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POTENTIAL OF MIXED FORAGES (*CALOPONUMMUCOIDS* AND *PANICUM MAXIMUM*) ON THE INTERNAL ORGAN CHARACTERISTICS OF PIGS

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ABSTRACT
A feeding trial was conducted to determine the nutritional potentials of combined fresh forages (Calopogonium mucunoides and Panicum maximum) on the internal organ characteristics of pigs. A total of 30 grower pigs averaged 18kg were used in 63 days feeding trial. Five diets which contained 0, 10, 15, 20 and 25% levels of the fresh forage respectively were formulated. Each diet formed a treatment which was fed to the pigs. Pigs were fed 4% of their body weight and the feed were given ad-libitum. Treatments were replicated thrice and each replicate contained two pigs in a completely randomized design.At the end of 63days trial, two pigs were randomly selected from each treatment, weighed, slaughtered, skinned and eviscerated and the organs weight taken, the organs investigated were the intestine, heart, liver, spleen, kidney and lung.Results showed that significant differences (P<0.05) were observed in most of the parameters investigated except the lungs, but these significant did not deviate from normal size of those organs that may be attributed to abnormally.
Key word: Forage, Pig, Calopogonium mucunoides and *Panicum maxcimum*

INTRODUCTION
Insufficient quantity and quality of animal protein in the diet of the world population affect not only the health and efficiency of the present generation, but also those of future generation because such deficiencies result in various clinical and subclinical conditions such as reduced growth, poor physical and mental development in children and adolescents, impaired health, reduce resistant to diseases and low working efficiency (Ojewola, 2010). Scarcity of conventional feeds resources has ever continued to challenge livestock industries especially the monogastrics, this has spurred animal nutritionists to resort to non-conventional feeds stuffs, so as to sustain uninterrupted animal protein supply and other livestock products. Forage over the years are being used extensively in ruminant animals feeding because of their ability to digest high fibre diets, but not much attempt has been made to include forage in piglets. There is this fear that monogastrics do not effectively digest high fiber diets, but report has shown that pigs require some level of lignocelluloses as the major component of fibre (Kroismay, 2008). Available findings showed that pigs can thrive on diets containing forage and forage products such as cocoyam (Rodrifues *et al*., 2006). Wild sunflower leaf meal (Oluyemi *et al*., 2006) and Morning glory leaves (Ekenyem, 2006). The gastrointestinal tracts of pigs have been found to contain some microbes which could be found in ruminants. other observations showed that the inclusion of forage in the diet of pigs leads to increase in the intestine and other digestive organs as reported by Uzegbu et al. (2018). This study therefore was undertaken to evaluate the impact of mixed forage on the internal organs of pigs.

MATERIALS AND METHODS

Experimental location

The experiment was conducted at the Teaching and Research Farm of department of Animal Nutrition and Forage Science of Michael Okpara University of Agriculture, Umuduike, Abia State. Umudike is located in the rain forest zone at latitude 5°29¹N and longitude 7°32¹E and lies at an altitude of 122 meters above sea level with average rainfall of 200mm. .

Procurement and processing of experimental materials.

The forages for the study were obtained from the university environment. The fresh forages cut at their bloom Stages were chopped into small sizes and incorporated into the concentrate feed (Table 1) formulated by trial and error method according to Olomu (1995) at 0, 10, 15, 20 and 25% supplementary levels respectively as shown in the table below

Experimental design and management of pigs

Completely randomized design was used. 30 strains of large white and landrace cross grower pigs were used. The animals were divided into five dietary treatments (T_1 – T_5). Each treatment was replicated three times and each replicate had two pigs.

Table 1: Composition of Concentrate Diet.

Ingredients (%)	**Composition**
Maize	50.70
Soyabean	27.60
Fish meals	1.50
Palm kernel Cake	16 00
Bone meal	3 50
Salt	0.25
*Mineral and VitaminPremix	0.25
Methionine	0.10
Lysine	0.10
Total	**100.00**
Calculated Composition (%)	
Crude protein	19.59
Metabolizable Energy (kcal/kg)	3046.33
Lysine	1.08
Methionine	0.38
Calcium	0.55
Phosphorous	0.51

*To provide the following per kg feed; vitamin A 10,000iu; vitamin D3 1500iu, vitamin E 4.8iu, vitamin K, 2mg; riboflavin 3mg; panthothemic acid 6mg; niacin, 15mg; choline 3mg; vitamin B12 0.08mg; folic acid 4mg; Mn 64mg; Zinc 0.5mg; iodine, 1.0mg; cobalt 125mg; copper 10mg; Iron, 20mg; flavomycin, 5mg; DL-methionine, 50gm; Selenium, 0.16gm; L-Lysine 120g; and BHT 5gm.

Table 2: Composition of Experiment III Diet Supplemented With Grass + Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Analysed Composition					
Dry Matter (%)	85.44	86.53	85.94	87.23	85.58
Crude Protein (%)	20.18	19.49	19.15	18.81	17.96
Ether Extract (%)	3.76	3.93	4.02	4.04	4.19
Crude Fibre (%)	11.13	12.81	13.66	14.49	15.34
Ash (%)	9.50	9.81	9.79	10.12	10.28
Nitrogen Free Extract (%)	45.74	43.99	43.09	42.29	41.84

Gross Energy ((kcal/kg)	4.00	3.94	3.92	3.90	3.88

The pigs were stabilized with the concentrate diet for a period of two weeks before the commencement of the experiment. Within this period, broad spectrum antibiotics, multivitamins and dewormer were administered to keep the animal fit for the trial. After this, they were randomly allocated to five different treatment groups after taking their initial weights. Feed and water were given daily at 8.00hours and 16.00hours at 4% of their body weight.

Data Collection/Analysis

At the end of 63 days of the trial, two pigs (a male and female) from each treatment group were slaughtered to evaluate the size of the organs. Prior to slaughter, the animals were fasted for 24 hours but were given only drinking water to avoid feed wastage and cleaning of their guts contents from undigested feed. The live weight of each pig was taken before slaughter. Slaughtering was done by stunning with a stunning stick, severing with sharp knife from the neck and bled completely by hanging from the hind limb up and held down. The pigs were scaled by pouring hot water (60^{o}c) on the entire skin and hairs easily removed by scratching with knife.

The slaughtered animals were skinned and the head, tail, intestinal content and organs including the heart, liver, kidney, spleen, intestine and lungs were removed and expressed as percentage of the live weight. The data collected were subjected to analysis of variance (ANOVA) using (SAS, 2004) and significant means were separated using Duncan Multiple Range Tests (DMRT).

RESULTS AND DISCUSSION

Table 2 shows the organ characteristics of pigs fed on combine (legume + grass) forage expressed as a percentage of the live weight. Results show that there is significant (P>0.05) difference in all the parameters investigated except the lungs. The intestine, heart, liver, spleen and kidney weight increased at higher forage inclusion level. The intestine had the least values in T_1 and T_2 but statistically (P> 0.05) different from T_3, T_4 and T_5. The heart has the highest value in T_4 and T_5, this did not statistically (P>0.05) differ from T_3, but in T_1 and T_2. The liver, kidney and spleen has higher values in diet T_5. However, the numerical value observed in the intestine of pigs fed on higher inclusion of forage (T_4 and T_5) could be due to increased crude fibre content of the diet, which may have led to increased activity on the organ. This observation is in agreement with the report by Uzegbu et *al.,* (2018),who observed that the introduction of forage in the diets of pig caused weight increase of the caecum. The increase in the liver on diets T_3, T_4 and T_5 may be attributed to hypertrophic effect resulting from increased activities of the liver. The progressive increase in the size of kidney could be attributed to high metabolic activities caused by the nature of the forages. This could be related to the presence of rhodanase in the kidney, an enzyme that functions in cyanide intoxication as reported by Akinmutimi (2004). The heart and spleen increase in weight couldalso be traced from increased activities.

Table 3 Effect of Grass + Legume Forage Combination on the Internal Organs of Pigs

Parameters	**T_1**	**T_2**	**T_3**	**T_4**	**T_5**	**SEM**
Intestine (%)	12.40^{c}	13.10^{c}	14.60^{b}	15.57^{a}	15.79^{a}	0.37
Heart (%)	0.85^{b}	0.77^{c}	0.94^{ab}	1.02^{a}	0.98^{a}	0.02
Liver (%)	3.15^{b}	3.20^{b}	3.80^{a}	3.70^{a}	3.80^{a}	0.15
ssSpleen (%)	0.46^{b}	0.51^{ab}	0.48^{b}	0.49^{b}	0.61^{a}	0.02

Kidney (%)	0.32[b]	0.38[a]	0.28[c]	0.39[a]	0.35[ab]	0.04
Lungs (%)	2.05	2.21	2.20	2.00	2.10	0.02

a-c means along the same row with different superscripts are significantly (P<0.05) different.
SEM = Standard Error of Means

CONCLUSION/RECOMMENDATION

This study shows that dietary inclusion of fresh combined forages in the diet of pigs did not have any deleterious effect on the animal and should be included at the range of 20 – 25% to boost organ function and proper development.

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