



DOI: <https://doi.org/10.71317/kjard.2.6.2026.448>

The Kashmir Journal of Academic Research and Development

Journal homepage: <https://rjsaonline.org/index.php/KJARD>



Comparative Evaluation of Growth Performance and Feed Efficiency of Four Varieties of Aseel Chicken Reared Under Farm Conditions

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ARTICLE INFO

ABSTRACT

Received:

May 12, 2026

Revised:

May 26, 2026

Accepted:

June 10, 2026

Available Online:

June 24, 2026

Keywords:

Aseel chicken, Growth performance, Body weight gain, Feed intake, Feed conversion ratio

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This study evaluated the comparative growth performance and feed efficiency of four varieties of Aseel chicken maintained under farm conditions. A total of 96-day-old chicks comprising 24 chicks from each variety, including Java, Mianwali, Sindhi, and Motled, were reared at a private poultry farm located in the district of Tando Allahyar, Sindh, Pakistan. All birds were maintained under similar environmental and management conditions up to 12 weeks of age. Feed and fresh drinking water were provided *ad libitum* according to NRC recommendations. Weekly body weight gain, fold increase in body weight, feed intake, and feed conversion ratio (FCR) were recorded throughout the study. The collected data were analyzed through analysis of variance (ANOVA), and means were compared using Duncan's Multiple Range test. The results revealed significant differences ($P < 0.05$) among the four Aseel varieties for body weight, body weight gain, feed intake, fold increase in body weight, and FCR during the experimental period.

Introduction

Aseel chicken is one of the oldest indigenous poultry breeds of South Asia, originally developed in the Indian subcontinent and later widely distributed across Pakistan. It is well known for its muscular body structure, hardiness, adaptability, and resistance to harsh climatic conditions. Historically, this breed has played an important role in rural poultry production systems because it can survive under low-input management conditions. The term “Aseel” reflects its Asian origin and long-standing cultural and genetic importance among indigenous poultry resources.

In modern poultry production systems, indigenous breeds such as Aseel are gaining renewed importance due to increasing consumer demand for organic and antibiotic-free meat, as well as their better adaptability under backyard and semi-intensive production systems. Although Aseel is traditionally known for its strength and survivability, claims such as “Aseel holds a top position in terms of vigor and hardiness” require scientific validation under controlled conditions, particularly for growth performance and feed efficiency. Similarly, behavioral traits such as reduced aggression over generations have been reported in some management systems; however, these require proper experimental verification with supporting references in specific production environments.

Different varieties of Aseel chicken, including Mianwali, Sindhi, Java, and Motled, exhibit variation in body conformation, plumage color, growth rate, and productive performance. Therefore, a comparative evaluation of these varieties is essential to identify superior strains for breeding programs and improved poultry production systems.

Growth performance traits such as body weight gain, feed intake, and feed conversion ratio (FCR) are key economic indicators in poultry production, as they directly influence production cost, profitability, and meat yield. Improved growth efficiency not only reduces feed cost but also enhances market value and supports sustainable poultry production systems. Therefore, evaluation of these traits among indigenous breeds is essential for breeding improvement and rural livelihood enhancement.

Previous studies have reported significant variation among indigenous chicken breeds regarding growth performance under different management systems. Jatoi et al. (2014) observed significant differences in growth performance among various Aseel varieties maintained under intensive conditions in Pakistan. Similarly, Ghayas et al. (2020) reported that genetic background and management conditions strongly influence the productive performance of poultry birds.

Aseel chickens are also recognized for their better adaptability to hot climates and resistance against common poultry diseases, making them suitable for rural production systems. In rural areas, these birds contribute significantly to household income generation and food security.

The present study was conducted in district Tando Allahyar, Sindh, a hot semi-arid region characterized by high summer temperatures, limited intensive poultry infrastructure, and predominance of backyard and small-scale farming systems. These environmental conditions make indigenous breeds particularly important because of their natural heat tolerance and adaptability compared with commercial broiler strains. Therefore, this study compared the growth performance and feed efficiency of four Aseel chicken varieties (Mianwali, Sindhi, Java, and Motled) maintained under similar farm conditions in Tando Allahyar District, Sindh, Pakistan.

Materials and Methods

Experimental Site

The present experiment was conducted at a private poultry farm located in the district of Tando Allahyar, Sindh, Pakistan. The study area has a hot, semi-arid climate with relatively high temperatures and moderate humidity, particularly during the summer season. The poultry house was maintained under proper hygienic and ventilated conditions throughout the experimental period to minimize environmental stress on birds.

Before the experiment began, all bird management and handling procedures followed standard poultry welfare practices. Ethical considerations for bird care and handling were observed throughout the study period.

Experimental Birds and Management

A total of 96 day-old Aseel chicks were procured from local poultry breeders. The chicks belonged to four different Aseel varieties, namely Java, Mianwali, Sindhi, and Motled, with 24 chicks from each variety. The Motled variety was included because it is commonly reared by local poultry farmers in Sindh and has distinct plumage characteristics and adaptability compared with other Aseel varieties. The birds were randomly distributed into three replicates, with eight chicks per replicate. The chicks were housed in well-ventilated cages under similar environmental and hygienic conditions throughout the experiment. Standard brooding practices were followed during the early growth period. A standardized vaccination

schedule was adopted for all experimental groups to ensure uniform health management throughout the study. Feed and clean drinking water were provided ad libitum according to NRC recommendations. Fresh potable water was supplied regularly, and proper sanitation measures were maintained to ensure water quality during the experiment. The birds were reared up to 12 weeks of age under identical management and feeding conditions. A commercial broiler starter and grower ration ("zero feed") was used during the experimental period. The ration was formulated to meet the nutrient requirements of growing chickens and contained adequate levels of crude protein, metabolizable energy, vitamins, and minerals according to NRC recommendations.

Data Collection

The following growth parameters were recorded weekly during the study period:

- Weekly body weight (g)
- Weekly body weight gain (g)
- Fold increase in body weight
- Weekly feed intake (g)
- Feed conversion ratio (FCR)
- Birds were weighed individually using an electronic digital balance at weekly intervals.

Statistical Analysis

The collected data were analyzed using analysis of variance (ANOVA) following the procedures described by Steel et al. (1997). ANOVA was used to determine whether significant differences existed among the means of different Aseel varieties for the studied growth parameters. Differences among means were compared using Duncan's Multiple Range (DMR) test at a significance level of $P < 0.05$ to identify pairwise variation among treatment groups.

Before statistical analysis, the recorded data were examined for normality and consistency. We carefully checked any abnormal observations to minimize experimental error and improve the reliability of the results.

Results

Weekly Body Weight

The weekly average body weight of the four Aseel varieties differed clearly throughout the 12 weeks (Table 1). Mianwali birds consistently exhibited the highest body weight at all time points, followed by Sindhi and Java varieties. Motled birds recorded the lowest body weight at all weeks. The higher growth performance of Mianwali birds may be attributed to their genetic potential for rapid weight gain and better feed utilization. In comparison, the slightly lower performance of Motled birds could reflect a slower growth rate inherent to this variety.

Table 1. Weekly average body weight (g) of four varieties of Aseel chicken during 12 weeks

Varieties	Initial weight	1st week	4th week	8th week	12 week
Java	31.12±0.52	64.25±1.12	215.42±5.11	585.36±18.42	1088.45±34.26
Mianwali	30.87±0.44	66.81±1.26	229.63±4.37	628.74±15.33	1147.52±28.41
Sindhi	30.95±0.63	65.43±1.08	221.56±5.29	607.51±16.72	1115.84±30.15
Motled	29.84±0.71	61.33±1.54	204.77±4.91	559.63±20.28	1012.46±24.61

Weekly Body Weight Gain

Body weight gain trends largely mirrored body weight patterns (Table 2). Mianwali birds achieved the highest weekly gains, particularly between the 4th and 12th week, whereas Motled birds showed slower gains. The superior growth of Mianwali and Sindhi varieties may reflect their inherent genetic potential combined with better adaptation to farm conditions in Tando Allahyar, which include high temperatures and a semi-arid environment.

Table-2 Weekly average body weight gain gram of four different varieties of Aseel of chicken for 12 age of 12 week

Varieties	1st week	4th week	8th week	12th week
Java	33.13±1.22	59.74±2.41	111.26±4.92	124.31±7.82
Mianwali	35.94±1.47	69.36±2.18	118.52±3.81	133.75±6.44
Sindhi	34.48±1.35	66.17±3.74	109.64±4.15	127.42±5.61
Motled	31.49±1.41	57.23±2.63	95.18±3.27	118.63±4.82

Fold Increase in Body Weight

The fold increase in body weight decreased progressively as birds matured, which is typical in growing poultry. Mianwali birds demonstrated the highest fold increase at all stages, indicating efficient early growth and sustained weight gain (Table 3). Motled birds showed the lowest fold increase, reflecting their slower developmental rate.

Table-3 Weekly average body weight gain gram in term of fold increase compare with previous four different varieties of Aseel of chicken for 12 age of 12 week

Varieties	1st week	4th week	8th week	12th week
Java	2.07±0.04	1.42±0.02	1.26±0.01	1.14±0.02
Mianwali	2.16±0.03	1.48±0.01	1.34±0.02	1.19±0.01
Sindhi	2.11±0.02	1.45±0.02	1.31±0.01	1.16±0.01
Motled	2.05±0.05	1.37±0.03	1.21±0.02	1.11±0.03

Weekly Feed Intake

Feed consumption patterns varied among the varieties (Table 4). Java birds consumed the most feed consistently, while Sindhi birds showed comparatively lower intake despite growth trends similar to Mianwali. Motled birds' feed intake was moderate but did not translate into high weight gain, indicating lower feed efficiency.

Table-4 Weekly average feed intake gram of four different varieties of Aseel of chicken during 12 week of age

Varieties	1st week	4th week	8th week	12th week
Java	99.24±0.63	301.44±3.15	472.36±6.24	612.53±5.72
Mianwali	100.71±0.58	294.17±2.48	421.55±4.63	548.46±6.18
Sindhi	98.84±0.47	286.23±2.16	398.74±5.02	522.15±6.31
Motled	103.62±0.39	289.54±1.84	448.31±5.46	571.28±4.29

Feed Conversion Ratio (FCR)

Feed efficiency, measured as FCR, also varied among varieties (Table 5). Mianwali birds demonstrated the best feed conversion efficiency, followed by Sindhi, while Motled birds exhibited the poorest efficiency. The efficient feed utilization of Mianwali birds may explain their superior growth performance despite comparable or slightly lower feed intake than Java birds.

Table-5 Weekly average FCR gram of four different varieties of Aseel of chicken from 1st to 12 week of age

Varieties	1st week	4th week	8th week	12th week
Java	2.98±0.11	4.87±0.18	4.51±0.21	4.92±0.26
Mianwali	2.81±0.09	4.22±0.16	3.56±0.18	4.11±0.12
Sindhi	2.86±0.10	4.41±0.24	3.98±0.19	4.37±0.14
Motled	3.31±0.27	4.95±0.31	5.21±0.27	5.44±0.22

Discussion

The findings of the present study revealed clear differences among the four Aseel varieties regarding body weight, body weight gain, feed intake, and feed conversion ratio. Among all varieties, Mianwali birds consistently demonstrated superior growth performance and better feed efficiency throughout the experimental period, followed by Sindhi and Java varieties. In contrast, Motled birds showed comparatively lower productive performance. The higher body weight observed in Mianwali birds agrees with the findings of Jatoti et al. (2014), who reported superior growth performance in Mianwali Aseel chickens under intensive management conditions. Ghayas et al. (2020) reported similar findings, stating that genetic differences among poultry strains significantly affect growth characteristics. The present results further strengthen previous observations by demonstrating that Mianwali birds maintained their superior growth performance even under the semi-arid

environmental conditions of Tando Allahyar, Sindh. This suggests that the Mianwali variety has strong adaptability and better genetic potential for growth.

The present study also demonstrated considerable variation in body weight gain among the varieties. The improved weight gain in Mianwali birds may be attributed to better genetic potential, adaptability, and efficient nutrient utilization. Singh and Singh (2004) also documented variations in growth performance among indigenous chicken breeds. In contrast, the comparatively lower weight gain observed in Mottled birds may indicate slower physiological development and lower growth potential associated with this variety. Differences between the present findings and some previous reports may be due to variation in feed quality, environmental conditions, management systems, and genetic background of the experimental birds.

Feed intake also varied among the varieties, with Java birds consuming comparatively more feed than the other groups. However, despite higher feed consumption, Java birds did not exhibit better feed efficiency than Mianwali birds. This indicates that Mianwali birds were more efficient in converting feed into body mass. Such differences may be associated with variation in metabolic efficiency and nutrient utilization among the varieties. The lower feed intake observed in Sindhi birds, combined with relatively good body weight gain, suggests that Sindhi birds may also possess efficient nutrient conversion ability under local farming conditions.

Feed conversion ratio (FCR) is considered one of the most economically important traits in poultry production because feed cost represents the major portion of total production expenses. Birds with lower FCR values require less feed to gain body weight, thereby reducing production costs and increasing profitability. In the present study, Mianwali birds exhibited comparatively better FCR values, indicating superior feed utilization efficiency. Ahmed (2013) and Jatoti et al. (2014) reported similar results, observing better feed efficiency in indigenous Aseel varieties. Sindhi birds also demonstrated comparatively favorable FCR values, suggesting their suitability for semi-intensive and backyard poultry production systems.

From a practical perspective, the present findings have important implications for poultry farmers, breeders, and policymakers. The superior growth performance and feed efficiency of Mianwali birds indicate their potential for use in selective breeding programs aimed at improving indigenous poultry productivity. Similarly, Sindhi birds showed balanced performance in growth and feed utilization, which may provide economic advantages for small-scale farmers due to relatively lower feed intake and an acceptable growth rate. Because feed expenses are a major component of poultry production costs, varieties with better feed efficiency can improve farm profitability and sustainability under rural production systems.

The poor performance observed in Mottled birds may be due to genetic variability and lower growth potential. Environmental conditions, management practices, feed composition, and disease resistance may also influence the productive performance of poultry birds. Additionally, the present study was conducted under a single management system and climatic condition in District Tando Allahyar; therefore, results may vary in different agro-climatic regions, intensive rearing systems, or alternative feeding strategies.

Although the study provided valuable information regarding comparative performance of Aseel varieties, certain limitations should also be considered. The experiment involved a relatively small number of birds, which may limit the generalizability of the results to larger commercial scales. Furthermore, the study duration was restricted to 12 weeks of age and did not include carcass characteristics, reproductive traits, or meat quality parameters. Future studies should therefore evaluate larger populations of indigenous birds under diverse environmental and management conditions to obtain more comprehensive information regarding the productive potential of Aseel varieties.

Overall, the present study suggests that Mianwali and Sindhi varieties have better growth potential and feed utilization efficiency than Java and Mottled birds under the environmental conditions of Sindh, Pakistan. These findings may contribute to future breeding, conservation, and rural poultry development programs focused on indigenous chicken genetic resources.

Conclusion

The study revealed clear differences among Aseel chicken varieties in growth and feed efficiency, with Mianwali birds showing the best performance and Sindhi birds also demonstrating good adaptability. These findings highlight the potential of indigenous varieties for low-input, climate-resilient poultry production in Sindh and similar regions. Mianwali may be recommended for breeding programs to improve meat yield and feed efficiency. Future research should include genetic analyses, larger populations, and trials under diverse environmental conditions to validate and expand these results.

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