Buletin Peternakan 46 (1): 23-30, February 2022

ISSTAP
Indonesian Society for Sustainable Tropical Animal Production

Bulletin of Animal Science

ISSN-0126-4400/E-ISSN-2407-876X Accredited: 36a/E/KPT/2016
http://buletinpeternakan.fapet.ugm.ac.id/

Doi: 10.21059/buletinpeternak.v46i1.67045

Comparison of Productivity of Sentul and Kampung Chickens until the Age of 3 Months in the First Generation Selection Population (G1)

Wahyuni, Depison*, and Gushariyanto

Animal Science Study Program, Faculty of Animal Science, University of Jambi, Jambi, 36361, Indonesia

Article history
Submitted: 14 October 2021
Accepted: 29 December 2021

* Corresponding author:
Telp. +62 812 7446 999
E-mail: depison.nasution@unja.ac.id

ABSTRACT

This study aimed to compare the productivity of Sentul chickens and first-generation Kampung chickens (G1) until the age of 3 months. The research material were Sentul chicken and Kampung chicken. The method used was an experiment method or direct observation with a sample of 174 chickens from each strain. The data collected were egg weight, doc weight, body weight, body weight gain, body measurements, and selection response. Data on egg weight, body weight, and body measurements were analyzed using the average difference test (t-test), while the average value vector of body measurements Sentul chicken and Kampung chicken were analyzed using the T2-Hotelling statistical test. To identify the body size and body shape characteristics of Sentul chickens and Kampung chickens were analyzed using principal component analysis. Data processing used the statistical software Minitab version 18. The results of this study showed that egg weight, body weight at the age of DOC-3 months and body measurements of Sentul chickens were significantly different ($P<0.05$) higher than the Kampung chickens. This study concludes that the egg weight, body weight, body weight gain, and body sizes of Sentul chickens are higher than Kampung chickens. The size characteristic of Sentul and Kampung chickens is chest circumference. The characteristic of the shape of the Sentul chicken is the length of the wings, while the shape of the native chicken is the width of the chest. The selection response and the heritability value of the Sentul chickens was higher than Kampung chikens.

Keywords: Kampung chickens, Productivity, Selection response, and Sentul Chickens

Introduction

Indonesia has the world's fourth largest population after China, India, and America, so the availability of plant protein and animal protein food is critical. Chicken is one of the livestock that can be used as a source of animal protein. Chicken is one of the livestock that contributes enough protein to meet the needs of rural communities, so many are kept and used as a source of income. Local chicken is one of the potential chickens to be developed.

Local Indonesia chicken is germplasm native to Indonesia that has adapted and breeds well in the Indonesia. Local chicken has several advantages, including disease resistance, adaptability to various environmental conditions, easy maintenance, a more delicious and savory taste, and a higher selling price (Nuraini *et al.*, 2018). Sentul chicken and Kampung chicken are two of the many types of local chickens found in Indonesia.

Sentul chicken is a type of poultry that is unique to the Ciamis Regency livestock sector and the original local chicken of Ciamis, as confirmed by the Minister of Agriculture of the Republic of Indonesia's Decree No. 689/Kpts.PD40/2/013 recognizing the Sentul chicken family as a local Indonesian family chicken from Ciamis (Minister of Agriculture, 2013). The kampung chicken (*Gallus domesticus*) is a source of genetic wealth for local livestock, and its distribution is nearly uniform throughout Indonesia (Amlia, 2016).

The productivity of Sentul and Kampung chickens is still relatively low when compared to purebred chickens. One of the efforts that can be done to increase the productivity of Sentul and Kampung chickens is through selection. Selection can be done through egg weight, DOC weight, body weight, body weight gain, and body measurements (Tarigan, 2015).

Egg weight is the value used as the selection criteria for DOC weight. DOC weight is the weight obtained from weighing chicks that hatch after the chicks' feathers are dry (Lestari *et al.*, 2013), the higher the egg weight, the higher the hatching weight is expected. Bodyweight is the value obtained from weighing at a certain time. Bodyweight gain is the difference between the

final weight and the initial weight with the length of maintenance (Kurnia, 2019). Body measurements are one of the quantitative traits described by: beak length, beak width, head length, head circumference, head height, neck length, neck circumference, wing length, back length, chest circumference, carrying body length, back height, chest-length, chest width, shank length, shank circumference, tibia length, tibia circumference, third finger length, pubic bone distance (Ashifudin *et al.*, 2017).

The high and low productivity of livestock can be seen from the selection response. Selection response is a change in the average generation of offspring due to the selection of the parent population (Hardjosubroto, 1994) obtained from the difference between the first generation (G1) and the basic population (G0). The First Generation (G1) is the generation obtained from the selection of Generation Zero (G0) at the age of 3 months.

Until now, data regarding egg weight, DOC weight, body weight, body weight gain, and body sizes of Sentul chickens is necessary, therefore it is necessary to research the comparison of the productivity of Sentul chickens and first-generation Kampung chickens (G1) until the age of 3 months.

Materials and Methods

Materials

The research material was 315 eggs and 174 birds from each strain of Sentul and Kampung chickens obtained from the parents (G0). The feed used was Japfa Comfeed production with BR 1 energy composition (kcal/kg): 4,100, protein (%): 21, fat (%): 3 – 7, calcium (%): 0.9 - 1.1, phosphorus (%): 0.6 - 0.9, and BR2 energy (kcal/kg): 4,100, protein (%): 19, fat (%): 3 – 8, calcium (%): 0.9 - 1.1, phosphorus (%): 0.6 - 0.9. (Br 1 for DOC-1 month and Br 2 for 1-3 months) vaccines, and medicines.

The equipment used was writing instruments, digital calipers, digital scales with a capacity of 3 kg with an accuracy of 0.1 g, digital cameras, measuring tapes, incandescent lamps, feeders, drinking places, and incubators.

Methods

This research used an experimental method through direct observation. The data collected were egg weight, doc weight, body weight, body weight gain, body measurements, selection response, sentul and kampung chiken from first generation. The process of formated of the first generation (G1) was by selecting the G0 broodstock by 20% males and 36% females, so that 10 males and 36 females were obtained. Chickens that have been selected were reared until they produce eggs with a male to female ratio of 1:6. Eggs were collected for 12 days, every 6 days, the collected eggs were weighed and then marked (A, B, C) using a marker to facilitate the process of turning the eggs when incubated and put into the incubator, eggs were incubated for ± 21 days. The first observation was carried out on the 5th day to determine fertile and infertile eggs. Fertile eggs were indicated by the presence of cobweb-like blood vessels with a spot in the middle, while infertile eggs were removed from the incubator. From 315 Sentul and kampung chicken eggs that were hatched, 261 and 255 fertile eggs were obtained and 183 and 176 eggs hatched.

The process of formated of the first generation (G1) was by mating in strains (Sentul x Sentul and Kampung x Kampung) selecting the G0 broodstock by 20% males and 36% females, so that 10 males and 36 females were obtained. Chickens that have been selected were reared until they produce eggs with a male to female ratio of 1:6. The hatched DOC were marked using label paper and weighed after the DOC feathers were dry (Okatama *et al.*, 2018) to obtain hatch weights. Chickens are reared from DOC until the age of 3 months. The size of the cage used is 4x3x1.8 m. for 100 chickens equipped with a feeder, a drinking place, and a lamp for lighting. Feed and water are provided continuously (ad libitum). Body weight measurements were carried out every week and body measurements were carried out every month, where the measured chickens were marked on the legs aged 0-1 months and on the wings aged 1-3 months.

The variables observed in this study were: Egg weight, DOC weight, body weight at 1 month until 3 month of age, body weight gain, and body measurements. Variables measured include beak length (BeLe), beak width (BeW), length head (LeH), head height (HeHe), head circumference (HeCc), neck length (NeLe), neck circumference (NeCc), wing length (WLe), Upper body length (UBLe), lower body length (LBLe), back height (BHe), chest circumference (CCc), chest length (ChLe), chest width (CW), shank length (ShLe), shank circumference (ShCc), tibia length (TLe), tibia circumference (TCc), third finger length (TFLe), pubic bone distance (PuBD).

Data analysis

t-test. The t-test is the average difference test used to see the difference between egg weight, DOC weight, body weight at the age of 1 months to 3 months, body weight gain, and body measurements between Sentul chicken and Kampung chicken**.**

T^2-Hotelling.T^2-Hoteling was used to analize vector values of the average body sizes of Sentul and Kampung chickens whice include, beak length (BeLe), beak width (BeW), length head (LeH), head circumference (HeCc), head height (HeHe), neck length (NeLe), neck circumference (NeCc), wing length (WLe), Upper body length (UBLe), chest circumference (CCc), lower body lengte (LBLe), back height (BHe), chest length (ChLe), chest width (CW), shank length (ShLe), shank circumference (ShCc), tibia length (TLe), tibia circumference (TCc), third finger length (TFLe), pubic bone distance (PuBD).

Empirically, it is proven that if there are differences between Sentul chickens and

Kampung chickens through the T2-Hotelling test, then data processing is continued with Main Component Analysis (MCA) (Gaspersz, 2006). If the linear measurements of the body surface between the two lines were the same, the two groups were combined and analyzed as one group.

Principal component analysis. Principal component analysis is a statistical technique used on a set of correlated data (Gaspersz, 2006). Principal component analysis is used to see differences in size or shape characteristics between Sentul chickens and Kampung chickens. The goal is to find a number of coherent variables in the subgroups, which are relatively independent of the others. The equation of size and shape is derived from the covariance matrix.

Selection response. The Selection response was calculated by comparing the average body weight of G1 at the age of 3 months with the average weight of G0. Heritability is obtained from the selection response divided by the selection differential. The selection differential was obtained from the average weight of 3 months of age, the body weight of the selected broodstock, minus the entire population of G0. Data processing is assisted by using statistical software, namely Minitab version 18.

Operational limits. The operating limits below are in accordance with the research of Putri *et al.* (2020).

Results and Discussion

Egg weight and body weight of Sentul chicken and Kampung chicken

The average egg weight and body weight of Sentul chickens and Kampung chickens at the age of DOC-3 months are presented in Table 1. Based on Table 1, it can be seen that the average egg weight, DOC weight, body weight at 1 month, 2 months, and 3 months of Sentul chickens were 50,12±2,76 g, 35,98±26,98 g, 400,63±26,82 g, 781,63±75,28 g, and 1281,49±56,96 g.

The average egg weight in this study was higher than the results of Irianti and Hartoyo (2019), which states that the average egg weight of Sentul chickens was 43.63±3.18 g. The body weight of Sentul chickens at the age of DOC-3 months in this study where higher than the result of Muhlishah *et al.* (2016), which states that the DOC weight of Sentul chickens was 30.19 g, the results of Puteri *et al.* (2020), which states that the average body weight of Sentul chicken at the age of 1 month was 217.06±35.10 g, the results of Mariandayani *et al.* (2013), which states that the average body weight of Sentul chichen at the age of 2 months was 632.88±85.10 g, and the results of Sartika and Iskandar (2019), which states that the average body weight of Sentul chicken at the age of 3 months was 532.1 g.

The average egg weight, DOC weight, body weight at 1 month, 2 months, and 3 months of Kampung chickens were 44,64±1,97 g, 31,48±1,30 g, 336,91±20,73 g, 726,16±25,62 g, and 1114,56±68,78 g.The average egg weight of Kampung chickens in this study were higher than the results of Wardono *et al.* (2014), which states that the average egg weight of Kampung chickens was 42.49 g. The body weight of Kampung chickens at the age of DOC-3 months in this study where higher than the result of Irmaya *et al.* (2021), which states that the DOC weight of Kampung chickens was 26.38 ± 1.78 g aged 1 month 224.68 g, age 2 months 605.53 g, age 3 months 1030.30 g.

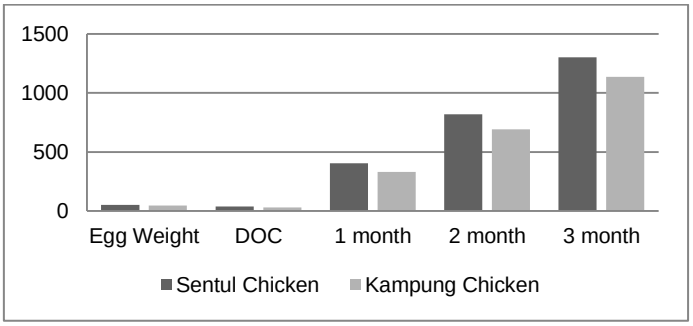
The results of this study showed that the average egg weight and the average body weight of Sentul chickens and Kampung chickens at the age of DOC-3 months of Sentul chickens and Kampung chickens were higher than some previous studies. This difference thought to due to genetic differences and the rearing environment. This is in accordance with the statement of Subekti and Arlina (2011), which states that differences in body weight of chickens can be caused by environmental conditions of different seed origin and different rearing environments, as well as genetic factors.

The results of the average difference test (t-test) showed that the average egg weight, body weight at the age of DOC-3 months of Sentul chickens were significantly different ($P<0.05$) higher than the Kampung chickens. This is presumably due to the difference in strains, this is in accordance with the statement of Susanti and Sri (2015), which states that the potential for weight growth is influenced by strain factors. Besides being influenced by strain, differences in body weight are also influenced by genetics. This is in accordance with the statement of Pagala *et al.* (2018), which states that there are differences in the increase in chicken growth caused by the influence of genetic factors. This means that the average egg weight, DOC weight, body weight age 1 month, 2 months, 3 months Sentul chickens are better than Kampung chickens.

Table 1. The average egg weight, body weight, Sentul chicken, and Kampung chicken

The weight/g	Sentul chicken	Kampung chicken
Egg	50.12±2.76[a]	44.64 ± 1.97[b]
DOC	35.98±26.98[a]	31.48±1.30[b]
1month	400.63±26.82[a]	336.91±20.73[b]
2month	781.63±75.28[a]	726.16±25.62[b]
3month	1281.49±56.96[a]	1113.56±68.79[b]

[a, b] Different letter superscripts on the same row are significantly different ($P<0.05$).



Graph 1. The average egg weight, DOC weight, body weight of Sentul and Kampung chickens.

Body weight gain of Sentul chicken and Kampung chicken

The body weight gain of Sentul chickens and Kampung chickens from the age of DOC-1 month, 1-2 months, 2-3 months is presented in Table 2. Based on Table 2 Showed that the body weight gain of DOC-1 month, 1-2 months, 2-3 months Sentul chickens, respectively, were 364,65±23,94 g, 381,00±54,00 g, and 499,86±45,03 g. The average body weight gain of Sentul chickens the age of DOC-1 month and 2-3 months, were higher than the results of Puteri *et al.* (2020), which stated that the body weight gain of Sentul chickens aged DOC-1 month and 2-3 months were 184.31±38.88 g, and 374.87±90.56 g, while aged 2-3 months was lower than the results of Puteri *et al.* (2020), which stated that the body weight gain of Sentul chickens aged 2-3 months was 411.12±78.60 g.

The body weight gain of DOC-1 month, 1-2 months, 2-3 months Kampung chickens, respectively were 364,65±23,94 g, 381,00±54,00 g, and 499,86±45,03 g. The average body weight gain of Kampung chickens from the age of DOC-1 month, 1-2 months, 2-3 months this study was higher than the results of Kestaria *et al.* (2016), which states that the increase in the average body weight gain of Kampung chickens aged DOC-1 month was 2250.30 g and 1-2 months old was 322.93 g, and the results of Irmaya *et al.* (2021), which stated that the average body weight gain of Kampung chickens aged 2-3 months was 372.87±76.31 g.

The average body weight gain from the age of DOC-1 month, 1-2 months, 2-3 months in this study was better than some previous studies. This is presumably due to differences in the research environment, this is in line with the opinion of Risnajati (2014), which states that differences in body weight, in environmental conditions and maintenance management.

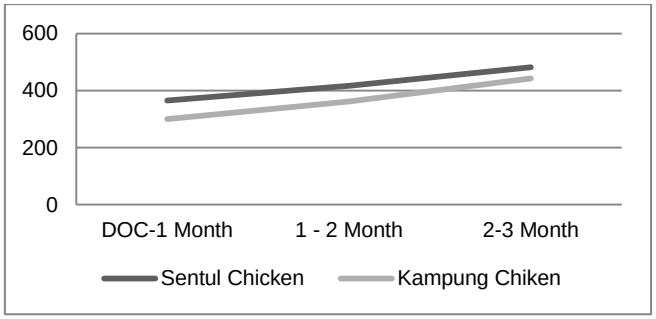
The results of the average difference test (t-test) also showed that the average body weight gain of Sentul chickens from the age of DOC-1 month, 1-2 months, and 2-3 months were significantly different (P<0.05) higher than the Kampung chicken. The difference is thought to be due to genetic influences. Rahayu *et al.* (2021) state that one of the factors that can affect chicken body weight gain is the genetic factor. This means that the body weight gain of Sentul Sentul chickens was better than that of Kampung chickens.

The results of the average difference test showed that the average body weight gain of Sentul chickens and Kampung chickens aged 2-3 months was significantly different (P<0.05) higher than the average body weight gain of 1-2 months old and the DOC-1 month old. The age of 1-2 months was significantly different (P<0.05) higher

Tabel 2. Body weight gain of Sentul chicken and Kampung chicken

Strain	Doc-1 month	1-2 month	2-3 month
Sentul chicken	364.65 ± 23.94^{cA}	381.00 ± 54.00^{bA}	499.86 ± 45.03^{aA}
Kampung chicken	335.43 ± 23.60^{cB}	359.26 ± 14.05^{bB}	387.39 ± 54.40^{aB}

$^{a, b, c}$ Different letter superscripts on the same row are significantly different (P < 0.05).
$^{A, B}$ Different letter superscripts on the same column are significantly different (P < 0.05).



Graph 2. Body weight gain of Sentul and Kampung chickens.

Table 4. Morphometric characteristics of Sentul chickens and Kampung chickens at 3 months

Body measurements	Sentul chickens	Kampung chickens
BeLe (mm)	38.34±1.62[a]	29.43±0.75[b]
BeW (mm)	40.89±1.93[a]	36.26±1.79[b]
LeH (mm)	7.88±0.60[a]	7.18±0.36[b]
HeHe (mm)	31.99±1.58[a]	29.99±1.31[b]
HeCc (mm)	114.91±1.20[a]	112.98±0.43[b]
NeLe (mm)	140.56±1.42[a]	133.12±0.69[b]
NeCc (mm)	93.63±1.59[a]	91.63±0.38[b]
WLe (mm)	220.12±1.79[a]	218.90±1.11[b]
UBLe (mm)	289.83±1.50[a]	267.83±0.78[b]
LBLe (mm)	301.35±1.51[a]	276.13±1.02[b]
BHe (mm)	311.93±2.92[a]	285.93±1.96[b]
ChLe (mm)	134.31±7.10[a]	130.31±5.45[b]
CW (mm)	67.73±7.21[a]	63.73±2.41[b]
CCc (mm)	330.93±1.98[a]	277.93±0.83[b]
ShLe (mm)	86.66±5.49[a]	78.66±3.31[b]
ShCc (mm)	46.21±0.54[a]	43.82±0.26[b]
TLe (mm)	133.01±5.42[a]	123.42±6.98[b]
TCc (mm)	107.34±1.50[a]	100.41±0.59[b]
TFLe (mm)	60.77±5.07[a]	55.47±3.80[b]
PuBD (mm)	14.24±0.40[a]	13.13±0.37[b]

[a, b] Different letter superscripts on the same row are significantly different (P < 0.05).

Beak length (BeLe). beak width (BeW). length head (LeH). head height (HeHe). head circumference (HeCc). neck length (NeLe). neck circumference (NeCc). wing length (WLe). Upper body length (UBLe). lower body lengte (LBLe). back height (BHe). chest length (ChLe). chest width (CW). chest circumference (CCc). shank length (ShLe). shank circumference (ShCc). tibia length (TLe). tibia circumference (TCc). third finger length (TFLe). pubic bone distance (PuBD).

than the average body weight gain of the doc-1 month of age. This means that the highest body weight gain of Sentul and Kampung chickens was achieved at the age of 2-3 months than 1-2 months of age and 1 month of doc. This is consistent with the opinion of Agustina *et al.* (2013), which states that a period of growth acceleration occurs before the cattle experience puberty (genital maturity) and then experiences a slowdown when they become sex adults. At the age of 12 to 20 weeks, there will be a decrease in the rate of growth until it reaches sexual maturity (Trisiwi, 2017).

Morphometric characteristics of Sentul chickens and Kampung chickens at 3 months

The T2-hotelling test is a test conducted on body sizes between strains simultaneously on Sentul and Kampung chickens. The results of the T2-Hotelling test analysis of Sentul chickens and native chickens have a statistical value of 0.160326, an F value of 0.007233, and a P-value of 0.01. The results of the T2-hotelling test above showed that the body sizes of Sentul chickens were significantly (P<0.01) higher than those of Kampung chickens. This means that Sentul chickens have a larger body size than Kampung chickens. This is presumably due to genetic influences so that the sizes of the two chicken strains are different, according to the opinion of Milas *et al.* (2020), which states that differences in body size are caused by a trait found in livestock genes. Based on the T2-Hotelling test, it can be concluded that the body sizes of Sentul chickens are better than those of Kampung chickens.

The results of the average difference test on body Measurements can be seen in Table 4 below. Based on Table 4, Sentul chickens have higher average body sizes than Kampung chickens. This means that the body size of the Sentul chicken is larger than that of the Kampung chicken. This happens because Sentul chickens have a higher weight than Kampung chickens. According to Sitanggang *et al.* (2016), The greater the size of an individual's body frame, the larger the body size will be. A large body size has a large carcass. According to Wahyudi *et al.* (2017), the greater the body size has a large carcass, the greater the bodyweight of the livestock.

Based on Table 4 above, the results of the average difference in body sizes of Sentul chickens were significantly higher (P<0.05) compared to native chickens. This difference in body size is thought to be due to genetic influences, so according to Putri *et al.* (2020), if the diversity of environmental conditions does not exist, then the difference in body size is caused by genetic diversity.

Principal component analysis

The equations, determining the body size and body shape, total diversity, and eigenvalues of Sentul chickens and Kampung chickens at 3 months, are presented in Table 5. Based on Table 6 above shows that the body size score equation for Sentul chickens has a total diversity of 85.8%, while Kampung chickens have a total diversity of 33.5%. The presentation above is the largest proportion among the main components determining body size. The highest eigenvector in the equation of body size in Sentul and Kampung chickens is chest circumference. The body size equation above is thought to occur due to the similarity of the maintenance environment according to Sartika and Iskandar (2019), which states that the determinants of body size are caused by different environmental conditions.

Sentul chicken body shape score equation has a total diversity of 4.0%, while the total diversity in Kampung chicken has a total diversity of 8.3%. The presentation above is the largest proportion of the main components determining body shape. The highest eigenvector in the equation of body shape in Sentul chickens is

chest width, while in Kampung chickens it is wing length. The difference in determining body shape above is thought to have occurred due to genetic differences between the two strains, according to opinion. According to Mahmudi *et al.* (2019), differences in body shape determinants in livestock strains are caused by differences in genetic factors.

These results can be used as a way of considering livestock breeding and as a consideration for the purification policy of Sentul and Kampung chickens in the future. Body

Table 5. Equation of body size and body shape with total diversity and eigenvalues in Sentul chickens and Kampung chickens

Type		Equations	KT (%)	Λ
Sentul chickens	body size	0.229 BeLe + 0.118 BeW + 0.200 LeH +0.232 HeHe + 0.232 HeCc 0.232 NeLe + 0.236 NeCc + 0.218 WLe +0.237 UBLe + 0.233 LBLe +0.236 BHe +0.236 ChLe + 0.150 CW + **0.238 CCc** + 0.234 ShLe + 0.233 ShCc + 0.234 TLe +0.235 TCc + 0.229 TFLe + -0.235 PuBD	85.8	17.16
	body shape	0.062 BeLe + -0.961 BeW + -0.006 LeH + 0.032 HeHe + 0.078 HeCc + 0.038 NeLe + -0.017 NeCc + -0.024 WLe + -0.011 UBLe + 0.052 LBLe + 0.036 BHe + 0.022 ChLe + **0.232 CW** + -0.027 CCc + -0.002 ShLe + 0.019 ShCc + -0.002 TLe + 0.030 TCc + -0.041 TFLe + 0.017 PuBD	4.0	0.79
Kampung chickens	body size	0.228 BeLe + 0.265 BeW + 0.241 LeH +0.281 HeHe + 0.218 HeCc + 0.204 NeLe + 0.127 NeCc + 0.035 WLe + 0.057 UBLe + 0.132 LBLe + 0.070 BHe + 0.282 ChLe + 0.279 CW + **0.289** CCc + 0.271 ShLe + 0.077 ShCc + 0.284 TLe + 0.224 TCc + 0.282 TFLe + 0.280 PuBD	33.5	0.8
	body shape	-0.371 BeLe + 0.113 BeW + -0.171 LeH + -0.041 HeHe + -0.221 HeCc + 0.083 NeLe + -0.312 NeCc + **0.486 WLe** + 0.138 UBLe + -0.286 LBLe + 0.465 BHe + 0.058 ChLe +0.019 CW + 0.056 CCc + 0.055 ShLe + 0.107 ShCc + -0.159 TLe + -0.05 TCc + 0.225 TFLe + 0.022 PuBD	8.3	1.66

Beak length (BeLe). beak width (BeW). length head (LeH). head height (HeHe). head circumference (HeCc). neck length (NeLe). neck circumference (NeCc). wing length (WLe). Upper body length (UBLe). lower body lengte (LBLe). back height (BHe). chest length (ChLe). chest width (CW). chest circumference (CCc). shank length (ShLe). shank circumference (ShCc). tibia length (TLe). tibia circumference (TCc). third finger length (TFLe). pubic bone distance (PuBD).

Table 6. Selection response

Strain	Selection diferential (g)	Selection response (g)	h^2
Sentul chicken	23.8	7.5	0.35
Kampung chicken	26.4	9.3	0.32

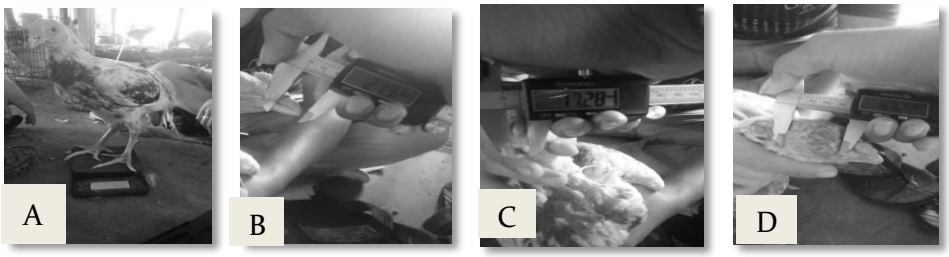


Figure 1. Measurement of body weight (A), beak length Head (B), beak width (C), and head length (D).

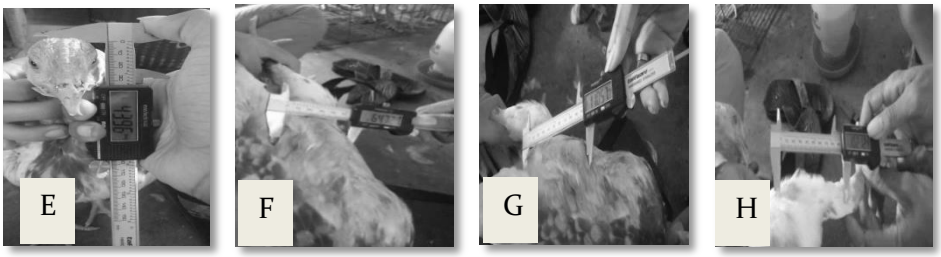


Figure 2. Measurement of head height (E), chest width (F), chest length (G), and tibial length (H).

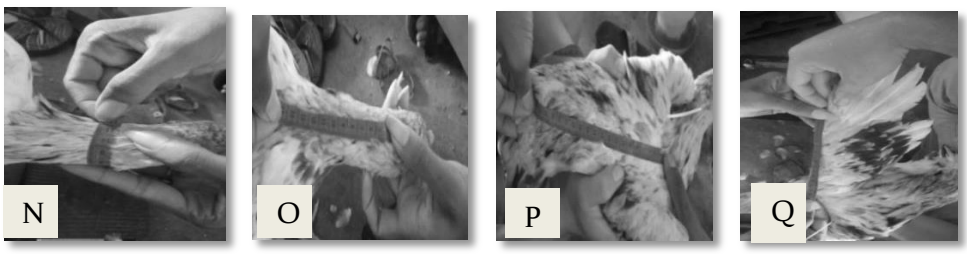


Figure 3. Measurement of neck circumference (N). neck length (O), upper body length (P) and wing length (Q).

Figure 4. Measurement of chest circumference (R), lower body length (S), and tibia circumference (T).

Figure 5. Measurement of shank circumference (U), back height (V).

measurements can be used to predict body shape as a characteristic of a particular nation (Putri *et al.*, 2020). The results of this study indicate that chest circumference (CCc) can be used as a selection parameter in increasing body scores and as a consideration for purification policies for Sentul and Kampung chickens.

Selection response

The response to the generation of Sentul and Kampung chicken lines is presented in Table 6. Based on Table 6 of the selection responses above, it is known that the value of the selection differential, the selection response, and the heritability value of Sentul chickens body weight were 23.8 g, 7.5 g, and 0.32 g, respectively. While the value of the selection differential, the selection response and the heritability value of Kampung chicken body weight were 0.26 g, 9.3 g, and 0.35 g. The heritability value of Sentul chickens and Kampung chickens in this study was higher than that of Pamungkas (2005), which stated that the heritability value of chickens aged 12 weeks was 0.22.

The heritability value of Sentul and Kampung chickens is categorized as high, according to Rotimi *et al.* (2016) stated that heritability values were categorized into low, medium and high. The low value is h^2<0.20, medium h^2 0.20-0.30, and high h^2 >0.3. High heritabilities reflect the genetic variability. On the contrary, low heritabilities were likely to reflect genetic invariability. This means that through selection can increase the productivity of both Sentul and Kampung chickens (G1).

Conclusions

Based on the results and discussion, it can be concluded that: Egg weight, body weight, body weight gain, and body sizes of Sentul chickens are higher than Kampung chickens. The size characteristic of Sentul and Kampung chickens is chest girth. The characteristic of the shape of the Sentul chickens is the width of the chest while the character of the shape of the Kampung chickens is the length of the wings. The selection response and the heritability value of Sentul and Kampung G1 chickens was high. The selection response and the heritability value of the Sentul chickens was higher than Kampung chikens.

References

Agustina, D., N. Iriyanti, and S. Mugiyono. 2013. Pertumbuhan dan konsumsi pakan pada berbagai jenis Itik Lokal betina yang pakannya disuplementasi probiotik. Jurnal Ilmiah Peternakan 2: 691-698.

Amlia, A., M. A. Pagala, and R. Aka. 2016. Studi karakteristik sifat kualitatif dan kuantitatif Ayam Kampung di Kecamatan Lasalimu Kabupaten Buton. Jurnal Ilmu dan Teknologi Peternakan Tropis 3: 31-39.

Ashifudin, M., E. Kurnianto, and Sutopo. 2017. Karakteristik morfometrik ayam Kedu jengger merah dan jengger hitam generasi pertama di Satker Ayam Maron-Temanggung. Jurnal Ilmu Ternak 17: 40-46.

Gaspersz, V. 2006. Teknik Analisis dalam Penelitian Percobaan. Tarsito, Bandung.

Hardjosubroto, W. 1994. Aplikasi Pemuliabiakan Ternak di Lapangan. PT Grasindo, Jakarta.

Irianti, N. and B. Hartoyo. 2019. Kualitas fisik dan kimiawi telur ayam Sentul dengan pemberian Fermeherbafit-encapsulasi sebagai feed aditif alami. Prosiding Seminar Nasional dan Call for Papers ”Pengembangan Sumber Daya Perdesaan dan Kearifan Lokal Berkelanjutan IX”. 123-131.

Irmaya, D., Depison, and Gurhairiyanto. 2021. Quantitative characteristic of indonesian native chickens at the age of 4 months. Anim. Res. 19: 108-119.

Kestaria, H. Nur, and B. Malik. 2016. Pengaruh substitusi pakan komersil dengan tepung ampas kelapa terhadap performa Ayam Kampung. Jurnal Peternakan Nusantara 2: 43-47.

Kurnia, A. D. 2019. Pertambahan bobot badan harian (pbbh) pada ayam layer starter grower yang diberi resveratrol tepung biji anggur. Jurnal Ternak 10: 7-11.

Lestari, E., Ismoyowati, and Sukardi. 2013. Korelasi antara bobot telur dengan bobot tetas dan perbedaan susut bobot pada telur entok (*Cairrina moschata*) dan itik (*Anas plathyrhinchos*). Jurnal Ilmiah Peternakan 1: 163-169.

Mahmudi, M., R. Priyanto, and J. Jakaria. 2019. Karakteristik morfometrik sapi Aceh, sapi PO dan sapi Bali berdasarkan analisis komponen utama (AKU). Jurnal Ilmu Produksi dan Teknologi Hasil Peternakan 7: 35–40.

Mariandayani, H. C., D. S. Dedy, S. Sri and S. Cece. 2013. Keragaman fenotipik dan pendugaan jarak genetik pada Ayam Lokal dan Ayam Broiler menggunakan analisis morfologi. Jurnal Veteriner 14: 475-484.

Milas, E. S. S., Josephine, L. P. Saerang, Lucia, J. Lambey, and B. J. Takaendengan. 2020. Karakteristik fenotipe beberapa sifat kuantitatif ayam Kampung di Minahasa. Zootec. 40: 603 – 614.

Muhlishah, S. L., T. Wiwin and Y. A. Indrawati. 2016. Inventarisasi, daya tetas telur, dan bobot tetas doc berdasarkan umur induk Ayam Sentul Barokah Abadi Farm Ciamis. Fakultas Peternakan Universitas Padjadjaran, Bandung.

Nuraini, Hidayat, Z. and K. Yolanda. 2018. Performa bobot badan akhir, bobot karkas serta persentase karkas Ayam Merawang pada keturunan dan jenis kelamin yang berbeda. Sains Peternakan 16: 69–73.

Okatama, M. S., S. Maylinda, and V. M. A. Nurgiartiningsih. 2018. Hubungan bobot telur dan indeks telur dengan bobot tetas Itik Dabung di Kabupaten Bangkalan. J. Tropical Anim. Prod. 19: 1-8.

Pagala, M. A., A. S. Aku, R. Badaruddin, and H. Has. 2018. Karakteristik fenotip dan genotip gen GH (growth hormon) pada Ayam Tolaki. Jurnal Ilmu dan Teknologi Peternakan Tropis 5: 1–4.

Pamungkas, F. A. 2005. Beberapa kriteria analisis penduga bobot tetas dan bobot hidup umur 12 minggu dalam seleksi ayam kampung. JITRO 10: 281-285.

Puteri, N. I., Gushairiyanto, and Depison. 2020. Growth patterns, body weight, and morphometric of Kub Chicken, Sentul Chicken And Arab Chicken. Buletin Peternakan 44: 67-72.

Putri, A. B. S. R. N., Gushairiyanto, and Depison. 2020. Bobot badan dan karakteristik morfometrik beberapa galur Ayam Lokal. Peternakan Tropis 7: 256-263.

Rahayu, F. F. Depison. Gushairiyanto. 2021. Performance of Kampung Super chicken and Bangkok chicken first generation (G1) until the age of 12 weeks. Livest. Anim. Res. 19: 326-336.

Risnajati, D. 2014. Pengaruh jumlah ayam per induk buatan terhadap performan ayam petelur Strain Isa Brown periode starter. Sains Peternakan: Jurnal Penelitian Ilmu Peternakan 12: 10–14.

Rotimi, E. A., J. O. Egahi and O. M. Momoh. 2016. Heritability estimates for growth traits in the Nigerian Local Chicken. J. Appl. Life Sci. Int. 6: 1-4.

Sartika, T. and S. Iskandar. 2019. Produktivitas ayam petelur KUB-2 generasi ke-4. JITV. 24: 151-157.

Sitanggang, E. N., Hasnudi, and Hamdan. 2016. Keragaman sifat kualitatif dan morfometrik antara Ayam Kampung, Ayam Bangkok, Ayam Katai, Ayam Birma, Ayam Bagon dan Magon di Medan. Jurnal Peternakan Integratif 3: 167–189.

Subekti, K. and F. Arlina. 2011. Karakteristik genetik eksternal Ayam Kampung di Kecamatan Sungai Pagu Kabupaten Solok Selatan. Jurnal Ilmiah Ilmu-Ilmu Peternakan 14: 74-86.

Susanti, I. M. N. I. and M. Sri 2015. Pengaruh bangsa pejantan terhadap pertumbuhan pedet hasil ib di wilayah Kecamatan Bantur Kabupaten Malang. J. Ternak Tropika. 16: 41-47.

Tarigan, J. H. 2015. Identifikasi bobot badan dan ukuran ukuran tubuh Itik Bali (kasus di kelompok ternak Itik Manik Sari Dusun Lepang Desa Takmung Kecamatan Banjarangkan Kabupaten Klungkung Provinsi Bali). Studens e-jurnal. 4: 1-7.

Trisiwi, H. F. 2017. Pengaruh level protein pakan pada masa pertumbuhan terhadap penampilan pada awal peneluran ayam betina hasil persilangan ayam kampung jantan dan ayam ras petelur betina. Jurnal Ilmu dan Teknologi Hasil Ternak 12: 61–68.

Wahyudi, E., G. Ciptadi, and A. Budiarto. 2017. Studi kasus tingkat pemotongan kambing berdasarkan jenis kelamin, kelompok umur dan bobot karkas di tempat pemotongan hewan Kota Malang. Jurnal Ternak Tropika 18: 69–76.

Wardono, H. Ponco, C. Sugihono, H. Kusnadi and Suprijono. 2014. Korelasi antara beberapa kriteria peubah produksi pada Ayam Buras. Prosiding Seminar Nasional "Inovasi Teknologi Pertanian Spesifik Lokasi".Pp. 578-582.