Tikrit Journal for Agricultural Sciences (2022) 22 (3):70-77
https://doi.org/10.25130/tjas.22.3.8

IRAQI Academic Scientific Journals
العراقية المجلات الأكاديمية العلمية

ISSN:1813-1646 (Print); 2664-0597 (Online)
*Tikrit Journal for Agricultural Sciences*
Journal Homepage: http://www.tjas.org
E-mail: tjas@tu.edu.iq

TJAS
Tikrit Journal for Agricultural Sciences

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**KEY WORDS:**

Milk productive and composition, growth traits, Awassi sheep.

**ARTICLE HISTORY:**

**Received**: 09/04/2022
**Accepted**: 25/04/2022
**Available online:** 30/9/2022



# Factors Affecting in Some Productive Traits for Local and Turkish Awassi Sheep

## ABSTRACT

The aim of study effecting fixed factors (breed, year of birth, age of dam, sex of lambs) in total milk yield and milk composition and some of growth traits (birth weight and weaning weight), the overall mean of milk yield (66.58 ±1.67. kg) ,it was breed effect significant (P<0.05) , while the effect factors (birth year, age of the ewe, sex of lambs, type of birth) was not significant, , the overall mean of milk components (fat, lactose, protein, non-fat solids) was 4.18 ± 0.29, 4.42 ± 0.02, 5.47 ± 0.11 and 10.69 ± 0.14 %, respectively ,the factors are non-significant effect on milk composition, the overall mean of birth weight was 4.76 ± 0.06 kg, the breed, year of birth, age of the ewe and the sex lambs did not effect on it, weight at weaning was 19.77 ± 0.27 kg. The effect of breed was highly significant, as the Turkish Awassi breed advantage to the local, while the factors (year of birth, age of ewe, sex of lambs) were non- significant effect on weaning weight. We conclude the local Awassi was superior to the Turkish in total milk yield. The birth weight of Turkish Awassi was slightly higher on the local, but dominant was highly significant in weaning weight.



## INTRODUCTION

Animal production generally depends on livestock breeding (cows, sheep, goats, camels) as well as poultry and fish farming and production to produce basic materials for human nutrition (red and white meat, milk and its derivatives, and table eggs) as well as by-products such as wool, leather, and others (Haenlein, 2007) Sheep are one of the most important sources of meat and milk production for humans (Al-Omar and Al-Khalid, 2009. ) . Locally grown sheep can also be classified with their low production of red meat as well as milk production, and al-Awassi Sheep is one of the essential breeds in Iraq due to the impact of genetic factors as well as their adaptability to environmental conditions and lack of pastures as well as their high ability to respond to genetic improvement programs (Elia,2018).the efficiency of productive ewes can be improved by increasing the number of births from the same abdomen through genetic selection, improving environmental conditions, and exploiting genetic variation between animals within the same breed (Elkasr et al., 1993) .

The current study aims the impact of genetic factors (breeds) and some non genetic factors (year of birth, age of dam, sex of lambs) on some productive traits (milk production and components and some growth characteristics such as weight at birth and weaning). and study of the chemical analysis of milk (protein, fat, lactose, and non-fat solids) and the factors affecting it.

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## MATERIALS AND METHODS

The study was carried out at the Ruminant Research Station of the General Authority for Agricultural Research /Ministry of Agriculture in Abi Ghraib (20 km west of Baghdad). From December 2018 to December 2020, 134 dam (aged from two to six and a half years) and 20 rams were imported from The Awassi breed is from Turkey, 33 dam and 13 local Awassi rams were brought from local markets. Use 200 records of 200 animals from the Turkish and local herd of Awassi sheep to study the impact of persistent factors (birth year, dam age at birth (year), sex of lambs) on traits of total milk production, and percentages of some of its components such as fat, protein, lactose, and non-fat solids, as well as weight at birth, weight at weaning,(

The ewes were bred in semi-open sheds designated to accommodate the ewes, represented by the huts of ewes of twin births, spoiled and weaning ewes, Turkish Awassi ewes, local Awassi ewes, and ewes that do not give birth, sheep less than two years old, selected rams, rams for sale, and isolated animals (excluded). The mother ewes are placed in unique sheds for births. The born are weighed and numbered 24 hours after their birth. Colostrums are given from the first hour of birth, and the newborns continue to breastfeed until weaning ( 120) days. Where the herd is managed according to a program that includes nutrition, health and veterinary care, and the provision of appropriate environmental conditions, Lambs born are weighed using a particular scale, which has weight measurements according to the following stages:

1 .Weight at birth: The importance of newborns at birth is taken within the first 24 hours after birth.

2.Weaning weight: Weaning weight is taken at 120 days of age.

### Milk data recording

Milk data was recorded according to the method used in the station through the manual milking method. The milk data was recorded two weeks after birth by isolating the lambs at night from their mothers and milking the ewes in the morning after 11-13 hours of isolation. After completing the milking process and recording the data, the lambs are returned with their mothers to complete the breastfeeding process, and this process takes place weekly, where milking takes place in the early morning. The analysis of milk components for each dam was conducted after taking a sample of milk for each dam once a month from the morning circuit in the milking place after weighing the milk and mixing it well in clean plastic containers of 50 ml capacity with tight lids that are closed after taking the sample; After that, these samples are cooled and transferred to a laboratory affiliated to the Ruminant Research Station in Akkarkov of the Agricultural Research Department to examine these samples in the Milk Components Analyzer called Julie-Z7, which is a German-origin device that has a digital screen showing the components of milk.

### Statistical Analysis

The General Linear Model G.L.M. method was used within the SAS statistical program (2012). The adjustment for the fixed factors (genetic group, year of birth, age of dam at birth, sex of birth) was according to the mathematical model below.

Yijklmno = μ + Gi + Rj + Ak + Sl + Tm + In + eijklmno

Yijklmno = Observed value o.

μ: The overall mean of the trait.

Gi: The effect of genetic group i (Local Awassi - Turkish Awassi).

Rj: Influence of the year of birth (2018/2019 and 2019/2020).

Ak: Effect of maternal age dam at birth (2, 3, 4, 5, 6 years).

Sl: The effect of the sex of birth (male-female).

In: effect of extracting contrast components (66 ram (tur. Awass. Loc .(.

eijklmno: The random error is normally and independently distributed with a mean of zero and □2e.

## RESULTS AND DISCUSSION

### Factors affecting the proportions of milk components.

The study results showed that the overall mean of total milk production amounted to 66.58±.1.67 kg (table 1), and we note a significant effect (P<0.05) of the strain on the rate of total milk production, The local Awassi ewes outperformed the Turkish Awassi ewes in the actual milk production rate, as the production rate was 71.91 ± 3.21 and 63.31 ± 2.76 kg, respectively. The

discrepancy in the rate of production is due to the difference in genotypes between breeds.These results were similar to what was reached by Ospanov and Botagoz (2020), and the results were different from what was called by Al-noori et al., (2014). and the year of birth did not significantly affect the rate of total milk production, as we note that the rate of production for the year of birth 2018-2019 It reached 68.25 ±2.56 kg and for the year 2019-2020 it reached 66.96 ±3.07 kg,

**Table (1): The effect of fixed factors on the Total milk production**

| Factors | N | Total milk production LSM ± SE |
|---|---|---|
| Overall mean | 200 | 66.58 ±1.67 |
| Genetic group | | |
| Local Awassi | 65 | 71.91 ±3.29 a |
| Turkish Awassi | 135 | 63.31 ±2.76 b |
| Significant level | | |
| Year of birth age | | |
| 2018/2019 | 134 | 68.25 ±2.56 |
| 2019/2020 | 66 | 66.96 ±3.07 |
| Significant level | ___ | N.s |
| Age of dam (year) | | |
| 2 | 30 | 70.89 ±4.39 |
| 3 | 46 | 64.77 ±3.62 |
| 4 | 33 | 68.38 ±4.33 |
| 5 | 66 | 69.55 ±3.01 |
| 6-6.5 | 25 | 64.43 ±4.77 |
| Significant level | ___ | N.s |
| Sex of lambs | | |
| Male | 103 | 68.19 ±2.46 |
| Female | 97 | 67.02 ±2.70 |
| Significant level | ___ | N.s |
| Means with different letters within the same column are significantly different from each other * ($P < 0.05$), N.s | | |

The results of Table (1) indicated that the age of the ewe at birth did not have a significant effect on the total milk production rate, as its lowest value was 64.43 ±4.77 kg among ewes aged six

years and over. Conversely, the highest value was 70.89 ± 4.39 kg among the earliest ewes (aged two years). This result is consistent with the findings of other researchers Regarding the lack of a significant effect of the dam age on the rate of total milk production (Gootwine and Pollott, 2000 Skoufos, 2017). We also note that there is no significant effect of the gender of the newborn on the total milk production rate, as the ewes that gave birth to males reached 68.19 ±2.46 kg and those who gave birth to females whose production reached 67.02 ± 2.70 kg, and the current study agreed with Al-noori et al., (2014).

**2 -Factors affecting in the proportions of milk components**

Through the results of Table (2), the overall mean of the percentages of milk components of fat, lactose, protein, and non-fat solid components was 4.18 ± 0.29, 4.42 ± 0.02, 5.47 ± 0.11, and 10.69 ± 0.14 %, respectively. The results are shown in Table (2) indicate that the proportions of milk components will not differ significantly between the local and Turkish Awassi.

**Table (2): The effect of fixed factors on the percentages of studied milk components**

| Factors | N | L.S.M ± S.E. | | | |
|---|---|---|---|---|---|
| | | fat (%) | lactate (%) | protein (%) | non-fat solids (%) |
| Overall mean | 134 | 4.18±0.29 | 4.42 ±0.02 | 5.47±0.11 | 10.69 ±0.14 |
| Genetic group | | | | | |
| Local Awassi | 46 | 4.12±0.52 | 4.43 ±0.04 | 5.46±0.21 | 10.60 ±0.25 |
| Turkish Awassi | 36 | 4.76±0.61 | 4.42±0.05 | 5.33±0.24 | 10.54±0.30 |
| Significant level | | N.S | N.S | N.S | N.S |
| Year of birth | | | | | |
| 2018/2019 | 59 | 4.05 ±0.38 | 4.41 ±0.03 | 5.46 ±0.15 | 10.69 ±0.19 |
| 2019/2020 | 23 | 4.84 ±068 | 4.43 ±0.05 | 5.34 ±0.27 | 10.45 ±0.34 |
| Significant level | --- | N.S | N.S | N.S | N.S |
| Age of dam (year) | | | | | |
| 2 | 15 | 3.59 ±0.72 | 4.43 ±0.05 | 5.29 ±0.29 | 10.49 ±0.36 |
| 3 | 17 | 4.60 ±0.70 | 4.43 ±0.05 | 5.58 ±0.28 | 10.78 ±0.35 |
| 4 | 14 | 4.94 ±0.77 | 4.42 ±0.06 | 5.49 ±0.31 | 10.51 ±0.38 |
| 5 | 23 | 4.43 ±0.61 | 4.39 ±005 | 5.24 ±0.24 | 10.41 ±0.30 |
| 6 | 13 | 4.64 ±0.78 | 4.43 ±0.06 | 5.40 ±0.31 | 10.64 ±0.39 |
| Significant level | --- | N.S | N.S | N.S | N.S |
| Sex of lambs | | | | | |
| Male | 48 | 4.54 ±0.45 | 4.39 ±0.03 | 5.38 ±0.18 | 10.62 ±0.22 |
| Female | 34 | 4.34 ±0.52 | 4.45 ±0.04 | 5.42 ±0.21 | 10.52 ±0.26 |
| Significant level | --- | N.S | N.S | N.S | N.S |

These results agreed with Thomas et al. (2001) and Jawasreh and Khasawneh (2007) and are inconsistent with Komprej et al., 2009. It was also found that the effect of the year of birth 2018-

2019 and the year of birth 2019-2020 was not significant in the proportions of milk components, as the percentages of fat, lactose, protein and non-fat solids for the year 2018 were 4.05 ± 0.38, 4.41 ± 0.03, 5.46 ± 0.15, 10.69 ± 0.19% And for the year 2019 4.84 ±0.68, 4.43 ±0.05, 5.34 ±0.27, 10.45±0.34 %, symmetrically, as we note that these results were in agreement with the results of Haenlein et al., (2007), Also, the results of Table (2) indicate that the age of the ewe did not significantly affect the proportions of milk components, although the differences were not significant, but the percentage of fat increased from 3.59 ± 0.72 for two-year-old ewes to 4.94 ± 0.77% at the age of four years, as for the rest of the components (lactose and protein And solid non-fatty materials) .and these results agreed With the findings of Oravcova et al., (2007), and the effects of Kuchtík et al,(2006) ,.

Table (2) indicates no significant effect of the gender of the lambs born on the proportions of milk components in their mothers, as we note that the percentages of fat, lactose. The reason for the convergence of proportions in male and female newborns is due to the type of feed provided to animals and its containment of essential nutrients in addition to the availability of pastures that contribute to increasing the proportions of milk components. These results agreed with what was reported by McGovern et al. (2020).

**3 -Factors affecting growth traits**

**3-1 Factors affecting the weight of lambs at birth**

Table (3) shows the overall mean lambs' weight at birth was 4.76 ± 0.06 kg, and it is an acceptable value for the average birth weight of lambs of sheep breeds. We note that the species had no significant effect on birth weight, as it was recorded as 4.52 ± 0.13 kg for local Awassi breed lambs and 4.73 ± 0.11 kg for Turkish Awassi breed lambs, respectively. These results were similar to the results of Aktas and Dogan, (2014), and the consequences of Table (3) showed that the year of birth did not record any significant effect of the year of delivery on the average birth weight, as the importance of lambs born in the year 2018-2019 was 4.72 ± 0.10 kg and those born in the Year 2019/2020 4. 54 ± 0.12 kg, as these results were in agreement with, Rather,(2020 ),

**Table (3): Effect of fixed factors on birth and weaning weight**

| Factors | N | L.S.M ± S.E. | |
|---|---|---|---|
| | | Weight at birth (kg) | Weight at weaning (kg) |
| Overall mean | 200 | 4.67 ±0.06 | 19.77 ±0.27 |
| Genetic group | | | |
| Local Awassi | 65 | 4.52 ±0.13 | 17.96 ±0.47 ab |
| Turkish Awassi | 135 | 4.73 ±0.11 | 20.77 ±0.39 a |
| Significant level | | IN.S | ** |
| Year of birth | | | |
| 2018/2019 | 134 | 4.72 ±0.10 | 19.22 ±0.36 |
| 2019/2020 | 66 | 4.54 ±0.12 | 19.52 ±0.44 |
| Significant level | --- | IN.S | IN.S |
| Age of dam (years) | | | |
| 2 | 30 | 4.60 ±0.17 | 19.29 ±0.63 |
| 3 | 46 | 4.71 ±0.14 | 18.79 ±0.52 |
| 4 | 33 | 4.61 ±0.17 | 19.20 ±0.62 |
| 5 | 66 | 4.64 ±0.12 | 18.92 ±0.43 |
| 6 | 25 | 4.57 ±0.19 | 20.61 ±0.68 |
| Significant level | --- | N.S | N.S |
| Sex of lambs | | | |
| Male | 103 | 4.72 ±0.09 | 19.52 ±0.35 |
| Female | 97 | 4.21 ±0.10 | 19.21 ±0.38 |
| Significant level | --- | N. S | N.S |
| The averages with different letters within the same column differ significantly between them. * (P<0.05), ** (P<0.01), N.S: N significant. | | | |

We note from the results of Table (3) that there was no significant effect of the mother's age on the birth weight of the lambs, as we note that the mother's aging did not affect the average birth weight of her lambs, as it reached the highest birth weight of three-year-old ewes (4.71 ± 0.14 kg) and the lowest weight of ewes The consequences between the ages of two to six years (4.57 ± 0.19 kg), and these results agreed with the results of Hermiz and Alkass(2018)

It is evident from the results presented in Table (3) that males have an insignificant superiority over females. Its amount (0.51 kg) in the average born weight was 4.72 ± 0.09 and 4.21 ± 0.10 kg for male and female lambs symmetrically, where these results are similar to the effects of Al-Samarai et al. (2016) and Al-Momani (2020).

**3-2 Factors affecting the weight of lambs at weaning**

The general average weaning weight of lambs was 19.77 ± 0.27 kg (Table 3), and this average is close to what was found by Villalobosa et al. (2017) and higher than what was seen by Rather et al. (2020) and Kramarenko et al. (2021) in several breeds of sheep.

T is noted from Table (3) that there is a highly significant effect ($P<0.01$) of the genetic group on the weight of newborns at weaning (kg), as the Turkish Awassi was 20.77 ± 0.39 kg over the local Awassi of 17.96 ± 0.47 kg on the symmetry. This superiority is due to the genetic structures and the amount of milk consumed during the lactation period (Mohammed, 2011), and these results were similar to those found by Mousa (2013).

We also note that there is no significant effect of the year of birth on the weighted average of the lambs. For example, in 2018/2019, 19.22 ±0.36 kg and for 2019 /2020, 19.52 ±0.44 kg of symmetry, the reason for this is that the two years had the same environmental conditions. These results are similar to Ali et al. (2016).

The age of the mother at birth did not significantly affect the weaning weight, as the lowest weaning weight for lambs from mothers aged three years (18.79 ± 0.52 kg) and the highest weaning weight for lambs from mothers aged six years and over (20.61 ± 0.68 kg), The reason may be due to the availability of the same environmental factors, and these results converged with the results of Siddalingamurthy et al. (2017). The gender of lambs was not significant on the average weaning weight, as it amounted to 19.52 ± 0.35 kg for male lambs and 19.21 ± 0.38 kg for female lambs on symmetry, and these results were similar to the effects of Boujenane and Diallo (2017).

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# العوامل المؤثرة في بعض الصفات الإنتاجية لدى الأغنام العواسي المحلية والتركية.

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**الكلمات المفتاحية:**
انتاج الحليب ومكوناته، صفات النمو. اغنام عواسي

**الخلاصة**

الهدف من الدراسة تأثير العوامل الثابتة (السلالة ، سنة الميلاد ، عمر النعاج ، جنس الحملان) على صفات إنتاج الحليب الكلي ومكونات الحليب (الدهن ,البروتين, اللاكتوز, المواد الصلبة غير الدهنية) وبعض صفات النمو (الوزن عند الميلاد ، ووزن الفطام) بلغ المتوسط العام لإنتاج الحليب الكلي (66.58 ± 1.67 كغ) وكان للسلالة تأثيراً معنوياً (P <0.05) في معدل انتاج الحليب ، بينما لم تكن للعوامل (سنة الولادة ، عمر الام ، جنس الحملان ) اي تأثير معنوي , بلغ المتوسط العام لمكونات الحليب (دهون ، لاكتوز ، بروتين ، مواد صلبة غير دهنية) 4.18 ± 0.29 ، 4.42 ± 0.02 ، 5.47 ± 0.11 ، 10.69 ± 0.14٪ ، على التوالي ولم يكن لجميع العوامل المدروسة اي تأثير معنوي في نسب مكونات الحليب, بلغ المتوسط العام لوزن الميلاد .764±0.06 كغم , ولم تؤثر كل من السلالة وسنة الولادة وعمر النعجة وجنس الحملان في معدل وزن الحملان , كان المتوسط العام للوزن عند الفطام 19.77 ±0.27 كغم وكان تأثير السلالة عالي المعنوية اذ تفوقت سلالة العواسي التركي على المحلي , بينما ولم يكن للعوامل الاخرى اي تأثيراً معنوياً, وبذلك يمكننا ان نستنتج تفوق سلالة العواسي المحلية على العواسي التركية في إنتاج الحليب الكلي , وزن الميلاد لدى العواسي التركية كان أعلى قليلا منه في العواسي المحلية ولكن كان التفوق عالي المعنوية في وزن الفطام.