International Journal of ChemTech Research
CODEN (USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555
Vol.9, No.12 pp 259-265, 2016

Assessment of some productive performance of Boer goats and their crosses with Egyptian Baladi goats

Abd-Allah. S*, M. I. Mohamed, H. H. Abd- Elrahman and R. I. EL-Kady.

Animal Production Department, National Research Centre, 33 El-Bohouth Street, P.O:12622, Dokki, Giza, Egypt.
***Corresponding Author: sablogical2007@yahoo.com**

Abstract: Productive performance of Baladi, Boer and their crosses were studied in Abdel Moneim Riad village, El-Nubaria, Egypt. Body weight of the kids were recorded for one year at five periods for kids in four age groups namely, A (0 to 3 months), B (3 to 6 months), C (6 to 9 months) and D (9 to 12 months) to assess the effect of genotype, sex and type of birth on body weight (kg). Body weight changes were influenced ($P<0.05$) by genotype, the body weight at birth (BW) of Boer kids (3.2 kg) was significantly ($P<0.05$) higher than of Boer × Baladi (2.7 kg) and pure Baladi kids (1.9 kg). In addition, birth weight of Boer was about 68% higher than Baladi kids. Average body weight from 3 to 12 months was greater for Boer compared with Baladi kids. Boer goats grew faster with a marked difference (16.86 kg) among animals at 6 months of age. Baladi kids had a lower growth rate from 3 to 6 months with daily gain (44.22 g/d) that increased with the age increase from 6 to12 months. Average daily gain of Boer × Baladi was also higher than Baladi kids, but there was no significant difference observed in group B between Baladi and Boer × Baladi kids. The crossbred F1 generation between Boer and local Baladi goats increases birth weight (BW), 3 month weight (3MW), 6 month weight (6MW), 9 month weight (9MW), 12 month weight (12MW) for males compared with those of female kids. Male kids tended to grow faster than females with a pronounced difference (72.25, 90.11and 110.22 g/d) being observed in group D for Baladi, Boer × Baladi and Boer F1 kids, respectively. Pre-weaning weights were heavier for single than for twin kids. Average daily gains from birth to weaning of single and twins were (60.33 and 55.22 g/d), (67.22 and 67.20 g/d) and (81.66 and 80 g/d) for Baladi, Boer × Baladi and Boer kids, respectively.
Keywords: Goat, crossbreeding, performance, Boer, Baladi, sex, birth type, genotype.

1. Introduction:

Genetic improvements of goats play an important socio-economic role in many rural districts in Egypt, especially in contributing to food and nutrition security. In our country, it is clear that there are some of goat breeds that have good potential for meat production. The Egyptian goat breeds, especially the local Baladi breed with a wider distribution across the delta and have a high genetic variability. The present productivity of local Baladi goat is very low. Many of studies concerning growth rates of Egyptian Baladi goats reported that, low values of the average daily gain and the high values of variability coefficient demonstrate reduced aptitudes for meat production. Crossbreeding is an easiest methods to get very productive goats within little period of time. It is also the easiest method to acquire superior stock from elsewhere [1]. Boer goats are meat type breed and have been introduced to different countries of the world including Egypt. The Egyptian Baladi goat breed is one of the breeds that are used for crossing with Boer goats.

In order to improve performance of Baladi goats in Egypt, a crossbreeding scheme of local Baladi goats with Boer goats is becoming an important method to improve meat productivity of Egyptian Baladi goat [2]. The objective of this research was to assess the effect of genotype, sex and type of birth on the productive performance of (F1) of Baladi, Boer × Baladi and Boer kids reared under the same environmental conditions of Egypt.

2. Materials and Methods:

This research was carried out at the Sheep and Goats Research Unit of the Department of Animal Production at Abdel Moneim Riad village near of the Cairo-Alexandria desert road, approximately 100 kilometers, south of Alexandria city. It is situated in the recently reclaimed areas of the West Delta, in El-Nubaria New Land Development Region. Experimental area has an arid climate with hot dry summers and cool winter prevailing in this area. During winter season 2009, two bucks and ten does of Boer were collected from Ministry of Agriculture and Land Reclamation, Sharq El Owainat, Egypt (Photo 3). Baladi mature female goats (n = 20) were purchased from Shanway village, Ashmoun, El-Menoufia, near of north of Cairo city, Egypt (Photos 1and 2). Boer bucks were introduced for crossbreeding purpose to begin evaluating meat goat breeds of doe for kids' growth and production efficiency with help of Egyptian Baladi goat productivity improvement program project. Dams and kids were kept in the barn for almost two weeks after kidding. During that period, the dams were offered about one kilogram of concentrate feed mixture and berseem hay ad libitum. After that, doe groups were fed on the basis of their body weight according to NRC recommendations [3]. Kids were tagged and identified with their dam within one day of birth and the kids were left with their dams for sucking till weaning age at three months. They also received ad labium fresh berseem hay starting from 3 weeks of age up to weaning. Kids were fed a concentrate feed mixture (prepared in the Sheep and Goats Research Unit) with a standard chemical composition of 16 % CP. The kids were grouped into four age categories: A (0 to 3 months), B (3 to 6 months), C (6 to 9 months) and D (9 to 12 months). After weaning, at 3 months of age, all the kids were gathered together, independently of genotype. Water was freely available. All animals, and basic information about birth date, sex, genotype and birth type, were registered in a database. Birth weight (BW), 3 month weight (3MW), 6 month weight (6MW), 9 month weight (9MW) and 12 month weight (12MW) were recorded . All weight measurements except birth weight were taken at three week interval using the Salter scale with capacity of 50kg. In this study data from (2009-2010) to (2010-2011) were used for statically analyzed with SPSS 15.0 [4] software using parametric tests. One-way ANOVA was used to compare means of different factors in goats of the different groups. Differences among means were ranked using Duncan's New Multiple Range Test[5]. All analysis were carried out in triplicates and the differences were considered significant at ($p<0.05$).

3. Results and Discussion

3.1. Effect of genotype on body weight and average daily gain change of kids born to experimental genetic groups.

Data recorded in this research indicated that differences (P<0.05) between different groups in the average live body weight at different ages and stages of live kids may be due to genotype differences (Table 1). Least-squares mean (LSM) and standard errors (SE) of different age groups for all kids in various genotypes are given in (Table 1 and Figure 1). Least-square means of BW, 3MW, 6MW, 9MW and 12MW (Kg) were (1.9, 6.99, 10.79, 16.24 and 22.11kg) for Baladi kids, (2.7, 8.68, 12.86, 19.73 and 27.26 kg) for Boer × Baladi kids and (3.2, 10.52, 16.86, 25.87 and 35.4 kg) for Boer kids. The higher body weight of Boer kids in the present study is mainly related to genotype differences. The results showed that, kids of Boer × Baladi were heavier (P< 0.05) than Baladi kids from birth to one year. The present result agrees with other studies by many authors [2,6,7,8,9,10]. It is important that, the differences between genotypes from birth to one year were always had a highly average daily gain (ADG).

Table 1. Effect of genotype on body weight (Kg) and average daily gain change (g/d) of kids born to experimental genetic groups:

Age group	Genetic Group					
	N	Baladi	N	Boer × Baladi	N	Boer
	Body Weight (Kg)					
BW (Kg)	15	1.90^{c}±.0259	12	2.70^{b}±.0228	10	3.20^{a}±.0210
3MW(Kg)	11	6.99^{c}±.0698	9	8.68^{b}±.1852	8	10.52^{a}0780
6MW(Kg)	10	10.97^{c}±.0645	9	12.86^{b}±.0773	8	16.86^{a}±.0518
9MW(Kg)	10	16.24^{c}±.0272	9	19.73^{b} ±.0434	8	25.87^{a}±.1731
12MW(Kg)	10	22.11^{c}±.0718	9	27.26^{b}±.1013	8	35.40^{a}±.0292
	Average daily gain(g/d)					
A	11	56.55^{c}±.765	9	66.44^{b}±.546	8	81.33^{a}±.412
B	10	44.22^{b}±.878	9	46.44^{b}±.334	8	70.44^{a}±.252
C	10	58.55^{c}±.987	9	76.33^{b}±454	8	100.11^{a}±.612
D	10	65.25^{c}±.398	9	83.66^{b}±.312	8	105.88^{a}±.266

a, b and c Means in the same column with different superscripts are different at (p <0.05), (BW)Birth weight, (3MW) 3 month weight, (6MW) 6 month weight, (9MW) 9 month weight, (12MW) 12 month weight, A (0-3 months), B (3-6 months), C (6 -9 months) and D (9 to 12 months), N. Number of kids.

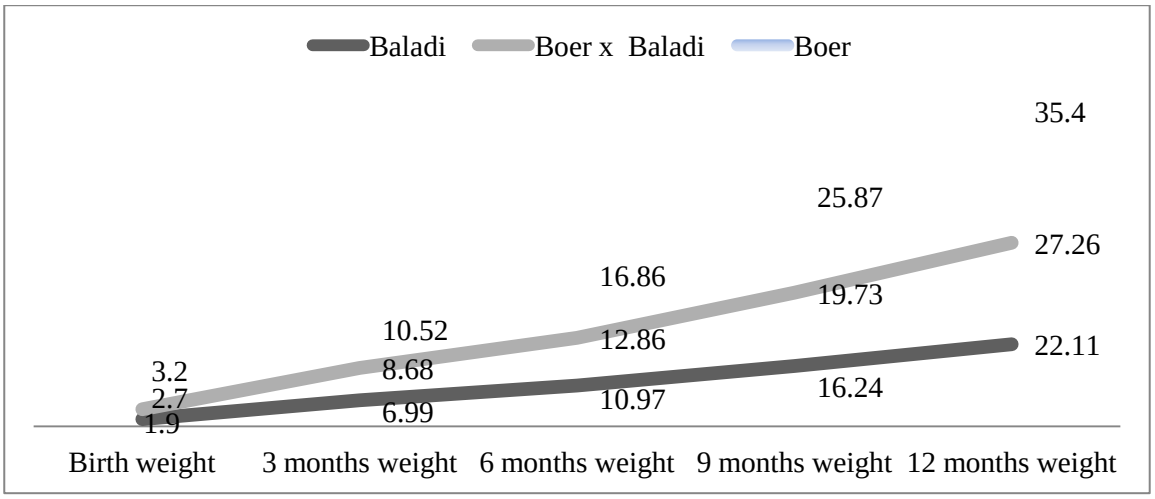

Figure 1: Effect of genotype on body weight change (Kg) of kids born to experimental genetic groups.

Least-squares means (LSM) and standard errors (SE) of ADG (BWto3M), ADG (WW to 6M), ADG (6M to 9M) and ADG (9M to 12M) for all kids in various genotypes are given in (Table 1 and Figure 2).The average daily gain (ADG, g/d) of A (BW to 3M), B (3MW to 6MW), C (6MW to 9MW) and D (9MW to12MW) were (56.55, 44.22, 60.60 and 65.25 g/d) for Baladi, (66.44, 46.44, 76.33 and 83.66 g/d) for Boer × Baladi (81.33, 70.44, 100.11 and105.88 g/d) for Boer kids, (Table 1 and Figure 2). The difference in growth rate between Baladi kids and their crosses was lowest of age group B. No significant difference (P<0.05) in average daily gain after weaning was found between Boer × Baladi crossbred kids (46.44 g/d) and the kids born to Baladi does (44.22 g/d). [11]indicated that crossing between Boer bucks and Baladi does in Egypt increased in daily weight gain after weaning of Boer × Baladi and Baladi kids but not significantly [P<0.05]. Similar improvements on daily gain of crossbreeding were also found in India and China using Boer goats [12,13]

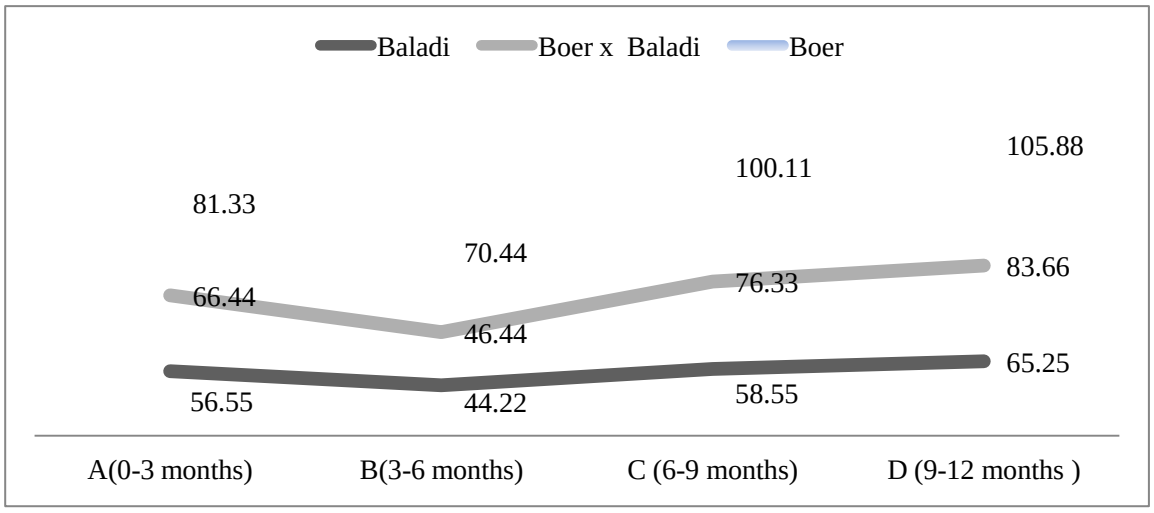

Figure 2: Effect of genotype on average daily gain change (g/d) of kids born to experimental genetic groups.

F1 Baladi kids were significantly smaller than those of other genotypes; this is because genotype with small weight at breeding will have low average daily gain after kidding. Also differences recorded between the two genotypes of Baladi does were significant (P<0.05), (Table 1 and Figure 2).[14]studied the effect of crossbreeding Boer and Baladi goats, reported that the Boer × Baladi kids had a higher growth rate than Baladi kids. Also, Boer × Baladi kids recorded a higher average daily gain than Baladi kids from birth to one year [2].

3.2. Effect of sex and type of birth on live weight changes (Kg) of kids born to experimental genetic groups:

This result indicated that, male kids were heavier than females. The average birth weight of male and female was (1.93 and 1.90 kg), (2.74 and 2.67 kg) and (3.33 and 3.08 kg) for Baladi, Boer × Baladi and Boer kids, respectively. Male kids of Baladi, Boer × Baladi and Boer weighed 5.75 %, 4.13% and 5.11% higher at 12 MW than female kids, respectively. The higher body weight of male kids after weaning may be attributed to their birth weight; this is because they were born heavier than females. The live body weight of Boer male goat kids was higher than in female Boer kids for all age groups. Differences observed between male and female kids were small and non-significant after weaning. Table 2 shows the influence of type of birth on BW, 3MW, 6MW, 9MW and 12MW (Kg). The results showed that in all growth parameters, single kids performed better than twins (Table 3). Kids of Baladi and Boer does born single (2.07and 3.50kg) were significantly heavier than their twin (1.75 and 3.10 kg) counterparts, Table 2.This finding was in agreement with that of [14] in Boer, Baladi and F1 Boer × Baladi crossbred kids. BW and 3MW weight Kids of Boer × Baladi born as singles were heavier than twins. The difference in body weights for different type of births at all age groups may be due to that littermates had to share the prenatal maternal nourishment in contrast to the single born kids[15].

Table 2. Effect of sex and type of birth on live weight changes (Kg) of kids born to experimental genetic groups:

Genetic Group	Factor		Age group									
			N	BW, kg	N	3MW, kg	N	6MW, kg	N	9MW, kg	N	12MW, kg
Baladi	Sex	Male	9	1.93 ± 0.144	6	7.03± 0.098	6	10.99± 0.297	6	16.26± 0.320	6	22.76± 0.174
		Female	6	1.90 ± 0.485	5	6.97± 0.047	4	10.90± 0.347	4	16.15± 0.237	4	21.45± 0.122
	type of birth	Single	3	2.07± 0.247	3	7.50± 0.109	3	11.50± 0.147	3	16.80± 0.199	3	22.90± 0.137
		Twin	12	1.75± 0.117	8	6.70± 0.145	7	10.60± 0.147	7	15.70± 0.176	7	21.50± 0.247
Boer × Baladi	Sex	Male	7	2.74±0.299	6	8.70± 0.156	6	12.88± 0.199	6	19.74± 0.157	6	27.85± 0.190
		Female	5	2.67±0.034	3	8.68± 0.161	3	12.85± 0.257	3	19.62± 0.287	3	26.70± 0.497
	type of birth	Single	4	2.95± 0.127	4	9.00± 0.180	4	12.90± 0.109	4	19.96± 0.156	4	27.70± 0.347
		Twin	8	2.45± 0.120	5	8.50± 0.047	5	12.40± 0.134	5	19.40± 0.147	5	27.00± 0.193
Boer	Sex	Male	6	3.33±0.044	5	10.53± 0.043	5	16.98 ± 0.436	5	26.28± 0.109	5	36.20± 0.130
		Female	4	3.08±0.033	3	10.19± 0.132	3	16.42± 0.254	3	25.34± 0.397	3	34.35± 0.499
	type of birth	Single	3	3.50± 0.345	3	10.85± 0.332	3	17.18± 0.347	3	26.18± 0.147	3	35,73± 0.143
		Twin	7	3.10± 0.542	5	10.30± 0.211	5	16.60± 0.167	5	25.74± 0.124	5	35.10± 0.120

(BW) Birth weight, (3MW) 3 month weight, (6MW) 6 month weight, (9MW) 9 month weight, (12MW) 12 month weight.
N. Number of kids.

3.3. Effect of sex and type of birth on average daily gain (g/d) of kids born to experimental genetic groups:

Least squares means for average daily gain (ADG) of the kids are in (Table 3). The average daily gain from birth to weaning of male and female was (56.66 and 56.33 g/d), (66.22 and 66.2 g/d) and (80 and 79 g/d) for Baladi, Boer × Baladi and Boer kids, respectively. In the present study, male kids were grow faster than females in all age groups and the difference in growth rate was not significant for male kids in B age group with Baladi kids (44.02 g/d) compared to Boer × Baladi crossbred male kids (46.44 g/d).

Table 3. Effect of sex and type of birth on average daily gain (g/d) of kids born to experimental genetic groups:

Genetic Group	Factor		Age group				
			A	B	C	D	$\bar{X}$
Baladi	Sex	Male	56.66 ±3.39	44.02 ±7.17	58.60 ±3.03	72.25 ±4.44	57.88
		Female	56.33±2.886	43.66±1.732	58.44±2.057	58.88±2.066	54.32
	type of birth	Single	60.33±5.131	44.44±9.814	58.88±4.076	67.77±3.551	57.85
		Twin	55.22±6.761	43.33±4.091	56.66±3.991	64.44±3.331	54.91
Boer × Baladi	Sex	Male	66.22±7.076	46.44±6.061	76.22±1.451	90.11±5.941	69.74
		Female	66.20±6.044	45.77±4.043	75.20±4.632	78.66±5.055	66.45
	type of birth	Single	67.22±5.051	43.33±4.551	78.44±5.090	86.00±7.646	68.74
		Twin	67.20±3.041	43.33±3.091	77.75±5.541	84.44±7.071	68.18
Boer	Sex	Male	80.00±5.066	71.66±4.451	103.33±5.04	110.22±5.55	91.30
		Female	79.00±5.551	69.22±5.044	99.11±6.041	100.11±6.06	86.86
	type of birth	Single	81.66±7.047	70.33±6.066	100.00±7.05	106.11±9.54	89.52
		Twin	80.00±9.071	70.00±5.541	101.55±8.04	104.00±8.66	88.88

A (0-3 months), B (3-6 months), C (6 -9 months) and D (9 to 12 months)

The highest average daily gain ADG values were recorded for male Boer kids from birth to one year old age in this study. The mean average daily gain from birth to one year of male Boer kids (91.30 g/d) was higher than male kids of Baladi does (57.03 g/d). Their values were greater than our values for ADG (69.74 g/d) for male Boer × Baladi kids at similar age (Table 3). It was observed that (A) age group gain was higher in the male Boer kids and growth rate of male kids was always higher than females. In addition, the weight gain of Boer × Baladi kids is closely associated with lower level of milk intake during the weaning period and declines with declining milk production. Similar result was reported in male kids of Boer × Baladi kids which is 2.3% higher than female kids[14]. [16] noticed that sex has significant effect on pre weaning average daily gain. The differences in average daily gain (ADG, g/d) between male and female kids from birth to one year was (4.44 g/d) for Boer kids compared to F1 Boer × Baladi kids (3.29 g/d) and Baladi kids (2.71g/d), respectively, (Table 3). We noticed slightly difference in ADG from birth to one year of age approximately 12.71g between male Baladi crosses and male Baladi kids; although ADG were considerably lower (i.e. 69.74vs. 57.03 g). In the present study, single born kids grew faster than twin born kids. The average daily gain of twin kids was lower than that of single kids. Average daily gains of (A) age group for single and twins were (60.33 and 55.22 g), (67.22 and 67.20 g) and (81.66 and 80.00 g) for Baladi, Boer × Baladi and Boer kids, respectively (Table 3). Higher average daily gains from birth to one year of single were (81.66, 70.33,100 and106.11 g) for single Boer kids' at different age groups (A, B, C and D), respectively (Table 3). On the contrarily, single Baladi kids indicated significantly slower gains, while Boer × Baladi crosses indicated intermediate values (67.22, 43.33, 78.44 and 86.00 g), being faster than the corresponding native pure Baladi kids and slower than pure Boer kids at different ages (Table 3). Our results from type of kids from birth to weaning are consistent with past literature reports where single kids were averaged higher daily gain than kids born as twins [14,8,17]. [18] reported that single birth kids had faster growth rate than kids from multiple births. Also the kids born as singles were heavier than twins [19].

4. Conclusions

Although this is a preliminary assessment, the genetic potential and the larger body weight of the Boer breed gives it an advantage as purpose breed that can be used to produce meat. Therefore, should be that introduction of Boer breeds with a proper study on their ability to adapt to local conditions, the Boer goat must be considered as the base for any future work aiming to enhance Egyptian goat production.

Acknowledgement

We are grateful to the farmers and Ministry of Agriculture and Land Reclamation who have given us the animals during the experiment. Special thanks go to Prof. Dr. Sawsan Mansour Ahmed, the principle investigator of project (Enhance the productive performance of Baladi goats by crossing with high producing breeds) for that every possible help and continues the kindly offered during this investigation and guidance encouragement.

5. References:

1. Belay S, Gebru G, Godifey G, Brhane M, Zenebe M, Hagos H and Teame T 2014: Reproductive performance of Abergelle goats and growth rate of their crosses with Boer goats. Livestock Research for Rural Development. Volume 26, Article #5. Retrieved December 24, 2016, from http://www.lrrd.org/lrrd26/1/bela26005.htm
2. Abd-Allah, S., Salama, R., Mohamed, M.I., Mabrouk, .M. El-kady, R.I., Kadry, A.I., Ahmed, S.M. 2015. A comparative study on reproductive and productive performance of Bore and Baladi goats raised under similar environmental conditions in Egypt. International Journal of ChemTech Research ISSN: 0974-4290 Vol.8, No.9, pp 225-236.
3. NRC, 1981. Nutrient Requirements of Goats. National Research Council (NRC). National Academy Press, Washington D.C., U.S.A.
4. SPSS 15.0 Command Syntax Reference. Chicago, Illinois: SPSS Inc., 2006.
5. Duncan, B.C. (1955). Multiple range and multiple F test. Biometrics, 11, 1–42.
6. Browning, R. Jr., Kebe, S. and Byars, M. 2004. Preliminary assessment of Boer and Kiko does as maternal lines for kid performance under humid, subtropical conditions. S. Afr. J. Anim. Sci. 34:1–3
7. Newman, S-A. N. and Paterson, D.J. 1997. Potential to improve goat production in New Zealand through the introduction of Boer genetics. J. Anim. Sci. 75 (Suppl. 1):12 (Abstr.)
8. Bogui, N. S. 1986. Reproductive performance and preweaning growth of Spanish goats. M.S. thesis. Texas A&M Univ., College Station.
9. Luo, J., Sahlu, T., Cameron, M. and Goetsch, A.L. 2000. Growth of Spanish, Boer × Angora and Boer × Spanish goat kids fed milk replacer. Small Ruminant Res. 36:189-194.
10. Malan, S.W. 2000. The improved Boer goat. Small Rumin. Res. 36:165–170. Reduction efficiency in farm animals: A review. Livest. Prod. Sci. 56:15–33.
11. Salama. R; M. I. Mohamed; S. Abd-Allah; R. I. El-Kady; A. I. Kadry And M. M. Mabrouk (2015). Improving the productive performance of local baladi goats throughout crossbreeding with South African Boer, Advances in Environmental Biology, 9(27): 224-231.
12. Jiabi P, Taiyong C, Jiyun G, Bin P and Zegao D 2004 Effects on crossbreeding Boer goats with local goats in China. Book of Abstracts of the 8th International Conference on Goats South Africa.B.011: 17.
13. Nimbkar C, Ghalsasi P and Nimbkar C 2000 Crossbreeding with the Boer goat to improve economic returns from smallholder's goat in India. Proceedings of the 7th International Conference on Goats, 15 - 18 May, Tours, France, 551 - 556.
14. Abd-Allah, S. 2014. Application of some crossbreeding and feeding programs to improve the productive performance in Baladi goats. Ph.D. Thesis, Fac. of Agric., Al-Azhar Univ.
15. Zahraddeen, D., Butswat, I.S.R., Mbap, S.T., 2008. Evaluation of some factors influencing growth performance of local goats in Nigeria. African Journal of Food Agriculture Nutrition and Development. Volume 8, No. 4, pp. 464-479.
16. Yusuff, M. K., Sulaiman, A. W. and Ohtman, A. S. H. 1981. Comparative pre-weaning growth performance of crossbred kids. Malaysian Veterinary Journal, 7(2): 29-36.
17. Sebhatu, G., L.S. Sartin III, and M. Iheanacho. 1993. Genetic and non-genetic effects on the growth and mortality of Alpine, Nubian, and crossbred kids. Small Ruminant Res. 13:169-176.
18. Belay Deribe and Mengistie Taye. 2013. Evaluation of Growth Performance of Abergelle Goats under traditional management systems in Sekota District, Ethiopia. Pakistan Journal of Biological Sciences, 16: 692-696.
19. Alula Petros, Kassaye Aragaw and Berhanu Shilima. 2013. Pre-weaning kid mortality in Adamitulu Jedokombolcha District, Mid Rift Valley, Ethiopia . Journal of Veterinary Medicine and Animal Health 6:1-6.

*****