Lentil, Chickpea & Fababean Variety Update

Bunyamin Tar’an
Bert Vandenberg
Tom Warkentin
Sabine Banniza
Kirstin Bett

Lentils: what you grew in 2014

(SCIC, 2014)
**Tips how to choose a variety:**

- Decide what market class you want to grow
- Check the yield data for your area (north vs south); longer term data reflects the stability!
- Check the agronomy & disease package
- Check the seed availability

---

### 2015 Variety of Grain Crops

<table>
<thead>
<tr>
<th>Market class</th>
<th>Variety</th>
<th>Years Tested*</th>
<th>Yield % CDC Maxim CL</th>
<th>Maturity Rating</th>
<th>Anthracnose Race 1</th>
<th>Seed Weight (g/1000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small red</td>
<td>CDC Maxim CL</td>
<td>8</td>
<td>100</td>
<td>E/M</td>
<td>G</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>CDC Cherie</td>
<td>5</td>
<td>109</td>
<td>E/M</td>
<td>F</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>CDC Impulse CL</td>
<td>5</td>
<td>108</td>
<td>E/M</td>
<td>G</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>CDC Redcliff</td>
<td>7</td>
<td>107</td>
<td>E/M</td>
<td>F</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>CDC Redcoat</td>
<td>6</td>
<td>105</td>
<td>E/M</td>
<td>G</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>CDC Scarlet</td>
<td>6</td>
<td>105</td>
<td>E/M</td>
<td>F</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>CDC Dazil CL</td>
<td>7</td>
<td>104</td>
<td>E/M</td>
<td>F</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>CDC Redberry</td>
<td>6</td>
<td>97</td>
<td>E/M</td>
<td>G</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>CDC Imap CL</td>
<td>8</td>
<td>96</td>
<td>E/M</td>
<td>F</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>CDC Rouleau</td>
<td>6</td>
<td>96</td>
<td>M</td>
<td>G</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>CDC Red Rider</td>
<td>6</td>
<td>95</td>
<td>E/M</td>
<td>F</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>CDC Impact CL</td>
<td>6</td>
<td>80</td>
<td>E</td>
<td>P</td>
<td>34</td>
</tr>
<tr>
<td>Extra small red</td>
<td>CDC Roxy</td>
<td>4</td>
<td>103</td>
<td>E/M</td>
<td>G</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>CDC Redbow</td>
<td>6</td>
<td>102</td>
<td>E</td>
<td>G</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>CDC Rosebud</td>
<td>6</td>
<td>100</td>
<td>E</td>
<td>G</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>CDC Impala CL</td>
<td>6</td>
<td>94</td>
<td>E</td>
<td>G</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>CDC Ruby</td>
<td>7</td>
<td>90</td>
<td>E</td>
<td>G</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>CDC Rosie</td>
<td>6</td>
<td>92</td>
<td>E/M</td>
<td>G</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>CDC Imperial CL</td>
<td>6</td>
<td>84</td>
<td>E</td>
<td>G</td>
<td>30</td>
</tr>
<tr>
<td>Large red</td>
<td>CDC KR-1</td>
<td>8</td>
<td>110</td>
<td>M</td>
<td>G</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>CDC KR-2 CL</td>
<td>4</td>
<td>105</td>
<td>M</td>
<td>G</td>
<td>55</td>
</tr>
</tbody>
</table>

*All are ranking good for ascochyta blight  CL = Tolerant to IMI herbicides*

All have red cotyledon colour
All have gray seed coat colour, except CDC Rosebud which is tan
### 2015 Variety of Grain Crops

<table>
<thead>
<tr>
<th>Market class</th>
<th>Variety</th>
<th>Years Tested*</th>
<th>Yield % CDC Maxim CL</th>
<th>Maturity Rating</th>
<th>Ascochyta Blight</th>
<th>Anthracnose Race 1</th>
<th>Seed Weight (g/1000)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Area 1 &amp; 2</td>
<td>Area 3 &amp; 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small green</td>
<td>CDC Invincible CL</td>
<td>8</td>
<td>96</td>
<td>83</td>
<td>E</td>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td>CDC Milestone</td>
<td>6</td>
<td>91</td>
<td>84</td>
<td>E</td>
<td>G</td>
<td>VP</td>
</tr>
<tr>
<td></td>
<td>CDC Viceroy</td>
<td>6</td>
<td>97</td>
<td>98</td>
<td>E</td>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>Extra small green</td>
<td>CDC Asterix</td>
<td>7</td>
<td>99</td>
<td>101</td>
<td>E</td>
<td>G</td>
<td>F</td>
</tr>
<tr>
<td>Medium green</td>
<td>CDC Impress CL</td>
<td>6</td>
<td>87</td>
<td>71</td>
<td>M</td>
<td>G</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>CDC Imigreen CL</td>
<td>7</td>
<td>78</td>
<td>71</td>
<td>M</td>
<td>G</td>
<td>VP</td>
</tr>
<tr>
<td></td>
<td>CDC Meteor</td>
<td>6</td>
<td>102</td>
<td>89</td>
<td>M</td>
<td>G</td>
<td>VP</td>
</tr>
<tr>
<td>Large green</td>
<td>CDC Richlea</td>
<td>6</td>
<td>93</td>
<td>80</td>
<td>M</td>
<td>VP</td>
<td>VP</td>
</tr>
<tr>
<td></td>
<td>CDC Greenstar</td>
<td>5</td>
<td>101</td>
<td>78</td>
<td>M/L</td>
<td>G</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>CDC Impower CL</td>
<td>7</td>
<td>85</td>
<td>68</td>
<td>M/L</td>
<td>G</td>
<td>VP</td>
</tr>
<tr>
<td></td>
<td>CDC Improve CL</td>
<td>6</td>
<td>87</td>
<td>76</td>
<td>M</td>
<td>F</td>
<td>VP</td>
</tr>
<tr>
<td></td>
<td>CDC Plato</td>
<td>6</td>
<td>87</td>
<td>77</td>
<td>M/L</td>
<td>G</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>CDC Sovereign</td>
<td>6</td>
<td>83</td>
<td>77</td>
<td>L</td>
<td>G</td>
<td>P</td>
</tr>
</tbody>
</table>

Comparisons to the check variety, small red lentil CDC Maxim CL.
CL indicates Clearfield variety.
All have green seed coat colour and yellow cotyledon colour

---

<table>
<thead>
<tr>
<th>Market class</th>
<th>Variety</th>
<th>Years Tested*</th>
<th>Yield % CDC Maxim CL</th>
<th>Maturity Rating</th>
<th>Ascochyta Blight</th>
<th>Anthracnose Race 1</th>
<th>Seed Weight (g/1000)</th>
<th>Seed Coat Colour</th>
<th>Cotyledon Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Area 1 &amp; 2</td>
<td>Area 3 &amp; 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French green</td>
<td>CDC LeMay</td>
<td>6</td>
<td>84</td>
<td>80</td>
<td>E</td>
<td>F</td>
<td>VP</td>
<td>33</td>
<td>green marble</td>
</tr>
<tr>
<td></td>
<td>CDC Marble</td>
<td>6</td>
<td>107</td>
<td>103</td>
<td>E</td>
<td>G</td>
<td>F</td>
<td>34</td>
<td>green marble</td>
</tr>
<tr>
<td></td>
<td>CDC Peridot CL</td>
<td>6</td>
<td>84</td>
<td>94</td>
<td>E</td>
<td>F</td>
<td>P</td>
<td>38</td>
<td>green marble</td>
</tr>
<tr>
<td>Green cotyledon</td>
<td>CDC QG-1</td>
<td>5</td>
<td>80</td>
<td>65</td>
<td>M</td>
<td>F</td>
<td>F</td>
<td>49</td>
<td>green</td>
</tr>
<tr>
<td></td>
<td>CDC QG-2</td>
<td>5</td>
<td>91</td>
<td>94</td>
<td>E</td>
<td>F</td>
<td>F</td>
<td>32</td>
<td>green marble</td>
</tr>
<tr>
<td>Spanish brown</td>
<td>CDC QG-3 CL</td>
<td>4</td>
<td>73</td>
<td>-</td>
<td>E/M</td>
<td>F</td>
<td>G</td>
<td>46</td>
<td>green gray dotted</td>
</tr>
<tr>
<td></td>
<td>CDC SB-1</td>
<td>4</td>
<td>76</td>
<td>81</td>
<td>E</td>
<td>F</td>
<td>F</td>
<td>37</td>
<td>green</td>
</tr>
<tr>
<td></td>
<td>CDC SB-2</td>
<td>5</td>
<td>95</td>
<td>85</td>
<td>E</td>
<td>G</td>
<td>G</td>
<td>37</td>
<td>gray dotted</td>
</tr>
</tbody>
</table>

Comparisons to the check variety, small red lentil CDC Maxim CL.
CL indicates Clearfield variety.
CDC Maxim, CL (check)  
(S, F, R, C)

CDC Dazil, CL  
104% of Maxim  
(R, C)

CDC Imax, CL  
96% of Maxim  
(F, R, C)

CDC Scarlet  
105% of Maxim  
(R)

CDC Roxy  
103% of Maxim  
(F)

CDC Redbow  
102% of Maxim

S = Select; F = Foundation; R = Registered; C = Certified

Extra small green

CDC Asterix  
(C)

CDC Invincible, CL  
(R)

Large Green

CDC Greenland  
89% of Maxim  
(R, C)

CDC Greenstar  
100% of Maxim  
(S, F, R)

CDC Impower, CL  
85% of Maxim  
(S, F, R, C)

CDC Improve, CL  
87% of Maxim  
(R)

S = Select; F = Foundation; R = Registered; C = Certified
Some notes on lentils...

- Affected by Aphanomyces?  ➤ Yes
- Short rotations/wet weather  ➤ Bad

Possible resistance from wild species ➔ Long term solution

Lots of lentils to be produced in 2015... be careful of short rotations....
Lentils in Canada

Things can go upside down in a hurry….

Some Food for Rotational Thoughts

<table>
<thead>
<tr>
<th>Year</th>
<th>OLD ROTATION</th>
<th>Year</th>
<th>NEW ROTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>cereal</td>
<td>1</td>
<td>cereal</td>
</tr>
<tr>
<td>2</td>
<td>oilseed</td>
<td>2</td>
<td>oilseed</td>
</tr>
<tr>
<td>3</td>
<td>cereal</td>
<td>3</td>
<td>cereal</td>
</tr>
<tr>
<td>4</td>
<td>lentil or pea</td>
<td>4</td>
<td>lentil or pea</td>
</tr>
<tr>
<td>1</td>
<td>cereal</td>
<td>5</td>
<td>cereal</td>
</tr>
<tr>
<td>2</td>
<td>oilseed</td>
<td>6</td>
<td>oilseed</td>
</tr>
<tr>
<td>3</td>
<td>cereal</td>
<td>7</td>
<td>cereal</td>
</tr>
<tr>
<td>4</td>
<td>lentil or pea</td>
<td>8</td>
<td>NOT LENTIL OR PEA!</td>
</tr>
</tbody>
</table>
## Characteristics of Chickpea Varieties (2015 Seed Guide)

<table>
<thead>
<tr>
<th>Market class</th>
<th>Variety</th>
<th>Years Tested</th>
<th>Yield (% Amit)</th>
<th>Ascochyta Blight**</th>
<th>Height (cm)</th>
<th>Days to Flower</th>
<th>Maturity</th>
<th>Seed Weight (g/1000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kabuli</td>
<td>Amit (B-90) ^</td>
<td>13</td>
<td>100</td>
<td>100</td>
<td>4.4</td>
<td>47</td>
<td>57</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>CDC Alma</td>
<td>6</td>
<td>90</td>
<td>94</td>
<td>6.1</td>
<td>42</td>
<td>54</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>CDC Frontier</td>
<td>13</td>
<td>108</td>
<td>104</td>
<td>4.4</td>
<td>45</td>
<td>56</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>CDC Leader</td>
<td>9</td>
<td>110</td>
<td>107</td>
<td>4.5</td>
<td>42</td>
<td>55</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>CDC Luna</td>
<td>12</td>
<td>97</td>
<td>100</td>
<td>5.7</td>
<td>40</td>
<td>54</td>
<td>ML</td>
</tr>
<tr>
<td></td>
<td>CDC Orion</td>
<td>8</td>
<td>108</td>
<td>107</td>
<td>5.0</td>
<td>45</td>
<td>51</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>CDC Palmer</td>
<td>4</td>
<td>108</td>
<td>105</td>
<td>4.8</td>
<td>44</td>
<td>53</td>
<td>ML</td>
</tr>
<tr>
<td>Desi</td>
<td>CDC Consul</td>
<td>7</td>
<td>112</td>
<td>110</td>
<td>4.0</td>
<td>46</td>
<td>53</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>CDC Corinne</td>
<td>12</td>
<td>114</td>
<td>110</td>
<td>4.2</td>
<td>40</td>
<td>56</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>CDC Cory</td>
<td>6</td>
<td>112</td>
<td>105</td>
<td>4.2</td>
<td>48</td>
<td>57</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>CDC Vanguard</td>
<td>12</td>
<td>107</td>
<td>108</td>
<td>4.8</td>
<td>39</td>
<td>53</td>
<td>ML</td>
</tr>
</tbody>
</table>

* Area 1: brown soil zone; Area 2: dark brown soil zone

** Ascochyta Blight at pod filling period 0-9 scale; 0 = no symptom; 9 = plants are completely blighted. Scores 4-6 are considered fair.
**Chickpea Yield Trend**

- **Potential yield** (24 entries; 8-10 sites per year)
- **Actual yield** (data from STATCAN and SK Crop Stats)

**CDC Orion**
- (439g/1000 seeds)
- 108% Amit (B-90)
- 5.0 Ascochyta rating
- Late maturity
  - S, F, R, C

**CDC Leader**
- (392g/1000 seeds)
- 110% Amit (B-90)
- 4.5 Ascochyta rating
- Medium maturity
  - S, F, R, C

**CDC Palmer (2014)**
- (424g/1000 seeds)
- 105% Amit (B-90)
- 4.8 Ascochyta rating
- Medium late maturity
  - S

**CDC Consul**
- (303g/1000 seeds)
- 112% Amit (B-90)
- 4.0 Ascochyta rating
- Medium maturity
  - S

**Chickpea Yield Trend**

- **Yield (kg/ha)**
- **Potential yield** vs. **Actual yield**

- Near perfect?!
- Narrowing the gap - How?
- Hot & dry (July & Aug)
- Cool & wet
Recipe for Achieving Yield Potential of Chickpea

1. Maintain crop rotation, appropriate field selection;
2. Variety Selection: Use best variety and best seed quality; use seed treatment if necessary → even and fast seed emergence
1. Optimum seeding date (seed early) and seeding rate;
2. Scout fields daily → timely ascochyta disease control; *First spray at ~8 node stage is critical!*
3. Weed management → eliminate weeds early;
4. Proper fertilizers/inoculant.

Faba bean – Canadian experience

• 1982-2012 – 5,000 ha annual average
• 2013 - 15,000 ha
• 2014 - 40,000 ha
• 2015 – 100,000 ha?
Current high level of interest in faba bean is driven by:

1. Disappointing yield of pea and lentil due to root disease(s), *Aphanomyces* ?!
2. Desire to retain benefits of pulse rotations during wet weather cycle.
3. Watching the neighbors’ crops.
4. Straight cutting potential – crop stands until harvest, leaves stubble.
5. Perceptions of protein and fibre markets.
6. Good weed control options

Faba bean – Canadian experiences….

- Yield higher than other pulses
- Exporter/farmer interest is growing
- Protein higher than pea
- New ideotypes
- Tolerates wetter soils
- Tolerates cold
- Excellent N fixation
- Protein premium on following wheat
**Faba bean – global protein/fibre crop?**

**Ideotype for faba bean**
- small round seed
- low vicine (or none?)
- flower colour?
- nitrogen fixation
- deeper roots
- more protein
- disease resistance

---

Vicine/convicine are pyrimidine glycosides responsible for favism, an acute hemolytic disease resulting from oxidative damage in red blood cells that affects human populations suffering from glucose-6-phosphate dehydrogenase deficiency.
Tannins: associated with flower colour

Seed coat of white flower type: 0 to 0.6 % tannin → better digestibility of protein and a higher proportion of available energy

Seed coats of coloured flower type: 4 to 8 % tannin

Zero tannin – 310 mg

Normal tannin – 700 mg

Current Relevant Varieties in SK

- **Snowbird** - *medium size*
- **CDC Snowdrop** – *small size*
- **FB9-4** - *large seeded for export*
- **Taboar** – *medium size*
- **Tobasco** – *medium size*
- **SSNS-1** – *small size (green manure)
Faba bean – Advice for 2015

• **Agronomy**
  - optimize seeding rate ~ 44 plants/m$^2$
  (four plants/ft.$^2$)
  - watch for chocolate spot
  - get good advice!
  - try faba bean specific inoculant strains

• **Marketing**
  - work *with* processors
  - *don’t* export seed

• **Seed Growers**
  - *make sure seed crops are isolated*
  faba bean is partially outcrossing....

Acknowledgments:

Acknowledgments:
CSFL Pulse Breeding Staff
Kernen Breeder Seed Facility Staff
Pulse Genetic Lab
Pulse Pathology Research Group
Cooperators