

Immersive learning

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Groundswell report

Nine years of Groundswell festival and it continues to be a sell-out event. CPM joined the 8000 visitors at Lannock Manor Farm in Hertfordshire to hear this year’s hot topics, meet faces new and old, and take inspiration for the future.

By Melanie Jenkins and Janine Adamson

It’s questionable whether many individuals would receive roaring applause and whooping when they walked onto stage at an agricultural show or conference. However, that was certainly the case for Amish farmer, John Kempf.

Founder of regen agronomy consultancy, Advancing Eco Agriculture, John was billed by the event organisers as one not to miss. And although he had slots

throughout the two days of Groundswell, John first introduced himself during a session entitled ‘Untapped potential in regenerative ag’, which took place in the big top (the equivalent of the Pyramid Stage at Glastonbury).

Headline speaker

In many ways, it was quite a coup – being from Northeast Ohio, John rarely travels and this was his first time visiting the UK. But with an audience ready to hang from his every word, he opened his talk by stating many people don’t have an appreciation for what healthy plants do, because most haven’t observed it.

“To provide some context, I grew up on a fruit and vegetable farm where we’d receive 40” (around 1000mm) total accumulation of snow and rain, with up to 280 cloud cover days a year and high humidity – it was ideal for disease.

“At the same time, my father was a pesticide distributor so we’d be the first to test and evaluate new products as they were released. In the early 2000s, we lost around 70% of our primary crops due to issues such as mildews and blight. It seemed the more intense our pesticide use was, the worse the problem became”, explained John.

“It was a wake-up moment. Then, we rented some nearby land from a neighbour which hadn’t had the same pesticide use. The comparison was so pronounced it had our attention; we wanted to know why.”

During the following years, John said it became apparent that plants have the capacity to be completely resistant to pest and disease pressure if they have a good immune system and microbiome health. As a result, he believes it’s possible to grow resistant plants that aren’t susceptible to pests.

“Our approach is to achieve the highest yields possible but with a twist – healthy plants to produce the highest yields, but with robust immune systems and resistance to pests. There’s a misconception that we should expect to see yield decline, but we’ve observed the opposite. After all, how can you have healthy plants and see yield



Good root systems produce glomalin which is the glue that holds soil particles together and this’ll help water retention, said Odette Ménard.

decline?” he questioned.

John stressed that it's not a case of simply removing inputs, instead it's about earning the right to do so by improving plant health to a place where they're not required. "Plants with a robust immune system can transfer that immunity to humans and livestock while also regenerating soils and the ecosystem at the same time."

According to John, regenerating soils isn't always about replenishing them through added organic matter or cover crops, for example. To explain further, he highlighted the role of photosynthesis. "What's changed as a result of micronutrition and microbiome depletion, is a plant's photosynthetic ability has been reduced therefore the sugars it produces are compromised. These sugars go into the roots and are emitted as root exudates, and that's how to build organic matter.

"Crops don't have to be extracting from the soil and a change in agronomic approach can address this – reducing pesticides, improving soil health and growing food as medicine," he said.

Recognising that incentives are often required to instigate change at scale, John posed the question of how to deliver immediate economic results within the first year of operating with such an approach. "That became our focus, rather than undergoing a long transition or expecting productivity losses.

"For us, the foundation of regen agronomy lies in managing both nutrition and the soil microbiome. By doing this, it's a self-perpetuating system which doesn't require constant support or inputs," he added. "The only difference between a regenerative and degenerative cycle is you as the farm manager and the decisions that you make."

Perhaps a little controversially, John then pointed out that the widely-publicised principles of soil



According to Lydia Smith, fibre crops such as flax and hemp are exciting and have the potential to produce deep rooting structures that can improve the carbon content of soils.

health / regenerative agriculture are not a recipe to be strictly followed. "It's a foundation, yes, but in certain situations it's not possible to include it all. So we have to compensate, for example, if you can't have livestock within your system you could grow crops with more aggressive root systems."

But back to the point of how to achieve results immediately, consistently and reliably – John said a key component is measuring and using data, including in-depth soil analysis and SAP testing. "During the years of doing this, we've been able to correlate pest and disease pressure with nutritional status," he suggested.

And this topic was at the heart of another of John's Groundswell sessions which explored nutrition for insect resistance. To begin, he quoted soil fertility expert, the late William Albrecht: "Insects are nature's garbage collectors and diseases are her clean-up crew.' Pests don't turn up indiscriminately – the question is why? What is it about that crop or its environment?"

"When you take the conventional disease triangle (pathogen-host-environment), I suggest we've not given

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Attracting a packed out big top tent was Henry Dimpleby and Andy Cato who discussed transforming the food landscape at scale, can it be done? Discussions included questioning what it is the industry wants to scale, with Andy stating Wildfarmed is trying to achieve biodiversity-rich, food producing landscapes and therefore, it's time to back those who want to achieve both food and nature net gains.



NIAB is seeking useful genetics which may have been left behind in older wheat varieties, to bring forward as diversity-enriched wheat to be exploited on farm, said Phil Howell.

► enough consideration to the host. The immune status of a plant varies significantly, although being a 'host' doesn't mean it's susceptible to disease," explained John.

He then stated that due to how insects communicate within the infrared spectrum, nutritionally imbalanced plants are more visible and appear as 'neon lights' from a significant distance. And furthermore, he added in some ways, insects appear to eat plants not suitable for human or livestock consumption.

So what's the solution? John shared

thinking behind his plant health pyramid where at the base is complete photosynthesis which is achieved through 'proper nutritional balance'. "If we increase the volume of photosynthesis the sugar/carbohydrate profile changes – we get a high proportion of complex carbohydrates with low levels of non-reducing sugars in the plant sap.

"At this level, plants become resistant to soil-borne fungal pathogens, but they require adequate Mg, Fe, Mn, N and P to achieve it."

Protein synthesis

The next layer up in the pyramid is complete protein synthesis, where all soluble N compounds are converted to amino acids and complete proteins within a 24hr photo-cycle. "These plants are resistant to larval and sucking insects because these insects are incapable of breaking down complete proteins meaning plants are no longer a food source. For this, the plant requires optimum levels of Mg, S, Mo and B," said John.

The third pyramid level is increased lipid

Cut flower revival

Renowned for highlighting alternative approaches to agriculture, Groundswell thrust the concept of flower farming into the spotlight.

Olivia Wilson of the British Flower Studio Wetherly opened the session by stating there's a perception that flower farming is simply growing and picking flowers with a trug. "However, the UK cut flower industry's worth £1.4Bn and is a big business, but is currently lacking scalability and growers with professional mindsets," she said.

Calixta Killander founded Flourish Produce in 2017 – a 30ha site growing 750 varieties of crops including heritage grains, organic fresh produce and cut flowers. She said the business is based on an agroforestry model with crop stacking, allowing maximum output from the available land.

"We've tried to avoid wholesale so sell

direct to consumers, but the challenge here is improving the perception of what British flowers should look like and their seasonality/availability."

Anna Taylor from Anna's Flower Farm agreed that the future of flower farming is in stacking – layering perennial species and bulbs to reduce the time and investment required while respecting the environment.

But a purpose of the session was to highlight the opportunity to 'conventional' farmers and the benefits of teaming up with flower growers, rather than individuals embarking on the process from scratch. Following the panel session, there was networking to matchmake landowners with suitable flower farmers.

And judging by the audience's positive response, the benefits of flower farming for all parties were clearly conveyed.



The sun shone at Groundswell this year, attracting 8000 visitors to the site in Hertfordshire.

Loyal to the soil

Farming land at the edge of the Saskatchewan prairies on the Canadian border with the US, Derek and Tannis Axten, have fragile soils across 4850ha, with 30-35cm of rain per year. Having inherited Axten Farms from Derek's father, they adopted a no-till approach in the 1990s but found yields plateaued.

Unsure why this was happening, the couple began attending conferences with the aim to learn from others. It was the summer of 2006 when Derek met Dr Wayne Beck, the grandfather of the no-till movement, in South Dakota, when things started to change. "I saw him again in 2007 and it was the first time I'd ever seen someone put a shovel in the soil," said Derek. "I'd studied agriculture at college and this was still all new to me, and I could see that this soil didn't behave how ours back home did at all."

He returned to South Dakota a number of times and on one occasion was tapped on the shoulder by none other than Gabe Brown, who subsequently invited him back to his farm. "At Gabe's farm I saw that his soil was entirely different to soil just 200m away, with the latter just like the farm at home. This was the moment that changed my life because I knew I had to alter the management of the farm."

One of the key ways to learn how to manage land is to look to the native system as a model, said Derek. "For us, that means the prairie, where 85% of the plant life is grasses, the rest is legumes and the rest is forest, which is all live root and permanent cover – so these are the soil health principles now in our model."

With a background as a high school biology teacher, Tannis was interested in learning more about what was going on in the soil and so took a course to be able to identify microbes in 2017. "It was really disappointing because I just found lots of bacteria. We'd been making lots of changes but to see no healthy biology was really sobering."

"This is when we decided to make our farm motto, 'loyal to the soil'. Every decision we now make on the farm, we look at how



Derek and Tannis Axten farm 4850ha at the edge of the Saskatchewan prairies on the Canadian border with the US. Their session was entitled 'loyal to the soil'.

it would impact the soil biology, whether it would be harmful at all and what we could do to make up to that. It's a long process and means our approach constantly changes but we focus on low disturbance, nutrient balancing and diversity, and work with our agronomist to be proactive rather than reactive."

Derek is a keen experimenter and so is self-proclaimed to have owned basically every single and double disc drill available in Western Canada. "There was always something wrong with them but we've landed on one we're pretty happy with in the form of the K-Hart 18m double disc off set drill," he said.

The couple now leave cover on the soil which provides moisture retention and soil biology, and they've also introduced controlled traffic farming. "We generally try to do everything we can to get as much aeration into the soil."

"We were the first farmers in Western Canada to introduce a chaff deck to the farm," explained Derek. "This is a divider on the back of the combine which captures the heaviest portion of the chaff that's full of weeds and would usually go on the field, but is instead dropped into the tramlines. One of our biggest fears with CTF was trampoline

erosion but this mechanical weed control which doesn't take any horsepower or diesel, is low impact and easily solves the problem."

The couple have also worked to reduce their reliance on synthetic inputs, using green-on-brown spraying technology with their Agrifac sprayers, and also have dynamic dosing for variable rate per nozzle. "We used to apply 10,000 litres of herbicides and now we only use 950 litres," said Derek.

To maximise diversity, about 14 different crops are grown on the farm, some being intercrops. "There was so much diversity in what Gabe grew and it all looked so good without any fertiliser on it, and this really stuck with me."

Further to this they've introduced pollinator boundaries, have introduced perennials, utilise livestock grazing and now SAP test, as well as apply micronutrients and biologicals.

Tannis highlighted that they hardly use any nitrogen now. "It can be hard not to panic when you're seeing your neighbours applying it, so try to be confident in what you're doing. We still have some years where we feel things go backwards, but you have to be out there with a shovel to see the changes."

synthesis (fats and oils) which is related to a plant's waxy leaf surface and achieved through an aggressive microbiome. "When a plant absorbs the majority of their nutrition in the form of microbial metabolites, which are very energy efficient, any surplus energy is stored as lipids. This waxy layer can serve as a shield from airborne fungal and bacterial pathogens."

At the top of the pyramid is increased plant secondary metabolite synthesis

(essential oils). "Immunity pathways are triggered by microbes in the plant's microbiome meaning they become resistant to the entire beetle family as well as nematodes. To achieve this, plants require the right microbes in the microbiome," explained John.

Taking a more simplistic perspective, he stated that the bottom two levels are based on balanced chemistry whereas the top two are about active

immunity and vigorous biology.

It could be argued that in one way or another, everything leads back to the soil, and this was certainly the focus of Odette Ménard's seminars at Groundswell. An agricultural engineer, Odette has travelled the world to learn how to best create healthy soils for the long-term. "When we talk about agriculture, it's often about what we see on the surface, but what we see here

A stalwart on stage

Undoubtedly a familiar face for many *CPM* readers, weed researcher, Dr Stephen Moss, took to the stage to share his thoughts on managing blackgrass within arable rotations. With more than 250 research papers under his belt, unsurprisingly, spare seats in the audience were limited.

As a means of condensing his expansive knowledge into easy bitesize chunks, Stephen discussed five key aspects of blackgrass, starting with its seed longevity in the soil. "When soil is disturbed through cultivations, we can expect a 80% decline in the seedbank per year, but of course this may consist of 50,000 seeds/m². If seed return is reduced, populations should decline," he explained.

Then, Stephen discussed the fact that blackgrass can only emerge from the top 5cm of the soil profile, therefore, cultivations are important in managing the weed. "This includes plough resets or rotation ploughing,"

he stated with some reticence, which he said was due to Groundswell's target audience.

Point three was emergence patterns: "For blackgrass, 80% of emergence is in the autumn which is why spring cropping and delayed drilling/stale seedbeds are effective control methods."

To follow, Stephen pointed out the role of shedding in blackgrass. "Seed is shed from mid-June onwards, with 95% being lost by harvest. That means plants should be hand-rogued or sprayed off before this date, given heads appear in May but aren't viable," he said.

To conclude with point five, Stephen highlighted the population dynamics of blackgrass. "Populations can increase 10-fold per year with more than 95% control required to prevent the build-up. However, herbicide resistance is becoming a problem worldwide.

"All-in-all, an integrated strategy is key for a long-term approach to



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blackgrass management," he added.

"All of the above values are averages and it varies field to field. Every farm is different, there's no magic bullet."

Stephen was joined on stage by ADAS's Lynn Tatnell and Althorpe Estate's Garth Clark.

▶ doesn't show us what's really happening, so we have to get into the soil profile."

And what's going on below the surface has a huge impact on water, so during a rainfall simulation display, hosted by Affinity Water, she focused on the ability of healthy soils to retain water and prevent run-off compared with poorer soils.

"Soil run off starts when the amount of water accumulated on top of the soil is raised to half the diameter of a raindrop, so it doesn't take a lot of rain for run off to start.

"The first thing we want water to do is infiltrate soil, but any water that runs off won't be infiltrating it to supply our plants. This is where we introduce some kind of cover in our fields, but we also require a root system that will impact water infiltration by creating structure and stability in soils.

"Good root systems will produce glomalin which is the glue that holds soil particles together and this'll help water retention. So the more cover you have, the less run off and the greater the root

systems the better the infiltration."

Also contributing to the rainfall simulator session, John Kempf, founder of Advancing Eco Agriculture, pointed out that one of the best ways to measure soil health is its aggregation and not just in the top 15cm, but at depth. "The healthiest soils will have deep soil aggregation to 1m deep and this revolves around how rapidly and efficiently water infiltrates and percolates – these soils will facilitate microbial delivery of nutrition, and in order for this to happen, it requires constant small doses of water – think of it as a sub-aquatic environment." [This subject will further be explored by *CPM* in an article on soils in its August issue].

More diversity

To target better soil health, NIAB's Lydia Smith advocated the use of more complex farming systems by including greater diversity. She noted that if growers can't run livestock on their farms, there are tools at hand to bring above and below ground benefits through introducing different crops.

"Fibre crops such as flax and hemp are hugely exciting and have the potential to produce deep rooting structures that can improve the carbon content of soils, and you can generate saleable products from these crops, plus they can be grown across the UK. The next challenge is developing infrastructure around crops like these."

Although introducing diversity of plant species can aid soils and biodiversity, there's still significant demand for wheat



*During an interactive session led by entomologist Dr Kelly Jowett, Rothamsted Research gave audience members a copy of the institute's latest farmland carabids identification guide. The aim is to give farmers tools to monitor the beneficial beetles to help understand if the sustainable actions they're undertaking are being successful. Read more about carabid beetles in the December 2023 issue of *CPM*.*



It's been revealed that Groundswell 2025 will be taking place on 2-3 July.

to be grown in the UK, so how can diversity be introduced to this monocrop? NIAB's Phil Howell has spent his career looking at wheat and the genetic diversity of the base material and how this can be selected to introduce resilience to plants and help reduce reliance on inputs.

"In terms of evolutionary history, wheat starts from a narrow base where two different grass species crossed 10,000 years ago, and domestication has involved selection for certain attributes that make wheat a crop and not a weed. And more recently, plant breeding has intensified selection, so at NIAB we're seeking to look at what useful genetics may have been left behind in older wheat varieties, to bring these forward as diversity enriched wheat that can be exploited on farm."

Professor Giles Oldroyd of the University of Cambridge sees gene editing as one of the answers to bringing greater genetic diversity to farm. "There are traits we've completely lost from our crop plants because we haven't been intentionally breeding for them – these are orphaned traits. So we have to adapt our crop plants to

a regen farming system to maximise their performance in this system. But we have to be delivering crops for the requirements of this country and the globe, which will involve bringing in genetics to maximise performance."

To do this, Giles advocates gene editing as a way of rapidly introducing critical traits suited to regen farming. "Gene editing is an extraordinarily valuable and revolutionary technology that's transforming the natural sciences and I think we're foolhardy as a community if we don't embrace it to improve our crops out of fear."

But speaking on a panel exploring the idea of a new cereal seed system, Dr Ed Dicken, lecturer at Harper Adams University, pointed out that changes to the seed breeding system could be beneficial to farmers. "When people grew landraces these required low to no inputs, whereas modern wheats are designed for more intensive systems.

"Growing one variety is like everyone having the same lock on their front door and wondering why everyone can break in – whereas diversity builds in resilience." ■

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