



Orthoptera

Grasshoppers / Locusts / Crickets / Katydids

The name Orthoptera, derived from the Greek "*ortho*" meaning straight and "*ptera*" meaning wing, refers to the parallel-sided structure of the front wings (tegmina).

Classification & Distribution	Life History & Ecology	Physical Features	Economic Importance	Major Families	Bug Bytes
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• Classification & Distribution

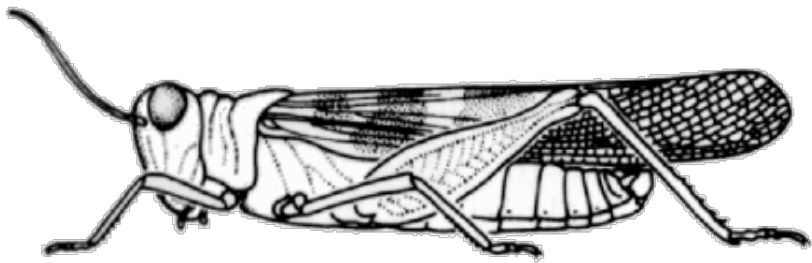
- Hemimetabola
 - incomplete development (egg, nymph, adult)
- Orthopteroid
 - closely related to Blattodea and Dermaptera
- Distribution: Common and abundant throughout the world

	North America	Worldwide
Number of Families	11	28
Number of Species	1,080	>20,000

• Life History & Ecology

Orthoptera probably arose during the middle of the Carboniferous period. Most living members of this order are terrestrial herbivores with modified hind legs that are adapted for jumping. Slender, thickened front wings fold back over the abdomen to protect membranous, fan-shaped hind wings. Many species have the ability to make and detect sounds. Orthoptera is one of the largest and most important groups of plant-feeding insects.

• Physical Features



Adults

- Antennae filiform
- Mouthparts mandibulate, hypognathous
- Pronotum shield like, covering much of thorax
- Front wings narrow, leathery (tegmina); hind wings fan-like
- Hind legs usually adapted for jumping (hind femur enlarged)
- Tarsi 3- or 4-segmented
- Cerci short, unsegmented

Immatures

- Structurally similar to adults
- Developing wingpads often visible on thorax

• Economic Importance

Orthoptera is generally regarded as a dominant group in most terrestrial habitats. These insects feed on all types of plants and often cause serious economic damage. Swarms of grasshoppers (locusts) regularly appear in parts of Africa, Asia, and North America and destroy crops over wide land areas. Mole crickets are major pests in lawns and golf courses in the southern United States. Several species of field crickets are reared commercially as fish bait.

• Major Families

Grasshoppers and Locusts:

- **Acrididae** (short-horned grasshoppers and locusts) -- Herbivores. Common in grasslands and prairies. This family includes many pest species such as the two-striped grasshopper (*Melanoplus bivittatus*), the differential grasshopper (*M. differentialis*), the African migratory locust (*Locusta migratoria*), and the desert locust (*Schistocerca gregaria*).
- **Tetrigidae** (pigmy grasshoppers) -- Herbivores. Similar to short-horned grasshoppers but with a pronotum that extends to the back of the abdomen.

Katydid:

- **Tettigoniidae** (long-horned grasshoppers and katydids) -- Herbivores. Females have a long, blade-like ovipositor. Some species are pests of trees and shrubs.

Crickets

- **Gryllidae** (true crickets) -- Herbivores and scavengers. Females have a cylindrical or needle-shaped ovipositor. This family includes the house cricket, *Acheta domesticus*.
- **Gryllacrididae** (camel crickets) -- Scavengers. Most species have a distinctly hump-backed appearance; a few are cave dwellers.
- **Gryllotalpidae** (mole crickets) -- The front legs are adapted for digging. Most species feed on the roots of plants, but some are predatory.

• Bug Bytes

- In many species of Orthoptera, the males use sound signals (chirping or whirring) in order to attract a mate. The sound is produced by stridulation -- rubbing the upper surface of one wing against the lower surface of another wing, or the inner surface of the hind leg against the outer surface of the front wing.
- Each stridulating species produces a unique mating call. In fact, some species may be so similar to each other that they can only be distinguished by their mating calls.
- Many grasshoppers produce ultrasonic mating calls (above the range of human hearing). In some species, the sounds may be as high as 100 kHz. (Human hearing extends to about 20 kHz.)
- Species that produce sound also have auditory (tympanal) organs. In crickets and katydids, these "ears" are on the tibia of the front legs. In grasshoppers, they are on the sides of the first abdominal segment.
- The snowy tree cricket, *Oecanthus fultoni* (family Gryllidae), is often called the temperature cricket. Adding 40 to the number of chirps it makes in 15 seconds will equal the ambient temperature in degrees Fahrenheit.
- The redlegged grasshopper *Melanoplus femurrubrum* is not only a crop pest but also the intermediate host for a tapeworm *Choanotaenia infundibulum* that infests poultry