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Reproductive Performance of Rabbits (*Oryctolagus cuniculus*) Fed Mistletoe (*Tapinanthus bangwensis*) Leaves from Different Host Plants

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Abstract

This study was conducted to evaluate the effect of mistletoe (*Tapinanthus bangwensis*) leaves from different host trees on reproductive performance of rabbits (*Oryctolagus cuniculus*). A total of sixteen (16) rabbits does were randomly allocated into four dietary treatment groups designated as T1, T2, T3 and T4 consisting of four rabbits, each serving as a replicate. The rabbits does were fed with a common concentrate diet and fresh mistletoe leaves from different host trees (Shea-buttter, Almond and Locust bean). Rabbits in T1(Control) were fed with only the concentrate diet while rabbits in T2 were fed concentrate alongside mistletoe leaves from Shea-butter tree, those in T3 were fed concentrate alongside mistletoe from almond tree and rabbits in T4 were fed concentrate alongside mistletoe from locust bean tree. The feeding trial lasted for 12 weeks during which data for birth and weaning traits were obtained. The result obtained showed no significant differences (P>0.05) in performance among the different treatment groups. It is therefore concluded that mistletoe leaves from Shea-butter, almond and locust bean tree can be fed to rabbits without any deleterious effect on their reproductive performance.

Keywords: Mistletoe leaves, Almond tree, Sheabutter tree, Locustbean tree, Reproductive Performance.

Introduction

It is a known fact that only a small proportion of protein in the diets of Nigerians is derived from livestock products. Animal protein, as important as it is to human feed is however not produced sufficiently to meet the dietary requirements of the teeming population of Nigeria. According to Ani and Okafor (2004), solution to this problem depend on the production of fast maturing animals with the use of cheap and locally available feedstuffs. One of such animals is the rabbits Nutritionally, rabbit meat has a higher protein (20-21%), low calories (1749kcal/kg) and low fat content (10-11%) when compared with meat from most livestock species. Rabbits meat has a low cholesterol value of 169mg/100g (dry matter basis) when compared with beef (200mg), chicken (220mg) and pork (223mg) and low sodium content (Janieri, 1987). In spite of these attributes, rabbit meat production still remain at a low level due to high cost of conventional feed and competition between man and livestock for the available feed ingredients. This has challenged animal nutritionists for the past two decades to search for alternative feedstuffs for monogastric animals (Alemede, *et al* .,2013).

African mistletoe (*Tanpinanthus bangwensis*) is a promising plant because it is an evergreen, perennial and semi-parasitic shrub. Ruminants in the study area (the middle belt zone of Nigeria) do relish it without any reported digestive disorder (Egbewande *et al.*, 2011). Most work that has been done on mistletoe is related to its antitumour and anticancer activities (Osadowor and Ojewe, 2008) without any special reference to the host tree. Alemede, *et al* (2013) studies the effect of mistletoe leaves obtained from Shea-butter tree on the reproductive performance of rabbits and obtained a better reproductive response in rabbits fed mistletoe. This present study attempt to further report the effect of fresh mistletoe leaves harvested from different host trees such as the Shea-butter tree, locust bean tree and almond tree on the reproductive performance of rabbits.

Materials and Method

The experiment was conducted at the Rabbitary unit of the Teaching and Research Farm of the Department of Animal Production, School of Agriculture and Agricultural Technology, Federal University of Technology, Gidan Kwano Campus, Minna, Niger State. A total of sixteen (16) rabbits does were used for this study, which lasted for a period of 12 weeks. The rabbits were allowed two weeks adaptation period so as to adjust to the feed and cage prior to the 12 weeks data collection. The rabbits were randomly allocated to four dietary treatments comprising of four rabbits each. Rabbits in T1 (Control) were fed concentrate feed only. Rabbits in dietary treatment group T2, T3 and T4 were fed the concentrate feed alongside mistletoe leaves from the Shea-butter tree, the almond tree and locust bean tree respectively. The rabbits were given the concentrate diet in the morning and the mistletoe leaves in the evening. Data collected on reproductive performance include birth traits like Gestation length (GL), Kindling loss (KL), Litter size at birth (LSB), Litter weight at birth (LWB), Neo-natal mortality (NNM), Coefficient of milking capacity (CMC) and parameters on weaning trait like Litter size at weaning (LSW), Litter weight at weaning (LWW), Litter weight gain (LWG), Survival rate to weaning (SRW) and weaning sex ratio (WSR). The proximate composition as well as the anti-nutritional factors present in the African mistletoe leaf samples were determined and proximate composition of the concentrate diet was also carried out. All data were subjected to One-way analysis of variance using statistical package (SPSS 16.0, 2006) and variations in mean were separated using the Duncan Multiple Range Test.

Result and Discussion:

The results of the proximate composition, the anti-nutritional factors and the reproductive performance of rabbits fed mistletoe leaves from locust bean, Almond and Shea butter tree are presented in tables 1,2 and 3,

respectively . The result of the proximate composition of the mistletoe from different host plants (Table 1) show that mistletoe is richly endowed with nutrients; Worthy of noting is the crude protein content which was very high (21.90 %), irrespective of the source. Crude fibre content of the species obtained from Locust bean and Almond tree (14.70 %) was not significantly($p \geq 0.05$) different from that obtained from Shea butter(13.06 %) likewise the ether extract (5 %, 2 % and 3 %), dry matter (68 %, 49.65 %, 53.70 %,) , ash (9 %, 7.70 %, 8 %) and nitrogen free extract (17.40 %, 3.35 %, 7.74 %). Generally, species obtained from Shea butter and Locust bean tree are better endowed in terms of their nutrient content. The dry matter, crude protein and crude fibre content of mistletoe leaves were within the acceptable range for weaner rabbits as reported for Anya *et al*.(2011). The values of crude protein in mistletoe leaves was higher than the 16 – 18 % recommended for weaner rabbits as reported by Lukefahr, (1992), consequently it can be used conveniently to raise rabbits in the tropics since it is readily available all the year round and will further increase the feed resources of rabbits which hitherto has been *Tridax procumbens* and *Centrosema pubescens* (Odeyinka *et al*.,2007: Odeyinka *et al*, 2008)

The result of the anti-nutritional factors (Table 2) reveal the presence of alkaloids, flavonoids, phytates, tannin, oxalate and saponin in the samples of mistletoe leaves, however this did not pose any deleterious effects on the reproductive performance of the rabbits as they fell within the recommended safe levels specified by D'Mello (2000); Kumar and Amit (2010). Anti-nutritional factors are categorized as constituents present in all forage used in practical livestock feeding that have potential to produce adverse effect on the productivity of animals (Steenland, 1991).

Data obtained for reproductive parameters, showed that feeding mistletoe has no significant ($P>0.05$) effect on all values obtained for all parameters measured.

Conclusion

The results from the experiment show no significant difference ($P>0.05$) for all reproductive parameters measured between the treatments groups and control (T_1,T_2 ,T_3 and T_4). It is therefore concluded that mistletoe, irrespective of the host tree from which it is harvested, does not produce any adverse effect on the reproductive performance of the rabbits.

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Table 1 Proximate composition of the mistletoe from different host plants.

Parameters	Composition		
	Locust bean	Almond	Shea-butter concentrate
Dry matter (%)	68.00	49.65	53.70 88.20
Moisture content (%)	32.00	50.35	46.30 11.80
Crude Protein (%)	21.90	21.90	21.90 18.10
Crude Fibre (%)	14.70	14.70	13.06 13.20
Ether extract (%)	5.00	2.00	3.00 6.50

Ash (%)	9.00	7.70	8.00
7.43			
NFE (%)	17.40	3.35	7.74
42.97			

Table 2 Composition of anti-nutritional factors present in mistletoe leaves.

	Composition			
Parameters	Locust bean	Almond	Shea-butter	Recommended Safe Level *
Alkaloid (%)	0.92	0.85	1.08	NA
Flavonoid (%)	0.25	0.15	0.78	NA
Phytate (mg/g)	175.04	102.99	89.04	23.40
Tannin (%)	0.20	0.80	2.40	31.20
Oxalate (%)	5.94	3.74	0.84	0.54
Saponin (%)	1.18	3.55	5.04	7.02

*Kumar and Amit (2010).

Table 3 Reproductive performance of the rabbits fed mistletoe leaves from Locust bean, Almond and Shea-butter trees.

	Treatments				
Parameters	T1	T2	T3	T4	LS
Gestation length	32.00± 1.00	31.00±1.73	31.25±1.71	31.67±0.58	NS
Litter size at birth	4.67±0.58	5.00±1.73	4.50±1.29	3.00±0.50	NS
Litter weight at birth	0.14± 0.04	0.19± 0.06	0.16± 0.05	0.11± 0.03	NS
Kindling loss	2.07± 0.73	3.23± 0.17	2.32± 0.57	2.27± 0.29	NS
Neo-natal mortality	20.00± 0.94	53.97± 2.90	35.42± 1.28	33.33± 1.34	NS
Coeff. Of milking capacity	0.29± 0.03	0.23± 0.04	0.21± 0.05	0.31± 0.08	NS
Litter size at weaning	3.00± 1.00	2.00± 2.00	2.00± 1.41	1.67± 0.58	NS
Litter weaning weight	3.40± 0.84	2.91± 0.64	2.97± 0.66	4.23± 0.08	NS
Litter weight gain	2.60± 0.79	2.25± 0.59	2.38± 0.26	3.43± 0.48	NS
Survival rate at weaning	63.33+ 1.28	41.28+ 3.07	42.08+ 2.92	55.56+ 1.25	NS

Keys:

T1 – concentrate diet only.

T2 – concentrate diet and mistletoe from shea-butter tree.

T3 – concentrate diet and mistletoe from Almond tree.

T4 – concentrate diet and mistletoe from locust bean tree.