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Comparative Study of the Fecundity and Growth Rate of Three Breeds of Rabbit-(New-Zealand White, Chinchilla and California)

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ABSTRACT

The growth and reproductive performance of three breeds of rabbits: New-Zealand white, Chinchilla and California were compared at the peak of dry season, using 15 does and 3 bucks, 1 – 3 years old with live weight ranging from 1.5 – 2.5kg. Balanced compounded growers concentrate, chicken pelleted diet, forage and water were available *ad libitum.* Characteristics considered in the study for comparison were conception rate, gestation length, number kindled alive, number of still birth, litter birth weight, weight at 8 and 12 weeks, weight of Doe between kindling and weaning. Results show that there were differences in number of kids kindled alive, litter birth weight and weight of Doe between kindling and weaning ($P<0.05$), but there were no differences in the other characteristics. The New-Zealand white delivered more kids alive than either of the two breeds. The change in doe weight at kindling and weaning also shows that New-Zealand white was heaviest than either of the two breeds ($P<0.05$). Chinchilla delivered heaviest kids among the breeds tested ($P<0.05$).

Keywords: **Rabbit Breeds, Reproductive Traits.**

Introduction

The problem of 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 (Odubote and Akinokun, 1991). Concurrent with this approach was the search for other sources of animal protein. Rabbit and glasscutter has been thought of being suitable in this regard (Odubote and Akinokun, 1991).

Due to protein requirement by man, the need for a continual increase in production of monogastric animals like rabbit and grasscutter has come to stay. Recently poultry which used to be a more available source of protein have not

met the requirement of protein intake per head per day, and following the outbreak of the avian influenza (HSNI) otherwise called bird-flu disease, in Nigeria and some other developing countries sometime ago. It is against this backdrop that effort should be made to increase production of grasscutter to fill up the vacuum created since by the break in poultry production due to bird-flu and the expensive nature of its production which rearing grasscutter will possibly improve and complement in terms of quantity and quality of meat supply in the country.

According to Bamgbose and Kudi (1996) rabbit and grasscutter production is currently being encouraged especially grasscutter in Nigeria as a means of improving the daily protein intake of individuals. The increase in the cost of raw materials have been attributed to the expensive nature of rearing these animals, and according to (Mustapha and Tunde, 1990) it has thus; become necessary to explore other locally available and relatively cheaper feed materials. The limited supply of raw materials for the feed industry has resulted in a continuous increase in the cost of production, causing a phenomenal rise in the unit cost of animal products. Thus, these products have become too expensive for the majority of the population (Hahn, 1988; Wekhe, 1994; Adesope, 2000; Ebenebe, 2000).

The increase in the cost of energy and protein sources in Nigeria has also been related to their scarcity as a result of the competing demand for these ingredients. However, the use of these ingredients in animal feed production when human needs have not been met introduces questions of economic and moral justification to mankind. Hence, it seems a prerequisite for a profitable animal production business to have a local surplus production of grains, soybean meal and other feed stuff. To venture into alternative source of ingredients, especially when it encourages a shift to alternative source of ingredients for which there is less competition, may help, if the later is sufficiently available (Oluyemi and Robert, 1979).

Studies in the agro-industrial by-products utilization in animal feed has increased in the past two decades because of the clear necessity to conserve these ingredients for human consumption especially in the less developed Countries (Alawa and Umunna, 1993 and Onimsi, 2005). There is also increasing knowledge of the problems created in the environment by disposing these industrial by-products and agricultural wastes. The rational use of these nutritive diets for profitable rabbit production depends to a large extent, on litter size per kindling per year coupled with high weaning weights, little or no

mortality, early sexual maturity, high prolificacy and ability to rebreed shortly after parturition (Dim *et al.,* 1990).

In domesticating rabbits, there is need to develop variety of breeds with high reproductive performance and also induce them to breed more (Dimitrifyer, 1989). However Odubote and Akinokun (1991) indicated paucity of information on base line performance level and correlation among traits of economic importance for Nigerian environment. There are more than 32 breeds of domestic rabbits, ranging in weight from 1kg dwarf breed to 10kg giants, the large breeds such as the New-Zealand White, Chinchilla are regarded as heavy breeds and are used for commercial meat production. Wool from Angora rabbit and pelts from Rex are in demand for the California in laboratory (Cheeke *et al.,* 1987). They are also commonly reared breed in Nigeria especially in the South-Eastern region of the country among other breeds.

Materials and Methods

The experiment was carried out at the Rabbit Unit of the Teaching and Research Farm, of Abia State University Umuahia Campus, Faculty of Agriculture and Veterinary Medicine. The experimental animals consisted of 3 bucks and 15 does. The breeds used are New Zealand White, Chinchilla and California White breeds. The rabbits were housed in a wooden three tier hutch system raised 120cm from the ground. The wooden hutch is 120cm floor dimension with urine and faeces collecting tray under each pen. The hutch were placed in an open sided house roofed with corrugated roofing sheets, the side walls up to 1 meter high and the remaining part of the sides made of wire mesh. The rabbits were fed compounded concentrate mesh, and also given *Tridax procumbens, Panicum maximum, Centrosema pubescens and Aspilla Africana* forages. Mating were done by taking the does to the bucks when they were 1 to 2 years of age (360-720 days old) in the morning time around 7am which was repeated in the evening time around 5-6pm. Mating the doe took place within 15 minutes as the doe was receptive but otherwise it took between 30 and 45 minutes, and palpating of the abdominal region between the thighs was carried out 14 – 17 days after mating to confirm pregnancy. Pregnant does were supplied with clean disinfected nest boxes, 26 days after mating. The nest boxes were lined with cotton wools. In cases where the does kindled on the floor of the hutch the kits were carefully removed and placed in the nest boxes. The kindled dates were noted, and the litter size and litter weight were taken and recorded immediately kindling was discovered or a few hours thereafter. Kits were then weighed on a weekly basis and mortalities adequately recorded. Talcum powder was sprinkled on the kits and rubbed on the nose of the dam after each handling

of the kits. The kits were weaned at 4weeks old. Data collected were analyzed using the one-way ANOVA, while Duncan New Multiple Range Test was used to compare means among the three breeds.

Results and Discussion

Observations showed that almost all the does mated during their first introduction to the bucks when they were about 360-700days old due to their age and pre trial done on them for effective result.

The fecundity performance and growth rate of the 3 breeds compared are as shown in table 1. The conception rate of 80%, 76% and 75% were recorded for New Zealand White, Chinchilla and California white respectively. This difference will be attributed to the small number of mating in this study in contrast with 250 mating reported by- Lebas *et al.* (1986) while Cheeke *et al.* (1982) also observed that conception is lower in forced mating than in natural mating.

The conception rate followed a particular trend as it varied from 75% for California white to 80%for New-Zealand White. The variations were not significant ($p>0.05$) between the three breeds. The relative higher value of the conception rate of New-Zealand White breed compared to Chinchilla and California white could be an indicator of higher reproductive performance of New-Zealand White although the conception rate of both breeds are on the high side. The reports of *Adams et al.* (1966), Odubote and Akinoku (1991) who recorded 71% to 90% conception rate agrees with the results of the present study (Table 1).

Gestation length showed no significant difference in all the three breeds ($p>0.05$) from 32.12 – 32.13 days. An average gestation of 31.5 days reported by Cheeke *et al.*, (1982) for New-Zealand White, 32.0 days for Chinchilla and 32.1 days for California white fall with the range in the present study. The number kindled alive from the three different breeds are as shown in table 1 which is 2.42 to 7.01 were significantly different ($p<0.05$) between New-Zealand White and other breeds. The litter size at birth showed that New Zealand White had more litter size at birth than California and Chinchilla with 6.80, 4.35 and 3.40 respectively as there litter size at birth varied insignificantly ($p<0.05$).The number of still birth from table 1 is 0.1, 0.5 and 0.3 for New-Zealand White, Chinchilla and California white respectively showed that incidence of still birth was not rampart among the breeds, meaning there was no significant difference ($p>0.05$).

Conclusion

It can be concluded from this study that New-Zealand White is best suited than Chinchilla and California white for the tropical environment in terms of number of kids kindled alive, and it exhibited a superior conception rate. New-Zealand White breed can therefore be used to produce large litters of rabbits without compromising for weights in the shortest possible time in other to boost the meat supply of the nation.

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Table 1: Means + Standard Error of the Reproductive Performance and Growth Rate of Three Breeds of Rabbits

Breeds	New Zealand White	Chinchilla	California
Number	5	5	5
Av. Conception rate(%)	80	76	75
Av. Gestation rate(days)	32±1.3 32±1.3	32±1.25	
Av. Number kindled alive	7.0±2[a] 3.35±1[b]	2.42±1[b]	
Av. Number of still birth	0.1±0.1 0.3±0.7	0.5±0.2	
Av. Litter size at birth	6.80±0.80	3.40±0.40	4.35±0.35
Av. Litter birth weight (g)	47±8[b] 47±9[b]	62±6[a]	
Av. Number weaned	6.05	5.25	453
Weaning weight at 6 weeks (g)	478	468	453
Weight at 8 weeks (g)	603	658	405
Weight at 12 weeks (g)	755	750	733
Mortality rate (%)	1.80±0.8	1.40±0.40	1.35±0.35
Doe weight between kindling and weaning (g)	170±82[a]	90±25[b]	89±23[b]

a, b: Superscript with different alphabets are significantly different (P<0.05)

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