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**IMPROVING PRODUCTIVITY OF SMALL EAST
AFRICAN GOATS USING NATIVE BROWSE SPECIES**

BY

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ABSTRACT

Goats (*Capra hircus*) are widely distributed in Sub-Saharan Africa and are important to the subsistence and economic livelihoods of many people. Despite their potential to reduce poverty and increase nutritional security, their productivity remains low. This has majorly been attributed to inadequate feeding and nutrition. This study sought to contribute towards improved productivity of Small East African goats in Buyende district through improved nutrition. Specifically to identify priority browse species, their availability and germination characteristics. The chemical composition, rumen dry matter degradation, voluntary dry matter intake, digestibility and nitrogen balance of the priority species were also determined. Further, the effect of supplemental diets based on preferred browse species on growths and carcass characteristics of tethered indigenous goats and the effect of supplemental diets based on preferred browse species on meat quality of indigenous goats. Data was collected using ethnobotanical and ecological approaches, sowing experiments, chemical analyses, and feeding experiments. Results revealed that farmers rear indigenous goat breeds tethered in natural pastures. Goats are known to feed on 48 plant species dominated by trees and shrubs. However, only 31 browse species were encountered in the ecological survey. *Ficus natalensis*, *Harrisonia abyssinica* and *Rhus natalensis* were prioritized as the most preferred species. There was a significant difference ($P < 0.05$) among the germination percentage of the browse species under the different treatments. The mean lengths of seedling emergence ranged between 7 and 21 days. *Harrisonia abyssinica* presented the highest ($P < 0.05$) DM degradability. No difference between dry matter (DM) intake of *F. natalensis* and *H. Abyssinica* was observed. Similarly, the form in which the browses were offered (fresh vs. wilted) neither affected digestibility (DM, CP and OM) nor nitrogen retention. Although average CP content of browse species was high and ranged between 110 to 121 g/kg

DM, it was poorly utilized by goats. Generally CP content did not differ ($P>0.05$) across browse species and season with the exception of *R. natalensis* which had higher CP content of 132.5g/kg DM during the wet season. *H. abyssinica* had the lowest ($P<0.05$) NDF content (233 g/kg DM) than *Rhuss natalensis* (392 g/kg DM) and *Ficus natalensis* (387 g/kg DM). NDF content was higher ($P<0.05$) during the wet season across the three browse species. Consequently, the DM intake and degradability of *Rhuss natalensis* was inferior compared to *Harrisonia abyssinica* and *Ficus natalensis*. The effect of supplements based on *Ficus natalensis* and *Harrisonia abyssinica* foliage on intake, growth and carcass yield of tethered goats was assessed on-farm using forty growing intact male indigenous goats was determined. The DM intake from tethering ranged between 124 and 162g/day, and was not affected ($P>0.05$) by basal DM intake. However, the total DM and CP intakes were increased ($P<0.05$) by supplementation with the browse foliage. Compared with the control, supplementation with browse foliage increased ($P<0.05$) the average daily gain, hot carcass weight and dressing percentage by up to 37.2, 2.3 and 6%, respectively. Results on meat quality showed that Diet did not influence ($P>0.05$) the cooking loss and shear force values, chemical composition, total fat content, fatty acid composition, total SFA, total MUFA, total PUFA, $n3$, $n6$, PUFA:SFA ratio, $n6/n3$ ratio. In conclusion, *Ficus natalensis* and *Harrisonia abyssinica* foliages have potential to be used as low cost protein supplements in low-input goat feeding systems to produce high quality meat.