AC Alta spring triticale

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McLeod, J. G., Townley-Smith, T. F., DePauw, R. M. and Clarke, J. M. 1996. AC Alta spring triticale. Can. J. Plant Sci. 76: 139–141. AC Alta, a spring triticale cultivar (× Triticosecale Wittmack) was developed at the Semiarid Prairie Agricultural Research Centre, Research Branch, Agriculture and Agri-Food Canada, Swift Current, Saskatchewan. AC Alta is a high-yielding, large kernalled, lodging resistant cultivar of triticale which is widely adapted to the Prairie Provinces. AC Alta is very resistant to leaf and stem rust, resistant to common bunt and moderately resistant to common root rot. AC Alta will be distributed by Progressive Seeds Limited.

Key words: Cultivar description, grain yield, test weight, triticale (spring), × Triticosecale Wittmack

Pedigree and Breeding Methods

AC Alta derives from a cross made in 1984, at the University of Manitoba between Cinnamon/Ciano/Beagle/3/Merino ‘S’ and entry number 169 (W74.103-Addax/Beagle ‘S’-Maya 2A × IRA) from the 12th International Triticale Screening Nursery. AC Alta was tested under the experimental designation T122 from 1991 to 1993, inclusively.

In 1984, F₃ seed was transferred to the Swift Current program from the University of Manitoba. The F₄, F₅, and F₆ generations were grown in a winter nursery near Brawley, California to multiply seed for early generation, replicated yield tests. The F₇, F₈, and F₉ generations were grown as replicated yield trials at two locations to evaluate agronomic performance. The line designated UM8401A-29E1 was evaluated in the Triticale ‘A’ Test in 1988 and entered into the Western Spring Triticale Cooperative Test in 1989 as T103. In 1990 the breeder lines were observed to be heterogeneous for anthesis date. Late heading lines were selected and reevaluated in the Western Spring Triticale Cooperative Test from 1991 to 1993 as T122. The 42 breeder lines grown at Swift Current in 1990 as 3m rows and in 1993—1994 at Brawley, California as 7m rows, derive from an F₇ derived F₁₁ single plant progeny row.

AC Alta was grown in special nurseries established for the evaluation of reaction to common root rot, common bunt and leaf and stem rust at Agriculture and Agri-Food Canada Research Centres located at Saskatoon, Lethbridge and Winnipeg.

Performance and Adaptation

AC Alta is well adapted to the soils of the Canadian Prairies and has a large kernel that meets the criteria of the Canada Triticale class.

In the Black soil zone of Manitoba and Saskatchewan, the yield of AC Alta was equal to the best triticale check (Wapiti) and greater than Biggar Canada Prairie Spring wheat (Triticum aestivum L.) by 50.6%, while in the Brown and Dark Brown soil zones of Saskatchewan and Alberta it was equal in yield to the best triticale check (AC Copia) and greater than Biggar Canada Prairie Spring wheat by 26.8% (Table 1). In the Black soil zone of Alberta, AC Alta was equal in yield to both the best triticale check (Frank) and Biggar Canada Prairie Spring wheat. Under irrigated Brown soil conditions of Alberta, AC Alta was equal in yield to the best triticale check (Frank) and Biggar Canada Prairie Spring wheat. Overall, AC Alta outyielded the best triticale check (Frank) by 6.0% and Biggar by 28.4%.

The test weight of AC Alta is equal to that of Wapiti but less than that of Frank and AC Copia (Table 2). The kernel weight of AC Alta is 7.5% greater than that of the largest
check cultivar (AC Copia). AC Alta is shorter than the triticale check cultivars. It is more resistant to lodging than the check cultivar (Frank). AC Alta is equal in maturity to the triticale checks.

**Disease Reaction**

AC Alta is very resistant to the prevalent races of stem rust (caused by *Puccinia graminis* Pers. f. sp. *tritici* Eriks. and E. Henn.), leaf rust (caused by *P. recondita* Rob. ex Desm. f. sp *tritici*); resistant to common bunt (caused by *Tilletia foetida* (Wallr.) Liro and *Tilletia caries* (DC.) Tul. & C. Tul.) and moderately resistant to common root rot (caused primarily by *Bipolaris sorokiniana* (Sacc. in Sorok.) Shoem.) (Table 3).

**End-use Suitability**

AC Alta was similar to Wapiti in protein content (9.4%) and

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**Table 1.** Mean grain yield performance of AC Alta compared with Wapiti, Frank and AC Copia triticales and Biggar Canada Prairie Spring wheat, based on data from the Western Spring Triticale Tests (1991–1993)

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Zone 1*</th>
<th>Zone 2</th>
<th>Zone 3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biggar</td>
<td>3.75</td>
<td>4.42</td>
<td>7.73</td>
<td>6.61</td>
</tr>
<tr>
<td>Wapiti</td>
<td>5.40</td>
<td>5.31</td>
<td>7.52</td>
<td>5.97</td>
</tr>
<tr>
<td>Frank</td>
<td>5.34</td>
<td>5.24</td>
<td>7.82</td>
<td>6.51</td>
</tr>
<tr>
<td>AC Copia</td>
<td>5.13</td>
<td>5.36</td>
<td>7.60</td>
<td>6.48</td>
</tr>
<tr>
<td>AC Alta</td>
<td>5.65</td>
<td>5.60</td>
<td>8.05</td>
<td>6.98</td>
</tr>
<tr>
<td>LSD&lt;sub&gt;0.05&lt;/sub&gt;</td>
<td>0.46</td>
<td>0.40</td>
<td>1.43</td>
<td>0.81</td>
</tr>
<tr>
<td>No. of tests</td>
<td>15</td>
<td>11</td>
<td>3</td>
<td>33</td>
</tr>
</tbody>
</table>

*Zone 1, Black soils of Manitoba and Saskatchewan; Zone 2, Brown and Dark Brown soils of Saskatchewan and Alberta; Zone 3, Black soils of Alberta; Zone 4, Irrigated Brown soils of Alberta.

**Table 2.** Means for agronomic performance of AC Alta compared with Frank, Wapiti and AC Copia triticales and Biggar Canada Prairie Spring wheat, based on the Western Spring Triticale Cooperative Tests (1991–1993)

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Maturity (d)</th>
<th>Height (cm)</th>
<th>Lodging (1-9)&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Test wt. (kg ha&lt;sup&gt;–1&lt;/sup&gt;)</th>
<th>Kernel wt. (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biggar</td>
<td>107</td>
<td>80</td>
<td>1.8</td>
<td>75.0</td>
<td>34.1</td>
</tr>
<tr>
<td>Wapiti</td>
<td>112</td>
<td>108</td>
<td>2.3</td>
<td>66.6</td>
<td>43.3</td>
</tr>
<tr>
<td>Frank</td>
<td>112</td>
<td>104</td>
<td>2.4</td>
<td>68.4</td>
<td>38.6</td>
</tr>
<tr>
<td>AC Copia</td>
<td>112</td>
<td>108</td>
<td>2.3</td>
<td>71.0</td>
<td>44.2</td>
</tr>
<tr>
<td>AC Alta</td>
<td>113</td>
<td>97</td>
<td>1.6</td>
<td>66.7</td>
<td>47.5</td>
</tr>
<tr>
<td>LSD&lt;sub&gt;0.05&lt;/sub&gt;</td>
<td>1.2</td>
<td>1.5</td>
<td>0.7</td>
<td>1.0</td>
<td>1.3</td>
</tr>
<tr>
<td>No. of tests</td>
<td>27</td>
<td>32</td>
<td>10</td>
<td>33</td>
<td>33</td>
</tr>
</tbody>
</table>

<sup>a</sup>I = no lodging; 9 = completely lodged.

**Table 3.** Disease reactions of AC Alta compared with Wapiti, Frank and AC Copia triticales and Biggar Canada Prairie Spring wheat, based on the Western Spring Triticale Cooperative Tests (1991–1993)

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Year</th>
<th>Leaf rust</th>
<th>Stem rust</th>
<th>Common bunt</th>
<th>Common root rot (% infection)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biggar</td>
<td>1991</td>
<td>5VR</td>
<td>–</td>
<td>S</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>1992</td>
<td>40MR</td>
<td>40MR</td>
<td>S</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1993</td>
<td>5R</td>
<td>10MR</td>
<td>S</td>
<td>9</td>
</tr>
<tr>
<td>Wapiti</td>
<td>1991</td>
<td>5VR</td>
<td>–</td>
<td>VR</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>1992</td>
<td>10VR</td>
<td>VR</td>
<td>VR</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>1993</td>
<td>5VR</td>
<td>TR</td>
<td>–</td>
<td>3</td>
</tr>
<tr>
<td>Frank</td>
<td>1991</td>
<td>5VR</td>
<td>–</td>
<td>VR</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>1992</td>
<td>10VR</td>
<td>VR</td>
<td>VR</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>1993</td>
<td>5VR</td>
<td>5VR</td>
<td>–</td>
<td>15</td>
</tr>
<tr>
<td>AC Copia</td>
<td>1991</td>
<td>5VR</td>
<td>–</td>
<td>VR</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>1992</td>
<td>10VR</td>
<td>VR</td>
<td>–</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>1993</td>
<td>5VR</td>
<td>TR</td>
<td>–</td>
<td>11</td>
</tr>
<tr>
<td>AC Alta</td>
<td>1991</td>
<td>5VR</td>
<td>–</td>
<td>VR</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>1992</td>
<td>10VR</td>
<td>VR</td>
<td>–</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>1993</td>
<td>5VR</td>
<td>TR</td>
<td>–</td>
<td>16</td>
</tr>
</tbody>
</table>

<sup>a</sup>Types of reaction: TR = trace resistant; VR = very resistant; R = resistant; MR = moderately resistant; S = susceptible. Numbers indicate percent infection.
1.2% less than Biggar Canada Prairie Spring wheat; kernel hardness (measured by grinding time) is slightly softer than other check triticales; flour yield is equal to Wapiti (Table 4). AC Alta is eligible for the grades of Canada Triticale.

Other Characteristics

S P I K E S . Long, tapered and nodding at maturity; mid-dense and glaucous; chaff is white; awns are long, white and spreading at maturity.

K E R N E L S . Red, soft and of large size; elliptical in shape with rounded cheeks; crease is of medium depth and narrow; brush hairs are of medium length; germ is large and oval in shape; phenol reaction is black.

Maintenance and Distribution of Pedigreed Seed

AC Alta has been released to Progressive Seeds Limited, 155-4752 Ross Street, Red Deer, Alberta, Canada T4N 1X2, for multiplication and distribution. Breeder seed originating from 42 breeder lines will be maintained by the Seed Increase Unit of the Experimental Farm, Indian Head, Saskatchewan, Canada S0G 2K0.

Appreciation is expressed to J. S. Noll for providing end-use quality analysis; J. A. Kolmer and D. E. Harder (Research Centre, Agriculture and Agri-Food Canada, Winnipeg, MB) for determining leaf and stem rust reaction; K. L. Bailey (Research Centre, Agriculture and Agri-Food Canada, Saskatoon, Saskatchewan) for determining the reaction to common root rot; D. A. Gaudet and B. Puchalski (Research Centre, Agriculture and Agri-Food Canada, Lethbridge, AB) for determining the reaction to common bunt; and R.A. Ferguson (Research Centre, Agriculture and Agri-Food Canada, Regina, Saskatchewan), D. Green and D. T. Gehl (Research Farm, Agriculture and Agri-Food Canada, Indian Head, Saskatchewan), J. F. Payne, C. W. B. Lendrum, and G. McClare, (Semiarid Prairie Agricultural Research Centre, Agriculture and Agri-Food Canada, Swift Current, Saskatchewan) for their expert technical assistance in developing AC Alta.