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EFFECT OF GROUP MATING SCHEMES ON LAMB GROWTH PERFORMANCE

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ABSTRACT

The study was aimed to determinate the effect of group mating scheme on lamb growth performance. Rams, representing different group mating scheme, were assigned to mate 60-80 ewes per a ram for a 45-day breeding period. In group mating scheme, each ram is placed in a separate pasture with a group of ewes gathered from participating herders involved in group breeding during mating season. The average birth, weaning and post weaning weight for lambs from the group mating of selected rams to selected ewes involved in the study were 4.4, 33.8 and 40 kg for male lambs and, 4.3, 29.8 and 35.7 kg for ewe lambs respectively. These figures indicate that progeny of that group mating scheme were 0.5 to 6.3 kg for male lambs and 0.6-5.5 kg for ewe lambs heavier than progeny of group mating of selected rams to randomly allocated ewes at different age of growth (P <0.05). Mean values of birth, weaning and post weaning weight of progeny for control group mating were lower (P < 0.05) than those of the progeny for all other groups of mating.

KEY WORDS: group mating, progeny, weaning and post weaning weight.

INTRODUCTION

It is not necessarily the case; a nucleus herder/farmer may have inferior females as well. In that case the nucleus herder/farmer may identify his "best" females and mate only these with "best" males, or he may mate all his females with "best" males but consider for selection only the progeny of "best" females. There are three options to be run a controlled mating: mating of selected animals in a fenced area; mating of selected animals by separate grazing; and artificial insemination or hand mating of selected females. In group mating scheme, each ram is placed in a separate pasture with a group of best ewes and hogget gathered from participating herders involved in group breeding during mating season. This allows stud herders to know exactly which lambs were sired by each ram. This system can be used on farms where sheep numbers are small or even large numbers of sheep if there are enough small camps and grazing land. Usually 60 to 80 ewes are placed with each ram, depending on the age and ability of the ram. Selection should be conducted on the progeny of ewes included in the group mating scheme and rams for breeding will be selected as replacements.

MATERIALS AND METHOD

This study was initiated to determine the body weight advantage of selected on-farm rams mated to selected group of ewes including no ewe selection one. The experimental procedure for mating is shown in Table 1. Rams and ewes of mating groups were selected based on a body weight and visual appraisal before mating period. Rams, representing different group mating scheme were assigned to mate 60-80 ewes per a ram for a 45-day breeding period. In group mating scheme, each ram is placed in a separate pasture with a group of ewes gathered from participating herders involved in group breeding during mating season. This allows herders to know exactly which lambs were sired by each ram. Nine participating herder flocks provided ewes for this study. Flock management practices were not modified other than to collect complete production records on the ewes and their offspring. Information collected during this study included ram and ewe body weight before mating season, birth, weaning and post weaning weight. Experiment was performed in Sartuul breed of Mongolian sheep bred in Yaruu and Erdenekhairkhan soums of Zavkhan province for 2014-2015.

Statistical analyses

All data were analyzed using ANOVA procedure outlined by Cameron N.D. (1997).

Table1.

Experimental procedure for group mating

Ram ID	Flock code	Location: aimag and soum	No. of partici-pating flocks	Group mating scheme for ram	ewes
300920	Flock_1	ZavkhanYaruu	3	Selection	Selection
300320	Flock_2	ZavkhanYaruu	3	Selection	Selection
300061	Flock_3	ZavkhanErdenekhairkhan	1	Selection	No selection
300161	Flock_4	ZavkhanErdenekhairkhan	1	Selection	No selection
300250	Flock_5	ZavkhanErdenekhairkhan	1	No selection	No selection

RESULTS

Based on the limited number of rams evaluated in this study, it appears that ram selection based on a combination of body weight and external appearance can be used to adequately identify superior sires for sheep flocks. Data from this study indicate an economically important advantage in lamb growth for selected rams and ewes for high body weight (Flock_1 and Flock_2) compared to that for rams selected for body weight only (Flock_3, and Flock_4) including Flock_5 (control) where no ram and ewes selection for body weight is occurred (Table 2.). Pre- and post weaning growth performance is shown in Table 2. for the progeny. Lamb weaning and post weaning weight was statistically different for the progeny of various group mating scheme. The average birth, weaning and post weight for lambs from the group mating of selected rams to selected ewes on the study were 4.4, 33.8 and 40 kg for male lambs and, 4.3, 29.8 and 35.7 kg for ewe lambs respectively. Theses figures indicate that progeny of that group mating scheme were 0.5 to 6.3 kg for male lambs and 0.6-5.5 kg for ewe lambs heavier than progeny of group mating of selected rams to randomly allocated ewes at different age of growth (P <0.05). Mean values of birth, weaning and post weaning weight of progeny for control group mating were lower (P < 0.05) than those of the progeny for all other groups of mating. The data for flocks for the group mating of selected rams to selected ewes strongly support the rams as the superior sires for progeny growth performance at all stages of growth (P<0.001). Pre weaning growth differences are expected to be more reflective of maternal traits, such as milk production, than sire effects. Differences in post weaning performance would most accurately reflect the genetic contribution from the sire. The variation across flocks was large as might be expected with various ewe types and management systems represented by the different flocks.

DISCUSSION

The sheep breeding structure in the country can be best described as a one-tier structure, with herders. Most sheep herders practice selection of replacement stock within their flocks, with a limited exchange of breeding stock between flocks. Uncontrolled mating occurs among animals of different flocks in soum and bag due to communal grazing. This uncontrolled gene flow between flocks and the relatively small flock sizes hampers the efficiency of within-flock selection by individual producers. Group mating schemes based on genetic evaluation across flocks assumes uniformity of environmental effects within a given location. Our survey on flock management practices showed that flocks within a soum are mainly managed in communal grazing areas. Furthermore, little variation is observed among herders in the health care and supplementary feeding for sheep in the study area. Flocks in such a place could thus be virtually considered as one large flock. Under these rather uniform conditions, selection of animals based on phenotypes recorded within a village seems appropriate. Based on our survey, a feasible group mating scheme is one based on mass selection, since pedigree recording is absent or incomplete under local conditions (Table 2). We found that group mating schemes could result in reasonable genetic progress. It is clear that a rate of inbreeding in the sheep population can be reduced without affecting response to selection by increasing the number of herders households cooperating in the group mating program (across-flock schemes), thereby increasing the pool of candidates for selection. However, implementation of a cross-flock scheme can be constrained by the absence of genetic links between sires in different flocks needed for evaluating sires across flocks. In this study, it is assumed that sire exchange between flocks would be practical to establish the genetic links between sires across flocks. Lewis and Simm (2000) suggested that once a sufficient proportion of ewes in flocks (10–20%) are mated to reference sires, a scheme effectively operates as large panmictic population, allowing for a more reliable genetic evaluation of animals across-flock. Ram exchange among cooperating sheep households will be found to reduce the rate of inbreeding, which is consistent with earlier findings on various rotational ram exchange schemes (Caballero et al., 1996; Shepherd and Williams, 2004). Design and implementation of livestock breeding programs in the country need special considerations since the breeding structure is not well defined. A herder's group -based scheme appears to be more acceptable and successful since the program is owned and managed by the communities.

CONCLUSION

The results indicate that substantial genetic gain can be made by group mating scheme especially including mating of selected sire to selected ewes during mating season under pastoral condition of the country.

RECOMMENDATIONS

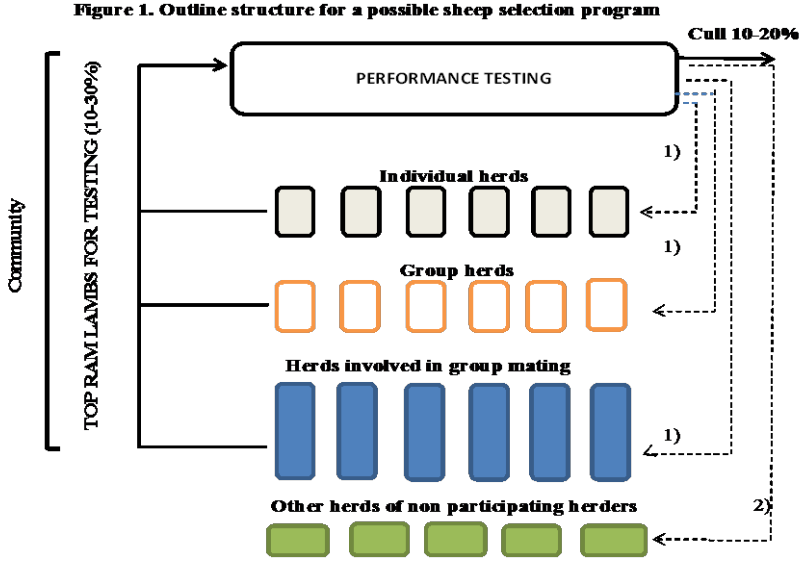
For practical reasons, it is difficult for the individual herders and those involved in group herd or group mating scheme to raise male candidates till final selection under pastoral herding practice of the country. If this is the case a useful recommendation (alternative) could be to gather male candidates shortly after weaning at a "performance testing". Such a center may belong to the herders groups or coops itself and private entity or may be facilitated by the state and an external organization (Figure 1).

Table 2

Progeny lamb performance

Ram ID	Flock code	Sex	Birth weight, kg	Weaning Wt, kg	Post weaning Wt, kg
300920	Flock_1	m	4.3±0.05	29.5±0.44	38.6±0.38
		f	4.3±0.04	26.2±0.42	34.5±0.36
300320	Flock_2	m	4.4±0.06	38.2±0.45	41.4±0.37
		f	4.3±0.05	33.4±0.43	36.9±0.38
Mean for the group mating of selected rams to selected ewes		m	4.4±0.05	33.8±0.44	40.0±0.37
		f	4.3±0.04	29.8±0.43	35.7±0.37
300061	Flock_3	m	3.9±0.06	30.2±0.55	33.7±0.36
		f	3.8±0.05	29.9±0.52	33.5±0.35
300161	Flock_4	m	4.0±0.06	31.0±0.57	34.6±0.37
		f	3.7±0.05	29.1±0.54	33.3±0.35
Mean for the group mating of selected rams to randomly allocated ewes		m	3.9±0.06	30.2±0.56	33.7±0.37
		f	3.7±0.05	29.2±0.53	32.8±0.35
The group mating of rams to randomly allocated ewes (Control group: Flock_5)		m	3.8±0.05	28.0±0.44	31.3±0.34
		f	3.7±0.04	27.0±0.42	30.2±0.34

Figure 1. Outline structure for a possible sheep selection program



1)- First category rams (10-20%)
2) - Second category rams (40-60%)

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