The Effect of Some Placental Factors in Birth Weight of Awassi Lambs

Jawasreh, K.I. Z.; Awawdeh, F.T.; Al-Khasawneh, A.Z; Shdaifat, B.; Al-Shboul, H. and Al-Hamed, B.

Directorate of Livestock and Range Land Researches, National Center for Agricultural Research and Extension, (NCARE)

Abstract: Ninety nine Awassi ewes, lambed through the lambing season of 2004 (75 singles and 24 twins) were used for investigating the effect of some non-genetic factors (sex, type of birth, and ewe weight and parity at lambing) on some placental factors (placental weight and cotyledons number). The relationship between placental traits and litter weight at birth was also investigated. The results shown that ewe age and parity, sex, type of birth and type of birth have significant (P< 0.001) effect on placental traits as well as birth weight of neonates. A highly significant positive correlation was estimated between placental traits (placental weight and cotyledons number) and litter weight at birth.

Keywords: Awassi sheep, placental weight, cotyledon number and litter weight at birth.

INTRODUCTION

Awassi sheep is the main fat tail breed of sheep that raised in Jordan [9]. Placenta can be defined as an apposition or fusion of the fetal membranes to the endometrium to permit physiologic exchange between fetus and mother. The development of the placenta is associated with viviparity. The placenta functions as a multi-organ performing many functions and substituting for the fetal gastrointestinal tract, lung, kidney, liver, and endocrine glands. In addition, the placenta separates the maternal and fetal organism, thus ensuring the separate development of the fetus[6].

The necessity of placenta in fetal development has been studied by many authors [11,4,2] to have main effect in birth weights of many species. Rhend et al., [12] indicated that age of dam, sex of lambs, type of birth and gestation length influenced placental weight and cotyledons number which in turn affect birth weight of newborn lambs.

The objectives of this study were to evaluate some placental factors as affected by some maternal traits and to investigate the effect of placenta weight and number of cotyledons in newborn birth weight of Awassi lambs.

MATERIALS AND METHODS

During lambing season (2004) of Awassi sheep in Al-Khanasry Station (National Center for Agricultural Research and Extension (NCARE), Jordan) the study was conducted.

The data was analyzed by using GLM procedure of SAS (2002) by using the following Model:

\[ Y_{ijkl} = \mu + A_i + P_j + S_k + T_l + e_{ijkl} \]

Where:

- \( Y_{ijk} \) is the observation of each trait
- \( \mu \) is the overall mean, \( A \) is the effect of age of dam where \( i=2, 3, 4, 5, 6 \) and \( \pm 7 \).
P is the effect of ewe parity where j=1, 2, 3, 4 and 5.
S is the effect of sex of lamb where k= male and female.
T is the effect of type of birth where l=single and twin and eijkl is the residual.

Moreover simple correlations between the studied traits were calculated (SAS 2002).

RESULTS AND DISCUSSION

The effect of age of ewe has been observed to have significant effect (P< 0.01) on Birth weigh, seven years old ewes produce the highest birth weight (5.74 ± 0.43kg) compared with 3.38 ± 0.33 Kg for ewes in age of three years old. Birth weight tended to increase gradually as the age of ewe increased (Table 1).

The effect of parity in birth weight was observed to be significant (P< 0.01). In the first three parities ewes gave heavier birth weights and it was declined after the fourth parity (table 1).

Similar findings were obtained through different studies [7,1].

The effect of ewe age and parity in birth weight may due to the elevation of Cotyledons number and placental weight (table 1) as the age and parity increased.

Males born heavier than Females (P< 0.01) and singles born heavier than twins (P< 0.01) (table 1). Jawasreh [7] and Al-Qaisy et al., [1] previously observed the superiority of Awassi males and singles in their birth weights over females and twins, respectively.

The effect of sex in birth weights may due sex hormones effect namely Progesterone and Estrogen that affect the metabolism of Embryos and new born as will as adult animals [4].

According to our results the cotyledon number was higher and placental weight was heavier in dams that lambed males (table 1) and this may affect birth weights of male to be higher.

Placental traits: The overall mean of placenta weight for Awassi sheep was 521.21 ± 21.9 gm, the highest weight of placental weight was obtained from ewes in their fourth and fifth parities that were 745.73 and 755.27 gm, respectively. Males produced from the heaviest ewes placental weight (670.0± 46.32 gm) compared with 615.90± 50.08 gm for females. Placental weight of the dams delivered twins was double folds (833.11± 59.46 gm) that produce singles (table 1).

The average cotyledon number was calculated to be 51.15 ± 13.1 gm (table 1).Age of dam was investigated to have a significant effect on cotyledon number, the number of cotyledons tended to increase gradually as the age increased. Two years old dams seemed to have the lowest cotyledon number (49.62 gm) while 3rd and 7th years old have the highest number (61.63 and 60.97 gm), respectively.

The 5th parity old dams produces the highest number of cotyledons (66.14 ± 5.35 gm) (P < 0.001) compared with the other parities (the lowest number of cotyledons was calculated for the ewes in their 2nd parity (532.9 ± 109.97)) (table 1). cotyledon number increased with twinning (P<0.001) in our study and it was similar to the results obtained by Alexander [1], Dwyer et al., [5] and Konyali et al., [8] and Ocak et al., [10].

**Table 1: Least square means ± S. E for some factors affecting Birth and placental weights and Cotyledons number of Awassi ewes**

<table>
<thead>
<tr>
<th>Overall Means: SE</th>
<th>Birth weight(Kg) ± S.E</th>
<th>Placental Weight (gm) ± S.E</th>
<th>Cotyledons Number ± S.E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.31 ± 0.01</td>
<td>521.21 ± 21.9</td>
<td>51.15 ± 13.1</td>
</tr>
<tr>
<td>Ewe Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3.68 ± 0.42b</td>
<td>775.22±77.27</td>
<td>49.62± 4.79b</td>
</tr>
<tr>
<td>3</td>
<td>3.38 ± 0.33b</td>
<td>665.91± 62.82</td>
<td>61.63± 3.89a</td>
</tr>
<tr>
<td>4</td>
<td>4.83 ± 0.52b</td>
<td>696.31±96.53</td>
<td>56.50± 5.98b</td>
</tr>
<tr>
<td>5</td>
<td>5.38 ± 0.40a</td>
<td>562.72± 74.33</td>
<td>55.72± 4.60b</td>
</tr>
<tr>
<td>6</td>
<td>4.95 ± 0.51b</td>
<td>588.73± 95.77</td>
<td>58.98± 5.93b</td>
</tr>
<tr>
<td>7</td>
<td>5.74 ± 0.43a</td>
<td>568.83± 80.63</td>
<td>60.97± 5.0a</td>
</tr>
<tr>
<td>Ewe Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5.42±0.59a</td>
<td>532.9± 109.97bc</td>
<td>57.4 ± 6.82c</td>
</tr>
</tbody>
</table>

 Table 2: Simple correlation coefficient between birth weight (single and twins) and placental traits and other traits of Awassi ewes

<table>
<thead>
<tr>
<th>Traits Studied</th>
<th>LWT</th>
<th>PLWT</th>
<th>COTNO</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLWT</td>
<td>0.56***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COTNO</td>
<td>0.43***</td>
<td>.63 ***</td>
<td></td>
</tr>
<tr>
<td>WTL</td>
<td>0.19 NS</td>
<td>0.19 NS</td>
<td>0.17 NS</td>
</tr>
</tbody>
</table>

(LWT)=Litter weight. PLWT=Placental weight, COTNO=Cotyledons number, WTL=Ewe weight at lambing.

** significant at 0.01 level and *** significant at 0.001.

Dwyer et al., (5) found that sex, parity and litter size have a significant effect on placental weights and cotyledons number. At the contrary Ocak et al., (16) didn’t observe the differences between placental traits due to sex but they were in agreement with the results that confirm the effect of litter size on placental traits. Previously Alexander (3) reported that sex and litter size as well as parity of dam significantly affected cotyledon number and placental weight of sheep and this was in agreement with Al-Khaouzai (2).

Simple correlation results shown a highly significant positive correlation between litter weight at birth and placental weight and cotyledon number (0.56 and 0.43, respectively) (table 2) and also positive (P<0.001) correlation was obtained between Placental weight and cotyledon number and this is a reasonable conclusion that as placenta weight increased the cotyledon number also increased. This result agreed with the finding of Konyali et al., (8) and Al-Khaouzai (2) who indicates the same relationship between the same studied traits. The correlation between Placental weight and cotyledon number and ewe weight at lambing was investigated to be non-significant positive correlation.

ACKNOWLEDGEMENT

The Author would like to thank the staff of Al-Khanasry station (especially Dr. Hussien Al-Zioud) for their help in preparation of this work.

REFERENCES