

Explaining why pruning encourages plants to thrive

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Scientists have shown that the main shoot dominates a plant's growth principally because it was there first, rather than due to its position at the top of the plant.

Collaborating teams from the University of York in the UK and the University of Calgary in Canada combined their expertise in molecular genetics and computational modelling to make a significant discovery that helps explain why pruning encourages [plants](#) to thrive.

Understanding of the action and interaction of these hormones can inform horticultural practices aimed at changing branching patterns in diverse [crops](#).

The research was funded by the Biotechnology and Biological Sciences Research Council (BBSRC) and the Natural Sciences and Engineering Research Council of Canada (NSERC).

Led by Professors Ottoline Leyser and Przemyslaw Prusinkiewicz and published by the journal PNAS, the research showed that all [shoot](#) tips on a plant can influence each other's growth.

Professor Leyser, of the University of York's Department of Biology, said: "It is well known that the main growing shoot of a plant can inhibit the growth of the shoots below - that's why we prune to encourage growth of branches. What we are interested in is exactly how the main shoot can exert this effect.

"It has been known since the 1930s that the plant hormone auxin is released by the plant's actively growing tip and is transported down the main stem where it has an indirect effect on buds to inhibit branching. There are a number of ways in which the hormone exerts this effect and we have discovered a new path by which it works."

The research suggests that for a shoot tip to be active, it must be able to export auxin into the main stem. But if substantial amounts of auxin already exist in the main stem, export from an additional shoot tip cannot be established.

Professor Leyser said: "Using this mechanism, all the shoot tips on a plant compete with each other, so that tips both above and below can influence each other's growth. This allows the strongest branches to grow the most vigorously, wherever they may be on the plant. The main shoot dominates mostly because it was there first, rather than because of its position at the apex of the plant."

The teams went on to show that the recently discovered plant hormone, strigolactone, works at least in part by making it harder to establish new auxin transport pathways from shoot tips, strengthening the competition between auxin sources and reducing branching.

The research also involved scientists at the Department of Forest Genetics and Plant Physiology at the Swedish University of Agricultural Sciences.

Provided by University of York

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