

Exercise walk-through

Pest Control Methods ■ 5.6

eXercise

You must be able to

- describe chemical **pesticides** 农药 and their problems
- explain **pesticide resistance** 抗药性 and the “pesticide treadmill”
- describe biological control

Method — Chemical pesticides

Pesticides kill pests and raise yields, but they also **harm non-target species** (bees, birds), **pollute water**, and can **bioaccumulate** in food chains.

Method — Pesticide resistance

Using a pesticide **selects** for the few resistant pests, which survive and reproduce. Over time the pest population becomes **resistant**, so the pesticide stops working.

Method — The pesticide treadmill

As resistance grows, farmers apply **more** or **stronger** pesticides for the same effect — the “**pesticide treadmill**” — raising costs and pollution.

Method — Biological control

Biological control uses a pest's natural **predators** or parasites instead of chemicals — targeted and less polluting, but must be managed to avoid introducing a new problem species.

Practice 2.1 ■ 1 mark

State one problem caused by chemical pesticides.

Solution 2.1

Method: Chemical pesticides

Worked steps

Any one: harms non-target species, pollutes water, bioaccumulates, causes resistance

B1.

Practice 2.2 ■ 1 mark

How does pesticide resistance develop?

Solution 2.2

Worked steps

The pesticide kills susceptible pests, and the surviving resistant ones reproduce, so resistance spreads **B1**.

Practice 2.3 ■ 1 mark

What is biological pest control?

Solution 2.3

Method: Biological control

Worked steps

Using a pest's natural predators or parasites to control it **B1**.

Exam-style 3.1 ■ 1 mark

Repeated pesticide use leads to resistance because it

- A** kills all pests equally
- B** selects for pests that survive
- C** creates new genes
- D** helps predators

Solution 3.1

- A** kills all pests equally
- B** selects for pests that survive 
- C** creates new genes
- D** helps predators

Worked steps

B — selects for pests that survive.

Exam-style 3.2 ■ 2 marks

A farmer sprays the same pesticide every year and finds it works less well over time.

- (a) Explain why, using natural selection.
- (b) State one alternative to chemical pesticides.

Solution 3.2

Worked steps

(a) A few pests already carry a resistance allele; the pesticide kills the rest, so the resistant survivors reproduce and resistance spreads **M1 A1**. (b) Any one: biological control, integrated pest management, crop rotation **B1**.

Exam-style 3.3 ■ 2 marks

Explain one advantage and one risk of biological pest control.

Solution 3.3

Method: Biological control

Worked steps

Advantage: targeted and less polluting (no chemicals); risk: the introduced predator could become an invasive pest itself **M1** **A1**.