

Six years of crop competition research in the northern grains region – key trends in impact on weed and crop growth

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Summary Resistance to herbicides in weeds is widespread in the northern grains region of Australia. To reduce continued reliance on herbicides and improve the control of herbicide resistant weeds, alternative non-chemical and agronomic approaches for weed management are being explored. One such option is growing a competitive crop by manipulating crop row spacing, density and cultivar. Over a period of five years (2017 – 2022), researchers in the northern grains region have been investigating the effect of growing competitive summer (sorghum and mungbean) and winter (faba bean, chickpea and wheat) crops on key weeds *Echinochloa colona*, *Chloris virgata* (summer crops) and *Sonchus oleraceus* and *Conyza bonariensis* (winter crops). Over the six experimental years, a total of 22 summer and 49 winter field trials were conducted in Wagga Wagga (winter only), Narrabri and Southeast Queensland at either Hermitage, Wellcamp or Kingaroy. Competition effects were assessed through the collection of weed biomass, weed seed production

and crop yield data. The large data set is being analysed to identify consistent trends across sites and seasons with each crop by weed combination being analysed independently. While results are still pending, preliminary summation of the data suggests narrow row spacing is a reliable agronomic approach for increasing crop competitiveness and reducing weed growth and seed production. Increasing crop density has also been shown to reduce weed growth and reproduction but results have been more variable. The impact of cultivar is also variable, being greatly influenced by location and seasonal conditions. The impact of narrow row spacing and increased crop density on crop yield has differed between crops, sites and seasons. However, yield responses were generally found to be positive in favourable growing seasons. Results of the meta analysis will help inform decision making on the fit and application of growing a competitive crop.

Keywords Crop competition, meta analysis, row spacing, crop density