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Soil Research

Supplementary Material

Pesticide extraction from soil into runoff in North American and Australian croplands

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Supplemental data from Silburn (2023)

Table S1. Pesticides studied and amount applied.

Site	Pesticide (common name)	Product and Formulation	Type	Application type	Amount applied (g.a.i. ha ⁻¹)	
					First spray	Second spray
<u>Gatton</u>						
	Endosulfan	EC 350	Insecticide	Experimental	720	780
	Dimethoate	Roger 400 EC	Insecticide	Experimental	145	145
	Prometryn	Bandit EC	Herbicide	Experimental	570	560
<u>Emerald</u>						
	Endosulfan	Thiodan ULV	Insecticide	Experimental	890	1000
	p,p' DDE	DDT	Residue	Historic	Unknown	Unknown
	Prometryn	Cotogard	Herbicide	Farmer	625	None
	Trifluralin	Treflan	Herbicide	Farmer	1120	None
<u>Jondaryan</u>						
<u>Insecticides</u>						
	Endosulfan	Thiodan 350 EC	Insecticide	Experimental	1456	None
	Chlorpyrifos	Lorsban 500 EC	Insecticide	Experimental	747	None
	Dimethoate	Roger 400 EC	Insecticide	Experimental	192	None
	Profenofos	Curacron 250 EC	Insecticide	Experimental	1000	None
	Monocrotophos	Nuvacron 400 EC	Insecticide	Experimental	800	None
	Parathion-methyl	Folidol 500 EC	Insecticide	Experimental	350	None
	p,p' DDE	DDT	Residue	Historic	Unknown	
<u>Herbicides</u>						
	Diuron	Diuron	Herbicide	Experimental	2000	None
	Fluometuron	Fluometuron	Herbicide	Experimental	1510	None
	Metolachlor	Dual 720	Herbicide	Experimental	1440	None
	Pendimethalin	Stomp 33E	Herbicide	Experimental	660	None
	Prometryn	Cotogard 500 FW	Herbicide	Experimental	750	None
	Pyriithiobac sodium	Staple 85% active	Herbicide	Experimental	102	None
	Trifluralin	Treflan	Herbicide	Farmer	Unknown	

Pesticide application methods are described by (Silburn 2023).

Gatton. The main treatment was time after spraying (2hr–15d) through a sequence of two applications six days apart. Rainfall was applied at 95 mm hr⁻¹ for a total amount of 65 mm. Endosulfan, prometryn and dimethoate were blanket sprayed (Table 1) on (a) four pairs of standard plots (EC formulation, bare, 1.6m long, 1.5% slope, 95mm hr⁻¹ rain), and rain was applied 2 hr after the first spray and 2 hr, 26 hr and 9 d after the second spray, and (b) five pairs of plots of secondary treatments where one plot variable was altered: rained on 2 hr after the first spray - plot length (12m), plot slope (0.9% and 4.3%), and stubble cover (100%); rained on 2 hr after two sprays - formulation (ULV). A second storm was also applied to the 12m plots, 20 min after the first. There was some variation in runoff (30-41mm), infiltration (22-28mm) and sediment concentration (24-57 g L⁻¹). The stubble covered plot resulted in double the amount of infiltration.

Emerald. This study had plots with a range of crop residue cover (wheat stubble or cotton trash), with and without prior wheel traffic. Rain was applied at an intensity of 95 mm hr⁻¹ for a total amount

of 65 mm, 4-7 d after two endosulfan applications, 17 d after prometryn (banded) and 50 d after trifluralin application (Table 1). Data were averaged for traffic treatments and pooled as 'bare' (bare and cotton trash mulched plots, cover of 0-10 %, five pairs of plots) and 'covered' treatments (30-50% cover, 3 pairs of plots). There were no significant differences in pesticide runoff concentrations between treatments within these groups, or due to time after spraying for each pesticide. Thus, there was a limited range in soil concentrations for each pesticide, in contrast to the other sites.

Jondaryan. The focus of this study was in creating a range in soil concentrations for a wide range of pesticides. Rainfall was applied at an intensity of 67 mm hr⁻¹ for a total amount of 47 mm. Five rainfall simulations (pairs of plots) were run; three were blanket sprayed at 5, 25 and 34 days before rain and two band sprayed, 2.3 and 34 days before rain. Four insecticides and six herbicides were applied (Table 1). Different times after spraying were achieved by staggering spray dates prior to a 2-week period of rainfall simulator studies. The blanket-25 d plot was only sprayed with the insecticides and pyriithiobac sodium and had low or non-detectable concentrations of other herbicides. The blanket-5d plot was band sprayed with pyriithiobac sodium 25 days before rain (rather than 5d). Trifluralin and DDE, residues from past applications (>1yr), were also studied.