

New discovery could stimulate plant growth and increase crop yields, researchers say

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Scientists led by experts at Durham University have discovered a natural mechanism in plants that could stimulate their growth even under stress and potentially lead to better crop yields.

Plants naturally slow their growth or even stop growing altogether in response to adverse conditions, such as water shortage or high salt content in soil, in order to save energy.

They do this by making proteins that repress the growth of the plant. This process is reversed when plants produce a hormone - called Gibberellin - which breaks down the proteins that repress growth.

Growth repression can be problematic for farmers as crops that suffer from restricted growth produce smaller yields. The research team, led by the Durham Centre for Crop Improvement Technology, and including experts at the University of Nottingham, Rothamsted Research and the University of Warwick, have discovered that plants have the natural ability to regulate their growth independently of Gibberellin, particularly during times of environmental stress.

They found that plants produce a modifier protein, called SUMO that interacts with the growth repressing proteins.

The researchers believe that by modifying the interaction between the modifier [protein](#) and the [repressor proteins](#) they can remove the brakes from [plant growth](#), leading to higher yields, even when plants are

experiencing stress.

The interaction between the proteins can be modified in a number of ways, including by conventional plant breeding methods and by biotechnology techniques.

The research was carried out on Thale Cress, a model for plant research that occurs naturally throughout most of Europe and Central Asia, but the scientists say the mechanism they have found also exists in crops such as barley, corn, rice and wheat.

Corresponding author Dr Ari Sadanandom, Associate Director of the Durham Centre for Crop Improvement Technology, in Durham University's School of Biological and Biomedical Sciences, said the finding could be an important aid in crop production.

Dr Sadanandom said: "What we have found is a molecular mechanism in [plants](#) which stabilises the levels of specific proteins that restrict growth in changing environmental conditions.

"This mechanism works independently of the Gibberellin hormone, meaning we can use this new understanding for a novel approach to encourage the plant to grow, even when under stress.

"If you are a farmer in the field then you don't want your wheat to stop growing whenever it is faced with adverse conditions.

"If we can encourage the crops to keep growing, even when faced by adverse conditions, it could give us greater yields and lead to sustainable intensification of food production that we must achieve to meet the demands on the planet's finite resources."

More information: Small Ubiquitin-like Modifier Protein SUMO

enables plants to control growth independently of the phytohormone Gibberellin, Conti, L, et al, published in *Developmental Cell*, Volume 28, Issue 1, Manuscript 2850

Provided by Durham University

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