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Growth and Productivity of Clover in Response to the Preceding Crops and Organic Matter Applications in the Highlands of Awi Zone of Ethiopia

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Abstract

Erosion, low carbon and soil fertility status is one of the dominating challenges in Ethiopian agriculture since decades. Our research aim was therefore, to combine a clover crop rotation, with *Sesbania* mulching and farm yard manure to rebuild soil fertility. Hence, both station and on-farm experiments were conducted from 2013 to 2014 in Awi Zone/Ethiopia to evaluate the outcome of preceding crops and organic matter applications on growth and biomass yield of clover. On station, two levels of preceding crop (wheat and potato) and four different levels of organic matter applications (control; 5 t ha^{-1} farmyard manure (FYM); 2.5 t ha^{-1} fresh *Sesbania* manure (FSB); and 5 t ha^{-1} FYM combined with 2.5 t ha^{-1} FSB) were factorially combined and laid out under randomised complete block design (RCBD) with four replications. In the like style, the treatment combinations were applied at four different farmers' fields considering each on-farm site as a replication. Days to 50 % flowering, plant height, number of tillers $plant^{-1}$, number of nodules $plant^{-1}$, root biomass $plant^{-1}$, shoot fresh and dry biomass ha^{-1} of clover were considered as study parameters. The overall experimental results indicate that only the main effect of organic matter application showed a significant effect on the growth parameters and biomass yield of clover. The highest total dry biomass of clover (5.6 t ha^{-1}) was recorded on FYM at 5 t ha^{-1} combined with FSB at 2.5 t ha^{-1} followed by FYM at 5 t ha^{-1} (4.68 t ha^{-1}). The unfertilised control gave the lowest mean dry biomass (3.06 t ha^{-1}) of clover compared to all other treatments. FYM at 5 t ha^{-1} combined with FSB at 2.5 t ha^{-1} gave as much as 86.6 % biomass yield advantage over the unfertilised control. Thus, FYM at 5 t ha^{-1} combined with FSB at 2.5 t ha^{-1} could be recommended for better dry biomass yield of clover. The finding also bridges the gaps of chronic livestock feed shortage and green manure under sub-Saharan environmental conditions.

Keywords: Biomass yield, clover, organic matter application, preceding crop

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