

Growth and Yield Response of Cowpea (*Vigna unguiculata*) to Poultry and Cattle Manure as Amendments on Sandy Loam Soil Plot

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Abstract: The effect of cattle and poultry manures on growth and yield of TV-3236 cowpea (*Vigna unguiculata*) variety was investigated. The effect of added manures on the fertility and salinity levels of the receiving soil was also evaluated on 10×20 m sandy loam plot containing eight 10×2 m ridges. After the establishment of the cowpea crops, plant parameters like height, stem girth and leaf area index were measured while the yield parameters like average length of one pod, number of pod/stand, weight of 20 grains and total weight of bean grain per 20 m² were also measured. It was observed from the results that a combination of poultry and cattle manures gave better leaf area of 1.445 cm over either of cattle and poultry manure which were 1.191 and 1.215 cm, respectively. Other growth parameters were affected by the application of these manures if compared with crop on the control plot. The plot treated with poultry waste alone has the highest yield of 854 kg ha⁻¹. The applied manures have significant effect on soil chemical and organic parameters. Soil organic matter for instance increased from 438 mg L⁻¹ for control plot to 865 mg L⁻¹ on poultry and cattle manure plot while the electrical conductivity increased from 66.7-90 dS m⁻¹. It can be concluded from this research that while the effect of organic manure on the fertility level of soil is high, its usage should also be regulated to avoid salt build up that can render the receiving soil too saline.

Key words: Amendment, growth, manures, sandy loam soil and yield, plot, poultry

INTRODUCTION

Animal manures and compost have been used since earliest civilizations for improving soil property. In years gone by these fertilizers were the only sources of nutrient for crops production. Though, they contain relatively low concentrations of nutrients and handling them is labour intensive, there has been largely increase in their use over inorganic fertilizers as nutrient source on many farms (Kamran *et al.*, 2005). Their beneficial effects on soil physical properties and the ease with which they decompose inside soil are major advantage they have over inorganic fertilizers.

Their effects on soil is manifold, it can increase the nutrient availability, alter chemical properties of the solid such as salinity, sodicity and pH (Alababan *et al.*, 2009). They can also improve organic matter as well as physical property of the soil such as bulk density, aggregate stability, aggregation, crust strength and water infiltration (Zeidan, 2007). Allowing manure to flow into surface water can give rise to pollution, time has therefore come when one must worry about the impact of organic manure on the soil and crop production and also its effect on the

environment and human's health. Considerations such as appropriate rate, timing and method of application and expected crop response are important when using manure as a source of plant nutrient. Crop may suffer from deficiency and injury as a result of under application and over application, respectively both leading to reduced yield (Saleh *et al.*, 2003).

Cowpea (*Vigna unguiculata*) is a legume grown in savannah region, the tropics and sub-tropics. It is largely grown in West and Central African countries. Its value lies with high protein content, its ability to tolerate drought and the fact that it fixes atmospheric nitrogen if allowed to grow on a poor soil (Akinyele *et al.*, 1986). The ability of cowpea plant to tolerate drought and poor soil makes it an important crop in the savannah region where these constraints restrict other crops. Its grain is nutritious and is a cheap source of protein for both rural and urban consumers. Its grain contains about 25% protein and 64% carbohydrate, it is also a genuine African crop for hay and forage production (Chirima *et al.*, 2008).

The 1st step in good management of any product is to understand the nature of the material. A practical approach to poultry manure handling is to characterize the