

THE EFFECT OF NITROGEN NUTRITION ON SEEDLING BLIGHT OF SORGHUM  
INCITED BY FUSARIUM MONILIFORME SHELDT.

by

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**THIS BOOK  
CONTAINS  
NUMEROUS PAGES  
WITH DIAGRAMS  
THAT ARE CROOKED  
COMPARED TO THE  
REST OF THE  
INFORMATION ON  
THE PAGE.**

**THIS IS AS  
RECEIVED FROM  
CUSTOMER.**

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## INTRODUCTION

Fusarium moniliforme Sheldon, the conidial stage of Gibberella fujikuroi (Saw.) Wr., is the causal organism in certain cases of seedling blight and stalk and root rots of sorghum, occurring singly or in complexes with other soil-inhabiting plant pathogens. A similar syndrome occurs in corn.

In the past, losses due to F. moniliforme were not considered great enough to warrant concerted attention. However, the advent of certain cultural practices such as high nitrogen fertilization, high plant populations, minimum tillage and continuous cropping has seemingly accentuated the problem, especially on irrigated lands where soil temperatures are high.

Recommended levels of nitrogen vary from 30-80 lbs. actual N/acre for dryland sorghum in northeastern Kansas, to 80-120 lbs. actual N/acre for irrigated sorghum in southwestern Kansas.

This study was designed to determine, under controlled conditions, if level of nitrogen in the growth medium affects seedling blight severity. In addition, it was designed to examine the effect of specific forms of nitrogen on pathogen populations in the growth medium before planting of seeds and what effect the final populations and/or the nitrogen forms might have on subsequent seedling blight severity.

## REVIEW OF LITERATURE

F. moniliforme as a Pathogen of Corn and Sorghum

Fusarium moniliforme as a gramineous root and stalk pathogen was first reported on corn (14, 29, 40, 49). However, there is lack of agreement among these early reports. Many workers (13, 29, 14, 49) claimed that the organism was definitely pathogenic. Others (26, 50) were convinced it was only a weak pathogen, and some (6, 42) claimed that it was non-pathogenic. Leonian (27) examined the potential of variability in this organism. From a single-spore culture of a vigorously-growing isolate, 50 segregants were isolated within a year. These isolates showed considerable variability in morphology, physiology and pathogenicity.

The first report of a sorghum disease caused by this organism came from Pammel et al. (40) in connection with studies on stalk rots in Iowa. Valteau (49) found while experimenting with root and stalk rots of corn that F. moniliforme could cause damping-off of sorghum seedlings. He was, however, unable to reproduce the experiment. Tullis (48) reported a stalk rot of sorghum caused by this fungus. He also noted that F. moniliforme rarely formed macroconidia in culture.

Leukel and Martin (28) showed in greenhouse tests that the organism caused a reduction in seedling emergence that was most severe at low temperatures. It also caused damping-off of young seedlings which increased with rise in temperature. Seed-treatment was more effective against seed-borne inoculum than against soil-borne inoculum. Futrell and Webster (11) found that the incidence of F. moniliforme was high in sorghum heads covered with pollination bags. They consistently isolated this organism from scabbed seeds. Johnson (23) noted that F. moniliforme caused a reduction in root elongation.