Fieldwise
AGRONOMY NEWS FROM HUTCHINSONS
Crop Production Specialists
MARCH EXTRA 2021

# New tools help fine tune nutrition planning

**From advanced early-sown wheat to land that is still far from being drilled, there is much variability across regions, farms and individual fields this spring. Hutchinsons supports the use of key technologies, tested on our Helix farms, that growers can use to tackle these challenges and ensure crops fulfill their potential.**

**The options for managing crop variability have come a long way in recent years and are likely to come into their own this season given the legacy of another wet autumn and winter.**

Many early-sown winter crops have good yield potential that must be protected, while those crops sown late may need extra support to recover lost ground.

Heavy winter rain presents further nutritional challenges on less retentive soils through the main growing period, while flooding and waterlogging in many areas hit late-sown crops hard, and is forcing some growers to review cropping plans.

## Tailoring nutrition strategies

Managing nitrogen effectively is one of the main ways to maximise yield potential in winter cereals, but both the amount and type of product must be adaptable to the season, says Hutchinsons nutrition manager Tim Kerr.

Estimating crop requirements based on predicted yield and an assessment of what the soil will provide, is commonplace, however he believes more accuracy is needed. Tools such as Omnia's yield analysis and TerraMap high-definition soil scanning greatly increase the detail going into such planning, and there are other options too.

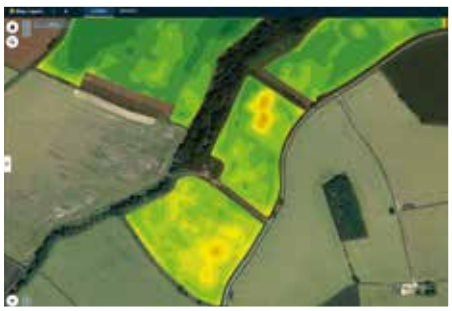
This year Omnia users can now access satellite imagery to help identify variations in crop growth within fields and formulate accurate application plans, says agronomist Rob Jewers.

Two types of imaging are available. One measures the red and near-infrared light reflected by vegetation to produce an NDVI (normalised difference vegetation index) map. Once uploaded to Omnia, it can be used to highlight variations in biomass growth for closer inspection, and/or used to produce a variable rate application plan.

*Omnia NDVI*

NDVI imagery is most useful earlier in the season, as once crop growth becomes more advanced (typically beyond GS 30/31) maps can become too saturated to pick out clear differences.

That is where the second form of satellite imaging becomes more useful. This combines near-infrared band measurements to produce a relative score of the crop's chlorophyll content to give a relative index. Omnia converts this chlorophyll map into a variable rate application plan, or it can be used as another tool to support field walking and management decisions.



*Omnia layer map*

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Hand-held testers such as the Yara N-Tester have been a proven technique for measuring chlorophyll content to interpret nitrogen status of winter wheat and will remain important for making in-season fine tuning adjustments to later fertiliser applications, notes Mr Kerr.

The weather can greatly influence any fertiliser plan, particularly if very dry conditions inhibit plant uptake of granular products, so he urges growers to tailor products to the season.


"In dry conditions, using smart foliar nitrogen products circumvents the difficulties of soil-applied fertiliser not reaching the roots fast enough. Products such as Persist-N and N-Durance are safe to apply without causing scorch and efficiently get nitrogen into the leaves to help meet crop demand through peak growth periods."

Mr Kerr reminds growers not to consider nitrogen in isolation, as other nutrients, notably phosphate, potassium and sulphur, influence nitrogen use efficiency. In-season tissue testing is therefore a valuable tool to ensure no other nutritional factors are limiting growth, and growth stage-specific tissue tests are available in winter wheat.

**If micronutrients are to be included with a planned herbicide or fungicide application, Mr Jewers recommends planning tissue testing in advance, so results are available in time to inform any changes.**

# Summer cover for wet soils

**Although the disruption caused by winter rain is less severe than 2019/20, some growers have been forced to rethink drilling programmes. But, establishing any crop in spring must not compromise soil health, Hutchinsons technical manager Dick Neale says.**

**Avoid forcing spring crops into sub-optimal conditions where they are unlikely to perform well, as doing so risks soil structure damage. The same applies to any areas of autumn-sown crops that struggled to establish or have been killed by prolonged anaerobic conditions over winter, where there may be the temptation to "stitch-in" a spring cereal to fill the void, he says.**

"Stand back and use tools such as the yield map analysis and gross margin predictor within Omnia to see whether it is financially worthwhile sowing a spring crop. If you won't make money doing so, look at other options rather than cropping for the sake of it."

He believes where land is unsuitable for spring drilling, or where there are failed patches that won't make a profit growing a spring crop, establishing a summer cover crop may be more effective.

Cover cropping is one of the best tools for rectifying soil health issues, providing multiple species with varied root architecture are used, with seed mixes carefully matched to the specific problems that need rectifying, he says.

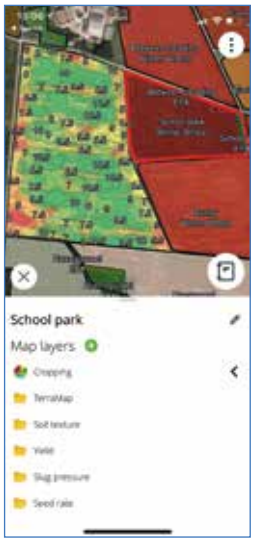
"Identify what you want the cover crop to do, then choose the best mix to do it.

"The starting point is always to get a spade and see what's going on beneath the surface. March and early April are the ideal time for soil and rooting assessments."

# NEW App moves crop walking up a level

HELIX APPROVED · TRIED · TESTED · TRUSTED

**Developed on our Helix farms, a new version of the Omnia Scout app** has been launched to make it easier for growers and agronomists to share crop walking information and update field records remotely.




The iOS app is a complete rebuild of the original Omnia Field Scout app, that allows growers to view the various layers of data stored within their Omnia account from an iPhone or iPad, and also update field records with notes, pictures, operational inputs or other information.

Providing there is a data or Wifi connection, the app will automatically sync with the associated Omnia account as soon as information is added, giving instant access to field notes and observations, digital farming manager Lewis McKerrow explains.

It also features an offline function whereby crop records can be downloaded in advance of going into an area with limited or no data connection, and any changes will be synced as soon as a connection is available.

"It provides a more professional, standardised way of making, recording and sharing crop notes from the field. It is especially important in this current Covid world, where agronomists and farmers aren't necessarily able to meet face-to-face, so it should help strengthen these relationships."

With increasing scrutiny of all crop inputs, particularly insecticides, the app also provides a digital record to help demonstrate the rationale behind input decisions and potentially allow more targeted treatment of crops.

Location markers can be tagged to any notes or pictures manually or by using the phone's GPS, allowing that area to be revisited and monitored over time, and targeted management plans to be developed in Omnia if required.

Likewise, users can analyse data, such as satellite biomass imagery or yield maps, in Omnia and highlight specific areas for further investigation and "ground-truthing".

Field information can be accessed and edited in a variety of ways through the app, such as by viewing all diary notes for a particular field, fields, variety or crop type.

"For example, you may find yellow rust present in one variety, so the app allows you to add this as a note to all fields affected," Mr McKerrow says.

**The Omnia Field Scout app is available now for iPhone and iPad from the App store.**

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Generally growers only need to dig down about a spade depth (12"), as that is the most biologically-active zone and where many structural issues occur. Deeper digging may be necessary if specific compaction or drainage problems are suspected though.

## Key questions to ask:

- **Is there compaction? If so, how deep is it?**
- **Is root growth restricted?**
- **Is soil wet throughout the profile or just in certain areas?**
- **How does water move through the profile?**
- **Does structure need loosening or stabilising?**
- **Is extra fertility or organic matter needed?**
- **Does soil look, feel and smell healthy?**
- **How much biological activity is present?**

Mr Neale says not to assume waterlogging is due to deep compaction that requires subsoiling, as it may just be surface capping impairing infiltration. "We've seen in the Fens for example, where land after sugar beet was overworked, it destroyed natural structure and resulted in fields laying very wet last winter."

Such problems are easily rectified with a mix such as MaxiRooter or MaxiCover, which both include species to break tight layers, open structure, stabilise the surface and act as water "pumps" to help dry soil.

Be cautious about drilling cover crops early in the spring, as this increases the chance of crops running to flower and setting seed. "Crops such as Daikon or fodder radish for example, grow relatively slowly when sown in autumn and produce a large root. But when sown in spring or summer, we see much more top growth and fibrous rooting as the plant wants to produce seed."

If cover is sown early, he recommends topping to 6-8" high when it comes into flower to prevent seed set. If multi-way mixes have been sown, topping encourages a second flush of shorter species, such as clover, so can be very beneficial.

The alternative is to sow later - e.g. June - thereby reducing the time for cover to run to seed. This also gives more time for wet ground to dry properly and for a good seedbed to be prepared.

**Hutchinsons offers a range of 7-8 species mixes to suit different situations. See www.hlhltd.co.uk/resources/#Seed for more details.**

**If you have questions about these topics, please contact us: information@hlhltd.co.uk**

# Sustainable Potato Cyst Nematode (PCN) control

## – findings from our Fenland potato trials 2017-2020

**Dr John Keer reviews research work undertaken on PCN control, using effective Integrated Crop Management techniques along with traditional chemical nematicides.**

When originally planning this trial series back in 2016, we were concerned about the future of nematicides for the control of PCN, so a large proportion of the work concentrated on the evaluation of PCN resistant varieties and to practically assess their role in sustainable PCN management.

All trials were sited on peaty loams, a typical soil type of the Cambridgeshire fenlands, an area with a long history of intensive potato production, which has led to increased PCN levels.

## Chemical nematicides

In the first two seasons, we compared the efficacy of nematicides Mocap, Vydate, Nemathorin and Velum Prime. Nematicides were shown to protect yield and offer some limited reduction of PCN multiplication, although no significant efficacy differences between the nematicides were found. The deep organic soils provide an extra level of tolerance to PCN damage, mostly due to the extensive root systems produced by crops on this soil type. This additional tolerance probably explains why all nematicides performed similarly, which contrasts to mineral soils, where efficacy differences are commonly observed.

Over the four years of the project, Mocap and Vydate have been lost, leaving only Nemathorin and Velum Prime now available for PCN control.

## Varietal resistance to PCN

PCN resistant varieties prevent or reduce the formation of cysts on root systems. The ideal potato variety will have complete resistance to both species of PCN and be tolerant to root invasion and feeding damage.

We compared the resistance of over twenty varieties and obtained very consistent results over a four-year period. The level of resistance was determined by comparing the **initial PCN count (Pi)** with the **post-cropping PCN count (Pf).** Working with pure G pallida populations throughout, several varieties caused a sharp decline in PCN numbers, indicated by a Pf:Pi ratio of less than one. Some of the best PCN resistant varieties included Innovator, Arsenal, Rock, Eurostar, Performer and Lugano.

Pf:Pi information also identified varieties which caused the highest levels of PCN multiplication. Varieties which consistently resulted in the highest levels of post cropping PCN included Cara (standard), Markies, Agria and Maris piper.

## Practical use of varietal PCN resistance to sustainably manage PCN

Thanks to the generation of consistent PCN multiplication data over four seasons, we can now use field data to predict the effect of variety on PCN numbers over the course of multiple rotations. The values in **Figure 1.** are examples of the consistency of Pf (eggs/g soil) achieved over very different growing seasons.

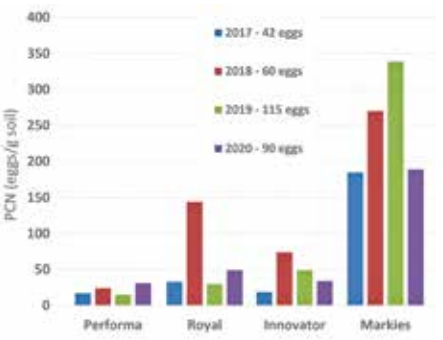



***Fig. 1 - PCN population dynamics 2017-2020*** *(Pf - eggs/g +Nemathorin)*

Richard Austin agriculture ltd

***Dr John Keer*** *(Richard Austin Agriculture)*

**Figure 2.** demonstrates how growing two successive crops of the resistant variety Innovator with a Pi of 72 eggs/g, reduces the PCN level to 3 eggs/g soil. These predictions use real field data for organic soils; the only assumptions made are for an annual PCN decline of 25 percent.

In contrast, growing two successive crops of Markies results in an increase from 72 eggs/g to 98 eggs/g, which is clearly an unsustainable PCN management policy.

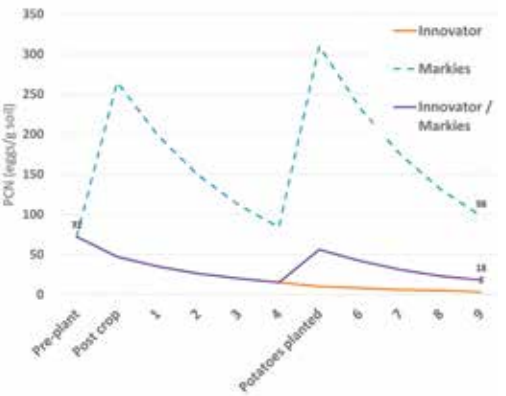


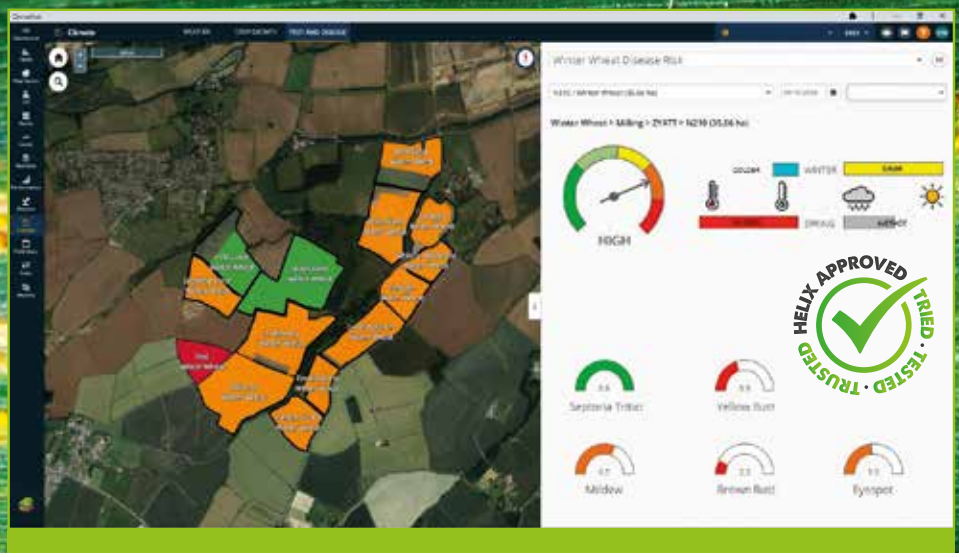

***Fig. 2 - PCN population dynamics over two rotations*** *- using mean field data 2017-2020*

Richard Austin agriculture ltd

Newer resistant varieties may be more difficult to sell than older, trusted varieties. However, wholesale change to resistant varieties is not always necessary, as also shown in Fig. 2 where Innovator is alternated with Markies to give an overall decline in PCN numbers from 72 to 18 eggs/g. In addition, resistant varieties can be confined to PCN hotspots within a field, whilst growing more "saleable" varieties elsewhere in the field. This strategy requires intensive PCN mapping at one-hectare grids using GPS.

Chemical nematicides remain essential for PCN management but this work demonstrates that ICM principles can very effectively aid PCN management.

**If you have questions about PCN control, please contact us: information@hlhltd.co.uk**




*Omnia Wheat Disease Risk Forecasting model*

***David Howard** (Head of Integrated Crop Management)*

# Tailoring disease control to risk through ICM

**Hutchinsons Head of ICM, David Howard shares his views on how disease control in wheat can be achieved within an Integrated Crop Management (ICM) approach this season.**

Understanding risk based on early cropping decisions like variety or drilling date and in-season monitoring of crops is the key to using **Integrated Crop Management** successfully – which is something many farmers are already doing without fully realising it.

ICM does not require a drastic change from the norm, in fact many ICM principles have already been adopted over the years due to the positive effect they can have on disease management. It is simply a more strategic approach to planning which crops and varieties to grow, assessing where risks lie and then adapting management and inputs in response to changing weather patterns and disease levels – or visualizing risk.

This can be more complicated than it sounds, for example over the last two years growers have juggled with a spectrum of drilling dates and varieties across the farm, which makes assessing which crops are at higher risk more complicated - and that is without the extremes of weather to consider throughout the season.

## Factors affecting disease risk in wheat crops:

- Varietal susceptibility based on AHDB RL ratings
- Drilling date
- Rotational position
- Current and forecasted weather
- Local disease levels

To simplify this process, a **Wheat Disease Risk Forecasting model** within Omnia has been developed and tested at our **Helix** farms.

This model automatically calculates which crops are at the highest risk from disease, taking into account all of the factors affecting disease developing in the crop - allowing the user to tailor a fungicide approach accordingly.

It is about being better informed to plan a strategy; the job of the model is not to tell us that disease is present, but rather to plan for what disease will be more likely to develop in a particular variety/field etc.

This allows the user to temper that risk as much as possible, not eliminate it, by tailoring a planned fungicide approach accordingly.

The model effectively takes into account the data already entered into Omnia, like variety and drilling date alongside the climatological data provided by the Climate tool to provide a visual risk map across the farm illustrating which fields pose higher risks and where that risk is coming from.

The weather data within the model is supplied through Omnia's well established, Climate module, providing extremely accurate current and forecasted weather conditions for locations down to a 1km resolution.

Users can allocate specific fields and are presented with a sliding scale to access visual representations of crop growth and certain growth stages, likely spray days are then predicted, and as the weather patterns change, the calculated risk constantly evolves and fungicide programmes can then be planned more effectively.

The risk is recorded though the season within Omnia to provide a record for justification purposes, something that is becoming increasingly important.

**Improving the accuracy of crop modelling as Omnia is doing, lends itself to pro-active decision making and more accurate agronomic advice - the very cornerstone of integrated crop management.**

Plans are to develop similar models for barley, and a Lodging Risk model for wheat, all of which are being trialed this spring on our **Helix** farms.

# Managing disease risk

**Preventing disease from spreading up the plant starts at the mid-late tillering /stem extension stage followed by the T1 spray, usually at GS32, which is targeted to protect final leaf 3.**

**Dr David Ellerton**, (Hutchinsons Technical Development Director) gives his views on how to manage disease risk at this key timing.

The decision on active ingredients to include in the T1 spray is determined by risk; risk from varietal susceptibility, drilling date, position in the rotation, weather conditions, location and what was applied at T0.

**This risk can now be calculated within the Disease Risk Forecasting model in Omnia, allowing for an appropriate fungicide programme to be planned, based on predicted levels of risk.**

In any fungicide programme, an anti-resistance strategy needs to be strongly considered, only using certain modes of action where they are necessary, which is best achieved by tailoring the fungicide programme to risk.

**Septoria remains the main disease in winter wheat** in most seasons, with pressure heavily dependent on rainfall in April and May. While earlier-sown crops will be at greatest risk, late-sown crops can still come under significant pressure if conditions favour disease development.

Susceptible varieties rated less than 5, such as Elation, KWS Barrel, KWS Jackal, KWS Kerrin and RGT Gravity, should be prioritised for treatment. For these crops, the strongest active against Septoria is mefentrifluconazole, commonly known as Revysol. It should only be used where Septoria risk is high, as with all actives, the more it is used, the higher chance there is of resistance developing.

At the other end of the scale, with lower risk varieties such as Theodore, KWS Extase and LG Sundance, prothioconazole based products work effectively, particularly if mixed with an SDHI.

The strongest individual SDHI for Septoria control is fluxapyroxad (Xemium) while benzovindiflupyr (Solatenol) gives good persistence and excellent control of rust. On varieties with the very highest Septoria ratings, any additional SDHI will suffice.

Including a multi-site such as folpet is also important and plays a crucial role in an anti-resistance strategy. Biostimulants such as Scyon also offer an alternative disease control option, and while it is best used at T0, it can be added at T1.

## Yellow rust

Yellow rust can become the number-one threat given suitable conditions, especially as new races emerge and challenge varietal resistance, as seen last season. Even if a variety has strong adult resistance, that may not kick-in until flag leaf emergence. Complacency can result in early crop damage, making it harder to control, putting undue pressure on chemistry and the plant's genetic resistance.

T0 treatments should have eliminated any early yellow rust, easing the pressure at T1. If still present, additional tebuconazole may be warranted for quick knockdown while strobilurins, such as azoxystrobin or pyraclostrobin, give long-lasting protection. The physiological benefits of strobilurins such as increased rooting are also worth keeping mind, but note that strobilurins can only be used twice in any programme.

SDHI's such as benzovindiflupyr (Solatenol) can also boost rooting and help the plant become more resistant to drought.

***Dr David Ellerton*** *(Hutchinsons Technical Development Director)*

Consider the control of stem-based diseases such as eyespot and take-all, particularly in early sown second wheats. Many popular varieties, such as Swallow, LG Sundance or Graham only have eyespot ratings of 3 or 4, so need protecting.

Here prothiconazole should be included for eyespot control. Addition of strobilurin fungicides

e.g., azoxystrobin or fluoxastrobin can help reduce take-all.

Even on more resistant varieties such as Zyatt (7) or Illustrious (6), remain vigilant for any brown smudges on the outer and possibly inner leaves. At this stage, eyespot can often be mistaken for Fusarium, however as prothiconazole is also effective for early control of Fusarium it will not be a wasted spray either way.

Any lurking mildew on more susceptible varieties, crops in high-risk areas in the north-west, or on organic soils, can be dealt with at T1 using cyflufenamid or prothioconazole.

**If you have questions about using Integrated Crop Management on your own farm, please contact us: information@hlhltd.co.uk**