

Breeding Alfalfa To Have

More Resistance To Parasites

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The joint release in 1957 of the alfalfa variety, Moapa, by several state and federal agencies inaugurated a new method of insect control on alfalfa in Arizona—that of plant resistance. Plant resistance can express itself in three ways:

1. Non-preference — having any quality which tends to discourage or repel an insect from feeding, resting or laying eggs on a plant.
2. Tolerance — having the ability to sustain insect infestations without apparent or serious damage.
3. Antibiosis — having the ability to prevent or hinder normal insect development and reproduction.

Eggs and Summer Heat

(Cont. from preceding page)

partially, the reason for poorer feed utilization among caged birds. However, the added factor to be considered here is the inability of the cage bird to find protection against cold weather. During the cold months the caged flock will use much of the feed energy to maintain body temperature.

The relationship between feed utilization and environmental temperatures can best be seen by comparing the winter and summer feed conversion differences. With one exception the amount of feed required to produce a dozen eggs declined in the summer. Yet, this occurred in the face of declining egg production, which, as stated earlier, is contrary to the usual pattern.

Calls for Special Diets

Lowered feed intake in the summer

Many Strains Aphid-Tested

Initial resistance work in Arizona was begun in 1956 on the spotted alfalfa aphid, since at that time it was by far the most destructive of the alfalfa insect pests. During 1956 and 1957 many varieties and strains of alfalfa were evaluated for performance under heavy aphid populations. Five of these varieties had considerably fewer aphids, and were damaged less than all other entries.

Three of these varieties have been released to growers. One of these is Moapa, which has been recommended for southern Arizona and California; Lahontan for northern Arizona and California, Utah and Nevada; and Zia for New Mexico.

More recently research efforts have been directed toward obtaining new and better sources of resistance to the spotted alfalfa aphid. Large scale plantings have been made of adapted southwestern varieties such as African, followed by exposure of seedlings to heavy populations of the spotted alfalfa aphid. Frequently under such conditions less than one in a thousand seedlings survives. These survivors are subjected to further individual

does not explain it, because we are comparing the number of pounds of feed required to produce one dozen eggs. The data again indicate that relatively less feed energy is used for body temperature maintenance during the summer. The practical application of this observation is the feasibility of formulating a diet for winter egg production furnishing feed energy at a lower cost. The reverse would apply for the summer period.

In summary: (a) Certain chemotherapeutic agents may find use for maintaining summer production; (b) Such additives may be more useful when fed on an intermittent basis; (c) High levels of such supplements should not be administered without professional advice; (d) Different additives may be required for floor and cage-housed birds; (e) There is room to speculate that seasonal productivity can be overcome by environmental control, breeding and changes in the relationships of nutrients.



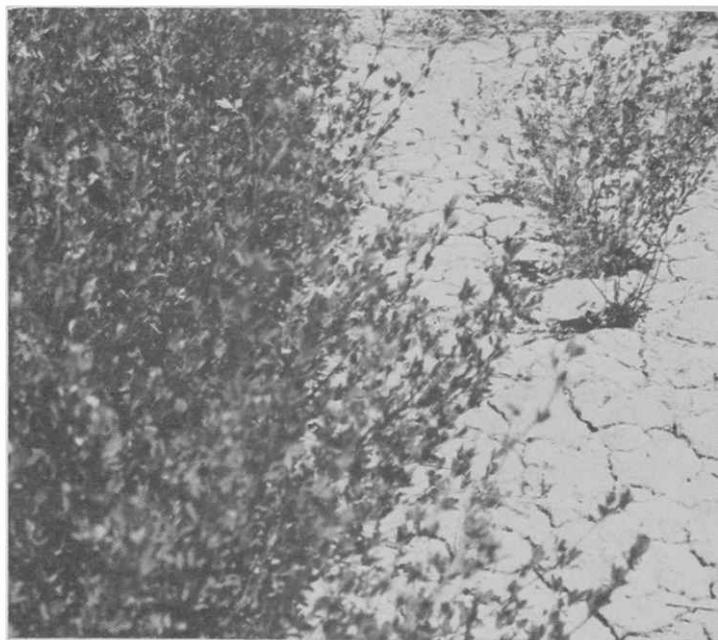
BORDER SIZE plots of resistant and non-resistant alfalfas. Note that plot at left shows heavy growth of weeds and grass, where non-resistant alfalfa was grown. Contrast is lustrous alfalfa growth in plot of resistant variety, at right.

tests with caged aphids. Only the plants on which aphids are unable to develop and reproduce are saved for further evaluation.

Seek Further Resistance

This year preliminary studies are being conducted at the Yuma and Mesa branch stations to find sources of resistance to some other important alfalfa pests, such as the pea aphid, leafhopper, the three-cornered alfalfa hopper, lygus bug, stink-bug and the clover seed chalcid. Results to date have shown that resistance to these insects will be much more difficult to find.

However, there is some evidence that certain varieties and strains of alfalfa have some degree of resistance to one or more of these insects. It is the ultimate goal of this cooperative effort between state and federal agencies to develop an alfalfa highly tolerant or resistant to most of these insect pests.



ROW AT LEFT, in this nursery plot, is aphid-resistant alfalfa, while at right a few puny plants are all that is left of a row of non-resistant alfalfa.