

SHALLOW STRIP TILLAGE IN SEEDBED PREPARATION

By K. R. Frost

Numerous tests on both field and vegetable crops by agronomists at The University of Arizona during 1962 and 1963 demonstrated the effectiveness of petroleum strip-mulches in improving early season germination and emergence. Early season stands often result in increased yields because of a lengthened growing season.

Effective application of petroleum emulsion requires a smooth soil surface which will result in development of a thin continuous film of petroleum at a minimum application rate. The reduction of cloddy and rough surfaces is necessary if emulsion performance and cost is to be physically and economically satisfactory.

Soil Condition Differs

Strip seedbed preparation may be required in either moist or dry soils. Cotton is normally planted in soil moisture at or near field capacity. Initial field trials of strip tillage machines indicated that wet and dry seedbeds required quite different mechanical treatment for satisfactory pulverization. Strip tillers were developed for wet and dry soil preparation. In these units the strip tiller, tiller housing, adjustable vee-type clod pushers, seed furrow openers, seed hoppers and drops, seed press shoe, and convex zero-pressure smoothing press-wheel are combined into one assembly.

The tillage rotor for moist soils was designed for strip tillage. It consists of a spring-tined tiller 8 inches in diameter and is rotated at 700 to 900 r.p.m. in the forward-rolling direction. Reduction of clods is accomplished by impact and the pulverized soil is smoothed into place by the deflector plate. This tiller operates in the range of one to two inches in depth.

The spring-tined tiller had little effect in changing the size of aggregates of dry soil. The most effective device for dry soils was a 5-inch-

diameter grinder. This rotor was operated at 1200 to 1400 r.p.m. in a counter-rolling direction. Soil flows up and over the rotor and is pulverized by rubbing action against the shear plate. The pulverized soil flows out below and to the rear with respect to the shear plate and is de-

posited in a 1/2- to 3/4-inch layer.

This type of soil treatment has made it possible to develop satisfactory petroleum films at application rates of 8 to 10 gallons per acre per inch of band at 40-inch row spacing. Two-stage application of the petroleum emulsion has been found most effective for film development.

Field Tests Are Made

Preliminary field testing of the strip-tiller system for petroleum emulsion treatment of cotton was conducted in 1964 in cooperation with the Agronomy Department. The spring-tined tiller or the grinder was used in these

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Emergence of Cotton Plants per 100 Feet

Date of Planting	SHALLOW				DEEP		
	No Emulsion		No Emulsion		No Emulsion		No Emulsion
	Tiller- mulched	Un- mulched	Tiller- mulched	Un- mulched	Tiller- mulched	Un- mulched	Tiller- mulched
Wellton, Ariz. March 4, 1965	110			44			
Phoenix, Ariz. March 8, 1965	114	101	84		74	54	46
Phoenix, Ariz. March 26, 1965	184	176	137	103	170	176	93
Phoenix, Ariz. April 21, 1965	207		260	83	187	182	260

TRACTOR MOUNTED strip-tillage machine planting two rows. Note asphalt-emulsion tank on front and black strip on soil surface at rear.



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Cultivating Our Garden

By Arthur H. Beattie

"EDITOR'S NOTE: This is fourth and final portion of Dr. Beattie's beautiful address to the national honorary society for agriculture, Gamma Sigma Delta. Like the previous portions, this is an entity unto itself, and can be so enjoyed.

A little reading in the background of this land of ours informs us that the Papago did not wait idly for the summer rains to come. Under the direction of the medicine man, he participated in bringing them through the most important religious ceremony of the year. The Papago was an abstemious man, who carefully shook out and gathered the seeds of wild grasses and the beans of the mesquite bush.

The cactus of the desert, roasted under a fire, provided food for him. Fermented drinks (until the white man's example taught him otherwise) had no place in his life except for the annual rainmaking ceremony. It was not men such as these that Isaiah cursed, saying, "Woe unto them that are mighty to drink wine, and men of strength to mingle strong drink."

Like the cities of the Hebrews, after the years of wandering, Southern Arizona has known its share of "men of strength to mingle strong drink," but this was not true in the days when the Papago possessed the land. Drinking the fermented liquor made from the saguaro was reserved for the lengthy ceremonials whose object was to bring the summer rains.

These ceremonials offer an excellent example of the effective use of magic. The saguaro fruit did not ripen until the necessary heat to bring

the summer rains had developed, and the fermenting of the liquor required the higher humidity which is a forerunner of the rainy season. Thus the rituals were regularly successful, for normally the rain followed closely upon their performance. For magic to work, it must, of course, be closely tied to natural forces.

Biblical Range Wars

The Papagos, before the coming of the white man, were not herdsmen. Today, however, Indians and whites raise cattle in our region. In a land of scant rainfall and sparse grass, vast areas are required for the grazing of flocks and herds, and the danger of overgrazing is a constant one. The most popular folk entertainment of our day — the TV Western — depicts with keen delight the gunfights of cowboys, but rarely suggests the underlying problems of the shortage of water and the necessity of preserving the range from overgrazing.

This, too, was a problem familiar to the Hebrews of patriarchal days. We who know the rangelands of the Southwest find understandable and enlightening the quarrels between Abram's men and those of Lot, and the separation of the two parties. "And Abram was very rich in cattle, in silver and in gold. And he went on his journeys from the south even to Beth-el. And Lot also, which went with Abram, had flocks, and herds, and tents. And the land was not able to bear them, that they might dwell together. And there was a strife between the herd men of Abram's cattle

and the herd men of Lot's cattle. . . . And Abram said unto Lot, "Let there be no strife I pray thee between me and thee, and between my herd men and thy herd men; for we be brethren. Is not the whole land before thee? separate thyself, I pray thee, from me; for if thou wilt take the left hand, then I will go to the right; or if thou depart to the right hand, then will I go to the left."

"... Do Not Stagnate"

Reading for most of us makes the greatest single contribution toward the development of a full and rich inner life, but of course the arts are important also, and in the cultivation of our garden must not be neglected. The important thing is that we not stagnate, that we not content ourselves with a mere animal, or even vegetative, existence.

At times we may admire, even envy, the apparent placidity of certain animals. On that chill Visitors' Day on the campus I watched the magnificent, heavily meated Herefords put on display outside the west wall of the Student Union. That they had more dignity than many of the people who stopped to chatter around them, that they enjoyed a greater calm, was certain. Yet these were creatures bred to produce the greatest possible quantity of high quality beef for our tables.

Their placidity is a result of an absence of thought, of any concern for the world about them, that it would be folly for us to seek to emulate. Discontent is one of the most important traits of human nature; without it there would be no striving for improvement, no cultivation of our garden, no progress.

Walt Whitman in "Song of Myself" writes a fascinating passage expressing envy of the animal's lot. I think of it often, for the bovine life has a strong appeal, and there are in the verses in question certain phrases
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tests depending on soil moisture conditions. In these tests, the petroleum emulsion had been applied at 70 to 80 gallons per acre in 8-inch bands on 40-inch centers. Plantings were made "to a stand" with no subsequent chopping. Some difficulty was experienced in maintaining proper seed depth. Germination was not good where seeds were shallower than 1-inch, but deeper placement was felt

to be practical under petroleum emulsion because of the soil temperatures developed.

In 1965, field tests were again made in cotton, and included strip-tillage, petroleum-emulsion, and strip-tillage with petroleum-emulsion as compared to conventional seedbeds. Also included were tests of planting depth under emulsion. These tests were conducted near Phoenix. Very early plantings were also conducted near Wellton on March 7. A fair stand was obtained although rows were overirrigated and two rains followed

which left soil in hard and cracked condition. A poor stand resulted from the germination on conventional seedbeds.

Our table shows results of four plantings in 1965 and indicates better stands with petroleum-emulsion applications and for strip-tillage mulched rows compared with non-mulched. The last planting (April 21) resulted in no advantage to the emulsion application as soil was sufficiently warmed to germinate seeds in all treatments.