

Herbicide effectiveness under elevated CO₂

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Summary Chemical control is the most ubiquitous management technique for invasive plant species worldwide. Although the increase in atmospheric CO₂ is thought to affect the efficacy of herbicides, there have been few studies that have investigated the effect of elevated CO₂ concentration on herbicide efficiency in invasive plants and these have focused on CO₂ effect on efficacy of the widely used herbicide glyphosate.

In this study we assessed the effect of two herbicides on four functional types of exotic invasive plant species: grasses, herbs, shrubs and trees. In total, we grew 15 common Australian environmental weed species at ambient and elevated CO₂ concentrations and applied recommended and double-recommended

concentrations of glyphosate and metsulfuron methyl herbicides. Increased CO₂ showed a positive fertilising effect on plant biomass but the effect of the herbicides on plant survival was very variable.

We found no clear relationships between species' responses to herbicide under elevated CO₂ and a range of functional and allocation traits. Our results suggest that plant responses and herbicide efficacy under future CO₂ conditions may change but that the differences in response will be species-specific. The potential implications for weed management in the future will be discussed.

Keywords Herbicide, chemical control, invasive species, climate change, elevated carbon dioxide.