

collaboration, knowledge-sharing and forward-looking discussion. With representation from 14 research institutes and 18 industry organisations, the event once again demonstrated the strength, breadth and momentum of the network.

The programme followed PCGIN's trusted format, offering concise research updates from ongoing pea and faba bean projects, including advances in mutant populations, new sources of disease resistance, molecular insights into pests such as bruchid beetle, and progress in drought-tolerance phenotyping. Delegates also heard about efforts to broaden the pulse germplasm available for UK breeding, including lentils, chickpea, soybean and lupins – pulse crops that may be of interest for the future.

Industry perspectives from Andrew Whiting from Nomad Foods, Justin Barrett from Askew & Barrett and Josiah Meldrum from Hodmedods added both practical and strategic depth. Speakers highlighted real-world challenges in pulse breeding, processing and market trends.

The energy and talent of the next generation were on full display in a rapid-fire session by PhD students and early-career researchers.

The day closed with invited horizon-broadening talks. First, Aimee Fowkes (Fera Science Ltd) presented state-of-the-art virus surveillance using high-throughput sequencing. This was followed by Tom Crocker (Met Office), who showcased climate-risk modelling to project the future of pea and bean production in the UK over the next 25 years and beyond.

Overall, the event was widely viewed as informative, engaging and forward-looking. The mix of cutting-edge science, industry insight and collaborative discussion underscored PCGIN's role in strengthening the UK pulse sector.

[View the full report.](#)

Industry spotlight: Elsoms



Elsoms is the UK's largest independent seed specialist and plant breeder, bringing nearly two centuries of expertise to support modern, resilient agriculture.

Founded in Lincolnshire over 180 years ago and based in Spalding, the company blends long-standing heritage with cutting-edge innovation to help growers “unlock the power of plants” through improved seed genetics, technology and practical on-farm solutions. Its involvement in PCGIN is led by Panida Wadsworth, who represents the company across the network.

With a strong track record in pulses, the team works closely with global breeding partners to deliver high-performing pea varieties to UK and European markets. Collaboration with Crites Seeds, a leading U.S. pea breeder, provides access to proven vining pea genetics and supports the development of new varieties tailored specifically to European growers' needs. Alongside this, Elsoms' partnerships with major European breeders, such as Nordic Seed, Saaten Union and Florimond Desprez, ensure that UK growers benefit from a diverse and resilient pulse portfolio spanning both peas and field beans, complementing the company's well-established expertise in vegetable and arable breeding.

Crop Manager for Vining Peas and Sweetcorn, Ed Cooper, explained: "Elsoms is growing its peas and beans presence by delivering high-performance, reliable varieties that meet end-user needs while aligning with modern agriculture's priorities of productivity, sustainability, nitrogen efficiency, and plant-based, healthy diets; by trialling varieties and selecting lines that show better agronomic performance and superior quality traits that strengthen the whole supply chain. With vining peas central to its long-term strategy, Elsoms continues to invest in people, genetics, seed technology and facilities to strengthen the entire UK supply chain for the future."

Elsoms' wider investment programme includes the recent opening of a new £1.7 million seed processing facility at their main site, designed to increase throughput, improve grading precision and enhance overall product quality for growers and commercial partners.

Meet the PCGIN researchers...

Postdoctoral Researcher: Fiona Corke at the University of Aberystwyth

Fiona is a Post-Doctoral Researcher and Smarthouse Manager at the National Plant Phenomics Centre (NPPC) at IBERS, where she plays a key role in delivering high-throughput phenotyping for crops including peas and beans.

With a research background that began at the John Innes Centre (working on pea development) she now supports large-scale studies into drought tolerance and other abiotic stress traits that are needed for improving pulse crops under future climate conditions. Her work combines phenomics, genetics and hands-on experimental



coordination to help identify resilient germplasm in a range of crops including peas and barley.

How has your early research experience shaped your interest in improving peas and beans today?

Whilst I was an undergrad I worked as a summer student in the 'JIC pea lab'. I was intrigued by the diversity of accessions in the JIC germplasm collection. We were scoring the seed phenotypes onto 'input punch cards'. My PhD project coincided with the European Union's push to increase homegrown protein through CAP support for protein crops, which helped shape the research priorities at the time and deepened my long-term interest in improving peas and beans.



In your current role at the National Plant Phenomics Centre, you oversee high-throughput phenotyping experiments. How does this technology help you study traits that matter for pulse crops, such as drought tolerance or early vigour?

We capture information about how plants change over time and respond to stress by imaging them daily, the plants live on conveyors and travel through imaging chambers on a daily basis.

Automated watering is the other aspect that is key to studying drought tolerance, it allows us to set precise watering targets and monitor daily water use for individual plants (up to 2000 seedlings or 400 adult plants per experiment).

IBERS has recently led major drought-screening experiments on diverse pea germplasm. What insights have emerged from this work, and why is drought tolerance such an important focus for peas and beans in the UK?

The 'diversity panel' of pea lines we scored ranges from modern varieties to wild relatives from arid climates. We grew 260 of these diverse accessions under four different soil moisture regimes (3600 pots in total) and scored for various phenotypes including biomass at harvest. This data was sent to collaborators at JIC to identify regions of the genome associated with drought tolerant traits. Some accessions were much less sensitive to drought than others. Drought has become an increasingly serious problem for farmers in the UK and globally, leading to severe impacts on establishment and yield. Pinpointing genetics that breeders can focus on in their programmes will increase crop resilience.

Looking ahead, what aspects of pulse crop phenotyping or abiotic stress research are you most excited to explore further?

Water use efficiency (WUE) is a trait I am particularly interested in as it is controlled by many different factors. Does seedling drought tolerance translate into yield benefits in mature plants? Although I am a plant researcher foremost,

I never lose sight of the agronomic significance of my work, and that focus helps translate our findings into outcomes that matter in the field.

Postdoctoral Researcher: Nicolas Trenk at the John Innes Centre

Nicolas recently defended his PhD after four years in the Arora lab at the John Innes Centre, where he focused on genetic resistance against root rot pathogens in peas. He is now continuing as a postdoc to develop his plant pathology expertise by building on the work of co-PhD student Kara Boyd (featured in the November 2025 Newsletter), advancing research into downy mildew for PCGIN.

Can you describe your current research and how it builds on your PhD work?

My work focuses on screening the diverse pea germplasm at JIC to identify natural resistance to downy mildew and *Fusarium*, both of which pose significant challenges for growers. I use large-scale phenotyping, genetic analysis and statistical approaches to map the genes underlying resistance. This project is a natural extension of my PhD, where I developed high-throughput methods for screening *Fusarium* root rot and gained experience in handling complex disease assays. Although downy mildew is a very different pathogen, the principles of designing and coordinating large screens translate well, and the project allows me to build on that expertise while tackling new biological questions.



How has the transition from PhD student to postdoc changed your approach to research?

Becoming a postdoc has made me more deliberate in planning and more confident in balancing multiple projects. During my PhD I learned how to manage large, carefully timed screening experiments, and that experience now helps me coordinate several lines of work at once. Another big change is how intuitive plant pathology has become, as recognising symptoms, anticipating problems and troubleshooting quickly now feels almost second nature.



What new challenges have arisen in moving from *Fusarium* to downy mildew?

Working with downy mildew has required adapting to a pathogen that behaves very differently from *Fusarium*. As an obligate biotroph, it must be maintained on living plants, so inoculum can't be stored and reused; instead it has to be produced fresh for every experiment, which adds a layer of logistical complexity. Thanks to the groundwork Kara established, we were able to implement an effective protocol quickly, but maintaining a reliable supply of inoculum remains demanding. The benefit is that resistance in downy mildew is often easier to assess visually through reduced sporulation, which is easier to quantify than root rot.

Are you working closely with breeders or other PCGIN partners in your current project?

Yes, collaboration with breeders and PCGIN partners is essential to ensure the resistance we identify is relevant in real-world conditions. Our controlled-environment screens provide valuable insight, but field performance can differ substantially, so we work closely with partners.

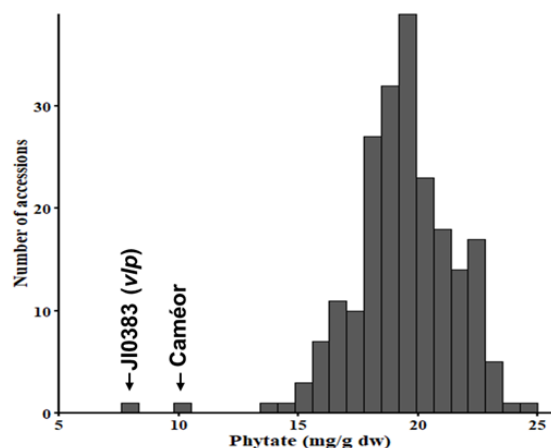
What achievement from your PhD are you most proud of, and how has it shaped your research direction?

The highlight of my PhD was identifying the genetic factor behind resistance to a *Fusarium* strain and then validating its function through transgenics and gene editing. Seeing a previously susceptible variety become fully resistant was incredibly rewarding and confirmed my interest in connecting genetic discoveries to molecular mechanisms. That experience has guided my current ambitions. I hope to continue developing my bioinformatics skills, explore more functional genomics and contribute to bringing legumes further into the genomics era.

Research Updates

Peas with lower phytic acid levels (Milestone 19)

Pulses are a 'superfood' in terms of protein, energy and minerals. However, one abundant compound, phytic acid, is less desirable. It inhibits digestion when pulses are added to animal feed of monogastric animals (chickens and pigs). In humans, it reduces the absorption of iron and zinc from our diet. Phytic acid is the storage form of phosphate, an important nutrient for plants, and this is why the concentration is high in seeds (1 – 2% in pea seeds).



Over the last decades, low-phytic acid (*lpa*) lines have been identified in most crops. We have screened a pea diversity panel and have found two *lpa* lines, Caméor and J10383. We have mapped the *lpa* traits to chromosome 5 and 6, respectively. For Caméor, several phosphate transporters lie in the mapping interval, which are now candidate genes for further study. For a previously published mutant, we have identified the causative mutation, which is predicted to disrupt transport of phytic acid into storage compartments of the cell. The genetic information enables us to design markers for breeding.

Pea seedlings screened for drought tolerance (Milestone 20)

Climate modelling from the Met Office predicts drier and hotter summers, especially in the East of England where peas are grown. Last year, the spring drought had a devastating effect on pea crop yields. With the aim of improving drought tolerance, we have screened a total of 260 genetically diverse pea varieties. This was done at the fully automatic National Plant Phenomics Centre in Aberystwyth. The pea seedlings move around on conveyer belts, are given precise amounts of water and weighed regularly to see how much water is used. The screen identified germplasm with contrasting performance both in terms of growth rate and water use efficiency under control and two water-limiting conditions. Initial bioinformatics analysis uncovered genetic changes that can be directly incorporated into breeding programmes.

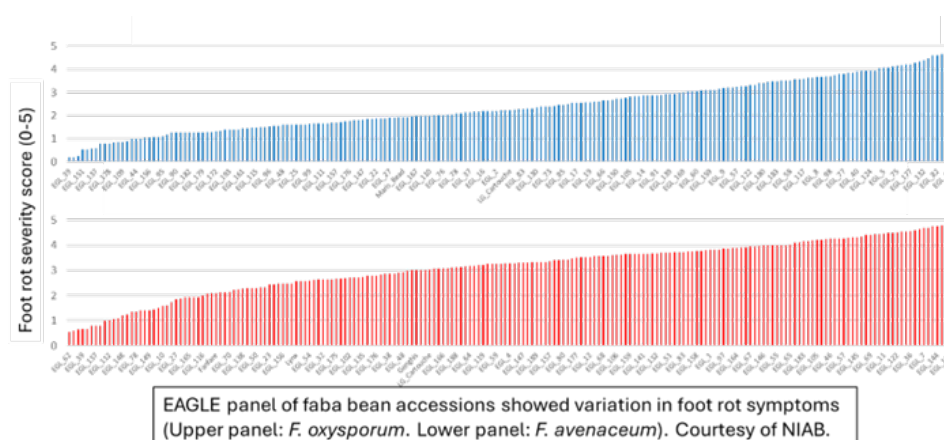


Growth varies considerably between pea accessions with varying soil water content (SWC). Image by IBERS

An overlapping set of lines is also being screened for **differences in root architecture** and for the shoot-to-root freshweight ratio. From the latter, we will know if germinating pea seedlings prioritise root growth over shoot growth in the first 4 weeks, which should correlate with drought tolerance. The data set will be completed over the summer (Milestone 34).

New sources of root and foot rot resistance in Faba bean (Milestone 23)

Root rot, primarily caused by *Fusarium* species, remains a significant constraint in faba bean production. Screening of a 200-line diversity panel identified 10-20 lines showing resistance to either *F. avenaceum* or *F. oxysporum*. These resistant lines are now being crossed with elite cultivars to begin incorporating improved resilience into breeding material. The dataset will also support GWAS analysis to uncover genetic factors underlying resistance and susceptibility.



Publications



Webb A., Thomas J.E., Davis H., McAdam S., Angra D., O'Sullivan D.M., Gostkiewicz K., Capozzi M., Wood T.A. (2025) Identification of QTLs linked to

partial resistance to foot and root rot caused by *Fusarium avenaceum* and *Fusarium oxysporum* in faba bean (*Vicia faba*). *bioRxiv*, 2025.02.21.639454.

DOI: [10.1101/2025.02.21.639454](https://doi.org/10.1101/2025.02.21.639454)

Ellis N., Hofer J., Ambrose M., Kite G., Steuernagel B., Paajanen P., Rayner T., Deng S., Wouters R.H.M., Vikeli E., Horler R.S.P., Jiang M., Feng C., Cheng S., Domoney C., Chayut N. (2026) Mapped deletions in a publicly available Fast Neutron mutant collection for gene identification in pea. *BMC Plant Biology*, in press.

DOI: [10.1186/s12870-026-08508-8](https://doi.org/10.1186/s12870-026-08508-8)

Warsame A. (2025). An optimized high-throughput colorimetric assay for phytic acid quantification. *Crop Science* 65, e70195.

DOI: [10.1002/csc.2.70195](https://doi.org/10.1002/csc.2.70195)



You are receiving this newsletter as a member of the PCGIN stakeholder mailing list. To unsubscribe from the list, please email pcgin@jic.ac.uk. For full information regarding how we store and use your personal data, please see our [Privacy Policy](#).