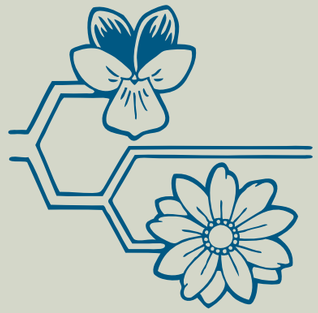
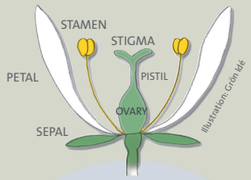
The Systematic Section

Welcome to the Systematic Section of the Bergius Botanic Garden. Here some 1400 angiosperms are cultivated with the purpose of showing the diversity among the flowering plants of the world and how they are related to each other.



What is plant systematics?

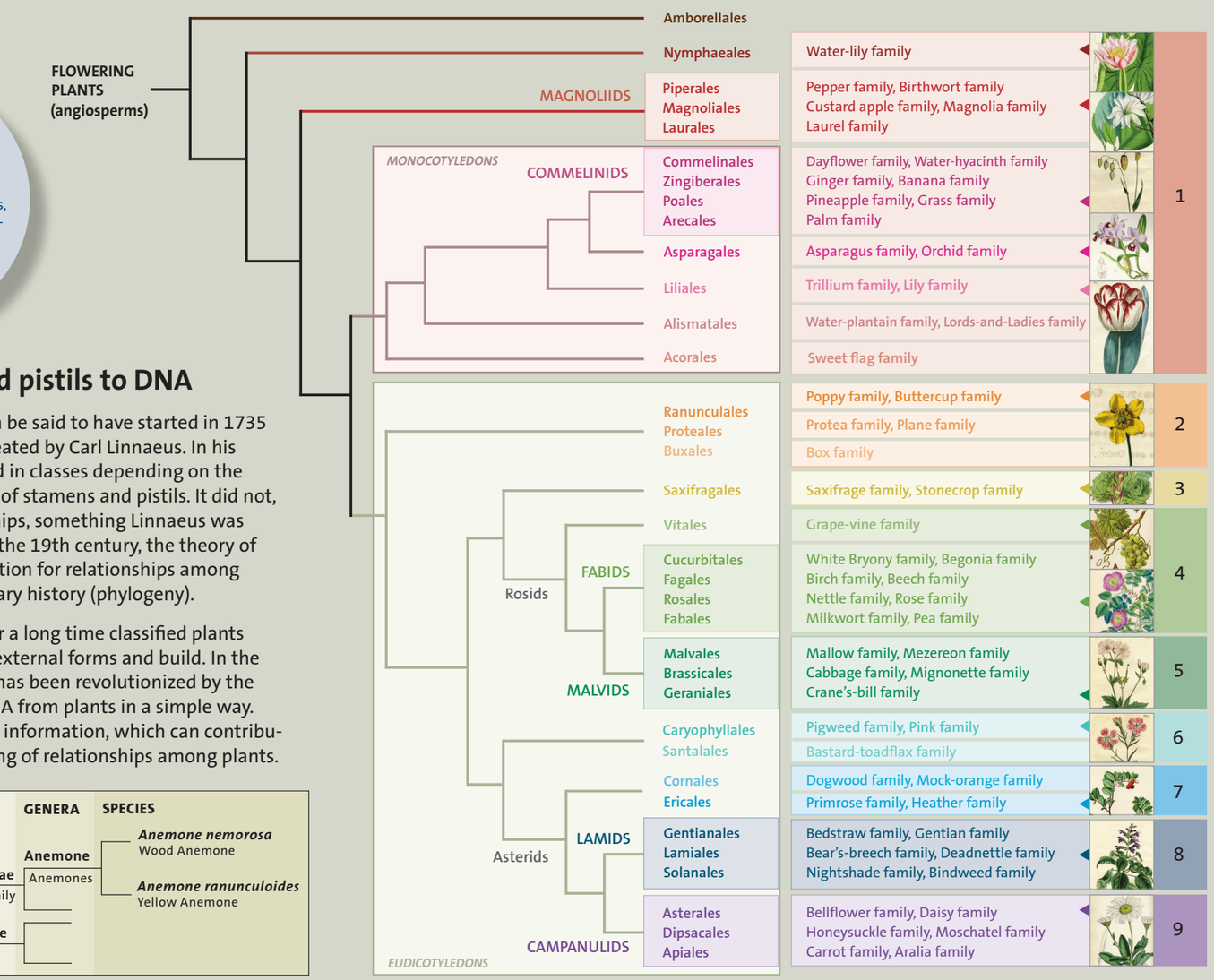
Plant systematics is the study of plants' biological diversity, their evolutionary history and their relationships. Other important parts are classification and taxonomy, i.e. identification and name giving.



What is a flowering plant?

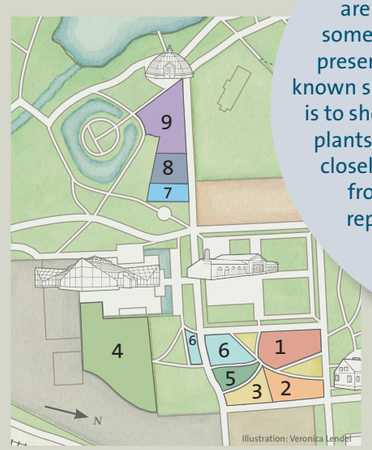
Plants with flowers, that is with sepals and petals, stamens and pistils, and seeds enclosed in fruits, are called flowering plants (angiosperms means "hidden seeds"). There are about 250 000 known species of flowering plants in the world.

THE FLOWERING PLANTS OF THE WORLD



The tree presented above is a simplified version of the phylogeny of flowering plants published by "The Angiosperm Phylogeny Group" in 2009 (APG III). This diagram shows a selection of all existing orders. In some cases a number of orders are parts of a larger unit, such as monocotyledons and commelinids. To each order examples are given on families that are included. The oldest known fossils of flowering plants are from the Cretaceous period about 130 million years ago.

THE SYSTEMATIC SECTION WITH THE DIFFERENT SUB-AREAS 1-9



The Systematic Section

consists of nine sub-areas, which are shown on the adjacent map. Here some 1400 angiosperms are cultivated to present the diversity of the nearly 250 000 known species of flowering plants. The purpose is to show variation and similarities and how plants are related to each other. Those who closely related are placed together. Plants from the Rose family (Rosaceae) are represented with for example roses, lady's-mantles, pearl bushes, apples, and cinquefoils.

From stamens and pistils to DNA

Scientific classification can be said to have started in 1735 with the sexual system created by Carl Linnaeus. In his system, plants were placed in classes depending on the number and arrangement of stamens and pistils. It did not, however, reflect relationships, something Linnaeus was aware of. In the middle of the 19th century, the theory of evolution gave an explanation for relationships among plants and their evolutionary history (phylogeny).

Plant systematists have for a long time classified plants mainly according to their external forms and build. In the last 30 years, systematics has been revolutionized by the possibility to sequence DNA from plants in a simple way. DNA data give much more information, which can contribute to a better understanding of relationships among plants.

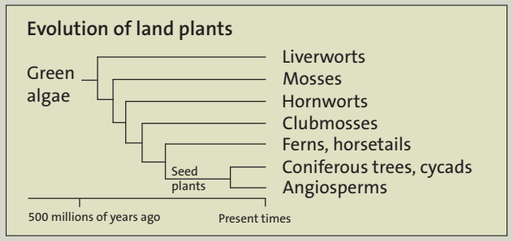
Carl Linnaeus implemented the binary nomenclature for plants and animals, i.e. that a scientific name should be made up of a generic name and a specific epithet, such as *Anemone nemorosa* for Wood Anemone. In his sexual system Linnaeus arranged species into genera, and genera into classes.

Later botanists have added more ranks, such as families and orders. Wood Anemone and Yellow Anemone are both included in the genus Anemone, which is included in the Buttercup family (Ranunculaceae). The Buttercup family is included in the order Ranunculales, together with the Poppy family (Papaveraceae).

Systematic Section since the 19th century

Shortly after the Bergius Botanic Garden's move in 1885, the work to establish a systematic section was started. The then Professor Bergianus Veit Wittrock arranged the plants after the view of how plants were classified at the time.

In later years we have acquired more knowledge about the phylogeny of flowering plants, mainly due to modern DNA techniques, which showed that there was a great need to update the Section. During the years 2007-2014, a rearrangement has therefore been made of the Systematic Section, and the plants are now placed in accordance with the system presented by the international research team "Angiosperm Phylogeny Group" (APG) in 2009. Birgitta Bremer, Professor Bergianus 2002-2014, participated in APG.



The diagram above shows the evolution of land plants. The closest relatives of the flowering plants are other seed plants, such as coniferous trees and cycads.

Further back in time, ferns and mosses parted from the branch that would lead to the angiosperms. All green land plants are related to aquatic green plants such as charophytes and green algae, and everything indicates that the ancestors of the land plants lived in fresh water.

The Systematic Section *In the Systematic section around 1400 plants are cultivated in order to present the great variety of the roughly 250,000 known species of flowering plants. For an English version, go to www.bergianska.se/systematicsection*

BERGIANSKA TRÄDGÅRDEN
Bergius Botanic Garden