

Effect of Grain Development on Grain Quality Parameters

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Introduction

Panicle architecture in oats influences the size and shape of grain within it and this is reflected by differences in grain development across the panicle. In order to understand how panicle and grain development influence grain quality parameters, panicle architecture was analysed from field grown material from anthesis until full grain maturity.

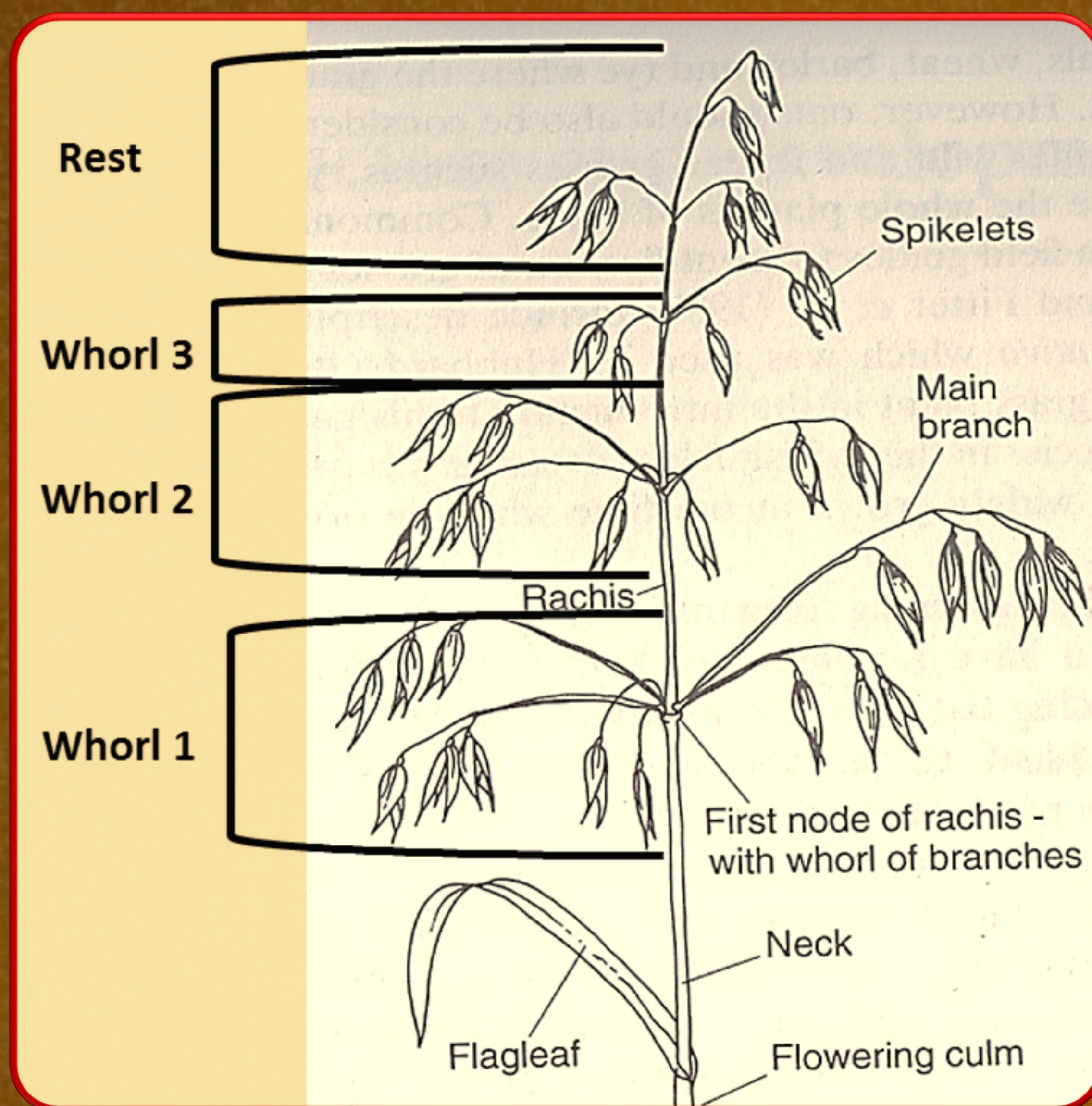


Figure 1. Panicle architecture in oats. The rachis bears the whorls of branches where we can find the spikelets. Each spikelet contains two to three grains, protected by a leaf like structure, the hull.



1. Early Milk 2. Late Milk 3. Soft Dough 4. Hard Dough 5. Ripening

Figure 2. Primary grain of Mascani, before and after dehulling (groats on right hand side) at each growth stage sampled

Methods

Three winter oat varieties, two conventional height (Tardis and Mascani) and one dwarf (Buffalo), were grown in a field trial in summer 2015 and developing grain sampled at five different growth stages (Zadok decimal growth stage, GS). At each GS (figure 2) and from each variety, main stem panicles were sampled and divided into individual whorls as indicated in figure 1. Primary, secondary and tertiary grain were separated and analysed by image analysis, before and after dehulling. Measurements of area, length, width and moisture content of both whole grain and groats were taken. Results presented here are from Mascani as a model.

Results

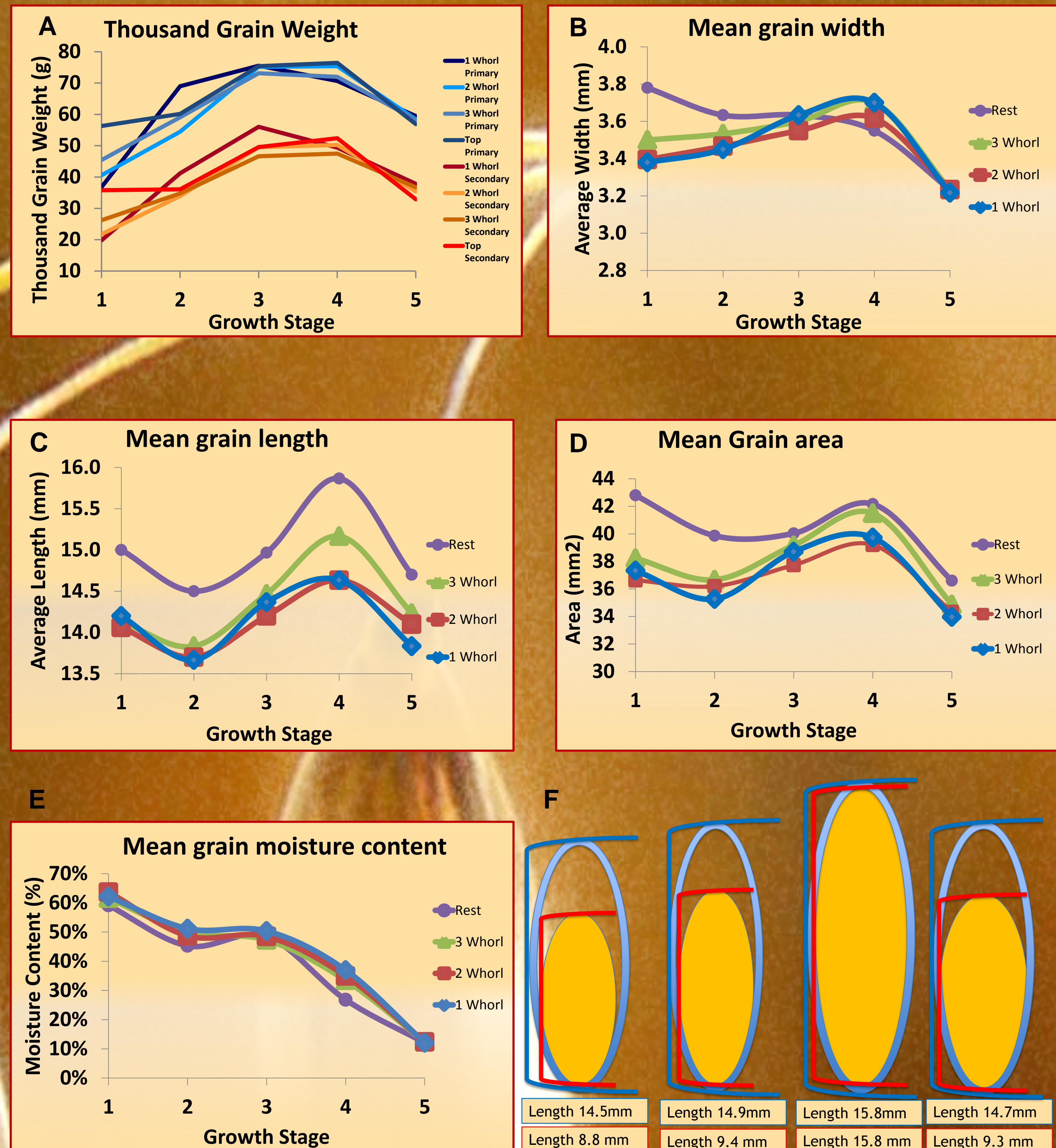


Figure 3. Development of primary and secondary thousand grain weight (A) of Mascani and of mean grain width (B), grain length (C), area (D) and moisture content (E). F. Graphic example of Mascani primary grain and groat from the top of the panicle regarding length, measured from late milk to ripening.

Conclusions

- Grain displays a sequential development from the top to the bottom of the panicle (fig 3)
- No significant differences in the pattern showed by primary and secondary grain (fig 3A)
- Grain width established first (fig 3B) and then grain length (fig 3C)
- Decrease found in all grain and groat dimensions at full maturity
- Differences in development variety dependent

Next

- Chemical analysis: β -glucan content through grain development
- More sampling points: after anthesis, between early milk-late milk and between hard dough and ripening.
- Quality traits: Kernel content.