

Vale of Belvoir Monitor Farm

Meeting title: Crop nutrition

Date: 16 January 2020

Speakers: Ian Robertson (Sustainable Soil Management)



Linking soil health to output

- Tissue testing is very useful if you measure biomass at the same time – only then can it really be helpful; the idea is to do the tests and match to the crop's requirement
- Soil measurements – measure the stuff that matters:
 - Soil structure
 - Soil health, e.g. worm counts
 - organic matter
 - microbial activity
 - nutritional volumes (in kg/ha)
 - root mass and soil access (i.e. is there a compaction pan preventing roots from getting down?)
 - plant biomass
- Spade – sometimes healthy soils can get too tied up with technology and it becomes more about the platform than the soil – digging holes is better
- Control – is the soil controlling the farmer? Current mentality often says it is the soil's fault – it can't be worked because it's too wet or too dry etc.

Delivering crop nutrition

- Plant diets are delivered by macro-nutrients and microbial activity
- We need to move from the “more on, more on” diet to the soil health diet
- There is a tendency to rely on the physical and chemical aspects and technology
- Soil biology has been ignored at our peril

Soil structure

- In healthy soil the structure is made up of 50% air and water, without this the soil will not be healthy. Of the remainder 45% is minerals and approx. 5% organic matter
- Bulk density measurements allow you to tell if roots will penetrate the soil
- The bulk density of a healthy soil is 1; if the bulk density is higher root growth will become increasingly restricted
- Crop yield is directly related to total root length (see the Wheat Growth Guide)
- Every 1 cm deeper gives access to 130 t/ha more soil; 5 cm deeper gives 650 t/ha more soil
- How much more nutrition does this provide? More than 5 extra days of grain fill at 180 kg/ha/day which could produce nearly a ton extra of yield

Cover crops

- In one season they can give a quick increase in worm numbers but not necessarily extra yield – although this is just the start
- They can allow a large reduction in added N

- Placement of N in the seedbed can allow a crop to get away very quickly – then N will be in the crop rather than leaching

Take-home messages

- Tissue testing can be very useful if you measure crop biomass at the same time and match to the crop's requirements
- Don't get carried away with technology and miss the point – a spade is the best way to assess soils
- Soil bulk density measurements indicate how well roots will penetrate the soil and therefore how much extra nutrition they will be able to access
- A few extra centimetres of root length can have a huge impact on potential yield

Further information

- More information can be found at ahdb.org.uk/cover-crops
- Project: [21140009 Maximising the benefits from cover crops through species selection and crop management \(Maxi-cover crop\)](#)

Crop nutrition at Vale of Belvoir Monitor Farm

- Manganese has been added in deficient areas over time then the farm started experimenting with magnesium after seeing trials showing increased leaf area
- Since then manganese and magnesium have been added every year
- Phosphites were added to aid winter rooting
- Biostimulants have also been used but their contents are unknown
- Tissue testing indicated low P but soil indices are high; this also applies to K
- The farm currently has a significant spend on cereals nutrition - £38.49/ha in the 2018/19 harvest year
- Planning a crop nutrition programme: Soils were tested in November in two contrasting fields at the monitor farm

Further information

- [Nutrient Management Guide \(RB209\)](#)
- [Wheat Growth Guide](#)
- [AHDB Recommended Lists for cereals and oilseeds](#)

AHDB resources

- Understand your business costs with AHDB's benchmarking tool Farmbench at ahdb.org.uk/farmbench
- Monitoring tools are available at ahdb.org.uk/tools
- Sign up to market information and research newsletters at ahdb.org.uk/keeping-in-touch
- Find out what's going on at other Monitor Farms and Strategic Farms at ahdb.org.uk/farm-excellence
- All AHDB events can be found at ahdb.org.uk/events
- For guidance on how Brexit will impact your business, see ahdb.org.uk/brexit

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