CHAPTER 5

GRASSLAND AND WETLAND VEGETATION

5.1 Background

Several phytosociological studies have been conducted on grasslands along the northeastern escarpment of the Northern Province and Mpumalanga (e.g. Bloem 1988; Deall *et al.* 1989; Matthews *et al.* 1992a, 1992b; Burgoyne *et al.* 2000). However, the vegetation of some areas remained to be investigated and described, both on reconnaissance level and in more detail. An area, for which very limited information on the grasslands vegetation exists, is the undulating norite hills in the Roossenekal-Tonteldoos region. This area is located in the southern portion of the SCPE (Van Wyk & Van Wyk 1997; Van Wyk & Smith 2001), and comprises the Roossenekal Subcentre of Endemism (Siebert 1998). The Roossenekal Subcentre is known for its many plant endemics, the distributions of which correlate with the diversity in geological substrate in the region (Siebert 1998; Siebert *et al.* 2001).

Various grassland and wetland vegetation types, which show a floristic affinity and relationships with the Roossenekal Subcentre (Siebert 1998), have previously been described from the adjacent Steenkampsberg (Bloem 1988; Burgoyne 1995), Witbank Nature Reserve (Smit *et al.* 1997), and the Great Dyke of Zimbabwe (Werger *et al.* 1978). Acocks (1953) mapped the vegetation of the Roossenekal Subcentre as two veld types, namely North-eastern Sandy Highveld (57) and Bankenveld (61). The grassland area forms an ecotone between the Mixed Bushveld (18) and the North-eastern Sandy Highveld (57) Veld Types (Acocks 1953), but it is probably more representative of Bankenveld (61), than any of the aforementioned. A broad scale classification of the same region's vegetation was given by Low & Rebelo (1996), who recognises three vegetation types in the study area, namely Mixed Bushveld (18), Moist Sandy Highveld Grassland (38) and North-eastern Mountain Grassland (43). These veld/vegetation types are closely associated with seasonal fires (Edwards 1984).

Only Acocks (1953) accurately mapped the high-altitude outcrops of norite (Leolo Mountains) in the northern region of the SCPE as grassland, namely North-eastern Sandy Highveld (57). Geologically and floristically the Leolo Subcentre is similar to the Roossenekal Subcentre, and is treated as part of the study area covered in this chapter (Siebert 1998). However, the vegetation classification of the entire Sekhukhuneland Centre needs further attention as comparatively little is known about its plant communities, floristic diversity and the relationship between distribution patterns of plants and the clayey soils derived from the ultramafic norite.

In a broad overview of the vegetation types of the SCPE, Siebert *et al.* (2002a) recognised six major vegetation units. The vegetation units described in this paper covers the *Themeda triandra–Senecio microglossus* Cool Moist Grassland and the *Fuirena pubescens–Schoenoplectus corymbosus* Wetland Vegetation, the two major vegetation types of the relatively moist Roossenekal and Leolo Subcentres.

The grasslands and wetlands of the SCPE are situated in northern Mpumalanga between latitude 25°00'00"–25°20'00" S and longitude 29°50'00"–30°05'00" E (southern part of the SCPE) and latitude 24°30'00"–24°50'00" S and longitude 30°00'00"–30°05'00" E (Leolo Mountains) (Figure 7). The area covers approximately 1 500 km^2 and comprises a homogeneous geology (Visser *et al.* 1989), with a heterogeneous physiography (Land Type Survey Staff 1987). The area dealt with here lies on the Upper and Main Zones of the Rustenburg Layered Suite and is mainly underlain by concentric belts of norite, and to a lesser degree outcrops of ferrogabbro (Visser *et al.* 1989). This norite stratum extends north-south and rises to form the Leolo Mountains (1 700 m asl). The lower reaches of the mountainous areas are characterised by many small outcrops of magnetite.

The valleys have a subtropical climate with little or no frost in winter, whereas in the mountains conditions become more temperate with increasing altitude. Average annual precipitation is about 700 mm (South African Weather Bureau 1998). Local rainfall patterns are strongly influenced by the area's topography and altitude (Siebert 1998), varying from 721 mm in the east, to 607 mm per annum in the west; 710 mm in the south, to 702 mm in the north (Erasmus 1985). Daily average temperature ranges from a minimum of 2.8°C in

winter to a maximum of 25.9°C in summer, with an average annual temperature of 16.2°C (South African Weather Bureau 1998). In this region of undulating rocky hills, the vegetation is characterised by scattered woodlands in sheltered habitats along foot slopes and in valleys. Grassland, with scattered bush clumps, cover the exposed plateaus, hill slopes and valleys. The difference in altitude between the two most extreme locations is approximately 500 m (1 700 m asl on the Leolo Mountains to 1 200 m asl where the Klip River cuts through the hills near Roossenekal).

5.2 Classification

The analysis resulted in the identification of 17 plant communities, ordered as eight associations, 11 sub-associations and four variants (Table 3a & 3b). These units were subsequently hierarchically classified. Since the area covered by these communities lies in the climatically uniform moist and cool southern region of the SCPE (Siebert 1998), no major macro-climatic variation plays a role in local differentiation of the plant communities. The major plant communities relate to soil character, rockiness and terrain type, with aspect and slope also playing minor roles. Communities were not always distinctive in the field. This might be attributed to the homogeneity of grassland physiognomy and the heterogeneity of the environmental factors, which resulted in a complex mosaic distribution pattern of habitats and associated vegetation.

The hierarchical classification of the vegetation reinforces the correlation between habitat and plant communities (Figure 8a & 8b). The distribution of the SCPE endemic/near-endemic and Red Data List plant taxa among various plant communities is listed in Table 4. A summary of selected floristic and habitat attributes for each plant community is supplied in Table 5.

The *Themeda triandra–Senecio microglossus* Cool Moist Grassland (Siebert *et al.* 2002a) is interpreted as belonging to the proposed *Tristachya leucothrix-Trachypogon spicatus* Class (Du Preez & Bredenkamp 1991). The *Fuirena pubescens–Schoenoplectus corymbosus* Wetlands Vegetation (Siebert *et al.* 2002a) is interpreted as part of the *Miscanthus junceus–Schoenoplectus corymbosus* plant community described by Bloem

(1988) and proposed here as an alliance. The grassland and wetland plant communities of the Roossenekal Subcentre are classified as follows:

I. *Tristachya leucothrix–Trachypogon spicatus* class of moist mountain slopes and plateaus

(*Themeda triandra–Senecio microglossus* Cool Moist Grassland (Siebert *et al.* 2002a))

1. *Helichryso splendidii–Tristachyetum leucothricis*
2. *Zantedeschio pentlandii–Aloetum castaneae*
3. *Brachiario serratae–Melhanietum randii*
   - 3.1 *Brachiario serratae–Melhanietum randii helichrysetosum rugulosii*
     - 3.1.1 *Digitaria eriantha* variant
     - 3.1.2 *Alloteropsis semialata* variant
   - 3.2 *Brachiario serratae–Melhanietum randii argyrolobietosum transvaalense*
     - 3.2.1 *Koeleria capensis* variant
     - 3.2.2 *Berkheya seminivea* variant
   - 3.3 *Brachiario serratae–Melhanietum randii gnidietosum capitatae*
   - 3.4 *Brachiario serratae–Melhanietum randii setarietosum nigrirostis*
4. *Elionuro muticusae–Trachypogonetum spicati*
   - 4.1 *Elionuro muticusae–Trachypogonetum spicati bewsietosum biflorae*
   - 4.2 *Elionuro muticusae–Trachypogonetum spicati acacietosum tortilis*
5. *Jamesbrittenio macranthae–Loudetietum simplicis*
   - 5.1 *Jamesbrittenio macranthae–Loudetietum simplicis combretetosum hereroense*
   - 5.2 *Jamesbrittenio macranthae–Loudetietum simplicis eucleetosum linearis*

II. *Miscanthus junceus–Schoenoplectus corymbosus* community of streams and seepage areas

(*Fuirena pubescens–Schoenoplectus corymbosus* Wetlands (Siebert *et al.* 2002a))

6. *Fuireno pubescentis–Schoenetum nigricantis*
   - 6.1 *Fuireno pubescentis–Schoenetum nigricantis triraphietosum andropogonoidis*
   - 6.2 *Fuireno pubescentis–Schoenetum nigricantis pycnostachetosum reticulatae*
   - 6.3 *Fuireno pubescentis–Schoenetum nigricantis bulbostylietosum hispidulae*
7. *Andropogono eucomis–Fimbristyletum ferrugineae*
8. *Limosello maioris–Ranunculetum meyeri*

5.3 Description

The *Themeda triandra–Senecio microglossus* Cool Moist Grassland and scattered *Cymbopogon validus–Fuirena pubescens* Wetland Vegetation are predominantly restricted to the valleys, slopes and plateaus of undulating norite hills (Siebert *et al.* 2002a). Surface rocks are common and abundant in many of the communities, with soil clay percentages varying from 25% to more than 50%. The vegetation can be classified into herbland and grassland (Edwards 1983). An important feature of the region is the fact that the mountain and hill ranges have a north-south orientation; therefore the grassland communities are mostly restricted to east and west aspects, crests and valleys. Grasslands have been a long-standing component of the Afromontane vegetation mosaic (Meadows & Linder 1989; Matthews *et al.* 1993), and are therefore seen as primary vegetation. Plant communities of the grasslands and wetlands recognised in the SCPE are classified and desribed as follows:

I. *Tristachya leucothrix–Trachypogon spicatus* class (Du Preez & Bredenkamp 1991)

1. *Helichryso splendidii–Tristachyetum leucothricis* ass. nova hoc loco

Nomenclatural type: relevé 408 (holotypus)

Environmental data. Vegetation representing this association occurs at medium altitudes and forms a transition from low to high altitude grassland (1 700 m above sea level). It lies in a rather moist region (> 700 mm/annum), mostly restricted to the summit of the Leolo Mountains on norite. The habitat is a gentle undulating plateau (1–5°) with a general eastern or western aspect (Table 5). The dominant soil type is the Mayo form, a melanic A-horizon over a lithocutanic B-horizon. Average rock size varies from 300–500 mm in diameter and covers 15–20% of the soil surface.

Diagnostic and dominant/prominent taxa. In the SCPE this undersampled association is characterised by species group A (Table 3a). *Euryops brevipapposus*, *Helichrysum splendidum* and *Vernonia myriantha* are the most prominent diagnostic species of this syntaxon. Other diagnostic species include the shrub *Buddleja saligna* and the herbaceous *Lotononis foliosa* and *Xerophyta viscosa*. There are no diagnostic grasses, but dominant species include *Eragrostis capensis*, *E. curvula* and *Tristachya leucothrix*. A prominent

forb is *Pentanisia prunelloides*, while the shrub *Protea caffra* (endemic form) is conspicuously present.

Notes on floristic diversity. This grassland community is unique for the SCPE and only a slight floristic affinity exist with other grasslands types of the SCPE in species groups M and X (Table 3a). The average number of species per relevé is 30, and the total number of species recorded for the association is 40 (two relevés) (Table 5). Four plant taxa of conservation significance occur in this association (Table 4), namely the endemic forms of *Euclea crispa* and *Protea caffra*, the endemic *Zantedeschia jucunda* that is classified as Indeterminate in the Red Data List (also restricted to the association) and *Jamesbrittenia silenoides*, a taxon assessed as Vulnerable in KwaZulu-Natal.

2. *Zantedeschio pentlandii–Aloetum castaneae* ass. nova hoc loco
Nomenclatural type: relevé 100 (holotypus)

Environmental data. The vegetation is a short shrubland on rocky flats; areas where bedrock is exposed at ground level. The plant community is associated with exposed rock outcrops of norite, a rock type mined extensively as dimension stone in the region. It is situated on gentle slopes (0–5°) and with a very high surface rock cover percentage of 50–70% (Table 5). Solid exposed rock sheets can cover areas of 25 m^2. The dominant soil type is the Mispah form, indicating very shallow soils over hard rocks, often restricted to crevices. The habitat is situated on the midslopes, scarps and crests of undulating hills.

Diagnostic and dominant/prominent taxa. Characteristic species are represented by species group B (Table 3a). Diagnostic trees/shrubs of the association include *Apodytes dimidiata*, *Canthium suberosum*, *Halleria lucida* and *Olinia emarginata*. Diagnostic forbs are *Thesium burkei*, the succulents *Crassula sarcocaulis* and *Aloe pretoriensis*, and the geophytes *Boophane disticha* and *Zantedeschia pentlandii*. *Aristida junciformis* and *Cymbopogon excavatus* are the diagnostic grasses of this association. Prominent plants are the succulent *Aloe castanea*, the shrubby *Rhoicissisus tridentata* and the grasses *Eragrostis pseudosclerantha*, *Themeda triandra* and *Tristachya leucothrix*.

Notes on floristic diversity. This association exhibits a typical floristic relationship with other grasslands of the SCPE (Table 3a). The average number of species encountered per sample plot is 36, with a total of 105 species recorded for the association (five relevés) (Table 5). Sixteen taxa of conservation significance are present in the association (Table 4), six are SCPE endemics, six are SCPE near-endemics and seven are Red Data List taxa. This association has a high number of plant taxa with conservation status in the southern region of the SCPE. The association also has a high number of five taxa with conservation status restricted to it, such as *Asclepias* sp. (*Siebert 27*) (endemic), *Eucomis montana* (Rare), and *Zantedeschia pentlandii* (endemic, Rare).

3. *Brachiario serratae–Melhanietum randii* ass. nova hoc loco
Nomenclatural type: relevé 321 (holotypus)

Environmental data. The vegetation comprises short, dense and very diverse grassland associated with plateaus or terraces on rocky undulating hills. The association is found on all aspects, on gentle to moderate slopes (5–15°) of footslopes, midslopes, scarps and crests (Table 5). Soils are characterised by a melanic A-horizon underlain by hard rock (Milkwood form) or a soft carbonate horizon (Steendal form). The soil surface is covered by 15–75% of rock with a diameter of 0.1–1 m (Table 5).

Diagnostic and dominant/prominent taxa. Characteristic species of the association are represented by species group C (Table 3a). The dominant diagnostic forbs are *Callilepis leptophylla*, *Dicoma zeyheri*, *Gnidia capitata*, *Melhania randii* and *Vernonia oligocephala*. Woody species typical of the association include the geoxylic suffrutices *Elephantorrhiza elephantina* and *Rhus wilmsii*, and the small trees *Acacia caffra*, *Protea caffra* and *Vitex obovata* subsp. *wilmsii*. Other prominent forbs include *Clerodendrum triphyllum*, *Senecio latifolius* and *Tephrosia purpurea*. Prominent grasses for the association are *Andropogon chinensis*, *Brachiaria serrata*, *Setaria sphacelata*, *Themeda triandra*, *Trachypogon spicatus* and *Tristachya leucothrix*.

Notes on floristic diversity. The average number of species encountered per sample plot in this association is 48, with the total number of plant species being a minimum of 119 taxa

(29 relevés) (Table 5). There are 23 plant taxa of conservation value in the association, of which six are restricted to it. These include taxa such as the near-endemics, *Argyrolobium wilmsii* and *Pachycarpus transvaalensis* (Table 4). Red Data List taxa include *Callilepis leptophylla* (status is Rare in KwaZulu-Natal), *Mehania randii* (status is Insufficiently Known in the northern provinces) and *Scilla natalensis* (status is Vulnerable in the Free State and KwaZulu-Natal). This association harbours the highest number of plant taxa with conservation status in the southern region of the SCPE and, together with plant community 2, the highest number of Red Data List taxa.

3.1 *Brachiario serratae Melhanietum randii helichrysetosum rugulosii* sub-ass. nova hoc loco

Nomenclatural type: relevé 321 (holotypus)

Environmental data. In the Roossenekal Subcentre this sub-association represents short rocky grassland communities on clay soils such as Mayo and Milkwood forms. This grassland vegetation occurs on midslopes, scarps and crests of undulating norite hills. It occurs on slopes of 3–9° on all aspects. Rocks cover 20–50% of the soil surface and are an average size of 0,15–1 m in diameter (Table 5).

Diagnostic and dominant/prominent taxa. Species group F contains the diagnostic species for this sub-association, with the taxa *Helichrysum rugulosum*, *Pimpinella caffra* and *Tephrosia elongata* (Table 3a). Other characteristic species include the forbs *Acalypha punctata*, *Leonotis ocymifolia* and *Senecio lygodes*, as well as the grasses *Panicum natalense* and *Tristachya biseriata*. Trees that are prominent are *Euclea crispa* and *Vitex obovata* subsp. *wilmsii*. Predominant grasses are *Themeda triandra* and *Tristachya leucothrix*.

Notes on floristic diversity. A strong floristic affinity exists with all the sub-associations of the association (Table 3a). The average number of species encountered per sample plot in this sub-association is 49, with the total number of plant species being a minimum of 130 taxa (14 relevés) (Table 5). Two plant taxa of conservation value are restricted to the sub-association (Table 4).

3.1.1. *Digitaria eriantha* variant

Environmental data. The variant is rocky grassland on shallow clay soils of moderately slope hill scarps and crests (Table 5). Average rock size is 600 mm in diameter and covers 25% soil surface (Table 5).

Diagnostic and dominant/prominent taxa. Diagnostic taxa include the forbs *Agapanthus inapertus*, *Berkheya densifolia*, *Cyanotis speciosa*, *Indigofera hedyantha*, *Monsonia attenuata* and *Tephrosia longipes* and the grass *Digitaria eriantha* (species group D; Table 3a). Other frequently occurring grasses are *Andropogon schirensis*, *Brachiaria serrata* and *Setaria sphacelata*.

Floristic diversity. A strong floristic similarity exist with plant community 3.2.1, probably due to the similarity in their rock size and cover (species group H; Table 3a & Table 5). Five SCPE endemics, five near-endemics and seven Red Data List taxa are found in this variant (Table 4). Of the 112 taxa recorded for the variant (seven relevés), only 15 are of conservation value (one is restricted to it). The average number of species encountered per sample plot is 47 (Table 5).

3.1.2. *Alloteropsis semialata* variant

Environmental data. This variant represents rocky grasslands on shallow clay soils occurring on relatively steep midslopes of hills. Rock cover of the surface is 35%, with rocks averaging 350 mm in diameter (Table 5).

Diagnostic and dominant/prominent taxa. Berkheya onopordifolia, *Helichrysum albilanatum*, *H. nudifolium* and the succulent *Kalanchoe rotundifolia*, are the diagnostic forbs, with *Alloteropsis semialata* and *Sporobolus pectinatus* the diagnostic grasses species (species group E; Table 3a). Dominant dwarf shrubs are *Clutia pulchella* and *Rhus discolor*.

Floristic diversity. The community shares a floristic identity within various species groups (Table 3a). Five SCPE endemics, and seven near-endemics and seven Red Data List taxa are found in this variant (Table 4). It has 17 taxa of conservation value, the highest number for this paper, with only one taxon restricted to it. The average number of species recorded per sample plot is 51 (richest plant diversity of all the study area's grassland communities), with a total number of 130 plant taxa (seven relevés) (Table 5).

3.2 *Brachiario serratae–Melhanietum randii argyrolobietosum transvaalense* sub-ass. nova hoc loco

Nomenclatural type: relevé 8 (holotypus)

Environmental data. This is relatively tall rocky grassland of midslopes and crests of undulating norite hills. The sub-association occurs on soils of the Milkwood and Steendal forms. It lies on relatively steep sloped areas (3–15°). Rock cover of the surface is between 25–75%, with rock diameter between 100–950 mm (Table 5).

Diagnostic and dominant/prominent taxa. Diagnostic species for this vegetation type is *Berkheya seminivea* and *Drimiopsis atropurpurea*. This sub-association is characterised by group G (Table 3a). Prominent taxa that occur in this vegetation unit are the forbs *Acalypha punctata*, *Argyrolobium transvaalense*, *Barleria ovata*, *Pachycarpus transvaalensis*, *Rhynchosia spectabilis*, *Tephrosia purpurea* and *Vernonia natalensis*. Important grasses for this vegetation type are *Brachiaria serrata*, *Diheteropogon amplectens*, *Setaria sphacelata* and *Themeda triandra*. Prominent woody species include the geoxylic suffrutices *Elephantorrhiza elephantina* and *Rhus discolor*.

Notes on floristic diversity. The community exhibits a strong floristic affinity with all the grasslands of the study area (Table 3a). The average number of species encountered per sample plot in this sub-association is 49, with the total number of plant species being a minimum of 119 taxa (nine relevés) (Table 5). No plant taxa of conservation value are restricted to it (Table 4).

3.2.1 *Koeleria capensis* variant

Environmental data. This variant of relatively tall rocky mountain grassland on east-west aspects of steep midslopes and crests occurs on shallow clay soils. It is covered by approximately 30% rock, with a relatively large rock diameter (on average 650 mm) (Table 5).

Diagnostic and dominant/prominent taxa. No diagnostic species occur in this variant. Character species include the prominent forbs *Crabbea hirsuta* and *Ipomoea obscura*, and prominent grasses are *Eulalia villosa* and *Koeleria capensis* (species group G; Table 3a). Other dominant plants include the geoxylic suffrutex *Rhus discolor* and the small tree *Euclea crispa*. Grass cover is dense and species rich.

Floristic diversity. A strong floristic similarity is shared with plant community 3.1.1, probably due to similarity in rock size and cover (species group H; Table 3a & Table 5). Of the 14 taxa of conservation value in this variant, five are SCPE endemics, six near-endemics and five Red Data List taxa (Table 4). The average number of species encountered per sample plot is 48, with a total of 119 plant species (6 relevés), the second richest plant diversity in the study area's grasslands (Table 5).

3.2.2. *Berkheya seminivea* Variant

Environmental data. This variant represents rocky grassland communities on shallow clays of moderate midslopes and crests that are situated on east-west aspects (Table 5). Average rock size is 200 mm and cover 40% of the soil surface (Table 5).

Diagnostic and dominant/prominent taxa. There are no diagnostic species, but characteristic species for this variant include the forbs *Berkheya seminivea*, *Drimiopsis atropurpurea*, *Helichrysum cephaloideum* and *Thesium magalismontanum* the most frequent (species group G; Table 3a). Other important taxa are *Andropogon schirensis*, *Argyrolobium transvaalense*, *Eragrostis chloromelas* and *Rhynchosia spectabilis*.

Floristic diversity. This variant is floristically typical of its association, but is characterised by the absence of the sister variant's diagnostic species (species group G & H; Table 3a). Of its 13 taxa of conservation value, five are SCPE endemics, four near-endemics and six Red Data List taxa (Table 4). The average number of species encountered per sample plot is 50, with the total being 95 taxa (three relevés) (Table 5).

3.3 *Brachiario serratae- Melhanietum randii gnidietosum capitatae* sub-ass. nova hoc loco
Nomenclatural type: relevé 86 (holotypus)

Environmental data. In the Roossenekal Subcentre this sub-association represents rocky grassland communities on black clay soils. The habitat is found on footslopes and midslopes of undulating norite hills. The gentle slopes vary from 5–9°, with an east-west aspect the norm. Soils characteristic of these slopes is the Milkwood form. Rock cover percentage vary from 35–40% and rock size from 400–750 mm in diameter.

Diagnostic and dominant/prominent taxa. Species group J contains the characteristic species for this sub-association, with prominent forbs such *Becium obovatum*, *Convolvulus sagittatus*, *Gerbera ambigua* and *Vernonia galpinii* (Table 3a). The forbs *Senecio microglossus* and *S. latifolius*, and the grasses *Themeda triandra* and *Tristachya leucothrix* are the most dominant in this sub-association. Other important taxa are the woody species *Elephantorrhiza elephantina* and *Euclea crispa*, succulents *Aloe castanea* and *A. greatheadii*, and grass species such as *Eragrostis superba*, *Setaria sphacelata*, *Sorghum bicolor* and *Tristachya rehmannii*.

Notes on floristic diversity. A strong floristic affinity exists with certain plant communities of the association (species group J), but excludes species from plant communities 3.1.1 and 3.4 (Table 3a). The average number of species encountered per sample plot in this sub-association is 46, with the total number of plant species being 109 (six relevés) (Table 5). Although 16 taxa with conservation value occur in this sub-association (Table 4), namely six SCPE endemics, six near-endemics and six Red Data List taxa, no plant taxa with conservation value are restricted to it.

3.4 *Brachiario serratae–Melhanietum randii setarietosum nigrirostis* sub-ass. nova hoc loco

Nomenclatural type: relevé 64 (holotypus)

Environmental data. The sub-association is moist rocky mountain grassland on black turf soils. It lies on the lower part of gentle sloped footslopes (3–5°). It is found predominantly on soils of the Arcadia form. Approximately 15–30% of the soil surface is covered by rocks, with a relatively small average size of 100–250 mm in diameter (Table 5).

Diagnostic and dominant/prominent taxa. Diagnostic species are represented by species group L (Table 3a). Diagnostic forbs are *Lotononis adpressa* and *Scleria dieterlenii*, and the grass *Setaria nigrirostis*. No tree species are diagnostic, but *Protea caffra* is extremely prominent in this sub-association. Other important forbs are *Bulbostylis contexta*, *Lotononis macrosepala* and *Pegolettia lanceolata*. *Berkheya insignis*, *Hermannia antonii*, *Hypoxis rigidula*, *Melhania randii*, *Senecio microglossus* and *Thesium gracilentum* are prominent forbs. Prominent grasses of the sub-association are *Elionurus muticus* and *Eragrostis nindensis*. Grasses found frequently are *Brachiaria serrata*, *Diheteropogon amplectens*, *Themeda triandra*, *Trachypogon spicatus* and *Tristachya leucothrix*.

Notes on floristic diversity. The sub-association shows its strong floristic affinity within association 3 in species groups C and M (Table 3a). More detailed future studies could suggest its upgrading to the level of association. The average number of species encountered per sample plot in this sub-association is 44, with 77 plant species the total number (four relevés) (Table 5). Thirteen taxa with conservation value occur in this sub-association (Table 4), namely five SCPE endemics, five SCPE near-endemics and five Red Data List taxa. No plant taxa with conservation value are restricted to it.

4. *Eliomuro muticusae–Trachypogonetum spicati* ass. nova hoc loco
Nomenclatural type: relevé 112 (holotypus)

Environmental data. This rocky mountain grassland on deep black turf soils (500–750 mm) lies on moderate sloped lower footslopes and valley bottoms (5–15°) of the SCPE. It is found predominantly on vertic Arcadia and Steendal soil forms. Approximately 10–40% of the soil surface is covered by rocks, with an average size of 100–150 mm in diameter (Table 5).

Diagnostic and dominant/prominent taxa. Diagnostic species are presented in species groups N (Table 3a). The diagnostic species for this association are characterised by the small trees *Rhamnus prinoides* and *Rhus rogersii*, the grasses *Brachiaria eruciformis* and *Setaria incrassata*, and the forbs *Indigofera evansiana*, *Kohautia caespitose* and *Striga elegans*. Forbs are abundant in the vegetation unit and prominent species include *Albuca setosa*, *Berkheya onopordifolia*, *Felicia muricata*, *Helichrysum albilanatum*, *H. nudifolium*, *Justicia anagalloides*, *Kalanchoe rotundifolia* and *Rubia horrida*. Prominent grasses of the association are *Alloteropsis semialata* and *Sporobolus pectinatus*, and dominant grasses such as *Brachiaria serrata*, *Eragrostis chloromelas*, *Heteropogon contortus* and *Panicum natalense*.

Notes on floristic diversity. The average number of species encountered per sample plot in this association is 44, with the total number of plant species being a minimum of 84 taxa (12 relevés) (Table 5). There are 12 plant taxa of conservation value in the association (Table 4), of which two are restricted to it, including *Rhus rogersii*, a shrub assessed as Insufficiently Known in the Red Data List for Swaziland.

4.1 *Eliomuro muticusae–Trachypogonetum spicati bewsietosum biflorae* sub-ass. nova hoc loco
Nomenclatural type: relevé 42 (holotypus)

Environmental data. The vegetation is moist, cool mountain grassland on turf soils. It lies on gentle sloped footslopes (3–5°), restricted to deep Steendal soils. Approximately 20–

25% of the soil surface is covered by rocks, with an average diameter of 50–150 mm (Table 4).

Diagnostic and dominant/prominent taxa. Diagnostic species are represented by species group O (Table 3a). Only one woody species, the shrubby *Rhus tumulicola* var. *meeuseana*, is diagnostic of the sub-association, with *Acacia karroo* being a dominant and extremely common tree. *Argyrolobium amplexicaule*, *Conyza podocephala*, *Helichrysum* spp., *Rhynchosia albissima* and *Senecio* spp. are the diagnostic forbs. *Bewsia biflora* is the only diagnostic grass. Other prominent forbs include *Pearsonia grandifolia*, *Senecio microglossus* and *Striga elegans*. Dominant grasses include *Brachiaria eruciformis*, *Brachiaria serrata*, *Diheteropogon amplectens*, *Elionurus muticus* and *Themeda triandra*.

Notes on floristic diversity. A floristic link with plant community 4.2 in species group N, indicates the relationship between these two sub-associations on turf (Table 3a), although the environmental data differs to a great extend. The average number of species encountered per sample plot is 46. The total number for this sub-association being 84 (four relevés) (Table 5). One plant taxon with conservation value, the near-endemic *Rhus tumulicola* var. *meeuseana*, is restricted to it. Ten taxa with conservation value occur in this sub-association and comprise five SCPE endemics, three near-endemics and two Red Data List taxa (Table 4)

4.2 *Elionuro muticusae–Trachypogonetum spicati acacietosum tortilis* sub-ass. nova hoc loco

Nomenclatural type: relevé 78 (holotypus)

Environmental data. In the Roossenekal Subcentre this sub-association represents wooded grassland communities on black turf soils. These units occur in valley bottoms between undulating norite hills. The gentle slope varies from 1–3° and east or west aspects are predominant. Soil characteristic of these slopes is the Arcadia form. Rock cover percentage vary from 5–10% and average rock diameter is relatively small from 50–100 mm (Table 5).

Diagnostic and dominant/prominent taxa. Species group P contains the diagnostic species for this association (Table 3a). Two trees are diagnostic for the association, namely *Acacia tortilis* and *Dichrostachys cinerea*. These taxa are often dominant in the *Panico maximi–Acacietea tortilis* class (Winterbach *et al.* 2000), a class representing microphyllus savanna in the central Bushveld of South Africa. Diagnostic grasses for the sub-association are *Digitaria sanguinalis*, *Panicum deustum*, *P. maximum* and *Sporobolus fimbriatus*. The association is dominated by forbs such as *Chrysanthemoides monilifera*, *Indigastrum burkeanum*, *Jasminum quinatum* and *Kyphocarpa angustifolia*. Other prominent taxa include the woody species *Rhamnus prinoides* and *Acacia karroo*, the herbaceous species *Asparagus suaveolens*, *Berkheya insignis*, *Gnidia caffra* and *Senecio microglossus*, and the grasses *Cymbopogon validus*, *Diheteropogon amplectens*, *Elionurus muticus*, *Hyparrhenia filipendula*, *Loudetia simplex*, *Setaria sphacelata* and *Themeda triandra*.

Notes on floristic diversity. A floristic link exists with the more herbaceous plant community 4.1, in species group N (Table 3a), but a difference in vegetation structure is apparent. The average number of species encountered per sample plot is 41 (Table 5). The total number of plant species for this sub-association is 65 (four relevés). No plant taxa with conservation value are restricted to the community, although four SCPE endemics, three SCPE near-endemics and two Red Data List taxa were recorded.

5. *Jamesbrittenio macranthae–Loudetietum simplicis* ass. nova hoc loco
Nomenclatural type: relevé 47 (holotypus)

Environmental data. The vegetation is wooded grassland. It occurs on red clay and white loam soils of predominantly the Mispah form. It lies on moderate footslopes of 5–9° on all aspects of undulating hills. Approximately 20–70% of the soil surface is covered by large rocks, with an average size of 100–400 mm in diameter (Table 5).

Diagnostic and dominant/prominent taxa. Character species are represented by species group S (Table 3a). Herbs are diagnostic of this community, namely *Helichrysum uninervium*, *Jamesbrittenia macrantha*, *Lotononis wilmsii*, *Polygala hottentotta* and *Rhynchosia komatiensis*. *Elephantorrhiza praetermissa* is the characteristic woody species

and *Aristida adscensionis* and *Melinis repens* the characteristic grasses. Prominent forbs are *Dicoma anomala, Gnidia caffra, Melhania prostrata* and *Thesium multiramulosum*. Grasses of importance include *Aristida congesta, Diheteropogon amplectens, Elionurus muticus, Eragrostis nindensis, Loudetia simplex, Themeda triandra* and *Tristachya leucothrix*. *Protea caffra* and *Vitex obovata* subsp. *wilmsii* are prominent trees and *Rhus wilmsii* a prominent geoxylic suffrutex of the association.

Notes on floristic diversity. The average number of species encountered per sample plot is 36, with the total number of plant species being a minimum of 72 taxa (nine relevés) (Table 5). There are 16 taxa of conservation value occurring in the association (Table 4). The association has the highest number of taxa with conservation status restricted to it (seven), and include plant species such as the near-endemics *Helichrysum uninervium* and *Lotononis wilmsii*, and the endemic and Red Data listed *Jamesbrittenia macrantha*.

5.1 *Jamesbrittenio macranthae–Loudetietum simplicis combretetosum hereroense* sub-ass. nova hoc loco
Nomenclatural type: relevé 47 (holotypus)

Environmental data. The vegetation is a wooded grassland of rocky footslopes with clay soils. It lies on moderate slopes of 7–9° on north-south aspects of rocky ridges of magnetite. Soils are predominantly the Mispah form. Approximately 60–70% of the soil surface is covered by large rocks, with an average diameter of 100–400 mm (Table 5).

Diagnostic and dominant/prominent taxa. The diagnostic species are represented by species group T (Table 3a), and include one tree species, *Combretum hereroense*. The forbs *Aneilema longirrhizum, Chamaecrista comosa, Hemizygia petrensis, Ledebouria marginata, Lotononis calycina, Phyllanthus incurvus* and *Triumfetta sonderi* are diagnostic. The most important dominant grasses include *Loudetia simplex, Themeda triandra, Tristachya leucothrix* and *T. rehmannii*. Other dominant taxa include *Protea caffra, Rhus wilmsii* and *Senecio microglossus*.

Notes on floristic diversity. The sub-association shows a floristic affinity with the grasslands of the Roossenekal Subcentre in species groups V and W (Table 3a). A specific link with the grasslands of the study area, which includes its sister sub-association, is indicated in species group X. The average number of species encountered per sample plot is 39, with the total number for this sub-association being 70 (four relevés) (Table 5). Six SCPE endemics, six near-endemics and three Red Data List taxa are found in this sub-association (Table 4). Of its 12 taxa of conservation value, only the near-endemic *Aneilema longirrhizum* is restricted to it.

5.2 *Jamesbrittenio macranthae–Loudetietum simplicis eucleetosum linearis* sub-ass. nova hoc loco
Nomenclatural type: relevé 106 (holotypus)

Environmental data. This association represents wooded rocky grassland on whitish loam soils. It is restricted to exposed norite surfaces. It lies on moderately sloped footslopes of 5–7° on all aspects. Soils are predominantly the Mispah form. Approximately 20–70% of the soil surface is covered by large rocks with an average diameter of 100–200 mm (Table 5).

Diagnostic and dominant/prominent taxa. Species group U (Table 3a) represents the diagnostic species of the sub-association. The diagnostic grass species of the sub-association is *Andropogon chinensis*. Six forbs are diagnostic, namely *Indigofera tristoides*, *Ipomoea bathycolpos* var. *simiatodentata*, *Jamesbrittenia burkeana*, *Phyllanthus glaucophyllus*, *Polygala* sp. nov. (*Siebert 449*) and *Seddera capensis*. *Euclea linearis* is the diagnostic woody species of the sub-association. Dominant plants in the community are the forbs *Dicoma anomala* and *Helichrysum uninervium*, and grasses *Aristida adscensionis*, *Diheteropogon amplectens* and *Eliomurus muticus*. *Protea caffra*, *Rhus wilmsii* and *Vitex obovata* subsp. *wilmsii* are dominant woody species.

Notes on floristic diversity. A slight floristic affinity exists between this sub-association and plant communities 4.2 and 5.1 in species group V (Table 3a). The average number of species encountered per sample plot is 33, with the total number for this sub-association

being 72 (five relevés) (Table 5). It is one of the syntaxa with the highest numbers of SCPE endemics and SCPE near-endemics. It also has three Red Data List taxa (Table 4). Of its 15 taxa of conservation value, four taxa, namely the SCPE near-endemics *Rhus keetii* and *Euclea linearis* (form), and the SCPE endemics *Ipomoea bathycolpos* var. *sinuatodentata* and *Polygala* sp. nov. (*Siebert 449*), are restricted to it. This number is the second highest for any community in the Roossenekal area.

II. *Miscanthus junceus–Schoenoplectus corymbosus* community (Bloem 1988)

6. *Fuireno pubescentis–Schoenetum nigricantis* ass. nova hoc loco

Nomenclatural type: relevé 73 (holotypus)

Environmental data. Within the Roossenekal and Leolo Subcentres, this association represents hygrophilous vegetation of mountain streams and seepage areas. The association occurs on wet sites where rocks of approximately 150 mm diameter cover approximately 25% of the soil surface. These areas have gentle slopes (3°) and the soils are typically clay on solid rock, with a sandy alluvial layer on the surface.

Diagnostic and dominant/prominent taxa. Species group AA (Table 3b) contains the diagnostic species. Dense stands of the diagnostic sedge *Schoenus nigricans* and the diagnostic grass *Hyparrhenia tamba* dominate the vegetation. Other diagnostic forbs are *Chironia purpurascens*, *Equisetum ramosissimum* and *Hypoxis argentea*. Sedges such as *Fuirena pubescens* and *Schoenoplectus corymbosus* are also prominent, while *Andropogon eucomis*, *Cymbopogon validus*, *Hyparrhenia filipendula* and *Imperata cylindrica* are prominent grasses. *Acacia karroo* and *Rhus leptodictya* are the woody species that may occur in the association.

Notes on floristic diversity. A strong floristic affinity with the wetland community 7 is indicated in species group AI and some relationships exist with the grasslands (species group Y) (Table 3b). The azonal wetland vegetation is not as rich in plant diversity as the grasslands. The average number of species encountered per sample plot is only 27, with the total number of plant species being a minimum of 52 taxa (11 relevés) (Table 5). There are,

however, four taxa of conservation value that occur in this association (Table 4), and two taxa with conservation status restricted to it, namely the Red Data listed orchid *Disa rhodantha* (Insufficiently Known), and the near-endemic shrub, *Nuxia gracilis*.

6.1 *Fuireno pubescentis–Schoenetum nigricantis triraphietosum andropogonoidis* sub-ass. nova hoc loco
Nomenclatural type: relevé 73 (holotypus)

Environmental data. This sub-association represents sparsely wooded moist herbland and grassland along mountain streams in rocky areas lying on gentle to moderate midslopes (5–7°). The average rock size varies between 350–750 mm in diameter and covers 35–45% of the soil surface.

Diagnostic and dominant/prominent taxa. Species group AB (Table 3b) contains the diagnostic species for this sub-association, which include the woody species *Acacia karroo*, *Nuxia gracilis* and *Rhus leptodictya*. Diagnostic forbs are the fern *Adiantum capillus-veneris*, and the sedges *Coleochloa setifera*, *Dittrichia graveolens* and *Juncus punctorius*. *Triraphis andropogonoides* is a diagnostic grass. Prominent forbs are the sedges *Fuirena pubescens*, *Schoenoplectus corymbosus* and *Schoenus nigricans*. *Andropogon eucomis*, *Aristida bipartita* and *Cymbopogon validus* are the most dominant grasses.

Notes on floristic diversity. A notable relationship exists with plant community 6.2 in species group AC (Table 3b). The average number of species encountered per sample plot is 28, with the total number for this sub-association being 51 (four relevés) (Table 5). The association has three taxa of conservation value, comprising one SCPE endemic, one SCPE near-endemic and two Red Data List taxa (Table 4).

6.2 *Fuireno pubescentis–Schoenetum nigricantis pycnostachetosum reticulatae* sub-ass. nova hoc loco

Nomenclatural type: relevé 23 (holotypus)

Environmental data. This sub-association of dense moist reed-beds along permanent mountain streams occur on gentle midslopes and footslopes of 1–3°. Approximately 5–15% of the soil surface is covered by small rocks, with an average size of 50–150 mm in diameter (Table 5).

Diagnostic and dominant/prominent taxa. Characteristic species are represented by species group AC and AG (Table 3b). No woody or grass species are diagnostic of this community. Characteristic forb species include the sedges *Cyperus sexangularis* and *Kyllinga erecta*, and the forb *Berula erecta*. Dominant grass species are *Miscanthus junceus* and *Phragmites australis*, the forbs *Pycnostachys reticulata* and *Senecio gerrardii*, and the sedges *Fuirena pubescens*, *Schoenoplectus corymbosus* and *Schoenus nigricans*. *Andropogon eucomis*, *Cymbopogon validus* and *Hyparrhenia filipendula* are prominent grasses.

Notes on floristic diversity. A floristic affinity exists with the adjacent grassland plant community 3.4 (species group L) (Table 3a), and with the wetland plant community 7 (species group AG) (Table 3b). The average number of species encountered per sample plot is 27, with the total number for this sub-association being 42 (three relevés) (Table 5). Only two taxa of conservation value, namely Red Data List taxa, are found in this sub-association (Table 4).

6.3 *Fuireno pubescentis–Schoenetum nigricantis bulbostylietosum hispidulae* sub-ass. nova hoc loco

Nomenclatural type: relevé 34 (holotypus)

Environmental data. This sub-association of sparsely wooded herbland and grassland occur in moist valley bottoms or on mountain crests, usually in seepage areas along streams. It is

associated with gentle slopes of 1–3°. Approximately 10–20% of the soil surface is covered by scattered stones of an average diameter of 50–100 mm (Table 5).

Diagnostic and dominant/prominent taxa. Diagnostic species are presented in species group AD (Table 3b), including the forbs, *Alepidea amatymbica* and *Bulbostylis hispidula*, and the grasses, *Bothriochloa insculpta* and *Microchloa caffra*. The woody *Rhus leptodictya* is a prominent species. Predominant forbs include *Artemisia afra* and *Cliffortia nitidula*, and the sedges *Mariscus congestus* and *Schoenus nigricans*. *Andropogon eucomis*, *Cymbopogon validus*, *Hyparrhenia filipendula*, *Ischaemum fasciculatum* and *Miscanthus junceus* are the dominant grasses.

Notes on floristic diversity. A strong floristic affinity exists with the grassland community 4.1 (species group O), but a distinct affinity also exists with the wetland plant community 7 in species group AH (Table 3b). In this sub-association the sedges are less prominent and should be seen as a moist grassland-wetland ecotone. The average number of species encountered per sample plot is 25, with 52 taxa the total number for this sub-association (four relevés) (Table 5). The sub-association has four taxa of conservation value that comprises one SCPE endemic, one SCPE near-endemic and three Red Data List taxa (Table 4).

7. *Andropogono eucomis–Fimbristyletum ferrugineae* ass. nova hoc loco
Nomenclatural type: relevé 192 (holotypus)

Environmental data. This association represents wooded herbland and grassland along larger rivers in valleys, such as the Steelpoort River. The vegetation covers the zone directly adjacent to streams, on permanently moist soils. The area has a gentle slope of 1–3° and approximately 20–30% of the soil surface is covered by stones with an average diameter of 150–200 mm (Table 5).

Diagnostic and dominant/prominent taxa. Diagnostic species are represented by species group AF (Table 3b). The vegetation unit is dominated by diagnostic forbs, which include the prominent weedy aliens *Conyza bonariensis* and *Flaveria bidentis*, the sedges

Cyperus marginatus, *Mariscus rehmannianus*, *M. sumatrensis*, and the forb *Polygonum meisnerianum*. The presence of weeds is the result of disturbance caused by annual floods, often supplemented by trampling by domestic animals, notably cattle and goats. *Salix mucronata* is the diagnostic woody species and *Eragrostis gummiflua* the diagnostic grass. Hygrophilous grasses and sedges such as *Miscanthus junceus* and *Schoenoplectus corymbosus* are dominant. *Acacia karroo* and *Rhus leptodictya* are common small trees of the association. *Andropogon eucomis*, *Cymbopogon validus*, *Hemarthria altissima*, *Hyparrhenia hirta* and *Imperata cylindrica* are dominant grasses of the association.

Notes on floristic diversity. A strong floristic affinity exist with the wetland plant community 6 (species group AI) and a weaker affinity with the grasslands (species group Y) (Table 3b). The average number of species encountered per sample plot is 27, with the total number of plant species being 52 taxa (four relevés) (Table 5). This association has the lowest number of taxa with a conservation status (Table 4) and include the Red Data List taxon *Eucomis autumnalis* subsp. *clavata*, which is classified as Rare in the Free State and Vulnerable in KwaZulu-Natal, and the SCPE endemic form of *Acacia karroo*.

8. *Limosello maioris–Ranunculetum meyeri* ass. nova hoc loco
Nomenclatural type: relevé 410 (holotypus)

Environmental data. This rare association represents dense herbland of moist seepage areas, only recorded on the summit plateaus of the Leolo Mountains. It is usually associated with black clay soils. A short, dense cover of non-grassy forbs dominates the vegetation. It lies on gentle slopes of 1–3° and approximately 10% of the soil surface is covered by small stones with an average diameter of 50 mm (Table 5).

Diagnostic and dominant/prominent taxa. Diagnostic species are represented by species group AJ (Table 3b). The most predominant diagnostic taxa of the association are the small forbs *Anagallis huttonii*, *Limosella maior*, *Ranunculus meyeri* and *R. multifidus*. *Sporobolus centrifugus* is the diagnostic grass. *Schoenoplectus corymbosus* is a dominant sedge in the association.

Notes on floristic diversity. A very slight floristic affinity exists with the other wetland plant communities of the area (species group AK) and also with the grasslands of the study area (species group Y) (Table 3b). The average number of species encountered per sample plot is 20, with the total number of plant species being 24 taxa (two relevés) (Table 5). Together with plant community 7, this association has the lowest number of taxa with a conservation status, namely two. These include the Red Data List species *Eucomis autumnalis* subsp. *clavata*, and the undescribed SCPE endemic *Tulbaghia* sp. nov. (*Siebert 1304*), which may comprise a new genus of the Alliaceae.

5.4 Vegetation key

A dichotomous vegetation key is presented to facilitate identification of the various syntaxa found in the study area (Table 6). The definitions are broad indications of the syntaxa and should be seen as a guideline, rather than precise descriptions. A diagnostic characteristic of the vegetation or habitat is given, followed by the most diagnostic and conspicuous species of a particular syntaxon. The first species listed is restricted to the specific syntaxon only, and the second is dominant in the syntaxon, but may occur in other syntaxa. Where one species is given, no species were restricted to the particular syntaxon only.

5.5 Ordination

A scatter diagram displaying the distribution of the relevés along the second and third ordination axes is presented for both grassland and wetlands in Figure 8a (eigen values: axis 2 = 0.471; axis 3 = 0.325) and Figure 8b (eigen values: axis 2 = 0.458; axis 3 = 0.256) respectively. Vegetation units are represented as clusters, their distribution on the scatter diagram corresponding with certain physical environmental conditions. The gradient described by the first axis in both instances, is related to drainage and hence, soil moisture. In the grasslands the communties with the highest available soil moisture are situated at the left of the diagram (Figure 8a), but communities of the wetlands with poor drainage on waterlogged soils are to the right (Figure 8b). In addition, communities of the grasslands on clay soils of steep slopes are situated to the left of the diagram and communities on gravel soils of steep slopes to the right (Figure 8a). The clay soils have the highest moisture

availability, although the run-off is high. Grassland communities of turf soils on moderate slopes are positioned in the centre of the diagram, because these soils have a high soil moisture percentage, which is unavailable due to retention by the soil particles. The gradient shown by the second ordination axis for communities of wetlands is that of topographic position (Figure 8b). Here, the water systems of mountain slopes with a faster run-off are placed to the top of the scatter diagram. Perennial seepage systems of plateaus are centred in the middle of the diagram, and communities of permanent, slow flowing rivers are located at the bottom.

The gradient along the first axis of Figure 8a is also an indication of the species diversity in the grasslands, with the species diversity at the left of the diagram being higher than that of the communities at the right. This phenomenon can be attributed to the heterogeneous environment experienced by most *Brachiario serratae–Melhanietum randii* rocky grassland communities.

The gradients that have been identified correlate closely with each other and have a strong influence on the vegetation. The three most dominant and conspicuous taxa of each growth form (trees/shrubs/suffrutices, forbs/sedges and grasses) are given for each of the eight major vegetation types depicted in the scatter diagram (Table 7).

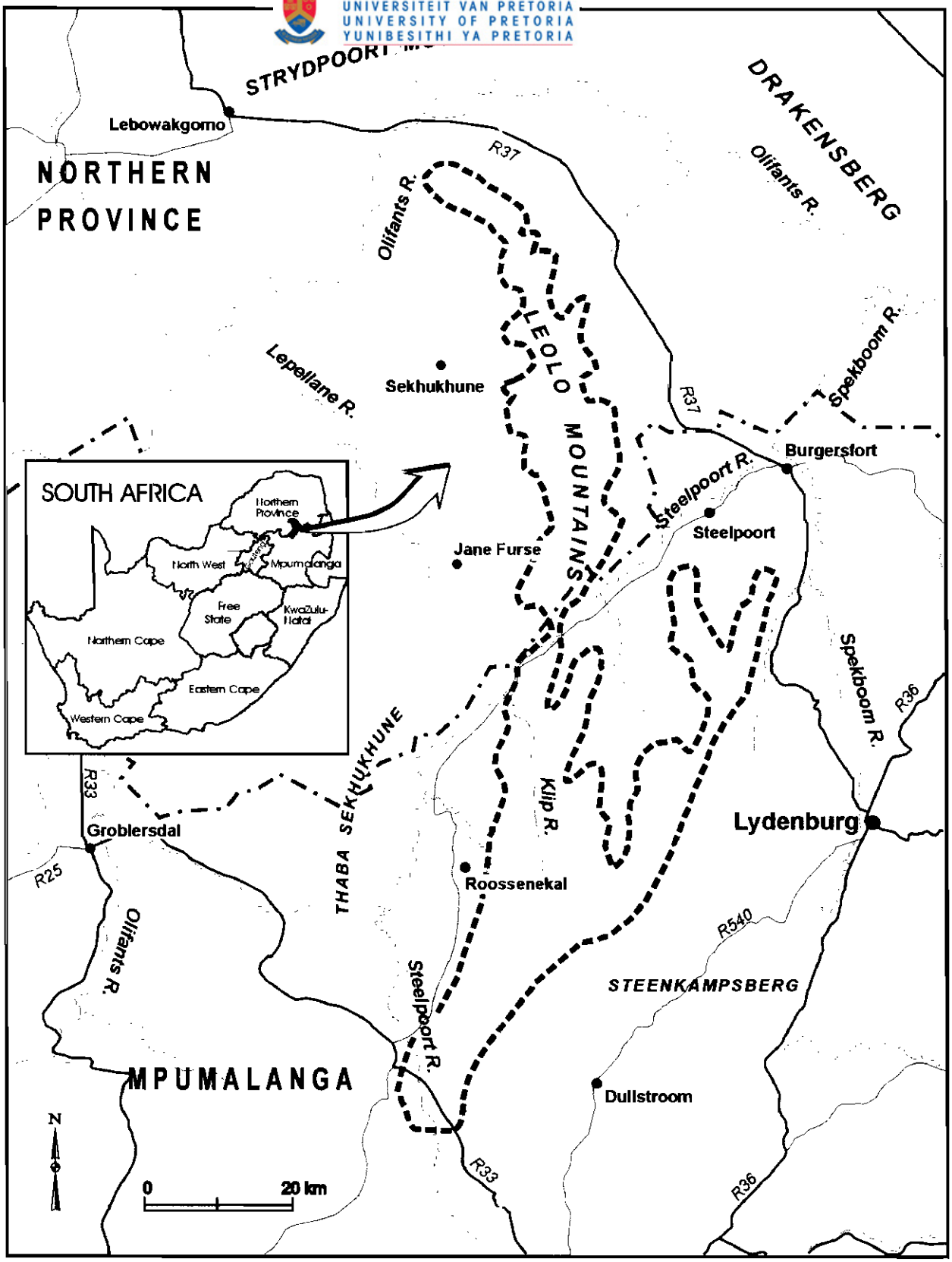

Figure 7 Location of the Grassland and Wetland Vegetation of the Sekhukhuneland Centre of Plant Endemism in the Northern Province and Mpumalanga, South Africa.

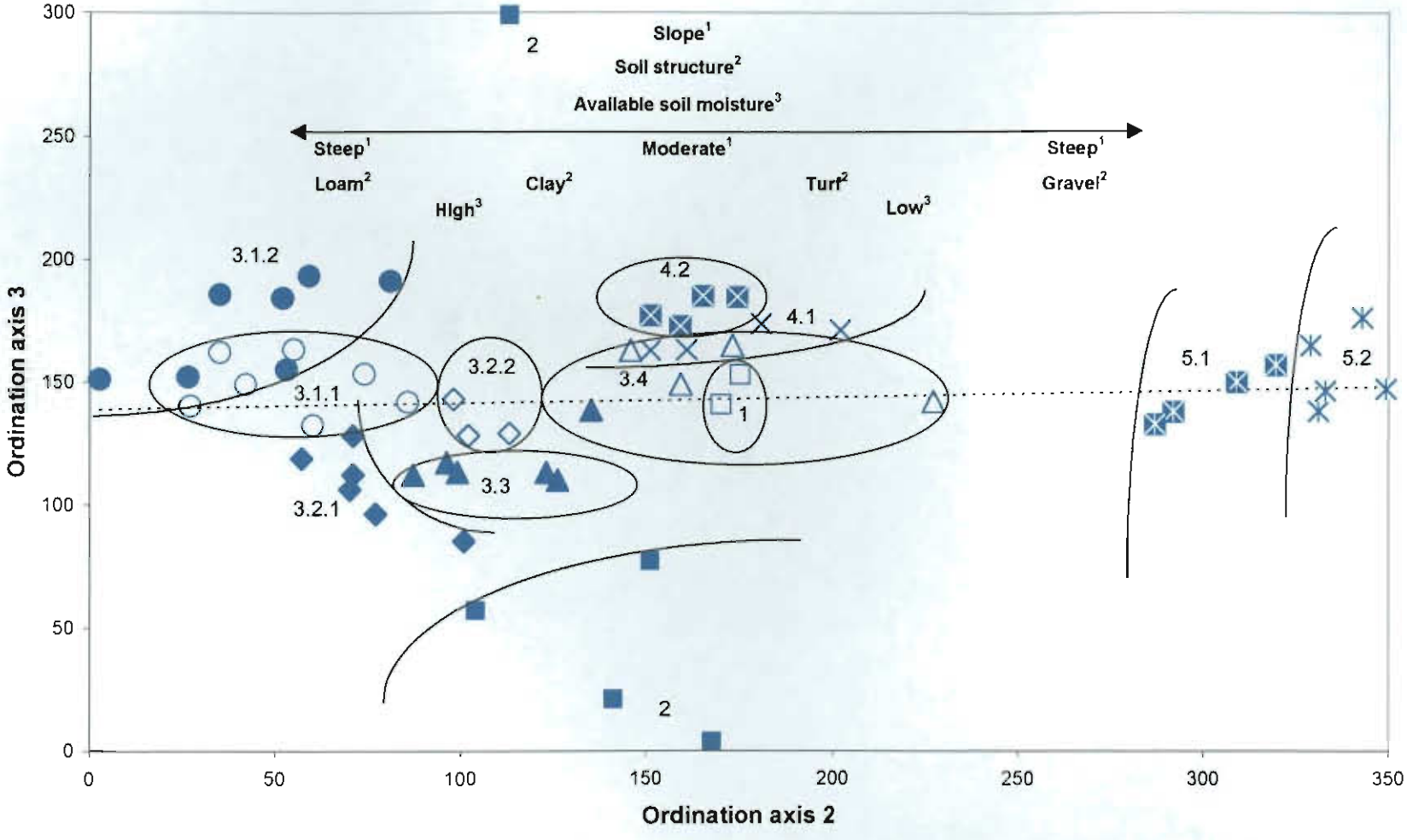

Figure 8a Relative positions of all the releves along the second and third axis of the ordination of the Grassland Vegetation of the Sekhukhuneland Centre of Plant Endemism. Numbers correspond with the plant communities in Table 3a.

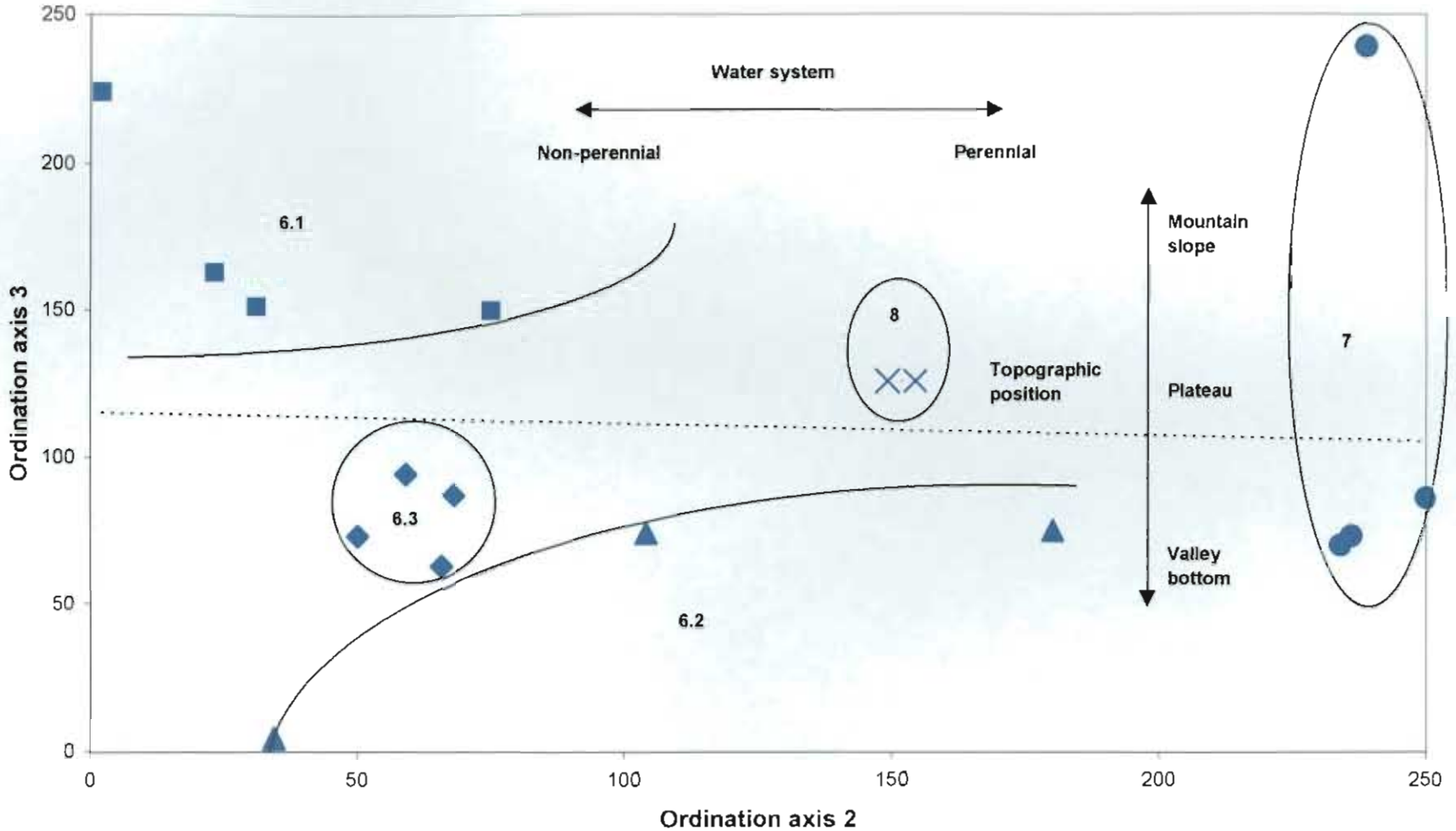

Figure 8b Relative positions of all the releves along the second and third axis of the ordination of the Wetland Vegetation of the Sekhukhuneland Centre of Plant Endemism. Numbers correspond with the plant communities in Table 3b.

104

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Table 3a A phytosociological table of the Cool Moist Grasslands of the Sekhukhuneland Centre of Plant Endemism.

Relevé	408	409	2	3	92	100	312	25	26	31	94	278	277	314	52	53	316	318	321	319	323	8	10	28	89	101	109	56	63	90	6	9	13	14	21	66	57	61	85	64	42	48	104	111	77	78	110	112	33	43	44	47	37	49	65	106	289
Association	1		2					3	.						3	.						3	.					3	.		3	.					3	.			4				4	.			5				5	.			
Sub-association								1	.						1	.						2	.					2	.		3						4				1				2				1				2				
Variant								1							2							1						2																													
Species group A																																																									
Euryops brevipapposus	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum splendidum	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lotononis foliosa	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vernonia myriantha	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Xerophyta viscosa	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hirpicium bechuanense	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Manulea parviflora	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Buddleja saligna	R	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jamesbrittenia silenoides	R	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Androcymbium melanthioides	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium wakkerstroomianum	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group B																																																									
Cymbopogon excavatus	.	.	+	+	.	A	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Zantedeschia pentlandii	.	.	+	+	R	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crassula sarcocaulis	.	.	+	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Canthium suberosum	.	.	+	R	+	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thesium burkei	.	.	R	R	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Halleria lucida	.	.	+	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Boophane disticha	.	.	R	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Apodytes dimidiata		.	R	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aloe pretoriensis	.	.	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Olinia emarginata	.	.	.	R	1	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aristida junciformis	.	.	.	R	+	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group C																																																									
Vernonia oligocephala	.	R	.	.	.	.	.	1	.	+	.	+	.	+	.	1	+	+	+	.	R	+	R	+	1	+	.	R	+	.	R	.	+	1	+	+	+	1	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melhania randii	.	.	.	.	R	R	.	+	+	1	1	.	1	1	.	.	+	.	1	.	R	1	.	+	.	R	+	.	R	1	R	.	R	+	.	1	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Clerodendrum triphyllum	.	.	.	R	.	.	R	+	+	.	1	+	.	+	+	R	1	.	1	+	+	+	+	1	+	1	.	+	+	+	+	1	+	1	R	.	+	R	R	R		.	.	.	.	.	.	.	.	R	.	R	R	.	.	R	.
Rhynchosia sordida	.	.	.	.	.	.	.	+	R	+	.			.	.	R	.	R	.	.	.	+	.	+	.	+	R	.	.	+		+	.	+	R	.		R	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dicoma zeyheri	.	.	.	.	.	.	.	R	.	+	.	+	+	R	R		.	+	+	.	1	.	+	.	+	+	R	.	R	+	.	.	+	.	R	+	.	+	+	+	.	.	R	.	.	.	R	.	.	.	.	.	.	.	.	.	.
Gnidia capitata	.	.	.	R	.	.	.	R	.	+	+	+	+	.	+	.	R	+	+	+	.	1	+	+	.		R	R		.	+	+	+	+	+	+	R	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Callilepis leptophylla	.	.	.	.	R	.	.	.	+	.	+	+	.	.	+	.	1	.	+	.	+	+	1	+			+	R	.	+	+	+	1	+	.	R	R	+	1	+	.	R	.		.	.	.	.	.	.	.	.	.	.	.	.	.
Phyllanthus parvulus	.	.	.	.	.	.	.	.	R	+	.	+	.	R	R	+	.	+	+	.	+	R		R	R		R	R	R	.	R	+	.	R	.	.	.	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dierama mossii	.	.	.	.	.	.	.	.	R	R	.	.	.	.	R	.	.	.	R	.	+	.	.	R	.		.	.	+	.	.	R			.	R	R	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.
Hypoxis hemerocallidea	.	.	R	.	.	.	.	.	R	.	+			+	1	R	.	.	.	R	.	+	.	.	R		+	+	.	R	.	.	R	.	+	.	+	R	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.
Species group D																																																									
Berkheya densifolia	.		.	.	.	.	.	+	R	.	.	.	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cyanotis speciosa	.	.	.	.	.	.	.	+	R	.	+	+	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Digitaria eriantha	.	.	.	.	.	.	.	+	.	1	1	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Agapanthus inapertus	.	.	.	.	.	.	.	+	.	+	.	+	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia clavarioides	.	.	.	.	.	.	.	+	.		+	+	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Indigofera hedyantha	.	.	.	.	.	.	.	R	R	.	+	.	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tephrosia longipes	.	.	.	.	.	.	.	R	.	+	+	R	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Monsonia attenuata	.	.	.	.	.	.	.	.	R	R	.	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group E																																																									
Schistostephium heptalobum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	R	.	R	+	.	+	.	.	.	.	.	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Alloteropsis semialata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	1	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum nudifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	R	R	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhynchosia hirta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	R	R	.	+	R	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Clutia pulchella	R	R	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Albuca setosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	R	+	R	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Felicia muricata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	+	.	+	R	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Kalanchoe rotundifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	R	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Berkheya onopordifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sporobolus pectinatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	R	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum albilanatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	+	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group F																																																									
Helichrysum rugulosum	.	.	.	.	.	.	.	1	+	.	.	+	+	1	R	.	1	+	1	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella caffra	.	.	.	.	.	.	.	1	.	+	+		+	.	R	+	+	.	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio coronatus	.	.	.	.	.	.	.	+	R	.	R	.	+	R	R	R	.	.	+	.	R	.	.	.	.	.	R	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tephrosia elongata	.	.	.	.	.	.	.	+	.	R	.	+	.	R	.	+	.	.	R	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 3a continued.

Relevè	408 409	2 3 92 100 312	25 28 31 94 276 277 314	52 53 316 318 321 319 323	8 10 28 88 101 109	56 63 90	6 9 13 14 21 88	57 81 95 64	42 48 104 111	77 78 110 112	33 43 44 47	37 49 85 106 288
Association	1	2	3	3	3	3	3	3	4	4	5	5
Sub-association			1	1	2	2	3	4	1	2	1	2
Variant			1	2	1	2						
Species group F cont.												
Tristachya biseriata	. .	. . . . +	R . . + . + +	. + . + + . R	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Acalypha angustata	. .	. . . . .	. R + + . + .	1 + R + . 1 +	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	+ . . .	. . . . .
Panicum natalense	. .	. . . . .	. R + . 1 . +	+ 1 + 1 . R R	. . . R . .	R . .	. + ...	. . . .	. . . .	. . . .	. . . .	. . . . .
Leonotis ocymifolia	. .	. . . . .	. R . + . . +	. + . R . . +	. . . + . .	. . .	. . . R . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Species group G												
Berkheya seminivea	. .	. . . . .	. . . .	. . . .	R R . . + .	+ + .	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Drimiopsis atropurpurea	. .	. . . . .	. . . .	. . . .	R . R R . .	R . +	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Helichrysum cephaloideum	. .	. . . . .	. . . .	. . . .	R . . R . +	+ + .	. . . . . R	. . . .	. . . .	. . . .	. . . .	. . . . .
Pachycarpus transvaalensis	. .	. . . . .	. . . .	R	R . . + + .	. . +	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Thesium magalismontanum	. .	. . . . .	. . . .	. . . .	. R + + . .	R . +	. . . . . .	. . . .	. R . .	. . . .	. . . .	. . . . .
Helichrysum pilosellum	. .	. . . . .	. . . .	. . . .	. R R . . +	. + .	. . . . . R	. . . .	. . . .	. . . .	. . . .	. . . . .
Pearsonia obovata	. .	. . . . .	. . . . . R .	. . . .	. R . . + +	+ . .	. . . . . R	. . . .	. . . .	. . . .	. . . .	. . . . .
Species group H												
Eulalia villosa	. .	. . . . .	1 + + . R + .	. . . . R . .	+ + . . + .	. . .	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Ipomoea obscura	. .	. . . . .	R . + R . . R	. . . .	+ + . R . R	. . .	. . . R . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Crabbea hirsuta	. .	. . . . .	+ . + R . R R	. . . .	R . R . R .	. . .	. . + . . .	. . . .	. . . .	. . . .	. . . R	. . . . .
Koeleria capensis	. .	. . . . .	. 1 + . R . .	. . . .	. + + 1 . R	. . R	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Species group I												
Eragrostis chloromelas	. .	. . . . .	1 . 1 A R . .	1 1 1 1 + R .	. 1 R . + .	+ . +	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Thunbergia atriplicifolia	. .	. . . . .	+ . + . + R .	. R + . . R +	R . + . + .	R R .	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Haplocarpha scaposa	. .	. . . . .	R + . . R . .	. + . R + . +	R . + . . +	R R .	. R	. . . .	. . . .	. . . .	. . . .	. . . . .
Helichrysum setosum	. .	. . . . .	. R R . + . +	+ . . + . . +	. R . + + .	+ . R	. . . . . +	. . . .	. . . .	. . . .	. . . .	. . . . .
Schistostephium crataegifolium	. .	. . . . .	. R . + . + A	R . 1 . . R +	R R . R . +	1 . +	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Species group J												
Vernonia natalensis	. .	. . . . .	. . . .	1 + + . 1 + .	1 + . R 1 +	. + R	. R R . R .	. . . .	. . . .	. . . .	. . . .	. . . . .
Rhus discolor	. .	. . . . .	. . . .	1 + . 1 + . .	R + . R + .	+ . R	. . R R . R	. . . .	. . . .	. . . .	. . . .	. . . . .
Argyrolobium transvaalense	. .	. . . . .	. . . .	1 . R . 1 1 .	+ + . R . +	1 A .	R	. . . .	. . . .	. . . .	. . . .	. . . . .
Vernonia galpinii	. .	. . . . .	. . . .	+ R + R . . +	+ R . R . +	R + .	. + R + . +	. . . .	. . . .	. . . .	. . . .	. . . . .
Becium obovatum	. .	. . . . .	. . . .	+ . R . + R .	+ . R . R .	. + .	. + . + . R	. . . .	. . . .	. . . .	. . . .	. . . . .
Convolvulus sagittatus	. .	. . . . .	. . . .	+ . . R . R +	R . + . . R	. R R	R . . R . R	. . . .	. . . .	. . . .	. . . .	. . . . .
Barleria ovata	. .	. . . . .	. . . .	R . + . . + R	. . R . + .	R + .	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Gerbera ambigua	. .	. . + . .	. . . .	. + + . + . .	. R . + + .	+ + +	R . R + . +	. . . .	. . . .	. . . .	. . . .	. . . . .
Ipomoea crassipes	. .	. . . . .	. . . .	. . R + R . +	. + R . R +	+ . R	. R	. . . .	. . . .	. . . .	. . . .	. . . . .
Species group K												
Aloe castanea	. .	+ 1 . + .	R + + . R R .	R . . + . + .	. R . + . R	R . R	. + . + . +	. . . .	. . . .	. . . .	. . . .	. . . . .
Kedrostis foetidissima	. .	+ + . R .	R . . R + . .	. R . + . . .	+ R . + . .	. + .	. . R . R .	. . . .	. . . .	. . . .	. . . .	. . . . .
Eragrostis racemosa	. .	+ . R . .	. + . + 1 1 .	B . R + + . .	1 + 1 . R .	R . .	R + . 1 . R	. . . .	. . . .	. . . .	. . . .	. . . . .
Ledebouria revoluta	. .	R + . R +	+ + + . R . +	. R R . . + R	. + R . . R	. R R	R R + + + .	. . . R	. . R .	. . . .	. . . .	. . . . .
Cyphostemma sp. A (AW 13389)	. .	R . . . R	R . R . . R .	R . R . . R .	. . R . R .	. R R	. . . . . .	R . . .	. . . .	. . . .	. . . .	. . . . .
Alepidea setifera	. .	. + 1 . +	. R . . R . R	. . + + 1 . +	R . R . . +	1 . .	. . . R . .	. . . .	. . . .	. . . .	. . . .	. . . . .
Tetraselago wilmsii	. .	. + + . +	R + 1 + + R 1	. R . 1 . + 1	. + . + R +	R . R	. . . . R .	. . . .	. . . .	. . . .	. . . .	. . . . .
Pellaea calomelanos	. .	. . R . R	R + R . . R .	. + . + R . R	+ + . + + .	. R .	. + + + . R	. . . .	. . . .	. . . .	. . . .	. . . . .
Species group L												
Setaria nigrirostris	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	1 + 1 +	. . . .	. . . .	. . . .	. . . . .
Pegolettia lanceolata	. .	. . . . .	. . . .	. . . .	+	. . .	. R . R . .	+ + . R	. . . .	. . . .	. . . .	. . . . .
Scleria dieterlenii	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	+ + . B	. . . .	. . . .	. . . .	. . . . .
Bulbostylis contexta	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	+ . + +	. . . .	. . . .	. . . .	. R . . .
Lotononis macrosepala	. .	. . . . .	. . . .	. . . . . + .	. . . . . .	. . .	. . . R . R	+ . R R	. . . .	. . . .	. . R .	. . . . .
Mentha longifolia	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	R + . +	. + R .	. . . .	. . . .	. . . . .
Mariscus dregeanus	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. + + +	R . . R	. . . .	. . . .	. . . . .
Lotononis adpressa	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. R + .	. . . .	. . . .	. . . .	. . . . .
Species group M												
Pentanisia prunelloides	+ +	. R R . .	R . . R + + .	. + R . R + .	+ . R . + .	+ . +	+ . R . R R	+ . . +	. . . .	. . . .	. . . .	. . . . .
Senecio latifolius	R R	1 + + + +	1 + + . + 1 +	. + . 1 + + 1	+ + + 1 1 +	+ + .	1 1 + + + A	. + R +	. . R .	. . R .	. . . +	. . . . .
Polygala uncinata	+ .	R . . R .	+ . R R . R .	+ . . + + . R	R + . + + .	+ . .	+ R . . R .	+ 1 . +	. . R .	. . . .	. . . .	. . . . .
Tephrosia purpurea	. R	+ + . R R	+ + + . . R R	R . R + . + .	. + + + 1 R	R + 1	+ . + + . +	+ . + +	. . . R	. . . .	. . . .	. . . . .
Acalypha punctata	. R	+ . . + +	+ + 1 + . . +	+ . + . 1 . +	1 + + 1 1 .	+ + +	. + + + + 1	R + + .	. . . .	. . . .	. . . .	. . R . .
Eragrostis pseudosclerantha	. .	+ 1 . R .	. . R	. R . . . . R	+ . . . . R	. R .	R . . . R .	R . . R	. R . .	. . . .	. . . +	. . . . .
Scilla natalensis	. .	+ . . . +	. + . + . . .	+ . . + . + +	. + ...	. + .	+ . . . + +	+ + . +	. . . .	. . . .	. . . .	. . . . .
Andropogon schirensis	. .	. R R . 1	1 R 1 + 1 . 1	. 1 1 1 1 . 1	+ 1 . + . R	. 1 +	. R R 1 + .	. R + .	. R . +	. . . .	. . . .	. . . . .

Table 3a continued.

Relevé	408	409	2	3	92	100	312	25	26	31	94	276	277	314	52	53	316	318	321	319	323	8	10	28	89	101	109	58	63	90	6	9	13	14	21	66	57	61	95	64	42	49	104	111	77	78	110	112	33	43	44	47	37	48	65	106	298
Association	1		2					3							3							3						3			3						3				4				4				5				5				
Sub-association								1							1							2						2			3						4				1				2				1				2				
Variant								1							2							1						2																													
Species group N																																																									
Brachiaria eruciformis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	R	.	.	.	R	.	R	.	+	.	.	+	+	.	+	+	.	+	+	.	.	.	.	.	.	.	.	.
Indigofera evansiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	+	.	+	R	+	.	.	.	.	.	.	.	.	.	.	.
Rhus rogersii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	R	R	.	.	R	.	R	.	.	.	.	.	.	.	.	.	.
Kohautia caespitosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	R	.	R	.	R	.	R	.	.	.	.	.	R	.	.	.	.
Striga elegans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	R	.	.	.	.	R	.	.	.	.	.	.	.	R	.	R	R	.	.	+	+	+	.	+	+	+	.	.	.	R	.	.	.	.	.
Rhamnus prinoides	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	1	+	1	.	.	.	.	.	.	.	.	.	.
Setaria incrassata	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	R	+	+	.	.	.	.	.	.	.	.	.
Species group O																																																									
Bewsia biflora	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A	+	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Pearsonia grandifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	R	.	+	1	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio erubescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhynchosia albissima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum harveyanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	R	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio venosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	R	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio inornatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	R	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum oreophilum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.
Argyrolobium amplexicaule	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Conyza podocephala	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhus tumulicola var. *meeuseana*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group P																																																									
Panicum maximum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	R	.	.	.	.	.	.	.	.	.
Acacia tortilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	1	.	.	.	.	.	.	.	.	.
Dichrostachys cinerea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.
Digitaria sanguinalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	+	.	R	.	.	.	.	.	.	.	.	.
Jasminum quinatum	.	.	.	.	R	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	+	.	+	.	.	.	.	.	.	.	.	.
Kyphocarpa angustifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	+	.	R	.	.	.	.	.	.	.	.	.
Chrysanthemoides monilifera	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	+	R	.	.	.	.	.	.	.	.	.
Sporobolus fimbriatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	R	.	.	.	.	.	.	.	.	.	.
Indigastrum burkeanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	R	.	.	R	+	R	.	.	.	.	.	.	.	.	.
Panicum deustum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	R	+	.	.	.	.	.	.	.	.	.
Species group Q																																																									
Pollichia campestris	.	.	.	.	.	.	.	.	.	.	R	.	.	.	+	.	R	.	+	+	.	.	.	+	+	.	R	R	.	+	R	.	.	R	.	+	+	R	+	R	.	+	R	+	.	R	R	R	.	.	.	.	.	.	.	.	.
Senecio sellus	.	.	.	.	.	.	.	.	.	.	.	.	.	R	+	.	.	+	R	.	R	.	+	.	R	+	.	.	+	.	.	+	+	.	R	.	R	.	R	.	+	.	1	.	.	R	.	.	.	.	.	.	.	.	.	.	.
Rhoicissus sp. (*SS 48*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	R	+	+	+	.	1	+	R	.	+	+	1	1	.	+	+	+	1	+	+	.	R	.	+	R	.	+	.	.	.	R	.	.	.	.	.	.	.	.	.	.
Sorghum bicolor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	+	.	.	.	+	.	.	+	.	.	R	.	.	+	+	+	+	.	.	.	.	R	+	.	R	.	R	1	.	+	.	.	.	.	.	.	.	.	.
Asparagus suaveolens	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	R	.	+	+	+	.	.	+	1	+	.	+	+	+	+	.	.	+	.	.	1	R	.	.	+	+	+	+	+	.	.	.	.	.	.	.	.	.
Senecio lygodes	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	+	.	R	.	.	R	.	R	.	+	.	.	.	.	R	+	.	R	.	.	+	+	.	.	+	.	+	.	.	.	.	.	.	.	.	.
Species group R																																																									
Setaria sphacelata	.	.	.	R	.	.	.	1	1	A	.	1	.	+	.	1	+	.	+	.	1	+	A	+	1	+	1	R	.	+	A	+	+	R	A	+	1	+	R	.	R	+	+	.	1	1	1	A	.	.	R	.	.	.	.	.	.
Thesium gracilentum	.	.	.	.	.	.	.	+	R	+	R	R	+	R	+	R	.	+	.	+	R	R	.	+	.	R	.	R	R	R	.	R	.	.	R	R	R	+	+	+	R	+	R	R	.	.	R	+	.	.	.	.	.	.	.	.	.
Sphenostylis angustifolia	.	.	.	.	.	R	.	+	R	+	.	+	.	R	.	R	+	.	+	+	.	R	+	R	.	.	R	R	+	.	R	.	R	+	.	R	.	R	.	R	+	.	.	R	.	.	.	R	.	.	.	.	.	.	.	.	.
Sebaea grandis	R	.	.	.	.	.	.	+	.	+	.	R	.	+	R	.	+	.	+	R	.	.	+	+	R	+	.	R	.	.	.	+	.	.	R	+	R	.	R	.	+	.	R	.	.	.	R	.	.	.	.	.	.	.	.	.	.
Rhynchosia spectabilis	.	.	.	.	R	R	.	+	.	+	.	R	R	.	+	+	.	R	+	+	+	R	.	R	1	1	1	1	1	R	1	.	1	R	+	R	.	.	R	R	.	R	+	+	+	+	+	.	.	.	.	.	.	.	.	.	.
Elephantorrhiza elephantina	.	.	R	.	.	.	.	R	1	+	+	.	+	.	+	.	R	.	1	.	R	1	.	+	.	.	+	.	+	+	+	+	+	R	+	.	R	+	+	+	.	R	.	+	.	R	.	.	.	.	.	.	.	R	.	.	.
Trachypogon spicatus	.	.	.	.	.	.	R	R	.	R	1	+	.	+	+	.	R	1	+	.	+	+	.	.	R	.	+	.	+	.	.	+	+	.	R	+	A	+	.	R	+	.	1	+	.	+	1	A	.	.	.	.	.	.	.	.	.
Cephalaria zeyheriana	.	.	.	.	.	.	.	.	+	.	+	.	R	1	R	.	.	+	+	.	.	+	+	.	+	+	+	.	.	+	.	+	.	+	.	+	+	.	1	+	1	.	+	.	.	+	.	+	.	.	.	.	.	.	.	.	.
Gnidia variabilis	.	.	.	.	.	.	.	.	R	.	+	R	.	.	.	.	+	.	.	R	.	.	.	R	.	.	.	+	.	.	R	.	+	.	.	.	.	R	.	.	.	+	.	R	+	.	R	.	.	.	.	.	.	.	.	.	.
Species group S																																																									
Jamesbrittenia macrantha	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A	R	+	+	1	+	+	+	+
Rhynchosia komatiensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	+	.	R	+	A	+
Helichrysum uninervium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	R	+	1	1	1	1	.
Melinis repens	.	.	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	+	1	+	.
Aristida adscensionis	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	1	1	1	+	R	1
Polygala hottentotta	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	R	R	.	R	R	R	+	.
Lotononis wilmsii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	R	.	R	.	+	.	R
Elephantorrhiza praetermissa	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	+	.	.	.	+	R
Species group T																																																									
Combretum hereroense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+	+	.	.	.	.	.
Hemizygia petrensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.
Chamaecrista comosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	R	R	.	.	.	.	.
Lotononis calycina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	R	.	.	.	.	.
Phyllanthus incurvus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	+	R	.	.	.	.	.	.

Table 3a continued.

Relevé	4 4	1 3	2 2 3	3 3 3 3 3	1 1				1 1	1 1		1 2
	0 0	9 0 1	2 2 3 9 7 7 1	5 5 1 1 2 1 2	1 2 8 0 0	5 6 9	1 1 2 6	5 6 9 6	4 4 0 1	7 7 1 1	3 4 4 4	3 4 6 0 6
	8 9	2 3 2 0 2	5 6 1 4 6 7 4	2 3 6 8 1 9 3	8 0 8 8 1 9	6 3 0	6 9 3 4 1 6	7 1 5 4	2 6 4 1	7 8 0 2	3 3 4 7	7 9 6 6 8
Association	1	2	3 .	3 .	3 .	3 .	3 .	3 .	4 .	4 .	5 .	5 .
Sub-association			1 .	1 .	2 .	2 .	3	4	1	2	1	2
Variant			1	2	1	2						
Species group T cont.												
Ledebouria marginata	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	R + . R	. . . . .
Triumfetta sonderi	. .	. . . . .	. . . .	+	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	R + . +	. . . . .
Aneilema longirhizum	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	. + R R	. . . . .
Species group U												
Seddera capensis	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	. . . .	1 . + R .
Andropogon chinensis	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	. . . .	+ 1 + 1 R
Polygala sp. (*SS 449*)	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	. . . .	+ R R + .
Indigofera tristoides	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . + .	. . . .	. . . .	+ R . + R
Euclea linearis	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	. . . .	R 1 + 1 R
Jamesbrittenia burkeana	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	. . . .	. + R + .
Phyllanthus glaucophyllus	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	. . . .	. R . . +
Ipomoea bathycolpos	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. . . .	. . . .	. . R . +
Species group V												
Melhania prostrata	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . R . .	. . . .	. . . .	+ . + R	1 + 1 1	. + . R R
Thesium multiramulosum	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	R + . R	R + + +	1 + + . R
Aristida congesta	.	. . R . .	. . . .	. . . .	. . . . . .	. . .	. . . . . .	. . . .	. . . .	. + + .	1 R + R	+ . + R .
Species group W												
Pearsonia aristata	. .	. . . . .	. . . .	. . . .	. . . . . R	. . .	+ + . + . R	. R . +	. R . .	. R + .	R . . R	+ . + . R
Dicoma anomala	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	+ . R + . R	R . . +	+ . 1 +	+ . R +	. + + .	1 + + 1 1
Indigofera egens	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	+ . R . R .	. + . +	+ 1 + .	. R . R	R . . R	+ . R R .
Polygala amatymbica	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	+ . . R . R	. R R .	. . R .	R . . R	R . + .	. R . + .
Abildgaardia ovata	. .	. . . . .	. R	. . . .	R . . . . R	. . .	R . . R + .	R . R .	+ . . R	R . R .	+ . + .	R . . R .
Loudetia simplex	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. + . R 1 .	R . + .	B . + 1	+ 1 + A	1 + + A	R 1 . 1 +
Anthospermum rigidum	. .	. . . . .	. . . .	R . . . . . +	. . . . . .	. . .	. R R . . +	. R . +	. R + .	. R . R	. + 1 +	. R 1 + .
Hermannia antonii	. .	. . . . .	. . . .	. . . . + . .	. . . . . .	. . .	. R . + . +	+ + . B	. . + R	R . R .	. + + +	. + + . +
Helichrysum gerberifolium	. .	. . . . .	. . . .	. . . .	. . . . . .	. . .	. R . R 1 .	+ . R +	+ + . R	. R . +	. + + .	+ . + + .
Species group X												
Tristachya leucothrix	1 1	1 A 1 +	B 3 . 1 . R R	R + + 1 1 R 1	1 3 B . R A	1 . B	B 1 B B 1 A	A 1 . A	. + R .	. + R .	R 1 + +	. + + . R
Protea caffra	+ +	R . . R .	. R . + + . 1	R . . + . + +	. R . R . +	+ + .	. R . R . .	1 + + +	. R . R	. . . R	. 1 1 .	+ + 1 R .
Eragrostis nindensis	+ R	. R R . +	+ . R . . R .	. B . . R . +	R . R . R .	+ A .	R . + . + +	+ 1 A 1	R . + .	+ . + .	R 1 + .	+ + + . R
Commelina africana	R .	+ + . . +	A + + R + . .	R . + . . + .	R . + . . .	+ + +	R . R 1 . .	+ + . R	. . R .	R . . .	. R . R	R . . . +
Cyanotis pachyrrhiza	R .	R . . . R	. R . R . . .	R . R	. R . . . +	+ . R	R . + . R .	+ . R .	R . . +	. . R .	R . R +	. . . . .
Themeda triandra	. R	1 A 1 1 .	+ A 1 B 1 1 1	+ 1 1 + 1 . 1	A 1 1 1 B .	1 . B	A A A A 3 1	1 + 3 1	1 + B 3	A B B 3	B . R +	. 1 + . +
Euclea crispa	. R	+ + + . .	. . R . + . +	+ 1 + . . . R	. R . . . 1	. R .	+ . R . + +	. R . .	R . . R	. R R +	. R . .	. + . . R
Brachiaria serrata	. R	+ . . +	A 1 1 . 1 1 1	. + R 1 1 1 +	1 . 1 1 R 1	+ + .	1 . R 1 1 +	1 1 + R	. 1 1 1	+ + . 1	+ + . 1	. . . . .
Gnidia caffra	. R	. . . R .	. + . R . + +	R R . R . + R	. + R . . R	+ . +	R . + . 1 R	+ R + R	R + + R	+ + + +	. + R +	+ R + + .
Diheteropogon amplectens	. .	1 1 . . 1	A + . . R 1 .	. R . + 1 . R	+ + + 1 + A	A 1 A	1 1 . + + 1	B + 1 3	+ + 1 A	1 + 1 B	+ . 1 A	+ 1 A B A
Rhoicissus tridentata	. .	1 + + + .	+ R 1 + + . 1	. . R . . R .	. R + + . +	. . R	. R . R . .	. R . .	. R . +	R . + .	. R . R	. + R + .
Hypoxis rigidula	. .	+ + + + .	+ + + 1 + + 1	R . . 1 1 + .	+ 1 + + + +	+ 1 1	+ 1 + + + 1	+ 1 + 1	. R R +	+ + + +	+ . R .	. . . R +
Vitex obovata subsp. *wilmsii*	. .	+ + . . R	R R + R . + .	. + R . R . .	+ R R R . +	R R .	. R R R R R	. R R R	. R . R	+ . R R	+ R . +	. + + . .
Raphionacme galpinii	. .	+ R + + R	+ R . R . . R	. R . . + R .	R . + R + .	R R R	+ R R . . +	R . + .	. . R .	. R . .	R . + R	R . . + +
Rhus wilmsii	. .	+ . + . R	. + . + + . .	1 + . . 1 . R	R . . . . +	. R +	. . R . . +	. . . +	R . R .	. . . R	+ + 1 .	+ + + A +
Acacia caffra	. .	R + . R .	+ . + ...	. + ... +	. . + + . +	. R .	+ . R . R .	. . R .	R R . .	. 1 . +	R . . +	R . . + .
Aloe greatheadii	. .	R + + R .	+ . R . + . +	R . R . . . +	+ + . + R .	. + .	+ + + + . +	. R R .	+ . R .	. + . +	. R . +	. . . . .
Athrixia elata	. .	R . R . .	R . R . R . .	. R . . R + +	. . + . . +	. + .	. . . R . +	. . R .	+ . + +	+ + R +	. R . .	. + + + .
Ruellia patula	. .	. R + . R	. + . . R R .	. + . + + R .	+ . + + R .	+ . +	. + + + . R	. + . R	. R . .	. R . R	+ + . .	. . . . .
Striga bilabiata	. .	. R . R .	R R + + . . R	R . R . . . R	R . + . . R	. R .	R + + . + R	R + . .	. . + .	R . + .	. R + R	. . . . .
Rhynchosia totta	. .	. R . . .	. + . . R . R	R . . + . . +	R . R . + .	+ . R	. + . R . .	R . . .	R + . .	. + . +	+ . . R	. R . + R
Tristachya rehmannii	.	. . + 1 .	. R R + . . R	+ R . . . R .	. R + . . +	+ . .	1 + 1 R R .	R + . R	R . . R	. R . .	R + R A	R + . R .
Indigofera hilaris	.	. . . + R	R . . 1 . R .	. + + R . . R	. . + + + +	+ + 1	. + . + + +	R + + +	R R . .	R . . R	+ + . .	R + R . .
Eragrostis superba	. .	. . . . .	R . + . R . .	. R . R . . .	. + . + . .	. R +	+ + R 1 + +	. + R +	. . + R	R . R .	R . + .	1 R + . .
Berkheya insignis	. .	. . . . .	R . . + . + +	. . 1 . . + .	R + . . . +	+ + .	. + + . + +	+ 1 1 +	1 1 . +	+ + + 1	1 . + .	R . + + +
Elionurus muticus	. .	. . . . .	. + R . R 1 .	+ . + . R . +	+ . . R + .	+ + +	1 . 1 . + .	A A . 1	B 1 1 1	+ 1 A A	. + 1 A	R . 1 1 +
Species group shared with Table 3b												
Species group Y												
Eragrostis capensis	1 1	+	. . . .	. . . .	. . + . . .	. R .	. . . . . R	. . . .	. . . .	. . R .	. . . .	R R + . .
Eragrostis curvula	1 1	. . . . .	. + + + 1 1 .	+ + . . . 1 .	. + ...	+ . .	1 . + . . .	. . . .	1 . + .	1 1 . +	. . R .	. R . . .
Hyparrhenia hirta	R R	. R . . .	R	. 1 A 1 R + .	. R . . A .	. . .	. . . . . .	. . . .	. . . .	. . R .	. . . .	. . . . .
Senecio microglossus	. R	. . . R .	1 . . . . . +	. . + R + . .	1 A . 1 + A	1 1 .	1 1 B + . A	1 1 1 1	A 1 + A	+ 1 A A	1 1 1 .	+ . . + R
Aristida bipartita	. R	. . . . .	. R	. . R	. . . . . R	. . R	. . R . . .	. R . .	. R . +	R . + +	. . . .	. . . R .
Heteropogon contortus	. .	1 . . + +	1 . + A + 1 1	1 1 + 1 + . +	. + . + . +	. + .	. . . R . .	. . . .	. . R .	. . . .	. . . .	. . . . .
Cymbopogon validus	. .	. . + 1 .	. . . R . . .	R	. . . . R .	. . .	+ . . . 1 .	. . . R	+ 1 R +	+ + 1 1	. . . .	. . . . .
Hyparrhenia filipendula	. .	. . R . .	. R	. R	. . R . . .	R . .	+ . + . . .	. . . .	+ . 1 +	1 1 1 1	. . . .	. . . R .
Scabiosa columbaria	. R	. . . . R	. . . . . R .	. R . . . R .	R . . . + .	+ . +	R . R . R +	R + . .	. 1 . +	. + + .	. . . .	. . . . .
Lippia rehmannii	R .	. . R . .	. . R	. . . .	. . . . R .	. . .	. . R R R R	. R . .	+ . + .	. . . .	. R . .	. . . . .
Acacia karroo	. .	R	. . . .	. . . . R . .	. . . . . .	. . .	+ . . . + .	. . . .	. 1 + +	1 1 1 1	. . . .	. . . . .
Eucomis autumnalis	. .	. R . . .	. . . . R . .	. . . R . . .	. . . . . .	. . R	. . . . R .	. R . .	. . . .	. . . .	. . . .	. . . . .
Chlorophytum fasciculatum	. R	. R . . .	. . . . . R .	. . . . . R .	. R	R . .	. . . R . .	. . . .	R R R R	. . . .	. . . R	. . . . .

Table 3b A phytosociological table of the Wetland Vegetation of the Sekhukhuneland Centre of Plant Endemism.

Relevé			3			1			2	1	1	1	2	4	4
		1	7	2	2	2	0	3	3	6	7	4	8	9	8	1	1
	5	1	3	2	2	3	2	4	6	6	5	1	1	2	1	0	5
Association	6	.			6	.		6	.			7				8	
Sub-association	1				2			3									
Species group AA																	
Schoenus nigricans	A	A	1	+	3	A	.	1	1	A	R	.	.	.	.	.	.
Chironia purpurascens	+	+	.	+	+	+	+	+	+	+	.	.	.	.	.	.	.
Hypoxis argentea	R	R	.	.	.	R	R	R	R	.	.	.	.	.	.	.	.
Hyparrhenia tamba	.	+	R	1	.	R	.	1	.	+	.	.	.	.	.	.	.
Equisetum ramosissimum	.	.	+	+	.	.	R	.	.	+	R	.	.	.	.	.	.
Species group AB																	
Triraphis andropogonoides	A	1	A	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Juncus punctorius	A	1	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.
Ditrichia graveolens	+	1	+	R	.	.	.	.	.	.	.	.	R	.	.	.	.
Nuxia gracilis	+	+	1	.	.	.	.	.	.	R	.	.	.	.	.	.	.
Adiantum capillus-veneris	R	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Coleochloa setifera	.	R	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Species group AC																	
Cyperus sexangularis	1	+	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.
Kyllinga erecta	+	.	+	R	+	+	.	.	.	.	.	.	.	.	.	.	.
Berula erecta	.	+	R	+	+	R	+	.	.	.	.	.	.	.	.	.	.
Species group AD																	
Bulbostylis hispidula	.	.	.	.	.	.	.	A	1	+	.	.	.	.	.	.	.
Alepidea amatymbica	.	.	.	.	.	.	.	+	+	R	.	.	.	.	.	.	.
Bothriochloa insculpta	.	.	.	.	.	.	.	+	+	.	+	.	.	.	.	.	.
Microchloa caffra	.	.	.	.	.	.	.	+	.	.	R	.	.	.	.	.	.
Species group AE																	
Pycnostachys reticulata	.	.	.	.	1	1	1	.	+	R	.	.	.	.	.	.	.
Mariscus congestus	.	.	.	.	1	+	+	+	+	A	.	.	.	.	.	.	.
Leonotis leonurus	.	.	.	.	+	.	R	+	.	.	+	.	.	.	.	.	.
Lippia javanica	.	.	.	.	R	+	.	R	+	R	+	R	.	.	.	.	.
Senecio gerrardii	.	.	.	.	.	1	1	1	.	.	+	.	.	.	.	.	.
Monopsis decipiens	.	.	.	.	.	+	R	.	.	R	+	.	.	.	.	.	.
Pteris buchananii	.	.	.	.	.	+	.	.	R	.	+	.	.	.	.	.	.
Species group AF																	
Polygonum meisnerianum	.	.	.	.	.	.	.	.	.	.	.	1	.	R	.	.	.
Mariscus sumatrensis	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.
Conyza bonariensis	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.
Cyperus marginatus	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.
Flaveria bidentis	.	.	.	.	.	.	.	.	.	.	.	R	.	R	.	.	.
Mariscus rehmannianus	.	.	.	.	.	.	.	.	.	.	.	.	1	1	R	.	.
Salix mucronata	.	.	.	.	.	.	.	.	.	.	.	.	+	+	1	.	.
Eragrostis gummiflua	.	.	.	.	.	.	.	.	.	.	.	.	R	1	+	.	.
Species group AG																	
Phragmites australis	.	.	.	.	1	1	3	.	.	.	.	A	3	1	3	.	.
Fimbristylis ferruginea	R	.	.	.	+	+	.	.	.	R	.	+	1	+	.	.	.
Helichrysum cooperi	.	.	.	.	+	R	+	.	.	.	.	.	R	.	R	.	.
Cyperus sphaerospermus	.	.	.	.	R	.	+	.	.	.	.	1	+	.	+	.	.
Gomphocarpus fruticosus	.	.	.	.	R	.	1	.	.	.	.	+	.	R	.	.	.
Senecio gregatus	.	.	.	.	.	R	+	.	.	.	.	.	.	+	R	.	.

Relevé			3			1			2	1	1	1	2	4	4
		1	7	2	2	2	0	3	3	6	7	4	8	9	8	1	1
	5	1	3	2	2	3	2	4	6	6	5	1	1	2	1	0	5
Association	6	.			8	.		6	.			7				8	
Sub-association	1				2			3									
Table 3b continued																	
Species group AH																	
Ischaemum fasciculatum	.	.	.	.	.	R	.	+	+	R	.	R	+	.	.	.	.
Kyllinga alba	.	.	.	.	.	.	.	R	.	+	+	R	+	+	R	.	.
Hemerthria altissima	.	.	.	.	.	.	.	.	+	.	R	.	+	.	+	.	.
Species group AI																	
Andropogon eucomus	1	.	1	+	.	1	+	1	+	+	1	1	R	+	1	.	.
Fuirena pubescens	A	1	+	+	+	1	3	B	A	A	1	.	+	R	1	.	.
Artemisia afra	1	+	+	.	.	+	+	+	+	+	+	.	.	+	1	.	.
Clitoria nitidula	1	1	.	+	.	R	.	1	+	R	1	R	+	.	+	.	.
Verbena brasiliensis	+	R	.	+	.	+	+	R	.	.	+	1	+	.	.	.	.
Miscanthus junceus	+	.	.	+	A	A	.	.	R	1	1	1	+	.	1	.	.
Pulicaria scabra	+	.	.	R	.	.	R	+	.	+	.	R	+	.	+	.	.
Imperata cylindrica	.	+	+	.	+	.	+	.	+	.	+	.	+	.	+	.	.
Rhus leptodictya	.	R	+	.	R	.	.	.	R	+	.	R	+	+	R	.	.
Plantago lanceolata	.	R	R	.	+	.	R	+	+	.	+	+	.	.	R	.	.
Verbena bonariensis	.	.	+	+	+	R	.	.	R	R	+	R	.	.	.	.	.
Typha capensis	.	.	R	+	R	+	1	.	1	.	+	.	R	1	.	.	.
Species group AJ																	
Ranunculus meyeri	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Anagallis huttonii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Limosella maior	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Ranunculus multifidus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Sporobolus centrifugus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Species group AK																	
Schoenoplectus corymbosus	+	A	+	+	1	B	A	R	+	.	+	+	R	1	+	+	+
Gomphostigma virgatum	+	+	.	+	.	R	.	R	.	+	.	.	1	.	+	R	.
Species goup shared with Table 3a																	
Species group Y																	
Eragrostis capensis	.	.	.	R	.	.	.	+	.	.	.	.	+	.	.	R	.
Eragrostis curvula	R	.	R	.	R	.	.	R	.	.	.	.	.	.	.	.	.
Hyparrhenia hirta	.	.	R	.	R	.	.	.	.	.	.	.	+	1	.	.	.
Senecio microglossus	1	+	+	.	+	.	+	.	.	+	.	R	.	.	.	R	.
Aristida bipartita	+	+	1	R	.	R	.	.	.	R	.	R	.	R	R	.	.
Heteropogon contortus	R	R	R	.	.	.	.	.	.	R	.	+	.	R	.	R	
Cymbopogon validus	1	B	+	+	A	1	1	1	+	.	1	+	+	+	+	.	.
Hyparrhenia filipendula	R	R	.	1	+	+	+	1	+	+	1	+	.	.	R	R	.
Scabiosa columbaria	+	.	.	.	.	.	.	+	+	R	.	.	.	+	.	.	.
Lippia rehmannii	.	.	R	+	.	R	+	.	+	.	.	.	.	+	+	.	R
Acacia karroo	R	+	.	+	.	.	.	.	.	+	.	.	+	.	R	.	.
Eucomis autumnalis	.	R	.	.	.	R	.	.	.	R	R	.	R	.	R	.	R
Chlorophytum fasciculatum	+	+	R	.	.	.	.	.	.	.	.	.	.	.	.	.	R

Table 4 Sekhukhuneland Centre endemic/near-endemic and Red Data List plant taxa of the Grassland and Wetland Vegetation.

Taxon	Family	Syntaxa																
		I												II				
		1	2	3.1.1	3.1.2	3.2.1	3.2.2	3.3	3.4	4.1	4.2	5.1	5.2	6.1	6.2	6.3	7	8
Acacia karroo [form] (*P4*)	FABA	.	.	.	.	.	.	$+	.	$1	$1	.	.	$+	.	$r	$r	.
Aloe castanea	ASPH	.	#1	#+	#r	#r	.	#+	.	.	.	.	.	.	.	.	.	.
Aneilema longirrhizum	COMM	.	.	.	.	.	.	.	.	.	.	#+	.	.	.	.	.	.
Argyrolobium wilmsii	FABA	.	.	.	#r	#r	#r	.	.	.	.	.	.	.	.	.	.	.
Asclepias sp. nov. (*S27*)	ASCL	.	$r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Berkheya densifolia	ASTE	.	.	#r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
B. insignis [form] (*S257*)	ASTE	.	.	$+	$+	$+	$+	$+	$1	$1	$1	$+	$+	.	.	.	.	.
Callilepis leptophylla	ASTE	.	.	N+	N+	N+	N+	N+	N+	.	.	.	.	.	.	.	.	.
Cyphostemma sp. nov. A (*W13389*)	VITA	.	$r	$r	$r	$r	.	$r	.	.	.	.	.	.	.	.	.	.
Disa rhodantha	ORCH	.	.	.	.	.	.	.	.	.	.	.	.	.	Kr	Kr	.	.
Elephantorrhiza praetermissa	FABA	.	K$r	.	.	.	.	.	.	.	.	K$r	K$r	.	.	.	.	.
Euclea crispa [form] (*W&S13205*)	EBEN	$r	$+	$r	$+	$r	$r	$+	$+	$r	$r	$r	$r	.	.	.	.	.
E. linearis [form] (*S937*)	EBEN	.	.	.	.	.	.	.	.	.	.	.	#1	.	.	.	.	.
Eucomis autumnalis subsp. *clavata*	LILI	.	.	Nr	Nr	.	Nr	.	.	.	.	.	.	Nr	Nr	Nr	Nr	Nr
E. montana	LILI	.	Rr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gnidia caffra [form] (*W12975*)	TILI	.	.	$+	$r	$r	$+	$+	$+	$+	$+	$+	$+	.	.	.	.	.
Helichrysum albilanatum	ASTE	.	.	.	#1	.	.	.	.	.	.	.	.	.	.	.	.	.
H. uninervium	ASTE	.	.	.	.	.	.	.	.	.	.	#1	#1	.	.	.	.	.
Hermannia antonii	STER	.	.	.	#r	.	.	#+	#1	#r	.	#r	#r	.	.	.	.	.
Ipomoea bathycolpos var. *sinuatodentata*	CONV	.	.	.	.	.	.	.	.	.	.	.	$r	.	.	.	.	.
Jamesbrittenia macrantha	SCHR	.	.	.	.	.	.	.	.	.	.	K$1	K$1	.	.	.	.	.
J. silenoides	SCHR	Nr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jasminum quinatum	OLEA	.	#r	.	.	.	.	.	.	.	#+	.	.	.	.	.	.	.
Melhania randii	STER	.	.	K#1	K#1	K#1	K#1	K#1	K#1	.	.	.	.	.	.	.	.	.

Table 4 continued.

Taxon	Family	Syntaxa																
		1	2	3.1.1	3.1.2	3.2.1	3.2.2	3.3	3.4	4.1	4.2	5.1	5.2	6.1	6.2	6.3	7	8
Nuxia gracilis	LOGA	.	.	.	.	.	.	.	.	.	.	.	.	K#1	.	K#+	.	.
Pegolettia lanceolata	ASTE	.	.	.	.	#r	.	#+	#r	.	.	.	.	.	.	.	.	.
Polygala sp. nov. (*S449*)	POLY	.	.	.	.	.	.	.	.	.	.	.	$1	.	.	.	.	.
Protea caffra [form] (*S1382*)	PROT	$+	.	$1	$+	$r	$+	.	$1	.	.	$1	$1	.	.	.	.	.
Rhoicissus sp. nov. (*S48*)	VITA	.	.	.	$+	$+	$1	$1	$r	$r	.	.	.	.	.	.	.	.
Rhus keetii	ANAC	.	.	.	.	.	.	.	.	.	.	.	#r	.	.	.	.	.
R. rogersii	ANAC	.	.	.	.	.	.	.	.	Nr	Nr	.	.	.	.	.	.	.
R. tumulicola var. *meeuseana*	ANAC	.	.	.	.	.	.	.	.	#r	.	.	.	.	.	.	.	.
R. wilmsii	ANAC	.	K#+	K#+	K#+	K#r	K#r	K#r	K#r	.	.	K#1	K#1	.	.	.	.	.
Rhynchosia nitens	FABA	.	Kr	.	.	.	.	Kr	.	.	.	.	.	.	.	.	.	.
Schizoglossum sp. nov. (*S628*)	ASCL	.	$r	$r	.	.	$r	.	.	.	.	.	.	.	.	.	.	.
Scilla natalensis	LILI	.	Nr	Nr	N+	Nr	Nr	N+	N+	.	.	.	.	.	.	.	.	.
Thesium gracilentum	SANT	.	.	K+	K+	Kr	Kr	Kr	K+	K+	K+	.	.	.	.	.	.	.
T. multiramulosum	SANT	.	.	.	.	.	.	.	.	.	#+	#+	#+	.	.	.	.	.
Triaspis glaucophylla	MALP	.	#+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tristachya biseriata	POAC	.	Kr	K+	K+	.	.	.	.	.	.	.	.	.	.	.	.	.
Tulbaghia sp. nov. (*S1304*)	LILI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	$r
Vitex obovata subsp. *wilmsii*	VERB	.	#+	#+	#+	#+	#+	#+	#+	#+	#+	#+	#+	.	.	.	.	.
Xerophyta retinervis [form] (*W13208*)	VELL	.	$r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Zantedeschia jucunda	ARAC	I$+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Z. pentlandii	ARAC	.	R#+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 4 continued.

Taxon	Family	Syntaxa																
		1	2	3.1.1	3.1.2	3.2.1	3.2.2	3.3	3.4	4.1	4.2	5.1	5.2	6.1	6.2	6.3	7	8
SCPE endemics		3	6	6	6	6	6	6	5	5	4	6	8	1	0	1	1	1
SCPE near-endemics		0	6	5	7	6	4	6	5	3	3	6	7	1	0	1	0	0
Red Data List		2	7	7	7	5	6	6	5	2	2	3	3	2	2	3	1	1
Restricted to syntaxon		2	5	1	1	0	0	0	0	1	0	1	4	0	0	0	0	1
Restricted to association		2	5			6				2		7			2		0	1
Total for syntaxon		4	16	16	18	15	14	16	13	10	9	12	15	3	2	4	2	2
Total for association		4	16			23				12		16			4		2	2

Endemism: $ = endemic, # = near-endemic; **Red Data List:** I = Indeterminate, K = Insufficiently Known, R = Rare, N = Not threatened in the northern provinces of South Africa, but in other areas of southern Africa; **Abundance in communities:** 1 = abundant, + = frequent, r = rare, . = absent; **Collectors:** P = Swartz, S = Siebert, W = Van Wyk; **Bold** blocks represent community/syntaxon specific taxa.

Table 5 Environmental factors and selected attributes associated with different plant communities of the Grassland and Wetland Vegetation.

Factors/attributes	Syntaxa																
	I												II				
	1	2	3.1.1	3.1.2	3.2.1	3.2.2	3.3	3.4	4.1	4.2	5.1	5.2	6.1	6.2	6.3	7	8
Number of relevés	2	5	7	7	6	3	6	4	4	4	4	5	4	3	4	4	2
Total number of species	40	105	112	130	119	95	109	77	84	65	70	72	51	42	52	52	24
Average number of species per relevé	30	36	47	51	48	50	46	44	46	41	39	33	28	27	25	27	20
Number of endemics/ near-endemics	2	11	10	12	11	9	11	9	7	6	11	14	2	0	2	1	1
Number of Red Data List taxa	2	7	7	7	5	6	6	5	2	2	3	3	2	2	3	1	1
Topographic position*	C	C	CS	M	CM	CM	MF	F	F	V	F	F	M	M	CV	V	C
Slope (°)	1–3	1–5	5–9	3–7	3–15	5–15	5–9	3–5	3–5	1–3	7–9	5–7	5–7	0–1	0–1	3–5	0–1
Aspect	E	ESW	NESW	NESW	EW	EW	EW	EW	EW	EW	NS	NESW	-	-	-	-	-
Predominant soil type**	My	Ms	My	Mw	Mw/Sd	Mw/Sd	Mw	Ar	Sn	Ar	Ms	Ms	-	-	-	-	-
Rock cover percentage (%)	15–20	50–70	20–40	25–50	25–50	25–75	35–40	15–30	20–25	5–10	60–70	20–70	35–45	5–15	10–20	20–30	5–10
Average rock size (mm)	300–500	> 1000	200–950	150–450	450–950	100–250	400–750	100–250	50–150	50–150	100–400	100–200	350–750	50–100	50–100	150–200	10–50

* C = crest; S = scarp; M = midslope; F = footslope; V = valley

** Ms = Mispah; Ar = Arcadia; Sn = Steendal; My = Mayo; Mw = Milkwood; Sd = Shortlands

Table 6 A key to the syntaxa of the Grassland and Wetland Vegetation of the undulating norite hills of the Sekhukhuneland Centre of Plant Endemism.

Leads/description	Go to/syntaxon
1a Grassland (*Tristachya leucothrix* & *Senecio microglossus*)	**2**
b Wetland (*Schoenoplectus corymbosus* & *Cymbopogon validus*)	**13**
2a Mispah soils on footslopes (*Jamesbrittenia macrantha* & *Dicoma anomala*)	**3**
b Other soils and terrain types (*Tristachya leucothrix*)	**4**
3a Gentle sloped (*Euclea linearis* & *Loudetia simplex*)	5.2 *Jamesbrittenio macranthae–Loudetietum simplicis eucleetosum linearis*
b Larger rock size and cover (*Combretum hereroense* & *Brachiaria serrata*)	5.1 *Jamesbrittenio macranthae–Loudetietum simplicis combretetosum hereroense*
4a Higher altitudes (*Helichrysum splendidum* & *Pentanisia prunelloides*)	1. *Helichryso splendidii–Tristachyetum leucothricis*
b Lower altitudes (*Acacia caffra*)	**5**
5a Larger rock size and cover (*Zantedeschia pentlandii* & *Aloe castanea*)	2. *Zantedeschio pentlandii–Aloetum castaneae*
b No Mispah soils; low rock cover (*Trachypogon spicatus*)	**6**
6a Vertic A-horizon (*Rhamnus prinoides* & *Setaria sphacelata*)	**7**
b Melanic A-horizon (*Rhynchosia spectabilis* & *Protea caffra*)	**8**
7a Lower rock cover percentage (*Acacia tortilis* & *Hyparrhenia filipendula*)	4.2 *Elionuro muticusae–Trachypogonetum spicati acacietosum tortilis*
b Steeper slope (*Pearsonia grandifolia* & *Senecio microglossus*)	**9**
8a All aspects (*Helichrysum rugulosum* & *Clerodendrum triphyllum*)	**10**
b East-west aspects (*Vernonia oligocephala*)	**11**
9a Steendal soils (*Bewsia biflora* & *Tephrosia purpurea*)	4.1 *Elionuro muticusae–Trachypogonetum spicati bewsietosum biflorae*
b Arcadia soils (*Setaria nigrirostris* & *Callilepis leptophylla*)	3.4 *Brachiario serratae–Melhanietum randii setarietosum nigrirostis*
10a Milkwood soils, midslopes (*Alloteropsis semialata* & *Hyparrhenia hirta*)	3.1.2 *Brachiario serratae–Melhanietum randii helichrysetosum rugulosii, Alloteropsis semialata* variant
b Mayo soils, scarps and crests (*Digitaria eriantha* & *Tetraselago wilmsii*)	3.1.1 *Brachiario serratae–Melhanietum randii helichrysetosum rugulosii, Digitaria eriantha* variant
11a Footslopes/midslopes (*Vernonia galpinii*)	3.3 *Brachiario serratae–Melhanietum randii gnidietosum capitatae*
b Midslopes/crests (*Berkheya seminivea*)	**12**
12a Higher rock cover (*Argyrolobium transvaalense*)	3.2.2 *Brachiario serratae–Melhanietum randii argyrolobietosum transvaalense, Berkheya seminivea* variant
b Larger rock size (*Koeleria capensis*)	3.2.1 *Brachiario serratae–Melhanietum randii argyrolobietosum transvaalense, Koeleria capensis* variant

Table 6 continued.

Leads/description	Go to/syntaxon
13a High altitude seepage (*Ranunculus meyeri* & *Schoenoplectus corymbosus*)	8. *Limosella maioris–Ranunculetum meyeri*
b Streams/rivers (*Fuirena pubescens* & *Schoenoplectus corymbosus*)	**14**
14a Valley rivers (*Mariscus rehmannianus* & *Andropogon eucomis*)	7. *Andropogono eucomis–Fimbristyletum ferrugineae*
b Mountain streams (*Schoenus nigricans* & *Miscanthus junceus*)	**15**
15a Rocky streams (*Cyperus sexangularis* & *Hyparrhenia tamba*)	**16**
b Stream seepage (*Bulbostylis hispidula* & *Chironia purpurascens*)	6.3 *Fuireno pubescentis–Schoenetum nigricantis bulbostylietum hispidulae*
16a Level slope (*Cyperus sexangularis* & *Berula erecta*)	6.2 *Fuireno pubescentis–Schoenetum nigricantis pycnostachetosum reticulatae*
b Steeper slope, more rocky (*Triraphis andropogonoides* & *Kyllinga erecta*)	6.1 *Fuireno pubescentis–Schoenetum nigricantis triraphietosum andropogonoidis*

Table 7 The three most dominant and conspicuous plant taxa of each of the major vegetation types of the Grassland and Wetland Vegetation depicted in the DECORANA scatter diagram.

Major vegetation type	Trees/shrubs/suffrutecis	Forbs/sedges	Grasses
1. *Helichryso splendidii–Tristachyetum leucothricis*	*Buddleja saligna*	*Euryops brevipapposus*	*Eragrostis capensis*
(*Helichrysum splendidum–Tristachya leucothrix*)	*Clutia pulchella*	***Helichrysum splendidum***	*Eragrostis curvula*
	Protea caffra (form)	*Pentanisia prunelloides*	***Tristachya leucothrix***
2. *Zantedeschio pentlandii–Aloetum castaneae*	*Apodytes dimidiata*	***Aloe castanea***	*Aristida junciformis*
(*Zantedeschia pentlandii–Aloe castanea*)	*Canthium suberosum*	*Crassula sarcocaulis*	*Cymbopogon excavatus*
	Halleria lucida	***Zantedeschia pentlandii***	*Eragrostis pseudosclerantha*
3. *Brachiario serratae–Melhanietum randii*	*Elephantorrhixa elephantina*	*Clerodendrum triphyllum*	*Andropogn chinensis*
(*Brachiaria serrata–Melhania randii*)	*Protea caffra* (form)	***Melhania randii***	***Brachiaria serrata***
	Rhus wilmsii	*Vernonia oligocephala*	*Tristachya leucothrix*
4. *Elionuro muticusae–Trachypogonetum spicati*	*Rhamnus prinoides*	*Berkheya insignis*	***Elionurus muticus***
(*Elionurus muticus–Trachypogon spicatus*)	*Rhus rogersii*	*Cephalaria zeyheriana*	*Setaria sphacelata*
	Vitex obovata	*Gnidia caffra*	***Trachypogon spicatus***
5. *Jamesbrittenio macranthae–Loudetietum simplicis*	*Elephantorrhiza praetermissa*	*Helichrysum uninervium*	*Aristida adscensionis*
(*Jamesbrittenia macrantha–Loudetia simplex*)	*Protea caffra* (form)	***Jamesbrittenia macrantha***	***Loudetia simplex***
	Vitex obovata	*Thesium multiramulosum*	*Melinis repens*
6. *Fuireno pubescentis–Schoenetum nigricantis*	*Acacia karroo*	***Fuirena pubescens***	*Hyparrhenia filipendula*
(*Fuirena pubescens–Schoenus nigricans*)	*Nuxia gracilis*	***Schoenus nigricans***	*Hyparrhenia tamba*
	Rhus leptodictya	*Typha capensis*	*Imperata cylindrical*
7. *Andropogono eucomis–Fimbristyletum ferrugineae*	*Acacia karroo*	*Cyperus sphaerospermus*	***Andropogon eucomis***
(*Andropogon eucomis–Fimbristylis ferruginea*)	*Rhus leptodictya*	***Fimbristylis ferruginea***	*Eragrostis gummiflua*
	Salix mucronata	*Mariscus rehmannianus*	*Phragmites australis*
8. *Limosello maioris–Ranunculetum meyeri*		***Limosella maior***	*Eragrostis capensis*
(*Limosella maior–Ranunculus meyeri*)		***Ranunculus meyeri***	*Heteropogon contortus*
		Ranunculus multifidus	*Sporobolus centrifugus*