Fynbos restoration: The sooner you fell pines, the better for fynbos

According to research in the South African Journal of Botany that was conducted by researchers from Stellenbosch University and the City of Cape Town, landowners who want to remove pine trees from their property with the hope of seeing fynbos grow again should do so before the trees are more than 30 years old. If you wait any longer, it's less likely that any fynbos seeds will be left in the soil to sprout successfully.

Stellenbosch University student Alistair Galloway on one of his field trips during the course of his research work. (Image Supplied)

Soil and plant samples were analysed by Stellenbosch University postgraduate student Alistair Galloway of the Department of Conservation Ecology and Entomology.

Galloway says he decided on the topic because not as much research has gone into the restoration of fynbos veld after the removal of pines as has been done about the clearing of acacia trees. His efforts led to him to publish his first peer-reviewed paper and receive his department's Daniel Booysen Memorial Award for the best fourth-year project conducted in 2016. Galloway recently also received a Rector's Award for Academic Excellence from Stellenbosch University.

His co-authors and supervisors are three respected researchers of matters relating to the impact of invasive species on the Cape Floral Kingdom's indigenous fynbos plants. They are Dr Pat Holmes of the City of Cape Town's Environmental Management Department (and an associate professor of the Department of Conservation Ecology and Entomology), Dr Mirijam Gaertner of the Nürtingen-Geislingen University of Applied Sciences in Germany, and Prof Karen Esler of Stellenbosch University's Department of Conservation Ecology and Entomology.

Galloway's project was funded through the Centre of Excellence for Invasion Biology based at Stellenbosch University, to which Gaertner, Holmes and Esler are also affiliated.

The study was conducted in the Helderberg Nature Reserve, which is managed by the City of Cape Town. It's a reserve that Galloway, who hails from Somerset West, has frequented since childhood. For his research project, Galloway compared sites where naturally occurring vulnerable Cape Winelands Shale fynbos grow with those on which Pinus radiata pines were planted in the 1960s. The study sites were all burnt in the autumn of 2015.

Trees in three of the plantation sections were felled between 1992 and 1994. Over the past 20 years, the natural plants that used to grow there have had an opportunity to regrow. Trees from another three sections were only felled in the winter of 2014 and were, therefore, under pine plantations for about 50 years.

The sooner, the better for fynbos

Galloway took soil samples to find out if there were still any viable fynbos seeds left in the soils of the former plantation sites. He also noted how the natural vegetation grew back after the trees were removed and the areas burnt. A high number of seeds from different types of native fynbos species were still to be found in the soils of areas from which 30-year-old pines were removed. The fynbos plants also regrew at a similar density to that of the undisturbed fynbos areas. However, the same could not be said of the areas on which 50-year-old trees had stood, as there was little left of the native seed bank stored in the soil.

According to Galloway, seeds that survive in the soil makes it possible for some of the plants that used to be found there to regrow on the 30-year-old plantation sites. Active restoration steps to reintroduce species from surrounding areas might be needed on the 50-year-old sites, to ensure the recovery of native plants that once grew there, and to prevent possible soil erosion on the cleared area.

"Because there's very little native seed left in the ground, restoration work on older sites will be much more time consuming and costly," he says.

"Pine plantation and invasion management in the Fynbos biome should, therefore, aim to fell pines before the trees are 40- to 50-year-old. This will help to maintain the native seed bank and the recovery potential of fynbos, and minimise the need for active restoration," adds Prof Esler. "Long-term follow-up control of several alien species will also need to be implemented so that the alien seed bank can be depleted, and the survival of restored native species can be maximised."