RELATIONSHIPS OF SPRING BARLEY QUALITY CHARACTERISTICS WITH ENVIRONMETAL CONDITIONS

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Abstract. *The duration of cereal growth depends strongly on temperature and precipitation therefore these are one of the most important factors affecting grain quality. This study investigated effects of environment on variation of spring barley (Hordeum vulgare L.) grain quality characteristics. Five morphologically and phenologically different varieties of Latvian origin including three covered (Ansis, Idumeja, Austris) and hulless ones (Irbe, Kornelija) were grown during 8 growing seasons (2007-2014) at the State Stende Cereal Breeding institute where detailed climatic data about mean daily temperature and precipitation were being collected during three months from May to July. Grain chemical composition (crude protein, starch and total β-glucans concentration) was evaluated by Infratec 1241. Results were subjected to analysis of variance and Pearson phenotypic correlations of spring barley quality characteristics with climatic data were calculated across all environments for each genotype, they were pooled and their homogeneity determined. Genotypic means of grain quality characteristics indicated that the hull-less variety 'Kornelija' ranked highest in protein content (148.2 g kg^{-1}) and β-glucans (50.5 g kg^{-1}) content. Environmental variation for crude protein was from 114.8 to 151.4 g kg^{-1}, for starch from 606.6 to 628.4 g kg^{-1}, but for β-glucans from 40.2 to 51.2 g kg^{-1}. Crude protein content was correlated posetively with high temperature and drought conditions in the beginning of both June and July. High precipitation amount at the third decade of both June and July stimulated the accumulation of starch. High precipitation in May and its deficiency in the first decade of July were correlated posetively with total β-glucans content. The correlations coefficients were not homogenous across covered and hulless genotypes related to effect of temperature on development of β-glucans. The accumulation of β-glucans significantly possitively effected by warmer temperature in May for hulless barley, and in the first decade of July for covered barley.*

Key words: *spring barley, environment conditions, grain quality, correlation.*