

## STUDING SOME FACTORS EFFECT IN MILK PRODUCTION AND COMSTITUTE AND LAMBS WEIGHT IN AWASSI SHEEP

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### ABSTRACT

This study was conducted on a flock of Awassi ewes at animal farm elated to animal production department / college of Agriculture and Forestry at University of Mosul, during the productive seasons 2020-2021. The study included 60 Awassi ewes, study the effect age of dam (Yr.), sex of lamb, type of birth and month of birth on daily milk yield (DMY), total milk yield (TMY), constitute and lambs weights. The results highly significant effects ( $p < 0.01$ ) for age of dam on daily milk yield, total milk yield, and lambs weights. The results highly significant effects ( $p < 0.01$ ) for Sex of lamb on daily milk yield, total milk yield and lambs weights (LW). There was a highly significant affects for type of birth on daily milk yield, total milk yield and birth weight(BW). The month of birth also had a significant effect ( $P < 0.05$ ) in each of the characteristics of total, daily milk yield, the superiority was in favor of January over December and November. The month of birth did not affect the rest of all the studied traits.

**Key word:** Awassi Sheep, Milk yield, Wight of lambs, Sex of lamb and Months of birth.

### INTRODUCTION

Sheep are bred in Iraq mainly to produce meat, then milk and wool, and their productive performance depends on the percentage of animals capable of production in the herd (1). The importance of providing milk and meat, especially day after day, is increasing in order to meet the increasing needs of society as a result of the increase in population numbers and the rise in the standard of living. The number of sheep has decreased. In Iraq, according to the changing conditions that the country has gone through for many years and their impact on the productive efficiency of sheep, and changes in market requirements and local needs depending on the economic conditions of the country, the number of sheep has decreased very dramatically, which required searching for other means to increase the number of sheep. The age of dam is one of

the factors that affect the productive characteristics of sheep (2). Milk production is considered one of the important functional qualities in sheep due to the high percentage of fatty, protein and total solid materials in it, which led to its importance in many industries such as making cheese, milk, butter and cream, etc., in addition to using it for drinking as fresh milk or in breastfeeding newborns (3). It is known that milk production and the growth of lambs are affected by a number of factors such as the age of the mother, the sex of lamb, the type of birth and the month of birth, in addition to the influence of many other factors (4). Therefore, this study aimed to know the effect of some of these factors (Age of dam, sex of lamb, type of birth and month of birth) on the characteristics of milk production and its components and the growth of lambs at different ages for Awassi ewes.

## MATERIALS

This study was conducted on a flock of Awassi sheep of the Department Animal production / College of Agriculture and Forestry at the University of Mosul. During the productive seasons 2020-2021. The study included 60 Awassi ewes, The ewes were fed on concentrated fodder with two morning and evening meals, at average of 500 gm/ewe/day, which consisted of 63% barley, 35% wheat bran, 1% salt and 1% lime, while providing hay freely as well as grazing in the adjacent areas of the field to obtain green fodder and field crop residues and providing blocks of mineral salts and water continuously during the study period. Putting the herd under a health and preventive program that includes all the procedures that ensure the preservation of the health status of the animals throughout the experiment period. The measurement of milk production was started after 15 days of birth using the hand milking method, as the lambs were isolated from their mothers in the evening and then the ewes were milked the next morning That is, 12 hours after the isolation of the births, the amount of milk was multiplied by 2 to obtain milk production (5). A sample of milk was taken at each test to estimate the percentage of fat, protein, lactose and solids not-fat (SNF). The samples were analyzed using the Eko-Milk Analyzer.

The weights of lambs at birth and weaning were recorded, the dam age, type of birth and sex of lamb and month of birth was fixed immediately after birth.

**Statistical analysis:** data were analyzed statistically by using the complete random design GLM (General Linear Model) and the Multiple test range was used (6) test the significant differences among averages by statistical programmer (7), following equation:

$$Y_{ijklm} = \mu + A_i + S_j + T_k + D_m + e_{ijklm}$$

$Y_{ijklm}$  = The value of the studied trait for any observation in the experiment.

significant effect ( $P < 0.01$ ) was observed in favor of the ewes that gave birth to twins on the ewes of single births, where the averages

## AND

## METHODS

$\mu$  = General mean..

$A_i$  = The effect Age of dam on the studied traits, and  $i = (2, 3, 4, 5 > \text{years})$ .

$S_j$  = The effect of the sex of lamb and  $j = (1, 2)$  for males and females.

$T_k$  = Effect of birth type, where  $k$  represents either a single or a twin.

$D_m$  = The effect of the month of birth and  $m = \text{November, December, January}$ .

$e_{ijklm}$  = Effect of random error..

## RESULTS AND DISCUSSION

### Daily milk production:

The general average daily milk production of ewes was  $694.58 \pm 15.12$  g (Table 1). The results of the study showed highly significant effect ( $P < 0.01$ ) of the age of dam on daily milk yield in favor of a group of ewes aged 4 and 5 > years and over, superior to ewes of 2 and 3 years, which amounted to (722.26, 712.35) and (538.21, 664.64) respectively. The increase in production with the age of dam is attributed to the increase in the maturity of the animals and the secretory system (8). These results agree with (9). mentioned in their study on Awassi sheep that the age of dam had a significant effect on milk yield for the first weeks, where 6 years old ewes outperformed their two year olds. (10) stated that the Awassi ewes that he used in his study were superior in favor of the 5-year-old ewes, which gave the highest daily milk yield of 791.25 g compared to the lowest production of 3-year-old ewes, 500.91 g. (9).

The results also indicated that there was highly significant effect ( $P < 0.01$ ) of sex of lamb on the daily milk yield rate, as the average daily yield of ewes that breastfed males and females reached 744.52 and 612.85 g, respectively (Table 1). The reason for this is that male lambs are usually larger in size, which makes them need more nutrients and thus lead to stimulating their mothers to produce more milk (8). These results agree with (11). as well as with regard to the type of birth, the highly were (775.35 and 674.59) g, respectively. The reason is attributed to stimulating breast-feeding as a result of increasing its frequency.

Breast-feeding stimulates the secretion of the hormone prolactin, thus increasing the production of milk. Also, twins have a longer suckling period, and thus the stimulation is higher(12). The above researchers emphasized that ewes that are lactating to twins produce 40% more milk than ewes that are lactating for single lambs, despite the presence of differences between breeds or due to different environmental conditions. These results agree with (4).

The results of the study showed that the month of birth had significant effect ( $P<0.05$ ) on the daily milk production, as the ewes born in **Total Milk Production:**

The general average of total milk yield for ewes was  $58.54 \pm 13.9$  kg (Table 1). The results of the study showed highly a significant effect ( $P<0.01$ ) of age of dam on total milk production in favor of a group of ewes of 4, 5 years of age and over, superior to ewes of 2,3 years of age, which reached (, 61.67, 60.45) and (45.21, 55.83) kg. straight. These results were in agreement with (9) .

The results also indicated that there was highly a significant effect ( $P<0.01$ ) of the sex of lamb on the total milk production, as the total production of ewes that breastfed males and females reached 62.54 and 51.48 kg, respectively (Table 1). These results were in agreement with (11). As well as for the type

January were characterized by the highest rate of daily milk yield of 798.40 g, while the differences were not significant between the ewes born during the months of November and December, which averaged Its milk yield is 680.59 and 716.78 g, respectively. The superiority of the ewes born during the month of January may be attributed to the improvement in the environmental conditions represented by the change in weather, the abundance of green fodder and good pastures, which leads to the provision of the animal's nutritional requirements and thus obtaining the highest milk production. (13).

of birth, the significant effect ( $P<0.01$ ) was observed in favor of the ewes that gave birth to twins on the ewes of single births, where the averages were (65.13 and 56.68) kg, respectively. These results were in agree with (9).

The results of the study showed that the month of birth had a significant effect ( $P<0.05$ ) in the total milk production, as the ewes born in January were characterized by the highest rate of total milk production of 67.57 kg, while the differences were not significant between the ewes born during the months of November and December, which averaged Its milk yield is 57.17 and 60.21 kg, respectively. This is all confirmed by (4-13).

**Table (1): Effect some factors effect on Daily milk yield and Total milk yield in Awassi ewes. ( Mean± S.E).**

Factors of effect	Daily milk yield gm	Total milk yield kg
Overall means	694.58 ±15.12	13.95± 58.54
Age of dam (Yr.)	**	**
2	538.21±16.23 c	45.21±14.15 c
3	664.64±15.21 b	55.83±17.03 b
4	722.26±19.34 a	61.67±15.05 a
5 >	712.35±17.21 a	60.45±19.14 a
Sex of lamb	**	**
Male	744.52±13.21 a	62.54±12.13 a
Female	612.85±12.45 b	51.48±11.32 b
type of birth	**	**
Single	674.47±17.86 b	56.68±15.54 b
Twins	775.35±19.21 a	65.13±14.71 a
month of birth	*	*
December	680.59±15.21 b	57.17±12.71 b
November	716.78±17.23 b	60.21±14.52 b
January	798.40±14.48 a	67.57±11.17 a

). P<0.01 (level Significant \*\*

). P<0.05 (level Significant\*

\*Means in each Colum with small letters are differs significantly.

## MILK CONSTITUTE

### Fat percentage:

The general average of the percentage of fat in milk was  $5.36 \pm 0.20$  (Table 2). The results of no significant effect of the age of dam on the percentage of fat in milk. These results were in agreement with the findings (14-15). The results of (Table 2) indicate that there is no significant effect of the sex of lamb and the type of birth on the

percentage of fat in the milk. This result was in agreement with what was mentioned by (16-17), there was no significant effect of the month of birth on the percentage of fat in milk. There was ewes percentage of milk fat. This result agreed with what was found (18).

**Protein percentage :**

The general average of the protein content in milk was  $5.38 \pm 0.16\%$  (Table2). The results of the study showed that there was no significant effect of all the studied factors on the percentage of protein. These results were in agree with the findings of researchers (19).

**Non-fat solids percentage:**

The general average of the percentage of non-fat solids in milk was  $10.60 \pm 0.17$  (Table 2). The results of the study showed that there was no significant effect of all the studied

factors on the percentage of non-fat solids. These results were in agreement with what was reached (15).

**Lactose percentage:**

The general average of the percentage of lactose in milk was  $4.42 \pm 0.01$  (Table 2). The results of the study showed that there was no significant effect of all studied factors on the percentage of lactose. These results were in agreement with the findings of a number of researchers (10-15).

**Table (2): Effect some factors effect on milk compositions in Awassi ewes.( Mean± S.E).**

Factors of effect	Milk fat%	Milk protein%	Solid non-Fat%	Milk lactose%
Overall means	$5.36 \pm 0.20$	$5.38 \pm 0.16$	$10.60 \pm 0.17$	$4.42 \pm 0.01$
Age of dam (Yr.)	N.S	N.S	N.S	N.S
2	$5.54 \pm 0.11$ a	$5.14 \pm 0.15$ a	$10.26 \pm 0.12$ a	$4.38 \pm 0.01$ a
3	$5.13 \pm 0.12$ a	$5.28 \pm 0.19$ a	$10.46 \pm 0.15$ a	$4.41 \pm 0.01$ a
4	$5.21 \pm 0.19$ a	$5.39 \pm 0.18$ a	$10.63 \pm 0.18$ a	$4.42 \pm 0.02$ a
5 >	$5.11 \pm 0.20$ a	$5.57 \pm 0.12$ a	$10.82 \pm 0.14$ a	$4.46 \pm 0.01$ a
Sex of lamb	N.S	N.S	N.S	N.S
Male	$5.49 \pm 0.21$ a	$5.38 \pm 0.17$ a	$10.62 \pm 0.19$ a	$4.41 \pm 0.02$ a
Female	$5.51 \pm 0.25$ a	$5.39 \pm 0.19$ a	$10.65 \pm 0.17$ a	$4.44 \pm 0.03$ a
type of birth	N.S	N.S	N.S	N.S
Single	$5.52 \pm 0.19$ a	$5.37 \pm 0.12$ a	$10.66 \pm 0.12$ a	$4.43 \pm 0.01$ a
Twins	$5.19 \pm 0.18$ a	$5.48 \pm 0.16$ a	$10.67 \pm 0.13$ a	$4.41 \pm 0.02$ a
month of birth	N.S	N.S	N.S	N.S
December	$5.32 \pm 0.23$ a	$5.21 \pm 0.14$ a	$10.38 \pm 0.14$ a	$4.41 \pm 0.01$ a
November	$5.45 \pm 0.22$ a	$5.45 \pm 0.17$ a	$10.72 \pm 0.15$ a	$4.47 \pm 0.02$ a
January	$6.52 \pm 0.18$ a	$5.56 \pm 0.19$ a	$10.70 \pm 0.13$ a	$4.37 \pm 0.02$ a

).  $P < 0.01$  (level Significant\*\*

N.S no Significant.

\*Means in each Colum with small letters are differs significantly.

**BIRTH WEIGHT:**

The general average weight at birth was  $3.91 \pm 0.14$  kg (Table3). The results of the statistical analysis indicate a significant effect ( $P < 0.05$ ) in favor of a group of ewes lambs aged 5 > years and over on the rest of the age groups, as it reached 4.51 kg. The average birth weights of the three age groups appeared. The first age lambs are not significant differences from each other (3.92, 3.62, 3.51), respectively.

The reason may be attributed to the fact that young ewes are in the stage of growth and development, thus affecting the amount of food available for the growth and development of the fetus (20), these results were in agreement with (17).

It was found that the sex of lamb had a significant effect ( $p < 0.05$ ) on birth weight, as males outperformed females by 0.49 kg. This result was in agreement with (21-22) who reached a similar significant effect. For sex of lamb in birth weight, the superiority of males' weights over females may be due to the genetic ability of males to grow and develop faster than females' ability and this superiority appears early during the embryonic development stage. As well as for the type of birth, as single births significantly ( $P < 0.05$ ) outperformed twins by 0.94 kg. To exchange different nutrients between the mother and the fetus in her womb (23).

**Daily and total weight gain from birth to weaning:**

The general average of daily and total weight gain from birth until weaning was  $0.177 \pm 0.32$  and  $16.01 \pm 0.13$  kg, respectively. Table (3) The table shows a significant effect ( $P < 0.05$ ) of the age of dam on the daily and total weight gain, as it was in favor of ewes

These results are in agree with (24). the month of birth had no significant effect on birth weight, despite the fact that November births were the heaviest, and this is the result (22).

**Lamb growth:**

Due to the dependence of the birth lambs on their mothers' milk, the largest effect was the amount of milk yeild by mothers in different age groups. Accordingly, lambs of the age group 5 years and over appeared the best among the other groups, reaching an average weight of 11.13 kg at the age of 30 days and 15.92 kg at 60 days, and gradually superior to the younger age groups, reaching the moral difference ( $P < 0.05$ ) for Average weight of 21.71 kg at weaning 90 days for 2-year-old ewes. These results are in positive agreement with the previously mentioned characteristics of ewes of 5 years and over category, such as the milk produced in particular. These results were in agreement with (25). And also for the sex of lamb, as the significantly ( $P < 0.05$ ) was in favor of male lambs over females at the ages of 30, 60 and 90 days. The reason for this superiority may be attributed to the effect of the action of sex hormones (20). These results were in agreement with (4). As for As for the type of birth and the month of birth, there are no significant differences, and these results were in agreement with both. These results were in agreement with (24).

aged 5 > years and over the rest. Lambs of other age groups, and this result is in agreement with the findings (25). Also, for the sex of lamb, the highly significant effect ( $P < 0.01$ ) was in favor of male lambs over females in the rate of daily and total gain. These results agreed with and (19).

**Table (3): Effect some factors effect on Lamb growth.( Mean± S.E).**

Factors of effect	Birth weight (kg)	Age 30 day (kg)	Age 60 day (kg)	Age 90 day (kg)	Daily weight gain (kg)	Total weight gain (kg)
Overall means	3.91±0.14	10.61±0.32	14.96±0.52	19.92±0.82	0.177±0.32	16.01±0.13
Age of dam (Yr.)	*	*	*	*	*	*
2	3.51±0.16 c	9.45±0.30 c	13.20±0.24 c	18.70±0.21 c	0.168±0.25 b	15.19±0.12 b
3	3.62±0.21 bc	10.46±0.51 b	14.70±0.50 b	19.50±0.75 b	0.176±0.22 b	15.88±0.11 b
4	3.92±0.11 bc	10.32±0.41 b	15.41±0.71 ab	19.90±0.65 ab	0.177±0.43 b	15.98±0.15 b
5 >	4.51±0.17 a	11.13±0.42 a	15.92±0.60 a	21.71±1.70 a	0.191±0.31 a	17.20±0.14 a
Sex of lamb	*	*	*	*	*	*
Male	4.22±0.14 a	11.34±0.31 a	15.93±0.40 a	21.31±0.51 a	0.190±0.24 a	17.10±0.17 a
Female	3.72±0.13 b	10.32±0.35 b	14.61±0.47 b	19.41±0.65 b	0.174±0.30 b	15.69±0.12 b
type of birth	**	N.S	N.S	N.S	N.S	N.S
Single	4.10±0.09 a	10.90±0.25 a	14.48±0.31 a	20.07±0.42 a	0.177±0.41 a	15.97±0.21 a
Twins	3.16±0.14 b	10.03±0.42 a	14.01±0.43 a	19.67±0.81 a	0.183±0.53 a	16.51±0.13 a
month of birth	N.S	N.S	N.S	N.S	N.S	N.S
December	4.27±0.21 a	10.95±0.45 a	15.27±0.21 a	19.32±0.41 a	0.167±0.24 a	15.15±0.11 a
November	3.97±0.14 a	10.75±0.27 a	15.11±0.22 a	19.45±0.34 a	0.172±0.28 a	15.48±0.13 a
January	4.03±0.23 a	11.12±0.31 a	15.98±0.23 a	20.11±0.25 a	0.178±0.34 a	16.08±0.12 a

) P<0.01 (level Significant\*\*

). P<0.05 (level Significant\*

\*Means in each Colum with small letters are differs significantly

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