



*Original Research*

## Comparative Production Performance of Three Fast Growing Broiler Strains in the Rainy Season of Eastern Uttar Pradesh

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### Abstract

Growth performance of broiler chicks depends on strains as well as season in addition to other management and nutritional factors. An experiment was conducted to determine the comparative production performance of three fast growing broiler strains viz. Hubbard, Vencobb and Vencobb-400 in rainy season of Eastern Uttar Pradesh. Total 450 day-old chicks were divided in three groups of 150 chicks of each strain with three replications of 50 chicks in each. The production performance was analyzed in terms of feed intake, body weight gain, FCR, mortality percentage and dressing percentage, which were observed three times during the experimental period. Major findings of the experiment showed that there exists a significant difference in production performance of the three broiler strains during rainy season. Production performance in terms of feed intake, body weight gain, FCR, mortality percentage and dressing percentage were significantly different among the strains at each stage of experimental age. It was concluded that the production performance of Vencobb-400 was better than the other two strains during rainy season of Eastern Uttar Pradesh.

**Key words:** Feed Intake, Body Weight Gain, FCR, Rainy Season, Hubbard, Vencobb and Vencobb-400 Poultry Strains

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### Introduction

India ranks sixth in the world poultry market. Domestic poultry industry is the fastest growing segment with a compound growth rate of 18%. Poultry meat being the most popular in India, it has been receiving significant boost through investment Poultry India (2017) and it has become a popular and promising agribusiness. In a short period, in the livestock sector poultry is the most efficient enterprise for increasing the supply of proteins, fats, minerals and vitamins Vetrvel and Chandrakumarmangalam (2013). Poultry





meat is an important source of high quality proteins, minerals and vitamins to balance the human diet. Share of meat production of poultry was 3045.10 tons in 2016 which was higher than any other livestock Annual Report 2015-16, Ministry of agriculture and farmers welfare (2016). It has become possible because of availability of specially developed breeds of chicken meat (broiler) that has ability of quick growth and high feed conversion efficiency. It has become clear that poultry enterprises are growing day by day and are indispensable component of agriculture and they are substantially important for developing country like India. It has now become a vibrant agribusiness with an annual turnover of Rs 30000 crores (Mehta and Nambiar, 2007). Poultry has been the fastest growing sub-sector; between 1985 and 2005 poultry meat and egg production grew by about 12 and 5 percent per year, compared to an annual growth rate of 1.5 to 2.0 percent for beef, milk and mutton and lamb and it is said that poultry contribute significantly to poverty reduction in India (Pica-Ciamarra and Otte, 2009). It could be said that they are crucial for our economy also. As far as broiler production is concerned, India ranked eighteenth in the world (APEDA, 2016).

Factors like genotype, feeding and management influence the production performance of poultry strains (Rack *et al.*, 2008). Environmental factors such as season, temperatures, humidity were also found to influence the production performance and hence the rearing of poultry strains (Rack *et al.*, 2008; May *et al.*, 1998). Rahman *et al.* (2003) analyzed how rainy, winter and summer seasons affect the performance of two different broiler strains. Therefore, in the present study performance of the three broiler strains viz. Hubbard, Vencobb and Vencobb-400 were analyzed in rainy season in the Eastern Uttar Pradesh state of India.

In this study, feed intake, body weight gain, FCR, mortality and dressing percentage of broiler chicks were observed to compare the performance of different broiler strains in rainy season.

### Materials and Methods

The experiment was carried out at the poultry research centre of Udai Pratap College, Varanasi during the rainy season (August to September) in order to investigate the performance of three broiler strains Hubbard, Vencobb and Vencobb-400. A total of 450 day old chicks of the three strains were equally divided and randomly assigned to three groups of 150 birds each, with three replicates in each group. The number of chicks in each replicate was 50. The chicks were reared from day one to day 42 and provided by identical care and management including feeding throughout the experiment. Data were taken on feed intake, live weight, body weight gain, FCR and mortality and analyzed for the period when the broiler was 14, 28 and 42 days old. At the end of the experiment, dressing percentage of three broiler strains was also observed.

### Environmental Conditions

During the experimental period of the rainy season the highest and lowest temperature were recorded as 36 °C and 26 °C respectively and highest and lowest relative humidity were recorded as 100% and 61%



respectively. The average temperature and humidity percentage were recorded as 30 °C and 79% respectively.

### Statistical Procedure

The obtained experimental data were statistically analyzed using univariate General Linear Model (GLM) design and two-way analysis of variance (ANOVA) followed by Duncan's New Multiple Range Test (DMRT) using standard statistical procedures Snedecor and Cochran (1989) through SPSS Version 23.00 statistical package program. P-values for strain mean, age mean and mean of the interaction effect of strain and age of the experimental broiler birds were obtained and presented with the data. Significance was declared at  $P < 0.05$  unless otherwise stated.

### Result and Discussion

#### Feed Intake

In the rainy season, the corresponding average feed intakes in the three strains of broiler, Hubbard, Vencobb and Vencobb-400, at the age of 1-14 day were observed as 340.88, 334.70 and 328.53g (as shown in Table 1) the highest feed intake was seen in Hubbard followed by Vencobb and Vencobb-400. At the age of 15-28 day the feed intake were 910.89, 892.67 and 879.40g in Hubbard, Vencobb and Vencobb-400 respectively, showing highest feed intake in Hubbard followed by Vencobb and Vencobb-400.

**Table 1:** Average feed intake (g/chick) and average live weight (g/chick) of broiler strains at different age in rainy season

| Attributes                           | Strain         |                |               | Age Mean<br>±SE           | P Value     |          |
|--------------------------------------|----------------|----------------|---------------|---------------------------|-------------|----------|
|                                      | Hubbard        | Vencobb        | Vencobb-400   |                           | Strain Mean | Age Mean |
| <b>Average Feed Intake (g/chick)</b> |                |                |               |                           |             |          |
| 1-14 Day                             | 340.88         | 334.7          | 328.53        | 334.70±1.97 <sup>a</sup>  | 0.044       | 0.001    |
| 15-28 Day                            | 910.89         | 892.67         | 879.4         | 894.32±4.69 <sup>b</sup>  |             |          |
| 29-42 Day                            | 1781.12        | 1800.33        | 1739.27       | 1705.20±9.58 <sup>c</sup> |             |          |
| Strain mean±SE                       | 1010.96±209.41 | 1009.23±213.54 | 982.40±205.24 |                           |             |          |
| <b>Average Live Weight (g/chick)</b> |                |                |               |                           |             |          |
| 14 <sup>th</sup> Day                 | 343.94         | 345.29         | 347.01        | 345.41±0.84 <sup>a</sup>  | 0.098       | 0.001    |
| 28 <sup>th</sup> Day                 | 976.69         | 979.69         | 980.8         | 979.06±1.04 <sup>b</sup>  |             |          |
| 42 <sup>nd</sup> Day                 | 1655.45        | 1673.77        | 1658.79       | 1662.67±4.40 <sup>c</sup> |             |          |
| Strain mean<br>±SE                   | 992.03±189.34  | 999.58±191.82  | 995.54±189.40 |                           |             |          |

Level of significance was declared at  $P \leq 0.05$ .

At the age of 29-42 day the respective feed intake of Hubbard Vencobb and Vencobb-400 were 1781.12, 1800.33 and 1739.27g, showing highest feed intake in Hubbard followed by Vencobb and Vencobb-400. It has been revealed that in rainy season the difference in the feed intake in the three strains of broilers were

found significant ( $P \leq 0.05$ ) during the age of 1-14, 15-28 and 29-42 day. Findings of Rahman *et al.* (2003) supports the higher feed intake in Hubbard strain.

### Live Weight

The highest average live weight of 347.01g at 14<sup>th</sup> day was seen in Vencobb-400 followed by 345.29g in Vencobb and 343.94g in Hubbard (Table 1). Similarly at 28<sup>th</sup> day the average live weight of Vencobb-400 (980.80 g) was higher than the Vencobb and Hubbard strains (979.69g and 976.69g respectively). At 42<sup>nd</sup> day, the highest average live weight of 1673.77g was found in Vencobb followed by 1658.79g in Vencobb-400 and 1655.45g in Hubbard. The difference in the live weight of the three broiler strains was found significant ( $P \leq 0.05$ ) at 14<sup>th</sup>, 28<sup>th</sup> and 42<sup>nd</sup> day. At 14<sup>th</sup> and 28<sup>th</sup> day, the live weight of the Vencobb-400 was found highest; whereas, at 42<sup>nd</sup> day the live weight was highest in Vencobb. Significant difference in live body weight during week 1 to 5 was also observed by Ipek and Sahan (2006).

### Body Weight Gain

At the age of 1-14 day, the highest body weight gain of 303.37 g was seen in Vencobb-400 followed by 301.70 g in Vencobb and 300.01 g in Hubbard (Table 2). At the age of 15-28 day, the highest body weight gain of 634.40 g was observed in Vencobb followed by 633.79 g in Vencobb-400 and 632.76 g in Hubbard. At the age of 29-42 days, the highest body weight gain of 694.08 g was seen in Vencobb followed by 678.76 g in Hubbard and 677.99 g in Vencobb-400. The means of the body weight gain of the three strains differed significantly ( $P \leq 0.05$ ) during 1-14, 15-28 and 29-42 days of age. Shim *et al* (2012) also reported significant differences in body weight gain between broiler strains at various ages.

### Feed Conversion Ratio (FCR)

At the age of 1-14 day, the FCR values in the Hubbard, Vencobb and Vencobb-400 strains were 1.14, 1.11 and 1.08 respectively (Table 2), the FCR value of Vencobb-400 was found better than the FCR of other two experimental strains. At the age of 15-28 day the corresponding FCR values of Hubbard, Vencobb and Vencobb-400 were observed as 1.44, 1.41 and 1.39. At the age of 29-42 day the respective FCR values of Hubbard, Vencobb and Vencobb-400 were 2.62, 2.59 and 2.57 showing better performance of Vencobb-400 strain than the other two strains in the experiment. The Vencobb-400 strain was found significantly ( $P \leq 0.05$ ) superior to the other two strains in the experiment. Our results collaborate with the results of Younis and Abd El Ghany (2003) that FCR is significantly different in different strains. Abdullah *et al.* (2010) also reported difference in FCR of different strains. Better FCR in Vencobb-400 followed by Vencobb and Hubbard may be attributed to reverse trend in feed intake and body weight gain as observed in the present experiment. This may be due to better dry matter digestibility and nutrient utilization in the Vencobb-400 followed by Vencobb and Hubbard. However, the experiment on digestibility or metabolic

trial was not conducted in the present study and these studies in the future will authenticate the proposed hypotheses for the reverse trend. Subsequently, the overall economics of broiler meat production must have been in the similar order being maximum profitability in Vencobb-400 followed by in Vencobb and Hubbard due to their better growth performances in spite of less feed intake in the former.

**Table 2:** Average body weight gains (g/chick) and feed conversion ratio (FCR) of broiler strains at different age in rainy season

| Attributes   | Strain             |                    |                    | Age Mean $\pm$ SE              | P Value     |          |
|--|--------------------|--------------------|--------------------|--------------------------------|-------------|----------|
|  | Hubbard            | Vencobb            | Vencobb-400        |                                | Strain Mean | Age Mean |
| <b>Average Body weight gain (g/chick)</b>                                  |                    |                    |                    |                                |             |          |
| 1-14 Day   | 300.01             | 301.7              | 303.37             | 301.70 $\pm$ 0.86 <sup>a</sup> | 0.154       | 0.001    |
| 15-28 Day  | 632.76             | 634.4              | 633.79             | 633.65 $\pm$ 1.22 <sup>b</sup> |             |          |
| 29-42 Day  | 678.76             | 694.08             | 677.99             | 683.61 $\pm$ 4.09 <sup>c</sup> |             |          |
| Strain mean $\pm$ SE   | 537.18 $\pm$ 59.67 | 543.39 $\pm$ 61.05 | 538.38 $\pm$ 59.18 |                                |             |          |
| <b>Feed conversion ratio (FCR; g feed intake/ g body weight gain/ day)</b> |                    |                    |                    |                                |             |          |
| 1-14 Day   | 1.14               | 1.11               | 1.08               | 1.11 $\pm$ 0.01 <sup>a</sup>   | 0.048       | 0.001    |
| 15-28 Day  | 1.44               | 1.41               | 1.39               | 1.41 $\pm$ 0.01 <sup>b</sup>   |             |          |
| 29-42 Day  | 2.62               | 2.59               | 2.57               | 2.59 $\pm$ 0.02 <sup>c</sup>   |             |          |
| Strain mean $\pm$ SE   | 1.73 $\pm$ 0.23    | 1.70 $\pm$ 0.23    | 1.68 $\pm$ 0.23    |                                |             |          |

Level of significance was declared at  $P \leq 0.05$ .

### Mortality Percentage

The mortality percentage (Table 3) was highest in Hubbard 3.33% at the age of 1- 14 day followed by Vencobb (2.67%) and Vencobb-400 (2.00%). Least mortality percentage was seen in Vencobb-400 at the age of 1- 14 day. At the age of 15-28 day, mortality was seen only in Vencobb-400 with mortality percentage of 0.67% while there was no mortality in Hubbard and Vencobb. However, no mortality was seen in any broiler strain at the age of 29-42 day. The highest mortality percentage observed in Hubbard at age of 1-14 day may be due to comparatively more susceptibility of this strain to high humidity of weather during the experimental period. The cross with the fastest growth rate also had the highest mortality during rainy season (Shim *et al.*, 2012).

**Table 3:** Mortality percent of three broiler strains in rainy season

| Age                  | Strain          |                 |                 | Age Mean $\pm$ SE            | P Value     |          |
|----------------------|-----------------|-----------------|-----------------|------------------------------|-------------|----------|
|                      | Hubbard         | Vencobb         | Vencobb-400     |                              | Strain Mean | Age Mean |
| 1-14 Day             | 3.33            | 2.67            | 2               | 2.67 $\pm$ 0.33 <sup>b</sup> | 0.781       | 0.001    |
| 15-28 Day            | 0               | 0               | 0.67            | 0.22 $\pm$ 0.22 <sup>a</sup> |             |          |
| 29-42 Day            | 0               | 0.67            | 0               | 0.22 $\pm$ 0.22 <sup>a</sup> |             |          |
| Strain mean $\pm$ SE | 1.11 $\pm$ 0.59 | 1.11 $\pm$ 0.48 | 0.89 $\pm$ 0.35 |                              |             |          |

Level of significance was declared at  $P \leq 0.05$ .

## Dressing Percentage

Dressing percentage was observed at 42<sup>nd</sup> day. Highest dressing percentage of 64.68% was observed in Hubbard followed by 62.58% in Vencobb-400 and 61.20% in Vencobb (Table 4). Although, there was no statistically significant ( $P \geq 0.05$ ) difference was observed in the mean dressing percentage of the three strains, the dressing percentage was Hubbard strain followed by Vencobb-400 and Vencobb strains.

**Table 4:** Dressing percent of three broiler strains in rainy season

| Strain      | Dressing % $\pm$ SE | Average Mean $\pm$ SE | P Value Strain Mean |
|-------------|---------------------|-----------------------|---------------------|
| Hubbard     | 64.68 $\pm$ 2.37    | 62.82 $\pm$ 0.90      | 0.27                |
| Vencobb     | 61.20 $\pm$ 0.62    |                       |                     |
| Vencobb-400 | 62.58 $\pm$ 0.76    |                       |                     |

Level of significance was declared at  $P \leq 0.05$ .

## Conclusion

In rainy season, Vencobb-400 performed better than the other two strains of broilers viz. Hubbard and Vencobb. So, it may be recommended for commercial production in Gangetic plains of Eastern Uttar Pradesh during rainy season.

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