



New innovations in spraying technology

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Measuring canopy volume



Cabernet Franc

Key factor: know your canopy



14 -May-2015



27-May-2015



22-Jun-2015



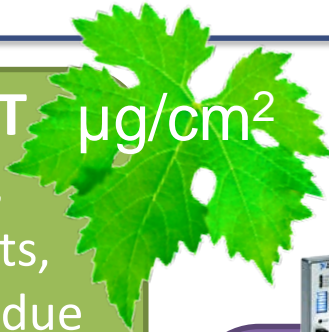
2-Jul-2015

Automated control



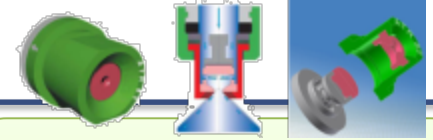
THE TARGET $\mu\text{g}/\text{cm}^2$

Leaves, fruit, diseases, insects, variable canopy due to growth stage, trellis or variety



CENTRAL CONTROLLER

Inputs, outputs and monitoring



LIQUID FLOW

Application rate, pressure, nozzle size and number. GPS location of spray & GIS mapping of spray use

SENSORS

Using a canopy sensor to monitor volume, density, absence or presence. Sprayer: GPS will provide location and speed

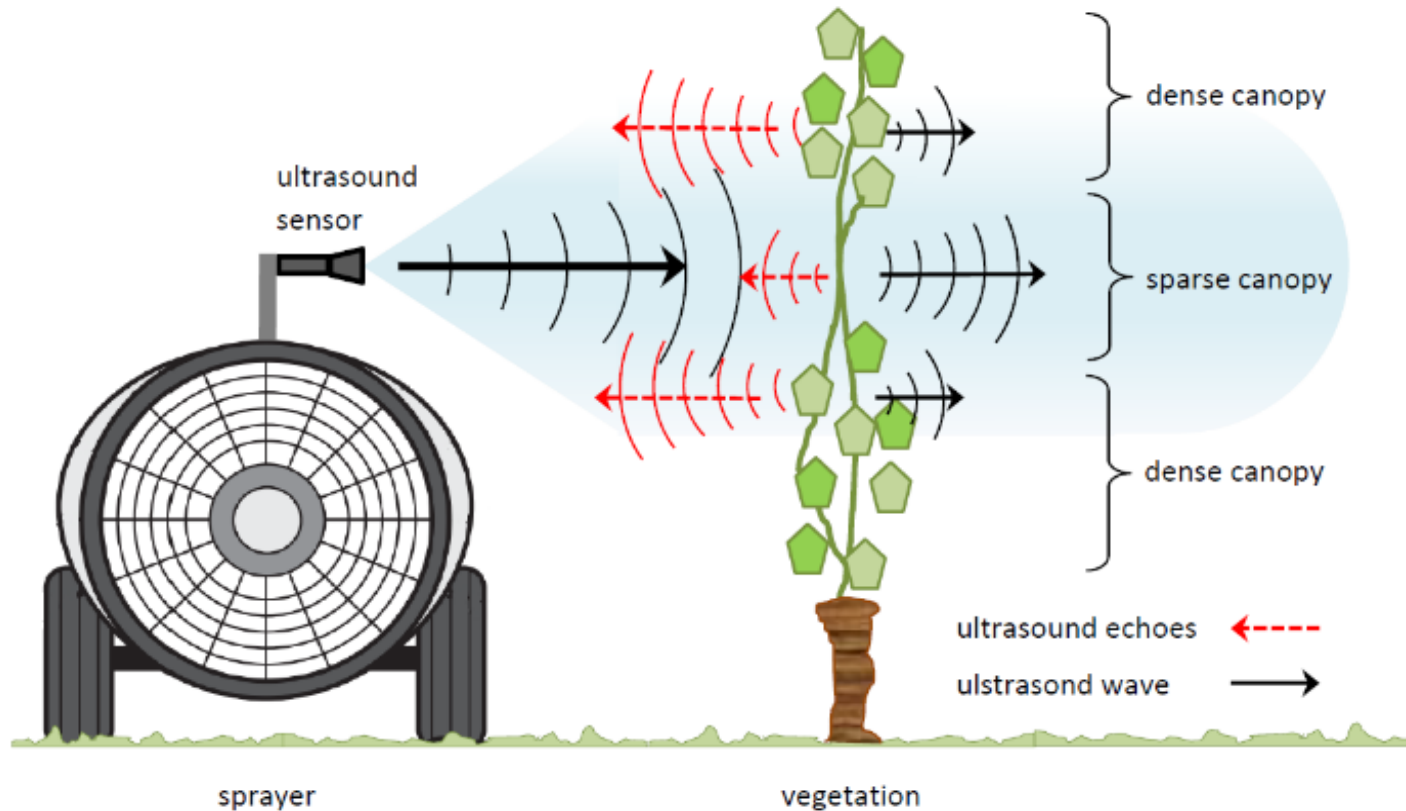


AIR FLOW

Adjustable, to match the canopy via infinitely variable louvre system



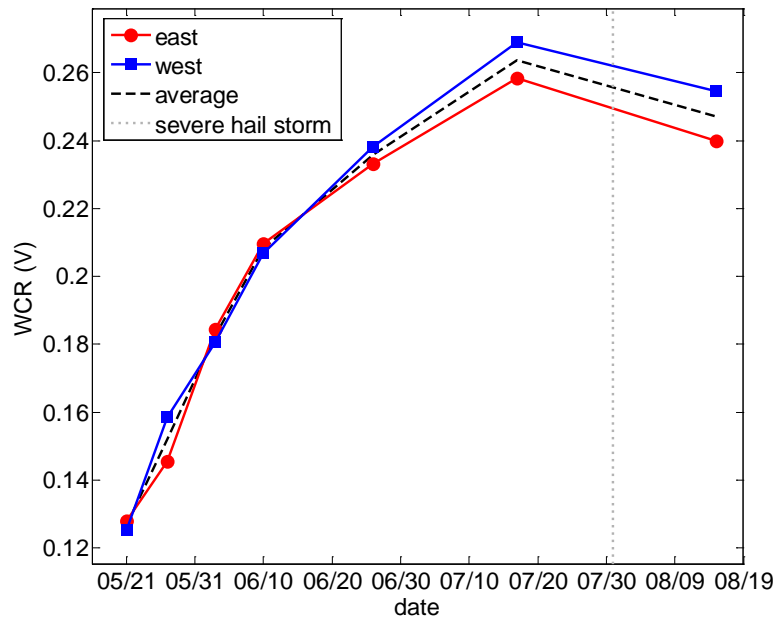
Ultrasonic sensors mounted on the sprayer



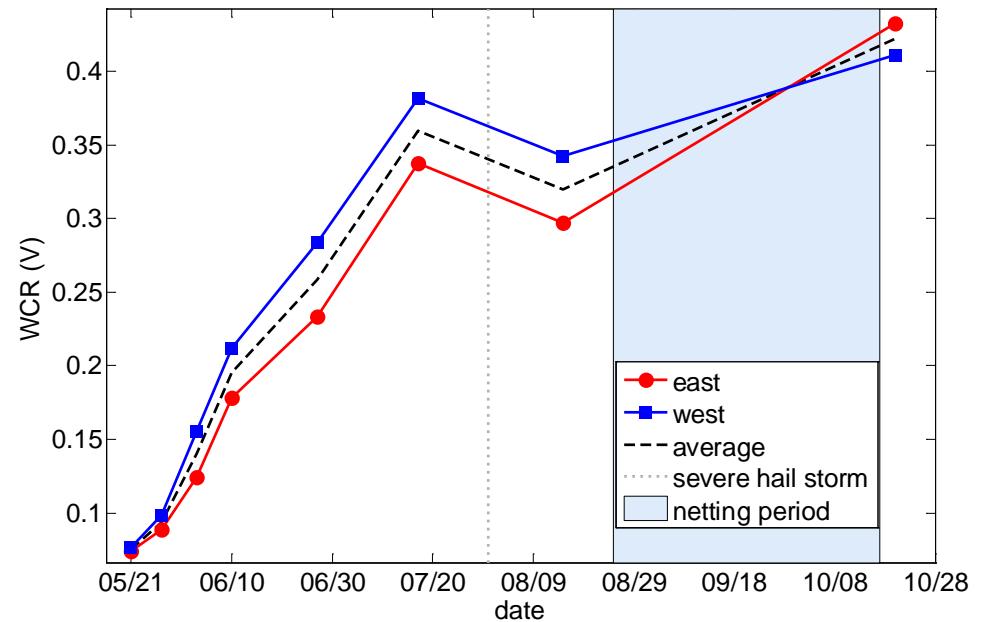
Automatic canopy volume measurement

Using 'sensors 2' to measure canopy density (2014 data)

Orchard



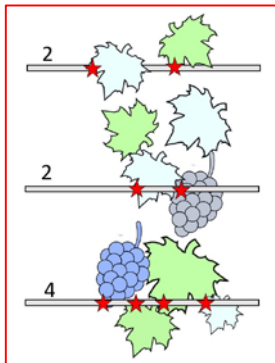
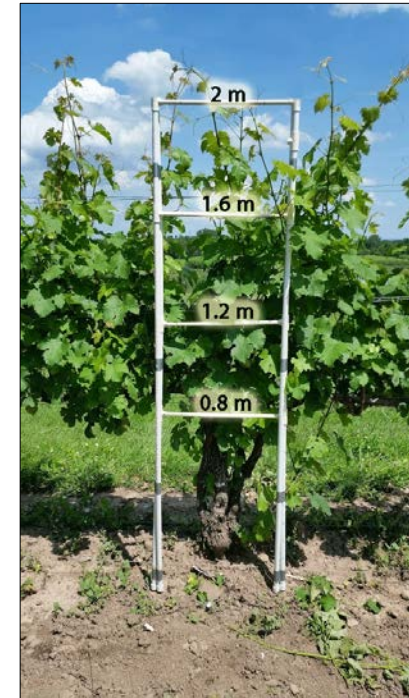
Vineyard



The estimated density increased throughout the season but was not compared to actual density

Automatic canopy volume measurement

A probe is used to count the number of leaf layers



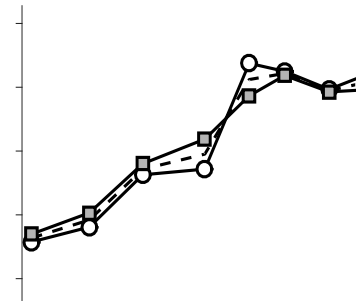
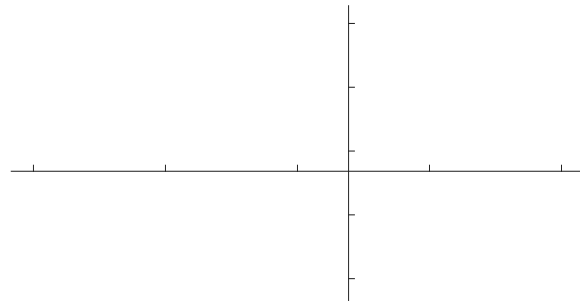
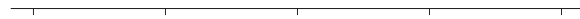
- The frames have 4 horizontal bars, matching the ultrasonic sensors' height.
- Each horizontal bar has 6 marks spaced 10 cm apart

Automatic canopy volume measurement



Cabernet Franc

Using 'sensors 2' to measure canopy density



Automatic canopy volume measurement

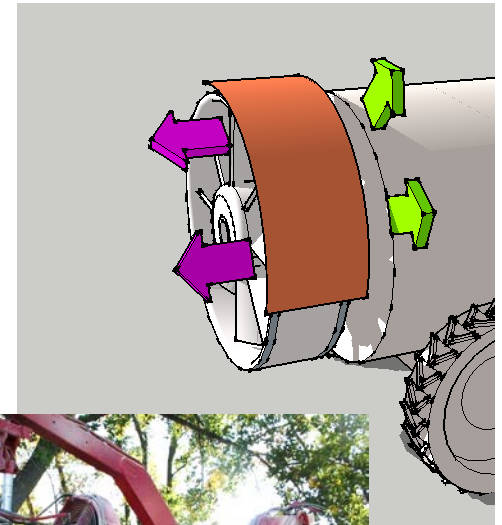
- 'Sensors 2' results show a good correlation between PQA and ultrasounds.
- The signal is related to intrinsic plant characteristics, such as leaf size, leaf softness, branches, structure, etc
- Each species or variety has to be calibrated.

Canopy density sensing allows changes in real-time

Liquid flow

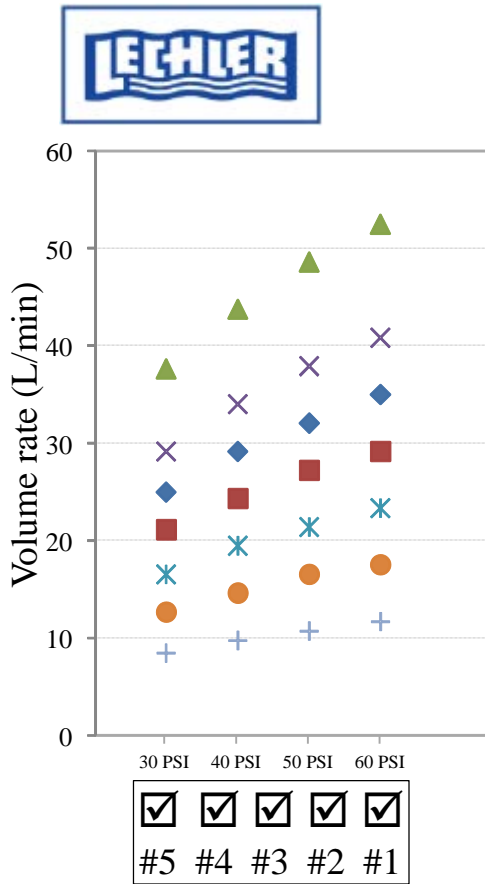


Airflow



Liquid adjustment

Lechler Vario Select






Manifolds and Pressure



ST 110-01 0.087 GPM 30 PSI



	ST 110-01	0.087 GPM	30 PSI
	ST 110-015	0.13 GPM	30 PSI
	ST 110-02	0.17 GPM	30 PSI

Air flow regulation system

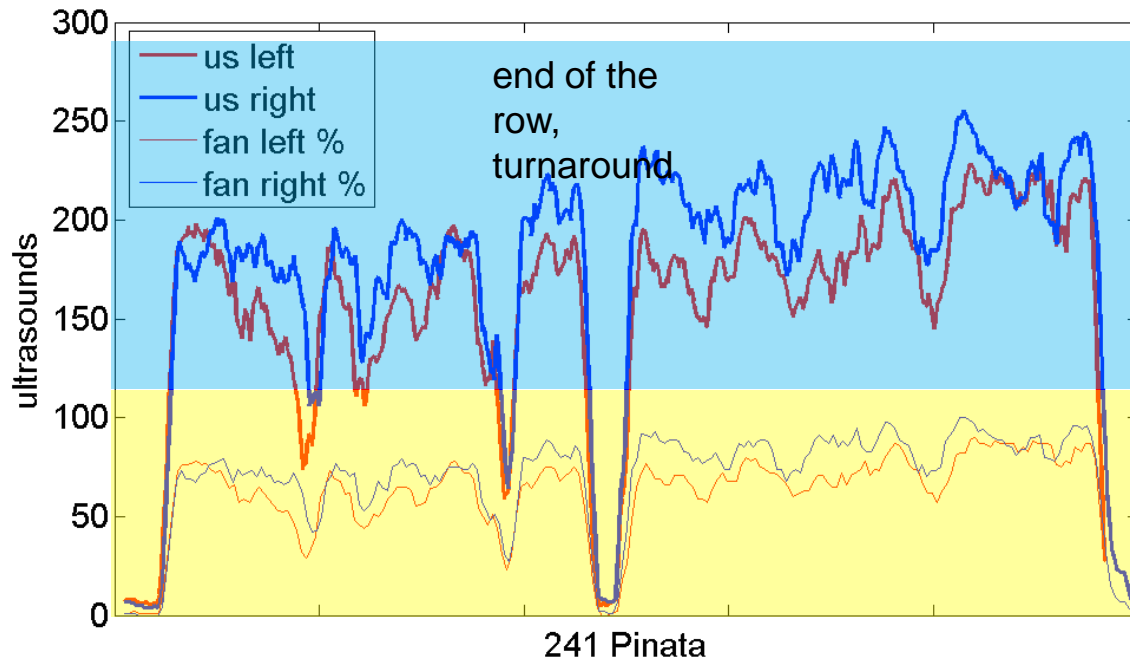


Lamont Fruit Farms (USA) used Croplands Quantum mist with SARDI fan sprayer in their apple orchard (2014 – 2016)



Air flow regulation system

Croplands Quantum Mist with SARDI fans in apple orchard



E.D. signal
and
fan speed
regulation
from 0 to
100%

Monitoring spray application for record keeping

GPS system (rtkGPS)



GPM	Line color
1.77 - 3.5	Orange
1.5 - 1.76	Blue
0.51 - 1.49	Yellow
0 - 0.5	Red



RFID cards

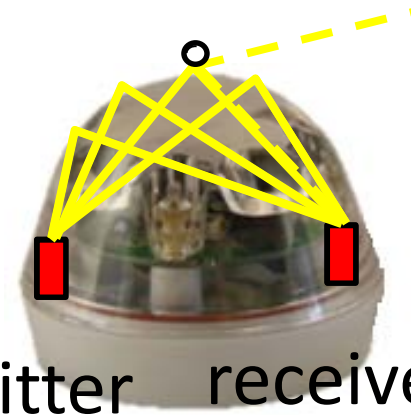
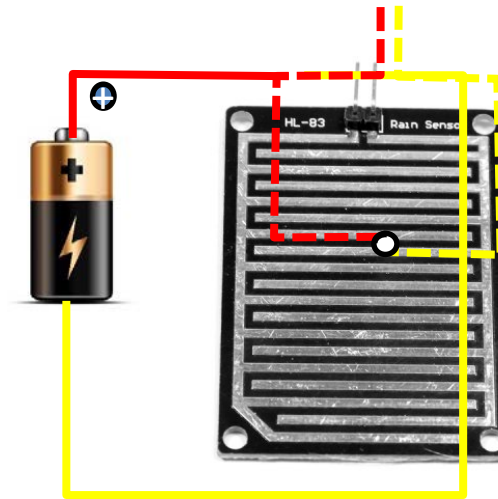


Spray deposition sensor – in canopy

Resistor



Light



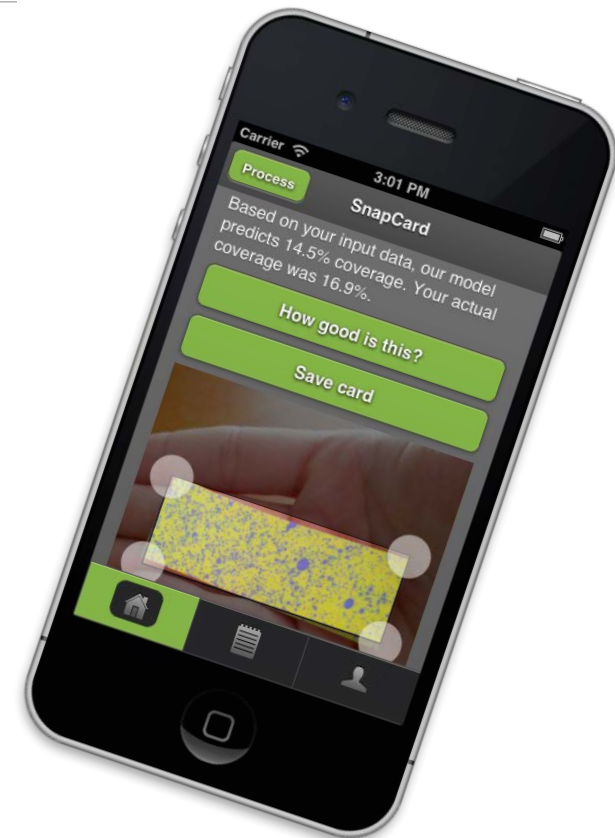
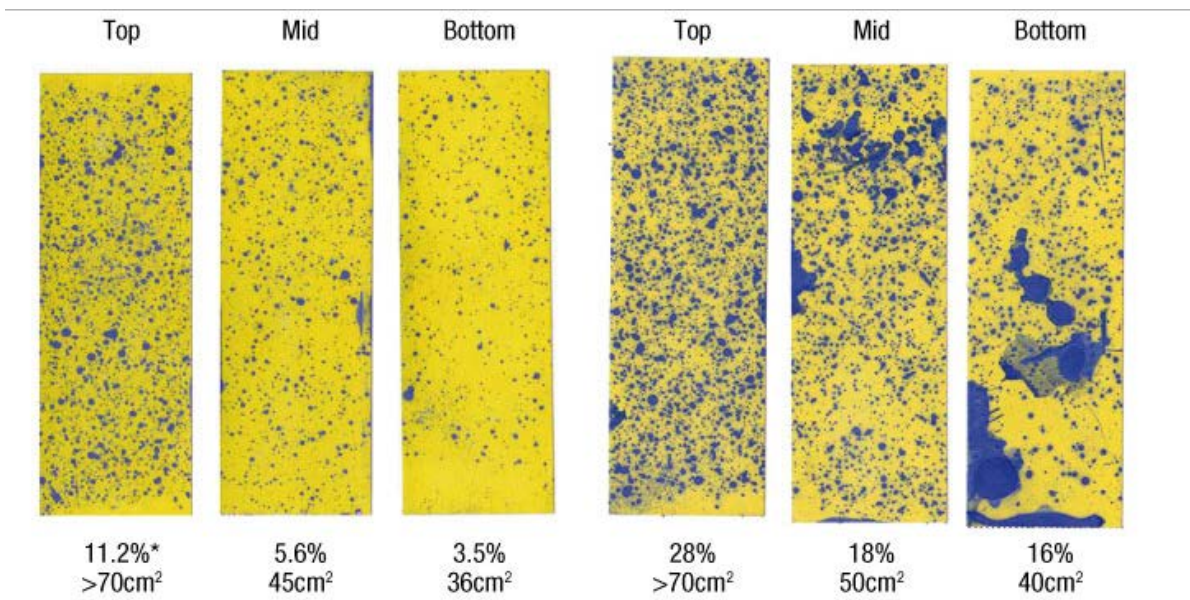
UAV (unmanned aerial vehicle)



SKY TRIAL: Trainee pilot Lauren Goddard, pilot and instructor Phil Chadd and Tamburlaine vineyard manager Clayton Kiely have been testing the capabilities of the Yamaha Rmax helicopter at the Tamburlaine Organic Vineyard at Borenore. Photo: JUDE KEOGH 0503jkhelicopter11

SnapCard

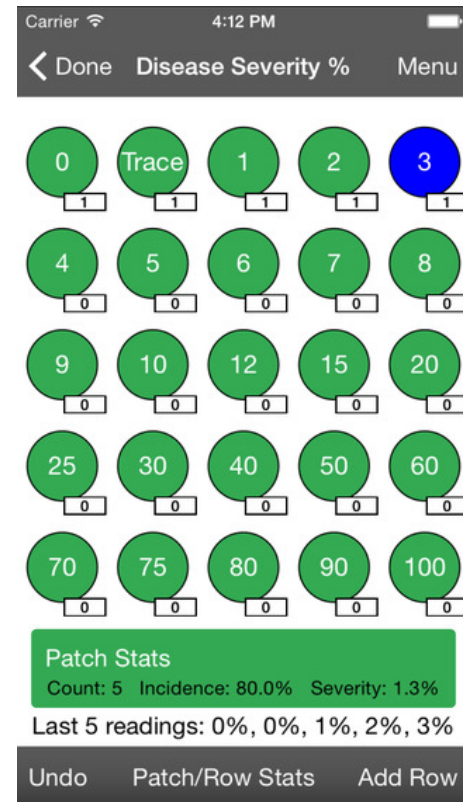
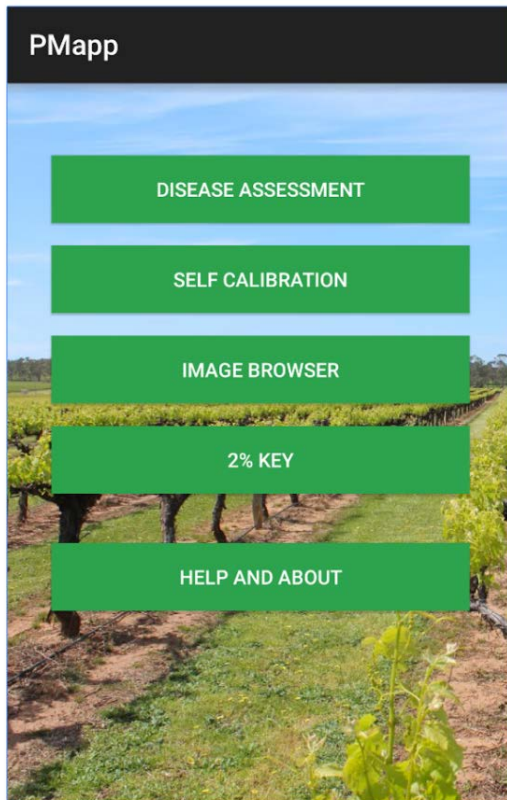
Water sensitive paper image analysis



<http://agspsrap31.agric.wa.gov.au/snapcard>

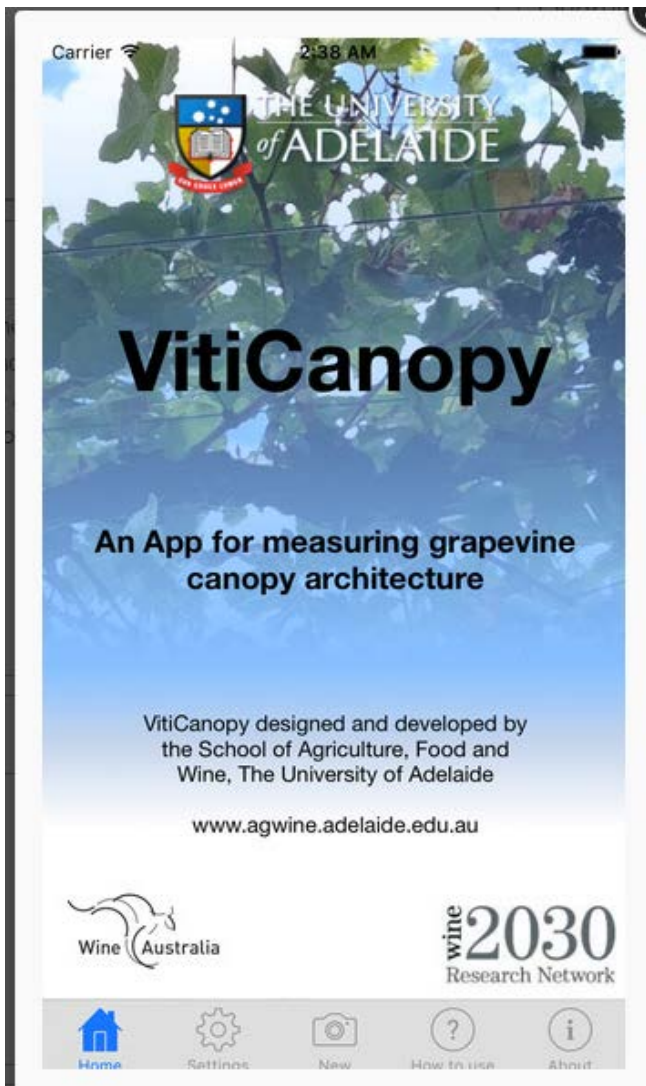
PMapp

Powdery Mildew assessment & record keeping app



Powdery Mildew assessment training tool –
www.pmassessment.com.au

VitiCanopy app



VitiCanopy could be used when calculating 'unit canopy row'



<https://itunes.apple.com/au/app/viticanopy/id1042914901?mt=8>

The fear of technology

- Costs involved
- Breakdown/repairs
- Labour to supervise

- Look to others involved in agriculture
 - Robotic milking equipment
 - Grading line equipment
 - Greenhouse automation
 - Field crop sprayers



Further information

Spray related factsheets:

www.awri.com.au/industry_support/viticulture/agrochemicals/spray-application

Agrochemical 'dog book' online:

www.awri.com.au/industry_support/viticulture/agrochemicals/agrochemical_booklet

AWRI helpdesk – (08) 8313 6600 or helpdesk@awri.com.au

Free offer for water sensitive paper – www.syngenta.com.au/awri

More information:

Wine Australia – <http://research.wineaustralia.com>

Australian Wine Research Institute - www.awri.com.au