

# Slight climate change can reduce drought effect in wheat, study finds

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(Phys.org)—Increased carbon dioxide levels caused by climate change may help wheat cope with drought, according to researchers at The University of Western Australia.

In a world-first study, PhD student Eduardo Dias de Oliveira found that when wheat is exposed to more CO<sub>2</sub>, it is better able to cope with [high temperatures](#) and water restrictions.

As long as the temperature does not rise 2°C more than average, combining the effects of elevated carbon dioxide and high temperature with water restrictions actually improves biomass and grain yield.

Mr Dias de Oliveira's finding could have significant impact on the future of [crop production](#) in the Mediterranean-type climatic wheat-growing regions of Australia, where [climate change](#) is expected to have a severe impact on annual yields of 20 million tonnes of wheat over the next 50 years.

Mr Dias de Oliveira compared three scenarios in specially designed tunnel houses at UWA's Shenton Park Research Station with and without drought and elevated CO<sub>2</sub> conditions at 2°C, 4°C and 6°C above ambient temperature.

Two bread-wheat genotypes, the vigorous line 38-19 and the non-vigorous cultivar Janz, were grown in the tunnel houses. Janz is a high yielding semi-dwarf cultivar widely adapted in Australia.

The scientists expected to find that higher CO<sub>2</sub> and temperatures could compensate for the negative effect of end-of-season [drought](#) on biomass and grain yield in wheat through an increase in the rate of leaf photosynthesis and biomass.

Research co-author Winthrop Professor Kadambot Siddique said what they found was that while at 2°C above ambient temperature, yields were indeed enhanced regardless of whether they were well-watered or not, the combination of elevated CO<sub>2</sub> at 4°C or 6°C above the ambient temperature tended to decrease wheat biomass and grain yield.

"Our studies unravelled the impact of interaction between elevated CO<sub>2</sub>, high temperature and [water stress](#) in wheat. The vital information generated from the project will help towards developing climate ready wheat for the future," Professor Siddique said. The PhD project is supported by UWA, CSIRO and Department of Agriculture, Forestry and Fisheries (DAFF).

**More information:** The paper: "Can elevated CO<sub>2</sub> combined with high temperature ameliorate the effect of terminal drought in wheat?" has been published in the journal *Functioning Plant Biology*.

Provided by University of Western Australia

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