
Conservation and Ecosystem Services

The potential of small and medium mammalian carnivores to mediate rodent pest damage in commercial agriculture

Lourens H. Swanepoel¹, Corrie M. Swanepoel², Mark Keith³, Steven R. Belmain⁴, Peter J. Taylor⁵, Reimund P. Rötter⁶, Munir Hoffmann⁶, Sam Williams¹

¹Department of Zoology, University of Venda, Thohoyandou, South Africa, lourens.swanepoel.univen@gmail.com

²Institute for Soil, Climate & Water, Agricultural Research Council, Pretoria, South Africa

³Mark Keith, Centre for Wildlife Management, University of Pretoria, Pretoria, South Africa

⁴Natural Resources Institute, University of Greenwich, Kent, United Kingdom

⁵South African Research Chair on Biodiversity Value and Change and Centre for Invasion Biology, University of Venda, Thohoyandou, South Africa

⁶Division Tropical Plant Production and Agricultural Systems Modelling, University of Göttingen, Germany

Rodents remain a key pest of grain crops globally. However, the use of chemical control to manage rodent populations is problematic due to increased rodenticide resistance in rodents and negative environmental effects. This has sparked interest in ecologically based rodent control (EBRM). Predation is a key component of EBRM that is often neglected. In this study we aimed to evaluate the potential of predation to mitigate rodent pest damage in commercial maize fields in the Free State Province, South Africa. We used camera trapping to quantify the occupancy and species richness of small mammalian carnivores. We used live trapping to assess rodent densities, and snap traps to investigate rodent diet. Finally, we applied a crop simulation model (APSIM) to estimate the effect of varying plant densities (which act as a proxy for varying rodent densities) on crop yields. Camera trapping studies showed that at least 8 mammalian carnivore species frequented the cropping areas, of which 6 species preyed on rodents. Grain damage was impacted by rainfall, planting density and the amount of seed incorporated in the rodent diet. The greatest impact of rodent seed damage (2-40% yield decline) occurred under high rainfall and densities of 10-30 rodents/ha. In contrast, under low rainfall, seed damage was less prevalent. In low rainfall seasons crops are severely limited by available soil water, and seed damage (up to 20%) will not affect crop yield, as the remaining crops have more water and can compensate for the seed losses with increased yields. Seed impact will only become evident at rodent densities 30-100 rodents/ha. Therefore, rodent densities up to 30/ha can be of concern, especially under ideal climatic conditions. Our results show that the combined predation of mammalian carnivores have the potential to significantly impact rodent biomass, and hence alleviate crop losses.

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Book of Abstracts



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Editors:

Jens Jacob¹ and Jana Eccard²

¹Julius Kühn Institute, Federal Research Centre for Cultivated Plants,
Institute for Plant Protection in Horticulture and Forests, Vertebrate Research,
Toppeideweg 88, 48161 Münster, Germany

²University of Potsdam, Institute of Biochemistry and Biology,
Animal Ecology Group, Maulbeerallee 1,
14469 Potsdam, Germany

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