

Effect of mother bonded rearing on growth, health and physiological state of Murrah buffalo calves

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Diarrhoea score of the calves were recorded using a 5 point scale. The scoring details are described in table 1 as follows:

Table 1: Scoring criteria for diarrhoea on a scale of 1-5

Score 1	When faeces were firm to soft, odourless, and brown to light brown in colour
Score 2	When the consistency of the faeces was soft to loose, with a faint odour and a yellow, brown, or green colour.
Score 3	When faeces were loose to watery with a strong odour and a yellow to green colour with mucus.
Score 4	When the consistency of the faeces was watery with a strong odour and a yellow to green colour with traces of blood and mucus.
Score 5	When faeces were fluid with clear colour, mucous, and blood.

Details of different behaviour patterns and ethogram observed are discussed in Table 2 as follows

Table 2: Ethogram for various behaviour and ear postures were as discussed

Behaviour	
Cross-sucking	Calf's mouth contacting any body part of another calf for more than 2 seconds.
Licking inanimate objects	Calf touching its tongue to any element of the pen construction, such as the railing, manger, and floor, and so on.
Self-licking	Calf's repetitive actions of rubbing its tongue to its own body parts.
Play	Interaction between two calves with head butting and furious galloping, interrupted by a quick shift in direction with body rotation and twists.
Standing	Calf's weight is supported by at least one hoof with no body translocation.

Sitting	The calf's flank is in touch with the ground, and none of the hooves are supporting any weight.
Ear posture	
Backward ears	Ears oriented backward with the tip of the ears at an angle more than 30% from the vertical.
Forward ears	Ears oriented forward, loosely hung downwards with the tip of the ear at an angle of more than 30 percent from the perpendicular.
Asymmetrical ears	Ears are oriented in opposing directions; the left ear is oriented backward and the right ear is orientated axially or forwardly, or vice versa (right ear is backward and the left ear is axial or forward).
Axial ears	Ears are straight out to the side and perpendicular to the head-rump axis.

Details of weekly body weight (kg), average daily gain (kg), IgG level (mg/ml) in blood plasma, cortisol level (ng/ml) in blood plasma and incidences of diarrhoea in calves of different treatment groups are discussed in Table 3, 4, 5, 6 and Table 7 as follows:

Table 3: Weekly body weight (kg) of calves in different treatment groups were as follow

Age (week)	Fenceline mother contact (Mean±SE)	Restricted mother contact (Mean±SE)	No mother contact (Mean±SE)
1	30.25±1.04	29.41±1.31	31.47±1.24
2	34.87±1.07	32.60±1.35	33.97±1.25
3	39.31±1.09	35.92±1.34	36.82±1.25
4	43.84 ^a ±1.14	39.36 ^b ±1.27	40.22 ^b ±1.25
5	48.36 ^a ±1.16	42.93 ^b ±1.22	43.93 ^b ±1.24
6	52.63 ^a ±1.18	46.76 ^b ±1.19	47.73 ^b ±1.29
7	56.84 ^a ±1.27	50.67 ^b ±1.11	51.44 ^b ±1.38
8	60.92 ^a ±1.31	54.48 ^b ±1.04	55.00 ^b ±1.38
9	65.27 ^a ±1.28	58.54 ^b ±1.04	58.99 ^b ±1.48

10	69.45 ^a ±1.32	62.41 ^b ±1.06	62.88 ^b ±1.53
11	73.48 ^a ±1.35	66.36 ^b ±1.04	66.85 ^b ±1.63
12	77.25 ^a ±1.38	70.30 ^b ±1.01	70.80 ^b ±1.71
Overall	58.64 ^a ±1.53	52.87 ^b ±1.38	53.62 ^b ±1.38

*Means bearing different superscripts in column differ significantly (P<0.05)

Table 4: Weekly average daily gain (kg) in calves of different groups were as follow

Age (week)	Fenceline mother contact (Mean±SE)	Restricted mother contact (Mean±SE)	No mother contact (Mean±SE)
1	0.66 ^a ±0.02	0.45 ^b ±0.03	0.35 ^c ±0.01
2	0.63 ^a ±0.01	0.47 ^b ±0.07	0.40 ^c ±0.08
3	0.64 ^a ±0.02	0.49 ^b ±0.02	0.48 ^b ±0.02
4	0.64 ^a ±0.01	0.51 ^b ±0.02	0.52 ^b ±0.02
5	0.61 ^a ±0.02	0.54 ^b ±0.02	0.54 ^b ±0.02
6	0.60 ^a ±0.02	0.55 ^{ab} ±0.02	0.53 ^b ±0.02
7	0.58±0.02	0.54±0.02	0.52±0.01
8	0.62 ^a ±0.02	0.57 ^{ab} ±0.03	0.55 ^b ±0.02
9	0.59±0.03	0.55±0.02	0.55±0.02
10	0.57±0.01	0.56±0.02	0.56±0.02
11	0.57±0.01	0.56±0.01	0.56±0.02
12	0.60 ^a ±0.07	0.54 ^{ab} ±0.01	0.56 ^b ±0.01
Overall	0.61 ^a ±0.06	0.53 ^b ±0.06	0.51 ^b ±0.08

*Means bearing different superscripts in column differ significantly (P<0.05)

Table 5: IgG level (mg/ml) in blood plasma of calves in different groups

Age (day)	Fenceline mother contact (Mean±SE)	Restricted mother contact (Mean±SE)	No mother contact (Mean±SE)
0	0.47±0.14	0.50±0.14	0.46±0.14
7	26.48 ^c ±0.85	22.25 ^b ±0.46	19.70 ^a ±0.50
28	23.06 ^c ±0.58	18.59 ^b ±0.21	16.09 ^a ±0.53
42	22.81 ^c ±0.57	18.35 ^b ±0.20	15.97 ^a ±0.50

56	22.85 ^c ±0.59	18.33 ^b ±0.21	15.91 ^a ±0.49
Overall	20.72 ^c ±0.47	17.04 ^b ±0.23	15.09 ^a ±0.31

*Means bearing different superscripts differ significantly (P<0.05)

Table 6: Cortisol level (ng/ml) in blood plasma of calves in different groups

Age (Day)	Fenceline mother contact (Mean±SE)	Restricted mother contact (Mean±SE)	No mother contact (Mean±SE)
0	7.13 ^a ±0.27	12.63 ^b ±0.37	21.50 ^c ±0.46
7	4.55 ^a ±0.25	8.02 ^b ±0.21	14.88 ^c ±0.80
28	2.81 ^a ±0.11	5.96 ^b ±0.26	9.42 ^c ±0.52
42	2.60 ^a ±0.09	5.74 ^b ±0.29	9.22 ^c ±0.50
56	2.43 ^a ±0.05	5.64 ^b ±0.29	8.92 ^c ±0.39
Overall	3.90 ^a ±0.10	7.60 ^b ±0.23	12.79 ^c ±0.48

*Means bearing different superscripts differ significantly (P<0.05)

Table: 7 Incidences of diarrhoea in calves of different treatment groups

Parameter	Fenceline mother contact (Mean±SE)	Restricted mother contact (Mean±SE)	No mother contact (Mean±SE)
No. of animals affected	04	06	08
Diarrhoea score (1-5)	1.50 ^a ± 0.18	2.12 ^{ab} ± 0.35	2.75 ^b ± 0.25
Total duration (days)	2.60 ^a ± 1.03	5.50 ^{ab} ± 1.29	7.87 ^b ± 1.45
Frequency	2.25±0.25	2.60±0.21	2.75±0.50

*Means bearing different superscripts in column differ significantly (P<0.05)