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Results in Brief

Effect of elevated CO₂ levels on Poplar stomata

Stomata can provide valuable information by acting as bio indicators of environmental change. They were studied in a tree plantation in order to better understand the impact of increased levels of carbon dioxide CO₂ on such ecosystems.



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Tree plantations have great potential for alleviating CO₂ levels and helping to reduce Europe's carbon emissions. Multidisciplinary studies were conducted into the role of Poplar plantations in capturing CO₂, supporting Europe's commitment to the Kyoto protocol. The work carried out by the EUROFACE project involved quantifying the uptake of elevated levels of atmospheric carbon dioxide under present and future climate conditions.

The results provided data for policy makers regarding the long-term exposure of trees to elevated CO₂ and its effect on carbon fixation in woody plants.

The study of stomata was important to the project. This is because these tiny pores on the undersides of leaves regulate the exchange of gases and water vapour with the atmosphere. In the past studies have been undertaken to measure the response of stomata to increasing levels of carbon dioxide. The EUROFACE project, however, was the first to have carried out long term studies, extending over several years, into the effect on stomata of elevated levels of CO₂. Understanding the stomatal response was important because it can affect levels of photosynthesis, transpiration and the efficient use of water within the leaves.

Results indicated that in younger trees raised levels of CO₂ caused a reduction in stomata, whereas older trees, exposed over a longer period, showed no significant reduction. Although mechanism controlling the response of stomata to CO₂ is not completely understood it is clear that sensitivity is not due to internal leaf tissues. It appears that it is controlled at the guard cell which surrounds the stomata regulating the opening, or the cuticle which is the waxy covering to the leaves.

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Project Information

EUROFACE

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