Insects Are Crustaceans

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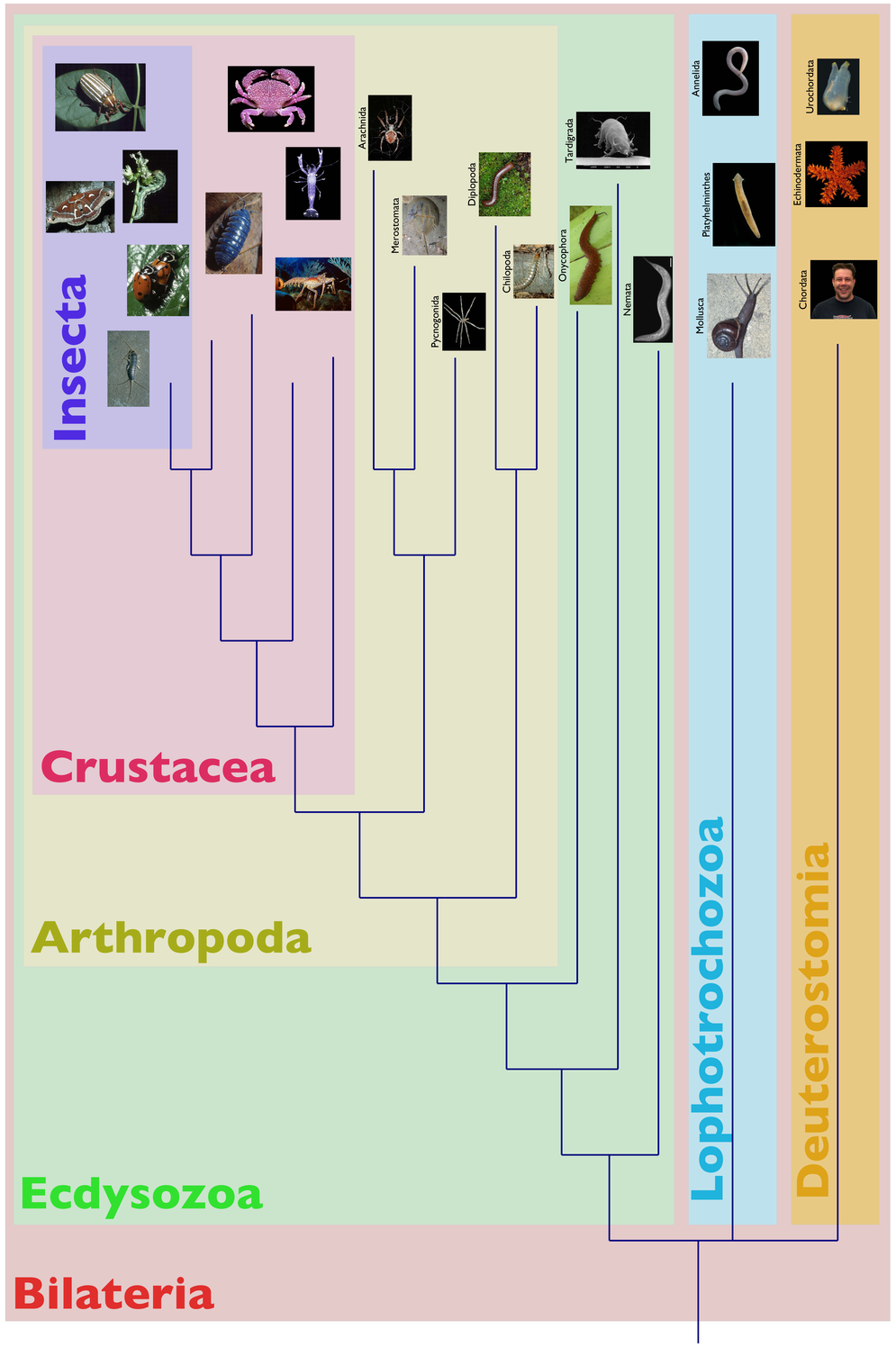
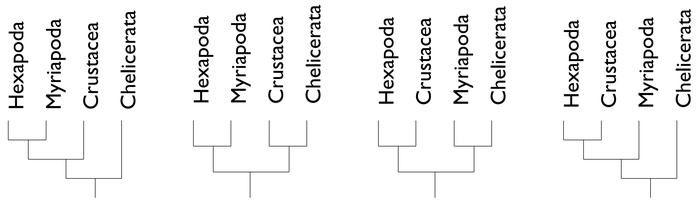


Previous Hypotheses

The study of the evolution within the Arthropoda has been extemely active in recent years. Every imaginable phylogenetic tree has at one time or another been proposed. Four hypotheses are depicted below:



The taxon **Chelicerata** includes spiders, scorpions, horseshoe crabs, ticks, and mites. **Myriapoda** are the centipedes and millipedes. Some recent studies point to the possibility that centipedes and millipedes may not actually be a monophyletic group (data not shown here). **Hexapoda** includes insects and their kin (springtails, proturans, and diplurans). **Crustacea** includes lobsters, shrimp, crabs, barnacles, and pillbugs.

Current Thinking

At the turn of the twentith century W. T. Calman had proposed a close relationship between insects and crustaceans based on comparative anatomical characteristics. Although this idea has not always been favored, recent advances in molecular, neurological, and development biology have renewed the interest in a crustacean – insect relationship. Recent studies (see references) have been adding strong evidence that insects are actually *derived* from a crustacean ancestor and arise from within the Crustacea. Insects are nested within Crustacea. Insects are actually crustaceans!

Life Changes Over Time

Life evolves by descent with modification. That leads to a nested pattern of evolution (as depicted in the tree at left). A lineage always remains as part of its ancestral lineage, even though sub-lineages diverge through time. That means that insects, because they are now believed to have descended from crustaceans, actually *are* crustaceans.

As a more familiar analogy, we now have good evidence that modern-day birds are descended from within the maniraptorian lineage of dinosaurs. That is why we now refer to birds as modern dinosaurs: because their ancestors were dinosaurs, they are still dinosaurs, despite the evolutionary change that has happened since *Velociraptor* walked the world.

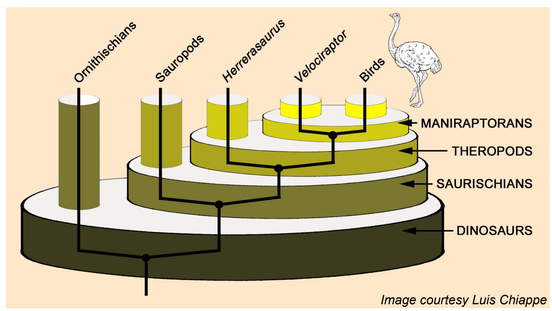


Image courtesy Luis Chiappe

In the evolution of birds from dinosaurs, it turns out that birds are the sole survivor of the ancestral lineages. The evolution of insects within the Crustacea was different: many crustacean "sister lineages" have persisted through time, and are abundant today.

References

A partial list of some recent references on crustacean/insect relationships.

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