ABSTRACT

Rotational Effects of Grain Amaranth (*Amaranthus Hypochondriacus L.*), Soybean (*Glycine Max L.*) and Nitrogen Onstriga Hermonthica infestation and Maize (*Zea Maysl.*) Performance in Siaya County.

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Maize is a dominant food crop in Kenya. It is a crop consumed in various forms by both urban and rural population and thus important in terms of food security. It is also grown for use as livestock feeds. Maize production in Siaya County is declining due to Striga weed infestation, soils degradation, pest infestation and unreliable rainfall. The aim of this study was to determine the rotational effects of grain amaranth, soybean and nitrogen fertilization on Striga hermonthica infestation and maize performance in Striga infested soils. On-farm trials were conducted from August 2014 to July 2015 at Ugunja, Siaya county, western Kenya. The treatments included grain amaranth, soybean, maize and nitrogen. Grain yields and economic productivity of each crop was also determined. The maize test crop which was supplied with five levels of nitrogen, 0, 50, 100, 150 and 200 kgNha-1. Fifteen treatments were arranged as a split-plot in a randomized complete block design (RCBD) replicated three times. The main plot consisted of grain amaranth, soybean and maize while the subplots consisted of nitrogen rates. Maize without N fertilizer succeeding soybean resulted to 41.2% reduction on Striga count while maize without N fertilizer succeeding amaranth resulted in 34.4% reduction on Striga at 12WAP as compared to that produced from maize without N fertilizer succeeding maize in the rotation. The highest Striga number (31.44/m2) at 12WAP was observed on maize mono-crop system without N fertilizer while the lowest Striga numbers (6.89/m2) at 12WAP was observed on soy bean-maize crop rotation system. Though lower than soybean-maize rotation, amaranth-maize crop rotation at all level of N resulted in higher maize yield than in maize-maize crop rotation at similar levels of Nitrogen. Grain amaranth-maize rotation system interacting with 200kgNha-1 resulted in 10.5% maize yield increase while soybean-maize rotation system interacting with 200kg N ha-1 resulted in 25.7% increase in maize yield as compared to maize-maize crop rotation system interacting with 200kgNha-1. Similarly, there was a significant increase in maize height and stover yield in grain amaranth-maize crop rotation system, soy bean-maize crop rotation system at all levels of N than in maize-maize crop rotation. The study showed that crop rotation involving grain amaranth-maize and soybean –maize resulted in lower Striga population and higher returns of maize than maize-maize crop rotation system and hence this study recommend the adoption of amaranth-maize crop rotation system and soybean –maize crop rotation system by farmers as an efficient cropping system, strategy to reduce Striga, increase maize yield and improve nutrition of people in rural and urban.

Keywords: Amaranth rotational effects, soybean rotational effects, maize rotational effects, nitrogen rotational effects