# Empowering local communities in biodiversity conservation: *towards the conservation of threatened African violets* (*Streptocarpus*) *at the coastal biodiversity hotspot, Kenya*.

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**Project Hosted by: Nature Kenya**

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## Executive Summary

African violets are perhaps the most spectacular plant species on earth yet extremely threatened in nature due to increasing habitat loss. This project, through the funding of Rufford Foundation, sought to enhance the conservation of these rare species in Kenya through a community-based approach. The project was implemented guided by three action plans; (i) to raise public education and awareness on matters of biodiversity conservation, (ii) to establish the current status of African violets including populations sizes and ecological interactions, and (iii) to conduct propagation trials, both *in-situ* and *ex-situ,* for conservation and restoration. To guide the scientific community, including future plans for the African violet's conservation, this report provides key information on the current status of the species in the wild. Additionally, we have tried two propagation approaches for the species, and raised community awareness on the importance of biodiversity and sustainable utilization. Therefore, having achieved majority of the project's focus, we believe the project contributes greatly to the future sustainability of the African violets. In conclusion, we plan to expand this work and massively propagate the species, restore the habitats (that have greatly degraded), and involve more locals in the species recovery process.

## 1. Introduction

### *1.1 Background Information*

The highly fragmented remnant patches of coastal forests of Kenya are refugia to high endemic and endangered plant species diversity, including the rare African violets, commonly known as the *Saintpaulia*. This project focuses on the critically endangered *Streptocarpus ionanthus* subsp. *rupicola* which is only survived by three populations occurring at the Coast of Kenya. The species is majorly lithophytic (growing on rock crevices - **Figure 1A**) and survives well in wet areas characterized by moss (**Fig. 1B**). According to the IUCN review and assessment, most populations have disappeared, and the extant ones reduced in size due to the current anthropogenic activities in the area (e.g., crop farming, charcoal burning, forest fires, etc.), leading to a Critically Endangered status. Therefore, our project sought to enhance the conservation of this rare species in Kenya through a community-based approach, aimed at improving the conservation status through the objectives explained below.

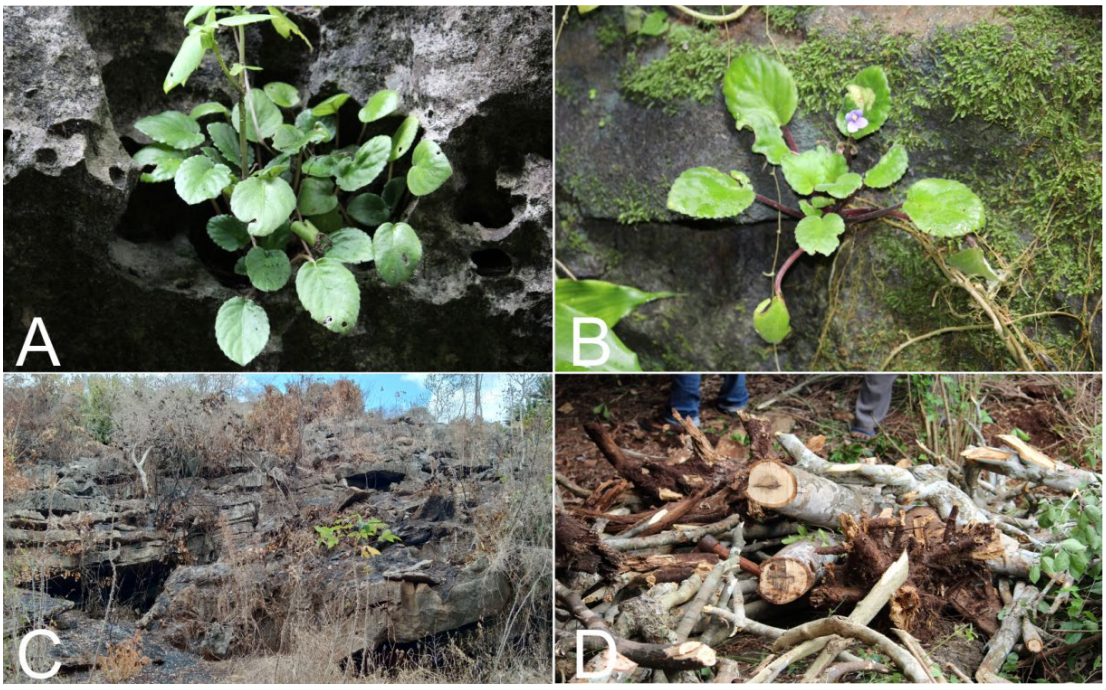


**Figure 1**: **A**, African violets growing on rock crevices, **B**, African violets growing on moss nursing, **C** & **D**, threats facing African violets' habitat such as fires and charcoal burning.

### *1.2 Project Objectives*

This project was implemented in three action plans:

(i) *public education and awareness on matters of biodiversity conservation*: to raise the awareness of the locals and engage the local communities on matters of biodiversity conservation.

(ii) *establish the current status of African violets' populations, population sizes and ecological interactions*: through intensive field surveys to document all populations and population census, threats, ecological status, and associate species.

(iii) *conduct propagation trials for conservation and restoration*: propagation trials of African violets were initiated in a propagation center to test for the best propagation approach/technique and understand the propagation concepts.

# Project Part 1

# Establishment of the current status of African violets in Kenya

Although African violets are perhaps the most spectacular plant species on earth, they are extremely threatened in nature due to increasing habitat loss. Here, we sought to enhance conservation of this rare species in Kenya through a community-based approach. In the first phase, we conducted successful field surveys in the three project sites (Cha Simba, Mwarakaya and Kachorororoni) and established the current status of African violets in the field. This included roughly estimating the population sizes, present threats and ecological status of each population.

The field survey was conducted in November and December, during the short rains in Kenya. As a result of the rains some parts of the populations were in-accessible due to the thick and bushy vegetation. Further, due to the small sizes of the population extent and the thick vegetation, we used the random survey approach to collect the information. However, we achieved the objective to a greater extent.

## 2.1 The status of African violets in Cha Simba

### *2.1.1 Population size, census, and status*

Cha Simba population occurs in a largely rocky area covering approximately between 200m x 200m to 300m x 200m extent. However, not all parts of the area have African violet individuals as the species is confined only to the ecologically suitable parts (well shaded and wetter areas). Further, we established that the population is characterized by a patchy distribution nature, spread across the rock. The number of individual samples across the patches varied, greatly influenced by the soil moisture and protection form sunlight. The well-shaded and wet patches comprised dense clustering of the individual plants while drier and most parts of the population housed very few individual plants. Since some parts are not accessible, we estimate that this population comprise not less than 2000 individuals and is largely stable, although consistent monitoring will be more informative.

*2.1.2 Phenology*

During our field survey, most individuals were vegetative, with a few mature one's flowering and some juveniles emerging around the patches.

*2.1.3 General population assessment*

The deep and thick areas of the population house fresh and lively individuals while the edges appeared relatively scorched due to the dry conditions and lack of shade which is a requirement for African violets survival.

*2.1.4 Associated species*

In Cha Simba, the population comprised many other plant species. However, some of the most common plant species recorded in patches frequented by African violets were; *Impartiens spp., Croton spp (*at the edges), *Caparis spp,* Msasa, Mgandi and others.

*2.1.5 Observable threats*

The population is characterized by tourist activities, including visit by school children to take photos. It was noted that these children damage African violets unknowing of their value. Further, since the habitat occurs on private land, crop cultivation has led to bush clearance, leaving only the inaccessible areas (**Fig. 2G, I**). Invasive species such as *Lantana camara* dominated the habitat edges, and this is a threat to the survival of other plant species in the area. Unfortunately, a survey in the neighboring forest fragments adjacent to Cha Simba recorded an emerging threat of deforestation (to create more land for crop cultivation) through bush burning.


**Figure 2**: The status of African violets in Cha Simba population during the rainy season. **A**, a photo showing the entire population; **B**, a cluster of African violets individuals on a rock crevice; **C**, an African violet individual thriving well in the wet part of the population; **D** & **F**, a field team member conducting census of the number of individuals in a patch; E & H, the field team during field investigation; **G** & **I**, representation of agricultural threats facing this habitat.

During the dry season, this population was observed to have opened-up due to dry and hot conditions in this season. Unfortunately, the vegetation 'clouding up' the wetter central parts of the population seemed withered too (**Fig. 3**). Despite the central areas having notably mature trees, seasonal climber plants cover up the tiny spaces, ensuring conducive shade for African violets to thrive well during the rainy seasons. However, since the seasonal plants wither or completely die-off during the dry season, the African violets are directly hit by sunlight, leading to withering and some dying-off. As a result, the number of individuals had reduced, and the existing ones looked withered (**Fig. 3**).

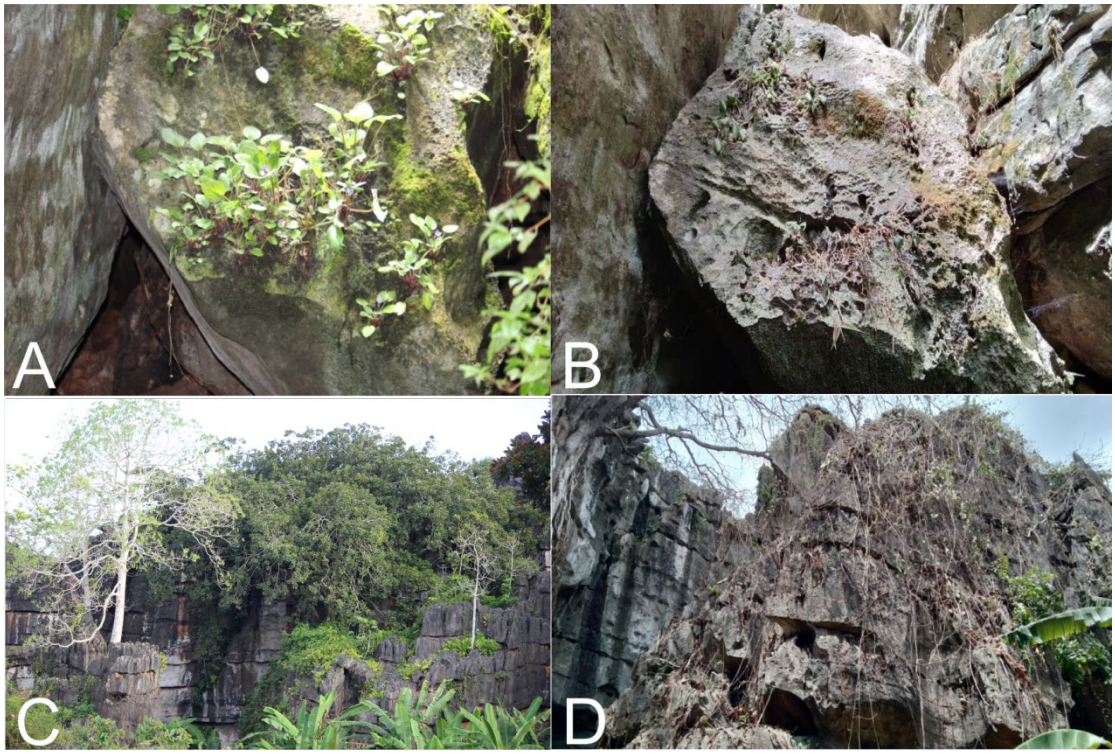


**Figure 3**: A comparison of the status of African violets in Cha Simba population during both the wet (**A** & **C**) and dry season (**B** & **D**). Images demonstrating withered vegetation cover in Cha Simba.

### 2.2 The status of African violets in Pangani rocks (Mwarakaya)

This population occurs in a relatively small rocky area covering approximately 100m x 50m extent. However, the population has lost vegetation to a large extent, leaving the individuals of African violets exposed to sunlight and hot conditions. During our field investigations, we observed few patches hanging in the rock crevices, only in the inaccessible parts of the rock (**Fig. 4A, B**). There were only few well-shaded patches, that are protected by one big tree (**Fig. 4C**) and that area comprised dense clustering of the individual plants. Since some parts are not accessible, we could not give a reliable estimate of the number of individuals.

However, we plan to visit the population in the dry season (probably in February) and establish more on the ecological conditions.

***The current status of African violets in Kenya***

*2.2.1 Phenology*

During our field survey, most individuals were vegetative, with a few mature one's flowering and some juveniles emerging around the patches.

*2.2.2 General population assessment*

The entire population appeared relatively scorched due to the dry conditions and lack of shade which is a requirement for African violets survival.

*2.2.3 Associated species*

The population comprised many other plant species. However, the most important species to the African violets is a locally known Mfunda tree that accounts for almost the entire shaded area. Therefore, it is important to highlight how eliminating this plant would mean to African violets and other under-story plants.

*2.2.4 Observable threats*

The most observable threat in the Pangani rocks is crop cultivation by the landowners. Further, the locals graze their livestock in the habitat, unaware of the importance it holds to the African violets. In preparation for the rainy season, the locals burn bushes to prepare for cultivation and this has led to decreased forest and increased grassland in the area.

This population also suffers from dry conditions, leaving the individuals of African violets exposed to sunlight and majority withering (Fig. 5). During field investigations phase 2, very few patches/individual African violet plants could be spotted in the thicker and shady areas of the site. Our assessment confirms a decreasing population size, unless habitat restoration initiatives are implemented. However, we have initiated tree seedlings propagation in the area for subsequent habitat restoration initiatives.

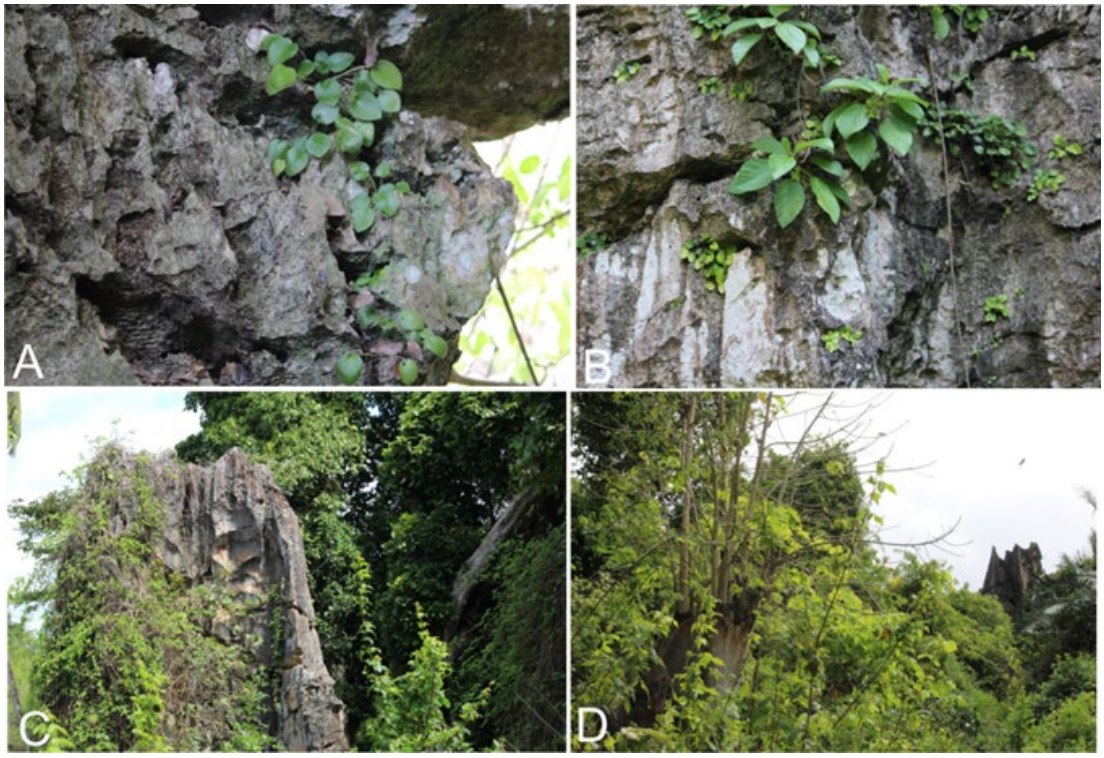


**Figure 4**: The status of African violets in Pangani rocks, Mwarakaya population. A, B, patches of African violets growing on rock crevices in the area; C, an image showing the shading by Mfunda tree and D, a representation of deforestation in the population.


**Figure 5**: The contrasting status of African violets in Pangani rocks, Mwarakaya population between the wet and dry seasons.

## 2.3 The status of African violets in Kachororoni

Kachororoni is considered the largest habitat in which the African violets occur in Kenya. This is partly because the area is largely a riverbank, making it inaccessible or useful for agricultural activities by the locals. This has ensured its continued existence and ability to harbour the African violets. However, like in other populations visited, not all parts of the area have African violet individuals as the species is confined only to the ecologically suitable parts (well shaded and wetter areas). It is unfortunate to note that this population is exhibiting a great declining trend, making it hard to establish the population size as the species has become rare. Further, due to very steep terrain and thick vegetation (**Figure 6E**), we could hardly explore the entire area and consistent monitoring will be more informative.

### *2.3.1 Phenology*

During our field survey, most individuals were vegetative, with a few juveniles emerging, raising a question of the recruitment rate of this population.

### *2.3.2 General population assessment*

The population seems declining, and the quality of the habitat is growing poor with time (**Fig. 6D, E**). The degrading habitat quality is highly attributed to human activities including charcoal burning and tree felling. This trend was evidenced by the relatively scorched individuals due to the dry conditions and lack of shade.

### *2.3.3 Observable threats*

The most observable threat in Kachororoni is charcoal burning and tree felling by the adjacent community (**Fig. 6B, C**). Further, climate change could be attributed to the dry conditions and exposed habitat witnessed (Figure 3D, E), making the habitat less suitable for the African violets.


**Figure 6**: The status of African violets in Kachororoni population. **A**, African violet individual on a rock crevice; **B**, **C**, illegal deforestation activities in the area for charcoal burning; **D**, **E**, the degraded habitat quality due to human activities and climate change impacts; **F**, the steep terrain alongside the riverbanks of rare river; **G**, **H**, the project leader during filed investigations and **I**, part of the project team for Kachororoni population.

Although Kachororoni is considered the largest habitat in which the African violets occur in Kenya, the population is quickly becoming unsuitable for the African violets (**Fig. 7A**). This is because the area has attracted unsustainable human activities; cattle grazing (creates paths (**Fig. 7B**) and destroys vegetation cover), and charcoal burning. This has led to reduced area under constant shade and wetness, and not funny that it is hard to spot an African violet individual. Contrary to normal observations, during our visit, no single juvenile was spotted, bringing to doubt the recruitment rate of this population. We propose to study the recruitment rate in future projects.


**Figure 7**: The status of African violets in Kachororoni population in the short dry season. A, a scorching African violet juvenile, and B, a created footpath due to grazing.

## Project Part 2

## Public education and awareness

Community awareness is evidently an important part of biodiversity conservation. This is because the local communities are the custodians to the world's natural resources and ought to be included in practical conservation initiatives. In the case of African violets, the extant populations occur in community areas, characterized by human activities. Unfortunately, the locals are not aware of the importance of the areas in terms of special biodiversity. Therefore, raising the awareness of the locals on the conservation status of this species is a step in the right direction. We organized for awareness seminars in the three project sites (**Figure 8**), to practically interact with the locals and enlighten them on sustainable natural resources utilization. During the seminars, the locals turned up in large numbers, and positively demonstrated interest in environmental matters. From our discussion, the following challenges were highlighted as key hindrances to environmental conservation.

(1) *Poverty* - the locals argued charcoal burning was a source of income to support their families,
(2) *Hunger and famine* - since the area receives little rainfall, crop farming could not fetch enough food to sustain the families, leading to forest clearance.
(3) *Lack of awareness* - the locals were not aware of the biodiversity potential of their localities, how their activities were impacting on the environment, and how they can venture into nature-based sustainable economic ventures.
(4) *Lack of incentives* - although they understood the importance of environmental conservation after our awareness seminars, the locals were reluctant to leave environmentally destructive activities, due to lack of alternatives.

***Public education and awareness***


**Figure 8**: Awareness seminars in the project sites

*3.1 Publicity material*

During the awareness campaigns, we developed publicity materials such as posters, and an informative banner presented below (**Fig. 9**).

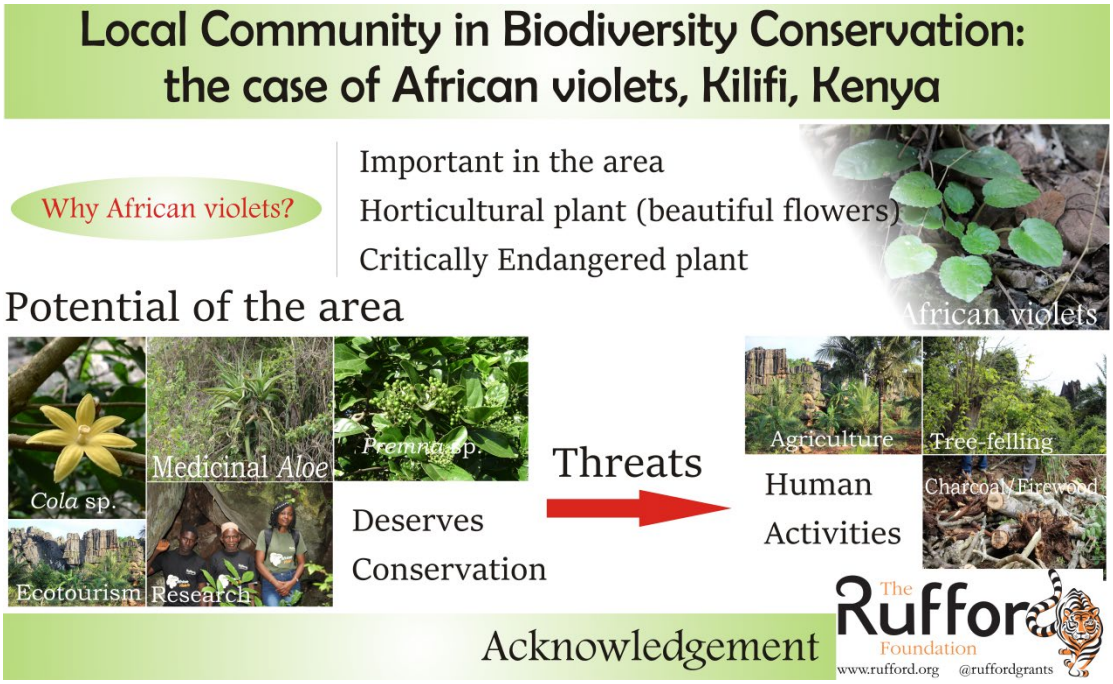


**Figure 9**: A publicity banner used during awareness seminars in the project sites, highlighting the biodiversity potential of the area, including the African violets importance, and key threats.

## Project Part 3

### Propagation trials for conservation and restoration

The growth and propagation of African violets has been reported a challenge in continued survival and conservation initiatives. As a course of action towards African violets conservation, we sought to test different methods of propagation. We tested for both seed and leaf propagation, using different soils, resulting in different outcomes. Seed propagation was observed to be the most successful approach, as leaf propagation is delicate, took longer time (2-5 months depending on the maturity of the leaf used), and exhibited low success rate. However, both methods worked to some extent (**Figure 10**) and a larger room for propagation is required for mass propagation.

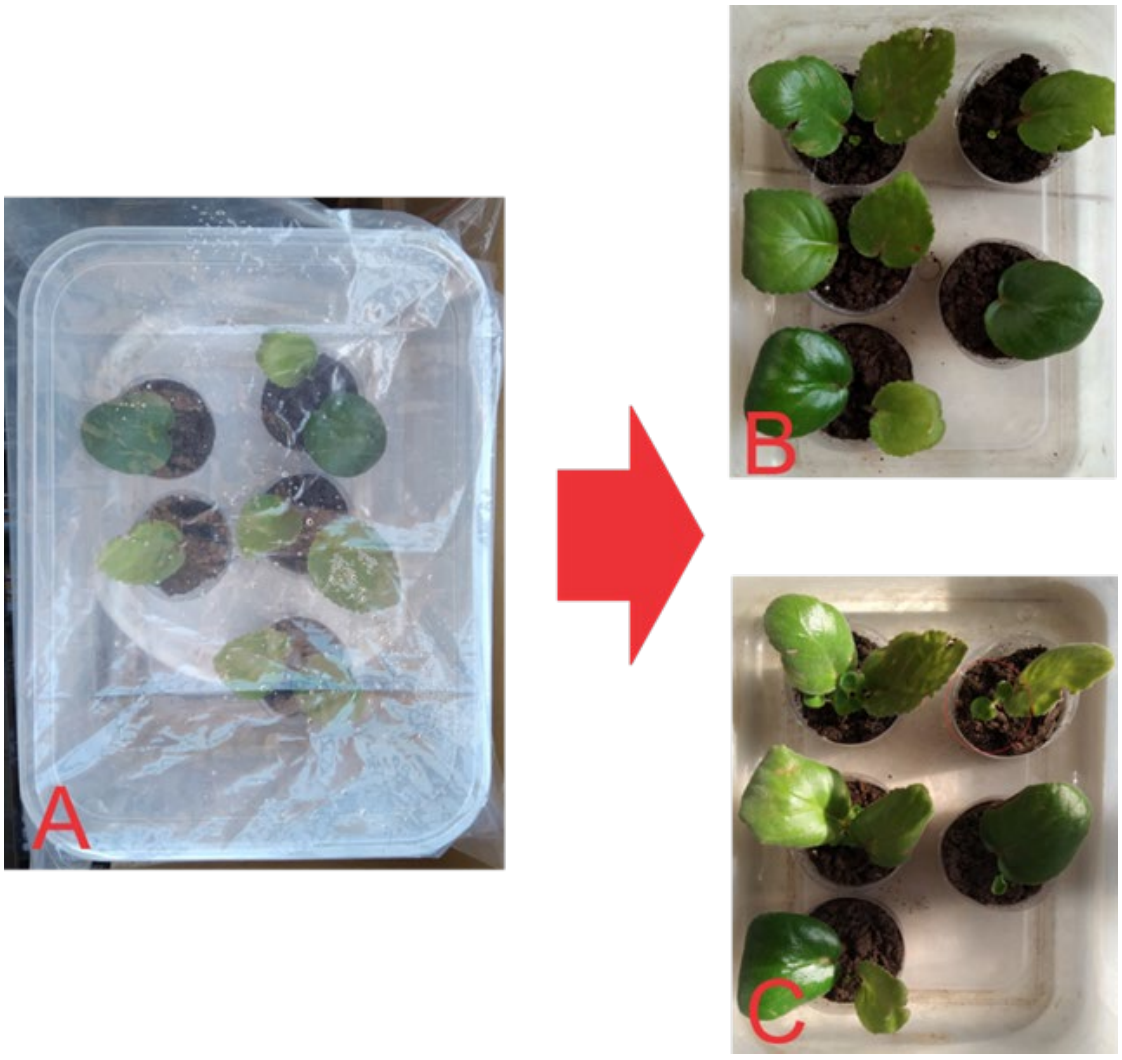


**Figure 10**: A representation of propagation trials conducted on African violets. **A**, Leaf propagation in polythene tight plastic dishes; **B**, the leaves sprouting; **C**, the leaves after successful propagation.

# Conclusion & Prospects

## *Conclusion*

In conclusion, to conserve and ensure continued survival of African violets in Kenya, we will need to upscale our efforts on several key angles; (1) local community awareness, (2) improving the ecological suitability of the habitats, and (3) intervening on the seedling's recruitment. Although this project has introduced the awareness campaign to some extent, it is important to also teach the locals on alternative sources of livelihoods suitable in the area, reducing pressure on African violets' habitats. Further, since the populations are drying and affecting the ecological requirements for African violets, intensive tree planting exercises in the populations need to be done in subsequent conservation projects. For instance, the seedling recruitment of African violets in the area was observed to be high. However, very few seedlings/juveniles survive after the rain seasons, due to the dry conditions. Therefore, on this project, we harvested some seedlings and transferred them into a propagation center where we are nurturing them, with the hope of taking them back to the wild once the habitat is healthy.

## *Prospects*

Future projects, ought to take into consideration the aspect of seedlings recruitment, restoration of the habitats, and how to reduce key threats facing the African violets. Therefore, we plan to proceed to the next round majoring on these aspects.