

Mating behaviour of ram on exposure to estrous ewes*

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ABSTRACT

The experiment was conducted to study the pattern of rams' mating behaviour and its preference for ewe when exposed to multiple estrous ewes. Four rams and four estrous ewes were used for the study. Ewes were shorn and brought to estrus artificially. Different mating activities were noted during one hour mating session. The number of times ewe mated and time spent by ram with ewe were also noted to check the order of preference among the available ewes. Courtship activities were found low with subsequent ejaculation. Depending upon percentage of mounting sessions, number of mounts per session, number of matings per session and time spent by ram with each ewe; the ewes were ranked I, II, III & IV by allotting marks to each parameter. Ewes A, B, C & D ranked I, II, IV & III indicating the preferential mating by the ram among available ewes. It was observed that number of ewes mated per session varied and ram's preference was based on number of times the ewe served and varied from estrus to estrus of the same ewe. It was concluded that preferential mating of rams was found among available estrous ewes, which led to uneven distribution of mating. The number of mounts per hour and ejaculation per hour increased when ewe number in the mating pen increased.

Keywords: Estrous, Ewe, Mating, Preference, Ram

INTRODUCTION

Generally one ram for 30-40 ewes is kept for mating in the flock with the assumption that each ewe in the flock will get equal opportunity to be mated during the limited breeding season under range condition. However, preferential mating in flock conditions can have quite considerable consequences in farm economics.

Ram sexual behaviour, mainly under controlled flock conditions, had been studied by several workers (Hulet *et al.*, 1962 a, b; Banks, 1964; William and Clegg, 1965; Patel *et al.*, 2005 a, b). The number of copulation is greatly affected by individuals, climate, time at which the rams are introduced into pen and number of estrous ewes (Lambourne 1956). In pen mating studies where rams have been presented with a number of ewes in estrus at the same time, the rams have displayed clear mating preference for particular ewes (Tilbrook, 1987). Synnott and Fulkerson (1984) found that preferred ewes at one estrus were not necessarily those "most preferred at a subsequent estrus, which suggests that the elements of attractiveness" may not be stable. Although total number of matings increased as the number of estrous ewes increased, number of matings per estrous ewe declined (Hulet *et al.*, 1962a; Hohenboken and Schreffler, 1973) and total number of ejaculations per ram increased, which led to uneven distribution of matings.

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The sexual attractiveness of the ewes was not significantly related whether or not the ewes had been previously exposed to rams or to the immediate mating history of the ewe or dose of estradiol benzoate (Tilbrook and Lindsay, 1987). The soliciting behaviour of the ewes had less influence on whether or not they were mated than did the ram's mating preference (Tilbrook, 1987).

Keeping these things in mind, this experiment was designed to study the pattern of mating behaviour and to check the preference for ewe by rams when exposed to four shorn estrous ewes.

MATERIALS AND METHODS

To study mating behaviour of ram and its preference for ewe when exposed to multiple estrous ewes, four intact, healthy and sexually experienced Muzaffarnagari rams aged 2 to 3 years were selected. Rams and ewes used in this study were maintained under standard feeding and managerial conditions. Four healthy, sexually matured, shorn ewes of similar age group and body weight were ovariectomized and artificially brought to estrus every 6th day after the protocol of Kilgour and Whale (1980). On the first and third day, 25 mg of progesterone (Proluton Depot, German Remedies) and on fifth day, 200 to 250 mg of oestrogen (Oestrogen, Mac. Millan) were administered by deep intra-muscular route. Ewes were observed for estrus using teaser ram. Although all four ewes were given the same hormonal treatment, some ewes showed lesser estrus response while others showed intense estrus, which necessitated the standardization of the dose of oestrogen for each ewe.

All the experiments were conducted in the observation pen having the area of 4m X 3m. On the day of testing, individual ram was exposed to a group of 4 estrous ewes (all in same stage of acceptance) in a pen. The observations were made for recording mating activities like sniffing, vocalization, leg kicking, Flehmen's reaction, mounting, ejaculation and refractory period for each ram continuously for 60 min.

In addition, the ram's preference for a particular ewe amongst the group was observed through following parameters: (a) number of times mounted (b) number of times mated and (c) time spent by ram with individual ewe (s) in any of the three conditions:

- i) Ram's head was closest to rump of the ewe provided he was within half a body length.
- ii) Standing closely behind the ewe.
- iii) Standing and facing a particular ewe (looking towards the ewe)

However, in some situations it was difficult to judge the preference of ram like;

- a) More than one ewe surrounded the ram closely.
- b) Ram stood behind 2 ewes and did not show any interest toward any.
- c) Ram standing parallel between the two ewes and in close touch to both ewes. The time spent by ram on such condition was considered as unclassified time. The session with >20% unclassified time was repeated.

Frequency and the mean intensity of each mating activity were calculated as follows:

$$\text{Frequency (\%)} = \frac{\text{No. of mating sessions in which activity was exhibited}}{\text{Total number of mating sessions}} \times 100$$

$$\text{Mean intensity} = \frac{\text{Total number of occurrence of the activity}}{\text{No. of mating sessions in which activity was exhibited}}$$

Each ram, was tested with same group of ewes on 3 occasions and all 4 available rams were used for the observations.

RESULTS AND DISCUSSION

Frequency (%) and mean intensity of mating activities of rams exposed to multiple estrous ewes are presented in Table I. Frequency of different courtship activities were found low before 1st ejaculation in comparison to subsequent ejaculations. Vocalization and leg kicking along with vocalization were the most important teasing activities which occurred in more than 77 per cent and 88 per cent of the mating sessions, respectively. Mean intensity of vocalization increased with each successive ejaculation. In the second and subsequent ejaculations, sniffing frequency varied from 45 to 65 per cent and mean intensity ranged from 2.5 to 2.8 whereas both frequency and intensity of leg kicking were more or less same except the mean intensity at third ejaculation. Behavioral activities like urination and nudging were absent before 1st ejaculation, thereafter an increasing trend in the frequency was observed with successive ejaculations. Incidence of false mounting was observed in less than 1/5 of the total session whereas mounting occurred in more than 65 per cent of the mating sessions with intensity ranging from 2.8 to 7.6. Mounting activity was exceptionally high with fifth ejaculation. Number of ejaculations ranged from 4.66 ± 0.47 to 11.00 ± 1.41 with an average number of 6.77 ± 2.16 ejaculations per one hour of mating session. No reference was available in the literature to compare the present findings.

Ram Preference Ranking

The preference ranking of ewe based on ram's response is represented in Table II. To identify the ram preference, the ranking of ewes was done on the basis of: (1) percentage of mounted sessions, (2) number of mounts per session, (3) number of mated sessions, (4) number of matings per session and (5) time spent by rams with each ewe. All four ewes were tested with individual rams in three separate mating sessions, thereby each ewe was tested 12 times during the trial. Percentage of mounted sessions for A, B, C and D ewes was 91.60, 83.33, 75.00 and 83.33 per cent, respectively and ewes were ranked as I, IV, III and II respectively. The number of mounts per session for A, B, C and D were 5.81, 1.90, 1.22 and 15.60 and ewes were ranked as II, III, IV and I, respectively. Similarly the percentage of mated session for A, B, C and D ewes were 75.00, 100.00, 66.60, 41.66 per cent with respective ranks of and ewes were ranked II, I, III and IV and number of matings per session was 2.80, 1.91, 2.50 and 2.00 with ranks of I, IV, II and III, respectively. Likewise the time spent by rams with A, B, C and D was 12.95, 15.38, 5.30 and 15.28 min. respectively and ewes ranked as III, I, IV and II, respectively.

The five rankings of each ewe were combined to make their preference ranking. For combining the rankings, each rank was given a score (viz., Rank I = 40, Rank II = 30, Rank III = 20, Rank IV = 10). Thereby aggregate score of A, B, C and D ewes were 170, 140, 80 and 110, respectively. The aggregate score revealed that 'A' ewe was most preferred, followed by B, D and C ewes. The results of preferential mating by rams were in conformity with the reports of Jennings and Crowley (1972), Synnott *et al.*, (1981) as well as Synnott and Fulkerson (1984). The number of ewes mated per session varied from session to session. Out of 12 sessions, all the four ewes mated in 25 per cent of the mating session; whereas three ewes mated in 42 per cent and 2 ewes in the remaining sessions of the mating session. Synnott *et al.*, (1981) also found that, when ram confined to pens with eight estrous ewes achieved an average of 12 ejaculations per day but those were distribution among only five ewes.

During the study, it was observed that ram preference was based on the number of times ewe served and varied from estrus to estrus of ewe. The finding is in conformation to the results of Synnott and Fulkerson (1984) who also reported that preferred ewe at one estrus was not necessarily the most preferred one at a subsequent estrous. But this is at variance with the results of Tilbrook and Lindsay

(1987) who reported that not only did all rams find ewes of similar attractiveness with one estrus, but the attractiveness of the ewes did not vary from one estrus to next. This important difference in results of the experiment and that of Tilbrook and Lindsay (1987), could be due to the difference in experimental procedure; *i.e.* terminating the experiment after ram spending 5 min. with any ewe, against one hour in the present trial.

It was concluded that preferential mating of ram among available estrous ewes, led to uneven distribution of mating. Number of mounts/hr and ejaculation/hr increased when the number of ewe in the mating pen increased.

Table I: Frequency (%) of mating activities in rams exposed to multiple estrous ewe

Activity	I	II	III	IV	V
	Ejaculation	Ejaculation	Ejaculation	Ejaculation	Ejaculation
Sniffing	27.77 (1.40)	66.66 (2.75)	55.55 (2.70)	44.44 (2.00)	53.33 (2.12)
Vocalization	55.55 (4.90)	77.77 (5.01)	88.88 (9.62)	94.44 (11.94)	100.00 (15.13)
Leg kicking	55.55 (3.00)	38.88 (3.00)	38.88 (6.00)	38.88 (3.71)	40.00 (3.00)
Leg kicking with vocalization	61.11 (2.90)	94.44 (6.82)	94.44 (9.58)	88.88 (10.5)	100.00 (9.06)
Flehmen reaction	22.22 (1.00)	27.77 (1.20)	38.88 (1.00)	22.22 (1.50)	46.66 (1.71)
Urination	-----	5.55 (1.00)	22.22 (1.25)	38.88 (1.14)	33.33 (1.00)
Nudging with head	-----	5.55 (5.00)	16.66 (3.33)	50.00 (2.55)	53.33 (5.12)
False mounting	16.66 (1.00)	22.22 (1.25)	22.22 (1.00)	11.11 (1.00)	6.66 (1.00)
Mounting	72.22 (2.84)	50.00 (4.44)	72.22 (3.36)	66.66 (3.58)	86.60 (7.61)

Figures in parentheses indicate the mean intensity

Table II: Preference ranking of ewe based on rams' performance

Ewes	No. of testing sessions (a)	No. of mounting sessions (b)	Percentage of mounted session $(\frac{b}{a} \times 100) 100$	No. of times ewe mounted	No. of mounts per session
A	12	11	91.60	64	5.81
B	12	10	83.33	19	1.90
C	12	9	75.00	11	1.22
D	12	10	83.33	156	15.6

Ewes	No. of mated sessions (c)	Percentage of mated sessions $(\frac{c}{a} \times 100) 100$	No. of times ewe mated	No. of matings per session	Time spent by ram with each ewe (min.)
A	9	75.00	26	2.80	12.95
B	12	100.00	23	1.91	15.38
C	8	66.66	19	2.50	5.30
D	5	41.66	10	2.00	15.28

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