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For a complete listing of which varieties were planted in each bed, please refer to the chart at the top of page 8 regarding water usage.
2011 Annual Flower Trial Garden
Performance Report
Dr. James E. Klett, David Staats and Jaclyn Salts*

Introduction

The W. D. Holley Plant Environmental Research Center (PERC) on the Colorado State University campus has been in operation for 38 years. Dr. James E. Klett is the Director of PERC and the faculty coordinator for the Annual Flower Trial Garden. In 2000, the trial garden was moved from its site at PERC to the park located on the north-west corner of Remington and Lake Streets (1401 Remington Street). 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.

The outdoor display and test areas 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 Annual Flower Trial Garden is both an All-America Selections® display and trial site. The garden is 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 annual flowering varieties.

The purpose of the trial garden is to evaluate the performance of annual flower varieties 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. Performances of these cultivars are judged in early August, and again in early September, by selected students, faculty, industry representatives, public horticulturalists and advanced Master Gardeners.

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 and world. The trial garden at Colorado State University receives no operating dollars directly allocated from state funds. Some operational and staff dollars have come

* Professor and Extension Landscape Horticulture Specialist; Horticulture Research Associate; Environmental
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 26 vegetative and seed companies participated in the trials, entering 1,025 varieties of annual bedding plants.

| AmeriSeed Inc.                | Grolink                    |
| American Takii Inc.           | Keift Seed Co.             |
| Ball Horticultural Co.        | PanAmerican Seed           |
| Ball FloraPlant               | Paul Ecke Ranch            |
| Ball Seed                    | Plug Connection            |
| Benary Seed                  | Proven Winners             |
| Burpee Home Garden           | Sakata Seed America Inc.   |
| Cohen Nurseries c/o Agreixo  | Selecta First Class, Inc.  |
| Conard-Pyle Company          | Skagit Gardens             |
| Danziger                     | Suntory Flowers Limited    |
| Dummen USA, Inc.             | Syngenta Flowers Inc.      |
| Fides North America          | Vegetalis                  |
| Floranova                    | Westflowers                |

A very special thank you goes out to Welby Gardens of Denver, Colorado. Every year, Welby Gardens germinates and grows-on all of the seed propagated varieties for the trials. Their generosity is greatly appreciated, as they do this for us at a reduced cost.

We would like to recognize other 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 donating 50 yards of Growers Mix media to amend the beds, for use in the outdoor containers and for the quick release fertilzer that was applied to the ground beds prior to planting. Thank you to Gulley Greenhouse for donating Helictrotrichon, Heuchera, and Hosta as filler plants for our containers. Also thank you to the Scotts-Sierra for donating the slow release fertilizer for the ground beds and containers.

We would like to thank our 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:
Harvey Lang (Syngenta Flowers), Ann Hartman-Mahr, Celia Tannehill, Danny Brooks (Benary Seed), Dan Gerace (Welby Gardens), Al Gerace (Welby Gardens), Diana Reavis (Eason Horticultural Resources Inc.), Duane Sinning (Floranova), Eric Pitzen (Syngenta Flowers), Frank Yantorno (Center Greenhouse, Inc.), Galen Dokter (Syngenta), Gary Douglas (Denver City Park Greenhouse), Gene Pielin (Gulley Greenhouse), 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 (Sakata), Merle Moore (retired, Denver Zoological Gardens), Paul Hammer (Dummen USA), Ron Brum (Ball Horticultural Company), Ross Shrigley (Denver Botanic Gardens), Lida Sladkova (Fides NA), Luke Ellington, (Express Seed Company), Jennifer Sheldon (Color Star Growers), Susan Stauber (Ball Horticultural Company), Wayne Pianta (PanAmerican Seed)

We also thank all the Larimer County Master Gardeners who volunteered their time and hard work this year. They were instrumental in completing the huge tasks of transplanting thousands of plugs in the greenhouses this spring and planting the thousands of plants in the garden in the early summer.

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:

Undergraduate Trial Garden Coordinator  
Jaclyn Salts

Undergraduate Trial Garden Staff  
Benjamin Ott  
Caitlin Nase  
Cullen McGovern  
Sara Shaub  
Patrick Sorteberg  
Montana Williams

Undergraduate PERC Staff  
Sean Powell

Horticulture Research Associate  
David Staats

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

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PERC Director and Annual Flower Trial Garden Coordinator  
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Fax: (970) 491-7745  
E-mail: jim.klett@colostate.edu

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

Growing

All seeds were sent to Welby Gardens in Denver, CO in January and February 2011 for germination and growing-on in their greenhouses into 3.5” jumbo 4-cell packs. Seed varieties from Welby Gardens were all received on June 7th and planted in the garden shortly thereafter. All vegetative varieties were received as plugs and transplanted into 4.5” pots shortly after arriving at Colorado State University from mid-March to mid-April.

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. All plants were grown in the greenhouses at PERC. They received fertilization at a rate of 200ppm. New Guinea Impatiens were fertilized at this same rate, every other time they were watered. Clear water was used for alternate waterings.

Chemicals Used in the Greenhouses

Banrot® (6 oz/gallon) and Rootshield® (0.5 tsp/gallon) was applied to all vegetative plugs in their plug trays immediately after arrival and prior to potting up.

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

May 2nd: Cycocel® was applied to geraniums which required two applications at a rate of 1 oz/gallon (1st application)

May 4th: Insecticidal soap was applied to control aphids on all Dahlias

May 9th: B-9® was applied to all Petunia, Calibrachoa & Combos at a rate of 1.1 grams/gallon

May 11th: Cycocel® was applied to all geraniums at a rate of 1 oz/gallon. B-9® was applied to all Petunia, Calibrachoa & Combos at a rate of 1.1 grams/gallon.

May 23rd: Safari was applied to Gaillardia, Heliotropium, Ipomoea, Lantana, Phlox, Portulaca, Salvia, Scaevola, Verbena, Vinca & Zinnia to control aphids

May 23rd: Safari was applied to all Impatiens to control thrips

May 25th: Safari was applied to all Calibrachoa to control aphids

May 31st: Insecticidal soap was applied to control aphids on Ipomoea

2 No endorsement of products named is intended nor is criticism of products not mentioned.
Geranium PGR Application

Since 2007, participants entering Geraniums in the trials were given the opportunity to choose the number of PGR treatments to be applied to their entry plants while in the production greenhouse. They were given the choice of no treatments, one treatment or two treatments. The number of treatments applied to each Geranium variety in the trials is included in the information presented in the trial results section of this report.

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. In 2011, approximately 2” of new media (Grower’s Mix donated by Organix) with organic matter was added to all sun beds. The beds were roto-tilled to a depth of 8” which helped incorporate the new media. After tilling, the beds were crowned for better drainage and raked smooth. For containers, the top 6-8” of media was removed and were then re-filled with fresh, new media (Grower’s Mix donated by Organix).

Planting

Plants are grown either in the sun or under our shade structure that provides approximately 60% to 70% shade. The plant companies are given the option to choose whether they want their varieties grown in a ground bed, a container or in both locations. Each trial entry in the ground is planted in 2 parallel rows of up to 12 plants per row for a maximum of 24 plants. Each 20” container is planted with 5 plants of the same variety. Holes were pre-dug for each row in the ground beds using a 4” auger. A string stretched from the front of the row to the back was used as a guide to keep the spacing uniform.

The majority of plants were planted during organized planting sessions with Master Gardeners on May 24th, 27th, and June 2nd. The remainder of plants were planted by the garden staff on June 3rd, 6-10th, 13-17th and June 24th.

Container Spacing

This year we were able to give larger spreading varieties more space in the containers due to a decrease in entries. We spaced the calibrachoas, combos, and petunias every other container with blue oat grass in the alternating containers. There were extra containers located by the University Center for the Arts where the combination liners were featured. To fill these containers some varieties were planted twice on a prorated basis in proportion to the number of entries from each company. These duplicated entries were listed from containers U45-U61. Shade varieties were also spaced every other container with Heuchera and Hosta in alternating containers.
**Bed Spacing**

This year, we had a decrease in sun entries which allowed for some increases in spacing for plants. However, an increase in shade bed entries resulted in a decrease in shade bed spacing.

![Diagram showing bed spacing]

<table>
<thead>
<tr>
<th>Variety</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibrachoa, Cana, Combo, Cyperus</td>
<td>12&quot;</td>
<td>20&quot;</td>
</tr>
<tr>
<td>Calitunia, Verbena</td>
<td>14&quot;</td>
<td>22&quot;</td>
</tr>
<tr>
<td>Geranium</td>
<td>13&quot;</td>
<td>22&quot;</td>
</tr>
<tr>
<td>Ipomoea, Lantana, Sun New Guinea Impatiens, Sun Coleus, Osteospermum, Zinnia</td>
<td>12&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>Petunia</td>
<td>12&quot;</td>
<td>15&quot;</td>
</tr>
<tr>
<td>Other Sun Varieties</td>
<td>12&quot;</td>
<td>24&quot;</td>
</tr>
<tr>
<td>Begonia</td>
<td>12&quot;</td>
<td>19&quot;</td>
</tr>
<tr>
<td>Impatiens (exotic, double, seed, trailing)</td>
<td>13&quot;</td>
<td>23&quot;</td>
</tr>
<tr>
<td>Shade Coleus</td>
<td>15&quot;</td>
<td>25&quot;</td>
</tr>
<tr>
<td>Shade New Guinea Impatiens</td>
<td>12&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>Torenia</td>
<td>12&quot;</td>
<td>15&quot;</td>
</tr>
</tbody>
</table>

**Watering**

Plants were watered on an “as needed” basis while in the greenhouses. All plants were thoroughly hand watered after being planted outside in the garden or in a container. Containers were irrigated three times a day (depending on rain), for about the first two weeks after planting and then twice a day after that. Each container had 2 drip emitters positioned towards the center that are rated at 1 gallon per hour. All sun containers ran for one hour per cycle and the shade containers ran for 45 minutes per cycle. Beds are zoned according to weekly water-use requirements of 0.5”, 1.0” and 1.5” of water per week, and were watered 2-3 times a week for varying amounts of time, depending on the bed’s water-use rating. Because of the amount of precipitation in early to mid-summer, the irrigation was sometimes decreased depending on how much water the individual beds needed.
### Water-use Rating

<table>
<thead>
<tr>
<th>Water-use Rating</th>
<th>Beds</th>
<th>Varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5” per week</td>
<td>F, G, H, I</td>
<td>Ageratum, Calitunia, Gazania, Heliotropium, Lantana, Mandevilla, Mecardonia, Petunia, Portulaca, Scaevola</td>
</tr>
<tr>
<td>1.0” per week</td>
<td>C, D, J, K, L, M, N</td>
<td>Armeria, Asystasia, Calibrachoa, Combos, Diascia, Euphorbia, Gaillardia, Gaura, Geranium, Incarvillea, Ipomoea, Lobularia, Marigold, Mimulus, Nicotiana, Osteospermum, Salpiglossis, Verbena, Vinca, Zinnia</td>
</tr>
<tr>
<td>1.5” per week</td>
<td>A, B, E, SA, SB, SC</td>
<td>Alcea, Alternanthera, Angelonia, Argyranthemum, Bacopa, Begonia, Bidens, Brachyscome, Bracteantha, Cana, Carnation, Cleome, Coleus, Coreopsis, Cyperus, Dahlia, Dianthus, Helichrysum, Hibiscus, Impatiens, New Guinea Impatiens, Juncus, Lavender, Leycesteria, Lobelia, Melampodium, Nemesia, Nierembergia, Ornamental Pepper, Otomeria, Pennisetum, Penstemon, Phlox, Rudbeckia, Salvia, Santivalia, Torenia, Tradescantia, Zea</td>
</tr>
</tbody>
</table>

After September 19th, watering of the beds was reduced to 1-2 times a week, depending on the weather, meaning the total amount of water being applied per week was variable and considerably less than during the summer.

**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.

Before planting, Osmocote® (14-14-14) was mixed into the media of all sun containers at a rate of 130 grams/pot.

Before planting, Osmocote® (14-14-14) was mixed into the media of the shade containers at a rate of 65 grams/pot.

After planting, Osmocote® (14-14-14) was applied to all sun beds—including the All America Selections display bed and the CSU “Best-Of” bed—at the rate of 9.8 grams/sq. ft. (suggested medium rate on label) or approximately 286 grams/variety.

Osmocote® (14-14-14) was applied to all shade beds at the rate of 4.9 grams/sq.ft. or approximately 143 grams/variety.

Greencare water soluble fertilizer (20-10-20) was dispensed through a 100 GPM Dosatron® twice a week at a rate of 200 ppm. This fertilization schedule was maintained until September 6th, which was the last day the garden was ferti-irrigated for the season.

Chelated iron (FeATURE®) was applied at the rate of 3 lbs/100 gallons to all Calibrachoa, Ivy Geraniums & Scaevola in the ground and in pots on June 22nd. A second application of chelated iron (FeATURE®) was applied at a rate of 3 lbs/100 gallons to all Calibrachoa, Ivy Geraniums & Scaevola in the ground and in pots on July 21st.
**Maintenance of Flowers & Pinching**

### Greenhouse Maintenance

<table>
<thead>
<tr>
<th>Plant Type</th>
<th>Date(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacopa</td>
<td>Pinched 4/27, 5/2</td>
</tr>
<tr>
<td>Bidens</td>
<td>Pinched 4/27, 5/24, 5/29</td>
</tr>
<tr>
<td>Calibrachoa, Petunias</td>
<td>Pinched 4/29</td>
</tr>
<tr>
<td>Combos</td>
<td>Pinched 4/29, 5/19, 5/31</td>
</tr>
<tr>
<td>Dahlia</td>
<td>Dead-headed 4/27, 5/24</td>
</tr>
<tr>
<td>Diascia, Lobularia, Mecardonia, Scoparia</td>
<td>Pinched 5/2</td>
</tr>
<tr>
<td>Geraniums</td>
<td>Dead-headed 4/29, 5/24</td>
</tr>
<tr>
<td>Impatiens, Lantana</td>
<td>Pinched 4/29</td>
</tr>
<tr>
<td>Nemesia</td>
<td>Pinched 4/27</td>
</tr>
<tr>
<td>Osteospermum</td>
<td>Pinched 5/2</td>
</tr>
<tr>
<td>Petunias</td>
<td>Pinched 4/29</td>
</tr>
<tr>
<td>Salvia greggii</td>
<td>Pinched 4/1, 4/28/5/19</td>
</tr>
<tr>
<td>Scaevola</td>
<td>Pinched 5/19</td>
</tr>
<tr>
<td>Verbena</td>
<td>Pinched 4/27, 5/17</td>
</tr>
</tbody>
</table>

### Garden Maintenance

<table>
<thead>
<tr>
<th>Plant Type</th>
<th>Date(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dahlia</td>
<td>Dead-headed 7/6, 7/25, 8/9, 9/1</td>
</tr>
<tr>
<td>Geraniums</td>
<td>Dead-headed 6/29, 7/21, 8/15, 9/1</td>
</tr>
<tr>
<td>Potted Dahlias &amp; Geraniums</td>
<td>Dead-headed 7/7, 7/25, 8/18, 9/1</td>
</tr>
<tr>
<td>Dianthus, Gaillardia, Gerbera, Penstemon</td>
<td>Dead-headed 7/20</td>
</tr>
<tr>
<td>Coreopsis</td>
<td>Dead-headed 8/8, 9/1</td>
</tr>
<tr>
<td>Dianthus</td>
<td>9/1</td>
</tr>
</tbody>
</table>

**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 and in the pathways on June 22nd and July 11th. Additional wood chip mulch was applied to the pathways between the beds on July 11th. Otherwise, all weeding was done by hand throughout the season.

**Pest Control in Garden**

Leaf miner was observed on several petunias, combos and gaillardia varieties both in containers and in the ground. We controlled this by pulling off the worst leaves and destroying them early in the season. Marathon® 1G was later applied to sun containers most affected by leaf miner on July 20th at a rate of 2tsp/20”pot. Malathion at a rate of 8 tblsp/gallon was applied to the shade coleus to control earwigs on June 28th and July 7th.

**Disease Control in Garden**

Due to the recent passage of new federal regulations, this year was the first year we did not fumigate with Vapam® in the fall. In previous years this was done as a preventative measure against Xanthomonas, which was a problem in the garden five years ago. The annual garden has its own
supplies and tools which are disinfected on a regular basis in order to reduce the potential spread of disease from other sites.

**Dates of Severe Weather**

This summer consisted of a mild May with regular rains in June and July. June 8th, the garden suffered a moderate hail storm (pea size) causing moderate damage to many of the vegetative trials. Not all plants were in the ground at the time so the seed propagated varieties escaped damage and shade varieties were protected by the shade structure. Varieties damaged by hail are noted as such in a column next to their name in the inventory that follows in this book. The petunias and verbenas seemed to withstand the hail the best while the phlox, heliotropium, lantana and otomeria were particularly hard hit. The hail damage also seems to have significantly slowed geranium growth. This past August was also one of the hottest Augusts on record for Colorado due to a couple of weeks with highs reaching into the 90s.

**Monthly Temperatures and Precipitation for Summer 2011**

<table>
<thead>
<tr>
<th>Month</th>
<th>Avg. Maximum Temperature</th>
<th>Avg. Minimum Temperature</th>
<th>Precipitation (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>66.3°F</td>
<td>46.6°F</td>
<td>0.55</td>
</tr>
<tr>
<td>June</td>
<td>82.4°F</td>
<td>52.5°F</td>
<td>2.78</td>
</tr>
<tr>
<td>July</td>
<td>89.2°F</td>
<td>60.4°F</td>
<td>1.70</td>
</tr>
<tr>
<td>August</td>
<td>89.8°F</td>
<td>58.8°F</td>
<td>1.60</td>
</tr>
<tr>
<td>September</td>
<td>76.8°F</td>
<td>48.6°F</td>
<td>1.33</td>
</tr>
</tbody>
</table>

*Weather information for the Annual Flower Trial Garden area provided by the Department of Atmospheric Science at Colorado State University:  http://ccc.atmos.colostate.edu/*
Data Collection Methods

Plant Size
Height and width measurements were taken twice during the growing season, July 7th and August 8th. This was done to get a feel for the average size of the plants and each variety’s growth performance. For consistency in bed data collection, the second plant from the front of the right row was measured; however, if that plant was noticeably smaller or larger than average on August 8th, an alternate plant was selected for measurement and the location was noted so the same plant would be measured when the second measurements were taken. Measurements were taken at the highest and widest parts of the plant, including any flowers. This may account for the decrease in height on some varieties. For containers, measurements were taken at the highest and widest parts of overall growth.

Flowering Performance
Since 2007, data on the bloom period for each variety has been taken. In presenting this data, we hope to give a feel for how long the plants were in bloom and how well they bloomed during that period of time. Data was collected on a weekly basis. Plants were evaluated by estimating the overall flowering based on four bloom stages. These stages were first bloom, few flowers, full bloom and no bloom, with full bloom meaning the stage at which the average consumer perceives the plant as being in perfect bloom. One should take into consideration the broad range between these ratings when interpreting these data. A rating of first bloom means the very first flower out of the entire plot has fully opened. A rating of full bloom means the plants were considered to be at peak bloom. If a variety started at full bloom, it means it was already in full bloom in the greenhouse before it was planted. All of this data was summarized at the end of the season. Towards the end of the season, any dead plants in the trial were not considered in the evaluation; thus, the data given always reflects the percent of live plants in bloom.
Soil Samples

Soil samples were taken from individual ground beds on June 20\textsuperscript{th}, July 20\textsuperscript{th} and August 23\textsuperscript{rd} and were combined into a single sample per category for each bed. These categories were sun beds and shade beds. Samples taken from various containers in both the sun and shade areas and were combined into single samples on June 20\textsuperscript{th}, July 20\textsuperscript{th} and August 23\textsuperscript{rd}.

Soil Analysis

<table>
<thead>
<tr>
<th>Location</th>
<th>PH</th>
<th>E.C. mmhos/cm</th>
<th>Lime Estimate</th>
<th>% O.M.</th>
<th>NO\textsubscript{3}-N</th>
<th>P</th>
<th>K</th>
<th>Zn</th>
<th>Fe</th>
<th>Mn</th>
<th>Cu</th>
<th>Texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun Beds 6/20/11</td>
<td>6.6</td>
<td>0.5</td>
<td>Low</td>
<td>15.0</td>
<td>50.9</td>
<td>232</td>
<td>581</td>
<td>33.2</td>
<td>194</td>
<td>8.2</td>
<td>5.0</td>
<td>Sandy Loam</td>
</tr>
<tr>
<td>Sun Beds 7/20/11</td>
<td>6.8</td>
<td>0.9</td>
<td>Very High</td>
<td>23.8</td>
<td>57.4</td>
<td>198</td>
<td>537</td>
<td>21.1</td>
<td>123</td>
<td>2.7</td>
<td>7.7</td>
<td>Loam</td>
</tr>
<tr>
<td>Sun Beds 8/23/11</td>
<td>6.6</td>
<td>1.3</td>
<td>Low</td>
<td>15.7</td>
<td>138</td>
<td>237</td>
<td>295</td>
<td>20.1</td>
<td>112</td>
<td>5.9</td>
<td>2.7</td>
<td>Sandy Loam</td>
</tr>
<tr>
<td>Shade Beds 6/20/11</td>
<td>6.9</td>
<td>0.6</td>
<td>Low</td>
<td>25.7</td>
<td>230</td>
<td>232</td>
<td>576</td>
<td>39.0</td>
<td>182</td>
<td>8.9</td>
<td>5.2</td>
<td>Loam</td>
</tr>
<tr>
<td>Shade Beds 7/20/11</td>
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<td>504</td>
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<td>Low</td>
<td>15.6</td>
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<td>286</td>
<td>20.1</td>
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<td>87.2</td>
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<td>445</td>
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*All elements are measured in parts/million*
Evaluation

The trial evaluation day was held on August 1st. Approximately 100 judges consisting of industry representatives, master gardeners, university employees and trial garden advisory committee members evaluated the plant varieties for performance using a combination of these criteria:

Plant Quality:
- Uniformity of plant habit
- Bushy, well-branched shape versus open and leggy
- Healthy foliage (deep green versus chlorotic, yellow leaves)
- Foliage texture
- Disease resistance

Flower Quality:
- Flower power (number of flowers per plant, substance and holding power)
- Flower presentation (i.e. not hidden by the foliage)
- Color uniformity
- Stable color (resistance to fading) and stable pattern (for bicolor)
- Flower size and uniformity of flowers
- Balance of color in a mixture

Overall Presentation:
- Overall “clean” look, versus visible spent blooms
- Fragrant flowers and/or foliage
- Good vigorous growth
- Resistance to climatic stress
- Novelty value of unique features
- Overall consumer appeal

Plant varieties were rated on a scale of 1 to 10 (1 = very poor performance; 10 = excellent performance). These numerical evaluations were used to calculate the average ratings for each variety in the trials. Participants were encouraged to circle pre-generated comments on the evaluation form, if appropriate, as well as write in any other comments and observations they had. The pre-generated comments they could choose from included: Low vigor, Vigorous plant, Few flowers, Many flowers, Uniform, Non-uniform, Unique color and Some chlorosis.

Selection of “Best Of” Winners and other “Plants Rated As Superior”

Ratings from all evaluators on August 1st were averaged and the top five in each class were placed on a preliminary list. A class is determined to be any group of plants in the same genus that consisted of 10 or more trial entries. The “Best Of” award was given to classes whose top-five list had ratings of at least 6.0 and one of them could be considered superior. A sub-committee of university and industry representatives revisited the garden on September 9th to review the top-five list and verify the superiority of the top rated varieties later in the season and not just on August 1st. A majority vote was taken for each class to determine the final selections for winners. “Plants Rated as Superior” was an award created to recognize other plants that deserved special recognition; especially for those plants that did not have ten varieties to make up a class.
Other Information for the 2011 Trials

Number of companies participating.................................................................26

Total number of trial entries...........................................................................1,025

- Varieties grown in the ground.................................................................655  64%
- Varieties grown in a container.................................................................236  23%
- Varieties grown in both locations.........................................................134  13%
- Varieties propagated by seed.................................................................194  19%
- Varieties propagated by cuttings...........................................................830  81%

Number of genera represented......................................................................87

Number of student employees dedicated to the project

- Spring (part-time, 10-20 hrs/wk).............................................................6
- Summer (part-time, 20 hrs/wk, entire summer).......................................1
- Summer (full-time, 40 hrs/wk)...............................................................5
  - Entire summer.................................................................................3
  - Temporary (May 19 through June 14)..............................................2
- Fall (part-time, 10-15 hrs/wk)...............................................................4
### All-America Selections®

#### Display Garden Varieties
- Celosia 'Fresh Look Gold'
- Echinacea 'PowWow Wild Berry'
- Echinacea 'Warm Color Shades'
- Gaillardia 'Arizona Apricot'
- Gaillardia 'Mesa Yellow'
- Gaura 'White w/Pink Blush'
- Marigold 'Moonsong Deep Orange'
- Ornamental Kale 'Glamour Red'
- Petunia 'Opera Supreme Pink Morn'
- Phlox 'F1 Blue Shades'
- Salvia coccinea 'Summer Jewels Red'
- Snapdragon 'Twinny Peach'
- Vinca 'Pacific Burgundy Halo'
- Viola 'Endurio Sky Blue Martien'
- Viola 'Rain Blue and Purple'
- Viola 'Shangri-La Marina'
- Viola 'Skippy XL Plum-Gold'
- Zinnia 'Double Zahara Cherry'
- Zinnia 'Double Zahara Fire'
- Zinnia 'Double Zahara Starlight Rose'

#### Trial Ground Varieties
- Angelonia 'Deep Pink F1' (Trial)
- Angelonia 'Serena Lavender'
- Angelonia 'Serena Lavender Pink'
- Angelonia 'Serena White'
- Canna 'Red F1' (Trial)
- Canna 'Tropical Bronze Scarlet'
- Canna 'Tropical Red'
- Canna 'Tropical Rose'
- Ornamental Pepper 'Black Pearl'
- Ornamental Pepper 'Deep Purple' (Trial)
- Ornamental Pepper 'Pretty in Purple'
- Osteospermum 'Asti White'
- Osteospermum 'Passion Mix'
- Osteospermum 'White w/Yellow Disk F1' (Trial)
2011 Best Annuals from Colorado State University

Best of Show – *Argyranthemum ‘Flutterby Yellow’* from Paul Ecke Ranch
Abundant flowering and intense yellow color makes this variety standout in any garden. Plants were uniform both in growth habit and flowering. Constant bloom throughout the summer made it rank the highest. ‘Flutterby Yellow’ has proven to be a consistent variety over time since it was also selected the “Best Argryanthemum” in 2010.

Best New Variety – *Lantana ‘Bandana Rose Improved’* from Syngenta Flowers
The vibrant multicolor flowers on this *Lantana* looked good even as they aged. Plants have a uniform “tidy” growth habit with healthy green foliage. Another superior feature is that it produces virtually no fruit or seeds and saves its energy for a constant show of blooms.

Novelty – *Hibiscus ‘Mahogany Splendor’* from PanAmerican Seed
Plant has impressive vigor and beautiful dark mahogany colored foliage. It is a fast grower with a height of 3-5’ and a great choice for the back of a border. Flowering was non-existent in our trial but was selected as a winner because as one evaluator stated, it had plenty of “boom without bloom”.

Best Angelonia – ‘Carita Purple 09’ from Syngenta Flowers
Plants in the ground looked great and even better in the container. Outstanding features included the many flowers with a deep, rich purple color on an attractive, vigorous plant.

Best Begonia (*hiemalis*) – ‘Rhine Dragone Pink Hope’ from Dummen USA
Abundant bright pink flowers did not fade and complimented the uniform growth habit of this variety. Plants were more disease tolerant than many others in the trials. The entire series were good performers. They were all the heimalis type of begonia.

Best Bidens – ‘Sunbeam’ from Ball FloraPlant
Vigorous plants maintained a compact habit and good uniformity while being extremely floriferous. Bright yellow blooms covered the plants which created a yellow carpet on the ground, but would also look great in a container.

Best Calibrachoa – ‘Callie White 11’ from Syngenta Flowers
Plants were grown in a container and had a very attractive growth habit. Flowering was even all over the plants and bloom was consistent all season long.

Best Combo – ‘Kwik Kombo Fire and Ice Mix’ from Syngenta Flowers
Evaluators were impressed with the good mix of bright flower colors as well as similar growth habits. Bloom times were also matched and constant throughout the summer.

Best Dahlia – ‘Hypnotica Lavender’ from Fides North America
Flowers were prolific and large relative to plant size. Blooms were a dark lavender color which faded to an attractive pale lavender color. Plants were vigorous, uniform and did not have any mildew even in September.

Best Euphorbia – ‘Diamond Frost’ from Proven Winners
The non-stop flowering was best described by one evaluator as “white frothy wonderfulness”. The overall appearance was quite uniform in both growth habit and flowering. It can fit many different roles in the garden such as in mass plantings or as a specimen. It is drought tolerant and tolerates full sun.

Best Impatiens (seed) – ‘Impreza White’ from PanAmerican Seed
The heavy flower count and bright white flowers on this variety made an impressive display. Growth habit and flowering was very consistent on each plant. The entire Impreza series is bred to have less vertical stretch and a more spreading habit.
**Best Gaillardia** – ‘Galya Yellow Spark’ from Danziger
   The flower petals had a unique trumpet shape and were abundant with an eye-catching apricot color. The apricot center of the flower would fade to yellow along the edge. Plants were vigorous with clean foliage even into mid-September.

**Best Geranium (ivy)** – ‘Cascade Acapulco Compact’ from Syngenta flowers
   Exceptional vigor and prolific flowering created an almost perfect ball in the container. This variety with pink and white flowers has always been a strong performer in CSU’s trials.

**Best Geranium (seed)** – ‘Pinto Premium Salmon’ from Syngenta Flowers
   This entry was noted for a uniform growth habit with impressive vigor and uniformity. Flowering was strong and consistent throughout the summer. The entire Pinto series was praised for their superior qualities as seed geraniums.

**Best Geranium (zonal)** – ‘Calliope Dark Red’ from Syngenta Flowers
   Everything about this geranium was impressive – from the large, uniform plants to the abundant, rich dark red blooms. A full growth habit was attributed to the very good branching habit when established in the landscape. Flower size was also noted to be larger than most zonal Geraniums.

**Best Ipomoea** – ‘Desana Bronze’ from Suntory Flowers, LTD.
   Grown in both the ground and a container, evaluators noted that this vigorous variety doesn’t “take over” the surrounding area. The plant itself had beautiful, heart shaped foliage that emerges as a dark purple which change to an attractive bronze as it ages.

**Best Lantana** – ‘Bandana Rose IMP’ from Syngenta Flowers
   This plant had vibrant multicolor flowers that looked good even as they aged for a long lasting garden presence. Plants had a uniform, “tidy” growth habit with healthy green foliage. Another superior feature is that it produces virtually no fruit or seeds and saves its energy for many flowers.

**Best Lobelia** – ‘Techno Heat Electric Blue’ from Syngenta Flowers
   This vegetative propagated plant was noted for being a great early season performer. It had better heat tolerance than the seed propagated lobelias. Unique bright blue flowers combined well with dark green foliage on this standout variety.

**Best Marigold** – ‘Narai Orange’ from AmeriSeed Inc.
   Perfectly shaped orange flowers had a nice carnation look and a heavy petal count. Blooms kept a nice crisp, fresh look and did not rot in the center. Plants were vigorous and uniform.

**Best New Guinea Impatiens** – ‘Super Sonic Magenta 08’ from Syngenta Flowers
   These large plants had many flowers with an attractive deep magenta color. Both plant growth habit and blooming were uniform.

**Best New Guinea Impatiens (sun)** – ‘SunPatiens Compact Blush Pink’ from Sakata Seed American, Inc.
   The pink flowers and dark foliage created an eye-catching contrast on uniform, floriferous plants. Flowers were noted for having a beautiful color that aged gracefully. This New Guinea performed well even after the hottest August on record.

**Best Osteospermum** – ‘Margarita Cool Purple’ from Fides North America
   Dark, deep purple flowers combined with uniform dark green foliage made this entry a winner. Even in September, this variety maintained a healthy appearance and were loaded with many flowers and buds.

**Best Petunia (seed-spreading)** – ‘Easy Wave Neon Rose’ from PanAmerican Seed
   Large blooms with a “day-glow” color made this entry hard to miss even from a distance. Plants were vigorous and had a good spreading growth habit. This variety also did well in other trials and won an American Garden Award.
**Best Petunia (veg-mini)** – ‘Littlelunia Sweet Dark Pink’ from Danziger
   This entry impressed the evaluators with the abundant long-lasting flowers and a dark pink color. Plants had controlled vigor resulting in an excellent uniform growth habit.

**Best Petunia (veg-spreading)** – ‘Supertunia Vista Bubblegum’ from Proven Winners
   This annual is a perennial favorite. It has been a “Best Of” winner for multiple years and always has exceptional vigor and prolific blooming. Plants had so much vigor that they rose above the other petunias with a mound of bright pink flowers.

**Best Portulaca** – ‘Pazzaz Tangerine’ from Danziger
   This variety featured a unique flower color and abundant blooms on vigorous, uniform plants with Purslane type foliage. This genus required a lot of sun for the flower to open.

**Best Salvia greggii** – ‘Sally G Flamingo’ from Danziger
   Abundant pink blooms accented vigorous upright plants to create this standout. This variety is a great choice for xeric gardens and attracts hummingbirds.

**Best Torenia** – ‘Rose Moon’ from Danziger
   Plants had good vigor and it was noted that held true for all the other cultivars in the series. Flower color was an attractive soft rose and blooming was strong even in the cooler September nights and arid Colorado climate. It grew well in shade but is also reported to be tolerant of sun.

**Best Verbena (spreading)** – Tapien Salmon’ from Suntory Flowers, LTD.
   At peak bloom it was difficult to see foliage due to abundant flowering. When the foliage does peak through, it has a beautiful, delicate, fine texture. The salmon colored flowers were still showy in September. Growth habit was vigorous and uniform.

**Best Verbena (upright)** – ‘Costa del Sol Pink’ from Paul Ecke Ranch
   Flower color was a great deep pink color with a nice crisp appearance. This broadleaf type of Verbena was grown in a container and had impressive color. Plants did not have any leaf miner or any signs of powdery mildew which occurred on some other varieties.

**Best Zinnia** – ‘Double Zahara Fire’ from PanAmerican Seed
   Prolific flowering and a radiant scarlet/fire-orange petal color captured the attention of evaluators. Blooms were a good double petal variety that created a nice, full appearance to each flower.
Additional “Plants Rated as Superior” for 2011

Nicotiana ‘Whisper Mix’ from Floranova
Light pink and white flowers sway in the air on tall stems which gave a delicate and fanciful feel to a garden. It can make a great landscape plant or it can be used in the back of a border. Plants had basal leaves with good vigor and healthy appearance.

Pennisetum ‘Skyrocket’ from Eason Horticultural Resources
The showy variegated foliage and vigor made this an exceptional plant. The graceful pink plumes added great texture. Leaf blades were a medium green with a white-striped margin. The plant as a whole was low maintenance.

Phlox ‘Astoria Peach’ from Suntory Flowers, LTD.
The soft peach flower color combined with prolific flower power throughout the entire summer made this an obvious standout. Plants had good uniformity and vigor.

Zinnia ‘Queen Red Lime’ from Benary
Unique flower color was the primary feature of this variety. It also earned a lot of comments for vigor, prolific blooms and uniform plants. Flowers had a unique coloring due to young center petals starting out as a lime green color and maturing to a mauve color on the outer petals. The tall statuesque growth habit make it a good cut flower. Plants were noted for being powdery mildew resistant.

For a more complete report and photo’s of all of these winners go to www.flowertrials.colostate.edu.

For further information about the Colorado State University Annual Flower Trials, contact Jim Klett at Jim.Klett@ColoState.edu or phone 970-218-0104.