

“ We can now have more confidence in the RB209 guidance. ”

Rebuilding the crop nutrition ‘bible’

AHDB
CEREALS & OILSEEDS
from theory to field

The Fertiliser Manual, RB209, is currently under review, under new management and is set to benefit from a wealth of relevant research. CPM takes a look at the changes growers can expect.
By Tom Allen-Stevens

If you were to pick out some of the most-thumbed possessions in your office (or boot of your car in the case of many agronomists) chances are there'd be a number of familiar suspects: The BCPC UK Pesticide Guide, the AHDB Cereals and Oilseeds Recommended List, and probably looking a little worse for wear by now, Defra's 8th edition of the Fertiliser Manual (RB209).

But if it's looking a bit tired and weathered, there's a very good reason — RB209 was last updated in 2010 and is now well overdue for a revision. “Defra didn't have any plans to update it,” says Dr Sajjad Awan of AHDB Cereals and Oilseeds.

“But collectively, the AHDB sector boards have been the biggest contributors of the research that goes into it over the past 25 years. So it made sense for AHDB to take on responsibility for the manual and produce the next revision.”

In fact, nearly £11 million has been spent by the industry on relevant research since the 8th edition of RB209 was published. “Only research up to about 2008 would have been included in the last revision — science has moved on a lot since then.”

And that's one of the first changes that's



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been agreed for the new, industry-owned RB209. “Rather than publish a new version every 5-6 years, we're aiming to revise it every two years. There'll be some significant changes in the 2017 version, but thereafter it'll be a relatively minor revision,” explains Sajjad Awan.

But it's not just AHDB that will take the new manual forward — the six sector bodies are joined by another 32 industry organisations in

a new UK Partnership for Crop Nutrient Management. These include Government representation and academic bodies, but 22 commercial organisations form the majority of the partnership.

“There are a lot of people involved, and a number of technical working groups have now been set up. But it’s not an unwieldy partnership, and it’s resulted in data coming forward that would otherwise have never been considered for the new manual.”

Proprietary research

This includes some proprietary research carried out by Yara and CF Fertilisers, for example, while data from work on phosphates in Ireland has been contributed by Teagasc. “In total there’s around £1.5 million of extra research we simply wouldn’t be able to access had it not been for the partnership,” notes Sajjad Awan.

Significant AHDB-funded research includes work carried out by Dr Pete Berry at ADAS on winter barley, and the Critical-P research led by NIAB TAG. “There are a number of projects nearing completion, and findings from these will be included in the 2019 revision.”

In all, there are about 60 new pieces of research, knowledge transfer publications



The 38 organisations on the Partnership for Crop Nutrient Management have helped bring forward around £1.5 million of extra research.

and tools that are being considered for the current revision. This is the job of the research consortium, led by Dr Paul Newell Price of ADAS.

“We’ve been assessing the results from the projects, asking whether the science is robust enough and deciding how it affects the recommendations in RB209. We’re also looking to identify what gaps still exist,” he says.

The review has been split into six work packages, two of which cover principles of

crop nutrient management and organic materials. The rest cover the different relevant sectors, with separate sections on cereals and oilseeds, grass and forage crops, potatoes and horticultural crops.

“Most of the revisions to RB209 will be reinforcing existing guidelines, clarifying and making the wording stronger where we now have the science to have more confidence in the advice. There could be additional information on cover crops, for example, and a number of notable changes to the way ►

Advert removed



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► recommendations are presented,” reports Paul Newell Price.

Among these is a simplification of the grassland recommendations, while advice on barley and oilseed rape nutrition is also likely to be updated. “There’s significant evidence indicating that more N could be applied earlier to winter barley, and

there’s more information available on canopy management in OSR.”

There’ll also be a noticeable change in tone, reveals Paul Newell Price, reflecting the differing objectives AHDB has, compared with Defra. “The advice will be streamlined, with a focus on practical recommendations and signposting to environmental regulations. There’ll be changes in presentation and format — each section will be standalone, so you can discard those that aren’t relevant to your business.”

One section where recent research has helped to remove much of the mystery is in manures, and in particular the crop-available sulphur content of organic materials. This work has been led by Dr Lizzie Sagoo at ADAS. “Three years ago, we completed a project looking at quantifying the S supply from farm manures to winter wheat crops. But we were keen to repeat these in oilseed rape, and also carry out some sulphur-response trials.”

That led to the Opti-S project, that started in 2013 and includes a work package specifically geared towards quantifying the S supply from organic materials to OSR.

“The crop puts on quite a bit of growth in the autumn. What we wanted to find out was whether that affected the way it utilises manure applications.”

Sure enough, the results so far suggest that it does. “We applied manure to OSR crops in both the autumn and spring, and there’s very little difference in the response. In wheat, however, there’s better utilisation from spring applications. That shows less S is leached from autumn-applied manure if it’s applied to an OSR crop,” notes Lizzie Sagoo.

New in the RB209 revision will be figures on the crop available S content of a range of organic materials, based on the wheat work. “We’ve reasonable confidence in those figures, but we’ll be reviewing the table at the end of the Opti-S project, and any changes will be made to the 2019 version of RB209.”

But it’s the S-response trials that have brought the most remarkable results so far. “The recommendations for OSR in RB209 are based on a small number of trials carried out in the 1990s. Rates of sulphur deposition have come down since then, and varieties have moved on. A number of commercial companies are now recommending SO3

RB209 must be a manual that can be trusted

George Lawrie views RB209 from a number of different perspectives: he’s farmed at Kinross, between Edinburgh and Perth in Scotland for 30 years, so is aware of its value to growers. He’s chairman of AHDB Cereals and Oilseed Research and Knowledge Transfer Committee as well as chairing Scottish Agronomy, and knows it’s an essential reference manual for advisors.

Now he also has the role of chairing the Partnership for Crop Nutrient Management, responsible for guiding the new revision of RB209 through its current research review to publication next May.

“Everyone in the industry uses RB209,” he notes. “In fact, one of the significant aspects of the manual is that it’s used as a basis for regulation by Defra and other UK Government agencies. But it’s not a statutory document, it’s an advisory manual, and we must ensure it remains a valuable, reliable tool to help growers maximise returns from crops.”

That’s why he’s keen to ensure the current research review brings the manual up to date. “The 8th edition of RB209 is six years old, but it’s based on research carried out over 12 years ago. Some of the information for Scotland draws on work done back in the 1980s.

“Varieties perform differently now, we have a

much greater understanding of how nutrients are utilised, and how they interact with soils, and you could also say the climate’s changed. We should have a fertiliser manual that reflects those changes.”

And a significant change that’s already been agreed by the partnership is that RB209 will move to become a ‘rolling’ document, updated as and when relevant research is completed and can be included.

“Recent research I’m looking forward to seeing come through is some of the AHDB-funded work on nitrogen-use efficiency and in-field variability, led by ADAS,” notes George Lawrie. “There have been some interesting results on how to refine the optimum dose of applied N.”

A lot of research has also come forward from the many organisations in the partnership, and he reckons this will add further confidence in the advice included in the next revision. “It’s great to have such a wealth of information on which to base recommendations — there are a number of commercial organisations that have done valuable work they’re offering for inclusion,” he says.

“But we have to look pragmatically at this information. It’s essential that RB209 is scientifically robust, which is why there’s a very

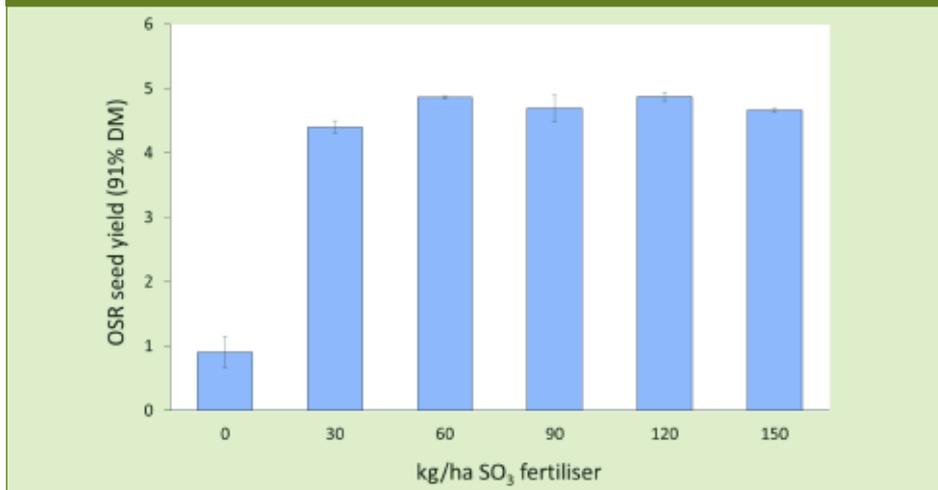


RB209 works well as an advisory tool, but also puts the industry on the front foot with regulators, says George Lawrie.

solid consortium of research institutes reviewing all the material. There are also representatives from the Environment Agency and UK Government agencies in the partnership — we’re keen to ensure RB209 remains a manual that can be relied on to protect the environment.”

And this is a key strength, he maintains. “Across the industry, you see instances of where single-issue pressure groups have undermined scientific understanding, and it’s led to product withdrawals and greater regulation. RB209 puts us on the front foot — it’s a manual both industry and regulators can have confidence in.”

OSR response to applied sulphur



Source: ADAS; Frostenden, 2014; total N 190kg/ha

application rates some way above the 50-75kg/ha advised in RB209.”

So are these higher rates justified? “Surprisingly not,” states Lizzie Sagoo. “The economic optimum found in the trials supports the amount recommended in RB209. Whether that’s because the original recommendation was on the high side or that OSR doesn’t need a large quantity of the nutrient isn’t clear. What it does mean is that we can now have more confidence in the RB209 guidance.”

Truly staggering

There’s been one finding from the trials that was truly “staggering”, however. “We knew from the wheat trials that the S response can vary quite a bit depending on the nature, location and history of the site. So we deliberately chose sites for the OSR work that would show a decent response.”



In all, there are about 60 new pieces of research, knowledge transfer publications and tools the research consortium is sifting through.

For 2014 harvest, these were at Frostenden in Suffolk and Woburn in Beds — both loamy sands. Six ammonium sulphate rates, from 0-150kg/ha SO₃, were applied at two overall N rates. It soon became clear that the plots that received no S were suffering. “The flowers were visibly paler, the plants stunted and thinner.”

And when the combine went through, the zero-S plots yielded as low as 0.9t/ha, compared with 4.3t/ha where just 30kg/ha SO₃ had been applied (see chart above). “That’s a massive yield response, and it shows for growers on these light soils that failing to apply any S can have catastrophic results,” notes Lizzie Sagoo.

The project has received a two-year extension to 2018. “This will bring better results on a range of livestock manures — we now have some robust data on the use of biosolids. We’re also targeting heavier



The economic optimum application rate of sulphur remains the same, reports Lizzie Sagoo, but the yield response on light soils has been staggering.

sites to understand the range of response growers are likely to achieve.”

Some of the results to date will be fed through to appear in the 2017 RB209. Once published, this will be available to download as a pdf and 1500 copies will be printed for those who like to thumb through it in the office. A web-based version isn’t currently on the cards, says Paul Newell Price, “but ideas are being developed”.

“Ultimately, RB209 could also reside in the cloud, accessed through your laptop, iPad or mobile phone, and updated almost on a project-by-project basis. It’ll be a big step, but AHDB and the new UK Partnership for Crop Nutrient Management are keen for RB209 to embrace the digital age.” ■

Research round-up

The revision of the Fertiliser Manual (RB209) started in Sept 2015 and runs to May 2016, with the new version due to be published in May 2017. The aim is to review the crop nutrient recommendations outlined in the current guide, considering existing farm practices and recent research. The project covers grass and forage crops, cereals and oilseeds, potatoes and horticulture, and is carried out by an ADAS led consortium including NIAB, Bangor University, Warwick University, East Malling Research and Plant Nutrition Consulting. The total cost is £98,000, with AHDB Cereals and Oilseeds contributing £18,000.

AHDB project 216-0007, Optimising sulphur management to maximise oilseed rape yields and

farm profitability (Opti-S), runs from Aug 2013 to Sept 2018. Its aim is to develop improved guidance for farmers on sulphur management through S-rate response field experiments and improving information on the S supply from organic materials. The project is led by ADAS with Rothamsted Research as academic partner. The total cost is £245,030, funded by Anglian Water, AHDB Dairy, AHDB Beef and lamb, CF Fertilisers, Monsanto, Severn Trent Water, United Utilities, Wessex Water and Yorkshire Water and with AHDB Cereals and Oilseeds contributing £138,030.

The Fertiliser Manual (RB209) 8th edition, published in 2010, can be accessed at www.ahdb.org.uk/projects/CropNutrition