

AS Level Biology B
H022/01 Foundations of biology

Question Set 11

1 In addition to stomata, seedlings of trees such as the red maple, *Acer rubrum*, develop lenticels in their stems as they grow.

(a) Explain why tree seedlings need to develop lenticels in addition to stomata as they grow. [2]

(b) Flooded or waterlogged soils can affect the development of lenticels in *A. rubrum* seedlings.

The effect of waterlogged soils on lenticel development was investigated *in situ* on a sloping hillside as shown in Fig. 1.1.

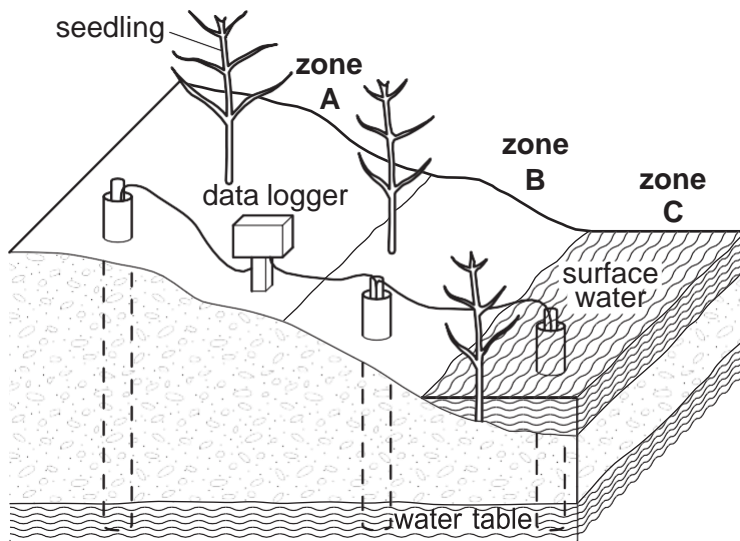


Fig. 1.1

Three zones were established:

- **Zone A** (upland) dry soil. Seedlings would only receive water when it rained
- **Zone B** (saturated) wet soil. Roots of the seedlings would always be in contact with water
- **Zone C** (wetland) water-logged soil with surface water always present at a depth of at least 5 cm. Both stems and roots of seedlings would always be in contact with water.

(i) The level of the water table shown in Fig. 1.1 was monitored throughout the investigation.

Suggest why.

[1]

(ii) Suggest one advantage **and** one disadvantage of carrying out this investigation *in situ* rather than in a laboratory.

advantage

disadvantage [2]

- (c) There were 100 seedlings in each zone and the number of lenticels on the stem of each seedling was counted over a period of 13 weeks.

Fig. 1.2 shows the results of the investigation.

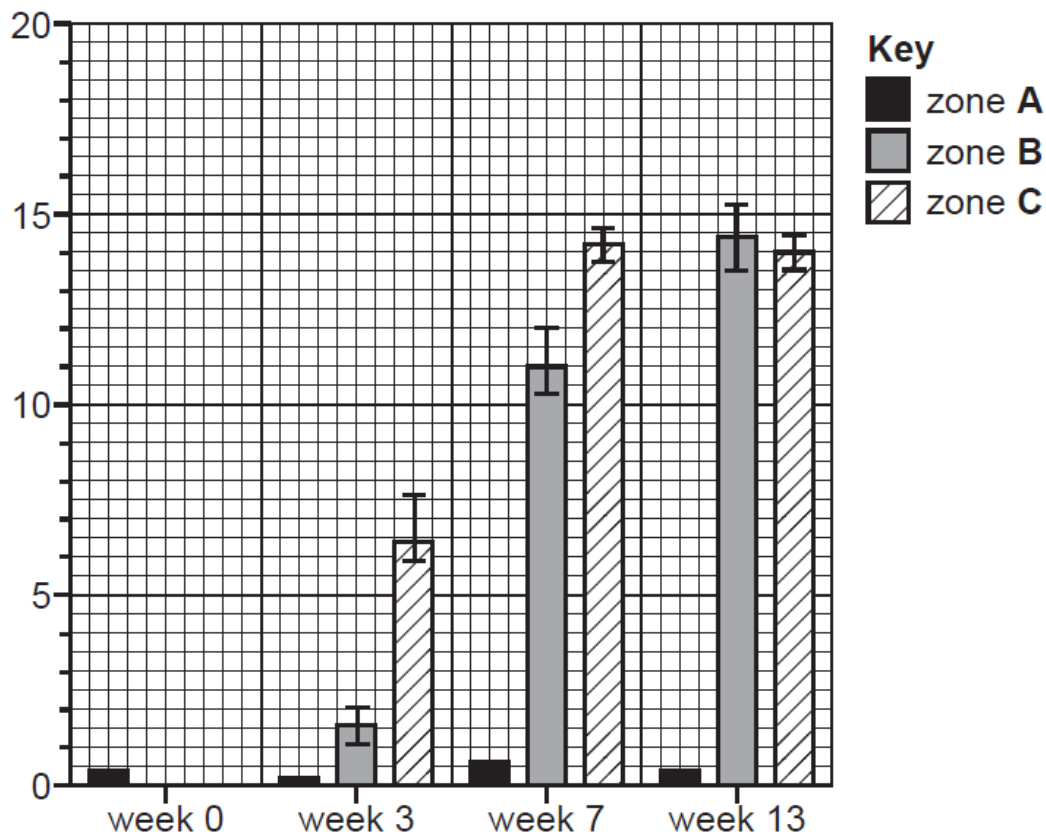


Fig. 1.2

- (i) What would be a suitable label for the y-axis of the bar chart shown in Fig. 1.2? [1]
- (ii) Using Fig. 1.2, what can you conclude about the results for zones B and C over the period of the investigation? [2]
- (d) After 13 weeks it was noticed that the seedlings in zone C developed an increase in thickness of the stem (stem hypertrophy) caused by enlargement of cells in the cortex of the stem.
- (i) Apart from enlargement of cells, name **one** other process that would result in an increase in the thickness of the seedling stem. [1]
- (ii) Suggest why the roots of *A. rubrum* seedlings in zone C had reduced uptake of nutrients during the investigation. [2]

Total Marks for Question Set: 11



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