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Goat crossbreeding for sustainable production and livelihoods in West Africa: Empirical evidence from Benin

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Abstract

Goat production is a cornerstone of rural livelihoods and food security in West Africa, where smallholder systems dominate. The West African Dwarf (WAD) goat is widely kept in Benin and across the humid coastal regions of West Africa, valued for its adaptability and low-input requirements, yet its productivity (kid growth and doe reproductive efficiency) is often perceived as limited. Crossbreeding this valuable indigenous genetic resource with breeds from the drier Sahelian region has emerged as a strategy to improve performance, but it is frequently practised without regulation or empirical evidence, raising concerns about sustainability. This study evaluated reproductive and growth performance of purebred WAD, Red Maradi (RMG), Long-Legged Sahelian (LLG) goats, and their crossbred progenies under semi-intensive management. A total of 48 goats (15 females and one male per breed) were included in a reciprocal crossbreeding scheme. Reproductive traits and kid growth were analysed using Generalized Linear Models and Linear Mixed-Effects Models, with parity, litter size, and sex as fixed effects. Results indicated no significant ($p > 0.05$) breed effects on parturition rate ($68.5 \pm 30.51\,\%$) and abortion incidence ($13.4\,\%$), though abortion reduced kidding performance ($p < 0.05$). Rates of prolificacy ($149.5 \pm 57.66\,\%$) and fecundity ($212.4 \pm 135.53\,\%$), increased with parity, while the average kidding interval was 210.3 ± 23.77 days. Kid mortality ($43.3 \pm 46.72\,\%$) varied significantly with litter size and genotype ($p < 0.05$), largely due to nutritional deficiencies and parasitic infections. WAD kids had the lowest birth weight ($1.3 \pm 0.45\,\mathrm{kg}$) and average daily gain at 90 days ($46.3 \pm 31.72\,\mathrm{g/day}$), whereas crossbreds with Sahelian breeds showed superior growth ($p < 0.05$). Growth was further influenced by sex, parity, and specific Sahelian genotype. In conclusion, WAD goats demonstrate strong reproductive aptitude but limited growth potential. Crossbreeding with Sahelian genotypes enhances growth traits without compromising reproduction, offering a viable pathway to strengthen rural livelihoods and promote sustainable goat production in West Africa. These findings underscore the need for structured, evidence-based genetic improvement programmes to guide sustainable goat production in West Africa.

Keywords: *Capra hircus*, genetic improvement, reproductive efficiency

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