

## Effect of Litter Size at Birth on Litter Traits and Growth of Broiler Rabbit in Sub Temperate Climate of India

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### Abstract

Several workers indicated the influence of litter size at birth on different litter traits in India and abroad. In this region of India, no study was done on this aspect. So, an effort was made to find the effect of litter size at birth on different litter traits and growth of broiler rabbit. Data on litter traits i.e., litter size at birth, litter weight at birth, litter size at weaning and litter weight at weaning of 227 numbers of kindling recorded from ten numbers each of New Zealand White, Soviet Chinchilla, Meghalaya Local and Cross Bred rabbits were analyzed. Data analysis revealed that litter size at birth had highly significant ( $P < 0.01$ ) effect on all the traits except post weaning growth. Litter size at birth had highly significant ( $P < 0.01$ ) effect on litter weight at birth and individual litter weight at birth. The average litter weight at birth and individual litter weight at birth was recorded to be  $310.93 \pm 3.01$  g and  $53.38 \pm 0.51$  g. Litter size at birth had highly significant ( $P < 0.01$ ) effect on litter size at weaning and litter weight at weaning. The average litter size at weaning, litter weight at weaning and individual litter weight at weaning were recorded to be  $4.41 \pm 0.07$ ,  $1926 \pm 28$  g and  $442.92 \pm 3.59$  g respectively.

**Keywords:** Growth; India; Litter Size at Birth; Litter Traits; Rabbit

### Introduction

Rabbit is introduced in India hardly three decades ago as an alternative source of meat production. Rabbit farming is gaining popularity due to its high reproductive potentiality since they are induced ovulator, so could be bred throughout the year [5,6]. They have high mothering ability and producing four crops per year and six litters in each birth. So, it is quite feasible to obtain twenty-four kits per year per doe [7]. They have also high roughage utilization potentiality [9].

Several workers indicated the influence of litter size at birth on different litter traits in India and abroad. In this region of India, no study was done on this aspect. So, an effort was made to find the effect of litter size at birth on different litter traits such as litter weight at birth, individual litter weight at birth, litter size at wean-

ing, litter weight at weaning, individual litter weight at weaning and growth of broiler rabbit.

### Materials and Methods

Data on litter traits i.e., litter size at birth, litter weight at birth, litter size at weaning and litter weight at weaning of 227 kindling recorded from ten numbers adult doe each of New Zealand White (NZW), Soviet Chinchilla (SC), Meghalaya Local (ML) and Cross Bred rabbits of SC and ML (CB) were analyzed. In total 40 does were taken for the study. So, litter traits of kits born from 227 kindling were analysed. Does were maintained individually in outdoor system of housing in RRF of ICAR-RCNEHR, Barapani, Meghalaya. Rabbits were maintained outside of the shed in small hutch made of wood with wire mesh floor and GI sheet roof having five compartments. Dimension of each hutch was 1.5 x 0.5 m. Afterwards individual litter weight at birth, individual litter weight at weaning

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and post weaning growth rate were calculated by standard procedure. Data were classified into five groups in respect of litter size at birth i.e., 4, 5, 6, 7 and 8 irrespective of breeds. Kits were weaned from doe after 42 days of kindling. Does were fed concentrate mash feed @ 100 g/head/day and green roughages *ad libitum*. Green roughage such as Congosignal grass, Guinea grasses etc. were fed *ad libitum*. Concentrate mash feed was composed of maize crust - 40%, wheat bran - 22%, groundnut cake - 25%, fish meal - 5%, molasses - 5%, vitamin and mineral mixture - 2.5%, common salt - 0.5%. The proximate composition of feed was DM - 92.14, CP - 14.21, TA - 6.72, EE - 9.33, CF - 10.24, NFE - 59.50 and OM - 93.28% respectively. All other management conditions were remaining same. Feed and fodder were analyzed as per AOAC [1]. Regular meteorological parameters were recorded as per instruction bulletin of IMD [2]. Data were analyzed as per methods described in Snedecor and Cochran [10].

## Results and Discussion

The average air temperature, maximum temperature, minimum temperature and relative humidity during period of experiment were 24.44 °C, 27.16 °C, 16.54 °C and 66.16% respectively. Highest air temperature was found in the month June while highest rainfall was recorded in the month July.

Data analysis revealed (Table -1) that litter size at birth had highly significant ( $P < 0.01$ ) effect on all the litter traits except post weaning growth. Litter size at birth had highly significant ( $P < 0.01$ ) effect on litter weight at birth (LWB) and individual litter weight at birth (ILWB). Litter weight at birth was highest in the 5<sup>th</sup> group of rabbit where rabbits had highest litter size at birth and it

was gradually decreasing with the decrease of litter size at birth. The average litter weight at birth was recorded to be  $310.93 \pm 3.01$  g. In contradiction to present findings, Das and Bujarbaruah (2007) [3] reported better litter weight at birth ( $339.68 \pm 4.37$  g) in rabbit than the present finding. It was found that individual litter weight at birth was highest in the rabbits of Gr -1, where rabbits had least litter size at birth. It gradually decreased from Gr -1 to Gr -5 with an average individual litter weight at birth of  $53.38 \pm 0.51$  g.

Litter size at birth had highly significant ( $P < 0.01$ ) effect on litter size at weaning which was highest in Gr -5 and it was significantly and gradually decreased to Gr -1 with an average value of  $4.41 \pm 0.07$ . However, Das and Bujarbaruah (2007) [3] reported better litter size at weaning ( $4.62 \pm 0.06$ ) in rabbit than the present findings. On the contrary Das and Nayak (1991) [4], Reddy, *et al.* (2003) [8] reported lower litter size at weaning ( $3.93 \pm 0.05$ ) than the present findings. So, litter size at birth had also highly significant ( $P < 0.01$ ) effect on litter weight at weaning and obviously it was highest in Gr -5 with an average value of  $1926 \pm 28$  g. It also gradually and significantly decreased to Gr -1 (1396 g). Litter size at birth had also highly significant ( $P < 0.01$ ) effect on individual litter weight at weaning. However, it was significantly higher in Gr -1 and Gr -4 than the animals in Gr -5. There was non-significant difference in individual litter weight at weaning between Gr -1 and Gr -4, between Gr -2 and Gr -3. The average individual litter weight at weaning was recorded to be  $442.92 \pm 3.59$  g. Litter size at birth had no significant ( $P > 0.05$ ) effect on post weaning growth rate of rabbit. However, it was recorded to be highest in Gr -4 where litter size at birth was 7 with an average growth of  $18.61 \pm 0.06$  g/day.

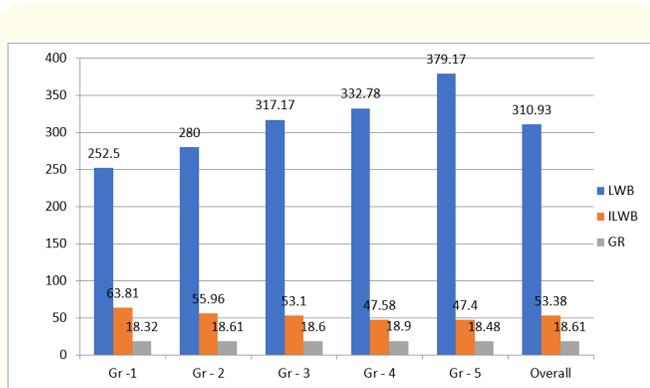
**Table 1:** Effect of litter size at birth on litter traits of rabbit.

Parameters	Gr - 1 (LSB = 4)	Gr - 2 (LSB = 5)	Gr - 3 (LSB = 6)	Gr - 4 (LSB = 7)	Gr - 5 (LSB = 8)	Overall	F Value
Litter weight at birth (g)	252.50 <sup>e</sup> ±7.96(22)	280.00 <sup>d</sup> ± 5.40 (45)	317.17 <sup>c</sup> ± 2.95 (106)	332.78 <sup>b</sup> ± 4.56 (36)	379.17 <sup>a</sup> ± 9.21 (18)	310.93 ± 3.01 (227)	51.46 **
Individual litter weight at birth (g)	63.81 <sup>a</sup> ±1.46(22)	55.96 <sup>b</sup> ± 1.07 (45)	53.10 <sup>c</sup> ± 0.57 (106)	47.58 <sup>d</sup> ± 0.66 (36)	47.40 <sup>d</sup> ± 1.25 (18)	53.38 ± 0.51 (227)	28.37 **
Litter size at weaning	3.23 <sup>e</sup> ± 0.13 (22)	3.84 <sup>d</sup> ± 0.11 (45)	4.42 <sup>c</sup> ± 0.08 (106)	5.08 <sup>b</sup> ± 0.17 (36)	5.89 <sup>a</sup> ± 0.19 (18)	4.41 ± 0.07 (227)	38.83 **

Litter weight at weaning (g)	1396 <sup>e</sup> ± 52 (22)	1679 <sup>d</sup> ± 41 (45)	1936 <sup>c</sup> ± 33 (106)	2239 <sup>b</sup> ± 60 (36)	2505 <sup>a</sup> ± 70 (18)	1926 ± 28 (227)	45.57**
Individual litter weight at weaning (g)	447.20 <sup>a</sup> ± 11.50 (22)	444.09 <sup>ab</sup> ± 6.74 (45)	442.45 <sup>ab</sup> ± 4.70 (106)	447.41 <sup>a</sup> ± 8.21 (36)	428.51 <sup>b</sup> ± 8.60 (18)	442.92 ± 3.59 (227)	46.15 **
Growth Rate (g/d)	18.32 <sup>a</sup> ± 0.24 (22)	18.61 <sup>a</sup> ± 0.14 (45)	18.60 <sup>a</sup> ± 0.08 (106)	18.90 <sup>a</sup> ± 0.18 (36)	18.48 <sup>a</sup> ± 0.19 (18)	18.61 ± 0.06 (227)	1.45 NS

NB: Figures having different superscripts in a row differ significantly (P < 0.05).

\*\* = P < 0.01, NS = P > 0.05. Parenthesis indicates number of observations.



**Figure 1:** Diagrammatic representation of litter weight at birth (LWB), individual litter weight at birth (ILWB) and growth (GR) of rabbits in different groups.

### Conclusion

So, litter size at birth in rabbit was found to have highly significant (P < 0.01) effect on all the litter traits such as litter weight at birth, individual litter weight at birth, litter size at weaning, litter weight at weaning, individual litter weight at weaning but no significant effect (P > 0.05) on post weaning growth of rabbit in sub temperate climate of India.

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