THE INSECT WORLD: HIDDEN LIVES IN CENTRAL ILLINOIS

FACILITATOR

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Session 1 Questions – if you don't have the book, there is a WWW

What good is an insect? The rivet popper hypothesis, proposed by ecologist Paul Ehrlich, compares an ecosystem to an airplane and every species inside it to a metal rivet. Pulling out a rivet or losing a species weakens the system. Losing a critical rivet from a vital spot like a wing causes sudden failure. Your thoughts?

Chapter 1 Ancestors and Evolution

The Flight Revolution: Flight evolved in insects long before birds, bats, or pterosaurs. How did the early acquisition of wings shape global ecosystems during the Carboniferous period, and what ecological niches did it open first?

The Metamorphosis Advantage: Complete metamorphosis (holometaboly) allows larvae and adults to utilize entirely different food sources and habitats. What are the evolutionary trade-offs of this strategy compared to incomplete metamorphosis (hemimetaboly), especially regarding vulnerability during the pupal stage?

The Crustacean Connection: Modern genetics firmly places insects within the pancrustacean clade. When looking at local terrestrial insects vs. aquatic crustaceans (like crayfish or pillbugs), what traits highlight their shared ancestry, and what are the most radical adaptations insects made to conquer dry land?

Chapter 2 Insect Body Plan

The Scaling Problem: The insect exoskeleton is highly efficient but physically limits their maximum body size due to respiratory and structural constraints. How does this "ceiling on size"
affect their ecological roles compared to larger vertebrates?

Mouthpart Evolution: Insect mouthparts are highly modified versions of the same basic ancestral appendages. How might a naturalist use the structural variations of mouthparts (e.g., piercing-sucking vs. chewing) found in a specific local habitat to map out the food web without seeing the insects actually feed?

Form Follows Function in the Thorax: The thorax is entirely dedicated to locomotion, housing massive muscles for wings and six legs. When observing insects in the field, how can the relative size or shape of the thorax tell us about an insect's lifestyle (e.g., a fast-flying predator vs. a sedentary herbivore)?

If we have time…

The "Living Fossil" Trap: We often call insects like silverfish or dragonflies "primitive" or "ancient." Based on their body plans and evolutionary history, why is this terminology technically misleading when evaluating their success in modern local ecosystems?