

Water Dynamics in Plant Production, 2nd Edition WWW.cobion

**Questions and Discussion Points** 

## Chapter 10 – Radiation and Dry Matter Production

## Section 10.1

1. Please explain the term 'photosynthetically active radiation' (PAR).

2. Explain CO<sub>2</sub> exchange rate (CER). It is the result of which physiological processes?

**3.** Sketch out the light response curves for a  $C_3$  and a  $C_4$  crop. Where is the light compensation point? Are there differences in light saturation between the crops?

**4.** Is the efficiency of radiation use greater for net  $CO_2$  fixation at a lower or a higher radiation level?

5. What is photorespiration of C<sub>3</sub> plants? Why does it not exist in C<sub>4</sub> plants?

## Section 10.2

**1.** Radiation interception of a crop stand increases with leaf area index (LAI). What causes the difference in interception when comparing soybean and maize (Fig. 10.2)? **2.** Discuss the effect of leaf inclination on radiation use for  $CO_2$  fixation, when radiation changes from a low to a high level.

**3.** Discuss the effect of leaf inclination on soil evaporation, weed control and transpiration.

**4.** Show the connection between LAI and net assimilation rate (NAR). Why then does crop growth rate (CGR) increase, when with increasing LAI the NAR declines?

**5.** When conditions for water and nutrient uptake are not growth limiting, a crop usually experiences a linear phase of dry matter increase per unit of time (Fig. 10.4). Please explain the connections that give rise to the linear phase.

6. What is 'radiation use efficiency'?

