## **Conservation and Ecosystem Services**

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

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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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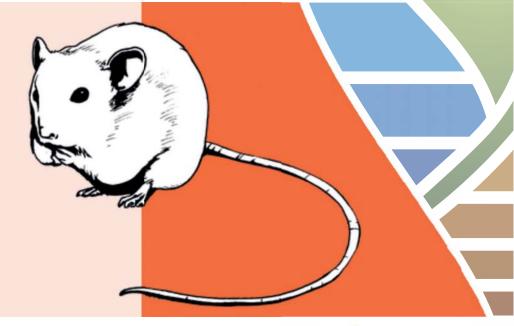
Jens Jacob, Jana Eccard (Editors)

6<sup>th</sup> International Conference of Rodent Biology and Management and

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