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Fresh Semen Production of Kacang Goat (Capra Aegagrus Hircus) with Semi-Intensive Maintenance

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ABSTRACT

The research aims to determine the effect of fresh semen production from kacang goats (*Capra Aegagrus Hircus*) using a semi-intensive maintenance system. The research used 4 kacang goats, including 3 males aged 2 years and 1 female aged 2 years, artificial vagina, eosin-nigrosin solution for spermatozoa staining, and physiological NaCl with 5 replications. Observations were made macroscopically (spermatozoa volume, color, pH) and microscopically (motility, viability and abnormalities). Completely Randomized Design (CDR) were used and results data were analyzed descriptively. The results showed a volume 1,2 ± 0,26 ml per ejaculate, white and cream in color, pH 4,2 ± 1,03 and mass movement + to ++. Statistical analysis show that average motility percentage of spermatozoa was 64.66 ± 4,61, average viability 69.66 ± 3.78, average abnormalities 4.6 ± 0,57, and average concentration was 2,777 ± 495. The result of research can be concluded that semi-intensive maintenance greatly affects the production of kacang goats' fresh semen.

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1. INTRODUCTION

Kacang Goat is one of cattle that are often developed or kept by people in Merauke regency. Kacang Goats are commonly reared and developed because they are easy to adapt to environment and have potential in the fulfillment of prime seedlings. But the reproductive factor still becomes an obstacle such as the bad quality of cattle's semen, especially by the system of semi-intensive cared which is assumed of having low semen quality. Environmental temperature changing greatly affects the male reproductive organs. Furthermore, the season of weather greatly affects the quality and quantity of semen, the higher environmental humidity in the cage, the lower the quality of spermatozoa motility (Khairi F 2016).

Generally, in practice there are three types of cattle raising which are applied by farmers, among them are cattle raising extensively (grazing), semi-intensive assimilation of modern and traditional technology, goats are abandoned to graze during the day, and then in the afternoon cattle are put back in the cage, and raising intensively or goats are penned.

The endeavor of improving of kacang goat spermatozoa quality are currently being carried out using a semi-intensive rearing system through improved management and increased disease prevention as well. It is important to know the quality of semen, especially fresh semen, to facilitate the implementation of artificial insemination, especially the clot semen which is less available and

rarely used, therefore the quality of fresh semen of peanut goats which are reared semi-intensively in Merauke Regency needs to be developed.

The purpose of this study is to determine the affect the semi-intensive maintenance on production fresh semen of kacang goat in Merauke.

2. METHOD

2.1 Analysis

The study carried out with using 5 kacang goat rearing semi intensively by the breeder in District of Merauke. Collection semen was carried out at 07.00 – 08.00 pm 2 times a week for 1 month. The research parameters included microscopic (Mass Sperm Motility, Motility, Viability, Abnormalities, Concentration) and microscopic evaluation (Color, Consistency, Volume).

2.2 Research Procedures

Research procedures among others: Prepare the equipment and materials; Prepare the male to collect semen; Clean the stud preputium using NaCl; Provide a female goat teaser; The male is brought closer to the female then attracted back and brought closer again 3-4 times in order to male goat's libido increases; Let the male ascend the female, then at the peak erection, insert the penis into the artificial vagina at a temperature of 30^{o}C; Afterwards, the artificial vaginal shaken follow the figure eight shape; Open the semen tube and covered with paper or cloth to avoid sunlight directly and semen ready to the laboratory for examination and processing.

3. RESULTS AND DISCUSSION

3.1 Macroscopic characteristics of fresh semen

In this study, the microscopic characteristics of fresh semen show that the color of the semen is cream, the consistency is medium thin and the pH ranges from 3-4.8 which can be presented in the following table:

Table 1. Average Macroscopic of Fresh Semen Kacang Goat

Parameter	P1	P2	P3	P4	P5	Average
Colors	White	Cream	Cream	Cream	White	Cream
Consistency	Thin	Thin	Medium	Thin	Medium	Thin
pH	4,8	4,8	3	4,2	4,1	4,2 ± 1,03
Volume (ml)	0,9	1,3	1,4	1,0	1,3	1,2 ± 0,26

3.1.1 Color

The results showed that the semi-intensive maintenance produce semen of kacang goats was colored cream. Semen color is influenced by riboflavin pigment and does not affect spermatozoa fertility (Toelihere M R, 1981). Quality semen is usually more concentrated with a creamy white color due to the high spermatozoa content (Souhoka D F et al, 2009). Furthermore (Husin N et al, 2007) reported that the average color of semen in goats is creamy white. As well as they have explained that color of semen goat is generally cream and white.

3.1.2 Volume

The results showed that semen of kacang goat run into a decrease volume of 1.2 ± 0.2. This is thought to result from a lack of kacang goat libido because the feed intake given is forage only. Moreover, the volume of semen stored using an artificial vagina tends to be less than natural mating. The volume of semen ejaculated of buck is at least 0.5 ± 1.0 ml. Poor quality feeding cause a decrease in the health condition which will ultimately affect the reproductive cycle until to produce infertile livestock. The variation in semen volume of kacang goats was influenced by differences in goat breeds, methods of collecting semen, frequency of shelters, and feed quality (Setiadi B S et al, 2001).

3.1.3 Consistency

The results showed that the consistency of fresh kacang goats' semen were on average are thin. The thinner degree of viscosity may be caused by forage feeding without the addition of other feed. The addition of protein as feeding or a treatment to semen of goat can increase the viscosity (Susilowati S and Hernawati T, 2011; Yusmeidianty D, 2015; Pileckas V et al, 2013; Ilman M et al, 2018). Furthermore, in generally, consistency of semen is closely related to the concentration of spermatozoa, the higher concentration of spermatozoa, the thicker semen consistency of livestock. The thinner the consistency of the semen, also suspected the lower the concentration of spermatozoa (Pamungkas F A et al, 2008).

3.1.4 Acidity

The degree of acidity or pH value of semen can be an indication that in acidic or alkaline condition. In this study, the results showed that the average semen pH of kacang goats was in the range of 4.2 ± 1.03. This pH is lower when compared with this research according to obtained goat semen pH between 6.2 ± 0.25 – 6.4 ± 0.26 (Susilowati S and Hernawati T, 2011). This difference is due to differences in the type of goat and the feeding. Moreover, the low pH of semen (acid) caused by the length of time the semen hasn't collected.

3.2 Microscopic characteristics of fresh semen

Table 2. Average Microscopic of Fresh Semen

Parameter	P1	P2	P3	P4	P5	Average
Mass Sperm Motility	+	++	++	++	+	++
Motility	62	70	62	63	65	64.66 ± 4.64
Viability	68	74	67	68	72	69.66 ± 3.78
Concentration (10^6 per ml)	2.780 x 10^6	2.802 x 10^6	2.750 x 10^6	2.788 x 10^6	2.760 x 10^6	2.777
Abnormalities (%)	5	4	5	4	5	4.6 ± 0.57

3.2.1 Mass Sperm Motility

Spermatozoa mass movement in semi-intensive maintenance in this study showed that the spermatozoa of kacang goat were classified as in good condition when observed under a microscope with 10 x 40 magnification. The observation results show that the results on the criteria (++) are good. This may be due to the age of the goats that are still productive, where the average age of the livestock in this study sample is 2-3 years old. This research is in line with the research, which found that the older the goats have lower quality of semen (Heriyanta E et al, 2014). The mass sperm motility reflects the motility of individuals. There are various methods of mass sperm motility include moving together in one direction and then forming thick and thin waves, moving slowly or quickly depending on the concentration of living spermatozoa (Pamungkas F A et al, 2008).

3.2.2 Motility

The results of kacang goat semen motility test showed that percentage was in the range of 64.66 ± 4.64, this his average was still normal because it was above 50%. The results of this study are similar to research by Lestari et al 2017 which found fresh semen motility of Boer goats to be around 69.26 ± 2.64%. The higher spermatozoa motility of Boer goats is thought to be due to differences in the type of goat and the type of feeding. Motility is the propulsion of an individual which is used as a parameter of the spermatozoa's ability to fertilize an egg in order to achieve successful fertility (Sukmawati E et al, 2014). Although relatively high, the motility of spermatozoa in this study cannot be used as freeze-drying semen because it is still below 70%. Environmental temperature in the Merauke area can be a trigger for this low motility. In accordance with which found that spermatozoa motility is highly affected by extreme environmental conditions, the higher or lower the ambient temperature, spermatozoa motility would decrease (Aisah S et al, 2017).

3.2.3 Viability

The viability of bean goat spermatozoa showed that the semen in this study was of good quality. This is indicated by the percentage of spermatozoa viability to reach 69.66 ± 3.78%. The results of this research are good, in accordance with the opinion of that one of the minimum standards for the quality semen that can be used for artificial insemination is contains a minimum of 50% percentage of live sperm (viability) (Kusumawati E D et al 2016). The high percentage of viability of spermatozoa with semi-intensive maintenance may cause by the soil containing many organic compounds (Takdir N et al, 2022) and one of the organic compounds such as Zn which increase the viability of spermatozoa (Hindrawati S et al, 2020).

3.2.4 Abnormalities

The results of this study obtained a percentage scale below the 10%, were in the range of 4.6 ± 0.57. Spermatozoa abnormalities can reach 5.6% of the average percentage of spermatozoa abnormalities (Toelihere M R, 1981). According to Evans G and Maxwell W M C (1987) kacang goats' semen were good for artificial insemination methods contains less than 15% abnormal spermatozoa, if more than 15%, there will be a decrease in spermatozoa fertility. Furthermore, it was also report that abnormalities in the shape is level of spermatozoa abnormalities which are closely related to fertility level of males [Hartawan R, 2003;Rizal M 2006). The minimum standard of semen quality for artificial insemination is a minimum of 500 million cells/ml/ejaculate.

3.2.5 Concentration

The concentration of spermatozoa kacang goats in this study was average 2.777 ± 455 (million/ml). The results of this study were lower than the study which found the concentration of kacang goat was between 2865 ± 431 (million/ml) (Ansari M S et al, 2011). This difference is probably caused by differences of goat breeds, different rearing systems and the type of feeding. Moreover, there are many factors cause different concentrations of spermatozoa, including age, temperature and animal health. Concentration affected by breed, feed, age, and temperature, and also by frequency of ejaculation (Adhyatma M et al, 2013;Syarifuddin N A et al, 2020). The higher of frequently ejaculated at period of time, then lower concentration of spermatozoa.

4. CONCLUSION

The summary of this study that production fresh semen of kacang goat with semi-intensive maintenance is reduce semen volume 1,2 ± 0,26 ml/ejaculate and increase pH as far as 4,2 ± 1,03, and also has impact to average of motility 64,66 ± 4,61, viability 69,66 ± 3,78, concentration 2,777 x 10^6 and average of abnormalities 4,6 ± 0,57.

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