Plant competition during climate change

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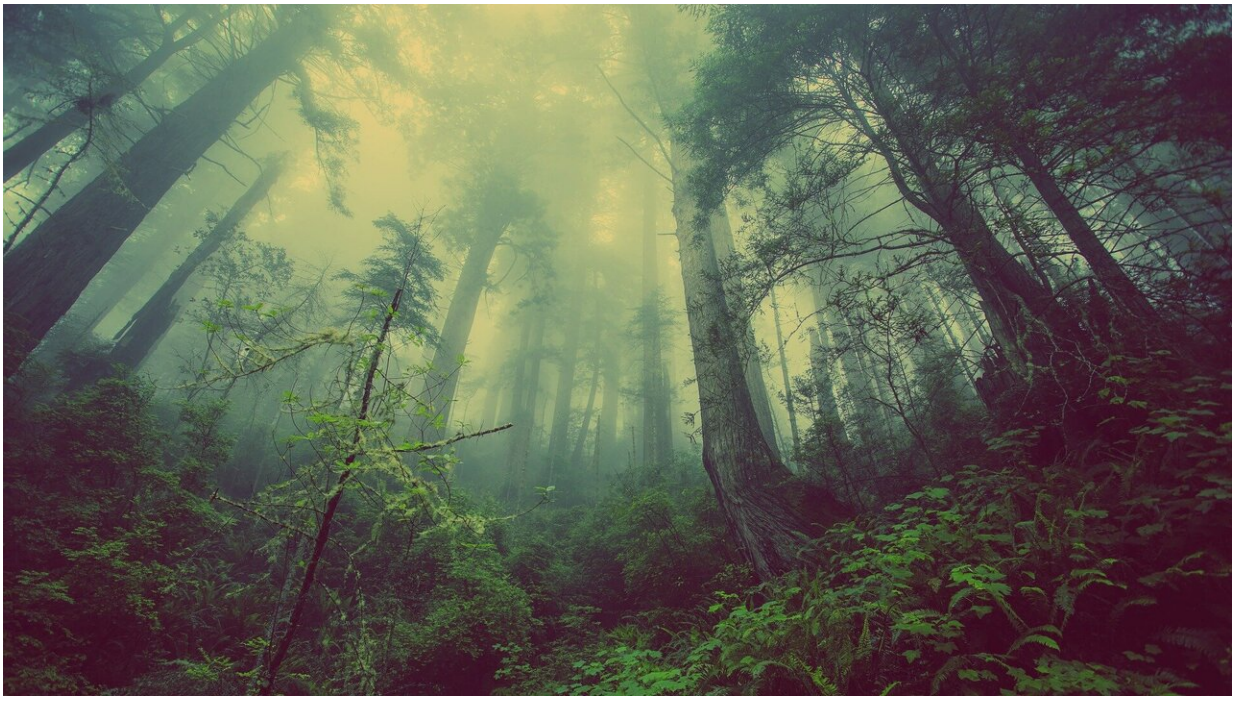

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How plants cope with stress factors has already been broadly researched. Yet what happens when a plant is confronted with two stressors simultaneously? A research team working with Simon Haberstroh and Prof. Dr. Christiane Werner of the Chair of Ecosystem Physiology at the Institute of Forest Sciences and Natural Resources (UNR) of the University of Freiburg is investigating this. Together with colleagues from the Forest Research Center of the School of Agriculture of the

University of Lisbon in Portugal and the Institute of Meteorology and Climate Research at the Karlsruhe Institute of Technology—KIT, they have published their findings in the specialist journal *New Phytologist*.

The researchers set up a field study in the Park Tapada Real in the small Portuguese town of Vila Viçosa. The focus was on how cork oak (Quercus suber) handles two stressors: the first being extreme drought; and the other, the invasive plant species gum rockrose (Cistus ladanifer). The study has great relevance because both stress factors are currently clearly on the increase. At the same time, there was a gap in research on the issue. Researchers have up to now rarely looked at how different, interacting stress factors influence ecosystems.

The researchers were in part surprised by their findings. "The factors interacted more dynamically than we expected," says Haberstroh, who did the investigative work for his doctoral thesis. During wet years, the interacting stressors didn't cause any significant changes in the cork oak, while in dry conditions, the factors either amplified or buffered each other. One surprising result was also that cork oak, despite the double burden, was able to recover better than had been expected after extreme drought. The researchers observed that happens above all when the invasive gum rockrose shrubs were seriously compromised by the drought as well. The team will continue its work in Portugal to gather more data and look at long-term trends.

"These new research findings contribute to better understanding and more expedient care of ecosystems," Haberstroh explains. "Using them we can, for example, develop rules for particularly dry years, which is a central issue in times of climate change," he says.

More information: Simon Haberstroh et al, Non-linear plant-plant interactions modulate impact of extreme drought and recovery on a Mediterranean ecosystem, *New Phytologist* (2021). DOI:

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