IDT3-008 | Drought (WS) and low phosphorus (LP) stress in groundnut: Water extraction pattern and tolerance related traits for breeding program

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Drought (WS) and low soil phosphorus (LP) are major constraints of groundnut productivity. This study aims to (i) understand the relative importance of phosphorus (P) deficiency, water stress and their interaction, (ii)investigate water extraction pattern under WS and LP, and (iii) identify field and controlled conditions measured traits related to better performance of genotypes under WS and LP. Six groundnut varieties were assessed under field and lysimetre conditions. Two water regimes (WW, WS) and 2 phosphorus treatments (HP, LP) were imposed. Leaf Area Index (LAI), roots volume (RV), length density (RLD) and roots dry matter (RDM), water extraction (WEx), transpiration efficiency (TE), soil moisture content (SMC) and yield were investigated. LP stress decreased LAI and pod weight (Pwt) (42 and 28 % respectively). ICGV 12991 and 12CS-116 varieties showed the highest LAI and Pwt. LAI, correlated to Pwt(r2 = 0.77), revealed relevant trait for LP tolerance.LP and WS decreased roots and canopy measured traits. WS and LP decreased WEx (51 and 7% respectively). Combined LP and WS (WS-LP) decreased WEx up to 60%. ICG 12991 and 12CS-116 showed the highest WEx, RLD and RDM under WS-LP; RLDcould contribute to water uptake to avoid dehydration. Significant genotypic variation observed on SMC revealed different pattern of WEx. TE increased under WS and decreased under LP; factors driving TE would be different.12CS-116, 55-437 and ICG 12991 revealed high TEand tolerant to WS-LP but showed different tolerance mechanism. This study revealed that ICG 12991 and 12CS-116 were tolerant to WS-LP and LAI, RLD, while WEx and TE revealed relevant traits for groundnut improvement.

IDT3-009 | Effects of drought stress on water relationships and osmotic adjustment in pasture annual medic ecotype

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Drought stress is a major factor limiting growth, development and dispersal of plants in the biosphere. There are cultivated plants with increased resistance to this stress, which appears critical to keep growth and yields at a sufficient level. A tolerant ecotype of cutleaf medic [*Medicago laciniata* (L.) Mill] was recognized from arid areas that are able to sustain high productions and growth during drought. Thus, evaluation of mechanisms of drought response in tolerant ecotypes is important. In order to evaluate water relations and osmotic adjustment in sensitive and tolerant genotypes of cutleaf medic under drought stress, a factorial greenhouse experiment was conducted in a RCBD at the University of Tehran, Iran. The drought stress levels comprised -0.1, -0.2, -1 MPa as low, medium and high stress levels respectively, and normal condition (FC = -0.03 MPa). Results indicated that tolerant genotypes had a significant superiority to sensitive genotypes in most of the studied characteristics such as Relative Water Content (RWC), Water Potential (ψ_w), Osmotic Potential (ψ_s), Turgor Potential (ψ_t) and Osmotic Adjustment during medium and high water stress levels. The experiment showed that high RWC in drought-tolerant ecotypes was simultaneous with increase in OA and osmolytes in leaves of tolerant ecotypes. This experiment indicated that osmotic adjustment is one of the major concerns of tolerance. Therefore, it might be possible to use OA and RWC for selection of drought-tolerant medics or gene transfer them in alfalfa as a crop.