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UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE
AGRICULTURAL EXTENSION SERVICE

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Growing Cotton
A 4-H Club Project

Fig. 1.—Growing cotton is a good project for a 4-H club member.

WHAT IS THE COTTON PROJECT?

Any boy or girl living where cotton is grown can choose cotton for a project. If you choose this crop for a project you can become a successful cotton grower. For you will learn to select the land, prepare the soil, plant, cultivate, harvest and market your cotton. And you can make your crop pay.

As a club member you must grow one or more acres of cotton. Then turn in your report on the blank in the center of this circular.

Prepared by J. R. Paulling, Extension Specialist in Field Crops, in collaboration with Lester O. Akers, State 4-H Club Agent.

If you grow cotton, you will be helping produce one of the most important crops in Missouri. For the cotton crop usually ranks second or third among field crops grown here. And average yields from our cotton are the highest in the world except where irrigated. As a cotton grower you will help keep this yield high by caring for the soil and planting pure seed of the best suited varieties. What's more, you will learn and use the best production methods, for your county agent will show you just how it is done. And you can share what you learn with others by putting into use the good practices you learn.

You will learn how to guard against diseases and insects. Our cotton section is remarkably free of these troubles, partly because it is a new cotton region. But we must watch to keep it so.

Ten years ago our cotton was the shortest grown in the Mississippi bottom lands and the lowest in grade of all American cotton. Now it exceeds the average in staple length, but is still below average in grade. Here is a real challenge to club members to show that Missouri cotton can be further improved.

Choice of Land

Your project of one or more acres does not necessarily need to be a separate field or plot. It should be plainly staked off or marked. If the project is to be less than a five-acre plot, it might be best to locate it in a field that is to be planted to cotton. By doing this the cultivation and use of equipment can be carried on more easily.

Cotton can be grown on many different soils but most profitably on good, fertile land. The higher the yield the less the cost will be for growing the crop. These figures, taken from a study by the Arkansas Experiment Station show the importance of a high yield.

Yield of lint cotton per acre	Production cost per lb. of lint cotton
100 lbs.	27.9 cents
200 lbs.	16.3 cents
400 lbs.	10.5 cents
500 lbs.	9.4 cents

Higher yields mean that we have more cotton to sell. And this means more profit per acre. For example, suppose cotton is worth 30 cents a pound. The 100-pound crop would bring only $2.10 profit per acre. (30 cents - 27.9 cents = 2.1 cents profit per pound. 100 × 2.1 cents = $2.10 profit per acre.)

Now let us consider a 500-pound yield. (30 cents - 9.4 cents = 20.6 cents profit per pound. 500 × 20.6 cents = $103.00 profit per acre.) Thus we see that this increase in yield jumps the profit 50 times.

The ideal cotton soil may be described as one which is well drained. It is rich in organic matter (decaying plant matter—stalks, straw, hulls, manure, etc.) and also nitrogen, phosphorus, potash and other nutrients. Good cotton land retains moisture well for the crop's use during dry periods.

Taking a Soil Sample

Soil tests made in the county agent's office will tell you what kind

and how much fertilizer your field will need. Take your soil sample exactly as directed on the instruction sheet furnished by your county agent. As a cotton project member you should know the analysis of the soil on which you plan to grow your crop. Take a soil sample to your county agent's office and have it tested. Place the results and recommendations on your record blank. Here are the steps for taking a soil sample.

1. Make a map of the field.

2. Mark off areas where the soil is different, such as sandy areas in a field of loam soil or black soil adjoining light-colored soil.

3. If parts of the field were in different crops in recent years or had different soil treatments, this fact should be shown on the map.

4. You should have as many different samples as you have different areas marked on the map. At several places in each area take samples as described here. Mix the samples taken from the same area. Place samples in clean containers or the test may be affected.

5. An auger or spade may be used to take a sample. With the auger, bore down 7 inches, withdraw the auger, catch the soil clinging to it on a newspaper and place in a clean container. With a spade dig a V-shaped hole seven inches deep, and cut a thin slice from one side. Then with a knife cut away a strip of soil from top to bottom onto a newspaper. Whether using an auger or spade, a teacup of soil is ample. Take three or more augers or spade slices for a single sample.

6. All the drawings from an area should be mixed thoroughly, then about a teacupful of the well mixed soil placed in a clean container for the sample.

7. Number the samples to correspond to numbers given areas on the map. Then give them to your county agent.

Commercial Fertilizers

The 4-H club cotton project gives a splendid opportunity for you to help your community by conducting a result demonstration. A five- to seven-row strip through the project area left untreated (this is called a check strip) while the remainder was treated with the needed commercial fertilizer, would be a result demonstration. Make a record of the difference in yield. County agents are always glad to have pictures of such demonstrations which show the results you can get by following good practices.

The three elements most often found in commercial fertilizers are nitrogen, phosphorus and potash. Their influences are:

1. Nitrogen promotes plant growth. Too much of it in relation to the other two elements, particularly phosphate, will tend to delay maturity.

2. Phosphate hastens maturity and stimulates development of the fruit.

3. Potash keeps plants healthy. With cotton plants, the disease known as rust shows a need for potash in the soil.

The term 4-12-4 or a similar combination of figures is used to express the amounts of nitrogen, phosphate and potash in a "complete" fertilizer. The first number refers to the pounds of nitrogen, the second, to the pounds of phosphate, and the third, to the pounds of potash per 100 pounds of fertilizer.

Cotton hulls and barnyard manure are both rich in plant food. Cotton hulls are much richer in plant food than commonly believed. Here are average values of the two:

Pounds Per Ton of Essential Plant Foods

	Nitrogen	Phosphorus	Potash
		(P_2O_5)	(K_2O)
Manure	10	5	8
Hulls	18	10	66

The cotton fertilizing program can be greatly aided by using winter legume crops. They afford a practical means of adding nitrogen and organic matter to the soil. They help prevent plant food loss by leaching. (Plant food dissolved in soil moisture and carried away by underground water or bound in the soil is referred to as leaching.) Also, winter cover crops check wind and water erosion and, if turned under, improve the structure of the soil.

A well-drained soil is needed for cotton growing. Drainage will be considered under two heads, surface and internal. *Surface* drainage is used to keep surplus water from standing on the land. *Internal* drainage is needed because cotton does not grow well on waterlogged or saturated soil. Most fields needing internal drainage require surface drainage first. After the surface has been drained, the next step is to improve the structure of the soil itself. This can be done by plowing under large quantities of organic matter. Also, using lime, and growing legume crops will improve the structure of the soil.

The practice of working the fertilizer deep into the soil has advantages. This can be done by applying fertilizer in the furrow when plowing or by applying it ahead of the plow. A light additional treatment at planting time or just before planting time as a starter is a good practice. To protect the seed from injury, apply fertilizer so it will not come in direct contact with the seed.

Preparing the Soil

The ideal seed bed for cotton is firm, free of weeds and grass, and ready for the seed in late April or early May. Naturally, conditions of the particular field will bear on how well this can be done.

The heavier the soil the more reason there is for bedding high and early so the land will dry out and warm up for timely planting. On lighter soils (those with more open texture and good internal drainage) bedding is less general. Much of the crop there is flat planted which is the trend today. The bed is disappearing from cotton fields, as we learn the means and value of improving internal drainage and move toward mechanical production. A high bed interferes with the mechanical chopper and flame cultivator.

Whether your crop is planted on a bed or flat planted, the idea of

having a "fresh bed" for the seed is good. This means stirring the soil deep enough to destroy sprouting weeds with the aim of at least denying them a head start on the cotton. With bedded land this calls for dragging the bed down severely or disking and rolling the land to be flat planted immediately ahead of the planter. This treatment benefits the cotton as much as the later cultivations and comes at a time when it can be done quickly and easily.

If the cotton land is growing vetch or other cover crops, it is most important that these be turned under regardless of the stage of growth some 10 days or two weeks before cotton planting time. This will allow the green matter to "go through the heat" and the soil to settle somewhat before the cotton sprouts. If this is neglected, poor stands are likely to result.

Cotton Seed

Variety and purity are our first thoughts when considering the seed we would plant. We must have an early variety because the Missouri grower is at the northern boundary of the cotton belt where the season is shortest. We know that variety practically controls the staple length, that it has a great deal of influence on yield and some bearing on grade. So important is the right choice of variety that it is aptly said that once the cotton grower has put his planter away in the spring he has set the staple length of his crop, gone far toward determining the yield and to some extent the grade.

Use of pure seed is scarcely less important than choosing the best variety; for cotton seed degenerates, or "runs out" quickly—more quickly than most farm seed. Mixing at the gin is the chief cause. But even with no mixing, the seed of each succeeding crop tends to become less pure. For this reason there is great advantage in having everyone in the community grow the same variety. The seed in that community will be better and the lint, being more uniform, should command a higher price. Whatever the community situation, it is safe to assume that the purest seed is that coming directly from the breeder. First year seed so handled as to preserve its purity is next choice; then second year seed. Cotton seed is certified as to its purity and other qualities under direction of the State Seed Improvement Association. This certified seed usually is the best outside of certified breeder (foundation) seed.

Once assured of the variety and purity of our seed, find out how well it germinates, which means producing live healthy sprouts. Cotton seed is so sensitive that many conditions will destroy the germination. The chief one is putting the seed into storage when immature or damp.

Seed Testing

Experienced cotton growers know that planting time is short. Delays in getting stands, sometimes due to the necessity of replanting, generally reduce yields. They know too that thick cotton can be thinned to stands but that thin stands cannot be thickened.

Testing the seed for germination is an important step toward getting a *good stand on time.* This allows adjustment in the planting rate. Of course, that lot of seed which gives the nearer 100 vigorous sprouts per 100 seeds is the one that germinates best. Good cotton seed ordinarily germinates 80 per cent or better (80 or more healthy sprouts per 100 seeds).

The seed testing laboratory at the College of Agriculture, University of Missouri at Columbia, Missouri, will test your seed free. Your county agent will provide instructions, and send samples to the laboratory. While this test is more accurate, you can make a simple test at home that will give useful information.

Materials required for this home test are a large plate or platter and an ordinary face towel.

1. Fold and refold the towel until it fits nicely in the plate.
2. Soak the folded towel in water and replace in plate.
3. Open the last fold, as opening a book.
4. Distribute 100 seeds over one side of the towel, then close it. The seed should be taken at random from different parts of the stored lot of seed—the more the better. Avoid picking only the best looking seed.
5. Set the dish in a moderately warm place, preferably where it will be seen daily and where water is convenient. The kitchen usually will serve well.
6. Each day check to see that the towel is moist and sprinkle it with water when necessary.
7. After several days, sprouting should have begun. The sprouts will spread the towel open. Large healthy sprouts may be counted and removed.
8. At the end of seven days, add number of strong sprouts. This figure will represent the per cent germination.

Seed Treatment

Treating cotton seed is another means of improving stands. Such materials as Ceresan, properly applied, will rid the seed of disease borne on their surface and tend to protect the young seedlings against infection in the field.

Usually, the stand and vigor of seedlings from treated seed are far greater than from untreated seed. Club members are encouraged to plant one or two rows with untreated seed and then the remainder of the field with treated seed from the same lot. This is a good demonstration opportunity. The untreated seed should be planted first else enough of the dust treatment will carry over in the planter box to give a partial treatment and thus confuse the results.

Manner of treating cotton seed:

A barrel treater as shown is considered the best homemade device for treating cotton seed. The county agent can provide detailed plans for making it. Ceresan can be bought in packages at seed houses and drug stores. Follow carefully the manufacturer's instructions given on the package.

Precaution—Avoid breathing this dust or allowing it to remain on the

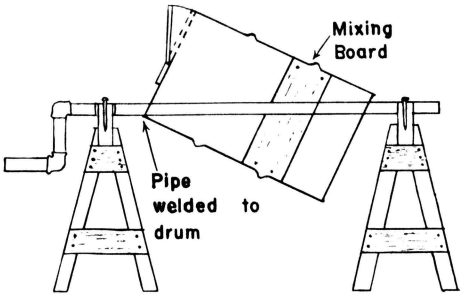

Fig. 2.—Treating cotton seed.

body. Treated seed should be considered poisonous.

Planting Dates, Rates and Methods

Cotton, being a hot weather plant, simply will not grow normally unless the soil is warm. Thus when planted too early or if the weather remains cool, the stand may be so damaged as to require replanting. Poor germination, diseases (damping off), insect injury (plant lice, particularly), and weediness are dangers of planting too early. On the other hand, late planting tends to delay maturity and reduces yields and quality.

Planting time in Missouri ranges from mid-April to mid-May. Remembering that the general tendency is to plant too early, we would regard mid-April as safe only if the soil is deep, well drained and fertile and the weather favorable for drying and warming the land. More often April 25 to May 5 is the best time for planting.

Rates.—From one to 1½ bushels of seed per acre is the usual rate if the crop is planted in a continuous row. This allows for a thick row which can be thinned to the stand desired.

Hill planting, which gives promise of becoming a part of mechanical production, calls for only about 12 pounds of delinted good quality seed an acre. The practice of planting in hills spaced about the same as the width of the row and cross plowing the crop, already has become fairly common in some parts of the Delta.

Whatever the manner of planting, the seed should barely be covered since the sprouts cannot emerge from deep planting. It pays in better stands to be sure the seed bed is firm and free from weeds and grass.

Cultivating and Thinning

Should packing rains cause crust to form immediately after planting, break this crust promptly with either a rotary hoe or section harrow. If you use a harrow, slant the teeth back slightly and draw it across the rows at an angle. Use of the rotary hoe or section harrow is a splendid means of cultivation. You can repeat such cultivation after the plants are up if there is a good stand. Cultivate after noon, when the sun has shown long enough to toughen the plants so they will bend without breaking . Such cultivation is quickly done, and stirs the soil within and between the rows. It is useful both before and after the plants come up but should not be done just as the seedlings are appearing. Too many will be destroyed at this stage.

Unless weeds and grass become very bad, which is not likely if the harrow or rotary hoe is used as de-

scribed, barring off is not necessary. But if barring off is done, run the plow shallow and chop and cultivate soon to return the soil around the plants.

Many factors influence what percentage of seed planted will grow into strong healthy plants. So it is common practice to plant more seed than the number of plants desired. This is the only safe course, but it raises the question of how many plants to leave.

In solid row plantings yields have been best with two to four plants per hill, and hills some 10 to 12 inches apart. Cotton grown in such relatively thick stands tends to open earlier and hold its fruit higher from the ground. Both of these contribute to higher grade.

Experience with hill-dropped and cross-plowed cotton is limited but it appears that this practice works best on land capable of yielding a bale or more per acre; that there should be at least three plants per hill and that even six or eight may not be too many. Where there are more plants than necessary, the bolls per plant decrease but the yield per acre remains about the same. If there are too few plants, the yield is likely to drop. In hill planting, the hills are generally spaced the same distance in the row or slightly less than the width between the rows.

In principle, row width and spacing within the row should be closer on thin land than on fertile land. Thin or chop when danger of damage by cold weather or other causes is passed.

Cultivation should be frequent and shallow. The less ridging done in cultivating the better, because moisture losses and damage to roots are lessened. *Frequent* cultivation means as often as necessary to *keep* the land free of weeds and grass. If we don't keep *ahead* of the weeds, whatever growth they make comes at the expense of the cotton. The larger a weed grows before it is destroyed the less the advantage in destroying it, the greater the damage it already has done. *Shallow* cultivation is just deep enough to stir the surface of the ground, destroying weeds and grass *before* they get a start. With thorough early cultivations, the later cultivations are made much easier and none need be over an inch deep.

The flame cultivator has proved so effective that it promises to come into general use. At this time two requirements stand out if the flame cultivator is to be satisfactory—level culture and frequent use. Any appreciable ridging, cloddiness or roughness of the surface will turn the flame up into the cotton and damage it. The smaller the weeds and grass when flamed the better the kill. Once they reach such size that their tip buds stand above the flame, control drops sharply.

Control of weeds with chemicals is already being used with some crops. Controlling weeds is the chief purpose of any cultivation, however done.

Since the plow cultivator is expected to continue for some time as our most common weapon against

weeds, here are a few points about its use.

1. The earlier weeds are destroyed, the less damage they do and the greater the benefit of cultivation.

2. Breaking crust formed by rain and letting air into the soil are other purposes of cultivation. But they are not the most important.

3. Cultivation generally should be only deep enough to destroy weeds. If it is so deep that crop roots are destroyed, then cultivation has damaged the crop. Usually one to two inches at most is deep enough to get the weeds with frequent cultivation.

4. The older the crop, the more roots there will tend to be near the surface. Before growth stops cotton will send roots entirely across the middles between the rows. Therefore, the older the crop the more important it is that the cultivation be shallow.

5. The higher the bed the more moisture is lost, because moisture losses are proportionate to the area of surface exposed. The more level the land, the less area exposed, the less will be the moisture loss. This is especially important on sandy land which by nature is "droughty".

6. Shallow cultivation is easier with sweep type shovels. They should be set as flat as possible—as in a mowing rather than a digging position.

Points to remember about the cultivator:

1. Have the shovels sharp and pointed, not rounded.

2. Shovels can best be adjusted on a level floor that has been lined off as shown in Figure 3.

3. Set shovels by shank adjustment as flat as possible and so all shovels run at same depth. With sweep type shovels the tip or point needs to be very slightly, if any, below the sole (bottom) of the sweep.

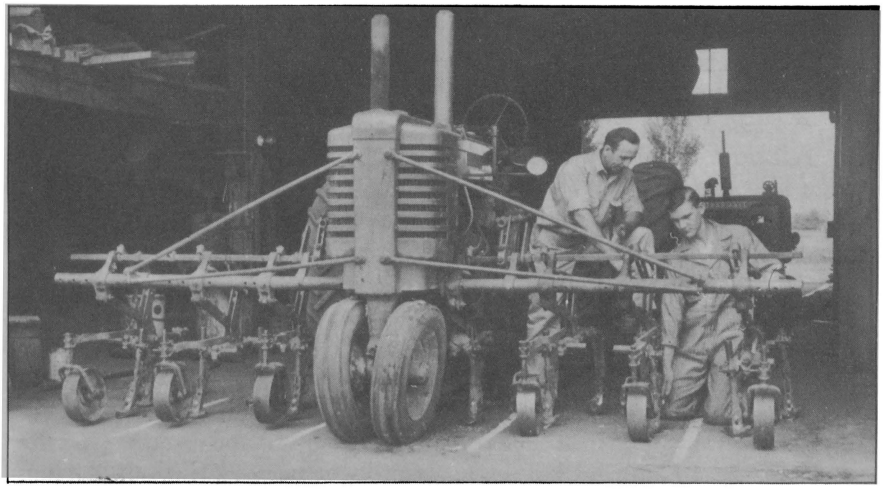

Fig. 3.—Adjusting the shovels of a cotton cultivator.

Diseases of Cotton

Rust, wilt, root knot anthracnose and sore shin are the most common diseases of cotton in Missouri.

Black rust (frequently referred to simply as rust) is the most serious in terms of damage done. Where the crop is affected, the leaves show a pale green color. Later, yellow and reddish brown spots appear. The spots gradually enlarge and become darker. Finally the leaves turn black, curl and drop. Many young bolls also are shed. Those bolls remaining don't develop properly, either failing to open or producing a poor quality lint.

Black Rust is not caused by an organism but by improper soil condition. Lack of potash, low organic matter and poor drainage are possible causes. Applying potash fertilizer is one of the most effective control measures in Missouri. Rates of 200 to 400 pounds of Kainit an acre or equal quantities of potash in other forms, as 3-9-18, depending upon seriousness of the disease, are recommended. Such treatment may make the difference between a good crop and a very poor crop.

The relation of this disease to drainage and organic matter re-emphasizes the importance of these points covered under the section entitled, "Commercial Fertilizers".

Wilt, though not so widespread as black rust, may be more serious if it gets established on a farm because it is hard to control. It is caused by a fungus that may live in a soil for years. Soil treatments do not have so direct a benefit in controlling this disease as in the case of rust.

Symptoms of wilt are: The disease appears after fruiting begins. The leaves begin to wilt and shed without apparent reason; the main stem becomes dwarfy; and the joints shorten. If a freshly wilted plant is cut off and black or brown discolorations are found just inside the inner bark, it is a sure sign of wilt.

The most practical control is to plant wilt-resistant varieties, such as Rowden and the wilt-resistant strain of Coker 100; and rotate crops on the infected field, using crops resistant to root knot, a disease which increases the severity of wilt. Also, make sure ample potash is supplied.

Root Knot is a disease caused by tiny eelworms (nematodes) that enter and live in the roots of cotton and certain other plants. They cause knots or galls to form on the roots, varying in size from that of a small shot to the size of a quail's egg.

Other crops subject to the disease are cowpeas (other than the Brabham and Iron varieties), soybeans, potatoes, and watermelons. The nematodes may be spread from one field to another in any way that the infested soil may be transferred. Surface drainage water, farm tools and the feet of men and livestock spread infected soil.

Root knot is best controlled by crop rotation with use of immune crops. Such crops are corn, oats, wheat, rye, barley, sorghums and all the hay grasses.

Sore Shin is most damaging during cold, wet periods in early spring and kills or stunts the young plants,

often making it necessary to replant.

Characteristic symtoms are dark, reddish brown cankers on the stems of small plants near the surface of the soil. In severe cases the spots become so enlarged that they weaken the plant, causing it to fall over and die. Many plants, when not severely affected, will recover with the arrival of warm weather, and outgrow the injury.

Sore shin is caused by organisms that live both on the seed and in the soil. Treatment of the seed with Ceresan usually will check losses markedly. Damage can be further reduced by use of fertilizer and other practices that start the young plants off quickly into a strong, vigorous growth. In addition, a heavy rate of planting will provide enough plants, so the loss of a few will not ruin the stand.

Insect Pests of Cotton

The cotton leaf worm, red spider and cotton aphid are the most common insect enemies of Missouri cotton. Elsewhere in the cotton belt the Mexican boll weevil and pink boll worm are extremely serious pests but they are not common to the Missouri crop.

Cotton Leaf Worm is the most destructive insect pest we have. The insect does not winter here but spends the winter farther south, probably below the Mexican border, where the weather is milder. The moths (the adult form, tawny in color with a wing spread of about 1½ inches) fly North during the summer. In some seasons they fail to reach Missouri in harmful numbers but in others they travel even as far north as Michigan where they attack other crops. They lay their eggs on the under side of the leaf. These eggs hatch in 3 to 20 days. The small worms (larvae) vary in color, being yellowish green without stripes, some with a black stripe down the back and others with a fine yellow stripe. All have four black dots on each body segment (joint). The worm remains in this stage 10 days to 3 weeks and then webs itself into the fold of a leaf and pupates there (passes through a resting stage emerging as a moth). The pupal stage lasts one to four weeks. Then the moth or adult form emerges, completing the life cycle.

The leaf worm makes its appearance in Missouri generally in late summer. If conditions are not favorable for the trip north and for multiplication here, little damage is done. If conditions are favorable, the insects multiply in great numbers and strip cotton plants of their leaves unless controlled.

The leaf worm, being a chewing insect, is controlled with a stomach poison like calcium arsenate, benzene hexachloride (BHC) and chlorinated camphene. From 5 to 10 lbs of calcium arsenate an acre (depending on size of the plants and seriousness of infestation) applied when the plants are wet with dew or rain give effective control. The dusting may well be done at night.

Dusters used vary in type from hand guns to the dusting apparatus used on airplanes. A good low cost

duster can be had at home by hanging two muslin bags partially filled with calcium arsenate from a pole as long as the rows are wide. By riding horseback between the rows the operator may treat two rows at a time. The movement of the animal and some agitation by the operator will cause the dust to shake out fairly uniformly.

Red Spider is in reality a tiny red mite that lives on the leaves of a number of different plants, including cotton. It is red or reddish brown in color. It may be found on close examination of the under side of the leaf where it feeds by sucking the sap of the plant. These leaves turn brown and drop.

Usually red spider injury begins in spots near weedy areas in or near the field and spreads from these. If found early, the best control is simply to burn the infested plants, preferably where they are found. If infested plants are removed, be careful that the insects are not spread to other parts of the field from the infested plants. Place these plants in oil soaked sacks for removal else the spiders are readily spread.

If the area infested is quite large, dusting is the proper control. Whatever is used must be applied to the under side of the leaves. Fine dusting sulphur, lime sulphur, and kerosene emulsion are some of the materials which are good for this purpose. Sulphur is the most popular.

Cotton Aphid is an insect commonly called the cotton louse. It is a small, green, gray, or greenish black insect that attacks the leaves of the plant soon after it comes through the ground. The leaves curl and in severe cases, the plant dies. The greatest damage is done in early spring when the weather is cool and plant growth slow.

Aphids may be controlled by using nicotine sulphate. Benzene hexachloride (BHC) is a promising new treatment. Absolute control being difficult, use of the following methods of combatting the pest are effective:

Do not plant too early.

Use good seed and a heavy rate of seeding.

Apply practices that promote rapid growth.

Carefully select the best plants at the time of thinning.

The Field Tour

The field tour gives you a chance to see various practices you have learned about in club meetings. For this reason, it should be one of the most valuable activities of the entire club year. The best time is when the cotton is pretty well made and before picking begins.

Use your eyes. Make see! SEE!! **SEE!!!** the keynote of the tour. Some of the many things we could look for and the questions they should arouse in our minds are:

Note the difference between bedded cotton and flat planted. In which case is more ground surface exposed? Remembering that the soil loses moisture in proportion to the surface exposed, which cotton likely will suffer more from drought?

Which could be chopped mechanically and flamed more easily?

Dig for roots near the row and in the middles, to find how near the surface they are and how far they reach. What relation has this to cultivation?

Note thick stands and thin. Which matures earlier? Which bears its fruit higher? What relation has this to grade? Compare hill planted with solid drilled cotton. Note stands and maturity of cotton planted too early, at the right time and too late.

Compare stands from treated and untreated seed, and from gin-run and pure seed.

Look for the diseases wilt and rust. Look for red spider and leaf worms.

Compare fertilized and unfertilized cotton; also that on land treated with hulls and not; and on land where a winter legume was plowed under with that not so handled.

In making these and other comparisons, boll counts are an interesting way to measure difference. For accuracy, counts are made on equal lengths or row and after any heavy shedding is likely.

In all cases where two fields or parts of a field are compared to learn the effect of one factor, all other conditions that might affect yield should be as similar as possible. For instance, if the effect of spacing is to be measured, the cotton on both plots or fields compared should be of the same variety, planted at the same time, row widths the same, fertilized the same, and the land should be similar. It is recognized that exactly these conditions seldom will be found, but the principle must be kept in mind if results are to be fairly comparative.

How to Make the Boll Count

Make a mark across the middle between two rows. Measure off 30 feet along this middle and make another mark. This may be paced or actually measured but one must be careful that all measurements are the same wherever made in the field.

Count and write down the number of stalks on one row between these marks. Then count and record the number of stalks on the other row between these marks.

COMPARISON OF EFFECT OF SPACING

	Thick Spaced			Wide Spaced	
Rows	No. Stalks Per 30 Ft.	No. Bolls of Row	Rows	No. Stalks Per 30 Ft.	No. Bolls of Row
1	32	288	1	18	184
2	27	265	2	21	219
3	36	304	3	16	178
4	33	290	4	23	232
5	26	258	5	22	239
6	38	311	6	20	224
Total	192	1716	Total	120	1272
Average	32	286	Average	20	212

$286 - 212 = 74$

$74 \div 212 \times 100 = 35\%$ = percentage by which thick spaced cotton is exceeding wide spaced cotton in fruiting.

Note: Wherever any comparison except for spacing is made, the average number of stalks per 30 feet of row in the two fields or plots compared should be practically the same.

In the spaces below, compare two fields, or parts of a field, for effect of spacing and two for the effect of some other factor, such as time of planting or effect of fertilizer on fruiting.

Next count and write down the number of bolls on one row between the marks. Then count and record the number of bolls on the other row between these marks.

Repeat this in at least three average places of each field or part of the field in the comparison. More would be still better. Average the number of stalks and the number of bolls in each and compare.

COMPARISON OF EFFECT OF SPACING

Thick Spaced			Wide Spaced		
Rows	No. Stalks Per 30 Ft. of Row	No. Bolls Per 30 Ft. of Row	Rows	No. Stalks Per 30 Ft. of Row	No. Bolls Per 30 Ft. of Row
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
Total	——	——	Total	——	——
Average			Average		

— ÷ — = × 100 = % = percentage by which thick spaced cotton is exceeding wide spaced cotton in fruiting.

COMPARISON OF EFFECT OF ————

————			————		
Rows	No. Stalks Per 30 Ft. of Row	No. Bolls Per 30 Ft. of Row	Rows	No. Stalks Per 30 Ft. of Row	No. Bolls Per 30 Ft. of Row
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
Total			Total		
Average			Average		

— ÷ — = × 100 = % = percentage by which ———— ———— cotton is exceeding ———— cotton in fruiting.

Marketing Cotton

The expression is sometimes heard that cotton growers spend 13 months growing a crop but refuse to give more than 13 minutes to selling it. This springs from an "oh, what's the use" attitude. True, the individual cotton grower finds many market

Table 1.—Approximate average bale values at Memphis, Tenn. for selected grades and staple lengths during the 10-year period ending 1946[1]

Staple length (inches)	Grade: Strict Middling Dollars	Middling Dollars	Strict Low Middling Dollars	Low Middling Dollars
7/8	87.45	85.95	81.25	72.75
15/16	91.80	90.10	85.50	75.60
1	93.60	91.65	87.10	76.50
1-1/16	97.40	94.70	89.40	77.70
1-1/8	107.60	103.20	94.90	80.35
1-3/16	123.70	118.15	105.10	83.20

[1]For a 500-pound (gross weight) bale based on average prices of specified white grades and staple lengths prevailing at Memphis, Tenn., for the seasons 1937-1946 inclusive.

conditions not to his liking which alone he can do little to correct. But let us look for some of the ways he can help himself sell his cotton to better advantage.

The table below shows the difference in value per bale of cotton for differences in staple length and grade. These figures were gathered on the Memphis market over a 10-year period when the average price of cotton was 18 cents a pound, so they are conservative. This is to say, that with thirty-odd cent prices as at present, the differences are greater in dollars per bale. With prices lower than 18 cents the differences a bale will tend to be smaller. It is just as important to understand that the lower the market, the greater the spread in price tends to be per *$100 worth of cotton.* This is not easy to understand or explain. But it means simply that when money is scarce with cotton growers because cotton prices are low, it is all the more important that we make our cotton as long and high in grade as possible.

Some of the things we can see here that would help us sell better are:

1. From the column headed "middling" as we move from top to bottom we see that the longer the staple the more the cotton is worth. The 15/16 cotton was worth $4.15 a bale more than 7/8 inch; 1-1/16 cotton brought $8.75 more; and 1-3/16 inch was valued $32.20 higher than 7/8 inch cotton.

So, we conclude, the longer the staple the better the price. There is a limit, unfortunately, to how far we can go. Experience and experiments teach us that varieties which produce longer than 1-1/16 - 1-3/32 staple generally yield so much less in Missouri than these that the price difference won't overcome the yield difference. So, we conclude we should plant varieties that yield lint that "pulls" around 1-1/16 inch.

2. Reading the values of 1-1/16 inch cotton from left to right we see how much difference grade makes. A strict low middling bale brought $11.70 more than low middling; a

middling bale $17.00 more and strict middling $19.70 more a bale than low middling. And mind you, the time and manner of picking along with the manner of ginning account for this difference in grade. It is important to know, too, that our Missouri cotton is criticized for its grade more often than for anything else. Here, we wonder, is it worthwhile to pick more promptly and more carefully? Is there something to gain by working more closely with the ginner and expecting him to work with us? All this with the aim of raising the grade of our cotton. Remember, only four bales in ten of Missouri cotton grade middling or higher, while some seven in ten of the National crop are this good. We see there is room for improvement.

3. But, you may say, the local buyer pays one price regardless of grade and staple. The answer here is not too hard if we are sure of our grounds.

First, we should understand that the different lengths and grades of cotton follow the same scale of differences in real value. Therefore, they ought to be bought at prices differing in the same way. If you demand no more for your long high-grade lint than the careless producer gets for his short low-grade product, you get less than your cotton is worth and encourage careless production and unfair buying practices.

The buyer who pays the same price for all grades and lengths must set his price below the real value of at least half the cotton he buys.

4. Again you ask, "How can I know the grade and staple of my cotton? Doesn't it take an expert to class cotton?"

Answering the second question first—yes. Yet you and every Missouri cotton grower, can have your cotton classed by experts free of cost. Too, you can develop yourself to the point where you will have helpful ideas. To be specific, we know that the staple length is pretty well set by the variety we plant. Stoneville and Deltapine produce 1-1/16 inch staple principally in Missouri and very few bales grown with pure seed of these varieties should pull lower than 1-1/32 or longer than 1-3/32 inches. If the season or the land is abnormally droughty the staple will tend to be shorter by *maybe* 1/16 inch, but otherwise the statement holds.

As to grade, we want to know the color, leaf (foreign matter) and smoothness of ginning. The whiter, the cleaner and the smoother the cotton—the higher the grade. Practice and frequent checking against known grades such as the government sample boxes are necessary if you become skillful. Yet very little practice should enable us to recognize such difference as there is between middling and low middling.

Aside from what we may prepare ourselves to do, classing service by government classes is to be had free by all Missouri cotton growers. By this means the service of experts is

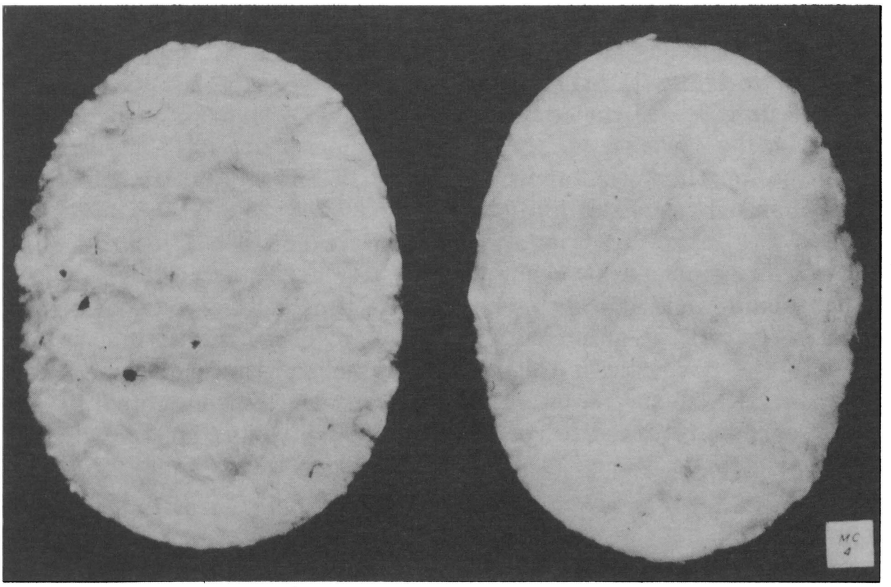

Fig. 4.—Samples ginned from a portion of a short staple seed cotton picked damp (left) and from a portion of the same seed cotton picked dry (right).

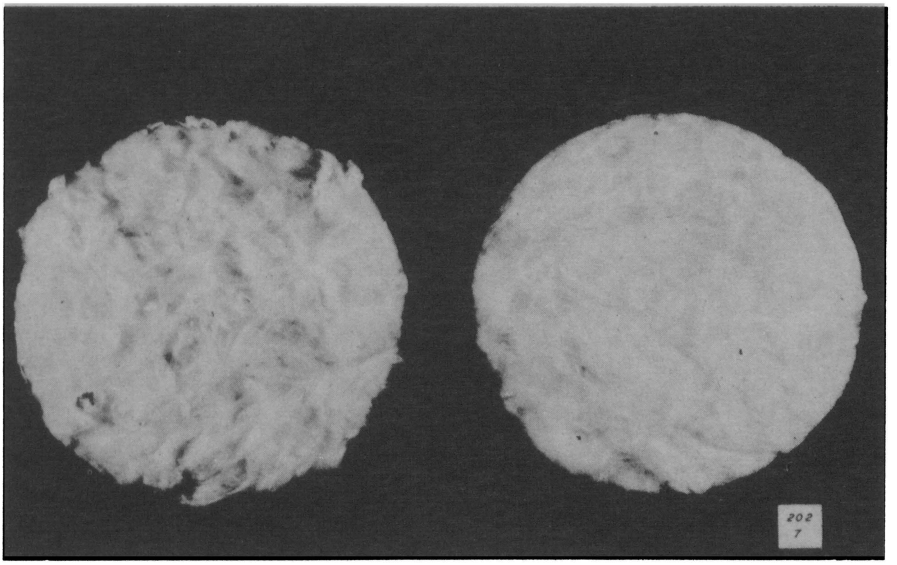

Fig. 5.—Undried (left) and artificially dried (right) samples ginned from portions of a green and damp cotton of 1-3/16 inches staple length. (Figures 4, 5, 6 and 7 courtesy USDA Ginning Laboratory.)

available without cost. The requirements are simple:

A. That we join with other growers in forming a one-variety association.

B. Agree to plant the approved variety chosen by the group, using pure seed.

C. Have the ginner draw a sample of each bale immediately when ginned, tag it with your name, and send it to the government classing office at Hayti with the request that the class card be returned to you.

D. Await return of the class card showing the grade and staple of your cotton before you sell. This takes only two days as a rule and means the difference between knowing exactly or perhaps not knowing what you have for sale. For example, you will know if you have a strict middling bale of 1-1/16 cotton worth $97.-40 or a low middling bale of 1-inch cotton worth only $76.50.

See what it means to spend a little more time selling your cotton?

As to other marketing activities, let us check the bale value by looking up the price quoted in newspapers, or listed in the gin office, and announced by radio for cotton of the grade and staple the classing card shows ours to be.

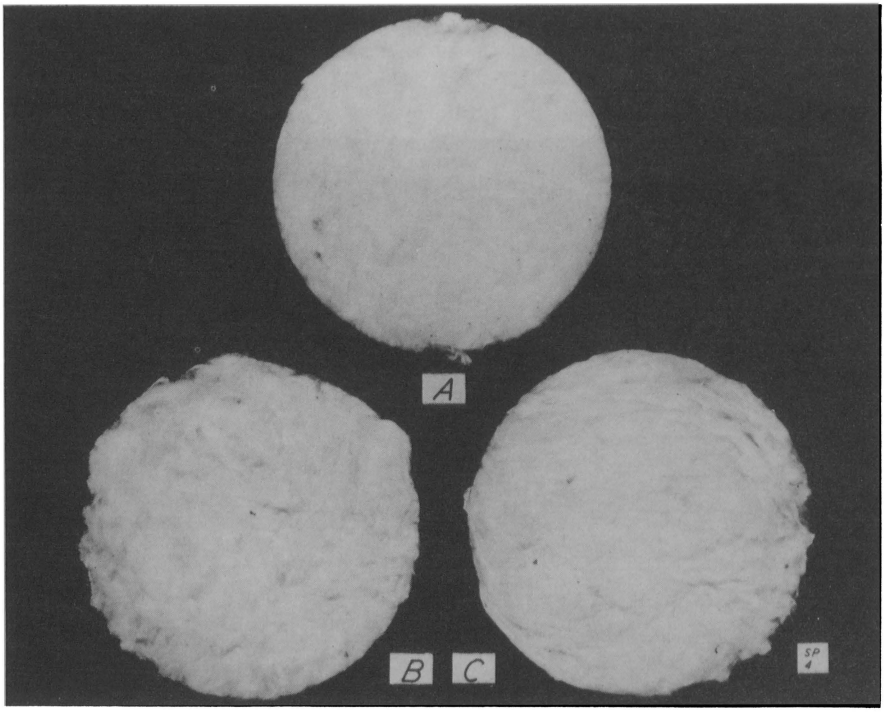

Fig. 6.—Ginned lint samples resulting from ginning portions of a long staple seed cotton harvested as follows: (A) picked just before a rain; (B) picked just after the rain; and (C) picked after drying in the field after the rain.

It is suggested also that several buyers, including independent buyers, be offered your cotton before you sell. Generally, the more buyers you interest the better the sale.

Too, you may find it advantageous to "take the loan" which means taking an advance, mortgaging the bale and storing it for sale later.

Now take a look at the pictures on pages 17, 18 and 19. They will show you how various different practices will help you improve the grade of your cotton. Figures 4 and 5 show the advantage of having your cotton mature early so that it can be picked before the rainy season sets in. Figures 6 and 7 show the advantage of careful picking and handling so as to keep the cotton free of trash, dirt, dust, sand and other foreign matter.

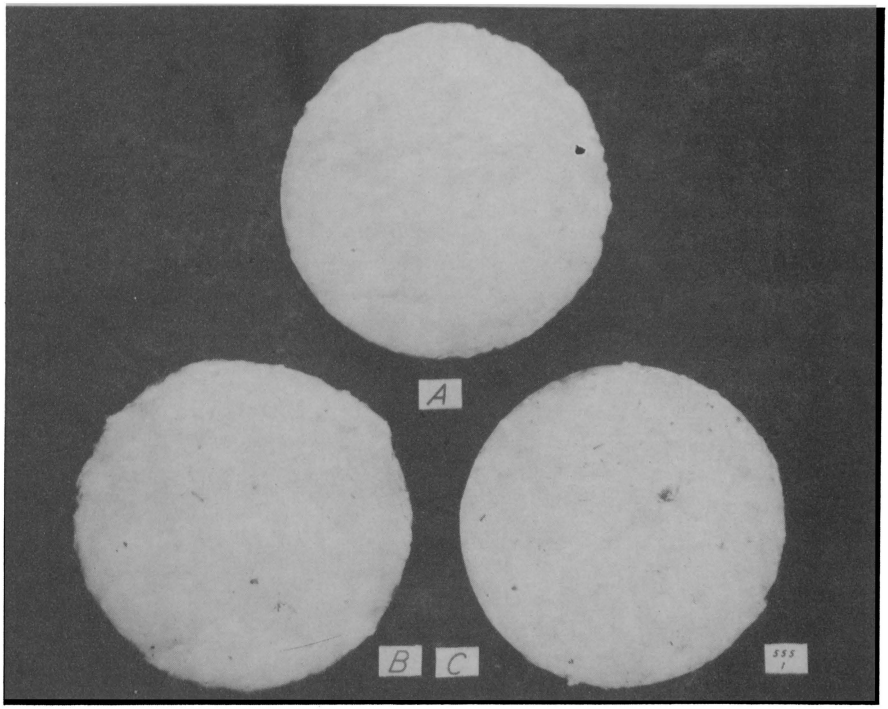

Fig. 7.—Ginned lint samples resulting from ginning portions of a 1-3/32 inches cotton harvested as follows: (A) very clean picking; (B) normal or average picking; and (C) trashy or rough picking.

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