Soil Health Focus June 2023

DEEP SOIL ANALYSIS SHINES LIGHT ON EFFECTIVE NITROGEN BUDGETING

Dr Kirsten Barlow - Precision Agriculture Principal Scientist

Nitrogen is a key investment into cropping systems, but it needs to be measured and managed correctly to maximise yields and return on investment.

Precision Agriculture's extensive deep-nitrogen analysis highlights the crucial role of measuring soil mineral nitrogen before finalising the nitrogen budget and reveals some important considerations for N topdressing this season.

The importance of measuring soil mineral-nitrogen ahead of finalising the nitrogen budget for the year has once again been highlighted by the results of extensive deep-nitrogen (N) analysis conducted by Precision Agriculture P/L (PAPL) in Autumn 2023.

Precision Agriculture has compiled over 3,000 deep N soil tests from its soil database – Soli. 1,900 individual samples were taken ahead of winter cropping in SA, VIC and NSW in 2023, and an additional 1,100 analyses from 2022. Deep N sampling used in the analysis was a combination of 0-10,10-60 cm depths, 0-30, 30-60 cm depths and single 0-60 cm depths; with the data compared on 0-60cm mineral-nitrogen (ammonium N plus nitrate N) and kilograms per hectare basis.

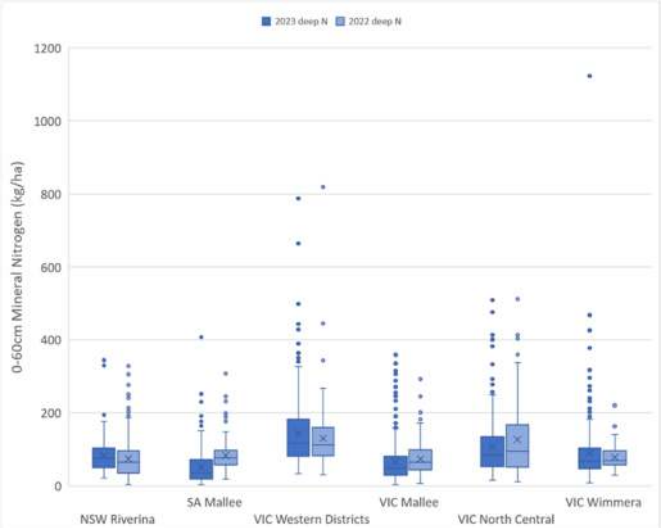

Figure 1: Box and whisker diagram showing the variability measured in soil-nitrogen (0-60cm) across several Precision Agriculture defined regions (the box shows the 25th, 50th (median) and 75th percentile, the x is the mean, the whiskers represent the remaining data except for outliers – which are represented by the dots).

Observations

- Generally there is greater variability in the 2023 soil test results with more outliers,
- The upper range (top of the whisker) for each region are very similar year on year in the NSW Riverina, SA and Vic Mallee; while they were higher and Vic Western District and Wimmera, and lower in Vic North Central.
- High variability is observed across each region, driven by soils, management, crop types and the yields observed.
- In 2023, variability within a range maybe exacerbated by the impact of seasonal conditions including above average rainfall on individual properties.
- SA Mallee, VIC Mallee and VIC North Central all showed a decrease in both mean and median N values from 2022 to 2023. This is likely reflecting above average yields across these regions. This is also consistent with three years of strong yields in some regions which has consequently resulted in larger N deficits in these environments.
- These results highlight that measuring soil nitrogen each year is the only way to know your starting position.

When determining your nitrogen sampling strategy, it is important to consider the different soil types and stages of crop rotation across a property. It is also important to consider the intra-paddock variability to ensure that the sampling method and locations will best reflect nitrogen levels within a paddock as these can also vary significantly. This variation across a paddock is highlighted in the 0-30 cm mineral

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N sampled on a two-hectare grid in the Mallee in both 2022 and 2023 (Figure 2).

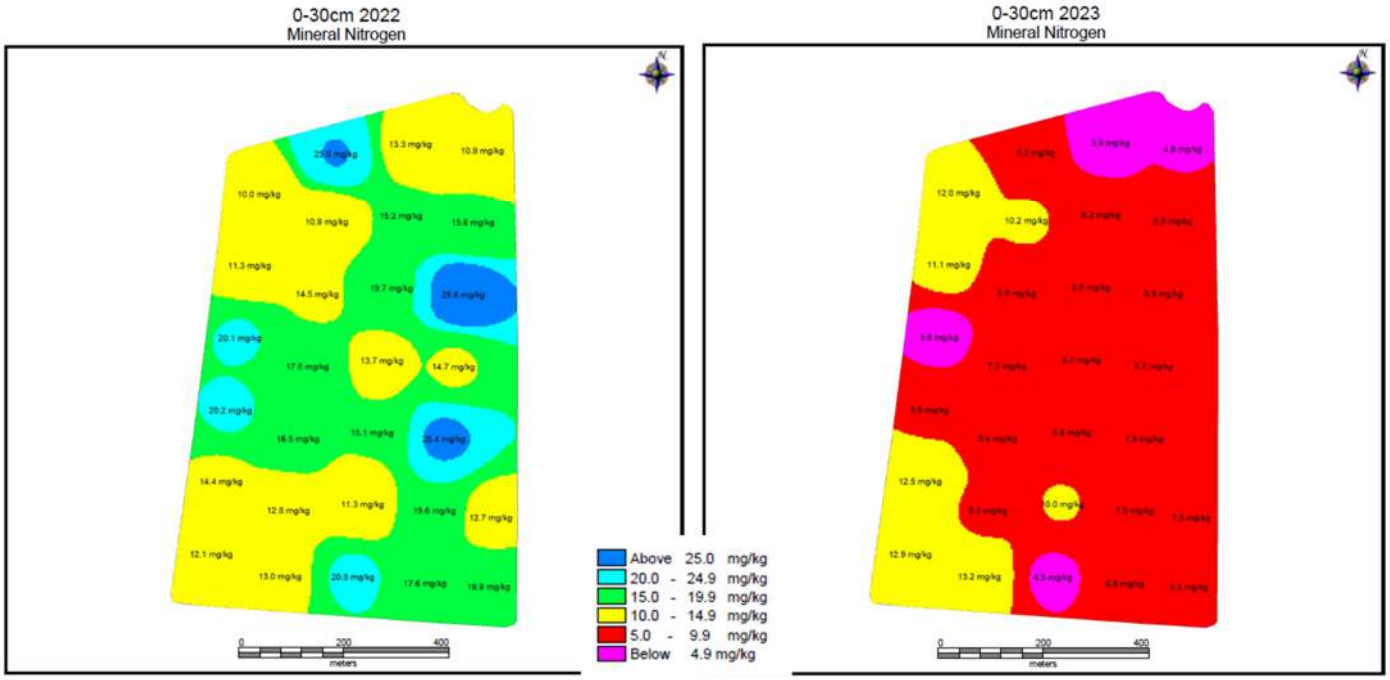

Figure 2: 0-30cm mineral nitrogen (nitrate + ammonium) measured in March 2022 and again in March 2023 in the Mallee region.

Further Information

Please contact your nearest Precision Agriculture specialist for further information on 1800 773 247.

And for more information about Nutrient Advantage or nitrogen strategies you can contact:

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