



NEWSLETTER

September 2026

THIS SEASON IN ONE CROP HEALTH

Andrea Cavalieri

Following the final summer monitoring described in our June newsletter, the One Crop Health field teams are now bringing together two years of observations from farms across Denmark and the UK. With two growing seasons of monitoring behind us, we can begin to move beyond simply describing what we find in individual fields. The aim now is to understand why crop-health pressures differ between farms, cropping systems and countries. Why are weeds more abundant in some fields than others? Why do particular pests or diseases become important on some farms but not others? And what determines where beneficial organisms are most abundant? By combining our observations of weeds, pests, diseases and beneficial organisms with information on cropping practices, field management, soils and weather, we can start to identify the factors associated with these differences. Comparisons between Denmark and the UK provide another dimension, helping us ask whether some patterns reflect local farming practices and environments or are more general across agricultural systems.

The findings will contribute to scientific publications, but an equally important goal is to turn them into useful information for participating farmers. Building on the first OCH farmer bulletin produced in Denmark, we are preparing further bulletins that will share emerging results and insights from across the farm networks.

Meanwhile, preparations for the 2026/27 growing season are already under way. Farmers will shortly be contacted about fields planned for winter wheat and oilseed rape, and we are developing new automated and digital approaches to expand monitoring across experimental and pioneer farms. Each additional season makes the OCH dataset more powerful, allowing us increasingly to distinguish year-to-year fluctuations from persistent differences between farms and farming systems.



@Two spinning 'rotorods' mounted on a plastic arm suspended above the crop sample air for disease/pathogen spores. Lab analysis is able to identify the presence and abundance of pathogen spores. Credit: Jon West, 2026

FIELD INSIGHTS

Comparing the field situation in the UK and Denmark

Louise Johns

As highlighted in "This Season in OCH", the completion of two years of field monitoring marks the beginning of an important new phase: bringing together observations from across the Danish and UK farm networks and investigating the patterns emerging from the data. One of the first questions being explored is whether the pressures from weeds, pests and diseases differ between the two countries.

For the One Crop Health project, our field teams survey commercial farms growing winter wheat and oilseed rape in the UK and Denmark.

By using the same methods to survey weeds, pests, diseases and beneficials in the UK and Denmark, we are generating a large dataset that will allow us to compare the field situation between the two countries.

Our surveyors reported seeing lower numbers of pests, weeds and diseases in Denmark compared to the UK. More thorough data analysis will be needed to confirm this, but a preliminary look at the data we collected in April 2025 shows that, for weeds, we do indeed see some fields with much higher weed abundance in the UK compared to Denmark.

Top 5 most abundant weeds

	UK	DK
WW	1. Blackgrass 2. Field pansy 3. Fat hen 4. Cleavers 5. Geranium sp	1. Speedwell 2. Annual meadow grass 3. Blackgrass 4. Brassicas 5. Knotweed
OSR	1. Blackgrass 2. Field pansy 3. Speedwell 4. Shepherd's purse 5. Rygrasses	1. Speedwell 2. Rough meadow grass 3. Field pansy 4. Shepherd's purse 5. Wheat

Table: green = species in the top 5 in both UK and DK in the same crop

@The five most commonly found weeds in winter wheat (WW) and oilseed rape (OSR) in Denmark and the UK.

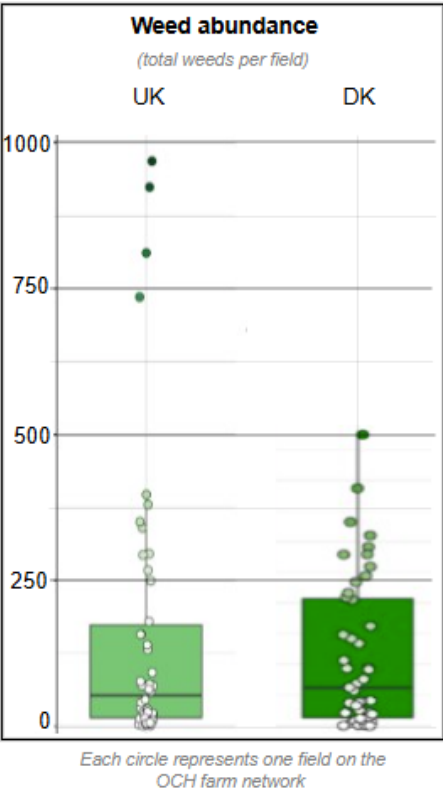


Photos from OCH OSR fields in the UK, showing the variation in weed abundance

However, the average weed abundance, and the average number of different species per field appears to be the same in both countries.

We are currently analysing the data collected from the farm network to determine whether pests, weeds and diseases are more abundant in the UK than Denmark. If this were confirmed, it would raise some interesting questions about what's driving this difference. Does Denmark have better pest control, or are pests less of a problem?

Does the UK have pest species that are more 'dominant' (e.g. Blackgrass). Does pesticide use vary between the two countries? And if so, is this a result of, or a driver of different pest pressures?



@The total number of weeds counted at nine sampling points across UK and DK fields during 2025.

Does Denmark have less pesticide resistance? These are the kinds of questions that One Crop Health aims to answer with the help of our farm network.

These preliminary observations demonstrate the value of collecting comparable data across countries, seasons and farming systems. Continued collaboration between researchers and farmers across the Danish and UK farm networks will be essential for turning these early patterns into a clearer understanding of what drives crop-health pressures, and how they can be managed more sustainably.

PHD PROJECT DIGEST

Using environmental DNA to assess health bioindicators and their relationship to crop nutrition and production under different agricultural regimes

Sabina Schneider

The farm-network observations described in the "Field Insights" section help us identify differences in weeds, pests and diseases across fields and between countries.

To understand what drives these patterns, however, we must also look below ground.



@Soil tasting workshop at ISEE13. Credit: Guy Ackermans, 2026

Healthy, functioning soils support resilient crops and agroecosystems, and earthworms can provide valuable insights into how agricultural management affects soil health.

Did you know that 89% of agricultural soils in the EU show signs of critical loss of functioning (EUSO 2024)? This could soon become a food security crisis as the soils we heavily rely on for food fuel and fibre are further degraded by intensive agriculture and climate change. There are a couple resultant questions that arise from this grim assessment:

- How can we meaningfully assess and quantify soil health and functioning?
- What changes can we make to cease and even begin to reverse widespread soil degradation?

Against this backdrop, my PhD aims to scale up monitoring of key soil health indicators (earthworms!) using environmental DNA (eDNA) metabarcoding, which offers significant advantages over traditional earthworm sampling methods.

Crucially, we want to use this sampling effort to find patterns of agricultural management that benefit earthworms, and therefore soil health, and therefore...crop health!

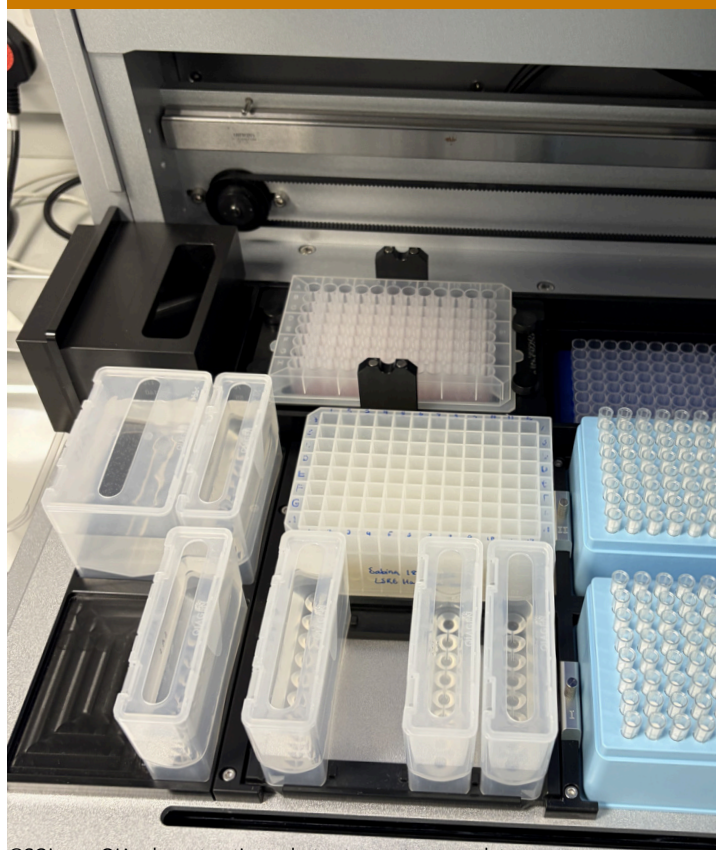
Recent Activities:

The summer is lab work season for earthworm scientists. Whilst the earthworms 'aestivate' protective dormancy during the dry season, I have been busy extracting DNA from soil samples collected from Rothamsted's Large Scale Rotation Experiment using our shiny new QIAcube extraction robot (Qiagen).

I also had the pleasure of attending and presenting a poster at the 13th International Symposium on Earthworm Ecology (ISEE13), hosted by Wageningen University & Research in August.

The week was packed with thought-provoking talks, macrophotography demos, interactive earthworm art exhibits, soil tasting (!) and even the annual earthworm charming championship! It was great to spread the word about One Crop Health and its goals, and even share some limited edition OCH stickers!

By developing a faster and more scalable way to monitor earthworm communities, this PhD project will add an important below-ground perspective to OCH's wider field research.



@SQiagen QIAcube extraction robot setup; extracts a plate of 96 samples in around 4 hours (including prep. time)

TECHNOLOGY CORNER

Judging Cabbage Stem Flea Beetle damage is harder than it looks

Laurence Still

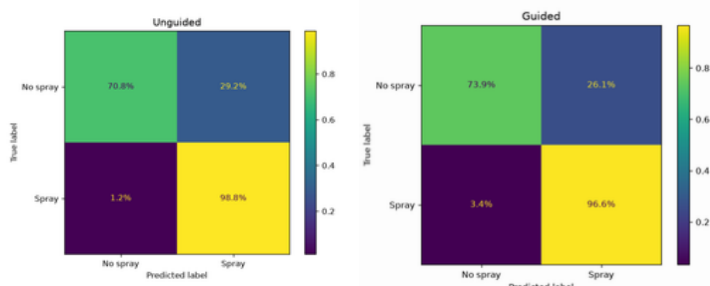
As Sabina Schneider's PhD project shows, new technologies can help us monitor aspects of soil and crop health that are difficult to assess using traditional methods. While Sabina is using eDNA to improve the monitoring of earthworms below ground, our cabbage stem flea beetle work is exploring whether artificial intelligence can provide a more accurate and consistent assessment of visible crop damage above ground.

really is.

Deciding whether to spray for cabbage stem flea beetle usually comes down to a judgement call: how much leaf area has this cotyledon actually lost? Get it wrong and you either spray a crop that did not need it, or miss one that did. As part of our CSFB monitoring work, we have been measuring how accurate that judgement call really is.

We asked researchers working in oilseed rape to estimate the percentage of leaf area lost on photos of damaged cotyledons, then compared those estimates against the actual figure, using the current 25% spray threshold to see how often this would have led to the right decision.

Nearly three in ten leaves that were actually under the threshold were misjudged as over it, enough to trigger a treatment that was not needed.



@Unguided (left) vs. guided (right) accuracy of spray decisions at the 25% threshold

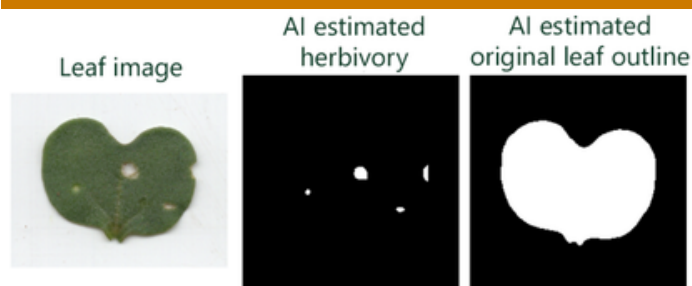
We then gave the same researchers a reference image to work from on a second pass, expecting this might sharpen the estimates. It made little difference, bringing the rate down to roughly one in four, and if anything slightly more of the leaves that actually did need spraying were missed.

A reference image, then, does not appear to solve the problem. Estimating what percentage of a single leaf has been eaten seems to be a difficult judgement to make consistently.

We have also been building an AI model to carry out this measurement directly from a photo. Working from the same images the researchers above were judging, it is landing within 2 percentage points of the true figure, a level of accuracy the human estimates did not approach. What we have not yet tested is how the model performs on photos taken in real field conditions, where light, wind and awkward angles make everything harder.

What we also do not yet know is how farmers perform on this same task. Whether that turns out better or worse than the researchers, we would like to find out.

If you have not completed the survey yet, you can do so [here](#)



@AI-estimated herbivory and leaf outline, used to calculate percentage leaf area lost.

OUT & ABOUT WITH OCH

One Crop Health has been out and about over the past few weeks, taking its message on reducing pesticide dependence to scientific and policy audiences in Denmark and beyond.

In August, Rothamsted project lead Jonathan Storkey gave a keynote at the Novo Nordisk Foundation-sponsored **Future Agri-Food Systems Symposium**. His talk, Sustainable Crop Protection – what does success look like?, made the case for redesigning cropping systems rather than relying predominantly on pesticides. Across pests, weeds and diseases, the pattern is familiar: low-diversity cropping systems combined with intensive pesticide use can favour a small number of abundant, damaging and increasingly resistance-prone species. Greater crop and management diversity, Jon argued, needs to be part of the solution.

That theme continued in September, when Danish project PI Paul Neve spoke at the joint Nordic and German ecological societies meeting in Odense. In the session Beyond Pesticides: When and how diversity regulates pests in agroecosystems, Paul discussed how diversity, new technologies and better prediction could be combined to build more preventative approaches to crop protection. The common message from both meetings was clear: reducing pesticide dependence while maintaining productive agriculture will require changes to the way cropping systems are designed and managed. One Crop Health aims to help develop and test what those changes could look like.

The conversation also moved from science to policy. Paul recently attended an Integrated Pest Management Day organised by CropLife Denmark, where discussions covered Denmark's

forthcoming pesticide strategy, political ambitions to reduce pesticide use, and some of the practical barriers and opportunities involved.

Next up for the project is the One Crop Health annual meeting in November at the University of Sheffield, where partners will bring together progress from across the project and set priorities for the year ahead.

NEWS

The One Crop Health project enters a new chapter at Aarhus University

The OCH project is entering a new phase. Following Professor Paul Neve's move to Aarhus University on 1 September 2026, the project will be transferred from the University of Copenhagen to Aarhus University.

While the host institution is changing, OCH's objectives and collaborative approach remain the same. The project will continue to bring together researchers, farmers and partners across Denmark and the UK to improve our understanding of crop health under real-world farming conditions.

This edition of the newsletter reflects that continuity and sense of progress. As the team begins analysing data from the first two years of field activities and prepares for the coming season, researchers are comparing crop-health pressures in Denmark and the UK, developing new approaches to monitoring earthworms and soil health, and investigating how disease-suppressive soils may help protect plants.

We look forward to beginning this new chapter at Aarhus University while continuing the strong partnerships and interdisciplinary research that underpin OCH.



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