



Current Report

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SOUTHERN CORN BLIGHT IN OKLAHOMA

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Southern Corn Blight (race "T") was identified from diseased samples collected in the Guymon area August 25, 1970. However, unfavorable weather conditions, little rain or dew, restricted disease development and little decrease in yield resulted. We expect the blight pathogen to be present during the 1971 season and blight tolerant seed will not be readily available. Environmental conditions normal to Oklahoma should aid in limiting disease development.

The rapid and wide spread occurrence of Southern Corn Leaf Blight in 1970 caused major concern and growers are asking a lot of questions about this disease in Oklahoma.

Southern Corn Leaf Blight caused by the fungus Helminthosporium maydis is distributed over the world wherever corn is grown. The disease is not new, it has been known to occur in the United States for at least 50 years, but damage from infection was considered of minor importance. The disease appeared to be restricted to the southern half of the corn belt, occurring late in the season and only infecting the leaves. A new strain or race of the fungus called the "T" race caused this sudden and explosive transition from a relatively mild disease to one of major importance. It was named "T" race because corn hybrids produced with the Texas male sterile cytoplasm (T-ms) are very susceptible to this race of the fungus.

In the process of developing new hybrids, two or more inbred lines are crossed. To make these crosses, tassels are removed by hand from the female plants

to prevent self fertilization and pollination occurs only from the tassels of the male plants. Corn plants were found in Texas which were sterile or did not produce pollen. Seed companies incorporated this male sterile cytoplasm in one of their inbred lines thus making hand detasseling unnecessary, since one line would be sterile. This saved them at least \$200 per acre in labor and reduced the cost of producing hybrid seed corn. This encouraged the extensive use of Texas male-sterile (T-ms) lines and set the stage for the 1970 epidemic.

The epidemic of Southern Corn Blight in 1970 developed due to extensive use of susceptible hybrids (T-ms), the abundance of race "T" inoculum, and favorable weather conditions for disease development and spread.

The older race of the fungus, race O, attacks both T-ms and normal cytoplasm corn varieties but rarely causes a serious problem.

The susceptibility of cytoplasmic male-sterile lines of corn to the fungus was reported from the Philippines in 1961. The two physiologic races, "O" and "T", are morphologically similar. We find that the size, shape, number of cross walls and color of the spores are about the same in both races.

Symptoms of the two races vary somewhat in the field depending on the corn hybrid grown and various environmental factors. The "T" race is highly virulent on corn containing the Texas male-sterile (T-ms) cytoplasm and only mildly pathogenic on corn inbreds and hybrids containing "normal" cytoplasm.

The "T" race attacks all above ground parts of the corn plant, while race "O" attacks leaves only. The "O" race attacks both T-ms and normal cytoplasm corn varieties, but rarely causes problems. The primary infections develop rapidly but cannot be detected for several hours. Leaf lesions enlarge to about $\frac{1}{2}$ to 1 inch in length and $\frac{1}{4}$ to $\frac{1}{2}$ inch in width.

The "T" race lesions are more spindle shaped than those of race "O". Large, white to gray lesions may be found on the leaf sheaths and gray to dark-brown lesions develop on the husks of the ears. Infection can penetrate into the ears causing a gray to black rot of the kernels and result in a very serious rot of the entire ear and cob, making shelling difficult.

Southern Corn Leaf Blight is favored by warm, wet weather. High moisture conditions or rain, with air temperatures between 60°- 90° F are necessary. A film of moisture on the leaves and air temperatures in the 80's are especially conducive for infection and rapid disease development.

Race "T" appears to be a prolific spore producer and under ideal conditions can complete its life cycle in 60 hours. A film of moisture on a leaf surface for 4 to 8 hours is sufficient for germination of spores and infection to take place. This means that the disease can spread very rapidly and cause serious injury in a corn field in a very few days if conditions are favorable.

Conditions normal to Oklahoma, such as lack of rainfall and drying winds, are not conducive to development of Southern Corn Leaf Blight. The brisk winds can carry the fungus spores for many miles, thus spreading the fungus over large areas in a short period of time. However, low rainfall, low humidity, little dew, and surface or ditch type irrigation tend to inhibit spore germination. Preliminary research suggests that spores may also be carried on the seed, thus a good chemical seed treatment may be needed. Most plant pathologists believe that seed dissemination of the fungus plays a minor role in spread of the fungus.

Southern Corn Leaf Blight was not of economic importance in Oklahoma in 1970, however, it is here and growers should be concerned with the various control practices.

Don't panic! Field preparation should follow practices found best for your area and the equipment you have available. This is not the time to gamble on new crops or unfamiliar methods. Study the facts carefully before switching farming practices.

Suggested Practices for 1971

Plant the most disease tolerant seed available. Select adapted varieties.

Plant early - plants will be less affected.

Follow the cultural practices proven best for your area. Use a good fertility program.

Consider alternate crops - grain sorghum.

Use fungicides if warranted.

Dry shelled corn to 12-13 percent moisture. Follow good harvesting practices.

Current information regarding disease potential of Southern Corn Leaf Blight in Oklahoma in 1971 does not warrant changes in present practices. However, growers may want to consider some of these suggestions for added protection.

Seed Selection: Total seed corn seems to be adequate to plant the same acreage as was planted in 1970, however resistant seed is scarce and little will be made available in Oklahoma.

Hybrid seed corn in Oklahoma will be labeled according to resistance - N, T or B. The "N" indicates the seed carries normal cytoplasm which is tolerant to the disease. All blight susceptible seed, containing Texas male sterile cytoplasm will be marked with a "T". Bags containing a mixture of "N" (Resistant) and "T" (Susceptible) seed will be marked with a "B" meaning the seed is a blend showing percent of N and T.

Early Planting: Southern Corn Leaf Blight (Race T) caused less damage on susceptible varieties planted early. Resistant vari-

eties produced high yields, regardless of planting time. However, don't plant too early, wait until soil is optimum for maximum germination.

Oklahoma growers should follow good management practices such as proper planting and tillage practices, crop rotation, timely irrigation, weed and insect control, and a good fertilization program.

Aerial and Hi-boy spray applications to prevent Southern Corn Leaf Blight have been successful in several states. When Hi-boy is used, we suggest applying the fungicide in 30 to 40 gallons of water per acre. Four hollow cone-type drop nozzles, two on either side, spaced and directed to cover the ears and upper foliage, and a fifth nozzle above the row are necessary to obtain adequate coverage. Aerial application is easier, faster, and more operable in the irrigated fields. Only aircraft properly equipped for fungicide application should be used (Micronair sprayers are suitable). Recommended fungicides should be applied in at least 5 gallons of water per acre.

In Oklahoma only two to four applications on 10 - 14 day intervals may be needed for disease control. Frequent rains or overhead irrigation may require reducing the spray interval to 7 - 10 days. Fungicides need time to dry to

prevent wash-off by irrigation or rain.

Chemicals approved for commercial corn are: Maneb, Zineb, Maneb and Zinc Ion. We suggest the use of Dithane M-45, $1\frac{1}{2}$ lbs. or Manzate 200, $1\frac{1}{2}$ lbs. per acre (plus a sticker-spreader) beginning when the disease first appears and repeat on 10 - 14 day intervals. Do not apply within seven days of harvest.

Many plant pathologists were concerned that the fungus causing Southern Corn Leaf Blight would be toxic when fed to animals. Several universities conducted feeding trials with cattle, swine, and laboratory animals, and showed no problems from feeding the blighted corn or silage. No problems occurred from feeding shelled corn, and the fungus was destroyed by the fermentation process in silage in 10 days.

The breeding of corn with resistance to Southern Corn Leaf Blight can be accomplished by using different sources of cytoplasm having disease resistance. The development of hybrids with resistance to leaf blight will require several years of breeding and, until resistant lines become available, cultural and chemical control practices should be used.

Consult your local county extension director or area agronomist for help in forming production decisions.

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