

IN THE MATTER of the Resource Management Act
1991 ("**the Act**")

AND

IN THE MATTER of the Resource Management Act
1991 and the Environment
Canterbury (Temporary
Commissioners and Improved Water
Management) Act 2010

AND

IN THE MATTER of the hearing of submissions on the
Proposed Land and Water Regional
Plan

**STATEMENT OF EVIDENCE BY ROGER LASHAM FOR
HORTICULTURE NEW ZEALAND
2 APRIL 2013**

QUALIFICATIONS AND EXPERIENCE

1. My name is Roger Lasham. I am a self-employed agronomist currently working in Canterbury.
2. I have a National Diploma in Agriculture, an Agricultural Advisers Certificate and a Fertiliser Advisor Certificate obtained in the United Kingdom.
3. I have been in New Zealand the last six years, mostly in Canterbury but also with one-year working in the Hawke's Bay region. Prior to this, I spent 17 years in the United Kingdom doing similar work.
4. I currently undertake intensive management of 4000 ha of Canterbury arable/vegetable cropping land, and work in an advisory capacity for another 6600 ha. I have specialities in the area of cereals, beets, pulses, grass seeds and small seeds.
5. I have been provided with a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's Consolidated Practice Note dated 1 November 2011. I have read and agree to comply with that Code. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

OVERVIEW

6. In my evidence I cover my experience in relation to nutrient management.
7. My experience has taught me that nutrients can't be applied with accuracy without knowing what point you are at on the farming system. That requires accurate record-keeping, regular testing, adherence to guidance, sound training and management of staff and regular management and maintenance of equipment.

NUTRIENT MANAGEMENT

8. "Canopy management" is a significant part of my agronomic approach. This is managing canopy for light - if there is too much green mass then not enough **light** (energy) is able to access the target parts of the plant, to maintain yield potential. Generally, too much nitrogen too early, means too much leaf not enough grain – so the timing of nitrogen and other nutrient applications is crucial. There are many tools used to manage canopy.
9. My nutrient management approach is based on the U.K.'s fertiliser manuals produced by DEFRA, known as RB209. It is an inputs based approach. English farmers need to demonstrate adherence to RB209 to be eligible for farming subsidies. Significant research has gone into the production of the standards. They are able to advise what mix of nutrients should be applied depending on the pre-existing crops, the paddock history, the soil types and the climate. It is not always possible to completely apply the standard here in New Zealand. For example, there is often a stock grazing element between crops in Canterbury. The other key difference is that in New Zealand there is plant growth over the winter period, so there is a greater uptake of nutrients. There is also a greater yield (for example 8 tonnes in Europe cf. 10 tonnes here). So occasionally, we increase the application to take account of this. We also have to do this after very heavy rainfall.
10. Application is informed by measurement, particularly soil tests. It is also very important to know that the fertiliser recommendation is what actually has been applied. You can never underestimate the importance of keeping track of how well crop managers have followed the fertiliser recommendations.
11. For this I use standard proprietary software called "Cropwalker". It keeps track of my recommendation based on the imports from the monitoring program, and my recommendations. It records my work and what nutrient I have applied. From this, a job sheet is generated for the employees.

12. What is supplied also depends greatly on what is being contracted to be grown. Processing varieties aren't always conducive to application of good or best management practice. The difference between a crisping potato and a chipping potato can be the difference between applying 60 KG's of nitrogen per hectare per year, and applying 300 KG's of nitrogen. The same sort of thing is true of the difference between production of a milling wheat compared to production of biscuit wheat.
13. Both I and Duncan McLeod make significant use of deep N testing. I have a method I have developed a deep N tests. I do one test to paddock. I cover all possible crop scenarios on the farm. Over time, I cover all paddocks. We use this to determine existing nutrient levels. These form the basis of our recommendations. We build fertiliser application into this to meet the crop requirement. I treat direct drill differently to cultivation, because the losses from direct drilling are less. Deep N testing is not easy to do, but in our experience it is a very useful tool.
14. Another way we refine our nutrient management is through Petiole testing. Petiole testing covers potatoes and many other crops. It is a leaf test conducted in the lab. Based on the results of those tests we increase or decrease nutrient application – over all elements required by the plant, over the critical growing period. Potassium, Magnesium and Calcium balance with Nitrogen is critical.
15. We collect data to produce maps for the whole farm to inform the variable application of nutrients. There are two basic ways to do the mapping. I prefer to test all soils on every hectare for nutrients every 3-5 years and then fertilise according to the historic data. The other way is to feed for yield from a yield map. Attached to my evidence as Appendix 1B is a series of maps, produced as an example of the sort of maps I produce to guide the variable application of nutrients. We then programme our spreaders to work off GPS - they automatically adjust the rate of fertiliser application in the paddock.

16. Another way of doing this (for nitrogen only) is measuring the size of the canopy using software called "Yarra N-sensor" or via satellite photography using infrared spectrometry. Measures the greenness of the crop and adjusts" based on the measurement of infrared signals from a sensor on the tractor. The different colour spectrums can be analysed to assist in producing canopy maps to aid in decision making (ground truthing).
17. The problem with many of these techniques is implementation. For many farmers there are simply too much on. With all of the pressures, some development issues don't go forward. To go forward it requires capital and the time. Showing farmers the results of the high-tech agronomy is key. So we worked very hard to capture the data that proves the results. Farmers using this technology in New Zealand are early adopters. Often they are being asked to take a calculated risk that the application of the new technology will pay off.
18. Another way we manage nutrients is by providing residues of crops for Mushroom compost production. Mushroom compost being produced from our residual cropping waste (straw) has traditionally been used to grow mushrooms at a local mushroom farm. Then we bring back the compost to replace soil organic matter and nutrients. We are then looking at the balance and adding that back in as part of the fertiliser programme. So nothing is missed in the budget.
19. Good management practices include addition of organic matter to prevent leaching from highly mineralised soils. Some contouring and the formation of raised beds is also helpful because it improves drainage, decreases wetness and maintains soil consistency (and therefore the efficiency of the application of nutrients). Techniques such as furrow or dammer "dyking" help to prevent overland flow in rain events, as does deep ripping of paddocks in some instances. We also flatten the tops of our potato beds to increase the absorption of water. Marking and returning each year to the same wheel tracks using GPS is also very effective in my opinion.

20. It is really important to remember that you can't use all the methods available in all the paddocks. You need the experience to know which paddocks each technique will work in. Each paddock is different and requires a different mix of tools for management of the nutrients and the crops.

GOOD MANAGEMENT PRACTICES

21. Attached as Appendix 1A to the evidence of Duncan McLeod is a diagram that I would describe, in my opinion as being a useful outline of the range of good and best management practices suited to arable and vegetable cropping the Canterbury region.
22. I have worked on this diagram with Duncan McLeod and we both concur on the description of these practices.

R Lasham

2 April 2013