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RESEARCH PAPER

TITLE

STUDY ON PERFORMANCE POTENTIAL AND QUANTITATIVE TRAITS OF INDIGENOUS CHICKEN OF TANDO ALLAHYAR

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STUDY ON PERFORMANCE POTENTIAL AND QUANTITATIVE TRAITS OF INDIGENOUS CHICKEN OF TANDO ALLAHYAR

ABSTRACT: This study aimed to evaluate the qualitative and quantitative characteristics of indigenous chickens in Tando Allahyar raised by rural communities. The study involved 50 villagers from 470 households with more than 10 indigenous chickens. The findings showed that 72% of cockerels reached maturity between 4-6 months and 24% between 7-8 months. Female chickens matured at 6–8 months (44%), 8-9 months (40%), and 9-11 months (10%). Male chickens had significantly higher live body weight during maturity and adulthood compared to female chickens. Egg production from indigenous chickens in free-range scavenging systems was low, ranging from 55 to 65 eggs per year, but improved to 80 to 95 eggs per year in backyard scavenging systems. Male chickens had significantly higher live body weight during maturity and adulthood compared to female chickens. The study identified four periods of broodiness per year, averaging 13-15 days and increasing to 30 days in some instances. The average incubation period was 11-14 days (80%) and 15-18 days (20%), with a hatchability rate of 78-82%. Regarding the characteristics of backyard poultry birds in Tando Allahyar, 30% had yellow skin color, while 70% had white skin. Plumage color distribution was 40% black, 45% barred, and 15% white. Most chickens laid brown eggs with an average weight of 47.01±0.43 grams and a high quality of 61 Haugh units. Mortality percentages, mainly due to ND+IB and predators, were observed at 45%, although this was reduced in backyard scavenging systems with minimal health care management. The study concluded that enhancing backyard chicken production can be achieved through improved management practices, including proper vaccination and treatment provisions.

KEYWORDS: Backyard, Indigenous chicken, Production potential, qualitative, quantitative traits

1. INTRODUCTION

The Tando Allahayr district is home to approximately 239,242 indigenous chickens, according to Kaleri et al. (2023a). These chickens are typically raised in a traditional free-range or backyard system, feeding on leftover human foods, kitchen waste, insects, and worms. The chickens have undergone natural selection over thousands of years, which has made them well-suited to local conditions and resistant to disease (Kaleri et al., 2023b). The low-input, low-output farming system used to raise these chickens contributes to their men for fulfilling their families basic need and nutritional requirement in rural areas. Studies have shown that this system also helps alleviate poverty in developing countries. In contrast, hybrid poultry farming is demanding and costly and can have negative effects on rural economies and empowerment initiatives (Apuno et al., 2011). China, India and various other developing states higher threat to the genetic variation arises from agriculture depression and large number of crossbreeding of indigenous chicken breeds

with exotic breeds, causes, resulting in the creation of highly productive breeds. This short-sighted approach endangers our animal capital for immediate profits, neglect's ability and performance of such indigenous chicken that can adopt harish environment conditions and help to maintain ecosystem at desirable level. In order to maintain and conserve the pure chicken breeds is major factor for interest of human (Kaleri et al., 2023ef). A major step in the commitment to conservation was taken in 1982 when a high-level political decision discouraged the establishment of world data building in Italy Room. It was reported by Hodges, 2002 that FOA plays important role for establishment of center to conserve the nature. The FAO Special Program for Food Security in 1997 recognized the integral role of domestic poultry and incorporated village chicken production systems into mainstream agriculture. Keeping in the view importance of production and qualitative characteristics of local chicken in Tando Allahyar, present study was designed with following methodology.

2. MATERIAL AND METHOD

Present investigation focused on the native chicken population in 50 villages in the Tando Allahyar district of Sindh province. The villages were selected randomly to ensure a diverse representation of the area. A total of 470 households, each raising at least 10 local chickens, participated in the survey. Information about the breeding and performance of indigenous chickens were recorded from family members by questioning surveys, which involved questions from family members responsible for raising the chickens.

The time period between successive clutch events was defined as clutch following the method of Whittow (2000). Live bird weights were measured on site using a single pan scale. Qualitative and physical traits, as well as their management environment including feed formulation, housing type were observed in this study.

In order to evaluate the various egg characteristics fresh eggs were collected from owners and observed for different qualitative and quantitative traits with procedure as suggested by Panda, 1998). For this purpose, different egg parameters were computed using the method described by Winton and Barber (2003). Albumin quality was evaluated by calculating Haugh units based on the approach established by Haugh in 1937. The data collected were then analyzed using standard statistical procedures as outlined by Snedecor and Cochrane (1967).

3. RESULTS

There are two main systems for raising indigenous chickens: the free-range system, commonly Applied in rural population with lack information about animal rearing as well as poultry rearing system. The chickens roam freely around the village in free range rearing system and feed on kitchen waste, human food scraps, worms, or insects. Some households may provide hand-feeding of broken rice, paddy, or spoiled grains. Predation by various animals is the primary cause of mortality in this farming method. Health care is virtually non-existent, and the predominant disease responsible for significant chicken losses is Newcastle disease. Due to this health concern egg production has been recorded less with average 55-65 number of eggs in year as mentioned in Table-1.

Table-1 Indigenous chicken characteristics and rearing system in Tando Allahyar

Parameter observed	Free range	No. of backyard poultry birds
Size of flock	4-12	12-22
Purpose of rearing	Rural families	Urban families with

		few rural families
Feeding pattern	Mostly scavenging sometime hand feeding	Mostly scavenging with supplementation
Health measurement	Very rarely vaccination and medication	vaccination with no medicine
Housing type	Mostly tree sitting in night few have simple house for night stay	Fencing line provided with night shelter
Product use	Consumption of home purpose	Sale as well as home consumption
Production of egg	55-65	70-90
Owner	Children and old women	Family but mostly women
Chicken breeds	Only indigenous	Crossbred with indigenous
Mortality	Very high ND+IB and predation	By primary disease with moderate risk

In a backyard or subsistence rearing system, chickens are allowed to roam freely for scavenging and are given supplemental feeds such including regular health checks and vaccinations. The birds are fed a balanced diet and provided with clean water at all times. The eggs are collected daily and stored in a cool, dry place until they are ready for sale. The hens are allowed to roam freely and engage in natural behaviors, resulting in high-quality, nutritious eggs with vaccinations administered, though not on a routine basis. Recorded egg production in this rearing system typically ranges from 80 to 95 eggs per year. However, during the survey, instances of as high as 115 eggs per year were reported, particularly among the Mari and Kalroo tribes of Tando Allahyar, who lead a nomadic lifestyle with a continuous sequence of laying.

Tabel-2 Data of quantitative character of backyard chicken in Tando Allahyar

Traits	Female bird	Male bird
Maturity age	6–8-month 44% 8-9-month 40% 9-11-month 10%	4-6 month (72%) 7-8month (24%)
Live body weight at maturity	0.911±0.13	0.989±21
Live body weight of adult bird	1.261±0.31	1.971±17
Egg production (lying between 2 brooding	13-17 with average 14	
Per year clutch	4 (76%) 5 (24%)	
Egg lying time	Afternoon (20%) Forenoon (80%)	
Egg lying sequence	Continuous (20%) Alternate (80%)	
Brooding time	13-15 days (84%) 30 days (16%)	
Incubation ability egg laying hen	11-14 (80%) 15-18 (20%) 78 (85%)	
Season of incubation	January to September	
Hatchability percentage	78-82%	

Roosters mature faster than hens and are much heavier when fully grown. Hens usually lay 55 to 65 eggs per year, but under ideal conditions, this can increase to 85 to 95 eggs annually. Keeping hens from becoming broody can help boost egg production. In

Tando Allahyar's moderate climate, most incubation and hatching take place from January to September, corresponding with the spring and fall equinoxes in the northern hemisphere. Longer periods of broodiness and egg hatching occur when there is less difference in the lengths of day and night. Details are in the Table2.

Local chickens come in various colors, including black, white, and some with featherless necks. They are known for their active behavior, often flying short distances and getting into occasional fights. Many hens have a distinctive feathered cap, as shown in Tabel-3.

Table-3 Morphological traits of Indigenous chicken in Tando Allahyar

Trait	Skin color	Color of pulmage	Type of comb	Color of comb	Color of shank	Naked neck	Color of earlobe
Parameters	Yellow 30% White 70%	Black 40% Barred 45% White 15%	Pea 15% Single 77% Rose 8%	Dark slate 22% Yellow 15% Black 37%	Yellow 30% White 70%	4%	Red 15% White 85%

72% of the eggs weigh more than 47 g and are classified as "medium" according to Indian weight standards. Other egg characteristics such as eggshell thickness, egg albumin index, egg shape index and egg yolk index meet international standards. Indigenous chicken brown eggs are preferred for their deep yellow yolk, distinctive taste, and higher market price compared to white eggs as mentioned in Table-4.

Table- 4 Qualitative and Quantitative traits of local chicken eggs in Tando Allahyar

Observation	Egg parameters
Color of egg	White 25.13% Brown 74.87%
Thickness of Eggshell	0.27±001
Egg shape index	67.21
Haugh unit	61
Eggshell weight	3.79±0.43
Egg albumin index	0.061
Egg weight	47.01±0.85 small 36-42 (25%), medium 25-47 (72%), large 52 (3%)
Egg yolk index	0.347

4. DISCUSSION

Indian, China and number of other counties introducing different exotic chicken breeds produce more amount of meat and egg as compared with local indigenous chicken production. It is real fact that to achieved higher production of egg as well as meat only by taking important steps for management and prevention from various dreadful diseases. It is well known that egg production decreases significantly without proper feeding, good housing and disease protection (Ahmed et al., 2023). This study reports an egg production of only 55-65 eggs per year in indigenous chickens, which corresponds to the production potential observed in indigenous chickens in African countries (Akbar et al., 2020), Chitral (Kaleri et al., 2023e). The early mortality in poultry chicks is a significant challenge in village chicken production, highlighting the need for

management interventions to improve chick survival and egg production.

The determinants of egg quality in this study are consistent with values reported for improved layers (Panda, 1998; Kaleri et al., 2023abcd). In our study average egg weight of local chicken falls within acceptable limits as per Indian weight classification standards. While indigenous chicken farming in rural communities is commonly considered less input as well as less output performance (Kaleri et al., 2023ef), successes in different communities of Indian city such as Jodhpur and Jalapur mentioned by (Ravikumar et al. al (2002), show that better management, vaccination, disease control and selective breeding can bring positive results. Similar success stories in the China, Bangladesh and South Africa (Sharma et al., 2002), Saleque and Mustafa, 1996) and Sonajya et al., 1999), respectively described that importance of local poultry birds and their performance with better management, feeding and with proper vaccination schedule. Recently world is working on biodiversity and genetic conservation of local breeds neglecting gene conservation in rural poultry crossbreeding programs could lead to the erosion of native germplasm (Kaleri et al., 2024ab). Farooq et al (2004) reported problems such as non-hatching in local chickens due to interbreeding with exotic birds, which adversely affects hatching. Keeping in the importance of local chicken in economy of rural areas of developing countries and its aim to enhance by improving feeding and vaccination with increasing the net profit of small scale poultry farmers and low land peoples, scientists and rural development agencies have emphasized this over the past two decades (FAO 1982, 1987; Ahmed et al. ., 2023 , Ullah et al., 2019 and Ullah et al., 2022). The native Tando Allahyar chicken, as revealed in this study, exhibits significant genetic variation and its breeding could become a vital component of rural development, contributing to job creation, rural economic growth and nutritional security with minimal inputs. Achieving this goal, akin to countries like China or South Africa, requires a thoughtful approach to livestock husbandry and planning by both administrators and communities, emphasizing the need for a sustainable strategy to preserve local breeds over reliance on external genetic resources.

5. CONCLUSION

Enhancing backyard chicken production in Tando Allahyar necessitates improved management practices, especially in the areas of vaccination and treatment, to address mortality problems and maximize egg production in local chickens.

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