WEED CONTROL IN COTTON

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THE CONTROL OF WEEDS IN COTTON

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The use of improved mechanical equipment or the use of the right chemicals can reduce the weed problem in the production of cotton. Just which of these procedures is used will depend upon the individual conditions.

Use of Rotary Hoe for Control of Weeds in Cotton

The North Carolina Agricultural Experiment Station and the farmers of North Carolina have demonstrated over the past several years that the rotary hoe is an effective and economical tool. It has been widely used in the Coastal Plain with good results. Use in the Piedmont has been more limited.

In planning to use the rotary hoe for weed control of cotton, the first step is to plant to a proper stand so the hand thinning operation may be avoided. This usually means planting 6 to 9 seeds per foot of row to obtain a final stand in the range of 1.5 to 4.5 plants per foot of row. More seeds are planted than are expected in the final stand because only a part of the seeds will germinate and, over the season, from 15% to 25% of the initial stand will be removed by the rotary hoe.

The rotary weeder should be operated at depths of 1 to 2 inches and it is necessary to use speeds in excess of 4 miles per hour. To be effective, the rotary hoe should be used when the weeds and grasses are so small they cannot be seen except by very close inspection. The first rotary weeder cultivation should be given 3 or 4 days after the cotton plants have emerged or earlier if a hard crust has formed. The operation should be repeated weekly for 3 or 4 weeks. After this time it will usually not be possible to use the rotary hoe.

Both the four wheel rotary hoe attachment (with adjustable spring tension) for cultivators and the broadcast types are satisfactory. When using the rotary hoe attachment, the sweeps should be mounted to the side and far enough ahead to throw soil to the center of he roary weeder wheel. This allows the fine soil to sift around the base of the small plants, and at the same time deflects the larger clods.

Use of Chemicals for Control of Weeds in Cotton

Research on pre-emergence chemical weed control in cotton continues to give encouraging results. In addition to a regular research program, a series of "test-demonstrations" in 1954 and 1955 aided in checking results under widely different soil and climatic conditions. Results to date indicate that chemicals can be very effective under many conditions. The farmer who has a labor shortage for hoeing and cultivating cotton should give serious consideration to using one of the chemicals now available. If using a herbicide for the first time, only a small portion of an individual's cotton acreage should be treated unless some expert aid is available. At the same time, the precautions necessary when using these chemicals should be understood. It should be remembered that improper use of herbicides may cause much damage to the cotton.

Two chemicals are suggested for use as pre-emergence weed control measures in cotton. They are: Chloro IPC [Isopropyl-N-(3-chlorophenyl) carbamate] and "Karmex" DL [3-(3,4 dichlorophenyl)-1, 1-dimethylurea]. Both of these compounds are available from many farm chemical dealers. Where these herbicides have been used in the early spring at rates suggested, no stunting has been noted on crops the following year. In a few cases, some stunting has been noted on small grain seeded 5 to 6 months after treatment. This has been noticed particularly where land preparation has been poor. DN (Salts of Dinitro-O-secondary Butyl Phenol) has not been generally successful for weed control in cotton.

Many common weeds are controlled by these chemicals but certain weeds are tolerant to them. A partial list of these weeds is presented in Table I. Additional information concerning these herbicides is given in Table II. These points deserve careful study.

Pre-emergence applications have proven more effective and practical than other types of treatments. This is the application of a chemical to the soil surface after planting and before the crop emerges. The success of these pre-emergence treatments generally is closely associated with weather conditions that are neded for good growth of the crop. However, if the soil surface is stirred with a drag or rotary hoe after the spray treatment is applied, the effectiveness will be reduced. The same is true if soil is thrown around the small plants with a cultivator.

In order not to disturb the treated land it is necessary to plant to a stand so that a thinning operation is not required. When planting to a stand an attempt should be made to establish a number of plants per acre which

TABLE I THE SUSCEPTIBILITY OF CERTAIN WEEDS* TO PRE-EMERGENCE APPLICATIONS OF CHLORO IPC AND "KARMEX" DL

	Chloro IPC	"Karmex" DL
Weeds Controlled	Crab grass Goose grass Pig weed Poor-Joe (Diodia) Lambsquarters Other Annual grasses	Ragweed Crab grass Goose grass Pig weed Poor-Joe (Diodia) Lambsquarters Other Annual grasses
Weeds Apparently Controlled	Smartweed Marestail Sida Rabbit tobacco Jimson weed Foxtail Prostrate knotweed	Smartweed Marestail Sida Rabbit tobacco Jimson weed Foxtail Prostrate knotweed
Weeds Apparently Not Controlled	Wild Potato vine Sedges Wild Onion Sandspur Morning Glory	Wild Potato vine Sedges Wild Onion Sandspur Morning Glory
Weeds Not Controlled	Ragweed Cocklebur Bermuda grass Johnson grass Nutsedge (Nutgrass) Trumpet vine Horsenettle Smilax spp.	Cocklebur Bermuda grass Johnson Grass Nutsedge (Nutgrass) Trumpet vine Horsenettle Smilax spp.

* Scientific Name Available Upon Request. Results expected where weed seed germinate near soil surface.

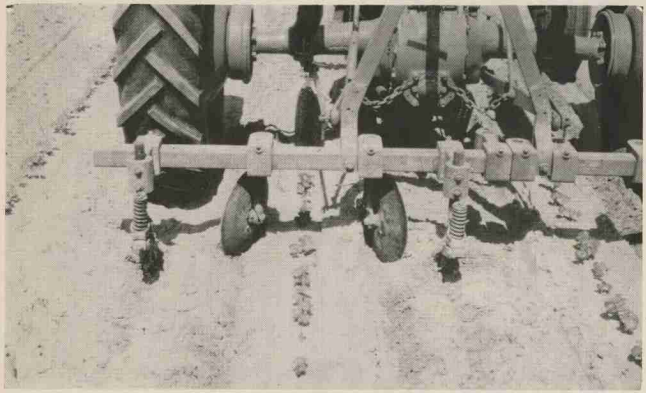
TABLE II IMPORTANT FACTS TO CONSIDER WHEN DETERMINING WHICH CHEMICAL TO USE

QUESTIONS	CHEMICALS	
	Chloro IPC	"Karmex" DL
Farmer experience in North Carolina	Some but not widespread	Limited
Control of grassy weeds	Very good	Very good
Control of broadleaved weeds	Good	Very good
Length of control	3 to 5 weeks	4 to 7 weeks
Effect of high temperature on chemical	Chemical lost as a vapor	None
Effect of chemical vapor on cotton	None	None
Effect of chemical on cotton following heavy rain	Leaches slightly; causing some injury	Leaches little; no injury expected
Pounds per acre suggested (lower rates should be used on lighter sandier soils.) (a) Broadcast (b) 12" band on 36" rows	 6 to 9 2 to 3	 .75 .25
Effect of overdosage	Stunted cotton and little loss of stand.	Severe loss of stand
Approximate cost of chemical per acre (a) Broadcast treatment (b) 12" band on 36" rows	 $11 to $17 $3.50 to $5.50	 $5.00 $1.75

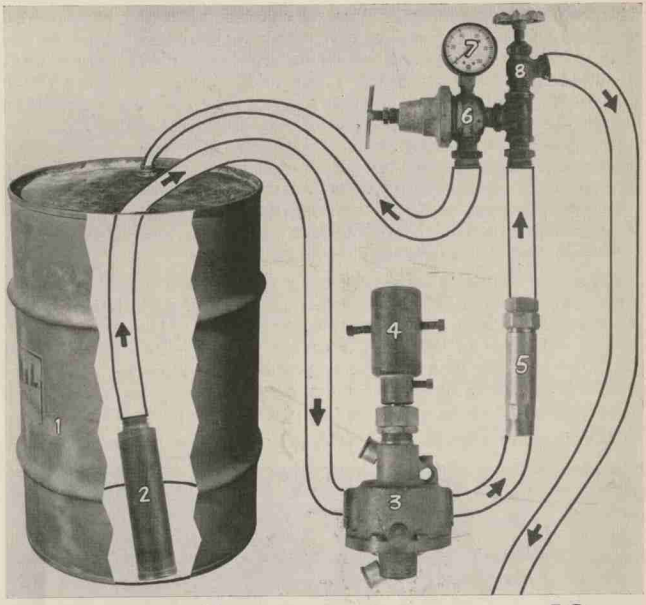
will come within certain limits. Research on cotton production has indicated that good yields can be obtained over a wide range in plant stand. On the average it seems that equally good results are obtained with *uniform* plant stands of from 20,000 to 60,000 cotton plants per acre. Using 40 inch (3⅓ foot) rows this would indicate that we should attempt to establish between 1.5 and 4.5 plants per foot of row. Avoid chopping, if possible. When chopping is necessary, use a sharp hoe as a swinging blade so that treated soil will not be disturbed. Depth of planting is not definitely known to affect the response of cotton to the herbicides considered here. However, until more experience is gained it is suggested that seed be planted at least one-half inch deep. High quality, treated, delinted seed should be used for producing good stands of healthy seedlings.

The use of a 12 to 14 inch chemically treated band over the row can lower the per acre cost of materials used as compared with treating a field broadcast. When such a band treatment is used the untreated portion between bands must be cultivated to control weeds. Cultivating equipment should be provided with a device to prevent throwing fresh soil on the treated bands. Discs set shallow and at a slight angle so as to throw soil to the middle have been useful for this purpose (see photo below).

Many farmers who are using herbicides for the first time may not have



The above photo shows a chemically treated band over a row of cotton. The cost of materials used is lower when compared with a field treated by broadcasting. When using the band treatment method, the untreated portion between bands must be cultivated to control weeds.



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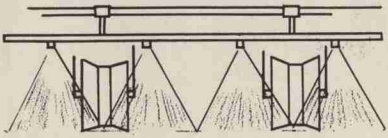

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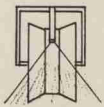


Parts of sprayer necessary for the application of pre-emergence herbicides to cotton

1. Barrel to carry spray solution
2. Suction strainer to remove trash from solution
3. Pump
4. Sleeve to attach pump shaft to tractor power-take-off shaft
5. Line strainer (optional) to assure clean solution to nozzles
6. Pressure regulator
7. Pressure gauge
8. On-off valve
9. Diagram of nozzles spraying broadcast treatment behind planters
10. Diagram of single nozzle spraying band treatment behind planter

proper equipment. Information in the following paragraphs illustrates that there are several ways of solving this problem.

Parts can be made into a sprayer which will apply the chemicals on a band or on a broadcast basis at the same time as planting cotton. Factory built sprayers are available.

Some boom type weed-sprayers are already in use. These sprayers equipped with proper nozzles, may be used for applying pre-emergence herbicides to cotton provided they are cleaned thoroughly beforehand. (Use ammonia solutions to remove 2,4-D.)

Suggestions have been made to use a cylindrical roller following the planter press wheel and in front of the sprayer nozzles. Recent work indicates that under dry soil conditions the germination of cotton seed may be more rapid and a weed problem may develop quicker. Since any advantage gained would be slight, the use of this roller is not suggested.

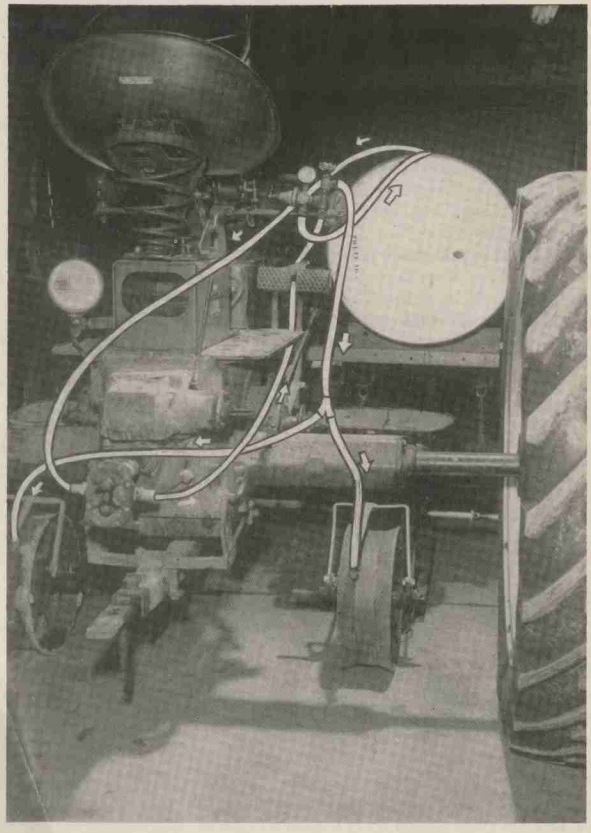
Although the information above is for tractor mounted sprayers, it is possible to use a knapsack sprayer for small acreages. Plans for these are available.

The proper application of chemicals involves spreading a uniform spray mixture evenly over the soil area to be treated. It is necessary to use a constant tractor speed and a constant sprayer pressure. Select special weed spraying nozzles which will deliver approximately 30 gallons per acre when using a pressure of about 30 pounds per square inch and a speed of 3 miles per hour. These nozzles are made by several companies.

Very careful sprayer calibration should determine the amount of solution sprayed when the equipped tractor moves over a known part of an acre at a constant speed in the field to be treated. A speedometer is helpful in maintaining a constant speed.

The herbicide concentrate should be thoroughly mixed with water. If the calibration showed that 30 gallons of solution per acre would be applied, this means that enough herbicide to treat one acre should be mixed with water to make 30 gallons of mixture. If 8 lbs. of Chloro IPC is to be applied per acre, 2 gallons of Chloro IPC would be mixed with 28 gallons of water. (Present formulations of Chloro IPC contain 4 pounds of active ingredient per gallon.) If .75 lb. of "Karmex" DL is to be applied per acre, one quart (32 liquid ounces) would be mixed with 30 gallons of water. (Present formulation of "Karmex" DL contains 3 pounds of active ingredient per gallon.) Both of these chemicals require some agitation in order to keep them mixed with water. Pumps should by-pass a moderate amount of solution to provide adequate stirring.

Whatever method of application is used, a very small amount of chemical is spread over an acre. For this reason it is extremely important to follow carefully the points outlined. The methods described have proven most satisfactory.



Tractor equipped with two-row planter and single nozzles behind each planter for applying band treatment.