MINIMUM TILLAGE AND SEEDING, AND DOUBLE DISKING AND CONVENTIONAL SEEDING ON RECROP

In 1976 there was no significant difference in wheat production between minimum tillage and conventional tillage on second cropping. Growing conditions were excellent in 1976.

In 1977, hot, dry spring weather conditions were not particularly favorable to germination and early crop growth because of dry surface soil. Because of the small diameter of the rotating coulters on the John Deere 1500 Power till seeder, it was not possible to place seed deep enough to get it into moist soil. As a consequence germination was spotty and delayed until later rainfall came. Excessive weed growth was also a problem on this treatment. Penetration of the surface soil and satisfactory seed placement was not as difficult with the Melroe 701 minimum tillage drill. Germination and growth was satisfactory and production was double that for the Power till seeder. Conventional disking and seeding was the best production method in the 1977 comparison.

In 1978 and 1979 only the Melroe 701 and the conventional tillage and seeding treatments were compared. Initial growth was slower on the minimum tillage treatment. This may be partly due to lower surface temperatures caused by the reflective and insulating effects of the straw and stubble on the field surface. Weed problems were also greater problems on the minimum tillage treatment.

In 1980 the Melroe 701 drill and conventional seeding was compared once again. Because of severe drought, production was zero for both treatments.

In 1981 the John Deere hoe drill was used for seeding the minimum tillage treatment. A good stand of wheat resulted from both the minimum tillage seeding and the conventional seeding, with the minimum tillage treatment producing slightly higher yields for the first time since the trial was begun.

In 1982 the John Deere hoe drill was once again used for seeding the minimum tillage treatment, with the conventional treatment consisting of double disking and seeding with the double disk press drill. Excellent growing conditions produced the highest yields recorded in this trial over the past seven year period.

In 1983 the LIlliston no-till drill was used for seeding the minimum tillage treatment. The conventional treatment once again consisted of double disking the land in preparation for seeding, then seeding with the double disk press drill. Ample stored soil water from heavy fall precipitation, and otherwise excellent growing conditions produced the highest yields recorded in the trial over the past 8 year period, with no advantage shown for either cropping method in this trial this year. Two additional trials in 1983 comparing no-till, conventional disking and seeding and the plow-packer-press drill on recrop land produced the following results. Barley yields were 49.6 bushels per acre for the plow-packer-press drill treatment, 28.1 for the no-till treatment and 27.9 for conventional disking and seeding.

Wheat seeded in a similar comparison trial produced 22.3 bushels per acre on plowing, 19.2 bushels per acre on conventional disking and 17.7 bushels per acre on the no-till treatment.

Equipment and seeding method for the 1984 trial was the same as described for 1983. The fall of 1983 was drier than average with less than two and on-half inches of precipitation in the four month period, September through December. Precipitation continued below average from January until April 27 when a thirty inch snowfall provided enough soil water to carry the crop through the driest May in 93 years of record. Excellent distribution of five inches of rainfall in June was followed by a very dry July.

In 1985, a Lilliston no-till drill was used again for seeding the minimum tillage treatment. The preceding fall and winter precipiatation was 1.12 inches below average. April precipitation was considerably lower than average. May rainfall of 4.31 inches was most effective for crop growth. June rains were less than average but were well distributed. Cool temperatures in June, promoted excellent growth of small grain crops.

In 1986, the same Lilliston no-till drill was used for seeding the minumum tillage treatment. The conventional treatment once again consisted of double-disking in preparation for seeding, followed by seeding with a double disk press drill. Effective weed control was provided by the use of Hoelon-bromoxynil tank mix applied at recommended rates.

Fall precipitation during the last four months of 1985 was two inches above average and provided good residual soil water for fallow and recrop stubble. Above average precipitation was well distributed during the growing season except for a dry period starting on May 25 and extending through June. While total precipitation for June was above average, 3.30 inches of that total fell during the last four days of the month.

In 1987, the Lilliston no-till drill was used once again for seeding the minimum tillage treatment. The conventional treatment consisted of double-disking in preparation for seeding, followed by seeding with a double disk press drill. Effective weed control was provided by the use of Hoelon-bromoxynil tank mix applied at recommended rates.

Total precipitation for the twelve month period, September, 1986 through August, 1987 was 21.19 inches which was slightly higher than for the preceding twelve month period. However, distribution of precipitation this year was much less favorable for crop growth than that of a year ago, resulting in considerably lower yields. Precipitation in April was only .17 inches, in May 1.87 inches and in June 2.32 inches, totalling 4.36 inches for the three month period. This was nearly 3.00 inches below normal. Coupled with below average precipitation was above average temperatures. Temperature for April was 7°F, for May 3°F and for June 5°F higher than the 94 year average.

High temperatures had a major effect on crops. From April through June the number of wheat growing degree days—the sum of daily degrees above 32—ranged from 500 to 700 more than normal across the state. This means that by July 1 the growing season for perennial plants and early-seeded crops was 14 to 17 days more advanced than usual. Above normal heat combined with a dry spell in April and May to reduce crop yields.

Table 39. Minimum Tillage, Double Disking and Seeding for Wheat Production on Recrop

	Yield in bushels per acre on:	
	Minimum Tillage and Seeding	**Double Disking and Conventional Seeding**
1976	28.0	27.0
1977	12.6	15.0*
1978	10.3	28.5*
1979	9.6	15.9*
1980	0.0	0.0
1981	15.3	14.3
1982	20.9	31.8*
1983	39.0	38.5
1984	20.4	27.2*
1985	14.8	20.6*
1986	24.3	30.6*
1987	4.8	9.3*
12 Year Average	16.7	21.6

*Years when yields exceeded no-till yields by significant margin.