NEW TECHNOLOGIES FOR CROPPING: Annual LandWISE Seminar 24 & 25 May 2005
Closing Remarks: Garth Eyles, HBRC

NOVEL APPROACHES TO BIRD MANAGEMENT
Chris Pennell, Pasture Agronomist, AgResearch Limited

SRIP TILL OBSERVATIONS 2004/5
JB Squash Ltd

CURRENT HAWKE'S BAY REGIONAL COUNCIL WATER ALLOCATION
Andrew Curtis, HBRC

DECISION SUPPORT IN FRUIT PRODUCTION
by Dr Trevor Atkins, Director, HortPlus

SUSTAINABLE FARMING FUND
Barrie Wallace, MAF

INFORMATION TECHNOLOGY – CROP MANAGEMENT TOOLS
Jeremy Pile, Muddy Boots Software Ltd

N SENSOR AND EM SOIL MAPPING
Aaron Stafford, Ballance Agri-Nutrients

SOIL PH AND THE USE OF LIME
Mike White, ARL

STRIP TILL TRIALS SUMMARY 2004-2005
Wayne Hosking, LandWISE Field Officer

NEW TECHNOLOGIES FOR CROPPING: Annual LandWISE Seminar 24 & 25 May 2005

Closing Remarks: Garth Eyles, HBRC

It has been great listening and learning over the 2 days of the seminar. LandWISE began as a farmer group developing techniques to minimise soil erosion while maximising production. It has grown amazingly and is now increasingly pushing new technologies, to increase profitability while maintaining the environment. Its success is evident by the number here.

Hawke's Bay Regional Council is very pleased with the way LandWISE is developing. This conference is evidence that industry and owners are interested in taking a controlling hand in developing sustainable ways of increasing production profitably; this means reducing the risk of soil erosion, reducing nutrient loss and maintaining or improving soil condition – all to the benefit of the region.

These comments are not a comprehensive review of all the papers; rather they are comments on areas and papers that I found particularly interesting.

I felt it was particularly appropriate for Barrie Wallace to represent the major sponsor, Sustainable Farming Fund, at this seminar. Barrie has been a guiding hand in agriculture in Hawke's Bay for many years. The Sustainable Farming Fund could be considered the saviour of New Zealand agriculture as it has filled the void created by the CRIs moving away from practical and applied research. The Sustainable Farming Fund assists practical applied research through to its implementation. I congratulate them on maintaining this approach.

Session 1: Visions for the Future

Nick Pyke from FAR tempted us with snippets of the future; smart seeds – designer seeds. He also reminded me of history by talking about the extension gap as it wasn't that long ago New Zealand had possibly the most effective extension service in the world and it threw it away – we now have an extension gap! He talked about the future need for whole catchment studies. When I joined soil conservation in the 1960's whole catchment studies were the "in" thing. It is amazing how the circle goes round.

E-farming – this conjures up the ideal of bringing together all the latest and future developments and advances and presenting them in such a way that all farmers have easy access through new technology and computers systems.

David Walker from Telecom provided a tantalising picture of what the future might hold with E-farming through broad banding. For the majority of Hawke's Bay farmers, I doubt the advances he talked about will be available as we only have about 90 dairy farmers and that will not be enough to prioritise broad banding the whole of Hawke's Bay. Satellite communication will probably be the solution but that depends on who owns the access and their profit requirements.

Session 2: Information Technologies

Trevor Aitkin from HortPlus described the potential of an integrated pattern of weather stations. Just imagine a network of these throughout Hawke's Bay, connected through the-Web with the information being freely available for farmers to interpret or for modellers to develop and apply models relating to animal health/plant health and the like. That would be a great opportunity.

Session 3: Soil Management Alternatives

To me the highlight of this session was the report on the LandWISE trials by Wayne, supported by the other speakers. It was interesting to me that the speakers tended to emphasise the reasons why some yields were not as good as others, even though 50% of the trials provided

improved yields. I believe we need to be more positive about the results from these new techniques:

We can't expect the soils to change immediately a new technique such as strip tillage is introduced. It may take 5 or even 10 years for significant soil structural changes to occur. David Clark, with his controlled traffic approach on the Gisborne flats is finding very significant soil structural changes after a relatively short time but this may not follow in all sites.

Grazing during the winter may destroy the changes caused by the minimum tillage techniques during the summer.

New technologies require supporting research to understand the unknowns. We are just touching the surface of this. There is simply not enough money for us to carry out comprehensive research programmes to be able to understand all the aspects associated with the new technologies that we need to.

Be patient! It takes time for these new developments to be shown to be successful and economic.

One of the strip tillage sites that had a negative net return didn't mention that the farmer had achieved a $1700 per hectare profit from the cattle that he grazed on that site immediately prior to the crop.

An aspect that hasn't been discussed in these papers but is probably quite significant is the whole year management of these areas. It seems to me that it is difficult to expect a new management technique like minimum till or strip till to work effectively when the area is perhaps overgrazed for the remainder of the year.

Session 4: New Approaches to Pest Management

The main message I got here was that croppers can learn from the orchardists about integrated pest management. Or, putting it another way, we were shown what is in store for the croppers by seeing what the orchardists have to do to document their practices and reduce reliance on agrichemicals.

Did you know that a slug can be identified by rubbing its back? If you didn't know that – check up on the display information that was provided for the Workshop.

I never knew bird control could be so entertaining - or so significant.

Session 5: Optimal Crop Nutrition

This session comprised a series of interesting papers on a number of topical issues ranging from soil sampling to the whizz-bang.

I was particularly interested in the LandWISE project to investigate banded fertiliser application. This shows the need to think through the implications when applying new technologies. The phosphate levels in the band were extremely high and this presumably means that significantly less phosphate needs to be applied if the planting is going to occur in exactly the same line each year, or conversely will the plants starve if their roots are outside the strip.

It always amazes me how little we actually know about the critical but basic components of plants. For instance – what <u>is</u> the root morphology of our major crops when growing in our major soil types?

The mind boggles at the future tractor – GPS unit, Nitrogen sensors and so on. One wonders if there will be room on these tractors for the primary pulling unit.

The presentations on modelling illustrated their importance when planning what fertilisers and what practices should take place when growing a crop to achieve a particular yield. These models will allow more specific programming of fertiliser to be applied, which will mean less fertiliser loss.

Session 6: Irrigation Systems

To me, this session was about using the whole water resource more effectively to ensure that this limited and resource is not wasted.

Andrew Curtis explained the Hawke's Bay Regional Council's approach to water allocation and the need for consultation and careful planning to ensure that the very limited amounts of water available are not wasted.

Dan Bloomer followed on from this by illustrating the different efficiencies of a range of irrigation systems and explained the reasons for these variations along with the financial implications.

SUMMARY

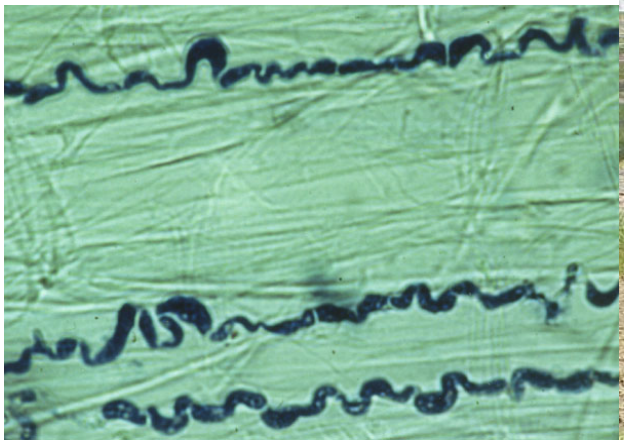
Altogether, a very stimulating two days, concluding with a very enjoyable afternoon at Crop and Food's Lawn Road Station, seeing first hand some of the new big toys that the croppers have to play with. One highlight of the afternoon was seeing the traditional field day "after function" group gathered around a Rush Munro's freezer all eating ice creams!

Garth Eyles
MANAGER LAND MANAGEMENT
Ph: 06 835 9200 extn 9218
Email: garth@hbrc.govt.nz
www.hbrc.govt.nz

Novel Approaches to Bird management

Chris Pennell. Pasture Agronomist. AgResearch Limited.
Canterbury Agriculture & Science Centre. Lincoln

The idea that we could produce grasses infected with endophytes, to reduce the bird strike problem in the aviation industry, came from research with fungal endophytes that were causing staggers in stock.




Endophyte fungus growing in ryegrass plant tissues. Captive Canada Geese in grazing trials.

Research with Canada geese, gulls and finches showed that we could induce a sickness in the grazing birds and therefore reduce losses to the predated crop.

Modern sound equipment developed and marketed by Bird Gard gave a 47% increase in yields of the test winter wheat.

Considerable losses are incurred where perching sites are close to the crops grown and there needs to be more research on what shelter belts offer shelter to the crop but a poor habitat for birds.

We are getting more problem birds predating our crops due to the diversity of edible seed crops grown later into the winter and maturing earlier in the spring. Should we be looking at fertility reduction of our problem birds?

Delivery ideas please: Email chris.pennell@agresearch.co.nz
Direct Dial +64 3 983 3969

May 2005

JB SQUASH LTD
STRIP TILL OBSERVATIONS 2004/5

OBSERVATIONS

- Plant performance compared to conventionally grown squash.
- Weed Control Management
- Wind Protection Benefits
- Cost Benefits
- Cultivation Benefits

CONCLUSIONS

- Strip tillage is a must where soil erosion is a risk factor.
- Flexibility to hoe in uncultivated strips if plants are struggling or weed control is going to be an issue.
- Strip till area grown will probably increase.

May 2005

CURRENT HAWKE'S BAY REGIONAL COUNCIL WATER ALLOCATION
Andrew Curtis, HBRC

How much water?
Brief overview of the science and the evolving models.

How is water allocated?

Brief overview of irrigation consent system - including current ability to transfer/trade either wholly/partially/temporarily water allocations within it.

Future

Overall HBRC has recognised the water resource as one of the main future issues that needs to be dealt with - LTCCP – 2004-2014 – strategic review of water resources

Pressures and Issues

- Public perception and changing values - recreation and conservation vs irrigation. Power generation may also enter the equation in the future?
- Potentially irrigable land vs presently irrigated (potential for large scale development especially river terraces such as Wakari and Mohaka - however, does Heretaunga have this further potential given its fractured nature and land values?)
- Over allocation of surface water bodies – Ngaruru and Tukituki.
- Efficient use of resource - including the use of water meters as a tool to do this?
- Water quality – phosphate.
- Better public education of the resource and its use – what is there and the actual effects of irrigation on it and also public perceptions of irrigation efficiency losses (i.e. visual inefficiencies vs uniformity).
- Ruataniwha - whole basin management ground/surface water interactions.
- Effects of increased use of actual water allocation - current 40% use could be potentially 90%+ especially if consent allocations better utilised i.e. double cropping or temporary trading of allocations.
- Agricultural commodity prices (i.e. lucrative milk solid prices once again causing an eruption in dairy conversions or maybe a massive potato expansion on the Ruataniwha?).

Potential Solutions

- Encourage groundwater use rather than surface water.
- Improve public and grower education regarding resource and irrigation practices.
- Help Councils understand the water requirements of efficiently irrigated crops – efficiency measures not likely to be required by Councils but will become an exercise to be carried out by growers to better utilise their water allocations i.e. as Councils knowledge of crop water requirements increase, it's likely that irrigation allocations will reflect this.
- Long-term - water storage schemes - individual or catchment/sub-catchment schemes?

Overall

HBRC emphasis is working towards better understanding of the resource in order to satisfy the requirements of all user groups.

May 2005

DECISION SUPPORT IN FRUIT PRODUCTION

The importance of weather information and weather forecasting
by Dr Trevor Atkins, Director, HortPlus

Decision Support tools such as HortPlus MetWatch are critical to the consistent production of high quality produce while meeting the demands for reduced environmental impact and improved human health outcomes.

Weather information - both recent history and forecast - is critical information for sound decision making in the fruit industry. The time scale for decision making often demands frequent re-appraisal of conditions, sometimes down to an hourly basis in extreme situations.

A number of advances in technology now enable Decision Support tools such as HortPlus MetWatch to deliver very real benefits. Some of the advances driving this are:

- Weather forecasting technologies that enable forecasts of conditions such as temperature, rainfall, and wind on an hour-by-hour basis going out 2-3 days; and over high spatial resolutions with a 12km grid
- Numerical forecasts that can be incorporated directly into models to interpret the forecast to provide management information
- Constantly improving range and quality of biologically-based models for interpreting information
- Virtually global computer access and access to internet for moving information
- Development of new mediums for the delivery of information coming from Decision Support tools including desktop software applications, the World Wide Web and cell phones.

Fruit growers now routinely use their computers to access high quality weather information from forecasts and weather stations, and to interpret this information for disease pressure, future disease risk, and suitability of conditions for spraying.

HortPlus contact details:
0800 438 457
Email: info@hortplus.com

May 2005

Sustainable Farming Fund

Barrie Wallace, MAF

The aim of the Sustainable Farming Fund is to assist those involved in the land based sector to solve problems and take up opportunities in economic, environmental and social development. The fund was introduced by the Hon Jim Sutton and established in 2000.

It is now into its sixth funding round and has contributed over $9 million annually to the 300+ projects which are currently running. These range from Alpaca to Zespri with LandWISE Incorporated being just one of them. SFF contributes from $1,300 to $400,000 to each project over a one to three year period.

Projects supported by the SFF are developed and run by an appropriate community of interest with Landwise being a very good example. The teams involved with the projects are almost always made up of producers, scientists, agribusiness, local government and consultants. These 300 plus projects are managed by team of six at SFF. In Wellington, Kevin Steel (Fund Manager), Fiona Duncan and Amanda Hall; Helen Percy at Ruakura; Katherine McCusker in Christchurch and Barrie Wallace in Palmerston north.

You can find out more about the Fund and its projects on our website www.maf.govt.nz/sff

May 2005

Information Technology – Crop Management tools

Jeremy Pile, Muddy Boots Software Ltd

Many growers are struggling to keep up with the increasing demands that are placed on them to keep crop records and manage their farm businesses successfully. Demand for food traceability is an issue that is not going away and neither is the need to comply with an ever increasing number of growing standards.

Muddy Boots Software has a range of innovative software systems which are used by agronomists, growers, processors and retailers. It works with family owned farm businesses through to multinational companies delivering IT solutions for their everyday businesses. Muddy Boots software can help reduce the burden of keeping management records to meet food traceability and compliance demands. Its understanding of the practical issues and problems that growers face within the food industry has resulted in the development of the most successful crop management software on the market today.

The CropWalker software programme is designed to make crop recording simple, the intuitive features makes it easy even for the novice computer user to generate information. The principle of 'one time data entry' saves hours over hand written records and easily produces records for crop reports and management plans.

The supporting NZ database of registered agrichemicals and the automated warnings in CropWalker ensures that farmers and growers keep within the rules for agrichemical use including approved withholding periods for the end use market. The powerful reporting capabilities provide all the necessary documentation to keep pace with change.

Muddy Boots Software contact details:
www.muddyboots.com
j.pile@muddyboots.com
Ph 09 238 1176

May 2005

N SENSOR AND EM SOIL MAPPING

Aaron Stafford, Ballance Agri-Nutrients

Remote sensing can be defined as "the technique or process of obtaining data/images from a distance".

Remote sensing technique depends on the parameter being measured. For example, remote sensing includes EM soil mapping, where measurement of soil electrical conductivity can be used to produce maps that show soil spatial variation in texture, porosity, organic matter, moisture holding capacity etc. These factors can have a large impact on seed sowing rate, irrigation requirement, and nutrient supply and retention.

Remote sensing also includes measurement of crop properties. Satellite technology can be used to scan crops from space, allowing rapid and multiple assessments to be made in a non-destructive manner. This could help in early identification of areas of crop stress.

The Yara N-Sensor that Ballance Agri-Nutrients is investigating is a tractor mounted unit that is used to measure crop chlorophyll and biomass. Both of these measures are largely a function of crop N supply. The N-sensor uses this data to drive variable rate N application.

The end goal of remote sensing is to use the information captured to drive better management of resources - Variable Rate Application Technology. Improved resource management can increase profitability, and with less wastage (particularly in regard to nutrient loss) potential risk to the environment is reduced.

May 2005

SOIL PH AND THE USE OF LIME

Mike White, May 2005
Analytical Research Laboratories (ARL) Limited

Soil acidity refers to the concentration of H+ ions in the soil. This is represented on a pH scale of 1-14 with pH 1 being strongly acidic, pH 7 neutral and pH 14 strongly alkaline. Most New Zealand soils have natural pH values between pH 4.5 to 7.0.

Over time the soil pH will decrease (become more acidic) due to plant growth, organic matter mineralization, nitrate leaching and the acidifying effect of some fertilisers (the fertiliser effect is relatively minor when compared to the soil acid generated by the soil-plant environment).

For optimum production and quality the target soil pH for arable crops generally lies between values of pH 5.8-6.5, depending on the crop. Agricultural lime, which consists of calcium carbonate (CaCO3) is generally used to correct soil pH in acidic soils or to maintain the soils current pH status. Lime neutralises soil acidity by the carbonate in lime reacting with the acidic hydrogen ions (H+) in the soil to ultimately form water and carbon dioxide. Other liming agents include dolomite, burnt and slaked lime and industrial by-products usually containing calcium oxide/hydroxide).

The benefits of liming soils include:

- increased mineralisation
- supplying calcium
- increased molybdenum availability
- increased phosphate availability (limited to some specific soils)
- decreased aluminium and manganese toxicity and,
- increased soil water holding capacity.

However care should be taken not to over lime as this can reduce availability of trace elements (such as zinc and manganese) and the use of lime can also reduce the plant availability of rock phosphate where this is part of the fertiliser programme.

Generally for crops it is economic to apply lime to achieve the target soil pH values. Agricultural lime does take time to dissolve in the soil so it is essential to plan lime applications 3 to 6 months in advance of planting the crop. Good quality lime should have a calcium carbonate content of 80% or better and a particle size distribution where at least 50% of the lime passes through a 2mm sieve. For best results lime should be incorporated into the soil. As a general guide to liming quantities, 1 tonne of good quality limestone raises soil pH by 0.1 units for the top 15cm of the soil. However, this relationship varies depending on soil type and recommendations should be altered to take this into account.

Analytical Research Laboratories (ARL)
890 Waitangi Road
Awatato
NAPIER

Ph 06 835 9222
Free phone 0800 100 668

STRIP TILL TRIALS SUMMARY 2004-2005

Wayne Hosking, LandWISE Field Officer

Strip till will yield as well, or better, than conventional cultivation but can be severely penalised if there is soil compaction left between the rows.

Strip tilling into a quality soil with the correct soil conditions will result in a quality crop. Any compaction at all must be removed to allow adequate root penetration between the rows. This is especially important with corn and squash. The two paddocks where the strip till corn had a significantly lower yield had visible compaction from grazing bulls. Running an aerator down between the rows to shatter the soil may remove this problem.

The squash this year showed an interesting pattern with adventitious roots. The higher yielding treatments had a greater number of fruit with adventitious roots.

Maize appears to have the ability to cope with minor compaction better but there were some poor crops due to strip tilling in wet ground and not matching planter rows to strip till rows.

Peas are also known to be susceptible to compaction. Low pH can affect peas and we saw that this year with no nodule formation causing a deficiency of nitrogen and a lot of very yellow pea plants.

To get a top yield with strip till you must:

- Strip till under the right conditions
- Remove any soil compaction between rows
- Maintain good weed control
- Get your soil fertility right

May 2005