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Growth Performance of Rhode Island Red, Vanaraja and Desi (Non-Descript) Chicken in Intensive System of Rearing (California Type)

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Abstract

A comparative study was conducted to evaluate the growth performance of Rhode Island Red, Vanaraja and Desi (non-descript) chicken in intensive system of rearing. One hundred chicks from each group with same management, feeding and healthcare were undertaken in the study. The data were collected weekly basis from 0 to 21 weeks of age for both male and female separately. The mean body weight of male and female up to 6 weeks was the highest in RIR (639.81 ± 0.72 g) followed by Vanaraja (633.91 ± 0.92 g) and Desi (219.26 ± 0.68 g). But for female up to 6 weeks of age Vanaraja (534.12 ± 0.73 g) attained higher weight than RIR (439.84 ± 0.52 g) and Desi (187.93 ± 0.89 g). The mean body weight of male and female up to 14 weeks was highest in RIR (1491.39 ± 0.53 and 1271.31 ± 0.68 g respectively) followed by Vanaraja (1342.20 ± 0.23 and 1048.48 ± 0.61 g respectively) and Desi (792.51 ± 0.30 and 576.96 ± 0.49 g respectively). The mean body weight for both male and female up to 21 weeks of age the highest body weight was gained by RIR (2273.79 ± 2.30 and 1762.59 ± 1.19 g respectively) followed by Vanaraja (2021.04 ± 1.69 and 1561.94 ± 0.22 g respectively) and Desi (1420.65 ± 1.83 and 1119.21 ± 0.83 g respectively). The statistical analysis confirmed that there were significant differences between male and female of three types of chicken.

Key words : Rhode Island Red, Vanaraja and Desi, FCR, Intensive system.

In West Bengal, backyard poultry keeping is extremely popular but now a day's people are using low cost cages for proper feeding and fresh watering so that production level may increase. Egg producers are planning to expand their layer operations that are often faced with the dilemma of deciding on the style of housing and equipment they should consider to best compliment their growing operation. The capital costs associated with this investment are major and the consequences of the decision, positive or negative, will be managed for years and decades into the future. Of course, the primary goal of any such investment is to realize the greatest return of efficiency and profit on this investment throughout its life expectancy (1—6). So the farmers and the private enterprises are showing interest to rear the poultry in locally available low cost cage and improved cage because in cage system of rearing proper feeding, watering, close observation and health management can easily be done. As a result total production is in-

Table 1. Mean ± SE of body weight (g) of brooding male (0—6 weeks). Mean value bearing different superscripts varies significantly ($P < 0.05$). n = 3.

Strain	Weeks 0	1	2	3	4	5	6
Desi	31.51^{b}±0.51	55.81^{c}±0.65	75.93^{c}±0.15	106.84^{c}±0.43	151.45^{c}±1.08	170.60^{c}±0.87	219.26^{c}±0.68
Vanaraja	37.25^{a}±0.33	75.69^{b}±0.86	147.14^{b}±0.72	240.38^{b}±0.29	419.98^{a}±0.62	529.94^{a}±0.68	633.91^{b}±0.92
RIR	38.47^{a}±0.21	114.41^{a}±0.43	193.64^{a}±0.92	163.66^{a}±1.19	406.40^{b}±0.57	523.55^{b}±1.04	639.81^{a}±0.72

Table 2. Mean ± SE of body weight (g) of growing male (7—14 weeks).

Strain	Weeks 7	8	9	10
Desi	259.33^{c} ± 1.02	302.10^{c} ± 0.49	412.46^{c} ± 0.27	500.85^{c} ± 0.24
Vanaraja	712.14^{b} ± 0.67	806.09^{b} ± 0.88	936.32^{b} ± 0.72	1002.09^{b} ± 0.61
RIR	727.94^{a} ± 0.83	847.89^{a} ± 0.28	947.89^{a} ±0.64	1093.33^{a}± 1.17

Table 2. Continued.

Strain	Weeks 11	12	13	14
Desi	569.01^{c} ± 0.41	637.59^{c}± 0.20	720.99^{c} ± 0.92	792.51^{c} ± 0.30
Vanaraja	1096.42^{b} ± 1.19	1166.91^{b} ± 0.21	1260.16^{b} ± 0.57	1342.20^{b} ± 0.23
RIR	1214.76^{a} ± 0.35	1292.04^{a} ± 0.80	1371.04^{a} ± 0.33	1491.39^{a} ± 0.53

creased. In view of this the present study was conducted.

Methods

In the present study 100 day old chicks of RIR, Vanaraja and Desi chicken (non-descript) were used. All the day old chicks were kept up to 6 weeks in brooder house, then 7—14 weeks in grower house and from 15 weeks to till the end of experiment in layer house (California type). From the day old till the end of experiment all the birds had given same managemental practices. Individual body weight of each experiment strain were recorded at weekly intervals up to 21 weeks of age to assess the weekly gain in body weight using unipan digital balance.

Feed Conversion Ratio (FCR). The indicates the amount of feed required to produce one kilogram of live body weight by the bird. It is indicated by dividing the cumulative (in kg) of feed consumed by the total quantity (kg) of weight gained in live broiler produced.

$$\text{Feed conversion ratio (FCR)} = \frac{\text{Cumulative feed consume}}{\text{Cumulative live weight}}$$

The data obtained from the experiment were statistically analyzed and the means were compared using Tukeys' multiple range tests. Probability of $P<0.05$ was described as significant.

Results and Discussion

Body Weight at Brooding (0—6 Wks)

Birds from three strains (RIR, Vanaraja and Desi) were placed randomly in the brooder house up to 6

Table 3. Mean ± SE of body weight (g) of male at slaughtering (15—21 weeks).

Weeks 15	16	17	18	19	20	21
881.55^{c}±1.03	918.29^{c}±1.28	1048.45^{c}±0.46	1125.31^{c}±0.53	1236.65^{c}±0.31	1352.88^{c}±0.65	1420.65^{c}±1.83
1459.24^{b}±0.50	1576.71^{b}±1.00	1637.04^{b}±0.85	1754.40^{b}±0.69	1833.11^{b}±0.75	1922.46^{b}±0.53	2021.04^{b}±1.69
1586.74^{a}±0.64	1649.90^{a}±0.67	1783.12^{a}±0.92	1903.50^{a}±0.40	1982.29^{a}±1.20	2112.31^{a}±0.76	2273.79^{a}±2.30

Table 4. Mean ± SE of body weight (g) of brooding female (0—6 weeks). Mean values bearing different superscripts varied significantly ($P < 0.05$). n = 3.

Strain	Weeks 0	1	2	3	4	5	6
Desi	$29.12^{b} \pm 0.23$	$44.11^{c} \pm 0.84$	72.9^{c} 1 ± 0.99	$93.65^{c} \pm 0.75$	$125.42^{c} \pm 0.43$	$154.66^{c} \pm 0.44$	$187.93^{c} \pm 0.89$
Vanaraja	$36.32^{a} \pm 0.15$	$64.86^{b} \pm 0.47$	$119.57^{b} \pm 0.65$	$190.21^{b} \pm 0.72$	$338.49^{a} \pm 0.59$	$422.99^{a} \pm 0.91$	$534.12^{a} \pm 0.73$
RIR	$35.43^{a} \pm 0.67$	$84.47^{a} \pm 0.77$	$128.49^{a} \pm 0.54$	$204.50^{a} \pm 0.83$	$266.78^{b} \pm 0.50$	$360.96^{b} \pm 0.65$	$439.84^{b} \pm 0.52$

weeks of age and their weekly body weights were measured both for male and female. The mean ± SE of body weight of male and female of RIR, Vanaraja and Desi up to 6 weeks are given in Tables 1 to 6. For male up to 6 weeks of age the highest body weight was attained by RIR (639.81 ± 0.72 g), lowest body weight was attained by Desi (219.26 ± 0.68 g) and Vanaraja (633.91 ± 0.92 g) attained the intermediate body weight. But for female up to 6 weeks of age Vanaraja (534.12 ± 0.73 g) attained higher weight followed by RIR (439.84 ± 0.52 g) and Desi (187.93 ± 0.89 g). The statistical analysis confirmed that there were significant ($P<0.05$) differences between the male as well as between the female of three strains of chicken.

Body Weight at Growing (7—14 Wks)

The birds were placed in the grower house from 7—14 week and weekly body weights of different strains were collected. The mean body weight for both male and female up to 14 weeks was highest in RIR (1491.39 ± 0.53 g and 1271.31 ± 0.68 g respectively) followed by Vanaraja (1342.20 ± 0.23 g and 1048.48 ± 0.61 g respectively) and Desi (792.51 ± 0.30 g and 576.96 ± 0.49 g respectively). The statistical analysis confirmed that there were significant ($P<0.05$) differences between the male as well as between the female of three strains of chicken.

Body Weight at Onset of Laying for Female and Slaughtering of Male (15—21 Wks)

As for the 15—21 weeks the birds were placed in the layer house and weekly body weights of different strains were collected. The mean body weight for both male and female up to 21 weeks of age the lowest body weight was gained by Desi (1420.65 ± 1.83 g and 1119.21 ± 0.83 g respectively) and highest body weight was gained by RIR (2273.79 ± 2.30 g and 1762.59 ± 1.19 g respectively) and Vanaraja (2021.04 ± 1.69 g

Table 5. Mean ± SE of body weight (g) of growing female (7—14 weeks).

Strain	Weeks 7	8	9	10
Desi	$201.85^{c} \pm 0.93$	$247.18^{c} \pm 0.96$	$341.69^{c} \pm 0.68$	$399.23^{c} \pm 0.57$
Vanaraja	$589.14^{a} \pm 0.89$	$624.01^{a} \pm 0.44$	$699.24^{b} \pm 0.51$	$750.66^{b} \pm 0.39$
RIR	$521.01^{b} \pm 0.93$	$613.67^{b} \pm 0.70$	$703.22^{a} \pm 0.98$	$790.29^{a} \pm 0.40$

Table 5. Continued.

Strain	Weeks 11	12	13	14
Desi	$435.01^{c} \pm 0.12$	$482.21^{c} \pm 0.57$	$547.92^{c} \pm 0.48$	$576.96^{c} \pm 0.49$
Vanaraja	$812.86^{b} \pm 0.74$	$922.98^{b} \pm 0.68$	$999.47^{b} \pm 0.70$	$1048.48^{b} \pm 0.61$
RIR	$901.94^{a} \pm 0.36$	$1026.24^{a} \pm 0.50$	$1090.76^{a} \pm 0.47$	$1271.31^{a} \pm 0.68$

Table 6. Mean ± SE of body weight (g) of female at laying (15—21 weeks).

Strain	Weeks 15	16	17	18	19	20	21
Desi	621.01^{c}±0.35	718.64^{c}±0.62	799.53^{c}±0.38	865.39^{c}±0.81	932.76^{c}±0.74	1012.40^{c}±0.59	1119.21^{c}±0.83
Vanaraja	1103.50^{b}±0.45	1190.50^{b}±0.58	1236.11^{b}±0.82	1314.78^{b}±0.34	1404.45^{b}±0.72	1490.65^{b}±0.49	1561.94^{b}±0.22
RIR	1333.24^{a}±1.01	1391.48^{a}±0.55	1442.05^{a}±0.73	1554.34^{a}±0.64	1650.30^{a}±0.54	1689.58^{a}±0.68	1762.59^{a}±1.19

and 1561.94 ± 0.22 g respectively) gained the intermediate body weight. The statistical analysis confirmed that there were significant differences (P<0.05) between male and female of three strains of chicken.

The difference in growth performance of three strains of male and female might be due to genetic variation of breed, adaptability in microclimate and cage system of rearing.

Body Weight Gain

The mean body weights gained up to 21 weeks of age for male and female of Desi, Vanaraja and RIR chicken are presented in Tables 7 and 8 respectively.

Body Weight Gain at Brooding (0—6 Wks). The mean body weight gain up to 6 weeks of age for both male and female of RIR (601.34 ± 0.90 g and 404.10 ± 0.84 g respectively) was higher than that of Vanaraja (596.65 ± 0.98 g and 497.10 ± 0.62 g respectively) and Desi (187.75 ± 0.69 g and 158.81 ± 0.70 g respectively). The statistical analysis indicated that there were significant (P<0.05) differences between male and female of three strains of chicken.

Body Weight Gain at Growing (7—14 Wks). At the end of 14 weeks of age, the mean body weight gain of male and female of RIR was highest (763.45 ± 0.09 and 158.81 ± 0.70 g respectively) followed by Vanaraja (630.06 ± 0.64 g and 459.35 ± 1.05 g respectively) and Desi (533.18 ± 0.98 g and 375.12 ± 0.59 g respectively). The statistical analysis indicated that there were significant (P<0.05) differences between male and female of three strains of chicken.

Body Weight Gain at Onset of Laying for Female and Slaughtering of Male (15—21 Wks). At the end of 21 week of age, the mean body weight gain of male of RIR was higher (705.05 ± 1.76 g) than that of Vanaraja (561.81 ± 1.96 g) and Desi (539.10 ± 1.47 g). In female bird of three strain up to 21 weeks the body weight gain was highest in Desi (498.20 ± 0.52 g) followed by Vanaraja (458.44 ± 0.23 g) and RIR (429.35 ± 0.32 g). The statistically there were significant (P<0.05) differences between male and the female of three strains of chicken.

0—21 Week. The mean body weight gain up to 0—21 weeks of age for both male and female of RIR (2235.32 ± 2.51 g and 1727.16 ± 1.27 g respectively) was higher than that of Vanaraja (1983.80 ± 2.01 g and 1525.62 ± 0.21 g respectively) and Desi (1389.13 ± 2.33 g and 1090.08 ± 0.94 g respectively). The statistical analysis indicated that there were significant (P<0.05) differences between male and female of three strains of Chicken. The difference in body weight gain might be due to genetic difference of breed.

Feed Conversion Efficiency

Table 7. Mean ± SE of body weight (g) gain of male. Mean value bearing different superscripts varies significantly (P<0.05). n = 3.

Strain	Weeks 0—6	7—14	15—21	0—21
Desi	187.75^{c} ± 0.69	533.18^{c} ± 0.98	539.10^{c} ± 1.47	1389.13^{c} ± 2.33
Vanaraja	596.65^{b} ± 0.98	630.06^{b} ± 0.64	561.81^{b} ± 1.96	1983.80^{b} ± 2.01
RIR	601.34^{a} ± 0.90	763.45^{a} ± 0.099	705.05^{a} ± 1.76	2235.32^{a} ± 2.51

Table 8. Mean ± SE of body weight (g) gain of female. Mean value bearing different superscripts varies significantly ($P<0.05$). n = 3.

Strain	Weeks 0—6	7—14	15—21	0—21
Desi	$158.81^{c} \pm 0.70$	$375.12^{c} \pm 0.59$	$498.20^{a} \pm 0.52$	$1090.08^{c} \pm 0.94$
Vanaraja	$497.80^{a} \pm 0.62$	$459.35^{b} \pm 1.05$	$458.44^{b} \pm 0.23$	$1525.62^{b} \pm 0.21$
RIR	$404.10^{b} \pm 0.84$	$750.31^{a} \pm 0.38$	$429.35^{c} \pm 0.32$	$1727.16^{a} \pm 1.27$

The feed conversion ratio at 21 weeks of age of Desi, RIR and Vanaraja is presented in Table 9.

At the end of 21 week, the mean feed conversion ratio of male of Desi, Vanaraja and RIR was 3.65 ± 0.08, 3.35 ± 0.05 and 2.90 ± 0.0 respectively. The mean feed conversion ratio of female of Desi, Vanaraja and RIR was 4.74 ± 0.06, 4.44 ± 0.04 and 3.74 ± 0.06 respectively. The statistical analysis confirmed that there were significant differences ($P<0.05$) between the male and female.

Normally feed consumption is considered a heritable characteristic ; however, in the present study, a probable explanation for more feed consumption in Desi birds might be due to their activeness, where a large portion of feed might have been consumed in their physical activities than that of Vanaraja and RIR.

Conclusion

In can be concluded that among the three strains of poultry (RIR, Vanaraja and Desi), with regard to body weight, body weight gain, RIR gave better result than those of Vanaraja and Desi in intensive management. It might be due to different genetic potentialities of different strain. Vanaraja is not giving better result than RIR in intensive system of management. It might be due to the reason that Vanaraja is mainly a dual purpose backyard breed (7, 8). Thus the intensive system of management in California cage might be given stress to the bird. Performance of Desi (non-descript) is lowest due to the lower genetic potentialities.

Table 9. Mean ± SE of FCR of male and female. Mean value bearing different superscripts varies significantly ($P < 0.05$). n = 3.

Strain	Male (0—21 weeks)	Female (0—21weeks)
Desi	$3.65^{a} \pm 0.08$	$4.74^{a} \pm 0.06$
Vanaraja	$3.35^{b} \pm 0.05$	$4.44^{b} \pm 0.04$
RIR	$2.90^{c} \pm 0.05$	$3.74^{c} \pm 0.06$

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