Roger and Julie Lasham: Precision nutrient technology.

Photos John Houston.

HITTING THE SPOT

An agronomist's mission is to boost soils strategically with the nutrients needed. **Sandra Taylor** explains.

The unexplained variations in nutrient levels in successive soil tests got Ashburton-based agronomist Roger Lasham thinking.

As the agronomist for large-scale Mid Canterbury farmer Murray Turley, Roger had noted significant variations in soil pH levels in samples taken from the same paddock over three successive years. Similar variations also occurred in the levels of other nutrients such as phosphate and potassium.

The only possible explanation was the variation in the distribution of nutrients within the paddock and Roger began questioning the wisdom of both basing fertiliser application decisions on single-site tests and the blanket applications of nutrients.

Using technology he had seen used in his native England, Roger undertook trials on the Turley farms and sent the results of comprehensive soil tests to Soyl, a precision agriculture service company in the UK. Soyl generated nutrient maps detailing the variations in nutrients levels throughout individual paddocks. This information was used to create variable rate fertiliser application maps for the strategic application of nutrients using GPS technology.

The amount of variation in seemingly even soils continues to surprise Roger; in one example, where a standard single soil test would have resulted in a lime application of 6t/ha or a total of 240t, the variation in pH across the paddock meant the paddock needed a total of only 14 tonnes of lime.

Similarly in a paddock where a standard soil test showed an Olsen-P level of 35, the nutrient map showed 46% of the paddock had an Olsen P of less than 21, with 10% being under 15.

These are extreme examples, Roger says, but not unusual.

In a climate of rising fertiliser prices and increased environmental regulation, Roger and his wife, Julie, could see the value of using precision nutrient technology on all farms, but particularly arable and dairy farms, and earlier this

year launched their precision nutrient management business as Agronomy Solutions Ltd.

Roger says the mapping and variable-rate application puts more precision around fertiliser application as the fertiliser is going only where it is needed.

"It's about getting the fertiliser in the right spot and doing the job properly."

Julie, who grew up on an arable farm, says the environmental advantages of precision nutrient management appealed to her. With blanket applications farmers are often putting on more fertiliser than needed and not using nutrients as efficiently as they could be. She says they are aiming to provide farmers with the tools to get well- balanced soils and make the most efficient and effective use of their fertiliser applications.

Julie does the leg work by going into paddocks with a hand-held GPS system and taking 16 core (15cm) samples from at least one central site a hectare. She says this number gives a good indication of the nutrient levels throughout the paddock.

The core samples are sent off to ARL laboratories (affiliated with Ravensdown) and the results are sent off to Soyl in the UK where a nutrient map is created. Roger then uses his skills to create an application map and make recommendations on the precise quantity of fertiliser needed in different parts of the paddock.

The application map can be put into the GPS system of a spreader unit and nutrients are phased in and out of different areas of the paddock according to the soils requirements.

The nutrient that Roger and Julie are doing the most work with is lime and correcting pH variables, but they also make recommendations around the variable rate application of potassium, magnesium and phosphate.

The one downside is that the nutrients need to be applied separately, but in the UK farmers are now using GPS-logged hoppers on the front and back of their spreaders, each containing a different nutrient, so the technology is available to strategically apply different nutrients in the one pass.

Roger says that while they do supply application maps, farmers may also choose to work with their own fertiliser representative or consultant to decide on the quantities of nutrients they want to apply. In most cases, applying nutrients strategically will result in some cost savings but more importantly it will correct yield limiting areas in the paddock.

"It's about lifting the soils to their full potential and setting the soils up with the nutrients needed to maximise yield potential."

Roger and Julie stress that their system is not a quick-fix, rather it is an on-going process of correcting and balancing.

Lighter soils need to be re-tested every three years whereas on heavier clay soils the tests need be tested only every four or five years.

Julie recommends farmers get one-third of their farm tested every year and in that way they keep the farm covered. The service costs between $12.50-$19/ha/year depending on soil type.

The couple view variable rate fertiliser application as another tool in the precision agriculture toolbox, along with EM mapping and yield maps all of which can be used in unison to optimise the yield potential of a paddock.

Roger says that while EM maps will identify areas in a paddock that will perform poorly, they do not identify the variation in the spread of nutrients throughout the paddock.

Since arriving in New Zealand six years ago, Roger and Julie say they have been amazed at the way in which nutrients are applied in a blanket fashion and by how farmers use such a small number of soil tests to determine fertiliser applications.

As Roger points out, fertiliser is usually the biggest expense item on farms so it makes sense to apply it only where needed.

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