

## **The effect of cold stress on the root-specific lipidome of two wheat varieties with contrasting cold tolerance**

### **ABSTRACT**

Complex glycerolipidome analysis of wheat upon low temperature stress has been reported for above-ground tissues only. There are no reports on the effects of cold stress on the root lipidome nor on tissue-specific responses of cold stress wheat roots. This study aims to investigate the changes of lipid profiles in the different developmental zones of the seedling roots of two wheat varieties with contrasting cold tolerance exposed to chilling and freezing temperatures. We analyzed 273 lipid species derived from 21 lipid classes using a targeted profiling approach based on MS/MS data acquired from schedule parallel reaction monitoring assays. For both the tolerant Young and sensitive Wyalkatchem species, cold stress increased the phosphatidylcholine and phosphatidylethanolamine compositions, but decreased the monohexosyl ceramide compositions in the root zones. We show that the difference between the two varieties with contrasting cold tolerance could be attributed to the change in the individual lipid species, rather than the fluctuation of the whole lipid classes. The outcomes gained from this study may advance our understanding of the mechanisms of wheat adaptation to cold and contribute to wheat breeding for the improvement of cold-tolerance.