

EFFECT OF SEASON ON REPRODUCTIVE AND GROWTH PERFORMANCE OF WEANING NON DISCRIPT RABBIT

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ABSTRACT

The study was conducted to determine the effects of season on reproductive and growth performance of non-descript rabbits. A total of 24 non descript late grower rabbit comprising a males and 20 females were purchased from Dagwom farm of the National Veterinary Research Institute (NVRI) Jos and used as parent stock. 59 kits (34 in dry season and 25 in raining season) were used for the experiment. The kits were housed according to season. Data on litter size, birth weight, weekly body weight, weekly body weight gain and growth rate were obtained and subjected to one way analysis of variance. The results obtained from this study indicated that season had significant ($P \leq 0.05$) effect on birth weight, weekly body weight, weekly body weight gain and growth rate. Rabbits raised in raining season had significantly ($P < 0.05$) higher body weight except at week 7 and 8 which were not significant. Also, season had significant ($P < 0.05$) effects on body linear measurements. Rabbits raised in raining season had significantly ($P < 0.05$) better body length and hind leg length while rabbits raised in dry season had significantly ($P < 0.05$) longer tail length and ear length than those of raining season. From the findings of this research, it was recommended that rabbits should be bred and raised in the raining season than the dry season to maximise better growth performance.

Key word: body linear measurements, body weight, Growth rate, litter size.

INTRODUCTION

In tropical countries, the high temperature or heat stress affects the success of rabbit farming (Carneiro *et al.*, 2009), as it leads to a significant reduction in the daily weight gain, daily feed intake and feed efficiency. Above 25-28°C of ambient temperature, rabbits decreased their feed consumption and required more digestible energy (Lebas *et al.*, 1983). At 30°C, the average feed consumption was reported to be decreased by 30% and affected growth as well (Carneiro *et al.*, 2009). The effect of experimental hot environment conditions in rabbits have been extensively discussed in the last two decades mainly on growth performances and feed intake (Lebas *et al.*, 1983). But, the information based on experimental conditions, which are often quite different from each other, provide incomplete picture (Carneiro *et al.*, 2009) and cannot be implemented universally at least under farmer's conditions in developing countries. The objective of this study was therefore to determine the effect of season on reproductive performance of non descript weaner rabbit.

MATERIALS AND METHODS

The experiment was carried out at the Livestock Teaching and Research Farm of the Faculty of Agriculture, Shabu-Lafia Campus, Nasarawa State University, Nasarawa State. The total of twenty four non-descript late growers rabbit were purchased from Dagwom farm of the National Veterinary Research Institute (NVRI) Jos and used as parent stock for generating offspring to be used as the foundation stock.

This was comprised of 4 males and 20 females. They were bred at ratio of 1 male to five females. Extra 2 males were bought and kept as reserve in case of mortality. 59 kits (34 in dry season and 25 in raining season) were used for the experiment. The kits were housed according to season. Hutches were cleaned, scrubbed and disinfected using vinkokil disinfectant and allowed to fallow for two weeks before arrival of the rabbits. The males were kept separately from the females for a period of four weeks for quarantining and determination of pregnant rabbit doe. During quarantining, the rabbits were given anti stress, antibiotics and all other necessary medications as appropriate. After quarantining, female rabbit on heat was taken to the male rabbit hutch for mating. This was to ensure successful mating. Each rabbit doe were mated twice to ensure conception. However, palpation was carried out ten days after successful mating to determine pregnancy. Any rabbit doe detected not to be pregnant after palpation was re-mated. The rabbit were fed formulated diet at the rate of 3kg of their body weight and forages *adlibitum*. The offspring were housed according to the season in which they

were kindled. Two major seasons such as dry (October to April) and rainy (May to September) season were considered. The rabbits were assessed to determine the effect of seasons on their reproductive and growth performance up till weaning. During this period, the rabbits were fed both concentrate and forages.

Parameters that were measured: Data collected include litter size, birth weight, weekly body weight, weekly body weight gain, growth rate and body linear measurements at weaning

Experimental Design and Analytical Procedure

The design of the experiment was Completely Randomized Design (CRD). Data collected on phenotypic traits of body weight and body linear measurements were analyzed using Analysis of Variance (ANOVA) of the Statistical Package for Social Science (SPSS) 2011 version. Duncan Multiple Range Test were used to separate the means where significant difference was observed.

RESULT

The effect of season on litter size, birth weight and weekly body weight of non-disrupt rabbits is presented in table 1. Season had significant ($P<0.05$) effect on birth weight, body weight at weeks 1, 2, 3, 4, 5 and 6. Rabbits raised during raining season had significantly ($P<0.05$) higher birth weight and weekly body weight. However, no significant influence of season on litter size and body weight at weeks 7 and 8 was detected.

Table 1: Effect of season on litter size, birth weight and weekly body weight of non-disrupt rabbits

Body weight	Dry season	Raining season	LOS
Litter size	4.00±0.58	4.75±0.69	NS
Birth	35.74±0.95 ^b	39.16±1.18 ^a	*
Week 1	69.08±2.17 ^b	94.53±4.99 ^a	*
Week 2	100.65±3.82 ^b	150.58±9.50 ^a	*
Week 3	130.57±5.24 ^b	191.81±13.00 ^a	*
Week 4	188.62±7.66 ^b	251.90±15.24 ^a	*
Week 5	243.53±10.33 ^b	317.55±18.10 ^a	*
Week 6	318.97±11.99 ^b	387.74±23.97 ^a	*
Week 7	406.08±13.90	456.23±29.45	NS
Week 8	508.74±16.23	540.57±34.44	NS

NS = not significant, * = significant at 5 percent probability, ^{ab} = values with different superscript in the same row are significant ($P<0.05$)

Table 2 presents the effect of season on weekly body weight gain of non-disrupt rabbits. Season had significant ($P<0.05$) effect on weekly body weight gain at weeks 0-1, 1-2, 5-6 and 7-8. Rabbits raised during raining season had significantly ($P<0.05$) higher body weight gain at weeks 0-1 and 1-2 while rabbits raised during dry season had significantly ($P<0.05$) higher body weight gain at weeks 5-6 and 6-7. Season effect was not significant on body weight gain at weeks 2-3, 3-4, 4-5 and 7-8.

Table 2: Effect of season on weekly body weight gain of non discript rabbits

Body weight	Dry season	Raining season	LOS
Week 0-1	33.34±1.79 ^b	54.39±3.97 ^a	*
Week 1-2	33.03±3.01 ^b	57.00±5.25 ^a	*
Week 2-3	29.92±2.65	41.23±4.82	NS
Week 3-4	58.05±3.20	60.10±5.57	NS
Week 4-5	61.57±6.72	65.65±4.14	NS
Week 5-6	98.19±9.54 ^a	70.19±7.14 ^b	*
Week 6-7	100.63±11.90 ^a	71.97±6.60 ^b	*
Week 7-8	102.65±4.36	87.71±8.31	NS

NS = not significant, * = significant at 5 percent probability, ^{ab} = values with different superscript in the same row are significant (P<0.05)

Season effect on weekly growth rate (Table 3) was significant (P<0.05) at weeks 0-1, 3-4, 5-6, 6-7 and 7-8. Rabbits raised in raining season had significantly (P<0.05) higher growth rate at week 0-1. However, at weeks 3-4, 5-6, 6-7 and 7-8, rabbits raised in the dry season had significantly (P<0.05) higher growth rate compared to those of raining season.

Table 3: Effect of season on weekly growth rate of non-discript rabbits

Body weight	Dry season (1)	Raining season (2)	LOS
Week 0-1	47.37±1.32 ^b	56.79±1.33 ^a	*
Week 1-2	31.68±1.57	36.43±1.69	NS
Week 2-3	22.25±1.48	20.56±1.40	NS
Week 3-4	30.43±0.97 ^a	24.36±1.86 ^b	*
Week 4-5	23.74±1.65	20.93±0.87	NS
Week 5-6	28.94±2.30 ^a	17.43±1.07 ^b	*
Week 6-7	23.48±2.35 ^a	15.29±0.81 ^b	*
Week 7-8	20.23±0.69 ^a	16.15±1.30 ^b	*

NS = not significant, * = significant at 5 percent probability, ^{ab} = values with different superscript in the same row are significant (P<0.05)

Body linear measurements (Table 4) were significantly (P<0.05) affected by season except fore-leg length, and chest circumference which were not significant. Rabbits raised in raining season had significantly (P<0.05) better body length and hind leg length while rabbits raised in dry season had significantly (P<0.05) longer tail length and ear length.

Table 4: effect of season on weaning weight and body linear measurements at weaning of non-discript rabbits

Parameters	Dry season (1)	Raining season (2)	LOS
Number of observation	34	25	
Body length	28.91±0.27 ^b	31.40±0.39 ^a	*
Tail length	7.13±0.11 ^a	6.39±0.25 ^b	*
Hind leg length	14.06±0.12 ^b	14.94±0.19 ^a	*
Fore leg length	7.91±0.11	7.59±0.26	NS
Ear length	8.45±0.16 ^a	7.32±0.32 ^b	*
Chest circumference	5.93±0.09	6.23±0.18	NS

NS = not significant, * = significant at 5 percent probability, ^{ab} = values with different superscript in the same row are significant (P<0.05)

DISCUSSION

The significant effect of season on birth weight and weekly body weights of non discript rabbits with respect to mean birth weight of 35.74±0.93 and 39.16±1.18 g for dry and raining season observed in this study is lower than 51.0 g reported by Zerrouki (2004). Differences in litter size at birth may be due to differences in ovulation rate, pre-implantation viability, high uterine capacity, maternal effects, body size and age of the rabbit doe (Rashwan *et al.*, 1995; Argente *et al.*, 2003). The body weight increased progressively till week 8 as similarly reported by Zerrouki (2004). The results of weekly body weights at birth and from week 1 to 8 obtained in this study were similar to those of Khader *et al.* (2001) at birth and by De Paula *et al.* (1996) and El-Maghawry *et al.* (1999) at weaning and those of Darwish *et al.* (1995) and Saleh *et al.* (2005). The mean body weight obtained in this study across season at week 3 (130.75±5.24 and 191.81±13.00 g, respectively for dry and raining season) were lesser than the value of 205g and 222g for Egyptian and Bouscat rabbits reported by Brun and Ouhayoun (1989).

The effects of season on the body weight gain and growth rate of non discript rabbits indicates that season had significant effects on body weight gain and growth rate. With advancing age, body weight gain increased while growth rate decreases. The present result agrees with the report of El-Bayomi *et al.* (2012) who observed a decline in growth rate with advancing age in their work on the New Zealand White, Californian and Gray Giant Flander breeds. The significant better birth weight and weekly body weight for rabbits raised in raining season in current study is in agreement with those obtained by Seleem (2005) who reported that superiority of litters weight may be due to hybrid vigour which appeared in different ages of kits up till weaning.

CONCLUSION AND RECOMMENDATION

The result of this study indicates season had significant effects on birth weight, weekly body weight and body linear measurements. Rabbits raised in raining season had better birth weight and weekly body weight. Body weight and body weight gain increases progressively with age until 8 weaning. However, growth rate decreases with advancing age. Generally, rabbits raised in raining season performed better than their counterpart raised in the raining season. From the findings of this research work it was recommended that: Rabbits should be bred in the raining season than the dry season to maximized better litter size and higher birth weight which will translate to higher body weight at various ages.

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