ABSTRACT

Effect of Incorporating Lablab Biomass in Soils on Root Rot Disease Complex and Yield of Beans Intercropped with Maize

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Root rot is a major constraint to bean production in western Kenya causing poor crop stand and high yield losses. The disease is caused by a complex different pathogens which together exhibit synergistic effects. The pathogens survive in soils as resting spores and options of managing the disease are limited This study evaluated the effectiveness of incorporating lablab biomass in managing root rot of beans in maize intercrop system. The experimental treatments evaluated were incorporation of lablab biomass over the whole plot, biomass placed between rows of beans, biomass removed from the plot plus application of inorganic fertilizer and biomass removed from the plot without fertilizer application. In each experimental treatment, four bean varieties KK8, KK15, KK072 (tolerant to root rot) and GLP2 (susceptible to root rot) were planted intercropped with maize. The experiment was carried out at two agro-ecologically and soil fertility diverse sites. Incidence of root rot and chafer grub was determined at early growth stages while biomass and yield of both maize and beans were determined at harvest. Incorporation of lablab biomass increased soil carbon and nitrogen content but reduced both pH and cation exchange capacity. However, it reduced root rot incidence for the root tolerant bean varieties at the low soil fertility site but increased chafer grub incidence. Bean stem bases from the high soil fertility site had higher incidences of infection with Fusarium oxysporum while Fusarium solani and Macrophomina phaseolina were more prevalent in the low soil fertility site. Addition of lablab biomass significantly increased both bean biomass and seed yields in both low and high soil fertility sites. The positive effect on yield was more pronounced at the low soil fertility site. The study indicated that addition of lablab biomass to soils is beneficial in managing root rot of beans and improving crop yields in low soil fertility areas. The use of green manure soil amendments is an ecologically sustainable way of increasing bean yield for small scale farmers.

Keywords: Chafer grub, Phaseolus vulgaris, root rot complex, soil fertility, yield