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PJBS

ISSN 1028-8880

Pakistan Journal of Biological Sciences

ANSInet
Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Pakistan Journal of Biological Sciences 4 (7): 912-915, 2001

Milk Production Profile in Baghabarighat Milk Shed Area of Bangladesh

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Abstract: Milk production profile in Baghabarighat Milk Shed Area (BMSA) of Bangladesh was studied from July 1991 to June 1996 to identify the development and production pattern of milk throughout the year. Data collected based on active primary society, number of members and milch cows, milk collection, feed intake and live weight gain of ruminants, feed availability of that area throughout the year etc. Results indicated that the collection of milk, number of active society and members, number and productivity of milch cows improve year to year due to increase in extension activities and breeding policy of Bangladesh Milk Producers Co-operative Union Limited (BMPCUL) in the area. But, milch cows per member's (2.06) yet not increased indicating that the economic status of farmers was unchanged. Moreover, it was found that feed adequacy, climatic condition etc govern the flushing and calving season and ultimately trend of milk production throughout the year which may be compared with a production trend of a lactating cow over the lactation period.

Key words: Milk yield, feed availability, co-operative, milch cows

Introduction

Domestic milk production of Bangladesh represents only 9.42 % (23.56ml/day/head) of the actual need (250ml/day/head). This small amount of milk comes from 3.8 million milch cows out of total 23 million cattle heads (Akhter, 1992). Livestock survey carried out in 1983-84 estimated the annual milk production at 1024,000 tons, of which only 2% comes from organized dairy sub-sector and a half of that quantity is produced by Bangladesh Milk Producers Cooperative Union Limited (BMPCUL) (BBS, 1983-84).

There are more than 300 primary milk producers cooperative societies in different milk shed areas of BUMPCUL named Baghabarighat, Manikganj, Tangail, Takerhat etc. and a milk processing plant in each area has also been established. Through these processing plants, cattle development program for supply of improved semen, mobile veterinary services, feed and fodder etc., was initiated by the union. The products like liquid milk, butter, ghee etc. are found in the market under the same trade name of "Milk Vita"(Rahman, 1993).

Baghabarighat Milk Shed Area (BMSA) of Sirajganj district belongs to more than hundred primary milk producers societies. The members of society produce milk as a part of agricultural products like fish, paddy, poultry etc. But, actual production profile including pattern of production throughout the year till unidentified, is important to make policy of dairying. Keeping this in view the area was selected to draw a milk production profile and pattern throughout the year, which is the aim of this study.

Materials and Methods

Organized data were recorded from July 1991 to June 1996 based on following parameters in registrar book of the dairy plant and society office of BMSA.

Milk Collection: Daily collection of liquid milk was recorded in registrar book of quality control division of the plant. Total amount of collection by 8, 8, 8 and rest of the days of months were divided by respective number of days to obtain daily average. So, four average numbers per month were considered as replications.

Society and relevant information: Records for total number of active society, farmer, milking cows etc. of BMSA of each year were collected from the society office of the area. Some breeding information was also collected from the record book of Animal Breeding Section of BMSA.

Performance of Cattle: Dry matter intake and live weight gain of cattle of the area throughout the years were calculated by Islam *et al.* (1995) from July 1989 to June 1990 for different age groups.

Availability of Feedstuff: There are two types of cattle rearing systems, depending on availability of feedstuffs, climatic conditions and natural floods etc.

The two types are: Bathan system (where abundant green fodder are available from November to February in medium low land and where the animals are tethering by tying with ropes) and during July to October the animals are kept in and around settlements or cow sheds of the farmer due to natural flood) and Non-Bathan system (the animals are stall-fed and have access to limited grazing by owner himself on fallow land and in border of paddy field).

Analyses of Data: Data obtained for different parameters were analyzed statistically by completely randomized design and significant differences among the treatment means were identified by Duncan's Multiple Range Test (Steel and Torrie, 1980). Also, the regression lines were drawn in relation to milk collection, daily dry matter intake and live weight gain of cattle.

Results and Discussion

Five years milk collection record (thousand liter/day) indicated that the pattern throughout each year follows a specific trend (Table 1). Lowest ($p < 0.01$) collection was observed for July (20.47) to October (18.87) and highest for January (40.94) and February (41.13) of the year. But, intermediate types of production observed for November (24.35), December (34.70), March (31.72), April (29.33), May (26.23) and June (28.14). According to Rahman *et al.* (1998) the farmers faced very acute shortage of straw during September-October (before harvesting Aman rice) and green grass deficit during February-March causes lower milk yield. This fact was in agreement with present results. Drastic change of green grass availability makes the cattle dependent upon straw and takes time to adjustment with straw based ration. So, at the end of February drastic fall of milk yield occurred and after

Table 1: Daily milk collection(1000 liter) by Baghabarighat Dairy Plant

Months	Session					Mean
	1991-92	92-93	93-94	94-95	95-96	
Jul	6.47a	19.74bc	20.78abc	21.97a	33.37a	20.47a
Aug	4.18a	14.24ab	17.93a	21.61a	31.24a	17.84a
Sep	4.59a	12.11a	20.01ab	22.01a	34.24a	18.59a
Oct	3.93a	10.85a	20.04ab	23.33a	36.21ab	18.87a
Nov	7.15a	14.38ab	26.06bcd	30.97b	43.19b	24.35ab
Dec	17.04b	23.39cde	37.46e	41.26c	54.35c	34.70ab
Jan	24.88c	26.98def	41.14e	49.01d	62.69c	40.94b
Feb	25.06c	30.01ef	37.05e	57.59e	55.95c	41.13b
Mar	16.99b	21.69cd	28.53cd	48.10d	43.27b	31.72ab
Apr	15.21b	28.54ef	28.26cd	41.94c	32.72a	29.33ab
May	16.12b	28.60ef	22.93abc	34.13b	29.35a	26.23ab
Jun	19.37bc	25.63cdef	26.53cd	34.44b	34.73ab	28.14ab
Mean	13.42	21.35	27.23	35.53	40.94	27.69
LSD	6.12	6.12	6.15 6.15	8.81	19.15	

abcMeans with different superscript in the same row differ significantly($p < 0.01$). LSDLeast significant differences between two mean

Table 2: Milk procurement(1000 liter) from the societies

Session	Total procurement	Per society per day	No.of active society	Growth rate (percent/society)
1991-92	4850	0.190	70	-
1992-93	7658	0.247	85	30.03
1993-94	9587	0.276	95	12.00
1994-95	12865	0.320	110	15.90
1995-96	14779	0.337	120	5.30
Average	9948	0.274	96	12.65

Table 3: Growth rate of membership of societies

Session	Total members	Increase (percent)	Members/society	Increase/society (%)
1991-92	4900	-	70.0	
1992-93	6375	30.10	75.0	7.14
1993-94	8075	26.67	85.0	13.33
1994-95	9460	17.15	86.0	1.18
1995-96	10800	14.16	90.0	4.65
Average	7922	22.02	81.2	6.58

Table 4: Number of milch cows of the members

Session	Milch cows (total)	Cow/society	Increase/society (%)	Cows / member
1991-92	10090	144.0	-	2.06
1992-93	13100	155.0	7.64	2.05
1993-94	16630	175.0	12.90	2.06
1994-95	19590	177.0	1.14	2.08
1995-96	22350	185.0	4.20	2.07
Average	16346	167.2	6.47	2.06

Table 5: Milk supply (1000 liter) from the members

Session	Per society	Per cow/anum	Per day/cow	Increase/cow (%)
1991-92	990	480	1.32	-
1992-93	1201	585	1.60	28.0
1993-94	1187	578	1.58	-1.35
1994-95	1360	657	1.80	13.9
1995-96	1368	661	1.81	0.6
Average	1221	592	1.62	10.29

Table 6: Seasonal milk yield (1000 liter/day) and reproductive relationships of the cows

Parameters	Monsoon (x±SE)	Winter (x±SE)	Spring (x±SE)	Summer (x±SE)
Milk yield	18.42c±0.51	33.33a±8.37	34.06a±6.24	24.95b±3.99
No. of AI	15.33a±2.51	29.13b±2.62	37.63c±1.92	17.51a±2.12
(%)	(38843)	(38843)	(38843)	(38843)
Calves born	29.93ac±1.82	34.01a±1.48	17.92b±1.88	18.14bc±1.22
(%)	(15064)	(15064)	(15064)	15064)

Means with different superscript in the same row differ significantly. Figures in the parentheses indicates the number of observations.
Monsoon : August-October; Winter: November-January; Spring: February-April; Summer: May-July. AI = Artificial insemination

adjustment the situation recovered to its original trend at January. Considering the entire situation the trend is similar to milk production pattern of a lactating cow throughout the lactation period (Fig. 1). In this sense we can consider all the milch cows as a large single cow having seasonally fixed production pattern over the year.

Milk production (Table 6) was usually less (24.95 thousand litter/day)) during summer (May to July) because of the higher environmental temperature (35°C) and relative humidity (85%) and the prevalence of green forage scarcity (Table 8), as agreed by Banerjee (1995). High relative humidity accentuates the problem of high temperature. Moreover, the

Table 7: Average daily dry matter (DM) intake, live weight gain (LWG) and Milk yield (1000 liter/day) of cattle in different seasons

Parameters	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
***DM intake (g/KgW 0.75)**						
Bathan area	91.0c	80.0abc	75.4ab	69.0a	71.0a	88.4bc
Non-Bathan	87.8bc	79.2ab	76.4ab	71.8a	69.4a	90.8c
Average	89.9b	79.6ab	75.9a	70.4a	70.2a	89.6b
***LWG (Kg/day)**						
Bathan area	0.21	0.18	0.19	0.15	0.15	0.22
Non-Bathan	0.20	0.19	0.18	0.17	0.15	0.23
Average	0.21	0.19	0.19	0.16	0.15	0.23
Milk Yield						
	41.04a	30.53ab	27.19ab	19.16b	18.73b	29.53ab

Means with different superscript in the same row differ significantly. * Calculated from Islam *et al.* (1995).

Table 8: Availability of feed-stuffs in Bathan and Non-Bathan areas in different seasons

Parameters	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
Bathan						
	Maticoli	Durba	(pastures	under	water)	Maticoli
	Khesari	Straw	Straw	Straw	Straw	Durba
	Cheaca	Cheaca	RSG	RSG	RSG	Straw
	WB,RB	WB,RB	WB,RB	WB,RB	WB,RB	WB,RB
	TOC etc.	TOC etc.	TOC etc.	TOC etc.	TOC etc.	TOC etc.
Non-Bathan						
	Maticoli	Straw	Straw	Straw	Straw	Straw
	Dudulia	TL	(pastures	under	water)	Dudulia
	Khesari	Ipil Ipil	TL	TL	TL	TL
	Durba	Durba	WB	WB	WB	Durba
	WB,RB	WB,RB	RB	RB	RB	WB,RB
	TOC etc.	TOC etc,	TOC etc.	TOC etc.	TOC etc.	TOC etc.

RSG- Road side grass; RSS- Road side straw; RSW- Road side weed; TL- Tree leaves; WB- Wheat bran; RB- Rice bran; TOC- Till oil cake
Durba- *Cynodon dactylon;* Maticoli- *Vigna mungo;* Khesari- *Lathyrus sativus;* Cheaca- *Eleusine indica;* Dudulia- *Euphorbia hitra;* Jack fruit- *Artocarpus heretophylus lam;* Ipil Ipil- *Leucaena Leucocephala*

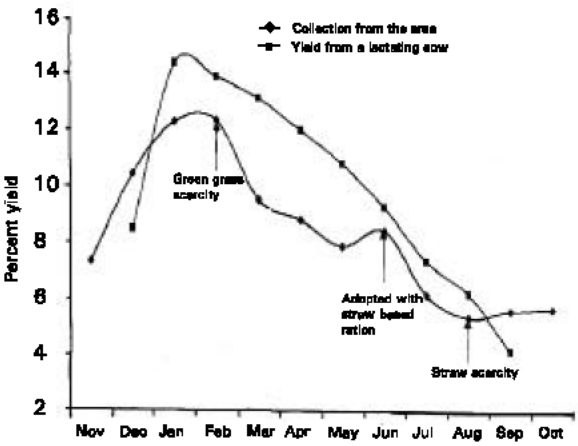

Fig. 1: Comparison between milk collection (%) from the area and yield from a lactating cow (Banerjee, 1995).

season of calving has got a marked effect on the production (Table 6). Cows fleshing shortly before winter months (November-January) produce more than those calving at other times of the year. The increase is probably due to more favourable temperature and feeds available during the winter (Table 8).

Increase of milk procurement (12.65 %) was observed (Table 1&2) in session 1991-92(4850 thousand liter) to 1995-1996 (14779 thousand liter). This is due to increase of total membership (22.02 %) from the year 91-92(4900) to 95-96(10800), number of society (70 to 120) and also due to increase of membership (6.58 %) per society (Table 3). The increment of membership was lower than mentioned by Ali and Chowdhury (1996) for the year 1988-89 (30.52 %). It reveled that the overall extension activities were lower than the session 1988-89.

Total number of milking cows of the society was increased from 10090 to 22350 for the sessions 1991-92 to 1995-96 (Table 4). But this development occurs due to increase (6.47 %) in members (144 to 185 per society) but not for the number of milch cows per member. Because, it was unchanged (2.06/member) from session to session. Causes behind the increase of milk procurement are supported by the improvement of productivity of individual cows from 1.32l/d (in 1990-91) to 1.81l/d (in 1995-96) and total productivity (10.29 %) per year (Table 5). Improvement of productivity occurred due to sound breeding program of Animal Breeding Section of BMPCUL. Originally cows were local and of non descriptive types and development takes place due to crossing with Sahiwal, Hariana and Red Sindhi bulls (Islam and Vaughan, 1980; Udo *et al.*, 1992; Ghosh, 1981).

There was positive relationship between DM intake and Live weight gain and also with the milk yield (Fig. 2) of the cattle. It reveled that the DM (g/d) intake of cattle was higher during November to February (Table 7). This higher intake of DM was due to seasonal availability of abundant green forages like Maticoli (*Vigna mungo*), Khesari (*Lathyrus sativus*), which corresponds to a better body weight gain in cattle (Table 7 & 8). On the other hand, during July to October, due to scarcity of green forages, the daily DM intake was lowered that resulted in a decreasing rate of body weight gain in the lean period of milk production. It may be concluded that there was a functional relationship between DM intake, body weight gain and also with the milk yield in different seasons of the year.

November to March is the period of feed adequacy and the cows are bred and become pregnant (Razzaque *et al.*, 1995) and hence, natural calving (34.01%) occurs from November to January as synchronized calving (Table 6). Highest number (37.63%) of artificial insemination is done (Table 6) from February to April of the year due to natural flashing before winter (November to January), when good quality feeds are available (Table 8). So, winter is the flush period for milk yield (34.06 thousand liter/d) of that area. This situation was also agreed by Razzaque *et al.* (1995), who stated adequate good quality legumes feed from November to March with Khesari

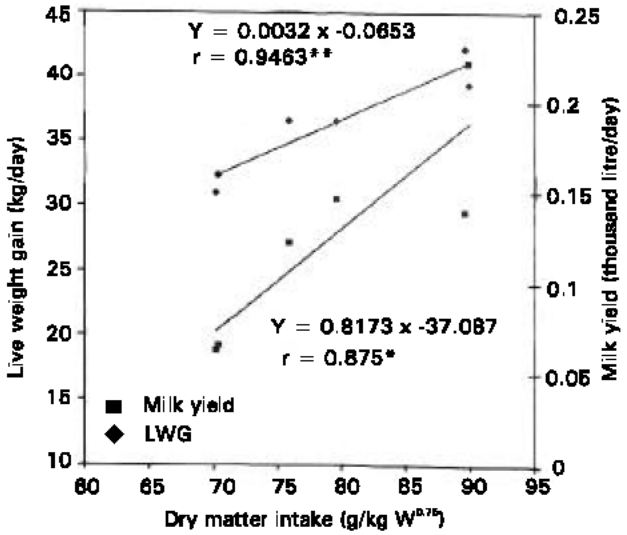

Fig. 2: Relationship between dry matter intake, live weight gain and milk yield

and Maticoli, milk production was 6±2.7 liter/cow /day, while in summer cows are fed mainly rice straw and milk production drops to as low as 1.5±0.03 liter.

Under the above circumstances we can say that the milk production, number and membership of active societies, productivity and the number of milch cows improved year to year. But, milch cows per member yet not increased. It also revealed that the extension activities of BMPCUL increased year to year but condition of farmers yet not improved in this aspect. Moreover, it may be concluded that feed adequacy, climatic condition etc. guide to flashing and calving season and ultimately trend of milk yield of the area may be comparable with a production trend of a lactating cow.

Implications: Every country including Bangladesh, has a report on total milk yield over the year, which indicates only the per capita availability of raw milk for whole year. But, this experiment will be helpful to calculate seasonal availability of raw milk. Moreover, it is important to emphasize in preservation and other byproduct making policy from raw milk based on flush and lean period of production. This experiment also indicated that the dairying under cooperative system will improve the milk production of a developing country like Bangladesh.

Acknowledgments

The authors gratefully acknowledge the cooperation of BMPCUL (Milk Vita) in allowing access to the collection of information and also acknowledge Mr. Md. Azharul Haque, Assistant Manager, Animal Breeding Section, BMSA for providing some breeding information.

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