

The Influence of Egg Shape on Gender and Abnormality of Kampung Chicks

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Abstract

This research aimed to determine the influence of egg shape on the gender and abnormalities of hatched kampung chicks, conducted over one month in Wailela Hamlet, Ambon City. Using an experimental method with a quasi-experimental design, the study observed 120 kampung chicken eggs less than five days old. Data were collected by directly observing hatched eggs and chicks using hatching machines and digital scales. The eggs were cleaned, identified, and numbered before placement in a fumigated hatching machine. Ventilation and screening maintained temperature and humidity stability. The chi-square test (X²) analyzed the effect of egg shape on gender and abnormalities. The study's significance lies in its potential to improve breeding practices by understanding the impact of egg shape on hatching outcomes. However, the results indicated that egg shape did not significantly affect the gender or abnormalities of the hatched chicks. Consequently, egg shape cannot be used as a reliable criterion for selecting eggs to determine the gender or abnormalities of kampung chicks. This insight highlights the need for genetic or molecular techniques for gender determination and suggests further research with larger samples to explore other influencing factors.

Keywords: abnormality, egg shape, gender

Introduction

Local or kampung chickens are potential germplasm of kampung Indonesian poultry (Palestho, 2020). Kampung chickens have high adaptability to their environment (Horhoruw & Kewilaa, 2024; Sirait et al., 2023). Free-range chickens have several advantages compared to purebred chickens in terms of maintenance, such as resistance to certain diseases and relatively easy maintenance (Schreiter & Freick, 2023). Products from non-purebred chickens, such as eggs and meat, have special features and are difficult to replace with other commodities. In addition to advantages, free-range chickens also have several disadvantages, such as slow growth, low production, still incubation properties, slow gender maturity, long egg-laying interval due to parenting, and low genetic quality (Schreiter & Freick, 2023)

In order to keep pace with production figures, the increase in the number of kampung chicken populations is one indicator of business development (Lisnahan et al., 2023;

Zainudin, 2022). The increase in kampung chicken populations is influenced by various factors, one of which is breeding or providing kampung chicks through artificial hatching technology (Haryuni et al., 2020; Saragih et al., 2024).

Artificial hatching can be used to provide kampung chickens because a mother's ability to incubate is limited. It also extends the production period because the time for incubation and childcare is eliminated (Kamal et al., 2024; Yang et al., 2024; Zhu et al., 2023).

Selection of kampung chicks produced from hatched eggs, such as determining gender, weight, and condition of DOC, is very helpful in breeding efforts because it can determine who must be thought and who will be raised to be raised as broilers or laying hens (Kozák et al., 2023; Yang et al., 2024). In general, in the breeding business, chicks are widely expected to be females because they can be used as prospective parents in an effort to multiply eggs or populations (Aksan et al., 2021; Hung et al., 2024).

In relation to the gender of the chicks to be chosen, some farming communities assume that the oval shape of the egg will produce male chicks and the round shape of the egg will produce female chicks (Corion et al., 2022; Kamal et al., 2024). The assumptions mentioned above have not been scientifically proven. In addition to gender, chick abnormalities produced from hatching eggs based on egg shape have not been scientifically proven, so there is a need for research related to the influence of egg shape on gender and abnormalities of kampung chicks (Andaruisworo, 2022; Utami et al., 2020; Zhu et al., 2023).

Recent research from 2020 to 2024 has significantly contributed to the understanding of kampung chicken breeding and adaptation. Sudrajat et al. (2023) explored genetic markers for disease resistance, while Mege et al. (2021) investigated environmental adaptations in various regions. Horhoruw et al. (2024) studied the effects of different hatching techniques on chick survival rates, laying important groundwork in this field. This research introduces a novel approach by specifically examining the impact of egg shape on the gender and abnormalities of hatched kampung chicks, an area less explored in previous studies.

The primary objective is to determine if egg shape affects the gender and abnormalities of hatched kampung chicks. The benefits of this research include insights for more efficient breeding practices, revealing that egg shape is not a reliable criterion for gender or abnormality determination. This could save breeders time and resources by avoiding unnecessary reliance on egg shape. The implications suggest using genetic or molecular techniques for gender determination and conducting further research with larger samples to explore additional factors influencing hatching outcomes.

Research Methods

This study used an experimental method with a quasi-experimental design that aimed to observe the influence of egg shape on the gender and abnormality of hatched kampung chicks. The object of the study was 120 kampung chicken eggs aged less than five days,

obtained from the results of a male and female gender ratio of 1:8. Data were obtained from direct observation of hatched eggs and chicks, with kampung chicken egg populations and purposively selected samples. Research techniques include direct measurement and observation using tools such as hatching machines, digital scales, calipers, thermometers, hygrometers, hand sprayers, candler, and egg racks, as well as materials such as formalin, 70% alcohol, and warm water to clean eggs. The research procedure begins with the preparation of hatching eggs that are cleaned, identified, and numbered, then placed in a fumigated hatching machine. Eggs undergo several stages of manual ventilation and screening to maintain temperature and humidity stability and prevent the yolk from sticking to the centipede wall.

Egg cooling is done on day 4 to day 18 to ensure the embryos get enough oxygen. Examination of eggs is carried out three times during the hatching process using an egg observation device in a dark room to evaluate egg fertility and embryo condition. The effect of egg shape on gender and abnormalities was analyzed using the chi-square test method (X²) to determine the relationship between egg shape and hatching results, both in terms of gender and level of abnormality. This research is expected to contribute to the understanding of the effect of egg shape on hatching results, which can be used to improve efficiency and quality in kampung chicken breeding.

Results and Discussion

Egg shape to the gender of kampung chicks

The observed egg shape of the hatched eggs is divided into three groups. The number and percentage of Male and female chicks by egg shape are shown in Table 1 below.

Table 1. The influence of egg shape on the gender of Kampung chicks

Categories Egg Form	Gender Chick				Sum
	Male		Female		
	Tail	%	Tail	%	
Oblong	4	36,36	7	63,64	11
Oval	10	28,57	25	71,43	35
Round	13	33,33	26	66,67	39
Total	27	31,76	58	68,24	85

The results showed that the three categories of egg shapes that produced the most male chicks were found in oblong egg shapes with a percentage of 36.36%. The egg form that produces the most female chicks is found in the oval egg form, with a percentage of 71.43%.

The results of the analysis showed that the shape of the egg had no real effect ($P > 0.05$) on the gender of the hatched kampung chicks. This is because the number of samples is too small, or the samples used in this study from the three categories of egg shapes are not the

same, causing an intangible effect. It is proven that eggs cannot be used as hatching egg criteria and gender determination of kampung chicks because all three egg forms produce male and female chicks, so there is no dominant one that produces chicks that are all male or all female.

Based on Table 1, it can be seen that the male gender is mostly found in the oblong egg shape, while the one that produces the most female gender is in the oval egg shape. Therefore, the egg shape cannot be used as a criterion for determining the gender of the chicken. Gender determination can be done by means of the Gender Linking Gene and Molecular Gendering Method. Furthermore, Shetty et al. (2020) explained that gender determination by the Molecular Gendering Method can be done through the DNA amplification process using PCR (Polymerase Chain Reaction).

Egg shape against abnormalities of kampung chicks

The number and percentage of normal and abnormal chicks based on egg shape are shown in Table 2 below.

Table 2. The Effect of Egg Shape on Abnormalities of Kampung Chicks

Categories Egg Form	Chick conditions				Sum
	Normal		Abnormal		
	Tail	%	Tail	%	
Lonjong	10	90,91	1	9,09	11
Oval	34	97,14	1	2,86	35
Round	34	87,18	5	12,82	39
Total	78	91,76	7	8,24	85

The results of the study showed that normal chicks were found in oval egg shapes with a percentage of 97.14%, while abnormal ones were found in round egg shapes with a percentage of 12.82%. Based on Table 2 above, it can be seen that most kampung chick abnormalities in eggs are round. From the number of defective chicks, the percentage of chicks based on egg shape was obtained, which was an oblong egg shape of 9.09%, a round egg shape of 2.86%, and an oval egg shape of 12.82. From the observation of chicks hatched in the shape of round eggs, defective or abnormal children are produced because chicks in the process of cursing centipedes have difficulties because of the large size of the eggs, have thick egg centipedes, and also at the time of formation of organs and their development is late so that hatched chicks become deformed or abnormal.

The results of the analysis showed that the shape of the egg had no real effect ($P > 0.05$) on the abnormality of kampung chicks. This is thought to be because the number of samples is too small or the samples used from all three categories differ. These results also show that the shape of oval (small) or large (round) eggs is less than ideal as hatching eggs because it has an abnormally high percentage of chicks. In the results of observation, abnormal chicks were found, such as blind eyes, limping legs, and hanging belly buttons. This is thought to

be due to the ratio of albumin to egg yolk, which is not proportional, so the growth and development of embryos cause the hatching results of chicks to be deformed. This is in line with Helgrain et al. (2022), who states that the egg size can affect the embryo's attachment to the eggshell membrane, which can cause damage to the embryo that will hatch.

Conclusion

Based on the study's results, it can be concluded that the shape of the egg does not affect the gender and abnormality of the hatched kampung chicks. Furthermore, the shape of the egg cannot be used as a criterion in selecting eggs to determine the gender and abnormality of hatched kampung chicks.

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