Topic/Title (Norwegian)

Forbedret genomisk seleksjon for Fusarium-resistens i hvete basert på prediksjonsmodeller med hovedgener og bruk av maskinlæring

Topic/Title (English)

Improved genomic selection for Fusarium head blight (FHB) resistance in wheat by exploring use of key genetic loci and machine learning in genomic prediction models

Summary

Genome-wide association study (GWAS) helps to detect the variation associated with diseases in form of genes and will identify the candidate genes that can be used in Genomic prediction modelling. Genomic prediction is a good novel alternative for selecting new resistant cultivars among new candidate breeding lines in no time compared to traditional breeding by estimating their breeding values based on marker data. The accuracies of these estimated breeding values are normally affected by various factors. Machine learning is gaining momentum in improving these accuracies, and how efficient this machine learning is over traditional statistical genomic prediction models needs to be assessed.

The research objectives are (1) Identify the key genetic loci by GWAS analysis (2) develop a genomic prediction model which includes the genetic information from GWAS (3) comparing the efficiency of classical genomic prediction models and machine learning models in achieving better prediction accuracies.

Subject area (keywords): Wheat, FHB, GWAS, Genetic Loci, Genomic Prediction, Machine Learning.

Language thesis: English

Bachelor or Master thesis: Master thesis

Credits: 60 ECTS

Project/company

WheatSustain - Knowledge-driven genomic predictions for sustainable disease resistance in wheat

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