at peak flowering due to small yellow anthers that gave it a golden glow from a distance. Tawny plumes arch above medium green foliage in late summer. Perfect in the foreground of any bed especially when used with other late bloomers. Small enough to be used in containers. Prefers moderate moisture. Deer resistant. Planted in 2008.

Pulmonaria 'Gaelic Spring' (Gaelic Spring Lungwort) from Proven Winners
Mounds of lime green dappled leaves emphasize pink and flowers that emerge from purple buds. Growth habit was very uniform. Perfect for shady borders but did surprisingly well in full sun. Very easy to grow. Average water requirements. Listed as supposedly being deer resistant. Planted in 2007.

Rudbeckia 'Early Bird Gold' (Early Bird Gold Coneflower) from Center Greenhouse
Unlike other black eyed Susans, this variety is day length neutral. This allows it to produce it's golden daisy-like flowers earlier in the season and will continue to bloom longer than other Rudbeckias. Flowering was prolific. Plants had excellent winter survival after one winter and were very uniform. Benefits from dead heading. Moderate to low water needs. Planted in 2008.

Salvia 'Pink Friesland' (Pink Friesland Meadow Sage) from Center Greenhouse
This compact, easy to grow salvia produces a profusion of reddish pink flower spikes throughout most of the season, especially if spent blooms are removed. Both flowering and growth habit were very uniform and made a very attractive overall presentation. Attracts bees, butterflies and hummingbirds. Excellent for any sunny border or container. Should be drought tolerant. Planted in 2008.

Saxifraga x arendsii 'Touran Scarlet' (Touran Scarlet Rockfoil) from Gulley Greenhouse
This early bloomer produces red blooms above compact, evergreen foliage. Plants are attractive even without flowers and it is so beautiful with a unique texture that people want to touch it. Perfect for lightly shaded rock gardens but did great in full sun. Average to lower water needs. Supposedly rabbit and deer resistant. Planted in 2008.

Silene 'Rolly's Favorite' (Rolly's Favorite Rose Campion) from Skagit Gardens
Soft pink blooms with white centers form atop upright stems graced with oval, dark green leaves. Flowers are prolific and has a long bloom time. Requires deadheading for best appearance and some secondary blooming. Requires well drain soil. Easy to grow and well behaved. Planted in 2008.

Veronica spicata 'Tickled Pink' (Tickled Pink Spike Speedwell) from Eason Horticultural Resources
This vigorous speedwell produces large showy inflorescences of pink flowers. Selected for longer lasting flowers. Uniform flowering and growth habit made a very impressive overall appearance. Removal of fading spikes will prolong bloom further. Planted in 2008.