



## FIBRE FLAX PRODUCTION IN CANADA

Fibre varieties of flax are entirely different from those of linseed sorts. For generations, fibre types grown in humid countries have been selected for long, non-branching stems, strength, volume and quality of fibre, and with an almost complete disregard for seed yield.

From small proportions at the beginning of the present century, flax production in Canada was expanded rapidly during the last war, in the effort to supply fibre requirements urgently needed by the United Kingdom to replace supplies from Russia and Eastern Europe which had been cut off.

After the war, it became increasingly difficult to compete with cheaply-produced fibre and seed again available from Russia and the Baltic States, with the result that heavy losses were experienced by many Canadian producers, and production finally dropped again to very modest volume.

Based on arrangements made with the Government of Northern Ireland to develop in Canada a source of supply for certified seed of improved varieties, the industry was gradually revived and maintained on a limited scale. Despite the fact that the superiority of this seed was recognized in the price paid for it, it was found that flax could not be grown with profit for the production of seed alone. For some years, therefore, production was limited by the market which could be found on this side of the Atlantic for green tow for upholstering purposes.

It became clear that further expansion of the industry was dependent on reducing the cost of the production of fibre and tow, in order that Canada could compete with Russia, Belgium and other countries in the sale of these products on the British market. To that end, the establishment of modern milling machinery and the use of labour-saving machinery in pulling and handling the crop was encouraged, with the result that at the outbreak of the present war there was sufficient seed in Canada to provide for material expansion in production in 1940, after supplying seed required by the Government of Northern Ireland.

The utilization of this seed to ensure maximum production in 1940 of both seed and fibre will necessitate concentration of effort in areas in which milling machinery is already available or will be established. To those in such areas who have not had previous experience in fibre production, the following notes on the growing and handling of the crop may prove of value.

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## Cultural Methods for Fibre Flax

*Climatic Conditions.*—Fibre flax requires a comparatively long and moderately warm growing season with plenty of moisture. Moderately cool and humid weather during the early season of growth followed by warm and drier weather during maturation is most desirable for fibre formation. A dry, hot period at a critical stage of growth may cause a cessation of growth and induce branching and early seed formation.

Fibre flax is grown in Southwestern and Eastern Ontario and in Quebec along the St. Lawrence River. It also does well along the coast of British Columbia and in certain parts of the Maritime Provinces.

*Soil.*—A medium clay soil is most suitable for fibre flax. Soil type not only affects the yield of fibre but as well influences the quality. Light and sandy soils are not recommended as they are unable to retain sufficient moisture to carry the plants through periods of drought. Land used for flax must be well drained, as uniform in type and as free from weeds as possible.

*Rotation.*—The general practice in Canada is to follow a pasture or sod with flax. If the soil is fertile, flax does well following a cultivated crop, provided it has been kept clean of weeds. In any case, the rotation should be such that it does not come on the same land oftener than once in seven years on account of the danger from wilt disease.

*Preparing the Seed Bed.*—One of the most important factors in the growing of flax for fibre is the preparation of a suitable seed bed. The land must be brought into a fine state of tilth so that the seed will be uniformly covered. Land that is hard and lumpy prevents an even distribution and germination of seed, resulting in a non-uniform growth, which is very undesirable.

The land should be fall-ploughed and worked as early in the spring as possible to loosen up the soil so it will warm up more quickly and start the weed seeds germinating. These can be killed a few days later by a second cultivation with a spring-tooth harrow.

If the land is spring-ploughed, it may be more satisfactory to use a disc harrow rather than a spring-tooth. The land is usually rolled or packed before seeding to make a uniform surface for an even distribution of seed, which ensures a more uniform covering and germination.

## Seed and Seeding

*Seed.*—Only seed that is well matured, plump and free from shrivelled seed and weed seeds should be used for sowing. Pedigreed seed has given increased yields of fibre over ordinary seed, and there are several good varieties to select from. Seed for sowing should germinate 90-100 per cent.

*Seeding.*—Fibre flax should be seeded early in the spring, as soon as the land has warmed up sufficiently and can be brought into a suitable state of tilth. This enables the plants to secure the major part of their growth before the hot summer weather begins.

The amount of seed to sow depends on the nature of the soil, the method of seeding, and the germination of the seed. The usual rate of seeding is 84 pounds, or 1½ bushels per acre. Sowing heavier may produce a higher yield of better quality fibre but the danger of the crop lodging is also substantially increased. Sowing less produces a heavy, coarse-stemmed plant of inferior quality and lessened yield of fibre.

Flax for fibre can be broadcast or sown in drills. In drills the seed is more uniformly deposited and covered but the straw is not as uniform as when the seed is broadcast. An ordinary grain drill with the discs removed and a board

attached below the spouts at an angle so that the seed is deflected groundwards may be used for broadcasting. The seed should then be covered with a light harrowing, after which the soil is sometimes rolled or packed to ensure a more rapid and complete germination. The proper depth to sow fibre flax is one-half to one inch and certainly no deeper than two inches for the best results.

### Fertilization

There is a widespread opinion that flax is hard on the land. This idea has been proved to be unfounded; investigations have shown that a crop of flax removes from the soil approximately the same amount of nutrients as a crop of oats.

Ordinarily fibre flax does not show much response to commercial fertilizers provided it follows a good rotation and the soil is suitable and fertile. A dressing of a 2-0-16 fertilizer applied at the rate of 500 pounds per acre has shown slightly beneficial returns on the experimental plots at Ottawa.

### Harvesting and Processing

*Harvesting.*—It is better to pull fibre flax than to cut it. Pulling, formerly done by hand, is now mostly done by special machines. There are two types of these machines in general use: the one pulls the flax and spreads it on the field behind to ret, while the other pulls it and binds it into sheaves which are afterwards stooked in the field to dry.

In Canada a large amount of the seed from the fibre flax crop is saved for export, and so the flax should mature as much as possible without unduly injuring the quality of the fibre. The time to harvest is when the crop has reached the golden-yellow stage, at which time the lower half of the stems have turned yellow, most of the leaves have dropped off, and about one-third of the seed bolls have turned brownish. The seeds should be fully formed and turning brown.

If flax is harvested too early, the fibre will be of fine texture but low in yield and the seed will lack quality. If allowed to become too mature, the fibre becomes coarse and harsh and loses considerable quality.

*Deseeding.*—Deseeding consists of crushing or removing the seed bolls from the straw; this must be accomplished without injury to the fibre. There are several types of deseeding machines in use, namely, the rippling machine, the hammer-type machine, and the whippers. The former type removes the bolls from the straw by a comb-like process, while the latter two machines crush the bolls on the straw so that the seed falls out.

When the seed is to be saved for export purposes, it is best to use a puller and binder and then deseed before the straw is spread for retting; otherwise considerable seed is lost and the remainder is dark and of poorer quality.

*Retting.*—The object of retting is to dissolve the gummy substances surrounding the fibre bundles so that the woody portion can be readily separated from the fibrous tissue. There are two methods of retting, dew and water, but practically all the flax produced in Canada is dew-retted.

This operation consists of spreading the flax thinly and evenly on a grass field for a period of two or three weeks, depending on weather conditions. During this period the flax should be turned to promote a more uniform ret. This is done by running a long pole under the flax near the end of the straw and lifting it up and over so that the retted side is turned underneath.

*Breaking and Scutching.*—After the straw is retted and dried, it is passed through a machine called a "brake" which consists of two pairs of steel fluted rollers, each pair being enmeshed. As the straw passes between these rollers,

the woody portion of the stem is broken up into small pieces called "shives", while the more flexible fibrous portion passes through uninjured. Many of these particles of wood adhere to the fibre after breaking. These are removed in the subsequent operation of scutching, in which fast revolving blades strike against the fibre, knocking and shaking the shives loose.

During scutching there is a certain amount of the fibre beaten off along with the woody pieces. This material, consisting of short and broken fibres, is collected from underneath the scutching blades and rescutched so as to remove the wood and dirt. The resulting short and tangled fibre is called tow.

### Flax Fibre Products

*Line Fibre.*—In the production of line fibre the straw is kept straight and parallel and the ends as even as possible at all times. Two methods are generally used, depending on whether the seed is to be retained for export as well as on the amount of labour and type of equipment available.

When the seed is to be saved, the flax is pulled, bound, and stooked in the field for a few days to dry. It is then deseeded, either in the field or in the mill, and then spread on a meadow to ret.

If the seed is not considered of prime importance, the most economical method is to use a puller and spreader which does both operations at the same time and leaves the flax drying in swaths on the field.

In either case, as soon as the flax is retted it is lifted and bound evenly into sheaves and drawn to the barn or mill, where it is stored for processing. If the flax has been deseeded before retting, it is passed directly into a turbine scutcher which breaks and scutches it and the resulting line fibre is delivered at the other end of the machine. The tow falls below on to a tow shaker from which it is removed and scutched by hand to remove the wood and dirt. When the flax still retains the seed on the straw, it is passed through a deseeder before it reaches the turbine. Line fibre is the choice type and brings the highest returns.

*Tossed Flax.*—To make tossed flax, the flax can be either pulled or cut with an ordinary mower with the dividing board removed. It is allowed to lie in the field with the seed on until retted, then raked up with an ordinary hay rake and handled in a loose condition. The loose straw is passed through two brakes which are arranged in series. The seed is removed during the first breaking. The fibre is then scutched by hand, using the scutching knives. No attempt is made to keep the straw or fibre straight during any of the operations.

*Upholstering Tow.*—Upholstering tow, as the name implies, is a product of fibre flax which is used to a limited extent for upholstering purposes. The production of this product requires less experience and involves less work than is required in the making of line fibre or tossed flax.

The flax is cut with an ordinary mower when ripe. The straw is allowed to lie in the swath for a few days until dry. It is then raked up with a hay rake and hauled to the mill in a loose condition, where it is passed through a breaking machine two or three times, depending on the condition of the straw. The seed is removed in the first breaking and is gathered from beneath the breaking machine and cleaned. The tow is packed into convenient-sized bales and sold in that form.

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