Journal of Tropical Resources and Sustainable Science

journal homepage: jtrss.org

Preliminary Study on Birth Weight and Pre-weaning Growth Pattern in Crossed Boer Kids

M.Y. Syahirah, K.B. Mat*, N.D. Rusli, C.H. Hasnita

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

Received 2 November 2016
Accepted 6 December 2016
Online 18 December 2016

Keywords:
crossed Boer, body weight, growth pattern, pre-weaning

⊠*Corresponding author:
Dr. Khairiyah Mat,
Faculty of Agro Based Industry,
Universiti Malaysia Kelantan,
Jeli Campus, 17600 Jeli,
Kelantan, Malaysia.
Email: khairiyah@umk.edu.my

Abstract

This study was aimed to measure influence of some factors that involved in growth performance of crossed Boer kids including parity of mother, sex and litter size of kids. The data gained on body weight at birth weight (BW), 1 (Wt. 1), 2 (Wt. 2), and 3 (Wt. 3) months of age of 20 crossed Boer kids were recorded. There were two kids from does with parity 1, three kids from does with parity 2, eleven kids from does with parity 3, and four kids from parity ≥4. From all kids, eleven of them are male and nine female. Kids Six kids were born as single whereas eight kids were born as twin and six kids were born as triplet. Results showed that there was a no significant different ($P>0.05$) associated with parity of mother. For sex of kids, results show that highly significant differences ($P<0.01$) for body weight were identified at age one, two and three months. On the other hand, there was no significant difference ($P>0.05$) for body weight of kids due to single, twin or triplet kid born effect.

© 2016 UMK Publisher. All rights reserved.

1. Introduction

Production of small ruminants is an important industry in Malaysia as the demand increased year after year. Malaysia have to depend on the imports to meet the shortfall in domestic production. Increased in population growth accompanied by urbanisation and increasing in buying ability is likely to increase the demand for high quality animal proteins in Malaysia. Boer goat were first brought into Malaysia in 2001 by Malaysian Agricultural Research and Development Institute (MARDI) to provide alternative agricultural activity for the local farmers and entrepreneurs. Nowadays, most of farmers tend to rear Boer or crossed Boer due to their high quality traits which are fast growth rate, excellent body conformation, and good carcass quality compared to other breeds [1]. However, proper management in rearing goat is critical for diversification of income for the producers and production to the nation. One of the aspect that need to be emphasized in goat farming is growth pattern of kid, start from birth to wean. The birth weight of kids is highly variable, and is mostly under the influence of breed. In most cases it is 1/15 of the body weight of an adult goat [2]. According to Laes-Fettback and Peters [3], within the breed, variations of birth weight are conditioned by the type of birth, sex, parity, the development and age of dam, length of pregnancy, feeding, season of kidding and health condition. According to Mioc [4], birth weight and growth of kids until weaning, together with reproduction characteristics, dressing percentage, meat quality, certain tissue share and others, are reliable indicators of the breed efficiency in the production of meat. It is known that birth weight and the growth of kids are mostly under the influence of breed [2][5], then litter size [6], sex of kids [7], parity [8] and reproduction status of the dam [9]. Nevertheless, the information regarding growth pattern of crossed Boer kid rear in Malaysia is limited. As its depend on management aspect and record keeping of individual farm. Therefore, this study was aimed to measure the influence of some factors that involved in growth performance of crossed Boer kids which are parity of the dam, sex and litter size of kids.

2. Materials and Methods

2.1. Experimental Animals

This research was conducted for five months from July to November 2014 in Projek Ternakan Kambing Komersial (PTKK) Kubang Menerong farm, under PERDA Ventures Incorporated Sdn Bhd. located at Tasek Gelugor, Pulau Pinang. PERDA Ventures Incorporated Sdn Bhd. (PVI) is a wholly owned subsidiary of Penang Regional Development Authority (Government) established in 2007. The rearing system conducted by PTKK Kubang Menerong is intensive farming whereby the goats in that farm are confined 24 hours in raised goat shed of slatted floors that allows for ventilation. The goats are fed with fodder, the Napier grass (*Pennisetium purperum*). Apart from Napier grass, Ipil-ipil (*Leucaena leucocephala*)

eISSN Number: 2462-2389 © 2016 UMK Publisher. All rights reserved.

and Guinea grass (*Panicum maximum*) are given as well. In addition, they are also fed with concentrate feed supplemented with mineral block and molasses block while water were given *ad libitum*.

2.2. Data Collection

Twelve Boer does, age ranged between one to three years with different parity, which have giving birth, are selected. The kids were numbered according to doe number. From these twelve does used, there were 20 kids produced consist of 11 males and 9 females. The parameters measured are the live weight of the Boer kids starting from the birth until it reaches 3 months old. The details of the newborn including parity of dam, date of birth, sex, litter size/birth type, and the body weight at different ages (birth weight, weight at 1, 2, and 3 months old) were recorded. Within 6 to 10 hours after birth, birth weights of the kids were recorded with accuracy of ±0.05 kg. After a month, body weights of the kids were recorded again for every month until they reach weaning weight about 3 months old. The growth pattern of Boer kids observed by referring to factors such parity of mother, type of birth, and also sexes of kids.

2.3. Statistical Analysis

All the result from the research were analysed by statistical software SPSS Analysis of Variance (ANOVA) except for sex of kids that used SPSS version 20 Independent T-Test to examine the data and records on body weight at different ages across the different levels in the study.

3. Results and Discussion

The Boer kids had greater total birth weights (5.2 ± 0.23 kg) compared to Kacang goat (3.1 ± 0.19 kg) [10]. The research conducted by Mioc et al. [11] identified the significant ($P<0.01$) influence of birth weight on the age and and body weight of kids at weaning, as well as on the average daily weight gain of kids until weaning. Kids with birth weight higher than 2.5 kg had a higher average daily weight gain until weaning and further were weaned earlier than kids of lower birth weight. Elieser et al. [10] claimed that total of birth and weaning weight of the kids was positively correlated with weight of birth and weaning.

In the present study, there was no significant different ($P>0.05$) of effects of parity number of the dam on value for birth weight, for weight at one, two and three months (table 1). However this result is in contrast with previous research that has been done, parity of dam significantly affects all the production performances [12]. As the maternal ability is improved with an increase of parity, especially in multiple birth species. The cotyledon number and placental weight will be increased with the increase of parity of dam in the Turkish Saanen goat, and high relationships exist with litter size weight [13]. The youngest dam had the lowest productive capability [10]. The increased production of dam from parity 1, 2, 3 and 4 due to the condition of the uterus were the better with increasing parity [6] this causes of the hormonal mechanisms at reproductive organs will grow perfectly and skill of dam was higher parenting [14][15]. However, at parity 5 and higher, reproductive performance of the dam was decreased because the parent has been older. Though, this research does not have a significant effect of parity on body weight of kids might be due to small sample size.

In term of the effects of the sex on body weight is significant different for weight during one, two and three months with $P<0.05$ respectively (table 2). This shows that the sex is highly contributed to weight of kids after their birth until reach weaning age. Besides, previous researches have similar findings, there was a significant influence of sex on the birth weight and growth of kids [7][16][17]. According to Kezic et al. [18], determined a significantly higher average daily weight gain in male kids in comparison to female Alpine and Crotian white kids. Mioc et al. [11] determined the significant influence of sex on average daily weight gain of kids in the period until weaning, and resulted on the age and weight of kids at weaning. However, this study found that there was no significant different for weight at birth ($P=0.145$) (table 2). In contrast, Rhone [19] discovered that male kids at birth weighed 3.37±0.04 kg, and were significantly heavier than female kids who averaged 3.14±0.04 kg. This case also happened in the previous study by [6][20][21][22] in which male kids were heavier than female kids whereby these are common observations in goats.

Table 1: Effects of the parity on body weight in kg (mean ± SE) at birth weight (BW), weight at 1 month (Wt.1), weight at 2 month (Wt.2), and weight at 3 month (Wt.3).

Parity	n	BW	Wt. 1	Wt. 2	Wt.3
1	2	2.65±0.1499	9.00±0.4999	15.45±0.7545	22.00±0.9998
2	3	2.70±0.0577	9.08±0.0882	15.63±0.2729	22.00±0.4041
3	11	2.52±0.0536	8.72±0.1016	15.00±0.2004	21.37±0.2867
≥4	4	2.55±0.1190	9.08±0.1377	15.93±0.1315	22.5±0.2121
Sig. value		0.458	0.230	0.096	0.197

Finally, the results of the effects of litter size on body weight shows that there was a significant different at birth and at age of one month ($P<0.005$) (table 3). Birth weight and live weight at all ages were significantly affected by type of birth or litter size [23]. Total weight of birth and weaning the kids would increase with the increase

eISSN Number: 2462-2389 © 2016 UMK Publisher. All rights reserved.

of single birth and weaning weight. This means that kid who has been born with single has high birth weight compared to twin and triplet kids. Single kid wills has high birth weight due to condition where dam will give nutrient intake directly to kid during pregnancy. So the birth weight of single kid is high compared to twin and triplet kids because they don't need to compete for nutrition during pregnancy.

Table 2: Effects of the sex on body weight in kg (mean ± SE) at birth weight (BW), weight at 1 month (Wt.1), weight at 2 month (Wt.2), and weight at 3 month (Wt.3).

Sex of kid	n	BW	Wt. 1	Wt. 2	Wt.3
Male	11	2.62±0.062	9.12±0.086	15.89±0.091	22.54±0.101
Female	9	2.50±0.047	8.57±0.047	14.63±0.073	20.80±0.094
Sig. value		0.145	0.000	0.000	0.000

Generally when litter size increases, the birth weight decreased. For lambs in utero, as the number of fetuses increases, the number of caruncles attached to each fetus decreases, thus reducing the feed supply to the fetus hence reduce the birth weight of the lambs [24]. On the other hand, there was no significant different at age of two and three months. However, the result gained is not in line with several studies conducted before. A research conducted by Zhang et al. [6] which involved Boer goat shown that there were significant effect of litter size in goat on birth weight and at weaning age which the values linearly declined with the increase of litter size.

Table 3: Effects of the litter size on body weight in kg (mean ± SE) at birth weight (BW), weight at 1 month (Wt.1), weight at 2 month (Wt.2), and weight at 3 month (Wt.3).

Litter size effect	n	BW	Wt. 1	Wt. 2	Wt.3
Single	6	2.77±0.0742	9.18±0.1701	15.78±0.2868	22.32±0.3885
Twin	8	2.51±0.0441	8.76±0.1016	15.21±0.2271	21.49±0.3113
Triplet	6	2.43±0.0333	8.70±0.0774	15.02±0.2469	21.55±0.3658
Sig. value		0.001	0.028	0.132	0.221

4. Conclusion

The body weights of kids were not affected by parity effect, and litter size effect. Though, effect of sex of kids had influenced the body weights of kids. Regardless of how, there was slightly difference between single kids and triplet kids in term of body weight as single kids had highest body weight compare to triplet kids. Therefore, based on the results from the studies, we can conclude that nutrition become main factors on affecting body weights of kids. Thus, pre-weaning study is very important as it can provide information on management to post-weaning and growth of kids. However, larger sample number is required to increase the accuracy of the results.

Acknowledgement

This research was financially supported by Research Acculturation Grant Scheme (RAGS), Kementerian Pendidikan Malaysia (KPM) code: R/RAGS/A07.00/00130A/001/2015/000194.

References

[1] Ayob, N. A. C. 2012. Estimation of breeding value for pre-weaning and post-weaning weight gain in Boer goat. B. Appl. Sc. Thesis. University Malaysia Kelantan, Malaysia.

[2] Morand-Fehr, P. 1981. Growth. In: Goat Production. (Gall, C., Ed.). Academic Press. London. pp. 53-283.

[3] Laes-Fattback, C. and Peters K. J. 1995. A comparative study of performance of Egyptian goats breeds II. Growth performance and productivity. Arhiv für Tierzucht 38, 563-575.

[4] Mioc, B., Prpic, Z., Vnucec, I., Susic, V., Antunovic, Z., Barac, Z. and Pavic V. 2008. Exterior characteristics of different categories of Croatian Coloured Goat. Stočarstvo 62, 439- 447.

[5] Mourad, M. 1993. Reproductive performances of Alpine and Zaraibi goats and growth of their first cross in Egypt. Small Rum. Res. 12, 379-384.

[6] Zhang, C.Y., Ying Zhang, De-Qing Xu, Xiang Li, Jie Su, Li-Guo Yang 2009. Genetic and phenotypic parameter estimates for growth traits in Boer Goat. Livest. Sci. doi:10.1016/j.livsci.2008.12.010.

[7] Kuchtik, J. and Sedlackova H. 2005. Effect of some non-genetic factors on the growth of kids of the brown short-haired breed. Czech J. Anim. Sci. 50, 104-108.

[8] Akpa, G.N., Alphonsus, C., Dalha, S.Y., Yakubu, H., Garba,Y. 2011. Relationship between litter size and parity of doe in smallholder goat herds in Kano and its environs, Nigeria. African Journal of Agricultural Research, 6 (29), 6212-6216.

[9] Mat, K. B., Panadi, M. B., Victor, S. S., Rusli, N. D., Hasnita, C. H. and Ahmad F. I. S. 2015. Preliminary Study on Influence of Parity and Body Condition Score (BCS) on Estrus Response and Conception Rate of Saanen-Cross by Estrus Synchronization with CIDR. Advances in Environmental Biology, 9(27) December 2015, Pages: 307-316.

[10] Elieser, S., Sumadi, Budisatria, G.S. and Subandriyo 2012. Productivity comparison between Boer and Kacang goat dam. J. Indonesian Trop.Anim.Agric. 37 (1), 15-20.

[11] Mioc, B., Susic, V., Antunovic, Z., Prpic, Z., Vnucec, I., and Kasap, A. 2011. Study on birth weight and pre-weaning growth of Croatian multicolored goat kids. Veterinarski Arhiv, 81(3), 339-347.

[12] Bagnicka, E.; Wallin, E.; Lukaszewicz, M.; Adnoy, T. 2007. Heritability for reproduction traits in Polish and Norwegian populations of dairy goat. Small Ruminant Research, v. 68, n. 3, p. 256-262.

[13] Konyal, A., Tolu, C., Das, G., Savas, T., 2007. Factors affecting placental traits and relationships of placental traits with neonatal behaviour in goat. Anim. Reprod. Sci. 97, 394–401.

[14] Farid A. H. and Fahmy M. H. 1996. East Friesian and other European Breeds. In: Fahmy MH ed. Pro- lific sheep. Wallingford, UK, CAB Internation- al. Pp.93-108.

eISSN Number: 2462-2389 © 2016 UMK Publisher. All rights reserved.

[15] Ahmad Fuad, I. S., Mat, K., Rusli N. D. and Hasnita, C.H. 2016. The effects of parity on oestrus expression and kidding rate in meat type goat following control internal drug release (CIDR) treatment. Proc. 37th MSAP Ann. Conf., 1 – 3 June 2016, Melaka, Malaysia.

[16] Mavrogenis, A. P., Constantinou, A. and Louca A. 1984: Environmental and genetic cause of variation in production traits of Damascus goats. 1. Pre-weaning and post-weaning growth. Anim. Prod. 38, 91-97.

[17] Ruvuna, F., T. C. Cartwright, H. Blackburn, M. Okeyo, S. Chema 1988: Gestation length, birth weight and growth rates of pure-bred indigenous goats and their crosses in Kenya. J. Agricultural Sci. 3, 363-368.

[18] Kezic, J., V. Pavic, B. Mioc, M. Kaps, I. Vnucec, Z. Prpic 2005: Growth of kids fed milk replacer. Stocarstvo 59, 323-331.

[19] Rhone, J. A. 2005. Estimation of reproductive, production, and progeny growth differences among F1 Boer-Spanish and Spanish females. M. Sc. Thesis. Texas A&M University, U.S.

[20] Warmington, B. G. and Kirton A. H. 1990: Genetic and non-genetic influences on growth and carcass traits of goats. Small Rum. Res. 3, 147-165.

[21] Lehloenya, K. C., J. P. C. Greyling, L. M. J. Schwalbach 2005: Reproductive performance of South African indigenous goats following oestrous synchronization and AI. Small Rum. Res. 57, 115-120.

[22] Boujenane I. and El Hazzab A. 2008. Genetic parameters for direct and maternal effects on body weights of Draa goats. Small Ruminant Research 80, 16-21.

[23] Das, N., Sharma, A. K. and Joshi, H. B. 1995. Body growth in Barbari goats under intensive management system. Indian J. Anim.Sci., 65(3) : 348-351.

[24] Robinson, J.J., I. McDonald, C. Fraser, and I. McHattie. 1977. Studies on reproduction in prolific ewes. I. Growth of the products of conception. J.Agri.Sci. Cambridge. 88:539-552.

eISSN Number: 2462-2389 © 2016
UMK Publisher. All rights reserved.