



Collaboration meeting on oat genome sequencing and exome capture

Meeting location: Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany.

Primary Participants: Nick Tinker (AAFC), Tim Langdon (IBERS, UK), Martin Mascher (IPK), Edyta Paczos-Grzęda (U. Lublin, Poland).

Sponsorship: This meeting and associated travel was supported by a BBSRC UK-Canada partnership award.

Overview:

Participants met over several half-day sessions at IPK to evaluate the current status of oat genome sequencing, and to develop a strategy to design a targeted oat exome capture assay using existing resources (oat diploid sequence, draft hexaploid sequence, and transcriptome data) that could be accomplished in advance of (and in anticipation of) a complete, annotated, hexaploid reference genome sequence. Dr. Mascher has extensive and recent experience in this area of bioinformatics, and he provided expert advice on the strategy. Dr. Tinker will complete the bioinformatics analysis to produce the capture design, with occasional consultation with the others.

While at IPK, Drs. Tinker and Langdon presented research talks as part of the institution's Vavilov Seminar Series.

Side trips and other meetings:





IPK is near Quedlinburg, where the participants stayed. It is a rich agricultural region, where we visited other key German agricultural institutions as well. Quedlinburg is a beautiful and historic city - well worth the four hours that it takes to get there from the nearest international airports at Frankfurt or Berlin.

While at IPK, we toured the national genebank facility, along with the herbarium collection and a special collection of cereal heads and panicles. The facilities and contents appear to be in excellent condition. Much of the research at IPK, including bioinformatics, supports the maintenance and use of this collection.

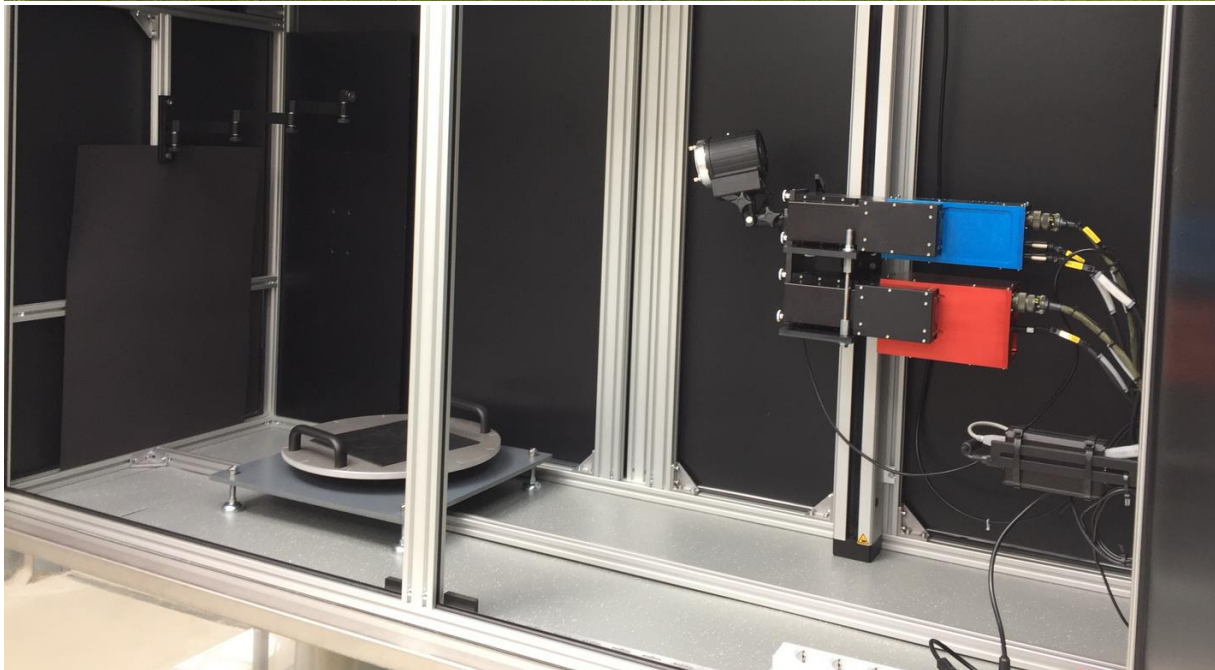


The genebank collection and herbarium at IPK.



We also visited the nearby Institute for Resistance Research and Stress Tolerance (RS), which is part of the Julius Kühn-Institut (JKI). The JKI belongs to the Federal Ministry of Food and Agriculture and consists of 17 specialized institutes, which are located at different sites in Germany.

After a round table with some staff and the institute director, Dr. Frank Ordon, we had a tour of the facilities. Although RS does not currently work on oat, Frank Ordon and others have interests in BYDV tolerance, as well as other expertise that could easily be applied in oat if the opportunity arose. The Quedlinburg site of RS is a modern facility, and contains a new phenomics installation.



The facilities at JKI, including a set up for plant phenotyping.



While at JKI, we also met with Dr. Matthias Hermann and his student, Sophie Brodführer, who are conducting research on the genetics and relationship of cleistogamy on resistance to *Ustilago avenae* (loose smut in oat) using a GWAS diversity analysis. There was excellent differential infection in this field, and we also saw good differentiation for powdery mildew infection.



Drs. Edyta Paczos-Grzęda, Matthias Hermann, Tim Langdon, and Sophie Brodführer in the “smut test”.

Also near Quedlinburg is the research headquarters of Nordsaat, a family-owned plant breeding company that is part of the Saaten-Union variety distribution system. Dr. Steffen Beuch, the oat breeder from Nordsaat, gave us a complete tour of the facilities, including an in-depth tour of the oat field tests, and an overview of wheat, rye, barley, and triticale varieties developed at Nordsaat. Nordsaat developed the first fertile triticale, and has a proud and successful history in plant breeding. We were very impressed with the modern facilities and equipment, with the efficiency of the operation, and with the clean fields of very nice looking oats. The previous night, a storm had passed through with 4cm of rain. Most of Steffen’s oats were still standing straight. One exception was a black oat variety which is bred for the French market, where horses apparently only eat black oats!



Steffen Beuch of Nordsaat showing off the first fertile triticale heads, Edyta with the giant space combine, and demonstration plots including lodged black oats.

-Nick Tinker, July 2017.