Feeding Evaluation in Mature Ewes at PT Juara Agroniaga Sejahtera Farm

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ABSTRACT
The sheep breeding program at PT Juara Agroniaga Farm is aimed to increase the sheep population, in contrast to the predominant focus on fattening programs in most Indonesian livestock businesses at the time. Field data collection was conducted between June and August 2023 to assess the feeding strategy for the sheep breeding program. The farm had 200 ewes, aged between 1.5 and 2 years, with the potential for double and triple pregnancies. The observations in this study encompassed the evaluation of feed types, the nutritional content of feed, and feeding strategies implemented on the farm. The study showed that local feeds commonly used on the farm include corn tumpi, coffee husks, water spinach straw, pollard, copra meal, palm kernel cake, soybean straw, peanut shells, molasses, and lime. The nutritional content of the ewe feed was determined to be approximately 9.71%. This study showed that the feed intake of mature ewes ranged from 0.58 to 0.77 g/head/day, and the average daily gain ranged from 50 to 69 g/head/day. As a result, it can be inferred that the feed provided on the farm, with regard to its crude protein content, sufficiently meets the nutritional requirements of mature ewes during the pre-breeding, effectively preventing a decline the body weight. After the MF project, the nutrient intake and average daily gain (ADG) of the ewes tend to be high and meet the ewe requirements (SNI), compared to before the MF project.

Keywords: *Feeding, Mature ewes, Feed intake, Average daily gain, Pre-breeding.*

1. INTRODUCTION

The Ruminant production system in Indonesia is mostly done by cut and carry method. Forages given are usually obtained from common grazing areas and less quality control. In other conditions, crop by products such as rice straw and maize stover is still the main source of forage, especially during dry seasons.

Sheep breeding holds great potential for future sheep population growth due to its ease of maintenance, relatively short reproductive cycle and inherent disease resistance. BPS [1] Reported that the sheep population in East Java has increased from 2020 to 2023 by 2.72% with a population in 2020 of 1,419,490 heads, in 2021 of 1,420,965 heads and in 2022 of 1,458,157 heads. Bojonergoro regency is one of the districts in East Java Province which has a large population of sheep.

Sheep has contributed significant value to protein consumption, but their productivity on local farms is still relatively low. The low productivity of sheep on local farms is caused by conventional rearing methods without paying attention to the quality and quantity of feed provided. PT Juara Agroniaga can bridge the farmers (plasma) and the investors (nucleus). The farmers provide land and barn and the investors can provide another facility needed and also guide the farmers in the breeding process. Improvements in feeding and maintenance management are expected to increase productivity and sheep population. Therefore, this study aimed to evaluate feed quality, feed intake (DMI, OMI and CPI) and average daily gain (ADG) that was applied by PT Juara Agroniaga Sejahtera Farm.

Y. A. Yusran et al. (eds.), *Proceedings of the 2023 Brawijaya International Conference (BIC 2023)*, Advances in Economics, Business and Management Research 294,
https://doi.org/10.2991/978-94-6463-525-6_28

2. MATERIALS AND METHODS

2.1. Research Location

The study was conducted at PT Juara Agroniaga, Kanor Village, Bojonegoro Regency, East Java in July to September 2023. Chemical composition analysis [2] of feed conducted at Animal Nutrition and Feed Laboratory, Faculty of Animal Science, Universitas Brawijaya.

2.2. Research Materials

The materials in this study were 54 Fat-Tailed Ewe sheep, aged 9 – 12 months and weight of 15 – 19 kg. The type of feed given to livestock is a complete feed consisting of fiber-sourced feed ingredients namely coffee husk, peanut shell, corn tumpi, soybean straw, cassava peel, corn stover and concentrate sourcefed ingredients namely corn seed, pollard, sawit meal, pellet sawit meal, copra meal, rice bran, tofu waste, CGF, molasses, salt and mineral lime. The chemical composition of feed ingredients can be seen in Table 1.

Table 1. Chemical composition of feed ingredients

Feed Ingredients	Chemical Composition							
	DM (%)	Ash	OM	CP	EE	CF	TDN	NDF
		(% DM)						
Corn Stover	23.21	13.26	86.74	9.24	2.16	28.22	63.72	27.45
Cassava Peel	29.64	10.48	89.52	4.02	1.28	17.10	54.91	32.47
Soybean Straw	88.62	7.29	92.71	3.54	0.32	47.76	60.43	79.70
Corn Tumpi	90.48	6.78	93.22	6.83	0.71	21.66	58.53	87.80
Peanut Shell	88.28	5.13	94.87	6.14	0.08	53.10	48.60	66.40
Coffe Husk	90.72	10.32	89.68	9.02	2.80	21.74	50.60	61.80
Corn Seed	91.32	2.10	97.90	8.69	4.27	2.20	67.34	16.73
Pollard	89.65	6.62	93.38	14.83	5.32	11.27	70.23	37.83
Rice Bran	88.73	5.34	94.66	8.42	3.23	9.65	79.24	10.26
Sawit Meal	89.83	10.41	89.59	15.04	3.11	28.54	65.64	73.60
Pellet Sawit Meal	89.83	10.41	89.59	15.04	3.11	28.54	65.64	73.60
Copra Meal	91.73	8.81	91.19	22.32	2.78	18.76	65.52	54.70
Tofu Waste	12.31	3.81	96.19	22.37	4.12	25.34	61.12	31.34
CGF	91.55	7.45	92.55	23.78	8.74	6.89	79.66	41.64
Molasses	72.24	9.46	90.54	3.42	0.23	0.00	63.21	0.80
Salt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mineral Lime	90.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Nutrition and Animal Feed Laboratory, Faculty of Animal Sciences, Universitas Brawijaya (2023).

2.3. Research Methods

This study method is observation or case studies in the farm owned by PT Juara Agroniaga sheep breeders. The 54 Fat-Tailed Ewe sheep were replaced in 3 group cages, with each cage containing 18 sheep. Feed intake observations were conducted every day for 8 weeks. Feed offered and feed refusals were sampled daily and bulked over each week for the duration of experiment, then composited for the analysis of dry matter, organic matter and crude protein content in the Laboratory. The data obtained were tabulated using Microsoft Excel then analyzed using descriptive analysis.

3. RESULTS AND DISCUSSION

3.1. Chemical Composition of Complete Feed

Complete feed is a combination of feed consisting of fiber sources and concentrates that have balanced nutritional content. The benefits of providing complete feed include fulfilling nutrition, saving labor lower feed costs, and reducing feed selection by livestock [3]. The chemical composition of feed given to sheep before and after the MF project can be seen in Table 2 and 3.

Table 2. Proportion and chemical composition of complete feed before MF project

Feed Ingredients	Proportion (kg DM)

Molasses	1.20
Coffe husk	17.60
Corn tumpi	126.00
Water spinach straw	22.00
Pollard	27.00
Copra meal	45.00
Soybean straw	35.60
Palm oil cake	79.20
Peanut shell	108.00
Lime	2.70
Chemical composisition (%DM)	
DM	89.29
CP	9.62
TDN	57.17
NDF	69.49

Table 3. Proportion and chemical composition of complete feed after MF project

Feed Ingredients	Proportion (% DM)
Corn Stover	51.93
Cassava Peel	2.01
Soybean Straw	1.82
Corn Tumpi	3.04
Peanut Shell	3.34
Coffe Husk	4.86
Corn Seed	1.82
Pollard	4.86
Rice Bran	6.08
Sawit Meal	6.08
Pellet Sawit Meal	6.08
Copra Meal	3.04
Tofu Waste	0.18
CGF	4.86
Chemical Composition	(%)
DM	89.73
CP	11.07
TDN	68.16
NDF	38.86

Based on Table 2 and 3. it can be seen that the feed given at the PT Juara Agroniaga Sejahtera farm before the MF project had a Dry Matter (DM) content of 89.29%, Crude Protein (CP) 9.62%, Total Digestible Nutrient (TDN) 57.17% and Neutral Detergent Fiber (NDF) 69.49%. The chemical composition of this feed does not meet the SNI for ewes (female sheep). Meanwhile, the chemical composition of feed after the MF project had a DM content of 89.73%, CP 11.07%, TDN 68.16% and NDF 38.86%. The standard concentrate feed for sheep according to SNI-8819 [4] is to have a maximum water content of 13%, minimum CP 10%, minimum TDN 60% and maximum NDF 35%. The implication of this results after the MF project, parameters such as feed intake and ADG would be better.

3.2. Dry Matter Intake (DMI) and Organic Matter Intake (OMI)

Feed intake is a very important factor because it can directly influence the level of livestock productivity. The results of the feed intake such as DMI, OMI and CPI is presented in Table 4 and 5.

Table 4. DMI and OMI before MF Project

Flock	DMI (g/head/day)	OMI (g/head/day)
Flock 1	889.90	746.38
Flock 2	892.60	746.38
Flock 3	895.90	746.38
Flock 4	834.86	697.86
Flock 5	892.90	746.38
Flock 6	867.90	725.48
Flock 7	876.36	732.55
Flock 8	892.90	746.38
Flock 9	881.15	736.55
Flock 10	881.74	737.05
Average	880.62 ± 18.379	736.14 ± 15.338
DMI in kg BW	3.04%	

Table 5. DMI, OMI and CPI after MF Project

Flock	DMI	OMI	CPI
		(kg/head/day)	
A	0.709	0.634	0.077
B	0.709	0.634	0.077
C	0.709	0.634	0.077
Average	0.709	0.634	0.077

Total DMI before MF project of 880.62 ± 18.379 g/head/day and OMI 736.14 ± 15.338 g/head/day. The average DM intake in kg body weight is 3.040%. Meanwhile, after improving the feed, average DM, OM and CP intakes were 709 g/head/day, 634 g/head/day and 77 g/head/ day, respectively (after MF project). The level of feed consumption in livestock can be influenced by several factors, including feed palatability and livestock age. The amount of feed intake by livestock is very dependent on the level of palatability of the feed [5]. Palatability is the level of acceptance or preference of livestock for the feed given. The level of palatability can be influenced by the physical and chemical composition of the feed as well as the psychological and characteristics of the livestock [6]. Mubarok [7] reported that apart from the type of feed given to livestock, the factor that influences dry matter intake is the rumen capacity of each animal.

3.3. Average Daily Gain (ADG)

Average daily gain reflects the quality of the feed provided. ADG measurements can describe the extent to which feed can be used by livestock other than for basic living needs. The results of the ADG before and after MF project can be seen in Table 6 and 7.

Table 6. ADG before MF Project

Flock	ADG (g/head/day)
Flock 1	52.14
Flock 2	42.78
Flock 3	45.75
Flock 4	58.96
Flock 5	52.03
Flock 6	33.29
Flock 7	43.60
Flock 8	34.89
Flock 9	30.99
Flock 10	33.27
Average	42.77 ± 3.351

Table 7. ADG after MF Project

Flock	ADG (g/head/day)
A	45.488
B	79.102
C	99.667
Average	74.883 ± 27.140

Based on study, it can be seen that the ADG of sheep gas increased from 42.77 ± 3.351 g/head/day to 74.883 ± 27.140 g/head/day. An increase in the ADG value can be caused by the quality of the level of consumption and factors from the animal itself [8]. The higher protein content compared to previous feed can cause the sheep's growth rate to be faster. The reason is, the body needs protein to repair and replace damaged body cells and for production.

4. CONCLUSIONS

Based on the result of this study, it is concluded that:

1. The nutritional content of feed in plasma level, after the MF project, meets the dietary requirements of ewe sheep and complies with the SNI.
2. After the MF project, the nutrient intake and average daily gain (ADG) of the ewes tend to be high and meet the ewe requirements (SNI), compared to before the MF project.

5. RECOMMENDATIONS

To meet the nutritional requirements of sheep, farmers should formulate the feed based on the stage of physiology, such as prebreeding, prepartum and postpartum.

AUTHORS' CONTRIBUTIONS

Poespitasari Hazanah Ndaru designed the research, formal analysis, data curation and writing (original data, review and editing). Mashudi, M. Halim Natsir, Veronica Margareta Ani Nurgiartiningsih, M. Pramujo and Irida Novianti designed the research and conducted the analysis.

ACKNOWLEDGMENTS

The authors wished to thank the Directorate General of Higher Education, Research and Technology, Ministry of Education, Culture, Research and Technology, Republic Indonesia, for providing the Matching Fund Program 2023 that enabled this research.

REFERENCES

[1] BPS. 2021. Populasi Domba menurut Kabupaten/Kota di Jawa Timur Tahun 2021-2022. https://jatim.bps.go.id/statictable/2023/03/28/2602/-populasi-ternak-kambing-domba-babi-menurut-kabupaten-kota-dan-jenis-ternak-di-provinsi-jawa-timur-ekor-2021-dan-2022.html. Accessed on February 4, 2024.

[2] AOAC. 1995. *Official Methods of Analysis.* 16th Edition, Association of Official Analytical Chemists, Washington DC.

[3] Y. A. Beigh, A. M. Ganai and H. A. Ahmad. Prospects of Complete Feed System in Ruminant Feeding: A review. Veterinary world, Vol. 10(4), 2017, pp 424-437.

[4] Badan Standardisasi Nasional. Pakan Konsentrat Domba Penggemukan SNI 8819-2019. Jakarta; 2019.

[5] P. D. C. Jiwuba and F. O. Udemba. Productive and Physiological Characteristics of West African Dwarf Goats Fed Cassava Root Sievate-Cassava Leaf Meal Based Diet. *Acta Fytotech Zootechn*. Vol. 22(3), 2019, pp 64-70.

[6] N. Hidayah, R. Lubis, K. G., S. Suharti, W. Rita dan Nurhaita. Effect of Native Grass Substitution with Jengkol (Archidendron jiringa) Peel on Sheep Performance. IOP Conference Series: Earth and Environmental Science, 2020, 456: 012021.

[7] S. S. Mubarok, T. Rohayati dan I. Hernaman. Pengaruh Imbangan Protein dan Energi Terhadap Performa Domba Garut Betina. Jurnal Ilmu Peternakan, Vol. 2(2), 2018, pp 22-31.

[8] E. Tasoin. Pertumbuhan Kambing Kacang Jantan di Desa Kualin Kecamatan Kualin Kabupaten Timor Tengah Selatan. Journal *of Animal Science,* Vol. 4(2), 2019, pp 23-25 sing descriptive analysis.