

# The Taxonomy of Life



Taxonomy is the practice and science of classifying life forms.



There are 8 main taxonomic ranks:



## The Domains of life

Life forms are divided into two broad Domains: the prokaryotes and the eukaryotes.

**Prokaryotes** have small, simple cells that do not contain a cell nucleus. They are often considered to be very primitive organisms – some of the first to have evolved. Yet they are remarkably hardy and have persisted until today. Some have evolved to live in very extreme environments.

**Eukaryotes** are characterised by more complex cell structures. Each cell contains a nucleus and often other 'organelles' that perform specific functions.

## Kingdom

As modern DNA techniques enable biologists to understand so much more about life on earth, scientists are discovering that life is far more complicated than previously thought. This is particularly true of the small microbial forms of life, and some forms of 'fungi'.

While there is on-going debate about the 2 or 3 microbial Kingdoms, biologists agree on the three higher Kingdoms – Plants, Animals and Fungi.

## Phylum

Phylum groups organisms based on both their general body plan and how internal organs develop, which tends to reflect their evolution.

Phyla (the plural of Phylum) may be hard to guess ... for example, seemingly different-looking, spiders and crabs both belong to the Phylum Arthropoda ; whereas earthworms and tapeworms are similar in shape but are from different Phyla.

Humans belong to the Phylum Chordata, which refers to animals who (for at least some period of their life cycle) have a hollow dorsal nerve cord, some particular mouth and throat structures for feeding and breathing, and a post-anal tail.

## Class

There are no hard rules that a taxonomist needs to follow in describing a class, but for well-known life-forms there is generally good agreement e.g., mammals.

## Order

Most of the organisms being counted here at BioBlitz are being sorted by specialists in particular Classes (e.g., Insects) and Orders (e.g., beetles, moths and butterflies)



# Taxonomy Examples



Biodiversity is life and supports life.

Biodiversity is complex and dynamic.

Biodiversity is the interlinked and inseparable mix of life forms and processes that have evolved over millions of years.



Humans

## Humans

- **Domain** - Eukarya
- **Kingdom** - Animalia/Metazoa
- **Phylum** - Chordata
- **Class** - Mammalia [all mammals]
- **Order** - Primates [arboreal prehensile locomotion; terrestrial bipedal leaping in some cases; Strepsirrhini, Prosimians, also included, oldest living primates, common ancestor with them]
- **Family** - Hominidae [great apes, hominids; fist-walking; family with Ponginae, Orangutans also included, oldest living ones, common ancestor with them]
- **Genus** - Homo [or humans; specific and specialized development of memory/learning/teaching/learning application (learning driven ethology)]
- **Species** - *Homo sapiens* [further development and specialization of learning application]; active environment transformation, acclimatization and control; infrastructures and advanced technology]

## Puriri Moth

- **Domain** - Eukarya
- **Kingdom** - Animalia/Metazoa
- **Phylum** - Arthropoda [creatures with exoskeleton and jointed limbs]
- **Class** - Insecta [all insects]
- **Order** - Lepidoptera [scaled wings, foreleg with moveable process for antenna-cleaning etc.]
- **Family** - Hepialidae [swift moths or ghost moths; tongue reduced and non-functional; antennae short; moderately robust to very large and robust moths]
- **Genus** - *Aenetus* [splendid ghost moths; colour usually green, often with white markings; size large to very large; male with scent-scales on hindlegs; larva initially fungus-feeding on forest floor, later boring in tree-trunks]
- **Species** - *Aenetus virescens* [puriri moth; restricted to New Zealand's North Island; colour variable; females with brown markings; differing from Australian species in details of wing markings and genitalia; larva in various native and introduced trees feeding for up to 5 years, grazing on scar tissue from hole in the trunk.]



Puriri Moth



Basket Fungus

## Basket Fungus

- **Domain** - Eukarya
- **Kingdom** - Fungi
- **Phylum** - Basidiomycota [mushrooms, boletes, bracket fungi, stink horns, jelly fungi, rusts and smuts]
- **Class** - Agaricomycetes [mushrooms, boletes, bracket fungi, and stink horns]
- **Order** - Phallales [stinkhorns, lattice stinkhorns, and some false-truffles with spores enclosed inside a truffle-like fruiting body; mostly saprobes on soil and rotting plant material; spores with strong odour like rotting meat to attract insects for spore dispersal]
- **Family** - Clathraceae [lattice stinkhorns - basket fungi and flower fungi]
- **Genus** - *Ileodictyon* [basket fungus; mostly in the Southern Hemisphere]
- **Species** - *Ileodictyon cibarium* [endemic to New Zealand, often common in wood chip mulches.]

## Lancewood

- **Domain** - Eukarya
- **Kingdom** - Viridiplantae [Includes the common ancestor of all green plants. United by the occurrence of chlorophyll b, starch storage, stellate flagellar structure, gene transfers including green algae, mosses, liverworts, hornworts, ferns, lycophytes]
- **Phylum** - Spermatophyta [Includes the common ancestor of all seed plants. Includes cycads, ginkgos, conifers and flowering plants]
- **Class** - Magnoliophyta [Includes the common ancestor of all flowering plants.]
- **Order** - Apiales [Includes the common ancestor of anise, carrots, celery, coriander, ginseng, English ivy and poison hemlock. United by umbrella-shaped flower heads, foliage that is often aromatic, flowers generally reduced, ovary inferior, styles swollen at the base to form a nectar-secreting structure.]
- **Family** - Araliaceae [Includes the common ancestor of Ginseng, Pseudopanax, Shefflera] dioecious
- **Genus** - *Pseudopanax* [Includes the common ancestor of the five finger and lancewoods. Shrubs or small trees with variable leaves, flowers are male or female (dioecious) and fleshy fruits]
- **Species** - *Pseudopanax crassifolium* [Horoeka, lancewood. Includes the common ancestor of all species of *Pseudopanax crassifolium*. Trees reaching 13 m. The juvenile form is long persistent with deflexed, rigid linear leaves and flowers in compound umbels]



Lancewood