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Nomadic and indoor concentrate-based production systems: impacts on growth, reproduction and hemato-biochemistry of goat bucks

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Abstract

This study aimed to evaluate the effects of four different production systems on the growth, reproductive effectiveness, and health indicators of goat bucks. A total of 40 yearling bucks (10 bucks/treatment) were randomly allocated to nomadic grazing (T1) and three different levels of concentrate (CN): roughage/concentrate ratio 60:40 % (T2), roughage/concentrate ratio 50:50 % (T3), and roughage/concentrate ratio 40:60 % (T4) on a DM basis for a period of 90 days. CN-fed bucks had greater average daily gain (ADG), scrotal circumference, number of mounts, ejaculation frequency, and courtship behaviour scores (CBS), particularly in the T3 and T4. The nomadic grazing bucks exhibited longer reaction times and refractory periods compared to the CN-fed bucks. The semen volume, sperm cell concentration, semen motility, and testosterone levels were also considerably improved in CN-fed animals; however, the production systems had no significant effect on semen pH, colour, and viscosity. CN-fed bucks had also exhibited a greater hemoglobin concentration, red blood cell (RBC) count, packed cell volume (PCV), and glucose concentrations compared to nomadic grazing, but the difference between T1 and T2 was not significant. Serum protein, albumin, and testosterone concentrations increased progressively with increasing concentrate levels. In contrast, white blood cell count, mean corpuscular volume, mean corpuscular hemoglobin concentration, red blood cell distribution width indices, globulin, and albumin-globulin ratios remained unaffected. Calcium levels were significantly improved in the CN-fed groups, while the levels of K, Na, Cl, and P remained unchanged. The correlation matrix revealed strong positive correlations between dry matter intake (DMI), scrotal circumference, and semen volume. The ADG was also strongly correlated with semen volume, motility, and scrotal circumference. Correlation analysis also revealed significant positive correlations between PCV and RBC, protein and testosterone, and testosterone and glucose. The result of this study indicated that bucks fed CN (particularly T3 and T4) had better ADG, scrotal development, reproductive, and hemato-biochemical profiles than the nomadic grazing group. Increased DMI, along with enhanced energy and protein supplies, could explain this improvement. In conclusion, concentrate feeding at 50-60 % (T3-T4) of the daily requirements could improve the growth, reproductive, and health conditions of goat bucks.

Keywords: Average daily gain, health indicators, reproduction effectiveness, roughage/concentrate ratio

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