Plants cannot absorb as much CO? as we once thought.

New research shows that climate models have overestimated plants' ability to absorb CO? due to incorrect assumptions about natural nitrogen levels.

Overestimating the amount of nitrogen available in nature has led many climate models to exaggerate the ability of plants to compensate for the increasing amount of CO? in the atmosphere.

Rising concentrations of carbon dioxide in the atmosphere are one of the main causes of climate change. At the same time, more CO? can also stimulate faster plant growth, thereby helping to slow global warming by absorbing carbon from the atmosphere.

However, this benefit only occurs when plants have enough nitrogen to grow. New research shows that scientists have only recently gained a more accurate understanding of the actual amount of nitrogen that plants can access in nature.

As a result, the so-called 'CO? fertilizing effect' – the way CO? strongly promotes plant growth – has been overestimated for a long time, according to a new study involving the University of Graz (Austria).

The amount of naturally fixed nitrogen has been exaggerated.

Plants cannot use nitrogen directly from the air. Nitrogen only becomes useful when it is converted into a form that plants can absorb by microorganisms in the soil, through a process called biological nitrogen fixation. This process occurs both in the natural environment and in agriculture.

" *In nature, this process has been greatly overestimated. Conversely, over the last 20 years, the amount of nitrogen fixed by agricultural activity has increased by 75%,* " said Bettina Weber, a biologist at the University of Graz, summarizing the research results published earlier this year.

Based on those findings, a new study indicates that the calculations used in some Earth system models have now been readjusted. These are models widely used to assess climate trends, including global climate reports. The updated analysis, published in the scientific journal *PNAS* , concludes that previous estimates of nitrogen fixation were too high.

Adjust the nitrogen assumption.

This research was led by Dr. Sian Kou-Giesbrecht of Simon Fraser University (Canada), as part of a research group on biological nitrogen fixation that Bettina Weber is a member of. This group was supported by the John Wesley Powell Center for Analysis and Synthesis of the United States Geological Survey (USGS).

" *We compared various Earth system models with updated nitrogen fixation values ??and found that they had overestimated the rate of nitrogen fixation on natural surfaces by about 50%*, " said Weber. Overall, this overestimation resulted in a reduction of about 11% in the CO? effect promoting plant growth compared to previous estimates.

Therefore, Weber called for adjustments to climate models to more accurately reflect reality. According to her, the nitrogen cycle also produces gases such as nitrogen oxides and nitrous oxide, which can be released into the atmosphere during transformation and thereby alter, or even disrupt, climate processes.

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