

## The vegetation of the Karoo Nature Reserve, Cape Province. II. A preliminary systematic plant species list

A.R. Palmer

Botanical Research Unit, P.O. Box 101, Grahamstown, 6140 Republic of South Africa

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The vegetation of the Karoo Nature Reserve is discussed briefly. The 336 plant species recorded are presented in a checklist. Of the 71 angiosperm families recorded, the Asteraceae (55 spp.), Poaceae (36 spp.), Liliaceae (25 spp.) and Crassulaceae (16 spp.) are those best represented.

Die plantegroei van die Karoo-Natuurreservaat word kortiks bespreek. Die 336 plant-spesies wat aangeteken is, word weergegee in 'n kontrolelys. Van die 71 angiosperm-families wat aangeteken is, is die volgende die beste verteenwoordig: Asteraceae (55 spp.), Poaceae (36 spp.), Liliaceae (25 spp.) en Crassulaceae (16 spp.).

**Keywords:** Checklist, ferns, flowering plants, Karoo

### Introduction

The Karoo Nature Reserve is approximately 16 200 ha in extent and surrounds the town of Graaff-Reinet, Cape Province. Acocks (1975) recognized four veld types in the study area, namely False Central Lower Karoo, False Karroid Broken Veld, Succulent Mountain Scrub or Spekboomveld, and Karroid *Merxmuellera* Mountain Veld. The vegetation of the study area consists of three distinct physiognomic classes, namely Shrubland, Succulent Thicket and Dwarf Shrubland. The Shrubland is located on the sandstone-dominated uplands above 1 300 m elevation and displays a gradient from a mesic condition in which the shrubs are separated by grasslands, to a xeric condition in which the inter-clump cover is dominated by dwarf shrubs. The Succulent Thicket is a distinctive unit, dominated by shrubs and succulents of sub-tropical affinity. The Dwarf Shrubland is restricted to the bottomlands, where alkaline alluvial soils are encountered. The Dwarf Shrubland may be grassy, succulent or degraded, depending on the nature of the near-surface substrate, the frequency of precipitation and the recent land-use history.

A study of the vegetation of the reserve was initiated to provide a classification of the vegetation into 'ecological units correlated with stable and permanent conditions, distinguishing areas of uniform potential for management purposes' (Coetzee 1974). This included the preparation of this species list and the establishment of a herbarium on the reserve. The species list is a permanent record of the plant species that occurred in the conservation area at the time of its establishment (1976), and serves as a reference collection of the species listed in the phytosociological study. Although this list is incomplete, it provides the basis for the syntaxonomical classification of the vegetation (Palmer 1988).

### Methods

Since its establishment, the Nature Reserve has been visited by various researchers and collectors who have provided material for the compilation of this list. These

botanists and nature conservators include O.M. Hilliard, B.L. Burt, M.T. Linger, C. Newton and R. Allardice. The efforts of these collectors are greatly appreciated, and their contribution to the knowledge of this flora is recorded. In 1980 I initiated a vegetation survey of the reserve using the Braun-Blanquet phytosociological technique. Voucher specimens collected during this survey are deposited in the Karoo Nature Reserve Herbarium (1st collection), PRE (1st duplicate) and GRA (2nd duplicate).

The Pteridophyta are arranged according to the classification system of Schelpe (1969), while the Angiospermae are arranged in families and genera according to Dyer (1975, 1976), as based upon De Dalla Torre & Harms (1958). In the case of the Poaceae, the genus numbers appearing in the text are based on the Hubbard system, whereas the genus numbers within all other families are based upon De Dalla Torre & Harms (Dyer 1975, 1976). Author names are in agreement with Gibbs Russell *et al.* (1985, 1987).

In order to assess possible additions to the list, the PRECIS listings (Gibbs Russell 1985) for the quarter degree squares 3224 AB, AD, BA and BC were examined for similarity. All common species were noted and the possible additional species estimated. The naturalized aliens are listed according to MacDonald (1933), Wells *et al.* (1986) and Gibbs Russell *et al.* (1987) and have been included.

### Results and Discussion

A total of 327 indigenous plant species were collected in the study area, together with nine naturalized aliens. These species represent 191 genera and 71 families (Table 1). Analysis of the species list reveals that nine families account for 190 species, or 56.2% of all species.

Possible additional species amount to 223 (Table 2). A review of the recent revision of the genus *Helichrysum* (Hilliard 1983) yielded 16 possible additional species for the study area. These additional species are not included in the list (Table 3).

**Table 1** The number of genera and species in the plant families on the Karoo Nature Reserve

Family	Genera	Species
<b>Pteridophyta</b>		
Adiantaceae	1	2
<b>Angiospermae</b>		
Poaceae	25	36
Cyperaceae	2	3
Commelinaceae	1	1
Juncaceae	1	1
Liliaceae	10	25
Amaryllidaceae	2	2
Dioscoreaceae	1	1
Iridaceae	2	2
Salicaceae	1	1
Ulmaceae	1	1
Moraceae	1	1
Urticaceae	1	1
Loranthaceae	1	1
Viscaceae	1	1
Santalaceae	2	6
Polygonaceae	1	1
Chenopodiaceae	3	5
Nyctaginaceae	1	1
Aizoaceae	4	4
Mesembryanthemaceae	9	10
Portulacaceae	1	1
Caryophyllaceae	1	1
Illecebraceae	2	2
Ranunculaceae	1	1
Menispermaceae	1	1
Brassicaceae	2	3
Capparaceae	2	2
Crassulaceae	4	16
Fabaceae		
Mimosoideae	1	1
Caesalpinioideae	1	1
Papilionoideae	6	11
Geraniaceae	2	10
Oxalidaceae	1	2
Zygophyllaceae	2	4

**Table 1** Continued

Family	Genera	Species
Rutaceae	1	1
Polygalaceae	1	3
Euphorbiaceae	2	4
Anacardiaceae	1	9
Celastraceae	1	4
Sapindaceae	2	2
Rhamnaceae	1	1
Vitaceae	1	2
Tiliaceae	1	2
Malvaceae	5	5
Sterculiaceae	1	14
Tamariaceae	1	1
Flacourtiaceae	1	1
Thymelaeaceae	1	1
Araliaceae	1	2
Myrsinaceae	1	1
Ebenaceae	2	7
Oleaceae	1	1
Loganiaceae	1	2
Apocynaceae	2	2
Asclepiadaceae	3	5
Convolvulaceae	1	1
Boraginaceae	1	1
Verbenaceae	3	3
Lamiaceae	4	4
Solanaceae	2	6
Scrophulariaceae (A)	7	13
Selaginaceae	2	5
Scrophulariaceae (B)	1	1
Bignoniaceae	1	1
Gesneriaceae	1	1
Acanthaceae	4	7
Rubiaceae	1	1
Dipsacaceae	1	1
Cucurbitaceae	2	2
Campanulaceae	1	1
Lobeliaceae	1	1
Asteraceae	29	55
Total	191	336

With cryptogams and naturalized aliens being seriously under-collected, I estimate that this list represents 40–50% of the flora of the reserve. It is essential to view this checklist within these constraints. The flora of the

region has been historically under-collected and new efforts should be initiated to remedy this situation throughout the karoo biome. The number of specimens recorded from the reserve, but not listed in PRECIS

**Table 2** A comparison of the species list of the plants of the Karoo Nature Reserve with other sources of taxon lists for the area

Quarter degree square	No. of species common to PRECIS	No. of additional species	No. of species only on this list	Possible Hilliard (1983) addition	Possible total number
3224 BC	135	194	203	16	
3224 BA, AB, DA	20	27			575

**Table 3** A preliminary systematic plant species list of the Karoo Nature Reserve. \* = alien to southern Africa. Collectors codes: A = R. Allardice; L = M.T. Linger; N = C. Newton; H&B = O.M. Hilliard and B.L. Burt; P = A.R. Palmer

**Table 3** Continued

<b>Pteridophyta</b>		
Adiantaceae		
	<i>Cheilanthes</i> Swartz	
	<i>C. hirta</i> Swartz	A 1504
	<i>C. marlothii</i> (Hieron.) Schelpe	L 2041
<b>Angiospermae — Monocotyledonae</b>		
Poaceae		
K75	<i>Cymbopogon</i> Spreng.	
	<i>C. marginatus</i> (Steud.) Stapf ex Burt	
	Davy	P 700
	<i>C. plurinodis</i> (Stapf) Stapf ex Burt	
	Davy	A 1589
K73	<i>Hyparrhenia</i> Anderss. ex Fourn.	
	<i>H. hirta</i> (L.) Stapf	A 1502
K80	<i>Heteropogon</i> Pers.	
	<i>H. contortus</i> (L.) Roem. & Schult.	P 527, A 1586
K83	<i>Themeda</i> Forssk.	
	<i>T. triandra</i> Forssk.	N 2
K89	<i>Digitaria</i> Haller	
	<i>D. eriantha</i> Steud.	A 1509, 1617, P 529
K116	<i>Panicum</i> L.	
	<i>P. maximum</i> Jacq.	A 1580, 1613
K128	<i>Setaria</i> Beauv.	
	<i>S. sphacelata</i> (Schumach.) Moss	
	var. <i>sphacelata</i>	P 1064
K132a	<i>Rhynchelytrum</i> Nees	
	<i>R. repens</i> (Willd.) C.E. Hubb.	A 1594
K140	<i>Cenchrus</i> L.	
	<i>C. ciliaris</i> L.	A 1590, P 1025
K160	<i>Ehrharta</i> Thunb.	
	<i>E. calycina</i> J.E. Sm.	
	var. <i>angustifolia</i> Kunth	A 1508, 1582
K204c	<i>Merxmuellera</i> Conert	
	<i>M. disticha</i> (Nees) Conert	P 859
K214	<i>Phragmites</i> Trin.	
	<i>P. australis</i> (Cav.) Steud.	P 948
K260a	<i>Stipagrostis</i> Nees	
	<i>S. obtusa</i> (Del.) Nees	A 1575
K262	<i>Aristida</i> L.	
	<i>A. adscensionis</i> L. subsp.	
	<i>guineensis</i> (Trin. & Rupr.) Henr.	A 1577
	<i>A. congesta</i> Roem. & Schult. subsp.	
	<i>barbicollis</i> (Trin. & Rupr.)	
	de Winter	P 736
	<i>A. congesta</i> Roem. & Schult.	
	subsp. <i>congesta</i>	P 748
	<i>A. diffusa</i> Trin.	
	var. <i>burkei</i> (Stapf) Meld.	P 535
K263	<i>Stipa</i> L.	
	<i>S. dregeana</i> Steud.	
	var. <i>elongata</i> (Nees) Stapf	L 2063
K274	<i>Tragus</i> Haller	
	<i>T. berteronianus</i> Schult.	A 1619
	<i>T. koelerioides</i> Aschers.	A 1592
K283	<i>T. racemosus</i> (L.) All.	A 864
	<i>Sporobolus</i> R. Br.	
	<i>S. fimbriatus</i> (Trin.) Nees	
	var. <i>fimbriatus</i>	P 577
	<i>S. nitens</i> Stent	P 1060
K286	<i>Eragrostis</i> Beauv.	
	<i>E. curvula</i> (Schrad.) Nees	P 543, 619
	<i>E. lehmanniana</i> Nees var. <i>lehmanniana</i>	P 1260
	<i>E. obtusa</i> Munro ex Fical. & Hiern	P 501, A 1618
	<i>E. sp.</i>	A 1581
K296	<i>Cynodon</i> Rich. ex Pers.	
	<i>C. dactylon</i> (L.) Pers.	P 467
	<i>C. incompletus</i> Nees	A 1608
K301	<i>Chloris</i> Swartz	
	<i>C. virgata</i> Swartz	P 550
K302	<i>Eustachys</i> Desv.	
	<i>E. paspaloides</i> (Vahl) Lanza & Mattei	P 904
K357	<i>Enneapogon</i> Desv. ex Beauv.	
	<i>E. scoparius</i> Stapf	P 874
K371	<i>Fingerhuthia</i> Nees	
	<i>F. sesleriiformis</i> Nees	P 564
K386	<i>Melica</i> L.	
	<i>M. racemosa</i> Thunb.	P 517
K428	<i>Bromus</i> L.	
	* <i>B. unioides</i> H.B.K.	A 1604
Cyperaceae		
459c	<i>Mariscus</i> Gaertn.	
	<i>M. rehmannianus</i> C.B. Cl.	A 1620
	<i>M. vestitus</i> (Hochst. ex Krauss)	
	C.B. Cl.	A 1621
465	<i>Ficinia</i> Schrad.	
	<i>F. trichodes</i> (Schrad.)	
	Benth. & Hook. f.	P 695
Commelinaceae		
896	<i>Commelina</i> L.	
	<i>C. africana</i> L. var. <i>barberae</i> C.B. Cl.	P 587, N (sn)
Juncaceae		
936	<i>Juncus</i> L.	
	<i>J. effusus</i> L.	P 583
Liliaceae		
969	<i>Androcymbium</i> Willd.	
	<i>A. melanthioides</i> Willd.	N (sn)
985	<i>Bulbine</i> Willd.	
	<i>B. abyssinica</i> A. Rich.	L 2013, P 574
	<i>B. frutescens</i> (L.) Willd.	L 2016
	<i>B. narcissifolia</i> Salm-Dyck	L 2021
	<i>B. sp.</i>	H&B 10733
1010	<i>Schizobasis</i> Bak.	
	<i>S. intricata</i> (Bak.) Bak.	A 1591
1026	<i>Aloe</i> L.	
	<i>A. ferox</i> Mill.	L 2147
	<i>A. longistyla</i> Bak.	L 2104
	<i>A. microstigma</i> Salm-Dyck	L 2119
	<i>A. striata</i> Haw.	L 2143, 2113
	<i>A. variegata</i> L.	L 2149
1029	<i>Haworthia</i> Duval	
	<i>H. arachnoidea</i> (L.) Duval	L 2133

Table 3 Continued

	<i>H. viscosa</i> (L.) Haw.	L 2128
1084	<i>Dipcadi</i> Medic.	
	<i>D. viride</i> (L.) Moench	P 705
1085	<i>Litanthus</i> Harv.	
	<i>L. pusillus</i> Harv.	H&B 10749
1098	<i>Lachenalia</i> Jacq. f. ex Murray	
	<i>L. bowkeri</i> Bak.	L 2099
1110	<i>Sansevieria</i> Thunb.	
	<i>S. aethiopica</i> Thunb.	A 1585
1113	<i>Protasparagus</i> L.	
	<i>P. acocksii</i> Jessop	A 1544
	<i>P. laricinus</i> Burch.	L 2026
	<i>P. racemosus</i> Willd.	P 605, L 2117
	<i>P. retrofractus</i> L.	L 2029
	<i>P. setaceus</i> (Kunth) Jessop	L 2072
	<i>P. striatus</i> (L. f.) Thunb.	P 496, L 2059
	<i>P. suaveolens</i> (Burch.) Oberm.	A 1540, P 593, L 2028
	<i>P. subulatus</i> Thunb.	P 483, A 1591
Amaryllidaceae		
1167	<i>Haemanthus</i> L.	
	<i>H. albiflos</i> Jacq.	L 2136
1168	<i>Böophane</i> Herb.	
	<i>B. disticha</i> (L. f.) Herb.	P 749
Dioscoreaceae		
1252	<i>Dioscorea</i> L.	
	<i>D. elephantipes</i> (L'Hérit.) Engl.	P 513
Iridaceae		
1265	<i>Moraea</i> Mill.	
	<i>M. polystachya</i> (Thunb.) Ker-Gawl.	L 2022, 2098
1301	<i>Hesperantha</i> Ker-Gawl.	
	<i>H. longituba</i> (Klatt) Bak.	L 2106
<b>Angiospermae — Dicotyledonae</b>		
Salicaceae		
1873	<i>Salix</i> L.	
	<i>S. mucronata</i> Thunb. var. <i>mucronata</i>	P (sn)
Ulmaceae		
1898	<i>Celtis</i> L.	
	<i>C. africana</i> Burm. f.	P 937
Moraceae		
1961	<i>Ficus</i> L.	
	<i>F. burtt-davyi</i> Hutch.	A 1610
Urticaceae		
2012	<i>Forsskaolea</i> L.	
	<i>F. candida</i> L. f. var. <i>candida</i>	L 2070
Loranthaceae		
2074	<i>Moquinella</i> Balle	
	<i>M. rubra</i> (Spreng. f.) Balle	L 2043
Viscaceae		
2093	<i>Viscum</i> L.	
	<i>V. obscurum</i> Thunb.	P 511
Santalaceae		
2108	<i>Osyris</i> L.	
	<i>O. lanceolata</i> Hochst. & Steud.	H&B 10737
2118	<i>Thesium</i> L.	
	<i>T. imbricatum</i> Thunb.	A 1567
	<i>T. lineatum</i> L. f.	L 2082

Table 3 Continued

	<i>T. namaquense</i> Schltr.	P 609
	<i>T. scandens</i> Sond.	L 2146
	<i>T. sp.</i>	P 556
Polygonaceae		
2194	<i>Emex</i> Neck. ex Campd.	
	<i>E. australis</i> Steinh.	L 2097
Chenopodiaceae		
2223	<i>Chenopodium</i> L.	
	<i>C. phillipsianum</i> Aell.	A 1547
	* <i>C. schraderanum</i> Roem. & Schult.	L 2010
2229a	* <i>Atriplex</i> L.	
	<i>A. lindleyi</i> Moq. subsp.	
	<i>inflata</i> (Muell.) P.G. Wilson	A 1550, P 454
2269	<i>Salsola</i> L.	
	<i>S. aphylla</i> L. f.	P 472
	* <i>S. kali</i> L.	A 1598
Nyctaginaceae		
2349	<i>Boerhavia</i> L.	
	* <i>B. cordobensis</i> Kuntze	P 460
Aizoaceae		
2390	<i>Hypertelis</i> E. Mey. ex Fenzl	
	<i>H. bowkeriana</i> Sond.	P 1102
2395	<i>Trianthema</i> L.	
	<i>T. triquetra</i> Willd. subsp.	
	<i>parvifolia</i> (Sond.) Jeffrey	A 1607
2399	<i>Galenia</i> L.	
	<i>G. sarcophylla</i> Fenzl	L 2033
2401	<i>Aizoon</i> L.	
	<i>A. rigidum</i> L. f. var.	
	<i>angustifolium</i> Sond.	A 1519
Mesembryanthemaceae		
2405	<i>Delosperma</i> N.E. Br.	
	<i>D. lehmannii</i> (Eckl. & Zeyh.) Schwant.	P 572
	<i>D. sp.</i>	L 2056
2405	<i>Eberlanzia</i> Schwant.	
	<i>E. spinosa</i> (L.) Schwant.	L 2132, P 548
2405	<i>Glottiphyllum</i> N.E. Br.	
	<i>G. sp.</i>	L 2112
2405	<i>Malephora</i> N.E. Br.	
	<i>M. sp.</i>	L 2032, 2127
2405	<i>Mesembryanthemum</i> L.	
	<i>M. karroense</i> L. Bol.	L 2140
2405	<i>Mestoklema</i> N.E. Br.	
	<i>M. tuberosum</i> (L.) N.E. Br. ex Glen	
	var. <i>tuberosum</i>	L 2052, 2018, P 607
2405	<i>Pleiospilos</i> N.E. Br.	
	<i>P. bolusii</i> (Hook.f.) N.E. Br.	A 1609
2405	<i>Psilocaulon</i> N.E. Br.	
	<i>P. articulatum</i> (Thunb.) Schwant.	L 2046, 2142, 2144
2405	<i>Trichodiadema</i> Schwant.	
	<i>T. sp.</i>	L 2051
Portulacaceae		
2419	<i>Portulacaria</i> L.	
	<i>P. afra</i> Jacq.	A 1579
Caryophyllaceae (Part A)		
2429	* <i>Stellaria</i> L.	
	<i>S. media</i> (L.) Vill.	L 2125

Table 3 Continued

Illecebraceae		
2467	<i>Pollichia</i> Ait.	
	<i>P. campestris</i> Ait.	L 2094
2502	<i>Dianthus</i> L.	
	<i>D. namaensis</i> Schinz var. <i>namaensis</i>	H&B 10717
Ranunculaceae		
2542	<i>Clematis</i> L.	
	<i>C. brachiata</i> Thunb.	A 1572
Menispermaceae		
2573	<i>Antizoma</i> Miers	
	<i>A. capensis</i> L. f.	A 1503
Brassicaceae		
2875	<i>Heliophila</i> L.	
	<i>H. carnosa</i> (Thunb.) Steud.	A 1562
	<i>H. minima</i> (Stephens) Marais	L 2068
2883	<i>Lepidium</i> L.	
	<i>L. africanum</i> (Burm. f.) DC. subsp. <i>divaricatum</i> (Ait.) Jonsell	P 243
Capparaceae		
3106	<i>Boscia</i> Lam.	
	<i>B. oleoides</i> (Burch. ex DC.) Toelken	L 2088, P 825
3109	<i>Cadaba</i> Forssk.	
	<i>C. aphylla</i> (Thunb.) Wild	A 1, P 1069
Crassulaceae		
3164	<i>Cotyledon</i> L.	
	<i>C. orbiculata</i> L. var. <i>orbiculata</i>	L 2129, 2130
	<i>C. sp.</i>	H&B 10734
3166	<i>Kalanchoe</i> Adans.	
	<i>K. rotundifolia</i> (Haw.) Haw.	L 2080
3168	<i>Crassula</i> L.	
	<i>C. capitella</i> Thunb.	
	subsp. <i>thyrsiflora</i> Toelken	P615, A 1593
	<i>C. corallina</i> Thunb.	
	subsp. <i>corallina</i>	A 1557
	<i>C. expansa</i> Dryand. subsp. <i>expansa</i>	A 1511
	<i>C. muscosa</i> L. var. <i>muscosa</i>	A 1527, A 1588
	<i>C. nemorosa</i> (Eckl. & Zeyh.) Endl. ex Walp.	L 2083
	<i>C. ovata</i> (Mill.) Druce	A 1532
	<i>C. pubescens</i> Thunb. subsp. <i>pubescens</i>	H&B 10744
	<i>C. rogersii</i> Schonl.	P 491
	<i>C. rupestris</i> Thunb. subsp. <i>rupestris</i>	L 2081, P 559
	<i>C. sarcocaulis</i> Eckl. & Zeyh.	
	subsp. <i>sarcocaulis</i>	A 1595
	<i>C. tetragona</i> L. subsp. <i>tetragona</i>	P 617
3175	<i>Adromischus</i> Lem.	
	<i>A. cooperi</i> (Bak.) Berger	H&B 10750
	<i>A. triflorus</i> (L. f.) Berger	A 1587
Fabaceae		
Mimosoideae		
3446	<i>Acacia</i> Mill.	
	<i>A. karroo</i> Hayne	A 1576
Caesalpinioideae		
3506	<i>Schotia</i> Jacq.	
	<i>S. afra</i> (L.) Thunb. var. <i>afra</i>	P 633

Table 3 Continued

Papilionoideae		
3657	<i>Lotononis</i> (DC.) Eckl. & Zeyh.	
	<i>L. sp. cf. L. depressa</i> Eckl. & Zeyh.	A 1616
3665	<i>Melolobium</i> Eckl. & Zeyh.	
	<i>M. candicans</i> (E. Mey.) Eckl. & Zeyh.	L 2107, P 876
3673	<i>Argyrolobium</i> Eckl. & Zeyh.	
	<i>A. barbatum</i> Walp.	L 2095
	<i>A. variopile</i> N.E. Br.	L 2091
3702	<i>Indigofera</i> L.	
	<i>I. argyraea</i> Eckl. & Zeyh.	L 2015, 2096
	<i>I. heterophylla</i> Thunb.	P 503, 542
	<i>I. sp. cf. I. denudata</i> Thunb.	P 589
3754	<i>Sutherlandia</i> R.Br. ex Ait. f.	
	<i>S. humilis</i> Phill. & R.A. Dyer	L 2053
3756	<i>Lessertia</i> DC.	
	<i>L. annularis</i> Burch.	L 2093
	<i>L. depressa</i> Harv.	A 1538, L 2049
	<i>L. physodes</i> Eckl. & Zeyh.	L 2053
Geraniaceae		
3926	<i>Sarcocaulon</i> (DC.) Sweet	
	<i>S. camdeboense</i> Moffett	L 2001, P 534
	<i>S. vanderietiae</i> L. Bol.	L 2134
3928	<i>Pelargonium</i> L'Hérit.	
	<i>P. abrotonifolium</i> (L. f.) Jacq.	A 1506, P 614
	<i>P. aridum</i> R.A. Dyer	A 1614
	<i>P. carnosum</i> (L.) L'Hérit.	A 1615
	<i>P. trifidum</i> Jacq.	A 1584
	<i>P. glutinosum</i> (Jacq.) L'Hérit.	H&B 10711
	<i>P. myrrhifolium</i> (L.) L'Hérit.	
	var. <i>myrrhifolium</i>	P 613, A 1596
	<i>P. zonale</i> (L.) L'Hérit.	H&B 10710, A 1611
	<i>P. sp.</i>	A 1614
Oxalidaceae		
3936	<i>Oxalis</i> L.	
	<i>O. bowiei</i> Lindl.	A 1531
	<i>O. pes-caprae</i> L. var. <i>pes-caprae</i>	L 2079
Zygophyllaceae		
3965	<i>Zygophyllum</i> L.	
	<i>Z. gilfillani</i> N.E. Br.	A 1541, L 2057
	<i>Z. microcarpum</i> Licht.	
	ex Cham. & Schlechtd.	A 1553, L 2109
	<i>Z. retrofractum</i> Thunb.	A 1552, L 2034
3978	<i>Tribulus</i> L.	
	<i>T. terrestris</i> L.	P 630, A 1617
Rutaceae		
4076	<i>Vepris</i> Comm. ex A. Juss.	
	<i>V. undulata</i> (Thunb.) Verdoorn & C.A. Sm.	P 620
Polygalaceae		
4273	<i>Polygala</i> L.	
	<i>P. asbestina</i> Burch.	P 514
	<i>P. ephedroides</i> Burch.	A 1526, L 2017
	<i>P. hottentotta</i> Presl	P 594
Euphorbiaceae		
4299	<i>Phyllanthus</i> L.	
	<i>P. sp.</i>	H&B 10736
4498	<i>Euphorbia</i> L.	

Table 3 Continued

	<i>E. mauritanica</i> L. var. <i>mauritanica</i>	P 560, L 2050
	<i>E. sp.</i> cf. <i>E. ferox</i> Marloth	L 2135
	<i>E. sp.</i>	L 2077
Anacardiaceae		
4594	<i>Rhus</i> L.	
	<i>R. erosa</i> Thunb.	A 1539
	<i>R. incisa</i> L. f. var. <i>incisa</i>	A 1554, 1583, P 1023
	<i>R. lancea</i> L. f.	A 787
	<i>R. pentheri</i> Zahlbr.	A 1533
	<i>R. refracta</i> Eckl. & Zeyh.	L 2137, P 477
	<i>R. rigida</i> Mill.	A 1573
	<i>R. undulata</i> Jacq.	A 1516
	<i>R. longispina</i> Eckl. & Zeyh.	L 2090
	<i>R. sp.</i>	P 691
Celastraceae		
4626	<i>Maytenus</i> Molina	
	<i>M. capitata</i> (E. Mey. ex Sond.) Marais	L 2103
	<i>M. heterophylla</i> (Eckl. & Zeyh.) N.K.B. Robson	P 484
	<i>M. linearis</i> (L. f.) Marais	P 567, L 2061
	<i>M. polyacantha</i> (Sond.) Marais	L 2139
Sapindaceae		
4784	<i>Pappea</i> Eckl. & Zeyh.	
	<i>P. capensis</i> Eckl. & Zeyh.	P 474, L 2121
4831	<i>Dodonaea</i> Mill.	
	<i>D. angustifolia</i> L. f.	A 1571
Rhamnaceae		
4875	<i>Rhamnus</i> L.	
	<i>R. prinooides</i> L'Hérit.	A 1554
Vitaceae		
4917	<i>Rhoicissus</i> Planch.	
	<i>R. rhomboidea</i> (E. Mey. ex Harv.) Planch.	L 2120
	<i>R. tridentata</i> (L. f.) Wild & Drum.	P 495, 476
Tiliaceae		
4966	<i>Grewia</i> L.	
	<i>G. occidentalis</i> L.	P 525, L 2024
	<i>G. robusta</i> Burch.	P 473
Malvaceae		
4983	<i>Abutilon</i> Mill.	
	<i>A. sonneratianum</i> (Cav.) Sweet	L 2012, P 629
4986a	<i>Anisodonteia</i> Presl	
	<i>A. malvastroides</i> (Bak. f.) Bates	H&B 10708, A 1570
4998	<i>Sida</i> L.	
	<i>S. ternata</i> L. f.	L 2123
5013	<i>Hibiscus</i> L.	
	<i>H. pusillus</i> Thunb.	L 2011, 2002, P 523
5013a	<i>Radyera</i> Bullock	
	<i>R. urens</i> (L. f.) Bullock	L 2105
Sterculiaceae		
5056	<i>Hermannia</i> L.	
	<i>H. bryoniifolia</i> Burch.	L 2074
	<i>H. cernua</i> Thunb.	A 1565, L 2148
	<i>H. cuneifolia</i> Jacq. var. <i>cuneifolia</i>	L 2138
	<i>H. cuneifolia</i> Jacq. var. <i>glabrescens</i>	A 1543
	<i>H. erodioides</i> (Burch. ex DC.) Kuntze	H&B 10726

Table 3 Continued

	<i>H. filifolia</i> L. f. var. <i>filifolia</i>	L 2037, H&B 10725
	<i>H. glabrata</i> L. f.	L 2071
	<i>H. gracilis</i> Eckl. & Zeyh.	A 1530
	<i>H. holosericea</i> Jacq.	L 2062
	<i>H. pulverata</i> Andr.	A 1555, 1558
	<i>H. sulcata</i> Harv.	P 627
	<i>H. vestita</i> Thunb.	H&B 10730
	<i>H. sp.</i> cf. <i>H. muricata</i> Eckl. & Zeyh.	A 1535, H&B 10728
	<i>H. sp.</i> cf. <i>H. coccocarpa</i> (Eckl. & Zeyh.) Kuntze	H&B 10726
Tamaricaceae		
5239	* <i>Tamarix</i> L.	
	<i>T. usneoides</i> E. Mey. ex Bunge	A 1599
Flacourtiaceae		
5296	<i>Kiggelaria</i> L.	
	<i>K. africana</i> L.	L 2044
Thymelaeaceae		
5435	<i>Gnidia</i> L.	
	<i>G. microphylla</i> Meisn.	L 2014
Araliaceae		
5872	<i>Cussonia</i> Thunb.	
	<i>C. paniculata</i> Eckl. & Zeyh.	L 2047, 2054
	<i>C. spicata</i> Thunb.	A 1514, 1522
Myrsinaceae		
6313	<i>Myrsine</i> L.	
	<i>M. africana</i> L.	P 696
Ebenaceae		
6404	<i>Euclea</i> Murray	
	<i>E. crispa</i> (Thunb.) Guerke subsp. <i>crispa</i>	P 1061
	<i>E. undulata</i> Thunb. var. <i>undulata</i>	A 1525, P 482
6406	<i>Diospyros</i> L.	
	<i>D. austro-africana</i> De Winter	P 554
	<i>D. lycioides</i> Desf. subsp. <i>lycioides</i>	L 2141
	<i>D. ramulosa</i> (E. Mey. ex A. DC.) De Winter	L 2086
	<i>D. villosa</i> (L.) De Winter var. <i>villosa</i>	P 539
	<i>D. sp.</i>	P 705
Oleaceae		
6434	<i>Olea</i> L.	
	<i>O. europaea</i> L. subsp. <i>africana</i> (Mill.) P.S. Green	A 1551
Loganiaceae		
6473	<i>Buddleja</i> L.	
	<i>B. glomerata</i> Wendl. f.	A 1521, H&B 10746
	<i>B. saligna</i> Willd.	A 1524, H&B 10729
Apocynaceae		
6559	<i>Carissa</i> L.	
	<i>C. haematocarpa</i> (Eckl.) A. DC.	P 475
6681	<i>Pachypodium</i> Lindl.	
	<i>P. succulentum</i> (L. f.) Sweet	H&B 10732
Asclepiadaceae		
6791	<i>Asclepias</i> L.	
	<i>A. burchellii</i> Schltr.	L 2019, A 1621
	<i>A. cancellata</i> Burm. f.	P 698
	<i>A. fruticosa</i> L.	A 1621

Table 3 Continued

6849	<i>Sarcostemma</i> R. Br. <i>S. viminalis</i> (L.) R. Br.	P 383
6885	<i>Tridentea</i> Haw. <i>T. sp. cf. T. gemmiflora</i> (Mass.) Haw.	A1523
Convolvulaceae		
6993	<i>Convolvulus</i> L. <i>C. sagittatus</i> Thunb. var. <i>ulosepalus</i> (Hallier f.) Verdc.	P 468
Boraginaceae		
7043	<i>Ehretia</i> P. Br. <i>E. rigida</i> (Thunb.) Druce	P 565, 624
Verbenaceae		
7144	<i>Lantana</i> L. <i>L. rugosa</i> Thunb.	L 2008, P 557
7145a	<i>Phyla</i> Lour. <i>P. nodiflora</i> (L.) Greene var. <i>nodiflora</i>	L 2048, A 1606
7148	<i>Plexipus</i> Rafin. <i>P. cuneifolius</i> (L. f.) Rafin:	P 1062
Lamiaceae		
7212	<i>Teucrium</i> L. <i>T. africanum</i> Thunb.	A 1534
7281	<i>Stachys</i> L. <i>S. scabrida</i> Skan	A 1501
7290	<i>Salvia</i> L. <i>S. repens</i> Burch. ex Benth. var. <i>repens</i>	P 1060
7366a	<i>Becium</i> Lindl. <i>B. burchellianum</i> (Benth.) N.E. Br.	A 1529, H&B 10747
Solanaceae		
7379	<i>Lycium</i> L. <i>L. cinereum</i> Thunb. <i>L. oxycarpum</i> Dun. <i>L. schizocalyx</i> C.H. Wr. <i>L. sp.</i>	P 545 A 1520, L 2003 L 2030 P 573
7407	<i>Solanum</i> L. <i>S. coccineum</i> Jacq. * <i>S. elaeagnifolium</i> Cav.	P 516 N 1
Scrophulariaceae (Part A)		
7467	<i>Aptosimum</i> Burch. <i>A. procumbens</i> (Lehm.) Steud. var. <i>procumbens</i>	L 2004
7468	<i>Peliostomum</i> Benth. <i>P. organoides</i> E. Mey. ex Benth.	P 510
7471	<i>Diascia</i> Link & Otto <i>D. capsularis</i> Benth.	L 2023
7476	<i>Nemesia</i> Vent. <i>N. fruticans</i> (Thunb.) Benth. <i>N. hanoverica</i> Hiern	L 2076 L 2055
7519	<i>Sutera</i> Roth <i>S. albiflora</i> Verdoorn <i>S. caerulea</i> (L. f.) Hiern <i>S. halimifolia</i> (Benth.) Kuntze <i>S. mollis</i> (Benth.) Hiern <i>S. pinnatifida</i> (Benth.) Kuntze	L 2042 A 1622 H&B 10712 L 2006, H&B 10727 P 498
7522	<i>Polycarena</i> Benth. <i>P. capillaris</i> (L. f.) Benth.	A 1548

Table 3 Continued

7523	<i>Zaluzianskya</i> F.W. Schmidt <i>Z. africana</i> (Thunb.) Hiern <i>Z. crocea</i> Schltr.	A 2561 L 2046
Selaginaceae		
7568	<i>Selago</i> L. <i>S. albida</i> Choisy <i>S. bolusii</i> Rolfe <i>S. corymbosa</i> L.	P 880, P 1022 H&B 10735 P 621
7568a	<i>Walafrida</i> E. Mey. <i>W. geniculata</i> (L. f.) Rolfe <i>W. saxatilis</i> (E. Mey.) Rolfe	L 2005, P 492 A 1518, 1615
Scrophulariaceae (Part B)		
7597a	<i>Alectra</i> Thunb. <i>A. pumila</i> Benth.	A 1546
Bignoniaceae		
	<i>Rhigozum</i> Burch. <i>R. obovatum</i> Burch.	P 968
Gesneriaceae		
7823	<i>Streptocarpus</i> Lindl. <i>S. meyeri</i> B.L. Burtt	H&B 10724
Acanthaceae		
7973	<i>Barleria</i> L. <i>B. irritans</i> Nees <i>B. obtusa</i> Nees	P 504 A 1624
7980	<i>Blepharis</i> Juss. <i>B. capensis</i> (L. f.) Pers. var. <i>capensis</i> <i>B. villosa</i> (Nees) C.B. Cl.	H&B 10719 H&B 10715, L 2084
8094	<i>Justicia</i> L. <i>J. cuneata</i> Vahl subsp. <i>cuneata</i> <i>J. sp.</i>	P 561 P 595
8094a	<i>Monechma</i> Hochst. <i>M. spartioides</i> (T.Anders) C.B. Cl.	A 1542, L 2067
Rubiaceae		
8486	<i>Galium</i> L. <i>G. tomentosum</i> Thunb.	L 2025
Dipsacaceae		
8546	<i>Scabiosa</i> L. <i>S. columbaria</i> L.	H&B 10731
Cucurbitaceae		
8568	<i>Kedrostis</i> Medik. <i>K. africana</i> (L.) Cogn.	P 566
8599	<i>Cucumis</i> L. <i>C. myriocarpus</i> Naud. subsp. <i>leptodermis</i> (Schweick.) C. Jeffrey & P. Halliday	L 2101
Campanulaceae		
8670	<i>Lightfootia</i> L'Hérit. <i>L. albens</i> Spreng. ex A. DC.	A 1597
Lobeliaceae		
8681	<i>Cyphia</i> Berg. <i>C. sylvatica</i> Eckl. var. <i>sylvatica</i>	P 905
Asteraceae		
8862	<i>Pteronia</i> L. <i>P. adenocarpa</i> Harv. <i>P. glauca</i> Thunb.	A 1568 A 1510

Table 3 Continued

8887	<i>Amellus</i> L.	
	<i>A. strigosus</i> (Thunb.) Less.	
	subsp. <i>strigosus</i>	H&B 10722
	<i>A. strigosus</i> (Thunb.) Less.	
	subsp. <i>pseudoscabrinus</i> Rommel	L 2102
8919	<i>Felicia</i> Cass.	
	<i>F. filifolia</i> (Vent.) Burt Davy	
	subsp. <i>filifolia</i>	A 1512, P 555
	<i>F. hirsuta</i> DC.	P 461
	<i>F. hyssopifolia</i> (Berg.) Nees	
	subsp. <i>polyphylla</i> (Harv.) Grau	L 2009, P 590
	<i>F. muricata</i> (Thunb.) Nees	
	subsp. <i>muricata</i>	P 549
	<i>F. ovata</i> (Thunb.) Compton	L 2066, P 879
8930	<i>Chrysocoma</i> L.	
	<i>C. ciliata</i> L.	A 1560
8992	<i>Gnaphalium</i> L.	
	<i>G. capense</i> Hilliard	H&B 10740
	<i>G. confine</i> Harv.	H&B 10743
8992a	<i>Pseudognaphalium</i> Kirp.	
	<i>P. luteo-album</i> (L.) Hilliard & Burt	A 1605
8992b	<i>Troglophyton</i> Hilliard & Burt	
	<i>T. capillaceum</i> (Thunb.) Hilliard & Burt subsp. <i>capillaceum</i>	L 2075
9006	<i>Helichrysum</i> Mill.	
	<i>H. cymosum</i> (L.) D. Don subsp. <i>cymosum</i>	A 1536
	<i>H. hamulosum</i> E. Mey. ex DC.	P 531
	<i>H. pumilio</i> (O. Hoffm.) Hilliard & Burt subsp. <i>pumilio</i>	A 1505
	<i>H. rosum</i> (Berg.) Less. var. <i>rosum</i>	P 520
9041	<i>Elytropappus</i> Cass.	
	<i>E. rhinocerotis</i> (L. f.) Less.	P 530
9050	<i>Rosenia</i> Thunb.	
	<i>R. humilis</i> (Less.) Bremer	A 1513, P 547, L 211
9073	<i>Pegoletia</i> Cass.	
	<i>P. baccharidifolia</i> Less.	A 1507, 1566
	<i>P. retrofracta</i> (Thunb.) Kies	P 591
9090	<i>Geigeria</i> Griesselich	
	<i>G. ornativa</i> O. Hoffm.	L 2031
9306	<i>Gaillardia</i> Foug.	
	* <i>G. pulchella</i> Foug.	A 1600
9320	<i>Eriocephalus</i> L.	
	<i>E. africanus</i> L.	P 1011
	<i>E. ericoides</i> (L. f.) Druce	A 1517, P 521
9336	<i>Phymaspermum</i> Less. emend. Kallersjo	
	<i>P. parvifolium</i> (DC.) Benth. & Hook.	L 2126
9351	<i>Cotula</i> L.	
	<i>C. anthemoides</i> L.	H&B 10721
	<i>C. sororia</i> DC.	H&B 10738
9366	<i>Pentzia</i> Thunb.	
	<i>P. incana</i> (Thunb.) Kuntze	A 1537
	<i>P. pilulifera</i> (L. f.) Fourc.	L 2115
	<i>P. punctata</i> Harv.	P 690
9406	<i>Cineraria</i> L.	
	<i>C. alchemilloides</i> DC.	L 2065
	<i>C. aspera</i> Thunb.	L 2058
	<i>C. mollis</i> E. Mey. ex DC.	H&B 10742

Table 3 Continued

	<i>C. sp.</i>	H&B 10741
9411	<i>Senecio</i> L.	
	<i>S. acutifolius</i> DC.	P 1528
	<i>S. angustifolius</i> (Thunb.) Willd.	L 2114
	<i>S. cotyledonis</i> DC.	L 2100
	<i>S. junceus</i> (DC.) Harv.	A 1569
	<i>S. laevigatus</i> Thunb. var. <i>laevigatus</i>	A 1528, P 586
	<i>S. longiflorus</i> (DC.) Sch. Bip.	A 1556, P 458
	<i>S. radicans</i> (L. f.) Sch. Bip.	L 2131, P 1056
9417	<i>Euryops</i> Cass.	
	<i>E. anthemoides</i> B. Nord.	
	subsp. <i>astrotrichus</i> B. Nord.	P 512
	<i>E. spathaceus</i> DC.	L 2020, P 515
9420	<i>Othonna</i> L.	
	<i>O. cylindrica</i> (Lam.) DC.	L 2085, P 600
9425	<i>Dimorphotheca</i> Vaill. ex Moench	
	<i>D. zeyheri</i> Sond.	A 1513, L 2007
9427	<i>Osteospermum</i> L.	
	<i>O. calendulaceum</i> L. f.	L 2073, 2111
	<i>O. scariosum</i> DC. var. <i>scariosum</i>	L 2092, P 1017
9431	<i>Ursinia</i> Gaertn.	
	<i>U. nana</i> DC. subsp. <i>nana</i>	A 1549
9432	<i>Arctotis</i> L.	
	<i>A. sulcarpa</i> Lewin	L 2035
9438	<i>Berkheya</i> Ehrh.	
	<i>B. cardopatifolia</i> (DC.) Roessl.	P 687
9438a	<i>Cuspidia</i> Gaertn.	
	<i>C. cernua</i> (L. f.) B.L. Burt	
	subsp. <i>annua</i> (Less.) Roessl.	L 2069
9462	* <i>Cirsium</i> Mill.	
	<i>C. vulgare</i> (Savi) Ten.	A 1601
9501	<i>Dicoma</i> Cass.	
	<i>D. spinosa</i> (L.) Druce	A 1545, P 536

(43,5%), is indicative of the representativeness of the PRECIS database and for this area. This study provides support for an effort to intensify collecting in this region.

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### References

ACOCKS, J.P.H. 1975. Veld types of South Africa. *Mem.*



- bot. Surv. S. Afr.* 40: 1-128.
- COETZEE, B.J. 1974. A phytosociological classification of the Jack Scott Nature Reserve. *Bothalia* 11: 329-347.
- DE DALLA TORRE, C.G. & HARMS, H. 1958. Genera Siphonogamarum. Engelmann, Leipzig.
- DYER, R.A. 1975. The genera of southern African flowering plants. Vol. 1, Dicotyledons, Government Printer, Pretoria.
- DYER, R.A. 1976. The genera of southern African flowering plants. Vol. 2, Gymnospermae and Monocotyledons, Government Printer, Pretoria.
- GIBBS RUSSELL, G.E. 1985. The National Herbarium's computerized information system. *S. Afr. J. Sci.* 81: 62-65.
- GIBBS RUSSELL, G.E., REID, C., VAN ROOY, J. & SMOOK, L. 1985. List of species of southern African plants. 2nd edn. *Mem. bot. Surv. S. Afr.* 51: 1-152.
- GIBBS RUSSELL, G.E., WELMAN, W.G., RETIEF, E., IMMELMAN, K.L., GERMISHUIZEN, G., PIENAAR, B.J., VAN WYK, M. & NICHOLAS, A. 1987. List of species of southern Africa. 2nd edn, Part 2. *Mem. bot. Surv. S. Afr.* 56: 1-270.
- HILLIARD, O.M. 1983. Asteraceae. In: Flora of southern Africa, ed. Leistner, O.M., Vol. 33, pp. 7, Government Printer, Pretoria.
- MACDONALD, I.A.W. 1983. A list of invasive alien plants in southern Africa. Unpublished report, pp. 1-101, Percy FitzPatrick Institute of African Ornithology, Cape Town.
- PALMER, A.R. 1989. The vegetation of the Karoo Nature Reserve, Cape Province. I. A phytosociological reconnaissance. *S. Afr. J. Bot.* 55: 215-230.
- SCHELPE, E.A.C.L.E. 1969. A revised checklist of the Pteridophyta of southern Africa. *Jl S. Afr. Bot.* 35: 127-140.
- WELLS, M.J., BALSINHAS, A.A., JOFFE, H., ENGELBRECHT, V.M., HARDING, G. & STIRTON, C.H. 1986. A catalogue of problem plants in southern Africa incorporating the National Weed List of South Africa. *Mem. bot. Surv. S. Afr.* 53: 1-658.