PERFORMANCE OF RABBITS FED *LEUCAENA LEUCOCEPHALA* AND CONCENTRATE BETWEEN 9TH AND 25TH WEEKS OF AGE.

ODEYINKA S.M. AND IJIYEMI O.C.

Department of Animal Science, Faculty of Agriculture, Obafemi Awolowo University, Ile-Ife

Received 30 May 1995, Acccepted 02 December 1996

ABSTRACT

Fourteen fryer male Rabbits (New Zealand white and Chinchilla breeds) were used for the experiment. Equal numbers of rabbits from the two breeds were used for each treatment. The rabbits were randomly assigned to 100g and 200g of *Leucaena leucocephala* respectively. The rabbits in the two groups were given the same amount of pelleted concentrates from a commercial feed miller and were fed to determine the effect of level of leucaena offered/intake on the growth rate of rabbits. Four fryers which were fed the same % of concentrates and *Aspilia africana* served as the control. Growth rate decreased at the beginning of the study followed by satisfacotry growth thereafter. The control animals had a higher growth rate compared to the other two groups ($P<0.05$). Alopecia and decreased appetite were the initial symptoms of mimosine toxicity observed, but they were soon overcome with time. Rabbits can tolerate up to 100g leucaena in their diet in addition to pelleted concentrate.

Keywords : *Leucaena leucocephala,* Rabbit, Growth rate.

INTRODUCTION

The low intake of animal protein in Nigeria may be attributed to the low productivity of the livestock. Poor nutrition, resulting from inadequate amounts and poor quality of feed, is one of the major causes of low productivity in the tropics. Rabbits have the ability to thrive on forages which are abundant and available all the year round in high rainfall areas. However, tropical forages are nutritionally adequate only when the plants are very young. In Nigeria today, rabbits pelletes are very expensive and most livestock farmers cannot afford them. Apart from the low nutrient composition of tropical forages, their yields also decline greatly during the dry season.

Leucaena leucocephala is a leguminous shrub/tree that is very palatable to livestock. The use of leucaena as an all-purpose livestock feed has been limited by the presence of mimosine, B(1-(3-hydroxy-4Pyridone)-X-amino propionic acid, a toxic, non- protein amino acid that causes low weight gains, general poor condition and hair loss in ruminants and non ruminants (Kingsbury, 1964; Hegarty *et al;* 1979). The intoxication hazard is generally more serious for non-ruminants than ruminants. The study was carried out to determine the performance from 9-25th week of rabbit fed two levels (100 and 200g) of leucaena.

MATERIALS AND METHODS

Fourteen fryers male rabbits of New Zealand White (NZW) and the Chinchilla breeds were used. The fryers were housed one per cage in a long tier wire cage supported at the base with wooden planks such that the cages were raised to 80cm from the floor level. The cages were placed inside a well ventilated and naturally illuminated housing unit and the dimension of each was 74cm x 60cm x 54cm. The wire netting and cages were washed and disinfected before the animals were moved into them.

The animals were introduced to leucaena over a 7-day adjustment period. Data collection started a week after the weights of the animals had been taken. The animals were divided into 3 groups:

GROUP I: 4 rabbits, 2 each of NZW and Chinchilla breeds and were fed 100g of leucaena per animals per day.

GROUP II: Consisted of 6 rabbits, 3 each of the NZW and Chinchilla breeds and were given 200g leucaena per animal per day.

GROUP III: This served as the control. 4 rabbits were fed 100g of *Aspilia africana* per day.

All the animals in the various groups were given 100g of the concentrate per day while water was offered *ad. libitum*. Pelleted concentrates were fed throughout the duration of the experiment. The pelleted concentrate by a commercial feedmiller contained 20% CP, 9% CF, 1.2% Ca and 0.6%P. Weighed quantities of freshly-cut leucaena and aspilia were offred each morning after the feed refusals (orts) of the previous day's feeding were cleaned out and weighed. Samples of feed offered and feed refusals were taken during each collection period for dry matter determination according to A.O.A.C. (1975).

Data collected from the experiment were subjected to analysis of variance and student T-test, while differences between each means were determined by Duncan's Multiple Range test (Steel and Torrie, 1980). Feed efficiency was calculated as gain in body weight per total fed intake (concentrate and browse).

RESULTS AND DISCUSSION

The liveweight and performance results are presented in Table 1. Aspilia has been documented by Somade (1982) to be highly nutritious and acceptable to rabbits. For rabbits to consume more of leucaena than the Aspilia in the study shows that rabbits relish leucaena and found it palatable especially the succulent portions. This is in line with the report of NAS (1977). The supplementation of leucaena forage with concentrate in feeding the animals was in accordance with the suggestion of Ositelu (1966) that growing rabbits and nursing does should not be maintained on all forage diet. From Table 1, the dry-matter intake of concentrates for the control animals was higher than that of groups I and II ($P<0.05$). Animals in group II had significantly ($P<0.05$) higher total dry matter intake than for groups I and II. Despite this higher intake, the group growth rate per day (8.19g) was lower than that of group 1 (8.56g) although the difference is not significant. The animals in the control group had higher feed efficiency than the other two groups on leucaena ($P<0.05$).

The control animals fed with Aspilia showed higher growth rate than for animals in group I and II. The explanation could be the absence of mimosine in their diets and increased level of concentrate intake thereby favouring increased biological value of the feed offered. There is no known limiting factor in aspilia. However, considering the equal amount of concentrate and higher leucaena consumed, the mimosine may hinder the utilisation of the concentrate (Blunt and Jones, 1977). From Table 2(1st quarter) it could be seen that group II rabbits with higher feed intake gained less (1.18g/d compared with group 1) which was not observed in the control. This could be due to the fact that with higher levels of leucaena, there was increased concentration of orts which might result in rapid decline in serum thyroxine (Jones *et al.* 1976), depression of intake and poor weight gains (Blunt and Jones) 1977; Lowry, 1987). There was no significant ($P>0.05$) difference in the average feed intake and mean weight gain (except 2nd quarter) for all the quarters

No mortality was recorded throughout the

TABLE 1: LIVEWEIGHT AND PERFORMANCE RESULTS (g) OF THE RABBITS

Parameters	Group I (100g of **Leucaena**)	Group II (200g of **Leucaena**)	Control (100g of **Aspilia**)
Average weight at the start	932.50[a]	981.67[a]	850.00[a]
Average weight at the end	1891.25[a]	1917.33[a]	2131.33[b]
Average concentrates (DM) consumed (g/day)	50.00[a,b]	46.27[a]	54.16[b]
Average forage (DM) consumed (g/day)	25.22[a]	39.72[b]	23.68[a]
Mean growth rate (g/day)	8.56[a]	8.19[a]	11.63[b]
Feed efficiency (gain/DM)	0.11[a]	0.10[a]	0.19[b]

*Mean with different superscripts on the same row are significantly different ($P<0.05$).

TABLE 2: AVERAGE DAILY WEIGHT GAIN PER 4 WEEKS INTERVAL WITH CORRESPONDING FEED INTAKE (DM) IN GRAMMES.

Animal Group	Average feed intake (DM/day)	Mean weight gain (g/day)
Group I (100g **Leucaena**)	10.94[a]	1.67[a]
Group II (200g **Leucaena**)	12.05[a]	1.18[b]
Control (100g of **Aspilia**)	11.52[a]	1.90[a]
2nd Quarter		
Group I	10.61[a]	0.76[a]
Group II	11.97[a]	0.67[a]
Control	11.23[a]	1.80[b]
3rd Quarter		
Group I	10.84[a]	1.30[a]
Group II	12.52[a]	1.50[a]
Control	10.71[a]	1.51[a]
4th Quarter		
Group I	10.59[a]	1.15[a]
Group II	12.16[a]	1.32[a]
Control	10.44[a]	1.46[a]

Means with the same superscripts in the same column show no significant difference ($P > 0.05$)

experimental period but different manifestations of the effect of the feed taken were exhibited by the animals. The symptoms noticed were alopecia and anorexia in groups I and II animals. These rabbits showed a sign of dull, coarse and unshining body hair compared to animals not fed with leucaena. Jones (1979) attributes the loss of hair by animals feeding on leucaena to the presence of mimosine in the plant. All the animals that expressed the symptoms recovered after about ten weeks of the experiment. This characteristic tolerance of the animals might suggest that the intestinal microbes of rabbits are able to detoxify mimosine by converting it to 3, 4-dihydroxypyridone (DHP) which is similar to what was observed with ruminants. According to Lowry (1983) animals that can break down the mimosine to DHP can tolerate higher dietary levels of leucaena than other animals. Also animals that can degrade DHP even further can tolerate higher levels yet, even diet that are solely on leucaena.

In conclusion, *Leucaena leucocephala* can be fed to rabbits especially during the growth phase as it can be used as a part- replacer for the energy rich but expensive concentrate feedstuffs.

REFERENCES

A.O.A.C. (1975). Association of Official Analytical Chemists. Official methods of analysis (12th edition) Washington, D.C.

BLUNT, C.G. and JONES, R.J. (1977). Steer liveweight gain in relation to the proportion of time on **Leucaena leucocephala** pastures. Trop. Grass 11: 150-164.

DAVIDSON, W.J. and SPREADBURY, D. (1975). Nutrition of Newzealand White. Pro. Soc. Nutr. 24: 75-83

JONES, R.J. (1979). The value of **Leaucaena leucocephala** as a feed for ruminants in the tropic. World Anim. Rev. 31: 13-23.

JONES, R.J.; BLUNT, C.C. and HOLMES, J.G. (1976) Enlarged thyroid glands in cattle grazing **Leucaena** pastures. Trop Grass : 10(2): 113-116.

LOWRY, J.B. (1983). Detoxification of **Leucaena** by enzymic or microbial processes. In: Asia-pacific region proceedings of a workshop held in Singapore, 23-26 Nov 1982. pp 49-54.

LOWRY, J.B. (1987). The **Leucaena** story - A biological solution to a toxicity problem. Australian Science mag. issue No 4.

NAS (1977). **Leucaena:** Promising forage and tree crop for the topics. Washington D.C. National Academy of the Sciences.

OSITELU, G.S. (1966). **How to keep rabbits to profit farmers.** Advisory Bulletin 16. Publicity and Information Section M.A.N.R. Ibadan.

SOMADE, B. (1982). Influence of two environments on reproductive performance of NZW rabbits. J. Anim. Prod. Res. 2(2) 113-122.

STEEL, R.G.D. and TORRIE, S.H. (1980). **Principles and procedures of Statistics.** 2nd Ed. McGraw-Hill Book Co. Inc. N.Y.