

Testing of pre-harvest sprouting of wheat and triticale at the breeding station Uhretice, Selgen Corp., Czech Republic

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Abstract

Germination of grains at the spike before harvest is called pre-harvest sprouting (PHS). Periods of rainfall and high humidity after grain maturity and before harvest can contribute to PHS, which can be seen of as a premature germination. Germination can begin when a grain absorbs moisture. Visible indications of PHS include grain swelling, germ discoloration, seed coat splitting and root and shoot emergence. Sprouting is influenced by the weather during ripening and pre-harvest time. Among varieties significant differences in regard to resistance to pre-harvest sprouting can be observed. Resistance to sprouting at the breeding station Uhretice is selected only on visual evaluation. Other methods can be used to evaluate grain dormancy, the influence of awns and wax layer, the effect of temperature and dry conditions before harvest or falling number test can be used to measure alpha-amylase activity.

Keywords

Falling number, pre-harvest sprouting, quality, *Triticosecale*, *Triticum aestivum*, weather

Introduction

Pre-harvest sprouting (PHS) results in reduced end-use quality. PHS occurs when wet or rainy conditions delay the harvest. Cool and moist conditions after grain maturity lead to increased risks of PHS (JIANG and XIAO 2005, THOMASON et al. 2009). Physiological mature grains start to germinate in the field. The more wet and dry cycles the grain experiences the more likely dormancy is broken and the grain germinates at the spike. Water must penetrate the seed coat and move into the seed before it can germinate. Results of pre-harvest sprouting are the decrease of test weight and the degradation of starch and protein. Reduction of kernel quality together with yield losses cause financial losses to farmers and food processors (CHAPMAN 2011). Timely harvest is one of the most important things if quality wheat is to be produced (FOSTER 2011). Testing for resistance to sprouting is a standard selection method in wheat and triticale breeding.

Material and methods

Five spikes from each test line are harvested at physiological grain maturity from field trial plots. The spikes are tied into

small bouquets with wire and labels marked with numbers. The spikes are soaked in water for 3 h to absorb water. Afterwards the spikes are placed on a steel crosshatch in a way that no spike touches another spike (*Figure 1*).

The spikes are continuously irrigated with water (*Figure 2*). The time period between irrigation depends on weather conditions but it is regulated in a way that constant wet conditions are provided. After 7 and 14 d the degree of sprouting is scored on a 1 to 9 scale (9=extensive sprouting on the spike, 1=no sprouting, *Figure 3*). Spikes with fungal infections are discarded.

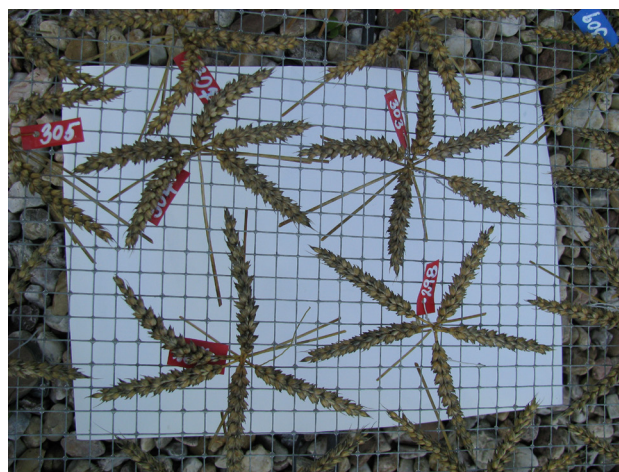


Figure 1: Spikes on the steel crosshatch



Figure 2: Irrigation of spikes

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