

AAB 'Roots to Regenerative Agriculture' Conference

18-20 November, York, UK

A report produced by Louisa Robinson Boyer (Niab) for the GCRI Trust

Key messages from the meeting

- Growers are facing challenges for cropping, due to the removal of key chemical control agents and climate change. The search for alternative methods of growing has begun to accelerate.
- The conference reinforced that regenerative agriculture is no longer a nice idea or a niche area but is increasingly recognised by farmers and the industry as central to the future of sustainable cropping, to combat climate resilience and crop and plant productivity.
- Regenerative agriculture techniques are key to improving the production of protected crops and ornamentals. Themes such as soil/substrate health, crop diversification, reduced external inputs, and ecosystem resilience were central throughout. Attendees saw a strong link between regenerative principles and future agricultural viability.
- There is widespread multidisciplinary interest across farmers, scientists, consultants, and policymakers.
- Researchers need a greater understanding of the regulatory and policy framework surrounding regenerative agriculture for UK cropping. This is currently unclear, even though ideas are being pushed through by the central government and DEFRA.
- There is a need to connect the science with Real-world farming; the science and research need to be tailored to farming needs, and a one-size-fits-all approach is unlikely to succeed. Scientists and policymakers need to be aware of this to support regenerative practice.

Purpose of the conference

The event was a collaboration between the AAB 'Soil and Root Biology' and 'Cropping and the Environment' specialist groups to bring together two broad yet highly interconnected topics across a three-day event. The event was held in the beautiful Guildhall in York, made certainly more magical by the unexpected snow. Day 1 focused on root and soil biology, with sessions exploring soil organisms, biodiversity, plant interactions, and the rhizosphere and microbiome. Day 2 focused on how regenerative soil management approaches impact root and soil health. The remainder of Days 2 and 3 focused on the longer-term impacts of regenerative

agriculture, including on-farm experiences from a mixed panel of experts and discussion of the evidence base underpinning regenerative approaches.

Discussion panels focused on the practical application of regenerative approaches and the learnings from long-term projects. The overriding message was that applications need to be tailored to individual farms and situations, with no one-size-fits-all solution. This makes it difficult to regulate regenerative farming and certification going forward. The discussion of what does and does not constitute regenerative practice is still widely debated across the spheres of science, farming, and policymaking.

The hope, however, is that the regenerative movement is now seen as a necessary tool to enable sustainable crop production in the future and to combat the risks posed by food security and climate change. Growers and researchers now have a variety of systems that can be implemented practically on farm to improve both crop productivity and protect the environment around the farming system.

Presentation highlights

For me, Ken Giller's keynote presentation was the most interesting, as he spoke about the perils of populism and the precarious promise of regenerative agriculture. He made important points about the need for evidence-based science to address the needs and challenges of growers. He spoke about the need to properly analyse claims made by commercial companies that produce nature-based solutions and to better regulate these products. He spoke about the general principles of regenerative agriculture being, in general, 'good practice'; however, monitoring the effects of these practices often leaves farmers feeling that the solution is simply 'greenwashing'. There was a long debate after this talk and during the discussion panels about how the scientific community can support growers so that these solutions work for them. This, however, requires tailored solutions that fit modern practice. Not all solutions will work for every grower. How, then, do we certify what makes a 'regenerative farm'?

This talk was followed by a talk by Paul Allison, who is himself a regenerative farmer. He made the point that the scientific community (through opportunities such as this conference) needs to pinpoint what research farmers need researchers to do. He spoke about the need for biodiversity, noting that simply increasing all species may not benefit growers and that introducing key, targeted species may be more beneficial.

Plant-microbiome interactions.

There were many talks and discussions regarding the interactions of the microbiome and plants and how these factors affect commercial cropping.

Sharon Zytynska delivered a brilliant keynote that outlined the importance of considering the root-associated microbiome as a second genome for the plant. The interaction between plant root systems and soil with this vast community of microorganisms is now known to underpin crop productivity. However, with our current understanding, it is extremely difficult to predict what a 'good' microbiome for a cropping system is. There is a need to use novel 'omics' techniques to really dig down to understand which are microbial key players for crop production. Work is underway to examine situations where there is natural suppression of pests or disease, or improved plant growth, to see whether these changes affect the plants' microbiomes. This type of work will provide the basis for a full understanding of this topic.

Siobhan O'Brien discussed the effects of agricultural stressors on the soil microbiome and the need to consider them. Many factors affect this microbiome; changes in community relative abundance drive functional changes, and these need to be understood and managed, especially in a changing climate.

Tim George also discussed the benefits of regenerative cropping for the soil microbiome. He highlighted that this dynamic between the microbiome and the roots underpins nutrient cycling, carbon sequestration, and the reduction of biotic and abiotic stresses. He spoke about how the mechanistic understanding of how plant genotypes, root traits and microbial communities remained incomplete. His work is leading to a deeper understanding of how the microbiome affects root traits, which is key to the success of regenerative agriculture. Their work could lead to better choices when selecting genotypes to better adapt crops to regenerative systems.

Tracy Valentine also spoke about the need to adapt crop cultivars to better suit regenerative practices. Many modern crop varieties have been bred to grow in highly intensive commercial cropping environments. Some older varieties may well be better suited to regenerative cropping.

It was clear from the talks that careful consideration is needed to establish the long-term effects of regenerative practice, for example, regarding pests and diseases. What considerations can be put in place to restrict outbreaks

affecting crops? Cultivar selection is increasingly important, as is planting to harbour natural enemies and soil biodiversity.

Networking

The networking opportunities at the conference allowed me to make some key connections with academic groups and some industry stakeholders. I gained great insight into current best practise and what others around the industry are doing to implement regenerative schemes. My presentation on the use of beneficial microbes in commercial cropping was well-received, with many questions and potential future collaborations. The work at Niab East Malling demonstrated that novel science can be applied to commercial cropping at the field scale.

Conclusion

This was an interesting conference that provided a unique platform to bring together farmers, scientists, industry representatives, civil servants, and other key stakeholders. The sessions and panel discussions benefited from firsthand experience from growers who have fully embraced regenerative practices and shared not only the benefits they had seen for crops, soil health, wildlife, and the local environment, but also, importantly, the pitfalls and unexpected long-term effects. The structure of the conference and the variety of participants ensured that discussions were relevant to the future of cropping, being both applicable and connected to real cropping challenges faced today.

It was clear that many knowledge gaps needed further investigation for regenerative practice to be fully integrated into commercial cropping environments. The vast complexity of the plant cropping environment, which is constantly changing, makes it impossible to deliver a universal approach. Not all solutions for regenerative cropping will be applicable or helpful to all growers, farms, and environments. Bespoke tailored solutions are essential if we are to truly achieve sustainable cropping in the future. Many large companies (driven by retail) are keen to regulate and certify regenerative farming in the same manner as the organic movement. However, this is by no means a simple task, and a one-size-fits-all approach is not viable.

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