A giant quiver tree *Aloe pillansii* growing in its type locality at Cornell's Kop near the Richtersveld National Park. It is not known why the population of these trees is declining.

Is the flagship of the Richtersveld sinking?

by **John Duncan** and **Timm Hoffman,** Leslie Hill Institute for Plant Conservation, Botany Department, University of Cape Town and **Rick Rohde**, Centre of African Studies at the University of Edinburgh

For many, the giant quiver tree *Aloe pillansii* is the flagship species of the Richtersveld. Listed in Janice Golding's 2002 Southern African Plant Red Data Lists as Critically Endangered, by definition it faces an 'extremely high risk of extinction in the wild in the immediate future'. Local botanists and conservators such as Jeremy Midgley, Graham Williamson and Elsabé Powell (see *Veld & Flora* December 2003, page 150) have previously written about the decline of this keystone species in the Richtersveld. No-one is quite sure, but causes for its demise have been variously listed as off-road vehicle impacts, illegal collecting, grazing by goats, damage by porcupines and baboons and drought stress as a result of climate change.

In 2004, students and staff from the Leslie Hill Institute for Plant Conservation at the University of Cape Town made some further investigations into the decline of *Aloe pillansii* starting at its type locality, Cornell's Kop near the Richtersveld National Park. Named after the prospector-author Fred Cornell, this easily accessible site supports the most easterly population of the species and as such has been regularly photographed over the last sixty years by tourists and botanical enthusiasts *en route* to the Richtersveld and the Orange River.

Through plant surveys and repeat photography we constructed a picture of not just the current situation but one which spans the last seventy years. After a few days spent hunting for the original photo position and a few days more behind a computer, the first thing we discovered is that this species is extremely slow-growing and therefore lives for a very long time. While young plants less than a metre tall grow on average just over 4 cm a year, adult plants over three meters have only grown at about 1.6 cm a year during the twentieth century. This means that that at 8 m, the tallest individual on Cornell's Kop could be hundreds of years old.

As old as the giants might be, it is clear that the population on Cornell's Kop is collapsing. There are currently seventy-five individuals on the hill, thirty-nine of which are adult plants greater than three metres in height. Since 1937, however, when the first photographs were taken, adult plants have died at an average rate of 1.9% a year. If this rate of mortality continues then by about 2050 none of the adults alive today will still grace the hill.

Fortunately our surveys revealed a significantly greater number of seedlings than has ever before been recorded on Cornell's Kop. We recorded thirty-three individuals less than one metre in height and because we have established the growth rate of seedlings, we estimate that they must have all germinated after 1980. We have further calculated that there was a burst of recruitment in the decade of the 1990s, coincident with above-average rainfall in the region, and most of the seedlings date from this time.

What was intriguing to us was the 'missing cohort'.

Hans Dieter Ihlenfeldt's original photograph of the north facing slope on Cornell's Kop (left) taken in 1963 and re-photographed in 2004 (right). The number of skeletons in the repeat photograph tells the sorry story of the decline of *Aloe pillansii* on this historic hill.

Of the seventy-five plants recorded on Cornell's Kop in 2004, there were only three individuals between one and three metres in height. Why is this? Could this size class have been stolen, grazed out, driven over or simply not recruited as climatic conditions were just not good enough for their establishment in the first eighty years of the twentieth century? We could not decide on these competing explanations but have seen that once young seedlings grow away from the security of the rock crevice or nurse plant in which they recruited, they become increasingly vulnerable. We were alarmed to find out that since 2000, six seedlings have disappeared from Cornell's Kop. If this rate of attrition continues, our grandchildren will only be able to imagine what the hill once looked like when it was 'all set about' with the beautiful behemoths that are the giant quiver trees – the flagship of the Richtersveld.

The authors

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ABOVE: Photograph of Harry Hall standing next to a young adult *Aloe pillansii* on Cornell's Kop in 1953 with Timm Hoffman matching the pose beneath the same individual in 2003. This plant has grown 80 cm since 1953 at an average rate of 1.6 cm per year, while in the background to the right the death of many adult plants can be seen.

BELOW: Piet van Heerde's original photograph of the skyline along Cornell's Kop (top) taken circa 1950 and re-photographed in 2004 by the authors (bottom) showing just how much things have changed in half a century. If the current mortality rate persists, none of the plants in this image will be alive in fifty years.

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WHO SAYS old photos are just junk? Often old photographs stored in shoeboxes in dusty cupboards can provide very valuable information. From a botanical perspective this is particularly so for landscapes and plants. Old photographs with known localities and dates (or approximate dates) can yield information about the plants and vegetation. For some time Prof Timm Hoffman has analysed sets of old photographs and come to fascinating conclusions about how, for example, the vegetation has changed over time. So if you have well preserved old photographs of indigenous plants and vegetation, with known localities and dates, they could be very valuable for botanical research. Let us know by contacting the Editor.