

Protecting Health of Plants Is Major Field of Research

R. B. Streets

The Plant Pathology Department was organized in 1920 and attention was first given to angular leaf spot of cotton, date fruit rot and bacterial soft rot of lettuce, which were causing serious losses to crops.

Dr. J. G. Brown and Dr. R. B. Streets achieved the first practical control of angular leaf spot by inventing and building machinery which automatically acid-delinted, washed, dried, and treated the seed with an organic mercury fungicide at the rate of one to three tons per hour. The process, with refinements to increase

Root Rot Was Early Worry

Research on Texas root rot then considered the most important root disease of cotton, alfalfa, deciduous fruit trees and most ornamental trees, vines and shrubs, was begun in 1925. Successful control of root rot in moderately susceptible woody plants such as pecan, mulberry, ash, *Rhus lancea*, privets, *pyracantha*, cotoneaster, etc., was developed by Streets.

A method of preparing tree holes to permit replanting where trees had been lost by root rot has also been in use for some time. Control of root rot in cotton and other summer annuals such as castor bean, soybeans and black-eyed beans was achieved by use of a winter cover crop of Papago peas, which permits growing a cash crop every year on root-rot-infested land.

Pioneer work on the use of antibiotics to control plant diseases was done by Dr. Brown and Dr. Alice M. Boyle, who found penicillin made in the department's own laboratory was effective against the crown gall bacterium. This research has been continued by Dr. Boyle and all new antibiotics available have been screened for their effectiveness against bacterial and fungus parasites of plants. Conspicuous success has been achieved in the con-

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trol of fire-blight by spraying at blossoming time in pear orchards and on *pyracantha* which are often severely damaged in nurseries and home plantings. Two major lawn diseases are best controlled by antibiotics.

The death of many giant cacti was found by Dr. Boyle to be due to a new species of bacterium of the soft-rot type often spread by an insect vector. Penicillin was found to be effective in early stages of the disease. The project was taken over by the USDA and is being continued by Dr. Stanley Alcorn.

Control Citrus Tree Diseases

Research on the prevention and control of root diseases and wood rots of citrus trees by Dr. Streets and Dr. Ross M. Allen have contributed to control of these diseases. The introduction, increase and distribution of bud wood of superior varieties of citrus, in cooperation with the Horticulture Department and USDA workers, has given Arizona growers and nurserymen the best possible supply of superior strains of citrus free from citrus viruses for which there is a reliable test. This gives the best possible protection against virus diseases which cannot at this time be cured.

Dr. Boyle has studied the various diseases which have become important in the maintenance of turf on golf courses,

parks and home plantings, and the diseases of clover, Lippia and *Dichondra* in home plantings. A recent bulletin covers the recognition and treatment of these maladies.

Vegetable Diseases

Major diseases affecting principal vegetable crops, lettuce and cantaloups, as well as the more important diseases of cabbage and onion have been investigated at the Mesa Vegetable Research Laboratory by Dr. R. B. Marlatt and methods of prevention and control developed. Crown blight of cantaloups is being studied by Dr. Marlatt and Dr. M. R. Nelson, while Dr. Ross Allen and Dr. Paul D. Keener are investigating different phases of the problem.

Both Marlatt and Nelson are working on improved methods of control of the root knot of vegetables on tomato, and other vegetable crops. Dr. Keener has been making a critical study of the various virus diseases of vegetables, especially tomatoes, cantaloups, watermelons and lettuce. Curly top, cucumber mosaic, western celery mosaic and tobacco mosaic (singly and in combination) have been found to be the most prevalent and destructive.

Seek Resistant Varieties

Several research projects which include cooperation with other departments and agencies in the search for and development of disease resistant varieties are in progress: Alfalfa clones resistant to the major root and crown rots, cotton resistant or tolerant to verticillium wilt, and disease resistant or tolerant turf grasses. Control of the relatively new southwestern rust of cotton is being sought by Dr. Streets and Dr. L. M. Blank, U.S. Department of Agriculture plant scientist.

Three editions of a bulletin summarizing information on diseases of roses in our semi-arid climate, where problems of disease control and culture are different, have been issued through the years by Dr. Streets. Popular articles have been issued at intervals and a fourth bulletin is awaiting publication. A new project, in cooperation with horticulture, is a study of disease control problems in connection with the large scale commercial production of roses.

Study Pine Fungi

Studies in forest pathology, especially relating to coniferous trees, were initiated by Dr. Keener in 1949. One of the major problems concerns the identification, epidemiology and pathological histology of several fungi attacking needles of the principal lumber tree, *Pinus ponderosa*. Another disease of the same species, limb rust, caused by *Peridermium filamentosum*, is undergoing reappraisal as to prevalence and pathogenic importance.

