STRIP TILLAGE AND PETROLEUM MULCH

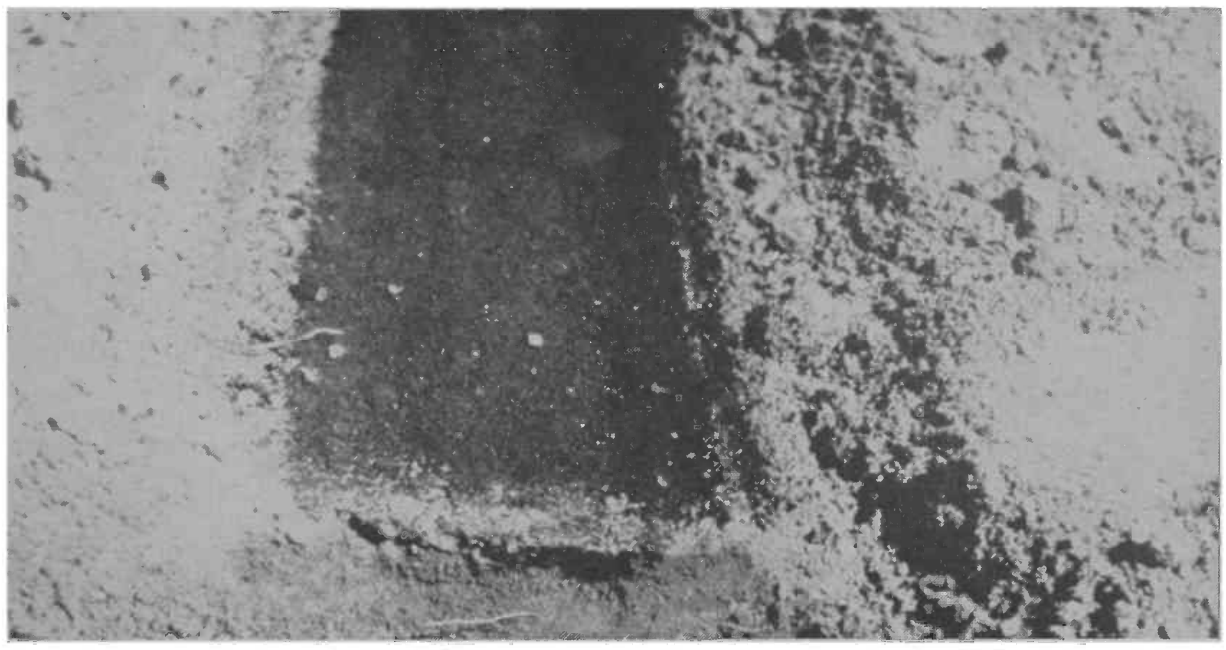


Figure 1. Moisture level several hours after asphalt emulsion was applied and planting completed (Campbell Avenue Farm). Note that the moisture is very near the surface.

Figure 2. Plants emerging from surface, treated and untreated soil. (Photo taken on eighth day.) Note there are no skips in asphalt emulsion-treated cotton row.

By K. R. Frost

The author is a Professor of Agricultural Engineering.

Testing of surface mulches has been conducted the past few years at the UA Cotton Center, Phoenix, by Dale Cannon and Gerald Christenbury of the Agricultural Engineering Department, and at the UA Campbell Avenue Farm, Tucson.

These tests have generally compared the influence of different mulches on soil temperatures and subsequent effect on germination of early cotton seed plantings. Weather conditions often delay planting time, in addition to prolonging the germination period. A delay of two to three weeks in planting because of low soil temperatures often may justify the added expense of using the petroleum mulch. An increase of 4 to 8 degrees in soil temperature usually will assure excellent germination at early planting dates and provide optimum conditions for early stages of plant growth.

In One Operation

A thin band of asphalt emulsion (petroleum mulch) will provide a black surface (Figure 1) for absorbing additional solar heat for warming the seedbed. A once over operation of soil tillage, herbicide application, planting and emulsion application is desirable in order to keep costs at a minimum. The emulsion should be applied to a *smooth* surface in order to obtain effective film coverage.

A strip-tillage machine was designed and constructed to provide a smooth surface for asphalt emulsion application. It also provides equipment for seeding and for applying the emulsion. The surface film, if properly prepared, will aid in conserving moisture and preventing crusting in case warm dry winds prevail during the germination period.

Seedlings will emerge readily through the film. Planting depths for the treated rows are not critical, since higher soil temperatures are obtained than in the untreated soil. If the crop is preplant irrigated, seeds placed at 1½ inch depth will readily emerge. Those seeds planted in moisture and placed at 1½ to 2 inches will germinate before moisture dries from the top soil under the emulsion film.

Size of Application

Sixty to 80 gallons of emulsion per acre (60% asphalt and 40% water) sprayed in strips 5 to 6 inches wide,

(Continued on Next Page)

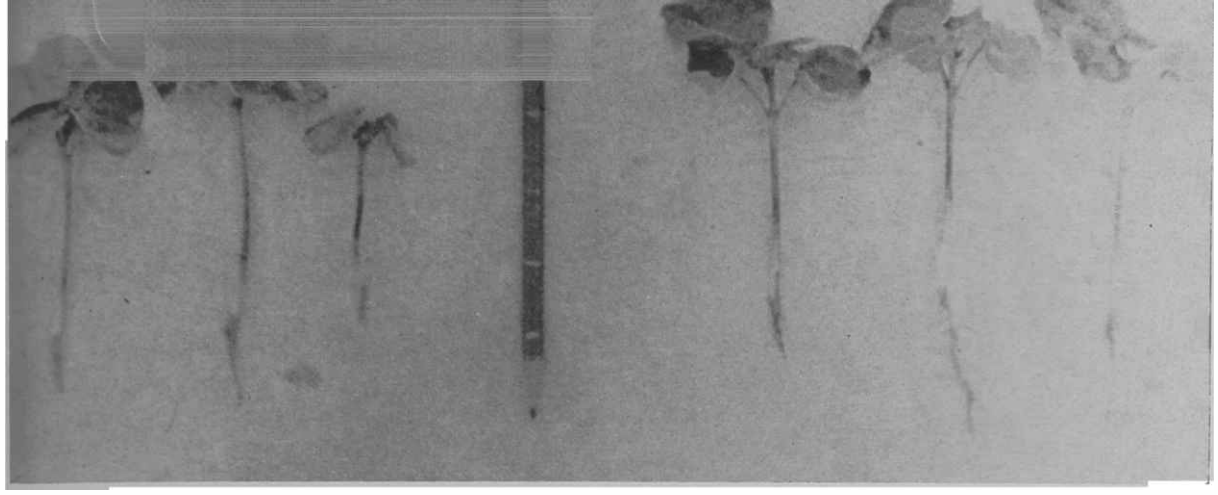


Figure 3. Cotton seedlings 14 days after planting. Plants from treated row on right and untreated on left.

Figure 4. Cotton seedlings 30 days after planting. Right, treated and left untreated all plants were retarded by cold nights.

(Continued from Previous Page)

40 inches apart will provide an adequate film for cotton seed germination. Most asphalt emulsions require a two-step application using two nozzles spaced at 30 inches in the row. Liquid pressures of 35 to 40 psi at the nozzle are generally desirable with ground speeds of 2 to 2½ mph.

Present asphalt emulsion costs are variable depending on the location, type of emulsion and supplier. Some petroleum companies are offering delivery prices of 20 cents per gallon in large lots. The cost per acre under these conditions would be $12 to $15 for material, with $5 to $10 added for application.

The result of tests conducted at Campbell Avenue Farm the past several years indicates above average yields with early plantings using petroleum mulch applications, and provides a good insurance against the necessity of replanting. Plant counts have shown 30 to 40 percent better stands (Table 1) with treated rows. Emergence was often delayed a week or more with the untreated surface when weather turned cold. Several tests have resulted in poor stands for the untreated rows under wet and cold conditions while fair stands were obtained from the emulsion treated. Emergence required from 5 to 7 days with the treated rows and 8 to 12 days with the untreated.

Table 1. Average Number of Plants for 16 Plots

Plants per 100 ft. of row
(Campbell Avenue Farm)

Treatment	*1966*	*1967*	
	21 da.	*10 da.*	*21 da.**
Emulsion Treated	160	225	268
Untreated	137	166	206
Percent Increase	120	136	130

* 0.2 inch rain on 15th day

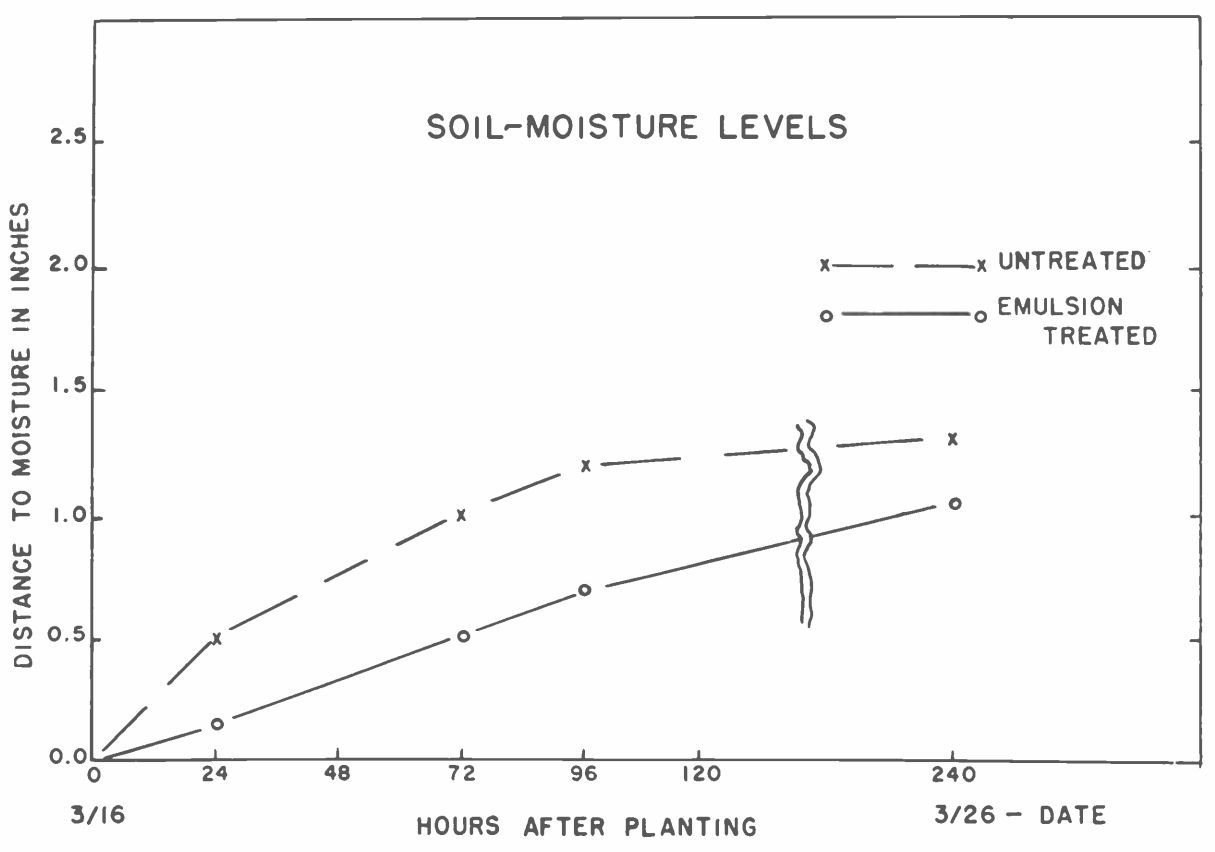
Planting to a Stand

Planting to a stand has been very successful with petroleum mulch (Figure 2). Thinning operations have been eliminated in treated planting. Two to three cotten seeds at 8 to 9 inches were planted in the tests. Seeding rates could have been reduced to an average of two seeds at that spacing and resulted in excellent stands for the treated but not with the untreated.

Plants showed faster growth the first 30 days for the treated rows, Figure 3 and 4. Top soil in the treated row will gradually approach the moisture conditions of the untreated within 10 days after emulsion application. (Figure 5). In 1966 there was no significant differences in yield (Table 2) as satisfactory stands (1 to ½ plants per foot) were obtained with both treated and untreated rows.

(Continued on Next Page)

Figure 5. Soil-moisture levels following planting date of March 16, 1967. Note that emulsion treated was losing advantage over untreated after six days. (Campbell Avenue Farm).



(Continued from Previous Page)

Table 2. Average Yield For 16 Plots

	Yield of Seed Cotton #/A (Campbell Avenue Farm)	
Treatment	*1966*	*1967*
Emulsion Treated	3030	—
Untreated	3008	

Conclusion:

1. Thirty percent or more plants will result in an early spring soil temperature when an *effective treatment* of petroleum mulch is applied.
2. Earlier plantings are possible without being affected by sudden cold snaps.
3. Treatment provides greater span in planting period (as often desirable) by using emulsion applications during first half of planting season.
4. More flexibility in planting results from choice of wet or dry seeding without sacrifice in stand or yield.
5. With precision planting it is safe to plant two or three seeds per hill when using petroleum mulch instead of 3 or 4 as often required with untreated surfaces.
6. Plant shallow for preplant irrigation, deeper for preirrigated planting when using petroleum mulches.

Don't Try to Store Frozen Meat Too Long

The longer frozen meat is stored, the more flavor and quality is lost, says June C. Gibbs, nutritionist with the UA Extension Service.

Long storage beyond the recommended time lowers the flavor of both the fat and lean meat. The more fat on the meat and the more it's cut up, the shorter its freezer life, added Miss Gibbs.

"Ground meats and thin cuts will not keep as long as roasts and steaks at least an inch thick," said the nutritionist.

When packaging meat for freezing, it is important to keep the oxygen shut out, because oxygen makes the meat rancid and will cause "freezer burn," which is loss of moisture, she said.

High Yielding Hybrid Cantaloupes Tested by Mesa Research Team

By R. E. Foster

The University of Arizona Agricultural Experiment Station and the Agricultural Research Service, U.S. Department of Agriculture, released two new cantaloupe stocks last December. These were put out with a modest notice, without the fanfare that usually accompanies a new variety.

Why so quiet? Because in themselves the new cantaloupes would interest neither the Arizona melon growers nor their customers. The new stocks, however, could herald the most significant advance to hit the Southwestern muskmelon industry since the introduction of the PMR 45 variety.

G1-A and G1-B, the newcomers, were released as breeding lines for the development, production, and use of F_1 hybrid cantaloupes. First generation hybrids have proven their value in many crops, especially corn, onions and sorghum. Cantaloupe hybrids experimentally produced and tested at the UA Mesa Experiment Station yielded 75 to 100 percent *more* marketable fruit than standard varieties. The hybrids also had better appearance, improved flesh characteristics and higher sugar. It is a fair assumption that both growers and consumers will be eager for such hybrids.

Is Not Complicated

Final production of the hybrid seed for growers will be fairly easy and only slightly more costly than production of ordinary seed. Details of the procedure are explained in a scientific article, but briefly they may be summarized as follows: A special "Seed Parent" cantaloupe stock is planted in the usual manner. Another special "Pollen Parent" line is sown close by and a good supply of bees is provided when flowers appear. As soon as fruit is set on the seed parent, the pollen parent plants are killed. Fruit is allowed to ripen and seed is harvested in the usual way. The "catch" in the whole operation lies in the development of the special "Seed Parent" and "Pollen Parent" breeding stocks.

Seed produced with the method outlined above will not be pure F_1 hybrid. Since the bees will move pollen from both types of parents, hybrid seed will be formed only following the mating of the seed parent plants by the pollen parent plants. Seed parent pollen carried to seed parent flowers will produce ordinary or non-hybrid seed.

A crop resulting from the method proposed will be a mixture of F_1 hybrid seed and non-hybrid seed, and a field planted with such seed will contain both hybrid and non-hybrid seedlings. This is not at all as serious as it might seem. If the non-hybrid seedlings can be recognized at thinning time they can all be removed. After all, more seed is always planted than is needed, and most of the seedlings are chopped out in thinning the crop to the desired stand.

Remove the Unwanted

The real value of UA Cantaloupe Breeding Lines G1-A and G1-B lies in the fact that when these stocks, or breeding material derived from them, are used as "seed-parents," the non-hybrid seedlings can be spotted by the regular thinning crew after minimum instruction and removed easily and quickly. With all the non-hybrid seedlings chopped out, the final field stand consists of only the desirable F_1 hybrids, capable of doubling yields.

To supply the anticipated demand for F_1 hybrid cantaloupe seed, seed companies will face two challenges. First, many experimental hybrids will have to be made and tested. Only the right combinations of selected breeding stocks will give superior F_1 hybrids and until more information is obtained on each breeding line, the best combinations can be found only by a trial-and-error method. Secondly, the stock chosen as the seed parent must be bred and selected to carry the "recognition" characteristics present in G1-A or G1-B.

Probably both phases of research will be carried out simultaneously by seed companies. The UA Horticulture Department is continuing to develop superior parent cantaloupe stocks, and the program is now being extended to include honeydew melons and watermelons.

Grower demand for the new type of cantaloupe seed would be a major factor in speeding its availability. Demand indicates interest and defines the market.

Dr. Foster is Horticulturist located at the Mesa, Ariz., Branch Experiment Station.