

Abstract

Impact of Push–Pull Cropping System on Pest Management and Occurrence of Ear Rots and Mycotoxin Contamination of Maize in Western Kenya

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Push–pull involves intercropping of cereals with *Desmodium* as a “push” crop and planting Napier grass/*Brachiaria* as the “pull” crop at the border. The technology has been reported to effectively control stemborers, striga weed, and fall armyworm (FAW), and to improve soil nutrition, resulting in increased grain yield. This study evaluated the impact of stemborer and FAW management using this technology on incidence of maize ear rots and preharvest contamination of grains with aflatoxin and fumonisin in western Kenya. The study was conducted during three cropping seasons on maize grown under the push–pull system and as a monocrop. Incidence of stemborer and FAW damage was determined as percentage of damaged plants, while incidence of ear rots was determined as percentage of ears with symptoms. At harvest, fungi were isolated from kernels and aflatoxin and fumonisin were quantified using enzyme-linked immunosorbent assay. Stemborer and FAW damage was significantly ($p = .001$) reduced by over 50% under the push–pull system. There was also a significant ($p < .001$) reduction in the incidence of *Fusarium verticillioides* (60%) and *Aspergillus flavus* (86%), which was reflected in a reduced incidence of ear rots (50%) with the push–pull system ($p = .001$). Fumonisin in maize from push-pull farms was significantly ($p = .048$) reduced (39%) but the technology had no significant ($p > .05$) effect on aflatoxin. The study showed that push–pull is an effective strategy for managing maize ear rots and fumonisins, and therefore could play a role in improving food safety among smallholder maize farmers in the region.

Keywords: Push-pull cropping system, Pest management, Ear rots, Mycotoxin contamination, Maize, Western Kenya, Agriculture, Agroecosystem, Integrated pest management, Crop protection