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Performance of *Mucuna pruriens* as a Cover, Feed and Green Manure Crop in Banana-Based Systems in Eastern Democratic Republic of Congo

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Abstract

Intercropping in banana systems in central Africa is mainly practiced during the rainy seasons, and in low density plantations. Few intercrops are cultivated in more dense plantations and during dry season months. Integration of shade- and/or drought-tolerant crops in these banana systems could significantly boost overall farm biomass production, provide additional forage and a year-round ground cover. *Mucuna pruriens* is a tropical legume widely used as a forage, fallow, soil cover and green manure crop due to its rapid growth rate. The plant also fixes nitrogen thus fertilising the soil. A total dry biomass production ranging from 7-11 tonnes ha^{-1} has been reported. Mucuna prefers hot, humid climates with annual rainfall of 1,000 - 2,500 mm, but will grow with annual rainfall as low as 400 mm, possibly due to its often deep root system. The crop exhibits reasonable growth under drought and shaded conditions. Integration of this legume in banana fields, during contrasting seasons was assessed in eastern Democratic Republic of Congo which has a bi-modal rainfall pattern. The rainy seasons cover February till May (596 mm) and September till December (709 mm), while annual rainfall totals 1,522 mm. Mucuna was planted at the beginning and end of the rainy season, and at one month before the end of the rainy season, enabling plantlets to establish before less favourable dry season months. Field management included minimum tillage before planting and hand weeding during the first three months until the soil is completely covered by the Mucuna plants. Plant total above ground biomass was assessed on average at 5.2 months after planting. Mucuna planted at the onset of the rainy season and under mono-cropped conditions yielded on average 4.0 tonnes ha^{-1} of dry weight biomass per annual growing cycle compared with 2.5 tonnes ha^{-1} under banana shade. Mucuna planted one month before the end of the rainy season yielded on average 0.6 and 2.1 tonnes ha^{-1} under respectively, shaded and mono-cropped conditions. Mucuna planted at the very end of the rainy season and under shaded conditions yielded 1.14 and 0.38 tons ha^{-1} when planted, respectively, in December and May, the former reflecting a less severe dry season. Under mono-cropped conditions, the yields were higher, 4.12 and 1.43 tons ha^{-1}, respectively, when planted in December and May. Although biomass yields were mostly lower for planting dates at end/one month before end of rainy season, year-round biomass production and ground cover during the dry season months was achieved, thus contributing to whole farm productivity, and system integration and health.

Keywords: Biomass production, drought-tolerance, shade-tolerance, whole farm productivity

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