A checklist of vascular plants of the Amatole Mountains, eastern Cape Province/Ciskei

P. B. PHILLIPSON*

Abstract

A checklist of vascular plants of the Amatole Mountains is presented. The physical environment, climate and vegetation of the study area and the history of its botanical exploration are described. The mountains form part of the Winterberg Range in the eastern Cape/Ciskei region of south-eastern Africa, and cover an area of approximately 900 km². The altitude ranges from about 700 m to 2 000 m above sea level, and the topography is very varied. The climate is warm temperate and supports various vegetation types including forest, sclerophyllous shrubland, grassland and marshland. The checklist records the occurrence of 1 215 taxa. The largest families and genera in the area contain predominantly grassland herbs. Many of the characteristic families of the Cape Floristic Region and of the arid areas of southern Africa are poorly represented in the Amatole Mountains.

Introduction

The Amatole Mountains in the south-east of southern Africa are of particular botanical and ecological interest for a number of reasons. The Mountains lie in a region where six major African phytogeographic provinces meet. These are the Indian Ocean Coastal Belt, the Sudano-Zambesian Region, the Karoo-Namib Region, the Cape Region and the Afro-montane archipelago with its associated Afro-alpine areas (Werger 1978). The Mountains receive a relatively high rainfall, and act as an important drainage sponge for the neighbouring lower lying semi-arid areas. The indigenous forests and marshlands are believed to be particularly important in this respect.

State forestry plantations and residential areas are responsible for the introduction of many exotic species, some of which have become naturalized. The establishment of forest plantations and the encroachment of exotics into natural vegetation have had a very significant effect on the indigenous flora and on the ecology of the area as a whole.

The Amatole Mountains have been known to botanists since the early nineteenth century, and have gradually become relatively thoroughly explored. They have long been recognized as an area with a high species diversity, but little precise information has been available about their flora.

The aim of this work is to provide a reliable and comprehensive checklist of the vascular plants of the Amatole Mountains which can serve as a basic reference for taxonomic, floristic and ecological research, and for educational purposes in the future.

Study Area

Physical Environment

The name Amatole (or Amatola) Mountains has been applied to a vaguely-defined section of the Winterberg Range, centred on the well known Hogsback Ridges. In the present study they are defined as bounded by the Kat and Esk Rivers in the north-west and the Thomas and Keiskamma Rivers in the east. The bottom edge of the escarpment forms the southern edge, while an arbitrary line across the African surface plateau connecting the Esk and Thomas Rivers forms the northern boundary (Figure 1). Defined in this way the Amatole Mountains form an area of about 900 km², lying within the latitudes 32° and 33° S, and longitudes 26° and 28° E.

The Amatole Mountains are part of a long outlying spur of the high interior plateau of southern Africa. The spur extends south-east and then east from the Great Escarpment, gradually losing height and disappearing near the town of Stutterheim. It has been breached by the Fish River, which separates the Amatoles and other mountains of the Winterberg Range to the east from the Bankberg, Bruinjeshoogte and Tandjesberg Ranges to the west.

The Winterberg Range has a steep, irregular escarpment facing south, which rises above the 'Post-African' erosion surface. To the north of the escarpment...
ment, the land, which forms part of the older ‘Afri­
can’ erosion surface, slopes gradually into the basins
of the Fish and Kei Rivers. Remnants of the still
older ‘Gondwana’ erosion surface remain as scat­
tered peaks, ridges and mesas above the African
surface plateau.

The escarpment of the Amatole Mountains falls
from the African surface plateau at about 1 500 m to
between 700 and 1 000 m, broken in many places by
an intermediate platform at about 1 250 m. Above
the plateau the highest mountain peaks reach about
2 000 m. The most prominent of the peaks are shown
in Figure 1.

The Winterberg Range consists of dolerite sheets,
dikes and sills intruded into weak shales and sand­
stones of the Karoo sequence (Beaufort Group).
The resistant dolerite has strongly influenced the
landscape, helping to maintain the prominent es­
carpment and the Gondwana remains, and also caus­
ing a number of less important features. The geo­
morphology of the Hogsback area was described in
more detail by Agnew (1958).

Climate
The climate of the Amatole Moutains is warm
temperate, characterized by high rainfall, cold win­
ters and moderately warm summers relative to other
parts of southern Africa.

Moist air from the south is forced upwards by the
escarpment and results in rainfall of between 750
and 1 500 mm per annum, increasing from lower to
higher altitudes (Story 1952). Behind the escarp­
ment and on north-facing slopes the rain shadow
decreases the rainfall, while local topographic effects
may increase it in certain places. Rainfall is more
evenly spread throughout the year than is common
in many parts of southern Africa, although it is high­
est in summer, with a peak in February. On the es­
carpment and south-facing mountain slopes fog is
common, and mist gauges have recorded 20 – 30% gains over the standard precipitation (S. Russell
pers. comm.).

At the Hogsback settlement (about 1 250 m) the
annual average temperature is about 15 °C, with ab­solute maxima and minima of 40° in summer and -6°
in winter respectively, with some snow falling in most years. Obviously altitude and topography influence temperatures, and very much colder conditions are found at the summits of the main peaks.

Vegetation

The vegetation of the Amatole Mountains is predominantly Afro-montane in affinity (White 1978, 1983), and many typical Afro-montane species reach their southern limit in this region. In addition the Mountains contain a significant Cape element in their flora, together with many SE African endemics. They fall within an area of Highland and Dohne Sourveld in the vegetation classification of Acocks (1975).

The high rainfall in the Amatole Mountains is able to support well developed high forest. These forests are floristically rich, containing both evergreen and deciduous species, with large specimens of Podocarpus falcatus being particularly prominent. Well preserved forest is present on most of the escarpment slopes, and in some areas of the intermediate platform. On the mountain peaks, above the plateau, some forest/woodland patches are found in sheltered positions. These patches are poor in species and are probably above the altitudinal limit for many forest tree species in this region.

The plateau areas and mountain slopes are largely grass-covered. This 'sour' grassland has provided good grazing land for domestic stock, and this has given rise to the Mountains' name. Amatole (or Amatola) is derived from the Xhosa word amatole, the plural of ithole, meaning calves. Oral history describes the large herds of cattle owned by pastoralists in the days of Paramount Chief Sandile. These herds thrived on the rich grassland and produced many calves, and the area eventually became known as the 'mountains of calves' (intabie zakwamathole) (Pahl pers. comm.). Excessive grazing by domestic stock can severely reduce grass cover, and this may lead to soil erosion. Serious erosion has occurred in some localities, particularly near the base of the escarpment. At higher altitudes bare ground does not appear prone to excessive erosion, and is usually colonized by unpalatable herbs and small shrubs which help to stabilize the soil surface. Helichrysum argyrophyllum, in particular, covers large areas that have been overgrazed, and once it is established, re-growth of grasses appears to be very slow. Grassland in the Amatole Mountains contains a large number of herbs which are highly responsive to fire, being inconspicuous in moribund grassland, but flowering prolifically after burning.

In many places the vegetation is dominated by sclerophyllous shrubs growing up to about 3 m tall. Such areas are relatively poor in species, with Cliftonia spp., Erica brownleeae, Passerina spp. and Stoebe spp. predominating. These communities are often referred to as 'false-macchia' to distinguish them from the true macchia (fynbos) of the Cape region and can colonize grassland areas very rapidly. It is not certain whether they represent a climax stage, or merely a step in the succession from grassland to forest. In many localities old stands of false-macchia may contain forest pioneer species such as Buddleja salviafolia, Halleria lucida and Rapanea melanophloeos, and probably in the more sheltered localities the succession could proceed to forest, while in the more exposed areas a mixed false-macchia/woodland may result. The false-macchia communities are very sensitive to fire, and controlled burning programmes have been employed successfully in eliminating sclerophyllous shrubs and promoting the re-establishment of pasture grasses. Overgrazing practices may encourage the encroachment of false-macchia. The agricultural management of vegetation in the Amatole Mountains has been discussed by Trollope (1973).

The summits of the highest peaks reach into the Sub-alpine Belt of the Afro-alpine Region (Killick 1978), where a montane moorland vegetation occurs. On rocky areas this consists of small sclerophyllous shrubs, growing to a height of about 0.5 m, often with scattered small trees of Protea subvesitita. These shrubs may include Arrowsmithia stypelioideae, Chrysocoma tenafolia, Cliftonia paucistaminaea, Erica spp., Euryops dyeri, Murallia spp. and Passerina montana, with Restio sejunctus and Thamnocalamus tesselata also common. Elsewhere on the summits grassland may occur with Agrostis spp., Aristida junifórmis subsp. galpinii and Festuca spp. predominating. Little is known about the ecology of the summit vegetation.

Depressions in level areas may support patches of marshland. These are usually dominated by species of Cyperaceae, although the invasion of some marshes near Gaika's Kop by Phragmites australis has been noted.

Man has certainly had a significant influence on the vegetation of the Amatole Mountains over a long period of time. Since about 1850 forestry activities and the development of the Hogsback residential/recreational area have caused the introduction of a large number of exotic species. A number of economically important forest trees have been planted in the region, and some of these have become naturalized. The Hogsback settlement is well known as a place where temperate garden plants will flourish, and some of these have also become naturalized. Most of the naturalized exotics in the Amatole Mountains are confined to disturbed ground near plantations and cultivated ground, and most have failed to encroach significantly on the natural vegetation. Important exceptions are Acacia mearnsii, Pinus spp., Rubus fruticosus and certain grasses, notably Stipa trichotoma, which have become widespread.

HISTORY OF BOTANICAL EXPLORATION IN THE AMATOLE MOUNTAINS

The earliest known preserved botanical specimens from the Amatole Mountains are those collected by C. F. Ecklon and C. L. P. Zeyher in 1831/2. Their contemporary, J. F. Drêge, and earlier collectors such as W. J. Burchell and C. P. Thunberg collected in neighbouring areas, but did not actually visit the Amatole Mountains (Gunn & Codd 1981). Ecklon and Zeyher collected on 'Schumiberg', the mountain
now known as Juanasberg. While collecting in the area they probably stayed at Tyumie Mission, which had been founded by Rev. J. Brownlee in 1820. Brownlee was himself a keen amateur botanist, but he only started preserving plant specimens after moving to King William's Town in 1825 (Gunn & Codd 1981). During this early period the Amatole Mountains must have been very inaccessible, and further botanical exploration was probably prevented by the series of frontier wars which continued until 1847. In 1860 T. Cooper visited the area, and collected extensively, particularly on Elandsberg. Soon a number of forest stations were set up along the Winterberg, and gradually the mountains became more accessible (Sim 1907). As botanical exploration of southern Africa proceeded, many important collectors of the late nineteenth century visited parts of the Winterberg, but little material was collected in the Amatole Mountains. The Pirie Mountains in the east, and the Boschberg to the west of the Winterberg were extensively explored by T. R. Sim and P. Macowan respectively. J. Buchanan collected grasses and ferns in the Amatole Mountains while he was stationed at Lovedale Mission from 1876 to 1877, and Sim and W. G. Bennie also made some collections in the area (Sim 1915; Gunn & Codd 1981). However, in general the flora of the area remained poorly known.

In the early part of the twentieth century G. Rat-

tray made extensive collections in the Amatole Mountains, mainly at Hogsback, and some other important collectors visited the area at this time. In 1934 systematic botanical exploration of the Mountains commenced with the appointment of M. H. Giffen as the lecturer in Botany at the nearby South African Native College (now the University of Fort Hare). Giffen collected extensively during the 1930's and 1940's but unfortunately did not distribute duplicate specimens. His main interest was in diatoms and his collections of other plant groups did not receive the attention they deserved (M.H. Giffen pers. comm.).

In 1947 R. Story commenced a botanical survey of the Keiskammahoek District, which includes a portion of the Amatole Mountains, but also includes part of the Pirie Mountains and some lower lying areas (Story 1952). This work is important, not only with respect to the specimens collected, but also in providing a basic ecological account of the District.

Since the mid-1950's regular student field excursions to the Hogsback area have been organized by A. R. A. Noel, A. Jacot Guillarmod and R. A. Lubke of Rhodes University, Grahamstown, which formed the basis of an unpublished checklist. Specimens collected on these visits are housed at RUH, but have not been critically identified. Since 1975 staff and students at the University of Fort Hare have continued collecting in the Amatole Mountains, and a number of ecological research projects have been carried out. Field work undertaken for the present study was concentrated on the more poorly collected localities, habitats and taxa, in order to give a more thorough coverage of the flora of the area. The Giffen collections were finally identified and labelled and his duplicate specimens and other collections were distributed by G. E. Gibbs Russell. By July 1986 nearly 3000 specimens of vascular plants from the Amatole Mountains had accumulated in the Herbarium of the Department of Plant Sciences at the University (UFH), and these form the basis of the present checklist.

The Amatole Mountains have been visited by many botanists from other institutions during the past 20 to 30 years, and they have become botanically well explored in comparison with many areas of southern Africa.

CHECKLIST

The present checklist of vascular plants was compiled from a number of sources. The specimens at UFH have been examined and identified using the relevant Floras and monographs. In problematic cases comparison of material with authentically determined specimens in other herbaria has been made. In many cases, specimens of taxa currently under revision have been seen by or discussed with the taxonomists concerned. Specimens at UFH thus form the basis of the checklist. Duplicate material has been distributed to many other herbaria, but the main duplicate sets are held at K, MO and PRE.

Records of additional taxa have been obtained directly from taxonomic literature where a locality within the study area has been specifically mentioned. An extensive search of the available literature was made for such records, and these have been cited in full in the checklist.

No attempt has been made to systematically search for material from the Amatole Mountains in other herbaria, however a comparison was made with the computerized record (PRECIS) of the collections at PRE. Duplicates of the historically important Cooper, Sim and Rattray collections, together with many recent collections, are listed and these were checked against the present checklist. In a sample section of about a sixth of the PRECIS record no additional taxa were found.

In the course of field work for the present study a few sight records of additional taxa were made, and these are given in the checklist.

Nomenclature follows the list of accepted taxa at PRE (Gibbs Russell et al. 1984, 1985), except where more recent treatments are available. Every effort has been made to ensure that the checklist was taxonomically and nomenclaturally up-to-date on completion in December 1986.

DISCUSSION

The checklist includes 1 215 taxa, 65 pteridophytes, 4 gymnosperms, 328 monocots and 818 dicots. The largest families (with over 50 taxa) are the Asteraceae (208 taxa, 17%), Poaceae (83 taxa, 7%), Fabaceae (67 taxa, 6%), Cyperaceae (62 taxa, 5%), Liliaceae (54 taxa, 4%) and Orchidaceae (53 taxa, 4%). The two largest genera are Senecio (50 taxa, 4%) and Helichrysum (49 taxa, 4%), both members of the Asteraceae. No other genus has

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more than 14 recorded taxa, but the following have 10 or more: Argyrolobium, Asplenium, Cheilanthes, Crassula, Disa, Erica, Geranium, Hypoixis, Indigofera, Pelargonium, Rhus, Stachys and Wahlenbergia.

Most of the largest families and genera are groups containing predominantly grassland herbs, notably the Asteraceae and the Poaceae, and this reflects the high diversity of species found in this habitat in the Amatole Mountains. There is also a large number of species of Cyperaceae, a family characteristic of marshland habitats. Taxa typical of forest habitats are only represented, in these figures, by the relatively small genera Asplenium and Cheilanthes (both Pteridophytes), and the sclerophyllous vegetation only by the genus Erica.

Comparison of the figures given above with those given by Goldblatt (1978) for the whole of southern Africa show some similarities in the relative proportions of many taxa. The most noticeable differences in the flora of the Amatole Mountains is the low number of species of Ericaceae, Proteaceae and Restionaceae, characteristic families of the Cape Floral Region, and of Mesembryanthemaceae (included in Aizoaceae by Goldblatt), which are concentrated in arid areas.

Some specimens belonging to genera which are currently in a state of taxonomic confusion or currently under revision could not be identified, these include Alchemilla, Erica, Harveya, Hypoixis, Indigofera, Lomenonis, Pentaschistis, Senecio and Wahlenbergia. Other genera contain probable new species, these include Cliftonia, Cineraria, Comium, Crassula, Fuiere, Helichrysum, Passerina, Pentzia, Sctoebe and Watsonia. Some naturalized exotics recorded in the Amatole Mountains, but lacking voucher specimens, were not identified to species level, and the record of Othonna sp. is based on an unsubstantiated literature reference. In some cases, specimens of species divided into varieties or subspecies could not be assigned to these taxa with certainty.

ACKNOWLEDGEMENTS

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**CHECKLIST**

The checklist is divided into four sections: section 1 deals with the Pteridophyta, each genus prefixed with 'P' and numbered according to the sequence in Anthony & Schelpe (1985); sections 2, 3 and 4, which deal with the Gymnospermae, Angiospermae—Monocotyledoneae and Angiospermae—Dicotyledoneae respectively, are numbered according to the system used in the *Flora of southern Africa* (Dyer 1975, 1976). This is based on that of De Dalle Torre & Harms (1963), except the Poaceae which are numbered according to the Kew system, each genus prefixed with 'K'. In the checklist the voucher specimens cited are specimens at UFH, unless otherwise stated or unless a literature citation is given. The following abbreviations for collector's names are used: Br = E.D. Brown, Fu = H.D. Furness, GR = G.E. Gibbs Russell, Gi = M.H. Giffen, Hu = A. Hutchings, Ph = P.B. Phillipson and Tu = M. Tussenius.

**PTERIDOPHYTA**

**LYCOPODIACEAE**

P2 Lycopodium clavatum *L.* Fu & Ph 146; GR 3481; Gi 36, 235, 582; Ph 408; Raymond s.n.

gnidoides *L.* f. Gi 226, 1050, 1569, s.n.; Gi s.n.; Ph 593.

saururus *L.* Fu & Ph 42; Ph & Hu 120; verticillatum *L.* f. Gi 237, s.n.; Raymond s.n.

**SELAGINELLACEAE**

P3 Selaginella caffrom (Milde) Hieron. Gi 124; Ph 830.

kraussiana *Kunze* A. Br. ex Kuhn Bryant s.n.; Gi 807; Mgwdwa 29.

**OPHIOGLOSSACEAE**

P6 Ophioglossum polyphyllum *A. Br.* Gi 1502.

**GLEICHENIACEAE**

P10 Gleichenia polyposioides *L.* J.E. Sm. Gi s.n.; Ph 343.

**SCHIZAEACEAE**

P12 Schizaeopsis pectinata *L.* Swartz Raymond s.n.

P14 Mohria caffrom (L.) Desv. Fu & Ph 214; Gi 805, s.n.

**CYATHEACEAE**

P19 Cyathea capensis (L. f.) J.E. Sm. Gi 604, 779, s.n.

**HYMENOPHYLLACEAE**

P20 Trichomanes pyxidiferum *L.* var. melanotrichum (Schlecht.) Schelpe GR 3828, Gi 774.

**DENNSTAEDTIACEAE**

P23 Histiopteris incisa (Thunb.) J. Sm. Ph 1505.

P24 Pteridium aquilinum (L.) Kuhn subsp. aquilinum *Fu & Ph* 223; GR 3484; Gi 84.

P26 Hypolepis sparsiora (Schrad.) Kuhn Gi s.n.

**ADIANTACEAE/PTERIDACEAE**

P32 Adiantum capillus-veneris *L.* Gi 590; Ph 877, poiretii Wikstr. var. poiretii Gi 554, s.n.

**POLYPODIACEAE**

P42 Polypodium vulgare *L.* Hitchc. subsp. ecklonii *Kunze* Schelpe GR 3815, 3817; Gi 802, 803, s.n.; Ph 824.

P43 x Pleopodium ecklonii *L.* Gi s.n.; Ph 824.

**ASPLENIACEAE**

P52 Asplenium aethiopicum (Burm. f.) Becherer Gi 2, 787, 1462, s.n.

boltonii Hook. ex Schelpe GR 3829; Gi 786, s.n.; ph 824.

erectum *Bory ex Willd.* var. erectum GR 3820; Gi 551, 785, s.n.

lunulatum *Swartz* Gi 528, s.n.

monanthes *L.* Gi 784, s.n.

platyneuron *L.* Ookes Gi 1473, s.n.; protensum Schrad. Gi s.n.

rutifolium (Berg.) Kunze GR 3827; Gi s.n.; stoloniferum *Bory* GR 3826; Gi s.n.
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theciiform (H.B.K.) Mett. var. concinnum (Schrad.) C. Chr. Gi 789.
trichomanes L. Ph 878.
varians Wall, ex Hook. & Grev. subsp. fimbriatum (Kunze) Schelpe Gi s.n.
P53 Ceterach cordatum (Thunb.) Desv. Gi 42.

THELYPTERIDACEAE
P54 Thelypteris
bergiana (Schlecht.) Ching Gi 471, 555, s.n.; Ph 917. confuens (Thunb.) Morton Ph 1284.
pozoI (Lagae) Morton Gi 472, 775, s.n.

ATHYRIACEAE
P61 Cystopteris fragilis (L.) Bernh. Gi 138, s.n.

LOMARIOPSISIDACAE
P62 Elaphoglossum acrostichoides (Hook. & Grev.) Schelpe Gi 579, 804, s.n.; Ph 1270.

ASPIDIACEAE/DROPYTERIDACEAE
P66 Dryopteris inaequalis
P67 Cyrtomium caryotideum
P62 Elaphoglossum acrostichoides
P61 Cystopteris fragilis (L.) Bernh. Gi 138, s.n.
P70 Rumohra adiantiformis (G. Forst.) Ching Gi s.n.

BLECHNACEAE
P75 Blechnum
australe L. var. australis Gi 781, 1464, s.n.; Ph 337.
capense (L.) Chlecht. Ph 953.
iganteum (Kaulf.) Schlecht. Gi 782, 1436, s.n.
tabulare (Thunb.) Kuhn Gi s.n.

GYMNOSPERMAE

PODOCARPACEAE
13 Podocarpus
falcatus (Thunb.) R. Br. ex Mirb. Fu s.n.; Fu & Ph 250; GR 3825, 3835; Gi 75.
latifolius (Thunb.) R. Br. ex Mirb. Gi 870; Ph 571.

PINEAE
22 Pinus spp. Seen naturalized in many places.

CUPRESSACEAE
38 Widdringtonia nodiflora (L.) Powrie Gi 234.

ANGIOSPERMAE — MONOCOTYLEDONEA

POTAMOGETONACEAE
58 Potamogeton pusillus L. Fu & Ph 197.

POACEAE
K2 Coix lacryma-jobi L. Ph 135.
K10 Ischaemum fasciculatum Brongn. Ph 1486.
K28 Elionurus muticus (Spreng.) Kunth Fu & Ph 100; GR 3414, 3433, 3490a; Ph & Hu 93.
K29 Coelorhachis capensis Stapf Ph 1323.
K38 Miscanthus capensis (Nees) Anders. var. capensis Fu & Ph 299; Gi 6660, s.n.
K53 Eulalia villosa (Thunb.) Nees Ph 1016.
K71 Andropogon appendiculatus Nees Br 42, 159; Fu et al. 10, 11; Gi 3477, Gi 1280; Ph & Hu 59.
K72 Cymbopogon nardus (L.) Rendle Fu & Ph 222, 300; GR 3133, 3540; Gi 1284, s.n.

K73 Hyperbrenia hirta Stapf Gi s.n.
K78 Trachypogon spicatus (L. f.) Kunze Br 10, 15; Fu & Ph 249; Gi 1283.
K80 Heteropogon contortus (L.) Roem. & Schult. GR 3445; Ph 979.
K83 Themeda triandra Forssk. Br 18, 33; Fu & Ph 244; GR 3452.
K89 Digitaria
diagonalis (Nees) Stapf var. diagonalis Ph 1469.
Sanguinalis (L.) Scop. Mahlobo 9.
serrifolia Stapf Fu & Ph 212; GR 3492a.
ternata (A. Rich.) Stapf Gi s.n.
K94 Allotropis semialata (R. Br.) Hitchc. subsp. eckloniana (Nees) Gibbs Russell GR 3447; Ph 1193.
K104 Brachiaria euriceps (J.E. Sm.) Griseb. Ph 1050.
K107 Paspalum scrobiculatum L. Gi s.n.
K112 Echinochloa crus-galli (L.) Beauv. Gi s.n.
K115 Opismenus hirtellus (L.) Beauv. Gi 659, 1442, s.n.
K116 Panicum
eaquinerne Nees Fu & Ph 225; GR 3416, 3489a; Gi s.n. deustum Thunb. GR 3130; Gi 163, 512; Ph 105.
ecklonii Nees GR 3411, 3454; Ph 1155.
hymenochilum Nees Ph 1324.
K128 Setaria
schelalata (Schemnach.) Moss var. sericea (Stapf) Clayton Ph 957.
shelalata (Schemnach.) Moss var. schelalata Ph 1057.
K132a Rhynchelytrum nerviglume (Franch.) Chiov. Ph 964.
K139 Pennisetum
candidam (Chiov.) Ph 394.
macrourum Trin. Br 19; Fu 618; Fu & Ph 26, 177, 211.
thunbergii Kunth Br 01, 17, 24, 113; Fu & Ph 78, 80, 82, 121.
K160 Echtharta
calyx (J.E. Sm.) var. calyx Fu & Ph 357.
erecta Lam. var. erecta Mdzeke 21; Ph 931.
K163 Phalaris
angusta Nees ex Trin. Ph 506.
arundinacea L. Fu & Ph 170.
K164 Anthoxanthum
eckonii (Nees ex Trin.) Stapf Dyer 339 (GRA); Rattray 204 (GRA).
odoratum L. Ph 906.
K173 Arundinella nepalesis Trin. Br 40; Fu 756; Fu et al. 44; Gi s.n.; Ph 1058.
K174 Tristachya leucothyrix Nees Br 34, 43; Fu et al. 12; Fu & Ph 330; GR 3409; Ph & Hu 62.
K192 Holcus lanatus L. Fu & Ph 178.
K197 Helictotrichon hirtulum (Steud.) Schweick. GR 3518; Ph 1028.
K204c Merxmuellera drakensbergensis (Schweick.) Conert Ph & Hu 1.
K205 Pentaschistis
setifolia (Thunb.) McClean Br 16; Fu & Ph 213.
tysonii Stapf Fu & Ph 97; GR 3507a.
sp. Fu & Ph 358.
K214 Phragmites australis (Cav.) Steud. Fu 759; Fu & Ph 175.
K243 Agrostis
barbuligera Stapf var. barbuligera Br 09; Fu 724; GR 3418.
bargiana Trin. var. bargiana Mdzeke 17.
K262 Aristida junciformis Trin. & Rupr. subsp. galpinii (Stapf) De Winter Br 18, 38, 157; Fu et al. 48; Gi s.n.; Mdzeke 06.
K263 Stipa
dregeana Steud. var. elongata (Nees) Stapf Ph 797.
trichotomy Nees Fu & Ph 317.
K283 Sporobolus centifolius (Trin.) Nees GR 3487a; Gi 1282; Ph & Hu 87.
K286 Eragrostis
caesia Stapf Gi s.n.
capensis (Thunb.) Trin. Br 134; Fu et al. 45; GR 3446; Ph 978; Ph & Hu 60.
curvula (Schrad.) Nees GR 3444; Ph 1487.
planiculmis Nees Fu 752.
racemosa (Thunb.) Steud. Ph & Hu 96; Ph 1257.
K 294 Microchloa cafra Nees Gi s.n.
K 295 Cynodon dactylon (L.) Pers. Fu & Ph 281; Gi s.n.
K 298 Bromus mollisf. (L.) C.B. Cl. Ph 99, 122; Ph & Hu 162.
K 400 Stiburus alopecuroides (Hack.) Stapf Br 77.
K 404 Briza maxima L. Ph 1525.
K 407 minus L. Ph 507.
K 407 Poa annua L. Mdzeke 20.
binata Nees Ph 1347.
heterogama Hack. Ph 1169.
pratenisis L. Fu & Ph 328.
K 417 Festuca caprina Nees var. caprina Br 118, 153; Fu & Ph 98.
caprina Nees var. irrasa Stapf GR 3408.
costata Nees var. costata Br 123; Ph & Hu 89.
longipes Stapf Ph 791.
K 418 Vulpia bromoides (L.) S.F. Gray Fu et al. 39.
myuros (L.) C.C. Gmel. Fu & Ph 321.
K 428 Bromus mollisf. Lloyd Fu & Ph 320.
speciosus Nees Fu & Ph 132; GR 4313, 3494a; Ph & Hu 92.
unioileus H.B.K. Mdzeke 28.
K 432 Brachypodium flexum Nees GR 3024; Gi s.n.; Russell 2354.
K 433 Lolium multiflorum Lam. Fu & Ph 343.
K 457 Thamnocalamus tesselata (Nees) Soderstrom & Ellis Gi 280; Ph 434.

cyperaceae

454 Asclepios capensis (Kunth) Ridley Br 109, 135, 147; Fu 725, 15; Fu et al. 53; Fu & Ph 173, 322.
456 Carpha bracteosa C.B. Cl. Fu & Ph 182, 347.
glomerata (Thunb.) Nees Ph 935.
459 Cyperus albostratus Schrad. GR 3023; Gi 1589.
diformis L. Ph 572.
obtusiflorus Fahl var. flavissimus Boeck. Ph 99, 1298.
pulcher Thunb. Ph 110, 950, 167.
schlechtenii C.B. Cl. Ph 1165.
semirufus Schrad. Ph 1005, 1164; Ph & Hu 165.
tenellus L. var. tenellus Gi 1596; Ph 344.
459a Pycreus betschuanus (Boeck.) C.B. Cl. Fu & Ph 122, 157, 200.
cooperi C.B. Cl. Br 25, 140; Fu et al. 14; Fu & Ph 123, 156, 169, 179, 205.
macranthus C.B. Cl. Fu & Ph 158, 207.
munditi Nees Fu & Ph 163, 187.
nitidus (Lam.) J. Raynal Fu & Ph 102, 164, 171; Ph 237, 238.
oakfortensis C.B. Cl. Fu & Ph 28.
unioileus (R. Br.) Urb. Fu et al. 06, 51.
459c Mariscus congestus (Vahl) C.B. Cl. GR 3007; Gi 1593; Ph 156, 239, 1035.
grantii C.B. Cl. Ph 1254.
owani (Boeck.) C.B. Cl. Ph 398.
tabularis (Schrad.) C.B. Cl. Ph 1299.
thunbergii (Vahl) Schrad. Fu & Ph 192.
462 Kyllinga elatior Kunth Ph 109.

erecta Schumach. Fu & Ph 186.
melanosperma Nees Ph 1296.
pauciflora Ridley Br 26, 136, 168; Fu & Ph 159; Ph 242.
pulchella Kunth Ph 1188.
465 Ficinia bergiana Kunth Ph 921.
cinnamomea C.B. Cl. Gi 3509a; Ph 944.
fascicularis Nees Gi 1597, s.n.; Ph 426.
stolonifera Boeck. Ph & Hu 76.
tristachya (Rotthb.) Nees GR 3469.
467 Fuirena pubescens (Poir.) Kunth Fu et al. 54; Fu & Ph 208; GR 3510a.
sp. Ph 1498.
468 Scirpus falsus C.B. Cl. Ph & Hu 17.
ficinioides Kunth Br 02, 30, 87, 101, 103; Fu et al. 29; Fu & Ph 79, 335.
inanis (Thunb.) Steud. Fu & Ph 125.
468a Schoenoplectus paludicola (Kunth) Pall. ex J. Räynal Ph 1328.
468b Issolepis cemua (Vahl) Roem. & Schult. Fu 692; Fu et al. 40; Fu & Ph 77, 189.
costata (Boeck.) A. Rich. Br 167; Fu 693, 719; Fu et al. 03, 41, 42; Fu & Ph 124; GR 3003.
fluittans (L.) R. Br. Fu & Ph 01, 134; Ph 1225.
ludwigii Kunth Fu & Ph 162.
natans (Thunb.) Dietr. Fu & Ph 29, 131, 201, 209.
sepulcralis Steud. GR 3513a; Ph 493.
469 Eleocharis acutangula (Roob.) Schl. Fu & Ph 192.
471 Fimbristrylon complanata (Retz.) Link Ph 236, 1203.
471a Bulbostylis humills (Kunth) C.B. Cl. Fu & Ph 7; Ph 1350.
schoenoides (Kunth) C.B. Cl. Fu & Ph 83, 103, 333.
471b Abildgaardia ovata (Burm. f.) Kral Ph 1310.
472 Rhynchospora browni Roem. & Schult. Fu 728, 733; Fu et al. 5; Fu & Ph 14, 160.
494 Tetraria cuspidata (Rotthb.) C.B. Cl. Fu & Ph 118, 248; GR 3514a; Ph 562.
macowaniana B.L. Burtt Fu & Ph 234; Ph 557.
521 Schoenoxiphium lehmannii (Nees) Steud. Gi 513, 1588; Ph 930.
perdensium Kukkonen, Keiskamahoe, near Ghulu Kop, 4,000 ft (Kukkonen 1983: 822).
rufum Nees Ph & Hu 112; Robinson s.n.
sparticum (Wahlenb.) C.B. Cl. Ph & Hu 16, 83, 166.
sp. aff. S. schweikerdtii (Boeck.) C.B. Cl. Ph & Hu 163.
kuukonii (Kunth) C.B. Cl. Fu & Ph 172, 198; Gi 1588.
524 Carex zuluensis (Hook.) Rich. Ph 940.
carpinus (Boeck.) C.B. Cl. Fu & Ph 128, 172; Gi 1586.
clavata Thunb. Fu & Ph 128, 172; Gi 1586.
petitiana A. Rich. Ph 940.
schlechteri Nelmes Ph 788.
zuluenisi C.B. Cl. Ph 1170.
araceae

748 Zantedeschia aethiopica (L.) Spreng. GR 3500; Gi 885.
albomaculata (Hook.) Baill. subsp. albomaculata Ph 1098.

restionaceae

804 Restio sejunctus Mast. Ph 323.
804c Ischyrolepis disticta (Mast.) Linder, Gaika's Kop (Linder 1985: 404).
804j Calopis paniculata (Rotthb.) Desv. Gi 1017; Ph 411.
804p Hydrophillus rattrayi (Pillans) Linder, Hogsback (Linder 1985: 484).
807 Elegia asperiflora (Nees) Kunth var. lacera (Pillans) Pillans Fu & Ph 16, 176; Gi s.n.
Bothalia 17.2 (1987)

1265a Dietes iridoides (L.) Sweet ex Klink Ph 954.
1295 Aristea
1265a Dietes iridoides (L.) Sweet ex Klink Ph 954.
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1265a Dietes iridoides (L.) Sweet ex Klink Ph 954.
ULMACEAE
1898 Celtis africana Burm. f. Tu 183.
1906 Chaetacme aristata Planch. Ph 786.

MORACEAE
1961 Ficus
burr-davyi Hutch. Fu & Ph 312.
sur Forssk. Fu s.n.; Gi s.n.

URTICACEAE
1980 Laportea peduncularis (Wedd.) Chew Gi 112, 400, 560, 869, 1019.
2007 Parietaria micrantha Ledeb. Ph 1340.

MORACEAE
1961 Ficus
burr-davyi Hutch. Fu & Ph 312.
sur Forssk. Fu s.n.; Gi s.n.

PROTEACEAE
2035 Protea
simplex Phill. Gi 1160; Lyle 79.
subvestita N.E. Br. Gi 1353; Ph 56 7; Tu 250.

LORANTHACEAE
2074a Tapinanthus prunifolius (E. Mey. ex Harv.) V. Tieghem Gi 1065.

VISCACEAE
2093 Viscum obscurum Thunb. Fu & Ph 255.

SANTALACEAE
2104 Colpoon compressum Berg. Gi s.n.
2116 Osyridocarpus schimperianus (Hochst. ex A. Rich.) DC. Gi 478.
2118 Thesium triflorum Thunb. ex L. f. Gi 581.

POLYGONACEAE
2195 Rumex
angiocarpus Murb. Br 86; Fu 747; Gi 1226, 1276.
crispus L. Ph 1287.
dregeanus Mein., var. dregeanus Ph 1166.
lanceolatus Thunb. Ph 1187.
sagittatus Thunb. Gi 498; McGillivray 5; Ph 1036.
steudelii Hochst. Ph 1223, 1289.
woodii N.E. Br. Fu & Ph 136, 316.
triumphorum Thunb. ex L. f. Gi 581.

MESEMBRYANTHEMACEAE
2405 Aptenia cordifolia (L. f.) Schwant. Gi 1056.

CARYOPHYLLACEAE
2429 Stellaria media (L.) Vill. Ph 887.
2430 Cerastium
capense Sond. Br 100, 104, 145; Fu & Ph 331; Ph 926.
dindicum Wight & Arn. Ph 1482.
2490 Silene
burchellii Oth. var. burchellii Br 127; Ph 1281.
undulata Alt. Gi 1081.
vulgaris (Moench) Gareke subsp. macrocarpa (Marsden) Jones & Turrill Ph 1131.

RANUNCULACEAE
2502 Dianthus
basitucus Burr-Davv subsp. basitucus var. basitucus Ph & Hu 168.
crenatus Thunb. Ph & Hu 150.

TREMENIACEAE
2759a Xymalos monospora (Harv.) Baill. Gi 73, 95; Ph 869, 870.

LAURACEAE
2813 Cryptocarya woodii Engl. Gi 99.

PAPAVERACEAE
2853 Papaver aculeatum Thunb. Ph & Hu 87, 141.

BRASSICACEAE
2875 Heliophila
elongata (Thunb.) DC. Gi 284, 1245, s.n.; Ph 1097; Ph & Hu 34.
rigidisula Sond. Fu & Ph 108, 356; Gi 1117.
2883 Lepidium ecklonii Schrad., Hogsback, Jacot Guillarmod 4523 (Marais 1970: 93).
2965 Rorippa nasturtium-aquaticum (L.) Hayek GR 3823.
2966 Cardamine africana L. Ph 903.

ACCRIPACEAE
2940 Acrocomia aculeata (L.) Willd. Ph 547.

CAPRIFOLIACEAE
3050 Cape Primrose (L.) R. Br. Ph 903.

CRASSULACEAE
2429 Crassula ovata (L.) Willd. Ph 903.
2430 Sedum
adolphii Sond. Fu & Ph 108, 356; Gi 1117.
2490 Sedum
burchellii Oth. var. burchellii Br 127; Ph 1281.

CARYOPHYLLACEAE
2429 Stellaria media (L.) Vill. Ph 887.
2430 Cerastium
capense Sond. Br 100, 104, 145; Fu & Ph 331; Ph 926.
dindicum Wight & Arn. Ph 1482.
2490 Silene
burchellii Oth. var. burchellii Br 127; Ph 1281.
undulata Alt. Gi 1081.
vulgaris (Moench) Gareke subsp. macrocarpa (Marsden) Jones & Turrill Ph 1131.

RAINFOREST
3112 Maerua racemulosa (A. DC.) Gilg & Ben. Gi 534.

DROSERACEAE
3136 Drosera auriculata (L.) A. Juss. Ph 903.

CRASSULACEAE
3164 Cotyledon orbiculata L. var. oblonga (How.) DC. Ph 897.
3168 Crassula cordata Thunb. Gi 476.
dependens H. Bol. Fu 697; Fu & Ph 31.
natans Thunb. var. natans Fu & Ph 204; Ph 1141.
nemorosa (Eckl. & Zeyh.) Walp. Gi 1029a; Ph 907.
nudicaulis L. var. nudicaulis Br 90; Gi 1332.

CARYOPHYLLACEAE
2429 Stellaria media (L.) Vill. Ph 887.
2430 Cerastium
capense Sond. Br 100, 104, 145; Fu & Ph 331; Ph 926.
dindicum Wight & Arn. Ph 1482.
2490 Silene
burchellii Oth. var. burchellii Br 127; Ph 1281.
undulata Alt. Gi 1081.
vulgaris (Moench) Gareke subsp. macrocarpa (Marsden) Jones & Turrill Ph 1131.

RAINFOREST
3112 Maerua racemulosa (A. DC.) Gilg & Ben. Gi 534.

DROSERACEAE
3136 Drosera auriculata (L.) A. Juss. Ph 903.
| scientific name            | family       | references                                      |
|---------------------------|--------------|------------------------------------------------|
| Rosa odorata              | ROSACEAE     | Tolken, Cata Ridge, Dyer 356 (GRA, K. LU, PRE) |
| Pittosporum viridiflorum  | PITTOSPORACEAE | Tolken 1977: 374. |
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4193 Ekebergia capensis Sparrm. Ph 1119.

POLYGALACEAE
4273 Polygala confusa Macowan Gi 291; Ph 107.
fruticosa Berg. Ph 967.
hispid Burch. Fu & Ph 114; Gi 242, 287, 1088, 1304; Ph 393; Ph & Hu 22.
hottonetta Presl Br 173; Fu et al. 13; Fu & Ph 115.
myrtifolia L. Gi 1565; Ph 894.
holendorffiana Eckl. & Zeyh. Br 151; Fu & Ph 55; Gi g718; Ph 391, 986.
refracta DC. Ph 1263.
uncinata E. Mey. ex Meisn. Fu & Ph 89.
vigata Thunb. Ph 582.
4278 Muralia
alticola Schltr. Ph 439.
macroceras DC. GR 3492; Gi 195, 247, 1124, s.n.; Ph 414.
saxicola Chod. Ph 436.
4279 Nyanitina spinosa (L.) Damort. Ph 1126.

EUPHORBIACEAE
4299 Phylanthus incurvus Thunb. Ph 1232.
4348 Croton rivularis E. Mey. Gi 1468; Ph 835.
4370 Adenocline
acuta (Thunb.) Baill. Gi 1443, 1535.
pauciflora Tuzec. Fu & Ph 359; Gi 232, g748.
4372 Leidsechia obtusa (Thunb.) Muell. Arg. Gi 1546.
4407 Acalypha
eckloni Baill. GR 3010; Ph 1183.
peduncularis E. Mey. ex Meisn. Fu & Ph 230, 352; Gi 992, 1024, 1028, 1154, 1181, 1264.
4416a Ctenomeria capensis (Thunb.) Harv. ex Somd. Gi 164, 883, 896, 976, 1506.
4424 Ricinus communis L. Ph 1049.
4448 Clatia
affinis Sond. GR 3822; Gi 41, 70, 412, 768, g886; Mahlobo 41; Ph 150.
alaternoides L. (var. not determined) Fu & Ph 345; Gi 416, 769; Ph 407; Tu 208.
disceptata Prain Gi 1169.
heterophylla Thunb. Fu & Ph 296; Gi 1111; Ph 1201; Ph & Hu 77.
hirsuta E. Mey. ex Sond. var. hirsuta Ph 962.
katharinae Pax & Fu & Ph 39; Ph 358.
natalensis Bemh. ex Krauss Tu 168, 169, 171.
pulchella L. var. pulchella Fu & Ph 268; Ph 503; Tu 255.
4498 Euphorbia
epipyrrhiasis E. Mey. ex Bios. var. epipyrrhiasis Fu 35; Gi 40, 765, 766; Ph 409; Tu 231.
krassnia Bemh. (var. not determined) Gi 764; Mahlobo 42.
pulvinata Marloth. Seen among rocks on Gaika's Kop and neighbouring peaks.
sclerophylla Boiss. Fu & Ph 61; GR 3429.
striata Thunb. Fu & Ph 109.
4498b Chamaesyce inaequilatera (Sond.) Sojak Ph 1047.

ANACARDIACEAE
4562 Harpephyllum caffrum Bemh. Fu s.n.; Tu 188.
4594 Rhus
chirindensis Bark. f. Fu s.n.; Fu & Ph 252; Gi 579, 994, 1059.
dentata Thunb. Fu & Ph 284, 294; Gi g882, 991; Ph 548; Tu 141.
dentata Thunb. x R. divaricata Eckl. & Zeyh. Tu 136.
discolor E. Mey. ex Sond. Gi 1308; Ph 545.
fastigiata Eckl. & Zeyh. Fu & Ph 311; Ph 244.
fastigiata Eckl. & Zeyh. x R. rehmanniana Engl. Fu & Ph 310; Gi g884.
icina L. f. var. effusa (Presl) R. Fernandes Ph 794.
krebisiana Presl ex Engl. Tu 270 (possibly crossed with R. di-
varicata Eckl. & Zeyh.).
Bothalia 17,2 (1987)
pallens Eckl. & Zeyh. forma pallens Robinson 1071. pyroides Burch. var. gracilis (Engl.) Burtt Davy Gi 1241, 1294, 1305, 1349. pyroides Burch. var. pyroides Gi 323, 324, Ph 552; Russell 2339; Tu 117, 120, 121, 129. rehmianiana Engl. Fu & Ph 308; Gi g883. tomentosa L. Ph 333; Robinson 1070, 1501, s.n.; Tu 239.

AQUIFOLIAE
4614 flex mitis (L.) Radlk. Fu s.n.; Gi 136.

CELASTRACEAE
4626 Maytenus acuminata (L. f.) Loes var. acuminata Ph 761, 777, 868; Tu 210. heterophylla (Eckl. & Zeyh.) N.K.B. Robson Fu & Ph 264; Ph 785, 795, 873; Tu 202. nemorosa (Eckl. & Zeyh.) Marais Gi 496, 535, g851, 892; Ph 781, 881, 883; Tu 216. peduncularis (Sond.) Loes. Ph 872, 882; Tu 216. undata (Thunb.) Blakelock Ph 764.

4628 Putterlickia verrucosa (E. Mey. ex Sond.) Szyszyl. Gi 1102; Ph 896.

4630 Pterocelastrus tricuspidatus (Lam.) Sond. Gi 316.

4641 Cassine aethiopica Thunb. Fu s.n.; Ph 901.

papillosa (Hochst.) Kuntze Fu s.n.; Fu & Ph 265; Gi 772; Ph 883, 900b, 1125. tetragona (L. f.) Loes Ph 871.

ICACINACEAE
4671 Cassinopsis ilicifolia (Hochst.) Kuntze Fu s.n.; Ph 1124, 1318.

4686 Apodytes dimidiata E. Mey. ex Arn. subsp. dimidiata Tu 205.

SAPIANDACEAE
4734 Allophylus decipiens (Sond.) Radlk. Fu s.n.; Fu & Ph 271; Ph 779; Tu 184.

4836 Hippobromus pauciflorus (L. f.) Radlk. Gi 533, 1036; Tu 178.

MELIANTHACEAE
4854 Melianthus dregeanus Sond. subsp. dregeanus Gi g841, 1526; Ph 415; Tu 245. major L. Gi s.n.

BALSAMINACEAE
4856 Impatiens hochstetteri Warb. subsp. hochstetteri GR 3128; Gi 312; Mgudla 25; Ph 162.

RHAMNACEAE
4861 Ziziphus mucronata Willd. subsp. mucronata Fu & Ph 291; Ph 104.

4874 Scleria myrtina (Burm. f.) Kurz Fu s.n.; Fu & Ph 295; Gi 1063; Mahlobo 12; Tu 203.

4875 Rhamnus prinoides L. Heritt. Fu s.n.; Gi 68, 251, 1520; Ph 553.

4880 Nothia africana (L.) Reichb. f. Fu & Ph 285; Gi 1585; Ph 589.

4886 Physicca galpinii Pillans Gi 276; Ph 566.

4905 Helinus integri folius (Lam.) Kuntze Fu & Ph 254; Gi 1084; Ph 796.

VITACEAE
4917 Roxiepooa digitata (L. f.) Gilg & Brandt Tu 189.

microphylla (Turcz.) Gilg & Brandt Ph 554, 1342; Tu 137, 142, 149.

revoiili Planch. Gi g881; Ph 763.

tridentata (L. f.) Wild & Drum. subsp. cuneifolia (Eckl. & Zeyh.) N.K. Urton Fu & Ph 258; Gi 573.
LYTHRACEAE
5476 Lythrum hyssopifolium L. GI 1346.

MYRTACEAE
5578 Eugenia zeyheri Hart. Fu & Ph 251.
5598 Eucalyptus sp. (seen naturalized, mainly near plantations).

ONAGRACEAE
5795 Epilobium capense Buch. ex Hochst. Br 23, 160, 178; Fu et al. 15; Fu & Ph 226; Gi 221, 1178.

HALORAGACEAE
5833 Laurembergia repens

APLICAIEAE
5894 Centella

MYRISINACEAE
6283 Maesa alnifolia Harv. Fu & Ph 261; GI 65, 401, 531, 937.
6313 Myrsine africana L. GR 3021; GI 146, 537; Ph 342, 424; Tu 139, 226.
6314 Rapanea melanoploceos (L.) Mez Fu & Ph; GI 74; Tu 199.

PRIMULACEAE
6330 Lysimachia nutans Nees Gi 231, 771, 1135; Ph & Hu 117.
6338 Anagallis huttonii Harv. Br 177; Fu 690, 720; Fu 04; Fu & Ph 24.

PLUMBAGINACEAE
6334 Plumbago auriculata Lam. Ph 102.

SAPOTACEAE
6386 Mimusops obovata Sond. Fu & Ph 259; Ph 880.

EBENACEAE
6404 Euclea
crispa (Thunb.) Guerke var. crispa Fu & Ph 289; Ph 773; Tu 187, 232, 233.
schimperi A. DC. var. schimperi Ph 1120.
undulata Thum. var. undulata, Elandsberg (Story 1952: 93).
6406 Diospyros
asturo-africana De Winter var. microphylla (Burch.) De Winter Ph 547; Tu 143, 144, 147.
dichrophylla (Gand.) De Winter Gi 1528; Tu 262.
scabrida (Harv. ex Hiem) De Winter var. cordata (E. Mey. ex A. DC.) De Winter Ph 889.
simil (Kunte) De Winter Ph 776, 790.
villosa L. var. villosa Fu & Ph 253; Gi 978; Tu 201.
whyteana (Hiem) F. White Ph 1116; Tu 200.

OLEACEAE
6428 Chionanthus foveolatus (E. Mey.) Steam subsp. foveolata Fu s.n.; Gi 842.
6434 Olea
capensis L. subsp. macrocarpa (C.H. Wright) Verdoorn Fu s.n. europa L. subsp. africana (Mill.) P.S. Green Tu 271.

LOGANACEAE
6473 Buddleja
auriculata Benth. Ph 828, 831.
dysophylla (Benth.) Radlk. Gi 413; Tu 175.
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7471 Diascia
mollis Hilliard & Burtt. Hogsback, Bongo Mts 5 000 ft, Sidye 706 (PRE) (Hilliard & Burtt 1984: 291).
rigescens Benth. GR 3485: Gi 720a, 1312; Ph 412; Ph & Hu 31; Robinson s.n.
7476 Nemesia
mellissifolia Benth. Gi 719a; Ph 565, 886, 1024, 1059, 1261; Ph & Hu 126; umbonata (Hem.) Hilliard & Burtt Fu & Ph 351; Gi g727; Ph & Hu 48, 128.
7477 Dichis
reptans Benth. Gi 278, 1299, 1600, 1601; Ph 335.
rotundifolia (Hem.) Hilliard & Burtt Ph 1172, 1465.
7480 Linaria vulgaris Mill. Ph 1088.
7493 Halleria lucida L. Fu & Ph 307; Gi 60, 1608; Tu 224.
7494 Teedia lucida Rudolphi Gi 192.
7495 Phygelius capensis E. Mey. ex Benth. Fu & Ph 283; Gi 268.
7500 Bowkeria verticillata (Eckl. & Zeyh.) Schinz Gi 143, 1248; Ph 769.
7519 Sutera
aurantiacata (Benth.) Hem. Ph 1101.
campunulata (Benth.) Hem. Ph 157.
pauciflora (Benth.) Kunzze Gi 1091.
pinnatifida Kunzze Ph 90, 158, 1331.
7523 Zaluzianskya
angustifolia Hilliard & Burtt Br 92; Gi 440; Ph 421.
ova (Benth.) Walp. Ph & Hu 143.
spatheacea (Benth.) Walp. Gi 238; Ph 1278.
7524 Mimulus gracilis R. Br. Ph 1138.
7558 Limosella
aquatica L. Gi 64a.
grandiflora Benth. GR 3017.
maior Diels Fu & Ph 203; GR 3001; Gi 64b; Ph 495.
7566 Hebesstrea
comosa Hochst. Ph 1008.
dura Choisy GR 3521; Ph 429, 546; Tu 133.
robusta E. Mey. Gi 734a, 1125; Ph 406.
7568 Selago
corymbosa L. Fu & Ph 303; McCullivray 37.
galpinii Schltr. Ph & Hu 29; Rattray 260 (PRE); Story 3505 (PRE).
7568a Walafrida polystachya Rolfe Br 131; Fu & Ph 337.
7579 Veronica angallis-aquatica L. Fu & Ph 185; Gi 1070a; Ph 136.
7597 Melasma scabrum Berg. Fu & Ph 155; Gi 1602; Ph 240.
7597a Alectra capensis Thunb. Ph 1264.
cessilliflora (Vahl) Kunzze var. cessilliflora Ph 137.
7614 Graderia scabra (L. f.) Benth. Ph 1304.
7616 Sophisa simplex (Hochst.) Hochst. Ph 1279.
7622 Buchnara
dura Benth. Ph 1272.
glabrata Benth. Gi 1174.
7623 Cynium racemosum Benth. Fu & Ph 138; Gi 209, 1122; Ph & Hu 10.
7625 Stigma bilabiata (Thunb.) Kunzze Gi 223, 1071, 1173, 1606; Ph 138.
7627 Harveya
coccinea Schltr. Gi 213; Ph 801.
huttonii Hem. Fu & Ph 323.
speciosa Benth. Fu 17; Gi 229, 1607.
sp. aff. H. bolusii Kunzze Gi 211, g706.
7645 Bartsia trixago L. Br 150; Gi 1182; Ph & Hu 26, 136.
GESNERIACEAE
7823 Streptocarpus rexii (Hook.) Lindl. Gi 39, 1548, s.n.
LENTIBULARIACEAE
7901 Utricularia livida E. Mey. Fu & Ph 32; Gi 1272, 1342, s.n.
ACANTHACEAE
7941 Chaetacanthus setiget (Pers.) Lindl. Ph 1233.
7978 Sclerochiton odoratissimus Hilliard Gi 1114; Ph 1190.
8032 Hypoestes forskaolfi (Vahl) R. Br. Gi 452.
triflora (Forssk.) Roem. & Schult. Gi 1099, 1543.
8079 Isoglossa cooperi C.B. Cl. GR 3819; Gi g59, 1013; Ph 1115, 1199.
eckloniana (Nees) Lindau Gi 100, 789; Ph 1460.
8094 Justicia campylostemon (Nees) T. Anders. Ph 780.
PLANTAGINACEAE
8116 Plantago
lanceolata L. Fu & Ph 65. major L. Ph 918.
RUBIACEAE
8136 Kohautia amyatymbica Eckl. & Zeyh. Fu & Ph 350; GR 3479.
8281 Burchellia bialalina (L. f.) Sims GR 3500a; Gi 55, 56, 191, 1037, 1374.
8283b Codidia rudes (E. Mey. ex Harv.) Verde. Ph 388.
8285 Gardenia amoena Sims Gi s.n.; Ph 1127.
thunbergii L. f. Gi s.n.
8285a Rothmannia capensis Thunb. Ph 836.
8348 Pentanisia prunelloides (Klotzsch ex Eckl. & Zeyh.) Walp. subsp. prunelloides Fu et al. 28; Fu & Ph 73; Gi 246.
8352 Canthium ciliatum (Klotzsch) Kunzze Fu & Ph 272; Gi 508, 811, 888; Ph 504, 771, 787, 1123.
inermes (L. f.) Kunzze Fu s.n.; Ph & Fu 266, 276.
mundianum Cham. & Schlecht. Fu s.n.; Fu & Ph 275; Gi 887.
oboatum Klotzsch Ph 1128.
puiciflorum (Klotzsch) Kunzze Fu & Ph 273.
8383 Pavetta capensis (Howitt.) Brem. subsp. komphensis (Brem.) Kok Gi 1158.
kotezi Brem. GR 3501a.
lanceolata Eckl. Fu s.n.
8399 Psychotria capensis (Eckl.) Vatke GR 3835a; Ph 951.
8435 Galopina
aspera (Eckl. & Zeyh.) Walp. Ph 1461.
circaeoides Thunb. Fu 678; Gi 409; Russell 2357.
8438 Anthospermum herbaceum L. f. Fu & Ph 104, 245; GR 3533; Gi 1025, 1075, 1228, 1445.
paniculatum Orce Fu & Ph 63; GR 3529; Gi 1229.
pumilium Sond. subsp. pumilum Ph 96.
spathulatum Spreng. subsp. spatulatum Gi 147; Ph 413; Tu 236.
8464 Richardia scabra L. Ph 1051.
8482 Sheardia arvensis L. Fu & Ph 319; Ph & Hu 130.
8486 Galium
amatymbicum Eckl. & Zeyh. Ph & Hu 7.
capense Thunb. subsp. capense Fu 18; Ph 992.
capense Thunb. subsp. garipace (Sond.) Puff, Hogsback, Rat­
try 433 (PRE) (Puff 1978: 242).
scabreloides Puff Br 182; Fu & Ph 167; Gi 240, 371.
thunbergianum Eckl. & Zeyh. var. hirsutum (Sond.) Verde. Ph 893.
thunbergianum Eckl. & Zeyh. var. thunbergianum Ph 1060.
8489 Rubia petiolaris DC. Gi 1095; Ph 544.

Bothalia 17.2 (1987)
8925 Nidorella auctuicata DC. Fu & Ph 227; Gi 389, 438, 1303, 1579. undulata (Thunb.) Sond. ex Harv. Fu & Ph 43; sp. Ph 1239.

8926 Conyza pinnata (L.) Kunze Fu & Ph 35; Gi 1277. scabrida DC. Gi 390; Ph 140; Tu 181. sumatrensis (Rett.) E.H. Walker Br 35, 39; GR 3013; Ph 810.

8930 Chrysocoma tenuifolia Berg. Ph 816; Tu 97, 113, 116, 146.

8936 Brachylaena elliptica (Thunb.) DC. Gi 977; Tu 174, 177.

8949 Denekia capensis Thunb. Fu 757; Fu & Ph 5, 127, 161.

8992 Gnaehalium austroafricanum Hilliard, Amatola Mts (Hilliard 1983: 20). capensis Hilliard, Amatola Mts (Hilliard 1983: 24). cauctactum Willd. Gi 140; Ph 501, 927. confine Harv. Ph 1485. vestitum Thunb. Gi s.n.

8992d Troglodyton capillaceum (Thunb.) Hilliard & Burtt subsp. diffusum (DC.) Hilliard Ph 1341.

8992e Pseudognaphalium luteo-album (L.) Hilliard & Burtt GR 3138; Ph 505. undulatum (L.) Hilliard & Burtt Br 03, 06, 31.

9006 Helichrysum adenocarpon DC. subsp. adenocarpon Br 44; Fu 718; Gi 504, s.n.

allioidee Less., Amatola Mts (Hilliard 1983: 239).

alticolum H. Bol. Ph 822, 1063.

anormalum Less. Fu & Ph 279, 298; GR 3465, 3542; Mc Gillivray 39; Ph 540.

appendiculatum (L.) Less. Fu & Ph 15; GR 3442; Gi 174, 1725; Ph 94, 509; Ph & Hu 68.

argyrophyllum DC. Fu 675; Fu & Ph 240; Gi 442, s.n.; Ph 235; Zwane 101.

asperum (Thunb.) Hilliard & Burtt var. appressifolium (Moester) Hilliard Ph 93, 1020.

aureonitens Sch. Bip. Br 07, 89, 122, 146; Fu & Ph 64.

aureum (Houtt.) Merrill var. aureum Br 83, 117; Gi 382, 1128, 1254; Ph 946.

bellidiastrom Moester Ph & Hu 3.

colphaleum DC. GR 3528; Ph 811, 1096.

cysoeum (L.) D. Don subsp. cysoeum Gi 4393; Ph 103; Tu 195.

dasycephalum Hoffm. Fu & Ph 237.

ecklons Sond. Fu & Ph 153; GR 3451; Robinson s.n.

epapposum H. Bol., Amatola Mts (Hilliard 1983: 74).

fellinus Less. GR 3466; Gi 1127; Ph 416; Robinson s.n.

foetidum (L.) Moench Br 08, 41, 94; Fu & Ph 232; GR 3144, 3303; Gi 276, 379, 1350; Ph 813 (Involucral bracts cream-coloured).

glomeratum Klett Br 36; Gi s.n.; Ph 808, 815.

grandibracteatum M.D. Henderson GR 3463; Gi 149; Ph 991; Robinson s.n.

griseolaturn Hilliard Fu & Ph 19, 37, 236; Gi 3532.

herbarceum (Andr.) Sweet Gi 1242; Ph 1017.

intricatum DC. Fu 689, 695.

isolepis H. Bol., Gaika’s Kop, Hilliard & Burtt 18791 (E, NU) (Hilliard & Burtt unpublished data).

kebsianum Less. Fu et al. 26; Gi 1255.

miconifolium DC. Br 165; Fu & Ph 145.

mixtum (Kunze) Moester var. mixtum Br 164; Fu et al. 24; Fu & Ph 219; GR 3459; Gi 1258.

montis-cati Hilliard Ph 420.

mundii Harv. Fu et al. 33; Gi 737.

nudifolium (L.) Less. Br 120; Fu et al. 22; Fu & Ph 301, 302; GR 1324; Ph 338, 541, 1177.

odoratissimum (L.) Sweet Fu & Ph 111, 243; GR 3478; Gi s.n.; Ph 809, 1095.

oxyphyllum DC. Gi 1192.

pallicium DC. Fu et al. 21; Fu & Ph 148.

pedunculatum DC. Ph 100.
petiolare Hilliard & Burtt  Gi 1147; Tu 196, 242; Zwane 105.
pilosum (L. f.) Less. Br 114, 129; Fu & Ph 325; GR 3439; 
Ph 990; Robinson s.n.
platyterum DC. Ph 823, 1070.
psilolepis Harv. Fu et al. 23; Ph 149.
rugulosum Less. Br 04, 32, 112; Fu & Ph 62; GR 3475; Gi 1132.
sessile DC. Gi 374; Ph & Hu 32.
simillimum DC. Br 14, 37, 183; Fu et al. 19; Gi 1311; Ph 543.
spiralepis Hilliard & Burtt Br 128; Fu et al. 57; Fu & Ph 154; 
GR 3458, 3530; Gi 1259.
splendidum (Thunb.) Less. Fu & Ph 113; GR 3539; Russell 2341; Tu 101, 109, 247.
subglomeratum Less. Gi 1447, s.n.
tenax M.D. Henderson var. tenax Br 11; Fu & Ph 314; GR 
3541; Gi 144; Robinson s.n.
trilinatum DC. Ph 867, 1062.
unbraculigerum Less. Fu et al. 27; GR 3543; Gi 448, 1076, 
1257; Ph 961, 1224.
xerochrysum DC. Gi 505; Ph 735.
zyheris Less. Fu & Ph 277.
sp. aff. H. mollifoilium Hilliard Ph & Hu 144.
9037 Stroblo
vaigaris Levltyxns (S. plumosa sensu Story 1952: 98) GR 3460; 
Gi s.n.; Ph 539; Tu 98, 108, 114, 256.
sp. aff. S. vaigaris (S. cinerea sensu Story 1952: 98) Fu & Ph 
218; Gi 145; Tu 220, 222.
9041 Elytropappus rhinocerotis (L. f.) Less., between Chatha 
and Donsta Forest Stations (Story 1952: 153).
9043 Metalasia macrocephalus DC. Fu & Hu 36; Ph 326; 
Tu 266.
9050 Retahania
pungens L’Hérit. subsp. angustifolia (DC.) Bremer Fu & Ph 33.
pungens L'Herit. subsp. pungens Gi 372, 1323.
9052 Leysera gnaphalodes (L.) L. Fu & Ph 52; Ph 542.
9053 Macowania revoluta Oliv. Gi 72; Tu 225, 227.
9054 Anthoxia
fontana Macowan Fu & Ph 23.
phylloicdes DC. Fu & Ph 304; Gi s.n.
9058 Arrowsmithia sperchiioides DC. Fu & Ph 36; Gi 148, 212; 
McGillivray 43.
9059 Printzia
huttoni Harv. Gi 35, 385; Ph 765.
pyrifolia Less. Gi 1015; Ph 560.
9078 Pulicaria scabra (Thunb.) Druce Ph 1090.
9155 Zinnia peruviana (L.) L. Ph 1329.
9151 Tagetes minuta L. McGillivray 44; Tu 104.
9320 Ercephenhus tenifolius DC. Ph 890.
9321 Lasiospermum hipinnatum (Thunb.) Druce Fu & Ph 51.
9326 Athanasia dregeana (DC.) Harv. Russell 2352; Ph 1055, 
1072.
9339 Matricaria
nigelilfolia DC. var. tenuior DC. Gi 1087; Ph 153.
nigelilflkla DC. var. nigelilflkla GR 4022.
9340 Lepidostethium
asteroides (H. Bol. & Schltr.) Kroner Gi s.n.
denticulatum Oliv. Fu & Ph 55; GR 3506; Gi 1180.
9351 Cotula
heterocarpa DC. Fu & Ph 10, 329; GR 3090, 3141, 3448, 
3511; Ph 155.
hispida (DC.) Harv. GR 3512.
9356 Schistostethium
crataegifolium (DC.) Fenzl ex Harv. Ph 1071.
flabelliforme Less. Gi 474, 890, 1453.
hippisfolium (DC.) Hutch. Gi 43, 89, 1446; Tu 263.
9358 Artemisia afra Jacq. ex Wildl. Fu & Ph 293; Gi 828; Tu 
152, 163.
9364 Gymnopetothena bifurcata Benth. Ph 1351.
9366 Pentzia
cooperi Harv. Ph 819; Tu 130, 132.
sp. Ph 1196.
9417 Euryops
chrysanthemoides (DC.) B. Nord., 1–2 miles along road to
Ghulu Kop, Keiskamma Hoek, Wells 3185 (GRA, PRE)
(Nordenstam 1968: 368).
ciliatus B. Nord. Ph 802, 827.
dyeri Hutch. Ph & Hu 19.
galpinii H. Bol. Ph 792.
dyeri Hutch. Ph & Hu 19.
galpinii H. Bol. Ph 792.
spathaceus DC. Tu 257, 258, 261, 264.
9420 Othonna sp. (possibly O. natalensis Sch. Bip.), Geju
Mountain (Story 1952: 156, as O. amplexicaulis).
9426 Gazania sonchifolium (DC.) T. Norl. Gi g838; Ph 874.
9427 Osteospermum
caulescens Harv. GR 3425; Gi 150.
grandidentatum DC. Gi 66, 380, 451, 1176.
9427b Chrysanthemoides monilifera (L.) T. Norl. subsp. pisifera
(L.) T. Norl. Gi 62, 393, 395, g846; Tu 198, 230, 243.
9431 Ursinia
nana DC. subsp. nana Ph 1494.
tenuiloba DC. GR 3432; Ph 1158; Robinson s.n.
9432 Arctotis arctotoides (L. f.) Hoffm. Fu & Ph 47; Ph 817, 1490.
9432 Haplocarpha
nervosa (Thunb.) Beauv. Br 121; Fu & Ph 50, 53; Gi 63, 436.
scaposa Harv. Br 124, 141; Fu & Ph 66; GR 3403; Gi 1193; Ph 252.
9434 Gazania
krebiana Less. subsp. krebiana, Hogsback, Rattray 108 (PRE)
(Roessler 1959: 403).
linearis (Thunb.) Druce var. linearis Fu & Ph 280.
9438 Berkheya
acanthopoda (DC.) Roessler, Dootsa Pass, Acocks 9581 (M,PRE)
(Roessler 1959: 256).
bipinnatifida (Harv.) Roessler subsp. bipinnatifida Ph 834.
buphthalmoides (DC.) Schltr. Ph 1004.
carduoides (Less.) Hutch. Ph 1075.
decurrents (Thunb.) Willd. Ph 1313.
onopordifolia (DC.) Hoffm. ex Burtt Davy var. onopordifolia
Ph 1093.
purpurea (DC.) Mast. GR 3534.
rhapontica (DC.) Hutch. & Burtt Davy subsp. aristosa (DC.)
Roessler var. aristosa Fu & Ph 137, 247; GR 3462, 3510; Gi 1345.
speciosa (DC.) Hoffm. subsp. speciosa GR 3486a, 3491; Gi 1179.
9461 Carduus tenuiflorus Curtis GR 3406.
9462 Cirsium vulgare (Savi) Ten. GR 3146.
9528 Gerbera
 kraussii Sch. Bip. Ph 1545.
parpa N.E. Br. Ph 1010.
9528b Piloselloides hirsuta (Forssk.) C. Jeffrey Gi 135, 373, 383.
9561 Tolpis capensis (L.) Sch. Bip. Br 138; Gi 1231; Ph 980.
9572 Hypochoeris radicata L. Br 154; Fu & Ph 67; GR 3012,
3405, 3522; Ph 928.
9592 Taraxacum officinale Weber Ph 995.
9595 Sonchus
asper (L.) Hill subsp. asper Ph 1288.
dregeanus DC. Ph 974, 975; Ph & Hu 90.
oleraceus L. Ph 919, 929, 1026.
wilmsii R.E. Fries Ph 1173.
9596 Lactuca
capensis Thunb. Ph & Hu 94.
scirrulosa L. Ph 1027.
tysonii (Phill.) C. Jeffrey Ph & Hu 79.
9605 Crepis hypchoeroidea (DC.) Thell. Ph 973.