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Saving an iconic South African plant from extinction

Critically Endangered succulents need our help, but how do we ensure that our efforts bear fruit?

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Image 1: The iconic Magaliesberg Aloe in habitat. (Photo. A. W. Frisby)

THE MAGALIESBERG ALOE

The Magaliesberg Aloe (*Aloe peglerae*) is one of the most iconic South African plant species and one of the most sought after by aloe and succulent collectors. This is thanks to its unique appearance that changes through the seasons and is crowned by one of the most spectacular floral displays in the succulent kingdom, setting the veld alight in the gloomy highveld winters with densely packed rich red flowers. Alas, the combination of human greed and the beauty of this species has sent it to the brink of extinction in the wild.

CRITICALLY ENDANGERED

Poachers and uninformed plant collectors have reduced this species' numbers in the wild dramatically over the past twenty years, likely by over 50%. If this rate of decline continues, the species will have lost 80% of its population by 2070. The main threat faced by the Magaliesberg Aloe is illegal harvesting for the horticultural trade, that includes the collection of fruit (and seeds) from plants in the wild. Harvesting for medicinal purposes and habitat destruction for developments are additional threats, albeit minor compared to the threat of poaching. The slow-growing nature of the species, with a generation time of 30-40 years, and low levels of recruitment (plants that germinate in habitat) mean that even minor levels of poaching and seed harvesting will have dire conservation consequences. Because of the threats faced by the Magaliesberg Aloe, it has been classified as Critically Endangered on the Red List of South African Plants.

Image 2: The Magaliesberg Aloe showing its winter colours and closed leaf ball, together with unripe fruit. (Photo. A. W. Frisby)

HABITAT SPECIALIST

The threats faced by the Magaliesberg Aloe are compounded by its specific habitat requirements. It is restricted to the upper rocky north-facing slopes of the Magaliesberg and Witwatersrand in the Gauteng and North-West provinces. The habitat is dominated by grasslands that receive summer rainfall. The soils are very shallow (no deeper than 10 cm), which means that extremely good drainage is essential for the species, a fact that is often overlooked by poachers. Thus, most poached plants die in cultivation due

to inappropriate soil and moisture conditions. This aloe is also adapted to fire, which is common in its habitat, and withstands burns by “closing” its leaves into a compact ball in winter, protecting its growth point deep within itself. Long periods without fire due to poor veld management could lead to bush encroachment that would have obvious negative effects on the species. In areas such as this, an eventual and inevitable fire would result in more intense fires due to higher fuel loads that these plants, and particularly their seedlings, may not be able to tolerate. The Magaliesberg Aloe is a habitat specialist that requires a fine balance of factors to persist in nature.

Image 3: A group of one-year-old seedlings ready for transplantation. (Photo. A. W. Frisby)

Image 4: A seedling with roots growing through a biodegradable gusset bag that protects the roots from damage during transplantation. (Photo. A. W. Frisby)

A PLAN OF ACTION

The ongoing decline of South Africa's plant species, particularly its rare and endangered succulents, is disheartening to all nature lovers. But it is not all doom and gloom. One way to stem the extinction tide is the practice of Conservation Translocations as defined

by The International Union for Conservation of Nature (IUCN). Conservation Translocations broadly refer to active efforts to increase the numbers of threatened life forms, such as plants, in their natural habitats or conserved areas deemed to be ecologically suitable. Although this concept is by no means new, it is not often undertaken, particularly in Africa, because of various constraints including a lack of resources and poor knowledge of species' biological and ecological requirements. Additionally, the remote nature of many threatened species' habitats means that little to no care can be given once they are planted or released, resulting in many "failures" and wasted resources. Therefore, if efforts to translocate species are to be undertaken in such a way that resources and effort is rewarded, best practice protocols need to be made available to conservation organisations. This is why we hatched a plan in 2019 to do just that for the Magaliesberg Aloe.

GROW, GROW, GROW, PLANT, PLANT, PLANT!

We identified two sites in the Magaliesberg in the North-West Province where a good number of *Aloe peglerae* were present, and obtained permits that allowed us to collect a limited number of seeds. These seeds were planted in specialised containers and germinated in a greenhouse at the University of Pretoria in December 2019, and grown for one year. During this time half of the seedlings were treated with drought-tolerance-enhancing compounds. Crucially, all the seedlings were regularly dosed with pesticides and fungicides. One cannot risk taking any nasties back into their habitat with them. In December 2020, the dimensions of all the seedlings were measured and recorded (yes, the seedlings went through lockdown too). At this stage, the first batch were ready to plant back into their habitat. The timing of their planting coincided with the start of reliable rains. The seedlings hiked back up the mountain with us after a drive from Pretoria, and were carefully planted in selected locations. Specifically, half were planted in the shade of a grass tussock, and the other half in the open. The rationale behind these methods was to identify the best planting conditions maximise the aloes chances of survival and growth. Additionally, the effect of the chemical treatment on survival and growth was also being investigated. The process described above was repeated in December 2021 and December 2022 with additional batches of one-year-old seedlings.

MEASURE, MEASURE, MEASURE?

During 2021 and up to the end of 2023, all the seedlings were revisited three times a year and scored based on their condition as well as remeasured. Although, "all the seedlings" is not quite accurate, as some had disappeared without a trace! Devastatingly, many had also burnt in an unplanned veld-fire. Some showed signs of

animal damage. Camera traps later showed baboons passing through the sites and it was clear that some were curious (or bored?), and had simply uprooted seedlings. We feared the worst but continued our trips to the sites and before we knew it, three years of monitoring had passed, and it was time to crunch the numbers.

Image 5: Arnold Frisby and Prof. Peter le Roux finding suitable places to plant the seedlings.
(Photo: M. Momberg)

Image 6: Dr. Mia Momberg relocating transplanted seedlings after an unexpected fire. (Photo: A. W. Frisby)

A RAY OF HOPE

Although survival rates dropped year by year, we were delighted to see that almost all the seedlings that had burnt had fully recovered and had grown a lot. It was also clear that once the seedlings reached a certain size, their short-term survival became more likely. Similarly, animal damage stopped once the seedlings were big enough (and well rooted). The chemical treatment had a positive effect on the growth of the seedlings. The size when they were planted also had a positive effect on their survival: the bigger the better. However, one factor was abundantly clear: seedlings planted in the shade of grass clumps had much higher survival and growth rates than those planted in full sun.

This result made us ecstatic, and it conformed with a well-known ecological phenomenon known as the “nurse plant theory” where proximity between plants can have beneficial effects on one, or both plants involved. In this case, the aloe seedlings were clearly benefitting from the shade (and possibly higher moisture and nutrient levels) provided by the grasses. In summary, it seemed that there is a clear way to translocate the Magaliesberg Aloe in a way that maximises their chances of survival without further human intervention, despite the harsh nature of their natural habitat.

Image 7a: a seedling planted in December 2020. (Photo: A. W. Frisby)

Image 7b: the same seedling three years later, in December 2023. (Photo: A. W. Frisby)

A PLAN FOR THE FUTURE

In a recently published scientific article, we provide a protocol that can be followed for future translocations of the Magaliesberg Aloe. Our hope is that insights gained from this project will aid in informing similar efforts for other threatened aloes and even other succulent genera. Indeed, well over a quarter of *Aloe* species in South Africa are of conservation concern and in need of similar translocation efforts. We do offer a word of caution: three years of monitoring felt long to us but this is a short period of time for plants surviving the rigours of nature! Future translocations should also consider the genetic diversity of the species, as some populations may be distinct and could be "contaminated" by the introduction of unrelated individuals. In terms of the long-term success of this project, we are to continue monitoring and expect some of the surviving seedlings to die before reaching maturity but hopefully, in time, many will bear fruit.

Image 8: A seedling planted on the eastern side of a grass, where it benefitted from the nurse plant effect. (Photo: A. W. Frisby)

Image 9: A majestic clump of the Magaliesberg Aloe, lighting up the winter landscape. (Photo: A. W. Frisby)

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ADDITIONAL READING

Frisby, A.W., Momberg, M. and le Roux, P.C., 2025. Improving success rates of remote conservation translocations by mitigating harsh in-situ environmental conditions: A case study on a Critically Endangered succulent. *Journal for Nature Conservation*.

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