



Parasitism

THE ECOLOGY OF EXPLOITATION

One Benefits, Host is Harmed



The Parasite

- ✓ • Secures free lodging and meals.
- ✓ • Population thrives and maximizes reproductive fitness.



The Host

- ↓ • Reduced survival, growth, and reproduction.
- ↓ • Lower population density.
- ↓ • Physically weakened; highly vulnerable to secondary predation.

Co-Evolutionary Balance: An ideal parasite thrives without killing its host immediately. If the host evolves resistance, the parasite must evolve counter-mechanisms to survive.

Evolutionary Adaptations for Parasitism

— Loss of sense organs:

Sensory processing is redundant inside a host environment.

— Loss of digestive system:

Nutrients are absorbed directly from the host's processed food or tissues.



+ Adhesive organs & suckers:

Specialized physical structures to aggressively cling to host tissues.

+ Extreme reproductive capacity:

Morphological simplicity allows maximum energy allocation to reproduction.



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$$E=mc^2$$



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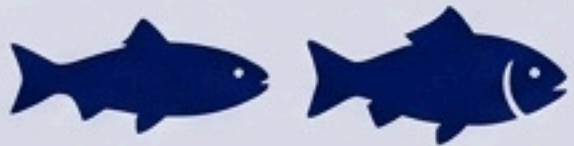
Ectoparasites: The External Feeders



Humans
Lice



Dogs
Ticks

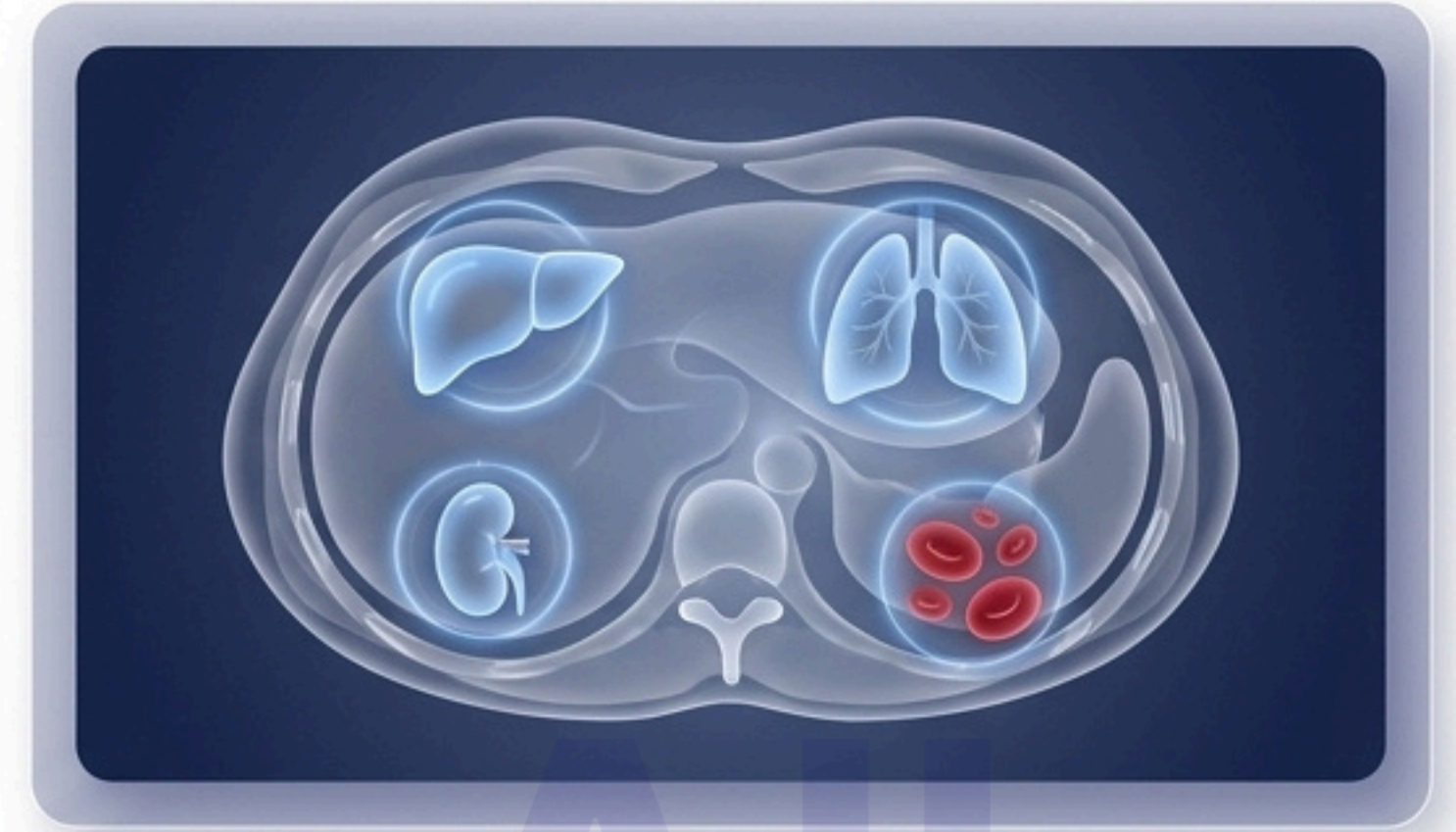


Marine Fish
Ectoparasitic copepods



Plants
Cuscuta (Parasitic vine)
Evolutionary loss of chlorophyll and leaves; derives 100% of nutrition from the host hedge.

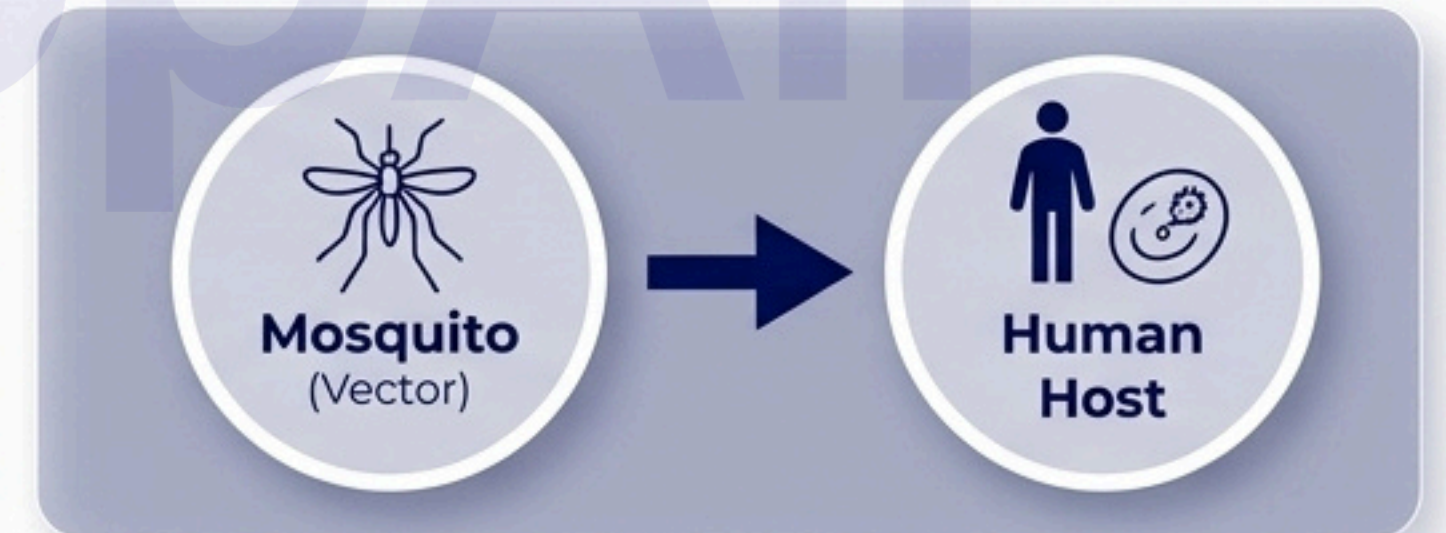
Endoparasites: The Internal Inhabitants



Human Liver Fluke



Malarial Parasite



Extreme Specialisation: Internal habitats allow highly simplified anatomy but demand vastly complex, multi-host life cycles.

Brood Parasitism: The Art of Deception

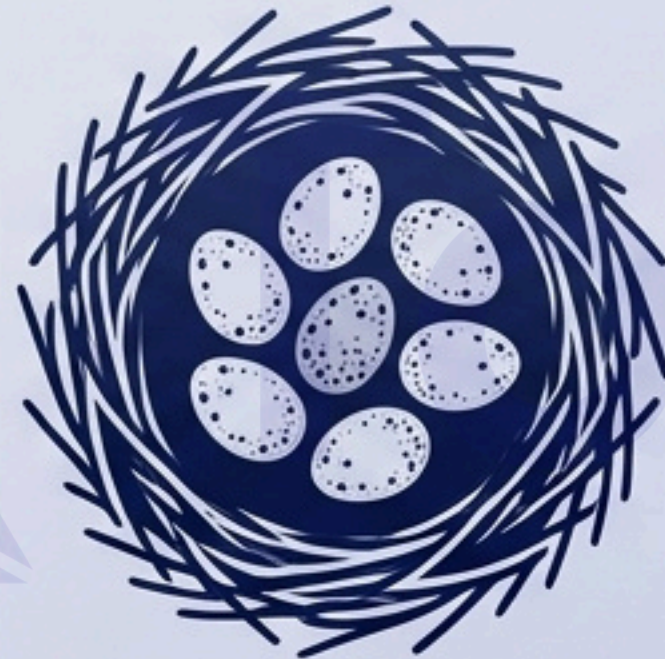
Case Study: The Cuckoo (Koel) and the Crow

Step 1: Infiltration



The parasitic bird lays its eggs in the nest of its specific host.

Step 2: Deception



Evolutionary Mimicry: The parasite's eggs co-evolve to perfectly match the host's eggs in size and colour.

Step 3: Exploitation



The host is tricked into incubating the foreign eggs, preventing detection and ejection.

NEET Key Takeaways: Parasitism



-  **Interaction Type:** A strict (+, -) population interaction where one benefits and the other is harmed.
-  **Co-evolution:** A constant biological arms race; host evolves rejection, parasite evolves counter-mechanisms.
-  **Plant Ectoparasite:** *Cuscuta* — highly testable for its evolutionary loss of chlorophyll and leaves.
-  **Vector Dependencies:** Human liver fluke requires both snail and fish intermediates; Malaria requires a mosquito vector.
-  **Morphological Mimicry:** Brood parasitism (Koel & Crow) is a prime example of evolutionary egg mimicry to avoid host ejection.



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