

**ECONOMIC EVALUATION OF LAMB PRODUCTION IN
RAHMANI SHEEP UNDER TWO REGIMES FOR
SUPER-OVULATION**

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التقييم الإقتصادي لإنتاج الحملان فى أغنام الرحمانى تحت نظامين مختلفين للتبويض المتعدد

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من

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ABSTRACT

The aim of this study was to calculate the net return of two farms each of 500 ewes applying two protocols for superovulation (PMSG treatment and flushing) compared to a control farm. The study included two parts; the first was an experimental study to extract some technical coefficients, while the second was an empirical simulation study. In the first part, 94 Rahmani ewes were divided into three groups. Ewes in all groups were estrous synchronized by two doses (0.5 ml each) of PGF_{2α} (Estrumate) at an 11-day interval. Ewes in the 1st (G1) and the 2nd (G2) groups were fed during the pre-mating period (3 weeks) on maintenance requirements, while those of the 3rd one (G3) were flushed by feeding 160% of G1 and G2 requirements during the same period. Ewes of G2 were treated with 750 IU PMSG immediately after the 2nd dose of Estrumate, while the 1st group was kept without treatment as control.

Ovulation rate measured as number of corpora lutea per ewe mated increased ($P < 0.05$) from 1.54 in G1 to 3.38 and 2.10 in G2 and G3, respectively. The highest average of litter size (LS) and LS alive were observed in G2 (1.73 and 1.59, respectively), while the lowest were recorded in G1 (1.21 and 1.21, respectively). Lambs weaned per ewe mated were 0.56, 0.83 and 0.89 in G1, G2 and G3, respectively.

In the second part, the annual gross margin per head was LE 11.58, 67.60 and 100.79 in G1, G2 and G3, respectively. Treatment of ewes with superovulation or flushing increased the value added by 44.4 % and 53.9 %, respectively, while the additional cost increased as compared to untreated ones respectively by 14.9 % and 5.7 % only.

It was concluded that, flushing increases the annual profitability of local Rahmani sheep as compared to PMSG treatment and untreated ewes.

المستخلص

أجريت هذه الدراسة بهدف تقدير أرباحية مشاريع قطاع الأغنام نتيجة استخدام نظامين مختلفين لتعدد التبويض مقارنة مع قطع نعاج غير معاملة. وقد اشتملت الدراسة على جزأين، الأول منهما تجريبي لاستنباط بعض المعاملات الفنية و التي سوف يتم استخدامها لعمل دراسة محاكاة على قطع من النعاج يبلغ قوامه 500 نعجة (الجزء الثانى). فى الجزء الأول من البحث تم تقسيم عدد 94 نعجة رحمانى الى ثلاث مجاميع متساوية تقريباً فى العمر و الوزن. تم تنظيم الشياخ لنعاج الثلاث مجموعات بحقن كل منها بمجرتين من البروستجلاندين (0.5 مللتر استروميت للجرعة) بفاصل زمنى مقداره 11 يوم. تم تغذية نعاج المجموعتين الأولى و الثانية أثناء فترة ما قبل التلقيح و لمدة ثلاث أسابيع على المقررات الحافظة لها، بينما أجرى دفعاً غذائياً لنعاج المجموعة الثالثة (160 % من المقررات الحافظة). تم حقن نعاج المجموعة الثانية بـ 750 وحدة دولية من مصل دم الفرسة الحامل مباشرة بعد الحقن بالجرعة الثانية من الاستروميت. تم قياس استجابة النعاج لمعاملة تنظيم الشبق و صفات الخصوبة و التوأمية للنعاج. وقد حسبت الميزانية المزرعية لمقارنة المجموعات الثلاث من الناحية الاقتصادية باستخدام هامش الربح السنوى و النسبة بين المخرجات و المدخلات.

ازداد معدل التبويض من 1.54 بالمجموعة الأولى (المقارنة) الى 3.38 و 2.10 بالمجموعتين الثانية و الثالثة. وقد سجلت المجموعة الثانية أعلى معدل للحملان المولودة و الحملان المولودة حية بالنسبة للنعاج الوالدة (1.73 و 1.59 على التوالى)، بينما تم تسجيل أقل معدل لهما بالمجموعة الأولى (1.25 و 1.25 على التوالى). وقد بلغ معدل فطام الحملان نسبة الى النعاج الملقحة حوالى 0.56، 0.83 و 0.89 بالمجموعات الثلاث على التوالى. فى الجزء الثانى من الدراسة وجد أن هامش الربح السنوى للنعجة بلغ 11.60، 67.60 و 100.79 جنيه فى الثلاث مجموعات على التوالى. كذلك وجد أن العائد الاضافى فى المجموعتين الثانية و الثالثة قد بلغ 44.4 % و 53,9 % على التوالى مقارنة بالمجموعة المقارنة، بينما بلغت التكلفة الإضافية فى كلتا المجموعتين 14.85 % و 5.68 % على التوالى.

و لذلك فإن الدفع الغذائى للنعاج قبل موسم التناسل يؤدى الى زيادة الأرباحية السنوية لأغنام الرحمانى مقارنة بالمعاملة الهرمونية لزيادة التبويض و كذلك مع النعاج الغير معاملة.

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I. INTRODUCTION

Sheep production has a distinguished position in agricultural system in Egypt particularly in desert and new reclaimed areas (Ahmed, 1990). Sheep contributes to the local production of red meat in Egypt by about 7 % (FAO, 2006).

Increasing annual lambing production is the ultimate goal of sheep breeders, since it affects the net return of sheep raising. Accelerated lambing system (3 lambing / 2 years) is recommended to increase lambs crop (Aboul-Naga and Aboul-Ela, 1987; Mokhtar *et al.*, 1991a; Aboul-Naga *et al.*, 1991 & 1992) when compared with the traditional system (one lambing / year). Such system is not fully succeeded because of the seasonal variation in ovarian activity among local sheep breeds (El-Wishy *et al.*, 1976; El-Fouly *et al.*, 1977; Gabr *et al.*, 1989 and Elias, 1991) and location (Aboul-Naga and Aboul-Ela, 1984) within Egypt.

Under traditional system of sheep breeding (one / year), increasing feed allowance before breeding season (flushing) (Ozbey and Tatli, 2002 and Lassoued *et al.*, 2004) or treating ewes with pregnant mare serum gonadotropin (Salama, 1991, Sallam, 1999 and Ozbey and Tatli, 2002) to enhance ovulation rate are widely applied in sheep flocks. These regimes are sometimes accompanied by estrous synchronization to facilitate insemination of ewes and/or to reduce labor cost of newborn

lambs care (Gordon, 1997). Treatment of ewes with prostaglandin $F_{2\alpha}$ for estrous synchronization is a common practice (Sallam, 1999, Hussein *et al.*, 2003 and Lethy *et al.*, 2003).

Early embryonic mortality is one of the reproductive failure that negatively affect lambing crop when applying flushing and/or hormonal treatment technique (Gordon, 2004 and Thompson and Cheeke, 2005). Percentage of embryonic mortality under ovarian enhancement protocols is not well determined. Using ultrasonography would provide an efficient tool at that concern (Beck *et al.*, 1996 and Kaulfuss *et al.*, 1997).

Increasing lambs crop per ewe per year or number of weaned lambs per ewe are good measures for reproductive efficiency (Barghouth, 2000). Technique(s) of ovarian enhancement before breeding season may have an impact on farm profitability, which could be measured by farm budget under different production systems (FAO, 1994).

The net return of sheep farms using the hormonal treatment to enhance ovulation rate comparing to flushing is the aim of this study.

II. REVIEW OF LITERATURE

Estrous synchronization is a technique used to improve reproductive efficiency and to facilitate artificial insemination and embryo transfer process. Moreover, it is a technique for ovarian manipulation to control estrous detection, parturition time and care of new born animals (Oyediji *et al.*, 1990; Beck *et al.*, 1993 and Squires, 2003).

1: Hormonal Treatment for Estrous Synchronization

Presence of a functional corpus luteum (CL) during the estrous cycle prevents ovulation, due to the negative effect of progesterone (P_4) on LH secretion (Squires, 2003). In absence of pregnancy, prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) causes luteolysis and decreases P_4 level. This restores the LH secretion, follicular development and ovulation few days thereafter.

Many hormones and techniques are using in estrous synchronization. $PGF_{2\alpha}$ and its analogues are more effective in luteolysis than using estradiol (E_2) and P_4 (Hawk and Conley, 1975 & Gonzalez *et al.*, 2005).

$PGF_{2\alpha}$ and its analogues are very potent luteolytic factors in cycling ewes (Thimonier, 1981), when treatment is taking place between day 4 and 14 of the estrous cycle (Gordan, 1997). The response to $PGF_{2\alpha}$ varied according to dose of treatment and potency of the commercial product.