VEGETATION ECOLOGY OF DRAKENSBERG FOOTHILL MOIST GRASSLAND ON HLOGOMA MOUNTAIN, UNDERBERG, KWAZULU-NATAL

by

Sharron Marion Berruti

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Supervisor: Prof. L.R. Brown

Co-supervisor: Dr. A.S. Barrett

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DECLARATION

Student number: 4198-9112

I, Sharron Marion Berruti, declare that “Vegetation ecology of Drakensberg Foothill Moist Grassland on Hlogoma Mountain, Underberg, KwaZulu-Natal” is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

S M Berruti

_____ 26 November 2017

SIGNATURE DATE
(Mrs S.M. Berruti)

“These hills are grass-covered and rolling, and they are lovely beyond any singing of it……

The grass is rich and matted, you cannot see the soil. It holds the rain and the mist, and they seep into the ground, feeding the streams in every kloof. It is well-tended, and not too many cattle feed upon it; not too many fires burn it, laying bare the soil. Stand unshod upon it, for the ground is holy, being even as it came from the Creator. Keep it, guard it, care for it, for it keeps men, guards men, cares for men. Destroy it and man is destroyed.”

(*Cry the Beloved Country*, Chapter one, Alan Paton 1948)

Rise above

You must rise above
the gloomy clouds
covering the mountaintop
otherwise, how will you
ever see the brightness

(Poem by Taigu Ryokan 1758−1831)

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ABSTRACT

Hlogoma Mountain is a small inselberg surrounded by farms and commercial forestry in the Underberg district (KwaZulu-Natal) within the Gs10 Drakensberg Foothill Moist Grassland. As little is known about the vegetation on Hlogoma, a survey was undertaken to classify, map and describe the plant communities occurring on the inselberg. A total of 100 (16 m^2) randomly stratified sample plots were placed in homogeneous vegetation units within the 117 ha study area. A TWINSPAN classification, refined by Braun-Blanquet procedures, resulted in the identification of two major communities, five communities, 12 sub-communities and four variants. All communities were described and a vegetation map constructed. Ordinations identified key environmental variables that have an impact on the vegetation at the study site. A plant species checklist was created and analysed for floristic composition; rarity and threatened species; medicinal plants; endemism; phenology; flower colour and elevation range; species richness and plant community biodiversity. A total of 467 species were identified, represented by 271 genera and 87 families. Four Red Data species and a new *Aspidoglossum* species were discovered. Two near-endemic genera, two endemic species and 88 near-endemic species belonging to the Drakensberg Alpine Centre were found on Hlogoma. This study showed that Hlogoma Mountain is an inselberg with high plant species richness and endemism, and is a refuge of conservation importance for biodiversity.

KEYWORDS:

Hlogoma Mountain, Underberg, Gs10 Drakensberg Foothill Moist Grassland, Braun-Blanquet, phytosociology, plant communities, floristic composition, phenology, biodiversity, Drakensberg Alpine Centre (DAC), TWINSPAN, JUICE

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CHAPTER ONE

INTRODUCTION

1.1 Grassland Biome of South Africa

1.1.1 Distribution and subdivisions

The global Temperate Grassland Biome comprises the Eurasian Steppes and American Prairies in the northern hemisphere and the South African Grassland Biome, the Argentinean and Uruguayan pampas, the Australian Alps and the tussock grasses of New Zealand in the southern hemisphere (Mucina and Rutherford, 2006).

The Grassland Biome (Figure 1.1), the second largest of the nine biomes in South Africa, occupies an area of approximately 355 000 km^2 or 27.9% of South Africa (Mucina and Rutherford, 2006). Although this biome is found in eight of the nine provinces of South Africa, it occurs mainly on the high central plateau (Highveld and Mpumalanga), the inland areas of the seaboard of KwaZulu-Natal, mountainous areas of KwaZulu-Natal and the central parts of the Eastern Cape (Mucina and Rutherford, 2006). Altitude ranges from 300 m above sea level (m.a.s.l.) on the coastal plateau to 2 850 m.a.s.l. in the Drakensberg (Rutherford and Westfall, 1994).

The Grassland Biome is divided into four bioregions based on altitudinal gradients and rainfall (Mucina and Rutherford, 2006). The four bioregions are: Drakensberg Grassland Bioregion, Dry Highveld Grassland Bioregion, Mesic Highveld Grassland Bioregion and Sub-Escarpment Grassland Bioregion. Dry Highveld Grassland Bioregion (with an annual rainfall less than 600 mm) forms the western belt of the Grassland Biome. Drakensberg Grassland Bioregion and the Mesic Highveld Grassland Bioregion (moist grasslands with annual rainfall exceeding 600 mm) form the central and eastern part of this biome, extending

northwards along the eastern escarpment. The Sub-Escarpment Grassland Bioregion, which is a mixture of moist and dry grassland types, lies below the main escarpment of the Drakensberg.

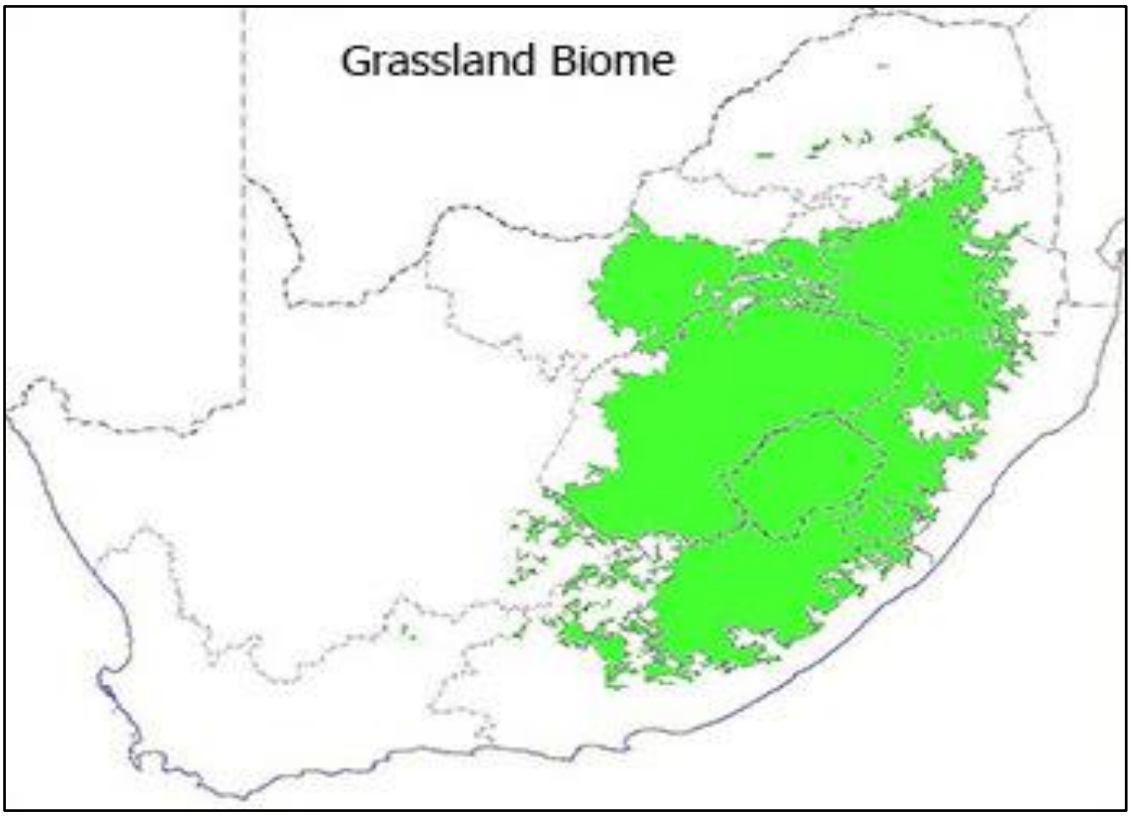

Figure 1.1: Map showing the Grassland biome of South Africa according to Mucina and Rutherford (2006)

Mucina and Rutherford (2006) further sub-divide the bioregions into vegetation units on a basis of floristic and environmental factors, such as Mean Annual Precipitation (MAP), Mean Number of Days with Frost (MFD), Mean Annual Temperatures (MAT), Mean Annual Potential Evaporation (MAPE), and Mean Annual Soil Moisture Stress (MASMS).

1.1.2 Grassland biodiversity

Grasslands have a simple, single-layered structure dominated by grasses predominantly of the Poaceae family (Mucina and Rutherford, 2006). The number of taxa in this biome is second only to that of the Fynbos Biome (SANBI, 2013). A species richness of over 4 000 plant species indicates a high alpha biodiversity (Mucina and Rutherford, 2006). While grasses contribute the bulk of the biomass, they make up just over 20% of the number of species in semi-arid and montane grassland and 13.5% in mesic grassland, while forbs (herbaceous dicotyledonous species, non-graminoid monocotyledons and geophytes) make up the balance of the total plant species richness (Morris, 2004; Uys *et al*., 2004).

Van Wyk and Smith (2001) identified five Centres of Plant Endemism within the Grassland Biome, namely, the Drakensberg Alpine, the Wolkberg, Sekhukhune, Barberton and Soutpansberg. The Drakensberg Alpine Centre (DAC) is rich in plant endemics and near-endemics with approximately 334 endemic (13%) and 595 (24%) near-endemic species of the total number of 2 520 angiosperm species recorded for the area (Carbutt and Edwards, 2004, 2006).

Grassland studies tend to focus on the management of grassland to maintain veld condition for optimum livestock production and not on the maintenance of floristic diversity (Tainton, 1999; O'Connor *et al.*, 2010). Various phytosociological studies have been conducted on grassland vegetation, though mainly restricted to conservation areas (e.g. Bredenkamp, 1975; Kay *et al.*, 1993; Bredenkamp and Brown, 2003; Swanepoel, 2006). According to O'Connor and Bredenkamp (1997) grasslands have a relatively uniform physiognomy, but there is considerable variation in terms of species diversity, composition, ecosystem functioning and dynamics. In spite of these different studies, Morris (2004) points out that very little is known about the possible functional roles of grassland forb species and the ecological consequences of the loss of individual forb species or overall forb richness and diversity. Scott-

Shaw and Morris (2014) state that there is mounting empirical evidence that maintaining plant species diversity not only aids conservation of forb species but also ensures sustained function of healthy ecosystems and the services they provide to direct and indirect users.

Plant species diversity studies are essential to assess species losses as a result of habitat transformation in grasslands (Siebert, 2011). In addition, plant species richness data can be used to help assess and monitor the impact of management and conservation efforts in grasslands (SANBI, 2013).

1.1.3 Grassland ecosystem services

In addition to the biodiversity value of grasslands, they are the source of many direct and indirect ecosystem services that support the people associated with them, who live in grasslands and outside the biome. Some 40% of South Africans live and work in grasslands (SANBI, 2013).

The Grassland Biome contains heavily urbanised, industrialised and populated areas, important mining resources, commercial forestry and is a critical area for agricultural food production (maize, soya, wheat, dairy, beef and wool) (Rutherford and Westfall, 1994). The forestry sector is the second largest land user after agriculture in the Grassland Biome (SANBI, 2013). These activities are important as they form the backbone of the South African economy (SANBI, 2013). In rural areas, many communities graze their cattle on communal land, hunt wild animals, collect medicinal plants and harvest various grasses for thatching, making traditional baskets, hats, beer strainers and many other items (Moffett, 1997). In addition, important recreation and tourism enterprises are found in grassland areas.

Indirect ecosystem service benefits which rely on natural grassland vegetation cover, include carbon sequestration that reduces the amount of atmospheric carbon contributing to climate change, reduction of immediate water run-off and

erosion, reduction of nutrient and sediment loss, and the promotion of soil accumulation processes (Egoh *et al*., 2011). The watersheds of South Africa's major rivers including the Vaal, Caledon and Orange, which drain into the Atlantic Ocean, and the Tugela, Kei, and Pongola, which drain into the Indian Ocean, are situated within the grassland region of the eastern escarpment (Rutherford and Westfall, 1994).

1.1.4 Grassland Biome threats

The Grassland Biome is one of the most threatened biomes in South Africa. Approximately 33.0% of the biome is permanently transformed, primarily by agriculture (27.0%), forestry (2.8%), urban development (1.6%), and mining and quarries (0.3%) (Carbutt *et al*., 2011). Only 2.0% of the Grassland Biome is formally conserved (Carbutt *et al*., 2011). An additional 7.0% has been degraded by erosion and other factors, including woody encroachment (Mucina and Rutherford, 2006). A further concern, according to Mucina and Rutherford (2006), is the fragmentation of untransformed grassland, which adds to the vulnerability, disturbance and exploitation of this biome.

An additional threat to grassland biodiversity is overharvesting of medicinal plants. According to van Wyk *et al.* (2009), there are an estimated 200 000 traditional healers in South Africa, with up to 60% of South Africans consulting these healers. Harvesting and storage of medicinal plants was previously carried out by trained traditional healers under strict customary conservation practices (Williams *et al.,* 2000); however, population growth, urbanisation and the increasing numbers of urban healers has led to an increase in the demand for medicinal plants (Zschocke *et al*., 2000). As a result, harvesting to meet this demand by untrained, commercial gatherers, who often have no other source of income, has led to unsustainable harvesting of many medicinal plant species (Williams *et al.,* 2000).

Poor grassland management can lead to infestation by invasive alien species, which affects grassland species composition by replacing indigenous species, change vegetation structure and reduce the ecological functioning of the grassland (SANBI, 2014). The extent of infestation ranges from growth of alien plants on localised disturbances to a complete modification of the grassland into a stand of woody invasive alien plants (SANBI, 2014). The margins and forest gaps of indigenous forest patches found across the grassland landscape may also be susceptible to invasive alien plant infestation, particularly if cattle and goats regularly access the forest and cause damage by grazing, browsing and trampling, creating gaps that allow alien plants to enter the system (SANBI, 2014).

The threats to grasslands will persist and expand in the face of population increases, with the resultant need for enhanced food security and necessary economic development leading to an increase in irreversible transformation. The degradation of grasslands threatens not only biodiversity, but also ecosystem services (Egoh *et al.,* 2011). According to SANBI (2013), efforts to protect the remaining natural grasslands have become critically important.

Climate change, including an increase in temperature of 2%, less precipitation and increased atmospheric carbon dioxide, could significantly reduce the extent of the Grassland Biome in the foreseeable future (Mucina and Rutherford, 2006).

1.2 Vegetation ecology and classification

Vegetation ecology is the study of the relationships between plants and their environment. Van der Maarel (2005) points out that these studies are complex scientific undertakings, which attempt to integrate and understand the variation of vegetation that may occur in an ecosystem within the paradigm of its complex interrelationships with abiotic and biotic factors.

A discipline of vegetation ecology, synecology, observes the form and structure of plant groups/communities that repeat themselves under similar environmental conditions (Van Wyk and Smith, 2001; Brown *et al*., 2013). Phytosociology is a sub-discipline of synecology and is concerned with the classification, description and mapping of vegetation (Van Wyk and Smith, 2001). According to Westhoff and Van der Maarel (1978), vegetation classification forms the framework of any plant ecological study.

The main aim of vegetation classification is to arrange and group sample relevés into a hierarchy of distinct plant communities based on floristic composition and structure. The resulting phytosociological table is the core of a phytosociological study, providing the basis for the description and interpretation of the environment and its different plant communities (Brown *et.al*., 2013).

Brown *et al*. (2013) set-out clear recommendations and guidelines for South African phytosociological studies according to the Zurich-Montpellier (Braun-Blanquet) school of phytosociology. These guidelines include principles, field survey methods, data analysis and rules for the classification and description of plant communities. Recommendations by Brown *et al*. (2013) align phytosociological studies of southern African vegetation ecologists and researchers with international trends. Mucina *et al*. (2000), also state that agreement on common data standards for recording phytosociological relevés for phytosociological classification enhances the credibility and application of vegetation science. This approach provides reliable data for environmental and conservation planning, management and monitoring.

Brown *et al.* (2013) recommend that phytosociological studies be accompanied by vegetation maps. These maps provide a spatial representation of the plant communities they represent as an aid to management decision making, providing information about habitats available for animals, and are invaluable tools to monitor changes in cover, structure and composition over time.

According to Mucina and Rutherford (2006), a plant species list is an important element of the description of a plant community. A total species list provides floristic information for the study area. This information may be used to document and analyse the floristic composition of the area, analyse species richness, determine biodiversity, rarity, endemism, the presence or absence of medicinal plants, and phytogeographic links.

Phytosociological studies are also important tools to document and monitor the effects of increasing anthropogenic pressures, including climate change, on the Grassland Biome.

1.3 Inselbergs/Outliers as biodiversity refuges

Approximately 182 million years ago the earth's crust ruptured along extensive fissures during the break-up of the supercontinent Gondwanaland (McCarthy and Rubidge, 2005). Vast basalt lava-flows poured out of these ruptures for approximately two-million years covering virtually the whole of modern-day South Africa (McCarthy and Rubidge, 2005). The Drakensberg escarpment is estimated to have retreated an average distance of approximately 161 km from the coast in 123 million years (Killick, 1990).

The extensive retreat of the basalt via erosion has left outlier-mountains/inselbergs, capped in basalt or dolerite, rising above lower-lying terrain. These inselbergs endure because the dolerite sills and dykes, and basalt cap remnants are resistant to erosion and protect the underlying sedimentary rocks from the elements (McCarthy and Rubidge, 2005).

The term 'inselberg' is defined as an isolated rock outcrop that stands alone and rises abruptly from the surrounding landscape. It may be an isolated hill, a small mountain or a large monolithic massif (Sarthou and Villiers, 1998). Inselbergs form striking and characteristic landforms in southern Africa (McCarthy and Rubidge, 2005). Hilliard and Burtt (1987) refer to "isolated mountains standing

off the southern Berg" as outliers of the southern Drakensberg, namely Mahwaqa Mountain and Ngeli Mountain. Inselbergs have high species richness explained to a large degree by high terrain heterogeneity (Brand *et al.,* 2008, 2010).

The floristic study of the basalt-capped inselberg/outlier Mahwaqa Mountain, Bulwer KwaZulu-Natal (Meter *et al*., 2002) showed that the inselberg supports a highly diverse flora and the researchers suggested that it is a floristic refuge which should be considered for long-term conservation in an area of transformation. The floristic study by Grieve and Downs (2015) in the 3029DA WEZA District, KwaZulu-Natal, which includes the Ngeli Mountain range with its associated forest and grassland, recorded significant floristic biodiversity, high numbers of endangered, endemic and near-endemic plant species, and the presence of important fauna. Their results led Grieve and Downs (2015) to recommend that the area is appropriately protected. The floristic analysis of Brand *et al.* (2010) on the Platberg inselberg in the eastern Free State showed it to be a site of significant biological diversity with high species richness and endemism. The area was also recommended as an important conservation site, which should be protected.

The study area, Hlogoma Mountain, is a small inselberg capped by a dolerite sill. Based on the floristic studies on inselbergs (Meter *et al.,* 2002; Brand *et al*., 2010; Grieve and Downs, 2015), there is a good possibility that Hlogoma Mountain is an area of high species richness and diversity and may be a refuge for all biodiversity present. This ecology study of the study area will investigate this possibility.

1.4 Inselbergs/Outliers and links to the Drakensberg Alpine Centre (DAC) of endemism and Cape Floristic Region (CFR)

Hilliard and Burtt (1987) suggested that isolated outlier mountains standing off the southern Drakensberg should be examined to understand floristic distribution patterns of the southern Drakensberg flora.

The DAC has been designated a distinct floristic centre of endemism by Van Wyk and Smith (2001). The lower altitudinal limit of 1 800 m.a.s.l. was used to delimit the boundary of the DAC by Hilliard and Burtt (1987) and Van Wyk and Smith (2001). Thus the DAC comprises the mountainous areas above 1 800 m.a.s.l. in Lesotho, the Eastern Cape Drakensberg and Witteberge, and the KwaZulu-Natal Drakensberg of the eastern Free State (Van Wyk and Smith, 2001; Carbutt and Edwards, 2004).

Carbutt and Edwards (2004, 2006) included the following mountains in KwaZulu-Natal, namely, the Ngeli mountain range (dominant peak 2 268 m.a.s.l.), Little Bamboo Mountain (2 421 m.a.s.l.), Kamberg (2 095 m.a.s.l.) and Mahwaqa Mountain (2 075 m.a.s.l.) into the DAC, based on their peaks being higher that the 1 800 m.a.s.l. delimiting boundary, and the strong floristic ties between these outliers and the southern Drakensberg. Mucina and Rutherford (2006) note that there are a number of species linking the core of the DAC with high-altitude mountains lying to the south and south-east of the escarpment. They term these mountains as ‘islands’ whose vegetation should perhaps be re-considered and included in one of the Drakensberg Grassland (Gd) units within the Grassland Biome in the future.

Carbutt and Edwards (2004, 2006), compiled an extensive inventory of DAC endemics and near-endemics using the 1 800 m.a.s.l. contour limit as the delimiting boundary, although they state that in certain areas this cut-off altitude was difficult to maintain because the alpine regions spread to slightly lower

elevations (≥ 1 700 m.a.s.l.). Sources for these studies include the records of the extensive botanical survey of the southern Drakensberg conducted by Hilliard and Burtt (1987). However, Carbutt and Edwards (2006) excluded some of the records which had been sourced from as low as 1 500 m.a.s.l. from their study. Carbutt and Edwards (2004, 2006) found that the DAC supports over 2 800 specific and intraspecific indigenous taxa with the total number of angiosperm species at 2 520. Hilliard and Burtt (1987) suggest that the presence/absence of DAC endemic and near-endemics aids in understanding the biogeographical affinities of a given study area to the DAC.

Carbutt and Edwards (2001), regard a 'Cape element' as 'any plant taxon (usually at the generic level) whose species are most heavily concentrated in the Cape Floristic Kingdom relative to its distribution elsewhere'. Hilliard and Burtt (1987) suggest that the presence/absence of 'Cape elements' aid in understanding the biogeographical affinities and distributions of the study area to the CFR.

1.5 Research hypothesis

The vegetation of Hlogoma Mountain shows distinct plant communities and a rich floristic diversity related to environmental variability in a relatively small, untransformed inselberg.

1.6 Rationale

The Underberg district in KwaZulu-Natal is located within the Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit of the Sub-Escarpment bioregion in the Grassland Biome. It is a heavily impacted area with commercial forestry and intensive beef and dairy production as the major agricultural industries. Hlogoma Mountain, situated along the south-eastern border of the rural town of Underberg, is a relatively natural and untransformed site offering a range of habitats across an altitude gradient of 1 600−1 905 m.a.s.l. The study

site is an inselberg arising above the transformed lower lying areas. It is grazed by beef cattle, mostly in the late summer months and occasionally on a rotational basis, and is subject to annual burns.

Accurate baseline data is required to develop effective conservation initiatives, to protect and sustainably maintain grassland biodiversity and to investigate the impact of threats and changes to the environment.

As little is known about the vegetation of the study area and its surrounds, this investigation looks at the vegetation ecology of Hlogoma Mountain, providing new baseline knowledge for the Underberg and adjacent areas in terms of the ecosystems present. The relatively small survey area of 117 ha allowed for a detailed phytosociological study.

1.7 Aims

1. To identify, classify and describe the vegetation of Hlogoma Mountain using the Zurich-Montpellier phytosociological approach.
2. To compile a vegetation map of the study area.
3. To identify and interpret the influence of the most important environmental variables which might influence the distribution of plant communities in the study area.
4. To undertake a floristic analysis of the vegetation found in the study area, including the compilation of a species checklist, identification of threatened and rare species, recording the presence and traditional use of medicinal plants, compilation of phenology data, and relate flower colour to elevation range.
5. To assess floristic links of the Hlogoma Mountain inselberg to the Drakensberg inselbergs (Mahwaqa, Ngeli Mountains and Platberg), the southern Drakensberg and the Drakensberg Alpine Centre.
6. To assess floristic links of Hlogoma Mountain to the Cape Floristic Region.

7. To undertake a biodiversity analysis of Hlogoma vegetation.
8. To assess Hlogoma Mountain as a conservation refuge in an area of transformation.
9. To make recommendations for grassland management to maintain species richness and diversity on Hlogoma Mountain.

1.8 Contents of thesis

This thesis contains detailed information on the phytosociology of Hlogoma Mountain followed by an indication of the relationship between the distribution of identified plant communities and environmental variables. A detailed floristics analysis of the plant species identified follows which provides information about the different plant taxa in the study area. A biodiversity analysis of plant species in the study area and within and between identified plant communities is presented next. Thereafter affinities the study area may have with certain Drakensberg inselbergs, the southern KwaZulu-Natal Drakensberg, the Drakensberg Alpine Centre (DAC) and the Cape Floristic Region (CFR) are examined. In the last chapter conclusions and management recommendation for the study area are presented.

A complete phytosociological table with all species, including those not grouped into species groups, is attached as Annexure I at the end of the thesis. A complete species list of all species identified during the study is provided in Annexure II at the end of the thesis. A list of the medicinal plants gleaned from the checklist that are used in traditional medicine, together with botanical, English, Afrikaans, Zulu, Swazi, Sotho, South Sotho and Xhosa names and traditional medical uses, is provided in Annexure III. Endemic and near-endemic DAC species are included in Annexure IV. Phenology details, flower colour and elevation of 263 species from the plant checklist are presented in Annexure V. A comprehensive reference list of references cited in all chapters is also included.

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CHAPTER TWO

STUDY AREA

2.1 Location

The Hlogoma Mountain study site (29°47'55.18S, 29°30'58.96E) is situated along the south-eastern border of Underberg, a rural town located in the southern Drakensberg in the province of KwaZulu-Natal (Figure 2.1). Underberg is 132 km south-west of Pietermaritzburg and approximately 25 km from the uKhahlamba Drakensberg World Heritage site.

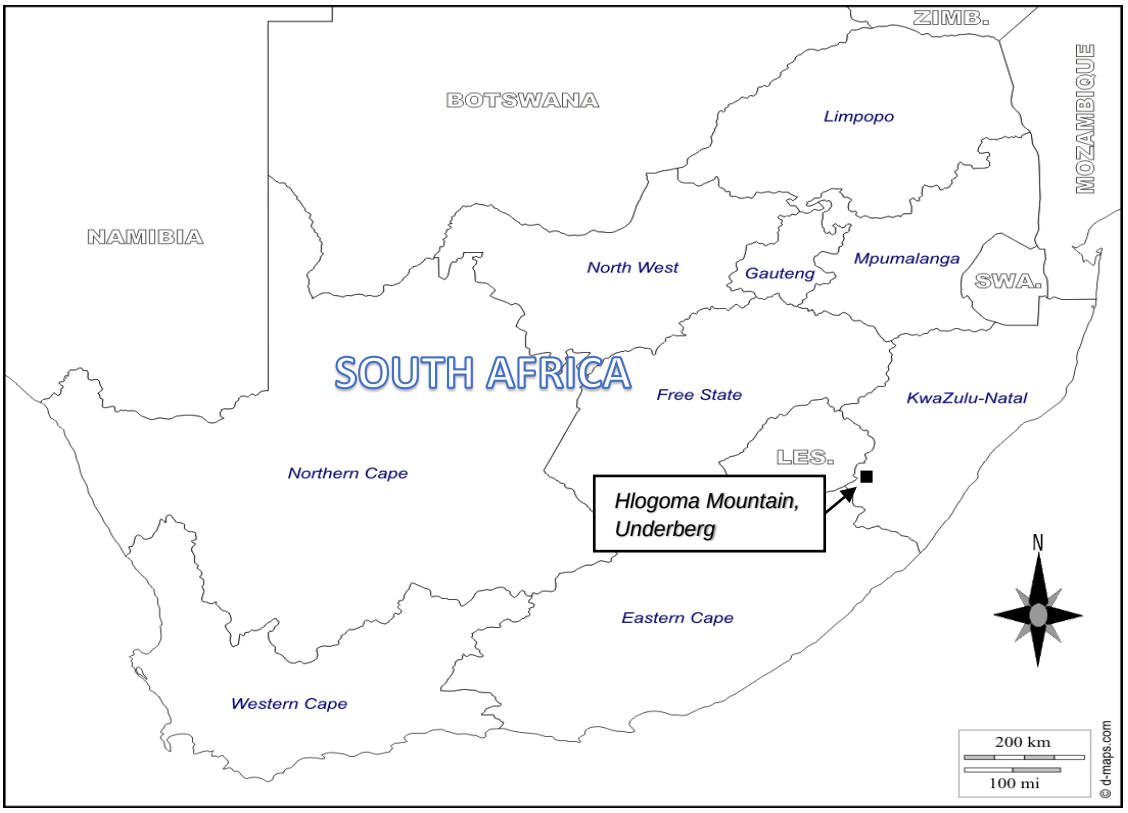

Figure 2.1: Location of the study site in the KwaZulu-Natal Province of South Africa

2.2 Vegetation

Hlogoma Mountain is located in the Grassland Biome and falls within the Sub-Escarpment Grassland Bioregion (Mucina and Rutherford, 2006). This bioregion is sub-divided into a number of grassland (Gs) vegetation units, with Underberg in the Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit (Figure 2.2) (Mucina and Rutherford, 2006). A previous classification by Acocks (1988) sets the study area in Veld Type 44a Highland Sourveld.

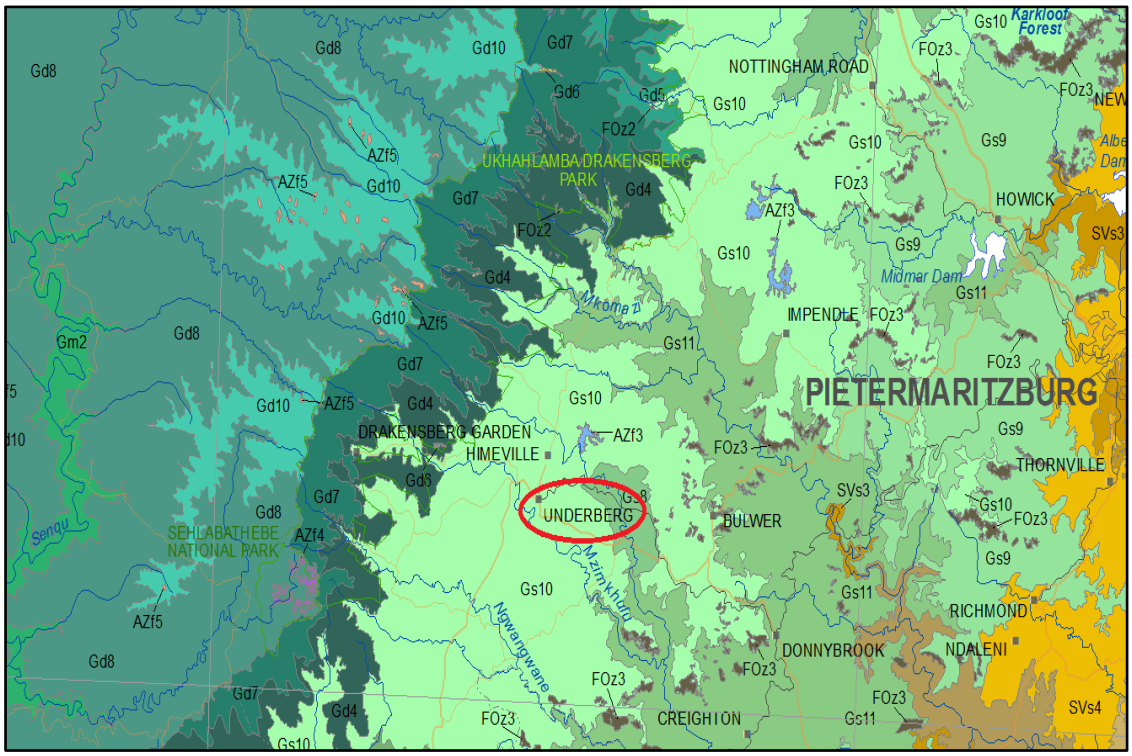

Figure 2.2: Location of Underberg within the Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit (Mucina and Rutherford, 2006)

The Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit occurs on moderately rolling and mountainous terrain covered by forb-rich grassland dominated by bunch grasses such as *Themeda triandra* and *Tristachya leucothrix*, with scattered forest patches in incised areas (Mucina and Rutherford, 2006). Altitudes range between 880−1 860 m.a.s.l. (Mucina and Rutherford, 2006). Important grass species include *Themeda triandra*,

Tristachya leucothrix, *Diheteropogon filifolius*, *Eragrostis racemosa*, *Heteropogon contortus*, *Microchloa caffra*, *Monocymbium ceresiiforme*, *Panicum natalense*, *Rendlia altera*, *Trachypogon spicatus*, *Alloteropsis semialata* subsp. *eckloniana*, *Aristida junciformis* subsp. *galpinii*, *Brachiaria serrata*, and *Hyparrhenia hirta* (Mucina and Rutherford, 2006). Important forbs found in this vegetation unit include *Helichrysum simillimum*, *Senecio retrorsus*, *Acalypha depressinerva*, *Ajuga ophrydis*, *Berkheya rhapontica* subsp. *aristosa*, *Dicoma anomala*, *Euryops laxus*, *Haplocarpha scaposa*, *Helichrysum chionosphaerum*, *H. cooperi*, *H. herbaceum*, *H. nudifolium* var *pilosellum*, *H. subglomeratum, H. umbraculigerum*, *Kohautia amatymbica*, *Pentanisia prunelloides*, *Schistostephium crataegifolium*, *Sebaea sedoides*, *Senecio asperulus*, *Hilliardiella hirsuta* and *Wahlenbergia undulata* (Mucina and Rutherford, 2006). Important geophytic herbs include *Oxalis depressa*, *Cheilanthes hirta*, *Habenaria dregeana*, *Haemanthus humilis* subsp. *hirsutus*, *Hypoxis rigidula* subsp. *pilosissima*, *Ledebouria sandersonii*, *Rhodohypoxis baurii* var. *platypetala*, *Watsonia pillansii* and *Zantedeschia albomaculata* subsp. *albomaculata* (Mucina and Rutherford, 2006*).* Other important species include the climber *Rhynchosia totta* and the low shrubs *Chrysocoma ciliata*, *Felicia filifolia* subsp. *filifolia*, *Lasiosiphon kraussianus*, *Helichrysum sutherlandii* and *Searsia discolor* (Mucina and Rutherford, 2006).

2.3 Topography

The study area, which covers approximately 117 ha, consists mainly of grassland with gently sloping plateaus, moderately steep slopes and steep slopes of up to 28° (Figure 2.3). A series of prominent medium-grained sandstone Elliot Formation rocky ridges, some as deep as 15 m, run more-or-less horizontally across the mountain at various elevations (Figure 2.3.). A dolerite sill of very large to massive jointed boulders and rocky outcrops forms the summit of the mountain (Figure 2.3). A number of streams, which emerge below the summit, form gullies, underground streams and seeps.

Figure 2.3: Hlogoma Mountain showing horizontal rocky ridges and dolerite summit

Elevation ranges from 1 600 m.a.s.l. at the base to 1 905 m.a.s.l. at the summit (Figure 2.4). Cultivated land, forestry plantations and dams surround Hlogoma Mountain, with Underberg town forming its south-west facing border (Figure 2.4).

Erosion is evident in portions of the study site varying from Class one with slight to no erosion, to Class four erosion (Fey, 2010) where there has been a total loss of topsoil. On the steep, grassy slopes near the summit, terracette erosion is visible as horizontal crescentic scars. According to Killick (1963), the process of alternate freezing and thawing of frost crystals throughout winter in slightly eroded areas causes soil to erode away at a continually increasing rate, until a crescentic terracette forms. Most terracettes in the study area are shallow, but occasionally as deep as 0.5 m. The vertical faces of the terracettes are predominantly bare but occasionally have moss growing on them. Van Oudtshoorn (1992) suggests that terracette erosion may be aggravated through trampling by cattle and sheep.

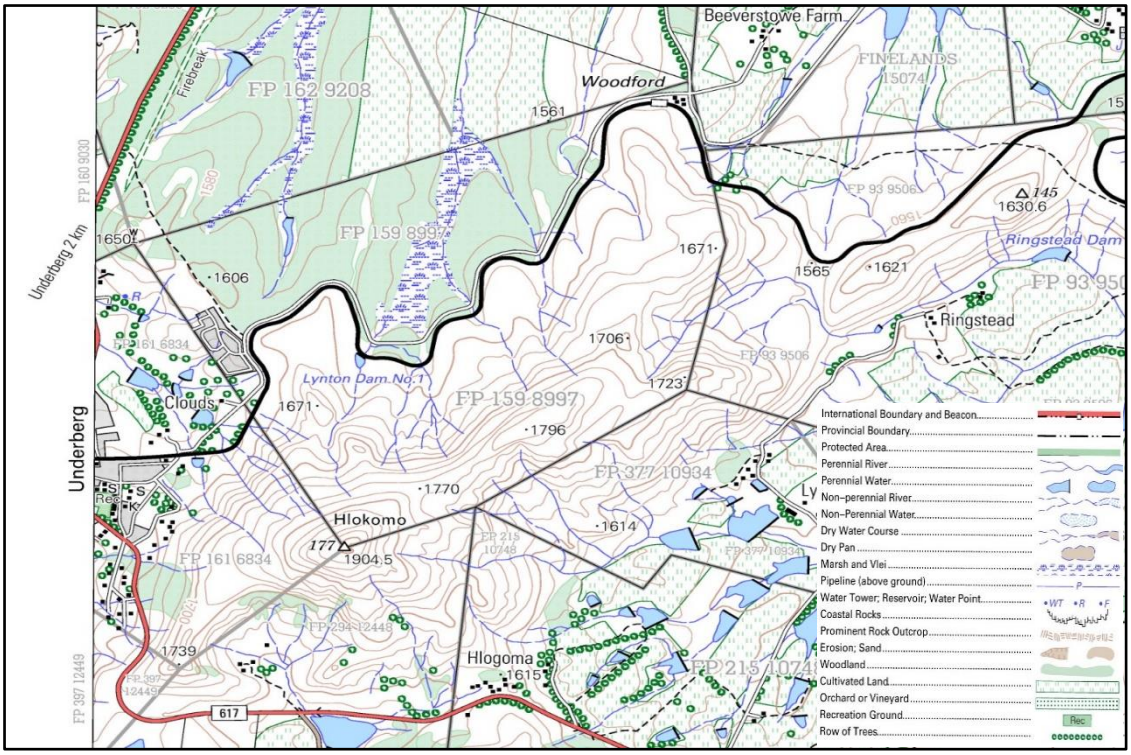

Figure 2.4: Topography of Hlogoma Mountain. Hlogoma is spelled as "Hlokomo" in this map. Contour intervals are 20 m. (2929DC PEVENSEY1:50 000 map, Chief Directorate Surveys and Mapping, Pretoria)

2.4 Geology

The geological layers of the Drakensberg lie in a horizontal sequence of sedimentary rocks which are included in the Karoo Supergroup, namely the Stormberg and Beaufort Series (McCarthy and Rubidge, 2005). These layers reflect an almost unbroken record of sediment deposition extending from the end of the Carboniferous (late Palaeozoic 300 million years ago) to the middle Jurassic period (Mesozoic 180 million years ago) culminating in a layer of basaltic lavas (Killick, 1990; Uken, 2002). The sequence of these geological strata in ascending order of formation is: Upper Beaufort Beds of the Beaufort Series, the Molteno Formation, the Elliot Formation (Red Beds), the Clarens Sandstone, and the Basaltic Lavas. The last four strata make up the Stormberg Series.

During the Jurassic basaltic lava eruptions, approximately 180 million years ago, some of the magma did not reach the surface but was injected under pressure into the layers of sedimentary rock of the Karoo Supergroup, crystalizing into dolerite sills and dykes (McCarthy and Rubidge, 2005). Erosion over millions of years exposed these dolerite sills and dykes, often evidenced in inselbergs, which may be mountains, cliffs or rocky ridges and outcrops rising above the surrounding terrain (Sarthou and Villiers, 1998). Hlogoma Mountain is a small inselberg capped by a dolerite sill, rising above the heavily transformed lower-lying area (Figure 2.4).

According to Mucina and Rutherford (2006), the dominant geology of the Gs10 Drakensberg Foothill Moist Grassland vegetation unit is mudstones and sandstones of the Tarkastad Subgroup, comprising the upper layers of the Beaufort Group, and the Molteno Formation of the Stormberg Group, and intrusive dolerites.

Sedimentary deposits of the Elliot Formation of the Stormberg Group and the dolerite sill form the geology of Hlogoma Mountain. The Elliot Formation comprises of medium-grained sandstone ledges up to 15 m thick and present as rocky ridges, separated by fine-grained mudstones consisting of a mixture of very fine sand and clay. These fine-grained layers are red to purple in colour because of the presence of iron oxide, hence the name “red beds” (McCarthy and Rubidge, 2005).

2.5 Soils

According to Fey (2010), the diagnostic soil horizons in the study area comprise the thin Humic A topsoil horizon and the Lithocutanic B subsoil Horizon. The topsoil is rich in humus, well drained, has a low base status and a thickness of less than 450 mm. Humic topsoils are usually restricted to regions of high rainfall and cool temperatures, and are associated with a high degree of weathering on gentle to moderate slopes (Fey, 2010). The Lithocutanic B

subsoil horizon consists of homogenised soil material interspersed with weathering bedrock in various stages of weathering (Fey, 2010). The weathering bedrock in the study site is the medium-grained sandstone of the Elliot Formation. The classified binomial soil form for the Humic A and Lithocutanic B Horizons, according to the Soil Classification Working Group (1991), is Nomanci (No) 1200. Soil depths vary from very shallow soils on the rocky ridges to deeper soils in grassland and forest patches.

2.6 Land use

The Drakensberg appears to have been largely uninhabited from at least 25 000 to 8 000 years ago, possibly because the near glacial conditions of that period would have created a severe climate which would have discouraged hunter-gatherers from living in the area (Wright and Mazel, 2007). Late Stone Age artefacts and animal bones appear in the Drakensberg dated after 8 000 years ago and these hunter-gatherers were probably ancestral to the Bushman of the area (Wright and Mazel, 2007). Occupation of the central and northern Drakensberg is evident between 3 000 and 1 600 years ago, indicated by increased evidence in the number of rock shelters occupied, increasing quantities of food and cultural remains found during excavations, and the dating of rock paintings (Wright and Mazel, 2007).

According to Wright and Mazel (2007), archaeological evidence confirms that after 1 000 CE, farming communities speaking Nguni languages began settling in the higher-lying grassland towards the central and northern Drakensberg mountains. These communities were ancestral to the communities of black farmers who lived in the southern, central and northern Drakensberg, known as the amaZizi, the Bhele and the Tolo (Wright and Mazel, 2007). Temporary cattle posts may have been established by these communities during the spring and summer in the plateaux of the Underberg-Himeville district (Wright and Mazel, 2007).

From 1886 the Underberg-Himeville area was colonised by a small number of white farmers (De F. Nagy, 2007). Difficult circumstances followed, including rinderpest, which wiped out a great many cattle in 1895 followed by a locust plague, which devastated crops in 1896 (De F. Nagy, 2007). Great blizzards in 1902 and 1905 isolated the district taking a further heavy toll on resources (De F. Nagy, 2007). Despite these hardships, by 1910 the land in the Underberg-Himeville district became populated as a farming district and expanded towards the greater Drakensberg (De F. Nagy, 2007).

Towards the early 1870s, conflicts between black and white farmers and the Bushman decreased in the Drakensberg as raids on livestock by the Bushman were being met with heavy retaliation (Wright and Mazel, 2007). Vinnicombe (2009), notes incidental encounters with small groups of Bushman in the Underberg area by local farmers and missionaries, the last being of an old sick Bushman who was called 'The Recluse', seen occasionally on the McClean farm 'Longlands', located in the Mkhomazi River Valley, up until the early 1900's.

In 1892 a portion of land that makes up most of Hlogoma Mountain was purchased by Benjamin Bateman who called the property 'Woodford' (De F. Nagy, 2007). The lowest-lying areas of this property became the site for the first district hostelry, trading store and stables, and the settlement at the base of Hlogoma Mountain was named 'Underberg' (De F. Nagy, 2007). In 1959 a major portion of 'Woodford' was sold to the Thurston family, who still run beef cattle on this land. The north and north-west portion of Hlogoma Mountain called 'Clouds' is owned by a philanthropist from the USA. Both the Thurston family and the philanthropist willingly gave permission for the study to be conducted on their land.

Due to steep slopes, Hlogoma Mountain has not been ploughed for pastures or agricultural crops. The smaller north to northwest facing area is grazed annually by 100 head of cattle for two to three months, usually from March to May. The

remainder of the mountain is grazed in a rotational pattern throughout the year by approximately 200 head of cattle. The land use of the study area has been grazing for beef cattle for the last 55 years.

There is a regular grassland burning regime on Hlogoma. The KwaSani Municipality burns firebreaks at the base of the mountain in May and June each year. Farmers in conjunction with the KwaSani Municipality burn the balance of Hlogoma Mountain in winter (usually in August) two out of every three years. Occasionally runaway fires occur.

An important feature on Hlogoma Mountain is the presence of a rock art shelter situated in one of the Elliot Formation hard sandstone ledges at 1 680 m.a.s.l. This small shelter is approximately 3 m long, 1 m deep and between 1.8 m and 2 m high. This site is called ‘Hlogoma Overhang’ or ‘RockShelter’ and has been documented by Amafa aKwaZulu-Natali (Zulu for 'Heritage KwaZulu-Natal') (Rossouw, 2014). It is rated as significant “for both the Bushman, Late Iron Age Farmers and perhaps even precolonial herders for socio-cultural and spiritual reasons” (Rossouw, 2014).

Underberg is the gateway to the iconic Sani Pass and the uKhahlamba World Heritage Site. Tourism companies offer trips up the Sani Pass, hiking trails, fly fishing and adventure tourism. The Underberg District is heavily transformed, with commercial farming being the most important economic contribution in the district and includes beef and dairy farming, seed potatoes, sheep and timber.

2.7 Climate

According to Schulze (1997), climate shapes the distribution and composition of plant communities on both micro and sub-continental scales. The most important climatic factors in vegetation development are light, moisture and temperature (Schulze, 1997). According to Schulze (1997), climatic factors cannot be viewed independently as climatic parameters operate together to

produce relatively homogeneous environments in which certain homogeneous plant communities can develop.

The Gs10 Vegetation Unit falls into the summer rainfall region with a Mean Annual Precipitation (MAP) of 887 mm, a Mean Annual Temperature (MAT) of 14.6 °C and 26 frost days per year (Mucina and Rutherford, 2006).

2.7.1 Precipitation

Precipitation, mainly in the form of rainfall, fog and snow, provides the soil water on Hlogoma Mountain. Winters in Underberg are cold and dry with frequent frost and occasional snow. In southern Africa, rainfall and fog are considered important forms of precipitation (Schulze and McGee, 1978). Generally, an increase in altitude corresponds with an increase in rainfall, but the orographic influence of mountains must also be considered. (Hoare, 2009)

2.7.1.1 Rainfall

Monthly rainfall was measured from January−December 2015 at the following four elevations from the base of Hlogoma Mountain to the summit: at 1 600, 1 753, 1823 and 1 905 m.a.s.l. respectively (Table 2.1). The 2015 total annual rainfall for the study area measured at the summit (828 mm) exceeds that measured at the base (774 mm) by 54 mm (Table 2.1). This may be a result of increasing rainfall with increasing altitude i.e. an increase of 305 m but could also be a result of the orographic rainfall on Hlogoma Mountain.

Rainfall figures from the Underberg area for January to December 2010−2015 are indicated in Table 2.2.

Table 2.1: January–December 2015 rainfall for four rain gauges at varying elevations

Month	Elevation m.a.s.l.			
	1 600 (base)	1 753	1 823	1 905 (summit)
	Rainfall (mm)	Rainfall (mm)	Rainfall (mm)	Rainfall (mm)
January	212	214	212	214
February	129	141	151	160
March	105	104	104	107
April	18	19	20	24
May	2	6	8	8
June	9	7	8	8
July	29	31	30	30
August	8	10	10	8
September	34	36	34	34
October	35	44	44	50
November	68	65	68	70
December	125	118	111	115
Total	**774**	**795**	**800**	**828**

Table 2.2: January to December 2010–2015 rainfall in Underberg (A. Small, fax pers. comm., 24 October 2016)

Year	2010	2011	2012	2013	2014	2015
Month	Rainfall (mm)	Rainfall (mm)	Rainfall (mm)	Rainfall (mm)	Rainfall (mm)	Rainfall (mm)
January	140	180	108	199	183	236
February	63	154	142	68	132	110
March	86	199	82	140	146	166
April	57	152	18	83	29	30
May	4	49	6	10	1	10
June	6	44	11	0	0	8
July	0	2	3	0	0	38
August	3	26	42	63	18	10
September	3	15	88	2	7	24
October	82	31	70	53	60	31
November	131	53	134	91	106	47
December	170	129	159	194	203	84
Total	**745**	**1034**	**863**	**903**	**885**	**794**

The rainfall totals in the study area in 2015 (Table 2.1) are lower than the MAP of 887 mm as per Mucina and Rutherford (2006) for the Gs10 Vegetation Unit, but fall within the range of totals measured from 2010−2015 in the Underberg area (Table 2.2.). The lower values in the study area may reflect the drought experienced in KwaZulu-Natal in 2015.

2.7.1.2 Fog

Fog in the Drakensberg is of two kinds, namely summer fog which is common, and winter fog which occurs in incised valleys and depressions at night as a result of cold air drainage (Killick, 1963). Orographic events on mountains result in regular mists which can be substantial (Schulze and McGee, 1978). According to Schulze and McGee (1978), the summer orographic fog contribution to precipitation at 1 800 m.a.s.l. is an additional 403 mm per annum in the higher lying areas of the foothills of the KwaZulu-Natal Drakensberg. This data stresses the importance of fog as an important ecological factor in southern Africa indicating that considerable amounts of moisture, not being recorded conventionally, may be intercepted and utilised by vegetation (Schulze, 1997).

For this study, fog events were recorded from January−December 2015 (Table 2.3).

Table 2.3: Fog events from January−December 2015

Month	No. days showing fog events
January	10
February	10
March	11
April	13
May	4
June	5
July	12
August	10
September	15
October	10
November	10
December	9
Total	**119**

The predominant form of fog is orographic fog on the upper third of Hlogoma Mountain, but occasionally it spreads across the whole mountain. There were 119 fog events spread, mainly evenly, throughout the year (Table 2.3). These results are higher than the 46 misty days recorded at Cedara (115 km south-east of Underberg) near Pietermaritzburg within the Gs9 Midlands Mistbelt Vegetation Unit (Mucina and Rutherford, 2006).

2.7.1.3 Snow

Snow occurs mainly on the high mountain ranges of the Drakensberg, Lesotho and the Western Cape. Snowmelt usually occurs within two to three days after the snow has stopped falling, however, snow can cover the ground for periods of three months or longer, especially in the protected gullies and southern slopes of the upper escarpment and Lesotho (Schulze, 1997; Van Wyk and Smith, 2001). According to Schulze (1997), the effects of sporadic snowfalls on vegetation in southern Africa are thought to be minimal.

Shallow snowfalls on Hlogoma Mountain occur two to three times a year during winter, sometimes just covering the summit dolerite sill or down to about 1 720 m.a.s.l. However, every four to five years a heavier fall of about 100 mm occurs, covering the entire mountain. Snowmelt occurs within one to two days after the snow has stopped falling.

2.7.2 Temperature

According to Schulze and McGee (1978), critical indices of temperature, such as summer maxima and winter minima or ranges of extremes of temperature, have a greater effect on vegetation than mean temperature, as these extremes can have a limiting effect on plant species and their distribution.

Variation in topography, including slope, aspect and altitude, result in differing local climatic conditions. In the southern hemisphere, north-facing slopes

receive more direct sunlight than south-facing slopes. There are also seasonal variations of radiation on slopes (Schulze and McGee, 1978), in mid-winter the low angle of the sun causes the steepest north-facing slopes to receive the most radiation and even the flatter north-facing slopes receive about half their mid-summer amount, but all south-facing slopes receive a much reduced radiation. Generally, an increase in altitude corresponds with a decrease in temperature (Hoare, 2009).

In the study area temperature was recorded from January−December 2015 at varying elevations, slopes and aspects in 13 permanent plots, which were selected from the 100 Braun-Blanquet plots placed out for the study. Temperature recording 'buttons', which logged temperature readings every three hours, were placed into these 13 plots and the data downloaded at intervals. Some of the recording devices malfunctioned and two were stolen from relevés at low elevations, hence results from only 10 relevés are included. To compare the temperatures recorded during the study period against temperatures recorded over longer time periods (2013−2015), temperature statistics were obtained from the Shaleburn South African Weather Station, which is the nearest station to Underberg - approximately 17 km south-west of the town (G. McKay, South African Weather Service, pers. comm., email 4 April 2016).

On Hlogoma Mountain, the mean daily maximum and minimum temperatures for each month and for the wet and dry seasons as recorded for 2015 are given in Table 2.4. The mean daily maximum for 2015 was 27.7˚C and the mean daily minimum was 8.2˚C. The mean maximum values recorded for the wet summer months (November−April) was 30.5˚C and 10.6˚C for the dry winter months (May−October) (Table 2.4). Mean minimum values recorded for the wet summer months (November−April) was 25.1˚C and 5.8˚C for the dry winter months (Table 2.4).

At Shaleburn Weather Station, the mean maximum and minimum values for the wet and dry seasons for 2013, 2014, 2015 and 2013−2015 are given in Table 2.5.

The values for Shaleburn are lower when compared to the same parameters for Hlogoma Mountain (Tables 2.4 and 2.5). This may be due to the location of the weather station in a cooler flood plain area between the Mzimude (a tributary of the Umzimkulu River) and Ngwangwane Rivers.

The MAT for 2015 for the study area is 15.7°C (Table 2.4), which is higher than the estimated MAT of 14.6°C for the Gs10 Vegetation Unit (Mucina and Rutherford, 2006). MAT from the Shaleburn Weather Station for the period of 2013, 2014 and 2015 is 14.5, 14.3 and 14.9°C respectively (Table 2.5).

Table 2.4: Hlogoma Mountain 2015: Elevation, aspect, slope, mean daily maxima, mean daily minima, Mean Annual Temperature (MAT), mean maximum temperatures for the wet season (January–April and November–December), mean maximum temperatures for the dry season (May–October), mean minimum temperatures for the wet season (January–April and November–December), mean minimum temperatures for the dry season (May–October) and absolute minima, absolute maxima and total range of temperatures

Relevé no.	Elevat.	Aspect	Slope	Mean daily max.	Mean daily min.	MAT	Mean max. Wet	Mean max. Dry	Mean. min. Wet	Mean min. Dry	Absol. max.	Absol. min.	Total range max.−min.
	m.a.s.l		°	˚C	˚C	˚C	˚C	˚C	˚C	˚C	˚C	˚C	˚C
92	1 623	W	18	28.2	8.2	15.9	31.1	24.5	11.0	5.3	38.5	-4.5	43.0
85	1 632	N	5	27.1	8.2	15.6	29.8	24.4	10.7	5.7	37.5	-3.0	40.5
49	1 720	W	14	28.4	8.6	15.8	31.9	25.0	11.1	6.1	39.0	-2.0	41.0
20	1 729	W	15	27.0	8.0	15.0	29.2	25.0	10.6	5.2	35.5	-3.5	39.0
81	1 762	N	13	28.5	8.6	16.3	31.7	25.3	11.1	6.2	37.0	-1.5	38.5
25	1 770	NW	9	27.2	8.5	15.8	29.7	24.8	10.7	6.2	38.0	-1.5	39.5
13	1 722	NW	12	28.9	7.7	15.5	31.8	26.1	10.3	5.4	35.5	-4.5	40.0
34	1 825	N	12	27.2	7.3	16.0	29.7	27.4	9.5	5.0	38.0	-2.5	40.5
42	1 855	N	10	25.6	8.1	15.0	28.5	22.1	10.2	6.0	39.0	-3.5	42.5
56	1 884	N	23	29.2	8.8	15.7	31.2	28.1	10.9	6.7	39.0	-1.5	40.5
Mean				27.7	8.2	15.7	30.5	25.1	10.6	5.8			

Table 2.5: Shaleburn South African Weather Station, Bushman's Nek (°C) (Time 08.00) 1 609 ma.s.l.: Temperature statistics for 2013, 2014, 2015 and the period 2013−2015: mean daily minimum and maximum temperatures, monthly averages, mean maximum temperatures for the wet season (January−April and November−December) and mean minimum temperatures for the dry season (May−October)

	2013			2014			2015			2013−2015	
Month	**Mean daily max.**	**Mean daily min.**	**Monthly Ave.**	**Mean daily max.**	**Mean daily min**	**Monthly Ave.**	**Mean daily max.**	**Mean daily min.**	**Monthly Ave.**	**Mean daily max.**	**Mean daily min.**
January	26.9	11.6	19.3	27.4	12.7	20.1	27.1	12.3	19.7	27.1	12.2
February	27.5	11.0	19.3	25.6	12.7	19.1	25.5	11.2	18.4	26.2	11.6
March	25.5	9.4	17.4	24.7	10.5	17.6	24.7	10.6	17.6	25.0	10.2
April	23.0	4.0	13.5	22.0	3.7	12.9	22	6.1	14.1	22.3	4.6
May	22.0	0.8	11.4	22.2	1.5	11.9	22.5	1.8	12.2	22.2	1.4
June	20.9	-2.7	9.1	19.7	-3.2	8.3	17.7	-2.9	7.4	19.4	-2.9
July	20.2	-0.8	9.7	18.4	-4.1	7.2	17.2	-0.1	8.6	18.6	-1.7
August	21.9	-0.4	10.0	20	1.4	10.7	23.1	2.4	12.8	21.7	1.1
September	24.4	2.6	13.5	26.1	3.6	14.9	22.2	6.0	14.1	24.2	4.1
October	24.1	5.2	14.7	21.4	6.9	14.2	25.9	8.1	17.0	23.8	6.7
November	26.3	9.2	17.8	22.4	10.0	16.2	24.7	7.3	16.0	24.5	8.8
December	24.0	10.6	17.3	24.7	11.9	18.1	28.1	12.4	20.3	25.6	11.6
Mean	23.9	5.0		22.9	5.6		23.4	6.3		23.4	5.6
MAT			14.5			14.3			14.9		
Mean Wet	22.3	9.3	−	24.5	10.3	−	25.4	10.0	−	25.1	9.8
Mean Dry	25.5	0.8	−	21.3	1.15	−	21.4	2.6	−	21.7	1.5

Table 2.6: Absolute minima and maxima and ranges for the period 2013−2015 recorded at Shaleburn South African Weather Station, Bushman's Nek (°C) (Time 08.00)

	2013		2014		2015	
Month	**Absolute min**	**Absolute max**	**Absolute min**	**Absolute max**	**Absolute min**	**Absolute max**
January	5.9	35.4	8.6	34.2	8.2	32.0
February	7.7	34.4	8.0	31.5	6.5	33.3
March	4.3	34.6	5.3	29.3	6.7	29.2
April	-0.7	32.6	-3.6	26.4	-1.3	27.0
May	-5.4	26.9	-4.3	27.2	-0.9	26.9
June	-8.8	26.9	-9.5	24.4	-8.0	24.7
July	-7.6	27.4	-12.4	26.9	-7.1	23.3
August	-7.3	29.4	-5.5	25.3	-7.8	29.1
September	-7.7	29.9	-4.8	32.3	-0.1	32.5
October	-3.9	33.9	1.4	30.2	1.8	32.4
November	3.9	35.5	1.9	29.2	0.8	33.6
December	7.8	31.0	8.1	30.5	8.2	35.5

The absolute minimum and maximum temperatures during 2015 on Hlogoma Mountain fluctuate from -4.5−39.0˚C with a total temperature range of 43.5˚C (Tables 2.7). The temperature range of absolute minimum and maximum at Shaleburn Weather Station at 43.3˚C for 2015 is similar to that of Hlogoma (Tables 2.6 and 2.7). The ranges at Shaleburn for 2013, 2014 for 2013−2015 are higher than for Hlogoma with lower minima and maxima being 4 to 5˚C lower for both parameters (Tables 2.6 and 2.7). This may be a result of the location of the weather station in a cooler habitat in a river valley.

Table 2.7: Absolute minima and maxima temperatures and total range for Hlogoma Mountain for 2015, Shaleburn Weather Station for 2013, 2014, 2015 and 2013–2015 (˚C)

Site	Date	Range		Total range
		Absolute min	Absolute max	
Hlogoma	2015	-4.5	39.0	43.5
Shaleburn	2013	-8.8	35.5	44.3
Shaleburn	2014	-12.4	34.2	46.6
Shaleburn	2015	-7.8	35.5	43.3
Shaleburn	2013–2015	-12.4	35.5	47.9

2.8 Wildlife

In addition to its high floristic diversity, Hlogoma Mountain is home to a wide variety of animal species, some that live there permanently and others that feed, breed or fly over on their journeys. Some of these species are listed below.

2.8.1 Mammals

Mountain Reedbuck (*Redunca fulvorufula*), Common Duiker (*Sylvicapra grimmia*) and Grey Rhebok (*Pelea capreolus*) are seen regularly. Mounds from burrows of molerat colonies are found extensively throughout the mountain, but particularly on gentle and moderate grassy slopes. The species of molerat, based on the distribution map (Smithers, 1983), is the Common Molerat (*Cryptomys hottentotus*). The Striped Mouse (*Rhabdomys pumilio*) can be seen

in the early mornings. Natal Red Rock Rabbit (*Pronologus crassicaudatus*) is seen occasionally and has extensive middens on and near the summit. A small population of Rock Hyrax (*Procavia capensis*) live amongst the north-facing dolerite boulders on and near the summit. Highveld Gerbils (*Tatera brantsii*) and their burrows are found in the grassy slopes. Scrub Hare (*Lepus saxatilis*) have been recorded at night at the base of the hill. Shrews (Family Soricidae) are also present, based on the finding of a single dead individual. Numerous quills of Porcupine (*Hystrix africaeaustalis*) have been found during the study period. It is suspected that Aardvark (*Orycteropus afer*) may occur based on the presence of burrows some of which have been recently used. Black-backed Jackal (*Canis mesomelas*) have been seen and their calls are heard at dusk.

2.8.2 Birds

Eighty seven bird species utilise Hlogoma Mountain in various habitats. The bird species, habitats, names and their Red Data List categories (Taylor *et al*., 2015) are indicated in Table 2.8. Six endemic species, three near-endemic species, one Critically Endangered, five Vulnerable and one Near-Threatened species are documented.

Table 2.8: Bird species, habitats, breeding status, common names, biological names, Red Data List Category: (CR-Critically Endangered, VU-Vulnerable, NT-Near Threatened, endemic* and near endemic**

Habitat, and common name	Biological name	RDL Status
Grasslands, cliffs, rocky slopes and gulleys		
Red-winged Francolin	*Scleroptila levaillantii*	
Ground Woodpecker	*Geocolaptes olivaceus*	*
Denham's Bustard	*Neotis denhami*	VU
Buff-streaked Chat	*Oenanthe bifasciat*	*
Common Quail	*Coturnix coturnix*	
Speckled Pigeon	*Columba guinea*	
Common Fiscal	*Lanius collaris*	
African Stone-chat	*Saxicola torquata*	
Red-winged Starling	*Onychognathus morio*	
Wing-snapping Cisticola	*Cisticola ayresii*	
Wailing Cisticola	*Cisticola lais*	

Drakensberg Prinia	*Prinia hypoxantha*	*
Malachite Sunbird	*Nectarinia famosa*	
Cape Wagtail	*Motacilla capensis*	
Cape Longclaw	*Macronyx capensis*	
Long-billed Pipit	*Anthus similis*	
Yellow Bishop	*Euplectes capensis*	
Southern Red bishop (visitor)	*Euplectes orix*	
Long-tailed Widowbird	*Euplectes progne*	
Red-collared Widowbird	*Euplectes ardens*	
African Quailfinch	*Ortygospiza atricollis*	
Cape Grassbird	*Sphenoeacus afer*	**
Cape Bunting	*Emberiza capensis*	
Aerial feeders		
African Black Swift	*Apus barbatus*	
Alpine Swift	*Apus melba*	
White-rumped Swift	*Apus caffer*	
Horus Swift	*Apus horus*	
Banded Martin	*Riparia cincta*	
Brown-throated Martin	*Riparia paludicola*	
House Martin	*Delichon urbica*	
Rock Martin	*Hirundo fuligula*	
Barn Swallow	*Hirundo rustica*	
Greater Striped Swallow	*Hirundo cucullata*	
Black Saw-wing	*Psalidoprocne pristoptera*	
White-throated Swallow	*Hirundo albigularis*	
Visitors		
Spotted Eagle-owl	*Bubo africanus*	
Yellow-billed Kite	*Milvus milvus aegyptius*	
Cape Vulture	*Gyps coprotheres*	EN
Bearded Vulture (occasional)	*Gypaetus barbatus*	CR
African Harrierhawk	*Polyboroides typus*	
Black Sparrowhawk	*Accipiter melanoleucus*	
Common Buzzard	*Buteo buteo*	
Jackal Buzzard	*Buteo rufofuscus*	**
Verreaux's Eagle (occasional)	*Aquila verreauxii*	VU
Long-crested Eagle	*Lophaetus occipitalis*	
Secretarybird (occasional)	*Sagittarius serpentarius*	VU
Rock Kestrel	*Falco rupicoloides*	
Amur Falcon	*Falco amurensis*	
Lanner Falcon	*Falco biarmicus*	VU
Black-headed Heron	*Ardea melanocephala*	
Cattle Egret	*Bubulcus ibis*	

Hadedah Ibis	*Bostrychia hagedash*	
White-necked Raven	*Corvus albicollis*	
Cape Crow	*Corvus capensis*	
Cape Rock-thrush (occasional)	*Monticola capensis*	*
Sentinel Rock-thrush (occasional)	*Monticola explorator*	*
Scrub patches and forest		
Red-throated Wryneck	*Jynx ruficollis*	
Speckled Mousebird	*Colius striatus*	
Red-chested Cuckoo	*Cuculus solitarius*	
Black Cuckoo	*Cuculus clamosus*	
African Olive-Pigeon	*Columba arquatrix*	
Cape Turtle-Dove	*Streptopelia capicola*	
Red-eyed Dove	*Streptopelia semitorquata*	
Fork-tailed Drongo	*Dicrurus adsimilis*	
Bokmakierie	*Telophorus zeylonus*	
Cape Robin-Chat	*Cossypha caffra*	
Dark-capped Bulbul	*Pycnonotus tricolor*	
Cape White-eye	*Zosterops pallidus*	
Willow Warbler	*Phylloscopus trochilus*	
Amethyst Sunbird	*Chalcomitra amethystine*	
Cape Sparrow	*Passer melanurus*	
Cape Weaver	*Ploceus capensis*	
Common Waxbill	*Estrilda astrild*	
Pin-tailed Whydah	*Vidua macroura*	
Cape Canary	*Serinus canicollis*	
Streaky-headed Seedeater	*Serinus gularis*	
Species confined to forest patch		
Olive Woodpecker	*Dendropicos griseocephalus*	
Black-headed Oriole	*Oriolus larvatus*	
African Paradise flycatcher	*Terpsiphone viridis*	
Southern Boubou	*Laniarius ferrugineus*	
Cape Batis	*Batis capensis*	
African Dusky Flycatcher	*Muscicapa adusta*	
Bar-throated Apalis	*Apalis thoracica*	
Barratt's Warbler	*Bradypterus barratti*	**
Yellow-throated Woodland-Warbler	*Phylloscopus ruficapillus*	
Bush Blackcap	*Lioptilus nigricapillus*	VU *
Greater Double-collared Sunbird	*Cinnyris afra*	*

2.8.3 Reptiles

A number of reptile species were seen throughout the study period. The snake most often seen was the Spotted or Rhombic Skaapsteker (*Psammophylax rhombeatus*), usually amongst the dolerite rocks near the summit. Rinkhals (*Hemachatus haemachatus*), Puff Adder (*Bitis arietans*) and Red-Lipped Herald (*Crotaphopeltis hotamboeia*) were occasionally observed.

Only two lizard species were identified and frequently observed: the Southern Rock Agama (*Agama atra*) and the Striped Skink (*Mabuya striata*).

2.8.4 Amphibians

A few frog and toad species were identified in and around the streams and seeps on the mountain. Toads seen include the Raucous Toad (*Bufo rangeri*) and the Guttural Toad (*Bufo gutturalis*). The Common River Frog (*Afana angolensis*) was observed near seeps.

2.8.5 Insects and Arachnids

In summer the grasslands and forests on the Mountain are home to a myriad of insects and arachnids. Hunting and web spiders were found in all habitats.

Butterflies identified in the different habitats include: **forest patches**: Garden Acrea (*Acrea horta*); **summit and summit slopes**: Gaudy Commodore (*Precis octavia*), Garden Commodore (*Precis archesia*), Long-Tailed Blue (*Lampides boeticus*), Common Sandman (*Spalia diomus ferax*), Yellow Pansy (*Junonia hierta*), Painted Lady (*Vanessa cardui*), Monarch (*Danaus chrysippus*), Wichgraf's Brown (*Stygionympha wichgrafi*) and Pennington's Copper (*Aloeides penningtoni*); and in the **grassland**: Brown-veined White (*Belenois aurota*), Painted Lady (*Vanessa cardui*) and Gaudy Comodore (*Precis octavia*).

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CHAPTER THREE

METHODS

The study was conducted over a 16 month period from October 2014 to February 2016. A phytosociological survey was undertaken during the study period to identify, classify, map and describe the different plant communities present on Hlogoma Mountain. A plant species checklist for the study area was compiled for analysing the flora in the study area.

The Braun Blanquet method of vegetation classification was used in this study to identify the different plant communities present in the study area. Brown *et al*. (2013), recommends the Zürich−Montpellier (Braun-Blanquet) approach for phytosociological studies and sets out guidelines and recommendations for the minimum requirements and methods to be followed when conducting such studies. These recommendations assist researchers conducting phytosociological studies in southern African to achieve and attain their goals of conforming to internationally accepted protocols and standards (Brown *et al.,* 2013).

According to Westhoff and Van der Maarel (1978), the basic principles of the Zürich-Montpellier (Braun-Blanquet) approach can be summarised as follows:

- Plant communities are recognised as vegetation units based on their floristic composition. The species composition of a plant community gives an indication of the relationship of the various communities to one another and the environment.
- Some plant species have a distinct concentration of occurrence or abundance in a particular plant community. These species have certain mutual relationships and are referred to as diagnostic or character species and are normally effective indicators of specific environmental conditions.

- Together with species of high cover abundance and frequency, diagnostic species are used to cluster vegetation into a hierarchical classification, of which the plant community is the basic unit.

Field survey and analysis methods of the Zurich−Montpellier (Braun−Blanquet) approach consists of the following (Brown *et al*., 2013):

- Stratified random placement of sample plots of a certain minimum size within a representative homogeneous stand of vegetation.
- Recording of all species present in the sample plot, recording of cover abundance values for all species by using a suitable cover-abundance scale.
- Measurement and recording of environmental data for each sample plot.
- The data collected is captured and analysed using standardised software programmes including TURBOVEG and JUICE to produce a hierarchical phytosociological table, which is be used to identify, classify and describe plant communities.

3.1 Reconnaissance

A preliminary survey is recommended prior to a vegetation analysis when little is known about the area to be investigated (Westhoff and Van der Maarel, 1978). A reconnaissance of the study area was carried out prior to the study to assess topography and vegetation variation. Permission from the landowners to conduct the study was obtained.

3.2 Sample site placement and plot size

During the desktop phase, Google Earth images were used to delineate and stratify relatively homogeneous vegetation units, representative of perceived plant communities, on Hlogoma Mountain. Placement of sample plots, using

Google Earth, was carried out in a randomly stratified way within each of these vegetation units and plot co−ordinates were determined. Maps showing plot locations were printed out from Google Earth and together with the co-ordinates list, were used by the researcher to locate plot positions during field surveys.

The plot size recommended by Brown *et al*. (2013) for dry and moist grassland communities was fixed at 4 x 4 m to give a total surface area of 16 m^2. For this study a total of 100 plots were placed within the study site. If the sample plot selected did not fall within a representative homogeneous vegetation stand, it was moved to the nearest locality that was representative of the vegetation stand (Brown *et al*., 2013). Thirteen permanent plots were selected from these 100 Braun-Blanquet plots for the purpose of recording temperature, rainfall and plant species on a monthly basis for the duration of the study.

3.3 Data sampling

3.3.1 Floristic data

A comprehensive floristic survey commenced in October 2014 and was completed in February 2016. The Braun-Blanquet survey was carried out in peak summer months (from December 2014 to February 2015 and from December 2015 to February 2016). In addition, plant species were recorded throughout the entire study period during monthly visits to the thirteen permanent plots, including autumn, winter and spring, to document the presence of plant species not growing during summer months. Thus, both early spring and winter-flowering species and other species which only flowered in one of the two summers were recorded.

All plant species within each sample plot were recorded. In addition, plant species within an approximate two-metre area beyond the plot boundary were also recorded for inclusion in the total checklist. Plant species were identified in the field and recorded and those that could not be identified were collected for

identification purposes. A permit for collecting unknown species was obtained from the Ezemvelo KwaZulu-Natal Wildlife Permit Office.

All collected plant specimens were processed according to standard herbaria protocol. Specimens were pressed, frozen, dried and issued with standard field and herbarium data collection labels. Plant specimens collected were taken to the KwaZulu−Natal National Herbarium in Durban for confirmation of identification and to identify unknown species. A number of specimens were also sent to the National Herbarium in Pretoria for specialist identification of certain taxa.

Plant species were identified in the field using the following references: Tainton *et al.* (1976); Hilliard (1977); Hilliard (1992); Hilliard (1996); Hilliard and Burtt (1987); Killick (1990); Van Oudtshoorn (1992); Van Wyk and Van Wyk (1997); Goldblatt and Manning (1998); Van Wyk and Malan (1998); Bromilow (2001); Pooley (2003); Pooley (2005); Manning (2009); Van Oudtshoorn (2009); Boon (2010); Crouch *et al.* (2011); Manning (2012); and Johnson and Bytebier (2015).

Cover abundance values were estimated for all plant species occurring within each sample plot using the modified Braun-Blanquet cover abundance scale (Mueller−Dombois and Ellenberg, 1974) (Table 3.1).

Table 3.1: Modified Braun-Blanquet cover−abundance scale (Mueller-Dombois and Ellenberg, 1974)

Scale	Description
r	One or a few individuals (rare) with less than 1% cover of total plot area.
+	Present but not abundant with less than 1% cover of total plot area.
1	Abundant but with low cover or less abundant with higher cover but covering between 1−5% of the total plot area.
2a	Abundant but with cover between 5−12% of total plot area.
2b	Abundant but with cover between 12−25% of total plot area.
3	25−50% cover of the of total plot area irrespective of number of individuals.
4	50−75% cover of the total plot area irrespective of number of individuals.
5	75−100% cover of the total plot area irrespective of number of individuals.

3.3.2 Environmental data

The plot number and a general description of the site were recorded for each sample plot. Photographs were taken of the plots to illustrate typical examples of the vegetation.

Plot co-ordinates, altitude and aspect were recorded using a Garmin eTrex Vista Global Positioning System. The percentage of the sample plot area covered by rocks and/or stones (rockiness) was estimated. The geology for each plot was recorded. Soil depth in each plot was estimated by inserting a metal probe into the soil until a hard layer was encountered and this length measured. Soil texture was classified as humus rich topsoil, humus rich topsoil sandy-clay loam, humus rich topsoil stony sandy-clay loam, sandy-clay loam and stony sandy-clay loam. Soil water content was classified as wet, damp or dry.

The slope of the plot was measured in degrees using a clinometer. The following classification of slope units, based on Westfall (1981), was used for this study (Table 3.2).

Table 3.2: Modified classification of slope units (Westfall, 1981)

Symbol	Description	Slope Class
L	Level	1°−3°
G	Gentle	4°−9°
M	Moderate	10°−15°
S	Steep	16°−25°
VS	Very steep	26°−55°

The erosion class for each plot was estimated using the erosion scale described by Fey (2010) in Table 3.3.

Table 3.3: Modified soil erosion classification (Fey, 2010)

Class	Description
1	None apparent or slight.
2	Moderate loss of topsoil and/or some slight soil dissection (cutting) by run-off channels or gullies.
3	Severe loss of topsoil and/or marked soil dissection by run-off channels or gullies.
4	Total loss of topsoil and exposure of subsoil and/or deep intricate soil dissection by gullies.

Temperature logging ‘buttons’ were attached to stakes at 300 mm above ground level in 13 permanent plots that were placed at varying elevations, slopes and aspects in the study area. Temperature buttons were calibrated to log temperatures at three hourly intervals. Temperature readings were downloaded regularly throughout the study period using the ColdChain software programme. The logging devices and software were provided by Applied Behavioural Ecology and Ecosystem Research Unit (ABEERU) within the

Department of Environmental Sciences and technical support was supplied by Fairbridge Technologies (Pty) Ltd.

For the duration of the study, rainfall was measured using rain gauges placed at elevations of 1 600, 1 753, 1 823 m.a.s.l. and at the summit (1 905 m.a.s.l.).

Other data collected included presence of wildlife and accessibility of the various portions of the study area by wildlife and cattle.

3.4 Data analysis

3.4.1 Plant community classification

All vegetation data collected from the 100 study relevés was captured into the TURBOVEG data management system resulting in a database which can be presented as a matrix with columns representing the plots and rows representing the plant species (Hennekens and Schaminee, 2001). TURBOVEG provides a standardised format for the management and storage of vegetation data (Brown *et al*., 2013). This data was exported as a Cornell Condensed species file and imported into the JUICE 7.0 software programme (Tichy, 2002).

The JUICE software programme is designed for editing, classifying and analysis of vegetation data into a phytosociological table (Tichy, 2002). The modified TWINSPAN (Two−Way Indicator Species Analysis) algorithm, contained in JUICE, is a divisive clustering method which results in vegetation clusters of similar internal heterogeneity within a hierarchical structure (Brown *et al*., 2013). From the TWINSPAN analysis a first approximation of the main plant communities was derived. Further refinement of the classification was achieved by following Braun-Blanquet procedures (Werger, 1974; Westhoff and Van der Maarel, 1978; Brown and Bredenkamp, 1994; Bredenkamp and Bezuidenhout, 1995). The results of this classification procedure resulted in a final

phytosociological table, which indicates the different plant communities, sub-communities and variants.

The modified TWINSPAN classification technique is recommended in guidelines set out by Brown *et al.* (2013) as it is objective, repeatable, and widely used in phytosociological research.

The procedures as described by Brown *et al.* (2013) for naming plant communities were followed. These rules, based on the guidelines set out by the International Code of Phytosociological Nomenclature for syntaxonomic classification, were compiled to avoid confusion and to enable consistency in naming.

A vegetation map indicating the different plant communities in the study area was produced using ARCMAP 10.2.1.

3.4.2 Plant community ordination

A Constrained Correspondence Analysis (CCA) ordination diagram for the vegetation in the study area was generated using the Vegan package within the R software suite. Habitat variables interrogated were slope, aspect, rock cover, geology, soil depth, soil water, soil type and erosion. The distribution of the 100 relevés from the study and their associated environmental variables, indicated by arrows, were shown in the ordination diagram.

Ordination methods used in the R Vegan package are based on Chi- distances and weighted linear mapping. The interpretation of the CCA ordination graph follows:

- the ***length of the vectors*** representing the different environmental variables indicates their importance to the ordination – environmental variables with longer vector lines are more important than those with shorter vector lines,

- the ***angles between the different environmental vectors*** indicates their correlation with one another – small angles indicate strong positive correlations. Angles between vectors that are 90 or 270 degrees indicate no correlation, and angles of 180 degrees indicate a strong negative correlation.

3.4.3 Plant community diversity

Species richness, as a measure of alpha diversity, for the study area, as well as for plant communities on Hlogoma Mountain was calculated and analysed. Mean species richness for each plant community was calculated and analysed. Species richness of plant communities was compared to baseline data for temperate grassland provided by Mucina and Rutherford (2006).

According to Wilsey, *et al.* (2005), species richness is an incomplete surrogate for grassland alpha biodiversity, as measures of species diversity are based on relative abundance and richness. There are various diversity indices available to solve this problem. In this study the widely used Shannon-Wiener Index (*H'*), based on relative abundance and richness, and Pielou's Evenness Index (*J'*) as a measure of the way species are distributed (Van der Maarel, 2005), were calculated to examine the diversity values of the plant communities.

The Shannon-Wiener Diversity Index (H') was calculated for the plant communities surveyed using the following formula:

$$H' = \sum_{i=1}^{s} (p_i)(\ln p_i)$$

Where: H' = Shannon-Wiener Diversity Index
s = the number of species
pi = proportion (n/N) of individuals of one particular species found (n) divided by the total number of individuals found (N) belonging to the i-th species
ln = is the natural log

Species Evenness (*J'*) was calculated for the plant communities surveyed using the following formula:

$$J' = \frac{H}{ln(S)}$$

Where: (J') = Species Evenness
H = Shannon-Wiener Diversity Index
s = the number of species
ln = is the natural log

3.4.4 Flora

3.4.4.1 Checklist and analysis of taxa

A total plant species list was compiled for Hlogoma Mountain throughout the entire study period. The taxon names follow Germishuizen *et al.* (2006) and any taxonomic changes after 2006 were integrated into the list based on updates in the South African National Biodiversity Institute (SANBI) Plants of South Africa (POSA) (2017a). The checklist was arranged according to families, genera and species of Pteridophytes, Gymnosperms and Angiosperms. The total numbers of families, genera and species per family were calculated. Plant families with 1% or more of the total number of species were listed in a ranked table.

3.4.4.2 Conservation status

Red Data List plants were recorded according to SANBI Red Data List version 2017.1. (SANBI, 2017b).

3.4.4.3 Medicinal plants

The botanical, English, Afrikaans, Zulu, Swazi, Sotho, South Sotho and Xhosa names, as well as the traditional uses of medicinal plant species recorded on

Hlogoma Mountain, were compiled from the following references: Hutchings *et al.* (1996), Pooley (2003); Van Wyk and Van Wyk (1997); Van Wyk and Malan (1998); Pooley (2005); Van Wyk and Gericke (2007); and Van Wyk *et al.* (2009).

3.4.4.4 Phenology

During monthly visits to 13 permanent plots from October 2014 to February 2015 and during the Braun-Blanquet survey of 100 plots, the colour of the flowers of the species present were recorded: white, yellow, blue, purple, pink, pink/white, red, green, green/white, orange and brown. Flowering timing and stages, noted as buds, buds/flowers, flowers/seeds and seeds, was recorded.

3.4.4.5 Flower colour and elevation range on Hlogoma

A table was compiled of species grouped by flower colour against elevation range.

3.4.4.6 Floristic affinities

Floristic affinities of the study area with the Drakensberg Alpine Centre (DAC) and Cape Floristic Region (CFR) were analysed. DAC near-endemics and endemics and typical Cape Elements, according to Carbutt and Edwards (2001, 2004, 2006), were recorded.

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CHAPTER FOUR

VEGETATION CLASSIFICATION AND DESCRIPTION

4.1 Introduction

Vegetation ecology is the study of plants in relation to the environment (Van der Maarel, 2005). According to Westhoff and Van der Maarel (1978), the Braun-Blanquet method is an efficient and effective approach for vegetation ecological studies. The classification and interpretation of plant communities is based on total floristic composition. The presence of diagnostic species within communities not only characterizes communities and indicates their relationship to various environmental aspects, but is also used to organize the communities into a formal hierarchical classification (Westhoff and Van der Maarel, 1978). Vegetation classification and mapping forms the basis of any natural resource management plan from which scientifically defendable management decisions can be taken (Brown *et al*., 2013).

Ordination analysis assists vegetation scientists in understanding and interpreting the relationship of relevés to one another in terms of their species similarity and/or their environmental variables (Kent, 2012). Thus, such an analysis does not only allow the illustration of floristic relationships within plant communities, but also links plant communities to environmental habitat variable gradients (Westhoff and Van der Maarel, 1978; Brown *et al.,* 2013).

The Braun-Blanquet approach to vegetation classification is widely used in South Africa (Bester, 1998; Brown and Bredenkamp, 1994; Van Wyk and Smith, 2001; Siebert *et al.,* 2002,; Brown *et al.,* 2013). Phytosociological studies have many important applications: Surveys of large areas of vegetation to provide an informed basis for making decisions on wildlife management and nature conservation; to assist in planning the monitoring of plant species and communities; to provide baseline data to monitor the effects of climate change

on current vegetation data and to assist in providing guidelines for the sustainable management of agricultural lands (Brown *et al*., 2013). The hierarchical nature of vegetation classification enables plant communities (at the level of association/community) to be regarded as reliable surrogates to describe, manage and monitor the macro-systems to which they belong (Brown *et al*., 2013).

Brown *et al*. (2013) have recommended broad guidelines for phytosociological classifications and descriptions in South Africa. Mapping and habitat interpretation studies following the Braun-Blanquet approach to ensure a more standardised protocol will produce compatible data sets in southern Africa according to internationally acceptable standards.

4.2 Classification of the plant communities

The modified TWINSPAN classification results of the 100 relevés surveyed are presented in a phytosociological table (Table 4.1). Two major communities, five communities, 12 sub-communities and four variants were identified and all communities, excluding the variants, are indicated on the vegetation map (Figure 4.1).

The phytosociological classification of these communities is as follows:

1. *Leucosidea sericea* Forest major community
2. *Themeda triandra* Grassland major community
    - 2.1 *Agapanthus campanulatus* subsp. *patens–Cymbopogon nardus* rocky outcrop community
        - 2.1.1 *Agapanthus campanulatus* subsp. *patens–Cymbopogon nardus–Hyparrhenia dregeana* rocky outcrop sub-community
        - 2.1.2 *Agapanthus campanulatus* subsp. *patens–Cymbopogon nardus–Koeleria capensis* rocky outcrop sub-community

2.2 *Senecio erubescens–Hyparrhenia dregeana* seep community

2.3 *Alloteropsis semialata* subsp. *eckloniana–Arundinella nepalensis* wet/moist grassland community

2.3.1 *Alloteropsis semialata* subsp. *eckloniana–Arundinella nepalensis–Cyperus congestus* sub-community

2.3.1.1 *Gunnera perpensa* variant

2.3.1.2 *Typicum* sp. variant

2.3.2 *Alloteropsis semialata* subsp. *eckloniana–Arundinella nepalensis–Acalypha punctata* sub-community

2.4 *Diheteropogon filifolius–Tristachya leucothrix* open grassland community

2.4.1 *Diheteropogon filifolius–Tristachya leucothrix−Schistostephium crataegifolium* sub-community

2.4.2 *Diheteropogon filifolius–Tristachya leucothrix–Helichrysum krebsianum* sub-community

2.4.3 *Diheteropogon filifolius–Tristachya leucothrix–Gerbera ambigua* sub-community

2.4.4 *Diheteropogon filifolius–Tristachya leucothrix–Helichrysum pallidum* sub-community

2.4.5 *Diheteropogon filifolius–Tristachya leucothrix–Helichrysum nudifolium* var. *nudifolium* sub-community

2.5 *Elionurus muticus–Harpochloa falx* rocky slope/ridge grassland community

2.5.1 *Elionurus muticus–Harpochloa falx–Cyanotis speciosa* sub-community

2.5.2 *Elionurus muticus–Harpochloa falx–Berkheya rhapontica* sub-community

2.5.3 *Elionurus muticus–Harpochloa falx–Helichrysum chionosphaerum* sub-community

2.5.3.1 *Pygmaeothamnus chamaedendrum* var *chamaedendrum* variant

2.5.3.1 *Psammatropha mucronata* variant

The study area consists predominantly of grassland with scattered pockets of indigenous forest.

The indigenous forest vegetation is characterised by a dominant tree layer comprising species such as *Leucosidea sericea, Kiggelaria africana* and *Celtis africana.* The herbaceous layer contains perennial and annual forbs, climbers, sedges and ferns.

The vegetation of the grassland areas is characterised by the presence of the perennial grass *Themeda triandra* with various cover abundance values, many as high as 3 or more. The species of species group W, are present in most grassland plant communities (Table 4.1), except the *Agapanthus campanulatus−Cymbopogon nardus−Hyparrhenia dregeana* sub-community and the *Senecio erubescens−Hyparrhenia dregeana* seep community. The most prominent grass species in almost all of the communities, many of which have a cover abundancy value of 3, include the grasses *Themeda triandra* (species group B), *Diheteropogon filifolius*, *Rendlia altera* and *Panicum natalense* (species group W). Species present in most plant communities, however with a lower frequency, include the grasses *Alloteropsis semialata* subsp. *eckloniana* and *Eragrostis racemosa* (species group W), the forbs *Hilliardiella aristata* (species group B) and *Senecio macrocephalus* and the sedge *Ficinia stolonifera* (species group W). *Tristachya leucothrix* (species group K) is locally prominent in open grassland.

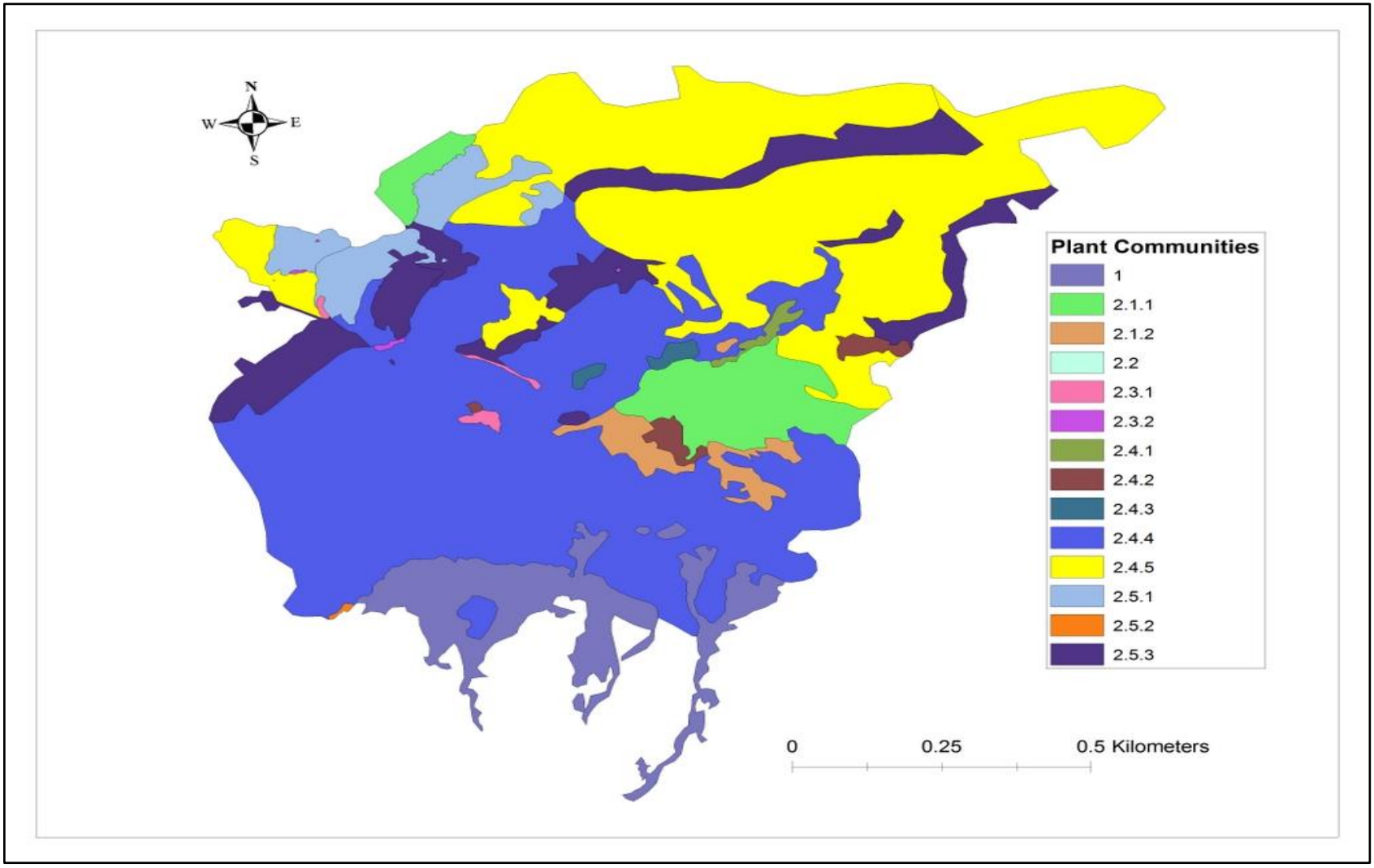

Figure 4.1: Vegetation Map for Hlogoma Mountain

Table 4.1: Phytosociological table for Hlogoma Mountain (The complete phytosociological table with all species, including those not grouped into species groups, is attached as Annexure I)

Major plant community number	1	2														
Plant community number		2.1		2.2	2.3			2.4					2.5			
Sub-community number		2.1.1	2.1.2		2.3.1		2.3.2	2.4.1	2.4.2	2.4.3	2.4.4	2.4.5	2.5.1	2.5.2	2.5.3	
Variant number					2.3.1.1	2.3.1.2									2.5.3.1	2.5.3.2
Relevé number	98 99 100	51 55 56 57 43	41 32 68 31	85	45 94 47	48 52 53 93	89 87 18 83 21	58 42	46 72 73 40	38 34	35 44 36 37 20 54 23 13 12 1 11 50 82 28 22 65 4 3 39 17 2	60 59 62 61 86 95 92 24 64 25 80 77 74 81	90 88 15 66 16 70 69 10 49	96 97	63 26 84 7 29 67 71 33 27 5 14 8	75 91 9 6 78 79 30 19 76
Species group A																
Leucosidea sericea	4 3 4	2	. . . .	.	. 2 2	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Achyranthes aspera	3 2 2	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Plectranthus grallatus	2 2 2	. . . . .	1 . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Nemesia silvatica	2 2 2	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Myosotis sylvatica	2 2 2	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Kiggelaria africana	3 2 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Galopina circaeoides	1 1 2	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Scadoxus puniceus	1 1 2	. r 2 + .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Polystichum transvaalense	2 2 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Nothoperanema squamiseta	. 2 2	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Celtis africana	2 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Asparagus asparagoides	1 . +	. . . . .	+ . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Carex zuluensis	r 1 .	+	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Pteris cretica	1 1 +	. . . . .	. . . .	.	. 1 .	. . . +	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Pleopeltis macrocarpa	1 + 1	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Adiantum poiretii	r 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Argyrolobium tomentosum	1 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Drymaria cordata subsp. *diandra*	1 . 1	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Impatiens hochstetteri subsp. *hochstetteri*	1 . 1	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Leonotis dubia	. 1 1	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Asplenium aethiopicum	r 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Dichrocephala integrifolia subsp. *integrifolia*	1 . +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Galium scabrelloides	1 + .	1	. . . .	.	. . +	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Disperis fanniniae	r . +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Polygala macowaniana	r . r	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Sandersonia aurantiaca	r . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Stachys grandifolia	2 . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Dioscorea rupicola	. 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Canthium ciliatum	1 . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Poa annua	. 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Schoenoxiphium sparteum	. + +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Streptocarpus gardenii	. 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Streptocarpus pentherianus	. + +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Asplenium monanthes	. . r	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Asparagus setaceus	r . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Riocreuxia torulosa	. . 1	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Cheilanthes hirta var. *hirta*	. . +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Cheilanthes viridis var. *macrophylla*	. . r	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Stenoglottis fimbriata	. . +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Species group B																
Themeda triandra	. . .	1 2 1 1 +	2 2 3 2	1	. . 1	4 2 2 2	4 3 3 2 2	4 3	3 3 3 3	3 3	3 3 4 3 3 3 4 4 3 3 3 3 3 2 3 3 3 2 3 3 3	4 4 4 3 3 2 3 3 3 4 3 3 4 3	2 3 2 2 2 2 2 1 3	1 1	3 2 2 2 2 3 + 2 2 1 2 3	+ . 2 2 + 1 1 . +
Hilliardiella aristata	. . .	1 . . + .	. r 1 .	+	. . +	. . + +	. + . + +	+ 1	. . . .	+ 1	+ + + + . . 1 1 + + + + + . . + . + + + 1	+ + + + + + + + 1 + + . + +	+ + . . . + + + +	. .	+ + 1 1 1 1 + 1 + + . .	. + ...
Commelina africana	. . .	. + r + .	. . . r	.	. . .	. r + r	. . . r +	. +	. . . .	+ r	. . . . + + . + r + . . r . + ... +	r r . . . . . r	. . r . + . + r r	r +	. . . . . . + . . . r .	. . . .

Major plant community number	1			2																					
Plant community number				2.1									2.2	2.3											
Sub-community number				2.1.1					2.1.2					2.3.1							2.3.2				
Variant number														2.3.1.1			2.3.1.2								
Relevé number	98	99	100	51	55	56	57	43	41	32	68	31	85	45	94	47	48	52	53	93	89	87	18	83	21
Species group C																									
Cymbopogon nardus	.	.	.	.	2	2	2	2	2	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Agapanthus campanulatus subsp. *patens*	.	.	.	.	1	1	1	.	2	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Stachys kuntzei	.	.	.	1	+	.	.	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chaenostoma floribundum	.	.	.	.	+	+	.	.	+	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Searsia discolor	.	.	.	.	1	+	1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Melinis nerviglumis	.	.	.	.	.	r	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group D																									
Heteromorpha arborescens	.	2	.	3	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhynchosia caribaea	.	.	.	2	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asparagus cooperi	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rabdosiella calycina	.	.	.	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	+
Aloe maculata	.	.	.	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eragrostis chloromelas	.	.	.	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leonotis intermedia	.	.	.	+	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Haemanthus humilis subsp. *hirsutus*	.	.	.	.	r	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Maytenus acuminata	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dioscorea sylvatica	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula sarcocaulis subsp. *rupicola*	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bidens pilosa	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cheilanthes eckloniana	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Zantedeschia albomaculata	.	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.
Zaluzianskya glareosa	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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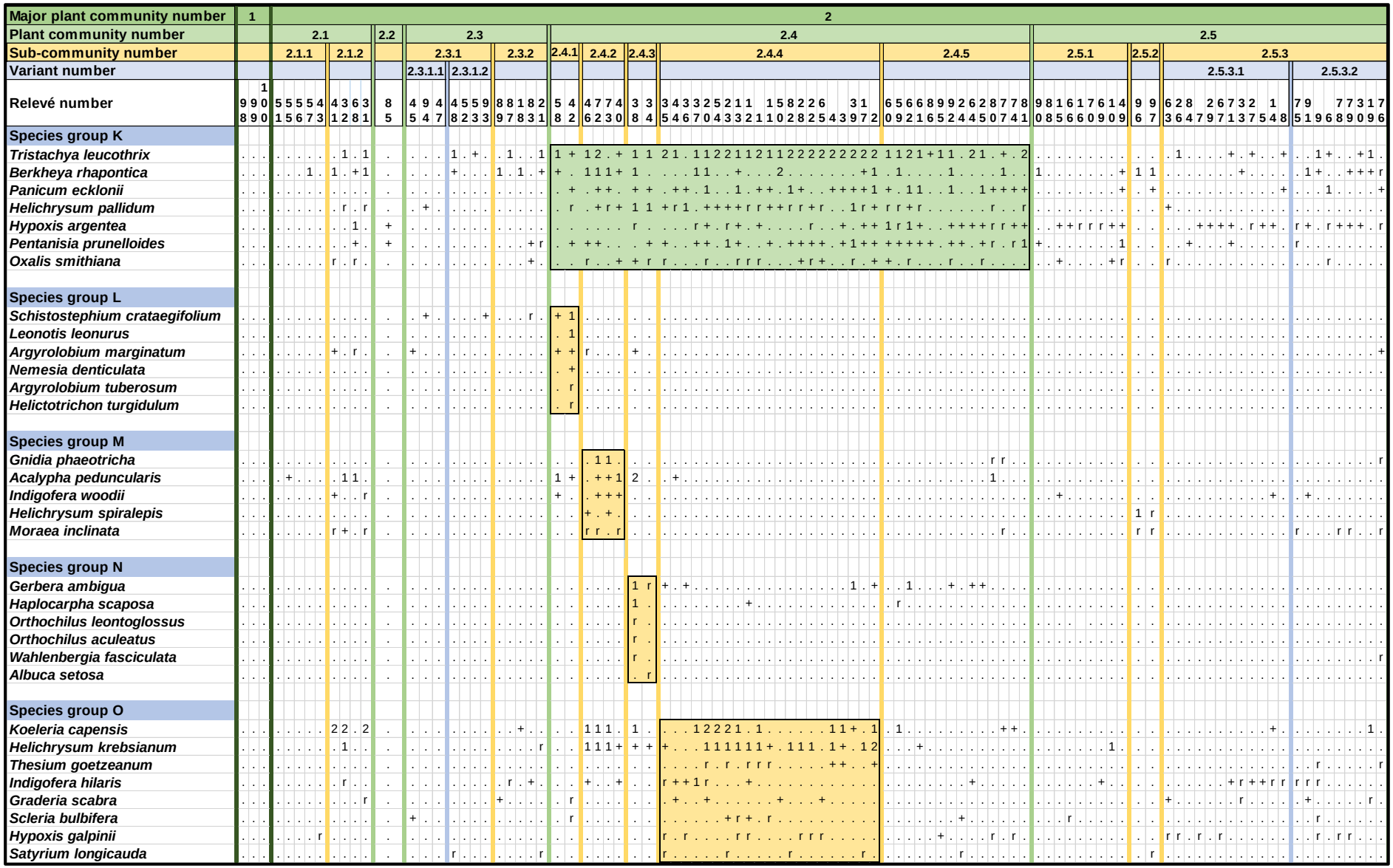
Species group E																									
Alepidea amatymbica	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ocimum obovatum	.	.	.	.	.	.	.	.	1	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Cotula hispida	.	.	.	.	.	.	.	.	1	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio subrubriflorus	.	.	.	.	.	.	.	.	1	+	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Cephalaria oblongifolia	.	.	.	.	.	.	.	.	+	r	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella caffra	.	.	.	.	.	.	.	.	r	+	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.
Crassula setulosa var. *setulosa*	.	.	.	.	.	.	.	.	+	+	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula umbraticola	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Cyphia elata	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	.	.	.	.	.	.	.	.	.
Kniphofia laxiflora	.	.	.	.	.	.	.	.	r	r	.	r	.	1	.	.	r	.	.	.	.	.	.	.	.
Afroscidium caffrum	.	.	.	.	.	.	.	.	.	r	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bupleurum mundii	.	.	.	.	.	.	.	.	r	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio oxyriifolius	.	.	.	.	.	r	.	.	+	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.
Streptocarpus polyanthus subsp. *dracomontanus*	.	.	.	.	.	.	.	.	+	+	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.
Pearsonia grandifolia	.	.	.	.	.	.	.	.	.	r	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eucomis bicolor	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lobelia vanreenensis	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Panicum aequinerve	.	.	.	.	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Schizoglossum bidens subsp. *pachyglossum*	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.

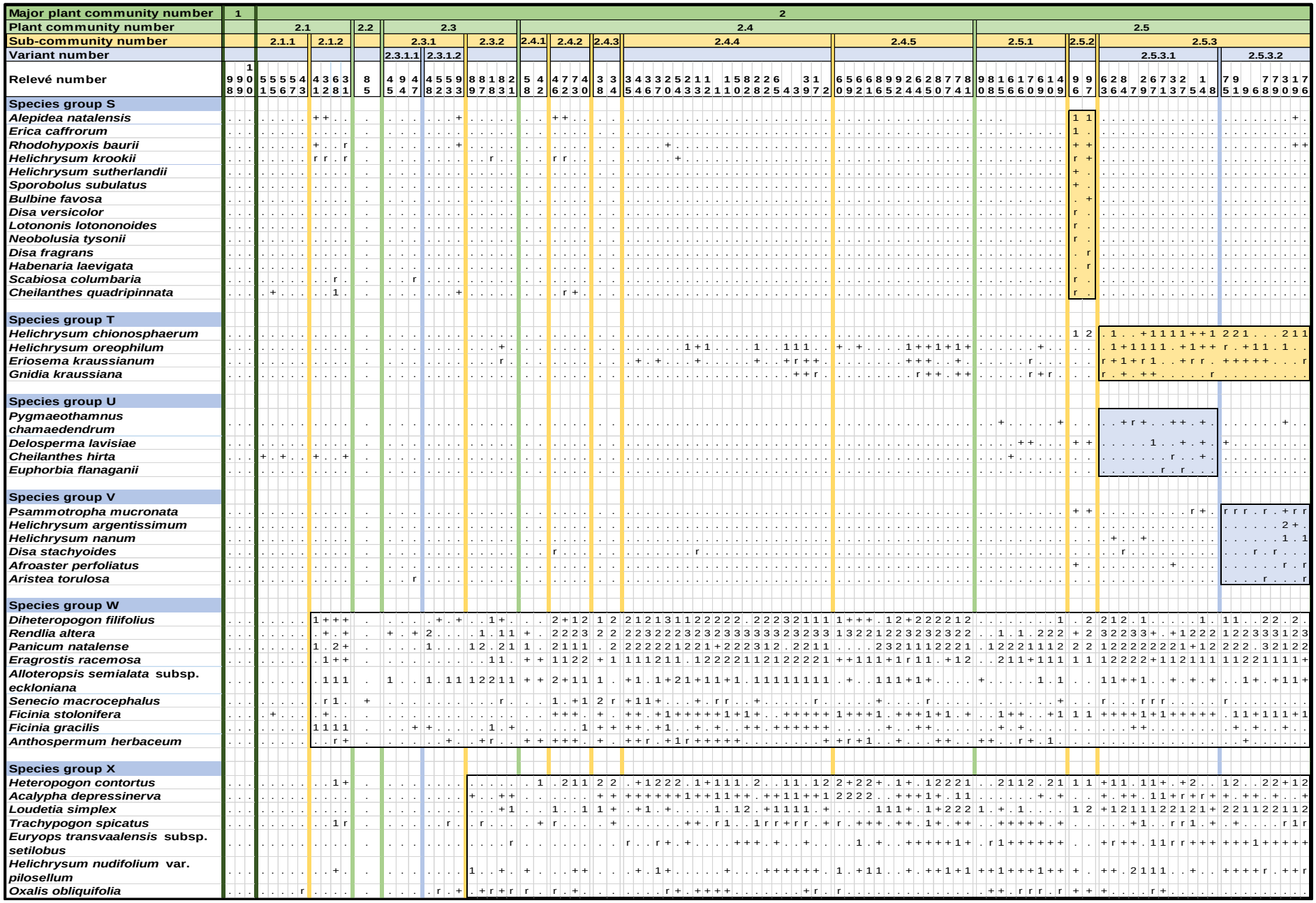
Major plant community number	2																																										
Plant community number	2.4																																										
Sub-community number	2.4.1		2.4.2				2.4.3		2.4.4																					2.4.5													
Variant number																																											
Relevé number	58	42	46	72	73	40	38	34	35	44	36	37	20	54	23	13	12	1	11	50	82	28	22	65	4	3	39	17	2	60	59	62	61	86	95	92	24	64	25	80	77	74	81
Species group C																																											
Cymbopogon nardus	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Agapanthus campanulatus subsp. *patens*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stachys kuntzei	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chaenostoma floribundum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Searsia discolor	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melinis nerviglumis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group D																																											
Heteromorpha arborescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhynchosia caribaea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asparagus cooperi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rabdosiella calycina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aloe maculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eragrostis chloromelas	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leonotis intermedia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Haemanthus humilis subsp. *hirsutus*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Maytenus acuminata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dioscorea sylvatica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula sarcocaulis subsp. *rupicola*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bidens pilosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cheilanthes eckloniana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Zantedeschia albomaculata	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Zaluzianskya glareosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group E																																											
Alepidea amatymbica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ocimum obovatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cotula hispida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio subrubriflorus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cephalaria oblongifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella caffra	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula setulosa var. *setulosa*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula umbraticola	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cyphia elata	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Kniphofia laxiflora	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Afroscidium caffrum	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bupleurum mundii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio oxyriifolius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Streptocarpus polyanthus subsp. *dracomontanus*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pearsonia grandifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eucomis bicolor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lobelia vanreenensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Panicum aequinerve	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Schizoglossum bidens subsp. *pachyglossum*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Major plant community number	2																															
Plant community number	2.5																															
Sub-community number	2.5.1									2.5.2		2.5.3																				
Variant number												2.5.3.1												2.5.3.2								
Relevé number	90	88	15	66	16	70	69	10	49	96	97	63	26	84	7	29	67	71	33	27	5	14	8	75	91	9	6	78	79	30	19	76
Species group C																																
Cymbopogon nardus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Agapanthus campanulatus subsp. *patens*	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stachys kuntzei	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Chaenostoma floribundum	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Searsia discolor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melinis nerviglumis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group D																																
Heteromorpha arborescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhynchosia caribaea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asparagus cooperi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rabdosiella calycina	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aloe maculata	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eragrostis chloromelas	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leonotis intermedia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Haemanthus humilis subsp. *hirsutus*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Maytenus acuminata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dioscorea sylvatica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula sarcocaulis subsp. *rupicola*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bidens pilosa	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cheilanthes eckloniana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Zantedeschia albomaculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Zaluzianskya glareosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group E																																
Alepidea amatymbica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ocimum obovatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cotula hispida	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio subrubriflorus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cephalaria oblongifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella caffra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula setulosa var. *setulosa*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula umbraticola	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cyphia elata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Kniphofia laxiflora	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Afroscidium caffrum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bupleurum mundii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio oxyriifolius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Streptocarpus polyanthus subsp. *dracomontanus*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pearsonia grandifolia	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	+	+	.	.	.
Eucomis bicolor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lobelia vanreenensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Panicum aequinerve	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Schizoglossum bidens subsp. *pachyglossum*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Major plant community number	1	2
Plant community number		2.1	2.2	2.3	2.4	2.5
Sub-community number		2.1.1	2.1.2		2.3.1	2.3.2	2.4.1	2.4.2	2.4.3	2.4.4	2.4.5	2.5.1	2.5.2	2.5.3
Variant number					2.3.1.1	2.3.1.2								2.5.3.1	2.5.3.2
Relevé number	1 9 9 0 8 9 0	5 5 5 5 4 1 5 6 7 3	4 3 6 3 1 2 8 1	8 5	4 9 4 5 4 7	4 5 5 9 8 2 3 3	8 8 1 8 2 9 7 8 3 1	5 4 8 2	4 7 7 4 6 2 3 0	3 3 8 4	3 4 3 3 2 5 2 1 1 1 5 8 2 2 6 3 1 5 4 6 7 0 4 3 3 2 1 1 0 2 8 2 5 4 3 9 7 2	6 5 6 6 8 9 9 2 6 2 8 7 7 8 0 9 2 1 6 5 2 4 4 5 0 7 4 1	9 8 1 6 1 7 6 1 4 0 8 5 6 6 0 9 0 9	9 9 6 7	6 2 8 2 6 7 3 2 1 3 6 4 7 9 7 1 3 7 5 4 8	7 9 7 7 3 1 7 5 1 9 6 8 9 0 9 6
Species group F															
Senecio erubescens var. *crepidifolius*	. . .	. . . . .	. . . .	1	. . .	. . . . .	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. . . . .
Senecio heliopsis	. . .	. . . . .	. . . .	1	. . .	. . . . .	. 2 . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. . . . .
Nidorella pinnata	. . .	. . . . .	. . . .	1	. . .	+	. . + . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. . . . .
Conyza chilensis	. . .	. . . . .	r . . .	+	. . .	. . . . .	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. . . . .
Acalypha glandulifolia	. . .	. . . . .	. . . .	+	. . .	. . . . .	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. . . . .
Gladiolus ecklonii	. . .	. . . . .	. . . .	r	. . .	. . . . .	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. . . . .
Species group G															
Arundinella nepalensis	. . .	2	. . . .	.	2 2 2 1 2 4 2	. . 2 1 1	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Hyparrhenia dregeana	. . .	2 2 2 2 5	. . . .	5	. . 1 2 4 . 2	. . 1 2 3	. 3	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Helichrysum umbraculigerum	. . .	1	+ . . .	.	. 1 2 1 . . +	. . 1 . . +	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Eragrostis planiculmis	. . .	1 . 1 + .	1 . . .	+	. 1 + 1 . . 1	1 . 1 . 2	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Miscanthus ecklonii	. . .	. . . . .	2 . . +	.	2 . . 1 . . .	 1	. .	. . . .	. .	. . . . .	. . . . .	. .	+ 2	. .	. . . . .
Senecio inornatus	. . .	. . . . .	2 . . .	1	1 . 1 r . . 1	. . + . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Species group H															
Cyperus congestus	. . .	. . . . .	. . . .	.	2 1 + . + + +	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Epilobium salignum	. . .	. . . . .	. . . .	.	+ 2 1	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Thelypteris bergiana	. . .	. . . . .	. . . .	.	. 2 1	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Sium repandum	. . .	. . . . .	. . . .	.	. 2 . . . 2 .	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Helichrysum mundtii	. . .	. . . . .	. . . .	.	. 1 . . 1 . +	. . . . +	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Isolepis cernua	. . .	. . . . .	. . . .	.	1 1 . . . 1 .	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Helichrysum aureonitens	. . .	. . . . .	. . . .	+	. 1 . 1 . 1 .	. . . . .	. .	. . . .	. .	 1	. . . . . + r	. .	. .	. .	. . . . .
Pycnostachys reticulata	. . .	. . . . .	. . . .	.	. 1 1 . 1 . .	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Lobelia erinus	. . .	. . . . .	. . . +	.	+ + + . r + +	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Oenothera rosea	. . .	r	. . . .	r	. . . . r . .	. r . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Species group I															
Gunnera perpensa	. . .	. . . . .	. . . .	.	2 . 2	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Helichrysum cooperi	. . .	. . . . .	+ . . .	.	. 2 1 . + . .	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. .	. .	. .	. . . . .
Nidorella obscura	. . .	. . . . .	. . . .	.	1 1 1	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	1	. .	. .	. . . . .
Limosella africana	. . .	. . . . .	. . . .	.	1 1 + ...	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. .	. . . . .
Agrimonia procera	. . .	+	. . . .	.	+ . 1	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. .	. . . . .
Juncus effusus	. . .	. . . . .	. . . .	.	2	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. .	. . . . .
Kniphofia species	. . .	. . . . .	. . . .	.	. 2	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. .	. . . . .
Isolepis costata	. . .	. . . . .	. . . .	.	1 + . . . + .	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. .	. . . . .
Ludwigia palustris	. . .	. . . . .	. . . .	.	. 1 + ...	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. .	. . . . .
Isolepis sepulcralis	. . .	. . . . .	. . . .	.	1	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. .	. . . . .
Xyris capensis	. . .	. . . . .	. . . .	.	. 1	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. .	. . . . .
Conyza bonariensis	. r .	. . . . .	. . . .	.	r r	. . . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. .	. . . . .
Species group J															
Acalypha punctata	. . .	1 . + . +	. . + .	.	 1	1 1 . 1 .	2 1	. . . .	+ .	. . + +	. . . . .	1 + ...	. .	. . . . . +	. . . . .
Phygelius aequalis	. . .	1	. . . .	.	 2	. . 1 . 1	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. . . . .	. . . . .
Lessertia perennans	. . .	. . . . .	. . . .	.	. . . . .	. . + . 1	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. . . . .	. . . . .
Afroaster pleiocephalus	. . .	. . . . .	. . . .	.	. . . . .	. 1 . . .	. .	. . . .	. .	. . . . .	. . . . .	. . . . .	. .	. . . . .	. . . . .
Helichrysum simillimum	. . .	. . . . .	. . . .	.	. . . . .	+ . + + .	. .	. . . .	. .	. . . . .	. . . . .	. . + . .	. .	. . . . .	. . . . .


Major plant community number
Plant community number
Sub-community number
Variant number
Relevé number
Species group K
Tristachya leucothrix
Berkheya rhapontica
Panicum ecklonii
Helichrysum pallidum
Hypoxis argentea
Pentanisia prunelloides
Oxalis smithiana
Species group L
Schistostephium crataegifolium
Leonotis leonurus
Argyrolobium marginatum
Nemesia denticulata
Argyrolobium tuberosum
Helictotrichon turgidulum
Species group M
Gnidia phaeotricha
Acalypha peduncularis
Indigofera woodii
Helichrysum spiralepis
Moraea inclinata
Species group N
Gerbera ambigua
Haplocarpha scaposa
Orthochilus leontoglossus
Orthochilus aculeatus
Wahlenbergia fasciculata
Albuca setosa
Species group O
Koeleria capensis
Helichrysum krebsianum
Thesium goetzeanum
Indigofera hilaris
Graderia scabra
Scleria bulbifera
Hypoxis galpinii
Satyrium longicauda

Major plant community number	1	2														
Plant community number		2.1		2.2	2.3			2.4					2.5			
Sub-community number		2.1.1	2.1.2		2.3.1		2.3.2	2.4.1	2.4.2	2.4.3	2.4.4	2.4.5	2.5.1	2.5.2	2.5.3	
Variant number					2.3.1.1	2.3.1.2									2.5.3.1	2.5.3.2
Relevé number	98 99 100	51 55 56 57 43	41 32 68 31	85	45 94 47	48 52 53 93	89 87 18 83 21	58 42	46 72 73 40	38 34	35 44 36 37 20 54 23 13 12 1 11 50 82 28 22 65 4 3 39 17 2	60 59 62 61 86 95 92 24 64 25 80 77 74 81	90 88 15 66 16 70 69 10 49	96 97	63 26 84 7 29 67 71 33 27 5 14 8	75 91 9 6 78 79 30 19 76
Species group P																
Helichrysum nudifolium* var. *nudifolium	. . .	. . . . .	. . . .	+	+ . .	+ . . +	. . + . .	. +	. . . .	+ +	. . . 1 + . + + . . . 1 . + . 2 + + . . +	+ 1 1 r . 1 1 + 1 + . 1 . +	. . . .	. +	. . 1 . + ...	. . . .
Helichrysum glomeratum	. . .	. . . . .	. . . .	.	. . .	. . . .	. + . + .	. .	. . . r	. .	. . + r . . + . + ... +	. 1 . . + . + + + . . . + +	. . . . + . + . .	. .	+ + + + . + + ...	. . . + ...
Helichrysum herbaceum	. . .	. . . . +	. . . .	.	. . .	. . . .	+ + . + .	. .	. . . .	. .	+ . . 1 . . . . + . + . . . r 1	+ 1 . . + + + . + + + . + +	. . + . . . 1 . +	. .	1 . + + . . . + . . . +	. . . . + ...
Hermannia woodii	. . .	. . . . .	. . . .	.	. . .	. . . .	. + . . .	. +	. . . +	. +	. r . r	+ r + 1 . . + ...	. . . .	. .	. . . .	. . . .
Tolpis capensis	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . . r	r . + r . . . . r r	. . . r r . . r r	. .	. . . .	r . . . .
Rhynchosia totta	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . . r	+ . . r	. . . .	. .	. . . .	. . . . r . . . .
Eulalia villosa	. . .	. + . . .	. . 1 .	.	. . .	. . . .	. r . . .	. 1	. . . .	. +	. . . .	. + ... r	. . . .	. .	. . . .	. . . .
Thesium natalense	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . . r r r . . r . . . r	. r	. .	. . . .	. r . . . .
Sporobolus africanus	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	r + r	. . . . . . 2 . .	. .	. . . .	. . . .
Hypericum aethiopicum	. . .	. . . . r	. . . .	.	. . .	. . . .	. . . . .	. r	. . . r	r .	. . r	. . r . r + ...	. . . r . . . . r	. .	. . . .	. . . .
Ledebouria lachenalioides	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	r .	. . . .	r r r r . . . . r r .	. . . .	. .	. . . .	. . . .
Afroaster hispida	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. r r . . . r . r	. . . .	. .	. . . .	. . . .
Kyllinga species	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	r r . r	. . . .	. .	. . . .	. . . .
Hypoxis filiformis	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . . r . r . r	. . . .	. .	. . . .	. . . .
Aspidoglossum species nova	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . . r	. . . .	. .	. . . .	. . . .
Species group Q																
Elionurus muticus	. . .	. . . . .	. 1 . 1	.	. . .	. . . .	1 1 . . .	. .	. . 1 .	. .	. . . . 1	+ . . . 1 1 1	2 + 2 2 2 1 1 2 1	. .	+ 1 . . . 2 2 1 2 2 + 2	. + ... 1 1
Harpochloa falx	. . .	. . . . .	. + . .	.	. . .	+ + . .	. . 1 . .	. .	1 . . .	. +	. . . . + ... 1	+ . . . . . . 1 . + . . . +	. + 1 2 1 . 2 2 +	. .	. 1 + 1 1 2 1 2 1 1 1 1	1 + 2 1 + + + 1 +
Microchloa caffra	. . .	. . . . .	. . . .	.	. . .	. . + .	. . . . .	. .	. . . .	. .	+ 1	. . . . . . 1 1 . + . . . +	. . 2 2 2 1 1 2 1	1 .	. 1 . 1 . 1 1 . 2 + 2 .	+ + 1 + + + 1 1 1
Brachiaria serrata	. . .	. . . . .	. . . .	.	. . .	. . . .	1 2 . . .	. .	. . . .	. .	. . . .	1 . + 1 1	2 2 1 . 1 2 + 1 .	. .	. . . 1 . 2 1 . 1 . . 1	1 . . . .
Aristida transvaalensis	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . 1 2	. .	. . . .	. .	. . . .	. . . .	. . . 2 1 1 . . .	2 1	. . . . . 1 1 + . 1 . .	1 1 . . . . . 1 2
Cyperus semitrifidus	. . .	. . . . .	. . . .	.	1 . .	. . . .	. . . . +	. .	. . . .	. .	. . . . 1	. . . .	. . 1 1 1 + + + 1	+ 1	+ . . + . + 1 + + + + +	+ 1 . + + 1 1 + 1
Gazania krebsiana	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . +	. .	. . . .	. .	. . . . + . r + + ... + r .	. . . . . . + . . + . . r r	. . + + + r r 1 +	+ +	. + ... r . r +	. + . . + r . r .
Dicoma anomala	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . +	. .	. . . . r + r .	. . . . + ... + . . r +	. . r . . . r + .	. .	. r r + r . r + r + + .	r r . r . . + r .
Senecio scitus	. . .	. . . . .	. . . r	.	. . .	. . . .	. . . . .	. .	. . . .	r r	. . . . r . . . . r + . . .	. . . . r . r . r r	. . . .	. r	. r r r . . r . . r r .	r r r . . r r r r
Gnidia fastigiata	. . .	. . r . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . . . . + ... r	. . + . + . . + .	r +	. . . . . . + . r + . +	. + ...
Species group R																
Cyanotis speciosa	. . .	. . . . .	. . . .	.	. . +	. . . .	1 + . . .	. .	. . . .	. .	. . . . r . r . . . . + ...	. . . . r	. + + . + r r 1 r	. .	r . . . . + . . r . r r	. . . .
Indigofera hedyantha	. . .	. + . . .	. . . .	.	. . .	. . . .	+	. .	. . . .	. .	. . . .	. . . .	1 2	. .	. . . .	. . . .
Richardia brasiliensis	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	+	. . 1 . . + + 1 .	. .	. . . .	. . . .
Eragrostis plana	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	+ .	. . . .	. .	. . . .	r . . 1	. . + + . + 2 . .	. .	. . . .	. . . .
Leobordia eriantha	. . .	. . . . .	. . . r	.	. . .	. . . .	. . . . .	+ +	. . . +	. .	. . . . + . + ...	. . . + ... + ...	. . + r + r . . .	. .	. . + + ... + r .	. . . . . + . . .
Nolletia rarifolia	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . . . + + ...	. . r . + . r + r	. .	. . . . . . r . . + r r	. . . .
Hesperantha baurii	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . r . . r . . .	. .	. . . . r	. . . .
Senecio harveianus	. . .	. . . . .	. . . .	.	. . .	. . . .	. . r . .	. .	. . . .	. .	. . . .	. . . .	. . . r . . r . .	. .	. . . .	. . . .
Polygala hottentotta	. . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . r r	. .	. . . . . r r	. r . . . .
Hypochaeris radicata	. . .	. . . . .	. . . .	.	. . .	. r . .	. . . . .	. .	. . . .	. .	. . . .	. . . . . . r	r r . . . . r . .	. .	. . . .	. . . .


Major plant community number
Plant community number
Sub-community number
Variant number
Relevé number
Species group S
Alepidea natalensis
Erica caffrorum
Rhodohypoxis baurii
Helichrysum krookii
Helichrysum sutherlandii
Sporobolus subulatus
Bulbine favosa
Disa versicolor
Lotononis lotononoides
Neobolusia tysonii
Disa fragrans
Habenaria laevigata
Scabiosa columbaria
Cheilanthes quadripinnata
Species group T
Helichrysum chionosphaerum
Helichrysum oreophilum
Eriosema kraussianum
Gnidia kraussiana
Species group U
Pygmaeothamnus chamaedendrum
Delosperma lavisiae
Cheilanthes hirta
Euphorbia flanaganii
Species group V
Psammotropha mucronata
Helichrysum argentissimum
Helichrysum nanum
Disa stachyoides
Afroaster perfoliatus
Aristea torulosa
Species group W
Diheteropogon filifolius
Rendlia altera
Panicum natalense
Eragrostis racemosa
Alloteropsis semialata subsp. eckloniana
Senecio macrocephalus
Ficinia stolonifera
Ficinia gracilis
Anthospermum herbaceum
Species group X
Heteropogon contortus
Acalypha depressinerva
Loudetia simplex
Trachypogon spicatus
Euryops transvaalensis subsp. setilobus
Helichrysum nudifolium var. pilosellum
Oxalis obliquifolia

4.3 Description of the plant communities

1. *Leucosidea sericea* Forest major community

Indigenous forest patches, covering approximately 9 ha, are found on moist south facing slopes in the shadow of the Elliot Formation cliffs and in sheltered gullies. The altitude range of the relevés is 1 690−1 721 metres above sea level (m.a.s.l.). The gradients of the relevés are level to gentle, between 2−7° ($\bar{x}$=4°), with steeper gradients in the more inaccessible high-lying slopes. Rock cover ranges from 4−20% ($\bar{x}$=10%), and consists of small rocks to large slabs of Elliot Formation sandstone. Extensive moss growth covers most of the rocks and fallen trees. Humus rich topsoil with dense leaf litter is present. Soil depth ranges from 140–250 mm nearby the cliff face to >600 mm in the central forest floor where the taller trees such as *Kiggelaria africana*, *Celtis africana* and *Leucosidea sericea* are present. No signs of erosion were observed.

Species belonging to species group A (Table 4.1) are characteristic for this major community and include the trees *Leucosidea sericea*, *Kiggelaria africana* and *Celtis africana*, the shrubs *Plectranthus grallatus* and *Leonotis dubia*, the forbs *Nemesia sylvatica, Myosotis sylvatica, Galopina circaeoides*, *Argyrolobium tomentosum, Impatiens hochstetteri* subsp. *hochstetteri*, *Dichrocephala integrifolia* subsp. *integrifolia*, the geophytic forb *Scadoxus puniceus*, climbers *Asparagus asparagoides, Riocreuxia torulosa* and the ferns *Polystichum transvaalense*, *Nothoperanema squamiseta*, *Pteris cretica* and *Pleopeltis macrocarpa*.

The vegetation is dominated by the tree *Leucosidea sericea*, while the trees *Kiggelaria africana* and *Celtis africana*, and the shrub *Plectranthus grallatus* are prominent (species group A). Dominant species in the herbaceous layer are the forbs *Achyranthes aspera* (introduced alien), *Nemesia sylvatica, Myosotis sylvatica*, *Galopina circaeoides* and *Scadoxus puniceus* (species group A). In the wet summer months the herbaceous layer can be dense and luxuriant but is dryer and more open in winter months due to most species being annual plants.

The species composition of this forest community indicates affinities with forest found in Highland Sourveld 44a (Acocks, 1988) as well as in the Drakensberg Afromontane forest (Killick, 1963). A notable exception is the absence of the tree *Podocarpus latifolius.* However, Hilliard and Burtt (1987), note that *Podocarpus latifolius* is also absent in forests found in the southern Drakensberg forests on Bamboo Mountain and in the forest in the Gxalingenwa valley.

The geophyte *Sandersonia aurantiaca* (species group A) is present within this community. Previously designated as Declining on the Red Data List, this species is now categorised as of Least Concern, however it is becoming rare throughout its range and locally extirpated in many areas due to flower picking, crop cultivation, forestry and overgrazing by livestock (SANBI, 2017b).

Amongst the birds present, the near-endemic Barratt's Warbler (*Bradypterus barratti*) and the Vulnerable Bush Blackcap (*Lioptilus nigricapillus*) breed in the forest.

The total number of species recorded for this major community is 45 (three relevés) and the average number of species is 27 per 16 m².

2. *Themeda triandra* Grassland major community

The grassland communities (represented by 97 relevés) are located in a range of habitats covering an area of approximately 108 ha. The topography ranges from level grassy plateaus to gentle and very steep slopes, dolerite rocky outcrops near the summit, as well as stony rock sheets of Elliot Formation sandstone ridges. Rock surface cover varies between 0–65% ($\bar{x}$=14%). Elevation ranges from 1 600–1 905 m.a.s.l. Water trickles and flows down from the summit, through the grasslands along drainage lines, to emerge at about 1 800 m.a.s.l. on ridges as seasonal streams, with waterfalls occurring after heavy rain. Some relevés are found in seeps, drainage lines and small marshy patches adjacent to streams on relatively small areas of minimal slope.

Occasionally streams burrow underground and sinkholes occur where *Alsophila dregei* tree ferns may grow. Rich humic soils, which may reach depths >600 mm, comprise the Humic A Horizon above the harder Lithocutanic B Horizon formed by sandstones of the Elliott Formation. Erosion ranges from none to Class 3 in some areas. Numerous terracettes are found on some of the steeper slopes.

This major community is characterised by species from species group B (Table 4.1), namely, the bunch grass *Themeda triandra* and the forbs *Hillliardiella aristata* and *Commelina africana*.

The dominant species for this major community is the grass *Themeda triandra* (species group B). The grasses *Tristachya leucothrix* (species group K), *Diheteropogon filifolius*, *Rendlia altera*, *Panicum natalense* and *Alloteropsis semialata* subsp. *eckloniana* (species group W) are locally prominent. Species present in most plant communities, however with a lower frequency, include the grass *Eragrostis racemosa* (species group W), the forbs *Hilliardiella aristata* (species group B) and *Senecio macrocephalus* (species group W), and the sedge *Ficinia stolonifera* (species group W).

The species composition of this major grassland community indicates affinities with Highland Sourveld 44a (Acocks, 1988) as there is a similar dominance of *Themeda triandra* and prominence of the grasses *Tristachya leucothrix*, *Eragrostis racemosa*, *Diheteropogon filifolius*, *Rendlia altera* and *Alloteropsis semialata* subsp. *eckloniana*.

Hlogoma Mountain has been burnt annually in the past or biennially in winter, either as a planned burn or in 2013 by an accidental fire. Cattle graze the Mountain at various times during the year, particularly in late summer. They favour the more level and gentle slopes, but will move to steeper slopes later during the grazing period. Occasionally, a small group of goats from a nearby local settlement graze on the higher, south facing areas.

The total number of species recorded for this major community is 320 (97 relevés) and the average number of species is 29 per 16 m².

2.1 *Agapanthus campanulatus* subsp. *patens*−*Cymbopogon nardus* rocky outcrop community

This community (represented by nine relevés) covering approximately 9 ha, is found mostly on moist, steep slopes ($\bar{x}$=21°) on north, north-west, south and south-west aspects along the edge of the dolerite sill and within the dolerite outcrops near the summit. The elevation of relevés, situated predominantly near the summit, ranges from 1 854–1870 m.a.s.l. Rainfall in this community is 50 mm more than that at the base of the mountain. For many of the 119 mist days recorded for 2015, mist shrouds the dolerite rocky outcrops of this community. Precipitation from mist supplements the rainfall precipitation and contributes to soil moisture.

Species belonging to species group C (Table 4.1) are characteristic for this community and include the small shrub *Searsia discolor*, the grasses *Cymbopogon nardus, Melinis nerviglumis* and the forbs *Agapanthus campanulatus* subsp. *patens*, *Stachys kuntzei* and *Chaenostoma floribundum*.

This community is dominated by the perennial grass *Cymbopogon nardus* (species group C). Other prominent species include the grass *Themeda triandra* (species group B) and the forb *Agapanthus campanulatus* subsp. *patens* (species group C).

Two sub-communities have been identified for this plant community:

- 2.1.1 *Agapanthus campanulatus* subsp. *patens–Cymbopogon nardus–Hyparrhenia dregeana* sub-community

- 2.1.2 *Agapanthus campanulatus* subsp. *patens–Cymbopogon nardus–Koeleria capensis* sub-community

2.1.1 *Agapanthus campanulatus* subsp. *patens–Cymbopogon nardus–Hyparrhenia dregeana* sub-community

This sub-community (represented by five relevés) covers an area of approximately 7 ha. It is located on moist gentle to steep slopes ranging from

4−23° (x̄=19°) on north and north-west aspects along the edge of the dolerite sill and within the dolerite outcrops at elevations ranging from 1 861−1 870 m.a.s.l. There is one relevé in this sub-community situated at a lower elevation (1 682 ma.s.l.) in a stream gulley cutting through a 15 m sandstone ledge. Surface rock cover ranges from 15–60% (x̄=41%) reflecting the presence of small to large dolerite rocks, huge dolerite boulders (some >20 m by 10 m) and the sandstone ledge. Humus rich topsoil with soil depths from 80–240 mm is present. No signs of erosion were noted.

The sub-community is characterised by the presence of species from species group D (Table 4.1). Species include the tree *Heteromorpha arborescens*, the shrubs *Leonotis intermedia*, *Rabdosiella calycina* and *Maytenus acuminata*, the grass *Eragrostis chloromelas*, the forbs *Zantedeschia albomaculata*, *Asparagus cooperi*, *Haemanthus humilis* subsp. *hirsutus, Zaluziankya glareosa*, climbers *Rhyncosia caribaea*, *Dioscorea sylvatica*, succulents *Aloe maculata* and *Crassula sarcocaulus* subsp. *rupicola* and the fern *Cheilanthes eckloniana*.

The sub-community is dominated by the grasses *Hyparrhenia dregeana* (Species group G) and *Cymbopogon nardus* (species group C). Other prominent species include the grass *Themeda triandra* (species group B), the climber *Rhyncosia caribaea* and the tree *Heteromorpha arborescens* (s group D).

Introduced alien species *Bidens pilosa* and *Tagetes minuta* are recorded in this community.

This community is not readily accessible to cattle due to the steep and rocky slopes. Natal Red Rock Rabbit (*Pronologus crassicaudatus*) is occasionally seen and a small, permanent population of Rock Hyrax (*Procava capensis*) is resident in this sub-community.

The vegetation of this sub-community shows affinity with the Platberg Mountain grassland Community 1.1 *Crassula eckloniana–Crassula sarcocaulis* community which is found within the *Themeda triandra–Cyanotis speciosa* major community (Brand *et. al*., 2011). Both communities have dolerite sills present, similar aspects, altitude, rock cover and slope, and share some species, including the grasses *Themeda triandra* and *Melinis nerviglumis*, the introduced alien *Bidens pilosa* and the succulent *Crassula sarcocaulis*.

The climber *Dioscorea sylvatica*, which is classified as Vulnerable, is present in this sub-community.

The total number of species recorded for this sub-community is 84 (5 relevés) and the average number of species is 27 per 16 m².

2.1.2 *Agapanthus campanulatus* subsp. *patens–Cymbopogon nardus–Koeleria capensis* sub-community

This sub-community (represented by four relevés) covers an area of approximately 2 ha. It is located on steep to very steep moist slopes, ranging from 21−28° (x̄=23°). Three relevés are located on south and south-west aspects amongst the large dolerite boulders and rocks near the summit and one relevé faces north along the edge of the dolerite sill. Surface rock cover varies between 25−60% (x̄=44%). Elevations range from 1 854–1870 m.a.s.l. Moist humus rich topsoil is present with soil depth varying greatly from 90 mm close to large rocks to >600mm in places. No erosion was visible.

Species from species group E (Table 4.1) are characteristic for this community and include the forbs *Ocimum obovatum*, *Bupleurum mundii*, *Cephalaria oblongifolia, Cotula hispida, Cyphia elata, Kniphofia laxiflora, Senecio subrubriflorus, Pimpinella caffra, Senecio oxyriifolius, Streptocarpus polyanthus* subsp. *dracomontanus, Pearsonia grandifolia, Afroscidium caffrum, Alepidea amatymbica, Eucomis bicolor* and *Schizoglossum bidens* subsp. *pachyglossum* and the succulents *Crassula setulosa* var. *setulosa* and *Crassula umbraticola.*

The sub-community is dominated by the grasses *Themeda triandra* (species group B) and *Koeleria capensis* (species group O). Other prominent species include the grasses C*ymbopogon nardus* (species group C), *Alloteropsis semialata* subsp. *eckloniana* and *Panicum natalense* (species group W), and the forb *Agapanthus campanulatus* subsp. *patens* (species group C).

Cattle do not graze in this community due to the steep and rocky slopes, however, goats from a nearby settlement are occasionally seen grazing in this community.

The Endangered *Alepidea amatymbica* and the Near Threatened *Eucomis bicolor* are present in this sub-community.

The total number of species recorded for this sub-community is 106 (4 relevés) and the average number of species is 47 per 16 m².

2.2 *Senecio erubescens* var. *crepidifolius–Hyparrhenia dregeana* seep community

This rare community (one relevé) is located near the base of Hlogoma Mountain (at 1 631 m.a.s.l.) in a north facing, seasonally waterlogged seep. Due to the small size of this community, only one sample plot could be surveyed without significant overlap. The community has a gradual slope of five degrees and is found below an eroded slope with exposed pink clay subsoil. The moist humus rich topsoil is mixed with the clay subsoil from the eroded slope. No surface rockiness is present.

Species from species group F (Table 4.1) are characteristic for this community and include the forbs *Senecio erubescens* var. *crepidifolius, Senecio heliopsis, Nidorella pinnata*, *Conyza chilensis, Acalypha glandulifoila* and *Gladiolus ecklonii*.

This community is dominated by the grass *Hyparrhenia dregeana* (species group G). Other important species include the grass *Themeda triandra* (species group B), the forbs *Senecio erubescens* var. *crepidifolius, Senecio heliopsis* and *Nidorella pinnata* (species group F).

The total number of species recorded for this community is 21 (1 relevé) per 16 m².

2.3 *Alloteropsis semialata* subsp. *eckloniana–Arundinella nepalensis* wet/moist grassland community

This community (represented by 12 relevés) is found on moist/wet, level to steep slopes ranging from 3−23° (x̄=13°) on north, north-west and south-west aspects within the Elliot Formation geological strata. Some of the relevés may become seasonally waterlogged.

Species from species group G (Table 4.1) are characteristic for this community and include the grasses *Arundinella nepalensis*, *Hyparrhenia dregeana, Eragrostis planiculmis* and *Miscanthus ecklonii,* and the forbs *Helichrysum umbraculigerum* and *Senecio inornatus*.

The community is dominated by the perennial grasses *Themeda triandra* (species group B), *Arundinella nepalensis* and *Hyparrhenia dregeana* (species group G). Other important species include the grasses *Alloteropsis semialata*

subsp. *eckloniana* (species group W), *Eragrostis planiculmis* (species group G), and the forb *Helichrysum umbraculigerum* (species group G).

Two sub-communities have been identified for this plant community:

- 2.3.1 *Alloteropsis semialata* subsp. *eckloniana–Arundinella nepalensis–Cyperus congestus* sub-community

- 2.3.2 *Alloteropsis semialata* subsp. *eckloniana–Arundinella nepalensis–Acalypha punctata* sub-community

2.3.1 *Alloteropsis semialata* subsp. *eckloniana–Arundinella nepalensis–Cyperus congestus* sub-community

This sub-community (represented by seven relevés) covering an area of approximately 0.5 ha, is located on gentle to steep slopes on north, north-west and south-west aspects ranging from 4−23° ($\bar{x}$=11°) within the Elliot Formation

geological strata. The relevés occur in seeps, at the origin of streams, across small running streams, on moist grassy slopes above streams and near waterfalls. Surface rock cover varies from 1−40% ($\bar{x}$=15%). Altitude varies from 1 705−1 810 m.a.s.l. Humus rich sandy-clay loamy soil is present with varying soil depths from relatively shallow values of 70−95 mm to depths of >500 mm. During the dry winter season some of the shallow wet areas may dry out completely. Slight erosion is present in some relevés while Class 2 erosion is present where the streams have cut through to the bedrock and in trampled areas where cattle drink.

Species from species group H (Table 4.1) are characteristic for this community and include the forbs *Lobelia erinus, Epilobium salignum, Helichrysum mundtii, Helichrysum aureonitens,* the robust perennial forbs *Pycnostachys reticulata, Sium repandum*, the sedges *Cyperus congestus* and *Isolepis cernua*, and the fern *Thelypteris bergiana*.

The vegetation is dominated by the perennial wetland grass *Arundinella nepalensis* and the moist-loving grass *Hyparrhenia dregeana* (species group G). Other prominent species include the grasses *Themeda triandra* (species group B), *Alloteropsis semialata* subsp. *eckloniana* (species group W), and the sedge *Cyperus congestus* (species group H).

The introduced alien *Oenothera rosea* was recorded in this community.

This community has some affinity with Community 2 and the *Pycnostachys reticulata−Arundinella nepalensis* Wetland as described by Eckhardt *et al.* (1996b). Both communities are located along mountain streams and vlei areas and share a number of species, including the grasses *Arundinella nepalensis* (dominant in both communities), *Hyparrhenia dregeana*, the forbs *Pycnostachys reticulata*, *Sium repandum*, *Nidorella auriculata*, and the introduced alien *Oenothera rosea.*

The total number of species recorded for this sub-community is 91 (seven relevés) and the average number of species per 16 m² is 25.

Two variants have been identified for this sub-community:

- 2.3.1.1 *Gunnera perpensa* variant
- 2.3.1.2 *Typicum* sp. variant

2.3.1.1 *Gunnera perpensa* variant

Species from species group I (Table 4.1) are characteristic for this variant and include the forbs *Gunnera perpensa, Helichrysum cooperi, Nidorella obscura, Limosella africana*, *Kniphofia* sp., *Ludwigia palustris, Agrimonia procera, Conyza bonariensis* and *Xyris capensis*, the sedges *Isolepis sepulcralis* and *Isolepis costata*, and the rush *Juncus effusus*.

The vegetation is dominated by the perennial wetland grass *Arundinella nepalensis* (species group G). Other locally prominent species include the small tree *Leucosidea sericea* (species group A), the forb *Gunnera perpensa* (species group I), and the sedge *Cyperus congestus* (species group H).

The Category 1b invasive species *Agrimonia procera* is present in this community.

The species *Gunnera perpensa* previously designated in the Red Data List as Declining is now categorised as of Least Concern. However, high volumes traded in the traditional medicine market in conjunction with the degradation and decline of its habitat may lead to re-assessment in the future (SANBI, 2017b).

2.3.1.2 *Typicum* sp. variant

This variant is characterized by the presence of species from species group G and H, and the absence of species from species group I.

This variant is dominated by the perennial grasses *Themeda triandra* (species group B), *Arundinella nepalensis* and *Hyparrhenia dregeana* (species group G). Other locally prominent species include the grass *Alloteropsis semialata* subsp. *eckloniana* (species group W) and the sedge *Cyperus congestus* (species group H).

2.3.2 *Alloteropsis semialata* subsp. *eckloniana–Arundinella nepalensis–Acalypha punctata* sub-community

This sub-community (represented by five relevés), covers approximately 1 ha and consists of moist to patchily damp scattered relevés. The community occurs on rough grassy moderate slopes with a relatively uniform gradient ranging from 14−18° (x̄=15°) on north, north-west and south-west aspects within the Elliot Formation geological strata. Underground streams run beneath two of the relevés, a seep is present below one relevé and two relevés are located on patchily damp grassy slopes exhibiting slight to Class 2 erosion. Terracettes, some up to 0.5 m high, are present. Surface rock cover ranges from 0−4% (x̄=2%). Altitude varies between 1 667−1 778 m.a.s.l. Humus rich topsoil with exposed sandy-clay loam is present in three relevés, as well as a mix of humus rich topsoil with stony sandy-clay loam present in the relevés with the deep terracettes. Soil depths range from 150 mm−450 mm.

Species from species group J (Table 4.1) are characteristic for this sub-community and include the shrubs *Lessertia perennans* and *Phygelius aequalis*, and the forbs *Acalypha punctata*, *Helichrysum simillimum* and *Afroaster pleiocephalus.*

The vegetation is dominated by the perennial grasses *Themeda triandra* (species group B), *Arundinella nepalensis*, *Hyparrhenia dregeana* and *Eragrostis planiculmis* (species group G), and the forb *Acalypha punctata* (species group J). Other prominent species include the grasses *Panicum natalense* and *Alloteropsis semialata* subsp. *eckloniana* (species group W).

The total number of species recorded for this community is 68 (5 relevés) and the average number of species is 25 per 16 m².

2.4 *Diheteropogon filifolius–Tristachya leucothrix* open grassland community

This community (represented by 43 relevés) covering approximately 82 ha, is located on level, gentle and moderately steep slopes ranging from 3−16° ($\bar{x}$=9°) on predominantly north and north-west aspects.

Species from species group K (Table 4.1) are characteristic for this sub-community and include the grasses *Tristachya leucothrix* and *Panicum ecklonii*, and the forbs *Berkheya rhapontica, Helichrysum pallidum, Hypoxis argentea*, *Pentanisia prunelloides* and *Oxalis smithiana*.

The community is dominated by the perennial grasses *Themeda triandra* (species group B), *Tristachya leucothrix* (species group K), *Diheteropogon filifolius*, *Panicum natalense*, *Rendlia altera* and *Eragrostis racemosa* (species group W). Other prominent species include the grasses, *Loudetia simplex*, *Heteropogon contortus* and the forb *Acalypha depressinerva* (species group X).

Some affinities exist, *senso lato*, between this community and the *Proteo simplicis−Themedetum triandrae* ass. nov. of the mesic grassland of the syntaxonomic study of the Stormberg/Drakensberg mountain region in the Eastern Cape (Hoare and Bredenkamp, 2001). Shared dominant and prominent grasses include *Themeda triandra*, *Eragrostis racemosa* and *Heteropogon contortus*. Other shared species include the shrub *Protea simplex*, the forbs *Hypoxis argentea*, *Acalypha depressinerva*, *Pentanisia prunelloides*, *Helichrysum nudifolium* var. *pilosellum*, and the sedge *Ficinia gracilis*.

2.4.1 *Diheteropogon filifolius–Tristachya leucothrix–Schistostephium crataegifolium* sub-community

This small and rare sub-community (represented by two relevés) covering approximately 0.5 ha, is located on north facing rocky grassy slopes at the base of the dolerite sill. The gradient on these gentle, moist slopes ranges from 6−8° (x̄=7°). Surface rock cover ranges from 10−15% (x̄=13%) and elevation varies between 1 861−1 864 m.a.s.l. Humus rich topsoil is present with depths between 140–300 mm.

Species from species group L (Table 4.1) are characteristic for this community and include the shrub *Leonotis leonurus,* the grass *Helictotrichon turgidulum*, and the forbs *Schistostephium crataegifolium*, *Argyrolobium marginatum, Nemesia denticulata* and *Argyrolobium tuberosum*.

The sub-community is dominated by the perennial grasses *Themeda triandra* (species group B), *Tristachya leucothrix* (species group K) and the herb

Acalypha punctata (species group J). The grass *Cymbopogon nardus* (species group C) is locally prominent.

This community is on the portion of the mountain where cattle are grazed on a rotational basis. However, these relevés are at a high elevation and located in a rocky portion of the grassland at the base of the dolerite summit and cattle were not often seen grazing in this area.

The total number of species recorded for this sub-community is 54 (2 relevés) and the average number of species is 33 per 16 m².

2.4.2 *Diheteropogon filifolius–Tristachya leucothrix–Helichrysum krebsianum* sub-community

This sub-community (represented by four relevés) covering approximately 1 ha, is found on moderate to steep grassy slopes ranging from 13−18° ($\bar{x}$=15°) on west, east, south-west and south-east aspects. Surface rockiness is low,

between 1–4% (x̄=2.5%). There is one relevé at 1 774 m.a.s.l. within the Elliot Formation strata and the other relevés are at higher altitudes from 1 846−1 876 m.a.s.l. located adjacent to the dolerite rocky outcrops. The soil is humus rich topsoil with depths ranging from 155–520 mm. There was none to slight erosion visible.

Species from species group M (Table 4.1) are characteristic for this community and include the forbs *Gnidia phaeotricha, Acalypha peduncularis, Indigofera woodii, Helichrysum spiralepsis* and *Moraea inclinata*.

The sub-community is dominated by the perennial grasses *Themeda triandra* (species group B), *Tristachya leucothrix* (species group K), *Koeleria capensis* (species group O) and *Diheteropogon filifolius* (species group W), and the forb *Helichrysum krebsianum* (species group O). Other prominent species include the grasses *Panicum natalense*, *Rendlia altera, Eragrostis racemosa*, *Alloteropsis semialata* subsp. *eckloniana* (species group W) and the grass *Heteropogon contortus* (species group X).

This community is located on two different portions of the Mountain grassland, where cattle graze on a rotational basis and where late summer grazing is practised. Cattle grazed in areas that have a moderate slope with reduced rock cover.

The total number of species recorded for this sub-community is 58 (4 relevés) and the average number of species is 29 per 16 m².

2.4.3 *Diheteropogon filifolius–Tristachya leucothrix–Gerbera ambigua* sub-community

This rare sub-community (represented by two relevés) covering approximately 0.5 ha, is located on moist gentle and moderately steep grassy slopes ranging from 5−12° ($\bar{x}$=9°) on north and north-west aspects a short distance below the dolerite sill. There is no surface rockiness. The elevation varies between1 827−1 842 m.a.s.l. The soil is humus rich topsoil with soil depths between 250–360 mm. There was no visible erosion.

Species group N is characteristic for this sub-community and includes the forbs *Gerbera ambigua*, *Haplocarpha scaposa, Orthochilus leontoglossus, Orthochilus aculeatus, Wahlenbergia fasciculata* and *Albuca setosa*.

The sub-community is dominated by the perennial grasses *Themeda triandra* (species group B) and *Diheteropogon filifolius* (species group W). Other prominent species include the grasses *Tristachya leucothrix* (species group K),

Rendlia altera (species group W), *Heteropogon contortus* (species group X) and the forb *Senecio macrocephalus* (species group W).

This community is on the portion of the mountain where cattle are grazed for two to three months in late summer. These relevés are easily accessible and are favoured areas for grazing.

The total number of species recorded for this community is 49 (2 relevés) and has an average number of 35 species per 16 m².

2.4.4 *Diheteropogon filifolius–Tristachya leucothrix–Helichrysum pallidum* sub-community

This sub-community (represented by 21 relevés) covering approximately 46 ha, is located on level, gentle and moderately steep slopes ranging from 2−16° ($\bar{x}$=8°) on predominantly north and north-west aspects within the Elliot Formation geological strata. Surface rock cover is mostly absent. The elevation

varies between 1 716−1 800 m.a.s.l. Relevés sampled at higher altitudes from 1 823−1 864 m.a.s.l. are found on the edge of dolerite rocky outcrops. There is none to slight erosion which is visible in most of the relevés in the form of shallow terracettes. The soil type is humus rich topsoil and soil depth ranges from 250−450 mm. In relevés on the dolerite outcrops, sandy-clay loam with yellow dolerite soils are present

Species group O is characteristic for this sub-community and includes the grass *Koeleria capensis*, the forbs *Helichrysum krebsianum*, *Thesium goetzianum*, *Indigofera hilaris*, *Graderia scabra*, *Hypoxis galpinii*, *Satyrium longicauda*, and the sedge *Scleria bulbifera*.

The sub-community is dominated by the perennial grasses *Themeda triandra* (species group B), *Tristachya leucothrix* (species group K), *Diheteropogon filifolius* and *Rendlia altera*, (species group W). Other prominent species include the grasses *Panicum natalense*, *Eragrostis racemosa, Alloteropsis semialata* subsp. *eckloniana* (species group W) and *Heteropogon contortus*, and the forbs *Helichrysum pallidum* (species group K) and *Acalypha depressinerva* (species group X).

The majority of the relevés of this community are on the portion of the mountain where cattle are grazed for only two to three months in late summer. The grassy, gentle slopes with little rock cover are easily accessible and are favoured by the cattle. Numerous active and old molerat hills are present.

This sub-community has some affinity with the Platberg Mountain grassland *Watsonia lepida–Helichrysum pallidum* sub community (Brand *et. al*., 2011). Both communities have little rock cover, deep soils, no erosion and share some species, including the grasses *Themeda triandra, Tristachya leucothrix Heteropogon contortus*, and the forbs *Helichrysum pallidum* and *Commelina africana*.

The Critically Endangered forb *Asclepias concinna* is present within this sub-community.

The total number of species recorded for this sub-community is 87 (21 relevés) and the average number of species is 26 per 16 m².

2.4.5 *Diheteropogon filifolius–Tristachya leucothrix–Helichrysum nudifolium* var. *nudifolium* sub-community

This sub-community (represented by 14 relevés) covering approximately 34 ha, is located on level, gentle and moderately steep slopes ranging from 1−16° ($\bar{x}$=8°) on predominantly northerly aspects. The surface rock cover is predominantly zero with three relevés having values from 3−12%. The elevation varies between 1 623−1 768 m.a.s.l. for the relevés within the Elliot Formation. Three relevés, located at higher altitudes from 1 813−1 831 m.a.s.l., are found on the edge of dolerite rocky outcrops. The soil is predominantly humus rich topsoil in areas of little or no erosion with soil depths up to 550 mm. Four

relevés, situated on moderate to steep slopes in this community, show Class 2 erosion exposing sandy-clay loamy soil.

Species group P is characteristic for this sub-community and includes the grasses *Eulalia villosa* and *Sporobolus africanus*, the forbs *Helichrysum nudifolium* var. nudifolium, *Helichrysum glomeratum*, *Helichrysum herbaceum*, *Hermannia woodii*, *Tolpis capensis, Rhyncosia totta, Thesium natalense*, *Hypericum aethiopicum*, *Ledebouria lachenaloides, Afroaster hispida, Hypoxis filiformis*, *Aspidoglossum* sp. nov., and the sedge *Kylinga* sp.

This sub-community is dominated by the perennial grasses *Themeda triandra* (species group B), *Tristachya leucothrix* (species group K), *Diheteropogon filifolius* and *Rendlia altera* (species group W). Other prominent species include the grasses *Panicum natalense*, *Eragrostis racemosa* (species group W) and *Heteropogon contortus*, and the forb *Acalypha depressinerva* (species group X).

This community is located on two different portions of Hlogoma, where there is rotational grazing in seven relevés, and where there is grazing for only two to three months in late summer on the other seven. Some of the relevés are easily accessible, with little rock cover, and are favoured by the cattle. Many fresh and old molerat hills were recorded.

A new species, *Aspidoglossum* sp. nov. is present in this community.

The total number of species recorded for this sub-community is 90 (14 relevés) and the average number of species per 16 m² is 30.

2.5 *Elionurus muticus−Harpochloa falx* rocky slope/ridge grassland community

This community (represented by 32 relevés) covering approximately 16 ha, is located on level to very steep slopes (1−30°, x̄=14°) at variable aspects on predominantly rocky grassy slopes, ridges and platforms of the Elliott Formation. Mean surface rock cover is 25%.

Species group Q is characteristic for this sub-community and includes the grasses *Elionurus muticus*, *Harpochloa falx*, *Microchloa caffra*, *Brachiaria serrata* and *Aristida transvaalensis*, the forbs *Gazania krebsiana*, *Dicoma anomala, Senecio scitus*, *Gnidia fastigiata*, and the sedge *Cyperus semitrifidus*.

The community is dominated by the perennial grasses *Elionurus muticus* and *Harpochloa falx* (species group Q). Other prominent species include the grasses *Themeda triandra* (species group B), *Microchloa caffra* (species group Q), *Panicum natalense*, *Rendlia altera*, *Eragrostis racemosa* and *Ficinia*

stolonifera (species group W), and *Heteropogon contortus* and *Loudetia simplex* (species group X).

Cattle tend to generally avoid this community owing to the difficulties of walking on rocky, moderately steep grassy slopes and rocky ridges.

2.5.1 *Elionurus muticus–Harpochloa falx–Cyanotis speciosa* sub-community

This sub-community (represented by 9 relevés) covering approximately 5 ha, is located on mainly moderate slopes ranging from 2−18° (x̄=10°) on predominantly north-facing aspects. This community occurs near rocky ridges and on rocky, eroded grassy slopes with surface rock cover ranging from 1–54% (x̄=20%). Elevation ranges from 1 669−1 747 m.a.s.l. All the relevés are situated within the Elliot Formation geological strata. Class 2 to 3 erosion is present in all the relevés with topsoil and stony sandy-clay loam present in

some relevés, and pink clay subsoil exposed in areas with a higher erosion class. Soil depths are predominantly shallow and range from 40–380 mm.

Species group R is characteristic for this sub-community and includes the grass *Eragrostis plana* and the forbs *Cyanotis speciosa, Indigofera hedyantha, Richardia brasiliensis, Leobordia eriantha, Nolletia rarifolia, Hesperantha baurii*, *Senecio harveianus*, *Polygala hottentotta* and *Hypochaeris radicata.*

This sub-community is dominated by the perennial grasses *Elionurus muticus*, *Harpochloa falx* and *Microchloa caffra* (species group Q). Other prominent species include the grasses *Themeda triandra* (species group B), *Brachiaria serrata* (species group Q), *Panicum natalense, Eragrostis racemosa* (species group W), *Heteropogon contortus* (species group X), and the forb *Cyanotis speciosa* (species group R),

Alien plant species recorded in this sub-community are *Richardia brasiliensis* and *Hypochaeris radicata*.

Four relevés sampled in this community, which have level to gentle slopes, are located a few meters above a sandstone ridge and are braided with cattle paths. Cattle regularly use these paths in the early morning and late afternoon to go to and from drinking areas resulting in disturbed and eroded areas. The grass *Eragrostis plana,* which is known to occur on disturbed and trampled areas (Van Oudtshoorn, 1992), and the forbs *Richardia brasiliensis* and *Hypochaeris radicata,* species which also occur in disturbed places (Van Wyk and Malan, 1997; Bromilow, 2001), are present in these relevés.

The total number of species recorded for this sub-community is 82 (9 relevés) with an average number of 28 species per 16 m².

2.5.2 *Elionurus muticus–Harpochloa falx–Berkheya rhapontica* sub-community

This rare sub-community (represented by 2 relevés) covering 0.04 ha, is located on steep to very steep moist slopes (21−30°, x̄=26°) on the south-east aspect of Hlogoma Mountain. The elevation is between 1 720−1 722 m.a.s.l. The community is located on exposed Elliot Formation medium-grained sandstone ridges with surface rock cover ranging from 30–55% (x̄=43%). Moist, shallow, humus rich topsoil at depths between 60–90 mm is present on the sandstone.

Species group S is characteristic for this sub-community and includes the grass *Sporobolus subulatus*, the forbs *Alepidea natalensis*, *Erica caffrorum*, *Rhodohypoxis baurii*, *Helichrysum krookii*, *Helichrysum sutherlandii, Bulbine favosa*, *Disa versicolor*, *Lotononis lotononoides*, *Neobolusia tysonii*, *Disa fragrans, Habenaria laevigata*, and *Scabiosa columbaria*, and the fern *Cheilanthes quadripinnata.*

Prominent species in this sub-community include the perennial grasses *Miscanthus ecklonii* (species group G), *Aristida transvaalensis* (species group Q), *Panicum natalense, Rendlia altera* (species group W) and *Loudetia simplex* (species group X).

The total number of species recorded for this community is 49 (2 relevés) and the average number of species is 38 per 16 m².

2.5.3 *Elionurus muticus–Harpochloa falx–Helichrysum chionosphaerum* sub-community

This sub-community (represented by 21 relevés) covering approximately 11 ha, is located on level to moderate slopes (1–19°, x̄ = 10°) on Elliot Formation rocky ridges and platforms. Aspect is variable and includes north, north-west, south-west, east and north-east aspects. Rock surface cover ranges from 1–65% (x̄=26%). Elevation ranges from 1 714−1 840 m.a.s.l. Slight to Class 3 erosion

is present in relevés in this sub-community with humus topsoil eroded to stony sandy-clay loam. Shallow soil depth ranges from 40−150 mm.

Species group T is characteristic for this sub-community and includes the forbs *Helichrysum chionosphaerum, Helichrysum oreophilum, Eriosema kraussianum* and *Lasiosiphion kraussianus.*

The community is dominated by the perennial grasses *Elionurus muticus* and *Harpochloa falx* (species group Q). Other prominent species include the grasses *Themeda triandra* (species group B), *Microchloa caffra* (species group Q), *Panicum natalense*, *Rendlia altera, Eragrostis racemosa* (species group W), *Heteropogon contortus, Loudetia simplex* (species group X), and the forb *Helichrysum chionosphaerum* (species group T).

This sub-community has some affinity with the Platberg Mountain grassland 2.2 *Muraltia saxicola−Helichrysum chionosphaerum* community (Brand *et. al*., 2011) Both communities have similar rock cover and slope, and share some species, including the grasses *Eragrostis racemosa, Heteropogon contortus* and *Harpochloa falx*, the forbs *Helichrysum chionosphaerum* and *Helichrysum argentissimum*, and the sedge *Ficinia stolonifera*.

The total number of species recorded for this community is 102 (21 relevés) and the average number of species is 30 per 16 m².

Two variants have been identified for this sub-community:

- 2.5.3.1 *Pygmaeothamnus chamaedendrum* var. *chamaedendrum* variant

- 2.5.3.2 *Psammatropha mucronata* variant

2.5.3.1 *Pygmaeothamnus chamaedendrum* var. *chamaedendrum* variant

Species group U is characteristic for this sub-community and includes the dwarf forb *Pygmaeothamnus chamaedendrum*, the succulents *Delosperma lavisiae, Euphorbia flanaganii*, and the fern *Cheilanthes hirta.*

The variant is dominated by the perennial grasses *Elionurus muticus*, *Harpochloa falx* and *Microchloa caffra* (species group Q). Other prominent species include *Themeda triandra* (species group B), *Panicum natalense*, *Rendlia altera, Eragrostis racemosa* (species group W) and *Loudetia simplex* (species group X).

2.5.3.2 *Psammatropha mucronata* variant

This variant is characterised by the dwarf forb *Psammatropha mucronata*, the forbs *Helichrysum argentissimum, Helichrysum nanum, Disa stachyoides, Afroaster perfoliatus* and *Aristea torulosa.*

The variant is dominated by the perennial grass *Harpochloa falx* (species group Q). Other prominent species include the grasses *Microchloa caffra* (species group Q), *Panicum natalense*, *Rendlia altera*, *Eragrostis racemosa,* (species group W), *Loudetia simplex* (species group X), and the sedges *Cyperus semitrifidus* (species group Q) and *Ficinia stolonifera* (species group W).

4.4 Plant community ordination

A CCA ordination diagram (Figure 4.2) was generated using the R package Vegan to display the distribution of the 100 relevés in the study area, the plant communities they belong to and their relationship with environmental variables (indicated by arrows) on the ordination graph.

The CCA ordination diagram (Figure 4.2) allows for interpretation of the distribution of the plant communities along the gradients of identified key environmental variables. As approximately 92% of the study area is grassland, the ordination analysis was important for understanding how environmental variables contribute towards the formation of the different grassland communities.

The plant communities, grouped according to the phytosociological table for Hlogoma Mountain (Table 4.1), are represented in the ordination diagram by different colour polygons. Plant community 1 (*Leucosidea sericea* Forest) with green; 2.1 (*Agapanthus campanulatus* subsp. *patens–Cymbopogon nardus* community) with blue; 2.2 (*Senecio erubescens–Hyparrhenia dregeana* seep) with light green; 2.3 (*Alloteropsis semialata* subsp. *eckloniana–Arundinella nepalensis* grassland community) with red; 2.4 (*Diheteropogon filifolius–Tristachya leucothrix* grassland community) with yellow; and 2.5 (*Elionurus muticus–Harpochloa falx* grassland community) with purple. Environmental variables selected for the ordination were: altitude, slope, geology, rockiness, aspect, erosion, soil water, soil type and soil depth.

The direction and relation of an ‘environmental’ gradient arrow to the x and y axes indicates the environmental gradient for that specific variable (ter Braak and Prentice, 1988). Axis 1 shows the variance in aspect, soil type, soil water and erosion and Axis 2 shows the variance in rock cover and soil depth.

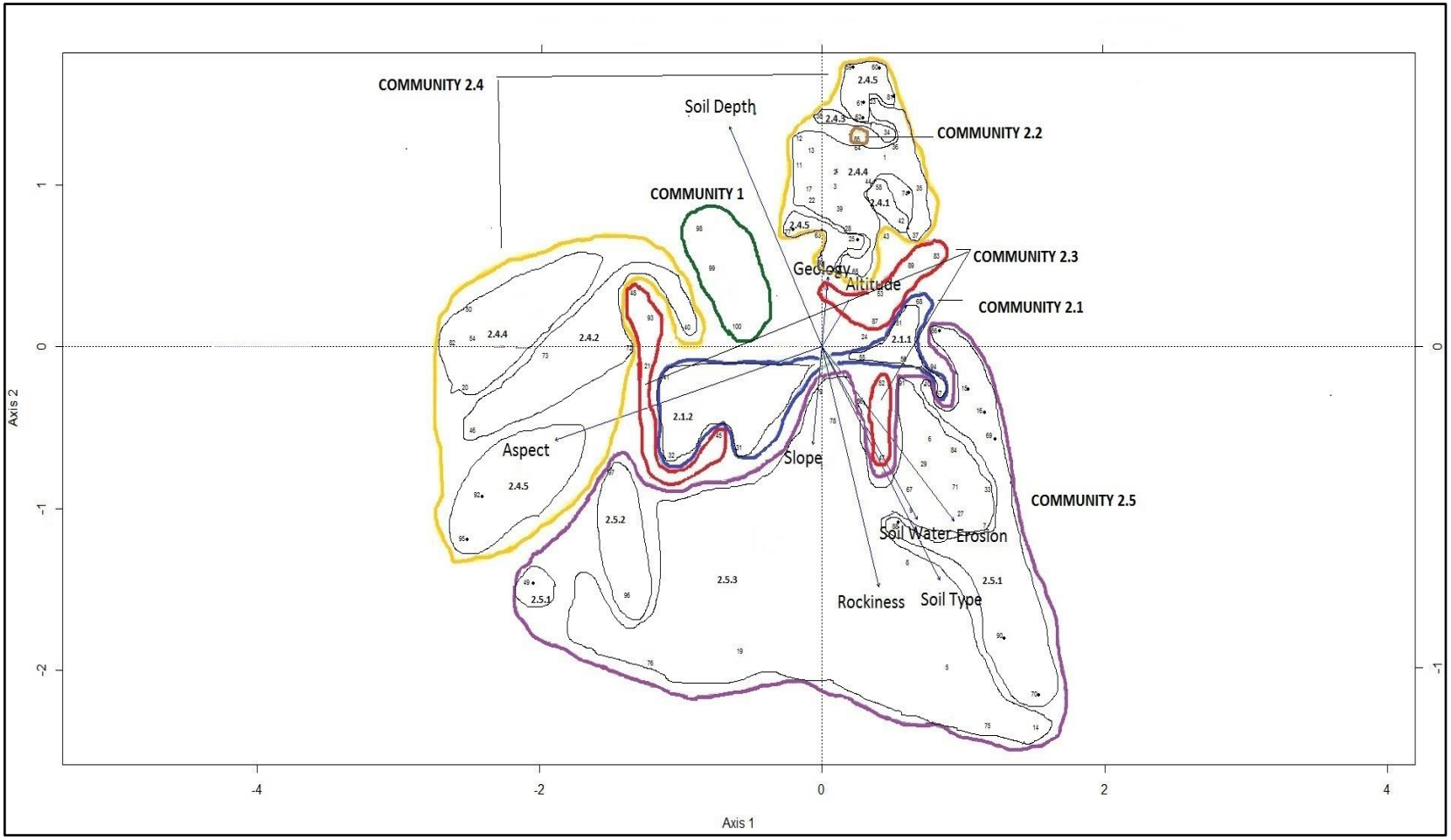


Figure 4.2: CCA Ordination results of the plant communities in the study area

Community 1 (*Leucosidea sericea* Forest major community) is associated with moist conditions, however, it is delineated by its south facing aspect, moderately deep to shallow humus rich soils and while altitude and geology were not indicated as key environmental factors, this community is confined within a small elevation range of 1 690–1 721 ma.s.l. in the lee of Elliott Formation cliffs and in moist gullies.

Community 2.1 (*Agapanthus campanulatus* subsp. *patens–Cymbopogon nardus* rocky outcrop community) is associated with moist conditions, however, it is delineated by the following key environmental variables: moderate to high surface dolerite rock cover, including extremely large boulders; humus rich soils with soil depths from shallow to moderate and while elevation and slope were not indicated as key environmental factors, this community is located near the summit and is associated with predominantly steep slopes. Aspect delineates this community into two sub-communities, 2.1.1 north and north-west facing and 2.1.2 south and south-west facing.

Community 2.2 (*Senecio erubescens–Hyparrhenia dregeana* seep community) is a little community associated with moist conditions, deep, humus rich soil and no rock cover at the base of the mountain.

Community 2.3 (*Alloteropsis semialata* subsp*. eckloniana–Arundinella nepalensis* wet/moist grassland community) is delineated primarily by the soil water environmental variable in the wet range and wet/moist range of the variance. In addition, low to moderate rock surface cover, low to moderate soil depths and a range of soil from humus rich soil to a mixture of humus and stony sandy-clay soil in moderately eroded areas also contribute to the delimitation of this community.

Community 2.4 (*Diheteropogon filifolius–Tristachya leucothrix* open grassland community) is associated with moist conditions; however, it is delineated by the following key environmental variables: humus rich topsoil with moderate to deep

soils depths, none to low rock surface cover and no obvious erosion. Aspect separates out sub-communities 2.4.2, 2.4.4 and 2.4.5 in this community.

Community 2.5 (*Elionurus muticus–Harpochloa falx* rocky slope/ridge grassland community) is delineated primarily by the soil water environmental variable in the dry range of the variance and moderate to high surface rock cover with predominantly shallow soil depths. While slope was not indicated as a key environmental vector, this community is associated with predominantly moderate to steep slopes. Aspect, erosion and soil type delineate this community into three sub-communities.

4.5 Discussion

Two clearly defined structural vegetation units, namely forest and grassland, were identified in the study area. The forest is approximately 9 ha and the grassland 108 ha in size. The relatively small survey area of 117 ha and the total of 100 relevés allowed for a detailed vegetation analysis of the site.

Community 1, *Leucosidea sericea* Forest major community, is confined to moist south-facing areas in gullies and in the shadow of Elliott Formation cliffs. According to Killick (1990), these environmental parameters provide favourable conditions for forest occurrence in the Drakensberg, namely sheltered, moist, south and east facing slopes and gullies, which provide protection from wind and fire.

The balance of the study area is represented by Community 2, *Themeda triandra* Grassland major community. Mucina and Rutherford (2006) state that various plant communities may be found within the Grassland Biome. On Hlogoma Mountain, five grassland communities were found. These are: Community 2.1 within and on the edge of the dolerite sill which forms a moist rocky outcrop community and includes small shrubs and trees; Community 2.2, a seasonally wet little seep at the base of the Mountain; Community 2.3, a

wet/moist community found at stream origins, marshy areas along streambanks and drainage lines; Community 2.4, a moist high altitude open grassland on deep and moderately deep soils; and Community 2.5, a drier community found on the shallow soils on rocky sandstone ridges and slopes with high rock cover.

4.5.1 Distribution of plant species in communities

Community 1 (*Leucosidea sericea* Forest major community): The occurrence of forest margin and forest proper tree species *Leucosidea sericea*, *Kiggelaria africana* and *Celtis africana* and forest floor species, including the shrub *Plectranthus grallatus* and the forbs *Nemesia sylvatica*, *Myosotis sylvatica*, *Impatiens hochstetteri*, and *Galopina circaeoides*, in this community accords with the description of their habitat choices (Killick, 1990; Pooley, 2003).

Community 2.1 (*Agapanthus campanulatus* subsp. *patens–Cymbopogon nardus* rocky outcrop community): The occurrence of the dominant grass *Cymbopogon nardus* in this community accords with the description of its habitat choice as locally common along drainage lines and damp slopes in mountain grassland (Hilliard and Burtt, 1987; Van Oudtshoorn, 2009). Similarly, *Themeda triandra* and the forb *Agapanthus campanulatus* subsp. *patens* are respectively described as often dominant on mountain slopes (Hilliard, 1996) and associated with moist slopes (Pooley, 2003).

The relatively warmer and drier north and north-west facing relevés, represented by sub-community 2.1.1, present a different floristic composition which favour somewhat drier rocky outcrops compared to the relatively moister south and south-west rocky outcrops, represented by sub-community 2.1.2.

Community 2.2 (*Senecio erubescens–Hyparrhenia dregeana* seep community): This community is dominated by the grass *Hyparrhenia dregeana*, which is often found in moist soils and drainage lines (Van Oudtshoorn, 2009).

Community 2.3 (*Alloteropsis semialata* subsp. *eckloniana–Arundinella nepalensis* wet/moist grassland community): The occurrence of the grasses *Arundinella nepalensis*, *Hyparrhenia dregeana* and *Miscanthus ecklonii* and the forbs *Helichrysum umbraculigerum* and *Senecio inornatus* in this community accords with the description of their habitat choice of streambanks, moist soils near streams and moist grassland, while *Alloteropsis semialata* occurs in stony acidic soils (Pooley, 2003; Van Oudtshoorn, 2009). The hydrophilic plant species, including the forbs *Limosella africana, Ludwigia palustris*, the sedges *Cyperus congestus* and *Isolepis cernua* and *Isolepis sepulcralis,* were recorded in marshy areas.

Community 2.4 (*Diheteropogon filifolius–Tristachya leucothrix* open grassland community): The occurrence of the dominant and prominent grasses *Themeda triandra, Tristachya leucothrix, Rendlia altera, Panicum ecklonii, Heteropogon contortus, Loudetia simplex* and *Diheteropogon filifolius* and the also the forbs *Helichrysum pallidum* and *Helichrysum pallidum* in this community accords with the description of their habitat choice of open grassland which can be mountainous (Pooley, 2003; Van Oudtshoorn, 2009).

Community 2.5 (*Elionurus muticus–Harpochloa falx* rocky slope/ ridge grassland community): The occurrence of the dominant and prominent grasses *Elionurus muticus*, *Harpochloa falx, Microchloa caffra*, *Loudetia simplex*, *Eragrostis racemosa, Heteropogon contortus, Panicum natalense* in this community accords with the description of their habitat choice of stony slopes, thin, stony, shallow soils and shallow soils on rocky ridge sheets, (Hilliard, 1996; Van Oudtshoorn, 2009) and the sedges *Ficinia stolonifera* of sandy and rocky ground and *Cyperus semitrifidus* o rock sheets (Hilliard, 1996; Pooley, 2003).

4.5.2 Floristic affinities between plant communities within the study area

Floristics affinities, which exist between different plant communities, are presented in Table 4.1.

Plant community 2.1 and sub-community 2.4.1 have affinities as they share some species including the grasses *Cymbopogon nardus* and *Hyparrhenia dregeana*, the forbs *Stachys kuntzei* and *Acalypha punctata*, and the shrub *Searcia discolor.* These two communities are located adjacent to one another at altitudes mostly between 1861−1870 m.a.s.l. at the edge of and amongst dolerite rocks and boulders with rock surface covering an average of 9–40% on predominantly north facing slopes. The soil for both communities consists of relatively shallow humus rich topsoil.

Plant community 2.3 and sub-community 2.1.1 have affinities as they share some species including, the grasses *Hyparrhenia dregeana*, *Arundinella nepalensis*, *Eragrostis planiculmis* and the forb *Helichrysum umbraculigerum*. Both these communities are located on predominantly north-facing, moderate to steep, moist/wet slopes and these common species are known to occur in moist habitats.

4.5.3 Floristic affinities with other communities

The study area is located within the Grassland Biome and occurs in the Drakensberg Foothill Moist Grassland Vegetation Unit (Gs10) (Mucina and Rutherford, 2006). The list of important taxa (species that have high abundance, a frequent occurrence, or are prominent in the landscape), noted by Mucina and Rutherford (2006) for each vegetation unit, forms a basic floristic profile of the vegetation unit. When comparing the taxa on Hlogoma to the list of important taxa of Mucina and Rutherford (2006) for the Gs10 Vegetation Unit; 44 out of 58 species of the dominant grasses, forbs, herbaceous climbers and low shrub taxa are in common, but only 8 out of 20 of the less abundant geophytic forbs. Environmental and climate parameters described in this study, as well as this relatively close match of floristic composition, indicate that Hlogoma Mountain is representative of the Gs10 Drakensberg Foothill Moist Grassland vegetation unit. Forest species are not included in the list of important taxa provided by Mucina and Rutherford (2006).

The vegetation of the study area is located in Highland Sourveld veld type (44a) as described by Acocks (1988). He described the vegetation as veld occurring on the slopes and foothills of the Drakensberg from approximately 1 350–2 150 m.a.s.l. The grassland communities in the study area appear to be representative of this veld type in terms of the composition and relative dominance of species noted as generally occurring in sourveld grassland, including dominance of *Themeda triandra*, *Tristachya leucothrix*, *Diheteropogon filifolius*, *Rendlia altera* and *Alloteropsis semialata* (Acocks, 1988). However, there is no *Protea caffra* and/or *Protea roupelliae* savanna present on Hlogoma Mountain. The trees, shrubs and herbs within the Forest major community in the study area have some species in common with the temperate forests that occur in this veld type described by Acocks (1988). However, a more comprehensive survey of the forest patches on Hlogoma is needed to enable a more detailed comparison.

Platberg, near Harrismith, is a significant “outlier” mountain of the Drakensberg range, offering an opportunity for comparison with Hlogoma. The description of the grassland communities from the phytosociological study of Platberg Mountain (Brand *et al*., 2011) revealed 27 different communities. Although there are many common species shared by these two sites, including the grass *Themeda triandra* which is dominant, there is only a partial affinity between relatively few communities. On a major community scale, the grassland of the study area shows affinity with the *Themeda triandra*−*Cyanotis speciosa* major community described on Platberg by Brand *et al.* (2011). The differences between the sub-communities described in this study and that of Platberg may be due to the difference in absolute altitudinal range from 1 900–2 394 m.a.s.l. for Platberg and 1 600–1905 m.a.s.l. for the study area. A second major difference is scale, with the study area of 3 000 ha for Platberg and 117 ha for Hlogoma. The sites also differ geologically. Although both sites have dolerite intrusions, Platberg comprises Cave Sandstone and a basalt cap, whilst Hlogoma comprises Elliott Formation sandstone geology with a dolerite summit.

4.5.4 Management issues for the Forest layer

There is a high local abundance of the introduced alien species *Achyranthes aspera* in the herbaceous layer of the forest. This species is regarded as an invasive species and grows in shady conditions on moist soil where the vegetation has been disturbed. Thus the conditions under the tree layer on the forest floor where not many herbaceous species can grow due to the low light penetration presents ideal growing conditions for this plant. A possible problem of encroachment of *Acacia mearnsii* and *Pinus patula* exists for the future as there are woodlands of these species relatively close to the southern edge of the forest where there is a small settlement of farm labour.

4.5.5 Management issues for the Grassland layer

The abundance and dominance of the Decreaser grass species *Themeda triandra* and *Panicum natalense* indicates that the grassland in the study area is in good condition (Van Oudtshoorn, 2009). In addition, *Themeda triandra* is highly palatable when young and adds to the importance of Hlogoma Mountain in terms of grazing value. *Themeda triandra* is resistant to fire and the history of annual burning on Hlogoma and lack of overgrazing, according to Van Oudtshoorn (2009), would explain the dominance of this grass. Forb species are well-represented in the study area.

In Community 2.4 which constitutes 70% of the grassland area, there is a mixture of grasses with varying ecological status categories. This community, with more level to gentle slopes and minimal rock cover is a favoured grazing area for the cattle on Hlogoma Mountain. The Decreaser grass *Themeda triandra* is most abundant, with *Panicum natalense* (Decreaser) and *P. ecklonii* (Decreaser) well represented in this community, indicating that the grassland on Hlogoma Mountain is in good condition. However, there is a mixture of relatively abundant Increaser III grasses in some areas, such as *Diheteropogon filifolius* and *Rendlia altera*, indicating moderate to heavy overgrazing on a local scale.

This is substantiated by the patchy prominence of the Increaser II grasses *Eragrostis racemosa* and *Koeleria capensis* in the lower-lying areas, also indicating some overgrazing. The Increaser I grass *Tristachya leucothrix* is dominant in this community, however, it does not appear to be an indicator of underutilised veld but can sometimes be locally dominant in open grassland (Hilliard, 1996).

4.6 Conclusion and management recommendations

Two major communities, five communities, 12 sub-communities and four variants were successfully classified and identified by the modified TWINSPAN analysis and were subsequently described and mapped. Despite affinities between some communities, clear distinctions based on floristic composition and environmental parameters were found between the communities. As little was known about the vegetation of the Hlogoma Mountain prior to this study, this phytosociological classification and description provides new baseline knowledge of the vegetation and natural ecosystems for the study area.

The CCA ordination indicated the key environmental variables influencing the distribution of the 100 relevés within the different communities in the study area, with aspect, soil type, rockiness, soil depth, erosion and soil water (in descending order) being the most important. Analysis of each plant community using the CCA ordination results suggest that the plant communities produced by the TWINSPAN classification can be correlated with key environmental variables.

By following recommended protocols to carry out phytosociological studies as set out by Brown *et al*. (2013), the identified plant communities and their associated vegetation maps can be regarded as reliable surrogates for larger ecosystems. Furthermore, by describing and mapping the surrogate, provides guidelines to monitor and manage the entire ecosystem. The study area on Hlogoma is small (approximately 117 ha) and the vegetation description of the study area indicates that Hlogoma Mountain can be considered as representative of veld type 44a (Acocks, 1988) and Drakensberg Foothill Moist Grassland (Gs 10) (Mucina and Rutherford, 2006). Perhaps this technique of

carrying out phytosociological studies using selected ‘small’ areas within larger macro-systems can be used to provide baseline data with more ‘economical’ use of time, money and personnel, particularly in light of economic restrictions placed on authorities managing protected areas.

The new baseline data provided by this study provides a platform for future monitoring of plant communities, rare and endangered species, in particular monitoring the threat of illegal harvesting of medicinal plants. This study also provides baseline data which can be used in the future to assess the effect of climate change in southern Drakensberg montane regions.

Management recommendations for the indigenous forest community are to focus on monitoring the encroachment of *Acacia mearnsii* and *Pinus patula.* The farm labourers living in a settlement close to the southern edge of the forest are utilising the *Acacia mearnsii* for firewood and have a small business making charcoal, thus currently decreasing the size of this woodland. Harvesting indigenous trees in the forest in the future will remain a constant threat.

Management recommendations for the grassland are to focus on maintaining the good condition of the *Themeda triandra* grassland and the high diversity of grassland forb species present on Hlogoma. In addition, the level of erosion present needs to be addressed. The two farmers, who graze beef cattle on different areas of Hlogoma, are experienced and successful farmers owning large farms in the area and aim to provide good grazing for their stock. While both have been receptive to reports on the status of the grassland biodiversity on Hlogoma, their main interest was the robustness and abundance of *Themeda triandra* and the rainfall levels. Both farmers changed management practice in 2016 to a biennial and not an annual burn, but have maintained the grazing regime. This will help to ensure abundant *Themeda triandra* and allow some recovery, perhaps over time, to diminish the levels of erosion in Community 2.5.

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CHAPTER FIVE

FLORISTIC ANALYSIS AND PLANT DIVERSITY

5.1 Introduction

Plant communities play a pivotal role in maintaining biodiversity (Panda *et al*., 2014) and are central when making management decisions. A floristic analysis of the communities in an area provides important information about the nomenclature of an ecosystem. Knowledge about the diversity and distribution of species not only serves as a reference tool for establishing site uniqueness and species richness, but is also important in understanding and monitoring changes in species occurrences (Pond *et al*., 2002).

This chapter provides information about the different plant taxa in the study area and examines floristic affinities with the Drakensberg Alpine Centre (DAC) and the Cape Floristic Region (CFR). Species richness, Shannon-Wiener Diversity Indices and Evenness diversity measures are analysed for the study area.

5.2 Floristic data

5.2.1 Composition of the flora of Hlogoma Mountain

The Hlogoma Mountain plant species list comprises a total of 467 species, represented by 271 genera and 87 families. Pteridophytes are represented by 21 species from 13 genera and nine families; Gymnosperms by one species, one genus and one family; Monocotyledons by 147 species, 87 genera and 19 families; and Dicotyledons by 298 species, 170 genera and 58 families (Table 5.1).

The complete species list, with families and their respective genera and species arranged in alphabetical order, is attached as Annexure II. Taxonomic names conform to Germishuizen *et al.* (2006) with subsequent name revisions based on information from the Plants of southern Africa (POSA) (SANBI, 2017a).

Table 5.1: Number of families, genera and species of Pteridophytes, Gymnosperms, Monocotyledons and Dicotyledons

Division/Class	No. families	% of total families	No. genera	% of total genera	No. species	% of total species
Pteridophytes	9	10.3	13	4.8	21	4.5
Gymnosperms	1	1.1	1	0.4	1	0.2
Monocotyledons	19	21.8	87	32.1	147	31.5
Dicotyledons	58	66.7	170	62.7	298	63.8
Total	**87**		**271**		**467**	

According to Hilliard and Burtt (1987), the relative size of families can be used to assess the floristic composition of a study area and to allow comparisons with that of other areas.

The twenty most important families, which each represent more than 1% of the total number of species for Hlogoma Mountain, together with the number of genera in each family, are listed and ranked by decreasing number of species in Table 5.2. These families collectively comprise 342 species (73% of the total number of species) and 177 genera (65% of the total number of genera) of the plant list.

The 15 most dominant genera are listed in Table 5.3 in decreasing order of ranking. *Helichrysum* has 29 species per genus and *Senecio* has 15 species per genus. The next four dominant genera have considerably lower number of species as they range from six to four species per genus.

Table 5.2: Ranking of the larger families which represent more than 1% of total number of species together with the number of genera in each family

Rank	Family	Species	% of total species	Genera	% of total genera
1	Asteraceae	89	19.1	34	12.5
2	Poaceae	43	9.2	32	11.8
3	Orchidaceae	28	6.0	12	4.4
4	Fabaceae	23	4.9	15	5.5
5	Apocynaceae	21	4.5	9	3.3
6	Iridacaeae	16	3.4	7	2.6
7	Cyperaceae	15	3.2	9	3.3
8	Scrophulariaceae	14	3.0	11	4.1
9	Lamiaceae	13	2.8	8	3.0
10	Rubiaceae	12	2.6	9	3.3
10	Hyacinthaceae	12	2.6	6	2.2
12	Apiaceae	7	1.5	6	2.2
12	Rosaceae	7	1.5	6	2.2
12	Hypoxidaceae	7	1.5	2	0.7
12	Crassulaceae	7	1.5	2	0.7
16	Campanulaceae	6	1.3	2	0.7
16	Euphorbiaceae	6	1.3	2	0.7
16	Polygalaceae	6	1.3	1	0.4
19	Adiantaceae	5	1.1	2	0.7
19	Lobeliaceae	5	1.1	2	0.7

Table 5.3: Ranking of the 15 most dominant genera for Hlogoma Mountain

Rank	Genus	Family	No. of species
1	*Helichrysum*	Asteraceae	29
2	*Senecio*	Asteraceae	15
3	*Asclepias*	Apocynaceae	6
3	*Crassula*	Crassulaceae	6
3	*Polygala*	Polygalaceae	6
3	*Hypoxis*	Hypoxidaceae	6
7	*Disa*	Orchidaceae	5
7	*Satyrium*	Orchidaceae	5
7	*Eragrostis*	Poaceae	5
7	*Wahlenbergia*	Campanulaceae	5
11	*Eulophia*	Orchidaceae	4
11	*Searsia*	Anacardiaceae	4
11	*Acalypha*	Euphorbiaceae	4
11	*Argyrolobium*	Fabaceae	4
11	*Cheilanthes*	Adiantaceae	4

The ecological status of Poaceae species in the study area according to Van Oudtshoorn (2009) is indicated in Table 5.4: Decreaser grasses are abundant in veld in good condition; Increaser I grasses increase in underutilised veld; Increaser II grasses increase when veld is overgrazed; and Increaser III grasses become dominant when veld is selectively overgrazed. The C3 or C4 photosynthetic pathways are indicated in Table 5.4 (Osborne *et al.,* 2011).

Table 5.4: Poaceae species on Hlogoma Mountain indicating ecological status categories (Van Oudtshoorn, 2009) and C3 and C4 photosynthetic pathways (Osborne *et al.,* 2011)

Poaceae	Ecological Status	Photosynth. Pathway
Arundinella nepalensis Trin.	Decreaser	C4
Brachiaria serrata (Thun.) Stapf	Decreaser	C4
Digitaria tricholaenoides Stapf	Decreaser	C4
Helictotrichon turgidulum (Stapf) Schweick.	Decreaser	C3
Monocybium ceresiiforme (Nees) Stapf	Decreaser	C4
Panicum ecklonii Nees	Decreaser	C4
Panicum natalense Hochst.	Decreaser	C3
Themeda triandra Forssk.	Decreaser	C4
Allopteropsis semi-alata (R.Br.) Hitchc. subsp. *eckloniana* (Nees) Gibbs Russ.	Increaser I	C3
Andropogon schirensis Hochst. ex A.Rich.	Increaser I	C4
Cymbopogon nardus (L.) Rendle	Increaser I	C4
Harpochloa falx (L.f.) Kuntze	Increaser I	C4
Hyparrhenia dregeana (Nees) Stapf ex Stent	Increaser I	C4
Miscanthus ecklonii (Nees) Mabb.	Increaser I	C4
Pennisetum thunbergii Kunth	Increaser I	C4
Trachypogon spicatus (L.f.) Kuntze	Increaser I	C4
Tristachya leucothrix Trin. ex Nees	Increaser I	C4
Eragrostis capensis (Thun.) Trin.	Increaser II	C4
*Eragrostis chloromelas S*teud.	Increaser II	C4
Eragrostis plana Nees	Increaser II	C4
Eragrostis racemosa (Thun.) Steud.	Increaser II	C4
Koeleria capensis (Steud.) Nees	Increaser II	C3
Loudetia simplex (Nees) C.E.Hubb.	Increaser II	C4
Microchloa caffra Nees	Increaser II	C4
Heteropogon contortus (L.) Roem. & Schult.	Increaser II	C4
Diheteropogon filifolius (Nees) Clayton	Increaser III	C4
Elionurus muticus (Spreng.) Kuntze	Increaser III	C4

Melinis nerviglumis (Franch.)	Increaser III	C4
Rendlia altera (Rendle) Chiov.	Increaser III	C4
Sporobolus africanus (Poir.) Robyns & Tournay	Increaser III	C4
**Agrostis montevidensis* Spreng. ex Nees	–	C3
Aristida transvaalensis Henrard	–	C4
Eragrostis planiculmis Nees	–	C4
Eulalia villosa (Thun.) Nees	–	C4
Helictotrichon longifolium (Nees) Schweick.	–	C3
Melinis repens (Willd.) Zizka	–	C4
Panicum aequinerve Nees	–	C3
Sporobolus subulatus Hack.	–	C4
Tenaxia guillarmodiae (Conert) N.P.Barker & H.P.Linder	–	–
**Paspalum notatum* Flüggé	–	C4
**Paspalum dilatatum* Poir	–	C4
**Paspalum urvillei* Steud	–	C4
**Poa annua* L.	–	C3

5.2.2 Threatened and rare taxa

Four Red Data List (RDL) species, listed in the SANBI Red List of South African Plants version 17.1 (SANBI, 2017b), are found in the study area (Table 5.5).

Table 5.5: Species on Hlogoma Mountain with Red Data List status (SANBI, 2017b)

Species	Family	RDL Category
Alepidea amatymbica Eckl. & Zeyh.	Apiaceae	Vulnerable
Asclepias concinna (Schltr.) Schltr.	Apocynaceae	Critically Endangered
Dioscorea sylvatica Eckl.	Dioscoreaceae	Vulnerable
Eucomis bicolor Baker	Hyacinthaceae	Near Threatened

The following species in the study area that were previously listed as Declining are now designated as of Least Concern: *Sandersonia aurantiaca*, *Eucomis autumnalis* and *Gunnera perpensa*. However, due to high volumes being traded in the traditional medicine and floral markets, these species may be re-assessed in the future (SANBI, 2017b).

The Vulnerable *Dioscorea sylvatica* was recorded within the rocky outcrop sub-community 2.1.1.

The Vulnerable *Alepidea amatymbica* and Near-Threatened *Eucomis bicolor* were recorded in the rocky outcrop sub-community 2.1.2. *Helichrysum paleatum*, though credited the RDL status of Least Concern, is listed as Rare in the Orange List of Victor and Keith (2004). This species is present in small numbers adjacent sub-community 2.1.2 at approximately 1850 m.a.s.l. and has been found previously in only five locations in the southern and central Drakensberg, from altitudes of approximately 1 900 to 2 500 m.a.s.l.

The Critically Endangered *Asclepias concinna* was recorded in open grassland sub-community 2.4.4. This rare species is present in three, possibly four isolated remnant populations (SANBI, 2017b). There are four collection records with two known subpopulations impacted by grazing, and potentially threatened by development and expanding rural settlements (SANBI, 2017b). Hlogoma Mountain is a new recorded site (SANBI, 2017b). Four plants of *Asclepias concinna* were found on Hlogoma Mountain, making it an important site for this threatened species.

A new species, *Aspidoglossum* species nova, was found in open grassland sub-community 2.4.5. In an email on 23 April 2017, P. Bester of the National Herbarium in Pretoria confirmed that he is currently describing this species and that Hlogoma Mountain is the type locality for this species. Additional plants of *Aspidoglossum* species nova have been found in extremely limited populations in the Qua Qua National Park and Golden Gate National Park in the Free State and close to Romatseliso’s Gate in the Eastern Cape. The scarcity of the populations would lead this species to be designated as Rare.

The primary threat for the following RDL plants is over-exploitation for the traditional medicine trade: *Alepidea amatymbica*, *Dioscorea sylvatica* and *Eucomis bicolor*.

According to Schedule 12 of the Natal Nature Conservation Ordinance No. 15 of 1974 (Natal Province, 1974), there are 74 specially protected indigenous plants on Hlogoma Mountain (Annexure II).

5.2.3 Medicinal plants

The botanical names, common names and medicinal uses of plant species used in traditional medicine found in the study area are presented in Annexure III.

There are 177 plant species used for traditional medicine on Hlogoma Mountain. This represents 38% of all species recorded. Of the total medicinal plant list (Annexure III), there are 10 Pteridophytes, 50 monocotyledon and 117 dicotyledon species. The family Asteraceae has the most medicinal plants with 31 of 89 species present being used for traditional medicine.

Three incidents of illegal harvesting occurred on Hlogoma during the study period. A female traditional healer was found harvesting *Gunnera perpensa*. She had collected only a few roots and said she was treating a client for a skin rash. A male traditional healer was found harvesting a large quantity of *Gunnera perpensa* as well as two large *Brunsvigia grandiflora* bulbs. He said he used the *Gunnera perpensa* to treat women after childbirth to help expel retained placentas. He added that he used the plant for the same function in cows. Both traditional healers were aware of trespassing and left shortly after my encountering them. On a third occasion, two traditional healers were seen amongst the extremely large dolerite boulders near the summit where it was known that the Vulnerable RDL plant *Dioscorea sylvatica* grows. Ezemvelo KZN Wildlife, the landowner, and the police were alerted. The two traditional healers, who were from Lesotho, were found with two large feed bags filled with harvested plants including two large *Dioscorea sylvatica* bulbs, a large quantity of *Heteromorpha arborescens* branches and leaves, many corms possibly *Gladiolus* or *Watsonia* and large quantities of *Helichrysum aureonitens*. Charges were laid by Ezemvelo KZN Wildlife against the women for illegally harvesting endangered plants and they were arrested. If they had not been spotted and arrested most of the bulbs of the *Dioscorea sylvatica* may have been removed from Hlogoma.

5.2.4 Alien and invasive plants

An updated Invasive Species Lists (as per the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEMBA) was published in the Government Gazette on 29 July 2016. Of the 27 alien species recorded on Hlogoma Mountain (Annexure II), the following species fall into the designated invasive species categories (description of categories according to SANBI, 2017c):

Category 1b: (Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. No permits will be issued and no trade in these plants allowed): *Cotoneaster franchetti*, *Rubus cuneifolius*, *Achyranthes aspera* and *Agrimonia procera*.

Category 2: (Invasive species regulated by area and may be grown under controlled conditions in permitted zones. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as gifs any plants in this category. No permits will be issued for planting in riparian zones. Species include commercially important species such as pine, wattle and gum trees): *Pinus patula* and *Acacia mearnsii*.

5.2.5 Phenology

The stages of flowering, recorded as buds, flowers and seeds and flowering times of 263 species are presented in Annexure V.

5.2.6 Flower colour and elevation range

Groupings of species by dominant flower colour for 263 species with relevant elevation record ranges are presented in Annexure V. Colour grouping by elevation range is summarised in Table 5.6. This set of data was analysed to determine if different flower colours change along the altitudinal gradient.

Table 5.6: Number of species of the same flower colour grouping by elevation range

Flower colour	No. of species	Elevation range m.a.s.l.
White/white-green	69	1623−1892
Yellow	85	1623−1892
Blue/purple.	34	1623−1876
Pink/magenta	34	1623−1892
Orange	11	1623−1892
Green/green-yellow	12	1623−1905
Red	9	1623−1884
Brown/brown-white	9	1623−1902

5.3 Hlogoma Mountain floristic affinities

According to Hilliard and Burtt (1987), the relative size of families can be used to allow comparisons with that of other areas.

A comparison of the 10 largest families on Hlogoma Mountain with the 10 largest families on the southern Drakensberg inselbergs/outliers Mahwaqa Mountain (Meter *et al*., 2002) and 3029DA WEZA Ngeli Mountain range (Grieve and Downs, 2015) in KwaZulu-Natal, the southern KwaZulu-Natal Drakensberg (Hilliard and Burtt, 1987) and the Drakensberg Alpine Centre (DAC) (Carbutt and Edwards, 2004, 2006) is presented in Table 5.7.

The data for relative family size in the Mahwaqa Mountain study (Meter *et al*., 2001), 3029DA WEZA Ngeli Mountain range study (Grieve and Downs, 2015) and southern Drakensberg data (Hilliard and Burtt, 1987) included the family Liliaceae *s.l.* which was treated as a single entity according to the old family structure. For comparisons to be made with the ten largest families on Hlogoma Mountain and the DAC (Carbutt and Edwards, 2004, 2006), the Liliaceae *s.l.* family data in these studies was restructured to reflect the current taxonomy as per Germishuizen *et al.* (2006). Thus, the families Asphodelaceae and Hyacinthaceae appear in Table 5.7. The Asclepiadaceae species for all the

studies mentioned are included under Apocynaceae as per Germishuizen *et al.* (2006).

The relative size of families, presented in Table 5.7, was calculated using the total number of Angiosperm species only. Bryophytes, Pteridophytes, Gymnosperms and alien Angiosperm exotic species were excluded, since they were not included in all the mentioned studies. The angiosperm totals noted are: Hlogoma Mountain n=419 (Annexure II), Mahwaqa Mountain n=941 (amended Meter *et al*., 2001), 3029DA WEZA Ingeli n=1373 (amended Grieve and Downs, 2015), the southern Drakensberg 1 332 (Hilliard and Burtt, 1987) and the DAC 2 520 (Carbutt and Edwards, 2004, 2006).

Analysis of the relative size of the families within this table will indicate if there is any floristic affinity of Hlogoma Mountain to these areas.

Table 5.7: Ranking (R) of the largest ten families, number of species and percentage of total Angiosperm species and their contribution to the floras of Hlogoma Mountain, Mahwaqa Mountain (amended from Meter *et al*., 2002), the 3029DA WEZA Ngeli Mountain range district (amended from Grieve and Downs, 2015), the southern Drakensberg (amended from Hilliard and Burtt, 1987) and the DAC (Carbutt and Edwards, 2004)

	Hlogoma			Mahwaqa			3029DA WEZA Ngeli			Southern Drakensberg			DAC		
Area Ha	c.117			c.4000			c.66 550			–			c.4 000 000		
Family	**R**	**Tot Sp.**	**% Sp.**	**R**	**Tot Sp.**	**% Sp.**	**R**	**Tot Sp.**	**% Sp.**	**R**	**Tot Sp.**	**% Sp.**	**R**	**Tot Sp.**	**% Sp.**
Asteraceae	1	89	21.2	1	168	17.8	1	239	17.4	1	285	21.4	1	430	17.1
Poaceae	2	43	10.3	2	91	9.7	5	58	4.2	2	108	8.1	2	267	10.6
Orchidaceae	3	28	6.7	3	85	9.0	3	89	6.5	3	83	6.2	5	130	5.2
Fabaceae	4	23	5.5	4	55	5.8	2	115	8.4	5	65	4.9	3	136	5.4
Apocynaceae	5	21	5.0	7	33	3.5	5	57	4.2	8	44	3.3	8	87	3.5
Iridacaeae	6	16	3.8	6	43	4.6	4	59	4.3	5	65	4.9	7	97	3.8
Cyperaceae	7	15	3.6	9	26	2.8	–	–	–	7	59	4.4	6	122	4.8
Scrophulariaceae	8	14	3.3	5	44	4.7	7	42	3.1	4	79	5.9	4	133	5.3
Lamiaceae	9	13	3.1	10	24	2.5	9	32	2.3	–	–	–	–	–	–
Rubiaceae	10	12	2.9	10	24	2.5	–	–	–	–	–	–	–	–	–
Hyacinthaceae	10	12	2.9	8	29	3.1	8	37	2.7	9	43	3.1	9	55	2.2
Asphodelaceae	–	–	–	–	–	–	10	29	2.1	–	–	–	10	50	2.0
Ericaceae	–	–	–	–	–	–	–	–	–	10	26	1.9	–	–	–
Aizoaceae	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Restionacaea	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Proteaceae	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Rutaceae	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

5.3.1 Hlogoma affinities to southern Drakensberg inselbergs/outliers

Mahwaqa Mountain and the 3029DA WEZA (Ngeli) study areas are referred to as outliers (inselbergs) of the southern Drakensberg in KwaZulu-Natal (Hilliard and Burtt, 1987) and outliers (inselbergs) of the DAC (Carbutt and Edwards 2004, 2006) respectively.

For Hlogoma Mountain's ten largest families, the total number of species per family, and the percentage contribution to total Angiosperm flora were compared to the ten largest families of Mahwaqa Mountain and 3029DA WEZA (Ngeli) study area in Table 5.7.

The ten largest families of Hlogoma Mountain were also the ten largest families of the Mahwaqa Mountain with some difference in ranking of families. A comparison of the top four families on Hlogoma showed an identical overlap with the top four families of Mahwaqa Mountain in descending order: Asteraceae, Poacaea, Orchidaceae and Fabaceae.

Eight of the largest families of Hlogoma Mountain were also among the ten largest families of 3029DA WEZA (Ngeli) study area with some difference in ranking of families (Table 5.7). Asteraceae is the largest family, with Fabaceae and Orchidaceae represented in the top four families for both study sites. Poaceae was ranked as fifth and Iridaceae as fourth in the WEZA Ngeli study area. However, Grieve and Downs (2015), suggest that Poaceae were under-collected, which could explain the difference between the two sites.

5.3.2. Hlogoma affinities to the southern KwaZulu-Natal Drakensberg

For the ten largest plant families on Hlogoma Mountain, the total number of species per family and the percentage contribution to total flora were compared to the ten largest families of the southern KwaZulu-Natal Drakensberg in Table 5.7.

Eight of the ten largest families of Hlogoma Mountain were amongst the ten largest families of the southern Drakensberg (Table 5.7). There is an identical overlap of the largest three families in descending order: Asteraceae, Poacaea and Orchidaceae.

5.3.3 Hlogoma affinities to the Drakensberg Alpine Centre (DAC)

For the ten largest plant families on Hlogoma Mountain, the total number of species per family and the percentage contribution to total flora were compared to the ten largest families of the DAC in Table 5.7.

Nine of the ten largest families in the study area were amongst the ten largest families of the DAC (Table 5.7). The largest two families for both sites in descending order were: Asteraceae and Poacaea.

5.3.4 Drakensberg Alpine Centre (DAC) endemics and near-endemics on Hlogoma Mountain

On Hlogoma Mountain two of the six DAC near-endemic genera, *Craterocapsa* and *Rhodohypoxis*, two DAC endemic species *Albuca rupestris* and *Helichrysum paleatum* and 88 DAC near-endemic species are present (Carbutt and Edwards, 2004; Annexure IV). There are 21 monocotyledon and 67 dicotyledon DAC near-endemics (Annexure IV).

According to Carbutt and Edwards (2006), of the 2 520 angiosperm species in the DAC, there are 334 (c. 13%) endemics and 595 near-endemic species (c. 24%). The two DAC near-endemic genera found on Hlogoma Mountain represent 33.3% of the total number of DAC near-endemic genera; the two DAC endemic species represent only 0.6% of the total number of DAC endemic species and the 88 near-endemic species represent 15% of DAC near-endemic species.

5.3.6 Cape elements on Hlogoma Mountain

Carbutt and Edwards (2001), regard a 'Cape element' as "any plant taxon (usually at the generic level) whose species are most heavily concentrated in the Cape Floristic Region (CFR)". Of the 62 typical Cape elements for the DAC (Carbutt and Edwards, 2001), a total of 30 Cape element genera are found on Hlogoma Mountain and are presented in Table 5.8.

There are 18 families represented, with most families containing a single genus except for: Iridaceae with five genera, Asteraceae with five genera, Scrophulariaceae with three and Orchidaceae with two genera. Only two of the 15 dominant genera (Table 5.3) are Cape elements, namely *Crassula* and *Wahlenbergia*.

Table 5.8: Cape element genera on Hlogoma Mountain

Genus	Family
Euryops	Asteraceae
Felicia	Asteraceae
Othonna	Asteraceae
Ursinia	Asteraceae
Cotula	Asteraceae
Aristea	Iridaceae
Hesperantha	Iridaceae
Moraea	Iridaceae
Tritonia	Iridaceae
Watsonia	Iridaceae
Hebenstretia	Scrophulariaceae
Nemesia	Scrophulariaceae
Zaluzianskya	Scrophulariaceae
Corycium	Orchidaceae
Holothrix	Orchidaceae
Anisodontea	Malvaceae
Bulbine	Asphodelaceae
Cliffortia	Rosaceae
Crassula	Crassulaceae
Erica	Ericaceae
Eriospermum	Ruscaceae
Gnidia	Thymelaceae
Heliophila	Brassicaceae

Osteospermum	Asteraceae
Otholobium	Fabaceae
Oxalis	Oxalidaceae
Pelargonium	Geraniaceae
Protea	Proteaceae
Sebaea	Gentianaceae
Wahlenbergia	Campanulaceae

5.4 Plant diversity

5.4.1 Species richness

Hlogoma Mountain plant species richness comprises a total of 467 plant species in the 117 ha study area (Annexure II). The mean species richness per $16m^2$ relevé (n = 3) in the *Leucosidea sericea* Forest major community is 27. The mean species richness per $16m^2$ relevé (n = 97) of the *Themeda triandra* Grassland major community is 29.

The mean number of species per $16m^2$ relevé for the plant communities surveyed on Hlogoma Mountain is illustrated in Figure 5.1.

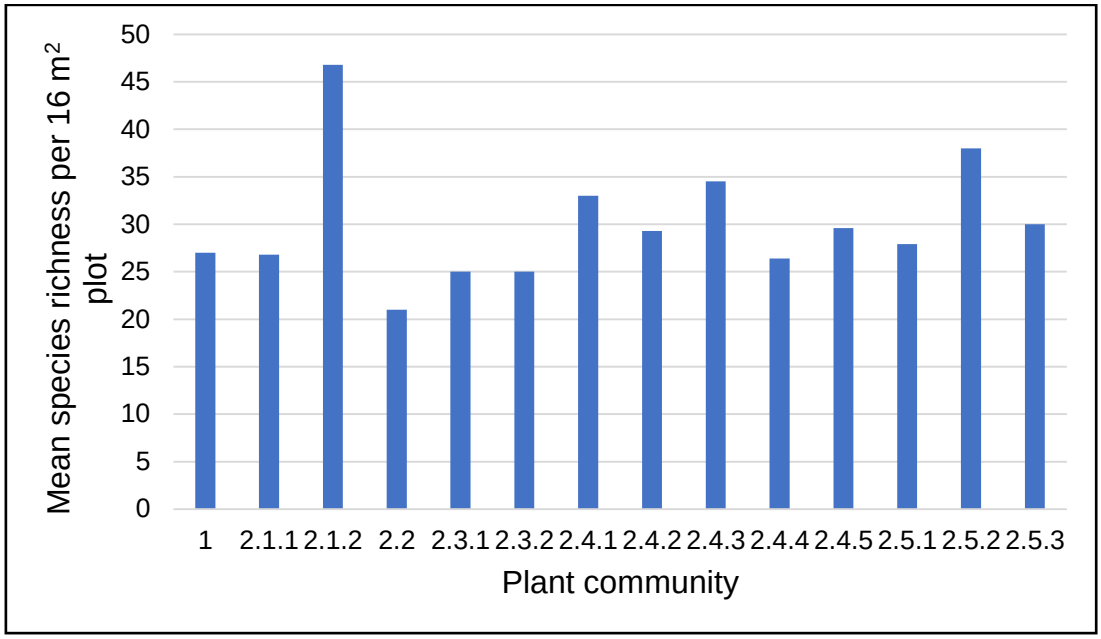

Figure 5.1: Mean number of species per 16m^2 relevé for plant communities on Hlogoma Mountain

The total number of species for each plant community surveyed on Hlogoma Mountain is illustrated in Figure 5.2. These values represent the species richness for each plant community.

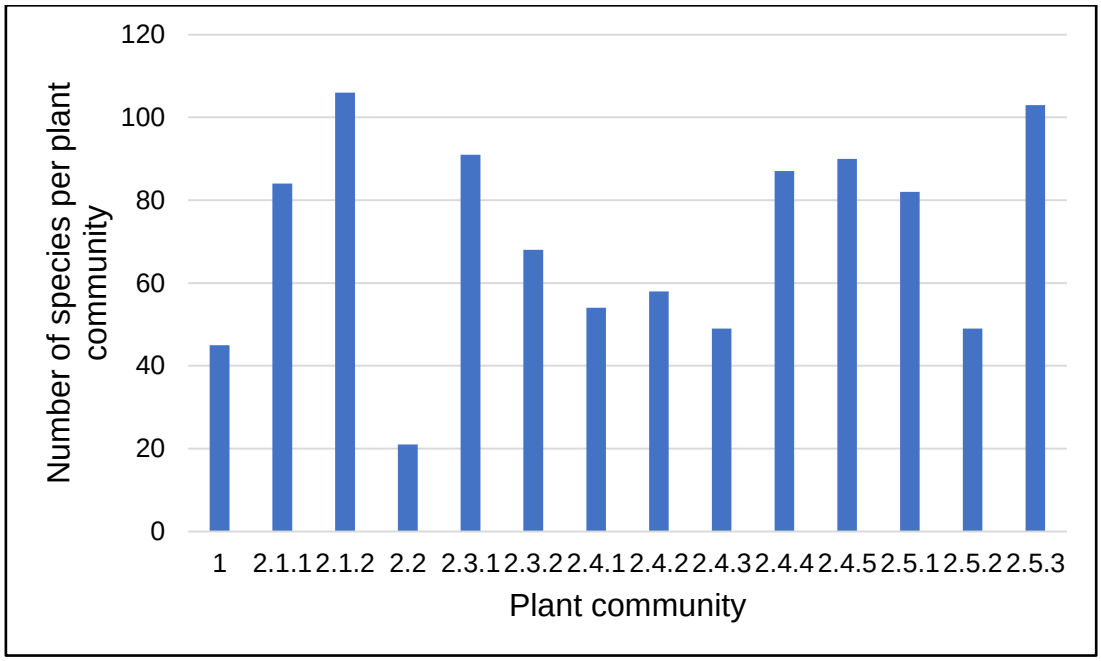

Figure 5.2: Total number of species per plant community on Hlogoma Mountain

Species richness and frequency distributions for the communities are presented in Table 5.9.

Table 5.9: Species richness, frequency distributions, deviation and standardised residuals for the plant communities on Hlogoma Mountain

Plant community	Species richness/ Observed frequency	Expected frequency	% Deviation (Obs. value - Exp. Value)	Standardised Residuals
1	45	70.5	-36.2	-5.0
2.1.1	84	70.5	19.1	3.7
2.1.2	106	70.5	50.4	5.9
2.2	21	70.5	-70.2	-7.1
2.3.1	91	70.5	29.1	4.6
2.3.2	68	70.5	-3.5	-1.6
2.4.1	54	70.5	-23.4	-4.0
2.4.2	58	70.5	-17.7	-3.5
2.4.3	49	70.5	-30.5	-4.7
2.4.4	87	70.5	23.4	4.0
2.4.5	90	70.5	27.7	4.4
2.5.1	82	70.5	16.3	3.4
2.5.2	49	70.5	-30.5	-4.7
2.5.3	103	70.5	46.1	5.7

There was a significant association between species richness values and communities surveyed ($X^2(13) = 115.79$, $P < 0.001$). Based on standardised residuals, sub-communities 2.1.2 and 2.5.3 are over represented (+5.9 and +5.7 respectively), and are the main contributors to the statistically significant differences between these communities (Table 5.9). Communities 2.1.2 and 2.5.3 are more species rich than the other communities surveyed with values of 106 and 103 respectively (Figure 5.2). Plant community 2.2 (21 species) has the lowest residual value at -7.1, followed by community 1 (45 species) at -5.0, then sub-communities 2.4.3 (49 species) and 2.5.2 (49 Species) at -4.7, reflecting lower species richness values for these communities (Figure 5.2; Table 5.9).

5.4.2 Plant community diversity and evenness

Results from Shannon Wiener Diversity Index (*H'*) and Evenness (*J'*) calculations for the plant communities found at Hlogoma Mountain are presented in Table 5.10.

Table 5.10: Total number of plants for all species**,** and Shannon Wiener Diversity Indices (*H'*) and Evenness (*J'*) for the plant communities surveyed

Plant community	Total number plants all species N	Sum of all n/N*ln(n/N)	*H'*	Evenness (*J'*)
1	283	-2.814	2.814	0.749
2.1.1	342	-3.819	3.819	0.862
2.1.2	404	-4.267	4.267	0.915
2.2	52	-2.887	2.887	0.948
2.3.1	492	-3.594	3.594	0.797
2.3.2	330	-3.822	3.822	0.906
2.4.1	152	-3.717	3.717	0.932
2.4.2	301	-3.600	3.600	0.887
2.4.3	168	-3.581	3.581	0.920
2.4.4	1559	-3.641	3.641	0.815
2.4.5	1038	-3.802	3.802	0.845
2.5.1	653	-3.892	3.892	0.883
2.5.2	182	-3.696	3.696	0.952
2.5.3	1592	-3.894	3.894	0.840

5.5 Discussion

5.5.1 Floristic analysis

Dicotyledons, which comprise 64% of all species recorded, and monocotyledons, which comprise 32%, are the dominant plant divisions recognised in the study area (Table 5.1). Pteridophytes follow at 5% and gymnosperms at 1%. The ratio of monocotyledons to dicotyledons on Hlogoma

Mountain at 1:2.03 is similar to the ratio of the DAC inselbergs Platberg (Brand *et al.*, 2010) at 1:2.15, Mahwaqa (Meter *et al*., 2002) at 1:2.10, the Eastern Cape Drakensberg (Bester, 1998) at 1:2.10 and in the DAC (Carbutt and Edwards, 2004) at 1:1.90. The ratio for the CFR at 1:3.00 is close to the average ratio for floras across the world (Manning and Goldblatt, 2012). The higher relative abundance of monocotyledons in the Drakensberg and associated grasslands was noted by Hilliard and Burtt (1987).

Analysis of the flora of Hlogoma Mountain shows that the largest family is Asteraceae, with 89 species comprising 19.1% of the total flora (Table 5.2). This dominance is a common aspect of many habitats and the Asteraceae make up the largest family at 11.5% in the CFR, 11.0% for Southern Africa and 11.4% for KwaZulu-Natal (Manning and Goldblatt, 2012). In the Drakensberg region these figures have a higher representation at 21.4% in the southern Drakensberg (Hilliard and Burtt, 1987), 15.3% in the Eastern Cape Drakensberg (Bester, 1998) and 17.1% in the DAC (Carbutt and Edwards, 2006). For Hlogoma Mountain, 19.1% is representative of this dominance by the Asteraceae in the Drakensberg region. Meter *et al*. (2002), state that the Asteraceae family is characterised by speciation in the Grassland Biome, and grassland is one of the two major communities on Hlogoma Mountain.

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The Poaceae, at 9.2% is the second most dominant family in terms of species numbers (Table 5.2), but dominates in terms of biomass. This is expected as Hlogoma Mountain falls within the Grassland Biome. The Decreaser grass *Themeda triandra* is the most abundant grass in the study area and *Panicum natalense* and *P. ecklonii* are well represented. However, there is a mixture of relatively abundant Increaser III grasses in some areas which include *Diheteropogon filifolius* and *Rendlia altera*, indicating moderate to heavy overgrazing on a local scale. This is substantiated by the patchy prominence of the Increaser II grasses *Eragrostis racemosa* and *Koeleria capensis* in lower-lying areas, also indicating some overgrazing. The abundance and dominance of Decreaser grass species indicates that overall the veld is in good condition.

There are two different grazing regimes on Hlogoma with 100 head of cattle grazing on the ‘Clouds’ portion for two to three months in late summer on the north and northwest face, and rotational grazing throughout the year on ‘Woodford’, which makes up the rest of the mountain. However, the strength and vigour of the Decreaser grass *Themeda triandra* is noticeably weaker on ‘Woodford’, where weak plants are pulled out of the ground during grazing (Figure 5.3).

Figure 5.3: Dead *Themeda triandra* plants after being pulled out by grazing cattle on the farm ‘Woodfood’

Of the 43 grass species on Hlogoma, 35 use C4 metabolic pathways and eight use C3 metabolic pathways (Table 5.5). The cool-temperate, high rainfall and high altitude grasslands of the Drakensberg are dominated by C3 grasses (Mucina and Rutherford, 2006). Thus, the dominance of C4 grasses (Table 5.5) and dominance in terms of most abundant species recorded in the vegetation sample plots (Annexure I), does not follow what is described in the literature. C4 grasses are referred to as tropical or warm season grasses, whereas C3 plants are referred to a cool-season or temperate grasses. It is generally accepted that C4 grasses would dominate at lower altitudes and that C3 plants would dominate at higher altitudes. This has also been found by Cavagnaro (1988), who established that their distribution is highly correlated with evapotranspiration and temperature parameters. Due to the high altitude of the

Hlogoma Mountain, it would have been expected that C3 grasses would dominate; however, the opposite has been found. C4 grass species are generally more drought tolerant and use water more efficiently. Plants with a C3 system are efficient in converting solar energy into carbohydrates when there are increases in CO_2, but they become less efficient when temperature increases. In contrast, plants with the C4 system are mostly unaffected by increases in CO_2 and temperature (Collatz *et al.,* 1998). The dominance of the C4 grasses on the Hlogoma Mountain could therefore be ascribed to temperatures becoming warmer with a higher evapotranspiration, but that was not looked at in this study and needs further investigation. According to Tieszen *et al*. (1979), the C4 photosynthetic system may be important in areas where there is a high evapotranspiration and distinct wet and dry seasons, which is also linked to a long history of herbivore utilisation. It therefore seems that the dominance of the C4 grasses could be the result of the long grazing history of the area, as well as to the distinct wet and dry seasons experienced at Hlogoma Mountain.

5.5.2 Threatened and rare species

Three of the four RDL species, namely, *Dioscorea sylvatica*, *Alepidea amatymbica* and *Eucomis bicolor*, were recorded within the damp, rocky outcrop sub-communities 2.1.1 and 2.1.2 respectively, while the Rare *Helichrysum paleatum* was recorded in an adjacent area. The Critically Endangered *Asclepias concinna* and the new species *Aspidoglossum* sp. nova are present in the open grassland sub-community 2.4.5. The records are new sites for these species. Herbarium specimens were made and are now stored at the Natal Herbarium in Durban. The presence of these rare and threatened species, as well as the 74 KwaZulu-Natal specially protected indigenous plants, reflects the importance of Hlogoma Mountain as a reservoir for these species. Finding a new *Aspidoglossum* species in sub-community 2.4.5 reflects the need for more botanical surveys within the Drakensberg grassland areas.

5.5.3 Medicinal plants

Asteraceae, with 31 species, is the most dominant plant family found in the 177 plant species used for traditional medicine on Hlogoma Mountain, followed by Fabaceae and Orchidaceae at 11 species each and Hyacinthaceae at nine. Asteraceae medicinal plants are used to treat a wide range of ailments, including fevers, coughs, headaches, stomach complaints, and are used as an anti-helminthic (Annexure III). Fabaceae medicinal plants are used to treat a wide range of ailments, including fevers, rheumatic pains, dysentery, nausea, impotence, headaches, and are used as charms (Annexure III). The medicinal Orchidaceae is used to treat infertility and as protective and love charms (Annexure III). The medicinal Hyacinthaceae is used to treat colds, for pain relief, low backache, fractures, urinary diseases, as purgatives and for diarrhoea and dysentery (Annexure III).

5.5.4 Alien and invasive plants

Of the 27 alien plants on Hlogoma, some species, such as *Verbena bonariensis*, *Bidens pilosa*, *Conyza bonariensis*, *Tolpis capensis* and *Tagetes minuta*, are annuals with a local abundance in certain areas, particularly areas of disturbance in plant community 2.5. The Category 1b *Achyranthes aspera* is abundant in the herbaceous layer of the forest, and the Category 2 species' *Acacia mearnsii* and *Pinus patula* may present an encroachment problem to the forest in the future as there are woodlands of these species to the south of the forest. Category 1b species *Cotoneaster franchetti* and *Rubus cuneifolius* and the Category 2 *Acacia mearnsii* are making an appearance at the base of the Mountain.

According to the Conservation of Agricultural Resources Act (CARA) Act No. 43 of 1983 (South Africa, 1983), landowners are legally required to control and/or remove and destroy invader species according to the requirements as designated in the invasive species categories.

5.5.5 Phenology

Phenology characteristics are a function of vegetation composition, structure and condition as well as environmental factors such as climate (especially rainfall), edaphic properties, solar radiation and management practices (Hoare and Frost, 2004). According to Walther *et al*. (2002), phenology is a simple and easily observable process that can be used to track changes in the ecology of species in response to climate change. The record of the phenology of 263 plants on Hlogoma Mountain for the duration of the study (Annexure V) provides baseline data that can be examined in the future to assess possible impacts of climate change in the area.

5.5.6 Flower colour and elevation range

Plants growing in mountainous regions face many challenges, such as contending with extremes of cold, high winds and severe storms, as well as increased ultraviolet exposure and pollinator function limitations (Arnold *et al.*, 2009). Floral colours are expected to vary with increasing elevation with white to yellow colours being more abundant at high altitudes as these colours are traditionally thought to be associated with fly pollination (Arnold *et al.*, 2009) and flies have been shown to have an ability to forage at higher elevations (Lázaro *et al.,* 2008). Blue/violet flowers are expected to be present at low to medium elevations as bees, traditionally associated with blue/violet flower pollination, are dominant at these latitudes, perhaps due to energy requirements for flight that restrict their activities in sub-alpine and alpine conditions (Lázaro *et al.,* 2008; Arnold *et al.*, 2009).

The results on Hlogoma Mountain indicate that the elevation range for all flower colour groups is similar (Table 5.6, Annexure V). This data set does not show a pattern to the colours of the flowers relative to altitude.

It must be noted that the study by Lázaro *et al*. (2008) was conducted in southern Norway with sample sites placed from 20−1 500 m.a.s.l, a range of 1 480 m, with the highest study site termed alpine. Arnold *et al.* (2009) conducted their study in Norway with sample sites placed from 700−1 600 m.a.s.l. (range=900 m) and the terms sub-alpine accorded to the 700 m.a.s.l altitude and alpine with 1 600 m.a.s.l. Hlogoma Mountain has an elevation range from 1 600−1 905 m.a.s.l. giving a range of 305 m, which is substantially less that the ranges from the Lázaro and Arnold studies. This relatively small elevation range on Hlogoma Mountain may account for the lack of colour pattern with increasing elevation.

Furthermore, according to Killick (1990) the Drakensberg montane belt ranges from 1 280−1 830 m.a.s.l. and the sub-alpine belt from 1 830−2 865 m.a.s.l. Hlogoma Mountain at a summit altitude of 1 905 m.a.s.l. falls mostly with the montane belt and is within the lower range of the sub-alpine belt. Perhaps the effects of elevation increase on flower colour and pollinator limitations may not apply at these altitudes; however, the degree of elevation range probably has a greater influence. Further studies would need to be done to investigate this topic further.

5.5.7 Floristic affinities

5.5.7.1 Floristic links to the DAC

A comparison of the relative size and ranking of the ten dominant Angiosperm families on Hlogoma Mountain to Mahwaqa Mountain and 3029DA WEZA (Ngeli) study area, the southern Drakensberg and the DAC shows close floristics affinities between the study site and these areas because of the striking overlap of families (Table 5.7).

Carbutt and Edwards (2006) included the inselbergs Mahwaqa Mountain and 3029DA WEZA (Ngeli) study area in the DAC based on their summits being higher than the 1 800 ma.s.l. delimiting altitude, and based on their strong floristic ties to the southern Drakensberg. The summit of Hlogoma Mountain is

1 905 m.a.s.l. and not only shows close affinities with these inselbergs, as well as with the southern Drakensberg, but also has floristic affinities with the DAC itself.

Further, with reference to DAC endemism, two of the six genera endemic to the DAC, two endemic species and no fewer than 88 near-endemic species occur on Hlogoma Mountain (Annexure III).

Based on the above, Hlogoma Mountain should be considered an inselberg/outlier of the southern Drakensberg and included in the DAC.

5.5.7.2 Floristic links to the CFR

The presence of 30 Cape element genera present on Hlogoma Mountain (Table 5.8) out of a 62 typical Cape elements in the KwaZulu-Natal Drakensberg (Carbutt and Edwards, 2001), indicates some affinity with the CFR.

These results contribute to information relating to the presence of Cape elements on the Hlogoma Mountain inselberg and floristic biogeographic knowledge.

5.5.8 Plant diversity

5.5.8.1 Species richness

In terms of species richness at the study area scale, the total number of plant species found in the 117 ha study area on Hlogoma Mountain is 467. These species were recorded and collected from within and adjacent to the 100 relevés of the study during the Braun-Blanquet surveys, as well as regular monthly visits to 13 permanent plots over a 16 month period, from October 2014 to February 2016.

The species richness of Hlogoma Mountain was compared with that of two other inselbergs in the Grassland Biome, namely Platberg Mountain, Harrismith, in the Free State province (Brand *et al*., 2010) and Mahwaqa Mountain, at Bulwer, KwaZulu-Natal (Meter *et al*., 2002). Hlogoma falls within the Sub-escarpment bioregion in Gs10 Drakensberg Foothill Moist Grassland, Mahwaqa within the Sub-escarpment bioregion in Gs11 Southern KwaZulu-Natal Moist Grassland and Platberg within Mesic Highveld Grassland in Gm4 Eastern Free State Sandy Grassland.

Hlogoma Mountain has 467 species in 117 ha; Platberg Mountain has 669 species in an area of approximately 3 000 ha; and Mahwaqa Mountain has 1 030 species in an area of approximately 4 000 ha. Hlogoma Mountain has a species-to-area ratio of 4:1, Platberg 0.2:1, and Mahwaqa 0.3:1. Thus Hlogoma has a markedly higher species-to-area-ratio.

The higher total species richness of Platberg and Mahwaqa is expected since species richness normally increases with an increase in area surveyed (Preston, 1962). Nevertheless, Hlogoma has a far higher species to area ratio than the other two areas.

The high species richness recorded on Hlogoma Mountain may be partly explained by the sampling regime, which comprised two peak growing seasons, plus autumn, winter and spring to document the presence of plant species not growing during summer months. Thus, both early spring and winter-flowering species and other species which only flowered in one of the two summers were recorded. It was difficult to compare the collecting timing on Mahwaqa as the species inventory was obtained from species lists provided by various collectors and subsequently cross-referenced with herbarium specimens in the Natal University Herbarium (NUH), a literature search, as well as relevant data obtained from the National Herbarium, Pretoria (PRECIS) (Meter *et al*., 2002). The main collections on Platberg (Brand *et al*., 2010) were made from October 2005 through to January 2007, however, exact months were not specified.

Structurally complex habitats provide more environmental niches and thus increase species diversity and this is a particularly typical characteristic of inselbergs (Brand, et.al, 2010). On Hlogoma, the high environmental variation (e.g. topography, aspect, steep slopes, altitude, rockiness, soil depth and climate) typical of inselbergs is contained within a relatively small area when compared to the inselbergs Mahwaqa and Platberg. This may account for the higher species-to-area ratio on Hlogoma when compared to Mahwaqa and Platberg.

In terms of species richness per small sampling units, Cowling *et al.* (1989) states that plant diversity for the Grassland Biome in a 1 m^2 area may contain 15 species and in a 1 000 m^2 area from 55–95 species. Mucina and Rutherford (2006) provide species richness estimates of 9–39 species per 100m^2 in uniform, single-layer high altitude grassland in the Eastern Cape or KwaZulu-Natal. Siebert (2011) obtained results for untransformed temperate and tropical grassland with a mean plant species richness of 55–67 species per 100 m^2. On Hlogoma Mountain the mean number of species for the open grassland sub-communities 2.4.1 to 2.4.5 ranges from 18–40 per 16 m^2. These results are similar to the diversity values from Mucina and Rutherford (2006); however, the plots on Hlogoma are 16 m^2, which is 62.5% smaller than the 100 m^2 stated in Mucina and Rutherford (2006), making a direct comparison impossible.

Mucina and Rutherford (2006) states that species richness in habitats such as rocky outcrops, which include greater plant habit complexity (e.g. a shrub layer in addition to the single grass/herb layer), may increase by 10 or more species per 100 m^2 (19–49). On Hlogoma Mountain the mean number of species for the rocky outcrop sub-communities 2.1.1 and 2.1.2 situated within or on the edge of the dolerite sill, ranges from 12–58 per 16 m^2 relevé. The upper range at 58 is higher than the upper range of the Mucina and Rutherford (2006) estimates, but generally these results match. For the rocky ridge/slope grassland sub-communities 2.5.1 to 2.5.3, the mean number of species per 16 m^2 relevé

ranges from 16–42. These results are similar to estimated records of larger plots in Mucina and Rutherford (2006).

5.5.8.2 Plant community diversity

Shannon-Wiener index values (*H'*) increase with the number of species in a community and could reach very large numbers; however, in practice, for biological communities, *H'* does not exceed 5 (Krebs, 1999).

The Shannon-Wiener indices for all the communities, with the exception of Communities 1 and 2.2, were not noticeably different (Table 5.10). The association between the Shannon-Weiner Diversity Index values (*H'*) for the surveyed communities was not significant ($X^2(13) = 0.514$, $P = 1.00$). The three communities that had the highest Shannon-Wiener Diversity Index values were 2.1.2, *H'* = 4.267, 2.5.3, *H'* = 3.894 and 2.5.1, *H'*=3.892, indicating that these were the most diverse communities. Communities with the lowest Shannon-Wiener Diversity indices were 1 and 2.2, both with *H* = 2.887, reflecting fewer species and dominance by less species. The results correlate with the plant community total species richness values as indicated in Table 5.2.

The *H*' values for the plant communities on Hlogoma (excluding communities 1 and 2.2), range from 3.581–4.267 (Table 5.10) indicating that the diversity of plant communities on Hlogoma is relatively high. These high plant diversity values show that not only is the species richness on Hlogoma Mountain high, but many species are relatively abundant.

Values for Evenness (*J'*) are, in practice, constrained between 0 and 1 and the more even the distribution of species in communities, the higher the *J'* values (Mulder *et al*., 2004

The evenness values on Hlogoma Mountain range from 0.75−0.95 (Table 5.10) indicating an equitable distribution of species throughout the area. Plant sub-

community 2.5.2 (*J'*=0.952) has the most even distribution of species followed by community 2.2 (*J'*=0.948), sub-community 2.4.1 (*J'*=0.932) and sub-community 2.1.2 (*J'*=0.915).

6 Conclusion

As little was known about the vegetation of Hlogoma Mountain prior to this study, the floristic analysis and plant diversity results provide new baseline knowledge of the vegetation for the study area and for the Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit.

The floristic analysis of Hlogoma Mountain shows that it is a site of high plant species richness and diversity within the Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit. This is evidenced by the 467 species, 271 genera and 87 families, four RDL species, one rare species and a new *Aspidoglossum* species found in the 117 ha study area. This data together with the presence of two of the six DAC near-endemic genera, *Craterocapsa* and *Rhodohypoxis*, two DAC endemic species *Albuca rupestris* and *Helichrysum paleatum* and 88 DAC near-endemic species (Annexure IV) reinforces the conservation value of this site. The presence of large number of plant species used for traditional medicine on Hlogoma Mountain, representing 38% of all species recorded as well as the threat of overharvesting, enhances the need to conserve the flora of Hlogoma Mountain.

Therefore, the small inselberg Hlogoma Mountain, rising above the heavily transformed land of Underberg, can be considered a refuge for floristic biodiversity and has important conservation value. Hlogoma Mountain can be regarded as an island of refuge within the Grassland Biome, which is one of the most threatened biomes in South Africa.

The relatively small area of this detailed study with high species richness and high biodiversity shows that small areas can contain significant biodiversity.

Further study needs to be done to examine the positive practical implications of biodiversity studies within selected small areas.

Hlogoma Mountain, at 1 905 m.a.s.l., is higher than the 1 800 ma.s.l. DAC lower delimiting altitude boundary. Hlogoma shows close floristics affinities with the DAC inselbergs Mahwaqa Mountain and the 3029DA WEZA (Ngeli) study area, the southern Drakensberg and with the DAC itself. Further, Hlogoma Mountain shares endemic genera and species and near-endemic species with the DAC. (Annexure IV). Thus, Hlogoma Mountain should warrant inclusion in the DAC.

Mucina and Rutherford (2006) notes that there are a number of species linking the core of the DAC with high-altitude mountains lying to the south and south-east of the escarpment. They suggest that the vegetation of these 'islands' should perhaps be re-considered and included in one of the Drakensberg Grassland (Gd) units within the DAC in the future. Hlogoma Mountain should be included in this possible review.

While there is a fairly strong affinity between Hlogoma Mountain and the CFR with the sharing of typical Cape elements, the study area shows a greater affinity with the DAC.

The analysis of the composition of grasses shows a mix of C3 and C4 with a dominance of the C4 grasses on the Hlogoma Mountain. This could be ascribed to temperatures becoming warmer but further studies on Hlogoma are needed. The phenology records throughout the study period provide baseline data for Hlogoma Mountain. Monitoring the change in C3 to C4 ratio of grasses and changes in phenology of the species on Hlogoma Mountain could be used in the future to track changes in species response to the possible impacts of climate change in the area.

This study further provides a platform for future monitoring and assessing species losses as a result of habitat transformation and for assessing and monitoring the impact that management and conservation efforts have on grassland biodiversity.

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CHAPTER SIX

CONCLUSION AND MANAGEMENT RECOMMENDATIONS

Hlogoma Mountain is a small inselberg rising above areas heavily transformed by commercial farming and forestry in the Underberg district of KwaZulu-Natal. It is located within the Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit of the Grassland Biome. Little information was known about the vegetation of Hlogoma Mountain hence this research was undertaken to investigate the vegetation ecology of this small relatively untransformed inselberg. The small study area of 117 ha allowed for a detailed study to be carried out.

The aims of the study were satisfactorily achieved. The vegetation of Hlogoma Mountain was successfully identified, classified and described and the different plant communities interpreted. A detailed vegetation map was compiled. Interpretation of the CCA ordination gained understanding of the influence of key environmental variables on the distribution of plant communities in the study area. A comprehensive plant species checklist of the study area was compiled and a floristic analysis undertaken, which included results of the floristic composition of taxa present, records of rare and threatened plants, records of medicinal plants and their use in traditional medicine, phenology records documented and flower colour correlated with elevation ranges. Plant community biodiversity was investigated in terms of species richness and the Shannon Wiener Diversity (H') and Evenness (J') Indices. Floristic links to the Drakensberg Alpine Centre (DAC) and the Cape Floristic Region (CFR) were assessed. Results of this research provide valuable baseline data on the vegetation and plant ecosystems of the study area.

The research hypothesis for this study "The vegetation of Hlogoma Mountain shows distinct plant communities and rich floristic diversity related to environmental variability in a relatively small, untransformed inselberg" has been proven. The following results support the hypothesis.

The widely accepted Braun Blanquet method of vegetation classification was used in this study to identify the different plant communities present in the study area. This method has been used to successfully analyse vegetation in several ecological studies. Guidelines and recommendations for phytosociological studies as set out by Brown *et al*. (2013) were followed. There are clear distinctions between the communities identified. Two major communities, five communities, 12 sub-communities and four variants plant communities were successfully classified, identified and described. Ordination analysis indicated the key environmental variables, with aspect, soil type, rockiness, soil depth, erosion and soil water (in descending order) being the most important variables which influence the distribution of the 100 relevés within the different plant communities in the study area. This phytosociological classification and description of Hlogoma provides valuable data on the natural ecosystems in the study area.

The floristic analysis of the plant checklist of Hlogoma Mountain shows that it is a site of high plant species richness and diversity. This is evidenced by the 467 species, four RDL species, one rare species and a new *Aspidoglossum* species, two DAC endemic genera and two DAC endemic species and 88 DAC near-endemic species.

As a site of high species richness and biodiversity, the small inselberg Hlogoma Mountain, rising above the heavily transformed land of Underberg, can be considered a refuge for floristic biodiversity. The presence of rare, threatened, endemic and near-endemic plant species, as well as a large number of plant species used for traditional medicine, enhances the need to conserve the flora in the study area. Hlogoma Mountain is also the type locality of a new *Aspidoglossum* species. In addition, the study area is home to many animals including endangered and endemic and near-endemic bird species, which live and breed in the grassland, rocky outcrops and forest patches. Hlogoma Mountain has important conservation value and is an island of refuge within the Grassland Biome.

Hlogoma Mountain is located within the Grassland Biome, which is one of the most threatened biomes in South Africa. Agriculture and forestry are two of the most dominant threats leading to grassland transformation. The Underberg district is an area greatly transformed by forestry and is an important beef and dairy farming district. Hlogoma Mountain is a grassland island refuge within this sea of transformation. At least two other inselbergs, with summits above 1 900 m.a.s.l., are present in the Underberg district on private land and may be part of an archipelago of island refuges in this transformed grassland area.

Further information from the floristics analysis shows that Hlogoma shares floristics affinities with the DAC inselbergs Mahwaqa Mountain and the 3029DA WEZA (Ngeli), the southern Drakensberg, and with the DAC itself. Hlogoma Mountain, at 1 905 m.a.s.l., is higher than the 1 800 ma.s.l. DAC lower delimiting altitude boundary and the close floristics affinities with the DAC indicate that Hlogoma Mountain should warrant inclusion in the DAC. Assessment of floristic links with the Cape Floristic Region (CFR) indicates that while there is an affinity between Hlogoma Mountain and the CFR through sharing of typical Cape elements, the study area shows a greater affinity with the DAC.

Mucina and Rutherford (2006) note that there are a number of species linking the core of the DAC with high-altitude mountains (such as Hlogoma) lying to the south and south-east of the escarpment. Results from this study justify the inclusion of Hlogoma Mountain into one of the Drakensberg Grassland (Gd) units within the DAC in this possible review.

The ownership of Hlogoma Mountain is divided into two privately owned sections. Hlogoma Mountain has been used to graze beef cattle for many years and is burnt on a regular basis. Management recommendations for the grassland are to focus on maintaining the good condition of the *Themeda triandra* grassland and the high diversity of the grassland forb species present on Hlogoma. However, the level of erosion present particularly on steep slopes

needs to be addressed. Both farmers changed management practice in 2016 to a biennial and not an annual burn, but have maintained the grazing regime. This will ensure abundant *Themeda triandra* and allow some recovery, perhaps over time, to diminish the levels of erosion in Community 2.5. The effect on non-grass diversity will need to be monitored. Removal of the invasive species *Rubus cuneifolius*, *Cotoneaster franchetti* and *Acacia mearnsii* at the base of Hlogoma requires urgent attention to reduce the possibility of these species spreading up the mountain.

Management recommendations for the indigenous forest community should focus on monitoring the encroachment of *Acacia mearnsii* and *Pinus patula* and the removal of a number of alien invasive plants present, including *Achyranthes aspera*. Harvesting the indigenous trees in the forest in the future will remain a constant threat.

Based on the results of this study, future work could be undertaken to:

- Monitor changes to plant community composition, species inventory, the C3 to C4 ratio and to the phenology to track changes in species response to the possible impacts of climate change in the study area and subsequently in the wider Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit.
- Monitor and assess species losses as a result of possible habitat transformation and the impact that management efforts have on grassland biodiversity on Hlogoma Mountain. This could provide information on the impact of the grazing and fire regimes on Sub-Escarpment grasslands.
- Monitor the species composition of plant communities, presence/absence of rare and endangered species and medicinal plants, particularly in terms of the threat of illegal harvesting of medicinal plants.

As little was known about the vegetation of Hlogoma Mountain prior to this study, results of the phytosociological study and the floristic analysis and plant

diversity results provide new baseline knowledge about the vegetation in the study area. Although, according to Mucina & Rutherford (2006), the conservation status of the Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit is ‘Least Threatened’, the collected data will contribute to the baseline knowledge of temperate grasslands, will add to the understanding of the biology of these mountain grasslands and will contribute towards grassland management and conservation programmes.

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ANNEXURE I

Complete phytosociological table for Hlogoma Mountain, including those species not grouped into species groups

Major plant community number	1	2														
Plant community number		2.1		2.2	2.3			2.4					2.5			
Sub-community number		2.1.1	2.1.2		2.3.1		2.3.2	2.4.1	2.4.2	2.4.3	2.4.4	2.4.5	2.5.1	2.5.2	2.5.3	
Variant number					2.3.1.1	2.3.1.2									2.5.3.1	2.5.3.2
Relevé number	98 90 100	51 55 56 57 43	41 32 68 31	85	45 94 47	48 52 53 93	89 87 18 83 21	58 42	46 72 73 40	38 34	35 44 36 37 20 54 23 13 12 1 11 50 82 28 22 65 4 3 39 17 2	60 59 62 61 86 95 92 24 64 25 80 77 74 81	90 88 15 66 16 70 69 10 49	96 97	63 26 84 7 29 67 71 33 27 5 14 8	75 91 9 6 78 79 30 19 76
Species group A																
Leucosidea sericea	4 3 4	2	. . . .	.	. 2 2	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Achyranthes aspera	3 2 2	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Plectranthus grallatus	2 2 2	. . . . .	1 . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Nemesia silvatica	2 2 2	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Myosotis sylvatica	2 2 2	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Kiggelaria africana	3 2 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Galopina circaeoides	1 1 2	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Scadoxus puniceus	1 1 2	. r 2 + .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Polystichum transvaalense	2 2 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Nothoperanema squamiseta	. 2 2	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Celtis africana	2 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Asparagus asparagoides	1 . +	. . . . .	+ . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Carex zuluensis	r 1 .	+	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Pteris cretica	1 1 +	. . . . .	. . . .	.	. 1 .	. . . +	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Pleopeltis macrocarpa	1 + 1	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Adiantum poiretii	r 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Argyrolobium tomentosum	1 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Drymaria cordata subsp. *diandra*	1 . 1	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Impatiens hochstetteri subsp. *hochstetteri*	1 . 1	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Leonotis dubia	. 1 1	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Asplenium aethiopicum	r 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Dichrocephala integrifolia subsp. *integrifolia*	1 . +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Galium scabrelloides	1 + .	1	. . . .	.	. . +	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Disperis fanniniae	r . +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Polygala macowaniana	r . r	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Sandersonia aurantiaca	r . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Stachys grandifolia	2 . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Dioscorea rupicola	. 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Canthium ciliatum	1 . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Poa annua	. 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Schoenoxiphium sparteum	. + +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Streptocarpus gardenii	. 1 .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Streptocarpus pentherianus	. + +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Asplenium monanthes	. . r	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Asparagus setaceus	r . .	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Riocreuxia torulosa	. . 1	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Cheilanthes hirta var. *hirta*	. . +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Cheilanthes viridis var. *macrophylla*	. . r	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Stenoglottis fimbriata	. . +	. . . . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Species group B																
Themeda triandra	. . .	1 2 1 1 +	2 2 3 2	1	. . 1	4 2 2 2	4 3 3 2 2	4 3	3 3 3 3	3 3	3 3 4 3 3 3 4 4 3 3 3 3 3 2 3 3 3 2 3 3 3	4 4 4 3 3 2 3 3 3 4 3 3 4 3	2 3 2 2 2 2 2 1 3	1 1	3 2 2 2 2 3 + 2 2 1 2 3	+ . 2 2 + 1 1 . +
Hilliardiella aristata	. . .	1 . . + .	. r 1 .	+	. . +	. . + +	. + . + +	+ 1	. . . .	+ 1	+ + + + . . 1 1 + + + + + . . + . + + + 1	+ + + + + + + + 1 + + . + +	+ + . . . + + + +	. .	+ + 1 1 1 1 + 1 + + . .	. + ...
Commelina africana	. . .	. + r + .	. . . r	.	. . .	. r + r	. . . r +	. +	. . . .	+ r	. . . . + + . + r + . . r . + ... +	r r . . . . . r	. . r . + . + r r	r +	. . . . . . + . . . r .	. . . .

Major plant community number	1	2														
Plant community number		2.1		2.2	2.3			2.4					2.5			
Sub-community number		2.1.1	2.1.2		2.3.1		2.3.2	2.4.1	2.4.2	2.4.3	2.4.4	2.4.5	2.5.1	2.5.2	2.5.3	
Variant number					2.3.1.1	2.3.1.2									2.5.3.1	2.5.3.2
Relevé number	98 99 100	51 55 56 57 43	41 32 68 31	85	45 94 47	48 52 53 93	89 87 18 83 21	58 42	46 72 73 40	38 34	35 44 36 37 20 54 23 13 12 1 11 50 82 28 22 65 4 3 39 17 2	60 59 62 61 86 95 92 24 64 25 80 77 74 81	90 88 15 66 16 70 69 10 49	96 97	63 26 84 7 29 67 71 33 27 5 14 8	75 91 9 6 78 79 30 19 76
Species group C																
Cymbopogon nardus	. . .	. 2 2 2 2	2 1 1 1	.	. . .	. . . .	. . . . .	1 1	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	+ . . . .
Agapanthus campanulatus* subsp. *patens	. . .	. 1 1 1 .	2 + + +	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	+ .	. . . .	. . . .
Stachys kuntzei	. . .	1 + . . .	+ . 1 .	.	. . .	. . . .	. . . . .	. +	. . . .	. .	. . . .	. . . .	. + ...	. .	. . . .	+ . . . .
Chaenostoma floribundum	. . .	. + + . .	+ . + .	.	. . +	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	r .	. . . .	. . . .
Searsia discolor	. . .	. 1 + 1 .	. . . +	.	. . .	. . . .	. . . . .	1 .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Melinis nerviglumis	. . .	. . r + .	. . + .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Species group D																
Heteromorpha arborescens	. 2 .	3 . 2 . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Rhynchosia caribaea	. . .	2 1 2 . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Asparagus cooperi	. . .	. . 2 1 .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Rabdosiella calycina	. . .	. . 1 2 .	. . . .	.	. . .	. . . .	1 . 1 . +	. .	. . . .	. .	. . . .	. . . .	. . + ...	. .	. . . .	. . . .
Aloe maculata	. . .	1 1 1 1 .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	1	. .	. . . .	. . . .
Eragrostis chloromelas	. . .	. 1 . + .	. . . .	.	. . .	. . . .	. . . . .	. +	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Leonotis intermedia	. . .	+ 1 1 . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Haemanthus humilis* subsp. *hirsutus	. . .	. r + 1 .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Maytenus acuminata	. . .	. . . 2 .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Dioscorea sylvatica	. . .	. . 2 . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Crassula sarcocaulis* subsp. *rupicola	. . .	. . . 1 .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Bidens pilosa	. . .	+ . + . .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . . . r . . .	. .	. . . .	. . . .
Cheilanthes eckloniana	. . .	. + + + .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Zantedeschia albomaculata	. . .	. . r . r	. . . .	.	. . .	. . . r	. . . . .	. r	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Zaluzianskya glareosa	. . .	. . . r .	. . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
		. . . . .														
Species group E																
Alepidea amatymbica	. . .	. . . . .	2 . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Ocimum obovatum	. . .	. . . . .	1 + . 1	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Cotula hispida	. . .	. . . . .	1 1 . +	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	1 +	. . . .	. . . .
Senecio subrubriflorus	. . .	. . . . .	1 + 1 +	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Cephalaria oblongifolia	. . .	. . . . .	+ r . +	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Pimpinella caffra	. . .	. . . . .	r + . +	.	. . .	. . . +	. . . . .	. .	. + + +	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Crassula setulosa* var. *setulosa	. . .	. . . . .	+ + . r	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Crassula umbraticola	. . .	. . . . .	. . . +	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Cyphia elata	. . .	. . . . .	. . r r	.	. . .	. . . .	. . . . .	. .	. . . r	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Kniphofia laxiflora	. . .	. . . . .	r r . r	.	1 . .	r . . .	. . . . .	. .	. . r .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Afroscidium caffrum	. . .	. . . . .	. r 1 .	.	. . .	. . . .	. . . . .	. +	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Bupleurum mundii	. . .	. . . . .	r . . +	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Senecio oxyriifolius	. . .	. . r . .	+ . . +	.	. . +	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Streptocarpus polyanthus* subsp. *dracomontanus	. . .	. . . . .	+ + . r	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Pearsonia grandifolia	. . .	. . . . .	. r + .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	+ +	. . . . . + + ...	. . . . + + . . .
Eucomis bicolor	. . .	. . . . .	+ . . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Lobelia vanreenensis	. . .	. . . . .	+ + . .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Panicum aequinerve	. . .	. . . . .	r . r .	.	. . .	. . . .	. . . . .	. +	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .
Schizoglossum bidens* subsp. *pachyglossum	. . .	. . . . .	. r r .	.	. . .	. . . .	. . . . .	. .	. . . .	. .	. . . .	. . . .	. . . .	. .	. . . .	. . . .

Major plant community number	1			2																																																																																															
Plant community number				2.1									2.2	2.3												2.4																																										2.5																														
Sub-community number				2.1.1					2.1.2					2.3.1							2.3.2					2.4.1		2.4.2				2.4.3		2.4.4																					2.4.5														2.5.1									2.5.2		2.5.3																				
Variant number														2.3.1.1			2.3.1.2																																																																2.5.3.1												2.5.3.2								
Relevé number	98	99	100	51	55	56	57	43	41	32	68	31	85	45	94	47	48	52	53	93	89	87	18	83	21	58	42	46	72	73	40	38	34	35	44	36	37	20	54	23	13	12	1	11	50	82	28	22	65	4	3	39	17	2	60	59	62	61	86	95	92	24	64	25	80	77	74	81	90	88	15	66	16	70	69	10	49	96	97	63	26	84	7	29	67	71	33	27	5	14	8	75	91	9	6	78	79	30	19	76
Species group F																																																																																																							
Senecio erubescens var. *crepidifolius*	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio heliopsis	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nidorella pinnata	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Conyza chilensis	.	.	.	.	.	.	.	.	r	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Acalypha glandulifolia	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gladiolus ecklonii	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group G																																																																																																							
Arundinella nepalensis	.	.	.	2	.	.	.	.	.	.	.	.	.	2	2	2	1	2	4	2	.	.	2	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hyparrhenia dregeana	.	.	.	2	2	2	2	5	.	.	.	.	5	.	.	1	2	4	.	2	.	.	1	2	3	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum umbraculigerum	.	.	.	1	.	.	.	.	+	.	.	.	.	.	1	2	1	.	.	+	.	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eragrostis planiculmis	.	.	.	1	.	1	+	.	1	.	.	.	+	.	1	+	1	.	.	1	1	.	1	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Miscanthus ecklonii	.	.	.	.	.	.	.	.	2	.	.	+	.	2	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio inornatus	.	.	.	.	.	.	.	.	2	.	.	.	1	1	.	1	r	.	.	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group H																																																																																																							
Cyperus congestus	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	+	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Epilobium salignum	.	.	.	.	.	.	.	.	.	.	.	.	.	+	2	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thelypteris bergiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sium repandum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum mundtii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Isolepis cernua	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum aureonitens	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	+	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pycnostachys reticulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lobelia erinus	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	+	.	r	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Oenothera rosea	.	.	.	r	.	.	.	.	.	.	.	.	r	.	.	.	.	r	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group I																																																																																																							
Gunnera perpensa	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum cooperi	.	.	.	.	.	.	.	.	+	.	.	.	.	.	2	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nidorella obscura	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Limosella africana	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Agrimonia procera	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Juncus effusus	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Kniphofia species	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Isolepis costata	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ludwigia palustris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Isolepis sepulcralis	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Xyris capensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Conyza bonariensis	.	r	.	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group J																																																																																																								
Acalypha punctata	.	.	.	1	.	+	.	+	.	.	+	.	.	.	.	.	.	.	.	1	1	1	.	1	.	2	1	.	.	.	.	+	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Phygelius aequalis	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lessertia perennans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Afroaster pleiocephalus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum simillimum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Major plant community number	1			2																					
Plant community number				2.1									2.2	2.3											
Sub-community number				2.1.1					2.1.2					2.3.1							2.3.2				
Variant number														2.3.1.1			2.3.1.2								
Relevé number	98	99	100	51	55	56	57	43	41	32	68	31	85	45	94	47	48	52	53	93	89	87	18	83	21
Species group K																									
Tristachya leucothrix	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	1	.	+	.	.	1	.	.	1
Berkheya rhapontica	.	.	.	.	.	.	1	.	1	.	+	1	.	.	.	.	+	.	.	.	1	.	1	.	+
Panicum ecklonii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum pallidum	.	.	.	.	.	.	.	.	.	r	.	r	.	.	+	.	.	.	.	.	.	.	.	.	.
Hypoxis argentea	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Pentanisia prunelloides	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	+	r
Oxalis smithiana	.	.	.	.	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Species group L																									
Schistostephium crataegifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	r	.
Leonotis leonurus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Argyrolobium marginatum	.	.	.	.	.	.	.	.	+	.	r	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Nemesia denticulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Argyrolobium tuberosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helictotrichon turgidulum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group M																									
Gnidia phaeotricha	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Acalypha peduncularis	.	.	.	.	+	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Indigofera woodii	.	.	.	.	.	.	.	.	+	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum spiralepis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Moraea inclinata	.	.	.	.	.	.	.	.	r	+	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group N																									
Gerbera ambigua	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Haplocarpha scaposa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orthochilus leontoglossus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orthochilus aculeatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wahlenbergia fasciculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Albuca setosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group O																									
Koeleria capensis	.	.	.	.	.	.	.	.	2	2	.	2	.	.	.	.	.	.	.	.	.	.	+	.	.
Helichrysum krebsianum	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Thesium goetzeanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Indigofera hilaris	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	r	.	+	.
Graderia scabra	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	+	.	.	.	.
Scleria bulbifera	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Hypoxis galpinii	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Satyrium longicauda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	r

Major plant community number	2																												
Plant community number	2.4																												
Sub-community number	2.4.1		2.4.2				2.4.3		2.4.4																				
Variant number																													
Relevé number	58	42	46	72	73	40	38	34	35	44	36	37	20	54	23	13	12	1	11	50	82	28	22	65	4	3	39	17	2
Species group K																													
Tristachya leucothrix	1	+	1	2	.	+	1	1	2	1	.	1	1	2	2	1	1	2	1	1	2	2	2	2	2	2	2	2	2
Berkheya rhapontica	+	.	1	1	1	+	1	.	.	.	.	1	1	.	.	+	.	.	.	2	.	.	.	.	.	.	.	+	1
Panicum ecklonii	.	+	.	+	+	.	+	+	.	+	+	.	1	.	.	1	.	+	+	.	1	+	.	.	+	+	+	+	1
Helichrysum pallidum	.	r	.	+	r	+	1	1	+	r	1	.	+	+	+	+	r	r	+	+	r	r	+	r	.	.	1	r	+
Hypoxis argentea	.	.	.	.	.	.	r	.	.	.	.	r	+	.	r	+	.	+	.	.	.	.	r	.	.	+	.	+	+
Pentanisia prunelloides	.	+	+	+	.	.	.	+	+	.	.	+	+	.	1	+	.	.	+	.	+	+	+	+	.	+	1	+	+
Oxalis smithiana	.	.	r	.	.	+	+	r	r	.	.	.	r	.	.	r	r	r	.	.	.	+	r	+	.	.	r	.	+
Species group L																													
Schistostephium crataegifolium	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leonotis leonurus	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Argyrolobium marginatum	+	+	r	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nemesia denticulata	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Argyrolobium tuberosum	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helictotrichon turgidulum	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group M																													
Gnidia phaeotricha	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Acalypha peduncularis	1	+	.	+	+	1	2	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Indigofera woodii	+	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum spiralepis	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Moraea inclinata	.	.	r	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group N																													
Gerbera ambigua	.	.	.	.	.	.	1	r	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+
Haplocarpha scaposa	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Orthochilus leontoglossus	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orthochilus aculeatus	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wahlenbergia fasciculata	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Albuca setosa	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group O																													
Koeleria capensis	.	.	1	1	1	.	1	.	.	.	.	1	2	2	2	1	.	1	.	.	.	.	.	.	1	1	+	.	1
Helichrysum krebsianum	.	.	1	1	1	+	+	+	+	.	.	.	1	1	1	1	1	1	+	.	1	1	1	.	1	+	.	1	2
Thesium goetzeanum	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	r	r	r	.	.	.	.	.	+	+	.	.	+
Indigofera hilaris	.	.	+	.	.	+	.	.	r	+	+	1	r	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Graderia scabra	.	r	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.
Scleria bulbifera	.	r	.	.	.	.	.	.	.	.	.	.	.	.	+	r	+	.	r	.	.	.	.	.	.	.	.	.	.
Hypoxis galpinii	.	.	.	.	.	.	.	.	r	.	r	.	.	.	.	r	r	.	.	.	.	r	r	r	.	.	.	.	.
Satyrium longicauda	.	.	.	.	.	.	.	.	r	.	.	.	.	.	r	.	.	.	.	.	r	.	.	.	.	.	.	r	.

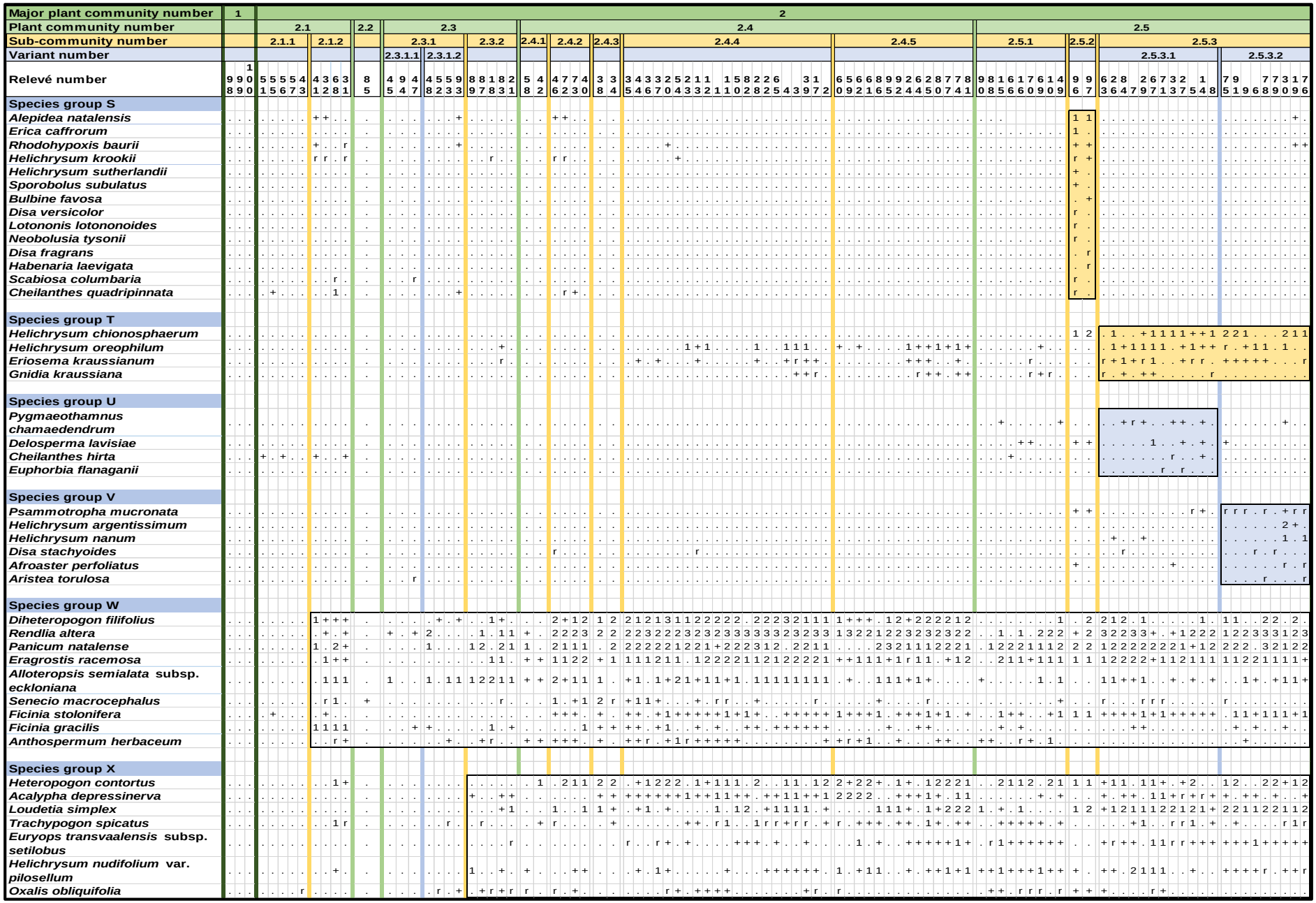
Major plant community number	2																								
Plant community number	2.4														2.5										
Sub-community number	2.4.5														2.5.1									2.5.2	
Variant number																									
Relevé number	60	59	62	61	86	95	92	24	64	25	80	77	74	81	90	88	15	66	16	70	69	10	49	96	97
Species group K																									
Tristachya leucothrix	1	1	2	1	+	1	1	.	2	1	.	+	.	2	.	.	.	.	.	.	.	.	.	.	.
Berkheya rhapontica	.	1	.	.	.	.	1	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	+	1	1
Panicum ecklonii	+	.	1	1	.	.	1	.	.	1	+	+	+	+	.	.	.	.	.	.	.	.	+	.	+
Helichrysum pallidum	r	r	+	r	.	.	.	.	.	.	r	.	.	r	.	.	.	.	.	.	.	.	.	.	.
Hypoxis argentea	1	r	1	+	.	.	+	+	+	+	r	r	+	+	.	.	+	+	r	r	r	+	+	.	.
Pentanisia prunelloides	+	+	+	+	+	.	+	+	.	+	r	.	r	1	+	.	.	.	.	.	.	.	1	.	.
Oxalis smithiana	+	.	r	.	.	.	r	.	.	r	.	.	.	.	.	.	+	.	.	.	.	+	r	.	.
Species group L																									
Schistostephium crataegifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leonotis leonurus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Argyrolobium marginatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nemesia denticulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Argyrolobium tuberosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helictotrichon turgidulum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group M																									
Gnidia phaeotricha	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	.	.	.	.	.	.	.	.	.
Acalypha peduncularis	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Indigofera woodii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Helichrysum spiralepis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	r
Moraea inclinata	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	r	r
Species group N																									
Gerbera ambigua	.	.	1	.	.	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Haplocarpha scaposa	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orthochilus leontoglossus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orthochilus aculeatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wahlenbergia fasciculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Albuca setosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group O																									
Koeleria capensis	.	1	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum krebsianum	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Thesium goetzeanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Indigofera hilaris	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Graderia scabra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Scleria bulbifera	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.
Hypoxis galpinii	.	.	.	.	.	+	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Satyrium longicauda	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r

Major plant community number	2																				
Plant community number	2.5																				
Sub-community number	2.5.3																				
Variant number	2.5.3.1												2.5.3.2								
Relevé number	63	26	84	7	29	67	71	33	27	5	14	8	75	91	9	6	78	79	30	19	76
Species group K																					
Tristachya leucothrix	.	1	.	.	.	.	+	.	+	.	.	+	.	.	1	+	.	.	+	1	.
Berkheya rhapontica	.	.	.	.	.	.	.	+	.	.	.	.	.	1	+	.	.	+	+	+	r
Panicum ecklonii	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.	.	.	.	+
Helichrysum pallidum	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypoxis argentea	.	.	.	+	+	+	+	.	r	+	+	.	r	+	.	r	+	+	+	.	r
Pentanisia prunelloides	.	.	+	.	.	.	+	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Oxalis smithiana	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.
Species group L																					
Schistostephium crataegifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leonotis leonurus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Argyrolobium marginatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Nemesia denticulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Argyrolobium tuberosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helictotrichon turgidulum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group M																					
Gnidia phaeotricha	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Acalypha peduncularis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Indigofera woodii	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.
Helichrysum spiralepis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Moraea inclinata	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	r	r	.	.	r
Species group N																					
Gerbera ambigua	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Haplocarpha scaposa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orthochilus leontoglossus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orthochilus aculeatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wahlenbergia fasciculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Albuca setosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group O																					
Koeleria capensis	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1	.
Helichrysum krebsianum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thesium goetzeanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	r
Indigofera hilaris	.	.	.	.	.	.	+	r	+	+	r	r	r	r	r	.	.	.	.	.	.
Graderia scabra	+	.	.	.	.	.	.	r	.	.	.	.	.	+	.	.	.	.	.	r	.
Scleria bulbifera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Hypoxis galpinii	r	r	.	r	.	r	.	.	.	.	.	.	.	.	r	.	r	r	.	.	.
Satyrium longicauda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Major plant community number	1			2																					
Plant community number				2.1									2.2	2.3											
Sub-community number				2.1.1					2.1.2					2.3.1							2.3.2				
Variant number														2.3.1.1			2.3.1.2								
Relevé number	98	99	100	51	55	56	57	43	41	32	68	31	85	45	94	47	48	52	53	93	89	87	18	83	21
Species group P																									
Helichrysum nudifolium var. *nudifolium*	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	+	.	.	+	.	.	+	.	.
Helichrysum glomeratum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.
Helichrysum herbaceum	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.
Hermannia woodii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Tolpis capensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhynchosia totta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eulalia villosa	.	.	.	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	r	.	.	.
Thesium natalense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sporobolus africanus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypericum aethiopicum	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ledebouria lachenalioides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Afroaster hispida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Kyllinga species	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypoxis filiformis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aspidoglossum species nova	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group Q																									
Elionurus muticus	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	1	1	.	.	.
Harpochloa falx	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	.	.	.	.	1	.	.
Microchloa caffra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Brachiaria serrata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.
Aristida transvaalensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2
Cyperus semitrifidus	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	+
Gazania krebsiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Dicoma anomala	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio scitus	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.
Gnidia fastigiata	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group R																									
Cyanotis speciosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	+	.	.	.
Indigofera hedyantha	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Richardia brasiliensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eragrostis plana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leobordia eriantha	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.
Nolletia rarifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hesperantha baurii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio harveianus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Polygala hottentotta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypochaeris radicata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.

Major plant community number	2																																										
Plant community number	2.4																																										
Sub-community number	2.4.1		2.4.2				2.4.3		2.4.4																					2.4.5													
Variant number																																											
Relevé number	58	42	46	72	73	40	38	34	35	44	36	37	20	54	23	13	12	1	11	50	82	28	22	65	4	3	39	17	2	60	59	62	61	86	95	92	24	64	25	80	77	74	81
Species group P																																											
Helichrysum nudifolium var. *nudifolium*	.	+	.	.	.	.	+	+	.	.	.	1	+	.	+	+	.	.	.	1	.	+	.	2	+	+	.	.	+	+	1	1	r	.	1	1	+	1	+	.	1	.	+
Helichrysum glomeratum	.	.	.	.	.	r	.	.	.	.	+	r	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	+	.	+	+	+	.	.	.	+	+
Helichrysum herbaceum	.	.	.	.	.	.	.	.	+	.	.	1	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	r	1	+	1	.	.	+	+	+	.	+	+	+	.	+	+
Hermannia woodii	.	+	.	.	.	+	.	+	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	+	1	.	.	+	.	.	.	.	.	.	.
Tolpis capensis	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	+	r	.	.	.	.	r	r	.	.	.	.
Rhynchosia totta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	r	.	.	.	.	.	.	.	.	.	.
Eulalia villosa	.	1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	r	.	.	.	.	.	.	.
Thesium natalense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r	r	.	.	r	.	.	.	r
Sporobolus africanus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	+	r	.	.	.	.	.	.	.	.	.	.	.
Hypericum aethiopicum	.	r	.	.	.	r	r	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	+	.	.	.	.	.	.	.	.
Ledebouria lachenalioides	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r	r	r	.	.	.	.	.	.	.	r	r	.
Afroaster hispida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	r	.	r	.	.	.	.	.
Kyllinga species	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r	.	r	.	.	.	.	.	.	.	.	.	.
Hypoxis filiformis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	r
Aspidoglossum species nova	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Species group Q																																											
Elionurus muticus	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	+	.	.	.	1	1	1	.	.	.	.	.	.	.
Harpochloa falx	.	.	1	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	.	+	.	.	.	+
Microchloa caffra	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	+	.	.	.	+
Brachiaria serrata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	1	1	.	.	.	.	.	.	.	.	.
Aristida transvaalensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cyperus semitrifidus	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gazania krebsiana	.	.	.	.	.	.	.	.	.	.	.	.	+	.	r	+	+	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	+	.	.	+	.	.	r	r
Dicoma anomala	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	+	r	.	.	.	.	.	+	.	.	.	.	+	.	.	r	+
Senecio scitus	.	.	.	.	.	.	r	r	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	r	+	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	r	r
Gnidia fastigiata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	r
Species group R																																											
Cyanotis speciosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.
Indigofera hedyantha	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Richardia brasiliensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Eragrostis plana	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	1	.	.	.	.	.	.	.	.	.	.
Leobordia eriantha	+	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.
Nolletia rarifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.
Hesperantha baurii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio harveianus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala hottentotta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypochaeris radicata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.

Major plant community number	2																															
Plant community number	2.5																															
Sub-community number	2.5.1									2.5.2		2.5.3																				
Variant number												2.5.3.1												2.5.3.2								
Relevé number	90	88	15	66	16	70	69	10	49	96	97	63	26	84	7	29	67	71	33	27	5	14	8	75	91	9	6	78	79	30	19	76
Species group P																																
Helichrysum nudifolium var. *nudifolium*	.	.	.	.	.	.	.	.	.	.	+	.	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum glomeratum	.	.	.	.	+	.	+	.	.	.	.	+	+	+	+	.	+	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Helichrysum herbaceum	.	.	+	.	.	.	1	.	+	.	.	1	.	+	+	.	.	.	+	.	.	.	+	.	.	.	.	+	.	.	.	.
Hermannia woodii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tolpis capensis	.	.	.	r	r	.	.	r	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Rhynchosia totta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
Eulalia villosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thesium natalense	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.
Sporobolus africanus	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypericum aethiopicum	.	.	.	r	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ledebouria lachenalioides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Afroaster hispida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Kyllinga species	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypoxis filiformis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aspidoglossum species nova	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group Q																																
Elionurus muticus	2	+	2	2	2	1	1	2	1	.	.	+	1	.	.	.	2	2	1	2	2	+	2	.	+	.	.	.	.	.	1	1
Harpochloa falx	.	+	1	2	1	.	2	2	+	.	.	.	1	+	1	1	2	1	2	1	1	1	1	1	+	2	1	+	+	+	1	+
Microchloa caffra	.	.	2	2	2	1	1	2	1	1	.	.	1	.	1	.	1	1	.	2	+	2	.	+	+	1	+	+	+	1	1	1
Brachiaria serrata	2	2	1	.	1	2	+	1	.	.	.	.	.	.	1	.	2	1	.	1	.	.	1	1	.	.	.	.	.	.	.	.
Aristida transvaalensis	.	.	.	2	1	1	.	.	.	2	1	.	.	.	.	.	1	1	+	.	1	.	.	1	1	.	.	.	.	.	1	2
Cyperus semitrifidus	.	.	1	1	1	+	+	+	1	+	1	+	.	.	+	.	+	1	+	+	+	+	+	+	1	.	+	+	1	1	+	1
Gazania krebsiana	.	.	+	+	+	r	r	1	+	+	+	.	+	.	.	.	.	.	.	r	.	r	+	.	+	.	.	+	r	.	r	.
Dicoma anomala	.	.	r	.	.	.	r	+	.	.	.	.	r	r	+	r	.	r	+	r	+	+	.	r	r	.	r	.	.	+	r	.
Senecio scitus	.	.	.	.	.	.	.	.	.	.	r	.	r	r	r	.	.	r	.	.	r	r	.	r	r	r	.	.	r	r	r	r
Gnidia fastigiata	.	.	+	.	+	.	.	+	.	r	+	.	.	.	.	.	.	+	.	r	+	.	+	.	+	.	.	.	.	.	.	.
Species group R																																
Cyanotis speciosa	.	+	+	.	+	r	r	1	r	.	.	r	.	.	.	.	+	.	.	r	.	r	r	.	.	.	.	.	.	.	.	.
Indigofera hedyantha	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Richardia brasiliensis	.	.	1	.	.	+	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eragrostis plana	.	.	+	+	.	+	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leobordia eriantha	.	.	+	r	+	r	.	.	.	.	.	.	.	+	+	.	.	.	.	.	+	r	.	.	.	.	.	.	+	.	.	.
Nolletia rarifolia	.	.	r	.	+	.	r	+	r	.	.	.	.	.	.	.	.	r	.	.	+	r	r	.	.	.	.	.	.	.	.	.
Hesperantha baurii	.	.	r	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio harveianus	.	.	.	r	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala hottentotta	.	.	.	r	r	.	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	.	.	r	.	.	.	.	.	.	.
Hypochaeris radicata	r	r	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.


Major plant community number
Plant community number
Sub-community number
Variant number
Relevé number
Species group S
Alepidea natalensis
Erica caffrorum
Rhodohypoxis baurii
Helichrysum krookii
Helichrysum sutherlandii
Sporobolus subulatus
Bulbine favosa
Disa versicolor
Lotononis lotononoides
Neobolusia tysonii
Disa fragrans
Habenaria laevigata
Scabiosa columbaria
Cheilanthes quadripinnata
Species group T
Helichrysum chionosphaerum
Helichrysum oreophilum
Eriosema kraussianum
Gnidia kraussiana
Species group U
Pygmaeothamnus chamaedendrum
Delosperma lavisiae
Cheilanthes hirta
Euphorbia flanaganii
Species group V
Psammotropha mucronata
Helichrysum argentissimum
Helichrysum nanum
Disa stachyoides
Afroaster perfoliatus
Aristea torulosa
Species group W
Diheteropogon filifolius
Rendlia altera
Panicum natalense
Eragrostis racemosa
Alloteropsis semialata subsp. eckloniana
Senecio macrocephalus
Ficinia stolonifera
Ficinia gracilis
Anthospermum herbaceum
Species group X
Heteropogon contortus
Acalypha depressinerva
Loudetia simplex
Trachypogon spicatus
Euryops transvaalensis subsp. setilobus
Helichrysum nudifolium var. pilosellum
Oxalis obliquifolia

Species with low diagnostic value shared across communities																																	
Major plant community number	1			2																													
Plant community number				2.1									2.2	2.3												2.4							
Sub-community number				2.1.1					2.1.2					2.3.1							2.3.2					2.4.1		2.4.2				2.4.3	
Variant number														2.3.1.1			2.3.1.2																
Relevé number	98	99	100	51	55	56	57	43	41	32	68	31	85	45	94	47	48	52	53	93	89	87	18	83	21	58	42	46	72	73	40	38	34
Senecio brevidentatus	.	.	.	.	.	.	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Schizocarpus nervosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sebaea sedoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	r
Senecio adnatus	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	r	.	r
Berkheya speciosa	.	.	.	1	.	.	.	.	.	1	.	+	.	.	.	+	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypoxis acuminata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	r	.
Wahlenbergia huttonii	.	.	.	.	.	.	.	.	.	r	r	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	r	.	r
Cyperus sphaerocephalus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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Watsonia lepida	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.
Crassula pellucida subsp. *brachypetala*	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Spermacoce natalensis	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia natalensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gerbera piloselloides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hilliardeilla hirsuta	.	.	.	.	+	+	.	+	+	.	.	.	1	.	.	.	+	.	+	.	+	r	r	.	.	+	.	.	.	.	.	.	.
Hypoxis costata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium wakkerstroomianum	.	.	.	.	+	.	.	.	+	.	.	.	.	.	+	+	.	.	+	+	.	.	+	r	.	+	+	.	.	.	.	.	.
Helichrysum appendiculatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.
Erica woodii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.
Printzia pyrifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
Cephalaria natalensis	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Ursinia montana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypoxis rigidula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Asclepias macropus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orthochilus foliosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala rehmannii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Sopubia cana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asclepias stellifera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala gerrardii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Brunsvigia grandiflora	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Crassula alba	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Ajuga ophrydis	.	.	.	.	r	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	r	.	.	.	.	.	.	.
Galium thunbergianum	.	1	.	+	.	r	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hebenstretia dura	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helictotrichon longifolium	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hesperantha woodii	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Moraea brevistyla	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rubus ludwigii	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.
Salvia aurita v. galpinii	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Satyrium parviflorum	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sebaea natalensis	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Troglophyton capillaceum subsp. *capilla*	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Urginea macrocentra	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cynoglossum austroafricanum	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.

Sub-community number	2.4.4																					2.4.5													
Relevé number	35	44	36	37	20	54	23	13	12	1	11	50	82	28	22	65	4	3	39	17	2	60	59	62	61	86	95	92	24	64	25	80	77	74	81
Senecio brevidentatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Schizocarpus nervosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	r	.	.	.	.	.	.	.
Sebaea sedoides	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	r	+	.	.	.	.	r	.	.	.	.	.	.	r	.	r
Senecio adnatus	r	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	.	r	.	.	.	.	.	.	.
Berkheya speciosa	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypoxis acuminata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wahlenbergia huttonii	r	.	.	.	r	.	.	r	r	.	.	.	.	r	.	r	r	.	.	.	.	.	.	.	.	r	.	.	.	.	.	r	.	r	.
Cyperus sphaerocephalus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r	r
Protea simplex	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Watsonia lepida	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula pellucida subsp. *brachypetala*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Spermacoce natalensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia natalensis	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gerbera piloselloides	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.
Hilliardeilla hirsuta	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypoxis costata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium wakkerstroomianum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum appendiculatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erica woodii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Printzia pyrifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cephalaria natalensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ursinia montana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Hypoxis rigidula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asclepias macropus	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
Orthochilus foliosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
Polygala rehmannii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sopubia cana	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asclepias stellifera	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala gerrardii	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Brunsvigia grandiflora	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula alba	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ajuga ophrydis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium thunbergianum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hebenstretia dura	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helictotrichon longifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hesperantha woodii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Moraea brevistyla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rubus ludwigii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salvia aurita v. galpinii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Satyrium parviflorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sebaea natalensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Troglophyton capillaceum subsp. *capilla*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Urginea macrocentra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cynoglossum austroafricanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Plant community number	2.5																															
Sub-community number	2.5.1									2.5.2		2.5.3																				
Variant number												2.5.3.1												2.5.3.2								
Relevé number	90	88	15	66	16	70	69	10	49	96	97	63	26	84	7	29	67	71	33	27	5	14	8	75	91	9	6	78	79	30	19	76
Senecio brevidentatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Schizocarpus nervosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Sebaea sedoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio adnatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Berkheya speciosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypoxis acuminata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wahlenbergia huttonii	.	.	.	.	.	.	.	.	.	r	r	r	r	.	.	.	.	.	.	.	r	r	r	.	r	r	r	.	r	r	r	r
Cyperus sphaerocephalus	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.
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Watsonia lepida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	1	.	.	.	.	.	.	.	.	r	.	.	r	r	.	.
Crassula pellucida subsp. *brachypetala*	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	r	.	.	.	.	.	.	.	.	.
Spermacoce natalensis	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia natalensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gerbera piloselloides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hilliardeilla hirsuta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypoxis costata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium wakkerstroomianum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum appendiculatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erica woodii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.
Printzia pyrifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cephalaria natalensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ursinia montana	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.
Hypoxis rigidula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
Asclepias macropus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orthochilus foliosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala rehmannii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Sopubia cana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asclepias stellifera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala gerrardii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Brunsvigia grandiflora	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula alba	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ajuga ophrydis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium thunbergianum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hebenstretia dura	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helictotrichon longifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hesperantha woodii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Moraea brevistyla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rubus ludwigii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salvia aurita v. galpinii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Satyrium parviflorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sebaea natalensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Troglophyton capillaceum subsp. *capilla*	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Urginea macrocentra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cynoglossum austroafricanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Species with low diagnostic value shared across communties																																																																																																				
Major plant community number	1			2																																																																																															
Plant community number				2.1								2.2	2.3												2.4																																										2.5																															
Sub-community number				2.1.1					2.1.2				2.3.1						2.3.2					2.4.1		2.4.2				2.4.3		2.4.4																				2.4.5														2.5.1								2.5.2		2.5.3																			
Variant number														2.3.1.1			2.3.1.2																																																														2.5.3.1											2.5.3.2								
Relevé number	98	99	100	51	55	56	57	43	41	32	68	31	85	45	94	47	48	52	53	93	89	87	18	83	21	58	42	46	72	73	40	38	34	35	44	36	37	20	54	23	13	12	1	11	50	82	28	22	65	4	3	39	17	2	60	59	62	61	86	95	92	24	64	25	80	77	74	81	90	88	15	66	16	70	69	10	49	96	97	63	26	84	7	29	67	71	33	27	5	14	8	75	91	9	6	78	79	30	19	76
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Polygala ohlendorfiana	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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Dierama argyreum	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Xysmalobium parviflorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	r	.	.	.	.	.	.	.	.
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Pterygodium magnum	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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Species with low diagnostic value shared across communties

Major plant community number	1			2																																																																																																
Plant community number				2.1									2.2	2.3												2.4																																												2.5																														
Sub-community number				2.1.1					2.1.2					2.3.1							2.3.2					2.4.1		2.4.2				2.4.3		2.4.4																					2.4.5														2.5.1									2.5.2		2.5.3																				
Variant number														2.3.1.1			2.3.1.2																																																														2.5.3.1												2.5.3.2								
Relevé number	98	99	100	51	55	56	57	43	41	32	68	31	85	45	94	47	48	52	53	93	89	87	18	83	21	58	42	46	72	73	40	38	34	35	44	36	37	20	54	23	13	12	1	11	50	82	28	22	65	4	3	39	17	2	60	59	62	61	86	95	92	24	64	25	80	77	74	81	90	88	15	66	16	70	69	10	49	96	97	63	26	84	7	29	67	71	33	27	5	14	8	75	91	9	6	78	79	30	19	76
Pennisetum thunbergii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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Senecio humidanus	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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Coccinia hirtella	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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Melasma scabrum	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Otholobium polystictum	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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Zantedeschia aethiopica	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eriosema salignum	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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Chenopodium schraderianum	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galinsoga parviflora	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hermannia cristata	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hermannia gerrardii	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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Phytolacca octandra	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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Osteospermum moniliferum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dimorphotheca jucunda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asclepias cultriformis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linum thunbergii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Schizoglossum atropurpureum subsp. *atropurpureum*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Athrixia phylicoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Felicia filifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula vaginata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.

ANNEXURE II

Checklist of the flora on Hlogoma Mountain; KwaZulu-Natal Specially Protected Indigenous Plants▲; Introduced Alien Plants*

PTERIDOPHYTA
ADIANTACEAE
Cheilanthes hirta Sw. var. *hirta*
Cheilanthes eckloniana (Kunze) Mett.
Cheilanthes quadripinnata (Forssk.) Kuhn
Cheilanthes viridis (Forssk.) Sw. var. *macrophylla* (Kunze) Schelpe & N.C.Anthony
Pellea calomelanos (Sw.) Link var. *calomelanos*
ANEMIACEAE
Mohria rigida J.P.Roux
Mohria vestita Baker
ASPLENIACEAE
Asplenium aethiopicum (Burm.f.) Bech.
Asplenium monanthes L.
Asplenium stoloniferum Bory
CYATHEACEA
Alsophila dregei (Kunze) R.M.Tryon▲
DRYOPTERIDACEAE
Dryopteris lewalleana Pic.Serm
Dryopteris athamantica (Kunze) Kuntze
Nothoperanema squamiseta (Hook.) Ching
Polystichum transvaalense N.C.Anthony
POLYPODIACEAE
Pleopeltis macrocarpa (Bory ex Willd.) Kaulf.
PTERIDACEAE
Adiantum poiretii Wikstr.
Pteris cretica L.
Pteris dentata Forssk.
THELYPTERIDACEAE
Amauropelta bergiana (Schltdl.) Holttum

WOODSIACEAE
Athyrium schimperi Moug. ex Fée
GYMNOSPERMS
PINACEAE
**Pinus patula* Schltdl. & Cham. var. *patula*
MONOCOTYLEDONS
AGAPANTHACEAE
Agapanthus campanulatus F.M.Leight. subsp. *patens* (F.M.Leight.) F.M.Leight.
ALLIACEAE
Tulbaghia ludwigiana Harv.
AMARYLLIDACEAE
Brunsvigia grandiflora Lindl.▲
Cyrtanthus tuckii Baker var. *viridilobus* I.Verd.▲
Haemanthus humilis Jacq. subsp. *hirsutus* (Baker) Snijman▲
Scadoxus puniceus (L.) Friis & Nordal▲
ARACEAE
Zantadeschia aethiopica (L.) Spreng.▲
Zantadeschia albomaculata (Hook) Baill.▲
ASPARAGACEAE
*Asparagus asparagoides (*L.) Druce
Asparagus cooperi Baker
Asparagus setaceus (Kunth) Jessop
ASPHODELACEAE
Aloe ecklonis Salm-Dyck▲
Aloe maculata All.▲
Bulbine favosa (Thunb.) Schult. & Schult.f▲
Kniphofia laxiflora Kunth▲
COLCHICACEAE
Sandersonia aurantiaca Hook.▲
COMMELINACEAE
Commelina africana L. cf. *krebsiana* (Kunth) C.B.Clarke
Cyanotis speciosa (L.f.) Hassk
CYPERACEAE
Carex zuluensis C.B.Clarke
Cyperus congestus Vahl

Cyperus obtusiflorus Vahl var. *flavissimus* (Schrad.) Boeck.
Cyperus semitrifidus Schrad.
Ficinia gracilis Schrad.
Ficinia stolonifera Boeck.
Isolepis cernua (Vahl) Roem. & Schukt. var*. cernua*
Isolepis costata Hoechst. ex A.rich
Isolepis sepulcralis Steud.
*Kyllinga s*p.
Pycreus rehmannianus C.B.Clarke
Rhynchospora sp.
Scleria bulbifera Hoechst. ex A.rich
Schoenoxiphium sp.
*Schoenoxiphion sparteum (*Wahlenb.) C.B.Clarke
DIOSCOREACEAE
Dioscorea sylvatica Eckl.▲
Dioscorea rupicola Kunth▲
HYACINTHACEAE
Albuca rupestris Hilliard & B.L.Burtté▲
Albuca setosa Jacq.▲
Drimia depressa (Baker) Jessop▲
Drimia elata Jacq.▲
Drimia macrocentra (Baker) Jessop▲
Eucomis autumnalis (Mill.) Chitt.▲
Eucomis bicolor Baker▲
Ledebouria cooperi (Hook.f.) Jessop▲
Ledebouria lachenalioides (Baker) J.C. Manning & Goldblatt▲
Ledebouria ovatifolia (Baker) Jessop▲
Ornithogalum graminifolium (Thun.)▲
Schizocarpus nervosus (Burch.) Van der Merwe▲
HYPOXIDACEAE
Hypoxis acuminata Baker
Hypoxis argentea Harv. ex Baker
Hypoxis costata Baker
Hypoxis filiformis Baker
Hypoxis galpinii Baker
Hypoxis rigidula Baker
Rhodohypoxis baurii (Baker) Nel var. *platypetala* (Baker) Nel
IRIDACEAE
Aristea abyssinica Pax▲
Aristea torulosa Klatt▲
Dierama argyreum L.Bolus▲
Dierama dissimile Hilliard▲

Dierama trichorhizum (Baker) N.E.Br.▲
Gladiolus ecklonii Lehm.▲
Gladiolus longicollis Baker▲
Gladiolus parvulus Schltr.▲
Hesperantha baurii Baker▲
Hesperantha woodii Baker▲
Moraea brevistyla (Goldblatt) Goldblatt▲
Moraea inclinata Goldblatt▲
*Moraea stricta B*aker▲
Tritonia gladiolaris (Lam.) Goldblatt & J.C.Manning▲
Watsonia lepida N.E.Br.▲
Watsonia pillansii L.Bolus▲
JUNCACEAE
Juncus effusus L.
Juncus dregeanus Kunth
ORCHIDACEAE
Brachycorythis ovata Lindl.subsp*. ovata*▲
Disa fragrans Schltr. subsp. *fragrans*▲
Disa oreophilla Bolus subsp. *oreophila*▲
Disa pulchra Sond.▲
Disa stachyoides Rchb.f. ▲
Disa versicolor Rchb.f.▲
Disperis fanniniae Harv.
Eulophia hians Spreng. var. *hians*▲
Eulophia ovalis Lindl. var. *bainesii* (Rolfe) P.J.Cribb & la Croix▲
Eulophia ovalis Lindl. var. *ovalis*▲
Eulophia zeyheriana Sond.▲
Habenaria dives Rchb.f.▲
Habenaria dregeana Lindl.▲
Habenaria laevigata Lindl.▲
Holothrix scopularia (Lindl.) Rchb.f.▲
Neobolusia tysonii (Bolus) Schltr.▲
Orthochilus aculeatus (L.f.) Bytebier subsp*. huttonii* (Rolfe) Bytebier▲
Orthochilus foliosus (Lindl.) Bytebier▲
Orthochilus leontoglossus (Rchb.f.) Bytebier▲
Pterygodium magnum Rchb.f.▲
Pterygodium nigrescens (Sond.) Schltr.▲
Satyrium cristatum Sond. var. *longilabiatum* A.V.Hall▲
Satyrium longicauda Lindl.▲
Satyrium macrophyllum Lindl.▲
Satyrium neglectum Schltr. subsp*. neglectum*▲
Satyrium parviflorum Sw.▲
Schizochilus flexuosus Harv.ex Rolfe▲
Stenoglottis fimbriata Lindl. subsp. *fimbriata*▲

POACEAE
**Agrostis montevidensis* Spreng. ex Nees
Allopteropsis semi-alata (R.Br.) Hitchc. subsp. *eckloniana* (Nees) Gibbs Russ.
Andropogon schirensis Hochst. ex A.Rich.
Aristida transvaalensis Henrard
Arundinella nepalensis Trin.
Brachiaria serrata (Thun.) Stapf
Cymbopogon nardus (L.) Rendle
Digitaria tricholaenoides Stapf
Diheteropogon filifolius (Nees) Clayton
Elionurus muticus (Spreng.) Kuntze
Eragrostis capensis (Thun.) Trin.
*Eragrostis chloromelas S*teud.
Eragrostis plana Nees
Eragrostis planiculmis Nees
Eragrostis racemosa (Thun.) Steud.
Eulalia villosa (Thun.) Nees
Harpochloa falx (L.f.) Kuntze
Helictotrichon longifolium (Nees) Schweick.
Helictotrichon turgidulum (Stapf) Schweick.
Heteropogon contortus (L.) Roem. & Schult.
Hyparrhenia dregeana (Nees) Stapf ex Stent
Koeleria capensis (Steud.) Nees
Loudetia simplex (Nees) C.E.Hubb.
Melinis nerviglumis (Franch.)
Melinis repens (Willd.) Zizka
Microchloa caffra Nees
Miscanthus ecklonii (Nees) Mabb.
Monocybium ceresiiforme (Nees) Stapf
Panicum aequinerve Nees
Panicum ecklonii Nees
Panicum natalense Hochst.
**Paspalum notatum* Flüggé
**Paspalum dilatatum* Poir
**Paspalum urvillei* Steud
Pennisetum thunbergii Kunth
**Poa annua* L.
Rendlia altera (Rendle) Chiov.
Sporobolus africanus (Poir.) Robyns & Tournay
Sporobolus subulatus Hack.
Tenaxia guillarmodiae (Conert) N.P.Barker & H.P.Linder
Themeda triandra Forssk.
Trachypogon spicatus (L.f.) Kuntze
Tristachya leucothrix Trin. ex Nees

RUSCACEAE
Eriospermum cooperi Baker▲
Eriospermum ornithogaloides Baker▲
TYPHACEA
Typha capensis (Rohrb.) N.E.Br.
XYRIDACEAE
Xyris capensis Thunb.
DICOTYLEDONS
ACANTHACEAE
Crabbea acaulis N.E.Br.
AIZOACEAE
Delosperma lavisiae L. Bolus
AMARANTHACEAE
**Achyranthes aspera* L. var. *sicula* L.
Cyathula uncinulata (Schrad.) Schinz
ANACARDIACEAE
Searsia dentata (Thunb.) F.A.Barkley
Searsia discolor (E.Mey. ex Sond.) Moffett
Searsia pyroides (Burch.) Moffett var. *gracilis*
Searsia pyroides (Burch.) Moffett var. *pyroides*
APIACEAE
Afrosciadium caffrum (Meisn.) P.J.D. Winter
Alepidea amatymbica Eckl. & Zeyh.
Alepidea natalensis J.M.Wood & M.S. Evans
Bupleureum mundii Cham. & Schltdl.
Heteromorpha arborescens (Spreng.) Cham. & Schltdl.
Pimpinella caffra (Eckl. & Zeyh.) D.Dietr.
Sium repandum Welw. ex Hiern
APOCYNACEAE
Asclepias concinna (Schltr.) Schltr.
Asclepias cucullata (Schltr.) Schltr. subsp. *cucullata*
Asclepias cultriformis (Harv. ex Schltr.) Schltr.
Asclepias macropus (Schltr.) Schltr.
Asclepias multicaulis (E.Mey.) Schltr.
Asclepias stellifera Schltr.
Aspidoglossum glanduliferum (Schltr.) Kupicha
Aspidoglossum gracile (E.Mey.) Kupicha
Aspidoglossum sp. nova Bester

Aspidonepsis flava (N.E.Br.) Nicholas & Goyder
Aspidonepsis reenensis (N.E.Br.) Nicholas & Goyder
Brachystelma pygmaeum (Schltr.) N.E.Br. subsp*. pygmaeum*▲
Miraglossum pulchellum (Schltr.) Kupicha
Pachycarpus campanulatus (Harv.) N.E.Br. var*. campanulatus*
Pachycarpus plicatus N.E.Br.
Riocreuxia torulosa Decne. var. *torulosa*
Schizoglossum atropurpureum E.Mey. subsp. *atropurpureum*
Schizoglossum bidens E.Mey. subsp*. pachyglossum* (Schltr.) Kupicha
Schizoglossum flavum Schltr.
Xysmalobium involucratrum (E.Mey.) Decne.
Xysmalobium parviflorum Harv. ex Scott-Elliot
ARALIACEAE
Cussonia paniculata Eckl. & Zeyh.
ASTERACEAE
Afroaster hispida (Thunb.) J.C.Manning & Goldblatt
Afroaster perfoliatus (Oliv.) J.C.Manning & Goldblatt
Afroaster pleiocephalus (Harv.) J.C.Manning & Goldblatt
Artemesia afra Jacq. ex Willd. var *afra*
Athrixia phylicoides DC.
Berkheya rhapontica (DC.) Hutch.& Burtt Davy
Berkheya setifera DC.
Berkheya speciosa (DC.) O.Hoffm.
**Bidens pilosa* L.
Chrysocoma ciliata L.
Cineraria mollis E.Mey. ex DC
**Conyza bonariensis* (L.) Cronquist
Conyza chilensis Spreng.
Cotula hispida (DC.) Harv.
Dichrocephala integrifolia (L.f.) Kuntze subsp. *integrifolia*
Dicoma anomela Sond.
Dimorphotheca jucunda E.Phillips
Euryops laxus (Harv.) Burtt Davy
Euryops transvaalensis Klatt subsp. *setilobus* (N.E.Br.) B.Nord.
Felicia filifolia (Vent.) Burtt Davy
**Galinsoga parviflora* Cav.
Gazania krebsiana Less.
Gerbera ambigua (Cass.) Sch.Bip
Gerbera natalensis Sch.Bip.
Gerbera piloselloides (L.) Cass.
Haplocarpha scaposa Harv.
Helichrysum adenocarpum DC.
Helichrysum appendiculatum (L.f.) Less.
Helichrysum argentissimum J.M.Wood

Helichrysum aureonitens Sch.Bip.
Helichrysum aureum (Houtt.) Merr. var. *monocephalum* (DC.) Hilliard
Helichrysum auriceps Hilliard
Helichrysum caespititium (DC.) Harv.
Helichrysum callicomum Harv.
Helichrysum cephaloideum DC.
Helichrysum chionosphaerum DC.
Helichrysum cooperi Harv.
Helichrysum glomeratum Klatt
Helichrysum herbaceum (Andrews) Sweet
Helichrysum krebsianum Less.
Helichrysum krookii Moeser
Helichrysum lingulatum Hilliard
Helichrysum mundtii Harv.
Helichrysum nanum Klatt
Helichrysum nudifolium (L.) Less. var. *nudifolium*
Helichrysum nudifolium (L.) Less. var. *pilosellum* (L.f.) Beentje
Helichrysum oreophilum Klatt
Helichrysum paleatum Hilliard
Helichrysum pallidum DC.
Helichrysum simillimum DC.
Helichrysum spiralepsis Hilliard & B.L.Burtt
Helichrysum splendidum (Thunb.) Less.
Helichrysum sutherlandii Harv.
Helichrysum umbraculigerum Less.
Helichrysum vernum Hilliard
Hilliardiella aristata (DC.) H.Rob.
Hilliardiella hirsuta (DC.) H.Rob.
**Hypochaeris radicata* L.
Lactuca inermis Forrsk.
Nidorella auriculata DC.
Nidorella obscura (DC.) J.C. Manning & Goldblatt
Nidorella pinnata (L.f.) J.C.Manning & Goldblatt
Nolletia rarifolia (Turcz.) Steetz
Osteospermum moniliferum (L.) subsp. *canescens* (DC.) J.C. Manning & Goldblatt
Othonna natalensis Sch.Bip.
Printzia pyrifolia Less.
Schistostephium crataegifolium (DC.) Fenzl ex Harv.
Senecio adnatus DC.
Senecio affinis DC.
Senecio barbatus DC.
Senecio brevidentatus M.D.Hend.
Senecio citriceps Hilliard & B.L. Burtt
Senecio erubescens Aiton var. *crepidifolius* DC.
Senecio glanduloso-pilosus Volkens & Muschl.

Senecio harveianus MacOwan
Senecio heliopsis Hilliard & B.L.Burtt
Senecio humidanus C.Jeffrey
Senecio inornatus DC.
Senecio macrocephalus DC.
Senecio oxyriifolius DC. subsp. *oxyriifolius*
Senecio scitus Hutch. & Burtt Davy
Senecio subrubriflorus O.Hoffm.
**Tagetes minuta* L.
**Tolpis capensis* (L.) Sch.Bip.
Troglophyton capillaceum (Thunb.) Hilliard & B.L.Burtt subsp. *capillaceum*
Ursinia montana DC. subsp. *montana*
Ursinia tenuiloba DC.
Vernonia gerrardii Harv.
BALSAMINACEAE
Impatiens hochstetteri Warb. subsp. *hochstetteri*
BORAGINACEAE
Cynoglossum austroafricanum Hilliard & B.L.Burtt
Cynoglossum hispidum Thunb.
**Myosotis sylvatica* Hoffm.
BRASSICACEAE
Heliophila rigidiuscula Sond.
BUDDLEJACEAE
Buddleja salviifolia (L.) Lam.
CAMPANULACEAE
Craterocapsa tarsodes Hilliard & B.L.Burtt
Wahlenbergia cuspidata Brehmer
Wahlenbergia fasciculata Brehmer
Wahlenbergia huttonii (Sond.) Thulin
Wahlenbergia krebsii Cham. subsp. *krebsii*
Wahlenbergia paucidentata Schinz
CARYOPHYLLACEAE
Drymaria cordata (L.) Willd. Ex Roem. & Schult. subsp. *diandra*
Silene burchellii Otth
Silene undulata Aiton subsp. *undulata*
CELASTRACEAE
Cassinopsis ilicifolia (Hochst.) Kuntze
Gymnosporia buxifolia (L.) Szyszyl.
Gymnosporia uniflora Davison

Maytenus acuminata (L.f.) Loes. var. *acuminata*
CHENOPODIACEAE
**Chenopodium schraderianum* Roem. & Schult.
CONVOLVULACEAE
Convulvulus natalensis Bernh. ex Krauss
CRASSULACEAE
Crassula alba Forssk.
Crassula pellucida L. subsp*. brachypetala* (Drége ex Harv.) Toelken
Crassula sarcocaulis Eckl. & Zeyh. subsp. r*upicola* Toelken
Crassula setulosa Harv. var. *setulosa*
Crassula umbracticola N.E.Br.
Crassula vaginata Eckl. & Zeyh. subsp. *vaginata*
Kalanchoe thrysiflora Harv.
CUCURBITACEAE
Coccinia hirtella Cogn.
Cucumis zeyheri Sond.
*Pilogyne parvifolia (*Cogn.) W.J.de Wilde & Duyfjes
DIPSACACEAE
Cephalaria natalensis Kuntze
Cephalaria oblongifolia (Kuntze) Szabó
Scabiosa columbaria L.
DROSERACEAE
Drosera natalensis Diels
EBENACEAE
Euclea crispa (Thunb.) Gürke
ERICACEAE
Erica caffrorum Bolus var. *caffrorum*
Erica woodii Bolus
EUPHORBIACEAE
Acalypha depressinerva (Kuntze) Schum. was A. schinzii
Acalypha glandulifolia Buchinger ex Meisn.
Acalypha peduncularis E.Mey.ex Meisn.
Acalypha punctata Meisn. var. *punctata*
Euphorbia flanaganii N.E.Br.
Euphorbia natalensis Bernh.

FABACEA
**Acacia mearnsii* De Wild.
Argyrolobium amplexicaule (E.Mey.) Dümmer
Argyrolobium marginatum Bolus
Argyrolobium tomentosum (Andrews) Druce
Argyrolobium tuberosum Eckl. & Zeyh.
Calpurnia sericea Harv.
Dolichos linearis E.Mey.
Eriosema kraussianum Meisn.
Eriosema salignum E.Mey.
Indigofera hedyantha Eckl. & Zeyh.
Indigofera hilaris Eckl. & Zeyh. var. *hilaris*
Indigofera woodii Bolus
Leobordea eriantha (Benth.) B.-E.van Wyk & Boatwr.
Leobordea pulchra (Dümmer) B.-E.van Wyk & Boatwr.
Lessertia perennans (Jacq.) DC.
Lotononis lotononoides (Scott-Elliot) B.-E.van Wyk
Otholobium polystictum (Benth. ex Harv.) C.H.Stirt.
Pearsonia grandifolia (Bolus) Polhill subsp. *grandifolia*
Rhynchosia caribaea (Jacq.) DC.
Rhynchosia totta (Thunb.) DC.
Tephrosia marginella H.M.L.Forbes
Vigna schlechteri Harms
Zornia capensis Pers. subsp. *capensis*
FLACOURTIACEAE
Kiggelaria africana L.
GENTIANACEAE
Sebaea filiformis Shinz
Sebaea natalensis Schinz
Sebaea sedoides Gilg
GERANIACEAE
Geranium wakkerstroomianum R.Knuth
Pelargonium alchemilloides (L.) L'Hér.
GESNERIACEAE
Streptocarpus gardenii Hook.
Streptocarpus pentherianus Fritsch
Streptocarpus polyanthus Hook subsp. *dracomontanus* Hilliard
GUNNERACEAE
Gunnera perpensa L.

HYPERICACEAE
Hypericum aethiopicum Thunb.
Hypericum lalandii Choisy
LAMIACEAE
Ajuga orphrydis Burch.ex Benth.
Leonotis dubia E.Mey.
Leonotis intermedia Lindl.
Leonotis leonurus (L.) R.Br.
Ocimum obovatum E.Mey. ex Benth.
Plectranthus grallatus Briq.
Pycnostachys reticulata (E.Mey) Benth.
Rabdosiella calycina (Benth.) Codd
Salvia sp.
Salvia aurita L.f. var. *galpinii* (Skan) Hedge
Stachys grandifolia E.Mey. ex Benth.
Stachys kuntzei Gürke
Stachys sessilis Gürke
LINACEAE
Linum thunbergii Eckl. & Zeyh.
LOBELIACEAE
Cyphia elata Harv.
Cyphia heterophylla C.Presl ex Eckl. & Zeyh.
Cyphia longifolia N.E.Br.
Lobelia erinus L.
Lobelia vanreenensis (Kuntze) K.Schum.
MALVACEAE
Anisodontea julii (Burch. ex DC.) Bates
Hibiscus aethiopicus L.
Hibiscus trionum L.
MOLLUGINACEAE
Psammatropha mucronata (Thunb.) Fenzl
MYRSINACEAE
Myrsine africana L.
ONAGRACEAE
Epilobium salignum Hausskn.
* *Ludwigia palustris* (L.) Elliott
**Oenothera rosea* L'Hér.ex Aiton

OROBANCHACEAE
Alectra sessiliflora (Vahl) Kuntze
Buchnera dura Benth.
Graderia scabra (L.f.) Benth.
Sopubia cana Harv. var. *cana*
OXALIDACEAE
Oxalis obliquifolia Steud. ex A.Rich.
Oxalis semiloba Sond. subsp. *semiloba*
Oxalis smithiana Eckl. & Zeyh.
PAPAVERACEAE
Papaver aculeatum
PHYTOLACCACEAE
**Phytolacca octandra* L.
POLYGALACEAE
Polygala gerrardii Chodat
Polygala hottentotta C.Presl.
Polygala macowaniana Paiva
Polygala ohlendorfiana Eckl. & Zeyh.
Polygala rehmannii Chodat
Polygala virgata Thunb.
POLYGONACEAE
Rumex woodii N.E.Br.
PROTEACEAE
Protea simplex E.Phillips▲
RANUNCULACEAE
Anemone sp.
Clematis brachiata Thunb.
Thalictrum rhynchocarpum Quart.-Dill. & A.Rich.
RHAMNACEAE
Rhamnus prinoides L'Hér.
ROSACEAE
**Agrimonia procera* Wallr.
Cliffortia nitidula (Engl.) R.E.Fr. & T.C.E.Fr. subsp. *pilosa* Weim.
**Cotoneaster franchetti* Boiss.
**Crataegus x lavallei* Hérincq
Leucosidea sericea Eckl. & Zeyh.
**Rubus cuneifolius* Pursh

Rubus ludwigii Eckl. & Zeyh.
RUBIACEAE
Anthospermum sp. 1
Anthospermum herbaceum L.f.
Canthium ciliatum (Klotzsch) Kuntze
Gallium capense Thunb. subsp. *garipense* (Sond.) Puff var. *garipense*
Gallium scabrelloides Puff
Gallium thunbergianum Eckl. & Zeyh. var. *thunbergianum*
Galopina circaeoides Thunb.
Kohautia amatymbica Eckl. & Zeyh.
Pentanisia prunelloides (Klotzsch ex Eckl. & Zeyh.) Walp.
Pygmaeothamnus chamaedendrum (Kuntze) Robyns
**Richardia brasiliensis* Gomes
Spermacoce natalensis Hoechst.
SANTALACEAE
Thesium goetzeanum Engl.
Thesium natalense Sond.
SAPINDACEAE
**Acer buergerianum*
SCROPHULARIACEAE
Bowkeria verticillata (Eckl. & Zeyh.) Schinz.
Chaenostoma floribundum Benth.
Diclis rotundifolia (Hiern) Hilliard & B.L.Burtt
Halleria lucida L.
Hebenstretia dura Choisy
Jamesbrittenia breviflora (Schltr.) Hilliard
Limosella africana Glück var. *africana*
Melasma scabrum P.J.Bergius
Nemesia denticulata (Benth.) Grant ex Fourc.
Nemesia silvatica Hilliard
Phygelius aequalis Harv. ex Hiern
Zaluzianskya elongata Hilliard & B.L.Burtt
Zaluzianskya glareosa Hilliard & B.L. Burtt
Zaluzianskya microsiphon (Kuntze) K.Schum.
SOLANACEAE
**Physalis peruviana* L.
STERCULIACEAE
Hermannia cristata Bolus
Hermannia gerrardii Harv.
Hermannia woodii Schinz

THYMELACEAE
Gnidia fastigiata Rendle
Gnidia phaeotricha Gilg
Lasiosiphon kraussianus (Meisn.) Burtt Davy var. *kraussianus*
ULMACEAE
Celtis africana Burm.f.
VERBENACEAE
**Verbena bonariensis* L.
VITACEAE
Rhoicissus tridentata (L.f.) Wild & R.B.Drumm.

ANNEXURE III

Medicinal plants: botanical and common names and traditional medicinal uses

FAMILY & SPECIES	COMMON NAME/S	MEDICINAL PLANT USES
PTERIDOPHYTA		
ADIANTACEAE		
Cheilanthes hirta Sw. var. *hirta*	Parsley Fern (E); inkomakoma, inkomankoma (Z) (1)	Used as a tapeworm antihelminthic (1); leaves are smoked or smoke from burning leaves inhaled to relieve head and chest colds (5)
Cheilanthes eckloniana (Kunze) Mett.	Resurrection Fern (E); lehorometso, mathomeng (SS) (2)	Leaves are smoked or smoke from burning leaves inhaled to relieve head and chest colds (5)
Cheilanthes viridis (Forssk.) Sw. var. *macrophylla* (Kunze) Schelpe & N.C.Anthony	ikhambi lesilonda (Z) (1)	Used to treat sores and other skin complaints (1)
Pellea calomelanos (Sw.) Link var. *calomelanos*	Blue Rock Fern, Hard Fern (E) (2); lehorometso (S and SS) (2) and (5); lepata-mao, pata-leona (SS) (2); phaladza (Z) (1)	Green leaves smoked for head & chest colds & asthma (1); leaves are smoked or smoke from burning leaves inhaled to relieve head and chest colds; decoctions of rhizomes to treat boils & intestinal parasites (5); used as protective charm (2)
ANEMIACEAE		
Mohria vestita Baker	Scented Fern (E); Brandbossie (A); leheromotso, mahorometso (SS) (2)	Used to relieve colds, burns nightmares, also to treat worms (2)
CYATHEACEA		
Alsophila dregei (Kunze) R.M.Tryon	Common Tree Fern (E) (2), Tree fern (E) (1); Boomvaring (A) (1), Gewone Boomvaring (A) (2) and (4); inkomankoma, isikhomane (Z) (1); umphanga, ishishi, isikhomankoma (Z) (2)	Unspecified parts of the plant can be used in infusions known as “incembe” taken regularly during pregnancy to ensure an easy birth; dried roots are used as antihelmintics (1)

DRYOPTERIDACEAE		
Dryopteris athamantica (Kunze) Kuntze	koma-koma, lehorometso (SS) (2); inkomankoma, inkomkomane, (Z) (1); inkomkomo (Z) (2)	Used a general antihelminthic; rhizome decoctions are used to expel retained placenta in cows (1)
Polystichum transvaalense N.C.Anthony	ukhomokhoma (Z)	Probably used as antihelmintics; also administered to horses with bot fly infestations (1)
PTERIDACEAE		
Adiantum poiretii Wikstr.	Fine Maidenhair Fern (E); Fyn Vrouehaarvaring (A); lehorometso, lepata - mao, pata-leoana (SS) (2)	Leaves are smoked or smoke from burning leaves inhaled to relieve head and chest colds (5)
Pteris cretica L.	Avery fern (E); lehorometso, lesira (SS) (2)	Used as a protective charm (2)
MONOCOTYLEDONS		
AGAPANTHACEAE		
Agapanthus campanulatus F.M.Leight. subsp. *patens* (F.M.Leight.) F.M.Leight.	Bell Agapanthus (E); Bloulelie (A); leralaphofu (SS); ugebeleweni (X); ubani (Z) (2); isicakhati (X) (5)	Used as love charm emetics and cultivated as protective charms against lightning; in Lesotho, crushed root lotions are used to bathe new-born babies to make them strong and crushed leaves to was young babies and also to treat the crust on infants' heads (1) and (2)
ALLIACEAE		
Tulbaghia ludwigiana Harv.	Scented Wild Garlic (E); ingotjwa, sikwa (Sw); umwelela-kweliphesheya (Z) (3) umwelela-kweliphesheya (Z) (1)	Rhizomes are used by men as love charms to attract girls or to make their girlfriends think of them when they are apart (1)
AMARYLLIDACEAE		
Brunsvigia grandiflora Lindl.	Giant Candelabra Flower (E); Kandelaarblom (A); isichwe (X); umqhele-wenkunzi (Z) (2); umqhele-wenkunzi , umqeme-wenkunzi (Z) (1)	Used to soothe and heal wounds (2); the Zulu use bulbs for coughs and colds and as enemas for renal and liver problems; outer skin of bulb used as a circumcision wound dressing by the Xhosa and reported to promote rapid wound healing (1)
Cyrtanthus tuckii Baker var. *viridilobus* I.Verd.	Green-tipped Fire Lily (E); Brandlelie (A); umpimpilizi (Sw) (3); isiwesa (Z) (1) and (2)	Bulb infusions are used as a sprinkling protective charms against storms and evil (1)
Haemanthus humilis Jacq. subsp. *hirsutus* (Baker) Snijman	Rabbit's Ears (E); Bobbejaanoor, Velskoenblaar (A); sekitla, tsebe ea phofu (SS) (2) and (3)	Used to treat stomach complaints, wounds & asthma (2) and (3)

Scadoxus puniceus (L.) Friis & Nordal	Paintbrush, Snake Lily, Blood Lily (E); Rooikwas, Seerooglelie, Skeerwas (A); idumbe-lika-nhloyile (Z) (2); idumbi, likanhloyila, umphompo (Z) (1)	Used to treat coughs and intestinal problems (1), (2) and (5); sometimes used as an ingredients in infusions in pregnancy to ensure safe delivery (1) and (5); highly toxic plant and indiscriminate use is lethal (5);
ARACEAE		
Zantadeschia aethiopica (L.) Spreng.	White Arum Lily (E); Varklelie, Witvarkoor (A); mothebe (SS);intebe (Z) (2); inyiba (X) (5)	Warmed fresh leaves used to treat wounds, sores and boils; also applied to parts affected by gout and rheumatism; boiled rhizomes sometimes mixed with honey for bronchitis, asthma, heartburn and rheumatism or gargled for a sore throat (5)
Zantadeschia albomaculata (Hook) Baill.	Arrow-leaved Arum, Spotted-leaved Arum (E); Kleinvarkoor, Witvlekvarkoor (A); mohalalitoe, mothebe (SS); intebe (Z) (2); ilabatheka-elimhlophe, ilabatheka-omhlophe, intebe (Z) (1)	Decoctions given to women suffering from repeated miscarriage and also to pregnant women to prevent them giving birth to small, weak babies; the Sotho rub powdered burnt rhizomes into incisions on the back (1)
ASPARAGACEAE		
*Asparagus asparagoides (*L.) Druce	Broad-leaved Asparagus (E); Breëblaarklimop, Krulkransie (A); khopananyane, likhopa, sethota-sa-mathuela (SS); isicakathi (X); ibutha, inkunzimbili (Z) (2)	Tuber infusions used as love charm emetics (1); also used to treat sore eyes and as charms to increase fertility in cattle (1) and (2)
Asparagus cooperi Baker	lehonyeli, lelala-tau-le-leholo, leunyeli, molala-tau-o-moholo (SS) (2)	Used to treat kidney and stomach complaints (2)
Asparagus setaceus (Kunth) Jessop	ibutha (Z) (3)	Tuber infusions used as love charm emetics (1)
ASPHODELACEAE		
Aloe maculata All.	Common Soap Aloe (E); Bontaalwyn (A); lekhala-la- quthing (SS) ikhala (X); inhlaba (Z) (2); incena (Z) (1)	Used to treat colds, wounds (2); powdered plant parts are mixed with pig or sheep fat to treat pimples, sores and skin lesions (1)
Kniphofia laxiflora Kunth	Slender Poker (E); umanthunga (Z) (2)	Hot infusions made from crushed rhizomes are sipped to ease chest ailments (1)
COLCHICACEAE		
Sandersonia aurantiaca Hook.	Christmas Bells (E); Geelklokkie (A); ihlamvu lasenhla, umagobongwana, ushayabhici (Z) (2) ihlamvusenhla (Z) (1)	Corms used as an aphrodisiac (1) and (2) and as a protective charm against evil (1)

COMMELINACEAE		
Commelina africana L. cf. *krebsiana* (Kunth) C.B.Clarke	Yellow Commelina (E); Geeleendagsblom (A); khopo, khotsoana, tabola-lefalo (SS); lidzangamane (Sw); lekzotswana (X); idangabane (Z) (3); ucolane (Z) (1)	Used to treat fits, pain, heart complaints, venereal disease and bladder complaints (3); root decoctions used to treat infertility and nervous aliments (1)
Cyanotis speciosa (L.f.) Hassk	Dolls Powderpuff (E); Bloupoierekwassie (A); khopo, thepe-balingoana (SS); umagoswana (X); inkombo, insonga, udabulamafu, umakotigoyile (Z) (3); ingongo, umakoti-eqoyile (1)	Ground root infusions used to treat infertility (1) and (3); also used as a love charm (3); root decoctions used for menstrual cramps and to facilitate conception (6)
DIOSCOREACEAE		
Dioscorea rupicola Kunth	impinyampinya, inkwa (Z) (1) and (2)	Used in traditional medicine-unspecified (1) and (2)
Dioscorea sylvatica Eckl.	Forest Elephant's Foot, Wild Yam (E) (2); Olifantsvoet Skilpadknol (2) and Wildjam (5) (A); ingwevu, ufudu (Z) (1) and (2)	Boiled tubers taken for "blood problems" and root decoctions for chest complaints; infusions from the white part of the tuber used as washes and emetics against parasites (1); infusions of the tuber and crushed tuber are applied topically to swellings and rashes (6)
HYACINTHACEAE		
Albuca setosa Jacq.	Small White Albuca (E); Slymstok, Slymuintjie (A); mototse (SS); gib'iziphoso (Sw); ingcino (Z) (3)	Used in ritual cleansing (3)
Drimia depressa (Baker) Jessop	Bergslangkop, Jeukul (A); moretele (SS) (3)	Can be used as a good luck charm or to cause harm to enemies (3)
Drimia elata Jacq.	Satin Squill (E); Brandui, Jeukbol (A); gib'iziphoso (Sw); undongna-zibomvana, isiklenama, umqumba (Z) (3)	Bulb scales are rubbed on the chest for stabbing pains and as a protective charm (1); used for pain relief and feverish colds (3)
Drimia macrocentra (Baker) Jessop	Poison Snake-head (E); Natalse Slangkop (A); injoba (X), (Z); isiklenama, ujoba (Z) (3) ufobo (Z) (1)	Used to treat roundworm and tapeworm (1) and (3)
Eucomis autumnalis (Mill.) Chitt.	Pineapple Flower; Wilde Pynappel (A); umathunga (Z) (5),	An enema of bulb decoctions for low backache, to assist post-operative recovery & healing of fractures; to treat other ailments including urinary diseases, stomach ache, fevers, colic, flatulence & syphilis & to help in childbirth (5); Infusions taken during pregnancy to facilitate delivery (1)
Eucomis bicolor Baker	Bontpynappelblom (A); khapumpu-ea-thaba (SS); umbola (Z) (2) imbola (Z) (1)	Used to treat colic (2); probably used as purgatives (1)

Ledebouria cooperi (Hook.f.) Jessop	Cooper's Squill (E); lepjetlane (SS); icubudwana, icukudwane (Z) (3)	Used to ease pregnancy and treat internal ailments in cattle (3)
Ledebouria ovatifolia (Baker) Jessop	icubudwana, untanganazibonvu (Z) (3)	Treatment of diarrhoea (3)
Schizocarpus nervosus (Burch.) Van der Merwe	White Scilla (E); Sandlelie (A); magaqana (X); seboka (SS); imbita-yebantwana, ndvwendvweni (Sw); ingcino, ingcolo, umgcinyana, imbizankulu ingema (Z) (3) inngcino (1)	Diluted bulb decoctions used in small doses for pain in rheumatic fever (1) and dysentery (3)
HYPOXIDACEAE		
Hypoxis argentea Harv. ex Baker	Small Yellow Star-flower (E); leihlo-khoma le leholo, lesikitlane (SS); ixalanxa (X); inongwe (X,Z); isinana (Z) (3)	Used to treat cracked cows' teats and wounds on horses (3)
IRIDACEAE		
Aristea abyssinica Pax was *A.cognata*	Blue-eyed Grass, Miniature Blue Iris (E); lethephu-le-lenyenyane (SS); phayimashimane (Sw); icebethwane (Z) (3)	Hot leaf infusions used to treat sprains (1) and (3); also as a protective charm (3)
Aristea torulosa Klatt *was A. woodii*	Wood's Aristea (E); Blousuurkanol (A); khahla, lethephu-le-lenye-nyane (SS); phayimashimane (Sw); umluzi omncane (Z)	Rhizome and leaf infusions are used as a washing lotion by young men when courting (1); also as a good luck charm
Gladiolus ecklonii Lehm.	Sheathed Gladiolus (E); kxahla, litsoantsoang, makhabebe (SS); sidvwana (Sw);	Used to treat rheumatic pain (3)
Hesperantha baurii Baker	khahla-e-nyenyane, khukhu-e-nyenyane, qelo (SS); isidwa (3), isidwi (1)(Z)	Corms placed in seed-gourds as a fertility charm to ensure a good harvest; ground corm infusions are used as emetics from chest complaints (1)
Tritonia gladiolaris (Lam.) Goldblatt & J.C.Manning	Pencilled Tritonia, Yellow Tritonia (E); Bergkatjietee (A); khahla-e-nyenyane (SS); isidwi esimpofu, isidwi esincane (1) and (3)	Powder from burnt corms is used to heal newly-born infant's navels; crushed corms to treat newly-born infants with stomach ailment (1) and (3)
Watsonia lepida N.E.Br.	khahla (SS) (3)	Used to treat diarrhoea in calves (3)
ORCHIDACEAE		
Brachycorythis ovata Lindl.subsp*. ovata*	imfeyamasele yentaba (Z) (1) and (2)	Tuber infusions used to spray huts and yard to ward off evil (1); used to treat madness and as a protective charm (2)
Disa stachyoides Rchb.f.	ihlamvu elimpofu lasenkangala (Z)(1) and (2)	Whole plant infusions are used a sprinkling charms to ward off evil and lightning (1); used to ward off evil spirits and storms (2)

Disa versicolor Rchb.f.	Apple-blossom Orchid (E) (2); ihlamvu elibomvu (Z) (1) and (2)	Whole plant infusions are used a sprinkling charms to ward off evil and lightning (1);
Eulophia hians Spreng. var. *hians*	lekholela, maholohanya, mametsana (SS) (2)	Used a protective charm
Eulophia ovalis Lindl. var. *ovalis*	iphamba (Z) (1)	Tuber infusions are taken by young men as love charm emetics; to treat infertility tubers are crushed to form a doll, which is carried as a charm (1)
Habenaria dives Rchb.f.	Death Orchid (E) (2); lekoesha, mametsana (SS) (2); Inhluthi yotshani (Z) (1) and (2)	Dried and ground tubers are mixed with other herbs to be used as death charms; powder is said to be out into food or drink by person wishing harm to another n the same kraal to cause death within a year by wasting away (1)
Habenaria dregeana Lindl.	Small Green Hood (E) (2); mametsana (SS) (2); intelezi ye-zulu (Z) (1)	Infusions made from crushed corms and leaves used as sprinkling protective charms against thunder storms (1) & (2)
Orthochilus leontoglossus (Rchb.f.) Bytebier	iphamba (Z) (1)	Tuber infusions used as sprinkling protective charms against storms (1)
Pterygodium nigrescens (Sond.) Schltr.	umbelembuca (Z) (1)	Roots infusions emetics are used to ward off evil (1);
Satyrium longicauda Lindl.	Blushing Bride Satyrium (E); Langstert-trewwa (A); lekoesha (SS) (2)	Used as protective and love charms (2)
Satyrium parviflorum Sw.	Devil Orchid (E) (2); mametsana (SS) (2); ilabatheka elikhulu elibomvu, impimpi enkulu (Z) (1) and (2)	Tuber infusions are sprinkled around huts and yards to ward off evil and are taken by young men a love charm emetics (1) and (2)
POACEAE		
Cymbopogon nardus (L.) Rendle	Giant Turpentine Grass (E) (7); Tamboekie Gras, (1) Reuse Terpentyngras (7) (A); uQunga (7); isicunge, isiqunga (1) (Z)	Chewed to prevent colds; roots and shoots used in protective sprinkling charms; used in milk decoctions to strengthen the blood and nervous system; water decoctions as emetics and as enemas to treat young children suffering from flatulence or swollen stomachs; also as a vermifuge (1)
Digitaria tricholaenoides Stapf	Ox Grass (1), Fan Lovegrass (E) (7); Bastergras, Beedgras, Osgras, Vleigras, Blousaad (1), Taipol Eragrostis (7) (A); umtshiki, umvithi (Z) (1) and (7)	Decoctions made from roots mixed with decoctions from *Rubia cordifolia* are taken for profuse menstruation; charm ingredient in preparations to treat fractures and as a tonic (1)
RUSCACEAE		
Eriospermum ornithogaloides Baker	khongoana-tsa-ngoana, khongoana-tšingoana (SS) (2); incameshela (Z) (1) and (2)	Used to treat earache and crushed burnt tubers are made into the likeness of a baby to be carried on the back to induce pregnancy in barren women (1)

TYPHACEA		
Typha capensis (Rohrb.) N.E.Br.	Bulrush (E) (3); Papkuil (A); motsitla (SS); ibhuma (Sw); ingcongolo, umkhanzi (X) (3); ibhuma, ibuma (Z) (1)	Root decoctions are widely used to treat venereal diseases and to strengthen uterine contractions and to aid expelling the placenta in women and cows; also for dysentery, urinary infections, haemorrhages of the bowel, kidney and bladder problems; woolly inflorescences used to staunch bleeding wounds, leaves applied as bandages to reduce swellings and sprains (1); to enhance male potency and libido, improve circulation and to treat dysmenorrhoea (5)
DICOTYLEDONS		
ANACARDIACEAE		
Searcia discolor (E.Mey. ex Sond.) Moffett	Grassveld Currant (E); Grasveldtaaibos (A); kopshane, mohlohlooena (Ss); inhlangushane (Sw); inkobeshlungulu, intlokotshane, umnungambele (X) (3)	Plant ritually burnt to ensure a good crop (3)
APIACEAE		
Afrosciadium caffrum (Meisn.) P.J.D. Winter	Wild Parsley (E); Pietersielietabak, Tamboekietwak (A); tloro-ea-ngoala (SS); isincina, nhlasane (Z) (3)	Used to treat diarrhoea (3)
Alepidea amatymbica Eckl. & Zeyh.	Giant Alepidea, Larger Tinsel Flowers (E); Kalmoes, Slangwortel (A); lesoko (SS); inkatsankatsa (Sw); iqwili (X); ikhathazo (Sw, X, Z) (3)	Roots are eaten raw or cooked for colds and influenza; snuff made from powdered roots or inhaled smoke from burning roots used to treat colds and flu; to treat stomach complaints and rheumatism and as a styptic effect on wounds (1); used to wash divining bones (3)
Bupleureum mundii Cham. & Schltdl.	lekhasi (SS) (2); ibeka (Z) (1)	Taken as love charm emetics (1)
Heteromorpha arborescens (Spreng.) Cham. & Schltdl.	Parsley Tree; Wildepietersielie (A) (3) and (5); mkatlala (SS) (3) and (5); umbangandlala (X,Z) (1), (3) and (5)	Main use is that the decoctions of roots or leaves used to treat tuberculosis, abdominal pains & colic, nervous or mental disorders, headaches, fever, shortness of breath, asthma, coughs, dysentery, intestinal worms, infertility and for purifying blood, stomach or kidneys (5); root and bark used for infants with depressed fontanelles (1)
Pimpinella caffra (Eckl. & Zeyh.) D.Dietr.	mohopu, sohoetjana (SS) (3); ibeka, ibheka (Z) (1)	Used a love charm emetics, as protection against evil spirits and to treat intestinal worms (1)

APOCYNACEAE		
Asclepias cucullata (Schltr.) Schltr. subsp. *cucullata*	Hooded Meadow-star (E) (3); udambisa, udelunina (Z) (1) and (3)	Root infusions used as sprinkling charms against evil (1)
Asclepias cultriformis (Harv. ex Schltr.) Schltr.	Satellite-dish (E) (3); ishongwe, elimpofu (3), ishongwe-eluhlaza (Z) (1)	Bundles of dried roots are hung in huts to be preserved by smoke and pieces are burned during a bad storm to ward off lightning (1)
Schizoglossum atropurpureum E.Mey. subsp. *atropurpureum*	Red Milkwort (E); Basoetoraap, Melkwortel (A); sehoete-moru (SS) (3); ishongwe (-elincane elibomvu) (Z) (1) and (3)	Pieces of dried roots are hung in huts to be preserved by smoke and pieces are burned during a bad storm to ward off lightning (1)
Xysmalobium involucratrum (E.Mey.) Decne.	Scented Xysmalobium (E); Hongersnoodbossie (A) (3); udambisa okhulu (Z) (1) and (3)	Root infusions used a sprinkling charms against evil (1)
ARALIACEAE		
Cussonia paniculata Eckl. & Zeyh.	Mountain Cabbage Tree (E); Berg/Hoëveldse Kiepersol (A); motšetše (SS); umsenge (Z) (3)	A decoction of the leaf together with unspecified other plants are used to treat early mental disease (6)
ASTERACEAE		
Afroaster hispida (Thunb.) J.C.Manning & Goldblatt	phoa (3) (SS); noxgxekana, umthekisana (3), unozixekana (5) (X); udlatshana (3) and (1), umaqhunsula (1) and (3), umhlungwana, udlutshana (1) and (5) (Z)	Enemas made from roots are used for stomach complaints; pounded roots used to clean nostrils and for snakebite, ground roots as snuff for headaches, root lotions for sores, used as antihelmintics, root decoctions for syphilis (1) and (5)
Artemesia afra Jacq. ex Willd. var *afra*	African Wormwood (E); Als, Alsem, Wildeals (A); lengana (SS); umhlonyane (X,Z) (5) umhlonyane omncana (Z) (1)	Leaf infusions taken as teas or administered as enemas or emetics for fevers, crushed leaves in steam from infusions for headaches and colds; decoctions taken as blood purifiers for acne and boils (1); used to treat earache, malaria & intestinal worms (5).
Athrixia phylicoides DC.	Bushman's Tea (E) (3); Boesmanstee (A); luphephetse, sephomolo (Sw); icholocholo (X,Z) (3); iphephetha, ishanela, ishayelo (3); itshelo, umshanela (1) (Z)	Root decoctions are taken as cough remedies and purgatives, infusions for blood purifiers(1) and (5); pounded and boiled roots used by women to treat excessive menstrual bleeding, leaf and root extracts as antihelmintics; also treatment of vomiting, hypertension, heart disease, diabetes, diarrhoea and skin complaints(5)
Berkheya rhapontica (DC.) Hutch.& Burtt Davy	ntsoa-ntsane, pepetloane-e-meutla (SS) (3); ikhakhasi (3), iphungula (1)and (3) (Z)	Decoctions of roots mixed with parts of *Athrixia phylicoides* are taken for dry coughs (1)

Berkheya setifera DC.	Buffalo-tongue Berkheya (E); Rasperdisseldoring (A); lelelemela-khomo, ntsoantsane (Sw); indlebe-lenkomo (X); ulimi-lwenkomo (Sw, Z); ikhakhasi, ulimi-lwenyathi (Z) (3)	Used to treat stomach complaints (3)
Berkheya speciosa (DC.) O.Hoffm.	Skraaldisseldoring (A); ntsoantsane (SS); ikhakhasi elikhulu, umaphola (3), ikhakhasana omkhulu (1)(Z)	Infusions taken or administered as enemas for abdominal pains; root infusions to treat schistosomiasis, warm water infusions of crushed leaves to bathe sore eyes (1); also to repel evil spirits (3)
**Bidens pilosa* L.	Blackjack (E) (3); Knapsekêrel (A) (3); umhlabangubo (X,Z); amalenjane, isikhathula, ucucuza, ugamfe, umesisi, uqadolo (Z) (3)	Hot leaf infusions taken or administered as enemas for treatment of stomach complaints, young shoots chewed for rheumatism, pain, flowers used for diarrhoea & ear ailments (1) and (3)
Dicoma anomela Sond.	Koorsbossie, Maagbitterwortel (A) (2) and (3); hloenya, mohlasetse (SS); inyongana (SW,Z); isihlabamakhondlwane, umuna (Z) (1) and (3)	Used to treat fever, upset stomach, influenza, high blood pressure, diarrhoea & cancer; roots ground and snuffs for treatment of colds, or as a decoction with gin to treat haemorrhoids (5); toothache and sterility (3)
Dimorphotheca jucunda E.Phillips	Trailing Mauve Daisy (E); Bergbietou, Bloutou (A); umasigcolo-nkonekazi (1) and (3)(Z)	Pounded leaf and root infusions taken for stomach and intestinal complaints (1)
Gazania krebsiana Less.	Common Gazania (E); Bruingousblom (A); mabone, shoeshoe, tsikitlane (SS); isapokwe, umkwinti(X); ubendle (X,Z); impephotshani, isiphephane (Z) (3)	Used to treat sickly babies, earache, and sterility in women (3)
Gerbera ambigua (Cass.) Sch.Bip	Pink and White Gerbera (E); Botterblom, Griekwateebossie (A); moarubetso, ripa-lithaate, seboka (SS); ucabazane, uhlmvuhlosane, ulimi-lwenkomo (3), yempiti, iqwa, uhlunguhloshana, (1) (Z)	Pounded leaf infusions used for tapeworm and stomach ache; hot root infusions are sipped for coughs (1)
Gerbera piloselloides (L.) Cass.	Small yellow gerbera (E) (3); Swartteebossie (A) (1) and (3); moarubetso, mothuntsetso, tsebe-ea-pela (SS); mabophe (Sw); ubulawu, umqwashu (X); indlebeyempithi, uhlango, olimpofu, umoya-wezwe (Z) (1)and (3)	Strained leaf infusions taken for tape worm, root infusions applied as drops for earache, roots used for coughs and tonics (1)

Haplocarpha scaposa Harv.	False Gerbera (E); Bietou, Melktou (A); khutsana, lengoako, leshala, lisebo, moarubetso, sesweu (SS); isikhali, umkhanzi (X) (3)	Crushed leaves are used by women during menstruation (3)
Helichrysum aureonitens Sch.Bip.	Golden-everlasting (E) (3); Gouesesewejaartjie (A); toane-ntja (SS) (3); Imphepho-omhlophe, inkondwane (Z) (1)	Leaves and stems burned as incense to invoke the goodwill of the ancestors; probably used by the isangoma to induce trances (1) and (3)
Helichrysum caespititium (DC.) Harv.	Speelwonderboom (A); boriba, botsiki-nyane, lelulaphooko, morri-oa-lefatse, phate-ea-naha (SS) (3)	Used to treat colds and nausea (3)
Helichrysum cooperi Harv.	Yellow Everlasting (E) (3); umadotsheni (Z) (1) and (3)	Ointment made from dried leaves is applied to the body as a love charm by men;
Helichrysum herbaceum (Andrews) Sweet	Monkey-tail Everlasting (E) (3); imphepho-yamkhosi (Z) (1) and (3)	Leaves and stems are burned to invoke the goodwill of the ancestors (1) and (3)
Helichrysum mundtii Harv.	phefo-ea-liliba (SS)	Used to treat chest complaints (3)
Helichrysum nudifolium (L.) Less. var. *nudifolium*	Hottentots Tea (E) (3); Hottentotsteebossie, Kooigoed (A) (5); letapiso, mohlomelatsie-oa-thaba (SS) (3); ludvutfane (Sw); isicwe, indlebe zebhokwe, undleni (X); icholocholo, imphepho, isidwaba-somkhovu (Z) (5)	A tea is made from leaves are boiled with milk and used as a treatment for coughs and colds; for pain relief smoke from the burning leaves is inhaled; leaves can be used on wounds (especially circumcision wounds) to prevent infection (1) and (5); leaves burned as incense to invoke the goodwill of the ancestors (1)
Helichrysum nudifolium (L.) Less. var. *pilosellum* (L.f.) Beentje	umadotsheni (Z) (1)	Leaf infusions are used for children with stomach ache (1)
Helichrysum splendidum (Thunb.) Less.	Cape Gold (E); Geelsewejaartjie (A); phefo-ea-loti, toane-moru (SS); imphepho (Sw) (3)	Used to treat rheumatism (3)
Hilliardiella aristata (DC.) H.Rob.	Silver Vernonia (E) (3); ihlambihloshana, isibhaha, sasenhlanga, umhlahlankosi-omhlope (1) and (3) ileleva, sasenkangala (Z) (3)	Leaves and roots used as charms against lightning, smoke from burning plants inhaled for headaches (1); Used to treat coughs, malaria, and ensure healthy pregnancy (3)
Hilliardiella hirsuta (DC.) H.Rob.	Quilt-leaved Vernonia (E) (3); Wildesonsoekertjie (A); hiele hiele, phefo-e-kholo, sethsee (SS); ijungitheka, ikhambi lenyongo, uhlunguhlungwana lwentaba, umhlazawentaba (Z) (3)	Hot milk infusions are sipped for sore throats, powder from ground dried stems and stalks is used for snuff for headaches (1); also used to treat colds and rashes (3)

Osteospermum moniliferum (L.) subsp. *canescens* (DC.) J.C. Manning & Goldblatt	Bush-tick Berry (E) (2); Bietou, Boetabessie (A) (1) and (2); monokotsoai-oa-makhoaba, motlempe, ntlo-ea-lekhoaba (SS) (3); inkhupuyana, itholonja, umtholombe (Z) (1) and (3)	Infusions from leaves used to treat fevers; juice from the fruit used as blood strengtheners and purifiers to men suffering from impotence or weakened by intestinal ailments; used by adolescents to clear up pimples (1)
Othonna natalensis Sch.Bip.	incama, incamu (Z) (1)	Cold water infusions taken for nausea and tapeworm (1)
Printzia pyrifolia Less.	uhlunguhlungu (Z) (1)	Roots used for stomach ache, hysterics, enemas for internal tumours, and purgatives (1)
Schistostephium crataegifolium (DC.) Fenzl ex Harv.	Golden Flat-flower (E); Bergkruie (A); kobo-ea-marena, kobo-kholo, leapi, lehakanya (SS) (3)	Used to treat chest complaints, sore eyes, excess bile and a charm to chase away hail (3)
Senecio inornatus DC.	uhkabo (Z) (1)	Root decoctions used for palpitations and phthisis, coughs and difficult breathing (1); Used to prevent sorcery (3)
Senecio oxyriifolius DC. subsp. *oxyriifolius*	False Nasturtium (E); Kappertjieblaar (A) (3); idumbe, lasendhle, ihlula (3), idinjana, idumbe les endhle (1) (Z)	Root decoctions are taken for shivering during fever; powdered roots to treat barrenness in women (1) and (3)
**Tagetes minuta* L.	Tall Khaki Weed, Mexican Marigold (E); Kakiebos, Langkakiebos (A); insangwana, unukani (3),	Used to treat nematode infestations, fleas on dogs (3)
Ursinia tenuiloba DC.	umithi wezifuba (Z) (1)	Hot root decoctions are taken for coughs (1)
BALSAMINACEAE		
Impatiens hochstetteri Warb. subsp. *hochstetteri*	Common Wild Impatiens (E) (2); ihlula (2), umadolwane (1) and (2) (Z)	Leaf and stem infusions used to treat eczema (1)
BUDDLEJACEAE		
Buddleja salviifolia (L.) Lam.	Quilted Sagewood (2), Mountain Sage, Butterfly Bush (1) (E); Saliehout (A) (2); lelothoane (SS); ilothane, igqange (X) (2); iloshane (2), igqange, igwangi, mupambati (1)(Z)	Roots are reportedly used in witchcraft and are believed to be very poisonous; root decoctions used for stomach upsets, flatulence and diarrhoea; a decoction from leaves is used as an eye wash (1)
CARYOPHYLLACEAE		
Silene burchellii Otth	Gunpowder Plant (E); Kruitbossie (A); ho-batla, kopane lithokoano, motebane (SS); iyeza lehashe (X) (3); igwayintombi elincane, injuju (1) and (3) umthusi (3) (Z)	Root infusions taken as love charm emetics (1); Treatment of scrofula and as a tonic (3)

CELASTRACEAE		
Gymnosporia buxifolia (L.) Szyszyl.	Common Spike-thorn (E); Gewone-pendoring (A); sefea-maeba (SS); umqaqoba, (X); usala, ingqwangane, isibhubhu, iihlangu (3), yehlanze, isibuku, umkhokhozo (1) (Z)	Bark infusions used as enemas or emetics for diarrhoea; mixed with parts of snakes as a snakebite remedy and also as a love charm; root decoctions used for haemorrhoids, urine retention and venereal diseases, antihelmintics (1)
Maytenus acuminata (L.f.) Loes. var. *acuminata*	Silky Bark (E); Sybas (A); tšikane (SS); umnama, umzungulwa (X); isinama, umulana (Z) (2)	Bark is used for stomach ailments (1)
CRASSULACEAE		
Crassula alba Forssk.	feko, khato (SS); isidwe, isikhelekkhehlane (Z) (1) and (3)	Lightly boiled decoctions used as enemas for dysentery and diarrhoea; sap mixed with water applied as a nasal douche for influenza and fevers; infusions as emetics for heartburn and hysteria as well as protective sprinkling charms (1); used as charms to make one invisible (3)
Crassula sarcocaulis Eckl. & Zeyh. Subsp. r*upicola* Toelken	serelilienyane (SS) (3); umadinsane (1) and (3)(Z)	Used as a strong emetic (1)
Crassula vaginata Eckl. & Zeyh. Subsp. *vaginata*	White Stonecrop, Yellow Crassula (E); makulefincane, udumbukaye (Z) (1) and (3)	Root infusions used as love charm emetics and protective charms; hot infusions to treat earache and bruises (1) and (3)
Kalanchoe thrysiflora Harv.	White Lady, White Bird's Brandy (E); geelpakkie, meelplakkie, voëlbrandewyn (3) (A); serilile (SS); utywala bentaka (X); utshwala benyoni (Z)	Sap from a warmed leaf to treat earache; plant decoctions as an antihelmintic; also used for colds and as a charm (1)
CUCURBITACEAE		
Cucumis zeyheri Sond.	Wild Cucumber (E); Wilde-agurkie, Wildekomkommertjie (A); lerakana, monyaku (SS); inhlakahlela, iselwa-lenja (Z) (3)	Used to treat chest complaints, diarrhoea; has to be used carefully due to poisonous properties (3)
DIPSACACEAE		
Scabiosa columbaria L.	Wild Scabiosa (E); Bitterbos, Meerjarige Skurfkruid (A); hlaku-ea-pitsi, 'mamokhale, moholungoane, selomi (SS); ilelemimoya, isilawu esikhulu, iyeza lamehlo, makgha (X); ibheka, ubucubele, udoloqina, uxhaphozi (3), igwalaza (1) (Z)	Root decoctions used to treat sterility and colic; ointments made from burnt roots for venereal sores; used to treat painful menstruation and difficult confinements; roots are used to treat sore eyes (1) and (3); taken as a love charm emetic (1)

EBENACEAE		
Euclea crispa (Thunb.) Gürke	Blue Guarri (E); Bloughwarrie (A); mohlakola (SS); umtshei-sani, umgwali (X); umshekisane, idungamuzi, umnqandane (2), idungamuzi (male plant), isizimande, umgwali, umnqandane, umshekisane (female plant) (1) (Z)	Infusion of root bark administered as an enema for stomach disorders; roots are used for treating patients with intercostal neuralgia or muscular rheumatism believed to be caused by witchcraft; leaves used for menstrual pain and whole plants as charms; strong purgative effects of both fruit and rootstock (1)
EUPHORBIACEAE		
Acalypha depressinerva (Kuntze) Schum. was A. schinzii	Bearded-leaved Brooms and Brushes (E) (2); umsongo (Sw) (2); usununundu (Z) (1)	Roots are used as emetics for chest complaints (1); used to treat diarrhoea (2)
Acalypha glandulifoila Buchinger ex Meisn.	Red Catkins (E) (3); umsongo (Sw) (3); ikhote, usununundu (3), igibonisele (1) (Z)	Used to treat diarrhoea and other complaints (3)
Acalypha peduncularis E.Mey.ex Meisn.	Brooms and Brushes (E) (3); ikhote (3), usununundu (1) and (3) (Z)	Infusions made from bruised roots in warm water taken as emetic expectorants for coughs and chest complaints (1) and tonics (3)
Acalypha punctata Meisn. var. *punctata*	Sticky Brooms and Brushes (E) (3); umsongo (Sw); usununundu (1) and (3) (Z)	Infusions of decorticated roots taken as emetics for chest complaints (1); also to treat diarrhoea (3)
Euphorbia natalensis Bernh.	inkalamasane, inkamamasane (1) and (3), umnhlonhlo (3) (Z)	Whole plants used in traditional medicine (unspecified) (1)
FABACEA		
Argyrolobium marginatum Bolus	intondo (Z) (1)	Crushed root infusions are taken for hiccups and nausea (1)
Argyrolobium tomentosum (Andrews) Druce	Velvety Yellow Bush-pea (E) (3); umadlozana, umlomomnandi (3) and umadlozana ompofu (1) (Z)	Root infusions are taken by isangomas (diviners) to sharpen their vision (1) and (3)
Calpurnia sericea Harv.	Mountain Calpurnia (E); Berg-geelkeur (A); tloele (SS) (2)	Used to wash maggot infested wounds in animals (2)
Eriosema salignum E.Mey.	Narrow-leaved Eriosema, Brown Bonnets (E)(3); lesapo (SS) (3); ubangalala, uluphondongozi, uqonsi (3) and iqonsi, uqontsi oluncane (1) (Z)	Hot milk infusions of roots or cold water infusions of root bark taken for impotence (1); also as expectorants and diuretics (1) and (3)
Indigofera hedyantha Eckl. & Zeyh.	Black-bud Indigo (E); Aambeibossie (A); ‘musa-pelo-oa-mafika (SS); ilidolo-lendoda, uluhlomantethe (Z) (3)	Treatment of fevers and as a good luck charm (3)
Indigofera hilaris Eckl. & Zeyh. Var. *hilaris*	Red indigo Bush (E); chubhujeje (Sw); igqokisi, uhlomatethe (3) and isikhubabende, (1) and (3) (Z)	Used as a remedy for dysentery; reported to possibly produce delirium and paralysis (1)

Leobordea eriantha (Benth.) B.-E.van Wyk & Boatwr.	Russet Lotononis (E); lefehloane, molomo-monate, phehloane (SS) (2)	Used as a charm (2)
Otholobium polystictum (Benth. ex Harv.) C.H.Stirt.	Vlieëbos (A); mohlonecha, mohlonepshoa (SS) (3)	Roots are smoked for head colds and as a body wash for chiefs (1) and (3)
Rhyncosia caribaea (Jacq.) DC.	monya-mali, morarana-oa-liphepa, thara (SS) (3)	Used to treat rheumatic pains and headaches (3)
Tephrosia marginella H.M.L.Forbes	isidala (Z) (1)	Leaves and stems used a love charms (1)
Zornia capensis Pers. subsp. *capensis*	Caterpillar Bean (E) (3); umkhondo (1) and (3) (Z)	Used as a charm, tied around the ankle of a pregnant woman to protect the unborn baby from a disease called umkhonndo, which is believed to be caused by crossing the track of an 'ill-omened' animal (1)
GENTIANACEAE		
Sebaea sedoides Gilg	isivumelwane esikhulu, umanqweyana (1) and (3), umsolo (3) (Z)	Leaf infusions administered as enemas to children; cold water infusions are taken as a love charm (1) and (3)
GERANIACEAE		
Pelargonium alchemilloides (L.) L'Hér.	Pink Trailing Pelargonium (E); Wildemalva (A); bolila-ba-litsoene (SS); inkubele (X,Z); ishwaqa, umangqengqe (3) and amazemnyama (1) (Z)	Treatment of fever, diarrhoea and wounds (3); leaf paste is used for wounds and abscesses (1)
GUNNERACEAE		
Gunnera perpensa L.	Wild Rhubarb (3), River Pumpkin (5) (E); Wilderabarber (3), Rivierpampoen, Wilderamenas (5) (A); qobo (SS); uqobho (Sw); iphuzi (X); imfeyesele, ugobho, uklenya (1) ansd (3), imfe- (Z); uxobo (X,Z) (3)	Used to augment labour and to facilitate expulsion of the placenta in women and animals (1),(3),(5); taken to treat stomach trouble, rheumatic fever, swellings, menstrual pain and stomach bleeding (1) and (5); Applied externally for dressing wounds and for psoriasis and cancerous sores (1) and (5)
HYPERICACEAE		
Hypericum aethiopicum Thunb.	Small Hypericum (E); Vleëpisbos (A); bohohoana, ho-ila, leilane-bohohoana, leilane-la-bale, tabane (SS); isimayisane, isimonyo, isivumelwane, unsukumbile (2), isi emovisane (1) (Z)	Roots are used as enemas for backache or pains in the loin due to kidney or abdominal complaints; unspecified parts for ear problems; decoctions used to treat venereal diseases (1)
Hypericum lalandii Choisy	Spindly Hypericum, Laland's St John Wort (E); Laland-se-Sint-Janskruid (A); bohlokoana, bohlokoanyana (SS) (2)	Used in traditional medicine – no specifics (2)

LAMIACEAE		
Ajuga orphrydis Burch.ex Benth.	Bugle Plant (E); moonyane, se-nyarela (SS) (3)	Used to treat female sterility and painful menstruation (3)
Leonotis dubia E.Mey.	Rooidagga (A); bolila-ba-linonyana (SS); umfincafincane (X) (2)	Used as a tonic and to treat nervous conditions (2)
Leonotis intermedia Lindl.	Broad-leaved Leonotis (E); Klipdagga (A); joala-ba-li-nonyana, moseneka (SS); fincane, isihlungu sedobo, umuncwane (SS); imunyane, utshwala-benzoni obuncane (Z) (3)	Used to treat colds, also for fowl sickness and gall-sickness in cattle (3)
Leonotis leonurus (L.) R.Br.	Wild Dagga (E); Wildedagga, Diuwelstabak (A); imvovo, utywala-bengcungcu (X); umfincafincane (X,Z); umcwili, umunyane, itswala-bezinyoni)Z) (3)	Cold water infusions of pounded leaves drawn into nostrils to relieve feverish headaches; infusions of stems and leaves are taken for dysentery or as enemas for coughs and colds; rootbark decoctions for snakebite; leaves and flowers used for tapeworm (1);infusions are sprinkled to keep snakes away (1) and (3); leaves smoked for the relief of epilepsy; leaf infusions for asthma and hepatitis; externally, infusions used to treat boils, eczema, skin diseases, itching and muscular cramps (5)
Ocimum obovatum E.Mey. Ex Benth.	Cat's Whiskers (E); Katsnor (A); idada, iziba, ufukuzela, umathanjane (Z) (2)	Pounded leaves used as hair restoring washes; warm water infusions of pounded roots used as enemas for children with stomach complaints; plants are burned as protective charms; root infusions used for nosebleeds and male infertility; smoke from burnt leaves inhaled for chest pain; leaves applied to ulcers (1)
Pycnostachys reticulata (E.Mey) Benth.	Slender Pycnostachys, Blue Soldier (2) (E); uhlalwane (2), umvuthuza (1) and (2) (Z)	Root decoctions used as mouthwashes and teeth aching from neuralgia and not decay (1)
LINACEAE		
Linum thunbergii Eckl. & Zeyh.	Wild flax (E); Wildevlas (A); bohlokoana (SS); ithalelimpofu (Z) (3)	Cold water infusions are taken as emetics to purify the blood; used for pain and as a protective charm for homes and fields (1) and (3)
LOBELIACEAE		
Cyphia elata Harv.	ibutha lentaba (1) and (3), igela, igonsi (3) (Z)	Pounded leaf decoctions are taken as emetics to cleanse the stomach (1)

Lobelia erinus L.	Edging Lobelia (E); mahlo-a-konyana, napjane-ea-phiri, tsoinyane (SS); impenjana, incamathela (3), isidala esiluthaza (1) and (3)(Z)	Ground roots and leaves are mixed with a little water and sniffed to clear nostrils blocked from colds ; leaves eaten for diphtheria (1); used to wash divining bones (3)
MALVACEAE		
Hibiscus aethiopicus L.	Common Dwarf Wild Hibiscus (E); lereletsane, se-seholo (SS); ibunda elimpofu, ihlalanyosi elimhlope (3), uvemvane (1) and (3), umhlope (1) (Z)	Poultices from pounded roots applied to swollen joints, and sprains (1); also to treat colic (1) and (3)
Hibiscus trionum L.	Bladder Hibiscus (E); Terblansbossie (A); iyeza lentshulube (X); uvemvane loukhulu (Z) (3)	Treatment of worms & other internal parasites (3)
MOLLUGINACEAE		
Psammatropha mucronata (Thunb.) Fenzl	imphepho-tshani (Z) (1) and (2)	Used in traditional medicine – unspecified (1) and (2)
OROBANCHACEAE		
Buchnera dura Benth.	False Verbena (E); umusa umkhulu (Z) (1)	Pounded root infusions taken as love charm emetics (1)
Graderia scabra (L.f.) Benth.	Wild Penstemon, Pink Ground-bells (E) (3); impundu, isimonyo, ugweja, umphuphutho (3), ibeja, isiqomiso (1) (Z)	Cold water infusions with other plants to treat stomach complaints, fevers, rashes, sores, prevent miscarriages and to relieve menstrual pain (2); roots are used for an ointment for the face (1)
Sopubia cana Harv. var. *cana*	Silvery Sopubia (E); leilana, pulumo-tsoe (SS) (3)	Used to relieve menstrual pain and prevent miscarriage (3)
OXALIDACEAE		
Oxalis semiloba Sond. subsp. *semiloba*	Common Sorrel, Folded-leaved Sorrel (E); Suring (A); bolila (SS); incangiyane, isibungu, isimuncwane, isimunyane (3), isinungu, isithathe (1) (Z)	Crushed leaves are rubbed over sore parts of the mouth to treat infant's thrush (1)
Oxalis smithiana Eckl. & Zeyh.	Narrow-leaved Sorrel (E); Klawersuring (A); bolila (SS); izotho (X); umuncwane (bulb), inkolowane (X,Z); incangiyame (Z) (3)	Used as a tapeworm remedy (3)

PHYTOLACCACEAE		
**Phytolacca octandra* L.	Inkberry, Pokeweed (E); Boobejaandriuf, Inkbessie (A); amahashe, ayatsala (X); Umnanja (X,Z); umnyandla (Z) (3)	Roots are used for lung sickness in people and cattle; also sores and snakebite; leaves used to treat septic wounds; as an emetic for diviners (1) and (3); fruit used as ink by the Zulu and Xhosa (1)
POLYGALACEAE		
Polygala gerrardii Chodat	ungqengandla (1) (Z)	Whole plants are used – unspecified treatment (1)
Polygala hottentotta C.Presl.	Small Purple Broom (E); leklokoa-la-tsela (SS); mbobozan (1), umanqandi (3), uzekane (1) and (3) (Z)	Warm water infusions of pounded plants used as enemas for intestinal problems; as charms to bring back missing people; to treat anthrax (1)
Polygala macowaniana Paiva	ungqengendlela (1) (Z)	Whole plants are used – unspecified treatment (1)
Polygala virgata Thunb.	Purple Broom, Bumble-bee Polygala (E); ujulwenzinyosi, unohlonishwayo obomvu (3), ithethe (1) and (3) (Z)	Used as a love charm emetic; powdered root milk infusions are administered as purgative enemas for children; roots are used a expectorants (1); used a blood purifier (3)
POLYGONACEAE		
Rumex woodii N.E.Br.	Paper hearts, Woods Rumex (E); Tongblaar (A); bolila-likhomo (SS) (2)	Used in traditional medicine – unspecified treatment (2)
RANUNCULACEAE		
Clematis brachiata Thunb.	Traveller's Joy (E); Klimop, Lemoenbloeisels (A); morarana-oa-mafehlo (SS); ityolo (X); ihlonzo leziduli, inhlabanhlanzi (1) and (2), inhlongo, umdlonzo, umdlozo (1) (Z)	Leaf and stem infusions used as enemas for abdominal disorders; pounded leaves mixed with red earth applied to children's rashes; used as a vermifuge; roots and leaves in steam inhaled for colds; hot decoctions taken for malaria; to drive away evil spirits (1); used to treat syphilis (2)
Thalictrum rhynchocarpum Quart.-Dill. & A.Rich.	Kabousie (A) (2); izaza (Z) (1)	Used a love charm and to treat earache (1)
RHAMNACEAE		
Rhamnus prinoides L'Hér.	Glossyleaf, Shinyleaf, Dogwood (E); Blinkblaar (A); mofifi (SS); umnyenye (X,Z) (2); ulunyenye, umgilindi, umhlinye (1) (Z)	Embrocations from unspecified parts used for sprains; root decoctions used as blood purifiers and for pneumonia; plants used as protective charms against lightning and green twigs are burned to protect lands from evil influences; used as protective charms; bark decoctions as emetics; ground bark used as snuff for mental disorders (1)

ROSACEAE		
**Agrimonia procera* Wallr.	Agrimony (E); Akkermonie, Geelkits (A); bohome, mo-sinoana-o-monyenyane (SS); umakhuthula (Z) (3)	Used to treat coughs and intestinal worms (3)
Leucosidea sericea Eckl. & Zeyh.	Oldwood (E); Ouhout (A); cheche (SS); isidwadwa (X); umtshitshi (2), umchichi (1) (Z)	Ground leaf paste applied to the eyeball and inside and outside the eyelid for infections; as a protective charm for homesteads; as an ingredient with other plants as a vermifuge (1)
Rubus ludwigii Eckl. & Zeyh.	Silver Bramble, Ludwig's Ample-bramble (E); Wildebraam (A); monokotsoai-oa-basali (SS); imencemence, itshalo, unomhoshane (Z) (2)	Powdered roots taken in water to ease stomach ache; roots used for colds and indigestion, decoctions for acute pain during illnesses in the belief that the prickly nature of the plant will overcome the pain; roots used for fits and snakebite(1)
RUBIACEAE		
Canthium ciliatum (Klotzsch) Kuntze	Fringed/Hairy Turkey-berry (E); Harige Bokdrol (A); seeqoane (SS); umnyulushube, (2), isalungu sikankonka, umevana, umgomisentabeni (1) (Z)	Roots used in emetics to induce trances before divining dances; bark and leaf infusions used as enemas for abdominal pain; plants used as protective charms on graves to prevent disturbances of newly interred bodies (1)
Kohautia amatymbica Eckl. & Zeyh.	Tremble Tops (E); lehlokoana, 'mangoakoane, morokolo-poli (SS); ikhubalo, labantwana (X); umfana-ozacile, umqanda, umhungulo (2), imunwane (1) (Z)	Taken as love charm emetics; root infusions are given to babies as protective charms against evil; plant infusions taken as emetics for snakebite and against lightning (1)
Pentanisia prunelloides (Klotzsch ex Eckl. & Zeyh.) Walp.	Broad-leaved Pentanisia (E); Sooibrandbossie (A); khatoane, setima-mollo (SS); icishamililo (X,Z); isibunde, umakophole (2), icimamilo, umakuphole (1) (Z)	Roots are used for haemorrhoids, snakebite and rheumatism; leaf poultices or hot root decoctions applied to painful swellings, rheumatic parts, sprains, sores and for fevers; leaf poultices applied to the abdomen to aid expulsion of a retained placenta; as an ingredient in cleansing decoctions used as a poison antidote; root decoctions to relieve chest pain, itching and blood impurities; unspecified parts used to treat tuberculosis; also used as charms against lightning and protection from sorcery (1)
Spermacoce natalensis Hoechst.	insulansula, isimuyisane, isindiyandiya, umabophe-wentaba (Z) (1)	Roots are used in enemas to treat gangrenous rectitis; mixed with termite earth in pastes applied for febrile rashes; cold pounded leaf infusion taken for dysentery and diarrhoea; leaves are put under the tongue or chewed after committing a fault as protective charms against the anger of teachers or judges (1)

SCROPHULARIACEAE		
Chaenostoma floribundum Benth.	Kerriebos (A); boluma (SS); usikisiki lwehlathi (Z)	Hot pounded leaf infusions are used for menstrual pains; hot decoctions are used for children's chest colds (1)
Halleria lucida L.	Halleria, Tree Fuschia (E); Notsung (A); lebetsa (SS); uminza (X,Z) (2); iminya, umobibi, unobhibhi, unonomela (1) (Z)	Dried leaves moistened with water and squeezed into ears for earache; used for skin complaints; also as charms against evil and, mixed with crocodile fat, against lightning; twigs burned when offering sacrifices to ancestors; young women place plant parts into their clothing as charms for the production of healthy babies (1)
Hebenstretia dura Choisy	Eastern Shrubby Slugwort (E); tšitoane, tšitoare-ea-setlolo (SS) (2)	Mixed with fat to make a perfumed ointment (2)
Phygelius aequalis Harv. ex Hiern	River Bells (E); Foksia , Rivierklokkie (A); mafifi-matšo, metsi-matšo (SS) (2)	Used as a charm against hail damage to crops (2)
SOLANACEAE		
**Physalis peruviana* L.	Cape Gooseberry (E); appeliefie, Kaapse nooientjie, klapbessie (A); ugqunmgqumu, umsobo (Z) (1)	Leaf infusion used as enemas for children with abdominal upsets; warm leaves used as poultices for inflammation; leaves and roots used as diuretics (1)
STERCULIACEAE		
Hermannia woodii Schinz	moleko, phate-ea-ngaka, seletjana (SS) (2)	Used to treat colic and diarrhoea, to boost the effectiveness of other medicines and to give them a red colour; also used by diviners (2)
THYMELACEAE		
Lasiosiphon kraussianus (Meisn.) Burtt Davy var. *kraussianus*	Lesser Yellow Head (E); Harige Gifbossie (A); thobeha, thopa (3) (SS); umsilawenge (Sw, Z); inhlashane, isidikili, umfukuzane (1) and (3) (Z)	Enemas made from root extracts used for stomach complaints and scrofula; root decoctions or infusions taken for chest complaints, lumbago, sore throats and snakebite (1); also to ensure easy childbirth (3)
ULMACEAE		
Celtis africana Burm.f.	White Stinkwood (E); Witstinkhout (A) (4); ndwandwazane, umvumvu (Z) (1)	Wood is used with crocodile fat as a charm against lightning; wood used for protective magical purposes (1)
VITACEAE		
Rhoicissus tridentata (L.f.) Wild & R.B.Drumm.	Bushman's Grape, Northern Bushman's Grape (E); Boesmansdruif, Bobbejaantou (A); morara-oa-thaba (SS); isaqoni (X); isinwazi, umthwazi (Z) (2)	Chopped root decoctions are used as enemas for dysmenorrhoea and to facilitate delivery; tubers used for renal complaints, sterility and cattle diseases; also used for epilepsy to treat colds and stomach complaints causing blood in the faeces (1)

ANNEXURE IV

DAC endemic species and near-endemic genera and species on Hlogoma Mountain

DAC near-endemic genera	Family
Craterocapsa	Campanulaceae
Rhodohypoxis	Hypoxidaceae
DAC endemic species	
Albuca rupestris Hilliard & B.L.Burtt	Hyacinthaceae
Helichrysum paleatum Hilliard	Asteraceae
DAC near-endemic species	
Monocotyledons	
Agapanthus campanulatus F.M.Leight. subsp. *patens* (F.M.Leight.) F.M.Leight.	Agapanthaceae
Brunsvigia grandiflora Lindl.	Amaryllidaceae
Cyrtanthus tuckii Baker var. *viridilobus* I.Verd.	Amaryllidaceae
Eucomis bicolor Baker	Hyacinthaceae
Hypoxis costata Baker	Hypoxidaceae
Rhodohypoxis baurii (Baker) Nel var. *platypetala* (Baker) Nel	Hypoxidaceae
Dierama dissimile Hilliard	Iridaceae
Dierama trichorhizum (Baker) N.E.Br.	Iridaceae
Gladiolus parvulus Schltr.	Iridaceae
Hesperantha woodii Baker	Iridaceae
Moraea brevistyla (Goldblatt) Goldblatt	Iridaceae
Moraea inclinata Goldblatt	Iridaceae
Watsonia lepida N.E.Br.	Iridaceae
Disa oreophilla Bolus subsp. *oreophila*	Orchidaceae
Disa pulchra Sond.	Orchidaceae
Eulophia zeyheriana Sond.	Orchidaceae
Holothrix scopularia (Lindl.) Rchb.f.	Orchidaceae
Neobolusia tysonii (Bolus) Schltr.	Orchidaceae
Schizochilus flexuosus Harv. ex Rolfe	Orchidaceae
Helictotrichon longifolium (Nees) Schweick.	Poaceae
Eriospermum ornithogaloides Baker	Ruscaceae
Dicotyledons	
Delosperma lavisiae L. Bolus	Aizoaceae
Alepidea natalensis J.M.Wood & M.S. Evans	Apiaceae

Asclepias cucullata (Schltr.) Schltr. subsp. *cucullata*	Apocynaceae
Asclepias macropus (Schltr.) Schltr.	Apocynaceae
Aspidonepsis flava (N.E.Br.) Nicholas & Goyder	Apocynaceae
Aspidonepsis reenensis (N.E.Br.) Nicholas & Goyder	Apocynaceae
Miraglossum pulchellum (Schltr.) Kupicha	Apocynaceae
Pachycarpus campanulatus (Harv.) N.E.Br. var. *campanulatus*	Apocynaceae
Pachycarpus plicatus N.E.Br.	Apocynaceae
Schizoglossum atropurpureum E.Mey. subsp. *atropurpureum*	Apocynaceae
Schizoglossum flavum Schltr.	Apocynaceae
Xysmalobium parviflorum Harv. ex Scott-Elliot	Apocynaceae
Afroaster perfoliatus (Oliv.) J.C.Manning & Goldblatt	Asteraceae
Afroaster pleiocephalus (Harv.) J.C.Manning & Goldblatt	Asteraceae
Cineraria mollis E.Mey. ex DC	Asteraceae
Cotula hispida (DC.) Harv.	Asteraceae
Dimorphotheca jucunda E.Phillips	Asteraceae
Helichrysum argentissimum J.M.Wood	Asteraceae
Helichrysum auriceps Hilliard	Asteraceae
Helichrysum cooperi Harv.	Asteraceae
Helichrysum glomeratum Klatt	Asteraceae
Helichrysum krookii Moeser	Asteraceae
Helichrysum lingulatum Hilliard	Asteraceae
Helichrysum nanum Klatt	Asteraceae
Helichrysum oreophilum Klatt	Asteraceae
Helichrysum sutherlandii Harv.	Asteraceae
Helichrysum vernum Hilliard	Asteraceae
Osteospermum moniliferum (L.) subsp. *canescens* (DC.) J.C. Manning & Goldblatt	Asteraceae
Printzia pyrifolia Less.	Asteraceae
Senecio barbatus DC.	Asteraceae
Senecio brevidentatus M.D.Hend.	Asteraceae
Senecio citriceps Hilliard & B.L. Burtt	Asteraceae
Senecio harveianus MacOwan	Asteraceae
Senecio heliopsis Hilliard & B.L.Burtt	Asteraceae
Senecio scitus Hutch. & Burtt Davy	Asteraceae
Senecio subrubriflorus O.Hoffm.	Asteraceae
Ursinia montana DC. subsp. *montana*	Asteraceae
Cynoglossum austroafricanum Hilliard & B.L.Burtt	Boraginaceae
Craterocapsa tarsodes Hilliard & B.L.Burtt	Campanulaceae
Wahlenbergia cuspidata Brehmer	Campanulaceae
Wahlenbergia fasciculata Brehmer	Campanulaceae
Wahlenbergia krebsii Cham. subsp. *krebsii*	Campanulaceae
Wahlenbergia paucidentata Schinz	Campanulaceae

Coccinia hirtella Cogn.	Cucurbitaceae
Cephalaria natalensis Kuntze	Dipsacaceae
Erica caffrorum Bolus var. *caffrorum*	Ericaceae
Euphorbia natalensis Bernh.	Euphorbiaceae
Lotononis lotononoides (Scott-Elliot) B.-E.van Wyk	Fabaceae
Otholobium polystictum (Benth. ex Harv.) C.H.Stirt.	Fabaceae
Tephrosia marginella H.M.L.Forbes	Fabaceae
Sebaea natalensis Schinz	Gentianaceae
Streptocarpus gardenii Hook.	Gesneriaceae
Streptocarpus pentherianus Fritsch	Gesneriaceae
Plectranthus grallatus Briq.	Lamiaceae
Stachys kuntzei Gürke	Lamiaceae
Stachys sessilis Gürke	Lamiaceae
Cyphia longifolia N.E.Br.	Lobeliaceae
Rumex woodii N.E.Br.	Polygonaceae
Gallium scabrelloides Puff	Rubiaceae
Bowkeria verticillata (Eckl. & Zeyh.) Schinz.	Scrophulariaceae
Jamesbrittenia breviflora (Schltr.) Hilliard	Scrophulariaceae
Nemesia silvatica Hilliard	Scrophulariaceae
Phygelius aequalis Harv. ex Hiern	Scrophulariaceae
Zaluzianskya glareosa Hilliard & B.L. Burtt	Scrophulariaceae
Zaluzianskya microsiphon (Kuntze) K.Schum.	Scrophulariaceae
Hermannia gerrardii Harv.	Sterculiaceae
Hermannia woodii Schinz	Sterculiaceae

ANNEXURE V

Phenology: b=buds, f=flows and s=seeds, flower colour; and elevation range where species are found in m.a.s.l.

Species	J	F	M	A	M	J	J	A	S	O	N	D	Colour	Elevation ma.s.l.
Haemanthus humilis Jacq. subsp. *hirsutus* (Baker) Snijman										f	f		white	1883−1892
Zantadeschia aethiopica (L.) Spreng.	f							f	f	f	f	f	white	1682−1765
Zantadeschia albomaculata (Hook) Baill.	f	s	s							f	f	f	white	1705−1883
Asparagus cooperi Baker									b	b	b		white	1884−1892
	s	s							f	f	f	s	white	
Drimia depressa (Baker) Jessop									b				white	1750−1790
									f	f			white	
Drimia macrocentra (Baker) Jessop									b	f	f		white	1854
Schizocarpus nervosus (Burch.) Van der Merwe	f	s										f	white	1623−1842
Rhodohypoxis baurii (Baker) Nel var. *platypetala* (Baker) Nel	f	f								f	f	f	white	1705−1870
Dierama argyreum L.Bolus	f	f											white	1868
Moraea brevistyla (Goldblatt) Goldblatt		f											white	1854
Crabbea acaulis N.E.Br.	f	f											white	1864
Disperis fanniniae Harv.	f	f											white	1690−1715
Neobolusia tysonii (Bolus) Schltr.	f	f											white	1720−1780
Satyrium cristatum Sond. var. *longilabiatum* A.V.Hall		b											white	1855
		f												
Schizochilus flexuosus Harv.ex Rolfe	f	f	f										white	1720−1870
Alepidea amatymbica Eckl. & Zeyh.	f	f											white	1854
Alepidea natalensis J.M.Wood & M.S. Evans	f	f										f	white	1705−1868
Afroaster pleiocephalus (Harv.) J.C.Manning & Goldblatt										b	b		white	1632−1667
	s	s								f	f	f		
Dichrocephala integrifolia (L.f.) Kuntze subsp. *integrifolia*	f												white	1690−1715
Dicoma anomela Sond.	b												white	1647−1876
	f	f	s											
Gerbera ambigua (Cass.) Sch.Bip	f	f								f	f	f	white	1732−1842
												s		
Gerbera piloselloides (L.) Cass.	s									b	b		white	1719−1768
	f									f	f	f		

Helichrysum argentissimum J.M.Wood	f	f											white	1730–1788
Helichrysum chionosphaerum DC.										b	b		white	1715–1840
	f									f	f	f		
Helichrysum krebsianum Less.										b	b	b	white	1717–1876
	f	f									f	f		
Helichrysum lingulatum Hilliard	f							s	s	f	f	f	white	1806
Helichrysum mundtii Harv.	f	f											white	1705–1810
Helichrysum sutherlandii Harv.	f	f	f	f									white	1720–1730
Troglophyton capillaceum (Thunb.) Hilliard & B.L.Burtt subsp. *capillaceum*		f											white	1854
Senecio subrubriflorus O.Hoffm.	f	f											white	1854–1870
Drymaria cordata (L.) Willd. Ex Roem. & Schult. subsp. *diandra*	f												white	1690–1715
Silene burchellii Otth	f	f											white	1803–1870
Silene undulata Aiton subsp. *undulata*	f	f										f	white	1883
Convulvulus natalensis Bernh. ex Krauss	f						f	f	f	f	f	f	white	1835–1859
Crassula pellucida L. subsp. *brachypetala* (Drége ex Harv.) Toelken	f	f											white	1702–1854
Crassula sarcocaulis Eckl. & Zeyh. subsp. r*upicola* Toelken	f	f										f	white	1892
Crassula setulosa Harv. var. *setulosa*	f	f	f									f	white	1722–1870
Crassula umbracticola N.E.Br.		f											white	1870
Cephalaria natalensis Kuntze	f	f	f	f									white	1705–1721
Cephalaria oblongifolia (Kuntze) Szabó		f											white	1868–1870
Scabiosa columbaria L.	f	f											white	1722–1859
Erica caffrorum Bolus var. *caffrorum*	f												white	1720
Geranium wakkerstroomianum R.Knuth	f	f									f	f	white	1705–1883
Streptocarpus pentherianus Fritsch	f	f											white	1721
Ocimum obovatum E.Mey. Ex Benth.		f											white	1854–1870
Plectranthus grallatus Briq.	f	f										f	white	1690–1854
Pycnostachys reticulata (E.Mey) Benth.		f											white	1774–1810
Rabdosiella calycina (Benth.) Codd	f	f	f										white	1674–1892
Stachys grandifolia E.Mey. ex Benth.	f												white	1690

Stachys kuntzei Gürke	f	f										f	white	1669−1883
Stachys sessilis Gürke		f											white	1756
Cyphia elata Harv.	b												white	1859−1876
	f	f												
Cyphia heterophylla C.Presl ex Eckl. & Zeyh.	f												white	1682
Lobelia vanreenensis (Kuntze) K.Schum.		f											white	1854−1868
Epilobium salignum Hausskn.		f											white	1705−1810
Kohautia amatymbica Eckl. & Zeyh.								b	b	b	b		white	1623−1855
									f	f	f	f	white	
Spermacoce natalensis Hoechst.	f										f	f	white	1632−1727
Thesium goetzeanum Engl.									b	b	b		white	1717−1806
									f	f	f	s		
Thesium natalense Sond.										b	b		white	1623−1770
										f	f	f		
	s											s		
Chaenostoma floribundum Benth.	f	f	f										white	1720−1884
			s											
Hebenstretia dura Choisy	f	f									f	f	white	1854−1884
Limosella africana Glück var. *africana*		f											white	1765−1810
Nemesia silvatica Hilliard	f												white	1690−1721
Zaluzianskya elongata Hilliard & B.L.Burtt	f	f											white	1702−1803
Zaluzianskya glareosa Hilliard & B.L. Burtt		f											white	1892
Eriospermum cooperi Baker											b	b	white/green	1842−1861
											f	f		
Eriospermum ornithogaloides Baker											b		white/green	1714–1729
											f	f		
Ornithogalum graminifolium (Thun.)	b										b	f	white/green	1714−1827
	s											s		
Albuca setosa Jacq.										b	b	b	white/green	1752−1855
	f									f	f	f		
	s													

Bulbine favosa (Thunb.) Schult. & Schult.f											b	b	yellow	1722
	f										f	f		
Dioscerea rupicola Kunth	f												yellow	
Dioscorea sylvatica Eckl.											b	b	yellow	1884
	f	f									f	f		
		s	s											
Albuca rupestris Hilliard & B.L.Burtt										b	b		yellow	1721
										f	f			
Hypoxis acuminata Baker											b		yellow	1743–1842
											f			
Hypoxis argentea Harv. ex Baker	b								b	b	b	b	yellow	1710–1859
	f								f	f	f	f		
	s										s	s		
Hypoxis costata Baker										b	b		yellow	1736–1743
										f	f			
Hypoxis filiformis Baker											b		yellow	1762–1813
											f	f		
Hypoxis galpinii Baker										b	f	f	yellow	1640–1861
												s		
Xyris capensis Thunb.		b											yellow	1810
		f												
Eulophia ovalis Lindl. var. *bainesii* (Rolfe) P.J.Cribb & la Croix												b	yellow	1876
												f		
Holothrix scopularia (Lindl.) Rchb.f.										b	b		yellow	1715–1762
										f	f			
										s	s			
Orthochilus leontoglossus (Rchb.f.) Bytebier												b	yellow	1842
												f		
Afrosciadium caffrum (Meisn.) P.J.D. Winter										b	b		yellow	1859–1868
										f	f	s		
Bupleureum mundii Cham. & Schltdl.		f											yellow	1854–1870
Pimpinella caffra (Eckl. & Zeyh.) D.Dietr.	b	b											yellow	1705–1876
	f	f												

Aspidonepsis flava (N.E.Br.) Nicholas & Goyder											b		yellow	1730–1752
											f			
Berkheya rhapontica (DC.) Hutch.& Burtt Davy										b	b	b	yellow	1623–1876
										f	f	f		
	s										s	s		
Berkheya speciosa (DC.) O.Hoffm.											b		yellow	1705–1870
	f										f	f		
Cineraria mollis E.Mey. ex DC	b												yellow	1859
	f													
Cotula hispida (DC.) Harv.	f	f											yellow	1720–1970
Euryops laxus (Harv.) Burtt Davy										b	b		yellow	
	s									f	f	f		
Euryops montanus Schltr.	f												yellow	1806
Euryops transvaalensis Klatt subsp. *setilobus* (N.E.Br.) B.Nord.										b	b		yellow	1710–1862
	f									f	f	f		
	s											s		
Gazania krebsiana Less.								b			b		yellow	1623–1815
	f							f	f	f	f	f		
	s									s	s			
Haplocarpha scaposa Harv.											b		yellow	1717–1842
	s										f			
Helichrysum aureonitens Sch.Bip.										f	f	s	yellow	1623–1810
Helichrysum aureum (Houtt.) Merr. var. *monocephalum* (DC.) Hilliard								b	b				yellow	1750
								f	f					
Helichrysum auriceps Hilliard	f	f											yellow	1726–1774
Helichrysum cooperi Harv.	f	f											yellow	1774–1810
Helichrysum glomeratum Klatt		b											yellow	1623–1876
		f	f	f										
Helichrysum herbaceum (Andrews) Sweet	b												yellow	1623–1861
	f	f	f											
Helichrysum krookii Moeser	b	b											yellow	1715–1870
	f	f												

Helichrysum nanum Klatt				b	b								yellow	1770–1806
				f	f									
Helichrysum nudifolium (L.) Less. var. *nudifolium*	b										b	b	yellow	1623–1861
	f										f	f		
Helichrysum nudifolium (L.) Less. var. *pilosellum* (L.f.) Beentje									b	b	b	b	yellow	1647–1876
	f								f	f	f	f		
Helichrysum oreophilum Klatt									b	b			yellow	1689–1831
									f	f	f	f		
Helichrysum paleatum Hilliard		f											yellow	1870
Helichrysum pallidum DC.											b		yellow	1717–1876
											f	f		
Helichrysum simillimum DC.	f	f											yellow	1674–1778
Helichrysum splendidum (Thunb.) Less.										b			yellow	1780
										f				
Helichrysum umbraculigerum Less.	f	f											yellow	1682–1854
Nidorella auriculata DC.													yellow	1632–1710
Nidorella obscura (DC.) J.C. Manning & Goldblatt	f	f											yellow	1682–1810
	s													
Nidorella pinnata (L.f.) J.C.Manning & Goldblatt	b										b	b	yellow	1632
	f										f	f		
Nolletia rarifolia (Turcz.) Steetz	b									b	b		yellow	1623–1743
	f									f	f			
	s													
Osteospermum moniliferum (L.) subsp. *canescens* (DC.) J.C. Manning & Goldblatt										b	b		yellow	1702–1874
	f	f								f	f	f		
			s											
Othonna natalensis Sch.Bip.								b	b	b	b		yellow	1623–1820
									f	f	f			
Schistostephium crataegifolium (DC.) Fenzl ex Harv.	f	f	f										yellow	1705–1864
Senecio adnatus DC.	b											b	yellow	1623–1876
	f											f		

Senecio brevidentatus M.D.Hend.											b		yellow	1825–1859
	f										f	f		
Senecio glanduloso-pilosus Volkens & Muschl.								b					yellow	1623–1720
								f	f					
Senecio harveianus MacOwan		f	f	f	f	f							yellow	1716–1747
Senecio heliopsis Hilliard & B.L.Burtt								b	b	b			yellow	
								f	f	f				
Senecio humidanus C.Jeffrey											b		yellow	1632–1756
											f			
Senecio inornatus DC.	b	b											yellow	1631–1854
	f	f												
Senecio oxyriifolius DC. subsp. *oxyriifolius*										b	b		yellow	1782–1884
											f			
Senecio scitus Hutch. & Burtt Davy												b	yellow	1715–1870
	f											f		
	s													
Ursinia montana DC.subsp. *montana*	f												yellow	1722–1831
Ursinia tenuiloba DC.								f	f	s			yellow	1715–1752
Crassula vaginata Eckl. & Zeyh. subsp. *vaginata*	b	b											yellow	1689–1846
	f	f												
Coccinia hirtella Cogn.		b									b		yellow	1682–1884
	f	f									f	f		
Euphorbia flanaganii N.E.Br.							b	b	b				yellow	1630–1765
							f	f	f					
Argyrolobium marginatum Bolus	f									f	f	f	yellow	1765–1862
Argyrolobium tomentosum (Andrews) Druce	b												yellow	1690–1721
	f													
Argyrolobium tuberosum Eckl. & Zeyh.												b	yellow	1862
												f		
Eriosema kraussianum Meisn.										b			yellow	1715–1849
										f	f			
											s			
Leobordea eriantha (Benth.) B.-E.van Wyk & Boatwr.	f									f	f	f	yellow	1702–1876

Rhyncosia caribaea (Jacq.) DC.	b											b	yellow	1682–1884
	f	f	f									f		
			s	s										
Rhyncosia totta (Thunb.) DC.	f	f											yellow	1717–1814
Sebaea filiformis Shinz			f										yellow	1762
Sebaea natalensis Schinz	f												yellow	1854
Sebaea sedoides Gilg	b												yellow	1647–1827
	f													
Hypericum aethiopicum Thunb.	b										b	b	yellow	1640–1876
	f										f	f		
												s		
Hypericum lalandii Choisy		f											yellow	1756–1810
		s												
Linum thunbergii Eckl. & Zeyh.	f	f	f										yellow	1820–1831
Hibiscus aethiopicus L.	b									b	b	b	yellow	1859–1892
	f									f	f	f		
Hibiscus trionum L.												b	yellow	1884
												f		
Gallium scabrelloides Puff	f	f											yellow	1682–1792
Melasma scabrum P.J.Bergius	b	b											yellow	1682–1810
	f	f												
Hermannia gerrardii Harv.			b	b	b								yellow	1845–1884
			f	f	f									
Gnidia fastigiata Rendle	b												yellow	1714–1884
	f													
Gnidia kraussiana Meisn. var. *krausiana*							b	b	b	b			yellow	1702–1831
							f	f	f	f				
Gnidia phaeotricha Gilg		f											yellow	1806–1862

Afroaster hispida (Thunb.) J.C.Manning & Goldblatt									b	b	b	b	blue	1623–1766
	s								f	f	f	f		
Afroaster perfoliatus (Oliv.) J.C.Manning & Goldblatt	f										f			1722–1806
Agapanthus campanulatus F.M.Leight. subsp. *patens* (F.M.Leight.) F.M.Leight.	b												blue	1883–1892
	f	f												
Commelina africana L. cf. *krebsiana* (Kunth) C.B.Clarke	b										b	b	blue	1710–1861
	f	f									f	f		
Aristea abyssinica Pax was *A.cognata*												b	blue	1715–1861
	f											f		
	s													
Aristea torulosa Klatt *was A. woodii*										f			blue	1792–1814
Disa stachyoides Rchb.f.												b	blue	1716–1811
	f											f		
Cyanotis speciosa (L.f.) Hassk											b		blue	1667–1792
	f										f	f		
Moraea inclinata Goldblatt	f	f											blue	1720–1876
*Moraea stricta B*aker								b	b	b			blue	1623–1767
								f	f	f				
										s				
Lotononis lotononoides (Scott-Elliot) B.-E.van Wyk	b												blue	1715
	f													
Otholobium polystictum (Benth. ex Harv.) C.H.Stirt.	b												blue	1682
	f													
Ajuga orphrydis Burch.ex Benth.										b			blue	1778–1884
										f	f	f		
Vigna schlechteri Harms	f	f											blue	1726–1842
Pentanisia prunelloides (Klotzsch ex Eckl. & Zeyh.) Walp.										b	b	b	blue	1623–1861
	f								f	f	f	f		
	s											s		
Pearsonia grandifolia (Bolus) Polhill subsp. *grandifolia*	f											f	blue	1720–1868
	s					f								

Craterocapsa tarsodes Hilliard & B.L.Burtt	b												blue	1787
	f													
Wahlenbergia cuspidata Brehmer	f	f	f										blue	1884–1892
Wahlenbergia fasciculata Brehmer			b										blue	1806–1842
			f											
Wahlenbergia huttonii (Sond.) Thulin	b	b	b									b	blue	1647–1876
	f	f	f									f		
		s	s											
Wahlenbergia paucidentata Schinz									b	b	b		blue	1623–1716
									f	f	f	f		
Cynoglossum austroafricanum Hilliard & B.L.Burtt	b	b											blue	1861–1884
	f	f	f											
		s	s											
Felicia filifolia (Vent.) Burtt Davy		f				f	f	f					blue	1690–1702
Streptocarpus gardenii Hook.	b												blue	1721
	f	f												
Streptocarpus polyanthus Hook subsp. *dracomontanus* Hilliard	f	f											blue	1854–1870
Lobelia erinus L.	f	f											blue	1765–1870
Polygala gerrardii Chodat	b												blue	1839
	f													
Nemesia denticulata (Benth.) Grant ex Fourc.	b										b	b	blue	1855–1861
	f										f	f		
Aspidoglossum sp. nova											b	b	purple	1760–1772
	f										f	f		
Schizoglossum atropurpureum E.Mey. subsp. *atropurpureum*	b												purple	1667
	f	f												
Conyza chilensis Spreng.	b												purple	1631–1854
	f									f	f			
Hilliardiella aristata (DC.) H.Rob.*was Vernonia natalensis*										b	b	b	purple	1623–1892
											f	f		
	s											s		

Hilliardiella hirsuta (DC.) H.Rob. was *Vernonia hirsuta*										b	b	b	purple	1631–1884
	s									f	f	f		
Vernonia gerrardii Harv.										f			purple	1631
Afroaster hispida (Thunb.) J.C.Manning & Goldblatt										f	f	f	pink	1623–1766
Brunsvigia grandiflora Lindl.	b												pink	1854–1876
	f	f												
Ledebouria cooperi (Hook.f.) Jessop									b	b	b		pink	1726–1774
									f	f	f			
Ledebouria lachenalioides (Baker) J.C. Manning & Goldblatt										b	b		pink	1754–1846
											f			
Ledebouria ovatifolia (Baker) Jessop									b				pink	1632–1680
									f	f				
Dierama trichorhizum (Baker) N.E.Br.									b				pink	1650–1720
									f	f				
Gladiolus parvulus Schltr.										b	b		pink	1715
										f	f			
Hesperantha baurii Baker	b	b											pink	
	f	f												
Disa fragrans Schltr. subsp. *fragrans*		b											pink	1722
			f											
Disa oreophilla Bolus subsp. *oreophila*	b												pink	1720
	f													
Disa pulchra Sond.												b	pink	1690–1720
	f											f		
Disa versicolor Rchb.f.	b												pink	1720–1752
	f													
Orthochilus aculeatus (L.f.) Bytebier subsp. *huttonii* (Rolfe) Bytebier											b		pink	1842
											f			
Satyrium longicauda Lindl.	b	b										b	pink	1723–1823
	f	f										f		

Stenoglottis fimbriata Lindl. subsp. *fimbriata*		b											pink	1715
		f												
Watsonia lepida N.E.Br.	b										b	b	pink	1812–1842
	f							f			f	f		
								s						
Delosperma lavisiae L. Bolus	f	f								f	f	f	pink	1702–1905
Asclepias cucullata (Schltr.) Schltr. subsp. *cucullata*										b	b		pink	1762–1827
										f	f	f		
Asclepias stellifera Schltr.									b	b			pink	1762–1839
									f	f				
										s				
Athrixia phylicoides DC.								f	f				pink	1669–1674
Dimorphotheca jucunda E.Phillips												b	pink	1846
	f											f		
Helichrysum appendiculatum (L.f.) Less.	b												pink	1623–1792
	f	f	f											
Helichrysum caespititium (DC.) Harv.						b							pink	1705–1722
						f	f	f	f	f				
Helichrysum spiralepsis Hilliard & B.L.Burtt	b												pink	1720–1862
	f	f												
Printzia pyrifolia Less.						b							pink	1705–1726
						f								
Senecio macrocephalus DC.								b	b	b	b	b	pink	1631–1876
								f	f	f	f	f		
										s	s			
Impatiens hochstetteri Warb. subsp. *hochstetteri*	b	b											pink	1690–1715
	f	f												
		s												
Crassula alba Forssk.	b												pink	1876–1892
	f	f												
Lessertia perennans (Jacq.) DC.											b	b	pink	1729–1734
											f	f		
											s			

Graderia scabra (L.f.) Benth.										b	b		pink	1674–1870
										f	f			
Rubus ludwigii Eckl. & Zeyh.											b		pink	1705–1864
											f	f		
	s	s												
Oxalis smithiana Eckl. & Zeyh.											b	b	pink/magenta	1623–1876
	f										f	f		
Polygala hottentotta C.Presl.		b							b	b	b	b	pink/magenta	1714–1747
	f	f	f						f	f	f	f		
Polygala rehmannii Chodat									b	b	b		pink/magenta	1714–1827
									f	f	f	f		
Cyrtanthus tuckii Baker var. *viridilobus* I.Verd.									f				orange	1632
Scadoxus puniceus (L.) Friis & Nordal								b	b				orange	1690–1892
									f	f				
										s	s			
Aloe ecklonis Salm-Dyck											b	b	orange	1792–1876
	s										f	f		
Aloe maculata All.						b	b	b	b				orange	1682–1892
						f	f	f	f					
									s	s				
Kniphofia laxiflora Kunth	b	b											orange	1756–1870
	f	f												
Sandersonia aurantiaca Hook.	b												orange	1690–1715
	f													
Watsonia pillansii L.Bolus										b			orange	1803
										f				
Eriosema salignum E.Mey.									b	b			orange	1879–1883
									f	f				
Leonotis intermedia Lindl.	b	b											orange	1682–1884
		f	f	s										

Phygelius aequalis Harv. ex Hiern		b							b	b	b		orange	1682–1734
		f							f	f	f			
Hermannia woodii Schinz	b									b	b	b	orange	1623–1876
	f									f	f	f		
Eucomis autumnalis (Mill.) Chitt.	b												green	1623–1861
	f													
Orthochilus foliosus (Lindl.) Bytebier	b											b	green	1770–1825
	f											f		
Satyrium parviflorum Sw.		b											green	1854
		f												
Schizoglossum flavum Schltr.												b	green	1855
												f		
Xysmalobium involucratrum (E.Mey.) Decne.											b		green	1726
											f			
Xysmalobium parviflorum Harv. ex Scott-Elliot	b	b								b	b		green	1803–1905
	f	f								f	f			
Euphorbia natalensis Bernh.									f	f	f		green	1722
Psammatropha mucronata (Thunb.) Fenzl	f									f	f	f	green/yellow	1714–1814
Anthospermum herbaceum L.f.										b	b	b	green/yellow	1623–1870
	f									f	f	f		
Gallium thunbergianum Eckl. & Zeyh. var. *thunbergianum*	f	f											green/yellow	1682–1884
Pygmaeothamnus chamaedendrum (Kuntze) Robyns										b	b		green/yellow	1717–1840
										f	f			
Eucomis bicolor Baker		f											green/purple	1854–1864
		s												
Hesperantha woodii Baker	b												red	1854
	f													
Acalypha depressinerva (Kuntze) Schum. was A. schinzii									b	b			red	1623–1831
	f								f	f	f	f		
	s											s		

Acalypha peduncularis E.Mey.ex Meisn.	s									f	f	f	red	1667–1876
Acalypha punctata Meisn. var. *punctata*	s								f	f	f	f	red	
Indigofera hedyantha Eckl. & Zeyh.											b	b	red	1669–1883
	f	f									f	f		
Indigofera hilaris Eckl. & Zeyh. var. *hilaris*										b	b	b	red	1667–1876
										f	f	f		
Indigofera woodii Bolus												b	red	1710–1876
	f											f		
Jamesbrittenia breviflora (Schltr.) Hilliard										b	b		red	1859–1880
	f	f	f							f	f	f		
Hermannia cristata Bolus										b	b		red	1856–1884
										f	f	f		
	s											s		
Pterygodium magnum Rchb.f.	b												brown	1715–1861
	f	f												
Asclepias concinna (Schltr.) Schltr.											b		brown	1623–1746
											f			
Asclepias cultriformis (Harv. ex Schltr.) Schltr.	f											f	brown	1831–1837
Asclepias macropus (Schltr.) Schltr.	b												brown	1770–1792
	f													
Aspidoglossum glanduliferum (Schltr.) Kupicha											b		brown	1760
											f			
Aspidoglossum gracile (E.Mey.) Kupicha										b	b	b	brown	1715
										f	f	f		
Aspidonepsis reenensis (N.E.Br.) Nicholas & Goyder	b											b	brown	1720–1777
	f											f		
Gunnera perpensa L.	f											f	brown	1736–1792
Schizoglossum bidens E.Mey. subsp. *pachyglossum* (Schltr.) Kupicha	b	b										b	brown/white	1859–1902
	f	f										f		