Conception Rate and Frequency of Single and Multiple Births in Estrus Synchronized Nari Suwarna Ewes Maintained Under Two Different Systems of Feeding Strategies

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Abstract

The purpose of this study was to investigate the conception rate and frequency of single and multiple births in estrus synchronized NARI Suwarna ewes maintained under two different systems of feeding strategies. Fifty adult ewes of same age were randomly divided into two groups as per the type of feeding management. Ewes in both the groups were subjected for estrus synchronization protocol for 12 days by using intravaginal progesterone sponges with PGF₂α and PMSG. Ewes were inseminated with freshly collected & diluted semen and pregnancy was diagnosed with the aid of ultrasonography 30 days of post AI. The mean conception rate recorded was 83.3% & 55% for scientific feeding and pastures grazing respectively. Similarly, single & multiple births recorded were 20% & 80% and 45.45% & 54.55% for scientific feeding and pasture grazing respectively. In conclusion, significantly higher (83.3%) conception rate and multiple births (80%) were observed in ewes maintained under scientific system of feeding than pasture grazed ewes.

Key words: Conception, Multiple Births, Ewes, Scientific Feeding, Pasture Grazing

Introduction

Nutrition is one of the most important factors that influence the fertility of sheep. Flushing is understood as the rapid increase in ovulation rate of ewes receiving a nutrient supplementation before mating (Branca, et al., 2000). Poor nutrition may cause irregular cycles in females, reduced ovulation, weak offspring, and reduced twinning (Forcada and Abeica, 2006). The amount of food given to ewes immediately before fertilization is also of considerable importance. Experiments have shown that, if at that stage, given to ewe a generous plane of nutrition she is likely to shed more eggs than normal and results in higher lambing percentage by increasing the number of twin births (Lassoued et al., 2004). “Flushing”, around the time of mating improves reproductive performance (El-Hag et al., 1998). The role of nutritional flushing should not be ignored, especially where estrus is included and multiple births are
the result. Nutrition has an important impact on the reproductive performance in sheep, but the magnitude of the effect may vary with the season (Molle et al 1997).

The objective of the present study was, therefore, to investigate the rate of conception and frequency of single and multiple births in estrus synchronized NARI Suwarna ewes maintained under two different systems of feeding strategies.

**Materials and Methods**

Fifty adult Nari Suwarna ewes of same age group (1.5 to 2 Years) were randomly divided into 2 groups. All the ewes were vaccinated against Foot and Mouth, Enterotoxemia, Peste des petits ruminants and Black Quarter diseases and also dewormed once in 3 months using broad spectrum anthelmintics. Ewes in group I (n=30) were received approximately 250g of balanced sheep feed, comprising of yellow maize (45%), soybean meal (15%), wheat bran (35.5%), salt (2%) and mineral mixture (2%) daily as per the recommendations described by Brown, (1994). In addition to the concentrate feed, ewes were fed with *ad lib* ragi straw and water. Ewes in group II (n=30) did not receive any concentrate feed or mineral mixture and were allowed to graze in the field for a period of 10 hrs daily and these ewes were maintained under pasture grazing throughout the period of study. Further, ewes in both the groups identified to be in estrus were artificially inseminated (AI) using freshly collected and diluted ram semen of the same breed.

All the inseminations were carried out at approximately 12 hrs after the identification of estrus and ewes were artificially inseminated only once. Those ewes not returning to estrus were subjected to pregnancy diagnosis between 30-35 days of post AI using ultra sound scanner. Following lambing, frequency of single/multiple births in ewes were recorded. Multiple births were further categorized as twins, triplets and quadruplets. Chi square was used to study the significance difference in the conception rate and frequency of multiple births between ewes maintained under two different systems of feeding strategies.

**Results and Discussion**

The Conception rate to artificial insemination carried out at approximately 15 hrs after the detected estrus was significantly higher in ewes fed with a balanced diet (Table.1, Fig.1) and was nearly 28% higher than the conception rate observed in ewes maintained under pasture grazing. The mean conception rate in estrus synchronized ewes which were maintained on a balanced feed or pasture grazing was recorded as 83.3% and 55% respectively.

The frequency of multiple births was significantly higher in ewes maintained with a balanced feed as compared to the frequency in ewes which were maintained on pasture grazing only (Table.1 & Fig.1). The frequency multiple births was recorded as 80% in ewes maintained on a balanced feed & this was
about 25% more than the incidence of multiple births (54.55%) recorded in ewes maintained on pasture grazing.

Table 1 - Conception rate and frequency of single and multiple births in estrus synchronized NARI Suwarna ewes maintained under two different systems of feeding strategies.

<table>
<thead>
<tr>
<th>Particulars (n=25)</th>
<th>Scientific feeding</th>
<th>Pasture grazing</th>
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</thead>
<tbody>
<tr>
<td>No. of ewes inseminated</td>
<td>24(96%)</td>
<td>20(80%)</td>
</tr>
<tr>
<td>Conception rate</td>
<td>83.3%&lt;sup&gt;A&lt;/sup&gt; (20)</td>
<td>55%&lt;sup&gt;B&lt;/sup&gt; (11)</td>
</tr>
<tr>
<td>Single births</td>
<td>20.00%&lt;sup&gt;A&lt;/sup&gt; (4)</td>
<td>45.45%&lt;sup&gt;B&lt;/sup&gt; (5)</td>
</tr>
<tr>
<td>Multiple births</td>
<td>80.00%&lt;sup&gt;A&lt;/sup&gt; (16)</td>
<td>54.55%&lt;sup&gt;B&lt;/sup&gt; (6)</td>
</tr>
</tbody>
</table>

The values in rows with different superscript differ significantly at α = 0.05%

Fig 1 - Conception rate and frequency of single and multiple births in estrus synchronized NARI Suwarna ewes maintained under two different systems of feeding strategies.

The conception rate to AI carried out during estrus observed following removal of vaginal sponge was recorded as 83.3% in the group of ewes maintained with a balanced feed (Table 1). A conception rate of 78% was reported by Das et al. (1998) following AI in ewes treated with intravaginal sponges containing...
350 mg of progesterone for 12 days followed by 200 IU of PMSG. In another trial, Das et al. (1998) reported a conception rate of 80% with natural matings in maiden ewes treated with intravaginal sponge containing 350 mg of progesterone. Several other reports have also indicated the conception rate following sponge removal to be around 70-80% (Khan et al., 2007).

Zonturlu et al. (2011) reported that conception rates were 82.35, 80.0 and 82.60 per cent in Awassi ewes with natural mating treated with intravaginal sponge containing 30 mg of FGA left in place for 12 days followed by intramuscular injection of 300, 400 and 500 IU of PMSG, respectively at the time of sponge removal during transition period in Turkey.

Garole breed of sheep, which is found in hot and humid region of southern parts of West Bengal produces multiple offspring in one lambing. This breed has an adult body weight of 10-14kgs with, 7.3% single births, 65.45% twins, 21.8% triplets and 5.45% quadruplets (Nimbkar et al. 1998). Verma et al (2002) reported that, single and multiple births in non-prolific breeds of Marwari and Bharat sheep were 96% & 4% and 94% & 6% respectively. Casellas and Caja (2014) reported single, 81.09%, twins, 18.41%, triplets, 0.47% and quadruplets, 0.02% in purebred Ripollesa ewes after AI.

Reports of a lower conception rate following natural mating or AI during estrus observed following withdrawal of progesterone sponge is also available in the literature (Mousavy et al., 2009). However, very few studies have indicated the plane of nutrition on which the ewes were maintained during the course of experimentation. The present study has indicated that, it is possible to obtain a conception rate 80-90% to AI provided the ewes are maintained on balanced feed. The effect of nutrition on the conception rate was evident in the group of ewes maintained under pasture grazing. The conception rate recorded in this group was about 28% lower than those observed in ewes maintained with a balanced feed.

Gunn. (1983) stated that, when under nutrition is severe, there can be a significant decrease in pregnancy rate in sheep, although, this does not appear to be attributable to any inadequacy in corpus luteum function. There are several studies which have highlighted the importance of diet around the time of mating and in particular, the significance of over or under feeding either pre or post mating in regulating pregnancy rates (Rhind and Neilly,1998). Chronic and severe feed restriction has been found to compromise reproductive performance by impairing the hypothalamic gonadotropin releasing hormone pulse generator (Schillo,1992). Realimentation or flushing is associated with significant increase in systemic LH secretion (Booth. 1990), that ultimately restores the ovulation rate. The low conception rate
observed in the ewes maintained under pasture grazing is probably associated with an altered endocrine balance.

In the present study, the incidence of multiple births in ewes synchronized with intravaginal progesterone sponges and maintained with a balanced feed compared favorably with a twinning per cent observed after insemination during natural estrus in group of ewes also maintained with a balanced diet, suggesting that, synchronization protocol involving PMSG does not significantly enhanced the twinning percentage in NARI Suwarna ewes that were maintained on a balanced feed. On the other hand, the incidence of multiple births was significantly lower in group of ewes subjected to progesterone PMSG synchronization protocol but maintained on pasture grazing. This observation suggests that the nutritional status may play a role in modulating the ovarian response to exogenous hormone such as PMSG.

References


