

INFLUENCE OF DIFFERENT ORGANIC MANURES ON BIOMASS YIELD OF CoCN4 HYBRID NAPIER IN FARMERS FIELD

Dr. B. Rajesh Kumar

Assistant Professor, Veterinary University Training and Research Centre,
Tamil Nadu Veterinary and Animal Sciences University (TANUVAS),
District Collectorate Campus, Sathuvachari, Vellore – 632009

E-mail: drrajeshvet2008@gmail.com

Abstract: A field experiment was conducted in Ramapuram village, Kaveripakkam block of Vellore district, Tamil Nadu. The experiment was laid out with three replications per treatment in all the fields viz., Farm yard manure, Poultry manure and Vermicompost. The CoCN4 Hybrid Napier fodder slips were planted as per the standard agronomic practices. Biomass yield of the fodder crop was assessed on 90th day (harvest) which revealed highly significant difference between treatments. Among the organic manures, Vermicompost recorded significantly higher fodder yield when compared to other treatments and farmers could utilize vermicompost which have more advantage in terms of increased biomass yield from their land.

Keywords: Organic manures, Bio mass yield, CoCN4 Hybrid Napier.

Introduction

In India today, modern agriculture based on chemicals is not sustainable because of problems associated with loss of soil productivity due to excessive erosion and plant nutrient losses, surface and ground water pollution as a result of pesticides and fertilizers. Intensive agriculture had negative effects on the soil environment over the past decades due to loss of soil organic matter, soil erosion and water pollution. Hence, use of organic manures to meet the nutrient requirement of crop would be an inevitable practice in the years to come for sustainable agriculture since, organic manures generally improve the soil physical, chemical and biological properties along with conserving the moisture holding capacity of soil and thus resulting in enhanced crop productivity along with maintaining the quality of crop produce (Maheswarappa *et al.*, 1999). Organic fertilizers have a positive effect on soil microbial population resulting in enhanced soil biomass, carbon, nitrogen content and dehydrogenase activity. To compensate the short supply and to mitigate recent price hike in inorganic fertilizers, use of indigenous sources of organic manures is necessary (Singh and Biswas, 2000). Hence, keeping all the facts in view an experiment was conducted to compare the efficacy of different types of organic manures viz., Farm yard manure (FYM), Poultry

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manure (PM) and Vermicompost (VC) on biomass yield in CoCN4 Hybrid Napier under farmers field conditions.

Materials and Methods

Field experiments were conducted in Ramapuram village, Kaveripakkam block of Vellore district at five different farmer's location wherein composite soil samples were collected in all the fields prior to the study and analysed for the physico chemical properties. The experiment was laid out with three replications per treatment in all the fields viz., T1- Farm yard manure (5t/acre), T2 - Poultry manure (2.5t/acre) and T3- Vermicompost (2.5t/acre). The basal manure was applied in all the experimental fields and the land was ploughed twice by a tractor with chisel ploughing followed by harrowing. The fields were brought to fine tilth and laid out in to proper plot size (6 x 4 m). The CoCN4 Hybrid Napier fodder slips were planted at 50 x 50 cm spacing and the first irrigation was done on the same day of planting and thereafter as and when required. The necessary after care operations such as hand weeding were done as per the requirement. Also 5 plants were tagged in each plot initially on 15th day and biomass yield (green fodder) was assessed by harvesting the fodder crop on 90th day at 3 different points in one square meter area in each experimental plot and the weight of fresh fodder biomass was measured using digital electronic weighing balance. The data collected on green fodder yield on 90th day (Harvest day) between treatments were subjected to one way Analysis of Variance (ANOVA) by SPSS 13.0 and interpretation of data was done as per the procedure described by Gomez and Gomez (1984).

Results and Discussion

The mean values of Green fodder yield (t/ha) for CoCN4 Hybrid Napier for T1, T2 and T3 were 83.32, 90.56 and 94.61 respectively (Table1). Highly significant difference ($P < 0.01$) was observed between treatments for the fodder crop on 90th day of harvest period. The increased green fodder yield was due to the result of higher plant height, stem diameter and more dry matter production per plant. This was due to the regulatory role of nitrogen in production of amino acids and plant hormones responsible for cell division and enlargement and higher nitrogen facilitated optimum development of photosynthetic apparatus which captured the incident light more efficiently (Tariq *et al.*, 2011). Nitrogen is an important constituent of amino acids and chloroplasts which directly influenced plant growth and development through greater photosynthates. Higher leaf area captures more photosynthetically active radiation with higher photosynthesis. Nitrogen is a vitally important plant nutrient involved in protein and enzyme synthesis. Also the availability of soil nitrogen

and other macro and micronutrients could have enhanced meristematic growth and resulted in higher fodder yield. Also the organic manure contained readily metabolizable carbon and N which increased the root biomass and root exudates which play a vital role in contributing to its biomass increase (Enke liu *et al.*, 2010). Moreover, the beneficial effect of organic manure on yield might be due to increased organic matter present that has improved the soil structure conditions which encouraged the plant for good root development by improving the aeration of the soil (Ouda and Mahadeen, 2008). The higher yield could be due to the fact that these organic manures supplies direct available nutrients such as nitrogen to the plants and these organic manures improves the proportion of water stable aggregates of the soil. This was attributed to cementing action of polysaccharides and other organic compounds released during the decomposition of organic matters, thus leading taller plants, increased number of leaves, tillers and in turn the final yield (Martens *et al.*, 1992).

Among the various treatments, Vermicompost recorded significantly higher yield which might be due to greater root extension under phosphorus application would have helped in greater uptake of nutrients which ultimately improved the fodder yield. Also, higher photosynthates produced under vermicompost would be due to better nitrogen and phosphorus availability, better translocation within plants and favourable sink source ratio of photosynthates (Joshi *et al.*, 2016). Also it acts as a store house of all plant nutrients including trace elements which would have released gradually and steadily and this contributed towards the balanced nutrition of crop resulting in maximum yield (Jamir *et al.*, 2017). Thus, it could be concluded that Vermicompost recorded significant higher fodder yield than others and farmers could realize the importance of organic manure for increased fodder production which serves environment friendly. Hence it could be recommended that farmers could adopt this environment friendly technique for increased renewed income generation and sustainable livelihood.

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Table: 1**Biomass yield of CoCN4 Hybrid Napier under different types of Organic manure**

S. No	Technology Options	90 th day (Biomass yield – t/ha)	Level of significance (Between treatments)
1.	T1 (Farmyard Manure)	83.32 ± 0.46 ^c	**
	T2 (Poultry Manure)	90.56 ± 0.47 ^b	
	T3 (Vermicompost)	94.61 ± 0.74 ^a	

Means bearing same superscripts within columns do not differ significantly

** - Highly Significant ($P < 0.01$)