

- 1 The passage describes the feeding relationships between some of the organisms in an African grassland ecosystem.

The dominant grass species in the African grassland ecosystem are star grass and red oat grass. Star grass is eaten by antelope species, such as topi and Thomson's gazelle. Smaller animals such as mice and grasshoppers also feed on grass. Antelopes are eaten by predators such as cheetahs, lions and serval cats. Grasshoppers and mice are eaten by serval cats and tawny eagles. Ruppell's vulture feeds on dead mammals.

Fig. 1.1 shows part of the food web for this ecosystem.

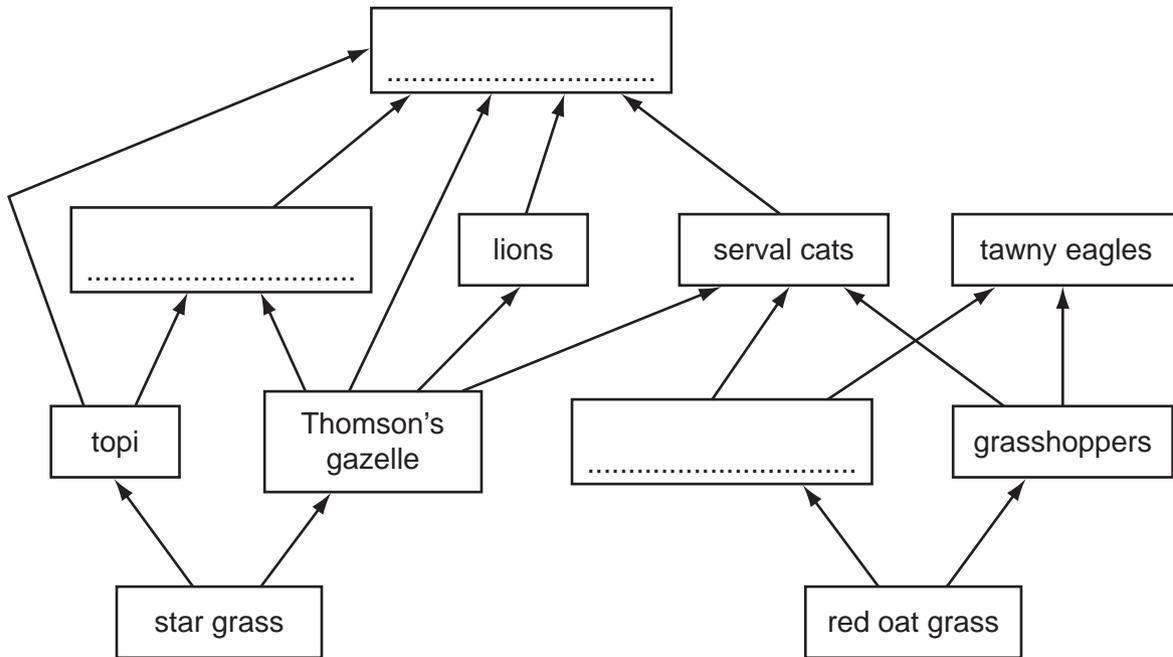


Fig. 1.1

- (a) Complete the food web in Fig. 1.1 by writing the names of the organisms in the boxes.

Write your answers in the boxes in Fig. 1.1.

[3]

- (b) Name the trophic level of the following species:

star grass

topi [2]

- (c) State the source of energy for the food web shown in Fig. 1.1.

..... [1]

- (ii) State what happens to energy when it leaves an ecosystem, such as the African grassland.

..... [1]

(d) Nutrients are recycled in ecosystems but energy is **not** recycled.

Explain why there are no more than four trophic levels in the ecosystem shown in Fig. 1.1.

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..... [3]

(e) Fish, such as salmon reared in fish farms, are fed on high protein food made from animals. When eating this food, these fish are feeding as secondary consumers.

Discuss the **disadvantages** of farming fish, such as salmon, for human food.

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..... [3]

[Total: 13]

- 2 The brown plant hopper is a serious insect pest of rice. Spraying with pesticides is a common way to control it. However, brown plant hoppers have become resistant to pesticides.

Fig. 6.1 shows the effect of spraying pesticides against populations of this insect pest.

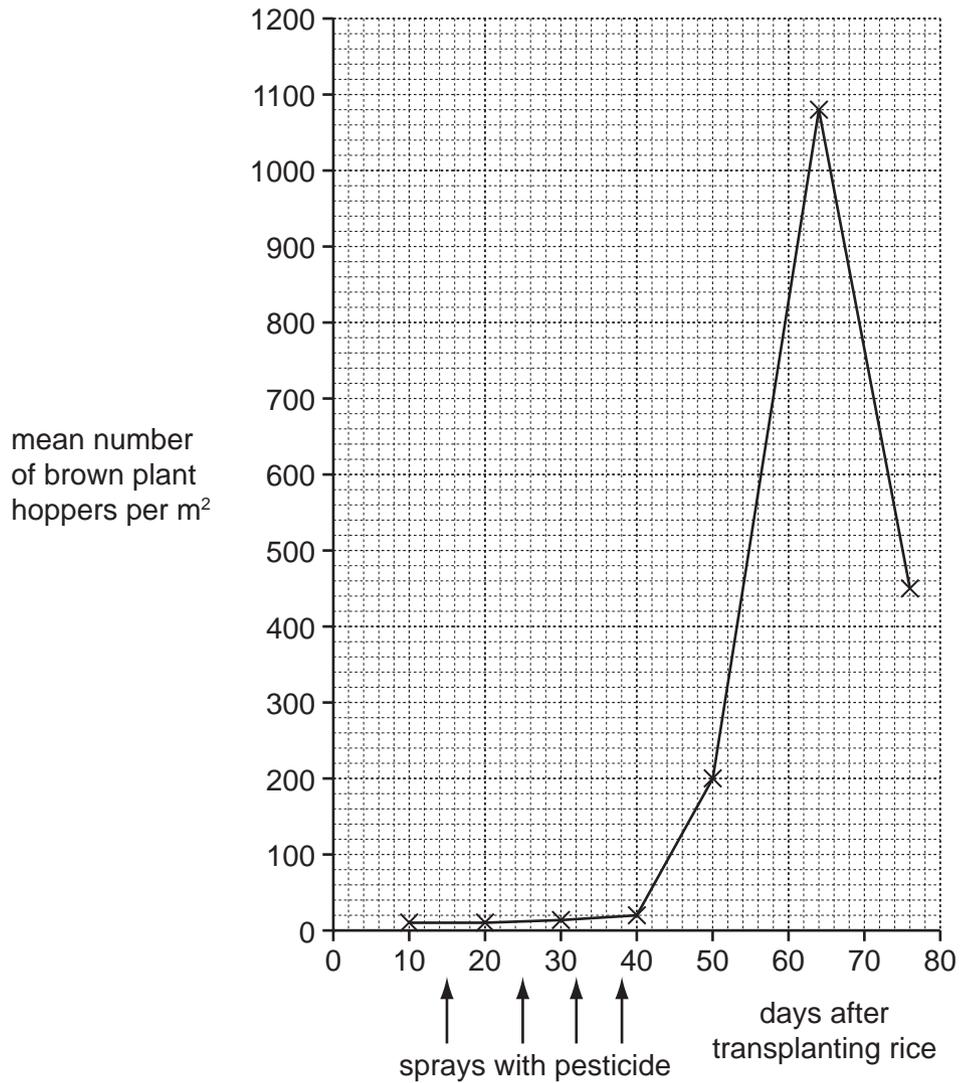


Fig. 6.1

- (a) Define the term *population*.

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..... [2]

(b) Use Fig. 6.1 to describe the effect of pesticides on populations of the brown plant hopper.

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(c) Some pesticides used against insects kill them on contact. Others are systemic pesticides.

Explain how these systemic pesticides kill insects.

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..... [2]

- (d) As an alternative to spraying pesticides, some farmers use predatory animals, such as the hunting spider, *Lycosa pseudoannulata*, to control brown plant hoppers.

During an investigation into the effectiveness of this method, brown plant hoppers were put into cages in rice fields. The plant hoppers could not leave the cages but were able to feed. Predators, such as hunting spiders, could enter some of the cages to feed.

Fig. 6.2 shows the change in numbers of brown plant hoppers in these cages over a period of time.

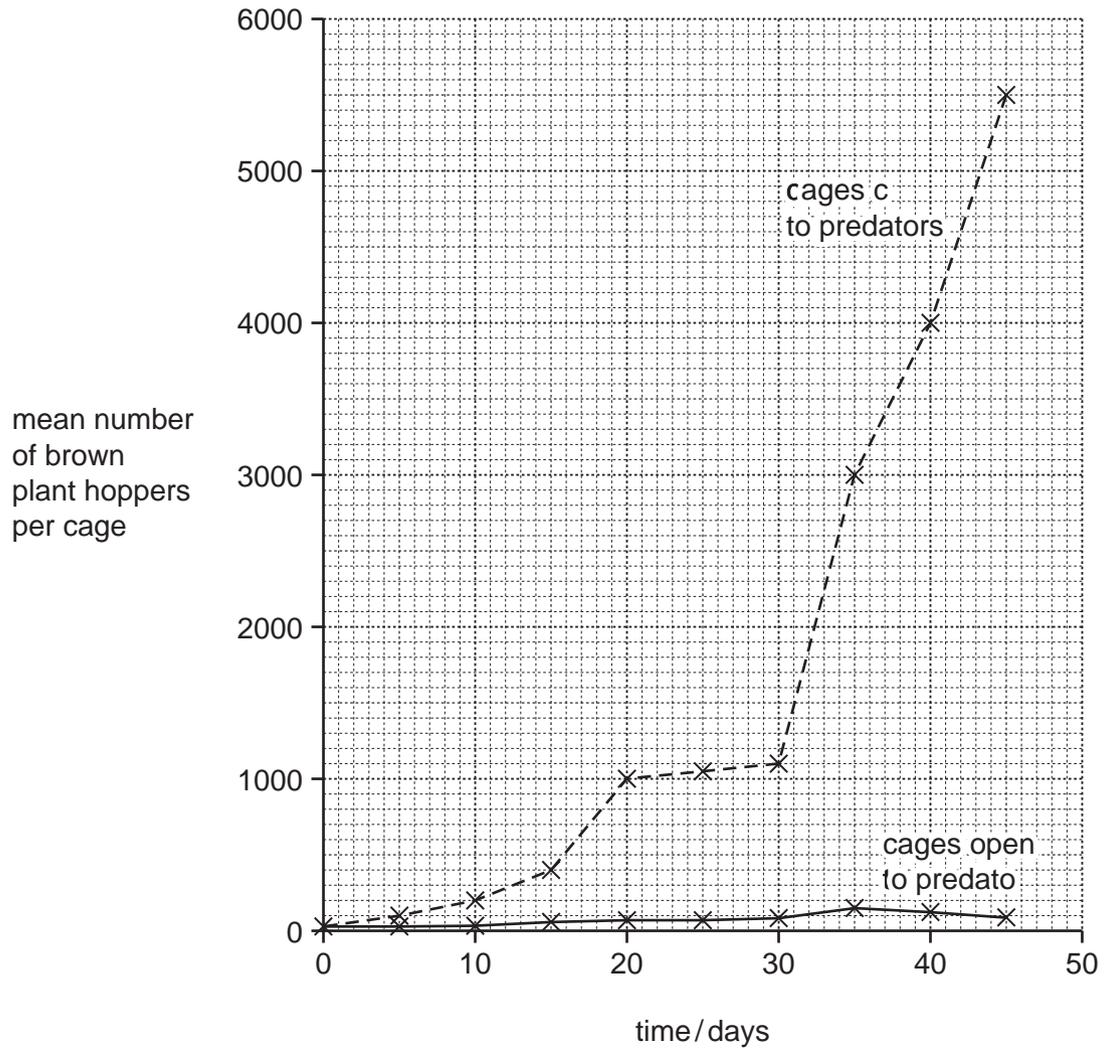


Fig. 6.2

3 Fig. 5.1 shows the processes involved in the manufacture of yoghurt.

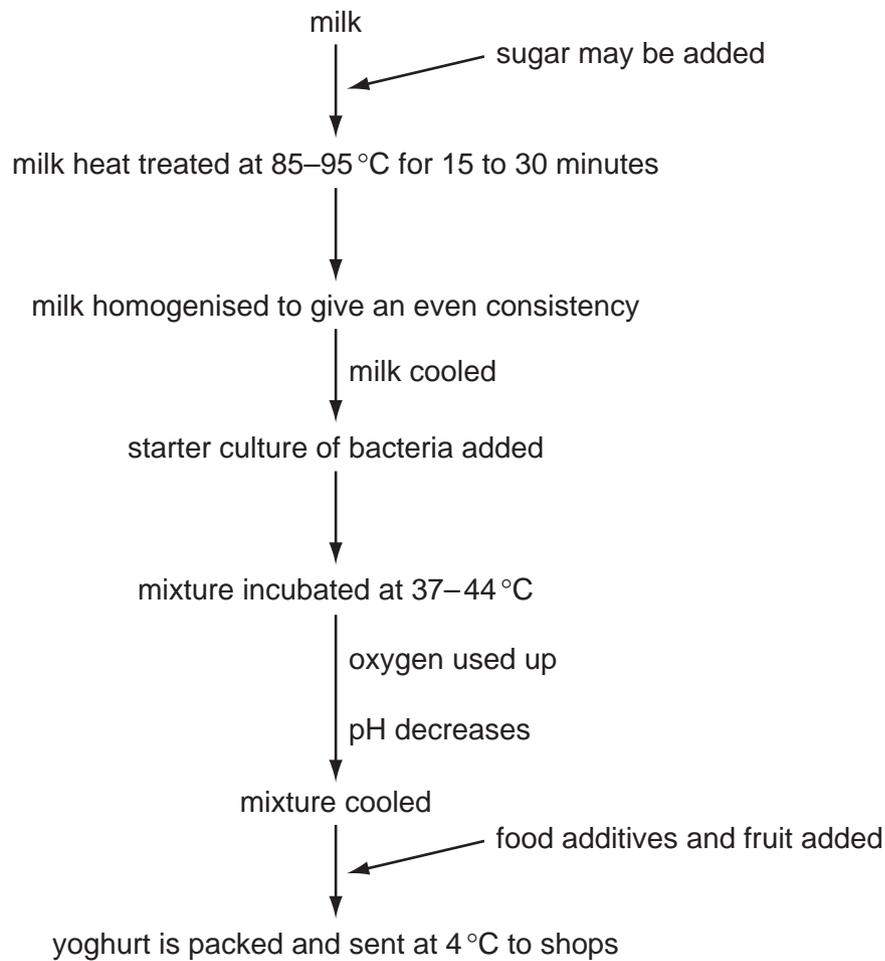


Fig. 5.1

(a) Explain why the milk must be cooled before the bacteria are added.

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..... [2]

(ii) Explain why the pH decreases only **after** the oxygen in the milk has been used up.

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..... [2]

(iii) Suggest **one** type of food additive that could be added to yoghurt.

..... [1]

(c) Suggest why the numbers of *L. bulgaricus* do not start to increase until after the increase in the numbers of *S. thermophilus*.

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..... [2]

[Total: 12]

- 4 Marine conservationists are concerned that fish stocks in the sea are decreasing. Drastic measures will have to be taken to stop the extinction of many fish species.

Fig. 5.1 shows a marine food web. Tuna are large carnivorous fish that are an important human food. Dolphins may be caught in fishermen's nets and die.

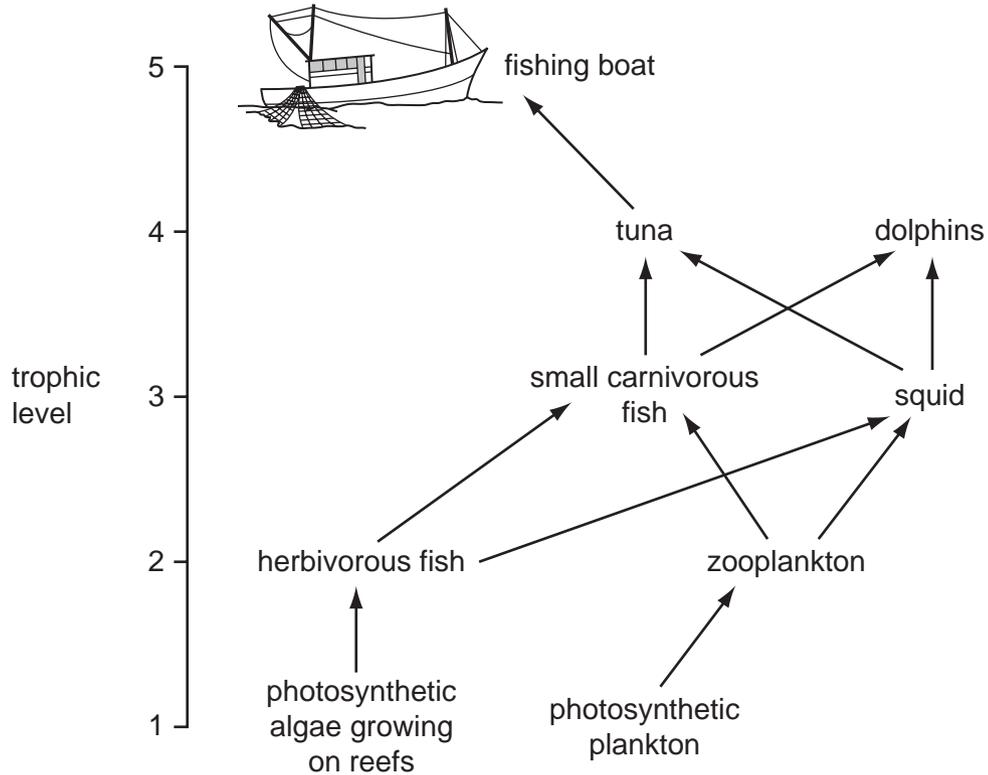


Fig. 5.1

(a) State the names given to trophic levels 1 and 3.

- 1
- 3 [2]

