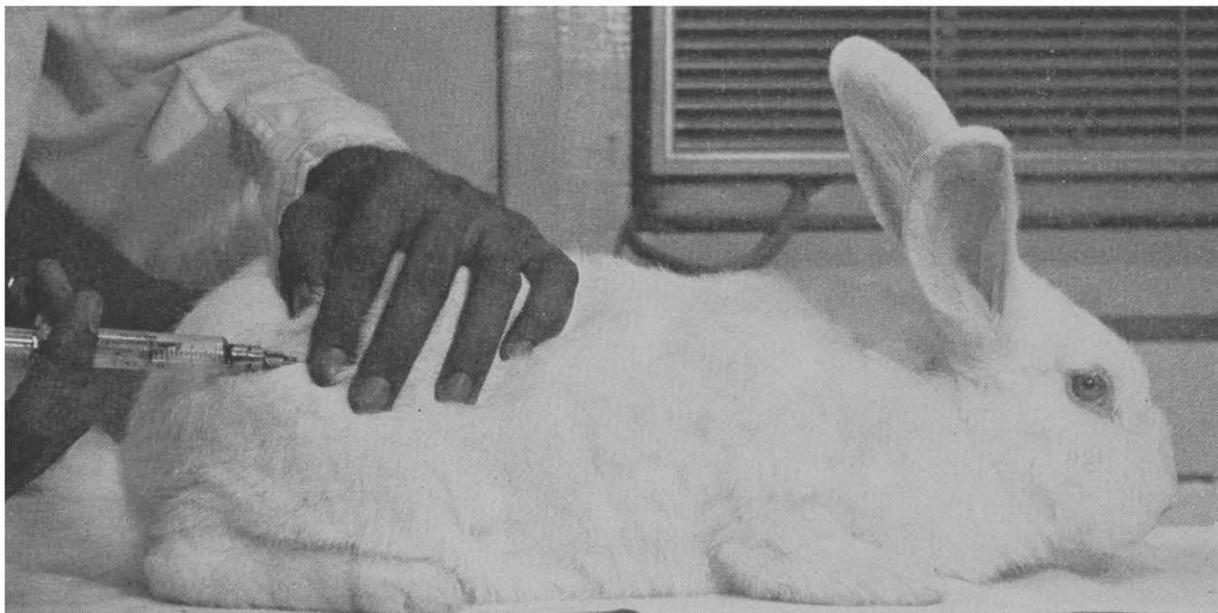


Little White Rabbit Aiding Citrus Bud Indexing Program



Leonard Storm and R. B. Streets

Rabbits are helping the plant pathologists by supplying them with antibodies. When a foreign protein is injected into an animal body, antibodies are produced. These then will react with the original protein when they are mixed.

This principle is being used at the University of Arizona to aid in diagnosis of citrus virus diseases.

To furnish virus-free budwood to Arizona citrus growers it is first necessary to be able to determine if a given virus is present in the mother tree. Since some citrus viruses do not produce symptoms in infected trees until the trees are 12 to 20 years old, detection of the citrus viruses is slow and often difficult. Although indicator plants are available for some viruses, many others have no indicator plants, and research workers are often forced to wait 20 or more years before they can reasonably be sure that a tree is free of a certain virus.

Serology: How it Works

Serology is a branch of the science of immunology which deals with the produc-

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The reader is referred to "Virus Indexing for 'Clean' Citrus Bud Source Trees," by Dr. Ross M. Allen, on Page 5 of the Winter, 1961, issue of *PROGRESSIVE AGRICULTURE*. Dr. Allen, Plant Pathologist at the Yuma Branch Station, discussed in that article procedures currently used in producing virus-free budwood.

tion and usage of blood sera and antibodies. In the human body, with its circulatory system, a doctor is able to inject a harmless form of a disease organism, thus protecting a person from the dangerous forms of that organism.

For example, we have all been urged to get our polio shots. The polio shots are made up of a harmless form of the polio virus. When this harmless virus enters the blood stream antibodies are produced. These antibodies are able to attack all forms of the virus. When a person who has had polio shots is exposed to a severe form of the virus, the antibodies in his blood attack the virus. As a result of this attack the virus is precipitated, carried in the blood stream to the kidneys and excreted.

The same principles are applied to plant viruses except that the antibodies are produced in rabbits and the precipitation is accomplished in a test tube where it can be detected.

Inject Rabbits With Virus

In the university laboratories, rabbits are injected with viruses concentrated from citrus fruit. Antibodies are formed in the serum of the rabbits' blood. This serum containing antibodies (antiserum) is removed without harm from the rabbit at intervals of two weeks. When the juice from suspected fruit is mixed with the antiserum a precipitation will appear in the test tube if the virus is present. These precipitation tests are very accurate and rapid. Thus in only a few days it is possible to learn if the tree in question is free of the virus.

Although serology has been used for

many years in identifying virus diseases of ornamentals, vegetables and field crops, many technical difficulties have prevented it from being used in the identification of fruit tree virus diseases. Research workers at the University of Arizona have recently been able to overcome the technical problem and have produced an antiserum to two viruses involved in stubborn disease of citrus.

Soon it should be possible to use the stubborn disease antisera in detecting the disease in trees which as yet show no symptoms. This technique could save many years in the search of budwood free from stubborn disease.

Could Speed Detection

If serological methods can be extended to other citrus viruses, which are difficult to identify, the program to furnish the Arizona citrus industry virus-free budwood will be speeded up appreciably. Testing of citrus trees as potential sources of virus-free budwood could be accomplished in weeks, as contrasted to periods ranging from months to years using present techniques. Also of importance, the cost of the program could be substantially reduced, since use of costly greenhouse, screenhouse and field plot facilities would be greatly decreased.

Tucker is Concluding Fertilizer Use Study

Dr. T. C. "Curt" Tucker, University of Arizona soils scientist, is terminating a project aided by a grant from U. S. Steel.

The project, titled "Effect of source of nitrogen and time of application on cotton," is a windup of four years of research.

Nitrogen sources have been compared, when applied to cotton at two irrigation levels and also two different times. Tucker sought to learn the effect of timing of nitrogen application on vegetative and fruiting characteristics and yield of lint.

The use of petiole analysis for nitrate nitrogen has been related, in this study, to yield and the factors which lead to yield.

Purpose of the study, of course, is to elicit information helpful in nitrogen fertilization of the cotton crop.

BEEF CATTLE

The gross cash income to Arizona beef cattle producers, including the last two months of 1959 and the first 10 months of 1960, is estimated to be \$145.6 million. When the estimated cost of cattle shipped in the state, \$53.6 million is subtracted from the estimated gross cash income, it leaves a value for the beef produced in Arizona and sold during this period of \$92 million compared to \$97 million a year earlier.