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Figures at the end of the issue.

BOOK REVIEW

BIKHELE, Z. N., MOLDAU, KH. A., ROSS, YU. K.: MATEMATICHESKOE MODELIROVANIE TRANSPIRATSII I FOTOSINTEZA RASTENII PRI NEDOSTATKE POCHVENNOI VLAGI. [MATHEMATICAL MODELING OF TRANSPIRATION AND PHOTOSYNTHESIS IN PLANTS AFFECTED BY SOIL MOISTURE STRESS.] — Gidrometeoizdat, Leningrad 1980. 223 pp., 2 Rbl., in Russian with English Summary.

Mathematical modelling, relying on the use of high-speed computers, has been developed to provide a comprehensive quantitative description of the behaviour of dynamic systems. In this monograph the simulation techniques are applied to the analysis of the effects of meteorological factors on the processes influencing plant production and efficiency of water utilization. In the first chapter the authors critically evaluated basic concepts and formulae concerning the energy and mass exchange between the plant and environment and review models of the production process. The second chapter describes the mathematical model of transpiration and photosynthesis. It is very important to study these processes also under conditions of water stress because in the existing production models the influence of water deficit is often neglected. Special attention is paid to stomatal regulation. The model includes about 30 parameters, their values being derived from authors' own experiments or from data available in the literature. The model plant has evenly illuminated non-growing leaves and non-growing roots evenly distributed in the soil. Calculations obtained with the use of this model allow the authors to predict the dependence of leaf water potential, stomatal resistance, transpiration rate, photosynthetic rate, transpiration coefficient and productivity on soil moisture, air humidity, temperature, wind speed and photon fluence rate (Chapter 3), or the daily and seasonal courses of leaf water potential, stomatal resistance, transpiration rate, photosynthetic rate and heat balance components under various real meteorological conditions (Chapter 4). In the fifth chapter the authors analyse the choice of parameters and results of calculations and propose possibilities of the further improvements of such models.

The book is addressed to all research workers in agrometeorology, ecology, plant physiology, agriculture, forestry, etc. who are rather interested in a theoretically based than completely empirical approach to the research.

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