Research Notes: Soybean Gene Resources Recently Received from China

R. I. Buzzel  
_Agriculture Canada_

B. R. Buttery  
_Agriculture Canada_

L. J. Anderson  
_Agriculture Canada_

D. A. Littlejohns  
_Ridgetown College of Agricultural Technology_

J. G. R. Loiselle  
_The Plant Gene Resources of Canada_

Follow this and additional works at: http://lib.dr.iastate.edu/soybeangenetics

Part of the _Agronomy and Crop Sciences Commons_

Recommended Citation

This Article is brought to you for free and open access by the Journals at Iowa State University Digital Repository. It has been accepted for inclusion in Soybean Genetics Newsletter by an authorized administrator of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.
1) Soybean gene resources recently received from China.

Forty soybean cultivars were received from the People's Republic of China in a number of exchanges between June 1973 and June 1974. The first eight cultivars that we received were grown in row tests at Harrow, Woodslee and Ridgetown in 1975, along with 'Harlen,' 'Harosoy 63,' and 'Harcor.' These eight, plus the next seven that we received, had been tested in hill plots at Harrow in 1974, along with Hardome, Harlon, Harosoy 63, and 'Harwood.' The highest and lowest cultivar values are given for each of a number of characteristics within each group of cultivars as an indication of the potential value of the new germplasm. The Chinese cultivars did not exceed those from Harrow in productivity. Although plant height tended to be shorter, lodging was more of a problem with the Chinese cultivars in row culture than with the Harrow cultivars.

Of the 40 cultivars, some were determinate and 12 had narrow leaves, in contrast to the indeterminate Harrow cultivars which have broad leaves. Only four cultivars carry \( R_{ps} \) resistance to race 1 of Phytophthora megasperma var. sojae, with none having specific resistance to the new races. However, of the eight cultivars grown in 1975 at Woodslee where race 6 is prevalent, all were as field tolerant as Harcor which was considerably better than Harlon and Harosoy 63. This germplasm is being tested as a source of polygenic variability for resistance to phytophthora rot.
Table 1
Ranges for groups of Chinese and Canadian (Harrow) soybean cultivars

<table>
<thead>
<tr>
<th></th>
<th>1974 Hill Test</th>
<th>1974 Row Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chinese</td>
<td>Canadian</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Days to flower</td>
<td>37</td>
<td>48</td>
</tr>
<tr>
<td>Days to mature</td>
<td>104</td>
<td>121</td>
</tr>
<tr>
<td>Yield</td>
<td>81^a</td>
<td>185</td>
</tr>
<tr>
<td>Yield-maturity index</td>
<td>0.78</td>
<td>1.53</td>
</tr>
<tr>
<td>Lodging</td>
<td>1.8</td>
<td>3.2</td>
</tr>
<tr>
<td>Plant height, cm</td>
<td>59</td>
<td>95</td>
</tr>
<tr>
<td>g/100 seeds</td>
<td>15.9</td>
<td>22.4</td>
</tr>
<tr>
<td>PA</td>
<td>30.2</td>
<td>35.7</td>
</tr>
<tr>
<td>% beans</td>
<td>48.8</td>
<td>57.3</td>
</tr>
</tbody>
</table>

^a Grams per plot.

^b Kilograms per ha.

Yield-maturity index = Yield (in grams/plot or kg/ha)/days to mature.
Lodging: 1 = Erect, 5 = Prostrate.

PA = photosynthetic rate (mg CO₂/dm²/hr) measured at early flowering stage.
% beans = bean weight x 100/mature plant (top) weight.
Copies of cultivar descriptions and results are available from the Harrow Research Station, and seeds of the 15 cultivars grown in 1974 are available from The Plant Gene Resources of Canada.

R. I. Buzzell, B. R. Buttery and L. J. Anderson
Agriculture Canada

D. A. Littlejohns
Ridgetown College of Agricultural Technology

J. G. R. Loiselle
The Plant Gene Resources of Canada

BELTSVILLE AGRICULTURAL RESEARCH CENTER
Cell Culture and Nitrogen Fixation Laboratory
Beltsville, Maryland

1) Genetic studies of soybean host cultivar interactions with Rhizobium strains.

Several genetic factors have been identified which govern specific nodulation response in soybeans. The \( R_i \) \(_2 \) genotype, carried by the cultivars 'Hardee' and 'CNS,' conditions an ineffective response in specific combination with Rhizobium japonicum strains of serogroups cl and 122. The ineffective response is characterized as the development of either cortical proliferations on the roots or rudimentary nodules, rather than normal nodules. The \( R_i \) \(_3 \) genotype, carried by the cultivar Hardee, conditions an ineffective response in combination with strain 33; and the \( R_i \) \(_4 \) genotype, carried by the cultivars 'Hill,' 'Dunfield,' and 'Dare,' conditions an ineffective response with strain 61.

In monitoring the presence of these genes in the germplasm now used in the production of soybeans in the U.S., the cultivars in Table 1 were tested, by the leonard jar technique, against Rhizobium strains defining for the presence of several \( R_i \) factors: strain 7 (of serogroup cl) for \( R_i \) \(_2 \), strain 33 for \( R_i \) \(_3 \), strain 61 for \( R_i \) \(_4 \). Strain 123 was included because of its aberrant reaction with the cultivar 'Peking.' Strain 110 was included as a check.

The results indicate that the cultivars 'Lee' and 'Davis' exhibit the \( R_i \) \(_3 \) phenotype. Both Lee and Davis have pedigrees which involve CNS. In other tests we have found that CNS also carries the \( R_i \) \(_3 \) gene as well as \( R_i \) \(_2 \). In this test 'Amsoy 71' exhibits the \( R_i \) \(_4 \) phenotype. 'Tracy' is heterogeneous