

Author: Al Laius except where otherwise stated

## Tropical East African aloes: conservation status, uses and threats

Mkala,E.M., Mutinda,E.S., Wanga,V.O., Oulo,M.A., Oluoch,W.A., Nzei,J., Waswa,E.N., Odago,W., Nanjala,C., Mwachala,G., Hu,G.-W. & Wang,Q.-F. Modeling impacts of climate change on the potential distribution of three endemic *Aloe* species critically endangered in East Africa. *Ecological Informatics* 71 (2022) 101765, <https://doi.org/10.1016/j.ecoinf.2022.101765>

Abihundi,S.A., de Boer,H.J. & Treydte,A.C. Conservation status revision and communities perceptions of 22 *Aloe* species in Tanzania. *Plant Ecology and Evolution* 154 (3): 391–404, 2021. <https://doi.org/10.5091/plecevo.2021.1838>

Abihundi,S.A., de Boer,H.J., Mahunnah,R.L.A. & Treydte,A.C. Ethnobotanical knowledge and threat factors for *Aloe* species in Tanzania. *Ethnobotany Research & Applications* 18: 1–28, 2019. <http://dx.doi.org/10.32859/era.18.43.1-28>

Around 90 species of *Aloe* occur in tropical East Africa (Kenya, Tanzania and Uganda) out of a total of maybe 550 species for the genus as a whole. For Kenya alone around 30 species or 50% are endemic. Overall, therefore this area represents a biodiversity hotspot for aloes but many of these species are under threat. These three studies together assess threat factors for East African aloes both current and modelled into the future.

Climate change has had a significant impact on ecosystems and endemic species worldwide and without action these impacts are predicted to continue to increase into the future. The study by Mkala *et al.* (2022) aimed to use a specific model to assess the impact of future climate change on the distribution of suitable habitat for three critically endangered *Aloe* species. *Aloe ballyi* (Fig. 1) is a rare evergreen tree-aloe with a slender unbranched stem. *Aloe classenii* (Fig. 2) is a suckering, low-growing plant with creeping stems. *Aloe penduliflora* (Fig. 3) is a perennial sprawling evergreen shrub. According to the modelling calculations, the current suitable habitat for these three species will shrink with precipitation and temperature having the greatest impact on their distribution. For *A. ballyi* for example, climate change is expected to devastate more than 44% of its original habitat. Based on their assessments, the authors propose that habitats predicted to contract due to climate change should be designated as key protection zones for *Aloe* species conservation. It also seems likely that a broader range of tropical East African aloes are likely to be impacted significantly by future climate change.

Besides climate change, many *Aloe* species are globally threatened due to over-harvesting for trade and by habitat destruction. In Tanzania only 50% of the species had previously been assessed for their threatened status. In the study by Abihundi *et al.* (2021), Area of Occupancy (AOO), Extent of Occurrence (EOO) and number of locations were determined for 22 Tanzanian *Aloe* species. They assessed the reasons for their decline based principally on direct



Fig. 1 *Aloe ballyi* in habitat in Kenya (Photo: Al Laius)



Fig. 2 *Aloe classenii* in habitat in Kenya (Photo: Al Laius)

field observations but also on community perceptions. As a consequence of their studies, two species were assessed as Critically Endangered using IUCN criteria, five as Vulnerable and five as of Least Concern. The Critically Endangered *Aloe boscawenii* was, according to these authors, rediscovered having not been seen in Tanzania for six decades. In contrast they proposed to downgrade the endemic *Aloe dorotheae*, *A. leptosiphon* and *A. flexifolia* from Critically Endangered to lower threat levels. Of these, the first is an attractive, popular species in cultivation, so it is good to know that it is apparently less severely threatened in the wild than was previously thought. Agricultural activities and climate change effects were identified as the two main threats to Tanzanian aloes. The authors concluded that overall numbers are declining for the selected 22 Tanzanian *Aloe* species, mainly due to human activities.

In an earlier study, Abihudi *et al.* (2019) investigated ethnobotanical knowledge and use of aloes in Tanzania and preliminarily assessed consequent risk factors. Their headline conclusion was that over-exploitation is threatening some species with extinction. A total of 23 *Aloe* species were identified in this study, 20 of which were being used locally and were mostly collected from the wild. Uses for *Aloe bicomitum*, *A. leptosiphon*, *A. mzimbana*, *A. parvidens* and *A. volkensii* subsp. *volkensii* were identified for the first time. Three other species, *Aloe duckeri*, *A. lateritia* and *A. secundiflora* were identified as the most preferred but also widely distributed species. Human diseases frequently treated using aloe extracts include malaria and stomach ache. Fortunately, rare aloes were perceived to be less preferred as they mostly occur far away from human settlements. Overall, aloes are used widely across Tanzania and it was recommended that conservation measures are required to prevent individual species from becoming extinct in the wild.

In summary, these three studies present a mixed picture for the threats to aloes across tropical East Africa. Some highly localised species are significantly under threat, notably from climate change which currently seems likely to continue to reduce small populations. Additionally, local extinctions of individual species could occur due to over exploitation for ethnobotanical use. A general decline of *Aloe* populations highlights the importance of conservation measures that need to be taken to ease the pressure on wild populations. In contrast, the news is not all bad in that a few species appear to be less endangered than was previously assumed.

Colin C Walker



Fig. 3 *Aloe penduliflora* in habitat in Kenya (Photo: Al Laius)

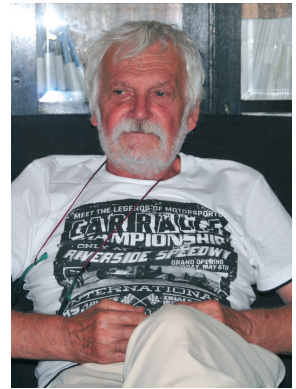


Fig. 1 (left) Jan Řiha during the famous 'Season closure' event in Chrudim (Czech Republic) in September 2002 (Photo: Jaroslav Vích)  
Fig. 2 (right) Jan Řiha in his house in Lysá nad Labem in June 2017 (Photo: Zlatko Janeba)

## Jan Řiha – In memoriam (18 Sep 1947–26 Sep 2022)

Dr Jan Řiha, an under-appreciated legend of the cactus world, passed away in September 2022 after a long illness. He was one of the most eminent cactus students, and later expert, not only in Czechoslovakia or Europe, but he was respected worldwide. Older cactus enthusiasts must have known him well, or at least must have heard his name, but the younger generation quite probably is not aware of his personal achievements and of the huge contributions he made to our hobby and to science.

Jan started to grow cacti at the age of 10 when he learnt a lot about the plants from the famous Czech grower Bohumil Rektoufík. A few years later he already owned a 20m<sup>2</sup> greenhouse full of cacti. He studied plant physiology at the Faculty of Sciences at Charles University in Prague and in 1968 participated in a six-month-long study visit at the University of Reading (England). During that time, he established a lifelong friendship with Gordon Rowley, who was working at the university, and with David Hunt from Royal Botanic Gardens, Kew. Between 1969 and 1970, Jan worked on his diploma thesis in Havana (Cuba), studying succulent halophytes (salt-tolerant plants from coastal areas), and at the same time, he had a great opportunity to study other tropical flora (including cacti, mostly of the genus *Melocactus*, but also *Leptocereus* etc.) in their habitat, often accompanied by the Cuban scientist Jorge Ramón Cuevas. It is worth mentioning that he actively participated in the rediscovery of *Neobesseya cubensis* (currently known as *Escobaria cubensis*). Interestingly, his first article in the Czechoslovak journal *Kaktusy* was about this taxon (*N. cubensis*) and was published in 1970.

Jan Řiha established an inseparable duo with another legend of the Czech (Czechoslovak) cactus society, Rudolf Šubík (1923–2011). Šubík was a trained horticulturalist and a noted traveller and photographer. Šubík did not write much. He published, as a co-author, his first book (*Kaktusy*) in 1960. But later, he only took and published photos. Jan and Rudolf formed an ideal pair: Jan was an excellent and knowledgeable writer, while Rudolf was a