

EFFECT OF RAM EXPOSURE ON ESTRUS SYNCHRONIZATION AND CONCEPTION UNDER TWO SYSTEMS OF FEEDING STRATEGIES IN NARI SUWARNA EWES

B.M. RAVINDRANATH *, V.CHANDRASHEKARA MURTHY AND A. KRISHNASWAMY

Dept. of VGO, Veterinary College, KVAFSU, Bangalore -24

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ABSTRACT

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The present study was aimed to investigate the effect of ram presence on estrus characteristics in NARI Suwarna ewes. Forty eight ewes were equally divided into two groups as per the type of feeding management. Ewes in each group again divided into two subgroups (n=12), according to the presence or absence of ram during estrus synchronization protocol by using progesterone intravaginal sponges for 12 days. The time taken for onset of estrus, duration of estrus and conception rate in presence and absence of ram was 24.99±0.61 h and 28.63±0.97 h; 34.57±1.26 h and 39.68±1.35 h and 83.3 % and 75 % respectively under scientific feeding. Similarly, 27.54±1.13 h and 30.94±1.11 h; 35.11±1.97 h and 40.31±2.26 h and 75 % and 66.6 % for onset of estrus, duration of estrus and conception rate in presence and absence of ram respectively under pasture grazing. Further, it was concluded that the presence of ram significantly reduced the time of onset of estrus but not the duration of estrus and conception rate in both the groups.

Keywords: NARI Suwarna, Ram effect, Estrus and conception

The duration of seasonal anoestrous in the ewe may be modified by introduction of males to the flock, a process usually known as male effect, which is a suitable tool for out-of season estrus induction mainly because of its low cost. In anoestrous ewes that have been isolated from rams, introduction of males commonly induces a rise in LH pulse frequency within few minutes. This pattern of LH release causes ovulation, usually within 1 to 2 days of ram introduction.

The ram effect is used to manipulate reproduction to advance puberty, advance the breeding season and provide some degree of estrus synchronization late in anestrus (Martin *et al.*, 1986). The use of ram exposure during the breeding season has been limited to studies where rams are introduced after progestagen sponge withdrawal in an attempt to

increase the synchrony of estrus and ovulation (Lucidi *et al.*, 2001). Walkden-Brown *et al.* (1993) found that bucks that had been at a high level of nutrition were more effective in stimulating anoestrous does to ovulate than bucks at a low level of nutrition. However, in rams nutritional status does not influence serving capacity or the ability to induce ovulation (Fisher *et al.*, 1995).

Exposure of ewes to rams has profound effects on their reproductive physiology and therefore the objective of the present study was to examine the effects of ram exposure in estrus synchronized NARI Suwarna ewes, on some of the estrus characteristics and conception rate under two systems of feeding management.

Experiment was carried out to examine whether, the introduction of an adult intact ram during the estrus synchronization protocol would enhance the reproductive response of ewe in terms of time taken for onset of estrus, duration of estrus and conception rate of NARI Suwarna ewes maintained under two different systems of feeding, namely scientific feeding and pasture grazing.

*Corresponding Author,
email: ravi_bm565@yahoo.co.in ,
Asst. Professor, Dept. of TVCC, Veterinary
College, Bangalore.
Part of Ph.D. work of the first author

The study was conducted on two groups of twenty four ewes each, one group had been maintained on scientific system of feeding and management, while the other on pasture grazing. Ewes in both the groups were subjected to estrus synchronization protocol using progesterone impregnated intravaginal sponges. Following random selection of ewes, intravaginal sponge containing 350mg of natural progesterone procured from Central Sheep and Wool Research Institute (CSWRI), Avikanagar, Rajasthan was introduced using an applicator deep in to the vagina. The treatment was carried out irrespective of the stage of the cycle. The sponge was allowed to remain in the vagina for the next 12 days. The sponge was removed on 12th day. Forty eight hrs prior to sponge removal, each animal received an intramuscular injection of 125 µg of synthetic prostaglandin (cloprostenol) and intramuscular injection of 500 IU of Pregnant Mare Serum Gonadotrophin (PMSG). Twenty four hrs after the sponge removal a vasectomized ram was left along with the treated animals 3 times a day with each session lasting for 10 to 20 minutes to identify and segregate the animals identified to be in estrus by the vasectomized ram. An adult intact ram was introduced to the flock of animals subjected to estrus synchronization and was allowed to remain with the flock 24 hrs a day for 12 days (Until sponge removal). However, the ram was tied in the vicinity of the female flock even after sponge removal and females could continuously visualize the male even after sponge removal. Following sponge removal, the identification of estrus was carried out using a vasectomized ram to determine the time of onset of estrus after the sponge removal as well as the duration of estrus. All the animals identified by the vasectomized ram were artificially inseminated about 15 hrs after the onset of estrus and were subjected for pregnancy diagnosis between day 35-40 of post insemination.

Mean and standard errors were calculated for continuous variables and proportions were calculated for discontinuous variable. The comparison of means of two different classes was done by Students't' test with assumption of equal variance and Chi-square

test was used for comparison between proportions. In both the tests a statistical significance was considered at $P \leq 0.05$.

The introduction of ram during the estrus synchronization protocol significantly shortened the time taken for the onset of estrus. In the group of ewes exposed to ram effect, the time taken for onset of estrus was recorded as 24.99 ± 0.61 hrs after the sponge removal and in the absence of ram, it was recorded as 28.63 ± 0.97 hrs. The duration of estrus, however, did not seem to be influenced by the presence or absence of ram during the synchronization protocol when the animals were maintained under balanced feeding. The duration of estrus was recorded as 34.57 ± 1.26 hrs and 39.68 ± 1.35 hrs in the presence and absence of the ram respectively. The conception rate also did not seem to be influenced by the presence of ram during the synchronization protocol, when the animals were maintained with a balanced diet. A conception rate of 83.33% and 75% was recorded in the presence of ram and absence of ram respectively, in groups of ewes maintained with a balanced diet.

The presence of ram also significantly reduced the time taken for the onset of estrus in animals maintained under pasture grazing. The time taken for onset of estrus in the presence of ram was recorded as 27.54 ± 1.13 hrs and 30.94 ± 1.11 hrs in the absence of ram.

The duration of estrus, however, was not influenced by the presence or absence of ram during the estrus synchronization protocol in the group of ewes maintained under pasture grazing. The duration of estrus was recorded as 35.11 ± 1.97 hrs and 40.31 ± 2.26 hrs in presence and absence of ram respectively.

The conception rate also did not seem to be influenced by the presence of ram in animals which were pasture grazed and it was recorded as 75% and 66.6% in presence and absence of ram respectively and the difference was not statistically significant.

The reproductive response of anestrus ewes to the introduction of rams (Ram effect) has long been established (Underwood *et al.*, 1944). The ram effect is useful and suitable tool for enhancing reproductive efficiency in sheep because its cost is negligible (Martin *et al.*, 1986). There have been suggestions that, the ram effect may elicit two different responses: advancing the breeding season and a high ovulation rate (Cognie *et al.*, 1982). Ram introduction is believed to result in a sustained increase in LH secretion by way of increased LH frequency (Gordon, 1997). The LH pulse frequency was recorded to increase within minutes of ram introduction (Martin *et al.*, 1980). It has also been shown by Atkinson and Williamson, (1985) that the ram was capable of stimulating ovarian follicular development in anestrus ewes when the concentration of gonadotrophins was low. Oldham *et al.* (1979) observed that ewes stimulated by the ram effect apparently experienced a preovulatory LH surge similar to that of spontaneously ovulating sheep and have been observed to ovulate about 40 hrs after exposure to the male. It was suggested by Martin *et al.*, (1980) that ram induced ovulation occur because their lowering of the sensitivity of the hypothalamus to the negative feedback effect of estrogen permitting an increased LH frequency.

In view of the stimulatory effect of the ram, many reports of induction of fertile estrus by using the ram effect has been reported in the literature (Hawken *et al.*, 2008; Ergul ekiz *et al.*, 2009). There have been reports which indicate that ewes subjected to ram stimulus for several months adapted to stimulus occur and such sheep apparently becomes less sensitive to stimuli (Lishman, 1975). It is widely held that the male effect is not much useful in cyclical females (Gordon, 1997). However, it has been found that the introduction of teaser ram can even override the effect of luteal progesterone resulting in more robust response in sheep. Therefore, in the present study the ram was introduced in to a group of ewes subjected to estrus synchronization protocol for a period of 12 days using intravaginal progesterone sponges. It was also the aim of the study to determine, if there was

an interaction between the ram effect and the type of nutrition on which the ewes were being maintained.

In the present study, the onset of estrus was significantly shorter following the withdrawal of intravaginal progesterone sponges in the group of ewes subjected to the ram effect. This phenomenon was observed in ewes maintained under balanced sheep feed as well as in ewes maintained under pasture grazing. However, the duration of estrus did not appear to be influenced by the ram effect. The accelerated onset of estrus in group of ewes exposed to rams suggests that, the introduction of ram may stimulate rapid ovarian follicular development and maturation as suggested by Atkinson and Williamson (1985). In the present study, the conception rate, on the other hand did not seem to be influenced by the ram effect.

Moor. (1988) and Gordon (1997) suggested that, continues presence of ram during anestrus season may modify the sensitivity of neural mechanisms mediating estrus behavior. These observations may suggest that, the duration of exposure of ewes to the ram effect is critical and obviously while continued exposure of the ewe to the ram may not be advantageous as is done by the farmers. A shorter duration of exposure of the male to the ewes may be beneficial. However, a 12 days exposure as was carried out in the present study was perhaps too long particularly in cycling animals. The results of the present study suggests that farmers should ensure that the rams are well and securely separated from the ewes and exposed them to ewes during the beginning of breeding season.

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