

DO CELL WALL PROTEINS AFFECT THE SETTING OF GRAINS AND THEIR POTENTIAL WEIGHT IN SUNFLOWER?

***Daniel CALDERINI*¹, *Santiago VASQUEZ*², *Francisca CASTILLO*³, *Paola MONTECINOS*¹, *Alejandro CLAUDE*⁴, *Carolina LIZANA*¹, *Ricardo RIEGEL*¹**

¹ *Plant Production and Plant Protection Institute, Faculty of Agricultural Science, Universidad Austral De Chile, Valdivia, Chile*

² *Graduate School, Plant Production and Plant Protection Institute, Faculty of Agricultural Science, Universidad Austral De Chile, Valdivia, Chile*

³ *Universidad Austral De Chile*

⁴ *Biochemistry and Microbiology Institute, Faculty of Sciences, Universidad Austral De Chile, Valdivia, Chile*

danielcalderini@uach.cl

ABSTRACT

Physiological bases of grain setting and potential grain weight are still partially understood in sunflower. There are evidences that grain number (GN) and weight (GW) are sensitive to environmental conditions immediately before flowering (R5) and during grain filling. Additionally, it has been pointed out that a better knowledge about the growth of maternal tissues of grains (ovary/pericarp) will improve the understanding of GN and potential GW settings, highlighting the key role of expansins (proteins controlling plant cell wall loosening). This study aimed to evaluate the impact of ectopic applications of cell wall proteins, including expansins, on GN and GW in sunflower. Two contrasting grain weight genotypes were sown in a split plot design with three replicates at the Agricultural Research Station (UACH), Chile. Cell wall proteins were extracted from sunflower seedlings and they were applied on the capitula at R4 or after 10 days of flowering (R5). Two control treatments (without proteins and only buffer applications) were also assessed. Extracts of proteins were assessed by SDS-PAGE and by mapping and database searches. Fresh and dry weight of ovaries and grains (dissecting pericarp and embryo) were recorded from R3 to physiological maturity. At harvest, GN, GW and oil concentration were measured. Proteins applied at R4 increased ($P < 0.05$) GN (20%) and GW (30%) in both genotypes. Lower impact was found under applications at 10 days after flowering. Remarkably, oil concentration of grains was not affected ($P > 0.05$). These results support that the growth of maternal tissues before R5 affects GN and potential GW in sunflower highlighting the likely key role of expansins.

Key Words : expansins, ovary, kernel, grain yield