

## Technical Characteristics of Muscovy Duck (*Cairina moschata*) in Ciayumajakuning, West Java Indonesia

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### ABSTRACT

**Purpose :** This research aims to study the technical characteristics of Muscovy duck in Ciayumajakuning.

**Research Method :** The study uses a survey method and applies a purposive sampling to take samples by observing 22 farmers. Data analysis used in this study is a descriptive exploratory method.

**Findings :** The results show that 95.5% of pens are in postal shape; 50% of the pen material is made from bamboo, wood, and roof tile while the other 50% is made from bamboo and roof tile; 72.7% of observed farmers have size of pens of 1-100; 95.5% of feed is in pasta-shaped and 4.5% is in flour; the frequency of 2 times feeding is 86.4%; mostly-used (54.5%) feed ingredient is in the form of Aking rice bran and 18.2% use pur bran; 9.1% farmers apply traditional raising management, 81.8% is semi-intensive, and 9.1% is intensive; lastly, sex ratio of 1: 1 reaches 18.2%. Conclusion that the technical characteristics of Muscovy duck in Ciayumajakuning have not yet been standardized. It is expected that the farmers, relevant agencies, and other related parties can overcome the problem and seek for better and optimal management.

**Limitations :** Research includes feed, pen, and raising management of Muscovy Duck.

**Value :** The basis for establishing national standards for Muscovy Duck production and development.

**Keywords:** Technical Characteristic, Muscovy duck, Ciayumajakuning

### INTRODUCTION

Muscovy duck (*Cairina moschata*) is one of the waterfowls commonly raised in Indonesia. Muscovy duck has a high potential as a source of animal protein and can be used for meat and eggs production, and therefore, more attention has been agreed lately on increasing meat production, especially ducks which are considered the easiest domestic poultry (El-Soukkary *et al*, 2005). African Muscovy duck weight (12 weeks) drake weighed 1832 g, while the fedrake reached only 68.2% of the drake weight (Téguia *et al*, 2008). In term of body size, Muscovy duck is generally larger than broilers and laying ducks so that it has the potential as livestock of a meat producer. (Ali, 2005) showed that average dressing percentage was 62.18 in Muscovy ducks. (El-Samee *et al*, 2012) dressing percentage, being 73.35 in Muscovy duck at the same age 12 week.

Muscovy Generally; Indonesian people raise Muscovy duck for meat and as savings that can be sold anytime when they are in need.

Muscovy duck population in West Java is 1,451,743. The Muscovy duck population in the regencies of Cirebon, Indramayu, Majalengka and Kuningan (Ciayumajakuning) is 1,036,666 head or about 71% of Muscovy duck population is in West Java (Dinas Peternakan Provinsi Jawa

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Barat, 2017). If it is not properly raised and maintained, the Muscovy duck population will become extinct. The raising and development of Muscovy duck must be supported by high productivity.

The productivity of Muscovy duck in Ciayumajakuning is still low, which is marked by the length of time to raise them (12 weeks) before farmers can get their meat with optimum in 28 weeks is considered drake and 24 weeks duck is considered an adult. While body weight of the sudani duck (one year old) weighed 2171 with feed conversion recorded 4.4 (El-Samee, 1982). Further studies were reported on Muscovy ducks in Egypt (El-Ghamry, 2014). They do the mating process naturally which causes problems in the process of reproduction and production in general. Their raising system is still traditional in nature, which means it is only a farmers' side job, the ownership scale is less than 10, breeds are passed down from generation to generation, pens are made from used materials such as bamboo and wooden crate of egg or fruits, feeding with whatever food that can be found such as the lowest level of rice bran and waste vegetables, farmers let the Muscovy duck to roam freely (extensive), and there is no prevention and treatment of the disease so that the Muscovy duck could have died suddenly and causing losses to farmers.

Muscovy duck productivity can be increased through the use of superior breeds supported by good feeding and raising management. Excellent Muscovy duck breeds can be obtained by selection, namely the decision to choose Muscovy ducks with superior characteristics to be kept alive. Muscovy duck characteristics consist of biological and technical features. Biological characteristics include qualitative and quantitative properties. Qualitative traits are properties visible to the eye that can be used as trademarks, such as the color of plumage, beak shapes, and shank colors. Quantitative traits are properties with high economic value that are not visible to the eye but can be measured, such as body weight, beak length, neck length, wing length, body length, femur length, tibia length and shank length. Technical characteristics

include pen, feed, and raising management.

The pen consists of shape, material, and size. Poultry production in Europe is based mainly on intensive systems (Damaziak *et al.*, 2014). Raising management, intensification has enabled increased production with lower financial inputs (Erisir *et al.*, 2019). The negative effects of this type of raising management are, however, worse product quality and deteriorating bird welfare (Mench, 1992). Ducks that are kept in intensive systems are characterized by, inter alia, many behavioral disorders that often lead to self-mutilation and cannibalism (Raud and Faure, 1994) (Zhang *et al.*, 2009).

Feed consists of the form of food, frequency of feeding, and feed ingredients. Muscovy duck is significantly different from other ducks in the growth curve as well as body composition. Muscovy duck ration protein requirements aged 4-6 weeks around 14.5 - 15%, body weight of 1085 grams, and consumption of 2850 grams of ration (Leclercq *et al.*, 1986). Protein requirements for optimal growth from period 0-3 week around 12-18%. For the tropics it is also available 24% for period of 0 - 8 weeks. The content of protein rations for Muscovy duck can vary but this is related to the energy content of the ration (Dean, 2001). In the initial period, enter fed a diet containing 22% protein, but (Siregar *et al.*, 1982) allow 18-19% with an energy of 3000 kcal / kg of ration. Energy requirements for Muscovy duck is almost the same as broiler chicken (Mohammed *et al.*, 1984). Research results on White Pekin can also be used for Muscovy, which is 0-2 weeks old given a ration containing 2900 kcal / kg of energy and aged 2-7 weeks given rations containing 16% protein with 3000 kcal / kg energy (National research Council, 1994). Raising management consists of the sex ratio and pen maintenance system.

Therefore, the importance of raising ducks has also increased gradually (Ensminger, 1992). Ducks are usually raised in intensive systems without pool (Selcuk and Akyurt, 1986). This system is divided into three groups; extensive, semi-intensive, and intensive. Intensive system includes deep litter and cage systems (Önk *et*

al, 2018). Ducks are raised in a closed room for this system in such a way to provide proper air conditioning and ventilation as for chicken (Rodenburg, 2005).

Research on drake body size has been done by (Yakubu, 2013) in Africa which includes body weight, body length, body circumference, thigh circumference or tibia, beak length, neck length, leg length, and wing length. Muscovy duck body measurements in four districts can be used to determine the characteristics of Muscovy duck. (Fatmarischa, 2013) states that the phenotypic diversity of Muscovy ducks based on body size can determine the characteristics of Muscovy ducks in Central Java. (Fatmarischa, 2013) only examined the biological characteristics of drake and duck aged 6 months, while their technical characteristics have not been studied, even though these technical characteristics are crucial in order to get good technical standards in supporting optimal Muscovy duck productivity. This study aims to study the technical characteristics of Muscovy duck raising in Ciayumajakuning.

## OBJECT AND RESEARCH METHOD

Observations are conducted on 22 Muscovy duck farmers consisting of 4 farmers from Cirebon, 4 from Indramayu, 9 from Majalengka, and 5 from Kuningan. The selection of the study area was carried out using a purposive sample based on participation data in West Java obtained from the Animal Husbandry Department of West Java Province in 2017 and the potential of dredging marketing. Sampling was conducted by multistage probability stratified random sampling multistage random sampling (Sulistyo and Basuki. 2006) based on the largest population of dents in each district based on data (Dinas Peternakan dan Kesehatan Hewan Kabupaten Indramayu, 2017) (Dinas Peternakan Provinsi Jawa Barat, 2017). This study uses a survey method with purposive sampling to select samples. Data analysis uses descriptive exploratory analysis. Primary data were obtained from observations and direct interviews with farmers. Secondary data were obtained from relevant officials and agencies.

## RESULT AND DISCUSSION

### *Scope of Ciayumajakuning Area*

Jawa Barat (West Java) Province is located at coordinates of 104° 48'-108° 48' East Longitude and 5° 50'-7° 50' South Latitude. The altitude of place can be divided into places with steep heights of more than 1500 m above sea level (asl) in the southern region, sloping hillside areas in the middle of 100-1500 m asl and 19-857 m asl, and large plateau areas in the north of 1- 100 m above sea level. The minimum temperature is 19.5 ° C and the maximum is 29.9 ° C with the average humidity of 74%. The area is 35,377.76 km<sup>2</sup>. Total population of 1,180,774 inhabitants. Jawa Barat consists of 18 regencies, 9 cities, sub-districts, 13 (urban) villages, and 323 villages (Badan Pusat Statistika Jawa Barat, 2017). The Muscovy duck population is 1,348,324 head centered in the districts of Indramayu, Cirebon, Bogor and Majalengka (Dinas Peternakan Provinsi Jawa Barat, 2017).

Cirebon Regency is located at coordinates of 108° 40'-108° 48' East Longitude and 6° 30'-7° 00' South Latitude. The altitude is 0-300 m asl. Temperatures range from 25° to 34° C. The total area is 990,40 km<sup>2</sup>. The total population of people is 2.162.644. Cirebon consists of 40 regencies and 412 (urban) villages (Wikipedia Indonesia, 2015) (Badan Perencanaan Pembangunan, Penelitian dan Pengembangan Daerah Kabupaten Cirebon 2018). The Muscovy duck population is 253.063 centered in the districts of Celancang, Sindang Laut, and Sasak (Dinas Peternakan Provinsi Jawa Barat, 2017).

Indramayu Regency is located at coordinates of 107° 52'-108° 48' East Longitude and 6° 15'-6° 40' South Latitude. The altitude is 0-18 m asl. Temperatures range from 24° to 29° C. The total area is 1.204,24 km<sup>2</sup>. The total population of people is 1.180.774. Indramayu consists of 31 regencies, 8 (urban) villages and 307 villages (Wikipedia Indonesia, 2015) (Badan Perencanaan Pembangunan, Penelitian dan Pengembangan Daerah Kabupaten Cirebon 2018). The Muscovy duck population is 770.605 centered in the districts of Losarang, Kroya, and

Gabus Wetan (Dinas Peternakan dan Kesehatan Hewan Kabupaten Indramayu, 2017) (Dinas Peternakan Provinsi Jawa Barat, 2017).

Majalengka Regency is located at coordinates of 108° 12'-108° 25' East Longitude and 6° 4'-7° 03' South Latitude. The altitude is 19-857 m asl. Temperatures range from 24 ° to 34° C. The total area is 1.204,24 km<sup>2</sup>. The total population is 1.180.774. Majalengka consists of 26 regencies, 13 (urban) villages and 323 villages (Wikipedia Indonesia, 2015) (Badan Perencanaan Pembangunan, Penelitian dan Pengembangan Daerah Kabupaten Majalengka, 2018). The Muscovy duck population is 129.980 centered in the districts of Rajagaluh, Jatiwangi, and Bantarujeg (Dinas Peternakan Provinsi Jawa Barat. 2017).

Kuningan Regency is located at coordinates of 108° 23'-108° 47' East Longitude and 6° 47'-7° 12' South Latitude. The altitude is 120-700-1500 m asl. Temperatures range from 22° to 29° C. The total area is 1.178,58 km<sup>2</sup>. The total population is 1.140.777. Kuningan consists of 32 regencies and 376 (urban) villages (Wikipedia Indonesia, 2015)(Badan Perencanaan Pembangunan Daerah Kabupaten Kuningan, 2018). Based on a preliminary survey at 2017 the Muscovy duck population is 980 centered in the districts of Darma and Cigugur.

### **Pen**

The following Figure 01 describes pen of Muscovy duck.

Based on Figure 01, there are 95.4% of postal-shaped Muscovy duck pens in Cirebon, Indramayu, Majalengka and Kuningan. Generally, the Muscovy duck pen has a shelter, a playground in the form of a yard and pond, and a place of feed and drink provided by farmers; but there are also pens that are already in the form of buildings (4.6%) in intensive Muscovy duck raising in Majalengka which have proper place for play, food, and drink. The pen building is divided into 3 parts based on Muscovy duck age, namely starter (age 0-2 months), grower (> 2-5 months), and broodstock (> 5 months). Postal pens generally consist of shelters and place for play. According to (Soeharsono,

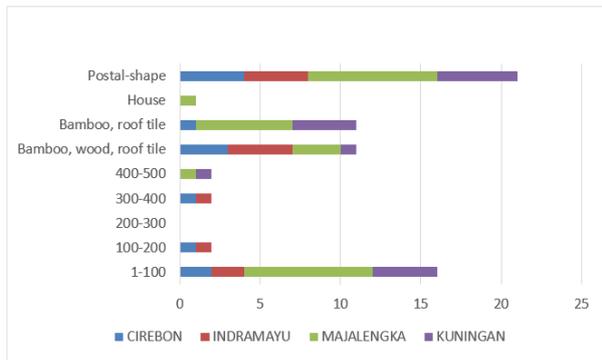
1976). playing or physical exercise to move muscles is a healthy activity. Physical motion, emotions, social growth and development are in line with the growth and development of the functions of organs in the body to support the implementation of activities in life (Hall, 1991). Increased muscle mass is not only caused by the number of muscle cells but because of the increase in myofibrils. The enlarged muscle due to exercise is not caused by the increasing number of muscle cells (hyperplation) but because of muscle volume (hypertrophy) (Soeharsono, 1976).

50% of Muscovy duck pen materials are made from bamboo, wood, and roof tile; while the other 50% is made from bamboo and roof tile. Pens are made using materials found around farmers' houses, for example, bamboo and wood from gardens or the-used ones and only a few are deliberately purchased. Pen/pen size is generally less than 100 (72.7%), the remaining are the size of 100-200 (9.1%), 300-400 (9.1%), and 400-500 (9.1%). Bamboo is a suitable material for pens in the tropics because it can substitute wood. The advantages of bamboo from wood, among others, are having a small shrinkage ratio, they can be bent or having elasticity, and they also have a high decorative value (Arsyad, 2015). ( Sulastiningsih and Santoso, 2012) argue that bamboo is one of the raw materials that easily split, formed, processed, with a relatively cheap price compared to the wood raw material. The availability of bamboo for pens is quite a lot, able to reduce CO<sub>2</sub> emissions, and produce heat efficiency by 80% (Wang and Yan, 2005).

### **Feed**

The following figure 02 describes Feed of Muscovy duck.

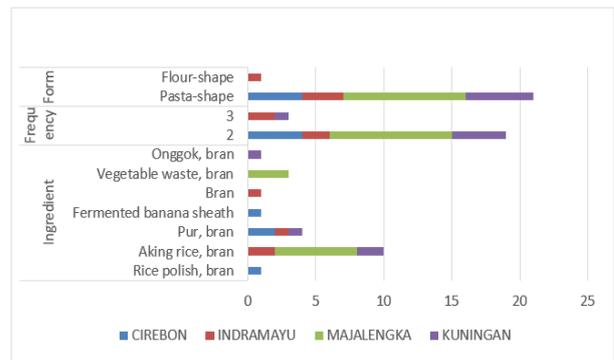
Based on figure 02 above, 95.5% of Muscovy duck feed is a paste-shaped, which is feed material brewed or mixed with hot water then cooled briefly; after it is cold or in a warm state then it is given to Muscovy duck. Flour feed is 4.5%. The shape of the ration affects its efficiency. The ration is crucial because it holds a budget of around 70% of the production costs allocation (Syamsu, 2007).



**Figure 01: Pen of Muscovy duck**

The form of commercial feed rations is generally in the form of pellets. (Murtidjo, 1987) (Cutu, 2003) added cassava flour as an adhesive to the pellet-shaped ration. Ration storage is an important element in supporting the success of livestock business (Syarif dan Halid, 1993).

The frequency of feeding twice a day (86.4%) is done in the morning and evening with consideration of time efficiency for farmers. Frequency of feeding 3 times per day (13.6%) is done in the morning, afternoon, and evening with the consideration that the food can be consumed more than wasted. Feeding can be done by ad libitum (freestyle-feeding) and restricted feeding. Feed restriction on duck: Muscovy ducks aim to obtain uniform body weight during adult, to delay adult mating, to reduce fat before the egg-laying period, to increase egg weight by delaying adult mating, to decrease feed conversion in the growth phase, to improve the quality of hatching eggs, and to increase Muscovy duck health (Fassbinder-Orth and Karasov, 2006). Feed restriction also aims to control growth because Muscovy ducks are a type of livestock that grow fast (Ayuningtiyas, 2016).

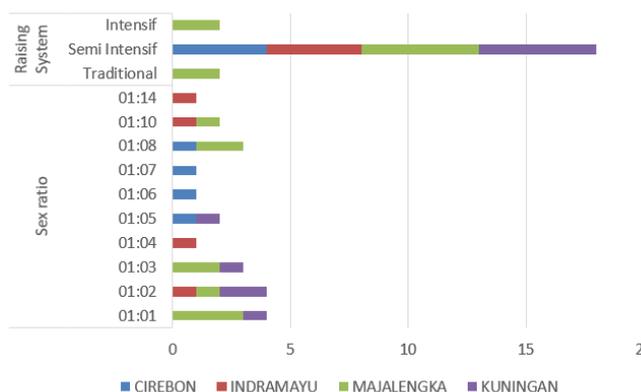


**Figure 02: Feed of Muscovy duck**

Feed of Muscovy duck: 50% use the Aking rice bran, 18.2% use pur bran, 13.6% use vegetable waste bran, 4.5% use rice bran, 4.5% use banana sheath bran, 4.5% use onggok bran, and 4.5% use rice polish. Farmers take feed ingredients around them with the consideration of the feed availability and price, such as vegetable waste, banana sheath/stems, and Aking rice. Some farmers even try to use alternative feed ingredients such as azolla, maggot, and indigofera but still in small quantities and frequency of administration at uncertain times. According to (El-Samee, 2012) the nutritional content of Muscovy duck rations aged 3-12 weeks contains metabolic energy of 2922 kcal/kg and crude protein of 18.28% which can produce an Muscovy duck body weight of 2590.0 grams/head; body weight gain 1888.33 grams/head with feed consumption of 131.05 grams/head/day, and feed conversion of 4.7. While in (El-Badry, 2004) Muscovy duck body weight at the same age is 3243 grams/head.

**Raising Management**

The following figure 03 is the Raising management of Muscovy duck.



**Figure 03: Raising Management of Muscovy duck**

Based on figure 03, raising management of intensive Muscovy duck is 9.1%. This raising uses the whole pen building for Muscovy duck to carry out all its activities such as sheltering and resting, eating, drinking, reproducing, and playing. Semi intensive Muscovy duck raising is 81.8%, means there is a pen for shelter and rest at night and a yard to eat, drink, reproduce, and play during the day. Traditional Muscovy duck raising reaches 9.1%, with a pen for Muscovy duck to shelter and rest, but there is no divider which limits the Muscovy duck to do its activities. Muscovy ducks can play in the yard, fields, and even mingle around the housing. Land capacity for Muscovy ducks with a roam freely raising system is 2500 or 5000 per hectare in an intensively managed yard. The density of pens for Muscovy ducks with conventional raising system in Germany is 9 heads/m<sup>2</sup> (non litre), intensive is 5 heads/m<sup>2</sup>; whereas, conventional animal raising in France is 13 animals/m<sup>2</sup>, intensive is 9 animals/m<sup>2</sup> (Rodenburg *et al*, 20015). The size of pond for Muscovy duck raising is 30m long, 10m wide and 3m deep. The best swimming time for Muscovy duck is between 12.00-14.00 which can improve its performance, the carcass percentage, tenderness, and body temperature (Farghly, 2017). In summer, the duration of Muscovy duck playing in the yard is 4 hours to improve its performance, carcass percentage, tenderness, and body temperature (Farghly, 2018)

Sex ratio of 1:1 (18,2%), 1:2 (18,2%), 1:3 (13,6%), 1:8 (13,6%), 1:5 (9,1%), 1:4 (4,5%), 1:6 (4,5%), 1:7 (4,5%), and 1:11 (4,5%). Sex ratio affects the fertility and hatchability of eggs. Fertility is the ratio between the number of fertile eggs and hatched eggs. Hatchability is the ratio between the number of eggs that hatch with fertile eggs. (According and Roudybush, 1971), the optimal sex ratio for ducks is at 1 : 5. This was confirmed by (Nickolova, 2010) study which stated that an Muscovy duck sex ratio of 1: 5 produced the highest fertility at peak production times of 98.4%, 1: 6 produced

96.2% fertility, and 1: 7 produced 95.95% fertility.

## CONCLUSION

Based on result and discussion, it can be concluded that the technical characteristics of Muscovy duck in Ciayumajakuning have not yet been standardized. It is supported by the following data that 95.5% of Muscovy duck pens are in postal shape; 50% of the pen material is made from bamboo, wood, and roof tile while the other 50% is made from bamboo and roof tile; 72.7% of observed farmers have size of pens of 1-100; 95.5% of Muscovy duck feed is in pasta-shaped and 4.5% is in flour; the frequency of 2 times feeding in the morning and evening is 86.4%; mostly-used (54.5%) feed ingredient is in the form of Aking rice bran and 18.2% use pur bran; 9.1% farmers apply traditional raising management, 81.8% is semi-intensive, and 9.1% is intensive; lastly, sex ratio of 1: 1 reaches 18.2%.

## Data Availability Statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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