EFFECT OF AGE, LAMBS SEX AND BIRTH TYPE ON SOME HAEMATOLOGICAL AND BIOCHEMICAL PARAMETERS OF AWASSI EWES IN IRAQ

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Received on: 11.04.2021
Accepted on: 09.05.2021

ABSTRACT

This study was conducted on 100 Awassi ewes in two private flocks near Kirkuk city, IRAQ to investigate the effect of location, age, litter sex and birth type on some haematological, biochemical parameters of Awassi ewes. Three blood samples collected monthly after parturition from jugular vein in using EDTA tubes. Determined haematological and biochemical parameters include: haematocrit (HCT), haemoglobin concentration (Hb), serum glucose (SGLU), cholesterol (SCHOL), total protein (TP), albumin (ALB), potassium and sodium (K, Na) parameters. Location had significant (P<0.0001) effect on HCT, HB, K also significant (P≤0.003) effect on TP and ALB with non- significant effect on SGLU and SCHOL where location 1 surpassed location 2. Age had significant (P≤0.05) effects in HCT, HB parameters and non-significant effect in K and Na parameters, where 3 years old ewes surpassed 4 and 5 years old in HCT and HB. Sex of litters showed non-significant effect in all parameters except serum Na. Correlation coefficients of HCT with Hb are positive significant (P≤0.01). HCT and HB showed positive significant (P≤0.05) correlations with TP and Na and negative significant (P≤0.05) correlations with ALB and Na. SGLU had the only significant (P≤0.05) positive correlation with SCHOL. Potassium level showed negative significant (P≤0.05) correlations with HCT, HB, SCHOL and TP while its correlation with AL was positive significant (P≤0.05). Na exerted positive significant (P≤0.05) correlations with HCT, HB and K and negative significant (P≤0.05) correlations with both SCHOL and TP.

***Key words**:* Haematological and biochemical profiles, age, litter sex and birth type, correlations, Awassi ewes

Introduction

Iraqi Awassi sheep among other local sheep breeds is expected to get more economic importance in the near future due to increasing Iraqi population, increasing demand for meat production specially lamb and mutton (Juma and Alkass, 2000) and recent decrease in sheep population in Iraq. There is urgent need to increase meat production from sheep which rely on increasing sheep population size and increasing the productivity per ewes, through improving health status that can detect by an important and reliable tool such as haematological parameters (Aktas *et al*., 2007). Several haematological parameters could be useful for prognosis and diagnosis of many diseases (AL- Hadithy *et al*., 2014). Determination of the current health status of location animals could have low reliability without haematological parameters, these parameters provide the opportunity for more accurate diagnosis. Several studies confirmed that the reference values of haematological parameters could be influenced by some factors such as the age, sex, breed, health status and nutrition (Etim *et al*., 2014). In Iraq, however, there are some studies documented the reference values of haematological parameters in Awassi ewes (Jawasreh *et al*., 2009), but the studies about the factors that could affect those parameters are scanty. Therefore, this study was conducted to determine the effect of the flock, age, sex and birth type of litters on some haematological parameters in Awassi ewes.

Materials and Methods

This study carried on 100 Awassi ewes in two private sheep location near Kirkuk city, Iraq to investigate the effect of some fixed effects (location, ewes age, litters sex and birth type) on some haematological and biochemical parameters of Awassi ewes. All ewes reared and managed under normal farm conditions with feeding system depends mainly on black barley (1 kg/head/day) without grazing which reduced to approximately 650 gm/head/day with grazing in addition to free offer of wheat straw. All ewes were under routine veterinary care during study period.

Three blood samples collected at monthly intervals after parturition from jugular vein in tubes with EDTA for haematological parameters determination. Part of blood sample used to separate blood serum to measure serum biochemical and electrolyte parameters. Determined haematological, biochemical and electrolyte parameters include: haematocrit (HCT), haemoglobin concentration (Hb), serum glucose (SGLU), cholesterol (SCHOL), total protein (TP), albumin (ALB), potassium and sodium concentrations.

Data analyzed using the general linear model procedure within SAS software (SAS, 2005) applying Anova and Duncan multiple range test (Duncan, 1955) according to following linear model.

$Y_{ijkl} = \mu + F_i + A_j + S_j + T_k + e_{ijkl}$

The observation in i^{th} location, i^{th} lamb sex and k^{th} lambs type of birth.

μ Overall mean
F_i location effect 1 and 2
A_j ewes age 3, 4 and 5 and years
S_j lambs sex effect 1= male and 2 = female
T_k lambs type of birth effect 1= single and 2 = twi
e_{ijk} Experimental error (NID 0, δ^2e)

Results and Discussion

Haematological and electrolytes means HCT, HB, K and Na are represented in Table 1, the overall means were 28.03%, 9.30 g/dl, 4.42 mEq/l and 147 mEq/l, respectively, these means are in agreement with the means recorded by many authors

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Table 1: Location and age effect in hematological and electrolytes parameters (LS means ± S.E)

	General mean	Location		Age		
		1	2	3	4	5
Number	100	50	50	39	28	15
HCT %	28.03 ± 0.27	29.83 ± 0.30^{a}	26.23 ± 0.26^{b}	28.07± 0.36^{a}	26.99 ± 0.44^{b}	27.17± 0.59^{b}
HB g/dl	9.30 ± 0.09	9.89 ± 0.10^{a}	8.71 ± 0.09^{b}	9.64 ± 0.12^{a}	8,96 ± 0.15^{b}	9.02 ± 0.19^{b}
K mEq/l	4.78 ± 0.06	4.42 ± 0.06^{b}	5.13 ± 0.09^{a}	4.61 ± 0.08^{a}	4.99 ± 0.13^{a}	4.84 ± 0.14^{a}
Na mEq/l	147 ± 0.73	148 ± 0.96^{a}	145 ± 1.08^{a}	147 ± 1.04^{a}	146 ± 1.31^{a}	147 ± 1.67^{a}
SGLU mg/dl	56.80±0.55	56.44 ± 0.68^{a}	57.17 ± 0.86^{a}	56.03 ±0.70^{a}	58.39 ±1.17^{a}	56.48 ± 1.13^{a}
SCHOL mg/dl	65.92±0.83	66.44 ± 0.70^{a}	65.39 ±1.51^{a}	66.25 ± 0.95^{ab}	66.04 ±1.89^{ab}	65.11 ±1.96^{b}
TP g/l	6.81 ± 0.05	6.97 ± 0.06^{a}	6.65 ± 0.07^{b}	6.92±0.06^{ab}	6.71±0.10^{b}	6.71 ±0.10^{ab}
ALB g/l	2.89 ± 0.02	2.77 ± 0.02^{b}	3.02 ± 0.03^{a}	2.84 ± 0.03^{a}	2.98 ± 0.04^{a}	2.90 ± 0.05^{a}

Different letters for each factor in the same rows denote significant (P<0.05) differences

Table 2: Litters sex and type of birth effect in haematological and electrolytes parameters (LS means ± SE)

	Litter Sex		Litter Type of birth	
	Male	Female	Single	Twin
No	51	49	97	3
HCT %	28.03 ± 0.38^{a}	28.03 ± 0.39^{a}	28.10 ± 0.27^{a}	24.83 ±0.17^{b}
HB g/dl	9.29 ± 0.13^{a}	9.31 ± 0.13^{a}	9.32± 0.09^{a}	8.23 ± 0.07^{b}
K mEq/l	4.72 ± 0.07^{a}	4.84 ± 0.10^{a}	4.77± 0.06^{a}	4.87 ± 0.68^{a}
Na mEq/l	145 ± 0.95^{b}	148 ± 1.06^{a}	147 ± 0.73^{a}	141 ± 6.17^{a}
SGLU mg/dl	57.51 ±0.73^{a}	56.05 ± 0.81^{a}	56.79 ±0.56^{a}	57.52 ±0.55^{a}
SCHOL mg/dl	67.98 ±1.29^{a}	6377. ± 0.95^{b}	65.93 ± 0.85^{a}	65.15 ± 5.30^{a}
TP g/l	6.87 ± 0.06^{a}	6.75 ± 0.07^{a}	6.89 ±0.05^{a}	7.24 ±0.10^{a}
ALB g/l	2.94 ± 0.03	2.86 ± 0.03^{a}	2.89 ±0.02^{a}	3.02 ±0.05^{a}

Different letters for each factor in the same rows denote significant (P<0.05) differences.

Table 3: Phenotypic correlation between haematological and biochemical parameters

	HCT	HB	FBS	SCHOL	TP	AL	K	NA
HCT	1	0.9**	0.13^{NS}	0.02^{NS}	0.20*	-0.28**	-0.23*	0.36**
HB			0.13^{NS}	0.021^{NS}	0.20*	-0.27**	-0.24*	0.35**
FBS				0.23*	0.13^{NS}	0.19^{NS}	0.06^{NS}	0.10^{NS}
SCHOL					-	0.14^{NS}	-0.20*	-0.10^{NS}
TP						-0.02^{NS}	-0.20*	-0.10^{NS}
AL							0.23*	-0.20*
K								0.23*
Na								1

(Jawasreh *et al*., 2010; Ibrahim, 2014; Nse Abasi *et al*., 2014; Oramari *et al*., 2014), while recorded HCT mean are lower than what recorded by Carlos *et al.* (2015) and Gorkhali (2017). Table 2 represent serum biochemical concentrations (SGLU, SCHOL, TP and ALB), the overall means were 56.80 mg/dl, 65.92 mg/dl, 6.81 g/l and 2.89 g/l, respectively. These means are in agreement with the overall means recorded by Oramari *et al.* (2014), Borjesson *et al*. (2000) and Forhead *et al.* (2002).

Location had significant (P≤0.0001) effects in HCT, HB and K where location 1 surpassed location 2, these result are in agreement with what mentioned by Al-Samarai and Al-Jbory (2017) location effect in serum glucose and cholesterol were non- significant while its effect in TP and ALB were significant (P<0.003). A quantifiable variation was reported in blood parameters due to management, feeding level. These results confirmed the previous results of significant effect of the location on some haematological parameters. The results obtained by Šimpraga *et al*. (2013), revealed that the effect of location (which include climate and food availability) was more pronounced than that of breed and seasons in organically raised sheep in Croatia.

Age had significant (P≤0.05) effects in HCT and HB and non-significant effect in K and Na (Table 1) where 3 years old ewes surpassed 4 and 5 years old in HCT and HB, these findings are in agreement with the result of Oramari *et al*. (2014) and Rahman *et al*. (2018). Also it was found that the age of the sheep decreased the values of blood SCHOL, TP (Carlos *et al*., 2015). Rahman *et al.* (2018) pointed to significant age effect on TP. While Al-Samarai and Al-Jbory (2017) reported no significant age effect on haematological parameters of sheep, also Rahman *et al.* (2018) pointed to non-significant age effect on SGLU and SCHOL. Jabbar *et al*. (2012) concluded that higher erythrocyte count was responsible for increased HCT value in growing buffalo heifers as compared to adult heifers; apparently due to high basal metabolic rate, leading to increased rate of erythropoiesis and hence increase in erythrocyte count.

Sex of litters showed non-significant effect in haematological, electrolyte and biochemical parameters except in serum Na parameters (Table 2), with slight non-significant increase in SGLU, SCHOL, TP and ALB in ewes with male lambs than ewes with female lambs, this may be due to higher average milk yield in ewes rearing male lambs than ewes rearing female lambs (Gürsu and Aygün, 2014) and its subsequent effect in biochemical parameters (AL-Jelawi *et al.,* 2011).

A significant decrease of HCT and HB were determined in Awassi ewes with twin birth with slight increase in K and Na in ewes gave birth to single lambs and reversed situation founds in TP and ALB which disagree with Al-Thuwaini *et al*. (2020).

Correlation coefficients among blood parameters are represented in Table 3. HCT correlation with Hb are positive significant (P≤0.01), similar correlation reported by Antunoviæ *et al*. (2017) and Oramari *et al*. (2014). HCT and

HB showed positive significant (P≤0.05) correlations with TP and Na and negative significant (P≤0.05) correlations with ALB and Na. SGLU had the only significant (P≤0.05) positive correlation with SCHOL. Potassium level showed negative significant (P≤0.05) correlations with HCT, HB, SCHOL and TP while its correlation with AL was positive significant (P≤0.05). Na exerted positive significant (P≤0.05) correlations with HCT, HB and K and negative significant (P≤0.05) correlations with both SCHOL and TP. These values are similar to what reported by Rouatbi *et al.* (2020).

Acknowledgement

Authors thanks Library staffs for their valuable contribution and timely help.

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