

# Water Dynamics in Plant Production, 2nd Edition

## Questions and Discussion Points

### Chapter 6 – The Root – the Plant’s Organ for Water Uptake

#### Section 6.1

1. Nutrient uptake by roots requires ion transport directed from bulk soil towards the root surface. Which are the two contrasting processes causing nutrient transport and which are the forces driving the transport?
2. Please give a short description of mucilage, mucigel and rhizosphere and indicate their significance for water and nutrient availability to plants.
3. What is a mycorrhiza?

#### Section 6.2

1. Describe the structure and function of the various zones of the root tip.
2. What is the special feature of the endodermis containing the Casparian strip?
3. In contrast to the shoot, vascular tissue in the root is arranged in sections radiating from the centre of the stele. Name the two forms of vascular tissue and contrast their functions.

#### Box 6.1

1. Give an account of the four basic methods of studying root systems.

#### Section 6.3

1. Please describe the two major types of root system.
2. Explain how a root system develops.
3. List some crop plants according to increasing rooting depth.
4. Give a rough estimate of the ‘speed’ of cereal root growth to depth.
5. The basic process enabling root growth is the inflow of water into the cells of the root tissue. Basically, pressure exerted by the growing root tip has to overcome the counter pressure from two sources. What are those sources?
6. Describe the rooting of oat and faba bean over the growing season (Fig. 6.4) by exploring the change of rooting depth and root length density with time.