DRY MATTER YIELD OF *Brachiaria ruziziensis* AS AFFECTED BY POULTRY MANURE RATES AND STAGES OF HARVEST.

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ABSTRACT

The study was carried out at Professor, Lawal Abdu Saulawa Livestock Teaching and Research Farm, Federal University Dutsin-Ma to evaluate the effect of poultry manure rates and stages of harvest on the dry matter yield of *Brachiaria ruziziensis.* The experiment was laid in a Randomized Complete Block Design (RCBD) in a 3×3 factorial arrangements, with three manure rates (5, 10 and 15 t/ha), replicated three times and stages of harvest (6, 8 and 10WAP). Poultry manure rate was the first factor while the stage of harvest was the second factor. A week before transplanting, poultry manure was applied to each plot manually by broadcast and immediately incorporated into the soil using hoe. Seedlings of *B.*ruzi were uprooted from the Pasture introduction plot of the Teaching and Research Farm and transplanted to the experimental field with inter and intra-row space of 0.5m and 0.2m respectively when the rain was established. Weeds were controlled during the experimental period. Data on Dry Matter Yield of *B.*ruzi was taken at each of the stageof harvest. Data collected on dry matter yield was subjected to ANOVA, using GLM SAS, 2005. Significant difference among the treatment means were compared using DMRT. The result showed that the DMY was higher ($P<0.05$) at 10WAP and 10t/ha of poultry manure application rate. It was concluded that poultry manure should be applied to *Brachiaria ruziziensis* at the rate at 10 ton/ha and the forage be harvested at 10WAP to achieve a higher forage yield.

Key words: manure, cutting, yield, poultry, pasture.

INTRODUCTION

Paucity of feeds is one of the major challenges of ruminant animal production in Nigeria due to variation in the pattern of rainfall (Lamidi and Olugbose, 2014) thereby resulting in slow growth and reduction in milk output per animal. This results in seasonal migration of herdsmen from north to the southern part of Nigeria, leading to encroachment of farmlands, culminating in farmers/herders clash, a menace which has hitherto become the order of the day in Nigeria (Aruwayo *et al.,* 2021). *Brachiaria ruziziensis* is a grass forage plant with higher dry matter yield, palatability, ease of cultivation and high nutritional quality which if explored can increase the productivity of ruminant animals in the north western Nigeria (Umami *et al.,* 2018). Pasture production and availability in Sub Saharan Africa has become a big challenge as a result of soil infertility being caused by soil degradation which can be physical, chemical or biological (Aregheore, 2002). Organic manure is an alternative source of soil nutrient used in amendment of soil condition (Neil, 2007). Poultry manure is rated one of the best organic manure of animal origin with high available nitrogen phosphorus, potassium and other essential minerals (Amanullah *et al.,* 2010) when compared with sheep, goats and cow dung, though, its use in farmlands as nutrient source has gained popularity over the years, but has not been used on *Brachiaria ruziziensis* in the Sahel Savanna region of Nigeria. Meanwhile, it has been established that stages of harvest greatly influence the dry matter yield of forages, as there exist an increase in yield as the stage of harvest advances (Turk *et al.,* 2009).

Materials and methods

Experimental site

The experiment was conducted at the experimental field of the Prof Lawal Abdu Saulawa Livestock Teaching and Research Farm, Federal University Dutsin-Ma, Katsina State, Nigeria. Located on Latitude $11^0$9’45"N, and Longitude 07 ^{0} 38’ E, at an Altitude of 610m above the sea level, along Katsina-Kankara road is characterized by a defined wet and dry season. Wet season starts from early June to late September while the dry season is from September to June. The experiment was conducted at the Prof Lawal Abdul Saulawa Livestock Teaching and Research Farm, FederalUniversity Dutsin-Ma, Katsina State, located in the Sudan Savanna ecological zone. The area lies between Latitude12°27’18’N and Longitude 7°29’29’E, and 605 meters above sea level. The area receives an annual rainfall of 700 mm,which spread from May to September. (Tukur *et al*., 2013).Maximum and minimum air temperature measured during the experimental period were 28.25^0Cand 23.35^0C respectively in September with relative humidity of approximately 68% during the rainy season (MSGRP, 2022).

Soil sample of the experimental site

Soil samples was collected for nutrient analysis from the experimental site with the aid of Soil auger at four corners and center of the plots at 0-30cm depth to make a composite for soil analysis at the beginning of experiment so as to ascertain the level of nutrient in the soil as well as determining the nutrient requirement. The soil sample was analyzed for physical and chemical properties as described by A.E.S (1998) while the poultry manure was also analyzed for its chemical composition. The analysis was carried out at the chemical laboratory of the Department of Soil Science, Faculty of Agriculture, Ahmadu Bello University, Zaria. The result of manure analysis indicated 4.13% total N, 0.85% P, and 1% K.

Land preparation and experimental design.

A gross land area measuring 9m×9m was used for the trial. The land was cleared and seed beds were prepared to meet a better condition for early establishment of seedlings. The experiment was laid out in a randomized complete block design (RCBD) with 3x3 factorial arrangements, replicated three times. 3 levels of poultry manure (5, 10 and15 t/ha) were the first factor and 3 stages of harvest (6, 8 and 10 weeks after planting) were the second factor. Forage samples cut at each stage of harvest was bulked, and sub-samples oven dried for estimation of dry matter yield.

Data collection

Yield determination (t/ha) of fresh forage within each treatment was determined by the use of a $(0.5m)^2$ quadrant and the forage was cut at 5cm above the ground level using a hand sickle for total fresh forage and sub-sample of 100-120g was taken, weighed and oven dried at 65^0C to a constant weight to estimate dry matter yield. Dry matter production was calculated as (TFW (DWss/FWss)) ×10=dry matter kg/ha. (Tarawali *et al*., 1995) where:

TFW= Total fresh weight from $0.5m^2$ in (g), DWss= Dry weight of the sub sample in (g)

FWss= Fresh weight of the sub-sample in (g)

Statistical analysis

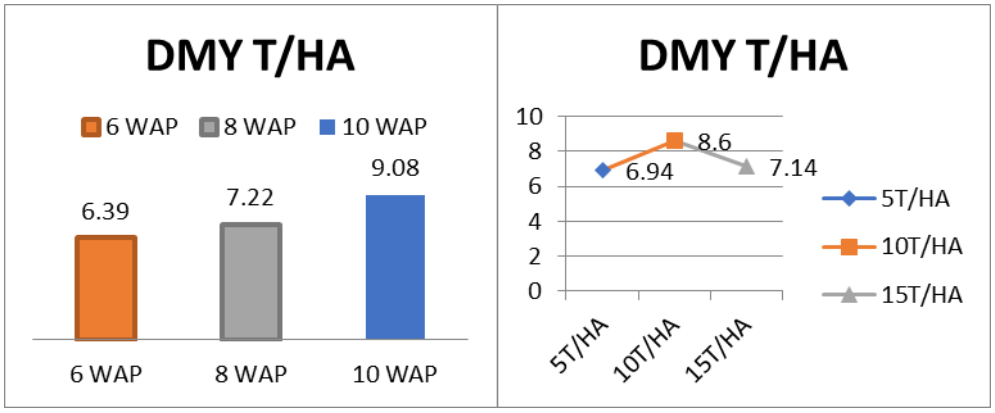
All data collected were subjected to a three-way analysis of variance (ANOVA) using the General Linear Model (GLM) procedure of SAS (2005). Significant ($P<0.05$) differences between the treatment means were compared using the Duncan Multiple Range Test (Duncan, 1995) of the SAS package.

Results and discussion

Dry matter yield was significantly ($P<0.05$) affected by the rate of P. manure application, (Fig 2) there was a numerical increase in the DMY (7.14t/ha), (8.60t/ha) and (6.94t/ha) at 15, 10 and 5t/ha respectively which indicate that 10t/ha produced the highest DMY, By implication, 10t/ha rate of poultry manure application gives the maximum yield of *Brachiaria ruziziensis.* These values fall within the DMY range of 6.1-21.8ton/ha reported by Akinola, (2018) which is in line with the finding of (Ogunkunle 2015; Nnadi *et al.*, 2015) who reported that dry matter yield was generally higher with poultry manure application. However, this yield could increase significantly in the subsequent year when the manure has adequately mineralized.. it is also in line with the the finding of Ogunkunle *et al.,* (2015) who reported a significant effect of poultry manure rate on yield of *Panicum maximum* and Idowu *et al.,* (2021) who reported 10t/ha of swine manure application as the best for the dry matter yield of *Panicum maximum*. DMY was also significantly affected ($P<0.05$) by the stages of harvest (fig 1) , there was a progressive increase in the yield of *Brachiaria ruziziensis* with 10WAP having the highest yield (9.08t/ha) as compared with 8 (7.22t/ha) and 6WAP (6.39t/ha) respectively. This increase could be as a result of cumulative influence of poultry manure rich in essential nutrients there by increasing the relative growth rate and net assimilation rate resulting in biomass accumulation through the growth phases. This agrees with the report of Idowu *et al.,* (2021) who observed significant increase in DMY of forage as the stages of harvest increased. The interaction between the stages of harvest and poultry manure application rate was not significant on the dry matter yield of *Brachiaria ruziziensis.*

Conclusion

Based on the findings of this work, 10t/ha rate of poultry manure application and harvesting at 10WAP gives ahigher DMY of *Brachiaria ruziziensis.* It is therefore recommended that farmers should apply poultry manure to *Brachiaria ruziziensis* at the rate of 10t/ha and harvest at 10WAP for higher dry matter yield in the Sahel Savanna zone of Nigeria.



Graph of DMY vs Stage of harvest
Fig.1DMY as affected by stages of harvest

Graph of DMY vs Poultry manure rate
Fig. 2 DMY as affected by poultry manure rate

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