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Poster Abstract – B.06

GENETIC VARIABILITY IN TWO-ROWED BARLEY FOR *IN VIVO* β-GLUCAN DEGRADATION

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Two-rowed barley genotypes, varieties and advanced lines have been studied for enzymic β-glucan degradation. Malt β-glucan content is an important quality feature and, in turn, it depends upon barley β-glucan content as well as on β-glucanase activity during modification. Another enzyme, β-glucan solubilase, has been repeatedly, but unsatisfactorily, suggested to precede β-glucan depolymerization by β-glucanase. Actually, neither solubilase has been univocally identified, nor solubilizing activity has been uncontroversially proven to be different from that of β-glucanase itself.

Our approach was the following: barley genotypes were characterized for parameters related to malting quality; some of these genotypes were selected for their wide differences and monitored for the degradation of β-glucans and the development of β-glucan-degrading enzymes during malting (a dedicate assay for the measurement of β-glucan solubilization activity was developed). A biphasic model for β-glucan degradation implying sequential action of solubilase and β-glucanase was compared to a monophasic model that assumes all β-glucans are essentially depolymerized by β-glucanase. The comparison was performed by formulating these models in terms of *in vivo* kinetics, so that confirmatory regression analysis could be used to test their fitting to the observed data.

Results showed β-glucan degradation is mostly monophasic, notwithstanding the role of a small fraction of 'masked' β-glucans in malting quality remains unclear. However, the genotype-dependent kinetic rate constant (indicating β-glucan degradability), in addition to β-glucanase activity, is suggested to play a relevant role in malting quality.

We identified the variety Scarlett as the best one for this trait; consequently, Scarlett is confirmed to be at top level for malting quality, but even one of our advanced lines, Fior 7054, had high values of β-glucan solubilase.