

Exercise walk-through

5.6

Pest Control Methods

AP Environmental Science

What we will cover

- 1 The tragedy of the commons
- 2 Agriculture and food
- 3 Irrigation and water
- 4 Pest control and IPM
- 5 Harvesting resources
- 6 Urbanization and sustainability



Pest control and IPM

Two approaches to pests:

- **chemical** : fast, but breeds **pesticide resistance**
- **biological** : natural predators, no poison

IPM : monitor first, spray last.



Chemical control: fast, but resistance rises

What pesticides cost, and what IPM does instead

pesticides

raise yields, but harm non-target species and pollute water

pesticide resistance

survivors breed, so stronger doses are needed – the **pesticide treadmill**

integrated pest management

IPM: biological controls (natural predators), crop rotation, **limited targeted** pesticide, and monitoring

why IPM wins

lower cost and lower environmental damage, and it does not breed resistance the way blanket spraying does

IPM is not 'no pesticides'. It is pesticide as the **last** tool rather than the first.

Exercises 2.1-2.3

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]

Exercises 2.1-2.3

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

2.1

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

2.2 How does pesticide resistance develop? [1]

2.2

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

2.3 What is biological pest control? [1]

2.3

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

Exercise 3.1

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

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3.1 B

- selects for pests that survive

Exercise 3.2 (a)

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]

Exercise 3.2 (a)

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]

(a)

- A few pests already carry a resistance allele; the pesticide kills the rest, so the resistant survivors reproduce and resistance spreads

Exercise 3.2 (b)

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

(b) State one alternative to chemical pesticides.

[1]

Exercise 3.2 (b)

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

(b) State one alternative to chemical pesticides.

[1]

(b)

- Any one: biological control, integrated pest management, crop rotation

Exercise 3.3

3.3 Explain one advantage and one risk of biological pest control.

[2]

Exercise 3.3

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

3.3

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