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SEASONAL ADAPTATIONS IN MANAGEMENT AND FEEDING PRACTICES FOR COMMERCIAL LAYER CHICKENS: A STUDY IN SOUTHERN REGION OF TELANGANA

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Abstract: This study investigates the seasonal adaptations in management and feeding practices of commercial layer chickens in the Telangana region. The research focuses on three distinct seasons: summer, rainy, and winter. During summer, measures to mitigate heat stress were observed, with adoption rates ranging from 50% to 90%, highlighting the importance of such practices in enhancing production performance under challenging environmental conditions. Similarly, the rainy season witnessed the adoption of various management practices (60% to 90%), showing potential improvements in production capabilities despite adverse conditions. Challenges in the monsoon season, such as increased humidity and microbial proliferation were addressed through interventions like fluorescent lighting to maintain feed intake. In contrast, the winter season displayed varied adoption rates (37.50% to 100%) for management practices, reflecting the influence of temperature fluctuations and reduced daylight duration on feeding behaviour. Overall, this study underscores the necessity of seasonally tailored feeding and management strategies to optimize the production efficiency of commercial layer chickens.
Keywords: Management, Feeding Practices, Adaptations, Season, Layer Chickens.

INTRODUCTION

The poultry industry in India has emerged as a highly dynamic and rapidly expanding sector within the livestock economy, evident from the substantial increase in egg production. In the year 2022-23, egg production reached approximately 138.38 billion, marking a remarkable growth of 33.31% over the past five years compared to the estimated 103.80 billion in 2018-19. The annual growth rate for 2022-23 stood at 6.77% compared to the previous year (BAHS, 2023). Among the states, Andhra Pradesh leads in egg production, contributing 20.13% to the total, followed by Tamil Nadu (15.58%), Telangana (12.77%), West Bengal (9.94%), and Karnataka (6.51%).

Within the Telangana region of India, the poultry industry has undergone substantial growth and transformation, cementing its role as a cornerstone of the regional economy. Of particular importance within this industry are commercial layer chickens, specialized for egg production, forming an indispensable segment of operations. However, the performance of

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these layer chickens is intricately tied to seasonal variations and the nuanced feeding management practices adopted within the region.

In Southern Telangana, distinct seasonal changes significantly impact feeding practices and production outcomes for commercial layer chicken farms. These seasons - summer, monsoon, and winter - each present unique challenges and opportunities for farmers.

During the blistering summer months, soaring temperatures and low humidity levels pose numerous challenges for commercial layer chicken farms. To combat the adverse effects of heat stress, farmers must carefully adjust their management practices mainly on feeding strategies. Providing a well-balanced diet with precise nutrient proportions becomes crucial to sustain egg production while minimizing the detrimental effects of heat stress. High temperatures can lead to decreased egg production and compromised egg quality, potentially impacting the farm's profitability due to reduced growth and egg production resulting from reduced feed intake.

The onset of the monsoon season brings heavy rainfall and increased humidity, creating favourable conditions for disease outbreaks. Maintaining stringent biosecurity measures and disease prevention practices becomes imperative during this period. Elevated humidity levels can soften eggshells, affecting egg quality, and farmers must remain cautious to prevent the occurrence of soft-shelled eggs. Moreover, the muddy and wet conditions that accompany monsoon rains present challenges for both birds and farmers, emphasizing the importance of proper drainage and cleanliness protocols to prevent health issues.

As winter sets in, a different set of challenges arises, primarily due to increased humidity and the associated risk of disease. Farmers must adapt their feeding practices accordingly to mitigate these risks. Elevated humidity levels can promote mould growth in feed, necessitating proper storage practices to prevent contamination. Additionally, the increased risk of disease can lead to decreased egg production, further emphasizing the importance of effective management strategies.

In navigating these seasonal challenges, effective management strategies and tailored feeding practices are essential for maintaining the productivity and profitability of commercial layer chicken farms in the region. Understanding the intricate dynamics of feeding management across seasons holds paramount importance. Hence, this study focusing on seasonal variations will provide valuable insights into best practices, seasonal adaptations, and potential enhancements in feeding management strategies aimed at optimizing production outcomes.

MATERIALS AND METHODS

Location and Climate

This study was conducted in the southern region of Telangana state, India characterized by an annual rainfall ranging from 610 to 850 mm. Winter temperatures range from 20°C to 26°C, while summer temperatures range from 32°C to 38°C (TSDPS and DES, 2022).

Seasonal Variations

The southern Telangana region experiences distinct seasonal changes, including hot summers and a monsoon season. The highest mean maximum temperature of 40.9°C is recorded in May, while the lowest of 30.5°C is observed in December. Average relative humidity throughout the year stands at 62%, with peaks at 89% and lows at 39%. The year is divided into summer (March – June), rainy (July – October), and winter (November – February) seasons.

Birds and Housing

Ten commercial layer farms, seven from Mahabubnagar and three from Rangareddy district were selected for this study. These farms have an average capacity ranging from 100,000 to 150,000 birds, all rearing BV-300 strains. Data collection was conducted for layer birds aged 19-83 weeks during the period 2022-23. The birds were housed in elevated cage systems and primarily relied on natural daylight, with supplemental lighting provided using 60 W bulbs. Routine vaccination and preventive measures were implemented following standard protocols.

Management and Feeding practices

The feeding regimen comprised maize and soybean meal-based chick crumble feed for day-old chicks up to 9 weeks of age. Grower or developer feed was provided from 10 to 15 weeks of age, followed by pre-lay feed from 16th to 18th weeks of age (Table 1). Subsequently, layer Phase-I, Phase-2, Phase-3, and Phase-4 mash feed were administered from 19-30, 31-50, 51-72, and 73 weeks of age and above, respectively, in accordance with the nutrient specifications of the breeder (BV-300).

Table 1. Nutrient composition of diets followed in different phases

Nutrients (%)	Chick	Grower/ Developer	Pre-layer	Phase I	Phase II	Phase III	Phase IV
ME Kcal/kg	2900	2700	2700	2575	2545	2545	2435
Crude protein	19.00	17.00	17.00	16.63	15.75	15.23	14.58
Crude fibre	5.17	6.20	5.48	5.41	5.44	5.39	5.89
Ether extract	2.80	2.18	2.66	2.57	2.12	2.14	2.04
Calcium	1.04	1.02	2.49	3.86	4.00	4.21	4.16

Av. Phosphorus	0.47	0.42	0.45	0.40	0.35	0.32	0.28
Dig. Lysine	0.90	0.70	0.75	0.67	0.64	0.61	0.57
Dig. Methionine	0.41	0.31	0.30	0.36	0.30	0.27	0.24
Sodium	0.20	0.18	0.18	0.17	0.16	0.16	0.15
Chloride	0.22	0.18	0.18	0.17	0.16	0.16	0.16
Potassium	0.98	1.04	0.96	0.93	0.91	89.00	93.00
Linoleic acid	0.16	1.27	1.52	1.45	1.22	1.23	1.17

Data Collection and Statistical Analysis

In this study, primary and secondary data were collected from farm records, pre-structured questionnaires, and personal interviews. Both non-parametric and parametric statistical methods were utilized, chosen according to the characteristics of the data and the desired information. Descriptive analysis employed percentages for easy comparison. The calculation of percentages involved multiplying the frequency of each cell by 100 and then dividing it by the total number of respondents within the respective category to which the cell belonged.

RESULTS AND DISCUSSION

Management and feeding practices followed for various seasons

The feeding management practices adopted during various seasons viz., summer, rainy and winter in southern Telangana region of commercial layer farms are presented in Tables 2, 3 and 4, respectively.

Management and feeding practices followed during summer season

The data showed (Table 2) that the implementation of management practices to mitigate heat stress during the summer varied between 50% and 90%. These results highlight a higher level of awareness regarding these management practices, suggesting that their adoption could potentially enhance production performance in challenging environmental conditions.

Earlier research has established the advantageous effects of various management practices in bolstering the performance of layer chickens during the summer. Although wet mash feeding practices were not prevalent in southern Telangana, earlier research by Ashraf Waiz (2016) highlights the potential of wet mash feeding during the summer season to enhance productivity in laying hens by improving feed conversion efficiency in layer pullets. This enhancement in broiler performance likely arises from improved feed digestibility (Forbes, 2003). Furthermore, the heightened dry matter consumption through wet mash feed intake can elevate micronutrient intake, contributing to enhanced poultry performance in higher environmental temperatures.

Table 2. Management practices adopted (%) by the farmers during summer season in southern Telangana region

Sl. No.	Management practices	Adoption (%)
A	**Housing management**	
1	White wash on roof tops	14.2
2	Covering thatched material on roof tops	28.5
3	Fitting sprinklers on roof	42.8
4	Usage of foggers	85.7
5	Usage of fans	28.5
6	Fitting gunny bags on side wall with dripping of water	100
B	**Water management**	
1	Flushing out of pipe lines 2-3 times in a day during hot hours	100.0
2	Covering the water sources, tanks and pipe line with gunny bags	71.1
C	**Feeding management**	
1	Crumble / pellet feed	0
2	Mash feed	85.7
3	Wet feed	0
4	Feeding at cooler part of the day	100.0
5	Increased frequency of feeding (3 or 4 times per day)	100.0
6	Feed withdrawal during hottest part of the day	100.0
D	**Light management**	
1	Early morning light 4 am to late evening 8 pm	100.0
2	Midnight lighting of 1-2 hours	85.7
E	**Medications**	
1	Use Sodium bicarbonate in feed @1-2 kg / tonne feed / water	100.0
2	Use electrolytes in feed / water	42.8
3	Anti-stress vitamins like Vitamin C @ 150 mg /kg	71.1
4	Antioxidant Vitamin E @ 125 mg/kg	100.0
5	Aspirin powder @ 0.3 g /lit water	0
F	**Others**	
1	We should not disturb birds during hottest part of the day	71.1
2	Other activities like vaccination, Handling, Shifting, de-beaking, should be carried out in cooler part of the day	100.0

Management and feeding practices followed during rainy season

Our study findings indicate a range of 60% to 90% in the utilization of various management practices during the rainy season (Table 3). This heightened awareness of scientifically sound management practices harbours the potential to elevate production capabilities in adverse environmental conditions.

During the monsoon season, the ambient temperatures drop to colder levels and humidity increases. These conditions are more conducive to the proliferation of microorganisms. To counter these adverse conditions, appropriate preventive measures should be put in place to

prevent a decline in the production performance of laying chickens. The reduction in daylight duration leads to a decrease in feed intake, a challenge that can be mitigated by providing fluorescent lighting (Amit, 2022).

Table 3. Management practices adopted (%) by the farmers during rainy season in southern Telangana region

Sl. No.	Management practices	Adoption (%)
A	**Housing management**	
1	Repairing of the house and clearing the drainage	100.0
2	Usage of side curtains to close during rainy hours	100.0
3	Maintaining proper ventilation to reduce humidity inside shed	100.0
B	**Water management**	
1	Providing sanitised fresh water	100.0
2	Stimulation of water intake	50.0
C	**Feeding management**	
1	Crumble / pellet feed	0
2	Mash feed	100.0
3	Two times feeding	62.5
4	Preventing mould / fungus infestation in feed and feeders	100.0
D	**Light management**	
1	Following 16 hours lighting period	100.0
2	Adopting artificial lighting when reduction in day length	62.5
E	**Medications**	
1	Usage of preventive medication against infectious diseases	37.5
F	**Others**	
1	Sanitation and hygienic practices in around sheds	100.0
2	Following strict vaccination / deworming schedule	100.0

Management and feeding practices followed during winter season

The findings of this current study reveal a broad spectrum of adoption rates, ranging from 37.50% to 100%, for various management practices during the winter season (Table 4). This heightened awareness of scientifically grounded management practices holds the potential to enhance production capabilities in challenging environmental conditions.

Table 4. Management practices adopted (%) by the farmers during winter season in southern Telangana region

Sl. No.	Management practices	Adoption (%)
A	**Housing management**	
1	House designed in a way sun light enters the shed during day time	100.0
2	Preventing entry of cold air by hanging gunny bags	87.5
3	Maintaining proper ventilation to reduce humidity inside shed	87.5
B	**Water management**	
1	Providing sanitised and fresh water	37.5

2	Stimulation of water intake	62.5
C	**Feeding management**	
1	Crumble / pellet feed	0
2	Mash feed	100.0
3	Two times feeding	87.5
4	Avoid mould / fungus infestation in feed and feeders	100.0
D	**Light management**	
1	Following 16 hours lighting period	100.0
2	Adopting artificial lighting when reduction in day length	75.0
E	**Medications**	
1	Usage of preventive medication against infectious diseases	50.0
2	Anti-stress vitamins like Vitamin C @ 150 mg /kg	62.5
F	**Others**	
1	Sanitation and hygienic practices in around sheds	100.0
2	Following strict vaccination / deworming schedule	100.0

Fluctuations in feed consumption exhibit similar patterns with each temperature change, but they are more pronounced during cold weather as compared to the summer season. Low temperatures result in increased feed intake and greater oxygen demand. Moreover, the reduction in daylight during the cold season significantly impacts the feeding behaviour of birds. They tend to engage in fewer activities and huddle together to generate warmth and maintain their energy levels, which leads to an increased feed intake to meet their energy requirements and sustain their metabolic processes. It is, therefore, advisable to implement a range of management practices to address these challenges during the winter season (Ayomide adebayo, 2020).

CONCLUSION

This study highlights the importance of seasonally tailored feeding and management practices in optimizing the production performance of commercial layer chickens in the Telangana region. Management practices aimed at mitigating heat stress during summer were found to enhance production performance, while interventions during the rainy season showed potential for improving capabilities in adverse conditions. The varied adoption rates of management practices in winter underscore the need for flexibility to address fluctuations in feed consumption patterns and environmental challenges. Understanding and adjusting to environmental conditions such as heat stress and cold weather are essential for maintaining healthy and productive flocks. Continued efforts to develop and disseminate best practices for poultry farming in variable climatic conditions are crucial for the sustainability and success of the industry.

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