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Evaluation and application of DSSAT- Rice model to irrigated ecosystem

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An agricultural region can be considered as a collection of individual fields that vary in environmental conditions and management practices. Similarly, the impacts of any potential changes whether they are intended (such as reductions in fertilizer use) or unintended (such as climate changes) will be variable across a region. Influence of soil, water and climatic variables on rice productivity can be effectively estimated through different crop models. Greater use of crop simulation models has also been being suggested to increase the efficiency of different trials. Decision Support System for Advanced Technology Transfer (DSSAT) is relatively new model applying to Indian farming conditions. A field experiment conducted at Directorate of Rice Research, Hyderabad (17°322 N, 78°382 E) during 2006 was used for evaluation of this model. This experiment was laid out in randomized block design (RBD) with 2 rice varieties viz., BPT 5204 (long duration) and Ajaya (Medium duration) at 3 nitrogen (0, 100 and 200 kg/ha) levels and 3 replications. Genetic coefficients for these 2 varieties were calculated independently and used for executing this model. Crop growing dates and management data were entered into DSSAT model files and model was executed at 0,100 and 200 (kg/ha) nitrogen levels. Results of this model include days to panicle initiation, days to flowering and days to maturity and grain yield. DSSAT model performed well at 3 nitrogen levels and at 200 nitrogen level, percentage differences with observed values were below 10 (AJAYA-1% & BPT 5204-9%). Performance of this model was also assessed by statistical analysis (R^2, D-index and NOF). DSSAT model can be effectively used for simulating rice growth and development and to assist in management decisions under irrigated ecosystem in India.

Biography

B. Sailaja has completed her Ph.D. from Birla Institute of Technology, Mesra, Ranchi, India and has been working as Scientist in Computer Applications in Agriculture with Directorate of Rice Research (ICAR). She has 14 years experience in applying information technology tools to Rice Research in India. She has developed information systems, expert system and decision support system by integrating spatial technologies and crop models for rice management.

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