

Projekt rapport på PA1315 *Klimatpåverkan på brödkvaliteten i vårvete:
validera nya proteinkvalitetsmetoder med bakning*



Projekttitel

SLU Partnerskap Alnarps projekt nr: **PA1315**

Projekttitel på svenska enligt projektansökan: **Klimatpåverkan på brödkvaliteten i vårvete: validera nya proteinkvalitetsmetoder med bakning**

Projekttitel på engelska enligt projektansökan: **Climate impact on spring wheat bread baking quality: validating new protein quality characterization methods via bread-baking**

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Projektpartners: Lantmännen SW seeds

This project evaluated the impact of contrasting climatic conditions on the industrial quality characteristics of spring wheat genotypes grown during two markedly different growing seasons in 2017 and 2018 at Lantmännen SW, Svalöv. The aim was to evaluate the wheat protein and industrial flour quality characteristics (including baking tests) and other common and new wheat quality evaluation methods of 12 genotypes grown under diverse climatic seasons.

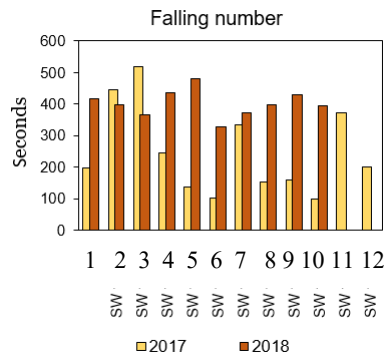
The 2017 season was characterized by cold and rainy conditions, whereas 2018 season experienced high temperatures and prolonged drought. The 12 genotypes were analyzed for key quality traits including gluten protein mapping, thousand kernel weight (TKW), gluten properties (glutogram and wet gluten), falling number, bread volume, and farinograph characteristics.

The results demonstrated clear climatic effects on the wheat quality characteristics evaluated by SE-HPLC and by the industrial wheat quality methods at Lantmännen SW quality lab. Wheat grown under the hot and drought-prone conditions of 2018 exhibited lower protein content and higher starch content compared with wheat produced in 2017. In contrast, TKW, glutogram, and wet gluten values showed relatively limited variation between years for most genotypes, suggesting greater stability of these traits under environmental stress. Major part of the genotypes displayed higher falling numbers in 2018 (**Figure 1A**), indicating altered enzymatic activity and grain quality under drought conditions.

Breadmaking performance also differed substantially between the studied years. Bread volumes range was lower in 2017 (up to 800 ml) and broader in 2018 (up to 900 ml), reflecting genotype-specific responses to environmental variation. Proffing and baking bread in forms was found important for most genotypes grown in 2017, while no such step was needed for 2018 genotypes, some baked breads are shown in **Figure 1B**. Farinograph analysis of the 2017 genotypes revealed contrasting trends between dough stability and dough resistance, highlighting variability in rheological behavior among genotypes. The SE-HPLC results highlighted the spring wheat genotypes having higher gluten strength in 2018 as compared to 2017 (Lama et al. 2022).

Overall, the study demonstrates that climatic fluctuations *e.g.* drought, significantly influences the industrial and breadmaking quality traits in spring wheat and emphasizes the importance of incorporating climate-resilience and quality stability evaluation into wheat breeding programs.

A



B



Figure 1. Falling number (A) and baking performance (B) of spring wheat genotypes from this study.

References

Lama S., Vallenback, P., Hall, S.A., Kuzmenkova M., R. Kuktaite, 2022. Prolonged heat and drought versus cool climate on the Swedish spring wheat breeding lines: Impact on the gluten protein quality and grain microstructure. *Food Energy and Security*, [10.1002/fes3.376](https://doi.org/10.1002/fes3.376).