Effects of Oestrus Synchronization and Various Doses of PMSG Administrations in Chios x Kivircik (F₂) Sheep on Reproductive Performances

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Abstract: The research was carried out to determine efficiency of oestrus synchronization in Chios x Kivircik (F₂) sheep under producers’ conditions and the effects of PMSG dose on reproductive performance criteria. Research was conducted with 120 animals. During the mating season, the ewes were divided into 4 groups and 2 groups were administered with sponge + different doses of PMSG (400 and 500 IU), one group was administered only with sponge and one group became the control group. The mean live weight of Chios x Kivircik (F₂) sheep was 39 kg, their mean pregnancy rate was 72%, their litter size was 1.36 and the number of weaned lambs was 0.65. When, the variations between mean live weights in ewes were examined by age, it was found to be significant (p<0.01). The effect of PMSG dose on pregnancy rate and litter size was significant (p<0.05).

Key words: Chios x Kivircik (F₂), oestrus, synchronization, PMSG, pregnancy rate, Aydin

INTRODUCTION

Applications of oestrus synchronization, which enable the ewes to display oestrus in the desired periods, can be applied during oestrus season or anoestrus season. Although, factors such as addition of rams to the flock and heat-light arrangements are effective on oestrus synchronization, prostegestagens, estrogens, PGF₂α and analogues, gonadotropin such as PMSG, GnRH and HCG, hormones like melatonin and their combinations are widely used in practice (Akcayrayar, 1994; Yarali and Karaca, 2004). Controlling the hormonal mechanism of oestrus cycle with exogenous intervention forms the basis of these methods.

In oestrus synchronization, the compressive effect of progesterone hormone on the FSH secretion on the pituitary gland and its effect of stimulating oestrus when its level in the blood falls are utilized (Fabucuoğlu et al., 1996).

With hormone administration in mammalian farm animals, animals are enabled to give birth simultaneously and to lamb also in anoestrus season by using hormone in the flock after involution. Besides, increasing the number of births in a certain time period, the number of lambs born after one gestation can be increased and the production of lamb meat can be corresponded to the period when demand and price are the highest in the market. Facilities and economic benefits are obtained in terms of care, feeding and workforce planning again with oestrus synchronization in animals whereas, a uniform fattening material is obtained in terms of age and live weight and great facilities are obtained in the organization of the application of artificial insemination. In addition, with nonseasonal lambing, continuity can be ensured in milk production and sufficient number of sib or half-sib lambs born in identical time section can be obtained for scientific research (Askin, 1982).

When, the progestogen sponges were removed following a 12-16 days (mean 14) administration, an intramuscular PMSG (Pregnant Mare Serum Gonadotropin) injection antedates the onset of oestrus, increases ovulation rate and enables ovulations to converge. So far, many studies have been made on progestogen sponges or progesterone sponge + PMSG administration (Sianic, 1986; Gonzales et al., 1988; Hamra et al., 1989; Walker et al., 1989; Zafracas et al., 1992; Beck et al., 1993; Driancourt and Avdi, 1993). However, the reaction of each breed to the kind, time and administration amount of hormone used is not identical. This is due to the fact that breeds have different reproductive traits (Scyli et al., 2002; Geken et al., 2002).

In a study, on the effects of various doses of PMSG in the ewes on oestrus and reproductive performance, the
data about oestrus rate and reproductive performance determined that PMSG did not have a statistically significant effect at different doses and the number of lambed ewes was found to be statistically significantly high in the control group than the groups administered with progesterone-containing sponge and different doses of PMSG (Unal et al., 2002). At the end of a research, it was observed that uniform lambs could be obtained in the marketing period and that producers were greatly interested in the application (Karae and Cemal, 2002). In the study, where they investigated the effects of use of progesterone and different doses of PMSG in Kivircik ewes on oestrus control and reproductive performance, Koyuncu et al. (2002) detected that oestraceae were effectively synchronized and that reproductive performance displayed a significant increase. Ozturk and Elicin (1999) investigated the effects of exogenous hormone use during anoestrus period in crossbred sheep bearing Boorola genes on reproductive performance and determined that pregnancy, lambing and multiple birth rates were significantly high in the group under application. In the study, on supervising reproductive performance using exogenous hormone in Karakas sheep under producers’ conditions in the Eastern Anatolian Region, Karakus and Askin (2007) concluded depending on their findings that some preliminary conditions were required for applying these applications under producers’ conditions.

This study intended to investigate, the effects of administrations of intravaginal sponge impregnated with synthetic progesterone, followed by different doses of PMSG injections in Chios x Kivircik (F,) sheep on oestrus and birth synchronization and superovulation and their benefits to be brought about for producers.

**RESULTS AND DISCUSSION**

Characteristics of live weight and reproductive performance of ewes are presented in Table 1 according to birth results. The mean live weight of Chios x Kivircik (F,) sheep is 39 kg, the mean pregnancy rate is 72%, litter size is 1.36 and the number of weaned lambs is 0.65. When, the variations among the mean live weights of ewes were examined by age, they were found to be statistically significant (p<0.01). The effects of PMSG dose on pregnancy rate and litter size were found to be statistically significant (p<0.05; p<0.01). According to control group, group with only sponge insertion and groups with administrations of 400 and 500 IU PMSG doses, the pregnancy rates were found as 60, 64, 72 and 79%, respectively and the litter sizes were found as 1.21, 1.25, 1.33 and 1.49, respectively. Although, the variations among enterprises regarding pregnancy rate, litter size and number of weaned lambs were found to be statistically insignificant, it is striking that enterprise 2 clearly differed from other enterprises. Although, the effect of age on pregnancy rate, litter size and number of weaned lambs was found to be statistically insignificant, it was observed that these values increased as age increased.

Among the groups with only sponge insertion, with sponge insertion + 400 IU PMSG injection and sponge insertion + 500 IU PMSG injection in the research, it was observed that the administration of 500 IU PMSG particularly had a clear advantage in terms of pregnancy rate and litter size. Success in applications of synchronization depends on many factors. It can be stated that deviations, which cannot be underrated, also occurred among the results obtained from the studies conducted under various conditions. Fabucescoglu et al. (1996) and Askin (1982) studies on Anatolian Merino and Akkaraman breeds, 91.69% of the total material administered with hormones for doses of 200, 400 and
Table 1: Characteristics of live weight and reproductive performance of ewes according to birth results

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>Live weight (kg)</th>
<th>Pregnancy rate</th>
<th>N</th>
<th>Litter size</th>
<th>No. of weaned lambs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>120</td>
<td>39.19±0.89</td>
<td>0.72±0.17</td>
<td>116</td>
<td>1.36±0.48</td>
<td>0.65±0.35</td>
</tr>
<tr>
<td>PMSG dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>30</td>
<td>38.69±0.89</td>
<td>*</td>
<td></td>
<td>1.21±0.07</td>
<td>0.51±0.36</td>
</tr>
<tr>
<td>0</td>
<td>21</td>
<td>37.85±0.75</td>
<td>**</td>
<td>19</td>
<td>1.25±0.06</td>
<td>0.45±0.33</td>
</tr>
<tr>
<td>400</td>
<td>32</td>
<td>38.96±0.86</td>
<td>**</td>
<td>35</td>
<td>1.52±0.06</td>
<td>1.06±0.33</td>
</tr>
<tr>
<td>500</td>
<td>37</td>
<td>39.75±0.95</td>
<td>**</td>
<td>39</td>
<td>1.64±0.07</td>
<td>1.21±0.39</td>
</tr>
<tr>
<td>Enterprise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>45</td>
<td>38.61±0.78</td>
<td>0.66±0.45</td>
<td>35</td>
<td>1.22±0.35</td>
<td>0.60±0.39</td>
</tr>
<tr>
<td>2</td>
<td>53</td>
<td>40.12±0.76</td>
<td>0.75±0.26</td>
<td>39</td>
<td>1.33±0.09</td>
<td>0.73±0.24</td>
</tr>
<tr>
<td>3</td>
<td>22</td>
<td>38.01±0.87</td>
<td>0.69±0.69</td>
<td>42</td>
<td>1.15±0.06</td>
<td>0.61±0.34</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£4</td>
<td>63</td>
<td>42.24±1.42</td>
<td>0.73±0.16</td>
<td>54</td>
<td>1.56±0.15</td>
<td>0.56±0.19</td>
</tr>
</tbody>
</table>

Mean values in the same column followed by the same letter (s) are not significantly different; *p<0.05, **p<0.01

600 IU PMSG gave birth within 1 week. It is also stated here that breed and injected PMSG doses do not cause any different effects on synchronization. About 94.17% of the ewes from both genotypes, administered with exogenous hormone, lamb. The variations detected between different PMSG doses in two genotype groups in terms of lambing rate were not found to be significant apart from the variations between doses of 200 and 600 IU PMSG in Merino sheep (p<0.05). Accordingly, increases were observed in lambing rate as the PMSG dose was increased from 200-600 IU. In another research by Ak et al. (1995), Kivircik breed sheep were divided into four groups and the pregnancy rates were determined to be 68.2, 85.7, 45.0 and 40.6%, respectively whereas, the litter sizes were determined to be 1.53, 1.78, 1.56 and 1.38. In the study conducted by Askin (1982), the effects of PMSG were examined and the pregnancy rates were found as 74.4, 75.8, 71.9 and 72.4%, litter sizes as 1.03, 1.00, 1.22 and 1.48 and multiple birth rates as 2.8, 0.0, 13.6 and 40.0%, respectively in the groups containing mature females at 0, 250, 500 and 750 IU PMSG injections. On the other hand, in this study, the rate of 72% calculated in terms of pregnancy rate is low and at acceptable level.

In the locality of Denizli, the mating season for ewes begins at the end of July and is quite intensive in August. Accordingly, births take place in a time frame covering December and January. The mean rate of 72% calculated in terms of pregnancy rate in this study is in good agreement with the study (Ak et al., 1995; Pabucucuoglu et al., 1996; Murtiga and Mugerva, 1992; Koyuncu et al., 2002; Cognie, 1990).

Among control group and the groups with only sponge insertion, sponge insertion + 400 IU PMSG injection and sponge insertion + 500 IU PMSG injection in the study, it was observed that the administration of 500 IU PMSG particularly had a clear advantage in terms of lambing rate. Although, the lambing rates obtained according to PMSG doses administered in the research are in parallel to the similar results in the studies by Askin (1982), Pabucucuoglu et al. (1996), Murtiga and Mugerva (1992), Altinol et al. (1998) and Karaca and Cemal (2002), they are lower than the reports by Askin (1982), Ak et al. (1995) and Koyuncu et al. (2002). The values of 1.21, 1.25, 1.33 and 1.49 found in terms of litter size, respectively depending on PMSG doses are lower than those of the above-mentioned studies. In the studies carried out, it is stated that estrus occur in a shorter period of time as the PMSG dose is increased and that it increases the number of lambs at birth (Askin, 1982; Pabucucuoglu et al., 1996). Although, it is possible to increase the number of lambs at birth by increasing the hormone dose administered, problems are sometimes encountered particularly in the care of lambs and their survival rates.

Even though, the differences among enterprises in terms of pregnancy rate, litter size and number of weaned lambs are not statistically significant in the study, when the obtained values are examined, it is striking that enterprise 2 has a clear advantage over others. It can be stated that the obtained values are low in comparison to some studies on different breeds (Askin, 1982; Gokcen et al., 2002; Ural et al., 2002). It can be expressed that this is due to different care and feeding practices in the enterprises where investigations were made.

**CONCLUSION**

Production of uniform lambs primarily for marketing period by oestrus synchronization within ordinary mating season and depending on this, by the synchronization of births taking place within a considerable time frame in Chios x Kivircik (F1) sheep has been put forward in this study. Accordingly, producers can utilize workforce more efficiently and produce homogenous lambs in terms of age and live weight particularly in marketing period.
Although, various and a number of studies have been made with respect to oestrus synchronization, it is seen that hormone administration is still not widely used in sheep production today. Conducting the research in producers’ flocks has enabled the use of hormones for oestrus synchronization to be transferred to practice. With synchronization practices and by arranging births according to the most convenient time for producers, maximum profitability can be attained. Thus, studies to be made on exogenous hormone use under producers’ conditions should be accelerated and care and feeding opportunities should be improved in order to attain more success in practices.

REFERENCES


