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Effect of Mixed Feeding Regime on Litter Performance Traits of Rabbit Does

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Abstract: Twenty-four clinically sexually mature New Zealand white rabbits consisting of (4 buck and 20 does) were used to study the effect of concentrate and Talinum triangulare combinations by breeding does during pregnancy on litter performance traits. The treatments comprised the following concentrate and Talinum triangulare combinations (%) respectively: (1) 20:80, (2) 40:60, (3) 60:40, (4) 80.20.. A total of 150 g/day was offered to the does during pregnancy. Average litter sizes at birth and weaning and litter weaning weight were similar (P > 0.05) between 40:60 and 60:40 concentrate and forage combinations, but, they differed significantly (P < 0.05) from 20:80 and 80:20 concentrate and forage combinations. However, 20:80 diets differed significantly (P < 0.05) from 80:20 diet combinations. Average litter weight gains (0 – 35 days) for the various concentrate and forage levels were 2054.40 ± 14.25 g (20:80), 2270.74 ± 18.85 g (40:60), 2314.40 ± 24.64 g (60:40) and 1485.24 ± 19.30 g (80:20). Mortalities were not significantly different (P > 0.05) between diets. From the economic stand point therefore, diet with 60:40 concentrate and forage combinations could be considered optimum, based on result on litter sizes, litter weight at weaning and mortality.

Key words: Mixed feeding, does, litter traits

Introduction

Nigeria like many other developing countries of the world has a protein deficiency gap, especially that of high quality animal protein. The inadequate supply of protein from the traditional livestock – cattle, sheep, goat and chicken has led to the intensification of efforts to improve on the productivity of these animals. (Rabbit has been thought of as being suitable in this regard (Iheukwumere and Okoli, 2002). The most advantageous attribute of rabbits is their high reproductive potential (Lebas *et al.,* 1997). This is as a result of their short gestation length, early sexual maturity, high prolificacy and ability to rebreed shortly after parturition all leading to a short generation interval (Effiong and Wogar, 2007).

Despite the above advantages, studies on the productive system showed that among other factors, feeding is one of the major limiting factors in achieving maximum performance in rabbits (Iheukwumere *et al.,* 2005). Asuquo (1993) observed that poor nutrition will delay sexual maturity in rabbits resulting in low financial returns for the farmer. Lebas (1993) and Effiong and Wogar (2007) also observed that increased feed and nutrient levels have been advocated for breeding rabbits as a means of increasing litter size, adequate maintenance of pregnancy and subsequent milk let down by the does. Aduku and Olukosi (1990) observed that even though forages can support up to 50% of rabbit nutrient requirements, these animals cannot be fed forages for optimum performance. Aliyu (1990) also observed that breeding rabbits on sole forage alone cannot guarantee maximum productivity considering the limited forage utilization capacity of this herbivore.

Table 1: Proximate Composition of Concentrate and Talinum triangulare fed to pregnant does

Nutrients	Concentral meal (%)	Talinum triangulare (%)
Dry matter	95.56	1.10
Ash	6.54	2.50
Ether extract	13.15	0.40
Crude fibre	9.18	1.70
Crude protein	22.85	2.50
Nitrogen free extract	47.63	2.00

Ngodigha and Mepha (1992) noted that feeding concentrate along side forages will improve reproductive efficiency of breeder rabbits.

This study was therefore designed to evaluate the feeding value of concentrate combined with forage Talinum triangulare on litter performance traits of breeding rabbits under mixed feeding regime.

Materials and Methods

Twenty-four sexually mature and clinically sound New Zealand white rabbits consisting of (4 bucks and 20 does) were used for this study. The rabbits were raised at the Rabbitary Unit of the Livestock and Research Farm, Abia State University, Umuahia, Nigeria. The rabbit does were divided into four treatment groups consisting of 5 does per treatment group. Each treatment group was replicated 5 times with one doe per replicate raised individually on separate cages. The treatments comprised the following:

Concentrate and Talinum triangulare combinations (%) respectively (1) 20:80, (2) 40:60, (3) 60.40 and (4) 80:20 fed to the rabbits in a completely randomized design.

Table 2: Reproductive performance of rabbit does fed concentrate and Talinum triangulare combination diets

Parameters	Treatment (Concentrate: Forage)			
	20:80	40:60	60:40	80:20
Kindling status (%)	51[ab]	65[ab]	77[a]	38[5]
Average litter size at birth	5.85[b] ± 0.24	6.18[a] ± 0.20	6.25[a] ± 0.30	5.00[c] ± 0.32
Average litter birth weight (g)	261.85[b]±10.65	273.42[a]±14.01	311.45[a]±13.33	266.23[c]±11.04
Average litter size at weaning	4.60[b] ± 1.30	5.13[a] ± 0.75	5.22[a] ± 1.21	3.65[c] ± 1.42
Percentage mortality (Pre-weaning)	15.31	14.65	13.25	18.24
Average quantity of daily conc. + forage intake (g)	95.06[c]	136.12[a]	143.54[a]	113.61

[b]a' b' c: Means with different superscripts along rows are significantly different . (P < 0.05)

The concentrate used was pelleted poultry grower's mash meal (20% CP and 2700 Kcal/kg) routinely fed to the rabbits. Talinum triangulare was harvested and dried at room temperature and chopped before feeding. The concentrate and forage were fed in the morning at 08.00 hour in separate feeders. A total of feed supply of 150 g/day was offered the does during pregnancy. Water and mineral lick were supplied *ad libitum.*

Random mating of the does to the bucks was done between 8.00 – 11.00 am and two weeks post partum. Pregnancy diagnosis was done by palpation and weight method as described by Iyeghe-Erakpotobor *et al.* (2007). The does were supplied earthen nest pots on day 25 of pregnancy. At kindling the kits were counted and weighed. Kittens were weaned at 35 days of age. The parameters monitored were litter sizes taken 24 hours after kindling, weights at birth and weaning. The proximate composition of the concentrate and Talinum triangulare was analyzed according to AOAC (1995). This study lasted for 4 months.

Data analysis: All the data collected from this study were subjected to analysis of variance (Steel and Torrie, 1980) and means separated using Duncan's New Multiple Range Test as described by Obi (1990).

Results and Discussion

Table 1 shows the proximate composition of concentrate and Talinum triangulare diet combinations, while Table 2 shows the results of the performance litter traits of breeder rabbit does on mixed feeding regime.

The results on average litter sizes at birth showed that rabbit does fed on 40:60 concentrate and forage diets 6.18 ± 0.20 and 60:40 concentrate and forage diets 6.25 ± 0.30 were not significantly different (P > 0.05) but they differed significantly (P < 0.05) from 20:80, 5.85 ± 0.24 and 80.20 5.00 ± 0.32 concentrate and forage combination diets.

In this study, it was observed that litter sizes at birth increased up to 60.40 concentrate and Talinum triangulare combination diet, but then decreased at 80:20 concentrate and forage combination diets. The higher performance of does on this treatment as expected was not achieved in this study. This observation agrees with the findings of Iyeghe - Erakpotobor *et al.* (2007) in rabbits does fed concentrate and *stylosanthes hamata* combinations during pregnancy. However, the significant differences observed in the litter sizes at birth in this study disagrees with earlier reports of Iyeghe-Erakpotobor and Muhammad (2004) who did not observe any significant differences in litter size at birth for rabbit does fed varying levels of concentrate and *lablab* combinations. Differences observed for litter size and weight at birth were due to differences in concentrate and forage levels (Asuquo, 1996). Increased concentrate and forage intake induced the shedding of more ova during ovulation, thereby increasing litter size at birth (Olentine and Esminger, 1980; Aduku and Olukosi, 1990). This observation has a strong basis on the fact that flushing of litter-bearing animals before breeding would enhance the number of young per litter (Asuquo, 1993; Odoh *et al.,* 2007). Also the linear relationship noted between concentrate and forage combination diets levels and litter weight could be argued of increased nutrient supply that enhanced better embryonic development pre-partum (Asuquo, 1996; Effiong and Wogar, 2007). Diets 40:60 and 60:40 concentrate and forage combinations, similarly promoted the highest average litter size and weight at weaning with no statistical differences (P > 0.05) between their values. Generally, for all parameters evaluated, performance declined at 80:20 diet combinations except in the concentrate and forage intake where the feed intake was higher in the 80:20 combinations 113.01 g and differed significantly (P < 0.05) from 20:80 combination diets 95.06 g. This observation is in agreement with the reports of Iyeghe-Erakpotobor *et al* (2007) in pregnant rabbits fed concentrate and stylosanthes combinations.

Average pre-weaning litter weights gains, based on litter weight at birth and weaning were (diets 20:80) 261.85 ± 10.65 g (diets, 40:60) 273.42 ± 14.01g, (diets60:40) 311.45 ± 13.33 g and (diets, 80:20) 206.23 ± 11.04 g. Percent mortality rate was lowest on 40:60 diet combinations.

Results form this study support the general view that a mixed feeding regime of concentrate-forage with the right proportion of concentrate and forage will maximize

litter traits in breeding rabbits. Diets 40:60 and 60:40 combinations of concentrate and forage combinations gave similar results in all traits.

Conclusion: It could be concluded that even though 40:60 and 60:40 concentrate and forage combination diets were similar in all traits determined, however, 60:40 combination diets showed higher values on litter sizes, litter weight at weaning and mortality. From the economic point of view 60:40 concentrate-forage combination diet can be considered optimal for breeding rabbits under the humid tropical environment.

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