

By

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Tulare County is one of the seven southern counties of the San Joaquin Valley in which a one variety cotton district is set forth in the state agricultural code.

The present strain of cotton in production is Acala 4-42. This strain has an average staple length of 1 1/16 inch. Other advantages of this strain over the former Acala P-18 strain are: 10 to 14 days earlier in maturity, yields equally as well, less waste in spinning, better yarn appearance, and 20 to 25% stronger fiber.

A deep, fertile, well drained soil is best suited for cotton. Soils which grow a good crop of deep rooted field crops, such as alfalfa and sugar beets, are best adapted to cotton.

SEEDBED PREPARATION AND PRE-IRRIGATION

A firm, moist seedbed is desirable at the time of planting. Land should be well worked and free of trash on the surface.

Soils should be wet prior to planting to a depth of about 6 feet or to the full depth of rooting on shallow soils. Under normal rainfall conditions, a pre-irrigation is necessary. Adequate moisture permits seedling plants to establish a root system to the full depth during early growth, and makes a reserve available during the period of peak moisture requirements in the summer.

PLANTING

Either flat or ridge planting is satisfactory, however yields from flat planting are usually somewhat greater. Row spacing is generally 38 or 40 inches apart with the latter recommended for machine picking.

Use of soil temperature is recommended as a guide to start planting. The minimum planting temperature should be when the soil reaches 58°F at an 8 inch depth at 8:00 a.m. for at least 3 consecutive days with an outlook for favorable weather.

In Tulare County, cotton is generally planted from late March into early May.

Seed should be treated with a disinfectant, such as Ceresan M, to help prevent seed rot. When damage from wireworms is expected, Lindane should be added to the disinfectant. Seed should be planted 3/4 to 1 1/2 inches deep into moist soil to assure germination under various weather conditions.

Sufficient seed should be planted to insure an adequate plant population. Either mechanically or acid delinted seed is satisfactory. Acid delinted seed gives faster emergence and the germination percentage is higher, but under adverse soil moisture conditions machine delinted seed is preferred.

Seed weight will vary from season to season but generally there are 3800 machine delinted seed per pound and 4000 acid delinted seed per pound. Ten to 20 pounds of acid delinted seed or 18 to 30 pounds of mechanically delinted seed is sufficient, for an adequate plant population.

The practice of planting to a stand with no thinning is used by some growers.

PLANT POPULATION

In producing high cotton yields for best machine picking efficiency, a high plant population per acre should be maintained. Generally highest yields have been obtained with a plant population per acre of from 20,000 to 70,000. The best spacing for individual growers depends on the size of plant generally produced and the soil fertility. The distance between plants should be in direct proportion to soil fertility. Where plant height is not expected to exceed 5 feet, an average of 4 inches or less between plants is near optimum for yield and machine picking efficiency. Where plant height is expected to exceed 5 feet, 5 or 6 inches or more between plants helps reduce lodging. In a few cases on very fertile clay soils, the best plant spacing may be as much as 9 to 10 inches.

Where less than about 18 to 20 pounds of seed per acre is planted it may not be necessary to thin.

Uniform plant distribution is important in machine picking, although thinning to individually, equally spaced plants is not necessary.

A low plant population results in low branching plants. Excessive population, where growth is very rank, results in severe lodging. Neither of these conditions is desirable.

High plant population decreases late weed growth by shading, and also increases yield when Verticillium wilt is a problem.

FERTILIZATION

Cotton following alfalfa, pasture or cover crops, with a good cover turned under, usually requires no fertilization. Growers should know the level of fertility of their land and the effects their cropping program is having on the fertility level.

The cotton plant permanently removes about 38 pounds of nitrogen, 18 pounds of phosphate and 14 pounds of potash per bale of yield, in addition to other nutrients. Fertilizer tests conducted on cotton in California have shown that of all the nutrients needed by the cotton plant, nitrogen is the one most likely to be deficient. Where yields do not average $1\frac{1}{2}$ bales per acre, with fertility limiting the yield, an application of fertilizer would be profitable.

In general, fertilizer applications should be applied early in the growing season, either at planting or prior to the first irrigation. Only on very light, sandy soils, where leaching is a problem, is there a need of a split application. Where nitrogen is expected to give an increase in yield, from 60 to 100 pounds of actual nitrogen per acre is the amount generally applied, depending on soil fertility. Where phosphorus is needed, it is advisable to apply 40 to 80 pounds of phosphoric acid (P_2O_5).

Side dressing results in more complete utilization of nutrients by the plant, however, broadcasting of fertilizer may lower application costs.

The distance from the drill row to side dress fertilizer will vary with different soil conditions and plant size. At planting 3 to 4 inches to the side

and 2 to 3 inches below the level of the seed is recommended. Applications made prior to the first irrigation should be placed far enough to the side of the row to prevent injury to the plant. Usually 5 to 7 inches to the side and 2 to 3 inches below the seed level is recommended.

CULTIVATION AND WEED CONTROL

Cultivation is mainly for the purpose of controlling weeds except on ground that cracks badly.

Uniform wetting and timely use of cultivating equipment is very important. Control of weeds is easier and cheaper if cultivating is done when weeds are in the seedling stage.

Cotton can be cultivated up to four feet or more in height with shielded, high clearance equipment. This equipment may allow 2 or 3 more cultivations after normal lay by time to control late weeds.

Heavy dirting to the cotton plant for weed control gives equal or higher yields as compared to where little dirt is thrown. The use of flame cultivation to control summer annual grasses has been more satisfactory than mechanical cultivation alone. The combination of flame, mechanical cultivation and hand hoeing has given the most satisfactory control of weeds.

Chemical control of weeds with pre-emergence material has shown little promise of justifying the cost. Early weed control can usually best be accomplished by timely mechanical cultivation. Post emergence materials have been inconsistent in weed control.

Many growers in the county are using geese as weeders. Control of Johnson grass, nut grass, Bermuda grass, and puncture vine has been found satisfactory by many growers following good geese management practices.

IRRIGATION

With an adequate pre-irrigation, a lighter application of water may be sufficient at the first irrigation. Plants which make rapid and extensive growth prior to heavy flowering out yield plants allowed to suffer for lack of water during early stages of growth. When plants suffer from lack of water, restoring normal growth by replenishing the water supply causes excessive shedding. A grower can expect an average shed for the season of 70 per cent even if he follows the best cultural practices.

Early irrigation encourages early fruiting with a higher percentage of the total crop being harvested at the first picking. Normally the first crop irrigation may be delayed until about the middle of July on the heavier soils. On lighter soils growers may need to apply the first irrigation during the latter part of May or the first of June.

It is important that a continuous available supply of soil moisture be maintained. The moisture level should not drop to a level where permanent wilting occurs.

After flowering begins, the plant should grow steadily but not luxuriantly. A few flowers should be readily observed among the top leaves. Ordinarily there should be 3 to 4 inches of tender green stem

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between the terminal bud and the reddish coloring of the stalk. Maintaining a high level of soil moisture, especially where there is relatively high soil fertility, encourages excessive vegetative growth at the expense of boll set.

Continued late irrigations cause excessive growth which delays maturity, interferes with harvest, and increases insect damage.

Water used by plants is around 29 acre inches per acre in the San Joaquin Valley.

Method of irrigation depends on local conditions. Irrigation by use of furrows, flat flooding or sprinkler is satisfactory if adequate soil moisture is maintained.

DISEASES

Damping off and sore shin may cause a serious loss of stand with unfavorable growing weather. Rain during and just after emergence is favorable for this fungus. There is no control other than warm dry weather.

Verticillium wilt will cause a mottling of the the leaves with pale yellow irregular areas appearing between the principal veins. Plants are seldom killed but yields are greatly reduced. A longitudinal cut into the wood at the base of the stalk may reveal a slight browning of the vascular system.

The organism is most active at soil temperatures around 78°F but becomes inactive at temperatures below 41°F and above 86°F. Where excessively high amounts of nitrogen or water are applied or where there is a high organic matter content the degree

of incidence is greater. Leaving a high plant population per acre aids in maintaining high yields on wilt infested soils as a larger number of plants escape infestation. Growers saving last years seed will not have seed with the latest wilt improvement.

Boll rots are caused by a number of different organisms. These organisms infect the boll where injuries are caused by insects or other means.

Root knot is caused by nematodes or microscopic eel worms which live in the soil. The root knot nematode is generally found in sandy soil.

This organism feeding on the roots causes galls or knots. Above ground symptoms are stunting and slow growth, resulting in reduced yields.

Control can generally be obtained with soil fumigation using either DD or EDB. Crop rotation with such crops as corn or grain will also reduce the nematode population.

INSECTS

Timely control of cotton insects is important to get cotton well distributed over the plant. Uneven distribution of bolls causes lodging. The feeding of some cotton insects can cause the shedding of fruit, and the plant tends to grow rank which increases lodging. When growth is particularly rank because of poor or untimely insect control, fewer bolls mature - reducing yield. Lodged cotton also hampers picking.

Uneven distribution of the bolls may cause the plants to mature unevenly which causes uneven defoliation.

A heavy infestation of lygus bug or cotton bollworm may cause staining of fiber which reduces grade. Neps may also be more numerous because of immature fiber caused by insects feeding.

TOPPING

The cutting off of the terminal growth of the cotton plant may increase harvest yield but not total yield. Some growers top cotton to prevent lodging. Topping generally is done the latter part of July or early August if cotton is about 48 inches in height. This allows enough growing season for stalks to strengthen.

DEFOLIATION

Defoliation is recommended only where there is a distinct need. Fully mature stressed plants may be machine picked satisfactorily without defoliation. Fields which have irregular growth and maturity, defoliate irregularly. If defoliation is too early, seed quality, seed germination, and yield of seed cotton can be reduced. Costs may be greater than the benefits where little attention is given to the plant condition, choice of material, and application.

Some reasons for defoliation are that it increases machine picking efficiency when plants are large and foliage dense. Late aphid infestations are prevented, and boll rots and leaf stains are reduced. Defoliation provides conditions for grade improvement.

ESTIMATING YIELD

An average of 7 mature bolls per liner foot of row is equivalent to one bale per acre on 38 inch row spacing. On 40 inch centers $7\frac{1}{3}$ bolls per liner foot is used. An average should be made of counts taken at several places in the field.

HARVEST

Where harvest is to be by machine, the row profile should be uniform in height, width and shape. The profile should crest at the base of the stalk, and be free of clods. The bottom of the furrows should be wide.

Care should be exercised in harvesting to maintain high grades. Trashy picking, picking when wet, and using excessive moisture in machines, tends to reduce grades. Ginners can only maintain grades, not improve them.

Other publications on cotton production available
at the Farm Advisors Office:

Control of Cotton Insects
(current years recommendations)

Guides in Cotton Irrigation Flame Cultivation

Fertilization of Cotton Kill that Grass

Chemical Defoliation of
Cotton Cotton Diseases

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