

# SEED BANK DYNAMICS OF THE STRANDVELD SUCCULENT KAROO

by

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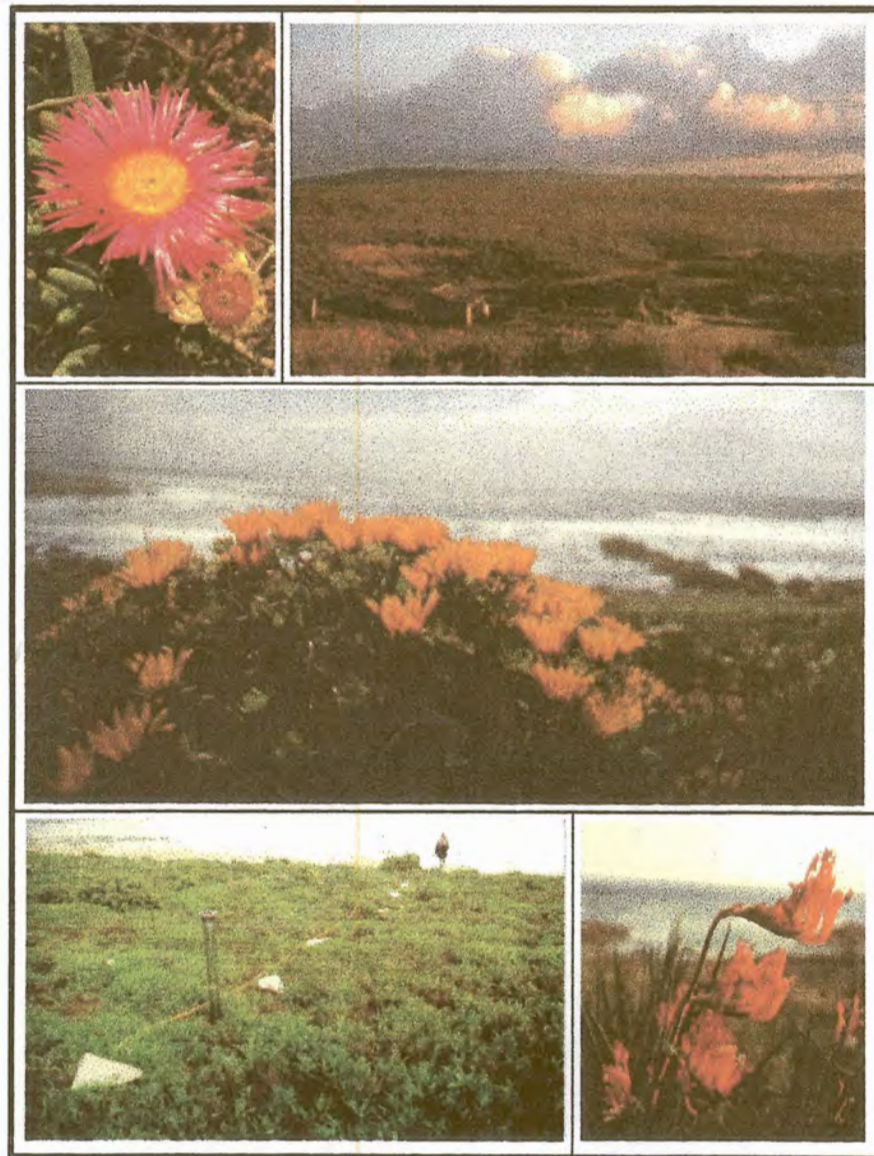
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**TO MY PARENTS, FAMILY AND FRIENDS**



“I took in February three table-spoonfuls of mud from three different points, beneath water, on the edge of a little pond; this mud when dry weighed only  $6\frac{3}{4}$  ounces; I kept it covered up in my study for six months, pulling up and counting each plant as it grew; the plants were of many kinds, and were altogether 537 in number; and yet the viscid mud was all contained in a breakfast cup” (Darwin, 1859).

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## ABSTRACT

### SEED BANK DYNAMICS OF THE STRANDVELD SUCCULENT KAROO

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The seed bank dynamics of the Strandveld Succulent Karoo was described in terms of spatial and temporal variation in seed bank size and composition. Factors affecting inputs and outputs, such as seed production, predation, dispersal, dormancy, germination, seed-borne fungi and environmental conditions, were investigated. This information was incorporated in the development of suitable post-mining revegetation strategies at a management level.

Phytosociological benchmark studies on the pre-mining standing vegetation and seed bank indicated that a realistic revegetation goal will be to return 30% of the total number of plant species recorded. The revegetation program should concentrate on perennial species, as these dominate the pre-mining standing vegetation. Perennial shrub species exhibited transient seed bank strategies, while perennial herb species exhibited both transient and persistent strategies. Seed banks of annual species were of a persistent nature and large in comparison with annual inputs and losses. Since annual species predominated the soil seed bank, topsoil replacement as well as sowing and transplanting of selected perennial species will be essential for the rehabilitation of the area.

Spatial variation in seed bank size and composition, at community level, was not as pronounced as temporal variation. The general dissimilarity between the seed bank and its associated vegetation was manifested in species composition, plant/seed densities and frequencies.

Taking seed bank dynamics into account, mining authorities should achieve great success in revegetating mined areas. Furthermore, knowledge obtained from this seed bank study will aid plant ecologists in gaining a better understanding of the processes contributing to reproductive strategies and plant population and community dynamics in the Strandveld Succulent Karoo.

## UITTREKSEL

# SAADBANKDINAMIKA VAN DIE STRANDVELD SUKKULENTE KAROO

deur

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Die saadbankdinamika van die Strandveld Sukkulente Karoo is beskryf in terme van ruimtelike en temporele variasie in saadbankgrootte en -samestelling. Faktore wat toevoegings en verliese beïnvloed, byvoorbeeld saadproduksie, predasie, saadverspreiding, dormansie, ontkieming, saadswamme en omgewingstoestande, is ondersoek. Hierdie inligting is op bestuursvlak geïnkorporeer in die ontwikkeling van geskikte plantegroeihervestiging strategieë vir gebruik in rehabilitasie van gemynde areas.

Fitososiologiese studies van die staande plantegroei en die saadbank het aangetoon dat 'n hervestigingsdoelwit van 30% van die totale aantal spesies aangeteken, realisties sal wees. Die hervestigingsprogram moet konsentreer op meerjarige spesies, aangesien dié spesies die oorspronklike staande plantegroei domineer. Meerjarige struikspesies het kortstondige, en meerjarige kruidspesies het beide kortstondige en blywende saadbankstrategieë getoon. Die saadbank van eenjarige spesies was blywend en groot in vergelyking met jaarlikse toevoegings en verliese. Aangesien eenjarige spesies die saadbank oorheers, sal die terugplaas van bogrond sowel as die saai en oorplant van geselekteerde meerjarige spesies, noodsaaklik wees vir die rehabilitasie van die gebied.

Op gemeenskapsvlak was ruimtelike variasie in die grootte en samestelling van die saadbank nie so opvallend soos variasie in tyd nie. Die algemene onooreenkomstigheid tussen die saadbank en geassosieerde staande plantegroei is bevestig deur spesiesamestelling, plant/saad digtheid en frekwensies.

Mynbou-instansies behoort groot sukses te behaal in die hervestiging van plantegroei op gemynde areas, indien hulle die saadbankdinamika in ag neem. Die kennis ingewin deur hierdie saadbankstudie sal plantekoloë help om die prosesse wat bydra tot voortplantingstrategieë asook plantpopulasie- en gemeenskapsdinamika van die Strandveld Sukkulente Karoo beter te verstaan.

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