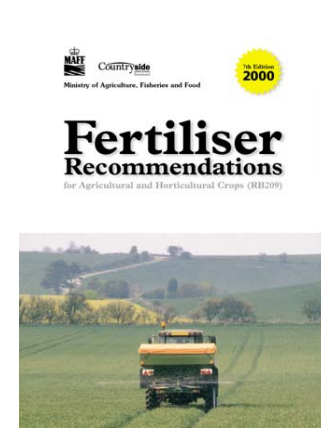


IF0114: Revision of the Fertiliser Recommendations



Keith Goulding

Department of Soil Science, Rothamsted Research



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and



Grassland and Organic Manures

covered by Dave Chadwick

Horticultural Crops - Fruit

- Few new UK data. European data used where relevant, but much of this is also old and not relevant to new varieties and crops – flagged for future research.
- Revision complete. Concentrating on existing crops, but with some new crops added. Where no specific guidance can be given because of lack of data, general guidance on making recommendations included.

Horticultural Crops – Field Veg

- N recommendations are likely to be reduced at low N indices but increased slightly at high indices, reflecting the increases in crop yields and make more explicit allowances for rooting depth and release of N from soil organic matter during the season.
- PK recommendations unchanged but up to date information on nutrient offtake will allow better matching of fertiliser amounts to maintain soil levels of P and K and increase them when they are low.
- The draft N recommendation tables have been sent to a wide range of stakeholders for comment.

Soil Nitrogen Supply

- 7 SNS indices retained, but it will be made clear that the indices are not precise.
- Both methods of determining SNS, tables and soil analyses retained. Methods clarified.
- Allocation of previous crop, soil type and winter rainfall to indices revised.

Soil Nitrogen Supply

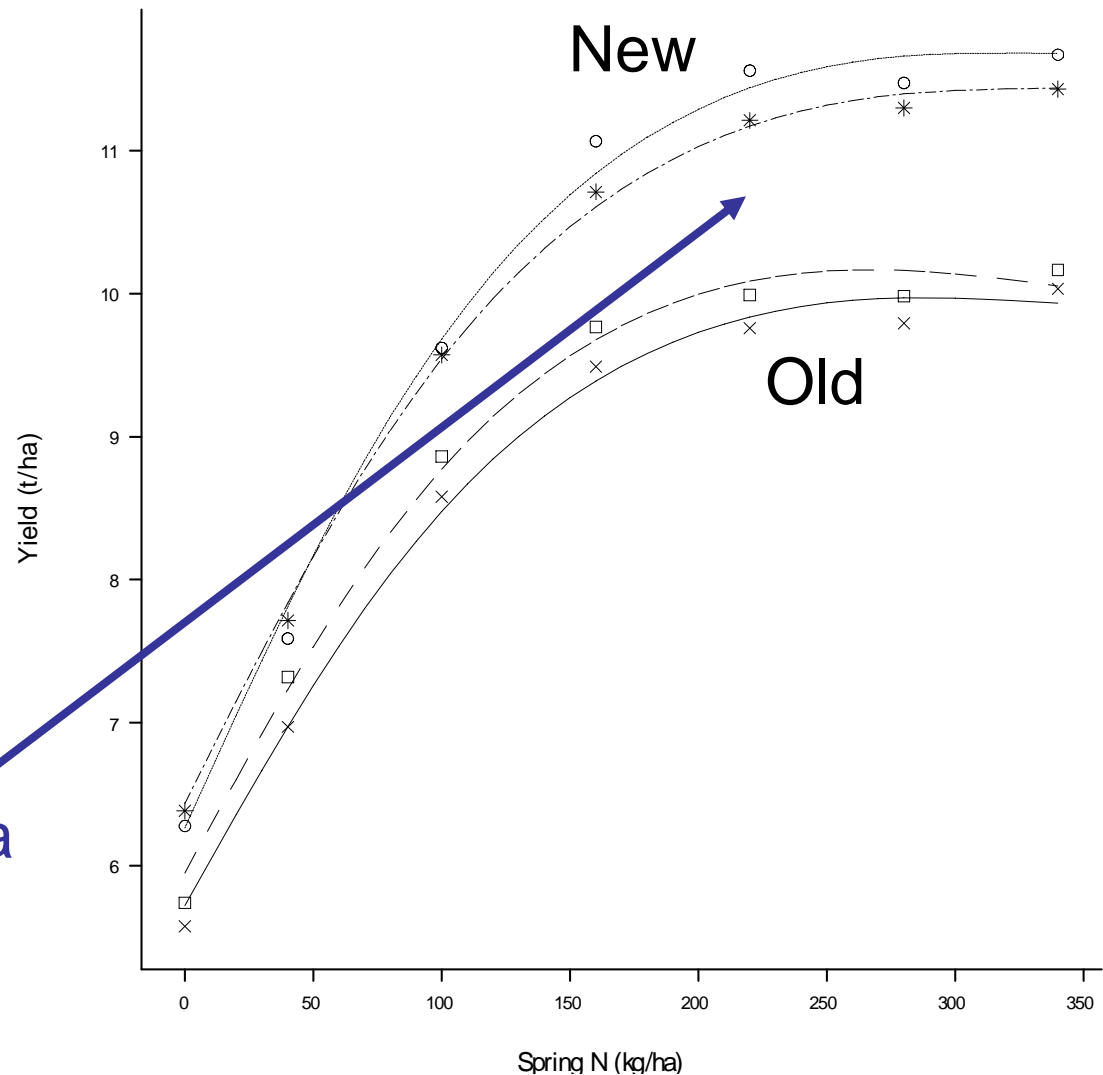
- Complete tables submitted to the N Response Curves team for iterative revision of the N recommendation tables.
- Revision aims to raise the profile for adjusting for previous manuring and cropping history.
- Final tables should be easier and more logical to use so that users will produce a considered index.
- HGCA project on effectiveness of SNS will produce useful data, but too late for incorporation into the revision.

Arable Crops

N response curves for cereals

1040 data sets received (ADAS, Kemira, Yara, TAG, DARDNI); 400 recent. Not all are useable, i.e. are from trials with 5 or more N rates.

Average of all data not so distinct



N for cereals

- Difference between new and old varieties approximately 1 t/ha yield.
- Extra N needed to achieve these differences about 40 kg N/ha.
- About half the yield increase may be attributed to better agronomy.
- Price ratios critical.
- ‘Greyed out’ boxes in the N recommendations to be replaced with stars with a footnote to say that such situations can occur and in these cases to seek professional advice.

N for cereals

- Considered recommendations based on %N content and yield. Opted for system based on yield.
- Wheat:
 - Used all new data received, including new trials on old varieties
 - Old data not useable – many trials did not yield 8 t/ha
 - Recommendations for average yield of 8 t/ha
 - Add 20 kg N/ha for every extra 1 t/ha yield
 - Recommended rates increased in line with previous graph
- Other crops being done
- Maximum N rates in NVZs concur with RB209 recommendations.

Arable Crops: Sulphur

The recent HGCA report (PR419 'Decision support for sulphur application to cereals'), suggests that S recommendations will not change but the need for S needs to be increasingly emphasised.

The report has been distilled into a 2-page topic sheet that which will be used in the revision, but with a map that includes NI.

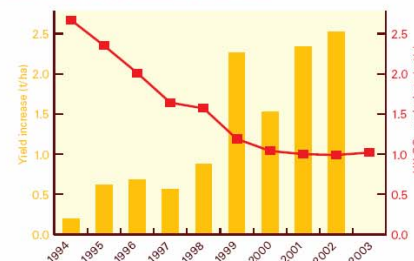
Decision support on sulphur application to wheat



Atmospheric sulphur deposition

Atmospheric deposition of sulphur (S) to land in the UK has decreased markedly during the past 30 years, as S emissions have fallen. As a result, S deficiency in crops has become more widespread. Responsiveness of crops to S has also increased, particularly at very deficient sites (Figure 1).

Figure 1. Yield responses of winter wheat to fertiliser S have increased while SO₂ emissions have fallen



Trials on sandy soil at Woburn, Bedfordshire, a site prone to severe S deficiency. 20kg S/ha was applied each year to trial plots.

Figure 2 shows S inputs to crops from atmospheric deposition are now less than 15kg/ha in most areas of Britain. Until recently, S deposition varied depending upon proximity to coal-burning industries and prevailing wind direction. However, these factors are now relatively unimportant in determining deposition in any area.

Action

Assess S responsiveness index for your location using local soil texture and over-winter rainfall data, along with the matrix table and S deposition map.

Consider other factors (eg organic manuring or buyer's specific S requirements) to decide if your crop needs S fertiliser.

Where response to S is likely, or predicted, apply around 20kg S/ha (50kg SO₂/ha) in March or April.

Always consider your local conditions and consult a FACTS-qualified adviser if necessary.

Update on S deficiency

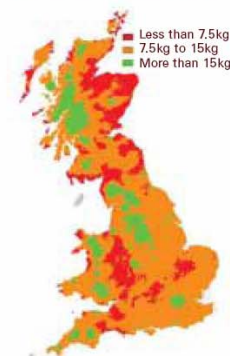
Sulphur deficiency in wheat is expressed as chlorosis in younger leaves. Winter wheat typically requires about 20kg S/ha (1kg S = 2.5kg SO₂). Sulphur improves breadmaking quality. Organic manure applied in autumn would provide very limited S to crops in spring.

Data from 88 field trials on S responses in wheat carried out by TAG and Rothamsted Research since 2000 were collated and analysed statistically.

Key findings were:

- an average 6% yield increase across all trials in response to S application
- a quarter of the trials responded significantly to S; in these, the average yield increase was 27%
- responses were particularly influenced by soil type, over-winter rainfall and S deposition.

Figure 2. Sulphur deposition map



Data for 2000-2004, provided by Centre for Ecology and Hydrology.

P, K, Mg and lime

- No major revisions of the indices or methods of analysis needed. The commentary will emphasize that inputs should balance offtakes.
- Evidence to support an update of P and K offtake tables is lacking.

Potatoes

- Matrix that included length of growing season, variety determinacy group and SNS Index will remain - accepted by the industry.
- Lower rates of N recommended will be reduced - overall, the average N recommendation for a crop is slightly lower for any determinacy group and soil index. This reflects the better understanding of N use and management of the crop.
- There will be a reductions in P recommendations and at the low indices some slight increases in potash rates.
- P&K the recommendations will distinguish between quantities needed for maximising crop yield, the amounts needed to replace what is needed by the crop, and applications to increase soil indices.

Sugar beet

- Recent results and grower application rates show that, for all mineral soils, the maximum rate of N on N Index 0 and 1 soils should be 120 kg/ha with only a 20 and 40 kg/ha N decrease on N Index 2 and 3 soils, respectively.
- Applying maintenance applications for both P and K on Index 2 soils will be stressed, as will be the need to build up the topsoil to Index 2 if appropriate. Field experiments done jointly with British Sugar on their unique K Response Site, confirm that applying fresh K on Index 0 and 1 soils does not increase yields to those on K Index 2 soils.
- Applying Na at 200 kg/ha salt will only be recommended on K Index 0 and 1 soils and only on K Index 2 soils if the exchangeable Na in soil is less than 40 mg/kg.

Other crops

- Biomass: very little information. Paper from the US suggests likely increases in P and K use if arable crops are grown as biomass crops. Some consideration needs to be given to how this P and K could be returned to the land in crop residues.
- Forage maize: data from Maize Growers Association being assessed.

Micronutrients

- Few, if any, new data on micronutrients.
- The section on diagnosing micronutrient deficiencies in the Introduction will be expanded.
- Published charts of deficiency symptoms will be referenced.
- In discussion with HGCA about new research on micronutrients.

Introduction

- Clear description of the principles of good soil and nutrient management.
- Expanded section on nitrogen use.
- More information on potential environmental impacts.
- Approved by the EA. With Defra for comment.

General

- Will probably be called the 'Fertiliser Manual'.
- All nitrogen recommendations will be based on ammonium nitrate. Information for the use of other forms of N (usually urea) with regard to efficiency of use, spreading, etc, will be in the Introduction.
- Introduction also includes more information on P and N losses, including nitrous oxide. Approved by the EA. With Defra.

Research needs

- N released by the mineralisation of soil organic matter is still the biggest unknown in making N recommendations.
- New trials on micronutrients.
- S requirements of field vegetables.
- Defra considering project to measure/estimate the environmental impact of the revisions

Acknowledgements

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