in the spearhead of strip tillage

John Deere's 2510S Strip-Till Residue Master Applicator

In spring 2004 Nathan Morris had a diploma, was forecast to earn a first class degree, and had the ambition to earn a PhD - but no studentship and no funding. Today he has his doctorate and has secured his first post with The Arable Group (TAG), both in the vanguard of an exciting new technology called strip tillage.

ANNE CHAMBERLAIN charts his progress.

DESPITE being from a non-farming background, Nathan Morris was drawn to a career in agriculture.

He went on from school to Hartpury College, part of the University of the West of England and, undecided after that, he took a year out and then went back to Hartpury to take a degree in agriculture and land management.

In March 2004 Nathan saw an invitation in the *New Scientist* to apply to Reading University and TAG for a studentship (PhD) in strip tillage. TAG is the UK's leading independent crop research and consultancy organisation offering impartial agronomic information to farmers on the entire range of crop types, cultivations, spray technology, environmental schemes and agronomic inputs.

"Preparing the ground and drilling (sowing) a crop uses a lot of energy," explains Jim Orson, Research and Technical Director of TAG and one of Nathan's supervisors. "It is about how much soil you move, and how often. Ploughing turns over every inch of soil to a considerable depth. Add harrowing or discing, drilling and rolling and you are using a lot of diesel.

"I had seen strip tillage, where just the band of soil along which the seed will be drilled is cultivated, in Minnesota. A row of tines mounted on a tractor-drawn frame cuts out slots in the ground, the seed is dropped in and pairs of following discs close the slots - all in one or two passes of the tractor.

"It would have been a huge help for there to have been a directory of funding sources"

Nathan Morris

"This technique is best suited to wide row crops. Where the rows are closer together, for example in wheat, it does not offer the same advantages. As strip tillage does not turn over the soil and expose bare earth, it also had potential to reduce erosion by wind and moisture and to leave the stubble in place for over wintering birds. Another reduced energy option we are looking at is shallow tillage, where only a very thin layer is cultivated," he said.

Reading University, working with TAG and two charities, The Morley Agricultural Foundation and the Chadacre Agricultural Trust, offered the studentship in strip cultivation. Nathan and other applicants were interviewed by Bob Froud-Williams, a weed control specialist in Reading University's School of Biological Science, Paul Miller (then at Silsoe Research Institute, which specialised in applying engineering to biosystems and now with TAG), Christine Hill from The Morley Agricultural Foundation and Jim Orson.

Nathan was awarded the studentship, based in the first year at Silsoe and for his

last two years at the TAG's Morley site in Norfolk. The funding covered his University fees and a stipend, paid quarterly.

Wanted: a mentor to help with crucial career decisions

"THIS all sounds quite straightforward now," says Nathan. "But I would have valued more sources of information and an experienced mentor to help me with my career decisions at that early stage. I thought I wanted to be an agronomist, but doubted that I had the 'pushy' selling skills needed. I knew little of organisations or charities which might fund a PhD."

Nathan expected to begin his PhD by reviewing literature and getting a grounding on research methods, but was rather more surprised by the first practical challenge. As there were no strip tillage machines in the UK - he had to locate one in the USA, get it shipped over in kit form and assemble it before he could start on the project. All this involved what he calls "several hiccups" and quite a bit of time.

Funding for Nathan to visit Indiana and Minnesota to see the method on the ground came from a third charity, The Roger Harrison Trust, and to purchase the Yetter strip tiller from a fourth, The Douglas Bomford Trust. Nathan's studentship was supervised by the three people, all of whom he met regularly and, he says, contributed to the development of the project.

Nathan is typically modest about his PhD work, completed in January 2008; "I would say that the trials in plots and field strips showed that slot cultivation could achieve yields similar to that achieved with the plough for both sugar beet and oilseed rape. I was very pleased to be offered a permanent post as a research and development agronomist with TAG, which allowed me to continue with this project and others," he said.

Jim Orson is excited about the potential of strip tillage; "I believe it can reduce diesel required to establish a crop by 50%, at least. We have more funding now from the British Beet Research Organisation to develop further the technique. Now that we have precision guidance technology, we can follow the six row tiller with a twelve row seeder and put the seed in exactly the right place.

"In Nathan we have taken on a very practical guy to work on projects which bring together engineering and agronomy - which probably did not happen enough in the past," he said.

Nathan points to the star wheels for removing crop residue and fluted disc coulter for initial soil cultivation. "In the US farmers sometimes use a strip tilling machine that completes cultivation/drilling in one operation, particularly for maize on lighter soil. In the UK, particularly for sugar beet, we will more likely be looking at a machine that cultivates earlier in the year e.g. late autumn and then following with the drill in the spring when sugar beet is drilled," he said

AFCP -

charities working together to fund more and better education and research

NATHAN Morris' PhD studies, travel to the United States and strip tillage equipment purchase were funded by:

- The Morley Agricultural Foundation
- The Chadacre Agricultural Trust
- The Roger Harrison Trust and
- The Douglas Bomford Trust

As such it is an excellent example of charities working together, and flexibly.

These four charities and 30-40 more are involved in the new initiative, The AgriFood Charities Partnership (AFCP), whose aim is to 'Maximise charitable support for science and education in UK food and farming'. They include funding charities specialising in sectors from arable, through dairy and top fruit, to horticulture; as well as travel, advanced business management, MBAs at Cranfield University and specific geographical regions.

One stop website

AFCP's one stop web site includes the first, and rapidly growing, directory of food, farming and land-based charities offering funding for education and research.

Applicants can quickly identify charities which might support their projects. The directory also enables the charities, some of which have modest resources, to locate partner charities and pool resources to increase the scale, number and quality of projects they can support.

"Eventually I was fortunate to win a studentship which was already funded, but when I started looking, it would have been a huge help for there to have been a directory of funding sources like that AFCP now offers," says Nathan.

Launched in 2007, AFCP this year initiated a project to develop and share best practice on funding among its member charities - including application, candidate assessment, supervision and communicating the results of the research.

AFCP is also making progress on developing an inside track and influence on research and education policy, priorities and strategy in food, farming and related fields.

AFCP

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