

Water Dynamics in Plant Production, 2nd Edition

Questions and Discussion Points

Chapter 14 – Water Stress in Plants

Section 14.1

1. A reliable field method for the determination of the plant water potential is to apply the pressure apparatus. Explain the steps of measurement and explain what kind of potential is characterized.
2. At which time of the day is plant water potential usually at its lowest? Why is that the case?
3. When plant water potential is used to indicate the status of extractable soil water, at what time of day is the approximation best?
4. Explain the principle of a steady state porometer. For which purposes is it used?
5. Plant water stress can be indicated by measuring leaf temperature. Explain the principle.
6. Temperature depression is related to another climatic variable. Explain the principle of determining the crop water stress index (CWSI).

Section 14.2

1. Low plant water potential may be a sign of high transpiration rate, but also a sign of water stress. Please outline the general background of this conflicting outcome.
2. Explain the split-root technique.
3. Using this technique, two special experimental approaches were employed to establish that the sensor of water shortage and the signal transmitter were localized within the root of apple trees and not within the shoot. Explain the details and the arguments.

Box 14.1

1. Roots can respond to soil drying and compaction in similar way. Please explain the background.
2. Please explain the role of phytohormones in controlling the root:shoot ratio.
3. Hydraulic and chemical signals cooperate in controlling water movement and water balance within the plant. What is the benefit to the plant?