

GCSE Biology

Worksheet: Detection and identification of plant diseases

TIME 20 min	TOTAL 19 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Detection and identification of plant diseases

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

Plants need mineral ions from the soil to grow well.

0 1 . 1

Explain why a plant growing in soil that lacks nitrate ions has stunted growth.

[3 marks]

0 1 . 2

Explain why a plant growing in soil that lacks magnesium ions grows slowly.

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[3 marks]

0 1 . 3

Suggest how a gardener could treat plants that lack nitrate ions.

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[1 mark]

0 2

Aphids are small insects that feed on plant sap. They push their mouthparts into the phloem of stems and leaves.

0 2 . 1

Suggest why plants with large numbers of aphids grow slowly.

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[2 marks]

0 2 . 2

Aphids can carry viruses from one plant to another.
Explain how aphids could spread a viral disease through a crop.

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[2 marks]

0 2 . 3

Give **one** way a gardener could detect an aphid infestation.

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[1 mark]

0 2 . 4

Ladybirds eat aphids.
Suggest **one** advantage of using ladybirds rather than an insecticide to control aphids.

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[1 mark]

0 3

Table 1 shows the concentration of two mineral ions in soil samples from three fields, and the symptoms observed in the crop growing in each field.

Table 1

Field	Nitrate ion concentration in mg/dm ³	Magnesium ion concentration in mg/dm ³	Symptoms observed
1	85	40	none
2	12	38	stunted growth
3	80	6	yellow leaves

0 3 . 1

Identify the mineral ion deficiency most likely to explain the symptoms in field 2 and in field 3.

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[2 marks]

0 3 . 2

Calculate the percentage by which the nitrate ion concentration in field 2 is lower than in field 1.

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Percentage = %

[2 marks]

0 3 . 3

Suggest a treatment that would improve growth in field 2, and explain how it would help.

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[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Biology · Worksheet: Detection and identification of plant diseases · 19 marks

Question 1 (7 marks)

01.1 [3 marks]

- nitrate ions are needed to make amino acids / proteins (1)
 - proteins are needed for growth / to make new cells / enzymes (1)
 - (so) less protein is made and the plant grows less (1)
-

01.2 [3 marks]

- magnesium ions are needed to make chlorophyll (1)
 - (so) less chlorophyll / leaves turn yellow (chlorosis) (1)
 - (so) less light is absorbed / less photosynthesis, so less glucose for growth (1)
-

01.3 [1 mark]

- add a fertiliser containing nitrates (to the soil) (1)
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Question 2 (6 marks)

02.1 [2 marks]

- aphids remove sugars / sap from the phloem (1)
- (so) less sugar reaches the growing parts of the plant for respiration / growth (1)

02.2 [2 marks]

- an aphid feeding on an infected plant takes in the virus (with the sap) (1)
- (when it) moves to / feeds on another plant it passes the virus into that plant (1)

02.3 [1 mark]

- look for the insects on the stems / undersides of leaves (1)

Notes: Allow 'curled / distorted leaves' or 'stunted growth'.

02.4 [1 mark]

- ladybirds do not harm other useful insects, e.g. bees (1)
- no chemicals are left on the crop / in the environment (1)
- the aphids will not become resistant (1)
- ladybirds breed, so control continues (1)

Any 1 of the points above.

Question 3 (6 marks)

03.1 [2 marks]

- field 2: nitrate ion deficiency (1)
- field 3: magnesium ion deficiency (1)

03.2 [2 marks]

Answer: 85.9%

- $(85 - 12) \div 85 \times 100$ (1)
- 85.9 (%) (1)

03.3 [2 marks]

- add a fertiliser containing nitrate ions (1)
 - nitrate ions are needed to make amino acids and proteins for growth (1)
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