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Hierarchical classification of the vegetation on the communal farmland of Soebatsfontein in the Succulent Karoo, South Africa

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Introduction

Climate change and landuse have a strong impact on the development of vegetation. To document the current state of the vegetation and to detect environmental shifts in the future, classification of vegetation forms a useful tool. This study aims to provide a first formal classification of the lowland vegetation of Namaqualand. We related the vegetation of the communal farmland of Soebatsfontein to habitat characteristics and grazing intensity of the recent past (1986–2000) and analyzed which factors determine diversity and composition of the vegetation.

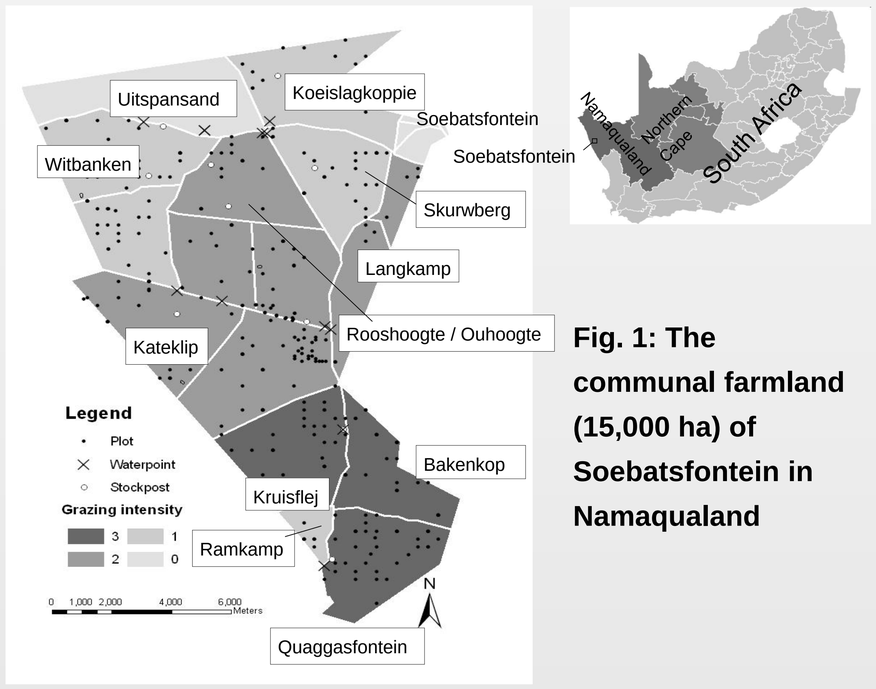
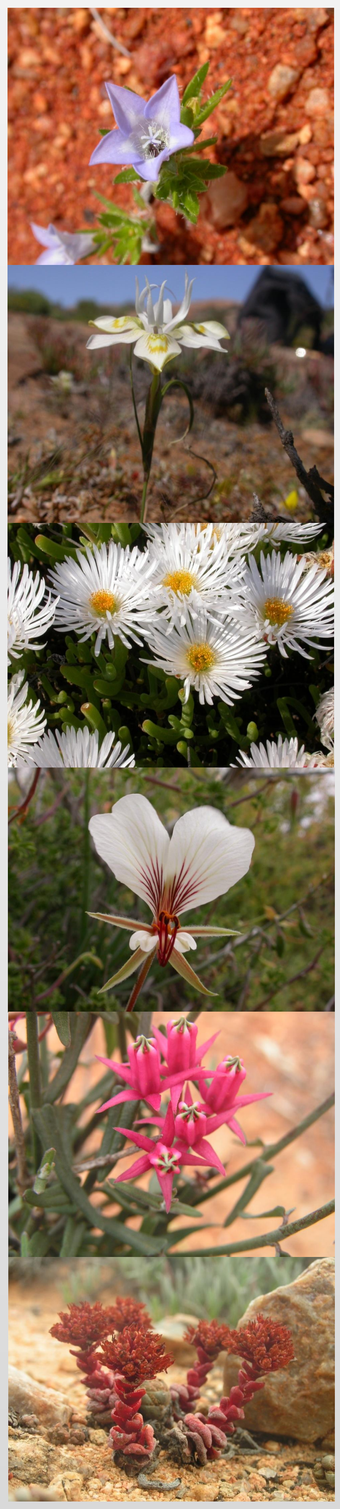


Fig. 1: The communal farmland (15,000 ha) of Soebatsfontein in Namaqualand



Methods

Study area: communal farmland of Soebatsfontein (Fig. 1)

Plot size: 100 m^2

Number of relevés: 355

Database programme: BIOTABase

Classification algorithm: modified Two-Way Indicator Species Analysis (TWINSPAN).

Diagnostic species: phi-coefficient of association

Environmental parameters: analyses of variance (ANOVAs).

Results & Conclusions

Water availability, salinity and soil pH were the main driving factors responsible for vegetation differentiation.

Class (1) represents the vegetation on less saline soils with higher water availability, e.g. rocky slopes and sandy plains.

Class (2) represents the vegetation of the saline soils on quartz fields and around heuweltjies (= fossil termitaria).

The findings reveal that the strong gradients of water availability, salinity and soil pH as well as high heterogeneity of habitats mask the historic grazing effects on the scale of the present units.

Syntaxonomic classification

Names of syntaxa are preliminary and might change in the final publication (Luther-Mosebach et al. in prep).

Class 1: *Karroochloetea schismoidae*				Class 2: *Cephalopylletea inaequalis*		
Order 1.1: *Stipagrostetalia ciliatae*			Order 1.2: *Rhusetalia undulatae*	Order 2.1: *Psilocauletalia dinteris*	Order 2.2: *Jacobsenietalia vaginatae*	Order 2.3: *Ruschietalia leucospermae*
Alliance 1.1.1 11 relevés One association Habitat: deep red sand, hardly saline, neutral soils	Alliance1.1.2 22 relevés One association Habitat: sandy dunes, hardly saline, neutral soils	Alliance 1.1.3 52 relevés Two associations Habitat: sandy but shallow soil, hardly saline, neutral soils	Alliance 1.2.1 75 relevés Three associations Habitat: rocky slopes and summits, slightly acidic soils	Alliance 2.1.1 94 relevés Four associations Habitat: heuweltjie centers and associated vegetation, highly saline, slightly alkaline soils	Alliance 2.2.1 8 relevés One association Habitat: quartz patches, extremly saline, slightly acidic soils	Alliance 2.3.1 95 relevés Five associations Habitat: heuweltjie matrix, highly saline, slightly acidic soils