Site specific assessment of spray drift hazard for avocados in New Zealand

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Outline

- Orchardists share the landscape with nonproductive lifestyle properties
- Risk of spray drift and tension is inevitable
- Tools are required to improve management in this area
- CART is a software tool designed for this purpose



CART

"Cumulative Agrichemical Residue Tracking"

A web-based GIS system - to assess potential hazard from spray drift - For orchard spray operation planning and recording

- Piloted on Avocado orchards





• Integrating

- Spray Drift models and chemical dissipation
- With defined Hazard levels for neighbouring land uses and sensitive areas
- **To**
 - Allow users to manage spray drift hazard at the time of spraying
 - Demonstrate good agricultural practice (Market Access)
 - Facilitate regulatory compliance with legislation





Key Aspects

- Set in a Web based GIS environment
- Farm manager/Sprayer are key users
- Crop interception and sprayer targeting are estimated
- Wind speed and direction entered manually
- AgDisp is used to predict droplet deposits downwind
- Deposit curve is modified using Raupach et al's model of droplet capture by shelterbelts.
- Deposit levels are compared with agrichemical specific predetermined hazard threshold levels to give green or red light for spraying.



CART input and output screens







Example Application Edit View Favorites Tools Help File Address ahttp://webcart.lvl.co.nz/webcartavo/CARTmainForm.aspx 🗙 🔁 Go Operator Name: jonesk Growsafe certificate No: None Expiry date: None Slow Internet Connection: • Fast Select 6549595 9159 ~ property: Set up Spray Operation Spray operation: Block ID Land use Select 9159 Back Avocado block to 9159 Front Avocado spray 9159_Middle Avocado Land Use Add selected blocks to spray list Currently selected blocks to spray: Remove selected blocks from list View block details Configure sprayer Select agrichemicals Set weather data Spray summary O Test Spray O Save to spray diary O Save to spray programme Logout Spray selected blocks Change map scale Display spray event info

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Blocks to be sprayed:		
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Block ID	9159_Middle Avocado	
Area (hectares)	0.7456	
Land Use	Avocado	
Date planted :	1/01/1985	
Height Actual Calcule	height (m):	
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Percentage canopy fil	(0,00%): No gaps (100% fill) No gaps (100% fill) Few gaps (90% fill) Some gaps (70% fill) Big gaps (young trees) Concer wirrood saving	

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User enters wind and other weather data



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Spray Event Summary: Date and Time:		Weather	
Date of spray event (dd/mm/yyyy): Estimated start time (hh:mm) : Estimated finish time (hh:mm) :	7/01/2008 2:20PM 3:20PM	Wind direction :315Temperature (degrees C) :Wind speed (m/s) :2Relative Humidity (%) :	20 60
Blocks: 9838_Avo2 Avocado Canopy height:5 9838_Avo1 Avocado Canopy height:5		Sprayer details: Sprayer: Volute Airblast Not Matched to Nozzle: TX 26 Droplet size: BCPC Fine Nozzle pressure: Tank capacity (litres): 2000 Boom height: Application rate (litres/ha): 100	20 0.5
Total land area (hectares): 0 Spray mixture: Products in spray mixture:	0.0000	Active ingredients in selected product:	
KOCIDE 2000 ATTACK	150 g/100 litres 100 ml/100 litres		
HSNO rating		HSNO requirements:	
		Close	

User can now select "Spray selected blocks"

Cumulative Agrichemical Residue Trackin	g - Microsoft Internet Explorer					
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CART Regional Spray Deposition Mapping

- Spray diaries from 3 orchards for 20th April 2005 to 31 December 2005.
- Weather data for the orchards used the closest local weather station records from internet
- The sprayer configuration was estimated
- Each spray event was set to an hour long duration.



CART Spray Deposition Mapping

- The results from the Spray events were put in an Access database linked to a GIS system.
- A query form built in the GIS to choose date and chemical
- Query produced a spatial image showing deposition levels
- Example for Copper Hydroxide





2 & 3 August 2005, orchard 3023 was sprayed with 150 g/100L Kocide DF (2000 DS)

4 & 5 August 2005, orchard 9838 sprayed 150 g/100L Kocide DF (2000 DS).



20427-59-2 Copper hydroxide



8 August 2005, two days after all spraying completed on orchards 3023 and 9838 with Kocide DF (2000 DS)





28 August 2005, about 20 days after the last lot of orchard spray events of Kocide DF (2000 DS)





14 September 2005, about 35 days after the last lot of orchard spray events of Kocide DF (2000 DS)





28 September 2005, about 50 days after the last lot of orchard spray events of Kocide DF (2000 DS)



Summary

- CART is a planning and recording tool
- Pilot project with avocado growers
- Integrates relevant site specific data and predictive models
- Compared predictions with regulatory levels for hazardous substances
- Provides better relevance than prescribed buffer zones



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GIS-based tool for regional analysis currently under development

