

**STUDIES ON THE USE OF ESSENTIAL OILS FOR THE CONTROL OF  
*SITOPHILUS ZEAMAI* (MOTSCHULSKY) (COLEOPTERA:  
CURCULIONIDAE): A PEST OF STORED MAIZE GRAINS**

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Submitted in fulfillment of the requirements for the degree:

**DOCTOR OF PHILOSOPHY: BOTANY**

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**2008**

## **Declaration**

The work contained in this thesis is my original work except where due reference has been made in the acknowledgements. This work has neither been submitted nor will be submitted for an award at another University or Institution of Higher Education.

**Signature of candidate:**

A handwritten signature in black ink, appearing to be 'K. K. K.' with a flourish at the end.

**Date: March, 2009.**

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## **GENERAL ABSTRACT**

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The common maize weevil, *Sitophilus zeamais* Motschulsky (Coleoptera: Curculionidae), a well known pest of stored-maize grain in most parts of the world, was identified as one of the major constraints of harvested maize grains in the Eastern Cape Province, South Africa. The use of plants or their products is one of the recent methods being investigated for insect pest control worldwide. Therefore, the main aim of the present study was to identify available plants in the Eastern Cape that could be used to combat the problem of *Sitophilus zeamais* in stored-maize grains.

For the realization of the aims of this research, the following studies were carried out; a preliminary survey was conducted to obtain baseline information on the farmers' knowledge and experience of indigenous insect pest control methods in the Eastern Cape. Also, studies on the insecticidal potential of the essential oils of some plants were investigated against the maize weevil. The quality parameters of maize grains treated with the essential oils was also studied and, using a rat model, the toxicity of the essential oils was investigated.

The outcome from this study revealed that there is awareness amongst the farmers in the Eastern Cape on the use of plants or their products to control insect pests. Unfortunately, such methods are currently being neglected and the knowledge of their application was found to be eroding. Among the various essential oils screened were those from *Mentha longifolia* L. and *Tagetes minuta* L. which evoked an appreciable level of contact, fumigant and repellent toxicity on the maize weevil.

Further work done to determine the effects of the oils on maize stored over a period of three months revealed that the two oils had no adverse effect on the proximate compositions and some quality parameters of the stored maize. However, the toxicological study conducted on rats showed that the oils at tested concentrations exhibited some level of toxicity. It is, therefore, suggested that the essential oils of *M. longifolia* and *T. minuta* should not be used to treat maize grains intended for human consumption.

## Acknowledgements

I am greatly indebted to my promoter, Prof. A.J. Afolayan, whose patience and ceaseless effort have seen me through the course of this programme. You are indeed a mentor who is worthy of emulating. My profound gratitude also goes to my co-promoter, Dr P.J. Masika, you were always there for me, thanks so much for making time for me from your tight schedule. I thank the National Research Foundation, South Africa for their financial support.

To all the members of the Phytomedicine Research Group, “I love you all. You indeed made the office a home for me to stay. I appreciate the effort and encouragement of Dr P.O. Adebola who introduced me to my promoter. I am grateful to the Institute of Agricultural Research and Training, O.A.U. Ibadan, for granting me the study leave to pursue this programme.

To the New Covenant Church and Delightful Land Fellowship members, thanks for your love and spiritual support. To my parents, words are not enough to express my joy for having you in my life. Thank you daddy, Mr J.A. Eyitayo (ESQ); my darling mother, Mrs M.B. Ladokun; my late dads, Mr. S.A. Babajide and Chief M.O. Ladokun. My siblings, Toyin, Bayo, Ayo and Niyi, I love you all.

I am indeed thankful to God for my wonderful husband Akinwumi (Mine), without whose support this programme would not have been possible, I love you dearly”. To my lovely children, Oluwatimilehin and Olaoluwa, thanks for your understanding. To all who

have contributed in one way or the other to the success of my programme, my sincere heart prayer is that God will not forget your labour of love.

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