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EFFECTS OF STAGE OF MATURITY AND GENOTYPE ON GROWTH, BLOOD CHEMICAL CONSTITUENTS AND CARCASS CHARACTERISTICS OF BARKI, AWASSI AND ½ AWASSI . ½ BARKI MALE LAMBS

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ABSTRACT

Thirty six Barki, Awassi and ½ Awassi.½ Barki male lambs weaned at 12 weeks of age and fattened to the 11th month of their age were used in the present study. Daily gains and total gains were recorded and blood serum constituents were determined. Nine animals from each genotype were slaughtered at three stages of maturity i.e. 50, 65 and 85%. Slaughter weight, dressing percentage, the 9-10-11th rib cuts physical and chemical analysis were determined.

The results revealed that : (1) Awassi breed was favour than Barki and ½ Awassi.½ Barki in final body weight and daily gain. (2) The lowest fattening period was 84 days for Barki to reach 50% of maturity whereas it was 308 days for Awassi to reach 85% of maturity. (3) Serum blood Hb, PCV, glucose, total lipids, total protein, globulin, ALT and AST values decreased when age of animal increase whereas albumin and A/G ratio were low in the first stage of life. A positive correlation between average daily gain and blood parameter was found. (4) Awassi carcass weight was higher than the two other genotypes. Significant differences between genotypes at the three stages of maturity were found, there were no significant differences in dressing percentages between genotypes. (5) Lean percentage decreased with the increase in mature weight in the three genotypes. Barki had a higher percentage of lean at 65 and 85% mature weight than Awassi and ½ Awassi.½ Barki. (6) The fat content differed in the three genotypes. Subcutaneous fat increased with the increase in mature weight, Barki had the lowest at 50% mature weight. Total fat followed the same trend and increased with the increase in maturity. (7) Chemical analysis of meat showed that protein and ash percentages decreased and fat content increased with the increase in maturity.

Keywords : Maturity, genotype, growth, blood chemical constituents, barki, awassi, male lambs.

INTRODUCTION

The increase in slaughter weight has a major influence on the choice of sheep breed with a steady trend toward heavier rams that can sire a fast growing. The carcass should have a high percentage of closely trimmed boneless, retail cuts, so production systems and breeding schemes are being re-evaluated to identify economically feasible approaches to producing consumer acceptable for meat lambs. Breed characterization for carcass composition is essential in identifying potential genetic resources for meat lamb production, Snowder *et al.* (1990), however, optimal lamb slaughter weight to produce a carcass which would certify the demands of the consumers have not been clearly identified. The optimal slaughter weight range of each breed should determine under varying conditions to produce

desirable carcass. Attention should be made to the fact that carcass composition can also be altered at given weight by various environmental factors.

Growth rate is influence by some physiological factors, the blood constituents one of the main important parameters which shows the animal health statues till its maturity and slaughtering weight. The objective of the present study was designed to estimate some blood constituents which affects animal health and growth and to compare the amount of lean, fat and bone in the entire carcass and in each whole sale cut of lambs from three genotypes of sheep slaughtered at three degrees of maturity.

MATERIALS AND METHODS

Animals feeding and management :

Thirty six male lambs belonging to the herd of Borg El-Arab Research Station of the Animal Production Research Institute were used in this study. They were of three genotypes i.e. Barki, Awassi and ½ Awassi.½ Barki. The animals were divided into three groups before weaning and weaned at 12 weeks, and fed according to the NRC (1985) fattening requirements. The pelleted concentrate diet used consisted of: 7% decorticated cotton seed meal; 4% soyabean meal; 20% wheat bran; 20% rice bran; 23% ground maize; 15% molasses; 8% rice gluten; 2.5% limestone and 0.5% salt. Berseem hay was also offered as 1% of the animal's body weight. The animals were fed and watered twice a day and were weighed weekly during the fattening period. Daily gains of lambs during the fattening period were calculated.

Blood samples collection and analysis :

Blood samples were collected monthly started from preweaning at one month of age tell the age of eleven months, samples were taken from each animal by jugular puncture into test tubes. Whole blood was used for haemoglobin (Hb) and packed cell volume (PCV) determination as described by Oser (1965). Serum samples were obtained by centrifugation of blood at 3000 rpm for 20 min then stored at –20°C until analysis. Serum samples were analysed for total protein, total lipids, glucose and albumin (A) while globulin (G) content was obtained as the difference between total protein and albumin and A/G ratio was calculated. The enzymes alanine amino transferase (ALT) and aspartate amino transferase (AST) were also determined. All serum contents determinations were carried out using bio-Mericux Kits.

Slaughter trail :

A total of 27 lambs (9 Barki, 9 Awassi and 9 ½ Awassi.½ Barki) were slaughtered at 50, 65 and 85% of the mature weight. Mature body weight was estimated as 60 kg for Barki (Mokhtar *et al.* 1991), 80kg for Awassi (Epstein, 1982), whereas the mature weight of ½ Awassi.½ Barki was estimated as the average mature weight of Barki and Awassi.

The slaughter weights for each genotype (3 lambs at each weight) :

Genotype	Mature weight (kg)	50% of mature weight (kg)	65% of mature weight (kg)	85% of mature weight (kg)
Barki	60	30	39.0	51.0
Awassi	80	40	52.0	68.0
½ Awassi. ½ Barki	70	35	45.5	59.5

The lambs were fasted for 18 hr perior to slaughter. After slaughter and skining all abdominal and thoracic organs were removed and weighed. Carcass weight was expressed as percentage of slaughter weight and as percentage of empty body weight to obtain two estimates of dressing percentage. The right 9-10-11th rib cuts were physically separated into their components (lean, fat and bone). The resultant lean and fat were minced in an electric mincer several times until a homogeneous mixture was formed. A sample of the mixture of each animal was kept for chemical analysis. Moisture, ash, protein and fat contents were determined according to the methods of A.O.A.C. (1970).

Statistical analysis :

Data of each trait was analysed using the least squares procedure described by SAS (1989). The following model was used :

$$Y_{ijk} = \mu + B_i + F_j + (BF)_{ij} + e_{ijk}$$

Where,

Y_{ijk} = The observation ijk;
μ = General mean;
B_i = An effect due to the i^{th} genotype;
F_j = An effect due to the j^{th} stage of maturity;
$(BF)_{ij}$ = The interaction effect of the i^{th} genotype with j^{th} stage of maturity;
e_{ijk} = Random error.

Differences among sub-classes were tested using the Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

1- Daily gain :

Means of daily gain, total gain, final weight and length of fattening period are presented in Table (1). Highly significant differences ($p<0.01$) in final weight, total gain, length of fattening period and daily gain were detected due to genotype and stage of maturity. The final weight of Awassi was higher at the three stages of maturity than those of Barki or ½ Awassi.½ Barki. Weight of Awassi was 35% higher than that of Barki and 23% higher than that of ½ Awassi.½ Barki at 50% mature weight.

Table (1) : Means ± SE of body weight and daily gain for the three tested genotypes.

Item	% of mature body weight	Genotype			Level of significance		
		Barki	Awassi	½ Awassi.½ Barki	Genotype	Stage of maturity	Interaction
Initial body weight (kg)					NS	NS	NS
	50	18.67 ± 0.34	20.67 ± 1.15	19.17 ± 0.45			
	65	18.33 ± 1.36	21.17 ± 0.74	20.33 ± 1.36			
	85	19.38 ± 1.48	19.17 ± 1.62	19.17 ± 1.62			
Final body weight (kg)					**	**	*
	50	31.33 ± 0.90	42.33 ± 0.33	34.67 ± 1.22			
	65	40.67 ± 0.34	52.33 ± 0.22	47.00 ± 1.02			
	85	52.33 ± 0.34	68.33 ± 0.88	59.00 ± 0.29			
Fattening period (day)					**	**	**
	50	84.00 ± 5.00	94.00 ± 2.00	100.00 ± 6.00			
	65	158.00 ± 4.00	171.00 ± 3.00	162.00 ± 2.00			
	85	287.00 ± 3.00	308.00 ± 8.00	267.00 ± 3.00			
Total gain (kg)					**	**	NS
	50	12.67 ± 0.90	21.67 ± 0.85	18.50 ± 0.90			
	65	22.33 ± 1.22	31.17 ± 1.22	23.67 ± 1.87			
	85	32.44 ± 1.13	49.17 ± 1.18	39.83 ± 1.19			
Daily gain (gm/day)					**	**	NS
	50	150.00 ± 6.0	229.00 ± 12.00	185.00 ± 7.000			
	65	141.00 ± 8.0	182.00 ± 11.00	155.00 ± 2.000			
	85	111.00 ± 3.0	160.00 ± 4.00	149.00 ± 3.000			

** : Significant at $p<0.01$. * : Significant at $p<0.05$. NS : Non-significant.

The final body weight of Awassi was also higher than those of Barki and ½ Awassi. ½ Barki by 30% and 10%, respectively at 65% mature weight. The percentage of superiority was 30% and 15% higher than Barki and ½ Awassi. ½ Barki at 85% mature weight, respectively.

The superiority of Awassi in daily gain could be attributed in part to its higher mature weight and to some genetic improvement achieved by the breed, Epstein (1982) and Galal *et al.* (1975). The average daily gains obtained in this study were 229, 182 and 160 gm for Awassi at 50, 65 and 85% mature weight, respectively. These averages were higher than those obtained by Hassan *et al.* (1996) and Galal *et al.* (1975). The high average of daily gain of the three genotypes at 50% of mature body weight indicate that the faster growth of lambs is achieved early in their lives (Blackburn *et al.*, 1990). The results also showed that there were significant differences ($p<0.01$) between the three genotypes in the fattening period. The shortest period of fattening was 84 days for Barki to reach its 50% mature weight, whereas the longest period was 308 days for Awassi to reach its 85% mature weight. The higher daily gain of Awassi and the growth rate that decreased with advancing in age and maturity was in line with the results of Taylor *et al.* (1989).

2- Blood chemical and biochemical constituents :

Data presented in Fig (1) and statistical analysis in Table (2) showed that hemoglobin (Hb) concentration is affected significantly ($p<0.01$) with age. Upcott *et al.* (1972) reported that Hb concentration increased in fetal lambs to reach a maximum concentration at the 130th day after birth. Also, Magdy (1991) reported that Hb concentration increased with age to seven weeks and then decreased after weaning to remained in the range of 9.7-11.2g/dl. The data of the present study are in agreement with such finding, where Hb concentration decreased after weaning and its value ranged between 9.5-11.9g/dl. Animals used in this study were born in winter, therefore their Hb concentrations were high at start. Hassanein (1988) observed that Hb concentrations in lambs were higher in winter than in summer. This denotes an adaptive response for increasing oxygen intake and metabolic heat production in winter born lambs to counteract the effect of cold weather.

Our finding of higher Hb concentration in early age of lambs was in contrary with the findings of Sharma *et al.* (1973), Hawkey *et al.* (1983) and Joshi *et al.* (1991), however, the age groups and the breeds studied by them were different from our investigation. Results presented in Fig. (1) and Table (2) indicate that PCV values followed a similar trend to that of Hb concentration being reduced in older animals. The decline in PCV was apparent at post-weaning till the seventh month, and that was in agreement with the finding of Magdy (1991), who mentioned that Hb concentration in whole blood is a product of its concentration in red blood cells and the amount of these cells per unit volume of blood. Hematocrit value was determined to elucidate the apparent change in Hb concentration being produced, mainly by a reduction in Hb concentration in whole blood. This is due to the dilution of blood, that is reduction in cell counts (PCV) rather than drop in Hb concentration in cells. Joshi *et al.* (1991) and Jelinek *et al.* (1984)

however reported trends of PCV values in contrary to that of the present study. Statistical analysis showed insignificant genotype differences in Hb concentration and PCV values, (Table 2).

The results presented in Fig. (1 and 3) and Table (2) indicated that blood glucose and total lipids decreased significantly ($p<0.01$) with age. The lowest values of serum glucose and total lipids were found at the 8th month of the experiment for the three genotypes studied but lowest value of plasma glucose was observed in Barki breed at the 7th month. Lindsay and Leat (1975) reported that on the 1st day of age, plasma glucose was 38.4 mg/dl and then reached a maximum level of 105.3 mg/dl on 16th day of age, then slowly declined to become 69.6 mg/dl at the age of 162 days. Similar results were reported by Hassanein (1988), whereas Magdy (1991) reported that after weaning, plasma glucose of winter-born lambs increased to become 83 mg/dl on the 13th week of age then fluctuated within the range of 66-79 mg/dl in ram lambs. It was concluded that older lambs seem to need less amount of glucose, this may be due to the decrease in metabolic rate as body insulation developed with age, hence reducing heat flow to the environment. Also, older lambs use other sources of energy than glucose such as volatile fatty acids. The plasma lipid values are low at birth but with suckling the concentration rises rapidly to double the adult values by 3 weeks post-partum, and then declines (Masters, 1964 and Leat, 1967). Weaning of the lamb results in an intermediate fall in plasma lipids (Leat and Gillman, 1964). Statistical analysis in Table (2) indicated that breed differences in serum glucose and total lipids were highly significant. The crossbreds had higher values of serum glucose than Barki and Awassi whereas Barki had lower values of serum total lipids than Awassi and crossbreds.

Concentration of serum total proteins, and globulin decreased ($p<0.01$) gradually all over the growth period (Fig. 2 and Table 2) except in the fourth and fifth months. Albumin had the same trend except in the second, fourth and fifth months. This may be due to, either increased rate of protein turnover or its slower clearance. Post-weaning in the third month of the experiment, there was a marked decrease in TP, albumin and globulin. In the present study, the greater globulin values in the early age of the lambs, could be attributed to the more efficient and sensitive immune system in new born lambs than in older lambs. Topps and Thompson (1984) stated that the concentration of blood albumin was considered as a reflection of the animal's ability to synthesize and store protein. Results presented in Table (2) and Fig. (2) showed that A/G ratio was affected significantly ($p<0.01$) by age. At the early stage of life A/G ratio was lower than in other months of the experiment. This was apparents due to higher values of globulin and lower values of albumin. Aminlari and Mehran (1988) mentioned in their study that no significant difference was found in total protein of sheep and goats at different ages. However, the age groups and breeds studied by them were different from the present investigation. Ashour *et al.* (2000) found that TP and A/G ratio not affected by the age in buffalo calves and Egyptian cattle while albumin values was increased with age. The present results showed that differences between breeds in serum total proteins, albumin, globulin and A/G ratio were insignificant (Table 2). Singh *et al.* (1982) and More *et al.*

(1980), similarity found no breed differences in TP, albumin, globulin or A/G ratio.

Results presented in Fig. (3) and Table (2) indicated that values of AST and ALT enzymes decreased significantly ($p<0.01$), by the advance in age. Their highest values were in the 1st month of the experiment (pre-weaning). There was a marked decrease in their values in the 3rd month (post weaning) after which they increased till the 4th month for AST or the 5th month for ALT, then decreased during the following six months of the experiment. Aminlari and Mehran (1988) showed in their study that AST and ALT were not affected by age of sheep and goats; however, they used different breeds and ages from that used in the present study. No breed differences were detected in AST and ALT (Table 2). All interactions between age and genotype in all parameters studied were insignificant. Correlations between daily gain and blood parameters are shown in Table (3). All blood parameters were positively correlated with daily gain. Blood parameters reflect the animal health status and hence the growth rate. High correlations indicate that selection on basis of any sheep blood parameter would lead to a moderate or high genetic daily gain improvement. However, this should be studied.

2- Carcass weight and dressing percentage :

The differences in Slaughter weight and hot carcass weight due to genotypes or stage of maturity were significant (Table 4); Awassi had the highest and Barki had the lowest weights. Weights of the crossbreds were intermediate. When carcass weight was expressed as percentage of live body weight the differences among genotypes or stages of maturity were not significant. At the lower weight Barki had the highest dressing percentage, whereas at the higher weight (85%) Awassi had the highest dressing percentage. The dressing percentage of the crossbred was superior at the 65% stage of maturity. The results were in agreement with Hassan and El-Feel (1991) and Galal *et al.* (1975). The superiority of Awassi in dressing percentage however, was mainly due to its excessive fat tail. When dressing percentage was estimated on empty body weight basis, the results indicated that at 50% of the mature weight dressing percentage were 61.03, 59.22 and 56.98 for Barki, crossbreds and Awassi, respectively.

The dressing percentage of Barki and crossbreds decreased as the lambs matured. Such change was not apparent in Awassi breed.

3- Physical carcass composition :

The difference among genotypes at the three stages of maturity in percentage lean; subcutaneous fat; intermuscular fat and total fat but not bone were significant (Table 5). Stage of maturity had similar significant effects on such components as well as bone percentage. Significant interaction was detected between genotype and stage of maturity in percentages of all dissected components. The results showed that in all genotypes as the body weight increased percentages lean decreased and percentages intermuscular fat and total fat increased. As for bone the percentage decreased as the body weight increased, however the rate of increment was not steep in Barki and Awassi.

Table (2) : Mean squars for the effect of genotype and age and their interaction on Hb, PCV, glucose, total protein, albumin (A), globulin (G) , A/G ratio, AST, ALT and total lipids in Barki, Awassi and their crossbred.

S.O.V	d.f.	Hb	PCV	Glucose	Total protein	Alb	Glo	A/G	AST	ALT	Total lipids
Genotype (B)	2	0.57	8.69	49.19**	0.43	0.03	0.12	0.01	48.38	1.03	6589.83**
Age (A)	10	38.59**	265.51**	1257.48**	7.88**	1.06**	4.16**	0.12**	484.88**	11.63**	84376.23**
A x B	20	0.13	1.50	14.60	0.13	0.06	0.09	0.01	23.73	0.38	345.62
Error	264	0.29	3.35	10.57	0.28	0.20	0.09	0.01	16.74	0.43	623.44

** : Significant at p<0.01.

Table (3) : Correlation between blood chemical and biochemical parameters and average daily gain.

Breed	Hb	PCV	Glucose	Total Protein	Albumin	Glubiolin	A/G	AST	ALT	T. lipids
Barki	0.18	0.10	0.15	0.23	0.34	0.10	0.34	0.12	0.25	0.23
Awassi	0.03	0.33	0.06	0.24	0.18	0.11	0.21	0.30	0.25	0.24
½ Barki. ½ Awassi	0.23	0.06	0.08	0.31	0.26	0.29	0.22	0.30	0.30	0.21

Table (4) : Means ± SE of slaughter weight and dressing percentage for the three tested genotypes.

Item	% of mature body weight	Genotype			Level of significance		
		Barki	Awassi	½ Awassi.½ Barki	Genotype	Stage of maturity	Interaction
Slaughter weight (kg)					**	**	**
	50	30.50 ± 0.29	39.83 ± 0.45	34.88 ± 0.17			
	65	39.67 ± 0.34	52.17 ± 0.17	45.33 ± 0.58			
	85	51.33 ± 0.34	66.67 ± 0.57	59.17 ± 0.61			
Hot carcass weight (kg)					**	**	*
	50	15.07 ± 0.30	18.60 ± 0.46	16.80 ± 0.21			
	65	18.90 ± 0.50	25.40 ± 0.68	22.75 ± 1.57			
	85	24.62 ± 0.48	33.65 ± 0.44	28.87 ± 1.25			
Dressing percentage of live body weight					NS	NS	NS
	50	49.40 ± 0.89	46.69 ± 0.79	48.23 ± 0.97			
	65	47.63 ± 0.41	48.68 ± 1.14	50.11 ± 2.76			
	85	47.95 ± 0.76	50.49 ± 1.04	48.80 ± 2.17			
Dressing percentage of empty body weight					NS	*	NS
	50	61.03 ± 1.55	56.98 ± 0.54	59.22 ± 1.24			
	65	55.32 ± 0.97	55.47 ± 1.56	58.46 ± 2.67			
	85	56.28 ± 1.36	56.84 ± 1.68	54.04 ± 1.87			

** : Significant at p<0.01. * : Significant at p<0.05. NS : Non-significant.

Table (5) : Means ± SE of the physical components of the 9-10-11th rib cuts of the three tested genotypes.

Item	% of mature body weight	Genotype			Level of significance		
		Barki	Awassi	½ Awassi.½ Barki	Genotype	stage of maturity	Interaction
Lean %					**	**	**
	50	56.04 ± 0.73	55.10 ± 0.93	57.63 ± 1.51			
	65	50.70 ± 1.90	47.33 ± 0.45	46.38 ± 1.07			
	85	46.21 ± 0.26	45.71 ± 1.21	44.47 ± 0.58			
Bone %					NS	**	*
	50	24.48 ± 0.55	20.32 ± 0.93	23.80 ± 0.73			
	65	18.08 ± 2.45	17.29 ± 0.45	20.25 ± 0.82			
	85	22.23 ± 0.26	19.61 ± 1.11	17.19 ± 0.95			
Subcutaneous fat %					*	**	*
	50	9.97 ± 0.56	15.94 ± 1.21	12.84 ± 0.66			
	65	22.92 ± 2.45	25.63 ± 0.13	24.68 ± 0.76			
	85	23.05 ± 0.26	20.71 ± 0.85	22.81 ± 0.78			
Intermuscular fat%					**	**	**
	50	9.52 ± 0.61	8.63 ± 0.59	5.71 ± 0.45			
	65	8.24 ± 0.20	9.77 ± 0.48	8.68 ± 0.63			
	85	8.50 ± 0.15	13.96 ± 0.33	15.52 ± 0.39			
Total fat %					*	**	**
	50	19.49 ± 0.65	24.57 ± 1.19	18.55 ± 0.56			
	65	31.22 ± 1.23	35.41 ± 0.42	33.36 ± 0.72			
	85	31.55 ± 0.35	34.68 ± 0.67	38.32 ± 0.61			

** : Significant at p<0.01. * : Significant at p<0.05. NS : Non-significant.

Subcutaneous fat percentage increased with the increase in weight however, at the 85% mature weight the percentages were a little lower than what was expected in the three genotypes. Barki had lower percentage of subcutaneous fat than the other two genotypes at 50% and 65% mature weight, whereas the Awassi had lower percentage subcutaneous fat than the Barki and ½ Barki. ½ Awassi at 85% mature weight.

Breed differences in lean percentage was reported occur even when breed comparisons were made at the same stage of physiological maturity (Croston *et al.*, 1979; Taylor *et al.*, 1980). Hudson *et al.* (1990) stated that selection based upon growth rate favors faster growing and larger but later maturing animals produce leaner carcasses than earlier maturing animals when compared at a constant weight. Thompson *et al.* (1979) concluded that differences in bone % among breeds are small and economically unimportant.

The results indicated that as animals grow from 50 to 85% mature live weight, the proportion of fat increased, the proportions of lean and bone decreased. The results of Taylor *et al.* (1989) showed that the proportion of fat increased, the proportion of bone declined and the proportion of muscle scarcely changed as the animals matured.

4- Chemical composition of 9-10-11th rib cuts :

No significant differences between genotypes were found in percentages dry matter, moisture, protein, fat and ash. Stage of maturity however had significant effects on all these components. As the animals become more mature percentages of dry matter and fat increased whereas percentages of protein and ash decreased. Hassan *et al.* (1996) reported that protein and fat percentages lower than what was found in the present study whereas, Hassan and El Feel (1991) reported similar percentage of ash.

Table (6) : Means ± SE of chemical components of 9-10-11th rib cuts of the three tested genotypes.

Item	% of mature body weight	Genotype			Level of significance		
		Barki	Awassi	½ Awassi.½ Barki	Genotype	Stage of maturity	Interaction
Dry matter %					NS	*	NS
	50	47.67 ± 1.24	41.64 ± 2.09	43.58 ± 0.37			
	65	46.49 ± 3.90	48.67 ± 4.60	49.99 ± 1.27			
	85	50.14 ± 5.80	54.49 ± 2.55	57.12 ± 5.05			
Moisture %					NS	*	NS
	50	52.33 ± 1.20	58.95 ± 2.77	56.42 ± 0.37			
	65	53.50 ± 3.90	51.32 ± 4.61	50.00 ± 1.26			
	85	49.86 ± 5.87	45.51 ± 2.55	42.87 ± 5.06			
Protein %					NS	**	NS
	50	63.97 ± 6.78	60.69 ± 2.03	58.43 ± 5.18			
	65	54.89 ± 7.06	58.49 ± 3.04	50.09 ± 0.66			
	85	46.28 ± 5.58	53.17 ± 4.91	37.06 ± 1.43			
Fat %					NS	**	NS
	50	32.05 ± 7.08	34.72 ± 1.58	36.52 ± 5.08			
	65	40.97 ± 7.25	37.32 ± 2.53	44.83 ± 0.60			
	85	50.30 ± 5.41	43.89 ± 4.83	59.70 ± 1.94			
Ash %					NS	*	NS
	50	3.48 ± 0.33	4.09 ± 0.59	4.05 ± 0.11			
	65	3.64 ± 0.19	3.72 ± 0.75	3.38 ± 0.43			
	85	2.92± 0.29	2.43 ± 0.13	2.75 ± 0.80			

** : Significant at p<0.01. * : Significant at p<0.05. NS : Non-significant.

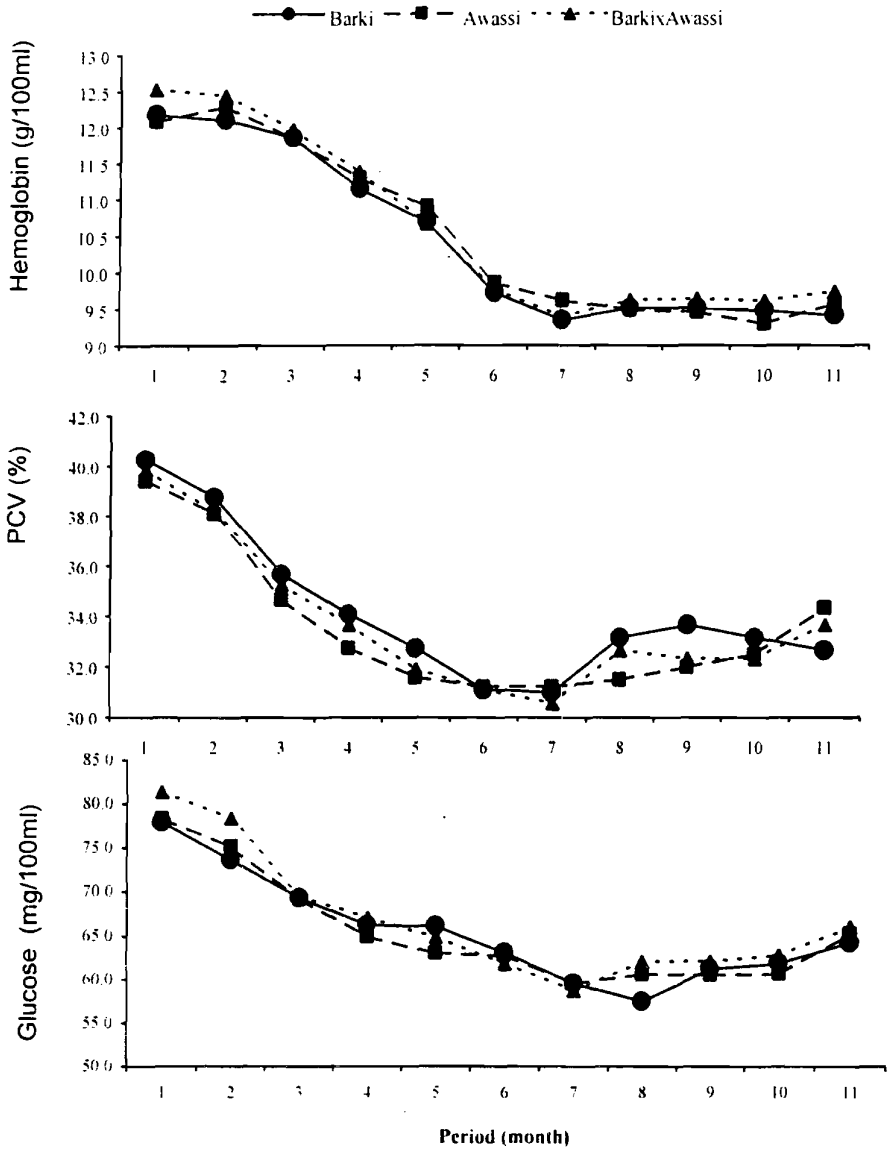

Figure (1) : Changes in hemoglobin, PCV and glucose concentrations in growing Barki, Awassi and crossbreed ½ Awassi. ½ Barki male lambs.

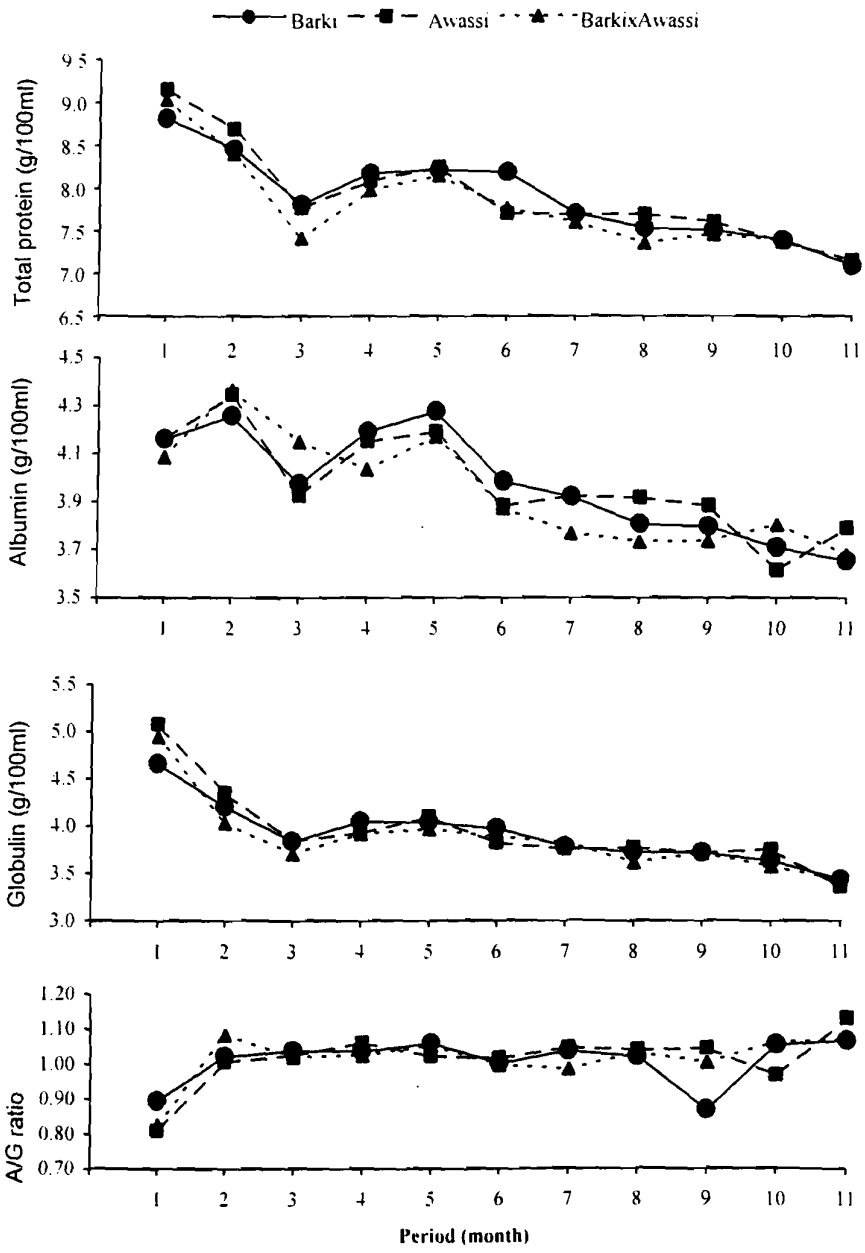

Figure (2) : Changes in total protein, albumin (A), globulin (G) and A/G ratio in growing Barki, Awassi and crossbreed ½ Awassi. ½ Barki male lambs.

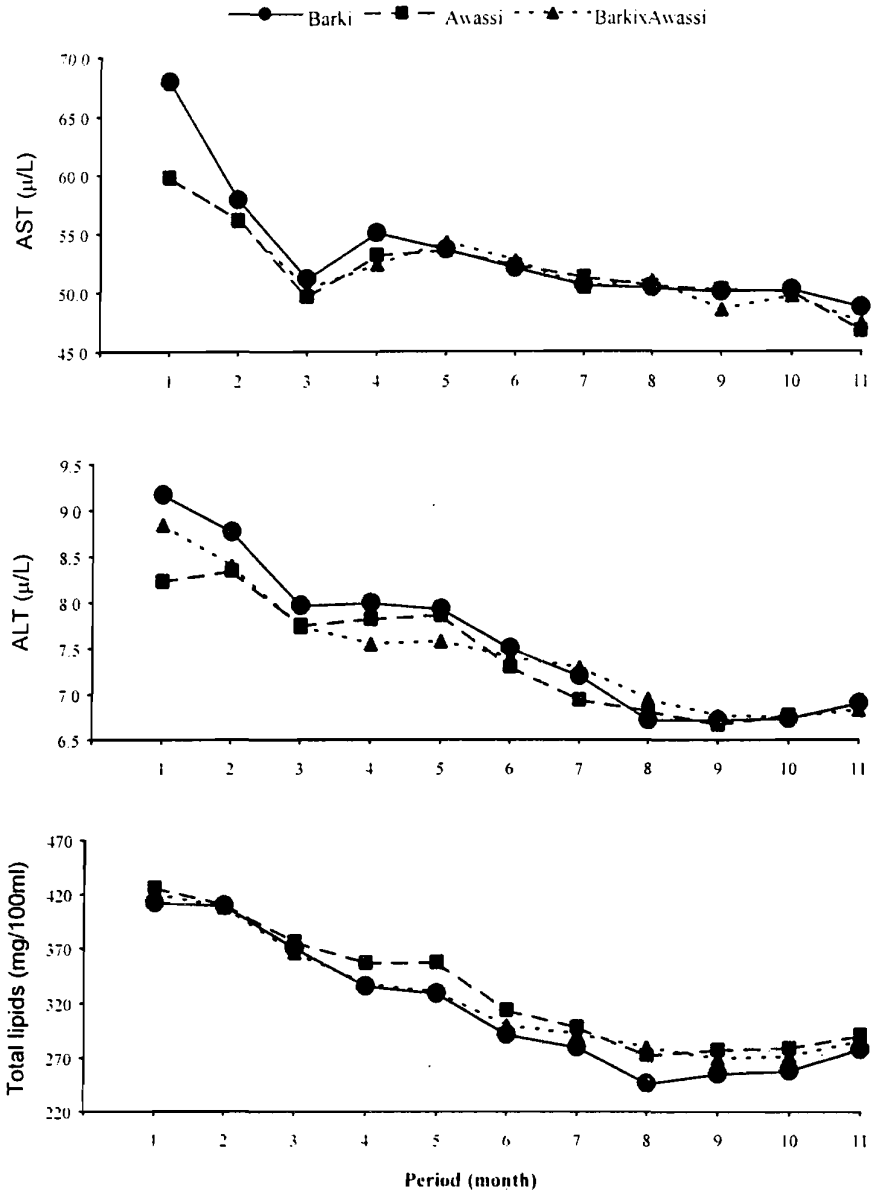

Figure (3) : Changes in aspartate amino transaminase (AST), alanine amino transaminase (ALT) and total lipids in growing Barki, Awassi and crossbreed ½ Awassi . ½ Barki male lambs.

REFERENCES

Aminlari, M. and M.M. Mehran (1988). Biochemical properties of cerebrospinal fluid of sheep and goat comparison with blood. J.Vet. Med., 35: 315-319.

Ashour, G.; A.S. El-Naggar; M.M. Yossef and H.M. Mourad (2000). Growth performance and metabolic profile of Egyptian cattle and Buffalo calves. Proc. 3rd All Africa Conf. Anim.. Agric. 11th Conf. Egyptian Soc. Anim. Prod., 469-477.

Association of Offical Agricultural Chemists (A.O.A.C.) (1970). Official methods of analysis, (2nd Ed.) Washington, D.C.

Blackburn, H.D.; G.D. Snowder and H.A. Glimp (1990). Breed, nutrition and slaughter weight effects on lean lamb production. Research Progress Report, U.S. Sheep Experimental Station, 144-151.

Croston, D.; D.W. Jones and A.J. Kempster (1979). A comparison of the performance and carcass characteristics of lambs by nine sire breeds. Anim. Prod., 28: 456-462.

Duncan, D.B. (1955). Multiple range and multiple F tests Biometrics, 11: 1-42.

Epstein, H. 1982. Awassi sheep. World Review of Animal Poduction. 44: 9-18.

Galal, E.S.E.; Y.S. Ghanem; M.A. Farid; M.H. Fahmy and A.E.M. Seoudy (1975). Carcass traits and feed-lot performance of Barki, Merino and Awassi breeds of sheep and some of their crosses. Egyptian J. Anim. Prod., 15: 33-46.

Hassan, A.H. and F.M.R. El-Feel (1991). The effect of breed, level of feeding, age and slaughter weight on performance and carcass traits of lambs. Egyptian J. Anim. Prod., 28: 255-268.

Hassan, A.H.; S.T.M. Fahmy; M.T. Mousa and A.I.A. Suliman (1996). The effect of crossbreeding between Chios and Ossimi sheep on growth performance and carcass characteristics of male lambs. Egyptian J. Anim. Prod., 33: 61-70.

Hassanein, A.M. (1988). The antagonism between fecundity and survival ability in sheep. Physiological studies on some blood parameters in relation to the antogonism between reproductive performance and viability. Ph.D. thesis, Fac. Agric. Georg-August Univ. Gottingen, W.G.

Hawkey, C.M.; M.G. Hart and A.K. Fitzgerald (1983). Age-related haematological changes in captive Barbari sheep (Ammotragrus lervia). Research in Veterinary Science, 35: 118-119.

Hudson, L.W.; H.A. Glimp and G.D. Snowder (1990). Production methods to increase lean and reduce fat in lamb. A Review Research Progress Report, U.S. Sheep Experiment Station, 119-136.

Jelinek, P.; J. Illek; I. Helanova and Z. Frais (1984). Biochemical and haemotological values of the blood in rams during rearing. Acta Veterinary Brno., 3-4: 143-150.

Joshi, S.; V.P. Vadodaria, R.R. Shah and K.R. Tajne (1991). Packed cell volume and haemoglobin values in relation to age, seasons and genetic groups, and their correlation with wool traits in various grades of patanwadi sheep. Indian J. Anim. Sci., 61: 728-734.

Leat, W.M.F. (1967). Plasma lipids of new-born and adult ruminants and of lambs from birth to weaning. J. Agric. Sci., 69: 241-264.

Leat, W.M.F. and T. Gillman (1964). Metabolism and physiological significant of lipids. Wiley, London.

Lindsay, D.B. and W.M.F. leat (1975). Carbohydrate and lipid metabolism. In : The blood of sheep. Composition and function. Ed. By M.H. Blunt., 45-56.

Magdy, M.A.E. (1991). Growth performance of lambs as affected by thermoregulation characteristics. Ph.D. Thesis, Fac. Agric. Cairo, Univ.

Masters, C.J. (1964). Fatty acid components of ovine plasma lipids during rumen development. Aust. J. Biol. Sci., 17: 183-189.

Mokhtar, M.M.; H. Mansour; A.A. Younis and H. El-Gabbas (1991). Growth and mature size in fat-tailed Barki sheep. Egyptian J. Anim. Prod., 28 (1) : 39-46.

More, T.; A. Singh and A.K. Ray (1980). Note on the effect of thermal exposure on body fluid composition of different breeds and breed crosses of sheep. Indian J. Anim. Sci., 50: 207.

N.R.C. (1985). Nutritient requirements of sheep (6th Ed.). National Academy Press, Washington, D.C.

Oser, B.L. (1965). Hawk's physiological chemistry, 14 Ed., Tate McGraw Hill, Publishing. Co. LTD. Bombay, New Delhi.

SAS, (1989). SAS User's Guide : Basics SAS Ins., Carng. N.C.

Sharma, D.P.; P.D. Malik and K.L. Sapra (1973). Age-wise and species wise hematological studies in farm animals. Indian J. Anim. Sci., 43: 289-295.

Singh, K.; T. More; A.K. Ral and S.A. Karim (1982). Anote on the adaptability of native and crossbred sheep to hot summer conditions of smi-arid and arid areas. J. Agric. Sci., 99: 525.

Snowder, G.D.; H.A. Glimp and R.A. Field (1990). Optimal slaughter weights in four breeds for lean carcasses. Research Progress Report, U.S. Sheep Experimental Station, 140-143.

Taylor, C.S.; J.I. Murray and M.L. Thonney (1989). Breed and sex differences among equally mature sheep and goats 4- carcass muscle, fat and bon. Anim. Prod., 49: 385-409.

Taylor, C.S.; M.A. Mason; T.H. McClell (1980), Breed and sex differences in muscle distribution in equally mature sheep. Anim. Prod., 30 : 125-133.

Thompson, J.M.; K.D. Atkins and A.R. Gllmour (1979). Carcass characteristics of heavy weight crossbred lambs 3-Distribution of subcutaneous fat, intermuscular fat, muscle and bone in the carcass. Australian Journal of Agricultural Research, 30: 1215-1221.

Topps, J.H. and J.K. Thompson (1984). Blood characteristics and the nutrition of the ruminants. Her Majesty's stationary office. London. Document No. 3: 281-293.

Upcott, D.H.; C.N. Hebert and M. Robins (1972). Erythrocyte and leukocyte parameters in fetal lambs. Res. Vet. Sci., 13: 507-510.

تأثير مستوي النضج والتركيب الوراثي علي النمـــو ومركبـات الـدم الكيماويـة ومواصفات الذبيحة في ذكور الحملان البرقى والعواسى وخليط ٢/١ عواســـى٢٠/١ برقى

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أجري هذا البحث علي ثلاثة أنواع من الحملان البرقي، العواسي، وخليط ٢/١ عواسى. ٢/١ برقـــي فـــي تجربـــة تسمين لدراسة النمو ومركبات الدم وبعض الإنزيمات والزيادة الوزنية وأيضا لمعرفة أنسب درجة نضج تذبح عندها هذه السلالات وكذلك صفات الذبيحة.

أستخدم ستة وثلاثون ذكر أغنام تنتمي إلي ثلاثة أنواع بالتساوي وهي البرقي والعواسي والخليط والتـــي فطمـــت علي عمر ١٢ أسبوعا واستمرت التجربة لمدة ١١ شهر. حسبت معدلات الزيادة الوزنية خلال فترة النمو وأخذت عينات من الدم لتقدير مكوناته وذبح من كل سلالة ٩ حيوانات كل ثلاثة منها علي إحـــدي درجـــات النضـــج ٥٠، ٦٥، ٨٥%. قدرت مكونات الذبيحة ونسبة التصافي لكل حيوان علي درجة النضج المذبوح عليها وأيضا نسب اللحم الأحمر والدهـــن والعظم. وقدرت نسب البروتين والدهن والرماد والرطوبة في عينات اللحم.

أوضحت النتائج مايلي :

١- تفوقت الحملان العواسي عند الثلاث درجات من النضج الجسمي وذلك في الوزن النهائي عن باقي التراكيب الوراثية ووصلت إلي ٣٥% زيادة عن البرقي و٢٣% زيادة عن الخليط وذلك عند الذبح في درجة ٥٠% من وزن النضـــج و٣٠% زيادة عن البرقي و١٠% زيادة عن الخليط في ٦٥% من وزن النضج بينما كـــانت ٣٠% و ١٥% عنـــد الذبح في ٨٥% من وزن النضج ووصل معدل الزيادة الوزنية اليومية ٢٢٩جم/يوم، ١٨٢ جم/يوم، ١٦٠ جم/يـــوم علي درجات النضج ٥٠%، ٦٥، ٨٥% وذلك للعواسي.

٢- كانت أقل فترة تسمين هي ٨٤ يوم للوصول إلي ٥٠% من وزن النضج وذلك لأغنام البرقي بينما كانت أكبر فـــترة للعواسي هي ٣٠٨ يوم للوصول إلي ٨٥% من وزن النضج.

٣- أوضحت نتائج تحليل مكونات الدم أن قيم الهيموجلوبين وحجم كرات الدم المعبأ والجلوكوز والدهن الكلي والبروتين والجلوبيولين تتناقص بتقدم العمر ولكـــن الألبيومين كـــان أقـــل فـــي بدايـــة عمـــر الحيـــوان وكذلـــك نســـبة الألبيومين/الجلوبيولين. أيضا انزيمات ALT وكذلك AST تتناقص مع تقدم الحيوان في العمر. كانت قيم معـــامل الارتباط موجبة ما بين معدلات الزيادة الوزنية اليومية ومكونات الدم في الثلاثة أنواع من الحملان.

٤- أوضحت نتائج الذبح أن وزن الذبيحة في العواسي كان أعلي من باقي التراكيب الوراثية المدروسة ولم يكن هنـــاك فروق معنوية في نسبة التصافي علي درجات النضج المختلفة.

٥- كلما زادت درجة نضج الحيوان قلت نسبة اللحم الأحمر في الذبيحة في الثلاث تراكيب الوراثية المختبرة وتفوقـــت سلالة البرقي في نسبة اللحم الأحمـــر عن باقي السلالات علي ٦٥%، ٨٥% من وزن النضج.

٦- وكانت هناك اختلافات ما بين التراكيب الوراثية في نسب الدهون وكانت الاختلافات ما بين الســـلالات فـــي نســـب العظم بالذبيحة قليلة. زادت نسبة دهن تحت الجلد بزيادة نسبة النضج للبرقي وكان أقل قيمة عند ٥٠% مـــن وزن النضج وأيضا الدهن الكلي اتبع نفس المعدل وقد ازدادت نسبة الدهن بتقدم الحيوان في نسبة النضج.

٧- أوضحت نتائج تحليل عينات اللحم أنه كلما زاد الحيوان في النضج قلت نسبة البروتين والرماد وزادت نسبة الدهـــن وذلك في الأضلاع ٩، ١٠، ١١.