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# Effect of some Non-genetic Factors on Lamb's Growth Traits of Awassi Sheep

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**ABSTRACT**

This study carried out on 96 Awassi lambs (from two private farm near Kirkuk city - Iraq, during autumn lambing seasons 2015 and 2016 to investigate the effect of farm-year, ewe's age and lamb's sex on lamb's birth (BWT), 90 days weaning weights (WWT) and 7 months' weight (FWT), daily weight gains pre and post weaning ((DWG1, DWG2). Results indicate that farm-year had significant (P<0.05) effect on BWT, WWT, FWT, DWG1 and DWG2 in favor of the 2nd farm-year in BWT, WWT and DWG1, while 1st farm-year had the high values in FWT and DWG2. Dam's age affected significantly (P<0.05) BWT, FWT and DWG2, lambs born from 4 years old ewes significantly (P<0.05) surpassed lambs born from of 2, 3 and 5 years in BWT, lambs born from 3 years surpassed those of 2 years in FWT and 2, 4 and 5 years in DWG2. Lamb's sex exerts significant (P<0.05) effect in BWT, WWT, DWG1 and FWT in favors of male lambs. All phenotypic correlations were significant (P<0.01) positive except the significant (P<0.05) correlation between BWT with DWG1 and the insignificant correlations between BWT with FWT and DWG2 BWT and the negative significant correlations between DWG2 with pre weaning traits.

**KEYWORDS**

Awassi Lambs, Growth Traits, Non-genetic Factors.

## Introduction

Awassi sheep as other Iraqi breeds are mainly used to produce meat and milk, characterized by low production ability due to genetic and environmental factors, mainly they are well adapted to harsh environmental conditions in expense to their production capability (Al-Rawi 2006). Iraqi sheep production classified as traditional nomadic system depends on poor pastures. Meat production of lambs depends mainly on number of lambs slaughtered for meat and slaughter weight of each of these lambs, improving both components relies on improving reproductive efficiency of breeding animals and lamb's growth traits (Dickerson 1970). Determining the effect of fixed factors in growth traits of lambs are essential pre-request to any plan of genetic improvement for meat production. The aim of this study was to determine the effect of some non-genetic factors (farm-year, dam's age and lamb's sex) in lamb's growth traits during first 7 months of live.

## Materials and Methods

### Experimental Animals

This study carried out in two private sheep farms near the city of Kirkuk–Iraq during the period from Nov 1st 2015 till Jan. 30th 2016 on 50 single born Awassi lambs for the 1st farm and from Oct. 15th 2016 till June 1st 2017 on 46 single born Awassi lambs for 2nd farm. All dams and their lambs were under continuous veterinary control and guaranteed to be free from diseases. Ewes received concentration ratio in addition to wheat or barley straw twice daily when they were kept indoor, reduced to once daily when they left to pasture. Lambs fully suckled their dams without milking for entire 90 days when they were weaned. Lambs weighted once biweekly interval from birth till weaning and monthly from weaning till 7 months of age using disc balance (50 kg capacity and 100 g sensitivity).

### Statistical Analysis

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

$$Y_{ijk} = \mu + F_i + A_j + S_k + e_{ijk}$$

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$Y_{ijk}$ the observation in $i^{th}$ farm-year, $j^{th}$ age group and $k^{th}$ sex.
$\mu$ Overall mean.
$F_i$ Farm-year effect where i = 1, 2.
$A_j$ dam's age effect.
1 = dams 2-year age.
2 = dams 3-year age.
3 = dams 4-year age.
4 = dams 5-year age.
$S_k$ lamb's sex effect where 1= Male, 2 = Female.
$e_{ijk}$ Experimental error (NID 0, $\delta^2 e$).

## Results and Discussion

### 1. Pre-Weaning Traits

BWT, WWT and DWG1 are represented in table 1, the overall means were 3.73 kg, 19.95 kg and 180 g/day respectively, obtained overall means for pre-weaning traits are close to what reported by Jawasreh and Khasawnah; 2007, Mohammed 2011 and Abdul-Noor et al 2013. Farm-year had significant (P<0.05) effect on BWT, WWT and DWG1 in favor of the 2nd farm, these results were similar to reports in the previous studies carried out on different breeds of sheep (Taşkin et al 2002; Behzadi et al 2007 and Şireli et al 2015). Year effect might be attributable to fluctuation in environmental and management conditions from farm to farm and year to year. Dams age affected BWT with inconsistent significant increase (P<0.05) in lambs born from mature ewes (3-4 years old) due to increased ewe's weights and its rumen which make them capable of consuming more feed in addition to increase in uterine space (Abdul Noor et al 2013 and Hawa et al 2013). Dam's age effects on WWT and DWG1 were non-significant. Lamb's sex had significant (P<0.05) effects on BWT, WWT and DWG1. Male lambs were significantly (P<0.05) heavier than females and the difference between the two sexes increased with age of lambs, probably due to increase differences in the endocrine system between males and females (Taşkin et al 2002, Behzadi et al 2007, Gamasaee et at 2010, Mohammed 2011, Thiruvenkadan et al 2012, Abdul Noor et al 2013 and Şireli et al 2015).

**Table 1.** Means ± S.E for pre weaning growth traits

| | Lamb's # | BWT (kg) | WWT (kg) | DWG1 (g/day) |
|---|---|---|---|---|
| Overall mean | 96 | 3.71 ± 0.06 | 19.99 ± 0.33 | 181 ± 3.43 |
| Farm-Year | | | | |
| 1 | 50 | 3.62 ± 0.09 b | 18.56 ± 0.37 b | 166 ± 3.60 b |
| 2 | 46 | 3.83 ± 0.08 a | 21.56 ± 0.47 a | 197 ± 5.05 a |
| Dam Age | | | | |
| 2 years | 21 | 3.42 ± 0.14 b | 19.62 ± 0.90 a | 181 ± 9.29 a |
| 3 years | 41 | 3.73 ± 0.08 b | 19.61 ± 0.42 a | 177 ± 4.32 a |
| 4 years | 18 | 4.06 ± 0.14 a | 21.00 ± 0.85 a | 188 ± 8.84 a |
| 5 years | 16 | 3.55 ± 0.13 b | 19.90 ± 0.79 a | 182 ± 8.31 a |
| Lamb's sex | | | | |
| Male | 55 | 3.85 ± 0.07 a | 20.87 ± 0.41 a | 189 ± 4.40a |
| Female | 41 | 3.54 ± 0.10 b | 18.81 ± 0.49 b | 170 ± 4.98 b |

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

### 2. Post Weaning Traits

FWT and DWG2 are represented in (table 2), the overall means were 37.30 kg and 146 g/day respectively, which are close to what reported by Jawasreh and Khasawnah; 2007, Mohammed 2011 and Abdul-Noor et al 2013. farm-year had significant (P<0.05) effect on FWT and DWG2, 1st farm-year surpassed 2nd farm-year in FWT and DWD2. These results are similar to what reported by Behzadi et al 2007; Şireli et al 2015 and Taşkin et al 2002, such significant effect may be due to fluctuation in environmental and management conditions from farm to farm and year to year. Dam's age affected significantly (P<0.05) FWT and ADG2, lambs born from 3 years old ewes significantly (P<0.05) surpassed those born from 2 years old ewes in FWT and those born from other age groups of ewes in ADG2. the significant increase in DWG2 and FWT may be due compensatory growth where lamb born from 3 years old ewes were inferior in pre-weaning growth rate (177 g/ day) subsequently they grew rapidly in comparison to lambs born from other age groups of ewes and got higher FWT which are consistent with the

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negative significant correlation between post weaning growth rate with pre-weaning traits (table -3). Lamb's sex had significant (P<0.05) effect on FWT in favor of male lambs on female lambs in both traits.

**Table 2.** Means ± S.E for post weaning growth traits

| | Lamb's # | FWT (kg) | DWG2 (g/day) |
|---|---|---|---|
| Overall mean | 96 | 37.51 ± 0.36 | 146 ± 3.26 |
| Farm-Year | | | |
| 1 | 50 | 38.80 ± 0.52 a | 169 ± 3.14 a |
| 2 | 46 | 36.11 ± 0.43 b | 121 ± 3.03 b |
| Dam Age | | | |
| 2 years | 21 | 36.15 ± 1.18 b | 137 ± 10.13 b |
| 3 years | 41 | 38.48 ± 0.41 a | 157 ± 3.93 a |
| 4 years | 18 | 36.91 ± 0.94 ab | 133 ± 7.35 b |
| 5 years | 16 | 37.19 ± 0.72 ab | 144 ± 6.81 b |
| Lamb's sex | | | |
| Male | 55 | 38.46 ± 0.49 a | 147 ± 4. a |
| Female | 41 | 36.23 ± 0.49 b | 145 ± 4.64 a |

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

### 3. Phenotypic Correlations

Table (3) represents the phenotypic correlations between growth traits during pre and post weaning periods. All correlation coefficients were high and significant except the insignificant correlation between BWT and FWT. The trend of correlation was positive except the correlation between DWG2 with WWT and FWT were negative significant (P<0.05). these correlations are similar to what mentioned by Taşkin et al 2002, Kuchtík and Dobes 2006, Al-Salman 2009 and Gamasaee et at 2010.

**Table 3.** Phenotypic correlations between growth traits

| | BWT | WWT | FWT | DWG1 | DWG2 |
|---|---|---|---|---|---|
| BWT | | 0.46** | $0.19^{N.S}$ | 0.30** | -0.21* |
| WWT | | | 0.41** | 0.99** | -0.45** |
| FWT | | | | 0.41** | 0.63** |
| DWG1 | | | | | -0.44** |

N.S non-significant, * Significant (P<0.05), ** Significant (P<0.01)

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