

**Association of *Fusarium moniliforme* with
Infection of Sorghum Seedlings by *Sclerospora sorghi***

Douglas C. Bain

Plant Pathologist, Department of Plant Pathology
and Weed Science, Mississippi Agricultural and
Forestry Experiment Station, State College 39762.

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ABSTRACT

Results of inoculation tests with powdered sorghum leaves infected by *Sclerospora sorghi* showed that the incidence of mildew was significantly higher in sorghum seedlings that later developed *Fusarium* blight.

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Additional key words: sorghum downy mildew,
Fusarium seedling blight.

In recent investigations of sorghum downy mildew (*Sclerospora sorghi* Weston & Uppal), attention was given to inoculation techniques to determine reaction of lines and cultivars of sorghum and corn to the fungus. The technique devised has been described (2). In this method, sorghum leaves containing oospores,

and beginning to shred, were collected from diseased field plants and used for inoculum. Such leaves were usually contaminated with spores of various fungi. It was found that numerous seedlings in several tests developed a blight 2-3 weeks after emergence, particularly when soil moisture was maintained at a high level. Blight usually appeared several days after symptoms of mildew had been evident. Further observation indicated that incidence of mildew was higher in seedlings that later developed blight than in those which remained free of this disease. *Fusarium moniliforme* (Sheldon) Snyder & Hans. was the only fungus consistently associated with this disease, and laboratory inoculation tests with an isolate of the fungus demonstrated a capability for pathogenicity. In similar tests where controls without inoculum were included, 37% of the control seedlings developed *Fusarium* blight. Since microconidia of *F. moniliforme* had been observed in abundance in powdered inoculum, and since the fungus is definitely known to occur within sorghum seed (1), there were two possible sources of this contaminant in all the tests in which steamed soil was used. The manner of occurrence of these two diseases indicated that plants infected with *S. sorghi* were either more susceptible to *Fusarium*, or that *Fusarium* might have predisposed sorghum seedlings to infection by *Sclerospora*.

In order to determine whether there was a

correlation between occurrence of the diseases, detailed counts were made in succeeding tests in which there were no controls. Out of a total of 5,128 plants involved (Table 1), 2,059 (40.1%) remained free of *Fusarium* blight, and only 360 (12.6%) of these developed symptoms of downy mildew. On the other hand, of the remaining 3,069 (59.9%) plants which had seedling blight, 1,118 (36.4%) had mildew. About one-third (33.1%) of the seedlings remained free of both diseases, which suggested a notable percentage of escapes; particularly from *Fusarium* as an inoculum contaminant. These figures indicated that there was a highly significant positive correlation between the number of plants with mildew and the number that developed seedling blight.

TABLE 1. Number of plants with and without downy mildew that did or did not develop *Fusarium* seedling blight (summary of three tests)

Plants	With <i>Fusarium</i> blight	No <i>Fusarium</i> blight	Total	% <i>Fusarium</i>
No mildew	1,951	1,699**a	3,650	53.4
With mildew	1,118	360	1,478	75.6*b
Total no. plants	3,069	2,059	5,128	

a ** = plants healthy.

b * = $\chi^2 = 215.6$; $df = 1$; $P < .005$.

Infection by *Fusarium* probably followed or preceded infection by *Sclerospora*. The first alternative is suggested by the fact that symptoms of blight usually appeared several days later than those of downy mildew. This would imply that seedling blight is more apt to occur in seedlings with mildew. Symptomology alone, however, cannot always be used to determine time of infection. If infection by *Fusarium* preceded that by *Sclerospora*, then mildew would have been more apt to occur in seedlings infected with the blight fungus but without symptoms of this disease. This infection had to originate with contaminated inoculum dusted onto seed and in furrows, or with the fungus inside the seed. Thus, it might be postulated that as seed were germinating, the fungus became active within seedlings and thereby predisposed seedlings to infection by *S. sorghi*. This could account in part for results reported by Clark et al. (3) relative to low quality seed and incidence of downy mildew.

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