

**Epidemiology and control of powdery mildew
(*Oidium anacardii* Noack) on cashew (*Anacardium
occidentale* L.) in Mozambique**

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Submitted to the Faculty of Natural and Agricultural Sciences

Department of Microbiology and Plant Pathology

University of Pretoria

Abstract

Introduction

Materials and Methods

Results

In partial fulfillment of the requirements for the degree of

MSc (Plant Pathology)

Discussion

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December, 2003

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ACKNOWLEDGEMENTS

The author wishes to express gratefulness to the following persons and institutions for their valuable support, which has contributed to finalisation of the present thesis:

- Professor Lise Korsten, my supervisor for sharing her insights on the subject, providing support and guidance throughout the study period.
- Professor Terry Aveling, my co-supervisor, for her advice and contribution to preparation of this thesis, especially on aspects related to electron microscopy.
- The Deutsche Gesellschaft für Technische Zusammenarbeit GTZ-IPM (Horticulture Project-Nairobi) P.O. Box 41607, Nairobi, Kenya, represented by Dr. Bernard Loer (coordinator) and Instituto de Fomento do caju (INCAJU), Rua de Resistência no. 1746, 4o Andar, Maputo, represented by Clementina Machungo (Director), for their financial support.
- Instituto Nacional de Investigação Agronomica (INIA) C. P. 3658, Maputo and ADPP Itoculo, especially Dr. M. Amane and Ms. Elsie Marie for the use of their orchard.
- Alan Hall for his technical assistance on the scanning and transmission electron microscopes.
- The personnel of the Department of Microbiology and Plant Pathology for their support and kindness, especially Mrs. Daleen Muller and Karin Zeeman.

Dedicated to my wife (Gilda Monjane Uaciquete), daughter (Diva Uaciquete) and son (Amerson José Uaciquete) who allowed me to be abroad for the study period.

SUMMARY

Epidemiology and control of powdery mildew (*Oidium anacardii* Noack) on cashew (*Anacardium occidentale* L.) in Mozambique

by

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For a successful and economical integrated control program aimed at a particular disease, pertinent information, regarding the environmental conditions prevailing in the growing area, the crop itself and the pathogen, must be available. Recently, the control of powdery mildew disease on cashew has moved from the use of non-systemic fungicides with a wide range of action, to highly specific systemic ones. Such a shift requires a more effective integrated control system, whereby tolerant varieties in combination with fungicide unaffected biocontrol agents are timely used to ensure disease control and reduce the hazards associated with excessive fungicide applications. The purpose of this study was to understand the relationship between the disease epidemic and some climatic factors over time. Appropriate periods for management interventions were determined. The cellular host reaction to infection by *Oidium anacardii* Noack was studied with a view to rapidly identify disease tolerant host types. Potential antagonists were isolated, screened and compared with commercial biocontrol products using *in vivo* techniques and chemical control programs were finally evaluated.

Electron microscopy elucidated that the powdery mildew tolerant cashew variety (H1) had a relatively higher consistency of cytoplasmic aggregates upon infection by *O. anacardii* when compared to the susceptible clone. Based on conidia and conidiophore morphology, conidial

germination and conidiogenesis processes observed indicated that *O. anacardii* belongs to the subgenus *Pseudoidium* (Y.S. Paul & J.N. Kapoor) comb. Et. Stat. Nov. (Holomorph *Erysiphe* Sect. *Erysiphe* U.Braun).

There was no direct relationship between the progress of the cashew powdery mildew epidemic and temperature, relative humidity or dew point over time. However, the epidemic did not start until conditions of average temperatures under the tree canopy were below 30°C, relative humidity was 80% and dew point was above 15.

In vivo screening of 72 isolates, amongst them bacteria and fungi, from cashew leaves and florets showed that none were effective against *O. anacardii*, the causal agent of cashew powdery mildew. However, commercial antagonists, *Candida saitoana*, *Bacillus subtilis* and *B. licheniformis* significantly reduced the growth and branching of primary hyphae. One antagonist, *B. licheniformis*, was as effective as the commercial fungicide triadimenol 25% EC (Bayfidan).

Chemical fungicides were found to be effective against powdery mildew; however, the currently prevailing economic environment in Mozambique was found inappropriate for the use of expensive organic fungicides. Additional gain from the use of fungicides was found to be solely qualitative and thus did not represent a fair investment return ratio in terms of cashew nut prices and production costs. The use of integrated cashew management was finally recommended. Further studies should focus on development of integrated and cost effective disease management strategies.