



Achieving a healthy and sustainable soil structure

Healthy soils are fundamental for growing healthy crops and delegates at the recent annual agronomist conference saw how Hutchinsons are leading the way in addressing this issue, with the launch of the new Healthy Soils Programme. The audience heard how the use of cover crops can play a pivotal role in improving soil structure in arable rotations.

The strategic cross-rotation deployment of cover crops is the most viable, long-term solution for improving and maintaining healthy soil structure. A comprehensive soil health assessment and on-going advice on soil management strategies, as provided by the Hutchinsons Healthy Soils Programme, will determine where cover crops might benefit most.

Soil structure is used to describe the physical arrangement of all components that make up a functioning soil, including mineral particles, air, water and organic matter. A healthy soil structure will allow the uninhibited growth of roots and movement of air, water and soil macro and micro-organisms through the profile, while also making a soil stronger and more resistant to compaction.

Rob Simmons of the Cranfield Soil and AgriFood Institute explained to the conference that the traditional focus on mechanical maintenance of a healthy soil structure is unsustainable and only provides a "quick fix" to structure issues, such as compaction.

Long-term tool

Instead, he sees cover crops roots as the best tool for restructuring soils right down the profile, improving the following crop's

access water and nutrients, increasing workability and reducing off site problems such as run-off and erosion (see table 1).

"We want to try and move away from a degraded soil system where you have issues of compaction and a compromised soil water reservoir and move towards a more sustainable system.

This can be achieved with whole profile, cross-rotational management, utilising cover cropping windows to enhance soil structure," he added.

Critical role

Hutchinson's technical manager Dick Neale agreed that cover crops can play a critical role in fulfilling the UK government's vision that all soils will be sustainably managed and degradation threats tackled by 2030.

"Whilst others in the industry may say there is insufficient evidence to make firm decisions, Hutchinsons believes there is more than enough to help farmers reap real benefits from cover crops" - with the AHDB Research Review No. 90 one example of a comprehensive information resource.

"It's giving clear statements on the pros and cons of using cover crops, their financial justification, species positioning and their specific values and options for destruction, so it is all there," he explained.

Fear of change

The fear of change, the cost of change and a fear of failure are further barriers to growers adopting soil improving practices such as cover crops.

To help break down those barriers in a practical and engaging way, Hutchinsons now offer a comprehensive soil health assessment as part of its **Healthy Soils Programme.**

This combines a hands-on soil evaluation by an agronomist and a spade, with chemical and biological lab analysis to identify any soil health or nutrition issues on any particular farm.

From this assessment, advice can then be given on a range of soil management strategies, including any changes to cultivation strategy and if cover crops might be required.

Demonstration sites

This is also being complemented by work at Hutchinsons FENCE (Farm for the Establishment & Nutrition of Crops) site in Norfolk and several other practical demonstration areas around the country, showing the benefits of cover crops and how they are best deployed to achieve a successful outcome, as part of a wider soil health strategy.

>>> Dick points out that “Where growers have tried cover crops before and failed is where they haven’t had enough information and guidance, or been sold a cover crop that hasn’t fitted the requirements of their situation.”

“Cover crops need to be used in the right place and combine the right species and our demonstrations are helping to show growers how to use them.”

Did you know?

Cover crop trials are active all around us, all the time, in the form of established volunteers – head out with a spade and compare the soil under volunteers with unpopulated areas to see how roots can benefit soil structure between cash crops.

Table 1: The role of cover crops in enhancing soil quality and system health

Benefits of cover crops	Impact on soil physical, biological and chemical quality	Consequences to system health	Impact on crop health
Generation of bio-pores through the “bio-drilling”	Structural improvement Soil aggregation Creation of macro-pores through compacted zones	Enhance the ability of soils to receive, retain and release water Improved trafficability and workability	Re-colonisation of residual root channels to increase access to water and nutrients 50% of the root system of wheat crops has been shown to be in direct contact with roots of previous cover crops Increased yield of follow on crops
Arbuscular mycorrhizal fungi (AMF) associations	Soil aggregation (enmeshment or binding via fungal hyphae)	Improved system resilience Improved resistance to erosion	Improves AMF colonisation and access to water and nutrients Provides resistance to fusarium Biological continuity
Root exudates and carbon stimulate soil microbiology (rhizosphere effect)	Soil aggregation (glues)	Timing of operations	Enhanced nutrient cycling

Farmer’s View

For healthier soils, check your underwear!

Just over a decade ago, Cambridgeshire grower Russell McKenzie set out to improve the health of his heavy clay soils and a recent test on two differing parts of his farm underlined the progress he has made.

The test involved burying a pair of 100% cotton underpants in the topsoil and leaving them for eight weeks. The extent to which the cotton material degrades will then indicate the microbial activity within the soil – a good indicator of soil health.

He buried one pair on land where he has implemented management practices to promote soil health and another in a field with a history of straw removal and intensive cultivations.

Although not a particularly scientific and a rather jovial way of getting the message across, the difference was marked - with the underpants on the intensively cultivated field barely degraded and the other pair full of holes.

So how did he achieve this improvement in soil health?

Stopped removing straw

The first major change Mr McKenzie made was to cease cereal straw removal at harvest to ensure organic matter is being put back into the soil and giving soil micro-organisms “something to feed on”.

Maintaining organic matter levels in soils is fundamental for adequate nutrient supply, water-holding capacity and soil structure aggregation.

“If you let straw go annually without putting anything back, it is like waving goodbye to trailer loads of carbon out the gateway.”

Changed tillage practices

The next area that Mr McKenzie addressed was tillage choice and depth, with the farm gradually moving away from ploughing and cultivations to improve soil structure.

For growers with black grass he sees the plough as a useful “reset button” when control is lost, but its negative impacts on soil health, including the reduction of earthworm numbers and reducing soil carbon, has seen it abandoned on his farm.

Currently, two of the five farms Mr McKenzie manages are under a no-tillage system that incorporates cover crops, while the remaining three are in transition, with black grass and soil structure issues being addressed first.

He explained that he invested just £3,000 in some low disturbance points for his Horsch drill to go direct drilling, demonstrating that you don’t need to spend a fortune on new machinery to change your establishment system.



Using cover crops

The final piece of the puzzle for Mr McKenzie is the use of cover crops, which capture nutrients, open up the soil profile with roots and conserve moisture before establishing his spring crops, which include barley, oats and beans.

Cover crops are grazed with sheep from November to January, allowing the elements to dry the surface, ensuring it is friable to allow good slot closure to be achieved when direct drilling in the spring.

He has also proven that you don’t need to plough to manage black grass, seeing good control in his spring crops after over-winter covers and in first wheats, after short term covers following oilseed rape, with the latter affording him time to drill later in the autumn.

Russell McKenzie’s tillage and cover crop tips

- Get the spade out to assess soil condition first and identify any problem areas
- Good drainage is essential to healthy soils
- Try a small area of reduced tillage or cover crops first, to see if it works and help you get comfortable with a different approach
- It can be a long game – do not expect to see drastic improvements in the first year, but the rewards will come with the right approach and mind-set.

Questions about Hutchinsons Healthy Soils Programme, or considering cover crops on your farm?

Contact us for advice – email: information@hlhlt.co.uk

The importance of early disease control in winter cereals

Trials over recent seasons have exposed the difficulties of trying to control established Septoria infections in winter wheat, with a range of fungicide options including the new SDHIs. In this article Dr David Ellerton (Hutchinsons Technical Development Director) highlights the importance of an early protectant approach to disease control to ensure growers maintain yield potential.

Foliar diseases

Despite a relatively dry autumn and early winter, Septoria present on the lower leaves of many crops can build rapidly should the UK return to mild wet conditions, as experienced in many areas of the country in November.

Trials by the AHDB and others have shown clearly that once Septoria is established on upper leaves, even high doses of the stronger triazoles such as epoxiconazole and prothioconazole will give only limited curative control and while the newer SDHIs offer enhanced control of established infections, the disease will still be capable of large yield reductions. In addition, a curative based strategy will significantly increase the risk of selecting for SDHI resistant strains of Septoria (which have already been detected in the UK and Ireland).

Yellow Rust susceptibility rating of selected winter wheat varieties - 2017/18 season

VARIETY	NABIM GROUP	DISEASE RATING
Reflection	4 (Hard)	3
Gallant	1	4
Cordiale	2	4
Britannia	3	4
Myriad	4 (Soft)	4
KWS Trinity	1	9
RGT Illustrious	1	9
Crusoe	1	9
KWS Siskin	2	9
LG Sundance	4 (Soft)	9
LG Motown	4 (Soft)	9
Revelation	4 (Soft)	9
Freiston	4 (Hard)	9
KWS Crispin	4 (Hard)	9
Dickens	4 (Hard)	9
Costello	4 (Hard)	9

It is important to recognise that mutation of yellow rust may allow it to overcome varietal resistance in the future.

Table 1 - Source:

AHDB Recommended List Winter Wheat 2017/18

Growers will need to ensure that the disease is prevented from spreading from the lower leaves, by adopting a strong protectant approach from early on in the spring. For winter wheat, the inclusion of a multi-site active ingredient such as chlorothalonil or folpet, at the T0 (mid to late tillering) timing, will help protect the newly developing leaves and pay considerable dividends over relying on curative control of Septoria should it become established within the crop.

New rust races

Recent work at NIAB, under the United Kingdom Cereal Pathogen Virulence Survey (UKCPVS), has identified several new races of yellow and brown rust affecting a large number of modern varieties. As described in the last Fieldwise newsletter, the resulting significant changes in yellow rust susceptibilities have led the AHDB to base current variety ratings on last years' assessments alone (see table 1):

Rapid disease knockdown

Where susceptible varieties are being grown and rust is present, careful choice of additional active ingredients to the multi-site product should be made at the T0 timing to give rapid knockdown of established disease. Key products for early rapid disease knockdown of yellow rust should include active ingredients such as cyproconazole, tebuconazole or epoxiconazole, while the latter offers a reasonable level of additional Septoria control. The strobilurins pyraclostrobin and azoxystrobin can also give good control of rusts and may help avoid overusing the triazole group of products, which will be important later in the season. The addition of fenpropimorph can also help control rust, as well as early infections of mildew, and has been shown to improve uptake of triazoles into the plant.



Yellow rust in KWS Basset Suffolk

Stem base and root diseases

In addition to foliar diseases, consideration should also be given to the control of stem base and root diseases such as eyespot and take-all, particularly in second wheats. Inclusion of certain strobilurin fungicides can help reduce take-all as well as promoting rooting in more backward crops. This may also assist crops in scavenging for nutrients or helping overcome possible drought later in the season. Some of the SDHI fungicides can also increase rooting, as well as giving useful control of eyespot - adding to the justification for their use at earlier timings. Inclusion of prochloraz may also give additional eyespot control.

Optimise barley growth

In winter barley Rhynchosporium, net blotch, brown rust and mildew have all been reported. Barley yields can be severely affected by early disease as it can impact on tiller development and early treatment prior to the traditional T1 timing of stem extension should be considered where disease levels are significant.

Although new fungicide groups will be arriving in cereals over the next few seasons, until then we need to use our current chemistry wisely and avoid further build up in disease resistance for UK cereal crops - maintaining protectant disease control will play a crucial role in this process.

By utilising information from last season's trials around the country, Hutchinsons will be able to provide expert guidance on suitable fungicide programmes.

Email us: information@hlhlt.co.uk.

Fieldwise nutrition - focus on Spring Wheat

In this issue, Tim Kerr (Hutchinsons Fertiliser Manager) highlights nutrition for spring wheat – historically regarded as only a minor crop, but now becoming of increasing interest.

Collective nouns are a wonderful part of our language; we might raise a rueful smile at the idea of a parliament of owls, or a siege of herons. Growing up, our elderly neighbouring farmer would always wait to apply his first top dressing of nitrogen (artificial) on his grass until he had seen the first ‘desert’ of lapwings arrive... a crop husbandry tip that was passed down from his father.

No science involved, but it seemed to work for him... we may have moved on a long way from this basis for nitrogen timing, however there is a general industry wide consensus that we have more to learn about nitrogen fertiliser amounts and timing on spring wheat (and, in some cases spring barley too).

Since the early 1990s, spring wheat has accounted for less than 5% of the total wheat acreage, so it can be no surprise that it was treated as a minor crop when meagre fertiliser research budgets were being divided up.

As the tide of black grass infestation becomes increasingly harder to stem, there are many growers turning to spring sown cereals to provide them with wider agronomic and rotational benefits. Estimates are that spring sown cereals will have increased by 15% over the last two years. Much of this area will be virgin spring cereal land – and there will undoubtedly be a few growers drilling cereals in March for the first time.

Inevitably our current recommendations are based on the results of experience of growing crops – if we are seeing spring cereals grown on heavy soils for the first time in a generation, answers are not so easy to find...

What do we know?

Nitrogen & Sulphur

Certainly the new generation of spring wheat varieties possess greater yield potential than ever. However, yield potential will only be achieved if the crop has enough nutrients to draw on from the soil. A spring wheat crop will produce less than 10 leaves and only 3 or 4 tillers before entering the stem extension phase. It is therefore very important to maintain nitrogen availability throughout this early phase of growth. It would still be preferable to split N applications – applying the balance of the recommended rates at Growth stage 30/31 in preparation for the construction stage. The nitrogen: sulphur ratio is the same for spring wheat as it is for its winter counterpart – **a quick rule of thumb calculation is 1 kg of SO₃ for every 5 kg of nitrogen applied.**

If target yield is 7.5 t/ha of spring wheat, on a mineral soil – a total Nitrogen application of 180 kg/ha could be split evenly between seedbed and early stem extension, with 35 - 40 kg/ha of SO₃ applied with the first N application.

Anyone doubting the need for sulphur applications might want to consider the latest national statistics on sulphur dioxide emissions in the UK – showing a remarkable 96% reduction since 1970. Just in the 12 months from 2014 to 2015, emissions dropped by 23%. It has been said here before, but bears repeating – the safest position to assume is that sulphur deposits are so low that the best policy is to apply the total sulphur crop requirement to every crop... every time.

Spring wheat nutrition example - target yield of 7.5 t/ha of spring wheat

(on a mineral soil - SNS index 1)

NITROGEN	180kg/ha (application evenly split between seedbed and GS30/31)
SULPHUR	35 – 40 kg/ha of SO ₃ (applied with the first N application)
PHOSPHATE	Placement fertiliser at planting – even maintenance dressing
POTASH	Check requirement with soil sample – may already have enough K

Phosphate

Of course it is not just Nitrogen and sulphur that a crop needs; bear in mind that a spring wheat crop probably only has 100 days growth before harvest – so time is tight to establish a root network that is capable of pulling sufficient nutrient and water from the soil. The inability of phosphate to move quickly in the soil, combined with the shorter life span and smaller root mass of spring wheat, means that placement of phosphate at planting is ideal – even when it is only calculated as a maintenance dressing.

Potash is just as important, but more mobile – and if you are growing spring wheat on some of the heavier clay soils, do check what is in the soil – some will already have more than enough K.

New challenges bring about new practises on farm, and we will no doubt continue to learn more about growing spring cereals widely in the coming years. As my old neighbour was keen to tell me, nature will tell you when you are getting it right (however I would also add your accountant to that short list).

Do you have questions about this article, or would you like help with your spring crop nutrition? Please talk to your Hutchinsons agronomist, or email information@hlhlt.co.uk

Variable rate drilling with **Omnia** Precision Agronomy

Needing to create a variable rate drilling plan that considers all the factors in that particular field or area of a field that will affect establishment, led Essex farmer and contractor, Tom Bradshaw to look at what the Omnia Precision Agronomy system could offer.



“The aim going into winter is to have plant populations as uniform as possible, so we can manage the crop as a whole in the spring. In the past we have dabbled in variable seed rates, but I never felt that these were taking into account the agronomy of the field sufficiently, and did not encompass factors such as soil type, weed pressure or seed bed quality all together,” says Mr Bradshaw.

“There were programmes available that could include one or two of these factors, but to get it right as many characteristics of the field or area of a field need to be considered together, not in isolation.”

“To my mind variable rate drilling should be working to even out extremes to average the crop out - adjusting the rate by 10% here or there is not achieving anything. Depending on the field and the variations of soil type, weeds and seed bed quality you would expect the rate to change by as much as 30—50% to make a difference.”

“When I heard about the Omnia system at Cereals this year, I felt that it was certainly worth trialling it to see if the mapping feature was indeed able to offer a better picture of the field or areas of the field, and then deliver a much more accurate and appropriate variable rate drilling plan.”

Trialling Omnia

Mr Bradshaw decided to trial Omnia over about 600ha of autumn sown wheat and hybrid barley at Fletchers Farm, just north of Colchester.

“The system was user friendly and pretty intuitive to setup. Working closely with my agronomist, we drew up maps on soil type, seed bed quality, black-grass pressure and slug pressure. Each field had zoned areas that represented different ranges of weed or slug pressures or soil types for example.”

“These maps were then overlaid; the variety and drilling information selected and the system generated a variable seed rate for that field.”

This ability to overlay maps of data means that the recommendations created through Omnia are much more closely aligned to the agronomic requirements of the field, than has ever been possible to produce before, and this is a really exciting step forward in how precision technology can make us more productive and efficient as an industry, says Oliver Wood, Precision Services Manager.

“Omnia contains crop specific algorithms which are based on many years of trials and field experience, this ensures that every part of every field accurately receives the appropriate inputs to maximise productivity, whilst minimising environmental impact.”

Mr Wood points out that an important attribute of Omnia is that it can use data collected through different systems, so if a client for example has data collected by SOYL, the system can use this and previous work does not go to waste.”

This was an important factor behind Mr Bradshaw's decision to trial Omnia this autumn, and is unique to the Omnia system. “It was reassuring to know that the system is supported by years of Hutchinsons own proven and tested trials data, so the data being generated is real and extremely valuable.”

“Being able to over-ride the system at any time, even from a tablet in the field, means that you can make constant adjustments as you go along, and this flexibility is a really important feature of Omnia.”

The results

Mr Bradshaw is pleased with the results so far. “In one field which ranges from a lovely loam to a heavy clay we had an 80% variation in seed rate! The average seed rate is usually about 150kg/ha, but using Omnia, this varied across the field from 120kg/ha to 210kg/ha.”

“The crop has established well and plant counts are looking even, all of which make for managing the crop more efficiently through the season.”

The system is available now to farmers and agronomists.

For more information please view our dedicated website: omniaprecision.co.uk or email us: consultancy@omniaprecision.co.uk



YEN initiative focuses the mind



Aberdeenshire farmer and Gardiner ICM agronomist Iain Learmonth has only been a member of the Yield Enhancement Network for one year, but already the project is stimulating changes on his 440ha (1,100-acre) mixed farm.

It was the recommendation of a client that spurred Mr Learmonth to join the project last year, in a bid to better understand the possible factors limiting yields across the 263ha (650 acres) of cropping, which include winter wheat, hybrid winter barley, spring feed barley, and oilseed rape.

“It’s been a really interesting process that concentrates the mind. It’s not about making big changes to what we do, but highlighting areas to fine-tune agronomy and push crops harder.”

Mr Learmonth was surprised when last season’s YEN report highlighted lack of moisture during May as a factor limiting wheat yields, especially as rainfall in June and July was well above average.

“Our soil type ranges from light sandy loam to clay loam, so it’s not classic wheat growing land. Nevertheless, it was interesting to see that damage to yield from lack of water could have been caused so early on.”

A number of changes are planned this season to try to boost average yields, which for wheat currently stands at 9.5t/ha, around 50% of the biophysical potential of that land. The 40ha of wheat is all down to Horatio and Zulu.

• Variable seed rates

Having bought a new Horsch Express KR combi drill this season, Mr Learmonth plans to try variable seed rates to achieve a more consistent plant population across fields with variable soil types.

Wheat is currently sown at around 375 seeds/m², but he says there may be scope to vary rates by plus or minus 20%, with rates increased on more moisture-retentive land and reduced on lighter areas.

• Nutrition

Fine-tuning fertiliser regimes to push modern varieties harder, is the aim for Mr Learmonth this season.

The farm sits within a Nitrate Vulnerable Zone and receives regular applications of manure from the 700-head of cattle.

Yara’s hand-held N-tester is used to establish the nitrogen status of growing crops, but he believes there is scope to do more and is considering a “little and often” approach to fertiliser applications throughout the growing season.

More green tissue testing is also planned to ensure crops have all the macro and micronutrients required.

“By the time symptoms appear in crops it’s too late, as yields have already been damaged. If you don’t check, you don’t know what crops may be missing, especially if issues are masked by other factors.”

• Robust disease control

Septoria control remains the priority for Mr Learmonth, who says the YEN project has reinforced his drive to remain on top of disease.

“It is much more difficult to control Septoria now, so you can’t afford to be in an eradicant situation.”

He plans a robust fungicide strategy from T0 to T3 as a matter of course, but varies rates and products according to disease pressure nearer the time.

He says there is no sense missing any of these key sprays, as it is impossible to predict what the following weather and resulting disease pressure will do. This was clearly highlighted last year when crops appeared clean up to mid-July, but broke down to Septoria quickly with wet weather.

“Given the price of grain last season we struggled to justify a T4, but it may be something to look at in future, if there is a worthwhile benefit from additional greening.”

Interested in participating in a YEN project this season? Read updates on our website www.hlhlt.co.uk and email Dr Bob Bulmer, information@hlhlt.co.uk

For more information on any of our products or services please contact your local Hutchinsons agronomist or contact us at:

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