INFLUENCE OF DIETARY INCLUSION OF *CALOPOGONIUM MUCUNOIDES* LEAF MEAL ON THE PERFORMANCE OF BROILER CHICKEN

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ABSTRACT
A feeding trail was conducted to ascertain the dietary inclusion of Calopogonmum mucunoides leaf meal on the performance of broiler chicken. A total of 60 3 weeks old broiler birds were used. Four diets which contained 0.0, 0.2, 0.4 and 0.6% levels of the forage meal were formulated. The trial was in a completely randomized design of four treatments replicated into three with 5 birds per replicated. Weight and feed intake of the birds were taken weekly and daily respectively. These were used to calculate weight gain, daily weight gain, total feed intake, daily feed intake FCR, PER and daily protein intake. Results obtained show that significant difference (P < 0.05) existed among final weight gain, total weight gain, daily weight gain, daily protein intake and protein efficiency ratio while such parameters like total feed intake, daily feed intake and feed conversion ration were not affected. It was concluded that the inclusion of C. mucunoides meal with 0.2% improved final weight, total weight gain, daily weight gain, daily protein intake and protein efficiency ratio in broiler chicken.
Keyword: *Calopogonium mucunoides* leaf meal, broiler chicken, inclusion levels

INTRODUCTION
The high demand for animal protein in Africa and beyond continues to increase due to the rise in population. This could be due to its rich in essential amino acids, mineral and vitamins which the body requires. The major hindrance to successful production of quality animal protein is the cost of feed which is over 70% of total cost of production (Sanwo *et al.* 2006). To meet the fast-growing demand of poultry and its products, farmers as well as scientists are looking out for alternative sources of feed ingredient which have little or no competitiveness between man or industry and animals. A lot of research works have been carried out using alternative feed ingredients to supplement or replace conventional feed ingredients.

One of such potential material used as a replacement for conventional feed ingredient in this trial is *Calopogonium mucunoides.* This is being used to check against soil erosion, reduce soil temperature, improve soil fertility and control weed (Heuze *et al,* 2016) like many other legume forages the nurtured value of calopogonium lies on its protein content (Evitayani *et al.,* 2004). The plant has been observed to contain some phytochemicals like alkanoides tanin, saponin, cardiac glycosides and flavonoides which have ethnomidicinal uses as the treatment of diarrhea (Borokini and Omotaya, 2012). But the nutritional value of the calopogonium forage has not been fully explored, hence this study was undertaken to investigate the growth performance of boiler finisher chicken feed difference levels of dry *Calopogonium mucunoides* forage meal.

MATERIALS AND METHODS
Experimental location
The experiment was conducted at the teaching and Research Farm of department of Animal Science and Fisheries, Abia State University Umuahia Campus. The area is located in the rain forest zone on latitude 05^0 27' North and longitude $07^0$52' East with an attitude of 122 meters above sea level with average rainfall of 2,177mm and relative humidity of about 50-90% (NRCRI, 2006).

Procurement and processing of experimental materials
The forage for the study was obtained from the university environment, dried at room temperature, with constant turning to evert fungi growth. After drying, the leaves were milled and incorporated into the broiler finisher ration at different proportion in the mixture (0.0, 0.2, 0.4 and 0.6%) in diets T_1, T_2, T_3 and T_4 respectively as shown in Table 1.

Experimental design and management of birds

The experiment was carried out on completely randomized design (CRD) with sixty 3 weeks old broiler chicks. There were four dietary treatments (T_1, T_2, T_3, and T_4) each having 15 birds per treatment. Each treatment was replicated three times with 5 birds per replicates.

Table 1: Composition of experimental diets

Ingredients	**T_1**	**T_2**	**T_3**	**T_4**
Maize	50	50	50	50
Soyabean	19.3	19.3	19.3	19.3
Wheat offal	20	19.8	19.6	19.4
Calopogonium mucunoide meal	0.00	0.2	0.4	0.6
Fish meal	7.0	7.0	7.0	7.0
Bone meal	3.0	3.0	3.0	3.0
Methionine	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10
*Premix	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Total	**100.00**	**100.00**	**100.00**	**100.00**
Calculated analysis				
Ingredients				
Crude protein %	20.30	20.27	20.24	20.21
Ether extract	5.50	5.30	5.20	5.10
Crude fibre	4.7	5.0	5.2	5.10
Calcium	1.30	1.20	1.20	1.20
Phosphorus	0.6	0.5	0.65	0.65
Metalolizable Energy (kcal/kg)	2634.46	2631.95	2629.44	2625.76

*Premix provides per kg diet; vit. A 10000iu, vit. D31500iu, vit.E 4.8iu, vit. K 2.86iu, riboflavin 3mg, panthonate 6mg, niacin 15mg, choline 3mg, vit. B12 0.08mg, folic acid 4mg, Mn64mg, Zn 0.5,iodine 1.0mg cobalt 125mg cu 10mg Fe 20mg flavomycin, 5mg, DL-methionine 5omg Se 0.16mg L-Lysine120mg and BHT5mg.

A week before the arrival of the birds, the poultry house was washed, disinfected, fumigated and allowed to dry, then the floor was covered with litter materials made of dry wood shaving. On arrival, the birds were given anti-stress medication to enable them recover from shock they may have passed through during transportation. Feed and water were offered *ad libitum* throughout the experimental period which lasted for 35 days.

Data collection and Analysis

Live body weight was obtained weekly using a 20kg capacity Camry weighing scale. Weight gain was calculated by subtracting the initial weight from the final weight. Feed intake of each replicate was calculated by subtracting the quantity of the left-over feed from the quantity of feed fed the previous day. This was later divided by the number of birds in the replicate.

$$feed:gain\ ratio = daily\ feed\ intake\ daily\ weight g$$

$$Daily\ protein\ intake\ PPI = \%CP\ in\ feed \times daily\ feed\ intake$$

$$Protein\ Effieciny\ ratio\ PER = daily\ weight\ gain\ (g) daily\ protein\ intake$$

Data Analysis

Data collected were subjected to Analysis of variance (ANOVA). Where significant effect was detected from analysis of variance, treatment means were compared using Duncan's Multiple Range Test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

The effect of supplementing *Calopogonium mucunoides* forage meal on finisher broiler chicken is shown in table 2. Observations show that total feed intake, daily feed intake and feed conversation ratio were all statistically ($P > 0.05$) unaffected by the treatment, while the final weight gain, total

weight gain, daily weight gain, daily protein intake and protein efficiency ratio were statically ($P < 0.05$) affected. The final weight gain in the treatments were all influenced statically ($P > 0.05$) in the same pattern, while the best daily weight gain was obtained at 0.2% inclusion level of *C. mucunoides* forage meal. The control group consumed the same quantity of protein with the *C. mucunoides* supplemented group, however, the daily protein intake of diet T_2 (0.2%) gave the best protein efficiently ratio when compared with the control.

The trend of the present results on growth performance in the trial is an indication that *C. mucunoides* forage meal at 0.2% inclusion level could have added some beneficial factors such as flavonoids and carotenoids which are bioactive compounds that could improved the health of animals (Norton, 1994). The result also agreed with the report of Uzegbu *et al.* (2022) who stressed the importance of feeding green forage to monogastric animals because they contain vitamins and proteins. This result is also in consonant with the result of Ihukwumere *et al.* (2008), who reported that green forage are essential natural feeding resources that could improve growth performance of broiler chicken.

Table 2: Growth Performance of Broiler Finisher fed Diets Containing Varying Levels of *C. mucunodies*

	Treatments				
Parameters	T_1	T_2	T_3	T_4	T_5
Initial live weight (kg)	1.00	0.99	0.99	1.00	0.02
Final live weight (kg)	2.97^{ab}	3.07^{a}	2.80^{ab}	2.67^{ab}	0.06
Total weight gain (kg)	1.97^{ab}	2.07^{a}	1.81^{ab}	1.67^{b}	0.06
Daily weight gain (g)	70.24^{ab}	74.29^{a}	64.76^{ab}	59.52^{b}	2.29
Total feed intake (kg)	4.29	4.46	4.38	4.20	0.07
Daily feed intake (g)	153.33	159.28	156.54	150.00	2.47
FCR	1.45	1.46	1.56	1.57	0.02
Daily protein intake (g)	31.13^{b}	32.29^{a}	31.28^{b}	30.32^{b}	2.46
Protein efficiency ratio (g)	2.26^{b}	2.39^{a}	2.07^{c}	1.92^{c}	0.09

^{abc} Means on the same row with different superscript are statically different ($p<0.05$)
SEM: Standard error of the mean

CONCLUSION and Recommendation

This study shows that dietary inclusion of *Colopogonum mucnoides* forage meal at 2% in the diet of broiler ration can improve the growth performance and enhances protein efficiency ratio.

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