***Research Paper***

# Comprehensive characterization of Indian native chicken breeds in Jharkhand: Exploring phenotypic, reproductive and behavioural traits

Reena Kamal [1], P.C. Chandran[2*], Amitava Dey[2], A.K. Mishra[3], Rekha Sharma[3], Rajni Kumari[2] and Anup Das[2]

*[1]ICAR- RCER, Farming System Research Centre for Hill & Plateau Region, Plandu, Ranchi-834010, Jharkhand, India*

*[2]ICAR Research Complex for Eastern Region, Patna-800014, Bihar, India*

*[3]ICAR-National Bureau of Animal Genetics Resources, Karnal-132001, Haryana, India*

## ABSTRACT

The native chicken population from Jharkhand is known for its hardiness and adaptability to the local environment, contributing to high survivability rates. Aseel is a significant native chicken breed of India, primarily found in Chhattisgarh and Andhra Pradesh, renowned for its aggressive fighting abilities, pugnacity, and majestic gait. Considering the importance of native chickens in the Eastern region of India, research work was undertaken to characterize, and conserve Jharkhand native chicken (JNC) and compare them with the Aseel breed based on phenotypic, growth, reproduction, and behaviour traits. The research was conducted in Tamar block of Ranchi district, where the birds were kept under deep litter housing, simulating a backyard environment with night shelters and free-range areas. Aseel chicken exhibited a variety of shades, predominantly red (33.67%), followed by multi-colour (35%) and white (21.33%), while JNC primarily showed red (41.33%) and a combination of white and black (39.33%) colours. Both Aseel and JNC predominantly had yellow shanks, 73.33% and 75%, respectively. Comb-type differences were evident, with Aseel having predominantly pea combs (86.67%) and JNC having mostly single combs (73.33%). Ear lobe colour was uniformly red in Aseel (100%), whereas JNC had a mix of red (81.67%) and white (18.33%) coloured ear lobe. The Aseel breed had significantly ($P < 0.05$) higher body weights at different ages and greater shank lengths at 20 and 40 weeks of age compared to the JNC. The JNC reached sexual maturity earlier and had significantly ($P < 0.05$) higher 40-week egg production (26.29±0.48) compared to Aseel (23.43±0.21). Notably, Aseel showed a greater incidence of feather-pecking behaviour, which was mild or even negligible in JNC. Broodiness at 40 weeks of age was observed to be high in both breeds, with 95.02% in Aseel and 98.09% in JNC. This study highlighted the distinct characteristics of Aseel and JNC, contributing valuable insights for conservation and breeding strategies aimed at enhancing local poultry genetic resources.

**Key words**: Aseel, Behaviour Growth, Jharkhand, Phenotypic, Reproduction

***Corresponding author:** vetchandran@gmail.com

## INTRODUCTION

India is very rich in biodiversity with all animal species and a large variability within species. Still, more than 50% population of poultry in India comprises nondescript / *deshi* birds. Traditionally, native chickens were the mainstay of poultry production in rural and tribal areas in the country (Haunshi and Rajkumar 2020). India is one of the richest poultry genetic resource countries in the world having 19 indigenous breeds, each contributing uniquely to the country's avian diversity. Within the country, the eastern states have a large population of indigenous fowl (>40%). Despite this genetic wealth Eastern India is represented by only five registered native breeds: *Aseel*, *Daothigir, Haringhata Black, Miri and Hansli* among the huge indigenous population. These indigenous chickens are primarily raised in backyard systems, particularly in rural and peri-urban areas of Jharkhand. While these indigenous fowls play a crucial role in subsistence farming, their genetic potential remains underexplored (Emuron *et al.*, 2010).

In India, indigenous breeds have been traditionally raised for their unique traits and adaptability. *Aseel* chickens, known for their robust physique and superior meat quality, are often prized for their resilience and distinctive characteristics. The main breeding tract of *Aseel* includes North Bastar and South Bastar of Chattisgarh and Khammam district of Andhra Pradesh (Pandey *et al.*, 2005). In contrast, Jharkhand chickens, native to the Jharkhand region, are appreciated for their adaptability to local environments and moderate egg production. Despite their historical significance and regional advantages, a comprehensive comparative analysis of these breeds in terms of their traits, performance, and behavior is lacking. This research aims to fill this gap by systematically examining the

physical attributes, production performance, and behavioral tendencies of *Aseel* and JNC. By evaluating these aspects, the study seeks to provide valuable insights for farmers and policymakers to make informed decisions regarding breed selection and management practices in diverse poultry farming systems.

## MATERIALS AND METHODS

The present study was undertaken to characterize and conserve the JNC and compare them with Aseel based on phenotypic, growth, reproduction, and behavioural traits. The study was carried out in the farmer's fields of Tamar block of Ranchi district Jharkhand, India. Tamar is located in the Lower Chotanagpur Plateau of South Chotanagpur division in the eastern part of India positioned between 23.05°N and 85.64°E at a height of 150-300 m above sea level. The region experiences usually a hot and humid tropical climate with maximum temperature ranging from 6°C in winter to 45°C in summer seasons. Ethical considerations such as ensuring humane treatment of the chickens and obtaining informed consent from local stakeholders were included during the study. Apart from this, the birds were also maintained in deep litter housing that simulated a backyard environment, including night shelters and a free-range area. Representative samples of both Aseel and JNC, with a balanced number of males and females, were selected for the study.

*Phenotypic characteristics*: Data on Phenotypic characteristics like plumage colour, comb types, colour of the shank, skin, ear lobe, eyes, etc., were collected on 210 birds (105 Aseel and 105 JNC) at 20 week of age as per the standard proforma developed by the Indian Council of Agricultural Research - National Bureau of Animal Genetic Resources (ICAR-NBAGR).

*Growth performance*: Growth performance was evaluated by measuring body weight at different stages, including 4 weeks, 8 weeks, 20 weeks, and 40 weeks, along with shank length at 20 and 40 weeks using digital scales and callipers.

*Reproductive performance:* Reproductive performance was assessed by recording the age at sexual maturity and the total number of eggs laid by each bird at 40 weeks.

*Behavioural observation:* Behavioural observation included monitoring the incidence of feather-pecking behaviour and recording broodiness at 40 weeks of age.

*Statistical analyses:* ANOVA were performed using SPSS software to compare the traits under study between Aseel and JNC chickens.

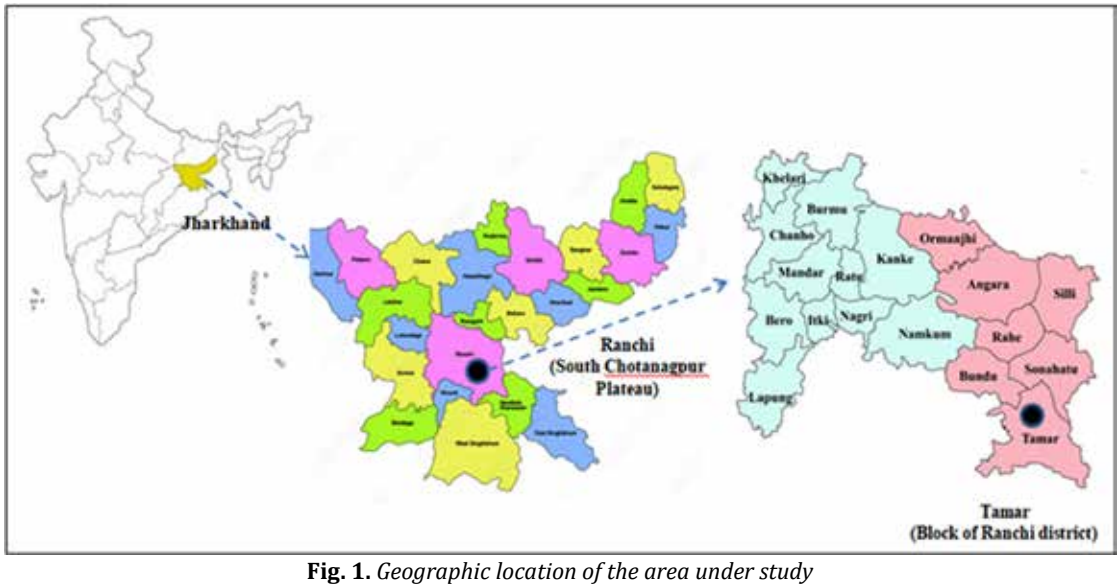


**Fig. 1.** *Geographic location of the area under study*

## RESULTS

### Phenotypic Characteristics

*Plumage colour: Aseel* chickens exhibited a variety of shades with a majority having red (41.33%) followed by multi-colour (34%), while JNC showed a dominance of white & black (35.00%) followed by red (33.67%) colours. *Aseel* chickens had fewer individuals with white (5.33%) and black (6.00%) plumage whereas Jharkhand chickens had relatively, higher frequencies of white (21.33%) and black (7.33%) plumage. The multicolour category was more prevalent in *Aseel* chickens (34.00%) than in JNC (2.67%).

*Shank colour*: Yellow shank was predominant in both breeds. A total of 73.33% *Aseel* birds and 75% JNC had yellow shanks. White shanks were observed more frequently in *Aseel* (23.33%) than in JNC (8.33%),

while black and orange shanks were less common in both breeds.

*Comb type*: Comb characteristics revealed a notable difference between the breeds. *Aseel* chickens predominantly had pea combs (86.67%), whereas JNC had a majority of single combs (73.33%).

*Comb colour*: The study compared the phenotypic characteristics of comb colour in Aseel and Jharkhand Native Chicken (JNC). It was observed that a high frequency of red combs was present in both breeds, with 96.67% of Aseel chickens and 95% of JNC chickens exhibiting this trait.

*Ear lobe colour*: Ear lobes were exclusively red in *Aseel* chickens (100%), while JNC had a mix of red (81.67%) and white (18.33%). Eye colour showed significant differences, with *Aseel* chickens predominantly having black/brown eyes (45.67%) and a minor presence of yellow eyes (3.33%). In contrast, JNC had predominantly yellow eyes (95%) and very few were black/brown (0.67%) eyed.

*Eye colour*: The study observed the distribution of eye colour in Aseel chickens and JNC, revealing notable differences between the two breeds. Among the Aseel chickens, the majority had black or brown eyes, with 91.33% exhibiting this colour, while only a small proportion, 6.67%, had yellow eyes. Red and white eye colours were rare in Aseel chickens, observed in only 1.33% and 0.67% of the population, respectively. In contrast, JNC predominantly displayed yellow eyes, with 95.00% showing this trait. Very few JNC had white eyes (4.33%, or 13 out of 300), and almost none had black/brown (0.67%). Red eyes were not at all observed.

*Skin colour*: Skin colour also varied notably between the breeds. *Aseel* chickens had predominantly yellow skin (80.00%), while JNC had mostly white skin (96.33%).

*Egg shell colour*: Egg shell colour analysis indicated that *Aseel* chickens predominantly laid brown eggs (84.44%), with cream-white eggs being less common (11.59%). JNC, however, showed a predominance of cream-white egg shells (86.49%) and fewer brown (12.97%) and white (0.54%) eggs.

**Table 1:** Phenotypic parameters of Aseel and Jharkhand native chicken (JNC)

| Parameters | | Aseel | | JNC | |
|---|---|---|---|---|---|
| | | No. of observation (n) | Frequency (%) | No. of observation (n) | Frequency (%) |
| Plumage colour | White | 8 | 5.33 | 64 | 21.33 |
| | Red | 62 | 41.33 | 101 | 33.67 |
| | White & Black | 20 | 13.33 | 105 | 35.0 |
| | Black | 9 | 6 | 22 | 7.33 |
| | Multi-colour | 51 | 34.00 | 8 | 2.67 |
| Shank colour | White | 35 | 23.33 | 25 | 8.33 |
| | Yellow | 110 | 73.33 | 225 | 75.00 |
| | Black | 4 | 2.67 | 30 | 10.00 |
| | Orange | 1 | 0.67 | 20 | 6.67 |
| Comb colour | Red | 145 | 96.67 | 285 | 95 |
| | Pale red | 5 | 3.33 | 15 | 5 |
| Comb type | Single | 5 | 3.33 | 220 | 73.33 |
| | Rose | 15 | 10.00 | 20 | 6.67 |
| | Pea | 130 | 86.67 | 60 | 20.00 |
| Ear lobe colour | Red | 150 | 100 | 245 | 81.67 |
| | White | - | - | 55 | 18.33 |
| Eye colour | Yellow | 10 | 6.67 | 285 | 95.00 |
| | White | 1 | 0.67 | 13 | 4.33 |
| | Red | 2 | 1.33 | 0 | 0.00 |
| | Black/brown | 137 | 91.33 | 2 | 0.67 |
| Skin colour | White | 30 | 20.00 | 289 | 96.33 |
| | Yellow | 120 | 80.00 | 11 | 3.67 |

| | | | | | |
|---|---|---|---|---|---|
| Egg shell colour | Cream White | 35 | 11.59 | 320 | 86.49 |
| | Brown | 255 | 84.44 | 48 | 12.97 |
| | White | 12 | 3.97 | 2 | 0.54 |

**Fig. 2:** *White & Black mix JNC male with single comb and yellow shank*

**Fig. 3:** *Red plumage colour JNC male with single comb and yellow shank*

**Fig. 4:** *Aseel male with multi-colour plumage, pea comb and yellow shank*

## Growth and Economic traits

*Body weight*: *Aseel* chickens demonstrated significantly higher weights compared to JNC at various ages. One day old *Aseel* chickens had an average weight of 28.93±0.08 g, while JNC weighed 26.23±0.15 g. By 4 weeks, *Aseel* chickens weighed 122.37±1.31 g, compared to JNC with a weight of 112.81±1.34 g. The weight difference increased with age, with *Aseel* chickens weighing 1755.29±8.28 g at 40 weeks, while JNC weighed 1311.50±11.12 g at the same age.

*Shank Length*: At 20 weeks, the shank length of *Aseel* hens was 100.90±0.12 mm and that of cocks was 130.25±0.17 mm, while JNC and cocks had shank lengths of 79.76±0.17 mm and 84.66±0.20 mm, respectively. Subsequently, at 40 weeks, *Aseel* hens had shank lengths of 113.88±0.20 mm and that of cocks was 138.82±0.10 mm, compared to JNC with 93.33±0.15 mm and 100.33±0.42 mm for hens and cocks, respectively.

*Reproductive Traits*: The age at the first egg for *Aseel* and JNC was similar, with *Aseel* chickens laying their first egg at 177.20±0.45 days and JNC at 176.38±0.28 days. However, *Aseel* chickens reached sexual maturity (214.60±0.85 days) much later than the JNC which attained sexual maturity at 202.53±0.30 days. Egg production at 40 weeks was higher in JNC (26.29±0.48 eggs) compared to *Aseel* chickens (23.43±0.21 eggs). JNC also had a higher egg number per clutch (15.02±0.21) and more eggs incubated per hen (12.81±0.13) compared to *Aseel* chickens (12.01±0.11 and 11.44±0.10, respectively). Hatchability and survivability were also higher in JNC chickens (72.88% and 75.07%, respectively) compared to *Aseel* chickens (68.42% and 73.25%, respectively).

**Table 2:** Growth and economic traits in Aseel and Jharkhand Native Chicken (JNC) germplasm

| Parameters | Aseel | JNC |
|---|---|---|
| **Different stages of growth (weeks)** | **Weight (g)** | |
| Day old | 28.93±0.08[b] | 26.23±0.15[a] |
| 4 | 122.37±1.31[b] | 112.81±1.34[a] |
| 8 | 229.79±0.89[b] | 210.95±1.02[a] |
| 12 | 817.13±1.08[b] | 527.66±2.72[a] |
| 16 | 1080.21±3.41[b] | 774.53±5.33[a] |
| 20 | 1151.74±6.94[b] | 905.47±4.83[a] |
| 40 | 1755.29±8.28[b] | 1311.50±11.12[a] |
| **Shank length (mm) at 20 weeks** | | |
| Hen | 100.90±0.12[b] | 79.76±0.17[a] |
| Cock | 130.25±0.17[b] | 84.66±0.20[a] |
| **Shank length (mm) at 40 weeks** | | |
| Hen | 113.88±0.20[b] | 93.33±.015[a] |

| | | |
|---|---|---|
| Cock | 138.82±0.10[b] | 100.33±0.42[a] |
| Age at first egg (d) | 177.20±0.45 | 176.38±0.28 |
| Age at sexual maturity (d) | 214.60±0.85[b] | 202.53±0.30[a] |
| Egg production (n) at 40 weeks of age | 23.43±0.21[b] | 26.29±0.48[a] |
| Egg numbers per clutch | 12.01±0.11[a] | 15.02±0.21[b] |
| Eggs incubated per hen | 11.44±0.10[a] | 12.81±0.13[b] |
| Hatchability (%) | 68.42±0.16[a] | 72.88±1.50[b] |
| Survivability (%) | 73.25±1.52[a] | 75.07±1.39[b] |

**Behavioural Traits:** The study compared the behavioural traits of *Aseel* and JNC, focusing on broodiness and feather-pecking. At 40 weeks of age, the incidence of broodiness in female *Aseel* chickens was 95.02%, while it was slightly higher in JNC with 98.09%. In terms of feather-pecking, *Aseel* chickens exhibited severe feather-pecking behaviour, whereas JNC demonstrated mild or negligible feather-pecking.

**Table 3:** Behavioral traits in Aseel and Jharkhand native chicken (JNC) germplasm

| Behavioural traits | Aseel | JNC |
|---|---|---|
| Broodiness at 40 weeks of age (Female) % | 95.02 | 98.09 |
| Feather-pecking | Severe | Mild or negligible |

## DISCUSSION

### Phenotypic Characteristics

*Plumage Colour*

The comparison of plumage color between Aseel and JNC reveals significant differences. Aseel chickens predominantly have red and multi-coloured plumage, whereas JNC chickens mainly have white & black mix followed by red and white plumage. Rare colours include white for Aseel (5.33%) and multi-color for JNC (2.67%). These distinctions highlight the genetic and phenotypic diversity between the breeds, which may be influenced by local adaptation and selective breeding. The findings of diverse plumage colour in Aseel birds are in agreement with the findings of Panda and Mohapatra, 1989, Singh 2001, Sarkar *et al.,* 2012, Siuganti, 2014, Rajkumar *et al.,* (2017) and Mishra *et al.,* (2019), who also observed that Aseel birds had multi-coloured plumage, predominantly dark brown, black, red, golden, and white, with solid feather patterns and normal distribution. Similarly, Agarwal *et al.,* (2022) reported different plumage colours in native chicken of Ranchi district of Jharkhand.

*Shank colour*

Both breeds predominantly had yellow shanks, which could be a common trait influenced by genetic factors. The higher prevalence of white shanks in *Aseel* chickens might reflect regional adaptation or selective breeding practices that emphasize this trait. The lower frequency of black and orange shanks in both breeds indicates a potential focus on yellow shank traits in selection processes. The predominant yellow shank colour corresponds with the findings of Sarkar *et al.,* 2012; Churchil *et al.*, 2019; Rajkumar *et al.*, 2017 and Agarwal *et al.*, 2022.

*Comb type*

The significant difference in comb type between the two breeds highlights a key morphological divergence. *Aseel* chickens predominantly had pea combs, while JNC were found with single combs. Rajkumar *et al.,* 2017 observed that almost 98% of *Aseel* birds had pea combs that were small in size with dark red colour and firmly set on the head. The pea comb was the breed characteristic of *Aseel* birds with minor variations (Singh, 2001). Strawberry combs were observed in 2% of the birds. Firm and small pea combs reduced the incidence of injuries during fights as the birds were bred for cock fights during earlier days. Similar to the present findings, strawberry combs (24.05%) were reported in *Aseel* from Bangladesh (Sarkar *et al.*, 2012); however, the proportion was found to be very low (2%) in the present study. This may be due to the purity and uniformity of the breed in India, the home tract of *Aseel* chickens. Agarwal *et al.,* (2022) reported that the predominant comb type was observed to be single followed by pea and comb type in few proportions in both the sexes of native chicken of Ranchi districts.

*Comb colour*

The high frequency of red combs in both Aseel (96.67%) and JNC (95%) indicates that red comb coloration is the dominant phenotype in these breeds. This suggests a possible genetic predisposition towards this trait in both breeds, which might be linked to sexual selection and overall health and vigor, as red combs are often associated with good circulation and fitness in chickens.

*Ear lobe colour*

The uniform red ear lobes in *Aseel* chickens and the predominant red comb colour followed by white comb

type in JNC suggest a potential genetic distinction between the breeds. Small and red ear lobes were reported by Rajkumar *et al.,* (2017) from India in *Aseel* chicken and Sarkar *et al.,* (2012) from Bangladesh. 100% red colour ear lobes and comb colour were reported by Agarwal *et al.,* (2022) in native chicken of Ranchi districts. These results are in close agreement with the findings of Churchil *et al.,* (2019) and Veeranna *et al.,* (2020).

*Eye colour*

The predominance of yellow eyes in JNC versus the black to brown eye colors in *Aseel* chickens could suggest different selective pressures or breeding practices. *Aseel* chickens' higher proportion of black/brown eyes might be indicative of genetic traits specific to their breed or local environmental adaptations. The findings are in agreement with Rajkumar *et al.*, (2017) who also reported 100% black eye color in *Aseel* chicken.

*Skin colour*

The observed difference in skin colour between *Aseel* and JNC is an important breed characteristic that may be linked to environmental adaptations. *Aseel* chickens were predominantly characterized by yellow skin, whereas JNC were found with white skin. This contrast not only serves as a distinguishing trait between the two breeds but also suggests underlying genetic and environmental factors that may influence skin pigmentation. Research has shown similar skin colour variations in other indigenous breeds. Nayak *et al.,* (2020) reported predominantly white skin in the Khadia chicken of Northern Odisha, a region geographically and climatically close to Jharkhand. Additionally, Agarwal *et al.,* (2022) observed the same findings in Jharkhand chickens. These findings suggest that white skin may be a common trait among indigenous breeds in this region, possibly as an adaptation to local environmental factors such as temperature, humidity, and diet.

*Egg shell colour*

*Aseel* chickens predominantly laid brown eggs whereas JNC, however, showed a predominance of cream white egg shells. Vij *et al.,* (2006) found the light brown, brown and dark brown coloured eggshell as 8, 36, 42 percent in Danki, 58, 45, 58 percent in Kalasthi and 34, 19, 0 percent in Ghagus breeds, respectively. Whereas Banerjee (2012) found cream and light brown coloured egg shell in naked neck chicken, frizzled chicken, muffed/bearded chicken, creeper chicken, crested chicken, rumpless chicken, feathered shank chicken and tinted bluish in fibromelanosis chicken. Similarly, Sarker *et al.,* (2012) observed light brown (77.78 %) and white (22.22 %) eggshell colour in *Aseel* chicken, whereas Vij *et al.,* (2015) recorded 79% light brown followed by 17% cream white and 4% brown shelled egg in Harringhata Black chicken. Further, Ferdaus *et al.,* (2016) also recorded light brown and white shelled eggs at 75.56 and 23.44%, respectively in indigenous dwarf chickens.

**Growth and Economic traits**

*Body weight* the study consistently found that *Aseel* chickens exhibited higher body weights compared to JNC across all measured ages, which may be attributed to several factors. Primarily, genetic differences between the two breeds are likely to play a significant role in influencing growth rates. *Aseel* chickens are known for their robust build and have historically been selected for traits such as aggression and size, which could contribute to their superior growth performance. Additionally, variations in management practices, such as feed quality and environmental conditions, could also influence these growth patterns. However, since both groups were studied under similar conditions in this study, the genetic predisposition of *Aseel* chickens is a more plausible explanation for the observed differences in body weight.

The body weights recorded up to 16 weeks of age for *Aseel* chickens align with the findings of Chatterjee *et al.,* (2007), suggesting that the growth performance observed in this study is consistent with established benchmarks for this breed. However, discrepancies were noted when comparing the results with other studies at 40 weeks of age. Haunshi *et al.,* (2011) reported higher body weights, whereas Mohan *et al.,* (2008) documented lower weights than those observed in the current study for *Aseel peela* chickens. These differences may be attributed to variations in selective breeding practices, environmental conditions, and feed quality used in different studies. In the study by Haunshi *et al.,* (2011), the selection for higher body weight over generations might have led to the enhanced growth performance of *Aseel* chickens. Conversely, the lower weights reported by Mohan *et al.,* (2008) could be due to differences in the genetic lines or environmental factors specific to that study. Regarding JNC, the adult body weights reported in this study are consistent with those found by Agarwal *et al.,* (2022), Dana *et al.,* (2010), Kumar *et al.,* (2016), and Mishra *et al.,* (2019). This consistency suggests that the growth patterns observed for Jharkhand Native chickens are stable and predictable under similar environmental and management conditions.

*Shank Length*

The findings of this study highlight notable differences in shank length between *Aseel* chickens and JNC, suggesting variations in their physical build and

selective breeding practices. *Aseel* chickens exhibited larger shank lengths at 20 and 40 weeks of age in both hens and cocks, indicating a more robust physical build compared to JNC. These results align with previous observations by Rajkumar *et al.,* (2017), who also reported higher shank lengths in *Aseel* chickens. However, the shank lengths observed in this study for *Aseel* chickens are slightly longer than those reported by Haunshi *et al.,* (2011), which may be attributed to differences in the study population or environmental factors affecting growth. Interestingly, the JNC in this study exhibited higher shank lengths than those reported by Agarwal *et al.,* (2022), suggesting potential genetic or environmental factors at play. These observations align with the findings of Dana *et al.,* (2010), Kumar *et al.,* (2016), and Mishra *et al.,* (2019), who also reported similar shank lengths in indigenous chicken breeds under varying conditions. These differences could be due to genetic diversity within the JNC population or the influence of local environmental conditions that may affect growth and development.

**Reproductive Traits**

The observed differences in sexual maturity between *Aseel* and JNC, despite a similar age at first egg, highlight distinct reproductive strategies between these two breeds. *Aseel* chickens reach sexual maturity later than JNC, a difference that can likely be attributed to variations in hormonal development patterns. This aligns with findings by Rajkumar *et al.,* (2017), who reported the age at sexual maturity for *Aseel* chickens to be around 214 ± 6 days. Mohan *et al.,* (2008) reported lower ages at sexual maturity for *Aseel* birds, suggesting variability due to factors such as rearing conditions, genetic lines, or environmental influences. In contrast, JNC reached earlier sexual maturity, consistent with their generally better reproductive performance. These chickens not only matured earlier but also showed higher egg production rates, more eggs per clutch, and greater numbers of eggs incubated per hen, indicating a better reproductive efficiency compared to *Aseel* chicken. The earlier sexual maturity observed in JNC in this study was lower than the age reported by Agarwal *et al.,* (2022) for Ranchi native birds (220.43 ± 1.36 days), indicating potential variability within regional native chicken populations. Similar patterns of earlier age at first laying have been documented by Mishra *et al.,* (2019) in other native chicken populations.

When comparing egg production at 40 weeks, JNC outperformed Aseel chickens. The egg production in the *Aseel* was poor as the hens were poor layers. The prominent broodiness character might be the primary reason for lower production in native chickens in general and *Aseel* in particular (Rajkumar *et al.,* 2022). However, there are reports of higher egg production in *Aseel* hens under different conditions. Sarkar *et al.,* (2012) reported a higher egg production at 40 weeks of age (35.71 ± 1.68 eggs/year) in *Aseel* hens from Bangladesh, while Haunshi *et al.,* (2011) found an egg production at 40 weeks of age of 36.23 eggs. Mohan *et al.,* (2008) recorded an annual egg production of 160 eggs in *Aseel* peela hens, the highest reported for this breed, suggesting that selective breeding programs aimed at reducing broodiness and enhancing productivity could significantly alter these birds' natural reproductive traits.

The higher hatchability and survivability rates in JNC suggest better overall reproductive efficiency and resilience. The increased hatchability rate indicates that JNC may have superior incubation behaviour or egg quality. Local chickens are known for their adaptation superiority in terms of their resistance to endemic diseases and other harsh environmental conditions (Nwakpu *et al.*, 1999). This is due to their long time developed genetic potential for survivability in harsh environments. The higher chick survivability as well as fewer chick deaths in local versus *Aseel* chickens observed in this study could partly be due to this potential genetic adaptability. The present findings are in agreement with Haunshi and Rajkumar, 2020.

**Behavioural Traits**

The results indicated that both *Aseel* and JNC exhibited high levels of broodiness, with JNC showing a marginally higher rate. This suggests that both breeds have strong maternal instincts, but JNC may have a slightly more pronounced broodiness tendency. The significantly lower incidence of feather-pecking in JNC compared to *Aseel* chickens is notable. Haunshi *et al.,* (2020) also observed a greater incidence of feather-pecking behaviour under floor rearing in Aseel. This behavioural difference could be attributed to genetic factors, management practices, or environmental conditions that affect feather-pecking behaviour. The severe feather-pecking observed in *Aseel* chickens may warrant further investigation into potential management strategies or genetic improvements to reduce this behaviour, as it can impact the welfare and productivity of the chickens.

## CONCLUSION

The present study reveals phenotypic variability and significant differences in growth, reproductive traits, and behavioral traits between *Aseel* and JNC, reflecting the distinct characteristics of these breeds. Considering the hardy nature and productive performance of these chickens, they have vast potential for subsequent breeding works. The indigenous chicken of Jharkhand needs further investigation for molecular

characterization and Genetic similarity/divergence with other Indian breeds and efforts must be taken to conserve germplasm. *Aseel* chickens had greater growth potential and larger shank size whereas JNC had superior reproductive performance and higher hatchability and survivability rates. These findings underscore the importance of the need for selecting chicken breeds based on specific production goals and environmental conditions. Present findings also highlight important behavioural distinctions between the two breeds, which could inform breeding and management practices to enhance poultry welfare and performance.

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