Journal of Rural Advancement
(RNI No. UPENG03889/2013; ISSN 2347 - 2561)
Vol. 01, Issue 01, Year 2013

Feed consumption and nutritional status of lactating buffaloes in Agra District under subtropical agro climate

Praveen Kumar Singh and Prakash Chandra

Department of Animal Husbandry and Dairying
R.B.S. College, Bichpuri-283105, Agra INDIA

Abstract

The present study was conducted to compare feed consumption and nutritional status of milch buffaloes during various seasons and domesticated by various categories of farmers in the Agra District under subtropical agro climate. Buffaloes (300) were randomly selected from 10 villages of 5 community development blocks in the District containing 2 villages in every 30 farmers, categorized into 5 groups i.e. landless, marginal, small, medium, and larger farmers. Each category includes 10 farmers in each village. They were surveyed during the winter, spring, summer, rains, and autumn seasons. Outcomes were collected with the help of a questionnaire and personal observation. The samples of feed and fodders were analyzed for the proximate principle. The quantity of DM, DCP, and TDN intake of various animals was calculated from the record of intake of feed and fodder using average digestibility coefficient values. Data recorded were statistically analyzed using appropriate methods. The decline in feed consumption with increasing environmental temperature was observed in buffaloes. DMI in the winter season was higher. On an overall basis, animals remained underfed in terms of DCPI and TDNI all season compared to that minimum requirement.

Keywords: Agra, Buffaloes, Feed Consumption, Intake, Nutrition, Subtropical agro climate.

Introduction

More than half of the buffalo population of the world is the inhabitants of India (FAO 2002). The buffalo forms the backbone of the Indian dairy industry and is rightly considered the ‘bearer cheque’ of the rural flock or India’s milking machine (Balain 1999). These animals require a relatively low level of inputs in the predominantly mixed farming systems and are well known for their ability to thrive on low-quality crop residues and green forage (Resali 2000) under harassing climatic conditions. Therefore, in India, the buffalo is steadily gaining importance as a major dairy animal.

They contribute more milk than cattle although one-third of the population (Giovanni 1988). Thus, the contributions of milk, meat, manure, and draft power of the buffalo to the overall national economy have been overwhelming (Shrestha and Shrestha 1998).

The present study was conducted to compare feed consumption and nutritional status of milch buffaloes during various seasons and domesticated by various categories of farmers in the Agra District under subtropical agro climate.

Materials and methods

Agra District of Uttar Pradesh was selected using the random technique as a representing district amongst others in the subtropical agroclimatic zone. Three hundred lactating buffaloes were randomly selected from 10 villages of five community development blocks in the District. Each block contains two villages and each village includes thirty farmers, which were categorized into five groups based on landholding capacity i.e. landless farmers (0 h), marginal farmers (< 1 h), small farmers (1-2 h), medium farmers (2-3 h) and larger farmers (>3 h). Each category includes ten farmers in each village. A survey was conducted during the different seasons of the year (2007-08) viz. winter, spring, summer, rains, and autumn seasons, i.e. Winter (15 Nov to 31 Jan), spring (1 Feb to 15 Mar), summer (16 Mar to 14 Jun), rains (15 Jun to 15 Sep) and autumn (16 Sep to 14 Nov). The data were collected with the help of a questionnaire and personal observation. The body weight of the individual animal was collected by using the Minnesota formula. The samples of feed and fodders were ground and analyzed for the proximate principle (AOAC 1990). The quantity of DM, DCP, and TDN intake of various animals was calculated from the record of intake of feed and fodder using the average digestibility coefficient value given by Ranjhan (1983). The data recorded were statistically analyzed as per standard methods (Snedecor and Cochran 1994).

Results and discussion

Seasonal variations and categories of the farmers are the most important factors which affect the feed consumption and nutritional status of the livestock. Seasonal variation in the chemical composition of feed and fodders in Table 1 and DMI in milch buffaloes have been presented in Table 2.

The declines in feed consumption with increasing environmental temperature were observed in the experiment (Mishra et al 1963, Raghavan et al 1963, Lal et al 1986, Verma and Hussain 1988, Mishra 1995, Verma 1998). Decreases in feed and increases in water intake under high

environmental temperatures (Collier et al 1982, Lal et al 1986, Verma and Hussain 1988) have been reported in buffaloes.

Table 1: Chemical composition of feed and fodders (%).

Ingredient	DM	CP	EE	CF	NEF	Ash	DCP	TDN
Berseem	20.7	16.4	1.2	26.1	40.7	14.8	12.2	62.5
Doob grass	33.5	08.3	1.5	32.8	43.2	10.5	09.7	62.4
Maize green	30.4	07.1	1.6	29.7	53.3	08.4	04.1	56.6
MP Chari	30.1	07.8	1.9	24.4	55.6	11.1	04.4	67.3
Paddy straw	90.2	03.6	1.0	30.5	48.4	15.2	00.0	38.1
Pasture	35.8	07.5	1.2	30.1	48.9	12.8	05.7	55.0
Sudan Grass	25.7	07.4	1.3	25.0	53.0	11.7	04.8	52.9
Sugarcane bagasse	35.0	03.7	3.0	40.3	57.6	04.9	02.5	45.2
Wheat straw	90.9	02.9	1.0	40.8	42.1	14.9	00.0	44.8
Chuni arhar	90.9	14.1	2.8	22.9	52.7	07.2	14.8	74.7
Chuni gram	90.6	16.2	3.6	12.3	61.4	05.9	13.5	57.0
Maize grain	90.6	09.0	3.9	02.3	82.0	02.7	07.0	81.7
Mustard cake	90.7	38.4	9.4	08.0	38.1	05.3	27.4	74.4
Rice bran	90.2	11.5	7.9	20.1	49.4	11.4	09.9	76.7
Wheat bran	90.3	12.2	3.6	11.8	64.1	08.4	08.6	70.0
Wheat grain	90.1	10.8	2.5	02.2	82.6	02.3	06.0	72.7
Cake mustard	90.8	47.7	2. 6	16.2	61.9	03.6	28.3	74.0
Cake groundnut	90.1	50.4	2.3	15.5	56.8	03.1	30.4	76.7

Intake of dry matter (DMI) in the winter season was higher in the medium followed by large, small, marginal, and landless categories of farmers. In the spring season, it was high in medium followed by small, marginal large, and landless categories of farmers. The same in the summer season was higher in the medium followed by large, marginal, small, and landless categories of farmers. Intake of this nutrient in the rainy season was higher in medium followed by marginal, large, small, and landless categories of farmers whereas, in the autumn season, it was higher in large followed by medium marginal, small, and landless categories of farmers. The lowest DMI was found in landless categories of farmers in each season due to the non-availability of cultivated green fodder, the animal was maintained only on purchased wheat straw and the limited amount of pasture grasses. The observations could confirm the previous observations (Jadhav 1973, Sohal et al 1982, Handa and Gill 1989, Verma et al 1995).

On an overall basis, animals remained underfed in terms of Intake of digestible crude protein (DCPI) in all seasons compared to that minimum requirement (ICAR 1985). DCPI was observed to be lowered in the summer season than that in others. Present findings confirmed the results of Verma and Hussain, (1988); Handa and Gill (1989) and Verma et al

(1995). DCPI is closely and positively correlated to DMI hence reduced DMI reduced DCPI. Hydrochloric acid secretion from abomasums declines during the summer season, when the ambient temperature reaches 40-45^{0}C, resulting fall in acidity and causing reduced digestion of crude protein (Harvey 1963). Another reason for loss of appetite in hot climate under tropical conditions, is lower ingestion and digestion of proteins having higher specific dynamics action (Best and Taylor 1945) and fat with twice the calorific value are necessary to reduce thermo-genesis which is beneficial for the animal, thus the animals accept less crude protein and more carbohydrate in the form of roughages during summer season (Mishra 1995).

In the winter season, higher DCPI was found in the medium followed by large, small, marginal, and landless categories of farmers. There was higher DCPI under spring season in small followed by marginal, medium, large and landless categories of farmers. In the summer season, higher DCPI was found in the medium followed by large, small, marginal, and landless categories of farmers. In the rainy season higher, DCPI was found in the medium followed by large, small, marginal, and landless categories of farmers. The results were clearly showing that DCPI was directly associated with the purchasing power of the farmers and their economic status; land and irrigation facilities were also limiting factors for the cultivation of green fodder (Sinha 1982).

DCPI was higher during the autumn season in large followed by medium, marginal, small, and landless categories of farmers. The deficit DCPI (Kg/animal/day) was provided in land less, marginal and small categories of farmers under winter season; in landless, marginal, small, medium, and large categories of farmers under spring season; and in all categories of farmers under summer, rainy and autumn season. The surplus DCPI was provided in medium categories of farmers during the winter season, while in the same season, in the large category of the farmer the DCPI was just equal to the requirement. Amongst categories, maximum DCPI was found in medium and large, and the lowest DCPI was observed in the landless category of farmers. DCP availability in different categories of animals was found to be less as compared to standard requirements (Ahlawat et al 1960, Singh 1970, Sharma and Chandar 1971, Sharma and Agarwal 1979, Handa and Gill 1989, Lal et al 1998, Singh et al 1998).

The deficit TDNI as per requirement (ICAR, 1985) in winter, spring, summer, and rainy season while in an autumn season whereas surplus TDNI was noticed under landless and large category of the farmer was recorded. The deficit TDNI in all categories of farmers in winter, spring, summer, and rainy seasons, while only in marginal, small, and medium categories of farmers, in the autumn season was found. TDNI in milch

buffaloes declined with increasing ambient temperature (Mallick and Kakkar 1961, Raghavan et al 1963, Mishra et al 1963, Verma and Hussain 1988). Low voluntary feed consumption in the summer season might be because total energy expenditure may vary considerably with ambient temperature and feed intake in ruminants is regulated by the total energy expenditure.

Table 2: Average consumption of feed and fodder

Category of farmer	BW (Kg)	Consumption per day per animal		
		DMI(Kg)	DCPI(g)	TDNI(Kg)
(a) Winter season				
Landless	420±2	08.1±0.1	432±10	4.03±0.07
Marginal	427±2	10.6±0.1	605±08	5.39±0.05
Small	469±3	11.1±0.1	653±11	5.79±0.09
Medium	474±3	12.6±0.1	720±08	6.61±0.05
Large	461±3	11.8±0.1	661±11	6.24±0.09
Average	450±1	10.8±0.1	614±06	5.62±0.05
(b) Spring season				
Landless	420±2	8.4±0.1	450±09	4.21±0.06
Marginal	431±2	11.2±0.1	655±11	5.74±0.06
Small	475±3	11.4±0.1	684±11	6.01±0.08
Medium	473±3	11.5±0.1	609±08	6.04±0.06
Large	457±5	11.5±0.1	581±11	5.85±0.08
Average	451±1	10.7±0.1	596±06	5.51±0.04
(c) Summer season				
Landless	435±4	9.0±0.1	187±05	4.17±0.07
Marginal	430±2	11.0±0.1	285±07	5.26±0.07
Small	462±3	10.6±0.1	323±10	5.18±0.09
Medium	476±3	12.0±0.2	456±10	6.02±0.09
Large	461±2	11.0±0.2	424±09	5.51±0.09
Average	453±1	10.7±0.1	335±06	5.23±0.05
(d) Rainy season				
Landless	437±4	10.3±0.3	255±15	4.96±0.16
Marginal	432±3	12.1±0.1	342±10	5.88±0.10
Small	466±3	10.7±0.1	348±13	5.28±0.10
Medium	475±3	12.5±0.1	445±10	6.21±0.07
Large	460±3	11.3±0.1	418±09	5.67±0.08
Average	454±2	11.4±0.0	361±06	5.60±0.05
(e) Autumn season				

Landless	425±4	11.8±0.1	376±11	5.70±0.09
Marginal	432±2	13.2±0.1	501±12	6.55±0.10
Small	469±3	12.1±0.1	476±09	6.04±0.09
Medium	474±3	13.1±0.1	543±08	6.56±0.06
Large	457±5	13.6±0.1	574±11	6.84±0.09
Average	451±7	12.8±0.1	494±06	6.34±0.04

TDNI was higher in the medium followed by large small marginal and landless categories of the farmers. In the rainy season, TDNI was higher in medium followed by marginal, large, small, and landless categories of farmers. In the autumn season, it was higher in landless followed by medium, marginal, large, and small categories of farmers. Similar observations were reported by Sharma and Chandar (1971), Jadhav (1973), Lal et al (1998) and Singh et al (1998).

Conclusion

Seasonal variations and categories of the farmers are the most important factors which affect the feed consumption and nutritional status of the livestock. The decline in feed consumption with increasing environmental temperature was observed in buffaloes. Intake of dry matter (DMI) in the winter season was higher. On an overall basis, animals remained underfed in terms of Intake of digestible crude protein (DCPI) in all seasons compared to that minimum requirement. The deficit TDNI in all categories of farmers in winter, spring, summer, and rainy seasons, while only in marginal, small, and medium categories of farmers, in the autumn season was found.

References

Ahlawat M R, Pal R N and Latter A N. 1960. A study of the practices in the feeding of the buffaloes in four towns of Punjab. Indian J. Dairy Sci. 13: 126.

AOAC 1990. Official Methods of Analysis, 15th Edn. Associations of Official Analytical Chemists, Arlington, Virginia USA.

Balain D S. 1999. Inflow and outflow of buffalo germplasm resources and their global contribution. Invited papers presented in short course on "characterization and conservation of domesticated livestock and poultry resources", 10-19 May, 1999, National Bureau of Animal Genetic Resources, Karnal.

Best C H and Taylor N B. 1945. The Physiological Basis of Medical Practices 6th Ed. Williams and Wilkins Co. Baltimore, USA, pp. 21-36.

Collior R J, Beede D K, Thatcher W W, Israd L A and Wilcox C J. 1982. Influence on dairy animal health and production. J. Dairy Sci. 56: 2213.

FAO 2002. Production yearbook. Rome. http://www.delaval.com/Dairy_Knowledge/EfficientFeeding/EconomE.htm.

Giovanni D F. 1988. Buffalo production System in Latin America. Second World Buffalo Congress, New Delhi.

Handa M G and Gill R S. 1989. Nutritional status of dairy animals kept by different categories of farmers in Punjab state. Indian J. Anim. Nutrition 6: 38.

Harvey D. 1963. Some aspects of the importance of buffaloes as farm stock. Nutritional Abstr. Rev. 33: 931.

ICAR 1985. Nutrient Requirement for Cattle and Buffaloes. ICAR, New Delhi.

Jadhav R A. 1973. Studies on the nutritional status of cattle and buffaloes in extension block, Agricultural College, Parbhani, pp. 62.

Lal S N, Verma D N. 1998. Nutritional Status of lactating Murrah Buffaloes kept-different categories of farmers in eastern U.P. Indian J. Anim. Nutri. 15: 44.

Lal S N, Verma D N and Hussein K Q. 1986. Effect of air temperature and humidity on the feed consumption, cardiorespiratory response and milk production in Haryana cows. Indian Vet. J. 64: 115.

Mallick D N and Kappar B. 1961. Cited from M.Sc. (Ag.) Thesis entitled "Effect of water application to the body surface of buffaloes on nutrient utilization. Physiological reaction and milk production, NDUAT, Kumarganj, Faizabad, pp. 87.

Mishra R M. 1995. Effect of air temperature and humidity on certain physiological reactions and water metabolism in lactating Murrah buffaloes. Thesis: M.Sc. (Ag.); NDAUT, Kumarganj.

Misra M S, SenGupta B P and Ro A. 1963. A physiological reaction of buffaloes, cows maintained in two housing conditions during summer months. J. Dairy Sci. 16: 203.

Raghavan G V, Mallick P N and Daniel S J. 1963. Effect of temperature and humidity on metabolism of feed nutrients in cattle and buffalo bulls. Am. Biochem. Exp. Med. 3: 23.

Ranjhan S K. 1983. Animal Nutrition and animal Feeding Practices in India. 3rd edn. Vikash Publishing House, New Delhi.

Resali D P. 2000. Recent trends in buffalo production in Nepal: A review, Buffalo News letter. Bulletin of the FAO Inter-Regional cooperative Research Network on Buffalo, Europe-Near Estate, 14: 6. ,

Sharma D D and Chandel S. 1971. Nutritional Status of animals in Kangra District. J. Res. Punjab Agric. Univ. 8: 136.

Sharma K N S and Agrawal S B. 1979. Estimation of milk production and feed consumption in bovines around Karnal. Indian j. dairy Sci. 32: 362.

Shrestha S K and Shrestha N P. 1998. Genetic improvement of buffalo. In Proc. First Nat. workshop on Anim. Genet. Resources Conserv. Genet. Improvement of Domest. Anim. NARC, Kathmandu, p. 98.

Singh A K, Vidyarthi V.K Verma, D N and Lal S N C. 1998. Nutritional status of buffaloes in rural area of Azamgarh District of UP. Indian J. Anim. Nutr. 15: 126.

Singh G S. 1970. Hybridization for more nutrients of livestock. Gaonsamvardhan, 18: 2.

Sinha M N. 1982. Gap analysis in relation to feeding recommendation. Annual report, NDRI, Karnal, pp. 168.

Snedecor G W and Cochran W G. 1994. Statistical Methods. 7th Edn. Oxford and IBH Pub. Co. New Delhi.

Sohal T S, Gupta B N, Singh B P and Oberoi A S. 1982. A study of the nutritional status of cattle and available feed and fodder resources in rural area around Karnal, Annual Report, N.D.R.I. Karnal, pp. 139.

Verma D N. 1998. Seasonal Variation in feed milk relationship in buffaloes in Faizabad region, Final Report. Department of Animal Science. NDAUT, Kumarganj, Faizabad.

Verma D N and Hussein K Q. 1988. Effect of ... on biological responses and productivity of buffaloes. Proc: II World Buffalo Congress, 1: 25.

Verma D N, Lal S N and Singh S P. 1995. Nutritional status of lactating buffaloes in eastern U.P. Proc. 7th Animal Nutritional Res. Workers' Conf. Bombay, pp. 113.