DOSSIER DEMANDE CONTRAT DOCTORAL - CONCOURS 2020

ECOLE DOCTORALE

SCIENCES DE LA VIE, SANTE, AGRONOMIE, ENVIRONNEMENT

**UMR UCA-INRAE Génétique, Diversité et Ecophysiologie des Céréales**

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**Functional characterization and validation of molecular actors in the transcriptional regulation of wheat grain storage proteins**

Grain storage proteins (GSP) content and composition are the main determinants of the end-use value of bread wheat. The accumulation of GSP is hypothesized to be mainly controlled at the transcriptional level by nitrogen and sulphur assimilates availability. Team’s works suggest that two transcription factors (TFs), not previously studied in wheat, are involved in the regulation of GSP synthesis. A characterization and functional validation of these two original candidates, TaMCB1 and NAC22, seem necessary to better understand the molecular mechanisms that control the accumulation of GSP in response to nitrogen and sulphur nutrition. For this, the PhD student:

1/ will study in vitro the interactions between candidate TFs and cis-motifs of GSP gene promoters by EMSA (Electrophoretic Mobility Shift Assay).

2/ will evaluate in vivo the regulatory activity of TFs by transient expression on wheat immature endosperms.

3/ will validate in planta the role of these TFs by studying the response to nitrogen and sulphur nutrition of transgenic plants over- and under-expressing TaMCB1 and NAC22.

A regional PSPC project currently being drafted will be able to support this project. As part of the I-SITE CAP 20-25 (2021-2026) project, discussions are also underway.

Boudet et al. (2019) The bZIP transcription factor SPA Heterodimerizing Protein represses glutenin synthesis in *Triticum aestivum* *Plant Journal* 97:858-871.

Bonnot et al. (2017) Grain subproteome responses to nitrogen and sulfur supply in diploid wheat *Triticum monococcum* ssp *monococcum* *Plant Journal* 91: 894-910.