**Oregon M176, S423, S434, S441 Disease Resistant Pea Breeding Lines**

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Pea (*Pisum sativum* L.) breeding lines Oregon M176, S423, S434, and S441, were released in 1975 by the Oregon Agricultural Experiment Station. These lines, all of freezing type, were developed primarily for Western Oregon where enation mosaic and pea streak are often seriously damaging to the later plantings of processing peas.

**Origin**
Hybridization leading to the development of these lines began in 1953 with the cross of 'Wando' × enation mosaic resistant G168 (Fig. 1). Near wilt and powdery mildew resistance were obtained from G59-29, and wilt resistance from 'Early Frosty' and other parents. Source of parental material was as follows: G168, a selection from PI 1402952 and G59-29 were from the New York Agr. Expt. Sta., Geneva, NY; P601 is a breeding line of freezing type obtained from M. C. Parker, Gallatin Valley Seed Co.; 'Frosty' and 'Early Frosty', are freezing cultivars developed by Rogers Brothers Seed Company.

**Description**
Plant and pod type are similar to 'Dark Skin Perfection'. Plants are somewhat heavy, with zigzag stems. Plant height at Corvallis is usually around 81.3 cm (32 inch) but may reach only about 66 cm (26 inch) in drier locations. M176 and S423 tend to have slightly "brushy" or indeterminate tops and are slightly taller than S434 and S441.

Maturity is midseason to late, about 4 days later than 'Early Frosty', and ranges from 1 to 3 days earlier than 'Dark Skin Perfection' and 'Aurora' (Table 1). Flowers are white.

Pods are blunt, tightly filled, 8.3 cm (3½ inch) to 8.9 cm (3½ inch) long (shorter in S441), usually borne 2 per node. Seed count per pod is normally 8, with a range of 6—8. Seed size is medium to medium-large in all except S441, which is distinctly smaller and may fit special needs of processors for a small-sieve freezer. Seeds are wrinkled with green cotyledons. Color and quality are generally good. No split seedcoats or other defects have been observed.

Disease resistance is summarized in Table 1. Resistance to wilt caused by *Fusarium oxysporum f. pisi* (Linford) race 1 Snyder & Hansen, and near-wilt caused by *F. oxysporum f. pisi* (Linford) race 2 Snyder & Hansen, was determined in greenhouse tests, while resistance to enation mosaic, pea streak, and powdery mildew caused by *Erysiphe polygoni* DC was determined under natural infection in the field. Further testing for near-wilt resistance, possibly under field conditions, is needed to determine the level of resistance involved, since 2 of the lines show intermediate reactions in the greenhouse.

**Availability**
Trial packets or limited seed stock are available from the author. These lines are released conditionally for breeding purposes and possible use in commercial production. Seed increase for large trial is encouraged. If any line is found to be acceptable for commercial use in its present form, or through normal seed stock improvement, it may be named and released cooperatively with Oregon State Univ., with mutual agreement on a cultivar name. Cooperative release will not confer exclusive cultivar rights to participating firms.

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**Table 1.** Some characteristics of 4 pea breeding lines.

<table>
<thead>
<tr>
<th>Line</th>
<th>Seeds/kg (lb.)</th>
<th>Sieve size*</th>
<th>Enation mosaic</th>
<th>Pea streak†</th>
<th>Fusarium wilt</th>
<th>Near wilt</th>
<th>Powdery mildew</th>
<th>Node to 1st bloom</th>
<th>Days to maturity††</th>
</tr>
</thead>
<tbody>
<tr>
<td>M176</td>
<td>4576 (2080)</td>
<td>Med. large</td>
<td>4.1</td>
<td>res</td>
<td>res</td>
<td>susc</td>
<td>susc</td>
<td>14</td>
<td>62</td>
</tr>
<tr>
<td>S423</td>
<td>4682 (2210)</td>
<td>Medium</td>
<td>3.4</td>
<td>res</td>
<td>res</td>
<td>int^</td>
<td>15-16</td>
<td>16-16</td>
<td>63</td>
</tr>
<tr>
<td>S434</td>
<td>4290 (1950)</td>
<td>Med. large</td>
<td>4.0</td>
<td>res</td>
<td>res</td>
<td>int^</td>
<td>15-16</td>
<td>16-16</td>
<td>64</td>
</tr>
<tr>
<td>S441</td>
<td>5478 (2490)</td>
<td>Med. small</td>
<td>2.9</td>
<td>res</td>
<td>res</td>
<td>int^</td>
<td>14-15</td>
<td>14-15</td>
<td>63</td>
</tr>
</tbody>
</table>

*Avg of sieve determined by volumetric means at an average tenderometer of 115 for M176, 92-96 for the other lines; sieve size class also from field notes.
†Not complete resistance, infection about 1-3% when susceptible cultivars have near 100 percent infection.
‡Possible intermediate level of resistance; not as susceptible as controls, resistance not clearly demonstrated.
††Commercial 'Aurora' was about 65 days at Corvallis; is listed in catalogs as 69 days.