



ChapterNotes

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CHAPTER NOTES

Organisms and Populations Class 12 Notes — CBSE Biology Chapter 13

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Organisms and Populations Class 12 Notes — CBSE Biology Chapter 13

Chapter 13 — **Organisms and Populations** — introduces ecology concepts: organism responses to environment, populations and their attributes. Carries **4-6 marks**.

Key Concepts

Organism Responses to Environment

Response	Description	Example
Regulate	Maintain constant internal environment	Mammals regulate body temperature (homeotherms)
Conform	Body changes with environment	Fish body temp changes with water (poikilotherms)
Migrate	Move to favourable habitat	Siberian cranes to India in winter
Suspend	Dormancy during stress	Hibernation (bear), Aestivation (snail), Diapause (insects)

Adaptations

- **Allen's rule:** Animals in cold regions have shorter ears/limbs (reduce heat loss)
- **Bergmann's rule:** Animals in cold regions are larger (reduce SA/volume ratio)
- **Desert plants:** Thick cuticle, sunken stomata, CAM pathway (fix CO₂ at night)
- **Kangaroo rat:** Survives without drinking water (metabolic water)

Population Attributes

Population density (N): Number of individuals per unit area/volume

Birth rate (b): Births per capita per unit time

Death rate (d): Deaths per capita per unit time

Population growth: $N_t = N_0 + (B + I) - (D + E)$

Where B = births, I = immigration, D = deaths, E = emigration

Growth Models

Exponential (J-shaped): $dN/dt = rN$ (unlimited resources)

$N(t) = N_0 e^{rt}$ where r = intrinsic rate of natural increase

Logistic (S-shaped/Sigmoid): $dN/dt = rN(K-N)/K$

K = carrying capacity (maximum population environment can support)

When $N = K$, growth rate = 0

Population Interactions

Interaction	Species 1	Species 2	Example
Mutualism (+/+)	Benefits	Benefits	Lichen (algae + fungus), Mycorrhiza
Competition (-/-)	Harmed	Harmed	Flamingoes vs fish for zooplankton
Predation (+/-)	Benefits (predator)	Harmed (prey)	Tiger and deer
Parasitism (+/-)	Benefits (parasite)	Harmed (host)	Cuscuta on host plant, tapeworm
Commensalism (+/0)	Benefits	Unaffected	Orchid on mango tree (epiphyte)
Amensalism (-/0)	Harmed	Unaffected	Penicillium inhibits bacteria

Gause's Competitive Exclusion Principle: Two species competing for the same resource cannot co-exist indefinitely — one will eliminate the other.

Quick Revision Points

- Regulators (maintain constancy) vs Conformers (change with environment)
- Hibernation (winter sleep), Aestivation (summer sleep), Diapause (insects, suspended development)
- Exponential growth: J-shaped, $dN/dt = rN$; Logistic: S-shaped, $dN/dt = rN(K-N)/K$
- K = carrying capacity; at K , growth = 0
- Mutualism (+/+), Predation (+/-), Parasitism (+/-), Competition (-/-), Commensalism (+/0)
- Gause's principle: competitive exclusion



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