Salt-loving plants may be key to global efforts for sustainable food production

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Farmland is vanishing in part because the salinity in the soil is rising as a result of climate change and other man-made phenomena. In an Opinion piece publishing in the Cell Press journal *Trends in Plant Sciences*, researchers propose a new concept for breeding salt- tolerant plants as a way to contribute to global efforts for sustainable food production.

"We suggest that we should learn from nature and do what halophytes, or naturally salt-loving plants, are doing: taking up salt but depositing it in a safe place—external balloon-like structures called salt bladders," says co-senior author Prof. Sergey Shabala, of the University of Tasmania, in Australia. "This strategy has never been targeted by breeders and, therefore, could add a new and very promising dimension to breeding salinity-tolerant crops."

Soil salinity is claiming about 3 hectares, or 7.4 acres, of usable land from conventional crop farming every minute. This costs the agricultural sector many billions of dollars each year and jeopardizes the ability to meet the target of feeding 9.3 billion people by 2050. Unfortunately, decades of plant breeding for salinity tolerance have not resulted in a major breakthrough that might allow us to resolve this issue.

Dr. Shabala and his colleagues note that recent research on salt bladders creates the exciting possibility of modifying genes in traditional crops such as wheat or rice to allow them to develop salt bladders without a major impact on their growth and yield. "We know already about the key genes required to grow trichomes, or outgrowths of a plant. If we

learn to activate those that trigger the developmental shift from an ordinary trichome to a salt bladder, one may be able to grow external salt depots on any crop," says co-senior author Prof. Rainer Hedrich, of the Institute for Molecular Plant Physiology and Biophysics, in Würzburg, Germany.

They are confident that researchers have all of the tools needed to identify the molecular transporters involved in salt loading within salt bladders as well as the developmental switches that are involved.

More information: *Trends in Plant Sciences*, Shabala et al.: "Salt bladders: do they matter?"

Provided by Cell Press