Dehydration avoidance of *Megathyrsus maximus* genotypes and cultivar Quênia grown in long tubes

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The development of new forage grass cultivars that avoid drought stress by root growth is important to ensure animal feeding during dry periods. We evaluated the ability of five genotypes of *Megathyrsus maximus* and of the cultivar *M. maximus* 'Quênia' (QE) to avoid dehydration. The experiment was conducted in a greenhouse at EMBRAPA-CPPSE in São Carlos, SP, Brazil. The genotypes PM22, PM37, PM10, PM20, and PM21 and QE were cultivated in acrylic long tubes and subjected to two treatments (irrigated or non-irrigated) with three replications per combination of cultivar/genotype and treatment, totaling thirty-six tubes. The tubes measured 0.12 m of diameter and 1 m of length, and were filled with substrate composed of 69, 7 and 24% of sand, silt, and clay, respectively, and fertilized with 300, 200 and 150 mg/dm^3 of N, P, and K, respectively. Two plants per tube were used. The experiment started on 04/09/2017 and on 13/09/2017 the irrigation was ceased in half of the tubes to apply the irrigated and non-irrigated treatments. The aerial biomass (AB) and root biomass per soil layer (RB) were measured when the leaves showed clear signs of wilting, which occurred on 26/09/2017 for PM20 and PM37 and on 10/10/2017 for the remaining genotypes/cultivar. For the AB characterization, the plants were cut at soil level. For RB assessment, the soil profile was divided into four layers (0-0.25, 0.25-0.5, 0.5-0.75, 0.75-1 m) hereafter called L1, L2, L3, and L4, and the roots were washed free of soil. Both AB and RB were oven-dried at 60°C for 72h. The data were analyzed using the PROC MIXED of SAS 9.4.. Genotype/cultivar, treatment, and layer (only for RB) were considered as fixed effects and the errors as random effects. For comparisons, the data were subjected to *t*-Student test ($p<0.10$). AB of irrigated plants was 2.5 to 4.5 times greater than that of non-irrigated treatments. In non-irrigated tubes, the AB of PM37 and PM20 was two to three times lower than the other genotypes (mean $\pm$ standard error of the mean: 2.3 $\pm$ 0.19 and 3 $\pm$ 0.32 g tube^{-1}, for PM37 and PM20, respectively). The proportions of RB in non-irrigated tubes were more evenly distributed among layers, while in irrigated tubes the RB decreased as depth increased. PM20 and PM37 had low values of RB (less than 1 g tube^{-1}. layer^{-1}), and no difference was observed between irrigated and non-irrigated treatments. For all the other genotypes/cultivar, RB was higher for the irrigated treatment. Under non-irrigated condition, PM10 had greater RB when compared to PM20 and PM37, and QE and PM22 had greater RB than PM37. The values of RB for non-irrigated condition ranged from 0.20 $\pm$ 0.09 to 1.11 $\pm$ 0.13 g tube^{-1}. layer^{-1}. The PM10, PM22, QE and PM21 showed ability to escape drought stress by great RB accumulation under non irrigated conditions. This ability underpinned greater AB accumulation for these plants. PM22, PM10, and PM21 can be used in the breeding program for development of forage cultivars that escape moderate droughts.

Keywords: drought stress, *Panicum maximum*, guineagrass, water stress, root growth.

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