

The Sperrgebiet – a Diversity Hotspot of Desert Plants

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A small portion of the Succulent Karoo, southern Africa's hotspot of plant diversity, extends into southern Namibia. Locked up in the enigmatic Sperrgebiet or Diamond Area 1, a remarkable diversity of living diamonds rivals the riches excavated from ancient beaches beneath the sand and sea by the diamond industry. Antje Burke, a freelance plant ecologist who has worked in Namibia over 15 years, and Coleen Mannheimer, associate researcher and former curator of the National Herbarium of Namibia, take stock of the Sperrgebiet's fascinating plant riches.

Patches of yellow, pink and purple succulents, their leaves bursting with water, carpets of yellow daisies, colourful white, purple, and yellow lilies, slopes covered in delicate, violet-flowered herbs and wherever we looked there was more to be seen. We will never forget our first 'formal' plant collecting trip to the Sperrgebiet in 1996 when the entire area had received exceptionally good rains and we happened to get the timing exactly right. Many more trips followed – at least once a year – and even if we were not always as lucky as the first time, a good seven years later we feel equipped to give a report back.

We always knew this area to be rich in plant species in the Namibian context. Yet, (1) How rich? (2) How special? and (3) What are the possible reasons for this? ... are three questions we would like to explore in this article.

What and where is the Sperrgebiet?

Covering some 20 000 km² – if one excludes the northern strip that extends into the Namib sand sea – in the south-west of Namibia, the Sperrgebiet (German for 'forbidden territory') is a prime wilderness area at the transitional zone between winter and summer-rainfall in southern Africa (Figure 1). Extreme aridity, – annual mean rainfall increases from about 20 mm to some 60 mm along a coast inland gradient – relentless winds, mainly from the south, and regular fog, particularly along the coast, characterise the

climate of this biodiversity hotspot. Certainly not a mellow environment for plants.

Breathtaking, spectacular and contrasting landscapes abound. Dune fields, some sparsely covered in low stem succulent shrubs (*Othonna cylindrica* and *Othonna furcata*), others mobile and only supporting a few patches of robust desert grasses (e.g. *Cladoraphis spinosa* and *Stipagrostis sabulicola*) alternate with gravel plains, ancient river courses that dried up many thousands of years ago, and groups of isolated mountains (inselbergs) with variable substrates caused by the complex geology of this ancient land surface. Some patches of gravel plain are so densely packed with minute succulents (*Crassula*, *Dracophilus*, *Fenestraria*, *Lithops* species and many more) it is almost impossible not to step on them, while the inselbergs and mountain areas provide perfect rock gardens that any horticulturist would envy. Here tall stem succulents (e.g. *Aloe ramosissima*, *Tylecodon paniculatus*), a tremendous variety of dwarf succulent and deciduous shrubs, lilies, herbs, climbers and creepers congregate to form structurally diverse, aesthetically astounding and taxonomically challenging plant assemblages. Many of the leaf succulent shrubs look very much alike, but a closer look reveals that they are all very different.

Long stretches of sandy beaches with occasional rock promontories break up the regular coastline. Along here fierce winds have perpetually swept valleys that run north-south for hundreds of years, preventing all but a few, isolated hardy shrubs from taking a foothold. In the lee of rocks and outcrops, numerous dwarf succulents cling onto the often steep slopes, many, such as the appropriately named *Namibia*, endemic to these rocky coastal habitats as well as other species, such as *Eremothamnus* and several *Pelargonium* species. Salt pans adjoin the sandy beaches inland, possibly relicts of former lagoons and now maintained by underground seawater seepage. All these varied habitats provide a home for plants, predominantly succulents, which seem well adapted to this harsh desert environment. A linear oasis, the Orange River, which carries water all year round, forms the southern boundary and locally supports evergreen riparian woodlands, reedbeds and grassy lawns.

The name of the area deserves an explanation. Initially created as a buffer zone for the diamond industry, the Sperrgebiet was proclaimed by the German colonial administration in 1908. Since then it has been closed to the public, and only mining and exploration activities are allowed there. Recently, in a very restricted area, a tourism concession has been granted. Mining is restricted to a small area on the eastern boundary, the Orange River terraces, and beaches on the coast. Yet exploration activities occur throughout the area. Its status is state land with, save of the mining and exploration licences, plans to proclaim a formally protected conservation area.

