

# Know Your Stuff

## The origins of the European Alpine flowers

The European Alps are alive with brightly coloured flowers and a very diverse array of flowering plants. The origins of which come from a wide range of ancient mountain ranges. This period in Earth's history occurred when central Europe was largely under an ancient sea and with global average temperatures around 20°C, far warmer than today's climate. This period also coincided with the end of the mighty dinosaur era.

The formation of the European Alps began in at the beginning of the Tertiary Period. This began around 60 Million years ago. Many of the world's major tectonic plates were closely aligned; Scandinavia was connected to Greenland and North America with land bridges linking to central and southern Asia. The Tethys Ocean covered most of Europe with the African continent lying to the south.

The land of central Europe lying above the sea had a climate much warmer than today with tropical to subtropical evergreen forests covering much of the land. Tectonic movements of the Earth's crust pushed the African plate against the European plate thrusting upwards and folding rock layers with the pressure. The islands emerging from the sea were colonised by innumerable plants migrating to the region.

The first colonisers of the Alps originated from the neighbouring Balkan Mountains, Carpathians, Apennines and Pyrenees. These mountain ranges already had high mountain plants through exchanges with old massifs and highlands in Asia and Africa. The steppe (treeless grasslands) environment of Central Asia had a similar climate to the Alps with extreme temperatures, limited humidity and strong sunlight. The steppe plants were therefore able to live at altitude and felt at home in the emerging Alps during this period.

At the end of the Tertiary period the global climate began to cool with the onset of the Quaternary Ice Age 2.5 Million years ago. Tropical vegetation gave way deciduous and coniferous trees from the north. Glaciers expanded in the Alps and the Scandinavian ice sheet expanded southward and covered vast stretches of Europe. Glaciers advanced and retreated throughout this time with global climate following cycles of warmer and cooler periods.

The Ice Age caused many changes in plant distribution and vegetation composition as the Alps created a natural barrier to plant movements. Some species became extinct, others became isolated whilst new species were able to migrate to the region. Through the passage of time some of the plants that have come to inhabit the Alps have remained identical to their ancestors with others have evolved into closely related species. The following is a summary of the major ancestral roots of the Alpine plants.

### Central Asia

With its highlands covered in steppe its climate was harsh and similar to the high mountains. The majority of louseworts (*Pedicularis spp.*) occur in the mountains of Asia. Gentians (*Gentiana spp.*) have a central diversity in Asia with 312 of 361 species worldwide growing there. The iconic Edelweiss (*Leontopodium alpinum*) – pictured right - originates from a species which migrated from Asia during the Ice Age. In the highlands of Asia more than



50 other species of Edelweiss occur. Amongst the other Alpine flowers with an Asian origin are Columbines (*Aquilegia spp.*), Alpen roses (*Rhododendron spp.*), Primroses (*Primula spp.*) and Rock-jasmines (*Androsace spp.*).

### Mediterranean basin and North African mountains

Species of Bellflower (*Campanula spp.*) have originated from this region. The ancestors of Spring crocus (*Crocus albiflorus*) come from the Mediterranean basin and are now found in meadows in either their purple or white flower forms. Other plant groups originating from this region include Baby's-breath (*Gypsophila spp.*), Campions (*Silene spp.*), Toadflaxes (*Linaria spp.*) - pictured right - and Globe-daisies (*Globularias spp.*) - pictured below right.



### North America

Land bridges allowed the passage of plants to immigrate from North America during glaciations. From this region the well-known and medicinal Mountain Arnica (*Arnica montana*) - pictured right - and Alpine Aster (*Aster alpinus*) originate. Amongst the other plant groups are Goldenrods (*Solidago spp.*), Bearberries (*Arctostaphylos spp.*) and Fleabanes (*Erigeron spp.*)



### Scandinavia

Many Arctic plants were able to migrate southwards during glacial times in the last Ice Age as colder climates pushed glaciers further south. Typical plants include Dwarf Willow (*Salix herbacea*), Glacier Crowfoot (*Ranunculus glacialis*) Mountain Avens (*Dryas octopetala*) - pictured below right - and many Saxifrages including Purple saxifrage (*Saxifraga oppositifolia*) and yellow mountain saxifrage (*Saxifraga aizoides*) - pictured right.



### Central Europe

Only a few plant groups have their origin in the central European Alps. The groups include St Bruno's lilies (*Paradisea spp.*), Snowbells (*Soldanella spp.*), Rampions (*Phyteuma spp.*) and Adenostyles (*Adenostyles spp.*) - pictured right.

