Response of common sowthistle, *Sonchus oleraceus* L. to simulated herbivory

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Summary Common sowthistle, *Sonchus oleraceus* L. is a major weed in grain growing regions of Australia. This weed is prevalent in conservation tillage systems, and its control is exclusively dependent on herbicides. However, *S. oleraceus* has developed resistance to herbicides chlorsulfuron and glyphosate, which makes it a difficult weed to control. Given its ability to develop resistance to herbicides and inefficiency of other tools, biocontrol is being developed as an additional tool for the management of *S. oleraceus*. Simulated herbivory studies on *S. oleraceus* were conducted under glasshouse conditions to understand the weed's ecology and inform the selection and prioritisation of potential biocontrol agents. We subjected *S. oleraceus* to 25, 50 and 75% leaf removal treatments (*sensu* defoliation) at early rosette stage and recorded effects on plant growth and physiology. Defoliation exerted significant negative effect on growth: plant height was reduced and fewer leaves were produced than non-defoliated plants, especially at 50 and 75% leaf removal. Regarding physiology, negative effect on transpiration and stomatal conductance was observed. While there was no effect of defoliation on CO_2 assimilation per unit area of leaves, a reduced number of leaves recorded in defoliated plants suggests there is likely a reduction in overall CO_2 assimilation per plant. These results suggest biocontrol agents that can reduce leaf numbers and leaf areas are likely to have a negative impact on *S. oleraceus*.

Keywords Biocontrol, CO_2 assimilation, respiration, defoliation, leaf area, photosynthesis.