

1954

REPORT of ROTATION and TILLAGE TRIALS

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INTRODUCTION

This is a report of the Rotation and Tillage Trials conducted at the Dickinson Experiment Station in 1954.

The Dickinson Experiment Station is a branch station of the North Dakota Agricultural Experiment Station, and is under the supervision of Mr. Raymond J. Douglas, Superintendent.

The completion of the 1954 crop year marks the 48th year of continuous crop rotation and tillage investigations at this station. These trials have established the following facts regarding farming practices for southwestern North Dakota:

1. Highest yields of small grains are obtained after fallow, followed closely by high yields on clean cornland. Corn should largely replace summer fallow on a combination livestock and grain farm since the corn can be utilized as feed. The value of the corn crop greatly exceeds the value of the additional yields of small grains obtained from fallow over that obtained from cornland.
2. Disking of small grain stubble in the spring in preparation for seeding the grain crop is a very undesirable practice and should be ruled out in southwestern North Dakota. Over a 45 year period, spring plowing in place of double disking stubble has resulted in a yield of wheat of approximately four bushels more per acre.
3. Double disking of clean cornland, in preparation for seeding wheat, is very satisfactory. However, if the cornland is not clean, spring moldboard plowing is more desirable.

4. Results obtained following a green manure crop do not justify the use of this practice in southwestern North Dakota.
5. No significant yield differences have been found between common and plowless or trashy fallow. Due to the fact that plowless fallow helps prevent both wind and water erosion it is recommended over regular common fallow. Best results have been from fallow when the first operation began about May 15 and was completed not later than June 1.
6. Perhaps the most successful rotation in this area is a three year rotation of wheat on clean cornland, disked; oats on spring-plowed wheat stubble, and corn on spring-plowed oat stubble. In this rotation, where barley is needed for feed, part of the oat acreage could be switched to barley without materially affecting the rotation.
7. Four year rotations do not produce quite as high yields as three year rotations except three year rotations which include fallow.
8. Five and six year rotations, or deferred rotations which include grasses or legumes, are good soil conserving or soil building practices which produce good yields and at the same time help maintain fertility of the soil. In the case of both alfalfa and sweet clover, nitrogen and humus are added to the soil. In the case of crested wheatgrass or any other grass, humus is added to the soil and the fine roots bind the soil together and help prevent both wind and water erosion. A grass or legume in any of these rotations is very valuable from the standpoint of feed production in a mixed farming operation.

CHARACTER OF THE SEASON

Precipitation totaling 2.63 inches for the first three months of 1954 provided sufficient soil moisture for spring work, and conditions for seeding small grain were generally good in this area. April rainfall was light and precipitation in May was nearly three-quarters of an inch below the average but temperatures were low for both of these months and warm, drying winds were not a serious problem. Cool, rainy weather in June was favorable for small grain and hay crops but retarded growth of corn. Small grain was beginning to head the last week in June. Stem rust of wheat was first observed about June 24th, but cool weather retarded its early development. One of the driest Julys in 63 years coupled with high temperatures during the month, (on 17 days during the month maximum temperature was 90°F or higher) damaged small grain and hay crops considerably and hastened development of corn. The dry, hot, July weather did retard development of wheat stem rust, however. Heaviest August rainfall in 63 years, 6.82 inches, came too late to benefit small grains much but provided much needed moisture for the corn crop and pastures,

which made excellent growth during this month and into September. Precipitation in September was below average and heavy weed growth promoted by the unusual August rainfall dried out the surface soil rapidly. The soil was found to be in poor condition for fall plowing on September 20th when the fall plowed plots in the rotation and tillage trials were worked. Precipitation in October and November has been light. Heavy winter snowfall and/or timely spring rainfall will be necessary to provide moisture for germination and early growth of the 1955 crop.

Winter wheat and winter rye seeded on September 3, 1954 have made only a weak growth and are not in the vigorous condition necessary for them to successfully withstand the winter.

[Daily Precipitation & Climatic Data Summary Tables](#)

ROTATION AND TILLAGE TRIALS - 1954

The 1954 trials complete 48 years of study in dry land soil management at the Dickinson Experiment Station. In 1907 all trials were grown on uniform cropping and are not included in the 45 year average for that reason.

In the following [summary tables](#), 1954 yields for the 4 principal crops, wheat, oats, barley and corn, included in these trials are compared with annual averages for the past 5 years and with the 45 year average for the more important cultural methods under investigation.

[Rotation and Tillage Trial Summary Table](#)

Yields were fairly good in 1954, considering the erratic seasonal rainfall pattern, and again followed the pattern of the 45 year average with one exception. Highest yields of small grains were obtained on green manured plots and were closely followed by yields from disked cornland and spring plowed stubble in that order. Fall plowing again proved to be one of the poorest tillage methods in these trials. Yields of small grain on double disked stubble were also extremely low. Yields on fallow were poor in comparison with what is usually expected from this method of production.

Part of the rotation and tillage trials on the Main field were revised in 1954 in preparation for long time commercial fertilizer trials which will be started in 1955. On Field "N" trials were revised to include a comparison of the

moldboard plow, the one-way disk and the double disk for wheat production on stubble land.

[Summary Sheets - Rotation and Tillage Experiments - Main Field - 1954](#)

[Rotation Sheets - Rotation and Tillage Experiments - Main Field - 1954](#)

[Rotation Sheets - Rotation and Tillage Experiments - Field N - 1954](#)

