



Effect of aphid infestation, in comparison with control. The brown thin and dying area is a strip which was missed when the insecticide was applied.



Many Weapons Used In Battle Against

Spotted Alfalfa Aphid

L. A. Carruth
Department of Entomology

The spotted alfalfa aphid was discovered in Arizona in 1954 and soon became the most important alfalfa pest in the state. Although early tests by University of Arizona entomologists resulted in effective insecticide recommendations, which did much to reduce losses from aphids attacking alfalfa foliage, it was soon apparent that other important problems remained to be solved. For example, insecticide applications of the type used on alfalfa foliage were relatively ineffective for controlling aphids on young seedlings.

A need for foliage insecticide treatments of lower cost, greater effectiveness and without objectionable toxic residues at harvest also was recognized. More information was needed on the importance of natural enemies, weather, and other factors as agents for aphid control.

More effectively to find answers for these and other problems, an expanded cooperative research program was begun in the summer of 1955 between the University of Arizona Agricultural Experiment Station and the Agricultural Research

Service of the United States Department of Agriculture. Under an agreement, which was aided by a new allocation of federal funds and additional support from U of A funds, a unified research program involving both federal and university workers is now in progress in Arizona.

Salt River Valley Study

Basic studies of the spotted alfalfa aphid, its natural enemies and its control by introduced parasites, are being made by O. L. Barnes and W. M. Nielson at the U.S.D.A. Cereal and Forage Insects Laboratory in the Salt River Valley. These workers are also cooperating in the evaluation of alfalfa varieties for aphid resistance, in experimental plantings by the Department of Agronomy at the University of Arizona research farm at Mesa.

Further investigations of insecticides for aphid control are being made by D. M. Tuttle and V. D. Roth at the University of Arizona's research laboratory near Yuma.

Attacks Young Seedlings

The destruction of newly-emerged alfalfa seedlings has been one of the most serious forms of injury caused by the spotted alfalfa aphid in Arizona. Growers have frequently been forced to re-

plant as many as three times to obtain an adequate stand.

Conventional types of applications of insecticides to alfalfa seedlings have been ineffective and wasteful of material. The feasibility of treating seeds with insecticides to protect young seedlings from aphid attack was, therefore, investigated. During the past year, 24 insecticides have been used one or more times as seed soaks, or as dust or emulsion formulations for seed surface applications.

Only a small number of these materials have been conclusively promising as thus far tested. Of these, only Thimet (when legally registered and approved for sale) and lindane, both at the rate of four pounds of actual toxicant per 100 pounds of seed, appear suitable for early use by growers. Seeds were more readily coated with insecticides after a preliminary coating of five percent methyl cellulose solution applied at the rate of $\frac{3}{4}$ ounce per pound of seed.

During the past three seasons, 72 formulations of 34 different insecticide compounds have been used in numerous tests against the spotted alfalfa aphid in Arizona. This work is still in progress in an attempt to develop cheaper and more effective treatments which will leave no illegal residue deposits.

A summary of the best available suggestions for controlling this pest, based on tests conducted in Arizona, is contained in University of Arizona Agricultural Experiment Station Report No. 131, entitled "The Spotted Alfalfa Aphid (A Progress Report)," which may be obtained on request from the Mailing Bureau, University of Arizona, Tucson.

miles. It is located about 10 miles east of Tucson. Normal rainfall in this area is around 11 inches a year. Most of the runoff occurs in the summer as the result of intense local thundershowers. Very little, if any, of this runoff ever reaches the ground-water reservoir. Twenty-seven standard rain gauges and two recording rain gauges were installed in the summer of 1955. Records of rainfall are complete from August 1955 to the present. Runoff is measured volumetrically in three reservoirs on the area. These reservoirs were

equipped with automatic water level recorders in the spring of 1956 and we have complete runoff records for the summer of 1956. Flow rates from a portion of the area are measured in a critical-depth flume.

1956 Unusually Dry

The year 1956 has been a year of low rainfall. Total average rainfall on our study area during the period January through September was 6.45 inches, 2.25 inches lower than the normal rainfall for this period at the University of Arizona. Three storms occurring in July and Aug-

ust produced 248 acre-feet of runoff, or almost 14 acre-feet of water per square mile of area. This yield is lower than we could normally expect, but since we have only one year of record, we cannot be sure. However, this yield is encouraging since our study area is located in the area of lowest rainfall in the upper Santa Cruz Valley.

Another phase of our project will be to carry out laboratory and field experiments on artificial recharge. There are many serious difficulties to overcome, but we hope to make artificial recharge a reality in Arizona.