J.Animal and Poultry Prod., Mansoura Univ., Vol. 5 (12): 793 - 813, 2014

CHANGES IN HAEMATOLOGICAL AND PHYSIOLOGICAL PROFILE OF BARKI LAMBS AND THEIR DAMS FED SALT TOLERANT PLANTS SILAGE DURING THE POST-PARTUM PERIOD

Ibrahim, N. H.
Animal and Poultry Physiology Department, Animal and Poultry Production Division, Desert Research Center, Mataria, Cairo, Egypt
Nagy_drc7777@yahoo.com

ABSTRACT

To investigate the changes which might occur due to feeding silage of salt tolerant plants in physiological and haematological profile of Barki ewes and their newly born lambs during neonatal period (1st month post-partum), a total of forty-eight adult Barki ewes (2.5- 3 years old and 38.39 kg average body weight) and their lambs (with a mean birth weight of 3.35 kg) were used. These ewes were randomly divided into two equal groups. The first group was fed a control roughage diet of Berseen hay while the second one was fed silage made from four salt tolerant plants (*Atriplex halimus* (50%), *Beta vulgaris* (25%), *Pearl millet* (15%) and *Carthamus tinctorius* hay (10%). Commercial concentrate mixture was used as the concentrate portion of the ration to ewes of the two groups. All ewes of both groups were naturally mated. The two groups fed these diets for an adaptation period of 21 days before mating season and continued all over the pregnancy period and then after parturition till weaning their lambs. Throughout the first month after parturition, live body weight changes, thermo-respiratory responses and haematological profile were recorded at intervals of five days for all ewes and their lambs. In addition, milk yield was estimated from all ewes in both groups immediately after birth and every week during the first month after birth.

In general, statistical analysis showed a significant (P<0.01) effect of measurement intervals on all the studied hematological parameters in both Barki ewes and their lambs except for mean corpuscular hemoglobin concentration of dams. However, all of these parameters didn't affected by type of maternal nutrition especially in lambs. There were no significant effects of type of feeding on rectal, skin, and coat temperatures at all times of measurement in lambs or their dams. However, Regardless of feeding type both ewes and lambs had higher (P<0.01) respiration rate at the first day of birth than at 7, 14, 21, 28 days post-partum.

In conclusion, results of the present study indicated that feeding Barki ewes on silage from the experimental salt tolerant plants can not affect their productivity with no health challenges to them or to their lambs.

Keywords: *Neonatal Period, Hematological Parameters, Physiological profile, Barki ewes, Barki Lambs, Salt tolerant plants.*

INTRODUCTION

Under the arid conditions of South Sinai Peninsula in Egypt, where sheep are raised in predominantly extensive production systems, shortage of feed stuffs and scarcity of fresh water are the main limiting factors for sufficient animal production. Barki is one of the three major sheep breeds of Egypt. About one million head of this breed are maintained along the North

Western Coastal Area (MoLAR, 2004), out of which 700 thousand weaned lambs may be produced yearly.

In Egyptian deserts, there are large areas of sandy soils that promote growth of halophytes and salt tolerant plants which can be used to feed desert animals (Helal and Fayed, 2013). Halophytes and other salt-tolerant plants, fresh or ensilage, can constitute a major portion of the feeding program of livestock in the arid and semi-arid regions (Squires and Ayoub, 1994; Abou El-Nasr *et al*., 1996 and El-Shaer, 2010). Several studies recommended cultivating salt and drought tolerant fodder shrubs (e.g. Atriplex spp.) and salt and drought tolerant grasses and legumes such as sorghum and Pearl millet which might fill the gap in animal feeding production in arid and saline areas (Hanafy *et al*., 2007 and El-Shaer, 2010). However, high salt content of the salt tolerant plants is perhaps the major negative component. Furthermore, some anti-nutritive factors like lignin, oxalates and nitrates could restrict the utilization of some halophytes and salt-tolerant forages in livestock feeding mainly when they are used as sole diets. The presence of these compounds forms insoluble complexes with essential minerals, proteins and carbohydrates, lowering the nutritive value of the product (El-Shaer, 2010). However, Abou El-Nasr *et al.* (1996) and ICBA (2006) stated that appropriate processing of these species as silage form could dilute the negative effects of these anti nutritional factors, and thus improve animal performances.

The maternal nutrition is a major intrinsic factor that influences intrauterine fetal growth and organogenesis (Elnageeb and Abdelatif, 2013). Manipulation of maternal nutrition is particularly critical during pregnancy and lactation.

Therefore, evaluating the effects of maternal nutrition on growth performance, physiological and hematological profile of newborn lambs and their dams provided useful data for sheep industry. Also, considerable attention should be focused on post-partum period as it critical regarding the fine-tuning shift in physiological responses of newborn lambs to extra-uterine environment.

Where the neonatal period is a critical step for newborn lambs which all organ functions must adapt to extra-uterine life (Piccione *et al*., 2007: Piccione *et al*., 2008; Piccione *et al*., 2009; Fragkou *et al*., 2010; Saddiqi *et al*., 2011 and Chniter, *et al*., 2013). During this period, known as the adaptive period, thermoregulatory, cardiovascular, respiratory, metabolic and homeostatic mechanisms complete their maturation. Thus, the newborn lamb is in a metabolically unstable state that makes it particularly sensitive to hazardous environmental conditions and perinatal diseases (Dwyer, 2008). Modification and adjustment of extra-uterine environment according to the needs of newborn in the first week of life can greatly reduce the death rate (Nowak *et al*., 2000; Sawalha *et al*., 2007). Neonatal lambs are not capable to face cold and heat stress and they show response to high temperature by change in respiratory rate and irregular breathing (Symonds *et al*., 1995). Maternal nutritional, age, sex, genetics (breed and crossbreeding), reproductive status (pregnancy, lactation and estrus), housing, salinity, feed shortage, environmental factors, lambs birth weight, stress and transportation are known to affect hematological and physiological parameters (Balikci *et al*., 2007).

The insufficient information about the effects of feeding silage from salt-tolerant plants was the motive of this study to focus on changes in body weight, some hematological and physiological parameters in Barki sheep and their lams during the first month post-partum under South Sinai conditions.

MATERIALS AND METHODS

Study location

The present study was launched at Ras Sudr Research Station, located at South Sinai Peninsula, belonging to Desert Researcher Center, Ministry of Agriculture and Land Reclamation, as a part of Bilateral Project (ICBA-DRC) in Egypt. The project aimed at improving the sustainability of sheep production systems by increasing the availability of non-conventional forage resources through introducing salt-tolerant plants. This study was conducted from January 1st to February 1st 2013.

Animals and management

Experimental animals were forty-eight adult estrus synchronized Barki ewes aging 2.5- 3 years old and averaging 38.39± 1.85 kg body weight and their born lambs. These ewes were randomly divided into two equal groups. Ewes of the first group was fed a control diet of Berseem hay and commercial concentrate while those of the second one were fed silage made from four salt plants (*Atriplex halimus*, 50%; *Beta vulgaris*, 25%; *Pearl millet*, 15% and *Carthamus tinctorius* hay, 10%) and commercial concentrate. Experimental animal were fed their nutrient requirements during different physiological status according to Kearl (1982). The chemical compositions of tested mixture, Berseem hay, silage mixture and Concentrate feed mixture were determined according to A.O.A.C. (1990) and presented in Table (1).

The two groups were fed these diets for an adaptation period of 21 days before mating season and all over the pregnancy period and after parturition till weaning lambs. Drinking clean fresh water was made available twice a day over the experimental period. All ewes of both groups were naturally mated. Birth weight of all lams averaged 3.35±0.03 kg. All lambs were housed with their mother during the entire study period (one month) and fed only with colostrum and maternal milk. During the experimental period, no abnormalities such as fever, anorexia, depression, soft feces, or other condition that can alter the studied parameters, were observed. Lambs were clinically healthy and the mothers were preventively treated for internal parasites at the start of the experiment.

Table (1): Chemical composition (%) of experimental feed stuffs (as % on DM basis)

Ingredient		DM	OM	CP	EE	CF	NFE	Ash
Berseem hay		85.1	88.95	12.22	1.18	28.55	47.00	11.05
Silage mixture		35.93	79.94	10.95	1.43	20.16	47.40	20.06
CFM		91.42	89.71	13.61	2.54	15.67	57.89	10.29

DM: dry matter, OM: organic matter, CP: Crude protein, EE: ether extract: CF: crude fiber, NFE: Nitrogen free extract, CFM: Concentrate feed mixture

Climatic conditions

During the experimental period, average ambient temperature and relative humidity were continuously recorded using a hygrothermometer. The temperature-humidity index (THI) was then calculated according Piccione *et al.* (2011) with the following equation:

THI (°C) = tbs – (0.55 – 0.55 φ/100) (tbs – 14.4)

Where:

tbs = dry-bulb temperature (°C),

φ = Relative Humidity (%).

The environmental conditions are given in Figure 1.

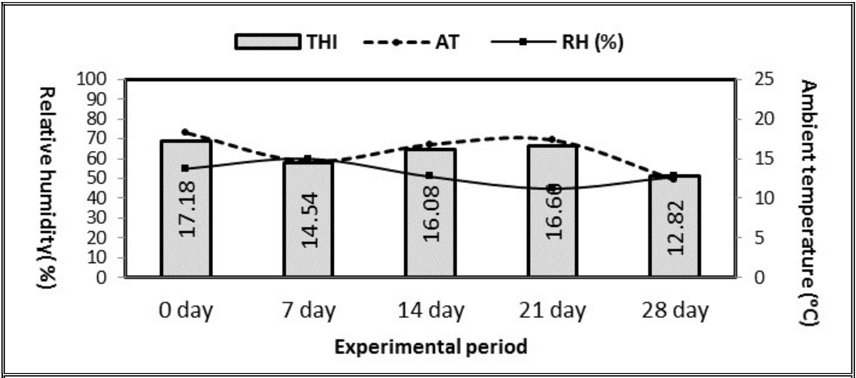


Figure (1):Graphical representation of the ambient temperature, temperature humidity index (THI) (expressed in °C), and relative humidity (expressed in %), recorded during the first month of life in lambs and their dams after parturition

Measurements

Each experimental ewe in both groups was weighted before mating and before parturition. These ewes and their lambs were weighted immediately after parturition and then every week early in the morning before feeding and suckling to the nearest 10 gm.

Milk yield was estimated from all ewes in both groups immediately after birth and every week during the following month. Chemical composition of milk in terms of fat, protein, lactose, total solids and solids not fat was determined using milk scan (Bently-Belguim).

During the first month after parturition, once every week in the morning (8:00 a.m.) 5 ml of blood were collected from the external jugular vein of each ewe in vacuum tubes containing EDTA. The first sampling in the lambs was performed a few hours after the colostrum intake. From lambs only 2 ml of blood were collected with the same modality. All parameters of blood picture (erythrocytes cell counts, RBCs; white blood cells, WBCs; hematocrit, Hct; hemoglobin, Hb; mean corpuscular volume, MCV; mean corpuscular hemoglobin, MCH and mean corpuscular hemoglobin concentration, MCHC) were measured in whole blood using blood counter apparatus model Rayto Product RT-7600 Auto Hematology Analyzer.

Thermo-respiratory responses included rectal temperature (RT, ^0C); skin temperature (ST, ^0C); coat temperature (CT, ^0C) and respiration rate (RR, acts/min) were weekly recorded 2-times daily (i.e., 08.00 and 14.00 hr) for all dams and their lambs. Since there was no differences between morning and afternoon readings, the averages were calculated and represented.

Statistical analysis

Results were presented as Mean ± SE. A two-way repeated analysis of variance (ANOVA) was used to determine statistical differences between mean values of the studied parameters in the first month postpartum. All the measurements were analyzed by generalized linear model using statistical software Minitab 12.1 (SAS, 2004).

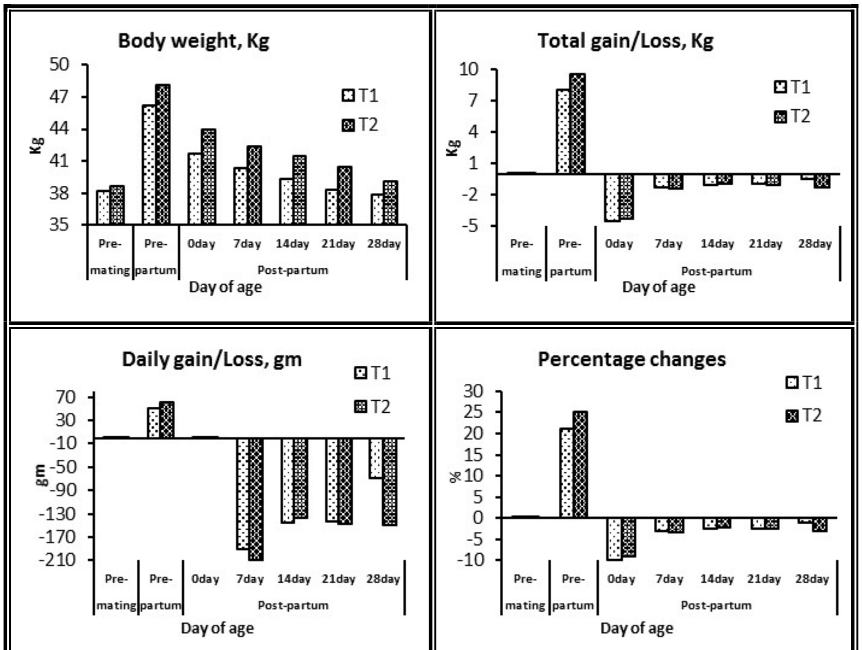
RESULTS AND DUSSCICION

Live body weight:

Live body weights (LBW) of Barki ewes in both groups at pre-mating were nearly similar, 38.17 and 38.60 kg for group 1 and 2, respectively (Figure 2. As usual, appreciable gains occurred in LBW of ewes from mating to parturition to be 46.21 and 48.14 kg, respectively, with insignificant ($P<0.05$) differences.

Ewes decreased ($P<0.01$) weight in both groups gradually during the neonatal period approaching their weights before insemination. The losses of weight as a percentage of initial body weight at pre-partum during 0, 7, 14, 21 and 28 days after birth were 21.18, 9.92, 3.20, 2.52 and 2.57% in ewes fed Berseem hay, while were 25.02, 8.90, 3.38, 2.24, 2.54 and 3.2% in ewes fed silage from salt tolerant plants. However, the experimental Barki ewes remained apparently in good health throughout the experimental period irrespective of maternal feeding type.

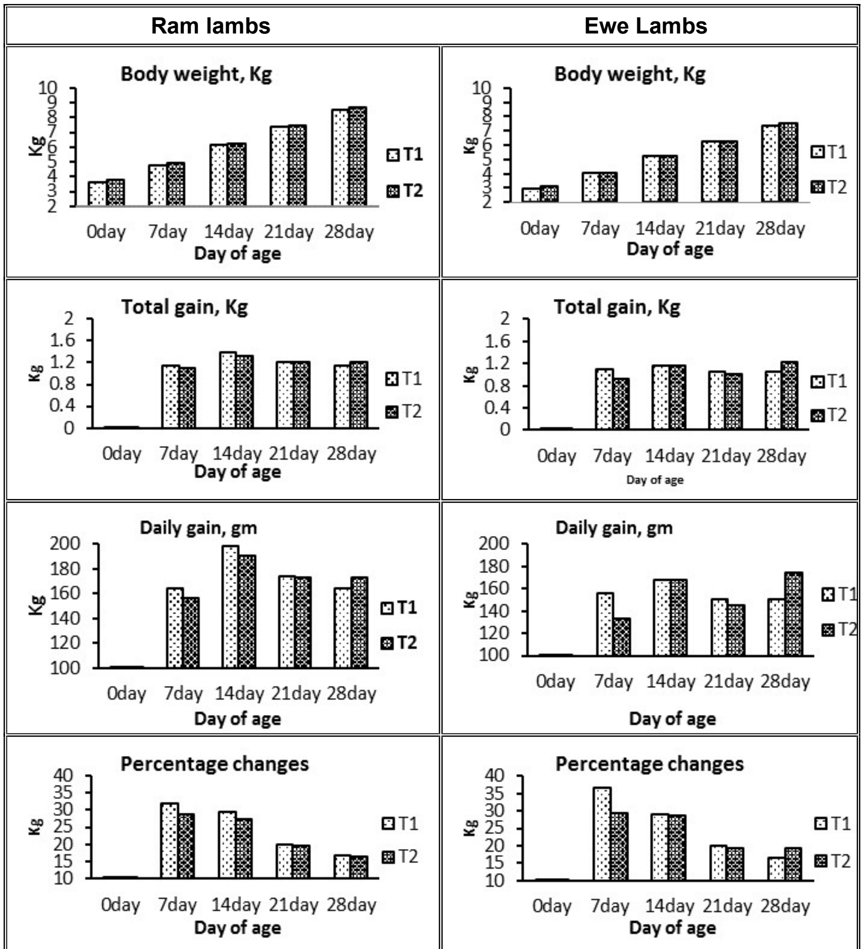
The obtained results showed that animals fed silage from salt tolerant plants had insignificant higher final body weight as compared to the control (Figure 2). These results demonstrated the potentiality of such salt tolerant plants mixture to fulfill the animal requirements to maintain their body weight. From other point of view, this slight increase in final body weight might be due to the increase in water intake in T2. Similar trends were obtained by (Shawkat *et al.*, 1988; Abou El-Nasr, 1998 and Shaker *et al.*, 2014).



T1, animals fed on berseem hay + CFM (Control group); T2, animals fed on silage made from salt tolerant plants.

Figure (2): Changes in live body weight of Barki ewes as affected by feeding salt tolerant plants monitored throughout experimental period

Average live body weight, total weight gain, average daily gain and percentage changes of male and female lambs at birth, 7, 14, 21, 28 days of age under the effect of feeding dams traditional diet (Berseem hay) or untraditional diet (silage) are presented in (Figure 3). Each of total gain and daily gain was not significantly affected by mothers type of feeding, but was affected ($P<0.5$) by sex throughout the experimental period. The average birth weight was 3.69 and 3.05 kg in male and female lambs, respectively. At 7, 14, 21, and 28 days of age body weights were 4.82, 6.18, 7.39, and 8.60 kg in male lambs while those of female lambs were 4.06, 5.24, 6.27 and 7.40 kg. These results agreed with those of Al-Shorepy and Notter (1998); Gootwine and Rozov (2006); Chniter *et al.* (2011) and Chniter *et al.* (2013). Abdel-Fattah *et al.* (2013) and Babar *et al.* (2004) interpreted that male lambs generally stay slightly longer in mother's womb than females and hence heavier at birth. Moreover, Ebangi *et al.* (1996) stated that the higher weight of male in comparison to female lambs at all ages in general trend in sheep and could reflect differences in hormonal profiles between males and females during infancy favoring growth rate in the former.



T1, lambs born from ewes fed on berseem hay + CFM (Control group); T2, lambs born from ewes fed on silage made from salt tolerant plants.

Figure (3): Changes in live body weight of Barki lambs as affected by maternal nutritional monitored throughout neonatal period

Milk yield and milk composition of Barki ewes as affected by feeding type:

Data of milk yield and composition for ewes fed Berseem hay or silage from salt tolerant plants during neonatal period are shown in Table 2.

Lactation curves, in yield and milk composition, are mainly conditioned by several factors including breed, stage of lactation, milking system, season and feeding in sheep (Flamant and Morand-Fehr, 1982; Treacher, 1983; Bocquier and Caja, 1993 and Caja and Bocquier, 2000).

Milk yield was recorded and analyzed from the fourth day after birth since colostrum lasts for the first three days. The milk yield was significantly ($P<0.05$) affected by both types of roughage and day after parturition. Ewes fed silage from salt tolerant plants had greater ($P<0.01$) average daily milk yield (696.6 ml) than ewes fed Berseem hay (683.3 ml). El-Hawy (2013) found similar results in Shami female goats. Increasing milk yield of ewes fed silage from salt tolerant plants is probably due to an increase silage moisture content and increase drinking water resulting from high silage content of mineral salts.

Average daily milk yields at different experimental occasions were 585.6, 606.8, 782.1, 752.0 and 721.1 ml for lactated ewes at 4, 7, 14, 21 and 28 days post-partum, respectively. Milk yield recorded the highest values in day 14 after parturition in both treatments (779.2 ml/day for T1 and 785.0 ml/day for T2). After attaining the peak, milk yield decreased gradually till the end of the neonatal period. These results are in agreement with those of Collomb *et al.*, (2004) and Mousa (1999&2011) who reported that daily milk of Awassi ewes reached the peak at 2^{nd} week of lactation and milk yield increased linearly with increasing salt tolerant plants. Likewise, the same trend was reported by Kassab *et al.* (2009), Hayder (2004), Hamdon (2005) and El-Medany (2005) in different sheep breeds.

The total fat, lactose and ash percentages insignificantly differed among treatments. In accordance, Ferris *et al.* (2003) reported that milk fat content in lactating dairy cows was unaffected significantly by the inclusion of fodder beet in the diet. Ewes received silage of salt plants, while had lower ($P<0.05$) milk protein as a result of low protein diet in this group, however they showed higher ($P<0.05$) solids not fat and total solid percentages than ewes fed Berseem hay which is probably due to an increase of salt in the silage halophytes. These results agreed with those obtained by Collomb *et al.* (2004) and Mousa, (2011). Nevertheless, Ferris *et al.* (2003) found that milk protein content showed a significant ($P<0.01$) increase with increasing crude protein of diet and inclusion of fodder beet in the diet. Also, Keogh *et al.* (2009) reported that cows offered fodder beet pre-partum had greater milk solids and solid not fat in the first 35 days of lactation than those offered Kale and grass silage pre-partum.

Table (2): Mean values of Milk yield and composition of Barki ewes as affected by feeding salt tolerant plants monitored during the first month after parturition

Item	Tr.	4 days after Birth	7 days after Birth	14 days after Birth	21 days after birth	28 days after Birth	Overall	±SE		
								T	D	T x D
Milk Yield, ml	T1	583.7	596.2	779.2	747.7	709.5	**683.3^{B}**			
	T2	589.5	617.5	785.0	756.4	734.8	**696.6^{A}**	4.54*	7.17**	10.15^{NS}
	Overall	**586.6^{E}**	**606.8^{D}**	**782.1^{A}**	**752.0^{B}**	**721.1^{C}**				
Fat, %	T1	4.91	5.06	5.25	5.94	6.03	**5.44**			
	T2	4.88	4.98	5.20	5.85	6.02	**5.38**	0.05^{NS}	0.08**	0.13^{NS}
	Overall	**4.89^{C}**	**5.02B^{C}**	**5.22^{B}**	**5.89^{A}**	**6.02^{A}**				
Protein, %	T1	6.90	5.39	4.55	4.45	4.12	**5.08^{A}**			
	T2	6.50	5.10	4.39	4.44	3.90	**4.86^{B}**	0.06*	0.10**	0.15^{NS}
	Overall	**6.70^{A}**	**5.24^{B}**	**4.47^{C}**	**4.44^{C}**	**4.01^{D}**				
Lactose,%	T1	5.60	5.19	4.19	4.39	4.13	**4.70**			
	T2	5.66	5.28	4.29	4.54	4.22	**4.80**	0.06^{NS}	0.10**	0.15^{NS}
	Overall	**5.63^{A}**	**5.24^{B}**	**4.24^{C}**	**4.47^{C}**	**4.17^{C}**				
Ash, %	T1	0.81	0.69	0.70	0.80	0.77	**0.76**			
	T2	0.92	0.90	0.91	0.93	0.88	**0.90**	0.06^{NS}	0.10^{NS}	0.15^{NS}
	Overall	**0.86**	**0.80**	**0.80**	**0.86**	**0.82**				
SNF, %	T1	10.33	10.20	10.11	10.02	9.75	**10.08^{B}**			
	T2	10.84	10.71	10.53	10.50	10.25	**10.56^{A}**	0.07**	0.11**	1.15^{NS}
	Overall	**10.58^{A}**	**10.45^{A}**	**10.32^{A}**	**10.26^{AB}**	**10.00^{B}**				
TS, pg/ml	T1	15.24	15.26	15.36	15.96	15.78	**15.52^{B}**			
	T2	15.72	15.69	15.73	16.35	16.27	**15.95^{A}**	0.11**	0.17**	0.25^{NS}
	Overall	**15.48^{C}**	**15.47^{C}**	**15.54^{BC}**	**16.15^{A}**	**16.02^{AB}**				

***, P<0.05, **, P<0.01, NS, non-significant, T1, animals fed on berseem hay + CFM (Control group); T2, animals fed on silage made from salt tolerant plants, SNF, solids not fat: TS, total solid. A, B = Values with different letters on the same row differ at (P<0.05), *A, B* = Values with different letters on the same column differ at (P<0.05).**

Hematological profile:

The mean values of erythrocyte cell counts (RBCs), white blood cells (WBCs), blood hemoglobin (Hb), hematocrit (Ht), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC) of Barki dams and their lambs are presented in Tables 2&3.

Blood is an important and reliable medium for assessing the health status of individual animal (Bhat *et al.*, 2012 & 2014). Variations in hematological responses of animals are due to several factors such as altitude, feeding type, age, sex, breed, diurnal and seasonal variation, temperature and physiological status of animals (Ramprabhu *et al.*, 2010). Hematological parameters are widely used for the diagnosis of serious animal diseases which can lead to economic losses in animals like reduced fur, wool and milk production (Oduye, 1976 and Mbassa and Poulsen, 2003).

In the current investigation, all hematological profile (Tables 3&4) were within the normal range in sheep (Abdel-Fattah *et al.*, 2013). Regardless day after parturition, Ht, Hb, WBCs, MCV and MCH in ewes fed silage from salt tolerant plants were lower (P<0.01) than ewes fed Berseem hay. This reduction is might be attributed to the hemodilution effect resulting from an increase in water intake, an increase in plasma volume and/or the increasing water mobilization to mammary gland through the vascular system (El-Sherif and Assad, 2001 and Bamerny, 2013). The increases of RBCs, Ht% and Hb concentrations immediately after parturition probably is due to higher demand for oxygen and the requirements of higher metabolic rate (El-Sharif and Assad, 2001; Antunovi *et al.*, 2011; and Bamerny, 2013).These parameters in Barki ewes decreased (P<0.01) gradually thought the period of post-partum (Table 2).

Table (3): Mean values of the hematological parameters of Barki ewes as affected by feeding salt tolerant plants monitored during the first month after parturition

Item	Tr.	Immediately after birth	7 days after Birth	14 days after Birth	21 days after birth	28 days after Birth	Overall	±SE		
								T	D	TxD
RBCs, x10^{6}/µL	**T1**	10.42	8.52	9.13	8.86	8.04	**8.99**			
	T2	10.23	8.28	9.38	8.96	8.66	**9.10**	0.08^{NS}	0.12**	0.17^{NS}
	Overall	**10.32^{A}**	**8.40^{C}**	**9.25^{B}**	**8.91^{B}**	**8.35^{C}**				
WBCs, x10^{3}/µL	**T1**	12.43	10.43	11.03	11.16	11.20	**11.25^{A}**			
	T2	12.12	10.00	10.50	10.62	10.71	**10.79^{B}**	0.02**	0.03**	0.03^{NS}
	Overall	**12.28^{A}**	**10.22^{D}**	**10.77^{C}**	**10.89^{B}**	**10.96^{B}**				
Ht, %	**T1**	33.16^{c}	30.83^{abc}	28.33^{bc}	29.50^{abc}	29.83^{abc}	**30.33^{A}**			
	T2	32.16^{ab}	30.16^{abc}	29.33^{abc}	26.83^{c}	27.66^{c}	**29.23^{B}**	0.23**	0.36**	0.52**
	Overall	**32.66^{A}**	**30.50^{B}**	**28.83^{C}**	**28.16^{C}**	**28.75^{C}**				
Hb, g/dl	**T1**	9.93	9.15	8.48	8.76	8.45	**8.95^{A}**			
	T2	9.66	8.90	0.30	8.20	8.18	**8.65^{B}**	0.04**	0.06**	0.09^{NS}
	Overall	**9.79^{A}**	**9.03^{B}**	**8.39^{C}**	**8.48^{C}**	**8.32^{C}**				
MCV, fl	**T1**	33.33^{b}	38.52^{a}	33.09^{b}	35.61^{a}	38.59^{a}	**35.83^{A}**			
	T2	31.77^{b}	36.94^{a}	31.63^{b}	30.30^{b}	32.16^{b}	**32.56^{B}**	0.45**	0.71**	1.01*
	Overall	**32.55^{C}**	**37.73^{A}**	**32.36^{C}**	**32.95^{C}**	**35.38^{B}**				
MCH, pg	**T1**	9.98	11.47	9.91	10.61	10.99	**10.59^{A}**			
	T2	9.66	11.06	9.08	9.41	9.72	**9.79^{B}**	0.12**	0.19**	0.26^{NS}
	Overall	**9.82^{BC}**	**11.27^{A}**	**9.50^{C}**	**10.01^{BC}**	**10.36^{B}**				
MCHC, %	**T1**	29.96	29.71	29.98	29.76	28.44	**29.57**			
	T2	30.51	30.01	28.98	31.63	30.62	**30.35**	0.3^{NS}	0.49^{NS}	0.70^{NS}
	Overall	**30.24**	**29.86**	**29.48**	**30.69**	**29.53**				

***, P<0.05, **, P<0.01, NS, non-significant, T1, animals fed on berseem hay + CFM (Control group); T2, animals fed on silage made from salt tolerant plants, RBCs: erythrocytes cell counts, WBCs: white blood cells, Ht: hematocrit, Hb: hemoglobin, MCV: mean corpuscular volume, MCH: mean corpuscular hemoglobin, MCHC: mean corpuscular hemoglobin concentration, a, b,c, =Values in the same column or row within certain trait with different super scripts are significantly differed (P< 0.05), A, B = Values with different letters on the same row differ at (P<0.05), *A, B* = Values with different letters on the same column differ at (P<0.05).**

Mayor and Cuezva (1985), Franzoi *et al.* (2002) and Piccione *et al.* (2008) stated that in general from the 34th day of intrauterine life till the first post-partum hours all blood components and the coagulation factors are subjected to continuous changes, even after this period. During the post-partum days the ewes showed a significant decrease (P<0.001) in RBCs, WBC, Ht and Hb. Instead, a significant increase after the birth was observed only on MCV and MCH, which constantly increased in day 7 and decreased from day 14 till day 28 after birth.

In lambs, a significant increase occurred since day 7 after birth in RBCs, and WBCs. According to Piccione *et al.* (2010) and Zumbo *et al*. (2011) the gradual increase in RBCs of newborn animals during the early life is not due to an abnormal response, but is called "adaptive period" during which, in all species, the stem cells change into normal erythrocytes that, in the embryo, are principally produced by the liver, and by the bone marrow in adults. In the goat foetus, bone marrow haematopoiesis is initiated shortly before day 70 of intrauterine life, although some hepatic and splenic erythropoiesis occurs even at the time of birth (Zanjani *et al.* 1974). The WBCs of the lambs showed Sudden increase (P<0.05) after birth especially throughout the first 14 days. This might be due to an improvement of the immunological system during this period after receiving the immunoglobulins from colostrum as suggested by Vihan and Ray (1983), Quigley *et al.* (2001) and Jeffcott (2008).

Results showed an increase of hemoglobin (Hb) gradually and simultaneously with the increase in the number of RBCs. In spite of the significant decrease in MCH and MCV, the value of MCHC showed gradual increase from birth to the day 28 of age. It seemed that lambs depend on concentrating Hb within erythrocytes to keep blood Hb within normal range. Increasing MCHC might was achieved through keeping body fluids outside cells (blood and intracellular space).

Despite the increase in both RBCs and WBCs, Ht value did not change appreciably from immediately after birth (23.25%) to the day 28 of age (23.83%). This mainly might be due to the significant decrease in MCV, in addition to increasing blood fluids volume. This decrease in MCV might lead to rapid diffusion of oxygen as a result of increasing surface to volume ratio of erythrocytes (Alessandro *et al.*, 2011). This is a characteristic of kids of every species since the volume of red blood cells is 21% higher in newborn than in adult animals (Huisman *et al.* 1969, Mbassa and Poulsen 1991).

Table (4): Mean values of the hematological parameters of Barki lambs as affected by maternal nutritional monitored during the first month of life

Item	Tr.	immediately after birth	7 days after Birth	14 days after Birth	21 days after birth	28 days after Birth	Overall	±SE		
								T	D	T x D
RBCs, x 10^6/µL	T1	4.03	5.24	6.05	6.45	7.54	**5.86**			
	T2	4.02	5.34	5.93	6.39	7.45	**5.82**	0.01^{NS}	0.16^{**}	0.23^{NS}
	Overall	**4.03^{C}**	**5.29^{C}**	**5.99^{B}**	**6.42^{B}**	**7.49^{A}**				
WBCs, x10^3/µL	T1	4.66^{c}	6.52^{b}	9.52^{a}	9.33^{a}	9.61^{a}	**7.93**			
	T2	4.67^{c}	6.57^{b}	9.14^{a}	9.29^{a}	9.56^{a}	**7.85**	0.07^{NS}	0.12^{**}	0.16^{*}
	Overall	**4.66^{C}**	**6.54^{B}**	**9.33^{A}**	**9.31^{A}**	**9.59^{A}**				
Ht, %	T1	23.33	23.66	21.83	22.16	24.00	**23.00**			
	T2	23.16	23.50	21.66	22.50	23.66	**22.90**	0.31^{NS}	0.49^{*}	0.70^{NS}
	Overall	**23.25^{A}**	**23.58^{A}**	**21.75^{B}**	**22.33^{AB}**	**23.83^{A}**				
Hb, g/dl	T1	5.90	5.85	5.92	6.30	7.32	**6.26**			
	T2	5.66	5.90	5.87	6.29	7.22	**9.20**	0.13^{NS}	0.20^{**}	0.29^{NS}
	Overall	**5.78^{B}**	**5.87^{B}**	**5.90^{B}**	**6.29^{B}**	**7.27^{A}**				
MCV, fl	T1	59.16^{a}	46.11^{b}	36.05^{cd}	34.49^{b}	32.21^{d}	**41.61**			
	T2	58.34^{a}	44.06^{bc}	36.35^{cd}	35.70^{cd}	32.34^{d}	**41.36**	0.87^{NS}	1.39^{**}	1.96^{*}
	Overall	**58.76^{A}**	**45.08^{B}**	**36.20^{C}**	**35.09^{C}**	**32.27^{C}**				
MCH, pg	T1	15.47^{a}	11.48^{ab}	10.04^{b}	10.10^{b}	10.00^{b}	**11.42**			
	T2	15.53^{a}	11.20^{ab}	10.31^{b}	10.20^{b}	10.12^{b}	**11.47**	0.33^{NS}	0.53^{**}	0.75^{*}
	Overall	**15.50^{A}**	**11.34^{B}**	**10.18^{B}**	**10.15^{B}**	**10.06^{B}**				
MCHC, %	T1	26.61	26.00	28.30	30.02	32.48	**28.68**			
	T2	27.61	26.43	28.62	28.96	33.20	**28.97**	0.72^{NS}	1.14^{**}	1.61^{NS}
	Overall	**27.11^{B}**	**26.21^{B}**	**28.46^{B}**	**29.49^{B}**	**32.84^{A}**				

***, P<0.05, **, P<0.01, NS, non significant, T1, lambs born from ewes fed on berseem hay + CFM (Control group); T2, lambs born from ewes fed on silage made from salt tolerant plants, RBCs: erythrocytes cell counts, WBCs: white blood cells, Ht: hematocrit, Hb: hemoglobin, MCV: mean corpuscular volume, MCH: mean corpuscular hemoglobin, MCHC: mean corpuscular hemoglobin concentration, - a, b,c, =Values in the same column or row within certain trait with different super scripts are significantly differed (P< 0.05), - A, B = Values with different letters on the same row differ at (P<0.05).**

Thermoregulation:

Tables 5&6 demonstrate thermoregulation of Barki ewes and their lambs in terms of thermo-respiratory responses as affected by maternal feeding type and day of age throughout neonatal period.

In ewes, feeding type affected (P<0.01) both rectal and skin temperatures (RT and ST), while respiration rate (RR) was affected (P<0.01) by day after parturition. Overall means of RT and ST decreased (P<0.01) in ewes fed silage from salt tolerant plants than in those fed Berseem hay (39.14 vs. 39.48 ^oC in RT and 38.20 vs. 39.28 ^oC in ST, respectively). The decrease in RT and ST observed in ewes fed silage from salt tolerant plants might be due to the increase in water intake (El-Sherif *et al.*, 2002), hence increased water available for evaporative cooling. This result was in agreement with that of Nassar and Hamed (1980) who reported that rams consuming 1.3% salt in drinking water showed tendency to have lower RT and ST than the control ones. However, Badawi (1969) reported that sheep drinking fresh water or 1.5% saline water had RT an ST close to each other.

Coat temperature was not affected significantly by all sources of variance in this experiment (Table 5). As a result, the gradient between ST and CT was at its highest level in ewes fed silage from salt tolerant plants. It seemed that feeding salt tolerant plants stimulated ewes to increase insulation capacity of their coat which in turn prevented heat load to reach their bodies leading to significantly lesser values of RT (Table 5).

Day of age affected significantly (P<0.01) respiration rate in ewes, while feeding type did not (Table 5). Overall mean of RR was higher (48.83 acts/min) for ewes immediately after parturition compared to 7, 14, 21, 28 days of parturition (40.50, 42.83, 41.66, 40.00 acts/min, respectively). Increasing RR immediately after birth might due to high inner energy production owing to the efforts made during the parturition process. Moreover, RR seemed to follow changes in CT, where the highest values of both parameters occurred immediately after birth then decreased and remained nearly persistent to the rest of experimental period.

Table (5): Mean values of the physiological parameters of Barki ewes as affected by feeding salt tolerant plants monitored during the first month after parturition

Item	Tr.	Immediately after birth	7 days after Birth	14days after birth	21days after birth	28days after birth	Overall	±SE		
								T	D	TxD
RT, °C	T1	39.36	39.56	39.43	39.50	39.53	**39.48^{A}**	0.08^{**}	0.13^{NS}	0.19^{NS}
	T2	39.26	39.23	39.03	39.05	39.15	**39.14^{B}**			
	Overall	**39.31**	**39.90**	**39.23**	**39.51**	**39.55**				
ST, °C	T1	38.53	39.23	39.43	39.23	40.00	**39.28^{A}**	0.21^{**}	0.34^{NS}	0.48^{NS}
	T2	38.86	38.50	37.40	37.03	39.23	**38.20^{B}**			
	Overall	**38.7**	**38.85**	**38.41**	**38.13**	**38.61**				
CT, °C	T1	28.90	27.60	28.00	25.93	26.13	**27.31**	1.37^{NS}	2.16^{NS}	3.06^{NS}
	T2	28.50	26.83	27.60	25.00	26.13	**26.81**			
	Overall	**28.70**	**27.21**	**27.80**	**25.46**	**26.13**				
RR, breaths/min	T1	49.66	39.66	42.66	41.33	39.66	**42.60**	0.86^{NS}	1.61^{**}	2.28^{NS}
	T2	48.00	41.33	43.00	42.00	40.33	**42.93**			
	Overall	**48.83^{A}**	**40.50^{B}**	**42.83^{B}**	**41.66^{B}**	**40.00^{B}**				

***, P<0.05, **, P<0.01, NS, non-significant, T1, animals fed on berseem hay + CFM (Control group); T2, animals fed on silage made from salt tolerant plants, RT: rectal temperature, ST: skin temperature, CT: coat temperature, RR: respiration rate, A, B = Values with different letters on the same row differ at (P<0.05), *A, B* = Values with different letters on the same column differ at (P<0.05).**

In lambs, both rectal temperature (RT) and skin temperature (ST) did not affected either by the type of mothers feeding or day of age (Table 6). The highest value in RT was recoded at day 14th of age and gradually decreased with advancing age. This proved faster production of metabolic heat in younger age and in counteraction to faster heat loss due to greater proportion of surface area. El-Sherif (1991) found that triiodothyronine was very high in newly born lambs than later ages. Runber (1883) stated that fasting metabolism per Kg weight decreased with increasing size of animal, but in general fasting homeothermy produce about 1000 Kcal heat for every square meter of their body surface per 24 hours.

Both coat temperature (CT) and respiration rate (RR) were decreased significantly (P<0.05) with advancing age. The data depicted in Table (6) indicated that immediately after birth lambs born from both groups maintained significantly (P<0.05) higher RR (84 acts/min); in spite of the low air temperature prevailing during experimental period; compared to 7, 14, 21, and 28 days of age (68.33, 63.50, 70.50 and 63.00 acts/min, respectively). As observed in ewes, CT showed the same trend of RR, which might indicate that initiation of panting depend on CT. This might also related to the level of metabolic heat production in relation to advancing age. Respiration rate of the lambs all over the neonatal period was higher than the normal value of sheep and never fall under 30 acts/min.

The results showed that, regardless of the day of age the lambs from ewes fed silage from salt tolerant plants had insignificantly lower RT and RR values compared to those born from ewes fed Berseem hay. This might be related to more fluids reached lambs from their dams fed on salt plants, hence more efficient evaporative cooling. Also, the dependence of RR on RT might be indicated. This might be related to improved nutritional status of dams. Budge *et al*. (2000) reported increasing the quality and quantity of food provided to ewes in late pregnancy promotes fetal growth and Brown Adipose tissue maturation, the combination of which will enhance neonatal viability. Moreover, when maternal nutrition was inadequate, the non-shivering thermogenesis was increased in newborn lambs (Gate *et al*., 1999). The higher values of RT and RR indicate that the lambs used physiological mechanism to regulate the body temperature by increasing metabolic rate and non-shivering thermogenesis. Generally, Neonatal lambs are not capable to face cold stress and they show response to high temperature by change in respiratory rate and irregular breathing (Symonds *et al*., 1995).

Table (6): Mean values of the physiological parameters of Barki lambs affected by dams feeding salt tolerant plants monitored during the first month after parturition

Item	Tr.	Immediately after birth	7days after Birth	14days after Birth	21days after birth	28days after birth	Overall	±SE T	±SE D	±SE TxD
RT, ^{O}C	T1	39.50	40.13	39.83	39.93	39.60	**39.80**	0.09^{NS}	0.14^{NS}	0.20^{NS}
	T2	39.43	39.30	39.80	39.53	39.69	**39.54**			
	Overall	**39.46**	**39.71**	**39.81**	**39.73**	**39.61**				
ST, ^{O}C	T1	37.96	38.86	38.36	38.13	38.86	**38.43**	0.40^{NS}	0.64^{NS}	0.95^{NS}
	T2	37.76	39.03	38.86	39.23	39.03	**38.78**			
	Overall	**37.86**	**38.95**	**38.61**	**38.63**	**38.95**				
CT, ^{O}C	T1	27.40	27.93	27.23	25.16	25.76	**26.70**	0.22^{NS}	0.35*	0.50^{NS}
	T2	27.23	27.03	26.86	27.43	25.93	**26.90**			
	Overall	**27.31^{AB}**	**27.48^{A}**	**27.05^{AB}**	**26.50^{BC}**	**25.85^{C}**				
RR, breaths/min	T1	84.00	72.00	69.00	72.33	62.66	**72.00**	3.49^{NS}	5.23*	7.81^{NS}
	T2	84.66	64.66	58.00	68.66	63.33	**67.00**			
	Overall	**84.33^{A}**	**68.33^{AB}**	**63.50^{B}**	**70.50^{AB}**	**63.00^{B}**				

***, P<0.05, **, P<0.01, NS, non-significant, T1, lambs born from ewes fed on berseem hay + CFM (Control group); T2, lambs born from ewes fed on silage made from salt tolerant plants, RT: rectal temperature, ST: skin temperature, CT: coat temperature, RR: respiration rate. A, B = Values with different letters on the same row differ at (P<0.05),**

CONCLUSION

In conclusion, results of the present study indicated that feeding sheep on silage from salt tolerant plants can maintain animal productivity with no health challenges to the animals. It could be concluded that feeding Barki ewes as silage form of salt tolerant plants was not hazardous under semi-arid conditions of South Sinai. This would lead to encourage sowing salt tolerant plants especially in new reclaimed lands in North Sinai to participate in solving of feed stuffs shortage and the problem of green forage shortage during summer and it can help to identify times at which changes in management may improve the lamb performances and to develop appropriates breeding practices which can reduce lamb mortality.

Corresponding author
Ibrahim, N.H.
Researcher, Animal and Poultry Physiology Department, Animal and Poultry Production Division, Desert Research Center, Mataria, Cairo, Egypt
Nagy_drc7777@yahoo.com

Acknowledgment

The author would thank Prof. Dr. El-Shaer, H. M. the coordinator and Prof. Dr. Badawy, M. T. the key person of the regional project titled "Adaptation to climate changes in WANA marginal environments through sustainable crop and livestock diversification" which is funded by International Center for Biosaline Agricultural (ICBA), UAE for their finical support to achieve this work.

REFERENCES

A.O.A.C. (1990). Official Methods of Analysis. 15th ed. Association of Official Analytical Chemists, Arlington, VA.

Abdel-Fattah, M.S.; Shaker, Y.M.; Hashem, A.L.S.; Ashgan M. Ellamei and Hanan Z. Amer (2013). Effect of Weaning Age on Thermo-Hematological and Immunocompetence of Barki Lambs in Siwa Oasis, Egypt. Global Veterinaria 10 (2): 176-188.

Abou El-Nasr, H. M. (1998). Vetch (Vicia Monatha) straw as a basal diet with Acacia or Atriplex shrubs for sheep under arid condition of Egypt. First International Conference on Animal Production and Health in Semi-aird Areas. 1-3 September, Cairo, Egypt.

Abou El-Nasr, H. M., Kandil, H. M.; El Kerdawy, A.; Dawlat, H. S.; Khamis and El-Shaer, H. S. (1996). Value of processed saltbush and Acacia shrubs as sheep fodders under the arid conditions of Egypt. Small Ruminant Res., 24: 15-20.

Alessandro, Z.; Salvatore, S.; Vanessa, M.; Stefania, C.; Ambra, R. and Giuseppe, P. (2011). Hematological profile of Messinese goat kids and their dams during the first month post-partum. Animal Sci. Papers and Reports Vol. 29, 223-230.

Al-Shorepy, S. A. and Notter, D. R. (1998). Genetics parameters for lamb birth weight in spring and autumn lambing. Anim. Sci. 67, 327–332.

Antunovi, Z.; Novoselec, J.; Sauerwein, H.; Speranda, M.; Vegara M.; and Pavic, V. (2011). Blood metabolic profile and some of hormones concentration in ewes during different physiological status.Bulgarian. J Agre Sci, 17: 687-695.

Babar, M. E., Z. Ahmed, A. Nadeem and Yagoob, M. (2004). Environmental factors affecting birth weight in Lohi sheep. Pakistan Vet. J., 24(1): 5-8.

Badawi, M. E. (1969). Some physiological responses of sheep drinking different concentrations of saline water to certain climatological factors. M. Sc. Thesis, Fac. of Agric. Cairo Univ., Egypt.

Balikci, E., Yildiz, A. and Gurdogan, F. (2007). Blood metabolite concentrations during pregnancy and post-partum in Akkaraman ewes. Small Rum. Res. 67, 247-251.

Bamerny, A. O. (2013). Changes in Some Haemato-Biochemical and Electrolytes Parameters in Female Meriz Goats during Pregnancy and After Parturition. Journal of Animal Scientist, 2013, 2(1): 11-14.

Bhat S. A.; Manzoor, R. M.; Qadir, S. and Khan, H. M. (2012). Prevalence of Gastro Intestinal Parasitic Infections in Sheep of Kashmir Valley, Vet World, Vol. 5, pp. 667-671.

Bhat, S. A.; Manzoor, R. M.; Reshi, A. A.; Ahmad, S. B.; Husain, I.; Bashir, S. and Khan, H. M. (2014). Impact of age and gender on some blood biochemical parameters of apparently healthy small ruminants of sheep and goats in Kashmir valley India. Int. J. Agric.Sc & Vet.Med. vol. 2, pp. 22-27.

Bocquier, F. and Caja, G. (1993). Recent advances on nutrition and feeding of dairy sheep. In: Proceedings of the 5th International Symposium on Machine Milking of Small Ruminants, Budapest, 14-20 May. Hungarian J. Anim. Prod., 1(Suppl.): 580-607.

Budge, H.; Bispham, J.; Dnrea, J; Evans, E. and Heasmani, L. (2000). Effect of maternal nutrition on brown adipose tissue and its prolactin receptor status in the feotal lamb. Pediatr. Res., 47:781-786.

Caja G. and Bocquier F. (2000). Effects of nutrition on the composition of sheep's milk. In : Ledin I. (ed.), Moran d-Feh r P. (ed.). Sheep and goat nutrition: Intake, digestion, quality of products and rangelands. Zaragoza : CIHEAM, 2 000. p. 59 -7 4 (Cah iers Option s Méditerran éen n es; n . 52).

Chniter, M.; Hammadi, M.; Khorchani, T.; Krit, R.; Lahsoumi, B.; Ben Sassi, M.; Nowak, R.; Ben Hamouda, M., (2011). Phenotypic and seasonal factors influence birth weight, growth rate and lamb mortality in D’man sheep maintained under intensive management in Tunisian oases. Small Ruminant Res. 99, 166–170.

Chniter, M.; Hammadi, M.; Khorchani,T.; Ben Sassi, M.; Ben Hamouda, M. and Nowak, R. (2013). Aspects of neonatal physiology have an influence on lambs’ early growth and survival in prolific D’man sheep. Small Ruminant Research 111 (2013) 162– 170.

Collomb, M., Sollberger, H.; Butikofer, U.; Sieber, R.; Stoll, W. and Schaeren, W. (2004). Impact of abasal diet of hay and fodder beet supplemented with rapeseed, linseed and sunflower seed on the on the fatty acid composition of milk fat. Int. Dairy J., 14: 549-559.

Dwyer, C. M. (2008). The welfare of the neonatal lamb. Small Ruminant Res. 76, 31–41.

Ebangi, A. L.; Mbah, D. A. and Ngo-tama, A. C. (1996). Impact of genetics and environment factors on birth weight of Fulbe sheep breeds in Cameroon. Rev. Elev. Méd. Vét. Pay. 49, 178–182.

El-Hawy, A. S. (2013). Reproductive efficiency of Shami goats in salt affected lands in south Sinai. Ph. D. Thesis. Faculty of Agriculture. Ain-Shams Univ., Egypt.

El-Medany, S. A. E. (2005). Effect of vitamins A and E on reproductive efficiency in Rahmani ewes. Ph.D. Thesis, Faculty Agriculture Ain Shams University, Egypt.

Elnageeb, M. E. and Abdelatif, A. M. (2013).growth, thermoregulation and hematological responses of lambs in relation to age and maternal nutritional supplementation. Pak. J. of Biol. Sci. ISSN 1028-8880/DOI:10.3923/pjbs.

El-Shaer, H. M. (2010). Halophytes and salt-tolerant plants as potential forage for ruminants in the Near East region. Small Ruminant Research 91, p. 3– 12.

El-Sherif, M. A. (1991). Growth performance of lambs as affected by their thermoregulation characteristics. Ph.D. Thesis, Faculty Agriculture Cairo University, Egypt.

El-Sherif, M. M. A. and Assad, F. (2001). Change in some blood constituents of Barki ewes during pregnancy and lactation under semi-arid conditions. Small Rumi Res, 40: 269-277.

El-Sherif, M. M. A.; Abdel Rahman, H.; El Sayed, M. A.; Omar, S. S. and Ibrahim, N. H. (2002). Effect of drinking diluted seawater on some behavioural aspects of camels. Int. Symp. on Optimum Resources Utilization in Salt-Affected Ecosystems in Arid and Semi Arid Regions, Cairo. 8-11 Apr., 486-495.

Ferris, C. P.; Patterson, D. C.; Gordon F. J. and Kilpatrick, D. J. (2003). The effect of concentrate feed level on the response of lactating dairy cows to a constant proportion of fodder beet inclusion in a grass silage-based diet. Grass Forage Sci., 58: 17-27.

Flamant, J. C. and Morand-Fehr, P. (1982). Milk production in sheep and goats. In: Sheep and Goat Production, Coop, I.E. (ed.). World Animal Science. C. Production-system approach.1. Elsevier Scientific Publishing Co., Amsterdam, pp. 275-295.

Fragkou, I. A.; Mavrogianni V. S. and Fthenakis, G. C. (2010). Diagnostic investigation of cases of deaths of newborn lambs. Small Rumin. Res. 92:41-44.

Franzoi, M.; Simioni P.; Luni S.; Zerbinati P.; Girolami A. and Zanardo V., (2002). Effect of delivery modalities on the physiologic inhibition system of coagulation of the neonate.Thrombosis Research105,15-18.

Gate, J. J., Clarke, L.; Lomax, M. A. and Symonds, M. E. (1999). Chronic cold exposure has no effect on brown adipose tissue in newborn lambs born to well fed ewes. Reprod. Fertil. Develop., 11:415-418.

Gootwine, E. and Rozov, A. (2006). Seasonal effects on birth weight of lambs born to prolific ewes maintained under intensive management. Livest. Sci. 105, 277–283.

Hamdon, H. A. M., (2005). Produtive and reproductive traits of Chios and Farafra sheep and subtropical Egyptian conditions. Ph.D. Thesis, Faculty Agriculture Assiut University, Egypt.

Hanafy, M.A.; Fahmy, A.A.; Farghaly, M.S. and Afaf, A.; El Sheref, (2007). Effect of using some fodder plants in diets on goats' performance under desert conditions of Sinai. Egyptian J. Nutr. Feeds 10, 151–163.

Hayder, M. (2004). Performance of ewes fed sugarcane bagasse silage treated with different level of urea. Ph.D. Thesis, Faculty Agriculture Assiut University, Egypt.

Helal, A. and Fayed, A. M. (2013). Wool characteristics of sheep fed on halophyte plants ensiled by some biological treatments. Egyptian Journal of Sheep and Goat Sciences, Vol. 8 (1), P: 131-139

Huisman, T. H. J.; Lewis J. P.; Blunt, M. H.; Adams, H. R.; Miller, A.; Dozy, A. M. and Boyd E.M., (1969). Hemoglobin C in newborn sheep and goats: a possible explanation for its function and biosynthesis. Pediatric Research 3, 189-198.

ICBA (2006). Biosalinity news. Newsletter of the International Center of Biosaline Agriculture (ICBA) 9 (July (2)), 2006.

Jeffcott L.B., (2008). Passive immunity and its transfer with special reference to the horse. Biology Review 47, 439-464.

Kassab, A. Y.; Abdel-Ghani, A. A.; Solouma, G. M.; Soliman, E. B. and Abd El-Moty, A. K. (2009). Lactation performance of Sohagi sheep as affected by feeding canola protected protein. Egyptian J. Sheep Goat Sci., 4: 65-78.

Kearl, I. C. (1982). Nutrients requirements in developing countries. Utah Agric. Exp. Stat., Utah State University, Logan, USA.

Keogh, B.; French, P.; McGrath, T.; Storey, T. and Mulligan, F.J. (2009). Effect of three forages and two forage allowances offered to pregnant dry dairy cows in winter on pre-parturient performance and milk yield in early lactation. Grass Forage Sci., 64: 292-303.

Mayor, F. and Cuezva J. M. (1985). Hormonal and metabolic changes in the perinatal period. Biology of Neonate 48, 185-196.

Mbassa G. K, and Poulsen J. S. D. (1991). Haematological profile in neonatal dwarf and landrace kids. Journal of Veterinary Medicine A38: 510–522.

Mbassa, G. K. and Poulsen, J. S. D. (2003). Reference Ranges for Clinical Chemical Values in Landrace Goats, Small Rumin.Res., Vol. 10, pp. 133-142.

MoLAR (2004). Agricultural Statistics, Economic Affairs Sector. Ministry of Agriculture and Land Reclamation, Egypt. pp 233.

Mousa, M. R. M. (1999). Milk production and metabolities of Awassi ewes influenced by feeding olive pulp in north Sinai. J. Agric. Mansoura Univ., 24: 6417-6426.

Mousa, M. R. M. (2011). Effect of feeding Acacia as supplements on the nutrient digestion, growth performance, carcass traits and some blood constituents of Awassi lambs under the conditions of North Sinai. Asian J. Anim. Sci., 5: 102-117.

Nassar, A.M. and Hamed, M.H. (1980). Some physiological responses of drinking different concentration of saline water. Res. Bull. Ain Shams Univ.; No. 1414.

Nowak, R.; Porter, R. H.; Lèvy, F.; Orgeur, P. and Schaal, B., (2000). Role of mother-young interactions in the survival of offspring in domestic mammals. Rev. Reprod. 5, 153-163.

Oduye, O.O. (1976). Haematological values of Igeria goats and sheep. Trop. Animal. Health .and prod. 8:131-136.

Piccione G.; Casella S.; Giannetto C.; Bazzana I.; Niutta P.P. and Giudice E. (2009). Influence of age on serum proteins in the calf. Acta Vet. Beograd, 59: 413–422.

Piccione G.; Casella S.; Pennisis P.; Giannetto C.; Costa A. and Caola G. (2010). Monitoring of physiological and blood parameters during perinatal and neonatal period in calves. Arq. Bras. Med. Vet. Zootec., 62: 1–12.

Piccione, G., Bertolucci, C., Giannetto, C. and Giudice E. (2008). Clotting profiles in newborn Maltese kids during the first week of life. J. Vet. Diagn. Inv., 20: 114–118.

Piccione, G.; Borruso, M.; Fazio, F.; Giannetto, C. and Caola, G. (2007). Physiological parameters in lambs during the first 30 days postpartum. Small Ruminant Res. 72, 57–60.

Piccione, G.; Sciano, S.; Messina, V.; Casella, S. and Zumbo, A. (2011). Changes in serum total proteins, protein fractions and albumin-globulin ratio during neonatal period in goat. Ann. Anim. Sci., Vol. 11, No. 2 (2011) 251–260.

Quigley, J. D.; Strohbehn, R. E., Kost C. J. and O’Brien, M. M., (2001). Formulation of colostrum supplements, colostrum replacers and acquisition of passive immunity in neonatal calves. Journal of Dairy Science 84, 2059-2065.

Ramprabhu, R.; Chellapandian, M.; Balachandran, S. and Rajeswar, J. J. (2010). Influence of Age and Sex on Blood Parameters of Kanni Goat in Tamil Nadu, Indian J. Small Rumin., Vol. 16, pp. 84-89.

Runber, M. (1983). Uber den Einfluss der Korpergrosse auf Stoffund Kraftwechsel. Z. F. Biol. 19:535. (C.F. Blaxter. 1969)

Saddiqi, H. A.; Nisa, M.; Mukhtar, N.; Shahzad, M. A.; Jabbar1, A.and Sarwar, M. (2011). Documentation of Physiological Parameters and Blood Profile in Newly Born Kajli Lambs. Asian-Aust. J. Anim. Sci. Vol. 24, No. 7: 912 – 918.

SAS Institute (2004). Statistical Analysis System, STAT/ user's guide, Release 9.1, SAS Institute, Cary NC. USA.

Sawalha, R. M., J. Conington, S. Brotherstone and B. Villanueva. (2007). Analyses of lamb survival of Scottish Blackface sheep. Anim. 1:151-157.

Shaker, Y.M., Ibrahim, N.H., Younis, F. E. and El-Shaer, H.M. (2014). Effect of Feeding Some Salt Tolerant Fodder Shrubs Mixture on Physiological Performance of Shami Goats in Southern Sinai, Egypt. Journal of American Science 2014; 10 (2s).

Shawkat, S. M.; Abou El-Nasr, H. M.; Farid, M. F. and El-Shaer, H. M. (1988). Studies on saline drinking water for camels and sheep. II-Feed utilization and nitrogen balance. Alex. J. Agric. Res., 33 (3): 107-119.

Squires, V.R. and Ayoub, A.T. (1994). Halophytes as Resource for Livestock and for Rehabilitation of Degraded Lands, Kluwer, London, pp: 315.

Symonds, M. E.; Bird, J. A.; Clarke, L.; Gate, J. J.; and Lomax, M. A. (1995). Nutrition, temperature and homeostasis during perinatal development. Exp. Physiol. 80:907-940.

Treacher, T.T. (1983). Nutrient requirements for lactation in the ewe. In: Sheep Production, Haresign, W. (ed.). Butterworths, London, pp. 133-153.

Vihan, V.S. and Rai, P. (1983). Metabolic profiles at different physiological stages in sheep and goats.Indian Journal of Veterinary Medicine 3, 1-8.

Zanjani E.D.; Mann L.I.; Burlington H.; Gordon A.S. and Wassermann L.R., (1974). Evidence for a physiologic role of erythropoietin in fetal erythropoiesis. Blood 44, 285-290.

Zumbo, A.; Sciano, S.; Messina, V.; Dirosa, A.; Assenza, A. and Piccione, G. (2011). The metabolical screening in the kid during neonatal period. Large Animal Review 17, 63-67.

التغيرات الهيماتولوجية والفسيولوجية للحملان البرقى وأمهاتها المغذاه على سيلاج النباتات المتحملة للملوحة خلال فترة ما بعد الولادة

ناجى حامد ابراهيم

قسم فسيولوجيا الحيوان والدواجن- شعبة الانتاج الحيوانى والدواجن- مركز بحوث الصحراء

أجريت هذه الدراسة على ٤٨ من النعاج البرقى البالغة (والتى يتراوح أعمارها من ٢,٥ : ٣ سنوات ومتوسط أوزانها ٣٨,٣٩ كجم) والحملان الناتجة منها (متوسط وزن الميلاد ٣,٣٥ كجم) والموجودة بمحطة بحوث رأس سدر بجنوب سيناء التابعة لمركز بحوث الصحراء وذلك بهدف دراسة التغيرات الهيماتولوجية والفسيولوجية والناشئة عن تغذية الأمهات على سيلاج النباتات المتحملة للملوحة خلال فترة شهر بعد الولادة. تم تقسيم هذه النعاج عشوائيا إلى مجموعتين متساويتين و تمت تغذية المجموعة الأولى (المجموعه الكنترول) على دريس برسيم مصرى في حين تم تغذية المجموعه الثانية (المجموعة المعاملة) على السيلاج المصنع من أربع نباتات ملحية وهى القطف بنسبة (٥٠%) وبنجر العلف بنسبة (٢٥٪) والدخن (١٥%) وحطب القرطم بنسبة (١٠%) بالإضافة للعلف المركز استخدم كنسبة من العليقة فى كلا المجموعتين. تم تزاوج كل

النعاج من كلا المجموعتين بشكل طبيعي. وتمت تغذية المجموعتين على هذه الأعلاف لمدة ٢١ يوما قبل إجراء موسم التلقيح كفترة تكيف (فترة تمهيدية) على هذه الأعلاف واستمرت طوال فترة الحمل والولادة حتى الفطام الحملان.

خلال الشهر الأول بعد الولادة تم تسجيل التغييرات فى وزن الجسم، والاستجابات الحرارية والتنفسية وصورة الدم على ٥ فترات يتخلل كل قياس أسبوع (اليوم صفر- اليوم ٧ – اليوم ١٤- اليوم ٢١- اليوم ٢٨ من الولادة) لجميع النعاج والحملان الناتجة منها وبالإضافة إلى ذلك تم تقدير محصول اللبن ومكوناته من جميع النعاج في كلا المجموعتين بعد الولادة وكل أسبوع خلال الشهر الأول بعد الولادة.

أوضحت أهم النتائج إنخفاض وزن النعاج فى كلا المجموعتين انخفاضا معنويا ($P<0.01$) خلال الشهر الأول بعد الولادة لتصل الى أوزانها الطبيعية قبل التلقيح كما أوضحت النتائج ان أوزان النعاج المغذاه على سيلاج النباتات الملحية كانت أعلى غير معنويا عن النعاج المغذاه على دريس البرسيم المصرى. كما أوضحت نتائج الدراسة أن كل من معدل النمو الكلى ومتوسط الزيادة اليومية لكل من إناث الحملان وذكور الحملان لم تتأثر بطبيعة تغذية الأمهات الناتجة منها فى حين كانت أعلى فى الذكور عن الاناث خلال جميع فترات مرحلة حديثى الولادة.

أوضحت النتائج تأثير معنوى لتغذية الأمهات على النباتات الملحية ($P<0.05$) على محصول اللبن حيث سجلت النعاج المغذاه على سيلاج النباتات الملحية ارتفاع طفيف فى محصول اللبن وقد سجلت أعلى زيادة فى محصول اللبن خلال الأسبوع الثانى بعد الولادة وعقب هذا انخفاض تدريجى حتى نهاية فترة التجربة بينما انخفض نسبة بروتين اللبن فى مجموعة سيلاج النباتات الملحية فى حين ارتفع كل الجوامد الغير دهنية والجوامد الكليه مقارنة بمجموعة الدريس.

كما أوضحت النتائج أنه بغض النظر عن فترات القياس أثناء فترة حديثى الولادة سجلت النعاج المغذاه على السيلاج انخفاضا معنويا ($P<0.01$) فى كل من الهيماتوكريت والهيموجلوبين وعدد كرات الدم البيضاء وحجم خلايا الدم الحمراء وتركيز الهيموجلوبين داخل الخلية مقارنة بمجموعة الدريس فى حين سجلت قياسات عدد كرات الدم الحمراء ونسبة الهيماتوكريت وتركيز الهيموجلوبين أعلى معدل بعد الولادة مباشرة. على العكس من ذلك سجلت الحملان أقل معدل لعدد كل من كرات الدم الحمراء والبيضاء ونسبة الهيماتوكريت وتركيز الهيموجلوبين بعد الولادة مباشرة وارتفعت تدريجيا بتقدم العمر فى حين لم تؤثر تغذية الأمهات على كل قياسات الدم للحملان الناتجة من كلا المجموعتين.

كما أنه لم تكن هناك تأثير لنوعية التغذية على درجة حرارة الجلد والمستقيم والغطاء فى جميع فترات القياس لكل من النعاج أو الحملان. ومع ذلك وبغض النظر عن نوع تغذية الامهات سجلت كل من النعاج والحملان أعلى معدل تنفس ($P <0.01$) في اليوم الأول من الولادة مقارنة بجميع فترات التجربة (اليوم ٧، ١٤، ٢١، ٢٨ بعد الولادة).

ونستخلص من هذه الدراسة أن تغذية النعاج البرقى على سيلاج النباتات المتحملة للملوحة لا تؤثر على إنتاجيتها و على الحالة الصحية لها أو لحملانها وبالتالى يسمح باستخدام النباتات الملحية المعاملة فى صورة سيلاج بشكل آمن تحت ظروف جنوب سيناء وبذلك يمكن زراعة هذه النباتات المتحملة للملوحة فى الأراضى الملحية أو الأراضى المستصلحة حديثا كأعلاف غير تقليدية لسد العجز من الأعلاف الخضراء وبخاصة خلال فصل الصيف.

الكلمات الدالة: بعد الولادة، صورة الدم، الحالة الفسيولوجية، النباتات المتحملة للملوحة، النعاج والحملان البرقى.