Water Dynamics in Plant Production, 2nd Edition

Multiple Choice Questions

Chapter 14 – Water Stress in Plants

1. The Scholander pressure chamber has been widely used to measure the total water potential of plant leaves.
(i) A record of leaf water potential in the early afternoon can indicate:
  (a) the time of peak resistance to water movement through the leaf
  (b) the time of peak radiation
  (c) the level of water stress experienced by the plant
  (d) the availability of soil water
(ii) A record of leaf water potential just before sunrise can indicate:
  (a) availability of soil water
  (b) leaf ageing
  (c) root pressure
  (d) none of the above

2. Which of the following can be used as an indicator of water stress?
(a) relative water content
(b) stomatal conductance
(c) leaf temperature
(d) all of the above
(e) none of the above

3. There is significant evidence that roots can sense declining water availability in the soil. Which of the following are possible mechanisms underlying the sensing?
(a) A reduction in soil water results in an increase in the osmotic potential within root cells.
(b) When roots experience a decline in available soil water they also experience an increase in the mechanical impedance to elongation.
(c) When roots experience a decline in available soil water, they also experience greater resistance to nutrient transport in the soil.
(d) All of the above.
(e) None of the above.

4. The hydraulic and chemical signalling of water shortage are considered to be linked through which of the following? (There may be more than one correct answer.)
(a) abscisic acid
(b) guard cell turgor
(c) cytokinins
(d) aquaporins
(e) all of the above
(f) none of the above

5. Control of leaf water potential through hydraulic signals involves a number of processes. Which of the following processes are involved? (There may be more than one correct answer.)
(a) Shoot total water potential declines.
(b) Potassium ions move out of the guard cells into subsidiary cells (monocots) or the apoplast (dicots).
(c) Stomatal guard cells loose turgor because of water loss.
(d) Stomatal pores close.