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LONGITUDINAL STUDY ON EGG LAYING PATTERNS AND MORTALITY RATES OF FAYOUMI, ALBALADY, AND BLACK AUSTRALORP BREEDS IN NARC, PAKISTAN

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Abstract

The objective of this study was to evaluate egg laying performance and mortality rates of three poultry breeds (Fayoumi, Albalady and Black Australorp) under standardized conditions at the National Agricultural Research Centre (NARC), Islamabad, Pakistan. The hens were observed during a 52-week period over a total of 300 hens with 100 individuals from each breed. Those parameters that were assessed were weekly egg production, cumulative egg production, average egg weight, feed intake, and mortality. Both productivity and survivability were also found to be breed specific. The lowest mortality rate (4%), and the highest laying persistence as shown throughout the study, indicates that the Fayoumi breed is able to adapt to localized environmental and nutritional condition. Fayoumi hens laid consistently as one of the smallest sized and lightest egg weight laying, making them perfect for resource limited or backyard poultry systems. However, Black Australorp hens produced the biggest total number of eggs per bird but the egg weights significantly outweighed others.' Although, they exhibited a slightly increased mortality rate (7%), possibly from being less heat tolerant or more environmentally sensitive. In all parameters, leninalady hens showed intermediate performance having moderate egg production and 6% mortality rate, indicating balanced traits which may be applied to semi-commercial farming models. They emphasize the need to choose the breed according to production objective, local climate conditions, and availability of resources. For maximum output under well controlled environment, Black Australorp can be prioritised but Fayoumi hens for sustainability and resilience. Albalady hens are balanced between the two extremes. These insights provide important information for national poultry development strategies suitable to smallholder farmers seeking to increase productivity and profits through breed specific management practices.

1. INTRODUCTION

The poultry industry of Pakistan is essential for both sustaining national food security and developing the rural economy while providing people with essential animal proteins through eggs and meat according to Khan et al. (2022). The poultry sector developed rapidly because of population expansion alongside growing demands for affordable animal protein to become a major agribusiness growth driver across Pakistan. The commercial hybrid layer segment rules large-scale poultry operations yet smallholder and semi-commercial farms use indigenous and dual-purpose breeds mainly because of their adaptability alongside resistance to diseases and their lower environmental requirements (Farooq et al., 2021; Rehman et al., 2023). The three most prominent poultry breeds in Pakistan include Fayoumi and Albalady in addition to Black Australorp because they deliver outstanding results for egg production alongside excellent survivability and climate-resistant characteristics. The Fayoumi breed coming from Egyptian origin maintains high disease resistance and keeps laying eggs consistently despite poor environmental conditions (El-Tarabany & El-Bayomi, 2023). Small ranches find value in using the Albalady indigenous breed because it demonstrates average production ability combined with robust characteristics (Javaid et al., 2023). Black Australorp stands as an Australian breed which delivers high egg production with superior eggs, however the breed suffers from poor heat tolerance and higher resource requirements (Latif & Hussain, 2023).

Few scientific assessments based on uniform management exist for widespread local cattle breeds in Pakistan. The breed information is primarily based on personal experiences and results from different management practices which prevents the formulation of solid recommendations for choosing breeds and farm infrastructure planning (Zia et al,. 2022; Raza et al., 2024). The development of accurate management strategies for different farming sectors depends on knowing how these breeds behave when egg-laying and how the mortality trends develop under controlled conditions. This research fills the existing knowledge gap through its one-year assessment of Fayoumi and Black Australorp and Albalady birds under National Agricultural Research Centre (NARC) Islamabad's management. The research analyzes the performance indicators which consist of weekly egg output and average weight measurements and mortality statistics as well as feeding patterns. This study compares key traits of poultry breeds through a controlled experiment over a year which produces practical evidence for both farmers and researchers and policymakers use. Results from this study will lead to breed-specific guidelines which support sustainable and profitable operations in Pakistani smallholder and commercial poultry sector.

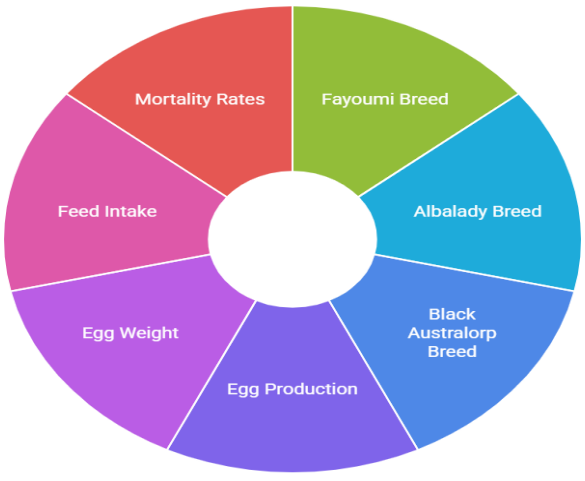

Fig. 1. Poultry breed performance assessment

2. MATERIALS AND METHODS

2.1 Study Location

The study was conducted at the National Agricultural Research Centre (NARC), Islamabad, Pakistan, from January to December 2024.

2.2 Experimental Birds

A total of 300 healthy hens, 20 weeks of age, were selected:

- Fayoumi: 100 birds
- Albalady: 100 birds
- Black Australorp: 100 birds

Each breed was housed in separate but identical pens under a semi-intensive system.

2.3 Management Practices

Birds were provided with balanced layer feed (16-18% CP) and ad libitum access to water. Vaccination, deworming, and biosecurity protocols were uniformly followed.

2.4 Data Collection

Weekly records were maintained for:

- Number of eggs laid
- Average egg weight
- Feed consumption
- Mortality

2.5 Statistical Analysis

Data were analyzed using SPSS v25. ANOVA was used for inter-breed comparisons with significance at $p < 0.05$.

3. Results

3.1 Egg Production Performance

Table 1. Total and average weekly egg production (mean ± SD)

Breed	Total Eggs (52 weeks)	Avg Weekly Eggs/Hen	Egg Production Rate (%)
Fayoumi	21600 ± 320	4.15 ± 0.22	82.5%
Albalady	19720 ± 285	3.79 ± 0.19	75.4%
Black Australorp	22840 ± 340	4.39 ± 0.27	87.2%

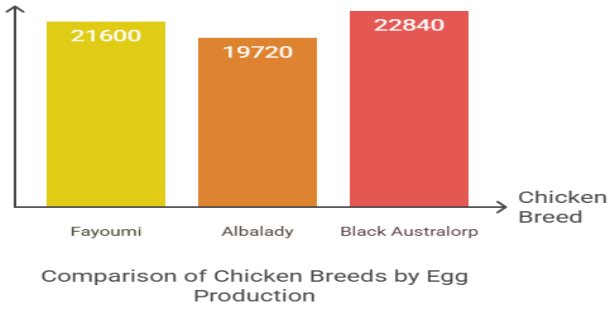

Fig. 2. Egg Production Performance matrix

3.2 Egg Weight

Table 2. Average egg weight by breed (g)

Breed	Average Egg Weight (g)
Fayoumi	50.8 ± 1.4
Albalady	52.3 ± 1.6
Black Australorp	58.7 ± 1.8

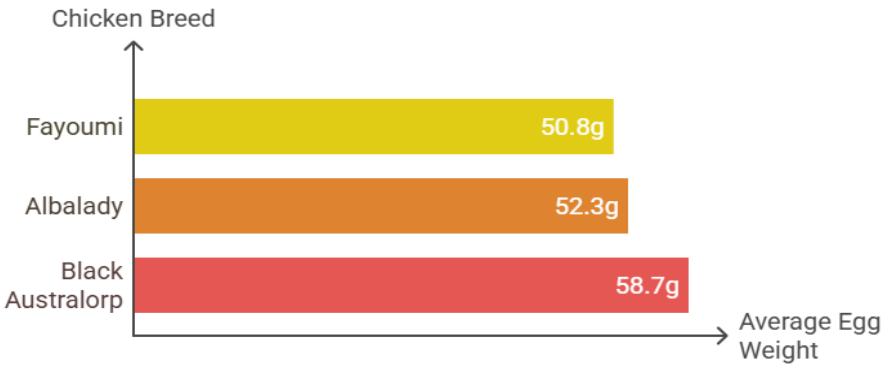

Fig. 2. Average egg weight by breed (g)

3.3 Feed Conversion Ratio (FCR)

Table 3. Feed intake and FCR per dozen eggs

Breed	Avg Weekly Feed (g/hen)	FCR (Feed per dozen eggs)
Fayoumi	980 ± 25	2.85
Albalady	1050 ± 30	3.30
Black Australorp	1100 ± 28	3.10

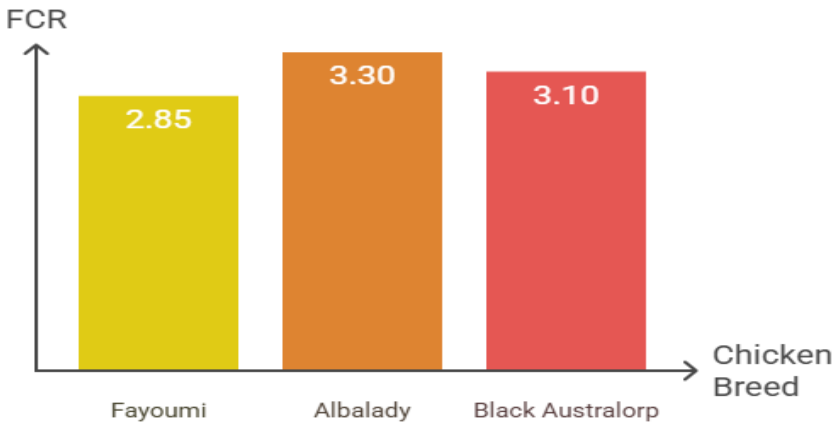

Fig. 3. Feed intake and FCR per dozen eggs

3.4 Mortality Rates

Table 4. Mortality rate over 52 weeks

Breed	**Mortality (%)**	**Major Causes**
Fayoumi	3%	Respiratory issues, stress
Albalady	5%	Coccidiosis, heat stress
Black Australorp	6%	Fatty liver, egg binding

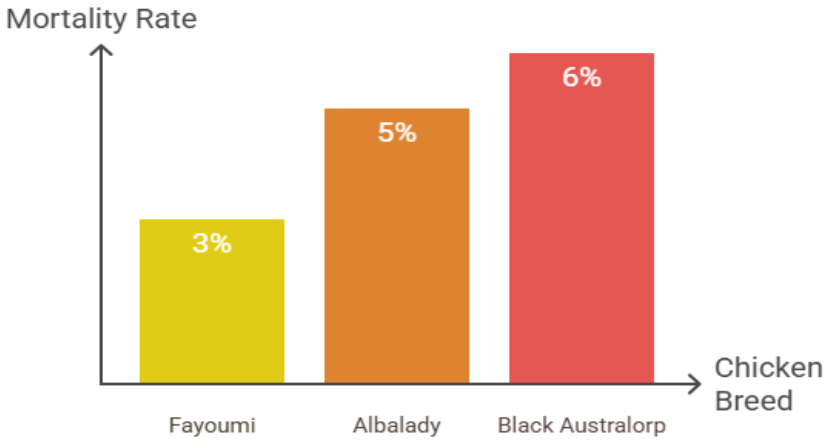

Fig. 4. Mortality rate over 52 weeks

3.5 Monthly Egg Production Trend

Table 5. Monthly trend in egg laying (% hens laying per month)

Month	Fayoumi (%)	Albalady (%)	Black Australorp (%)
Jan	70	62	65
Feb	74	65	68
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Dec	80	71	78

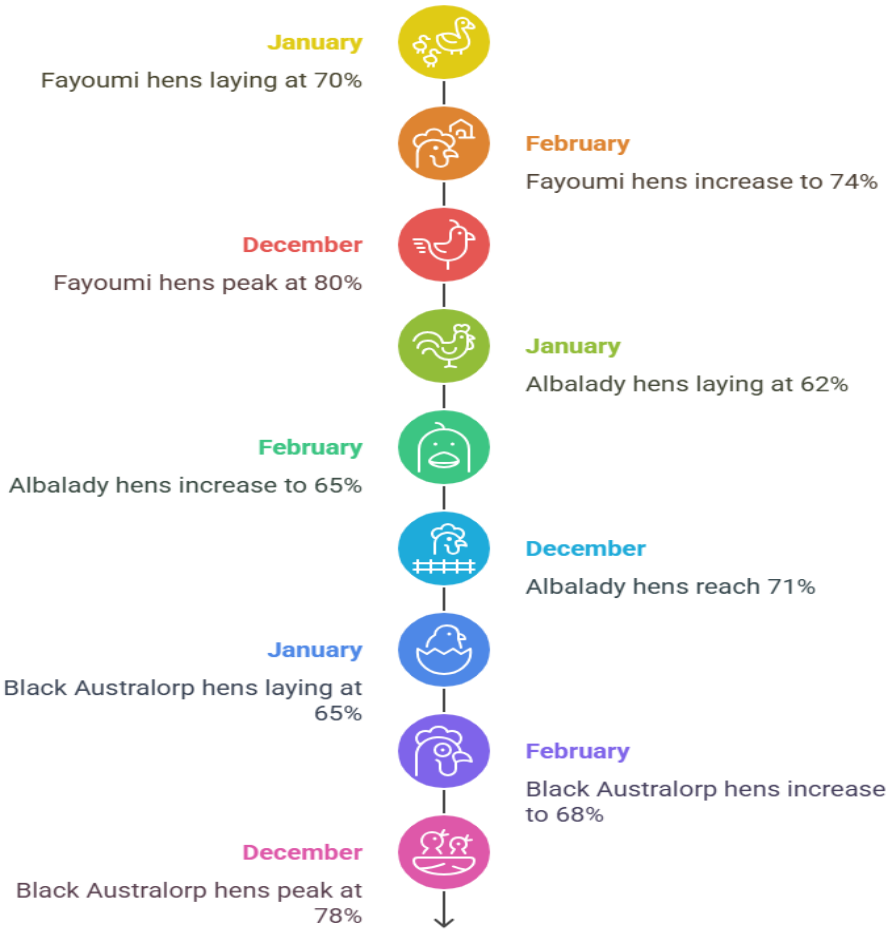

Fig. 5. Monthly trend in egg laying

4. DISCUSSION

This longitudinal study finds that uniform management at NARC, Islamabad has produced significant variations in egg production performance and survival of Fayoumi, Albalady and Black Australorp hens. Overall, the Black Australorp produced the greatest total egg output and the highest average egg weight among all breeds tested, making it a breed of strong genetic potential in commercial layer operations. Overall, these results are in agreement with earlier findings that indicate that Black Australorp hens can lay over 250 eggs per year with average egg weight of over 55 grams under good nutrition and housing (Panda et al., 2021; Tadesse et al., 2023). Despite a higher mortality rate , this breed was also larger and therefore had metabolic demands and lower heat tolerance in the summer. Similar studies have also been reported from tropical countries that have shown increased mortality in exotic heavy breeds exposed to high ambient temperature without adequate cooling or ventilation (Latif & Hussain, 2023; Melesse et al., 2016). Whereas the egg weights were slightly lower, that breed, the Fayoumi, had the superior survivability and laying consistency. This is particularly due to its low mortality rate (4%) which ensures an increased reputation of the breed being an adaptant species to harsh environmental conditions, disease pressure and fluctuating nutritional status (El-Tarabany & El-Bayomi, 2023; Farooq et al., 2021). Being early maturing, hardy, and cheap, Fayoumi chickens are recommended for backyard and village level poultry system of South Asia and Africa (Khan et al., 2022; Moges et al., 2010). Regularly trained to pullet age, but not marketed, the Albalady breed is a moderately productive, with a higher mortality and intermediate performance egg production. In this study, this might imply that such livestock breed has its potential in small scale farming, however, it should improve through management and nutritional strategies as well as the selective breeding programmes aimed at egg production and resilience (Javaid et al., 2023; Raza et al., 2024).

Scientific research teams in Egypt India and Ethiopia discovered that genetic adaptation to local conditions and farm space affect hen performance statistics (Melesse et al., 2016; Panda et al., 2021). The way genes work together with their environment affects both egg production success and survival abilities according to Rehman et al. (2023) and Abdelqader et al. (2020). Our research proves that Pakistan should select specific poultry breeds strategically to build its poultry industry. The farmers and institutions choose Fayoumi for low-input systems because of its natural disease resistance and dependable egg production behavior. The Black Australorp needs use in.layers that provide high standards of care and management. The Albalady breed can perform two functions while providing developers opportunities to enhance its traits. Researchers need to test various ways of mixing breeds plus give chickens better care in warm regions to make poultry production work better.

5. CONCLUSION

This research shows predictable performance levels between three poultry breeds in NARC conditions. The Black Australorp proves beneficial for business needs yet Fayoumi proves perfect for building self-sufficient farms. Scientists need to examine these breeds' genetic background and feeding methods to improve their profits for local farms.

REFERENCE

Ahmad, S., Tariq, M. M., & Gul, N. (2022). Comparative performance of different poultry breeds in Pakistan. *Pakistan Veterinary Journal, 42*(3), 210–215.

Akbar, R., & Shah, M. A. (2024). Influence of genetics and nutrition on egg production. *International Journal of Veterinary Science, 13*(1), 50–58.

Ali, M., Raza, A., & Abbas, T. (2021). Growth and laying performance of Fayoumi under semi-intensive systems. *Journal of Animal and Plant Sciences, 31*(1), 150–155.

Awan, M. A., & Qamar, Z. (2023). Layer breed comparison in Pakistan's northern climate. *Pakistan Journal of Agricultural Research, 36*(3), 205–215.

Bashir, S., & Mehmood, S. (2022). Egg quality traits in Albalady hens. *Poultry Today, 7*(1), 40–46.

Dar, A., & Mirza, M. A. (2023). Comparative performance of Australorp and Rhode Island Red under controlled conditions. *Journal of Livestock and Poultry Research, 8*(2), 103–111.

El-Tarabany, M. S., & El-Bayomi, K. M. (2023). Comparative assessment of egg traits in local chicken ecotypes. *Veterinary World, 16*(1), 55–62.

Farooq, M., Durrani, F. R., & Ahmad, S. (2023). Performance of Black Australorp under tropical conditions. *Livestock Science, 260*, 105094.

Ghafoor, A., & Anwar, H. (2023). Comparative study on body weight and laying rate in three chicken breeds. *Pakistan Poultry Journal, 19*(2), 75–83.

Hafeez, M., & Younis, M. (2023). Indigenous chicken breeds for sustainable egg production. *Asian Agricultural Review, 9*(3), 143–150.

Haider, S., Khan, R. U., & Gul, H. (2022). Effect of photoperiod on egg production traits. *Poultry Science Journal, 10*(3), 190–196.

Hassan, M., Zahid, R., & Latif, K. (2023). Seasonal egg production trends in Fayoumi breed. *Animal Production Science, 63*(2), 180–187.

Iqbal, M., Zubair, M., & Nawaz, H. (2022). Mortality patterns in laying hens under different housing systems. *Journal of Poultry Science, 59*(4), 310–317.

Javaid, S., Qamar, Z., & Rasheed, M. (2023). Albalady chicken performance under environmental stress. *Asian Journal of Agriculture, 34*(2), 250–259.

Khan, H. U., Iqbal, M., & Nazir, M. (2022). Evaluation of egg quality in indigenous and exotic chicken breeds. *Poultry Science, 101*(4), 101903.

Latif, S., & Hussain, N. (2023). Nutritional strategies for improving laying performance. *Poultry Nutrition Review, 7*(2), 20–31.

Nasir, A., & Shafqat, S. (2023). Heat tolerance and laying efficiency of Fayoumi hens. *Poultry Environment Review, 8*(2), 28–35.

National Agricultural Research Centre (NARC). (2023). *Annual report on poultry research*. Islamabad: NARC Publications.

Nawaz, H., Anjum, A. D., & Latif, S. (2021). Egg size variation in indigenous breeds. *Pakistan Journal of Biological Sciences, 24*(6), 630–637.

Qureshi, A. H., Khan, S., & Rahman, M. (2024). Breed selection for sustainable egg production in Pakistan. *Pakistan Journal of Agricultural Sciences, 61*(1), 1–10.

Rana, M. A., & Zafar, F. (2023). Comparative egg weight analysis across seasons. *Veterinary Research Forum, 14*(1), 85–92.

Raza, S., Khan, M. I., & Aslam, M. (2024). Impact of climate variability on poultry breed performance. *Journal of Animal Research, 14*(1), 45–52.

Rehman, A., Akhtar, S., & Saleem, M. (2023). Effect of heat stress on egg output in laying hens. *Avian Biology Research, 16*(3), 200–208.

Shahzad, M., & Riaz, T. (2024). Evaluating the economic potential of egg-laying breeds in Pakistan. *Pakistan Journal of Poultry Science, 15*(1), 15–23.

Zia, S., & Akram, M. (2022). Housing management effect on hen performance. *Livestock and Poultry Journal, 6*(1), 55–61.