UNIVERSITI TEKNOLOGI MARA

THE COMMUNITY STRUCTURE OF SOIL FAUNA OF ROADSIDE TREES AT THREE DIFFERENT ELEVATIONS IN MAURITIUS

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

Faculty of Applied Sciences

August 2014

CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 23rd July 2014 to conduct the final examination of Zaynab Jawaheer on her Master of Science thesis entitled "The Community Structure of Soil Fauna of Roadside Trees at Three Different Elevations in Mauritius" in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The panel of Examiners recommends that the student be awarded the relevant degree. The panel of Examiners was as follows:

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

This study was carried out in Mauritius during summer from November 2012 to April 2013 and was designed to test the hypothesis that roadside tree diversity, elevation and bait type in pitfall traps affect soil fauna distribution and abundance The specific objectives of this study were to determine the species richness and diversity of roadside trees and to quantify the species richness, diversity, abundance and biomass of soil fauna of roadside trees in pitfall traps at different elevations. Soil fauna were collected utilizing pitfall traps made of plastic cups containing three different bait types (beef extract, beer and banana, and soap water) placed at three different elevations (Flic en Flac, 5m; Rose-Hill, 221m; and Mare aux Vacoas, 569m). Traps were placed among primary roadside tree species: *Casuarina equisetifolia* (Flic en Flac,), *Dictyosperma album* (Rose-Hill) and *Pinus sylvestris* (Mare aux Vacoas). A total of 18,114 individuals of soil fauna were sampled of which 10,142 individuals were sampled at Flic en Flac; 5293 individuals at Rose-Hill; and 2697 individuals at Mare aux Vacoas. The most abundant soil fauna among the three study sites was *Carpophilus cheesmani* (relative frequency=25.31%; relative abundance=46.54%). The heaviest soil fauna recorded was *Achatina immaculata* (mean biomass=1.2g). The Shannon Wiener Diversity varied significantly ($p<0.05$) between elevations (5m=1.84, 221m =1.21, 569m=2.54) while evenness was highest at 569m (0.92) followed by 5m (0.70) and lowest at 221m (0.42). The study sites with the highest soil fauna similarity were Mare aux Vacoas and Rose-Hill (0.71). Significant difference in soil fauna abundance and biomass was observed between elevations (<0.05), between months (<0.05) and between bait trap types ($p<0.05$). Significant correlations ($p<0.05$) between soil physiochemical parameters were recorded as well as their effect on soil fauna abundance. This study gives an initial view on the diversity, biomass and abundances of soil fauna from roadside trees of Mauritius. The results of this study support the concept that diversity of roadside trees and elevation have an impact on the community structure, abundance and biomass of soil fauna. This study can be useful in determining soil fauna and their plant host specificity as such data has implications for biological control as well as for collection of specific insects. This study also has implications for town planners with respect to planting roadside trees and their ensuing edaphic communities for managing insect pests. When comparing the three study sites, anthropogenic disturbances seem to have affected the soil fauna diversity, abundance and biomass. In this study, the observed effects have been highlighted and could be useful to beach authorities and municipal councils to avoid costly maintenance.

AKNOWLEDGEMENT

I owe a debt of gratitude to my parents for their ultimate moral and financial support, time, encouragement and effort from the very beginning until the final stage of this project. Without their input, this project would not have been completed within due time.

This project would not have been possible without the Ministry of Agro-Industry and Food Security, Republic of Mauritius. I am sincerely grateful to the Mauritius Sugarcane Industry Research Institute (MSIRI) for granting me laboratory facilities and expertise.

I would also like to take this opportunity to express my deepest gratitude to the staff of the Mauritius Sugarcane Industry Research Institute (MSIRI), especially to Dr Ganeshan Seelavarn for his guidance, time and who has tremendously helped me in the soil fauna identification. I also, would like to thank Mr. Gunshiam Umrit for his assistance in soil sample analysis.

Many thanks to my supervisor, Dr Harinder Rai Singh for his input, guidance and patience throughout the course of this project and who taught me endurance and patience.

I would like to thank my friends who were present for me in difficult times and gave me some positive vibes when most needed.

Zaynab Jawaheer