Producing - Harvesting - Marketing

HIGH QUALITY UPLAND COTTON in the EL PASO TRADE TERRITORY

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Foreword

The El Paso trade territory, as shown on the front cover, includes several cotton-producing counties in the Trans-Pecos area of Texas, southern New Mexico and eastern Arizona.

Historically, this section is a one-variety cotton-producing area. Acala-type cotton, with superior fiber length, fiber strength and spinning performance, has been produced for several years. All segments of the industry prefer that it continue to produce high-quality cotton.

It is recognized that Pima (G. barbadense) is extensively grown in this area, one reason being its resistance to Verticillium wilt. The 1963 extra long staple allotment for nine Texas counties is 51,600 acres. In El Paso county, the Pima allotment was 35,312.1 acres. This publication, however, is concerned only with Upland cotton production.

Producers of this area are finding it difficult to profit from cotton production. Costs of most items such as machinery, labor, fertilizer, agricultural chemicals, and interest on borrowed money have risen steadily from year to year while the rate of production has not increased. In some parts of the area growers are harvesting less lint cotton per acre than they harvested a few years ago. Lower prices for cotton and reductions in acreage allotments are other causes for smaller returns.

This area was forced to shift rapidly from a predominantly hand-harvested crop to one machine-harvested because of the scarcity of labor. This adjustment was costly and confusing to many cotton farmers. Sufficient personnel competent to operate the $15,000 to $20,000 machines was not available; as a result, lower grades and higher field loss have been two of the main problems in this adjustment period.

Many people in the industry feel that cotton in the El Paso trade territory needs a boost to improve its competitive position and to bring about a healthier environment for all segments of the industry. With this in mind, the directors of the Agricultural Extension Services and the Agricultural Experiment Stations of Texas A&M University and New Mexico State University, with the assistance of research personnel, specialists, and county agricultural agents of both institutions, compiled this package of recommendations. The recommendations are based on factual information substantiated by research conducted by the institutions involved.

For additional information contact your local county agricultural agent, or write directly to the Agricultural Extension Service, New Mexico State University, University Park, New Mexico, or the Agricultural Extension Service, Texas A&M University, College Station, Texas.

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ACKNOWLEDGMENTS

The information in this publication was prepared by a committee composed of county agricultural agents, agricultural extension service specialists, research scientists and professors in agriculture, representing New Mexico State University and the Texas A&M University. It was compiled by Charles A. Taylor, area farm management specialist, Texas Agricultural Extension Service.

Message to the Cotton Producer

MANY OF YOU ALREADY ARE USING the practices recommended in this publication as they apply to your individual farming operation. We realize that many factors must be considered before you can adopt a new practice or change one. Some of these may be soil types, climate, growing season, water supply, water quality, capital invested, availability of credit and others. Therefore, we recommend a visit to your local county agricultural agent's office to counsel with him regarding the practices you may be considering.

Many good cotton programs are developed locally by the county agricultural agent in cooperation with local program building or planning committees. These programs are designed to help local farmers solve some of their problems and to demonstrate the research findings developed by the agricultural institutions involved. We hope you will participate in these programs as they are developed in your community.

In addition, we urge all producers to weigh carefully the short and long term economic impact of certain practices before making a final decision to adopt them. For example, the size of your operation might well be the determining factor in the purchase of certain machinery or implements needed to make a practice effective.

We hope you will consider these recommendations carefully and by doing so experience greater satisfaction in producing cotton on your farm. With good management and a few breaks in the weather you should be able to increase your net returns and strengthen the position that cotton holds in the economy of the El Paso trade territory.

Producing—Harvesting—Marketing

HIGH-QUALITY UPLAND COTTON IN THE EL PASO TRADE TERRITORY

LAND PREPARATION

COTTON GROWS BEST in fertile, deep soils of good structure and with well-drained subsoils. All land preparation should be aimed at obtaining and maintaining conditions favorable for good root penetration. This means good physical condition of the root zone of the soil. When a soil is in good physical condition, water and air can move throughout the root zone at adequate rates for good crop production. Soils should supply plants throughout the growing season with mechanical support and ample soil moisture, soil oxygen and mineral nutrients.

If the soil is stratified or has a hard-pan, deep plowing (24 inches or more) or chiseling at or before bedding time may be necessary to permit good root penetration. Soils should not restrict plant production by impeding root development. Cotton plants must have large, well-developed root systems to make efficient use of soil moisture and nutrients. Based on observations, deep tillage or subsoiling under the seed drill has been effective in increasing cotton growth and yields on some types of soil. Deep plowing or chiseling may be needed every 3 to 5 years depending on the soil and cultural practices used. In some localities, the use of deep plowing is limited by a saline or a caliche subsoil.

Other methods of maintaining good physical condition of the soil are crop rotations, use of cover crops and fallowing. Growing soil-improving crops should be considered an important part of land preparation.

The type of bedding depends on local problems and individual preferences. Excessive soluble salts applied to the soil in irrigation water limit the growth of plants. With furrow-type irrigation, much of the salt moves laterally into the beds and accumulates there. Where soil and farming practices permit, furrow planting may aid in obtaining a stand under these conditions.

Irrigation waters contain soluble salts. Water analyses should be made to determine the amount and types of salt present. Recommendations on water use and soil management can be based on these analyses. Both water and soil salinity analyses can be made at New Mexico State University and Texas A&M University. Contact your local county agricultural agent for details.

Soil amendments, such as gypsum, sulfuric acid and elemental sulfur, should be applied only if recommended on the basis of soil and water analyses.

Mechanization and frequent use of heavy implements have resulted in deterioration in soil tilth and productivity. All machines traveling on the surface of the soil tend to compact it. Therefore, it is recommended that minimum tillage be practiced in land preparation and during the remainder of the cropping season. Minimum tillage means the least number of operations possible to obtain an adequate seedbed and satisfactory weed control throughout the season.

PLANTING AND SPACING

Many factors influence planting rates and time of planting. Some are climate, soil temperature and labor supply. Space rows 38 to 40 inches. Two-row spindle pickers fit 40-inch rows better and minimize barking. Spacing in the row should be four or five plants per

foot for most conditions. To obtain this spacing on 40-inch rows, plant 18 to 20 pounds of delinted seed per acre. The seed should be high-quality tagged seed.

Recommended dates for planting cotton are April 15 to May 1. Soil temperatures in the area are normally above 61 degrees F. and can be expected to increase during and after this time.

Plant for mechanical harvest. Consider these factors:

1. Plant seed as high in the bed as practical.
2. Plant to get uniform stand of four or five plants per foot of row.
3. Leave the width of the turning row one and a half times the length of the harvesting machine.

FERTILIZATION

For maximum profits, cotton requires adequate fertility. The amount of fertilizer applied should be based on the results of a reliable soil test together with experience, taking into consideration past crop history, yields and fertility practices. Soil samples must be taken properly, analyzed and interpreted by competent personnel for best results. To assist in the interpretation, farmers are urged to furnish complete information about the soil to be tested and the management practices planned. Soil tests are an aid to determining the best fertilizer practices, but producers also should have untreated plots to permit on-the-farm evaluation of the fertilizer applications.

Soil and water analyses are available from New Mexico State University and Texas A&M University. Contact your local county agricultural agent for more details.

Fertilizer practices within the El Paso trade territory vary considerably. Therefore, farmers are urged to consult their local county agricultural agents for rates most applicable to their soils. The major reason for these variations is attributed to variation in soil types and management practices from farm to farm.

Apply half of the nitrogen at planting time, or as soon after emergence as possible. Then apply the remaining half at first square or about 40 days after emergence. In parts of the area, all of the nitrogen could be applied at the time of first square. Only relatively small differences have shown up in cotton response to the various forms of nitrogen. Ammonium-type forms, however, should be used on sandy soils to avoid excessive leaching losses. Phosphorus can be banded as the land is bedded for planting, or sidedressed shortly after emergence when nitrogen is applied. In some localities, a portion of the phophorus can be sidedressed at first square when nitrogen is sidedressed. Forms of phosphorus to be used in the area should be highly water soluble (80 percent or higher).

For most efficient use, apply fertilizer in bands. Application of nitrogen or phosphate in irrigation water is not recommended.

Potassium is deficient only on a relatively few sandy soils in the area.

Some irrigation waters in the Trans-Pecos area east of Van Horn and in Southeastern New Mexico contain appreciable amount of nitrate nitrogen. Water analyses should be made to determine the nitrate nitrogen content. If nitrogen is present in the water, the rate of nitrogen application can be reduced accordingly.

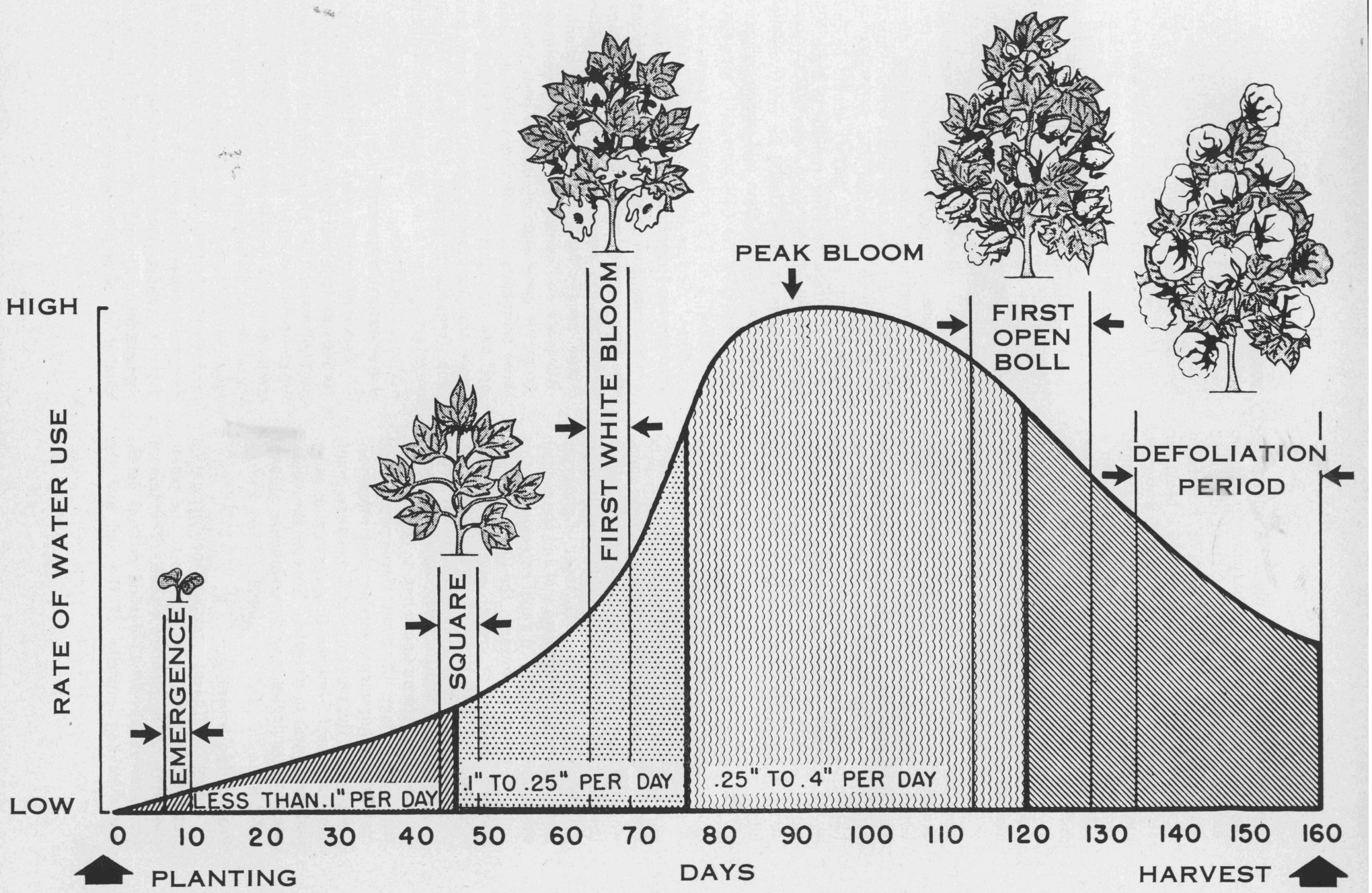
IRRIGATION

When to Irrigate

Cotton should be irrigated during the growing season just before the root zone of the soil no longer contains sufficient available moisture to supply the needs of the plant for proper development. From a practical standpoint, soil moisture can not be depleted to this point on an entire field. Ordinarily, irrigation should begin when about half the available moisture in the root zone has been depleted. This will provide sufficient time to cover the entire acreage before the available soil moisture on the last portion of the field has been depleted.

By inspecting soil moisture conditions at regular intervals and at several depths, information can be obtained on the rate moisture

Rate of Water Use in Relation to Plant Development



is being used by the cotton plant. A soil sampling tube, soil auger or a sharpshooter can be used to obtain soil samples from different depths in the root zone. Regular inspection of soil moisture conditions provides a basis for determining when and how much water to apply. The feel and appearance of a small amount of soil squeezed in the hand to form a ball is a practical guide for estimating soil moisture. While this method does not provide an exact measurement, it can be used effectively to estimate the amount of soil moisture available for plant use.

Cotton plants themselves can forecast their need for irrigation. After flowering begins, the plant should grow steadily but not luxuriantly. The squares at the top of the plant should be prominent. A few flowers should be visible among the top leaves. When flowers are hidden by the leaves, growth is too rapid and water possibly should be reduced. A flower garden effect indicates that growth is restricted and irrigation has been delayed too long.

The color of plant leaves and terminal growth may indicate the need for irrigation. A change in the appearance of the plant foliage occurs before signs of wilting appear. The foliage of plants in dry spots will appear somewhat darker with a slightly bluish tinge. When the plant is in thriving condition, usually there will be 3 to 4 inches of tender, light-green stems between the terminal bud and the reddish coloring of the stalk. A rapid extension of this reddish coloring toward the terminal bud shows a checking of growth and the need for irrigation.

Every guide and indication available should be used for determining when to irrigate cotton. The stage of plant development and moisture requirements during that stage, appearance of the plant and soil moisture conditions are useful guides in determining when and how much to irrigate. None of the guides used independently is as dependable as all used together.

Preplanting Irrigation

Apply sufficient preplanting irrigation water to replenish soil moisture to the potential depth of the plant root zone. The amount of water required will depend on soil depth, water holding capacity of the soil and the amount of soil moisture in storage in the root zone. Where salinity is a problem, sufficient water should be used to leach salts to a safe level. Apply preplant irrigation water early enough so that the soil temperature at planting time will not be affected adversely.

Early-season Irrigation

Delay the first post-planting irrigation until replenishment of the soil moisture in the root zone of the young cotton plant is definitely necessary. "Watering back" soon after planting should be done only when necessary. Under average conditions, irrigation water probably will not be required until 3 to 5 weeks after emergence. Irrigation too early may retard plant growth and increase seedling disease problems. On the other hand, withholding the first summer irrigation too long also may retard plant growth. Effort should be made to keep cotton growing rapidly in June. Soil moisture should be ample but not excessive. Irrigations in June should be relatively light and more frequent than mid-season irrigations since the effective root zone still is relatively shallow.

Mid-season Irrigation

The rate of water use increases rapidly after the first squares appear. The maximum rate of water use occurs during the peak bloom stage, usually 3 to 3½ months after planting. Adequate soil moisture should be maintained from the early square stage to peak bloom to keep the plants in a thriving condition. Avoid soil moisture during bloom and fruiting stages since this may cause shedding of new fruit. Too frequent irrigation can cause excessive vegetative growth at the expense of fruiting.

Late-season Irrigation

Some water is needed by the cotton plant as long as it is maturing bolls. However, the rate of water use declines rapidly when most of the bolls are fully developed and continues to do so as the crop matures. Sufficient moisture should be maintained during August to mature the crop, but excessive vegetative growth should be prevented by increasing the interval between irrigations. Two good irrigations in August should be sufficient. The last irrigation on Upland cotton should be applied during late August under average conditions.

Methods and materials are available under most conditions for the economical control of weeds in cotton without the hoe. Mechanical methods of control usually are cheaper, although new advances are being made in chemical control.

Preplanting Control

While several chemicals show considerable promise, no herbicides are now recommended in the El Paso area for application at or before planting. Fortunately, under most conditions, weeds are not a major problem at this time.

Early-season Control

Mechanical control. Rolling cultivators, such as the Lilliston, can be used effectively early in the season. When properly set, small weeds usually can be controlled in the drill without injury to the cotton.

Herbicidal naptha. Apply 5 to 7 gallons per acre, 1 to 3 applications as needed, at least 1 week apart after cotton is 2 to 3 inches tall, but not after bark cracks appear. Apply as laterally directed spray from two flat fan nozzles set 10 inches apart, one on each side of the row staggered and pointed to direct the naptha across the row beneath the cotyledons of the cotton plant. Make the first application before cultivation. See Texas Publication MP-504, *Lateral Oiling of Grass and Weeds in Cotton,* and Plan 489, *Plans for Chemical Weed Control Equipment.*

Directed spray. Recommended on a trial basis only.

After the cotton is 10 inches high, a directed spray in a 12-inch band across the drill is recommended on a trial basis for control of weeds 2 to 3 inches high. *Do not spray over the top of the cotton.* Direct the spray to give good weed coverage and avoid contact of cotton leaves with spray or drift; otherwise crop injury may result. Use nozzle pressures 20 to 25 pounds per square inch, two 0C-02 T-jet or equivalent nozzles per row mounted one on each side of the row on oiling shoes or wheel-type post emergence spray applicator. Keep nozzles within 2 to 3 inches of the ground. Calibrate the sprayer accurately. Use constant speed and pressure and maintain constant agitation in the spray tank.

The spray mixture to use depends on the kinds of weeds to be controlled. For careless weeds and very succulent grass less than 1 inch tall, use .25 pound of commercial diuron in 25 gallons of water per acre sprayed. For less succulent grass 2 to 3 inches tall, use up to 1 pound of diuron in 25 gallons of water per acre sprayed. Use 1 pint (.5 percent) or recommended surfactant (X-77, DuPont Surfactant WK, Sterex AA) per 25 gallons of spray. A 12-inch band is about one-third of total acreage and will require about 8 gallons of the spray solution per crop acre.

Mid-season Control

Flame cultivator. The flame cultivator can be used effectively after cotton stalks have attained a diameter of 3/16 inch. It will kill all small weeds and will check most perennials. Follow manufacturers' recommendations to avoid crop injury.

Layby. For early season layby on small weeds and grasses, use 1.0 to 1.5 pounds per acre of commercial diuron in 20 gallons of water plus 1 pint of a recommended surfactant. Material costs for the 1-pound rate will be approximately $3.95, and for the 1.5 pound rate, $5.43. Custom application costs are about $2.00 per acre. While this is a precision practice, farmers may make their own application by following closely the manufacturers' recommendations.

If appreciable nutgrass or other perennials exist, it usually is desirable to cultivate frequently and as long as possible, and to delay or forego the use of layby chemicals.

Control of Perennials

Bindweed. Cultivate and hoe or burn every 2 weeks to reduce the vigor of plants. After cotton is mature in the fall, spray the regrowth with 1 pound per acre of 2,4-D amine before frost. Eradicate spot infestations in otherwise clean fields with soil sterilants, such as Benzar 354, Zobar, Benzac 1281, Trysben 200, Tritac, Benzabor or No Vine.

Johnsongrass in fields. Spot treat with dalapon. Use approximately 1 pound of dalapon and 1 pound of detergent in 5 gallons of

water for knapsack-type sprayers; use somewhat less concentrated mixture for power sprayers. Begin early when grass is not more than 6 to 8 inches high and respray at 10 to 14-day intervals until the grass is under control. Wet the foliage thoroughly. See Texas Publication MP-423, *Sodium Dalapon, Grass Killer.*

Spot treat with oils. Begin early in the season or when young grass is not more than 4 to 6 inches high and before the stems begin to harden. Apply oil (about 1 teaspoon) on the stem at the soil surface. Repeat at approximately 10 to 14-day intervals until the grass is killed. Use naptha, general contact weed oils, such as Shell 20, Richfield 20, Standard Burner Oil No. 2 or other cracked distillates high in polycyclic aromatic compounds, or diesel oil fortified with dinitro, penta, pentadiene, C-56 or similar fortifying agents. See Texas Bulletin 902, *Spot-Spraying Johnsongrass.*

Johnsongrass on ditchbanks. Wet the foliage thoroughly with dalapon or the oil sprays already mentioned. For best results, begin early in the season when root reserves have been depleted from the winter. If eradication is desired, re-treat by the time regrowth is 10 to 12 inches high so that root reserves cannot build up between treatments.

Nutgrass. No herbicides are available for practical control of nutgrass in cotton. Frequent cultivation and shade from a good stand of vigorous cotton are perhaps the most effective treatments.

Use flame, oil or dalapon on ditchbanks, roadways and fencerows and other non-crop areas according to conditions present.

DISEASE CONTROL

Cotton disease control is primarily a program of prevention. Certain production and cultural practices and fungicide treatments will reduce disease losses. Burning the top debris does not eliminate the pathogenic organisms since they can survive on roots and in the soil. The following recommendations will help control most diseases in cotton.

Seedling Disease, Seed Rot and Seedling Damage (Rhizoctonia, Fusarium, Verticillium, Thielaviopsis, Pythium)

1. Use high-quality tagged seed that have been delinted and treated with a fungicide.

2. Plant in warm soil—61 to 65 degrees F. minimum.

3. Rotate with crop plants of the grass family, such as corn, sorghum or barley.

4. Fall-plow alfalfa and other green manure crops.

5. Where past history indicates a continuing seedling disease problem, make in-furrow applications of fungicides.

Further studies must be made before specific recommendations are justified.

Verticillium Wilt

1. Plant the most wilt-resistant adapted variety available. Currently this is Acala 1517 BR-2.

2. Plant to obtain a stand of four or five plants per foot of row.

3. Plant on high or double row beds except where highly saline irrigation water is used.

If this situation exists, furrow planting is advisable.

4. Use light irrigations where it is not necessary to leach out salts.

5. Avoid excessive irrigation. A 14 to 16-day irrigation interval and light applications of nitrogen reduce the incidence of wilt in cotton on some soils in the area. Normal irrigation means applying enough water each application to refill the soil profile plus a small amount for leaching.

6. Rotate with dry, clean fallow or grass crops followed by clean fallow the remainder of the year.

7. Avoid pruning roots when cultivating and chiseling in fertilizer.

8. Do not return gin trash to the soil where infection is severe.

9. Do not apply manure to the soil where infection is severe.

Bacterial Blight

1. Plant 1517BR-2—a locally adapted blight-resistant variety.

2. Destroy the old infected cotton plants by chopping the stalks and deep plowing to bury the debris completely.

3. Do not return gin trash to the soil where infection is severe.

4. Use acid-delinted, fungicide-treated planting seed from a blight-free source.

5. Rotate blight-infected fields to a crop other than cotton.

Phymatotrichum Root Rot

1. Turn under large amounts of green manure crops or apply heavy rates of stable manure.

2. Deep plow or flat break 14 to 18 inches deep.

3. Grow small grains, grass, corn or sorghum for 4 or 5 years on badly infected land between cotton crops.

4. Avoid spread of root rot across fields from localized infected areas. Soil carried on plows and other implements will carry infection.

Southwestern Cotton Rust

1. Zineb fungicide prevents rust if applied before the cotton becomes infected. Start spraying the fungicide the last of June and continue at 10-day intervals until mid-August on fields adjacent to infected grama grass. Use 2 pounds of Zineb per acre in 40 gallons of water with a spreader-sticker, such as X77, as directed on the container.

2. In the event of heavy infection, top-dressing liberally with nitrogen may cause the plants to renew vegetative growth and begin squaring again.

3. Determine the likelihood of having a rust epidemic before starting chemical control measures. The local county agricultural agent or experiment station scientist can obtain this information.

INSECT CONTROL

General Information

Guides for the control of cotton insects are available from county agricultural agents in New Mexico and Texas.

In the late season program, dusts and sprays are equally effective when applied properly. Repeat the application as soon as possible if the insecticides are washed off within 24 hours, except when aphicides are used. When infestations are especially severe, increase dosages to the maximum.

Apply dusts when the air is calm or nearly so. Dusts and wettable powders are washed off more easily by light showers than sprays. Place dust nozzles on ground machines 4 to 6 inches above the plants.

Ground machines and airplanes are effective for applying insecticides. Increase the recommended dosages by at least 50 percent when an airplane is used in making early season applications. Apply aerial sprays at 3 to 4 gallons per acre. For best results with airplanes, flag the swaths so that they overlap.

Some insecticides are particularly destructive to honeybees. Efforts should be made to prevent their destruction since bees help pollinate many agricultural crops.

For additional information on insect control, contact your county agricultural agent or write the Extension Entomologist, College Station, Texas, or University Park, New Mexico.

Cotton growers should strive to recognize harmful insects, determine damaging infestations and use the most economical control method.

Cotton insects can be controlled effectively by timely use of the proper insecticides at the recommended rates. Insecticides must cover the plants to kill the insects on them. Effective control of damaging insect infestations should result in substantial yield increases to the cotton producer, although many applications may be required. Cotton growing under

dryland conditions generally has fewer insect problems and injurious infestations usually do not last as long as in irrigated cotton. Consequently, fewer insecticide applications may be needed in dryland cotton.

The cotton insect program for the El Paso trade territory includes two major phases with the following objectives:

1. Early season control may be needed to insure early fruiting and maturity.

2. Late season control insures continued fruiting and protects the fruit.

Cotton fields should be examined closely throughout the growing season to determine when to apply insecticides. For information on insecticides and rates and methods of application, refer to current guides for controlling cotton insects published by New Mexico State University and Texas A&M University.

Early-season Control

Substantial savings can be realized by basing early-season control on infestation counts. The early season control program in most years will be conducted primarily to control lygus bugs, thrips, fleahoppers and aphids. Regular and thorough insect checks by the grower are necessary to obtain good insect control. Every grower should know how to to make insect counts, when to apply insecticides and how to recognize the damage caused by different cotton insects.

Thrips. Early infestations of thrips on young cotton may delay plant maturity a few days to a few weeks. Thrips normally cause the heaviest damage from the time plants emerge until early squaring. Serious damage may continue for longer periods. The first sign of thrips damage on newly emerged cotton is wrinkled, blackened leaves and terminal growth. The number of thrips and time of occurrence vary from season to season.

Lygus bugs and fleahoppers. Examinations of cotton should be made at regular intervals to determine the population of lygus bugs and fleahoppers and to initiate control measures before the fruit is damaged. These plant bugs cause the young squares to shed. The young squares should be protected to insure maximum production.

Late-season Control

The late-season control program, like that for early season, is based on infestation count. The principal insect involved is the bollworm. Other cotton insects which may occur are fleahoppers, lygus bugs, cotton leafworms, cabbage loopers, aphids, spider mites, garden webworms, beet armyworms and stink bugs. Begin control measures when bollworms and cabbage loopers are small.

Bollworms. The bollworm is a common pest of cotton and of other crops. It causes serious damage to cotton in this area.

Bollworm eggs generally are laid on the tender growth of the terminal areas of the plant. They hatch in about 3 days and the small worms begin working their way down the cotton plants, feeding on the squares and bolls.

Beet Armyworm and Tobacco Budworm

The beet armyworm and the tobacco budworm attack cotton in a manner similar to that described for the bollworm. The same mixtures of chlorinated hydrocarbons plus a phosphorus insecticide will control these species.

Pink bollworm. See Texas Agricultural Extension Service publication L-219, *Ways to Fight the Pink Bollworm in Texas.*

Stink bugs. Stink bugs cause damage to squares and bolls. The lint also may be stained.

Cotton aphids. Cotton aphids sometime increase to damaging numbers during the season. Controls should be applied before large populations are reached. Aphids may injure the leaves, stain the lint or produce honeydew which often interferes with mechanical harvesting and causes spotting of lint.

Caution

All insecticides are poisonous. Follow carefully all precautions on the label. Take special precautions in handling parathion, endrin, methyl parathion, Guthion, demeton, Di-syston, and phorate (Thimet) to avoid prolonged contact with the skin or breathing the vapors or drift from spray or dust.

Be mindful of insecticidal drift that may contaminate neighboring vegetables or forage crops.

DEFOLIATION

Defoliation of Acala 1517 cotton should be done only after very careful consideration in the El Paso trade territory for the following reasons: (1) the close proximity of normal plant maturity and occurrence of average annual frost date; (2) possible lowered micronaire from defoliated fields; and (3) possible reduction in yield of lint cotton per acre.

Acala 1517—an inherently fine-fiber variety—is affected by premature defoliation. Preliminary results of the cooperative USDA-NMSU cotton project, known as the Berino cotton fineness test, indicate that even small differences in micronaire readings make significant differences in manufacturing performance and product quality.

Defoliation of Acala 1517 cotton is not a generally adopted harvest practice in the area. In general, 1517 cotton requiring defoliation is in fields of rank cotton with excessive late season growth. Defoliation forces leaf drop and brings about more rapid opening of the crop for machine harvest.

In extremely rank cotton, bottom defoliation may be helpful in reducing boll rot and field loss, since the practice permits harvesting the early portion of the crop and avoids undue weathering of mature cotton in the field. But the practice should be used carefully to avoid reduction of yield and fiber quality. Be especially careful to see that the defoliant does not hit too high on the plant. The spray should be directed only toward the mature bolls on the lower part of the plant. If the spray covers leaves near immature bolls or squares, the youngest bolls and squares may shed excessively, and the treatment may damage fiber and seed of other immature bolls. When bottom defoliation is necessary, maximum benefits and minimum damage may be obtained if at least 50 percent of the bolls are open.

Cotton may be machine-harvested satisfactorily without defoliation, depending on plant and field conditions. The practice of picking in "green-leaf" is followed successfully and economically by many farmers in the area. If machine picking in green-leaf is attempted, have an experienced picker-operator. When picking in green-leaf, the pressure plates of the picker drums should be adjusted carefully and operated as loosely as possible. The machines should be cleaned regularly.

Defoliation Guides

Satisfactory defoliation depends on uniform stands grown under conditions which have been conducive to uniform growth and maturity. Defoliation usually has no adverse effect on mature cotton fibers. However, cotton plants that have been stressed have suffered severe insect damage or have otherwise had their growth impaired will not defoliate efficiently. Late application of nitrogen or water adversely affects defoliation.

When defoliation is necessary, the best time to apply it depends on the development of the plants, maturity of unopened bolls, presence of boll rot, acreage to be treated, mechanical pickers available and weather conditions. Maximum benefits are obtained when the plants are mature, when most of the vegetative growth has ceased and when at least 75 percent of the bolls are open. Plant and leaf moisture content must be normal for effective defoliation.

When defoliating, bolls must be mature enough so that yield will not be reduced or fiber and seed quality lowered. Some rule-of-thumb-tests that may be used to determine cotton boll maturity are: (a) mature bolls feel firm (cannot be dented easily) when pressed between thumb and forefinger; (b) they cannot be sliced easily with a sharp knife; and (c) the fibers in mature bolls tend to "string out" when the boll is cut.

Best leaf drop from defoliation, if necessary, is obtained when the temperatures are moderately high. Cool weather slows up defoliant action, and when the maximum daily temperatures are below 60 degrees F., defoliation is difficult.

All chemical defoliants should be applied as sprays. The inclusion of activators or spreaders may give some increase in leaf drop under conditions unfavorable to defoliation such as moisture stress or cold weather.

Desiccants

Disiccants are not recommended for the El Paso trade territory.

Advantages of Defoliation

1. Harvesting can begin earlier.

2. There are more hours of good picking conditions per day. Fields dry out earlier in the morning, permitting the harvest of more bales per day.

3. Trash and moisture content of machine-picked cotton are lessened, minimizing chances of fiber damage in storage or during ginning.

4. Moisture content is lower than in undefoliated cotton, prior to the start of picking.

5. It permits more efficient use of the mechanical picker.

Disadvantages of Defoliation

1. Results are erratic and proper timing of the application is difficult.

2. Defoliating too early to take advantage of higher temperatures, and thus earlier picking, may result in reduced yields.

3. Delayed defoliation of large, high yielding plants until late bolls are mature may mean lower temperatures at the time of application, thus preventing good leaf drop.

4. Premature defoliation results in lowered micronaire readings, affecting adversely the marketing and end-use value of the fiber.

Defoliation Chemicals

1. **Organic-phosphates** usually perform satisfactorily under ideal conditions at the recommended rates. These defoliants are more effective when temperatures are high; they are less effective as temperatures drop.

2. **Chlorate** defoliants usually are preferred where the foliage is tough and more leaf surface activity is required. These defoliants should be applied at the higher rates recommended. Chlorates generally are more effective than the organic-phosphates at lower temperatures.

HARVESTING

Moisture Guidelines

Machine picking should begin when the seed cotton moisture is 8 percent or less. Cotton harvested at this moisture level from defoliated fields contains a comparatively smaller percentage of trash. Cotton machine-harvested at 8 percent lint moisture content can be held in storage prior to ginning without grade or quality deterioration and will clean well at the gin.

Use only enough plain water on the picker spindles to pick the spindles clean. Usually 2 gallons of water per bale are the recommended amount of plain water to maintain clean spindles.

The use of textile oils as spindle moistening agents when picking by machine is not recommended.

Tips on Machine Operations

1. The success of a mechanical harvesting operation begins with the layout of the field, setting of the listing equipment, laying off the rows and establishing turn rows. For best results, the row width should be exactly 40 inches. This allows the harvest machine to fit the rows perfectly and barking will be minimized. The efficiency with which the machine cleans the field will be improved. To maneuver the machine properly, the width of the turning row should be a minimum of 1½ machine lengths. The turning row should be smooth, level and firm, to allow the operator to maneuver the machine easily, line it up on the row and enter the field at full operating speed. In this way the efficiency of the harvesting operation can be improved and losses of lint near the ends of the rows will be minimized. The row profile should be uniform, low and broad. The middle should be slightly lower than the drill to allow dry trash to accumulate away from the stalks. The drill should be raised slightly, but not hilled up excessively. Too much build-up of the drill area results in lowering the bottom fruit on the stalk. This lowers the efficiency of a harvesting machine. Plant lifters cannot do a satisfactory job of picking up the bottom fruit when the drill is built up excessively. Cotton should be planted to a uniform drilled stand of 3 to 4 plants per foot of row. This spacing tends to hold down the size of the stalks, causes the fruit to set slightly higher from the ground and reduces the length of the limbs on the stalk. All of these factors are desirable for machine operating efficiency.

2. Prior to the harvest season, check machines according to the recommendations of the manufacturers. Older machines may need modernization, replacement of badly worn parts and adjustment to factory specifications by trained personnel. This should be done during the slack season.

Picker drum servicing and storage during off-harvest season permit starting without delay in the fall and save costly down time during the rush of the harvest.

3. Clean the picker drums, including the spindles, daily. Failure to do so may result in greasy, dirty or stained lint. Remove all lint and trash accumulation from the picker drums each time the basket is emptied.

4. Maintain adjustments according to recommendations in the operator's manual. Adjust the moistening pads, doffers and spindles occasionally to allow for normal wear.

5. Center the picker on the row to prevent "barking" the plants and putting more trash into picked cotton.

6. Train operators and supervise the operations. There is no substitute for a well-trained operator. Keep the operator's manual handy for frequent reference. Producers who have custom harvesters should supervise harvesting operations closely for best grade and quality results.

7. Keep the basket clean. The basket on the picker and the roof grate in particular should not be allowed to "lint" over. Do not overfill the picker basket. Maximum leaf trash can escape through the roof grates more easily if the basket is filled not more than two-thirds.

8. Remove the lint. Sweep lint fly, dirt and trash accumulations off the basket before it is emptied into the trailer.

9. If high moisture conditions exist, set two trailers in the field and alternate the emptying of the baskets to allow maximum drying by the sun.

10. Adjust the height of trailers to machine specifications. Some adjustment can be made by placing wheels on one side in a shallow furrow if necessary.

11. Avoid tramping to allow air circulation. Trailer sideboards should be of slatted wood, expanded metal or woven wire-type construction to allow air circulation.

12. Wash the picker drums thoroughly with a pressure sprayer at the end of each work day. Then service and lubricate. Do not over lubricate.

Seed Cotton Storage

Moisture, temperature and humidity are the three main factors affecting the quality of seed cotton in storage. The basic points to remember are:

1. Quality deterioration can begin the first day of storage if the moisture content of the seed cotton mass, including trash, is 12 percent or more.

2. Seed cotton containing large quantities of moisture, whether in the seed, lint or green trash, will deteriorate in storage.

3. Artificial drying of seed cotton to remove excessive lint moisture for storage can trigger cotton to react, causing further heating and subsequent quality damage. This is especially important if the seed moisture is 12 percent or more.

4. When the seed cotton mass begins "heating," deterioration of quality will be rapid. As the seed cotton mass approaches this point, it can be detected by simply feeling the cotton in the trailer or bin some 18 to 24 inches below the surface.

GINNING

Major objectives at the time of ginning are to obtain maximum dollar returns from each bale and to maintain inherent fiber properties for the manufacturer and ultimate consumer. Success in achieving these aims is determined primarily by: (1) the type of harvesting job done, or the condition of seed cotton arriving on the gin yard; (2) the equipment in the gin; and (3) selective and judicious use of equipment as determined by conditions of cotton and status of current market premiums and discounts.

The ginner is in the best position to exercise judgment under a given set of conditions. In so doing, he can make use of machinery

recommendations established through extensive programs of the U. S. Department of Agriculture ginning research laboratories and Extension Services.

Numerous tests have proved that proper moisture is important. Fiber damage in ginning is related closely to the moisture content of the cotton being processed and the amount of drying and cleaning used. Cotton should be ginned with a moisture content of 5 to 7 percent and with no more machinery than is required to produce maximum total bale value.

MARKETING

To maintain its present enviable marketing position and reputation that cotton produced in the El Paso trade territory now has with domestic and foreign cotton mills, it is recommended that cotton growers and others:

1. Execute a vigorous and intensive area-wide promotion program for the production and marketing of high-quality cotton.

2. Promote one-variety cotton communities and stress adoption of and adherence to practices necessary to maintain cotton quality.

3. Adopt practices that will reflect in price, based on the true use-value of area-produced premium quality cotton.

4. Stress production - harvesting - ginning practices that will permit marketing on the basis of bale-value which leads to economic processing in the mills.

5. Take the steps necessary to maintain the present market for domestic and foreign use of area-grown quality cotton.

6. Strive for expanded markets by maintaining inherent fiber quality of the variety; increasing or maintaining a volume of one-variety quality cotton grown in the El Paso trade territory; and making available to the trade a highly spinnable fiber with a minimum of processing waste.

ECONOMIC PRODUCTION

To estimate accurately the per-acre cost of producing cotton in the El Paso trade territory is difficult because many factors affecting cost vary from section to section and from farm to farm.

The size of the unit plays an important part in the overall cost of production.

Water delivered to the crop will vary in price from $15 to $40 per acre for the growing season, depending on the location; whether the water is pumped from wells or delivered through canals from reservoirs; and the availability of certain kinds of fuel used by engines in pumping water.

Labor costs vary from area to area, depending on availability of dependable labor.

Costs usually are divided into two groups—fixed costs and variable costs. Normally, fixed costs are considered as being those which occur when we decide to farm. They include, among others, interest on the investment in land, interest and depreciation on the equipment used in farming, taxes and insurance. Variable costs are those associated with the production, harvesting and marketing of the crop. They include seed, labor, fertilizer, agricultural chemicals, fuel, oil, repairs, crop insurance, interest on operating capital and other expenses.

Following is a hypothetical average budget for a farm with a 100-acre cotton allotment. This budget will not fit many farms in the area, but it is average and the cost figures used are considered reasonable estimates for the area.

Production costs

		Estimated annual cost per acre
1. Fixed costs		
a. Land (1 to 5 acres of land for each acre devoted to Upland cotton depending on the location)		
Value $800 @ 5% interest on investment	$ 40.00	$_____
b. Interest on equipment $200 @ 7% ÷ ½	7.00	_____
c. Depreciation $200 ÷ 10	20.00	_____
d. Taxes and insurance	3.00	_____
Total fixed cost (per acre)	70.00	$_____
2. Variable costs		
a. Hired labor	$ 25.00	$_____
b. Seed	3.00	_____
c. Fertilizer	18.00	_____
d. Insecticide	20.00	_____
e. Fuel, oil, repair	30.00	_____
f. Hail insurance	10.00	_____
g. Interest on operating capital	9.00	_____
h. Miscellaneous or other expenses	15.00	_____
Total variable cost (per acre)	$130.00	_____
Total fixed plus variable cost (per acre)	$200.00	$_____

Harvesting costs (machine picking)

		Estimated annual cost per acre
1. Fixed costs		
a. Depreciation ($18,000 two-row spindle picker)	$ 25.00	$_____
b. Interest on investment	7.35	_____
c. Taxes and insurance	1.80	_____
Total fixed cost (per acre)	$ 34.15	$_____
2. Variable costs (twice over)		
a. Fuel and oil	$ 2.60	$_____
b. Labor	2.50	_____
c. Oil flushes	1.50	_____
d. Repairs	5.00	_____
e. Defoliation	5.00	_____
Total variable cost (per acre)	$ 16.60	$_____

Example: 100 acres (twice over) producing 2 bales per acre
$34.15 + $16.60 = $50.75 ÷ 2 bales = $25.38 per bale cost

Table 1. Estimated per bale harvest cost based on different per-acre yield and different number of acres harvested.

Lint yield per acre (Pounds)	Estimated total harvest cost per bale 100 acres	150 acres	200 acres
500	$50.75	$39.37	$33.67
600	42.29	32.80	28.06
700	36.25	28.12	24.05
800	31.72	24.60	21.04
900	28.19	21.87	18.71
1000	25.37	19.68	16.84
1100	23.07	17.89	15.30
1200	21.15	16.40	14.03

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Your County

EXTENSION AGENTS

can furnish you the latest information on farming, ranching and homemaking. They represent both The A&M College of Texas and the United States Department of Agriculture in your county.

Most county extension agents have their offices in the county courthouse or agriculture building. They welcome your visits, calls or letters for assistance.

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