

katchewan, Gives Results of Exhaustive Tests.

Most Pressing Problem in Production in Saskatchewan is control of crops on stubble fields. -- Nine-tenths of poor crops in the province are on stubble land.-Lack of moisture principal cause of low yields.-Methods of cultivating stubble land which have given best results.

of cultivating stubble land which have given best results. It is regrettable that in dry autumns fifty different ways and the yield of every ten poor crops in Saskatchewan in the seeds of annual weeds can be started only with difficulty; but bienual weeds can be started only with difficulty; but bienual weeds can be started only with difficulty; but bienual weeds is to be. Preceding the 1914 crop or flax after having been "broken" or fallowed. Such fields are commonly spoken of as "stubble" fields. The aurphice moleture stored in fallowed is an entry of the matic quack, sweet grass and prairie rotes are the most common, are serious in the tott crop the largest yield was spring after the long stubble has been the long stubble has been the stored in fallowed in the most common, are serious to the tillage method followed.

"stubble" fields. The surplus moisture stored in fallowed land is in semi arid regions an insurance against failure of the next semon's crop as a result of drought. The same is true in less degree of prairie or sod soil that has been well "broken" and left unsown till

1913 fall and spring plowing were apthe following year. On land that has ing, preferably in dry seasons when the proximately equal and each produced produced one or more crops, however, the soil moisture is largely exhausted and the next succeeding crop is almost wholly dependent upon the amount that falls after harvest time. Because of the fact after harvest time. Because of the fact Canada thistle and sow thistle. plowing gave larger returns than deep that equal opportunity to control the The "Seedbed"

Importance of "Available" Plant Food

factors necessary for growth is not given A good seed bed is one that provides it is probably true that we shall never on the conditions necessary for germination the average get as good returns from the -heat, air and moisture-in optimum "stubble" crop as from that sown on falamounts, at the right depth, at the time low or "breaking" or after "hoed" crops. Nevertheless much can be done to increase the seed is sown. Too often the surface

of our stubble fields is too hard to get the the productive power of such land. seed into, or too dry to cause germination, The control of the yield of crops on our or covered with stubble through which stubble fields is without doubt the most the drill cannot satisfactorily force the pressing problem in production now seed. The surface soil can be made facing the Saskatchewan grain grower; more mellow by surface cultivation or by and in view of the fact that over twoplowing, the moisture content can be thirds of our present cropped area is more or less controlled by the same stubble it would seem that this portion means, and the stubble, if too long, can of our farms should receive very much either be burned or plowed under deeply greater consideration than it has ever or left without any cultivation. been given before.

Causes of Low Yields

All of the plant food in a soil cannot be The causes of low yields on stubble drawn upon by the growing crop. Since that was free from grass. There are plants "drink" their food it is clear that times when it may not be best to plow fields are usually few in number. The most important ones are:--only that portion of the fertilizing con- clean stubble fields, but there is seldom

- The low moisture content of the soil. The presence of grass, shrubs and weeds.
- A poor seed bed. Insufficient "soluble" plant food. The stubble itself.

Unavailable subsoil moisture. The first is the most general but any one or all of the others may be contributing factors. Some of these, unfortunately, cannot be controlled absolutely, but all can be materially influenced by man and most are entirely within his control. Each is affected by certain specific tillage operations. if the largest net advantage is to be derived. Hence no fixed pro-

The actual causes of low yield on a given field must first be determined and then the cultural treatment that is likely

packing is done after seeding. (6) Burning Stubble is Permanently Wastejul but Immediateyl Profitable. The average yield during three years for all stubble land that was surface

there is cause jor so doing. On the other hand, this method does Weeds growing in a crop decrease the not give opportunity for controlling the yield. Moisture that evaporates prospread of annual and biennial weeds. In duces no wheat. Occasionally after a regions where spring burning has been crop is up many weeds may be killed, followed for any length of time, these are very abundant. If weeds are

In some older districts where weeds present and the surface soil quite firm, plowing gave larger retents than deep in some older districts where weeds present and the surface soil quite firm, plowing in 1912 and 191e there was are abundant, and where the fallow blows it is generally advisable to harrow. If plowing gave a slight increase in yield stubble fields and renders spring burning tains sufficient moisture to produce a stubble fields and renders spring burning tains sufficient moisture to produce a impracticable, fall burning and surface good crop harrowing may not be ad cultivation is sometimes practised. A visable.

Some Desirable Tillage Practices As a result of carefully observing the climatic and soil conditions that obtained, and of keeping a careful record of be-haviour and yield of the crops during these tests we have been forced to the opinion that certain practices for some the areat mater of organic matter of areat mater of organic matter of organic matt opinion that certain practices for some the great waste of organic matter and This is particularly true on light loose specific soil conditions have proven to nitrogen and the lack of opportunity be both desirable and profitable. Among spring burning offers for the control of weeds. (7) Srujace Cultivation is sometimes pre-The average yield of wheat for three

rable to Plowing. In the year 1912 on heavy land that A light lever harrow with the teeth tilted was free from weeds and grass as large returns were secured in a second crop after a good fallow, from sowing wheat backward is preferred for this work.

(Continued on page five)

CITY COAL CO soils or on fields carrying considerable rubbish in the form of stubble. On fields in this condition, harrowing, if Phone 2819 done at all, must be practised with care.

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of those particular causes must b given

The Control of Soil Moisture The low moisture content of the soil

cedure can with profit be followed on

all fields.

try to get more in.

is the principal cause of low yields on stubble land. "A dry season." "too little rain," "hot winds" are generally given as causes of partial failure. In the drier parts of the province the control of soil moisture is the most serious question to be faced in the handling of stubble fields

So far as this portion of the general problem of managing stubble fields is concerned only two things can be done: (1) endeavor to keep the moisture already in the soil from escaping, and (2) becomes available or soluble in a year,

otherwise the present holders of land The moisture in stubble land escapes would quickly dissipate its stores of wealth in only two ways:-By evaporating direct- and succeeding generations would starve. ly into the air and by being pumped out The agencies causing the breaking down by weeds or other volunteer plants grow- of plant food constituents in the soil are ing on the land. Evaporation can be more or less dormant during our dry effectively lessened by creating and mainautumns and long winters, with the taining a soil mulch—a loose layer of dry result that the amount of available plant soil on the surface of the field-through which moisture escapes very very slowly. Under our climatic conditions the quanfood in stubble fields is relatively small. The loss of moisture through the growth tity is increased—and with it the yield of weeds can be controlled by killing the of crors-by any form of tillage that does weeds when they are small. not waste soil moisture. Getting additional moisture into stubble

fields is a more difficult problem than is in a soil, t e less moisture is required too wet. keeping in what may already be there. to roduce a bushel of wheat. In stubble

Our autumn, winter and spring seasons fiel s tile amount of moisture is very are dry. In the seven months from low at test, and we cannot increase the September to March inclusive only about supply materially. But we can make one-third of the year's precipitation falls, better use of what we have by hiving it. and a large portion of this is in the form opportunity to carry into the rlant a of snow and therefore not easily con- more cense solution, a larger load, a trolled. It must be apparent to all that richer "soil soup."

on top as a result of surface cultivation Stubble A Nuisance ist important and some nearly other are internet or plowing, is likely to absorb more of The stubble of cereal crops is made up (4) The Desirability of Harrowing (4) The Desirability of Harrowing snow than an untilled field, particularly soil and air. If stubble is burned, the on undulating or rolling land. most valuable fertilizing element secured

To prevent the "run off" plowing would from the soil, viz., nitrogen, passes off seem preferable to surface cultivation or no cultivation and fall plowing would prove dissipates "organic matter," the conbetter than spring plowing. But "the stituent that helps to keep soils from likely to cause it to settle down and be-stubble holds snow" and "fall plowing blowing, the one that increases the water come hard and more or less baked. But dries out!" If in plowing to store mois- holding capacity of the soil and at the ours is not a humid climate and unharture in the soil we lose some that is al- same time makes it easier to work. The ready, then what is the net result?

Weeds

Weed seeds on the surface of stubble | the efficiency of tillage and seeding operafields are a menace not only to the crop immediately following, but to the farm often seriously interferes with the upward as a business concern. If they are left movement of soil moisture from the subto take their own course, they seldom soil, thus lessening the yield. Except germinate until spring and then the in drifting soils or on heavy tight clay plants generally mature and drop their stubble is a nuisance until it decays. seeds either before or at harvest time. Subsoil Moisture Must Be Kept Incidentally they use up tons of moisture,

Available to Plant Roots lessen the yield of the crop and increase Moisture and "plant food" are both the cost of cutting, stooking, threshing and marketing it.

and marketing it. Most of these are annuals that die when subjected to the low temperature of winter Obviously they ought to be subjected to the low temperature of rise to the plant roots by capitality. lever harrows the same day the plant winter. Obviously, they ought to be But frequently in our tillage operations was done was I bus. and 57 lbs. of wheat encouraged by some form of cultivation we create a condition where the subsoil cultivation induces a greater spring germination and enables us to kill the young plants by subsequent cultivation.



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instances it became overrun with native quack, or, in low places, with sweet grass and the cost of redeeming it was thus much increased. Cereal crops cannot compete successully for moisture and plant food with PROFESSOR BRACKEN established perennial plants. Neither burning nor surface cultivation will kill

plowing.

the latter and when they are present in stituents in the soil that becomes soluble any quantity in stubble fields plowing for he succeeding crop, either in fall or spring can be used by them. It is a wise probecomes almost a necessity. vision of nature that only a very small proportion of the total plant food in a soil ultivation.

(3) Early sall preferable to late fall In the 1911 wheat crop early fall plowing increased the yield I bus. and 36 lbs. ver fall plowing done three weeks later. In 1913 the increase due to the earlier work was I bus. 12 1-2 lbs. while in 1914

Some Desirable Tillage Practices

(1) The necessity of plowing "grassy" stubble.

years on untilled grassy stubble was 5 bus. 25 lbs. less than on untilled stubble

that was free from grass. There are

a time or condition that makes it ad-

visable to leave grassy stubble unplowed.

vated in the fall produced 3 bus. 45 lbs.

less wheat and 13 bus. 5 lbs. less oats per

face cultivated. Spring plowing pro-duced a slightly greater increase but less grass was killed by it than by the fall

On one piece of untilled grassy stubble

the average yield of wheat in 1914 was

5 bus. per acre (a part of it produced at

the rate of only 2 bus. per acre). Adjoining land in the same condition yielded

13 bus. 30 lbs. when plowed shallow, packed, double disced and harrowed in

It was observed that in all cases where

grassy stubble was plowed the yield in-

killed or very much lessened. When the

same land was left unplowed, in many/

l and the grass was either totally

In 1914 grassy stubble surface culti-

was 3 bus. and 4 lbs. per acre. In 1914 early double discing increased the yield I bus. 10 lbs. of wheat over double discing done 3 weeks later. It is often impossible to plow land early after harvest on account of its hard dry con-But it is never impossible dition. disc it.

Tie more "available" plant food there (3) Avoid working tight clay soils when

In the spring of 1913 some sticky clay portions of our investigation field plowed when the soil was too wet, with the result that they "baked" and the yield was cut down to less than half that secured on other lighter soils worked at the same time. Light soils are not likely to be hurt by working them too soor a receptive surface soil, that is, one loose on top as a result of surface cultivation Stubble—A Nuisance—Yet Important after heavy rains but medium soil may be and some heavy soils are invariably Plowed Land as soon as possible afte plowing.

In humid regions fall plowing is gener-ally left loose and untilled for the reason that the greater precipitation there is rowed plowing instead of settling down amount of this constituent in decayed and baking usually dries out.

form in a soil is the greatest single index to its "fertility." But stubble lessens The effect of harrowing fall plowed land within twelve hours after the plowing was done was to increase the yield of wheat 2 bus. and 46 lbs. in 1911; 3 bus. and 29 lbs. in 1913; and to decrease the

yield 30 lbs. per acre in 1914. The yield of wheat on spring plowing in 1911 was increased 60 lbs. per acre as a result of harrowing the same day the work was done. In 1913 the increase from the same practice was 3 bus. 36 lbs. and in 1914 I bus. and 21 lbs. pe

acre. Summarizing 28 tests during three years the increase from one operation we create a condition where the subsoil per acre. We are firmly convinced that moisture does not rise fast enough to harrowing plowed land as soon as posmeet the needs of the crop above, in sible after the operation is performed which case the lower yields result. Such is a very important and necessary operaa condition is produced when the furrow tion on all Saskatchewan soils excepting a condition is produced when the further that in a baskatchevian tone date in a size of plowed land is not pressed firmly a few tight clay types that may run against the subsoil. Moisture will not together and bake if more than normal precipitation occurs. (5) The Furrow Slice should be flat and

an air space. The chief reason why more firm against the jurrow bottom. In humid climates the practice of turning the furrow over flat is bot considered

advisable, but in scmi-arid regions it is. subsoil moisture with the inevitable effect important that the furrow slice be placed In addition to plowing in this way it is firmly in contact with the sub-surface Some Tillage Experiments at the soil. This can be done by using a land

University packer or by thorough surface cultiva-On the Investigation Field of the University, wheat stubble was tilled in tion, or, if the work be done early enough, the rains accomplish the same end-an each of twenty-three different ways for at no cost.

the 1911 wheat crop and the yields ranged A summary of all our work with th the 1911 wheat crop and the yields ranged from 12 bus to 28 bus. 29 lbs. according to the tillage given. For the 1912 crop wheat stubble was tilled (in the spring only) in each of 16 different ways and the yield of wheat ranged from 17bus. 8 lbs. to 20 bus. 31 lbs. For the 1913 crop, flax stubble was tilled in seach of done the crop was invariably more uniCANNED PEAS-We would recommend the finer grades of peas-they are smalle, and more tender than the others, because they are picked when younger and sweeter. Ever try baking them in the center of a dish of mashed potatoes? Nothing nicer. Per tin, 10c; per dozen, 1.20; per case, \$2.40.

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