RESEARCH ARTICLE

Feeding Management Practices of Gir Cattle followed in Gujarat, India

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Abstract

The present study was undertaken to collect information on feeding management practices of Gir cattle at Junagadh district and data were ascertained from randomly selected 320 Gir cattle owners through personal interview with the help of pre-tested structured schedule from four randomly selected talukas of Junagadh district, Gujarat. Majority of Gir cattle owners (86.88%) followed stall feeding system and most of them (93.44%) cultivated green fodder crops for feeding of Gir cattle. Majority (81.56%) of the respondents fed green and dry fodder as such. Groundnut gotar was the major ingredient (71.87%) used as dry fodder, 84.06 % respondents provided compound cattle feed as concentrate to their milking animals. Only 8.12 % of the Gir cattle owners followed scientific feeding of concentrates. Majority of the respondents fed concentrates to their young calves (80.94%) and heifers (87.5%) after soaking (62.81%) in water. 17.5 % of the respondents supplemented mineral mixture to their Gir cattle.

Key words: Feeding, Gir cattle, Management, Practices, Rural areas.

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Introduction

Due to the wide network of the cooperative dairy system on Anand pattern, Gujarat has achieved a leading position in milk production and marketing in India and is known as the "Milk bowl of India". The total livestock population in Gujarat is 26.89 million including 9.63 million cattle and 10.54 million buffaloes. The total milk production of Gujarat is 14.4 million tonnes with per capita availability of milk 595 g/day (Anonymous, 2020). Gir is an excellent dairy cattle breed of the Saurashtra region of Gujarat for its heat tolerance, production ability and resistance to various tropical diseases. Feeding is one of the most important aspects in animal husbandry. By adopting improved feeding practices, the farmers can reduce the cost of feed without losing milk production and with better utilization of nutrients. Delayed sexual maturity, poor growth and lower productivity can be caused due to underfeeding in dairy animals (Sabapara *et al.,* 2010, Dodiya *et al.,* 2023). Very meager information on Gir cattle management is available in its breeding tract. Thus, the aim of the present investigation was to ascertain the feeding management practices followed by Gir cattle owners in Junagadh district of Gujarat.

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Materials and Methods

A field survey was conducted in Junagadh district of Gujarat (India) during January to April, 2022. Out of nine talukas in the Junagadh district, four talukas were randomly selected. From each selected taluka, eight villages were selected at random. Ten Gir cattle owners from each village were randomly selected using a multi-stage random sampling technique to constitute a total of 320 respondents for present study. While selecting respondents due care was taken to ensure that they were evenly distributed and truly owning Gir in the area. The selected Gir cattle owners were interviewed with the help of pre-designed and pre-tested questionnaires desired information regarding feeding aspects was collected. The data obtained were tabulated and analysed by standard

statistical tools to draw meaningful interference (Snedecor and Cochran, 1994).

Results and Discussion

The findings on feeding management practices followed by Gir cattle owners presented in Table 1 revealed that majority (86.88 %) of owners followed stall feeding system, while 13.12% followed stall feeding as well as grazing. Supportive findings were reported by Malsawmdawngliana and Rahman (2016), Sabapara and Fulsoundar (2016), and Dodiya *et al.* (2023). However, present result is contrary to the findings of Sabapara (2016). Individual feeding system was adopted by majority of Gir cattle owner (99.38%) as compared to group feeding (0.62%). This is a good practice to save docile animals being harassed by vicious animals at feeding and to feed the milch animals according to their production level. Adoption of this practice showed full awareness of dairy animal owners in this study area. Similar findings were reported in previous studies (Sabapara and Fulsoundar, 2016; Rathva and Sorathiya, 2019). Fifty percent of the Gir cattle owners fed animals twice in a day followed by thrice or more (49.06%) and once in a day (0.94%). Significant ($p<0.05$) difference was found between the talukas. The results are similar with the findings of Jadav *et al*. (2014). Conversely, Malsawmdawngliana and Rahman (2016) reported that majority (92%) of the respondents supplied feed thrice a day in Mizoram, India. It was observed that majority of the respondents (93.44%) cultivated green fodder crops, probably due to large size land holdings and irrigation facilities. Highly significant ($p<0.01$) difference was observed with respect to cultivation of green fodder between the four talukas. Similar finding was observed by Singh *et al.* (2018) and Dodiya *et al.* (2023). In contrast, Malsawmdawngliana and Rahman (2016) observed only 4% of the respondents cultivating green fodder.

Majority of the respondents (76.57%) provided non-leguminous green fodder, while 22.19 % of the respondents provided both non-leguminous + leguminous green fodder to their animals. However, 71.25 % of the respondents provided non-cultivated green grasses / grasses from bunds and only 0.63 % of the respondents provided sugarcane tops. These results concurred with previous observations (Sabapara, 2016; Sabapara and Fulsoundar, 2016; Dodiya *et al.* 2023). Furthermore, the majority (71.87%) of Gir cattle owners fed their animals only with groundnut gotar followed by jowar straw + groundnut gotar (27.19%), wheat straw + jowar straw + groundnut gotar (0.94%, Table 1). These findings were in line with Pata *et al.* (2018), who observed 61.67 % of the respondents feeding groundnut gotar as dry fodder to their animals. Highly significant ($p<0.01$) difference was observed in feeding practice of green and dry fodder among four talukas. Majority of the Gir cattle owners (81.56%) offered intact green and dry fodders as compared to chaffed one, which might be due to lack of awareness on chaff cutter. These findings are in agreement with Sabapara (2016), Sabapara and Fulsoundar (2016) and Dodiya *et al.* (2023). Conversely, Shinde *et al.* (2018) reported 64.50 % farmers being practicing chaffing of green and dry fodder. Majority (84.06%) of the Gir cattle owners provided compound cattle feed followed by home-made + compound cattle feed (14.69%) and only home produced ingredients as concentrates (1.25%). These findings were in agreement with Henry *et al*. (2021), but contradicted Shinde *et al*. (2018). Further, in the study area, majority (91.88%) of the respondents did not follow any scientific criteria for feeding of concentrates, which was consistent with the report of Prajapati *et al.* (2021) but contradicted Kochewad *et al.* (2013).

The data shown in Table 1 indicates that all the Gir cattle owners fed concentrates twice in a day. It was also observed that, 82.19, 14.37 and 3.44 % Gir cattle owners practiced feeding of concentrates before milking, during milking and after milking, respectively. Practice of feeding concentrates before milking was due to habit of milk let down with concentrate feeding. These findings are in agreement with Kochewad *et al.* (2013), but contrary to Sabapara *et al.* (2010). Majority of the respondents (80.94%) fed concentrates to their young calves. These results concurred with Rathore *et al*. (2010) and Dodiya *et al.* (2023), but contradicted the report of Rathva and Sorathiya (2019), who recorded only 25.00 % of the respondents offering concentrate to young calves. Majority of the Gir cattle owners (87.5%) fed concentrates to their heifers. Highly significant ($p<0.01$) difference in concentrate feeding to heifers was observed between the talukas. Jadav *et al*. (2014) and Rathva and Sorathiya (2019) reported similar observations. It was also observed that majority (62.81%) of the Gir cattle owners fed concentrates to their animals after soaking in water, while 35.31 and 1.88 % of the respondents fed concentrates as such, and after soaking and boiling, respectively, as was noticed by Sabapara and Fulsoundar (2016) and Dodiya *et al.* (2023).

The data presented in Table 1 revealed that, majority (90%) of the Gir cattle owners practiced to feed concentrates to their advanced pregnant heifers. Further, it was found that, 44.69 % of the Gir cattle owners practiced to feed concentrates to heifers during last one month of pregnancy followed by 28.44, 11.25 and 5.62 % offering during last 15 days, last 2 months of pregnancy and confirmed pregnancy to calving, respectively. The digestive system of high yielders become well acquainted to concentrate digestion which results in body weight gain and improvement of body condition of animals too. These results were however in contradiction with previous studies (Sabapara, 2016; Sabapara and Fulsoundar, 2016). Majority of the Gir cattle owners (97.19%) followed special feeding after calving. Majority of the respondents had adequate knowledge about feeding care after calving. They fed energy and protein rich feed (Jaggary, Bajara *Pennisetum glaucum* L., Wheat *Triticum aresivum* L., etc.) mixed with ecbolic ingredients (Asaliya *Barbarea verna*, Suva *Anetheum sowa*, Methi *Trigonellafoenum graecum* L. etc.) to freshening

Table 1: Distribution of the Gir cattle owners according to feeding management practices followed in Junagadh district, Gujarat (India)

Sr. No.	Practices	Manavadar (N=80)		Mendarda (N=80)		Mangrol (N=80)		Junagadh (N=80)		Overall (N=320)	
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Feeding system										
	Stall feeding	64	80.00	70	87.50	73	91.25	71	88.75	278	86.88
	Grazing + Stall feeding	16	20.00	10	12.50	07	8.75	09	11.25	42	13.12
	X^2						4.93^{NS}				
2	Feeding of milch animal										
	Individual	80	100.0	79	98.75	80	100.0	79	98.75	318	99.38
	Group feeding	00	0.00	01	1.25	00	0.00	01	1.25	02	0.62
	X^2						2.01^{NS}				
3	No. of times of feeding										
	Once	01	1.25	00	0.00	01	1.25	01	1.25	03	0.94
	Twice	47	58.75	48	60.00	29	36.25	36	45.00	160	50.00
	More	32	40.00	32	40.00	50	62.5	43	53.75	157	49.06
	X^2						13.23*				
4	Cultivation of green fodder										
	Yes	66	82.50	78	97.50	78	97.50	77	96.25	299	93.44
	No	14	17.50	02	2.50	02	2.50	03	3.75	21	6.56
	X^2						20.95**				
5	Fodder availability (multi-choice)										
	Green										
	Non-legume	61	76.25	71	88.75	46	57.50	67	83.75	245	76.56
	Legume	00	0.00	00	0.00	02	2.50	00	0.00	02	0.62
	Non-legume + Legume	16	20.00	14	17.5	29	36.25	12	15.00	71	22.19
	Natural grass/ Grasses from bunds	56	70.00	54	67.50	69	86.25	49	61.25	228	71.25
	Sugarcane top	00	0.00	00	0.00	00	0.00	02	2.50	02	0.625
	X^2						29.89**				
	Dry										
	Wheat straw	00	0.00	00	0.00	00	0.00	00	0.00	00	0.00
	Groundnut (GN) gotar	43	53.75	67	83.75	62	77.50	58	72.50	230	71.87
	Jowar straw + groundnut gotar	37	46.25	15	18.75	13	16.25	22	27.50	87	27.19
	Wheat straw + Jowar straw + GN gotar	01	1.25	01	1.25	01	1.25	00	0.00	03	0.94
	Any other, specify	06	7.50	23	28.75	20	25.00	20	25.00	69	21.56
	X^2						33.12**				

(table continued)

(table continued)

Sr. No.	Practices	Manavadar (N=80)		Mendarda (N=80)		Mangrol (N=80)		Junagadh (N=80)		Overall (N=320)	
		No.	%	No.	%	No.	%	No.	%	No.	%
6	Green and dry fodder fed										
	As such	66	82.50	60	75.00	67	83.75	68	83.75	261	81.56
	Chaffed	14	12.50	20	25.00	13	16.25	12	16.25	59	18.44
	X^2						3.22^{NS}				
7	Types of concentrate feeding										
	Home made	01	1.25	00	0.00	02	2.50	01	1.25	04	1.25
	Compounded cattle feed	66	82.50	69	86.25	66	82.50	68	85.00	269	84.06
	Homemade + Compound cattle feed	13	16.25	11	13.75	12	15.00	11	13.75	47	14.69
	X^2						2.33^{NS}				
8	Scientific criteria followed for feeding										
	Yes	08	10.00	07	8.75	06	7.50	05	6.25	26	8.12
	No	72	90.00	73	91.25	74	92.50	75	93.75	294	91.88
	X^2						0.84^{NS}				
9	Time of feeding concentrate										
	During milking	14	17.50	09	11.25	10	12.5	13	16.25	46	14.37
	After milking	01	1.25	02	2.50	04	5.00	04	5.00	11	3.44
	Before milking	65	81.25	69	86.25	66	82.5	63	78.75	263	82.19
	X^2						4.22^{NS}				
10	Concentrate feeding to young calves										
	Yes	68	85.00	61	76.25	69	86.25	61	76.25	259	80.94
	No	12	15.00	19	23.75	11	13.75	19	23.75	61	19.06
	X^2						4.59^{NS}				
11	Concentrate feeding to heifers										
	Yes	70	87.50	60	75.00	78	97.50	72	90.00	280	87.5
	No	10	12.50	20	25.00	02	2.50	08	10.00	40	12.5
	X^2						19.2^{**}				
12	Concentrate fed										
	Dry	27	33.75	31	38.75	29	36.25	26	32.50	113	35.31
	After soaking	52	65.00	45	56.25	50	62.50	54	67.50	201	62.81
	After soaking/boiling	01	1.25	04	05.00	01	1.25	00	0.00	06	1.88
	X^2						7.41^{NS}				

(table continued)

(table continued)

Sr. No.	Practices	Manavadar (N=80)		Mendarda (N=80)		Mangrol (N=80)		Junagadh (N=80)		Overall (N=320)	
		No.	%	No.	%	No.	%	No.	%	No.	%
13	Feeding of concentrate to advanced pregnant heifers										
	No feeding	12	15.00	08	10.00	06	7.50	06	7.50	32	10.00
	For last 15 days	27	33.75	16	20.00	23	28.75	25	31.25	91	28.44
	For last one month	32	40.00	37	46.25	41	51.25	33	41.25	143	44.69
	For last two months	08	10.00	13	16.25	08	10.00	07	8.75	36	11.25
	Confirmed pregnancy to calving	01	1.25	06	7.50	02	2.50	09	11.25	18	5.62
	X^2						18.99^{NS}				
14	Special feeding after calving										
	Yes	80	100.0	80	100.0	77	96.25	74	92.50	311	97.19
	No	00	0.00	00	0.00	03	3.75	06	7.50	09	2.81
	X^2						11.32*				
15	Feeding of mineral mixture										
	Yes	11	13.75	12	15.00	17	21.25	16	20.00	56	17.5
	No	69	86.25	68	85.00	63	78.75	64	80.00	264	82.5
	X^2						2.25^{NS}				
16	Feeding of salt										
	Yes	22	27.50	14	17.50	08	10.00	20	25.00	64	20.00
	No	58	72.50	66	82.50	72	90.00	60	75.00	256	80.00
	X^2						9.37*				
17	Frequency of watering										
	2 times	10	12.50	19	23.75	02	2.50	14	17.50	45	14.06
	3 times	61	76.25	52	65.00	71	88.75	54	67.50	238	74.37
	4 times	08	10.00	07	8.75	07	8.75	09	11.25	31	9.69
	Free access of water	01	1.25	02	2.5	00	0.00	03	3.75	06	1.88
	X^2						21.16*				
18	Source of water										
	Well	24	30.00	21	26.25	67	83.75	22	27.50	134	41.88
	Pond	01	1.25	00	0.00	00	0.00	00	0.00	01	0.31
	Canal	00	0.00	00	0.00	00	0.00	02	2.50	02	0.62
	Bore well	55	68.75	59	73.75	13	16.25	56	70.00	183	57.19
	X^2						85.25**				
19	Method of watering										
	Bucket	44	55.00	43	53.75	25	31.25	33	41.25	145	45.31
	Cement tanks	36	45.00	37	46.25	55	68.75	47	56.75	175	54.69
	X^2						12.24**				

NS- Non-significant, *,** Significant at 5 % and 1 % level, respectively.

cows to prevent stress, clean up the uterus and initiate good milk flow. Significant ($p<0.05$) difference was observed between the talukas. These findings agreed with the reports of Kochewad *et al.* (2013) and Sabapara (2016). Only 17.5% of the Gir cattle owners provided mineral supplements to their milch animals as noted by Singh *et al.* (2020), but is contradictory to Henry *et al.* (2021) who reported > 60.00% of the respondents providing mineral supplements to their milch animals. Only 20.00% Gir cattle owners provided extra salt to their milch animals, of which 14.38 % provided along with mineral mixture. It might be due to lack of knowledge of owners. The observation on feeding of salt was significantly ($p<0.05$) different between the talukas. Sabapara and Fulsoundar (2016) and Henry *et al.* (2021) documented similar findings, while Choudhary *et al.* (2019) observed 89.16 % of the respondents supplementing common salt in Haryana, India.

Regarding water management, all of the respondents provided water to their milch animals *ad libitum* in quantity, but restricted in frequency, *i.e.* twice, thrice, four times a day and free access (14.06, 74.37, 9.69 and 1.88 % farmers, respectively) was common in summer. Thus the importance of water was known practically to all the farmers. Significant ($p<0.05$) difference in frequency of watering was observed between the four talukas. Majority of the Gir cattle owners depended on bore wells (57.19%) followed by well (41.88%), river (0.62%) and pond (0.31%) as a source of drinking water to their Gir cattle. The source of drinking water was highly significantly ($p<0.01$) different between the four talukas. The present findings are comparable with the results of Sabapara (2016) and Henry *et al.* (2021). Majority of the Gir cattle owners practiced watering to their animals by cement tanks (54.69%), whereas 45.31 % respondents used bucket for watering their animals. The difference in prevailing method of watering was highly significant ($p<0.01$) between the talukas. Henry *et al.* (2021) however practiced watering individually by bucket.

Conclusions

Majority of the Gir cattle owners in their home tract followed stall feeding system and cultivated green fodder crops. Groundnut gotar was the major dry fodder used. Most of the Gir cattle owners fed compound cattle feed as concentrate to their cows, mainly before milking, but after soaking in water and practiced to feed green and dry fodder as such. Majority of the Gir cattle owners fed concentrates to young calves and heifers, but did not provide mineral mixture supplements to their cattle. Thus, the management practices adopted by the respondents in the study area needs to be improved through organized training programmes, and demonstrations exposure visits by various government organizations and NGOs.

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