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# Effect of Genetic Groups on Pre-Weaning Body Weights and Growth Rates of Rabbits Maintained under Organized Farm Conditions

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**Abstract:** A study was conducted to assess the suitability of different crosses of rabbit breeds as efficient meat producers in the subtropical climatic conditions of Kerala India. Three rabbit breeds viz., White Giant (WG), Soviet Chinchilla (SC) and Grey Giant (GG) maintained at the University Rabbit Farm, Centre for Advanced Studies in Animal Genetics and Breeding, College of Veterinary and Animal Sciences, Mannuthy were utilized for the study. Body weight and growth records of $F_1$ progeny were taken at birth, 2nd and 4th week of age. Data on pre-weaning body weight and growth rates of 562 pure and crossbred kits was subjected to least squares analysis of variance. Among the purebreds, highest pre-weaning body weights at birth, 2nd and 4th week were recorded for WG. Among crossbreds and purebreds progenies of WG male crossed to GG female (WG x GG) recorded the highest pre-weaning weight at 2nd and 4th week. Birth weight was highest for WG x SC crosses. The growth rates during 0-2, 2-4 and 0-4 weeks were 9.16, 11.76 and 10.50 g, respectively. Based on the results obtained in the study it was concluded that the genetic group of the rabbits had highly significant ($p<0.01$) influence on pre-weaning body weights as well as growth rates.

**Key words:** Crossbreds, pre-weaning body weight, growth rate, rabbit, genetic group, significant

## INTRODUCTION

The existing livestock population in the third world countries will not solve the problem of increasing food shortage and in this context rabbit has a unique role in meeting the demand for animal protein. In developed countries, there exist a tremendous potential for rabbits based on economic traits like high rate of reproduction, early attainment of maturity, rapid growth rate and efficient feed utilization. Moreover, they pose limited competition for human foods and produce high quality nutritious meat. This potential of rabbits can be well utilized at a commercial or small scale to address the problems of food scarcity. Different rabbits of foreign origin viz. White Giant, Soviet Chinchilla and Grey Giant are generally being used for developing crossbreds for commercial meat production in Kerala. So far no research has been carried out on the suitability of various crossbred rabbits using the breeds and hence this research forms the pilot study in this regard.

## MATERIALS AND METHODS

The data was recorded on 562 rabbits produced using three breeds viz., White Giant, Soviet Chinchilla and Grey Giant maintained at the University Rabbit Farm, Mannuthy during March 2007 to July 2008. Purebred and crossbred progenies along with their reciprocals were produced for recording the data on body weight from birth to 4 weeks of age at fortnightly intervals. The growth rates from 0-2, 2-4 and 0-4 weeks were generated. The effect of genetic groups on different pre-weaning body weights and growth rates were analyzed by least squares technique as given by Harvey (1996). The model used was:

$$Y_{ij} = \mu + G_i + e_{ij}$$

$Y_{ij}$ = Observation of jth rabbit of the ith genetic group
$\mu$ = Overall mean
$G_i$ = Effect of ith genetic group
$e_{ij}$ = Random error

Duncan's multiple range test as modified by Kramer (1957) was used to compare the sub group means.

## RESULTS AND DISCUSSION

The overall average body weights at birth, 2 and 4 weeks of age were 47.55, 178.97 and 344.90 g, respectively (Table 1). The least squares analysis of

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Table 1: Least squares means of body weights and growth rates at different periods in rabbits

| | Body weight at different ages (g) | | | Growth rates at different periods (g) | | |
|---|---|---|---|---|---|---|
| Genetic groups | Birth weight (562) | 2 weeks weight | 4 weeks weight | 0-2 weeks | 2-4 weeks | 0-4 weeks |
| Overall | 47.55±0.40 | 178.97±2.60 | 344.90±5.660 | 9.16±0.17 | 11.76±0.26 | 10.50±0.19 |
| WG×WG | 53.22±1.35$^{g}$ | 197.50±9.40$^{f}$ | 357.94±20.41$^{b}$ | 10.34±0.62$^{cd}$ | 11.60±0.95$^{b}$ | 10.89±0.70$^{b}$ |
| SC×SC | 48.09±1.04$^{d}$ | 160.83±6.65$^{b}$ | 321.94±15.11$^{b}$ | 7.92±0.44$^{ab}$ | 11.06±0.70$^{b}$ | 09.71±0.52$^{b}$ |
| GG×GG | 47.32±1.00$^{c}$ | 178.61±6.65$^{c}$ | 339.71±14.22$^{b}$ | 8.95±0.44$^{bc}$ | 11.67±0.66$^{b}$ | 10.22±0.49$^{b}$ |
| WG×SC | 51.56±1.60$^{f}$ | 185.83±8.14$^{e}$ | 338.86±17.94$^{b}$ | 9.52±0.53$^{bc}$ | 10.81±0.83$^{b}$ | 10.21±0.62$^{b}$ |
| WG×GG | 48.75±1.17$^{e}$ | 215.65±8.31$^{g}$ | 444.35±17.54$^{c}$ | 11.44±0.55$^{d}$ | 16.34±0.82$^{c}$ | 13.89±0.60$^{c}$ |
| SC×WG | 42.92±1.03$^{a}$ | 162.17±8.31$^{b}$ | 320.68±17.94$^{b}$ | 8.07±0.55$^{ab}$ | 11.23±0.83$^{b}$ | 09.69±0.62$^{b}$ |
| SC×GG | 47.27±1.22$^{c}$ | 181.86±6.74$^{d}$ | 362.71±14.22$^{b}$ | 9.50±0.44$^{bc}$ | 12.92±0.66$^{b}$ | 11.21±0.49$^{b}$ |
| GG×WG | 42.54±1.09$^{a}$ | 140.96±7.82$^{a}$ | 257.50±17.94$^{a}$ | 6.87±0.51$^{a}$ | 7.84±0.83$^{a}$ | 07.57±0.62$^{a}$ |
| GG×SC | 46.29±1.11$^{b}$ | 187.31±7.82$^{e}$ | 360.38±16.50$^{b}$ | 9.84±0.51$^{cd}$ | 12.36±0.77$^{b}$ | 11.10±0.57$^{b}$ |

Means bearing same superscript in a column do not differ significantly

Table 2: Least squares analysis of variance (Mean squares only) of body weights and growth rates at different periods in rabbits

| Traits | Genetic group | Error | $R^2$-value |
|---|---|---|---|
| Birth weight | 672.94** | 81.69 (553) | 10.60 |
| 2 weeks weight | 11958.48** | 1589.81 (238) | 20.20 |
| 4 weeks weight | 55841.85** | 7080.41 (224) | 22.00 |
| Growth rate 0-2 weeks | 47.80** | 6.85 (238) | 19.00 |
| Growth rate 2-4 weeks | 114.58** | 15.32 (224) | 21.10 |
| Growth rate 0-4 weeks | 65.21** | 08.34 (224) | 21.80 |

**Highly significant ($p<0.01$)

variance of different body weight and growth rates revealed highly significant ($p<0.01$) difference between the pure and crossbred genetic groups (Table 2). Similar to the present findings significant effect of genetic groups on birth weight was also reported by Reddy *et al.* (2003). Among pure breds, maximum average weights at birth, 2nd and 4th weeks of age were recorded in WG while GG showed lowest birth weight and SC recorded lowest 2nd and 4th week weight. The highest birth weight for WG among purebreds noticed in the present study is in accordance with the maximum birth weight of 70.03 g in WG as reported by Lahiri and Mahajan (1984).

The highest birth weight of 51.56 g recorded in WG x SC crossbreds in the present study was lower than the value (63.83 g) reported by Lahiri and Mahajan (1984) in the same cross. Among the different crosses, WG male x GG female cross showed maximum body weight as well as growth rate during the 2nd and 4th weeks of age while the reciprocal cross (GG male x WG female) recorded the lowest values indicating the probable influence of the reciprocal effect (sex-linked effect) of the male female breed combinations as reported by Rubio *et al.* (2004).

The growth rates during 0-2, 2-4 and 0-4 weeks were 9.16, 11.76 and 10.50 g, respectively. Generally, the growth rate was more between 2-4 weeks of age (11.76 g) than 0-2 weeks (9.16 g) which may be attributed to higher milk production and better mothering ability. The present study also revealed a maximum growth rate of 10.89 g from 0-4 weeks in WG pure bred. Dhara *et al.* (2009) reported a pre weaning (0-4 weeks) overall growth rate of 9.79 g in SC and New Zealand White rabbits which is slightly lower than the corresponding value observed in the present study.

## CONCLUSION

Based on the results obtained in the present study it was concluded that among the three purebreds, WG was suitable as the parental breed for producing better performing rabbits suited to the agro-climatic conditions of Kerala. For the production of commercial rabbits the crossbreds of WG male and GG female was recommended.

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