DISTRIBUTION OF *DIPLODIA ZEAE* AND *D. MACROSPORA* IN THE UNITED STATES

NEIL E. STEVENS

University of Illinois, Urbana

Two apparently closely related fungi have long been known as causes of ear rots of corn. These are *Diplodia zeae* (Schw.) Lev, first reported in 1822, and *Diplodia macrospora* Earle, described in 1897. So far as can be determined by studies of the fungi in culture, *Diplodia macrospora* is physiologically decidedly inferior. It has a narrower temperature range, it sporulates less freely, and finally it is dependent on outside sources for the biotin necessary to its growth—a product which *D. zeae* is apparently able to produce. Hoppe has proved that when both fungi are allowed to grow on the same ear of corn, *D. macrospora* is unable to compete with *D. zeae*.[2]

In the United States, at least, *D. macrospora* has a more limited range than *D. zeae*. The latter fungus has been reported from California and from every state east of the Rocky Mountains except the three northern New England States. There is one report of *D. macrospora* from Connecticut and two from Delaware, otherwise, all recorded collections are from the south eastern states.

The relation between these two fungi and especially the question of the degree to which *D. macrospora* is able to compete in the field with the apparently more vigorous *D. zeae* has interested me for at least ten years. Most of February and March 1943 was spent in collecting in the states of Tennessee, Mississippi, Louisiana, Texas, and Oklahoma in order to gather further information on this point. The material gathered has now been examined and the fungi identified. In this summary, however, the results have been combined with all earlier available reports of examinations of large numbers of specimens of these two fungi. These included all reports by Eddins[1] from Florida, by Larsh,[4] based on my own collection in several southern states, and Hoppe's[3] reports covering several years of cultures made from diseased kernals, as well as information sent in a personal letter by J. Harvey McLaughlin from Oklahoma. This lumps together isolations from stalks and from kernels as well as reports of various years. So far as can be determined from an examination of tabulated figures this involves no significant error. When all the figures referred to have been included the numbers are fairly large, certainly much larger than in most records of fungi. They vary from 60 in Louisiana to well over 1100 from Tennessee. They thus may not be strictly comparable but they seem large enough to be significant. The exact numbers are as follows: Alabama 425, Florida 975, Georgia 175, Kentucky 254, Louisiana 79, Mississippi 233, Oklahoma 157, South Carolina 123, Tennessee 1148, and Texas 60.

The amount of Diplodia rot varies greatly from year to year,[3] both absolutely and relatively to other fungi. No doubt the relative amounts of the two species of Diplodia fluctuate somewhat also. In Hoppe's cultures from states of Kentucky, Tennessee, Alabama and Mississippi the percentage of *D. macrospora* in relation to all Diplodia isolated was as follows: 1937, 3.1; 1938, 3.9; 1940, 5.7; 1941, 5.5. Chief interest attaches here to the relative amounts of the two fungi in the truly random samples obtained in the field and from cribs and terminals. The relative abundance of *D. macrospora* is expressed as percentage of the entire number of Diplodia specimens examined. Thus zero does not mean that this fungus does not occur in a given state, merely that it was not found in the material examined by the observer. In general it will be noted that the percentage is larger in the states further south. Very likely the percentage indicated for Louisiana is too large due to the small number of specimens collected and to the fact that all of them were made at or south of Baton Rouge.

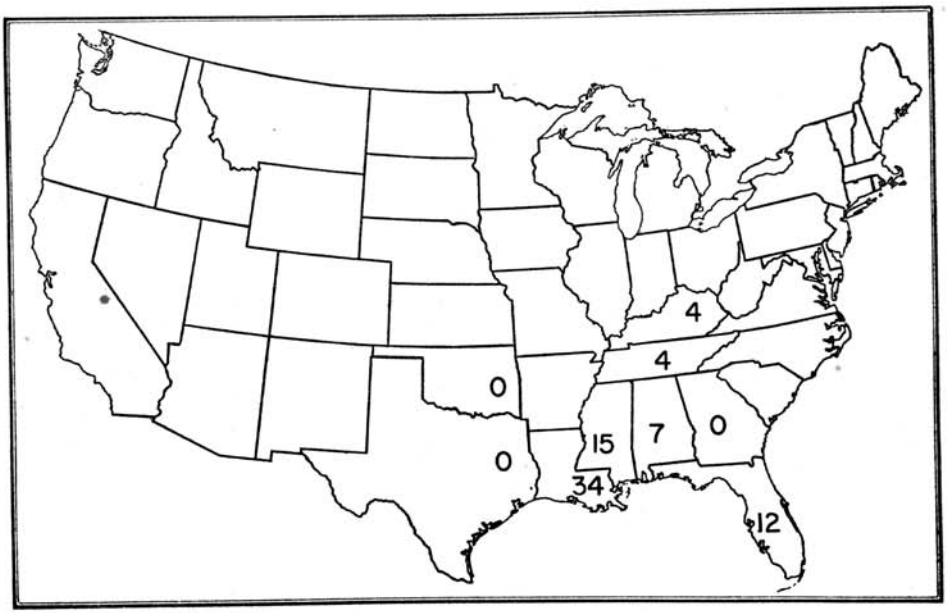

Fig. 1.—Relative abundance of *Diplodia macrospora* and *D. Zeae* on corn expressed as percentage of *D. macrospora*.

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