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EFFECT OF INBREEDING ON PRE-WEANING BODY WEIGHTS OF BROILER RABBITS*

S. Sai Reddy, C. Eswara Reddy, B. Ramesh Gupta and A. Satyanarayana[1]

Department of Animal Genetics and Breeding
College of Veterinary Science
Rajendranagar, Hyderabad-500 030

In developing countries, ever increasing population invariably lead to increased demand for food in general and protein, in particular. Production from large animals is not sufficient to meet the increased need for protein source. Rabbits have several advantages as meat producing animals as they can thrive well on high fibre feed stuffs, can be bred through out the year and are highly prolific. The meat is rich in protein and low in fat.

Information on the effect of inbreeding on the productive performance of rabbits is scanty. Therefore, the present investigation was undertaken to study the effects of litter size, genetic group and inbreeding on pre-weaning body weights of rabbits.

Materials and Methods

Data on body weight at birth, 1, 2, 3 and 4 weeks age of 316 bunnies belonging to New Zealand White (NN), Soviet Chinchilla (SS). Grey Giant (GG) and Flemish Giant (FF), born from December, 1995 to June, 1996 were utilized. The bunnies were weaned at 4 weeks of age and reared under uniform managemental conditions. The influence of litter size at birth, genetic group and regression of pre-weaning body weights on inbreeding coefficient of progeny were studied by assuming fixed effects linear model, using the least squares technique (Harvey, 1966). The inbreeding coefficients of progeny were calculated by variance-covariance method, as described by Malecot (1948).

Results and Discussion

Results of the Anlysis of Variance are presented in Table 1 and the least squares mean body weights are given in Table 2.

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1 *Incharge, Computer Centre, Acharya NG Ranga Agricultural University, Hyderabad*

Table 1 Least squares analysis of variance of pre-weaning body weights and Average Daily Gain (ADG)

Source of variation	d.f.	Birth	Age in weeks			
			1	2	3	4
			Mean squares			
Litter size at birth	3	234.47	7445.69**	29844.99**	90801.91**	23322.00**
Genetic group	4	37.86	5206.84**	14579.24**	38113.80**	26110.68**
Regression on Inbreeding	1	179.10	325.69	1449.60	40438.08**	2672.00
Error	307	77.29	462.48	924.04	2028.86	4983.10

*** Significant at P<0.01*

Table 2. Least squares means (g) of pre-weaning body weights

	n	Birth		1 Week		2 Weeks		3 Weeks		4 Weeks	
		Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Overall	316	54.88	0.56	107.07	1.37	155.97	1.93	214.43	2.86	329.98	4.48
Litter size at birth											
<3	28	57.53^{a}	0.57	117.93^{a}	1.40	185.38^{a}	1.98	285.78^{a}	2.93	446.09^{a}	4.59
4	68	56.65^{a}	0.56	121.70^{a}	1.36	180.81^{a}	1.93	240.67^{b}	2.86	370.09^{b}	4.48
5	85	54.89^{ab}	0.56	102.75^{b}	1.36	145.63^{b}	1.92	195.89^{c}	2.85	301.69^{c}	4.47
6	78	53.78^{b}	0.56	100.37^{bc}	1.36	138.41^{c}	1.92	179.85^{d}	2.85	277.96^{d}	4.47
7	57	51.55^{b}	1.24	92.63^{c}	3.04	129.63^{c}	4.24	169.94^{d}	6.36	254.07^{d}	9.98
Genetic group											
NN	91	54.86	0.56	103.91^{b}	1.36	150.46^{b}	1.92	197.73^{c}	2.85	319.60^{b}	4.47
SS	94	54.88	0.56	99.40^{b}	1.36	142.86^{c}	1.93	193.04^{c}	2.85	306.74^{c}	4.47
GG	84	55.93	0.56	118.78^{a}	1.36	175.35^{a}	1.93	243.13^{a}	2.86	348.11^{a}	4.48
FF	47	53.86	1.48	106.20^{b}	3.62	155.21^{b}	5.12	223.80^{b}	7.59	345.48^{ab}	11.89
Regression on inbreeding		-0.38		-0.12		-0.25		-1.33		-0.34	

Means with same superscript within a sub-group do not differ significantly.

Influence of litter size at birth

Litter size at birth had significant effect on body weight at all pre-weaning ages. The least square means at birth ranged from 51.55 in litter size of 7 and above to 57.53 g in litter size upto 3. At 4 weeks age, body weights varied from 254.07 g in litter size 7 or above to 446.07 g in litter size upto 3 bunnies. The mean body weights decreased as the litter size increased. A similar trend in body weights from birth to 4 weeks age was also reported by Prasad (19930 and Raj Kumar (1994).

Influence of genetic group

Genetic group had a significant ($P < 0.01$) effect on body weight at 1, 2, 3 and 4 weeks age, but not at birth. Significant effect of genetic group on pre-weaning body weights was also reported by Rafay *et al.* (1991), while Jayaramakrishna *et al.* (1990) and Krogmeier and Dzapo (1991) observed non-significant effect of genetic group on the body weight at birth and weaning, respectively.

Influence of inbreeding

Regression of pre-weaning body weights on the inbreeding coefficient of progeny was significant ($P < 0.01$) at 3 weeks age (-1.33 g) only, while the estimates were negative and non-significant at birth, 1, 2 and 4 weeks age. These results indicated that the body weights of bunnies at 3 weeks age declined significantly by 1.33g per 1 per cent increase in the inbreeding coefficient. Higher pre-weaning body weights in GG and FF breeds with lower levels of inbreeding, in comparison to NN and SS indicated that higher pre-weaning body weights were associated with the lower levels of inbreeding in these genetic groups.

From the present study, it was evident that pre-weaning body weights were significantly influenced by the litter size at birth, genetic group and regression on inbreeding coefficient of progeny. The body weight at three weeks of age declined as the inbreeding level in the progeny increased.

Summary

The effects of litter size at birth, genetic group and level of inbreeding on the body weight at birth, 1, 2, 3 and 4 weeks age of 91 New Zealand White, 94 Soviet Chinchilla, 84 Grey Giant and 47 Flemish Giant bunnies were studied. The overall least square means for body weight at birth, 1, 2, 3 and 4 weeks age were 54.88, 107.07, 155,97, 214.43 and 329.98 g. respectively. Litter size at birth and genetic group of bunny had significant effect on body weight at all pre-weaning ages. Least square means decreased as the litter size increased. The average body weights were highest in Grey Giant and the lowest in Soviet Chinchilla during first three weeks age. Regression of body weight on inbreeding coefficient of progeny was negative and significant at 3 weeks age only. There was a

reduction of 1.33 g in body weight at 3 weeks per 1 per cent increase in the inbreeding coefficient. Higher body weights were found to be associated with lower levels of inbreeding.

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