1950

ANNUAL REPORT

DICKINSON EXPERIMENT STATION
DICKINSON, NORTH DAKOTA

SECTION I

DRY LAND MANAGEMENT

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SECTION I

DRY LAND MANAGEMENT-1950

Yields in 1950 complete 44 years of studies in Dry Land Soil Management at the Dickinson Experiment Station. Results of the first year were all on uniform cropping, leaving 43 years results available for a comparison of tillage and fertility problems.

Wheat on the rotation and tillage experiments at the Dickinson Experiment Station in 1950 averaged 20.0 bushels per acre. This is more than twice the yield of 8.2 bushels harvested on these same plots and methods in 1949. The long time average of these plots is 19.0 bushels per acre.

The yield of Pilot wheat grown on fallow in these experiments was 23.1 bushels per acre. Wheat grown on disked cornground averaged 18.1 bushels per acre. Wheat on fall plowed land averaged 19.2 bushels per acre while that on spring plowing averaged 17.8 bushels per acre. Five plots grown on green manured land averaged 24.5 bushels per acre and was a little higher in average than on fallow. Gopher oats on these rotations averaged 44.5 bushels per acre in 1950. This also was more than double the yield of 21 bushels per acre on these same plots in 1949. Oats on fallow averaged 51.9 bushels per acre. On disked cornground the yield was 40.8 bushels per acre. On spring plowed ground the average was 40 bushels per acre and on fall plowed land the average was 43 bushels per acre. Three plots grown on green manured land averaged 58.7 bushels per acre in 1950. Both oats and wheat were of good quality with the Gopher oats grown on these experiments averaging about 35 pounds per bushel.

WHEAT ON FIELD N

Eighteen plots of wheat grown on field N averaged 21.1 bushels per acre. On this field 3 plots on disked cornground averaged 22.7 bushels per acre. Nine plots on fallow averaged 24.4 bushels per acre. Two plots on spring plowing averaged 16.5 bushels per acre and one on fall plowing averaged 17.5 bushels per acre. Better than usual yields considering the dry season were harvested from plots which had been seeded in disked stubble. Rot. 583 One plot on disked stubble the second year following plowing averaged 12 bushels per acre. A plot on disked stubble where the stubble was burned in the spring averaged 13 bushels per acre. Spraying the plots after harvest last year with 2,4-D at the rate of 1½ pounds per acre reduced weedpopulation on stubble plots to some extent this spring. These plots were also sprayed with 2,4-D when the plants were about 6-8 inches high, which further reduced the weed count.

OATS ON FIELD N

Three plots Gopher oats on fallow in this trial averaged 54.2 bushels per acre, two plots on disked cornground averaged 47.2 bushels per acre, one plot on fall plowed wheat stubble yielded 38.1 bushels and 35.9 bushels per acre was produced on rotation 579-C, double disked oat land the second year following fallow. Heavy test weights were recorded in these trials, seven plots on Field N averaging 36.5 pounds per bushel.

BARLEY

The average barley yield for all plots in 1950 was 24.0 bushels per acre, nearly three times the 1949 yield of 8.8 bushels. Barley on fallow averaged 29.0 bushels, on disked cornground 24.0 bushels and on spring plowed oat stubble in a 3-year corn-oats-barley rotation yielded 29.6 bushels per acre. Continuously cropped barley, spring plowed, averaged 19.4 bushels and fall plowed averaged 12.9 bushels per acre. Test weights averaged 44.0 pounds per bushel for all methods.

Tables 1, 2 and 3 of the appendix to Section I of this report summarize 43 years results for wheat, oats and barley respectively, in the rotation and tillage experiments at the Dickinson Experiment Station.

FLAX

Flax on spring plowed corn land and flax on disked cornland produced practically identical yields of slightly better than 6.5 bushels per acre. Test weights were fair, 55.0 pounds per bushel being recorded for both plots.

CORN

Because of the late cool spring and summer, early frosts and below normal precipitation during the growing season, the corn crop was poorly matured this year. Highest single plot yield was produced on rotation 62, a manured rotation, which yielded 42.4 bushels of shelled corn per acre and 7120 pounds of fodder. Spring plowed corn after oats averaged 23.9 bushels of shelled corn per acre and slightly over 2 tons of fodder per acre. Corn after oats on fall plowing averaged 23.7 bushels of shelled corn per acre and slightly over 1 3/4 tons of fodder per acre. Corn after wheat on spring plowing produced 19.6 bushels of shelled corn and nearly 2 tons of fodder per acre and corn after wheat on fall plowing yielded 25.1 bushels of shelled corn and approximately 1 3/4 tons of fodder per acre. Corn after barley on spring plowing in a 3-year corn-oats-barley rotation produced 15.3 bushels of shelled corn and slightly less than 1½ tons of fodder per acre.

Continuously cropped corn on spring plowing produced 22.1 bushels of shelled corn and nearly 2 tons of fodder per acre compared with 20.4 bushels of shelled corn and slightly over 1½ tons produced on continuously cropped fall plowing. Corn on fallow in the continuously cropped rotation yielded 16.4 bushels of shelled corn and 3300 pounds of fodder per acre.

Table 4 of the appendix to section one of this report summarizes 43 years results for corn in the rotation and tillage experiments at the Dickinson Experiment Station.

MISCELLANEOUS CROPS IN ROTATION

Durum Wheat-Field N

Yields for all tillage methods in the continuously cropped durum rotation on field N were practically the same. Yield from the spring plowed plot was 14.0 b.p.a., from the fall plowed plot, 14.2 b.p.a. and from fallow, 13.7 b.p.a.

Millet

Millet was disked cornground, Rotation242, a two year corn-millet rotation, produced 3500 pounds of hay in 1950.

Alfalfa

Alfalfa in rotation 42, plot A, seeded in 1948 produced 2600 pounds of forage per acre. Plot 42-F seeded in 1949 yielded 120 pounds of forage and plot 42-E seeded on double disked wheat stubble in 1950 produced 400 pounds of forage per acre. Germination and resulting stands in plot 42-F, seeded in 1949, were very poor due to the dry season. This plot was reseeded in 1950 but produced less than 42-E because of weed growth during the 1949 season.

Crested Wheatgrass

Crested Wheatgrass in five and six-year rotations with corn, oats and wheat produced nearly three quarters of a ton of hay per acre in 1950.

Sweet Clover

Sweet clover in rotation 11, a five-year rotation with wheat-corn-oats, produced 400 pounds of forage per acre the first year after wheat and 210 pounds per acre the second year after wheat. Because of the dry season in 1949 germination and resulting stands on the plot seeded that year were poor, making it necessary to reseed this plot in 1950. Yields were less on this plot than on the plot following wheat because of weed growth in 1949.

Potatoes

Potatoes on fallow in a 2-year rotation produced a greater total yield than potatoes following wheat in a 2-year rotation, but the potato-wheat rotation produced more tubers grading US No. 1. Yields in this trial were 81.7 bushels per acre, US No. 1, for the potato-wheat rotation and 68.3 bushels per acre, US No. 1, on fallow.

FERTILIZER TRIALS-1950

Soil fertility phases of the dry land management studies at the Dickinson Experiment Station in 1950 included the following projects:

I. Pilot wheat was seeded May 17, 1950 on a series of six spring plowed plots which have been in crested wheatgrass sod for the past six years, and which were fertilized on November 30, 1949 according to the following plan:

FERTILIZER TRIALS

Twenty-four 1-40th acre plots were fertilized with 200 pounds per acre of ammonium sulphate, 200 pounds of superphosphate and some with both of these on November 30, 1949.

1	N-P	4
	P	3
	O	1
	N	2
2	N	2
	N-P	4
	P	3
	O	1
3	P	3
	N	2
	O	1
	N-P	4
4	N-P	4
	O	1
	P	3
	N	2
5	O	1
	P	3
	N-P	4
	N	2
6	P	3
	N	2
	N-P	4
	O	1

Series V, NORMAL SCHOOL FIELD

II. Pilot wheat and Marion oats, the seed of which had been soaked in solutions and KH2PO4 of varying strengths, was seeded in the following outlined nursery trial to determine the effect, if any, of this seed treatment.

PROJECT II

Seed Soaking Experiment-1950

Wheat		Oats	
Plot No.	Key No.	Plot No.	Key No.
1	4	1	2
2	3	2	1
3	2	3	3
4	1	4	4
5	2	5	1
6	3	6	2
7	1	7	4
8	4	8	3
9	4	9	1
10	2	10	3
11	1	11	4
12	3	12	2
13	2	13	4
14	1	14	3
15	3	15	2
16	4	16	1
17	1	17	2
18	4	18	1
19	3	19	3
20	2	20	4

Key Legend:
Key No. 1 – Untreated seed
Key No. 2 – Distilled water
Key No. 3 - 5% KH2PO4
Key No. 4 – 10% KH2PO4

III. Pilot wheat and Gopher oats were seeded May 26th, 1950 according to the following plant. (see next page).

PROJECT III

Fertilizer Trials

Fertilizer drilled north and south May 26, 1950. Wheat and oats seeded the same day. Plots are drill widths wide-app. 22’ x 564’-1/3.51 acre.

		200 P	46%			--N--	(Plots	22 x	264)		
		200 N	&	200 P		--N &	P --				
		200 P	46%			--N--					
Oats-Check	Oats-Seed Soaked P	Oats-P	Oats-N & P	Oats-N	Oats-Check	Wheat-Check	Wheat-Soaked P	Wheat-N	Wheat-N & P	Wheat-P	Wheat-Check
12	11	10	9	8	7	6	5	4	3	2	1

Fallowed 4-30-49
Fertilizer drilled on fallow 11-30-49
Plots 22’ x 264’ – 1/7.5 acre

Results:

The fertilizer trials at this station have been designed to obtain preliminary information on the use and results from fertilizer applications under the conditions represented by this station. The interesting information accumulated on these trials is insufficient to base conclusions on, and it will be necessary to continue fertilizer trials at this station for several years before properly qualified conclusions may be drawn from this work.

MISCELLANEIOUS INCREASE CROPPING

Crested Wheatgrass Seed

Crested wheatgrass seed was combined this year in good condition. The extremely dry season had caused the seed crop mostly to dry up on the plants with less shattering than was thought probable. So the crested wheatgrass crop was harvested with relatively little loss. Shattering as the plants stood in the field probably was no greater than would have occurred had the crop been harvested with the binder and the bundles handled after they had dried in the shock.

Seed yields of crest wheatgrass, in general, varied from around 50 pounds or a little less on some plots on the Normal school field to above 150 pounds per acre. Some spots which had been favored with moisture from the snow probably yielded above this amount. All yields have not yet been calculated. But, in general, more seed was harvested than was thought probable. On the Agronomy Unit around three-thousand pounds of seed was harvested. On the Livestock Unit the patches left for seed produced 3300 pounds, more or less. In general very little crested wheatgrass seed was harvested through the area in 1950. Yet the total amount of the seed produced in the area was possibly ten times as great as in 1949. A market for crested wheatgrass seed has not yet been established but it seems certain that the price will be well under the prevailing price in 1949 and the spring of 1950. Local seedhouses were asking forty-four cents per pound for seed this spring. Last fall some seed was priced at sixty cents per pound but the market gradually worked down during the spring.

Germination and purity tests of cleaned samples of combined crested wheatgrass sent to the Seed Department, State of North Dakota, were reported as follows on September 8, 1950.

	Purity	Germination
Sample No. 1	97.7	90.0
Sample No. 2	96.3	94.0
Livestock Unit	96.6	93.0
Livestock Unit	95.2	96.0

Intermediate Wheatgrass Seed

Approximately 500# of cleaned Intermediate wheatgrass seed was harvested as is being held for sale.

Wheat

A 12 acre patch of Pilot wheat produced a total yield of 242 bushels of seed.

Oats

Sixteen acres of Marida oats, grown from certified seed obtained from Idaho, produced a total yield of 636 bushels of seed.

Approximately 60 acres of Gopher oats were seeded in 1950. Fourteen acres were cut for silage, fourteen acres were cut for hay and the remainder was threshed, producing a total yield of about 1000 bushels of grain.

Barley

Fifty-five acres of Trebi barley was seeded. Approximately 14 acres were cut for silage and 40 acres were combined, producing a total yield of 1250 bushels of seed.

Corn

Ninety-five acres of corn was raised and 77 acres of this was cut for silage and put into the two upright silos on the livestock farm.

Flax

A small 4-acre patch of land adjoining the Station was seeded to flax on shares, producing 15 bushels of seed for the Experiment Station.

Hay

Approximately 35 tons of crested wheatgrass and other tame grasses was cut for hay in 1950.

APPENDIX TO SECTION I

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DRY LAND MANAGEMENT

Table 1

Annual averages and relative yields of Wheat-1946-1950, and 43 years results of the tillage and rotation studies at the Dickinson Experiment Station.

Cultural Method	No. Plots	Average Yields 1946	1947	1948	1949	1950	1908-1950	Relative Yields 1908-1950 Fallow-100%
Fallow	3	26.5	23.3	41.2	9.7	23.1	20.8	100
Green Manure	5	25.2	27.6	37.1	6.5	24.5	18.8	90
Disked Cornground	9	12.5	25.1	34.7	10.3	18.4	18.3	88
Spring Plowed	2	8.6	18.6	26.6	6.1	17.9	16.0	77
Fall Plowed	4*	5.3*	23.2*	27.8*	9.1*	21.9*	16.2	78
Continuous:								
Spring Plowed	1	9.3	15.0	21.7	3.2	14.5	11.5	55
Fall Plowed	1	2.7	11.8	19.5	2.7	8.7	11.0	53
Alternate wheat and fallow	1	27.0	18.5	34.5	7.2	17.5	19.8	95

* Includes wheat in the manured rotation 62 which has a 43-year average of 18.6 b.p.a.

Table 2

Annual averages and relative yields of Oats-1946-1950, and 43 years results of the tillage and rotation studies at the Dickinson Experiment Station

Cultural Method	No. Plots	Average Yields 1946	1947	1948	1949	1950	1908-1950	Relative Yields 1908-1950 Fallow-100%
Fallow	3	63.7	69.9	89.7	24.9	51.9	46.8	100
Green Manure	3	67.8	65.4	87.4	15.9	58.7	45.5	97
Disked Cornground	5	23.6	61.1	71.7	22.7	40.8	37.1	79
Spring Plowed	6*	14.2	63.8	62.2	24.2	41.5	35.0	75
Fall Plowed	5	11.8	60.5	48.4	19.1	46.9	32.3	69
Sod	3	9.8	65.5	49.2	23.6	43.1	33.7	72
Continuous:								
Spring Plowed	1	20.3	37.2	31.6	13.8	30.6	26.4	56
Fall Plowed	1	6.6	38.1	29.1	8.1	43.0	24.5	52
Alternate oats and fallow	1	71.9	64.7	62.2	23.4	53.8	45.6	98

* Includes oats in the manured rotation 62 which has a 43-year average of 38.1 b.p.a.

DRYLAND MANAGEMENT

Table 3

Annual averages and relative yields of Barley-1946-1950, and 27 years results of the tillage and rotation studies at the Dickinson Experiment Station

Cultural Method	No. Plots	Average Yields 1946	1947	1948	1949	1950	1924-1950	Relative Yields 1924-1950 Fallow-100%
Fallow	2	27.3	28.1	33.8	5.8	25.4	26.4	100
Disked Cornground	2	13.1	32.2	38.4	14.1	24.0	20.8	79
Spring Plowed	1	7.9	16.9	23.1	5.8	29.6	16.1	61
Continuous:								
Spring Plowed	1	9.8	21.5	22.3	7.7	19.4	15.6	59
Fall Plowed	1	3.8	23.8	18.3	1.5	12.9	14.2	54
Fallow	1	35.8	43.5	54.2	12.7	32.7	23.6	89

Table 4

Annual and average yields of Corn-1946-1950 and 43 year average and relative yields for corn in the rotation and tillage studies at the Dickinson Experiment Station.

Cultural Method	No. Plots	Corn Grain Average Yields 1946	1947	1948	1949	1950	1908-1950	Relative Yields S. P. =100%
Spring Plowing	16	1.2	42.6	30.0	13.9	22.0	17.5	100
Fall Plowing	4	0.0	37.4	30.2	13.7	24.1	16.0	91
Continuous:								
Spring Plowing	1	16.6	27.8	26.4	5.0	22.1	18.9	108
Fall Plowing	1	11.9	28.4	28.4	14.1	20.4	18.5	106
Alternate Corn and Fallow	1	24.0	15.4	26.4	13.8	16.4	20.4	117
Cultural Method	**No. Plots**	**Corn Fodder Average Yields 1946**	**1947**	**1948**	**1949**	**1950**	**1908-1950**	**Relative Yields S. P. =100%**
Spring Plowing	16	1538	6209	4451	2263	3995	3601	100
Fall Plowing	4	1025	4918	4430	1960	3612	3115	86
Continuous:								
Spring Plowing	1	3000	4320	3550	1050	3950	3211	89
Fall Plowing	1	2349	3130	3390	2360	3180	3091	86
Alternate Corn and Fallow	1	4350	2060	3300	2870	3300	3436	95