Performance of Gestating Does of Ornamental Rabbits, Case Study: Smallholder Rabbit Farms in Bumiaji District

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Abstract. This study aimed to determine the does performance of ornamental rabbits during the pregnant period at smallholder rabbit farms in Bumiaji District, Batu City. The method used in this study was survey and direct interview with farmers of ornamental rabbits (Dutch, Holland Lop, and Netherland Dwarf). Primary and secondary data were collected by observation. Research variables included initial body weight, body weight gain during pregnancy, litter size, and birth weight of the offsprings. Data were analysed using analysis of variance and if there were differences between treatments, Duncan's test was conducted. The results showed no difference in initial body weight and weekly body weight gain during the gestation period and litter size, but there was a significant difference (P>0.05) in the birth weight of the offspring between the three different strains. The conclusion of this study is that the potential ornamental rabbits breeds that give the best performance during the gestation period at smallholder rabbit farms in Bumiaji District is Dutch strain.

Keywords: Production Performance, Ornamental Rabbits, Dutch, Holland Lop, Netherland Dwarf.

1 Introduction

Rabbits (*Oryctolagus cuniculus*) are pseudoruminant livestock that have the ability to produce high yields with short birth intervals. Rabbits are a type of prolific livestock, which means they have the ability to have many litters per birth cycle [1]. Rabbits can give birth as many as eight times within a year with the number of litters per birth (litter size) reaching 1 to 8 heads [2]. According to data from officers of the Batu City Agriculture Office, stated that from 2020 to 2022 the rabbit population in Batu City continued to decline. Data on the rabbit population in 2020 reached 22,280 heads, in 2021 the number of rabbit populations fell to 21,040 heads, while in 2022 the number of rabbit populations in Batu City was recorded at only 18,530 heads [3]. The cause of the decline in rabbit performance can occur due to the absence of complete maintenance records (recording data), the occurrence of uncontrolled mating between rabbit breeds, and the tendency to make the wrong crosses that can reduce the genetic quality of rabbits

[4]. Breeders are also more interested in selling rabbit offspring, resulting in a minimal number of rabbit offspring being kept to mature age. Farmers must know, understand, and apply the breeding of rabbits properly [5]. This condition can cause a decrease in the genetic quality of rabbit livestock which consequently decreases productivity. The lack of data on the productivity of rabbits until the age of maturity or ready for slaughter, especially for meat rabbits, is the cause of the difficulty of conducting rabbit breeding programs.

Rabbit productivity is very important to be used as a reference in improving the genetic quality of livestock breeds. In addition, information is also needed on the type of rabbit and the feed given. Rabbit breeds can be divided into meat rabbits and ornamental rabbits, rabbits that are utilized for their skin (fur) are also included in the ornamental rabbit breed. Batu City has a minimum temperature of 18-24°C and a maximum temperature of 28-32°C with an air humidity of around 75 - 98%. Because of these conditions, Batu City is very suitable for the development of various sub-tropical plant commodities in horticultural crops and livestock, one of which is rabbits. Collecting data on productivity, rabbit breeds, and physiological status of rabbit livestock to conduct future rabbit livestock development and breeding programs. This study aimed to determine the production performance of ornamental rabbits during the gestation period in smallholder rabbit farms in Bumiaji District, Batu City.

2   Materials and Methods

2.1   Materials

The research location was at the Smallholder Rabbit Farm in Bumiaji District, Batu City with range temperature 18-32°C and air humidity of around 75 - 98% RH. The materials used in this study were 30 pregnant Does of Dutch, Holland Lop, and Netherland Dwarf rabbits that were more than one year old and had given birth at least once.

2.2   Methods

The method used in this research is survey and interview with primary data and secondary data collection. Primary and secondary data were collected by direct observation and interview with farmers in rabbit farms in Bumiaji District on September, 1 2023 until November, 30 2023. Determination of the location and research samples by purposive sampling, namely the selection of subjects based on certain characteristics or traits that are already known in advance and refers to sampling deliberately to achieve research objectives.

2.3   Research Variables

Variables observed in this study include Weight gain of pregnant does (g/head), data obtained by calculating the difference between the doe's body weight before pregnancy and the mother's body weight weekly during of pregnancy [6]. Litter size, data obtained

by calculating the number of children born to each does in one birth or partus [7]. Birth weight of offspring (g/head), data obtained by weighing the body weight of newborn rabbit offspring, carried out no later than 24 hours after the offspring was born [5].

2.4   Statistical Analysis

The experimental design used Completely Randomized Design (CRD). Data were analysed using analysis of variance (ANOVA) and significantly different data continued with Duncan's multiple range test using SPSS software (SPSS® version 16.0).

3   Results and Discussion

Production performance in this study includes weight gain of the doe during pregnancy, litter size, and birth weight. Each variable will be observed based on the breed of rabbit and the results of ornamental rabbit production data are shown in Table 1.

Table 1. Performance of Ornamental Rabbit.

Rabbit Breed	Initial Body Weight (g)	Body Weight Gain / Week (g)				Litter Size	Birth Weight (g)
		1	2	3	4		
Dutch	1771.1 ± 202.30	119.86 ± 12.72	133.00 ± 23.66	148.92 ± 31.51	175.31 ± 27.42	5.67 ± 1.45	44.43 ± 1.45[b]
Holland Lop	1645.6 ± 329.85	125.19 ± 18.30	135.31 ± 21.57	149.47 ± 25.71	171.34 ± 46.40	4.78 ± 2.22	42.19 ± 5.71[ab]
Netherland Dwarf	1576.6 ± 281.46	110.50 ± 7.09	113.04 ± 12.40	122.28 ± 20.55	153.22 ± 27.01	5.75 ± 1.16	39.93 ± 2.74[a]

[a-c]Uncommon superscript indicates a significant difference ($P < 0.05$)

Based on the results showed that there was no difference ($P > 0.05$) in weekly body weight gain in the three breeds of ornamental rabbits observed. In terms of weekly body weight gain, the smallest pregnant doe in the Netherland Dwarf breed. This can occur because Netherland Dwarf is a type of ornamental rabbit that has the smallest body size with its adult weight only reaching 0.9 kg/head, short body and slightly round head [8]. According to Lukefahr et al, [9] stated that the body weight of adult Dutch rabbits is 1.6-2.5 kg/head; Holland Lop 1.8 kg/head; Netherland Dwarf 0.9-1.1 kg/head. The same research on other rabbit breeds by Sismala et al, [10] showed that the doe weight of New Zealand White rabbits has a very weak correlation value to litter size, birth weight of offspring, and mortality of rabbits. This indicated that the weight of the doe did not really determine the number of litter size, birth weight of offspring and mortality of New Zealand White rabbits. Several factors affect the body weight of pregnant does, such as feed consumption, rabbit breed, number of fetuses. Pregnant rabbits experience significant weight gain. This is due to high appetite, so that feed consumption also increases, but when it has given birth the doe's body weight will be decreased [11].

The majority of rabbit breeders in Bumiaji District, Batu City will mate their rabbits at the age of more than 6 months. Temperature is very influential on pregnancy and

litter size, where the smallest pregnancy and the least litter size if the marriage is carried out when the environmental temperature is high. Litter size is the total number of off-spring each doe gives birth to. Rabbits are a prolific breed, which means they have the ability to have many litters per birth cycle. The results obtained showed that the litter size of ornamental rabbits in Bumiaji subdistrict did not show differences (P > 0.05) between the three breeds of ornamental rabbits, which is between 4 to 6 heads per doe, this situation is greater than the results of research by Eshimutu et al, [12] which showed that the average litter size of Dutch rabbits was 3.5 heads / doe. Furthermore, the results of research by Yunita et al, [2] mentioned that rabbits can give birth as many as 8 times within a year, with the number of litters per birth (litter size) reaching 1 to 8 heads. According to Rahayu et al, [13] every year rabbits are able to give birth 6 times with a litter size of 4 to 10 heads.

The results showed that there were significant differences (P < 0.05) in the birth weight of offspring in the three different breeds of ornamental rabbits. Dutch rabbits have the highest birth weight of the offspring, 44.43 ± 1.45 g/head. The birth weight of Holand lop rabbits was not significantly different compared to Dutch and Netherland Dwarf rabbits. Factors that affect birth weight are in pre-natal growth. Rahayu [13] said that pre-natal growth is caused by 3 factors, including the number and sex of children in the womb, body size and age of the mother, and the level of nutrients consumed by the mother during pregnancy. Purnama [14] stated that litter size depends on the breed, feed given, age and environment of the mother. Furthermore, Whysnu [15] mentioned that the number of offspring will affect birth weight. The difference in birth weight is caused by the litter size of each mother. Does that have a small litter size tend to have a large birth weight, on the other hand, if the doe has many offspring, it tends to have a small birth weight. The birth weight of the offspring is also influenced by several fac-tors, which are the number of offspring born affecting the weight of the offspring, the influence of sex (generally the male sex is heavier than the female sex), breed, parent and stud, feed, and age of the parent [16].

4   Conclusion

The conclusion of this study is that the potential ornamental rabbits breeds that give the best performance during the gestation period at smallholder rabbit farms in Bumiaji District is Dutch strain. Further research should focus on better pedigree recording, feeding, and farming management.

Disclosure of Interests. The authors have no competing interests to declare that are relevant to the content of this article.

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