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Feeding Pattern During Advanced Pregnancy and Incidence of Reproductive and Metabolic Disorders in Crossbred Cows

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ABSTRACT

Present study results indicated that out of 105 dairy farmers visited, it was observed that all most all of the farmers practice stall feeding and offer feeds twice in a day, to advanced pregnant crossbred cows. The majority of farmers (56 %) were offered mixture of straws (wheat straw+ gram straw) and some of them used masoor/soybean straw as dry roughage. It was observed that 33 % farmers offered mixture of local grasses + maize fodder + MP Chari followed by maize + local grass (26 %) as green roughage. Twenty six percent farmers were not feeding any greens. Available concentrate feeds are wheat bran, cotton seed cake and concentrate mixture. Majority of farmers (84 %) offered wheat bran+ cotton seed cake as concentrate. Only 10% farmers were supplementing mineral mixture and 29 % supplementing salt. Prevalence of overall reproductive disorders was 15.8%. Among different disorders, incidence of retained placenta, vaginal prolapse and uterine prolapse were 9%, 4.2% and 2.6%, respectively. Prevalence of metabolic disorders and mastitis were 6.8 and 14 %, respectively in total population. Among metabolic disorders, incidence of haemoglobinuria was 2.5%, milk fever was 2.7% and downers cow syndrome was observed in 1.6% cows. The prevalence of mastitis (14%) was higher than other problems in crossbred cows. These results indicates that under existing feeding pattern inadequacy of various nutrients in the ration of advanced pregnant crossbred cows could be probable of various reproductive and metabolic disorders prevalent in this area.

Keywords: Feeding pattern, Madhaya Pradesh, metabolic, reproductive disorders

Dairy owners all over the country have suffered significant economic losses because of the various reproductive and metabolic disorders. These problems in dairy animals are of great concern to the growth of dairy industry as they seriously jeopardize the reproductive and productive efficiency of these animals. Nutrition is one of the most important factor which influences reproduction. Evidence from the literature and practical experience suggest that nutritional factors are perhaps the most crucial in terms of their direct effects on the reproductive phenomenon and the partial to moderate are the effects of other factors (Smith and Akinbamijo, 2000). The interaction between nutrition and reproduction needs particular attention in our country due to nutritional inadequacies in terms of quantitative feed intake and qualitative nutrient deficiencies/ imbalances. Most field cases of metabolic disorders and reduced fertility or of sterility due to nutritional origin are usually due to multiple deficiencies (Blood and Radostitis, 2007; Jain *et al*., 2012). It is absolutely true that reproductive performance is based on the general health of the animal. It was also reported by field veterinarians that a number of animals suffer from hypocalcimia, haemoglobinuria and reproductive disorders, like repeat breeding, retention of placenta and prolapse of uterus which might be associated with nutritional deficiency (Tewari *et al.*, 2014). The availability of minerals to cattle depends upon the production system, feeding practices, and environment. Malwa region of Madhya Pradesh has its own fame for agriculture and livestock farming in India. Most of the farmers rear crossbred cattle and follow traditional feeding practices. Cotton seed cake (un-decorticated) is the only concentrate source fed to pregnant animals along with straw (wheat/masoor/gram/soybean/grass) and mineral supplementation is rarely done (Jain *et al*.,

2012). This could greatly imbalance the micro nutrient availability to animals and also their utilization. In Indore district of Madhya Pradesh, reproductive problems (prolapse of uterus/vaginal, retention of placenta) and metabolic disorders (downers syndrome, pre and post haemoglobinuria) are common in crossbred cows under field conditions which are most likely due to under feeding and non availability of balanced ration. Therefore, an attempt was made, to assess the existing feeding practices in relation to prevalence of various pre and post partum disorders of crossbred cows in this area.

MATERIALS AND METHODS

Keeping this in view survey on existing feeding practices in advanced pregnant crossbred cows was done in the 10 villages of Mhow Tahsil. Total 10-12 farmers from each village were selected randomly. Data was collected from selected farmers through common questionnaire on general information about owner, herd strength, feeding pattern in advanced pregnant crossbred cows along with usage of mineral mixture and salt. Information was also collected on occurrence of common pre and post parturient reproductive (retention of placenta, vaginal/ uterine prolapse) and metabolic disorders (milk fever, hypophosphatemia, downer cow syndrome) and mastitis. Samples of feed stuffs from each village were collected and pooled (three of each) for analysis of proximate constituents (AOAC, 1995), Calcium (Talpatra *et al*., 1940) and Phosphorous (AOAC, 1995) and trace minerals by atomic absorption spectrophotometer (Model Elements: ECIL AAS 4141).

RESULTS AND DISCUSSION

The results of survey of feeding practices in dairy animals carried out in villages around veterinary college are presented in table 1. Out of 105 dairy farmers visited they had 559 crossbred cows, it was observed that all most all the farmers practiced stall feeding and offer feeds twice in a day, to advanced pregnant crossbred cows. The majority of farmers (56 %) were offered mixture of straws (wheat straw+ gram straw) and some use masoor/soybean straw as dry roughage. It was observed that 33 % farmers offered mixture of local grasses + maize fodder + MP Chari followed by maize + local grass (26 %) as green roughage. Twenty six percent farmers were not feeding any greens. Available concentrate feeds are wheat bran, cotton seed cake and concentrate mixture. Majority of farmers (84 %) offered wheat bran+ cotton seed cake as concentrate. Only 10 % farmers were supplementing mineral mixture and 29 % supplementing salt.

Table 1: Feeding pattern of advanced pregnant crossbred cows in Indore district of Madhya Pradesh

Feeds	No. of farmers	%
Dry roughage		
Wheat straw	13	12.40
Wheat straw+ Gram straw	59	56.20
Wheat straw+ Masoor straw	03	2.85
Wheat straw+ Soybean straw	05	4.76
Gram straw	10	9.50
Gram straw+ Masoor straw	15	14.30
Total	**105**	
Green roughage		
Local grasses + Maize fodder	27	25.71
Local grasses + Maize fodder+ MP chari	35	33.33
MP chari+ Maize fodder	10	9.52
MP chari	5	4.76
No green	28	26.67
Total	**105**	
Concentrate		
Wheat bran + Cotton seed cake	88	83.80
Cotton seed cake	13	12.38
Compounded feed + Cotton seed cake	4	3.80
Total	**105**	
Mineral mixture		
Supplementation	**10**	9.52
No supplementing	**95**	90.48
Total	**105**	
Salt		
Supplementation	**30**	28.57
No supplementing	**75**	71.43
Total	**105**	

The incidence of various reproductive and metabolic disorders like, prolapse (vaginal and uterine) and retention of placenta, haemoglobinuria, downers syndrome, ketosis and mastitis in the area of study are given in the table 2. The prevalence of reproductive disorders in crossbred

Table 2: Incidence of reproductive and metabolic disorders and mastitis in crossbred cows in Indore district of Madhya Pradesh

Name of village	No. of farmers	Total animals	Reproductive Disorders			Metabolic Disorders			Other disease
			ROP	Vaginal prolapse	Uterine prolapse	Haemoglobinuria	Downers Syndrome	Milk fever	Mastitis
Borkhedi	10	66	4	2	1	—	1	5	8
Sater	10	61	10	3	2	2	1	1	8
Panda-Navda	12	65	4	3	1	2	—	1	9
Harsola	10	61	8	4	2	4	1	1	9
Pipliyamalhar	10	50	3	1	1	—	1	1	7
Kewati	10	43	3	2	1	2	2	1	9
Sonwai	12	59	5	2	2	—	1	2	8
Bhaislai	11	51	3	3	2	1	—	2	6
Rau	10	57	6	3	1	2	1	—	8
Rangwasa	10	46	3	1	2	1	1	1	6
Total	**105**	**559**	**49**	**24**	**15**	**14**	**9**	**15**	**78**
Percentage			**9**	**4.2**	**2.6**	**2.5**	**1.6**	**2.7**	**14**

dairy cows was 15.8%. The prevalence of retained placenta was 9 % in the present study. Similar prevalence of retained placenta (9.5-10.18%) was also reported in crossbred cows by Verma and Mishra (1984) and Correa *et al*. (1993). However, Markusfeld (1987) observed 17.8% cases of retained placenta in different crossbred cows. In comparison, Grohn *et al*. (1990), Kanuya *et al*. (2000), and Alam *et al*. (2014) observed lower prevalence of retained placenta (4.4%, 4.2%, 0.1% and 4.7%, respectively) in cows.

The incidence of vaginal prolapse and uterine prolapse were 4.2% and 2.6%, respectively in the present study. Whereas Grohn *et al.* (1990) and Alam *et al*. (2014) observed lower incidence (1.6 – 2.7 %) for both types of prolapse in crossbred cattle. In present study, the overall prevalence of metabolic disorders was 6.8 %. The incidence of haemoglobinuria was 2.5%, which was somewhat lower than the value reported by Radostits *et al.* (2007). The incidence of milk fever was 2.7% in the present study that was lower to the reported values (Thirunavukkarasu *et al*., 2010) and higher than values reported by Markusfeld (1987) and Kanuya *et al.* (2000). The incidence of mastitis was 14% in present study, whereas others (Chahar *et al*., 2005; Sharma *et al*., 2006; De and Mukherjee, 2009) reported very wide ranges of mastitis incidence (15.18% to 78%) in dairy cattle.

The average values (% DM basis) of proximate principles (Crude protein, Ether extract, Crude fibre, Nitrogen free extract, Total ash and Acid insoluble ash) of available feed stuffs are presented in the table 3. Results indicated that among the dry roughages CP content varied from 3.19 ± 0.14 (wheat straw) to 5.12 ± 0.25% (masoor straw), EE 0.85 ± 0.11 (wheat straw) to 1.85 ± 0.12% (masoor straw), CF 35.31 ± 0.23 (wheat straw) to 41.99 ± 4.81% (soybean straw), NFE 42.68 ± 0.01 (gram straw) to 49.31 ± 0.03 % (wheat straw), TA 7.50 ± 1.55 (soybean straw) to 11.34 ± 0.61% (wheat straw) and AIA 1.70 ± 0.49 (soybean straw) to 6.44 ± 0.15% (wheat straw).

Among concentrate feeds, CP content ranged between 13.59 ± 1.08 (wheat bran) to 20.59 ± 1.08% (cotton seed cake), EE 1.38 ± 0.03 (wheat bran) to 9.07 ± 0.24 % (cotton see cake), CF 4.14 ± 1.02 (wheat bran) to 29.51 ± 5.76% (cotton seed cake), NFE 35.65 ± 0.01 (cotton seed cake) to 76.11 ± 0.06 % (wheat bran), TA 4.78 ± 0.13 (wheat Bran) to 12.59 ± 1.54 % (concentrate mixture) and AIA 0.25 ± 0.04 (cotton seed cake) to 2.44 ± 0.39% (concentrate mixture). Among green roughages, CP content varied from 4.76 ± 0.19 (local grass) to 5.48 ± 0.12 (MP Chari), EE 0.96 ± 0.18 (local grass) to 1.75 ± 0.01 (green maize), CF 29.59 ± 4.26 (local grass) to 37.42 ± 6.07 (MP Chari), NFE 46.44 ± 0.05 (MP Chari) to 54.69 ± 0.06 (local grass), TA 9.51 ± 0.34 (MP Chari) to 10.00 ± 0.09 (local

Table 3: Proximate composition (Mean±SE) of feedstuffs (on dry matter basis) in Indore district of Madhya Pradesh

Feed stuffs	CP	EE	CF	TA	AIA	NFE
Wheat straw	3.19±0.14	0.85±0.11	35.31±0.23	11.34±0.61	6.44±0.15	49.31±0.03
Gram straw	5.18±0.29	1.07±0.11	40.99±4.92	10.08±0.17	2.32±0.02	42.68±0.01
Masoor straw	5.72±0.25	1.85±0.12	37.25±3.38	10.60±0.07	3.75±0.19	44.59±30.67
Soybean straw	4.36±0.31	1.73±0.04	41.99±4.81	7.50±1.55	1.70±0.49	44.43±0.01
Wheat bran	13.59±1.08	1.38±0.03	4.14±1.02	4.78±0.13	0.49±0.04	76.11±0.06
Cotton seed cake (Undecorticated)	20.59±1.08	9.07±0.24	29.51±5.76	5.17±0.08	0.25±0.04	35.65±0.01
Compounded feeds	18.98±0.81	2.32±0.35	12.20±1.54	12.59±1.54	2.44±0.39	53.91±0.01
Local grasses (Late stage)	4.76±0.19	0.96±0.18	29.59±4.26	10.00±0.09	3.61±0.09	54.69±0.06
Maize fodder	7.13±0.17	01.75±0.01	30.50±5.27	10.65±0.06	1.62±0.11	49.96±0.05
MP chari (Sorghum)	5.48±0.12	1.15±0.05	37.42±6.07	9.51±0.34	3.98±0.37	46.44±0.05

Table 4: Mineral status (Mean ± SE) of feedstuffs (on dry matter basis) in Indore district of Madhya Pradesh

Feedstuffs	Ca (%)	P (%)	Fe(ppm)	Cu (ppm)	Zn (ppm)	Mn(ppm)	Co (ppm)
Wheat straw	0.51±0.07	0.08±0.02	395.58±7.90	13.37±0.51	38.86±0.56	7.65±0.22	0.12±0.05
Gram straw	0.80±0.03	0.10±0.02	471.06±7.22	24.40±0.15	37.25±0.62	5.97±0.11	0.55±0.09
Masoor straw	0.87±0.13	0.09±0.03	610.33±8.85	24.66±0.23	36.52±0.16	4.89±0.17	0.65±0.02
Soybean straw	0.77±0.13	0.17±0.01	450.46±5.78	26.90±0.06	28.40±0.27	9.66±0.12	0.12±0.01
Wheat bran	0.18±0.15	0.59±0.01	295.30±0.04	65.95±0.40	135.00±0.13	10.67±0.30	0.22±0.01
Cotton seed cake	0.26±0.05	0.57±0.03	295.54±0.16	44.55±0.02	16.18±0.26	12.49±0.26	0.41±0.01
Compounded feeds	1.26±0.09	0.97±0.09	910.19±2.31	28.92±0.15	96.81±0.24	16.60±0.33	0.79±0.01
Local grasses (Late stage)	0.38±0.01	0.19±0.08	113.08±1.45	18.36±0.22	28.96±0.21	8.19±0.22	0.11±0.01
Maize fodder	0.74±0.03	0.28±0.01	145.52±2.08	8.53±0.07	133.59±0.30	1.38±0.01	0.17±0.01
MP chari (Sorghum)	0.64±0.06	0.18±0.02	191.48±2.09	15.82±0.36	55.74±0.77	3.87±0.02	0.11±0.01

grass) and AIA 1.62 ± 0.11 (green maize) to 3.98 ± 0.37 (MP Chari). The DCP and TDN contents were highest in masoor straw (3.37 ± 0.01 and 52.71 ± 0.01 %) and lowest in wheat straw (0.25 ± 0.01 and 42.49 ± 0.01 %). Among green roughages, DCP and TDN contents were highest in maize fodder (4.35 ± 0.05 and 65.13 ± 0.06 %) and DCP lowest in MP chari (1.37 ± 0.05), TDN lowest in 51.59 ± 0.05 %). Among concentrate feeds, DCP content was highest in cotton seed cake (17.51 ± 0.05 %) and lowest in wheat bran (11.00 ± 0.58 %), while TDN content was highest in cotton seed cake (77.65 ± 0.01 %) and lowest in concentrate mixture (64.73 ± 0.01 %). These results of proximate composition of feedstuffs corroborate with the earlier reports (Morrison,1961; Sen *et al*., 1978; Kearl, 1982; NRC, 1989; Ranjhan, 1991; NRC 2001; Mudgal *et al*., 2003; Singh *et al*., 2005; Tiwary *et al*., 2007; Saksule, 2009; Tewari *et al*., 2014).

The minerals (Ca, P, Fe, Zn, Mn, Cu and Co) found in feed stuffs are given in the table 4. Among straws, wheat straw has lowest Ca (0.51 ± 0.07 %), P (0.08 ± 0.02 %), Co (0.12 ± 0.05 ppm) and Se (0.13 ppm) and masoor straw has highest calcium (0.87 ± 0.13 %), Fe (610.33 ± 8.85 ppm), Co (0.65 ± 0.02 ppm) and Se (0.36 ppm). Soybean straw had highest P (0.17 ± 0.01 %), Zn (26.90 ± 0.06 ppm) and Cu (9.66 ± 0.12 ppm). In concentrate feeds, wheat bran has lowest Ca (0.18 ± 0.15 %), Co (0.22 ± 0.01 ppm), Fe (295.30 ± 0.04 ppm) and Cu (10.67 ± 0.30 ppm), while concentrate mixtures had highest Ca (1.26 ± 0.09%), P (0.97 ± 0.09 %), Fe (910.19 ± 2.31 ppm), Cu (16.60 ± 0.33 ppm), Co (0.79 ± 0.01 ppm) and Se (0.76 ppm) and lowest Zn (28.92 ± 0.15 ppm). In green roughages, maize fodder has highest Ca (0.74 ± 0.03 %), P (0.28 ± 0.01 %), Mn (133.59 ± 0.30 ppm), Co (0.17 ± 0.01 ppm) and carotene (285 ppm) while, local grasses had

lowest Ca (0.38 ± 0.01 %), Fe (113.08 ± 1.45 ppm), Mn (28.96 ± 0.21 ppm), Co (0.11 ± 0.01 ppm) and carotene (97 ppm). MP Chari had highest Fe (191.48 ± 2.09 ppm). The minerals and contents of available feed stuffs were more or less within the range as reported by other workers (NRC, 1989, 2001; Mudgal, 2003; Tiwary *et al*., 2007; Garg *et al*., 2008a,b; Shinde and Sankhyan, 2008; Tewari *et el*., 2014). The levels of trace minerals in available feeds were varied. Iron content was higher in straws but it was within reported range. The Cu, Zn, Mn and Co contents in straws, green fodders and concentrate feeds were within the reported range. The Ca content was within the range in available straws and concentrate feeds except in masoor straw, which was much higher in calcium content in the present study as compared to values reported by other workers. The P contents in straws, concentrate feeds and green roughages were within the range as compared to values reported by other workers except cotton seed cake was lower than the reported values (Garg *et al*., 2008a,b; Shinde and Sankhyan, 2008; Tewari *et el*., 2014).

CONCLUSION

It may be concluded that under existing feeding pattern inadequacy of various nutrients in the ration of advanced pregnant crossbred cows could be probable of various reproductive and metabolic disorders and mastitis prevalent in the area.

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