

Biodiversity and genetic resources for *Brassica napus* and its major fungal pathogens within the UK Defra Oilseed Rape Genetic Improvement Network (OREGIN)

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Oilseed rape (*Brassica napus*) is an important UK arable crop and the cropping area is currently increasing. For long-term sustainability, there is a need to reduce inputs (e.g. fungicides to control diseases) that consume non-renewable resources (particularly fossil carbon), can lead to diffuse pollution and may have adverse impact on biodiversity. Genetic improvement of oilseed rape is a viable means to reduce the current reliance on high-input agriculture to achieve the yields that growers require for the crop to remain profitable.

As with many modern crops, oilseed rape exhibits a narrowing genetic base through allelic canalisation. This may restrict the scope for further genetic improvement of the crop to address the issues of sustainable production eluded to above. Breeders therefore require access to novel alleles, but in a form that is well characterised. As a resource within the UK Defra Oilseed Rape Genetic Improvement Network (OREGIN – <http://www.oregin.info>, Fig. 1.), we are developing a *B. napus* Diversity Fixed Foundation Set (BnDFFS). This will be a public-domain set of 188 genetically fixed lines structured to represent the diversity within the species. The use of fixed lines enables trait and genotype data to be accumulated over time for common genetic material, and provides a number of advantages over diversity collections containing heterozygous or mixed lines. In addition, OREGIN has adopted the Tapidor x Ningyou 7 oilseed rape segregating doubled haploid (DH) population (TN population), developed by Prof. J. Meng and colleagues at Huazhong Agricultural University, China, as a complementary public resource. A genetic linkage map for this population is currently being developed within the EU project IMSORB (<http://brassica.bbsrc.ac.uk/IMSORB>) and will be available later this year. We are also working towards aligning this map to a number other *Brassica* genetic maps to create a common framework with which to compare marker and trait data. The combination of these resources will enable mapped genetic markers to be used in allelic diversity surveys and trait diversity analysis to be associated with the genetic map.

A third set of resources being developed within the project are diversity collections for two major UK oilseed rape fungal pathogens, namely *Leptosphaeria maculans* (*Phoma lingam*), causing phoma leaf spot and stem canker (blackleg) (West *et al.*, 2001), and *Pyrenopeziza brassicae* (*Cylindrosporium concentricum*), causing light

leaf spot (Rawlinson *et al.*, 1978; Gilles *et al.*, 2000; Gilles *et al.*, 2001). A data-base of about 600 isolates of these pathogens from the UK and other countries around the world is currently being compiled. Future work will involve allelic diversity assessments of these collections, using SSR (minisatellite) (Eckert *et al.*, 2004) and AFLP markers. This information will also be incorporated into a database. In addition, standard techniques for investigating genetic variability under field, controlled environment and laboratory conditions are being developed as a set of standard operating procedures (SOPs). These will be publicly available on the OREGIN website and will include molecular procedures as well as whole plant inoculation (Huang *et al.*, 2004) and assessment procedures that are being established to screen the BnDFFS for novel sources of resistance to *L. maculans* and *P. brassicae*.

The screenshot shows the OREGIN website interface. At the top, there are logos for Rothamsted Research, Warwick HRI, and Defra. A search bar is located in the top right. The navigation menu includes 'Home', 'Research Activities', 'Resources', 'Stakeholders', and 'Admin Login'. The main content area is titled 'Stakeholder Forum' and contains the following text:

Purpose of the Stakeholder Forum

The stake-holder forum, chaired by Dr Peter Werner (an oilseed rape breeder), comprises breeders, sponsors, scientists and "end-users", who represent the substantial majority of UK's expertise relating to oilseed rape genetics and breeding. The forum aims to promote the activities of OREGIN and elevate its profile.

Below the text is a photograph of a group of people standing in a field, engaged in a discussion. The footer of the page contains the following text:

Site Map (not yet available) | Hosted by Rothamsted Research | Last updated: Friday, 1 October, 2004
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Figure 1. The “Stakeholder Forum” page of the OREGIN website which provides a portal to the OREGIN project, associated oilseed rape projects and other DEFRA Crop Genetic Improvement Networks.

An OREGIN Stakeholder Forum has been created to act as an interface between research scientists, the breeding industry, growers/field advisors and government and non-government organisations involved in the oilseed rape industry. Meetings are arranged annually to discuss issues affecting the industry and to debate “traits” important to the industry which would be good targets for improvement under future projects within OREGIN or through associated LINK-funded projects. Minutes and discussion notes of Stakeholder forum meetings are published on the OREGIN website. The Stakeholder Forum is chaired by an oilseed rape breeder, Dr Peter Werner of CPB Twyford (peter.werner@cpb-twyford.co.uk).

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