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THE EFFECT OF CAGE ENRICHMENT ON EGG WEIGHT, AGE OF FIRST LAYING AND BODY WEIGHT OF PADJADJARAN QUAIL PARENT STOCK

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ABSTRACT

The cage system can affect the performance of quail production. This study aimed to determine the effect of cage environmental enrichment on egg weight, age at first laying and the body weight of Padjadjaran quail at first laying. This study used 100 Padjadjaran quail parent stock consisting of 20 brown male quails and 80 black female quails kept from January to March 2025 at the Quail Breeding Center, Faculty of Animal Husbandry, Padjadjaran University. Each cage was filled with 1 male and 4 females. The experimental study used a Completely Randomized Design (CRD) method with 4 treatments (P1 = wire ram cage, P2 = wire ram cage with litter P3 = wire ram cage equipped with laying facilities and synthetic grass, and P4 = wire ram cage with litter equipped with laying facilities and synthetic grass) and each treatment was repeated 5 times. The variables observed included the weight of the first egg, the age of the first quail laying, and the weight of the first quail laying. Data were analyzed using analysis of variance (ANOVA). The results showed an average first egg weight of 10.05 grams per egg, an average age at first egg laying of 45 days, and an average first quail weight of 208.92 g. These results indicate that cage environmental enrichment had no significant effect (P>0.05) on the first egg weight, egg at first laying, or body weight at first laying of Padjadjadran quail.

Keywords : *Padjadjaran quail, environmental enrichment, egg weight, first age, quail weight.*

Introduction

Generally the quail breeding cage model in Indonesia is similar to the cage model used for the production process of final stock laying quail, which uses multi-storey colony cages without providing free space for quail to express their natural behaviour. Quail productivity is influenced by the environmental conditions the quails perform their activities, namely eating, drinking and laying eggs. The cage environment must be made comfortable and in accordance with the needs of the quail as this can affect the quality of production (Hossain et al., 2024). This study was conducted to determine the effect of environmental enrichment of the cage (nesting facilities, synthetic grass, and litter) on the weight of the first egg, the age of the first egg, and the body weight of the first egg of quail.

Quail are animals that are easily stressed. High levels of stress in quail can lead to decreased productivity in quail (Wuryadi, 2013). An uncomfortable cage environment will affect quail welfare, causing stress, weight loss, and dehydration, which can reduce quail productivity. The impact of these welfare problems leads to behaviours such as feather pecking and cannibalism, which tend to get worse as the quail age and occur when the quail enter the egg production phase (Janczak & Riber, 2015).

This study added plastic curtains as nesting areas, synthetic grass, and litter for scratching and other behaviours. Study by (Laurence et al., 2014) enrichment of the quail cage environment was carried out to reduce behaviours caused by chronic stress in Japanese quail by adding visual barriers in the form of cork panels as a barrier to reduce interference between quail, as well as the addition of a piece of plastic grass for scratching media that increases quail comfort behaviour such as pawing or dusting bath. In addition, the study (Hunniford et al., 2014) added elements in the form of red plastic curtains as egg-laying areas, and scratch mats, as well as perches. Enrichment of the cage environment aims to support

normal behaviour in animals, prevent or reduce abnormal behaviour, increase the ability of animals to overcome behavioural challenges and improve physiological function (Matur et al., 2015).

Keeping animals under stressful conditions not only affects production parameters but also affects reproductive and immune parameters, one of the most effective ways to regulate stress levels is to introduce environmental enrichment elements for animals. So far, the positive effect of environmental enrichment is to reduce the level of fear and intensity of stress response, reduce anxiety, or abnormal behaviour and stereotypy frequency (Ramankevich et al., 2022). Therefore, research was conducted on enriching the cage environment with litter, nesting places, and synthetic grass so that quails are able to produce optimal production performance.

Materials and Methods

A total of 100 quails were reared, consisting of 20 males and 80 females. Each cage is filled with 5 quails with a sex ratio of 1:4, one male is projected to marry four females. The cages used were made from ram wire. Each experimental cage unit had a density of 25 birds per m^2, therefore 20 cages with a length of 50 cm, width of 40 cm and height of 25 cm were used. The experimental cage units were equipped with litter made from rice husks, nesting facilities in the form of PVC plastic curtains, and synthetic grass measuring 25 cm long and 15 cm wide as a means of channelling quail behaviour.

The research cage treatments were:

T1: Wire ram cage.
T2: Wire ram cage with litter.
T3: Wire ram cages equipped with nesting facilities and synthetic grass.
T4: Wire ram cage with litter and synthetic grass.

This study used an experimental method with a completely randomized design (CRD), with 4 different types of cages. Each treatment was repeated five times and each repetition consisted of 5 quails (1 male and 4 female). Variables observed included albumen index, haugh unit, yolk index, egg pH. Data were analyzed by ANOVA.

The variables observed in this study are:

1. First Quail Egg Weight
   First egg weight is the weight of female quail eggs when they first lay eggs. First egg weight was determined by observing and weighing the first produced egg from each experimental cage unit.
2. Age at First Egg Laying of Quail
   Age at first egg laying is the age of the female quail when it first lays eggs. Age at first egg laying was determined by observing whether there was already a quail laying eggs from one of the females in each experimental cage unit. If there is one egg in the experimental cage unit, then all female quails in the cage have entered egg laying age.
3. Weight of Quail First Laying
   The weight of the first quail to lay an egg is the body weight of the female quail when it first lays an egg. The weight of the first quail to lay an egg is determined by weighing each female quail from each experimental cage unit that has been found to have produced an egg, even if it is only 1 (one) grain.

Results and Discussion

The results of the study of the effect of cage environmental enrichment on First Quail Egg Weight, Age at First Egg Laying of Quail and Weight of Quail First Laying of Padjadjaran parent stock quail eggs can be seen in Table 1.

Table 1. Average First Quail Egg Weight, Age at First Egg Laying of Quail and Weight of Quail First Laying of Padjadjaran parent stock quail eggs

	Treatments			
	T1	T2	T3	T4
n (tail)	100			
First Quail Egg Weight	10.16	10.59	9.44	10.01
Age at First Egg Laying of Quail	45.60	43.20	46.80	44.60
Weight of Quail First Laying	213.37	198.97	208.35	215.00

1. First Quail Egg Weight

The results of enrichment of the cage environment, both without treatment, the provision of litter alone, the provision of nesting facilities and synthetic grass, as well as the provision of litter, nesting facilities and synthetic grass together in the cage did not significantly affect (P>0.05) on the first egg weight of Padjadjaran parent stock quail. average first egg weight of Padjadjaran parent stock quail ranged 10.05 g per grain. In this study, the smallest quail first egg weight was 8.08 g and the largest was 14.40 g. Listiyowati & Roospitasari (2005), argue that the amount of feed, feed quality and cage comfort are environmental factors that affect egg weight. The weight of the first egg shows the magnitude of the genetic influence, while the weight of the second, third, and subsequent egg-laying ages is influenced by environmental factors, age and rations used (Widianingrum., 2017).

The use of rice husk litter as the base of the cage does not have an effect on the first egg weight of quail. quail reared in each replicate of the experimental cage unit given rice husk litter as a base has varying egg weights. According to (Pistekova et al., 2006), states that egg weight is significantly higher in the litter system in laying hens compared to ordinary battery cages. according to (Suleman et al., 2018), light does not affect the weight of eggs produced because egg weight is a trait inherited by the mother. The use of curtains as a means of laying eggs here aims to make the mother quail feel safe and comfortable when laying eggs without being disturbed by other quail. The addition of synthetic grass to the cage is done to channel their natural behaviour of pawing and pecking. According to Jones (2002), pecking has the potential to have adverse implications for quail welfare, including allowing quail to be in pain when pecked, feather loss causing quail to be susceptible to injury, and pecking can cause bleeding from the skin or follicles, thus leading to cannibalism and death in quail.

2. Age at First Egg Laying of Quail

Indicates that the enrichment of the cage environment, both without treatment, the provision of litter alone, the provision of nesting facilities and synthetic grass, as well as the provision of litter, nesting facilities and synthetic grass together in the cage gives no significant effect (P>0.05) on the age of first laying quail Padjadjaran parent stock. average age of first laying quail Padjadjaran parent stock starts at the age 45 days. In the results of this study, the earliest quail laying eggs at the age of 40 days and the longest age of 51 days. According to (Hossain et al., 2024), the factors that affect the first age of quail laying eggs are genetic value, nutrition, stress, and light and environment, besides that feed factors also have a significant influence on sexual maturity. Likewise, in the research of (Berliana et al., 2018), the first age of laying eggs was 39-41 days and argued that the age of first laying eggs varies greatly depending on maintenance management, ration provision and individual variations. According to (Hossain et al., 2024), the factors that affect the first age of quail laying eggs are genetic value, nutrition, stress, and light and environment, besides that feed factors also have a significant influence on sexual maturity.

Enriched cage environment is considered as one of the most significant nongenetic elements that affect health, behavior, productivity, and reproduction of quail (Roshdy et al., 2010). While according to (Hossain et al., 2024) that rearing procedures have little impact on production and reproductive performance in quail, it occurs due to several factors such as age, genotype, environment, housing system, and feed.

3. Weight of Quail First Laying

enrichment of the cage environment, both without treatment, giving litter alone, giving nesting facilities and synthetic grass, as well as giving litter, nesting facilities and synthetic grass together in the cage gave no significant effect (P>0.05) on the weight of the first quail laying eggs. the average weight of the first quail laying eggs was 208.92 g. In the results of this study, the lowest first quail egg laying weight was 180 g and the highest was 225.50 g per bird.

Research by (Roshdy et al., 2010), showed that the body weight of the first quail laying eggs did not differ between the cage system using rice husk mats and battery cages. Although the use of rice husk mats does not have a significant effect on the weight of the first quail laying eggs, a poor cage environment due to dirty, damp mats can cause disease and stress in quail, allowing growth inhibition in quail and can affect quail body weight at the time of the first egg laying. In the study of (Laurence et al., 2014), adding a barrier to reduce interference between quails. Quail both in the wild and captivity prefer closed places as

a response to something scary. Body weight is influenced by genetic and environmental factors, genetic factors are obtained from the genetic material of the elders passed on to their offspring, while environmental factors are obtained from outside the livestock body where the livestock is located (Widianingrum, 2017).

Conclusion

Based on the results of the research that has been conducted, it is known that enrichment of the cage environment by adding litter as a base, curtains as a means of laying eggs, and synthetic grass as a means for quail to channel their natural behavior, namely scratching, does not affect the weight of the first egg, the age of the first quail laying eggs and the weight of the first quail laying eggs.

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