

Soil fertility for tillage

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In October, a large cross section of the tillage industry attended the Teagasc National Soil Fertility Conference. A wide range of interesting topics related to soil fertility and crop nutrition were addressed at the conference, including:

Potassium

– Mark Plunkett

Potassium (K) has many roles in cereal production from improving straw strength to playing a role in plant resistance to mildew. Maintaining adequate soil K is crucial for both winter and spring barley crops. Spring barley showed a yield of response of 2.3t/ha when grown on a very low index 1 K soil compared with an index 2 K soil without K fertiliser.

Applying sufficient K proved very important in reducing the level of straw brackling (breakdown). Levels of brackling were steadily reduced as the rate of K fertiliser was increased up to the optimum level for the crop.

Which type of fertiliser K is most suitable for cereal crops – muriate of potash (MOP) or sulphate of potash (SOP)? Results presented for winter barley (two-row and six-row) indicated no difference between K fertiliser type for the two-row barley, while there was a significant yield response of 0.4t/ha in favour of MOP compared to the SOP in the six-row barley. This may be due to the effect of chlorine increasing the plant's resistance to disease infection compared to the SOP.

Urea

– Leanne Roche

Urea has been viewed as an unreliable fertiliser N source for cereal crops due to the risk of N loss through volatilisation. Leanne reported from her PhD studies comparing

urea and protected urea (NBPT) with CAN for spring barley production. She reported that N loss was more variable with urea depending on weather conditions while protected urea (NBPT) had lower N losses and similar performance to CAN.

Overall, grain yields were similar regardless of N fertiliser type used, despite differences in crop N uptake of 149kg/ha for protected urea (NBPT), 136kg/ha for CAN and for 131kg/ha urea. These results provide reassurance about the role of protected urea (NBPT) for spring cereal production. It produced similar grain yields to CAN while reducing costs and providing environmental benefits.

Nitrogen

– Richie Hackett

There has been much debate as to the number of N splits and most effective timing for the first N application for winter barley. Richie Hackett presented results from trials conducted over the last three years at Teagasc Oak Park Research Centre. Richie concluded that maintaining optimum tillers through effective N management is critical to realising yield potential in winter barley.

Applying first N in mid-March gave similar yields compared to late February/early March, for crops that reached GS 30 in late March/early April. This indicates that there is flexibility regarding the first application of N for winter barley crops. Generally, there was no yield difference between two or three splits. Richie said a third split reduced the risk of N loss through leaching and should be applied by GS 37.

Soil phosphorus

– Karen Daly

Karen Daly, a researcher on soil P dynamics at Johnstown Castle, explained the different soil P pools and what the soil test actually measures. Recent research has shown the importance of other soil properties such



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as soil pH, organic matter and soil type on the availability of soil P. Soil types which contain high levels of aluminium (Al) will lock up or “fix” P rendering it unavailable for plant uptake.

This may explain why it is particularly difficult to build soil P levels on certain soil types. Karen explained new soil testing/scanning techniques being developed at Johnstown Castle for rapidly analysing soil properties such as soil texture, aluminium, iron, calcium and organic matter, which will help to give more complete farm soil analysis at least cost.

Spreading urea

– Dermot Forristal

Dermot Forristal, Teagasc Oak Park, warned that spreading urea evenly presents challenges for wide bout

widths due to the relatively low density of urea. Dermot recommended selecting a urea type with good particle size and strength.

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Poultry manure

– Martin Bourke

Martin Bourke, Teagasc tillage advisor, Wicklow, presented trial results on the efficient use of manure from layers in spring barley production. The manure is dried to 89% dry matter and contains a good balance of major and minor nutrients. Martin reported that it is essential to test the manure before application in order to adjust manure rates and apply the

correct crop balance of N, P, K as fertiliser.

Fertiliser programmes including poultry manure produced the same grain yields and proteins as bagged fertiliser programmes. Whether poultry manure was ploughed down or incorporated into the top soil produced similar yields to bagged fertiliser programmes only. Where poultry manure is effectively used to replace fertilisers in spring barley production, significant cost savings can be made with the bonus of adding valuable soil organic matter.

Lime

– PJ Browne

The Fertiliser Association of Ireland’s president PJ Browne launched technical bulletin number two, *Soil pH and Lime*. This is very timely technical guidance bulletin on the effective use of lime for both grassland and tillage soils as a large percentage of Irish soils require lime.

Green book

– David Wall

Teagasc has completed the review of the Teagasc Green Book and David Wall, researcher at Johnstown Castle, presented the main changes. Since the 1940s, researchers at Johnstown Castle have developed and delivered nutrient advice for productive agricultural and horticultural crops.

David showed examples of nutrient advice booklets/manuals published since the 1950s and similar issues were being addressed then as today. The Green Book contains a number of new sections, for example:

- Major soil types, nutrient cycling and efficient nutrient management.
- Information on fertiliser ingredients available in Ireland.
- Information on our new fertiliser planning system in NMP Online.
- Nutrient advice for energy crops.

Revised sections:

- New and improved information on soil pH management and liming products.
- Updated organic manure values and efficient use of organic manures.
- New grassland advice for beef systems, sheep and horses.
- Updated cereal N advice timings.
- New advice for potato crops and nitrogen management.
- New N advice for winter oilseed rape crops.
- New and revised advice for horticultural crops.