JWPR
Journal of World's Poultry Research

J. World's Poult. Res. 4(1): 01-04, March 25, 2014

Original Article

Performance of Vanaraja Birds under Different Climatic Parameters

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Received: Aug 30, 2013
Accepted: Dec 25, 2013

ABSTRACT

Present study was conducted to study the effect of some climatic parameters on the performance of Vanaraja birds reared under intensive and backyard systems. Performance of Vanaraja (dual purpose) birds under the environmental conditions such as temperature, relative humidity and Temperature Humidity Index (THI) was studied in summer in Jammu region of Jammu and Kashmir. 120 birds were equally distributed and reared for eight weeks in two groups: intensive (inside shed) and semi intensive (outside shed). Each group was having four replicates of 15 birds each. Based upon average daily dry and wet bulb temperatures, THI values for outside and inside the shed were calculated. The overall average temperature, relative humidity, THI, mortalities, water intake, weight gain, feed consumption, and feed conversion ratio by the birds in intensive (inside shed) and semi intensive (outside shed) systems up to eight weeks of age were; 37.02 and 37.63 ^{o}C, 62.18 and 66.61 %, 84.5 and 83.85, 2.4 and 1.7, 1300.3$\pm$6.77 and 1055.92$\pm$ 7.32 ml, 173.27 ± 6.78 and 170.84 ± 5.21 g, 398.02 ± 5.66 and 327.90 ± 7.11 g, 2.24$\pm$ 0.112.0 and 2 ± 0.12 respectively. THI values for outside and inside the shed suggested that the birds were in stress during the experiment. It was concluded that during the extremes of temperature and relative humidity the performance of the Vanaraja birds was less.

Key words: Vanaraja, Intensive, Performance, Climatic Parameters.

INTRODUCTION

Improvement in poultry performance started from 1950s together with selection of genetically superior birds and improvement in ambient factors such as feeding and housing, which resulted in decrease slaughtering age to 42 days and increase body weight to 2 kg (Havenstien et al., 1994; Leterrier et al., 1998). In poultry production genotype and environment are two main factors that affect output. Loss in output might be due to genotype, ambient factors, management and climate (Cahaner and Leenstra, 1992). High environmental temperatures during summer months significantly reduce feed intake and causes slower growth rates of poultry (Bonnet et al., 1997).

For many years, researchers have been investigating the effect of high environmental temperature on the performance of poultry and have found deleterious effects on productive performance (Mashsly et al., 2004). Heat stress depresses body weight and is generally accompanied by suppression of feed intake leading to decline in production. In addition chronic heat exposure significantly decreased protein (Lardier *et al*., 1993) and other feed ingredients (Bonnet *et al*., 1997) digestibility.

Vanaraja is an example of superior stock (developed by the Project Directorate on Poultry, ICAR, Hyderabad for backyard farming in rural and tribal areas of India) a choice dual purpose coloured bird which have significantly contributed to the overall economy of the rural people in terms of eggs and meat (Bhattacharya et al., 2005).

Studies available with regard to performance of Vanaraja birds under different climatic parameters are less and therefore present study was conducted to see the effects of climatic parameters on Vanaraja birds reared under intensive and backyard systems.

MATERIALS AND METHODS

The Vanaraja chicks were procured from Government Poultry Breeding Farm (Jammu) and the experiment was conducted in summer (May) at the poultry farm of LPM Division of Faculty of Veterinary Sciences and Animal Science Jammu for a time period of

eight weeks where in the 120 birds were equally distributed in to two groups (four replicates in each group having 15 birds in each replicate). In the intensive group birds were reared on deep litter system within the poultry house and in the second group birds were reared in the backyard (fenced area in front of poultry shed was divided into 4 partitions and in each partition 15 birds were kept with 2 drinkers and one each dry and wet bulb thermometers) outside the poultry house. Standard feeding and drinking space was provided to the birds in two groups. The chicks in the semi intensive system were allowed to scavenge during the day time from 6.00 am to 7.00 p.m. and shelter was provided during night. Temperature Humidity Index (THI) stress indicator values were calculated based on the dry and wet bulb temperatures recorded daily by using the following equation (Mc Dowell, 1972).

THI = 0.72 (Dry bulb temp. ^{0}C + Wet bulb temp. ^{0}C) + 40.6

Chicks were vaccinated against Ranikhet (New Castle) disease (F1 strain at 6 day of age) and Infectious Bursal Disease (B_2K strain 15-16 days of age). Commercial standard poultry feed was offered to the birds (pre starter up to 15 days, starter 16-30 days and finisher 31-56 days) was fed to chicks.

Data recorders were settled in to middle of each pen (replicate) both inside and outside shed with at least 1.5 meters height from the floor. Feed consumption, weight gain, mortality, feed conversion ratio (FCR) was weekly calculated.

Table 1. The proximate analysis of feed (During 42 days in Vanaraja birds)

Proximate Principals	Pre Starter	Starter	Finisher
Crude Protein (%)	22.87	21.9	20.88
Metabolizable Energy (Kcal/Kg feed)	27950	2900	2998
Ether Extract (%)	4	4	4
Calcium (%)	1.0	1.0	1.0
Phosphorus (%)	0.5	0.5	0.5
Total ash (%)	6.7	8.76	9.1

Statistical analysis

The overall means of different parameters were compared using conventional statistical procedure. The data was analyzed using one way analysis of variance (ANOVA) and the level of significance was set at $P<0.05$. All the statistical procedures were performed based up on Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

The results of different climatic parameters like temperature, relative humidity and THI and performance parameters like weight gain, feed consumption, Feed Conversion Ratio (FCR) and mortalities are presented in Table 2 and Table 3 respectively for inside and outside poultry shed. As the THI values were higher than 80 during the trail indicated that the birds were in stress. The highest THI values were recorded for the 6th week (89 within shed and 86 outside shed).

Table 2. Climatic parameters and performance for intensive system in Vanaraja birds during 42 days

Age (weeks)	Temperature (^{o}C)	Relative Humidity (%)	Temperature Humidity Index	Mortality (No)	Water Intake (ml)	Average Weight Gain (g)	Average Feed Consumption (g)	Feed Conversion Ratio (%)
2nd	37.89	47.14	81	2	645.97 ± 4.06	106.82 ± 7.11	184.42 ± 4.51	1.72 ± 0.05
3rd	37.00	59.20	83	3	723.77 ± 6.96	134.62 ± 3.99	280.34 ± 7.80	2.08 ± 0.13
4th	38.70	56.85	84	1	1101.07 ± 4.10	160.08 ± 2.69	345.67 ± 9.10	2.16 ± 0.13
5th	37.10	46.71	83	3	1469.54 ± 3.62	183.12 ± 5.77	377.64 ± 8.02	2.06 ± 0.07
6th	39.40	81.57	89	7	1660.15 ± 6.32	181.53 ± 4.03	445.67 ± 5.03	2.45 ± 0.24
7th	32.10	67.42	88	1	1680.07 ± 7.77	192.64 ± 6.32	553.27 ± 4.05	2.87 ± 0.10
8th	37.01	76.42	84	0	1821.5 ± 10.01	254.09 ± 7.11	599.10 ± 7.35	2.35 ± 0.01
Overall Average	37.02	62.18	84.5	2.4	1300.3±6.77	173.27 ± 6.78	398.02± 5.66	2.24± 0.11

Table 3. Climatic parameters and performance for semi intensive (backyard) system during 42 days in Vanaraja birds

Age (weeks)	Temperature (^{o}C)	Relative Humidity (%)	Temperature Humidity Index	Mortality (No)	Water Intake (ml)	Average Weight Gain (g)	Average Feed Consumption (g)	Feed Conversion Ratio (%)
2nd	38.11	59.20	82	3	658.07 ± 6.25	98.44 ± 5.04	186.20 ± 7.11	1.89 ± 0.08
3rd	37.61	56.85	84	1	680.00 ± 7.22	135.93 ± 6.10	294.50 ± 6.98	2.17 ± 0.08
4th	39.00	46.71	84	1	876.21 ± 6.53	117.65 ± 8.22	300.03± 9.01	2.55 ± 0.03
5th	38.35	51.57	82	2	1145.08 ± 4.50	161.65 ± 6.01	330.11± 5.11	2.04 ± 0.01
6th	40.14	87.42	86	4	902.10 ± 9.21	166.85 ± 7.68	367.97 ± 3.09	2.38 ± 0.02
7th	32.64	86.42	85	1	1510.0 ± 8.55	245.43 ± 5.01	404.25± 5.27	1.64 ± 0.04
8th	37.60	78.14	84	0	1620.0± 10.02	269.95 ± 6.45	412.25 ± 9.09	1.52 ± 0.10
Overall average	37.63	66.61	83.85	1.71	1055.92± 7.32	170.84 ± 5.21	327.90± 7.11	2.02± 0.12

So the performance of birds for the 6th week within in the shed in terms of weight gain (181.53 g), feed consumption (445.67 g) and FCR (2.45) was comparatively less when compared to other weeks when the THI values were less. Similarly the performance of birds in terms of weight gain (166.85) and feed consumption (367.97) was less. It was suggested that the birds performed comparatively less during periods when THI values were high during the trail (Kamran, et al., 2008, Sivakumar et al., 2002, Barott, et al., 2006 and Ramirez et al 2005). Scott and Balnave, 1988 observed a less weight gain in birds due to more heat stress.

Highest number of mortalities (7 within shed and 4 outside shed) was recorded during the 6th week due to more heat stress to the birds as THI values were highest. Relationship between the temperature and relative humidity inside and outside poultry house and the number of mortalities was found statistically significant ($P<0.05$).

It was observed that water consumption and feed intake of birds in the three treatment groups increased linearly with the age of the birds (Savory., 1978 and Brake et al., 1992) but during the extremes of temperatures there was reduction in feed intake. Reduction in feed intake during high temperatures is in order to decrease metabolic heat generation (Abu-Dieyeh, 2006).

There was significantly more water intake by the birds reared in inside the shed as compared to those reared outside. This might be due to the birds in semi intensive system were allowed to scavenge on more succulent feed like foliage, worms, insects etc. and rested under tree shade during hot hours of the day.

The overall performance of the Vanaraja birds was more in outside shed than (semi intensive system) as these birds are more suited for semi intensive system**.** Better performance of birds in semi intensive system (outside shed) may be attributed to the more suitability of birds to semi intensive system (backyard) in this part of Jammu and Kashmir.

CONCLUSION

Vanaraja birds perform better in semi intensive (backyard system), however in order to improve their performance within the shed (intensive system) particularly in summers there is need to establish appropriate housing management to minimize the direct effect of different climatic factors like temperature, relative humidity and THI on the birds.

Acknowledgements

The authors are thankful to authorities of Govt. Poultry Farm, Department of Animal Husbandry, Jammu for providing the Vanaraja chicks at proper time.

REFERENCES

Abu-Dieyeh ZHM (2006). Effect of high temperature on growth performance of broilers. International Journal of Poultry Science, 5(1): 19-21. http://www.pjbs.org/ijps/fin489.pdf.

Barott HG and Pringle Emma M (2006). Effect of environment on growth and feed and water consumption of chickens. Journal of Nutrition, pp: 25-30.

Bhattacharya M, Buragohain R, Ahmed FA, Pathak PK and Ghosh MK (2005). Laying performance of *Vanaraja* birds in high altitude areas of Arunachal Pradesh under backyard system of rearing. Poultryvet.com.

Bonnet SP, PA Grearaert, M Lessire, B Carre and S Gullaumin (1997). Effect of high ambient temperature on feed digestibility in broiler. Poultry Science, 76; 857-863. PMID: 9181619

Brake JD, Chambler TN, Schultz CD, Peebles and ED Thaxton JP (1992). Daily feed and water consumption of broiler chicks from 0-21 days of age. Journal of Applied Poultry Research, 1: 160-163.

Cahaner A and F Leenstra (1992). Effects of high temperature on growth and efficiency of male and female broilers from lines selected for high weight gain, favourable feed conversion and high or low fat content. Poultry Science, 71: 1237-1250. PMID: 1523174.

Havenstein GB, PR Ferket, SE Scheduler and BT Larson (1994). Growth, livability and feed conversion of 1991 vs. 1957 broilers when fed typical 1957 and 1991 broiler diets. Poultry Science, 70: 1785-1794, PMID: 7877934

Kamran Z, Nisa M, Nadeem MA, Mahmood S, Babar ME and Ahmed S (2008). Effect of low protein diets having constant energy-to-protein ratio on performance and carcass characteristics of Broiler chickens from one to thirty five days of age. Poultry Science, 87: 468-474.

Larbie ZM, AM Chagneau and PA Geraert (1993). Influence of ambient temperature on true digestibility of protein and amino acids of rape seed and soya bean meals in broilers. Poultry Science, 72: 289-295. http://www.psa.uiuc.edu.

Leterrier CN, Rose P, Constantin and Y Nys (1998). Reducing growth rate of broiler chicken with a low energy diet does not improve cortical bone quality. British Poultry Science, 39: 24-30. DOI: 10.1080/00071669889349.

Mashsly MM, MA Kalama, GL Hendricks and AE Gehad (2004). Effect of heat stress on production parameters and immune responses of commercial laying hens. Poultry Science, 83: 889-894. http:/ps.fass.org/cgi/reprint/83/6/889.pdf.

McDowell RE (1972). Improvement of Livestock production in warm climate. pp. 51-53. WH Freeman and co., San Francisco.

Ramirez R, Oliverous Y, Figueroa R and Trujillo V (2005). Evaluation of some productive parameters in controlled environmental conditions and conventional system in a commercial farm broiler. Revista Ciemtica Facultad de Ciencias Veterinarias, Universidad del Zulia, 15(1): 49-56.

Savory CJ, DGM Wood-Gush and IJH Duncan (1978). Applied Animal Ethology, 4: 13-27.

Scott TA and D Balnave (1988). Comparision between concentrated complete diets and self selection for feeding sexually maturing pullets at hot and cold temperatures. British Poultry Science, 29: 613-625. DOI: 10. 1080/00071668808417088.

Sivakumar K, Muralidaran MR, Viswanathan K and Radhakrishnan K (2002). Microclimate and production performance of commercial layers under different roof types and rearing systems. Indian Journal of Animals Science, 37(3): 258-263.

Snedecor GW and Cochran GW (1994). Statistical methods 878 end. The lown state university Press, lowa, U.S.A.