INHERITANCE OF WATTLE AND THEIR EFFECT ON TWINING AND SOME PRODUCTIVE TRAITS IN SHAMI GOAT

[1]H.N. HERMIZ, [2]A.S. SHAKER, [3]T.R. AL-KHATIB, [4]SH.M. AMEEN, [5]A.M. AHMED, [6]D.A. HAMAD

[1]College of Agriculture, University of Salahaddin, Erbil, Kurdistan Region, Iraq
[2]Animal Production Div. Directorate of Agricultural Research– Sulaimani, Kurdistan Region, Iraq
[3,4,5,6]Animal Production Dept. Directorate of Agricultural Research–Erbil, Kurdistan Region, Iraq
E-mail: [2]kosrat_ahmed@yahoo.com

Summary— Data were obtained from Shami goat including bucks, does and their kids that bred at Shami Breeding Station/ Qushtapa-Erbil, during Sep. 2012 – March 2013. Ninety five kids resulted from six sires and sixty one does were used in this study. Presence or absence of wattles, type of birth of kids, milk yield of does as well body weight of kids at birth, weaning and at six month of age were recorded. General linear model procedure used to investigate the effect of wattle appearance on milk yield of does as well on body weights of kids. The appearance of wattle and their relationship with type of birth were analyzed by Chi-Square. Gene frequency was also calculated.

The results revealed that the sires were all heterozygotes for the wattle appearance trait. Two of the used does were dominant homozygotes, while twelve of them were recessive homozygotes, and eight were heterozygotes for the appearance of wattle. The gene frequency p and q for the kids were (0.5) for both of them. Recessive kids (ww) resulted by mating sire with wattle with does without wattle were (21) kids (male and female) and the percentage was 1:2, which indicate that the appearance of wattle not related with sex. Total milk yield was 267.728 kg in both does with wattle and without wattle. Does with wattle yielded significantly higher milk (289.920) kg than those without wattle (225.457). Body weights of kids at birth, weaning and at six month of age were 4.059, 16.320 and 35.455 kg, respectively. The body weight at birth and weaning were significantly influenced ($P<0.05$) by wattle incidence, where the kids with wattles have higher body weights comparing with kids without wattles. Although kids with wattles excelled those without wattles in their body weight at six month of age, but the differences were not significant. Does with wattle produced significantly higher twins comparing with does without wattles ($x2=27.905$; $p<0.001$).

It was concluded that does with wattles produce higher milk as well they were more fertile because they produce higher twins. Kids with wattles have higher body weights at all ages. So the breeders advised to bred bucks and does with wattles in order to increase the productivity of their flocks.

Keywords— Shami Goat, Wattle, Milk Yield, Body Weight.

I. INTRODUCTION

Shami goat are known as a productive breed and growth of their kids from birth to marketing age or for replacement is traits of great economic importance and required particular attention for increasing total goat productivity (Hermiz, 2001). Therefore it is considered as one of the important breed in Kurdistan Region Government (KRG) – Iraq. It has high productivity of milk and twins (Mavrogenis, et al., 2006 and Ciappesoni, et al., 2004), where they recorded the output of milk until weaning of off springs ranges between 528-682 liter according to the season (Mavrogenis, et al., 2006 and Omer, et al., 2015). Its originally is from Syria, and also known as the Damascus goat, it's briefly characterized by many researchers (Zaitoun, et al., 2005; Mavrogenis, et al., 2006; Alrousan, 2009; Rawya and Ahmed, 2014; Hermiz, et al., 2014 and Hermiz, et al., 2015).

Wattles represent congenital thumb-shaped appendages on the ventral throat and are common in domestic goats (Capra hircus) it's associated with (FMN1 and GREN1) genes which located in chromosome 10 (Reber, et al., 2015). Many production traits are correlated with present or absence of wattle like milk yield (Gasu, et al., 1970), lower fertility in sheep (Singh, et al., 1970) and higher body weight (Adedeji, et al., 2012).

Not much is known about the inheritance of wattle in Shami goat and their effect on productive traits, so this research was conducted to study the inheritance of wattle in Shami goat and their influence on the twins, milk yield of does and on body weights of their kids.

II. MATERIALS AND METHODS

The data were obtained from Shami goat including bucks, does and their kids that bred at Shami Breeding Station/ Qushtapa-Erbil, Northern Iraq (private sector) during Sep. 2012 – March 2013. A total of ninety five kids resulted from six sires and sixty one does were used in this study. The presence or absence of wattles, type of birth of kids, milk yield of does as well body weight of kids at birth, weaning and at six month of age were recorded. Management of the flock, feeding, mating system and the health program as well measuring body weights of kids were described by Hermiz et al. (2014). Measuring the milk yield was described by Hermiz et al. (2015).

Records were analyzed using general linear model (GLM) procedure (SAS, 2005) to investigate the effect of wattle appearance on milk yield of does as well on body weight of kids at birth, weaning and at six month of age. The appearance of wattle and their

relationship with type of birth (Single, Twins and Triple) were analyzed by Chi-Square within SAS (2005). Gene frequency was calculated as described by (Al-Rawi, et al., 2000).

III. RESULTS AND DISCUSSION

1. **The inheritance of wattle:**
   Table (1) shows the different matting of Shami goat. It revealed that the sires were all heterozygotes for the wattle appearance trait. Two of the used does were dominant homozygotes, while twelve of them were recessive homozygotes, and eight were heterozygotes for the appearance of wattle. The gene frequency p and q for the kids were (0.5) for both of them. The data also showed that the recessive kids (ww) that resulted by mating sire with wattle with does without wattle were (21) kids (Male and Female) and the percentage was 1:2, which indicate that the appearance of wattle not related with sex.
2. **Effect of wattle on total milk yield:**
   The overall mean of total milk yield in lactation period of the Shami does was 267.728 kg in both does with wattle and without wattle (Table 2). This result was found to be higher than those of Iraqi local and Damascus goat raised in the middle of Iraq (Hermiz et al., 1998 and 2004) as well than that of Native Black goat raised in Sulaimani-Northern of Iraq (Maarof et al., 2009) who claimed that such differences may be attributed to a combination of genetic and environmental factors affecting the performance of the animals, as well as to the procedure being applied for estimating milk yield. The does with wattle yielded higher milk (289.920 ± 9.38) kg than those without wattle (225.457 ± 12.95) and the differences were significant. These findings were similar to those observed by other researchers such as (Gasu et al., 1970) in ewes.
3. **Effect of wattle on body weights:**
   Table (3) shows the overall mean as well mean and standard error for the three periods. The overall mean of body weights of kids at birth, weaning and at six month of age were 4.059 ± 0.11, 16.320 ± 0.57 and 35.455 ± 6.07 kg, respectively. The body weights at the three ages of kids with wattle were 4.318 ± 0.11, 17.011 ± 0.68 and 37.281 ± 7.89, and for the kids without wattle were 3.441 ± 0.21, 14.412 ± 0.96 and 30.583 ± 7.58 kg, respectively. The results showed that body weight at birth and weaning were significantly influenced ($P<0.05$) by wattle incidence, where the kids with wattles have higher body weights comparing with kids without wattles. These finding confirms the results obtained previously by Adedeji, et al. (2012). Although kids with wattles excelled those without wattles in their body weight at six month of age, but the differences between the two groups were not significant.
4. **Effect of wattle on twin births:**
   The results of this study revealed that the does with wattle produce significantly higher twins comparing with does without wattles ($x2=27.905$; $p<0.001$) (Table 4).

CONCLUSION

It was concluded that does with wattles produce higher milk during the lactation season as well they were more fertile because they produce higher twins. Also kids with wattles having higher body weights at all ages. So the authors can be advice the breeders to bred bucks and does with wattles in order to increase the productivity of their flocks.

ACKNOWLEDGMENT

The authors thank and appreciate Mr. J.S. Toma (Directorate of Agricultural Research-Ministry of Agriculture-Erbil) for his assistance during the period of conducting the study.

Table 1.Type of progeny from different genotype matting of Shami goat:

Sire		Doe		Birth				
Phenotype	Genotype	Phenotype	Genotype	Phenotype	Genotype	Male	Female	Total
With wattle	Ww	Without wattle	Ww	With wattle	Ww	7	4	11
				Without wattle	ww	4	8	12
With wattle	Ww	With wattle	Ww	With wattle	WW or Ww	3	1	4
				Without wattle	ww	3	6	9
With wattle	Ww	With wattle	WW	With wattle	WW or Ww	5	1	6
Total						22	20	42

Table 2. Means ± standard errors for the effect of wattle on total milk yield (kg) of Shami goat:

Factors	No.	Mean ± S.E.
		TMY (kg)
Overall mean	61	267.728 ± 2.13
No. of Wattles:		
0	21	225.457 ± 12.95 b
2	40	289.920 ± 9.38 a

Means not having a common letter differ significantly ($P<0.05$).

Table 3. Means ± standard errors for the effect of wattle on body weights (kg) of Shami kids:

Factors	BWT (kg)		WWT (kg)		SMWT (kg)	
	No.	Mean ± S.E.	No.	Mean ± S.E.	No.	Mean ± S.E.
Overall mean	95	4.059 ± 0.11	64	16.320 ± 0.57	44	35.455 ± 6.07
No. of Wattles:						
0	28	3.441 + 0.21 b	17	14.412+0.96 b	12	30.583+7.58 a
2	67	4.318 ± 0.11 a	47	17.011±0.68 a	32	37.281±7.89 a

Means not having a common letter within each column differ significantly (P<0.05).

Table 4. Effect of wattle on the type of birth:

Sire	Does	T.B.			Sig.
		1	2	3	
With wattle	Without wattle	4	7	1	X^2=27.905
	With wattle	14	13	3	

REFERENCES

[1] Adedeji, T., Ozoje, M., Otunta, T., Ojedapo, L., Ojediran, T. and Lge, A. (2012). Effect of wattle trait on body sizes and scrotal dimensions of traditionally reared west african dwarf (WAD) bucks in the derived savannah environment. *Iranian Journal of Applied Animal Science, 2* (1): 69-72.

[2] Al-Rawi, A.A., Hermiz, H.N. and Asofi, M.K. (2000). Inheritance of polledness and coat color in goat. *Iraqi Journal of Agricltural Sciences, 31* (3): 445-460.

[3] Alrousan, L. (2009). Goat production in Jordan. *Proceedings of the 24th annual goat field day* (pp. 33-40). Langston University.

[4] Ciappesoni, G., Pribyl, J., Milerski, M. and Mares, V. (2004). Factors affecting goat milk yield and its composition. *Czech J. Anim. Sci., 49* (11): 465-473.

[5] Gasu, S., Boyazoglu, J.G. and Lauvergne, J.J. (1970). The inheritance of wattle in th esardinian breed of sheep. *Ann. Genet. Sel. Anim., 2*: 249-261.

[6] Hermiz, H.N. (2001).Genetic evaluation of local goats and their crosses using some productive traits. Ph.D. Thesis, University of Baghdad, Iraq.

[7] Hermiz, H.N., Al-Khatib, T.R., Amin, Sh.M., Ahmed A.M. and Hamad, D.A. (2014). Genetic and Phenotypic Parameters for Body Weights of Shami Kids in Erbil-KRG-Iraq. International Journal of Current Research. 6(11): 9482-9485.

[8] Hermiz, H.N., Ameen, Sh.M., Al-Khatib, T.R., Ahmed, A.M. and Hamad, D.A. (2015). Non genetic effects and prediction equations for milk traits of shami ewes in Erbil-KRG-Iraq. Proceedings of The IRES 10th International Conference, Prague, Czech Republic, 27th September. 2015, pp: 1-4.

[9] Hermiz, H.N., Asofi, M.K. and Al-Rawi, A.A. (1998). Some genetic and non-genetic causes of variation in milk traits of Iraqi local goat. 6th World Congress on Genetics Applied to Livestock Production. 12-16, Jan. Armidale, NSW Australia. 24: 212-215.

[10] Hermiz, H.N., Singh, M. Al-Rawi, A.A. and Alkass, J.E. (2004). Genetic and non genetic parameters for milk traits in Iraqi local goat and their crosses. Dirasat, Agricultural Sciences, 31(2): 223-228.

[11] Maarof, N.N., Hermiz, H.N., Salih, N.G. and Alkass, J.E. (2009). Prediction of total milk yield from partial monthly yield in Native Black Goats. J. Zankoy Sulaimani. 12(1) part (A): 1-5.

[12] Mavrogenis, A.P., Antoniades, N.Y. and Hooper, R.W. (2006). The Damascus (Shami) goat of Cyprus. *Animal Genetic Resources Information, 38*: 57-65.

[13] Omer, M., Ahmed, K. and Amani, A. (2015). The milk Yield and composition of Damascus (Shami) Cyprus goats in intensive system eastern Sudan. *Int. J. of Multidisciplinary and Scientific Emerging Research, 4* (1): 1035-1037.

[14] Rawya, A. and Ahmed, K. (2014). Physicochemical characteristics of damascus (Shami) Cyprus goats milk in different loctation periods. *International Journal of Liberal Arts and Social Science, 2* (6): 67-72.

[15] Reber, I., Keller, I., Becker, D., Flury, C., Vrelle, M. and Drogemulter, C. (2015). Wattle in goats are associated with the FMN1/ GREM1 region on chromosome 10. *Animal Genetics, 46*: 316-320.

[16] SAS. (2005). *SAS/STAT User's Guide for personal computer*. Cary, NC, USA: Release 8.2. SAS Institute Inc.

[17] Singh, L., Singh, O. and Dolling, C. (1970). Inheritance and occurences of wattle in malpura and crossbred sheep. *Indian Vet. J., 74*: 959-964.

[18] Zaitoun, I.S., Tabbaa, M.J. and Bdour, S. (2005). Differentaition of native goat breeds of Jordan on the basis of morphostructural characteristics. *Small Ruminant Research, 56*: 173-182.

★★★