

PROCEEDING

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International Seminar on Tropical Natural Resources 2015
**“Toward Sustainable Utilization of the Tropical Natural Resources
for a Better Human Prosperities”**

PROCEEDING

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International Seminar on Tropical Natural Resources 2015



University of Mataram
Indonesia

June 10-13, 2015

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KEYNOTE SPEAKERS

Keynote Speaker	Name and Institution	Country
Keynote Speaker 1	Dr. Ranvir Singh (Institute of Agriculture and Environment, Massey University)	New Zealand
Keynote Speaker 2	Prof Jim Gannon (University of Montana)	USA
Keynote Speaker 3	Prof. Dr. dr. Tuti Parwati (Faculty of Medicine, University of Udayana)	Indonesia
Keynote Speaker 4	Prof. I Made Sudarma (Faculty of Mathematic & Natural Science, University of Mataram)	Indonesia
Keynote Speaker 5	Assoc. Prof. Lim Phaik Eem (Centre for Marine Biotechnology, University of Malaya)	Malaysia
Keynote Speaker 6	Mr. John Higson (Ecoregion)	Indonesia
Keynote Speaker 7	Dr. Simon Quigley (The University of Queensland)	Australia
Keynote Speaker 8	Dr. Oni Yuliarti (School of Chemistry and Life Sciences)	Singapore
Keynote Speaker 9	Dr. kato Yasihiro (Peking University Health Science)	China
Keynote Speaker 10	Dr. Novianto Bambang (Dirjen PHKA Kementerian Kehutanan, RI)	Indonesia

CONFERENCE SCIENTIFIC PROGRAMS

Day 0 : Wednesday, 10 June 2015

Time	Event
10.00-12.00	Registration for student from 15.00 to 18.00 WITA (Auditorium M. Yusuf Abubakar)
15.00-18.00	Registration for other participants (Auditorium M. Yusuf Abubakar)

Day 1 : Thursday, 11 June 2015

Time	Event
07.30-8.30	Registration (Auditorium M. Yusuf Abubakar)
08.30-10.00	Opening Ceremony (Room : Auditorium M. Yusuf Abubakar)
08.30-08.45	Welcome Dance
08.45-09.00	Report From Organizing Committee
09.00-09.30	Welcoming remarks from Rector of Mataram University
09.30-10.00	Press Conference, poster, and exhibition viewing, morning tea
10.00-11.30	Plenary session I (Water Management & Environmental Microbiology) Room : Auditorium M. Yusuf Abubakar
10.00-10.30	Keynote 1. Dr. Ranvir Singh (Institute of Agriculture and Environment, Massey University, New Zealand)
10.30-11.00	Keynote 2. Prof Jim Gannon (University of Montana, USA)
11.00-11.30	DISCUSSION
11.30-13.00	PLENARY SESSION II (Health & Medicine) Room: Auditorium M. Yusuf Abubakar
12.20-13.00	Plenary session II (Marine Biology & fishery) Room: Auditorium M. Yusuf Abubakar

11.30-12.00	Keynote 3. Prof. Dr. dr. Tuti Parwati (Faculty of Medicine, University of Udayana, Indonesia)	
12.00-12.30	Keynote 4. Prof. I Made Sudarma (Faculty of Mathematic & Natural Science, University of Mataram, Indonesia)	
12.30-13.00	DISCUSSION	
13.00-14.00	House Keeping, Lunch, Poster, and exhibition viewing	
14.00-15.30	Parallel session I	
	Room 1 Moderator 1 : Dr. Bambang HK Topics : TRNM - Agriculture	Room 2 Moderator 2 : Dr. Oni Yulianti Topics : Food Teech - Animal Sciene
14.00-14.00	003-Roslinda E., et al	001-Nalle et al
14.10-14.20	004-Elsanti et al	039-Sukirno
14.20-14.30	005-Yunus A., et al	040-Wiryawan KG., et al
14.30-14.40	010-Sarjan M., et al	059-Astiti LGS., et al
14.40-14.50	015-Nikmatullah A.	112-Asih ARS
14.50-15.00	020-Aryana IGPM., et al	
15.00-15.30	Discussion	Discussion
15.30-15.50	Afternoon tea, poster, and exhibition viewing	
	Room 3 Moderator 3: Dr. Ranvir Singh Topics: Water & Energy; Industry & Mine	Room 4 Moderator 4: Prof Jim Gannon Topics : Health & Medicine
14.00-14.00	007-Wimbaningrum ., et al	037-Surya Hadi
14.10-14.20	027-Kamaruddin A., et al	042-Ekawanti A., et al
14.20-14.30	073-Ekyastuti & Ekamawanti	044-Priyambodo S., et al
14.30-14.40	076-Setiawan H	052-Suryani D., et al
14.40-14.50	080-Jamiluddin & Atmaja	060-Paryati SPY
14.50-15.00		066-Ambarukmi PF., et al
15.00-15.30	Discussion	Discussion
15.30-15.50	Afternoon tea, poster, and exhibition viewing	
	Room 5 Moderator 5: Assoc. Prof. Lim Phaik Eem Topics: Marine Biology & Fishery	Room 6 Moderator 6: Prof. M. Taufik Fauzi Topics : Biodiversity; Risk Management & Conservt
14.00-14.00	017- Sunarpi et al	019- Markum et al
14.10-14.20	026- Setyowati DN	002- Yonariza
14.20-14.30	033- Ali M., et al	043- Dailami M.,et al
14.30-14.40	035- Setyono BDH., et al	046- Defiani & Suriani
14.40-14.50	036- Zaenuddin M., et al	055- Tallei TE., et al
14.50-15.00	065- Ridwanuddin A., et al	091- Irmayanti L et al
15.00-15.30	Discussion	Discussion
15.30-15.50	Afternoon tea, poster, and exhibition viewing	

15.50-17.20	Parrallel session II	
	Room 1 Moderator : Dr. Herman Suheri Topics : TRNM- Agriculture	Room 2 Moderator 2 : Dr. Dahlanudin Topics : Food Tech Animal Science
15.50-16.00	021- Jaya IKD & Nurrachman	023- Nawangsih EN., et al
16.00-16.10	022- Kusumo BH., et al	050- Handayani BR., et al
16.10-16.20	024- Susilowati LE., et al	071- Zainuri et al
16.20-16.30	031- Sudantha IM & Suwardji	108- Ansar et al
16.30-16.40	068- Amien S., et al	053- Muktasam et al
16.40-16.50	048- Sudharmawan AAK & Aryana IGMP	127-Priyono J.
16.50-17.20	Discussion	Discussion
	Room 3 Moderator 3: Prof. Erri Noviar M. Topics: Water & Energy; Industry & Mine	Room 4 Moderator 4: Prof. Surya Hadi Topics : Healt & Medicine
15.50-16.00	083- Saigy AR., et al	067- Priyadi SP
16.00-16.10	094- Dini Iflakkhah & Ediati	070- Paryati SP
16.10-16.20	102- Saloko S., et al	103- Khoeri MM., et al
16.20-16.30	107- Faiza R & Setiawan H.	104- Muktiarti D., et al
16.30-16.40	110- Sabani R & Amuddin	120- Suharna J
16.40-16.50	083- suaidy AR., et al	136- Febrianto YH., et al
16.50-17.20	Discussion	Discussion
	Room 5 Moderator 5 : Dr. Imam Bachtiar Topics: Marine Biology & Fishery	Room 6 Moderator 6 : Dr. Sitti Latifah Topics : Biodiversity; Risk Management & Conservtion
15.50-16.00	025- Fathurrahman et al	092- Shabrina H. & Siregar UJ
16.00-16.10	034- Ali M., et al	093- Flowrensia L., et al
16.10-16.20	074- Agamawan	105- Zulia Z., et al
16.20-16.30	078- Mulyani S., et al	062- Siahaya ME., et al
16.30-16.40	101- Nurhidayati et al	089- Lestyningrum, R.A., et al
16.40-16.50	111- Samuel PD., et al	096- Astuti SP.
16.50-17.20	Discussion	Discussion

Day 2 : Friday 12 June 2015

Time	Event
08.00-10.15	Plenary session III : Water Management & Environmental Microbiology (Room : Auditorium M.Yusuf Abubakar)
08.00-08.30	Keynote 5. Assoc. Prof. Lim Phaik Eem (Centre For Marine Biotechnology, University Of Malaya, Malaysia)
08.30-09.00	Keynote 6. Mr. John Higson (Ecoregion, Indonesia)
09.00-09.30	Keynote 7. Dr. Simon Quigley (The University of Queensland, Australia)
09.30-10.15	DISCUSSION
10.15-10.30	Afternoon tea, poster, and exhibition viewing

10.30-12.00	PLENARY SESSION IV : Food Technology & Health (Room : Auditorium M.Yusuf Abubakar)	
10.30-11.00	Keynote 8. Dr. Oni Yuliarti (School of Chemistry and Life Sciences. Singapore)	
11.00-10.30	Keynote 9. Dr. kato Yasihiro (Peking University Health Science, China)	
11.30-12.00	Discussion	
12.00-14.00	Friday praying, Lunch, Poster, and exhibition viewing	
14.00-15.00	PLENARY SESSION V : Food Technology & Animal Science (Room : Auditorium M.Yusuf Abubakar)	
14.00-14.20	Keynote 10. Dr. Novianto Bambang (Dirjen PHKA Kementrian Kehutanan, RI, Indonesia)	
14.20-14.40	Keynote 11. Dirjen Sumber Daya Alam	
14.40-15.00	Discussion	
15.00-15.15	Afternoon tea, Poster, and exhibition viewing	
15.15- 16.25	Parallel session III	
	Roan 1 Moderator 1 : Prof. IKD.Jaya Topics : TRNM-Agriculture	Roan 2 Moderator 2 : Dr. Simon Quigley
15.15-15.25	049- Wangiyana W., et al	079- Faizal MI., et al
15.25-15.35	057- Niswati A., et al	081- Naitio E., et al
15.35- 15.45	032- Sukartono & Sudantha IM	084- Priatmadi BJ., et al
15.45- 15.55	069- Puromo et al	085- Sulistyadi FW., et al
15.55- 16.05	095- Yanuwadi B	088- Alfian et al
16.05- 16.15	008- Mahrup et al	134- Pitojo B., et al
16.15- 16.25	Discussion	Discussion
16.25- 17.00	Closing Ceremony : Auditorium M.Yusuf Abubakar, Best Presenter and Best Poster Presentation winners	Closing Ceremony : Auditorium M.Yusuf Abubakar, Best Presenter and Best Poster Presentation winners
	Room 3 Moderator 3 : Aluh Nikmatullah,. Ph.D	Room 4 Moderator 4 : Prof I Made Sudarma
15.15-15.25	090- Ansiska P., et al	122- Afiani L., et al
15.25- 15.35	097- Tejowulan S., et al	125- Sabrina Y
15.35- 15.45	123- Mulyaningsih T., et al	056- Laksmiwati D & Hakim A.
15.45-15.55	115- Mulyati et al	135- Pengestningsih TW., et al
15.55-16.05	133- Wijayanto H., et al	137- Kusindarta DL., et al
16.05- 16.15		
16.15- 16.25	Discussion	DISCUSSION
16.25- 17.00	Closing Ceremony : Auditorium M.Yusuf Abubakar, Best Presenter and Best Poster Presentation winners	Closing Ceremony : Auditorium M.Yusuf Abubakar, Best Presenter and Best Poster Presentation winners
	Room 5 STUDEN CHAPTER Moderator : Dr. Satrijo Saloko	Room 6 Biodesity, Risk Manag. & Conservation Moderator : Dr. Bambang Suryobroto
15.15-15.25		063- Irawati W., et al

15.25- 15.35		064- Yadnya SM.
15.35- 15.45		072- Latifah S & Syah T.
15.45-15.55		077- Herawati L., et al
15.55- 16.05		100- Hadi L, et al
16.05- 16.15		058- Astiani D., et al
16.15-16.25	Discussion	Discussion
16.25- 17.00	Closing Ceremony : Auditorium M.Yusuf Abubakar, Best Presenter and Best Poster Presentation winners	Closing Ceremony : Auditorium M.Yusuf Abubakar, Best Presenter and Best Poster Presentation winners

Day 3 : Saturday, 13 June 2015
Field Trip and Lombok Tour

OPENING SPEECH – RECTOR, UNIVERSITY OF MATARAM
International Seminar on the Tropical Natural Resources 2015

Respected guests,
Keynote speakers,
Seminar participants,
and all other participants.

On behalf of all staff of the University of Mataram, I welcome you all to Lombok, a beautiful island in West Nusa Tenggara Province, where the University of Mataram is located. Lombok is known for its natural and cultural diversity where you can enjoy traditional cuisines, beaches, waterfall, mountain, traditional villages and handicraft of many ethnics including Sasak, Samawa, Mbojo, Balinese, Chinese, Arabic, and many others.

As the Rector of the University of Mataram, it is great honour for me to address the opening of “the International Seminar on the Tropical Natural Resources” here at the University of Mataram, which will be held from 10th to 13th June 2015, with a theme “toward sustainable utilization of the tropical natural resources for better human prosperity”. The main aim of this seminar is to gather scientist from all over the world to share their ideas, knowledge and experiences and to build network for possible future collaboration.

As we are aware that sharing knowledge and experiences from speakers are extremely valuable in a seminar, therefor I would like to express my high appreciation, first, to the keynote speakers from overseas (USA, Australia, New Zealand, China, Singapore, Malaysia, the Philippines) and from Indonesia for their willingness to come to Lombok to share their acknowledged works. Your efforts and contribution to this seminar are absolutely valuable. Second, my high appreciation also goes to the national speakers and all other participants, including the speakers from University of Mataram and local universities in West Nusa Tenggara Province,

your participation in this seminar nor only will give incredible share of ideas, skill and knowledge that you have, but also will improve the academic of environment that we are developing in this university. I hope this seminar will be a good forum, not only for communicating and sharing ideas, knowledge and experiences, but also for building networking for future collaboration.

I would like to take this opportunity to express my appreciation to the sponsors (Bank Mandiri, Bank BNI, Bank BRI, Bank NTB, Bank Bukopin), which have given some contribution to this seminar. Last but not least, I would like to thank the steering and organizing committee as well as all other supporters and participants, without their effort, commitment and hard work, this seminar will not run well.

Finally, I wish you most successful seminar, enjoy Lombok Island and hope to see you again in other forum here at the University of Mataram.

Prof. Ir. Sunarpi, Ph.D

Rector of the University of Mataram

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INCREASING PRODUCTION AND QUALITY OF GOAT MILK BY MANAGING MILKING FREQUENCY AND GIVING EXERCISES

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ABSTRACT

The aim of this experiment was to evaluate the effect of frequency of milking and duration of exercises on production and composition of crossbred Ettawah goat milk. Sixteen first-early lactating crossbred Ettawah goats were allocated into four treatments in factorial (2 x 2) arrangement based on completely randomized design. The first factor was the frequency of milking (once and twice a day) and the second factor was duration of exercises (one hour and two hours a day). All goats were fed field grass ad libitum supplemented with one kilogram concentrate containing rice bran and coconut meal (1:1). Increasing frequency of milking from once to twice a day significantly ($P < 0.01$) increased milk production of crossbred Ettawah does, whereas increasing duration of exercises from one hour to two hours a day significantly ($P < 0.01$) reduced milk production. The highest production was achieved by the combination of milking twice and one hour exercises a day. The composition of milk components in this experiment were not affected by the frequency of milking and or duration of exercises. The results indicate that milking cross-bred Ettawah does twice a day and giving the goat one hour exercises a day is the best for milk production of lactating cross-bred Ettawah does.

Key words: Cross-bred Ettawah goats; milk production; milk composition; milking frequency and exercises.

INTRODUCTION

The Government of West Nusa Tenggara through the provincial Department of Livestock Services (Dinas Peternakan Provinsi) and a private agency have several times imported and developed crossbred of dairy Frisian Holstein cattle (PFH) as a pilot project to produce fresh milk to fulfill the needs of Mataram and West Lombok communities. However, those efforts were economically unsuccessful. The average milk production was only 8 litres per day, which was only a half of those produced in their origin, Malang, East Java. Those dairy cattle in Lombok Island, East Indonesia also has poor persistency (Lestari, 2006). The low milk production and poor persistency of those cattle in this region were due to poor nutrition and unsuitable environmental temperature (Asih, 2007). Even the offspring of those cattle were producing milk only 5.4 liter/day (Irmansyah, 2011).

The development of dairy goats is an alternative for fulfilling fresh milk needs of the West Nusa Tenggara communities (Asih, 2006). The biological productivity per kg body weight of dairy goats is 8 - 28% higher than those of dairy cattle (Devendra, 1975). They produce 1-3 kids in one birth and when the goats in ideal feed management, their milk production exceed the need for their

kids, which could be consumed by the owners. In West Nusa Tenggara, particularly in rural areas face problems of poor nutrition associated with limited availability of nutritious food as well as poor buying power and lack of understanding of the importance of good nutrition for their health. Commonly, farmers in rural areas raise animals not for supplying their animal protein need, but they sell them for other family needs. They pay a little attention on the need of good quality food for their infants result in malnutrition. The government efforts to solve those problems only for shorth periods of times by providing them nutritious food when the problem appears. It does not totally solve the problem. Hence, the problems will appear back if the food supply was terminated. Therefore, there is a need to formulate a more suitable and sustainable solution for increasing nutritious status of rural society by realizing them that the important of consuming nutritious food for their good health and providing themself the nutritious foods.

One of the alternative solutions is to assist them in producing nutritious food, e.g. fresh milk in their home by giving them a rotary packet assistance of 1-3 dairy does (Asih, 2006). Presently, this system is developing. However, the productivity is still relatively low due to, there is no properly managed. While research on dairy goat feeding and management in Indonesia is still lacking.

On dairy animals, theoretically, an alternative of several methods to maintain the milk production is by milking them regularly, even increasing daily frequency of milking could increase milk production, provided that the amount feed given also increased. Furthermore, to keep the goats' clean and hygiene milk production, they are kept in the cages all the time, considering the poor environmental condition in this area. In fact, this causes the does become stress and produce more adrenaline hormone which could inhibit the milk production. Therefore, the aims of this experiment was to investigate the effects of combination of daily frequency of milking and duration of exercises on milk production and composition of cross-bred Ettawah goats fed local feed resources such as field grass and a concentrate which consisted of coconut meal and rice bran.

MATERIALS AND METHODS

Sixteen lactating Crossbred Ettawah goats were randomly allocated into four groups of four goats each, based on factorial (2x2) and completely randomized design. The two factors were the frequency of milkings (A) and the duration of exercises (B). Detailed treatments were:

A1B1 = milked once and one hour exercises daily,

A1B2 = milked once and two hours exercises daily,

A2B1 = milked twice and one hour exercises daily, and

A2B2 = milked twice and two hours exercises daily.

During the first two weeks post parturition, the kids were leaved with their mothers to give sufficient colostrum and milk, then the does were transferred into the individual pens and their kids kept in group pen and identified accordingly to their mothers. The does were allowed to adapt to a new management in individual cages for two weeks and hand-milked twice a day. They were fed field grass ad-libitum and 1 kg concentrate consisted of 1:1 rice bran and coconut meal on the dry weight bases. The drinking water was also provided ad-libitum Their milk production were measured and fed to their kids accordingly by using baby bottle. The amount of field grass and concentrate consumed by each goats were noticed for references feed given to each goat during the experimental period with 10% addition.

The experimental period was run for three months, where the goats were given field grass three times (07.00 AM, 12.00 PM and 05.00 PM) and the concentrate twice a day (08.00 am and 04.00 PM)). Feed refusals were collected and weighed every morning for calculating the daily nutrients intakes. The goats were hand-milked and the milk produced were noted. The goats in treatment A1B1 and A1B2 were milked only at 07.00 AM, while those in A2B1 and A2B2 were milked at 07.00 AM and 05.00 PM before last feeding of the field grass. The goats were allowed to have exercises for one and two hours for treatments having combination B1 and B2 respectively, after morning feeding. Fifty millimeter milk samples from each goats were collected weekly then kept in the freezer. Monthly milk samples from each goat were pooled, and analysed with two replicates for their composition according to AOAC (1984). The data were analysed using PROC GLM (Sas, 1990) and the differences among treatment means were tested for their significancies with Duncan's New Multiple Range Test (Steel and Torrie, 1991).

RESULTS AND DISCUSSION

Milk Production

Results of the experiment is presented in Table 1. Frequency of milking and the duration of exercises significantly ($P < 0.01$) affect milk production of the PE goats. The goats milked twice a day with one hour exercises produced more milk than those milked once a day. However, increasing the duration of exercises did not elevate the milk production, vice versa reduced milk production. It may be caused by the more time exercises; the more time we let the goats to spend energy and no feed surrounding them. Consequently, besides losing more energy, the goats also consumed less feed, therefore, the dry matter consumptions were reduced (Table 1). Too long exercises may reduced milk production because of more energy is used for physical movement, resulted in decreasing the milk production due to less energy is available for milk production. Furthermore, reduce the dry matter consumptions of the goats also caused declined milk productions. This study showed that the goats allowed to have one hour exercises tended to produce more milk than those allowed to have two hours exercises at similar frequency of milking. In fact, those goats milked twice a day with two hours exercises (A2B2) produced significantly ($P < 0.01$) less milk than those given one hour exercise (A2B1).

To maintain or to increase milk production, the goats should be given a regular one hour exercises and milked twice a day at a fixed time, a part from feeding enough amount of a good quality diet.

Overall, the average milk production in this first experiment was 0.59 ± 0.208 liter. The results was slightly lower, but still in a normal range of production of PE given field grass. It might also because of their first lactation. According to Asih (2004) milk production will increase in line with increasing the stage of lactation. This means that the milk production in this experiment still has a potency to be elevated for the next stage of lactation with the same treatments. Triwulaningsih (1986) showed that milk production of PE was 0,498 0,692 liter/day, with the peak production around 0.868 liters.

Milk production varied depending upon breeds. Devendra (1983) showed that the average milk production of Ettawah was 0.7-1.0 kg, in 140 days lactation period. In general 4-5 years old

dairy goats produced around 1-3 liter/day, (Asih, 2000; Atabany, 2001), including Saanen (Asih, 2001).

Table 1. Production performances of first lactating PE given field grass supplemented with 1:1 rice bran and coconut meal.

Variable	Treatment				STD ERROR
	A ₁ B ₁	A ₁ B ₂	A ₂ B ₁	A ₂ B ₂	
Body weight (kg)	29.03	25.20 ^o	30.63 ^o	28.10 ^o	1.98
Feed consumption (kg dry weight/head)	1.45	1.13	1.63	1.29	0.10
Dry Matter consumption (% Body Weight)	5.01	4.54 ["]	5.31 ^a	4.68	0.35
Water consumption (liter/head/day)	1.56	1.75 ["]	2.11 ^a	2.01	0.21
Milk production (litre/head/day)	0.51	0.37 ^o	0.87 ["]	0.62	0.055
Total solid of the milk (kg/head/day)	0.07	0.05	0.11 ["]	0.09	0.0045
Milk composition (%)					
Total solid	14.36	13.93 ^o	13.26	14.48	0,67
Total solid fat free	9.34 ^a	8.94	8.23	9.23	0.47
Ash	0.64	0.65 ^a	0.70 ^o	0.69 ^o	0,06
Fat	5.02	4,99	5.03 ^o	5.25	0.33
Lactose	5.28	4.97 ^o	4.18	4.54 ["]	0.44
Crude Protein	3.42	3.32	3.35	4.00 ^o	0.43

Note:

A1B1= milked onced and one hour excercises daily

A1B2 milked onced and two hours excercises daily

A2B1milked twice and one hour excercises daily

A2B2= milked twice and two hours excercises daily

There was a positive relationship between milk production and dry matter consumption ($R^2= 0.42$). The goats consumed higher amount of feed tended to produce more milk (Figure 1).

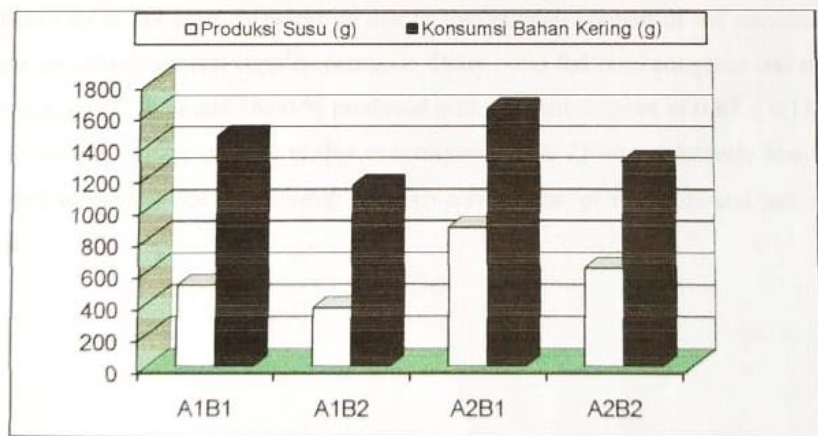


Figure 1. Milk production and dry matter consumption of PE as affected by milking frequencies and duration of exercises.

Milk Composition

Milk compositions were not affected by treatments. The average content (%) of dry matter, fat, protein, lactose and ash of PE's milk were 13.73+ 1.37; 5.07+0.50; 3.52+0.71; 3.35+0.83 and 0.62+0.13 respectively. However, total solid production of goats milked twice and given one hour exercises a day higher than other treatments in accordance to daily milk production. The content of total solid of goat's milk in this experiment was in line with those reported by Sadia et al. (2003) who found the content of total solid of milk of local goats producing 0.217 + 0.064 kg/day to be 13.96 + 1.22 %, but lower than those of dairy goats in India as reported by Devendra dan Burn (1994). Nevertheless, this milk component was slightly higher than those of cow's milk showed in different reports (Adnan, 1984; Bath et al., 1978; Lampert, 1975; Resang dan Nasotion, 1981) and much higher than Standart Nasional Indonesia (SNI) which is only 11.2 %. These differences might be due to different breed and managements.

The average total solid non fat content of milk produced in this experiment was 8.69 + 1.27 %, slightly lower than those found in different reports as reviewed by Sadia, et al. (2004) but still in a range of Standar Nasional Indonesia (SNI).

The average of ash content of milk of produced by crossbred Ettawah was 0.67 +0.07%, lower than those reported by Adnan (1984), Bath et al (1978), Eckles (1980), Lampert (1975), Gesang end Nasution (1981) for cow's milk and those of goat's milk as reviewed by Sadia et al. (2004), but still in a range of SNI % (Riyadi dan Kisworo, 2003). The reason of these differences is not clear. It might be due to low mineral content of the concentrate diets which were no adding mineral supplementations. Dairy cows fed elephant grass and rice bran with ash contents of 15.10 % and 18.60 % produced milk with ash content of 0.87 +0,11 % (Asih, 2007), whereas ash content of diets in this experiment (Table 2) were relatively low. Further study is needed to explain the relationship between ash content of the diets and ash content of goat's milk.

Table 2. The composition of feed used in this experiment

Feedstuffs	Dry Matter (%)	Ash (%)	Fat (%)	Fibre (%)	Crude Protein (%)	N-Free Extract (%)
Field grass	35	9,7	1,8	34,2	6,7	47,6
Rice bran	85,0	9,9	9,0	13,8	13,0	54,3
Coconut meal	90,0	6.4	15,5	15,8	20,5	41,8

Overall, the content of other components such as lactose, fat, and protein of PE's milk was in a range of SNI and higher than those of cow's milk (Table 1).

CONCLUSION

1. Increasing the frequency of milking from once to twice a day significantly ($P<0.01$) increased milk production of crossbred Ettawah (PE).
2. Increasing length of exercises from one hour to two hours a day significantly ($P<0.01$) reduced milk production.

3. The highest milk production of the does was achieved on combination of milking twice and giving one hour exercise a day.
4. The milk composition was not affected by the frequencies of milking and duration of daily exercises.

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References

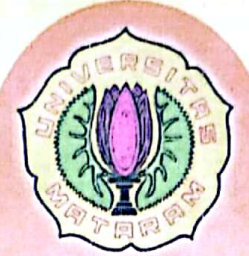
- AOAC. (1984). *Methods of Analysis*. 14th edn. Association of Official Analytical Chemists. Washington, DC.
- Asih, A.R.S. 2000. Milk yield, milk N content, nutrient intake and digestibility in dairy goats fed combination of nitrogen sources with increasing levels of dietary nitrogen. 2000, Bovine. Fakultas Peternakan, Universitas Mataram.
- Asih, A.R.S. 2001. Nitrogen Utilization and Production of Dairy Goats Fed Different Nitrogen Sources. Disertation of Doctor of Philosophy, School of Animal Studies, Queensland University, Australia.
- Asih, A.R.S. 2004. *Manajemen Ternak Perah*. Cetakan Pertama. UNRAM PRESS. Mataram.
- Asih, A.R.S. 2006. Pengembangan kambing perah sebagai penghasil susu untuk meningkatkan status gizi masyarakat pedesaan di pulau Lombok. *Oryza* IV(4):125-135.
- Asih, A. R. S., 2007. Produksi dan Komposisi Air Susu Sapi perah PFH yang dipelihara di Dinas Peternakan NTB Banyuwulek. *Jurnal Penelitian Unram*. Mataram.
- Devendra, C. (1994). Goats and sheep in Asia. In *Small Ruminant Production in the Humid Tropics*, pp. 1-33 [M. Wodzicka-Tomaszewska, A. Djajanrgara, S. Gardiner, T.R. Wiradarya and I. M. Mastika, editors]. Sebelas Maret University.
- Irmansyah, D. 2011. Produksi Air Susu dan Komposisi (Protein dan Lemak) dan Berat Jenis Air Susu Sapi Perah PFH yang Dipelihara Semi Intensif di BLPKH Banyuwulek. Thesis Mahasiswa Fakultas Peternakan UNRAM
- Lestari, D. 2006. Produksi Air Susu dan Komposisi (Protein dan Lemak) dan Berat Jenis Air Susu Sapi Perah PFH yang Dipelihara Semi Intensif di BLPKH Banyuwulek. Thesis Mahasiswa Fakultas Peternakan UNRAM
- Resang, A.A. dan Nasution, A. M., 1982. *Pedoman Pelajaran Kesehatan Susu*. Institut pertanian Bogor, Bogor.

Riyadi, S. dan Kisworo, D., 2003. Ilmu Teknologi Susu. Bahan Ajar Fakultas Peternakan. Universitas Mataram, Mataram.

Sadia, I.N., Dohi, M., Kertanegara, Spudiati. 2004. Produksi dan Komposisi Susu Kambing Lokal Yang Dipelihara Secara Tradisional Di Teaching Farm Lingsar. Laporan Penelitian Fakultas Peternakan Universitas Mataram, Mataram.

SAS Institute Inc. (1990). SAS/STAT User's Guide, version 6.0, 4th Edn. SAS Institute Inc. Cary, NC. USA.

Steel. R. G. D. and J. H. Torrie, 1991. Prinsip Dan Prosedur Statistika Suatu Pendekatan Biometrik. Terjemahan PT. Gramedia Pustaka Utama. Jakarta.



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