

African Insect Science for Food and Health

On-Farm Maize Storage Systems and Rodent Postharvest Losses in Maize Growing Agro-Ecological Zones of Kenya



September 18 - 21, 2016 Vienna, Austria

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Abstract

- Rodents are one of the major postharvest pests that affect food security. Knowledge of impact of rodents in on-farm maize storage systems in Kenya is limited.
- A study was conducted in 2014 with maize farmers spread across the six maize growing agro-ecological zones (AEZs).
- Findings: Rodents are second most important cause of storage losses after insects countrywide but are the main storage problem in the lowland tropical zone. Total weight losses were found to be 11.1 ± 0.7% in cobs storage, with rodents causing up to 43% of these losses; and 15.5 ± 0.6% in shelled grain storage with rodents accounting for up to 30%. Regression analysis identified rodent trapping as the main storage practice that significantly lowered the losses.

Background

• Rodents are recognized world over as a serious problem in agriculture and are associated with various diseases of public health concern (Singleton et al., 2010; Meerburg et al., 2015).

• Only one study in Kenya (De Lima, 1979) reported losses caused by rodents in small holder systems to be 1.45%.



Fig. 1. Commensal rodents responsible for postharvest losses in East Africa– (a) *Rattus rattus*, (b) Mastomys natalensis and (c) Mus musculus.

 Rodents can heavily contribute to postharvest losses in small farmer's stores and negatively impact on food security as most rural households

• On-farm maize storage systems in Kenya present favourable conditions for the presence and proliferation of rodents.

• Therefore, it is important to assess the magnitude of their losses to improve postharvest management practices.



Fig. 3. Proportion of farmers ranking a particular problem as the main or "number one" storage problem in the agro-ecological zones





Fig. 4. Rodent's damages to stored maize



Objective

To generate nationally representative data on maize storage practices and level of postharvest losses in on-farm stores and to assess the contribution of rodents to overall losses.

Materials and methods

630 maize small scale farmers across the six (6) maize AEZs were interviewed in 2014 using structured questionnaire (Fig. 2). Quantitative estimate of losses were collected using proportional piling method (Sharp 2007).



Fig. 5. Maize storage structures across agroecological zones. a and b: traditional granaries; c: traditional crib; d: improved crib with grass thatch roof; e: improved crib with roof in iron sheet; f: storage on the floor in a room; g: bagged maize grain stored in special room; h: bagged maize grain stored in crib; i: maize grain packed in plastic hermetic bags and stored in crib.

Conclusion



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Fig. 6 storage losses incurred by farmers on maize during storage in the various agroecological zones- (A) Cobs storage and (B) shelled grains storage. For each bar graph, categories marked with same letters are not significantly different at *p*<0.05

- Rodents postharvest losses vary between 1.3 to 9.7% depending of agro-ecological zone.
- The LLT zone is the hotspot region for rodent postharvest losses in Kenya.
- Further research should target food safety issues due to rodent infestations in stores.

