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Effects of Selenium-Vitamin E or Progestagen-PMSG Injections on Reproductive Performance of Ewes

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Abstract

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The experiment was conducted on 120 Karacabey Merino ewes divided into four groups. Two groups consisted of 2-year-old ewes, before their first lambing and two groups of the 3-year-old ewes after the first lambing. Within each age category, one group of ewes was treated with 5 ml 0.1% sodium selenate and 250 mg vitamin E, the other group progestagen sponge + 500 IU PMSG. The progestagen sponge + PMSG treated groups demonstrated oestrus symptoms earlier than the Vit E + Se injected groups. The progestagen sponge + PMSG treated group significantly increased fertility (100%, P<0.01) and prolificacy (146.7%, P<0.01) in 3 year-old ewes compared to other groups. The injections Vit E + Se significantly increased lamb birth weight (4.4 kg, P<0.05) and daily weight gain for 60 days (290.0g, P<0.01) in 3-year-old ewes compared with 2-year-old ewes treated with Vit E + Se and progestagen sponge + PMSG ewes.

Key words: Progestagen, PMSG, vitamin E, Se, Karacabey Merino, ewe.

Introduction

Two pharmacological agents are frequently used to synchronize estrus in small ruminants, luteolytic drugs and progesterone or its analog progestagen (Gordon, 1997). Progestagens or natural progesterone have been used to synchronize estrus in different forms, such as implants, impregnated sponges or controlled integral drug release device (Menegatos *et al.*, 2003). Reproduction performance of ewes has been reported to be improved by selenium or selenium plus vitamin E (Scales, 1974).

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The aim of the present investigation was to evaluate the effects of progestagen-PMSG and Se plus vitamin E supplementation on reproduction performance in treated ewes.

Materials and Methods

The experiment was conducted on 120 Karacabey Merino ewes divided into four equal groups. Groups 1 and 2 included 24 month-old ewes and groups 3 and 4 included 36 month-old ewes. The investigation covered lambs born of those dams. Two times (7-day intervals) before the mating season in the experimental groups 250 mg Vitamin E and 5 ml Sodium selenate (0.1%) injection were given 7 and 14 days before the mating

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season in groups 1 and 3. Groups 2 and 4 ewes were synchronized using 30 mg FGA (fluorogestone acetate) sponges inserted intravaginally for 14 days, plus 500 IU PMSG administered intramuscularly at sponge withdrawal.

The ewes from all groups were kept in the same shed and constituted one flock while grazing. Ewes grazed on the artificial pasture of common vetch *(Vicia sativa L)*, Hungarian vetch *(Vicia pannonica L)*, alfalfa *(Medicago sativa)* and sainfoin *(Onobrychis sativa)*, mixtures. Animals were routinely drenched against flukes and roundworms and vaccinated for pasteurellosis and clostridia infections. Ewes were exposed to 10 fertile Karacabey Merino rams during the 30-day breeding seasons in January and February.

The difference among groups in reproductive performance were estimated using the model (Harvey, 1990).

$$Y_{ij} = \mu + a_i + e_{ij}$$

Where μ is the overall mean, a_i effect of i_{th} group (i = 1-4) and e_{ij} the random error.

Mean body weight and live weight gains of lambs from birth to 60 day of life were calculated by least-squares analysis of variance by difference according to Harvey (1990).

$$Y_{ijklm} = \mu + a_i + b_j + c_k + d_l + (ab)_{ij} + e_{ijklm}$$

Where μ is the overall mean, a_i the effect of the age (i=3,4), b_j the effect of j_{th} group (j=1-4), c_k the effect of k_{th} type of birth and rearing, d_l the effect of l_{th} sex (l=1,2), $(ab)_{ij}$ the interaction of i_{th} age x j_{th} group, and e_{ijklm} the random error.

Results and Discussion

The effect of progestagen sponge + PMSG on reproductive performance was higher than Vit E + Se injection for both 2-year-old and 3-year-old ewes (P<0.01; Table 1). A positive effect of Se or Se-Vit E on fertility was also observed by Ramirez-Bribiesca *et al.*, 2001; Emsen and Yaprak, 2004. However, a positive effect of Se-Vit E on fertility and prolificacy was observed in 3-year-old ewes but not in younger ewes (Gabryszuk and Klewiec, 2002). The reasons of these discrepancies could be related to the level of Se, interaction of Se+Vit E and other nutrition factors as protein, energy, Ca, Mg and P intake that might also influence reproduction rates. Number of lambs born alive for control and Se+Vit E treated ewes were 1.61 and 1.81, respectively, and lambs weaned per ewe lambing were 1.1 and 1.5, respectively (Segerson *et al.*, 1986). In our study, supplemental Vit E+Se had a positive effect on birth weight, on daily weight gain

Table 1
Reproductive performance

Reproductive performance	2-year-old		3-year-old	
	Group* 1	Group 2	Group 3	Group 4
Fertility[1] (%)	76.7[b]	96.7[a]	86.7[b]	100.0[a]
Total lambs born (n)	26	39	33	44
Prolificacy[2] (%)	113.0[b]	139.3[a]	126.9[b]	146.7[a]

[1]Percentage of ewes lambing.

[2]Number of lambs born of ewes lambing x 100.

[a,b]Values with different superscripts in the same line are different (P<0.01).

*Group 1 & 3: Vitamin E+Se; group 2 & 4: progestagen sponge+PMSG, 30 ewes per group.

Table 2
Performance of lambs up to day 60 of life

Item	2-year-old		3-year-old	
	Group* 1	Group 2	Group 3	Group 4
No. of lambs born (n)	23	28	26	30
Lamb live weight at birth (kg)	3.9±0.12[b]	3.7±0.16[b]	4.4±0.14[a]	4.1±0.15[b]
Lamb live weight at day 60 (kg)	19.7±0.64[d]	19.3±0.57[d]	21.8±0.81[c]	20.5±0.75[d]
Daily live weight gain for 60 days (g)	263.3±7.81[d]	260.0±9.64[d]	290.0±10.23[c]	273.3±9.31[d]

[a,b]Values with different superscripts in the same line are different (P<0.01).

[c,d]Values with different superscripts in the same lines are different (P<0.01).

*Group 1 & 3: Vitamin E+Se; group 2 & 4: progestagen sponge+PMSG, 30 ewes per group.

and body weight at 60 days of life as compared to lambs from the groups receiving progestagen sponge + PMSG in older ewes only (Table 2). The results presented here show that before offering Vit E+Se it is necessary to determine their actual level in the flock in question. Øvernes (1993) reported that adequate measures should therefore be taken to ensure that animals receive an optimal supplementation of both selenium and vitamin E.

The proportion of ewes showing oestrous at 48h was 91.20%. Basaran and Askin (1995) using 40 mg FGA reported that in the breeding season oestrous proportion was 90.10%, which is similar to our results. The efficacy of prostagen treatments to synchronise oestrus in sheep has been documented (Gordon, 1997).

It is indicated that progestagen sponge + PMSG significantly affected oestrus and fertility in group 2 and 3. On the other hand Vit E+Se injection increased birth weight, lamb body weight at 60-day and daily weight gain in 0-60 days period in 3-year-old ewes.

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एम. कोयुन्कु, एस. कारा उजुन, एस. ओजिस, एच. यर्लिकाया। सेलेनियम-विटामिन ई अथवा प्रोजेस्ट्रान-पीएमएसजी टीकाकरण का भेड़ों के प्रजनन निष्पादन पर प्रभाव।

चार वर्गों में विभाजित 120 कौराकैबे मेरिनो भेड़ों पर परीक्षण किया गया। प्रथम ब्यात से पूर्व दो वर्गों की भेड़ें 2 वर्ष की थीं जबकि अन्य 2 वर्गों में 3 वर्ष की थीं। प्रत्येक आयु वर्ग में एक वर्ग की भेड़ों का उपचार 5 मिलि 0.1% सोडियम सेलिनेट और 200 मिग्रा विटामिन-ई से और दूसरे वर्ग में प्रोजेस्ट्रान स्पंज के साथ 500 आईयू केपीएमएसजी से किया गया। दूसरे उपचार वर्ग की भेड़ों में पहले उपचार वर्ग की अपेक्षा मद के लक्षण पहले प्रगट हुये। अन्य वर्गों की तुलना में प्रोजेस्ट्रान स्पंज और पीएमएसजी उपचार से 3 वर्ष की भेड़ों में निषेचिता (100%) और प्रचुरोद्भविता (146.7%) में सार्थक वृद्धि हुई। विटामिन-ई+सेलेनियम के टीकाकरण से 3 वर्ष की भेड़ों के मेमनों के जन्म पर शरीर भार और 60 दिनों तक दैनिक भार वृद्धि अन्य उपचार और 2 वर्ष की भेड़ों की तुलना में सार्थकतः अधिक हुआ।