Tropentag, September 10-12, 2025, hybrid conference

"Reconcile land system changes
with planetary health"

Performance of *Crotalaria juncea* and *Lablab purpureus* in three agro-ecologies of Kenya

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Abstract

The availability of high-quality forage is a major limitation to livestock productivity in sub-Saharan Africa. Integrating resilient, high-yielding forage legumes into mixed farming systems offers a practical approach to addressing seasonal shortages especially crude protein. In the current study, we evaluated the agronomic performance of 4 forage legumes including three *Lablab purpureus* lines and one Crotalaria spp. Two *Lablab purpureus* varieties namely, Jhansi (ILRI accession No. 652) and Highworth (ILRI accession No. 147) were obtained from International Livestock Research Institute gene bank in Addis Ababa while Lablab cv Maridadi, currently grown by farmers was used as a check. Three contrasting agroecological zones in Kenya were selected including, lower highland (LH3), upper midland (UM2) and lower midland 1(UM1). The trial design was Randomised Complete Block Design (RCBD). Data on plant height and dry matter (DM) yield were collected over two seasons.

Plant height varied significantly between species, sites, and seasons. *Crotalaria juncea* consistently attained the tallest plants across all locations. The average plant height for *Crotalaria juncea* ranged from 1.28m 1.45 cm. Lablab varieties exhibited plant heights ranging between 0.50 m 0.85 m. Differences in plant height among lablab accessions were not statistically significant. Dry matter yield was also influenced by both site and season. *Crotalaria juncea* accumulated (7.92 t/ha) at lower midland I in Season 1 and (9.89 t/ha) at upper midland in Season 2 greater than the other legumes. Significant differences between lablab ILRI 147 and ILRI 652 were observed with highest yields at upper midland 2, with ILRI 147 accumulating 20.23 t/ha. Consistently, Lablab cv Maridadi had the lowest yields across sites and seasons, with a minimum of 0.37 t/ha recorded at the lower highland site.On dry matter basis, *Crotalaria juncea*, is a promising candidate for improving crude protein availability across diverse agroecological contexts. Additionally, the high dry matter production of ILRI 147 and ILRI 652 at lower midland sites highlights the potential of these in semi-arid condition. Integrating these legumes into smallholder systems could significantly enhance quality feed resources and contribute to more sustainable livestock production in Kenya and similar regions.

Keywords: Agroecology forage nutrition, forage legume, semi arid

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