

Minutes
Oilseed Rape Genetic Improvement Network Management Meeting
Tuesday 2nd August 2022 (month 53, M80)

Zoom meeting

Meeting ID: 92394636624

Passcode: 297844

9:00 Meeting starts

Present:

ADAS: Kate Storer (**KS**)

AHDB Dhan Bandari (**DB**)

DEFRA: Helen Riordan (**HR**)

JIC: Rachel Wells (**RW**)

NIAB: Tom Wood (**TW**)

RRes: Jon West (**JW**)

UoH: Bruce Fitt (**BF**), Yongju Huang (**YH**)

UoR: John Hammond (**JH**)

UoW Graham Teakle (**GT**)

UoY: Ian Bancroft (**IB**), Lenka Havlickova (**LH**), Zhesi He (**ZH**)

Apologies: Fred Beaudoin (**FB**)

Organiser: **IB** (UoY), **LH** (UoY)

Chair: **IB**

Minutes: **LH**

Minutes and action points from previous meeting (Ian Bancroft)

IB opens the meeting, offers the apologies for the missing members. Everyone is happy with previous minutes circulated before the meeting.

AP49: **GT** has to double check, which lines haven't been sequenced **IB** - so if there is something which can be sequenced, it would be worth it to check it on Yorkknowledgebase. Sequencing technology is changing so not everything is compatible

AP51 - material sent by Neil and now being processed for screening

Project management and administrative matters (Ian Bancroft)

IB - no change or issues with internal contract for existing project.

HR - extension year the plan is taking one year contract extension March 2024. Paperwork submitted, it may take some time but it is going forward.

IB - UoY will start with contract updates immediately when it is formally signed. We all know that it's done, but now we just wait for the confirmation and going through the paperwork.

HR - we will be doing a commissioning review of the GINs and that should help us to find a best way forward for new GIN programmes.

IB - Bruce, one of the most important person from the point of the lifespan of the GINs. HR - probably for the last ten years only. IB - an important question is what the industry is doing with the results. BF - has a record of what happened earlier in GIN. In terms of industry, you can contact Coreta.Kloeppel (Limagrain)

IB - the thing that will be really most important is to try and get Mark and Coreta or Vasilis to actually say what they've used the material and information for, which I know they are very cagey about revealing because it gives information to competitors. But that's really crucial. and that's what's really hard to demonstrate in what's been published.

HR - we can anonymise sensitive information

Updates on work programme OREGIN 5

GIN Activity 1 – Stakeholder network

WP1. Maintain & expand interactions between UK stakeholders and academic researchers

WP1.1 Direct interactions between stakeholders and academic project partners. Activity throughout; Milestones 1, 5, 15, 20, 33, 38, 56, 62, 76, 81, 87 (Ian Bancroft)

WP1.2 Facilitated interactions between stakeholders and the wider academic community. Activity throughout; Milestones 3, 9, 17, 27, 36, 49, 59, 69, 78, 86 (Ian Bancroft, Lenka Havlickova, Limagrain?)

IB - no meeting since the November ones. Any update whether there's been something booked in at JIC now for this autumn?

RW - in touch with Smitha and Fred. All in progress, nothing booked yet but working on it.

IB - plan is probably two days meeting and have a good interaction in the evening

RW - seems worth to do it

IB - also nice for the people from the Nutritional project

GIN Activity 2 – Genetic tools and resources to address challenges

WP2. Provide physical resources to underpin rapeseed breeding

WP2.1 Maintain and make available for cost-recovered distribution core pathogen sets.
Activity throughout; Milestone 13, 31, 54, 74, 91 (Bruce Fitt/Yongju)

YH - sharing pp presentation. Collection of pathogens (*Leptosphaeria* species) for phoma stem canker - 24 international and 80 UK isolates. New isolates obtained since last meeting.

Mycovirus screening – virus infection can increase or decrease pathogenicity. Mycovirus in *L. biglobosa* increases pathogenicity, *L. maculans* and *P. brassicae* - didn't find any mycoviruses. There was variation in screening *L. biglobosa* from Canada (no Mycoviruses detected) and *L. biglobosa* from the UK (mycovirus detected). Selected *L. maculans* isolates sequenced (whole genome sequencing).

WP2.2 Maintain and make available for cost-recovered distribution *B. napus* DFFS lines.
Activity throughout; Milestones 14, 23, 32, 55, 75, 92 (Graham Teakle)

GT - seeds are ripening at the moment. 45 lines: some doing fine, some didn't get enough vernalisation even in the polytunnel (sown a bit late) which could also be linked to climate change? Harvesting towards the end of August.

IB - any requests for the material?

GT - yes a couple of small requests plus one PhD student will be looking for NUE in winter crop types.

RW - had a number of requests from Europe and now redirects them outside, because supplying them abroad is very costly. This is unfortunately leading towards losing interaction and collaboration with partners from abroad.

IB - the material is also quite different now after the years (the one in Warwick and one which Rod Snowdon has in Giessen).

GT - having pre-Nagoya material is quite plus

IB - anything before 2015 is plus. Within the project we are sharing material under the collaboration agreement.

WP2.3 Amplify panel of reference *B. napus* varieties for trialling. Activity in months 9-44; Milestones 21, 40, 63 (Neil Graham)

IB - polytunnel amplification done, seeds sent to Mark and thrashed. Waiting to confirm which plant will be used based on PCR screening.

WP3. Develop novel pre-breeding material for trait assessment
--

WP3.1 Agree target traits and genes 2 (All) completed

WP3.2-3.4 Develop pre-breeding lines. Activity in months 3-44; Milestones 6+7+8, 24+25+26, 41+42+43, 45+46+47, 64+65+66 (Lenka Havlickova)

LH - Material amplified in Nottingham, some of it is still segregating so has to be genotyped for FAE1 or target genes. Eight lines have been tested in the field trials. NG was able to create double mutants and this material is also under development.

RW - can be the GTR mutants used for tests with slugs?

IB - our PhD student has better mutants and the material is available.

AP56: *RW&LH liaise for the material which can be used in the field*

WP3.5 Develop pre-breeding F₁ hybrids between winter and spring oilseed rape. Activity in months 1-32; Milestones 22, 39 (Limagrain?)

IB - Coretta not present, IB giving update. The pre-breeding F1 hybrids didn't have very good germination rate. Sharing screen - we have got 4 hybrids (with enough seeds) and the purpose was to look at this material for heterosis (hybrid vigour). If we can deploy mechanisms against cabbage flea beetle by outgrowing it rather than repelling it. The hybrid combinations showed heterosis for two of these hybrid combinations. Measuring biomass of the first leaf after 26 days emerging. We did see some heterosis in the material. Next stage will be mRNA analysis of leaf transcriptome (4 biological replicates for the female, male parents and hybrid). PCA analysis showed good clustering (female parents, male parent transcriptionally different and hybrids clustered with the male parents - that was not expected). Looking at the number of genes which are differentially expressed between different pairs. Hybrids and female parents varied a lot. The hybrid and male parents varied less. We have got quite exciting results, but of course this is only a very small experiment of four combinations.

GT - was the cross done in other direction? IB - not because it is CMS cross so it is modeling situation.

RW - genetic difference between CMS parent and the male parent which is going in?

IB - we have not done this analysis. CMS line was not in the diversity panel and breeders didn't share information about it. We could do genetic distance analysis. They are all WOSR. The genetic distance is a very good predictor of heterosis - this works for maize, but not in case of OSR.

HR - why do you think that the hybrids are clustering with the males?

IB - That's telling us about the biology of hybrid systems working in rapeseed. That's maybe why genetic distance is not a relevant thing. We might be on something novel in this.

WP4. Conduct pre-breeding assessment of novel winter oilseed rape lines
--

WP4.1 Establishment, management and phenotyping of field trials. Activity Q7-Q19; Milestones 29, 44, 51, 67, 71, 82 (Tom Wood, Mark Nightingale, John Hammond, Kate Storer)

TW - field trials grown well, also tested for various traits, people from UoH also scored it for their traits. Nicest plants, everything harvested in July with a good amount of seeds.

YH - share the slide presentation: field trial assessing phoma stem canker and Light leaf spot on 8 April and 29 June 2022. Severe light leaf spot symptoms - much more severe than in past years. Data are very reliable, because the fields were very well established. Almost all lines had LLS and some of them phoma stem canker. For the severity some of them are quite high (severity score > 4) but also on some disease incidence (Imola) is very small.

Assessment before harvest (29th June) - severe light spot and stem canker symptoms and again Imola still clean for both. Very good line for breeding. This year also observed light leaf spot (*Pyrenopeziza brassicae*) on pods and severe verticillium (very dry weather).

LH - do you know why is Imola so resistant?

YH - one parent from ancestor line (cross).

IB - do you have any material from your crossing to test to see which introgression of *B. atlantica* is causing the resistance?

AP57: YH - it would be a really good idea to follow up on this issue by organising some follow up meeting **IB** - must be from *B. atlantica* and we have a strong tool to follow up. **RW** has some source of original Imola seeds and an older synthetic population.

RW - interestingly one of our postdocs is analysing data measured in the past and there are some interesting patterns and correlation between resistance and susceptibility between those traits.

IB - nice things are coming out of this project. Very encouraging. If we could get 3-4 years replicates from the field trials

JH - giving an update from Reading. It was very dry after sowing so seeds germinated, but then suffered. Took the decision to terminate the trial so no data this year from Reading.

KS - giving update on ADAS trials. Combined last week, seeds from novel lines and now stored. Trial drilled at the end of August with new drill. Established very well and rooting assessments done early June. Data being processed at the moment. Also trying to do some trial assessment at Elsoms so still hopefully get some decent data that we miss from the last year. We will use the same drill.

WP4.2 Assessment of heterosis in spring x winter hybrid oilseed rape. Activity Q7-Q18; Milestone 35, 58, 61, 79 (Limagrain?)

IB - already spoke when describing the hybrid material

WP4.3 Assessment of the impact of modified leaf wax composition in disease and pest interactions. Activity Q15-Q19; Milestone 83

FB sent an update:

*Wax was extracted from all leaves collected in our small polytunnel experiment (25 selected lines, 20 *B. napus* and 5 *B. rapa*, n=5) but they have not been run on GC yet because the person doing this work left before being able to complete the analysis. I will have more help in the lab from September so I am confident that we will finally be able to finish this work before the next meeting. I understand that Jon and Sam scored pest (CSFB) and disease (several pathogenic fungi) on the same material and saw differences between lines so we should be able to answer a few interesting questions when the whole data set is finally available.*

*An overlapping but different set of lines was also tested for interaction with *P. brassicae* in a separate experiment in collaboration with Henrik Stotz and Bruce Fit. Similar situation, all disease scoring was carried out but the student was not yet able to complete wax/cutin analyses although all samples were this time analysed by GC and the data extracted. It just has to be cleaned and formatted. Although this second experiment was not funded by OREGIN is complementary to the work carried out by Jon's team so it should help us to refine our understanding of the interaction between wax/cutin and *P. Brassicae* infection. Unfortunately I do not think that phoma and sclerotinia were scored in the UH experiment.*

WP4.4 Interpretation of trial data. Activity Q11 – Q19; Milestones 48, 68, 84

LH - will interpret when we will receive all data

***WP4.5** Systemic transcriptomic impacts of leaf damage CCN6.2 (Ian Bancroft)

*IB - sharing screen - insect damage, what kind of transcriptomic to leaf damage looking at systemic response - the effect sometimes later in older leaf. Looking at 16 replicates plants damaged and undamaged by perforation and results showed significant difference in the expression between damaged and undamaged plants. Using FC of expression. Genes induced in damaged plants are in pathway familiar for wounding response in *Arabidopsis thaliana*. This is showing that pathways we guessed are familiar to us: jasmonic and glutamate signalling genes, gibberelin signalling, cell wall. Giving more information about genes involved in this kind of response. Give confidence to look for responses proved in *Arabidopsis*.*

RW - got some decent transcriptomic data of response to Flea beetle on cotyledons and it would be interesting to compare **AP58**; IB & RW discuss the difference between needle perforation and flea beetle feeding IB - this is not on cotyledons, but it would be interesting to compare it.

***WP4.6** Screening for the presence of mycoviruses. Milestone CCN6.3 (Bruce Fitt/Yongju)

GIN Activity 3 – Develop and exploit opportunities for further research

WP5. Promote spin-off projects (all)

IB - please think about that and get in touch

GIN Activity 4 – Dissemination and knowledge exchange

WP6. Provide information resources to underpin rapeseed breeding

WP6.1 Provision of molecular data from the current phase of OREGIN. Activity Q1-Q20; Milestones 10, 12, 18, 30, 53, 73, 89 (Bruce Fitt/Yongju)

YH - website updated with all information about publications, linkage map, trait data, pathogen collection. Recently had two papers published in Feb/March 2022. Recent request for pathogens from UPR company and other UK based company.

WP6.2 Provision of trait data from the current phase of OREGIN. Activity Q9-Q20; Milestones 49, 68, 86 (Bruce Fitt/Yongju)

YH - trait data on the website - some requests from breeders were recorded so they are looking at the database. Please, if there is anyone having anything to add, contact UoH (Jamie Stone).

Reporting to the authority

AOB

JH - pea GIN - some discussion about working together more closely, material in rotation (OSR, Wheat, peas...). How is this discussion going?

HR - at the moment probably anything has been decided at the moment

IB - This is pushing into the sixth face of GIN. Next year we will spend a lot of time on defining the scope of the next GIN.

BF - attended one of the stakeholders VIGIN meeting. IB - there is a link to this on OREGIN page and they are open to everyone.

BF - in relation of OREGIN stakeholders meeting who is in the charge?

IB - We are not involved in UK BRC our role is only to fund the meeting. Mark and Correta should be involved plus Fred and Smitha.

AP59 for Fred and Smitha to decide who will be in charge RW - can drop a line to get where we are

Date for next Final Management Committee meeting (December)

AP60 - LH to set up Doodle poll