

PRODUCTIVE AND REPRODUCTIVE PERFORMANCES OF YOUNG ETTAWAH-CROSS DOES

I-KETUT SUTAMA, IGM. BUDIARSANA, H. SETIYANTO, and A. PRIYANTI

Research Institute for Animal Production
P.O. Box 221, Bogor 16002, Indonesia

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ABSTRAK

SUTAMA, I-KETUT, IGM. BUDIARSANA, H. SETIYANTO, dan A. PRIYANTI. 1995. Kinerja produksi dan reproduksi kambing Peranakan Ettawah betina muda. *Jurnal Ilmu Ternak dan Veteriner* 1 (2): 81-85.

Kinerja produksi dan reproduksi 85 ekor kambing Peranakan Ettawah (PE) betina muda diamati di Balai Penelitian Ternak Ciawi, Bogor. Pakan dasar rumput Raja (*Pennisetum purpureophoides*) dan kulit jagung segar dengan imbang 2:1 diberikan *ad libitum* dan 300 - 400 g pakan konsentrat/ekor/hari sebagai pakan tambahan. Pada bulan terakhir masa kebuntingan dan selama laktasi, jumlah pakan konsentrat yang diberikan ditingkatkan menjadi 500 - 700 g/ekor/hari. Enam puluh lima ekor ternak belum mencapai umur pubertas, dan sebagian besar (86,2%) dari ternak tersebut mencapai pubertas pada bobot badan 16 - 21,8 kg (rata-rata $18,8 \pm 0,4$ kg), atau sekitar 60,0% bobot badan dewasa. Empat ekor ternak (6%) menunjukkan birahi pertama tanpa diikuti ovulasi, dan ini mengakibatkan rendahnya tingkat konsepsi pertama (64,7%). Di samping itu, tingkat kematian anak pra-sapih yang tinggi (37,5%) merupakan faktor penyebab rendahnya efisiensi produksi kambing PE. Produksi susu harian selama 90 hari pertama masa laktasi sangat bervariasi (0,3 - 0,8 kg), yang berarti adanya peluang untuk ditingkatkan melalui program seleksi yang terencana menuju peningkatan produksi susu di Indonesia.

Kata kunci: Kambing, peranakan Ettawah, reproduksi, susu

ABSTRACT

SUTAMA, I-KETUT, IGM. BUDIARSANA, H. SETIYANTO, and A. PRIYANTI. 1995. Productive and reproductive performances of young Ettawah-cross does. *Jurnal Ilmu Ternak dan Veteriner* 1 (2): 81-85.

Productive and reproductive performances of 85 heads of Ettawah-cross (Peranakan Ettawah or PE) does at first breeding were studied at the Research Institute for Animal Production, Bogor. They were fed freshly-chopped King grass (*Pennisetum purpureophoides*) and corn-husk (2:1) *ad libitum* and concentrate feed was given at a rate of 300 - 400 g/head/day. During the last month of the pregnancy and lactation period the amount of concentrate feed was increased to 500 - 700 g/head/day. Sixty-five does were in pre-pubertal stage and 86.2% reached puberty at liveweights between 16 - 21.8 kg (mean 18.8 ± 0.4 kg) which is about 60% of mature liveweight. Oestrus without ovulation was found in 6% of the animals which has contributed on the relatively low conception rate (64.7%). A high pre-weaning mortality of kids born (37.5%) caused production inefficiency that suggests the challenge to improve management practices. Milk yield of PE does varied widely (0.3 - 0.8 kg/day), hence, there is a chance for improvement towards increasing milk production in Indonesia through well planned selection program.

Key words: Goat, Ettawah-cross, reproduction, milk

INTRODUCTION

The contribution of goats to the total national meat production is not as high as beef cattle (ANON., 1994), but their contribution to the income of farmers in rural areas is significant. Goats are relatively easily managed and require a relatively low investment; therefore, they fit well to the traditional farming systems condition in Indonesia. Besides making a variety of contributions, some important functions related to sustainable development by raising goats are generating diversification of resources and reduction of socio-economic risks and making of value-added products such as utilization of non-marketable fibrous crop residue to produce meat and milk.

The Ettawah-cross (Peranakan Ettawah or PE) goats is one of goat breeds in Indonesia. They are mostly found in Central and East Java, and traditionally managed as a component of the farm. Under the existing management system, breeding is difficult to control, and in the long run, it may impair genetic quality of the goat. Surprisingly, research work on goat in Indonesia, particularly on breeding and reproduction, is rather limited compared to that of sheep, although the population of goats out-numbers that of sheep (DIJANEGARA and SETIADI, 1991), and genetic improvement of goat until now is minimal.

It is essential to ensure that breeding strategies are designed with related to the adoption technology which are suited and appropriate to small farm systems that

are typical of Indonesian agriculture. Much will depend, of course, on whether the added benefits in terms of animal response are significantly higher than the associated costs of introducing the technology.

The present paper reports the productive and reproductive performances of young PE does which undergo selection program for higher productivity under intensive management system.

MATERIALS AND METHODS

The observation was conducted at the Research Institute for Animal Production, Bogor, West Java, Indonesia.

One hundred PE does six to eight months old, and 10 PE bucks (two tooth) were obtained from several areas in Central Java. Following a four weeks adaptation, ovarian activity of the pre-pubertal does were observed by mid-ventral laparoscopy. Oestrus was detected using mature buck fitted with an apron to prevent mating. The young does were mated when they reach liveweight of 20 kg.

The animals were fed forages in the form of freshly-chopped King grass (*Pennisetum purpureophoides*) and corn husk at a ratio of 2:1, supplemented with concentrate feed at a rate of 300-400 g/head/day. During the last month of pregnancy and lactation period the amount of concentrate supplement was increased to 500-700 g/head/day. The animals were weighed every two weeks.

At about 3-5 days post-oestrus, mid-ventral laparoscopy was performed to measure the ovulation rate. During the first cycle (i.e. at puberty), a 10 ml blood sample was collected every two days for 20 days from five randomly selected animals and subjected to progesterone analysis. Blood samples were also taken from five pre-pubertal and five mated animals. Milk yield of 26 does was measured following hand-milking twice daily.

Data were subjected to analysis of variance (STEEL and TORRIE, 1981).

RESULTS AND DISCUSSION

Fifteen does were not included in the observation because some were found to be pregnant and some died before the experiment started. Over the first 13 weeks of the study, the PE does grew at a rate of 62.4 g/day (19.7-109.8 g/day). The figures were higher than those (38.4 g/day) reported previously (SUTAMA *et al.*,

1995), even though management practices in the former experiments were almost similar. Differences in age and obviously genetic source of animals affect the results.

Following oestrous detection using mature buck, it was found that 65 young does were still in pre-pubertal stages (Table 1). Majority (86%) of them reached puberty when they reached a liveweight of 16-21.8 kg (average of 18.8 ± 0.4 kg) which is about 60% of mature liveweight of 31.5 ± 0.5 kg recorded for PE goat in the Institute. Average ovulation rate at puberty was 0.94; of which the right ovary contributes more actively than the left ovary (0.61 vs 0.33). Six percent of the does did not ovulate at first oestrus (puberty) which is a common phenomenon often occurring in young animals (EDEY *et al.*, 1977; SUTAMA *et al.*, 1988).

Table 1. Growth and ovulation rate at puberty of young PE does (mean \pm s.e.)

Parameters	Mean	Range
Number of does (heads)	85	
Daily gain over the first 13 weeks of study (g/day)	62.4 ± 2.3	19.7 - 109.8
Number of does in pre-pubertal stage	65	
Liveweight at puberty (kg)	18.8 ± 0.4	14.0 - 22.4
Ovulation rate at puberty	0.94	1 - 2
Left ovary	0.33	
Right ovary	0.61	

In pubertal does, concentration of progesterone in blood plasma increased to maximum (4.6 ng/ml) at day 10 of the cycle and decreased to less than 0.2 ng/ml at the end of oestrous cycle. In pregnant does, progesterone concentration continued to increase until the end of the 20 days sampling period. In pre-pubertal does progesterone level was very low (Figure 1). These results similar than that of reported in previous study with the same breed of goats (SUTAMA *et al.*, 1995).

Average conception rate at first oestrus in this study was relatively low (64.7%) compared to those reported for mature PE does (SETIADI and SITORUS, 1986). However, after four cycles all does were pregnant. In the present study, does were mated at about 20 kg liveweight. There is no scientific information of minimum liveweight for first mating of PE does. For temperate goats, THOMAS (1990) suggested that first mating is best carried out when does reached 60% of her mature liveweight.

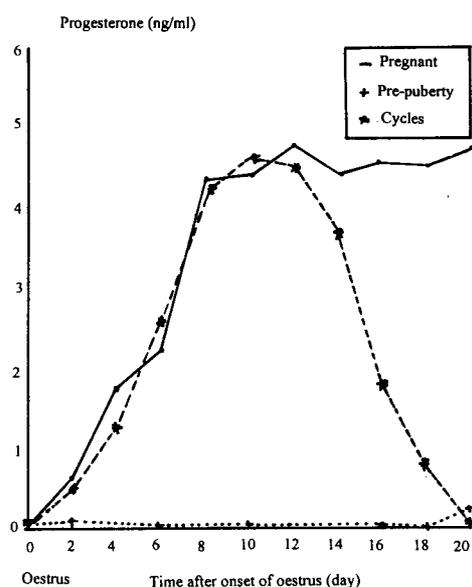


Figure 1. Changes in mean plasma-progesterone concentration of pre-pubertal, pubertal and pregnant PE does

It was reported that PE goats had the potential to produce twins (SETIADI and SITORUS, 1984; 1986; SOESILO *et al.*, 1989). At first kidding, this may not be obtained (SUTAMA *et al.*, 1993; 1995) as observed in the present study at which the average litter size of PE does was 1.04. BASUKI *et al.* (1982) reported a ratio of single:twins:triplets in PE of 7:1:0. It is obvious that litter size does not follow a linear relationship with the age of animals nor weight. In sheep, flushing increases ovulation rate and litter size (SUTAMA, 1989) and this might also occur in PE goats.

Differences in birth weight between male and female kids are small (3.5 vs 3.0 kg, $P < 0.05$) and the ratio of male and female kids was 72.3 : 27.7% (Table 2). This ratio was relatively extreme, since it was generally expected that the male/female ratio is around

Table 2. Reproductive performance at first breeding of PE does (mean \pm s.e.)

Parameters	Average	Range
Number of does (heads)	85	
Pregnancy rate (%) at:		
- first oestrus (%)	64.7	
- after 4 cycles (%)	100	
Liveweight of does (kg) at:		
Conception	23.3 \pm 0.4	18.8 - 30.8
Kidding	28.5 \pm 0.5	22.0 - 39.8
Weaning	25.1 \pm 0.4	22.8 - 27.8
Litter size	1.04	1 - 2
Ratio male:female kids (%)	72.3 : 27.7	
Birthweight (kg):		
- Males	3.5 \pm 0.1	2.2 - 4.6
- Females	3.0 \pm 0.1	2.0 - 4.0

50:50%. Variation in sex ratios does occur and this may warrant further investigation.

Pre-weaning mortality was high (37.5%) (Table 3). BASUKI *et al.* (1982) and SOESILO *et al.* (1989) reported between 7-18%, but a high value of 34.2% was also reported by SETIADI and SITORUS (1986). A high pre-weaning mortality would significantly affect the productive efficiency of PE goats. Measures for minimize pre-weaning loss should be applied in efforts to increase production and, hence, farmers' income.

Table 3. Pre-weaning growth of PE kids (mean \pm s.e.)

Parameters	Male	Female
Birthweight (kg)	3.5 \pm 0.1	3.0 \pm 0.1
Daily growth-rate (g):		
0 - 7 weeks of age	90.7 \pm 5.7	105.0 \pm 6.5
7 - 13 weeks of age	104.0 \pm 4.2 a	77.8 \pm 4.6 b
Weaning weight (kg)	11.8 \pm 0.2	10.5 \pm 0.6
Mortality, (%)	----- 37.5 -----	

Within a row, values with different superscript are significantly different ($P < 0.05$)

In the first 7 weeks of age, male and female kids grew at similar rates, indicating the importance of milk consumption for the kids. Milk yield during this period (0.4 - 1.1 kg/head/day) may be sufficient to support maximum growth. Significant differences in growth rates were seen in the last 6 weeks of prior to weaning. In this period milk yield of does had decreased and the kids started to eat solid food (forages and concentrate feed). Male kids are usually more active and aggressive than female kids in obtaining feed, therefore the males could grow faster than the females.

In the present study, milk yield of 26 does at first lactation was about half that of mature PE does reported by OBST and NAPITUPULU (1984). Apart from genetic factor, milk yield is closely associated with age, lactation stage, litter size and nutritional level (EHOCHÉ and BUVANENDRAN, 1983; MUKHERJEE *et al.*, 1994; LEE *et al.*, 1994). The large variation in milk yield of 450 - 2,200 g/day reported by OBST and NAPITUPULU (1984) and 285 - 825 g/day in the present study (Table 4) is a potential opportunity to increase

Table 4. Milk yield of PE does at first 90 days lactation

Parameters	Mean	Range
Lactation period (day)	156.1	92 - 256
Average milk yield at first		
90 days lactation (g/day)	497.5	285 - 825
Total milk yield during		
90 days (kg/head)	45.1	25.6 - 74.3

milk yield of PE does through within breed selection. Cross-breeding of local goats with temperate dairy goats to increase milk yield of local goat in Indonesia is probably an option. There is probably economically important genetic variance for using temperate dairy goats, as it is considered that the farmers' first priority is to increase income and feed their families. The more efficient use of appropriate technologies which generate profits for farmers and spearhead agricultural growth, and, hence, will assume for greater importance in the future. At present, PE goats are mainly for meat production, but have the potential to produce milk. The farmers that raise PE goats could get milk, without jeopardising kid production, and obtain additional income or increase nutritional status of the farmers' family through goat milk consumption. It would seem appropriate to focus research in goat milk production in conjunction with reducing the increasing importation of milk and apparently produce kids of better performance at weaning.

CONCLUSION

The present study showed that PE does reached puberty at liveweight of about 60% of mature liveweight. Mating at puberty resulted in a relatively low conception (64.7%), and this could be increased by allowing the bucks stay with the does over a longer period. The high pre-weaning mortality is the potential factor for production inefficiency in PE goat. While, a high milk yield variation suggests there is a high potential to improve milk yield through the implementation of a well planned selection program towards increasing national milk production in Indonesia.

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