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Website: www.wildorchids.co.za

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### Community based initiatives for the conservation of the ridge habitats of the Albertina Sisulu Orchid in Krugersdorp.

Andrew Hankey<sup>1,</sup>, Antonio de Castro<sup>2.</sup> & Belinda Cooper<sup>3.</sup>

<sup>1.</sup> Walter Sisulu National Botanical Garden,
P.O. Box 2194, Wilro Park, 1731, Gauteng,
South Africa. Email: A.
Hankey@sanbi.org.za

 <sup>2</sup>. De Castro & Brits cc, 23 Amajuba st., Noordheuwel, Krugersdorp, Gauteng, South Africa. Email: mwdcandb@iafrica.com

<sup>3.</sup> Proteadal Conservation Association, P.O. Box 2845, North Riding, 2162, Gauteng South Africa. Email: Proteadal@gmail.com

#### Introduction

The critically endangered (Cr) Albertina Sisulu Orchid (figure 1) is currently known from four remaining populations globally, three of the four populations comprise of less than ten individuals. (1). Whereas the Krugersdorp population still hosts over 100 individuals (2), and as such is the main focus of conservation efforts to save the species. The species is threatened by habitat loss at all the known remaining populations. The basis of data for the species remains scant and more efforts are needed to better understand the conservation biology of the species (3)

An application for the development of 3000 housing units on municipal land was approved in 2015 at the Krugersdorp population (4), this has since driven the local conservation community to action on numerous fronts to ensure the effective preservation of the remaining habitat that supports the species.



Figure 1:AlbertinaSisuluOrchid(Brachycorythisconicasubsp.transvaalensis).Picture A. Hankey.

#### PCA

The aim of the Proteadal Conservation Association (PCA) can be summarised as a conservation mission, where community involvement and action is engaged to prevent the loss of critical habitat, and so, protect, maintain and improve (where possible) the ecological integrity and natural capital of the remaining untransformed ridge system (5). Ultimately, the vision of the PCA is formal protection and active management of this area as a valuable natural asset that is part of the urban mosaic (4).

When the housing development was approved in 2015, the next step to achieving the PCA's vision was to launch a legal review opposing this Environmental Authorisation that was granted on appeal, after the initial application for this development was denied in 2014. From the PCA's perspective, the 2015 approval had gone against provincial environmental policy and guidelines and as such, undermined biodiversity protection and environmental legislation in South Africa. The PCA thus took the decision to proceed with a legal review of the decision. Fortunately, pro-bono legal support was secured soon after beginning the Review process in early 2016, and is still in process (4).

#### Habitat monitoring

Intensive, annual monitoring of the habitat of recorded colonies of the ASO was initiated by Tony De Castro of the PCA and Andrew Hankey of SANBI in February of 2016. Three monitoring sites were selected at the three largest recorded colonies of the species. A total of three large (100m<sup>2</sup>) monitoring quadrats and seven smaller (4m<sup>2</sup>) quadrats were permanently marked, using 12cm nails and plastic key tags, and subjected to a detailed floristic survey and fixed-point photography in February 2017, and this data will serve as a baseline against which future monitoring data can be compared. All quadrats were sampled using using standard vegetation survey procedures following the Braun-Blanquet approach (6) (7) which is in common use in South Africa, and all plots were located so as to include at least one ASO.

The following parameters were recorded in each quadrat:

- Floristic parameters;
  - all plant taxa, identifiable at the time of sampling, rooted in the sample site,
  - a growth form (tree, shrub, dwarf shrub, forb, grass) was assigned to each species;
  - projected canopy cover for each species recorded was visually estimated using the Braun-Blanquet cover-abundance scale;
  - in the case of woody communities, each site was classified according to the structural classification of Edwards (1983);
- Environmental parameters;
  - locality in degrees, minutes and seconds using a Global Positioning System (GPS) receiver (see Appendix 2);
  - slope, measured in degrees;
  - aspect,
  - elevation,
  - terrain unit (midslope, foot slope, etc.);
  - estimated percentage surface rock cover; and
  - any visible disturbances (e.g. grazing, fire, old lands and alien plants).

An interesting initial finding is that no alien plant species were in any of the monitoring quadrats, indicating that the confirmed habitat of this species on the Roodekraans Ridge is in a near pristine state and thus likely to be highly sensitive to disturbance.

#### **Population count**

In February 2017 a detailed count of the ASO was undertaken by personnel of the WSNBG, PCA volunteers and a team from the Threatened Species Project of the GDARD Biodiversity Management Department lead by Mrs. Lorraine Mills. A total of 15 scientists, technicians and volunteers searched the western part of the area within the 465ha proposed conservation area as well as potentially suitable habitat where the species has not yet been recorded, and a total of 58 individuals were counted. This figure was then added to the 74 geo-referenced photographic records collected by Mr Andrew Hankey during the 2015 flowering season, in the eastern part of the population.

The known 'Extent of Occurrence' of this species on the Ridge was significantly expanded as a result of this research, bringing the population estimate up to 134. All recorded plants were georeferenced using a hand-held GPS receiver. This count provided invaluable data on the distribution, population size and habitat requirements for this species on the Roodekrans Ridge and will serve as an invaluable and scientifically defensible baseline data against which future counts can be compared. The count will be repeated by the same organizations in February of 2018.

#### Habitat preservation

## Habitat degradation of the ridge and ASO habitat

The main threats to the habitats and biodiversity of the Roodekrans Ridge, as a direct result of the current lack of access control include:

- Illegal access by recreational 4x4 vehicles and off-road motorcycles which is causing severe erosion and habitat destruction and high levels to disturbance to species that do not habituate to humans, including the resident population of Mountain Reedbuck, an Endangered species.
- Illegal walking of dogs 'off-leash' which causes elevated disturbance to wildlife and poses a serious risk to wildlife, in particular juvenile Mountain Reedbuck, Duiker and predators such as Black-backed Jackal.
- Illegal commercial harvesting of *Protea caffra* trees for sale as firewood.
- Illegal overnight church camps which lead to the destruction of Protea caffra trees for use as firewood and have already caused some 'concentric zones of depletion' around popular campsites. Much progress has already been made bv PCA volunteers with regards to educating church goers and discouraging the destruction of Protea trees.

- Illegal harvesting of medicinal plants.
- Illegal dumping, which is a particularly problematic in quiet and unfenced parts of the periphery of the 465ha proposed conservation area.

#### Alien plant control

Members of the PCA commenced alien plant control activities in the western portion on the Protected Area belonging to the WSNBG (the 'Nature Reserve' area) in 2014. The WSNBG does not currently have the budget or personnel to conduct adequate alien plant control in this part of their protected area, the PCA is therefore assisting the WSNBG in controlling alien plants in this area as well as the adjacent parts of the Roodekrans Ridge, which belongs the Mogale City Municipality and private land owners. Currently, by far the greatest risk of habitat transformation on the ridge is posed by Acacia dealbata (Silver Wattle). This species is an aggressive invader and habitat transformer on the Roodekrans Ridge and adjacent parts of Gauteng and is list as a Category 1b invader in the AIS Regulations (6). Other important invasive species present that are established or potential habitat transformers include the trees Eucalyptus camaldulensis (Red river gum), Cotoneaster pannosus (Silver leaf cotoneaster), and Pyracantha angustifolia (Yellow firethorn) and the perennial herb Campuloclinium macrocephalum (Pompom weed).

The habitat for the ASO forms the core of the ca. 465ha area which has been earmarked for conservation by the various NGO's working towards the conservation of the Roodekraans Ridge. A total of 160 stands of Silver Wattle have been identified and mapped within the 465ha conservation area by the PCA and its consulting ecologists. Control efforts by small teams of PCA volunteers have thus far been strongly focussed on the control of Acacia dealbata situated within the western portion of the WSNBG Protected Area and in close proximity to ASO colonies. Control of Silver Wattle has thus far been completed (including initial control and at least four follow-up control episodes) at a total of 28 stands, with a combined surface area of 0.8ha. All but one of the Silver Wattle stands situated within the WSNBG Protected Area have been eradicated. Emphasis will now be placed on controlling all invasive tree stands in untransformed habitat and vegetation on the ridge. Control is carried out by felling trees with chainsaws or hand tools and treating the stumps with Kaput<sup>®</sup> herbicide. Follow-up control focusses on pulling out any emerging seedlings by hand and removing any coppice and treating the stem scar with Kaput<sup>®</sup>.

#### **Firewood harvesting**

In 2017, individuals were caught harvesting *Protea caffra* through the combined patrol efforts of the PCA, WSNBG, neighbourhood watches and private land-owners (figure 2), the wood is sold as firewood in the nearby Munsieville residential area.

These individuals were offered the opportunity to rather harvest Silver wattle for fire wood and untreated construction poles, on private portions of the 465ha conservation area. These two Munsieville residents are now regularly harvesting Silver wattle on the property of Mr Mike Gonzalves, and thereby not only assisting with wattle control but also making a significant income from the sale of firewood and poles.



**Figure 2:** Illegal firewood harvesting of *Protea caffra*, a small woodland tree which reaches up to three meters in height. Picture A. Hankey.

#### **General Patrolling for Illegal activities**

The western portion of the WSNBG Protected Area is currently not patrolled by WSNBG and there is no access control to this area. The WSNBG does not currently have any personnel tasked with the patrolling of this area. In an effort to assist the WSNBG in meeting its constitutional obligations to protect and manage this invaluable protected area and its immediate surrounds. In 2017 the PCA began liaising with the curator of the WSNBG, with regards to the appointment of at least two trained patrollers. The PCA is also currently in the process of formalizing a group of its own comprised of volunteers (to be known as the Roodekrans Ridge Volunteer Rangers (RRVR). These volunteer rangers are already actively patrolling the ridge on a weekly basis and will, under the auspices of the WSNBG, be tasked with assisting any WSNBG guards should they succeed in appointing such. The various NGO's currently involved in efforts to formalize the RRVR and establish a formal training program include the PCA, Black Eagle Roodekrans, Roodekrans Project Neighbourhood Watch (RNW), Krugersdorp CPF Sector 5 and private landowners.

#### **Erosion rehabilitation**

In 2015, the PCA approached Retief Grobler, a wetland specialist from Imperata Consulting, to conduct а 'Wetland Assessment' of the deeply eroded donga which has formed in a south facing valley of the ridge as a result of the illegal use of recreational off-road vehicles. This valley is situated on the edge of the Protected Area belonging to the WSNBG, forms part of the upper catchment of the "Mudersdrift se loop" which flows into the and contains the WSNBG. largest concentration of Albertina Sisulu Orchids thus far recorded on the Roodekrans Ridge. The erosion poses a serious risk to this crucial habitat for the Albertina Sisulu Orchid and the 'Wetland Assessment'

motivated strongly for the area to be selected as one of the 'rehabilitation intervention' sites in Gauteng in 2016. 'Working for Wetlands Program (WfW)' approved the recommendations of the 'Wetland Assessment' and the construction of erosion control measures commenced in April 2016. The total amount invested by WfW so far is approximately R4 million (pers. comm. Thumisile 2018), this represents а significant investment of government funds and the necessary resources need to be allocated to protect this investment against further degradation.

Input into the design and construction of the erosion control measures was provided by Andrew Hankey of the WSNBG and Tony De Castro of the PCA. Regular inspection and monitoring of the site has been conducted by the PCA, WSNBG and Mr. Retief Grobler who has contributed his time on a pro-bono basis. Erosion control measures consist of the filling in of erosion gulleys with rock and crushed stone and the construction of rock and compacted soil berms along all eroded tracks on the floor of the valley as well as on the steep side slopes (figure 3). The construction phase of the project is approaching completion and is expected to terminate in March 2018, after which a maintenance phase lasting two years has been budgeted for by Working for Water.



**Figure 3:** Erosion rehabilitation installed by the Working for Wetlands programme. Picture A. Hankey.

#### **Community engagement & awareness**

The PCA launched a drive to engage the surrounding community by giving illustrated talks to the local communities to create awareness and raise appreciation for the value of the local ridge systems. This initiative has been very successful and has sparked interest amongst many residents who were formerly unaware of the biodiversity and conservation importance of the ridges which form the spine of the local topography.

The PCA has also secured the engagement of eco-clubs from schools is also a valuable tool which brings school children into the natural environment and engages them in environmental tasks such as cleaning up and chopping out alien invasive plant species. Similarly one local private school (Curro Krugersdorp) hosted a fun run through the ridge system, some of the proceeds of which were donated to the PCA's conservation activities on the ridges. The PCA also recently secured a donation of fencing which was erected strategically to restrict illegal vehicular access at a key access point. More such work will be ongoing by the PCA and its partners.

The PCA have actively pursued establishing good working relations with key neighbours such as Hobby Park (an off road and outdoor cycling venue) and others. This has seen significant benefits in patrolling the greater conservation area for the benefit of all involved parties, thus improving security and reducing unsustainable utilization of the environment. The PCA have also secured working relations with two of the Community Policing Forums (CPF's) (Roodekrans-Noordheuwel-Wilro Park and Sector 7) which are both very active in the area. Joint patrols have already been seen within the conservation areas as a result.

Another benefit such partnerships was the establishment of a WhatsApp group, which was verv effective at opening communication channels between many key people in the area, who possibly did not have direct contact before the group was established. Since the establishment of this group the river which runs through the kloof which has been plagued with intermittent sewage leaks for many years, has been running clean for several months. Sewage leaks are now quickly resolved soon after being reported on the WhatsApp group. The group allows for quick identification of challenges and decisive action to be taken by the correct persons or departments.

#### **Community Coalition**

The PCA facilitated a meeting between 16 key local councilors from both Mogale City and City of Joburg municipalities. At this meeting several issues were discussed to work out ways to improve communication and information sharing for environmental awareness and education as well as for effective response and mitigation to threats to the conservation of the common ridge system which transects the municipal regions (3). In 2017 a coalition between several conservation focused entities, comprised of SANBI and several NGO's who share a common goal of conserving the ridges, was formed (6). This coalition currently comprises Walter Sisulu National Botanical Garden (WSNBG), Proteadal Conservation Association (PCA), Wild Orchids of southern Africa (WOSA). Botanical Society of South Africa -Bankenveld Branch (Botsoc) & Black Eagle Project Roodekrans (BEPR). The establishment of the terms of reference for the coalition first had to be finalized and ratified by the various bodies. Ratification by all was concluded in November 2017, the coalition can now be opened to other locally based other interest groups which share the common goal of conserving the remaining natural ridges which form the backbone of the northwestern suburbs of Roodepoort and Krugersdorp. The terms of reference documents and action plan for the coalition includes inter alia public engagement, providing information and education to the community; formation of a volunteer based group of ridge patrollers hosted under the PCA, participation in environmental impact assessment processes; ensuring sustainable utilization of the natural areas and joint fundraising for specific projects (6).

#### Scientific & technical engagement

The PCA in partnership with WOSA have engaged various scientific and technical partners who are conducting research into the various aspects of the conservation biology of the ASO and associated habitat. As a product of this an extensive academic paper was prepared and presented at the 22<sup>nd</sup> World Orchid Conference in Guyaquil, Equador in November 2017 (3). An excerpt from the paper was prepared as a poster presented at the 9<sup>th</sup> annual and Oppenheimer De Research Beers Conference in Johannesburg in Oct 2017 (11). (figure 4). These aspects have been adequately elucidated in (3) and therefore are not dealt with here in the interests of brevity.



**Figure 4:** Collaborative academic poster presented at the Oppenheimer de Beers 8<sup>th</sup> Research Conference in Johannesburg 2017.

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