J. Animal and Poultry Prod., Mansoura Univ., Vol.9 (8): 357 – 365, 2018

Changes in some Hemato-Biochemical Parameters and Hormonal Aspects in Baladi and Shami Kids in Relation to Their Mortality Rates during the Postnatal Period

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ABSTRACT

The Aim of this work was finding out the relationship between haematological profile, glucose levels, cortisol and T3 hormones of Baladi and Shami kids and their mortality rate during the postnatal period under Sinai desert conditions. the present study was conducted at South-Sinai Research Station - Desert Research Center (DRC), Ras Sudr City, South Sinai Governorate, Egypt. Fifty pregnant does were randomly divided into two groups according to their breed Baladi and Shami 25 each group, Baladi does (averaged 21.12 kg LBW) while Shami does averaged 35.78 kg LBW, all animals were estrus synchronized using PGF2α during the Reproductive season from Sep to Feb 2016 and mated naturally. Gained kids were kept with their dams along the study period (Feb to Mar 2016). After parturition, 101 kids (39 and 62, Baladi and Shami, respectively) were observed for one month of age. The mortality percentages for male and female kids were respectively 33.33% and 14.28% in Baladi while were 87.50% and 36.84% in Shami. Throughout the post-partum period haematological profile, glucose, cortisol and T3 were recorded at intervals of 1 day, 7^{th},14^{th},21^{th} and 28^{th} for all kids. the blood serum was then separated and kept at -25 ° C until the analysis was performed. In general, statistical analysis showed, the haematological profile of kids showed, the overall mean of WBCs ($x10^3/\mu L$), RBCs, ($x10^6/\mu L$), Hb (g/dl) and Hct (%) in Baladi and Shami kids , were (6.81 and 7.71), (8.70 and 8.44), (9.99 and 9.91), and (30.31 and 29.72), respectively, without significant difference. The obtained results showed that overall mean of glucose levels in Baladi and Shami kids, were (76.99 and 53.74), respectively with significant difference ($P<0.051$). The overall mean of cortisol in Baladi and Shami kids, were (487.32 and 496.86), respectively without significant difference. While The overall mean of T3 hormone of Baladi and Shami kids, were (1.37 and 1.35), respectively with significant difference ($P<0.051$). Kids that died then after had lower values of all studied parameters. The percentages decrease as compared to live kids within the 14 days in WBCs was between 25% and 41% in Baladi kids, while in Shami kids was between 20% and 41%. For RBCs, the decreased was between 28% and 31% in Baladi while was between 21% and 29% in Shami kids. The percentage decrease of Hb in Baladi kids was between 27% and 35% while in Shami kids was between 23% and 34%. The percentage decrease of Ht in Baladi kids was between 12% and 22% while in Shami kids was between 8.1% and 23%. The decrease percentage of glucose levels in Baladi were between 39% and 47%, while in Shami kids, was between 21.3% and 28.5%. The cortisol hormone in Baladi kids were between 28% and 34%, while in Shami kids were 21%-31%. For T3 hormone the decrease was between 18.5% and 19.2% in Baladi while was between 14.8% and 19.1% in Shami kids. it was concluded that Hematological profile, glucose, cortisol and T3 are indicative of health status of kids and had great effect on kids' survivability. Baladi kids had significant higher values of both glucose and T3 than Shami ones that might indicate its higher ability to cope cold stress hence showed significant reduction of mortality rate.

Keywords: Shami kids; Hemato-biochemical parameters, glucose, cortisol, T3, the postnatal period.

INTRODUCTION

Goats (*Capra hircus*) have a variety of functions and display a high capability to adapt and protect themselves in the harsh environment (Girma *et al.*, 2011). In Egypt, the population of goats is estimated by 4,207,400 million heads (FAOSTAT, 2012) this population is distributed all over the country, chiefly in the River Nile valley and the delta region followed by the north-westerner littoral region and at oases (Galal *et al.,* 2005). However, in Sinai goat population is almost three folds of that of sheep CAPMAS, (2016). Therefore, increasing productivity of goats will contribute to improving the living standard of the rural and Bedouin people in such marginal areas. Shami goats were widely introduced to Egypt as they are known for high performance of dairy production and twining ability, originally exported from Syria to Egypt and other Arabic countries (ACSAD, 1998).

Haematological parameters are considered to be good indicative of the physiological health status, and it's important to evaluation and determine the animal response to different physiological stressful conditions. Gupta *et al.*, (2008). The haemato-biochemical profiles can were previously reported to assess the immunity in offsprings (Al-Seaf and Al-Harbi, 2012).

Total leucocyte counts (TLC) are a good indicator of adaptation to reverse the environmental conditions. Haematological values were certainly used to estimate stress and welfare in the animals, using neutrophil to lymphocyte ratio as an indicator (Stanger *et al.,* 2005 and Minka and Ayo, 2007). Kaushalendra (2012) stated that circulating total leucocyte count (TLC) reflect the output of the dynamic production of the bone marrow, the cells releasing to the peripheral circulation, and the storage in different organs. Sex influence the immune functions, and strongly demonstrated in vertebrates. Haldar, (2012) showed that females of the Jamunapari goats possessed the higher immune parameters than males (e.g. TLC). While, Obidike *et al.,* (2009) found high lymphocyte count postpartum. On the contrary, several studies reported that no effect of reproductive status and sex on TLC (Iriadam, 2007). Generally, the observed variations in haematological parameters might be due to variations in age, animal housing, breed type, blood sampling method, parity, sex, species and subclinical illness. Moreover, several changes in haematochemical components were measured in first month period of the kids (Zumbo *et al.*, 2011), that showed a substantial increase in red blood cells (RBC). This shift is due to the adaptive period, during which, the stem cells is converted into normal erythrocytes. That previously were produced by liver in the embryo, and by the bone marrow in adults (Piccione *et al.*, 2010). RBCs transfusion forms an essential life-saving phenomenon in the critically ill animals (Weingart *et al*., 2004; Waziri *et al*., 2010 and Mamak & Aytekin, 2012).

Differences in glucose concentration may be affected by nutrients transfer through placenta in late gestation and postpartum colostrum intake. Kid size-at-birth can affect, one, the glucose regulation during the postnatal life and, two, the growth rate during the first six months (Clarke *et al*., 2000). It was proven that, the growing rate is positively correlated with higher plasma glucose concentrations during lamb's early life (Greenwood *et al*., 2002) and that weight-at-birth has a significant effect on glucose tolerance (Bloomfield *et al*., 2007). Additionally, the free-glucose in blood plasma is an important source of energy for the thermoregulation in neonatal period (Miller *et al*., 2010).

Blood cortisol concentration is a well-known index of the response of animals to any environmental stressors and elevated cortisol concentration may be needed to face the energy deficiency during the animal's physical stress. Recently, Tajik *et al*., (2016) showed that serum concentrations of cortisol, in Raini kids, males and females had similar serum parameters.

Birth weight has significant effect on cortisol secretion in neonates (Bloomfield *et al*., 2007). In ruminant, newborns have an increase in the plasma cortisol during labor and it is essential in embryo maturation and the newborns survival (Miller *et al*., 2010). Chniter (2013) reported that cortisol plasma was slightly decreased from birth. Also, reported that plasma levels of cortisol are affected by birth weight, birth season and litter size. Kaneko *et al*., 2008 and Eshratkhah *et al*., 2010 both reported that thyroid hormones are important modulators of metabolism in general. Blackface lambs had higher thyroid hormone (T3) level at birth than Suffolk lambs, while this was correlated with higher body temperature and improved thermoregulation (Dwyer and Morgan, 2006). Most recently, Ashour *et al.,* (2015) showed that young female lambs had a lower T3 levels than in young males.

The early period for newborn lambs is a critical step which all organ functions must adapt to the surrounding environment (Saddiqi *et al*., 2011 and Chniter, *et al*., 2013). During this period, cardio-vascularity, metabolic and homeostatic mechanisms, respiration, thermoregulation, continue to complete its system (Dwyer, 2009). Adjustment of the farming and surrounding environment in the first week of newborn life's can greatly reduce newborns mortality (Nowak *et al*., 2000; Sawalha *et al*., 2007). Postnatal period -especially the first week- is crucial due to metabolic instability This reflect the importance of the intrauterine / extra-uterine transition stage ((Piccione *et al*., 2008; 2009).

The current study aimed to investigate the relationship between haematological profile, glucose levels, cortisol and T3 hormones of Baladi and Shami kids and their mortality rate during the postnatal period under Sinai extremely semi-arid desert conditions.

MATERIALS AND METHODS

The present study was carried out in South Sinai Research Station between Feb to Mar 2016. South Sinai Research Station belongs to the Desert Research Center (DRC), located in Ras Sudr City, South Sinai Province at approximately 200 km east Cairo, Egypt. The study area occupies a desert portion of Egypt (South Sinai) with extremely semi-arid environment. The prevalent climate is distinguished by high evaporation rates, low rainfall, long hot summer and short winter. While at winter nights reached very low temperature.

Meteorological parameters:

Air temperature (AT 0C) and relative humidity percentage (RH %) an animal's level was recorded using a hygrothermometer. The temperature of solar radiation (TSR 0C) was measured by the black body that made of copper and containing a centigrade thermometer. The climatic elements of the completely experimental area throughout the year were obtained from the Egyptian Meteorological Authority. The average of the temperature humidity index (THI) for each season showed in figure (1) was calculated according to Piccione *et al*. (2011) with the following equation:

$$\textbf{THI (°C)} = tbs - (0.55 - 0.55\,\varphi/100)(tbs - 14.4)$$

Where: tbs =dry-bulb temperature (°C) and φ = Relative Humidity (%).

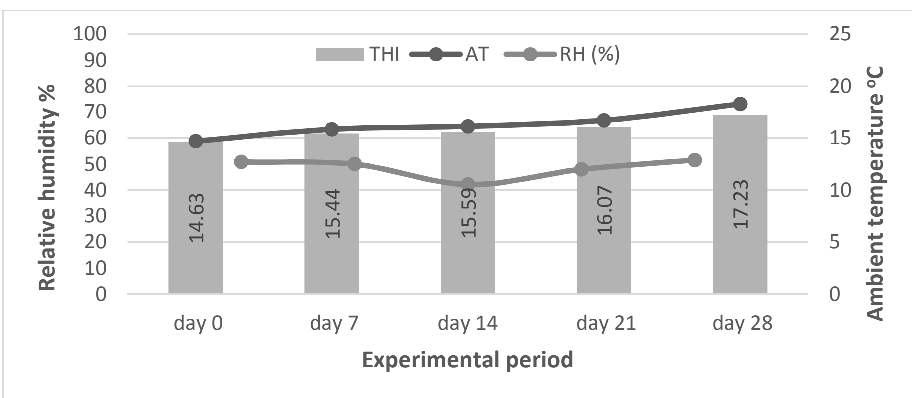

Figure 1. Graphical plot of the environmental temperature, relative humidity (expressed in %) and temperature humidity index (THI; expressed in °C), was recorded during the first month of newborn kids and their dams at postpartum.

Animals and management:

Fifty pregnant does were randomly divided into two groups according to their breed Baladi and Shami 25 each group, Baladi does (averaged 21.12 kg LBW) while Shami does averaged 35.78 kg LBW, all animals were estrus synchronized using PGF2α during the Reproductive season from Sep to Feb 2016 and naturally mated,

All goats were weighed before starting the experiment and lived in semi-open shaded-pens and fed twice a day at 8 am and 2 pm. Goats were drinking tap water 3 times per day at 8 am, 2 and 8 pm, during the experimental period.

All goats have been vaccinated against the main prevailing pestilence diseases internal and external parasites were controlled in experimental time. Animals fed uniformly with Berseem hay and concentrate feed mixture. The diet amount was adjusted according to the physiological and productive status of goats according to A.O.A.C. (1990). Concentrate feed mixture (CFM) was given to all animals to provide 100% of maintenance requirement following Kearl (1982) method.

Table 1. the chemical compositions percentage of experimental feed (% on DM bases)

Ingredients	DM	OM	CP	EE	CF	NFE	Ash
Berseemhay	100	88.95	12.22	1.18	28.55	47.00	11.05
Concentrate feed mixture	100	89.58	13.61	2.54	15.67	57.89	10.42

DM: dry matter, OM: organic matter, CP: Crude protein, EE: ether extract: CF: crude fiber, NFE: Nitrogen free extract.

Table 2. the chemical compositions (ppm) of tap water used in the experiment

Items	TDS	Na^+	K^+	Mg^+	CL^-
Tap water	600	145.2	9.09	15.3	179.88

TDS: Total dissolved salts

Blood collection and analysis

Blood samples were collected from the external jugular vein simultaneously from kids (5 ml) at (08.00 h). Sampling was carried out during the first month after parturition from kids at 1, 7th, 14th, 21st and 28th days). Blood samples were kept in vacuum glass tubes included Ethylene diamine tetra acetic acid (EDTA) anticoagulant for measuring the haematological parameters. the first sampling of the kids was taken shortly after the colostrum intake (20 min at room temprature). The tubes were centrifuged using a centrifuge model Hettich Universal 32R, Germany at 3000 rotations per minute (rpm) for 10 minutes. The serum samples stored in a deep freezer under -20 ^{0}C for biochemical analysis.

Blood complete pictures (C.B.C) were determined by a means of blood cell counter (Clinding, model HA-Vet, Belgium). The parameters of blood pictures were erythrocytes cell counts (RBCs,); white blood cells (WBCs); hematocrit (Hct); hemoglobin concentration (Hb g/dl), plasma glucose levels were determined with the aid of UV Spectrophotometer, using commercial kits (Spectrum Diagnostics Company, Egypt). In addition, cortisol and T3 hormones were evaluated using Elisa micro-plate reader (MeCan) Model Number: MCL-2100, China and commercial kits (Xema Co., Ltd, Russia).

Statistical analysis

Results were presented as means ± standard error. Two-way analysis of variance (ANOVA) considering repeated measurements was applied. Data were analyzed by the least square of analysis variance using the general linear model (GLM) procedure (SAS, 2004) according to the following model: $Yij=\mu+B_i+BS_{ij}+e_{ijk}$, where, Yij=Observations; μ=overall mean; B_i=Effect of i th breed (i:1-2); S_j=Effect of jth status (i:1-3); BS_{ij}= Interaction; e_{ij}=Experimental error. Duncan's new multiple range test (Duncan,1955) was used applied further.

RESULTS AND DISCUSSION

The Mortality rate of Baladi and Shami goat kids during the postnatal period:

Data showed in table (3) indicated that 101 kids (39 Baladi and 62 Shami) were gained and followed for up to the first month of their age. A number of 44 (9 Baladi and 35 Shami) died before they reached this age. Kids age had a significant effect ($P<0.05$) on the kids' mortality. During the first month postnatal period, 44 kid were died, in which 21 (47.72%) occurred within the first week and then death cases reduced significantly during the consecutive weeks (29.53, 13.62 and 9.09%). The overall of the mortality rate in this work was also significantly affected by the breed, recorded 23.06% for Baladi and 56.46% for Shami kids. Sex had a significant effect on the mortality rate as male kids showed a higher mortality rate than female kids (33.33% vs. 14.28%, respectively for Baladi kids and 87.50% vs. 36.84% for Shami kids, respectively). Previous reports demonstrated the same case, as in Aganga *et al.* (2005) and Hailu *et al.* (2006) higher mortality rates for male kids were recorded compared to female kids. On contrary, Petros *et al.* (2014) illustrated the insignificance of the sex on the pre-weaning mortality, while Debele *et al.* (2011) recorded higher mortality rates in Arsi-Bale female kids than male kids under a similar environmental condition. This might be related to the reported higher immunity of females as stated by Tambuwal *et al.* (2002) and by Ashour *et al.* (2015) both have reported a higher leucocyte count in female goats than in male goats.

Table 3. Means of twinning rate and mortality rate of Baladi and Shami kids during the postnatal period

Breed	Sex	Total live-born kids	Sex ratio	Twinning rate	kids die during the postnatal period as a percentage of total live-born kids								Total mortality rate %	
					Week 1		Week 2		Week 3		Week 4			
					N	%	N	%	N	%	N	%	N	%
Baladi	♀	21	53.85%	156%	2	11.11	1	5.56	0	0.0	0	0.0	3	14.28
	♂	18	46.15%		4	19.05	2	9.52	0	0.0	0	0.0	6	33.33
	Total	39	100%		6	15.38	3	7.69	0	0.0	0	0.0	9	23.07
Shami	♀	38	61.29%	248%	7	18.42	4	10.52	2	5.26	1	2.63	14	36.84
	♂	24	38.71%		8	33.33	6	25.00	4	16.67	3	12.50	21	87.50
	Total	62	100.0%		15	24.19	10	16.13	6	9.78	4	6.45	35	56.45

$$\text{Mortality rate} = \frac{\text{Dead kids number}}{\text{Total kids parturiated}} * 100$$

Haematological profile of Baladi and Shami kids during the postnatal period:

White blood cells (WBCs x10^3/ µL) count of Baladi and Shami kids during the postnatal period:

The data showed in Table (4) revealed that breed of goats, days neonatal period and their interactions (Br x St) affected WBCs count. WBCs count were insignificantly higher ($P<0.05$) in Shami kids than Baladi kids. While Shami kids showed a reduction in RBCs, Hb, and hematocrit.

Based on the present data, there was a significant increase in the overall mean values of WBCs count (p<0.05). During the 30-days post-partum, WBCs counts was increased significantly from day 1 to day 30 of post-partum (5.37, 6.40, 7.34, 7.98 and 9.19).

The present results revealed that goat breed, reproductive status and their interactions (Br x St) affected WBCs and their differential count. WBCs were insignificantly lower in Baladi kids than Shami kids. kids WBCs counts showed as increasing value during 2 weeks of postnatal period after receiving the immunoglobulins from the first milk, which can be related to the improvement in the immune system (Quigley *et al.*, 2001 and Jeffcott, 2008). It was well established that during the first week of life, neutrophils are the dominant WBCs in the kids, whereas by about week 2 of age leukocytes become dominant (Kramer, 2000). In earlier investigations conducted on calves, a similar significant variation of WBCs was attributed to a high concentration of cortisol, that just in the foetus, increases during the last days of intrauterine life and decreases progressively after the birth, for about 11-20 days; during weaning time the WBCS increase is significant (Mohri *et al.*, 2007 and Hoar and Myers, 2007). In neonates, natural suckling showed a higher value of total leukocytes which can be explicated as a natural adaptation of the immune system to the immuno-globulin delivered from the dams (Guedes *et al.*, 2010). Zumbo *et al.*, (2011). found that WBCs got significantly increased in kids during the postnatal days. on the other hand, Saddiqi et al., (2011) found that WBCs levels remained the same throughout the 30-days postnatal in Kajli lambs. Kajli lambs.

Red blood cells ($x10^6/\mu L$) count of Baladi and Shami kids during the postnatal period:

A significant increase in the overall mean values of RBCs (p<0.05) was recorded. The significant increase was during the post-partum period in both Baladi and Shami kids till the day 30[th] of partum. Piccione *et al.*, (2006) described factors involved in erythropoietin level in the kids, as he assumed that, this glycoprotein, produced by the peritubular capillary endothelial cells in the kidney in this period of life is not adequately produced because of the underdevelopment of the kidneys, still immature anatomically and functional. The increase in RBCs, during early life has been explained by (Zumbo *et al.*, 2011) as he showed that the kids exhibit a substantial increase in RBCs, during the early life, this shift 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 (Piccione *et al.*, 2010). Hemoglobin and hematocrit showed a high significant increase at the day of birth and showed low levels at the post-partum period in both breeds. The reduction of hemoglobin and hematocrit after the day of birth could be attributed to pediatric anemia (i.e. hemoglobin or hematocrit level lower than the age-adjusted reference range for healthy kids). Anemia is a physiological condition in which lower oxygen-carrying capacity due to reduced hematocrit or hemoglobin levels doesn't stand up to the metabolic demands of the body (Manat *et al.,* 2016)

Table 4. Means of the haematological profile of Baladi and Shami kids during the postnatal period

Item	Breed (B)	The neonatal periods (S) in days					Over all	±SE		
		0	7	14	21	28		B	S	B x S
WBCs ($x10^3/\mu L$)	Baladi	5.70^b	7.25^b	6.81^b	6.97^b	7.30^b	6.81^A	0.56^{NS}	0.07^*	0.34^*
	Shami	5.05^b	5.54^b	7.86^{ab}	9.00^{ab}	11.08^a	7.71^A			
	Overall	5.37^C	6.40^{BC}	7.34^{ABC}	7.98^{AB}	9.19^A				
RBCs ($x10^6/\mu L$)	Baladi	7.34^e	7.89^e	8.72^{cd}	9.33^{cb}	10.21^a	8.70^A	0.11^{NS}	0.18**	0.26^{NS}
	Shami	7.40^e	7.63^e	8.19^{de}	9.33^{cb}	9.67^{ab}	8.44^A			
	Overall	7.37^D	7.76^D	8.45^C	9.33^B	9.94^A				
Hb(g/dl)	Baladi	10.64^{ab}	11.03^a	10.20^{bcd}	9.43^{ef}	8.65^g	9.99^A	0.08^{NS}	0.13**	0.19**
	Shami	10.58^{abc}	10.08^{bcd}	10.02^{cde}	9.23f	9.63^{def}	9.91^A			
	Overall	10.61^A	10.55^A	10.11^B	9.33^C	9.14^C				
Hematocrit (%)	Baladi	33.89^a	32.08^{bc}	29.94^d	28.10^e	27.54^e	30.31^A	0.19^{NS}	0.31^{NS}	0.44^{NS}
	Shami	32.78^{ab}	31.11^{cd}	29.81^d	27.50^e	27.43^e	29.72^A			
	Overall	33.33	31.60	29.87	27.80	27.48				

Letters represent significant groups, small letters per breed, capital letter of overall values. NS= non-significant, * P<0.05, ** P<0.001

As presented in table (5) those kids had lower WBCs, RBCs,, Hb and Hct , the percentages of WBCs increased in Baladi dead kids as compared with living kids within the 14 days post-partum were between (25-41%) and (20 -25%) for Shami kids through the same period , then decreased within the following two weeks to reach (34-41%) in Shami kids Similarly in RBCs, , Hb and Hct were higher in Baladi dead kids as compared with living kids within the first two weeks post-partum it were between (28.8-31), (27.-35), (12-22), for Baladi dead kids and the percentage in Shami dead kids were (21-29), (23-33), (15-23) then decreased (28.1-28.6), (26-28), (8.1-8.7), respectively in Shami kids within the following two weeks the defects in WBCs , RBCs, Hb, and Hct were higher in Shami kids that might give reason to higher mortality rates in this breed.

Serum glucose concentrations of Baladi and Shami kids during the postnatal period:

The data presented in Table (6) concluded that Baladi breed had significantly higher values of glucose (76.99) mg/dl,) in comparison with the Shami breed (53.74). Data indicated that goat breed had a high significant effect (P <0.001) on glucose concentrations. On the other hand, reproductive status induced a significant effect (P <0.05) on serum glucose increased after birth and continued to increase until the 28[th] day of post-partum. Greenwood *et al.,* (2002) indicated that plasma glucose levels got increased rapidly after birth, as

Glucose is important in maintaining kids body temperature (Stafford *et al.,* 2007). Plasma Glucose represents an important source of energy for the newly born thermoregulation (Miller *et al.,* 2010) in addition to glycogenolysis which is stimulated during birth by the stress hormones adrenalin and noradrenalin. Adequate glucose supply is important in helping lambs maintain their birth temperature within the normal range (Stafford *et al.,* 2007). Antunović *et al*., (2017) recently reported that concentrations of glucose in the blood of kids were consistent with the consumptions of high concentrations of lactose and other Globulin coneogenic energy substrates via milk.

As shown in table (7) those kids had lower glucose the percentages of glucose increased in Baladi dead kids as compared with living kids within the 14 days post-partum were between (39-47%) and (21 -253%) for Shami kids through the same period , then decreased within the following two weeks to reach (27-28%) in Shami kids .the defects in glucose were higher in Shami kids that might give reason to higher mortality rates in this breed. in agreement with (Mellor and Stafford, 2004). reported that Low glucose levels observed in some lambs can represent a main risk of mortality as plasma glucose concentration decreases and leads to severe hypoglycaemia and Dwyer and Morgan, (2006) reported that the newlyborn survival in lambs can be improved by improving their thermoregulation ability, in this regard, recent studies by Antunović *et al* (2017) concluded that concentrations of glucose in the blood of kids were consistent with the consumptions of high concentrations of lactose and other gluconeogenic energy substrates via milk.

Table 5. Means of the haematological profile and percentage change of alive and dead Baladi and Shami kids during the postnatal period

Breed	Items	The neonatal period (Days)					
		Case	0	7	14	21	28
Baladi	WBCs ($x10^3/\mu L$)	Alive	5.70	7.25	6.81	6.97	7.30
		Dead	4.22	4.25	4.35	.	.
		% change	-25.9%	-41.3%	-36.12%	.	.
	RBCs ($x10^6/\mu L$)	Alive	7.34	7.89	8.72	9.33	10.21[a]
		Dead	5.22	5.40	6.20	.	.
		% change	-28.8%	-31.5%	-28.9%	.	.
	Hb(g/dl)	Alive	10.64	11.03	10.20	9.43	8.65
		Dead	7.02	7.11	7.43	.	.
		% change	-34.0%	-35.5%	-27.1%	.	.
	Hematocrit (%)	Alive	33.89	32.08	29.94	28.10	27.54
		Dead	26.12	26.16	26.22	.	.
		% change	-22.9%	-18.4%	-12.4%	.	.
Shami	WBCs ($x10^3/\mu L$)	Alive	5.05	5.54	7.86	9.00	11.08
		Dead	4.02	4.12	6.22	5.30	7.66
		% change	-20.3%	-25.6%	-20.8%	-41.1%	-34.1%
	RBCs ($x10^6/\mu L$)	Alive	7.40	7.63	8.19	9.33	9.67
		Dead	5.30	5.35	6.44	6.70	6.90
		% change	-28.3%	-29.8%	-21.3%	-28.1%	-28.6%
	Hb(g/dl)	Alive	10.58	10.08	10.02	9.23	9.63
		Dead	7.01	6.60	7.70	6.81	6.87
		% change	-33.7%	-34.5%	-23.1%	-26.2%	-28.6%
	Hematocrit (%)	Alive	32.78	31.11	29.81	27.50	27.43
		Dead	25.11	25.15	25.19	25.10	25.20
		% change	-23.4%	-19.1%	-15.45%	-8.7%	-8.1%

Table 6. Mean of glucose levels (mg/dl) of Baladi and Shami goat's kids during the postnatal period

Item	Breed (B)	Post-partum period (S) in days					Overall	±SE		
		0	7	14	21	28		B	S	B X S
Glucose mg/dl	Baladi	66.91	73.66	77.18	80.82	80.39	76.99[A]	2.12 **	3.06[NS]	4.74**
	Shami	52.54	51.89	51.09	55.68	56.48	53.74[B]			
	Overall	59.72	62.773	64.13	68.75	71.43				

Letters represent significant groups. NS= non-significant, * P<0.05, ** P<0.001

Table 7. Mean of glucose levels and percentage change of alive and dead Baladi and Shami kids during the postnatal period

Breed	Items	Postnatal period (Days)					
		Case	0	7	14	21	28
Baladi	Glucose (mg/dl)	Alive	66.91	73.66	77.18	80.82	80.39
		Dead	40.22	40.53	40.62	.	.
		% change	-39.8%	-44.9%	-47.3%	.	.
Shami	Glucose (mg/dl)	Alive	52.54	51.89	51.09	55.68	56.48
		Dead	40.11	40.16	40.19	40.32	40.38
		% change	23.6%	-22.6%	-21.3%	-27.5%	-28.5%

Cortisol hormone concentrations of Baladi and Shami kids during the postnatal period:

Shami kids breed had insignificantly higher values of cortisol (496.86) ug/dl,) comparison with Baladi kids breed (487.32). Data indicated that, goat breed had a high significant effect (P <0.001) on cortisol concentrations. On the other hand, reproductive status induced insignificant effect (P<0.05) on serum Cortisol levels was high at the first day of birth, while serum cortisol showed insignificantly decrease gradually on 7th, 14th, 21thand 28th of post-partum. (Table 8). Stanko *et al.,* (1991) observed that, an increase of plasma cortisol during delivery, and this plays a key role in fetal maturation in small ruminant neonates. (Liggins, 1994) and the neonatal survival (Miller *et al.,* 2010). More recent, Chniter, (2013) reported that at birth plasma cortisol levels slightly decreased, is an important regulator of fetal maturation, that may increase the production of T3 as early reported by (Liggins, 1994). These adaptations promote the partition of endogenous energy toward tissue growth rather than heat production (Bispham *et al.,* 2002).

As presented in table (9) those kids had lower cortisol the percentages of glucose increased in Baladi dead kids as compared with living kids within the 14 days post-partum were between (28-34%) and (21 - 31%) for Shami kids through the same period , then decreased within the following two weeks to reach (22-23%) in Shami kids .the defects in cortisol were higher in Shami kids that might give reason to higher mortality rates in this breed.in agreement with (Miller *et al*., 2010). observed that plasma cortisol in newborns, increased during delivery and is essential for embryo maturation and the newborn survival.

Table 8. Mean of cortisol levels (ug/dl) of Baladi and Shami goat's kids during the postnatal period

Item	Breed (B)	Post-partum period (S) in days					Overall	±SE		
		0	7	14	21	28		B	S	B X S
Cortisol ug/dL	Baladi	486.60	478.46	508.65	479.46	483.43	487.32	6.52 NS	9.42NS	14.59 NS
	Shami	512.31	515.77	471.33	497.11	487.77	496.86			
	Overall	499.46	497.12	489.99	488.28	485.60				

NS= non-significant, * P<0.05, ** P<0.001

Table 9. Mean of cortisol levels (ug/dl) and percentage change of alive and dead Baladi and Shami kids during the postnatal period

Breed	Items	Neonatal period (Days)					
		Case	0	7	14	21	28
Baladi	Cortisol (ug/dl)	Alive	486.60	478.46	508.65	479.46	483.43
		Dead	320.30	331.20	366.12	.	.
		% change	-34.1%	-30.7%	-28.02%	.	.
Shami	Cortisol (ug/dl)	Alive	512.31	515.77	471.33	497.11	487.77
		Dead	351.40	362.11	370.20	379.23	380.14
		% change	31.4%	29.7%	21.4%	23.7%	-22.1%

Triiodothyronine (T3) hormone concentrations of Baladi and Shami kids during the postnatal period:

The data presented in Table (10) concluded that, Baladi kids breed had the higher values of T3 (1.37, ng/dl,) comparison with Shami kids (1.35, ng/dl). Data indicated that, goat breed had significant effect (P <0.001) on the T3 levels.

The reproductive status induced a significant effect (P<0.05) on serum T3 levels it was high at the day of birth and showed stable until 14th day then it showed significant decrease at 21th, and 28th of post-partum.

The same trend of the present results in this investigation agreed with that the newborn lambs had higher T3 level than older lambs (Peeters *et al.,* 1989 and Celi *et al.,* 2003). Doubek *et al.,* (2003) exhibited that Merino lambs has stronger T3 levels than Romney-Marsh lambs aged 2 to 3 days when submitted to cold stress. As shown in table (11), those kids had lower T3 the percentages of T3 increased in Baladi dead kids as compared with living kids within the 14 days post-partum were between (18-19%) and (17 -19%) for Shami kids through the same period , then decreased within the following two weeks to reach (16-17%) in Shami kids .the defects in T3 were higher in Shami kids that might give reason to higher mortality rates in this breed. In agreement with (Dwyer and Morgan, 2006) who reported that kids had higher T3 level while this was correlated with higher body temperature and improved thermoregulation.

Table 10. Mean of T3 levels (ng/dl) of Baladi and Shami goat's kids during the postnatal period

Item	Breed (B)	Post-partum period (S) in days					Overall	±SE		
		0	7	14	21	28		B	S	B X S
T3 ng/dL	Baladi	1.35^b	1.35^b	1.36^b	1.40^a	1.41^a	1.37^A	0.01*	0.01*	0.006**
	Shami	1.28^c	1.34^b	1.40^a	1.36^b	1.36^b	1.35^B			
	Overall	1.32^C	1.35^B	1.38^A	1.38^A	1.39^A				

Letters represent significant groups, small letters per breed, capital letter of overall values. NS= non-significant, * P<0.05, ** P<0.001

Table 11. Mean of T3 levels (ng/dl) and percentage change of alive and dead Baladi and Shami kids the postnatal period

Breed	Items	Neonatal period (Days)					
		Case	0	7	14	21	28
Baladi	T3 ng/dl	Alive	1.35	1.35	1.36	1.40	1.41
		Dead	1.09	1.10	1.10	.	.
		% change	-19.2%	-18.5%	-19.1%	.	.
Shami	T3 ng/dl	Alive	1.28	1.34	1.40	1.36	1.36
		Dead	1.09	1.10	1.13	1.12	1.13
		% change	-14.8%	-17.9%	-19.1%	-17.6%	-16.9%

REFERENCES

ACSAD (1998). Annual Report, Animal Livestock Unit (in Arabic).

Aganga, A.A.; Omphile, U.J.; Chabo, R.G.; Kgosimore, M. and Mochankana, M. (2005): Goat production under traditional management in Gaborone agricultural region in Botswana. J. Anim. Vet. Adv., 4(5):515-566.

Al-Seaf, A.M & Al-Harbi, K.B. (2012). Variability of disease resistance, haematological parameters & lymphocyte proliferation in two goat breeds & their F1 & F2 crosses. Int. J. Food Agric. Vet. Sci. 2 (1): 47-53.

Antunović, Z; Šperanda, M; Novoselec, J; Đidara, M; Mioč, B; Klir, Ž; & Samac, D. (2017). Blood metabolic profile and acid-base balance of dairy goats and their kids during lactation. *Veterinarski arhiv*, *87*(1), 43-55.

Ashour, G . ; Neama, A. A. ; Dessouki, S. M. and Shihab, O. H . (2015) : Blood hematology, metabolites and hormones in newborn sheep and goat from birth to weaning. Int. J. Advan. Res; 3 (7): 1377-1386.

Bispham, J; Budge, H; Mostyn, A; Dandrea, J; Clarke, L; Keisler, D. H; ... & Stephenson, T. (2002). Ambient temperature, maternal dexamethasone, and postnatal ontogeny of leptin in the neonatallamb. *Pediatric Research*, *52*(1), 85.

Bloomfield, F.H; Oliver, M.H; Harding, J.E. (2007). Effects of twinning, birth size and postnatal growth on glucose tolerance and hypothalamo–pituitary–adrenal function in post-pubertal sheep. Am. J. Physiol. 292, E231–E237.

CAPMAS. (2016). Central Agency for Public Mobilization and Statistics CAPMAS. Yearbook. http://www. capmas.gov.eg/Pages/StaticPages. aspx?page_id=5035

Celi, P., Trana, A. D and Quaranta, A. (2008). Metabolic profile and oxidative stress status in goats during the peripartum period. *Aust J. Exp. Agric.,* 48(7): 1004-1008.

Celi, P; Seren, E; Celi, R; Parmeggiani, A; & Di Trana, A. (2003). Relationships between blood hormonal concentrations and secondary fibre shedding in young cashmere-bearing goats at their first moult. *Animal Science*, *77*(3), 371-381.

Chniter, M; Hammadi, M; Khorchani, T; Sassi, M. B; Hamouda, M. B & Nowak, R. (2013). Aspects of the neonatalphysiology have an influence on lambs' early growth and survival in prolific D'man sheep. Small Ruminant Research, 111(1), 162-170

Clarke, L; Firth, K; Heasman, L; Juniper, D.T; Budge, H; Stephenson, T; Symonds, M.E. (2000). Influence of relative size at birth on growth and glucose homeostasis in twin lambs during juvenile life. Reprod. Fertil. Dev. 12, 69–73.

Debele, G.; Duguma, M. and Hundessa, F. (2011): Effect of different factors on mortality rate of Arsi-Bale kids in mid rift valley of Ethiopia. Glob. Vet. 6(1):56-60.

Doubek, J; Slosarkova, S; Fleischer, P; Malá, G; & Skrivanek, M. (2003). Metabolic and hormonal profiles of potentiated cold stress in lambs during early postnatal period. *Czech Journal of Animal Science*, *48*(10), 403-412.

Dwyer, C.M. (2009). The ethology of domestic animals. In: Jensen, P. (ed.). The behavior of sheep and goats. CAB International, London UK. pp. 161-176.

Dwyer, C.M; Morgan, C.A; (2006). Maintenance of body temperature in the neonatallamb: effects of breed, birth weight, and litter size. J. Anim. Sci. 84, 1093–1101.

Eshratkhah, B; Sadaghian, M; Eshratkhah, S; Pourrabbi, S; & Najafian, K. (2010). Relationship between the blood thyroid hormones and lipid profile in Moghani sheep; influence of age and sex. *Comparative clinical pathology*, *19*(1), 15-20.

FAOSTAT. (2012). Characterization & value addition to local breeds & their products in the near east & north Africa, FAO Animal production & health paper No. 19-21 November 19-21 November 2012, Rabat, Morocco.

Galal, S; Abdel-Rasoul, F; Anous, M.R. and Shaat, I. (2005): On-station characterization of small ruminant breeds in Egypt. In: L. In˜ iguez (ed.), Characterization of Small Ruminant Breeds in West Asia and North Africa. Small Rumin. Res;60, 75–81.

Girma, D, Misgana, D & Feyisa, H. (2011). Effect of Different Factors on Mortality Rate of Arsi- Bale Kids in Mid Rift Valley of Ethiopia. Adami-Tullu Agricultural Research Center. Global Veterinaria 6 (1): 56-60, 2011

Greenwood, P.L; Hunt, A.S; Slepetis, R.M; Finnerty, K.D; Alston, C; Beermann, D.H; Bell, A.W. (2002). Effects of birth weight and postnatal nutrition on the neonatalsheep. III. Regulation of energy metabolism. J.Anim. Sci. 80, 2850–2861.

Guedes, M.T.; Zacharias, F.; Couto, R.D.; Portela, R.W.; Santos, L.C; Santos, S.C.; Pedroza, K.C.; Pelxoto, A.P.; Lopez, J.A. and Mendoca-Lima, F.W.(2010): Maternal transference of passive humoral immunity to Haemonchus contortus in goats. Vet. Immunol. Immunopathol; 136: 138-143.

Gupta, U., Jahan, S., Chaudhary, R., & Goyal, P. K. (2008). Amelioration of radiation-induced haematological and biochemical alterations by Alstonia scholaris (a medicinal plant) extract. *Integrative cancer therapies*, *7*(3), 155-161.

Hailu, D.; Mieso, G.; Nigatu, A.; Fufa, D. and Gamada, D. (2006): The effect of Environmental factors on pre-weaning survival rate of Borana and Arsi-bale Kids. Small Rum. Res; 66:291-294.

Haldar, K.C. (2012). Correlation between peripheral melatonin & general immune status of domestic goat, Capra hircus: A seasonal & sex dependent variation.Small Ruminant Research 107, 147–156.

Hoar, B.R & Myers, D.M. (2007). Effect of an immunostimulant administrated at or near weaning on weight gain & health of beef calves. Bovine Practitioner 41, 48-52.

Iriadam, M. (2007). Variation in certain haematological & biochemical parameters during the peri partum period in Kilis does. Small Ruminant Research 73,54–57.

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

Kaneko, J.J; Harvey, J.W. and Bruss, M.L. (2008). Clinical biochemistry of domestic animals. Vol. 6. Elsevier academic press, Amsterdam.

Kaushalendra, C.H. (2012): Correlation between peripheral melatonin and general immune status of domestic goat, Capra hircus: A seasonal and sex dependent variation. Small Rum. Res., 107: 147-156.

Kearl, L. C. (1982). Nutrient requirements of ruminants in developing countries. International Feedstuffs Institute, Utah, U.S.A.

Kramer, J.W.(2000): Normal Hematology of Cattle, Sheep and Goats. In: Schalm's Veterinary Hematology, Ed. Lippincott, Williams and Wilkins, Fifth Edi; 166: 1078-1079.

Liggins, G.C. (1994). The role of cortisol in preparing the fetus for birth. Reprod. Fertil. Dev. 6, 141–150.

Manat, T. D., Chaudhary, S. S., Singh, V. K., Patel, S. B., & Puri, G. (2016). Hematobiochemical profile in Surti goats during post-partum period. *Veterinary world*, *9*(1), 19.

Mamak, N; & Aytekin, İ. (2012). Principles of Blood Transfusion. In *Blood Cell-An Overview of Studies in Hematology*. InTech.

Mellor, D.J & Stafford, K.J. (2004). Animal welfare implications of the neonatalmortality & morbidity in farm animals. Vet. J. 168, 118–133.

Miller, D.R; Blache, D; Jackson, R.B; Downie, E.F; Roche, J.R. (2010). Metabolic maturity at birth and neonate lamb survival: association among maternal factors, litter size, lamb birth weight, and plasma metabolic and endocrine factors on survival and behaviour. J. Anim. Sci. 88, 581–593.

Minka, N.S. and Ayo, J.O. (2007): Physiological responses of transported goats treated with ascorbic acid during hot dry season. Anim. Sci. J; 78(2):164-172.

Mohri, M; Sharifi , K. and Eidi, S. (2007). Hematology and serum biochemistry of Holstein dairy calves: age related changes and comparison with blood composition in adult. *Res. Vet.Sci;* 83: 30–39.

Nowak, R; Porter, R.H; Levy, F; Orgeur, P; Schaal, B. (2000). Role of mother-young interactions in the survival of offspring in domestic mammals. Reviews of Reproduction. 5:153-163.

Obidike, I.R.; Aka, L.O. and Okafor, C.I. (2009): Time-dependant peri-partum haematological, biochemical and rectal temperature changes in West African dwarf ewes. Small Rum. Res; 82: 53–57.

Peeters R, Buys N, Pauwels T, Kuhn ER, Decuypere E, Siau O and Van Isterdael J .(1989). Relationship between the thyroidal and gonadal axes during the estrus cycle of ewes of different breeds and ages. Reproduction Nutrition Development 29, 237–245.

Petros, A. ; Kassaye, A. and Berhanu, S. (2014): Pre-weaning kid mortality in Adamitulu Jedokombolcha District, Mid Rift Valley, Ethiopia . J. Vet. Med. Anim. Health, 6(1) : 1-6.

Piccione G. Casella S. Lutri L. Vazzana I.Ferrantelli V. Caola G. (2010). Reference values for some haematological, haematochemical, and electrophoretic parameters in the Girgentana goat. Turk. J. Vet. Anim. Sci. 34(2): 197-204.

Piccione G; Sciano, S; Messina V; Casella S & Zumbo, A. (2011). Changes in serumtotal proteins, proteins fractions & albumin globulins ratio during the neonatalperiods in kids & theirmothers after parturition. Annals of Animal Science 11, 249-258.

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.; Costa, A.; Bertolucci, C.; Borruso, M.; Pennisi, P. and Caola, G. (2006): Acid-base balance modifications in the lambs and goat kids during the first week of life. Small Rum. Res; 63: 304–308.

Piccione, G; Giovanni, C; Claudia, G; Alessandro, Z. and Pietro, P. (2009). Selected biochemical serum parameters in ewes during pregnancy, post parturition, lactation and dry period. *Anim. Sci. Papers and Reports*, 27: 321-330.

Quigley, J.D; Strohbehn, R.E; Kost, C.J; O'brien, M.M. (2001). Formulation of colostrum supplements, colostrum replacers & acquisition of passive immunity in the neonatalcalves. Journal of Dairy Science 84, 2059-2065.

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

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

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

Stafford, K.J; Kenyon, P.R; Morris, S.T; West, D.M. (2007). The physical state & metabolic status of lambs of different birth rank soon after birth. Livestock Sci. 111, 10-15.STEELE M; 1996. Goats. Macmillan Publishers.

Stanger, K.J.; Ketheesan, A.J. and Parker, C.J. (2005): The effect of transportation on the immune status of Bos indicus steers. J. Anim. Sci; 83:2632-2636.

Stanko, R. L., Guthrie, M. J., & Randel, R. D. (1991). Response to environmental temperatures in Brahman calves during the first compared to the second day after birth. *Journal of animal science*, *69*(11), 4419-4427.

Tajik, J; Nazifi, S; & Eshtraki, R. (2016). The influence of transportation stress on serum cortisol, thyroid hormones, and some serum biochemical parameters in Iranian cashmere (Raini) goat. *Veterinarski arhiv*, *86*(6), 795-804.

Tambuwal, F. M; Agaie, B. M. & Bangana, A. (2002). Haematological & Biochemical Values of Apparently Healthy Red Sokoto Goat s. Proceeding of 27th Annual Conference, Nigerian Society of Animal production (NSAP), March, 17-21, FUTA, Akure, Nigeria. pp. 50-53.

Waziri, M.A.; Ribadu, A.Y. and Sivachelvan, N. (2010): Changes in the serum proteins, haematological and some serum biochemical profiles in the gestation period in the Sahel goats. Vet. Arhiv. , 80(2):215-224.

Weingart C; Giger U & Kohn, B .(2004). Whole blood transfusions in 91 cats: a clinical evaluation. Journal of Feline Medicine and Surgery. 6(3): 139–148.

Zumbo, A; Salvatore S; Vanessa M; Stefania C; Ambra R. D. & Giuseppe, P. (2011). Haematological profile of messinese goat kids & their dams during the first month post-partum.", Animal Science Papers & Reports vol. 29 (2011) no. 3, 223-230.

التغير في بعض صفات الدم والمركبات الحيوية والهرمونية وعلاقتة بمعدل النفوق فى جداء الماعز البلدى والشامى خلال فترة ما بعد الولادة

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يهدف هذا البحث الى دراسة العلاقة بين بعض القياسات الهيماتولوجية والبيوكيميائية والهرمونية ومعدل ، النفوق فى الجداء للماعز البلدى والشامى خلال فترة ما بعد الولادة تحت ظروف صحراء سيناء .اجريت هذة التجربة بمحطة بحوث راس سدربجنوب سيناء التابعة لمركز بحوث الصحراء ،وزارة الزراعة واستصلاح الأراضي، إستخدم فى هذة الدراسة عدد خمسون عنزة تم تقسيمهم تبعاً للسلالة الى مجموعتين بعدد 25 عنزة بلدى و 25 عنزة شامى ، بمتوسط وزن الجسم (21.12 كجم) ،(35.78 كجم) على التوالي. ، تم عمل موسم تناسلي لجميع الأمهات و إحداث تزامن شبقى بإستخدام هرمون البروستاجلاندين $PGF2_{\alpha}$.جميع الامهات تم تلقيحها وولادتها طبيعياً ، تم إيواء المواليد مع امهاتهم لمدة شهر من فبراير الى مارس 2016. تم الحصول على مائة وواحد مولود 39 بلدى و62 شامى، اخذت عينات دم وحصلنا منها على السيرم وتم حفظة على درجة حرارة -20 م ، قدرات بة بعض الصفات الهيماتولوجية وبعض القياسات البيوكيميائية والهرمونية فى اليوم الاول بعد الميلاد ، وبعد سبعة ايام ، وبعد اسبوعين ، وبعد 21 يوما، وبعد 28 يوم من الميلاد . حيث اظهرات النتائج الاتى :- ان نسبة النفوق كانت (33.33% و 14.28%) فى كل ذكور واناث الماعز البلدى على التوالى ، بينما ذادت نسبة النفوق فى ذكور والاناث الماعز الشامى حيث بلغت (87.5% و36.84%) على التوالى.- عدم وجود فروق معنوية فى عدد كرات الدم البيضاء والحمراء والهيموجلوبيولين ونسبة الهيماتوكريت فى مواليد البلدى والشامى، بينما كانت هناك فروق معنوية فى مستوى الجلوكوز بين مواليد الماعز البلدى والشامى ، وكذلك كانت هناك فروق معنوية فى تركيز هرمون الغدة الدرقية ثلاثى اليود (T3) . - لم يحدث نفوق فى مواليد الماعز البلدى بعد 14 يوم من الميلاد ، بينما استمر فى مواليد الماعز الشامى حتى نهاية التجربة فى الشهر الاول من الميلاد.- تشير نتائج هذة الدراسة ان هناك علاقة بين مقاييس الدو ومحتوياتة الحيوية والهرمونية والتى تعتبر دليل على الحالة الصحية للمواليد وبين هذة ونسبة النفوق حيث انها كانت اعلى فى مواليد الماعز الشامى عن البلدى والذى انعكس على نسبة النفوق المعنوى فى مواليد الماعز البلدى مقارنة بالمواليد الشامى تحت ظروف صحراء سيناء .