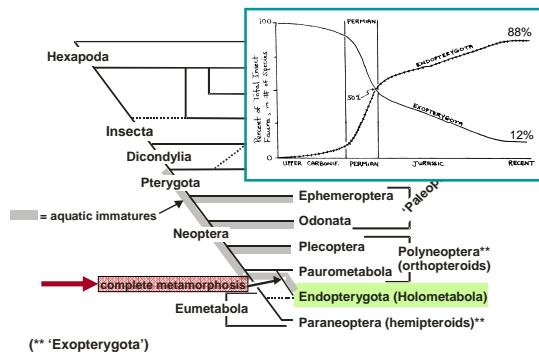
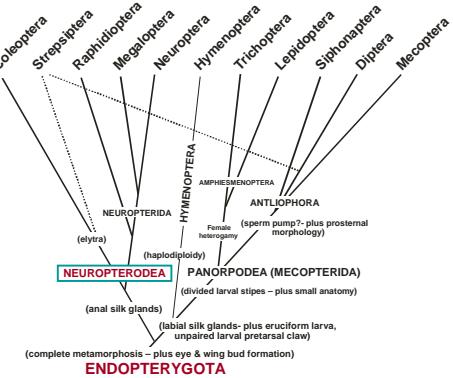


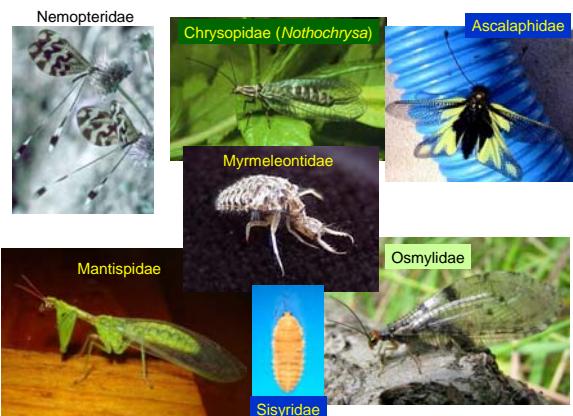
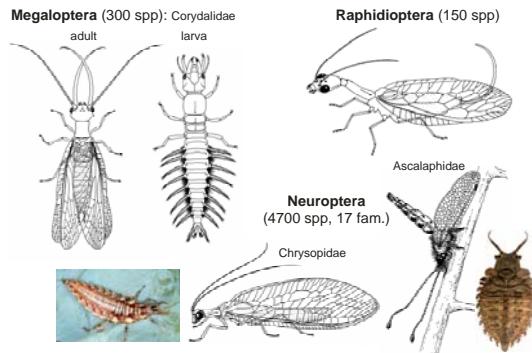
### The Origin of Complete Metamorphosis: Endopterygota



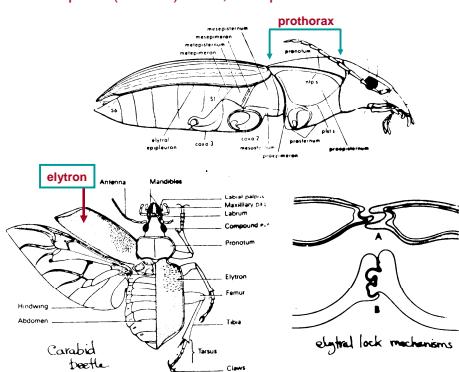
### Neuropterodea (alderflies, snakeflies, lacewings, & beetles)



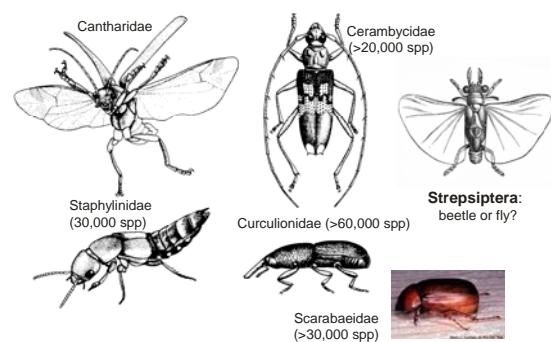
Pterygota, Neoptera, Eumetabola, Endopterygota: Neuropterodea  
Neuropterida (the smaller neuropteroid orders)



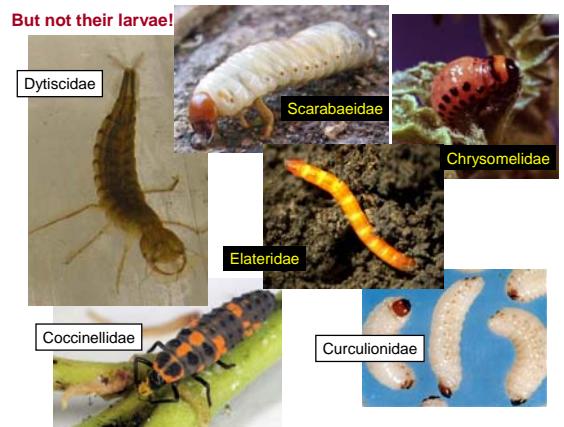
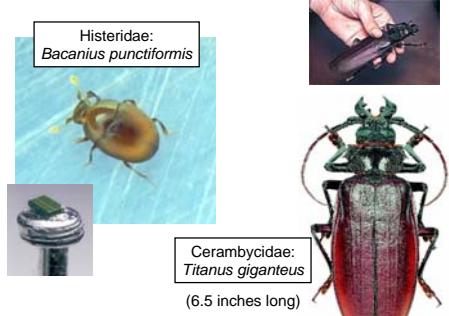
Pterygota, Neoptera, Eumetabola, Endopterygota: Neuropterodea  
Coleoptera (beetles) ~400,000 species in 158 families



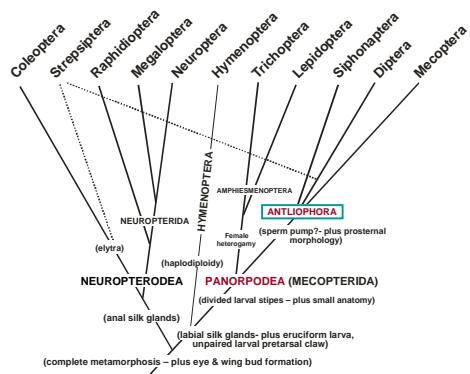
Some well-known families of beetles, plus the mysterious Strepsiptera



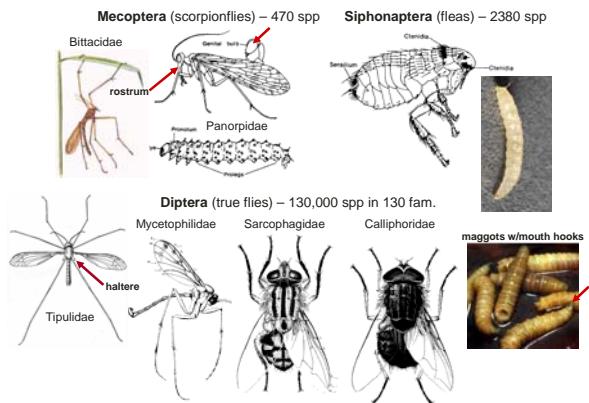
Big or little, beetles pretty much look like beetles...



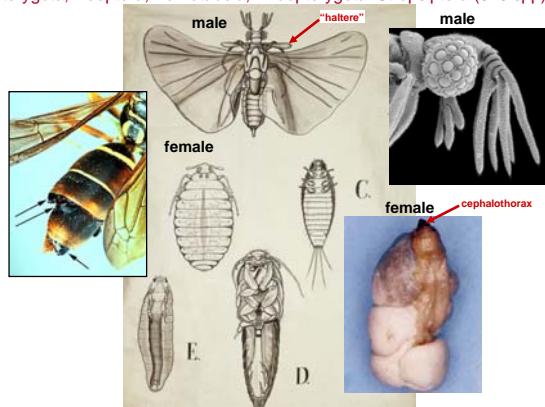
#### Panorpodea 1 – Flies, fleas, and scorpionflies



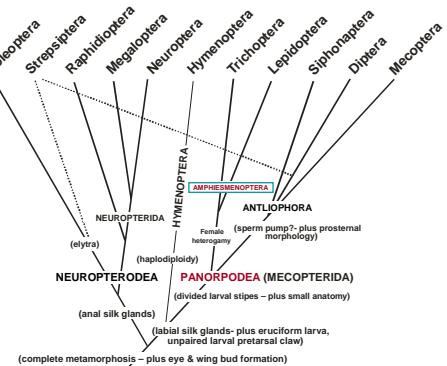
#### Pterygota, Neoptera, Eumetabola, Endopterygota: Antiophora



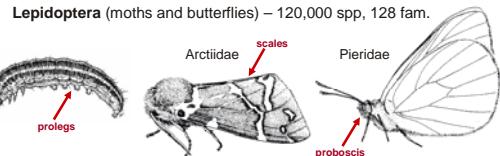
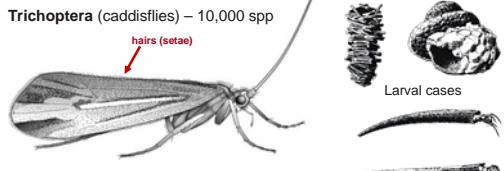
#### Pterygota, Neoptera, Eumetabola, Endopterygota: Strepsiptera (610 spp)



#### Panorpodea 2 – caddisflies, butterflies and moths



Pterygota, Neoptera, Eumetabola, Endopterygota: Amphiesmenoptera



Micropterygidae (Zeugoptera)



Agathiphagidae (Aglossata)



Eriocraniidae ("Daiconypha")



Mesarchaeidae (Exoporia)



Nepticuloidea ("Monotrysia")



Bombycoidea: Atlas moth



Incuvanoidea ("Monotrysia")



Palaephatidae ("Monotrysia")



Tischeriidae ("Monotrysia")



Tineoidea (Ditrysia)



Yponomeutoidea (Ditrysia)



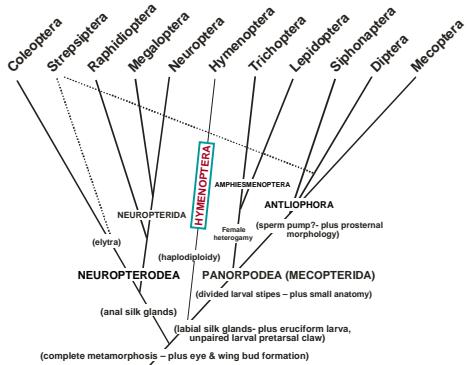
Gelechoidea (Ditrysia)



Papilioidea: Birdwing butterfly

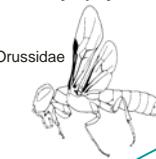


Hymenoptera – sawflies, woodwasps, wasps, ants & bees

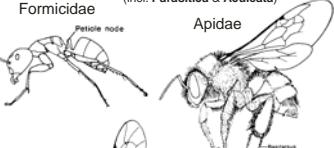


Pterygota, Neoptera, Eumetabola, Endopterygota: Hymenoptera (sawflies, bees, wasps & ants) – 180,000 spp in 91 fam.

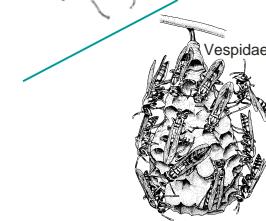
s.o. Symphyta:



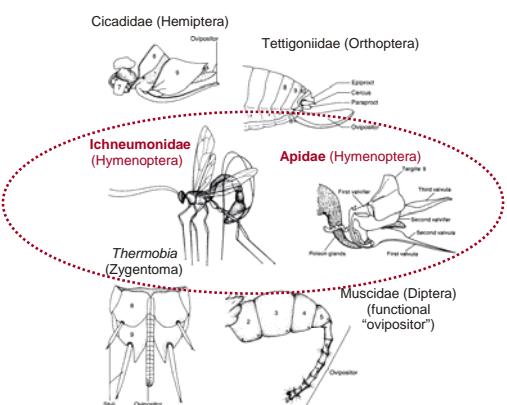
s.O. Apocrita: (incl. Parasitica & Aculeata)



Apidae



Ichneumonidae



s.o. Symphyta

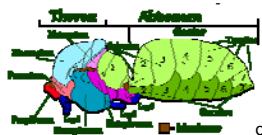


Wood wasps



Key adaptations:

The hymenopteran body is hard to crush;



...but the key to the success  
of the Hymenoptera is **eusociality**:

