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# Spear Oats

Plant Science Department  
Agricultural Experiment Station  
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# Spear Oats

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Spear, C.I. 9203, is a spring oat variety developed by the South Dakota Agricultural Experiment Station and released December 15, 1974. While being tested, it was designated SD 955. Spear combines excellent straw strength with good yields and a high groat protein content. With these characteristics, it should prove to be a good oat for most of South Dakota. Seed was increased in 1974 by the Foundation Seed Stock Division, South Dakota State University. Minnesota also participated in the simultaneous increase of Spear seed.

## Origin

Spear is a selection from a Neal x Clintland 64 cross made in 1963. Neal was a moderately early oat in South Dakota that possessed very stiff straw while Clintland 64 has long been recognized for its very good resistance to crown rust.

The original selection was a single F<sub>2</sub> plant. In the following generations it was rogued to remove less desirable plants, such as those which were most susceptible to crown rust and stem rust. The Crop Performance Testing Project grew Spear at all testing locations in South Dakota during 1971, 1972, 1973, and 1974. It was also grown from 1968 to 1971 and in 1973 in the Uniform Regional Midseason Oat Nursery which is coordinated by the U. S. Department of Agriculture.

## Characteristics

Spear is a midseason variety that heads about the same time as Chief and Garland. Plants are mid tall, being about the same height as Diana and Garland. Straw strength is very good, Spear exhibiting superior straw strength in South Dakota as well as in other states where tested. The kernels are white; however, up to 4% light yellow to yellow kernels may be present. Some of the plants have small awns. Test weight and yields are good and are equivalent to most commonly grown varieties. Preliminary tests have shown Spear to be a good milling oat.

The protein percentage of the oat groats (dehulled kernels) has shown that Spear has one of the highest protein levels of currently available varieties. This has been true for tests in South Dakota (Table 3) as well as in other states. Protein yield per acre is probably of greater significance than the protein percent. When compared to some of the widest grown varieties as well as other high protein varieties, Spear is one of the highest producers (Table 4), especially if the average over a period of years is considered. This high average protein yield indicates a combination of high protein percent and adaptation to South Dakota. The grain averages 7% oil as compared to 5% or 6% for most other varieties.

Stiff straw combined with the high protein yields and moderate crown rust resistance should make it well adapted to South Dakota. The tests indicate it is probably best adapted to conditions of good fertility and moisture.

#### Disease Reactions

Spear is moderately resistant to most current crown rust races. In South Dakota it has better resistance than Garland, Holden, Nodaway 70, and Trio. Seedling tests in-

dicate it is moderately resistant to crown rust race 264B but has some susceptible segregates.

Resistance to yellow dwarf is better than that of Froker, Diana or Chief. Spear is as resistant to smuts as most current varieties. Two-thirds of the plants are resistant to race 61 of stem rust but all are susceptible to race 31. Therefore, growers should take this into consideration before growing Spear where severe stem rust problems occur.

Table 1. Yield data (bushels/acre) from South Dakota Standard Variety Oat Trials.

	Centerville				Brookings				Watertown				Selby	
	'71	'72	'73	'74	'71	'72	'73	'74	'71	'72	'73	'74	'72	'73
Spear .....	83	91	90	87	97	64	73	35	89	71	97	46	77	95
Burnett .....	93	68	98	69	91	36	69	34	86	21	101	49	84	87
Chief .....	96	82	86	81	95	76	73	34	97	79	92	47	77	91
Dal .....	80	81	68	---	76	72	36	---	63	81	41	69	74	
Froker .....	74	87	92	73	90	75	80	33	88	61	88	48	83	75
Garland .....	85	---	88	86	96	47	72	40	79	65	92	49	74	103
Otec .....	88	80	84	85	89	57	58	40	86	46	86	46	73	81

  

	Highmore				Eureka		Bison		Wall			
	'71	'72	'73	'74	'71	'72	'73	'74	'71	'72	'73	'74
Spear .....	53	104	55	30	80	71	61	76	64	53	48	32
Burnett .....	67	77	60	24	60	87	66	62	65	60	46	35
Chief .....	66	81	62	26	77	68	68	69	65	55	53	28
Dal .....	---	76	46	24	---	70	52	57	---	51	55	24
Froker .....	57	87	56	23	74	81	58	66	61	46	52	29
Garland .....	71	88	51	29	66	81	74	77	67	56	56	26
Otec .....	64	88	55	24	74	65	58	63	71	50	48	35

Table 2. Average groat percentage and test weight of selected oat varieties. Data obtained from samples from the Standard Variety Oat Trials.

Number of locations Year	Groat Percentage				Test Weight (lb/bu)			
	6	7	6	6	7	7	6	
	'72	'73	'74	'71	'72	'73	'74	
Spear .....	71	64	64	36.2	34.3	35.0	37.7	
Burnett .....	71	67	64	42.3	34.4	36.0	31.7	
Chief .....	75	69	66	36.7	36.0	34.9	31.0	
Garland .....	71	68	64	36.5	35.5	40.6	31.0	
Froker .....	74	66	62	36.0	34.5	35.4	30.5	
Dal .....	74	64	62	---	35.7	33.7	30.7	
Otec .....	67	65	63	36.7	34.7	36.1	32.3	

(next page)

Table 3. Percent protein in oat groats. Grain was obtained from the Standard Variety Oat Trials.

	Centerville			Brookings			Watertown			Selby	
	'72	'73	'74	'72	'73	'74	'72	'73	'74	'72	'73
Spear .....	19	21	24	19	22	25	20	23	23	23	22
Burnett .....	17	20	21	19	20	22	20	19	21	20	20
Chief .....	19	21	21	18	23	24	18	22	23	22	21
Dal .....	21	21	23	20	22	27	22	24	24	22	22
Froker .....	18	19	22	16	20	25	19	21	23	21	20
Garland .....	.....	21	21	18	20	23	18	21	22	21	20
Otec .....	20	23	22	20	24	26	21	24	24	24	23

  

	Highmore			Bison		Wall			Average		
	'72	'73	'74	'73	'74	'72	'73	'74	'72	'73	'74
Spear .....	20	24	24	24	22	22	25	24	20.2	22.7	23.4
Burnett .....	19	21	21	21	18	19	23	23	19.1	20.4	21.1
Chief .....	19	23	24	23	21	21	24	25	19.3	22.3	22.8
Dal .....	21	24	25	26	24	22	27	28	21.4	23.6	25.1
Froker .....	20	22	24	23	21	20	24	24	19.1	21.3	23.2
Garland .....	20	22	22	22	19	21	24	22	19.6	21.2	21.5
Otec .....	23	25	25	25	23	23	26	27	21.8	24.3	24.4

Table 4. Pounds of goat protein produced per acre. Calculated from yields and protein data that were obtained by analyzing samples from the Standard Variety Oat Trials.

	Centerville			Brookings			Watertown			Selby	
	'72	'73	'74	'72	'73	'74	'72	'73	'74	'72	'73
Spear .....	387	437	420	265	359	177	282	450	230	406	464
Burnett .....	267	446	343	147	331	146	76	454	237	408	375
Chief .....	370	418	386	322	395	164	343	439	338	406	408
Dal .....	403	398	332	355	353	185	324	381	230	368	352
Froker .....	359	397	324	277	389	157	262	400	243	417	294
Garland .....	.....	411	418	161	348	180	244	416	199	383	449
Otec .....	346	440	391	239	315	205	174	424	239	400	414

  

	Highmore			Bison		Wall		Average		
	'72	'73	'74	'73	'74	'73	'74	'72	'73	'74
Spear .....	509	289	131	258	355	166	151	370	346	244
Burnett .....	366	280	84	257	221	166	152	253	330	197
Chief .....	373	320	115	324	314	220	134	363	361	241
Dal .....	374	231	107	337	213	241	121	365	315	198
Froker .....	428	268	94	249	261	216	121	349	318	200
Garland .....	445	252	118	262	302	228	105	308	349	220
Otec .....	469	296	109	258	318	210	175	326	337	239