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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

Southern Corn Leaf Blight

Talk at the 1971 Outlook Conference, Washington, D. C. 9:55 a.m.
Wednesday, February 24, 1971

The blight epidemic of 1970 was due to a combination of several factors: (1) a new race of the fungus which was highly pathogenic on corns carrying the T sterile cytoplasm, (2) a large percentage of our corn acreage planted to T cytoplasm or blend hybrids, (3) weather factors generally favorable to the spread of the disease and (4) other factors which are not understood.

Under favorable moisture and temperatures the blight spreads rapidly. The fungus produces a pathotoxin which kills tissue adjacent to the lesion. If infection is heavy the plant may die very rapidly.

We now know that we have had the T race of the fungus for several years. We have also had a large acreage of T cytoplasm hybrids. Why then have we not had serious blight in previous years. This is a question for which we have no satisfactory answers.

The new race of the fungus, Race T, differs from the old race, Race O, in many ways. First it attacks leaves, stalks and ears whereas the old race attacked only the leaves. Second the new race can complete its infection cycle in 4-6 days; the old race requiring 6-8 days. This new race can also grow and be infective at lower temperatures.

Feeding trials with blighted plants have shown no adverse effects on either steers or heifers. Blight damaged grain, when fed to swine or chickens, has shown no harmful effects. Other tests using rats, mice or guinea pigs have also shown no toxic effects. The pathotoxin therefore is not injurious to animals although it can kill tissue on T cytoplasm plants very rapidly. The toxin has no similar effect on normal cytoplasm hybrids.

When plants and ears are infected with blight, germination of seed may be adversely affected. Some seed lots produced in 1969 and 1970 exhibited such low germination percentages as to be unsalable. The commonly used seed treatment, thiram and captan, are ineffective in controlling blight.

In some cases the fungus penetrates the seed. Such seed either do not germinate or give rise to abnormal or blight seedlings which die during

germination or in the seedling stage. Under favorable laboratory conditions such seedlings can produce viable spores. How important this may be under field conditions remains to be established.

The important question is: Will we have a recurrence of the blight epidemic in 1971? Unfortunately this cannot be predicted with any greater accuracy than one can predict the weather. We can however, consider some of the arguments for and against the recurrence of a serious blight epidemic in 1971.

Some of the factors that point to a possible recurrence of a serious blight epidemic in 1971 are as follows:

1. The blight is now widely distributed throughout the corn-growing areas in plant residue. The fungus within leaves, stalks or ears can withstand very low temperatures. Over-wintering tests being conducted at many States indicate the fungus is still fully viable in debris on the soil surface.
2. Blight has been present on corn growing in Florida throughout the winter. Spring planting has begun in Florida and viable wind-blown spores are now being collected.
3. Normal wind currents move up the Mississippi Valley from both the southeast and southwest providing a vehicle for the northward movement of spores.
4. The weather for 1970 was, in general, favorable for both the growth of corn and for blight infection. A normal year in 1971 would provide equally favorable conditions for blight.

Some of the arguments advanced for a reduced blight epidemic in 1971 would include:

1. There will be a higher percentage of N cytoplasm hybrids planted in the South this year. The T race of the blight is only mildly pathogenic on normal corn and therefore the spore supply may be drastically reduced.
2. Although infected plant debris occurs throughout the corn-growing area some argue this will not likely lead to local infections. In the recurring warm moist conditions preceding corn planting, the mycelium is stimulated to growth and spore production. Such

spores will be ineffective as there will be no plants to infect. Growth and spore production will stop under dry, cooler conditions. The mycelium cannot survive many successive periods of wetting and drying and may become ineffective before corn has emerged.

3. Debris from susceptible plants exhibits a reduced ability to overwinter and remain infective. Thus heavily blighted fields in 1970 may pose no more of an infective hazard than fields with only moderate or mild blight infection.
4. Even if some infection occurs from infected debris the fungus must go through 6 to 8 infection cycles before the number of spores are sufficient to cause an epidemic. This time interval is sufficient for the arrival of wind-blown spores from the South. Thus severe infection may not occur any earlier than in 1970.

Unfortunately both series of arguments involve a considerable degree of uncertainty and speculation. We shall have to wait for the final answer.

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