Bothalia 23,1: 91–104 (1993)

Mycorrhizal status of plants growing in the Cape Floristic Region, South Africa

N. ALLSOPP* and W. D. STOCK*

Keywords: cluster roots, Fynbos, mediterranean-type shrublands, mycorrhizas, root systems

ABSTRACT

A survey of the mycorrhizal status of plants growing in the Cape Floristic Region of South Africa was undertaken to assess the range of mycorrhizal types and their dominance in species characteristic of this region. Records were obtained by examining the root systems of plants growing in three Cape lowland vegetation types, viz. West Coast Strandveld, West Coast Renosterveld and Sand Plain Lowland Fynbos for mycorrhizas, as well as by collating literature records of mycorrhizas on plants growing in the region. The mycorrhizal status of 332 species is listed, of which 251 species are new records. Members of all the important families in this region have been examined. Mycorrhizal status appears to be associated mainly with taxonomic position of the species. Extrapolating from these results, we conclude that 62% of the flora of the Cape Floristic Region form vesicular-arbuscular mycorrhizas, 23% have no mycorrhizas, 8% are ericoid mycorrhizal, 2% form orchid mycorrhizas, whereas the mycorrhizal status of 4% of the flora is unknown. There were no indigenous ectomycorrhizal species. The proportion of non-mycorrhizal species is high compared to other ecosystems. In particular, the lack of mycorrhizas in several important perennial families in the Cape Floristic Region is unusual. The diversity of nutrient acquiring adaptations, including the range of mycorrhizas and cluster roots in some non-mycorrhizal families, may promote coexistence of plants in this species-rich region.

UITTREKSEL

'n Opname van die status van mikorisas by plante wat in die Kaapse Floristiese Streek van Suid-Afrika voorkom, is onderneem om die omvang te bepaal van verskillende mikorisatipes en hulle oorheersing in spesies kenmerkend van hierdie streek. Rekords is verkry deur die wortelsisteem van plante in drie laagliggende Kaapse veldtipes, naamlik Weskus-strandveld, Weskus-renosterveld en Sandvlakte-fynbos, vir mikorisas te ondersoek. Rekords uit die literatuur van toepassing op mikorisas wat op plante in hierdie streek groei, is ook in ag geneem. Die status van mikorisas by 332 spesies word vermeld, 251 daarvan nuwe rekords. Lede van al die belangrike families in die streek is ondersoek. Die status van mikorisas is skynbaar hoofsaaklik met die taksonomiese posisie van die spesie geassosieer. Ons het tot die gevolgtrekking gekom dat 62% van die flora van die Kaapse Floristiese Streek vesikulêr-arbuskulêre mikorisas vorm, 23% geen mikorisas het nie, 8% erikoïede mikorisas vorm, 2% orgidee-mikorisas het, terwyl die mikorisa-status van 4% van die flora onbekend is. Daar was geen inheemse spesies wat ektomikorisas gevorm het nie. Die proporsie nie-mikorisaspesies is hoog in vergelyking met dié wat in ander ekosisteme aangetref word. Die afwesigheid van mikorisas by verskeie belangrike meerjarige families in die Kaapse Floristiese Streek is veral ongewoon. Die verskeidenheid aanpassings om voedingstowwe te bekom, insluitend die omvang van mikorisas en troswortels by sekere nie-mikorisafamilies, mag die gelyktydige bestaan van plante in hierdie spesieryke streek bevorder.

INTRODUCTION

It is generally accepted that most terrestrial plants probably form mycorrhizal associations between their roots and certain fungi, although the vast majority of plants growing in natural ecosystems have not had their mycorrhizal status confirmed (Trappe 1987; Newman & Reddell 1987). The mycorrhizal status of plants reflect both their taxonomic affinities and their ecology. Investigations on the mycorrhizal status of plants in various parts of the world indicate that the major terrestrial biomes can be characterized by specific mycorrhizal types (Read 1991). Surveys of mycorrhizas show that trees of forests and woodlands are either ectomycorrhizal or vesicular-arbuscular mycorrhizal; herbaceaous plants and shrubs in grasslands and shrublands usually form vesicular-arbuscular mycorrhizas; boreal and temperate heathlands are dominated by ericoid mycorrhizal species; and disturbed ecosystems by non-mycorrhizal weed species (see Brundrett 1991 for references). Whereas the mycorrhizal status of some floras is well documented (e.g. British Isles by Harley & Harley 1987), little is known about both the mycorrhizal associations of plants in the Cape Floristic Region (CFR) and their functional role in low nutrient ecosystems.

The vegetation of the CFR contrasts sharply, in terms of taxonomic composition and vegetation structure, with the surrounding southern African vegetation. The Cape flora has a high species diversity (± 8 500 species), around 68% species endemism (Bond & Goldblatt 1984), and high beta and gamma species turnover (Cowling 1990). Agriculture, urbanization and alien plant invasion are a severe threat to this flora as a result of the limited range of many plant species, and have led to the destruction of much of the lowland vegetation (Hall 1983). Mycorrhizas act as soil nutrient-absorbing organs for the plants. As such they will influence the physiology of individuals, as well as their interactions with other plants growing in the same community (Harley 1989; Read 1991). Recognizing the patterns of distribution and understanding the ecological role of mycorrhizal types in a community may be crucial to understanding the dynamics which shape plant communities (Allsopp & Stock in press).

This study collates published records of the mycorrhizal status of plants occurring in the CFR as defined by

* Department of Botany, University of Cape Town, Private Bag, Rondebosch 7700, South Africa.
MS. received: 1992-05-12.

Bond & Goldblatt (1984). In addition, the mycorrhizal status of plants growing in three lowland vegetation types, West Coast Strandveld, West Coast Renosterveld and Sand Plain Lowland Fynbos, is reported for the first time. The aim of this paper is to provide information on the mycorrhizal status of plant species which may be of significance in explaining vegetation patterns and plant functioning in the CFR.

STUDY AREAS

Three study sites representing West Coast Strandveld, at Melkbosstrand (33°45'S 18°27'E), West Coast Renosterveld on the hill, Joostenberg, on the farm Hercules Pillar (33°46'S 18°46'E), and Sand Plain Lowland Fynbos at the Fynbos Biome intensive study site (33°31'S 18°32'E) at Pella, were chosen to investigate the mycorrhizal status of a broad range of plants growing in threatened habitats in the CFR. The classification of the vegetation categories follows that of Moll *et al.* (1984). The strandveld vegetation, growing on coarse/medium sandy soil (organic matter 2.2%, pH of 7.5, total P 422 $\mu g\ g^{-1}$ (Witkowski & Mitchell 1987)) is a broad-leaved, sclerophyllous 1.0–2.5 m high shrubland with a large succulent component (Boucher 1983). The Renosterveld vegetation, growing on a fine sand/clayey soil [organic matter 4.9%, pH 4.1, total P 127 $\mu g\ g^{-1}$ (N. Allsopp unpublished)] is an evergreen, cupressoid or microphyllous shrubland, 1–2 m high, dominated by *Elytropappus rhinocerotis* with strong Lowland Fynbos affinities (Tansley 1982; Boucher 1983). The Sand Plain Lowland Fynbos growing on medium textured sandy soil [organic matter 1.4–3.4%, pH 4.6–4.8, total P 23–34 $\mu g\ g^{-1}$ (Mitchell, Brown & Jongens-Roberts 1984)] is an ericoid-leaved, sclerophyllous vegetation, 0.75–1.5 m high with some taller shrubs, characterized by the presence of *Phylica cephalantha* (Boucher 1983). Vegetation surveys at the three sites have recorded 56, 63 and 215 perennial species at the Strandveld (Siegfried 1981), Renosterveld (Tansley 1982) and Lowland Fynbos (Boucher & Shepherd 1988) sites respectively. In addition annuals and bulbous species are numerically important components of all three vegetation types (Boucher 1983; Bond & Goldblatt 1984).

MATERIALS AND METHODS

Root collection

Roots were collected during August, September and early October when unthickened roots were common while the soil was moist. Two collections were made at both the Strandveld (during August 1987 and September 1989) and Renosterveld sites (during October in 1988 and September 1989). The Lowland Fynbos site was sampled six times over four years (June and August 1986, August and September 1987, September 1988, August 1989). Two 25 × 25 m plots were set up at a site on each collection day. The plots at the Strandveld site were situated 60–300 m inland of the high water mark. The Renosterveld plots were on the NW-SW-facing lower slopes of Joostenberg. At the Lowland Fynbos site, plots were randomly scattered throughout the 269 ha study site.

Roots of one representative of all species occurring in the plots were sampled. In addition, plant species not in the plots, but encountered in the vicinity, were sampled. Smaller plants, including annuals, perennial seedlings and bulbous plants, were excavated with entire root systems. Roots of larger shrubs were collected by carefully tracing the root system from the main stem until young, unthickened roots were encountered. However, for some species, including members of the Anacardiaceae and Ebenaceae, few young roots could be found despite extensive excavation along roots down to 1 m. At the Renosterveld site some species were not sampled because they grew only in narrow cracks among rocks (e.g. *Olea* sp.). At the Strandveld site the large size of dominant shrubs and density of the vegetation at ground level, as well as spininess of some species, precluded collection of these species' roots.

Young roots were removed from surrounding soil in the field and immediately placed in vials containing 10% KOH for clearing. Wherever possible, 500 mm of root per plant was collected. Roots were cleared for one week at 20 °C, and then rinsed under running tap water (Smith & Bowen 1979). Where necessary, pigmented roots were decolourized with H_2O_2 or NaClO. This was followed by acidification in 1 M HCl and staining in 0.05% Trypan blue in lactic acid solution (Kormanik & McGraw 1982). Root segments were permanently mounted in a polyvinyl acid solution and inspected at 100 and 400 times magnification with a light microscope for mycorrhizal structures.

Plants were classified according to Cronquist (1988) and species names follow Gibbs Russell *et al.* (1985, 1987).

Literature survey

All known records of the mycorrhizal status of plants in the CFR were consulted. Only those records which reported the mycorrhizas of plants actually growing in the CFR are listed here. Confirmation of infection status of some species was undertaken by examining roots of plants growing in soil from their natural habitats in pot culture.

RESULTS

Vesicular-arbuscular mycorrhizas (VAM), characterized by the presence of arbuscules in the inner cortical cells with or without vesicles (Harley & Smith 1983), were the most common type of mycorrhiza (61% of species examined) (Appendix). Infections regarded as vesicular-arbuscular (VA) mycorrhizal but morphologically distinct from the above types were formed by *Aristea dichotoma*, which formed intracellular coils similar to those described by Brundrett & Kendrick (1990) in *Trillium grandiflorum*, while vesicular-arbuscular mycorrhizal fungi in *Orphium frutescens* and *Sebaea exacoides* formed structures typical of those seen in other members of the Gentianaceae (Jacquelinet-Jeanmougin & Gianinazzi-Pearson 1983). Infection formed by the 'fine endophyte' (Greenall 1963) was occasionally seen, but was never exclusively found on one species. Ericoid mycorrhizas (ERIC) were found in the hair roots of all members of the Ericaceae examined (Appendix). They are characterized by the formation of coiled and branched, fine hyphae in the cortical cells (Read 1983). Orchid mycorrhizas (ORCH) were seen in the two *Disa* spp. examined (Appendix) and consist of characteristic coarse, coiled intracellular hyphae (Harley & Smith 1983). No ectomycorrhizal infection was seen in the indigenous species examined. Introduced ectomycorrhizal species such as pines, oaks, poplar and eucalypts form ectomycorrhizas in the CFR but the ectomycorrhizal fungi were in all likelihood introduced with imported saplings (Van der Westhuizen & Eicker 1987).

Ninety-one of the 332 species reported formed no mycorrhizas (Appendix). These were concentrated in the Caryophyllidae and the families Brassicaceae, Crassulaceae, Proteaceae, Santalaceae, Zygophyllaceae, Restionaceae and Cyperaceae. Plant roots which contained occasional vesicles but no arbuscules were regarded as functionally non-mycorrhizal (Hirrel *et al.* 1978).

Some earlier studies (Laughton 1964; Low 1980) have reported endophytic mycorrhizas (ENDO) as being present but descriptions or illustrations do not indicate structures which are typical of mycorrhizas as they are presently delimited (Harley & Smith 1983). Non-mycorrhizal fungi were fairly frequent in both mycorrhizal and non-mycorrhizal roots examined for this study. Therefore, reports of fungal infection as 'endophytic mycorrhizas' should be viewed with caution. The most common non-mycorrhizal root inhabiting fungus was *Olpidium* sp., which forms cysts and zoosporangia (Sampson 1939), which may be mistaken for VA mycorrhizal vesicles if care is not taken. Unidentified hyphal fungi, including dark, septate hyphal fungi forming microsclerotia (DSH) similar to those described by Haselwandter & Read (1980) in alpine vegetation, were also present. The non-mycorrhizal roots of members of the Proteaceae have been shown to support a fungal flora that is distinctly different to that found in the non-rhizosphere soil (Allsopp *et al.* 1987). Infection by *Olpidium* sp. and other fungi was particularly heavy in the root systems of members of the Poaceae and Scrophulariaceae where they could obscure infection by VA mycorrhizal fungi (Appendix).

DISCUSSION

The mycorrhizal status of many of the taxa recorded here has not previously been reported, as can be expected, given the high levels of endemism and species radiation in the CFR and the paucity of mycorrhizal studies in this region. All the important families, as well as the twenty largest genera in the CFR (Bond & Goldblatt 1984), now have had some of their members examined for mycorrhizas. The endemic Penaeaceae and near endemic Bruniaceae have VA mycorrhizal species. Families which need further investigation are the Anacardiaceae, Ebenaceae, Juncaceae, and Celastraceae, as well as the endemic families Stilbaceae, Grubbiaceae, Roridulaceae, Retziaceae and Geissolomaceae. The lowland vegetation types have been well covered and generalizations regarding their mycorrhizas can now be made. However, the mycorrhizal status of the vegetation of habitats such as forests, seasonally waterlogged soils, limestone and mountain ecosystems are less well catalogued.

The absence of ectomycorrhizas is a notable feature of this flora. Ectomycorrhizal structures are reported in many plants growing in arid regions of Australia which belong to families and genera also present in the CFR (Warcup 1980; Warcup & McGee 1983; McGee 1986; Bellgard 1991). Ectomycorrhizas are also known to occur in the low nutrient soils of the Australian mediterranean heathlands (Chilvers & Pryor 1965; Brundrett & Abbott 1991). In addition, ectomycorrhizas have been found on trees growing in other African ecosystems (Redhead 1968; Högberg & Pierce 1986). However, shrub vegetation growing on Kalahari sands adjacent to ectomycorrhizal woodlands was exclusively vesicular-arbuscular mycorrhizal (Högberg & Pierce 1986). The reasons for the exclusion of ectomycorrhizas from the CFR are not clear, although this can possibly be ascribed to the absence of an organic surface horizon which is usually associated with the presence of ectomycorrhizas (Read 1991), and to frequent disturbance by fire. For instance, in Italian mediterranean ecosystems on calcareous soils, canopy cover values for ectomycorrhizal plant species nine years after fire was a quarter of that in unburnt forest (Puppi & Tartaglini 1991). However, these explanations do not account satisfactorily for their absence in the CFR, because ectomycorrhizas occur in fire-prone communities in Australia with low soil organic matter (Brundrett & Abbott 1991).

The explosive speciation that the genus *Erica* has undergone in the CFR (± 530 spp.) implies that ericoid mycorrhizas are unusually common in this area. Cowling *et al.* (1990) have suggested that edaphic specialization of the endophyte has powered this speciation, but, as yet, supporting evidence is lacking. An interesting feature of ericoid mycorrhizal plants in the mediterranean-climate regions of the world is their co-existence with other plant species, whereas in more temperate regions they usually form almost pure stands in areas where soil degradation has produced soil conditions which plant roots and other mycorrhizas cannot tolerate (Leake *et al.* 1989).

All the non-mycorrhizal families in this study have been reported as such before, although some have had very few species examined for mycorrhizal colonization (Trappe 1987). Many of the non-mycorrhizal species in this study fall into the Caryophyllidae which is roughly equivalent to the Centrospermae (Cronquist 1988) which was originally regarded as non-mycorrhizal (Gerdemann 1968). Subsequent studies have shown that many species in this group are capable of forming mycorrhizas (Tester *et al.* 1987), and that some families are typically mycorrhizal, e.g. Cactaceae (Miller 1979). However, despite these exceptions, 80% of the species in the Caryophyllidae which have been examined are either non-mycorrhizal or facultatively mycorrhizal (Trappe 1987). Mechanisms which enable some species to actively exclude mycorrhizal fungi, when exposed to viable inoculum, are unclear (Tester *et al.* 1987; Koide & Schreiner 1992).

In dicotyledonous species, weedy, herbaceous plants often lack mycorrhizas or are weakly mycorrhizal (Malloch *et al.* 1980; Trappe 1987) and it has been noted that some species are less likely to form mycorrhizas when colonizing disturbed sites than adjacent undisturbed areas (Miller 1979; Reeves *et al.* 1979). In our study, the annuals in the Scrophulariaceae were usually non-mycorrhizal, although a few individuals form typical VAM.

Anaerobic conditions in waterlogged soils have been invoked to explain the absence of mycorrhizas in some plants (Anderson *et al.* 1984), and Tester *et al.* (1987) advance this as an explanation of the absence of mycorrhizas in most of the Cyperaceae. In this study the members of the Cyperaceae and the Restionaceae examined were non-mycorrhizal while growing in well-drained soil with other mycorrhizal plants, although both families are often associated with waterlogged conditions, and so this does not seem to be the only reason for the exclusion of mycorrhizas from these taxa. Although Powell (1975) reported mycorrhizal structures in some roots of members of the Cyperaceae, he concludes that they are functionally non-mycorrhizal due to the possession of a fine root system. This complements Baylis' (1975) proposal that the magnolioid root form with poorly developed root hairs would be more strongly mycorrhizal than finer root systems. Two important perennial families in the CFR, which do not form mycorrhizas (viz. Proteaceae and Restionaceae), are characterized by the formation of cluster roots, the rootlets of which are densely covered in long root hairs (Purnell 1960; Lamont 1972a, 1982). In addition, cluster roots have been observed on members of the Cyperaceae (Lamont 1974), the genus *Aspalathus* (Fabaceae) (this paper and M. Cocks unpublished data) and Australian members of the Fabaceae (Lamont 1972b; Brundrett & Abbott 1991), which typically have low VAM infection levels. The absence or low infection levels of mycorrhizas in the taxa forming cluster roots support Baylis' (1975) proposition that mycorrhizas will be less important when root systems are finer. The loss of the ability to form mycorrhizas is regarded as an evolutionarily advanced feature (Trappe 1987).

The mycorrhizal status of the species in the CFR seems to be a reflection of their taxonomic position, although Newman & Reddell (1987) warn that very few families form exclusively one type of mycorrhiza or are consistently without mycorrhizas. This can be expected when worldwide the higher taxa of angiosperms are poorly correlated with their ecological niches (Cronquist 1988). Life form or environmental factors do not satisfactorily explain the absence of mycorrhizas in longer lived plants such as members of the Proteaceae, Restionaceae and Zygophyllaceae in the CFR and this must be regarded as a taxon-related characteristic for many groups. Reports of VA mycorrhizal species among the Proteaceae in New South Wales, Australia (Bellgard 1991) and ectomycorrhizal *Faurea saligna* (Proteaceae) in Zambia (Högberg & Piearce 1986), indicate that the mycorrhizal status of members of this family should be investigated with respect to soil fertility, as mycorrhizas are absent in members of this family growing in low nutrient soils of the CFR and Western Australia (Brundrett & Abbott 1991). Members of families such as the Aizoaceae and Mesembryanthemaceae, which are commonly found associated with disturbed areas in the CFR, are non-mycorrhizal when growing in undisturbed ecosystems. This supports the report that at the ecosystem level, patterns of mycorrhizal and non-mycorrhizal species among weedy species followed taxonomic divisions irrespective of growth form (Pendleton & Smith 1983). As most of the data here are obtained from plants growing in the field and mycorrhizal status was usually consistent at the family level, generalizations can be made regarding the mycorrhizal status of the Cape Flora, provided cognisance is taken that exceptions may arise. The mycorrhizal status of the flora of the three study sites, representing three lowland vegetation types is summarized in Table 1. If the mycorrhizal status of species listed in Bond & Goldblatt (1984) is inferred from that of taxonomically related species which have been examined, we conclude that 62% of the flora form VAM, plants without mycorrhizas are the next largest group, ericoid and orchid mycorrhizas are found in less than 10% of the flora, and the mycorrhizal status of 4% of the flora is unknown (Table 1).

TABLE 1.—Summary of the mycorrhizal status of the vegetation growing in Sand Plain Lowland Fynbos, Renosterveld and Strandveld communities, and the Cape Floristic Region (CFR)

	VAM (%)	ABS (%)	ERIC (%)	ORCH (%)	Unknown (%)
Lowland Fynbos	72	23	<1	1–2	3
Renosterveld	77	18	0	?	5
Strandveld	64	27	0	?	9
CFR	62	23	8	2	4

VAM = vesicular-arbuscular mycorrhizal; ABS = non-mycorrhizal; ERIC = ericoid mycorrhizal; ORCH = orchid mycorrhizal.

The proportion of non-mycorrhizal species in the CFR is high when compared to many other vegetation types worldwide (Brundrett 1991). As non-mycorrhizal plants are normally associated with high levels of disturbance, or edaphically and climatically extreme conditions, the non-mycorrhizal flora in the CFR is atypical in that representatives of two families that dominate the vegetation of the CFR, the Proteaceae and Restionaceae, are non-mycorrhizal. The evolutionary and ecological significance of this needs further exploration. The diversity of mycorrhizal types is possibly an indication that no one type of mycorrhiza or other nutrient acquiring adaptation is pre-eminently suited to the environmental conditions in the CFR and that the diversity of nutrient acquisition mechanisms in the CFR has probably promoted species co-existence.

ACKNOWLEDGEMENTS

We thank C. Allsopp, M. T. Deignan, E. C. February, J. Jacobs, A. Jensen and H. Vaughan for assistance with field work; J. Midgley and the nursery at Kirstenbosch for providing plants; and A. Bean, E. Esterhuysen, C. Johnson, H. P. Linder, P. Littlewort, J. Manning, F. Powrie and E. van Jaarsveld for help with identifying plant species. Mr S. de Wit is thanked for permission to collect roots on his farm, Hercules Pillar.

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APPENDIX—A preliminary list of the mycorrhizal status of plants occurring in the Cape Floristic Region

	No.	Loc.	Lit.	Myc.	Notes
MAGNOLIOPSIDA					
MAGNOLIIDAE					
LAURACEAE					
Ocotea bullata *(Burch.) Baill.*			EML	ENDO	
FUMARIACEAE					
Cysticapnos vesicarius *(L.) Fedde*	13	N	B, M & A	ABS	
CARYOPHYLLIDAE					
AIZOACEAE					
Aizoon sarmentosum *L. f.*	1	H	A & S	ABS	
Galenia africana *L.*	5	N	B, M & A	ABS	
Limeum aethiopicum *Burm.*	1	P	A & S	ABS	
Pharnaceum					
sp. cf. P. croceum *E. Mey. ex Fenzl*	2	P	A & S	ABS	
incanum *L.*	4	P	A & S	ABS	Vesicles, other fungi may be present
scleranthoides *Sond.*	1	P	A & S	ABS	
sp.	3	N	B, M & A	ABS	
Polpoda capensis *Presl*	3	P	A & S	ABS	Vesicles may be present
Tetragonia					
fruticosa *L.*	7	N	B, M & A	ABS	
portulacoides *Fenzl*	2	P	A & S	ABS	
MESEMBRYANTHEMACEAE					
Carpanthea pomeridiana *(L.) N.E. Br.*	2	PH	A & S	ABS	Other fungi present
Carpobrotus					
acinaciformis *(L.) L. Bol.*	1	M	A & S	ABS	*Olpidium*, DSH, other fungi present
edulis *(L.) L. Bol.*	3	P	A & S	ABS	Arbuscules in one specimen, vesicles and other fungi present
Dorotheanthus bellidiformis *(Burm. f.) N.E. Br.*	3	P	A & S	ABS	DSH, other fungi present
Drosanthemum					
floribundum *(Haw.) Schwant.*	5	N	B, M & A	ABS	
sp.	4	N	B, M & A	ABS	
Jordaaniella dubia *(Haw.) H.E.K. Hartm.*	1	M	A & S	ABS	
Lampranthus					
aurantiacus *(DC.) Schwant.*	2	P	A & S	ABS	Other fungi present
sp.	1	H	A & S	ABS	
Mesembryanthemum sp.	16	N	B, M & A	ABS	
Ruschia					
macowanii *(L. Bol.) Schwant.*	3	M	A & S	ABS	Vesicles, DSH, other fungi present
sp.	2	N	B, M & A	ABS	
CHENOPODIACEAE					
Atriplex					
halimus *L.**	2	N	B, M & A	ABS	
nummularia *Lindl.**	2	N	B, M & A	ABS	
semibaccata *R. Br**	5	N	B, M & A	VAM	
lindleyi *Moq.**	23	N	B, M & A	ABS	
Chenopodium murale *L.**	11	N	B, M & A	ABS	
Exomis sp.	27	N	B, M & A	ABS	
Manochlamys albicans *(Ait.) Aell.*	1	N	B, M & A	ABS	
ILLECEBRACEAE					
Silene					
clandestina *Jacq.*	2	P	A & S	ABS	Other fungi present
undulata *Ait.*	2	M	A & S	ABS	Vesicles, DSH, other fungi present
sp. 1	2	H	A & S	ABS	Arbuscules in one specimen, other fungi present
sp. 2	1	N	B, M & A	ABS	
POLYGONACEAE					
Emex australis *Steinh.**	12	N	B, M & A	ABS	
Rumex cordatus *Poir.*	4	P	A & S	ABS	Vesicles, DSH, other fungi present
PLUMBAGINACEAE					
Limonium perigrinum *(Berg.) R.A. Dyer*	2	M	A & S	ABS	Needs confirmation, small root samples

* introduced species.

No. = number of specimens examined.

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Myc. = mycorrhizal type: VAM = Vesicular-arbuscular mycorrhizas; ERIC = ericoid mycorrhizas; ENDO = endophytic mycorrhizas of an undesignated type (see text); ORCH = orchid mycorrhizas; ABS = no mycorrhizas seen in specimens examined; DSH = dark septate hyphae.

APPENDIX—A preliminary list of the mycorrhizal status of plants occurring in the Cape Floristic Region (continued)

	No.	Loc.	Lit.	Myc.	Notes
DILLENIIDAE					
STERCULIACEAE					
Hermannia					
alnifolia *L.*	1	P	A & S	VAM	
multiflora *Jacq.*	4	P	A & S	VAM	
MALVACEAE					
Lavatera trimestris *L.**	1	N	B, M & A	ABS	
BRASSICACEAE					
Brassica sp.*	2	N	B, M & A	ABS	
Heliophila					
africana *(L.) Marais*	1	M	A & S	ABS	
arenaria *Sond.*	1	P	A & S	ABS	
sp. 1	1	P	A & S	ABS	
sp. 2	1	M	A & S	ABS	
ERICACEAE					
Erica					
bauera *Andr.*			RKR	ERIC	
blenna *Salisb.*			RKR	ERIC	
campanularis *Salisb.*			RKR	ERIC	
cerinthoides *L.*			RKR	ERIC	
clavisepala *Guth. & Bol.*		O	ABL	ERIC	
daphniflora *Salisb.*			RKR	ERIC	
glauca *Andr.*		pot	A & S	ERIC	
grandiflora *L. f.*		pot	A & S	ERIC	
gracilis *Wendl.*		pot	A & S	ERIC	
hispidula *L.*		K	FC, S & M	ERIC	
inflata *Thunb.*			RKR	ERIC	
lateralis *Willd.*			RKR	ERIC	
mammosa *L.*			RKR	ERIC	
mauritanica *L.*			S & M	ERIC	
perspicua *Wendl.*			EML	?	Hair roots not examined
regia *Bartling*			RKR, A & S	ERIC	
sessiliflora *L.*			RKR	ERIC	
ventricosa *Thunb.*			RKR	ERIC	
Grisebachia plumosa *Klotzsch*	4	P	A & S	ERIC	
Simocheilus depressus *(Licht.) Benth.*		O	ABL	ERIC	
EBENACEAE					
Diospyros glabra *(L.) De Winter*	1	P	A & S	VAM	
PRIMULACEAE					
Anagallis arvensis *L.**	3	M H	A & S	VAM	
ROSIDAE					
CUNONIACEAE					
Cunonia capensis *L.*			EML	ENDO	
Platylophus trifoliatus *(L. f.) D. Don*			EML	ENDO	
BRUNIACEAE					
Staavia					
dodii *H. Bol.*		O	AG	VAM	
radiata *(L.) Dahl*	4	P	A & S	VAM	
CRASSULACEAE					
Cotyledon orbiculata *L.*	2	M	A & S	ABS	Vesicles, *Olpidium* present
Crassula					
capensis *(L.) Baill.*	1	H	A & S	VAM	Needs confirmation
dichotoma *L.*	5	P M	A & S	ABS	Vesicles, *Olpidium* present
expansa *Dryand.*	2	N	B, M & A	ABS	
filiformis *(Eckl. & Zeyh.) Dietr.*	1	P	A & S	ABS	DSH present
glomerata *Berg.*	2	M	A & S	ABS	Other fungi present
oblanceolata *Schonl. & Bak. f.*	5	N	B, M & A	ABS	
tomentosa *Thunb.*	2	M	A & S	ABS	

* introduced species.

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APPENDIX—A preliminary list of the mycorrhizal status of plants occurring in the Cape Floristic Region (continued)

	No.	Loc.	Lit.	Myc.	Notes
MONTINIACEAE					
Montinia caryophyllacea *Thunb.*	1	P	A & S	VAM	
ROSACEAE					
Cliffortia					
ruscifolia *Weim.*	1+	H B	A & S, ABL	VAM	ABL no VAM
polygonifolia *L.*	3	P	A & S	VAM	
Grielum humifusum *Thunb.*	2	N	B, M & A	VAM	
MIMOSACEAE					
Acacia					
cyclops *A. Cunn ex G. Don**	25	P	A & S	VAM	Other fungi present
karroo *Hayne*		pot	A & S	VAM	
saligna *(Labill.) Wendl.**	12+	P	A & S, H & M	VAM	VAM sometimes ABS, *Olpidium*, DSH, other fungi often present
FABACEAE					
Amphithalia ericifolia *Eckl. & Zeyh.*	1	P	A & S	VAM	
Aspalathus					
albens *L.*	2+	P	A & S	VAM	Infection slight (A & S), cluster roots present
divaricata *Thunb.*	1	P	A & S	ABS	Needs confirmation, other fungi present
flexuosa *Thunb.*	10	P	A & S, H & M	VAM	Other fungi present
linearis *(Burm. f.) Dahlg.*		pot	A & S	VAM	Cluster roots present
spinescens *Thunb.*	23	P	A & S	VAM	Cluster roots present, *Olpidium*, DSH, other fungi present
ternata *(Thunb.) Druce*	1	P	A & S	ABS	Needs confirmation
sp. 1	2	M	A & S	VAM	
sp. 2	1	H	A & S	VAM	
Indigofera sp.	3	M	A & S	VAM	
Lotononis involucrata *Benth.*	2	P	A & S	ABS	Needs confirmation
Medicago					
polymorpha *L.**	2	M	A & S	VAM	
sp.*	6	N	B, M & A	VAM	
Otholobium					
fruticans *(L.) C.H. Stirton*		pot	A & S	VAM	
hirtum *C.H. Stirton*	8	P	A & S	VAM	
sp.	1	H	A & S	VAM	
Podalyria					
calyptrata *Willd.*		pot	A & S	VAM	
cuneifolia *Vent.*		pot	A & S	VAM	
sericea *R. Br.*	2	P	A & S	VAM	
Priestleya					
glauca *Salter*	2	H	A & S	VAM	
sericea *(L.) E. Mey.*	1	P	A & S	VAM	
Psoralea pinnata *L.*		pot	A & S	VAM	
Rafnia angulata *Thunb.*	2+	P	A & S, H & M	VAM	ABS in A & S
Virgilia oroboides *(Berg.) Salter*		pot	A & S, EML	VAM	EML reports absence of fungi
PROTEACEAE					
Faurea macnaughtonii *Phill.*	3		A & S, EML	ABS	EML reports ENDO, no fungi present in young roots, fungi with vesicles in dead roots
Hakea sericea *Schrad.**		pot	A & S	ABS	
Leucadendron laureolum *(Lam.) Fourc.*		pot	A & S	ABS	
Leucospermum parile *(Salisb. ex Knight) Sweet*	3	P	A & S	ABS	Other fungi present
Protea					
burchellii *Stapf*	1	P	A & S	ABS	Other fungi present
scolymocephala *(L.) Reich.*	2	P	A & S	ABS	Other fungi present
Serruria fasciflora *Salisb. ex Knight*	2	P	A & S	ABS	
PENAEACEAE					
Stylapteris fruticulosus *(L. f.) Juss.*	3	P	A & S	VAM	
THYMELAEACEAE					
Cryptadenia grandiflora *(L. f.) Meisn.*	1+	P	A & S, M & R	VAM	
Passerina paleacea *Wikstr.*		pot	A & S	VAM	

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	No.	Loc.	Lit.	Myc.	Notes
THYMELAEACEAE (cont.)					
Passerina vulgaris *Thoday*	3	P	A & S	VAM	
Struthiola					
sp. 1	2	P	A & S	VAM	
sp. 2	2	P	A & S	VAM	
CORNACEAE					
Curtisia dentata *(Burm. f.) C.A. Sm.*			EML	ENDO	
SANTALACEAE					
Thesium					
densiflorum *A. DC.*	2	P	A & S	ABS	Other fungi present
sp. cf. T. strictum *Berg.*	1	P	A & S	ABS	
sp. 1	1	P	A & S	ABS	Other fungi present
sp. 2	1	P	A & S	ABS	DSH, other fungi present
CELASTRACEAE					
Putterlickia pyracantha *(L.) Szyszyl.*	1	M	A & S	VAM	
ICACINACEAE					
Apodytes dimidiata *E. Mey. ex Arn.*			EML	ENDO	
EUPHORBIACEAE					
Clutia					
alaternoides *L.*	2	P	A & S	VAM	
daphnoides *Lam.*	1	M	A & S	VAM	
sp. 1	1	P	A & S	VAM	
sp. 2	1	H	A & S	VAM	
Euphorbia					
burmannii *E. Mey. ex Boiss.*	2	M	A & S	VAM	
peplus *L.**	2	M H	A & S	VAM	
RHAMNACEAE					
Phylica					
cephalantha *Sond.*	1	P	A & S, M & R	VAM	Confirmed in pot experiments
ericoides *L.*	5	P	A & S	VAM	
plumosa *L.*	1	P	A & S	VAM	
stipularis *L.*	5	P	A & S, M & R	VAM	
sp. cf. P. rubra *Willd.*	1	M	A & S	VAM	
POLYGALACEAE					
Muraltia					
decipiens *Schltr.*	1	H	A & S	VAM	
dumosa *(Poir.) DC.*	5	P	A & S	VAM	
thunbergii *Eckl. & Zeyh.*	1	P	A & S	VAM	
Polygala					
affinis *DC.*	3	H	A & S	VAM	Fine endophyte in one
garcinii *DC.*	3	P	A & S	VAM	
virgata *Thunb.*		pot	A & S	VAM	
ANACARDIACEAE					
Rhus rosmarinifolia *Vahl*	1	P	A & S	VAM	DSH present
RUTACEAE					
Agathosma					
capensis *(L.) Duemmer*	2	H	A & S	VAM	
collina *Eckl. & Zeyh.*		pot	A & S	VAM	
gonaquensis *Eckl. & Zeyh.*		pot	A & S	VAM	
imbricata *(L.) Willd.*	6	P	A & S	VAM	Other fungi present
ovata *(Thunb.) Pillans*		pot	A & S	VAM	
ZYGOPHYLLACEAE					
Zygophyllum					
flexuosum *Eckl. & Zeyh.*	2	M	A & S	ABS	
morgsana *L.*	14	N	B, M & A	ABS	
sessilifolium *L.*	1	P	A & S	ABS	
spinosum *L.*	2	P	A & S	ABS	DSH, vesicles present

* introduced species.

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	No.	Loc.	Lit.	Myc.	Notes
OXALIDACEAE					
Oxalis					
capillacea *E. Mey. ex Sond.*	1	P	A & S	VAM	
luteola *Jacq.*	3	P	A & S	VAM	
sp. cf. O. tenuifolia *Jacq.*	1	H	A & S	VAM	
obtusa *Jacq.*	6	PMN	A & S, B, M & A	VAM	Fine endophyte, DSH present
pes-caprae *L.*	11	PMN	A & S, B, M & A	VAM	
polyphylla *Jacq.*	1	P	A & S	VAM	
purpurea *L.*	1	P	A & S	VAM	
tomentosa *L. f.*	1	H	A & S	VAM	
sp. 1	1	B	ABL	ABS	
sp. 2	2	N	B, M & A	VAM	
GERANIACEAE					
Erodium incarnatum *(L.) L'Hérit.*	1	H	A & S	VAM	Other fungi present
Monsonia speciosa *L. f.*	1	H	A & S	VAM	
Pelargonium					
elongatum *(Cav.) Salisb.*	1	H	A & S	VAM	
ovale *(Burm. f.) L'Hérit.*	3	P	A & S	VAM	
senecioides *L'Hérit.*	2	M	A & S	VAM	
triste *(L.) L'Hérit.*	3	P	A & S	VAM	DSH, other fungi present
sp. 1	1	P	A & S	VAM	
sp. 2	2	M	A & S	VAM	
APIACEAE					
Annesorrhiza					
sp. cf. A. capensis *Cham. & Schlechtd.*	1	P	A & S	VAM	
sp.	1	H	A & S	VAM	
Chamarea capensis *(Thunb.) Eckl. & Zeyh.*	2	H	A & S	VAM	
Torilis arvensis *(Huds.) Link*	2	M	A & S	VAM	
ASTERIDAE					
GENTIANACEAE					
Orphium frutescens *(L.) E. Mey.*	1	M	A & S	VAM	Morphology of both spp.
Sebaea exacoides *(L.) Schinz*	3	P J	A & S	VAM	Typical of Gentianaceae VAM
APOCYNACEAE					
Gonioma capensis *L.*			EML	ENDO	
ASCLEPIADACEAE					
Microloma tenuifolium *K. Schum.*	1	H	A & S	VAM	
Secamone alpinii *Schultes*	2	M	A & S	VAM	
SOLANACEAE					
Solanum					
americanum *Mill.**	2	N	B, M & A	VAM	
guineense *L.*	1	H	A & S	VAM	
BORAGINACEAE					
Lobostemon fruticosus *(L.) Buek*	2	P	A & S	VAM	Other fungi present
LAMIACEAE					
Ballota africana *(L.) Benth.*	2	M H	A & S	VAM	ABS in one
Salvia					
africana-caerulea *L.*	2	P H	A & S	VAM	ABS in one, other fungi present
chamelaeagnea *Berg.*	1	H	A & S	VAM	
lanceolata *Lam.*	4	P M	A & S	VAM	*Olpidium*, other fungi present
OLEACEAE					
Olea capensis *L.*			EML	ENDO	
SCROPHULARIACEAE					
Diascia diffusa *Benth.*	4	P	A & S	VAM	*Olpidium*, other fungi present
Manulea tomentosa *(L.) L.*	3	M	A & S	ABS	Or very slight VAM, *Olpidium*, other fungi present

* introduced species.

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	No.	Loc.	Lit.	Myc.	Notes
SCROPHULARIACEAE (cont.)					
Nemesia					
affinis *Benth.*	7	P H	A & S	VAM	ABS in some, *Olpidium*, other fungi present
versicolor *E. Mey. ex Benth.*	12	P M N	A & S, B, M & A	VAM	ABS in many at P and M, *Olpidium*, other fungi present
barbata *(Thunb.) Benth.*	1	H	A & S	VAM	
Phyllopodium heterophyllum *(L. f.) Benth.*	2	P	A & S	ABS	Or very slight VAM, other fungi present
Polycarena					
capensis *(L.) Benth.*	5	P	A & S	ABS	Or very slight VAM, *Olpidium*, other fungi present
cephalophora *(Thunb.) Levyns*	3	P	A & S	ABS	
Sutera linifolia *(Thunb.) Kuntze*	1	H	A & S	VAM	Other fungi present
Zaluzianskya					
divaricata *Walp.*	1	P	A & S	VAM	Slight VAM infection
villosa *(Thunb.) F.W. Schmidt*	5	M	A & S	ABS	*Olpidium*, other fungi present
sp.	4	N	B, M & A	ABS	
SELAGINACEAE					
Dischisma capitatum *(Thunb.) Croisy*	1	H	A & S	ABS	DSH, other fungi present
Hebenstretia					
dentata *L.*	1	M	A & S	ABS	*Olpidium*, other fungi present
repens *Jarosz*	1	P	A & S	VAM	Slight VAM infection
CAMPANULACEAE					
Microcodon					
glomeratum *A. DC.*	3	M	A & S	VAM	*Olpidium* present
hispidulum *(Thunb.) Sond.*	1	H	A & S	VAM	Slight VAM infection, fine endophyte present
Roella ciliata *L.*	2	P	A & S	VAM	
Wahlenbergia capensis *(L.) A. DC.*	2	H	A & S	VAM	
LOBELIACEAE					
Cyphia digitata *(Thunb.) Willd.*	3	M H	A & S	VAM	
Lobelia coronopifolia *L.*	4	P	A & S	VAM	Fine endophyte
RUBIACEAE					
Anthospermum					
aethiopicum *L.*	9+	PMHB	A & S, ABL	VAM	
sp. 1	1	H	A & S	VAM	
Galium tomentosum *Thunb.*	2	N	B, M & A	ABS	
ASTERACEAE					
Arctotheca calendula *(L.) Levyns*	10	M N	A & S, B, M & A	VAM	*Olpidium*, DSH, other fungi present
Arctotis					
leptorhiza *DC.*	1	P	A & S	VAM	
sp.	1	P	A & S	VAM	
Athanasia trifurcata *(L.) L.*	1	H	A & S	VAM	
Cenia turbinata *(L.) Pers.*	5	M H	A & S	VAM	
Chrysanthemoides incana *(Burm. f.) T. Norl.*	1	M	A & S	VAM	
Chrysocoma ciliata *L.*	1	H	A & S	VAM	
Cineraria geifolia *(L.) L.*	1	M	A & S	VAM	
Cotula coronopifolia *L.*	1	H	A & S	ABS	Needs confirmation
Didelta spinosa *(L. f.) Ait.*	2	N	A & S, B, M & A	VAM	
Dimorphotheca pluvialis *(L.) Moench*	8	P M H	A & S	VAM	Fine endophyte, *Olpidium*, other fungi present
Elytropappus					
glandulosus *Less.*	1	P	A & S	VAM	
rhinocerotis *(L. f.) Less.*	3	H	A & S	VAM	Other fungi present
Eriocephalus					
sp. 1	2	M	A & S	VAM	
sp. 2	4	H	A & S	VAM	
sp. 3	1	P	A & S	VAM	
Felicia tenella *(L.) Nees*	4	P M H	A & S	VAM	*Olpidium*, other fungi present
Gazania					
ciliaris *DC.*	4	P	A & S	VAM	
sp.	1	H	A & S	VAM	
Gymnodiscus capillaris *(L. f.) Less.*	4	P	A & S	VAM	ABS in some, *Olpidium*, other fungi present

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	No.	Loc.	Lit.	Myc.	Notes
ASTERACEAE (cont.)					
Helichrysum					
cymosum *(L.) D. Don*	1	P	A & S	VAM	
indicum *(L.) Grierson*	1	P	A & S	VAM	
pandurifolium *Schrank*	1	H	A & S	VAM	
revolutum *(Thunb.) Less.*	2	M H	A & S	VAM	
teretifolium *(L.) D. Don*	3	M H	A & S	VAM	*Olpidium* present
sp.	1	B	ABL	ENDO	
Ifloga ambigua *(L.) Druce*	5	P	A & S	VAM	
Lachnospermum fasciculatum *(Thunb.) Baill.*	2	P	A & S	VAM	
Leysera gnaphalodes *(L.) L.*	2	H	A & S	VAM	
Matricaria tenella *DC.*	20	N	B. M & A	VAM	
Metalasia					
adunca *Less.*	1	P	A & S	ABS	Needs confirmation
muricata *(L.) D. Don*	4+	P	A & S, M & R	VAM	ABS in some, other fungi present
Oedera imbricata *Lam.*	1	P	A & S	VAM	
Osteospermum					
clandestinum *(Less.) T. Norl.*	10	H N	A & S, B, M & A	VAM	
spinosum *L.*	1	H	A & S	VAM	
Othonna					
bulbosa *L.*	1	P	A & S	VAM	
digitata *L.*	4	P	A & S	VAM	Other fungi present
filicaulis *Jacq.*	2	H	A & S	VAM	*Olpidium*, other fungi present
parviflora *Berg.*	1	H	A & S	VAM	
stenophylla *Levyns*	3	P	A & S	VAM	
Petalacte coronata *(L.) D. Don*	6	P	A & S	VAM	Other fungi present
Relhania squarrosa *(L.) L'Hérit.*	1	H	A & S	VAM	*Olpidium* present
Senecio					
arenarius *Thunb.*	9	P M H	A & S	VAM	*Olpidium*, other fungi present
burchellii *DC.*	1	P	A & S	VAM	Other fungi present
elegans *L.*	1	M	A & S	VAM	
repandus *Thunb.*	1	H	A & S	VAM	
Stoebe gomphrenoides *Berg.*	2	P	A & S	VAM	Fine endophyte present
Troglophytum parvulum *(Harv.) Hilliard & Burtt*	1	H	A & S	VAM	
Ursinia anthemoides *(L.) Poir.*	5	P M H	A & S	VAM	Other fungi present
LILIOPSIDA					
ARECIDAE					
ARACEAE					
Zantedeschia aethiopica *(L.) Spreng.*	2	M H	A & S	VAM	
COMMELINIDAE					
RESTIONACEAE					
Cannamois parviflora *(Thunb.) Pillans*	1	P	A & S	ABS	
Hypodiscus willdenowia *(Nees) Mast.*	1	P	A & S	ABS	
Ischyrolepis monanthos *(Mast.) Linder*	7	P	A & S	ABS	Other fungi present
Staberoha distachya *(Rottb.) Kunth*	1	P	A & S	ABS	
Thamnochortus punctatus *Pillans*	2	P	A & S	ABS	
Willdenowia					
arescens *Kunth*	3	P	A & S	ABS	
incurvata *(Thunb.) Linder*	3	P	A & S	ABS	Other fungi present
CYPERACEAE					
Ficinia sp.	4	P M	A & S	ABS	Vesicles may be present
Isolepis antarctica *Nees*	1	P	A & S	ABS	Vesicles present
POACEAE					
Aristida					
sp. 1	2	P	A & S	ABS	*Olpidium*, other fungi present
sp. 2		B	ABL	ENDO	

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	No.	Loc.	Lit.	Myc.	Notes
POACEAE (cont.)					
Bromus					
pectinatus *Thunb.*	1	M	A & S	VAM	*Olpidium*, DSH, other fungi present
sp.	13	N	B, M & A	VAM	
Ehrharta					
calycina *J.E. Sm.*	10	P M N	A & S, B, M & A	VAM	VAM low at P and M, *Olpidium*, other fungi present
villosa *Schult. f.*	2	P	A & S	ABS	*Olpidium*, other fungi present
sp.	3	P	A & S	VAM	Other fungi present
Enneapogon sp.	5	N	B, M & A	ABS	
Festuca scabra *Vahl*	1	P	A & S	VAM	
Lolium sp.	32	N	B, M & A	VAM	
Pentaschistis angulata *(Nees) Adamson*	3	M	A & S	VAM	VAM low, *Olpidium*, other fungi present
Stipagrostis zeyheri *(Nees) De Winter*	2	P	A & S	VAM	VAM ABS in one, other fungi present
Themeda triandra *Forssk.*		B	ABL	ENDO	
Tribolium uniolae *(L. f.) Renvoize*	1	P	A & S	VAM	VAM low, *Olpidium*, DSH, other fungi present
LILIIDAE					
HAEMODORACEAE					
Wachendorfia parviflora *W.F. Barker*	5	P	A & S	VAM	VAM ABS in some, DSH, other fungi present
AMARYLLIDACEAE					
Haemanthus					
pubescens *L. f.*	6	P	A & S	VAM	
sanguineus *Jacq.*	1	H	A & S	VAM	
ASPARAGACEAE					
Myrsiphyllum asparagoides *(L.) Willd.*	1	P	A & S	VAM	
Protasparagus					
capensis *(L.) Oberm.*	3	P	A & S	VAM	
exuvialis *(Burch.) Oberm.*	2	P	A & S	VAM	
ASPHODELACEAE					
Anthericum rangei *Engl. & Krause*	1	H	A & S	VAM	
Trachyandra					
chlamydophylla *(Bak.) Oberm.*	1	P	A & S	ABS	Needs confirmation
ciliata *(L. f.) Kunth*	2	M	A & S	VAM	DSH, other fungi present
hispida *(L.) Kunth*	2	P	A & S	VAM	
muricata *(L. f.) Kunth*	2	H	A & S	VAM	
tabularis *(Bak.) Oberm.*	4	P	A & S	VAM	
ERIOSPERMACEAE					
Eriospermum					
sp. 1	2	P	A & S	VAM	
sp. 2	1	N	B, M & A	VAM	
HYACINTHACEAE					
Albuca					
canadensis *(L.) Leighton*	5	P M N	A & S, B, M & A	VAM	
sp. cf. A. spiralis *L. f.*	2	P	A & S	VAM	Other fungi present
sp. cf. A. tenuifolia *Bak.*	1	P	A & S	VAM	
Lachenalia					
mutabilis *Sweet*	2	P	A & S	VAM	
sp. cf. L. rubida *Jacq.*	1	P	A & S	VAM	
Ornithogalum					
thyrsoides *Jacq.*	2	H	A & S	VAM	
suaveolens *Jacq.*	2	H	A & S	VAM	
HYPOXIDACEAE					
Spiloxene schlechteri *(H. Bol.) Garside*	1	H	A & S	VAM	
TECOPHILAEACEAE					
Cyanella hyacinthoides *L.*	1	H	A & S	VAM	

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IRIDACEAE					
Antholyza ringens *L.*	1	P	A & S	VAM	DSH, other fungi present
Aristea dichotoma *(Thunb.) Ker-Gawl.*	1	P H	A & S	VAM	Intracellular hyphal coils
Babiana					
ambigua *(Roem. & Schult.) G.J. Lewis*	2	P	A & S	ABS	Needs confirmation, other fungi present
sp. cf. B. nana *(Andr.) Spreng.*	1	M	A & S	ABS	Needs confirmation, DSH, other fungi present
tubulosa *(Burm. f.) Ker-Gawl.*	1	M	A & S	VAM	
Geissorhiza sp. cf. G. aspera *Goldbl.*	1	P	A & S	VAM	
Gladiolus gracilis *Jacq.*	1	P	A & S	ABS	Needs confirmation, other fungi present
Homeria longistyla *Goldbl.*	3	P	A & S	VAM	
Lapeirousia anceps *(L. f.) Ker-Gawl.*	4	P	A & S	VAM	
Melasphaerula ramosa *(L.) N.E. Br.*	1	H	A & S	VAM	
Moraea					
angusta *(Thunb.) Ker-Gawl.*	3	P	A & S	VAM	Other fungi present
gawleri *Spreng.*	1	H	A & S	VAM	
Romulea schlechteri *Bég.*	1	P	A & S	VAM	DSH, other fungi present
Watsonia meriana *(L.) Mill.*	2	P	A & S	VAM	
ORCHIDACEAE					
Disa					
cornuta *(L.) Sw.*	1	P	A & S	ORCH	
uniflora *Berg.*		pot	A & S	ORCH	
MISCELLANEOUS RECORDS					
CUPRESSACEAE					
Widdringtonia nodiflora *(L.) Powrie*		OK	ABL	ENDO	Unusual type
PODOCARPACEAE					
Podocarpus falcatus *(Thunb.) R. Br. ex Mirb.*	2	S	A & S	VAM	
ADIANTACEAE					
Pellaea sp.	1	H	A & S	ABS	

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