**Original Research Article**

# Performance of Three Way Cross Dual Purpose Bird under Different System of Management

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**A B S T R A C T**

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| **K e y w o r d s**<br><br>Jharsim, Management, Poultry, Three way cross | The present study was conducted on 600 day old DBN chicks to evaluate the performance of Jharsim poultry under different system of management. The average value of day old DBN birds was 31.27 g. Significant effect of body weight (P<0.01) and body weight gain at various stages of growth was observed under different condition of management. The overall average body weight in deep litter system of management was 1547.55 ±8.69 g at 20 weeks of age. The corresponding values for semi-intensive and backyard system were 1462.95 ±3.86 and 1207 ±10.42 g respectively. The average monthly body weight gain was 60560±7.25 at $16^{th}$- $20^{th}$ weeks of age. The corresponding values for semi intensive and backyard system of management were 406.6±5.80 g and 280±4.67 g respectively. The average monthly feed consumption was 524.21 g from 0-4 week and 896 g from $4^{th}$ – $8^{th}$ weeks of age. Feed consumption was observed to significantly higher in deep litter system than Semi-intensive system of management. Significant effect of different carcass traits was observed under different systems of management. |

## Introduction

Poultry production systems in India are characterized by the simultaneous existence of the traditional extensive system of backyard production and the modern intensive system of production. Backyard poultry farming is being practiced in many countries in rural and tribal areas where the basic infrastructure for industrial poultry farming is lacking. Backyard poultry serves as an inexpensive means for households to generate highly nutritious food items at minimal cost (Akhtar *et al.,* 2013). In addition to indigenous fowl, crossbreds produced using exotic breeds are being utilized for backyard poultry farming (Padhi

*et al.,* 2012). Different pure lines are being developed through selection and are being crossed to develop crossbreds for backyard poultry farming (Padhi and Chaterjee, 2012). Uunderstanding the importance of backyard rural poultry farming, recently a new variety Jharsim is developed by three way cross, which have better result in less input including Punjab Broiler-2 ($PB_2$), Desi birds and Dahlem Red. The variety have rapid growth rate, high efficiency of feed utilization. Rapid growth, good body type and superior breast fleshing are more desirable in chickens raised for meat production. In view of the above ideas, the

present investigation has been undertaken to evaluate the performance of Jharsim poultry under different system of management.

## Materials and Methods

The present study was conducted on six hundred (600) day-old chicks of Jharsim bird. The brooding of the chicks was done for two months on standard managemental conditions.

All the chicks were maintained under standard management conditions at Hatchery Unit, Ranchi Veterinary College, kanke, Ranchi up to eight weeks of age (brooding period). After 8th week they were transferred to deep litter, semi-intensive and backyard system of management. Birds of deep litter and semi-intensive system were maintained at All India Coordinate Research project Ranchi and birds of backyard system were maintained at nearby village from the college. -

After two months of brooding period birds were randomly divided into three groups. In each group two hundred (200) birds were kept.

Under deep litter, the birds were kept under standard feeding, healthcare and management practices in open sided house. Under semi-intensive system birds were provided with housing with nests. A wire net camp attached to the house where these chicks can walk freely. The birds which were supplied to the farmers for their evaluation under backyard system were housed only at night. Under backyard system, birds were provided with some amount of supplementary feed in the form of kitchen waste, broken rice or wheat in the morning and allowed to walk to a distance in search of feed and these birds used to come back at dusk.

## Results and Discussion

### Body weight

The effect of different management systems on body weight of DBN birds at o day was observed to be $31.27\pm o.47$ g and at 8th week of age body weight was $571.67\pm6.35$ g under nursery management (Table 1). The findings observed in this study are in close agreement with Sah (1982), Singh (2003) and Singh *et al.,* (1976).

The difference in body weight seems to be inherent in the system of management. The low body weight of cheeks under backyard system may be attributed to proportionately less availability of ample and desirable nutrient from the feeding of balanced supplement as they were maintained on free range grazing in kitchen garden, kitchen waste, fallen grains etc. In semi intensive 50 percent feed supplement relative to their full requirement comparison to the extensive management group fed ad-lib. It may be reasonable to assume that the quantity and quality of nutrients available in semi intensive and backyard being not commensurate with the essential needs of energy and protein for further growth.

### Body weight gain

The body weight gain was found to be 421.9, 643.10, and 605.60g at the time interval 8-12, 12-16 and16–20th week respectively in deep litter system. The corresponding body weight gain was 301.20, 450.20 and 406.6 in semi intensive and 280.00, 320.23 and 280g in backyard system of management during the same time interval. The finding observed in this study are in accordance with Khawaja *et al.,* (2012) and Padhi *et al.,* (2016) who observed higher body weight in deep litter system.

**Table.1** Average body weight (g) of DBN birds during nursery management (0-8 weeks)

| Periods | Body weight (g) |
|---------|-----------------|
| Day-old | 31.27±0.47(600) |
| 4th week | 203.28±4.52(600) |
| 8th week | 571.67±6.35(598) |

**Table.2** Average body weight (g) of Jharsim birds at various ages reared under different management systems

| Periods | | Treatment groups | | | F - value |
|---------|------|--------------------------|---------------------------|----------------------------|-----------|
| | | T₁ (Deep Litter) | T₂ (Semi-Intensive) | T₃ (Backyard) | |
| 12ᵗʰ week | | 886.82±10.58ᵃ (198) | 881.89±6.63ᵇ (196) | 840.86±11.26ᶜ (198) | 6.76** |
| 16ᵗʰ week | | 1321.98±10.08ᵃ (196) | 1213.85±10.08ᵇ (196) | 1030.60±10.69ᶜ (196) | 237** |
| 20ᵗʰ week | Male | 1639.6±12.97ᵃ | 1556.5±9.82ᵇ | 1309.08±6.45c | 130** |
| | Female | 1455.50±7.32ᵃ (194) | 1369.4±4.56ᵇ (194) | 1104.91±7.11ᶜ (194) | 121** |
| | Pooled | 1547.55±8.69ᵃ (194) | 1462.95±3.86ᵇ (194) | 1207±10.42ᶜ (194) | 125.65** |

Figure in parenthesis indicate number of birds.
Different superscript within a row differ significantly (**p<o.o1).

**Table.3** Average body weight gain (g) of DBN birds at various ages during nursery management (0-8 weeks)

| Periods | Body weight gain (g) |
|---------|----------------------|
| 0-4ᵗʰ week | 172.68±4.49 |
| 4-8ᵗʰ week | 369.49±6.48 |

**Table.4** Average weight gain (g) of DBN birds during various periods of growth at under different systems management

| Periods | | Treatment groups | | | F - value |
|---------|--------|------------------|---------------------|-----------------|-----------|
| | | T₁ (Deep Litter) | T₂ (Semi-Intensive) | T₃ (Backyard) | |
| 8-12ᵗʰ week | | 421.9±6.20ᵃ | 301.20±2.19ᵇ | 280±2.72ᶜ | 57.51** |
| 12-16ᵗʰ week | | 643.10±5.88ᵃ | 450.20±6.40ᵇ | 320.23±2.10ᶜ | 5088.31** |
| 16-20ᵗʰ week | Male | 622.60±8.20ᵃ | 416.66±6.28ᵇ | 392±3.52ᶜ | 153.12** |
| | Female | 588.40±9.7ᵃ | 396.40±8.40ᵇ | 234±5.12ᶜ | 213.65** |
| | Pooled | 605.60±7.25ᵃ | 406.6±5.80ᵇ | 280±4.67ᶜ | 167.20** |

Different superscript within a row differ significantly. (**p<0.01).

**Table.5** Weekly feed consumption (g/ bird) of DBN birds at various ages during nursery management (0-8 weeks)

| Periods | Amount (g) |
|---|---|
| 0-4th week | 542.21 |
| 4-8th week | 896 |

**Table.6** Average feed consumption (g/4 week/bird) of DBN birds at different periods reared under different management system

| Period (weeks) | | Treatment groups | | T-test |
|---|---|---|---|---|
| | | $T_1$ (deep litter) | $T_2$ (semi intensive) | |
| 9 – 12th week | | 1181.32 | 647.58 | 91.47** |
| 13 – 16th week | | 1832.55 | 1148.01 | 129.38** |
| 17 – 20th week | Male | 1836.67 | 1291.64 | 78.41** |
| | Female | 1735.18 | 1228.84 | 74.45** |
| | Pooled | 1786.52 | 1260.46 | 76.56** |

**=P< 0.01

**Table.7** Feed Conversion Ratio (FCR) of DBN bird during different periods of growth under different management systems

| Periods | Treatment groups | |
|---|---|---|
| | Nursery management | |
| O-8 weeks | 3.10 | |
| | $T_1$ (deep litter) | $T_2$ (semi intensive) |
| 9-12 weeks | 2.80 | 2.15 |
| 13-16 weeks | 2.85 | 2.55 |
| 17-20 weeks | 2.95 | 3.10 |

**Table.8** Mortality percentage of DBN birds during whole experimental period under different systems of Management

| Parameters | Nursery Management | Treatment Group | | |
|---|---|---|---|---|
| | | $T_1$ (Deep Litter) | $T_2$ (Semi-Intensive) | $T_3$ (Backyard) |
| No. of Birds housed | 600 | 200 | 200 | 200 |
| No. of Birds died | 12 | 08 | 06 | 06 |
| Mortality (%) | 02 | 04 | 03 | 03 |
| Survivability (%) | 98 | 96 | 97 | 97 |
| Overall Mortality | 5.33 | | | |

**Table.9** Average carcass yields of DBN bird raised under different management systems

| Parameters | | Treatment groups | | | F value |
|---|---|---|---|---|---|
| | | T$_1$ (Deep Litter) | T$_2$ (Semi-Intensive) | T$_3$ (Backyard) | F value |
| Live weight | Male | 1979±2.08$^a$ | 1888.33±7.26$^b$ | 1792.33±4.33$^c$ | 344.45** |
| | Female | 1936.33±2.96$^a$ | 1888.33±7.26$^b$ | 1792.33±4.33$^c$ | 344.45** |
| Blood loss (%) | Male | 3.30±0.05$^a$ | 3.00±0.057$^b$ | 2.68±0.01$^c$ | 41.08** |
| | Female | 3.40±0.11$^a$ | 2.89±0.05$^b$ | 2.60±0.02$^c$ | 28.50** |
| Defeathered wt. (%) | Male | 90.10±0.057$^a$ | 88.65±0.23$^b$ | 89.90±0.11$^c$ | 25.55** |
| | Female | 90.91±0.07$^a$ | 89.36±0.24$^b$ | 88.88±0.008$^b$ | 53.40** |
| Breast (%) | Male | 25.20±0.50$^a$ | 26.35±0.07$^b$ | 24.82±0.04$^a$ | 7.26* |
| | Female | 23.06±0.08$^a$ | 21.10±0.58$^b$ | 20.92±0.01$^c$ | 4.47NS |
| Back (%) | Male | 18.81±0.64$^a$ | 19.74±0.005$^b$ | 18.60±0.006$^c$ | 539.28** |
| | Female | 20.73±0.011$^a$ | 20.14±0.006$^b$ | 19.46±0.02$^c$ | 935.77** |
| Giblets (%) | Male | 3.17±0.014$^a$ | 3.28±0.011$^b$ | 3.71±0.005$^c$ | 635.32** |
| | Female | 4.73±0.008$^a$ | 4.51±0.008$^b$ | 5.05±0.028$^c$ | 218.25** |
| Non-edible parts (%) | Male | 25.74±0.01$^a$ | 25.38±0.008$^b$ | 27.27±0.014$^c$ | 697.23** |
| | Female | 34.18±0.015$^a$ | 36.86±0.023$^b$ | 36.48±0.011$^c$ | 6148.79** |
| | Pooled | 29.96±0.015$^a$ | 31.12±0.015$^b$ | 31.87±0.011$^c$ | 4470.84** |
| Dressing % with giblet | Male | 74.19±0.003$^a$ | 76.12±0.011$^b$ | 73.79±0.008$^c$ | 6218.45** |
| | Female | 67.29±0.005$^a$ | 63.79±0.005$^b$ | 66.21±0.008$^c$ | 66744.53** |
| Dressing % without giblet | Male | 71.19±0.008$^a$ | 71.91±0.008$^b$ | 70.21±0.008$^c$ | 9365.47** |
| | Female | 62.83±0.005$^a$ | 58.84±0.005$^b$ | 60.95±0.006$^c$ | 107586.70** |

The body weight gain of birds maintained under deep litter system was observed to be better followed by semi-intensive and backyard system of management at whole of the experimental periods (Table 2). The difference in results might be attributed to difference in feed supplement, management systems and other environmental factors like type of soil, temperature, rainfall etc.

It was observed that systems, weeds as well as interaction of systems with weeds had significant effect on the fortnightly body weight gain. A fixed amount of total dietary protein and essential amino acid is needed to support given rate of gain of body tissue of constant composition. The feed consumption was lower in semi intensive and backyard in comparison to intensive management. This explains why the growth rate of birds of group T$_2$ and T$_3$ with dietary cut off if in semi intensive and backyard system. It also indicated that usable energy content of kitchen wastes, kitchen garden plant protein, grains etc on addition to feed supplement in semi intensive though not isocaloric did not suffice to support full dietary requirement. The protein required per unit of energy in the diet decreases as the animal becomes larger as the hypertrophy of cell is reduced (Nashim *et al.,* 1979).

In backyard system birds monthly body weight gain was lower the average of both deep litter and semi intensive group. This was but natural owing to difference in total nutritive intake of the birds under different set of environment and management. In

intensive management the birds had the advantage of uniform temperature being regulated through control of electricity. The semi intensive and backyard group is recouping from the effect of the above factor.

## Feed consumption

The variation in monthly feed consumption was observed during whole of the experimental period. The different management systems have significant role in daily feed consumption during different stages of growth in poultry. Feed consumption of DBN birds increases accordingly as they grow older. The feed consumption in birds of semi-intensive system was lower due to less feed supplied because they also took meet their feed requirement by grazing and scavenging. This result was similar to the observation of Patel *et al.,* (2014).

## Feed conversion efficiency

The average value of the feed conversion efficiency in Jharsim birds under nursery management was observed to be 3.10 and the same parameter during 8 – 12, 12 – 16 and 16 – 20 week of age were 2.80, 2.85 and 2.95 in deep litter system. The corresponding values for semi intensive systems were 2.15, 2.55 and 3.10 respectively.

These results corroborate with the findings of Prasad (1988)) who reported significantly difference in feed conversion ratio under different management system. The results for the average feed consumption and feed efficiency ratio was indicative of the effect of increase in body size and type of diet since feed intake varies inversely with the concentrations of energy in the diet. The lower feed efficiency is manifested in better

conversion rate than higher one. The conversion efficiency decreased from 16-20 weeks because of rapid increase due to hypertrophy and hyperplasia of cells during this phase of the birds.

## Carcass characteristics

## Carcass yields

Significant effect on different carcass traits like pre- slaughter live weight(g), dressed weight with viscera (g), eviscerated weight(g), giblet weight(g), blood loss percent, back percent, breast percent and dressing percentage of DBN birds in all the systems of management. The present findings are in close agreement with the findings of Menawat *et al.,* (1977) and Singh *et al.,* (1980). Afifi and Rasheed (1966) found that dressing percentage for both Fayoumi and RIR male (61.8%), which is nearly similar to present investigation. However, the values of giblet percent, and non-edible percentage were higher for birds of backyard system than those of birds of deep litter and semi-intensive system of management. Better growth of giblet and non-edible parts under backyard system as compared to deep litter and semi-intensive system of management might be attributed to the free movement of birds under backyard system.

## Survivability

The survivability percentage of DBN birds has been recorded under deep litter, semi-intensive and backyard system of management. The survivability percentages under deep litter, semi-intensive and backyard system of management were 96.00, 97.00 and 97.00 per cent respectively (Table 8). Kumar (1991) and Ramakrishna (1991) also reported comparatively higher viability percentage.

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