Bio-Chat

The Buffelskloof Biological Review

Summer Edition

November 2019 – February 2020

Erica drakensbergensis

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FROM THE EDITOR

Welcome to the first issue of Bio-Chat, a newsletter that aims to bring all our most important research news and snippets of biological interest that we'd like to share with you. We plan to combine four months of news per issue, one issue for each of our most notable seasons - Spring, Summer and Autumn. It will be sent out to the Friends of Buffelskloof who are all supporting us financially and ensuring that we can grow and, in turn, support the environmental community.

If you would like to know a little more about us and who we are, please scroll down to the last page - About Us - which also provides details of our associated websites.

Since I am writing this in the enforced isolation of Coronavirus lockdown, it is clear that our lives will be radically changed for the foreseeable future, perhaps even for years. How we interact socially with one another in the future, what the world economic landscape will look like, and whether Covid-19 will be with us forever, are questions that we cannot answer at present. However, I believe it is human nature to look on the bright side and trust that the conservation of our environment and the education of all our biologists and conservationists will be as important in the future as it has always been. Perhaps even more so as we come to realize just how fragile our world, and the life on it, really are – which, for better, for worse, includes all us humans.

So we set off on this project in the hopes that we can continue as we've started – perhaps not every season to start off with during these gloomy days – but reporting on our changing environment and how Buffelskloof Nature Reserve and its Research Centre manages to navigate the changes and remain relevant to our environmental world. We hope that you enjoy Bio-Chat and continue to support us through our uncertain future.

John Burrows

THE HERBARIUM

Welcome to the BUFFELSKLOOF HERBARIUM (BNRH)

Buffelskloof Herbarium houses nearly 26,000 specimens representing over 7,000 taxa mainly from the summer rainfall area of South Africa northwards into sub-equatorial tropical Africa. There are important collections of ferns and figs and Mozambican woody flora, the study of which have all resulted in highly regarded books, namely, *Southern African Ferns and Fern-Allies* (1990), *Figs*

by John and Sandie Burrows, and *Trees and Shrubs of Mozambique* (2018) by the same authors and others. In addition, the burgeoning *Asparagus* collection reflects the Burrows' major ongoing revision of the southern African taxa in this genus. In the last 30 years, the reputation of the Herbarium has grown both within southern Africa and abroad; indeed, it is often the recipient of type specimens of species new to science from the region.

Currently, Buffelskloof Herbarium (**above**) holds 55 published type specimens and a further dozen or so awaiting publication. Over the years, BNRH has attracted taxonomists working on particular plant groups such as Dr Iain Darbyshire (Acanthaceae) from the Royal Botanic Gardens, Kew (RGB Kew), and Dr R. Douglas Stone (Memecylaceae), lately from the University of KwaZulu-Natal in Pietermaritzburg.

Fairly recently, Prof Peter Bruyns from the University of Cape Town spent some time in the Herbarium perusing the *Euphorbia* specimens for his next book.

Soon after the publication of the *Trees and Shrubs of Mozambique*, the herbarium manager was inundated with requests from the *Tropical Important Plant Areas* (TIPA) project based at RGBK, for details of large numbers of specimens from Mozambique in the Herbarium.

A frequent correspondent with BNRH is Prof Kevin Balkwill from the University of the Witwatersrand who often requests scans of specimens housed in BNRH to aid his research, and in return, he has supplied names for some hitherto unidentified samples.

With the knowledge and expertise of visiting taxonomists, both professional and amateur, along with that of its staff, Buffelskloof Herbarium is able to offer a well-curated botanical collection for study by researchers and citizen scientists alike.

Two interesting collections on Buffelskloof Nature Reserve.

Asteraceae (**below**): this occasional herb, ± 30 cm tall with yellow flowerheads and sticky glandular leaves, has been collected in the northern grasslands of the Reserve and surrounding farms. Its identification has so far eluded taxonomists to whom duplicates have been sent, indicating that it could be a new species.

Fabaceae — *Leobordea* aff. *hirsuta* (**below**): a small pyrophytic herb with yellow flowers was collected on a rocky outcrop in the north of Buffelskloof. Images were sent to Prof Ben-Erik van Wyk at Johannesburg University, and Dr Marianne le Roux at the National Herbarium in Pretoria and, while it seems to have affinities with *L. hirsuta*, they both intimated that it may be a new species. Further investigations need to be carried out.

Segregation of the Genus *Vernonia* (Asteraceae)

https://*phytokeys.pensoft.net/article/6734/*

During the last two decades or so, researchers at the Smithsonian Institute, Washington DC, USA, and other universities, have been studying the relationships between the species of *Vernonia* in a world-wide context. Their findings have resulted in gradually excising all but the North American species from the genus and placing them in at least 13 genera.

Some of the new names have been around for a few years now, but there have also been fairly recent name changes. The new nomenclature is causing rather a headache for South African field botanists and citizen scientists in particular, since some of the very familiar species, in Mpumalanga for instance sport entirely different names, e.g. *Vernonia natalensis* is now *Hilliardiella aristata*, *V. galpinii* is now *Pseudopegolettia tenella* and *Vernonia tigna* is now *Gymnanthemum corymbosum*.

The table **below** displays the old names (synonyms) and their new names (accepted names) of all the species which are likely to be encountered in Limpopo, Mpumalanga, KwaZulu-Natal and Eswatini.

Barbara Turpin

Accepted Nomenclature for ***Vernonia*** species occurring in Limpopo, Mpumalanga, KwaZulu-Natal and eSwatini.

Old Name	New Name	SA Province or FSA Country
V. acuminatissima	***Vernoniastrum acuminatissimum***	LIM, KZN
V. adoensis var. *kotschyana*	***Baccharoides adoensis*** var. ***kotschyana***	LIM, M, S, KZN
V. adoensis var. *mossambiquensis*	***Baccharoides adoensis*** var. ***mossambiquensis***	'TV' [Transvaal]
V. africana	***Vernonella africana***	KZN (extinct in the wild)
V. amygdalina	***Gymnanthemum amygdalinum***	B, LIM, M, S, KZN
V. angulifolia	***Distephanus angulifolius***	KZN, EC
V. anisochaetoides	***Distephanus anisochaetoides***	S, KZN, EC, WC
V. aurantiaca	***Distephanus divaricatus***	N, B, LIM, M, KZN
V. bainesii subsp. *bainesii*	***Polydora bainesii***	'TVL' [Transvaal]
V. capensis	***Hilliardiella capensis***	M, S, FS, KZN, L, WC, EC
V. centaureoides	***Oocephala centaureoides***	M, S, KZN
V. cinerascens	***Orbivestus cinerascens***	N, B, LIM, M
V. cinerea	***Cyanthillium cinereum*** var. ***cinereum***	LIM, S, KZN
V. colorata subsp. *colorata*	***Gymnanthemum coloratum*** sensu lato	B, LIM, M, S, KZN
V. crataegifolia	***Gymnanthemum crataegifolium***	LIM, M, S, KZN, EC
V. dregeana	***Hilliardiella nudicaulis***	M, KZN, EC
V. fastigiata	***Parapolydora fastigiata***	N, B, LIM, NW, G, M, S, FS, KZN
V. flanaganii	***Hilliardiella flanaganii***	FS, KZN,
V. galpinii	***Pseudopegolettia tenella***	B, LIM, NW, G, M, S, FS, KZN, EC
V. gerberiformis subsp. *macrocyanus*	***Linzia gerberiformis***	N, B, LIM
V. gerrardii	***Parapolydora gerrardii***	KZN
V. glabra var. *glabra*	***?Linzia glabra***	N, B, LIM
V. glabra var. *laxa*	***Linzia glabra***	N, B, LIM, M, S, KZN
V. hirsuta	***Hilliardiella hirsuta***	LIM, NW, G, M, S, FS, KZN, L, EC
V. inhacensis	***Distephanus inhacensis***	KZN
V. meiostephana	***Cyanthillium vernonioides***	LIM, M, S
V. mespilifolia	***Gymnanthemum capense***	LIM, M, S, KZN, WC, EC
V. myriantha	***Gymnanthemum myrianthum***	LIM, M, S, KZN
V. natalensis	***Hilliardiella aristata***	LIM, NW, G, M, S, FS, KZN, L, EC
V. nestor	***Vernoniastrum nestor***	KZN
V. oligocephala	***Hilliardiella oligocephala***	N, B, LIM, NW, G, M, S, FS, KZN, L, NC, EC
V. poskeana subsp. *botswanica*	***Polydora poskeana***	N, B, LIM, NW, G, M, S, FS, NC
V. rhodanthoidea	***Polydora angustifolia***	LIM, NW, G
V. schlechteri	***Oocephala centaureoides***	M, S
V. staehelinoides	***Oocephala staehelinoides***	LIM, NW, G, M, FS
V. steetziana	***Polydora steetziana***	N, B, LIM, M, S, KZN
V. sutherlandii	***Hilliardiella sutherlandii***	LIM, NW, G, M, S, KZN
V. thodei	***Pseudopegolettia thodei***	M, S, FS, KZN
V. tigna	***Gymnanthemum corymbosum***	LIM, M, S, FS, KZN, EC
V. triflora	***Gymnanthemum triflorum***	LIM, M
V. wollastonii	***Cyanthillium wollastonii***	LIM, M, S, KZN

Legend for countries: B = Botswana; N = Namibia; S = eSwatini

Sources: SABONET 41 (2006); http://redlist.sanbi.org/; https://phytokeys.pensoft.net/article/6734/

Dr Rose Marks and Resurrection plants

Rose Marks hails from Michigan, USA and is a post-doctorate researcher working in the VanBuren lab at Michigan State University and the Farrant lab at the University of Cape Town.

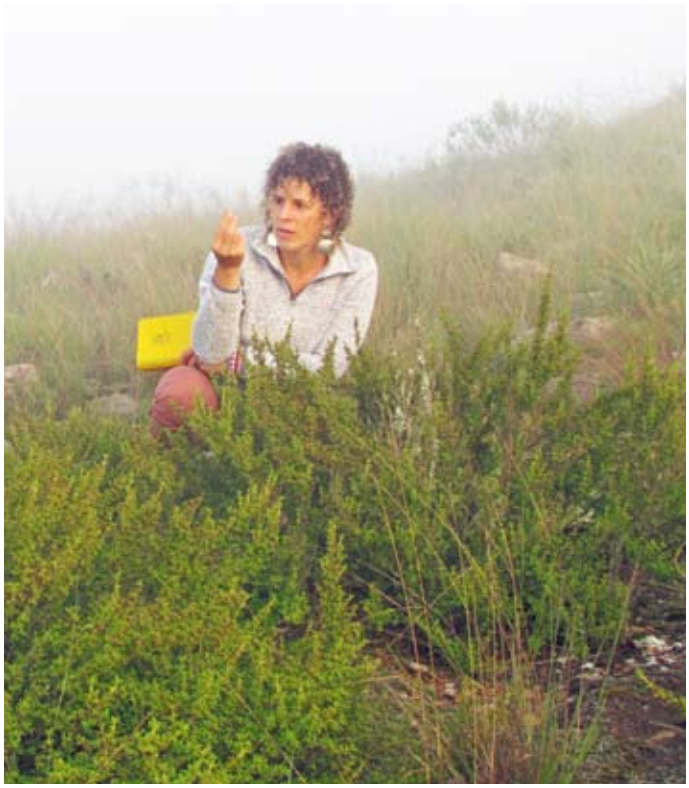
Rose has been carrying out long-term research on the Resurrection Plant, *Myrothamnus flabellifolius*, (**below** and **right**) and was recommended by Prof Jill Farrant that Buffelskloof was a good location to work on these plants. She spent three weeks in November working on Buffelskloof before moving on to the Waterberg to work there on *Myrothamnus* and returning to Buffelskloof briefly in January.

Myrothamnus flabellifolius

Xerophyta schlechteri

Rose is a passionate and experienced rock climber having been climbing all over the USA for 10 years. At Buffelskloof she was able to employ her rock-climbing skills **(right)** to survey cliff-dwelling populations of *Myrothamnus*, as well as another resurrection plant, *Xerophyta schlechteri*, (**above**) that favours inaccessible vertical rock faces. It is not often that a researcher can combine their research and their recreational pastimes so neatly!

Rose writes on her website: '*My research is focused on understanding the mechanisms of desiccation tolerance, which enables tissues to recover from extreme drying (below an absolute water content of -100M Pa). When desiccated, tissues enter a state of quiescence [dormancy] where (nearly) all metabolic activity ceases, and this allows them to persist through long and intense periods of drought. The advantages of this trait, if applied to crops in drought prone and marginal sites, cannot be overstated.*'



For more on Rose and her work, see:
https://*www.roseamarks.com/gallery?pgid=k3ag3dsd-c7056396-0b4d-4a1c-bfe4-b91d328e2f63*
https://*www.nature.com/articles/d41586-020-00673-6*

John Burrows

University of Pretoria and Bush Clumps

For several years now Dr Michelle Greve, of the Department of Plant and Soil Sciences at the University of Pretoria, has been bringing groups of post-graduate students to Buffelskloof Nature Reserve to carry out projects and studies into various aspects of the reserve's ecology.

Most important of these has been a series of ecological and successional studies surrounding the numerous bush clumps that are dotted along the shoulders of the kloof. These bush clumps, typically developing around a single fire-resistant tree or a small cluster of trees protected from fire within a small rock outcrop, appear to steadily expand over the years.

It is postulated that these ever-expanding bush clumps (**above**) could – under suitable environmental conditions – eventually coalesce to form a continuous dry forest.

This young bush clump (**above**) is developing under the fire protection and shade of a very old *Englerophytum magalismontanum*. Although it seems hard to believe, under its protective umbrella are 13 other trees and shrubs: *Brachylaena transvaalensis*, *Canthium inerme*, *Cussonia spicata*, *Diospyros whyteana*, *D. lyciodes* subsp. *guerkei*, *Ekebergia pterophylla*, *Empogona lanceolata*, *Myrsine africana*, *Pavetta gardeniifolia*, *Psychotria capensis*, *Scolopia zeyheri*, *Searsia chirindensis* and *Zanthoxylum capense*. Seven of these species are typically found in forests and it therefore suggests that, given long enough, these bush clumps will gradually develop and expand into small patches of forest.

Nearby (**above right**) is a much larger bush clump which has in excess of 40 different species of woody plants, in all stages from small seedlings to fully-developed trees. This shows the next step where forest canopy species, such as *Cussonia spicata*, are already reaching the canopy of the bush clump.

It is the dynamics of these bush clumps that have attracted post-graduate students from the University of Pretoria to work on them. **Left**: PhD student **Samantha-Leigh** ('Sam') **Jamison**'s thesis is entitled *'Patterns and drivers of bush clump development within a sub-tropical African savanna'*, a mammoth work in which she selected 40 bush clumps and, over two years, analyzed each bush clump, identifying 105 tree species over the 40 plots, from a total of 21 500 trees identified.

A number of other researchers from Michelle Greve's team have also been working on aspects of bush clump ecology.

Dr **Monique Botha** (**above**) is carrying out a post-doctoral thesis entitled '*Understanding bush encroachment from a functional trait perspective*', while MSc student Mathew Harris is looking at endophytic fungi in bush clump tree species.

John Burrows

Above: The University of Pretoria research team, under **Dr Michelle Greve** (standing, far right), with **Monique Botha** (far left), **Sam Jamison** (2nd from left) and **Mathew Harris** (seated left).

FIELD NOTES

Resurrection Plants on Buffelskloof

Broadly speaking plants that grow in our arid regions – the semi-deserts of western southern Africa and the savannas of south-central Africa that experience a long dry winter from May to November – have evolved four broad categories to either side-step the whole drought issue, or to withstand the droughts and heat.


Craterostigma wilmsii

Side-stepping strategies can include annual plants which die off after having completed their reproductive cycle during the brief rainy season, and set seeds which are dispersed widely and stored safely in the soil to await the rains of the following season.

Another method of avoidance is similar. All the aerial growth of a plant transfers its water and nutrients into an underground storage organ (bulb, rhizome, underground stem) during autumn and then dies off completely with the subterranean parts able to with stand years of aridity and remain ready to respond to the next rains with new aerial growth.

Withstanding drought is most clearly illustrated by plants with a swollen, succulent stem. The classic thick-stemmed *Euphorbia* epitomises a plant that is capable of storing water for extended drought periods in its succulent stem; likewise desert plants with succulent leaves can also withstand long periods of aridity. The last major drought-withstanding strategy is for the plant to shrivel up and go into a sort of indefinite hibernation during dry periods. These are resurection plants.

What is a resurrection plant?

A resurrection plant is any plant that has the capacity to 'close up shop' in order to withstand the long dry winter and often hot, dry spring that is a feature of the climate that prevails over most of south-central Africa. With the onset of the dry season these plants lose water but, instead of dying off, their physiological processes switch to indefinite 'standby'.

This standby mode can last for months or even years. But, within 12 to 36 hours of receiving a good amount for rain, the plants return to their normal functional green self, as if nothing had ever happened – least of all a 7 month spell without rain when they appeared, to all intents and purposes, to be quite dead!

Above: *Myrothamnus flabellifolius* (Resurrection Plant) in its dry dormant state (**left**), and 24 hours after rain (**right**).

This fascinating ability to withstand drought, but still remain alive, has evolved over a number of different families and several different genera or species (a phenomenon known as convergent evolution).

The classic Resurrection Plant (*Myrothamnus flabellifolius*), in its own unique family, (Myrothamnaceae), is perhaps the most high-profile of the African resurrection plants but there are many African grasses and sedges that behave in the same way. Likewise, a large number of primitive plants such as mosses, liverworts, and ferns (*Ceterach*, *Cheilanthes*, *Pellaea*, *Mohria*) that grow in seasonally-arid areas shrivel up – but remain alive – for months on end. Most are found in the savannas and semi-deserts of Africa and they are also true resurrection plants.

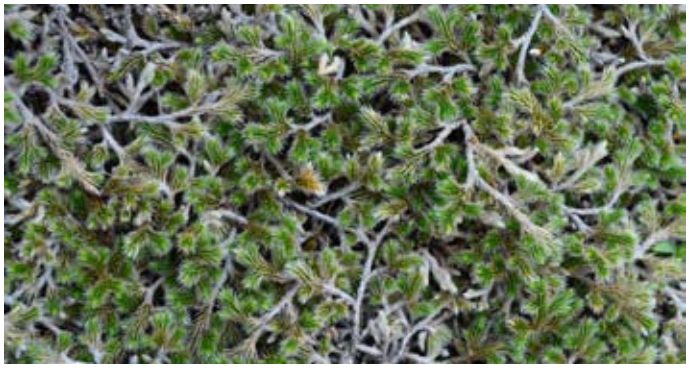
***Ceterach capensis* - a fern**

It is this physiological ability of resurrection plants to withstand long droughts - but remain alive - that has attracted the attention of scientists who have seen the possibility of breeding crops that, instead of dying off in the face of drought, could just close down for the length of the dry period and continue growing upon the resumption of the rains. This can be done by splicing genes that afford resurrection plants their drought tolerance into crops such as maize, wheat, sorghum, groundnuts and others. Although the perfect drought-tolerant crop has yet to be announced to the world, this quest has become a huge international endeavour (Germany, France, USA & South Africa) and it all started with the work of Prof **Jill Farrant** at the University of Cape Town.

(see also : https://*www.ted.com/talks/jill_farrant_how_we_can_make_crops_survive_without_water?language=en#t-824085*)

John Burrows

***Coleochloa setifera* - a sedge**



Above: *Selaginella dregei*, a moss-like fern-ally – dessicated & dormant (**left**); and green after overnight rain (**right**).

The common resurrection plants on Buffelskloof Nature Reserve
(excluding mosses & liverworts)

DICOTYLEDONS		
Myrothamnus flabellifolius	Myrothamnaceae	Resurrection Bush
Craterostigma wilmsii	Scrophulariaceae	Mole's Spectacles
MONOCOTYLEDONS		
Coleochloa setifera	Cyperaceae	Rock Sedge
Xerophyta purpurascens	Velloziaceae	Purple Baboon's Tail
Xerophyta schlechteri	Velloziaceae	Cliff Dwarf Baboon's Tail
FERNS & FERN-ALLIES		
Anemia dregeana	Anemiaceae	Southern Flowering Fern
Mohria marginata	Anemiaceae	Mountain Scented Fern
Mohria vestita	Anemiaceae	Scented Fern, Brandbossie
Ceterach capensis	Aspleniaceae	Scaly Fern
Selaginella caffrorum	Selaginellaceae	Cliff Clubmoss
Selaginella dregei	Selaginellaceae	Silver Clubmoss
Selaginella mittenii	Selaginellaceae	Dwarf Clubmoss
Cheilanthes eckloniana	Sinopteridaceae	Resurrection Fern
Cheilanthes hirta	Sinopteridaceae	Parsley Fern
Cheilanthes inaequalis	Sinopteridaceae	Mountain Resurrection Fern
Cheilanthes viridis	Sinopteridaceae	Common Lip Fern
Doryopteris concolor	Sinopteridaceae	Oak-leaf Fern
Pellaea calomelanos	Sinopteridaceae	Common Hard Fern
Pellaea dura	Sinopteridaceae	Small Hard Fern
Pellaea pectinatus	Sinopteridaceae	Comb Fern

Pineapple Flowers

the genus

Eucomis

along the Northern Drakensberg

The distinctive inflorescence of *Eucomis* with its top-knot of reduced leaves – likened to a pineapple but not related to it – have ensured that pineapple flowers always attract the attention of both amateur plant-lovers and scientists. There are only 12 species in the genus *Eucomis*, all confined to southern Africa, with only two of them extending north of the Limpopo River – *E. zambesiaca* and *E. autumnalis* subsp. *autumnalis*.

The mountains of eastern and northern Mpumalanga and Limpopo provinces support 6 species, with a seventh, *E. bicolor* occurring in the extreme south of Mpumalanga and excluded here since it is a component of the Drakensberg-Lesotho flora.

Two of the six species, *Eucomis sonnetteana* and *E. vandermerwei*, are known only from (endemic to) Mpumalanga Province, while *E. zambesiaca* is recorded only from the Soutpansberg although it is more widespread north of the Limpopo River.

Eucomis autumnalis subsp. *clavata*

(**below**) The most widespread species in our region since it is the only *Eucomis* that grows in open montane grassland. All the other species favour rock outcrops, areas of shallow soils and sparse grass growth, or wetlands – all areas that escape the full intensity of veld fires.

Eucomis montana

(**below** and **bottom**) A high-altitude species – as the name suggests – that commonly favours the shelter of rocky outcrops or crevices in cliffs in montane grassland. Easily distinguished from similar species of *Eucomis* by the purple spots at the base of the leaves and at the base of the flowering stalk.

Eucomis pallidiflora subsp. *pole-evansii*

The giant of our pineapple flowers, the flowering stalk may reach a height of 2.2 m. It is also the only species of *Eucomis* in our area that grows in wetlands, often with its roots in water. It often forms small colonies of plants which are evident from a distance in a wetland.

Eucomis sonnetteana

Only discovered in 2012 and described as new to science in 2019, *E. sonnetteana* is a rare dwarf pineapple flower of shallow soils in sparse montane grassland. The white flowers emit a strong, rather nauseous smell which implies that the flowers are pollinated by rodents.

Eucomis vandermerwei

One of the smallest of our pineapple flowers and perhaps the most distinctive. It is a rare species, confined to altitudes of over 2 000 m, growing on shallow sandy soils over quartzitic sheetrock. The distinct purple-spotting of the whole plant and frilly leaf margins are unmistakable.

Eucomis zambesiaca

This rather robust pineapple flower with long flowering spikes has only been recorded from the Soutpansberg of Limpopo Province in South Africa although it extends into Zimbabwe. It grows among rocks and in forest margins in mountainous areas.

John Burrows

Life in the *atroposphere*

Reptiles are generally regarded as one of the most difficult-to-study vertebrate groups. This is especially true for snakes which are often cryptically coloured and have random activity patterns.

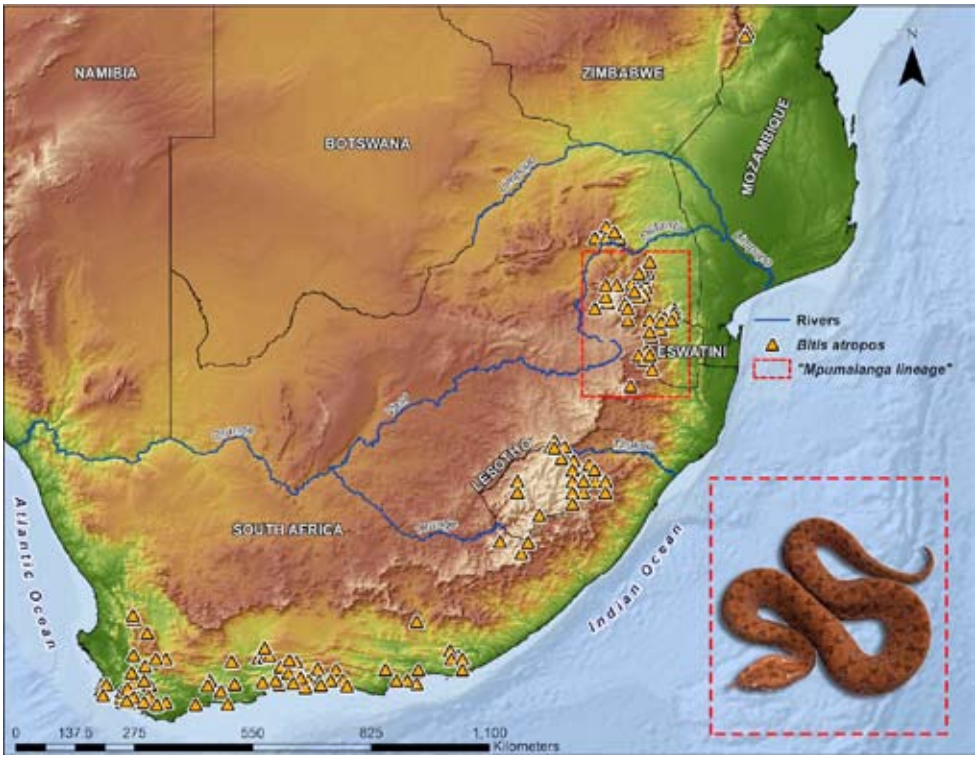
Many species inhabit areas like mountains that pose a challenge to researchers in terms of accessibility. Due to this, research related to the status and trends in population demography of many snake species remain un-quantified and therefore limit crucial information required by conservation decision-makers.

Berg adders (*Bitis atropos*) are no exception to this. These small-bodied vipers occur predominantly in mountainous terrain across South Africa. They are generalist ambush predators that feed on a variety of small vertebrates, especially rain frogs of the genus *Breviceps*. These snakes seldom attain lengths longer than 400 mm and females give birth to no more than 12 live young (viviparous) in early to late summer.

Despite not growing very large, these snakes make up for what they lack in size with a feisty attitude and often produce a loud hiss when threatened.

They are unique among South African vipers, not only because they are our only dwarf adder species with predominantly neurotoxic venom, but also because they are highly variable in colour (polymorphic). Being highly variable in colour could provide several advantages, one of which is that it may increase the survival and fitness of individuals whose colour better matches that of their environment.

Berg adders from the Mpumalanga escarpment are highly variable in colour. Pictured **left** are a few of the colour 'morphs' found during surveys at Buffelskloof.



Left: Geographic distribution of the berg adder across southern Africa. The map inset represents the known distribution of the Mpumalanga lineage.

Recent molecular studies have shown that berg adders consist of several isolated populations across their distributional range, and some are in the process of being described as new species. One of these populations occurs along the eastern escarpment of the Mpumalanga province where they inhabit short montane grassland habitat.

Despite being relatively common and often found in high densities little is known about the ecology of this population. Information related to their specific habitat preferences could prove useful to reserve managers and conservation planners to inform and guide conservation actions, especially considering that this population is likely to be described as a new species in the coming years.

Therefore, I set out to quantify habitat preferences of berg adders at Buffelskloof. The Reserve has considerable variability in microclimate as a result of its topographic complexity, and this is particularly useful for quantifying the habitat preferences of these snakes.

Above: Berg adders are generalist predators that prey on a variety of small vertebrates. Pictured here are the remains of a snake-eyed skink (*Panaspis wahlbergi*) regurgitated by a juvenile berg adder (*Bitis atropos*).

Above: Determining the habitat requirements of berg adders (*Bitis atropos*) or any species for that matter is a complicated exercise and requires a researcher to measure a suite of physical habitat characteristics in the field.

Above: Berg adders are small-bodied vipers with an elongated head that is triangular in shape. Despite being highly variable in colour, they usually have paired semi-circular patterns that run along their spine.

Above: Despite the over-generalized assumption that vertical pupils are associated with nocturnality, berg adders are diurnal viperids that are often encountered along hiking trails and rocky ridges.

I found that these snakes preferred mid to upper north-west facing slopes with generally higher temperatures, which is not surprising, considering that snakes are ectotherms and rely on external environmental heat gain to maintain optimal physiological functions necessary to survive.

Additionally, I showed that berg adders are challenging to detect during surveys, being more specific, I found that the chance of finding a berg adder is about 26% when carrying out surveys in known suitable habitat.

Lastly, my results confirm the difficulty of studying snakes and reaffirms the necessity of carrying out repeated surveys when attempting to confirm the presence of this species in a given area.

Their cryptic colouration and small body size, make them easy to miss during surveys, even when searching for them in their preferred habitat. Therefore, not only does the information that stems from studying berg adders at Buffelskloof Private Nature Reserve provide valuable information for use in the Reserve's management plan, it also adds a piece to the snake ecology puzzle.

This is especially true from a South African perspective where robust quantitative information at the population level, used to inform regional conservation assessments, is lacking for many snake species.

Adriaan Jordaan

Three female berg adders found underneath a flat piece of shale rock during a survey at Buffelskloof in July 2017.

Newborn adders are seldom longer than 100 mm. – despite their minute size, they are just as venomous as adults.

Above: Weighing an adult berg adder (*Bitis atropos*) found during a survey in October 2016 at Buffelskloof.

Above: Ziplock bags are often used by herpetologists (scientists studying reptiles and amphibians) when collecting specimens. These bags are punctured with several holes to allow air exchange. Here I am placing a berg adder in such a bag just prior to taking the specimen back to the research cottage to collect various morphological measurements. All snakes are released at the exact point of capture after all the necessary data are captured.

Above: See-through acrylic tubes provide a safe way to handle venomous snakes such as berg adders.

Hermenegildo Matimele

Hermengildo Alfredo Matimele is a citizen of Mozambique, born (1980) and raised in Zavala, Inhambane Province.

We first met Hermenegildo Matimele in December 2008 during the Pro-Natura International Expedition, organized by Kew Gardens and Muséum National d'Histoire Naturelle (MNHN), Paris, to Cabo Delgado, northern Mozambique. We were impressed with his knowledge, enthusiasm and easy personality and got to know him quite well. Therefore we invited him to join us in September 2009 on an expedition to the same area, during which he proved to be an able and valuable member of the group.

Above: September 2009, Rovuma River, on the Tanzanian border with, **from left**, Aurelio Banze, Barbara Turpin, Sandie Burrows, Hermengildo and John Burrows.

During the next few years we kept in contact and in 2014 Hermenegildo expressed a desire to study for his Masters of Science degree, in Conservation Biology, at the University of Cape Town. In 2015 he was accepted for the course, with myself, plus Domitilla Raimondo (SANBI) and Jonathan Timberlake (Kew), as his co-supervisors. However, because of our extensive knowledge of Mozambique plants, Hermenegildo spent much time at Buffelskloof writing up his thesis, studying plant material, and picking our brains. Buffelskloof's Barbara Turpin also gave him a course in BRAHMS to help him database all his study material.

In addition, we carried out two short field expeditions to Maputaland in southern Mozambique, with all his supervisors and his main supervisor, Prof Timm Hoffmann (**below**).

Above: January 2015, Bilene, Maputo Province, having just collected a new, undescribed species of *Memecylon* (now *M. incisilobum*); **From left**: John Burrows, Prof Timm Hoffmann, Tilla Raimondo, Jonathan Timberlake, with Hermenegildo reclining front.

Above: Jan. 2015, Bilene; Hermenegildo proudly displaying a specimen of *Hugonia busseana* (Linaceae). The Bilene area forms the northern border of Maputaland.

In May 2016 Hermenegildo also organized a workshop at Buffelskloof Nature Reserve on the Red Data assessments of endemic plants in the Maputaland region. It was attended by botanists from Kew, Maputo, Pretoria and Buffelskloof (**below**).

Above: May 2016, Buffelskloof. Participants at a Red Data workshop on endemic plants of Maputaland. **From left**: Dr Iain Darbyshire (Kew), Tilla Raimondo (SANBI), Dr Alice Massingue (Eduardo Mondlane University, Maputo), Jonathan Timberlake (Kew), Camila Souza (LMA, Maputo) and Prof Salomao Bandeira (Eduardo Mondlane University, Maputo).

Above: Hermengildo among his plants in Maputaland, Mozambique, here with the Maputaland endemic, *Acridocarpus natalitia* var. *linearifolius* (Malpighiaceae).

Above: In June 2016 Hermenegildo was awarded his MSc degree in Conservation Biology from the University of Cape Town where we attended his graduation ceremony.

In 2019 Hermenegildo was accepted at Kent University, Canterbury, UK, to study for his PhD, his thesis being entitled *Testing the effectiveness of different site-based biodiversity and conservation prioritisation approaches in Mozambique.*

Hermenegildo is the current Chair of the IUCN's Southern African Plant Specialist Group, and is head of Mozambique's Red Data Assessment programme.

Hermenegildo lives in Maputo and is married to Alice; they have twins, a boy and a girl.

John Burrows

VISITORS

Nov	Prof Dr Jürgen & Gabby Soll	Ludwig-Maximilians University, Munich
Nov	Dr Rose Marks	Michigan State University, USA
Nov	Marina Pérez-Llorca, PhD student	University of Barcelona, Spain.
Nov	Prof Mike Wingfield	FABI, University of Pretoria
Nov	Prof Pedro Crous	Westerdijk Fungal Biodiversity Inst., Utrecht
Dec	Lambert van der Nest	Kraft Designsmiths, Pretoria
Dec	Nicolene Roodt	Kraft Designsmiths, Pretoria
Dec	Prof Jim Leebens-Mack	Dept. of Genetics, University of Georgia, USA
Dec	Prof Eshchar Mizrachi	FABI, University of Pretoria
Dec	Prof Yves Van de Peer	Ghent University, Netherlands
Dec	Dr Julieta Rosell Garcia	National Autonomous University of Mexico
Dec	Dr Mark E. Olson	National Autonomous University of Mexico
Dec	Prof Susi Vetter	Rhodes University, Grahamstown
Dec	Prof Sally Archibald	University of Witwatersrand
Dec	Dr Monique Botha	University of Pretoria
Dec	Laura Milne	University of Pretoria
Dec	Deanne Murphy	University of Pretoria
Dec	Dr Michelle Greve	University of Pretoria
Jan	Prof Nicci Illing	University of Cape Town
Jan	Prof Robert Ingle	University of Cape Town
Jan	Dr Syd Ramdhani	University of Durban–Westville, Durban
Jan	Gracious Mona, PhD student	University of Durban–Westville, Durban
Jan	Teddy Govender	University of Durban–Westville, Durban
Jan	Dr Michelle Greve	University of Pretoria
Jan	Dr Monique Botha	University of Pretoria

From left: horticulturist Teddy Govender, Dr Syd Ramdhani and PhD student, Gracious Mona from the **University of Durban–Westville** Campus; studying medicinal properties of *Cassipourea malosana* and *Osyris lanceolata* for Gracious' PhD research.

Austrian photographer Herbert Stärker has visited us on several occasions to photograph orchids for the Johnson & Bytebier's 2015 definitive guide *Orchids of South Africa* in which feature a few orchid species photographed on Buffelskloof.

Laura Milne, an Honours student from the **University of Pretoria**, offered her voluntary services in the Herbarium over the Christmas holidays before embarking on her MSc in 2020. In return she gained some botanical field experience from the Herbarium staff, including a field trip to the Lebombo Mts of Eswatini.

Left: Mycologist Prof Mike Wingfield, recently head of **FABI (Forestry & Agricultural Biotechnology Institute)** at the University of Pretoria and (**right**) Prof Pedro Crous, a South African living in Utrecht (Netherlands), Director of the **Westerdijk Fungal Biodiversity Institute**. Here Mike and Pedro study the fungal pathogen that has been killing off many of our *Heteropyxis canescens* trees.

Back row, **left to right**: Dr Michelle Greve, senior lecturer in Ecology and Biodiversity at the **University of Pretoria**, Dr Monique Botha, post-doctoral fellow in the Plant and Soil Sciences Department and Annerine Venter, an MSc student. **Front row**, **left to right:** Megan van den Berg, an Honours student and Jenny de Jager, an ecology undergraduate. This team has been working on the Buffelskloof bush clumps.

As part of a joint research project on *Asparagus* between the USA and South Africa (FABI & Buffelskloof), in December we received a visit from two of the project leaders.

From left: John Burrows, Prof Yves Van de Peer (Ghent University, Netherlands), Sandie Burrows, Prof Jim Leebens-Mack (**University of Georgia, USA**) and Prof Eshchar Mizrachi (**Dept of Biochemistry, Genetics and Microbiology at the University of Pretoria's Forestry and Agricultural Biotechnology Institute [FABI]**).

. . . . . and from THE VISITORS BOOK

'Delightful stay in a beautiful area and in the company of lovely people. The time spent here will be in our fondest memories and we hope to return soon.'
Deanne Murphy, University of Pretoria

'This place is so special. It has truly stolen my heart. Thank you for your vision, commitment and generosity. This isn't the last you will see of me!'
Dr Rose Marks, Michigan State University

'Wonderful stay, great plants, lovely landscape, amazing people, incredible facilities – thank you for everything!!'
Drs Julieta Rosell Garcia & Mark Olson, (**right**)
National Autonomous University of Mexico

Above: Julieta and Mark, both of the **Institute of Ecology, National Autonomous University of Mexico, Mexico City**, and ecologist Prof Susi Vetter of **Rhodes University, Grahamstown**. They were researching the fire resistance characters of the bark of various savanna trees.

PUBLICATIONS

CROUCH, N.R., MARTINEZ-AZORIN, M., BURROWS, J.E., LOTTER, M.C. and CONDY, G. (2019). *Eucomis sonnetteana* (Hyacinthaceae). *Flowering Plants of Africa* 66: 46–55.

JORDAAN, A. (2019). Geographic Distribution and Habitat Selection in the Berg Adder, *Bitis atropos* (Serpentes, Viperidae) on the Mpumalanga Escarpment, and the Consequences for Conservation. MSc Dissertation, University of Free State.

OOSTHUIZEN, D. & BALKWILL, K. (2019). *Wurmbea* (Colchicaceae, Anguillarieae) in Mpumalanga Province, South Africa, including the description of two new species. *South African Journal of Botany* 127: 117–123.

SCHOEMAN, M.H., AUB, B., BURROWS, J.E., HALL, G. & WOODBORNE, S. (2019). Past Climatic Conditions for Bokoni at Buffelskloof, Mpumalanga, Using δ13C Analysis of *Prunus africana* and *Pittosporum viridiflorum* Tree Rings. *Journal of African Archaeology* 17.

SHAIK, Z. (2019). Species delimitation and speciation process in the *Seriphium plumosum* L. complex (Gnaphalieae: Asteraceae) in South Africa. MSc. Thesis, Department of Biological Sciences, University of Cape Town.

STONE, R.D., MONA, I.G., STYLES, D., BURROWS, J.E. & RAMDHANI, S. (2019). Taxonomic revision of South African *Memecylon* (Melastomataceae–Olisbeoideae), including three new species *M. kosiense, M. soutpansbergense* and *M. australissimum. Phytotaxa* 418 (3): 237–257 (2019); https:*//doi.org/10.11646/phytotaxa.418.3.1*

PEN & PENCIL

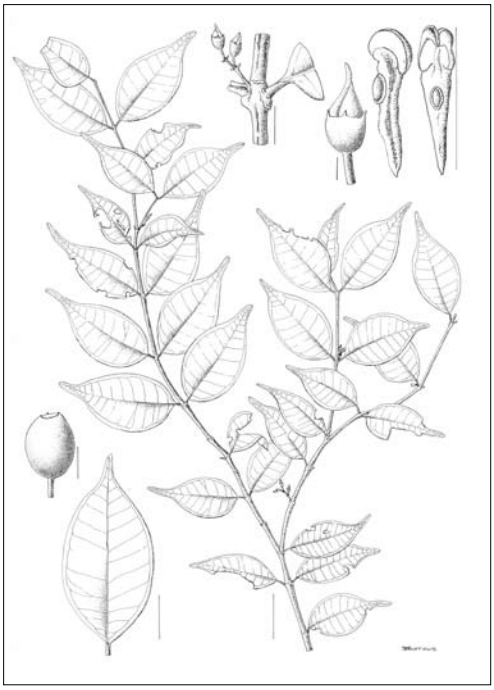
PEN . . . Illustrating plants for botanists, and awaiting publication of the paper with the illustrations always takes a while. Hence the delayed reporting of my work that I do throughout the year.

In this issue of Bio-Chat you will see illustrations that were completed last year, while the scientific papers have only been published recently.

I have just completed 9 illustrations of new species of *Memecylon* (Melastomataceae) of Madagascar that Dr Doug Stone is submitting for publishing.

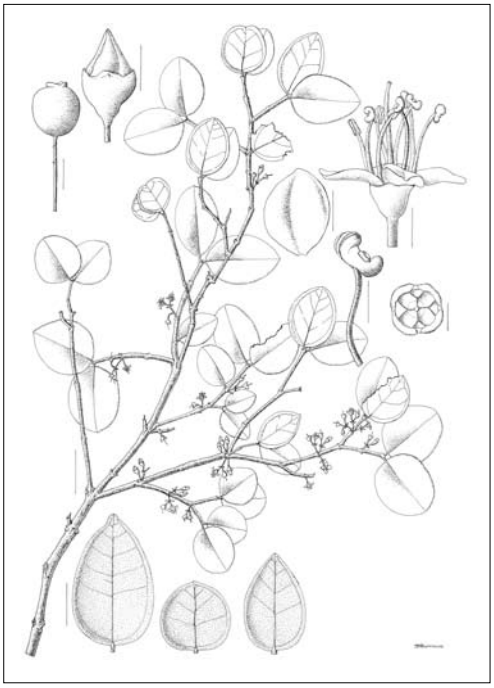
While that paper is being submitted, I will be drawing up the next 18 new species (from Madagascar) which are intended for a monographic treatment of the genus.

It is amazing that Madagascar is so rich in *Memecylon* species, the plants are not all unnamed (new discoveries), but once a monograph is undertaken, it is inevitable that new taxa are found 'in the pile'.

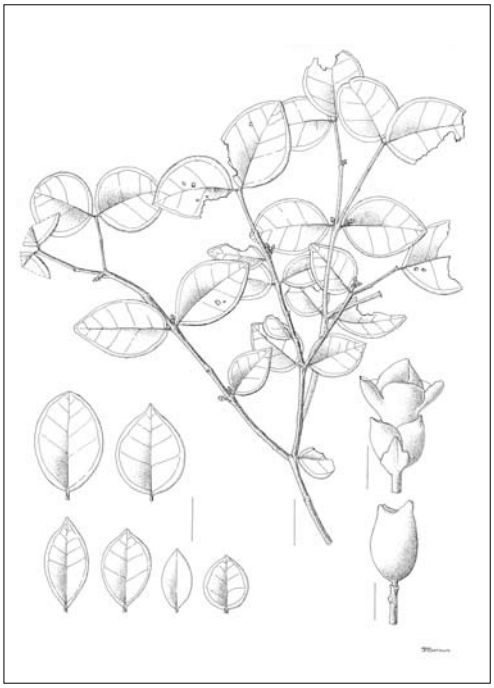


Above: "*Memecylon afroschismaticum* sp. nov. (Melastomataceae–Olisbeoideae) endemic to the East African Rift region of Rwanda, Burundi and western Tanzania"
https:*//doi.org/10.5091/plecevo.2020.1657*

Memecylon kosiense



Memecylon soutpansbergense



Memecylon australissimum

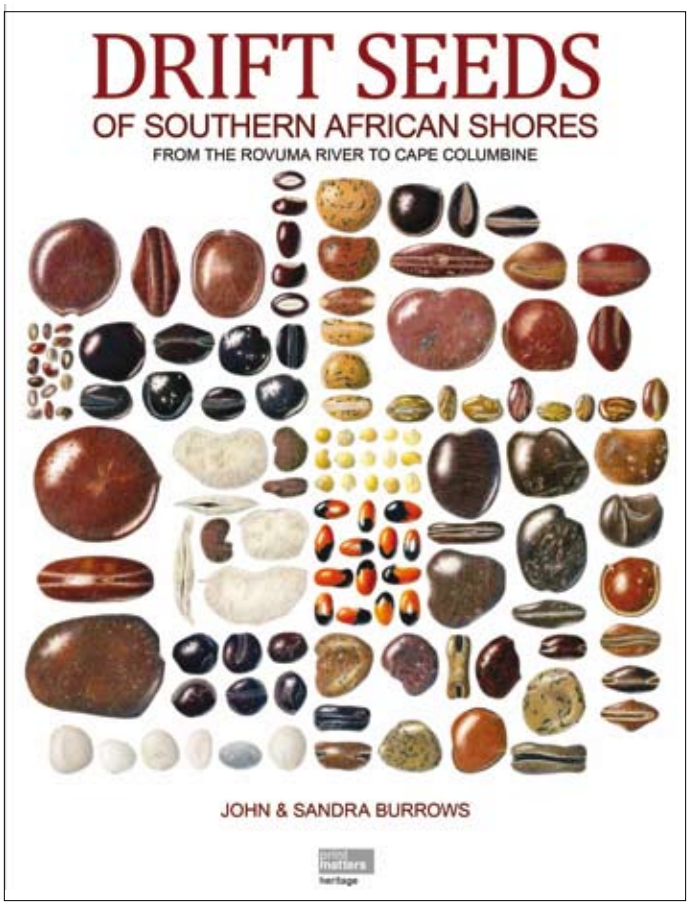
Of interest are 3 new *Memecylon* species published in the following paper:

STONE, R.D., MONA, I.G., STYLES, D., BURROWS, J.E. & RAMDHANI, S. (2019).
Taxonomic revision of South African *Memecylon* (Melastomataceae–Olisbeoideae), including three new species *M. kosiense, M. soutpansbergense* and *M. australissimum. Phytotaxa* 418 (3): 237–257 (2019); https*://doi.org/10.11646/phytotaxa.418.3.1*

. . . . . & PENCIL Many people know John and I have been working on our Drift Seed book over the years. **(right)** With the lockdown in place, we have been able to concentrate on our own research, and John has almost finished the text for the book - and me, well I am forging ahead with the coloured pencil illustrations and the book layout.

June last year (2019) was our last drift seed collecting and photography trip to Mozambique, the trip was delayed and our travel plans had to change due to the devastating Cyclone Idai that struck central coastal Mozambique.

For drift seeds collecting, it was remarkable!



Above: Morrungulo Beach, Massinga, where the beaches are littered with seeds and chunks of coral.

Above: Processing the seeds is time-consuming. Each species is put into a zip-lock bag with the collecting locality (beach), a GPS reading and date of collection. All our collections are then filed in small drawers in the Herbarium.

Above: *Coix lacryma-jobii* (Job's tears), found along the northern and southern KZN beaches.

Some of our favourite drift seeds that we pick up on our beach botanising forays are the diocleas, (Pea Family) with the very descriptive common name – **Sea Purse.**

Below: *Dioclea wilsonii,* is a common drifter from Madagascar; *Dioclea hexandra*, a rare find, arriving from the East Indies; *Dioclea reflexa,* a rare find from West Africa and lastly the beautiful *Dioclea javanica,* the most rare dioclea, with an Australasian origin.

The Legumes are the most important group of plants for producing seeds dispersed by ocean currents, with 19 species found on southern African shores.

Sandie Burrows

ABOUT US

BUFFELSKLOOF NATURE RESERVE & HERBARIUM

Buffelskloof Private Nature Reserve is situated on the lip of the escarpment of the Northern Drakensberg in Mpumalanga Province, South Africa. It is administered by the Buffelskloof Nature Reserve Trust and funded by the BNR Trust, as well as the UK-based John Rae Trust. The Buffelskloof Research Centre (BRC) provides accommodation and facilities for visiting post-graduate students and biological researchers to conduct research within the Nature Reserve. The nucleus of the BRC is the Buffelskloof Herbarium (BNRH), the largest herbarium in north-eastern South Africa.

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John Rae Trust
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