

Exercise walk-through

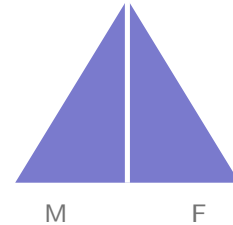
3.1

Generalist and Specialist Species

AP Environmental Science

What we will cover

- 1 Generalists and specialists
- 2 r- and K-selection
- 3 Survivorship curves
- 4 Carrying capacity
- 5 Age structure
- 6 Fertility and the transition



Carrying capacity, and what happens past it

carrying capacity

K – the maximum population an environment can support long-term

approaching K

growth slows as resources per individual fall – the logistic curve flattens

overshoot

a population may exceed K when resources are temporarily abundant

then a die-off

the excess cannot be supported, and numbers crash – sometimes below K

what sets K

the scarcest resource: food, water, nesting sites, or space

and it moves

K is not a constant – a wet year or a new technology raises it

K is a property of the environment, not of the species. That is why a habitat's degradation lowers it even when the population has not changed.

Check yourself

- 1 Is a panda a generalist or a specialist?
- 2 Which survivorship type fits an oyster?
- 3 What TFR keeps a population steady?
- 4 At $r = 2\%$, what is the doubling time?



Answers 1. specialist 2. Type III 3. about 2.1 4. $70/2 = 35$ years

Exercises 2.1-2.3

2.1 Does a generalist have a broad or narrow niche?

[1]

2.2 Give one example of a specialist species.

[1]

2.3 Which type copes better with environmental change?

[1]

Exercises 2.1-2.3

2.1 Does a generalist have a broad or narrow niche? [1]

2.1

- Broad

2.2 Give one example of a specialist species. [1]

2.2

- Any one: panda (bamboo), koala (eucalyptus)

2.3 Which type copes better with environmental change? [1]

2.3

- Generalists

Exercise 3.1

3.1 A specialist species is most vulnerable to

[1]

☐

A a stable environment

B loss of its specific resource

C having many food options

D abundant resources

Exercise 3.1

3.1 A specialist species is most vulnerable to

[1]

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3.1 B

- loss of its specific resource

Exercise 3.2 (a)

3.2 A panda eats almost only bamboo, while a raccoon eats many foods.

(a) Classify each as generalist or specialist.

[2]

Exercise 3.2 (a)

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(a) Classify each as generalist or specialist.

[2]

(a)

- Panda = specialist; raccoon = generalist

Exercise 3.2 (b)

3.2 A panda eats almost only bamboo, while a raccoon eats many foods.

(b) Explain which is more likely to survive habitat disturbance.

[2]

Exercise 3.2 (b)

3.2 A panda eats almost only bamboo, while a raccoon eats many foods.

(b) Explain which is more likely to survive habitat disturbance. [2]

(b)

- The raccoon (generalist) – it can switch foods/habitats, while the panda depends on bamboo and cannot adapt easily

Exercise 3.3

3.3 Explain why specialists can outcompete generalists in a stable environment. [2]

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3.3

- In a stable environment the specialist is highly efficient at using its particular resource, so it outcompetes the less-efficient generalist for that niche