

Abstract

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Title: Application of linear and nonlinear methods for the yield forecast based on results of variety trials.

Author: MSc. Eng. Magdalena Piekutowska

Supervisor: PhD Eng. Gniewko Niedbała, Poznań University of Life Sciences

The purpose of this work was to produce linear and nonlinear models for forecasting the yield of tubers of very early potato varieties in two dates and the content of starch in tubers. For the purpose of the work, data from 2010-2017, derived from varietal trials carried out by the Pomeranian Agricultural Advisory Center in Lubań and field units of COBORU: SDOO Karzniczka and Szczecin Dąbie, ZDOO Rarwino and Białogard, were collected. Linear models were created based on multiple linear regression analysis, nonlinear models were built using artificial neural networks. The produced models can forecast the yield of very early potato varieties as of June 20 (forecast for early harvest) and July 20 (forecast before harvest after the end of vegetation of plants) and the content of starch in tubers on July 20. Agronomic, phytophenological and meteorological data were used to prepare the models, and the verification of correctness of their operation was based on separate sets of data not involved in the construction of models. Six forecast error estimators were used for proper validation of the model, ie. global relative model approximation error (RAE), mean square error (RMS), mean absolute error (MAE), absolute percentage error (MAPE), maximum error (MAX), maximum error percentage (MAXP). As a result of the analyzes carried out, for most models, the forecast error results not exceeding 15% of MAPE were obtained. Predictive NP1, NP2, NSK neural models were characterized by better values of quality measures and ex post forecast errors than regression models RP1, RP2, RSK.

Keywords: linear and nonlinear models, very early potato, yield forecast, artificial neural networks, multiple linear regression