ECOS
SCIENCE FOR SUSTAINABILITY

www.ecosmagazine.com

Published: 10 November 2014

Salt-tolerant plants may hold key to more sustainable food production

Researchers from the Tasmanian Institute of Agriculture (TIA) believe that salt-loving plants may be the key to global efforts for sustainable food production.

Credit: Bryant Olsen CC BY-NC 2.0

Farmland globally 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 paper published in the journal *Trends in Plant Sciences* , Prof. Sergey Shabala, Dr Jayakumar Bose and Prof. Rainer Hedrich 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 on the leaf surface called salt bladders,' said Prof. Shabala.

'This strategy has never been targeted by breeders and, therefore, could add a new and very promising dimension to breeding salinity-tolerant crops. This is an untapped resource, and we are in a unique position to make a good use of it.'

Soil salinity is claiming about three 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 jeopardises the ability to meet the target of feeding 9.3 billion people by 2050.

Using non-GM breeding techniques, salt-tolerant plants such as wheat have already been trialled.

Professor Shabala's team suggests 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,’ said Prof. Rainer Hedrich, from the Institute for Molecular Plant Physiology and Biophysics, in Wurzburg, Germany.

‘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.’

The authors 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, creating the prospect of salt-tolerant crop varieties.

Source: TIA