



University of Venda

**Activity patterns, species composition and dietary analysis of bats  
on two macadamia farms in Levubu, South Africa.**

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**A Thesis submitted to the School of Environmental Sciences,  
University of Venda, in fulfilment for the degree of Masters of  
Environmental Sciences.**

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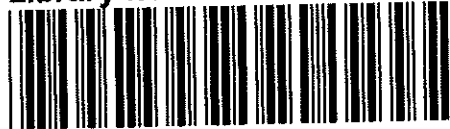
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**January 2017**

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## Abstract

Bat predation of pest insects has been documented to have a significant economic benefit in agro-ecosystems worldwide. The Soutpansberg range is situated in the savanna biome of northern South Africa and is a hotspot for plant endemism and animal diversity. Previous studies have documented that 66% of local bat species forage over macadamia farms. A study was carried out to provide data on the activity patterns and species composition of all insectivorous bats as well as the diet of two species of bats (*Mops midas* and *Nycteris thebaica*) roosting on two macadamia farms in the Levubu region, Limpopo, South Africa. Using SM2 detectors acoustic surveys were conducted on 128 detector-nights of recording in macadamia orchards (orchard edge and centre) on Farms Welgevonden and Laatsgevonden simultaneously. Ad hoc acoustic sampling was also conducted around farm houses on both farms. Discounting data from houses, highest bat activity was recorded on orchard edges at both Welgevonden and Laatsgevonden and a total of 22 insectivorous bat species were reported on both farms. Stinkbugs were sampled on a monthly basis by standard scouting methods by farmers. Activity of bats was positively significantly ( $P < 0.05$ ) related to stinkbug numbers in both cases. Activity index was also significantly related to habitat ( $P < 0.01$ ), crop cycle ( $P < 0.01$ ), temperature ( $p < 0.05$ ) and moon phase ( $P < 0.01$ ). The researcher was unable to test for the relationship between the number of stinkbugs and the proportion of bugs in the diet of *Mops midas* since there was only one data point (sample) from the macadamia study area, while the test between proportion of bugs in the diet of *Nycteris thebaica* and stinkbug numbers showed a slight positive correlation and was not significant ( $P = 0.06$ ). However, bugs were present in the diet of both species throughout the year in both macadamia and urban habitats, at higher proportions than generally found in natural habitats. Foraging activity of bats and higher proportions of bugs in the diet of *Mops midas* and *Nycteris thebaica* in macadamia orchards may be driven by seasonal abundance of pest insects such as stinkbugs. Insectivorous bats forage over macadamia orchards (feeding on bugs assumed to be stinkbugs) during stinkbug (*Bathypoelia natalicola* and *Nezara viridula*) outbreaks, thus integrated pest management technique should be adopted and farmers encouraged in conserving and using bats as biological control agents in macadamia farms.

**Keywords:** Bats, Macadamia, Stinkbugs, Bat detectors, Activity, Biological Control