



CHAPTER 4

RESULTS AND DISCUSSION

A. The vegetation of Marakele National Park

4.1 Introduction

The vegetation composition of the study area is summarised in a plant sociological table (Table 4.2) and a synoptic table (Table 4.1). The synoptic table summarizes the relationship between the plant communities of the plant sociological table. By means of the synoptic table, (Table 4.1) and plant sociological table (Table 4.2) five major plant communities were recognized. These are:

- A. *Olea europaea-Diospyros whyteana* Major Community;
- B. *Acacia caffra-Heteropogon contortus* Major Community;
- C. *Protea caffra-Loudetia simplex* Major Community;
- D. *Burkea africana-Setaria lindenbergiana* Major Community; and
- E. *Andropogon huilensis-Xyris capensis* Major Community.

The phytosociological classification of the vegetation in the study area resulted in the identification of 16 plant communities with three of the communities having variations (Tables 4.1 & 4.2). A vegetation map of the study area showing the distribution of the plant communities is given in Figure 4.1. Westfall (1981) described the plant communities adjacent to the study area and Coetzee (1975), Coetzee *et al.* (1976), Bloem (1988), Bloem *et al.* (1993 a&b), Du Preez *et al.* (1991) and Coetzee *et al.* (1993) described related vegetation.

4.2 *Olea europaea* subsp. *africana-Diospyros whyteana* Major Community

The species composition of the *Olea europaea* subsp. *africana-Diospyros whyteana* major community is given in Table 4.1. This major community is differentiated by the



following diagnostic plant species (species group A, Table 4.1 & 4.2 & species group I):

- | | |
|-----------------------------------|--|
| <i>Diospyros whyteana</i> | <i>Ochna holstii</i> |
| <i>Euclea natalensis</i> | <i>Olea capensis</i> |
| <i>Euphorbia ingens</i> | <i>Olea europaea</i> subsp. <i>africana</i> |
| <i>Ficus sur</i> | <i>Osyris lanceolata</i> |
| <i>Grewia occidentalis</i> | <i>Rhoicissus tridentata</i> |
| <i>Mimusops zeyheri</i> | |

This major community occurs in the kloofs, as bushclumps on south and east facing slopes and as bushclumps on termitaria. The kloofs are the least exposed of the geomorphology classes (Appendix I) found in the study area with water in the spruits. Coetzee (1975) described a related community as *Hypoestes verticillaris-Mimusops zeyheri* Forests, and Westfall (1981) described a related community as Kloof Forest Communities on moderately deep soils in moist, sheltered habitats. Du Preez et al. (1991a&b) described this type of forest as typical Afromontane Forests, where these forests occur in specific niches in deep valleys, protected gorges, crevices and ravines along the eastern and western slopes of the Drakensberg mountain range.

According to White (1978) the majority of the tree species in these forests are very widespread. Amongst them are *Podocarpus latifolius*, *Ilex mitis* and *Halleria lucida* that occur in the study area.

The abovementioned assemblage of species could almost be used to define the Afromontane region as a whole. Not one species occurs throughout, but most species of the assemblage are represented on virtually every "island" of Afromontane forest.

Coetzee et al. (1976) and Coetzee et al. (1981) described termitaria bushclump communities at Nylsvley Nature Reserve, which have diagnostic species similar to the bushclump communities on termitaria in the study area.

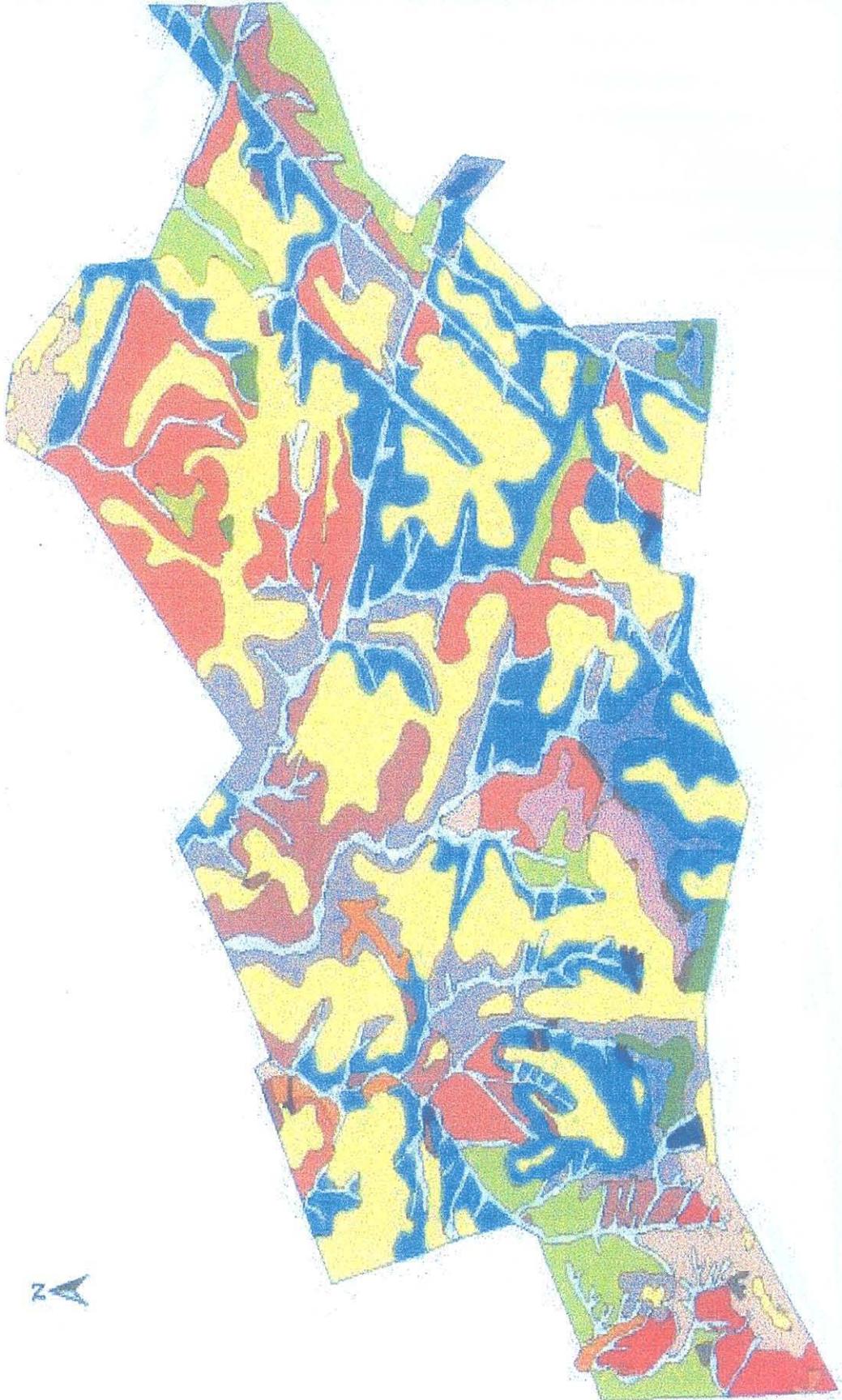
In the phytosociological classification, the following plant communities are classified under the *Olea europaea*-subsp. *africana*-*Diospyros whyteana* Major Community (Tables 4.1 & 4.2):

4.2.1 *Widdringtonia nodiflora*-*Podocarpus latifolius* Short Forest.



- 4.2.2 *Podocarpus latifolius*-*Rothmannia capensis* Tall Forest.
- 4.2.3 *Buxus macowanii*-*Kirkia wilmsii* Low Forest.
- 4.2.4 *Rhus leptodictya*-*Mimusops zeyheri* Termitaria Thickets.
- 4.2.4.1 *Rhus leptodictya*-*Carissa bispinosa* **variation**
- 4.2.4.2 *Rhus leptodictya*-*Berchemia zeyheri* **variation**
- 4.2.5 *Olea europaea*-*Calpurnea aurea* Tall Closed Woodland.

A dendrogram showing the habitat relationships of the various plant communities classified under the *Olea europaea* subsp. *africana*-*Diospyros whyteana* Major Community is shown in Figure 4.2.



Scale 1: 50 000

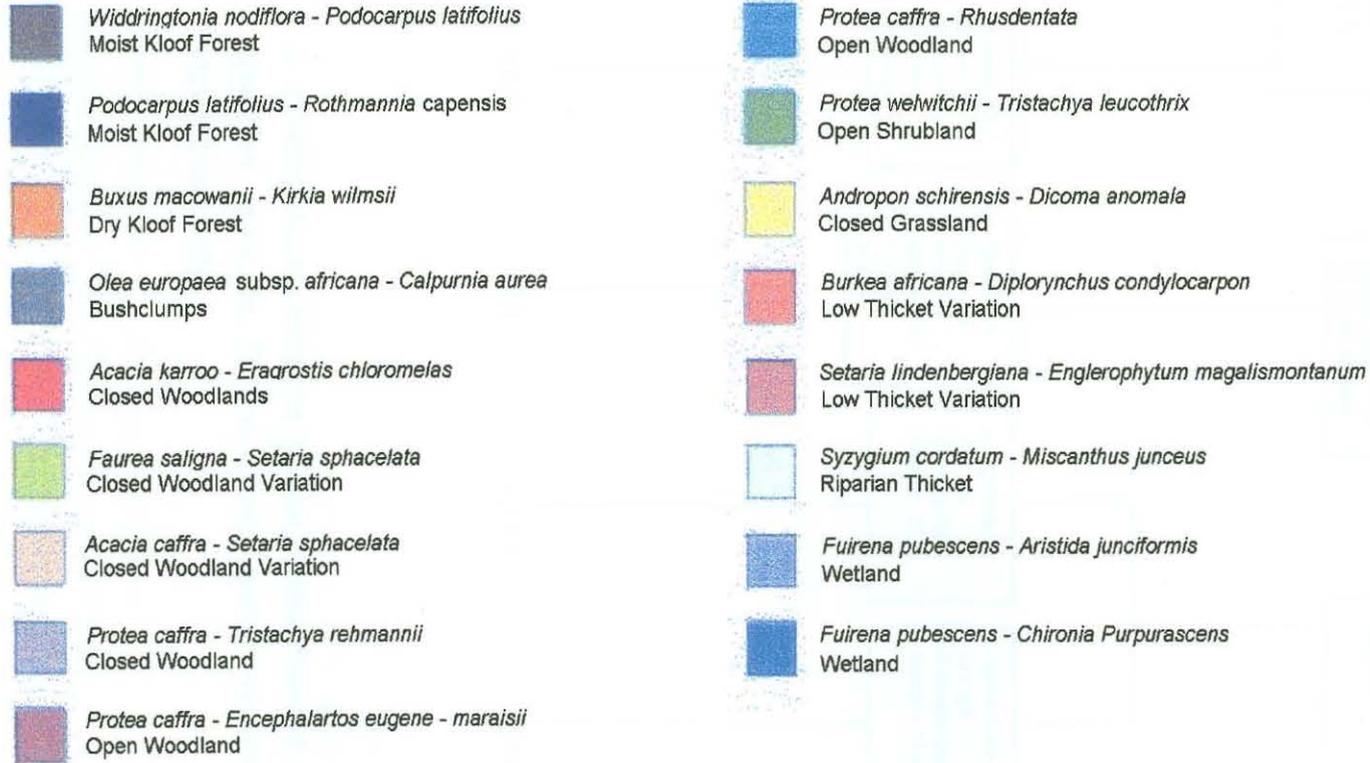


Figure 4.1 Vegetation map of Marakele National Park

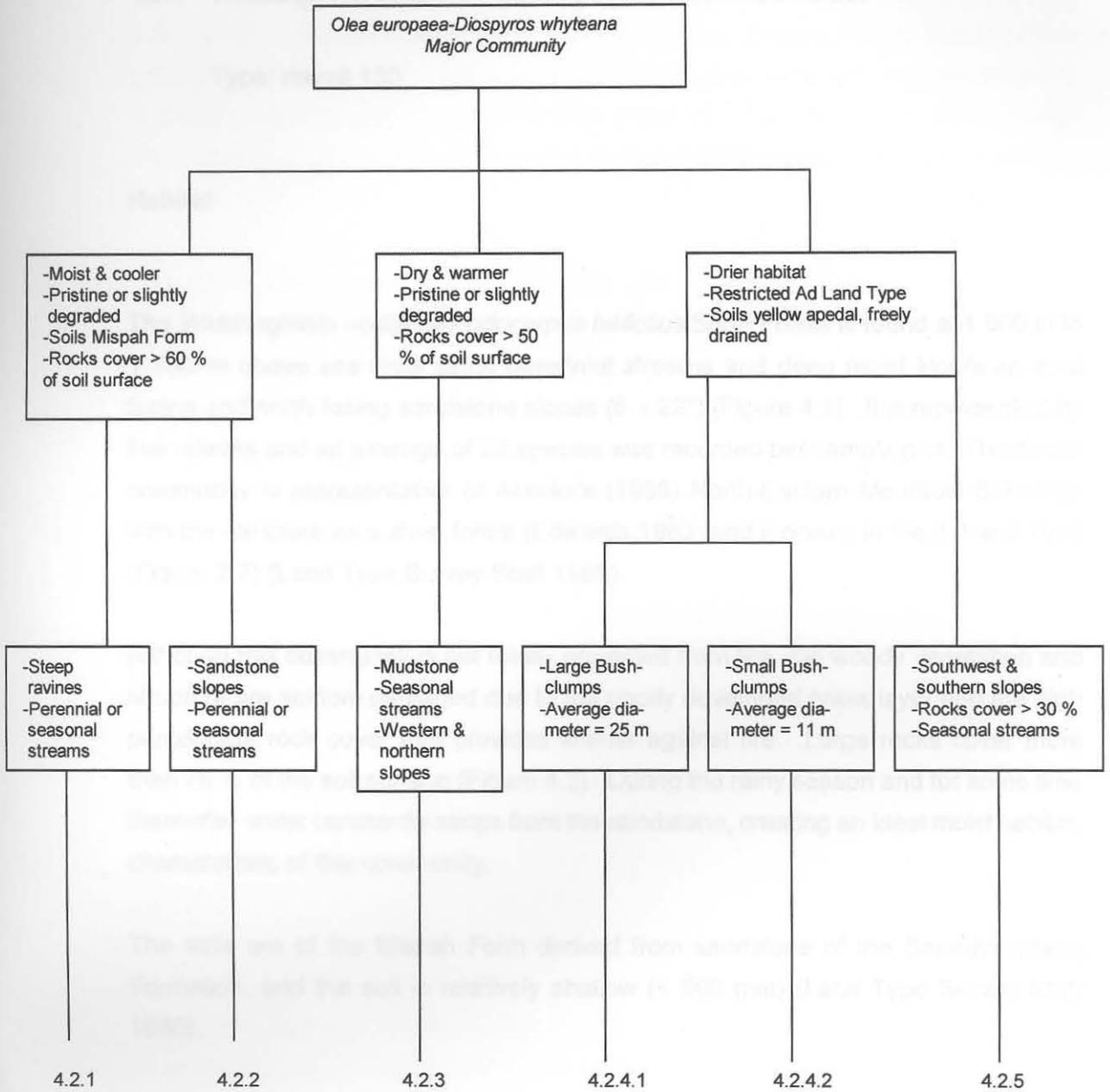


Figure 4.2 A dendrogram showing the habitat relationships of the plant communities classified under the *Olea europaea- subsp. africana-Diospyros whyteana* Major Community.

Agave splendens

Phytolacca paniculata

Diospyros glauca

Pinus sp. viridiflora

Chenopodium

Plantago aquilina

Hesperis matronalis

Wickstroemia rosiflora



4.2.1 *Widdringtonia nodiflora*-*Podocarpus latifolius* Short Forest

Type: relevé 130

Habitat

The *Widdringtonia nodiflora*-*Podocarpus latifolius* Short Forest is found at 1 500 m to 1 730 m above sea level along perennial streams and deep moist kloofs on east facing and north facing sandstone slopes (6 - 22°) (Figure 4.1). It is represented by five relevés and an average of 22 species was recorded per sample plot. This forest community is representative of Acocks's (1988) North-Eastern Mountain Sourveld, with the structure as a short forest (Edwards 1983) and it occurs in the Ib Land Type (Figure 2.7) (Land Type Survey Staff 1988).

Although this community is not totally protected from fire, the woody vegetation and structure are seldom damaged due to the poorly developed grass layer and the high percentage rock cover that provides shelter against fire. Large rocks cover more than 76 % of the soil surface (Figure 4.2). During the rainy season and for some time thereafter water constantly seeps from the sandstone, creating an ideal moist habitat, characteristic of this community.

The soils are of the Mispah Form derived from sandstone of the Sandriviersberg Formation, and the soil is relatively shallow (< 500 mm) (Land Type Survey Staff 1988).

Floristics

The *Widdringtonia nodiflora*-*Podocarpus latifolius* Short Forest is differentiated by the following plant species (species group A, Table 4.2):

- Asplenium splendens***
- Blechnum giganteum***
- Clusia pulchella***
- Halleria lucida***
- Phyllica paniculosa***
- Pittosporum viridiflorum***
- Pteridium aquilinum***
- Widdringtonia nodiflora***

The tree layer is on average 8,4 m tall with an average canopy cover of 79 % (Table 4.2). Other prominent trees are *Podocarpus latifolius*, *Curtisia dentata* and *Canthium gilfillanii* (species group C), *Olea capensis* (species group I) and *Syzygium cordatum*, *Cliffortia linearifolia* and *Ilex mitis* (species group CC, Table 4.2). The latter species also differentiates the *Syzygium cordatum*-*Miscanthus junceus* Riparian Vegetation (Table 4.2).

The shrub layer is on average 1,4 m tall, with an average canopy cover of 22 % (Table 4.2). Prominent shrubs occurring in this community are *Myrsine africana* (species group C), *Ochna holstii* and *Osyris lanceolata* (species group I), (Table 4.2). The woody liane *Secamone alpinii* is frequently found in the tree and shrub strata and the sedge *Cyperus albostratus* as ground cover in the more open areas among the trees.

The herbaceous layer has an average height of 0,5 m and an average canopy cover of 11,0 % (Table 4.1). It is dominated by the ferns *Blechnum giganteum*, *Pteridium aquilinum* and *Asplenium splendens* as the differential species in species group A. The tree fern, *Cyathea dregei*, which was not recorded in the sample plots, also occurs in such forests in the study area. These tree ferns are very susceptible to fire and some were in the past badly damaged by fire.

General

The *Widdringtonia nodiflora*-*Podocarpus latifolius* Short Forest has many characteristic species in common with the *Ilex mitis*-*Pittosporum viridiflorum* Forest Community described by Coetzee (1975) and the *Pittosporalea viridiflorii* described by Du Preez *et al.* (1991 a&b). The habitats are also quite similar. This community occupies the most mesic habitats of sheltered parts of kloofs on the eastern side of the mountain. The dominant woody species *Widdringtonia nodiflora* and *Podocarpus latifolius* are however absent from the forest communities described by Coetzee (1975) and Du Preez *et al.* (1991 a&b).

Communities 4.2.1 and 4.2.2 are related to each other through the mutual presence of the *Podocarpus latifolius* species group (Table 4.1) and communities 4.2.3, 4.2.4 and 4.2.5 are related to community 4.2.1 through the *Olea europaea* subsp. *africana* species group (Table 4.2).



4.2.2 *Podocarpus latifolius-Rothmannia capensis* Tall Forest.

Type: relevé 109

Habitat

The *Podocarpus latifolius-Rothmannia capensis* Tall Forest is found at 1 300 m to 1 660 m above sea level along perennial or seasonal streams and moist kloofs on south-east facing, north facing, north-east and east facing sandstone slopes (4 - 30°) (Figures 4.1). It is represented by five relevés and an average of 30 species was recorded per sample plot. This forest community is a representative of Acocks's (1988) North-Eastern Mountain Sourveld, with the structure as a tall forest (Edwards 1983) and it all occurs in the Ib Land Type (Figure 2.7) (Land Type Survey Staff 1988).

During the rainy season and for some time thereafter water constantly seeps from the sandstone, creating an ideal moist habitat, characteristic for this community. The soils are of the Mispah Form derived from sandstone of the Sandriviersberg Formation, and the average soil depth is relatively shallow (< 500 mm) (Land Type Survey Staff 1988). Large rocks cover more than 70 % of the soil surface (Figure 4.2).

Floristics

The *Podocarpus latifolius-Rothmannia capensis* Tall Forest is differentiated by the following plant species (species group B, Table 4.2)

- | | |
|------------------------------|---------------------------------|
| <i>Celtis africana</i> | <i>Asparagus setosum</i> |
| <i>Combretum moggii</i> | <i>Pterocelastrus echinatus</i> |
| <i>Diospyros lycioides</i> | <i>Rothmannia capensis</i> |
| <i>Dovyalis zeyheri</i> | <i>Solanum giganteum</i> |
| <i>Nuxia congesta</i> | <i>Strychnos usambarensis</i> |
| <i>Oplismenus hirtellus</i> | <i>Tetradenia brevispica</i> |
| <i>Pavetta gardeniifolia</i> | |

The tree layer is on average 12,0 m tall with an average canopy cover of 79 % (Table 4.2). Other prominent trees are *Pittosporum viridiflorum* (species group A), *Podocarpus latifolius* and *Curtisia dentata* (species group C), *Cussonia paniculata* and *Ficus thonningii* (species group F), *Calodendron capensis* (species group G), *Olea europaea* subsp. *africana*, *Euphorbia ingens*, *Mimusops zeyheri*, *Ficus sur* and *Olea capensis* (species group I) and *Syzygium cordatum* and *Ilex mitis* (species group CC, Table 4.2). The latter species also differentiates the *Syzygium cordatum-Miscanthus junceus* Short Thickets (Table 4.2).

The shrub layer is on average 1,7 m tall with an average canopy cover of 49 % (Table 4.2). Prominent shrubs occurring in this community are *Myrsine africana* and *Canthium gilfillanii* (species group C), *Ochna pretoriensis* and *Acacia ataxacantha* (species group D), *Calpurnia aurea* and *Maytenus undata* (species group G), *Pappea capensis* and *Zanthoxylum capense* (species group H) and *Ochna holstii*, *Osyris lanceolata*, *Diospyros whyteana*, *Grewia occidentalis*, *Rhoicissus tridentata* and *Euclea natalensis* (species group I, Table 4.1). The woody liane *Secamone alpinii* and *Cryptolepis transvaalensis* are frequently found in the tree and shrub strata and the sedge *Cyperus albostriatus* as ground cover in the more open areas.

The herbaceous layer has an average height of 0,5 m and an average canopy cover of 22 % (Table 4.2). It is dominated by *Cyperus albostriatus*, *Tetradenia brevispica*, *Solanum giganteum* and *Oplismenus hirtellus*. The tree fern, *Cyathea dregei*, which was not recorded in the sample plots, also occurs in this community.

Floristics

General

The *Podocarpus latifolius-Rothmannia capensis* Tall Forest is similar to the *Widdringtonia nodiflora-Podocarpus latifolius* Short Forest and was discussed under the latter. The difference in habitat between the *Podocarpus latifolius-Rothmannia capensis* Tall Forest and the *Widdringtonia nodiflora-Podocarpus latifolius* Short Forest lies in the terrain where each plant community occurs (Figure 4.2). This community is closely related to the *Celtis africana-Osyris lanceolata* Kloof Forest described by Westfall (1981). These two communities have many distinctive habitat features and many, distinctive species in common.



4.2.3 *Buxus macowanii*-*Kirkia wilmsii* Low Forest

Type: relevé 64

Habitat

The *Buxus macowanii*-*Kirkia wilmsii* Low Forest is found at 1 110 m to 1 250 m above sea level (Figure 4.1). This Low Forest occupies a relatively drier and warmer habitat than the *Widdringtonia nodiflora*-*Podocarpus latifolius* Short Forest and the *Podocarpus latifolius* -*Rothmannia capensis* Tall Forest. The *Buxus macowanii*-*Kirkia wilmsii* Low Forest is restricted to hot dry kloofs of north facing, east and northwest facing slopes (2 - 29°) of the study area (Figure 4.1)

The structure of this forest community is a low forest (Edwards 1983) and it occurs in the Ib Land Type (Figure 2.7) (Land Type Survey Staff 1988). It is represented by four relevés and an average of 28 species was recorded per sample plot. The soils are of the Mispah Form derived from sandstone of the Sandriviersberg Formation, and the soil is relatively shallow (< 500 mm) (Land Type Survey Staff, 1988). Rocks cover more than 50 % of the soil surface (Figure 4.2).

Floristics

The *Buxus macowanii*-*Kirkia wilmsii* Low Forest is differentiated by the following plant species (species group D, Table 4.2):

- | | |
|-----------------------------------|---------------------------------------|
| <i>Acacia ataxacantha</i> | <i>Heteromorpha trifoliata</i> |
| <i>Buxus macowanii</i> | <i>Kirkia wilmsii</i> |
| <i>Croton gratissimus</i> | <i>Ochna pretoriensis</i> |
| <i>Euphorbia turicalli</i> | |

The tree layer is on average 7,8 m tall, with an average canopy cover of 35 % (Table 4.2). Other prominent trees are *Rhus leptodictya* and *Ficus thonningii* (species group F) and *Olea capensis*, *Mimusops zeyheri*, *Olea europaea* subsp. *africana*, *Euphorbia ingens* and *Ficus sur* (species group I, Table 4.2).



The shrub layer is on average 2,3 m tall, with an average canopy cover of 83,8 % (Table 4.2). Prominent shrubs occurring in this community are *Dovyalis zeyheri* (species group B), *Canthium gilfillanii* (species group C), *Psiadia punctulata* (species group E), *Securinega virosa* (species group F), the liana, *Cryptolepis transvaalensis*, *Maytenus undata* and *Tricalysia lanceolata* (species group G), *Ochna holstii*, *Diospyros whyteana*, *Osyris lanceolata* and *Grewia occidentalis* (species group I) and *Apodytes dimidiata* and *Heteropyxis natalensis* (species group B, Table 4.2).

The herbaceous layer has an average height of 0,3 m and an average canopy cover of 6,5 % (Table 4.2). The herbaceous layer is poorly represented and is dominated by the xerophytic ferns *Cheilanthes viridis* and *Pellaea calomelanos* (species group BB) and the sedge *Cyperus leptocladus*.

General

Westfall (1981) described an *Erythrina lysistemon-Celtis africana* Kloof Forest with *Buxus macowanii* as a conspicuous woody species with more than 5 % mean canopy cover and occurring in more than 50 % of the relevés. This community is similar to the community found in the study area. The distribution of the shrub, *Buxus macowanii*, is restricted to warm valleys and coastal dunes in the Eastern Cape, with the Transvaal population as an unexpected outlier (Palgrave 1988). These shrubs are often gregarious, forming pure stands (Table 4.2).

4.2.4 *Rhus leptodictya-Mimusops zeyheri* Termitarium Thickets

Type: relevé 18

Habitat

The *Rhus leptodictya-Mimusops zeyheri* Termitarium Thickets are found from 1 160 m to 1 300 m above sea level. This widespread community occupies an even more dry habitat than that of the *Buxus macowanii-Kirkia wilmsii* Low Forest. These



bushclumps on termitaria are restricted to the Ad Land Type (Land Type Survey Staff 1988) (Figure 2.5).

It usually occurs on north facing, northwest facing, north-east facing, east and southeast facing level and gentle slopes (see section 3.7.4).

This community is a representative of Acocks's (1988) Sour Bushveld, with the structure as a short closed woodland (Edwards 1983) and it occurs in the Ad Land Type (Figure 2.5) (Land Type Survey Staff 1988). It is represented by 11 relevés and an average of 37 species was recorded per sample plot.

All units on the 1: 50 000 aerial photographs with an area of less than one square millimeter were omitted. It means that plant community units such as the *Rhus leptodictya-Mimusops zeyheri* Termitarium Thickets with an area of less than two hectares were not indicated on the vegetation map (Figure 4.1). The limited factor in the mapping of these vegetation units is the scale of the map and not the classification of the plant community.

Before proclamation of MNP, this community was subjected to heavy grazing by cattle and the field layer varies in height and cover depending on soil salinity and the amount of grazing (Coetzee *et al.* 1981). This community developed on huge termite mounds to form a specific plant community. The size of these termitaria determines the type of vegetation that occurs here. The trees are usually very tall because of the depth and aeration and the finer texture and higher nutrient status of the soil (Coetzee *et al.* 1976).

Floristics

The *Rhus leptodictya-Mimusops zeyheri* Termitarium Thickets are differentiated by the following plant species (species group F, Table 4.2):

Cussonia paniculata

Euclea crispa* subsp. *crispa

Ficus thonningii

Grewia flavescens

Pavetta zeyheri

Rhus leptodictya

Schistostephium heptalobum

Securinega virosa

Tagetes minuta



This community is divided into the following variations, based on floristic composition:

4.2.4.1 *Rhus leptodictya*-*Carissa bispinosa* variation

Type: relevé 18

Habitat

The *Rhus leptodictya*-*Carissa bispinosa* variation is found at 1 160 m to 1 300 m above sea level. This variation occurs on southeast facing, east facing, northeast facing, north facing, northwest and west facing level and gentle slopes (1 - 16) (see section 3.7.4). The soils are yellow apedal and well drained, belonging to one of the following forms: Inanda, Kranskop, Magwa, Hutton, Griffin and/or Clovelly. The soil is relatively deep (> 500 mm) (Land Type Survey Staff 1988) (Figure 4.2).

The average diameter of the *Rhus leptodictya*-*Carissa bispinosa* variation bushclumps is 25 metres. It is represented by seven relevés and an average of 37,4 species was recorded per sample plot (Table 4.2, Figure 4.6).

Floristics

The *Rhus leptodictya*-*Carissa bispinosa* variation is differentiated by the following plant species (species group E, Table 4.2):

General

- | | |
|--------------------------------------|-------------------------------------|
| <i>Adenia glauca</i> | <i>Maerua angolensis</i> |
| <i>Aloe marlothii</i> | <i>Maytenus heterophylla</i> |
| <i>Carissa bispinosa</i> | <i>Panicum maximum</i> |
| <i>Clerodendrum glabrum</i> | <i>Pavonia burchelli</i> |
| <i>Eragrostis rigidior</i> | <i>Psiadia punctulata</i> |
| <i>Gardenia volkensii</i> | <i>Scadoxus puniceus</i> |
| <i>Hemizygia pretoriae</i> | <i>Schkuhria pinnata</i> |
| <i>Ipomoea magnusiana</i> | <i>Scolopia zeyheri</i> |
| <i>Kalanchoe rotundifolia</i> | <i>Sida cordifolia</i> |
| <i>Lippia javanica</i> | <i>Sida dregei</i> |



The tree layer is on average 7,0 m tall with an average canopy cover of 78,6 % (Table 4.2). Other prominent trees are *Pappea capensis* and *Schotia brachypetala* (species group H), *Olea capensis*, *Mimusops zeyheri*, *Olea europaea* subsp. *africana* and *Euphorbia ingens* (species group I, Table 4.2) and *Acacia karroo* (species group J). The latter species also differentiates the *Acacia karroo-Eragrostis chloromelas* Short Closed Woodland (Table 4.2). *Dombeya rotundifolia* subsp. *rotundifolia*, *Berchemia zeyheri* and *Ziziphus mucronata* (species group N, Table 4.2) show strong affinities with the *Rhus leptodictya-Carissa bispinosa* variation.

The shrub layer is on average 1,4 m tall, with an average canopy cover of 45,7 % (Table 4.2). Prominent shrubs are *Calpurnia aurea*, *Maytenus undata* and *M. polyacantha* (species group G). The latter species also differentiates the *Olea europaea* subsp. *africana-Calpurnia aurea* Tall Closed Woodland (Table 4.2). Other shrubs include *Zanthoxylum capense* (species group H), *Osyris lanceolata*, *Diospyros whyteana*, *Grewia occidentalis*, *Rhoicissus tridentata* and *Euclea natalensis* (species group I) and *Dichrostachys cinerea* subsp. *cinerea* (species group N, Table 4.2).

The herbaceous layer has an average height of 0,4 m and an average canopy cover of 20 % (Table 4.2). It is dominated by the grass *Panicum maximum* and the forbs *Pavonia burchelli*, *Sida dregei*, *S. cordifolia*, *Adenia glauca*, *Eragrostis rigidior*, *Kalanchoe rotundifolia*, *Schkuhria pinnata* and *Lippia javanica* (species group E, Table 4.2). Other herbaceous plant species are *Eragrostis curvula*, *E. lehmanniana* and *Aristida congesta* subsp. *congesta* (species group N, Table 4.2).

General

Coetzee et al. (1976) described similar communities from flat bottomlands and from termitaria at Nylsvley Nature Reserve, and two variations were recognized: the *Pappea capensis-Acacia tortilis* variation, and *Acacia nilotica-Acacia tortilis* variation. Floristically the *Pappea capensis-Acacia tortilis* variation shows strong affinities with the *Rhus leptodictya-Carissa bispinosa* variation, with the most common differential plant species as *Carissa bispinosa* and *Pappea capensis*. The difference between the *Rhus leptodictya-Carissa bispinosa* variation and the *Rhus leptodictya-Berchemia zeyheri* variation is the structure, but they are floristically



similar and the difference in the table is that the one variation has more species than the other variation.

The structure of the *Rhus leptodictya-Berchemia zeyheri* **variation** is denser and sometimes virtually impenetrable because trees, shrubs and climbers interlock (Figure 4.6), especially the smaller termitarium bushclumps.

4.2.4.2 *Rhus leptodictya-Berchemia zeyheri* **variation**

Type: relevé 16

Habitat

The *Rhus leptodictya-Berchemia zeyheri* **variation** is found at 1 250 m to 1 360 m above sea level. It is represented by four relevés and an average of 34 species was recorded per sample plot. The soils are the same as for the *Rhus leptodictya-Carissa bispinosa* **variation** (see section 4.2.4.1).

Floristics

Although it seems that no differential species occur in this variation, it can be distinguished from the *Rhus leptodictya-Carissa bispinosa* **variation** by the absence of species in the species group E and the presence of species in species group F (Table 4.2).

The tree layer is on average 6,5 m tall with an average canopy cover of 66,3 %. The shrub layer is on average 1,6 m tall with an average canopy cover of 46,0 %. The herbaceous layer has an average height of 0,4 m and an average canopy cover of 10,3 % (Table 4.2).

Calodendron capense

Meyersonia polyantha

Calpurnia aurea

Asparagus virgatus



General

The average diameter of the *Rhus leptodictya*-*Berchemia zeyheri* variation is less (11 metres) than that of the *Rhus leptodictya*-*Carissa bispinosa* variation (25 metres).

4.2.5 *Olea europaea*-*Calpurnea aurea* Tall Closed Woodland

Type: relevé 97

Habitat

The *Olea europaea*-*Calpurnea aurea* Tall Closed Woodland is found from 1 180 m to 1 500 m above sea level in deep kloofs on southwest facing and south facing sandstone slopes (2 - 25°) (see section 3.7.4) (Table 4.2, Figure 4.1 & 4.2). It is represented by four relevés and an average of 34 species was recorded per sample plot.

This bushclump community is a representative of Acocks's (1988) Sour Bushveld, with the structure as a tall closed woodland (Edwards 1983) with two relevés (96 and 97) occurring in the Ad Land Type (Figure 2.5) and two relevés (87 and 86) occurring in the Ib Land Type (Figure 2.7) (Land Type Survey Staff 1988). The soils are of the Mispah Form derived from sandstone of the Sandriviersberg Formation and large rocks cover more than 31 % of the soil surface (Figure 4.2; Land Type Survey Staff 1988).

Floristics

The *Olea europaea* subsp. *africana*-*Calpurnea aurea* Tall Closed Woodland is differentiated by the following plant species (species group G, Table 4.2):

- Calodendron capense***
- Calpurnia aurea***
- Maytenus polyacantha***
- Asparagus virgatus***

Cryptolepis transvaalensis ***Tricalysia lanceolata***
Maytenus undata ***Vepris undulata***

The tree layer is on average 10,5 m tall with an average canopy cover of 56 % (Table 4.2). Other prominent trees are *Pappea capensis* and *Schotia brachypetala* (species group H), *Mimusops zeyheri*, *Olea europaea* subsp. *africana* and *Ficus sur* (species group I, Table 4.2).

The shrub layer is on average 1,8 m tall with an average canopy cover of 41 % (Table 4.2). Prominent shrubs occurring in this community are *Zanthoxylum capense*, *Ochna holstii*, *Diospyros whyteana*, *Grewia occidentalis* (species group H) and *Rhoicissus tridentata* and *Euclea natalensis* (species group I, Table 4.2).

The herbaceous layer has an average height of 0,4 metres and an average canopy cover of 21 % (Table 4.2). The herbaceous layer is dominated by the grass, *Setaria lindenbergiana* and the forb *Hypoestes forskoolii* (species group X, Table 4.2).

General

The *Olea europaea* subsp. *africana*-*Calpurnia aurea* Tall Closed Woodland has floristically very strong affinities with the *Rhus leptodictya*-*Berchemia zeyheri* variation, especially indicated by species group G and species group H (Table 4.2). The difference between these two bushclump communities is the general absence of termitaria in the *Olea europaea* subsp. *africana*-*Calpurnia aurea* Tall Closed Woodland and the occurrence of rocks in the latter community.

4.3 *Acacia caffra*-*Heteropogon contortus* Major Community

4.3.1 *Acacia caffra*-*Syntherisma sphaecolata* variation

4.3.2 *Acacia caffra*-*Syntherisma sphaecolata* variation

The species composition of the *Acacia caffra*-*Heteropogon contortus* Major Community is given in Table 4.1. This major community is differentiated by the following diagnostic plant species (species group B, Table 4.1):

Acacia caffra ***Heteropogon contortus***
Elionurus muticus ***Pogonarthria squarrosa***



***Faurea saligna* - *Solanum incanum* Closed Woodland**

This major community occurs on level surfaces and on slopes that are probably nutritionally enriched and in some places relatively mesic, due to water accumulation (Coetzee 1975). The soils are mainly of the Mispah-, Glenrosa-, Hutton- or Clovelly Form. The soil depth varies from 100 mm to more than 1 000 mm (Land Type Survey Staff 1988).

Coetzee (1975) described a similar community as *Eustachys mutica*-*Acacia caffra* Woodlands and Westfall (1981) described a similar community as Woodland, representative of Acocks's (1988) Sour Bushveld, on moderately deep to deep soils in moderately exposed habitats. Coetzee (1974) described *Acacia caffra* Savannas on diabase and in sheltered valleys that belong to the same syntaxon as the *Acacia caffra*-*Heteropogon contortus* Major Community described here. Many of the sample plots occur on diabase, which forms the substrate of this major community.

The *Rhus leptodictya*-*Mimusops zeyheri* Termitarium Thickets and the *Olea europaea* subsp. *africana*-*Calpurnia aurea* Tall Closed Woodland (Table 4.2) are related to the *Acacia caffra*-*Heteropogon contortus* Major Community through the mutual presence of species group N (Table 4.2).

A dendrogram to illustrate the habitat relationship of the plant communities classified under the *Acacia caffra*-*Heteropogon contortus* Major Community is shown in Figure 4.3.

In the phytosociological classification, the following plant communities are classified under the *Acacia caffra*- *Heteropogon contortus* Major Community (Tables 4.2):

- 4.3.1 *Acacia karroo*-*Eragrostis chloromelas* Short Closed Woodland
- 4.3.2 *Acacia caffra*-*Setaria sphacelata* Short Closed Woodland
 - 4.3.2.1 *Faurea saligna*-*Setaria sphacelata* **variation**
 - 4.3.2.2 *Acacia caffra*-*Setaria sphacelata* **variation**



4.3.1 *Acacia karroo-Eragrostis chloromelas* Short Closed Woodland

Type: relevé 111

Habitat

The *Acacia karroo-Eragrostis chloromelas* Short Closed Woodland is found at 1 200 m to 1 280 m above sea level (Figure 4.1) on level and gentle slopes (1 - 6) (see section 3.7.4). It is represented by five relevés and an average of 35 species was recorded per sample plot. This community is a representative of Acocks's (1988) Sourish Mixed Bushveld, with the structure described as a short closed woodland (Edwards 1983), and it occurs in the Ad Land Type (Figure 2.5) (Land Type Survey Staff 1988).

The soils are very rocky (all sizes) and gravelly and of the Mispah- and Glenrosa Forms. The soils are derived from sandstone of the Sandriviersberg Formation and of Post-Waterberg diabase dykes and sills. Rocks cover more than 12 % of the soil surface. The soil is relatively shallow (< 500 mm) (Land Type Survey Staff 1988) (Figure 4.3).

Floristics

The *Acacia karroo-Eragrostis chloromelas* Short Closed Woodland is differentiated by the following plant species (species group J, Table 4.2):

- | | |
|------------------------------------|--|
| <i>Acacia karroo</i> | <i>Eragrostis capensis</i> |
| <i>A. permixta</i> | <i>E. chloromelas</i> |
| <i>Aristida rhiniochloa</i> | <i>Grewia bicolor</i> |
| <i>Combretum apiculatum</i> | <i>Peltophorum africanum</i> |
| <i>C. hereroense</i> | <i>Sclerocarya birrea</i> subsp <i>caffra</i> |
| <i>Digitaria eriantha</i> | |

The dominant tree stratum is between five metres and eight metres tall with an average canopy cover of 46 % (Table 4.2). *Acacia karroo* is the dominant tree on west facing, north facing and northwest facing slopes. Other prominent trees are *A.*

caffra and *Faurea saligna* (species group M), *Dombeya rotundifolia*, *Berchemia zeyheri* and *Ziziphus mucronata* (species group N,) and *Lansea discolor* (species group X, Table 4.2). The latter species also differentiates the *Burkea africana*-*Setaria lindenbergiana* Major Community (Table 4.2).

The shrub stratum, which is on average 1,8 metres tall, has an average canopy cover of 9 % (Table 4.2). The dominant shrubs are *Combretum apiculatum* and *Dichrostachys cinerea* on western and north-western slopes. Grasses and forbs cover 39 % with an average height of 0,8 metres.

The dominant plant species in the herbaceous layer is *Heteropogon contortus*, *Elionurus muticus* and *Pogonarthria squarrosa* (species group M), *Aristida congesta* subsp. *congesta* and *Eragrostis lehmanniana* (species group N), *Themeda triandra*, *Eragrostis racemosa* and *Brachiaria serrata* (species group AA, Table 4.2).

General

The *Acacia karroo*-*Eragrostis chloromelas* Short Closed Woodland has many characteristic species in common with the *Eustachys mutica*-*Acacia caffra* Woodland described by Coetzee (1975) in the Rustenburg Nature Reserve. Communities 4.2.4, 4.2.5 and 4.3.1 are related to each other through the mutual presence of the *Dombeya rotundifolia* subsp. *rotundifolia* species group (species group M, Table 4.2) and communities 4.3.1 and 4.3.2 are related through the mutual presence of the *Heteropogon contortus* species group (species group M, Table 4.2).

4.3.2 *Acacia caffra*-*Setaria sphacelata* Short Closed Woodland

Type: relevé 91

Habitat

The *Acacia caffra*-*Setaria sphacelata* Short Closed Woodland is found at 1 180 m to 1 400 m above sea level (Figure 4.1) on level to gentle slopes (1 - 5) (see section 3.7.4).

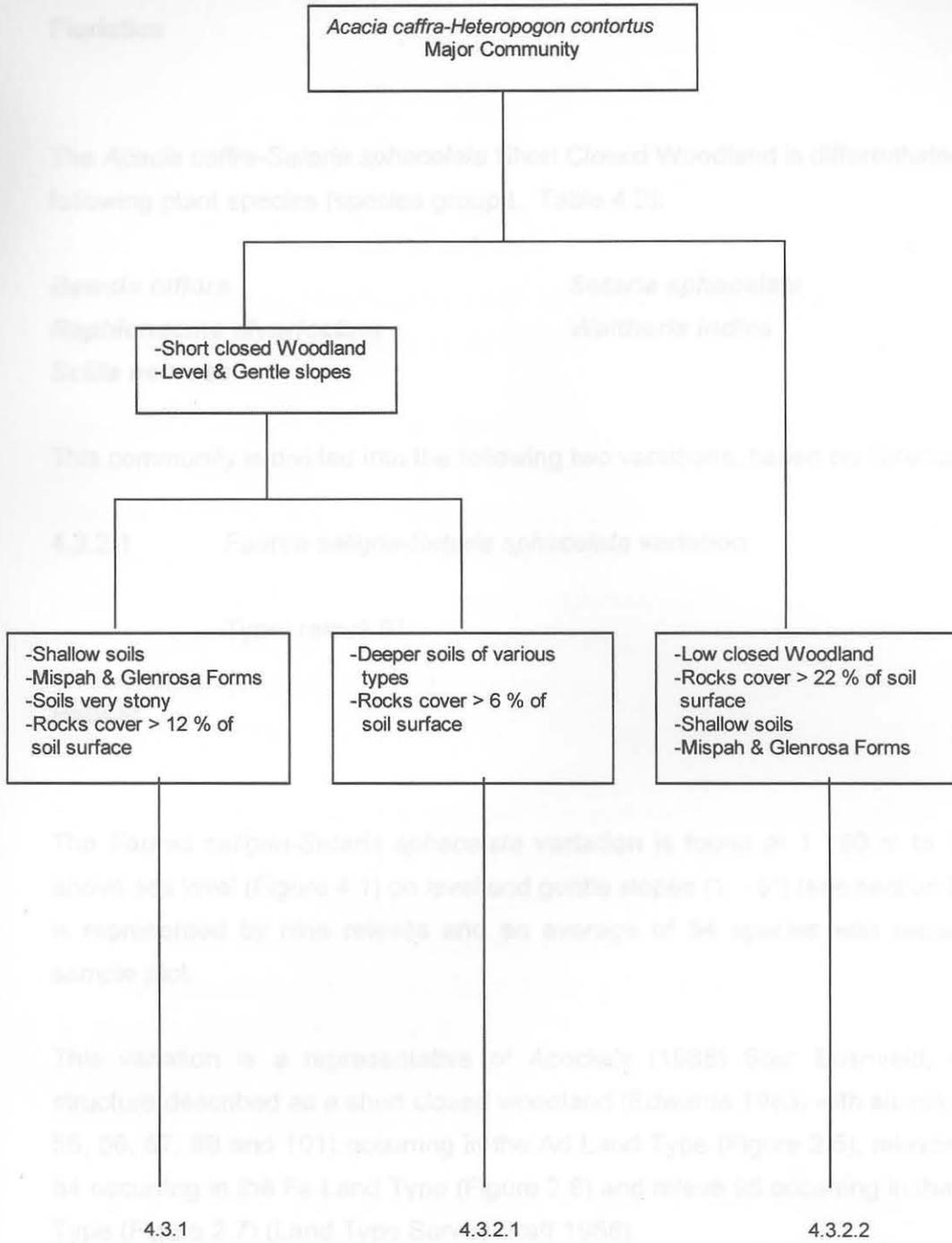


Figure 4.3 A dendrogram to illustrate the habitat relationships of the plant communities classified under the *Acacia caffra*-*Heteropogon contortus* Major Community.