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Herbage biomass production and nutritive value of *Morus alba* and *Calliandra calothyrsus* harvested at different cutting frequencies

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Key words : *Morus alba* ; *Calliandra calothyrsus* ; fodder maturity ; rumen degradable protein ; cutting frequency

Introduction Due to their high nutritive value and positive effects on rumen function, tree and shrub foliage has been recognized as potentially high quality feed for ruminants for supplying protein and minerals (Van et al., 2005). Despite the increasing popularity of *C. calothyrsus* and *M. alba* as alternative feed resources, especially in the dry season, there is little information on the influence of cutting frequency on the herbage yield and nutritive value. The objective of the study was to examine effects of harvesting frequency of these tree forages on biomass yield and nutritive value.

Materials and methods *C. calothyrsus* and *M. alba* forage regrowth was harvested at frequencies of 1, 2, 4 and 6 months with each treatment replicated thrice. Ten kg of fresh forage was sampled for estimating forage biomass yield, leaf : stem ratio and degradability characteristics. Degradabilities of crude protein (CP) and organic matter (OM) were measured at 0, 3, 6, 12, 24, 48, 72, 96 and 120h of rumen incubation by the nylon bag technique using three rumen fistulated steers. The exponential model of McDonald (1981) was fitted to the degradability data of the nutrients, using the non-linear procedure of SAS (1990). The fitted fractional constants combined with assumed fractional rumen outflow rate of 0.03 for solids (Orskov and McDonald, 1979) were used to estimate effective OM and CP degradabilities.

Results and Discussion CP of *C. calothyrsus* declined ($P < 0.05$) from 232.7 to 156.0 g/Kg DM while that of *M. alba* declined ($P < 0.05$) from 234.4 to 169.3 g/Kg DM with increasing maturity.

Neutral detergent fibre and lignin increased ($P < 0.05$) as both plants matured. *C. calothyrsus* and *M. alba* leaf : stem ratio decreased from 3.3 to 0.4 and 2.9 to 0.7, respectively, with increasing maturity. While *C. calothyrsus* had the highest herbage biomass yield of 45.9 t/(ha yr)⁻¹ at 4 months cutting frequency, *M. alba* had yields of 18.6 and 18.4 t/(ha yr)⁻¹ at 2 and 6 months respectively. Highest effective CP degradability of 901.3 g/kg CP occurred in *M. alba* at a cutting frequency of 1 month while in *C. calothyrsus* the highest value ($P < 0.05$) was 492.8 g/kg CP at 2 months. Consequently for all treatments, rumen degradable CP (RDP) was consistently higher for *M. alba* (96.5-199.2 g/kg CP) than for *C. calothyrsus* (52.5-105.2 g/kg CP) but decreased ($P < 0.05$) with increasing maturity. Digestible undegradable protein (DUP) was affected ($P < 0.05$) by increasing maturity but was lower in *M. alba* compared to *C. calothyrsus*. Although *C. calothyrsus* was superior to *M. alba* in annual herbage biomass yield and DUP, it had lower RDP.

Conclusions Cutting management options that involve harvesting *C. calothyrsus* and *M. alba* at maturities when leaf : stem ratio is greater than 1.0 are crucial in deciding when to harvest fodder of high nutritional value. This suggests that smallholder farmers can efficiently use *M. alba* and *C. calothyrsus* in rations to improve animal productivity if harvested at maturities between 2 and 4 months.

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