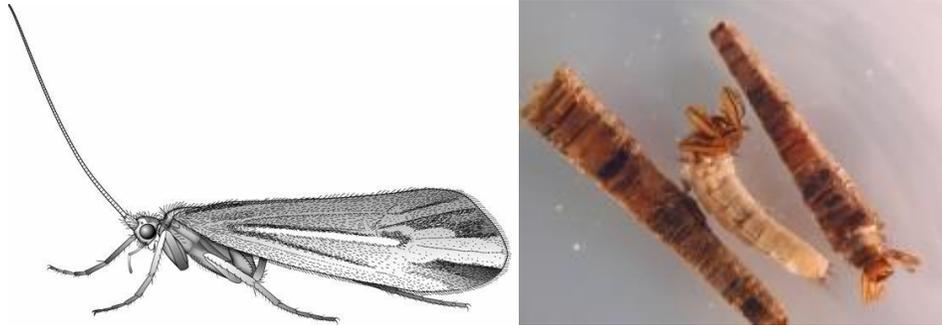


The Insect Orders V: Trichoptera and Lepidoptera

Trichoptera: The caddisflies



Caddisfly adult, left, (University of Minnesota) and larvae, right (University of Iowa)

Tricho = hair; ptera = wings; refers to the hair-covered wings of adults.

Web sites to check:

[Trichoptera on the NCSU General Entomology page](#)

[Trichoptera on BugGuide](#)

[Trichoptera illustrations \(http://tolweb.org/images/Trichoptera/8230\)](http://tolweb.org/images/Trichoptera/8230)

Description and identification:

Adult:

- Mouthparts: sucking (reduced, sometimes vestigial)
- Size: Medium
- Wings: 4, hair-covered
- Antennae long and filiform (hairlike)
- Other characteristics: Prominent palps; reduced mandibles

Immatures:

- Aquatic, caterpillar-like; 2 hooks near posterior of abdomen; most in cases (caddises) made of stones, twigs, etc.

Metamorphosis: Complete

Habitat: Aquatic

Pest or Beneficial Status: Indicators of water quality and important as fish food

Lepidoptera: The butterflies and moths

Lepido = scale; ptera = wings

Web sites to check:

- [Butterfly gallery \(http://www.butterflywebsite.com/gallery/\)](http://www.butterflywebsite.com/gallery/)
- [Lepidoptera at Wikipedia](#)
- [Lepidoptera on the NCSU General Entomology page](#)

Description and identification:

Adult:

- Mouthparts: sucking (coiled proboscis)
- Size: minute to large
- Wings: 4 (some wingless); scale-covered; fore and hind wings coupled in flight by a bristle (frenulum) or flap (jugum) to function as a single wing
- Antennae: long and capitate in butterflies; variable in moths
- Other characteristics: Adults feed on nectar and other liquids (some do not feed as adults); butterflies are diurnal (active during daylight); moths generally are nocturnal or crepuscular (active at dusk).

Immatures:

- Caterpillars ... head with short antennae and [stemmata](#) on each side; 10 abdominal segments with 5 or fewer pairs of prolegs with [crochets](#) (hooks)

Metamorphosis: Complete

Habitat: On plants ... virtually all are plant eaters

Pest or Beneficial Status: Many plant pests (but those that eat weeds are beneficial); many species appreciated for their beauty

Overall, adults have scale-covered wings; hind wings and forewings are linked to function as one. Mouthparts of adults form a sucking proboscis (or are vestigial). Larvae are caterpillars with short antennae, 6 simple eyes (called stemmata, pretty much the larval equivalent of ocelli) on each side of the head, and up to 5 pairs of abdominal prolegs (with crochets).

Larvae include leaf-feeders (external and leaf mining); root feeders, and wood borers. Many undergo one generation per year; many overwinter as eggs (some as larvae; few as adults).

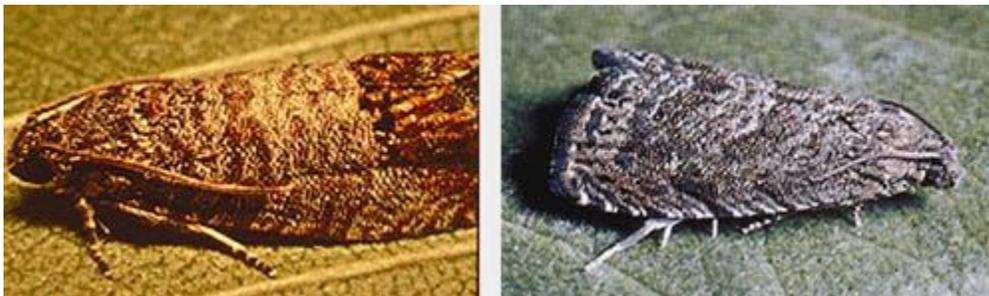
	Butterflies	Moths
Pupae	colorful, sculptured	brown, smooth
Cocoons	no, usually a naked chrysalis	yes, thin or thick
Time of adult activity	daytime	night (or crepuscular) (some day-flying groups)
Antennae	slender and knobbed	filiform, setaceous, or plumose
“Body type”	thin, “light”	broader, heavier
Coloration	bright, colorful	dull

The "butterfly vs. moth" separation is based mainly on antennal characteristics; other structures now provide primary basis for taxonomy. Phylogenetic groupings previously were based on the presence of a jugum (a coupling flap at the front of the hind wing) and similar venation in fore and hind wings in the Jugatae versus the presence of a frenulum (a coupling hair at the fore margin of the hind wing) and different fore and hind wing venation in the Frenatae. Now systematists identify the suborder Microlepidoptera and two groups based on the number of genital openings in the female. For most of us, the generalizations above are still useful.

Some important Lepidopteran families include:

Family Tortricidae:

- Small, usually tan or brown; wings marked by bands or mottled areas.
- Front wings are square tipped; wings at rest are held roof-like over the body.
- Larvae of many are leafrollers or leaf tiers; some bore into tissue.
- Examples: codling moth, *Cydia pomonella*, oriental fruit moth, *Grapholitha molesta*, and the spruce budworms, *Choristoneura fumiferana* and *C. occidentalis*.



Codling moth (left), oriental fruit moth (right)

Family Sesiidae: The clearwing moths

- Most of the area of the forewings and/or hind wings lacks scales; many species resemble wasps.
- Many are brightly colored and nearly all are active during the day.
- Larvae bore into roots, stems, crowns, canes, and trunks of annual and woody plants.

- Examples include: squash vine borer, *Melittia cucurbitae*, lesser peach tree borer, *Synanthedon pictipes*, and the ash/lilac borer, *Podosesia syringae*.



Lesser peachtree borer

See: ash/lilac borers at

http://extension.cropsciences.illinois.edu/fruitveg/insects/ashlilac_borers/.

(Superfamily) Pyraloidea: The snout and grass moths.

- Front wings are elongate and triangular
- Labial palps are scaled and project forward as a snout
- Examples include the European corn borer, *Ostrinia nubilalis*, sod webworms in the genus *Crambus*, the Indian meal moth, *Plodia interpunctella*, and several species of *Dioryctria* that bore into the cambium of pines and other conifers.



European corn borer moth

More illustrations: [European corn borer](#), [Dioryctria sp. damage](#)

Family Lasiocampidae: The tent caterpillars and lappet moths

- Medium sized and stout bodied moths, gray to brown in color
- Body, legs, and eyes are hairy
- Antennae somewhat feathery in both sexes
- Examples include the tent caterpillars in the genus *Malacosoma*.



Eastern tent caterpillar (left) and damage (right)

Family Saturniidae: The giant silkworm moths

- Large moths with brightly colored markings.
- Larvae feed on trees and shrubs.
- Examples include: the cecropia moth, *Hyalophora cecropia*, the luna moth, *Actias luna*, the Io moth, *Automeris io*, and the polyphemus, *Antheraea polyphemus*.



Io moth, *Automeris io*

See also ... [cecropia moth](#)

Family Sphingidae: The sphinx or hawk moths

- Medium to large, heavy bodied; long, narrow front wings. Body is pointed, front and back.
- Antennae often thickened at the middle or toward the tip.

- Larvae of most species have a horn or spine on the dorsum of the 8th abdominal segment
- Some species form a pitcher-like pupa in the soil (proboscis is the handle)
- Examples include the tobacco and tomato hornworms, *Manduca sexta* and *M. quinquemaculata*, respectively. Larvae commonly are parasitized by braconid wasps.

Illustrations: [tobacco hornworm](#).

Family Lymantriidae: The tussock moths and relatives

- Medium sized moths usually dull in color
- No ocelli
- Larvae are hairy, most feed on trees. Examples: the white-marked tussock moth, *Orgyia leucostigma*, and the gypsy moth, *Lymantria dispar*

Illustrations: [Gypsy moth](#); use the clickable links at this page to reach the illustrations).



Gypsy moth females laying eggs (left); gypsy moth damage (right)

Family Noctuidae: The noctuids (underwings, dagger moths, owlet moths, etc.)

- The largest family in the order -- >2,900 species in North America
- Medium sized, heavy-bodied moths with the front wings somewhat narrow and the hind wings broadened.
- Labial palps usually long, antennae usually filiform, may be brushlike in males.
- Larvae are more or less smooth and dull colored.
- Examples: cabbage looper, *Trichoplusia ni*, black cutworm, *Agrotis ipsilon*, corn earworm, *Heliothis zea*, and armyworm, *Pseudaletia unipuncta*



Corn earworm larva

Another common noctuid is the [black cutworm](#).

In addition to the groups of moths discussed above, see also the web sites and text pages for the species listed below:

- [Diamondback moth](#), *Plutella xylostella* (Lepidoptera: Plutellidae)
- [Fall webworm](#), *Hyphantria cunea* (Lepidoptera: Arctiidae)
- [Bagworm](#), *Thyridopteryx ephemeraeformis* (Lepidoptera: Psychidae)
- [Yellownecked caterpillar](#), *Datana ministra* (Lepidoptera: Notodontidae)

Butterfly families of interest include:

Papilionidae, the swallowtails

- Adults are large butterflies (75-150 mm wingspan), and the hind wings of most have tail-like extensions.
- Larvae are usually smooth-bodied with an eversible scent gland or osmeterium on the dorsal prothorax. Large eyespots also make them appear to be larger creatures.



Spicebush swallowtail adult (left) (Clemson University) and larva (right) (Auburn University).

Family Pieridae, the whites, sulfurs, and orange-tips

- Small to medium butterflies, usually white or yellowish, with dark markings near the margins of the wings.
- Larvae often covered with fine hairs that give a velvety appearance
- Common species include the cabbage white, the alfalfa butterfly, and clouded sulphur



Cabbage butterfly adult (left) (Cornell University) and larva (right) (Kansas State University)

Family Nymphalidae, the brush-footed butterflies. (The subfamily Danainae, which contains the [monarch butterfly](#), previously was recognized as a family (Danidae) but now is considered to be part of the Nymphalidae. Similarly, the subfamily Satyrinae, which includes the satyrs, wood nymphs, and arctics, previously was recognized as a family (Satyridae) but is now considered to be part of the Nymphalidae)

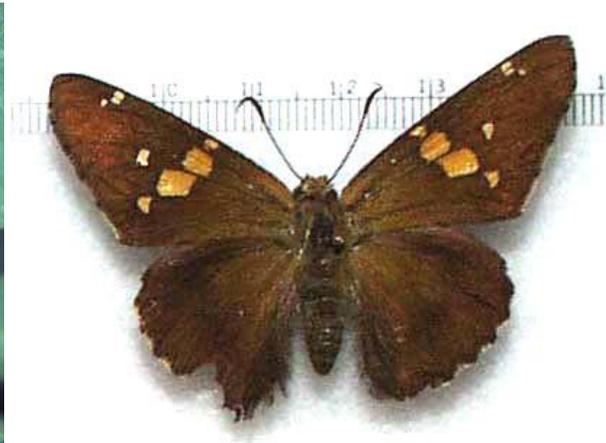
- Medium-sized butterflies
- Front legs greatly reduced and without tarsal claws. Only the middle and hind wings are used for walking.
- Many common species: monarch, viceroy, fritillaries, crescents, red admiral, comma, question mark, mourning cloak, redspotted purple, painted lady, and more.



Red admiral butterfly (Clemson University)

Family Hesperidae, the skippers (not all lepidopterists consider skippers to be butterflies)

- Small and stout-bodied.
- Antennae are widely separated at the base, usually hooked at the tip.
- Some have tail-like extensions of the hind wings, but these insects are much smaller than the swallowtails
- Flight is fast and erratic
- Fore and hind wings held at different angles when at rest



Silverspotted skipper larva (left) (Texas A & M University) and adult (right) (University of Arizona)

For information on the identification and life histories of Illinois butterflies, see "***Field Guide to Butterflies of Illinois***," by John Bouseman and Jim Sternberg (of the Illinois Natural History Survey and the University of Illinois (ISBN: 1-882932-05-6). This book contains lots of great color photos and sells for only \$19.95. (Hint: a good Christmas present for little brothers and sisters and for parents and grandparents.)