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Reproductive Performance of Rex and Rex-Satin Cross (Reza) Does and Their Bunny Growth in Tebonan Village, Hargobinangun, Pakem, Sleman

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Abstract

This study aimed to observe Rex and Rex-Satin cross (Reza) does and their bunny 'growth rate in Tebonan village, Hargobinangun, Pakem, Sleman. Two groups contain five of five- to eight-month-old Rex and Reza, respectively, were used in this study. Rabbits were reared in an individual wire hutch and fed with commercial feed and pasture i.e. groundnut straw or corn fodder. They were mated with the buck from the same breeds for each group. Data were analyzed using statistical analysis of independent sample T-test. Service per conception, gestation length, litter size, birth weight, litter weight, and mortality rate in Rex and Reza were 1.00±0.00 and 1.20±0.45 times, 32.20±1.48 and 32.20±1.30 days, 5.20±1.79 and 4.60±2.19 tails, 86.85±27.39 and 71.17±25.45 g, 412.80±137.78 and 336.68±168.40 g, and 10.00±14.91 and 30.00±27.39 % respectively. The bodyweight of bunny of Rex and Reza at one to four weeks of age were 170.83±69.96 and 148.09±47.24 g, 227.10±98.36 and 196.83±32.73 g, 286.60±135.76 and 233.30±29.01 g, and 341.13±158.19 and 304.70±49.44 g, respectively. It was concluded that the gestation length, litter size, birth weight, and litter weight of Rex and Reza were similar. Service per conception and bunny's mortality rate of Rex does were higher than those of Reza does. Bunny's growth rate of both breeds was similar.
Keywords: *Rex, Reza, Doe reproductive performance, Bunny's growth, Tebonan village*

Introduction

Indonesia's population growth rate is not matched by the rate of increase in livestock population, especially modern livestock. The impact that can be felt is the decline in the large livestock population. The decline in the population of large livestock is due to the high rate of slaughter. To reduce the slaughter of large livestock, the cultivation and development of small livestock are very necessary (Sarwono, 1996). One of the small livestock that can be developed is rabbit livestock.

Rabbit (*Oryctolagus cuniculus*) is one of the Pseudoruminansia livestock that has fairly good productivity. Reproductive characteristics of rabbits in one year are capable of giving birth six (6) times with the number of bunny per birth (litter size) four (4) to 10 tails, have a short reproductive cycle (estrus every four (4) days) and 28 weeks of gestation. up to 31 days. The broiler rabbit has a live weight that can reach four (4) to six (6) kg per head. Another advantage of rabbit livestock products is meat which contains 20.8% protein, 10.2% fat, metabolic energy 73 MJ/kg, and low cholesterol 0.1% so that in its development, rabbits have good prospects in overcoming the problem of meat shortages. as a continuous source of protein to ensure food availability at the community level (Rahardjo, 2005).

Rabbits have high growth rates, efficient use of feed, fast harvests and do not

require large rearing areas (Hernandez 2001 cit. Siregar et al. 2014). The growth rate is influenced by race, age, sex, weaning weight, feed, and environmental temperature. Rabbit meat is white meat with smooth and soft fiber and contains high protein content with lower fat cholesterol and calories (Siregar et al. 2014).

The Rex rabbit was imported to Indonesia in 1988. The rabbit was imported from America. Rex rabbits can quickly adapt to cold environments and need good attention in the maintenance process (Raharjo et al., 1995 cit. Brahmantiyo et al., 2010). A good environment for Rex rabbits to thrive is a temperature of 15 to 20°C and low humidity (Cheeke et al., 1987).

Satin rabbits were first imported to Indonesia (Balitnak - Ciawi) from the United States in August 1996 (Prasetyo, 1999). Satin rabbits are rabbits that have advantages in terms of fur, which is shiny hair (Lukefahr, 1981). According to Prasetyo (1999), the shiny skin of satin rabbits is caused by the absence of medulla cells from the hair shaft. Another characteristic of the Satin rabbit fur skin is smooth, dense, thick, and soft.

Prasetyo (1999) tried to form a cross between Rex and Satin rabbits with the hope of getting a rabbit that has smooth and shiny hair which is a combination of the smooth genes of Rex rabbit and shiny hair from Satin. According to Brahmantiyo et al. (2010), the fur trait of Reza rabbits was formed because the homozygous recessive gene pair for fine fur (rr) and glossy fur (sasa) were gathered. The structure of the feathers formed from these gene pairs causes the loss of cells in the medulla of the hair shaft. Furthermore, it was added that with the condition of the double recessive homozygous genotype (F_L_mmrrsasa), if the shiny fluffy rabbits were mated with each other according to Mendelian theory, there would be no trait diversity, because gene segregation would not produce new combinations. The weight of the 20-week-old Reza rabbit can reach 2,513 g. In addition, Reza's rabbit has solid bones, a wide head, and erect ears.

The village of Tebonan, Hargobinangun, Pakem, Sleman have good potential for the development of rabbits, this can be seen from the existing human resources, especially rabbit breeders, where the experience of raising rabbits has existed for a long time, thus efforts to improve the quality and quality of rabbits it is necessary to research the comparison of the reproductive performance of the parent and the growth of the Rex rabbit with Reza.

Material and Method

Livestock

The livestock used in this study did of the Rex and Reza types and the bunny born from these does. The does use are five (5) to eight (8) months old, each consisting of five (5) females and one (1) male, while the bunny used are bunny born to the does from birth to the age of one (1) month.

Feed and Hutch

The feed is used in the form of special pellets for rabbits imported from the Livestock Research Institute (Balitnak) Ciawi, Bogor, and forage. The pellets are assistance given to farmers in Tebonan Hamlet, Hargobinangun, Pakem, Sleman. The hutches used were ten individual hutch units in the form of a box. The floor and walls of the hutch are made of wire which is equipped with a place for eating and drinking made of clay. The hutch is equipped with a litter box made of wood. The size of the hutch is 80 cm long and 55 cm wide and the nest box is 40 cm long and 26 cm wide.

Equipment

The equipment used in this study included a Weston Scala scale with a capacity of 2 kg and a sensitivity of 10 g to weigh the rabbit's body weight every week, a thermometer to measure air temperature, a hygrometer to measure humidity, stationery, and labels.

Sampling

Sampling using a simple random sampling method. This method was carried out by taking a random sample of doe based on age considerations, namely five to eight months. The basis for determining the Rex and Reza people is by looking at hair color and hair smoothness. Rex's rabbit has smooth, velvety hair and Reza's has smooth and shiny hair.

Maintenance

Before conducting the research, a pre-research was held for approximately one week to provide an opportunity for the adaptation process of livestock to the new environment. The adaptation process is carried out on the feed given, injecting vitamins and injecting drugs for scabies disease.

Rex and Reza's doe rabbits were kept in individual box-shaped hutches. The floor and walls of the hutch are made of wire which is equipped with a place for eating and drinking made of clay. The hutch is equipped with a litter box made of wood.

The feed given to the rabbits is a special pellet from the Animal Research Institute (Balitnak), Ciawi, Bogor. Rabbit pellets were given in the morning (09:00 WIB) and in the afternoon (16.00 WIB) the rabbits were fed with groundnut straw/ “rendeng” or cornflour. Drinking water is provided ad libitum. Drinking water is changed every day by first cleaning the rest of the previous drinking water.

The doe Rex and Reza each numbered five tails mated with a male. The male used for both breeds is one each. Mating is done by looking at the sign of lust on the female parent, if the parent is in lust then it is immediately put into the male hutch to be married and the date of marriage is recorded. The signs of the doe lust are a red vulva, restlessness, and do not want to stay in the hutch.

Two weeks after mating, the doe pregnancy was checked by palpating on the abdomen. If you feel a round shape like marbles on the abdomen, it can be

ascertained that the rabbit is pregnant but must be able to distinguish between fetus and feces. If you feel a floating, round bulge the size of a marble and feel rubbery then you can be sure you are pregnant, but if the bulge feels hard and smaller then what you feel is feces. In addition to being touched on the abdomen, signs of a pregnant rabbit are that if the rabbit is put into a male hutch, the rabbit does not want to be mate.

Rabbits that are pregnant are kept until the rabbit gives birth. Two days before giving birth, rabbits will usually shed their hair and build a nest. The litter box is put in the hutch so that the bunny that is born does not die. Three days after the cubs were born, they were weighed and then interpolated to get their birth weights, then the male and female rabbits were kept for one month and weighed once a week to determine their body weight gain.

Three-week-old rabbits, apart from drinking milk from their doe, also began to eat the feed provided. Age 35 days to 45 days can start weaning. Weaning is done by transferring the rabbits to another hutch and allowed to eat pelleted feed and forage.

Data retrieval

Reproductive performance of doe. The observed reproductive performance data of rabbits included service per conception (S/C), gestation length, litter size, birth weight, litter weight, and bunny mortality. The way to determine the S/C of rabbits is by mating the doe with a male, then seeing the marriage by means that if the male has fallen, it means that the male has succeeded in mating the doe. After two weeks of checking the pregnancy, if pregnant, the mating is calculated as S/C is one.

The gestation length was determined by counting the number of days from the time the rabbits were mated until they gave birth. The litter size of the rabbit is determined by counting the number of bunny after the bunny is born. Counting of bunny is carried out in the litter box and should not be held because the rabbit has a distinctive smell so that when held by humans, the doe does not want to breastfeed her bunny. Birth weight was determined three days after the bunny was born, weighed using a scale with a capacity of 2 kg, and then interpolated, in addition to determining birth weight, weighing was also used to determine litter weight. The collection of rabbits was carried out using gloves. Every bunny who died was recorded for later use as a reference in determining mortality.

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Bunny growth

The data on the growth of the rabbits included data on the bodyweight of the rabbits every week for one month. Bodyweight was determined by weighing the rabbits once a week using a 2 kg capacity scale. Weighing is done by two people, one person takes the rabbit from the hutch and puts it on the scale, then one person looks at the scale and the numbers shown are recorded in the research book. Weighing is done by weighing the rabbits one by one in turn. Weighing rabbits is done carefully so as not to experience stress.

Data analysis

The data on the reproductive performance of the rabbits and the growth of their offspring were analyzed statistically by analysis of variance using the Independent sample T-test with the help of the Statistical Package for Social Science (SPSS) version 16.0 for Windows 2007.

Results and Discussion

Does Rabbit Reproductive Performance

Based on the results of research and field observations, data on the reproductive performance of Rex and Reza rabbits were obtained which can be shown in Table 1.year.

Table 1. Results of reproductive performance analysis of Rex and Reza rabbits in the hamlet of Tebonan

Variable	Breeds		Signifikansi
	Rex	Reza[a]	
Service per conception (times)	1,00±0,00	1,20±0,45	*
Gestation length (days)	32,20±1,48	32,20±1,30	ns
Litter size (head)	5,20±1,79	4,60±2,19	ns
Bobot lahir (g)	86,85±27,39	71,17±25,45	ns
Litter weight (g)	412,80±137,78	336,68±168,40	ns
Mortalitas (%)	10,00±14,91	30,00±27,39	*

[a] Rex-Satin cross
*(P≤0,05)
ns: *non-significant*

Table 2. Reproductive characteristics of female rabbits in the Dieng . area

Breed	Gestation length	*Litter size*
Rex	31,44	6,10
Reza	31,78	6,00

(Rossuartini dan Sumadia, 2006)

Service per conception

Service per conception (S/C) of Rex and Reza rabbits in Dusun Tebonan were 1.00±0.00 and 1.20±0.45 times. Based on these data, it can be seen that the S/C of Rex rabbits is lower than Reza's rabbits. This shows that the breed influences S/C. According to Sarwono (2002), unfavorable weather changes, namely changes in the air from hot to cold that is too sudden can also cause pregnancy failure after mating. Rex rabbits can quickly adapt to a cold environment (Raharjo et al., 1995 cit. Bahmantiyo et al., 2010).

The service per conception of Rex and Reza rabbits in Dusun Tebonan is lower than that of rabbits reared in Balitnak. Muslih et al. (2005) reported that the S/C of Rex and Reza rabbits kept in Balitnak was 1.90 and 1.345 times, respectively. This is due to the different environmental temperatures between Tebonan and Balitnak Hamlets. Based on the results of measurements in the field, the environmental temperature in Dusun Tebonan is 24.5 °C. The environmental conditions of the Balitnak experimental station, Banjarwaru Village, Ciawi District, Bogor Regency, among others, have an altitude of 500 m above sea level, an air temperature of 22 - 28 °C with an average annual rainfall of 3500 - 4000 mm (Brahmantiyo and Raharjo, 2011).

According to Manshur and Fakkih (2010), rabbits are more suitable for cold climates. Rabbits have a low thermoneutral zone around 15°C, male infertility starts at 29°C, becoming very poor above 35°C.

Gestation length

The gestation length for Rex and Reza rabbits in Tebonan Hamlet was 32.20 ± 1.48 and 32.20 ± 1.30 days, respectively. Based on the data obtained, gestation length for Rex and Reza rabbits was the same. This shows that the breed does not affect gestation length. According to Purnama (2000) in general, the length of pregnancy in rabbits is 28-35 days. According to Sandford and Woodgates (1980), the length of pregnancy is influenced by the breed of rabbit, the age of the doe, the size and number of bunny, and the environment.

The gestation length for Rex and Reza's rabbits in Tebonan Hamlet is longer than those in the Dieng area. Rossuartini and Sumadia (2006) reported that the gestation length for Rex and Reza rabbits in the Dieng area was 31.44 and 31.78 days (Table 2). This is following the litter size of rabbits in the Dieng area which is more than in the Tebonan Hamlet (Table 2). According to Purnama (2000), the gestation length is longer if the number of bunny born is small and weighs more than 100 grams, on the

other hand, a large number of bunny makes the gestation length shorter.

Litter size

The litter size of Rex and Reza rabbits in Tebonan was 5.20±1.79 and 4.60±2.19, respectively. Based on these data, the litter size of Rex and Reza rabbits is the same. This shows that the breed does not affect litter size. The litter size of the two breeds of rabbits is the same, this is following the gestation length of the two breeds which is the same (Table 1) because litter size is influenced by the length of gestation. A long gestation length is seen when the number of bunny born is small and weighs 100 g, on the contrary, a large number of bunny makes the gestation length shorter (Cheeke et al., 1987). The number of bunny born to each type of doe can vary. Generally, between 4 to 12 tails give birth once, for superior rabbits it can reach 15 tails (Sarwono, 1996).

The litter size in the Tebonan area is less than in the Dieng area. Rossuartini and Sumadia (2006) reported that the litter size of Rex and Reza rabbits in the Dieng area was 6.10 and 6.00 (Table 2). According to Purnama (2000), Rex rabbits in Balitnak in intensive care, the average number of bunny born is 7.00 tails. This is following the length of pregnancy that according to Rossuartini and Sumadia (2006), the length of pregnancy in the Dieng area is 31.44 and 31.78 days (Table 2).

Bunny birth weight

The birth weights of Rex and Reza rabbits in Tebonan Hamlet were 86.85±27.39 and 71.17±25.45 g, respectively. Based on these data, the birth weights of Rex and Reza rabbits were the same. This shows that the breed does not affect the birth weight of rabbits. According to Sartika and Diwyanto (1986), rabbit birth weight is influenced by rabbit breed, age of broodstock, food, and local climate.

The birth weight of Reza's rabbit is higher than that reported by Prasetyo (1999) that the average weight of Reza's rabbit at zero weeks of age is 49.8 g. Cheeke et al. (1987) stated that the time it takes a rabbit to conceive a bunny can affect birth weight, the longer it takes, the higher the birth weight.

Litter weight

The liter weight or the total birth weight of Rex and Reza rabbits in Tebonan Hamlet were 412.80±137.78 and 336.68±168.40 g, respectively. The results of the analysis showed that the litter weight of Rex and Reza rabbits was the same. This is because Rex and Reza rabbits have the same litter size, so the total birth weight of Rex and Reza rabbits is the same. The average litter weight of Rex and Reza rabbits in 2008 in Balitnak according to Brahmantiyo et al. (2009), is 361.61±85.73 and 381.12±48.04.

Cheeke et al. (1987), stated that litter size per birth, both in total and in weight, depends on the breed of the doe, nutritional status, and age of the doe, and the environment. At high temperatures, which is

30 0C, the live weight of female rabbits is low, the total weight of the offspring at birth is relatively low, growth is slow and survival is low in rabbits (Fernandez et al., 1995).

Bunny mortality

The mortality of Rex and Reza rabbits in Tebonan Hamlet was 10.00±14.91 and 30.00±27.39%, respectively. Based on the data obtained, the mortality of Rex rabbits was lower than Reza rabbits. This shows that the breed affects the mortality of bunny born. According to Manshur and Fakkih (2010), the change of seasons is often associated with health problems. Situations that change drastically from hot to cold or cold to hot affect rabbits.

The mortality during breastfeeding of Rex rabbits in Dusun Tebonan is lower than that reported by Raharjo (1988), that the mortality of Rex rabbits during lactation is 23 to 43%. According to Cheeke et al. (1987), the mortality rate of up to 20% in pre-weaned bunny with an intensive maintenance pattern is still quite reasonable. Szendro et al. (1996) stated that the most critical period of rearing rabbits was in the 0 to 1 week age period, where the highest mortality rate was found compared to 0 to 3 weeks of age (Gultom and Aritonang, 1988).

The survey results show that the highest bunny mortality rate is due to disease. Diseases that commonly occur are diarrhea, scabies, and bloating. Handling of diarrhea and bloating is done by reducing the provision of feed with high water content and before the forage is given it is withered first (Sardjono, 1997). Improper handling methods, low feed quality, and weather are factors related to the mortality rate of rabbits (Khusnia, 2001).

Bunny growth

Based on the results of research and observations in the field, data on body weight and growth of Rex and Reza rabbits were obtained which can be shown in Figure 10.

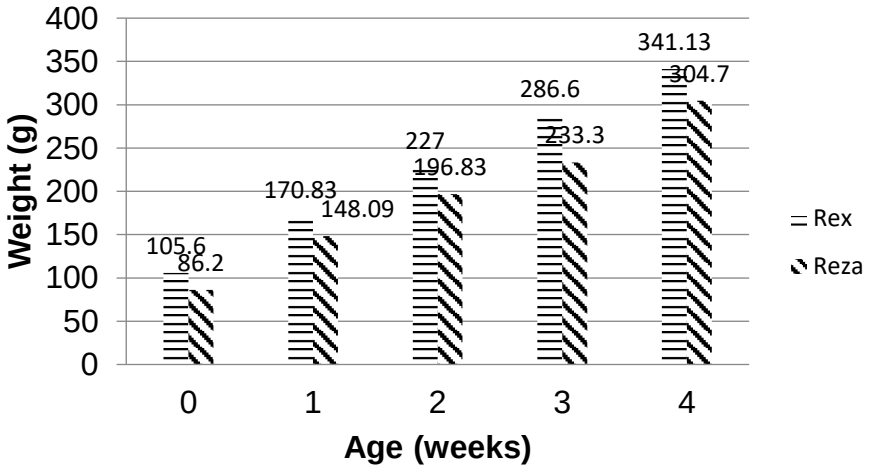

Figure 1. The growth chart of a rabbit for one month

The weights of Rex and Reza rabbits in Tebonan Hamlet aged one to four weeks were 170.83±69.96 and 148.09±47.24 g; 227.10±98.36 and 196.83±32.73 g; 286.60±135.76 and 233.30±29.01 g; and 341.13±158.19 and 304.70±49.44. Based on these data, the body weights of Rex and Reza rabbits at the age of one to four weeks were the same. According to Cheeke et al. (1987), rabbits aged one to three weeks are highly dependent on doe milk. Rao et al. (1977) reported that at one to three weeks of age rabbits achieved a weight gain of 10 to 20 g/head/day, then from three weeks of age until weaning, the rabbits began to eat additional feed such as forage and pellets.

According to Manshur (2009), three days from birth will appear the forerunner of his hair. A week later, the hair will be thicker. At the age of ten days, the bunny's eyes begin to open one by one and at the age of 17 days, usually, the bunny can walk smoothly and get out of the box by jumping.

According to Brahmantiyo et al. (2010), the growth of Reza rabbits looks faster than the growth of Rex and Satin rabbits until the age of 20 weeks. Reza's rabbit, which has a genetic mix between Rex and Satin, looks taller in adult weight than the rabbit that formed it.

Conclusion

Based on the results of research in Tebonan, Hargobinangun, Pakem, Sleman, It was concluded that the gestation length, litter size, birth weight, and litter weight of Rex and Reza were similar. Service per conception and bunny's mortality rate of Rex does were higher than those of Reza does. Bunny's growth rate of both breeds was similar.

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