‘Earligreen’ a Super-Dwarf Pea Cultivar for Use in Controlled Environment Research

Joseph F. Romagnano
Utah State University

Emily Mills

Bruce Bugbee
Utah State University, bruce.bugbee@usu.edu

Follow this and additional works at: https://digitalcommons.usu.edu/cpl_dwarfcrops

Part of the Plant Sciences Commons

Recommended Citation
Romagnano, Joseph F.; Mills, Emily; and Bugbee, Bruce, "Earligreen’ a Super-Dwarf Pea Cultivar for Use in Controlled Environment Research" (2010). Dwarf Crops. Paper 5.
https://digitalcommons.usu.edu/cpl_dwarfcrops/5

This Article is brought to you for free and open access by the Research at DigitalCommons@USU. It has been accepted for inclusion in Dwarf Crops by an authorized administrator of DigitalCommons@USU. For more information, please contact digitalcommons@usu.edu.
‘Earligreen’ a Super-Dwarf Pea Cultivar for use in Controlled Environment Research

Joseph Romagnano: joroma@cc.usu.edu
Emily Mills: emilysuem@cc.usu.edu
Bruce Bugbee: bugbee@cc.usu.edu

Earligreen is ideal for controlled environment studies due to its fast life cycle, short height, and excellent growth in low light. Earligreen peas typically grow 18 to 35 cm tall and flower 20 to 25 days after emergence with the first fresh seed ready at 40 days. Optimal temperature is 20 to 25°C. Earligreen grows well under a wide range of light levels (photosynthetic photon flux (PPF), 100 to 1000 µmol m⁻² s⁻¹) and a photoperiod of 16 to 24 hours. Leaves display a characteristic silver speckling pattern.

Earligreen was developed in 1950 at the Morden research station in Manitoba, Canada. Earligreen (PI 365417) is a hybrid of Engress and an unknown early maturing field pea. C. Walkoff from the Canada Department of Agriculture donated Earligreen seed to the ARS-GRIN network in June of 1971. Germplasm has not been commercially available for at least 20 years.

Study 1: Cultivar Development Trial
Earligreen growth and development were compared to twelve other cultivars listed as less than 25 cm tall in the ARS-GRIN database. Plants were greenhouse grown with supplemental high pressure sodium light to provide a sixteen hour photoperiod and were watered twice daily with a dilute nutrient solution. After 43 days plant height and developmental progress were recorded. Earligreen plants were first to flower and were shorter than 11 of the selected cultivars.
Study 2: Cultivar Yield Study
Earligreen was compared to two Russian cultivars (cv. 131 and cv. 102), which have been grown on the International Space Station. Plants were greenhouse grown with supplemental high pressure sodium light to provide a sixteen hour photoperiod and were watered twice daily with a dilute nutrient solution. Fully matured dry pods were harvested. Yield was cumulatively calculated and averaged for each cultivar. Earligreen flowered earlier and continuously produced a higher seed yield per unit area.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>16 hr</th>
<th>24 hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Flower</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Plant Fresh Weight (g)</td>
<td>9.3</td>
<td>9.8</td>
</tr>
<tr>
<td>Plant Dry Weight (g)</td>
<td>1.5</td>
<td>1.8</td>
</tr>
<tr>
<td>No. Pods per Plant</td>
<td>2.0</td>
<td>1.7</td>
</tr>
<tr>
<td>No. Peas per Pod</td>
<td>2.5</td>
<td>3.4</td>
</tr>
<tr>
<td>Dry Mass per Seed (g)</td>
<td>0.25</td>
<td>0.27</td>
</tr>
<tr>
<td>Yield (g/plant)</td>
<td>1.3</td>
<td>1.6</td>
</tr>
<tr>
<td>Harvest Index (%)</td>
<td>46</td>
<td>47</td>
</tr>
</tbody>
</table>

Study 3: Low Light: 16 and 24 hour Photoperiod Comparison
Earligreen plants were grown under cool white fluorescent lights at a PPF of 90 µmol m⁻² s⁻¹ and a photoperiod of either 16 or 24 hours. Osmocote Plus was mixed into the media with approximately 7 g per 2 L pot. Plants were watered with tap water twice daily. Plants were grown in ambient laboratory conditions. Lab temperature was maintained between 20 and 25°C. The three replicate plants in each treatment were harvested 65 days after emergence. No evidence of chlorosis was seen in plants grown under either photoperiod. Although time until first flower was unaffected, plants grown under continuous low light had a slightly higher yield and harvest index than those grown using a 16 hour photoperiod.