

Application of crop model STICs in the Central European conditions – evaluation and climate change impact estimates.

M. Trnka (1), Françoise Ruget (2), Petr Hlavinka (1), Marie Launay (2), J. Eitzinger (3), Zdeněk Žalud (1), Elmar Steinitzer (4)

(1) Institute for Agrosystems and Bioclimatology, Mendel University of Agriculture and Forestry Brno, Czech Republic, mirek_trnka@yahoo.com

(2) French National Institute for Agricultural Research, INRA CSE, Avignon, France

(3) Institute for Meteorology, University of Natural Resources and Applied Life Sciences (BOKU), Vienna, Austria

(4) Institut für Kulturtechnik und Bodenwasserhaushalt, Petzenkirchen, Austria

Crop growth models have become indispensable tools of agrometeorological and plant production research during past forty years. Out of the wide range of available tools CERES, WOFOST, LINTUL, EPIC, MACROS, SWAP, STICs and APSIM belong to the most used and know. Even though the basic philosophy of all models remains the same they differ in number of key modules as well as design. It is also the case of crop model STICs that has been built with an intension of flexible architecture allowing easy incorporation of new crop species and model functionalities. Other specific feature of the model is its consistency and transparency as the required inputs are almost exclusively in form of directly „measurable“ parameters without use of unit less semi-empirical coefficients. The presented study focuses on the model testing under the environmental conditions of Central Europe and its performance is being compared with other modeling tools that are presently used in the region. The main aim is to examine model capability to capture interannual variability of winter wheat, spring barley and grassland yields over range of sites with varying climatic and soil conditions. In case of winter wheat and spring barley models, the database includes field experiments at 5 representative sites (n=60). The stations are spread over the whole altitudinal gradient within which the crops are grown in Central Europe i.e.(100-700 m a.s.l.). Grassland data originate from Austrian permanent meadow experiments and include long-term (40 years) trials at Gumpenstein experimental station (700 m a.s.l.) as well as and 3 year experiments at 8 sites at various environmental settings (from 265 – 1025 m a.s.l.). In addition the results of the STICs model will be compared with those attained by CERES-Wheat, CERES-Barley and GRAM (grasslands) models using the same datasets. Besides the comparison of model results with those obtained from field experiments the model will be used to assess impact of expected climatic change on winter wheat yields at selected sites. By comparing these results with those of CERES

and GRAM notion of uncertainty in the impact assessment estimates caused by crop model will be estimated.

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