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## TEXAS RESEARCH FOUNDATION STUDIES SOIL PROBLEMS OF BLACKLANDS

The Blacklands of Texas, which occupy about 26,000,000 acres through the heart of the State, have been a major source of income for more than 100 years. Abundant crops of cotton, grains, and other commodities have been produced, and as the fertility of these black prairies was considered inexhaustible, continuous cropping to cash crops has been a common practice. However, excessive use of soils for producing these crops without benefit of soil-building or improvement practices has caused wholesale loss of soil fertility. The soil has lost a major portion of the original organic content; the soil structure has deteriorated so that its capacity to absorb and retain rainfall is seriously reduced and the effects of drought are greatly accentuated; the soil has become compacted so that tillage is difficult and plant root systems are stunted; most of the broad-leaf plants, which include fruits, vegetables, cotton, alfalfa, and similar crops, suffer from an inadequate supply of essential trace elements such as iron, boron, manganese, zinc, and copper. In addition, soil erosion losses have been enormous.

Soil scientists and agronomists have recognized for some time the serious need for a balanced system of Blackland farming which would return to the soil regularly the organic matter and other soil constituents necessary for production of good crop yields. Some efforts have been made to halt the deterioration of the Blackland soils, but most of these efforts have been fruitless. Yields have continued to decline even though tractors and power machinery have been almost universally adopted, fertilizers have been tried, and the breeding of better cotton and the control of insects and diseases have re-

ceived much attention. The basic difficulty in most of the past efforts has been that farming practices good for other regions were adopted in the Blacklands with little or no basic data on how well these practices apply to the peculiar conditions here. Because of the high clay and lime content and the radically different chemical and physical properties of the clay mineral in these soils, the Blacklands have failed to respond to many treatments developed for other regions.

Sometime prior to 1944, a group of progressive Texas businessmen became interested in doing something about conditions in the Blackland area. They believed that the welfare of the State depends to a large degree upon the welfare of the farmers. They believed also that the economy has its foundation in the land and that the wealth of this State would disappear if the fertility of its soils were lost completely. As a result of their efforts, the Texas Research Foundation was established at Renner, a few miles north of Dallas. Under the direction of Dr. C. L. Lundell, the Foundation, with a staff of over 50 scientists and specialists, is moving forward in exploring the problems that exist in farming the Blacklands and is seeking to determine some immediate effects of treatments that appear worthy of investigation.

The work of the agricultural research division of the Foundation is headed by Dr. Homer E. Sprague, who has been active in agricultural research for more than 20 years. The objective of this division is to accumulate a body of basic facts that will permit the development of permanently profitable types of farming in the Blacklands and associated soils of Texas. According to Dr. Sprague, the organic matter of the soil must be restored

to hold the soil in place and to save rain water for crop use. In order to do this, the cropping systems used in the area must be modified to include sod crops in the crop rotation and cover crops whenever the land is not occupied by a growing crop. Extensive studies are under way to determine which sod crops will return the greatest net income to the farmer and at the same time improve the soil. Several hundred grasses and legumes have been or are being studied for possible use in an improved system of Blackland farming.

Field investigations have disclosed the presence of a compacted layer of soil in a great many cultivated fields, beginning at depths of four to five inches and extending to about twelve or fifteen inches. This "hardpan" restricts root development and interferes with the absorption of water and the circulation of air in the soil. It greatly accentuates the effects of drought by reducing the amount of water stored in the soil and the volume of soil utilized by crop roots. Studies are under way to determine satisfactory methods of eliminating these compacted soil layers.

Results of tests at the Texas Research Foundation indicate that practically all crops grown on Blackland soils are suffering from deficient supplies of the major nutrients, particularly nitrogen, phosphates, and potash. However, investigators at the Foundation have obtained excellent responses to liberal applications of nitrogen fertilizer on winter grains, sudan grass, and similar crops. Further research is under way to explore the possibilities for use of fertilizers on Blackland soils and to determine which forms or types of fertilizers would be most beneficial.

A parallel study to the soil research program is the search for more productive crops specifically adapted to these high lime soils, and an intensive breeding program is in progress to develop superior varieties of such crops. Studies are being made of soybeans, sesame, and sunflowers, for example, as possible Blackland crops to be grown for oil-bearing purposes. Also, corn hybrids are being developed which will be adapted to the Blackland soil. Emphasis has been placed on

productive white corn hybrids suited to the dry milling trade which produces grits, hominy, and similar products. Substantial progress has been made also in the development of high-yielding and better quality popcorn hybrids. Texas has great climatic advantages over the Corn Belt for production of this specialized crop, and improved hybrids will permit Texas farmers to capitalize on these advantages.

A further important line of research deals with methods of producing all-season pastures. The Texas climate should permit grazing of livestock from 10 to 11 months of the year, instead of 6 to 7 months as now practiced, says Dr. Sprague. On the basis of experiments so far, it is believed that pastures can be seeded with a mixture of grasses which will provide grazing throughout most of the year. The use of superior warm-season perennials for production of feed in warm months, plus cool-season perennials for feed production in cool months, together with temporary pastures such as sudan grass and winter oats, should come close to producing a full year of feed which may be harvested "on the hoof" with little or no man-labor. It is quite obvious that development of such an all-season pasture program would be a distinct contribution to the Blackland area.

It took Texas farmers 50 to 100 years to exhaust the Blackland soils, and it will require time to restore them, even though full advantage is taken of all scientific knowledge. Dr. Sprague points out that there is no single practice that can suddenly correct the product of long-continued violation of basic principles of permanent agriculture. Some improvements in management are sufficiently well-understood to warrant immediate adoption, but others require further study. The most important thing from the standpoint of Blackland farmers is that they keep alert to the development or discovery of facts and principles that have special application to these unique soils. New facts are being sought in the research program of the Texas Research Foundation, and as farmers in the area take steps to incorporate into their current operations these facts and the improved

practices based on them, they will be contributing to their own security and also to the restoration of the farm income of this region to its former high level.

## FARM MANAGEMENT

### Department of Agriculture Issues Warning on Chemical Injury to Soil

Conditions justify a warning, says the Department of Agriculture, that serious trouble may be encountered on some soils and some crops within three to five years after general use of certain new agricultural chemicals if present heavy annual rates of application are continued. How long the poisonous effects of excessive quantities of DDT, benzene hexachloride, parathion, and chlorodane will remain in any particular soil or how to remove toxic quantities from a soil is not known. On studies made thus far, a given quantity of DDT is more toxic on light than on heavy soils, more toxic on soils low in organic matter than on soils well-supplied with it, and more so on a given soil when its reaction is alkaline or a trifle acid than when it is strongly acid.

Chlorinated camphene (Toxaphene), on the other hand, is believed to have only transient toxicity in the soil and does not seem to present as much hazard as some of the other compounds.

### Special Care of Winter Calves Advised

Cows freshening in the winter may increase the farmer's profits, but extra care is needed to insure survival of the calves, reports the Louisiana Agricultural Extension Service. Since the average dairyman loses more calves during the late fall and winter months than at any other time of the year, particular attention should be given to improving calf survival through better management and feeding practices. Dry cows should be well-fed to permit development of a strong healthy calf, and maternity pens should be disinfected between each calving. Calves should be placed in clean, well-bedded stalls, protected from drafts. As long as milk

is fed, it should be given warm and regularly. Good, bright hay, preferably mixed, should be added to the calf diet as soon as possible.

Such practices will cut down calf losses tremendously. Saving of the calves often means the difference between profit and loss on a dairy herd, since, by raising his own replacements, the owner has more control over the health of his herd and the producing ability of his animals.

### Louisiana Contest Proves Corn Hybrids Superior for High Yields

Evidence of what hybrid corn can mean to farmers can be found in the results of a corn production contest sponsored this year by the Louisiana Hybrid Seed Corn Association. A Concordia Parish grower placed first in the river bottom-land division of the contest with a yield of 163.3 bushels of Louisiana 521 hybrid per acre, while a farmer of Union Parish placed first in the hill-land division with 114.8 bushels from an acre of Louisiana 468 hybrid. Both hybrids were developed at the L. S. U. Agricultural Experiment Station.

These are remarkably good yields, in view of the fact that Louisiana's average corn yield is estimated at less than 20 bushels per acre. But the most interesting fact about the contest results is that, on the average, all contestants (including those who placed far down the list) recorded a considerable increase in yields over anything they had ever obtained with open-pollinated varieties. They found that hybrid-corn yields were consistently higher, even under identical conditions of planting and cultivation.

On the basis of these facts, the Extension Service concludes that use of adapted hybrids by all growers, plus better methods of fertilization and cultivation, would give Louisiana an average yield more or less in line with the yields of the mid-western corn-growing states. That would mean millions of additional bushels of corn from the same acreage, with the same labor and at very little more expense.

## FARM PRICES

### United States Department of Agriculture Announces Wool Support Program for 1949

The Department of Agriculture announced recently a 1949 wool price support program with a price schedule providing a national average wool price to growers of slightly more than 42 cents a pound, grease basis. This will approximate the 1948 wool price support level.

Wool prices will be supported by purchases, and the program will apply to all types and grades of shorn and pulled wool produced in the United States and territories. The program, already in effect, will continue through December 31, 1949.

### Farm Real-Estate Values Continue Climb

Farm real-estate values in the United States on November 1, 1948, were 8 percent above November 1947 and 113 percent above the 1935-39 average, according to the latest report of the Bureau of Agricultural Economics. The peak in real-estate values apparently had not been passed, as average values rose 2 percent during the four months ended November 1. Although some states had indicated a decline in earlier reports, the most recent increases have been rather general throughout the country.

The largest increases in land values in the Eleventh District have been in New Mexico and Oklahoma, where on November 1 they were 139 percent and 126 percent, respectively, above the prewar level. The percentage increases in other States in the District since before the war were: Arizona, 97; Louisiana, 101; and Texas, 109.

## TECHNOLOGICAL DEVELOPMENTS

### Range Brush Destroyed by Aerial Spraying

Success in destroying range brush in Oklahoma by spraying from an airplane is reported in the current issue of *The Farmer-Stockman* magazine. The chemical used in this method of brush control was 2, 4-D,

which has been used with usually favorable results for destruction of brush and other undesirable plants. This method of spraying, which costs about \$2.25 per acre, is cheaper and faster than other methods.

In experiments conducted in May 1948, results ranged from good to excellent, with an estimated 80 percent of the brush killed. The report states that plans are being made for aerial spraying of 100,000 acres of grazing land in Oklahoma and Texas.

### Chemical Treatment Will Keep Cottonseed From Spoiling in Storage

Spoilage of stored cottonseed is a serious problem to southern cotton farmers and cottonseed oil millers. In some years it costs them millions of dollars, but most of this loss can be avoided, says the Bureau of Agricultural and Industrial Chemistry, United States Department of Agriculture, by spraying the seed with chemicals before it goes into storage bins.

Scientists at the Bureau's Southern Regional Research Laboratory in New Orleans have tested various chemical treatments of cottonseed under actual storage conditions at cottonseed oil mills. They report that chemical treatment, used in addition to normal aeration or forced-draft ventilation of the stored seed, will greatly reduce spoilage of damp cottonseed. While the results of the studies are preliminary, it is expected that recommendations of chemicals to be used by farmers and millers can be made soon.

## ANNOUNCEMENTS

### Livestock Shows

The 1949 Southwestern Exposition and Fat Stock Show will be held at Fort Worth from January 28 through February 6.

The Houston Fat Stock Show and Livestock Exposition has been scheduled for February 2-13 at the Houston Coliseum.

The San Antonio Livestock Exposition will take place in San Antonio from February 18 through 27.