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Comparison of Rajasri birds with indigenous birds in performance and haemo biochemical parameters under scavenging system during summer season

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ABSTRACT

Performance and haemo-biochemical parameters of Rajasri and indigenous birds of northern region of Telangana state were studied under scavenging system of rearing. The overall mean body weight was significantly higher in Rajasri birds than indigenous birds from 6th to 52nd weeks of age. The mean age at sexual maturity was recorded as 172 days in case of Rajasri birds and in 219 days in indigenous chicken. The mean egg production and egg weights of Rajasri bird from 32 to 52 weeks of age were significantly higher than indigenous birds. There was significantly higher fertility and hatchability percent noticed in indigenous fowl compared to Rajasri birds. There was no significant difference noticed in total protein, SGOT, SGPT, bilirubin, calcium, phosphorus and blood glucose; however, there was significant difference in haemoglobin, PCV, MCH, MCHC and serum cholesterol at 21st week of age.

Key words: Calcium, Egg production, Fertility, Haemoglobin, Hatchability, Rajasri

Raising of local poultry breeds in backyard is an important source of livelihood for the rural people of Telangana region. However, the problems of low weight gain, less number of eggs per bird and high mortality of chicks of indigenous birds are some of the hindrances, which need to be overcome through introduction of improved varieties of birds with better performance levels. Haemato-biochemical parameters are important for diagnosis and treatment of diseases and for measuring the environmental stress in chickens (Panigrahy *et al*. 2017). The present study was undertaken to determine the comparison of Rajasri birds with indigenous birds on the performance, haematological and serum parameters under scavenging system during summer season.

MATERIALS AND METHODS

A total of 1000 one day old chicks were reared under deep litter system at Livestock Farm Complex, College of Veterinary Science, Korutla, up to the age of 6 weeks on balanced diet and were vaccinated as per the recommended protocol. At the end of 6th week, a total of 1000 birds were distributed to 50 identified beneficiaries from BPL families of rural areas of northern region of Telangana state free of cost under Rashtriya Krishi Vikas Yojana (RKVY) of Government of India (GoI) in 2014–2016. Each distributed unit of birds comprised ten males and ten females (20 birds in each unit). The farmers were selected randomly provided he had a minimum of 10 indigenous chickens of different age groups under backyard system. Thus a total of 520 indigenous chickens of different ages were covered under the present study. The data on body weights, age at first egg, egg weight, egg production, fertility and hatchability were recorded. Blood samples were collected on 21st week of age for estimation of haematological and biochemical parameters by using auto hematology analyzer (BC–2800, Mindray) and standard diagnostic kits of Erba Pvt. Ltd. The statistical analysis was done using SPSS 20.0 version.

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RESULTS AND DISCUSSION

Body weight: The mean body weights at 6, 12, 18, 25, 40 and 52 weeks of age are presented in the Table 1. The body weights of Rajasri birds were significantly (P≤0.05) higher than the corresponding body weights of indigenous chicken, which might be due to utilization of exotic germplasm (RIR, WLH and Dalhum red) for the development of Rajasri bird. Similarly, Vijaya *et al*. (2017) and Islam *et al*. (2014) also reported almost similar body weight of indigenous chicken under backyard system. Similar results were also reported by Niranjan *et al*. (2008), Ramana *et al*. (2010) and Islam *et al*. (2014). The mean age at sexual maturity was recorded as 172 days in case of Rajasri birds and 219 days in indigenous chicken. Dilip *et al*. (2013) reported that age at sexual maturity in Rajasri birds was lower than Aseel and Kadaknath birds. Bhattacharya *et al*. (2005) observed ASM (179 days) in Vanaraja birds. There was also a significant (P≤0.05) difference of body weight at sexual maturity between Rajasri birds and indigenous fowl, which might be due to

Table 1. Comparative productive performance of Rajasri birds and indigenous fowl under scavenging system

Body weight (g)	Rajasri bird	Indigenous fowl	*P* – value
6 week of age	256.99±2.50[a]	166.48±3.56[b]	0.001
8 weeks	302.95±1.70[a]	204.17±2.80[b]	0.001
10 weeks	403.24±1.96[a]	285.90±4.51[b]	0.001
12 weeks	455.70±3.26[a]	369.20±3.23[b]	0.001
14 weeks	521.80±4.86[a]	422.03±4.71[b]	0.001
16 weeks	654.73±2.38[a]	522.73±4.26[b]	0.001
18 weeks	746.80±4.49[a]	628.30±8.62[b]	0.001
20 weeks	971.03±5.57[a]	836.60±6.56[b]	0.001
25 weeks	1238.00±9.71[a]	910.70±10.48[b]	0.001
40 weeks	1398.00±25.01[a]	1218.40±6.42[b]	0.001
52 weeks	1517.90±18.70[a]	1315.90±10.50[b]	0.001
Age at sexual maturity (days)	172±2.33[a]	219±3.17[b]	0.001
Body weight at sexual maturity	1239.90±10.26 [a]	938.90±5.63 [b]	0.001

Values bearing different superscripts in a column differ significantly (P<0.05).

the genetic difference between two groups of birds. Gaining of low body weight at sexual maturity is a positive sign for getting more eggs. Similar results were also reported by Bhatt *et al.* (2007).

Egg production and egg weight: The mean egg production and egg weight are presented in Table 2. The mean egg production differed significantly (P£0.05) between two genetic groups, which might be due to different genetic makeup of two groups. These results were on par with Singh *et al.* (2007), in CARI-Nirbhik under village conditions (163 eggs/annum). Similar results were reported by Bhattacharya *et al.* (2005), Jha and Prasad (2013). There

Table 2. Reproductive performance of Rajasri and indigenous fowl under scavenging system

Trait	Rajasri bird	Indigenous fowl	*P* – value
Egg production (nos.) up to			
32nd week	41.30±0.56[a]	20.20±0.88[b]	0.001
42nd week	49.80±0.63[a]	26.40±0.67[b]	0.001
52nd week	55.60±0.65[a]	30.80±0.71[b]	0.001
Egg weight (g) at			
40th week	46.01±0.52[a]	35.45±0.46[b]	0.001
45th week	47.70±0.40[a]	38.65±0.45[b]	0.001
50th week	51.44±0.46[a]	41.61±0.57[b]	0.001
55th week	51.71±0.65[a]	41.93±0.32[b]	0.001
60th week	52.94±0.97[a]	43.14±0.65[b]	0.001
Fertility (%)			
45th week	89.57±0.76[b]	91.80±0.47[a]	0.022
50th week	92.30±0.53	93.76±0.67	0.105
55th week	90.36±0.51[b]	93.16±0.44[a]	0.001
Hatchability on TES (%)			
45th week	83.08±0.82[b]	86.45±0.57[a]	0.003
50th week	87.17±0.52[b]	90.64±0.31[a]	0.001
55th week	84.60±0.64[b]	90.10±0.75[a]	0.001

Values bearing different superscripts in a column differ significantly (P<0.05).

was significant (P£0.05) difference between the values of egg weight at different ages. The lower values might be due to poor genetic potential in indigenous chicken of Telangana. Kalita *et al.* (2011) also recorded the average weight of egg as 35.2 g in case of indigenous chicken. Further, the present findings of Rajasri birds are comparable with the findings of NagarajaKumari and Subrahmanyeswari (2014), who reported that the average egg weight of 55 g under traditional rearing system in Andra Pradesh. Similar results were reported by Islam *et al.* (2014).

Mortality: Both Rajasri and indigenous fowl were found to be less prone to environmental stress and easily escapes from predators in the present study. The average mortality of the birds was 4 to 6%. Similarly, Bhat *et al*. (2007) reported 3–5% mortality under field conditions. Orientation of the farmers regarding vaccination schedule, disease control and follow up by technical team might also one of the reasons for reduced mortality.

Fertility and hatchability: The fertility of Rajasri birds and indigenous chicken under backyard system of rearing were 89.57% and 91.80%, respectively. There was significantly (P<0.05) higher fertility percent noticed in indigenous fowl compared to Rajasri birds. The higher and almost similar percent of fertility in both the cases might be due to proper maintenance of male-female ratio and abundance of natural feed in their surroundings. Similarly, Kumar *et al.* (2005) reported lower fertility (71.13%) in Vanaraja birds under traditional system of rearing. The chicks were hatched out by indigenous broody hen in both the cases. The hatchability percent was recorded as 84.60% in Rajasri birds, whereas in case of Indigenous it was 90.10% on total egg set basis. The higher hatchability in the indigenous might be due to appropriate number of eggs set per broody hen. Similar results were also reported by Kalita *et al.* (2012a) and Kumar *et al.* (2005).

Haemato-biochemical parameters: The haematological parameters of Rajasri bird and indigenous fowl during summer are presented in Table 3. There was no significant difference noticed in the haematological parameters like WBC, RBC, MCV, PLT, MPV, PCT, total protein, SGOT, SGPT, bilirubin, calcium, phosphorus and blood glucose at 21st weeks of age; however, there were significantly (P<0.05) higher values of haemoglobin, PCV, MCH and MCHC in indigenous fowl than Rajasri birds. In a study on comparative haematology of different species of poultry by Pandian *et al*. (2012), highest haemoglobin and PCV was reported in Aseel. Higher haemoglobin level in indigenous fowl may be due to the fact that they are more active than the domestic chicken. Highest PCV value in indigenous fowl may be due to the flight activity over Rajasri birds. In dehydration, the MCHC value was increased due to heamo-concentration (Olayemi and Arowolo 2009). The serum cholesterol levels were significantly (P<0.05) higher in Rajasri than indigenous birds. These overall values were in agreement with the findings of Panigrahy *et al.* (2017).

It can be concluded that performance of Rajasri chicken

Table 3. Comparative haematology of Rajasri birds and indigenous fowl during 21st week under scavenging system

Parameter	Rajasri bird	Indigenous fowl	*P* – value
WBC (10^3/µl)	27.68±1.89	27.57±2.08	0.704
RBC (10^6/µl)	3.19±0.09	2.88±0.13	0.085
Hb (g/dl)	12.03±0.33[b]	13.53±0.40[a]	0.030
PCV (%)	40.47±2.05[b]	45.18±1.16[a]	0.048
MCV (fl)	142.82±2.47	142.10±1.49	0.809
MCH (pg)	39.63±0.61[b]	42.23±0.86[a]	0.034
MCHC (g/dl)	27.78±0.15[b]	29.73±0.46[a]	0.003
PLT (10^3/µl)	64.80±3.46	69.17±5.29	0.391
MPV (fl)	6.85±0.20	6.62±0.17	0.403
PCT (%)	0.04±0.00	0.04±0.00	0.191

Values bearing different superscripts in a column differ significantly (P<0.05).

Table 4. Comparative biochemical parameters of Rajasri bird and indigenous fowl during 21st week under scavenging system

Parameter	Rajasri bird	Indigenous fowl	*P* – value
Total protein (g/dl)	3.14±0.14	3.10±0.08	0.833
Serum cholesterol (mg/dl)	65.12±2.97[b]	63.36±3.06[a]	0.020
Serum bilurubin (mg/dl)	20.24±1.18	19.56±0.63	0.628
SGOT (mg/dl)	217.90±16.26	202.36±20.85	0.570
SGPT (mg/dl)	11.29±6.71	4.88±0.53	0.363
Serum calcium (mg/dl)	7.76±0.39	7.66±0.45	0.743
Serum phosphorous (mg/dl)	4.55±0.57	4.55±0.69	0.912
Blood glucose (mg/dl)	196±14.27	198±15.09	0.939

Values bearing different superscripts in a column differ significantly (P<0.05).

is better than indigenous bird in terms of body weight, egg production, egg weight as well as for other traits under backyard system of rearing in Telangana state. The haemato-biochemical values were almost on par with each other. So, farmers from rural areas of Telangana state can rear Rajasri birds for their livelihood and nutritional security.

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