

Hazlet winter rye

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McLeod, J. G. and Gan, Y. 2008. **Hazlet winter rye**. Can. J. Plant Sci. **88**: 527–529. Hazlet is a cultivar of winter rye (*Secale cereale* L.), developed at the Semiarid Prairie, Agricultural Research Centre, Research Branch, Agriculture and Agri-Food Canada, Swift Current, SK. Straw of Hazlet is about 10% shorter than tall cultivars such as Prima. Lodging resistance is poorer than AC Rifle and similar to Prima and Dakota. Hazlet has good winter survival and is well adapted to the Canadian Prairies. Kernels are about 16% larger and the test weight is significantly greater than the check cultivars. Grain yield is about 16% greater than that of Prima.

Key words: Cultivar description, winter rye, straw strength, reduced plant height, test weight, kernel weight, *Secale cereale* L.

McLeod, J. G. et Gan, Y. 2008. **Le seigle d'hiver Hazlet**. Can. J. Plant Sci. **88**: 527–529. Hazlet est un cultivar de seigle d'hiver (*Secale cereale* L.) créé au Centre de recherches sur l'agriculture des prairies semi-arides de la Direction générale de la recherche d'Agriculture et Agroalimentaire Canada à Swift Current, en Saskatchewan. Hazlet a une paille environ 10 % plus courte que celle de Prima. La variété résiste moins bien à la verse que AC Rifle, mais elle est aussi résistante que Prima et Dakota. Hazlet se caractérise par une bonne rusticité et est bien adaptée aux Prairies canadiennes. Son amande est environ 16 % plus large et son poids spécifique est sensiblement plus élevé que celui des cultivars témoins. Le rendement grainier de Hazlet dépasse celui de Prima d'environ 16 %.

Mots clés: Description de cultivar, seigle d'hiver, robustesse de la paille, réduction de la taille, poids spécifique, poids d'amande, *Secale cereale* L.

Hazlet is a cultivar of winter rye, *Secale cereale* L., which was developed from two cycles of recurrent selection for large seed size, floret fertility and reduced plant height. It was developed at the Semiarid Prairie Research Centre of Agriculture and Agri-Food Canada, Swift Current, SK. It received registration no. 6112 from the Variety Registration Office, Food Production and Inspection Branch, Canadian Food Inspection Agency on 2006 Apr. 28.

Breeding Methods and Pedigree

Hazlet was selected from a spring × winter habit cross of Gazelle (Sosulski and Curran 1975) and Saratov, an introduction (PGRC) from the Central-Chernozem Region of Russia, made in 1996 at Swift Current, SK. The F₂ generation was produced in the greenhouse in the winter and spring of 1997 and planted in a spaced plant nursery in the fall 1997. Two cycles of recurrent mass selection were done in 1997–1998 and 1998–1999 at a selection intensity of about 5%. The main selection criteria were: kernel weight, increased floret fertility measured as reduced numbers of sterile florets and reduced plant height. In the fall of 1999, 195 F₄ lines were entered into a preliminary replicated trial at Swift Current and evaluated for grain yield and agronomic traits. In the fall of 2000, grain of 28 superior lines was bulked and entered into cooperative yield and

agronomic trials as RT193. RT 193 was grown in the Western Fall Rye Cooperative Test from 2000 to 2002, inclusive, under the auspices of the Prairie Recommending Committee for Wheat, Rye and Triticale (Graf and Fox 2000).

Performance

Hazlet is adapted to the soils and climate of the Canadian Prairies where it performed consistently well. Averaged over 23 site-years, Hazlet yielded 13 and 30% more grain than Prima and AC Rifle, respectively, and was equal to Dakota ($P < 0.05$). The test weight of Hazlet was significantly greater than all checks ($P < 0.05$). The kernel weight of Hazlet was significantly greater than all of the checks ($P < 0.05$) and 20% greater than the best check, Prima. The plant height of Hazlet was significantly shorter than that of Prima, taller than that of AC Rifle and similar to that of Dakota ($P < 0.05$). Hagberg falling number, an indirect measure of harvest-time sprouting damage, was similar to that of the check cultivars (Table 1).

Hazlet headed significantly earlier than Dakota and AC Remington and at about the same time as Prima ($P < 0.05$). Hazlet matured significantly later than Prima and AC Rifle and at a similar time to that of Dakota. The winter survival of Hazlet was significantly greater than that of AC Rifle and similar to that of Prima and Dakota.

Table 1. Mean grain yield, test weight, kernel weight, plant height and Hagberg falling number of Hazlet compared with Prima, AC Rifle and Dakota checks based on data from Co-operative Fall Rye Tests (2000–2001, 2001–2002, 2002–2003)^z

Cultivar	Grain yield (kg ha ⁻¹)	Test weight (k hL ⁻¹)	Kernel weight (mg)	Plant height (cm)	Hagberg falling number (s)
Prima	3447	71.1	29.8	103	207
AC Rifle	2990	69.2	27.5	75	191
Dakota	4076	68.9	29.6	95	211
Hazlet	3901	71.9	35.8	93	187
LSD _{0.05} ^y	316	0.06	1.5	4.5	24
No. of tests	23	20	20	22	20

^zCo-operative Fall Rye Tests were grown at Beaverlodge and Lacombe, AB, and Indian Head, SK, in 2001 to 2003, inclusive; Neapolis, AB, in 2001 and 2002; Brookings, ND, in 2002 and 2003; Winnipeg, MB, Swift Current, Melfort and Saskatoon, SK, in 2001 and 2003, and at Irricana, AB, in 2001.

^yLSD_{0.05} was calculated from Proc Anova in SAS.

Lodging resistance was significantly poorer than that of AC Rifle and similar to that of Prima and Dakota ($P < 0.05$) (Table 2). Hazlet is identifiable as rye and is eligible for the grades of Canada Rye.

Other Characteristics:

DISEASE REACTION: The percentage of ergot infection [caused by *Claviceps purpurea* (Fr.) Tul.] of Hazlet was not significantly different from the check cultivars (Table 2).

SPIKES: Lemma awns are present with smooth margins and weak anthocyanin colour; semi-erect to horizontal at maturity; tapering to oblong, medium dense, medium length, and medium width; medium glaucosity (waxy bloom); Chaff is white.

KERNELS: Bluish-green in colour; short brush hairs; elliptical in shape; mid-long to long and mid-wide to wide.

END USE SUITABILITY: Hazlet is eligible for the grades of the Canada Western Rye class.

Maintenance and Distribution of Pedigreed Seed

The breeder seed of Hazlet will be maintained by the Seed Increase Unit, Agriculture and Agri-Food Canada, Experimental Farm, Indian Head, Saskatchewan, Canada S0G 2K0. Hazlet has been released to SeCan Association, 501–300 March Road, Kanata, Ontario, Canada K2K 2E2 for multiplication and distribution of pedigreed seed.

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Table 2. Mean heading, maturity, survival, lodging, and percent ergot of Hazlet compared with Prima, AC Rifle and Dakota checks, based on data from the Co-operative Fall Rye Tests (2000–2001, 2001–2002, 2002–2003)^z

Cultivar	Heading (days from Jan. 01)	Maturity (days from Jan. 01)	Winter survival (%)	Lodging ^y (1–9)	Ergot (%)
Prima	162	210	84.6	3.2	0.2
AC Rifle	165	211	70.8	1.3	0.2
Dakota	166	213	89.3	3.3	0.3
Hazlet	163	213	88.6	2.4	0.3
LSD _{0.05} ^x	1.0	1.7	13.1	0.9	0.2
No. of tests ^w	12	9	7	6	14

^zCo-operative Fall Rye Tests were grown at Beaverlodge and Lacombe, AB, and Indian Head, SK, in 2001 to 2003, inclusive; Neapolis, AB, in 2001 and 2002; Brookings, ND, in 2002 and 2003; Winnipeg, MB, Swift Current, Melfort and Saskatoon, SK, in 2001 and 2003 and at Irricana, AB, in 2001.

^y1 = no lodging; 9 = completely lodged.

^xLSD_{0.05} was calculated from Proc Anova in SAS.

^wHeading time was measured at Indian Head, SK, and Beaverlodge, AB, in all years; at Saskatoon, SK, in 2001 and 2003; at Irricana and Neapolis, AB, in 2001 and at Melfort, SK, and Lethbridge, AB, in 2003. Maturity was measured at Lacombe, AB, in all years; at Saskatoon and Melfort, SK, in 2001 and 2003 and at Lethbridge, AB, and Winnipeg, MB, in 2003. Winter survival was estimated at Melfort, SK, and Irricana, Neapolis and Beaverlodge, AB, in 2001; Indian Head, SK, in 2002, and at Winnipeg, MB, and Swift Current, SK, in 2003. Lodging was measured at Beaverlodge, AB, in 2001 and 2002; at Melfort, SK, in 2001 and 2003 and at Winnipeg, MB, and Lethbridge, AB, in 2003. Ergot% was determined from tests at Indian Head, SK, in all years; at Winnipeg, MB, Melfort, SK, and Lacombe and Beaverlodge, AB, in 2001 and 2003; at Irricana, AB, in 2001 and at Swift Current, SK, in 2003.

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Graf, R. J. and Fox, S. L. 2000. Subcommittee on wheat, rye and triticale operating procedures. *In* Wheat rye and triticale subcommittee report. Prairie Registration Recommending Committee for Grain, Edmonton, AB. 2000 Feb. 20–22.

Plant Gene Resources of Canada. 0000. [Online] Available: http://pgrc3.agr.gc.ca/index_e.html.

SAS Institute, Inc. 1999. SAS users guide. Version 8. SAS Institute, Inc., Cary, NC.

Sosulski, F. W. and Curran, W. A. 1975. Gazelle spring rye. *Can. J. Plant Sci.* **55**: 629