

Lentil and partial metribuzin tolerance

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Lentil are important in southern Australia's cropping systems as they provide benefits including a break to limit disease build up in cereals and increasing soil nitrogen through fixation. Weed control in lentil, especially for broadleaf weeds, can be challenging as there are limited in-crop herbicide options. Current herbicides can be damaging to the plants if applied outside the narrow crop safety window that lentil possess. Metribuzin is part of the Group C herbicides and works by inhibiting the flow of electrons in photosystem II in the chloroplasts of plants. It is used widely in Australia as a selective herbicide for suppression and control of broadleaf and grass weeds. A recent study has produced mutant metribuzin tolerant lines, however it has been found that these mutants cause a yield penalty. Partial tolerance has also been identified in the lentil line, SP1333 without obvious yield penalty. Genomic selection is a new molecular plant breeding technique that can efficiently combine partial tolerances. This technique uses a reference population that has been phenotyped and genotyped to develop prediction equations. Recent work in lentil has developed prediction equations for a number of traits with accuracies ranging from 0.2-0.75. In this study, field and controlled environment assays will be used to phenotype advanced lentil breeding germplasm and combined with existing genotypic data to develop prediction equations for metribuzin tolerance. For imposed herbicide treatments, damage will be assessed using a combination of visual scores, normalised differentiation vegetation index and yield data. The methodologies and initial results from these screenings will be discussed and the results from this study will be used to calculate prediction equations for genomic selection for partial tolerance of metribuzin in lentils. If genetic variation in lentil tolerance to metribuzin can be identified, this will be incorporated into current lentil breeding programs and ultimately provide industry with greater flexibility in herbicide options.