Growing crops in salty soils gets easier one step at a time

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A team of researchers from The University of Western Australia has made a breakthrough that could assist the future development of crops to cope with production in salty soils worldwide.

Soil salinity impedes crop production in many parts of the world, including large areas of farming land in Australia.

Professor Timothy Colmer from UWA's School of Plant Biology and Institute of Agriculture, who led the study, said his team studied how salt affects the reproductive processes in chickpea plants.

Working with research partners at the International Crops Research

Institute for the Semi-Arid Tropics (ICRISAT), scientists specifically looked at whether the effect of salinity on reproductive processes in chickpea was associated with ion concentration in specific tissues.

"This is the first detailed analysis of ion concentrations in specific cells of reproductive structures of plants subjected to salt stress, made possible by the techniques available at the UWA Centre for Microscopy, Characterisation and Analysis," Professor Colmer said.

Early reproductive tissues of developing ovules and pods between a known salt tolerant variety, Genesis836, and a known salt sensitive variety, Rupali, were analysed after they were subjected to varying concentrations of sodium chloride applied to soil.

"No differences in the accumulation of sodium or chloride in these structures were found between the contrasting genotypes," Professor Colmer said.

It was previously thought that the accumulation of salt ions in the reproductive structures of chickpea plants was responsible for its sensitivity to salt. The new results, recently published in the prestigious international journal *Plant, Cell and Environment*, have shown this is incorrect.

"Our findings, together with other experiments on responses of photosynthesis and sugar supply for seed filling in saline conditions, are exciting because they provide greater understanding of chickpea's salt tolerance, but also how different genotypes express their resistance to saline soils," Professor Colmer said.

"These are important initial steps towards enhancing future breeding strategies aimed at improving crop performance in mild-to-moderately salt-affected soils."

More information: "Salt sensitivity in chickpea (Cicer arietinum L.): ions in reproductive tissues and yield components in contrasting genotypes." *Plant, Cell & Environment*. doi: 10.1111/pce.12506

Provided by University of Western Australia