

THERE'S SOMETHING IN THE AIR: THE EFFECT OF BUSHFIRE SMOKE ON PLANTS

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Do different smoke exposure times and concentrations affect leaf gas-exchange of strawberry plants?

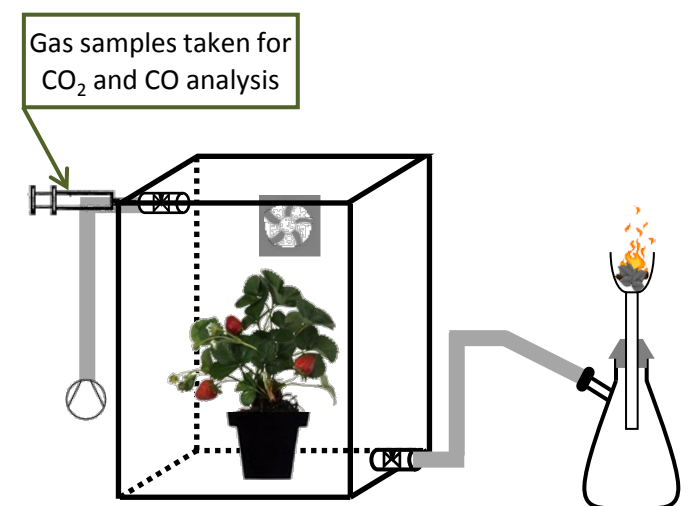
Introduction

The aim of this research is to understand how smoke from prescribed burning and bushfires affects agricultural and native plant physiology. Smoke has had a negative impact on the agricultural industry in the last decade. For example, wineries have experienced substantial financial losses due to smoke-tainted wine. As a test case, this experiment focuses on the effect of smoke from combustion of *Eucalyptus saligna* leaves on strawberry plants.

Methods

Whole plants were placed in a sealed chamber and exposed to different concentrations of smoke for different periods of time. Before and after exposure to smoke gas-exchange measurements were done with the Licor-6400. The following treatments and measurements were done:

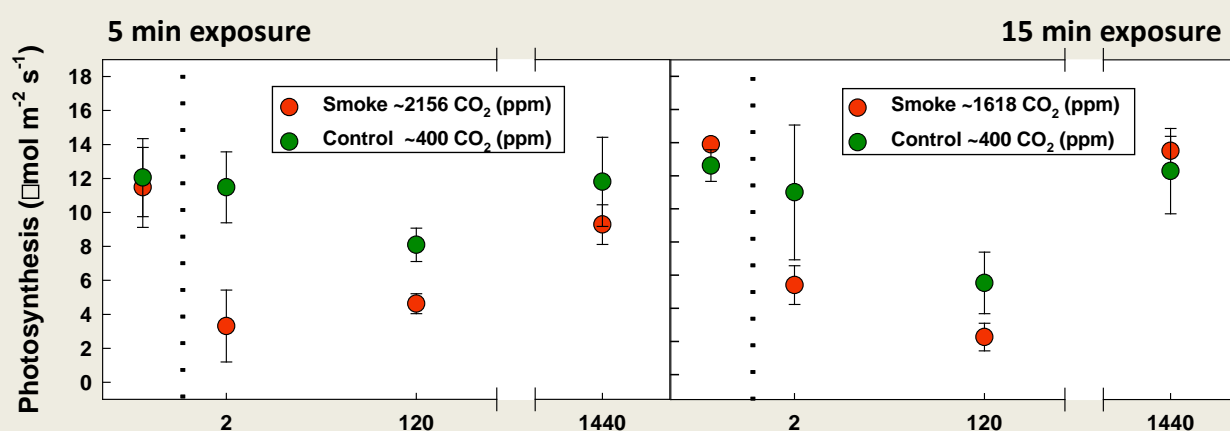
- Fuel: 0.5 - 1.0 g *E. saligna* leaf litter
- Smoke exposure time: 5, 10 or 15 min
- Gas samples for CO₂ and CO analysis
- CO₂ measured continuously in chamber using an Infra-red Gas Analyser Probe (Vaisala)



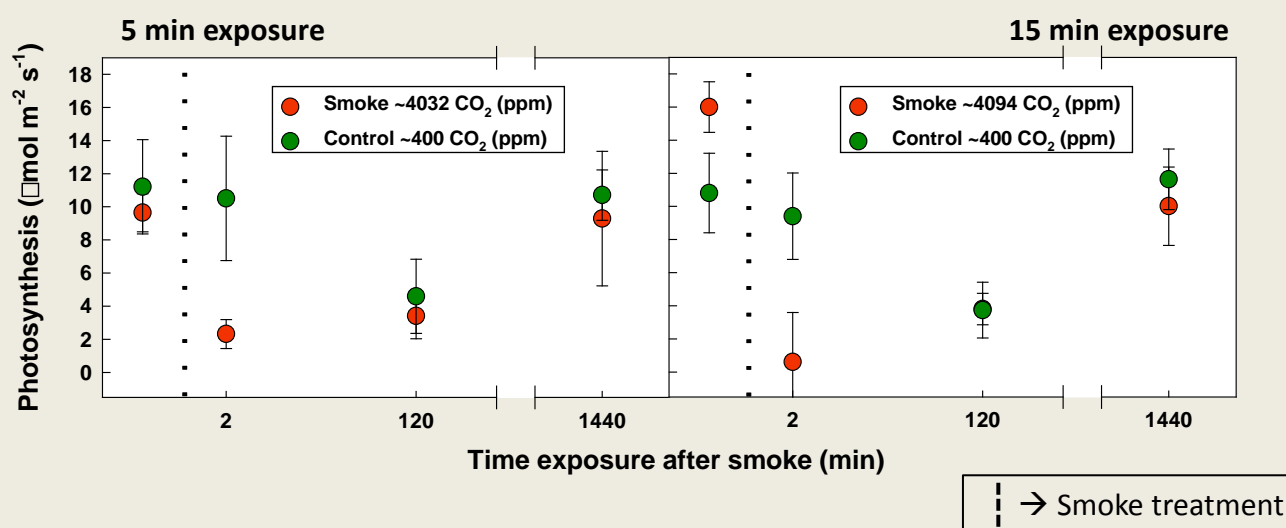
Results

- Smoke had an immediate impact on the gas exchange of strawberries ($p < 0.05$).
- The different exposure times and smoke concentrations did not show a significant impact on photosynthesis ($p = 0.187$ and $p = 0.221$, respectively)
- For all treatments, the strawberry plants showed full recovery of gas exchange capacity after 24 hours ($p > 0.05$)

Low smoke concentration



High smoke concentration



Smoke only had a temporary effect, plants recovered fully

Different smoke exposure times and concentrations did not have a significant effect on the photosynthesis of strawberry plant



'Vicky's work is a small starting piece in the puzzle regarding the effects of smoke on plant physiology and horticultural productivity. The ability to undertake hazard reduction burning increasingly depends on land managers' ability to recognise and consider the potential impacts across a wide range of variables and to modify burn prescriptions to minimise these. Continued work such as this will better enable practitioners to work with industry and plan to mitigate deleterious impacts of smoke'. – Tim McGuffog, Forests New South Wales

