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EFFECT OF CAGE TEMPERATURE AND HUMIDITY ON BODY WEIGHT AND FEED CONVERSION OF BROILER CHICKENS

(Pengaruh suhu dan kelembapan kandang terhadap bobot badan dan konversi ransum ayam broiler)

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ABSTRAK

Untuk meningkatkan performa produksi ayam broiler tiga faktor utama yang mempengaruhi adalah bibit, pakan dan manajemen. Bibit unggul diperoleh dari proses seleksi dan perkawinan silang, dengan proses ini produktivitas yang dihasilkan akan maksimal jika didukung dengan kondisi lingkungan yang nyaman. Tujuan penelitian adalah untuk mengetahui pengaruh penggunaan kandang closed house terhadap suhu, kelembapan, pertambahan bobot badan dan konversi pakan pada ayam broiler. Penelitian ini dilakukan selama periode masa pemeliharaan yaitu 35 hari dimulai dari Day Old Chick (DOC) hingga panen. Strain Day Old Chick (DOC) yang digunakan adalah CP 707 dengan populasi 32.000 ekor. Variabel penelitian yang diamati meliputi suhu, kelembapan, pertambahan bobot badan dan konversi pakan. Suhu rata-rata pagi hari 26,9ºC, sore hari 28,88ºC, malam hari 27,48ºC dan kelembapan udara rata-rata pagi hari 67,2%, sore hari 64,4%, dan malam hari 67,2% dalam kandang closed house berpengaruh baik terhadap hasil produksi yaitu bobot panen ayam 2.196,3 gram dan rasio konversi 1,50. Berdasarkan penelitian yang dilakukan, kandang dengan sistem closed house memberikan pengaruh yang baik terhadap peningkatan bobot badan ayam broiler dan konversi ransum.

Kata-kata kunci: ayam broiler, suhu, kelembapan, konversi pakan, pertambahan berat badan

ABSTRACT

To improve the production performance of broiler chickens, three main factors are breeding, feeding and management. Superior seeds are obtained from the selection and cross-breeding process, with this process the resulting productivity will be maximized if supported by comfortable environmental conditions (Comfort Zone). The aim of the research was to determine the effect of using closed house cages on temperature, humidity, body weight gain and feed conversion for broiler chickens. This research was carried out from one day old to 35 days. The Day Old Chick (DOC) strain used were CP 707 with a population of 32,000 individuals. The research variables observed included temperature, humidity, body weight gain and feed conversion. Average temperature of 26.9ºC in the morning, 28.88ºC in the afternoon, 27.48ºC in the evening and an average humidity of 67.2% in the morning, 64.4% in the afternoon, 67.2% in the evening in a cage with a the closed house cage had a good effect on production results, namely chicken harvest weight of 2,196.3 grams and conversion ratio 1.50. Based on the research conducted, a cage with a Closed House system had a good influence on the increase in body weight of broiler chickens and ration conversion.

Keywords: broiler, temperature, humidity, feed conversion ratio, weight gain

INTRODUCTION

Broiler chickens are one of the food sources of animal protein that people need. According to data (BPS, 2022), the average level of chicken meat consumption in Indonesia is around 0.15 kilograms per capita per week. This data increased 60% from the previous year. With the increasing demand for chicken meat, broiler chickens have the potential to be developed because they have a fast growth rate

and high carcass percentage (Bahari et al., 2012).

To improve the production performance of broiler chickens, three main factors are breeding, feeding and management (Barus and Sunarti, 2016). Superior breed are obtained from the selection and cross-breeding process, with this process the resulting productivity will be maximized if supported by comfortable environmental conditions (Comfort Zone) (Nuriyasa and Puspany, 2017). If the environment is comfortable then it will not have much influence on low genetic quality. Cahyani (2020) states that the optimum growth of broiler chickens is at a temperature of 20-24℃, whereas according to data (BMKG, 2022) the temperature in Indonesia has an average temperature of around 24-34 ℃ . High environmental temperatures cause high humidity, namely 70-95%, which can reduce the productivity of broiler chickens (Abudabos et al., 2013). Therefore, choosing the right cage determines maximum productivity.

Based on research (Marom et al., 2018), the performance of broiler chickens using closed house and open house cage systems showed that the performance of broiler chickens kept in closed house cages is better than open house. This is because feed consumption is high in the closed house cage system compared to feed consumption in the open house cage system (Azizah et al., 2013). The environmental temperature in open house cages is less stable so it causes more heat stress than in closed house cages where the temperature can be regulated and adjusted to the temperature required by broiler chickens (Fahrudin, 2017). Thus, a cage with a closed house system is more needed than an open house system. This is because it can overcome the decline in feed consumption due to uncomfortable environmental conditions (uncomfortable zone) (Faiq et al., 2013). Based on this background, the aim of the research was to determine the effect of using closed house cages on temperature, humidity, body weight gain and feed conversion for broiler chickens.

RESEARCH METHODS

The research was carried out at the PT Aretha Nusantara Farm broiler chicken farm, Kuningan Regency, West Java. This research was carried out for 35 days. This research used 3200 DOC broiler strain CP707. The variable observed included temperature, humidity, body weight gain and feed conversion. The temperature was checked 3 times in the morning, afternoon and evening using a climate controller or HTC-1 Thermohygrometer.

According to Hartanto (2020) the sample size calculation was carried out using the Slovin formula from the total population of broiler chickens. In this study, 100 broiler chickens from the entire broiler chicken population were weighed. Sampling calculations for body weight gain can be done by adding up all the body weights of the chickens in each compartment containing 25 birds, then the average body weight gain is obtained from the sum of the chickens' body weights divided by the number of chickens weighed (Figure 1).

The formula for calculating body weight can be done as follows: Body Weight: (S1)+(S2)+(S3)+(S4)+(S5)+…..+(S100).

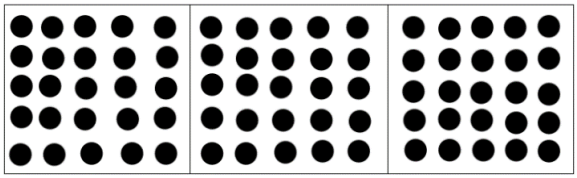

Figure 1. Sampling Plan (Source: PT. Aretha Nusantara Farm).

Apart from body weight, this study also calculated the average daily body weight gain. The formula for calculating body weight gain for broiler chickens is:

$$\text{BWG} = \text{Final body weight} - \text{Initial body weight}$$

BWG : Body Weight Gain
S1-S100: Total weight of chickens in the sample (100 broiler chickens).
According to (Nunung DV, 2021), ration conversion or Feed Conversion Ratio (FCR) is calculated by dividing the amount of feed consumed by the amount of body weight gain. The ration conversion formula can be written as follows:

$$\text{FCR} = \frac{\text{Total Amount of Feed Consumption}}{\text{Total Body Weight Gain}}$$

RESULTS AND DISCUSSION

The research results show that the temperature and humidity in the Closed House cage (morning, afternoon and evening) can be seen in Table 1 and 2. The temperature data in the Closed House cage is stable because it can be regulated and adjusted to the temperature required by broiler chickens, namely 28℃. This makes the cage environment comfortable (Comfort Zone) (Fatmaningsih et al., 2016). Meanwhile, humidity in the cage tends to be higher in the morning and evening. This is because the environmental temperature in the morning and evening outside the cage tends to be foggy, which affects the humidity inside the cage (Winardi, 2014). Temperature and humidity conditions that have been adapted to broiler chickens make the closed house cage system profitable for increasing the productivity of broiler chickens (Tabara, 2012).

Based on the calculation of body weight and daily body weight gain in Table 3, it shows that maintenance for approximately 35 days produces optimal productivity. This shows that the body weight value exceeds the PT body weight standard Aretha Nusantara Farm is 2.191 grams. This indicates that chicken growth is very optimal, reaching 2.196.3 grams at harvest age. This is of course influenced by the temperature and humidity of the cage, where temperature and humidity greatly influence the physiological condition of poultry (Caires, 2010). With environmental conditions in the cage that have been adjusted, broiler chickens can have optimal productivity (Yunus, 2007).

The results of the research on feed conversion per week can be seen in Table 4. The results of the research show that the growth of broiler chickens is optimal. This is because at harvest age the feed conversion value is 1.50, so it can be said that the feed provided is very efficient because 1.50 kg of feed can produce 1 kg of broiler chicken meat. The smaller the feed conversion value, it shows that the feed is very efficiently provided (Windarsari, 2007). This is because a small amount of feed is consumed, but still produces optimal body weight so that feed costs are economical (Rasyaf, 2011).

The temperature and humidity conditions in the Closed House cage system are indicated to be comfortable and in accordance with what broiler chickens need, so that the chicken's metabolism can run optimally to produce optimal body weight (Wijayanti et al., 2011). If the temperature and humidity of the cage are not suitable, it can trigger mortality rates and an increase in ammonia levels. This can disrupt the health of broiler chickens (Ibrahim and Allaily, 2012).

Table 1. Average temperature of closed house broiler chicken cages

Age	Temperature (℃)			
	Morning (07.00)	Afternoon (12.00)	Evening (17.00)	*Standard (℃)
0 – 7 days	30.5	31.7	30.5	30 - 32
8 – 14 days	28.3	30	28.3	28 - 30
15 – 21 days	26. 4	28.5	26.4	25 - 28
22 – 28 days	24.6	27.2	26.6	24 - 25
29 – 34 days	24.2	27	25.6	22 - 24
average	26.9	28.88	27.48	

Table 2. Average humidity of closed house broiler chicken cages

Age	Humidity (%)			
	Morning (07.00)	Afternoon (12.00)	Evening (17.00)	*Standard (%)
0 – 7 Days	70	65	70	60 – 70
8 – 14 Days	68	66	68	60 – 70
15 – 21 Days	68	65	68	60 – 70
22 – 28 Days	65	63	65	60 – 70
29 – 34 Days	65	63	65	60 – 70
Average	67.2	64.4	67.2	

Table 3. Calculation of body weight figures and body weight gain in broiler chickens

Age	Body Weight (g)	Body Weight Gain (g)	*Standard
7 days	188.3	21	185
14 days	488.3	42.8	465
21 days	963.3	68	943
28 days	1550.3	83.8	1524
35 days	2196.3	92.3	2191

*Source : PT. Aretha Nusantara Farm

Table 4. Feed Conversion Per Week

Age	Cumulative Feed Consumption (g/h)	Feed Conversion	*Standard
7 days	160	0.85	0.90
14 days	561.5	1.15	1.16
21 days	1184.8	1.23	1.26
28 days	2170.4	1.40	1.40
35 days	3294.4	1.50	1.53

CONCLUSION

Based on the research conducted, it can be concluded that with an average temperature of 26.9ºC in the morning, 28.88ºC in the afternoon, 27.48ºC in the evening and an average humidity of 67.2% in the morning, 64.4% in the afternoon, 67.2% in the evening in a cage with a Closed House system had a good influence on the increase in body weight of broiler chickens and feed conversion with a harvest weight of 2,196.3 grams and a feed conversion value of 1.50.

SUGGESTION

Temperature and humidity greatly influence body weight and ration conversion of broiler chickens. Therefore, it is recommended to regularly monitor the temperature and humidity conditions in the broiler chicken cage.

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