

FURROWING

After determining the correct course and spacing for the rows, the furrows are opened with a 2-horse middle breaker or other plow. On light, well-drained lands in Georgia and other States flat furrowing is the usual practice, but on heavy poorly drained lands, such as those occurring in southern Louisiana, the furrows in which the cane is planted are ordinarily made in ridges that are elevated slightly above the surface of the field. Ridging is done for the purpose of securing better drainage, the elevation of the ridges depending upon the location and character of the land and the experience of the grower.

The space between the rows varies from about 4 to 6 feet. In the rich soils of Louisiana the usual spacing is $5\frac{1}{2}$ to 6 feet. In southern Georgia $4\frac{1}{2}$ feet is most common. The more rapidly the cane grows and the longer the growing season, the wider may be the spacing. It is desired that by midsummer, at laying-by time, the crop shall shade the ground well.

Commercial fertilizer, and sometimes also barnyard manure, that is applied at the time of planting is distributed in the furrow and mixed with the soil by cultivating with a suitable implement. Seed cane is then distributed in the furrow and lightly covered with soil (fig. 5).

PLANTING

Throughout the States in which sugarcane is grown for sirup production planting has customarily been done in the spring—Feb-



FIGURE 5.—Planting sugarcane in Georgia. The cane has been stripped and cut into 2- or 3-foot lengths and is being placed in the furrows so as to form a continuous line of sound cane. The quantity of seed cane placed in the furrows varies, depending upon variety and condition. With varieties recommended in this circular considerably less seed cane is required than with the old varieties.

ruary or March—but varieties, such as C.P. 29/116, Co. 290, and C.P. 807, have given satisfactory results when planted in the fall. Except in the more northern limits of the cane-growing sections, the practice of planting in the fall appears to be increasing among farmers who have abandoned the culture of the varieties that were formerly grown. In those sections of Louisiana in which cane is grown for the production of sugar the greater part of the crop is now planted in the fall—October and November—though spring planting is still followed to some extent. Elsewhere in the State planting is done either in the fall or in the spring, with an increasing tendency toward fall-planting practice. In extreme southern Florida it is customarily planted in the late fall or early winter, though it is frequently planted in the spring and even during the winter. Different varieties respond differently to fall planting, depending on vigor and rate



FIGURE 6.—Stripping the cane for spring planting. In the fall the cane for planting is banked and covered with earth. In the spring it is "stripped" and cut into proper lengths for planting. Spoiled stalks and portions of stalks infected with red rot should be discarded.

of development, and the exact date should vary accordingly, but, in general, the cane should be planted far enough in advance of frost to permit the establishing of roots and some growth before the young cane is killed back by cold weather. The grower who contemplates fall planting should determine by experimental trials the most favorable date at which the cane should be planted in his locality. The advantage of fall planting is that in those areas in which the practice is feasible the cane starts to grow at an earlier date in the spring, and, in the absence of late killing frosts, is more mature by harvesting time.

The depth to which the seed cane is covered with soil is an important factor in connection with germination, early growth, and stand of cane, and, in general, it should be covered only deep enough to conserve soil moisture and prevent injury from freezing temperatures. Seed cane which is covered too deep—5 to 8 inches—fre-

quently fails to germinate, and the seed pieces may even rot, and such cane as germinates and grows ordinarily affords a poor and irregular stand. In most sections a covering of 1 to 3 inches of soil is ample for spring-planted sugarcane and 2 to 4 inches for fall-planted, but in sandy soils in the sirup-producing States 3 to 4 inches is preferable for fall-planted as a precaution against the seed cane drying out during the winter months. Upon the advent of warm weather in the spring any excess soil should be scraped off, leaving a depth of 1 to 2 inches over the cane.

Frequently the seed cane stored in windrows or banks for use in spring planting is damaged by red rot or from other causes. On the basis of ordinary field sanitation it is advisable to trim off the diseased portions and to plant only sound cane, the eyes of which are in good condition.



FIGURE 7.—Fall planting sugarcane in Louisiana. From one to two continuous lines of seed cane are ordinarily placed in the furrows. Where the borer is present in large numbers, as in Louisiana, an increased quantity of planting material is demanded to secure full stands in the resulting crop because of the large percentage of injured buds in the seed cane.

In Georgia and other sirup-producing States seed cane is customarily stripped and cut into pieces varying from about 18 inches to about 3 feet in length for placing in the furrow (fig. 6). In Louisiana whole stalks are usually used (fig. 7), and if the cane is too crooked to lie in the furrow it is cut after placement by "whacking" with a cane knife.

QUANTITY TO PLANT

As a factor contributing to maximum yields of cane the importance of a complete stand of plants in the row cannot be overemphasized. Even short gaps in the stand may reduce the yield by several tons per acre and longer gaps at frequent intervals of space are ruinous (fig. 8). The rate of planting in the row, considering sound, viable buds as the basis of rate, is primarily the thing that governs the resulting stand. Hazards, such as drought or other detrimental

weather conditions or invasion of the planted cane by disease organisms, may occasionally impair the stand arising from the most carefully planned seeding, but nothing can remedy an initially faulty seeding. It is within the power of an experienced planter to provide the requisite seed for a full stand however powerless he may be to escape the risk of subsequent hazards.

In the United States there are two ways to express the total amount of seed cane used to plant an acre. It is customary to state the requirement in tons in Louisiana and southern Florida, but in most other places the planting material is expressed in actual numbers of stalks, with some definite length of stalks stated or implied. Because of variation in distance between rows in different fields, it is readily seen that the same quantity of seed cane evenly distributed in the row would plant more or less acreage, or, stated in another way, the same quantity of seed cane would have to be distributed at a greater or lesser rate in the row to plant an acre. This has led to the

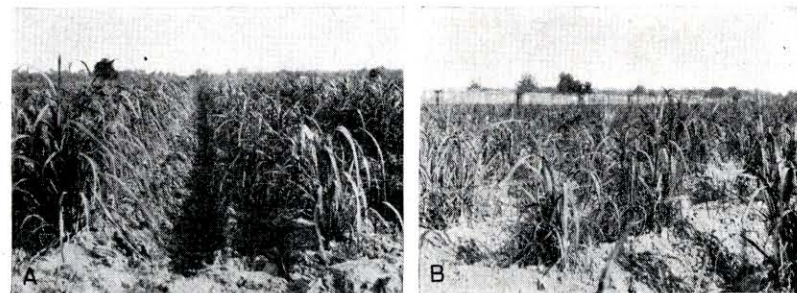


FIGURE 8.—Two views of the same field, illustrating loss due to gappy stand: A, Field viewed from the headland. No great loss is apparent looking down the rows. B, Field viewed across the rows showing gaps due to faulty planting. The main drainage ditch shown in A is typical of sugarcane fields in Louisiana.

use of another term to designate seed-cane requirements, namely, the number of continuous lines of cane stalks laid in the planting furrow. A fraction of a line, due to overlapping of the stalks, is referred to as a "lap" and in general the lap amounts to half of a continuous line.

None of the expressions in common usage state accurately the real requirement for a perfect stand, the basis of which, as already mentioned, is the rate of occurrence in the furrow of sound, viable buds, but they are terms of convenience, and experience has shown that for a given locality there is a fairly definite relationship between lines of seed cane in the furrow and number and distribution of sound eyes in the furrow. This relationship is due to the fact that, under normal conditions in a particular place, the percentage of buds that will germinate is about constant for a given variety of cane. Fluctuation in percentage of viable buds is mostly due to injury and disease of the seed cane, and even this can be taken into account by careful inspection of the seed cane at planting time.

One of the striking advantages of the varieties recommended in this circular is that there is great economy in the seed-cane requirement as compared with Louisiana Purple, Louisiana Striped, D-74, and other varieties formerly grown. The economy is due (1) to disease resistance and consequent higher percentage of sound buds,

and (2) to slenderness of stalk so that the number of buds per weight of cane is greater. Moreover, because these canes ratoon for a longer period of years it follows that replanting is less frequent and additional economy in seed cane is effected. A conservative estimate of the seed-cane saving throughout the country since adoption of the new varieties is 50 percent. The seed cane thus conserved goes into making sugar and sirup, and, as the former seed-cane requirement for the United States was a half million tons or more annually, the total saving is impressive.

The actual amount of seed cane that should be planted varies, depending upon distance between rows, time of planting (fall or spring), size and soundness of the stalks, and other factors, but with the above considerations as a guide the grower should plant sufficient seed to obtain a complete stand. In Georgia and northern Florida, where the rows are commonly spaced $4\frac{1}{2}$ feet apart, the practice is to plant one continuous line of sound seed cane in the spring. Because weather favorable for germination is uncertain, it is good insurance to plant $1\frac{1}{2}$ lines or "one line and a lap." An acre of rows spaced $4\frac{1}{2}$ feet apart represents 9,680 feet of planting furrow and requires one thousand nine hundred and thirty-six 5-foot stalks planted in one continuous line. The requirement for stalks of other length or for $1\frac{1}{2}$ lines, 2 lines, etc., can be calculated easily from this. In Louisiana, expressed in terms of weight, the requirement for fall planting rows $5\frac{1}{2}$ feet apart is 1 to 2 tons per acre. With the old varieties the requirement is double that amount. Spring planting is still practiced to some extent, and because of the gradual deterioration of the windrowed seed cane during the winter a somewhat larger quantity is required for planting in the spring.

The heavier requirement for Louisiana is explained in part by the presence of the borer and greater injury by red rot; also, inspection and culling of seed cane is not done in Louisiana to the extent that it is in the eastern area, where, because of smaller units and less congestion of work, this commendable practice may be followed.

In southern Florida, with weather conditions approaching those of the Tropics, the requirement is less than in the Georgia-northern Florida area, and one 3-eye cutting for every 18 inches of planting furrow is usually sufficient in the relatively warm, fertile soils. Because of the longer season in southern Florida it is also possible to replace seed that does not germinate, in order to fill up gaps in the stand. In the areas to the north such replacement of seed is not practicable because the resulting plants would not mature during the limited growing season. Top cuttings, such as are used in the Tropics, may also be used to advantage in southern Florida instead of the whole stalk. They are softer and less stable than the older portions of the stalk and require almost uninterrupted growing weather; that is, no dormant period during which it is necessary to store the seed cane.

The fundamentally different seed-cane requirements for the different sections are due primarily to differences in the relative lengths of growing and dormant seasons, resulting in greater or less loss of effective buds at the beginning of the growing season. This loss of effective buds ranges from less than 50 percent in the Tropics to more than 80 percent in Louisiana seed cane held over for spring planting.

CULTIVATION

PLANT-CANE CROP

In the spring before the newly planted cane is up or while it is still small, it is advisable, if the ground becomes crusted over badly or weeds tend to get a start, to stir the soil lightly with a light spike-tooth harrow, or, still better, with a spring-tooth weeder, covering the field once or twice in a direction, either diagonal to or up and down the rows.



FIGURE 9.—Off-barring sugarcane in Georgia.

After the cane is up and during its early growth it is usually necessary to give it from 1 to 3 hand hoeings in the rows to clean out the weeds. The cultivation of the space between the rows after the cane is up is much like that of other crops, a matter of killing the weeds and keeping the ground in good tilth. The early cultivation, before the root systems have developed much, should be relatively deep, but later in the season the cultivation must be shallow to avoid injuring the fine feeding roots that spread out from the cane near the surface.

Suckering of the cane can be controlled to some extent by cultivation. Leaving the bases of the plants exposed favors suckering, and therefore the soil is withheld from the rows as far as feasible during the early stages of cultivation to secure the best possible stands of cane. Later, when the season is too far advanced to permit new suckers reaching a suitable state of growth by harvest time, the soil is more liberally thrown against the rows to discourage the growth of suckers. This operation results in ridging the rows to some extent, but throughout the eastern Gulf States subsequent rains and light cultivations leave them but slightly above the level of the middles after lay-by time. Where natural drainage is poor, as in most of the Louisiana cane belt, the cane is planted in rows which are ridged up, sometimes to a height of 6 inches, above the level of the

middles. Cultivation is ordinarily carried on in such manner that the rows remain elevated above the middles, the latter serving as drainage furrows to quickly carry off surplus rainfall. Elevation of the rows depends largely upon the location and character of the land and the experience of the grower regarding the best conditions for securing adequate drainage.

The only difference in the cultivation of fall-planted cane, the rows of which should be covered late in the fall with a few inches of soil as a protection against cold, is that the rows are barred-off as early in the spring as the weather and the condition of the cane will permit and the soil scraped off of the top of the row (fig. 9). To off-bar means to plow a furrow away from each side of the cane, usually with a turnplow, leaving a ridge about a foot wide. This ridge is then scraped off with hoes or with a suitable implement, leaving 1 to 2 inches of soil over the cane.

RATOON-CANE CROP

Profitable sugarcane production depends to a large extent upon the yields obtained from ratoon (stubble) crops, and it is important that the stubbles be given timely and careful treatment. The customary practice is to burn the trash shortly after the cane has been harvested and then to "wrap" the stubble rows by throwing a furrow to them from each side by means of a turnplow. At the same time the remainder of the space between the rows is plowed with the turnplow. The crop is left in this condition through the winter. From the standpoint of improving the physical condition and fertility of the soil, especially of the lighter types of soil, turning the trash under appears preferable to burning it where it is feasible to do so without interfering with proper protection of the stubble rows. In lieu of "wrapping" some growers prefer to protect the stubbles through the winter by leaving the trash in the fields. This practice serves the purpose, especially if the trash is heaped directly upon the rows.

Treatment in the spring is about the same as that for fall-planted cane; that is, excess soil is removed, the rows are off-bared, and weeding and cultivation begun. Early cultivation should be relatively deep, but later in the season it must be shallow, in order to avoid injuring the roots which spread out near the surface. Practice followed in the application of fertilizer varies; in some instances the total quantity to be applied is distributed early in the season either in the off-bar furrow or as a side dressing, and in others the major part is applied in this manner and the remainder as a side application about the middle of May. The total quantity applied varies, depending upon local conditions and practices, but it is important that sufficient fertilizer be applied to insure rapid and satisfactory growth.

In the sirup sections of the eastern Gulf States, most of the cultivating and planting operations are done with 1-mule implements. This practice is in part justifiable because of the small patches prevailing, and also, in the rolling sections, because of many short rows resulting from laying off the rows on contour lines along the hill sides. In fields in which long rows prevail, however, there is undoubtedly room for improvement in the efficient utilization of a laborer's time by using 2-mule implements.

Cultivation generally ceases and the crop is laid by about the middle of July or the first of August. By this time the crop shades the ground and the rows have spread out until it is impracticable to get through with single-mule implements.

HARVESTING

With the coming of cool nights and moderately cool days in the fall, usually in October, the cane begins to mature⁶ and rapidly stores up sugar in the stalks. With suitably cool weather it may be in condition to permit the beginning of harvesting and grinding by the latter part of October, though throughout most of the areas in which it is grown for sirup the growers with small crops to dispose of prefer to wait until the middle of November. In southern Florida, where early winter frosts rarely occur, the beginning of the harvest may be delayed until December.

The cane continues to mature until its growth is stopped by frost, and the later in the fall or winter that harvest can be delayed the greater the yield of cane and sirup. However, frosted cane is liable to deteriorate rapidly and, therefore, harvesting should be begun enough in advance of the earliest probable frost to permit the major part of the crop to be harvested before the cane is seriously injured by cold. Slightly immature cane is not only less objectionable for sirup than it is for sugar manufacture but is usually even advantageous in that

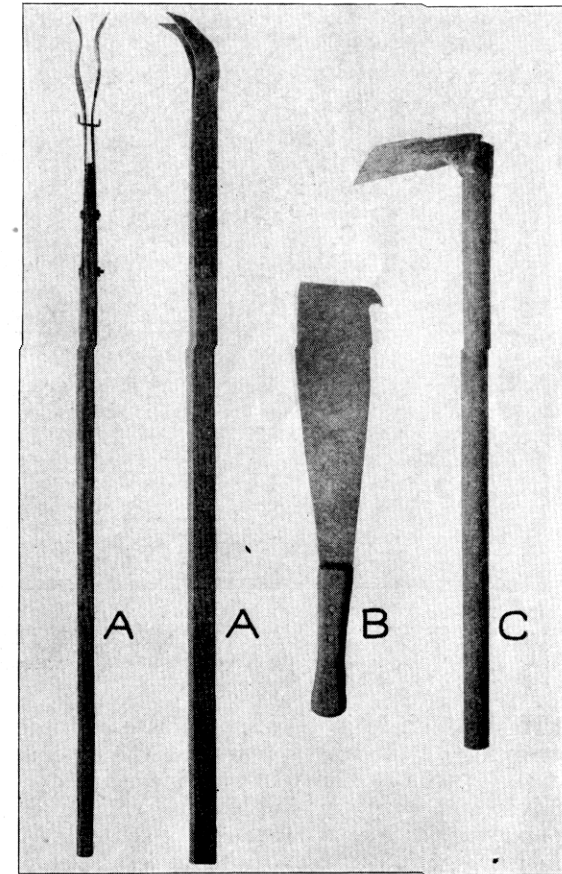


FIGURE 10.—Sugarcane harvesting tools: A, A, Tools used in Georgia and adjoining States for stripping the leaves from the standing cane; B, a type of cane knife commonly used for cutting the stalks; C, hoe of a type used when the stalks are cut below the level of the soil.

⁶The term "mature" as used here means that the cane has reached a stage of development suitable for making sirup. In the United States sugarcane never matures in the sense of developing flowers and true seeds except in southern Florida.