Morphological Characterization of Table Cassava (*Manhiot* esculenta Crantz) Accessions as a Preliminary Selection of Genotypes in the Region of Chapadinha- MA, Brazil

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Abstract

The cultivation of table cassava in the microregion of Chapadinha presents a very low productivity 7.4 t/ha compared to the Brazilian average 13.3 t/ha. The poor regional performance of this crop is due the usage of not adapted varieties. It has been observed that the morphological characterization enables to differentiate access into a species, besides to indicate the genetic diversity between genotypes. Thus this work was carried out to characterize ten genotypes of table cassava in Chapadinha as a preliminary way to select them for the region. The experiment was conducted in the village of Vila União, using randomized block design with four replications and ten treatments or genotypes. The treatments were distributed in the plots in spacing of 1,20 x0.5 meters with 6 utile plants per plot. The plants were characterized at the age of 8 months by 25 morphological descriptors proposed by the Embrapa Cassava and Fruits. It was concluded that there was predominance of conic cylindrical (50%) for the format of tuberous roots as well as vertical position of roots (60%). There was predominance of sessile roots (40%) white pulp of roots (50%), and absence of constriction in roots (80%). Also there was predominance of straight growth of stalk habit (50%), and cylindrical and compact plant kinds, both with frequency of (40%). It was observed frequency of green color (50%) and dark green (60%) for adult leaves and branches respectively. Light green (60%) was predominate color for apical bud, and for petiole it was observed predominance of the color green- reddish (30%).The genotypes Rampa, Rosa and Gema de Ovo presented good root's characteristics such as cylindrical format, absence of constriction and easy peeling besides of compact plant's format, which make them an excellent option for cultivation and consumption in the region.

Introduction

Cassava is one of the most important staple foods in the region of Chapadinha. Even with a paramount feeding role, the productivity of the crop (7, 4 ton/ha^{-1}) is lower than the Brazilian average (13, 3 tons/ha^{-1}), due the cultivation of non-adapted varieties. On the other hand, the morphological characterization of cassava germplasm is a valuable tool in the selection and adoption of better varieties. This tool provides precise information about the germplasm, enabling a more effective exchange and use, as well as the determination of genetic diversity and has lower costs compared to molecular characterization. Therefore, the objective of this work was to characterize morphologically and select cassava genotypes for the region of Chapadinha, East of Maranhão, Brazil.

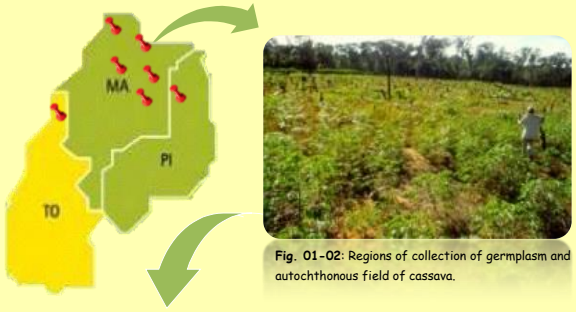

Fig. 01-02: Regions of collection of germplasm and autochthonous field of cassava.

Figure 03: Installation of experiment.

	Genotypes	Origin region
Autochthonous	Orelha Leão	Médio Mearim-MA
	Gameleira	Médio Mearim-MA
	Turiaçu	Gurupi-MA
	R-01	Chapadina-MA
	Rampa	Itapecuru Mirim -MA
	Rosa	Chapadina-MA
	Talo Vermelho	Bico do Papgaio-TO
Checks	BRS Dourada	Embaro- PI
	BRS Gema Ouro	Embaro- PI

Table 01: Genotypes, their state and region of origin.

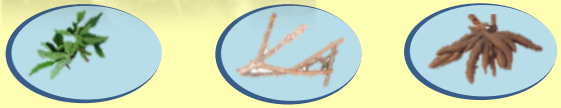

Figure 04: Morphological descriptors of leaf (nine), stem (seven) and roots (nine).

Methods and materials

- ✓ Collection of the germplasm in autochthonous fields in Maranhão and its neighbor states. (Hershey, 1992 and Martins,1994).
- ✓ The experiment was established in the village União in Chapadinha and conducted according to the cassava system of production in the Brazilian cerrado (Sousa and Fialho, 2008).
- ✓ Genotypes were characterized by twenty five morphological descriptors, eight months after the planting (Fukuda and Guevara, 1998) .

Results and Discussion

Leaf descriptors	classes	Frequency (%)	Entropy
Petiole color	Reddish green	10	1.16
	Yellowish green	30	
	Red	30	
	Greenish red	20	
	Purple	10	
Petiole position	Horizontal	50	0.44
	tilted up	50	
Shape of leaflet	Lanceolate shape	40	0,87
	Eliptical	10	
	oblong lanceolate	10	
	Eliptical lanceolate	40	
Color of developed leaf	Green	50	0.75
	Dark green	40	
	Light green	10	

Table 02. Leaf descriptors, classes of descriptors, their percentage and entropy levels.

High values for entropy shows disequilibrium in the frequencies of the accesses in the different phenotypic classes. There was predominance of the classes lanceolate and elliptical lanceolate for the shape of leaflet descriptor, both with frequency of (40%). It was observed elevated number of classes for this descriptor, evidencing high diversity for this trait within cassava germplasm.

Stalk descriptors	classes	Frequency (%)	Entropy
Growing habit	Upright	100	0
Branching habit	Dichotomic	20	0.63
	Erect	50	
	Trichotomic	30	
External color of stalk	Light brown	50	0.75
	Gray	40	
	Silvery	10	
Color of stalk cortex	Yellow	40	0.46
	Light green	40	
	Dark green	20	
Plant kind	Compact	40	0.46
	Cylindrical	40	
	Open	20	

Table 03. Stem descriptors, classes of descriptors and their percentage and entropy levels.

There was not phenotypic difference for growing habit of plants. Although there was predominance of the erect branching habit class for the branching habit(50%), as well as the compact (40%) and cylindrical (40%) classes for the kind of plants descriptor.

Growth habit and plant kind are strictly related to the architecture of plant, and are a determiner factor of leaf area. Ergonomically, these characteristics effect the cultivation of cassava, determining the density of planting, and the easy or difficulty of harvest.

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Root descriptors	classes	Frequency (%)	Entropy
Format	Cylindrical	40	0.73
	Cylindrical-conical	50	
	Irregular	10	
Root position	Horizontal tendency	40	0.42
	Vertical tendency	60	
Epiderm texture	Rough	90	0.47
	Smooth	10	
External color	Dark brown	10	0.58
	Light brown	70	
	Whit or cream	20	
Cortex color	Pinkish	20	0.63
	White or cream	50	
	Purple	30	
Pulp color	White	80	0.48
	Cream	20	
Root constriction	Few or absent	80	0.48
	Medium	20	

Table 04. Roots descriptors, classes of descriptors, their percentage and entropy levels.

Characteristic in the table cassava consumer market, being preferred the formats cylindrical or conical-cylindrical. Descriptors such as root position and root constriction determine the level of efficiency of work performed during the harvest and post-harvest time. The color of pulp it is a paramount aspect for the adoption of table cassava varieties, and preferences for specific color of pulp might vary according to the purpose, and region of production.

Conclusion

The Characterization of genotypes reveled high phenotypic diversity within the germplasm. Elevated diversity of genotypes demonstrated that genetic resources of cassava found in Maranhão and its neighbor states are valuable resources for cassava breeding. The accessions Rampa and Turiacu were the most promising genotypes. The genotype Rampa, assembled majority of the desirable morphological traits, which make it a potential key to enhance the regional yields of cassava.

Referencies

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Acknowledgement

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