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Rusfidra

Department of Livestock
Production Technology, Faculty
of Animal Science, Universitas
Andalas, Indonesia

Verucha Valensya

Animal Science Study Program,
Faculty of Animal Science,
Universitas Andalas, Indonesia

Harif Gusdinal

Animal Science Study Program,
Faculty of Animal Science,
Universitas Andalas, Indonesia

Kusnadidi Subekti

Animal Science Study Program,
Faculty of Animal Science,
Universitas Andalas, Indonesia

Firda Arlina

Animal Science Study Program,
Faculty of Animal Science,
Universitas Andalas, Indonesia

Corresponding Author:

Rusfidra

Department of Livestock
Production Technology, Faculty
of Animal Science, Universitas
Andalas, Indonesia

Diversity of eggs from the parent generation (G0) of *Kokok Balenggek* Chickens

**Rusfidra, Verucha Valensya, Harif Gusdinal, Kusnadidi Subekti and
Firda Arlina**

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Abstract

This research aims to examine the variability of *Kokok Balenggek* chicken (KBC) eggs from the parental generation (G0). Six laying cycles yielded a cumulative total of 160 eggs. We employed an observational research approach using purposive sampling. The observed parameters comprise egg weight, egg index, and eggshell color. The employed data analysis is descriptive statistical analysis, involving the calculation of the mean, standard deviation, and coefficient of variation. The research findings indicate that Black hens produced the heaviest eggs (39.73 ± 1.01 g), whereas Lurik hens produced the lightest (36.76 ± 1.53 g). The maximum egg index was observed in Black hens ($79.10 \pm 1.90\%$) and the minimum in Jalak hens ($75.10 \pm 1.59\%$). The prevailing eggshell color is white. The research concludes that egg weight, egg index, and eggshell color exhibit relative uniformity.

Keywords: *Kokok Balenggek* Chicken, Egg Weight, Egg Index, Eggshell Color

Introduction

Kampung chicken is a local chicken prevalent throughout Indonesian communities. Indigenous chickens represent a genetic resource in poultry that requires conservation. KBC is a native chicken breed from Solok Regency, West Sumatra. Extensive research on KBC has been conducted by various researchers, encompassing investigations into the characteristics of crowing sounds (Rusfidra *et al.* 2014; Rusfidra and Arlina, 2015; Arlina *et al.*, 2020) ^[14, 15, 14, 2], assessments of KBC semen and fertility (Ananda *et al.*, 2024) ^[1], the viability of KBC as meat chickens (Husmaini *et al.*, 2023) ^[5], analysis of sperm quality in KBC (Ananda *et al.*, 2024) ^[1], reproductive dynamics of KBC post-artificial insemination (Jaswandi *et al.*, 2023) ^[8]. KBC is a progeny of the hybridization between the Red Junglefowl (*Gallus gallus*) and indigenous chickens from the Central Region. We base this hypothesis on the assumption that only *G. gallus* lives on the Sumatera Island (Nishida *et al.*, 1982; Fumihito *et al.*, 1994) ^[12, 4]. Weigend and Romanov (2001) ^[17] assert that *G. gallus* is the progenitor of all contemporary domestic chicken breeds. KBC encompasses the "singing chicken" variety, characterized by a harmonious, multi-layered crowing sound that is enjoyable to hear (Rusfidra and Arlina, 2015) ^[14]. The Parent generation (G0) constitutes the inaugural generation of the KBC population, attaining sexual maturity at approximately 6 months of age. The objective of the parent generation (G0) is to augment and sustain the KBC population for five to six generations. Eggs are a compilation of nutrients supplied by avian parents for embryonic development into a chick. Eggs consist of three primary components: the eggshell (11%), egg white (57%), and egg yolk (32%). The preservation of KBC is imperative due to the declining numbers in central population centers, as many KBC are being sold outside these regions. Even KBCs with prolonged crowing noises (many syllables) are hardly encountered in their native habitat in Tigo Lurah District, Solok Regency. Furthermore, the KBC population has significantly diminished owing to the emergence of Newcastle disease and the absence of KBC competitions. In light of these circumstances, we must implement measures to conserve the KBC and prevent its extinction. One initiative to ensure the sustainability of KBC is focusing on the diversity of its hatching eggs.

The diversity of eggs is crucial for livestock preservation initiatives, since comprehending this variation aids in the selection of superior breeds and the effective preservation of KBC. Selection may be conducted according to factors including egg weight, egg index, and eggshell pigmentation. This research aims to assess the diversity of KBC eggs. This study's findings aim to furnish researchers and the public with insights into the diversity of KBC eggs, hence aiding in population enhancement and conservation efforts for KBC.

Materials and Methods

This study used a sample of 160 eggs from KBC hens categorized by distinct feather types: White, Black, Barred, and Jalak hens. The male-to-female ratio is 1:5. Eggs were gathered during six distinct phases of collecting KBC eggs. The instruments employed were calipers and a digital scale. A pan mating system of KBC house. Figure 1 illustrates four varieties of female hens utilized as breeders.

This research utilizes an observational approach through purposive sampling. The assessed factors include egg weight, egg index, and eggshell color. We determine the weight of the eggs by using a digital scale for measurement. The egg index is the ratio of the width diameter to the length diameter of the egg. Direct observation can determine the eggshell's color. We employ descriptive statistical analysis, which involves calculating the mean, standard deviation, and coefficient of variation (Steel and Torrie, 1991) [16]. Kurnianto (2009) [10] classifies the coefficient of variation as follows: low (< 5%), moderate (6-14%), and high (> 15%).

Results and Discussion

Egg diversity is crucial for livestock preservation, as comprehending this diversity aids in selecting superior breeds and effectively conserving KBC. Table 1 presents the mean, standard deviation, and coefficient of variation of the eggs from the *Kokok Balenggek* chicken generation (G0) categorized by feather color.

Weight of Eggs

The mean egg weight of KBC is 38.16 ± 4.46 g. Black hens

generate the highest average egg weight (39.73 ± 1.01 g), while Lurik hens produce the lowest average egg weight (36.76 ± 1.53 g). The Indonesian National Standard (SNI) states that an optimal egg weight ranges from 36 to 45 grams, indicating that the egg weights obtained from this investigation are satisfactory. Jull (1951) asserts that several genes that affect egg size pass on egg weight from progenitors to their descendants. The research findings are inferior to those of Irawan (2017) [7], which reported an average weight of KBC eggs at 39.79 ± 2.81 g.

Egg Index

The egg index is the ratio of the egg's width diameter to its length diameter. The maximum average egg width was observed in Black hens (3.80 ± 0.03 cm) and the minimum in Lurik hens (3.66 ± 0.07 cm). The maximum average egg length was observed in Jalak hens (4.93 ± 0.06 cm), while the minimum was recorded in White hens (4.8 ± 0.12 cm). The greatest average egg index was seen in Black hens ($79.10 \pm 1.90\%$), while the lowest was recorded in Jalak hens ($75.10 \pm 1.59\%$). The research findings indicate that the mean KBC egg index is $76.72 \pm 4.30\%$. The average KBC egg index surpasses the egg index documented by Asifa *et al.* (2020) [3] for Kampung chickens in Tongkuno District, which was $75.99 \pm 5.58\%$.

In comparison to Irawan (2017) [7] research, which reported an average egg index of $76.19 \pm 2.10\%$. Murtidjo (1992) [11] asserted that an optimal egg index falls between 70% and 79%. A greater egg index value signifies a more rounded egg, whereas an elongated egg possesses a diminished egg index. States that the standard range for the egg index is 70 to 74%.

Eggshell Color

The predominant eggshell color in the study is brownish white. In comparison to the findings of Asifa *et al.* (2020) [3], village chicken eggs in the Tongkuno and Tongkuno Selatan Districts exhibit three shell colors: white, brown, and cream. Romanoff and Romanoff (1963) categorize chicken eggshell colors into two primary hues: white and brown. Each chicken's genetic makeup determines the variations in hue.



Fig 1: KBC Female Utilised in This Research

Table 1: Average Eggs Performance of KBC Based On Feather Color

No.	KBC Strains	Egg Weight (g)	Egg Width (cm)	Egg Length (cm)	Egg Index (%)
1.	White hens (N=40)	$37,62 \pm 2,35$	$3,73 \pm 0,07$	$4,80 \pm 0,12$	$78,03 \pm 2,70$
2.	Black hens (N=40)	$39,73 \pm 1,01$	$3,80 \pm 0,03$	$4,81 \pm 0,11$	$79,10 \pm 1,90$
3.	Jalak hens (N=40)	$38,91 \pm 3,38$	$3,70 \pm 0,10$	$4,93 \pm 0,06$	$75,10 \pm 1,59$
4.	Barred hens (N=40)	$36,76 \pm 1,53$	$3,66 \pm 0,07$	$4,87 \pm 0,08$	$75,44 \pm 1,54$

Conclusion

The research findings indicate that the Black hen type produces the heaviest eggs, while the Lurik hen yields the lightest eggs. The Black hen possesses the greatest egg index, while the Jalak hen has the lowest. The eggshell is white.

Conflict of Interest

All authors declare no conflict of interest.

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Author Contribution

Rusfidra planned the experiment and writing article, Verucha Valenya and Harif Gusdinal responsible in collecting data, Kusnadidi Subekti and Firda Arlina responsible in interpreted the results, statistical analysed the data.

Conflicts of Interest

The authors declare that they have no conflict of interest.

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