

Comparative studies on kidding and lambing behavioural activities under mixed flock system*

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Received: 1 October 2009; Accepted: 31 December 2009

Key words: Goat, Mixed flock, Parturition behaviour, Parturition signs, Sheep

The overall production and reproduction performance depends on safe, easy and undisturbed expulsion of foetus and foetal membranes. The peri-parturient behaviours of the dam are indicative of extent of ease and safety in delivery of young. Though the parturition events have been studied in details in sheep (Kaushish *et al.* 1973, Alexander *et al.* 1993) and goats (Das and Tomer 1997, Ghosh and Das 2000) under single species flocking condition, the information on peri-parturient behaviours of does and ewes under mixed flock system is not available. The present study was, therefore, planned to study the kidding and lambing behavioural activities and to compare between the species under a different social condition, i.e. mixed flock system.

The present study was conducted at the Sheep and Goat Farm of Livestock Production and Management Section, Indian Veterinary Research Institute, Izatnagar, India. The experimental animals comprised 20 apparently healthy multiparous females of each species under semi-intensive system in one shed, attached with open paddock, which allowed the animals to loiter freely. Throughout the study period of 30 days, the housing and feeding for all the animals was kept identical in the given farm condition. Mean crude protein and total digestible nutrient content of the fodders and concentrate mixture was 16.6 and 67.8%, respectively. The behavioural data collection on 40 pregnant animals was conducted manually by their regular observation during last week of the gestation period. The behavioural parameters studied in goats (Dhiman 2003, Lickliter 1985, Hafez and Hafez 2000) and sheep (Alexander *et al.* 1993, Hafez and Hafez 2000) were documented. The recording was done by 3 observers for 24 h and was kept as unobtrusive as possible. The statistical analysis was done as per the procedures outlined in the sections like descriptive and mean

comparisons of statistical software package (SPSS 2001).

Most frequently occurring physical sign of approaching parturition in does (98%) and ewes (95%) was appearance of prominent spine at tail base. Significantly more ($P < 0.01$) does had thick creamy vaginal discharge 2–3 days prior to parturition as compared to ewes (60% vs 5%). The increase in size of flank hollow as a result of loosening of pelvic ligament was evident in significantly ($P < 0.05$) less number of ewes than does (80 % vs 90 %). The swollen and turgid udder and relaxation of pelvic ligament were among the other important signs in both the species. Among the signs recorded in does, sagged abdomen had the least frequency of 55% while the appearance of thick vaginal discharge was the least frequent sign (5%) in ewes. Isolation seeking (Table 1) was the earliest activity shown before the onset of labour by does (119.7 min) and ewes (93.1 min). The next activity accomplished by does was seeking vertical surface (106.26 min before the onset of labour), but ewes showed restlessness (71.64 min before the onset of labour) and then stopped ruminating (54.10 min before the onset of labour). In does, they stopped rumination 61.34±20.96 min before the onset of labour. The latest activity before onset of labour was frequent vocalization (24.0 min in does and 17.1 min in ewes). The first stage of parturition was significantly ($P < 0.01$) shorter in does than ewes (12.4 vs. 41.3 min). The duration of second stage of kidding was also shorter than that of lambing (16.5 vs 19.9 min). The third stage of kidding took significantly ($P < 0.01$) less time than that of lambing (124.2 vs. 170.7 min). The total parturition time in mixed flock was recorded to be 151.46±8.06 and 243.51±16.15 min in does and ewes, respectively, the difference between two species was significant ($P < 0.01$). The present findings were comparable with earlier observations in goats (Das and Tomer 1997, Ghosh and Das 2000) and sheep (Alexander *et al.* 1993), but their reported values were less than the present figures, which might be attributed to different social conditions. Mothers of either species took a mean time of 1.01–1.44 min after foetal expulsion to start licking the

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Table 1. Time pattern of peri-parturition behavioural sequences in does and ewes (in min)

Activities	Mean $\pm$ SE	
	Doe	Ewe
Stoppage of rumination to onset of labour	61.34 $\pm$ 20.96	54.10 $\pm$ 14.78
Isolation seeking to onset of labour	119.79 $\pm$ 29.06	93.11 $\pm$ 20.95
Intolerance to conspecific to onset of labour	70.54 $\pm$ 33.17	44.95 $\pm$ 17.41
Seeking vertical surface to onset of labour	106.26 $\pm$ 28.87	53.85 $\pm$ 12.90
Restlessness to onset of labour	102.11 $\pm$ 25.69	71.64 $\pm$ 14.96
Frequent vocalization to onset of labour	23.97 $\pm$ 15.92	17.11 $\pm$ 11.82
Frequent postural changes to water bag appearance	62.56 $\pm$ 21.77	46.97 $\pm$ 9.30
Frequent micturation/similar posture to water bag appearance	78.77 $\pm$ 17.11	91.99 $\pm$ 22.73
Onset of labour to intense straining	8.48 $\pm$ 4.49	31.48 $\pm$ 13.22
Intense straining to water bag appearance	4.59 $\pm$ 10.98	7.94 $\pm$ 3.03
Onset of labour to appearance of water bag	12.36 $\pm$ 11.40 ^a	41.32 $\pm$ 13.74 ^b
Appearance of water bag to rupture	4.33 $\pm$ 1.12	4.32 $\pm$ 1.75
Rupture to intense contraction	1.95 $\pm$ 4.12	5.98 $\pm$ 4.13
Rupture to appearance of forelimb	7.35 $\pm$ 9.32	3.94 $\pm$ 1.81
Appearance of forelimb to expulsion of head	5.42 $\pm$ 1.63	6.85 $\pm$ 1.46
Expulsion of head to expulsion of foetus	0.69 $\pm$ 0.18	2.30 $\pm$ 1.00
Appearance of water bag to complete foetus expulsion	16.53 $\pm$ 9.41	19.87 $\pm$ 5.62
Expulsion of foetus to expulsion of placenta	124.16 $\pm$ 6.40 ^a	170.73 $\pm$ 8.54 ^b
Total parturition time (onset of labour to placenta expulsion)	151.46 $\pm$ 8.06 ^a	243.51 $\pm$ 16.15 ^b
Expulsion of foetus to standing	0.70 $\pm$ 0.34	0.63 $\pm$ 0.21
Standing to licking	0.01 $\pm$ 0.35	0.32 $\pm$ 0.13
Expulsion of foetus to licking	1.44 $\pm$ 0.60	1.01 $\pm$ 0.36
Interval between expulsion of 1st foetus and appearance of 2nd foetus	7.13 $\pm$ 2.38 ^a	39.09 $\pm$ 10.28 ^b
Time lapsed between expulsion of 2 foetuses	8.70 $\pm$ 2.49 ^a	44.37 $\pm$ 11.98 ^b

a : b, Means with dissimilar superscripts in each row differ significantly (P<0.01).

newborn. The time interval between the expulsions of 2 fetuses in case of twin births was more in ewes than does (44.4 vs. 8.7 min); very few ewes (only 20%) gave multiple births. But for some differences due to variation in social condition in the present study, i.e. mixed flock, the present findings were almost comparable to the previous findings of Dhiman (2003), Lickliter (1985) and Das and Tomer (1997) in does and those of Alexander *et al.* (1990), Alexander *et al.* (1993) and Fahmy *et al.* (1997) for ewes. It can be inferred that the sheep and goats had almost similar peri-parturient behavioural signs and activities under mixed flock semi-intensive system.

SUMMARY

To study and compare the kidding and lambing behaviour, peri-parturient physical signs and behavioural activities were recorded and compared in 20 multiparous females of each species maintained under mixed flock system. Most common physical sign of approaching parturition was appearance of prominent spine at tail base (98% in does and 95% in ewes). The appearance of physical signs of parturition in does as well as ewes was, by and large, similar under mixed flock, except for thick creamy discharge and increased size and depth of flank hollow that were significantly less in ewes. The total parturition time in does was significantly shorter

than that in ewes (151.46 $\pm$ 8.06 min vs. 243.51 $\pm$ 16.15 min). The sequence of events was isolation seeking in both does and ewes (119.79 min vs. 93.11 min before onset of labour), seeking vertical surface (106.26 min before the onset of labour in does), and restlessness (71.64 min before the onset of labour in ewes). It was concluded that sheep and goats had almost similar peri-parturient behavioural signs and activities under mixed flock semi-intensive system.

ACKNOWLEDGEMENTS

The first author is highly thankful to the Director, National Research Centre on Mithun, Jharnapani, Nagaland and to the Director, Indian Veterinary Research Institute for extending help in taking up such studies. The financial help from Indian Council of Agricultural Research, New Delhi, is duly acknowledged.

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