7th Symposium on Precision Agriculture 2003

7th Symposium on Precision Agriculture Research and Implementation in Australasia

Australian Centre for Precision Agriculture

SPAA Southern Precision Agriculture Association

UniSA

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7th Symposium on Precision Agriculture Research and Implementation in Australasia
Mawson Lakes campus University of SA – Adelaide SA 15th August 2003

Symposium Program

8.30 am ***Symposium Registration***

9.00am *Welcome Prof Robin King Pro Vice Chancellor Div of IT Eng & the Environment Univ. of SA.*
Symposium Opening Malcolm Sargent (President SPAA) - page 2

9.10am Remote Sensing: KISS Works for Vineyard Management.
David Lamb (UNE) - page 3

9.30am Pedology for the Hoi Polloi - A Digital Soil Map of the Massey University farms.
Mike Tuohy (NZCPA) - page 4

9.50am Experience to Date with OmniStar HP.
Keith Dyer *(OmniStar)* - page 6

10.10am Mapping Mallee Subsoil Constraints with EM38.
Garry O'Leary, Michael Wells and Ken Bates - page 7

10.30am ***Morning Tea***

11.00am Spatial Variabilty in Fruit Quality.
John-Paul (JP) Praat (Lincoln Ventures Ltd) - page 8

11.20am Putting It All Together - Minimum-Till and Precision Agriculture
Mark Branson (Clifton Farms) - page 8

11.40am GPS Accuracy.
Brendan Williams (GPS-Ag) - page 12

Noon Precision Agriculture - From the Microscope to the Telescope.
Greg Butler (Agrilink) - page 13

12.20pm ***Lunch***

(Includes lunchtime tours of the University of SA Agricultural Machinery Research & Design Centre)

1.40pm Precision Viticulture - A Few More Areas of Progress.
Rob Bramley (CSIRO) - page 14

2.00pm Precise Fertiliser Spreading: Reality or Fantasy.
Ian Yule (NZCPA) - page 17

2.20pm Key Elements of the Successful Integration of PA into Day-to Day Management.
Mark Pawsey (SciAg) - page 22

2.40pm An Evidence-Based Approach to Predict Soil properties and to Manage Farms.
Mike Wong (CSIRO) - page 22

3.00pm ***Afternoon Tea***

3.30pm Development of Proximal On-The-Go Soil Sensing Systems: A Challenge for PA Research Worldwide.
Raphael Viscarra-Rossel (ACPA) - page 23

3.50pm Precision Agriculture - Making it Pay - Examples From a Small Business.
Matt Adams (Silverfox) - page 23

4.10pm Precision Viticulture - A Perspective from the Vineyard.
Colin Hinze (Southcorp Wines) - page 25

4.30pm Wrap Up (incl.What's new from the 4th ECPA).
Brett Whelan & Alex McBratney (ACPA) - Page 25

5.00pm ***Close***

SPAA Membership Application Form at back of proceedings

Proceedings compiled by Dr Brett Whelan ACPA & Dr Rohan Rainbow SPAA

Official Opening – Mr Malcolm Sargent - SPAA President

On behalf of symposium organising committee, SPAA and the Australian Centre for Precision Agriculture, we welcome you to the 7th Symposium in Precision Agriculture Research and Implementation in Australasia and trust that you will find the array of speakers and topics during the day useful and relevant.

The first year of any organisation is always critical and challenging. Without precedents and with modest predictions the Southern Precision Agriculture Association (SPAA) has completed a successful year. Prior to the formation of SPAA precision agriculture practitioners had little or no knowledge of others using PA. Now with over 150 members from all over Australia, we don't have to "re-invent the wheel".

Now with a wide membership base SPAA needs to be setting priorities for research and lobbying to assist users. Our involvement with the grain industry is obvious, but we need to extend PA into not just wine-grapes, but horticulture in general and other agricultural industry groups. The survival of primary industry depends on efficiency growth and PA is a tool to unlock that growth. This symposium will go a long way towards improving linkages across the many agricultural industries and building on existing ones.

This year's symposium program looks excellent. Have a great day.

Malcolm Sargent
SPAA President

Remote Sensing: KISS Works for Vineyard Management

David W. Lamb
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Remote sensing has recently enjoyed significant growth as a viticultural management tool. This is especially impressive given its applicability to the grape and wine industry was regarded with skepticism by numerous key onground-researchers only 5 years ago. A recent survey of major Australian remote sensing providers indicates that approximately 15,000 Ha of grapevines were imaged last season (approx. 10% of total vineyard holdings), covering most key viticultural production regions in the country.

The key behind the use of remote sensing as a viticultural management tool lies in its ability to discriminate between different levels of photosynthetically-active biomass (viz. canopy size and density). Given that microclimate plays an important role in the grapevine productivity (fruit yield and quality), overhead airborne/spaceborne sensors effectively get a bird's-eye view of what the sun is illuminating. Numerous research projects, worldwide, have now demonstrated links between appropriate remotely-sensed descriptors of canopy architecture and viticultural parameters including grape yield, anthocyanin and phenolics levels (red winegrapes), brix/baumé, pruning weights, LAI and the list goes on.

Remote-sensing products available on the market are generally (but not exclusively) variations of a similar theme; the use of either high-spatial resolution (pixel footprint smaller than individual vines, £50 cm pixel) or 'mid'-resolution (pixel footprint comparable to inter-row spacing » 2-3 m pixel), and an appropriate 1-D vegetation index such as NDVI, PCD etc. Providers of the high-resolution imagery necessarily include a post-processing step which removes non-vine pixels from data while providers of mid-resolution imagery merely rely on the contrasting of vine spectral signature against cover-crop or bare soil spectral signature. Both techniques have reported the ability of remotely-sensed descriptors to explain between 30 and 50% of the variance observed in biophysical variables on the ground. However, recently evidence has emerged to suggest that canopy size (as opposed to density) is the component of the remotely-sensed information which is doing most of the work in facilitating this link. In light of such evidence, lower-resolution data acquisition technologies and simple post-processing (both of which tend to equate to cheaper cost/ha) may be adequate for producing information useful to managers. After all, the relative advantages or disadvantages of either technique, while likely to be hotly argued amongst spirited commercial providers themselves, are not great when it is considered that no technique is capable of making an absolute determination of the factors driving variability, nor of the absolute impact of the perceived variability on the fruit. Following lessons learned ten years ago by providers of remote sensing products in other agricultural cropping systems, providers and users must both recognize the strength of the technology lies in pointing out relative differences and that such information must be integrated with an onground sampling and interpretation capability from the outset.

This presentation will summarise key aspects of the use of remote sensing as a viticultural management tool, discuss the uptake by the industry and outline a number of case studies of commercial grapegrowers who have directly observed the benefits and pitfalls associated the technology.

Pedology for the Hoi Polloi – A Digital Soil Map of the Massey University Farms

Mike Tuohy
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Ask most people on the street what a pedologist does and you are likely to receive either an “I dunno” or “something to do with feet”. We should know that pedology is the scientific study of soils and that pedologists are a rare breed who enjoy digging deep holes in the ground and then jumping in to these ‘profile pits’ to pick away and search for tell-tale features that enable each layer to be classified in a language all their own.

For over forty years Jim Pollok taught pedology at Massey University. Many pits were dug all over the 1195 hectares of Massey University farmland both by Jim and generations of students and technicians. It was always Jim’s intention to publish a soil map and associated bulletin to record for posterity this lifetime’s work but the years passed and there was always another hole to be dug somewhere.

Come the 21st century and Masterate student, Paul Nelson, came to me looking for a GIS project. I suggested that he digitize the soil map that Jim had put such a lot of effort into but had not yet published. In the way of traditional pedologists, Jim had carefully drawn the boundaries of all the different soils onto a large scale (1:5000) orthophoto of the area. Paul used a 100m resolution orthophoto in ArcView to trace the soil boundaries while interpreting the original data. This was often done with Jim looking on to ensure the accuracy of the on-screen digitizing.

Eventually, the digital soil map was completed and a rudimentary database containing not much more that the name and parent material of each soil was put together. We could have continued on down the traditional path and filled the database with all the usual pedological descriptors of each soil but then the final product would have been simply a digital version of a soil map and associated bulletin. And it would be accessible only to those with expensive GIS software on their computers.
We wanted something that was both more interesting to view and provided more easily understood descriptions of the soils and their productive capacity – the sort of information that the farmer, orchardist or market gardener might want from a soil map. Another requirement was for the final product to be accessible to everyone with a computer – either via our website or from a stand-alone CD.

Enter another bright student who had recently completed his Masterate and was looking for work. Sam Gillingham had been a programmer in a former life and took up the challenge. First of all each profile photograph and the abbreviated profile description was incorporated into a Word document that could be associated with the relevant soil polygons in the map. It was decided that information on the location, the classification and comment on the drainage and productivity for each soil should be shown as well as the profile; this was included in an .htm file with a standard format.

Now the map was really coming alive. Not only could you zoom and pan but you could click on any location and see a photograph of the soil profile and a succinct description of the soil and its production potential or limitations. Another link provided a photograph of the landscape in which the soil is found, while further links reveal photographs of similar soil profiles. All this was available through our image web server and required the user only to download a plug-in to handle the orthophoto that was used as a backdrop and made it easier for the user to know their location.

The next objective was to put the orthophoto, the map, the profile photographs and descriptions, the landscape photographs and all the associated htm files on a CD that could be simply inserted into a computer and would provide all the functionality without being connected to the internet. A bit of judicious surfing and careful consideration of the alternatives led eventually to the adoption GeoTools and some Java programming. GeoTools is an open source project which aims to provide a toolkit of resources to enable the creation of interactive geographic visualisation clients.

Imagine the era when Jim first began examining the soils around Massey Agricultural College back in 1955 – no computers, not even any calculators. No digital cameras, no photocopiers, not many colour photographs and no soil survey data available at a scale better than 1:2,000,000!!! Today, with a personal computer, you can view the soil map of the area at any scale you like, see photographs of the original profiles and reap the benefit of nearly half a century of accumulated knowledge.

Copies of the CD are available from the New Zealand Centre for Precision Agriculture (NZCPA) at www.nzcpa.com or you can view the same data at http://atlas.massey.ac.nz .

Experience to Date with OmniSTAR HP
- GPS Guidance - the Advantages from using Precise Positioning in Agriculture

Keith Dyer
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GPS has now been in use for several years as the enabling technology to permit other, largely mechanical, developments to achieve their potential to reduce input costs and increase yields. The initial focus on yield monitoring has been overtaken by other techniques whose benefits can be more proven in the longer-term, focussed on machine guidance. This paper reviews the typical cost savings that can result from the use of DGPS-based guidance systems of various types, ranging from public services through to local RTK technologies, and looks at how GPS is helping to change the shape of current farming.

OmniSTAR Pty Ltd has been providing reliable positioning solutions to Australian industry since 1994 and has maintained its position as industry leader through continual research and development into the best, most efficient ways to solve the requirements of different industries.

OmniSTAR is one of the most accurate positioning services available in the world today, providing positioning to clients in real time, 24 hours a day. System errors, such as ordbit, timing and atmospheric errors, limit the accuracy that can be achieved using the US Global Positioning System satellite service to approximately 10-15 metres.

Terrestrial DGPS and public access systems can improve GPS position accuracy to within three to ten metres but are dependent on range, transmission interference and are proven to be less reliable than satellite based systems like OmniSTAR.

OmniSTAR-HP - High Performance

The OmniSTAR-HP (High Performance) solution is a dual frequency GPS augmentation service that provides robust and reliable high performance GPS positioning. By using dual frequency GPS observations, OmniSTAR-HP can measure the true ionospheric error at the reference station and user location, substantially eliminating this effect in positioning accuracy. Using these iono-free measurements with other information contained in the GPS receiver carrier phase data, the OmniSTAR-HP solution is able to create a wide area positioning solution of unmatched accuracy and performance in selected areas.

Mapping Mallee Subsoil Constraints with EM38

Garry J. O'Leary[1], Michael Wells[2] and Ken Bates[3]
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[2]*Kerin Agencies,* Crystal Brook, South Australia. 5523 Australia.
[3]*Advanced Soil Mapping Pty Ltd,* Deniliquin, New South Wales 3501 Australia.

Electromagnetic induction technology coupled with accurate GPS equipment offers realistic economic opportunities to map out areas of farms affected by subsoil constraints that are related to high salt, since electrical conductivity (EC) is well correlated with soil water and salt content. This is particularly encouraging for large regions of southern and western Australia where high salt and poor water use and yield of crops is widespread. Much of these soils have high pH, high boron and salt and crops often do not extract all the apparent available water by harvest. The technical feasibility of using mobile EM38 over the surface to map out suspect subsoil constraints was examined on five farms across the Murray Mallee. Strong relationships between soil water, chloride and to a lesser extent boron were found with apparent EC measurements and large areas (> 60%) of some fields were discovered to have substantial subsoil constraints, previously unknown to the farmers. Despite the popular belief that much of these areas of Australia have serious subsoil constraints there was little evidence for this on some farms. EM38 mapping offers new ways to help develop more precise and profitable faming strategies in areas with difficult and unseen subsoil constraints.

Recipe for detecting subsoil constraints

1. Measure ECa <u>ONCE</u> at harvest
2. Calibrate ECa
3. Use many yield maps
4. Identify subsoil affected areas
5. Reassess yield potential
    - Reduce input to affected areas?
    - Increase input to unaffected areas?
    - Use tolerant cultivars (including pasture and perennial species)
    - Possibility of no management options

Conclusions

EM38 is a practical and economic method of identifying areas of subsoil constraints in Mallee soils. Not all poor yield areas and gross margins are due to subsoil constraints. Paddocks with significant areas of subsoil constraints now have the potential to be more profitable.

Spatial Variability in Fruit Quality

John-Paul Praat[1] and Marin Upsdell[2]
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[2]*AgResearch,* Hamilton, New Zealand

Systems involved in the application of Precision Horticulture complement modern supply chains where demands for information and traceability have increased. Existing data on fruit quality is underutilised and additional, more complex data is becoming available such as on-line assessment of internal fruit quality. A system is described which turns this data into information for fruit growers. The nature of data capture for hand harvested crops is explained using kiwifruit as an example crop along with analysis techniques.
Fruit crop quality variables such as product size, sweetness, dry matter and yield appear to have some auto-correlation or spatial dependence. However determining if the spatial effect is real or significant is a problem for workers in this field. This issue is important for users of spatially arranged data, such as managers of fruit crops, who are attempting to use geographical information systems to handle, display and analyse these data and plan to take advantage of the detailed nature of the information to improve crop management and returns. Current methods to analyse spatial patterns in fruit quality including visual, semi-variograms, inverse density weighted interpolation, kriging and clustering are time consuming and operator dependent. An alternative technique, based on bayesian smoothing or mixed model approach, is introduced which has potential to automate the analysis of spatial variability in fruit quality.

Putting The Package Together - No-Till and Precision Agriculture

Mark Branson (RBAG)
Farmer: Stockport

Property: 1000 Ha Owned at Stockport and Giles Corner, Lower North of S.A.
50Ha share farmed at Stockport.

Rainfall: 425 to 500mm, predominately winter rainfall.

Soil Types: Red Brown Earths, Self-Mulching Clays, Grey Loams. Highly variable across paddocks.

<u>*Soil Constraints*</u>:
- shallow topsoils.
- rocky outcrops.
- sodic subsoils.
- boron in subsoils.
- acidity.

Crops Grown: durum and bread wheats, malting and feed barleys, canola, faba beans, and field peas.

Machinery: Sowing Equipment 1/3 width of spray and urea booms on 2.2m wheel spacings.

<u>*Sowing Equipment:*</u>
- JD 8200 210hp FWA Tractor

- CASE PTX – 600 bar, 31' 9"alternate spacings, 550 lb trips, modified Morris Gumbo Boots. Sharman Press Wheels.
- Horward Bagshaw 3 * 2000L quad box with electric drives, DGPS Compatible.
- Vogt Engineering 29M Mounted Urea Boom.

Spray Equipment:
- Fiat 115-90 DT 115hp FWA Tractor.
- Hardi, 29M 4228 Sprayer, on single large wheel. Pilate Spray Controller.

Header:
- CASE 2388 Header, 30ft 1010 front, chopper, Field Tracker, AFS Monitor.

Precision Ag. Equipment:
- CASE AFS Yield and Moisture Monitor.
- KEE LYNX Computer controlling; Horward Box for Variable rate sowing and Urea application; Guidance on Airseeder, Spray and Urea Booms, and super spreader, and Header hight controller.
- Omnilite 5hz DGPS receiver.
- Pentium IV 2.4GHz Compucon Home Computer.
- Fairport PAM, Mapping and Farmstar Software and gpMapper.

Precision Ag. On Our Farm.

Our farm management has gone from fertilising the farm with 110 lb/ac over the whole farm every year when I left Roseworthy Ag. College in 1988, to fertilising patches different within paddocks last year. The future aim is to fertilise the farm using variable rate technology, according to crop type, land class, soil type, elevation and potential water holding capacity of the soil.

In 1997 when purchasing a new header I purchased a "Microtrac" yield monitor and "Omnistar" 1hz DGPS receiver and started yield mapping. Dad has always known where the bad soil patches were in the paddocks, but I wanted to map where these patches are and find out what the yields were in them. So I have been able to intensify the management from paddock to paddock basis, to within the paddocks.

Poor and good soil patches have been found but this process has tended to create more questions than answers, but I think last year progress was made with the development of the SPAA group. One thing the early testing found out was that a lot of yield variation came through change of soil type in the paddock and what was happening in the subsoil.

Last year I EM mapped 1/3rd of the farm to look deeper into the soil and took more 0-60cm soil tests and looked at the cors closely to see what was happening down below for I believe that it is this that is driving the variability in yield across my paddocks. I also have 2 paddocks intensively monitored through the SPAA group and Brett Whelan through the Australian Centre for Precision Agriculture, my yield maps better analysed and management zones statistically formed rather than gut feel management zones. This process involves producing Yield Maps, Soil EC and Elevation Maps through the Block Kriging with local Variogram process. These information layers are then clustered to determine potential management zones.

In Blackflat 2 zones were initially formed corresponding to the two main soil types of the paddock, red brown earth and dark brown cracking clays. The differences in the 2 zones have found out to be statistically 0.6T/Ha in wheat yield. After looking at the soil closely we decided to create a third zone corresponding to some transition soils that behave differently than the deep black high yielding soil and the shallow red brown earth. The second paddock at Giles Corner has vastly different soil types and profiles with 3 management zones being adopted. Zone one is a deep black cracking clay with a deep sodic layer, zone two being a transition soil, dark red on top going down to a limestone rock layer at 40cm, some of which is impermeable, and the third layer is a red clay, some of which is sodic, and other areas are very shallow limestone rock to the extent that a soil probe finds it difficult to go below 15cm.

Also some aerial photographs were taken last year with a multi spectral camera with spectacular results. We also variable rated a paddock of peas with high sowing rates where resistant ryegrass is and low fertiliser rate on the poor soil patch. This was successful with good crop competition in the ryegrass patches and no yield reduction on the low fertiliser poor patch.

I believe that two things will drive Precision Agriculture on my farm. The first being finding problems that can be fixed and fixing them. These include using gypsum to overcome sodicity, and lime to overcome acidity. Also the use of Manures has been used to reactivate “Dead” Soils. The second driver of Precision Agriculture is dealing with problems that cannot be fixed. This is dealing with shallow soils, deep sodicity, and very different soil types in the same paddock. This is where variable rate technology comes in with management zones being created and inputs varied in accordance to the potential yield of the created zone, i.e. Fertilising a wheat crop at 60% potential yield where a zone has been created in a shallow soil area, and 90% potential where there are no subsoil constraints, and the wheat yield is expected to be close to its potential. Another use of variable rate technology is to attempt to out-compete resistant weeds by increasing the seed rate significantly in the patches where resistant weeds are showing up.

No Till and Tramlining

While the movement into precision Ag. was happening we were also moving from a conventially worked farm to direct drilling and tramlining and the future controlled traffic.

Over the years we have always direct drilled the legumes, with a little dabble into direct drilling cereals, but up to last year we had settled on pre-drilling urea and sowing a week after, but this was time consuming and if I could equal the results by direct drilling then why not.

Last year we purched a CASE (flexicoil copy) bar with sharman press wheels and a Horward Bagshaw quad box, matched the widths of our machinery and went direct drilling the whole farm.

We sowed most paddocks up and back using the new guidance system, sprayed and spread urea using the boxes wheel marks. This worked very well and made spraying very easy especially when the crops grew up. The urea boom mounted on the box worked especially well with it spreading fertiliser accurately out to 29m.

The flexicoil bar works very well on undulating ground the gumbo boots split the seed and fertiliser well and the seed spreading 3.5” out of 9” giving a good SBU index. This system worked very well against the ryegrass with the seed being pressed in and the in-between soil being left rough. The use of “Trifluralin” in Wheat has opened up with the soil being thrown out of the seed row into the inner rows covering the Trifuralin, leaving the wheat unaffected and the ryegrass in the inner row thinned out.

Another tool in ryegrass control is to use a windrower with a sprayer attached with it and the ryegrass is sprayed during the windrowing operation. During the harvesting operation the spreaders are left off and the crop residues put back into a windrow. After harvest in autumn, the windrows are burnt, burning the ryegrass seeds left in the windrow. Crops that are windrowed using this system are Canola, Barley and Faba Beans.

Altogether I am happy with the farming system I have developed and I think that No-Till and Precision Agriculture both have big futures on our farm.

GPS Accuracy

Brendan Williams
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gps-Ag is an Australian company dedicated to linking new technology to practical and profitable solutions for all farmers. It was formed to provide practical and workable solutions to farmers in Australia with products that are recognized and proven to be the best available of their type in the world. gps-Ag is the Australian representative for world leading suppliers of agricultural electronic equipment and the range of products that are offered by them.

gps-Ag are Australian distributors for the following manufacturers:

- (Exclusive agents!) Integrinautics - AutoFarm GPS Autosteering, AutoLevel, AutoHarvest, AutoSpray
- (Exclusive agents!) AgLeader precision farming equipment - yield monitors, guidance and software
- Mid Western Technologies (Mid-Tech) - GPS guidance and ag electronics and control
- (Exclusive agents!) IC-Max variable rate irrigation control
- Monash Professional Group - GPS fleet tracking and remote monitoring
- NIR Technologies - On the go protein monitor
- Garmin GPS equipment
- GME Electrophone

AutoFarm features include:
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automatic disengage as soon as you touch the steering wheel for greater safety,
easily transferrable between vehicles,
operates up to 30 kph,
capable of working round and round, curve contour following, as well as straightline,
patented nudge feature that allows you to easily avoid obstacles like check and contour banks, finish paddocks at part implement width whilst still in autosteer,
nudge to make it simple to side dress fertiliser, sow between last years rows,
low power consumption base stations that are fully sealed.

Reap the benefits of 2cm Autosteer:
sow next years crop between the stubble rows of this years crop,
save on inputs by eliminating overlap,
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AutoFarm offers 2cm accuracy autosteer at an affordable price and with no ongoing costs. The 2cm accuracy is repeatable accuracy gained from having your own base station. With 80 systems operating in Australia, some for 3 years, the AutoFarm is proven technology.

GPS-Ag Pty Ltd, Head Office, 60 Breen St,
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Precision Agriculture – From the Microscope to the Telescope

Greg Butler
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Agrilink and Precision Agriculture
Agrilink provides knowledge to the agricultural and environmental markets with a critical focus on return from investment and ease of use. This is achieved by the application and provision ofsensors, service and software.

Constant Variable: Varies across an area and is constant over time (e.g. soil type, weed pressure). Managed with retrospective knowledge and operational planning.
Variable Variable: Varies across an area and is variable over time (e.g. seasonal conditions such as rainfall, hail, frost, disease pressure, etc). Managed with timely risk assessment.

Measuring variability
Constant Variables: Topographic mapping, soil Grids, EM survey.Variable Variables: Weather stations, disease modeling & assessment.
Result of contributing variables: Yield mapping – accurate and retrospective;
Remote sensing – relative and proactive.All variables contribute to the final crop outcome.
Site-Specific wetting patterns. & Regional environmental risk management

Precision Agriculture should not be constrained by fence lines. Here are some examples of other applications where location specific resource allocation is bringing agronomic, economic and environmental benefits.
Precision Irrigation (Site specific wetting patterns- a constant variable)
Soil type and therefore water holding characteristics may vary across a block. Developing irrigation strategies that enable lateral wetting patterns and reduced drainage as soil types vary across a block. Using spatial display techniques common to precision agriculture and developing location specific application management in the vertical plane.Marry soil water holding capacity to irrigation mechanism and schedule for:
* Maximum return on investment from water applied.
* Maximum return on investment from fertiliser & chemical applied to soil.
* Minimise environmental impact of operation.
* Aim for uniformity and repeatability across the field (e.g: well drained sandy soil; tight tape spacing, frequent emitters and pulse irrigation. Regional environmental risk management
(Disease pressure - a variable variable)

Risk of disease infection varies with:
- Variety.
- Location.
- Seasonality.
- Fungicide protection.

Example:
- Same variety and same location.
- Significantly different seasonal conditions.
- Employ strategic spray regime to:
  1) ensure adequate crop protection
  2) apply only when necessary

Result: Healthy crop, reduced economic input.

Summary
Agrilink provides Precision Agriculture applications for constant and variable parameters. Precision Agriculture applications are not limited by fences or only applicable in the horizontal plane.

"Waiter, is this wine from a good vintage ?"
"Well sir, let me see… what is your zonal preference ?"

Rob Bramley[1,3] and Richard Hamilton[2,3]

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Vineyards are variable. Growers have known this for as long as they have been growing grapes, but in the absence of tools or methods to accurately observe and measure the variation, variability has been accepted as a fact of life and the majority of vineyards have been managed on the assumption that they are homogenous.

The advent of Precision Viticulture (PV) promotes opportunities for the implementation of either targeted management of inputs during the season and/or selective harvesting at vintage. Here, 'targeted management' can mean the timing and rate of application of water, fertilizer or spray, or the use of machinery and labour for operations such as harvesting, pruning or just about any aspect of vineyard management. Of particular interest to both grapegrowers and winemakers is the opportunity to use PV as a means of ensuring that parcels of fruit delivered to the winery are as uniform as possible, as well as meeting specifications for their intended end product. Thus, 'selective harvesting' means split picking of fruit at harvest according to different yield / quality criteria in order to exploit the observed variation.

Before embarking on PV and investing in the capital or contracted services that this new approach to viticultural production implies, grapegrowers and winemakers have wanted the answers to a number of key questions. Foremost amongst these, they need to know whether the patterns of within-vineyard variation are constant from year to year. If they are not, then clearly the idea that PV increases the certainty that a given management decision will deliver a desired or expected outcome (Cook and Bramley, 1998; Bramley and Proffitt, 1999) may not be correct. They also want to know whether targeting management delivers an economic benefit over conventional uniform management, a practice which effectively assumes that vineyards are homogenous in so far as their potential productivity is concerned.

These questions are specifically addressed by the 'null hypothesis' of precision agriculture (Whelan and McBratney, 2000) which states that "given the large temporal variation evident in crop yield relative to the scale of a single field, then the optimal risk aversion strategy is uniform management." Recently, Bramley et al. (2003) have provided a commercial demonstration that that adoption of PV is potentially highly profitable. This paper seeks to complete the testing of Whelan and McBratney's null hypothesis by examining within-vineyard yield variability and the extent to which its patterns are temporally stable.

Using new yield monitoring technology, a differentially corrected GPS, a GIS and some simple methods of spatial analysis, variability in winegrape yield was studied over several vintages in blocks planted to Cabernet Sauvignon and Merlot in the Coonawarra and Clare Valley. In any given year, yield was highly variable and typically of the order of 10 fold (ie 2 to 20 t/ha). However, through the use of k-means clustering and a modification of the method of

Diker et al. (2003) in which the probability of achieving yield targets relative to the mean annual block yield is assessed, temporal stability in the patterns of yield variation was demonstrated, even though there were substantial year to year differences in mean annual yield in these blocks.

The fact that we saw similar results with different varieties grown at sites in regions as diverse as the Coonawarra and Clare Valley, suggests that our results are likely to have broad implications for the wine industry. In particular, they demonstrate that vineyard variability is both of sufficient magnitude in any given year, yet its patterns sufficiently temporally stable between years, to warrant consideration of the implementation of 'zonal management' strategies in vineyards. In other words, in the case of winegrape production, we feel confident in rejecting the null hypothesis of precision agriculture (Whelan and McBratney, 2000); that is, uniform management is not the optimal risk aversion strategy.

Both methods used to assess persistence in the patterns of spatial variation are simple, easy to use and accessible. This is important because our results, and especially those from Clare, suggest that the greatest benefit from using these methods may accrue through the use of both, rather than just one or the other. In simple situations such as our Coonawarra site, k-means clustering alone may provide all that is needed for identification of zones. However, the Clare study provides an important lesson for those interested in pursuing 'zonal management': the 'target yield' method of zone identification allows the user to incorporate some expert knowledge into the analysis (in this case, knowledge of an abnormally cold and lengthy flowering period) and to also consider risk in the zonal management process.

It is often assumed that there is a yield : quality trade-off operating in Australian winegrape production systems. Our data support the view that higher yields do not necessarily produce the best wines, but they provide no evidence in support of the view that low yields do produce such wines. They also clearly show that the best wines do not necessarily come from the same zone within a block every year. Thus, in order to make the most of zonal management, we need to improve our understanding of the physiology of grape and wine production and the vineyard factors that control it. Our new ability to identify characteristic zones within vineyards that, hitherto, have been managed on the basis that they were essentially homogenous, provides a framework against which such understanding can be sought.

This work has important implications for the adoption of precision viticulture. In addition to providing vineyard managers and winemakers with the concept of zonal management, it highlights the opportunity for growers and winemakers to focus on assessment of 'vintage performance' and the ability to better define premium fruit parcels and thereby maximise commercial returns.

Acknowledgments

This work was funded by CSIRO Land and Water (CLW), Southcorp Wines Pty Ltd (SCW) and Australia's grapegrowers and winemakers through their investment body the Grape and Wine Research and Development Corporation. Support from the latter was matched by the Federal Government and by the Commonwealth Cooperative Research Centres Program under the aegis of the CRCV. The Clare data were derived during a separate study funded by CLW and SCW. In addition to these organisations, we are most grateful to Susie Williams

(CLW / CRCV) for her excellent technical assistance, and to many of the staff and management of Southcorp Wines (Coonawarra, Clare) without whose support, the work would not have been possible. In particular, the input of John Matz, Colin Hinze and Tony Proffitt (now with Albert Haak and Associates) has been valued greatly.

References

Bramley, R.G.V. and Proffitt, A.P.B. (1999). Managing variability in viticultural production. Grapegrower and Winemaker 427 11-16.

Bramley, R., Pearse, B. and Chamberlain, P. (2003). Being Profitable Precisely – A case study of Precision Viticulture from Margaret River. Australian and New Zealand Grapegrower and Winemaker – Annual Technical Issue. 84-87.

Cook, S.E. and Bramley, R.G.V. (1998). Precision Agriculture - Opportunities, Benefits and Pitfalls. Australian Journal of Experimental Agriculture 38, 753-763.

Diker, K., Buchleiter, G.W., Farahani, H.J., Heerman, D.F. and Brodahl, M.K. (2003). Frequency analysis of yield for delineating management zones. In: Proceedings of the 6th International Conference on Precision Agriculture and Other Precision Resources Management, July 14-17, 2002, Minneapolis. Ed. P. Robert. ASA-CSSA-SSSA, Madison, WI.

Whelan, B.M. and McBratney, A.B. (2000). The "null hypothesis" of precision agriculture management. Precision Agriculture 2, 265-279.

Precise Fertiliser Spreading: Reality or Fantasy

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Introduction

Much has been made of the potential of precision agriculture and applying the correct amount of nutrient to any given area or zone in a paddock. The question is are we being realistic in terms of developing variable rate systems? What is the level of performance required for our spreading machinery and what is it's current performance? Experience would tell us that we basically have to improve performance before we can realistically control inputs to the level of accuracy specified in variable rate application of fertiliser.

Before getting all starry eyed about it there are a lot of factors to consider in terms of getting the basic performance of the machine correct. Trying to go on to the next precise step without these basics in place would be worthless. The requirement for variable rate has also brought into focus the need for changes to our quality assurance programmes for spreader certification.

Currently there is a fair amount of debate going on regarding the testing procedure and technical issues surrounding the statistics of testing in order to assess performance. The standards set under the Spreadmark (NZ) scheme are no less stringent than other QA schemes around the world. However there is a balance to be struck, testing alone is not the answer and it must be used to establish the basic standard to be achieved and the best way to improve performance is through driver/farmer education and training. This is also very much the view of the Groundspreader's Association in NZ who wish to improve the level of professionalism in the groundspreading industry. While an association may be able to have some level of control over its members, non-members and farmers may not need to comply with code of practice as it stands at the moment.

Machine performance

A summary of the factors affecting spreader performance is given in Table 1. The majority of machines used throughout the world are the spinning disc type, with usually two discs, either hydraulically or mechanically driven. Either system has its potential problems. For example maintaining disc speed: Mechanical systems, make sure engine revs are correct as disc speed is directly proportional. Does the spreader have enough power that engine revs do not drop on the way up a slope? Is the operator maintaining constant engine speed? Do you have an on-board method of measuring spinner speed? Is the spreader fitted with alarms and monitors to assist the driver? All are questions we should be asking.

Achieving an acceptable spread pattern will be affected by disc vane angle and the number of vanes. Some patterns make it more crucial to get the width absolutely correct, but it must be remembered that if you change your bout width you change the application rate. So if you are spreading at 200 kg/ha at a bout width of 14m and you are only actually achieving 12m then that application rate becomes 233 kg/ha. Where you go out to 16m then the application rate drops to 175 kg/ha. This does not take into account any changes in C.V. that would occur. But it shows that inaccurate driving does have a significant effect.

Table 1 Factors Affecting Performance

Environment
Wind velocity and direction,
Moisture (Fertiliser and dust sticking to vanes and disc)
Slope, ability to cope with slope
Surface roughness and machine bounce.
Fertiliser
Physical properties, UI, SGN, Bulk Density, Particle Strength.
Machine Design and Manufacture
Good basic design, (ability to cope with a range of products in a range of conditions)
Thorough testing in R&D period.
Consistency and accuracy in manufacturing process. (Are Spreader type consistent)
Operator
Knowledge of machine settings and characteristics.
Maintaining machine setting and performance in the field. (disc speed, machine level, engine revs and forwards speed, matching power unit to spreader)
Maintenance and cleaning of machine
Ability to accurately test and sample produce and machine.
Accurately and consistently drive at the correct bout width
Testing
A fair, repeatable and representative testing systems for field and type testing
Statistical treatment of the data.
Clear test instructions
Test Quality Assurance system

It is well known that the particle size distribution and the bulk density of the fertiliser does have a significant effect on the spreadability of any product. Correct storage is important. The particle size distribution can be estimated from carrying a sieve box in the cab and many contractors do this. Those with sufficient expertise and experience will be able to adjust the machine to cope with the change in particle size distribution. Clearly machines need to be set up for different products and cope with variation in the same product. Other measures such as the Uniformity Index UI and Size Guide Number SGN also give an indication of the products variability.

It is important that the spreader achieves a consistent drop-on point from the chain, belt or from the hopper to the disc, change this and you change the spread pattern. Spreaders that produce a consistent drop-on point are more likely to achieve consistent results, slope will affect this as will bounce. Field tests conducted by the authors would indicate that longitudinal variation is actually much greater than is generally accepted. In field trials longitudinal coefficient of variations (CV) of between 13 – 20% have been measured. Bear in mind that the accepted coefficient of variation for nitrogenous fertilisers is 15% for transverse testing. Clearly in some conditions we may have a situation where a machine meets the requirement for transverse CV but does not actually achieve this in terms of its overall spread because of excessive longitudinal variation. Machine design is an important factor in this as are field conditions.

Testing Procedures

There has been much fierce debate about testing methods but the Spreadmark NZ test is intended as a basic test to verify that a spreader can achieve a reasonably uniform spread pattern over a specific bout width. The present standards are a c.v. of 25% for non nitrogenous fertilisers and 15% of high N products. The test procedure must be carried out consistently between tests, be representative of the machines performance and be conducted in an efficient and cost effective manner. It differs from the Australian system in that there is no multiple passes over the test trays. However we compensate for this by making multiple passes over the try line.

The current situation in New Zealand is that test procedures are being reviewed and a number of test elements are being investigated. These include, tray placement for transverse tests, number of trays used, scale performance, and the possibility of longitudinal testing. There is some further work to be done in terms of evaluating longitudinal testing, such as, at which point do we test? Middle? 1/3 over the bout width? clearly the test method need to be established before the standard is imposed.

The methods for field testing the physical properties of fertilisers has also been reviewed. Balance Agrinutrients (one of the two main NZ suppliers) has produced a sieve box to be used for calculating Size Guide Number (SGN), Uniformity Index (UI) and Bulk Density (DB). The sieve box was developed with 9 sections. This attracted some comment from operators who felt that 9 were about 5 too many. Testing by the authors indicated that although in Urea a sieve box with as few as five sections would give reasonable results for calculating UI and SGN, in more variable products such as Superphosphate having fewer than seven sections in the sievebox made it insensitive when calculating UI and SGN.

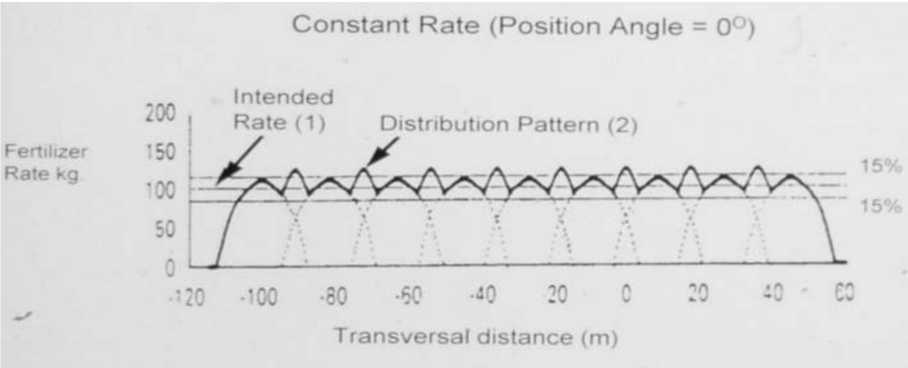
If operators are to use this measurement system then further knowledge needs to be developed and formalised as to how to react to the information presented, i.e. what is the effect on spread pattern for varying particle size.

Guidance

Guidance in the form of driver assistance has been around for a number of years and there are a number of systems now available in New Zealand. At this stage we are unsure of the number but there does appear to be a significant number of groundspreaders now using GPS guidance. Different swath patterns can be followed, up and down, round and round etc. The paths are generated within the receiver. The most basic systems do not record position but it is not a problem to do so with additional equipment. This has the advantage of providing a permanent record of where the spreader has been, this is becoming more important for QA purposes.

A number of operators have been concerned about the way in which they have felt the need to change their work pattern to accommodate the guidance assistance. This is mainly down to training and making sure that the operator understands how to set up the unit. If an operator has worked sloping paddocks in a pattern that is safe it is important that they do not inadvertently change to unsafe practices.

Figure 2a



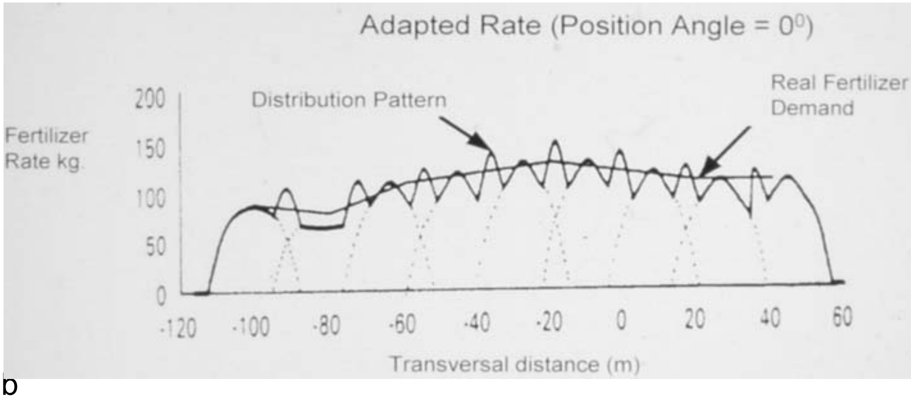
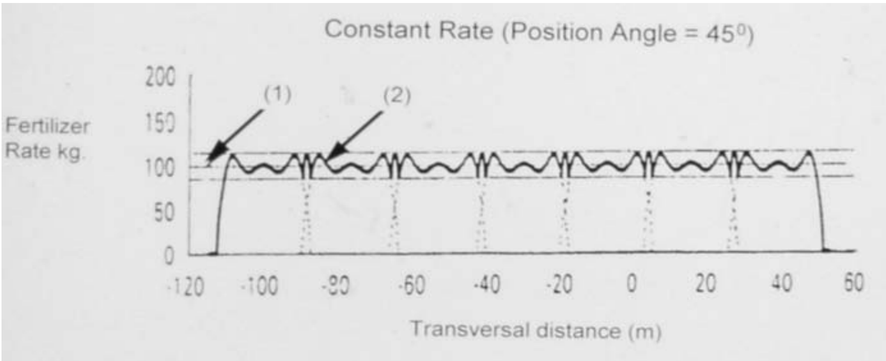
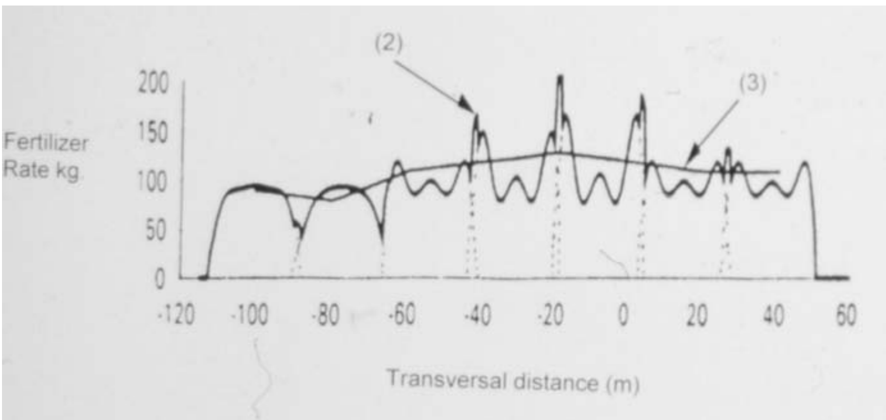


Figure 2b

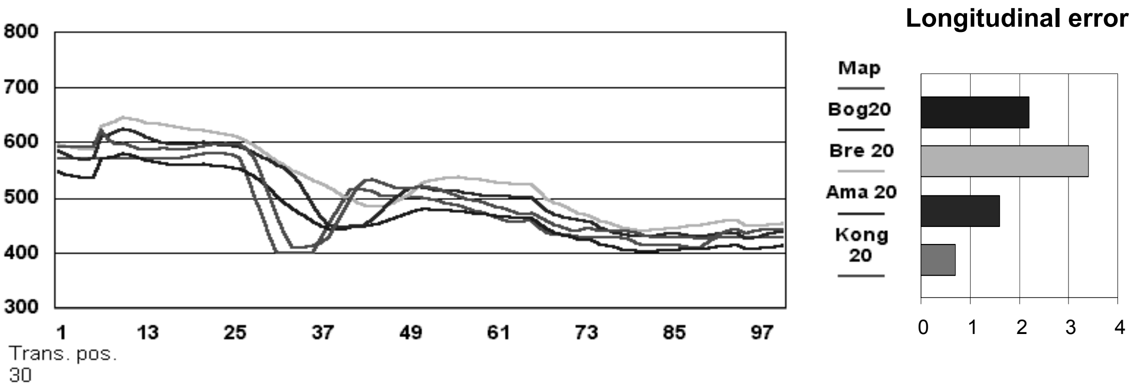




Variable Rate Applications

The technology has been available for a number of years, the biggest hurdle has been developing the knowledge to decide on spreading rates. The ability to change the rate quickly and accurately has come under heavier scrutiny more recently. This was highlighted by Persson et al., (2003) The sensitivity of the systems revolves around two factors, the foot print size of the spread pattern and the way in which the controller is set up, either reactive or predictive. Persson et al., (2003) presented evidence that would indicate some systems are slow to react, this is a clearly a problem that can be relatively easily solved. There is also an issue of accuracy in terms of achieving the desired application rate.

Figure 1: Longitudinal Fertiliser Distribution Error. From Persson, Skovsgaard, Weltzien. (2003)



Stability of the spread pattern as rates are changed has also been investigated. Olieslagers et al., (1994) presented evidence that in some cases spread pattern can change significantly as the spread rate is altered. Clearly this is a problem that needs to be addressed and is pretty fundamental to good spreading, i.e. that the spreader can achieve a consistent spread pattern at different rates using the same product.

Figure 2a & 2b. Illustrate a series of images showing the differences in performance and the potential problems.

Conclusions

The current generation of spreading equipment should be adequate for agricultural use however there are a number of design issues that need to be overcome to ensure good consistent performance. Having an adequate testing system is an initial step in ensuring good performance. Better operator training is required to ensure machines are used properly and regular calibration and maintenance is carried out. Guidance will help improve performance but this must be set up effectively in the vehicle cab to be used to its potential. There is some evidence that the controller performance for VAR needs to be examined more closely to achieve good results in terms of longitudinal accuracy.

References

Persson, K. Skovsgaard, M. Weltzien C. Technical Solutions for Variable Rate Fertilisation. Fourth European Conference on Precision Agriculture, Berlin, June 2003.

Olieslagers, R Ramon, R Delcourt, H. Bashford, L The Accuracy of Site Specific Fertiliser Application By Means Of a Spinning Disc Fertiliser Spreader. In proceedings of Site Specific Management for Agricultural Systems, Minneapolis, March 1994

Key Elements of the Successful Integration of PA into Day-to-Day Management

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Queensland Cotton is strongly committed to the sustainability of the cotton industry. As well as supporting local and national initiatives, the Company is investing in technological advances to assist the cotton industry use resources more efficiently, which is better for the environment, the Company and the cotton industry.
SciAg

Our satellite mapping services continue to expand and many customers are now reaping the financial rewards of using precision tools to manage their farming practices to ensure their properties remain fertile and usable into the future. Accurate information enables growers to quantify the exact amount of seed, fertiliser, water and pesticide usage, saving valuable resources and reducing pressure on the environment.

An Evidenced Based Approach to Predict Soil Properties And to Manage Farms

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The productivity of wheat belt paddocks in Western Australia is notoriously variable and grain yield ranging by a factor of ten is commonly measured by yield mapping. Preliminary economic analysis suggests that part of the paddock is consistently operating marginally and often at a loss. This lowers the paddock's overall financial performance. This problem of variable performance occurs in a context of community demand for land use change on a significant area of the farm to address issues of salinity and loss of biodiversity.

A key question is whether the poor performing areas of the paddock can be remedied economically or are inherently unsuited to annual cropping. The use of yield maps and a number of relevant independent spatial data sets such as EM, DEM, gamma emission and satellite imagery and spatial modelling can help understand yield variability and decide on suitability for current land use.

The weight of evidence model allows the grower to use his knowledge and the spatial data sets to address the question posed in a probability context using fuzzy sets derived from the spatial data. The Dempster Shafer extension of the model allows for ignorance in the decision-making process and the use of expert knowledge where formal quantitative relationships between cause and effect are not fully understood.

Another extension is Multi Objective Land Allocation (MOLA). MOLA takes into account trade offs between conflicting production and environmental objectives. We shall describe the model and its extensions in two examples of land use evaluation. An additional benefit of the Dempster Shafer extension is that it can also be used for predicting soil properties. This will be demonstrated with the mapping of boron deficiency in the Western Australian cropping areas.

Development of Proximal On-the-Go Soil Sensing Systems – A Challenge for PA Research Worldwide

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Site-specific crop management is the future aim of precision agriculture. For site-specific crop management soil data is needed at spatial resolutions of 20 metres or less. Grid soil sampling and laboratory analysis is laborious, untimely and expensive. Routine soil maps and existing databases are also clearly inadequate, although these may prove useful for stratification and calibration purposes. Combining grid or random sampling with digital elevation models and other environmental data and using geostatistics to interpolate may be an option. Zone management techniques have also been developed as interim approaches between uniform and site-specific management. However, soil sampling may nevertheless be too expensive; particularly for broadacre agriculture as sampling of large areas is required.

Sensing and scanning technologies must be strategically developed to aid with the collection of data at the appropriate resolutions. These systems should be timely, reduce the labour and minimise the expense of soil sampling and analysis. The development of 'on-the-go' proximal soil sensing systems to quantify soil spatial variability and produce the information required for site-specific management is particularly important for the wide-scale adoption and implementation of site-specific crop management.

This presentation will outline some of the sensing systems that have been developed and some that are currently under development.

Precision Agriculture – Making it pay: Examples from Small Business

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Company Background

Silverfox is a new innovative business whose vision is to bring together the fragmented components of precision agriculture; to ensure that this next major step forward in broadacre cropping is actually achieved. The Silverfox team includes a precision agriculture specialist, a long term agricultural systems and nutrition specialist, a marketer with extensive experience in delivering and supporting innovation and very youthful bright sparks delivering the work room grunt.

Our services are built around the analysis of satellite acquired normalized difference vegetation index (NDVI), which we refer to as biomass imagery. We carry out a similar range of analyses on header yield data. These services provide the starting point for a truly integrated farming system based on precision agriculture technologies. These services are available in Western Australia and they will be delivered by Kerin Agencies and Agconsulting in South Australia this year.

Why did we start with biomass imagery and yield data and not with EM38 or something else? The key reason is that the growing crop integrates all of the factors affecting plant growth during a given interval in a growing season. We can measure the many individual components in the environment that affect the plant's growth.

This environment is highly complex and involves soil chemical, physical and biological interactions with the plant's root systems and the interaction of the readily visible portion of the plant with the above ground outside world. The above ground interactions include elevation, aspect, incident sunlight, temperature, biological factors, leaf disease pressure, etc. The crop effectively integrates how it interacts with all these elements and demonstrates this through its biomass and eventually by its grain yield.

If the patterns that a crop shows us are consistent over the years you can alter your management accordingly, with little risk. As scientists we would like to measure all the variables that affect plant growth, but that is not a practical and cost effective starting point for the practising grower. But analysing how the plant sees all these factors is economical, practical and can lead to decisions that give an immediate financial return on farm, without any further investment in expensive equipment.

Silverfox Services

Our core services are based around an historical analysis of biomass or yield imagery, preferably over 5 years or more. These services define:

- What areas of the paddock perform above or below average by 20% or more over the years analysed

- Whether these areas have performed in this manner consistently through time or not (You can act on consistently performing areas immediately to increase the efficiency of inputs by at least 10-15%). In our experience clients save about $40GM/ha through reducing inputs to poor performing areas and raise returns through extra input to high performing areas by $100 – 200GM/ha. (In our presentation we will give examples that exceed those figures.)

- We combine both of these into a map that can be used to target soil sampling or define management zones

- Given the crop rotation, we then derive yield and Gross Margin maps for the most recent years cereal crop in the rotation

These analyses are then used by a consultant or agronomist, together with the grower's long term understanding of the farm, to assist in making management decisions. The decisions that are made are as diverse as our grower clients:

- One might use the analyses to drive full VRT fertiliser application (the person I am thinking of does this not because it is wizzz bang stuff but to help him manage relatively unskilled farm labour at sowing time.)

- Another growers might use it to actually trial a range of inputs across their variable environment and then ask us to analyse the results, so they can pick the best options.

- Other growers use them to define high risk areas or high risk paddocks. They then drop these areas or paddocks out of their sowing program in adverse years or during tight financial circumstances.

The important thing is to make a link to an individual who is totally committed to making this technology work for you and try it on a few paddocks now. Compared to other farm costs our analyses get you started relatively cheaply and at much less cost than going to full VRT; before you know whether this type of information can fit into your management approach.

The knowledge we have already gained from interpreting these images over the last year - has leaped forward from working with a range of clients. Having the results from analysing many paddocks across WA, has led us to new understandings. We will be discussing these in our conference presentation.

For more information please visit our web site at http://www.silverfox.net.au or telephone us to discuss your needs on 08 9361 0955.

Precision Viticulture – A Perspective from the Vineyard

Colin Hinze
Southcorp Wines

We are the largest investor in rural Australia. So it is no surprise that Southcorp is committed to ensuring that sound environmental principles and practices are integral to our operations and that we provide a safe, healthy, injury free and environmentally sound business.

Like many companies we have a systematic approach to identifying and managing environmental risk within our organisation. This has now been extended to ensure that each winery and vineyard has a site environmental management plan specific to its operations and risk. Accreditation to the International Environmental Management System standard, ISO14001, has been achieved at several sites.

But we have taken our commitment to sustainability and environmental protection much further than simply meeting regulatory requirements. Environmental responsibility and awareness permeates our business at all levels - from the Boardroom to the Cellar Door. In every part of our business, we seek out ways to make a positive contribution to the community on a national, state and local level.

Wrap-Up and Summary from the 4th ECPA

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Precision Agriculture is an evolving management philosophy and the evolutionary process is beginning to stir more interest among farmers, agribusiness and researchers. The attendance and presentations today are a testament to this fact. The information gathered today and the contacts/friendships developed should be used to continue the development of PA and all its practical applications within the Australasian region. Where we can work together, success should be achieved much faster and with minimal duplication or wastage. We should all also attempt to spread the positive messages of PA (responsible, efficient resource management for commercial and environmental gain) to the wider agricultural and urban communities.

4ECPA and the 1ECPLF
This year saw the 4th European Conference on Precision Agriculture and the 1st European Conference on Precision Livestock Farming. More than 500 participants from 40 nations attended the two conferences during the three days from June 16-19 in Berlin. There were 230 oral papers running in 6 parallel sessions and more than 200 posters. 20 companies from industry or ag services were on display in the hall.

The proceedings can be purchased from Wageningen Academic Publishers: http://www.wageningenacademic.com/

Some highlights:
*A greater number of papers on soil sensing systems under development
*A possibly invigorated attitude to trialling the Hydo-N sensing system in Australia
*Good beer and food

Some not-so highlights:
*A continuation of a degree of redundancy between the ECPA and International PA Conferences
*Currency exchange