

Evaluation of Oat Varieties for Agronomic and Spectral Traits in Ireland: Preliminary Insight from OatFrontiers Project

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Background

Ireland ranks top for average yield among major oat-producing countries. There is potential to expand oat production to meet the growing domestic and global demand for oats. However, the significant challenges are the stagnant yield potential, the lack of high-yielding oat germplasm, and the high-throughput screening of potential genotypes.

The core objectives of the OatFrontiers project are

- GWAS analysis of >390 single panicle progenies from a 20-parent recurrent selection population (Holland et al. 2002, Euphytica 113: 195-205)
- Evaluation of released oat varieties for adaptability and agronomic performances

Planned Work 2024-26

- Evaluation of 28 oat varieties of European origin across 10 contrasting sites located in Finland, Iceland, Ireland, Norway and Sweden
- Trait of interests were lodging and disease resistance, yield, grain physical and chemical qualities
- Unmanned Aerial Vehicle (UAV) based multispectral sensor-derived Vegetation Indices (Vis) as a proxy to distinguish yield potential of varieties (low vs high-yielding)



Fig 1. A. OatFrontiers trial locations for 2024; **B.** 1st OatFrontiers Workshop and Field Visit in Gunnarsholt, Iceland. 8th October 2024

Preliminary Results

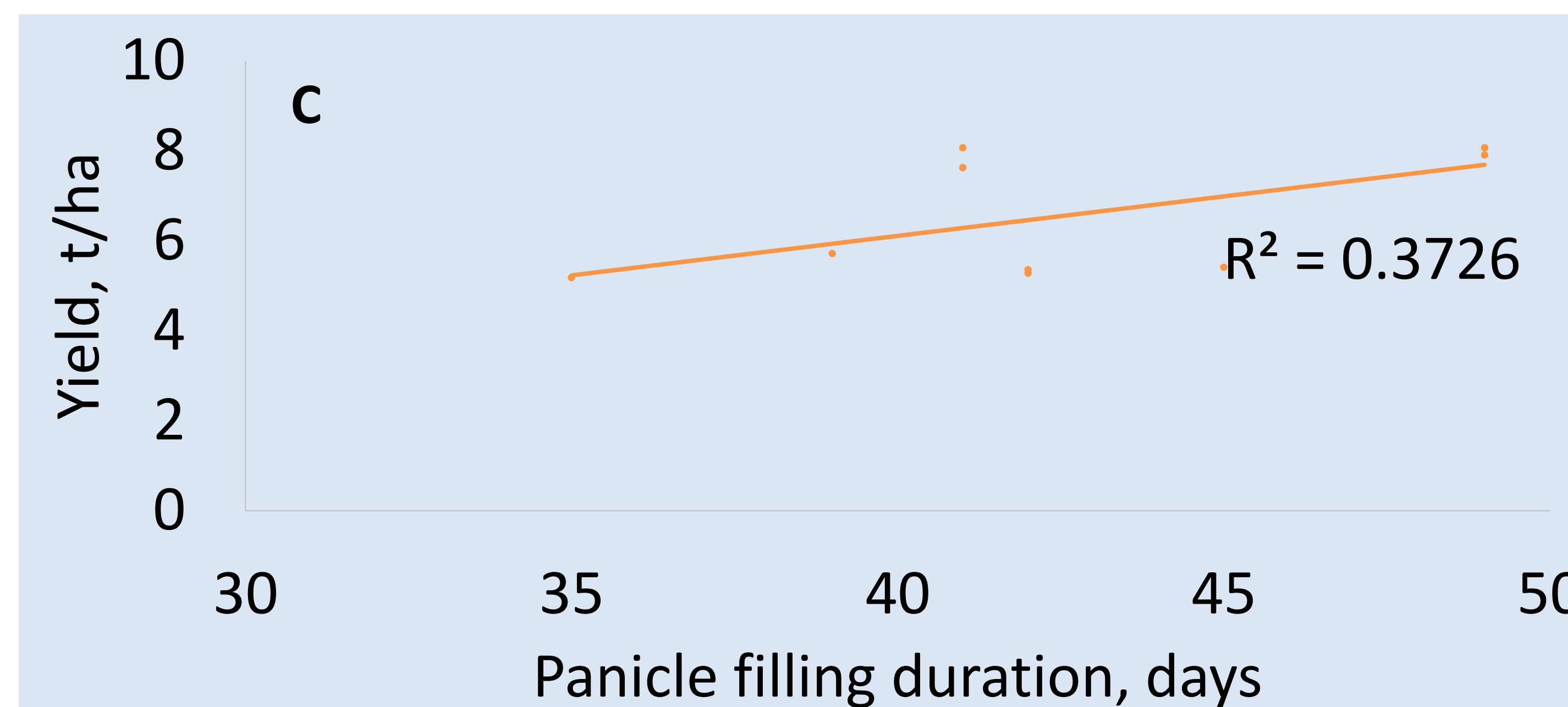
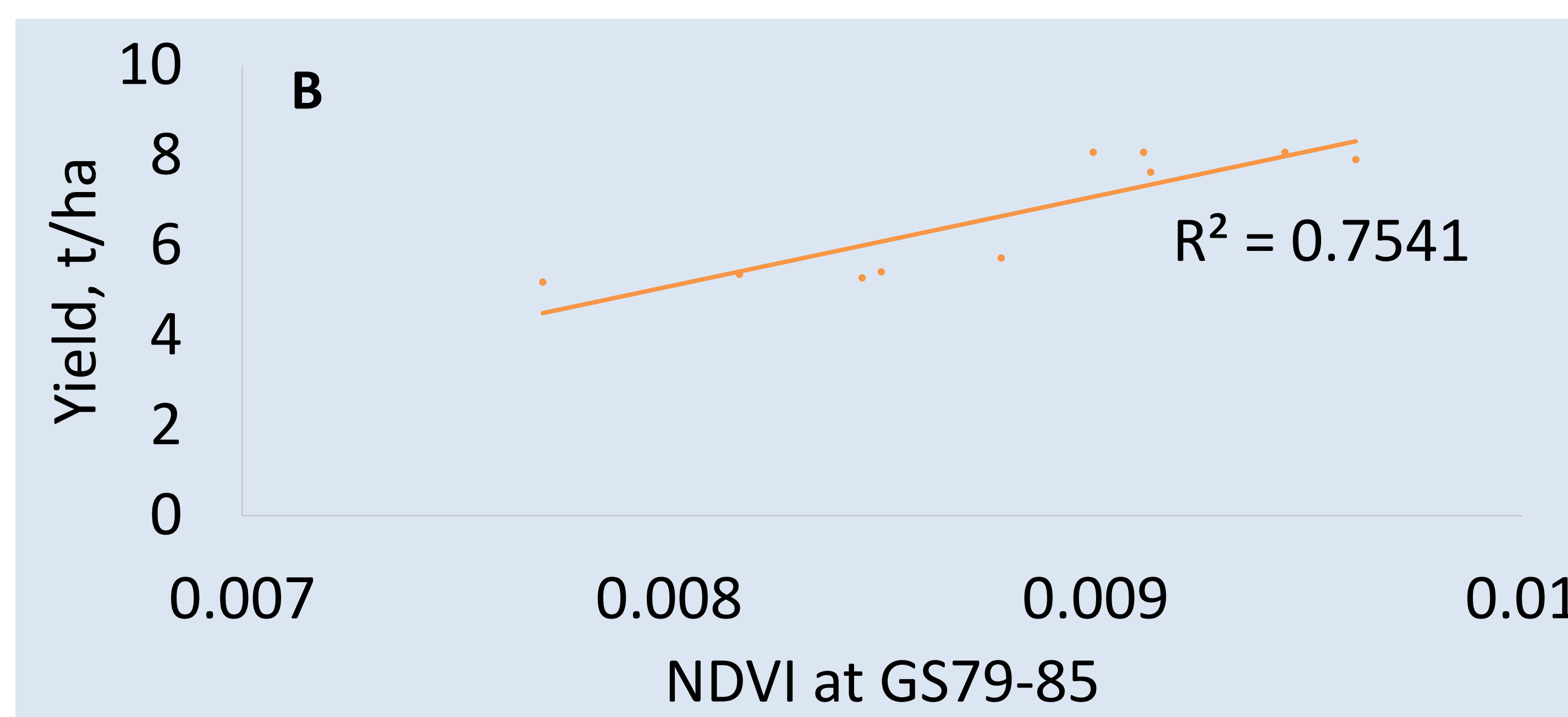
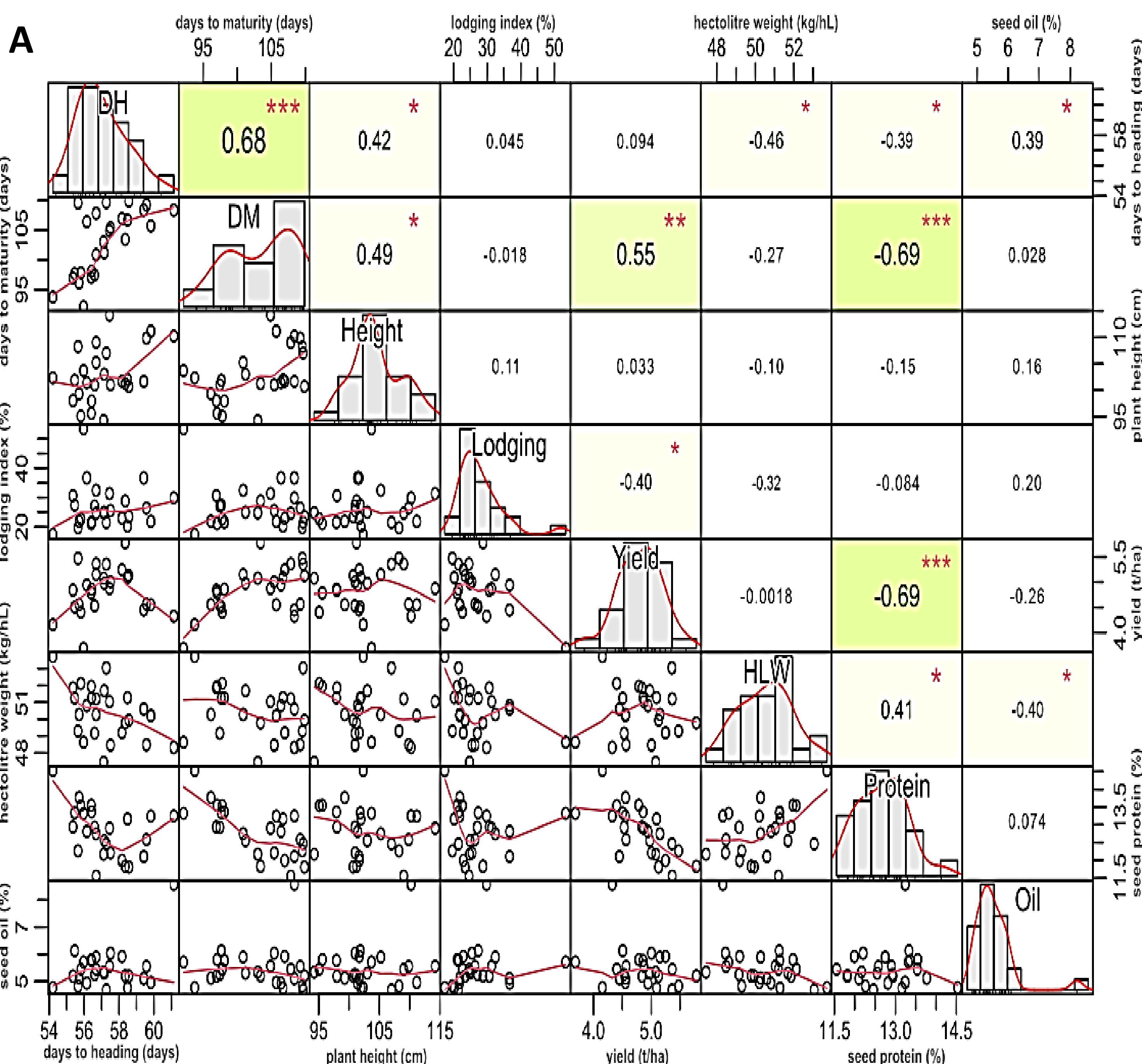
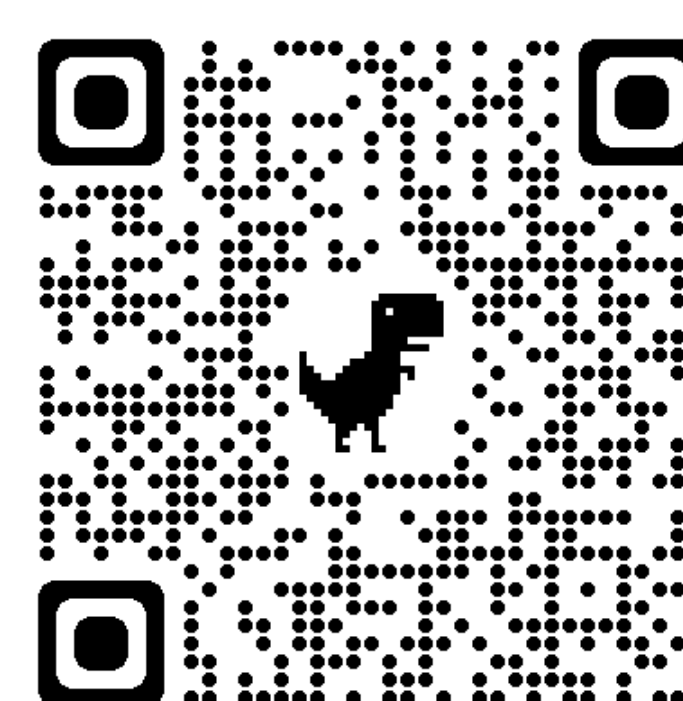


Fig 2. (A) Illustrates Pearson's correlation between agronomic and harvest traits for all trial locations combined. Statistical significance: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; **(B)** Regression between Yield and NDVI at GS79-80 and **(C)** Yield vs. Panicle filling duration of 10 low and high-yielding varieties from Carlow, Ireland-2024

Preliminary Findings and Future Work

- 1 year-1 site data suggest a possibility of using NDVI and other VIs as a proxy to rank oat varieties for yield potential
- Future development of VIs-based prediction model for Radiation Use Efficiency (RUE) in oats
- Two more years of field trials to be done to understand the stability of the traits



More about OatFrontiers

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