

Notat

SEGES Innovation
 Planter & Miljø

Artikler om tidlig rodvækst korn og græs	Ansvarlig	nhkr
	Oprettet	22-11-2023
Projekt: 7860 Optimerede afgrøder til fremtidens effektive og klima-	Side	1 af 1

To videnskabelige artikler om tidlig rodvækst i korn og græs

På baggrund af undersøgelser de rodstudier, som er lavet af Aarhus Universitet i projektet "Optimerede afgrøder til fremtidens effektive og klimavenlige landbrug" forventes at der i starten af januar 2024 publiceres to videnskabelige artikler. Begge artikler tager udgangspunkt i rodmålingerne, som er lavet på forskellige afgrøder i rodbokse i løbet af projektperioden.

Paper 1

Working Title: "An Automated Seminal Root Angle Measurement Pipeline using Corrective Annotation"

Species: Cereals (barley and wheat)

Target Journal: Plant Phenomics

Main Conclusions:

The manuscript will introduce an innovative image analysis pipeline developed for the automated extraction of root angles from images, specifically focusing on the seedling stage root systems. Employing a dataset featuring 196 breeding lines and four commercial cultivars grown in rhizoboxes, the pipeline navigates through three crucial stages: root segmentation, seed point localization, and angle extraction. Validation through manual measurements underscores a moderate correlation and Mean Absolute Error (MAE). The application of Bayesian Variable Selection identified specific Quantitative Trait Loci (QTLs) associated with both total root length and seminal root angle. The root angle extraction pipeline is anticipated to be published as GUI software, facilitating broader accessibility and utilization within the scientific community.

Expected Submission Date: February 2024

Paper 2

Working Title: "Unravelling the Relationship Between Early Root Development and Field Performance in *Lolium perenne*"

Species: Perennial ryegrass

Target Journal: Frontiers in Plant Science

Main Conclusions:

The study explores the genetic connection between early root development traits assessed in rhizoboxes and yield in perennial ryegrass (*Lolium perenne*), recorded at three European locations over two years. A bivariate model was employed to assess the relationship between the traits. We evaluated 239 families and four varieties. Results revealed a substantial genetic correlation (0.39) between total root length and yield, indicating a shared genetic influence. These findings emphasize the positive genetic correlation between early root development and yield in perennial ryegrass. This insight supports the integration of early root traits into breeding for improved productivity. Leveraging genomic selection could further accelerate the development of resilient and high-yielding cultivars.

Expected Submission Date: January 2024