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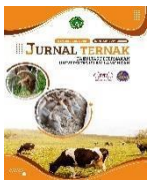

Evaluation Of The Performance Of Selfmix Feed-Based Layer Production Using And Not Using Feed Additive In Ponggok Village, Ponggok District, Blitar Regency

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ABSTRACT

This research was conducted in Ponggok Village, Ponggok District, Blitar Regency. The purpose of this study is to determine feed consumption, egg production, and physical quality of eggs based on self-mixed feed, using and not using additive feed. The data collection technique uses a qualitative approach with observation, interview, and documentation methods. The data analysis technique uses a descriptive analysis method. The study results show that the average age of farmers is 45-60 years old. The average level of elementary education. The average chicken strain used by farmers is the malindo strain with an average population of 3000-6000 heads. Production appearance includes feed consumption, hen day production (HDP), egg weight, shell color, shell texture in chickens aged 24, 25, and 26 weeks. The average level of feed consumption without the addition of feed additives was 120.6 grams, while feed consumption with feed additive added was 120 grams. The average HDP without the addition of feed additives to feed is 86 %, while HDP with the addition of feed additive to feed is 90.6%. The average weight of eggs without the addition of feed additives in feed was 55.8 grams (medium level), while the weight of eggs with the addition of feed additives in feed was 62.72 grams (extra level). The average color of egg shells without the addition of feed additives to feed is at level 7 (Mahogany), while the color of egg shells with the addition of feed additives to feed is at level 9 (Camel). The average texture of egg shells without the addition of feed additives to feed is at level 3 (slightly coarse), while the texture of shells with the addition of feed additives to feed is at level 1 (smooth).

Introduction

Blitar is the largest egg contributor in Indonesia. In 2020, according to data from the Blitar Regency Livestock and Fisheries Office, the Blitar Regency area has a total production of 1,150 – 1,200 tons of layer chicken eggs per day or a supplier of 70% of eggs in East Java and 30% of national eggs [1]. Based on data from the Central Statistics Agency, Ponggok District has the number of laying hen farmers,

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namely 618 breeders and a population of 3,118,415 laying hens, becoming the sub-district with the largest egg production in Blitar [1]. Based on the results of the survey in Ponggok village, there are 36 laying hen farmers. With this amount, it is assumed that Ponggok Village will be a supplier of 17% of eggs from the total number of farmers in Ponggok District. The amount of chicken egg production in Blitar Regency is able to meet the needs of egg consumption in the Blitar Regency and East Java areas by 70% and the remaining 30% for national egg needs. The productivity of laying hens is not only influenced by genetic factors, but also by environmental and feed factors. One of the environmental factors that is important to consider is maintenance management. In addition, good feed also affects egg productivity and quality [2].

Feed is the main determining factor for the success of a livestock business, as 75% of the total production cost is allocated to meet the feed needs consumed by livestock [3]. Feed is given to poultry livestock, it must contain sufficient nutrients and, according to their life needs. Feed for poultry, in this case for laying hens, is generally divided based on the method of manufacture, namely, feed from the factory or made by the factory and feed with its own mixture or made independently by the breeder (selfmix). Manufacturer feed for poultry also has two types, namely complete feed based on the type of poultry and special concentrated feed for poultry. Artificial feed is generally prepared independently by farmers, by having several stages from the collection of raw materials, the implementation of feed milling, mixing feed with machines or manuals and packaging by using sacks. Feed by mixing independently generally has a feed constituent from fishmeal or meatmeal as well as bone meal [4].

Based on the survey results, the problem experienced by farmers is the decrease in the productivity of laying hens. The thing that can cause a decrease in the productivity of laying hens is cage and feed management [5]. Finished feed or manufactured feed is a mixture of various feed materials that are low in crude fiber and high energy and protein. The feeding of the manufacturer must be adjusted to the needs of the livestock to ensure the desired livestock production. Farmers consider the price of factory feed to be very expensive, so they need other ingredients that are cheaper but have enough nutritional content to meet the needs of chickens [6]. Based on the survey results, to optimize the price of expensive factory feed and to meet the nutrient needs of laying hens. One of the alternatives that farmers can do to improve the efficiency of feed that originally used finished feed or factory feed became selfmix feed. The use of self-mixed feed has the effect of increasing egg production and egg quality. In addition, the price of selfmix feed is cheaper than finished feed or manufacturer feed so that it can reduce feed costs. Livestock businesses will be efficient if the available feed is cheap with nutrient content that can meet the needs of laying hens. Efforts to improve the efficiency of feed use are to use feed additives. The use of feed additives in animal feed is generally as an alternative to livestock treatment and as a feed supplement [7]. The addition of antibiotics as feed additives aims to spur livestock growth (growth promoter), improve health so that it can reduce the risk of death, increase production and productivity, increase feed use efficiency and fulfill livestock nutrition [8]. Based on the survey results, some farmers use self-mix feed without using additional feed additives. The use of self-mixed feed using feed additives and without the use of feed additives has their respective effects on feed consumption, egg production and egg quality. Therefore, in this study, the comparison of the productivity of laying hens based on self-mixed feed using feed additives and without using feed additives based on feed consumption, the amount of egg production and egg quality was examined.

Method

2.1 Time and Place

The activity was held in January and February 2025 at Ponggok Village, Ponggok District, Blitar Regency.

2.2 Research Data and Sources.

The data used in this study are primary data and secondary data. Primary data was obtained directly by observation and interviews with farmers in Ponggok Village, Ponggok District, Blitar Regency,

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while secondary data was obtained indirectly from books, journals, articles, the Central Bureau of Statistics, and other sources [9].

2.3 Research Methods

This study uses a qualitative approach with a case study method. The data collection technique consists of observation, interviews, and documentation then analyzing the data and providing data conclusions. The respondents in the study consisted of 36 laying hen farmers in Ponggok Village, Ponggok District, Blitar Regency. The observations carried out were daily feeding, egg production, and physical quality of eggs. Furthermore, analyzing the data, the data was analyzed descriptively to obtain an overview of chicken productivity, such as the average number of eggs per day and chicken feed consumption per day/head. The next step is to conclude that the productivity of laying hens uses feed additive-based selfmix feed and does not use feed additives, based on feed consumption, egg production and the quality of the eggs produced.

2.4 Data Collection Techniques

The data collection method used in the collection of primary and secondary data in this study uses observation, interview, and documentation methods. Qualitative observations are carried out in real-world situations that have been specifically designed for research. Observation provides the researcher with the opportunity to observe social interactions and contexts relevant to the phenomenon being studied [10]. This research was carried out by observing objects directly to the location of the layer chicken farm in Ponggok village to obtain accurate information. Observations carried out include feed consumption, egg production and egg quality. Interviews are used as a data collection technique if the researcher wants to conduct a preliminary study to find the background that must be researched and if the researcher wants to know something in-depth with a small number of respondents [11]. The interview was conducted using a guide in the form of a questionnaire that had been prepared beforehand. The interviews in this study were related to the identity of the breeder, self-mix feed, feed consumption, the use of feed additives, egg production and the physical quality of the eggs. Documentation is a method of collecting data to trace historical data. Documentation is divided into two, namely primary and secondary [9]. The primary documentation consists of live photos and videos. Secondary documentation consists of data recordings and libraries that are used to refer to literature. The documentation collected in this study includes documentation of farmers, selfmix feed, feed additive, and egg quality.

2.5 Data Analysis

The data that has been obtained will be analyzed using a descriptive approach by describing the data and analyzed descriptively. The data will be presented in the form of tables and narratives. Determination of the physical quality of the egg, namely the color of the shell, using the indicator of the level of the color of the eggshell. Descriptive analysis aims to transform a collection of several raw data and then process it into an easy-to-understand data in a more concise form of information.

Results and Discussion

3.1 Breeder Profile

Laying hen farmers in Ponggok District number 618 farmers. This number makes Ponggok sub-district the largest supplier of eggs in Blitar Regency. Ponggok Village has 36 laying hen farmers who use self-mix feed-based feed. Decreased productivity of farmers is one of the problems experienced by farmers. One of the solutions to overcome this problem is to use the addition of feed additives to feed. However, not all farmers use the addition of feed additives to their feed. Of the 36 farmers, 11 farmers are known to have not used the addition of feed additives. With this number,

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there are 30.5% of chicken farmers who do not use added feed additives. This certainly has disadvantages and advantages. The age classification of breeders is as follows:

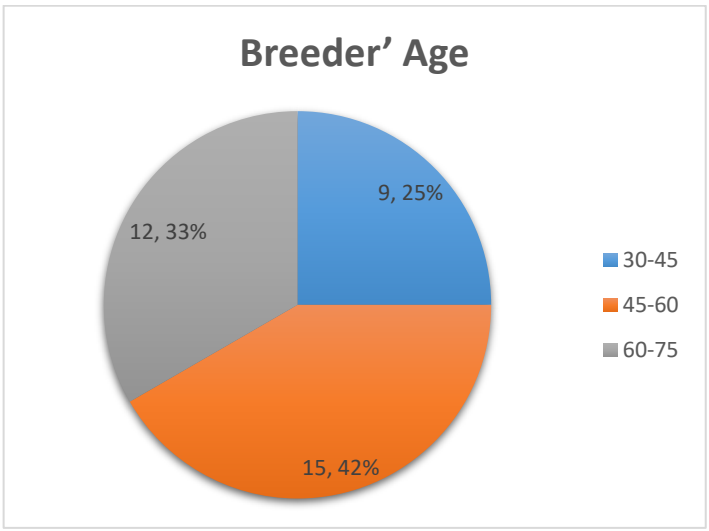

Figure 1. Breeder' Age

Age is one of the important indicators in the development and benchmark of a person's ability in the livestock business. Age affects a person's performance in thinking, making decisions, work ethic and innovating. The age of the farmer affects the performance in carrying out livestock farming activities. Based on figure 1, it is known that farmers aged 30-45 years are 9.25 years old, 45-60 years old are 15.42%, and 60-75 years old are 12.33%. This explains that the age between 20 and 55 years old is a productive age so that it can affect the ability to work [12]. The more mature they are, the wiser they will be in making decisions because they are more careful and do not want a burden for them [13]. The profile of farmers based on education level is as follows:

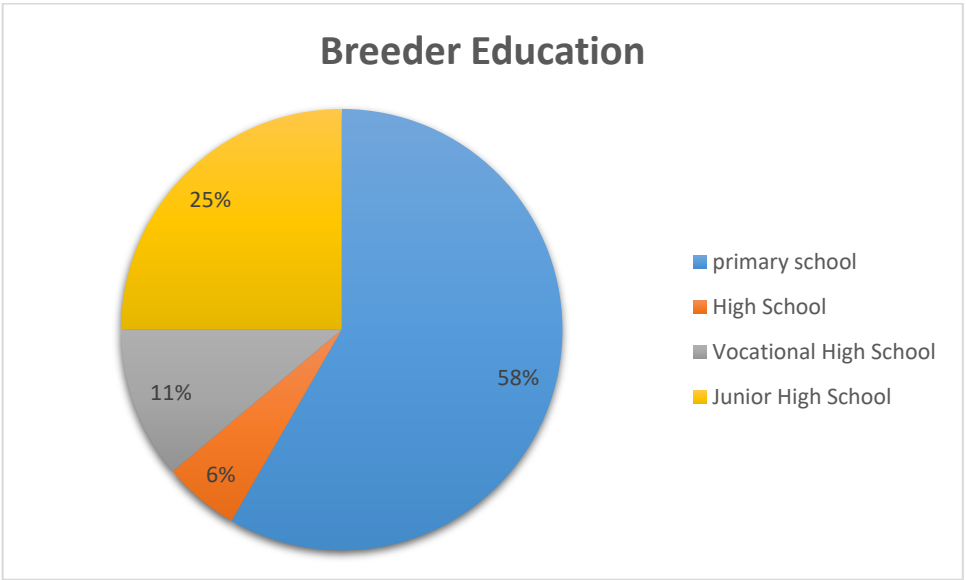

Figure 2. Breeder Education

Based on Figure 2. It can be seen that the number of farmers with an elementary school graduate's education level is 58%, farmers with junior high school graduates as much as 25%, farmers with vocational education graduates as much as 11%, and farmers with high school education graduates as much as 6%. The level of education of farmers in Ponggok Village is dominated by 58% of elementary school graduates, thus showing that the level of education of farmers in Ponggok

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Village is still very low. However, farmers in Ponggok Village have a long enough experience in livestock farming so that farmers in Ponggok Village have extensive knowledge in livestock breeding. Long experience in breeding will affect success in breeding [14]. The longer you live, the more it has a significant effect on a person's technical ability in raising livestock [15]. The profile of farmers other than the level of education is the population of laying hens as follows.

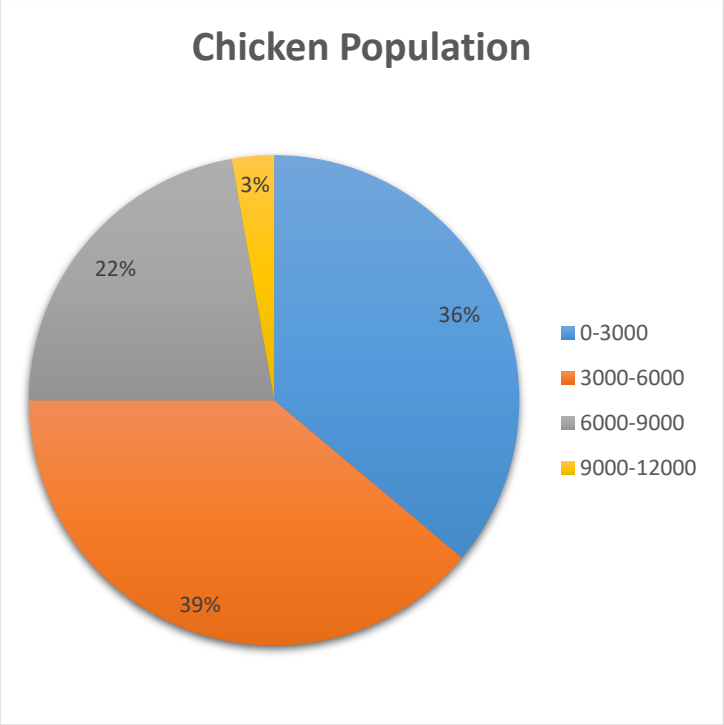

Figure 3. Chicken Population

Based on figure 3, it is known that the population of layer chickens in Ponggok Village is less than 1000 to 3000 heads as much as 36%, in the population of 3000 to 6000 as much as 39%, the population of 6000 to 9000 as much as 22%, and the population of 9000 to 12000 as much as 3%. From being dominated by a population of 3000 to 9000 which means that in Ponggok Village, the majority of small-scale chicken farmers [16]. This is due to the availability of land. The availability of sufficient land to raise chickens must be adjusted so that the population is not too dense. This greatly affects temperature control, maintenance management and chicken health. The large population must be proportional to the available land. This shows that the availability of lighting and a good temperature in the cage has an effect on the productivity of laying hens [17]. The level of population density affects the health of chickens, population density causes an increase in carbon dioxide and temperature [18]. This greatly affects hen day production (HDP). The profiles of partners other than the population are as follows:

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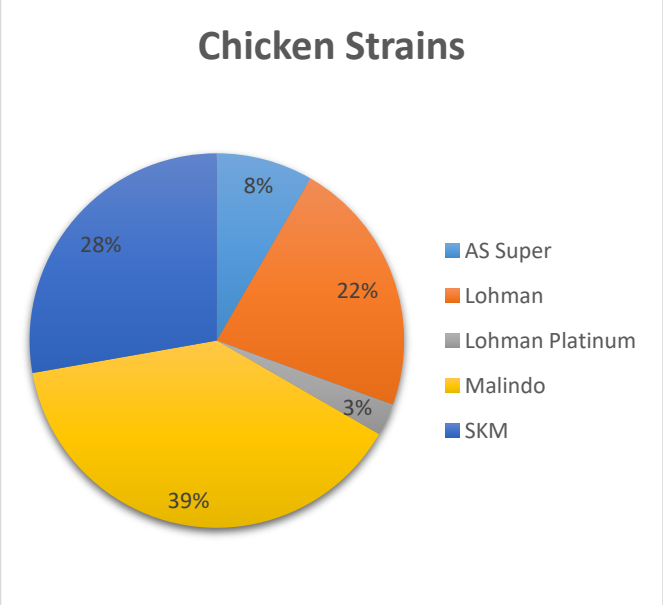

Figure 4. Chicken Strains

Based on Figure 4, it is known that the chicken strains found in Ponggok Village are AS Super strain as much as 8%, Lohman strain as much as 22%, Lohman platinum strain as much as 3%, malindo strain as much as 39%, and skm strain as much as 28%. Based on figure 4, the malindo strain is the dominant strain, which is 39% of all strains in Ponggok Village farmers. Malindo strain is a medium type of chicken. The weakness of this strain is that it has a large body posture and produces brown eggs. Raising medium-breed chickens is widely cultivated by the community because it is more profitable and has good productivity [19]. However, this type of chicken is very sensitive to the environment so it is easy to stress and has high cannibalism. This cannibalism can be minimized by cutting off the beak and using a battery cage [20].

The average productivity of laying hens (feed consumption, hen day production, egg weight, shell color, and shell texture) can be seen in Table 1.

Table 1. Average Productivity of Laying Hens During the Study

Chicken Age (Weeks)	Average Feed Consumption		Average Hen Day Production		Average Egg Weight (g)		Average shell color		Average Shell Texture	
	Non	FA	Non	FA	Non	FA	Non	FA	Non	FA
24	120g	120g	85%	92%	58 g	65 g	8 (Toffee)	10 (Truffle)	3 (Slightly Rough)	1 (Soft)
25	122g	120g	86%	90%	54,4g	62,18g	6 (Caramel)	8 (Toffee)	3 (Slightly Rough)	1 (Soft)
26	120g	120g	87%	90%	55 g	61 g	7 (Mahogany)	8 (Toffee)	3 (Slightly Rough)	2 (Soft)
Average	120,6 g	120 g	86 %	90,6 %	55,8 g	62,72 g	7 (Mahogany)	9 (Camel)	3 (Slightly Rough)	1 (Soft)

. Berdasarkan hasil analisis menunjukan bahwa pada umur ayam 24 minggu, 25 minggu dan 26 minggu, faktor penambahan *feed additive* memberikan pengaruh yang lebih baik terhadap

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konsumsi pakan dan HDP [21]. Penambahan feed additive berpengaruh pada kualitas fisik telur berat telur, warna telur dan tekstur cangkang [22]. Rataan konsumsi pakan yang didapatkan pada penelitian ini yaitu tanpa penambahan *feed additive* 120,6 g, sedangkan rataan konsumsi pakan dengan penambahan *feed additive* 120 g. Rataan HDP tanpa penambahan *feed additive* sebesar 86%, sedangkan rataan HDP dengan penambahan *feed additive* sebesar 90,6 %. Rataan bobot telur tanpa penambahan *feed additive* sebesar 55,8 g, sedangkan bobot telur dengan penambahan *feed additive* sebesar 62,72 g. Rataan nilai warna cangkang tanpa penambahan *feed additive* didapatkan nilai 7, sedangkan rataan nilai warna cangkang dengan penambahan *feed additive* didapatkan nilai 9. Rataan nilai tekstur cangkang tanpa penambahan *feed additive* didapatkan nilai 1, sedangkan rataan nilai tekstur cangkang dengan penambahan *feed additive* didapatkan nilai 3.

3.2 Feed Consumption

Feed consumption can be measured in grams per chicken given at each afternoon feeding and accumulated every week. The effect of adding feed additive to laying hens on feed consumption showed a better effect. Based on Table 1. Feed consumption without the addition of feed additive was 120.6 g, while feed consumption with the addition of feed additive was 120 g. Based on these data, it is known that the difference in feed consumption is 0.6 g. Feed with the addition of feed additives in this study showed a normal limit of feed consumption standards of 110-120 g/head [5]. The addition of feed additives has been proven to have an effect on feed consumption efficiency [23]. The addition of feed additives to feed can reduce the growth of pathogenic microorganisms in the production of toxins. Feeding additives reduces the negative impact caused by feed barriers in the form of anti-nutrients because feed additives can stimulate increased nutrients, increase the production of digestive enzymes and produce vitamins and anti-microbes so that the health of the digestive tract in chickens increases [24]. Feed additives can increase the productivity of laying hens by improving nutrient absorption, but the effects can vary depending on the type of feed additive used [25]. A measure of feed efficiency shows how much feed is needed to produce weight or egg production.

3.3 *Hen Day Production* (HDP)

Hen day production is a method used to measure the productivity of laying hens based on the percentage of egg production per day. HDP measurement aims to find out the number of eggs produced by a group of chickens and compare it to overall egg production. Standar HDP yang ideal pada ayam petelur umur 24 -26 minggu berkisar lebih dari 90,2 % pada saat masa puncak produksi [26]. Namun, HDP 85 % sampai 88 % juga ditemukan pada beberapa peternakan. Based on Table 1. The average HDP in chickens that did not use feed additives was 86%, while the average HDP in chickens that used feed additives in feed reached 90.6%. Thus, the effect of feed additive on hen day production (HDP) has a good effect. The average egg production of chickens with the addition of feed additive to basal feed obtained an HDP above 90% [27]. Meanwhile, egg production without the addition of feed additives to basal feed was obtained by HDP 72 %.

Egg production is influenced by external and internal factors. Internal and external factors are very important to obtain good egg production [28]. Internal factors include livestock health, nutrition and lifespan. Meanwhile, external factors include livestock management management and environmental conditions. Poultry that are susceptible to disease and affected by strees will disrupt egg production [29]. One of the solutions to reduce the occurrence of stress in poultry is to provide feed with nutrient content rich in antioxidants [30]. Antioxidants are active compounds that can strengthen the body's tissues from free radical attacks. The antioxidants that play a role in preventing stress in laying yama are asthaxanthin, lutein, beta-carotene, and phycocyanin [31].

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3.4 Egg Weight

Egg weight is obtained by weighing eggs in grams. Based on Table 1. The average weight of eggs without the addition of feed additives to feed obtained an average weight of 55.8 grams, while the weight of eggs with the addition of feed additives to feed obtained an average weight of 62.72 grams. Based on the data in Table 1. It shows that the addition of feed additives to feed has a better effect on chicken productivity, namely affecting egg weight. The weight of eggs in purebred chickens according to the standard (SNI) 01-3926-2006 is divided into 4 levels. Extra level (>60 gr), (56-60 gr), medium level (51-55 gr), small level (46-50 gr), and extra small level (<46 gr) [32]. Based on SNI, the average egg weight without the addition of feed additive to feed is at a moderate level, while the average egg weight with the addition of feed additive in feed is at an extra level. The quality of feed with good nutritional content, namely protein, amino acids and linoleic acids will affect the weight of the egg, because good feed can increase the weight of the egg [33]. Egg weight can be influenced by several factors, namely genetics, seasonal changes, broodstock weight and the ration used [34]. The use of feed additives should be carefully considered due to the additional costs involved. If there is no significant increase in egg weight, then the use of feed additives may not be necessary for that purpose. However, if the goal is to improve the quality of the eggs, adding feed additives with the right dosage can be an effective strategy [35].

3.5 Shell Color

Based on Table 1. It was found that the average color of the eggshell without the addition of feed additive to the feed showed a value of 7 with mahogany color, while the average color of the eggshell with the addition of feed additive in the feed showed a value of 9 with the color of camel. The color of the eggshell is influenced by several factors, namely age, genetics, and feed factors. Based on the results of the study, the age of chickens affects productivity and the color of the eggshells [36]. As a determination of the physical quality of eggs, the color of the shell determines the quality of the eggs. Brown color is the standard color of the eggshell. The lighter the color of the shell, the lower the quality of the eggs [37]. Younger chickens produce eggs that are certainly different from chickens with older ages due to changes in pigment production. The color of the eggshell tends to fade as the chicken ages, so the eggs produced by older chickens will tend to be pale in color [38]. Chickens between 25-37 weeks of age tend to be darker in color, while older chickens tend to have brighter eggs [39]. Genetic predominance in chickens affects the amount of pigment production thus determining the intensity of the color of the eggshell [40]. Based on research, the majority of farmers raise medium-type chickens. The advantage of medium-sized chickens is that they have large posture genetics and produce brown eggs [19]. Nutrients in feed are essential for eggshell formation such as calcium to maintain the quality of the eggshell [41]. Additional feeds such as premixes that contain vitamins and minerals help improve egg quality by ensuring the availability of calcium, indirectly affecting the color of the eggshell. Based on research, chickens that produce eggs with good physical quality use additional feed to improve feed quality. Feed with low nutrient content, indirectly affects egg quality [42]. Penambahan asam δ-aminolevulinic (ALA) sebagai prekursor biosintesis protoporfirin IX (PP9), pigmen coklat utama pada cangkang telur, dapat mengatasi penurunan warna tersebut akibat suplementasi magnesium [43]

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Figure 5. Egg Shell Color Level

3.6 Shell Texture

Based on SNI 3926:2023, the fineness of the shell is divided into 3, namely quality 1 and 2 (fine), quality 3 (slightly rough). Based on Table 1. It is known that the average texture of eggshells with feed without the addition of feed additives is at level 3 (slightly coarse). , while the texture of the shell with the addition of feed additive to the feed is at level 1 (fine). The characteristics of eggs with good quality are that they have a bright shell color, are thick, not speckled, and have a shell texture with fine grains on the surface. Factors that affect the quality of eggshells include the age of the chicken, nutrients in the feed, chicken strains, stress levels, and environment [44]. The age of the chicken greatly affects the quality of the eggshell. The older the chicken's life, the more the quality of the eggs and eggshells decreases [45]. The thickness of the eggshell is getting thinner and the texture of the shell becomes rougher, because the ability to produce calcium is insufficient. The texture and color of the eggshell becomes coarse and the color of the shell becomes faded more and more [46]. Nutrients in feed are an important factor to produce good quality eggs [47]. Feed with sufficient vitamins, minerals and calcium content affects the quality of the eggshell. The addition of proper feed additives in laying hen feed can improve the quality of the eggshell, making it smoother and stronger. Additional sources of calcium such as eggshell flour, the use of organic acids such as citric acid, and phytobiotic supplements such as herbafites can improve the physical quality of eggshells [48]. The addition of feed additives in the form of premixes to feed has benefits, including optimizing chicken health, feed cost efficiency and improving the quality of egg shells [49]. A chicken strain that produces a thick shell texture and is one of the most productive chickens is the isa brown strain [50]. Chickens with too high levels of stress tend to produce thin and brittle shells. Strees levels in chickens are often caused by changes in feed rations and hot cage temperatures caused by population density and farm locations [51].

Conclusion

Based on research conducted on layer farmers in Ponggok Village, Ponggok District, Blitar Regency, layer farmers in Ponggok Village are 15.42% aged between 45-60 years old with an education level of 58% at the elementary level. The majority of breeding experience is more than 10 years. The majority of layer farmers in Ponggok Village are still small-scale, this is due to limited land and dense residential areas. The majority of layer chicken farmers in Ponggok Village use chickens with the Malindo 39% strain because they are more resistant to changes in environmental conditions and their good productivity. Consumption of layer chicken feeding is 120 gr/head/day with a frequency of 2 times in the morning and noon. The addition of feed additives to feed has a better influence on feed consumption, HDP, egg weight, shell color and shell texture. The average level of feed consumption without the addition of feed additives was 120.6 grams, while feed consumption with feed additive added was 120 grams. The average HDP without the addition of feed additive to feed was 86%, while

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HDP with the addition of feed additive to feed was 90.6%. The average egg weight without the addition of feed additive to feed was 55.8 g (medium level), while the weight of eggs with the addition of feed additive to feed was 62.72 g (extra level). The average color of egg shells without the addition of feed additives to feed is at level 7 (Mahogany), while the color of egg shells with the addition of feed additives to feed is at level 9 (Camel). The average texture of egg shells without the addition of feed additives to feed is at level 3 (slightly coarse), while the texture of shells with the addition of feed additives to feed is at level 1 (smooth).

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