

# Plenty of Moisture, Not Enough Soil Fertility

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**T**HE weather records of 1950 for Missouri, and for the rest of the Corn Belt, report the distribution of rainfall during the corn-growing season as very favorable. No period longer than 12 days without significant rainfall during June, July, and August is the record of the weather station at Columbia, Missouri. For June the total rainfall there was 4.87 inches, for July it was 3.04 inches, and for August it was 5.76 inches.

However, in spite of the favorable distribution of rainfall during the summer months, and of the generous total supply of it, the corn crop examined in the fields and in the wagons this fall is disappointing in too many cases for us to be complacent about it. Examination of the corn in many fields in going across not only Missouri, but also Illinois on the east, and Kansas on the west, gives a similar report. Kansas announced "Corn yield per acre best since 1889," to suggest that even with big yields we are just now winning back. Even though this was a "banner year," it is disturbing to many folks still looking for "nice, big ears" when more of them—of less size—per acre and per stalk make bigger production. The ends of the ears are not filled, grain counts per row or per cob reveal as much as 20 per cent of the potential grains unfilled on the small end. The shelling percentage is correspondingly low. Something failed to carry through to finish out the ear. Something was running short, apparently, before the finish.

Such facts suggest that the fertility

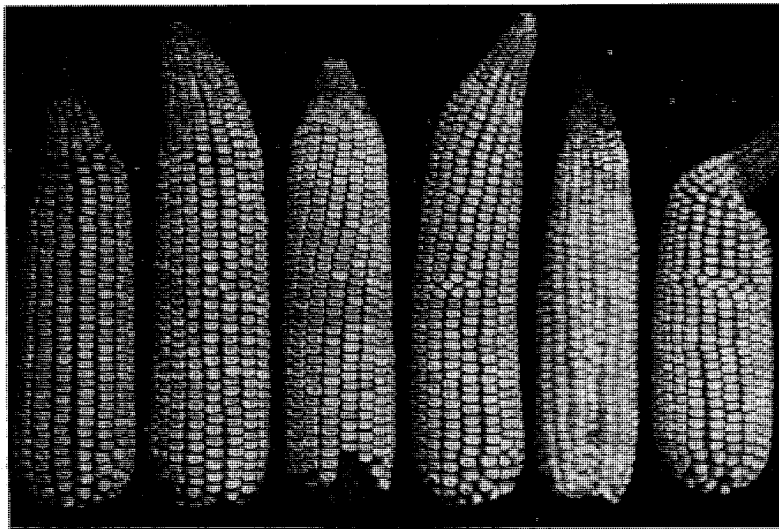
delivered by the soil was not enough to balance the moisture contributed by rainfall. The latter was equal to more corn but the fertility supplied by the soil was not.

Such a condition in which the tips of the ears fail to fill suggests a potassium deficiency. Treatments of potassium on the soil which gave well-filled ears this year verify that suggestion. Poor tips of ears are common even where ammonium nitrate and sulfate have been used. It is clear, therefore, poor tips are not due to nitrogen shortage. Poor tips are also common this fall on soils that had received generous amounts of phosphorus for some years past.

Nor can these defective ears be ascribed to a calcium shortage in the soil when they were so common on soils properly limed. Whether a magnesium deficiency in the soil and in the plants is responsible is still an open question.

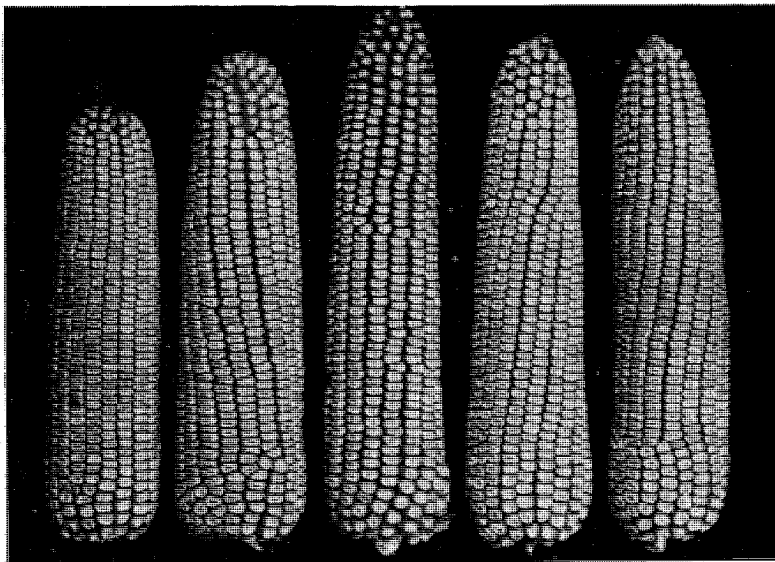
Insufficient potassium supply seems the most likely cause of these defective ear tips, since experiment fields have well-filled ears of corn where potassium was generously applied.

When the surface soil is constantly moist, the roots drink and feed in the topsoil. When the rainfall is less and the surface soil dries out, the roots go more deeply into the soil ahead of the drying effects. Penetration into the heavier clay layers of the soil makes contact with the untapped potassium reserves. Deeper rooting brought about by occasional shortages of rainfall means



No potassium was applied for the corn above. These poorly filled ears from the 1950 plantings at the Missouri Experiment Station indicate a case of wet-weather deficiency of potassium.

Potassium was applied for the corn below. Both plots had the same frequent, well-distributed rainfall to encourage shallow rooting and shallow feeding by the corn plants. Both plots had phosphorus, nitrogen, and calcium.



root-clay contacts with greater soil masses of fertility.

The corn crop this season indicated that the surface soil was not deep enough and was insufficiently stocked with fertility, at least with potassium, to balance the good supply of water. The weather was ample but our provision of fertility was not enough to make most use of that good weather.

When the yields as bushels per acre, and the shelling percentages of the present corn crop as a whole are summarized, we shall in all probability conclude that during the season of 1950 there was plenty of soil moisture but not enough soil fertility. We must then confess that we have not made maximum use of the opportunities naturally given us.

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