

# Research finds salt tolerance gene in soybean

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Photo of a soybean salt-tolerant plant compared to a non-tolerant variety

A collaborative research project between Australian and Chinese scientists has shown how soybean can be bred to better tolerate soil salinity.

The researchers, at the University of Adelaide in Australia and the Institute of Crop Sciences in the Chinese Academy of Agricultural

Sciences in Beijing, have identified a specific gene in [soybean](#) that has great potential for soybean crop improvement.

"Soybean is the fifth largest crop in the world in terms of both crop area planted and amount harvested," says the project's lead, University of Adelaide researcher Associate Professor Matthew Gilliam. "But many commercial crops are sensitive to soil salinity and this can cause major losses to crop yields.

"On top of that, the area of salt-affected agricultural land is rapidly increasing and is predicted to double in the next 35 years. The identification of [genes](#) that improve crop [salt tolerance](#) will be essential to our efforts to improve global food security."

Professor Lijuan Qiu and Dr Rongxia Guan at the Institute of Crop Sciences pinpointed a candidate salt tolerance gene after examining the genetic sequence of several hundred soybean varieties. Researchers at the ARC Centre of Excellence in Plant Energy Biology at the University of Adelaide's Waite campus then investigated the function of this gene.

"We initially identified the gene by comparing two commercial cultivars," says Professor Qiu. "We were surprised and pleased to see that this gene also conferred salt tolerance in some other commercial cultivars, old domesticated [soybean varieties](#) and even wild soybean.

"It appears that this gene was lost when breeding new cultivars of soybean in areas without salinity. This has left many new cultivars susceptible to the rapid increases we are currently seeing in soil salinity around the world."

By identifying the gene, genetic markers can now be used in breeding programs to ensure that salt tolerance can be maintained in future cultivars of soybean that will be grown in areas prone to [soil salinity](#).

"This gene functions in a completely new way from other salt tolerance genes we know about," says Associate Professor Gilliam. "We can now use this information to find similar genes in different [crops](#) such as wheat and grapevine, to selectively breed for their enhanced salt tolerance."

This research has received support from the Australian Research Council (ARC) and is a feature article in *The Plant Journal*.

**More information:** "Salinity tolerance in soybean is modulated by natural variation in GmSALT3." *The Plant Journal*, 80: 937–950.  
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