

GROWTH RESPONSE OF BOERKA GOATS TO MIXED ELEPHANT GRASS AND CORN STRAW FEEDING

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ABSTRACT

This study aimed to determine the growth response of Boerka goats to mixed elephant grass (*Pennisetum purpureum*) and corn straw (*Zea mays*) feeding. Boerka goats are superior crossbred goats with good growth potential, but their performance is strongly influenced by the quality and balance of feed. The study used an experimental method involving 20 male Boerka goats aged 6-8 months with an average initial body weight of 15 kg. The animals were randomly divided into two treatment groups. The first group received a mixed feed consisting of 70% elephant grass and 30% corn straw, while the control group received elephant grass only. Feeding was conducted for 60 days, and growth parameters, including body weight, body height, and chest circumference, were measured every two weeks. The results showed that Boerka goats fed the mixed elephant grass and corn straw diet had better growth performance than the control group. The mixed-feed treatment increased body weight, body height, and chest circumference more effectively and improved feed-use efficiency. These findings indicate that a combination of elephant grass and corn straw can be used as an effective local feed alternative to support Boerka goat productivity and sustainable livestock farming.

Keywords: Boerka goat, mixed feed, elephant grass, corn straw, growth

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INTRODUCTION

Boerka goats are superior crossbred goats resulting from the crossbreeding of Boer goats with local goat breeds. This crossbreeding system is designed to combine the genetic advantages of Boer goats, which are widely recognized for their rapid growth rate and high meat production potential, with the adaptability of local goats that are well-suited to tropical environmental conditions. According to Mulyono (2020), Boerka goats exhibit improved performance in terms of growth efficiency, carcass yield, and resilience compared to non-improved local breeds. These characteristics make Boerka goats an increasingly popular choice among smallholder farmers, particularly in developing livestock systems where productivity and adaptability are equally important.

Despite their superior genetic potential, the productivity of Boerka goats is not solely determined by genetics. Environmental factors, especially nutrition and feed management, play a critical role in determining the extent to which this genetic potential can be expressed. Feed quality and feed availability are among the most influential external factors affecting growth performance, body condition, and meat production in goats. Nutritionally adequate feed must provide sufficient levels of energy, protein, vitamins, and minerals to support essential physiological processes such as tissue synthesis, immune function, and metabolic activity. When nutrient supply is inadequate or imbalanced, growth performance may be suboptimal even in genetically superior animals. Therefore, feed management becomes a central component in optimizing Boerka goat production systems.

In ruminant livestock systems, forage constitutes the primary feed component. One of the most commonly used forages in tropical goat production systems is elephant grass (*Pennisetum purpureum*). Elephant grass is widely cultivated due to its high biomass yield, ease of cultivation, and adaptability to diverse soil conditions. From a nutritional standpoint, elephant grass provides a relatively high crude fiber content, which is essential for maintaining proper rumen function. Fiber plays an important role in stimulating chewing activity, saliva production, and rumen microbial fermentation, all of which contribute to efficient digestion in ruminant animals. Prasetyo et al. (2018) highlight that elephant grass is an important basal forage source in small ruminant production systems due to its availability and consistency in supply throughout the year.

However, despite its advantages, elephant grass has certain nutritional limitations. One of the primary constraints is its relatively low crude protein and energy content, particularly when harvested at advanced maturity stages. This limitation can restrict microbial protein synthesis in the rumen and subsequently reduce animal growth performance if used as a sole feed source. In growing goats such as Boerka goats, which have relatively high nutrient demands, reliance on elephant grass alone may not be sufficient to support optimal weight gain and tissue development. Therefore, supplementation or combination with other feed resources is often necessary to achieve balanced nutrition.

One alternative feed resource that can be utilized to complement elephant grass is corn straw (*Zea mays*). Corn straw is an agricultural by-product that is widely available in maize-producing regions. It is generally considered a low-cost and accessible feed ingredient, making it particularly suitable for smallholder farmers. Although corn straw is characterized by high crude fiber content and relatively low crude protein levels, its availability and economic value make it a practical component in ruminant feeding systems. Sutrisno and Budiman (2017) emphasize that agricultural residues such as corn straw can play an important role in sustainable livestock production by reducing dependence on conventional forage sources and minimizing feed costs.

Nevertheless, the nutritional quality of corn straw alone is also limited, particularly in terms of protein deficiency and low digestibility. Therefore, its utilization in goat diets is more effective when combined with higher-quality forage such as elephant grass or supplemented with protein-rich feed ingredients. The combination of elephant grass and corn straw is considered a strategic approach to optimize the utilization of available local feed resources while improving overall diet balance. This mixed feeding system can potentially provide a more stable fiber supply while improving rumen fermentation efficiency through better feed diversity.

From a nutritional ecology perspective, the combination of different forage types can influence rumen microbial populations and fermentation patterns. Balanced fiber intake

supports optimal rumen motility and microbial activity, while improved feed diversity may enhance nutrient utilization efficiency. In Boerka goats, such dietary strategies are expected to positively influence growth parameters such as daily weight gain, body length, body height, and chest circumference. Previous studies have shown that mixed forage-based diets can significantly improve growth performance and feed efficiency in meat-type goats. For example, Hadiyanto (2019) and Supriyanto et al. (2020) reported that goats fed with combined forage systems demonstrated better weight gain and improved feed conversion ratios compared to those fed with single forage sources.

In addition to biological efficiency, economic considerations are also an important aspect of goat production systems. Feed cost typically represents the largest proportion of total production expenses in small ruminant farming. Therefore, the use of locally available and low-cost feed ingredients such as elephant grass and corn straw can significantly reduce production costs. Arief and Sutrisno (2019) note that the integration of agricultural by-products into livestock feed systems not only enhances economic efficiency but also contributes to circular agricultural systems, where waste materials are converted into valuable livestock feed. This approach improves overall farm sustainability and profitability, particularly for smallholder farmers who operate under limited financial resources.

Furthermore, efficient feed management has broader implications beyond growth performance and economic efficiency. Proper nutrient balance in goat diets can improve overall animal health, including rumen stability, immune function, and metabolic efficiency. Adequate fiber intake from forage sources supports rumen health by maintaining appropriate pH levels and preventing metabolic disorders such as acidosis. At the same time, sufficient nutrient supply ensures proper skeletal development, muscle growth, and reproductive performance in breeding animals. Thus, the strategic combination of elephant grass and corn straw not only supports growth but also contributes to long-term productivity and herd sustainability.

Although both elephant grass and corn straw are widely available and commonly used in goat feeding systems, scientific information regarding their combined effects on Boerka goat performance remains limited. Most existing studies tend to evaluate these feed resources separately or in different livestock systems, rather than focusing on their synergistic effects in crossbred goats such as Boerka goats. Given the genetic potential and economic importance of Boerka goats, it is essential to explore feeding strategies that optimize growth performance while maintaining cost efficiency.

Different feed compositions may result in varying physiological responses in animals, particularly in terms of nutrient absorption, metabolic efficiency, and growth outcomes. Parameters such as body weight gain, body height, chest circumference, and feed conversion efficiency are commonly used indicators to evaluate growth performance in goats. Understanding how mixed forage diets influence these parameters is important for developing effective feeding strategies that align with both biological and economic objectives in goat production systems.

Therefore, this study was designed to analyze the growth response of Boerka goats to mixed feeding of elephant grass and corn straw. Specifically, the study aims to evaluate how different proportions of these feed ingredients influence growth performance indicators and to identify feeding combinations that provide optimal balance between nutritional adequacy and economic efficiency. The findings are expected to contribute to the development of more efficient feeding strategies for Boerka goat production, particularly in smallholder farming systems where resource optimization is essential.

METHODS

This research was conducted on a goat farm in Sumberjo Village, Magelang Regency, for 60 days from January to March 2023. The study used an experimental method with two feeding treatments. A total of 20 male Boerka goats aged 6-8 months with an average initial body weight of approximately 15 kg were used as experimental animals. The goats were randomly divided into two groups, each consisting of 10 animals.

The first treatment group received mixed feed consisting of 70% elephant grass and 30% corn straw. Elephant grass was harvested at 60 days of age and contained approximately 30% crude fiber, while corn straw was obtained from local maize harvest residues. The second group served as the control and received elephant grass only. Feed was provided fresh every day and offered *ad libitum*, while drinking water was provided without restriction.

During the study, feed offered and feed refusals were recorded to evaluate feed use. Growth observations were conducted every two weeks by measuring body weight, body height, and chest circumference. Body weight was measured using a calibrated digital scale with 0.1 kg precision. Body height was measured using a measuring stick, while chest circumference was measured using a flexible measuring tape.

The collected data were analyzed using a t-test to determine significant differences between the mixed-feed treatment and the control group. A normality test was conducted before the statistical test to ensure that the data were normally distributed. If the data did not meet normality assumptions, non-parametric analysis was applied. An economic analysis was also included to describe the efficiency of feed use based on production costs (Purnomo & Haryadi, 2018).

RESULT AND DISCUSSION

Growth Response of Boerka Goats

The results showed that mixed elephant grass and corn straw feeding improved the growth performance of Boerka goats. Goats receiving the mixed feed showed greater body weight gain than goats in the control group. At the end of the study, the mixed-feed group gained 2.4 kg, while the control group gained 1.6 kg. This indicates that adding corn straw to elephant grass may improve the effectiveness of the ration in supporting body growth.

The higher body weight gain in the mixed-feed group suggests that Boerka goats were able to use the mixed ration more efficiently. Corn straw provides additional fiber that can support rumen activity, while elephant grass supplies fresh forage for daily intake. Prasetyo et al. (2018) stated that forage containing sufficient crude fiber can stimulate rumen microbial activity, which supports fermentation and nutrient utilization in goats.

Body Height and Chest Circumference

In addition to body weight, body height and chest circumference also increased more in goats fed the mixed diet. The mixed-feed group showed an average increase in body height of 5 cm, while the control group increased by 3 cm. Chest circumference increased by 4 cm in the mixed-feed group and 2 cm in the control group. These results indicate that mixed elephant grass and corn straw feeding supports overall body development in Boerka goats.

Improved body height and chest circumference reflect better skeletal and muscular development. According to Wibowo et al. (2021), the physical development of meat goats is influenced by feed quality and nutrient balance. A ration containing adequate forage and fiber

can support the development of body frame and muscle growth, which are important indicators of production performance.

Feed Efficiency and Digestive Function

The mixed feed also showed a positive effect on feed-use efficiency. The goats in the treatment group had better growth with the use of locally available feed materials, indicating that the combination of elephant grass and corn straw can support efficient nutrient utilization. This finding is consistent with Nugroho and Santosa (2017), who reported that appropriate feed composition can improve feed efficiency and accelerate growth in Boerka goats.

The improvement in growth performance may be related to better rumen function. Corn straw contains high fiber that can stimulate chewing activity and rumen fermentation. However, because corn straw has lower energy and protein content than concentrate feed, it cannot fully replace the nutrient requirements of growing Boerka goats. Therefore, its use should be balanced with forage or additional feed ingredients when higher growth targets are expected.

Economic Benefits of Local Feed Use

The use of corn straw as a component of mixed feed provides economic benefits for goat farmers. Corn straw is cheaper than commercial concentrate and many other feed ingredients, and it is easy to obtain in maize-producing areas. Sutrisno and Budiman (2017) reported that corn straw can reduce feed costs in goat farming without substantially reducing growth performance when used appropriately.

From a practical perspective, the use of mixed elephant grass and corn straw can help farmers reduce dependence on expensive feed ingredients. This is particularly important for smallholder farmers who need affordable and sustainable feeding strategies. By using local feed resources, farmers can improve production efficiency while also utilizing agricultural residues that might otherwise be wasted.

Implications for Boerka Goat Farming

Overall, the findings indicate that mixed elephant grass and corn straw feed has a positive effect on Boerka goat growth. The mixture improved body weight, body height, and chest circumference compared with feeding elephant grass alone. These results support the use of local forage and crop residues as alternative feed resources in goat production systems.

Nevertheless, the study also shows that mixed forage-based feeding should be adjusted to the nutritional needs of Boerka goats. Corn straw is useful as a fiber source and economical feed component, but additional energy and protein sources may be needed when farmers aim for faster growth. Further research with different feed ratios, nutrient supplementation, and longer feeding periods is recommended to identify the most optimal formulation.

Mixed elephant grass and corn straw feeding had a positive effect on the growth of Boerka goats. Goats fed the mixed diet showed better growth performance than goats fed elephant grass only, as indicated by higher body weight gain, greater body height increase, and larger chest circumference development.

The mixed-feed group gained 2.4 kg of body weight, while the control group gained 1.6 kg. Body height increased by 5 cm in the mixed-feed group and 3 cm in the control group, while chest circumference increased by 4 cm and 2 cm, respectively. These results indicate that the combination of elephant grass and corn straw supports physical growth more effectively than elephant grass alone.

Corn straw can be used as a local, low-cost feed component to improve feed efficiency and reduce production costs in Boerka goat farming. However, because corn straw has relatively low energy and protein content, its use should be adjusted to the nutritional requirements of goats and may need to be combined with other nutrient-rich feed ingredients to achieve optimal growth.

In conclusion, mixed elephant grass and corn straw feed can be recommended as an effective and economical alternative for supporting Boerka goat growth and sustainable smallholder livestock production.

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