Leading Canadian agriculture.
“SHORT SEASON FLAX”

Flax Day - Growing Flax First
Saskatchewan Flax Development Commission

Paul Dribnenki, Ph. D.
Linum (Flax) Research Program Leader
The Issue

Flax requires more Growing Degree Days than most other crops

Barley...1269..............79%
Canola...1432 (to swath)....89%
Oats.....1483...............93%
Wheat....1538...............96%
Flax.....1603 (to swath)...100%

Data from Stu Brandt, AAFC Scott, SK
Growing Degree Days

Measure of heat accumulation during the growing season.

The daily high temperature + the daily low temperature divided by 2

Subtract by the base temperature
(0 degrees for flax)

Miller, Lanier and Brandt 2001
Flax Life Cycle

45 day to 60 day vegetative period
15 day to 25 day flowering period
30 day to 40 day maturation period

Total requirement; 90 day to 125 days

Canola has a shorter vegetative period and a longer flowering period...S. Brandt
The Project

Short Season, High Quality Flax Development for the Peace Region of Alberta and British Columbia
Partners and Funding

Alberta Agriculture and Food
British Columbia Grain Producers Association
Viterra

Funding; Advancing Canadian Agriculture and Agri-Food (ACAAF) Program
The Experiment

Genetics

40 earliest accessions from Plant Gene Resources of Canada (Dr. Axel Diederichsen)

147 cold tolerant Linola strains from Viterra’s program

8 checks including Noralta and CDC Bethune
The Experiment

Locations

• Fort St. John, BC...BCGPA...Clair Langois
• Dawson Creek, BC....BCGPA...Clair Langois
• Fairview, AB.......Peace Ag R&D...H. Vos
• Vegreville, AB......Viterra...S. McEachern
Start-Up Issues...

Project approval was delayed and as such logistics were less than ideal.

Seed for the field trials were grown in California during winter of 2006/07 and as such, seed was sent out to co-operators in the middle of May.

Wet weather during mid-May in the Peace River region delayed seeding till the end of May.
Results...

All locations completed data collection and harvest

CV’s were high for all tests

Data parameters included vigour, days to flower, days to maturity, lodging, height, seed yield, seed weight, oil content, fatty acid profile, iodine value, seed protein and meal protein
# Earliest Flax Strains

<table>
<thead>
<tr>
<th>Entries</th>
<th>DTM</th>
<th>Days (+/- NL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1   (PGRC)</td>
<td>98</td>
<td>-7</td>
</tr>
<tr>
<td>1   (PGRC)</td>
<td>100</td>
<td>-5</td>
</tr>
<tr>
<td>1   (Cold tol. Linola)</td>
<td>102</td>
<td>-3</td>
</tr>
<tr>
<td>5   (Cold tol. Linola)</td>
<td>103</td>
<td>-2</td>
</tr>
<tr>
<td>7   (Cold tol. Linola)</td>
<td>104</td>
<td>-1</td>
</tr>
<tr>
<td>2   (PGRC)</td>
<td>104</td>
<td>-1</td>
</tr>
<tr>
<td>11  (Cold tol. Linola)</td>
<td>105</td>
<td>0</td>
</tr>
<tr>
<td>1   (PGRC)</td>
<td>105</td>
<td>0</td>
</tr>
<tr>
<td>NorLin</td>
<td>105</td>
<td>0</td>
</tr>
<tr>
<td>Noralta</td>
<td>106</td>
<td>+1</td>
</tr>
<tr>
<td>CDC Bethune</td>
<td>109</td>
<td>+4</td>
</tr>
</tbody>
</table>

Average of 4 locations
## Growing Degree Days in 2007

<table>
<thead>
<tr>
<th>Location</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dawson Creek</td>
<td>279</td>
<td>418</td>
<td>527</td>
<td>386</td>
<td>1610</td>
<td>(100%)</td>
</tr>
<tr>
<td>Ft. St. John</td>
<td>299</td>
<td>434</td>
<td>557</td>
<td>404</td>
<td>1694</td>
<td>(105%)</td>
</tr>
<tr>
<td>Peace River</td>
<td>291</td>
<td>444</td>
<td>557</td>
<td>410</td>
<td>1702</td>
<td>(106%)</td>
</tr>
<tr>
<td>Vegreville</td>
<td>320</td>
<td>441</td>
<td>605</td>
<td>427</td>
<td>1793</td>
<td>(112%)</td>
</tr>
<tr>
<td>Saskatoon</td>
<td>349</td>
<td>450</td>
<td>652</td>
<td>481</td>
<td>1932</td>
<td>(121%)</td>
</tr>
<tr>
<td>Morden</td>
<td>394</td>
<td>540</td>
<td>678</td>
<td>562</td>
<td>2174</td>
<td>(136%)</td>
</tr>
</tbody>
</table>

1603 GDD to mature flax  
Peace River closest centre to Fairview, AB  
Data from Environment Canada
# Maturity of Checks

<table>
<thead>
<tr>
<th>Variety</th>
<th>Veg</th>
<th>Days to Maturity</th>
<th>Days to Maturity</th>
<th>Days to Maturity</th>
<th>Days to Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Fairview</td>
<td>FSJ</td>
<td>DC</td>
<td></td>
</tr>
<tr>
<td>Noralta 88</td>
<td></td>
<td>98</td>
<td>119</td>
<td>118</td>
<td></td>
</tr>
<tr>
<td>NorLin</td>
<td></td>
<td>91</td>
<td>99</td>
<td>117</td>
<td>117</td>
</tr>
<tr>
<td>P. Grande</td>
<td></td>
<td>93</td>
<td>104</td>
<td>116</td>
<td>117</td>
</tr>
<tr>
<td>Bethune</td>
<td></td>
<td>95</td>
<td>103</td>
<td>123</td>
<td>125</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GDD</th>
<th>1793</th>
<th>1702</th>
<th>1694</th>
<th>1610</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDD(% DC)</td>
<td>111</td>
<td>106</td>
<td>105</td>
<td>100</td>
</tr>
<tr>
<td>Latitude</td>
<td>53</td>
<td>56</td>
<td>56</td>
<td>55</td>
</tr>
</tbody>
</table>

Peace River closest centre to Fairview, AB
**Location, Location, Location**

The earliest 25 entries from the average of all four locations were identified

<table>
<thead>
<tr>
<th>Location</th>
<th># Entries in Earliest 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dawson Creek</td>
<td>10</td>
</tr>
<tr>
<td>Ft. St. John</td>
<td>10</td>
</tr>
<tr>
<td>Fairview</td>
<td>9</td>
</tr>
<tr>
<td>Vegreville</td>
<td>12</td>
</tr>
</tbody>
</table>
### Growing Degree Days in 2007

<table>
<thead>
<tr>
<th>Location</th>
<th>May</th>
<th>Total</th>
<th>Total GDD</th>
<th>May as %</th>
<th>Maturity (% Total GDD)</th>
<th>1 week Earlier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dawson Creek</td>
<td>279</td>
<td>1610</td>
<td>17%</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P. River</td>
<td>291</td>
<td>1702</td>
<td>17%</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegreville</td>
<td>320</td>
<td>1793</td>
<td>18%</td>
<td></td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Morden</td>
<td>394</td>
<td>2174</td>
<td>18%</td>
<td></td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Saskatoon</td>
<td>349</td>
<td>1932</td>
<td>18%</td>
<td></td>
<td>6%</td>
<td></td>
</tr>
</tbody>
</table>

Peace River closest centre to Fairview
Data from Environment Canada
1. Early maturity would benefit farmers across the northern edge of the Prairies, western Alberta and the Peace River Region.

2. Cold tolerance (seedling vigour and frost tolerance) may be more important than earliness.

3. That the project be continued, but modified to involve a two-prong approach; breeding and agronomy. Five year project.

4. Large early generation, segregating populations could be generated and screened at Vegreville.
5. Short-season, agronomic best practices need to be determined as part of this project. These practices need to determine the importance of:

A. Very firm, moist seedbed.
B. Seeding depth...0.5 inch (warmer soil)
C. Very early seeding...late April vs mid May
D. Seeding rate...45 pounds per acre
E. Seed treatment
Recommendations

6. Agronomy experiments to determine agronomic best practices should be developed on early maturing, cold tolerant flax lines that were identified in the 2007 field trials.

7. The end result would be cold tolerant, early maturing flax varieties along with agronomic best practices.