



The endemic flora of the Cape Peninsula

Many of the plants that grow in this well-known plant and people hotspot are found in this small area and nowhere else.

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The Cape Peninsula is an area of exceptional plant diversity, yet no list of the 161 endemic plant taxa that occur here has ever been published. We decided to set this right*. To start, we defined the Cape Peninsula as the area west of a line connecting Paarden Island to Muizenberg, including a small part of the western edge of the area known as the Cape Flats. The area is characterized by the presence of the Cape Peninsula mountain chain and this extends from Signal Hill and Lion's Head in the north to Cape Point in the south. The total land area is 471 km² (47 100 ha) and some 24 000 ha are now formally or contractually conserved within the Table Mountain National Park, which includes 80% of the actual mountain chain.

Studies of this nature are bedeviled by taxonomic (see glossary) revisions and changes (particularly in the genera *Erica*, *Cliffortia* and the mesembs) but about 2 285 plant species are known to be indigenous to the Cape Peninsula, which means that the Peninsula has the greatest concentration of plant species (per unit area) within the Cape Floristic Region. What makes this even more remarkable is that 161 (158 species and three subspecies) of these are found nowhere else and are thus regarded as being endemic. This concentration of endemic species is high for a continental area, but is substantially exceeded by various island floras.

TOP: View of the Peninsula mountain chain from Klawer Valley above Simon's Town, with Table Mountain in the distance and winter fog covering the Cape Flats and the lowlands surrounding False Bay.

ABOVE: *Staavia dodii*. Photos: Nick Helme.

A profile of the endemic flora

The figure of 161 endemic 'taxa' (see glossary on page 117 for a reminder of the meanings of the confusing terminology of taxonomy) includes three subspecies, and is made up of twenty-seven families[#]. The ten families on the Cape Peninsula with the largest numbers of endemic species within them are the Ericaceae with thirty nine species, the Fabaceae (legumes) with nineteen species, the Cyperaceae with eleven, the Asteraceae (daisies), Campanulaceae, Iridaceae, Polygalaceae and the Proteaceae all with ten, the Restionaceae with seven and the Aizoaceae[#] (mesemb) with six endemic species.

Each family is grouped into genera, and the genera are further divided into species (see glossary). Some of the families in the Top Ten list mentioned above are dominated by a single genus with lots of species (as in the Ericaceae), and others have a number of genera each further divided into species (as in the Restionaceae). Families with lots of endemic species on the Cape Peninsula include the Ericaceae, Campanulaceae, Cyperaceae, Polygalaceae and Proteaceae. Some families have no endemic species on the Cape Peninsula (the Geraniaceae, Oxalidaceae, Thymelaeaceae, Poaceae and Apiaceae), while others are represented by a few: the huge daisy family has only ten endemic species in this area, the Hyacinthaceae and Rhamnaceae have one each, the Rutaceae two and the Orchidaceae three.

Nine genera contain most of the of Cape Peninsula endemics, these being *Erica* with thirty-nine, *Muraltia* with ten, *Aspalathus* with seven, *Roella* with six, *Indigofera* and *Serruria* both with five, and *Gladiolus*, *Tetralix* and *Leucadendron* with four species each. The representation of endemic species within the Cape Peninsula appears to be heavily skewed in favour of a few genera, with only six genera accounting for 45% of the endemic species. *Erica* is a peculiar case as this enormous genus (containing almost 700 species) is species-rich in most areas where the climate is not extreme and the topography fairly variable, with many endemics in such areas. Only 6% of the *Erica* species of the Cape Floristic Region are endemic to the Cape Peninsula, but in terms of sheer numbers of endemic species this genus is by far the largest with thirty-nine endemics.

The standout genus is clearly *Roella*,

with a remarkable 31% of this genus endemic to the Peninsula, and the area can thus be regarded as a major centre of endemism for *Roella*. *Muraltia*, *Tetralix* and *Serruria* all have about 10% of their total species endemic to the Peninsula, and likewise this is something of a centre of endemism for these genera.

Even more noticeable is the significant under-representation of endemic species in certain large genera, such as *Agathosma*, *Phyllaea*, *Aspalathus*, *Pelargonium*, *Oxalis*, *Cliffortia*, *Moraea*, *Senecio*, *Thesium* and *Crassula*. In all these cases less than 2% of the total number of species in the genus is

endemic to the Peninsula. What is interesting about this is that many of these genera are well represented on the Peninsula (they are relatively species-rich), yet their centres of endemism lie further afield. In other words, the Peninsula is not a critical area for the conservation of species diversity within these genera.

Hotspots on the Peninsula

Distribution of endemic plant species on the Peninsula does not appear to be random, and all areas are not equally blessed with localized species. In some places we have recorded up to eight Peninsula endemics growing within a



ABOVE: *Mimetes fimbriifolius* is a Cape Peninsula endemic and one of the largest members of the Proteaceae in the south-western Cape. Indeed, with its height and thick protective bark - adaptations to survive fire - it can be regarded as an 'honorary' tree.

BELOW: *Staavia dodii* is endemic to a small, lowland area of about 100 ha near the southern tip of the Cape Peninsula, overlooking the cool Atlantic Ocean. It belongs to the Bruniaceae, a family endemic to the Cape Floristic Region, but one very rare outlier species in Pondoland, *Raspalia trigyna*.

Photos: Nick Helme.



30m² area! Interestingly, there is a strong correlation between the distributions of endemic animals (primarily invertebrates) and endemic plants on the Peninsula, and this is especially true on Table Mountain itself.

Concentrations of endemic plants occur on the few remaining examples of sand plain fynbos within the Peninsula, notably within the conservation area at Kenilworth Racecourse and at Zandvlei and Rondevlei Reserves (the latter just outside the study area). This concentration is probably artificial, in that once widespread Cape Flats species are now restricted to remnant conservation areas. Other notable hotspots of endemics include most of Table Mountain, Karbonkelberg, Constantiaberg, Noordhoek Peak, the Kalk Bay plateau, Rooikrans hill above Capri, the Klawer valley wetlands above Simon's Town, the Swartkop mountains above Millers Point and most of the Cape of Good Hope Nature Reserve area. The latter area supports no less than eleven endemics, with another species restricted to the area immediately adjacent. Key habitats for endemics include seepage areas and wetlands, steep, moist south or south-east facing slopes (many of which receive summer moisture in the form of cloud) and lower rocky sandstone slopes in the southern Peninsula. Relatively few species seem

to be endemic to the richer shale and granite soils that are prevalent on the lower slopes of the northern part of the Peninsula, perhaps because these habitats are better represented further to the east.

Numerous species occur only on the Peninsula and then again on the southern coastal Hottentots Holland Mountains between Rooiels and Kleinmond, providing strong evidence that these areas were once linked when sea levels were lower. There is also a notable link between the flora of Table Mountain and the higher mountains above Jonkershoek, just east

of Stellenbosch (as *Gladiolus pappi*, recently confirmed from the latter area, testifies). This link is perhaps maintained by high rainfall and summer cloud incidence in these areas that are separated by 60 km of intervening Cape Flats (at an elevation of no more than 100 m), which was largely under the sea four million years ago.

Conservation

At least sixty-six (41%) of the Peninsula's endemic species are currently Red Data Book listed as threatened in some way, and are thus of immediate conservation concern. Many

RIGHT: *Serruria decumbens* (Proteaceae) is a curious creeping member of the *Serruria* genus, endemic to relatively low altitude, rocky areas on the southern tip of the Cape Peninsula.

BELOW: *Erica halicacaba* is a very unusual member of the largest genus in the Cape Floristic Region. Its robust flowers have a very narrow opening and it is not known what pollinates them.

OPPOSITE: *Aloe commixta* (Asphodelaceae) and, in the background, *Aspalathus capensis* (Fabaceae) are endemic to the southern Cape Peninsula, growing in areas with shallow acidic sands and outcropping sandstones. Photos: Nick Helme.



are extremely localized, and in some cases are known from a single population of fewer than fifty plants, and these are obviously in imminent danger of extinction. Seven Peninsula endemics are already confirmed extinct, with only one of these, *Erica verticillata*, in cultivation. A further seven species are likely to be extinct as they have not been collected for at least thirty years, and in some cases for over a century. Most of the extinct species are lowland plants whose habitats have now been transformed by agriculture and urbanization, and the main 'extinction hotspot' is the western edge of the Cape Flats (incorporating acid sands, shales and granites) from Paarden Island to Kenilworth and Wynberg, with one extinct species from the Hout Bay valley and another from the Fish Hoek valley.

The creation of the Table Mountain

National Park is extremely fortuitous given the global conservation significance of this area, and its future looks relatively bright. The main concerns for the endemic species in the Park are inappropriate fire regimes (too far apart, or too frequent), alien invasive species, random events such as disease and plant collecting (for the rarest species) and, more difficult to detect, the long-term loss of genetic diversity and key pollinators. Urbanization pressures and lack of motivated and skilled management continue to be a major threat to the lowland areas outside the National Park. 🌿

*Look out for our forthcoming article in *The South African Journal of Botany*, 72(1), 2006.

#Using families as listed in *Cape Plants: A conspectus of the Cape flora of South Africa* by P. Goldblatt and J. Manning.

BotSoc link

TO DISCOVER more about the rich flora of the Table Mountain National Park, consult Mary Maytham Kidd's *Cape Peninsula*, South African Wild Flower Guide 3, published by the Botanical Society but beware of the fact that it is out of date and many names have changed. For more detail, see *The Levyns Guide to the Plant Genera of the Southwestern Cape* by Terry Trinder-Smith. These books are available at the Botanical Society Bookshop at Kirstenbosch (for details see p. 148).

Table Mountain's endemic invertebrates

THE WORLD Wide Fund for Nature's Table Mountain Fund (WWF) has recently awarded a grant to James Pryke, a Ph.D. student in the Department of Entomology at Stellenbosch University, to investigate the threat of invertebrate extinction on Table Mountain. Several Cape Peninsula endemic invertebrate species, various velvetworms, butterflies, dragonflies and damselflies, have not been recorded for many decades, and as their habitats on Table Mountain have been transformed by invasive trees, animals (such as the Argentine ant) and other reasons, the project will determine the biodiversity values of the various habitats on the mountain.

Pryke's study will be done under the leadership of Stellenbosch University's Prof. Michael Samways, entomologist and specialist on the conservation of invertebrates. These animals are under threat as much as plants and vertebrates. Invertebrates are part of the very fabric of ecosystems: they recycle nutrients, pollinate, eat and get eaten, yet only one in twenty or so species are known to science.

WHAT DOES THAT MEAN?

Cape Floristic Region One of the world's richest temperate areas in terms of botanical diversity, encompassing the Cape Peninsula and other winter rainfall parts of the N, W and E Cape.
endemic A species occurring in one particular area and nowhere else.

genus A rank in the taxonomic hierarchy, subordinate to family, but above the rank of species. All plants (indeed all living organisms) are given a Latin name in two parts: the binomial. The genus is the first part of the binomial, with the species (or specific epithet if you want to sound posh) making up the other half. For example, the king protea's Latin name is *Protea cynaroides*, which is made up of the generic name of *Protea* and the specific name of *cynaroides*.

species The main unit of study in taxonomy, it is a grouping of all the populations of one breeding group that are separated from other such groups by marked differences. It is the second part of the binomial (its Latin name).

taxon (plural **taxa**) A taxonomic group of any rank – order, family, genus, species or subspecies.

taxonomy The study of the principles and practices of the classification of the natural world, which includes systematics (the study and description of the variation in living organisms and the relationships that exist between them).



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Further reading

Biodiversity and Conservation, vol. 5, 1996. A special edition dedicated to the biodiversity of the Cape Peninsula with numerous relevant papers.

Goldblatt, P. and Manning, J. 2000. *Cape Plants: A conspectus of the Cape flora of South Africa*. *Strelitzia*, 9.

Pauw, A. and Johnson, S. 1999. *Table Mountain: a natural history*. Fernwood Press, Cape Town.