

Reproduction Performance of Magelang Duck Evaluated by Histological Preparation

Yosephine Laura Raynardia Esti Nugrahini^{1*)}, Monica Sonia Indri Pradipta²⁾

^{1),2)}Departement of Animal Science, Faculty of Agriculture, Universitas Tidar

Abstract

This study aims to increase duck population in their origin distribution area Sempu, Ngadirojo Village, Secang, Magelang district. The increasing is evaluated by Magelang duck reproduction performance in this area. Ngadirojo was the origin area of duck Magelang distribution but unfortunately the population has begun to decline due to the presence of commercial farmers who sell this type of duck out of the region. Most of the people in Ngadirojo also maintain semi-intensive methods so that reproduction and maintenance performance is poorly controlled due to low performance including reproduction. The data evaluated includes mature age, mature sex weight, egg laying, egg production per week, egg fertility, egg hatchability, incubation time, mating method, and reproductive technology that had been applied. Data collection was grouped on intensive and semi-intensive farms in Sempu sub-village, Ngadirojo village, Secang sub-district, Magelang regency. Evaluation has been carried out through the manufacture of histological preparations for female reproductive ducks of production age (6-12 months) on intensive and semi-intensive farms. Reproductive performance data were analyzed descriptively and data on histology preparations were displayed as support. The results obtained by farms in the Sempu sub-village are semi-intensive duck breeders, ducks are carried out in to the rice fields at certain hours. No intensive breeders were found in the Sempu hamlet, therefore comparative data as intensive breeders were obtained in the Tempuran area, Magelang district. It can be concluded that based on the survey, Magelang duck farmers in Sempu hamlet had normal reproductive performance but when evaluated through histology preparations the tissue of reproductive organ of Magelang ducks which were intensively maintained were more productive.

Keywords : Magelang duck, histological preparation, Secang hamlet, Reproduction.

Introduction

Magelang duck or called Kalung duck is the origin species of the duck that found in Magelang regency, especially in Ngadirojo district. It has a special characteristic on their neck with white round line. Based on Ministri of Agriculture in Indonesia 801/Kpts/PD.410/2/2013, this kind of duck has been identified as domestic animal genetic in Indonesia. They are grown as egg supplier and after reach end of their productive time they use as broiler duck. Magelang duck have egg production about 131-160 egg/year, they reproduction periodes are 9-10 months and start to laying egg at 6 months. They produce egg weight about 60-70g and Day Old Duck (DOD) weight about 41,70g (Wulandari and Saraswati, 2013).

As a local genetic resource, this duck needs to be preserved. A lot of data supports the profile of Magelang duck production. The existence of valid data

about ducks is needed because it is the basis for the steps to determine the treatment in order to increase the production and preservation of ducks. Data on reproduction is important because it is related to the fertility of the eggs and ultimately affects the amount of DOD (Day Old Duck).

The decreasing of the population can be caused by low regeneration and highly distribution of Magelang ducks outside the origin region. Currently there are many commercial farms that grow Magelang ducks intensively and they are sold out of the origin area, so the population in Magelang is not being considered. In addition, ducks that are not maintained commercially are only traditionally maintained by the surrounding community. The impact of this model of maintenance is the lower of Magelang duck production in Magelang regency due to lack of maintenance management. Ducks with high production would have been maintained in

*) Corresponding author:
yosephine.laura@untidar.ac.id

commercial farms so they cannot contribute to increase of local ducks in Magelang area.

Materials and Methods

Animal

Twelve female Magelang ducks in production phase were used in this study. Six ducks from non-intensive farm or traditional farm from Sempu hamlet, Ngadirojo village, Secang district, Magelang regency, Center Java, Indonesia. They are slaughtered by cut the artery carotid, trachea, and esophagus. Reproduction organs that includes ovarium, infundibulum, magnum, isthmus, uterus, dan vagina untill cloaca were collected.

Histological Preparation

Histology preparations was carried out from 2 cm long pieces for each sample from the vagina, uterus, magnum, isthmus, infundibulum, and ovarium then fixed in 10% buffered formalin, soaked for 24 to 48 hours, then made histological preparations. Each piece of tissue sample is hydrated which is

passed one by one in an alcohol series with concentrated levels ranging from 30%, 50%, 70%, 80%, 95%, and 100%. Each of the above samples is transferred one by one into each alcohol concentration for about 10 seconds. Then the sample is put in xylene and finally dipped in paraffin. Samples were sliced with 4 μ m thickness using microtome and histological process followed Alcian-Blue stained. Histological preparations in object glass are ready to be observed and measured using a microscope with the help of a computer. This process was held in Faculty of Medicine, Universitas Gadjah Mada.

Results and Discussion

The observation wants to determine the differences of characteristic that found in histological preparation of the female reproduction organ which grown in different kind of maintenance. The data of characteristic anatomy female duck reproductive organ are showed in Table 2.

Table 2. Anatomy of female duck reproductive organ in different maintenance

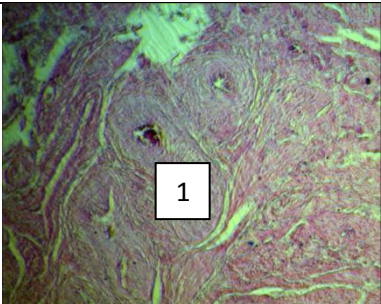
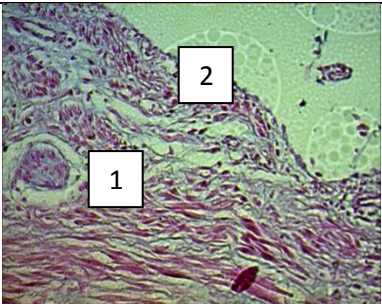
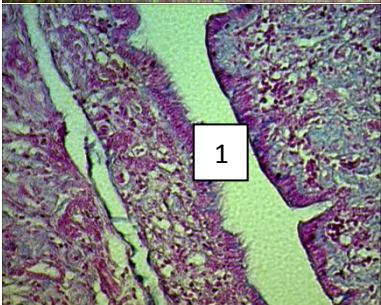
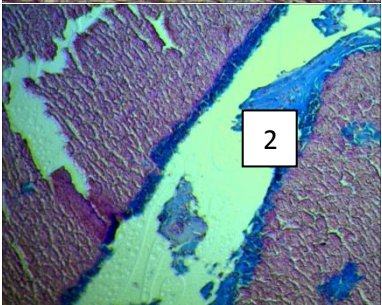
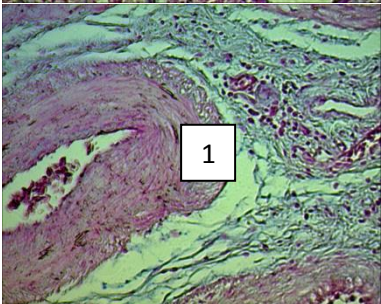
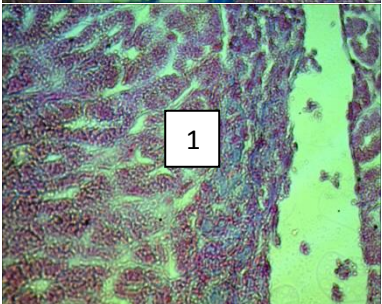
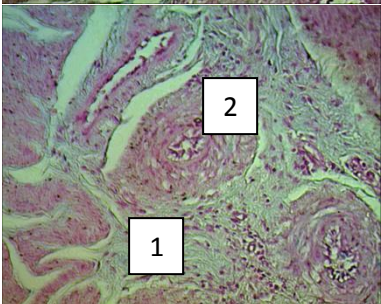
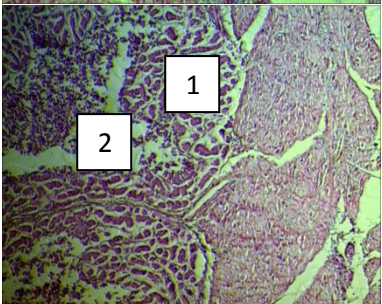
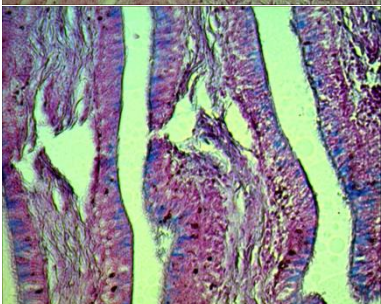
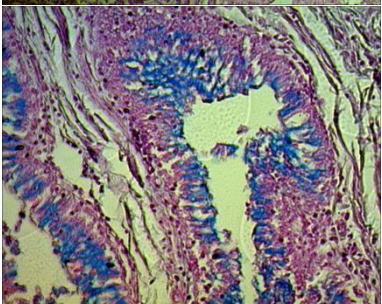
	Organs	Traditional maintenance (g)	Intensive manintenance (g)
1	Ovarium	3,40 \pm 0,69	48,27 \pm 25,11
2	Oviduct	10,37 \pm 1,16	99,76 \pm 22,76

Reproductive organs of female ducks consist of two important parts ovarium as the place of ovum production and Oviduct as ovum duct which consists of five parts that are infundibulum, magnum, isthmus, uterus, and vagina. Traditional maintenance showed the reproductive organ size is lighter than that of ducks that are intensively maintained. In this type of traditional maintenance, there are many unproductive duck animals. The ducks are in the laying phase but have an irregular spawn rhythm (more than 3 new days does not laying eggs). In intensive system maintenance, it was found that duck animals were more productive. The rhythm of laying eggs is more regular, that is, once every two days lay eggs that causes the difference in the size of the reproductive

organs is far enough between traditional maintenance and intensive maintenance. The differences is caused by the active tissue in reproductive organs will be larger because of secretive activities. Reproductive organs in poultry contain secretory cells which secretes components to make an egg until it is spawned. Tissues in the isthmus and magnum are thick secretory cells and have a mucosal layer in the production phase (Mohammadpour et al., 2012).

Histological preparations are obtained from duck reproductive tissues that are maintained intensively and traditionally maintained. This evaluation aims to determine the characteristics of the female reproductive organ tissue in the production phase. The characteristic of the histology preparation showed in Table 3.

Table 3. Histological characteristics of female duck reproductive organs

Organs	Traditional Maintenance	Intensive Maintenance	
1 Ovarium			1. Folicle 2. Tunica albuginea
2 Magnum			1. Ciliated Epitel 2. Mucopolysacharid e secretion
3 Isthmus			1. Luminal Epitelium
4 Uterus			1. Luminal Epitelium 2. Lumen
5 Vagina			

Tissue in duck production phase with different maintenance systems has several visible differences. In the ovary, ducklings from intensive care have a good development of follicular tissue seen in

ovules that are ready to be ovulated as they approach the tunica albuginea. Magnum is the next part of the reproductive organ that secretes the albumen of the egg. In this section found that traditional maintenance

the magnum are ciliated epithelial layer as secretory cells. Ducks that are kept intensively, ciliated epithelial tissue in the magnum shows a blue color which means the cell secretes mucopolysaccharide. The identification of magnum tissue found a tissue formation in the peri-albumen section containing polysaccharides and three glycoproteins. This formation was detected by Alcian-Blue staining in blue color (Sultana et al., 2003).

The isthmus network is secretory tissues that secrete a thin shell forming on the egg. The animals that are maintained intensively showed that the lumen begins to open and the size of the luminal epithelial cells enlarged. Isthmus is an extension of the magnum which secretes active fibers and keratin for the formation of thin shells (Noor and Nisa, 2014). The vagina is the place of sperm copulation and deposition, in poultry this part has folds as a place for sperm rest before conception. Mucopolysaccharide secretion in this part acts to supply nutrients for sperm. The vagina is composed of pseudostratified columnal epithelium cells which secrete mucopolysaccharide and as sperm storage sites (Wani, 2017). There is no difference between vagina histological which intensively maintained and traditionally maintained.

Conclusion

It can be concluded that there is an influence on the type of maintenance on reproductive performance. External factors are feed and environment that are not studied in this study. Internal factor evaluation with histochemical staining proves that intensive maintenance shows more productive tissue profiles.

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