4-1-1969

Winoka: A New Hard Red Winter Wheat

D. G. Wells

J. J. Bonnemann

G. W. Buchenau

Bulletin 557
April 1969

WINOKA

A New Hard Red Winter Wheat

"Its excellence . . . should upgrade the quality of South Dakota winter wheat"

Agronomy Department
Agricultural Experiment Station
South Dakota State University, Brookings

WINOKA

A New, High Quality Hard Red Winter Wheat

By **D. G. Wells, C. L. Lay, J. J. Bonnemann** and **G. W. Buchenau***

The need for better varieties of winter wheat is never more apparent than when stem rust is rampant as it was from 1962 to 1965. Among the varieties and lines tested in 1962 was Winalta a new release from Canada. Winalta was among the hardiest varieties, was of excellent milling and baking qualities and was a good yielder but half of its plants were resistant and half were susceptible to stem rust.

Selection is one method used by plant breeders in their work. This method applied to Winalta involved sorting out its resistant plants, testing them for hardiness, yield and quality, and combining the best lines to make a new variety. One hundred pure-lines were selected from Winalta and more than 90 were discarded for shortcomings in hardiness, quality or reaction to stem rust.

Table 1. Performance of pure-lines from Winalta at the Highmore Central Substation, 1966-67.

Entries	Lodging %	Test Weight lbs.	Grain Yield bu.
Minter check	20	62	45.6
Winalta check	10	64	46.0
Pure-line 2	30	64	45.6
Pure-line 3	20	64	44.3
Pure-line 26*	70	64	43.6
Pure-line 30	10	64	45.8
Pure-line 36	1	64	44.4
Pure-line 55	5	64	44.4
Pure-line 60	5	64	43.3

*Discarded because of severe lodging.

In a test at the Highmore Central Substation the final seven pure lines from the 1966 crop were compared with Winalta and Minter (table 1). Pure-line 26 lodged so severely it was discarded. Results of tests did not demonstrate that the difference in yield between Winalta and the pure-lines was a real one, so developers concluded that the remaining 6 pure-lines and Winalta were alike in yield and test weight. These 6 lines were combined to make a new variety now named "Winoka" at the suggestion of a Hyde County wheat producer.

The stem rust resistance of Winoka is derived from emmer through the parentage Minter x Wichita from which cross Winalta was selected at Lethbridge, Alberta by Dr. J. E. Andrews and Dr. M. N. Grant of the Canada Department of Agriculture.

*Professor of agronomy, assistant in agronomy, assistant agronomist, and associate professor of plant pathology, respectively, Agricultural Experiment Station.

Table 2. Performance of Winoka and selected varieties in the Northern Regional Performance Nurseries (1966-67 averages).

Variety	C.I.No.	Headed	Ripe	Plant Hgt.	Leaf Rust	Stem Rust†	False Black Chaff	Weight	Survival* 1966	Survival* 1967
	Station Years	10 June	4 July	9 In.	%		2 %	14 lbs.	1 %	4 %
Winoka	14000	16	20	41	S	R	1	62	95	43
Winalta	13670	16	20	41	S	S-R	1	62	100	49
Trader	13998	15	20	41	S	R	13	61	68	38
Trapper	13999	15	20	41	S	R	13	61	83	35
Warrior	13190	13	20	39	S	S	0	61	95	
Kharkoff	1442	17	21	43	S	S	0	60	93	

*1966 data are from small plots at Brookings. 1967 data are averages from small plots at Brookings, Watertown, Laramie and St. Paul.
†R=resistant, S=susceptible.

Description of Winoka

Winoka is as winter hardy as Hume, Minter and Winalta (table 2) and is hardier than other recommended varieties. It resists false black chaff and prevalent races of stem rust but is susceptible to leaf rust and streak mosaic. It is strikingly susceptible to necrosis which is premature dying of tissues in leaves, stems and heads. Necrosis is a physiological disease that is derived from emmer and which normally accompanies the emmer resistance to stem rust. Winoka is bearded, white-chaffed, resistant to lodging and shattering, the same height as Trader and Trapper, and an inch or two taller than Lancer. Winoka heads a day later than Trader and Trapper and 2 or 3 days later than Lancer.

Winoka appears to be a slightly better yielder than Hume and Min-

Table 3. Performance of selected varieties in Standard Variety Winter Wheat Tests.

Variety	Presho Grain Yields 1967	Presho Grain Yields 1968	Presho Ave.	Presho Test Weights 67-68	Quinn Grain Yields 1967	Quinn Grain Yields 1968	Quinn Ave.	Quinn Test Weights 67-68	Highmore* Grain Yields 1966	Highmore* Grain Yields 1967	Highmore* Ave.	Highmore* Test† Weights 1967
	bushels			pounds	bushels			pounds	bushels			pounds
Winoka	50	34	42.0	61	46	51	48.5	62	26	45	36.0	63
Hume	45	33	39.0	61	49	50	49.6	62	26	41	33.5	63
Minter	48	30	39.0	60	40	47	43.3	62	25	45	35.0	61
Winalta	52	41	46.5	61	50	59	54.5	62	29	48	38.5	63
Trader	50	38	44.0	61	51	59	55.0	62	—	45	—	63
Trapper	53	38	45.5	60	45	58	51.5	62	—	45	—	61
Lancer	48	39	43.5	61	51	63	57.0	62	30	43	36.5	64
Scout	51	40	45.5	61	53	65	59.0	63	31	45	38.0	63
Gage	48	43	45.5	60	54	64	59.0	62	31	43	37.0	62

*Cutworms destroyed the 1968 test at Highmore.
†Two entries were not in the 1966 test.

ter (tables 3 and 4) and is somewhat higher in test weight. As it is as hardy as the hardiest varieties now recommended, it should be useful where winter survival is a problem in areas of winter wheat production. Its excellence of quality to the miller and baker should upgrade the quality of South Dakota winter wheat. Winoka has better quality than the hardiest other winter wheats, Hume and Minter.

The winterhardiness of Winoka can be increased where winter wheat has been marginal by seeding it in small grain stubble.

Winoka yields less than such earlier, less hardy and lower quality varieties as Scout, Lancer and Gage. It is not likely to be used where less hardy varieties are adapted.

New winter wheats are needed with shorter straw and a higher yield potential under good growth conditions. Such wheats should be of excellent quality. Winoka is a move in the right direction so far as high quality and hardiness are concerned but does not have the improved yield potential that can be achieved for South Dakota wheat growers through plant breeding.

Seed of Winoka was released by the Foundation Seed Stock Division of South Dakota State University to the County Crop Improvement Associations for seeding in the fall of 1968.

Table 4. Performance of Winoka and selected entries in the Northern Regional Performance Nurseries at Presho and Highmore.

	Presho				Highmore				
	Grain Yields			Test Weights	Grain Yields				Test Weights
Variety	1967	1968	Ave.	1967-8	1966	1967	1968	Ave.	1967-8
	bushels			pounds	bushels				pounds
Winoka	48	35	41.5	62	25	48	41	38.0	63
Winalta	43	34	38.5	60	26	50	44	40.0	63
Trader	47	33	40.0	59	—	46	43	—	61
Trapper	41	37	39.0	60	—	46	40	—	61
Warrior*	47	42	44.5	58	23	50	45	39.3	61
Kharkoff*	53	29	41.0	58	21	47	43	37.0	61

*Susceptible to stem rust.

5M—4-69—9066