



Calibration and Validation of CERES-Wheat (DSSAT v4.6) Model for Wheat under Irrigated Conditions: Model Evaluation and Application

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Abstract: In this study, a manual method was applied to calibrate and validate CERES-Wheat (DSSAT v4.6) for the flowering day, maturity day, leaf area index and grain yield of Rabi wheat (cv. HD2733) using the experimental data of 7 years (2008-2014) with sowing date range between 18-23 November. The model was validated with independent data sets of 2012-13 and 2013-2014 of cropping seasons which were not used for models calibration. The model simulations were acceptable for calibration as well as validation period, as the model evaluation indicators showed R^2 within the range of 0.60 to 0.73, RMSE between 1.25 to 218, MAE (1 to 194), D -index (0.77 to 0.88) and percent error (0.79 to 8.50) against observed and simulated phenology and grain yield of wheat. Evaluation with the measured data showed that performance of model was realistic as indicated by the accurate simulation of crop phenology, LAI and grain yield against measured data. Climate variability results depicted that short exposure of crop to extreme temperature from 5 to 7°C resulted in significant reduction in days to anthesis, physiological maturity and 29% average decline in yield of wheat. It was concluded that, to bring accuracy in the simulation outcomes of models, new cultivars should be calibrated to minimize uncertainty to allow judicious recommendations in response to climate variability.

Keywords: CERES-Wheat model, Calibration & validation, Climate variability, Wheat
