



Morphometric Study of Indian Peafowl Feather as Material of *Dhadhak Merak* in Reog Ponorogo

Sultan Ahmad Dzakwan*, Fajar Agus Saputro, Khansa Mutiara Alifia, Muhammad Heri, Nurhafifah Febrian, and Diki

Universitas Terbuka, Biology Study Program, South Tangerang, Banten, Indonesia, 15437

Abstract – The scarcity of Green Peafowl feathers (*Pavo muticus*) as material of *Dhadhak Merak* in Reog Ponorogo art has increased the need for Blue Peafowl or Indian Peafowl feathers (*Pavo cristatus*). The Blue Peafowl, which is not an endemic bird of Indonesia, has caused the craftsmen of *Dhadhak Merak Reog Ponorogo* to import from India and China because *Dhadhak Merak* requires 1000-2000 Peafowl feathers as its material. This study aims to analyze the morphometric characteristics of the Blue Peafowl and estimate the production scale that can meet the needs of *Dhadhak Merak Reog Ponorogo* materials. This research will be conducted at the Gentan Farm Aviary in Ponorogo, using samples from five Adult Male Blue Peafowls. The research method is in the form of direct observation with morphometric measurements of Peafowl feathers using a flexible measuring tape and also conducting semi-structured interviews, a mixed-method approach of both quantitative morphometric measurements and qualitative interviews. Measurements will focus on the length of the feathers in various parts of the Peafowl's body, while adhering to standard protocols. Understanding the types and sizes of Peafowl feathers used in *Dhadhak Merak Reog Ponorogo* is important to know the needs of Peafowl feathers and the potential for large production to meet the demand for Peafowl feathers in Ponorogo. The results of this study are expected to bridge cultural needs and conservation efforts, as well as provide a scientific basis for the development of sustainable Peafowl farming in Indonesia. This study is expected to be a guide for the implementation of Peafowl farming that supports cultural preservation and species sustainability.

Keywords: *dhadhak merak*, indian peafowl, morphometry, peafowl feather, *reog ponorogo*

1. Introduction

Peafowls, especially the Blue Peafowl (*Pavo cristatus*) are birds originating from India, thus also known as Indian Peafowl [1], [2], [3]. Peafowl feathers, especially the male one, both Green Peafowl (*Pavo muticus*) [4] and Blue Peafowl (*Pavo cristatus*) [2] have an important role in the material for making the *Dhadhak Merak* mask in the Reog Ponorogo art [5], thus creating a dilemma between species preservation and culture. The *Dhadhak Merak* used in Reog Ponorogo initially used the endemic Green Peafowl as its main material, but due to its rarity and conservation efforts [4], [6], the *Dhadhak Merak* craftsmen had to switch to the Indian Peafowl which is not endemic to Indonesia but abundant, though this alternative requires Reog Ponorogo craftsmen to import directly from India or China.

*Corresponding author: ahmaddzakwan1@gmail.com

The discussion on import dependency is expanded to include logistical and economical challenges. So, by overcome the dependency on imports that is still carried out by the *Reog Ponorogo* Craftsmen because the Peafowl feathers used to make the *Dhadhak Merak* in *Reog Ponorogo* mask have more than 1000 feathers per mask, efforts have begun to breed the Indian Peafowl (*Pavo cristatus*) and Green Peafowl (*Pavo muticus*). One of the breeding efforts established in Ponorogo Regency is Gentan Farm owned by Mr. Edy who has succeeded in breeding the Blue Peafowl and also the Green Peafowl [7].

Then, because research on the morphology of the blue Peafowl [8], [9] and its needs in making the *Dhadhak Merak* is also still very limited, further research is needed on the characteristics of the Blue Peafowl feathers in captivity in Ponorogo which in our research was at Gentan Farm owned by Mr. Edy which is located in Ngrupit Village, Jenangan District, Ponorogo Regency. Further research will focus on the specific categories of Peafowl feathers used in *Dhadhak Merak* in *Reog Ponorogo*, as well as an understanding of the feather moulting cycle and the factors that influence its quality and quantity [10].

2. Materials and Methods

This research was conducted at the Gentan Farm Peafowl Breeding Center , which is owned by Mr. Edy, located in Ngrupit Village, Jenangan District, Ponorogo Regency, East Java Province. The research used five adult male Blue Peafowl (*Pavo cristatus*) as samples.



Fig.1. Blue Peafowls (*Pavo muticus*) in Gentan Farm Breeding Center

Then, the method of collecting data is carried out in two ways, namely Morphometric Measurement and Semi-Structured Interviews. In morphometric measurements, a flexible measuring tape with a total length of 150 cm was prepared, and samples of five Adult Male Blue Peafowl. The measurement was repeated three times per individual. The samples were measured for seven types of feathers on their bodies, including: Crown Feathers; Neck Feathers; Dorsal Feathers; Contour Feathers; Wing Feathers; Tail Feathers; and Chest Feathers [1].

In collecting data using semi-structured interviews, several questions were asked directly to Mr. Edy as the owner of the Gentan Farm Peafowl breeding center. The questions asked to obtain information related to the types of Peafowl feathers used in making the *Dhadhak Merak Reog Ponorogo*, then how many strands of feathers are needed to make one *Dhadhak Merak Reog*

Ponorogo, then what is the production capacity of Peafowl feathers that can be produced by Gentan Farm in one year, and to compare the results of previous research that focused on Blue Peafowls kept in captivity in India with Blue Peafowls kept at Gentan Farm.

3. Results and Discussion

The following table shows the results of the research on Blue Peafowls cared for at Gentan Farm.

Table 1. Range of Length Sizes of Various Feather Categories on Male Blue Peafowls (Blue Peafowl)

Indian Peafowl	Feathers Categories						
	Crown Feather	Neck Feather	Dorsal Feather	Contour Feather	Flight Feather	Tail Feather	Breast Feather
Ranges (cm)	6 – 6,5 cm	2 – 5 cm	6 – 8 cm	7 – 8,5 cm	8,5 – 18,5 cm	57,5 – 134 cm	5,5 – 7,5 cm

Table 2. Range of Length Sizes of Various Feather Categories on Male Blue Peafowls (Blue Peafowl) on Barua's research

Indian Peafowl	Feathers Categories						
	Crown Feather	Neck Feather	Dorsal Feather	Contour Feather	Flight Feather	Tail Feather	Breast Feather
Ranges (cm)	6 – 8 cm	2 – 6 cm	4 – 7 cm	3 – 12 cm	30 – 40 cm	39 – 45 cm	5 – 8 cm

From the table above, it can be seen that there are differences in the size of the various types of feathers on the body of the Blue Peafowl. The tail feather is the longest and also the most used feather for *Dhadhak Merak*, because more than one individual is used to make the whole mask. The crown, neck, dorsal, contour, flight and breast feather are all used only in one specific location on the center of the mask and only one individual is used. Crown feathers are a collection of feathers found on the top of the peafowl's head. These feathers consist of 12-15 feathers with a fan-like shape. The measurement results found that the size of the crown feathers ranges from 6 cm to 6.5 cm in male blue peafowls. Neck feathers are fine and short feathers found around the peafowl's neck and are known for their distinctive shiny metallic blue color. During the mating season, neck feathers provide an attractive appearance to female partners. The measurement results show that the length of the neck feathers on male blue peafowl ranges from 2 to 5 cm.



Fig. 2. Dorsal Feather measurement of Blue Peafowls (*Pavo muticus*) in Gentan Farm Breeding Center

Dorsal feathers are feathers that cover the back of the peafowl's body, function as a protective layer and help support the structure of the peafowl's long tail. The measurement results found that the size of the dorsal feathers ranges from 6-8 cm in male blue peafowls. Contour feathers are feathers that cover most of the body of the male blue peafowl, helping to shape the bird's outer body shape and providing protection and aerodynamics. The measurement results show that the length of the contour feathers on the male blue peafowl ranges from 7-8.5 cm.



Fig. 3. Flight Feather measurement of Blue Peafowls (*Pavo muticus*) in Gentan Farm Breeding Center

The flight feathers have a darker color than the other parts and are decorated with a shiny pattern, the length of these feathers ranges from 8.5 - 18.5 cm. The tail feathers are the longest feathers that grow on the peafowl's back, in the male blue peafowl the length ranges from 57.5 - 134 cm. Tail feathers have three different types, namely *pelong*, *cawang*, and *rawis*. The use of tail feathers on the Dhadak Merak is 90% *pelong* and 10% consist of either *rawis* or *cawang*. The use of *pelong* is caused by the aesthetic trait, and also the most abundant type of tail feather that found in one individual, therefore the cheapest among the three. Tail feathers and chest feathers are the most beautiful parts during visual attraction to attract the attention of females during the mating process. The pattern is unique with a striking blue eye pattern so that it is considered a symbol of beauty and elegance and is in great demand for aesthetic purposes. The breast feathers on the male look striking with bright metallic blue and green colors and are decorated with striking eye patterns, the length of these feathers ranges from 5.5 to 7.5 cm.



Fig. 4. Tail Feather measurement of Blue Peafowls (*Pavo muticus*) in Gentan Farm Breeding Center

The result of the *Dhadhak Merak* making process, each mask requires between 1,000 to 2,000 feathers to achieve the desired look. The breeding at Gentan Farm (in Ponorogo) has a fairly large population, namely around 100 Blue Peafowls and 21 Green Peafowls available. During the mating season, Mr. Edy's breeding can supply up to 5 *Dhadhak Merak*. This ability is influenced by the natural process of feather shedding, where each peafowl can lose between 100 to 120 feathers during the mating season. Therefore, the availability of peafowl tail feathers that fall out greatly supports the sustainable production of Peafowl *Dhadhak*, and shows the importance of good breeding to meet the aesthetic needs of local arts and culture. The presence of quite a lot of peafowls in this breeding allows craftsmen to continue to produce high-quality masks, while maintaining the sustainability of the peafowl species itself.

Interpretation of the measurement results in Table 1 shows a comprehensive picture of the variation in size and morphological specifications in various categories of male blue peafowl feathers (*Pavo cristatus*). These data show that the tail feathers are much longer than other feather categories, ranging from 57.5 to 134 cm. This finding has several important implications. First, the size and beauty of the male blue peafowl feathers indicate the importance of feathers in the process of attracting mates, an essential need for reproduction. Second, information on the size and number of feathers needed to make the *Dhadhak Merak* in *Reog Ponorogo* emphasizes the need for peafowl conservation and breeding to meet aesthetic and cultural needs. This shows that tail feathers are not only a key element in the mating ritual, but also a symbol of beauty and elegance that is preserved in the form of the *Dhadhak Merak* mask in *Reog Ponorogo*. The ability to breed the Indian Peafowl could paved the way to breed the endemic Green Peafowl, so the dependence on imports or illegal poaching could be reduced or eliminated completely.

Based on the references mentioned and our interview with Mr. Edy, the Breeding Program is started because the population of Green Peafowl are declining, and also the easiest and cheapest way to obtain the peafowl's feather is by importing it from either India or China, even though the one used is not the Green Peafowl (*Pavo muticus*) as usual, but the Indian Peafowl (*Pavo cristatus*) one that is used today.

The results of measurements carried out at the Gentan Farm breeding center showed a significant difference in the length of the Indian peafowl tail feather ranging from 57.5 - 134 cm, much longer than the measurements carried out by Barua (2020) in India with a tail length ranging from 39 - 45 cm. There are still more data needed to compare both individual on those two locations, including

environmental factors, genetics, or maintenance patterns that may contribute to these differences. In addition, there is a significant difference in color between the blue peafowls in the Gentan Farm captivity, which tend to resemble the green peafowl with a golden color. This is influenced by the type of food in the form of Madura corn & crickets, which are the original food of the green peafowl. This factor is the cause of the high price per strand of blue peafowl feathers in the Gentan Farm captivity compared to imported blue peafowl feathers. The results of this study support most of the research hypotheses and clearly answer the research questions, especially in terms of the size of the tail feathers and the need for feathers to make *Dhadhak Merak*. The size of the tail feathers of the male blue peafowl, as measured by Gentan Farm, shows a significant range. This helps meet the research objectives related to feather size.

There are also some morphological similarities between Indian Peafowl that was mentioned in Barua (2020), Kushwaha (2016), Freyer (2019), Weiss (2010), including the coloration and also the size, even though the one we found in Gentan Farm tend to be larger than individual in the mentioned references. In Kushwaha (2016), the individual is larger than what we found in Gentan Farm with the size ranging from 195 to 225 cm compared to our finding that had 134 cm maximum length.

In addition, information regarding the category of feathers needed to make *Dhadhak Merak* and the number of feathers needed for one mask is also answered through these findings. Data on the production capacity of feathers in captivity also provides insight into the scale of production, thus supporting the overall formulation of the problem where The *Dhadhak Merak* used in *Reog Ponorogo* requires more than 1.000 tail feathers, categorized into *pelong*, *cawang* and *rawis* feathers. Gentan Farm has a production capacity of approximately 1.000 to 1.200 tail feathers per molting season, which occurs between November and January. This production capacity plays a crucial role in supporting the sustainability of *Dhadhak Merak* craftsmanship while reducing dependence on imported peafowl feathers.

4. Conclusion

Blue Peafowl or Indian Peafowl has a type of feather with its own uniqueness and different lengths. Blue Peafowls cared for at Gentan Farm Ponorogo have colors like Green Peafowl feathers and tend to be larger in size than Blue Peafowls studied by Barua Research in Bangladesh. *Dhadhak Merak* of *Reog Ponorogo* requires more than 1000 strands of peafowl tail feathers consisting of *pelong* feathers, *cawang* feathers and *rawis* feathers, with a capacity that can be produced by Gentan Farm ranging from 1000 to 1200 feathers per shedding season in November to January. Moreover, maintaining a stable and sustainable breeding population ensures both the cultural preservation of *Reog Ponorogo* and the long-term conservation of peafowls in captivity.

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