FRST/ MSI Sponsored Project:
Protecting NZ’s Environment from Pesticide Exposure
Andrew Hewitt
Summary

- Description of Project
- Project Team
- Overview of Work to Date
- International Collaborations – Especially North America and Australia
- Future Work
Project Overview

- 6 year duration – we are in year 2 at present
- Over-arching aim is to develop new ground models (within AGDISP platform) and extend existing aerial modeling with extensive libraries, features and toolboxes
- Looking at total pesticide accountancy – on-target coverage optimisation and off-target loss minimisation
- Row, tree and vine crops and forestry
- Droplet and vapour drift
MSI Environmental Portfolio

- This science is under the FRST/MSI environmental portfolio and our research aims to balance crop protection and primary food production with protecting people and the environment from chemical exposure. By reducing total chemical use while increasing performance, this can be a “win-win” situation.
Project Team

- LVL for droplet deposition and drift field research as well as ground modeling
- Otago University for vapour drift research and modeling
- Scion for aerial application research/ modeling and forestry
- PPCnz for droplet canopy fate research and modeling
- AAFC (Canada) for ground boom sprayer research
- USDA FS for AGDISP model linkages
- Linkages with IVLO/ CUL in Belgium for CFD modeling; UQ in Australia for wind tunnel work
- Numerous collaborators in NZ
Advisory Committee

- Representatives of government, councils, grower groups, education/extension groups, pesticide registrants and others
- Meet twice per year
- Help steer research (within the MSI project objectives and milestones) and provide essential linkages for assuring extension of the research to end-users as well as providing field sites and other supporting help
- We welcome new participants on this committee – please contact hewitta@lvl.co.nz
Project Structure

• Three main objectives:
  Spray deposition within canopies
  Droplet and vapour drift research and modeling
  Technologies (sensors, DRTs, etc)

• Government funded, and therefore research available for all stakeholders to adopt – publications and extension are key part of the work
Overview of Drift Studies

- (Other presenters will cover the other objectives)
- Two MSc student theses prepared on wind tunnel work (Philip Donkersley and Chantal Lipscombe) looking at collectors and tracers – Rotorods performed best for collection and fluorescent tracers good for our sampling distances
- Initial field studies looked at vineyard applications
- Portable x-ray fluorescence explored as a new technique for assessing cation deposition (following on from previous Biomarkers project)
Collection systems
Completely New Sampling Approach Proposed by Mark Ledebuhr for our Research: Portable X-Ray Fluorescence

- In-situ (non-destructive and avoids need for artificial collectors with their own collection efficiency issues)
- Multiple cations (building on previous Biomarkers project) – allows each sprayer to be used under similar met. conditions
- Rapid processing (60 sec c/w weeks)
- Allows sampling in the actual wind direction after application – avoiding “chasing the wind”
- More work with Mark in USA next month in studies with Greg and others.
Study Outline

- 3 spraying systems at different canopy growth stages in wine grape vineyards (Blenheim)
- Looked at total spray accountancy: canopy deposition, grape bunch deposition, loss to ground below canopy, airborne drift, deposition drift
- One sprayer was a NZ system developed by NZ and Australian collaborative work. It reduced spray losses to the ground and in drift, while increasing deposition on the leaves and grapes
Mid-Season
Orange Line is Recycling Sprayer
Fruit-bearing Stage

Orange Line is Recycling Sprayer
Airborne Drift
Orange Line is Recycling Sprayer
On-Target Deposition

Orange Line is Recycling Sprayer
Congratulations to SprayPro for picking up the Supreme Marlborough Environment Award

A recycling vineyard sprayer that significantly cuts down spray drift won the Supreme Prize at the 2011 Marlborough Environment Awards announced on Friday night (MAY 6) at Drylands Restaurant.

The SprayPro R-series sprayer has been developed and manufactured by FMR Group, a Marlborough family company that supplies farm and vineyard machinery. The SprayPro recaptures spray that doesn't hit the leaves, filters it and sprays it out again. It cuts the use of chemicals by about 30 per cent, which is good for the grower's budget and good for the environment. The sprayer can be adapted for orchard crops as well.

Judges praised FMR Group for taking on a difficult environmental issue - spray drift - and coming up with a solution, backed by Lincoln University. They said the SprayPro R-Series is the complete package with export potential as well.

The Marlborough Environment Awards are held every two years to celebrate and showcase businesses or community projects that look after the environment. The Awards are supported by the Marlborough District Council and local sponsors. This year there were 32 entries in seven categories.

There will be field days to the winning properties later in May. The FMR Group sprayer also won the Innovation Award.
Other Drift Studies

- Tom Wolf will describe the arable field studies (2 months of intensive field trials with a wide range of application scenarios)
- Included tests to look at how to best determine the full-field 90th percentile from single swath applications
Other Drift Studies

• Preliminary studies with D. Manktelow- psyllid control (tomatoes with Watties in Hawkes Bay) – more work planned with tomatoes and potatoes (wind tunnel/field work plus collaborations with USDA and others)
• Tests planned with tree crops and kiwi vines in summer season in NZ (late 2011/ early 2012)
• New laser system being developed with Artium Technologies and UC Davis (Ken Giles) – if this works, we will be able to measure airborne drift (droplet size, velocity, flux) to initiate refined AGDISP model
Field PDPA Laser Development
Need to determine whether we need multiple vertical-stacked PDPAs or traverse a single probe
Questions?