Effect of grain development and nitrogen fertilizer on grain quality parameters

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Nitrogen fertilisation is an increasing economic and environmental concern, becoming a more important factor in developing sustainable production systems for cereal crops. Nitrogen is a vital nutrient for plant growth and yield formation. Understanding and enhancing the efficiency of nitrogen use is important in improving the economic competitiveness of oats but also has environmental benefits through reduced greenhouse gas emissions and reduced N leaching and run-off.

Additions of nitrogen have been shown to increase grain yield by increasing tiller survival and therefore the final shoot numbers and grain number per unit area. However it is important that the quality of that grain is maintained. Despite this, a clear understanding of the major effects regarding nitrogen influence on grain quality parameters is lacking. Results from a previous study on the genetic and environment effects on quality parameters showed that there was a differential effect of environment on grain chemical and physical parameters. On the basis of these results, in 2013-2014 and 2014-2015, four oat winter varieties, Mascani, Tardis, Balado and Gerald, were grown under six different levels of nitrogen fertilisation. After harvest, the grain was analysed by non-destructive methods (MARVIN), in addition to specific weight, kernel content, hullability, thousand grain weight, oil, and protein and β-glucan content determinations in order to identify the influence of nitrogen on grain quality parameters.

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