World Academy of Science, Engineering and Technology
International Journal of Agricultural and Biosystems Engineering
Vol:10, No:03, 2016

Sustainable Improvement in Soil Properties and Maize Performance by Organic Fertilizers at Different Levels

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Abstract : A sustainable agricultural system involving the improvement in soil properties and crop performance cannot be developed without organic fertilizer use. The effects of poultry manure compost (PMC) and pressmud compost (PrMC) at different levels on improving the soil properties and maize performance has not been yet described by any study comprehensively. Thus, field experiments (2011 and 2012) were conducted at Agronomy Research Area, University of Agriculture Faisalabad (31°26'5" N and 73°4'6" E) in sandy loam soil to determine the improvement in soil properties and maize performance due to application of PMC and PrMC each at five different levels (2, 4, 6, 8 and 10 t ha-1). A control (unamended) treatment was also included for comparison. The results indicated that performance of PMC levels was superior to PrMC levels. Increasing both composts levels improved soil properties, maize growth, and stover yield. Results showed that during both years' highest rates of PMC i.e. 10 and 8 t ha-1 improved the soil properties: ECe, pH, inorganic N, OM, and WHC higher than other treatments. While, 10 and 8 t PMC ha-1 also significantly increased leaf area index (LAI), crop growth rate (CGR) and net assimilation rate (NAR), and stover yield. Similarly, 10 and 8 t PMC ha-1 also improved the grain protein content, but contrarily, grain oil was lowest for 10 and 8 t ha-1 PMC during both years. Moreover, in both years highest gross and net income, and benefit cost ratio was also achieved by 10 and 8 t ha-1 PMC. It is concluded that PMC at rate of 10 and 8 t ha-1 sustainably improved soil properties and maize performance.

Keywords : compost, soil, maize, growth, yield
Conference Title : ICAES 2016 : International Conference on Agriculture and Environmental Systems
Conference Location : Miami, United States
Conference Dates : March 24-25, 2016