

Water Dynamics in Plant Production, 2nd Edition

Questions and Discussion Points

Chapter 8 – The Plant as a Link between Soil and Atmosphere: an Overview

Section 8.1

1. Explain the resistances (Fig. 8.1) according to the mechanism of water movement in the soil–plant–atmosphere continuum, the SPAC.

Section 8.2

1. Present the original definition of ‘potential evapotranspiration’ with the formulation given by Penman.
2. Why is the potential evapotranspiration normally slightly greater than the potential evaporation?
3. Please explain the term saturation deficit (SD) of water vapour in the air.
4. Determine the SD at an air temperature of 22°C and at a relative humidity of 65%.
5. Instead of potential evapotranspiration (ET_p) in more recent times the ‘reference crop evapotranspiration rate’ (ET_o) has been proposed. It is calculated by use of the FAO Penman–Monteith equation. Why was this proposed and what are the advantages? For what purpose is the equation necessary and in widespread use?

Section 8.3

1. Why does the soil water tension, critical for water uptake and transpiration, depend on ET_p , as shown for maize in a pot experiment? What is cause and effect?
2. In sandy soils, water supply can be problematic (Fig. 8.8). What are the reasons for this susceptibility?