

Endemic plants of the Sperrgebiet

A photographic guide



Antje Burke

–to John and Margret–

First published in 2020 by EnviroScience and the Namibian Chamber of Environment, Windhoek.

Text, sketches, maps, photos & design © Antje Burke, 2020, unless otherwise mentioned.

Edited by Carole Roberts.

This publication may be reproduced for non-commercial purposes only.

Citation: Burke A. (2020) *Endemic plants of the Sperrgebiet*. EnviroScience & Namibian Chamber of Environment, Windhoek.



Acknowledgements

This publication would not have been possible without the generous support of a Namibian Chamber of Environment Grant with funding from B2Gold Namibia and Total Namibia under the title 'Highlighting the importance of endemic plants of the Tsau //Khaeb (Sperrgebiet) National Park'.

My colleagues Stephen Brack, Sonja Loots, Coleen Mannheimer, Chris Rodgerson, Silke Rügheimer, Pieter van Wyk and Andrew Young generously contributed photos.

Pieter van Wyk also contributed to the *Antimima* descriptions.

A heartfelt 'thank you' to you all!

What's to follow?

Why do we need this book?	1		
What is an endemic plant?	2		
Where are Namibia's endemic plants?	3		
Are there any patterns?	4		
Why are there endemics?	5		
Why are there so many in the Namib?	6		
How well-protected are endemics in Namibia?	7	Types of endemics	14
How to use this guide	9	Bulbs	15
1. Which growth form?	9	Herbs	23
2. Which plant family?	10	Shrubs	27
Example of plant description	12	Stem succulents	43
Distribution	13	Compact succulents	47
A comment to the maps	13	Leaf-succulent shrubs	75
Endemism	13	Glossary	80

Why do we need this book?

While all creatures and their environment deserve our respect and protection, human activities invariably impact on plants, animals and their habitats. In the worst case, man's tampering with nature leads to the extinction of species – something we should avoid if at all possible. The risk of extinction is greatest for plants and animals with a very limited distribution. A useful concept in this context is to focus on endemics.

Namibia, as a signatory to the Convention on Biological Diversity, has a particular obligation to look after its endemics – that is, those plants that only occur in Namibia. In order to protect them, we need to know what they look like. Conservation officers, scientists and park officials – in fact all people working and moving in areas where endemics occur need to be able to recognise them.

The aim of this book is to help people recognise endemic plants. The focus is on the area with the greatest number of endemics in Namibia – the Tsau //Khaeb (Sperrgebiet) National Park (referred to as 'the Sperrgebiet'). This information in e-book format can easily be extended to other areas and other groups of organisms once more information is available.

The book is written for non-specialists and therefore uses a minimum of technical terms. Those that are necessary are explained in a glossary.

This book introduces plants endemic to Namibia and is written for non-specialists.



What is an endemic plant?

In a biological context, **endemic** means that a particular organism (or group of organisms) is only found in a certain region. If one speaks about a plant or animal being endemic, the **area** always has to be specified for it to be meaningful. So there are plants endemic to Namibia, or endemic to the Namib (which would occur across the country's borders into Angola in the north and/or South Africa in the south) or

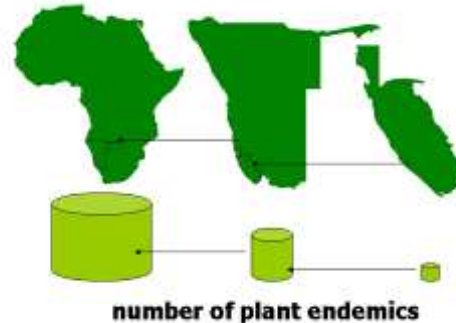
endemic to a specific protected area, for example.

Plants and

animals do not recognise political or administrative boundaries and although the concept of Namibian endemics is useful in allocating responsibilities for their protection to Namibia, ecological borders are a better reflection of the natural situation. Ecological borders are defined by climate, landforms and ecological processes. Therefore a watershed, perennial river or mountain are examples of boundaries that a plant or animal might 'recognise'. For example, many northern-Namib endemics occur in northwestern Namibia and southwestern Angola and similarly southern-Namib endemics occur in southwestern Namibia and northwestern South Africa.

Endemic means only found in a certain region.

The number of endemics is often used in conservation planning and it is useful to understand the relationship between this number and the size of the area.



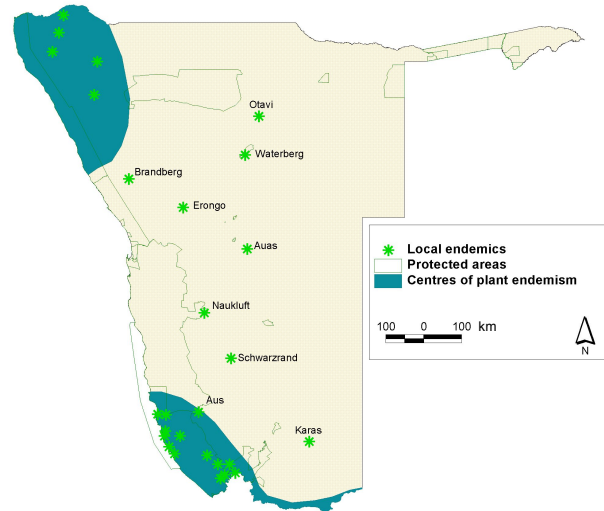
Zooming in from an African perspective to a local one, the number of endemics decrease. Most restricted are species endemic to a particular site, such as the Aurus Mountains in the Sperrgebiet and there are only a few.

Two points are important to remember: (1) the number of endemics increases with the size of the area, and (2) endemics of a smaller extent of area are automatically endemics of the larger area. For example, an endemic of the Sperrgebiet is automatically a southern-Namib endemic and also a Namibian endemic.

Where are Namibia's endemic plants?

Two centres of plant endemism are recognised in Namibia. Both are situated at the country's borders – the Kaokoveld in the north, and the Gariiep in the south. The Kaokoveld continues northwards across the Kunene River into southwestern Angola up to Namibe; the Gariiep crosses the Orange River into South Africa. Apart from these regional centres, there are also local areas within Namibia with concentrations of endemics. These are all associated with mountains, such as the Brandberg, and the Otavi, Auas, Erongo, Naukluft and Karas.

The regional centres of plant endemism in Namibia are the Kaokoveld and the Gariiep.



How many endemic plant species are there?

Namibia has 4,344 plant species, of which 680 (16%) are endemic. Most of these endemics occur in the Namib Desert. This is a rich proportion of endemic flora, only surpassed by South Africa (70%) and Angola (24%) in southern Africa. In comparison, Botswana has only 13 confirmed endemic species, a mere 0.4% of its flora, and Zimbabwe only 2%.

Are there any patterns?

Endemism and rarity do not always coincide. While any Namibian endemic is rare in a global sense, it may not necessarily be rare within its area. Some are fairly widespread and adapted to a range of habitats and climates, others are very limited in their distribution and are thus rare. In exceptional circumstances, a widespread endemic in terms of range can also be rare if it only occurs in very low numbers. *Aloe sladeniana* and *A. viridiflora*, for example, occur in widespread mountainous areas, such as Gamsberg, Naukluft and Tiras, but never in large numbers. Examples of widespread endemics in Namibia include the herbs *Acrotome fleckii* and the shrub *Aptosimum arenarium*.

Endemics come in all growth forms, although there are very few trees. *Commiphora saxicola*, *C. steynii*, *Cyphostemma juttae*, *Erythrina decora*, *Kirkia dewinteri* and *Sesamothamnus leistneri* are currently the only trees known to be endemic to Namibia.



Aptosimum arenarium is one of Namibia's more widespread endemics and is found from the Namib to the Central Highlands near Windhoek.

The plant family with the largest number of endemics in Namibia are the Mesembryanthemaceae or Aizoaceae (mesembs or vygies), followed by Asteraceae (daisies) and Acanthaceae (acanthus family). The mesembs are clearly linked to the southwestern winter-rainfall areas and the Acanthaceae largely to the proliferation of the genera *Barleria* and *Petalidium* in the Kaokoveld.

The Klinghardt Mountains in the Sperrgebiet are rich in endemics – three species are presently known to only occur here.



Why are there endemics?

Endemism is usually associated with a change in environmental conditions. In a very simplified example, the development of a mountain range might divide a population of a plant species into two: one growing north of the range, another south. If the distance between the two populations is sufficiently large and the plants can no longer exchange genetic material in the form of seeds or pollen, the two populations will evolve independently. As they adapt to the different environmental conditions on each side of the mountain – for example, less rainfall and more sun on the northern side than on the southern side – they evolve over many generations into different species, which eventually can no longer interbreed. These processes take place over millions of years and this is an oversimplified example. In nature the development of endemics is much more complex, subtle and often difficult to explain, as it involves a variety of factors.



Inselbergs surrounded by shifting sand, like the Chamnaub in the southern Sperrgebiet, may develop endemics if isolated for a sufficiently long time.

A change in environmental conditions may ‘trap’ species and lead to endemism over millions of years.

Why are there so many endemics in the Namib?

A combination of different factors, and probably different ones in different parts of the Namib Desert, has resulted in its remarkable level of endemism. A combination of old and new aptly summarises some of the reasons. Old: the Namib Desert has been in existence for 43 million years, which has given plants ample time to develop special adaptations to the Namib's environmental conditions. New: the southern part of the Namib is dominated by a relatively young family of plants in evolutionary terms – the Aizoaceae – and new species develop relatively rapidly in this group. This means that selection factors are probably different for the northern, central and southern Namib.

Overall, three factors may determine endemism:

1. The Namib is one of the oldest deserts in the world, thus a long evolutionary timeframe has enabled the development of many different adaptations to the special conditions found here.
2. For a desert, the Namib's climate is relatively benign, moderated by the coastal influence and has in the past provided a refuge for tropical species during cold periods.
3. The Namib's enormous latitudinal extent, well beyond the subtropical zone that usually defines deserts, means it reaches into the tropics in the north and into the temperate region in the south. This long north–south extent offers a variety of far-flung habitats with different conditions.

High altitude and rocky areas within the Namib fog belt, such as the Aurus and Kowis mountains and Boegoeberg (from left to right), provide special habitats that have contributed to the development of endemics.



How well-protected are endemics in Namibia?

Namibia's endemics are not necessarily protected by law. Iconic plants, plants known to provide a natural resource in demand (such as wood or medicine) or those sought-after by collectors are usually listed under conservation or forestry laws. For example, all *Aloe* and *Crassula* species are considered collectors' items and are protected, and so is the camel thorn (*Acacia erioloba*) because of its desirable wood. This leaves many endemic species unprotected, other than those in proclaimed protected areas. In protected areas, all plants and animals are automatically protected from harvesting or any other form of resource use, with some exceptions where harvesting is allowed for traditional use.

Many Namibian endemics – even some very rare ones – have not received an official conservation status and thus have no legal protection.

Protection is also provided in the form of Red Lists of threatened species. Red Lists provide the level of risk of extinction of plant and animal species in a country. International criteria are used in determining the risk and, for a plant or an animal to be listed as threatened, there must be a clear indication of decreasing abundance or a well-perceived threat to the survival of the species. As this type of information is rarely available, only a few plant species in Namibia have received threatened status on Namibia's Red List so far. Rarity has recently been revived again as an assessment criterion, and this may help to give the rarer endemics a conservation status.



Conophytum halenbergense is listed as 'vulnerable' on Namibia's Red List.

Threats to endemics are manifold. In an arid country like Namibia, a changing climate is likely to affect its endemic species because many are adapted to very special environmental conditions. For example, the winter-rainfall area is projected to retreat southwards which will severely affect Namibia's portion of the Succulent Karoo Biome and its Sperrgebiet flora.



Nobody knows how climate change will affect fog patterns, here seen moving in along the base of the Aurus Mountains. Many endemics are likely dependent on this regular, although meagre, moisture supply.



Examples of stone plants: *Fenestraria* (left) and *Lithops* (right).

Many endemics happen to be succulents and rare, and highly sought-after by plant collectors. The stone plants, such as *Lithops*, *Fenestraria* and *Conophytum* species, are good examples. Although many are commercially available now in cultivation, there are still unscrupulous collectors who only want plants from the wild – and the rarer the plant, the more highly they are priced.

Endemic dwarf succulents are highly sought-after by collectors.


Inadvertent destruction of populations of endemics often happens in the course of developments, such as infrastructure development, a change in farming practices, or mining and exploration. This could be avoided if people were aware of the endemics.


How to use this guide


This guide is structured according to, firstly, growth form and, secondly, plant family.

1. Which growth form?

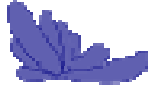
The species are organised according to the main growth forms: bulb, herb, shrub and various succulent forms (compact, stem and leaf succulents).

Bulb  has underground storage organs and only appears during the growing season p. 15

Herb  has soft leaves and stems and usually grows for one season p. 23

Shrub  is a woody plant with multiple stems; it is evergreen or has seasonal leaves p. 27

A succulent is a plant with water-storing tissue, either in its leaves or stems, or both.

Compact succulent  is a small plant (<20 centimetres high) with fleshy leaves and/or branches forming a dense clump p. 47

Stem succulent  has water-storing tissue in its stems; it can be several centimetres or metres high p. 43

Leaf-succulent shrub  is a woody plant with multiple stems and succulent leaves p. 75

2. Which plant family?

The plants are organised in each growth-form group alphabetically by family and then by species. The illustrations and brief descriptions that follow will help you find the right family. Only families with many species with a similar growth form and the family characteristics relevant to the species in this book are described below.

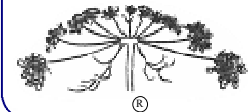
Acanthaceae (acanthus family)



- Shrubs
- Flowers in dense heads with spiny bracts
- Petals of uneven length with larger upper lip

p. 28

Apiaceae (carrot family)



- Shrubs
- Flowers in umbrella-shaped arrangement

pp. 29, 30

Apocynaceae (oleander family)

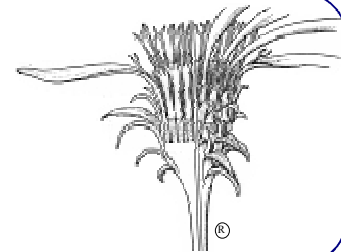
- Usually having milky sap
- Fruit opens on one side
- Male parts of flower (anthers) joined



pp. 31–33, 44–45

Asteraceae (daisies)

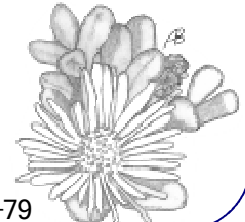
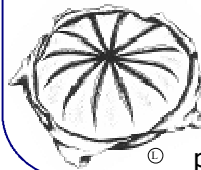
- Shrubs or succulents
- Composite flowers in dense heads
- Fruit (achene) usually with plume



pp. 34–38, 68

Aizoaceae (mesembs, midday flowers, vygies)

- Leaf succulents
- Fruit, an intricate capsule with many chambers
- Flowers showy with numerous petals, superficially resembling those of daisies



pp. 25, 48–67, 76–79

Chenopodiaceae (goosefoot family)

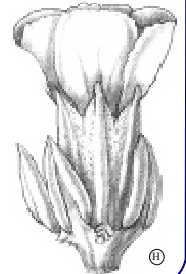


- Shrubs
 - Fruit, a small round nut, winged
 - Flowers small, without petals
 - Leaves scale-like
- p. 39–40

Frankeniaceae (frankenian family)



- Shrubs, heather-like
- Flowers small, regular
- Leaves decussate, scale-like
- Fruit, a capsule



p. 42

Crassulaceae (stonecrops)

- Succulents
- Flowers small, in numbers of five
- Fruit, a group of follicles (capsules open on one side)



p. 69–72

Euphorbiaceae (milkweeds)



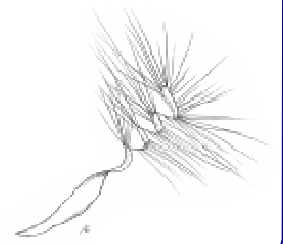
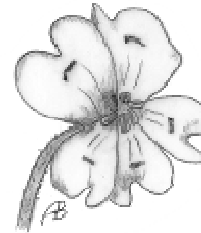
- Stem succulents
- Milky sap
- 'False flowers' (cyathia)
- Fruit capsule

p. 73–74



Geraniaceae (geraniums)

- Stem succulents or bulbs
- Flower regular to slightly irregular, in numbers of five
- Fruit splits into single-seeded parts when ripe and has long awns



p. 20, 46

Example and elements of plant descriptions

A *Juttadinteria deserticola*

E Gar P Named for Professor Dinter's wife Jutta and its occurrence in the desert


B

DESCRIPTION The plant forms an irregular tuft, sometimes with branches extending along the ground. With its brilliant white, terminal flowers, often up to 5 cm in diameter, the plant can hardly be overlooked. The grey-green leaves are broad, boat-shaped and can have a few teeth. The fruit capsules have 8 to 12 chambers.

DISTRIBUTION This is the most widespread *Juttadinteria* species in the park, mainly in the coastal area, but also south of the Orange River. It grows mainly on rocky substrate but also in sandy areas.

F

SIMILAR TO... other *Juttadinteria* species, but the broad, boat-shaped leaves are characteristic.



D

C

Alzooaceae (mesembs)

13

- B** Explanation of name
- C** Plant family
- D** Growth form

E Status

P

Protected according to Namibia's Conservation Ordinance of 1975/76

Red List status (IUCN):

R Rare

NT Near-threatened

VU Vulnerable

C2 Cites, Appendix 2

Area of endemism:

Sp Sperrgebiet

Gar Gariep

- F** Distribution; see next page

- A** The scientific name comprises two parts. The first (*Juttadinteria*) is the genus name, the second (*deserticola*), is the species name.

Distribution

A comment to the maps ...

The distribution maps were compiled from spatial (quarter-degree) records of plants. The range of a species was delineated around these records. Where a species is known to be associated with certain habitats, and such information was spatially available, the range was adapted to include areas where these habitats are known to occur. In many cases, the range was expanded to include in-between areas of similar habitat for which there were no records, as the species would be expected to occur there.

The maps thus show the species' geographic range – the area where it could possibly occur, or 'extent of occurrence' in IUCN terms. It says little about the number of plants of that species. There could be a few individuals scattered over a wide range or there could be plenty of individuals in one or two areas within the range and a few individuals in-between. The maps therefore give an indication of whether the species you are trying to identify is likely to occur where you found it. If you find the species outside its currently mapped range you will have found a new distribution record.

Endemism

Two levels of endemism are relevant in this book. The focus is on plants endemic to the Sperrgebiet – the area outlined in green on the map below. As this is an administrative rather than an ecological boundary, and follows the border of Namibia with South Africa, some species which have also been found south of the Orange River are included; these are Gariep endemics. As the Sperrgebiet falls almost entirely into the Gariep (shown by the turquoise shading), all Sperrgebiet endemics are automatically also Gariep endemics.



Types of endemics

In this book, endemics are arranged according to growth form and taxonomic relationship to make it easier to find what you are trying to identify. There are also other ways of classifying endemics. The size of the area that a species occupies helps to evaluate its conservation importance. The more restricted it is, the higher the conservation importance of the species. The list below shows where in the book to find the most restricted species.

Local endemics – only known from one or two localities or quarter-degree squares:

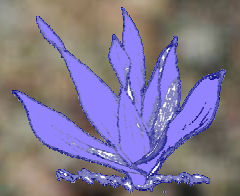
	page
<i>Blepharis meyeri</i>	28
<i>Conophytum halenbergense</i>	53
<i>Conophytum klinghardtense</i> ssp. <i>baradii</i>	54
<i>Conophytum klinghardtense</i> ssp. <i>klinghardtense</i>	55
<i>Conophytum taylorianum</i> ssp. <i>taylorianum</i>	56
<i>Eriospermum buchubergense</i>	18
<i>Eriospermum halenbergense</i>	19
<i>Heliophila obibensis</i>	25
<i>Juttadinteria kovisimontana</i>	60
<i>Lachenalia nutans</i>	22
<i>Lithops hermetica</i>	63
<i>Salsola hottentottica</i>	40
<i>Tylecodon aridimontanus</i>	71
<i>Tylecodon aurusbergensis</i>	72

Park endemics – restricted to within the boundaries of the Sperrgebiet:

	page
<i>Antimima aurasensis</i>	48
<i>Antimima dolomitica</i>	50
<i>Brownanthus namibensis</i>	52
<i>Crassula aurusbergensis</i>	69
<i>Crassula elegans</i> ssp. <i>namibensis</i>	70
<i>Drimia secunda</i>	21
<i>Eriocephalus klinghardtensis</i>	37
<i>Fenestraria rhopalophylla</i> ssp. <i>rhopalophylla</i>	58
<i>Frankenia pomonensis</i>	42
<i>Hoodia officinalis</i> ssp. <i>delaetiana</i>	44
<i>Lessertia cryptantha</i>	26
<i>Marlothiella gummifera</i>	29
<i>Namibia cinerea</i>	65
<i>Polemanniopsis namibensis</i>	30
<i>Psammophora saxicola</i>	78
<i>Pteronia spinulosa</i>	38
<i>Strumaria phonolitica</i>	16

All other plants in this book are Gariiep endemics that occur mainly in the Sperrgebiet, but also beyond its borders within the Gariiep area (see previous page). Their ranges may also extend further north into the Namib–Naukluft Park, east to Aus or south into the Richtersveld. The endemics included here are backed by a scientific study in the *Namibian Journal of Environment* (Burke & Loots 2020), which also lists all relevant literature.

Bulbs



Strumaria phonolitica

Sp

R

Named for its occurrence on phonolite rocks.

DESCRIPTION This bulb develops 3–4 delicate leaves that are arranged in a fan-like fashion at the base of the plant and can be up to 10 cm long and 1.5 cm broad. The flowers appear on a long stalk (up to 18 cm) of which there are up to 6 arranged in an umbel. They are funnel-shaped, with the funnel reaching 2–3 cm and smudgy-rose coloured. The stamens protrude above the flower and are reddish before opening.

DISTRIBUTION First recorded in the Klinghardt Mountains on phonolite, this bulb has subsequently also been found on other rock types in the Aurus Mountains. Its distribution is limited to rocky habitat, mostly on south- to west-facing slopes.



SIMILAR to other *Strumaria* species, but distinguished by having more than 2 leaves, narrow flower lobes (<5 mm) and the stamens protruding from the flower.

© Silke Rügheimer



Amaryllidaceae (amaryllis family)

Bulbine francescae

Sp

R

Named after Françoise Williamson.

DESCRIPTION This rare bulb produces only 2 leaves of unequal length, the larger one up to 10 cm long. The leaves are succulent, light green to translucent and transversely constricted, giving the leaf a rippled appearance. The flowers are solitary, small (up to 1 cm in diameter) and arranged on an upright, loose inflorescence. As in many *Bulbine* species, they are bright yellow and the filaments are bearded.

DISTRIBUTION The bulb has so far only been recorded from the northern section of the Schakalsberge on west-facing, quartzitic slopes.



SIMILAR to *B. diphylla*, which has not been recorded from Namibia and *B. vitrea* from the Richtersveld, which has shorter and usually more numerous leaves.



Eriospermum buchbergense

Sp

R

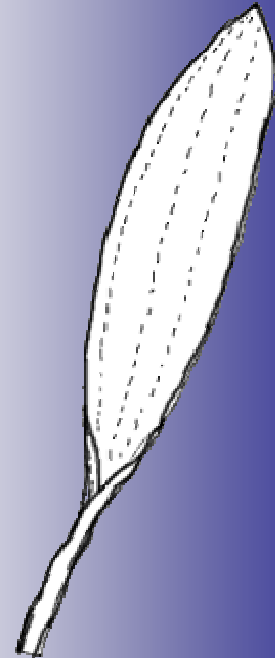
Named after the place where it has been found.

DESCRIPTION One small (2 cm x 1 cm) elliptic leaf is all one may be lucky to see of this elusive plant. The leaves are smooth and enclosed in a short (up to 0.5 cm) sheath. A rudimentary, hairy leaf may also be present. The inflorescence is dense, up to 6 cm long, and the lower flower stalks can be 4–5 cm long. The flowers have never been seen open.

DISTRIBUTION This plant has only been found once at Boegoeberg.



SIMILAR to many other elliptic-leaved *Eriospermum* species.



Eriospermum halenbergense

Sp

R

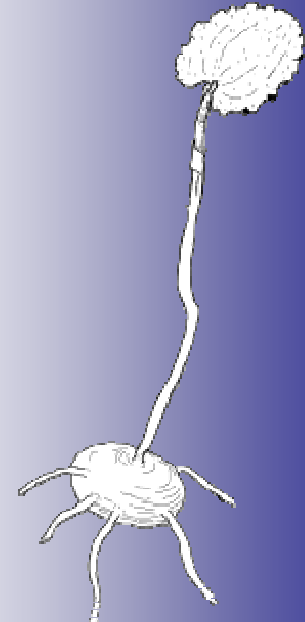
Named after the area where it has been found.

DESCRIPTION This small bulb has a heart-shaped leaf which grows 1.5–3 cm long. The leaf is slightly fleshy with wavy margins and covered in white hairs. These are sparse on top of the leaf, but very dense underneath. The inflorescences are up to 8 cm long and have flower stalks up to 7 mm long, which branch off the central stalk at right angles. Leaves and flowers appear at different times.

DISTRIBUTION The bulb has only been found between Haalenberg and the Tsaukaib Mountain.



SIMILAR to many other *Eriospermum* species, but the fleshy, hairy leaf with wavy margins is distinctive.



Pelargonium sibthorpiifolium

Gar Named after plants of the genus *Sibthorpia* which have similar-looking leaves.

DESCRIPTION The plant grows from small bulbs underground and produces a rosette of several heart-shaped leaves, no more than 8 cm above ground. The flowers range in colour from white to pink with purple markings on the inner petals that attract pollinators.

DISTRIBUTION This small plant grows on gravel plains, occasionally also in sandy habitats, generating magnificent flower displays after rains. It occurs in the coastal part of the northern Succulent Karoo from the Namaqualand coast to Lüderitz.



SIMILAR to no other *Pelargonium* species in the Sperrgebiet.



Drimia secunda

Sp

R

The genus is named for the plants' bitter taste.

DESCRIPTION This bulb produces a dense cluster of thread-like, slightly curled and shiny leaves. The flowers emerge on a stalk and are attached only to one side of it. Individual flower parts (tepals) are fused at the base; they are green with pink tips. The capsule splits into two halves.

DISTRIBUTION This plant has so far been found on sand plains and foot-slopes of mountains in the Sperrgebiet's coastal area and eastwards up to the Schakalsberge along the Orange River.



SIMILAR to *Trachyandra bulbinifolia*, but only when in leaf, as the flower arrangements are very different. The leaves of *T. bulbinifolia* are also more succulent.

This plant was formerly known as *Rhadamanthus secundus*.



©Antje Burke



Hyacinthaceae (hyacinth family)

Lachenalia nutans

Sp

R

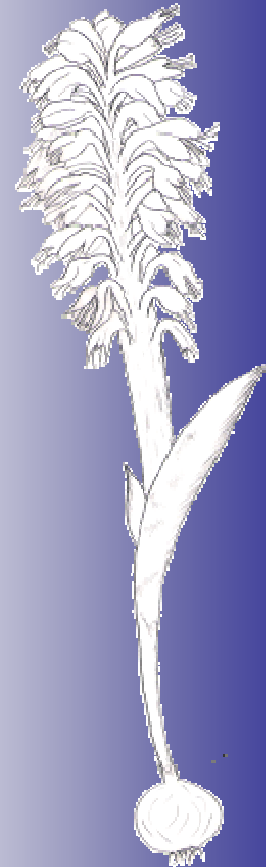
Named after its nodding flowers.

DESCRIPTION This small bulb grows up to 11 cm high and usually produces 1–2 lance-shaped leaves. These grow up to 6 cm x 2 cm, are usually dark green and unmarked on the upper surface. The margins can be dark red. The flowers are densely arranged on an upright stalk that usually has dark purple spots. The flowers are white to yellow-green and distinctly nodding.

DISTRIBUTION The plant has been found at a few localities on sandy and gravel plains near Haalenberg and the Klinghardt Mountains.



SIMILAR to *L. klinghardtiana* which has brown-purple flowers and *L. buchbergensis* which has flowers arranged vertically on erect.



Herbs



Synaptophyllum juttae

Gar So named because of its very close leaf bases.

DESCRIPTION This small, herbaceous, flat-leaved succulent can cover vast areas after exceptionally good rains. The often bright-red, tongue-shaped leaves and the opposite leaf arrangement are characteristic of this plant. It grows close to the ground, is usually no more than 20 cm high and has pretty white flowers. The capsules are four-chambered.



DISTRIBUTION *Synaptophyllum juttae* occurs throughout the north-western part of the Succulent Karoo Biome on the coastal plains of the Sperrgebiet and Namaqualand, occasionally extending inland. It has also been recorded in the central Namib once.

SIMILAR to no other plant in the Sperrgebiet, and the only species in this genus.



Heliophila obibensis

Sp Named after the place where it is found.

DESCRIPTION This small, inconspicuous herb grows upright and has narrow, undivided, hairless leaves with stipules. The white to pink flowers are in loose cymes. The pods are more than 2.5 mm broad, up to 22 mm long and constricted.

DISTRIBUTION As the name suggests, the small herb has so far only been recorded in the Obib mountains.



SIMILAR to various other annual *Heliophila* species in the Sperrgebiet, from which it can only be distinguished with certainty when pods are present.



Lessertia cryptantha

Sp

Named so because it is so elusive.

DESCRIPTION Very few people have ever seen this herb, which grows upright like a small tuft of grass to about 20 cm height. Its leaves are up to 12 cm long with individual leaflets up to 15 mm x 1.5 mm. The pods are smooth, rounded to skew and shorter than twice their width.

DISTRIBUTION *Lessertia cryptantha* has so far only been found in the Klinghardt Mountains and in the Rooiberg area.



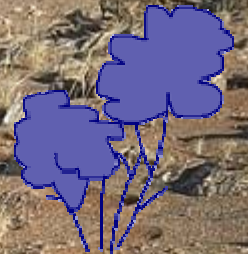
SIMILAR to other annual *Lessertia* species, but the skew-to-round fruit without hairs and its tuft-like growth are characteristic.

?



Fabaceae (pea family)

Shrubs



Blepharis meyeri

Sp

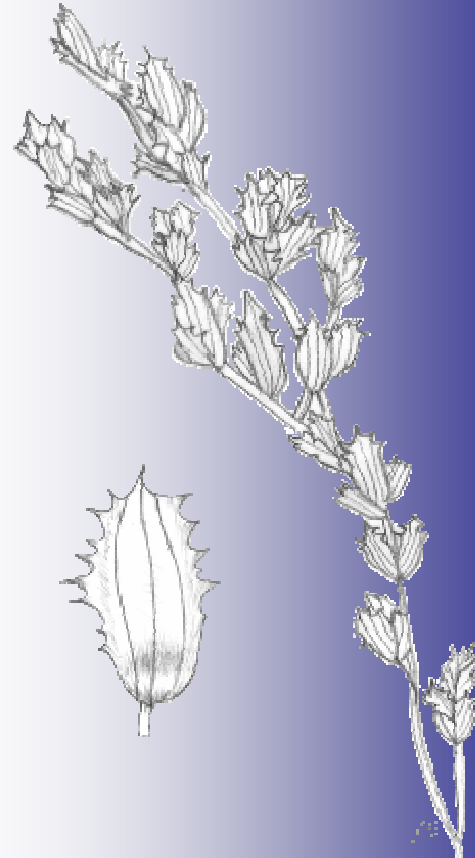
Named after a 19th century German plant collector (either Heinrich or Gottlieb Meyer).

DESCRIPTION This spiny low shrub is characterised by densely packed flower heads that are wrapped in spiny bracts and usually grow in the axils of branches. The leaves are arranged in whorls and are spine-tipped. The flowers are uneven-shaped (zygomorph) with a conspicuously blue to purple upper lip and up to 18 mm long. The capsules are ovate, flattened and contain 2–4 seeds.

DISTRIBUTION This shrub has so far only been found in the Klinghardt Mountains.



SIMILAR to other shrubby *Blepharis* species, but the branching in *B. meyeri* is irregular and not dichotomous; there are no thorns at the branch nodes; and the fertile bracts have three veins.



Marlothiella gummifera

Sp

Named after the botanist Marloth and refers to its resin-bearing nature.

DESCRIPTION This densely branched, compact small shrub grows no more than 30 cm high. Its leaves are yellow-green, profusely divided, somewhat succulent, but nevertheless hard and aromatic. They are evergreen and clustered along the branches. The small, pale-green flowers are arranged in dense umbrella-like clusters. The plant exudes an aromatic resin.

DISTRIBUTION This dwarf shrub is restricted to the Sperrgebiet's coastal area and grows on rocky outcrops and gravel plains.



SIMILAR to, but only vaguely, the related *Polemanniopsis namibensis*. However, their distributions do not overlap, and *P. namibensis* leaves are three-divided, dull to dark green, non-succulent and only present in winter.



Polemanniopsis namibensis

Sp

Named after the 19th century naturalist Polemann and refers to its occurrence in the Namib Desert.

DESCRIPTION This small shrub grows up to 0.5 m high and is rather inconspicuous most of the year because it bears leaves only in winter. The leaves are mostly three-divided, dull to dark green and resemble those of parsley. The small cream-coloured flowers appear in loose clusters in the summer, well before the leaves appear. The fruits have five wings.

DISTRIBUTION *Polemanniopsis namibensis* occurs in a few isolated populations in the north-central part of the Sperrgebiet, north and south of the Kaukausib valley.



SIMILAR to possibly its closest relative in the Sperrgebiet, *Marlothiella gummiifera* (see previous page).

Although known for decades, this shrub has only recently been named, because flowers appear separate from the leaves and therefore not when expected.



Apiaceae (carrot family)

Cynanchum meyeri

Gar

Named after a 19th century German plant collector (either Heinrich or Gottlieb Meyer).

DESCRIPTION This scrambling, densely branched shrub grows up to 0.5 m high. It has milky sap and grey-green branches. The leaves are circular-ovate to elliptic and have a long stalk up to 4 mm in length. The flower is inconspicuous, white to cream, with lobes fused near the base. The secondary corona around the female reproductive part is cup-shaped. The two-pronged fruit can grow up to 4 cm long and splits on one side when mature.

DISTRIBUTION The shrub grows on rocky slopes in the coastal area of the Sperrgebiet and along the Orange River up to Obib, but also just south of the Orange River in the Richtersveld.



SIMILAR to *Rhysolobium dumosum* which has linear-appearing leaves, spine-tipped branches and a simple flower that is pubescent inside.



Ectadium virgatum ssp. *latifolium*

Gar So named because of its broad leaves.

DESCRIPTION This tall shrub can be recognised by its long, flexible branches and large, broad (>5–20 mm) leathery leaves. It can grow up to 2 metres in height. Yellow flowers, borne close to the stem and a conspicuous longish pod with feather-bearing seeds are other characteristic features.

DISTRIBUTION This shrub grows in rocky habitat, largely in coastal areas from the Namib Sand Sea to Oranjemund. It has also been recorded occasionally on rocky ridges inland, and can tolerate sand burial to some extent.



SIMILAR to the other two taxa of *Ectadium* in Namibia. *Ectadium rotundifolium*, which has round leaves and is endemic to the central and northern Namib Desert, and *Ectadium virgatum* ssp. *virgatum*, which has long, narrow (<5 mm broad) leaves and extends south into the Northern Cape of South Africa.



Rhysolobium dumosum

Gar Named for its bushy appearance.

DESCRIPTION This shrub grows up to 0.3 m high and has spiny branch tips. The leaves are elongate-elliptic, leathery and rolled in at the margins and thus appear almost linear. They are densely pubescent below. The bell-shaped flower has no secondary corona and can be white, purple or yellow inside; it is conspicuously hairy. The two-pronged pod is broadly ovate and can be up to 3.5 cm long.

DISTRIBUTION *Rhysolobium dumosum* is a coastal plant of rocky and gravel-plain habitats and occurs from Lüderitz to northern Namaqualand.



SIMILAR to *Cynanchum meyeri* (see page 31).



© Pieter van Wyk



© Pieter van Wyk



Amphiglossa thuja

Gar Named for its resemblance to the conifer thuja.

DESCRIPTION This untidily branched shrub grows up to 50 cm high. Scale-like leaves are densely packed along the branches. Flower heads (capitula) are solitary or arranged in groups of a few at the end of branches or on short side-branches. The flower heads are small (<8 mm) and lance-like when closed. Disc and ray florets (individual flowers inside the flower heads) are white to cream in colour and the fruits have a crown of bristles.

DISTRIBUTION This low shrub is found in the southern Namib's central region, usually on rocky outcrops and inselbergs, often in sheltered positions.



SIMILAR to *Amphiglossa tomentosa* which is distinguished by needle-like, alternate leaves and to *A. triflora*, whose branches become thorny. The plant was formerly known as *Pterothrix thuja* and this name is proposed to be resurrected due to recent molecular studies.



Eremothamnus marlothianus

Gar Named after the botanist Marloth.

DESCRIPTION This dwarf shrub, which grows no higher than 50 cm, can be recognised by its silver velvety leaves, which have sharp teeth on their margins, as do the large bracts (flower-bearing leaves) which hold the flowers. The striking, solitary, yellow flowers on the tips of branches are also characteristic.

DISTRIBUTION *Eremothamnus marlothianus* is restricted to rocky outcrops in the Sperrgebiet's coastal area from Spencer Bay to Chameis.



SIMILAR to *Didelta carnosa* ssp. *tomentosa* which can be clearly distinguished by its flower with massive spiky bracts and absence of spines on its leaves.



Asteraceae (daisies)

Eriocephalus kingesii

Gar

NT

Named after the German teacher and plant collector Heinrich Kinges from Lüderitz.

DESCRIPTION This shrub grows to about 50 cm high, with branches growing nearly at right angles to each other and numerous short shoots with rings of leaf scars. The leaves are succulent, decussately arranged and velvety-silver. The flower heads are 4–8 mm and have no more than two white to cream ray florets.

DISTRIBUTION This shrub grows mainly in rocky habitat in the southern Namib's coastal area and has also been recorded on inselbergs in the Namib Sand Sea.



SIMILAR to a number of *Eriocephalus* species, it is distinguished by its relatively large flower head; the lack of, or only two, ray florets; and its decussate leaf arrangement.



Eriocephalus klinghardtensis

Sp

Named after the place it was first recorded.

DESCRIPTION This unassuming shrub grows upright to about 60 cm high. It is densely branched. Its leaves are arranged opposite and are succulent, cylindrical to club-shaped, velvety, silver-grey and up to 10 mm long and 1.2 mm broad. The flower heads have white ray florets and appear towards the branch tips; the bracts of the florets are joined.

DISTRIBUTION This low shrub grows in rocky habitat on inselbergs in the central and southeastern Sperrgebiet.



SIMILAR to a number of *Eriocephalus* species; distinguished from *E. scariosus* by its densely hairy and opposite leaves and from *E. dinteri* by its joined bracts.

© Sonja Loots



© Sonja Loots



Asteraceae (daisies)

Pteronia spinulosa

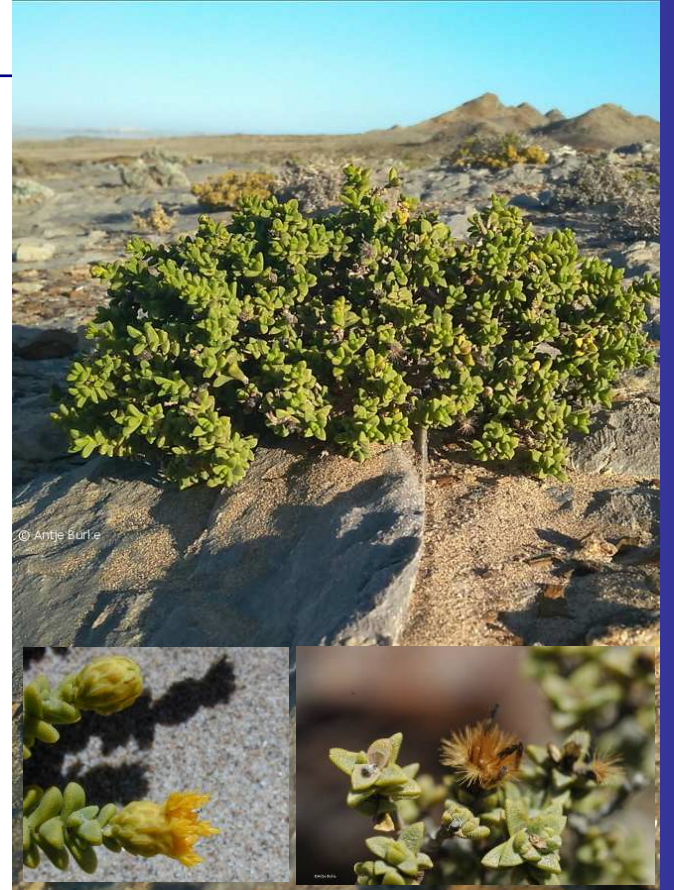
Sp Named for its winged flower bracts and the small, spine-like leaf remnants.

DESCRIPTION This small, densely branched, woody shrub grows up to 40 cm high, often hemispherically. The leaves are blue-green and arranged opposite along the branches. They are fused at the base, smooth and slightly boat-shaped, and succulent. The leaves leave small spines on younger branches when they break off. The flower heads are oblong and solitary at the branch tips. The small flowers are bright yellow.

DISTRIBUTION Mainly growing on gravel plains and rocky outcrops in the coastal and central areas of the Sperrgebiet.



SIMILAR to various *Pteronia* species (of which there are 15 in the Sperrgebiet), but are distinguished by their opposite, hairless and persistent leaves and their solitary flower heads at the branch tips.



Salsola dolichostigma

Gar

Named because of its salt-tolerance and long, narrow stigma.

DESCRIPTION This small, woody shrub grows up to 30 cm high and has a distinct grey-white appearance. The small leaves are scale-like, triangular and densely clustered around the branches; they are densely covered in woolly hairs. The cream-coloured flowers are minute and appear towards the branch tips. The small fruits have skin-like wings.

DISTRIBUTION This shrub grows mainly on gravel plains, often in wind corridors and on slightly saline substrates in the central Sperrgebiet. It has also been recorded at Spencer Bay.



SIMILAR to the (supposedly) 63 other *Salsola* species indigenous to Namibia.

Although this is the current status based on published names, there is a pressing need to revise this genus; the number of species is probably inflated.



Salsola hottentottica

Sp Named after Hottentot's Bay where it was found.

DESCRIPTION This shrub has scale-like leaves which are often longer than 2 mm. The calyx is covered in short hairs.

DISTRIBUTION This shrub has been recorded at Hottentot's Bay.

Salsola araneosa

Gar

DESCRIPTION This small shrub has scale-like leaves with entangled hairs. Round flower-supporting leaves distinguish this species.

DISTRIBUTION This shrub has been recorded in the Klinghardt Mountains, but is also supposed to occur in South Africa.

SIMILAR to some (supposedly) 63 other *Salsola* species indigenous to Namibia.



A *Salsola* species, not necessarily *S. hottentottica* or *S. araneosa*, which are supposed to look similar.



Calobota namibensis

Gar Named so because it occurs in the Namib.

DESCRIPTION This multi-stemmed, unassuming upright shrub grows to 1.2 m high. The branches are initially green and later develop a light brown bark. The leaves are small (up to 12 mm x 2 mm), sessile and ovate to elliptic. The flowers are bright yellow and densely hairy. The linear pods grow up to 17 mm long and are covered in short hairs.

DISTRIBUTION This low shrub is found in the northern part of the Sperrgebiet and southern Namib–Naukluft Park in dunes and on gravel plains.



SIMILAR to *C. linearifolia*, but the leaves of *C. namibensis* are smaller and not linear. The pods are also shorter and densely hairy.

This shrub was formerly known as *Lebeckia dinteri*.



Fabaceae (pea family)

Frankenia pomonensis

Sp

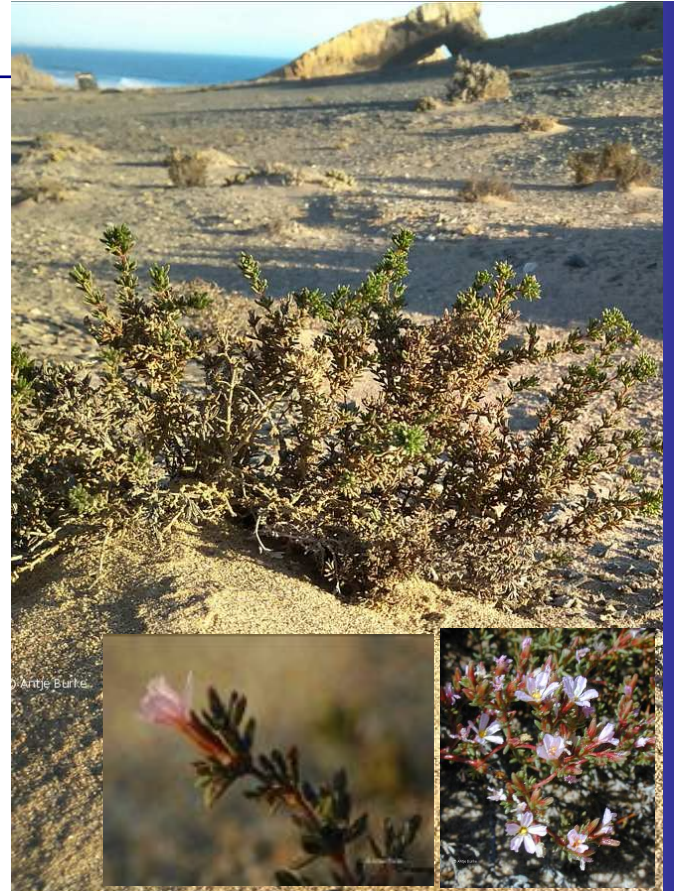
Named after Professor Franke, a 17th century botanist from Uppsala, and because it occurs near Pomona.

DESCRIPTION This rather unremarkable, densely branched, heather-like erect shrub grows no more than 30 cm high and bears clusters of small, needle-like leaves. Leaves and stems are often covered in dense papillae. The small flowers are borne near the branch tips and can range in colour from white to dark pink.

DISTRIBUTION This shrub only occurs on the central coast in the Sperrgebiet in the area around Pomona and Bogenfels in rocky and sandy terrain.



SIMILAR to the only other species in this genus in Namibia, *F. pulverulenta*, which is an annual and grows prostrate on the ground.



Stem succulents



Hoodia officinalis ssp. *delaetiana*



Named after the 19th century British succulent collector Hood, and Frans de Laet, a Belgian succulent expert.

DESCRIPTION This medium-sized stem succulent can grow over 50 cm tall, but is often found scrambling over rocks. It is recognised by its 19–23 rows of rather stout spines which can be up to 12 mm long. The 1–3 flowers are usually 14–20 mm in diameter and on short stalks (<2 mm). The red-brown flowers have few papillae. The horn-shaped capsule splits into two halves.

DISTRIBUTION The plant has so far only been found in the Klinghardt Mountains on quartz and quartzite outcrops and inselbergs.



SIMILAR to many other *Hoodia* species which are difficult to tell apart without flowers. Subspecies *delaetiana* is distinguished from its closest relative, ssp. *officinalis*, by its flower without papillae; ssp. *officinalis* has a larger, densely papillose flower.



Tridentea pachyrrhiza

Gar

P

The genus refers to 3 'teeth' on segments of the flower; the species refers to the stem-like rhizome.

DESCRIPTION This clump-forming, grey-green succulent has four-angled, spineless stems and grows up to 20 cm in diameter. The flowers are borne on a short (<3.5 cm) stalk, but are large (up to 7.5 cm across). They are brown to purple in the centre and irregularly mottled, appear rippled and their margins fold upwards and have no bristles. A horn-shaped, paired, smooth capsule develops from each pollinated

DISTRIBUTION Mainly found on gravel plains in the central coastal area of the park, but also recorded south of the Orange River.



SIMILAR to many other stapelioids, when not in flower. In flower, it is similar to *T. marientalensis*, but the latter's flower has long bristles and its margins fold backwards. Formerly known as *Stapelia pachyrrhiza*.

© Stephen Brack



Apocynaceae (oleander family)

Pelargonium cortusifolium

Gar Named after its heart-shaped leaf bases.

DESCRIPTION A thick, red-brown stem and heart-shaped, silvery leaves characterise this dwarf shrub. Showy, white to pink flowers, sometimes with red nectar guides, appear after rains. The leaves are densely covered in hairs, giving them a silvery appearance, and are aromatic.

DISTRIBUTION *Pelargonium cortusifolium* grows largely on rocky outcrops in the Sperrgebiet's coastal area from Spencer Bay to Chameis. It is also found on inselbergs in the northern and central area.



SIMILAR to *Pelargonium crassicaule*, which has a wedge-shaped rather than heart-shaped leaf base.



Compact succulents



Antimima aurasensis

Sp

P

R

Named so because it grows in the Aurus Mountains.

DESCRIPTION This leaf-succulent shrub forms tufts, often with long branches. The succulent leaves are fused at the base, elongate and often show a reddish tinge towards the keel. Flowers are strikingly magenta, sometimes with a pink to white centre. The capsules are five-chambered with large closing bodies.

DISTRIBUTION As the name suggests, this plant grows in the Aurus Mountains and areas nearby.



SIMILAR to *Antimima buchbergensis*, which has shorter leaves, to *A. quarzitica* which has slightly recurved leaves and *A. perforata* which has five- to six-chambered capsules.



Antimima buchbergensis

Gar

P

R

So named because it occurs in the Boegoeberg.

DESCRIPTION This tufted leaf succulent occasionally grows some long shoots; it is 15–25 cm tall. The succulent leaf pairs are almost pea-shaped, are triangular in section and have a recurved spine at the leaf tip. The internodes are flattened. The leaf surface is hairless, waxy and with slightly raised cells. The capsules are small and five-chambered and the flowers magenta-coloured to light pink with white filaments.

DISTRIBUTION This succulent shrub grows on mountains and inselbergs in the central and southern parts of the park, such as the Klinghardt and Aurus Mountains, Boegoeberg and Schakalsberge. It has also been found in the Richtersveld in South Africa.



SIMILAR to *A. aurasensis*, which has longer leaves, to *A. quarzitica* which has slightly recurved leaves and to *A. dolomitica* which has larger leaf pairs.



No photograph of *A. buchbergensis* could be sourced. The plant is similar to *A. dolomitica* above, but with smaller leaf pairs (only up to pea-size) and flattened internodes.

Antimima dolomitica

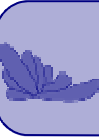
Sp P NT Named after its preferred habitat.

DESCRIPTION Distinctive characteristics of this compact, leaf-succulent shrub are the hazelnut-shaped leaves with a velvety appearance. The plant usually grows no taller than 15 cm. The flowers are whitish to pink or purple and the capsules are five-chambered.

DISTRIBUTION This plant is mainly found on coastal outcrops in the Sperrgebiet, often on dolomite as the name suggests, but has also been recorded in the Obib Mountains.



SIMILAR to *Antimima buchbergensis* which has smaller leaf pairs and magenta-coloured flowers. Also similar to *Ruschia deminuta*, which has small closing bodies.



Antimima perforata

Gar

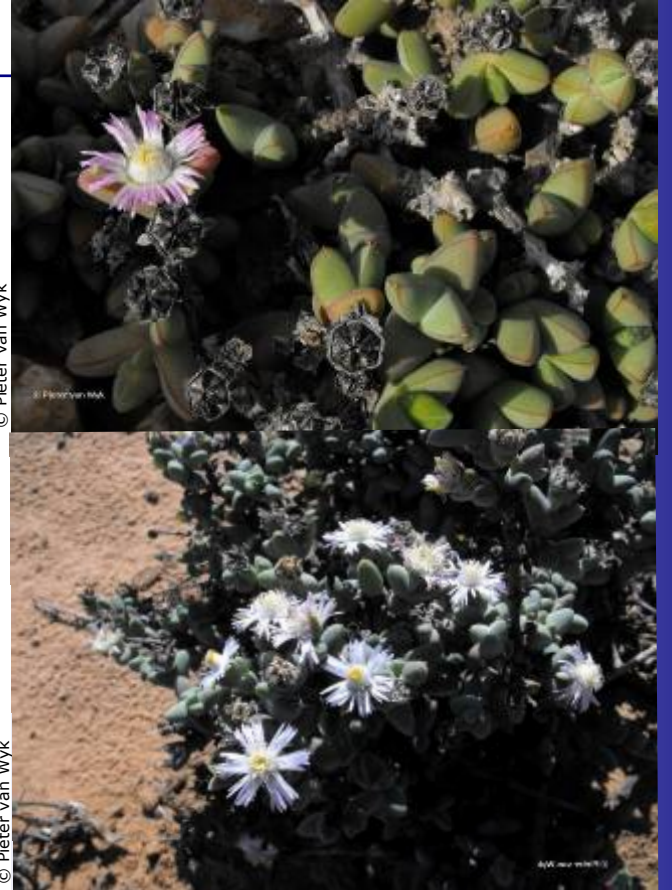
P

DESCRIPTION Very dense, compact growth with stiff, upright branches characterise this leaf-succulent shrub. The leaves are fused at the base, three-sided and taper towards the tip into a short spine. The leaf surface has long papillae which gives the plant a silver-grey appearance. It grows up to 25 cm high. The flowers are usually white to light pink, mostly solitary, rarely in groups of 2–3 flowers. The petals are arranged in groups of six. The capsules are mostly six-chambered with low valve rims.



DISTRIBUTION This plant is mainly found on gravel and sandy plains in the coastal and central area of the Sperrgebiet, but also in the Richtersveld in South Africa.

SIMILAR to *A. dolomitica* and *A. quarzitica*. Both always have five-chambered capsules though, while *A. perforata* has usually six.



Brownanthus namibensis

Sp So named because it occurs in the Namib Desert.

DESCRIPTION This succulent shrub often grows in a circle flat on the ground, but can also have some upright branches. It hardly grows taller than 20 cm. Distinguishing features include its raised, longish bladder cells, solitary flowers, cup-shaped internodes and fused, three-sided leaves. Dried leaves persist as a papery, bristly sheath around the leaf base. A single flower grows at the branch tips; it is up to 15 mm in diameter and white to cream in colour. The capsules are five-chambered.

DISTRIBUTION This plant is found in the central coastal area and grows in washes and on sand and gravel plains.



SIMILAR to other *Brownanthus* and *Psilocaulon* species, which are often difficult to tell apart. The most similar, and overlapping in distribution, is the more widespread *B. marlothii* which has heart-shaped internodes and whose leaves are not fused at the base.



Conophytum halenbergense

Sp

P

VU

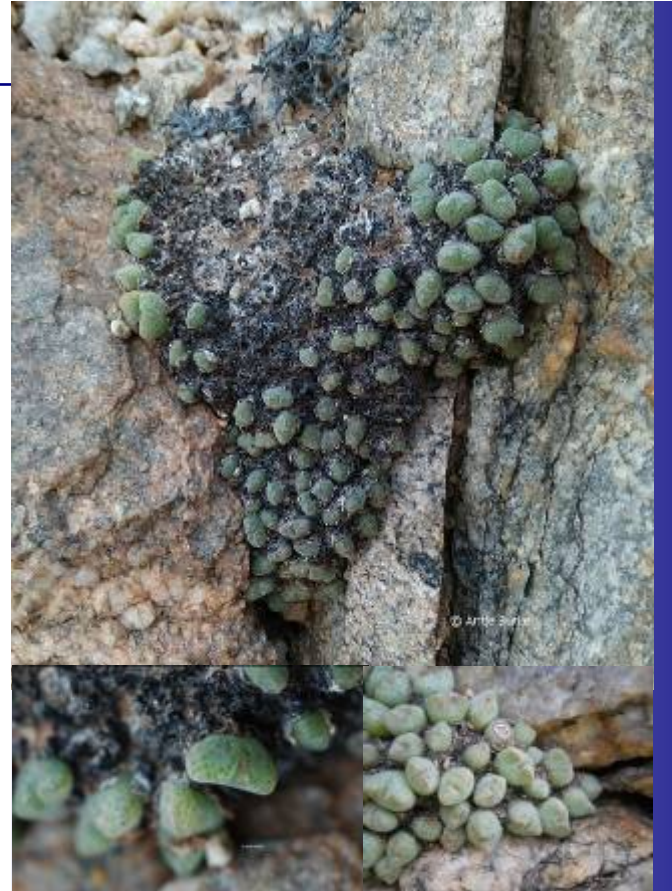
The genus is named for its cone-shaped leaves, the species after its type locality.

DESCRIPTION This tiny (no more than 10 mm), mat-forming leaf succulent is distinguished by its irregular, asymmetric body shape, its spots and distinct keel. The bodies are dull to brownish-green and spotted. Flower colour varies from whitish to copper, or sometimes magenta. The flower initially opens at night. The capsules have four to five chambers.

DISTRIBUTION This plant has so far only been found on Haalenberg and in the Kowis Mountains. It grows in the shelter of rock overhangs on gneiss outcrops.



SIMILAR to a range of *Conophytum* species, but particularly to *C. klinghardtense* ssp. *klinghardtense*, which occurs further south in the Sperrgebiet and has a more squat appearance.



Conophytum klinghardtense ssp. *baradii*

Sp

P

R

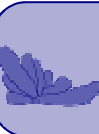
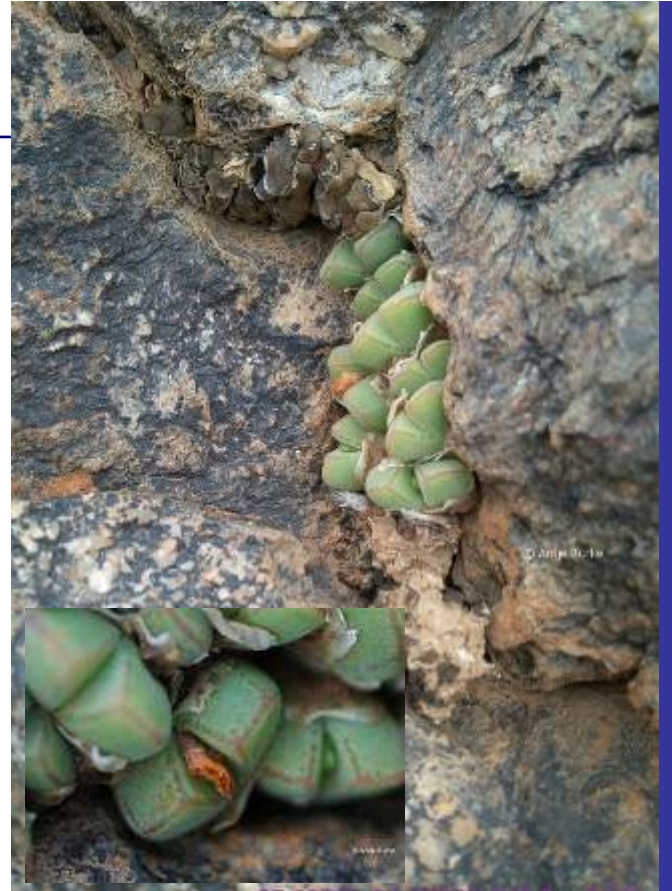
Named after Gerald Barad, who first discovered it.

DESCRIPTION This small succulent (no more than 20 mm high) forms dense clumps. It has an open, bilobed, grey-green body and the leaves are usually without a red keel, unspotted but with papillae, giving them a slightly pubescent appearance. The flowers are cream to pale pink or orange and open initially at night. The capsule is has four chambers.

DISTRIBUTION This cryptic dwarf succulent is only known from a few locations in crevices on conglomerate in the south-eastern part of the Sperrgebiet, on and near the Rooiberg inselberg.



SIMILAR to *C. klinghardtense* ssp. *klinghardtense* which has a yellow-green, more closed body, a distinctly red keel and is spotted.



Conophytum klinghardtense ssp. *klinghardtense*

Sp

P

R

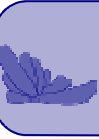
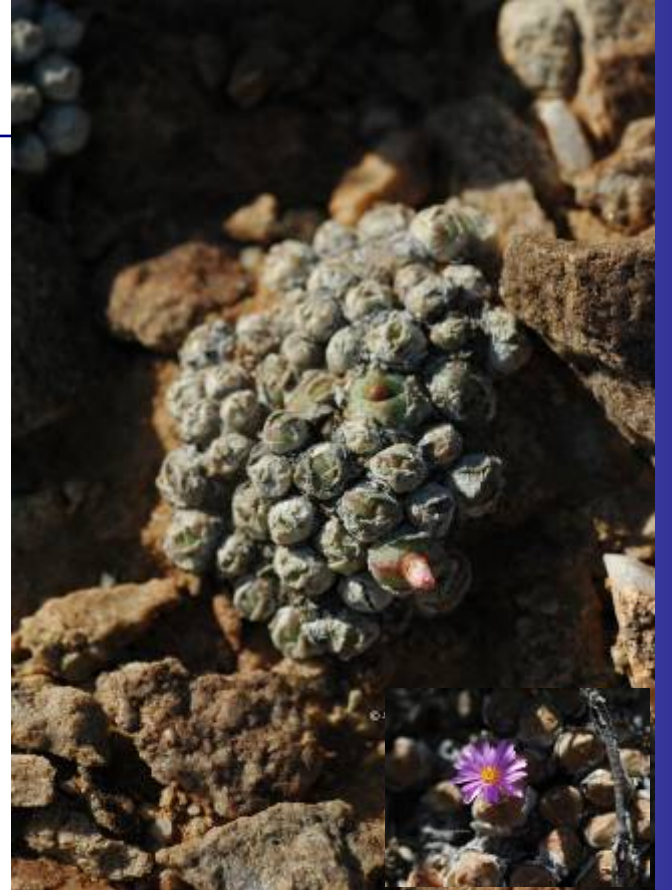
Named after the place where it occurs.

DESCRIPTION This mat-forming dwarf succulent is characterised by a relatively closed, yellow-green, squat body and distinctive red keels. It is usually distinctly spotted. The flowers initially open at night and are whitish-yellow to copper. The capsules have four to six chambers.

DISTRIBUTION This plant has so far only been found in the southern part of the Klinghardt Mountains and in the Heioab–Aurus mountain range. It can be found in sheltered crevices, mostly on the moisture-receiving south to west-facing slopes.



SIMILAR to ssp. *baradii* (see previous page).



Conophytum taylorianum ssp. *taylorianum*

Sp

P

R

Named after the plant collector Edward Taylor.

DESCRIPTION This minute succulent which in habitat grows no more than 10 mm high, forms dense clumps. The body is only slightly keeled, almost flat-topped, shiny and distinctly speckled. The flowers open during the day and are pale pink. The capsules have four to six chambers.

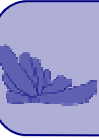


DISTRIBUTION The plant has only been found on quartzite slopes in the Klinghardt Mountains so far.

SIMILAR to *C. taylorianum* ssp. *ernianum*, which is distinguished by a strong keel, warty appearance and pink to magenta-coloured flowers.



© Andrew Young



Dracophilus dealbatus

Gar

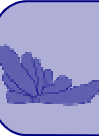
Named after its first find at Drachenberg, and its 'white-washed' leaves.

DESCRIPTION This compact, low succulent hardly reaches 15 cm in height. The leaves are blue-green and triangular with a rounded keel. Striking pink, sometimes white, flowers, which are up to 3 cm in diameter, decorate this attractive plant. The capsules have 8–14 chambers.

DISTRIBUTION Relatively widely distributed in the central and southern part of the park and beyond, up to Rosh Pinah and into the Richtersveld. It grows mainly on gravel plains and foothills, and is often associated with calcrete hardpans.



SIMILAR to *D. delaetianus*, which has very distinctive teeth along its leaf margins.



Aizoaceae (mesembs)

Fenestraria rhopalophylla ssp. *rhopalophylla*

Sp

P

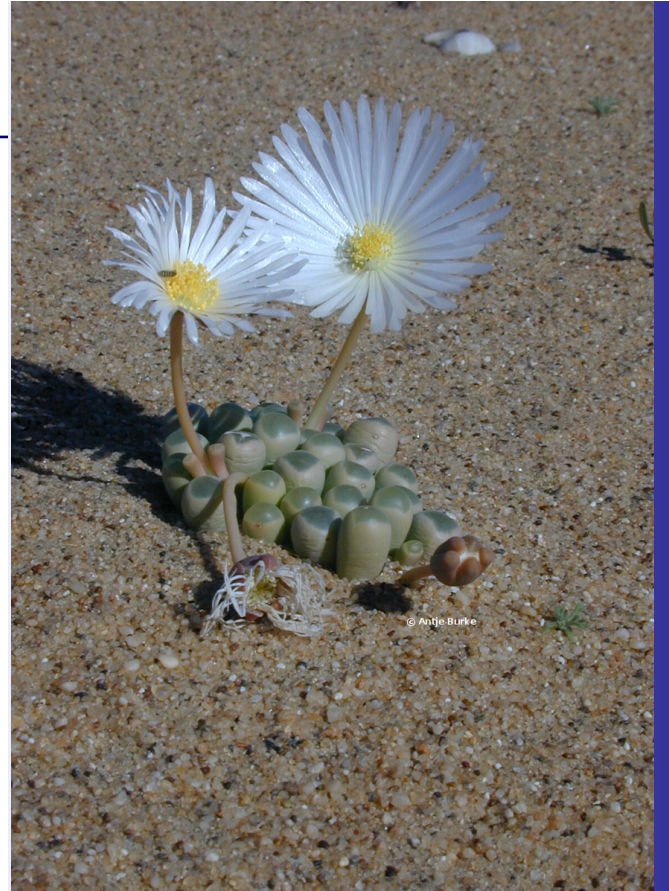
Named after the 'window' at the leaf tips.

DESCRIPTION This intriguing little mesemb has opted to bury most of its body in the sand. Usually only the tips of the leaves can be seen, showing a clear window, which gave the plant its common name, window plant. Spectacularly large, white flowers with a yellow centre emerge during the winter months. The capsules have 10–12 chambers and are produced on a long stalk.



DISTRIBUTION This succulent grows on sand and gravel plains, occasionally on the foothills of rocky outcrops; it is mainly restricted to the coastal area of the Sperrgebiet.

SIMILAR to ssp. *aurantiaca* which has a yellow flower.



Juttadinteria deserticola

Gar

P

Named after Professor Dinter's wife, Jutta, and because it occurs in the desert.

DESCRIPTION The plant forms an irregular tuft, sometimes with branches extending along the ground. With its brilliant white, terminal flowers, often up to 5 cm in diameter, this plant can hardly be overlooked. The grey-green leaves are broad, boat-shaped and can have a few teeth. The fruit capsules have 8–12 chambers.

DISTRIBUTION This is the most widespread

Juttadinteria species in the park; found largely in the coastal area, but also south of the Orange River. It grows mainly on rocky substrate but also in sandy areas.



SIMILAR to other *Juttadinteria* species, but the broad, boat-shaped leaves are characteristic.



Juttadinteria kovisimontana

Gar

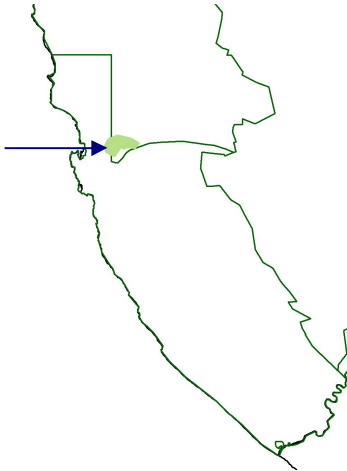
P

VU

Named after the Kowis Mountains where it occurs.

DESCRIPTION This clump-forming succulent has chunky leaves and dense papillae on the leaf surface. It feels rough when touched. Flowers are white and the capsules have 8–12 chambers.

DISTRIBUTION This plant only grows in the Kowis Mountains.



SIMILAR to *J. simpsonii* and *Namibia ponderosa*, and it has been suggested in Coleen Mannheimer's study¹ that *J. kovisimontana* may be a hybrid of these two species.

¹ Mannheimer C (2006) Taxonomic revision of the genera in the subtribe Dracophilinae (Aizoaceae). MSc thesis, Rhodes University, Grahamstown, South Africa.



© Coleen Mannheimer



© Coleen Mannheimer

Juttadinteria simpsonii

Gar

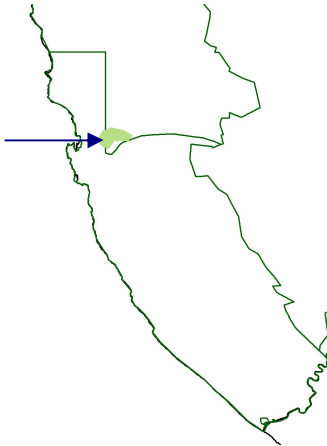
P

NT

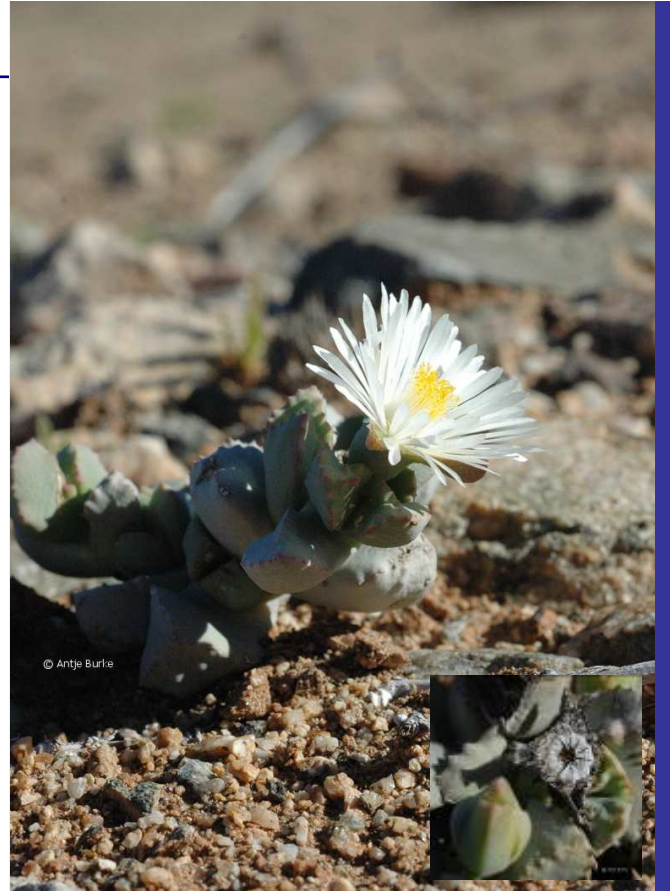
Named after the Simpson's who lived at the Haalenberg train station.

DESCRIPTION Forming small tufts up to 15 cm in height, this small succulent is recognised by its blue-green, asymmetric leaves which have a densely toothed margin. The showy flowers are white and up to 4 cm in diameter. The capsules have 8–12 chambers.

DISTRIBUTION The plant only grows at Haalenberg, and possibly in the Kowis Mountains.



SIMILAR to *J. deserticola*, which has more rounded leaves with only a few teeth or is without teeth altogether. Also similar to *J. kovisimontana* which grows taller and is more compact.



Lithops francisci

Gar

P

VU

This species is named after the Belgian succulent collector Franz de Laet.

DESCRIPTION These tiny succulents are characterised by hiding most of their bodies below the ground, but having a clearly convex body shape when fully saturated with water. The leaf surface of *Lithops francisci* has many dots which merge into a tree-like pattern; the leaves are often tinged yellow or pink. The flowers are yellow and the capsules five-chambered.

DISTRIBUTION This dwarf succulent is only known from the Haalenberg in the northern Sperrgebiet.



SIMILAR TO *L. hermetica*, which has deep channels on the leaves and grows only in the Tsaus Mountains; and to *L. gesinae* which has large islands on the leaves and grows in the Tiras Mountains.

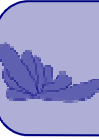
It has been proposed that these 3 species are merged to *L. francisci*, but further studies are required.



© Sonja Loots



© Sonja Loots



Aizoaceae (mesembs)

Lithops hermetica

Sp P VU

So called because it occurs in the restricted diamond area.

DESCRIPTION This 'living stone' is characterised by a leaf surface which has whitish grey to dark grey or purple windows, some dots and many deep fissures on the leaves. The flowers are yellow and the capsule is five-chambered.

DISTRIBUTION This dwarf succulent only grows on the Tsaus Mountains in the eastern Sperrgebiet.



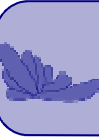
SIMILAR to *L. francisci* and *L. gesineae* (see previous page).



© Sonja Loots



© Sonja Loots



Lithops optica

Gar

P

This species is named after its clearly visible 'open windows'.

DESCRIPTION These tiny succulents hide most of their bodies below the ground with only the top of the leaf pair visible. Strictly speaking, the underside of two leaves, appear above ground. The large, open window is characteristic. The flowers are white and the capsules five-chambered.

DISTRIBUTION This dwarf succulent occurs in the coastal strip of the Sperrgebiet, on rocky outcrops and gravel plains.

SIMILAR to *L. herrei* which has a yellow flower with a white centre.



Lithops optica is currently being combined with *L. herrei*, and will then no longer be endemic to the Sperrgebiet, but also occur in the northwestern Cape. Reddish plants, thought to be originating from a mutant, occur on the Lüderitz peninsula.



Namibia cinerea

Sp

P

NT

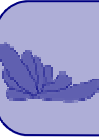
The plant is named 'cinerea' because of its ash-coloured appearance.

DESCRIPTION This dwarf succulent is characterised by a grey to brown-green, velvety appearance and compact, semi-globose growth; it hardly reaches 20 cm in height. The white flowers are large, up to 55 mm, and have a sometimes square appearance. The fruit capsules have 8–14 chambers.

DISTRIBUTION This plant grows in rock crevices, largely on dolomite outcrops in the coastal and near-coastal area.



SIMILAR to
N. ponderosa which has pink flowers.

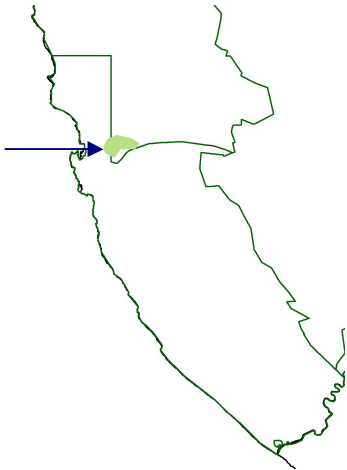


Namibia ponderosa

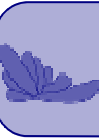
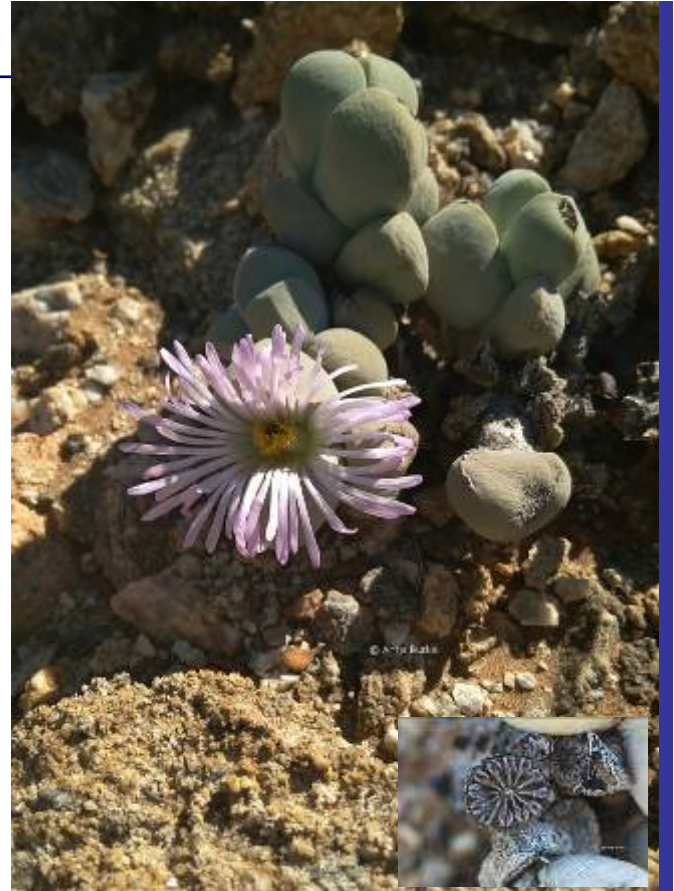
Gar P R So named because of its heavy 'ponderous' growth.

DESCRIPTION Growing in clumps of no more than 20 cm in diameter, this succulent shrub has large boat-shaped, velvety leaves. It resembles *N. cinerea* in all features, except its flowers, which are pale pink.

DISTRIBUTION *Namibia ponderosa* is presently only known to occur in the Kowis Mountains and Haalenberg, where it is found at all altitudes.



SIMILAR to *N. cinerea* which has brilliant white flowers.



Psammophora longifolia

Gar

P

Named after its sand-bearing leaf surface and long leaves.

DESCRIPTION This compact succulent grows in a low tuft and has long, slender (up to 10 mm broad), straight leaves. Sand sticks to the leaf surface forming a secondary protective cover. Five to six lobes envelop the white flower. The capsule is has five to six chambers.

DISTRIBUTION *Psammophora longifolia* grows in the southern part of the Sperrgebiet on both sides of the Orange River. It is therefore a Gariiep endemic.



SIMILAR to *P. nissenii* which is mostly buried in sand, with only the leaf tips emerging; also, the leaves broaden towards the tip and recurve.



© Andrew Young

© Silke Rugheimer

© Andrew Young

Othonna clavifolia

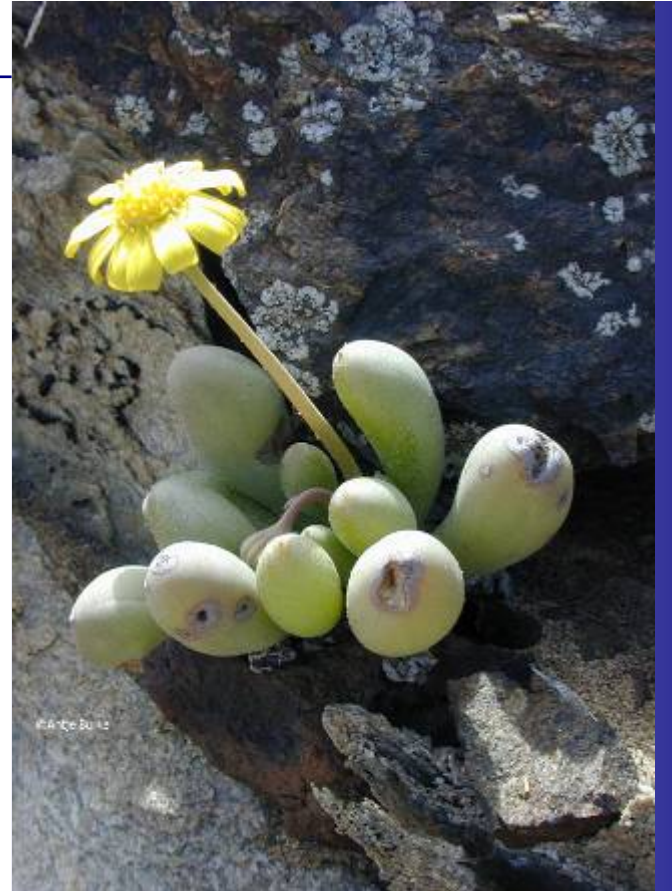
Gar So named because of its stem-clasping leaf bases.

DESCRIPTION Partly growing underground, this small succulent has a turnip-shaped stem which only emerges a few centimetres above the ground. The leaves almost clasp the stem and are cylindrical to club-shaped, and succulent. The 1–2 flower heads have bright yellow ray florets and emerge after rains.

DISTRIBUTION Restricted to coastal areas, this small succulent grows on rocky outcrops along the Sperrgebiet and northern Namaqualand coast.



SIMILAR to no other *Othonna* species, but could be confused with succulent-leaved *Senecio* or *Kleinia* species, when these are young and have no flowers.



Crassula aurusbergensis

Sp

P

R

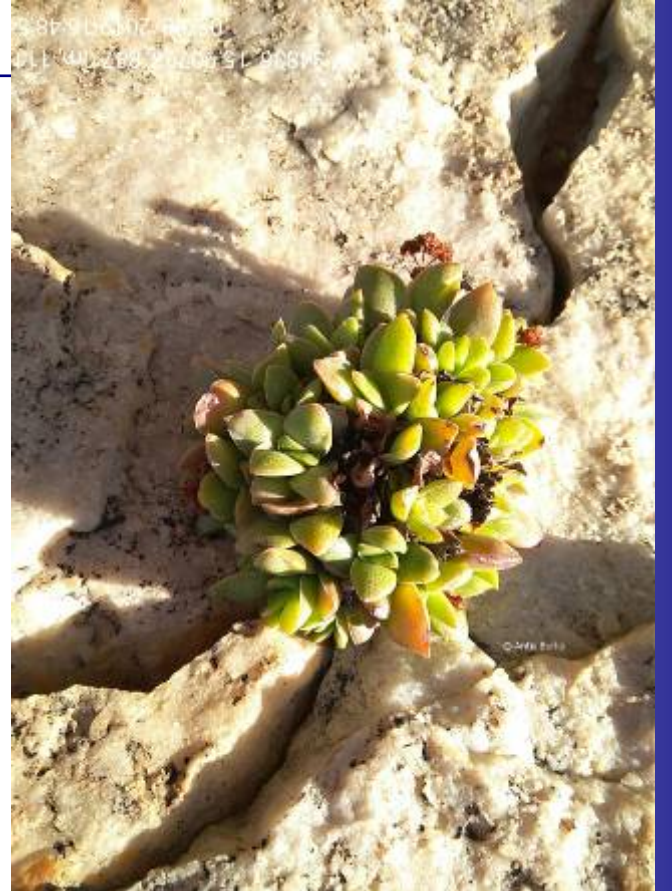
So named because it occurs in the Aurus Mountains.

DESCRIPTION This compact leaf-succulent plant grows in mats, no more than 2 cm high. The leaves are unequally bilobed and often have red to dark green spots; their margins are transparent and finely serrated. The dense flower heads rise several centimetres above the mats. The flowers are small and white to cream with yellow anthers.

DISTRIBUTION This succulent grows in shady spots on inselbergs and mountains and is restricted to the central-eastern Sperrgebiet. It is found on the Heioab–Aurus ridge and surrounding inselbergs, as well as on the Obib Mountains.



SIMILAR to other small *Crassula* species but distinguished by the unequally bilobed leaves and red to dark green spots.



Crassula elegans ssp. *namibensis*

Sp

P

NT

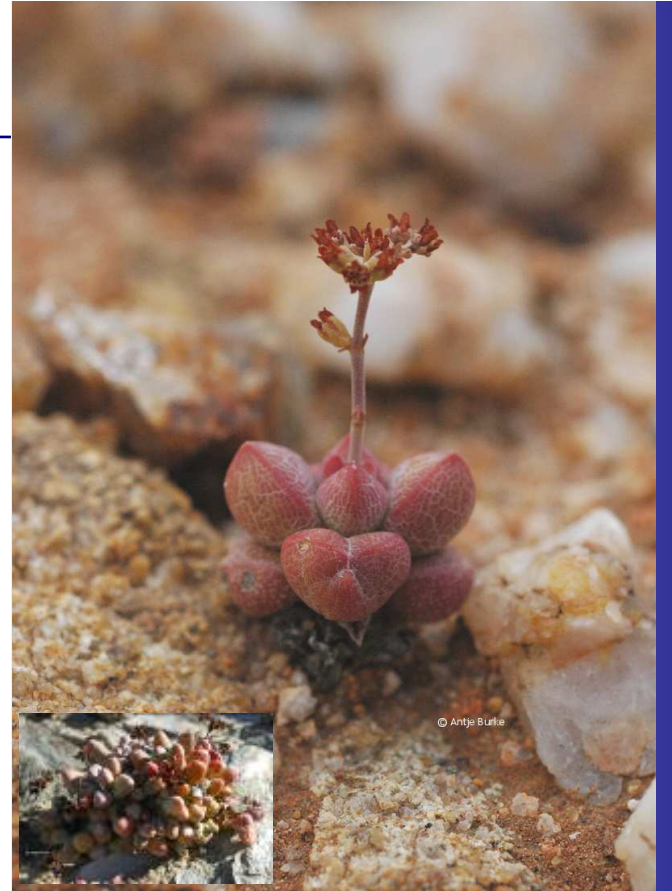
This elegant plant is also named after the Namib where it occurs.

DESCRIPTION This small, much-branched succulent grows up to 8 cm tall. The leaves are broadly triangular, up to 15 mm x 8 mm, often with a red tinge or turning completely red. The leaf surface has blister-like hairs. Flowers are white to cream and loosely arranged on stalks up to 6 cm long.

DISTRIBUTION Relatively widely distributed in the Sperrgebiet's coastal area and also along the Orange River, this plant is found on gravel plains and rock outcrops, often in completely exposed localities.



SIMILAR to *Crassula elegans* ssp. *elegans*, but distinguished by blister-like hairs on the leaf surface,



Tylecodon aridimontanus

Sp

R

So named because it occurs on a desert mountain.

DESCRIPTION This tiny succulent grows no more than 5 cm high. A few tapered branches emerge from a broad base – often partially underground. The leaves are ovate to elliptical, dark green, covered in glandular hairs, have a distinctive fold and do not have a swollen leaf base. The inflorescences branch and the flowers are on stalks of about 1 cm in length. They are pink to lilac and hairy inside.

DISTRIBUTION This dwarf succulent is only known from the Klinghardt and Heioab mountains in the central Sperrgebiet.



SIMILAR to *T. bleckiae*, *T. aurusbergensis* (see next page) and *T. schaeferianus*, all of which are extremely difficult to distinguish when the plants are small and have not yet developed a distinct stem.



Tylecodon aurusbergensis

Sp

P

R

So named because it occurs in the Aurus Mountains.

DESCRIPTION This dwarf succulent grows up to 8 cm high. Its knobby, peeling stem is distinctive. The leaves are succulent, flattened, spade-like, dark green, densely hairy and leave a swollen base where they have fallen off. The 1–3 pink flowers grow on stalks which can be up to 2 cm long.

DISTRIBUTION *Tylecodon aurusbergensis* has only been found on west- to south-facing slopes of the Aurus Mountains.



SIMILAR to *T. bleckiae*, *T. aridimontanus* and *T. schaeferianus*. The proposed revision of the genus may throw some more light on these very similar-looking dwarf succulents.



Euphorbia angrae

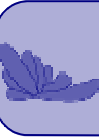
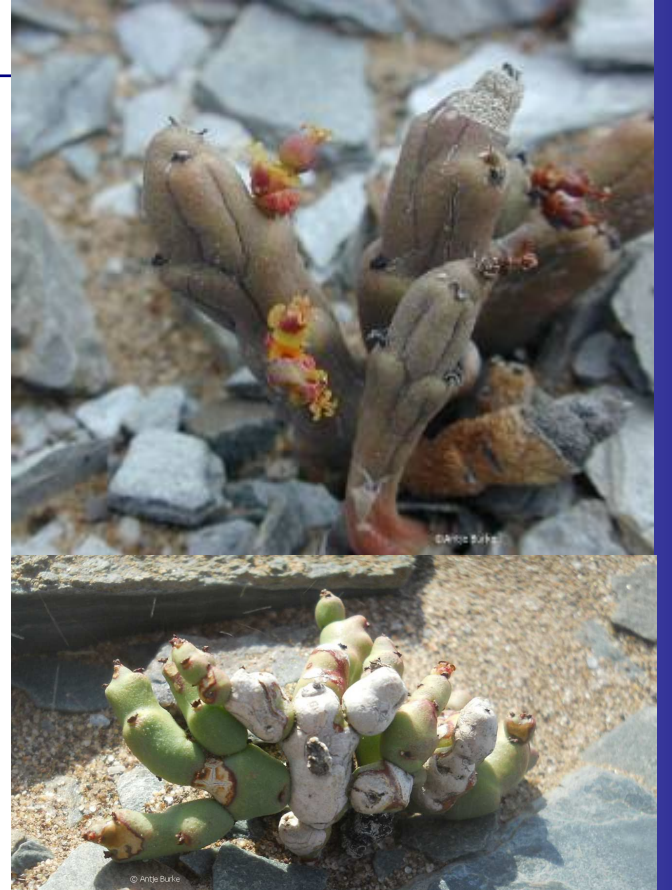
Gar C2 The genus is named after the Greek physician Euphorbius.

DESCRIPTION This small, densely branched stem succulent grows up to 12 cm high. The stems are somewhat constricted at the nodes, hairless and short (up to 25 mm). Flowers appear at the branch tips and have five yellow, kidney-shaped glands and are almost sessile.

DISTRIBUTION So far, this small succulent has only been found in the coastal area of the southern Namib from Alexander Bay to Lüderitz, and along the Orange River to Obib, and possibly north of Obib. It grows mainly on schist and quartz outcrops.



SIMILAR to a number of dwarf euphorbias, such as *E. herrei*, *E. stapelioides* and *E. verruculosa*; identification keys need to be consulted.



Euphorbia verruculosa

Sp C2 Named because of its warty stem surface.

DESCRIPTION This small stem succulent grows along the ground mainly, reaching only up to 13 cm high, although the warty stems and branches can be up to 10 cm long. The 1–3 unisexual flowers are arranged at the branch tips or in the branch forks. The round, small capsules are also warty and held on a curved stem.

DISTRIBUTION This plant grows mainly on windswept rocky surfaces, but can also be found on sandy and gravel plains. It is restricted to the coastal areas of the Sperrgebiet from Lüderitz to Chameis.



SIMILAR to a number of dwarf euphorbias such as *E. herrei*, *E. stapelioides* and *E. angrae*, but the warty stem surface of *E. verruculosa* is characteristic.



Leaf-succulent shrubs



Astridia cf. hallii

Gar

P

R

This genus is named after Professor Schwantes' wife, Astrid; the species is named after the horticulturist H. Hall.

DESCRIPTION This blue-green shrub grows upright to about 60 cm and has long, thick leaves (up to 3 cm x 7 cm). The flowers are white. The capsules are five- to six-chambered with a pronounced raised margin at the valve wings. The seeds have rounded papillae (projections).

DISTRIBUTION This plant grows on rocky substrates in the central and southeastern areas of the Sperrgebiet near the Orange River. It has also been recorded south of the river in the Richtersveld.



SIMILAR to *A. velutina* which has pink to white flowers, seeds with long papillae and much shorter leaves. The current revision of this difficult genus will shed some more light on it.



Juttadinteria albata

Gar

P

VU

Named after Jutta Dinter, the wife of a well-known Namibian botanist, while the whitish-grey colour of the plant describes the species.

DESCRIPTION This is one of the larger *Juttadinteria* species; it grows upright to 40 cm high. Distinctive characteristics are the long stems and long (up to 8 cm) boat-shaped leaves. The flowers are white, up to 5 cm in diameter, and the capsule has eight to nine chambers.

DISTRIBUTION This plant's range is restricted to rocky outcrops and gravel terraces along a short stretch of the Orange River between Sendelingsdrift and Daberas on both sides of the river.



SIMILAR to *J. deserticola* which has a more compact, low-growing form and to *J. attenuata* which has more tapered leaves.



Psammophora saxicola

Sp

P

So named because of its 'sand-bearing' leaves and its preference for rocky habitat.

DESCRIPTION This is an unusually large *Psammophora* which can grow up to 1.5 m high. The leaves are long, crescent-shaped and have a sticky surface to which sand grains adhere, typical for the entire genus. The flowers are white, up to 4 cm across and develop into eight-chambered capsules.

DISTRIBUTION This plant's range is restricted to rocky slopes in the Gomsawibberge–Obib range and is therefore one of the rarer plants in the park.



SIMILAR to a range of tall, erect mesembs, such *Amphibolia*, *Leipoldtia* and *Stoeberia*, but the white flower and a close look at the leaf surface and the capsule will reveal the difference.



Aizoaceae (mesembs)

Ruschia pollardii

Gar

P

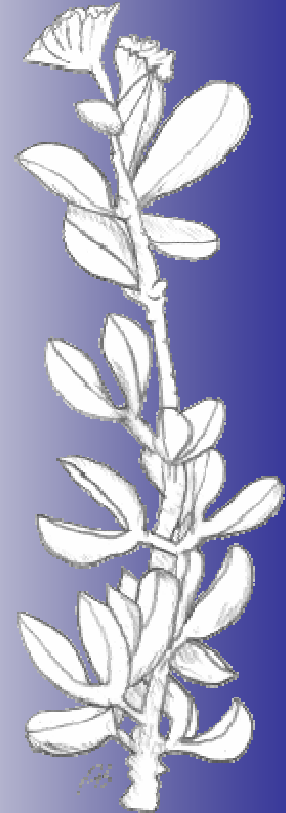
Named after the plant collector Ernst Rusch and Mr Pollard, a security officer who facilitated botanical collecting in this restricted diamond area.

DESCRIPTION This shrub grows upright up to 30 cm high and has brown internodes. The leaves are somewhat powdery on the surface, club shaped and up to 3 cm long. The flowers are white. The sepals and petals are in groups of six and the capsules are usually six-chambered. This is unusual in *Ruschia*.

DISTRIBUTION This small shrub has so far only been recorded from the Klinghardt and Obib mountains in Namibia, but may have been overlooked. It also occurs in the Richtersveld, mainly on sandstone or granite.



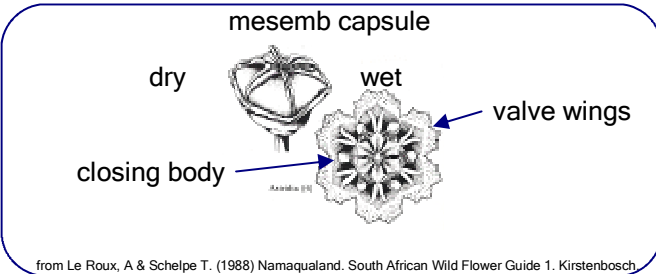
SIMILAR to other *Ruschia* species, but the six-chambered capsules are distinctive.



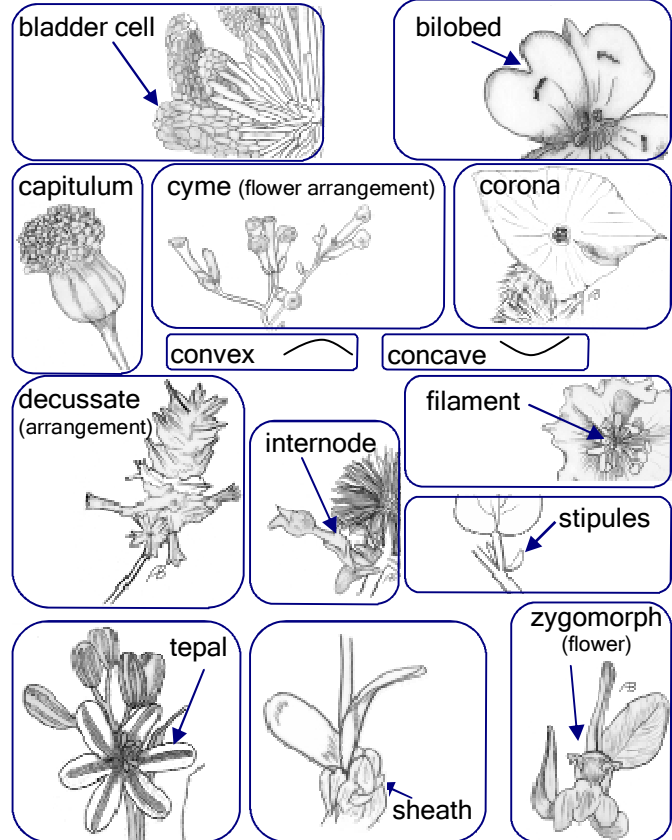
Glossary

biome region with similar climate and dominant growth form of plants
 cf. Latin 'confer', uncertain identification
 ecoregion region with similar climate
 endemic only occurring in a specified area
 genus / genera higher order of plant name
 hemispherical half-ball shaped
 IUCN International Union for the Conservation of Nature
 near-endemic almost restricted to a certain area
 papillae projections from the leaf surface
 phonolite dark volcanic rock
 ssp. subspecies
 unisexual one sex only (male or female)

Illustrated botanical terms



from Le Roux, A & Schelpe T. (1988) Namaqualand. South African Wild Flower Guide 1. Kirstenbosch



Look deep into nature, and then you will understand everything better.
~Albert Einstein



The Sperrgebiet's flora has fascinated me ever since I was whizzed through the area in a convoy on the jeep track from Rosh Pinah to Oranjemund in 1988 — the north-bank road did not exist then. That fascination developed into passion and a profound desire to learn everything I could about these magnificent creations of nature.

I would like to share my knowledge, excite a passion in others and thereby hope to ensure protection of the wonderful plant life of the Sperrgebiet into the future.

My previous wildflower guides have described common plants, which those with a love for plants are likely to see. This guide introduces some of the rarest plants in Namibia. Not even I have seen them all.

