

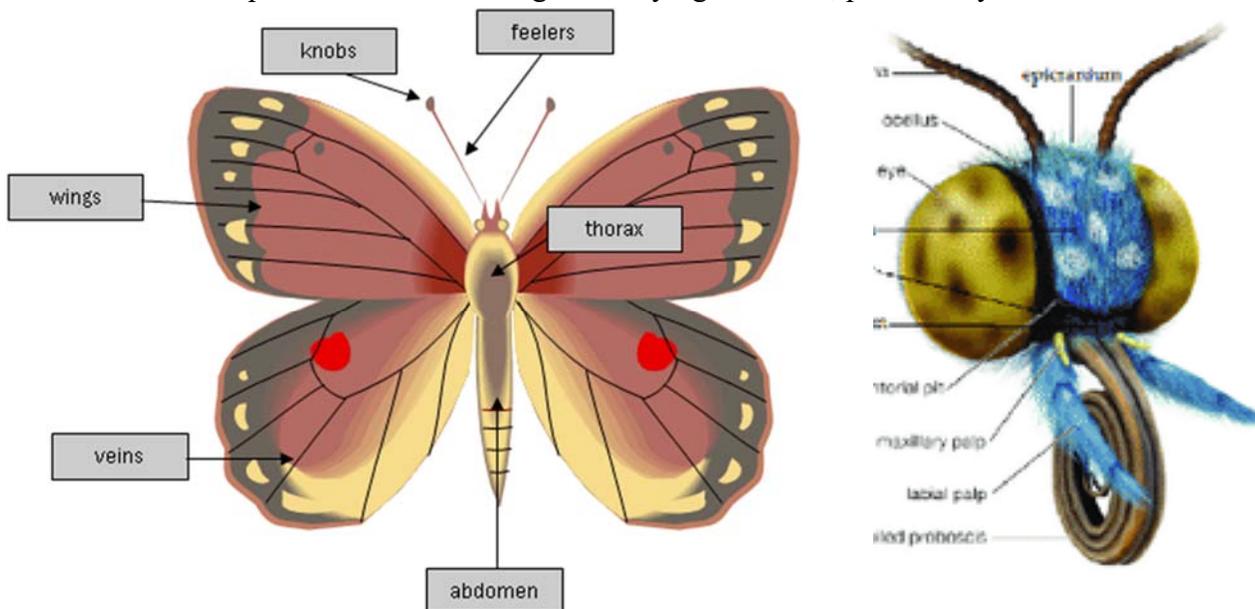
Order
Lepidoptera

Derivation: (Gk. *lepís* = scale; *petron* = a wing)

Common name: (butterflies and moths)

Metamorphosis: Complete (Holometabolous) - **Distribution:** Worldwide - **Number of families:** more than 120

The Lepidoptera is one of the major insect orders, both in terms of **size**, with some 160,000 described species in more than 120 families, and in terms of **popularity**, with many amateur and professional entomologists studying the order, particularly the **butterflies**.



Three (1- **Zeugloptera**, 2- **Aglossata**, 3- **Heterobathmiina**) of the four suborders contain few species and lack the characteristic **proboscis** of the largest suborder, 4-**Glossata** (includes all the superfamilies of moths and butterflies that have a coilable proboscis).



Adult lepidopterans that feed utilize nutritious liquids, such as **nectar** and **honeydew** from live and decaying plants, and a few species **pierce fruit**. However, none suck sap from the vessels of live plants. Many species supplement their diet by feeding on **nitrogenous animal wastes**.

Most **larvae** feed on higher plants and form the major insect **phytophages**; a few “primitive” species feed on **non-angiosperm** (non-flowering) plants, and some feed on **fungi**. Several are **predators** and others are **scavengers**, notably amongst the **Tineidae** (wool moths).

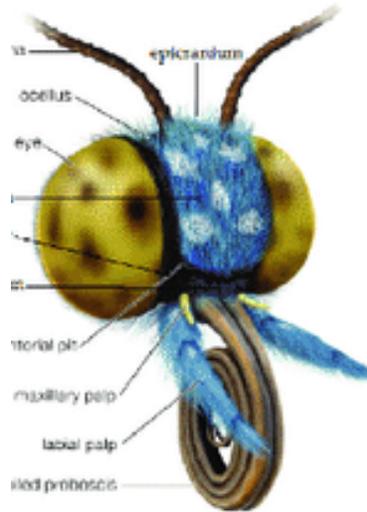
Butterflies are **day-flying** whereas most **moths** are active at **night or dusk**. In life, butterflies hold their wings together vertically above the body in contrast to moths, which hold their wings flat or wrapped around the body; a few lepidopteran species have **brachypterous** adults and sometimes completely **wingless** adult females.



Diagnostic characters:

Lepidopteran adults can be recognized by:

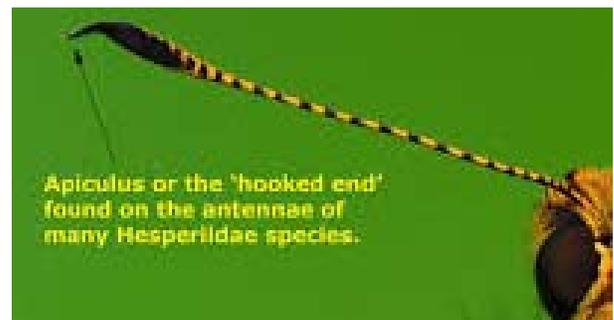
- *Adult lepidopterans range in size from very small (some **microlepidopterans**) to large (with wingspans up to 30 cm).*
- *The head is **hypognathous**, bearing a long coiled proboscis formed from greatly elongated **maxillary galeae**; large labial palps are usually present, whereas other mouthparts are absent, although mandibles are primitively present.*



- The compound eyes are large, and **ocelli** and/or **chaetosemata** (paired sensory organs lying dorsolateral on the head) are frequent.

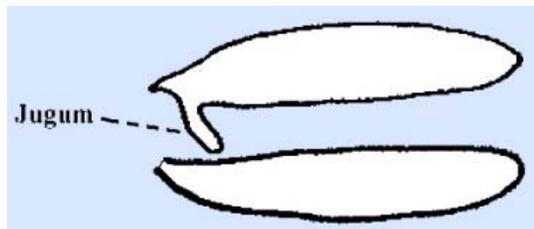
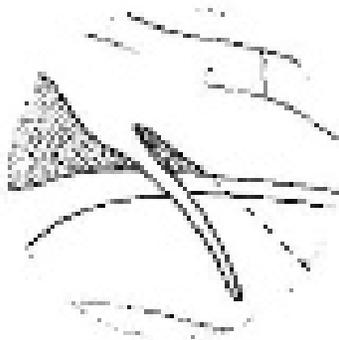
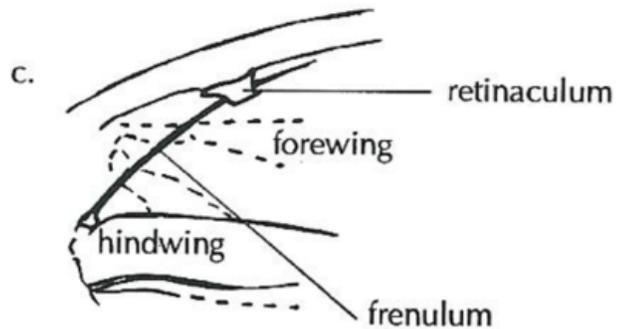
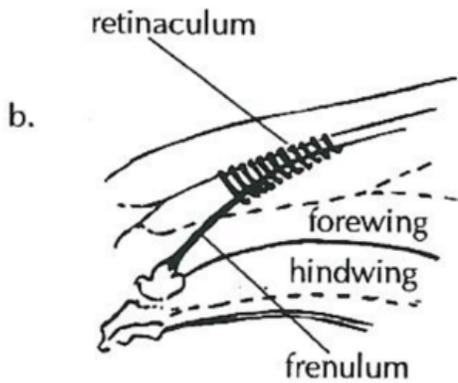
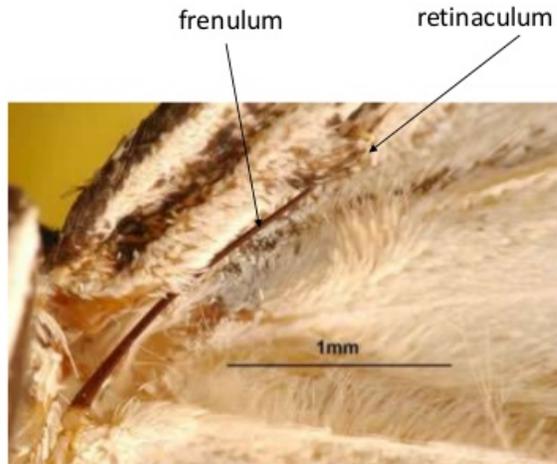
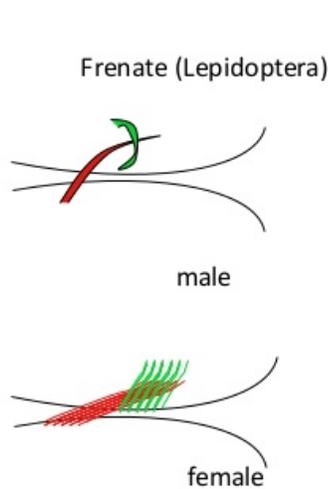


- The antennae are multisegmented, often pectinate in moths and knobbed or clubbed in butterflies.



- The prothorax and metathorax are small, whereas the mesothorax is large and bears a scutum and scutellum, and a lateral **tegula** protects the base of each fore wing.
- The wings are completely covered with a double layer of scales (**flattened modified macrotrichia**).
- Hind and fore wings are linked by **a frenulum, jugum, or simple overlap**.

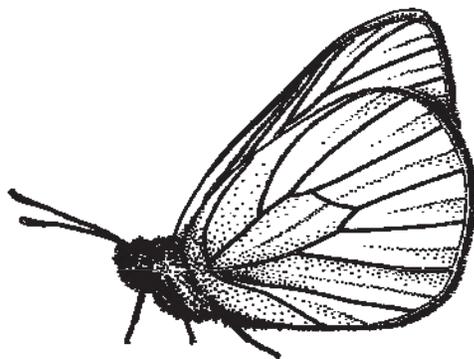
Wing Coupling mechanism in Lepidoptera is either 'Frenate' or 'Amplexiform'



- Wing venation consists predominantly of longitudinal veins with few cross-veins and some large cells, notably the discal.
- The legs are long and usually gressorial, with five tarsomeres.
- The abdomen is 10-segmented, with segment 1 variably reduced, and segments 9 and 10 modified as external genitalia.



- Internal female genitalia are very complex.
- Premating behavior including **courtship** often involves pheromones. Encounter between the sexes is often aerial, but copulation is on the ground or a perch. Eggs are laid on, close to or, more rarely, within a larval host plant. Egg numbers and degree of aggregation are very variable.
- Diapause is common.



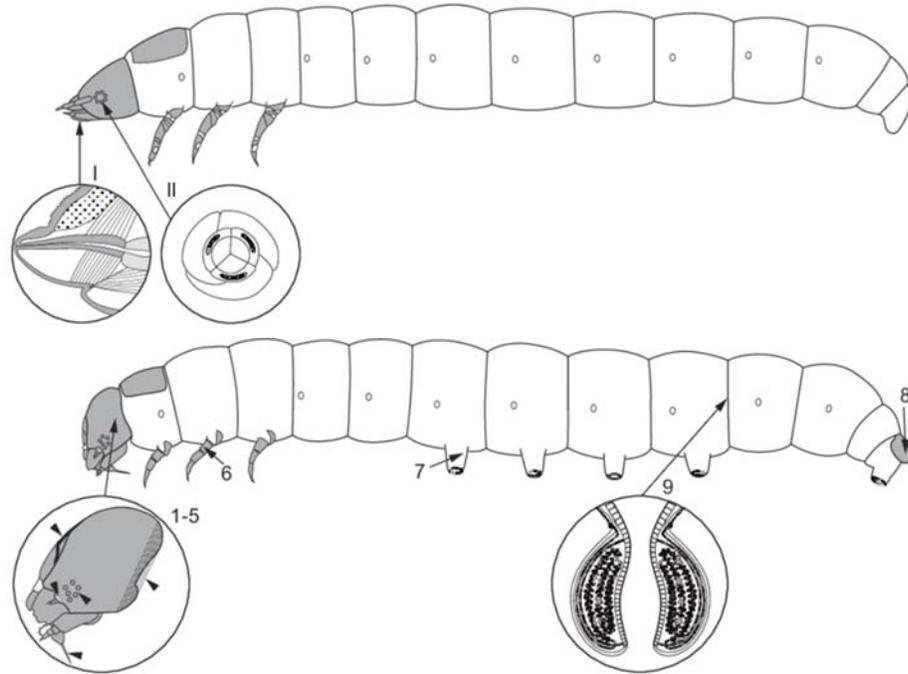
cabbage white butterfly, Pieridae: *Pieris rapae*



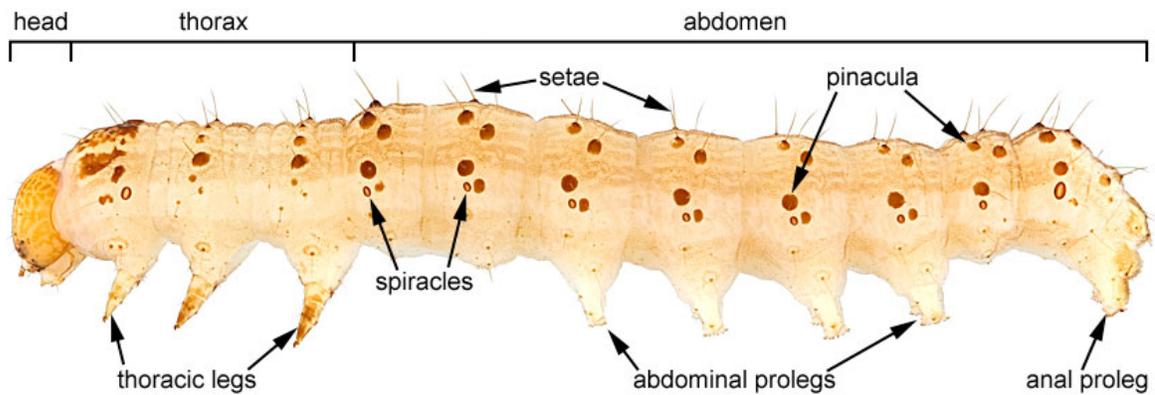
garden tiger moth, Arctiidae: *Arctia caja*

Lepidopteran larvae can be recognized by:

- With Sclerotized, hypognathous or prognathous head capsule
- Mandibulate mouthparts



- Usually six lateral **stigmata** (= simple eyes)
- Short three-segmented antennae
- Five-segmented thoracic legs with single claws
- 10- segmented abdomen with short prolegs on some segments (usually on 3–6 and 10, but may be reduced)



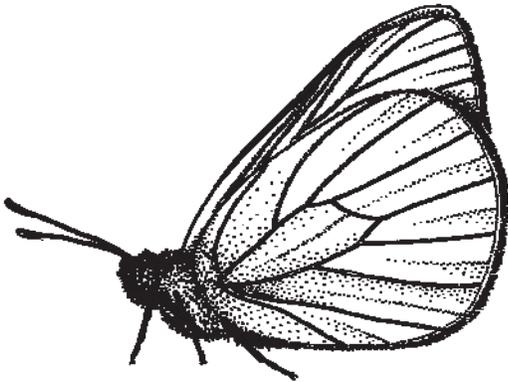
- Silk-gland products are extruded from a characteristic **spinneret** at the median apex of the labial prementum.

- The pupa is usually contained within a silken cocoon, typically **adecticous (have no mandible)** and **obtect**, with only some abdominal segments unfused; the pupa is exarate in primitive groups.



Keys to the major economic families of Lepidoptera

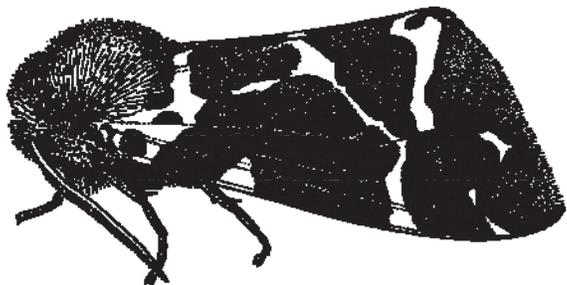
- 1. Antennae thread-like and knobbed at tip; wings without frenulum; ocelli absent (**Butterflies**) 2



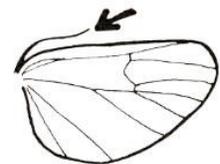
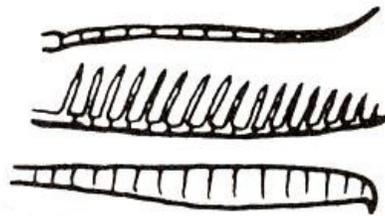
cabbage white butterfly, Pieridae: *Pieris rapae*



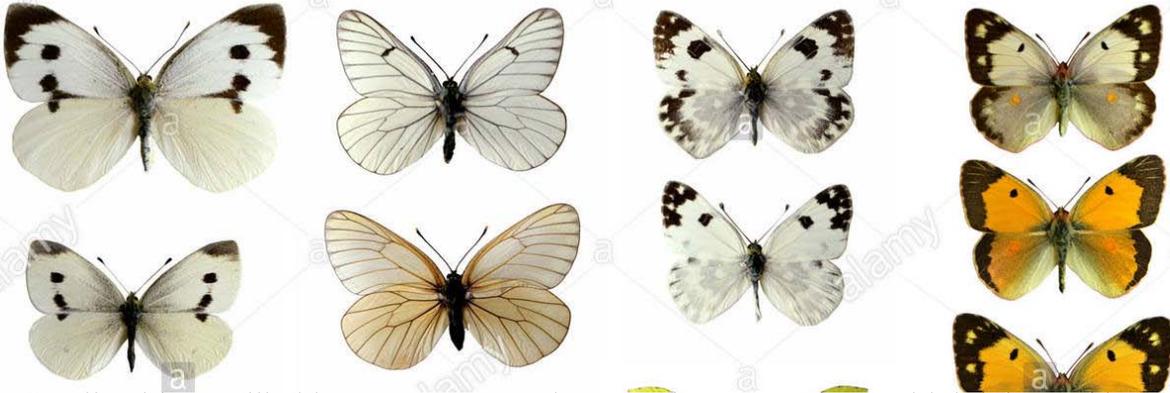
- Antennae of various forms, but usually not knobbed, if antenna clubbed, then frenulum present; ocelli often present (**Moths**) 3



garden tiger moth, Arctiidae: *Arctia caja*



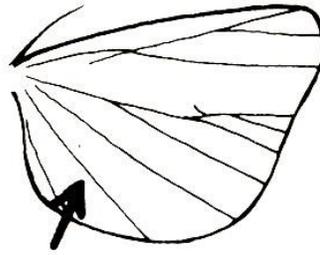
2. Small to medium sized, with white, yellow or orange wings often marked with black ... **Pieridae**



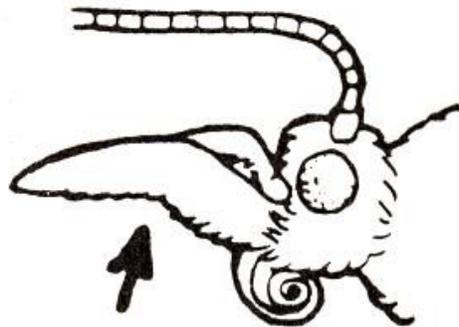
- Small, with metallic blue green, copper, bronze wings, sometimes with bright markings and / or tiny tail-like **Lyceanidae**



3. Hind wing with soft scales and small anal region; palpi not usually long 4



- Hind wing with firm, fine scales and large anal regions; palpi often large and forming snout-like projections **Pyralidae**

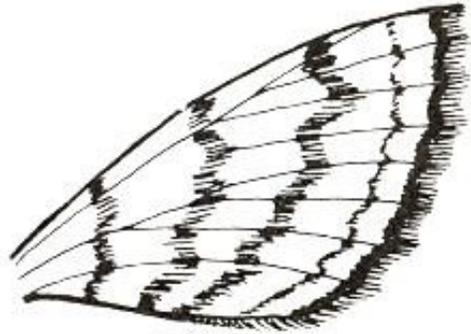


4. Fore wings usually long, narrow and pointed apically; hind wings usually shorter than forewing; body stout and tapered at both ends**Sphingidae**



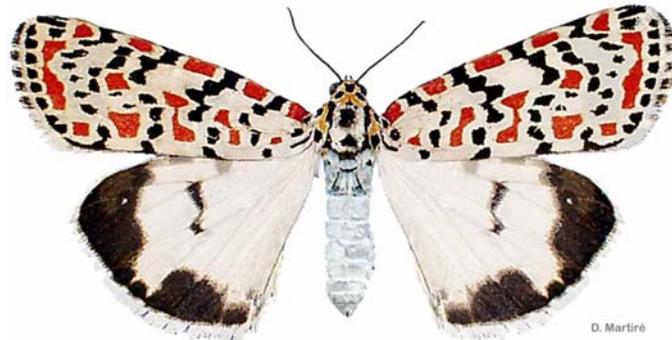
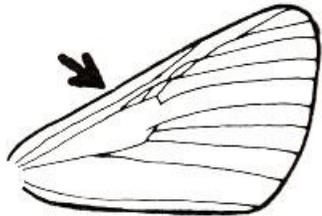
- Fore wings short, wide, and broad apically; hind wings often nearly as large as fore wings; body not usually tapering and usually slender5

5. Body and legs slender with few or no hairs; forewings marked with wavy parallel bands; hind wings usually smaller than forewings**Geometridae**



- Body and legs robust, either very hairy or spiny; fore wings without wavy parallel bands6

6. Fore wings brightly marked in contrasting colors, sometimes white or yellow; vein below discal cell in hind wing 4-branched**Arctiidae**



- Fore wings usually dull, grey or brown; vein below discal cell in hind wing often pears 3 branched [*antennae usually thread like*]**Noctuidae**



Suborder: Glossata
Order: Lepidoptera
Family: Pieridae

Pieris rapae

cabbage butterfly
أبودقيق الكرنب



Suborder: Glossata
Family: Lycaenidae
Deudorix livia

Pomegranate butterfly
أبودقيق الرمان



Suborder: Glossata
Family: Nymphalidae
Vanessa cardui

painter lady butterfly
أبودقيق الخبازي



Suborder: Glossata
Family: Papilionidae
Papilio demoleus

lemon or lime butterfly
أبودقيق الموالح



Suborder: Glossata
Family: Pyralidae
Hellula undalis

cabbage webworm
حفار ساق الكرنب



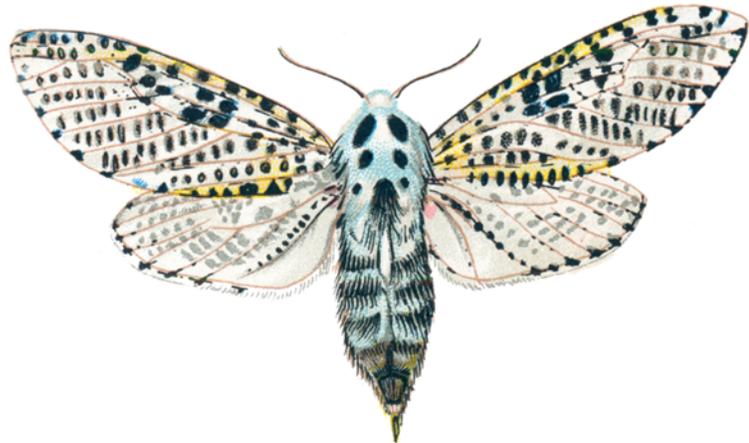
Suborder: Glossata
Family: Bombycidae
Bombyx mori

domestic silk moth
فراش دود الحرير



Suborder: Glossata
Family: Cossidae
Zeuzera pyrina

wood leopard moth
فراش حفار ساق التفاح



Suborder: Glossata

Family: Noctuidae

Earias insulana

Egyptian bollworm, spiny bollworm or cotton spotted bollworm

فراش دود اللوز الشوكية



D. Martini

Suborder: Glossata

Family: Noctuidae

Spodoptera littoralis

African cotton leafworm or Egyptian cotton leafworm

فراش دود ورق القطن



Suborder: Glossata

Family: Noctuidae

Helicoverpa armigera

cotton bollworm,
فراش دود لوز القطن



Suborder: Glossata

Family: Noctuidae

Agrotis ipsilon

black cutworm, greasy cutworm

فراش الدودة القارضة



Suborder: Glossata
Family: Arctiidae
Utetheisa pulchella

فراش الحنا



Suborder: Glossata
Family: Sphingidae
Hippotion celerio

vine hawk-moth
فراش دود ورق العنب



Suborder: Glossata
Family: Sphingidae
Acherontia Atropos

death's-head hawkmoth
فراش دود ورق السمسم



Suborder: Glossata
Family: Sphingidae
Daphnis nerii

army green moth, oleander
hawk-moth
فراش دود الدفلة



Suborder: Glossata
Family: Sphingidae
Agrius convolvuli

convolvulus hawk-moth
فراش دود ورق البطاطس

