FALLOW RAIN NEEDED FOR SAFE RECROPPING AFTER METSULFURON METHYL - QUICK ANSWERS FROM A SIMPLE METHOD

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Previous recent field studies on the cropping lands of central Queensland showed that current registered label recropping intervals for several sulfonylurea herbicides were very conservative. That research resulted in a redefining of recropping intervals (with fallow rainfall requirements) for the major crops grown in this semi-arid subtropical region. However, it was felt that the newly determined fallow rainfall requirements were still too conservative where metsulfuron methyl is used. This study set about determining more realistic fallow rain amounts required to permit safe planting of chickpea, sorghum and sunflower shortly after metsulfuron methyl had been applied in preceding fallows. A rather crude and simple but effective method was used to produce quick answers.

The herbicide Ally® (metsulfuron methyl 600 g/kg) was applied at 7 g/ha under fallow field situations in both summer and winter to a heavy clay soil (black earth, pH 7.8). Immediately after, numerous undisturbed cores, 10 cm in diameter and 20 cm deep (using open ended PVC piping) were taken across the sprayed areas. These cores were taken using a hydraulic ram to insert and remove the tubes allowing the soil surface to remain undisturbed, and the profile intact. Cores were taken back to the research facility and exposed to full sunlight but covered for impending rain. For the summer crop studies, after a period of 14 days exposure, simulated rain (sprinkler irrigation) was applied as single falls in various amounts (nil, 30 and 50 mm). Each treatment had 10 cores. These cores were then exposed for a further 21 days to full sunlight but again rain was excluded. The cores were then uniformly watered and planted to either sorghum or sunflower (half to each crop). Cores were thinned to 3 plants each after 7 days. For the winter crop study, the procedure was the same except cores were initially exposed for 18 days before simulated rainfall of nil, 10, 15, 30, 40, 60, 80, 100 and 140 mm was applied (again each as single falls). These cores were further exposed for 28 days before chickpea was planted and then thinned to 3 plants/core. Only the summer study included treatments without herbicide. For both studies, crop response was measured as dry matter per core 3 weeks after emergence. The recropping intervals examined were 35 days for sorghum and sunflower, and 46 days for chickpea.

Results showed sorghum required only 30 mm fallow rain (not including planting rain) to show no adverse effects to the herbicide. Sunflower, however required at least 50 mm rain on these short recropping intervals. The 50 mm rainfall treatment (sunflower) produced biomass that was 83% of the nil herbicide treatment and this was not significantly different. The chickpea was unaffected by the metsulfuron methyl when a minimum of 40 mm of fallow rain was received 18 days post-spraying. These very short recropping intervals are dramatic contrasts to the current herbicide label recropping recommendations. Similarly, these fallow rain requirements are great reductions to those currently suggested (usually 200-700 mm).

This methodology, while simple is very effective for producing quick answers. In the instances described here, we have only examined simulated rain applied as single falls with set exposure times before and after the rain was applied. There is potential with this method to vary all aspects, the permutations and combinations are massive. For example, consider applications of rain as several events each with variable amounts delivered. This methodology is particularly applicable where resources to conduct extensive field trials are very limited or where climate is unpredictable and desired conditions are unlikely to be encountered within short project timeframes. While this method is similar to pot studies, the difference is the relevant field situation is able to be duplicated since the undisturbed cores leave the soil surface and the profile as they would be found in the paddock situation – pot studies usually fail to do this.