RARE AND INTERESTING PLANTS OF THE NAMIB DESERT
PART 1. SEED-HOLDING STRATEGIES

by Magda Nel, Botany Department, University of Pretoria

During a relatively short stay of three and a half years in the Namib Desert, I encountered some of the most interesting plants that had, over millions of years, adapted to the harsh conditions of the desert. Antje Günster, a German botanist, and I investigated their strategies for survival; Antje did detailed studies for her Ph.D and my art skills were put to the test depicting these plants. I would like to share this fascinating world of the Namib with other plant-lovers.

Seed-holding strategies
Plants that hold on to their seeds until favourable conditions trigger their release, (see following article by Antje Günster) are common in arid and semi-arid areas and the Namib is no exception. Two major characteristics of these seed-holding or sorotinous plants are lignonification of the roots, seed capsules or the entire plant, and seed-protecting structures such as spiny bracts and thorns. This ensures that a good ‘seed-bank’ is maintained to ensure the survival of the species in a very unpredictable environment.
**Aptosimum spinescens**
This seed-holding perennial plant belongs to the family Scrophulariaceae. It is deciduous, prefers flat, sandy places and is found in the north-eastern part of the Namib Naukluft Park. It is also recorded in Namaqualand, Bushmanland and the northern Cape. It is palatable for herbivores. A close relative, occurring in the same areas, is *A. arenarium*.

**Blepharis grossa**
*Blepharis* belongs to the family Acanthaceae which is well represented in Namibia. The plants occur in depressions, washes and flats in the central inland Namib and also in the mountainous regions of eastern Namibia. The flowers are protected by spiny-toothed bracts that enclose and protect the fruit capsules after reproduction. Dead plant remains are all one usually finds of *Blepharis* plants, because germination of the seeds require unusually good rains (as do most desert plants). The dried inflorescences open their bracts only after being moistened by a second rain-shower. The fruit consists of 2 seeds with mucilaginous layers and hairs that bind the moistened seeds to the soil surface, thereby preventing the released seed from being blown away.
**Geigeria ornativa**

A member of the Asteraceae this plant seems to be restricted to Namib/Karoo region. It can be found in depressions, washes and flats on the gravel plains and sand-filled basins on inselbergs in the inland parts of the Namib Desert. The plant dries as a whole and the long taproot anchors it to the ground, preventing it from being blown away. The dead remains can persist for many years. Sufficient rain stimulates the bracts to release some of the enclosed seeds, but once it gets dry again, the bracts close and cover the remaining seeds once more. *Geigeria ornativa* is toxic and spreads as environmental conditions deteriorate (especially in over-grazed land), to the detriment of other species. In its habitat, it reminds me of the famous ‘Rose of Jericho’, *Anastatica hierochuntica*.

In the next issue of *Veld & Flora*, Magda Nel looks at desert plants with unusual pollination strategies.

**Acknowledgments**

The Desert Ecological Research Unit of Namibia and its staff is thanked for the hospitality received during my stay. Although I was an employee, I often felt that I should be paying for the wonderful privilege just to be there. Thank you to Braam van Wyk for advice and encouragement and to my mother for providing all the vital statistics.

Readers who would like to obtain a more comprehensive list of references and further reading, please send a stamped, addressed envelope with your request to: The Executive Officer, Botanical Society, Kirstenbosch, Claremont, 7735

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**RETYAINING SEEDS. A WINNING OR LOSING BATTLE?**

**by Antte Günster, University of Namibia**

The importance of seed-banks in all plants has been pointed out in a previous article (‘Banking on seeds’ in *Veld & Flora*, 76(2), 42-44). The way plants store seeds and the timing of seed-release and distribution is of crucial importance in highly variable, unpredictable environments such as deserts. While the majority of plants disperse their seed upon maturity, there are those that hold on to their seeds at least until the next rainy season. These are seed-holding or serotinous plants. They are often found in the fynbos where seed-dispersal by fire is common, but are also found in arid regions, such as the Namib Desert and the Karoo.

The extensive survey that I made stretching from the coast to the base of the Great Escarpment, confirmed the high number of serotinous plants in the Namib. Indeed, the eastern central Namib, just before the rise of the escarpment, is the centre of distribution of serotinous plants in the Namib. Perhaps this is because this area receives the minimum rain required to trigger seed-release and germination, and because of the high variability of the rainfall.

Seed-retention or serotiny is linked to the development of seed-protecting structures, so better protection of the seed against predators is thought to be one of the driving forces in the evolution of serotiny. However, insect predation of serotinous plants was no different to that of other Namib plants and herbivores also affect serotinous plants. Two of the four most common serotinous species are palatable, providing antelopes, ostrich, and possibly small mammals with a food source. A reasonable protection against seed predators is therefore not achieved by seed-retention, although in some cases, the population dynamics of serotinous plants are affected by browsing and grazing animals. One species, *Geigeria ornativa* is toxic and is a problem plant for the local farmers as it spreads alarmingly in over-stocked and over-grazed land, increasing as conditions worsen and causing the palatable species to decline.

The regulation of seed-release and germination when conditions are favourable for the establishment of new seedlings is crucial to the survival of these plants. Competition for water and suitable habitats seems to occur among serotinous plants within a community. Of 4 serotinous species growing together, 2 species selected for different micro-habitats and shapes, i.e. different ecological niches, and 2 germinated faster than the others, thereby using the scarce resources at different times.

On the whole, serotinous plants are successful in most parts of the Namib, forming dense communities in which several species exist together.