EAPR 2017 - ABSTRACT FOR ORAL PRESENTATION

REGRESSION ANALYSIS OF POTATO DORMANCY INTEGRATING GENETIC AND ENVIRONMENTAL FACTORS

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Potato dormancy is usually described as the period required by potato tubers to initiate sprouting after harvest. The dormancy parameter is key for the potato value chain because it defines the storage period during which no anti-sprouting treatment is required. Dormancy is known to have a genetic component because the time from harvest to sprouting varies between potato varieties. A better characterization of dormancy helps optimizing storage by reducing the frequency of anti-sprouting applications. Reducing the anti-sprouting treatments not only helps lowering storage costs but it also provides an immediate benefit for human health and for the environment.

The main objective of the present study is to develop a model predicting the dormancy length in function of the cultivar and the growing conditions of the considered year.

So, 2 sources of informations were used: 1) average dormancy of cultivars provided by breeders (*breeders dormancy*) 2) average dormancy of cultivars obtained from field experiments (*field dormancy*). The field experiments were managed in Switzerland during 25 years in four different locations and for 721 varieties of potatoes. Field data were registered during the growing season such as weather data (e.g. temperature, rainfall etc.), soil data and crop management data. One month after harvest, the potatoes were stored at 8°C in wooden crates containing 7 kg of potato tubers. The dormancy was defined as the time between the harvest and the emergence of the first sprouts. The data (n=3'730) were analyzed as follow: (1) calculation of the *field dormancy*, which is the average dormancy length of the tested cultivars from the field data; (2) merging of field dormancy and breeders dormancy records (3) univariate regressions to study the link between the breeders and field dormancy records; (3) ANOVA to identify the parameters with the highest influence on the dormancy length; (4) creation of a model using these identified parameters in order to predict the sprouting date of potato stocks based on the field data; (5) validation of the model.

Our results highlight the heterogeneity of the dormancy data provided by the potato breeders. Our results also stress the importance of climatic and field parameters to estimate the dormancy length of a given potato stock.

We discuss the practical consequences for growers and potato storage companies.

The Ministry of Walloon Region and Arysta in Belgium are thanked for their greatly appreciated partnership. The Commission for Technology and Innovation (CTI), Fenaco and ZWEIFEL in Switzerland are gratefully acknowledged for their financial support.