Check List

Flowering plant biodiversity of Augrabies Falls National Park: a comparison between Augrabies Falls National Park, Kalahari Gemsbok National Park, Vaalbos National Park and Goegap Nature Reserve

P.C. ZIETSMAN AND H. BEZUIDENHOUT

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A list of flowering plants has been compiled for the Augrabies Falls National Park, which occupies an area of approximately 18 600 ha. This list of 364 species represents 210 genera and 74 families. The Monocotyledonae are represented by 76 species (20.9 % of the total number of species) and the Dicotyledonae by 288 (79.1 %). Approximately 54 % of these species occur only in the Augrabies Falls National Park and not in one of the other conservation areas with which it was compared. According to the life form spectrum, the Augrabies Falls National Park is a therophyte-hemicryptophyte area. Five of these spesies are endemic to the Southern African floristic region. One of them is a rare species.

Key Words: check list, conservation, endemic species, Gariep centre of endemism, Orange River Nama Karoo.

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Introduction

Surveys of the floristic diversity and species richness of an area are fundamental to wildlife management programmes and conservation policies of such an area. This study aims to provide a floristic check list of the Augrabies Falls National Park. A check list is a research tool to address aspects such as biodiversity, endemic, rare or endangered species, exotic (alien) species, and is essential to determine the floristic affinities of different regions. A floristic database of a national park can also serve as a permanent reference for botanical surveys in the Northern Cape region.

This project also forms part of a broader inventory of the diversity of plant species in the different national parks. Similar studies were conducted for the Kruger National Park (Van der Schijff 1969), Zuurberg National Park (Van Wyk *et al.* 1988), Kalahari Gemsbok National Park (van Rooyen et al. 1988 and van Rooyen and Bezuidenhout 1997) and the Vaalbos National Park (Zietsman *et al.* 1992).

Study area

The AFNP, which was proclaimed in 1966, is situated on both sides of the Orange River between 28°25'S–28°38'S latitude and 20°15'E–20°20'E longitude (Fig. 1). The river devides it into a northern (13 700 ha) and southern (4 500 ha) section. Within the park

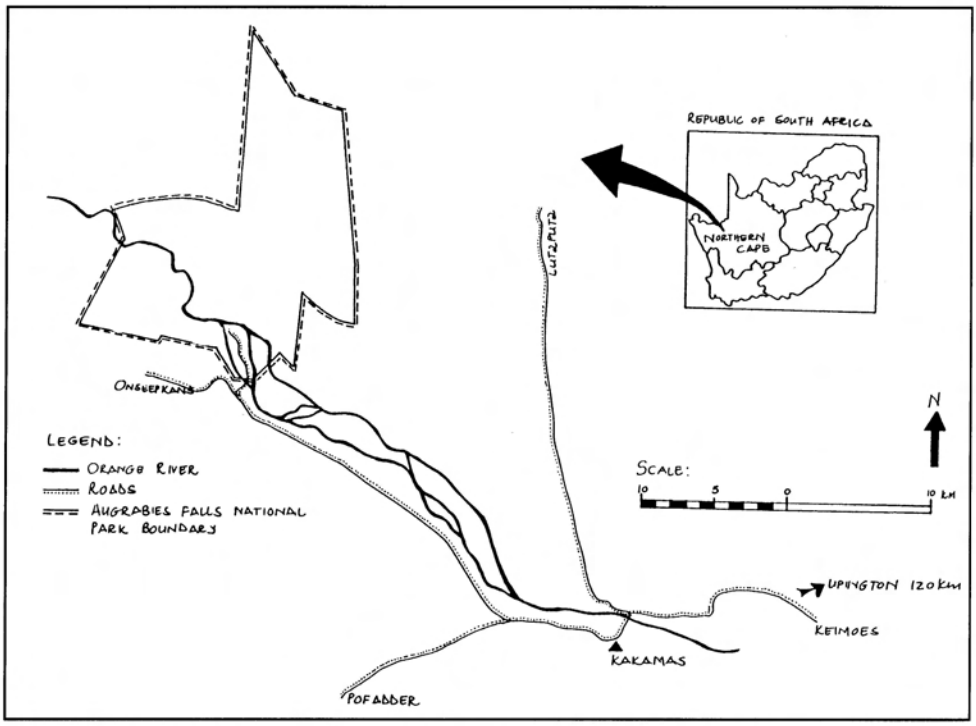

Fig. 1. The location of the Augrabies Falls National Park in relation to towns, main roads and the Orange River.

the Orange River flows through the rocky topography of the Orange River Nama Karoo (Hoffman 1996) and to the west through the extensive arid plains of Bushmanland. The Augrabies Falls, the Orange River Gorge, spectacular landscapes, and plant species of the area are the main tourist attractions.

The AFNP is the largest conservation area within the Orange River Nama Karoo vegetation type (Hoffman 1996). For more information on the plant communities, physiography and geology of the AFNP the papers by Werger & Coetzee (1977) and Bezuidenhout (1996) can also be consulted.

The rainfall, mainly during summer, is erratic and can be as high as 391 mm per year, but also lower than 40 mm per year (July to June). The average annual (July to June) rainfall for the AFNP is based on data collected by the Weather Bureau (1999) in the restcamp of the AFNP, over the past 52 years (1946–1998), and is just more than 211 mm. The past ten years (1988–1998) were dry years, well below the average annual rainfall, with the months December, January and February, representing the rainy period.

The temperature is less erratic than the rainfall with cold winter temperatures (coldest months June & July) as low as –2.9 °C while the summer temperatures (warmest months December, January and February) are as high as 42.9 °C (Land Type Survey Staff 1986).

Methods

This preliminary list of flowering plants of AFNP was compiled from collections made by P.C. Zietsman and H. Bezuidenhout between 1993 and

Table 1

An alphabetical list of the 74 families of flowering plants collected in Augrabies Falls National Park, showing the number of genera and species in each family

Families	Genera	Species
MONOCOTYLEDONAE		
Amaryllidaceae	1	2
Asparagaceae	1	4
Asphodelaceae	3	5
Colchicaceae	1	2
Cyperaceae	2	2
Dracaenaceae	1	1
Hyacinthaceae	2	3
Iridaceae	2	2
Poaceae	26	55
Total (Monocotyledonae)	39	76
DICOTYLEDONAE		
Acanthaceae	5	11
Aizoaceae	10	18
Amaranthaceae	5	5
Anacardiaceae	2	4
Asclepiadaceae	4	5
Asteraceae	26	42
Bignoniaceae	1	2
Boraginaceae	2	2
Brassicaceae	5	9
Burseraceae	1	1
Campanulaceae	1	1
Capparaceae	4	9
Celastraceae	1	2
Chenopodiaceae	4	11
Combretaceae	1	1
Convolvulaceae	1	1
Crassulaceae	2	3
Cucurbitaceae	1	3
Ebenaceae	2	3
Euphorbiaceae	3	14
Fabaceae	18	28
Frankeniaceae	1	1
Gentianaceae	1	1
Geraniaceae	2	4
Hydrophyllaceae	1	2
Illecebraceae	1	1
Lamiaceae	3	4
Loasaceae	1	1
Loganiaceae	1	1
Loranthaceae	1	1
Lythraceae	1	1
Malvaceae	4	7
Meliaceae	1	1
Mesembryanthemaceae	4	5
Montiniaceae	1	1
Moraceae	1	1
Neuradaceae	1	1
Nyctaginaceae	2	2
Oleaceae	1	1
Onagraceae	1	1
Oxalidaceae	1	1
Papaveraceae	1	1
Pedaliaceae	2	2
Periplocaceae	1	1
Plumbaginaceae	1	1
Polygalaceae	2	2
Polygonaceae	2	2
Portulacaceae	2	2
Resedaceae	1	1
Rhamnaceae	1	1
Rubiaceae	2	3
Salicaceae	1	1
Santalaceae	1	2
Sapindaceae	1	1
Scrophulariaceae	11	18
Selaginaceae	1	1
Solanaceae	2	11
Sterculiaceae	1	5
Tamaricaceae	1	1
Thymelaeaceae	1	1
Urticaceae	1	1
Vahliaceae	1	3
Verbenaceae	1	2
Viscaceae	1	1
Zygophyllaceae	3	11
Total (Dicotyledonae)	171	288
GRAND TOTAL	210	364

1998, a phytosociological and phytogeographical study by Werger & Coetzee (1977) and plants collected from time to time by the South African National Parks (SANP) officials and various other researchers at AFNP. All specimens were identified by the National Botanical Institute (NBI) and are housed in either the National Museum, Bloemfontein (NMB), the Kimberley South African National Parks Herbarium (KSAN) or the National Herbarium (PRE) of the NBI.

Nomenclature follows Arnold & De Wet (1993) with additions and changes following PRE herbarium practices. Species are arranged alphabetically under each genus, followed by author citation, collector and collector's number in paranthesis.

For comparison with the checklists on the flowering plants of the Kalahari Gemsbok National Park (Van Rooyen *et al.* 1988), Vaalbos National Park (Zietsman *et al.* 1992) and Goegap Nature Reserve situated near Springbok (unpublished report) life form classes were used according to Rutherford & Westfall (1986) and Mueller-Dombois & Ellenberg (1974).

The following life form classes are used:

Microphanerophytes (M): Perennial plants, usually woody, with the mean height of the renewel bud 2–5 m.

Nanophanerophytes (N): Perennial plants, usually woody, with the mean height of the renewal buds <2 m.

Chamaephytes (Ch): Perennial plants, generally woody or partly woody, with the mean height of the renewal buds less than or equal to 0,7 m.

Hemicryptophytes (H): Perennial plants, generally herbaceous, with the renewal buds at, or more often, close to ground level, but seldom exceeding 0,1 m in height.

Geophytes (G): Perennial plants, usually herbaceous, with renewal buds below ground level.

Therophytes (T): Ephemeral plants that complete their entire life cycle in one year or less.

Succulents (S), and parasites (Par).

Results and Discussion

The 364 species of flowering plants collected at the AFNP by the various researchers represent 210 genera and 74 families. The Monocotyledonae is represented by 9 families (12.2 % of the total number of families) and the Dicotyledonae by 65 (87.8 %) (Table 1). The Monocotyledonae is represented by 76 species (20.9 % of the total number of species) and the Dicotyledonae by 288 (79.1 %). The Poaceae is the largest family and represented by 55 species (15.1 % of all species), the Asteraceae second with 42 (11.5 %), the Fabaceae with 28 (7.7 %), the Aizoaceae and Scrophulariaceae with 18 species each (4.9 %) and the Euphorbiaceae with 14 (3.8 %). Nine genera are represented by five or more species, namely *Eragrostis* (15), *Euphorbia* (11), *Senecio* (8), *Solanum* (7), *Stipagrostis* (7), *Indigofera* (6), *Zygophyllum* (6), *Hermannia* (5) and *Salsola* (5). Only 20 % of the species collected in AFNP occur in the Goegap Nature Reserve, 21 % in Vaalbos National Park and 27 % in the Kalahari Gemsbok National Park. It is evident that the conservation of this area is important because of the high percentage (54 %) of plant species that occur only here as compared to the other conservation areas, a result of AFNP being situated in the Gariep centre of endemism.

Table 2

A comparison of percentage life form spectra between Augrabies Falls National Park (AFNP), Vaalbos National Park (V), Kalahari Gemsbok National Park (KG) and Goegap Nature Reserve

Locality	M	N	Ch	H	G	T	Other
AW	6	5	18	23	3	35	10
V	3	4	16	31	8	25	3
KG	1	7	15	31	13	31	1
Goegap	1	4	22	15	16	27	15

This study confirms the conclusion of Werger & Coetzee (1977) that the therophytes (T), hemicryptophytes (H) and chamaephytes (Ch) are the three dominant life forms (Table 2). The other life forms are relatively poorly represented. The low percentage of the geophytes may be explained by the fact that most of the data was collected during the fairly dry and unfavourable seasons between 1993 to 1998. According to Rutherford & Westfall (1986) the co-domi-

Table 3

Alphabetical list of flowering plants of the Augrabies Falls National Park and distribution of the different species in the other reserves (see text for explanation of growth form (GF) abbreviations)

G = Goegap Nature Reserve;
V = Vaalbos National Park;
KG = Kalahari Gemsbok National Park

** = Exotic (alien) species*

G	V	KG	GF	Plant species
				MONOCOTYLEDONAE
				Amaryllidaceae
				Nerine Herb.
			G	*N. filifolia* Bak. (Schlieben 11044)
			G	*N. gaberonensis* Brem. & Oberm. (P.C. & L. Zietsman 633)
				Asparagaceae
				Asparagus Oberm.
		X	H	*A. denudatus* (Kunth.) Oberm. (Werger & Coetzee 1977)
	X		Ch	*A. laricinus* (Burch.) Oberm. (Bezuidenhout 455)
		X	H	*A. pearsonii* (Kies) Oberm. (Coetzee & Werger 1730)
			H	*A. retrofractus* (L.) Oberm. (Coetzee & Werger 1731)
				Asphodelaceae
				Aloe L.
			S	*A. claviflora* Burch. (Leistner 2853)
X			S	*A. dichotoma* Mass. (Zietsman & Bezuidenhout 2423)
			S	*A. gariepensis* Pillans (Zietsman 3464b)
				Chlorophytum Ker-Gawl.
			S	*C. undulatum* (Jacq.) Oberm. (Marloth 12667)
				Haworthia Duval
			S	*H. transluscens* Haw. (Marloth 12525)
				Colchicaceae
				Ornithoglossum Salisb.
X			G	*O. viride* (L.f.) Ait. (Zietsman & Bezuidenhout 2431)
			G	*O. vulgare* B. Nord. (AFNP 97)
				Cyperaceae
				Bulbostylis Kunth
			T	*B. humilis* (Kunth) C.D. Cl. (Zietsman 3420)
				Cyperus L.
X	X		H	*C. marginatus* Thunb. (P.C. & L. Zietsman 631)
				Dracaenaceae
				Sansevieria Thunb.
			G	*S. aethiopica* Thunb. (Werger 1471)
				Hyacinthaceae
				Ornithogalum L.
			G	*O. suaveolens* Jacq. (AFNP 151)
			G	*O. unifolium* Retz. (Marloth 12462)
				Schizobasis Bak.
			G	*S. intricata* (Bak.) Bak. (Acocks 16382)
				Iridaceae
				Babiana Ker-Gawl.
			G	*B. tritonioides* G.J. Lewis (Marloth 12668)

G	V	KG	GF	Plant species
				Lapeirousia Pourret
			G	*L. plicata* (Jacq.) Diels (E. Wasserfall 1026)
				Poaceae
				Anthephora Schreb.
	X		H	*A. pubescens* Nees (Bezuidenhout 453)
				Aristida L.
	X	X	T	*A. adscensionis* L. (Smook 4575)
	X		T	*A. congesta* Roem. & Schult. subsp. *barbicollis* (Trin. & Rupr.) De Winter (Werger & Coetzee 1977)
				Bothriochloa Kuntze
			H	*B. bladhii* (Retz.) S.T. Blake (Acocks 16381)
			H	*B. insculpta* (A. Rich.) A. Camus (Bezuidenhout 458)
				Cenchrus L.
	X	X	H	*C. ciliaris* L. (P.C. & L. Zietsman 632)
				Chloris Swartz
X	X	X	T	*C. virgata* Swartz (Smook 4573)
				Dichanthium Willemet
		X	H	*D. annulatum* (Forssk.) Stapf var. *papillosum* (A. Rich.) De Wet & Harlan (P.C. & L. Zietsman 630)
				Digitaria Haller
			H	*D. ciliaris* (Retz.) Koeler (Smook 4574)
	X		H	*D. eriantha* Steud. (Zietsman & Bezuidenhout 2427)
				Echinochloa Beauv.
			T	*E. colona* (L.) Link (Acocks 21806)
				Enneapogon Beauv.
	X	X	T	*E. cenchroides* (Roem. & Schult.) C.E. Hubb. (Bezuidenhout 807)
X	X	X	T	*E. desvauxii* Beauv. (Werger & Coetzee 1977)
X		X	H	*E. scaber* Lehm. (Zietsman 3399)
				Eragrostis Wolf
		X	T	*E. annulata* Rendle ex Scott Elliot (Zietsman 3410)
			T	*E. aspera* (Jacq.) Nees (Repton 7163)
		X	T	*E. brizantha* Nees (Zietsman 3416)
			T	*E. cylindriflora* Hochst. (Liebenberg 4159)
	X	X	H	*E. echinochloidea* Stapf (Bezuidenhout 448)
		X	H	*E. homomalla* Nees (Smook 4563)
	X	X	H	*E. lehmanniana* Nees var. *lehmanniana* (Bezuidenhout 805)
			H	*E. nindensis* Fical. & Hiern (Coetzee & Werger 1694)
			T	*E.* cf. *pilosa* (L.) Beauv. * (Werger & Coetzee 1977)
	X	X	T	*E. porosa* Nees (Werger 372)
	X	X	H	*E. rotifer* Rendle (Coetzee & Werger 1685)
			H	*E. tef* (Zucc.) Trotter * (Smook 4578)
	X	X	H	*E. trichophora* Coss. & Dur. (Werger & Coetzee 1977)
			T	*E. virescens* Presl * (Botha & Panagos 37)
			T	*E. viscosa* (Retz.) Trin. (Repton 7164)
				Fingerhuthia Nees
X			H	*F. africana* Lehm. (Bezuidenhout 454)
				Hemarthria R. Br.
			H	*H. altissima* (Poir.) Stapf & C.E. Hubb. (Werdermann 3288)
				Leucophrys Rendle
			H	*L. mesocoma* (Nees) Rendle (Werger 344)
				Melinis Beauv.
	X		T	*M. repens* (Willd.) Zizka subsp. *repens* (Werger 371)
				Odyssea Stapf.
			H	*O. paucinervis* (Nees) Stapf (Bezuidenhout 797)

G	V	KG	GF	Plant species
				Oropetium Trin.
		X	H	*O. capense* Stapf (Werger & Coetzee 1977)
				Panicum L.
			H	*P. arbusculum* Mez (Smook 4564)
			H	*P. coloratum* L. var. *coloratum* (Bezuidenhout 450)
	X		H	*P. maximum* Jacq. (Werger & Coetzee 1977)
				Paspalum L.
			H	*P. distichum* L. (Acocks 18817)
				Phragmites Adamson
			H	*P. australis* (Cav.) Steud (Werger & Coetzee 1977)
				Polypogon Desf.
X			T	*P. monspeliensis* (L.) Desf. * (Smook 4579)
				Schmidtia Steud.
X		X	T	*S. kalihariensis* Stent (Zietsman & Bezuidenhout 2395)
				Setaria Beauv.
			H	*S. appendiculata* (Hack.) Stapf (Zietsman 3413)
	X	X	T	*S. verticillata* (L.) Beauv. (Werger & Coetzee 1977)
				Sporobolus R. Br.
			H	*S. ioclados* (Trin.) Nees (Bezuidenhout 426)
				Stipagrostis Nees
			T	*S. anomala* De Winter (Coetzee & Werger 1692)
X			T	*S. brevifolia* (Nees) De Winter (Werger & Coetzee 1977)
X		X	H	*S. ciliata* (Desf.) De Winter var. *capensis* (Trin. & Rupr.) De Winter (Werger & Coetzee 1977)
			H	*S. hochstetteriana* (Beck. ex Hack.) De Winter var. secalina (Henr.) De Winter (Zietsman & Bezuidenhout 2397)
X		X	H	*S. namaquensis* (Nees) De Winter (Bezuidenhout 400)
X	X	X	H	*S. obtusa* (Del.) Nees (Bezuidenhout 431)
	X	X	H	*S. uniplumis* (Licht.) De Winter var. *uniplumis* (Bezuidenhout 405)
				Tragus Haller
	X	X	T	*T. berteronianus* Schult. (Werger & Coetzee 1977)
				Triraphis R. Br.
		X	T	*T. purpurea* Hack.(Bezuidenhout 1000)
		X	T	*T. ramosissima* Hack. (Zietsman & Bezuidenhout 2391)
				DICOTYLEDONAE
				Acanthaceae
				Acanthopsis Harv.
			T	*A. hoffmannseggiana* (Nees) C.B. Cl. (AFNP 34)
				Barleria L.
			H	*B. lancifolia* T. Anders. (Werger & Coetzee 1977)
			H	*B. lichtensteiniana* Nees (Zietsman 3421)
	X	X	H	*B. rigida* Nees (Werger & Coetzee 1977)
				Blepharis Juss.
			Ch	*B. furcata* (L. f.) Pers. (Bezuidenhout 424)
		X	Ch	*B. mitrata* C.B. Cl. (Leistner 3355)
				Monechma Hochst.
			Ch	*M. desertorum* (Engl.) C.B. Cl. (Werger & Coetzee 1977)
		X	Ch	*M. divaricatum* (Nees) C.B. Cl. (Zietsman & Bezuidenhout 2406)
		X	Ch	*M. genistifolium* (Engl.) C.B. Cl. subsp. *genistifolium* (Meyer 2794)
			Ch	*M. spartioides* (T. Anders.) C.B. Cl. (PC & L Zietsman 636)
				Petalidium Nees
			Ch	*P. lucens* Oberm. (Meyer 7292)

G	V	KG	GF	Plant species
				Aizoaceae
				Aizoon L.
			H	*A. schellenbergii* Adamson (Werger & Coetzee 1977)
				Coelanthum E. Mey. ex Fenzl
			Ch	*C. grandiflorum* E. Mey. ex Fenzl (Marloth 12692)
				Galenia L.
X		X	N	*G. africana* L. (Werger & Coetzee 1977)
X			Ch	*G. sarcophylla* Fenzl (Wasserfall 1037)
		X	Ch	*G. secunda* (L. f.) Sond. (Werger & Coetzee 1977)
				Gisekia L.
		X	T	*G. africana* (Lour.) Kuntze var. *africana* (Brain P1)
			T	*G. pharnacioides* L. var. *pharnacioides* (Zietsman 2407)
				Hypertelis E. Mey. ex Fenzl
X	X		T	*H. salsoloides* (Burch.) Adamson var. *salsoloides* (Werger & Coetzee 1977)
				Limeum L.
	X		T	*L. aethiopicum* Burm. subsp. *namaense* Friedr. var. *lanceolatum* Friedr.(Werger & Coetzee 1977)
			T	*L. dinteri* Schellenb. (Werger & Coetzee 1977)
		X	T	*L. myosotis* H. Walter var. *confusum* Friedr. (Leistner 3346)
		X	T	*L. sulcatum* (Klotzsch) Hutch. var. *robustum* Friedr. (AFNP 64)
				Mollugo L.
		X	T	*M. cerviana* (L.) Ser. ex DC. (Zietsman 3414)
				Plinthus Fenzl
			Ch	*P. karooicus* Verdoorn (Werger & Coetzee 1977)
				Tetragonia L.
X		X	N	*T. arbuscula* Fenzl (Werger 368)
X			Ch	*T. reduplicata* Welw. ex Oliv. (Werger & Coetzee 1977)
				Trianthema L.
X			H	*T. parvifolia* E. Mey. ex Sond. var. *parvifolia* (Werger & Coetzee 1977)
		X	T	*T. triquetra* Rottl. ex Willd. (Werger & Coetzee 1977)
				Amaranthaceae
				Amaranthus L.
		X	T	*A. thunbergii* Moq. (Werger & Coetzee 1977)
				Hermbstaedtia Reichb.
X			T	*H. glauca* (Wendl.)Reichb. ex Steud. (Werger & Coetzee 1977)
				Kyphocarpa (Fenzl) Lopr.
	X	X	Ch	*K. angustifolia* (Moq.) Lopr. (Bezuidenhout 417)
				Leucosphaera Gilg
			Ch	*L. bainesii* (Hook. f.) Gilg (Werger 353)
				Sericocoma Fenzl
		X	Ch	*S. avolans* Fenzl (Werger & Coetzee 1977)
				Anacardiaceae
				Ozoroa Del.
			N	*O. namaensis* (Schinz & Dinter) R. Fernandes (Coetzee & Werger 1704)
				Rhus L.
X			M	*R. lancea* L. f. (P.C. & L. Zietsman 623)
			M	*R. pendulina* Jacq. (Bezuidenhout 447)
			N	*R. populifolia* E. Mey. ex Sond. (P.C. & L. Zietsman 634)
				Asclepiadaceae
				Microloma R. Br.
			H	*M. incanum* Decne.(Leistner 3347)
X			H	*M. sagittatum* (L.) R. Br. subsp. *sagittatum* (Zietsman & Bezuidenhout 2404)
				Orthanthera Wight

G	V	KG	GF	Plant species
			H	*O. albida* Schinz (Werger & Coetzee 1977)
				Pergularia L.
		X	G	*P. daemia* (Forssk.) Chiov. var. leiocarpa (K. Schum.) Huber (Zietsman 3418)
				Sarcostemma R. Br.
X			Ch	*S. viminale* (L.) R. Br. (Werger 377)
				Asteraceae
				Amellus L.
			T	*A. epaleaceus* O. Hoffm. (Wasserfall 1025)
			T	*A. tridactylus* DC. subsp. *arenarius* (S. Moore) Rommel (Zietsman 3436)
				Arctotis L.
	X		T	*A. leiocarpa* Harv. (Werger & Coetzee 1977)
			T	*A. venusta* T. Norl. (Zietsman 3446)
				Berkheya Ehrh.
			Ch	*B. chamaepeuce* (S. Moore) Rössl. (Werger & Coetzee 1977)
X			Ch	*B. spinosissima* (Thunb.) Willd. subsp. *spinosissima* (P.C. & L. Zietsman 641)
				Blumea DC.
			Ch	*B. caffra* (DC.) O. Hoffm. (AFNP 75)
	X	X	Ch	*B. gariepina* DC. (Bezuidenhout 444)
				Chrysanthemoides Tourn. ex Medik.
			Ch	*C. monolifera* (L.) T. Norl. subsp. pisifera (L.) T. Norl. (Bezuidenhout 799)
				Chrysocoma L.
X			Ch	*C. ciliata* L. (Werger 364)
				Conyza Less.
	X		T	*C. bonariensis* (L.) Cronq.* (AFNP 186)
				Dicoma Cass.
X	X	X	H	*D. capensis* Less. (Zietsman 3458)
				Dimorphotheca Vaill. ex Moench
			T	*D. pluvialis* (L.) Moench (Werger & Coetzee 1977)
X			T	*D. sinuata* DC. (Zietsman 3476)
				Felicia Cass.
X			Ch	*F. namaquana* (Harv.) (Zietsman 3430)
				Foveolina Kallersjo
X			T	*F. albida* (DC.) (Zietsman 3453)
				Gazania Gaertn.
X			H	*G. lichtensteinii* Less. (AFNP 190)
				Geigeria Griesselich
	X	X	Ch	*G. ornativa* O. Hoffm. (Ueckermann 7273)
			Ch	*G. vigintisquamea* O. Hoffm. (Zietsman 3441)
				Gorteria L.
			T	*G. corymbosa* DC. (Zietsman 3428)
				Helichrysum Mill.
	X	X	T	*H. argyrosphaerum* DC. (Werger & Coetzee 1977)
			T	*H. gariepinum* DC. (Zietsman 3435)
X			T	*H. herniarioides* DC. (Zietsman 3475)
				Ifloga Cass.
			T	*I. molluginoides* (DC.) Hilliard (AFNP 135)
				Kleinia Mill.
			H	*K. longiflora* DC. (Coetzee & Werger 1737)
				Leysera L.
X			T	*L. tenella* DC. (P.C. & L. Zietsman 655)
				Myxopappus Kallersjo
			T	*M. acutilobus* (DC.) Kallersjo (Zietsman & Bezuidenhout 2401)
				Nidorella Cass.
	X		T	*N. resedifolia* DC. subsp. *resedifolia* (AFNP 63)

				Osteospermum L.
X			T	*O. amplectens* (Harv.) T. Norl. (P.C. & L. Zietsman 637)
			T	*O. microcarpum* (Harv.) T. Norl. subsp. *microcarpum* (Zietsman & Bezuidenhout 2399)
				Othonna L.
			T	*O. sparsiflora* (S. Moore) B. Nord. (Marloth 12691)
				Pentzia Thunb.
			T	*P. quinquefida* (Thunb.) Less. (AFNP 182)
				Senecio L.
X			T	*S. arenarius* Thunb. (Coetzee & Werger 1729)
	X	X	T	*S. consanguineus* DC. (Zietsman 3457)
		X	T	*S. eenii* (S. Moore) Merxm. (Zietsman 3467)
			T	*S. flavus* (Decne.) Sch. Bip. (AFNP 83)
			T	*S. glutinosus* Thunb. (Werger & Coetzee 1977)
			T	*S. inaequidens* DC. (Werger 363)
X			T	*S. niveus* (Thunb.) Willd. (AFNP 58)
X			T	*S. sisymbriifolius* DC. (Zietsman 3485)
				Sonchus L.
			T	*S. oleraceus* L.* (AFNP 189)
				Verbesina L.
			T	*V. encelioides* (Cav.) Benth. & Hook. var. *encelioides** (AFNP 132)
				Bignoniaceae
				Rhigozum Burch.
			N	*R. obovatum* Burch. (Zietsman 3488)
	X	X	N	*R. trichotomum* Burch. (Leistner 3454)
				Boraginaceae
				Ehretia P. Br.
	X	X	N	*E. rigida* (Thunb.) Druce (Zietsman 3445)
				Trichodesma R. Br.
X			T	*T. africanum* (L.) Lehm. (Bezuidenhout 404)
				Brassicaceae
				Capsella Medik.
			T	*C. bursa-pastoris* (L.) Medik * (AFNP 71)
				Coronopus Zinn.
		X	T	*C. integrifolius* (DC.) Spreng. * (AFNP 65)
				Heliophila L.
X			T	*H. deserticola* Schltr. var. *deserticola* (AFNP 108)
			T	*H. minima* (Stephens) Marais (Zietsman 3474)
X			T	*H. seselifolia* Burch. ex DC. var. *seselifolia* (AFNP 11)
			T	*H. trifurca* Burch. ex DC. (AFNP 29)
				Lepidium L.
X			T	*L. africanum* (Burm. f.) DC. (AFNP 147)
X			T	*L. desertorum* Eckl. & Zeyh. (Werger & Coetzee 1977)
				Sisymbrium L.
			T	*S. capense* Thunb. (AFNP 159)
				Burseraceae
				Commiphora Jacq.
			Ch	*C. gracilifrondosa* Dinter ex J.J.A. V.D. Walt (P.C. & L. Zietsman 638)
				Campanulaceae
				Wahlenbergia Schrad. ex Roth
X			T	*W. prostrata* A. DC. (Marloth 1268O)

G	V	KG	GF	Plant species
				Capparaceae
				Boscia Lam.
X	X	X	M	*B. albitrunca* (Burch.) Gilg. & Ben. var. *albitrunca* (P.C. & L. Zietsman 625)
X			M	*B. foetida* Schinz subsp. *foetida* (Bezuidenhout 441)
				Cadaba Forssk.
	X		N	*C. aphylla* (Thunb.) Wild (P.C. & L. Zietsman 639)
				Cleome L.
		X	T	*C. angustifolia* Forssk. subsp. *diandra* (Burch.) Kers (Zietsman 3481)
			T	*C. foliosa* Hook. f. var. *lutea* (Sond.) Codd & Kers (Zietsman & Bezuidenhout 2405)
		X	T	*C. kalachariensis* (Schinz) Gilg & Ben. (AFNP 23)
			T	*C. oxyphylla* Burch. var. *oxyphylla* (Germishuizen 2828)
		X	T	*C. rubella* Burch. (Zietsman 3438)
				Maerua Forssk.
			N	*M. gilgii* Schinz (P.C. & L. Zietsman 621)
				Celastraceae
				Maytenus Molina
			M	*M. heterophylla* (Eckl. & Zeyh.) N.K.B. Robson (P.C. & L. Zietsman 619)
			M	*M. linearis* (L. f.) Marais (Zietsman 3459)
				Chenopodiacea
				Atriplex L.
	X		H	*A. semibaccata* R. Br. var. *appendiculata* Aell. (Werger 362)
				Chenopodium L.
	X	X	T	*C. album* L. * (AFNP 10)
			T	*C. ambrosioides* L. * (AFNP 161)
		X	T	*C. olukondae* (Murr) Murr (Werger & Coetzee 1977)
			T	*C. schraderianum* Roem. & Schult. * (Werger & Coetzee 1977)
				Salsola L.
			T	*S. aphylla* L. f. (Werger & Coetzee 1977)
			T	*S. arborea* C.A. Sm. ex Aell. (Coetzee & Werger 1681)
			T	*S. barbata* Aell. (Werger 1485)
X	X	X	T	*S. kali* L.* (Werger & Coetzee 1977)
		X	Ch	*S. tuberculata* (Moq.) Fenzl (Coetzee & Werger 1678)
				Suaeda Forssk.
			Ch	*S. fruticosa* (L.) Forssk. (Macdonald 54)
				Combretaceae
				Combretum Loefl.
	X		M	*C. erythrophyllum* (Burch.) Sond. (Werger & Coetzee 1977)
				Convolvulaceae
				Convolvulus L.
		X	H	*C. sagittatus* Thunb. var. *ulosephalus* (Hallier f.) Verdc. (Werger & Coetzee 1977)
				Crassulaceae
				Cotyledon L.
			S	*C. orbiculata* L. var. *oblonga* (Haw.) DC. (AFNP 19)
				Crassula L.
X			S	*C. elegans* Schonl. & Bak. f. subsp. *elegans* (AFNP 196)
			S	*C. sericea* Schonl. var. *sericea* (Werger 376)
				Cucurbitaceae
				Cucumis L.
			T	*C. meeusei* C. Jeffrey (AFNP 13)
			T	*C. sagittatus* Peyr. (Zietsman 3465)
			T	*C. zeyheri* Sond. (Zietsman 3415)

G	V	KG	GF	Plant species
				Ebenaceae
				Diospyros L.
	X		N	*D. lycioides* Desf. subsp. *lycioides* (Ueckermann 7272)
				Euclea Murray
			M	*E. pseudebenus* E. Mey. ex A. DC. (P.C. & L. Zietsman 622)
			N	*E. undulata* Thunb. var. *myrtina* (Burch.) Hiern (P.C. & L. Zietsman 645)
				Euphorbiaceae
				Chamaesyche S.F. Gray
			T	*C. glanduligera* (Pax) Koutnik (Zietsman 3401)
	X	X	T	*C. inaequilatera* (Sond.) Sojak (Werger & Coetzee 1977)
				Euphorbia L.
			S	*E. avasmontana* Dinter (Werger & Coetzee 1977)
			S	*E. brachiata* E. Mey. ex Boiss. (Leistner 3357)
			S	*E. caterviflora* N.E. Br. (Zietsman 3452)
			S	*E. gariepina* Boiss. subsp. *gariepina* (Marloth 14026)
			S	*E. gregaria* Marloth (Bezuidenhout 399)
X			S	*E. mauritanica* L. var. *mauritanica* (Werger 379)
			S	*E. peplus* L. * (AFNP 166)
			S	*E. rectirama* N.E. Br. (Bezuidenhout 425)
			S	*E. rhombifolia* Boiss. (Werger & Coetzee 1977)
			S	*E. spartaria* N.E. Br. (Coetzee & Werger 1733)
			S	*E. spinea* N.E. Br. (Werger331)
				Phyllanthus L.
	X	X	T	*P. maderaspatensis* L. (Werger & Coetzee 1977)
				Fabaceae
				Acacia Mill.
	X	X	M	*A. erioloba* E. Mey. (P.C. & L. Zietsman 618)
X	X	X	M	*A. karroo* Hayne (Bezuidenhout 456)
	X	X	N	*A. mellifera* (Vahl.) Benth. subsp. *detinens* (Burch.) Brenan (P.C. & L. Zietsman 648)
				Adenolobus Torre & Hillc.
			N	*A. garipensis* (E. Mey.) Torre & Hillc. (P.C. & L. Zietsman 646)
				Bauhinia L.
			N	*B. bowkeri* Harv. (Grobbelaar 2043)
				Cullen Medik.
	X	X	H	*C. obtusifolia* (DC.) C.H. Stirton (Zietsman 3156)
				Indigofera L.
	X	X	H	*I. argyraea* Eckl. & Zeyh. (Coetzee & Werger 1679)
			H	*I. argyroides* E. Mey. (Leistner 2842)
			H	*I. auricoma* E. Mey. (Werger & Coetzee 1977)
			H	*I. heterotricha* DC. (P.C. & L. Zietsman 629)
			H	*I. pechuelii* Kuntze (Bezuidenhout 419)
			H	*I. pungens* E. Mey. (Zietsman 3442)
				Lebeckia Thunb.
X			Ch	*L. spinescens* Harv.(Zietsman 3489)
				Lotononis (DC.) Eckl. & Zeyh.
	X	X	T	*L. platycarpa* (Viv.) Pichi Serm. (Zietsman 3477)
			T	*L. rabenaviana* Dinter & Harms (Zietsman 3426)
				Melilotus Mill.
			H	*M. alba* Desr. * (AFNP 168)
				Melolobium Eckl. & Zeyh.
X			T	*M. candicans* (E. Mey.) Eckl. & Zeyh. (AFNP 81)
				Parkinsonia L.
		X	M	*P. africana* Sond. (Wooley-Dod 2071)
				Piliostigma Hochst.

G	V	KG	GF	Plant species
			N	*P. thonningii* (Schumach.) Milne-Redh. (Leistner 2850)
				Prosopis L.
X			M	*P. glandulosa* Torr. var. *glandulosa* * (Balsinhas 109)
			M	*P. velutina* Wooton * (Harding 110)
				Ptycholobium Harms.
	X	X	Ch	*P. biflorum* (E. Mey.) Brummitt subsp. *biflorum* (Werger & Coetzee 1977)
				Rhynchosia Lour.
			H	*R. longiflora* Schinz (Zietsman 3464a)
	X		H	*R. totta* (Thunb.) DC. var. *totta* (Werger & Coetzee 1977)
				Schotia Jacq.
			M	*S. afra* (L.) Thunb. var. *angustifolia* (E. Mey.) Harv. (P.C. & L. Zietsman 647)
				Sutherlandia A. Br. ex Ait. F.
X	X		Ch	*S. frutescens* (L.) R. Br. (AFNP 192)
				Tephrosia Pers.
			T	*T. dregeana* E. Mey. (Zietsman 3405)
				Trigonella L.
			T	*T. hamosa* L. * (Zietsman 3427)
				Frankeniaceae
				Frankenia L.
			T	*F. pulverulenta* L. (AFNP 77)
				Gentianaceae
				Sebaea Soland. ex R. Br.
			T	*S. pentandra* E. Mey. var. *pentandra* (AFNP 22)
				Geraniaceae
				Monsonia L.
			T	*M. luederitziana* Focke & Schinz (Zietsman 3492)
			T	*M. umbellata* Harv. (Werger 330)
				Sarcocaulon (DC.) Sweet
X			Ch	*S. crassicaule* Rehm (Zietsman 3580)
			Ch	*S. patersonii* (DC.) G. Don (Werger & Coetzee 1977)
				Hydrophyllaceae
				Codon L.
X			T	*C. royenii* L. (P.C. & L. Zietsman 635)
			T	*C. schenckii* Schinz (Bezuidenhout 422)
				Illecebraceae
				Pollichia Ait.
	X	X	H	*P. campestris* Ait. (Werger & Coetzee 1977)
				Lamiaceae
				Lamium L.
			Ch	*L. amplexicaule* L. * (AFNP 40)
				Ocimum L.
	X		H	*O. canum* Sims (Werger & Coetzee 1977)
				Stachys L.
			Ch	*S. burchelliana* Launert (Zietsman 3402)
			Ch	*S. rugosa* Ait. (Zietsman & Bezuidenhout 2421)
				Loasaceae
				Kissenia R. Br. Ex Endl.
			Ch	*K. capensis* Endl. (Werger 333)

G	V	KG	GF	Plant species
				Loganiaceae
				Gomphostigma Turcz.
	X		Ch	*G. virgatum* (L. f.) Baill. (Wasserfall 1036)
				Loranthaceae
				Tapinanthus (Blume) Reichb.
		X	Par	*T. oleifolius* (Wendl.) Danser (Bezuidenhout 445)
				Lythraceae
				Heimia Link & Otto
			Ch	*H. myrtifolia* * Cham. & Schlechtd. (Bezuidenhout 800b)
				Malvaceae
				Abutilon Mill.
			Ch	*A. angulatum* (Guill. & Perr.) Mast. var. *angulatum* (Zietsman 3398)
			Ch	*A. pycnodon* Hochr. (Coetzee & Werger 1702)
				Hibiscus L.
			H	*H. elliottiae* Harv. (Bezuidenhout 438)
			H	*H. engleri* K. Schum. (Werger & Coetzee 1977)
			H	*H. fleckii* Guerke (Zietsman 3406)
				Malva L.
			H	*M. parviflora* L. * (AFNP 167)
				Radyera Bullock
X			H	*R. urens* (L. f.) Bullock (Werger & Coetzee 1977)
				Meliaceae
				Nymania Lindl.
			N	*N. capensis* (Thunb.) Lindb. (Zietsman & Bezuidenhout 2412)
				Mesembryanthemaceae
				Mesembryanthemum L.
			S	*M. perlatum* Dinter (P.C. & L. Zietsman 653)
				Psilocaulon N.E. Br.
			Ch	*P. absimile* N.E. Br. (Werger & Coetzee 1977)
				Ruschia Schwant.
			S	*R. cyathiformis* L. Bol. (AFNP 3)
			S	*R. griquensis* (L. Bol.) Schwant. (AFNP 12)
				Sphalmanthus N.E. Br.
			S	*S. olivaceus* (Schltr. & Berger) L. Bol. (AFNP 8)
				Montiniaceae
				Montinia Thunb.
X			N	*M. caryophyllacea* Thunb. (Zietsman 3400)
				Moraceae
				Ficus L.
X			M	*F. cordata* Thunb. subsp. *cordata* (Werger 1630)
				Neuradaceae
				Grielum L.
X		X	T	*G. humifusum* Thunb. (AFNP 79)
				Nyctaginaceae
				Boerhavia L.
		X	H	*B. repens* L. (Werger & Coetzee 1977)
				Phaeoptilum Radlk.
			Ch	*P. spinosum* Radlk. (P.C. & L. Zietsman 642)

G	V	KG	GF	Plant species
				Oleaceae
				Olea L.
			M	*O. europaea* L. subsp. *africana* (Mill.) P.S. Green (Bezuidenhout 437)
				Onagraceae
				Oenothera L.
			T	*O. indecora* Cambess. (AFNP 180)
				Oxalidaceae
				Oxalis L.
			G	*O. obliquifolia* Steud. ex Rich. (Werger & Coetzee 1977)
				Papaveraceae
				Argemone L.
	X	X	T	*A. ochroleuca* Sweet subsp. *ochroleuca* * (AFNP 61)
				Pedaliaceae
				Rogeria L.
			H	*R. longiflora* (Royen) Gay ex DC. (Zietsman & Bezuidenhout 2429)
				Sesamum L.
X		X	T	*S. capense* Burm. f. (Werger & Coetzee 1977)
				Periplocaceae
				Curroria Planch. ex Hook. f. & Benth.
			Ch	*C. decidua* Planch. ex Hook. f. & Benth. (Bezuidenhout 413)
				Plumbaginaceae
				Dyerophytum Kuntze
X			Ch	*D. africanum* (Lam.) Kuntze (P.C. & L. Zietsman 624)
				Polygalaceae
				Nylandtia Dumont
X			Ch	*N. spinosa* (L.) Dumort. (Repton 7179)
				Polygala L.
	X	X	Ch	*P. leptophylla* Burch. (Werger 375)
				Polygonaceae
				Emex Neek.
			T	*E. australis* Steinh. * (AFNP 194)
				Persicaria Mill.
			H	*P. serrulata* (Lag.) Webb & Moq. (Repton 7166)
				Portulacaceae
				Anacampseros L.
X			S	*A. albissima* Marloth (Wasserfall 1027)
				Ceraria Pearson & Stephens
			S	*C. namaquensis* (Sond.) Pearson & Stephens (Gubb 12991)
				Resedaceae
				Oligomeris Camb.
			Ch	*O. dipetala* (Ait.) Turcz. var. *dipetala* (Bezuidenhout 795)
				Rhamnaceae
				Ziziphus Mill.
	X		M	*Z. mucronata* Willd. subsp. *mucronata* (Werger 365)
				Rubiaceae
				Crocyllis E. Mey. & Hook. f.
			H	*C. anthospermoides* E. Mey. ex K. Schum. (Zietsman 3403)
				Kohautia Cham. & Schlechtd.

G	V	KG	GF	Plant species
			H	*K. caespitosa* Schinzl. var. brachyloba (Sond.) D. Mantell (Werdermann 3283)
	X	X	H	*K. cynanchica* DC. (Werger & Coetzee 1977)
				Salicaceae
				Salix L.
	X		M	*S. mucronata* Thunb. subsp. *capensis* (Thunb.) Immelman (Zietsman 3497)
				Santalaceae
				Thesium L.
			Par	*T. lacinulatum* A.W. Hill (Leistner 3345)
X	X		Park	*T. lineatum* L. f. (Zietsman 3460)
				Sapindaceae
				Pappea Eckl. & Zeyh.
X			M	*P. capensis* Eckl. & Zeyh. (Bezuidenhout 442)
				Scrophulariaceae
				Antherothamnus N.E. Br.
			Ch	*A. pearsonii* N.E. Br. (Bezuidenhout 804)
				Aptosimum Burch.
	X	X	H	*A. lineare* Marloth & Engl. (Zietsman 3440)
	X	X	Ch	*A. marlothii* (Engl.) Hiern. (Zietsman 3453)
		X	H	*A. procumbens* (Lehm.) Steud. var. *procumbens* (Zietsman 3431
		X	Ch	*A. spinescens* (Thunb.) Weber (Zietsman 3456)
				Diascia Link & Otto
			T	*D. engleri* Diels (Zietsman 3484)
				Diclis Benth.
			T	*D. petiolaris* Benth. (Zietsman 3495)
				Jamesbrittenia
			T	*J. aridicola* Hilliard (Zietsman 3450)
				Limosella L.
			T	*L. grandiflora* Benth. (Werger & Coetzee 1977)
				Manulea L.
			T	*M. gariepina* Benth. (Zietsman 3478)
		X	T	*M. gariepina* Benth. subsp. *campestris* (Hiern) Roessl. (AFNP 48)
			T	*M. schaeferi* Pilg. (Zietsman 3482)
				Nemesia Vent.
	X		T	*N. fruticans* (Thunb.) Benth. (Zietsman 3429)
				Peliostomum Benth.
	X		Ch	*P. leucorrhizum* E. Mey. ex Benth. var. *leucorrhizum* (Zietsman 3491)
	X	X	Ch	*P. leucorrhizum* E. Mey. ex Benth. var. *linearifolium* Weber (AFNP 25)
				Sutera Roth
			Ch	*S. ramosissima* Hiern (P.C. & L. Zietsman 649)
			T	*S. tomentosa* (Thunb.) Hiern (Zietsman & Bezuidenhout 2398)
				Zaluzianskya F.W. Schmidt
			T	*Z. diandra* Diels (Zietsman 3479)
				Selaginaceae
				Hebenstretia L.
X			T	*H. parviflora* E. Mey. (AFNP 70)
				Solanaceae
				Lycium L.
		X	N	*L. bosciifolium* Schinz (P.C. & L. Zietsman 620)
X			Ch	*L. cinerium (Thunb.) (Sens. lat.)* (Werger & Coetzee 1977)
X		X	N	*L. oxycarpum* Dun. (Werger & Coetzee 1977)
			Ch	*L. prunus-spinosa* Dun. (Werger & Coetzee 1977)
				Solanum L.
X			H	*S. burchellii* Dun. (P.C. & L. Zietsman 626)
		X	H	*S. capense* L. (AFNP 7)

G	V	KG	GF	Plant species
	X		Ch	*S. coccineum* Jacq. (Werger & Coetzee 1977)
X			Ch	*S. giftbergense* Dun. (AFNP 103)
	X		Ch	*S. nigrum* L. * (Werdermann 3290)
			Ch	*S. sisymbrifolium* Lam. * (Werger & Coetzee 1977)
			Ch	*S. villosum* Mill. (AFNP 76)
				Sterculiaceae
				Hermannia L.
			H	*H. leucantha* Schlechtd. (Zietsman 3469)
			H	*H. minutiflora* Engl. (Zietsman & Bezuidenhout 2390)
X		X	H	*H. pulchella* L. f. (Acocks 58355)
			Ch	*H. spinosa* E. Mey. ex Harv. (P.C. & L. Zietsman 627)
		X	Ch	*H. stricta* (E. Mey. ex Turcz.) Harv. (Bezuidenhout 420)
				Tamaricaceae
				Tamarix L.
			M	*T. usneoides* E. Mey. ex Bunge (Van Zinderen Bakker 1368)
				Thymelaeaceae
				Gnidia L.
	X	X	H	*G. polycephala* (C.A. Mey.) Gilg (AFNP 86)
				Urticaceae
				Forsskaolea L.
X			Ch	*F. candida* L. f. (Zietsman 3447)
				Vahliaceae
				Vahlia Thunb.
	X	X	H	*V. capensis* (L. f.) Thunb. subsp. *capensis* (Werger 11)
			H	*V. capensis* (L. f.) Thunb. subsp. *vulgaris* Bridson var. *linearis* E. Mey. ex Bridson Zietsman (3470)
	X		H	*V. capensis* (L. f.) Thunb. subsp. *vulgaris* Bridson var. *vulgaris* (AFNP 5)
				Verbenaceae
				Plexipus .Rafin.
		X	T	*P. garipensis* (E. Mey.) R. Fernandes (P.C. & L. Zietsman 650)
		X	H	*P. pumilus* (E. Mey.) R. Fernandes (Pearson 2929)
				Viscaceae
				Viscum L.
	X		Par	*V. schaeferi* Engl. & Krause (P. van Wyk 5191)
				Zygophyllaceae
				Tribulus L.
		X	T	*T. cristatus* Presl (AFNP 118)
			T	*T. pterophorus* Presl (Bezuidenhout 428)
X	X	X	T	*T. terrestris* L. (Werger & Coetzee 1977)
X		X	T	*T. zeyheri* Sond. subsp. *zeyheri* (Zietsman 3432)
				Sisyndite E. Mey.
			Ch	*S. spartea* E. Mey. ex Sond. (P.C. & L. Zietsman 628)
				Zygophyllum L.
			S	*Z. dregeanum* Sond. (Werger 1477)
			S	*Z. microcarpum* Licht. ex Cham. & Schlechtd. (Bezuidenhout 415)
			S	*Z. microphyllum* L. f. (Basson B23)
			S	*Z. simplex* L. (P.C. & L. Zietsman 652)
			S	*Z. stapffii* Schinz (Bezuidenhout 209)
			S	*Z. suffruticosum* Schinz (P.C. & L. Zietsman 677)

nant lifeforms are chamaephytes and hemicryptophytes.

Bauhinia bowkeri (Fabaceae) is the only species listed as endemic to the Southern African floristic region (FSA) and also regarded as rare (Hilton-Taylor 1996). Four other species *Babiana tritonioides* and *Laperousia plicata* (Iridaceae), *Crassula orbiculata* var. *oblongata* (Crassulaceae) and *Nemesia fruticans* (Scrophulariaceae) are endemic to the FSA region but are not endangered. None of these species are endemic to AFNP.

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