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Seasonal Influence on Productive and Growth Performance in Awassi Sheep

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ABSTRACT

Background: Sheep are one of the important sources of agricultural production in the country and they are one of the pillars of agricultural income. Awassi sheep constitute the numerical majority of Iraqi sheep, as it represents 55-60%. A modern method must be used to in feed, management, improvement of environmental and genetic improvement to increase that productivity in a way that matches the importance of these animals in the livestock sector to achieve the desired target. The season of birth is one of the environmental factors affecting the weight and growth rate of the lambs.

Methods: The study was conducted using forty Awassi ewes, 3-4 years old. lambed single male lambs distributed over the two birth seasons (20 ewes/season). The first season was at winter (October to December) and the second season was at spring (February to May). Milk samples were collected 50 ml/ewe for analysis of its components such as fat, protein and solids non-fat percentage, by the German Eco-Milk analyses device.

Result: The results of the statistical analysis showed no significant effect for birth season on weight of lambs at birth and a months after birth for the two seasons, while the differences were significant ($p \leq 0.05$) at the age of 2 and 3 months in favor of the winter birth. Milk production showed a significant increase ($p \leq 0.05$) at the second and third months of ewes in spring season compared to winter. the results showed a significant ($p \leq 0.05$) superiority for the percentage of fat, non-fat solids and protein for winter season ewes. A significant positive correlation ($p \leq 0.05$) was observed for winter season ewes in body weight, milk fat and protein ratio, a significant positive correlation ($p \leq 0.05$) for spring season ewes between body weight and milk production. While the results showed a significant negative correlation ($p \leq 0.05$) between the percentage of milk fat for ewes between winter and spring seasons and a highly significant positive relationship ($p \leq 0.05$) for milk protein, non-fat solids and weight of ewes for winter and spring seasons, respectively.

Key words: Awassi sheep, Birth season, Production performance.

INTRODUCTION

Sheep are one of the important sources of agricultural production in the country and they are one of the pillars of agricultural income. Awassi sheep constitute the numerical majority of Iraqi sheep, as it represents 55-60%. This breed is characterized by the ability to produce in harsh environmental conditions and adapt to live in dry farming areas and deserts (Othmane *et al.,* 2002). The production of Awassi meat and milk is low when compared to the specialized original breeds, so there is an importance. A modern method must be used to in feed, management, improvement of environmental and genetic improvement to increase that productivity in a way that matches the importance of these animals in the livestock sector to achieve the desired target (Dela Fuenta *et al.* 2006). The environmental conditions play an important role in addition to genetic factors, so the environmental factors are one of the important matters that affect the accuracy of estimating the breeding values of economic characteristics (Rashidi *et al.* 2008). The season of birth is one of the environmental factors affecting the weight and growth rate of the lambs. On the other hand, body weights and its dimensions at different ages are evidence of growth ability and the possibility of benefiting from this evidence in genetic improvement, as well as the body gives a good indication of general growth besides good nutrition (Al-Rawi *et al.* 2002).

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In addition, the variation in body weights and dimensions is the result of many genetic and non-genetic factors and the main desire of the breeder is to identify these factors and reduce their impact (Hermiz *et al.,* 2009). Therefore, the main objective of the current study was to determine the effect of birth season ewes on milk production and its components, growth characteristics and body dimensions of Awassi lambs.

MATERIALS AND METHODS

The study was conducted in a special field for sheep in Al-Shalalat area, north of Mosul, for the period from 1/11/2017 to 1/5/2018, using forty Awassi ewes, their ages 3-4 years. Devided into two birth seasons (20 ewes/season). The first

season was winter, from November to January, while the second season was spring, from (February to April). All animals were treated with a veterinary health care program. The ewes were fed on a standard diet consisting of concentrated and roughages at a ratio of (40:60) respectively, which included 30% crushed barley, 30% wheat bran, 20% crushed corn, 18% crushed lentils and 2% lime salt, at a rate of 1.5 kg/ewe/day. Ewes and lambs were weighed immediately after birth and then every month until weaning (90 days of age). Milk samples were taken (50 ml/ewe) to analyze its components represented by the percentage of fat, protein and non-fat solids, as they were estimated by the German-origin eco milk analyzer, body dimensions measurements were taken (body length, chest circumference, chest depth and body thickness at the shoulders and thighs) for each lamb in a standing position and on a flat floor to take body dimensions measurements. Body length and chest circumference were measured using a tape measure, chest depth and body thickness at the shoulders and thighs were measured using Caliper. The results were statistically analyzed using a one-way complete random design (CRD) using the (Anonymous, 2003) program and the significance between the averages was determined by Duncan's multiple range test, (1955).

RUSLUTS AND DISCUSSION

The results in Table (1) indicated that there was no significant effect of birth season on the weight of lambs at birth, which were 4.42 and 4.23 kg, respectively, for the winter and spring seasons, while the results showed that the winter lambs gave significantly higher weights ($p \leq 0.05$) at the age of 2 and 3 months and reached 19.33 and 24.38 kg compared to the average weights of spring lambs, which were 16.98 and 20.35 kg, respectively. The differences in weight at weaning were attributed to the difference in temperature, quantity of fodder, quality of available pastures and the amount of feed taken for ewes, which is positively reflected on the milk production of ewes. The results agreed with Al-Samarai *et al.* (2019), Mellado *et al.* (2016) and Belay *et al.* (2014) in their study that winter births gave heavier weights than spring and summer births. While it did not agree with Al-Khazraji *et al.* (2016) reported in their study that summer births gave higher weights compared to winter births, Raoof and Balisany (2016) indicated in their study, as they found that spring lambs gave heavier weights at weaning compared to winter lambs. It also did not agree with Torres *et al.* 2021 showed that the birth season had no significant effect on the weights of lambs at birth and weaning.

The results also indicated that there was a significant effect of the season of birth on chest circumference at the three months of age, as the winter lambs were significantly ($p \leq 0.05$) 56.05, 68.05 and 79.20 cm compared to 52.45, 54.25 and 75.50 cm respectively, for characteristic of chest circumference for spring birth lambs. While a significant effect was for winter lambs at the first months of age only for body length, chest depth, shoulders and thighs thickness, which amounted to 45.00, 18.55, 11.95 and 13.53 cm compared to spring lambs, which were 41.80, 16.88, 10.98 and 11.80 cm, respectively. The results agreed with Al-Azzawi (2011) which indicates that there is a high significant increase in winter lambing season in the circumference of the chest and the foreground height. Contrasting with Al-Khazraji *et al.* (2016) whose found the autumn-birth lambs gave a highly significant advantage for the chest circumference and the height of the foreground. No significant differences were observed ewes body weights between winter and spring lambing seasons, while the mean of their weight decreased significantly ($p \leq 0.05$) after the first month of spring birth to 38.45 kg compared to the weight of ewes at the winter season 43.63 kg at the same period, these results may be due to the pasture plants are early spring is high in moistly or the dry matter is not enough for maintaining body weight at the beginning of the season of milk production. However, with the improvement of the

Table 1: Effect of lambing season in body dimensions of lambs at birth to weaning.

	Seasons	Birth	Month 1	Month 2	Month 3
Lambs of weights kg	Winter	4.42±0.14	12.95±0.36	19.33±0.50^{a}	24.38±0.86^{a}
	Spring	4.23±0.15	11.55±0.55	16.98±0.80^{b}	20.35±0.93^{b}
Chest circumference/cm	Winter	40.80±0.71	56.05±0.50^{a}	68.05±0.50^{a}	79.20±0.96^{a}
	Spring	40.20±0.72	52.45±0.88^{b}	54.25±0.49^{b}	75.50±1.19^{b}
Body length/cm	Winter	35.15±0.41	45.00±0.69^{a}	53.35±0.65	64.35±0.54
	Spring	33.85±0.42	41.80±0.95^{b}	54.20±0.90	63.85±0.79
Chest depth/cm	Winter	13.55±0.15	18.55±0.16^{a}	21.78±0.16	23.10±0.30
	Spring	13.10±0.21	16.88±0.32^{b}	21.53±0.32	22.35±0.34
Thickness of the shoulders/cm	Winter	9.30±0.13	11.95±0.20^{a}	14.29±0.19	14.98±0.18
	Spring	9.45±0.25	10.98±1.90^{b}	13.93±0.23	14.75±0.23
Thickness of the thighs/cm	Winter	10.13±0.10	13.53±0.23^{a}	16.55±0.37	17.10±0.33
	Spring	9.93±0.25	11.80±0.21^{b}	16.45±0.42	17.00±0.39
Ewes' weight kg	Winter	43.21±1.15	43.63±1.26^{a}	43.68±0.99	41.70±1.05
	Spring	40.20±2.01	38.45±1.46^{b}	42.23±1.32	43.23±1.32

*^{a,b}Means values within a column with different superscripts differed ($P \leq 0.05$).

Table 2: Milk production and components during the two birth seasons.

Milk production gm/day	Seasons	Month 1	Month 2	Month 3
	winter	712±0.38	419±12.9^{b}	300±37^{b}
	Spring	729±57.2	664±43.9^{a}	577±63.0^{a}
Milk fat %	winter	3.69±0.18^{a}	4.23±0.21^{a}	4.86±0.15
	Spring	3.24±0.11^{b}	3.14±0.18^{b}	4.82±0.23
Non-fatty solids %	winter	12.23±0.17^{a}	12.17±0.18	12.20±0.20^{a}
	Spring	10.86±0.11^{b}	11.27±0.08	11.34±0.31^{b}
Milk protein %	winter	4.63±0.07^{a}	4.58±0.07	4.64±0.08^{a}
	Spring	4.06±0.05^{b}	4.24±0.03	4.26±0.11^{b}

*^{a,b}Means values within a column with different superscripts differed (P≤0.05).

Table 3: Correlation of ewes' weight and production of milk and components for the winter season.

Seasons	Ewes' weight kg	Milk production gm/day	Milk fat %	Non-fatty solids %	Milk protein %
Ewes weight kg		0.23	0.22	0.43*	0.42*
Milk production gm/day			-0.09	-0.04	-0.02
Milk fat %				-0.44*	-0.46*
Non-fatty solids %					0.99

*Probability (p≤0.05).

Table 4: Correlation of ewes' weight and production of milk and its components for the spring season.

Seasons	Ewes' weight kg	Milk production gm/day	Milk fat %	Non-fatty solids %	Milk protein %
Ewes weight kg		0.51*	0.18	0.14	0.14
Milk production gm/day			-0.07	-0.08	- 0.06
Milk fat %				-0.26	- 0.12
Non-fatty solids %					0.96**

*Probability (p≤0.05) **Probability (p≤0.01).

pasture, her body weight improved after the second month, reaching an average of 42.33 kg, with an insignificant difference 43.68 kg for the lambing season ewes. the winter lambing season ewes lost their weight to 41.70 kg when their lambs were weaned may be due to the competition of their lambs for them for concentrated feed, but with differences were not significant.

Results of milk production shown in Table (2) that the difference in lambing season did not have a significant effect on the rate of milk production during the first month after birth, which amounted to 712 and 729 g/day, respectively, for the winter and spring seasons. While the effect was significant for milk production in the second and third month, as the ewes of the spring season were significantly (p≤0.05) 664 and 577 g/day compared to 419 and 300 g/day for milk production for ewes of the winter season for the same period. This may be related to the availability of pasture and fodder for animals. The results agreed with indicated by Abd al-Rahman *et al.* (2015) and Raoof and Balisany (2016) in their study that the daily milk production in the spring season was better than winter season. contrary to what Al-Nouri *et al.* (2014) founded in their study, there was no significant effect of the month of birth on milk production. The results also show that the ewes born during the winter season were significantly (p≤0.05) to their counterparts born during the spring season in the percentage of milk fat at the first and second months 3.69 and 4.23% compared to 3.24 and 3.14% respectively. for the percentage of milk fat for spring season ewes. This superiority may be attributed to the influence of environmental conditions, changes in the condition of the pasture and the availability of green fodder according to the months of birth. The month of birth also had a significant effect (p≤0.05) on the percentage of non-fat solids and protein, the lowest percentage was recorded in the milk produced for spring season ewes for birth ewes during the spring season and it was 10.86, 11.34%, 4.06 and 4.26%, respectively. This result agreed with Abd al-Rahman *et al.* (2013), Augusta *et al.* (2008) and Martini *et al.* (2008), who noticed a significant effect of the month of birth on the percentage of fat.

Table 3 and 4 indicate that the coefficient of correlation of ewes' weight with their milk production was simple and amounted to 0.23 in winter season, but it appeared significant (p≤0.05) in the spring season 0.51. In addition, the results showed a negative relationship between milk production and the percentage of fat, as the correlation coefficient was -0.09 and -0.07, respectively, for the winter and spring seasons. the results showed a significant negative correlation (p≤0.05) for the percentage of milk fat with the percentage of non-fat solids and protein for the winter season, -0.44 and -0.46, respectively. While the highly significant correlation coefficient (p≤0.01) for the percentage of non-fat solids and protein for winter and spring seasons was 0.99 and 0.96, respectively. These results agreed from

Al-Jawari 2011 and Taha *et al.* 2011. Similar results were indicated by Oramary 2009 and Al-Dabbagh 2009, who showed the existence of inverse relationships between milk production and most of its components, especially the percentage of fat in milk.

CONCLUSION

In this study, it was found that milk production was better for the spring season compared to the winter season, as it was positive and significant for the spring season, while it was negatively and significantly correlated with the percentage of milk fat for the winter season.

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Conflict of interest: None.

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