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EFFECTS OF PLANTING METHODS AND FERTILIZER APPLICATION RATES ON PROXIMATE COMPOSITION OF *CENTROSEMA PASCUORUM* IN DUTSE LOCAL GOVERNMENT AREA OF JIGAWA STATE

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ABSTRACT

A study was conducted to evaluate effects of planting methods and fertilizer application rates on proximate composition of Centrosema pascuorum, at experimental field of crop science Department, Faculty of Agriculture Federal University Dutse, Jigawa State. The research was laid out in 2x5 factorial arrangement in a randomize completely block design (RCBD) consisting of two (2) methods of planting (Drilling and Broadcasting) and five (5) fertilizer rate (0kgha^{-1}, 150kgha^{-1}, 200kgha^{-1}, 250kgha^{-1} and 300kgha^{-1}). Fertilizer used was single super phosphate (SSP). Proximate components were all determined. Result revealed that Proximate composition had no effect on planting method, (P>0.05) numerically Moisture content and Ash (17.34) (15.15) was higher in drilling method compared to broadcasting. However, broadcasting method numerically NFE was higher (29.89). Effect of fertilizer on proximate composition Moisture content, Dry matter, Crude fibre, and Ash was significant (P<0.05).at 150 and 300kg/ha fertilizer. The effect of interaction between planting method and fertilizer application rates Crude fibre was highly significant (P<0.05) at 150 kg/ha fertilizer rates drilling (23.96), broadcasting (24.72) 150kg/ha,) and (25.23)300kg/ha respectively. The crude protein was numerically higher in drilling method (17.01) at 250kg/ha fertilizer rates.Based on the results obtained on the proximate composition of C. pascuorum in this study, it can be recommended that any farmer intending to go into pasture production particularly production of C. pascuorum can adopt any of the two levels of fertilizer (150 and 300kg/ha fertilizer) for higher dry matter, crude fibre and ash. 250kg/ha fertilizer for drilling can be recommended for crude protein from this study.

Keywords: Broadcasting method, *Centrosema pascuorum*, Drilling method, Fertilizer application and proximate composition

INTRODUCTION

Nutrition is one of the important management practices in ruminant production and it is the bed rock of performance in animal, but if there are limited forages; and reduction in nutrient composition of the available forage grasses and legumes during dry season, this poses a problem (Amole *et al.*, 2011). the major challenge to livestock production in Nigeria is ensuring adequate feed supply throughout the year in terms of quality and quantity in the traditional setting, where animals are predominantly raised on natural grasses (Kallah *et al.*1997). There are many pasture crops used in feeding animals made up of grasses and legumes. Among the forage is *Centrosema. pascuorum* (centurion). *C. pascuorum* is an annual twining leguminous herb that can root from the node of trailing herb under moist condition. *C. pascuorum* is suitable

for mixture with grasses or pure stands for lay-farming and adapted to wide range of soil ranging from sand to heavy clay and from slightly acidic to alkaline soil pH (5 – 8.5). It is adapted to tropical areas with pronounced dry season up to 8 months (Feedipedia, 2019). In grassland farming, the *C. pascuorum* phase is able to provide 80-100 kg/ha N to the system, (Thiagalingam *et al.*, 1997). However, the study aims to determine the effect of planting methods and fertilizer rate on proximate composition of *C. pascuorum*.

MATERIALS AND METHODS

Experimental sites

The experiment was conducted at the experimental field of Crop Science Department, Faculty of Agriculture, Federal University Dutse, Jigawa state of Nigeria. Located between latitude 11.00^{o}N to 13.00^{o}Nand longitudes 8.00^{o}E to 10.15^{o}E High temperature are normally recorded between the month of April and September with average temperature range of 15^{o}C and 35^{o}C. Raining season last from May to September with average rainfall of between 600mm to 1000mm. The ecological zone is sudan savannah vegetation which is made up vast grazing land suitable for livestock production and free from tsetse fly infestation. The environment is conducive to different species of livestock production, such as cattle, sheep, goats, Rabbits donkeys, horses and poultry (JARDA, 2012).

Materials use in the research

The seeds of *C. pascuorum* were purchased at National Animal Production Research Institute (NAPRI) Zaria. The single super phosphate fertilizer was used. Weighing scale and tape were used for the weighing and measuring purposes respectively.

Experimental design

The research was laid out in 2x5 factorial arrangement in randomize completely block design (RCBD) consisting of two (2) methods of planting (Drilling and Broadcasting) and five (5) fertilizer rate (0kgha^{-1}, 150kgha^{-1}, 200kgha^{-1}, 250kgha^{-1} and 300kgha^{-1}).A total land area of (120m^{2}) was used, the field was prepared by plouging and harrowing to soften and enhance early plant germination. The experimental field was 2mx2m each up to 30 plots, inter-row and intra-row of 0.5m, 1m was used respectively.

Chemical Analyses

Harvesting was carried out at 8 weeks post sowing, materials were then oven dried at 65°C for 72 h, dried samples was hammer (comprising leaves and stem) to pass through 2 mm sieve, the ground sample was used for proximate composition (DM, ash, CP, CF, EE and NFE) according to the procedures described by AOAC (2005).

Data analysis

Data collected were subjected to analysis of variance (ANOVA) using System Analytical Statistics package (SAS) package and differences between mean was separated using Duncan Multiple Range at probability level of 0.05 (SAS,2009)

RESULTS AND DISCUSSION

Table1. Presents proximate composition of *C. pascuorum*, had no effect on planting method, (P>0.05) numerically Moisture content and Ash (17.34) (15.15) was higher in drilling method compared to broadcasting. However, broadcasting method in numerically NFE was higher (29.89). The effect fertilizer on proximate composition of *C. pascuorum* is presented Table 2. Show that Moisture content, Dry matter, Crude fibre, and Ash was significant (P<0.05).at 150 and 300kg/ha fertilizer. The significant difference observed in proximate composition of *C pascuorum* as may be influence by varying levels of fertilizer applied. Table 3.shows the effect of interaction between planting method and fertilizer application rates Crude fibre was highly significant (P<0.05) at 150 kg/ha fertilizer rates drilling method (23.96), broadcasting method (24.72) 150kg/ha,) and (25.23)300kg/ha respectively. The crude protein was numerically higher in drilling method (17.01) at 250kg/ha fertilizer rates. This finding is contrary with the work of (Baba, M., *et al*., (2018) on "Dry matter yield and proximate composition of grass legume mixtures as influenced by sowing date" who reported that the CP, NFE, and CF were highly significant at (P<0.05)

level of significance. *C. pascuorum* on broadcasting method, CF was highly significant at (P<0.05) among the crude fibre with 25.23 and 24.27% at 300 1nd 150 kg/ha of fertilizer level. However, The CP content recorded for this study was greater than < 7 to 8 % CP suggested as threshold for sufficient utilization of feed by (Lamidi and; MacDonald 1995; Osarobundo, 2020). Therefore, *C. pascuorum*

Table 1: The effect planting methods on proximate composition of *Centrosema pascourum*

Planting methods	MC%	DM%	CP%	CF%	OIL%	ASH%	NFE%
Drilling method	17.34[a]	81.71	16.75	23.07	1.54	15.15[a]	27.46[b]
Broadcasting method	15.55[b]	82.67	16.54	22.40	1.71	13.76[b]	29.89[a]
SEM	0.481	0.80	0.18	0.43	0.12	0.481	1.01
LOS	NS	NS	NS	NS	NS	NS	NS

[ab]= mean values with different superscripts along the same column are significant (P<0.05) MC=Moisture content, DM=Dry matter, CP= Crude protein, CF= Crude fibre, NFE= Nitrogen free extracts, SEM=Standard error mean, LOS= Level of significance. NS= Not significant

Table 2: The effect of fertilizer on proximate composition of *Centrosema pascuorum*

Fertilizer rate (kg/ha)	MC%	DM%	CP%	CF%	OIL%	ASH%	NFE%
0	17.16[a]	82.90[a]	16.37	21.49[c]	1.43	13.91[c]	30.14[a]
150	16.61[ab]	82.04[ab]	16.51	24.11[ab]	1.64	14.15[bc]	26.56[b]
200	15.68[c]	81.08[bc]	16.60	21.96[bc]	1.72	14.21[b]	27.68[a]
250	15.81$_{bc}$	81.93[b]	16.90	21.98[b]	1.70	14.88[b]	29.04[a]
300	16.98[ab]	82.99[a]	16.83	24.12[a]	1.64	15.13[a]	29.96[a]
SEM	1.09	1.26	0.28	0.68	0.18	0.76	1.60
LOS	*	*	NS	*	NS	*	NS

[ab]= mean values with different superscripts along the same column are significant (P<0.05) MC=Moisture content, DM=Dry matter, CP= Crude protein, CF= Crude fibre, NFE= Nitrogen free extracts, SEM=Standard error mean, LOS= Level of significance. NS=Not significant * significant

Table 3: The effect of interaction of planting methods and fertilizer rate on proximate composition (g/100 g) of **Centrosema *pascuorum***

Planting methods	Fertilizer rate (kg/ha)	MC%	DM%	CP%	CF%	OIL%	ASH%	NFE%
Drilling method								
	0	16.12	83.86[a]	16.30	22.76[bc]	1.26	14.19	30.29
	150	18.42	79.84[b]	16.69	23.96[ab]	1.62	15.45	23.97
	200	16.22	81.03[a]	16.80	22.70[bc]	1.82	15.32	26.62
	250	16.84	81.90[a]	17.01	22.92[bc]	1.51	15.57	27.48
	300	19.04	81.93[a]	16.93	23.01[bc]	1.51	15.21	28.96
Broadcasting method								
	0	18.12	81.95[a]	16.44	20.23[d]	1.60	13.63	29.98
	150	14.80	84.24[b]	16.33	24.27[ab]	1.66	12.85	29.14
	200	15.13	81.14[a]	16.39	21.22[cd]	1.62	13.10	28.74
	250	14.79	81.97[b]	16.80	21.04[cd]	1.90	14.18	30.61

	300	14.93	84.05[b]	16.72	25.23[a]	1.763	15.04	30.96
SEM		1.546	1.785	0.40	0.960	0.26	1.075	2.263
LOS		NS	NS	NS	**	NS	NS	NS

[abcd]= mean values with different superscripts along the same column are significant (P<0.05) MC=Moisture content, DM=Dry matter, CP= Crude protein, CF= Crude fibre, NFE= Nitrogen free extracts, SEM=Standard error mean, LOS= Level of significance.

Conclusion

The study concluded that planting methods has no effect on proximate composition of *C. pascuorum* However;fertilizer and interaction of planting method and fertilizer affect proximate composition of*C. pascuorum.*

would provide the adequate nitrogen requirement for the rumen microorganisms to maximally digest the main components of dietary fibre leading to the production of volatile fatty acids (Trevaskis et *al* 2001; Lamidi and Ogunkunle 2016) which in turn assist microbial protein synthesis is Lamidi and Aina (2013).The dry matter in Table 3. ranged between 79.84 and 84.24 g/100 g in *C. pascuorum* this finding is agreed with finding of (Lamidi and; and Osarobundo, 2020).Who reported dry matter value of 87.66 and 90.79% C. pascuorum at four different cutting regimes in humid respectively.

RECOMMENDATIONS

.Based on the results obtained on the proximate composition of *C. pascuorum* in this study, it can be recommended that any farmer intending to go into pasture production particularly production of *C. pascuorum* can adopt any of the two levels of fertilizer (150 and 300kg/ha fertilizer application) for higher dry matter, crude fibre and ash. 250kg/ha fertilizer for drilling can be recommended for optimum crude protein from this study.

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