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Productive performance of broiler rabbits

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ABSTRACT

The study focuses on the effect of breed on the body weights and average daily gains (ADGs) during pre-weaning (birth-4 weeks) and post-weaning (4-16weeks) of Flemish Giant, Californian White and their Crossbreds. The data was subjected to one way analysis of variance. The difference between the means was tested by significance using Duncan's multiple range test by programming and processing in computer. The overall least squares mean body weights at birth, 1, 2, 3 and 4 weeks of age were 52.38 ± 0.69, 110.58 ± 1.77, 169.97 ± 3.23, 254.35 ± 5.77 and 398.13 ± 8.44g, respectively. The overall least square means for post-weaning body weights at 6, 8, 10, 12, 14 and 16 weeks of age were 620.90 ± 13.11, 862.50 ± 18.10, 1072.88 ± 21.40, 1302.47 ± 24.69, 1535.12 ± 26.90 and 1733.51 ± 29.09g, respectively. The influence of breed was found to be significant on body weights at all the ages except at birth and on ADGs at all ages during pre-weaning and most of the ages during post-weaning. Feed efficiency of Flemish Giant, Californian White and their crossbreds were studied during post weaning period and observed that FCR (kg DMI/ kg gain) were 3.46, 3.99 and 3.86.

Key words: Body weight, Crossbreds, Californian white, Flemish giant.

INTRODUCTION

Rabbits are becoming increasingly popular as an additional source of animal protein to meet the increasing demand from the ever-growing human population. Rabbit rearing gained momentum in the recent past among the developing countries including India, owing to their high prolificacy, early maturity, shorter generation interval and efficient feed utilization (Ghosh *et al.,* 2008). High prolificacy and fast growth make rabbit an ideal animal for meat production in developing tropics. Rabbits have high reproductive potentials and fast growth rate due to their high feed utilization efficiency.

Rabbit makes efficient use of plant protein (Timon and Hamrahan, 1985) and crude fibre (Egbo *et al*., 2001). Rabbit meat is relatively rich in protein and low in fat comprising 60% unsaturated fatty acids. In addition, rabbit meat is highly digestible and rich in omega-3 fatty acids, often recommended by nutritionists over other meats (McCroskey, 2000). Body weight as an economic important character in the commercial meat rabbit industry was found to be improved by crossing of local breeds with exotic standard breeds (Nofal *et al.,* 1995: Afifi *et al.,* 2000; Pilese *et al.,* 2004 and Saleh *et al.,* 2005). The body weights and growth rates are important variables determining the value in broiler rabbits. For the overall improvement of the rabbit production and a profitable enterprise, the performance level needs to be established for the various genetic groups under the local climatic conditions.

MATERIALS AND METHODS

Data on the growth performance of purebred and crossbred broiler rabbit breeds *viz*. Flemish Giant (150), Californian White (135) and their crossbreds (120) maintained at Rabbit Research Centre, Department of Animal Genetics and Breeding, College of Veterinary Science, Hyderabad were used for the present study.

All the rabbits were reared in the sheds with asbestos sheet roof. Rabbits according to their age and sex were placed in different cages. Females were housed in galvanized iron mesh cages with dimensions of 2.5×1.5×1 feet, whereas males and weaned rabbits were placed in cages with dimensions of 1.5×1.5×1 feet. Earthen pots of about half a litre volume were used as feeders. Clean drinking water was provided throughout the day using nipple drop system. The new born kits were milked twice a day until 14 days of age and were moved out of nest boxes and placed along with mother until they were weaned. Kits were weaned at 28thday of age by removing the bunnies from the dam's cage. At time of weaning, each kit was individually ear-tagged, sexed and weighed. Then the male and female bunnies from different litters of same age were mixed together and reared in groups of 5 bunnies in each cage, thus providing 1.2 square

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feet cage floor space per bunny up to 16 weeks of age. All bunnies were given adlibitum concentrate diet over the course of the experiment. Composition of concentrate mixture was crushed maize-50 %, groundnut cake-25%, wheat bran-24% and mineral mixture-1%. In addition to that green fodder was offered daily. Feed weights were recorded on a daily basis. Feed intake of bunnies was calculated as total feed consumed during 4-16 weeks growth period.

Body weights were recorded for each individual at 0 day, 1, 2, 3 and 4 weeks of age during the pre weaning period followed by post weaning body weights at bi- weekly intervals from 6 to 16 weeks.

Average Daily Gain (ADG) which indicate the growth rate were computed for each individual bunny for every weekly interval from birth to four weeks of age, followed by every two weeks intervals from six to sixteen weeks of age for post-weaning growth. The daily gains were derived as difference of the weight gain between succeeding weeks divided by number of days during which the gain was measured.

All statistical analyses were performed using SPSS 15.00 statistical package program. The data were investigated with the analysis of variance (ANOVA)

RESULTS AND DISCUSSION

The least square means of pre-weaning body weights and post-weaning body weights were presented in Tables 1 and 2, respectively. The effect of breed on pre-weaning body weights was highly significant (P≤0.01) at 1, 2 and 3 weeks and significant (P≤0.05) at 4 weeks among all pre-weaning ages studied. Significant effect of breed on pre-weaning body weights was also reported by Prakash and Gupta (2008), Anitha *et al.* (2009), Obike and Ibe (2010), Rojan *et al.* (2012) and Akinsola *et al.* (2014). The overall least square means of the body weights at birth, 1, 2, 3 and 4 weeks of age were 52.38 ± 0.69, 110.58 ± 1.77, 169.97 ± 3.23, 254.35 ± 5.77 and 398.13 ± 8.44g, respectively. Crossbreds recorded significantly heavier body weights at 1, 2 and 3 weeks of age.

Breed had a highly significant (P≤0.01) influence on body weights at 6, 8, 14 and 16 weeks and significant influence (P≤0.05) at 10 and 12 weeks among all post-weaning ages studied. Published literature also revealed significant effect of breed on the body weights (Prayaga and Eady., 2003; Chineke *et al.,* 2006; Jayalaxmi *et al.,*2009 and Anitha *et al.* 2009). However, Olawumi (2014) reported non-significant effect of breed on body weights. The overall least square means for post-weaning body weights at 6, 8, 10, 12, 14 and 16 weeks of age were 620.90 ± 13.11, 862.50 ± 18.10, 1072.88 ± 21.40, 1302.47 ± 24.69, 1535.12 ± 26.90 and 1733.51 ± 29.09g, respectively which are higher than the mean body weights reported by Poornima *et al.* (2002), Anitha *et al.* (2009), Apori *et al.* (2014) and Olawumi *et al.* (2014).

ADG is the economic trait which indicates the growth rate of rabbits and it manifests the pattern of daily gains in body weights which vary based on the age, feed intake and other management practices. The least squares mean of ADGs during pre-weaning and post-weaning were presented in Tables 3 and 4, respectively. The effect of breed was found to be highly significant (P≤0.01) on ADGs during 0-1, 1-2 and 3-4 weeks and significant (Pd"0.05) during 2-3 week among all pre-weaning ages studied. The finding concurs well with the findings of Rojan *et al.* (2012), Sarin (2013) and Sivakumar *et al.* (2013). The overall least squares mean ADGs during 0-1, 1-2, 2-3 and 3-4 weeks were 8.11 ± 0.20, 8.22 ± 0.32, 11.86 ± 0.51 and 20.12 ± 0.78g, respectively. Crossbreds recorded significantly higher ADGs at all the pre-weaning ages studied, except at 4 weeks of age.

Table 1: Least squares mean for pre-weaning body weights (g) of experimental rabbits

Parameter	Flemish Giant (FG)	Californian White (CW)	Crossbreds	Overall
BW 0	51.81± 0.84 (150)	52.65 ± 1.30 (135)	54.12 ± 2.33 (120)	52.38 ± 0.69
BW 1	109.74 ± 1.99^{a} (145)	106.15 ± 3.11^{a} (130)	125.38 ± 7.11^{b} (112)	110.58 ± 1.77
BW 2	167.47 ± 3.95^{a} (140)	155.83 ± 4.22^{a} (125)	219.13 ± 11.71^{b} (108)	169.97 ± 3.23
BW 3	256.73 ± 7.14^{b} (135)	224.72 ± 8.71^{a} (122)	314.78 ±19.36^{c} (102)	254.35 ± 5.77
BW 4	414.79 ± 10.70^{b} (132)	364.32 ± 14.68^{a} (120)	405.71 ± 27.67^{b} (100)	398.13 ± 8.44

Means with different superscripts row wise differ significantly

Table 2: Least squares mean for post-weaning body weights (g) of experimental rabbits

Parameter	Flemish Giant (FG)	Californian White (CW)	Crossbreds	Overall
BW 6	657.79±16.26^{b} (130)	557.21 ±19.81^{a} (115)	614.63 ± 52.92^{ab} (98)	620.90 ± 13.11
BW 8	902.31±22.63^{b} (128)	772.86 ± 26.10^{a} (112)	898.53 ± 80.96^{b} (95)	862.50± 18.10
BW 10	1114.88±27.41^{b} (125)	995.48 ± 28.35^{a} (108)	1054.40 ± 97.94^{b} (95)	1072.88 ± 21.40
BW 12	1342.56±31.67^{b} (120)	1207.15± 31.40^{a} (105)	1333.87 ± 110.71^{b} (93)	1302.47± 24.69
BW 14	1602.81±32.54^{b} (120)	1403.11±36.13^{a} (103)	1524.09 ± 139.75$^{a\,b}$ (90)	1535.12± 26.90
BW 16	1790.66±34.21^{b} (117)	1599.30±45.46^{a} (101)	1829.81 ± 138.99^{b} (90)	1733.51 ± 29.09

Means with different superscripts row wise differ significantly

Table 3: Least squares mean for pre-weaning ADGs (g) of experimental rabbits

Parameter	Flemish Giant (FG)	Californian White (CW)	Crossbreds	Overall
0-1 week	8.05 ± 0.23^{a} (145)	7.54 ± 0.36^{a} (130)	9.78 ± 0.74^{b} (112)	8.11 ± 0.20
1-2 week	8.11 ± 0.43^{a} (140)	6.71 ± 0.33^{a} (125)	12.67 ± 1.09^{b} (108)	8.22 ± 0.32
2-3 week	12.62 ± 0.67^{b} (135)	9.73 ±0.85^{a} (122)	13.66 ±1.46^{b} (102)	11.86 ± 0.51
3-4 week	21.88 ± 0.97^{b} (132)	19.73± 1.57^{b} (120)	13.06± 1.38^{a} (100)	20.12 ± 0.78

Means with different superscripts row wise differ significantly

Table 4: Least squares means for post-weaning ADG (g) of experimental rabbits

Parameter(weeks)	Flemish Giant (FG)	Californian White (CW)	Crossbreds	Overall
4-6	17.00 ± 0.68^{b} (130)	13.78 ± 0.76$^{a\,b}$ (115)	12.19 ± 3.09^{a} (98)	15.39 ± 0.60
6 -8	17.32 ± 0.86 (128)	14.67 ± 0.92 (112)	14.83 ± 2.43 (95)	16.26 ± 0.64
8 -10	14.12 ± 0.75 (125)	14.81 ± 0.73 (108)	14.13 ± 2.25 (95)	14.33 ± 0.55
10 -12	15.26 ± 0.78^{b} (120)	14.52 ± 1.09^{a} (105)	15.27 ± 2.73^{b} (93)	15.05 ± 0.65
12 -14	15.59 ± 0.74^{b} (120)	14.68 ±0.71^{a} (103)	16.04 ± 1.79^{b} (90)	15.36 ± 0.53
14 -16	16.11 ± 0.75^{a} (117)	14.01± 0.94^{a} (101)	18.84 ± 3.03^{b} (90)	15.71 ± 0.63

Means with different superscripts row wise differ significantly

Breed had a highly significant influence on ADGs during 4-6, 14-16 weeks of age (P≤0.01) and significant (P≤0.05) influence during 10-12 weeks among all post-weaning ages studied. Similar significant breed effect on average daily gains during post-weaning period was also reported by Metzger *et al.* (2006), AbouKhadiga *et al.* (2008), Anitha *et al.* (2009), Dhara *et al.* (2009) and Sarat Chandra *et al.* (2014). The overall least squares mean ADGs during 4-6, 6-8, 8-10, 10-12, 12-14 and 14-16 weeks of age were 15.39 ± 0.60, 16.26±0.64, 14.33±0.55, 15.05±0.65, 15.36±0.53 and 15.71±0.67g, respectively.

The mean total intake of concentrate feed, green fodder and their corresponding dry matter, body weight gain during the period which ranged from 4 to 16 weeks and their corresponding feed efficiency were presented in Table 5. The FCR (kg DMI/ kg gain) of FG, CW and crossbreds were 3.46, 3.99 and 3.86. The present findings are in accordance with Ozimba and Lukefahr (1991) and Dorota *et al.* (2009).

Table 5: Feed conversion efficiency of experimental rabbits

Parameter	Breeds		
	FG	CW	Crossbreds
Total Feed intake (kg)	37.30	33.19	33.79
Total Green intake (kg)	9.90	9.45	8.73
Total DM intake			
Feed (kg)	33.76	30.04	30.58
Green (kg)	1.64	1.57	1.45
Total (kg)	35.40	31.61	32.03
Weight gain (Kg)	10.24	7.92	8.29
Feed conversion ratio	3.46	3.99	3.86

CONCLUSION

From the results of the present study, it may be concluded that the body weights and average daily gains were significantly influenced by the breed. Crossbreds perform better at most of the pre-weaning ages while during post-weaning period performance of Flemish Giant breed is relatively more when compared to crossbreds as Flemish Giant is a heavy breed. Californian White rabbits performance is lower when compared to Flemish Giant and Crossbreds which indicates their performance can be improved by crossing with other breeds including Flemish Giant.

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