

A search for better

# Field Corn Varieties

by intercrossing

The major portion of California's field corn acreage is planted to hybrid varieties developed in the Midwest. These varieties have produced relatively high yields under ample water and essential plant nutrients. However, it seems unlikely that such varieties would represent the ultimate in adaptation to conditions in this state.

Research is being conducted to develop varieties with higher yields, better disease resistance and improved stalk quality so that they would stand erect for harvest during the dry fall season.

In most corn-growing areas of the United States, a number of locally adapted open-pollinated varieties served as sources of parental lines in the development of superior hybrids. In California, only one variety was grown to any extent before the introduction of hybrids from the Midwest. That variety was known as King Philip Hybrid, although

not a hybrid in the modern sense. Conventional methods of corn breeding with that variety used as a source of parental lines were not successful. Inbred lines were introduced from other areas to combine with those derived from the local source. This proved to be a promising approach to the development of better hybrids. However, most of the lines were lacking in one or more characteristics essential for maximum performance. A method is now being used which is a modification of the system of reciprocal recurrent selection which was proposed by researchers in North Carolina.

### Potential Lines

In this method, two new sources of potential lines have been developed. Source *A* resulted from intercrossing a number of the most promising lines from the King Philip Source. This intercross-

ing should permit recombinations of their desirable attributes. Similarly, Source *B* was produced by intercrossing a number of promising lines from the Midwest.

From Source *A*, individual plants are chosen. Progenies from these plants are top-crossed to Source *B*. In reciprocal fashion, selected progenies of individual plants of Source *B* are top-crossed to Source *A*. Only the best selections from *A*, as determined by their performance in top-cross tests, are saved. They are intercrossed to form a new Source *A*. A similar procedure is followed with the selections from *B*. The cycle is then repeated. After two or more cycles of this type of selection it is expected that Source *A* when crossed with Source *B* will produce a superior variety as only the best types of plants in each source are saved after every cycle.

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## AVOCADO

Continued from preceding page

blade near the base of the midrib remained green longest. Dry matter of the uppermost mature leaves of the culture that received no magnesium contained 0.169% magnesium, whereas the lower-

most leaves contained 0.202% instead of the 0.70% typical of healthy trees. The dry matter of the rootlets contained only 0.080% as against about 0.500% found in roots of healthy trees.

A similar nutrient solution was used with large, outdoor silica sand cultures with concentrations of magnesium nitrate

in the nutrient solutions of 0, 18, 36, and 53 ppm. Ammonium nitrate was used to equalize the total nitrogen in all cultures.

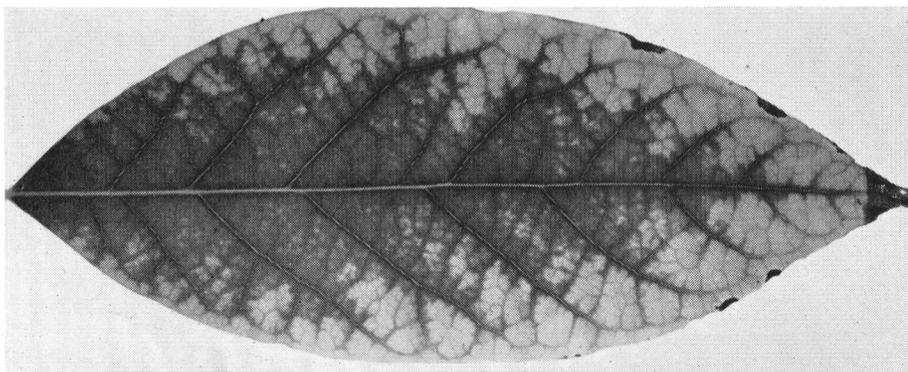
### Absence of Magnesium

When no magnesium was present in the nutrient solution, the green color began to disappear first along the margin of the leaf blade, with the portion along the midrib and near its base remaining green the longest. The culture with no magnesium produced the poorest roots, the dry weight of the entire rootstock—below the bud union—being only 770 grams whereas in the other cultures rootstocks weighed 1,472, 1,265, and 1,574 grams as the concentration of magnesium in the experimental nutrient solution was increased.

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**Toxicity symptoms in an avocado leaf from a soil culture containing 216 ppm magnesium and 159 ppm calcium. Lowering the concentration of magnesium eliminated such symptoms.**