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Comparing differential response of Lentil (*Lens culinaris* Medik) genotypes to aluminium toxicity in hydroponic and soil culture experiments

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Abstract

Aluminium is considered as the main abiotic stress in lentil grown on soils containing excessive aluminium contents. Developing more aluminium tolerant genotypes of lentil would help to improve productivity on these soils. This study assessed the differential response of lentil genotypes to aluminium toxicity stress under hydroponic and soil conditions to evaluate genotypes for aluminium tolerance. Significant genotypic differences in root length, shoot length, dry weight of root and shoot, root re-growth after staining, accumulation of aluminium in roots and shoots were observed under 0, 74, 148 and 222 and 296 mM Al concentration. Root and shoot aluminium contents were significantly lower in the tolerant than sensitive genotypes, indicating that aluminium exclusion mechanism was involved for aluminium tolerance. These results were compared with similar measurements including yield from soil assay. Root and shoot, aluminium content at 222mM Al concentrations were significantly correlated with biomass production under controlled conditions and ranked the genotypes with their seed yield in the soil assay. The trend in the differential responses of tolerant ('L-7903' and 'L-4602') and sensitive ('L-4147' and 'BM-4') genotypes to aluminium stress was fairly consistent in hydroponic and soil assays.