Assessment of mating behaviour associated with fertility in Boer bucks

Mariani, N.S.[1*], Yaakub, H.[2] and Shanmugavelu, S.[3]

[1]Strategic Livestock Research Centre, Station MARDI Kemaman, Terengganu.
[2]Department of Animal Science, Universiti Putra Malaysia, Serdang, Selangor.
[3] Strategic Livestock Research Centre, MARDI, 43400 Serdang, Selangor.
*Corresponding author: niksiti@mardi.gov.my

Abstract

A study on the mating behavior of Boer bucks using the serving capacity test was conducted. Ten healthy Boer bucks with no previous experience of sexual activity were randomly selected and kept in individual pens. Each buck was allowed to mate naturally with a restrained female in oestrus for 30 minutes. Data on the serving capacity test were collected every 2 weeks for 5 consecutive weeks. All occurrences of mount attempts, mounts with and without ejaculation and the frequency of each event occurred were recorded. Latency to first mount and first ejaculation and refractory period were calculated. Buck efficiency was calculated by dividing the total number of ejaculations by the total number of mounts with and without ejaculation. Results showed that there were significant differences ($P<0.05$) between weeks for the mean latency to first mount, number of mounts and mount attempts, latency to first ejaculation, refractory period, number of ejaculations and mating efficiency. The number of ejaculations and mating efficiency increased in the beginning of the study. It was noted that experience had a decisive effect on the ability of bucks to properly mount and successfully ejaculate. Sexual experience might have provided the opportunity for bucks to learn and recognize important behavioural cues from the females.

Key words: Boer buck, serving capacity test, ejaculation, mating efficiency

Introduction

Goat production is one of the major focuses in livestock development in Malaysia as emphasised in the Ninth Malaysia Plan. The buck plays an important role in terms of breeding to fulfill the demand for chevon and other goat products in the country. However, the existence of low libido bucks in a farm has become a major problem to the goat farmers. This problem is more pronounced in smallholder farms where it is uneconomical to keep less productive bucks for long period. Low libido bucks will have a negative impact on flock productivity and profitability by causing longer kidding interval and creating the need to keep many bucks.

Assessment of mating behavior using the serving capacity test is an alternative method to select for high performing bucks. The serving capacity test is an evaluation of the sexual performance (ejaculations/male/ mount time) of a male animal. It can be used to predict buck performance and suggest a suitable number of males in a mating programme to have an efficient buck to doe ratio in a flock.

High performing bucks will be able to ejaculate and shift females at a faster rate and be able to inseminate many females per unit time. There was a positive association between buck with high scores for sexual performance and doe fertility as reported by several researchers. It also influenced flock fertility. Therefore, assessing sexual activity of bucks using the serving capacity test is one alternative in selecting bucks for breeding purpose in the goat industry.

The objective of this study was to determine the sexual performance and mating behaviour of Boer bucks.

Materials and Methods

The experiment was conducted at the goat farm of Pusat Bioteknologi, Jabatan Perkhidmatan Haiwan dan Perusahaan Ternak (JPHPT) Daerah Keningau, Sabah. Ten healthy Boer bucks aged between 1 to 1.5 years (average body weight of 40 kg) with no previous experience of sexual activity (no contact with females after weaning) were randomly selected. Animals were housed in individual pens and feeds were offered based on 4% of bodyweight on a dry matter basis to meet their protein and energy requirements for maintenance and growth.

Five Boer does in oestrus were introduced to the bucks and left together for 2 to 3 hours, in order for the buck to develop affinity towards the females. The does were given intramuscularly 50 µg synthetic prostaglandin to induce oestrus (Billings and Katz, 1997). All chosen does in this experiment had acquired previous sexual experience and interaction with sexually experienced bucks.

Data on the serving capacity test were collected every 2 weeks for 5 consecutive weeks. Each buck was allowed to mate naturally with a restrained female in oestrus for 30 minutes. The bucks were free to actively nuzzle, sniff and pursue the females.

All occurrences of mount attempts (both front legs left the ground but the animal did not become firmly positioned on the female's rump), mounts with and without ejaculation and the times at which each event occurred were recorded. Ejaculation was considered accomplished when the penis of the buck entered the vagina of the doe and when the buck exerted a thrust (push) from its back and raised his head upward; otherwise it was considered as mount without ejaculation.

From the data, latency to first mount (time elapsed from the entrance of the buck into the test pen until the first mount attempted), latency to first ejaculation (time elapsed from the entrance of the buck into the test pen until the first ejaculation occurred), length of first refractory period (time from the first ejaculation until the next mount interaction) were calculated (Price *et al.,* 1991). Bucks without ejaculation were assigned a time score of 1800 seconds (Brandley and Larry, 2004).

Buck efficiency was calculated by dividing the total number of ejaculations by the total number of mounts with and without ejaculation (Godfrey *et al.,* 1998).

Results and Discussion

Results showed that there were significant differences ($P<0.05$) between weeks for the mean latency to first mount, number of mounts and mount attempts, latency to first ejaculation, refractory period, number of ejaculation and mating efficiency (Table 1). Bucks showed an equivalent improvement in sexual performance from week 1 to week 5. The bucks that were exposed to the females in oestrus for the first time took significantly longer ($p<0.05$) to mount, to ejaculate and on a longer refractory period when exposed for the first time. There were a lower number of mounts and number of ejaculations in the first three weeks of exposure which in turn resulted in a low level of mating efficiency ($p<0.05$). Similar findings were reported in sheep (Boyd and Corah, 1998) and cattle (Snowder *et al.,* 2002). Only 2 of the 10 bucks ejaculated. The mean ejaculation for bucks in the first week was 0.3. This is consistent with the findings reported by Brandley and Larry (2004), where the mean numbers of ejaculations of goats were reported to range from 0.2 to 0.5.

The serving capacity test is influenced by both genetic and environmental factors (Bench *et al.,* 2001). Factors such as shyness, new to the testing environment and the presence of an observer nearby might have contributed to the poor performance of the bucks in the first week.

Bucks were observed to mount the does many times until they successfully ejaculated. They were observed to mount and ejaculate more frequently during the first few minutes of the 30-minute testing period. At the end of the testing period the frequency of mounting and ejaculation decreased. This was probably due to the cause of the depletion of the semen

volume and overall energy reserve. Bucks which had a longer latency to first ejaculation were considered as low libido bucks. On the other hand, bucks which took a longer time to attempt the next mount interaction after having successfully ejaculated were also considered as low libido bucks.

At the end of the study all 10 bucks ejaculated successfully and the mean number of ejaculations were 4.3. According to Price *et al.* (1998) bucks with a mean number of ejaculations above 3.5 could be considered as high performing bucks. Therefore, the Boer bucks in this study could be categorized as high performing bucks. The number of ejaculations and mating efficiency increased over the period of the present study. It was noted that experience acquired by the buck had a crucial effect on the ability of bucks to properly mount and successfully ejaculate. It is essential that the bucks have an adequate serving capacity test score before they attain full sexual performance (Brandley and Larry, 2004). This was evident from the reduction in the latency to first ejaculation time (Table 1) with a low standard error of mean. However it cannot be denied that the method of restraint of females in oestrus may also have some influence on the mating behavior of the bucks.

Conclusion

It was concluded that the Boer bucks in this study had a good libido and were considered as high performing males. Sexual experience may provide an opportunity for the bucks to learn and recognize important behavioral cues from the females. Further studies need to be carried out to correlate serving capacity with sperm quality and serum testosterone level in order to reflect the actual reproductive potential of Boer bucks.

Table 1. Serving capacity test parameters of bucks for five weeks (mean±SEM; n=10)

Week	Latency to first mount (sec)	No. of mount attempts	Latency to first ejaculation (sec)	Refractory period (no./30 min)	No. of ejacula-tion	Mating efficiency
1	106.6±34.8^{a}	28.4±4.3^{ab}	1617.6±159.6^{a}	1622.4±157.2^{a}	0.3±0.2^{b}	0.08±0.07^{bc}
2	31.8±7.6^{b}	34.3±4.3^{a}	783.7±248.3^{b}	641.6±259.7^{b}	1.2±0.4^{b}	0.04±0.01^{c}
3	26.3±3.5^{b}	33.0±6.9^{a}	332.5±171.9^{c}	468.0±183.5^{bc}	1.5±0.4^{b}	0.06±0.02^{bc}
4	34.8±4.1^{b}	24.5±4.3^{ab}	161.5±75.8^{c}	89.2±34.2^{c}	3.0±0.4^{a}	0.19±0.05^{ab}
5	43.2±6.4^{b}	19.2±3.3^{b}	124.2±17.4^{c}	129.5±70.9^{c}	4.3±0.8^{a}	0.25±0.05^{a}

^{abc} Means within the same column with different superscripts are significantly different (P<0.05); SEM standard error of mean

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