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Assessing Drought Tolerance of five Improved Forage Legumes to Improve Smallholder Dairy Productivity in Uganda

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Abstract

Livestock production is an important component of smallholder farming systems in Uganda. One main constraint to especially dairy production is the lack of sufficient quantity and quality feed on a consistent basis. Therefore, this study aimed to evaluate and identify forage legumes that are adapted to drought. An on-station experiment was established at the NaLIRRI research station in Tororo, an area experiencing prolonged dry seasons. Five improved forages were compared under rainfed and irrigated conditions in a complete randomized block design (five replicates): *Canavalia brasiliensis* (CIAT 17009), *Desmanthus virgatus* (ILRI 321), *Desmodium uncinatum* cv Silver leaf (ILRI 6765), *Lablab purpureus* (CIAT 22759) and *Macroptilium bracteatum* cv Burgundy. Herbage biomass was sampled five times at two-monthly intervals, while root biomass was measured once. Biomass estimates were consistently higher on irrigated than non-irrigated plots, especially during the dry season. *Lablab* (1269.2 kg ha⁻¹), *Desmanthus* (1257.6 kg ha⁻¹) and *Canavalia* (1267.9 kg ha⁻¹) were screened as promising forages with the highest herbage biomass on non-irrigated plots and thus potential candidates for dry season feeding. *Macroptilium* and *Desmodium* recorded 1011.2 kg ha⁻¹ and 894.43 kg ha⁻¹ of herbage biomass which was significantly lower compared to the other forages. Root biomass was assessed once and was highest for *Desmanthus*, followed by *Desmodium* (36%) and *Canavalia* (26%) while both *Macroptilium* and *Lablab* had root biomass of less than 21%. Stable carbon isotope signatures ($\delta^{13}\text{C}$) are currently analysed to assess water use efficiency of the forage legumes.

Keywords: Drought resistance, herbage, tropical forage quality