

## Petworth Monitor Farm

### Nutrition, biostimulants and precision farming (data management)

24 January 2019

Medhone Barn, Blackhouse Lane, Petworth GU28 9NZ

For more information, visit: [cereals.ahdb.org.uk/petworth](https://cereals.ahdb.org.uk/petworth)



### Key messages

- We need to make more efficient use of our inputs (nutrition & chemical) which in turn will help us reduce our variable costs while also assisting in regulation compliance.
- Timings and application rates are crucial in product efficiency  
<https://ahdb.org.uk/weatherhub>
- Regular soil analysis and then acting on the results is key in decisions regarding additional nutrients
- Cover crops can be an important part in a rotation and assist in building soil carbon and nutrient retention. However, it is important you know your objectives when using cover crops and choose species/mixes accordingly
- A balanced C:N ratio and PH are critical for soil biology to work effectively and efficiently and can effect nutrient uptake efficiency as can variety and drilling date.
- A balanced C:N ration will influence the amount of nitrogen availability in the soils and plant
- With loss of chemistry we need to assess varieties' resistance scoring taking into account our farm location and known risks.
- Biostimulants to date haven't be proven so jury still out with much more research and data required
- Know your micronutrients as they are deemed essential for crop establishment and, if utilised correctly, (in accordance with soil and leaf tissue sampling) can influence a good ratio of income return
- Understand the factors that affect efficient nutrient efficiency uptake (NUE)
- Utilise available information to help make decisions ([Recommended Lists](#), [Nutrient Management Guide \(RB209\)](#)) but be realistic on yield expectation by annualising data from past 5+ years
- Implement integrated approaches to weed and pest management and never rely on one aspect alone
- Nitram is proven to leach more readily through soils than urea
- Timing of applications is crucial
- Be aware of nutrient interactions that can 'antagonise' and/or 'stimulate' plant growth.
- Soil applied bacteria can improve soil N use efficiency
- Always monitor the impact of your strategies

## Using nutrients to improve productivity

Macro nutrients and micronutrients are important for plants

### Macronutrients

- **Nitrogen:** critical to plant growth and, with the production of large leafy plants, an oilseed rape crop has a high requirement. Optimising canopy size to increase light interception is an essential role of nitrogen, helping maximise crop yield.
- **Phosphorus:** essential for the production of ATP within the plant and, therefore plays a major role in providing the energy behind many plant metabolic processes, enzyme activity and root development. This energy is also needed for the active uptake of other plant nutrients.
- **Potassium:** plays a major role in the uptake, and subsequent redistribution, of water and nutrients into the plant whilst also influencing protein and starch production. It also affects turgor pressure in the plant helping to strengthen it, reducing lodging and making it less susceptible to disease
- **Calcium:** essential for cell wall formation, calcium increases the mechanical strength of the plant improving its disease resistance. Adequate supply of calcium promotes proper plant cell elongation stimulating development of roots and shoots.
- **Magnesium:** the central atom in chlorophyll molecules, magnesium is essential for the formation of plant chloroplasts and therefore, photosynthesis. Other roles include involvement in protein production, mobilisation of plant carbohydrates and acting as one of the building blocks of ATP.
- **Sulphur:** essential for the formation of plant proteins, amino acids, vitamins and enzymes. Part of the enzyme required for nitrogen uptake, adequate sulphur is required to optimize nitrogen use efficiency.

### Micronutrients

- **Manganese:** has a very important role in the development of disease resistance in plants. Its application has been reported to have positive effects in controlling many foliar diseases, such as powdery mildew, downy mildew, tan spot and take-all. This is because Mn controls the biosynthesis of lignin and suberin through the activation of several enzymes.
- **Copper:** has a very important role in disease resistance and reproductive growth. Copper deficiency may play a role in increased infection, because Cu is necessary for cell wall lignification. When lignification is disrupted, cell walls are more susceptible to penetration by fungi.
- **Zinc:** is a structural component of several enzymes and is required for enzyme activation. Its application may reduce disease severity, which could be due to the direct effects of Zn on the pathogen but not through the plant's metabolism.

- **Boron:** plays important roles in cell wall synthesis and structure, and possibly membrane stability. It has a significant role in disease resistance, which is attributed to its role in cell wall structure, cell membrane permeability, stability and its role in the production of phenolics and lignin. It has been observed that B deficiency causes abnormal development of reproductive organs which reduces crop yield.

### Nitrogen use efficiency

- Nitrogen use efficiency (NUE) is the ability of the crop to capture nutrients from the available supply and the efficiency with which it is utilised to produce grain yield
- Factors affecting NUE:
  - Soil type (Physical and non-chemical factors)
  - Soil related factors (Soil pH, soil water and organic matter)
  - Nutrients and soil interaction
  - Regional rainfall (leaching, runoff)
  - Timing of application of the nutrients ( 2 splits, 3 splits, 4 splits)
  - Products (solid vs liquid)
- Soil applied bacteria can improve N use efficiency
- Liquid fertilisers can be applied accurately and are more crop available in dry conditions
- Ensure you understand the field data you collect and pay for as this information has the potential to help identify and develop strategies to increase yields and save you money.

Finally, build your knowledge and question the strategies / products your agronomist recommends so you understand exactly what you are using and why!

## Precision farming

### Cost of production mapping

- Field average: £135/tonne
- There is potential to identify the most profitable areas in the field
- Why continue to grow a crop when you know it's going to make a loss?



## Find out more... AHDB Information and Research Links

[Nutrient research](#)

[Nutrient management guide \(RB209\)](#)

[GREATsoils](#)

[Farmbench](#)

[Crop biostimulants](#)



## Further Information

Winter meetings will take place at 10am, Medhouse Barn, Blackhouse Lane, Petworth, West Sussex, GU28 9NZ.

For more information, visit [cereals.ahdb.org.uk/petworth](http://cereals.ahdb.org.uk/petworth)

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