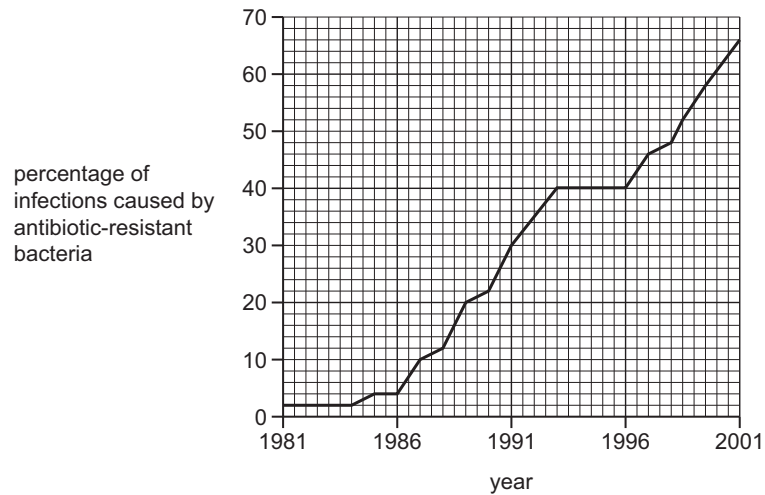


- 22 The graph shows the change in the percentage of infections caused by antibiotic-resistant bacteria in one country.



Which statements could explain the change in the percentage of infections caused by antibiotic-resistant bacteria?

- 1 The use of antibiotics has resulted in natural selection for resistant bacteria.
- 2 The use of antibiotics has caused a decrease in viral diseases.
- 3 The use of antibiotics when **not** essential increased the percentage of antibiotic-resistant infections.

A 1 and 2 **B** 1 and 3 **C** 2 and 3 **D** 3 only

- 30 What is a source of genetic variation that alters the base sequence of DNA?

- A** gene mutation
B mitosis
C random fertilisation
D random mating

- 34 What are features of hydrophytes which have leaves that float?

- A** long root system
B many stomata on upper surface of leaves
C hairy leaves
D small air spaces in the spongy mesophyll

- 34 Which term is used to describe a characteristic that helps an organism to survive and reproduce in its environment?

- A** adaptive feature
B competition
C observable feature
D phenotype

- 5 (a) Discuss the advantages of intensive livestock production.

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..... [3]

- (b) One disadvantage of intensive livestock production is that antibiotics are often used.

Suggest why antibiotics are needed in intensive livestock production.

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..... [2]

- (c) Fig. 5.1 shows the changes in antibiotic use in livestock production in seven countries between 2010 and 2016.

The suggested limit for antibiotic use in livestock is 50 mg per kg of livestock.

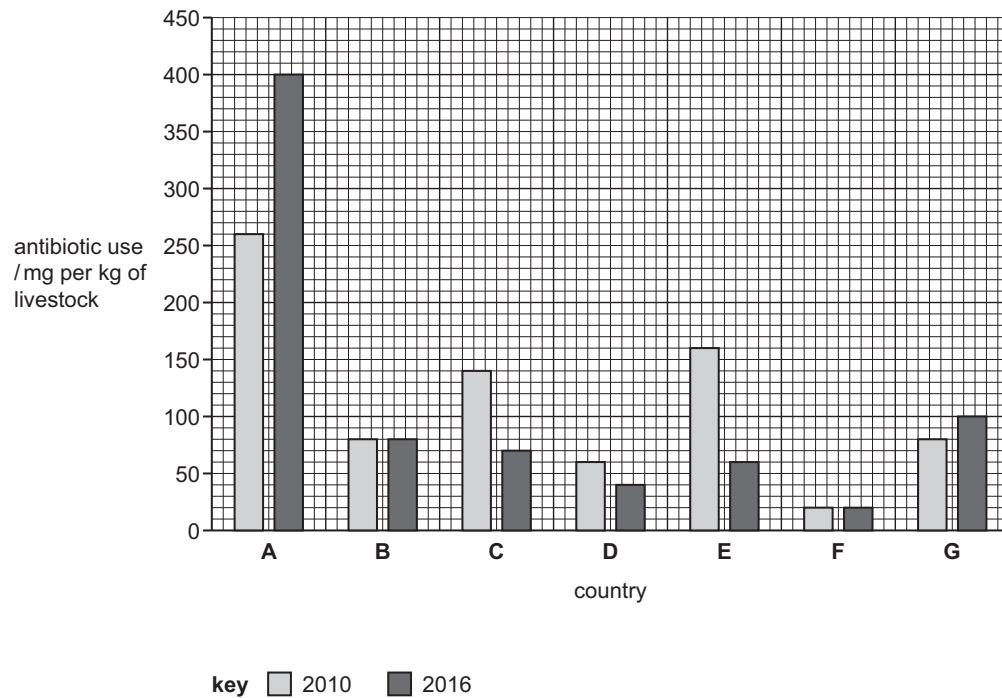


Fig. 5.1

- (i) State the letters of the countries in Fig. 5.1 that used less than the suggested limit of 50 mg of antibiotics per kg of livestock in 2016.

[1]

- (ii) Calculate the percentage increase in antibiotic use in country A in Fig. 5.1 between 2010 and 2016.

Give your answer to **two** significant figures.

Space for working.

- (iii) Explain the development of antibiotic resistance in bacteria.

[4]

[Total: 13]

3 (a) Describe the pathway a water molecule takes from the soil to reach the xylem.

[2]

(b) A student investigated the effect of temperature on transpiration.

The student collected four small plants and placed them in beakers filled with water.

Fig. 3.1 shows the apparatus used.

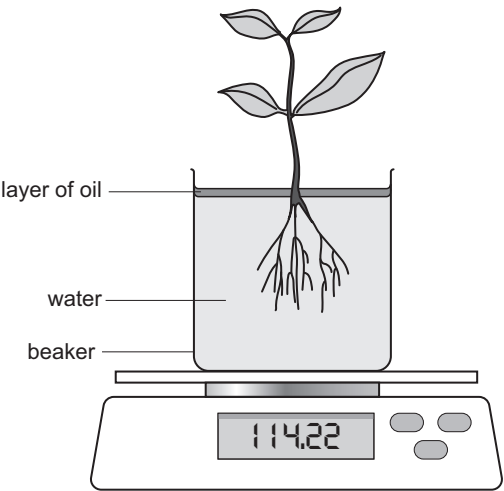


Fig. 3.1

For each plant, the student measured the initial masses of the equipment, water and plant.

Each plant was placed in a different temperature-controlled room for three hours.

After three hours, the student measured the final masses of the equipment, water and plants.

The results are shown in Table 3.1.

Table 3.1

temperature / °C	initial mass / g	final mass / g	transpiration rate / g per hour
15	138.2	135.5	0.9
20	136.1	132.5	1.2
25	137.8	128.5	3.1
30	135.7	118.3	

(i) Using the information in Table 3.1, calculate the transpiration rate in the plant kept at 30 °C.

..... g per hour [1]

(ii) Describe **and** explain the difference in the results for the plants kept at 15 °C and 25 °C.

[4]

(iii) The investigation was repeated with a plant kept at 25 °C in a lower humidity environment.

Predict the effect of these conditions on the transpiration rate.

Explain your prediction.

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..... [2]

(iv) Complete the sentences about water movement through the xylem.

The xylem transports water and

Xylem cells form a long continuous with thick walls

containing cellulose and

Water moves upwards in the xylem because of transpiration

This draws up a of water molecules, held together by

..... between water molecules.

[6]

(c) (i) Explain why wilting occurs.

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..... [3]

(ii) Marram grass, *Ammophila arenaria*, is a xerophyte.

Fig. 3.2 is a photomicrograph of a cross-section of a marram grass leaf.

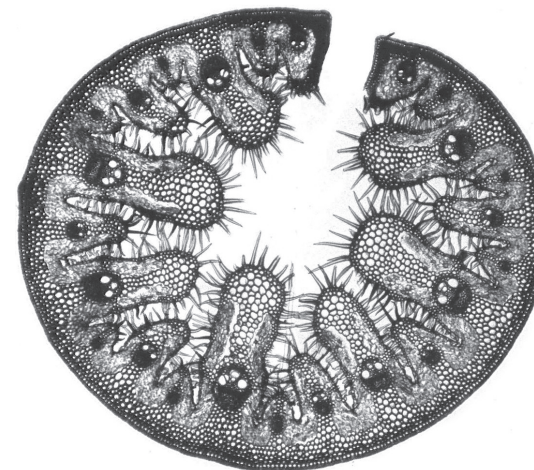


Fig. 3.2

Explain **one** way that the marram grass leaf shown in Fig. 3.2 is adapted to reduce transpiration.

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..... [2]

[Total: 20]

32 What is a way in which new alleles are formed?

- A artificial selection
- B mutation
- C natural selection
- D sexual reproduction