

# Minutes of OREGIN Management Meeting March, 2025

**Date:** 2025-03-19

**Time:** 9:30 AM - 12:30 PM

**Location:** Zoom

**Chairperson:** Prof. Ian Bancroft

**Attendees:** Ian Bancroft, Ben Hague, Todor Chiplakov, Tom Lawrenson, Bruce Fitt, Louise Everest, Zhesi He, Mark Nightingale, Fay Stemp-Walsh, Yongju Huang, Tom Wood, Pete Falloon, Graham Teakle, Kris Grenz, Jon West, James Fortune, Chinthani Karandeni Dewage, Nigel Padbury, Coretta Kloeppel, Peter Bancroft, Madeleine Berger

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## 1. Welcome and Introductions

- **Prof. Ian Bancroft** welcomed new attendees and clarified that the management meetings are open to all stakeholders.
  - **Attendees introduced themselves**
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## 2. Review of Previous Meeting Minutes

- **No major corrections** were raised for the last meeting's minutes.
  - **Action Items Reviewed:**
    - **Contract follow-ups:** Fay Stemp-Walsh to finalise pending contracts.
    - **Imola plant lines update:** Discussion on plant materials and upcoming field trials.
    - **AI tools for variant detection:** Zhesi to continue evaluating AI tools for variant detection and association analysis.
    - **Website updates:** Yongju confirmed the website has been updated with new project details.
    - **Dissemination opportunities:** Ian requested contributions for DEFRA's upcoming report.
    - **Training courses:** Andrea to continue developing early-career researcher training initiatives.
    - **Gene editing legislation monitoring:** No major updates; DEFRA website to be monitored for any policy changes.
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## 3. Administrative Updates

- **DEFRA Invoicing:**
  - Deadline for invoice submission: **26th March**.
  - Project leads need to ensure all invoices and milestone reports are submitted before this date.
- **Contracts and Subcontracts:**
  - Majority have been finalised; remaining contracts are being processed.
- **Funding Status:**
  - Some milestones are slightly behind schedule; discussions on **partial claims** for funding were mentioned.

### Action Items:

✓ **Fay Stemp-Walsh:** Meet with JIC to ensure details of OREGIN subcontract (IP & liability details) are acceptable to Defra (March 26).

✓ **Ian Bancroft:** Submit DEFRA milestone claim invoices by March 26, including partial milestone claims.

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## 4. Work Program Updates

### 4.1 Pathogen Research & Disease Monitoring (Yongju, John West)

- **Pathogen Isolate Collections:**
  - **PHOMA (Phoma stem canker) and Light Leaf Spot (LLS) pathogen collections** have been expanded.
  - **New isolates collected from field trials** at John Innes Centre and Rothamsted Research.
- **Genome Sequencing of Pathogens:**
  - Recent sequencing of **Phoma isolates (*L. maculans*)** revealed mutations in promoter regions (CYP51) associated with **fungicide resistance**.
  - **Genome sequencing of Light Leaf Spot isolates (*Pyrenopeziza brassicae*)** completed and now publicly available.
- **Findings on Fungicide Sensitivity:**
  - **Observed shift in pathogen *L. maculans* insensitivity** to fungicides in some field isolates.
  - **Decreased sensitivity** of Phoma to azole fungicides could indicate evolving resistance, as seen in Rothamsted trials.
- **Planned Actions:**
  - Continued **pathogen population monitoring** to detect further resistance shifts.
  - **Collaboration with breeders** to evaluate resistant varieties.

- **Field assessments planned for April** at John Innes Centre and Rothamsted Research.

### Action Items:

- ✓ **Yongju Huang/John West:** Monitor pathogen populations (Ongoing).
  - ✓ **Yongju Huang:** Collect isolates from JIC & Rothamsted trials (April 2025).
  - ✓ **John West/Tom Wood:** Investigate fungicide resistance/disease severity (Next Meeting).
  - ✓ **Yongju Huang:** Evaluate pathogen isolates from high-erucic acid rapeseed fields (Next Meeting).
  - ✓ **Mark Nightingale:** Will enquire with industry colleagues whether lines with new sources of LLS resistance can be made available to UoY and UoH (Ongoing).
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## 4.2 Imola Mutagenesis & Radiation Experiments (Peter, Zhesi, Todor)

- **Objective:**
  - To **restore Light Leaf Spot resistance in Imola** through **radiation-induced mutagenesis**.
- **Gamma Radiation Treatment:**
  - Two batches of Imola seed were irradiated with **1500 Gray and 2000 Gray** gamma radiation.
  - **High mortality observed in pure Imola seed at 2000 Gray**, indicating **radiation sensitivity**.
  - Field-grown Imola had better survival, suggesting an alternative approach for mutagenesis experiments.
- **Contamination in Seed Population:**
  - **Genotyping revealed non-Imola contaminants** in the population.
  - Contamination was more significant in the irradiated samples, indicating **selective loss of true Imola plants due to radiation sensitivity**.
- **Screening with ILP Markers (Zhesi & Todor):**
  - **Developed a computational pipeline** to design **Intron-Length Polymorphism (ILP) markers** for distinguishing true Imola plants.
  - **Screened 400+ plants**; only **1% were true Imola** in the 2000 Gray population.
  - **1500 Gray treated population to be used for further experiments**.
- **Next Steps:**
  - Field trials to identify **mutants with improved resistance**.
  - Continue **screening** new generations for true Imola background.

### Action Items:

- ✓ **Peter/Zhesi/Todor:** Prepare Imola mutants for field trials (April 2025).
- ✓ **Yongju Huang:** Can share pure Imola seed if needed (Ongoing).

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### 4.3 Hybrid Vigor for Improved Pest Resistance & Rooting (Peter)

- **Objective:**
  - To use **hybrid vigor to enhance establishment and stress tolerance** in oilseed rape.
- **Crosses Conducted:**
  - **131 Brassica napus varieties** crossed with **two CMS parents** provided by **Lima Grain & Elsom Seeds**.
  - Created **F1 hybrid seeds** for evaluation.
- **Experimental Design:**
  - **Above-ground traits:**
    - Evaluating **aerial biomass and early vigor** of hybrids.
    - **RNA sequencing** to identify key genes involved in hybrid vigor.
  - **Below-ground traits:**
    - **ADAS to conduct root growth experiments** to assess heterosis effects.
- **Discussions & Adjustments:**
  - **ADAS requires 40 seeds per genotype** for their analysis.
  - **Experiments expected to start in September** but are flexible.
  - **Potential pre-screening of above-ground vigor** before root testing.

#### Action Items:

- ✓ **Peter:** Coordinate hybrid selection for root growth analysis (April 2025).
- ✓ **Peter:** Plan timelines (April 2025).

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## 5. Discussions & Additional Action Points

- **Pathogen Isolates Collaboration:**
  - **James Fortune & Nigel Padbury** offered access to high erucic acid rapeseed fields for pathogen monitoring.
- **New Resistance Sources in Breeding:**
  - **Mark Nightingale highlighted new resistance sources** in commercial hybrids, potentially shifting disease pressures.
- **Potential Training Course:**
  - If interest is sufficient, **Zhesi & Ian will offer a training session** on using **ILP markers** for germplasm validation.
- **Legislative Monitoring on Gene Editing:**
  - No major policy changes; DEFRA website to be checked for updates.

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## 6. UMAMIT Genes (Madeleine Berger)

- **Madeleine Berger presented on glucosinolate-based pest deterrence** and the role of UMAMIT genes in glucosinolate transport.
- The goal is to determine whether knocking out **UMAMIT uniporters**, which facilitate the efflux of glucosinolates from cells, could improve pest deterrence.
- Glucosinolates are defense compounds found in both **leaves and seeds of oilseed rape**, deterring pests like slugs and pigeons. However, they must be kept low in seeds to ensure safe livestock feed.
- There are **eight UMAMIT genes in oilseed rape**, but their relative importance is unknown, so all are being analyzed.
- Deletions were found in all eight genes, including major **multi-gene deletions** and small deletions introducing **premature stop codons**.
- Current work involves **crossing these mutant lines with Jet Neuf, a high-glucosinolate variety**, to generate plants with UMAMIT knockouts and increased glucosinolate levels in leaves.
- The next-generation plants will have **homozygous UMAMIT deletions**, fully knocking out these transporters while maintaining high leaf glucosinolate content.

### Action Items:

- ✓ **Madeleine/Zhesi/Yongju:** Identify Brassica lines with natural variation in UMAMIT expression (Next Meeting).
- ✓ **Tom Wood/Madeleine:** Develop CRISPR-Cas9 knockout constructs for UMAMIT (Next Steps).
- ✓ **Madeleine:** Screen next-gen UMAMIT mutants and report findings (Next Meeting).

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## 7. Genome Editing in Winter Oilseed Rape (Tom Wood, Ian Bancroft)

- **Genome Editing Targets Discussed:**
  - **GLUCOSINOLATE transporter genes** suggested as primary targets.
  - **Alternative suggestions encouraged;** final gene list to be compiled.
- **Transformation Strategy:**
  - **Campus** background recommended for transformation.
  - **Non-winter types** (RV3, C6, Z11) could also be considered.
- **Next Steps:**
  - **Target genes to be finalised by the end of next week.**

- **Transformation trials to be initiated.**

### **Action Items:**

- ✓ **Project Team:** Finalise editing target genes (March 29, 2025).
  - ✓ **Tom/Ian Bancroft:** Confirm transformation background (Next Meeting).
  - ✓ **Tom:** Check feasibility of multi-gene knockouts (Next Meeting).
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## **8. Novel Technologies & Alternative Crops**

- **Radiation Mutagenesis in Winter OSR:**
  - **Two genotypes (Mazowieski & Duplo) chosen** for mutant screening. Following discussion, the committee agreed to proceed with both genotypes
  - **Seeds for 2000 lines** already sown; trials progressing.
- **Alternative Crops & Climate Modelling:**
  - **Met Office engaged in modeling OSR adaptation to climate change.**
  - **Literature review completed; feedback incorporated.**
- **Demonstration Trials:**
  - Spring hemp trial planned; field vs. greenhouse conditions being considered.
  - **Sunflower population amplification ongoing.**

### **Action Items:**

- ✓ **Peter:** Confirm planting for radiation mutagenesis populations (Ongoing).
  - ✓ **Zhesi / Pete Falloon:** Share climate model information (Next Meeting).
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## **9. Knowledge Exchange & Dissemination**

- **DEFRA Reports:**
  - Contributions requested for DEFRA reports and upcoming **stakeholder presentations.**
- **Annual UK Brassica Community Meeting:**
  - Proposal to merge OREGIN Stakeholder Forum with **UK Brassica Research Community (UKBRC)** annual meeting this year.
  - **Volunteers needed** to host the next meeting.

### **Action Items:**

- ✓ **Provide updates to report** (Now)
- ✓ **Bruce Fitt and Yongju Huang to check whether UoH could host the Stakeholder Forum / UKBRC meeting this year (Sept/Oct).**

## **10. Next Meeting**

Next management meeting to be held in person around June. Doodle poll to be circulated to find a suitable date. Possible venue Elsom Seed if those dates align.