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EFFECT OF PROGESTERONE INJECTION AND LEVEL OF NUTRITION ON SOME PHYSIOLOICAL RESPONSES OF SAIDI EWES

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ABSTRACT

Fifty Saidi ewes of about 4-6 years allotted to 2 feeding groups, control group (M) fed 100% maintenance and treated group (2M) fed 200% maintenance. Each group was divided into two subgroups, injected (IP) and non-injected (NI) with progesterone hormone. The M and 2M ewes groups diets were given diets from mating till 11 days of mating, then after and till that to the end of the experiment both groups fed according to the feeding system in the farm. Injection with (P) was given in day 11 of mating. Blood samples were taken before mating zero, 11, 16, and 21 days of mating for determination serum progesterone. T3 and T4 concentrations, rectal temperature (RT) respiration rate (RR) were recorded in both groups at 0, 30, 60, and 120 day of mating also before and after parturition. The results obtained can be summarized as follows: Ewes fed 2M had higher conception rate, and lambing rate, and total lambs than those fed M either injected or non injected. Ewes fed on 2M diet had higher birth weights of lambs than those fed on M one. Ewes fed on M diet had higher ($P<0.01$) serum progesterone concentration at day 11 and lower ($P<0.01$) at day 16 after mating compared with those fed on 2M one. Ewes injected with progesterone had higher ($P<0.01$) serum progesterone concentration than that of NI ewes at days 16 and 21 after mating.

Ewes (IP) had higher RT ($P<0.05$) at mating and ($P<0.01$) at day 30 till before parturition than those (NI). Ewes fed on (2M) diet and (IP) had higher RT than those of other groups at day 30 after mating till after parturition. Feeding level or progesterone injection had no significant effect on RR. Progesterone injection had no significant effect on RR, with exception of that before and after parturition, which were higher (IP) ewes than (NI) ones. Ewes fed on (2M) diet had higher serum T3 and T4 concentration than those fed on (M) one. Ewes (IP) had higher serum T3 before mating till day 21 after mating, whereas serum T4 concentrations were slightly higher in the injected ewes than that of (NI) ones at days 11, 16 and 21 after mating. Ewes fed on (2M) diet and non-injected with progesterone hormone had higher T3 and T4 before and at mating whereas ewes fed on (2M) and injected had higher T3 and T4 concentrations at days 11, 16 and 21 after mating compared with other treatments.

INTRODUCTION

Fertility and fecundity rates depend on number of eggs shed per estrus, which known by ovulation rate and represent the upper limit for lambing percentage. Marked differences occur in ovulation rate as a result of breed and nutrition Jainudeen and Hafez (1993). Gunn *et al.* (1984 a and b) and Abecia *et al.* (1993) reported that the ewes fed on high level of feeding had higher ovulation rate. In addition, the positive effect of dietary energy Smith and Murray (1995) and Abu El –Ella (2006) and protein Abecia *et al.* (1997) on ovulation rate has been reviewed.

Progesterone is essential for maintenance of pregnancy Ruckebusch *et al.* (1991), therefore it has been used to improve embryonic survival in

sheep. In some studies, reflected increases in pregnancy rates ranging from 11 to 28% were achieved by using progesterone supplements Pearce *et al.* (1984).; Peterson *et al.* (1984) and Davis *et al.* (1986). The Progesterone hormone declined after mating and at the beginning of the last week of pregnancy these reported by Rowlings and Cook (1991).; Ranilla *et al.*; (1994) and Marai *et al.* (2006).

There is evidence from studies in Australia that nutrition in early pregnancy and peripheral progesterone concentrations may be inversely related Parr (1991), Results from further studies reported by Parr *et al.* (1987) demonstrated that sheep fed high energy rations after mating had reduced progesterone levels and showed an increase in embryo mortality. Creed *et al.*(1994) and Haresign *et al.* (1994 a, b) showed that high levels of feeding around the time of ovulation reduced progesterone concentrations and impaired development of embryos recovered from super-ovulated sheep. Other work reported by McEvoy *et al.* (1995 a, b) showed that the provision of additional supplementation of progesterone to ewes on a high plane of feeding around time of ovulation elevated plasma progesterone levels and significantly enhanced subsequent embryo development.

Thyroid hormones on the other hand are necessary for normal growth and development of mammals, Cabello and Wrutniak (1989).; Morovat and Dauncey (1995).; Shalaby and Shehata (1995) and Abdel-Hafez (1997) reported that increased level of feed intake resulted significant effect on thyroid hormones. On the other hand, low feeding level significantly reduced the concentrations of both T3 and T4 , EL-Ashry *et al.*(1993).; Hegazy *et al.* (1996) and Shalaby and Shehata (1995).

Many investigators reported that rectal temperature (RT) and respiration rate correlated with the feeding contains of animals. Murad *et al.* (1994) and Abdel-Hafez (1997). There is no available data on the effect of progesterone on rectal temperature and respiration rate.

The mechanism involved in the relationship between nutrition and endocrine factors and the embryo survival needs more focus especially in local sheep. The aim of the present study was to investigate the effect of feeding level and progesterone injection on some physiological responses of saidi sheep.

MATERIALS AND METHODS

The present study was carried out in the Experimental Farm of Animal Production Department, Faculty of Agriculture, Assiut University.

A total number of 50 healthy Saidi ewes of about 4-6 years of age were used in this study. The body weight was averaged 40.2 ± 1.0 kg. The animals were kept in semi open shade during experimental period. The animals were divided into two treatment groups. The first group fed on 200% of maintenance requirement (2M). This group was sub divided into two subgroups, injected with progesterone as Luton dose (1 ml), and others not injected (NI). The second group fed on 100% of maintenance requirement (M). This group was sub divided into to subgroups, group MI injected with progesterone as Luton (1ml) and other not injected with progesterone. All

animals were flushed two weeks before mating. Animals were fed on concentrate and wheat straw from mating until 11 days after mating. Concentrate diet was about 1.25 and 0.625 kg per head per day for 2M and M groups, respectively at 9.00 a.m. daily. Water was offered ad *libitum*. The concentrate diet consisted of 35% maize, 32% wheat bran, 30% decorticated cotton seed meal, 2% limestone and 1% sodium chloride. Chemical composition of the concentrates and wheat straw are determined before start of the experiment

Blood samples were obtained from all animals before mating, mating, day 11, 16 ,and day 21 of mating during experimental period. Blood samples were collected from jugular vein and serum was then separated by centrifugation at 3000 rpm for 15 minutes. Serum was then stored at -20 °C until subsequent analyses. Biosource Europe, Belgium determined the concentrations of serum progesterone concentrations using enzyme immunoassay according to Alper (1987). Serum thyroxine (T_4) and triiodothyronine (T_3) concentrations were determined using enzyme immunoassay kits supplied by CDI Chino, California, USA. According to Kirkegaard and siersbak-nieissn,(1976) and Schuurs, *et al.* (1977) respectively. Respiration rate (RR) was determined at 08.00 - 10.00 a m. before measuring the rectal temperature by counting the flank movements for a minute (Breath/min.). The rectal Temperature (RT) was measured using a standard clinical thermometer inserted gently into the rectum for one minute, to the nearest 0.1 °C.

Data were statistically analyzed by using general linear model (GLM) procedure of SAS (1990).

RESULTS AND DISCUSSION

1-Reproductive Performance

Data of reproductive performance as affected by level of nutrition and progesterone injection is shown in Table (1). Animals fed 200% maintenance (2M) had higher conception rate and lambing rate compared with 100% maintenance (M). These results may be due to improving in body condition and ovulation rate of treated animals. This results agree with that of Asiedu and Appiah (1983) and Cisse' *et al.* (1994).They reported that level of feeding considered to be an important determinant of goat body condition and correlated positively with the conception rate.

Table 1.Reproductive performance as influenced by progesterone injection and level of nutrition.

Item	Fed 100% maintenance (M)		Fed 200% maintenance (2M)	
	NI	I	NI	I
No. of ewes	10	15	15	15
Conception rate %	80	80	90	86
Total of lambs	8	12	9	13
Lambing rate	80	80	90	86
Birth weight (KG)	3.26	3.37	3.57	3.93

I = Animals were injected with one dose of 25 mg progesterone hormone.
NI = Animals were not injected with progesterone hormone.

The results indicated also to increase of conception and lambing rates (86.0 and 86.0 %) of the group fed 2M and injected with progesterone compared to group (80.0 and 80.0%) fed M and injected Table (1). McEvoy *et al.* (1995 a & b) showed that supplementary of progesterone to ewes on a high plane of nutrition around time of ovulation elevated plasma progesterone levels and enhanced subsequent embryo development. A possible explanation of these results may be due to the nutritional status of the ewes during the treatment period. Appropriate levels must have the necessary raw materials for producing progesterone. Research has shown that certain fats and fatty acids in the diet are vital to production of progesterone, Blezinger (2001). There were slight differences in conception and lambing rates of ewes fed 200% maintenance either injected or non injected. Similar results were obtained by Smith *et al.* (1985). From the present results in Table (1) it can observed that, the birth weight of lambs recorded higher values in injected groups at M or 2M groups (3.37 and 3.93 Kg) in comparison with non injected groups (3.26 and 3.57).

2- Progesterone concentration

Serum progesterone concentration (ng/ml) during the experiment in relation to nutrition level is shown in Table (2). Before mating and at mating, serum progesterone was not differed between M and 2M groups. However, there was a significant ($P<0.01$) increase of serum progesterone concentration of ewes fed on M diet on the day 11 after mating compared to those fed on 2M diet. These results may be reflect the effect of feed intake level. In this respect, the inverse relationship between the plasma concentration of progesterone and feed was found by Parr (1992) and Creed *et al.* (1994). They attributed this result to differences in clearance rate of progesterone rather than to changes in the entry rate of the hormone into the blood, Parr (1991).

However, on the day 16 after mating, serum progesterone concentration of ewes fed on 2M diet was higher ($P<0.01$) than those fed on M diet Table (2). These results may be due to the effect of progesterone injected on day 11 after mating. If we consider that synthetic progesterone is 10 to 100 times as potent as the natural progesterone. Therefore, this may be a positive effect of ration (protein and energy) on ovulation rate, Smith and Murray (1995) and Abecia *et al.* (1997). And by the way, high ovulation rate leads to increase corpora lutea.

Effect of progesterone hormone injection on serum progesterone concentration (ng/ml) is illustrated in (Table 2). On the days 16 and 21 after mating, serum progesterone concentrations of ewes injected with progesterone hormone recorded higher ($P<0.01$) values than those non injected ones. Also, overall mean of serum progesterone was higher ($P<0.01$) in ewes injected with progesterone than those non injected ones. These results may be due to the effect of progesterone injection on the day 11 after mating. McEvoy *et al.* (1995 a & b) showed that supplementary of progesterone to ewes on a high plane of feeding around time of ovulation elevated plasma progesterone levels and enhanced subsequent embryo development.

Serum progesterone concentration (ng/ml) during the experiment as influenced by level of nutrition and injection of progesterone are shown in

Table (2). On day 11 after mating, serum progesterone hormone concentration was slightly higher in ewes fed on M compared with those fed on 2M. Serum progesterone hormone concentration was higher ($P<0.05$) in ewes injected with progesterone (MI or 2MI) compared with those non injected ones (MNI or 2MNI) on the day 16 after mating. Also, it can be observed that, overall mean of serum progesterone was higher ($P<0.01$) of ewes injected with progesterone (MI and 2MI) than those non injected ones (MNI and 2MNI). These results may be reflected the effect of progesterone injection and different feeding levels.

3- Rectal temperature and respiration rate

Average rectal temperature (RT) as influenced by level of nutrition during different periods is shown in Table (3). There was a significant increase of RT of 200% maintenance group compared with 100% maintenance one. These results may be due to the passive effect of diet on RT Murad *et al* (1994) and Abd El Hafez (1997) reported that concerning roughage level in the diet led to increase RT in crossbreed sheep. Moreover, Morovat and Dauncey (1995) reported that high level of feed intake led to increase thyroid hormones. The increase of thyroid hormones secretions is associated with the increase of oxygen consumption and body temperature. The thyroid hormones believed to stimulate oxygen utilization through their action on mitochondria, Mcdonald, (1980).

Rectal temperature (°C) during the experiment as influenced by progesterone injection is shown in Table (3). RT (°C) of injected group with progesterone was high compared with those of non injected group. These results may be due to increase progesterone hormone concentration in the injected group. Pope *et al.* (1995) concluded that progesterone treatment of ewes having an ovulation rate >2 improved embryo survival. They also reported that, pregnant animals had RT higher than non pregnant animals and non injected animals. Rectal temperature (°C) as influenced by feeding level and progesterone hormone injection is shown in Table (3). The overall mean of RT (°C) was high in the injected group with progesterone and fed 2 M compared with other treatments. These results may be due to high feed intake and progesterone hormone concentration of 2MI group than the other group.

During the experiment period there was no effect of feeding level on respiration rate (RR). Also, there was no effect of progesterone injection on respiration rate (Table 4), except before and after parturition; there is a significant increase of RR in the injected group. There is a slight increase of overall mean of RR in the injected group fed M or 2M compared to non injected group fed M or 2M (Table 4). These results may be due to the increase in progesterone hormone concentration in the injected group. Pope *et al.* (1995) observed that progesterone treatment of ewes led to increase RR than non injected animals.

Table (3). Effect of level of nutrition and progesterone injected on rectal temperature (°C) during different stages of pregnancy and after parturition in Saidi ewes.

Item	Level of nutrition		Progesterone injection		M		2M	
	M	2M	NI	I	NI	I	NI	I
Day0 (mating)	39.53	39.78	39.81 e	39.49 f	39.64	39.43	40	39.57
	±0.10	±0.10	±0.11	±0.09	±0.16	±0.13	±0.15	±0.12
Day 30	38.39	38.61	38.18c	38.82 d	38.21	38.58	38.15	39.06
	±0.11	±0.10	±0.12	±0.10	±0.17	±0.14	±0.16	±0.13
Day 60	38.27e	38.54 f	38.13 c	38.67 d	38.11	38.43	38.16	38.91
	±0.08	±0.06	±0.09	±0.07	±0.13	±0.11	±0.13	±0.10
Day 90	38.25 c	38.77 d	38.12 c	38.89 d	38.12d	38.37 d	38.13 d	39.42 c
	±0.07	±0.07	±0.07	±0.06	±0.11	±0.09	±0.10	±0.08
Day 120	38.31 f	38.55 f	38.12 c	38.75 d	38.13 d	38.50 d	38.11 d	39.00 c
	±0.07	±0.07	±0.08	±0.06	±0.12	±0.09	±0.11	±0.09
Before parturition	38.4 c	38.82 d	38.12 c	39.11 d	38.17 d	38.62 d	38.06 d	39.59 c
	±0.04	±0.04	±0.04	±0.03	±0.06	±0.05	±0.06	±0.06
After parturition	38.94	38.84	38.77	39.01	38.9	38.99	38.65	39.03
	±0.10	±0.09	±0.11	±0.09	±0.16	±0.13	±0.15	±0.12
Overall mean	38.61e	38.92 f	38.47 e	38.98 f	38.47 e	38.70 d	38.47 e	39.23 c
	±0.05	±0.04	±0.04	±0.05	±0.08	±0.06	±0.07	±0.06

Values are least square-means (LSM) and SE is a standard error of LSM
M = animals were fed 100% maintenance. 2M = animals were fed 200% maintenance.
I = animals were injected with progesterone. NI= animals were non-injected with progesterone. c,d ($P < 0.01$), e,f ($P < 0.05$)

Table 4. Effect of level of nutrition and progesterone injected on respiration rate (breath/min.) during different stages of pregnancy and after parturition in Saidi ewes.

Item	Level of nutrition		Progesterone injection		M		2M	
	M	2M	NI	I	NI	I	NI	I
Day 0 (mating)	23.33	23.25	22.94	23.64	23	23.66	22.88	23.62
	±0.41	±0.39	±0.08	±0.36	±0.65	±0.53	±0.61	±0.51
Day 30	23.37	23.88	23.59	23.65	23.75	23	23.44	24.31
	±0.60	±0.57	±0.64	±0.53	±0.93	±0.76	±0.88	±0.73
Day 60	23.02	23.68	23.67	23.04	23.13	22.92	24.22	23.15
	±0.28	±0.27	±0.30	±0.24	±0.44	±0.35	±0.41	±0.34
Day 90	23.08	22.94	23.18	22.84	23.25	22.92	23.11	22.77
	±0.26	±0.25	±0.28	±0.23	±0.41	±0.33	±0.38	±0.32
Day 120	23.37	22.57	22.72	23.22	23	23.75	22.44	22.69
	±0.28	±0.27	±0.30	±0.25	±0.44	±0.36	±0.42	±0.35
Before parturition	23.63	23.95	23.35e	24.44f	23.25	24.42	23.44	24.46
	±0.33	±0.32	±0.36	±0.29	±0.52	±0.42	±0.49	±0.41
After parturition	23.6	22.29	21.99c	22.89d	21.87c	23.33d	22.11d	22.46d
	±0.19	±0.18	±0.20	±0.17	±0.30	±0.24	±0.28	±0.23
Overall mean	23.27	23.25	23.07	23.39	23.04	23.43	23.1	23.35
	±0.14	±0.13	±0.12	±0.15	±0.22	±0.18	±0.20	±0.17

Values are least square-means (LSM) and SE is a standard error of LSM
M = Animals were fed 100% maintenance. 2M = Animals were fed 200% maintenance.
I = Animals were injected with progesterone NI= Animals were non-injected with progesterone c,d ($P < 0.01$)

4-Triiodothyronine (T_3) and Thyroxine (T_4).

Serum Triiodothyronine (T_3) and Thyroxine (T_4) concentrations during the experiment as influenced by level of nutrition are shown in Tables (5 and 6).

Table 5. Effect of level of nutrition and progesterone injected on serum triiodothyronine hormone (T3) concentration (ng/dl) in saidi ewes.

Item	Level of nutrition			Progesterone injection			M		2M		
	M	2M		NI	I		NI	I	NI	I	
Before mating	104.38	106.11	±0.5647	105.04	105.46	±0.5647	103.63	105.15	106.45	105.77	±0.7986
Mating	102.56e	104.90f	±0.6446	103.48	103.97	±0.6446	101.25d	103.87d	105.73c	104.07c	±0.9116
Day 11 of mating	95.17c	111.39d	±1.0199	101.78	104.78	±1.0199	93.86	96.48	109.7	113.08	±1.4424
Day 16 of mating	105.25c	112.82d	±0.6799	107.95e	110.12f	±0.6799	104.8	105.71	111.09	114.54	±0.9615
Day 21 of mating	109.43c	114.14d	±0.6414	111.23	112.34	±0.6414	109.95d	108.91d	112.50c	115.77c	±0.9070
Overall mean	103.36 c	109.87 d	±0.6600	107.34	105.9	±0.9100	102.70d	104.03 d	109.09c	110.65c	±0.8000

Values are least square-means (LSM) and SE is a standard error of LSM
M = animals were fed 100% maintenance. 2M = animals were fed 200% maintenance.
I = animals were injected with progesterone. NI= animals were non-injected with progesterone c,d ($P < 0.01$), e,f ($P < 0.05$)

Table 6. Effect of level of nutrition and progesterone injected on serum thyroxine hormone (T4) concentration (µg/dl) in saidi ewes.

Item	Level of nutrition			Progesterone injection			M		2M		
	M	2M		NI	I		NI	I	NI	I	
Before mating	2.32e	2.75 f	±0.1137	2.57	2.49	±0.1136	2.28	2.35	2.86	2.64	±0.1607
Mating	2.12	2.36	±0.0974	2.24	2.24	±0.0974	2.09	2.14	2.39	2.33	±0.1377
Day 11 of mating	1.90 c	2.77 d	±0.0645	2.32	2.35	±0.0645	1.9	1.91	2.75	2.79	±0.0913
Day 16 of mating	2.10 c	2.95 d	±0.0516	2.50	2.55	±0.0516	2.07	2.13	2.93	2.97	±0.0731
Day 21 of mating	2.29 c	3.07 d	±0.0331	2.65	2.72	±0.0331	2.27	2.31	3.02	3.13	±0.0468
Overall mean	2.15 c	2.87 d	±0.0450	2.47	2.46	±0.065	2.13 d	2.17 d	2.79 c	2.78 c	±0.0600
Before mating	2.32e	2.75 f	±0.1137	2.57	2.49	±0.1136	2.28	2.35	2.86	2.64	±0.1607

Values are least square-means (LSM) and SE is a standard error of LSM
M = animals were fed 100% maintenance. 2M = animals were fed 200% maintenance.
I = animals were injected with progesterone. NI= animals were non-injected with progesterone c,d ($P < 0.01$), e,f ($P < 0.05$)

Animals fed on 2M had significantly ($P<0.01$) effect on the concentrations of T_3 and T_4 than those fed M. These results may be due to increase feed intake as a result of increased conception rate and embryo survival. Morovat and Dauncey (1995) reported that increased feed intake resulted in increased thyroid hormones.Serum (T_3) and (T_4) concentrations during the experiment as influenced by progesterone injection are shown in Tables (5& 6). Generally serum (T_3) and (T_4) concentrations (ng/dl) of injected group with progesterone were higher compared with those of non injected group. These results may be due to increased progesterone hormone concentration as a result of progesterone injection and conception rate in the injected group. Pope *et al.* (1995) concluded that progesterone treatment of ewes having an ovulation rate >2 improved embryo survival. Serum (T_3) and (T_4) concentrations are important for embryo development of mammals.

Serum T3 and T4 concentrations as influenced by feeding level and progesterone hormones injection are shown in Tables (5 and 6). The overall mean of serum T3 and T4 concentrations were high in the group fed two times maintenance and injected or non injected with progesterone hormone compared with the group fed maintenance and injected or non injected with progesterone hormone. These results may be due to high level of feed intake, and by the way increased thyroid hormones. Naqvi and Rai (1991) showed that serum T3 and T4 levels of sheep decreased substantially as a result of dietary restriction. In additation, Shalaby and Shehata (1995), reported that thyroid hormones level increased related to increase energy level in ration

Conclusion

It could be concluded from the present study that high level of diet, i.e. 200% maintenance level during mating period could be increased conception rate, lambing rate and improving serum progesterone. In addition, no benefit of progesterone injection was demonstrated on conception rate and lambing rate.In the other was side using 200% maintenance or progesterone injection increased T_3 and T_4 concentrations reflected increased conception rate and/or feed intake. Therefore, no deput that using 200% of maintenance level during mating season could be improve reproductive performance of Saidi ewes.

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تأثير الحقن بالبروجستيرون ومستوي التغذية علي بعض الاستجابات الفسيولوجية فى الأغنام الصعيدى

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*** قسم الانتاج الحيوانى و الدواجن كلية الزراعة بسوهاج جامعة جنوب الوادى**

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أستخدم في هذه الدراسة ٥٠ نعجة من النعاج الصعيدي عمر ٤-٦ سنوات تم تقسيمها الي مجموعتين. مجموعة غذيت علي العليقة الحافظة وقسمت الي تحت مجموعتين حقنت احداها بالبروجستيرون والاخري استخدمت كمجموعة مقارنة (كنترول). المجموعة الاخري غذيت علي ضعف العليقة الحافظة وقسمت الي تحت مجموعتين احداها حقنت بالبروجستيرون والاخري استخدمت كمجموعة مقارنة (كنترول). وقد تمت التغذية علي العليقة الحافظة وضعف العليقة الحافظة من يوم التلقيح وحتي اليوم ١١ بعد التلقيح وبعد ذلك غذيت الاغنام طبقا لنظام المزرعة. تم الحقن بالبروجستيرون ١ ملي لوتون/ رأس (كل ١ ملى يحتوى علي ٢٥ مجم بروجستيرون فى محلول زيتى) عند اليوم ١١ بعد التلقيح. اخذن عينات الدم قبل التلقيح و عند اليوم ١١ و ١٦ و ٢١ من التلقيح و ذلك لتقدير تركيز هرمون البروجستيرون و هرمونات الغدة الدرقية . سجلت درجة حرارة المستقيم و معدل التنفس فى كل المجاميع عند يوم التلقيح و اليوم ٣٠ و ٦٠ و ١٢٠ من التلقيح و كذلك قبل وبعد الولادة.

وقد اظهرت الدراسة النتائج الاتية:زيادة نسبة الحمل وعدد المواليد و العدد الاجمالى للحملان و الوزن عند الولادة فى حالة التغذية علي ضعف العليقة الحافظة مقارنة بالتغذية على العليقة الحافظة فقط . الحقن بهرمون البروجستيرون ادى الي زيادة في وزن الميلاد.

التغذية علي العليقة الحافظة ادت الي زيادة معنوية ($P<0.01$) في تركيز هرمون البروجستيرون فى سيرم الدم للنعاج مقارنة بالتغذية علي ضعف العليقة الحافظة عند اليوم ١١ بعد التلقيح في حين حدث العكس عند اليوم ١٦ بعد التلقيح. الحقن بهرمون البروجستيرون أدى ألي زيادة معنوية ($P<0.01$) في تركيز هرمون البروجستيرون للنعاج عند اليوم ١٦ ، ٢١ بعد التلقيح. كما ادى الحقن بهرمون البروجستيرون الي زيادة في تركيز هرمون البروجستيرون سواء عند التغذية علي العليقة الحافظة او ضعف العليقة الحافظة مقارنة بعدم الحقن عند اليوم ١٦ ،٢١ بعد التلقيح.

وجد أن الحقن بهرمون البروجستيرون والتغذية علي ضعف العليقة الحافظة ادت الي زيادة في درجة الحرارة من المستقيم للنعاج مقارنة بعدم الحقن.بينما لا توجد فروق في معدل التنفس عند التغذية علي العليقة الحافظة أو ضعف العليقة الحافظة أو الحقن اوعدم الحقن باستثناء زيادة معدل التنفس عند الولادة مع الحقن .

التغذية علي ضعف العليقة الحافظة أدت الي زيادة معنوية ($P<0.01$) في تركيز هرمون الثيروكسين و الهرمون ثلاثي اليود (T4, T3) . النعاج المحقونة كانت بها تركيز عالى من الهرمون ثلاثي اليود قبل التلقيح وحتى اليوم ٢١ بينما الثيروكسين كان مرتفع قليلا فى النعاج المحقونة عن غير المحقونة فى اليوم ١١ و ١٦ و ٢١ من التلقيح . النعاج المغذاة علي ضعف العليقة الحافظة وغير محقونة كانت بها تركيز عالى من الهرمون ثلاثي اليود و الثيروكسين قبل وعند التلقيح بينما فى النعاج المغذاة على ضعف العلقة الحافظة و المحقونة بالبروجستيرون كانت عالية فى تركيز الهرمون ثلاثي اليود وهرمن الثيروكسين عند اليوم ١١و ١٦ و ٢١ بعد التلقيح بالمقارنة بالمعاملات الأخرى .

خلصت الدرلسة لاهمية أستخدام المستوى العالى من التغذية (ضعف العليقة الحافظة) خلال فترة التلقيح حيث انها تحسن المظر التناسلى للنعاج الصعيدى.