Oat breeding in the era of genomics: resistance to Fusarium (OatGen)

Oat has a long history as a major cereal crop, and is still very important to the Nordic countries as the third most produced cereal after barley and wheat. The recent outbreak of Fusarium Head Blight in the Nordic countries has caused a problem in oat production causing major economic losses. Of the Fusarium species, F. graminearum poses the biggest problem in Norway particularly in warm and wet weather conditions. Fungicides have had limited effect on the disease and they are costly and have a major negative effect on the environment. Therefore, resistance breeding is the most effective way to avoid negative damage. Graminor has the national responsibility to develop adaptable oat varieties with improved resistant to Fusarium disease. This will increase the company's market competitiveness and market share of Graminor's oat varieties in Norway and Nordic region. Graminor has invested heavily the last years in several research projects to effectively develop Fusarium-resistant oat varieties. The completed (2014-2017) innovation project "RESIFUS" (GRAMINOR ? IPN pr. # 233908) has made major groundwork in methodology and resistance research, so that resistance breeding can continue. OatGen will capitalize on the finding of RESIFU project to implement new genomics-based tools (i.e. Genomic Selection) in our national oat breeding. At OatGen project, and in collaboration with NMBU and NOFIMA, we will develop and study the genetic variation for fusarium resistance trait in the oat breeding panel to estimate the genomic breeding value (GEBV) for the application of genomic selection in the oat breeding program. Early and accurate estimation of GEBV can save time, and increase the genetic gain per year. The results will lead to a more efficient oat breeding that corresponds to the market's need of new varieties with better resistance to fusarium disease, and increase competitiveness of Graminor as a leading Nordic plant breeding company.