Feature Article

Exploring the Cape Floral Kingdom

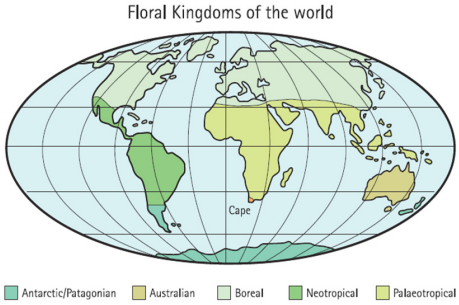
by Marilyn Daly

Most people almost certainly associate South Africa with wild animal safaris. However, visitors should also explore South Africa's other wildlife—the beauty, richness, and diversity of the Cape Floral Kingdom.

Though little known outside of South Africa, the Cape Floral Region and its plant communities are a plant lover's dream come true. The mountains and countryside offer endless hiking opportunities where one can walk among the Cape Flora seemingly forever.

Table Mountain and Fynbos

Ecotourism is a vital component of South Arica's economy. Fortunately, South Africa has taken the initiative to preserve the delicate balance between plant and human needs by preserving intact but threatened areas; through developing educational programs in schools; by holding local flower shows to help communities appreciate their floral heritage; by organizing outings to remove alien vegetation; and by reaching out to international organizations, such as the World Wildlife Fund for support. Conservation through cultivation encourages people to add nursery-grown, native plants in their gardens, thus preserving indigenous plants. Growing these native, drought-tolerant plants helps conserve water, a serious concern because of recently, widely publicized, critical water shortages in Cape Town.



Cape Floral Kingdom

The Cape Floral Kingdom, located at the southernmost tip of South Africa, is the smallest of the world's six floral kingdoms, has greater plant diversity than some of the richest parts of tropical Amazonia and is completely contained in one country. The Cape Floral Kingdom boasts nearly 9,000 indigenous plant species, of which 68% are endemic, meaning they are found nowhere else in the world. Compare this to the largest of the six floral kingdoms, the Boreal Forest Kingdom, which covers over 19,000,000 square miles or 40% of the earth's surface and extends across the northern parts of North America to Europe, northern and central Asia, and North Africa. The tiny Cape Floral Kingdom is less than 35,000 square miles and covers only 0.04% of the world's land surface and supports one of the world's highest level of plant biodiversity. Yet the wonders of South Africa's floral heritage are hardly known or appreciated outside of South Africa.

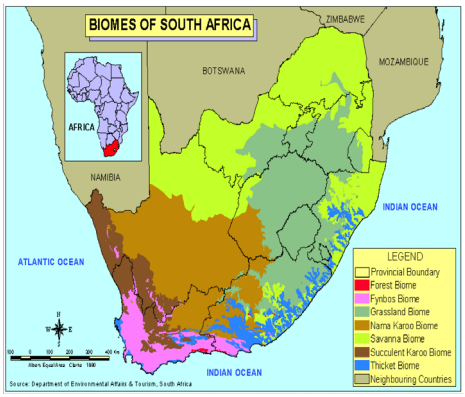
The heart of the Cape Floral Kingdom centers around Cape Town (a city built around the base of Table Mountain) and the Cape Peninsula in the Western Cape then extends northward to Namaqualand and eastward along the southern coast to Port Elizabeth. Cape Town and vicinity has a Mediterranean-type climate with winter-rainfall. Variation in topography, temperature, and rainfall within the Cape Floral Kingdom contribute to the varied habitats and increased species diversity.

Table Mountain with Cape Town below

photo courtesy of Suzanne Daly

Cape Town view with protea from top of Table Mountain

The Cape Floral Kingdom includes five of the seven South African biomes. A biome is a biological community of plants and animals that have adapted to local conditions such as



climate patterns (precipitation and temperature), geography, geology, soil type, and dominant vegetation and fauna. The Fynbos Biome is sometimes considered to be synonymous with the Cape Floral Kingdom because the Fynbos Biome dominates, supporting about 7,000 of the Cape Floral Region's 9,000 species with 80% of these being endemic.

Fynbos Biome Flora

The Fynbos Biome is made up of two primary vegetation types: Fynbos (fine bush) and Renosterveld. Fynbos vegetation makes up the majority of the Fynbos and characterizes several different Fynbos landscapes. Fynbos and Renosterveld are very distinctive and demonstrate different local growing conditions, plant communities, and ecological relationships. Regions of greatest rainfall (>26 inches/year) are dominated by Fynbos, whereas Renosterveld has rainfall between 10–26 inches/year. Areas with less than 10 inches/year shifts to the Succulent Karoo landscape.

Renosterveld Landscape

The Renosterveld vegetation type is named for the endemic and prevalent dull grey shrub, Renosterbos—*Dicerothamnus rhinocerotis* (Asteraceae); however, several other families are also well-represented. Because Renosterveld grows in areas with particularly fertile soils, much has been lost to wheat farming and grazing; whereas Fynbos, favoring poor soils, has been somewhat protected.

South African Fynbos: A patchwork of low shrubs

Fynbos Landscape

Fynbos winters are mild and rainy and summers are dry, ranging from warm-to-hot. The predominant vegetation is a patchwork of low shrubs, usually less than 3' tall. Most are tough, evergreen species that have developed characteristics to help them tolerate the warm, dry summer conditions and the frequent fires that rush across the landscape. Poor soil and frequent fires prevent population by typical grasses that would support large grazers. Most fynbos animals are small and nocturnal—tortoises, lizards, and geckos. You'll also come across ostriches, baboons, and some deer species. Insects are important pollinators.

While Fynbos plants are unique, they demonstrate many similarities to other Mediterranean-type plants around the world, especially the Kwongan vegetation type of southwestern Australia. Convergent evolution produced similar proteoid species on both continents that provide abundant nectar to attract pollinating birds.

Fynbos leaves may be reduced to fine, thin, or curved needles to decrease surface area; they may be thin and leathery with a thick waxy cuticle to limit water loss through transpiration; or they can be thick and fleshy to store water as a gelatinous liquid inside their leaves.

Some fynbos species contain volatile oils that discourage browsers. This resin causes these plants to burst into flames when ignited, thus contributing to the fire ecology upon which so many fynbos plants are dependent. Fire refreshes the fynbos landscape and prevents it from being overtaken by taller tree species.

Plant Families

Three distinctive plant families (Restionaceae, Proteaceae, Ericaceae) define fynbos. Geophytes (bulbs, tubers, corms, rhizomes) are considered an important fourth component. Succulent type plants also play an important role in various Fynbos types and other Cape Floral Biomes. Spring blooming annuals and herbaceous perennials add the finishing touches to the Cape Floral Biomes. These typical plant representatives vary in form and occurrence and help characterize different plant communities.

Restionaceae

Plants of the Restionaceae (Cape Reed) Family are always present in Fynbos. Known only in the southern

Elegia tectorum, previously *Chondropetalum tectorum* (Cape thatching reed) is the most well-known of the restios and is used as for thatching roofs in South Africa. It depends on smoke from the veldt's frequent fires to germinate its seeds. Upright to symmetrically arching, a smaller variety has been brought into cultivation that reaches only 2–3'. Grows best in moist conditions. Grow on pond's edge or in a water container.

Elegia capensis (horsetail restio) is the most elegant and dramatic of the Cape reeds. Its culms (stems) grow from underground rhizomes. It can spread rapidly like bamboo once established and grows to 9' tall. Each node on culms is encircled with fine needle-like leaves and a white papery sheath. The papery sheaths and culms rustle pleasantly in the wind. Grows in sandy soil, but needs to be well-watered.

Overview of restios in Fynbos

hemisphere, these are tough, shrubby, evergreen, reed-like plants usually with sheathed stems. They may be lower-growing, upright clumps, or majestically erect or arching shrubs, in some cases growing up to 9' tall.

Proteaceae

Proteoid plants, all from the Proteaceae (Protea) Family, are one of the most common and showy Fynbos flowers. They form the dominant shrub layer of the Fynbos, usually growing to over 5'. They have thick petals, tough woody stems, and fleshy leaves, which help them conserve water and resist fire. They may re-sprout after a fire or more frequently they reappear from wind-dispersed seeds that were safely protected within their cones (serotiny) or from seeds that were previously dispersed and buried by ants (myrmecochory).

Proteas form the dominant shrub layer.

There are about 2,000 protea species worldwide—92% of them are found in the Cape Floral Region and 69 species are endemic to the Fynbos. Proteas from South Africa were introduced to Europe by early plant explorers in the 1700s and have been popular cut flowers ever since.

Three popular Protea genera that have been brought into cultivation for garden use and for the cut flower trade include Protea, Leucospermum, and Leucodendron.

Protea neriifolia

Leucodendron sp.

Ericaceae

Ericoid or heath-like plants are not limited to the Ericaceae Family (Heath), but are well-represented by this family. Ericas typically have small, linear, needle-like leaves whorled around the stem and the leaves are rolled under to conserve water. They produce copious amounts of seeds which germinate prolifically after a fire.

Geophytes

Various fynbos habitats boast prolific geophytes (bulbs, tubers, and corms), the fourth important component of

Leucospermum sp.

Protea and Erica flowers co-evolved with pollinating sugar birds and sunbirds with long bills that can reach nectar deep in the fine tubular petals. Many sunbirds and sugarbirds, especially the endemic Cape sugarbirds, are dependent on fynbos flowers and now are threatened along with their fynbos habitat as more fynbos is lost to human activity.

Erica verticillata, locally endemic to a small area outside of Cape Town, became extinct due to early development of its isolated, natural habitat in Cape Town. Miraculously, it was brought back into cultivation after one bush was found under cultivation in a botanical garden in Pretoria. Since then several isolated specimens have been found in botanical gardens around the world (Kew), probably dating to collections made over 200 years ago by early collectors to the Cape. Kirstenbosch Botanical Garden is reintroducing *E. verticillata* into the wild. Its conservation status will be determined after it has undergone several burns when new seedling populations from these plants have become established. Several clones are available for cultivation.

fynbos. They may lay dormant for years; then their spectacular flower displays are the first to appear after fires.

Watsonia (a Geophyte) co-exist in mountain fynbos. This is after a fire.

Threats

One threat to fynbos flora are the indigenous flower pickers who depend on cutting wild flowers to sell as their only means of income. Commercial wild flower plantations for cut flowers and garden use and for growing herbal Rooibos (Red Bush) tea are taking over some of the native fynbos habitats. New technology and advanced agriculture methods (e.g. fertilizers, irrigation methods) allow crops to grow in once less usable fynbos regions. As a result, vineyards are gradually creeping up the fynbos mountainsides. Agriculture has already destroyed most of the fertile Renosterveld.

Alien species compete with native flora and cause fires to burn hotter. Although fire at regular intervals is essential, untimely, uncontrolled burning disrupts normal fynbos cycles and threatens homes and businesses.

Urban development continues to be the most serious threat throughout the Cape Floral Region. Finally, global climate change threatens the delicate balance between endemic Cape Floral plants and their very specific habitat needs.

Conclusion

At first, when hiking in the Cape Floral Region, it may not look like much.

Take a closer look. Hiking up Table Mountain you'll see bulbs (like Agapanthus, Kniphofia, and Watsonia), succulents like Aloe and *Cotyledon orbiculata* (pig's ears), and many others. The Cape Floral region is filled with an amazing diversity of plants growing together in perfect harmony

The beauty, richness, and diversity of the Cape Floral Kingdom is like nowhere else in the world and needs to be preserved for present and future generations to enjoy.

Ed Note: All pictures provided by Marilyn Daly, unless specified otherwise.

Marilyn Daly *recently retired after teaching for 36 years in the Biology Department at York College of Pennsylvania and 20 years in the Longwood Gardens Ornamental Horticulture Program. Over that time, she conducted numerous annual plant trials with students on her farm in Dallastown, PA. Marilyn's passion for plants and gardening and her plant trial research has taken her around the world.*

Marilyn and her husband travel extensively, especially to South Africa, photographing and searching for new and exciting plants that can be grown here in Pennsylvania. They have visited South Africa almost every year since 1996 when she took her first of three sabbaticals at Kirstenbosch National Botanical Garden in Cape Town, known for the famous "Fynbos" Plant Biome. Thirteen years ago they bought a second home in Cape Town, where she designed and planted an indigenous fynbos garden.