Identifying Physiological and Agronomical traits associated with High Yield in Linseed

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INTRODUCTION

- Linseed is recognized for its rich content of Omega-3 fatty acids, fibre, protein, and lignans and is classified as functional food.
- In the UK, it serves as a break crop due to its low fertilizer requirements and high yield.
- It acts as a perfect host for mycorrhizal fungi, and prepares the soil for subsequent crops (Swire,2018; Finch and Lane,2002).
- To adapt to the UK's climate and soil variations, focused research is crucial for optimizing sowing dates, seed rates, and crop varieties, especially for linseed, to achieve sustainability and high yields.

OBJECTIVES

- To investigate the genetic variations in the existing UK linseed germplasm.
- To investigate the effect of soil properties and its association with roots on yield performance.
- To analyse the physiological basis underpinning sowing time and density in above ground canopy and roots.

METHODOLOGY

- A polytunnel experiment was conducted in the first year at the Riseholme campus, University of Lincoln. It involved two varieties of linseed (Alpaga and Atilla), two soil types (sandy and clay loam), and two water treatments (irrigated and drought).

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- The experimental layout utilized a randomized block design, with 10 replicates comprising 80 pots, each containing two plants. For every parameter, a sample size of (n=10) was chosen, representing one variety and one treatment and one soil type.

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- The period of Drought exposure lasted for 12 weeks. Measured parameters included Plant Height, Number of Flowers, Tillers, Capsules, Plant Biomass, and Chlorophyll Content, continuing until the harvest cut.

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- Seeds were manually threshed, followed by a seed count, seed weight, and seed dimensions measurement using a vernier scale.

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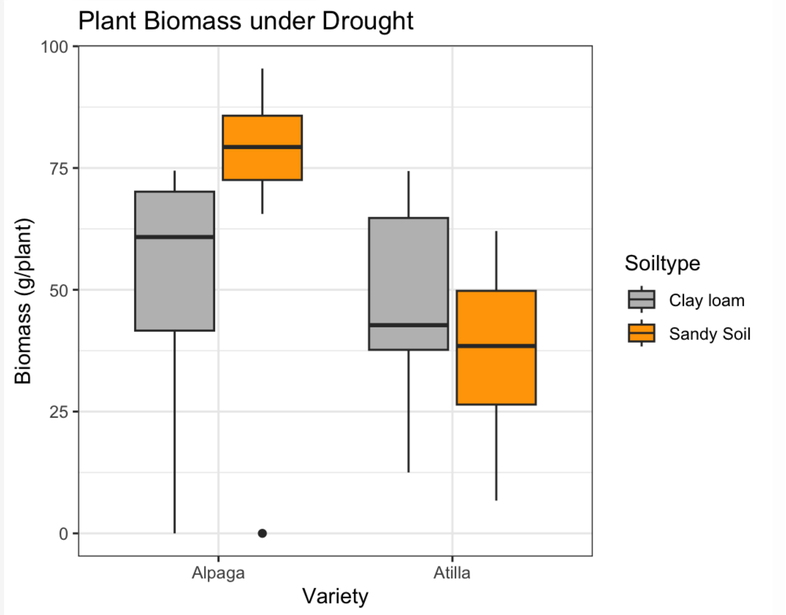
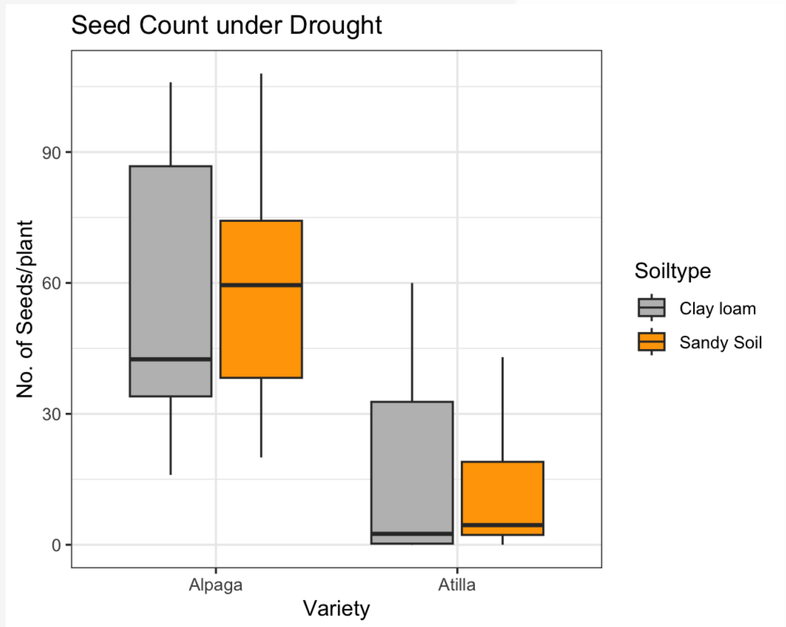
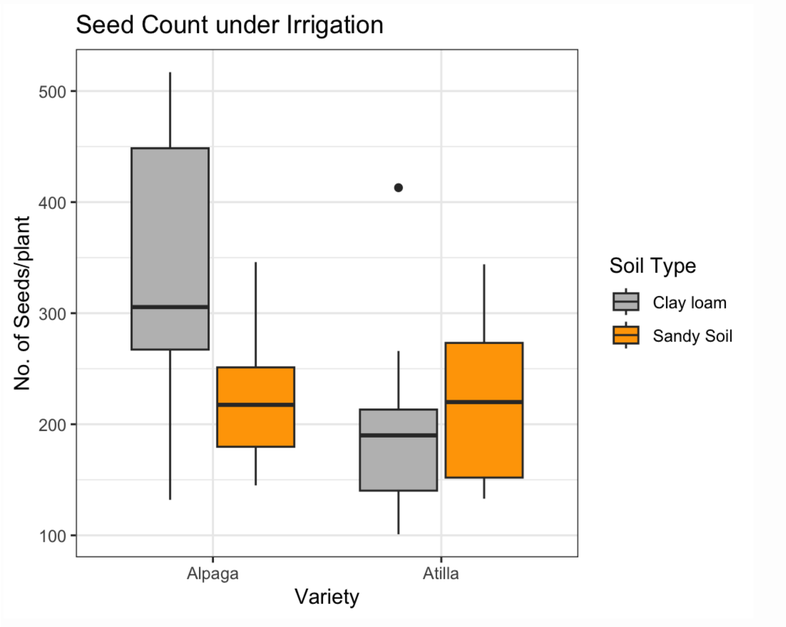
- Data collected, represented counted data with Normal distribution and was statistically analysed using Generalised Linear Model Framework (GLM).

RESULTS







- Plant Biomass was highest for the Alpaga on sandy soil with irrigation but varied greatly on clay loam. Atilla recorded the lowest biomass under all treatments and soil types.
- No. of Seeds were maximum for Alpaga across both the treatments with more variation in drought. Atilla had the lowest seed count across both treatments and soil type.
- For this experiment , treatment was found to be significant ($p < 0.05$) while soil type was not. It also concluded that Alpaga had more resilience towards water stress.

FUTURE RESEARCH PLAN

- A field experiment will be conducted that will study the effect of delayed sowing and different seed rates in Linseed.
- The parameters for this study includes Leaf Area, NDVI, Light interception, Chlorophyll Estimation, Plant Height, Flower Number, Capsule Number, Tillers/m2 and Yield kg/ha.
- Root Scanning will also be performed to assess the impact of delayed sowing on root structure.

- A polytunnel pot experiment will be conducted to understand the effects of Bio-stimulant on root structure in different linseed variety.
- The parameters of this study includes Leaf Area, Chlorophyll Estimation, Plant Height, Flower Number, Capsule Number, Tillers and Yield.

References:

1.Swire, John (2018). Spring Linseed - a great break crop.
2. Finch, H.J.S., A.M. Samuel and G.P.F. Lane (2002). '8 - Cropping techniques. In: Lockhart and Wiseman's Crop Husbandry Including Grassland (Eighth Edition).

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