

Soil Mineral Nitrogen and Organic Content

There is a large seasonal variation in the residual Soil Mineral Nitrogen levels left due to previous crop performance and how well the current crop was established in the autumn. Any fertiliser and/or organic manure applied to the previous crop, as well as the organic matter content, will have great influences on the remaining Nitrogen. With certain soils inability to hold onto nutrients, it has caused many concerns over Nitrogen losses from agricultural land, and because of this the agriculture industry is increasing the use of organic inputs (biosolids, compost and digestates). As it is difficult to estimate the amount of nitrogen mineralised, it is recommended in the RB209 to analyse the soil for Mineral Nitrogen, for each field every year, if you are applying any form of organic matter.

Nitrogen mineralised from soil organic matter and crop debris after sampling is a potentially important source of Nitrogen for crop uptake. Around 10kg/ha more SNS may be expected for each 1% increase in soil organic matter above 4% in England and Wales and above 10% in Scotland and Northern Ireland. Where soil organic matter is less than this, mineralization has generally been ignored, but recent research indicates that an estimate of around 20kg/ha may be appropriate, at least after cold winters. Utilisation of the SNS index system can then be employed to obtain the nitrogen recommendation and the amount of Nitrogen fertiliser finally applied will be as close to the 'on farm economic optimum' as possible.

As the results vary between field and seasons it is more important than ever to have your individual fields analysed for Soil Mineral Nitrogen, to understand more about Nitrogen losses that may have occurred. The key to applying the correct amount of Nitrogen is by determining the Soil Nitrogen Supply index. Tailored recommendations from having Soil Mineral Nitrogen analysed can maximise yield potential on the best fields and reduce the inputs needed on fields with lower yield potential.



For more information on the service offered by NRM please either refer to the relevant technical bulletins on our website or contact Rory Geldard on the details provided below:

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Calculating your Nitrogen Application

Soil Nitrogen Supply (SNS) =
Soil Mineral Nitrogen (SMN) + estimate of N
already in the crop + estimate of
mineralisable soil N

Where:

- Soil Mineral Nitrogen (kgN/ha) is the Nitrate-N plus Ammonium-N content of the soil within the potential rooting depth of the crop.
- Nitrogen already in the crop (kgN/ha) is the total content of Nitrogen in the crop when the soil is sampled for SMN.
- Mineralisable Soil Nitrogen (kgN/ha) is the estimated amount of Nitrogen which becomes available for crop uptake from mineralization of soil organic matter and crop debris during the growing season after sampling for SMN.

The SNS is the amount of Nitrogen (kgN/ha) in the soil (apart from that applied for the crop in manufactured fertiliser and manures) that is available for uptake by the crop throughout its entire life, taking into account N losses.

The SNS index can be determined by using the results you obtain from the NRM Soil Mineral Nitrogen analysis, an assessment of any Nitrogen already taken up by the crop and the amount of Nitrogen that may become available (an analysis which can also be carried out at NRM). By referring to the RB209 these results can then be used to determine Nitrogen recommendations. The recommendations are based on seven SNS indices and each index is related to a quantity of SNS in KgN/ha.