Government of the Province of Saskatchewan
DEPARTMENT OF AGRICULTURE

FIELD HUSBANDRY CIRCULAR NO. 19

Potato Growing in Saskatchewan

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The Potato crop occupies a position of relative unimportance as compared with grain crops in Saskatchewan, yet its use is so universal and its future so promising that the important points in connection with its culture should be well understood by all growers.

In Saskatchewan, potatoes are used almost altogether for human food. As yet none have been used for making starch or alcohol and only the unmarketable ones and the small surplus above the needs of the family have been used as food for stock. Up to the present time the only market outside the farm has been the village, town and city homes, chiefly within the province.

ADVANTAGES OF POTATO GROWING.

When given suitable soil conditions the potato is very productive. Yields ranging from 70 to 800 bushels have been produced in many parts of the province in different seasons. The average for all varieties good and poor, under field conditions, at Saskatoon for the last five years is just over 200 bushels per acre; the better varieties averaged 250 bushels. Under more favorable conditions average yields approaching 400 bushels per acre have been reported. Of course, under drier climatic and poorer soil conditions lighter returns have been secured.

The Potato furnishes the cheapest food the farmer can grow. When one considers that from 15 to 20 per cent. of the total yield is starch or, in other words, that a 200 bushel potato crop contains between 1,800 and 2,400 pounds of starch the value of this crop forces itself to one's attention.

The potato is an "intertilled" crop and being such leaves the land in much better condition for grain than any other crop with the exception of corn. Potato ground and corn ground have produced nearly as high yields of grain as a good summerfallow and much higher yields than land that in the previous year carried any other kind of crop.

DIFFICULTIES IN POTATO GROWING.

The production of potatoes presents fewer difficulties than that of most crops. Drought can generally be guarded against by thorough fallowing and planting in wide rows. Spring frosts often cut down the tops and thus lessen the yield but they seldom kill the plants, unless the planting has been done very early. Fall frosts sometimes come before the plants are mature thus lessening the yield and lowering

the quality of the tubers for cooking purposes. Insect damage is generally negligible, and but few diseases with the exception of scab are very prevalent. Freedom from disease is a condition that we should appreciate and do what we can while the soil is clean to keep it so. None of these difficulties should, however, be considered serious since they seldom affect the yield to a very great extent.

SUITABLE SOILS.

For potatoes a deep, rich, well-drained loam is generally the most productive. The medium to light types of loam soils often produce the best quality and the earliest crops. Potatoes will, however, do well on all normal soils. On those inclined to alkalinity more scab will develop. On the sandy loams the cleanest tubers will be found.

CLIMATIC PREFERENCES.

The potato prefers a moist, cool climate and a fairly long growing season. The eastern and northern portions of the province enjoy the former but the period between spring and fall frosts is shorter in that area than in the south and west. The high temperatures of July and August, particularly when they occur in protracted spells of dry weather, are conducive to a second growth or a growth from the newly formed tubers. Hot dry spells of long duration are not favorable to good yields.

PREPARATION OF THE LAND.

Generally speaking a good fallow is the best preparation for potatoes. Corn ground is perhaps the next best. Breaking done the year previous is also a good preparation. Stubble land, either fall or spring plowed, is sometimes used but is very much less productive and, in dry years, produces very small returns. If the fallow or corn ground or breaking is firm, the condition desired for wheat, it is better to plow the land or plow in the potatoes. Potato ground should be fairly loose to a good depth for the reason that in hard soils misshapen tubers usually develop. Of course, potato ground should not be prepared so loosely that it will dry out. But, a very firm fallow, unless the potatoes are plowed in, is sometimes too firm for best results.

FERTILIZERS.

In Saskatchewan commercial fertilizers are seldom or never used for farm crops. It is questionable whether under normal soil conditions any of them would pay their way. Barnyard manure applied to the fallow and plowed under, or applied before corn when the latter precedes potatoes, is an excellent practice. Fresh horse manure, particularly if it is applied in large quantities or in close contact with the tubers, encourages potato scab. If it is to be applied immediately before the potato crop, well rotted manure is much to be preferred.

THE CHOICE OF VARIETIES.

Several qualities combine to determine the suitability of different sorts for Saskatchewan conditions. Among these, yield, cooking quality, disease resistance, early maturity, shape and depth of eyes, are among the most important. Many scores of potato varieties have been tested in Western Canada and the same ones have not proven best under all conditions.

At Saskatoon the leading early variety is Early Ohio; the best medium early ones are: Rochester Rose, Everett and Irish Cobbler; among the best late varieties are: Carman No. 1, Gold Coin, Table Talk, Wee MacGregor and Pingree.

At Indian Head the white varieties recommended are: Carman No. 1, Empire State and Gold Coin. The pink sorts recommended are Everett and Vick's Extra Early.

At Rosthern, Dreer Standard, Morgan's Seedling and Everett have proven the most productive, but the varieties recommended are: White—Irish Cobbler, Dalmeny Beauty and Carman No. 1; Pink—Everett, Reeves Rose and Rochester Rose.

At Scott, Morgan's Seedling, Rawling's Kidney, Wee MacGregor, Table Talk and Gold Coin have yielded the most over a priod of three years.

DESCRIPTION OF VARIETIES.

Early Ohio is an early pink skinned sort with fairly deep eyes. The tubers are oval to oblong in shape, generally containing many eyes Flowers white. A standard early variety.

Rochester Rose is a seedling of Early Rose. At Saskatoon it is a medium early sort. It has a light pink skin. The eyes are fairly deep. It is rather longer and flatter than Early Ohio. The flowers are white. An excellent medium early pink skinned variety.

Everett is a medium early variety quite similar in size, shape and general characteristics to Rochester Rose.

Irish Cobbler is a medium sort having a white skin. It is oval in shape but sometimes slightly flattened or nearly round. Flowers light rose purple, and the flesh cream colored. The eyes are fairly deep. It has a good reputation for quality but is not a high yielder.

Carman No. 1 is a white skinned, oblong, rather flattened, late potato. An excellent yielder and in seasons when it matures the quality is good. The eyes are few and generally shallow. Flowers are white. This is a good late variety.

Gold Coin is a white skinned, oblong, rather flattened, late variety. Has been very productive at all Experimental Farms. Flowers are white. A good, late variety.

Table Talk—a white skinned, oblong, slightly flattened, late variety, very productive in long growing seasons. Eyes medium in depth. Flowers purple. Recommended strongly under northern Alberta and some Manitoba conditions.

Wee MacGregor is a white skinned, oblong, slightly flattened, late variety, having eyes of medium depth. It is quite productive and under some conditions a very satisfactory sort to grow. Flowers are white.

Pingree is a medium late, white skinned, long, slightly flattened variety having few eyes of medium depth. The flowers are white. Has proven a good yielder at Saskatoon but has no special quality to recommend it.

Empire State is a white skinned, oblong, rather flattened, late, productive variety. Eyes rather shallow. Highly prized by some growers. Flowers white.

Vick's Extra Early is a light pink, or pink and white skinned sort, oblong and somewhat flattened. Medium early in maturity. Flowers white. Recommended by the Indian Head Experimental Farm.

Dreer's Standard is a white skinned, oval, medium early sort, quite productive.

CHANGING OF SEED.

Under some conditions it is desirable to change the seed. Generally speaking, however, this is a bad practice unless it has been found by experience that the tubers produced on one's own farm are not as productive as those of the same variety secured from another place. There is no evidence to show what portions of the province or of Western Canada produce the most vigorous tubers for seed. This information will become available in time, but until it is secured, growers would do well to use their own seed unless disease is discovered or experience has demonstrated that tubers secured from other places produce a more vigorous growth.

SELECTION OF SEED.

Firm, unwilted potatoes that have not sprouted will produce more vigorous plants than any others. Our virgin soils are now free from disease and it should be the grower's firm determination to keep them so by rejecting all seed that contains any semblance of disease other than common scab.

TREATMENT OF SEED.

Potatoes, like the seed of grain crops, should be treated to aid in controlling disease. Either a Solution of Formalin or Corrosive Sublimate will aid in the control of but may not entirely prevent potato scab. If formalin is to be used the same strength recommended for treating wheat is best. One pound to 30 or 40 gallons of water is the proper strength and the potatoes should be soaked in this solution for 1½ to 2 hours. If Corrosive Sublimate is to be used, one ounce to 7 gallons of water is the best proportion. The tubers should be soaked in this solution for 1½ hours. It should be remembered that Corrosive Sublimate is a deadly poison. In treating potatoes with it wooden retainers should be used because of its corrosive action on metal vessels.

SIZE AND CONDITION OF SETS.

The larger the set planted the larger the yield will be. But the net yield, that is, the total yield less the number of bushels of seed planted is greatest when sets about two ounces in size, having two or three or more eyes in each set, are used. The size of the set

should vary with the size of the potato and the number of eyes it contains. The fewer eyes in a tuber the larger the portion planted should be and vice versa. Whether the seed end or the stem end of a large tuber is better depends upon whether the eyes in the stem end develop as well as those in the seed end. Both ends are equally good for seed if the eyes are not partially or wholly dormant in the stem end. The eyes in the seed end generally develop first and more of them are likely to grow. For these reasons the seed end often produces an earlier crop and a better stand. The seed ends are also likely to produce more small potatoes for the reason that more stocks develop from the greater number of sprouts.

Because of the fact that some of the sets in the middle or stem end of large tubers remain dormant and do not grow, thus lessening the stand, larger yields have been secured from the use of small uncut potatoes at Saskatoon than from sets of equal size cut from large tubers. It should be understood, however, that this increase was due altogether to a better stand. It is quite probable that given an equal stand in each case the yield from sets cut from large tubers would be greater than that from sets of equal size from small tubers.

If tubers are cut, they should be planted as soon as possible after cutting or in case some delay makes it impossible to plant at once they should be sprinkled with land plaster in order to prevent excessive drying.

TIME OF PLANTING.

The stems and leaves of young potatoes will freeze with the slightest frost. Planting should therefore be delayed until danger of heavy spring frosts is past. At Saskatoon in the years 1914 and 1915 the largest yields from our main crop were secured by plantings made during the first half of May. There is considerable danger of frosts even after these dates, but some risk in the spring must be run in order to have the crop fairly well developed before fall frosts come. For small areas of early potatoes earlier planting than this might be practiced. It should, however, be remembered that the earlier the planting the greater the danger from late spring frosts, and that rather later planting is a common practice among many good farmers.

DEPTH OF PLANTING.

The depth to plant varies with the type of soil and the moisture condition. From 2 to 5 inches represents the extremes in depth. Generally 3½ inches or thereabouts is the best. Where the crop is to be harrowed before the plants come up, deeper planting is desirable but in gardens or in other places where harrowing is not practiced at this time shallow planting will generally be found to give larger returns and will almost always give an earlier crop.

DISTANCE APART OF ROWS.

The drier the district and the less moisture the land contains the wider apart the rows should be. Under normal soil conditions

on fallowed land rows 30 to 36 inches apart are generally used. On fall or spring plowing rows 36 to as wide as 48 inches may be used. The cheaper the land and the more expensive the seed the wider the rows should be.

DISTANCE BETWEEN SETS IN ROWS.

This varies with the width of the rows. The wider the rows the closer the sets should be. Under normal conditions sets are placed from 12 to 16 inches apart.

METHOD OF PLANTING.

Potatoes may be planted by hand or with a machine planter or they may be plowed in. The hand method is, of course, the most expensive and is suitable only for small areas such as the kitchen garden. Where potatoes are grown in a commercial way the potato planter or the plow method should be used. A potato planter costs money but when a considerable area is to be grown it is likely to be found a profitable investment.

When potatoes are plowed in it is generally best, after planting one row, to cover same by plowing the next furrow as in ordinary plowing. The second or third furrow after the one planted should then be used for the next row. Where potatoes are plowed in, the land should be packed immediately afterward and harrowed. It is generally well to pack the land even after planting has been done with a regular potato planter.

A HOME MADE PLANTER.

A home made machine has been used by the Field Husbandry Department with considerable success. It consists simply of a hopper, with an opening in the front side at the bottom, attached to the stem of the seat of a two-furrow gang plow. The operator sits with his back to the horses and drops the potatoes into a zinc or tin conveyor which carries them to the bottom of the furrow made by the first plow where they are covered immediately by the second plow. A definite number of sets is planted in the distance covered at each round of the plow wheel thus insuring uniformity. If it is desired to plant the potatoes four feet apart, no seed is dropped the second round. If three foot rows are wanted a single furrow plow should follow or preceed the home made planter.

At a cost of a few cents for material and two or three hours time a very serviceable planter can thus be made from a two-furrow gang plow.

AFTER CULTIVATION.

After potatoes are planted the land should receive one or more harrowings in order to control weeds. Even after the plants are up harrowing should not be discontinued. When they reach a height of four or five inches intertillage should commence and it should continue throughout the season, the objects being: first, to control weeds, and

second, to lessen the evaporation of moisture by the formation of a soil mulch.

The practice of hilling potatoes is not so desirable here as in other places where drainage and easier digging and shallow planting are desired. Low hills rather than high ones will be found best under dry conditions on all soils except very shallow or very heavy or low lying soils. High hills will result in better drainage of low lying soils, in easier digging, and a slightly earlier crop, but generally in a decreased yield under normal soil conditions in Saskatchewan.

INSECTS AND DISEASES.

Fortunately but few insects attack the potato crop in the newly settled areas of the province. The potato beetle, or potato bug is, however, found occasionally in some of the older portions of the province. The application of Paris Green by spraying will be found to completely control this insect. One ounce of Paris Green to 5 gallons of water should be used. If ½-oz. of lime is added the injurious effect of the arsenic on the foliage will be neutralized.

The diseases most common to potatoes are the Early Blight, Late Blight and Potato Scab. The first two are the most serious, but fortunately neither of these is very prevalent yet in the province. Spraying with Bordeaux mixture after the 10th or 15th of July is the best remedy. For Potato Scab the Formalin or Corrosive Sublimate treatment is best. These were referred to under treatment of the seed.

Our alkaline soils encourage potato scab as do also our heavier types of land. Light loams and acid soils seem to produce less scab than heavier types and alkaline soils. There are many other diseases that affect potatoes, some of which are very serious. It is very desirable that potato growers take steps to inform themselves regarding the appearance of these diseases. Farmers' Circular No. 4, issued by the Dominion Department of Agriculture, entitled "Potato Diseases Transmitted by the Use of Unsound Tubers," shows the appearance of the common diseases in natural colors. This circular can be secured free of charge from the Dominion Department at Ottawa upon request and should be in the hands of all potato growers.

HARVESTING.

Three methods of harvesting, depending upon the size of the area in crop, are commonly followed. The oldest and most suitable for small cramped areas, such as the kitchen garden, is digging by hand. In modern days when labor is costly this method is not advisable for large areas.

The second method is to turn the tubers out with a plow; this is quick and cheap but very wasteful of potatoes and also of the pickers' time. Many of the tubers remain covered or partially covered and if not uncovered they are lost, while if uncovered by hand the time consumed is considerable.

The third and best method of harvesting is with a potato digger. Many forms of this machine are on the market. The cheapest is

a modification of the double furrow plow, having, instead of the ordinary mold boards, three or four tines on each side which permit of a rather imperfect separation of potatoes from the soil. The most expensive but most efficient diggers elevate the potatoes and soil, shake the tubers from the dirt, separate the tops from the potatoes and leave the latter in a neat row or in boxes or heaps as may be desired. Where large areas are grown the more expensive potato digger is a good investment. This necessitates, of course, more capital and requires four horses to operate, but will dig from three to five acres or more a day.

STORING.

Potatoes in storage should be kept at a temperature of 32 to 40 degrees F. in an atmosphere of normal humidity, neither too dry nor too damp and the room should be kept dark. If these conditions are provided small quantities can ke kept very easily. Larger quantities must receive some form of ventilation in order to permit fresh air to enter and disease laden air to get away. With good ventilation and clean tubers from which the diseased and injured ones have been removed, a cellar or pit that will keep the potatoes at as low a temperature as possible without freezing will be found to result in satisfactory storage conditions. In large bins spaces underneath and around the sides should be arranged, and open slatted columns in the centre. A high temperature should be avoided for the reason that it causes evaporation from the potatoes, thus decreasing the weight and lowering the vitality and market condition of the tubers.

MARKETING.

Saskatchewan farmers have not always in the past supplied even our home market with potatoes. The reasons are: first, there have been no efficient means developed to encourage or facilitate either the marketing or the quick, easy, cheap and safe handling of the crop between the field and the produce merchant's store house; and second, that as a result of this condition the price in years of large production is low and the producer is thus discouraged from future efforts at production.

The fact that every spring consumers pay very high prices for potatoes is in itself convincing evidence that storage facilities either on the farm, at the railway siding or in the town and city should be provided, and that closer relations be established between the grower and the produce merchant. At present it is easier for the latter to buy a carload of potatoes in the East, and sometimes cheaper, than it is to buy one in Saskatchewan. The producer, by co-operative effort, must make it as easy for the merchant in our cities to buy his potatoes in Saskatchewan as he can now in times of scarcity buy them elsewhere. Otherwise the Saskatchewan city market may not be supplied with home grown tubers. Unless we can co-operate to secure our local markets there would seem to be little use at present of attempting to get outside ones. It seems apparent that only by co-operation in shipping and marketing will this condition be corrected.

The Co-operative Organization Branch of the Department of Agriculture at Regina will be glad to aid local growers in an attempt to get and keep our local town and city markets for home grown products.

GROWING POTATOES FOR EARLY MARKET.

A number of men near our larger towns and cities cater to the early market requirements for potatoes. The following practices have been found to result in earlier maturity than those ordinarily followed:

(1) The choice of an early variety. The Early Andee, Early Triumph, Six Weeks. and Early Ohio, are some of the early sorts. The last mentioned being considerably the most productive.

(2) Placing the tubers in shallow trays in a cool room in the sun from two to three weeks before planting in order to encourage the development of a few vigorous green sprouts. After the first few days the temperature of the room should be increased. These potatoes are then planted very carefully so as not to break off the sprouts. This practice will be found to result in a considerably earlier crop.

(3) Large sets, whether whole or cut, usually produce an earlier crop than small ones. The disadvantage in using large sets is in the added cost of the extra weight of seed used.

(4) Shallow planting early in the spring results in quicker growth and earlier maturity than deep planting.

(5) Warm soils, such as well drained sandy loams, produce earlier crops than heavier types of soil.

(6) Any practice that results in bringing the potatoes above ground early in the spring results also in exposing them to greater danger from frost. It is difficult to lessen this risk but it has been found that a thin loose covering of soil thrown over the small plants with an out-throw cultivator, or with the hoe or rake, will protect them from quite severe frosts. This, of course, is not practicable over large areas but may be done on small areas in times when the temperature promises a big drop. Strawy manure may be used in the same way.

CONCLUSIONS.

1. The potato crop furnishes the cheapest food available to Western people.

2. A crop of potatoes, if kept clean, is an excellent preparation for any other crop.

3. A deep well drained loam, rich in organic matter, is the most desired type of soil for potato growing. The lighter types produce higher quality; the heavier, blacker types greater yields.

4. Plant on fallowed land or after a corn crop or on well prepared breaking of the previous year. If the corn crop or the fallow have been manured better results still will obtain. In the moist parts of the province potatoes may be planted in wide rows on fall or spring plowed land, but at the cost of lower yields.

5. Use one or other of the following varieties:

Early—Early Ohio.

Medium—Rochester Rose, Everett, Irish Cobbler, Vick's Extra Early.

Late—Carman No. 1, Gold Coin, Wee MacGregor, Table Talk, or Empire State.

6. Choose sound, firm seed free from disease and injury. Treat with formalin, one pound to thirty or forty gallons of water and soak for one and a half to two hours.

7 Use sets cut to two ounces or more in weight and containing not less than two or three good eyes.

8 Plant 3 to 4 inches deep—less in cold wet soils and for early potatoes, and deeper in loose dry soils for the main crop.

9 Place rows 30 to 48 inches apart depending upon the moisture supply of the soil and 12 to 16 inches apart in the row.

10. Firm the soil after planting.

11. Harrow before and while potatoes are coming up in order to control weeds.

12. Intertill sufficiently to kill weeds and maintain a mulch.

13. In deep loose soils do not make high hills. On heavy soils in humid parts and in poorly drained regions a medium height of hill is desirable. Higher hills in extreme conditions of this nature may be desirable. Under normal conditions hills of medium height generally prove best.

14. Unless tops freeze off do not harvest the main crop until maturity. If the tops freeze it is well to leave the tubers in the ground a few days. Care should be taken to see that they are dug before any are frozen.

15. Store at as low a temperature as possible and yet avoid freezing.

16. Supply the needs of the farm home and co-operate to get the market of the nearer towns and cities.

REGINA: Printed by J. W. REID, King's Printer.