Effect of soil moisture on evapotranspiration of a maize stand during one growing season

F. Matejka, T. Hurtalová
Geophysical Institute of the Slovak Academy of Sciences[1]

J. Rožnovský
Department of Agrosystems and Bioclimatology, Mendel University[2]

B. Chalupníková
Czech Hydrometeorological Institute[3]

A b s t r a c t : The cumulative evapotranspiration of a maize stand was determined during the growing season over the period of 148 days from planting to the stage of the full ripeness. The total evapotranspiration in this time interval was 276.4 mm while the amount of precipitation reached in the analysed period 295.4 mm. The transpiration and soil evaporation daily courses were calculated using a verified mathematical model of interrelationships existing within the system soil-plants-atmosphere. In the vegetation period 2000 the investigated maize stand transpirated under changing environmental conditions. It was found that the soil water availability practically did not affect the evapotranspiration when at least 58.2% of extractable soil water was present in the root zone, but below this value, the evapotranspiration decreased linearly with the decrease in the soil water content. During the analysed period, the reduction of evapotranspiration caused by shortage of soil water has been partially compensated by the high evaporative demands of the air, so that the daily totals of evapotranspiration remained relatively high.

Key words: maize, soil moisture, evapotranspiration, atmospheric factors

[1] Dúbravská cesta 9, 845 28 Bratislava, Slovak Republic
e-mail: geofmate@savba.sk, geoftahu@savba.sk
[2] Zemědělská 1, 613 00 Brno, Czech Republic; e-mail: roznovsky@chmi.cz
[3] Kroftova 43, 616 67 Brno, Czech Republic; e-mail: chalupnikova@chmi.cz