Elephant grass – germplasm and breeding in Brazil

Elephant grass (*Pennisetum purpureum* or *Cenchrus purpureus*) is one of the most important forage species, being cultivated in almost all tropical and subtropical regions of the world due to its high potential of dry matter production, nutritional quality, palatability, vigor, persistence and versatility of use.

Its most frequent use occurs at the cut-and-carry system, and it can also be used for silage and for grazing. In addition, elephant grass has been a notable option for use as bioenergetic feedstock.

Germplasm bank

Preservation of elephant grass germplasm presents current and future importance for genetic improvement. Genetic variability allows cultivar development with pest and disease resistance, tolerance to abiotic stress conditions, higher yield and better nutritive value, as well as adapted to the environmental stress caused by climate changes.

Embrapa Dairy Cattle maintains an Elephant grass active germplasm bank composed of accessions introduced from other national and foreign collections, improved cultivars and other species of *Pennisetum spp*. The germplasm bank has 121 accessions, being 94 of *Pennisetum purpureum*, nine triploid and hexaploids hybrids (*P. purpureum x P. glaucum*) and 18 accessions of other wild species.

The morphological, agronomic, cytogenetic and molecular characterization of the accessions was carried out allowing a broad knowledge about the genetic variability of the collection and providing information for genetic improvement.

Forms of use

Cut-and-carry system – This is the system most used by smallholders, mainly for supplementation of pasture in the dry period. Harvesting of the grass is frequent, and the forage is chopped and given green to the animals. This system allows a better use of the forage produced, but with a high labor cost.

Pasture – dwarf cultivars with high potential for aerial and basal tillering present better adaptation to the grazing system, since these characteristics are associated with superior forage availability, as well as greater plant under grazing persistence.

Silage – Silage is the forage conservation way to take advantage of the excess of production in the summer and to use it in winter or dry season. Elephant grass should be ensiled when the plant reaches the most favorable relation between dry matter content and nutritive value (90 and 110 days of regrowth), aiming to obtain a good fermentation and silage quality.

Bioenergy production - elephant grass presents high potential for energetic biomass, being able to be used for combustion or for production of lignocellulosic ethanol.

Improved Cultivars

The choice of the cultivar should consider the potential of production, the objective of use and the required management aiming at the best animal performance in economic bases. The main cultivars released by Embrapa's breeding program are summarized in the table.

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Cultivar	Details
 BRS Capiaçu	Released in 2016; recommended for silage production and green-cut forage; high productive potential (50 t DM/ha/year), high nutritional value; lodging resistance & good adaptation to mechanized harvesting.
 BRS Kurumi	Dwarf cultivar, released in 2014; stands out for production potential, high leaf-stem ratio & crude protein content (18-20%), recommended for rotational grazing system and for green-cut forage.
 BRS Canará	High productive potential (45 t DM/ha /year); used for green-cut forage or bioenergy production.
 Pioneiro	Recommended for green-cut & grazing; high potential of basal & aerial tillering. *All photos from FJ da Silva Ledo*

Francisco Ledo (Embrapa, right) and Chris Jones (ILRI, left) discussing Napier grass breeding at Campo Grande, ,Brazil. Photo BL Maass.

Visitors discussing Panicum breeding with Liana Jank (Embrapa,far right) at Campo Grande, Brazil. Photo BL Maass