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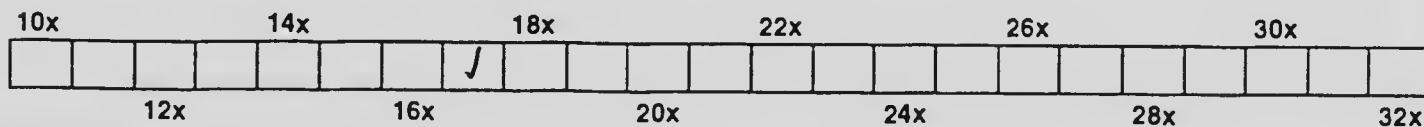
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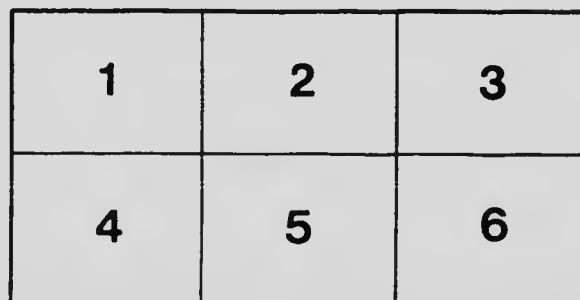
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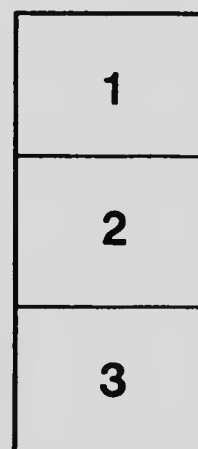
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DEPARTMENT OF AGRICULTURE OF THE PROVINCE OF QUEBEC

Horticultural Service

Home Gardens Section

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CIRCULAR No. 36

# GROWING BEANS

in Quebec

— BY —

J.-H. LAVOIE.

Chief, Horticultural Service.

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## Importance of this crop

The highly nutritious properties of the bean, the enormous consumption made of it, its relative scarcity and the high prices it has reached, the rapidity and facility with which it can be grown, kept, handled and carried over long distances, and finally its improving qualities as plant, should induce our farmers to take up on a larger scale the cultivation of this staple product which we have had to import in considerable quantities for our own use, in the past.

In fact, does anyone know that our crop of shelled beans which was of 330,000 bushels in 1907, with an average yield of 26.60 per acre, had fallen to 78,000 in 1916, with an average yield of 17.75?

## Soil

Strictly speaking, beans accommodate themselves of almost any soil, with the exception however of very limy

soils as well as those that are too light, moist or cold, which are injurious to them.

Light soils, loamy, gravelly, rather sandy then clayey, well drained and sufficiently rich in organic matters are those most generally suited to bean crops.

It is in fact acknowledged that beans fear cold and moisture much more than heat and drought. For this reason we recommend that they should be cultivated preferably in soils that grow warm and drain easily.

Also will they be grown in clay soils only when the latter have been thoroughly drained and tilled, otherwise the flowering will be poor, seeds will difficulty mature and their quality will be more altered as the season will have been more rainy.

### **Rotation of crops**

Belonging to the family of the Leguminosae the bean possesses the property of retaining the nitrogen of the air through nodes developing on its roots, so that it enriches of this element a soil hitherto poor of same. Also, should we logically make it succeed to nitrogen-exhausting crops, such as cereals.

Nevertheless, as the bean is a bettering plant, as it requires much dressing prior and during the vegetation, dressing that enables to clear the soil of noxious weeds, and as it is classed for this reason amongst the cleaning crops, some people take the stand that it should be grown before rather than after a cereal. In so doing, they say, cereals will at the same time benefit of a soil free of weeds and rich in nitrogen; conditions indispensable to them.

Everything depends evidently of the composition and condition of the soil, of the nature of the rotation or cropping system.

Being given, however, that farms in this Province are generally infested by weeds, that farmers very seldom plow up the stubble and that they are often short of labor and fertilizers, we would recommend to kill two birds with one stone: to have a bean crop after a potato, swede-turnip or beet crop and to have it followed by wheat or another cereal mixed with clover seed. That is, we believe, the best way to obtain large yields from average crops, and to have the land retain its fertility.

### **Fertilizers**

The bean requires a soil sufficiently rich in organic matters or old manure, and this is just the reason why it should follow crops requiring an abundant manuring such as potatoes, beets, swede-turnips. In this way, it could be grown without a new addition of fertilizers, as the soil would then contain a sufficient reserve of nitrogen.

In case of the contrary, we will dung only with rotten manure, spreading from 6 to 7 tons per acre, and yet this rotten manure will have to be perfectly incorporated to the ground by means of a disk-harrow.

Besides the amount of nitrogen fertilizers the bean particularly requires during the 3 or 4 weeks following its germination, that is pending formation of nodes on its roots, there must moreover be in the soil, and under assimilable shape, phosphoric acid to hasten the maturity of its fruits and potash to increase the yield and grade.

Superphosphate of lime or basic slag, applied in the spring at the rate of 400 lbs per acre, will provide the quantity of phosphoric acid most of the soils of this Province, and particularly clay loams, are generally short of.

Sulphate or muriate of potash, spread at the rate of 200 lbs per acre, or failing those, wood ashes, applied in quantities of 500 to 1000 lbs per acre, will exercise, in soils relatively poor in potash and chiefly in *sandy-loams*, a most favorable action on the yield and quality of beans which are included amongst the "*potash plants*."

### **Preparation of the Soil**

We will never insist too much on this point, because failures usually originate in the lack of care brought in the digging up and loosening of the soil.

It would be taking useless trouble, time and money thrown away than to sow beans in a soil that would not have received a preparation appropriate to this crop.

This preparation consists in plowing the ground in the fall so that it may benefit of the salutary action of the frost which contributes to its desaggregation, to make it porous, permeable and loose, and to destroy many insects and weeds.

This fall plowing is particularly imperative in the case of lands that are rather heavy than light, and must be 8 to 9 inches deep, if the thickness of arable soil allows it. In case of the contrary, it would be better to break up the sub-soil with a digging harrow and plow to a smaller depth.

In the following spring, as soon as the ground will permit, a plowing of at least 6 inches in depth will have to be executed without delay.

After this, the ground will be incessantly submitted to strong harrowings worked lengthwise and crosswise, either with a disk-harrow, a cultivator or a drag harrow, with a view of breaking the clods, of eradicating weeds and perfectly loosening the surface.

As it is extremely important that the evaporation be reduced in order to prevent the soil from drying and hardening, and to destroy weeds as they grow up, subsequent use of the harrow, roller and hoe will be made as often as necessary, at all intervals of about 8, 10 or 12 days, until seeding time has come.

### **Time of Planting**

The bean is extremely sensible to cold and fears very much a too abundant moisture or that lasts too long. In fact, when put in a cold and wet ground most of the seeds rot and others successful in coming up lose their vitality.

Even if they were planted in a soil well dried and warmed up, the spring frost might yet kill all beans that would have come up. It follows that bean seedlings in the open ground cannot be made in the spring, as long as the ground is not dry and warm and that the danger of late frosts is not over....

This time will then differ from one place to another as the spring will be more or less early and in accordance with the hardness of bean varieties used. Thus, we will plant earlier around Montreal than in Quebec, just as Kidney beans may be planted a few days earlier than Pea beans.

From the results already obtained in the various regions

of this Province, the time of planting for beans generally extends from *May 25th to June 5th*. Sowing earlier, pretexting that frosts are no longer to be feared and that the soil is in proper shape, would be running the risk of obtaining stunted plants, predisposed to *rust* and *anthracnose*, of poor yield and uneven ripening.

### **Rate of Planting**

This quantity varies in proportion of the particular development plants of certain varieties are supposed to reach, of the space left between the plants and between the rows, and of the size of the seeds used.

By following the method of planting hereafter recommended, this quantity will be of  $\frac{1}{2}$  to  $\frac{3}{4}$  of a bushel per acre, for beans of the *Pea* and *Medium* types, and of 1 to  $1\frac{1}{4}$ , for those of the *Marrow* and *Kidney* types.

*Space between the rows.*—Beans should always be planted in drills (1) 28 inches distant.

*Distance between the seeds.*—The distance to be left between the seeds varies according to the vitality of the seed, the condition of the soil and the space required by plants of different varieties in order to reach their full development. It is, as a rule, of 4 inches, though it may range from 3 to 6 inches.

*Depth to plant.*—As a general rule, the planting must be a shallow one in a rainy season, and deep in dry weather. When the season is fair and the ground in good shape, beans must not be buried in more than *two* inches of earth in light soils and *one* inch in compact soils.

### **Rolling**

The rolling has not only the effect of breaking, hardening and levelling the surface of the ground, but still makes the moisture come to the top, and places the seed in close contact with the particles of earth.

We shall consequently run the roller on the ground immediately after planting, if it was rather dry than

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(1) Numerous experiments have shown that it is much more advantageous to sow beans in *drills* than to plant them in hills or bunches.



wet at this moment, so as to favor the rapid germination of beans.

### **Cultivation**

*Hoeings and weedings.*—When sown in a well-prepared and warmed soil, beans generally come out after 8 to 10 days. In fair weather one can wait until all the stalks appear above the ground to give the first hoeing. But if, in the 4 or 5 days following the plantation, rains would happen which might have the effect of hardening and crusting the surface of the soil, it would be useful to mellow it by a light plowing, provided however there would be no danger of breaking germs while operating; because the least injury would then be sufficient, if not to kill the germ which is very breakable, at least to provoke a stop of the growth that will be nothing but prejudicial.

We must not forget, in fact, that the growth of the bean must be maintained vigorous during all the time of its vegetation, that is from planting time up to ripening. For this purpose, hoeings and weedings will be made as often as necessary to keep the surface of the soil well loosened, clean, and to provide the plant with the amount of moisture required.

When a light soil has been given frequent cultivation (alternated plowings and rollings, hoeings), previous to plantation, the first hoeing will generally be given only about 15 days after sowing and the second, a few days prior to flowering-time.

In compact grounds, intermediate hoeings should be made after each rainfall, as soon as the soil will have sufficiently dried up, so as to prevent the forming of a crust on the surface.

If hoeings are necessary to hasten the growth, it is not any less important that they be superficial and not made when the foliage of beans is wet. Should the teeth of the hoe penetrate deep enough to reach the running roots, there would certainly result a diminution in the yield and quality of beans, because they are the very ones nourishing the fruits. We shall consequently not come too close to the plants with the machine, when weeding. The work

must be done by hand between each of the plants. Moreover, it would be favoring the development of rust on the plants than to weed or hoe when wet....

It is particularly important to hoe frequently when the flowering-time is over, so as to destroy weeds, to prevent evaporation and to make the soil retain a sufficient amount of water to insure the plant with the food required to reach its full development: essential condition to have a good crop.

Hoeings and weedings are generally made with hand cultivators, one horse cultivators or two-horse cultivators, according to the importance or area of the crop.

### **Harvesting**

*Harvesting the crop.*—One will recognize that beans have come to maturity as soon as the leaves and pods are turning yellow, begin to dry and the seeds are hard enough to be difficultly penetrated with the finger nail. We will then hand pick the soundest and finest pods, store them carefully in a dry place, unshelled, because the first to ripen are those that afford the best seeds. The owners of genuine varieties would be well advised in always harvesting their seeds in this way; this is the safest means of obtaining first class seeds.

*Pulling.*—When most of the pods have matured, they will be pulled in dry weather, one by one, taking great care to gather them up, as the work is proceeding, in bunches which are left one after another in the field, where the pods will finish to ripen.

When they have thus been exposed to the sun during one day, they will be turned so as to dry up in an even manner, and they will next be collected in stacks 18 to 24 inches high. As soon as leaves are dry enough they will be taken into a dry and well ventilated room.

During these various operations, we must avoid shaking the pods too hard, so as to prevent the loss of too much seed. Big losses would be avoided if care was taken to cover with a cloth the bottom of the wagon used in hauling the crop.

### **Thrashing**

In order to obtain beans that will not lose in weight and bulk, we must wait, before thrashing, until they have thoroughly dried in their pods. Thrashing may then be made with a flail or a special bean thrasher.

*Flail.*—Although the flail is recognized as the least bean cracking instrument its use is not a very saving one compared with the time required by thrashers to perform the shelling of an equal quantity of beans. Its use will consequently be advantageous only when the saving of time gained with a thrasher would not compensate the loss of beans that might be occasioned.

### **Cleaning and grading**

After being sifted to rid them of foreign matter, beans are afterwards hand selected, if remunerative prices are to be obtained. When doing so, care must be taken to remove all discolored seeds, split, spotted, shrivelled, diseased or otherwise altered.

Moreover, beans selected for seed or for showing, shall be of even colour and size, of pure variety, and perfectly resembling the type of the variety to which they belong.

### **Sacking**

Awaiting their sale, they are generally kept in heaps, in a dry and well ventilated place. Stored in a place somewhat damp, they would become mouldy.

When selling time has come, they are sacked in strong linen bags, containing two bushels or 120 pounds: beans weighing 60 pounds to a bushel.



