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COTTON GROWING IN KENTUCKY

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Cotton Growing in Kentucky

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For many years cotton growing in Kentucky has been practically confined to Fulton county, which lies in the extreme southwestern corner of the state. Most of the acreage in this county has been grown on the reclaimed bottom lands along the Mississippi river and because the soil is so well adapted to the crop the growers have been very successful in obtaining good yields of fiber despite the fact that the growing season is rather short for cotton. During the past two or three years, due largely to the relatively high price of the fiber, rather numerous trials in growing cotton have been made in several other counties in the state, particularly in Ballard, Carlisle and Hickman counties, a tier of counties lying north of Fulton county and bordering on the Mississippi river. The trials gave results sufficiently satisfactory to encourage the planting in 1923 of several thousand acres in these counties and nearby territory in Illinois and Missouri. Despite a rather unfavorable season for the early development of cotton, the growers in this territory state that the yields obtained have been profitable, and a decided increase in acreage is planned for 1924. Provided prices for fiber remain around the present level, efforts will undoubtedly be made to raise cotton in other parts of Kentucky, particularly where preliminary tests have given satisfactory results. It is not the purpose of this circular to discuss the advisability of an extension of the industry either in the area where it has already become established or in other areas, but to give a brief description of methods of culture most likely to insure success.

EARLINESS ESSENTIAL

It should be clearly understood that the season in Kentucky is short for the production of cotton and that success with the crop depends upon getting a goodly number of bolls to develop early in order that they will mature before a killing frost occurs. Hence, every effort should be made to promote earliness. The type of soil selected, the variety of seed planted, the kind of fertilizers used, and the cultural methods followed must all be carefully considered in their relation to early development of bolls. It may be remarked incidentally that with the spread of the boll weevil over practically the entire main cotton belt it has become just as necessary to secure early boll development even where the seasons are long as in those regions where the shortness of the season makes it necessary. As the season advances the weevils become so numerous that all newly formed bolls are destroyed and only those formed early in the season are uninjured.

CHOICE OF SOIL

Cotton thrives best in well drained, warm soils, such as are usually termed "early" or "quick" soils. Earlier planting is possible on these lighter soils, germination is more prompt, and the early growth is more rapid than on heavy, colder soils. This means, of course, earlier blooming and boll development. In Kentucky it must be considered very risky to plant cotton on wet, poorly drained soil, either upland or lowland. Well drained bottom land, particularly that containing a large proportion of sand, such as the Hickman bottoms in Fulton county, are admirably adapted to cotton.

ROTATIONS WITH COTTON

It is hoped that wherever cotton growing may be developt in Kentucky it will not result in a one crop system of farming such as is prevalent over so much of the south. Such a system is unsound economically and there is no excuse for it in this state. Diversified farming is safe farming and cotton should not be allowed to crowd out other crops that may temporarily have a

smaller acreage value. Cotton fits fairly well into most rotations and the prospective grower can usually modify the rotation he has been following to include this crop. As cotton is rather a difficult crop to keep free from weeds, it is advantageous to have it follow a cultivated crop, such as corn or tobacco, the cultivation of which has helped free the soil of weed seeds. The following rotations are suggested as being suitable for western Kentucky:

I. (1) Corn; (2) cotton; (3) cowpeas or soybeans, cover crop of crimson clover or rye.
II. (1) Corn or tobacco; (2) cotton; (3) cowpeas; (4) wheat; (5) clover and grass.
III. (1) Cotton; (2) corn; (3) wheat; (4) clover and grass.
IV. (1) Cotton; (2) cowpeas; (3) corn; (4) wheat.

A cover crop should always be used following a cultivated crop. A fair stand of crimson clover can often be obtained by sowing in cotton and this should be practist when weather conditions are favorable for seeding. At other times rye is best.

FERTILIZERS FOR COTTON

Nearly all fertilizer tests with cotton have shown large increases in yield from the use of phosphate fertilizers, even where soils are fairly well supplied with phosphorus. Acid phosphate has usually proved the best carrier of phosphorus for cotton and because it decidedly hastens maturity, should be used by Kentucky cotton growers. Commercial nitrogen will undoubtedly prove profitable in many cases, also. The following recommendations are made in regard to the use of fertilizers:

1. Land in a fairly good state of productiveness, 200 to 500 lbs. of acid phosphate per acre.
2. Land in only a fair state of productiveness, (a) 200 to 250 lbs. of acid phosphate per acre and 100 to 150 lbs. of nitrate of soda, or (b) 400 lbs. per acre of a mixed fertilizer analyzing 3 to 4 per cent nitrogen, 8 to 10 per cent phosphoric acid, and 2 per cent of potash.
3. Land in a very poor state of fertility, (a) 250 to 300 lbs. of acid phosphate per acre, and 150 to 250 lbs. of nitrate of soda, or (b) 500 to 600 lbs. per acre of a mixed fertilizer analyzing 4 to 5 per cent nitrogen, 8 to 10 per cent phosphoric acid, and 2 per cent potash.

Lime is not usually of direct benefit to cotton but its use is necessary in most parts of Kentucky in a rational system of soil improvement and the maintenance of productivity. For the benefits resulting from the use of lime, see Extension Circular No. 123, of the Kentucky College of Agriculture.

It is understood, of course, that the application of manure or the plowing under of legumes or grazing them down just before planting land in cotton will reduce the amount of commercial nitrogen required or make its use unnecessary. Too much nitrogen may cause an excessive growth of plants and make the crop late in maturing.

PREPARATION OF THE SOIL

Time of Plowing—Because of the danger of the soil washing badly, only very level land or heavy grass sods should be plowed in the fall. It is much more desirable as a farm practis in most parts of Kentucky to sow the land intended for cotton in a cover crop so that washing of the soil and loss of plant food will be reduced to a minimum. A rather firm seed-bed is desirable for cotton as it favors good germination and consequently a good stand of plants. Furthermore, the young plants grow more rapidly on a moderately compact seed-bed, an important consideration in obtaining early maturity. The best seed-bed conditions are secured by plowing the land some time in advance of the planting date. Early plowing conserves moisture and gives the ground time to become mellow and settled.

Method of Plowing Land for Cotton.—Land is nearly all bedded for cotton; that is, a low ridge is formed on which the cotton is planted. Bedding, by giving good surface drainage, causes the soil to warm up more quickly, a condition favorable to quick germination of the seed and rapid growth of the plants, and makes cultivation much easier. Beds are formed by throwing four narrow furrows together or, as most Kentucky farmers would say, plowing the ground in lands of four furrows each. Sometimes the land is plowed in the ordinary way—"flush" or "broadcast" plowing in the terms of the cotton grower, and the beds are finished later. In regard to this practis, the Ten-

nessee Experiment Station found as the result of seven years' tests on its western Tennessee experiment field that the yield is not increased sufficiently to justify it. Plowing previous to bedding is probably desirable in case of sod land, however. The disk cultivator and disk harrow are often used for bedding on land previously plowed.

Forming the Beds and Applying Fertilizer.—For the many farmers who will plant cotton and who have never had any experience in bedding land, the following suggestions may prove helpful in getting the job done well:

First cut up with the disk harrow or stalk cutter all stalks or other litter on the land so that it will be buried perfectly by the plow. Otherwise it will interefere seriously with the cultivation of the crop. Litter should never be burned unless for the destruction of some insect pest. It is a valuable source of humus.

If cotton follows corn, tobacco or cowpeas, mark off the field with a shovel plow making the rows three to three and a half feet apart. Put the fertilizer in the furrows. It can be spread by hand if no fertilizer drill is available. With a breaking plow throw two furrows together over the center furrow, running the plow at a depth of 5 to 6 inches. The Tennessee experiments referred to previously have shown that plowing deeper than 6 inches is not necessary or even advisable. The two furrows thrown together form the "list." The unbroken space between is called the "balk." Bedding is completed by throwing another furrow to each side of the list or by running a double mouldboard plow known as a "middle breaker" or "middle buster" in the middle of each "balk." Considerable time is saved by the use of the middle breaker.

When cotton follows cotton, the usual method of forming the bed is to make the center furrow in the water furrow between the old beds, using a bull-tongue or small sweep. Another practis is to open a furrow with the middle breaker or breaking plow along the line of the old cotton row or in the center of the

old ridge. No further work is done until a few days before planting time. Then the fertilizer is distributed in the water furrow, the land disked or harrowed to level slightly and pulverize the clods, and the bed is formed over the water furrow. This last method is practically equivalent to a double plowing of the land and yet requires little additional time. It may, of course, be used anywhere except on sod land. The making of the center furrow is probably of no great advantage except to help in obtaining evenly spaced rows and to indicate where the fertilizer should be sown. Possibly, also, the more thoro working of the soil along the line of the row is advantageous in some cases. Experiments have not shown this to be true, however, and the grower need not hesitate to omit the furrowing if more convenient. Where the one-horse fertilizer drill is available for distributing the fertilizer, it seems to the writer that the position of the rows might as well be marked by this and the fertilizer sown at the same time. This saves a great deal of labor and time. With a drill the fertilizer may be sown after bedding—possibly a desirable practis when the land is bedded several weeks before planting time. Combination seed and fertilizer drills are extensively used by which the fertilizer is applied when the cotton is sown. Fertilizer distributed broadcast before bedding will undoubtedly give just as good results as drilling in the row. It makes little difference how the fertilizer is applied—the plants will get it.

Final preparation for seeding consists in dragging the ridges with a spike-tooth harrow or plank drag to lower them and provide a good surface for seeding. As a rule, this should be done just before planting, but if heavy rains occur before time to plant cotton, it is necessary to stir the soil with a harrow to prevent its becoming hard and dry. In such instances reworking just before planting is necessary if rains occur after the first working. Ground plowed late should be harrowed or dragged at once to prevent the formation of clods. Ridges should be worked down to a moderate height.

TIME FOR PLANTING

It is probably not safe to plant cotton in Kentucky much earlier than May 1, except, perhaps, in a few favored localities where late frosts seldom occur and the soil warms up quickly. On the other hand, planting should be completed, if possible, by the 10th to 15th of May. Later planting will usually give low yields.

RATE AND METHOD OF PLANTING

In order to be sure of obtaining a good stand of cotton plants it is advisable to plant the seed thickly in the rows. About a bushel per acre is the amount usually sown. Small trial patches may be sown by hand, but a cotton seed planter is the one implement that must be bought by the farmer who expects to grow even a small acreage of cotton. All the other operations may be carried out with the usual implements found on the average Kentucky farm. There are numerous types of planters, all of which do satisfactory work. In the better type the seed is covered with a wheel or roller which firms the soil over the seed and promotes germination during a dry period. *Cotton seed must not be covered deeply.* If the seed bed is smooth and fairly firm, a covering of one inch to two inches of soil is sufficient.

VARIETIES FOR KENTUCKY

Success in maturing a crop of cotton in Kentucky necessitates planting only early varieties. Great care should be exercised, therefore, that the seed used is of such a variety. An early variety may lack some of the desired qualities found in later varieties, such as large boll, length of lint, percentage of lint, etc., but early maturity is so important that, if necessary, other desirable qualities must be sacrificed to obtain it.

The number of very early varieties of cotton is rather small. Trice and Express are considered as perhaps the best in this class. Express has a much better fiber than Trice and in tests at the West Tennessee Station yielded practically as much fiber as the latter. For some reason, however, it has not become quite as popular with growers as Trice. This is due, possibly, to the fact that the percentage of lint is low. It is probably true also

that Express is not well adapted to very thin land as it makes only a moderate growth of plant. The Kentucky grower, however, will make no mistake in planting either of these varieties. Other varieties which have been tried in Kentucky, are Cleveland, Acala, Half and Half, and King. These varieties, with the possible exception of King, are considerably later than Trice or Express and while they have larger bolls and may yield more in favorable years, they will probably not give as good results in Kentucky on the average as the very early sorts named. It would seem wise for the growers in Kentucky to plant Trice or Express until tests have shown the value of the later varieties.

The Kentucky Experiment Station is planning variety tests with cotton in western Kentucky this year, and the Extension Division of the College of Agriculture will have several demonstrations with varieties in each of the counties where the interest in cotton is strong. These tests and demonstrations will be continued until the adaptability of different varieties for Kentucky has been determined.

CULTIVATION OF COTTON

The destruction of weeds is the chief reason for cultivating any crop. Cotton is more difficult to keep clean than corn because the young plants are delicate and grow slowly for a time. Methods of cultivation must therefore be very effective in controlling weeds if a great deal of work with the hoe is to be avoided. It is generally recommended by authorities on cotton growing that broadcast tillage with the spike-tooth harrow or weeder be more generally practist in caring for cotton while the plants are small, because it is the cheapest method of cultivation and because it is more effective in preventing weeds getting started in the rows than any other method. Broadcast tillage is possible only where the surface is free from litter and the seed bed has been well prepared. A weeder is better than the harrow unless the surface of the soil becomes hard. When rains occur after planting, the harrow or weeder should be used to prevent a crust forming before the plants get thru the ground. A second cultivation should be given as soon as the plants are up well and

a third a week later. The implement used should be run diagonally across the rows, reversing the direction at subsequent cultivations.

The first row cultivation given cotton is generally called scraping or barring off, because the usual custom in the cotton belt proper is the run on both sides of the row with a one-horse bar-share plow, as closely as possible, throwing the soil away from the row, or to use an implement that "scrapes" or cultivates very close to the row without throwing the earth to the plants. This cultivation is given as soon as the plants are fairly firmly rooted unless broadcast tillage has been practist. Barring off is not regarded as a good practis unless necessary to control weeds. When advisable, the two-horse disk cultivator will do a better job and more rapidly that the one-horse plow. The Kentucky farmer can use the ordinary implements used in cultivating corn and tobacco for cotton cultivation, but if he continues to raise the crop it will be found very advantageous to replace the shovels with sweeps, as they permit closer cultivation when the cotton is small and as the plants become larger the sweeps permit cultivating under the branches without injury to the plants.

After the first cultivation the cotton should be thinned. This is done by first chopping out the plants between the hills and then pulling out of each hill all but two or three plants. Immediately following thinning, or as fast as thinned, the cotton should be cultivated, throwing as much earth around the plants as possible without covering them. It is necessary later, after the plants have become well established, to go over the rows again and thin the hills to the desired number of plants. It is not regarded as safe to do this at the first thinning.

Subsequent cultivations should be given after rains, to break the crust and destroy weeds. Cultivation, particularly the later cultivations, should be shallow rather than deep. As a rule, cultivation should be discontinued in Kentucky by the middle to last of August. Except that greater care is necessary in early cultivation, the cultivation of cotton is not different from that generally given corn.

HOEING

After the crop is thinned, the only purpose of hoeing is to destroy weeds; therefore, the amount necessary will depend upon how well cultivation controls weeds. It is especially important that cotton be kept clean during the early stages of growth.

SUGGESTIONS REGARDING THE THICKNESS OF THE STAND

The necessity of securing early development of bolls before the boll weevils become numerous, has led to numerous experiments in the south to determine the influence of thickness of stand of plants upon boll development. These experiments indicate that decidedly more bolls are secured in close than in wide spacing. Since the early development of bolls is just as necessary in Kentucky as in boll weevil territory, it would seem that the Kentucky growers should try close spacing. The Mississippi Experiment Station recommends for soil of medium fertility, that two plants be left every 12 inches. Probably such a spacing is about right in Kentucky, with rows about 3½ feet apart. On very rich land, however, the spacing should be somewhat wider.

INSECT ENEMIES AND DISEASES OF COTTON

The boll weevil has not appeared in Kentucky, so far as the writer is aware. There are numerous other insect pests but none is likely to cause much damage in this state for some time at least. The corn ear worm or cotton boll worm prefers corn to cotton and as so much corn is grown in the parts of Kentucky where cotton is grown, it will probably not attack cotton seriously in most seasons. The caterpillars which eat the leaves of cotton plants in the fall can be destroyed by dusting the plants with arsenate of lead, if it is thought they are really damaging the crop.

Cotton diseases usually do not become serious for several years after cotton growing begins. Kentucky growers need not anticipate much trouble from this source.