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THE PRODUCTION OF HEMP SEED.

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THE PRODUCTION OF HEMP SEED.

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In the United States hemp is grown for two purposes, for fiber and for seed. The same crop is not used for both purposes. When grown for fiber the seed is sown broadcast like small grain, and the crop is harvested before its seeds are mature. When grown for seed the seed is planted in hills or drills, like corn, and cultivated, producing coarse, woody, branching plants from which the fiber can not be economically separated, and the fiber itself is of poor quality when the seeds are mature.

Practically all of the hemp seed produced in the United States is used for growing fiber hemp, but the production of hemp seed is entirely distinct from the production of hemp fiber.

Where grown: Nearly all of the hemp seed produced in the United States since 1860 has been grown in Kentucky. Most of it is grown in a limited area on the bottom lands of the Kentucky River and its tributaries for a distance of about 50 miles above High Bridge, where the river flows in a deep cañon bordered by limestone cliffs. The river overflows each year, leaving a rich alluvial deposit between the stream and the base of the cliffs, and the hemp seed is grown on these lands. Owing to heavy fogs in this deep valley, the killing frosts in the fall are at least two weeks later than on the uplands.

Before the Civil War hemp was grown for fiber extensively in Missouri and seed hemp was also grown there, especially in Saline and La Fayette Counties. In 1918 an effort was made to revive interest in growing seed hemp in Missouri and the results were encouraging.

Climate: The varieties of seed hemp now grown in the United States require a growing season of 150 to 160 days free from killing frost, or a frost-free season of at least 30 days longer than is necessary for fiber hemp. Young seedling hemp will endure frost as well as seedling oats, and seed hemp at

maturity is much more resistant to frost than corn, but the season is generally too short for commercial hemp-seed production north of Kentucky and Missouri.

Seed hemp requires a plentiful supply of moisture, either from frequent rains throughout most of the growing season, or from free water in the ground within 6 feet of the surface, but it will not grow well under swampy conditions or where water remains on the surface after rains.

Soils: Seed hemp can not be grown profitably on poor soils or soils of even moderate fertility. Good fertile soil is absolutely necessary. The best yields have been obtained on alluvial deposits of silt and sand. Loess soils, dark prairie loams, and muck soils over marl in reclaimed swamps produce good crops of seed hemp. Light sandy soils and clay or gravelly hills and lmolls are not adapted to this crop.

Rotation: On the overflowed lands along the Kentucky River seed hemp is planted year after year without rotation, except an occasional crop of corn, but a rotation would be better, and on upland it is necessary for continued success. Seed hemp may follow any crop, but after corn or potatoes gives the best results. If planted on spring-plowed sod, it is liable to be injured by cut worms.

Fertilizer. Stable manure is the best fertilizer for seed hemp, and unlike fiber hemp it may be applied directly to this crop either before plowing or as a top dressing after the seed is planted.

Preparing the soil. For seed hemp the land is prepared in the same manner as for corn or other intertilled crops. Fall plowing or very early spring plowing is necessary in order to permit early planting. Before planting the soil is worked thoroughly with a disk and harrow, drag, or meeker, so that it will be well packed and the surface will be smooth and well pulverized. If planting is delayed after the land is first prepared, it should be harrowed and smoothed with a float just before planting to improve the seed bed, and especially to destroy weeds that have begun to germinate, for after the hemp seed is planted the harrow can not be used as it is in seedling corn.

Planting: Hemp seed should be planted as early in the spring as the land can be prepared, and the seedlings will be safe from severe killing frosts.

In Kentucky the land is marked in both directions, making checks about 5 feet apart each way. The seed is dropped by hand in the cross marks, 10 to 15 seeds per hill, and covered with the foot or with a hoe. In Saline County, Missouri, it is planted with an ordinary grain drill. All the spouts are closed except two, 5 feet apart. The planting guage is set as if for wheat with small-size kernels. The seed should average less than 2 inches apart in the drill, and the drills should not be less than 5 feet apart.

Sufficient seed must be used so the young plants may help each other in pushing through the surface, especially in soils that form a crust after rains. If planted in hills 5 feet apart--1,742 hills per acre--at the maximum rate of 15 seeds per hill, it will require about one pound of seed per acre. If planted in drills 5 feet apart and 1 inch apart in the drill, it will require nearly 4 pounds of seed per acre. The seeds should be covered not more than 1 inch, and, in heavy soils or those which form a crust, they should be covered as lightly as possible. Hemp seedlings are tender and their blunt seed leaves can not push to the surface like the sharp-pointed shoots of corn, oats, and wheat.

Three points must be borne in mind in planting hemp seed:

(1) Sufficient space. Hills must be not less than 4 feet apart each way, or 5 feet apart on rich lowland, or drills not less than 5 feet apart in any soil.

(2) Sufficient seed. Ten to fifteen seeds per hill, or one seed about every 1-1/2 inches in drills.

(3) Shallow cover. The covering should be just enough to retain moisture for germination and not more than 1 inch in any soil.

Cultivation: Seed hemp should be cultivated in the same manner as corn. It should be cultivated first as soon as possible after the seedlings are up, so as to show the rows. The best growers cultivate three or four times. In weedy land it will be necessary to hoe the plants or pull the weeds in the hills or drills. Cultivators such as are used for corn are well adapted for cultivating hemp, but since the rows are farther apart it may be necessary to work out the middles. Cultivation should be sufficient to keep the soil well pulverized and the

land free from weeds until the hemp plants are 3 to 5 feet high and shade the soil so as to prevent further growth of weeds.

Thinning: When the hemp plants are 6 to 20 inches high, 5 to 6 weeks after planting, they must be thinned. In hills, only 4 to 5 plants per hill should be left, and in drills only one plant in 15 to 20 inches. Seeds are borne on the branches, and thinning is necessary in order that there may be plenty of room for the branches to grow. Good stands can not be obtained with thin seeding, but good plants can not be obtained without thinning. The best plants should be left. In hills the plants must be pulled by hand, but in drills they may be chopped out with a hoe like cotton. If the soil is moist at the time of thinning, skips in hills or drills may be filled by transplanting young plants from adjacent rows, with plenty of earth so as not to disturb the roots. Weeds in hills or drills should be pulled at the time of thinning.

Cutting out staminate plants. In hemp the staminate, or pollen-bearing, flowers and the pistillate, or seed-producing, flowers are borne on separate plants. It is impossible to distinguish between them until the staminate flower buds appear, about three months after planting. If a good type or improved variety is to be maintained, all defective or poor plants, both staminate and pistillate, should be cut out at this time, and all staminate plants except one or two per square rod should be removed. The pollen is produced in abundance, and one good staminate plant every third hill, or a rod apart in drills, will be sufficient to fertilize all the pistillate flowers. The relative proportion of staminate and pistillate plants may range from 25 to 75 per cent either way, even in different rows of the same strain, but they generally average about even, so that about half the plants are removed in cutting out the surplus staminate and poor pistillate plants.

A corn knife, preferably of the "Vermont" type, with a slightly curved blade at nearly right angles to the handle rather than the straight-blade machete type, is used for cutting out the plants. The work is done very rapidly as soon as one learns to select quickly the plants that are to be removed.

After the pollen has been shed, and the staminate plants begin to turn yellow, it is best to remove all of them so as to give the pistillate plants still more room to develop.

Harvesting: Seed hemp is harvested when the seed is hard and begins to shatter, about 40 days after the staminate

plants shed their pollen, or generally during the month of October. The seed continues to ripen until stopped by frost, and, unless there is danger of a severe killing frost or there is loss of seed from shattering or from birds, it is best to delay harvesting as long as possible. A frost of not more than 5 or 6 degrees below freezing will not injure the hemp, except to stop further seed production, but it also makes the seeds shatter more easily.

The seed is harvested by hand. It is cut with a corn knife, such as is used for cutting out the staminate plants. The stubble is left high, usually 1 to 2 feet, the plants being cut just below the first seed limbs. The seed shatters easily, and it is best to cut the plants on cloudy days or during the forenoon, when the moisture will tend to prevent loss of seed by shattering.

Some of the best growers in Kentucky bind the plants in small bundles before putting them in shocks. This tends to hold the seed which shatters out. The plants when harvested are set up in large shocks around a saddle of four uncut stalks from adjacent hills, bent over and tied to prevent the shock from being blown down. After the shocks are completed they are tied with binder twine, for if the plants blow down a very large proportion of the seed will be lost.

If flocks of migrating blackbirds or other seed-eating birds are abundant at the time the seed hemp is harvested, it may be necessary to protect the crop either by driving off the birds or by covering the shocks. Since each shock contains one-half bushel or more seed, valued at $5 to $7 per bushel, and a flock of blackbirds or tame pigeons may eat or shatter several bushels in a few minutes, protection against them should be considered. At Washington, D. C., where pigeons and blackbirds are both abundant at the time hemp seed is harvested, it is estimated from comparison of protected and unprotected plants that the birds cause a loss of about 90 per cent of the seed from plants not protected.

Thrashing: The seed is thrashed as soon as the plants are thoroughly dried in the shock. In one instance, at least, where there had been three or four frosts just before the hemp was harvested, a crop of excellent seed was thrashed out with remarkable ease and a minimum of waste the next day after the plants were cut. Three to five days are usually required for the plants to dry in the shock, but it is best to thrash as soon as possible to avoid waste.

by hand, and at war prices for labor should not cost more than $3 per acre for each operation. The cost of beating off the seed, cleaning it on the farm, and delivering it in sacks to the local dealers is estimated at about 75 cents per bushel, or 50 cents per bushel at prewar prices.

Prices: The average prewar price received by the farmers for hemp seed was about $3 per bushel. It is now nearly twice as much. During the past four years the average price received by the local dealers for the recleaned seed in sacks ready for shipment has been a little less than $7 per bushel.

At these prices hemp seed may well compete with other crops on lands suitable for hemp-seed production.

Varieties: Seed of improved varieties is now available in sufficient quantity to supply all demands for planting for seed production, and, since these selected strains not only produce more and better fiber but also give larger yields of seed, it will be to the best interests of all engaged in the hemp industry to have all seed hemp grown from these improved strains. New strains are being developed and tried out, but they should not be planted commercially until first tried out clear through to the spinning mill on a small scale.

Three varieties, Kymington, Chington, and Tochigi, developed by the United States Department of Agriculture, may now be recommended.

Kymington, as indicated by the name, is Kentucky seed selected eight generations in Minnesota, producing "Minnesota No. 8," and afterward, since 1911, selected each year at Washington, D. C. This is now more extensively grown than any other improved variety. It has long internodes, ascending branches, bearing many small seed clusters, and the seeds are small, dark colored, and typically well mottled.

Chington, Chinese seed grown at Washington, has been developed by selection from seed imported from China in 1913. It is similar to Kymington, but averages slightly taller, 10 to 15 days later in maturing, and its seeds are slightly larger.

Tochigi (pronounced To-ching'-ge) is the best variety grown in Japan. This is slightly shorter than the other varieties, and its spreading branches give an oval rather than

pyramidal outline. Its seed clusters are larger and its seeds are larger and lighter colored. It thrashes and cleans easily. The seed of this variety is recommended for cultivation away from the hemp-seed regions of Kentucky, to avoid crossing and mixing of diverse types.

It would result in marked advantage to the industry if each hemp seed-growing community would decide on one standard variety and permit no other to be grown there. The fiber grower could then purchase seed all of uniform standard type which would run at a uniform rate through the seeding drill, and produce a uniform plants, all ripening at one time. Or, if he wished a succession at harvest time, he could plant early fields with Kymington, later with Chington, and still later with Tochigi.