

A Level Biology A
H420/02 Biological Diversity

Question Set 3

1

The potato plant, *Solanum tuberosum*, is a staple food plant in many parts of the world.

Potatoes are susceptible to infection by a pathogen called *Phytophthora infestans*, which causes a disease known as potato late blight. The most visible sign of the disease is a brown discolouration of the leaves.

Some varieties of potato are resistant to infection by *P. infestans*.

(a) State **two** ways in which an individual *S. tuberosum* plant could respond to infection by *P. infestans*.

[2]

(b) The resistance of different varieties of *S. tuberosum* to infection by *P. infestans* was investigated.

- Three different clones, A, B and C, of *S. tuberosum* were used.
- The clones were grown in adjacent fields over the same time period.
- The percentage of leaf area affected by the disease was estimated at regular intervals.

The results are shown in Fig. 18.

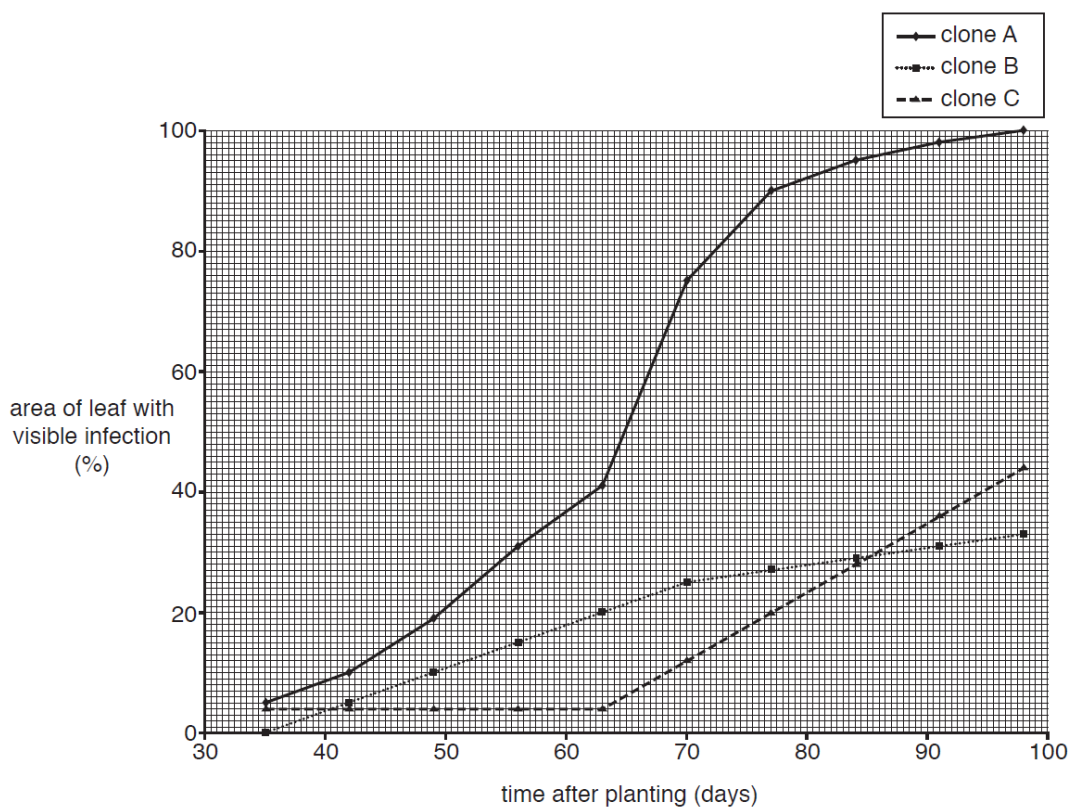


Fig. 18

(i) Suggest why it is important to use clones in an investigation such as this.

[2]

- (ii) State how a clone of potatoes could be produced for this investigation and explain why it is important to carry out this procedure under aseptic conditions.

procedure

asepsis is important because [2]

- (iii) The extent of infection is estimated by comparing the area under the curve from the graph. The area under the curve for clone **B** is 1250. (Units can be ignored in this instance.)

Using Fig. 18, calculate the approximate area under the curve, between day 35 and day 98, for clone **C**.

Answer..... [3]

- (iv) Calculate the area under the curve for clone **C** as a proportion of the area under the curve for clone **B**.

Answer..... [1]

- (v) **Using Fig. 18**, suggest why the area under the curve is used as a measure of infection rather than the area of leaf that is visibly affected on a given day.

[2]

- (vi) The clones were planted in adjacent fields in order to control variables such as temperature, wind speed and rainfall.

Suggest two other abiotic variables that this precaution was intended to control.

[2]

Total Marks for Question Set 3: 14

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