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Simple, Rapid and Cost effective screening method for drought resistant breeding in pearl millet

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Pearl millet is one of the most important cereals in drought-prone areas and is the staple grain for million of people in West Africa and India. However, its growth and productivity are limited by temporally and spatially erratic rainfall and poor soil fertility. Breeding for drought-prone environments is constrained by lack of suitable selection indices of drought stress resistance. Drought resistance screening under field condition varies from year to year and many traits are measured with complex, time-consuming techniques that are unsuitable for screening large numbers of progeny. The objective of the present study is to determine the reliability of *in vitro* screening method for initiating drought breeding programme. This *in vitro* screening method proves to be an ideal method for screening large set of germplasm with less efforts and accurately cost effective. *In vitro* growth pattern differences are only due to genotypes and environment has least influence. This experiment was carried out at Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore.

A collection of twenty one millet genotypes including commercial varieties and hybrid culture (under pipe line) were tested in completely randomized design. Data were recorded at five different moisture stress levels (-3, -5, -7.5, -10 bars and control) by using polyethylene glycol (PEG) 6000 on germination percentage, root length, shoot length, root / shoot ratio and analyzed for significance. The genotypes were differing significantly in response to the four levels of moisture stresses. There were highly significant differences for all traits. The genotype TNBH 0538 gave the highest germination percentage, root length, shoot length, and root/shoot ratio as compared with commercial cultivars under all four moisture stresses. ICMV- 221 showed maximum resistance against moisture stress while PT 6034 showed minimum resistance. TNBH 0541 also gave the better performance under all five moisture levels for most of the traits at seedling stage. The correlation studies indicated the germination percentage were the most important trait for drought tolerance owing to their high significant and positive correlation with root and shoot length. Hence, the hydroponic system used in this study appeared to be a simple, rapid and cost effective method for screening seedling traits response to water stress condition.