

Advanced Entomology: Ecology & Evolution

Entomology · Answer Key · 8 Questions

1. Which specific ecological role is most prominently associated with dung beetles (Scarabaeidae) in many terrestrial ecosystems?

- A) Primary producers through photosynthesis
- B) Decomposers and nutrient cyclers of animal waste**
- C) Apex predators controlling herbivore populations
- D) Pollinators of arid-adapted flora

2. The remarkable mimicry displayed by leaf insects (Phylliidae) is an example of Batesian mimicry when they resemble:

- A) Brightly colored, toxic butterflies
- B) Camouflaged, non-toxic plant parts
- C) Predatory praying mantises
- D) Unpalatable moths**

3. What is the primary evolutionary advantage conferred by the exoskeleton of insects, particularly in terms of terrestrial adaptation?

- A) Increased sensory perception through direct nerve endings
- B) Enhanced water retention and prevention of desiccation**
- C) Facilitation of gas exchange through spiracular openings
- D) Greater flexibility for rapid maneuvering

4. In what way do the symbiotic gut bacteria of termites (Isoptera) contribute significantly to their ecological niche?

- A) Synthesizing toxins to deter predators
- B) Facilitating the digestion of cellulose from wood**
- C) Producing pheromones for colony communication
- D) Aiding in nitrogen fixation from the atmosphere

5. The phenomenon of facultative parthenogenesis, observed in some insect species like aphids, allows for:

- A) Reproduction only during specific lunar phases
- B) Development of offspring from unfertilized eggs**
- C) Seasonal migration to warmer climates
- D) Formation of protective chrysalises

6. Which class of insects is characterized by complete metamorphosis (holometabolism), meaning their life cycle includes egg, larval, pupal, and adult stages?

- A) Orthoptera (e.g., grasshoppers)
- B) Odonata (e.g., dragonflies)
- C) Hemiptera (e.g., true bugs)
- D) Lepidoptera (e.g., butterflies and moths)**

7. The elaborate courtship rituals and complex social structures found in ants (Formicidae) are a hallmark of which type of ecological organization?

- A) Solitary foraging
- B) Eusociality with division of labor**
- C) Territorial defense by individuals
- D) Communal nesting without cooperation

8. What is the primary function of the Johnston's organ in many male insects, particularly those that are highly mobile flyers?

- A) Detecting polarized light for navigation
- B) Sensing vibrations to locate prey
- C) Detecting airborne pheromones from females**
- D) Perceiving changes in air pressure for flight control