

SANBI Team Member: Menzi M Nxumalo

Supervisors: tbc (at an Eastern Cape University), Mlungele Nsikani

Location: Eastern Cape

Level of project: Masters

Working title: Unravelling the eradication feasibility and management of two cactus species in South Africa

Background

The exponential growth of biological invasions globally over the past century has placed enormous pressure on biodiversity. Negative impacts of invasive alien species have been well documented, from biodiversity to social and economic (Pysek & Richardson, 2010). In South Africa, 560 alien taxa present in the country are regulated under the National Environmental Management: Biodiversity Act no. 10 of 2004 Alien and Invasive Species Regulations of 2020 (NEM:BA A&S Regulations). In particular cacti have a long history of invasions in South Africa, naturalising mostly in the karoo regions of South Africa with 35 species listed (Kaplan et al. 2017).

Both *Cylindropuntia pallida* and *Tephrocactus articulatus* are listed as Category 1a, i.e., nation-wide eradication is indicated. SANBI has been managing both taxa using herbicide control since 2011. Both species are suspected to have been introduced to South Africa as garden ornamentals and were previously used as protective hedges around many homesteads (Walters et al. 2011). The impacts associated with both these species include, negatively affecting agricultural productivity and biodiversity performance. They form dense stands that are difficult to penetrate, preventing movement of livestock and humans. In addition they replace pasture plants, thus reducing the grazing land value (Walters et al. 2011). Both cactus species reproduce vegetatively through easily detachable propagules that can root after being in contact with the soil. *Tephrocactus articulatus* is native to Argentina and has been introduced to many parts of the world where it naturalised and became invasive (Walters et al. 2011). In South Africa, it has now naturalised from garden escapees and has been found invasive in disturbed areas, rangelands, and roadsides in the arid interior of the country (Walters et al. 2011). *Cylindropuntia pallida* is native to Mexico and Northern Chile (Walters et al. 2011). It has also been introduced to many parts of the world where it became invasive (Novoa et al. 2015). The first record of this species on the Southern African Plant Invaders Atlas was from October 2008 along the N9 from Graaff-Reinet towards Middelburg. However, there are now confirmed populations of this species in other parts of the country (Walters et al. 2011).

This project aims to: 1) assess the distribution of these two cactus species in South Africa including the extent to which they are cultivated and the number of naturalised populations; 2) assess the invasive potential of these two cactus species in South Africa and conduct risk analyses; and 3) determine whether nationwide eradication might be feasible, both by looking at the ease with which individual populations can be controlled and by assessing the probability of being able to detect all populations.

This is a project suitable for students interested in invasion biology.

Key contacts

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Further Reading

- Kaplan H, Wilson JRU, Klein H, Henderson L, Zimmermann HG, Manyama P, Ivey P, Richardson DM, Novoa A (2017) A proposed national strategic framework for the management of Cactaceae in South Africa. *Bothalia: African Biodiversity and Conservation* 47: a2149. <http://dx.doi.org/10.4102/abc.v47i2.2149>
- Novoa A, Kaplan H, Kumschick S, Wilson JRU, Richardson DM (2015) Soft touch or heavy hand? Legislative approaches for preventing invasions: insights from Cactaceae in South Africa. *Invasive Plant Science and Management* 8: 307–316. <http://dx.doi.org/10.1614/IPSM-D-14-00073.1>
- Novoa A, Le Roux JJ, Robertson MP, Wilson JRU, Richardson DM (2015) Introduced and invasive cactus species—a global review. *AoB Plants* 7: plu078. <http://dx.doi.org/10.1093/aobpla/plu078>
- Walters M, Figueiredo E, Crouch NR, Winter PJD, Smith GF, Zimmermann HG, Mshope BK (2011) Naturalised and invasive succulents of southern Africa. *ABC Taxa* 11: 1–370. <http://www.abctaxa.be/volumes/naturalised-and-invasive-succulents-southern-africa-be-peer-reviewed>