AP ENVIRONMENTAL SCIENCE • EXERCISE SHEET

5.6 Pest Control Methods

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

KEY WORDS pesticides 农药 • pesticide resistance 抗药性 • integrated pest management 综合虫害管理 • crop rotation 轮作

Objective

Build the skills to answer exam questions on **pest control methods**.

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

1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

■ 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.

■ 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.

■ The pesticide treadmill

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

■ 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.

2 Practice

Now apply the methods above.

2.1 State one problem caused by chemical pesticides. [1]

2.2 How does pesticide resistance develop? [1]

2.3 What is biological pest control? [1]

3 Exam-style questions

3.1 Repeated pesticide use leads to resistance because it [1]

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

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

(a) Explain why, using natural selection. [2]

(b) State one alternative to chemical pesticides. [1]

3.3 Explain one advantage and one risk of biological pest control. [2]

Solutions

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

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

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

3.1 B — selects for pests that survive.

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

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