



Drought resistance of selected forage legumes for smallholder farmers in East Africa

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Objective

To improve (dry-season) feed availability for smallholder farmers in East Africa with forage legumes.

Material and Methods

- Field trials in Uganda and Rwanda (Fig. 1)
- Five forage legumes: *Lablab purpureus*, *Desmodium uncinatum* cv Silverleaf, *Desmanthus virgatus*, *Macroptilium bracteatum* cv Burgundy bean, and *Canavalia brasiliensis*
- With/without additional irrigation
- Completely randomized block design, n = 5
- Two-monthly biomass harvests
- Sampling of youngest leaves for carbon stable isotope analysis ($\delta^{13}\text{C}$, directly proportional to intrinsic water use efficiency = C assimilation/stomatal conductance for H_2O)



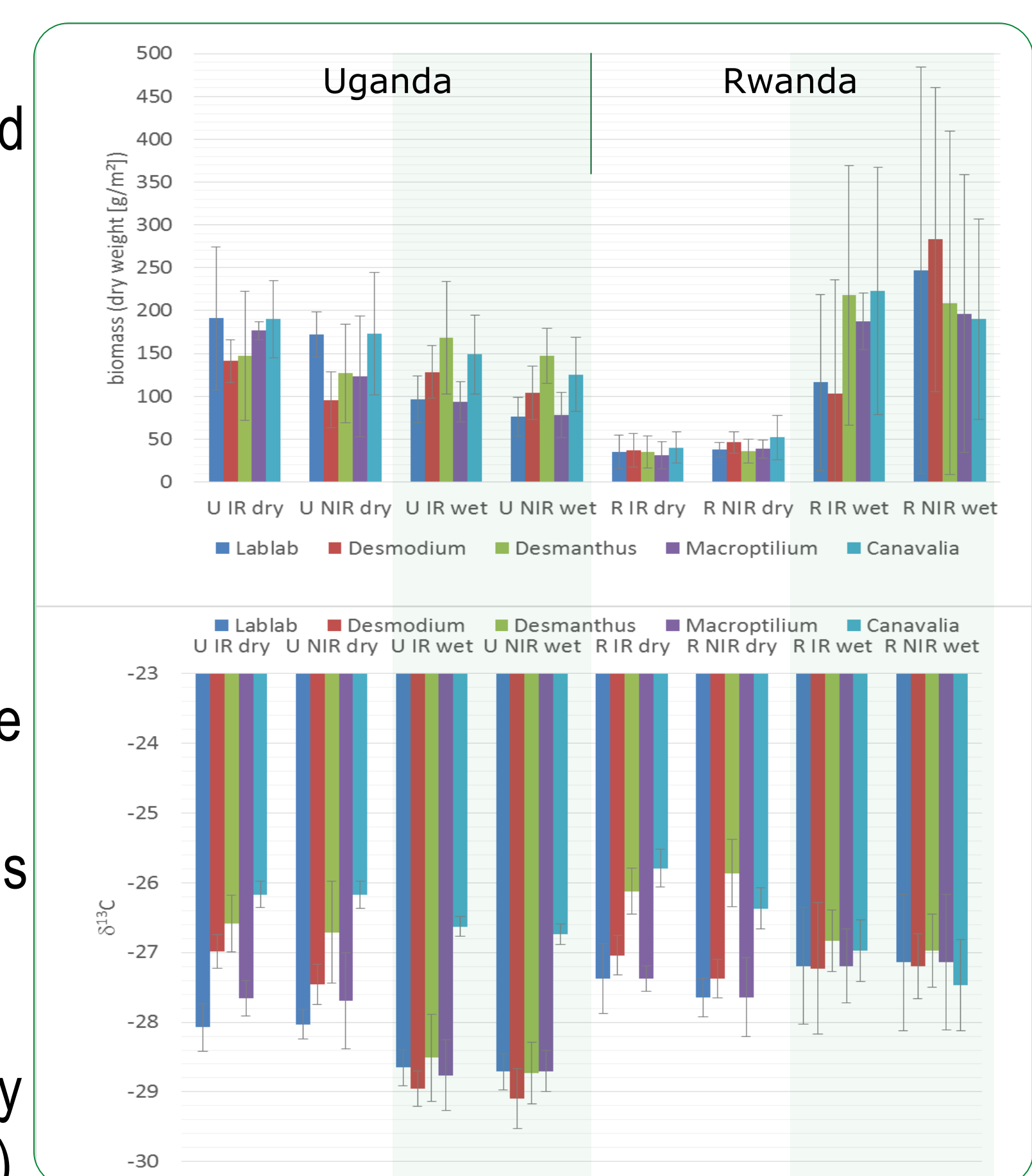
Fig. 1: Field sites in Rwanda (left) and Uganda (right)

Discussion and Conclusions

Although biomass production was limited during the dry season, some biomass could still be harvested from all tested legumes. Carbon isotopic signatures were generally more enriched for samples from Rwanda, hinting at a larger intrinsic water-use efficiency under the local conditions. *C. brasiliensis* had most enriched carbon isotope signatures in both countries, coupled with acceptable biomass production and should be further investigated for adaptation in smallholder farming systems. Effects on soil fertility still need to be examined.

Results

Fig. 2: Harvested biomass (g/m^2) and $\delta^{13}\text{C}$ (‰) of the youngest leaves. U: Uganda, R: Rwanda, IR: irrigated, NIR: not irrigated, dry: dry season, wet: wet season. Shown are means and standard deviations of one representative harvest per country and season (n = 5).



There were significant differences in biomass production between seasons (especially in Rwanda) and countries, but not among species (Fig. 2 upper part). $\delta^{13}\text{C}$ signatures differed between seasons and countries and among species, with *D. virgatus* and especially *C. brasiliensis* showing more enriched values (Fig. 2 lower part). The irrigation treatment had no significant influence as a single factor on either variable, but was significant in interaction with country for biomass production.