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News Release

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Insights into plant growth could curb need for fertilisers

New insights into how plants regulate their absorption of an essential nutrient could help avoid pollution caused by excess use of fertiliser.

The findings could lead to the development of crop varieties that need less of the primary nutrient – nitrogen – than conventional crops. It could also inform how much nitrogen should be added to plant feed.

This would allow optimum plant growth without producing excess nitrogen in run-off from fields, which is a major source of water pollution.

Agricultural fertilisers typically contain high levels of nitrogen that boost plant growth and yield even on poor soils. This helps plants avoid the typical characteristics of nitrogen deficiency – stunted growth and pale or yellow leaves.

The study, by researchers at the University of Edinburgh and the University of Campinas in Brazil, examined how nitrogen is absorbed and converted into cellular building blocks in plants.

They found that when nitrogen is absorbed, plant cells produce nitric oxide, which acts as a signalling molecule. This nitric oxide fine-tunes how much nitrogen is used for growth, by signalling to the plant's cells when to limit its uptake.

The scientists say that because nitric oxide plays important roles in shaping the development of plants, and how plants respond to environmental stress, these insights highlight key considerations of how nitrogen-based fertilisers should be used in agriculture.

Their study, published in *Nature Communications*, was funded by the Royal Society and the Biotechnology and Biological Sciences Research Council.

Dr Steven Spoel of the University of Edinburgh's School of Biological Sciences, who led the study, said: "Understanding nitrogen absorption better will ultimately allow us to breed crop varieties that need less fertiliser, and therefore are better for the environment."

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