PRECISION VEGETABLE PRODUCTION COMES OF AGE

by Richard Crowhurst

Vegetable growers visiting this year’s Precision Farming Event in Peterborough at the start of March will have noticed many more companies offering solutions tailored to vegetable and potato growers, from remote weather stations to yield monitoring and variable machinery control.

There was also a change of tone in the seminar area, with people starting to pick and chose the technologies which help their business, and an acknowledgement that the greatest benefit of remote operations may be to reduce the scale of field machinery.

Professor Simon Blackmore is Head of Engineering at Harper Adams University and has been instrumental in establishing the National Centre for Precision Farming at the campus. The new centre will hold technical days, short courses and other events while Harper Adams is developing a range of new qualifications in Precision Farming from diploma level all the way up to MSC.

Precision farming is all about refining the size of homogenous management units according to Professor Blackmore. “If we extend it to the ultimate goal we can come down to the level of an individual plant,” he explained. Such a concept may seem novel for arable farmers, but is not farm removed from many intensive horticultural systems. “We need to consider the system itself and how to modify it,” he added.

He admitted that it is very rare for precision farming technologies to increase yields. Instead their benefits come in the form of reducing the costs of production or improving the quality of the crop produced. For example, using route planning to decide the optimal way to plant crops and travel across fields can lead to fuel savings of up to 15 per cent in some situations.

Referring to problems travelling on wet soils, Simon said that it was time to reassess the move to larger, heavier and more powerful machinery. “If you can’t travel it’s not the weather that’s wrong, it’s the tractor,” he said. “We’ve got to change what we do. Effectively what I’m trying to do is take away the machine limitations. The more I think about it the more I realise these limitations are quite significant.” He pointed out that the larger the machine, the smaller the working window available, the smaller the working window available, and the smaller the working window the larger tractor you need.

“We need weight to handle the horsepower, but it’s the weight that is causing the problems,” he added, saying that the compaction caused by large tractors results in up to 90 per cent of the energy being used in cultivation being used to repair the damage caused by the machinery in the first place. As well as the potential for autonomous machines to be smaller and lighter, he said inputs such as fertiliser and pesticides could be reduced by innovations such as using lasers to destroy weed seedlings and using ‘smart microdot sprayers’ to deliver individual droplets of herbicide to specific plants.

GPS solutions

Allowing vegetable production to benefit from the precision farming revolution is one of the key aims of Manterra Limited, which provides a range of machinery and services in the sector. The company supplies GPS equipment from Dutch-based SGB Precision Farming, including RTK-based controls for bed formers, planters and sprayers. There are even modules available for trial fields and crop registration, for example when the variety is changed part way along a row.

“We sell tractor and implement auto-steer systems,” explains Manterra’s Andrew Manfield. “We helped to evolve the SGB products to suit UK conditions and are now also importing weeder and band sprayers from Agronomic of France, which can be steered via RTK GPS. “We are looking to offer a range of products that address the needs of vegetable growers as the benefits of precision farming are much more apparent in vegetables,” he adds. Manterra is now
working with Stockbridge Technology Centre in a partnership to deliver a complete precision farming training package to horticulture, known as SATS4CROPS. The programme aims not only to provide R&D facilities, but to combine theoretical and practical training for growers and operators.

AS Communications provides a range of GPS, guidance, and precision agriculture solutions from entry level systems to top-end guidance. With controllers from a number of manufacturers, the company also provides its own RTK correction signal offering growers 25 mm pass-to-pass accuracy. "It is possible to set up your own base station, but in certain areas these already exist to save you the expense," says Ross Macdonald. "We run a number of networks ourselves, and are able to offer many of our customers own networks on their behalf, giving you the opportunity to subscribe to them. These networks are available only in certain areas, so you will need to contact us to find out whether any exist near your farm.'

**Recording data**

With so many different devices and systems on offer, making sure that all the different pieces of equipment can communicate and that records can be kept in a common system is a key consideration for growers and is one of the reasons behind the success of GateKeeper software as Peter Henley of Farmade Management Systems Ltd explains. "The GateKeeper crop management software is used widely on many crop types including the most intensive crops such as salad, soft and top fruit and field scale vegetable production," he says. "Fully integrated mapping and precision farming modules are available which allow GateKeeper to exchange data with an enormous range of machinery manufacturers and agronomy service providers.

"This allows GateKeeper to accept, process and display spatial data and store this within the body of the field recording system. Any data can be accessed and used to improve on-going decision making. Precision farming prescriptions can be built within the software using the grid generator tool which creates application plans using underlying precision farming data. These application plans can be exported in a format that is suitable for virtually any precision farming variable rate controller. In this way GateKeeper can act as the hub for all the businesses precision farming data." Compatibility is also behind a new development from Patchwork Technology and Muddy Boots Software. The two companies have now integrated WebTrack 3 and CropWalker, to form CropWalker Mapping. This new module allows farmers, agronomists and contractors to easily view and share valuable mapping data through an online tool.

According to the companies the linking of crop records to an online map store means that anyone with a web-based device can access and share mapping data. Jeff Goulding, Farm Services Director at Muddy Boots explained, "The integration of our two systems leverages off their respective strengths and brings together a highly valuable solution for those farmers and advisors who need a way of more easily accessing and sharing linked crop and map data."

Farmade’s GateKeeper software allows precision farming application plans to be exported in a format suitable for virtually any variable rate controller.

**Yield mapping**

Up until now yield mapping has been the preserve of cereal growers with top of the range combine harvesters. However a new system, developed for potatoes and other root crops by SoilEssentials Ltd, is attracting plenty of interest. "As farmers ourselves, we've been interested in yield mapping potatoes since the mid 1990s," explained Technical Manager Jim Wilson. "There has always been a demand from growers of root crops too, so we designed and developed our own solution."

EssentialsRooYield consists of a weigh cell fitted beneath the main web of the harvester combined with Trimble's FmX™ yield mapping system. Now in its second year of trials on trailed and self-propelled machines in the UK and the Netherlands, the system can easily be fitted to any web-based harvester and so can be used with all root crops, including potatoes, carrots, onions and others. "We are now starting to look at variable rate potato planting maps based on yield and fertiliser..."