

Herbicide use in sugarcane and Great Barrier Reef: Can growers reduce their pesticide losses via runoff

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Summary The Great Barrier Reef (GBR) ecosystems have been recognised at risk from the exposure of agricultural pesticide runoff, particularly herbicides from sugarcane. To mitigate this risk, the Sugar industry is required to transit towards an 'alternative' herbicide suite, and to move away from diuron. This shift to new weed management strategies involving regulatory product changes in recent years, has become increasingly complicated for sugarcane farmers to adapt to their specific farming system. This paper quantifies and compares the efficacy and environmental risk profile of a range of established, emerging, and recently registered pre-emergent herbicides across three rainfed field trials in green cane trash blanketed ratoons in the Wet Tropics region of North Queensland, a major contributing region to annual herbicide loads to the GBR coastal environment. Herbicide efficacy trials were implemented as randomised complete block with three replicates and adjacent untreated controls and were monitored fortnightly for six months after pre-emergent herbicide application at 300L/ha water rate. Losses of the tested pre-emergent herbicides in runoff were monitored using replicated rainfall

simulations, delivering 80mm of simulated rain, 48h after herbicide application. Imazapic (95g/ha) + hexazinone (475g/ha) was found as efficient as the now restricted diuron (1872g/ha) + hexazinone (528g/ha), while other tested active ingredients like imazapic (96g/ha), isoxaflutole (150g/ha) and amicarbazone (980g/ha) were effective only on some weed species and would require to be apply in a mixture if a wider weed spectrum is targeted. All tested herbicides were found in runoff water at levels aligned with their application label rate, and all tested alternatives were likely more environmentally friendly than diuron on basis of available ecotoxicity data. Herbicides such as isoxaflutole and imazapic had minimal environmental runoff footprints (14 to 250 times less risk) when compared with diuron. Results demonstrated that alternatives to some of the more environmentally problematic herbicides are available, but considerable challenges still face canegrowers in making cost-effective decisions on sustainable herbicide selection.

Keywords Great Barrier Reef, herbicides, runoff, sugarcane, diuron