

# Evaluation of body condition score, reproduction performance and feed management in housing group system pangestu, girikerto, turi-sleman

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## ABSTRACT

This study aims to determine body condition score, reproductive performance, and feeding management in the housing group system Pangestu. Evaluation of body condition score is carried out directly by feeling the part of the loin area (back) which describes the longissimus dorsi muscle, muscle, and fat tissue that covering the spinous and transverse processes of lumbar. The reproduction performance observed were signs of estrus, postpartum estrus, postpartum mating, litter size, kidding interval, and weaning time. Feeding management includes the type of feed given, method, frequency and timing of feeding. Based on the results of the observations, average of body condition score was  $2,4 \pm 0,67$ . The reproduction performance including, postpartum estrus was  $6,69 \pm 0,31$  months, postpartum mating was  $6,82 \pm 0,31$  months, litter size was  $2,3 \pm 0,11$  heads, kidding interval was  $11,73 \pm 0,50$  months and the weaning time was  $3,17 \pm 0,10$  months. The conclusions were body condition score is under normal standard, while reproductive performance such as post partum estrus, post partum mating and kidding interval are tends to under normal conditions.

*Keyword: Body condition score (BCS), Ettawa Crossedbred, Feed, Reproduction.*

## 1. INTRODUCTION

Peranakan Ettawa (PE) goat is potential livestock that has to be developed. But any problem found on farm, like difficulty in detecting estrus, invisible signs of estrus, so is causing unknowing ovulation time [1]. PE goats were kept by farmers who tend to show low reproductive efficiency. This is due to reproductive failure due to ignorance or delays in detection of estrus, that consequence will reduce the conception rate [2]. The quality and quantity of feed that is insufficient for the needs will lead to low livestock productivity, such as slow growth rates and low body weight. Young cattle that have low body weight will result in delayed puberty and low fertility [3]. Therefore, it is necessary to get attention to the preparation of the ration components so that the rate of goat growth and reproduction can be optimal.

The purpose of this study was to determine BCS, reproductive performance and feed management PE goat

in the Pangestu farmer group, which will used as a reference for further research. After obtaining this information, it will then be used as a reference for further research to improve feed management and reproductive performance of does in the housing group Pangestu.

## 2. MATERIALS AND METHODS

### 2.1 Material

#### 2.1.1 Sample

The selection of goats in this study used a purposive sampling method. The requirements for goats that can be used in this study are does at least had been partus two times and initial weight of  $\pm 30$  kg. In addition, farmers who keep are selected based on their breeding experience for at least 5 years, then the feed used is fresh forage instead of fermentation and the use of concentrates is

limited to the form of polard. Based on these requirements, 23 PE goats were obtained.

## **2.2 Methods**

### **2.2.1 Body condition score (BCS)**

The scale used is 1 to 5. Measurement of the BCS is done by feeling the loin area (back) which represents the longissimus dorsi muscle. Muscle and fat tissue cover the spinous and transverse processes of the lumbar vertebrae. Muscle and fat will also feel filled in the area between the spine and the horizontal bone. In addition, it is also measured the fat that is under the chest (sternal fat) and also on the ribs.

### **2.2.2 Reproduction performance**

Goats that have been known the BCS have then conducted interviews with farmers regarding reproductive performance which include signs of estrus, postpartum estrus, postpartum mating, service per conception, and kidding interval.

### **2.2.3 Feeding management**

The farmer was also interviewed regarding the type of feed that is usually given both forages and concentrate, the method of administration (ad libitum, restriction, or voluntary), and the frequency of administration.

## **3. RESULTS AND DISCUSSION**

### **3.1. BCS (Body Condition Score)**

BCS or Body condition score is a subjective assessment technique by measuring the proportion of body fat and muscle in livestock, and this method is widely accepted and can be used to determine the nutritional status of livestock [3]. Inappropriate BCS during maintenance can result in increased production costs, disease or parasites and decreased fertility, and milk production [4]. Based on the research that has been done, the mean BCS is  $2.4 \pm 0.67$ . There are 14 cattle with BCS 2-2.5 and 9 BCS 2.6-3.

Farmers are usually only provided one type of forage or mixture that does not meet the needs of livestock resulting in a deficiency of protein, energy, and minerals [5]. The results of research [5] regarding increasing the level of concentrate in the ration, 60% of the concentrate showed that the increase in body composition of the Etawah crossbreed goat was the best compared to treating concentrates of 75%, 45%, and 30%. Based on this research, it can be estimated that the BCS of the Etawah

Peranakan goat in the Pangestu herd is below normal because the feed used has mostly foraged so that the formation of muscle and fat is less and it also causes a lack of fat reserves in the body of the livestock.

The ideal of BCS will produce milk with high production during lactation, where the doe at that time will experience a decrease in energy [6]. The ideal score is 3 to 3.5, the doe who has this score will have a positive impact on health, reproductive performance, and milk production. BCS research based on age, namely 0.5 to 1 year, > 1 to 2 years, and > 2 to 4 years, the results obtained from various ages, BCS showed the same score, namely 3, so it was concluded that maintenance management especially feeds should be considered. from the beginning of growth until it can produce [7].

### **3.2 Reproductive performance**

#### **3.2.1 Postpartum Estrus**

Based on the observations, the postpartum estrus of goats were  $6.69 \pm 0.31$  months. The postpartum estrus of PE goat occurs in months 3 to 5 [8]. Several factors influence postpartum estrus, including genetic, environmental, and metabolic factors [9]. The results obtained a longer postpartum estrus. This can be caused, among other things, cattle that experience estrus show unclear signs so that usually breeders are not aware of it. Besides that, does during pregnancy until giving birth usually insufficient feed both in quantity and quality, resulting in a slow process of returning the reproductive organs to normal (uterine involution) which then will also delay the next estrous cycle (anestrus postpartum) [10].

#### **3.2.2 Postpartum Mating**

The results showed that postpartum mating of Ettawa crossbreed goat ranged from  $6.82 \pm 0.31$  months. Research in two regions with differences in altitude, namely 4.2 months on the beach and 4.6 months in the mountains [11]. Postpartum mating is an indicator of whether reproductive management is good or not, which is related to the care of the does and the adequacy of feed after birth.

The length of postpartum mating will always be related to postpartum estrus. Postpartum mating is strongly influenced by postpartum estrus which then affects the kidding interval [12]. However, when postpartum estrus is seen, it is not certain that livestock can be directly mating because [13] postponement of mating until second to the third estrus after giving birth is still within reasonable limits, with the aim of giving

does's body and reproductive organs a chance to return to normal.

### 3.2.3 Litter size

Based on the results of the study, it was found that the average litter size was  $2.3 \pm 0.11$ , which, higher than the study [14] namely  $1.51 \pm 0.43$ , and tends to increase from the first to sixth parity with a peak litter size of  $1.96 \pm 0.32$  individuals. The litter size can also be affected by the nutrient content in the feed, especially when it is about to be bred [15].

### 3.2.4 Kidding interval

Kidding interval is the most important character for assessing productivity and is the best index for evaluating reproductive efficiency in a herd of cattle in the field [16]). Based on research conducted on breeders, it was found that the kidding interval was  $11.73 \pm 0.40$  months. According to research conducted [17] in the Turi region, the interval kidding for the Ettawa crossbreed goat ranges from  $10.0 \pm 3.3$  months. The factors that determine the kidding interval include the length of gestation and the time of estrus after birth. The does will generally return to estrus after giving birth so that the kidding interval reaches 8 to 10 months [11]. The varying kidding intervals are influenced by the rate at which uterine activity returns to normal size [18]). In addition, the kidding interval is also influenced by the length of weaning, breeders usually extend the mating time after giving birth because the chicks get optimal milk to achieve optimal growth of their children, so they are ready to sell at high prices [19]).

### 3.2.5 Weaning time

The young goats will be weaned when the doe milk production has decreased or has stopped, according to the [20], the weaning age is 90 days and because at that age the kid has received enough milk from its mother and can eat solid feed. Based on the results of the study, the average weaning time of the breeders was  $3.17 \pm 0.10$  months. The results showed that there was not much difference between the time set by [20]. Based on observations in the field, the variation in the length of weaning time is influenced by several things, among others, the condition of the parent, the condition of the small, and differences in maintenance objectives. For example, for breeders who raise Ettawa Cross-breed goats whose purpose is to collect milk, the weaning time is faster, but different from breeders whose maintenance goals are to increase the population of chicks which will later be sold, the time based on the research is sufficient.

## 3.3. Feed Management

The farmer was interviewed regarding the type of feed that was usually given both forages and concentrate, method of administration (ad libitum, restriction, or voluntary), frequency of forage and concentrate, and timing of feeding. The maintenance of goats in the Pangestu Girikerto herd is carried out intensively namely the goats are kept in the pen without being removed to be spilled so that the feed is given directly in the pen.

### 3.3.1 Type of feeds

The breeders in this herd usually provide forage in the form of leaves and grass in a cut and carry manner. The types of forage provided consist of grass, legume, and annual plants, namely, kolonjono, field grass, calliandra, sengan, gliriside, cassava leaves, salak leaves, mindi leaves, talok, banana leaves, mahogany, and avocado. The type of forage given per day varies from 2 to 3 different types of forage. The amount is given also depends on the forage variation. The more variety of forage, the less quantity per type is given. The total forage gave ranges from 5 to 7 kg/head/ day.

Based on the chemical composition of several forages commonly given to livestock, there are several types of forages that contain high crude protein ( $> 18\%$ ), namely calliandra, sengan, gliriside, and cassava. This forage is very potential as a feed supplement for crude protein for livestock. Forages is the largest source of fiber for ruminant animal feed, which is around 60 to 70%, although it contains low energy but has a fundamental role in maximizing dry matter intake (DMI), stimulating chewing activity and the fermentation process in the rumen [21]. The provision of various forages in the treatment of elephant grass 15% + 20% rice straw + 25% gamal + 10% calliandra + 30% concentrate showed an increase in the production of acetic acid, propionic and microbial protein synthesis of Ettawa crossbreed goat [21].

### 3.3.2 Method and frequency of feeding

Forage and concentrate feed was given ad libitum. Providing large amounts of forage at one time, for example in the morning or evening. Giving in large quantities at once is due to the farmer already knowing the habit of the amount of forage consumed by the goat so that giving at one time can save the farmer's time.

The frequency of forage is usually only done once a day but in large quantities, adjusted based on body weight and sex. There was a difference in frequency of giving concentrate feed, 65.21% of breeders gave

concentrate feed twice a day and 30.43% gave it once a day. The concentrate feed is usually given in the form of pollard and some provide tofu pulp or a combination of the two with a quantity of 300 to 500 grams/head. The amount of concentrate given is not weighed with certainty but is usually measured using a scoop or other container as a measure.

The frequency and timing of different feeding had no effect on body weight gain, chest circumference, body length, height, and feed conversion [22]. The frequency and timing of different forages have an effect on the consumption of BK, PK, milk production, and milk dry matter, and an increase in the frequency of providing forage can increase forage consumption, milk production, and milk BK [23].

Maintenance of Ettawa Cross-breed goats in Indonesia is traditional by providing main feed in the form of field grass as a single feed, therefore it is necessary to improve the quality of the ration by increasing the provision of forage legumes such as gamal (*Gliricidia sepium*) and waru (*Hibiscus tiliaceus*). ), however, feeding in the form of forage alone has a weakness, namely the lack of nutrients contained so that concentrate supplementation is required [24].

### 3.3.3 Time of feeding

Feeding time in the morning is usually done from 6 am or until 8 am, while it starts at 3 to 4 in the afternoon. Based on the research of [25] a case study regarding forage inventory in the Prodosumbul hamlet of Malang Regency, breeders provide forage 2 times a day, namely in the afternoon and evening with different amounts. Based on this, it can be seen that the difference in the time of giving, can be caused by the free time owned by the breeders is usually determined by the main job of each farmer.

The frequency of forage feeding in the frequency treatment 4 times per day namely, at 08.00, 11.00, 14.00, and 16.00 showed the best results and could increase feed consumption, milk production, and milk content in ettawa crossbreed goats [23]. High temperature and humidity will cause heat stress on livestock and will have an effect on decreasing productivity due to feed consumption and decreased feed efficiency [26].

## 4. CONCLUSION

The conclusions obtained, BCS and reproductive performance are still below normal standards.

## REFERENCES

- [1] Widayati, D.T., M. Suryaputri dan Y. Suranindyah, The effect of body condition score on estrous postpartum of ettawa crossed breed does in girikerto farmer group, Turi, Sleman, The 2nd Animal Production International Seminar (The 2nd APIS) 1-5 (2013)
- [2] Dewi, R.R., Wahyuningsih dan D.T. Widayati, Respon estrus pada kambing peranakan ettawa dengan body condition score 2 dan 3 terhadap kombinasi implant controlled internal drug release jangka pendek dengan injeksi prostaglandin F2 alpha, *Jurnal Kedokteran Hewan* 5, 11-16 (2011)
- [3] Phythian, C.J., D. Hughes, E. Mechalopoulou, P.J. Cripps and J. C. Duncan, Reliability of body condition scoring of sheep for cross-farm assessments, *Small Ruminant Research*, 104, 156-162 (2012)
- [4] Detweiler, G., T. Gipson, R. Merkel, A. Goetsch and T. Sahlu, *Body Condition Scores in Goats*. Langston University, (2008)
- [5] Yogantara a.p.i.k.d, Suarna I. W dan Suryani N.N, Pengaruh level konsentrat dalam ransum terhadap komposisi tubuh kambing peranakan etawah, 17, 113-116 (2014).
- [6] Susilorini, T.E., Nurhayaningtyas, D dan Suryadi S, Manajemen perkawinan pada Kambing Peranakan Etawah (PE) dengan gejala anestrus postpartum: pengaruh perlakuan induksi berahi menggunakan laserpunktur atau PGF2 $\alpha$ , *Pros.Semnas.TPV*, 474 – 480, (2014)
- [7] Subrata, G, Identifikasi body condition score Kambing Peranakan Ettawa betina sebagai standar bibit pada kelompok peternak di Desa Geres Kecamatan Gerung Lombok Barat. Skripsi. Fakultas Peternakan. Universitas Mataram, Mataram. (2014)
- [8] Utama, I.K, Productive and reproductive performances of female ettawah crossbred goats in Indonesia, *Wartazoa* 19, 1-6, (2009)
- [9] Hafez, E.S.E, *Reproduction in Farm Animals* 7th Ed. Lea and Febiger, Pennsylvania, USA, (2000)
- [10] Susilorini, T.E., Nurhayaningtyas, D dan Suryadi S, Manajemen perkawinan pada Kambing Peranakan Etawah (PE) dengan gejala anestrus postpartum: pengaruh perlakuan induksi berahi menggunakan laserpunktur atau PGF2 $\alpha$ , *Pros.Semnas.TPV*, 474 – 480, (2019)
- [11] Utomo, S, Pengaruh perbedaan ketinggian tempat terhadap capaian hasil inseminasi buatan pada Kambing Peranakan Ettawa, *Sains Peternakan*. 11, 34-42, (2013)

- [12] Murdjito, G. B., Panjono, N. Ngadiyono dan E. Baliarti, Kinerja kambing bligon yang dipelihara peternak di Desa Giri Sekar, Panggang, Gunung Kidul, Buletin Peternakan 35, 86-95, (2011)
- [13] Setiadi, B., I-K. Utama dan I.G.M. Budiarsana, Efisiensi reproduksi dan produksi Kambing Peranakan Etawah pada berbagai tatalaksana perkawinan, Balai Penelitian Ternak Bogor, 233-236, (1997).
- [14] Sudewo, A.TA., S.A Santosa dan A. Susanto. 2012. Produktivitas Kambing Peranakan Etawah Berdasarkan litter size, tipe kelahiran dan mortalitas di Village Breeding Centre Kabupaten Banyumas, Pros Semnas, 1-7, (2012).
- [15] Utama, I.K, Utama, I.K, Productive and reproductive performances of female ettawah crossbred goats in Indonesia. *Wartazoa* 19, 1-6, (2009).
- [16] Paramaswati, F., Suyadi dan S. Wahyuningsih, Performan reproduksi pada persilangan Kambing Boer dan Peranakan Ettawah (PE), *Jurnal Ilmu-Ilmu Peternakan* 23, 11-17, (2013).
- [17] Suranindyah, Y., T.S.M. Widi, Sumadi, N.H. Tarmawati and U. Dwisepta, Production performance of Etawah Crossed Goats in Turi-Sleman Yogyakarta, The 1st International Seminar on Animal Industry, 273-277, (2009).
- [18] Tambing, S.N, M.Gazali dan B. Purwantara, Pemberdayaan teknologi inseminasi buatan pada ternak kambing, *Wartazoa* 11, 1-9, (2001).
- [19] Adiati, U dan Priyanto. D, Efisiensi reproduksi induk Kambing Peranakan Etawah yang dipelihara di pedesaan, Seminar Nasional Teknologi Peternakan dan Veteriner, 482-486, (2010).
- [20] Direktorat Bina Produksi Peternakan, *Pola operasional pembinaan bibit kambing*, Direktorat Bina Produksi Peternakan, Ditjen Peternakan, Departemen Pertanian, (1981).
- [21] Suryani, N.N., I.K.M. Budiasa dan I.P.A. Astawa, *Fermentasi rumen dan sintesis protein mikroba Kambing Peranakan Ettawa yang diberi pakan dengan komposisi hijauan beragam dan level konsentrat berbeda*, *Majalan Ilmiah Peternakan* 17, 56-60, (2014).
- [22] Herijanto, S dan E. Nurwantini, *Manipulasi pola pemberian pakan ternak untuk peningkatan kinerja produksi kambing Peranakan Etawa (PE)*, *Media Peternakan* 13, 1-5, (2017).
- [23] Amrudin, R., Sambodho dan T.H. Suprayogi, *Pengaruh frekuensi pemberian hijauan yang berbeda terhadap produksi dan bahan kering susu kambing perah*, *Animal Agriculture Journal* 32, 242-248, (2014).
- [24] Cakra, I.G.L., M.A.P. duarsa dan S. Putra, *Kecernaan bahan kering dan nutrien ransum pada Kambing Peranakan Etawah yang diberi hijauan beragam dengan aras konsentrat 'molmik' berbeda*, *Majalah Ilmiah Peternakan* 17, 10-14, (2014).
- [25] Marhaeniyanto, E., S. Susanti, B. Siswanto dan A.T. Murti, *Inventarisasi pemanfaatan daun tanaman sebagai sumber protein dalam pakan Kambing Peranakan Etawah: Studi kasus di Dusun Prodosumbul Desa Klampok Kecamatan Singosari Kabupaten Malang*, *JTAP* 20, 59-69, (2019).
- [26] Wibowo, S.Y., E. Purbowati dan A. Purnomoadi, *Pengaruh waktu pemberian pakan yang berbeda terhadap kandungan protein tubuh domba lokal jantan*, *Animal Agriculture Journal* 3, 544-549, (2014).