IDT4-018 | High throughput screening for differential nocturnal transpiration in rice genotypes under moisture-deficit stress

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Drought is the major abiotic stress affecting growth and productivity of rice. Efficient use of water by genotype is one of the key mechanisms for minimizing fresh water requirement under irrigated ecosystem and yield stability under drought stress. Significant efforts have been made to unravel the physiological and molecular basis of transpiration during day time, while nocturnal transpiration has received limited attention. Global climate change is expected to increase night time temperature more than the day time temperature. Hence identification of donors and genomic regions associated with nocturnal transpiration will be critical for achieving more crop per drop. An experiment to study the diurnal and nocturnal transpiration and their contribution to total transpiration in rice genotypes was conducted in automated plant phenomics facility. Sixty rice genotypes were transplanted in pots with six replications each and grown under controlled environment conditions at the national phenomics facility, ICAR-IARI, New Delhi. One set of plants (three replications each) were imposed with moisture-deficit stress during reproductive stage, while the other set was well irrigated. Data on gravimetric change in soil moisture was recorded by using automated weighing and watering unit and plant stress responses were measured by using visual, IR and NIR imaging platforms. Results revealed considerable variations among the rice genotypes in nocturnal transpiration, and thus suggest the potential for using this trait for improving rice crop.

IDT4-019 | Determining transpiration efficiency of *bmr* sorghum genotypes for progressive drought tolerance

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Food and energy security are fundamental to the economic development of nations and considering environmental issues, biomass-based energy is a promising option in India through lingo-cellulosic (2G) biofuel production. High biomass sorghum is a promising feedstock for 2G biofuels production. However, higher lignin content of the biomass and water-deficit stress are major issues in enhancing biomass sorghum based biofuels production. In sorghum, brown midrib (*bmr)* mutants with reduced lignin content were developed.The present glass house study summarizes a screening experiment of 14 *bmr* sorghum lines (Atlas, Atlas *bmr*-12, Early hegarisart, IS 18542, Kanas collier, N 592, N 593, N 594, N 595, N 596, N 597, N 598, Roxorange and R-16) for progressive drought tolerance. The results showed that among the various *bmr* lines tested, N 593 had the highest transpiration efficiency in water-stressed conditions, whereas N 592 had the highest in well-watered conditions. The lowest transpiration efficiency was observed in N 597 under water stressed treatment. However, for well watered treatments the lowest was observed in N 596. The genotypes having higher transpiration efficiency has more water holding capacity for longer time under water stressed conditions. This preliminary study helps to identify genotypes with more water-holding capacity to adapt well in drought conditions. The *bmr* genotypes used here showed reduced lignin content vis-à-vis white midrib sorghums. The identified lines with low-lignin, high biomass and higher water holding capacity can be used as feedstocks in 2G Biofuels production after appropriate testing in target environments.