

The Year of Drought

A Summary of the Lessons Learned from Experimental Work at the University of Saskatchewan

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The Agricultural Editor has asked me to give some observations on the effect of tillage methods on crop yields during the past dry season, one of the driest South Western and West Central Saskatchewan has experienced. Space will not permit a full statement of our results, even for this one year, nevertheless the brief summarized account following may be of some service to those readers of The Guide who live in "Dry Farm Areas."

In the investigation field on the university farm a uniform piece of land was fallowed in each of 17 different ways in 1913 and the actual yield of wheat ranged from 16 bushels to 34 bushels 20 pounds; the yield of oats from 28 bushels 8 pounds to 58 bushels 8 pounds; and the yield of barley from 10 bushels to 34 bushels 28 pounds, according to the tillage given. In the same field stubble land that had borne two crops after being broken was tilled in the fall of 1913 and spring of 1914 in each of 33 different ways for the third crop. The actual yield of wheat on this land ranged from 5 bushels to 23 bushels 10 pounds, while the yield of oats ranged from 15 bushels to 45 bushels 10 pounds per acre, according to the tillage method followed. On very grassy untilled stubble the yield of wheat was but 2 bushels and the yield of oats only 6 bushels per acre.

The chart summarizes some of these results with wheat. When referring to it as well as when considering the statements made, the reader should keep in mind that the figures are from one or at most from four years work on but one soil in one district. It should be recognized that on different soils or in different climates, or even on the same soil under other climatic conditions, similar results need not necessarily obtain. At the same time essentially these returns are likely to be had under conditions of soil and climate that approximate those in this district for the period considered.

The work was done on a brown clay loam soil over a clay subsoil. The monthly precipitation during the year as compared with the average for the province for the years 1899 to 1908 was as follows:

	Jan.	Feb.	Mar.
Prov. of Sask.	0.70"	0.66"	1.03"
Saskatoon	90	40	48
	April	May	June
Prov. of Sask.	0.72	2.10	3.49
Saskatoon	40	1.65	1.88

	July	Aug.	Sept.
Prov. of Sask.	2.28"	2.41"	1.65"
Saskatoon	85	41	1.44
	Oct.	Nov.	Dec.
Prov. of Sask.	0.69	0.61	0.60
Saskatoon	2.60		

It will be observed that during the growing months, May, June and July, the precipitation at this point was but little more than half the provincial average, and that in the months March to August, inclusive, the precipitation was less than half the provincial average.

An analysis of the yields referred to above forces us to the conclusion that certain specific tillage practices are desirable in those regions where the supply of moisture limits the yield of crops. Among these may be mentioned:

The Necessity of Fallowing

The average yield of wheat on well fallowed land was 30 1/4 bushels per acre, as compared with 16 bushels 53 pounds on well cultivated stubble and an absolute failure on spring breaking. A fallow plowed shallow early in the spring and harrowed before the regular plowing increased the yield of wheat 1 bushel 54 pounds; the yield of oats 2 bushels 17 pounds; and the yield of barley 2 bushels 38 pounds per acre; while double discing early in the spring increased the yield of wheat 48 pounds, that of oats 3 bushels 10 pounds, and that of barley 1 bushel 44 pounds per acre over land otherwise similarly prepared. What the increase from fall cultivation before the fallow would have been we do not know. Projects now under way will give us this information. We are of the opinion that it would have increased the yield considerably more than did the spring cultivation. As an illustration of the value of early plowing of the fallow land, a fallow plowed June 1 produced an increase of 10 bushels 24 pounds of wheat, 11 bushels 30 pounds of oats and 11 bushels 16 pounds of barley more than a fallow plowed July 1; while a fallow plowed June 15 produced 10 bushels 20 pounds of wheat, 7 bushels 10 pounds of oats and 8 bushels and 24 pounds of barley more than fallow plowed July 1, but otherwise similarly treated.

Pasturing Fallow Decreased the Yield

Growing a thin crop of oats on the fallow for pasture decreased the yield

of wheat 11 bushels 22 pounds and the yield of oats 19 bushels 29 pounds; while rape sown in rows for pasture on the fallow decreased the yield of wheat 8 bushels and the yield of oats 6 bushels 6 pounds per acre. Readers should note the reference to this and the preceding statement in the last paragraph of this article. Once plowing of the fallow is preferable to twice plowing when the second plowing is done after the rainy season has passed. On land free from grass, once plowing in the middle of June with later surface cultivation with disc and harrows increased the yield of wheat 2 bushels 3 pounds, oats 5 bushels 14 pounds and barley 4 bushels 34 pounds over land plowed in the middle of June and harrowed and plowed again in August and disced, packed and harrowed. Deep plowing of the fallow is also desirable in dry regions, but on new land the depth of seven or more inches should generally be reached gradually and not all at once at the time of the first fallow. Our experiments have clearly demonstrated that "grassy" stubble should be plowed. Stubble land containing some creeping rooted grasses yielded when plowed, disced, packed and harrowed in the fall, an increase of 3 bushels 15 pounds of wheat and 13 bushels 6 pounds of oats more than adjoining unplowed stubble that was disced, packed and harrowed in the fall; and grassy stubble plowed, disced, packed and harrowed in the spring returned 5 bushels 56 pounds more wheat and 10 bushels 3 1/2 pounds more oats than unplowed land that was disced, packed and harrowed in the spring, and unplowed, uncultivated, grassy stubble yielded 2 bushels of wheat, when the average yield on exactly the same land after it was plowed shallow in the fall, disced, packed and harrowed, and harrowed again both before and after seeding, was 16 bushels and 53 pounds per acre. That stubble land plowed early in the fall in preference to later on gives better yields is clearly shown by the following: Fall plowing done early after harvest increased the yield of wheat 3 bushels 2 pounds and the yield of oats 8 bushels 6 pounds over fall plowing done three weeks later, but otherwise similarly treated.

Harrow Plowing Immediately

It should be mentioned here that all

fall or spring plowing, particularly the former, should be well worked down immediately after the operation. If it is not done soon the moisture in the furrow slice evaporates quickly, and if it is not done at all the yields are often less than if left unplowed. The average increase in the yield of wheat from thirty different tests over a period of four years from harrowing plowed land immediately after the operation was 1 bushel 57 pounds per acre; while the average increase from eight different tests in the 1913 crop from harrowing plowed land immediately after it was turned over was 3 bushels 32 pounds per acre. In regard to packing, the average increase during four years from packing deep fall-spring plowing was 2 bushels 6 pounds of wheat; from packing shallow fall-spring plowing 1 bushel 40 pounds of wheat; while packing unplowed land decreased the yield slightly in three of the four years, but increased it in the wet year of 1911, a year when the frost came early in the fall.

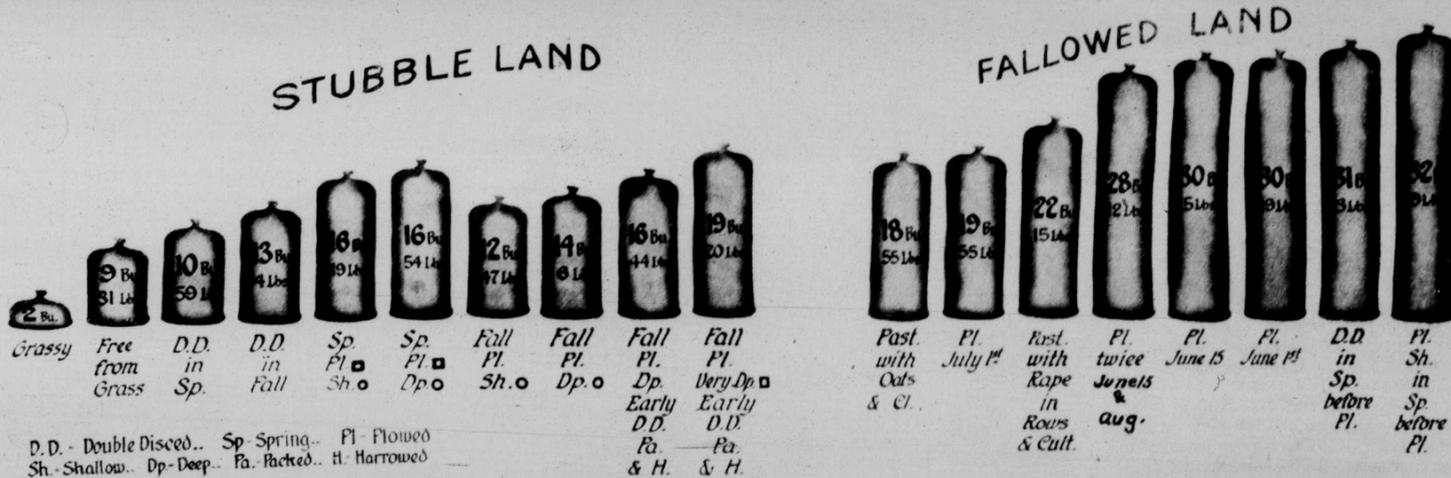
Soil Conditions Should be Studied

Our observations based on four years work incline us to the opinion that the "condition" of the soil with respect to grass, weeds, amount of stubble and moisture content are the principal factors that determine the best depth and the best time to plow stubble land or whether it should be plowed at all. Spring plowing, fall plowing, shallow plowing and deep plowing have each in turn, but in different seasons, given us the largest yield, and in the wet year of 1911, on land free from weeds and grass, unplowed uncultivated stubble in the second crop after a good fallow gave as large returns as any other preparation.

In each case the plowing that proved best was the one done at the time the soil was in the best "condition" for plowing and at the depth that enabled the best work to be done. An important exception to this statement, however, is the uniformly good returns from shallow fall plowing done early after harvest and well worked down. The data at present available does not favor the teaching often advanced that deep plowing and fall plowing are always best for a second or third crop after fallow in dry areas. At the same time it should be pointed out that the very favorable results this

Continued on Page 38

INFLUENCE OF TILLAGE on 1914 WHEAT YIELDS



○ Average of 4 Plots (Pl. only = Pl. & H., - Pl. DD & H., - Pl. D.D. Pa. & H.)

□ In previous years this practice has not given equally good results.

Except where otherwise indicated fallowed land was plowed June 15 & Harrowed; and Disced & Harrowed uniformly thereafter as needed. The Pastured Fallow was Flowed & thoroughly prepared before sowing the Pasture Crop and was Double Disced, Packed & Harrowed after its removal. The Oats and Clover Pasture yielded 1000 lbs of Green Crop, and the Rape grew 8 to 10 inches high. All plots harrowed before and after seeding in addition to above.

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