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A SMALLER ROOT SYSTEM WITH ENHANCED BIOMASS ACCUMULATION AND TRANSPORTER EXPRESSION IN FOXTAIL MILLET *[SETARIA ITALICA (L.)* BEAUV.] UNDER LOW NITROGEN

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Foxtail millet (FM) [*Setaria italica* (L.) Beauv.] is an important grain and forage crop well adapted to nutrient-poor soils. Studies related to its adaption to nutrient limitation are rare. How FM adapts to low nitrogen (LN) at the morphological, physiological, and molecular levels remains worth studying and to date, little is known about that. Low nitrogen (LN) led to lower chlorophyll contents and N concentrations, and higher root/shoot and C/N ratios and N utilization efficiencies in FM variety Yugu1 under hydroponic culture. A smaller root system as indicated by significant decreases in total root length; crown root number and length; and lateral root number, length, and density; was in contrast to enhanced biomass accumulation in the root under LN. Increased average diameter of the LN root, potentially favourable for wider xylem vessels or other anatomical alterations favourable for nutrient transport facilitated enhanced carbon allocation towards root. Consistent with smaller root system IAA and CKs levels were lower whereas higher levels of GA may promote root thickening under LN. Further, up-regulation of *SiNRT1.1*, *SiNRT2.1*, and *SiNAR2.1* expression and nitrate influx in the root and that of *SiNRT1.11* and *SiNRT1.12* expression in the shoot probably favoured nitrate uptake and remobilization as a whole. Lastly, more soluble proteins accumulated in the N-deficient root likely as a result of increases of N utilization efficiencies. Such excessive protein-N was possibly available for shoot delivery. Thus, FM may preferentially transport carbon toward the root facilitating root thickening/ nutrient transport and allocate N toward the shoot maximizing photosynthesis/ carbon fixation as a primary adaptive strategy to N limitation.

Biography

Faisal Nadeem has completed his Masters' degree in Agriculture-Soil Science from Pakistan and then got admitted to China Agricultural University, Beijing, China for PhD. He is in final year of his PhD and his research focuses on morphological, physiological and molecular response of foxtail millet to different nitrogen regimes. He has published one research article as first author and the other as second author during his PhD tenure so far.

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