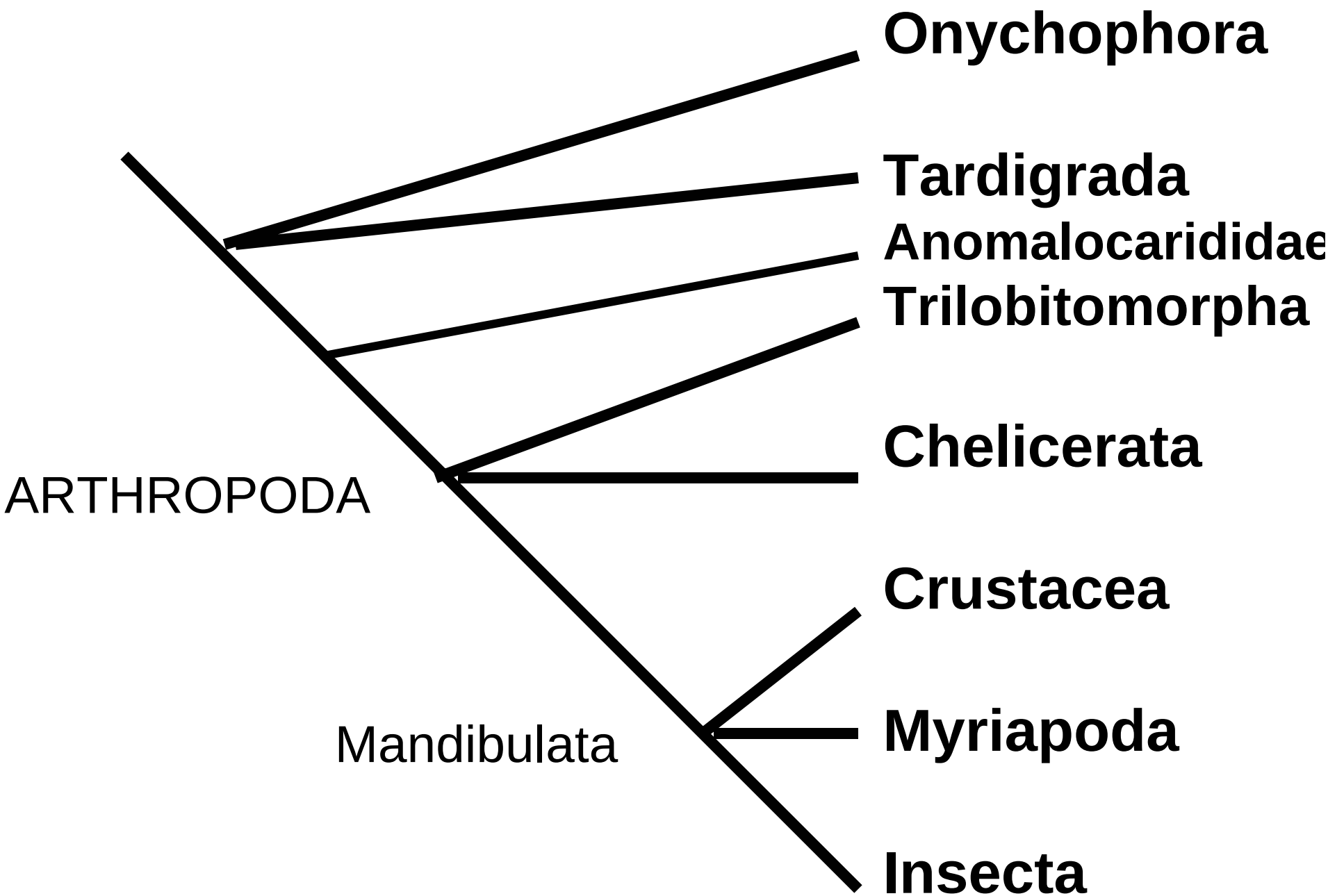
Natural Sciences 360
Legacy of Life
Lecture 08
Dr. Stuart S. Sumida

Finishing Protostomes


Onychophora
Tardigrada
Anomalocarididae
Trilobitomorpha
Chelicerata
ARTHROPODA
Crustacea
Mandibulata
Myriapoda
Insecta

Hurdia – from the Burgess Shale.

Hurdia

Amongst the most primitive and oldest known of true arthropods.

Belongs to a group call the Anomalocarididae.

Known from the Late Cambrian Burgess Shale.

It demonstrates earliest evidence and example of the organization of the “head shield) region.

TRILOBITOMORPHA

- Oldest known of arthropods.
- Excellent examples known back to Cambrian period (about 540 million years ago).
- Survived until Early Permian (about 280 million years ago).
- Usually considered to be very basal (primitive) member of Arthropoda.

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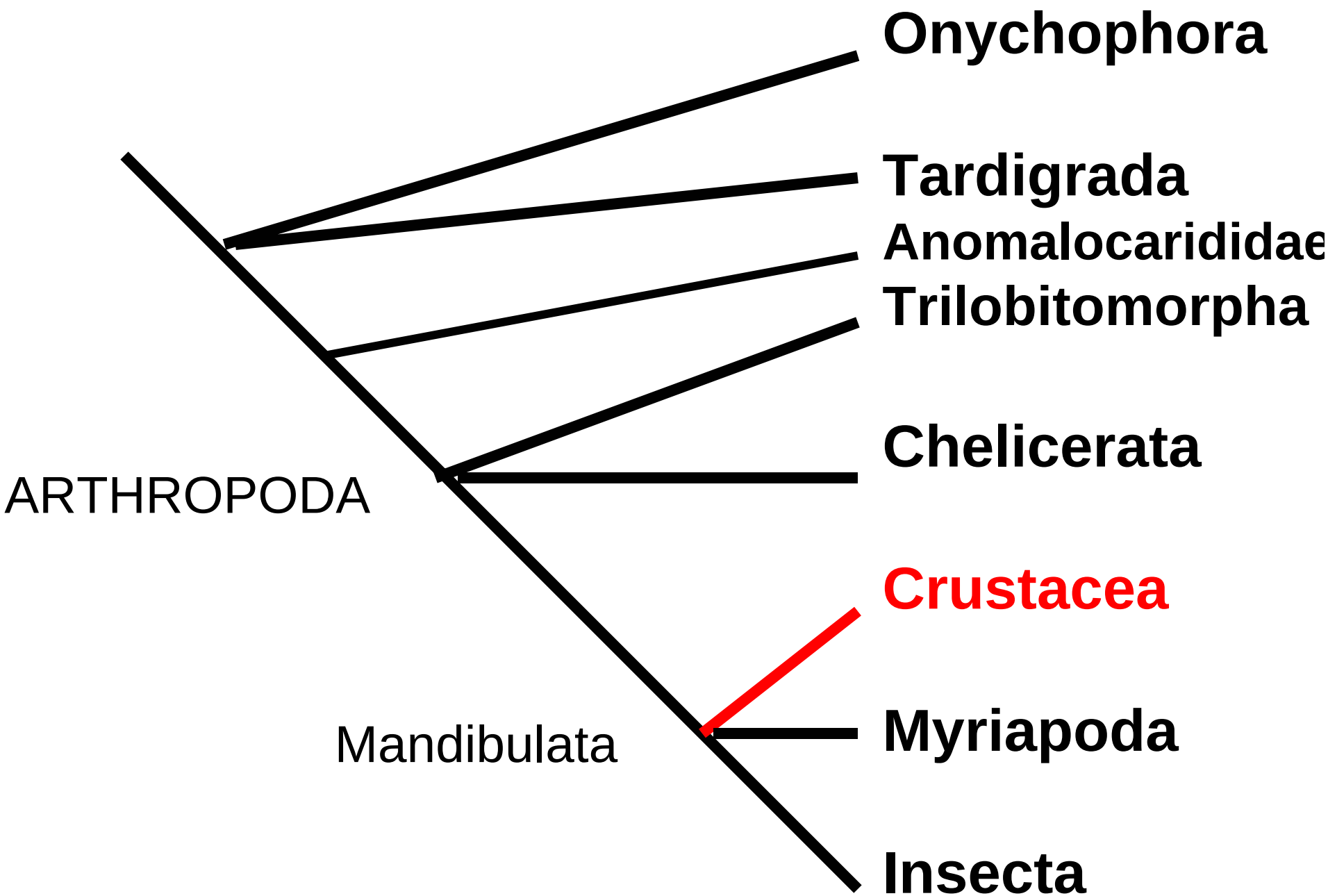
CHELICERATA

Includes spiders, scorpions, eurypterids

Have specialized mouth parts (but not jaws) called chelicerae.

Some eurypterids were up to two meters in length!

Hadrurus arizonensis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MANDIBULATA – Arthropods with jaws. Includes crustaceans, insects, and others

CRUSTACEA
Includes crabs, lobsters, shrimp, one terrestrial group—pill bugs. Primarily marine.

A Crustacean

A Crustacean

Insects are thought to have evolved from MYRIAPODS through the phenomenon known as NEOTONY

NEOTONY – the retention of juvenile features and characters will attaining sexual maturity.

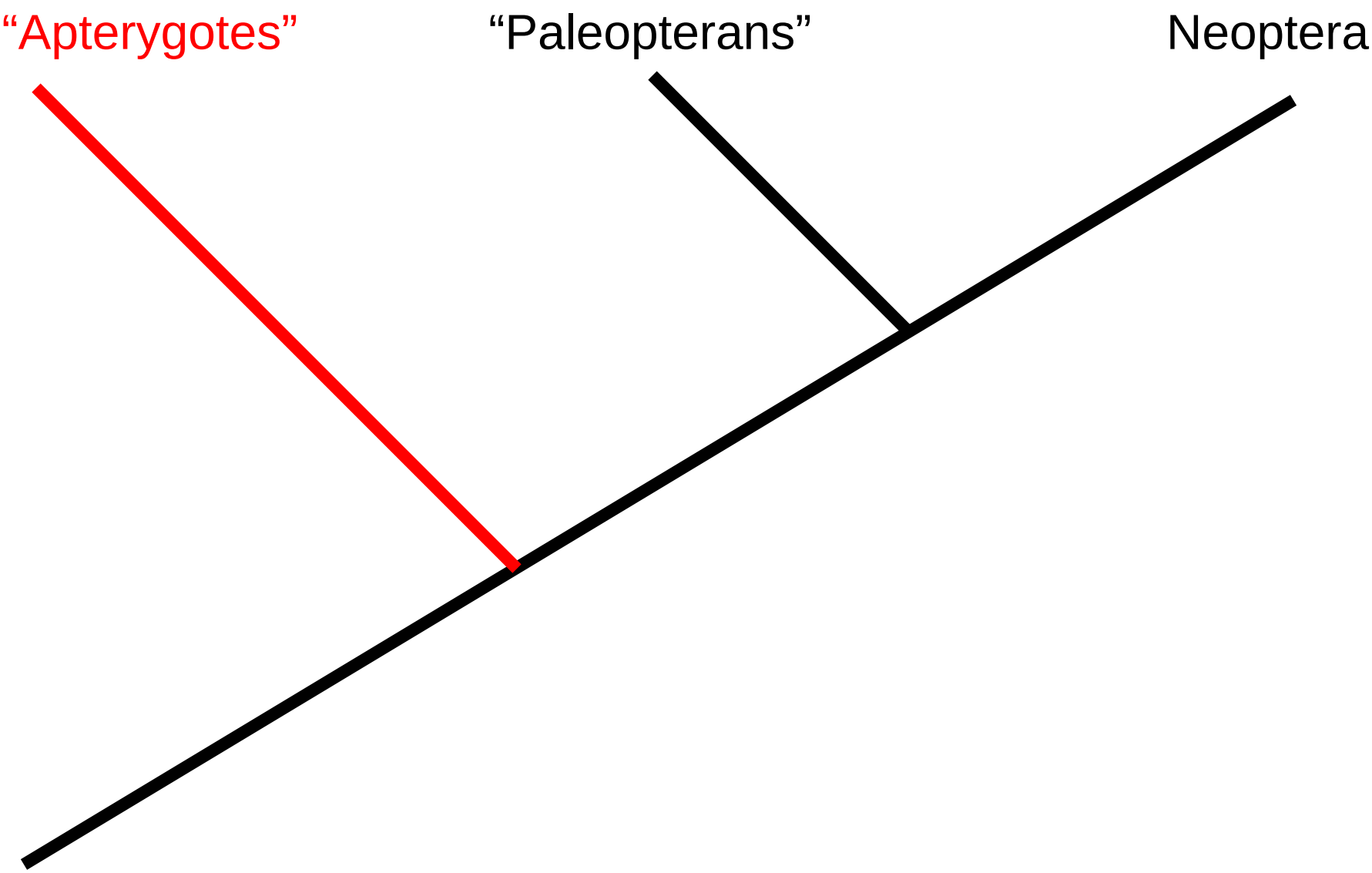
Insects exploited the land with little or no competition.

Key innovations that allowed this:

1st – Chitonous exoskeleton hardened and became more waterproof.

Later (after insects had already appeared) - wings.

The most primitive insects (called APTERYGOTES) did not have wings.



“Apterygotes” are wingless bugs and include things like silverfish and their relatives.

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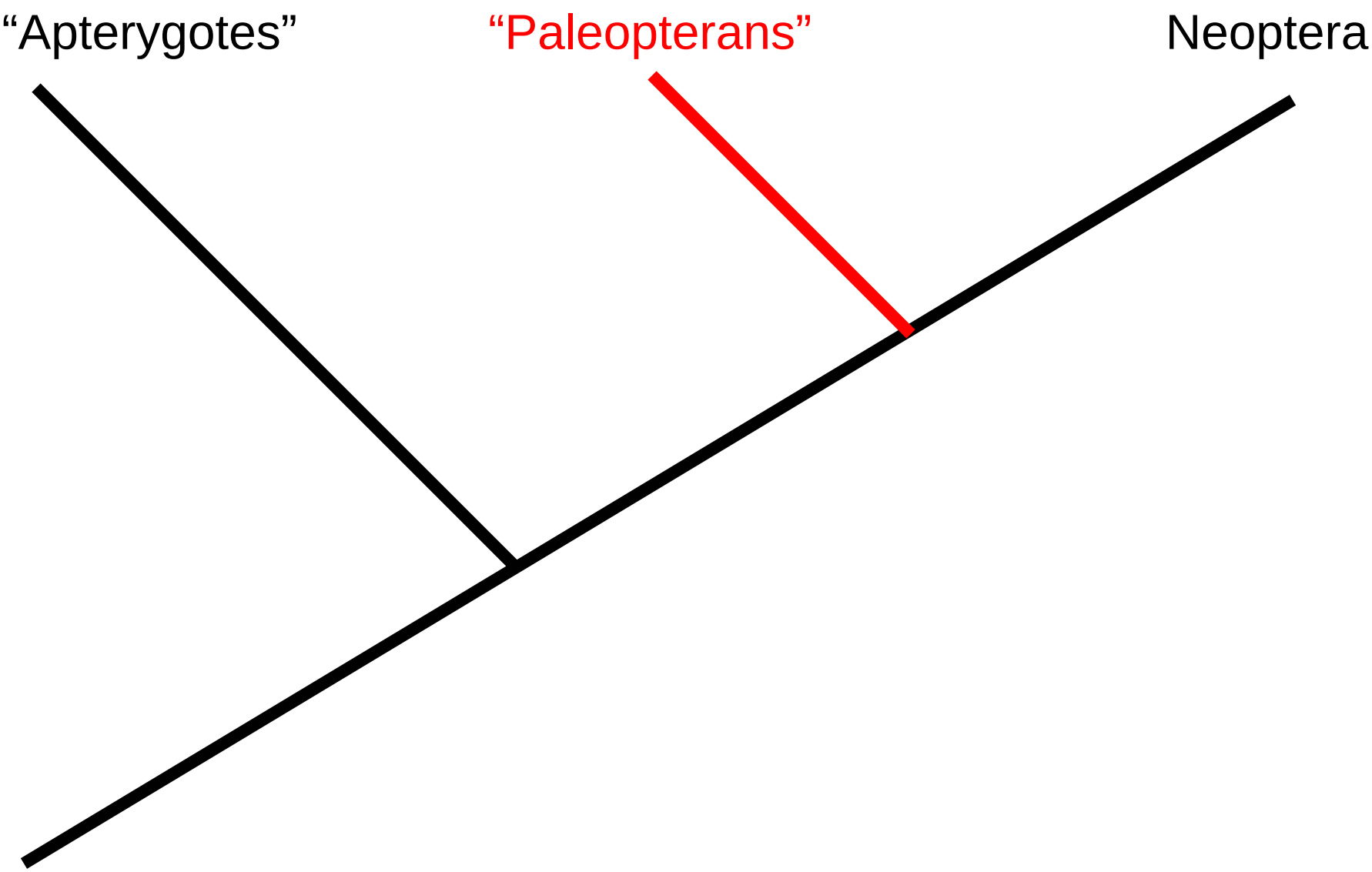


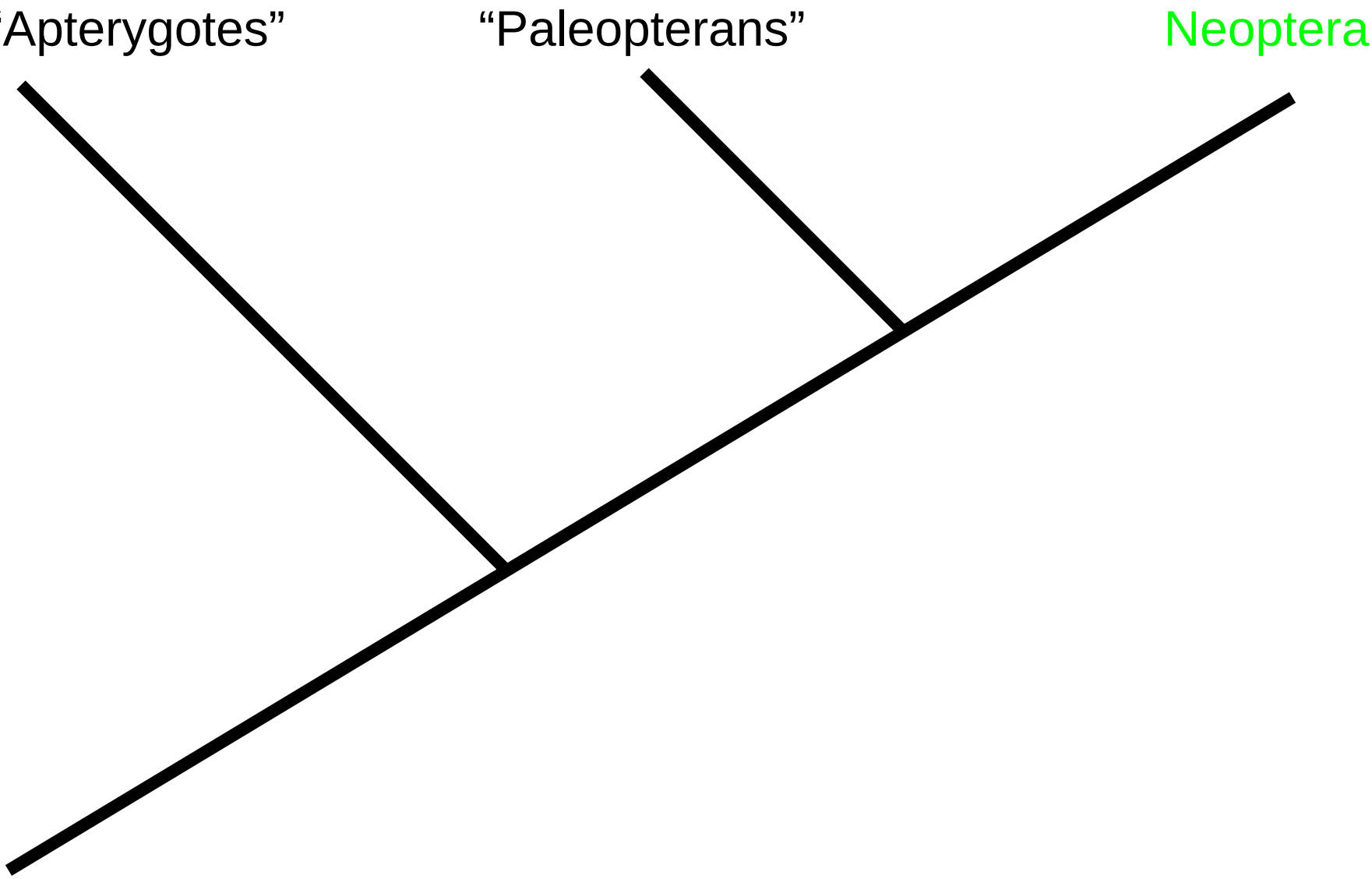
The more primitive winges insecs includde mayflies (Ephemeroptera) and the ODONATA.

The ODONATA includes damselflies and dragon flies.

Original function of insect wings:

Probably not for flight, but for thermoregulation.

The most primitive insects (called APTERYGOTES) did not have wings.



LOTS and LOTS of insect groups:

Amongst the most important:

Coleptera (beetles)
Hymenoptera (ants, bees, wasps, others)
Lepidoptera (moths and butterflies)

Coleoptera (beetles)

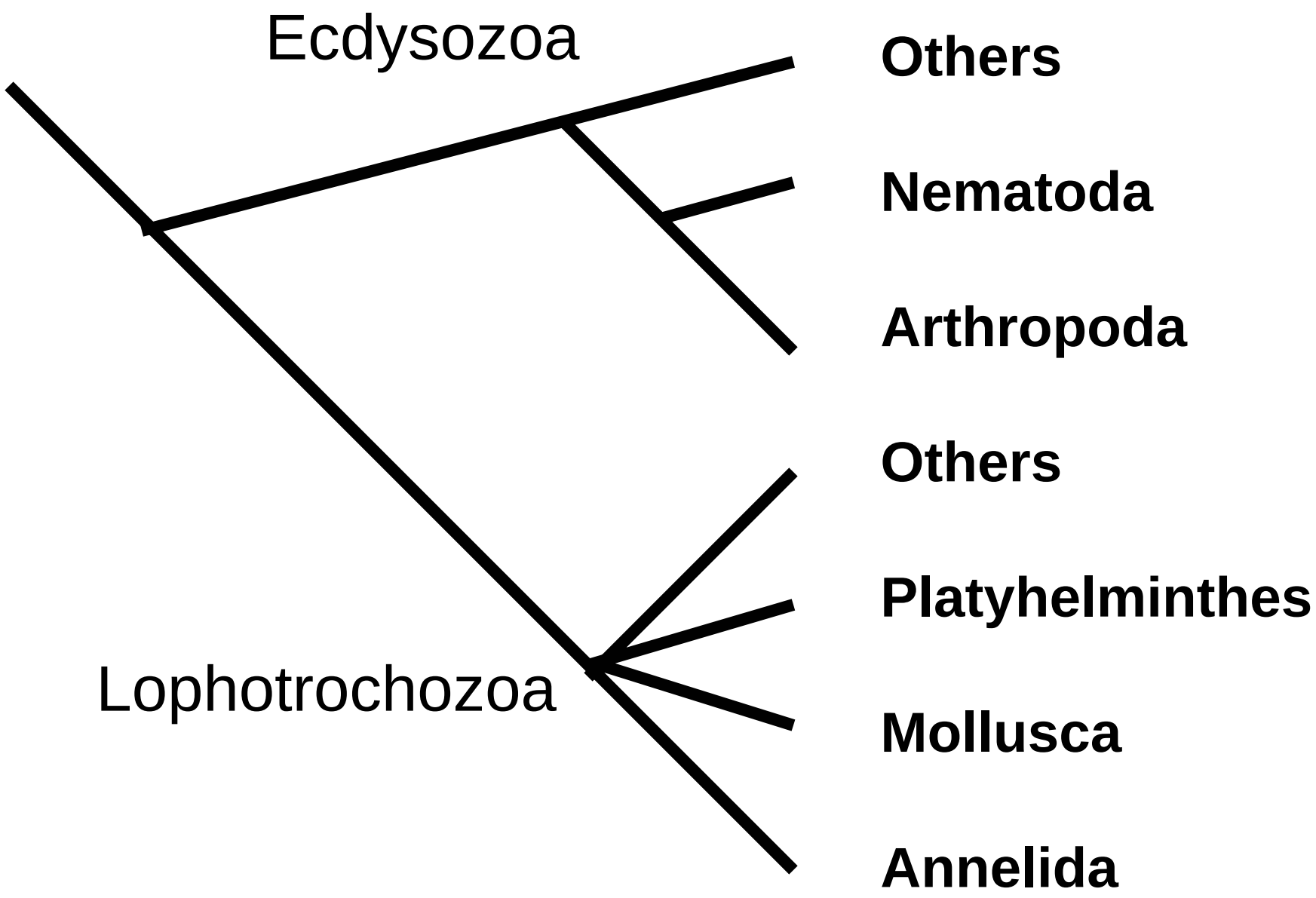
Almost 33% of all known species on the planet.

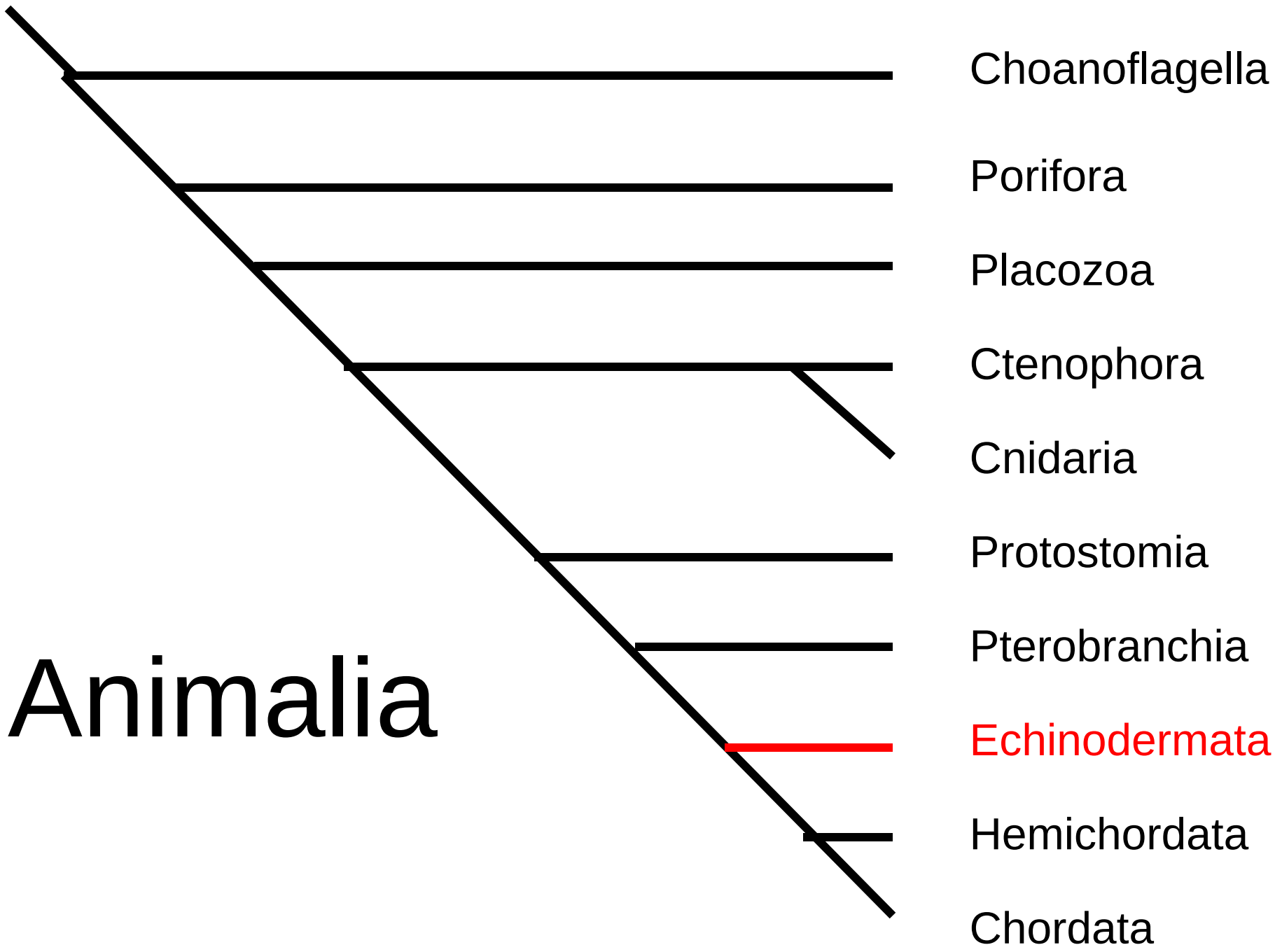
Hymenoptera (ants, bees, wasps, others)

Evolution of extreme examples of social systems

Lepidoptera (moths and butterflies)

Important pollinators, night and day.


Ecdysozoa
Others
Nematoda
Arthropoda
Others
Platyhelminthes
Lophotrochozoa
Mollusca
Annelida


Animalia
Choanoflagella
Porifora
Placozoa
Ctenophora
Cnidaria
Protostomia
Pterobranchia
Echinodermata
Hemichordata
Chordata