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Plants are Making Secret Decisions about Carbon Dioxide

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A new study indicates that plants decide how much carbon to release into the atmosphere on their own, a discovery that will have far-reaching implications for using plants as carbon sinks. By using the findings, future plants might be able to meet food demand while also benefiting the environment.

Its basic knowledge that plants do photosynthesis using sunlight, water, and carbon dioxide to create oxygen and energy in the form of sugar. But during the process of cellular respiration, a plant releases half of the carbon it takes in by photosynthesis back into the atmosphere as CO_2. As a result, plants are unable to be the best sinks for the carbon they could be and limit their ability to aid in lowering atmospheric CO_2 levels.

According to Professor Millar, the key author of the study, plants keep the decision of when and how much CO_2 to lose, a secret inside their mitochondria. This study is the first to discover that the decision to release CO_2 is the result of a previously unknown process, a metabolic channel that controls whether pyruvate is oxidized to CO_2 or stored for plant biomass.

It has been shown that plants can differentiate between pyruvate sources and use one over another for CO_2 release. Secret processes typically break the rules of biochemistry since the next step in the process is unaware of the product's origin.

To limit CO_2 release from plants, this channelling could either be limited to respiration or new channels could be made to direct carbon inside mitochondria back to biomass production.

This illustrates the importance of addressing the issue of carbon net-zero, as well as the role that crops, forests, and grasslands can play alongside global financial decisions.

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Metabolomics, plant transporters, research, science and environment, carbon sinks, photosynthesis, carbon dioxide, pyruvate, global warming