Fungal diseases

4.3.1.4 · Infection and response · revision notes

Rose black spot is the fungal disease in the specification. You need to know what it looks like, how it spreads, why it reduces the plant's growth and how it is treated.

Key facts

- Rose black spot = fungal disease of roses
- Spread: by water or wind
- Treatment: fungicides and/or remove and destroy affected leaves
- Symptoms: purple or black spots on leaves; leaves turn yellow and drop early
- Effect: less photosynthesis → less growth
- Fungicide = chemical that kills fungi

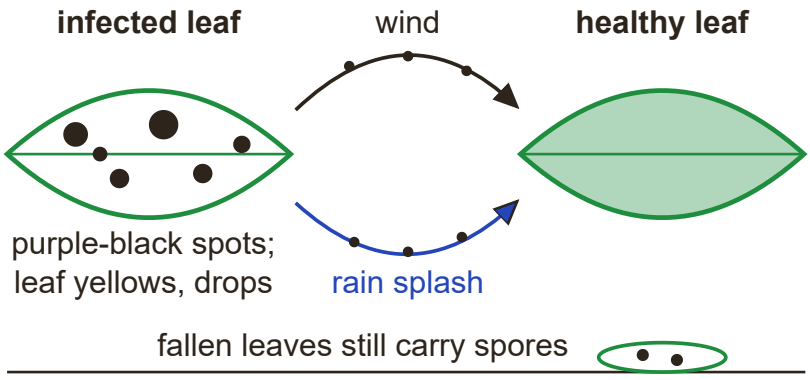
Notes

What rose black spot is

- A disease of roses caused by a **fungus**.
- Symptoms: **purple or black spots** develop on the leaves. The leaves often **turn yellow** and **drop early**.

How it spreads

- The fungus produces spores, which are spread in the environment by **water** (e.g. rain splashing from leaf to leaf) or by **wind**.
- Spores that land on the leaves of a healthy rose can infect it.
- The fungus can survive on fallen leaves, so fallen leaves can be a source of new infections.



Spores spread in wind and rain splashes; fallen leaves are a source of new infections.

Why it reduces growth

- The spotted and yellow parts of the leaves have less chlorophyll, and leaves that have fallen off cannot photosynthesise at all.
- So the plant carries out less **photosynthesis**, makes less glucose and **grows less**.

Treatment

- Spray the plant with **fungicides** (chemicals that kill fungi).
- **Remove and destroy** the affected leaves, including any that have fallen, so the fungus cannot spread to other leaves or plants.
- Gardeners often use both methods together.
- Antibiotics do not treat fungal diseases: they kill bacteria, not fungi.

How to answer each type of question

Recall: pathogen type, symptoms and spread 1 to 3 marks **Grade 4**

1. Name the pathogen type: a fungus.
2. Use the exact symptom words: purple or black spots, leaves turn yellow, leaves drop early.
3. For spread, give water and wind.

Example. Rose black spot is a disease of rose plants.
(a) What type of pathogen causes rose black spot?
(b) Describe how rose black spot is spread from one plant to another.

Model answer.

(a) A fungus (1)

(b) By water, e.g. rain splashing spores onto other leaves (1); by the wind carrying spores to other plants (1)

Describe and explain treatments 2 to 4 marks **Grade 5**

1. Give the two treatments: fungicide and removing and destroying affected leaves.
2. Explain each: the fungicide kills the fungus; destroying leaves stops the fungus spreading.

Example. Give **two** ways a gardener could treat roses with black spot. Explain how each way helps.

Model answer. Spray the roses with a fungicide (1), which kills the fungus (1). Remove and destroy the affected leaves (1), so the fungus cannot spread from them to healthy leaves (1).

Explain why growth is reduced

3 marks | Grade 6

1. Start with the symptoms: spots, yellow leaves, leaves falling off.
2. Link to less photosynthesis.
3. Finish with less glucose for growth.

Example. A gardener noticed that roses with black spot grew fewer new shoots than healthy roses. Explain why.

Model answer. The leaves have black spots, turn yellow and fall off early (1). So there is less photosynthesis (1). So the plant makes less glucose, which it needs for respiration and to make new cells for growth (1).

Data: testing a treatment

2 to 3 marks | Grade 7

1. Percentage = number affected ÷ total × 100.
2. Compare the treated and untreated groups.
3. For 'suggest why', think about how the fungus could still reach or survive on the leaves.

Example. A gardener sprayed 40 rose plants with a fungicide and left 40 plants unsprayed. The table shows how many plants in each group later had black spot.

Group	Number of plants	Number with black spot
Sprayed with fungicide	40	12
Not sprayed	40	33

(a) Calculate the percentage of plants in each group that had black spot.
(b) Suggest **one** reason why some sprayed plants still had black spot.

Model answer.

(a) Sprayed: 12 ÷ 40 × 100 = 30% (1); unsprayed: 33 ÷ 40 × 100 = 82.5% (1)

(b) Any one from: rain washed off the fungicide; not every leaf was covered; spores kept arriving from unsprayed plants nearby (1)

Don’t lose marks

- Saying black spot is caused by a virus or a bacterium. It is caused by a fungus.
- Suggesting antibiotics or 'medicine' as a treatment. Use fungicides.
- Writing 'remove the leaves' without 'destroy'. Leaves left lying on the ground can still spread the fungus.
- Writing 'it stops photosynthesis'. It reduces photosynthesis.

More tips

Memory tricks

- The name tells you the symptom: black spots on the leaves, which then turn yellow and fall off.
- Fungi → fungicides; bacteria → antibiotics. Match the chemical to the pathogen.
- Any plant disease that damages leaves: fewer or less green leaves → less photosynthesis → less glucose → less growth.

Exam technique

- Use the precise symptom words: purple or black spots, leaves turn yellow, leaves drop early.
- For 'explain why growth is reduced', always link to photosynthesis and glucose.
- If a question gives a fungal disease you have not met, apply the same ideas: spread by water or wind, treated with fungicides and by removing infected parts.

What each grade needs

What you need to be able to do, from the first marks up to the top grade.

Grade 3

Name a fungal disease of plants

Rose black spot is a fungal disease of roses.

Grade 4

Describe the symptoms of rose black spot

Purple or black spots develop on the leaves, which often turn yellow and drop early.

Grade 4

State how rose black spot is spread

It is spread in the environment by water (e.g. splashing rain) or by wind.

Grade 5

Describe how rose black spot is treated

Use fungicides and/or remove and destroy the affected leaves.

Grade 5

Explain why infected leaves must be destroyed

Infected leaves, including fallen ones, still carry the fungus, which can spread to healthy leaves by water or wind.

Grade 6

Explain why black spot reduces growth

Spotted, yellow and fallen leaves mean less photosynthesis, so less glucose is made for growth.

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