# Study Effect of fixed factors in Milk Production and Growth Traits of Local Iraqi Goats

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#### Abstract

The study was conducted on a sample of 34 local goats in Diyala governorate / Canaan district in one of the goat breeders' fields in the region, for the period from 13/11/2021 to 1/5/2022, with the aim of knowing the effect of fixed factors represented by type of birth, sex of the newborn and month Birth in the characteristics of daily and total milk production, birth weight, weaning weight, total weight gain from birth until weaning, body dimensions of the newborn at birth and weaning, through the statistical analysis, it was found that there was a significant effect of twin births on the single and the superiority of January and February over the months of October and December in the daily and total milk production, as well as a significant effect of the twin births on the single and the superiority of males over females and the superiority of January and February in weight at weaning. Overall weight gain, as for the body dimensions of newborns at birth, twin births outperformed in breech height and males in body length, as well as February in all body dimensions of newborns at birth. February in all characteristics of body dimensions for weight at weaning.

Key words: fixed factors, local goats, milk production

### Introduction

Goats are among the oldest animals that were domesticated by humans more than 10,500 years ago in the Fertile Crescent (Levant and Mesopotamia), and then their breeding spread to all parts of the world (1). Productivity with poor feeding and less forage on pastures compared to cows and sheep (2). Because of the increasing population numbers around the world, the demand for animal products has increased, which called researchers to find ways to improve the productivity of farm animals, including goats, and this began to be clear in many different studies (3). (4) mentioned in his study on goats that twin and triple births are common in goats, and that the productive life of goats is long and their productive efficiency is high, as growth is represented by body weight at different This weight reflects ages. the real

productivity of the mother in terms of milk production during the lactation period and her production of meat through the weight of the weaning males, and the productive efficiency of the goats, measured on the basis of the total weaning weights / goats, is evidence of the ability of one goat to produce more than one newborn and deliver them to the weaning date with a good weight. The milking female in Asia is called the poor peasant's cow (5).

The aim of this study is to find out the relationship between fixed factors with milk production and growth characteristics in local Iraqi goats.

### materials and methods

The study was conducted on a sample of 34 local goats in Diyala governorate / Canaan district, in one of the fields of goat breeders in the region, for the period from 13/11/2021 to 1/5/2022. The total milk production of the goats was calculated for one production season based on the daily milk production, which was measured weekly for each goat by manual milking method, by isolating the newborns from their mothers at night and for 12 hours from eight in the middle of the night until seven in the morning, in order for the goats to be milked in the morning depending on the morning circuit and then estimated total milk production (6), based on the following equation (7):

 $TMY = (T_{1}-T_{0}) M_{1} + \Sigma^{11} (T_{r} - T_{r-1}) (M_{r} + M_{r-1})/2$ 

They represent:

TMY = total milk production.

T0 = date of birth.

T1 = the date of the first measurement.

M1 = first measurement (amount of milk in kg).

 $\xi 11 = \text{total number of circuits}$ 

Tr = date of measurement in that week.

Tr-1 = measurement date for the previous week.

Mr = the measurement in that week (amount of milk in kg).

Mr-1 = Measurement in the previous week (amount of milk in kg).

The weight at birth was taken 24 hours after birth using a disc scale (20 kg), and the weight of the mothers at birth was measured with a scale of 150 kg. Body weight at weaning was measured after three months with a scale of 150 kg, and then the weight gain was calculated before weaning through the difference between weight at weaning and weight at birth according to the following equation:

Weight gain before weaning = weaning weight - birth weight

While the body dimensions of newborns at birth and weaning were measured according to the method (8). The data on the characteristics of milk production, growth characteristics and body dimensions were analyzed using the General Linear Model (GLM) method within the (9) statistical program according to the following mathematical model: Yjklm =  $\mu$  + Tj + Sk + Ml + ejklm

Since:

Yjklm: watch value m .

 $\mu$ : the general average of the adjective.

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

Sk: the effect of the gender of the newborn k (male, female).

Ml: the effect of the month of birth 1 (November, December, January, February).

ejklmn: the random error that is normally and independently distributed with a mean of zero and a variance of  $\sigma^2 e$ 

## **Results and discussion**

Through the current study, it was found that the type of birth had a significant effect, as twin births significantly outperformed the single in daily milk production (398.70, 321.98) g/day and total milk production (31.09, 25.11) kg/season (Table 1), and this result is identical to what was stated (10), and in violation of the result of (11), as well as a significant effect of the month of birth, January and February as births outperformed November and December in daily milk production (494.70, 441.13, 274.87, 270.63) g/day and milk production 34.40, Total (38.58, 21.44, 21.10)kg/season, respectively. The reason for the production of milk for twin births can be attributed to the increased need to breastfeed the newborn compared to a single newborn.

Trait	No. 34	DailyMilkProductiong/day	Total Milk Production kg/season			
Birth Type						
Single	24	$25.0 \pm 321.98$ b	$25.11 \pm 1.95$ b			
Twins	10	398.70 ± 39.07 a	$31.09 \pm 3.04a$			
Gender Newborn						
Male	22	340.07 ± 26.70 a	$26.52 \pm 2.08$ a			
Female	12	352.73 ± 38.24 a	27.51 ± 2.98 a			
Birth Month						
November	9	$274.87 \pm 10.91 \text{ b}$	$21.44\pm0.85~b$			
December	13	$270.63 \pm 20.43$ b	$21.10\pm1.59~b$			
January	8	494.70 ± 39.83 a	38.58 ± 3.10 a			
February	4	$441.13 \pm 49.02$ a	$34.40 \pm 3.82$ a			

Table (2) showed that the type of birth has a significant effect, as twin births outperformed singles in birth weight (2.66, 2.95) kg, and twin births outweighed singles in weaning weight (16.69, 13.48) kg and total weight gain (14.02, 10.53), also The male-born gender outperformed the female in weaning weight (15.42, 14.09) kg and the total weight gain (12.55, 11.35) kg, as the results of the study were in agreement with what was stated by (12) and (13), but it did find (14)and (15)significant not differences between the sexes. The reason may be due to the correlation of weaning weight with birth weight as a result of the mother's influence during pregnancy (fetus) resulting in an increase in the size of the cotyledons and testosterone and after birth the consumption of a higher amount of milk, which is reflected on the weight of Weaning, while the month of birth had a

significant effect on birth weight, as the month of December outperformed the rest of the months (3.32, 2.81, 2.80, 2.21) kg, and January and February outperformed November and December in weaning weight (19.87, 19.50, 11.57)., 11.05 kg and in total weight gain (17.06, 16.68, 9.35, 7.73 kg, respectively, and this result agrees with (16), between (17) that the reason for the difference in weights at weaning is the difference in temperature, quality of pastures, quantity of feed, as well as the amount of feed the goats eat, which affects the productivity mothers of milk The reason can also be attributed to the increase in milk production in twin births (Table 1) of this study, which led to an increase in weight at weaning.

Trait	No. 44	Birth weight kg	Weaning weight kg	Total weight gain kg		
Birth Type						
Single	24	2.95 ± 0.14 a	$0.89 \text{ b} \pm 13.48$	10.53 ± 0.92 b		
Twins	20	$2.66\pm0.08~\text{b}$	1.07 a ± 16.69	14.02 ± 1.03 a		
Gender Newborn						
male	28	$2.86 \pm 0.12$ a	0.93 a ± 15.42	12.55 ± 0.95 a		
female	16	2.74 ± 0.12 a	1.14 b ±14.09	11.35 ± 1.13 b		
Birth Month						
November	11	$2.21 \pm 0.14$ c	0.49 b ±11.57	$9.35\pm0.46~b$		
December	14	$3.32 \pm 0.16$ a	0.37 b ±11.05	$7.73 \pm 0.38$ c		
January	13	$2.80\pm0.05~b$	0.99 a ±19.87	17.06 ± 0.97 a		
February	6	$2.81 \pm 0.07 \text{ b}$	0.56 a ±19.50	16.68 ± 0.52 a		

Table 2 effect of fixed factors on birth weight, weaning weight and total weight gain

Through the statistical analysis of the relationship of fixed factors with body dimensions at birth, Table (3) showed that single birth was significantly superior to twin birth in breech height (37.20, 35.25) cm, and the male gender outperformed the female in body length (24.28, 22.81) cm. For the result of (18) and (19), While the month of birth had a significant effect on the dimensions of the body, as the month of February outperformed the rest of the months in the circumference of the abdomen, chest circumference, front height and rear height, and November .

Table (4) showed a significant effect of fixed factors on the body dimensions of lambs weaning. Twin births at outperformed singles in frontal height (57.75, 52.75) cm, hindquarters height (61.60, 55.58) cm, and body length (37.90, 34.91 cm), and males outweighed the females in the foreground height (55.78, 53.68) cm and body length (36.57, 35.75) cm. Also, the month of birth had a significant effect on body dimensions, as February and January exceeded November and December in all body dimensions for weight at weaning, and this result agrees With (20) and (21).

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Trait	No. 44	Abdominal circumferenc e	Chest circumferenc e (cm)	Front height (cm)	Back height (cm)	body length (cm)
Birth Type	Birth Type					
Single	24	35.58 ± 0.68 a	$\begin{array}{r} 34.08 \ \pm \ 0.60 \\ a \end{array}$	35.12 ± 0.54 a	37.20 ± 0.65 a	24.16 ± 0.49 a
Twins	20	34.40 ± 0.64 a	34.20 ± 0.60 a	34.65 ± 0.86 a	35.25 ± 0.72 b	23.25 ± 0.40 a
Gender Newborn						
Male	28	35.17 ± 0.61 a	34.32 ± 0.59 a	35.50 ± 0.61 a	36.50 ± 0.66 a	24.28 ± 0.42 a
Female	16	34.81 ± 0.78 a	33.81 ± 0.53 a	33.87 ± 0.77 a	$36.0 \pm 0.77$ a	22.81 ± 0.42 b
Birth Month						
Novembe r	11	32.18 ± 0.86b	$\begin{array}{r} 31.81 \ \pm \ 0.69 \\ c \end{array}$	$33.09 \pm 0.96$ b	33.90 ± 1.23 b	25.45 ± 0.71 a
December	14	36.14 ± 0.85 a	33.78 ± 0.68 bc	33.71 ± 0.59 b	36.64 ± 0.71 ab	22.85 ± 0.56 b
January	13	$3\overline{5.53} \pm 0.71$ a	35.23 ± 0.66 ab	36.92 ± 0.87 a	37.46 ± 0.85 a	$2\overline{3.61} \pm 0.50$ b
February	6	36.66 ± 0.61 a	36.83 ± 0.74 a	36.66 ± 1.17 a	37.50 ± 0.67 a	$23.0 \pm 0.36$ b

 Table 3 effect of fixed factors on the body dimensions of lambs at birth

Trait	No. 44	Abdominal circumference	Chest circumference (cm)	Front height (cm)	Back height (cm)	Body length cm))	
Birth Type	Birth Type						
Single	24	60.45 ± 1.39a	56.33 ± 0.97 a	52.75 ± 1.47 b	55.58 ± 1.03 b	34.91 ± 0.57 b	
Twins	20	61.35 ± 1.93 a	58.0 ± 1.09 a	57.75 ± 1.30 a	61.60 ± 1.77 a	37.90 ± 0.62 a	
Gender Newl	oorn						
male	28	61.64 ± 1.54 a	57.14 ± 0.97 a	55.78 ± 1.35 a	58.82 ± 1.27 a	36.57 ± 0.63 a	
female	16	59.50 ± 1.65 a	57.0 ± 1.11 a	53.68 ± 1.68 b	57.43 ± 1.97 a	35.75 ± 0.60 b	
Birth Month							
November	11	$55.54 \pm 1.30$ b	$53.90 \pm 0.70 \text{ b}$	50.36 ± 1.06 b	54.09 ± 1.01 b	$\begin{array}{rrr} 34.09 & \pm \\ 0.28 \ b & \end{array}$	
December	14	56.78 ± 1.15 b	$53.85 \pm 0.85$ b	49.53 ± 0.79b	53.42 ± 0.81 b	33.85 ± 0.45 b	
January	13	66.69 ± 2.16 a	61.53 ± 1.11 a	61.69 ± 1.30 a	65.07 ± 1.76 a	39.38 ± 0.65 a	
February	6	67.50 ± 1.72 a	60.83 ± 1.01 a	62.33 ± 0.95 a	62.83 ± 2.67 a	39.16 ± 0.30 a	

Table 4 effect of fixed factors on the body dimensions of lambs at weaning

### References

- Alberto, F.J., Boyer, F., OrozcoterWengel, P., Streeter, I., Servin, B., de Villemereuil, P., Benjelloun, and Pompanon, F. 2018. Convergent genomic signatures of domestication in sheep and goats. Nat. Commun.; 9:813.
- 2- Ibtisham, Fahar, Li, Z., Mei, X., Lilong, A., Muhammad, B. R., Aamir, N., Yi, Z., Guanghui, L., and Ying, M. X. 2017. Genomic selection and its application in animal breeding. Thai J Vet Med. 47(3): 301-310.
- 3- Oget, C., Servin, B. and Palhière, I. (2019). Genetic diversity analysis of French goat populations reveals selective sweeps involved in their differentiation. Anim Genet.; 50:54–63.
- 4-Poul, D.G.; M.F. Haque, and M.S. Alam, 1991 Goats production in south-west region of Bangladesh. Livestock research for rural development. Volum 3, No3.
- 5- Elia, Gayal Victor (1996). Some factors affecting birth weight and weaning of domestic and batted goats. Master

Thesis - College of Agriculture - University of Baghdad.

- 6- ICAR , 2004 . International Committee for milk recording. Milk recording in sheep in ICAR member countries. ICAR , Rome .
- 7- Gootwine, E. and G.E. Pollott. 2000. Factors affecting milk production in improved Awassi dairy ewes . Animal Science, 71: 607-615.
- 8- Cam, M. A., M. Olfaz and E. Soydan,.
  2010.Body Measurements Reflect
  Body Weight and Carcass Yields in
  Kara Yaka Sheep .Asian J.Anim
  .Vet.Adv,(5):120-127
- 9- SAS .2010. SAS/STAT User's Guide for Personal Computers . Release 9.1 SAS Institute Inc. , Cary , N. C. , USA .
- 10- Salih ,N. G. and N.N. Maarof .2004. Studies of Some Milk Production and Body Weight Traits of Black Mountainous Goat in Sulaimani Governorate – Iraqi Kurdistan Region. *Kurdistan Academicians Journal. 3(1) Part A (51-57).*
- 11- Al-Dabbagh, Salim Abdel-Zahra and Al-Anbari, Nasr Nouri and Hadi, Findia Hussein and Sheikho, Ludiya Shino. 2011. The effect of the relationship between the type of birth and the stage of production on milk production and the main components of Shami goats raised in Iraq. Iraqi Agricultural Research Journal (special issue) 16 (6): 173 - .180
- 12- Abdel Rahman, Faris Younis, Wasoufi, Munther Korkis and Jassem, Alaa Karim. 2006. A study of some productive traits of local, Shami and batted goats. Rafidain Agriculture Journal. 34 (2): 30-36.
- 13- Browning, R., M.L. Leite-Browning and M. Byars . 2011. Reproductive and health traits among Boer, Kiko, and

Spanish meat goat does under humid, subtropical pasture conditions of the southeastern United States . Journal of Animal Science , 89(3):648-660 .

- 14- Ahmed, Bashar Adham and Abdullah, Dhafer Shaker. 2012. The effect of using magnetized water on the performance of some characteristics of Awassi lambs. Diyala Journal of Agricultural Sciences 4(2): 11-21.
- 15- Mia, M.M., M.A.Khandoker, S.S. Husain, M.O. Faruque, D.R.Notter and M.N. Haque. 2013. Genetic evaluation of growth traits of Black Bengal goat , 3(4): 845-852.
- 16- Ahmed, Bashar Adham; Mahdi, Maen Faleh; Ibrahim, Mustafa Jalil; Mahmoud, Alaa Shaker. 2015. Effect of the mother's breed and some fixed factors on the growth of lambs at weaning. Diyala Journal of Agricultural Sciences 7(2): 13-19.
- 17- Jawasreh, K.I. 2003. Genetic evaluation of Damascus goats in Jordan. Ph.D. Thesis, University of Baghdad, Iraq.
- 18- Mohammed, I.D., B.A. Abdullahi and I.A. Adeyinka . 2006. The Performance of Borno White Goat in Agropastoral Management of Semi-Arid North East Nigeria . Journal of Animal and Veterinary Advance, 5(11) : 959- 963.
- 19- Jimmy, S., D. Mutetikka, R.D. Kugonza and D. Mpaiwe. 2010. Variability in body morphometric measurements and their application in predicting live body weight of Mubende and Small East African goat breed in Uganda . middle-East Journal of Scientific Research , 5(2) : 98-105.
- 20- Al-Anbari, Nasr Nouri Khudair. 1998. Genetic analysis of body weights and dimensions at different ages in some

genetic groups of sheep. Master Thesis . faculty of Agriculture.

21- Al-Azzawi, Saleh Hassan Jassim. 2011. The effect of mixing local and imported Shami goats on some productive traits under intensive breeding conditions. PhD thesis. College of Agriculture / University of Mosul. Iraq.