

**IDENTIFICATION OF FUNGAL SEED BORNE PATHOGENS IN FARM SAVED AND
CERTIFIED SEED OF SORGHUM (*SORGHUM BICOLOR* (L.) MOENCH) AND
EVALUATION OF THE INCIDENCE AND SEVERITY OF SEED BORNE AND NON-
SEED BORNE DISEASES IN THE FIELD**

By

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**A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Science in Crop Protection**

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University of Zimbabwe

December 2004

UNIVERSITY OF ZIMBABWE**FACULTY OF AGRICULTURE**

The undersigned certify that they have read and recommend to the Department of Crop Science,
the thesis entitled:

**Identification of fungal seed borne pathogens in farm saved and certified seed of sorghum
(*Sorghum bicolor* (L.) Moench) and evaluation of the incidence and severity of seed borne
and non-seed borne diseases in the field.**

Submitted by **JOSEPHINE JERE** in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE IN CROP PROTECTION.

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ABSTRACT

A study to identify fungal seed borne pathogens on sorghum seed samples and to assess seed to field transmission of these pathogens was carried out at the Crop Science Department in the 2003/04 season. Seed samples collected from Mbare Musika traders and Seed Companies were tested for germination, fungal infection and for *Phoma sorghina* transmission in the laboratory. The samples were then planted in the field in a randomized complete block design (RCBD), replicated three times. Disease severity on sorghum plants was assessed at 2-week intervals from the time disease symptoms appeared in the field for a period of 10 weeks. Mean normal germination was higher for the farm saved samples (13.15% and 11% for white and red farm saved seed respectively) as compared to the certified samples with 11.5% and 9.25% for white and red certified sample groups respectively. Six pathogenic fungal genera isolated from certified and farm saved samples were *Fusarium*, *Cercospora*, *Phoma*, *Bipolaris*, *Curvularia* and *Exserohilum*. Seed infection with these pathogens ranged from 0 – 38.1%, with *Fusarium*, *Cercospora* and *Phoma* having the highest infection percentages of 38.1%, 33.5% and 34% respectively. The farm saved samples had generally higher infection levels for most pathogens whilst the certified samples had higher infection levels of *Cercospora* as compared to the other pathogens. Diseases observed in the field were anthracnose (*Colletotrichum graminicola*), grey leaf spot (*Cercospora sorghi*), leaf blight (*Phoma sorghina*) and covered kernel smut (*Sphacelotheca sorghi*). There were significant differences in the area under disease progress curves (AUDPC) calculated for the different diseases among the samples ($P < 0.05$). Anthracnose and leaf blight were prominent in red accessions of both certified and farm saved samples. Grey leaf spot was prevalent in the white samples, with the white certified samples having the highest AUDPC of 6.31. Covered kernel smut was noted on white farm saved samples only with mean infection of 8.1%. The diseases had no significant effect on the final yield ($P > 0.05$). *C. sorghi* and *P. sorghina* that were detected in the seed were also observed in the field, showing high seed to field transmission of the pathogens. *C. graminicola* was not identified in the laboratory but in the field implying that the disease could be from sources other than seed. The presence of seed borne pathogens on certified seed samples indicates a need for improvement in the seed certification procedures for sorghum.

ACKNOWLEDGEMENTS

I would like to acknowledge and thank the wonderful people with whom I worked with for this study to be a success. Firstly, I thank my supervisors Mrs J. Sibiya and Mr W. Manyangarirwa; I appreciate your advice and guidance from the beginning to the end of this thesis. Mrs M. Cavill, Mrs E. Ngadze and Mr D. Icishahayo should be commended for their assistance in the laboratory work and statistical analysis. I thank also Mr Tumbare and Mr Kambidzi for helping me in laying out the field trial and spraying. I am also indebted to the Belgian Technical Cooperation (BTC) whose financial support made the whole study possible.

May God bless all who have contributed to the success of this research study.

Dedicated to my husband Dzingai.

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