

SWS-52 soft white spring wheat

Sadasivaiah, R. S. and Thomas, J. B. 1991. **SWS-52 soft white spring wheat**. *Can. J. Plant Sci.* **71**: 531–534. SWS-52 has higher grain yield potential than Fielder and Owens, combined with resistance to prevalent races of stripe rust and moderate resistance to black point and bunt. It matures 5–6 d later than Fielder and Owens and has good resistance to lodging and moderate resistance to shattering. Compared with Fielder and Owens, it has a higher falling number accompanied by lower α -amylase and better sprouting resistance. SWS-52, however, has slightly stronger gluten and thus marginal cookie quality.

Key words: Wheat, *Triticum aestivum* L., cultivar description

Sadasivaiah, R. S. and Thomas, J. B. 1991. **Blé tendre blanc de printemps SWS-52**. *Can. J. Plant Sci.* **71**: 531–534. SWS-52 a un plus grand potentiel de rendement grainier que Fielder et Owens, conjugué à une résistance aux races dominantes de la rouille jaune striée et à une résistance modérée à la mélanose du grain et à la carie. Il parvient à maturité cinq à six jours plus tard que Fielder et Owens et affiche une bonne résistance à la verse et une résistance modérée à l'égrenage. Comparativement à Fielder et Owens, il a un indice de Hagberg plus élevé, une concentration en alpha-amylase plus faible et une meilleure résistance à la germination sur pied. SWS-52 possède toutefois un gluten légèrement plus fort, d'où une mauvaise aptitude à la confection de biscuits sucrés.

Mots clés: Blé, *Triticum aestivum* L., description de cultivar

SWS-52, a soft white spring wheat (*Triticum aestivum* L. em. Thell.) cultivar, was developed at the Research Station, Agriculture Canada, Lethbridge, Alberta. An interim registration no. I-91 was issued for SWS-52 on 24 May 1989 by Plant Health and Plant Products Directorate, Food Production and Inspection Branch of Agriculture Canada.

Pedigree and Breeding Method

SWS-52 was developed using a modified pedigree method from an F_4 bulk of unknown crosses received in 1980 from Dr. D. W. Sunderman, Agricultural Research Service, USDA, Aberdeen, Idaho. An F_5 -derived F_8 line was tested as L2630-25 in preliminary and advanced replicated yield trials in 1982 and 1984, respectively. From 1985 to 1988, it was evaluated in Western Soft White Spring Wheat Cooperative tests as SWS-52. For the development of breeder

seed, 347 single heads selected from an F_5 -derived F_{11} line were grown as head-rows, and 323 breeder lines derived from selected head rows were increased and bulked in 1988. Analyses of gliadin (PAGE=polyacrylamide gel electrophoresis) and glutenin (SDS-PAGE=sodium dodecyl sulfate-PAGE) electrophoregrams of single seeds revealed no variability, thus confirming the uniformity of the breeder seed for these endosperm proteins. The characteristic electrophoretic patterns of gliadin and glutenin proteins of SWS-52, in comparison with Neepawa, are shown in Fig. 1.

Performance and Adaptation

SWS-52 is a bearded wheat with stiff straw and brown chaff (when mature) and is adapted to irrigated regions of southern Alberta and Saskatchewan. It outyielded Owens and Fielder by 5 and 11%, respectively, in 4 yr of testing in the Western Soft White Spring Wheat Cooperative test (Table 1), but matured 5–6 d later. SWS-52 exhibited good resistance to lodging and moderate resistance to shattering (Table 2).

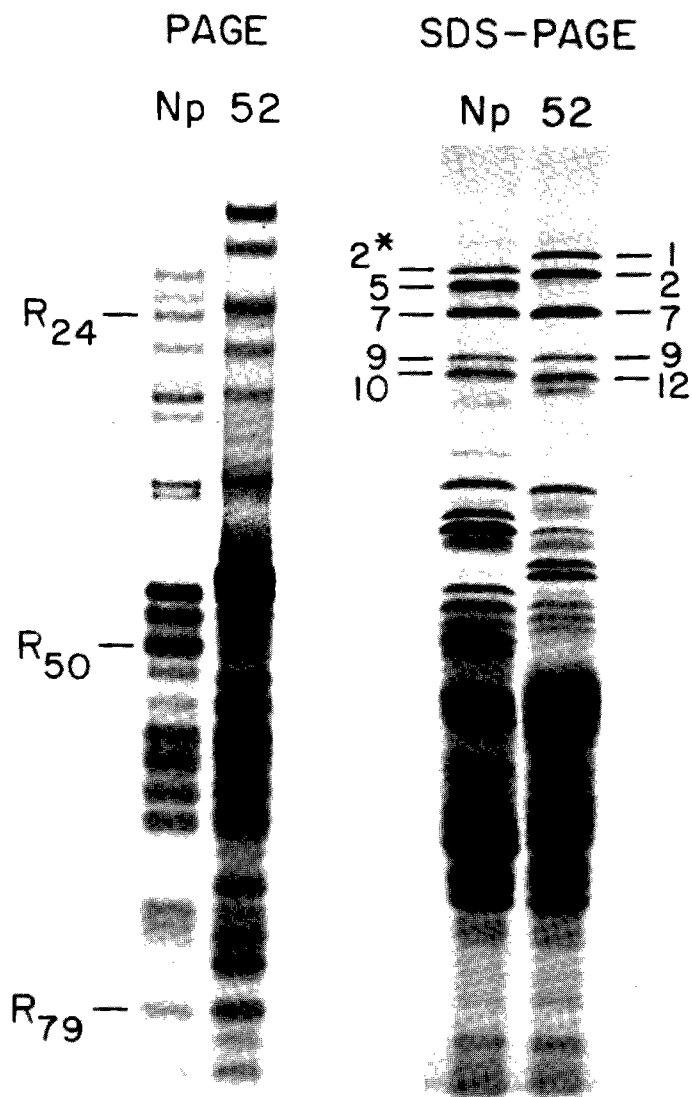


Fig. 1. Polyacrylamide gel electrophoretic (PAGE) and sodium dodecyl sulphate-PAGE (SDS-PAGE) patterns of gliadin and glutenin, respectively, in Np=Nee-pawa (standard) and SWS-52.

Other Characteristics

SPIKES. Oblong to tapering, mid-dense, mid-long, seminodding, glabrous, and brown at maturity; glume shoulders elevated, midwide; glume beaks narrow, acute.

KERNELS. Soft, white, midsize, ovate; cheeks rounded; brush hairs midlong; crease narrow, and mid-deep; germ mid-size, ovate.

Table 1. Grain yield for SWS-52 and check cultivars in the Soft White Spring Wheat Cooperative Tests (1985–1988)

Entry	Yield (t ha ⁻¹)				Mean
	1985	1986	1987	1988	
SWS-52	6.58	6.42	5.66	5.37	6.01
Owens	6.04	5.80	5.84	5.19	5.72
Fielder	5.57	5.47	5.63	5.05	5.43
SE ^z	0.22	0.15	0.31	0.15	0.11
No. station-years ^y	5	6	5	5	21

^zBased on cultivar × test interaction mean squares.

^yTests with a coefficient of variation exceeding 15% were not included; tests were grown at Bow Island, Iron Springs, Lethbridge and Vauxhall, Alberta, and at Outlook and Saskatoon, Sask.

Table 2. Agronomic performance of SWS-52 and check cultivars in the Soft White Spring Wheat Cooperative Tests (1985–1988)

Entry	Maturity (d)	Height (cm)	Lodging (1–9) ^z	Shattering (1–9) ^y	1000 kernel wt. (g)	Sprouting	
						(0–4) ^x	(1–3) ^w
SWS-52	117.3	78.2	1.3	2.1	35.5	2.8	1.3
Owens	112.9	73.4	2.5	2.1	35.3	3.7	2.5
Fielder	111.8	76.7	1.5	3.1	38.5	3.8	2.5
SE ^v	0.6	0.8	0.4	0.4	0.4	0.6	–
No. station-years	18	20	7	9	24	2	1

^z1=no lodging, 9=completely lodged.

^y1=no shattering, 9=completely shattered.

^x1987 and 1988 data based on rain simulator assessment with four replicates and five heads per replicate; 0=no sprouting, 4=whole head sprouted.

^w1986 sprouting data estimated on harvested grain sample; 1=1/3 sprouted, 3=all sprouted.

^vBased on cultivar × test interaction mean squares.

MATURITY. Five to six days later than Fielder and Owens (Table 2).

STRAW. Two to five cm taller; stronger than Fielder and Owens (Table 2).

SHATTERING. Moderately resistant, similar to Owens, better than Fielder (Table 2).

DISEASE REACTION. Resistant to prevalent races of stripe rust (caused by *Puccinia striiformis* West.); moderately resistant to black point [caused by *Alternaria alternata* (Fr.) Keissler] and common bunt [caused by *Tilletia laevis* Kühn (syn. *T. levis*, *T. foetida* (Wallr.) Liro) and *T. tritici* (Bjerk.) Wint. (syn. *T. caries* (DC) Tul)]; highly susceptible to loose smut [caused by *Ustilago tritici* (Pers.) Rostr.]; moderately susceptible to leaf rust (caused by *Puccinia recondita* Rob. ex.

Desm. f. sp. *tritici*) and powdery mildew (caused by *Erysiphe graminis* DC. f. sp. *tritici* E. Marchal) (Table 3).

QUALITY. Similar to Owens in test and kernel weights, but better than Owens in flour yield. It has a higher falling number accompanied by lower α -amylase and better sprouting resistance than Fielder and Owens. SWS-52 has slightly stronger gluten and thus marginal cookie quality compared with the checks (Table 4).

Maintenance and Distribution of Pedigreed Seed

Breeder seed derived from a bulk of 323 breeder lines will be maintained by Agriculture Canada Experimental Farm, Indian Head, SK, Canada S0G 2K0. The multiplication and distribution of pedigreed seed are handled by

Table 3. Disease reactions of SWS-52 and check cultivars in the Soft White Spring Wheat Cooperative Tests (1985-1988)

Entry	Stripe rust ^z (1-6)	Leaf rust (1-6)	Stem rust rating (%)	Powdery mildew (1-6)	Black point (%)	Ergot no. kg ⁻¹	Bunt rating (%)	Loose smut rating (%)	Root rot (%)
SWS-52 ^y	1.0	1.8	10R	3.0	9.4	0.04	12.9I	89HS	40.0
Owens	1.0	2.1	30MR	3.1	18.3	0.33	30.6S	68S	22.4
Fielder	2.7	1.8	20R ^x	2.9	17.1	0.13	34.3S ^x	74HS ^x	42.6
SE ^w	0.3	0.1	-	0.1	0.8	0.1	4.7	9.0	2.3
No. station-years	9	9	1	16	24	19	3	3	3

^zScale of 1-6 rated under field conditions with natural infection; 1=resistant, 6=highly susceptible.

^ySWS-52 is resistant to current races of stripe rust at the seedling stage.

^xR=resistant; MR=moderately resistant; S=susceptible; HS=highly susceptible; I=intermediate reaction.

^wBased on cultivar × test interaction mean squares.

Table 4. Quality parameters of SWS-52 and check cultivars in the Soft White Spring Wheat Cooperative Tests (1985-1987)

Quality parameters	SWS-52	Owens	Fielder
Test wt. (kg hL ⁻¹)	79.67	79.24	79.42
Protein (%) ^y (wheat)	10.07	10.43	10.14
Falling no. ^y	367.50	230.00	272.50
Alpha amylase ^y (wheat)	5.70	48.65	25.95
Flour yield (%)	71.73	69.77	71.20
<i>Alveograph</i>			
Peak height (mm)	35.67	23.00	21.67
Length (mm)	100.33	119.67	133.67
Work (μJ) ^x	7.467	5.033	4.967
<i>Cookie</i>			
Spread (mm)	77.50	80.00	79.35
Ratio ^w	7.05	7.75	7.45
Score ^w	14.50	17.83	17.50

^yDetermined by standard Kjeldahl test.

^yBased on 2 yr of data.

^xThe higher the value, the stronger the flour.

^wSpread to thickness, based on 2 yr of data; Score based on spread, ratio, and crust characteristics, including color, and the degree and uniformity of cracking.

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