



Drought tolerant stem anatomy characteristics in *Manihot esculenta* (Euphorbiaceae) and a wild relative

N.M.A. Nassar¹, L.F.A. Abreu¹, D.A.P. Teodoro² and D. Graciano-Ribeiro²

¹Departamento de Genética e Morfologia, ²Departamento de Botânica, Universidade de Brasília, Brasília, DF, Brasil

Corresponding author: D. Graciano-Ribeiro

E-mail: graciano@unb.br

Genet. Mol. Res. 9 (2): 1023-1031 (2010)

Received February 21, 2010

Accepted March 16, 2010

Published June 1, 2010

DOI 10.4238/vol9-2gmr800

ABSTRACT. The stem structure of two cassava cultivars, UnB 99 and UnB 110, known for being adapted to humid conditions and tolerant to drought, respectively, and of a wild species, *Manihot glaziovii*, was examined anatomically. Free-hand sections of secondary stems were made, clarified with 50% sodium hypochlorite solution, stained with 1% alcian-blue safranin, and then passed through an ethanol series and butyl acetate, followed by mounting in synthetic resin. *M. glaziovii* stems had dense prismatic and druse crystals in the cortical parenchyma, along with abundant gelatinous fibers. The pericycle fibers also had thicker walls. An absence of crystals, offset by abundant starch, was observed in clone UnB 99. In *M. glaziovii*, abundant tyloses were found in vessel elements; these were rare in clones UnB 99 and UnB 110. The wild species had larger vascular vessels; the secondary xylem showed very little starch, unlike UnB 99 and UnB 110. In clone UnB 110, starch was observed in the cortical region, and medulla and gelatinous fibers were found in the pericycle and secondary xylem. Brown stem color was found to be associated with tolerance to drought.

Key words: *Manihot glaziovii*; Cassava cultivars; Stem anatomy; Prismatic and druse crystals; Drought resistance; Gelatinous fibers