

## Effect of Micro Environmental Changes on Rabbit Production

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### ABSTRACT

Ten grower rabbits of each of Gray Giant (GG), Black Brown (BB), New Zealand White (NZW) and Soviet Chinchilla (SC) breed of our institute farm were considered for the study. Animals were maintained individually in indoor cage system of housing. Concentrate mash feed @ 80-100 g / day and green grass ad libitum were supplied regularly twice daily. Live weight of rabbit was taken bimonthly. Average live weight gain fortnightly and average growth was calculated. Micro climatological parameters such as maximum temperature, minimum temperature, dry bulb temperature, wet bulb temperature were recorded daily inside the shed by standard procedure. Afterwards relative humidity (RH) was found out by standard psychometric table. Temperature Humidity Index (THI) was calculated by standard formula. Multiple regression analysis of data revealed that change of both maximum and minimum temperature had highly significant ( $P < 0.01$ ) effect on live weight of all the four breeds of rabbit. Maximum reduction of fortnightly live weight was observed in GG rabbit (116.45 g) followed by BB (101.43 g), SC (93.98 g) and NZW (85.90 g) rabbit per unit increase of maximum temperature. However, per unit rise of minimum temperature, maximum reduction of live weight was recorded in GG (85.29 g) followed by BB (77.89 g), NZW (68.64 g) and SC (62.92 g) rabbit. It was observed that change of air temperature had significant ( $P < 0.05$ ) negative effect on average daily gain of all the breeds of rabbit. Average daily gain was reduced by 16.78 g in Gray Giant (GG), 14.84 g in Black Brown (BB), 12.50 g in Soviet Chinchilla (SC) and 6.51 g in New Zealand White (NZW) rabbit per unit increase of air temperature respectively. So, it would be inferred that adverse effect of maximum temperature, minimum temperature and air temperature was most pronounced on Gray Giant and Black Brown rabbit indicating maximum adaptability of New Zealand White and Soviet Chinchilla rabbit.

**Key words :** Rabbit; Animals; Micro climatological parameters; Humidity (RH); Multiple regression analysis;

Rabbit contributes substantially to enhance the meat production. There is no social barrier regarding consumption of rabbit meat in Goa. As per the livestock census (2007), the rabbit population in the state was 794 comprising of 492 in North Goa and 302 in South Goa district. In this context, broiler rabbit would provide a new avenue for meat production and could play a major role in augmenting the animal protein supplies mainly because of its small size, low space requirement, rapid growth rate, high reproductive efficiency and ability to utilize green roughage ie vegetables, grass, fodder, tree leaves etc. Rabbit being the animal of sub temperate climate they are sensitive to high temperature. Hence one study was made to find the effect of micro environmental changes on live weight and growth of different breeds of rabbit and to find the most adaptable breed suitable to the agro climatic condition of Goa.

### METHODOLOGY

Ten grower rabbits of the age group 6-7 weeks each of Gray Giant (GG), Black Brown (BB), New Zealand White (NZW) and Soviet Chinchilla (SC) breed were considered for the study from our institute farm. Animals were maintained individually in indoor cage system of housing. House is of concrete with GI sheet roof. Concentrate mash feed @ 80-100 g / day and green grass ad libitum were supplied regularly twice daily. Concentrate feed was composed of maize powder 50%, rice bran 20%, soya cake 25%, molasses 3%, vitamin and mineral mixture 1.5% and common salt 0.5% Live weight of rabbit was taken bimonthly. Average live weight gain fortnightly and average growth was calculated. Micro climatological parameters such as maximum temperature, minimum temperature, dry bulb temperature, wet bulb temperature were recorded daily inside the shed by standard procedure as per IMD (2007). Afterwards

relative humidity (RH) was found out by standard psychometric table. Temperature Humidity Index (THI) was calculated by standard formula as per West (1994). Data were analyzed as per *Snedecoe and Cochran (1994)* using SPSS package.

**RESULTS AND DISCUSSION**

It was revealed that change of both maximum and minimum temperature had highly significant ( $P < 0.01$ ) effect on live weight of all the four breeds of rabbit. Maximum reduction of fortnightly live weight was observed in Gray Giant rabbit (116.45 g) followed by Black Brown (101.43 g), Soviet Chinchilla (93.98 g) and New Zealand White (85.90 g) rabbit per unit increase of maximum temperature. However, per unit rise of minimum temperature, maximum reduction of live weight was recorded in Gray Giant (85.29 g) followed by Black Brown (77.89 g), New Zealand White (68.64 g) and Soviet Chinchilla (62.92 g) rabbit. Therefore, adverse effect of both maximum and minimum temperature was most pronounced on Gray Giant and Black Brown rabbit (Table-1).

**Table 1. Effect of micro climatological changes on live weight of rabbit**

$$Y_1 = 234.21 + 19.30x_1 + 87.35x_2 + 23.49x_3 - 85.90^{**}x_4 - 68.64^{**}x_5$$

$$Y_2 = 201.03 + 15.60x_1 + 60.96x_2 + 20.42x_3 - 93.98^{**}x_4 - 62.92^{**}x_5$$

$$Y_3 = 233.63 + 19.30x_1 + 81.91x_2 + 24.86x_3 - 116.45^{**}x_4 - 85.29^{**}x_5$$

$$Y_4 = 209.67 + 16.72x_1 + 65.46x_2 + 219.59x_3 - 101.43^{**}x_4 - 77.89^{**}x_5$$

$Y_1$  = Fortnightly Live weight of NZW rabbit  
 $Y_2$  = Fortnightly Live weight of SC rabbit  
 $Y_3$  = Fortnightly Live weight of GG rabbit  
 $Y_4$  = Fortnightly Live weight of BB rabbit  
 $x_1$  = Fortnightly Average Air Temperature  
 $x_2$  = Fortnightly Average Relative Humidity,  
 $x_3$  = Fortnightly Average Temperature Humidity Index  
 $x_4$  = Fortnightly Average Maximum Temperature  
 $x_5$  = Fortnightly Average Minimum Temperature.

\*\* =>  $P < 0.01$ , \* =>  $P < 0.05$

It was observed that change of air temperature had significant ( $P < 0.05$ ) negative effect on average daily gain of all the breeds of rabbit. Average Daily Gain was reduced by 16.78 g in Gray Giant, 14.84 g in Black Brown, 12.50 g in Soviet Chinchilla and 6.51 g in New Zealand White rabbit per unit increase of air temperature

respectively. So, effect of air temperature on growth of rabbit was most pronounced on Gray Giant rabbit followed by Black Brown, Soviet Chinchilla and New Zealand White rabbit. Effect of relative humidity on average daily gain in all the breeds of rabbit was observed non significant (Table 2). However, maximum negative impact was on Black Brown followed by Gray Giant, Soviet Chinchilla and New Zealand White rabbit.

**Table 2. Effect of micro climatological changes on av daily gain of rabbit**

$$Y_5 = -67.89 - 6.51x_1 - 0.226x_2 + 0.913^{**}x_3 + 2.36x_4 + 4.75^{**}x_5$$

$$Y_6 = -89.70 - 12.50x_1 - 0.325x_2 + 0.378x_3 + 6.75x_4 + 7.50x_5$$

$$Y_7 = -165.55 - 16.78x_1 - 0.334x_2 + 1.660^{**}x_3 - 0.87x_4 + 0.97x_5$$

$$Y_8 = 52.6 - 14.84x_1 - 0.368x_2 - 0.246x_3 + 12.18x_4 + 13.23x_5$$

$Y_5$  = Average daily gain of NZW rabbit  
 $Y_6$  = Average daily gain of SC rabbit  
 $Y_7$  = Average daily gain of GG rabbit  
 $Y_8$  = Average daily gain of BB rabbit  
 $x_1$  = Fortnightly Average Air Temperature  
 $x_2$  = Fortnightly Average Relative Humidity  
 $x_3$  = Fortnightly Average Temperature Humidity Index  
 $x_4$  = Fortnightly Average Maximum Temperature  
 $x_5$  = Fortnightly Average Minimum Temperature.

\*\* =>  $P < 0.01$ , \* =>  $P < 0.05$

In rabbit shed of our institute in the year 2010, highest air temperature was observed in the month May ie 32.38 °C with an average value of 28.75 °C. Highest THI (86.75), highest maximum temperature (35.60 °C) and highest minimum temperature (29.16 °C) were also found in the month May. Overall mean value of THI, maximum and minimum temperature in the year 2010 were recorded to be 78.80, 32.05 °C and 24.42 °C respectively. Maximum relative humidity was observed in the month July (92.95%) with an average value of 83.72 %. ANOVA of micro environmental parameters indicated significant ( $P < 0.05$ ) differences between the months. Range of maximum RH was 95.23 to 76.00%. Range of minimum RH was 84.88 to 52.90%. Range of average wind speed was 0.26 to 0.68 m/s.

So, it would be inferred that adverse effect of maximum temperature, minimum temperature and air temperature was most pronounced on Gray Giant and Black Brown rabbit indicating maximum adaptability of New Zealand White and Soviet Chinchilla rabbit.

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