Available Issues | Japanese   >> Publisher Site

Author: [ ] ADVANCED   Volume   Page

Keyword: [ ] Search   [ ] [ ] Go

Add to Favorite/Citation Articles Alerts   Add to Favorite Publications   Register Alerts   My J-STAGE HELP

TOP > Available Issues > Table of Contents > Abstract

Cited
JST Link Center

[PDF (721K)] [References]

Predicting the Protein Content of Grain in Winter Wheat with Meteorological and Genotypic Factors

Jie Pan[1], Yan Zhu[1], Weixing Cao[1], Tingbo Dai[1] and Dong Jiang[1]

1) Hi-Tech Key Lab of Information Agriculture of Jiangsu Province, Nanjing Agricultural University

Abstract: Meteorological conditions including temperature, sunshine and precipitation during grain growth are the primary factors determining the variation of the protein content of grain (PC) in wheat. On the basis of field experiments, a simplified regression model was developed for predicting the PC in winter wheat. From stepwise regression analysis, it was found that the PC of high-protein cultivars was correlated with the difference between daily maximum and minimum temperatures (ΔT) when ΔT variation under the environment was significant, but with the interaction of mean temperature (Tmean) $\times$ total sunshine hours from anthesis to maturity (TSUN) under the environment with ΔT variation less than 5%. In medium-protein cultivars, the PC was correlated with TSUN, and in low-protein cultivars, with the combination of Tmean, total rainfall from anthesis to maturity (TR) and TSUN. The climatic factors influencing PC were further quantified incorporating five genetic parameters. The ΔT and TSUN were linearly correlated with PC, and Tmean was quadratically correlated with PC. The precipitation was linearly correlated with PC if it was less than 50mm, otherwise quadratically. The average root mean square error (RMSE) values of the estimated PC relative to the observed value were less than 7 percent, indicating a good fit between the estimated and observed PC. Thus, it is concluded that the present model can predict the PC of different winter wheat cultivars under various climate environments.

To cite this article:

Jie Pan, Yan Zhu, Weixing Cao, Tingbo Dai and Dong Jiang: "Predicting the Protein Content of Grain in Winter Wheat with Meteorological and Genotypic Factors". Plant Production Science, Vol. **9**, pp.323-333 (2006) .