POST-LAMBING PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF OSSIMI EWES AS AFFECTED BY THERIOGON ORAL ADMINISTRATION DURING THREE SEQUENCE BREEDING SEASONS.

M. Yassin[1]; M.A. El-Barody[2]; M.G.K. Gabr[1]; Safaa, N. AbdelAzeem[1]; A.K.I. Abd Elmoty[2] and A.A. Abd El-Hakeam[2]

[1] Animal Production Research Institute, Agricultural Research Center, Egypt.,
[2]Animal Production Department, Faculty of Agriculture, Minia University.

(Received 25/7/2011, Accepted 22/9/2011)

SUMMARY

The investigation was carried out to study the impact of theriogon (L-Tyrosine) oral administration on the performance of Ossimi ewes post-lambing during three sequence breeding seasons (summer, autumn and winter, respectively). Twenty ewes during each breeding seasons were used in this experiment. Animals were divided into two equal groups 10 in each. At three days post-lambing, the first group was given orally a single dose of theriogon (100 mg / kg. Bw) after being dissolved in 200ml of water. The second group wasn't treated by theriogon and served as control. Animals were used to study the effect of giving theriogon on estrus behavior of ewes post-lamping till weaning, lambs weaning weight, growth rate, survival rate, milk production and lactation performance as well as prolactin hormone concentration. The results indicated that most of post-lambing productive traits (lambs weaning weight, total and daily gain up to weaning, relative growth rate and milk production) were significantly ($P<0.01$) improved in treated group compared to the control group in different breeding seasons. Prolactin concentration was significantly ($P<0.01$) increased by administration of theriogon especially in autumn breeding season compared to winter and summer breeding seasons. First estrus of Ossimi ewes post-lambing was insignificantly hastened by oral administration of theriogon in different breeding seasons. It can be concluded that oral administration of theriogon of Ossimi ewes post-lambing improved most productive traits and prolactin hormone concentration.

Keywords: *theriogon, ewe, productive, prolactin and breeding season.*

INTRODUCTION

Tyrosine is an aromatic amino acid derived from the essential amino acid phenylalanine by the action of phenylalanine hydroxidase enzyme. It is necessary for the synthesis of catecholamines (adrenaline, noradrenaline and dopamine), thyroxin and protein, in addition to its important role in the citric acid cycle and building of melanin (Harper *et al.*, 1980). Based on the use of some organic substances possessed to improve the reproductive efficiency of the animal, one of these substances is the tyrosine (El-Battawy, 2006) as a semi essential amino acid involved in formation of catecholamines from adrenal gland and thyroxin from thyroid gland.

Rae and Ingalls (1984) concluded that the availability of tyrosine can affect milk production in some circumstances. Omima *et al.* (2001) reported that milk production and milk composition in rabbit were significantly improved as a result of L-tyrosin supplementation in drinking water.

Sheep are considered seasonal breeders with onset of reproductive estrous cycles activity during the short-day photoperiod, whereas cattle are polyestrous throughout the year. In both species prolactin secretion is tightly regulated by photoperiod with maximal circulating concentrations during the long-day photoperiod and minimal blood levels during the short-day photoperiod. Estrous cycles in sheep begin when PRL blood concentrations are approaching their nadir, whereas cattle remain cyclic regardless of maximal or minimal blood concentrations of prolactin. Regulation of prolactin secretion is under tonic and inhibitory control by the hypothalamus. Median eminence lesions or pituitary stalk section results in increased PRL secretion in cattle and sheep (Benoit *et al.*, 1989; Lincoln and Clarke, 1994; Anderson *et al.*, 1999). Many studies have shown that there is a close correlation between the level of some amino acids in the blood and reproductive performance in various stages of the production cycle in both male and females of animals. The treatment by some amino acids especially tyrosine at each of these stages led

to improve significantly productive and reproductive performance (Roohi *et al.* 1997 and El-Amrawi, 2008).

MATERIALS AND METHODS

The study aimed to evaluate the effect of theriogon oral administration (Alpha-amino-p-hydroxyhydrocinnamic acid or L-Tyrosine) on productive and reproductive performance post-lambing of adult Ossimi ewes during different breeding seasons (summer, autumn and winter).

In each of the three breeding seasons a twenty ewes averaged 46.40, 46.62 and 46.24 kg body weight, aged 54.80, 37.05 and 41.95 months and parity 1.70, 0.48 and 1.05 in summer, autumn and winter season, respectively were used in this experiment. Animals were divided into two equal groups 10 in each. The first group was given orally a single dose of theriogon (100 mg / kg. Bw) after being dissolved in 200ml of water (Kamel, 1996; El-Battawy, 2006), three days post-lambing. The second group wasn't treated by theriogon and served as control. Animals were used to study the effect of giving theriogon on estrus behavior of ewes post-lamping till weaning, lambs weaning weight, growth rate, survival rate, milk production and lactation performance as well as prolactin hormone concentration.

Blood samples during lactation period were collected post-lambing at the 3rd (peak of production), 6th and 9th weeks of lactation to determine levels of prolactin hormone concentration in plasma. Prolactin hormone was determined by radioimmunoassay procedure according to Dowining (1994) and Dowining *et al.*, (1995) by using kits purchased from Diagnostic products corporation, United States.

All animals were fed the same ration during the experimental period to cover the requirements according to NRC (1985) allowances. Fresh water and mineral blocks were provided ad-libitum.

Data were statistically analyzed according to the General Liner Model (GLM) of the SAS program (SAS, 1999) and the differences between means were detected by Duncan's Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Some productive performance of Ossimi ewes as affected by theriogon oral administration in different breeding seasons are presented in Table (1). Theriogon oral administration, season and the interaction between both factors illustrated that lamb's birth weight and survival rate were insignificantly increased due to theriogon, but the breeding season didn't affect them. While, there were highly significant ($P<0.01$) increase in the other productive traits (growth performance of suckling lambs till weaning and milk production) during breeding seasons of the year, due to theriogon compared to control group. The best values of weaning weight, total gain, daily gain, relative growth rate, total milk yield and average daily milk yield were obtained in treated group by theriogon compared to the control group and in autumn compared to summer and winter breeding seasons (Table, 1). Such trend was parallel to that reported by Sevi *et al.*, (2004) and Ali *et al.*, (2009). They reported that ovine suckling lambs till weaning, milk quantity and quality were strongly affected by the seasonal changes in climate, herbage availability and variations in ewe metabolic status with the advancement of lactation.

Fig (1) showed that treated ewes group significantly ($P<0.01$) yielded higher milk production than those of control group and reached their production peak at the 3rd week of lactation period (10th week) in all breeding seasons. The significant increase in milk production as a result of theriogon oral administration may be due to increasing of body weight and body condition score of ewes and /or increasing of prolactin level (Table, 2). It has been reported that there was an apparent circadian rhythm in circulating prolactin concentrations (Karch *et al.*, 1989; Jackson and Jansen, 1991). Also, such differences in growth performance of Ossimi lambs may be due to the significant increase of milk production for ewes that were treated by theriogon compared with the control ewes as shown in Table (1). Omima *et al.*, (2001) reported that litter body weight at weaning, milk production and milk composition were significantly improved in theriogon groups when compared with control ones.

Table (1): Ossimi ewes post-lambing performance as affected by theriogon oral administration during different breeding seasons.

Item	No. of ewes	Traits (LSM±SE)							
		Lambs birth weight (kg)	Lambs Weaning weight (kg)	Total gain (kg)	Avg. daily gain (g)	Relative growth rate (%)	Lambs Survival rate (%)	Total milk yield (kg)	Avg. yield /day /ewe (g)
Treatments		NS	**	**	**	**	NS	**	**
TH	30	4.27	19.52^{a}	15.30^{a}	203.96^{a}	360.71^{a}	100.0	40.21^{a}	536.14^{a}
CO	30	4.08	15.30^{b}	11.21^{b}	149.42^{b}	275.21^{b}	90.0	27.46^{b}	366.16^{b}
±SE		0.1	0.5	0.5	6.5	13.5	----	2.3	30.0
Breeding season		NS	**	**	**	**	NS	*	*
Summer	20	4.16	14.60^{c}	10.42^{c}	138.90^{c}	252.55^{c}	95.0	27.94^{b}	372.47^{b}
Autumn	20	4.19	19.89^{a}	15.83^{a}	211.03^{a}	381.13^{a}	95.0	36.83^{a}	491.12^{a}
Winter	20	4.18	17.72^{b}	13.51^{b}	180.14^{b}	320.25^{b}	95.0	36.74^{a}	489.87^{a}
±SE		0.1	0.6	0.6	8.1	17.3	----	2.8	36.8
			**	**	**	**	NS	**	**
Summer	TH	10	16.65^{b}	12.39^{b}	165.20^{b}	294.25^{b}	100.0	32.86^{ab}	438.17^{ab}
	CO	10	12.56^{c}	8.44^{c}	112.59^{c}	210.86^{c}	90.0	23.01^{b}	306.78^{b}
Autumn	TH	10	22.90^{a}	18.82^{a}	250.87^{a}	446.14^{a}	100.0	44.04^{a}	587.14^{a}
	CO	10	16.89^{b}	12.84^{b}	171.20^{b}	316.12^{b}	90.0	29.63^{b}	395.10^{b}
Winter	TH	10	19.00^{b}	14.69^{b}	195.83^{b}	341.86^{b}	100.0	43.73^{a}	583.10^{a}
	CO	10	16.44^{b}	12.33^{b}	164.46^{b}	298.65^{b}	90.0	29.75^{b}	396.65^{b}
±SE		0.2	0.9	0.9	11.7	23.4	----	3.9	52.0

*$^{a, b, c}$. Means in the same column under the same factor followed by the same superscript in each parameter are not significantly different. NS = Not significant. * = (P < 0.05), ** = (P < 0.01). TH= Theriogon treated, CO= control.*

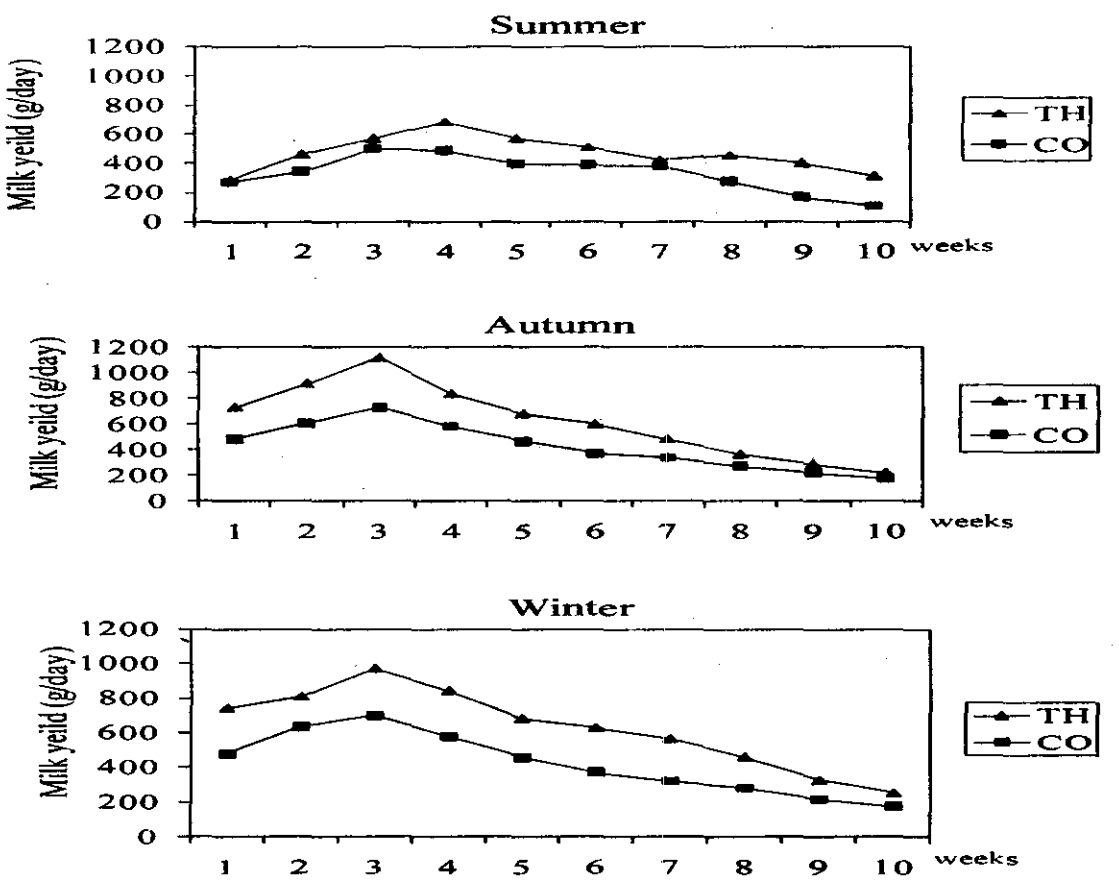

Fig (1): Effect of theriogon oral administration on daily milk yield during lactation period of Ossimi ewes in different breeding seasons.

The significant increase of milk production from tyrosine supplementation is unlikely to have occurred due to the effect of tyrosine on rumen microbial activity. There is little doubt that a substantial

portion of the supplemented tyrosine was metabolized in the rumen. Milk yield may have been increased because at elevated supply of tyrosine to the mammary gland. Plasma tyrosine is the sole precursor of tyrosine in milk protein. So an adequate supply of exogenous tyrosine is probably essential for synthesis of milk protein (Mepham, 1982). Milk production may have been stimulated by the effect of tyrosine on hormonal regulation. Administration of tyrosine to rats resulted in increased energy intakes (Anderson, 1979) and alterations of blood flow by catecholamine mediated mechanisms (Wurtman, 1982). Brain catecholamines, particularly norepinephrine, also were believed to be potent stimulators of growth hormone (GH) release (Martin, 1980). Milk yield of lactating cows has been increased dramatically following administration of exogenous GH (Peel *et al.*, 1981). The modest increase of milk production following tyrosine administration conceivably could have been from stimulation of GH release by brain catecholamines. Further work is required to determine the effect of tyrosine administration on GH release.

Data in Table (2) showed that three factors (theriogon treatment, time post treatment and breeding season) affected prolactin concentration. Prolactin concentration in plasma was significantly ($P<0.01$) increased by administration of theriogon than the control. Also, it was significantly ($P<0.01$) increased by both time post treatment and breeding season. It was reached to the peak at the 3rd week (4.78±0.19 ng/dl) of lactation compared to at 6th (3.67±0.19 ng/dl) and 9th weeks (2.82±0.19 ng/dl). Also, it was reached to the highest in autumn compared to summer and winter. Also, it can be observed that, prolactin concentration in plasma was reached to the highest value (7.23±0.46 ng/dl) in autumn breeding season within treated group at 3rd week of lactation. While it was reached to the lowest value (1.59±0.46 ng/dl) in summer breeding season in control group at 9th week of lactation (Table, 2).

Table (2): Prolactin level (ng/dl) of Ossimi lactating ewes as affected by theriogon oral administration, time post-treatment and breeding season.

Item		No. of samples	Prolactin level (ng/dl) (LSM±SE)		
Treatments			**		
TH		9	4.45 [a]		
CO		9	2.98 [b]		
±SE			0.15		
Time post-treatment			**		
3 weeks (Peak)		18	4.78 [a]		
6 weeks		18	3.67 [b]		
9 weeks		18	2.82 [c]		
±SE			0.19		
Breeding season			**		
Summer		6	2.38 [c]		
Autumn		6	5.12 [a]		
Winter		6	3.65 [b]		
±SE			0.19		
Treatments	Breeding season		3rd weeks	6th weeks	9th weeks
			**	**	**
TH	Summer	3	3.35 [cd]	2.88 [c]	2.07 [b]
	Autumn	3	7.23 [a]	6.49 [a]	5.44 [a]
	Winter	3	6.31 [ab]	3.23 [bc]	2.89 [b]
CO	Summer	3	2.40 [d]	1.79 [c]	1.59 [b]
	Autumn	3	4.23 [c]	4.66 [b]	2.68 [b]
	Winter	3	4.88 [bc]	2.35 [c]	2.23 [b]
±SE			0.46	0.46	0.46

[a-d] Means in the same column followed by the same superscript are not significantly different.
*** = (P < 0.01). TH= Theriogon treated, CO= control.*

Data of Ossimi ewe reproductive performance post-lambing as affected by theriogon oral administration during different breeding seasons are presented in Table (3).Untreated ewes by theriogon reached first estrus post-lambing at earlier time than the other ewes treated by theriogon. Also, mean of body weight of ewes at first estrus treated by theriogon recorded heavier body weight in summer, autumn

and winter than untreated but the differences were not significant. While, significant (P<0.05) increases were noticed in the age at first estrus and mean body weight post-lambing in summer and autumn compared to winter breeding season. These differences could be due to increasing milk production and prolactin concentration as shown by (Lopez *et al.,*(2004);and Benoit *et al*(2009).They also reported that there were antagonistic relationship between milk production, prolactin concentration and estrous behavior of lactating sheep and dairy cows. Regulation of prolactin secretion under tonic and inhibitory is controlled by the hypothalamus. Median eminence lesions or pituitary stalk section resulted in increase of prolactin secretion in cattle and sheep (Benoit *et al.*, 1989; Lincoln and Clarke, 1994; Anderson *et al.*, 1999).

In addition, Harrison *et al.*, (1990) reported that higher yielding cows showed weaker signs of estrus than lower yielding. In contrast, Van-Eerdenburg *et al.* (2002) reported no relationship between milk yield and estrous behavior score from Holstein cows when a visual scoring system for estrous characterization was applied. Variation in the results from previous studies that analyzed the relationship between level of milk production and estrous behavior of lactating cows may be related to sample size, differences in the level of milk production and the period when milk production data were collected and the system used to characterize and detect estrus.

Table (3): Ossimi ewe performance post-lamping as affected by theriogon oral administration in different breeding seasons.

Item			LSM±SE	
			1st estrus (day) post-lambing	Ewe weight at 1st estrus (kg)
Treatments			NS	NS
TH		30	40.60	45.57
CO		30	35.33	44.63
±SE			2.26	0.57
Season			*	*
Summer		20	42.25 ^{a}	46.30 ^{a}
Autumn		20	39.30 ^{ab}	46.30 ^{a}
Winter		20	32.35 ^{b}	45.05 ^{b}
±SE			2.77	0.69
Treatments	Breeding season		1st estrus (day)	Ewe weight at 1st estrus (kg)
			*	*
TH	Summer	10	43.10 ^{a}	47.30 ^{a}
	Autumn	10	41.10 ^{a}	43.80 ^{b}
	Winter	10	37.60 ^{ab}	45.60 ^{ab}
CO	Summer	10	41.40 ^{a}	45.30 ^{ab}
	Autumn	10	37.50 ^{ab}	44.10 ^{b}
	Winter	10	27.10 ^{b}	44.50 ^{ab}
±SE			3.91	0.98

*a, b, Means in the same column under the same trait followed by the same superscript are not significantly different. Ns = Not significant, * = (P < 0.05). TH= Theriogon treated, CO= control.*

Another drawback of these previous studies is the timing of milk production data collection in relation to the expression of estrus. These studies analyze either total milk yield or milk production during long periods (70–120 days) in relation to estrous behavior (Fonseca *et al.*, 1983; Harrison *et al.*, 1989; Harrison *et al.*, 1990; Van-Eerdenburg *et al.*, 2002). However, to precisely evaluate the relationship between milk production and estrous behavior, milk production near the time of estrous expression should be used as an indicator of the level of production rather than total or predicted milk yield. Finally, Lopez *et al.*, (2004) supported our general hypothesis that incidence of estrus post-lamping is reduced by increased level of milk production. It appears that estradiol concentrations at estrus and duration and intensity of estrus are inversely affected by the level of milk production.

CONCLUSION

From the present study, it can be concluded that one dose of theriogon oral administration to mature ewes significantly improved most of productive traits in different breeding seasons of the year. Also,

theriogon administration increased prolactin hormone in adult ewes. While, first estrus of Ossimi ewes post-lambing was insignificantly unhastened by administration of theriogon in different breeding seasons. The oral administration of one dose could be recommended for ewes post-lambing to increase and improve productive performances.

REFERANCES

Ali, A., R. Derar and M. Hayderb (2009). Reproductive performance of Farafra ewes in the subtropics. Animal Reproduction Science, 114 (4): 356.

Anderson, G. H. (1979). Control of protein and energy intake: role of plasma amino acids and brain neurotransmitters. Can. J. Physiol. Pharmacol., 57: 1043.

Anderson, L.L., D. L. Hard. L. S. Carpenter. E. K. Awotwi. M. A. Diekman. A. H. Trenkle and S.J. Cho (1999): Pregnancy, parturition, and lactation in hypophyseal stalk-transected beef heifers. J. Endocrinol., 163: 463.

Benoit, A.M., J.R. Molina, S. Lkhagvadorj and L.L. Anderson (2009). Prolactin secretion after hypothalamic differentiation in beef calves: Response to haloperidol, α-methyl-ρ-tyrosine, thyrotropin-releasing hormone and ovariectomy. Animal Reproduction Science, 111: 54.

Benoit, A.M., J. R. Molina, D.L. Hard and L.L. Anderson (1989). Prolactin secretion after hypophysial stalk transection in prepuberal beef heifers. Anim. Reprod. Sci., 18: 61.

Downing, J.A. (1994). Interactions of nutrition and ovulation rate in ewes PhD Thesis, Macquarie University, North Ryde.

Downing, J. A. J. Joss and R. J. Scaramuzzi (1995): A mixture of the branched chain amino acids leucine. isoleucine and valine increases ovulation rate in ewes when infused during the late luteal phase of the oestrous cycle: an effect that may be mediated by insulin. Journal of Endocrinology, 145: 315.

Duncan, D. B. (1955): Multiple range and multiple F-tests. Biometrics, 11:1.

El-Amrawi (2008). Effect of Theriogon in concentration of testosterone in buffalo-bulls.16th International Congress on Animal Reproduction (ICAR) 12-16 Juli Budapest, Hungura.

El-Battawy, K. A. (2006): Reproductive and endocrine characteristics of delayed pubertal ewe-lambs after melatonin and L-tyrosine administration. Reproduction-in-Domestic-Animals, 41(1): 1-4.

Fonseca, F. A., J. H. Britt, B. T. McDaniel, J. C. Wilk and A. H. Rakes (1983). Reproductive traits of Holsteins and Jerseys. Effects of age, milk yield, and clinical abnormalities on involution of cervix and uterus, ovulation, estrous cycles, detection of estrus, conception rate, and days open. J. Dairy Sci., 66: 1128.

Harper, H. A., V. W. Rod-well and Mayes (1980). Review of physiological chemistry 17th Ed. Long Medical Publications, Middel East Edition, 265.

Harrison, R.O., S.P. Ford, J.W. Young, A.J. Conley and A. E. Freeman (1990). Increased milk production versus reproductive and energy status of high producing dairy cows. J. Dairy Sci., 73: 2749.

Harrison, R.O., J.W. Young, A.E. Freeman and S.P. Ford (1989). Effects of lactational level on reactivation of ovarian function and interval from parturition to first visual oestrus and conception in high-producing Holstein cows. Amin. Prod., 49: 23.

Jackson, G.L. and H.T. Jansen (1991). Persistence of a circannual rhythm of plasma prolactin concentrations in ewes exposed to a constant equatorial photoperiod. Biology of reproduction, 44: 469.

Kamel, T.M.M. (1996): Effect of tyrosine supplementation on the fertility of Egyptian Balady goats. M. Vet. Sc. Zagazig Univ., Banha, Egypt.

Karch, F. J., J. E. Robinson, C. J. I. Woodfill and M. B. Brown (1989). Circannual rhythm of luteinizing hormone and prolactin secretion in ewes during prolonged exposure to a fixed photoperiod: evidence for an endogenous reproductive rhythm. Biology of reproduction, 41: 1034.

Lincoln, G.A. and I.J. Clarke (1994). Photoperiodically-induced cycles in the secretion of prolactin in hypothalamo-pituitary disconnected rams: evidence for translation of the melatonin signal in the pituitary gland. J. Neuroendocrinol., 6: 251.

Lopez, H., D. Satter and M. C. Wiltbank (2004). Relationship between level of milk production and estrous behavior of lactating dairy cows. Animal Reproduction Science, 81 (3-4): 209.

Martin, J. B. (1980). Functions of central nervous system neurotransmitters in regulation of growth hormone secretion. Fed. Proc., 39: 2902.

Mepham, T. B. (1982). Amino acid utilization by lactating mammary gland. J. Dairy Sci., 65: 287.

N.R.C. (1985): Nutrition requirements of sheep. National Academy of Science. National Research Council, Washington, D. C., U.S.A.

Omima, M.K., R.I. El-Sheshtawy and H.A. Sabra (2001). Effect of L-tyrosine and bovi C3 supplementation, siré breed and superovulation on some reproductive performance of Egyptian rabbit. J. Egypt. Vet. Med. Assoc., 61 (6): 207-216.

Peel, C.J.; D.E. Bauman; R.C. Gorewit and C.J. Sniffen (1981). Effect of exogenous growth hormone on lactational performance in yielding dairy cows. J. Nutr., 111: 1662.

Rae, R.C. and J.R. Ingalls (1984). Lactational response of dairy cows to oral administration of L-Tyrosine. Journal of Dairy science, 67: 1430.

Roohi, N., A.M. Cheema, N. Rashid and M.W. Akhtar (1997). Plasma free amino acid fractions in different phases of reproduction in dwarf nanny goat. Punjab University Journal of Zoology.12:35-42.

S.A.S. (1999): Statistical Analysis System Guide. Version 6.12 Ed. SAS Institute Inc Cary. NC, USA.

Sevi, A., M. Albenzio, R. Marino, A. Santillo and A. Muscio (2004). Effects of lambing season and stage of lactation on ewe milk quality. Small Ruminant Research, 51 (3): 251.

Van-Eerdenburg, F.J.C.M., D. Karthaus, M.A.M. Taverne, I. Merics and O. Szenci (2002). The relationship between estrous behavioral score and time of ovulation in dairy cattle. J. Dairy Sci., 58: 1150.

Wurtman, R. J. (1982): Nutrients that modify brain function. Sci. Am., 246: 50.

الأداء الإنتاجى والتناسلي للنعاج الأوسيمى عقب الولادة وتأثرها بالثريوجون أثناء ثلاث مواسم تلقيح متتالية.

محمود يسن محمد[1] ، محمد عبد الفتاح أحمد البارودى[2] ، محمد جبر خليل[1] ، صفاء نادى عبد العظيم[1] ، عبد المعطى خيرى[2] ، عبد الهادى عبد الحكيم عبد النبى[2]

[1] معهد بحوث الإنتاج الحيوانى، مركز البحوث الزراعية، مصر.

[2] قسم الإنتاج الحيوانى ، كلية الزراعة، جامعة المنيا، مصر.

استهدفت هذه التجربة دراسة تأثير تجريع الثريوجون (١٠٠ ملجم/ كجم وزن حي) على الأداء الإنتاجي والتناسلي للنعاج الأوسيمي عقب الولادة في ثلاث مواسم تلقيح متتالية (الصيف ، الخريف ، الشتاء على الترتيب). أستخدم في هذه المرحلة ٢٠ نعجة وزعت عشوائيا في كل فصل إلي مجموعتان متساويتان في العدد (١٠ نعجات في كل مجموعة) أخذت إحداهما جرعة واحدة من الثريوجون بعد الولادة بثلاث أيام وظلت الأخرى ككنترول. ولقد تم تقييم بعض الصفات ومنها وزن الحملان عند الميلاد، إنتاج اللبن، نمو الحملان الرضيعة، معدل الوفيات في المواليد، تركيز هرمون البرولاكتين. وأوضحت النتائج أن معظم الصفات الإنتاجية (الوزن عند الفطام , إنتاج اللبن, معدل نمو الحملان حتى الفطام) كانت متوسطات قيمها أفضل معنويا في المجموعة التي عوملت فيها النعاج بالثريوجون في مواسم التلقيح المختلفة. وأيضا تركيز هرمون البرولاكتين ارتفع بشكل ملحوظ كنتيجة للمعاملة بالثريوجون وخاصة في موسم الخريف مقارنة بموسمي الصيف والشتاء. بينما لم تختلف معنويا المجموعتين في ميعاد وصولهم إلى أول دورة شبق بعد الولادة في المواسم المختلفة. ويمكننا القول بأن معاملة النعاج الأوسيمي عقب الولادة بجرعة واحدة من الثريوجون أدى إلي تحسن ملحوظ في الصفات الإنتاجية وأيضا تركيز هرمون البرولاكتين في بلازما الدم.