

Seasonal Feeding Practice Impact on Lactating Cow Performances Kept in Bogor Lowland Small Enterprise Dairy Farming

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ABSTRACT

Impact of seasonal feeding practice on lactating cow performance under small enterprise located in dairy cattle estate area (KUNAK) Cibungbulang, Bogor Regency have been studied to improve feed utilization efficiency. Nineteen farmers of KPS Bogor cooperative members have been interviewed and 131 lactating cows have been observed in two periods to represent drought and rainy seasons. Type and amount of feeds offered have been recorded, weighted and sampled. Feed compositions of each feed type have been analyzed to get proximate composition, mineral, fermentability, digestibility, metabolisable and net energy for lactation information. The cow body weight and score have been measured. Milk production and qualities have been recorded and scanned. Descriptive statistics were used to describe the main and range values of each parameter and one way ANOVA was used to compare the effect of seasons. The results showed small enterprise dairy farmer in KUNAK Cibungbulang vary extremely in feeding practice (type of feeds, feeding strategy) but did not influence by season. There is no significant effect of seasonal feeding practice on dairy cow performances have been observed. The farmer feeding strategy in coping with seasonal feed availability will be discussed.

Key Words: Cow, Feed, Performance, Season, Small enterprise

INTRODUCTION

Backgrounds. Decreasing dairy cattle milk production during drought season has been known caused by lack of high quality feed available especially forage. Feeding strategy in coping with the difficult time will determine survival of a dairy business by maintaining animal performance and farmer income (Hardie et al., 2014). Results of our previous study in two different types of dairy farming system concluded that feeding strategy in both system vary greatly. Traditional farmers located in surrounding horticultural land Lembang district were more resilient in compare to small enterprise dairy farmer located in dairy estate area (KUNAK) Cibungbulang, Bogor Regency because of the possibility to get access into horticulture plant waste. Although in both systems the farmer offered feeds and macro nutrients more than their cows need, however, it could not support a long term high milk production persistency (Despal et al., 2013) showed by low BCS and reproduction performances. However, there was no estimate model could be build convincingly using the available data. In-depth study trying to improve available data and understanding better of the farmer strategy in coping with the difficult time have been conducted by adding several feed utilization parameters and qualitative feeding strategy.

Objectives. The study was aimed at describing and comparing feed offered and utilized at rainy and drought seasons to better understanding dairy farmer strategy

MATERIALS AND METHODS

The field study has been conducted in two periods (July – August 2012 for drought season and February - March 2013 for rainy reason) observations. Laboratory works have been continued until July 2013. The amounts of 19 farmers have been interviewed and 131 (drought season) and 133 (rainy season) lactating cows have been studied. Type and amount

of feeds offered have been recorded, weighted and sampled. Feed compositions of each feed type have been analyzed to get proximate composition (DM, ash, CP, lipid and CF), mineral (Ca and P), fermentability (NH₃ and VFA), digestibility (DMD and OMD), metabolisable (ME) and net energy for lactation (NEL). The cow body weight (BW) and score (BCS) have been measured. Milk production and qualities have been recorded and scanned to get milk fat, protein and lactose contents. Descriptive statistics were used to describe the main and range values of each parameter and one way ANOVA was used to compare the effect of seasons.

Body weight was estimated using Schoorl method as describe by Jaelani et al (2013). Body condition (BCS) was scored using 5-point scale as used by Roche et al (2009). Milk components were determined using Lactoscan type S_L to get milk fat, protein, lactose and SNF contents. Nutrients offered were weighted and analyzed using proximate analysis (AOAC, 1988), Ca and P contents in each feed were determined using Reitz et al. 1987) preparation methods and quantified using Taussky& Shorr (1953) method for P and AOAC (2003) for Ca. Fermentability of organic material in rumen to produce VFA in vitro was quantified using steam distillation method and fermentability of protein was quantified using Conway method. Digestibilities was analyzed using in vitro two stage (Tilley and Terry, 1969) and Hohenheim gas test (Menke et al, 1979). ME and NEL were calculated according to the formula given by Menke et al (1979). Detailed of feeding practice were summarized from questionnaire and tabulated. Descriptive statistics were used to get mean and STD value of each parameter measured. ANOVA was used to compare the effect of seasons. Data analyses were done using SPSS 16 (2007) statistical package software.

RESULTS AND DISCUSSION

Feeding strategy. The type and amount of feed offered (as fed), total feed (DM basis) and their nutrient contents and utilization during drought and rainy seasons are shown in Table 1. There was no significant different between seasons. Cultivated high production grass such as napier and king grasses were found in both seasons at quite similar amount. Natural grasses, rice straw and cabbage crop waste were used more frequent in rainy seasons, while corn stover, agricultural by product that are more available in market were used more frequent in drought season when other forage shortage. Although, forages were more available and used during rainy season (55.56 vs 48.6 kg/head/day), however, because of its high moisture content, resulting in lower forage dry matter offered (7.33 vs 7.51 kg/head/day) and proportion in ration (52.65 vs 57.60%). During rainy season, more farmer (54%) fed their cows with long cut of napier/king grass because the grasses used were young and moist. No forage conservation method have been applied by the farmer as well as forage weighing prior to feeding. Forage were fed at least twice a day and more frequent in rainy season. In both seasons, farmers found forage left over every day and the farmer were not sure if the feeds offered have fulfilled the cow's requirements.

Concentrate used by the farmers were vary greatly. Only 7 out of the 19 farmers used concentrate produced by cooperative. Others purchased it from other sources or self-mixed. Concentrate feeding strategy and quality were not influenced by seasons but slightly higher in rainy seasons. In general, the amount of DM offered were more than their required (3.2 – 3.3% BW vs 2.7% BW) but their energy contents were lower (55 – 60% vs 65%). Protein contents in rations were sufficient but their fermentability slightly low especially of the rainy season ration. In both seasons, feed types used were of low digestibility (<50%), ME and NEL feeds.

Table 1. Lactating cow performances, feed and nutrients offered and utilized

Feed, Nutrient offered	Drought season		Rainy Season	
	Mean	STD	Mean	STD
Forage offered (kg <i>as fed</i>)				
Napier grass cv. Taiwan	27.25	12.29	26.97	19.30
King grass	3.95	11.83	2.89	8.71
Napier grass cv. Hawaii	1.89	8.26	1.58	6.88
Natural grass	1.21	5.28	1.84	6.06
Rice straw	12.25	11.85	20.17	23.01
Corn Stover	1.79	5.37	0.53	2.29
Cabbage crop waste	0.26	1.15	1.58	6.88
Total forage (kg DM)	7.51	3.38	7.33	4.95
Forage proportion (% ration)	57.60	15.50	52.65	15.19
Concentrate offered (kg <i>as fed</i>)				
Cooperative concentrate	1.41	2.11	1.37	2.04
Bandung A	0.46	1.39	0.47	1.43
Bandung B	0.42	1.43	1.21	4.60
Bandung C	0.17	0.73	0.16	0.69
Bogor A	0.83	2.13	0.74	2.06
Bogor B	0.28	1.15	0.44	1.36
Mako Rusdi	0.32	1.38	0.17	0.76
Cargill	0.42	1.84	0.42	1.84
Rice Bran	0.11	0.46	0.11	0.46
Tofu Waste Parung	5.55	8.24	5.95	10.38
Tofu Was Bandung	0.89	3.90	1.74	5.21
Tofu Waste Bogor	1.74	5.22	1.63	4.89
Tofu Waste Pangalengan	3.42	6.63	5.13	10.83
Tofu Waste Jakarta	1.86	4.58	1.39	3.62
Tempe Waste Jakarta	1.00	3.00	0.63	2.14
Total concentrate (kg DM)	5.40	2.12	6.03	3.28
Concentrate proportion (% ration)	42.40	15.50	47.35	15.19
Nutrient offered (head/day)				
DM (kg)	12.91	3.94	13.36	7.53
ASH (% DM)	10.67	1.80	11.84	3.02
Lipid (% DM)	3.44	0.98	3.35	1.31
CP (% DM)	12.05	2.33	13.43	2.57
CF (% DM)	22.30	3.16	22.59	3.11
Ca (% DM)	0.32	0.19	0.38	0.25
P (% DM)	0.19	0.05	0.17	0.04
TDN (% DM)	60.00	7.37	55.43	11.15
Nutrient utilization				
NH ₃ (mM)	8.33	1.10	7.72	1.31
VFA (mM)	113.90	17.79	118.03	15.59
DMD (%)	49.30	6.90	47.92	7.12
OMD1 (%)	49.13	7.04	47.97	7.41
ME (Mcal/kg DM)	7.75	0.93	7.78	0.87
NEL (Mcal/kg DM)	4.45	0.66	4.47	0.61

Note: different superscript at the same row indicated significant different (P<0.05)

Cow's performances. Average and range of cow's performances in both seasons were shown in table 2. There was no significant different in all parameters observed. Cow's BW, BCS and milk production were slightly better in rainy season but their milk component were better in drought season. In general, the cows should be in a peak performance (3rd lactation, 4 – 6 months in milk). However, the table showed that in both seasons, cow's milk production and BSC were under performances (Roche et al., 2009) in compare to national

average (DGLS, 2012). Lactation cycle in rainy season were lower than drought season which showed an end drought to beginning rainy season calving tendency.

Table 2. Correlation between parameters observed

Cow performances	Drought season		Rainy Season	
	Mean	STD	Mean	STD
Body Weight (kg)	408.4	19.0	400.1	23.5
Body Condition Score	2.5	0.2	2.6	0.2
Age (years)	5.05	0.90	4.52	1.41
Lactation period	2.93	0.63	2.73	1.14
Lactation cycle (months)	6.39	1.96	4.40	2.21
Milk Production (l/day)	9.35	2.63	10.33	3.44
Milk quality				
Fat (%)	4.24	1.04	4.07	1.15
Lactose (%)	4.27	0.31	4.12	0.17
SNF (%)	7.44	1.76	7.16	0.31
Protein (%)	2.83	0.10	2.76	0.12
Water (%)	6.97	3.57	8.96	4.27
Temperature (%)	30.05	0.66	28.95	0.51

CONCLUSION

The results showed small enterprise dairy farmer in KUNAK Cibungbulang vary extremely in feeding practice (type of feeds, feeding strategy) but did not influence by season. There is no significant effect of seasonal feeding practice on dairy cow performances have been observed. The farmer feeding strategy in coping with seasonal feed availability will be discussed.

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