Improvement and Application of Weather Generators for Agricultural Modelling

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In the paper, evaluation and application of WGEN and SIMMETEO procedure generating daily values of solar radiation, maximum and minimum temperature, and total precipitation is presented. Weather generators were examined for seven stations of Ontario Environment Canada by comparing observed and generated means, variances and correlations in different time period as annual, vegetative period (March – October), bimonthly and monthly. Evaluation of methods showed low errors for means and variance of generated data, and not acceptable errors for lag, cross and cross-lag correlations. Simple modification of methods was applied, in which taking the climatology of region and annual course of correlations into consideration by introducing monthly values. Above simple modification reduced absolute errors to about 30% (WGEN) and 50% (SIMMETEO); new correlations were statistically examined (at 0.05 level) and accepted in 98% and 90% for WGEN and SIMMETEO respectively, for all 6,048 computed tests. In the paper also the problem of estimation of solar radiation for the needs of crop models is presented. The aim of this study was to determine the accuracy and applicability of a number of existing and newly developed formulae for calculating solar radiation from other weather variables.

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