



Cotton showing only a trace of root rot at the end of the 1949 growing season (November 1). Both plots were heavily infested with root rot in 1943. The plots were planted to flax in winter and sesbania (plot at left) and guar (plot at right) in summer for five years, 1944-48.

best treated plots and the check plots became progressively larger in the third, fourth and fifth years of the experiment.

The highest yield of seed cotton in the fifth year was on plots on land planted to Papago peas as a green manure crop in winter and cotton in summer. These plots averaged 3250 lbs. of seed cotton per acre. Early-maturing sour clover and Hubam clover have been discarded in favor of Papago peas which make the greatest tonnage of green weight per acre (almost 16.5 tons in 1949). Ammonium phosphate 16-20 was applied when peas were planted (Dec. 3) and ammonium nitrate was applied April 15 to aid decay of green manure crop when it was plowed under.

#### Manure Applied

Manure applied in deep furrows under the rows of cotton—a method found satisfactory on some soils by the late C. J. King of the Sacaton Experiment Station — reduced the amount of root rot and produced good yields (2258 lbs. seed cotton per acre in 1948). This method, with the addition of soil sulphur and ammonium sulphate to the manure in the furrows, was even more successful (2400 lbs. per acre). The expense and labor involved, however, detract from the value of these methods and they are not recommended.

A two-year rotation in which a crop of barley is followed by a crop of guar grown for seed and cotton grown the second year produced some reduction in root rot and good yields of all three crops. (2564 lbs. seed cotton per acre). The check plots averaged 902 lbs. seed cotton per acre in 1948.

Since a large percentage of the cotton plants killed by root rot die in late summer and fall, an early-maturing cotton produces more cotton before the plants are killed. Paula C, a variety introduced by this department, was found to yield 50 per cent more cotton in the first picking and yielded better than Delta Pine 14.

In 1949 half of each cotton plot was planted to Acala X 33, an early-maturing strain developed by E. H. Pressley of our Plant Breeding Department. Paula and X 33 were equal

# Farming *Root-Rot* Infested Lands

## Five Rotations Using Cotton as Principal Cash Crop Are Tested

By R. B. Streets

Cotton (or Texas) root rot has been a major plant disease problem in the irrigated lands of southern Arizona ever since these lands were brought into cultivation. The disease is caused by a fungus (*Phymatotrichum omnivorum*) native to the soils of the semi-arid Southwest from east Texas to the Colorado River, and attacks most tap-rooted plants (over 2,000 different species).

The principal crops on much of the Arizona acreage have been cotton and alfalfa, and these crops have usually been alternated on the same land—several years of alfalfa followed by two or three crops of cotton. Such a program permits the greatest possible increase of root rot as both cotton and

alfalfa are very susceptible to attack by the root rot fungus.

Long rotations with small grains, corn, grain sorghum or forage grasses will reduce root rot infection as these crops are immune to attack, but any program of land use which restricts or omits the growing of cotton on these valuable lands with a high annual overhead expense is not satisfactory to most growers. This has been especially true during the past few years when the support price on cotton made its culture attractive.

In the fall of 1943 a series of experiments was initiated on the Mesa Experiment Farm to explore the possibilities of making profitable use of land heavily infested by the root-rot fungus. Five rotations based on cotton as the principal cash crop, and three rotations based on flax as the cash crop were established and maintained for five years (1944-1948).

The differences in yield between the

## How Is Your Range Land?

(Continued From Page 3)

you're losing. It also shows you *where* you're losing it. You get a good, clear picture of your overall management practices, their faults and their good points. The range survey also points out the problem areas—those areas which, though often small in size, can make or break a range.

On the general management side, a survey can give you such information as the kind of operation and class of stock that will give you the greatest economic return. It can give you the rate of stocking for a particular condition class. Not just the rate of stocking that will keep that range in its present condition class, but the rate that will bring that range up to excellent condition. It can show which parts of your range are better suited for use at certain seasons than at others. Or it may show that your range is more suited for continuous yearlong use, or for a deferred-rotation system.

### Aids "Problem" Areas

As for the problem areas, a survey can show many things. For instance, it can show up faulty distribution of livestock with one area grubbed into the ground while forage elsewhere is going to waste. The survey will show the best location for new water developments or salt grounds, or fences to correct poor distribution. It will show the areas being invaded by noxious plants—not only the places already covered with brush—but also the good grasslands where a few shrubs and weeds are beginning to come in. A little work with a grubbing hoe on those areas may save thousands of dollars later on.

The survey can also point out a creek bottom where the forage has been trampled out, but that would make permanent pasture if reseeded to the right plants—a pasture that would carry your stock through that dry year when nothing else could help you, except rain. Or the meadow full of poisonous plants that have been causing losses from an "unidentified cause."

You may know about most of these things already, or at least have them in the back of your mind. But the survey will emphasize them and give you a solid base from which to start your improvement operations.

Once the indicators of the different condition classes are recognized, they are summarized in a bulletin known

## Aggie House

(Continued From Page 9)

plus very efficient management of the financial affairs, have enabled Aggie House to clear part of the financial burden. A portion of the nominal monthly income can now complete the payments over the coming years.

Any Arizona farm boy interested in studying agriculture at the University is eligible to pledgship in Aggie House. The group enjoys the status of a fraternity and yet the boys are accepted through their individual applications. Students in the College of Agriculture consider it a distinct privilege to be accepted into the Aggie House, following their pledgship, by their fellow students and the faculty advisory board.

Each of the 35 to 38 members of Aggie House gladly assumes his share of the work and develops a sense of responsibility. Pledges start with kitchen police duty while upperclassmen have more exacting duties such as those of Joe Nesbitt, of Mesa, house manager and treasurer. He does all the buying and meets all financial obligations within the fixed budget.

This year the boys are under the leadership of Larry Perry of Mormon Lake and Frank Shown of Yuma, president and vice-president, respectively.

Prospective students in the College of Agriculture at the University interested in Aggie House should contact the president, Aggie House, 819 North Euclid Avenue, Tucson.

—F. G. Harland, Assistant Dairy Husbandman, is Adviser to the Aggie House group.

as a range-condition guide. The rancher can take this guide, make his own survey, and reach his own conclusions about his range. The bulletin lists the signs of each condition for a certain type of range, describes these signs in plain language, and is well illustrated.

Work on these range condition guides is going on now, although necessarily slowly, because of the vast areas to be examined, the many factors to be evaluated, and the limited personnel. Even with these problems, range-condition guides for Yavapai county should be published within the year, and others within a reasonable time thereafter.

—R. R. Humphrey is Associate Range Ecologist, A. L. Brown is Assistant Range Ecologist.

## Farming Root-Rot Infested Lands

(Continued From Page 7)

in root-rot susceptibility and yield at the time of the second picking.

The three rotations with flax as a cash crop produced good yields but were somewhat less profitable than the best cotton rotations. Sesbania and guar as green manure crops were about equal in their effect on yield of flax.

An early-maturing variety of guar which could be harvested in time to plant flax on the land, produced lower flax yields but the total return per acre was greater on account of the value of the guar seed. Unfortunately, this variety of guar is moderately susceptible to root rot and is less desirable on this account. Both sesbania and the branching varieties of guar are highly resistant to root rot and, therefore, desirable in rotations to control root rot.

In 1949 all plots were changed, except the two-year rotation, and cotton planted on the plots which had been in flax and green manure crops for five years. Only a trace of root rot survived in these plots. In the cotton rotations while yields were maintained, there was no marked reduction in root rot although the death of plants was considerably retarded and occurred only after a greater part of the crop had been matured.

—R. B. Streets is Associate Plant Pathologist.

## Tune In!

Here are radio programs that provide agricultural and home economics information. Tune in and listen!

### SUNDAYS

KOY Phoenix, 9:45 a.m.—Farm Demonstration Garden Program.

KCKY Coolidge, 12:15 p.m.—Extension Service program.

### WEDNESDAYS

KYUM Yuma, 7:00 a.m.—Extension Service program.

### FRIDAYS

KAWT Douglas, 12:30 p.m.—Farm and Ranch program.

### SATURDAYS

KOPO Tucson, 11:00 a.m. Extension Service program.

KOY Phoenix and KSUN Bisbee, 12:30 p.m.—University of Arizona Farm and Ranch Hour. (Check locally for possible change in schedule.)

KGLU Safford, 12:30 p.m.—Stepping Along with the Extension Service.