Water Dynamics in Plant Production, 2nd Edition

Questions and Discussion Points

Chapter 13 – Development of Economic Yield under Inadequate Water Supply

Section 13.1

1. Water deficit within the plant tissue during the day is caused by an imbalance. What processes are responsible for this imbalance?
2. How would you define water stress? In this context, what is the stressor?
3. Which process is very important for grain filling in cereals but is not highly susceptible to water stress?
4. Describe and explain the anatomical changes in capsicum plants, when water supply is short by use of limited drip irrigation (Fig. 13.2).
5. Please comment on the effect of prolonged water shortage on root mass and on rooting depth.

Section 13.2

1. In dryland farming, dry matter yield and grain yield can vary considerably between years (Fig. 13.4). Explain the general relation between dry matter and grain yield and try to explain the variability of the data.

Section 13.3

1. Present some reasons why plants with indeterminate growth can compensate more flexibly for the negative effects of temporary water shortage on biologic and economic yield compared with plants with determinate growth habit.
2. Summarize the effect of water shortage experienced by plants with determinate growth in periods before and after anthesis on sources and sinks and economic yield.
3. Describe the effect of water stress experienced at different growth stages on seed yield and yield components of soybean (Fig. 13.8). Present an example of compensatory growth. Explain why water stress near the end of bean filling influenced seed yield decidedly negatively.
4. A particular faba bean cultivar is known to react negatively in terms of seed yield, when soil water content is at a high level during flowering (Fig. 13.9). Please explain the special feature of this cultivar.

Section 13.4

1. Explain the meaning of water use efficiency (WUE), grain (economic) water use efficiency (WUE_G) and grain transpiration efficiency (TE_G).
2. Classify crops presented in Table 13.1 according to the mode of CO_2 assimilation, to winter and summer annuals, and finally to the type of reserve material stored in grain.