

Choosing Winter Wheat Varieties for Dryland, Limited, and Full Irrigation

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Researchers have conducted experimental wheat variety tests at NMSU's Agricultural Science Center at Clovis for a number of years. New varieties are added as they are released. Due to declining water resources in the Ogallala Aquifer, agricultural producers in eastern New Mexico must make more efficient use of existing water supplies for their irrigation programs. For this reason, yield trials also are conducted under limited irrigation conditions.

BACKGROUND INFORMATION

The Agricultural Science Center at Clovis is located approximately 14 miles north of Clovis and has an altitude of 4,435 feet. Soils in the area are classified as Olton silty-clay loam. All experimental variety trials are conducted on fallow land. Full irrigation tests normally receive five irrigations, except during extremely dry years, which may require six irrigations. Limited irrigation variety trials receive either three or four irrigations, depending on rainfall. Dryland variety trials receive no irrigation unless one is necessary for germination purposes. Each irrigation applies between 4 and 5 acre-inches of water. Fertility rates vary from none in dryland plots to 200 pounds of nitrogen in fully irrigated plots.

Yield test results for wheat varieties are determined for dryland, limited, and full irrigation production conditions. Variety production was measured for an 11-year period (1985–1995) under each of the environmental conditions (tables 1–3). In addition to the 11-year averages, yields are presented for 10-, 8-, and 5-year averages to provide information on as many varieties as possible, because not all varieties were tested for 11 years.

YIELD RESULTS

Dryland Variety Tests

Average yields for 24 wheat varieties were tested (table 1). In 1995, yields were extremely low due to drought conditions that prevailed in eastern New Mexico. Yields ranged from 1 bu/acre to 6 bu/acre. The 10-year average yields ranged from a low of 18 bu/acre to a high of 29 bu/acre. For the 11-year average, TAM105 was the top yielding variety at 32 bu/acre, followed closely by Scout 66 and Brule at 30 bu/acre. Brule is the standard variety for the Southern Regional Performance Nursery trials. It's not commonly used by agricultural producers. Even though 1995 was an extremely dry year for wheat producers, TAM105 and Tamex each yielded 6 bu/acre.

Limited Irrigation Variety Tests

Average yields for 14 wheat varieties were tested under limited irrigation conditions (table 2). Limited irrigation tests were originally initiated in 1979. At that time, wheat varieties were only irrigated twice—at planting and heading. Later trials were irrigated at planting, jointing, and heading. In 1995, wheat varieties received four irrigations—at planting, mid-December, early February, and early spring. The individual variety yields for 1995 ranged from 11 bu/acre to 16 bu/acre. The 11-year averages ranged from 41 bu/acre to 54 bu/acre. The 1995 averages were considerably below the 5- to 10-year averages due to extreme dry weather which prevailed from the fall of 1994 through the early summer of 1995. Once again the top yielding wheat varieties for the 11-year average were Brule and TAM105, followed closely by Scout.

Full Irrigation Variety Tests

Average yield of 18 wheat varieties was tested under full irrigation (table 3). In 1995, yields ranged from 16 bu/acre to 34 bu/acre. The 11-year average yields ranged from 67 bu/acre to 87 bu/acre. The highest yielding varieties in the full irrigation tests were TAM105 and Vona.

RECOMMENDATIONS

The most consistent variety under all conditions was TAM105. This variety is well adapted to all conditions in the Clovis production area and other areas with similar growing conditions. All varieties were not tested under all conditions. However, TAM105,

Vona, Newton, Capitan, Scout 66, TAM108, Brule, Larned, Sage, Chisolm, Centura, and Osage were tested under all conditions.

Based on the environment at the Agricultural Science Center at Clovis, the 11-year average highest yielding varieties for dryland were TAM105, Scout 66, Brule, and Larned (table 1). Under limited irrigation, the 11-year average highest yielding varieties were Brule, TAM105, and Scout (table 2). For full irrigated conditions, the 11-year average highest yielding varieties were TAM105, Vona, and Newton (table 3). For an 8-year average, both TAM200 and TAM107 exceeded yields of all varieties except TAM105.

Comparison of monthly and yearly rainfall with wheat yields provides some insight into wheat responses to available moisture (table 4).

Table 1. Average yield (bu/acre) of winter wheat varieties, dryland tests, New Mexico State University Agricultural Science Center at Clovis, 1985–95.

Variety	1995	1991–1995	1988–1995	1986–1995	1985–1995
TAM105	6	21	24	28	32
Scout 66	5	20	22	27	30
Brule	5	22	23	27	30
Larned	3	19	20	25	29
Capitan	4	19	18	24	27
Osage	4	18	19	23	27
Centura	3	20	19	24	27
Newton	1	22	19	23	27
Vona	4	17	17	20	24
Chisolm	3	15	14	18	23
TAM107	4	21	23	29	—
TAM108	5	19	21	25	—
Siouxland	5	20	19	24	—
TAM200	5	21	25	—	—
Dodge	4	18	17	—	—
Norkan	4	17	17	—	—
Sage	4	22	—	—	—
Scout	4	21	—	—	—
Tamex	6	20	—	—	—
Siouxland 89	4	19	—	—	—
Arkan	2	16	—	—	—
Karl	2	16	—	—	—
TAM201	2	15	—	—	—
Century	4	14	—	—	—

Table 2. Average yield (bu/acre) of winter wheat varieties, limited irrigated tests, New Mexico State University Agricultural Science Center at Clovis, 1985–1995.

Variety	1995	1991–1995	1988–1995	1986–1995	1985–1995
Brule	12	46	48	51	54
TAM105	16	43	49	51	53
Scout	14	43	46	50	51
Capitan	11	40	41	47	49
TAM108	12	40	45	49	49
Larned	13	39	44	48	49
Sage	15	37	41	45	48
Scout 66	12	37	41	46	47
Vona	12	36	41	44	46
Centura	12	31	37	44	46
Osage	12	32	38	43	46
Newton	12	31	36	43	46
Chisolm	13	35	39	45	45
Century 78	11	30	34	39	41

Table 3. Average yield (bu/acre) of winter wheat varieties, full irrigation tests, New Mexico State University Agricultural Science Center at Clovis, 1985–1995.

Variety	1995	1991–1995	1988–1995	1985–1995
TAM105	24	84	89	87
Vona	26	72	77	79
Newton	24	65	72	78
Capitan	28	62	67	71
Scout 66	25	59	63	67
TAM107	26	73	82	—
TAM108	28	68	75	—
TAM200	25	81	86	—
Norkan	16	73	76	—
Brule	34	69	73	—
Century 78	26	65	69	—
Larned	24	64	69	—
Sage	30	65	66	—
Dodge	28	64	68	—
Chisolm	22	62	70	—
Centura	24	58	63	—
Siouxland	30	60	62	—
Osage	28	59	62	—

Table 4. Total precipitation (in inches) by month, NMSU Agricultural Science Center at Clovis, 1985–1995.

Year	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly totals
1985	0.40	0.00	2.80	1.60	2.70	2.80	2.00	1.50	4.73	2.60	0.20	0.15	21.56
1986	0.00	0.75	0.45	0.96	4.10	2.67	0.99	4.95	3.90	2.92	2.53	1.05	25.27
1987	0.27	1.29	0.24	0.17	4.44	2.04	0.22	9.35	1.73	0.78	0.30	1.50	22.33
1988	0.00	0.02	0.11	1.28	10.60	6.86	2.81	1.89	1.90	trace	0.03	0.20	25.70
1989	0.21	0.50	0.05	0.43	2.84	2.93	1.87	3.25	1.38	0.06	trace	0.62	14.14
1990	1.02	0.64	0.15	1.30	0.15	0.00	1.83	1.96	2.43	0.57	0.71	0.29	11.05
1991	0.61	0.02	0.63	trace	0.99	0.40	7.80	2.92	2.90	0.41	1.36	2.78	20.82
1992	0.51	0.45	1.52	0.51	3.11	4.02	1.22	2.60	3.20	0.02	0.23	0.03	17.45
1993	0.28	0.02	0.21	0.52	0.76	2.50	2.41	1.79	1.22	2.06	0.41	0.09	12.27
1994	0.06	0.17	1.42	0.69	3.86	1.47	2.17	2.11	0.65	0.72	0.33	0.30	13.95
1995	0.57	0.00	0.40	0.43	2.69	2.41	1.28	1.86	3.34	1.36	0.04	0.48	14.86
Avg.	0.36	0.35	0.73	0.72	3.30	2.56	2.23	3.11	2.49	1.04	0.56	0.68	18.13

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