

## Glyphosate resistant common sowthistle (*Sonchus oleraceus* L.)

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**Summary** A consequence of the widespread use of glyphosate for weed control has been the evolution of glyphosate-resistant weeds, with resistance to glyphosate having evolved in 40 weed species worldwide. The first case of glyphosate resistant common sowthistle (*Sonchus oleraceus* L.) was reported in 2014 when an application of glyphosate failed to control field populations of sowthistle in northern New South Wales. Sowthistle is an annual broad-leaf weed of both crops and pastures in Australia, particularly prevalent in grain and cotton crops in northern New South Wales and Queensland.

Environmental factors have an impact on glyphosate activity and may affect the expression of glyphosate resistance in plants. Temperature is one such factor, with some studies finding reduced glyphosate efficacy at higher temperatures, particularly in the case of glyphosate resistance. Preliminary results suggest

this may be the case in glyphosate resistant sowthistle, with resistant biotypes more easily controlled at lower temperatures. Susceptible and intermediate resistant biotypes had an LD<sub>50</sub> of 135 and 132 g ai ha<sup>-1</sup> respectively at 20°C, and two resistant biotypes had an LD<sub>50</sub> of 389 and 439 g ai ha<sup>-1</sup> respectively. However at a higher temperature of 30°C, the LD<sub>50</sub> of both the intermediate resistant and two resistant biotypes increased 2–3 fold, while the susceptible remained around the same.

This study investigates glyphosate resistance in sowthistle with the aim of determining the level of resistance in glyphosate resistant populations, the mechanism of resistance, and whether temperature has an influence on the expression of glyphosate resistance.

**Keywords** *Sonchus oleraceus*, glyphosate, resistance mechanism, temperature.