Soil Health Focus June 2023

FOLIAR NITROGEN SOLUTIONS FOR A DRIER SEASON.

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The past three seasons in northwest New South Wales and southern Queensland generated high-yielding winter crops. This has mined soil Nitrogen supplies and on top of this N export, sporadic denitrification events have been experienced due to flooding and waterlogged soils.

Nitrogen fertiliser will need to be applied, but it will require rain and time to get into the profile and down to an appropriate depth.

With a drier season expected, it will be a challenge for growers and agronomists on heavy vertosol soils to achieve a successful combination of fertiliser placement, timing and co-located moisture. A mismatch of these three critical factors will result in yellowing crops with reduced growth, with likely negative yield implications.

Location of N in the profile

Soil nitrate-N results from the long term Incitec Pivot experiment at Colonsay indicate the greatest zone of N depletion is at 30-70 cm soil depth (Figure 1).

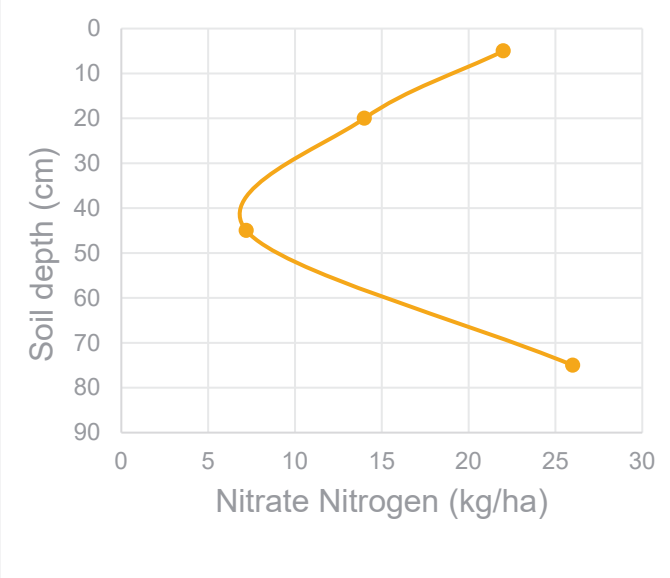

Figure 1: Calculated available nitrogen (kg/ha) from individual subsoil sampling segments sampled in January 2023.

Nitrate-nitrogen is moved down the profile by soil moisture. If in-crop rainfall is low, N movement down the profile will be limited.

In wheat, nitrogen demand increases rapidly towards the end of tillering, into stem elongation and through to head emergence (Figure 2). Generally, biomass development in this period is well correlated to yield if crops do not suffer from terminal moisture stress. The yield potential of crops suffering from nitrogen stress or deficiency during this period is reduced due to lower biomass production and lower grain number.

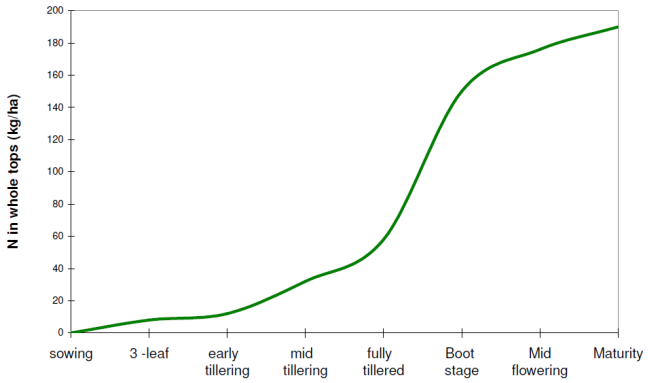

Figure 2: Relationship between growth stage and nitrogen uptake in whole tops of high yielding wheat crops.

Crop root development by the end of tillering / start of stem elongation will have reached a depth of approximately 50 – 60 cm in unconstrained soil (Figure 3).

If the availability of soil moisture in upper layers is low, crops will rely on available nitrogen in lower layers to supply crop requirements. Analysis of deep soil-nitrogen results from the Nutrient Advantage Laboratory this season indicate low availability of nitrogen in most fields.

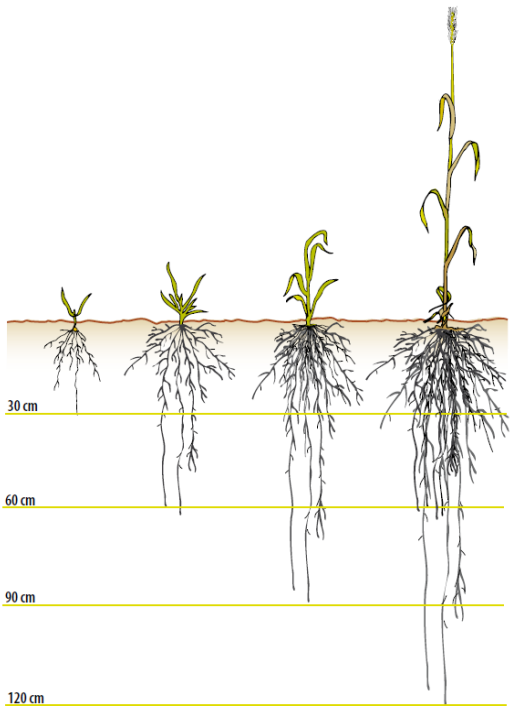

Figure 3: The increase in root volume as the wheat plant develops (Source: NSW DPI)

The first is head initiation, which occurs at the end of tillering. The second is head growth, which occurs from flag to head emergence. Reduced N availability during these periods has major effects on yield potential.

Foliar N a solution

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nunc eget dui Where soil moisture in upper layers is low and expected rainfall is insufficient or to incorporate and activate soil applied N fertilisers, foliar N applications may provide a solution. Foliar N applications have been shown to be effective in supplementing the difference between crop demands and soil supply of N, particularly during high uptake periods. In some situations, foliar N has maintained plant growth rates and allowed the plant roots to forage further and find more N as well.

Studies have investigated the effectiveness and efficiency of foliar N applications under varied conditions. Some studies focused on efficiency of foliar N to increase grain protein at flowering while others looked at N uptake into plant biomass at earlier growth stages (Gooding and Davies 1992, Rawluk et al 2000 and Smith et al 1991). Generally, soil applied N was incorporated into the soil with water and compared to foliar applied N.

Reported results of foliar N effectiveness vary from 10-60%, which covers both uptake into grain as well as plant tissue. Uptake into plant tissue was generally on the higher end and this supports the use of Foliar N to supply targeted applications of N when soil supply is short.

Considerations before applying foliar nitrogen:

- Crop growth stage
    - The effectiveness of foliar N relies on the amount of N fertiliser product that is intercepted and retained on the leaves and stems. Crops which cover more of the ground will intercept a higher proportion of the applied fertiliser.
- Crop N requirement
    - If no extra N is needed, then there will be no benefit of foliar N application.
- Leaf disease status:
    - Diseased leaf tissue will either not take-up N or N will be trapped in leaf, not available for remobilisation if required.
- Weather conditions:
    - Frost, high temperatures and/or windy conditions can cause plant stress, reducing plant capability to use applied N and increasing the risk of leaf damage.
- Soil moisture:
    - If crops are moisture stressed and not growing, Foliar N may be detrimental as plants will not be able to assimilate N and leaf damage can be caused.

IPF's Easy Liquids range of liquid fertilisers includes foliar N fertiliser, Easy N-Fol. It can be applied with conventional nozzles targeting a medium droplet. Common application rates for winter cereals and canola are 60-80 L/ha.

Further Information

For further information about Easy N-Fol, application rates or ag chem compatibilities, please contact your local Easy Liquids Sales agronomists.

You can also contact either:

Easy Liquids Sales agronomists:

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