

Karoo Desert National Botanical Garden

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The Breede River Valley is well known by many visitors to South Africa for its fine wines, fruit and beautiful mountains. Not so well known is the Karoo Desert National Botanical Garden located near Worcester, capital of the Breede River Valley. It is one of the only, truly indigenous South African succulent gardens, and is one of only a handful of outdoor succulent gardens in the world. The Karoo Desert Garden is surely the showpiece of the Breede River Valley. In August and September of each year it becomes a magnificent carpet of colourful flowers. It can also be described as the gateway to the floral delights of Namaqualand – a one-hour drive from Cape Town.

History

The Karoo National Botanical Garden was originally established in 1921 on twenty morgen (app. 40 acres) of land at Whitehill near Matjiesfontein. It was known as the Logan Memorial Garden. Mr. J. Archer, former stationmaster at Matjiesfontein and lover of succulents, was the first curator appointed on 1st January, 1925. Unfortunately, owing to the lack of water and the re-routing of the national road, the garden was closed in 1935. Professor Compton, then Director of the National Botanic Gardens, decided to look for a more suitable location in late 1944.

Two sites were considered for the Garden relocation. One was near Robertson and the other was just outside Worcester. The site chosen was thirty-six morgen (app. 72 acres) of land just north of Worcester, the current location of the Garden. The first curator, Mr. J. Thudicum, was appointed in August 1945. He was responsible for laying out the roads and pathways and for the planting out of many railway truck loads of plants from the old garden at Whitehill. Many of these plants, especially the *Aloe dichotoma* (quiver tree), still survive in the original area on a hillock to the right of the main entrance. It is interesting to note that Mr. Thudicum watered all the plants with buckets suspended from a wooden shoulder harness or balanced on the handlebars of his trusty bicycle. Mr. Thudicum is remembered in the botanical world for a showy yellow Mesembryanthemum, *Drosanthemum thudichumii*, which grows in shale hills just north of the existing garden.

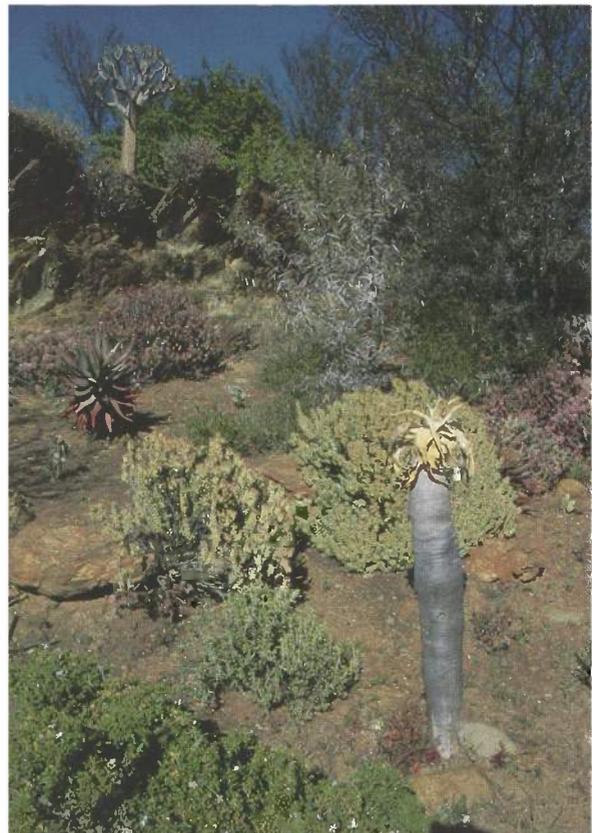
The Gardens' first horticulturist, Mr. R. C. Littlewood, was appointed in 1957 and served with great dedication until his untimely death in 1968. *Drosanthemum littlewoodii* is

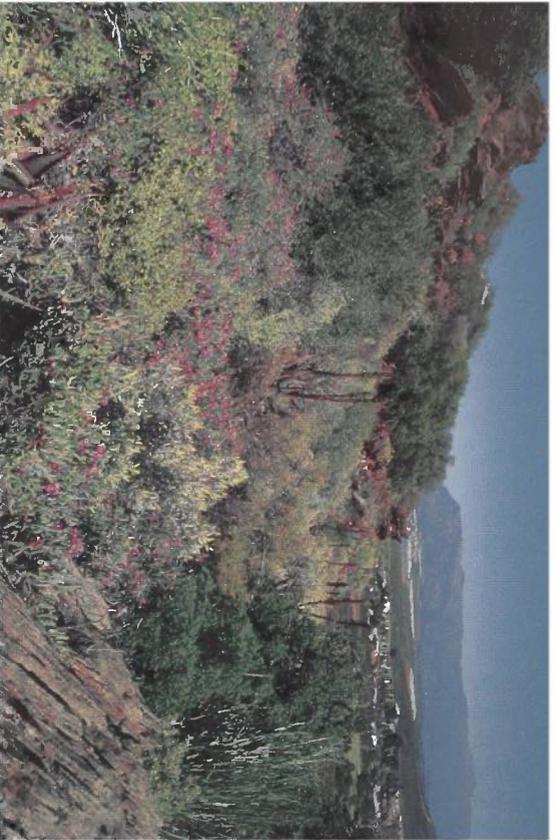
named in his honour. Mr Frank Stayner curated the Karoo Garden from 1959 until his retirement in July 1973. During this time, many buildings and plant houses were built and the irrigation systems (some still in use today) were installed. To him went the honour of naming *Stayneria*, a monotypic succulent genus in the Aizoaceae (Mesembryanthemum Family).

In 2001, some 80 years after the garden started, the name was officially changed to Karoo Desert National Botanical Garden. This new name is consistent with other desert gardens throughout the world and international visitors can relate to this new name with relative ease. The addition of the word desert emphasizes that this is a garden that cultivates and displays plants from an arid environment.

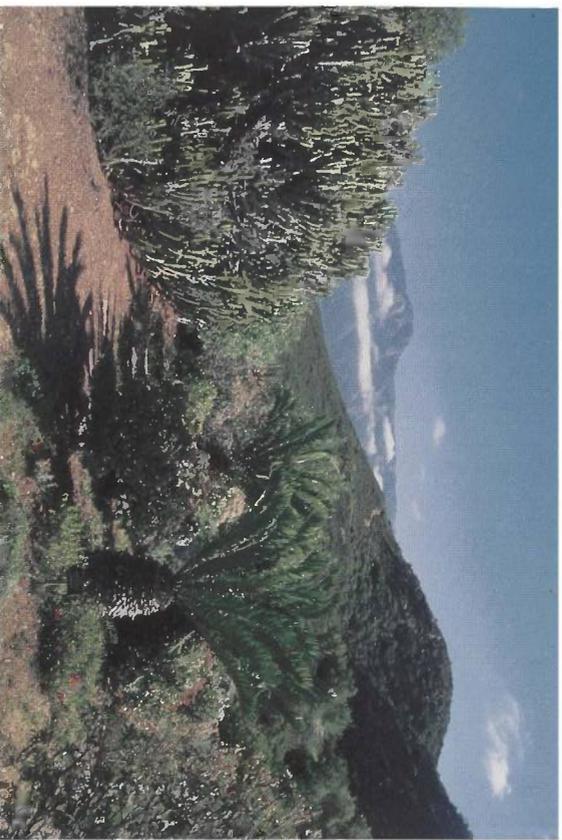
Living plant collections

Bruce Bayer, previously a technical assistant at this Garden, was appointed Curator in 1973 and really put the Karoo Desert Garden on the international succulent map. The scientific collections were increased and local and international succulent taxonomists made use of the living specimens in the plant houses. Mr. Bayer is internationally known for his work on Haworthias, having written 4 books and numerous scientific publications on the subject. The floral displays in the garden were extended, making the garden famous for its masses of colour in spring. The Karroid phytogeographic beds in front of the main administrative offices, displaying various regions of the Karoo, have proved

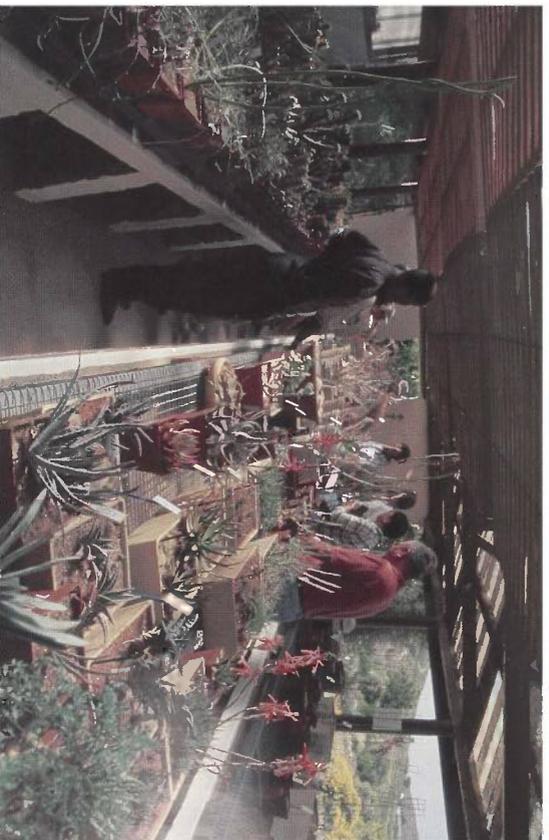




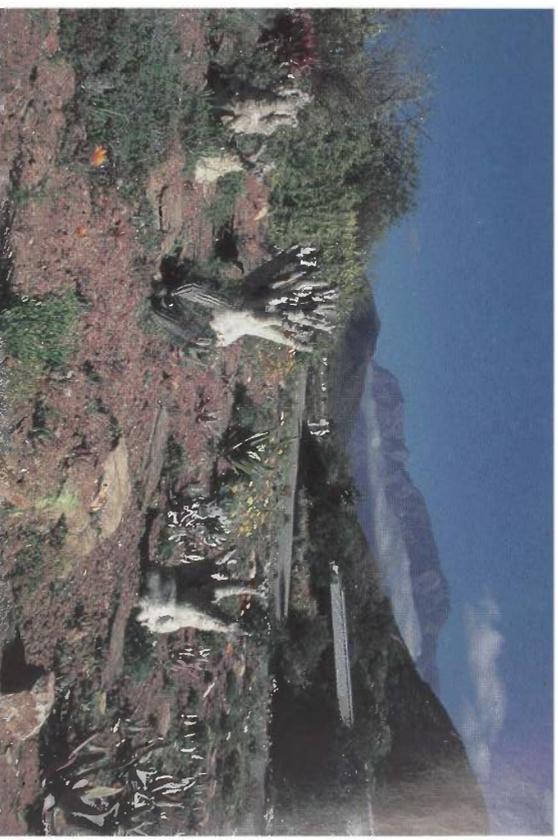
View from hillside in botanical garden to nearby town.
(S. Carter)



Path in botanical garden. (S. Carter)



Plants are initially grown in pots in a greenhouse. Author is on the right at the far end. (S. Carter)



Several *Cylindropuntia juttae* in garden. (S. Carter)

to be immensely popular with visitors. Some plants named in honour of Bayer's work include *Tylecodon bayeri*, *Haworthia bayerii*, *Gasteria brachyphylla* var. *bayeri* and *Anacampseros bayeriana*.

The Garden's main living plant collections are made up of the following families: Apocynaceae, Asclepiadaceae (now known as Apocynaceae), Aizoaceae, Amaryllidaceae, Asphodelaceae, Hyacinthaceae, Oxalidaceae, and Portulacaceae. In total, we have 94 genera that are being worked on. There are approximately 2000 species in the index collections (special growth houses). In total there are nearly 3700 species. This includes species in the index nursery, production nursery, garden and estate. In terms of succulent genera, for which this Garden is internationally known, the following collections are included: *Conophytum*, *Huernia*, *Avonia*, *Anacampseros*, *Gasteria*, *Haworthia*, *Gibbaeum*, *Lithops*, *Stapelia* and *Tylecodon*. The Garden also has extensive geophyte (bulb) collections including: *Brunsvigia*, *Haemanthus*, *Lachenalia*, *Ixia*, *Sparaxis*, *Strumaria*, *Boophane* and *Crossyne*, just to mention a few. Cape bulbs are world renowned for their exceptional beauty.

The succulent living collections are cultivated and displayed in four glass houses under a total of 330m². As fast as a house is completed it is filled to capacity! The bulb living collections are grown in raised beds. Each plant has its own compartment, allowing the plants to fully develop. Some of the more shade loving plants have a wooden, slatted roof (lath roof) over the individual specimens, giving much needed shade during the very hot summer. The concept of raised beds (1.5 m in height) works very well. Plants are grown under cooler conditions as a result of the deeper soils thus they are able to develop fully as opposed to the cramped growth restrictions of a plastic pot.

The original karroid phytogeographic collections are still on view near the main office. There are 1160 m² of karroid (semi desert) habitats growing in small beds each representing its own unique phytogeographical area. To date 30 karroid phytogeographic areas have been identified. There are nearly 900 species of plants in this area. The rest of the garden is used for display and educational purposes.

The Garden through the Seasons

The Karoo Desert National Botanical Garden has expanded from its original 33 ha to 154 ha (app. 239 acres) in extent with a developed area of eleven hectares (app. 25 acres). The Garden lies within the winter rainfall area of South Africa, receiving 65% of its annual 250 mm precipitation in the winter months of May to September. Summers are hot, up to 46 degrees C, and winters are cool and wet with light frost in the lower reaches of the garden. Minimum temperatures of 1 degree C have been recorded. Constant wind is experienced, especially during the winter.

The best time to visit the Karoo Desert garden is in spring when the Namaqualand daisies (*Dimorphothecas*), Bokbaai vygies (*Dorotheanthus*), *Gazanias*, *Ursinias*, *Felicias* and *Arctotis* all look their best. Spring bulbs, including *Freesias*, *Tritonias*, *Lachenalias*, *Ornithogalums*, *Sparaxis*, *Babianias* and *Bulbinellas* are also in flower. The actual peak time of flowering depends very much on the rain – when it falls and how much falls – but generally August to early September are the best times to visit the Gardens. The perennial vygies (mesembs), *Drosanthemums* and *Lampranthus* are at their best in early October. By November most of the annuals and vygies (mesembs) are over.

Spring and early summer are ideal times to take advantage of the Gardens' numerous nature walks. There is a network of pathways in the natural areas that are approximately 8 km long. These pathways are connected to the Fairy Glen hiking trail. There are three trails with information/story/picture boards. These trails are: 1) The Braille trail – 400 m; 2) The Shale trail – 1000 m and 3) The Karoo Adventure trail (including the new Bushmanland section, 2 ha). December, January and February are the dry, hot months of the year, but lots of hardy karroid trees have been planted in the car park and on the upper lawns. In time, these will give shade to the weary visitor. During summer some of the red and pink *Crassula* species are in full flower. It is during these hot months, when the natural karoo veld takes on a pale green hue, that fires become our biggest threat. The karoo veld, when devastated by fire, can take up to 30 years to recover.

Autumn is the time when many of the (dormant) summer bulbs push out their massive round heads of flowers. *Brunsvigia*, *Boophane*, *Cyrthanthus*, *Haemanthus*, *Nerine* and *Amaryllis* flower from March until May. The carrion-smelling flowering plants in genus *Stapelia*, *Duvalia*, *Piarranthus*, *Hoodia* and *Huernia*, flower from early March until the end of May. These flowers are characterized by their smell of rotten meat, which is very noticeable on hot, balmy afternoons. Autumn is also the time when the *Lithops* (stone plants), *Conophytum* (resembling stone plants) *Pleiospilos* (liver plant), *Dinteranthus*, *Argyrodermas* and *Lapidaria* all flower. These chunky, succulent plants, all of which make ideal pot plants, look their best after the hot, dry, summer months. Their iridescent flowers are spectacularly shown off against the stone-like bodies of the parent plants.

During the winter months the days are short. The first snow of the season usually falls on the Brandwacht Mountains (2100 m above sea level) to the north of the Garden. Rain falls sporadically, often accompanied by strong, north westerly winds. The attractive displays of *Oxalis* (clover-like plants) make a visit to the garden rewarding. These cheerful plants flower in a wide array of colours including pink, yellow, white, mauve and purple. The dullness of winter is brightened by the warm colours of the many flowering

aloes. *Aloe dichotoma* (Quiver tree) and *Aloe ramosissima* with their bright, yellow flowers and pale, flaky bark, stand out like beacons in the wintry landscape. Other noteworthy aloes include: *Aloe ferox* (bitter aloe/Cape aloe), *Aloe barberae*, (the giant tree aloe from the eastern Cape) and *Aloe plicatilis* (fan aloe). Some of the vygie species start flowering from early winter through to spring. The mat forming *Cephalophyllum* (Mesemb.) make especially vivid displays with their metallic red, magenta, yellow and pink flowers.

The natural vegetation

According to Dr. Tim Hoffmann in *Vegetation of South Africa, Lesotho and Swaziland*, edited by A B Low & A G Rebelo, the Karoo Desert Garden falls within the Little Succulent Karoo. This region occurs in the hot, dry valleys between the two parallel, east-west trending mountains of the Cape Fold Belt. Thus, the physical geography, locality, climate, geology and soil create the ideal conditions for a succulent-rich flora.

The natural vegetation is characterized by small karroid bushes, hardy geophytes and succulents. The shrubby plants are mainly of the family Asteraceae. These include perennial shrubs such as *Pteronia*, *Elytropappus*, (Rhino bush), *Galenia*, *Rhus*, *Eriocephalus* and *Euclea* (Gwarribos). Plants of a succulent mesemb nature include *Antimima mucronata*, *Conophytum ficiforme*, *Drosanthemum bicolor*, *Drosanthemum speciosum*, *Drosanthemum micans*, *Drosanthemum striatum*, *Drosanthemum thudichumii*, *Drosanthemum barkwickii*, *Ruschia carolii*, *Ruschia multiflora* and *Ruschia pygmaea*. Other notable succulents are *Aloe microstigma*, *Cotyledon orbiculata*, *Crassulas* (25 species), *Euphorbia burmannii*, *Euphorbia mauritanica*, *Haworthia herbacea* var. *herbacea*, *Haworthia pumila*, *Orbea variegata*, *Othonna retrofracta*, *Senecio radicans*, *Quaqua mammilaris*, and *Tylecodon paniculatus*. Some of the succulent Pelargoniums are: *Pelargonium abrontanifolium*, *Pelargonium alternans*, *Pelargonium carnosum* and *Pelargonium karooicum*. There are 422 species found growing naturally on the estate. A large proportion of these species are succulents. There are also many geophytes (bulbs) of real beauty, such as the *Nerines*, *Massonias* and *Ornithogalums*, and the giant *Brunsvigia josephinae*.

The Garden Today

The Karoo Desert Garden, with a total developed area of 11 ha (approx. 25 acres), has a number of sections for displaying the horticultural potential of the various desert plants. These are mainly plants grown for their brilliant flower colour or sculptural forms i.e. caudiciform plants. Nearly 90% of the plants grown are of a water-wise nature. Other sections of the Garden represent the different karroid phytogeographical areas where desert plants are found. These include the Richtersveld, Little Karoo, Great Karoo, Bushmanland, Eastern Karoo, etc. The garden staff are continually expanding these areas so as to give the general public a greater picture of the wonders of the different areas of the succulent world.

The Garden has fairly comprehensive succulent and arid geophyte collections. A few of these include: *Haworthia*, *Conophytum*, *Lithops*, *Stapelia*, *Huernia*, *Avonia*, *Anacampseros* and *Tylecodon*. The arid geophytes include: *Brunsvigia*, *Hessea*, *Strumaria*, *Crossyne* and *Boophone*. Due to the tremendous floral diversity, it was decided to concentrate on selected families, genera and species. The main families which the Garden concentrates on are Amaryllidaceae (11 genera), Apocynaceae (2 genera), Aloeaceae (3 genera), Aizoaceae (44 genera), Asclepiadaceae (new name Apocynaceae) (20 genera), Crassulaceae (1 genus) and Portulacaceae (4 genera).

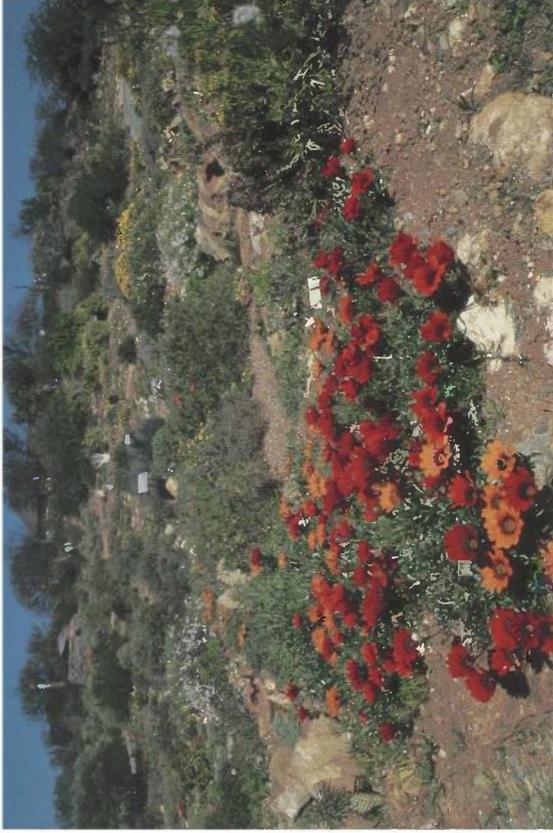
In total, the Karoo Desert National Botanical Garden has about 3,700 taxa under cultivation. Nearly 65% of these are of a succulent nature. (We have recorded 375 species, of which, over sixty percent are succulents.) Rare and endangered plants are propagated and offered for sale in an attempt to take the pressure off of populations in the wild.

Future Development Plans

- 1.) Development of a 5000 m² (0.5 ha) *Aloe dichotoma* (Quiver tree) forest/Bushmanland area. This project is well under way with 300 young *Aloe dichotoma* plants having been planted. We plan to rescue another 200 young *Aloe dichotomas* in 2002 and 2003, bringing this project to its conclusion. Eventually there will be 500 quiver trees growing in this area, making it the largest planted quiver tree forest in the world.
- 2.) Development of a 1000 m² *Aloe barberae* (Bain's Aloe) forest. These plants were grown from cuttings and seed and planted during the winter of 2002.
- 3.) Further development and planting-up of Karroid phytogeographical areas.
- 4.) Development and planting-up of a *Pelargonium* hillock. This would feature mainly succulent *Pelargoniums* and *Pelargoniums* from the arid areas.
- 5.) Installation of automated irrigation systems for all lawned areas.
- 6.) Featuring the trees from the dry areas with emphasis on *Acacia*.
- 7.) Participation in a joint NBI/NBRI (Windhoek) project for the establishment of *Aloe pillansii* in South Africa and Namibia (in the Richtersveld). The mortality of these plants is extremely high, with a large percentage of mature trees dying. Recruitment of new seedlings has been sparse in places.
- 8.) Construction of an additional glass house for cultivation of *Aloe* species.

References

- Oliver, I.B. 1993 Veld & Flora. Vol. 79(2), Pages 46 –48, Cape Town.
- Oliver, I.B. 2000 Aloe. Vol. 37 (2 & 3), Pages 28 – 30, Pretoria.



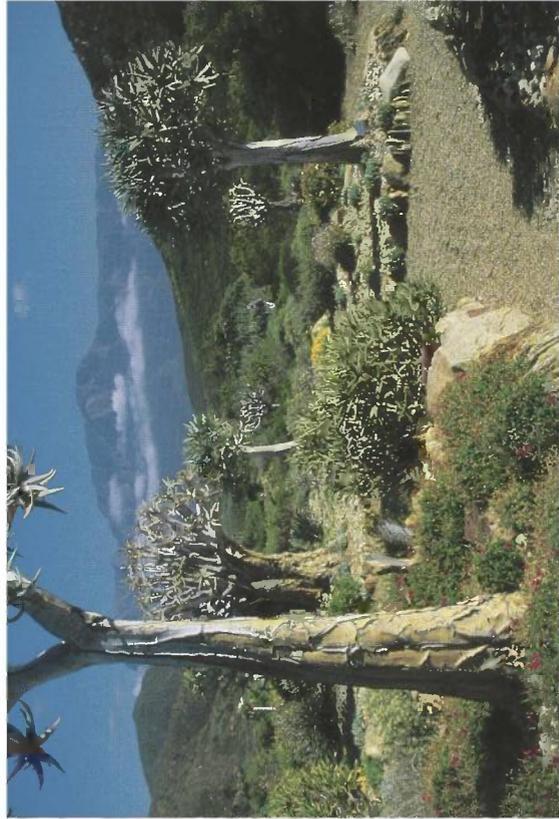
The colors of spring. (S. Carter)



Hillside at Karoo Botanical Gardens (S. Carter)



Incredible variety of growth forms. (S. Carter)



Aloe pilansia (S. Carter)