

# Bio-Chat

The Buffelskloof Biological Review

Autumn Edition

March 2021 – July 2021



*Rothmannia globosa*

# Mountainlands – a veritable Eden

By: Delia Oosthuizen



With every step you take on Mountainlands Nature Reserve you go back into Deep Time. It is hard to imagine that the volcanic, igneous and sedimentary rocks here are part of a story that dates back 3.6 to 3.25 billion years. You read it correctly: billions not millions of years and it has survived right under our feet. The geology is a time capsule of 350 million years packed with information about the early Earth. It is one of only a few places on Earth where scientists can study these exposed, virtually unaltered and well-preserved rocks of such great age.

The reserve is located in the Barberton Greenstone Belt (BGB) - a mountainous geological region roughly 60 km wide and 100 km long and shared with neighbouring Eswatini (formerly Swaziland). In this time slice of the Archaean era our planet was a primordial soup of boiling lavas pouring out into a silica rich ocean, with volcanic islands beginning to emerge and eroded sediments being dumped into trenches.

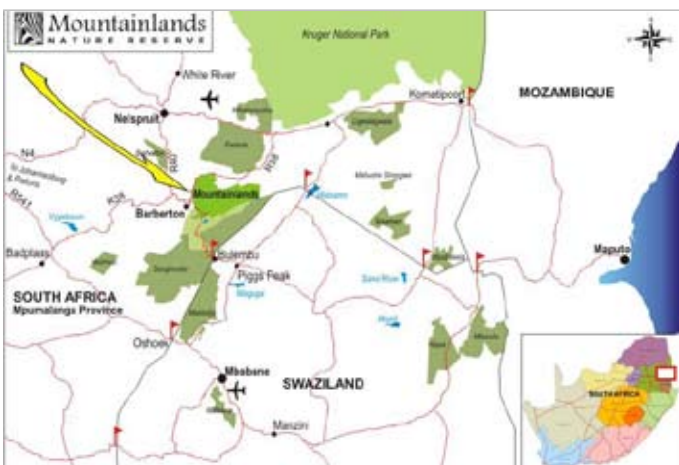
Scientists tell us, back then that the planet did not have an ozone layer, the sun was weak; there was

little light and the atmosphere was a humid, thick cocktail of greenhouse gases with very little free oxygen.

In Mountainlands evidence has been found of massive meteorite impacts possibly related to the formation of our moon. Here you can see and touch crinkly laminations – crinklies for short – some of the first single cell organisms on Earth visible to the naked eye. Over time this Archaean landscape folded, buckled and tilted giving rise to the sweeping mountains with their endless green, rolling hills, dramatic gorges and cliffs of today.

For many years many of the mind-blowing geological discoveries remained in the realm of scientific research. However, in 2014, a 45 km self-drive trail that interprets the geology and environment for the general public was opened.

When the concept of the Barberton Makhonjwa Geotrail was hatched, the plan was that, together with decades of research into the geology, it would lay the groundwork to assist the decision makers at UNESCO to understand the immense importance



of this region. In 2018, after a twelve year process of lobbying, consultation and a whole team of people working on the nomination dossier, a large part of the landscape located in the south-eastern corner of Mpumalanga Province was inscribed as the Barberton Makhonjwa Mountains World Heritage Site (BMMWHS).

Mountainlands, together with Songimvelo, Nkomazi, Queens River and Barberton private nature reserves sit at the core of the BMMWHS. Although the magnitude of the geology is overpowering, the presence of the nature reserves assisted with the inscription. These protect many important geological points and are home to a significant number of rare and endemic plant species. The unique geology underlies a diversity of approximately 2180 species discovered to date ... and counting.



**Above:** View over grasslands and riverine thickets in the south of Mountainlands.

The Barberton Centre of Plant Endemism (BCPE) overlays the BGB and is also shared with Eswatini. A centre of endemism has a high level of plant species that only occur there and nowhere else. The BCPE is home to a large number of endemic plant species, of which around 40% occur on serpentine outcrops. The serpentine rocks give rise to soils with unusually high magnesium and calcium ratios. These soils, together with those derived from ultramafic\* rocks, are also associated with high concentrations of heavy metals, which are potentially toxic to plants.



**Above:** Impala have also been introduced as grazers in the grasslands.

Many of the serpentine endemics which have adapted to thrive in these soils, also grow in areas to the north and south of Mountainlands Nature Reserve. Of these *Gladiolus serpenticola* (right) and *Aloe thorncroftii* are probably the most striking ones in the grasslands.



**Right:** *Gladiolus serpenticola* is endemic and the name alludes to the serpentine rocks on which it is commonly found.



**Left & above:** One of the largest populations of *Protea comptonii* (Saddleback Sugar bush) grows on Mountainlands N.R. The tree protea blooms in winter and is well adapted to cope with veld fires.

The 18 000 ha that comprises Mountainlands was first reserved for conservation in 1985. My husband, Nico Oosthuizen has always been a visionary man and when our family bought farms in the Barberton area he looked at the neighbouring properties and realized their conservation value.

Lengthy consultations under the maroela tree with other stakeholders, among them officials from the then Mpumalanga Parks Board and representatives from the Lomshiyu Community Trust took place

to get the reserve off the ground. The state, community-owned and privately held land was consolidated into the reserve when the perimeter game fence was erected in 2000 and large game such as zebra, eland, blue wildebeest and others were reintroduced.

The model holds all the elements of a true Community, Public, Private Sector Partnership and on this large scale it is a pioneering concept for conservation in South Africa.

One of the principal strengths of the reserve is the increased ecological and economic viability achieved through the consolidation of the different properties into a single entity.

The integrated development plan, reserve management plans and individual facility development plans are aligned to guide all aspects of development and management functions through an adaptive management approach. All of these mechanisms are designed to fulfil the vision of the reserve to protect the high species diversity and unique floristic composition.

**Below:** Zebra and Blue wildebeest are bulk grazers that have been reintroduced to Mountainlands

Mountainlands forms part of the 70 000 ha Barberton Mountainlands ecosystem which was listed by National Government as Vulnerable and in need of protection.

The ecosystem includes 37 threatened or endemic plant and animal species. It also includes important water sub-catchments, provides an escarpment corridor and is important for grassland and forest processes.

Approximately 52% of the ecosystem is protected in Mountainlands and the surrounding Barberton Municipal, Cynthia Letty, Ida Doyer, Nkomazi Wilderness, Queens River, Songimvelo, Tienie Louw and Thorncroft Nature Reserves.



**Below:** Zebra and Blue wildebeest in the grasslands with the Scarp Forests in the background



The lowest point on Mountainlands is 540 m above sea level and the highest 1640 m. An interplay of factors such as the range in elevation, unique geographical location, climate and broken mountain topography, abundance of pollution-free streams and different rainfall levels have endowed it with a remarkable and diverse flora.

It is also one of the most important *refugia* in the province for plant species threatened by climate change.

Many endemic plant species occur in the higher lying grasslands with some serpentine endemics in the lower lying areas.

When applying the classification of Mucina and Rutherford (2006), three distinct vegetation types dominate at different altitudinal zones: **Granite Lowveld** at altitude 400–500 m; **Kaalrug Mountain Bushveld** between 350–950 m with *Euphorbia complexa*, *Thorncroftia longiflora* and *Ledebouria cremnophila* as endemic taxa and **Barberton Montane Grassland** from 760–1640 m with some of the endemic and near endemic taxa, namely: *Protea comptonii*, *Syncolostemon stalmansii*, *Leucospermum gerrardii*, *Thorncroftia thorncroftii*, *T. lotteri*, *Tinnea barbata*, *Helichrysum calocephalum*, *Holothrix culveri*, *Aloe albida*, *A. chortolirioides* var. *chortolirioides*, *A. craibii*, *Brachystelma dyeri* and *B. swazicum*.

Two Forest Biomes are also represented and worth protecting in their own right: **Northern Mistbelt Forests** at 1050–1650 m and a patch of **Scarp Forest** that extends from 810–1220 m.

These forests are characterized by the occurrence of, among others, the following plant species unique and endemic or near endemic: *Pavetta barbertonensis*, *P. galpinii*, *Psoralea glabra*, *Ochna gamostigmata*, *Bersama lucens*, *Cassinopsis tinifolia*, *Aphloia theiformis*, *Micrococca capensis*, *Chionanthus peglerae*, *Heterosamara galpinii* and *Clivia miniata*.

Naturalists long since passed, such as Ernest Galpin and George Thorncroft collected numerous plants new to science in these mountains. The genus *Thorncroftia* honours Thorncroft and species such as the endemics *Thorncroftia longifolia* and *Aloe thorncroftii* have been named after him.

Galpin's name is captured in local plant names such as *Bauhinia galpinii* and *Streptocarpus galpinii*.

Since then, individuals, scientific, academic and conservation institutions have collected and described several new species in the BCPE. Examples are *Ochna barbertonensis* (2018), *Viscum songimveloensis* (2017), *Thorncroftia lotteri* (2006), *Aloe craibii* (2003) and *Syncolostemon stalmansii* (2001).



**Above:** One of the slender aloes, *Aloe chortolirioides* var. *chortolirioides* often flowers after fire.

**Left:** *Thorncroftia lotteri* is endemic to the BGB.

Realizing the importance of the plants I have started to build up a representative herbarium collection of those growing on Mountainlands and the BCPE that will be housed on the reserve.

John and Sandie Burrows and Barbara Turpin from Buffelskloof Nature Reserve Herbarium and Prof Kevin Balkwill from the School of Animal, Plant and Environmental Sciences, at Wits University, are some of the people who have played a significant role in giving guidance and direction to this project. It has been a steep learning curve for someone who does not have an academic background in botany.

I have acquired an arsenal of study material and have bugged everyone I know to help with identifications. Kevin, especially, has been a dedicated task master committed to teaching me about the taxonomic side of plants. The herbarium is a work-in-progress and with proper facilities that still need to be constructed on the reserve, space at home has had to be sacrificed to house the growing collection (I am sure my husband would like his garages back).

Only about a quarter of the reserve has been botanized and so far five plants collected are

nameless and await taxonomists to volunteer to do the scientific descriptions. A lot of collecting still needs to be done to complete a comprehensive plant species list that can assist with descriptions of the floristic zones and guide conservation.

The flora on Mountainlands face challenges with climate change and invasive plant species as the main culprits. To the south and east, the reserve is boxed in by Eucalyptus and Pine plantations, to the north it links with Barberton Nature Reserve phase 2 and two gold mines straddle a section of the reserve.

To the west human habitation and farming is expanding leading to habitat fragmentation. The World Heritage Site status is the highest form of protection possible for Mountainlands and very well deserved indeed. However, it is of paramount importance that functional corridors for conservation with and between the neighbouring reserves are maintained to safeguard the high biodiversity and water catchments for the future.

\*Ultramafic: Rocks with a high mafic mineral content and low silica content that solidified from magma or lava.

*Delia Oosthuizen*



**Left:** So far, *Streptocarpus denticulatus* has been discovered on only one mountain on the reserve.

**Right:** *Asclepias stellifera* is also endemic.

All photographs by Delia Oosthuizen.



**Above:** The coral-red flowers of *Bauhinia galpinii* (Pride of De Kaap) and white of *Clematis brachiata* (Traveller's Joy) growing in the higher altitudes of the reserve

**Left below:** A *Berkheya* species new to science that was recently discovered by Dr Mervyn Lötter on Mountainlands.

**Right below:** The succulent *Kleinia galpinii* grows on rocky outcrops in the grasslands and is spectacular when in bloom.





## References:

[www.mountainlands.co.za](http://www.mountainlands.co.za) and [www.bmmlworldheritage.org](http://www.bmmlworldheritage.org)

Williamson, S.D., Balkwill, K. 2015. Plant census and floristic analysis of selected serpentine outcrops of the Barberton Greenstone Belt, Mpumalanga, South Africa. *South African Journal of Botany* 97: 133–142.

Mpumalanga Tourism and Parks Agency (MTPA). 2012. *Integrated Management Plan: Barberton Nature Reserve: Phase 3: Mountainlands, Mpumalanga Province, South Africa*. MTPA, Nelspruit.

Paton, A.J., Balkwill, K. 2001. *Hemizygia stalmansii* (Labiatae), a New Species from Mpumalanga, South Africa and Swaziland. *Kew Bulletin* 56 (2): 491.

Edwards, T.J. 2006. Notes on the Lamiaceae: a new *Tetradenia* and a new *Thorncroftia* from South Africa. *South African Journal of Botany* 72: 202–204.

Smith, G.F. 2003. *Aloe craibii* Gideon F.Sm. (Asphodelaceae: Alooidae): a new species of grass aloe from the Barberton Centre of Endemism, Mpumalanga, South Africa. *Bradleya* 21:25–28.

---

# Plantation Timber Residue - A wasted resource

I know that we all love the cool, tranquil sensations that wash over us when we enter a tall and stately pine plantation (**right**). And, of course, we all realize that we cannot live without plantation-grown timber in our lives, either in the form of paper or structural timber. But I am going to turn now to an environmental issue, rooted here in Mpumalanga and Limpopo, that has festered in my consciousness for many years.

Here at Buffelskloof, we sit on an idyllic nature reserve surrounded by one of the most densely afforested pieces of South Africa – rolling hills carpeted in seemingly endless plantations of *Pinus* and *Eucalyptus*, all feeding the apparently insatiable demand for paper, pallets, saw timber and mine-props. But what happens to that part of the plantation that remains behind after the loggers have hauled off their product to the sawmills and paper factories?

Figures available on what is left behind in a plantation after clear-felling vary from about 30% to 20% of the total biomass of a standing plantation before harvesting.

Traditional post-harvest management practice in South Africa occasionally includes windrowing the residue to allow easy access in the case of fire.



But – frighteningly and more usual – is to burn everything and thereby reduce the risk of intense fires should a wildfire get a hold in the area later on. This not only destroys all the nutrients tied up in the needles, leaves and branches, but also exposes the soil beneath, which just waits for next heavy rainfall which will wash all the loosened topsoil into our already silted streams and rivers. This results in an environmental disaster – polluting our rivers, stripping away our top-soils, and depriving the soils of all the nitrogen, potassium and phosphorus that are tied up in this timber