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Late infection of

Curly Top in Field Melons

in producing areas of desert valleys

Low populations of beet leafhoppers, rare incidence of curly top infection, and an almost complete absence of crown blight in the melon producing area of the Colorado desert in the spring and early summer of 1959 coincided with a good melon crop.

In 1958 when the melon crop failed in the Imperial and Palo Verde valleys, there were large populations of beet leafhoppers, a great deal of visible curly top infection in such good indicator plants as tomato, and widespread crown blight of melon plants. Some of the melon plants showed the extreme stunting characteristic of early infection by curly top virus, but most of them grew beyond that point and set a few fruits. Curly top infection seriously injures melon plants if they are infected by the time they get six true leaves. Plants infected later than the six-true-leaf stage grow reasonably well, so it has become an accepted idea that late infection of melons by curly top does not harm the plants.

The absence of natural curly top infection of melon plants in 1959 made it possible to test the effect of experimental infection without the confusion of natural infection of check plants.

Test plots to study the effect of inoculation by curly top virus at two stages were set up in a cantaloupe field about three miles south of Blythe. In a series of tests on early infection curly top-infective beet leafhoppers were confined on March 23 to cantaloupe plants with only one or two true leaves. In tests on late infection, infective beet leafhoppers were confined to larger cantaloupe plants with from five to 49 leaves, an average of 15.1 leaves per plant. The late infections were made with a strain of curly-top virus taken from cantaloupe in the Imperial Valley in 1958. The test strain is quite mild in sugar beet and is well adapted to melons.

Most of the plants infected early were severely stunted. They stopped growing when they had only 6–20 leaves, and bore no fruit. A few of the plants grew until they had 30–45 leaves and then bore small melons. A very few of the infected plants grew to practically full size and bore a nearly normal crop. Since only every third hill in the row was used in the tests, most of the infected plants were strongly overgrown by healthy plants. Most of the overgrown plants were dead by picking time.

Late-infected plants also showed a range of symptoms, although most of them showed some stunting. Some plants stopped growing when they had from 40 to 50 leaves; others grew to various sizes up to full-sized plants with more than 250 leaves. All late-infected plants set and matured some fruit, most of it small, poorly netted, elongate, and with low sugar. There was a strong tendency to ripen the fruit early. Much of the fruit on infected plants was ripe several days before the field was first picked. Plants in this field that were not intentionally infected showed no pests except powdery mildew, and the crop was good.

On June 2, just before the first pick, the melons in the test plots and in the check plots were measured and counted. The yield, in crates, of plants infected with early curly top was about 7% that from healthy plants, while the yield from plants with late curly top yielded about 44% of the normal. The plants infected with late curly top bore about 70% as many melons as the healthy plants but they were generally smaller and peaked at 45 per crate. Melons from healthy plants peaked at 36 per crate.

In 1959 there were practically no melon plants in the Palo Verde Valley

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Melons on left and below on curly top, upper on healthy plant.

Cantaloupe hill infected with late curly top on left, healthy hill on right.

H. T. STRONG, M. T. CLEGG, AND J. H. MEYER

Enzymes as a feed additive for

Finishing Beef Cattle

failed to show significant benefit in feed lot trials

Some 900 steers were included in the first of a series of trials designed to field test feeds, feeding practices, and the reported benefits accruing from the addition of an enzyme to a feed lot finishing ration.

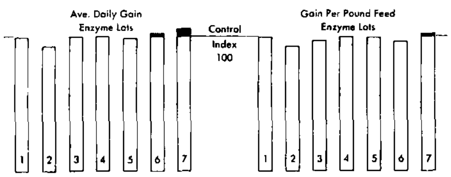
The trials were conducted in cooperation with feed lot operators in Fresno, Kings, Los Angeles, Riverside, Imperial, Santa Barbara, and Napa counties. From 32 to 91 animals were involved in the test in each feed lot, with a total of some 900 head in the entire trial.

The cattle were steers of varied origin. With the exception of two trials with Brahman crossbreds, the animals were straight Hereford breeding with a few Hereford-Angus crossbreds in two of the tests. Most of the cattle were within the Choice to Good feeder grades. In each test the animals were randomly selected into two lots. One lot, which served as the control, was fed the regular feed lot ration. A commercially prepared enzyme was added to the ration of the second lot.

Prior to each trial, the cattle were randomly sorted into two pens and fed the regular feed lot ration for about two weeks. They were then weighed, following an overnight stand without feed or water.

The animals in the control pen in each feed lot were provided with the regular feed lot ration. The animals in the test pen were given the same ration with the enzyme material added at the rate of 31 grams per head per day. In four of the seven trials the enzyme was mixed with the ration in a batch mixer. In the remaining three trials a daily measured amount of enzyme was sprinkled over the feed in the trough and mixed into the ration by hand with a fork. Addition of enzymes had no apparent effect on palatability of the ration.

Steers in feed lot trial with enzyme additive in ration.



All rations fed were similar in composition, with a roughage-concentrate ratio of approximately 25 to 75 when on full feed. Samples of the control ration were collected at intervals during the trial and analyzed for dry matter, protein, fat, ash, nitrogen free extract, fiber and lignin content.

In all trials stilbestrol was included in the regular feed lot ration and was, therefore, fed to both test pen and control pen at 10 milligrams per head per day.

At the close of each trial all lots were again weighed, following an overnight stand off feed and water.

While the number of head, days on feed, initial weight of cattle, average daily gain and feed consumed per pound gain varied between feed lots in the trial, there was little or no difference for any of these items between the control and test pens within each test.

In the four trials from which slaughter data were available, there was no significant difference in the dressing percentage between the control pen and the test animals. Most of the carcasses graded U. S. Choice. In one test 90% in the control group graded Choice, but only 83% of the enzyme-fed group reached Choice.

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Direct supervision of the feeding trials was maintained by the farm advisors in the test counties.

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with symptoms of natural infection by curly top. Experimentally infected plants had the same symptoms that were almost universal when the crop failed in 1958: stunted gray-green plants, some very small; death of crown leaves; sparse set; fruit small in size, poorly netted, elongate, low in sugar, and ripening prematurely.

The Palo Verde Valley melon crop failure in 1958 probably was caused by curly top infection from the large beet leafhopper population present that year. Some of the infection was early and some late, but almost all melon plants must have been infected by curly top virus.

In 1958 the melon plant disorder was referred to as crown blight. The deduction that curly top infection—particularly when late—can contribute to at least one condition of crown blight is supported by the almost complete absence of crown blight in the Palo Verde Valley in 1959, when curly top infection was very rare.

The wet winter of 1957–58 caused a large growth of desert annual plants favored by the beet leafhopper as breeding hosts. The leafhopper population bred up on the desert and, when the vegetation dried up, migrated to the valleys. The winter of 1958–59 was dry with no desert annual vegetation and therefore contributed to the low beet leafhopper population in the spring of 1959. Other factors may have helped keep the population low; for instance, a rather small beet leafhopper flight into the Palo Verde Valley while the melon plants were coming up did not remain, but seemed to migrate north.

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