from de novo synthesis of the MDH molecules, density labeling experiments were performed. Our results showed that both s-MDH's and m-MDH's extracted from scutella grown in 70% D_2O with 10mM $^{15}NH_4Cl$ do have higher buoyant densities than those grown in H_2O and $^{14}NH_4Cl$. This finding indicates that both s-MDH's and m-MDH's in the scutella of developing maize seedlings are de novo synthesized. These results suggest that in maize m-MDH isozymes are synthesized in the cytoplasm and then become associated with the mitochondria.

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1. Genetic studies of susceptibility to bacterial leaf freckles and wilt, Corynebacterium nebraskense.

A new bacterial wilt disease first discovered in Dawson County Nebraska in 1969 and later found in 23 counties in Nebraska, one in Iowa and one in Kansas, was observed to be much more severe on some hybrids than others in a demonstration plot in Dawson County in 1971. Therefore some preliminary studies have been conducted to obtain information on the genetic nature of susceptibility and tolerance in lines and their hybrids.

Twenty-three lines previously used in two diallel crosses (one 10 x 10 and one 13 x 13) were evaluated in the greenhouse in 1972. Two weeks after planting seeds in soil in pots, the plants were inoculated using a 25 gauge, 1 cc plastic tuberculin syringe. Two punctures were used, one just above ground level and the other about one inch above the first and at right angles to it. A total of 1 ml of inoculum containing approximately 1×10^8 bacterial cells from a mixture of 6 cultures was injected into each plant. Plants were each rated for susceptibility two weeks after inoculation using the following scale: 0 = no visible infection, 1 = slight infection, 2 = moderate infection, 3 = severe infection and 4 = dead. Since no plants were killed and the highest rating was 3, a

disease index was calculated by dividing the mean rating by 3 and multiplying by 100.

No resistant lines were evident and only a few 0 ratings were given. However, some lines were definitely more tolerant than others. Disease indexes ranged from 30 to 100. The most tolerant line and the two most susceptible lines from one diallel and the two most tolerant lines and the two most susceptible lines from the other along with their F_1 and F_2 hybrid and available backcross generations were then grown in the greenhouse in gravel beds flushed periodically with nutrient solution. Approximately the same inoculation and rating procedure was followed as in the first experiment except that inbred lines had not reached sufficient size to be inoculated until 18 days after planting.

In the second experiment, F_1, F_2 and backcross generations tended to be intermediate between their susceptible and tolerant parents. Ratings obtained were quite close to that expected based on an additive model.

The third experiment included the same lines and F_1, F_2 and backcross generations of Experiment 2 but it was grown in a field nursery in 1972. Planting date was June 3, plants were inoculated June 22, and disease ratings were determined July 14. A mixture of 6 cultures of the bacteria were again used in a sterile distilled-water suspension but in a higher concentration of about 2×10^8 bacterial cells per ml. One ml was injected into each plant using two injections as before--one at ground level and another one inch above the first and at right angles to it.

Some plants were completely killed and distinct differences between lines were evident. In addition to leaf blight and wilt symptoms, stunting of some plants was evident. In general, field ratings were in agreement with greenhouse ratings; however, the correlation coefficient between field ratings and greenhouse ratings was only 0.55. Hence, the predictive value of greenhouse studies is not as good as we would like. One experimental line which was completely susceptible in the first greenhouse experiment (Index = 100), and quite susceptible in the second (I = 82.4) was somewhat intermediate in the field (I = 68.5). Two of the most resistant lines, B37 and N10, appeared to be more susceptible in the field study than in the greenhouse. Nevertheless, the more tolerant lines based on greenhouse studies were also the most tolerant in the field, and they produced hybrids

which were also more tolerant than hybrids of susceptible x susceptible or susceptible x tolerant lines.

We can conclude from these studies that some lines are quite susceptible and some are reasonably tolerant but none were resistant when Corynebacterium nebraskense cells are injected into the plants at the dose levels used. Crosses of susceptible x susceptible, susceptible x tolerant and tolerant x tolerant lines tend to be intermediate between their parents. Probably more than one major gene locus controls disease reaction, but no definite conclusions can be drawn at this time. Further refinement of techniques are essential and further studies are needed to establish the genetic nature of disease reaction on corn plants.

We can definitely conclude that the use of resistant lines and hybrids and the breeding of even more resistant ones seems to be the best way to avoid farm losses due to bacterial leaf freckles and wilt of corn in Nebraska.

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1. Growth regulator induction of parthenocarpy in maize.

Natural parthenocarpy in maize is a common occurrence on partially fertilized ears. Growth substances from pollen or developing seeds stimulates parthenocarpy in unfertilized ovaries. This was first noted by Jones (1920) and investigated by Mangelsdorf (1926). Britton (1947, 1950) artificially induced parthenocarpy with alpha-naphthaleneacetic acid applied through a thistle tube in the cob or topically to the exposed ovaries. He included indole-3-acetic acid, indole-3-propionic acid, indole-3-butyric acid and beta-naphthoxyacetic acid in the 1950 study, but did not continue their use because of low or irregular response. He also tried applications of NAA to the silk, but got no ovary response to that method of application.