

SEEDING RATE TRIALS

Spring wheat seeding rates of 22, 45, 67, and 101 kg/ha were compared in a field experiment on a medium-textured soil at Swift Current, Saskatchewan, over the period 1960-1968. Data collected during eight years indicated that when weeds, insects and diseases were chemically controlled, low seeding rates produced significantly more grain than higher seeding rates, with greatest increases occurring during years of severe moisture stress. Low seeding rates produced longer heads, heavier kernels, and in some cases taller plants. Plant population differences resulting from the variation in seeding rate were largely eliminated by plant survival and tillering. The number of mature kernels per unit area did not differ significantly for all treatments.

Seeding rates had an effect on the rate at which moisture was used by the crop. Soil moisture supplies were quickly exhausted on plots seeded at rates of 67 and 101 kg/ha, whereas moisture was available to the crop seeded at lower rates over a longer period. The crop seeded at 22 kg/ha matured 3 to 5 days later than that seeded at 101 kg/ha.

Trials to determine the optimum seeding rate for wheat in western North Dakota were conducted from 1964-1968. Three seeding rates: 45, 60, and 75 pounds per acre were used in these trials. There was no significant difference in yield between any of the seeding rates used.

Branch station conference review of these trials showed a need for refinement of rates used because appreciable differences in seed size for different varieties affects plant population when rates are established on a weight or volume basis. Accordingly, rates of 1/3 million, 2/3 million, 1 million and 1 1/3 million plants per acre were used for this trial in 1969 and 1970. Adjustments were made for seed size and for purity and germination per cent of the seed lots used. In 1971 rates were changed to 1/2 million, 3/4 million, 1 million, 1 1/2 million and 2 million plants per acre, to establish population limits both higher and lower than those used in 1969-1970. These rates will be used for a minimum of three years.

Data from these trials are summarized in Tables 47 through 56.

Table 47. YIELD DATA – RATE OF SEEDING TRIAL – 1969 – DICKINSON

Variety	Fertilizer Applied	Seeding Rate / Acre		Yield in Bushels per Acre			
		Million Plants	Pounds	Rep 1	Rep 2	Rep 3	Average
FORTUNA	CHECK TREATMENT – NO FERTILIZER APPLIED	1/3	25.0	28.6	24.3	32.8	28.6
FORTUNA		2/3	50.0	35.5	37.4	33.2	35.4
FORTUNA		3/3	75.0	40.8	34.5	38.3	37.9
FORTUNA		4/3	100.0	32.7	35.9	41.0	36.5
WISC. 271		1/3	24.0	39.5	39.4	35.9	38.3
WISC. 271		2/3	48.5	34.6	55.8	41.7	44.0
WISC. 271		3/3	72.5	29.7	60.5	49.5	46.6
WISC. 271		4/3	97.0	46.8	55.4	73.9	58.7
WALDRON		1/3	27.5	31.7	35.0	33.3	33.3
WALDRON		2/3	55.0	43.7	43.7	38.1	41.8
WALDRON		3/3	82.5	42.6	39.4	35.3	39.1
WALDRON		4/3	110.0	35.6	38.3	46.9	40.3
LEEDS		1/3	31.5	34.4	52.7	43.1	43.4
LEEDS		2/3	63.0	40.7	48.9	51.3	47.0
LEEDS		3/3	94.5	55.2	56.2	55.3	55.6
LEEDS		4/3	126.0	53.4	53.3	43.3	50.0

Table 48. YIELD DATA – RATE OF SEEDING TRIAL – 1969 – DICKINSON

Variety	Fertilizer Applied	Seeding Rate / Acre		Yield in Bushels per Acre			
		Million Plants	Pounds	Rep 1	Rep 2	Rep 3	Average
FORTUNA	18-46-0-55 POUNDS PER ACRE APPLIED TO ALL VARIETIES AND RATES	1/3	25.0	30.3	30.5	18.5	26.4
FORTUNA		2/3	50.0	32.0	36.0	38.1	35.4
FORTUNA		3/3	75.0	31.4	34.4	26.4	30.7
FORTUNA		4/3	100.0	29.5	36.8	44.1	36.8
WISC. 271		1/3	24.0	34.5	36.3	26.4	32.4
WISC. 271		2/3	48.5	43.5	42.1	40.1	41.9
WISC. 271		3/3	72.5	39.9	48.6	61.0	49.8
WISC. 271		4/3	97.0	44.3	53.9	64.9	54.4
WALDRON		1/3	27.5	34.1	40.6	26.1	33.6
WALDRON		2/3	55.0	34.3	34.9	44.4	37.9
WALDRON		3/3	82.5	29.6	39.7	46.8	38.7
WALDRON		4/3	110.0	33.1	38.7	36.8	36.2
LEEDS		1/3	31.5	42.1	34.6	30.3	35.7
LEEDS		2/3	63.0	39.2	52.4	49.9	47.2
LEEDS		3/3	94.5	48.9	52.9	41.6	47.8
LEEDS		4/3	126.0	48.9	49.9	49.7	49.5

Table 49. YIELD DATA – RATE OF SEEDING TRIAL – 1969 – DICKINSON

Variety	Fertilizer Applied	Seeding Rate / Acre		Yield in Bushels per Acre			
		Million Plants	Pounds	Rep 1	Rep 2	Rep 3	Average
FORTUNA	18-46-0-105 POUNDS PER ACRE APPLIED TO ALL VARIETIES AND RATES	1/3	25.0	36.1	24.1	40.2	33.5
FORTUNA		2/3	50.0	36.8	28.0	31.3	32.0
FORTUNA		3/3	75.0	42.6	19.5	40.1	34.1
FORTUNA		4/3	100.0	37.6	36.3	37.6	37.2
WISC. 271		1/3	24.0	28.7	43.7	40.1	37.5
WISC. 271		2/3	48.5	31.4	46.0	50.4	42.7
WISC. 271		3/3	72.5	49.7	50.6	52.2	50.8
WISC. 271		4/3	97.0	44.0	43.6	47.4	45.0
WALDRON		1/3	27.5	36.0	38.9	39.5	38.1
WALDRON		2/3	55.0	30.7	38.5	39.9	36.4
WALDRON		3/3	82.5	28.7	36.8	38.5	34.7
WALDRON		4/3	110.0	44.4	43.0	23.5	37.0
LEEDS		1/3	31.5	32.2	43.4	43.9	39.8
LEEDS		2/3	63.0	32.9	49.1	34.3	38.8
LEEDS		3/3	94.5	40.7	47.4	53.8	47.3
LEEDS		4/3	126.0	52.0	45.5	53.1	50.4

Table 50. YIELD DATA – RATE OF SEEDING TRIAL – 1969 – DICKINSON

Variety	Seeding Rate / Acre		Check	Average Yield		All Treatments
	Million Plants	Pounds		55 lbs. 18-46-0	105 lbs. 18-46-0	
FORTUNA	1/3	25.0	28.6	26.4	33.5	29.5
FORTUNA	2/3	50.0	35.4	35.4	32.0	34.3
FORTUNA	3/3	75.0	37.9	30.7	34.1	34.2
FORTUNA	4/3	100.0	36.5	36.8	37.2	36.8
WISC. 271	1/3	24.0	38.3	32.4	37.5	36.1
WISC. 271	2/3	48.5	44.0	41.9	42.7	42.9
WISC. 271	3/3	72.5	46.6	49.8	50.8	49.1
WISC. 271	4/3	97.0	58.7	54.4	45.0	52.7
WALDRON	1/3	27.5	33.3	33.6	38.1	35.0
WALDRON	2/3	55.0	41.8	37.9	36.4	38.7
WALDRON	3/3	82.5	39.1	38.7	34.7	37.5
WALDRON	4/3	110.0	40.3	36.2	37.0	37.8
LEEDS	1/3	31.5	43.4	35.7	39.8	39.6
LEEDS	2/3	63.0	47.0	47.2	38.8	44.3
LEEDS	3/3	94.5	55.6	47.8	47.3	50.2
LEEDS	4/3	126.0	50.0	49.5	50.4	50.0

Table 51. YIELD DATA – RATE OF SEEDING TRIAL – 1970 – DICKINSON

Variety	Fertilizer Applied	Seeding Rate / Acre		Yield in Bushels per Acre			
		Million Plants	Pounds	Rep 1	Rep 2	Rep 3	Average
FORTUNA	CHECK TREATMENT – NO FERTILIZER APPLIED	1/3	25.0	11.2	11.2	15.2	12.5
FORTUNA		2/3	50.0	9.6	11.2	20.0	13.6
FORTUNA		3/3	75.0	12.8	18.4	19.2	16.8
FORTUNA		4/3	100.0	8.0	22.4	17.6	16.0
WISC. 271		1/3	24.0	15.2	20.8	12.8	16.3
WISC. 271		2/3	48.5	16.0	17.6	24.8	19.5
WISC. 271		3/3	72.5	10.4	27.2	20.0	19.2
WISC. 271		4/3	97.0	14.4	30.4	28.8	24.5
WALDRON		1/3	27.5	14.4	22.4	8.8	15.2
WALDRON		2/3	55.0	11.2	19.2	9.6	13.3
WALDRON		3/3	82.5	12.0	14.4	18.4	14.9
WALDRON		4/3	110.0	10.4	21.6	18.4	16.8
LEEDS		1/3	31.5	12.0	22.4	36.0	23.5
LEEDS		2/3	63.0	17.6	28.8	32.0	26.1
LEEDS		3/3	94.5	14.4	24.8	19.2	19.5
LEEDS		4/3	126.0	12.8	20.0	21.6	18.1

Table 52. YIELD DATA – RATE OF SEEDING TRIAL – 1970 – DICKINSON

Variety	Fertilizer Applied	Seeding Rate / Acre		Yield in Bushels per Acre			
		Million Plants	Pounds	Rep 1	Rep 2	Rep 3	Average
FORTUNA	18-46-0 55 POUNDS PER ACRE APPLIED TO ALL VARIETIES AND RATES	1/3	25.0	15.2	20.0	14.4	16.5
FORTUNA		2/3	50.0	18.4	11.2	18.4	16.0
FORTUNA		3/3	75.0	14.4	20.8	13.6	16.3
FORTUNA		4/3	100.0	14.4	21.6	15.2	17.1
WISC. 271		1/3	24.0	12.0	28.0	28.0	22.7
WISC. 271		2/3	48.5	28.0	17.6	28.8	24.8
WISC. 271		3/3	72.5	31.2	26.4	26.4	28.0
WISC. 271		4/3	97.0	21.6	45.6	26.4	31.2
WALDRON		1/3	27.5	13.6	9.6	14.4	12.5
WALDRON		2/3	55.0	8.8	14.4	26.4	16.5
WALDRON		3/3	82.5	11.2	29.6	12.0	17.6
WALDRON		4/3	110.0	14.4	37.6	23.2	25.1
LEEDS		1/3	31.5	9.6	19.2	22.4	17.1
LEEDS		2/3	63.0	19.2	28.8	26.4	24.8
LEEDS		3/3	94.5	18.4	25.6	17.6	20.5
LEEDS		4/3	126.0	13.6	18.4	16.0	16.0

Table 53. YIELD DATA – RATE OF SEEDING TRIAL – 1970 – DICKINSON

Variety	Fertilizer Applied	Seeding Rate /Acre		Yield in Bushels per Acre			
		Million Plants	Pounds	Rep 1	Rep 2	Rep 3	Average
FORTUNA	18-46-0 105 POUNDS PER ACRE APPLIED TO ALL VARIETIES AND RATES	1/3	25.0	16.0	20.8	8.0	14.9
FORTUNA		2/3	50.0	20.8	11.2	9.6	13.9
FORTUNA		3/3	75.0	18.4	12.8	12.8	14.7
FORTUNA		4/3	100.0	14.4	14.4	24.8	17.9
WISC. 271		1/3	24.0	22.4	20.8	26.4	23.2
WISC. 271		2/3	48.5	25.6	29.6	23.2	26.1
WISC. 271		3/3	72.5	46.4	31.2	39.2	38.9
WISC. 271		4/3	97.0	18.4	26.4	28.8	24.5
WALDRON		1/3	27.5	16.0	18.4	22.4	18.9
WALDRON		2/3	55.0	13.6	30.4	15.2	19.7
WALDRON		3/3	82.5	22.4	12.0	19.2	17.9
WALDRON		4/3	110.0	16.0	17.6	21.6	18.4
LEEDS		1/3	31.5	20.0	21.6	29.6	23.7
LEEDS		2/3	63.0	20.8	16.0	16.8	17.9
LEEDS		3/3	94.5	14.4	22.4	30.4	22.4
LEEDS		4/3	126.0	15.2	20.0	29.6	21.6

Table 54. YIELD DATA – RATE OF SEEDING TRIAL – 1970 – DICKINSON

Variety	Seeding Rate / Acre		Check	Average Yield		All Treatments
	Million Plants	Pounds		55 lbs. 18-46-0	105 lbs. 18-46-0	
FORTUNA	1/3	25.0	12.5	16.5	14.9	14.6
FORTUNA	2/3	50.0	13.6	16.0	13.9	14.5
FORTUNA	3/3	75.0	16.8	16.3	14.7	15.9
FORTUNA	4/3	100.0	16.0	17.1	17.9	17.0
WISC. 271	1/3	24.0	16.3	22.7	23.2	20.7
WISC. 271	2/3	48.5	19.5	24.8	26.1	23.5
WISC. 271	3/3	72.5	19.2	28.0	38.9	28.7
WISC. 271	4/3	97.0	24.5	31.2	24.5	26.7
WALDRON	1/3	27.5	15.2	12.5	18.9	15.5
WALDRON	2/3	55.0	13.3	16.5	19.7	16.5
WALDRON	3/3	82.5	14.9	17.6	17.9	16.8
WALDRON	4/3	110.0	16.8	25.1	18.4	20.1
LEEDS	1/3	31.5	23.5	17.1	23.7	21.4
LEEDS	2/3	63.0	26.1	24.8	17.9	22.9
LEEDS	3/3	94.5	19.5	20.5	22.4	20.8
LEEDS	4/3	126.0	18.1	16.0	21.6	18.6

Table 55. COMBINED AVERAGE YIELD DATA – RATE OF SEEDING TRIAL – 1969-1970 – DICKINSON

Variety	Seeding Rate / Acre		Yield in Bushels per Acre			All Treatments
	Million Plants	Pounds	Check	55 lbs. 18-46-0	105 lbs. 18-46-0	
FORTUNA	1/3	25.0	20.5	21.4	24.2	22.0
FORTUNA	2/3	50.0	24.5	25.7	22.9	24.4
FORTUNA	3/3	75.0	27.3	23.5	24.4	25.0
FORTUNA	4/3	100.0	26.2	26.9	27.5	26.9
WISC. 271	1/3	24.0	27.3	27.5	30.3	28.4
WISC. 271	2/3	48.5	31.7	33.3	34.4	33.2
WISC. 271	3/3	72.5	32.9	38.9	44.8	38.9
WISC. 271	4/3	97.0	41.6	42.8	34.7	39.7
WALDRON	1/3	27.5	24.2	23.0	28.5	25.2
WALDRON	2/3	55.0	27.5	27.2	28.0	27.6
WALDRON	3/3	82.5	27.0	28.1	26.3	27.1
WALDRON	4/3	110.0	28.5	30.6	27.7	28.9
LEEDS	1/3	31.5	33.4	26.4	31.7	30.5
LEEDS	2/3	63.0	36.5	36.0	28.3	33.6
LEEDS	3/3	94.5	37.5	34.1	34.8	35.5
LEEDS	4/3	126.0	34.0	32.7	36.0	34.3

Table 56. YIELD DATA – RATE OF SEEDING TRIAL – 1971 – DICKINSON

Variety	Seeding Rate / Acre	Yield in Bushels per Acre				
	Million Plants	Rep 1	Rep 2	Rep 3	Rep 4	Average
WISC. 271	1/2	16.2	11.8	16.5	16.0	15.1
WISC. 271	3/4	12.1	16.2	17.4	11.8	14.4
WISC. 271	1	16.7	17.6	13.0	20.5	17.0
WISC. 271	1 1/2	17.1	17.0	17.7	20.9	18.2
WISC. 271	2	22.3	14.8	16.2	17.0	17.6
LEEDS	1/2	14.9	14.0	13.6	11.8	13.6
LEEDS	3/4	17.6	15.0	12.6	18.3	15.9
LEEDS	1	16.4	15.0	18.0	11.4	15.2
LEEDS	1 1/2	16.1	16.1	16.4	15.7	16.1
LEEDS	2	12.2	16.0	14.2	16.8	14.8
FORTUNA	1/2	17.6	15.4	15.8	17.4	16.6
FORTUNA	3/4	16.1	19.7	19.6	16.0	17.9
FORTUNA	1	15.6	19.5	20.4	14.6	17.5
FORTUNA	1 1/2	18.1	15.0	19.4	22.2	18.7
FORTUNA	2	19.2	19.9	21.5	14.0	18.7
WALDRON	1/2	15.8	16.0	17.2	14.0	15.8
WALDRON	3/4	19.8	19.1	18.8	15.9	18.4
WALDRON	1	16.9	19.7	18.5	20.3	18.9
WALDRON	1 1/2	19.2	18.2	18.7	18.0	18.5
WALDRON	2	15.3	19.5	18.1	16.2	17.3