

Selecting Rhodes and Napier grass genotypes for dry areas

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Aim of the research: To assess drought resistance in the collections of Napier and Rhodes grass held in the ILRI genebank to select better genotypes for use as livestock feeds in dairy or fattening systems in dry areas.

Species descriptions:

Rhodes grass (*Chloris gayana*)

- ✓ Widely adapted perennial grass that makes excellent hay
- ✓ Fast growing and deep rooted
- ✓ Good drought and salinity tolerance, some cold tolerance
- ✓ Tolerates seasonal waterlogging
- ✓ Very palatable and good nutritive value
- ✓ Can withstand cutting as well as heavy grazing



Napier grass (*Pennisetum purpureum*)

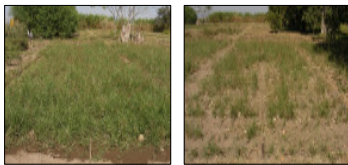
- ✓ Very tall perennial grass that is useful for cut and carry, hay or silage
- ✓ Fast growing and deep rooted, vigorous
- ✓ Tolerates limited dry spells as well as poor drainage
- ✓ Good palatability in early growth stage, but tends to become coarse as it matures
- ✓ Can be used to improve soil stability and as a wind break



Methodology used: Separate trials were planted for each grass during the dry season at the ILRI research station Zwai in the Ethiopian Rift Valley, where both grasses are well adapted under irrigation. For each species, 60 accessions were planted in 3 replicates in a split-plot design with irrigated and non-irrigated treatments. The irrigated plots were watered weekly with flood irrigation and the non-irrigated plots received less than 20 mm of rainfall over the trial period. Gravimetric soil moisture content was determined weekly in the two treatments. Plants were established from cuttings during the wet season and cut back to 10 cm at the start of the experiment. Biomass yield was measured after 5 weeks of re-growth for Rhodes grass and after 8 weeks of re-growth for Napier grass. Drought resistance was measured as the ability of a genotype to be relatively more productive than others under water deficit conditions.



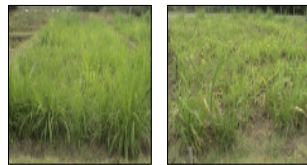
Significant differences between treatments in the Rhodes grass experiment



Irrigated plot

Non-irrigated plot

Significant differences between treatments in the Napier grass experiment

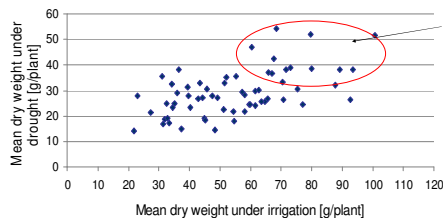


Irrigated plot

Non-irrigated plot

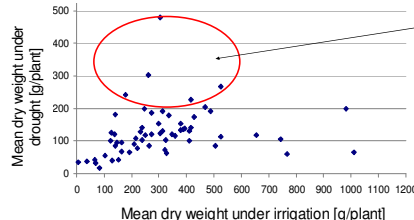
Results: Although the trial was limited to one site and one season, split-plot ANOVA showed significant differences between irrigation treatments and among accessions for biomass yield ($p < 0.01$) in both species indicating the possibility to select from the germplasm collection. Rhodes grass showed better adaptation to drought than Napier grass. Better adapted accessions of more productive grasses will support demand for feeds for dairy and fattening systems in dry areas and could provide solutions for smallholders to adapt to changing environments in sub-Saharan Africa.

Rhodes grass



Promising drought tolerant accessions:
ILRI 890, 13317, 719, 6625, 993

Napier grass



Promising drought tolerant accessions:
ILRI 16836, 16782, 16802, 16837, 16814

Mean dry weight of Rhodes grass accessions under drought vs. irrigation

Mean dry weight of Napier grass accessions under drought vs. irrigation



The **good** news is ...

Diversity exists among accessions in the ILRI genebank and better suited and more drought tolerant genotypes can be selected for use as feed in dry areas.



And the **not so good** news is ...

Providing more productive forages for dry areas may support increased livestock numbers with associated environmental stress.