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STUDY THE PRODUCTION PERFORMANCE OF KARAKOL AND LOCAL SHEEP UNDER THE SYSTEM OF REPEATED BIRTHS

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Abstract
This study was applied in Al-Kafil Station located in Karbala Governorate, located 13 Kgm south of Karbala City, for the period from May 15, 2021 to August 15, 2022. It included different ages and weights: 20 sheep from Karakol and local sheep. The aim is to study the effect of the genetic group (strain) and some non-genetic factors such as age and weight, gender of the newborn, type of birth and season of birth on birth weight and weaning. And the average of the daily weight gain as well as the estimation of the daily and total milk production of the sheep Also, the study of the effect of genetic and non-genetic factors mentioned earlier on the survival rate of lambs from birth to weaning and the results of the study are as follows. The results showed a significant effect ($P<0.01$) on birth weight and ($P<0.01$) on weaning weight and daily weight gain, where the Karakol group was superior to the two strains in birth weight, weight and daily weight gain, reaching 4.55, 23.12, and 0.207 Kg respectively. Age, birth weight and season of birth have been recorded a significant effect on birth weight, weaning weight and daily weight gain, where sheep aged four years and more and in the weight category of 50 kg or more have the best performance, while the type of birth has no significant effect on birth weight, weaning weight and daily weight gain. The general average for daily and total milk production was 0.459 kg/day, 55.16 kg/day, respectively. It is clear that the sex of the sheep has a significant effect ($P<0.05$) on the daily and total milk production, where male-born ewes achieve more than female sheep.

Keywords: Karakol, local sheep, repeated births, sheep weight, sheep age

Introduction

In fact, animal production is considered as the main source of income for the economy and the main aspect of the livelihood of many people, and sheep are the most common one (FAO, 2000). The global demand for animal products is increasing, which confirm the importance of breeding strategies to enhance ruminant production and reduce product costs (Difar, 2018). In developing countries, human consumption of meat is 5-6% a year. However, on the global level, the consumption of sheep meat is rapidly increasing including Australia, New Zealand and China consumes a lot of lamb meat. In addition, Asia alone has the largest number of sheep, it is accounting to 43.6% of the total number of sheep in the world.

The reason for the increase in the number of sheep worldwide is due to the increase in meat and dairy consumption (Mazinani and Rude, 2020). The productive and reproductive characteristics that affect the economy sheep is one of the important animals, but more important for having high (Farrag, 2019). They have reproductive traits of high economic value, such as fertility, lifespan at the first pregnancy, and gestation period (Yavarifard and Vakhroon, 2015). In addition, it represents the reproductive performance that is the most important factor in determining the

production efficiency of sheep. They are having good reproductive performance in sheep, which leads to the productive efficiency of the sheep herd (Mazinani and Rude, 2020; Ibarra and Khoron, 2000). The last three strains in Iraq are Al-Awasi, Karadi and Arabi (Al-Jalili and Akhron, 2006). Sheep breeding in Iraq has not reached the required level as in the rest of the world. They are leaving the sheep for grazing in the middle of the heat of the flame, as well as the use of cattle with the females at the most times of the year.

Many and overlapping factors cause the low number of sheep that produced annually. The increase in the period between two births, which may negatively affect fertility and for the following season (Al-Saegh and Al-Qas, 1992). In recent years, there has been a lot of effort to understand the effect of some factors on efficiency productivity of sheep, in order to maintain high reproductive performance in sheep herds under normal traditional conditions. Therefore, determining the factors that affect reproductive efficiency is an important matter, but it is very important to consider Kurdish and Awasi sheep as a local breed of sheep in Iraq.

The most important breeds of sheep in the most regions of the Middle East countries (Juma and Alkass 2006) The aim of the this study is to compare the production performance of Karakol and Awasi sheep and their multiplication in the traits of production performance. It is represented by the weights of sheep at birth and weaning and daily weight gain during the lactation period. In addition, to the effects on some traits of daily and total milk production, the length of the milking season, and the ratio of survival of sheep from birth.

Materials and Methods

This study was applied in Al-Kafil Station, Karbala Governorate, located 13 km from the south of Karbala city, for the period from May 15, 2021 to August 15, 2022. It is using 60 sheep of different ages and weights from two hereditary groups (strains). The first one was the local Al-Awasi and includes 20 sheep and produced 18 lambs during the first season and 5 lambs during the second season. The second group was Karakol sheep that was 20 sheep, produced 17 lambs during the first season and 8 lambs during the second season.

Keeping animals in semi-open sheds intended for sheltering sheep, and managing the herd accordingly. The program prepared for the breeding season and the preparation for birth. The males are isolated from the herd in a special manner, was released to the females during the breeding season, which usually begins in the month of 5-6. The females are separated according to the breed and the males are included in the breeding season. The pregnant females are separated before giving birth in special place and returning to the herd after the first week of birth.

Nutrition and veterinary care

The herd was fed on a nutritional program calculated according to the station's system, due to the variety of grass between the center of table (5) and the green, while providing mineral salts forms. As well as, the mulched hay in sufficient quantities to satisfy the animal's needs and appetite, and the clean water for the animals in the ponds inside the barns continuous. It is known that there is no continuous grazing for animals, but there is an annual grazing for animals for 4 days per week and for a period of two months only (March and April).

Table (1) Ingredients of fodder for sheep

fodder	The percentage %
corn	10
Barley	50
wheat bran	30
Gaining soybeans	8
Mineral	1
Vitamins	1
Total	100

As for the feeding of newborns, it is left with the mothers until weaning, with only small amounts of green fodder after two weeks of birth, taking into account the increase gradually with age. All animals have undergone a health and preventive program, including regular vaccinations against germs that cause various diseases, internal and external antiparasitic injections, and spraying of barns with special pesticides. They are placing the animals under similar agricultural containers in terms of housing, management and handling.

Data collection

Growth measurement

All the data for each pregnancy has been recorded including the type of birth, strain of the birth, age, weight of the birth, number of the birth, date of birth, gender of the birth, type of birth, city of birth, and the weight at birth and weaning. Also, the weight of the mothers at birth was obtained using a 100 kg scale, which is hung in the barns with the animal placed in a mineral bucket and hung in the scale, while the weight of the sheep was measured using a standard scale (electronic scale) with a capacity of 60 kg. In addition, it is record the weights of the sheep on the first day, and considers that weight at birth and at the age of three months, which is considered the weight of weaning, then calculate the daily weight gain according to the following equation:

The daily weight increase = (final weight - primary weight / number of days).

Estimation of milk production

In addition to the data mentioned above, information on growth has been added the amount of milk produced from calving to the end of the sheep dryness. The new birth sheep are separated from their mothers at eight o'clock in the evening, and then the measurement is taken the next morning. After 12 hours of separation, the weight of the sheep is left with the mothers for 15 minutes. The weight of the sheep is measured again, where the difference in weight represents the amount of milk consumed.

After that, the sheep is milked to make sure that the udder is completely emptied of milk. The weight of the milk is recorded and added to the difference between the two weights, and the amount of milk produced is multiplied by 2 to obtain the daily milk production (Boujenane and Lairini, 1992). All the data has been recorded every week and periodically until the sheep is dead. In order to minimize the cause of the experimental error in recording the production performance data, the

lack of assigning a single trained person to carry out the manual milking process during the experimental period. The production of total milk, it is calculated by multiplying the average daily milk production during the milking season (ICAR 1995).

Statistical analysis

The data were analyzed using the SAS (2012) program to study the effect of genetic group and some fixed factors in different traits, and the correlation of moral differences between means with Duncan's (1955) multiple-range test according to the General Linear Model-GLM method. According to the following mathematical model:

$Y_{ijklmno} = \mu + G_i + A_j + B_k + W_l + T_m + S_n + e_{ijklmno}$

Yijklmno: The value of sample o.

μ: the general average.

Gi: the effect of the genetic group (Awasi, Karakol).

Aj: The effect of age at birth (2, 3 and 4 years abd more).

Bk: The effect of the season of birth.

Wl: the effect of birth weight (40 kg, 40-50 kg and maximum 50 kg).

Tm: the effect of the type of birth (single, twin).

Sn: the effect of the gender (male, female).

eijklmno: the random error that is normally distributed with a mean equal to zero and a variance of magnitude σ2e.

How to extract the interaction effect between genetic group and season in fertility at birth

Results and Discussion

Factors that affect the frequency of births

The results have been showed that the number of sheep exposed to benefit was equal to all of Al-awasi and Karakul. The weaned lambs during the first month were equal, while the total number of Al-awasi and Karakul were equal in the second season. At the same time, it was superior to Al-Awasi (Table 2). This is in agree with Al-Khazarji and Akhron (2014) وthis is due to the new and improved genetic compositions. The number of dead births was equal in the first season, while there were no deaths during the second season.

For the milk production, there was a clear superiority of the Karakol over Al- awasi in total daily and total milk production for the first and second seasons. The results of this study with us were agreed with Al-Kalabi (2020), where the superiority of the Karakol over Al-Awasi, where the daily production of milk was 0.650 and 0.599 kg/ day. This is because to the difference in genetic compositions. And the equality of the two strains, the Karakol and Al-awasi in the number of births for the seasons.

Table (2) numbers of sheep that exposed to exploitation and their productivity under the repeated birth system

trails	Karakol	local	average
number of sheep exposed for one season	20	20	60

number of lambs of the first season	16	15	47
number of lambs of the second season	8	8	21
number of lambs of both seasons	24	23	68
daily milk production- first season(Kg)	9.66	7.56	24.19
daily milk production- second season(Kg)	4.29	3.59	9.82
daily milk production- both seasons (Kg)	13.96	11.15	34.02
milk production- first season(Kg)	1160.82	907.46	2906
milk production- second season(Kg)	515.92	431.57	1180.19
milk production- both seasons (Kg)	1676.74	1339.03	4086.19
number of births that dead in the first season	2	2	6
number of births that dead in the second season	0	0	0
number of births in the first season	18	17	53
number of births in the second season	8	8	21
number of births in the both seasons	26	25	74

The sheep age

The results have been recorded that 4 year old sheep are superior to 3 year old sheep that over 5 and 2 year old sheep in the number of weaned lambs for the seasons (Table 3). This is agree with Aliah Ahmad and Vakhroon (2015) which found in a study conducted on Al-Awasi, Iraqi, Karadi, Turkish and Hamdani sheep for the age of the mother in terms of birth weight and the superiority of 4 year old sheep over the rest of the ages. This may be due to the increase in the mother's weight as the weight of the rumen increases and therefore consumes larger quantities. Therefore, reflected on the weight of the new sheep at birth. Also, the difference of 4 year old sheep in terms of daily and total milk production for the seasons and the number of births for the seasons. The results is in agreed with Hiale et al. (2017), which noting that the increase in milk production at the age of 3 and 4 years was 90 kg, while the lowest production was at the age of one year.

Table (3) number of sheep that exposed to exploitation and their productivity under the birth frequency system according to the age

trails	2 years	3 years	4 years and more	average
number of sheep exposed for one season	15	19	26	60
number of lambs of the first season	10	16	21	47
number of lambs of the second season	2	6	13	21
number of lambs of both seasons	12	22	34	68
daily milk production- first season(Kg)	5.512	8.455	10.23	24.197
daily milk production- second season(Kg)	0.848	2.67	6.305	9.823
daily milk production- both seasons (Kg)	6.36	11.125	16.535	34.02

milk production- first season(Kg)	662.35	1014.98	1228.67	2906
milk production- second season(Kg)	101.9	320.52	757.77	1180.19
milk production- both seasons (Kg)	764.25	1335.5	1986.44	4086.19
number of births that dead in the first season	3	3	0	6
number of births that dead in the second season	0	0	0	0
number of births in the first season	13	19	21	53
number of births in the second season	2	6	13	21
number of births in the both seasons	15	25	34	74

The sheep weight

It is clear that the sheep with a weight of 40-50 kg are superior to the sheep with a weight of less than 40 and more than 50 kg in the number of weaned lambs for the seasons (Table 4). These results agree with Almasri (2021), which shows the existence of a spiritual effect between the weight of the mother and the number of lambs. The number of lambs is more because it is the result of heavier sheep compared to the least weighted sheep. The reason may that the sheep give the lambs a larger amount of food when compared to the light weight sheep. Also, the difference between sheep weighing 40-50 kg and sheep weighing less than 40 and more than 50 kg in terms of daily and total milk production for the season (Table 4).

This is agree with Macdonald et al. (2003) and Badri et al. (2004) and this may be attributed to the development of the body systems of heavier sheep, including the milk system, where the development of the udder and secretory cells for milk is completed, in addition to the increase in the amount of consumed grass, which in turn increases the amount of alcoholic milk produced (Norgaar et al., 2008). Also, the difference in the number of births for the seasons in the sheep was 40-50. The results of this study are consistent with our previous findings (Mathias et al., 2013).

Table (4) numbers of sheep that exposed to exploitation and their productivity under the system of repeated births according to the weight

Trails	Less than 40	40-50	More than 50	average
number of sheep exposed for one season	17	34	9	60
number of lambs of the first season	14	26	7	47
number of lambs of the second season	2	12	7	21
number of lambs of both seasons	16	38	14	68
daily milk production- first season(Kg)	7.667	11.907	4.623	24.197
daily milk production- second season(Kg)	0.902	5.292	3.629	9.823
daily milk production- both seasons (Kg)	8.569	17.199	8.252	34.02
milk production- first season(Kg)	921.4	1427.49	557.11	2906

milk production- second season(Kg)	108.4	634.44	437.35	1180.19
milk production- both seasons (Kg)	1029.8	2061.93	994.46	4086.19
number of births that dead in the first season	3	3	0	6
number of births that dead in the second season	0	0	0	0
number of births in the first season	17	27	9	53
number of births in the second season	2	12	7	21
number of births in the both seasons	19	39	16	74

Genetic group

It is clear from the table (5) that the genetic group has a significant effect (P<0.01) on the birth weight of pregnant female, the superiority of Karakol over Al-Awasi. The average weight of lambs at birth was 4.55 kg for Karakul, while was 3.20 kg for Al-Awasi, respectively. This may be attributed to the high genetic group of Karakul. This is agree with Al-Khazrji and Akhrun (2014) where the Al-Awasi Turkish strain differed from the local Al-Awasi due to the high genetic group of the Turkish Awasi and the weights of the lambs at birth were 3.876 and 3.479 kg respectively. In another study, Al-Qudsi and Ibrahim, 2014 explained that the weights of hybrid Al-Awasi were different and the weight at birth was 4.12 kg, and this is due to Al-Awasi's new genetic.

Table (5) Effect of genetic group and some factors of non-genetic on weight of lambs at birth ± standard error (SE)

The study trails	Samples number	average± SE
		The birth weight (Kg)
Total mean	68	0.07± 3.86
Genetic group		**
Al-Awasi	21	c 0.02± 3.20
Karakol	23	b 0.02± 3.74
The birth gender	24	a 0.07± 4.55
Male		NS
Female	40	0.09± 3.86
The birth type	28	0.11± 3.85
individuality		NS
Twin	64	0.07± 3.87
Birth month	4	0.24± 3.79
First		**
Second	47	b 0.07± 3.75

The mother age at brith (year)	21	a 0.16± 4.10
2		*
3	12	b 0.07± 3.58
4 and more	22	b 0.11± 3.66
Mother weight at birth (Kg)	34	a 0.11± 4.08
Less than 40		*
40-50	16	b 0.09± 3.67
	38	b 0.09± 3.71
More than 50	14	a 0.11± 4.49

Effect of female age at birth

The weight of the mother has a significant effect on the birth weight (P<0.05). The sheep aged 4 years and older had the highest birth weight compared to the sheep aged 2 and 3 years and the averages were 4.08, 3.66 and 3.58 kg respectively (Table 5). The results have noticed that older sheep that are heavier compared to younger ones. This is probably due to the fact that the food that the ewe eats is shared between the pregnancy and the sheep, and because the sheep is young in life, most of the food will go to them to complete their growth and development, and the little of the food will go to the fetus (Ahmad et al., 2015). The 4 year old sheep are distinguished by their larger body size and during pregnancy, the embryos are better nourished than the 2 year old sheep due to the large uterus, which provides a larger area for the fetus to grow and increase in weight.

In addition to the large sheep, which leads to the consumption of large amounts of grass, which increases the state of health, which is reflected in the weight of the pregnancy, where the amount of milk given to the pregnant female increases after birth due to the large udder (Abdul Noor et al., 2013). The advancement of the sheep with age leads to the development of the uterus to create suitable conditions for the growth of the fetus and the expansion of the digestive tract, which leads to an increase in the amount of forage and thus providing the fetus with the necessary elements for growth (Kuchtik and Dobes, 2004). Ahmad et al. (2015) explained in a study on the quality of Al-Awasi, Karadi, Turki and Hamdani sheep, the influence of the mother's age on birth weight and the superiority of 4 year old sheep over the rest of the ages.

Effect of birth weight

The effect of weight on birth weight was significant (P<0.05). The highest birth weight of sheep with the highest weight of 50 kg compared to the sheep with the lowest weight of 40-50 and 40 kg and the averages were 4.49 and 3.71 and 3.67 kg respectively. These results agreed Al-Masri (2021), where he explained that the weight of the mother has a significant effect on the weight of the lambs, as the heaviest mothers, weighing more than 65 kg, gave birth to babies weighing 4.20 kg, compared to sheep weighing at least 55 kg, whose babies weighed 2.96 kg. .

Ahmed and Akhroon (2015) have been found the same conclusion when they found that the weight of the mother has a spiritual effect on the weight at birth, at the same time it agreed with the results

of (Al-Barzanji, 2006) during his study on Al-Hamdaniya sheep, where he explained that the high weight of the newborns was from the high weight of the sheep compared to low weights and resulting in low weight mothers. Abd al-Noor and Khron (2013) have been indicate that the reason that the heaviest sheep at the time of pregnancy are fed well. Therefore feed the embryos better than the sheep of low weight, due to the milking of the womb, which allows a larger space for the fetus and increased weight growth. Some researchers explained that there is no spiritual effect of the mother's weight loss on the weight of the weaning. The results were not in agreed with (Khasawneh and Jawasreh, 2007; and Ahmed et al., 2015).

The effect of the gender

The current results have been showed that the gender of the newborn has a significant effect on the birth weight of pregnant female, as the average birth weight for males and females is 3.86 and 3.85 kg, respectively (Table 5). This is agreed with Wajda Abdul Latif (2017), who did not observe significant gender differences in the weights of males and females, where they were 3,400 and 3,650 kg, respectively, and the results of this study also agreed with Al-Kalabi (2020), where the weights of male births were 4.27 and 4.03 Kg respectively and without any spiritual influence, the influence of the gender of the child on the birth weight.

The reason may be for the lack of spiritual differences in the current birth weights is due to the implementation of the food payment process for sheep during the pregnancy period, especially in the last period of my pregnancy, which causes the lack of difference between the sexes in the birth weight. At the same time, Haile et al., (2017) noted the existence of a spiritual effect of birth weight on the birth weight of males over females during their study on various strains of sheep.

Effect of birth season

It is clear that there is a significant effect ($P<0.01$) of the season of birth on the weight at birth, where the second season is superior to the first season, and the averages were 4.10 and 3.75 kg, respectively (Table 5). The agreement of this study with Al-Kalabi (2020) which showed that there is a spiritual effect of the city of birth on the birth weights, where the averages of births in the cities of October and November were 4.23 and 3.66 kg, respectively. This difference in birth weights may be attributed to the difference in temperature between the cities. The final state of good nutrition for sheep during the upper months (Mellado et al., 2016).

Effect of birth type on birth weight

Table (5) shows that there is no significant effect of the type of birth on the weight of the lambs at birth. This result is agreed with Al-Sultani and Azzawi (2019) in the study of Al-Awasi. Mohammed (2015) did not find any spiritual effect of the type of birth on birth weight in Al-Awasi sheep. This study does not agree with Al-Samrai and Al-Khoron (2015) when they found that the significant effect ($P<0.05$) of the type of birth on the birth weight because the difference between single births and twin births is 0.59 kg.

Conclusions

The study have been concluded that mother strain had a significant effect (P<0.01) on the growth characteristics of the group Karakol on two lines and this shows the possibility of genetic improvement of the Karakol strain in growth traits. The age, the weight of the mother, and the season of birth have a spiritual effect on the studied attributes. The weight of mother has a spiritual influence in all the studied attributes of the milk. The birth weight had a significant effect (P<0.05) on daily and total milk production. Also, the type of birth that has a spiritual effect on the proportion of sheep dying from birth to weaning. The type of birthing season that has a spiritual effect on the proportion of sheep dying from birth to weaning. Finally, the superiority of the Karakol group in the production of alcoholic milk over the Al-Awasi strain.

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