24.1 Arthropod Diversity

KEY CONCEPT

Arthropods are the most diverse of all animals.

24.1 Arthropod Diversity

Arthropod features are highly adapted.

- Arthropods are invertebrates that share several features.
  - exoskeleton (cuticle) made of chitin
  - jointed appendages
  - segmented body parts

24.1 Arthropod Diversity

- Arthropods are classified into five groups.
  - Trilobites—extinct, bottom feeders

The oldest fossils are of trilobites that date back 540 million years.

24.1 Arthropod Diversity

– Crustaceans—live in oceans, freshwater streams, and on land

24.1 Arthropod Diversity

– Chelicerates—specialized daggerlike mouthparts

24.1 Arthropod Diversity

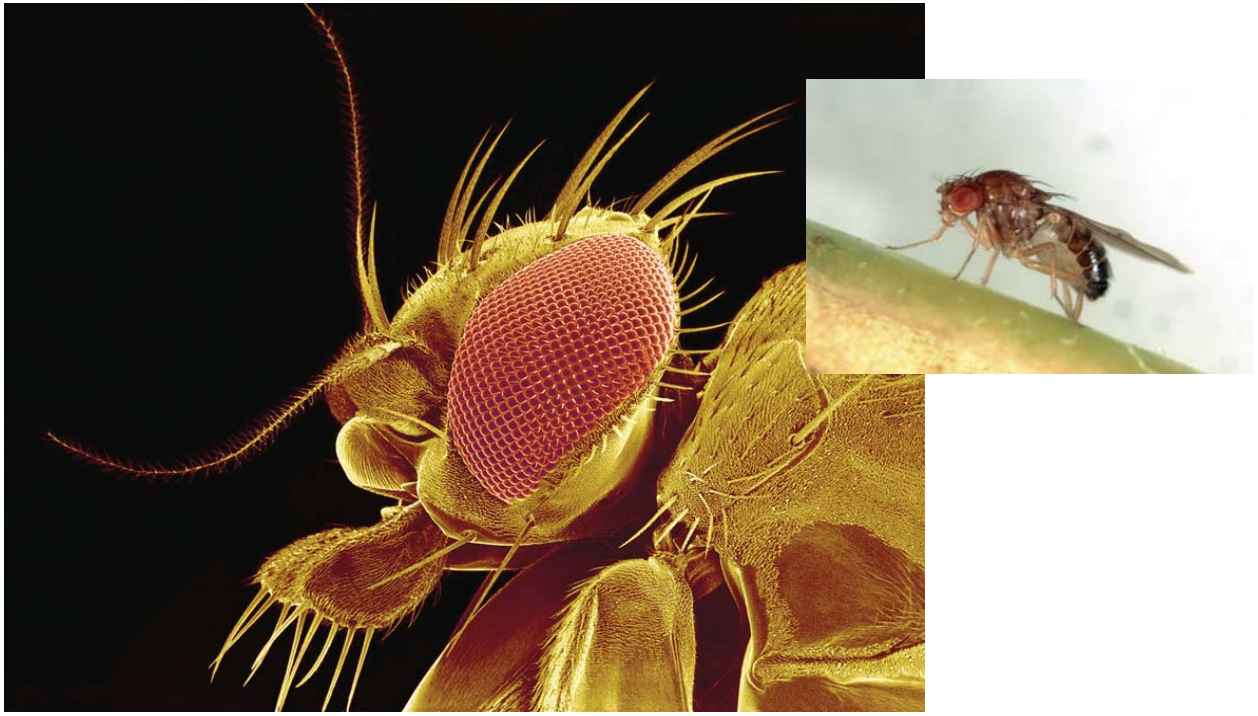
– Insects—most live on land, have six legs

24.1 Arthropod Diversity

– Myriapods—long bodies and many pairs of legs

24.1 Arthropod Diversity

- Arthropods have an open circulatory system.
- Sensory organs such as antennae are made of modified cuticle.
- Most arthropods have compound eyes.



24.1 Arthropod Diversity

- The evolutionary relationship between arthropods and other invertebrates remains under question.
  - body segmentation similar to annelids
  - molecular evidence suggests segmentation is analogous development
- Velvet worms and water bears are considered the closest relatives of arthropods.

24.1 Arthropod Diversity

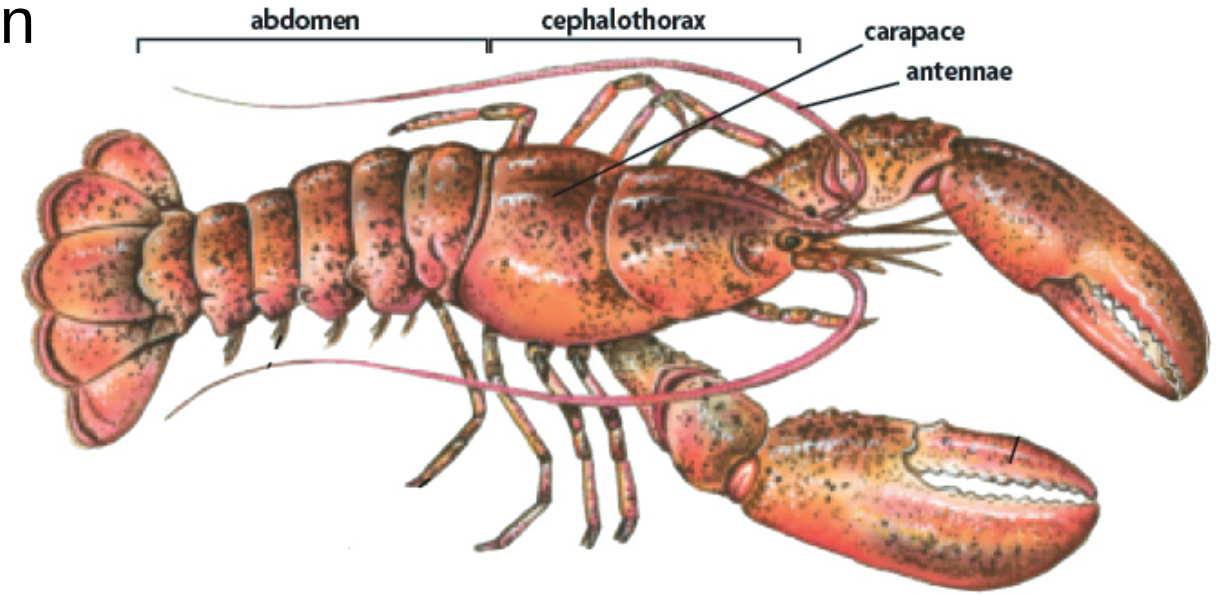
KEY CONCEPT

Crustaceans are a diverse group of ancient arthropods.

24.1 Arthropod Diversity

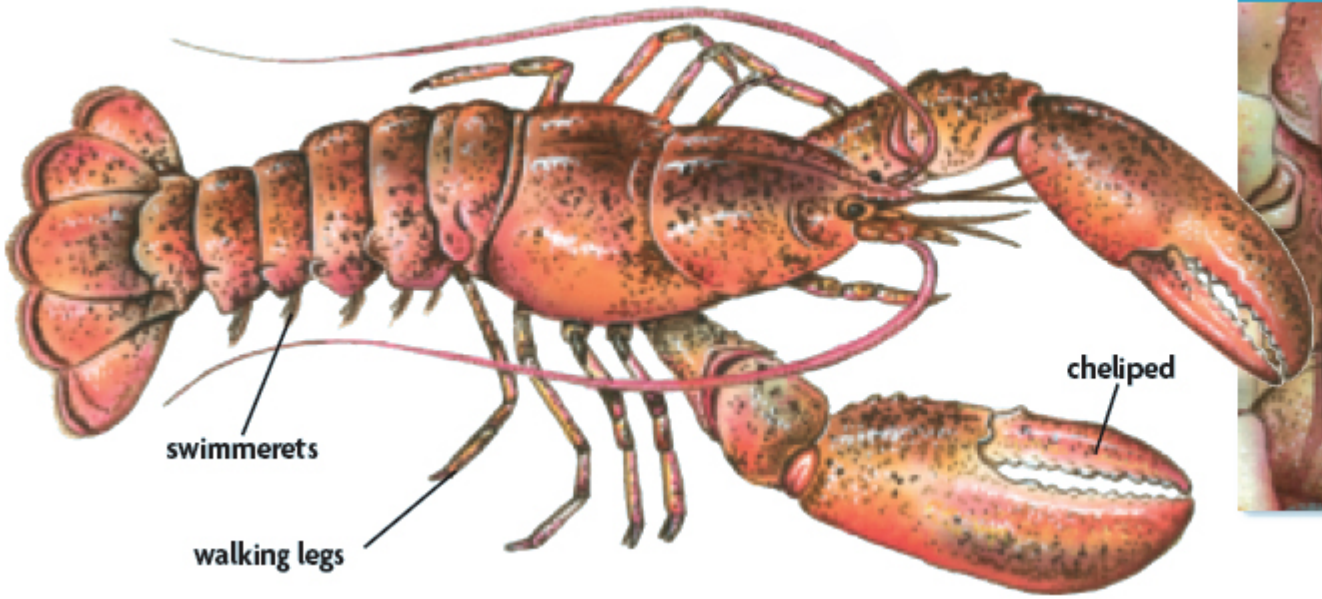
Crustaceans evolved as marine arthropods.

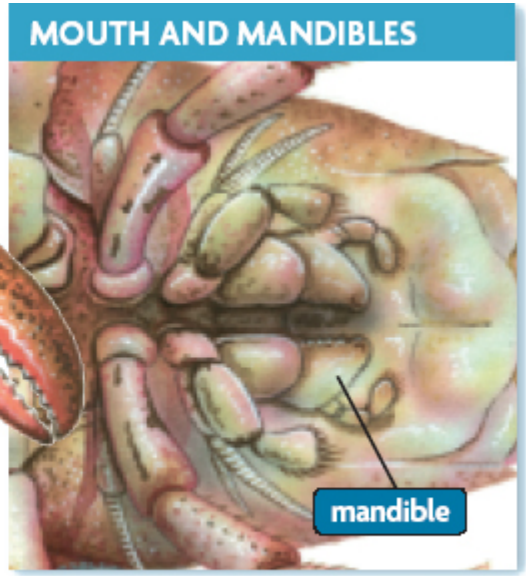
- Crustaceans share several common features.
  - two distinct body sections, cephalothorax and abdomen
  - one pair of appendages per segment
  - two pairs of antennae
  - exoskeleton
  - carapace



24.1 Arthropod Diversity

- Crustacean appendages are used for a variety of functions.
  - collecting and manipulating food
  - attracting females
  - protection
- Appendages include claws, antennae, walking legs, swimmerets, and mandibles.



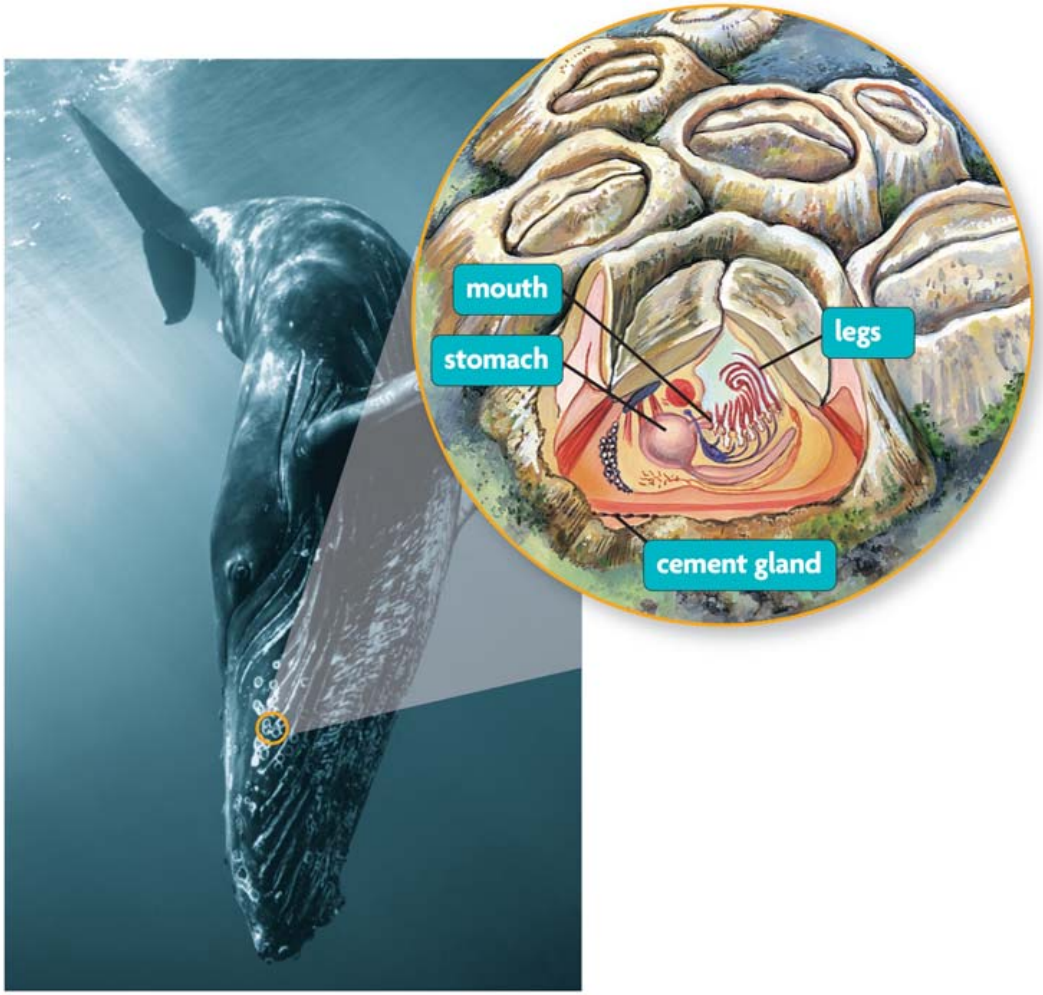


24.1 Arthropod Diversity

- **There are many different types of crustaceans.**
  - Crustaceans vary in both anatomy and structure.
    - Decapods such as lobsters and crabs have ten legs.

24.1 Arthropod Diversity

– Barnacles are sessile filter feeders wrapped in a hard shell.



24.1 Arthropod Diversity

– Isopods such as pill bugs have flattened bodies and seven pairs of legs.

– Tongue worms are parasites found in a host's lungs or nasal passages.

24.1 Arthropod Diversity

KEY CONCEPT

Arachnids include spiders and their relatives.

Arachnids are the largest group of chelicerates.

- There are three major groups of chelicerates.
  - horseshoe crabs

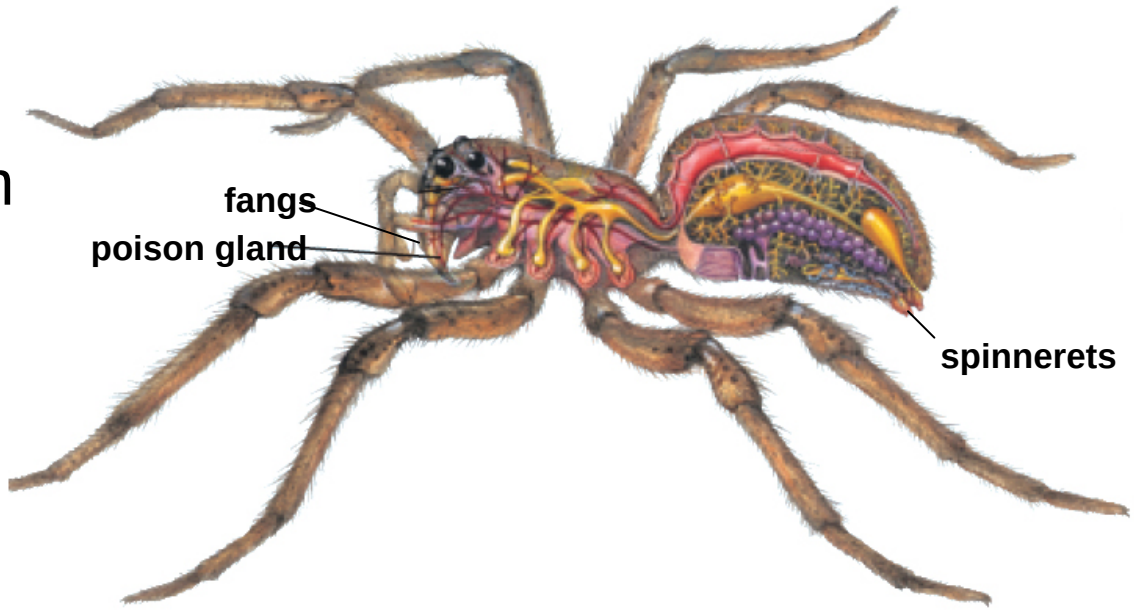
24.1 Arthropod Diversity

Arachnids are the largest group of chelicerates.

- There are three major groups of chelicerates.
  - horseshoe crabs
  - sea spiders
  - arachnids

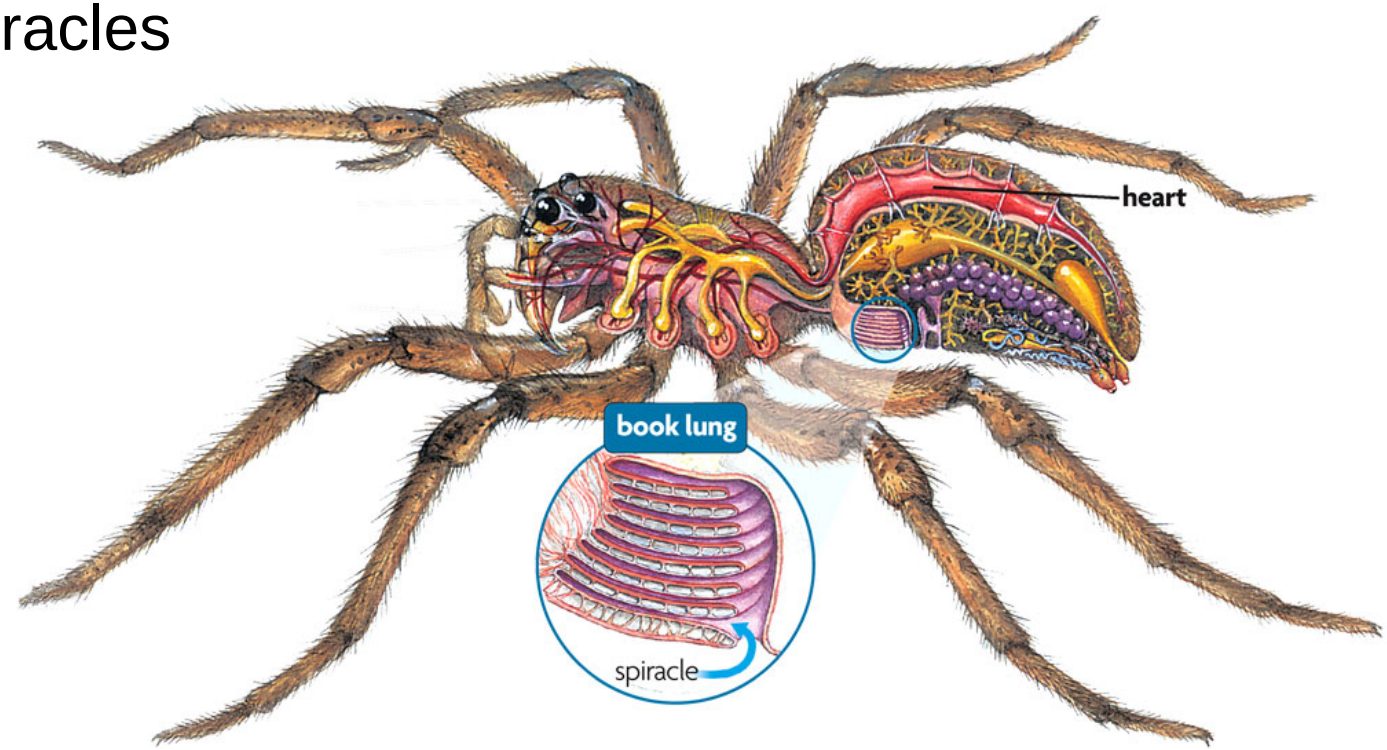
24.1 Arthropod Diversity

- Chelicerates share several features.
  - no antennae
  - four pairs of walking legs
  - one pair each of chelicerae and pedipalps
- Arachnids are a group of chelicerates that live on land.
  - eight legs
  - fanglike pincers that inject venom
  - silk glands



24.1 Arthropod Diversity

- Arachnids have four different adaptations that reduce water loss.
  - waterproof cuticle
  - book lungs
  - Malpighian tubules
  - spiracles



24.1 Arthropod Diversity

- **Arachnids have evolved into a diverse group.**
  - All spiders make silk and produce venom.

24.1 Arthropod Diversity

Arachnids have evolved into a diverse group.

- Spiders make up half of the more than 60,000 known arachnid species.
- Arachnids also include mites, ticks, chiggers, and scorpions.

24.1 Arthropod Diversity

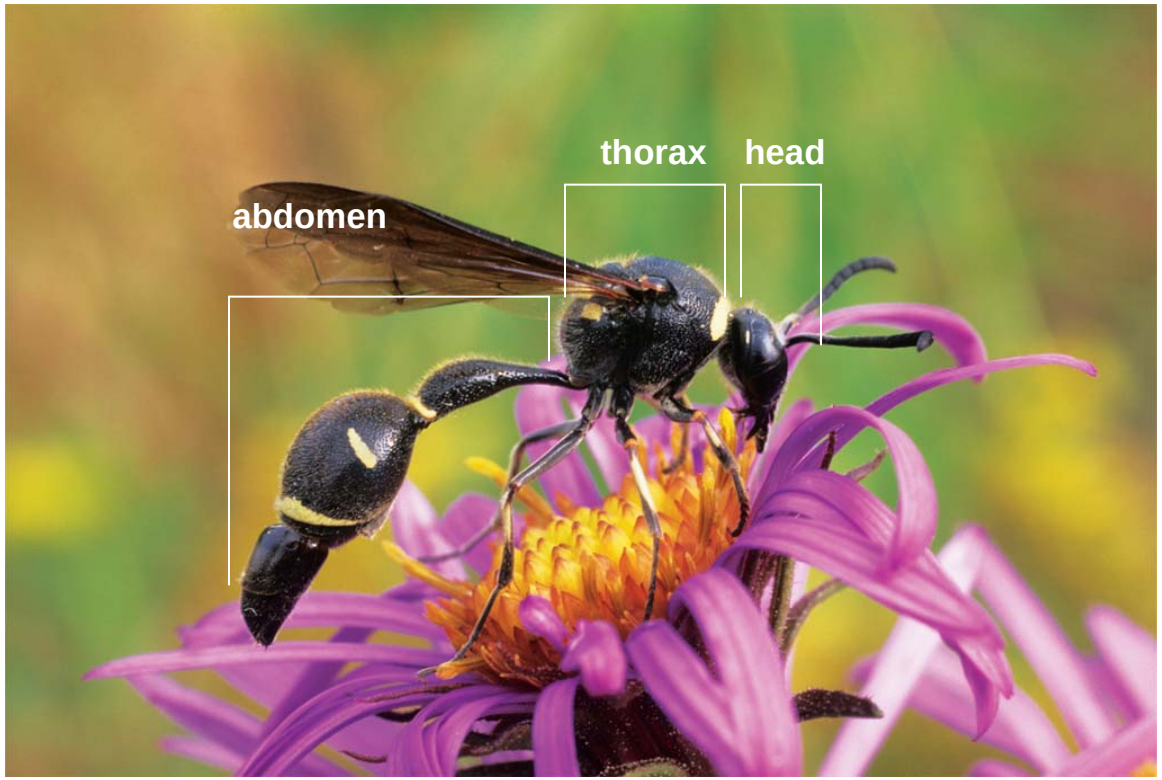
KEY CONCEPT

Insects show an amazing range of adaptations.

24.1 Arthropod Diversity

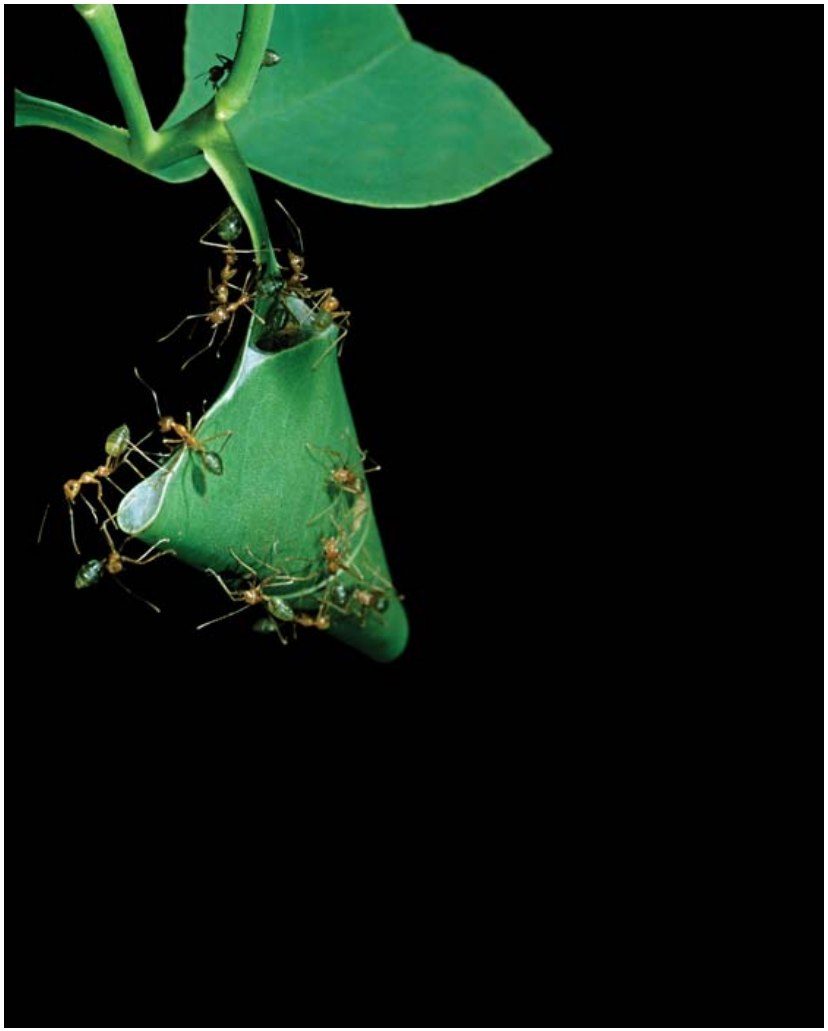
Insects are the dominant terrestrial arthropods.

- Insects are in nearly every ecological niche.
- Insects have a body with three parts.
  - head
  - thorax
  - abdomen



24.1 Arthropod Diversity

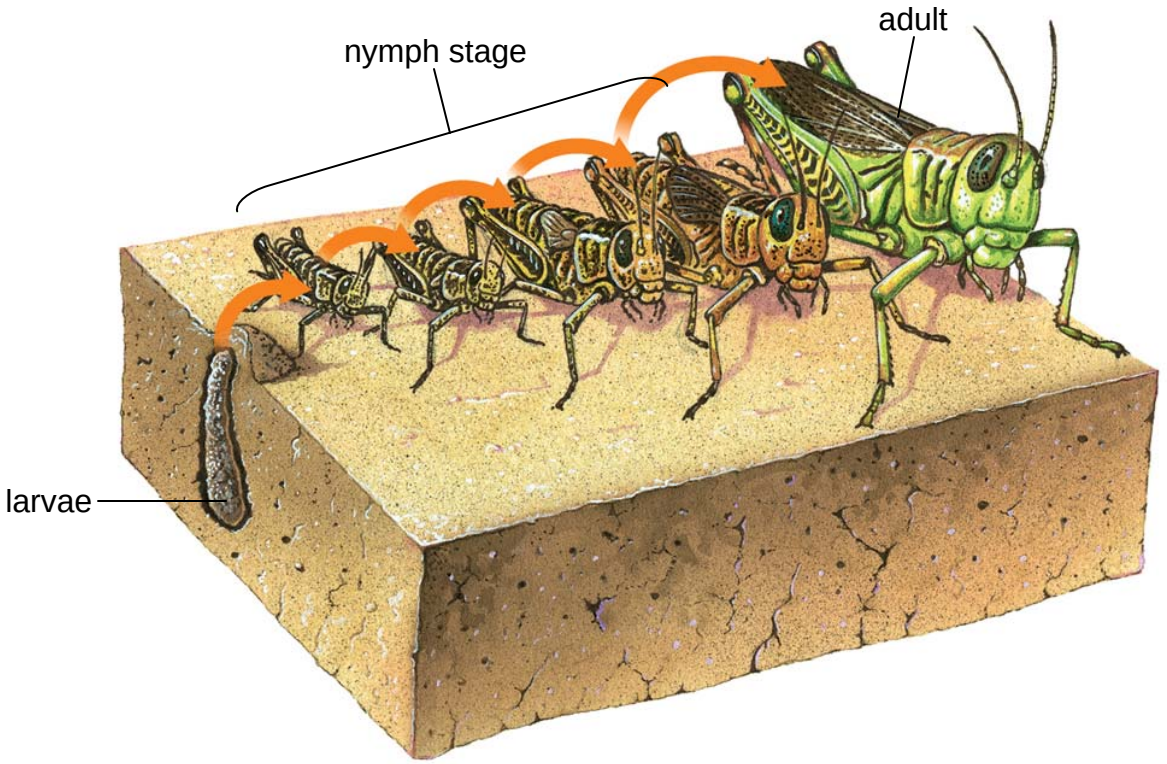
- Some insects live independently, others live in social colonies.



24.1 Arthropod Diversity

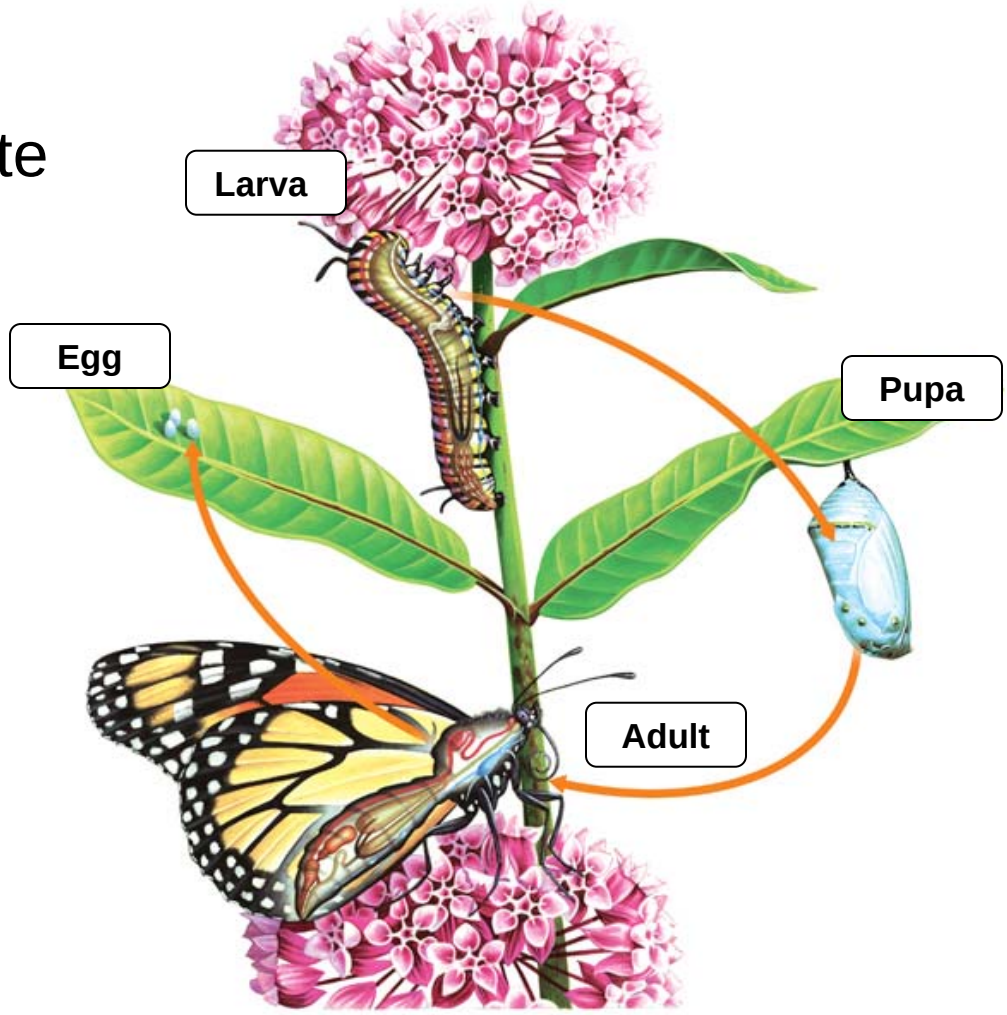
Insects undergo metamorphosis.

- In incomplete metamorphosis, insects look like miniature adults when they hatch.
- There are three life stages of incomplete metamorphosis.
  - larva
  - nymph
  - adult



24.1 Arthropod Diversity

- In complete metamorphosis, the insect changes form entirely.
- There are three life stages of incomplete metamorphosis.
  - egg
  - larva
  - pupa
  - adult



24.1 Arthropod Diversity

- **Insects have adapted to life on land.**
  - The evolution of flight occurred in insects 400 million years ago.

24.1 Arthropod Diversity

- An insect's mouth parts are adaptations related to its specialized diet.
  - sucking mouth parts

24.1 Arthropod Diversity

– chewing mouthparts