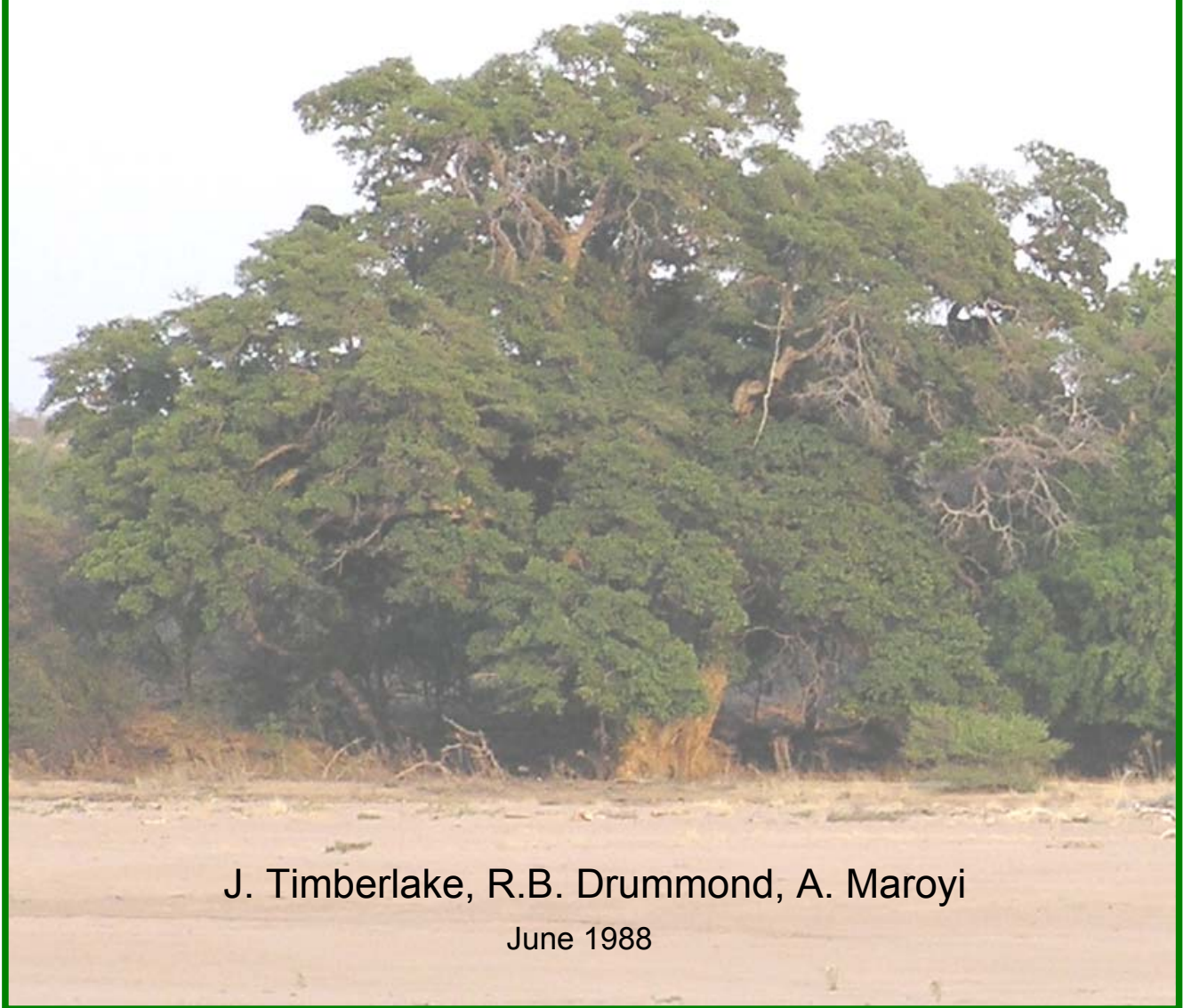




BIODIVERSITY ASSESSMENT OF THE LOWER GURUVE REGION, ZAMBEZI VALLEY, ZIMBABWE



J. Timberlake, R.B. Drummond, A. Maroyi

June 1988

Occasional Publications in Biodiversity No. 4

**BIODIVERSITY ASSESSMENT OF THE
LOWER GURUVE REGION,
ZAMBEZI VALLEY, ZIMBABWE**

REPORT FOR CIRAD ON
BOTANICAL INVENTORY AND VEGETATION MAPPING

by

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June 1998



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BOTANICAL STUDIES IN THE LOWER GURUVE DISTRICT

Introduction

The biodiversity, defined as species and habitat diversity, of the three northern wards of the lower part of Guruve communal land (essentially between the old tsetse fence and the Mozambique border) is not particularly well known. A basic vegetation map exists, initial lists of trees and shrubs can be compiled from existing records, the populations of large mammals are fairly well documented, and minor collections of various other animal groups have been made. However, much collecting remains to be done before even an adequate listing of the range of species, both plant and animal, in the area can be compiled.

At the invitation of the CIRAD Biodiversity Conservation Project, the Biodiversity Foundation for Africa (BFA) was asked to carry out a botanical inventory and vegetation survey of the communal lands of lower Guruve District (Wards 2, 3 and 4 of Dande Communal Land). The initial proposal stated:

1. Various small-scale vegetation maps of the mid-Zambezi valley exist, but the most comprehensive and recent are those by Timberlake & Mapaure (1992) and Timberlake, Nobanda & Mapaure (1993), which are from the same data set – the phytosociologically based Communal Lands Vegetation Survey at 1:500,000 scale carried out by the National Herbarium, Harare. In view of further fieldwork and the availability of better quality and more recent satellite imagery (Landsat TM and SPOT) it is felt that this map could be updated and improved, both in terms of the legend as well as the extent of each vegetation type.
2. Identification of sites of high botanical interest has already been done by the National Herbarium (Timberlake, Nobanda, Mapaure & Mabasa 1991), revised and updated by the Zambezi Society/BFA (Timberlake 1996). It is hoped to cover additional work on this topic under a forthcoming Zambezi Society/BFA project. The area is one with a large number and diversity of sites of botanical interest, owing mostly to some good remaining stands of dry forest vegetation on sands and old alluvium. Some of the best remaining areas of these types in the country are found within the study area.
3. Identification of a network of benchmark sites or "witness stands" of the range of vegetation types which could be conserved has not yet been done. However, most of the necessary fieldwork has already been carried out, and a network of such sites could be suggested and described.
4. Fairly extensive plant collecting is necessary in order to obtain a comprehensive inventory of the flora of the study area. This particularly applies to herbaceous species (including grasses), which are grossly under-collected. It is hoped to carry out plant collections from some of the more important sites of botanical interest under another Zambezi Society/BFA project, but areas of vegetation of lesser interest (in fact the majority of the area) will not be covered.

As the National Herbarium collections are not computerised or indexed by locality, it is not practical to compile a list from existing records. Lists can be compiled, together with known records from the area, but additional fieldwork would be necessary to fill in the gaps. Assistance from officers from the National Herbarium would greatly assist this fieldwork.

The original intention was that the above studies would be complementary to the second, consolidation, phase of a joint Zambezi Society/BFA project identifying and documenting areas of high conservation interest. Unfortunately, funding for this was not forthcoming. In light of the above, and after discussions with Gilles Kleitz (CIRAD Project Coordinator), it was decided to focus on (a) revising the vegetation map of the area, and (b) providing comprehensive species lists from the various vegetation types. The identification of benchmark sites (original activity 3) has been, in effect, covered by the choice of plant collecting sites (see Table 2).

This report is divided into two parts. The first presents the vegetation map revision, and the second is the listing of plant species.

REVISED VEGETATION MAP OF WARDS 2, 3 & 4 OF DANDE COMMUNAL LANDS, LOWER GURUVE DISTRICT

Introduction

The map presented is a revised version of the 1:500,000 scale vegetation map produced for the Communal Lands Vegetation Survey by Timberlake, Nobanda & Mapaure (1993), also shown in Timberlake & Mapaure (1994). The revision was carried out by Jonathan Timberlake in June 1997 for the CIRAD Biodiversity Conservation Project.

Methodology

The revision was done at a scale of 1:250,000 using the Zimbabwe Forestry Commission VegRIS 1:250,000 false-colour, Landsat-TM image for Mhangura (sheet SE 36-1, bands 2, 3 & 4 dating from 16 September 1992). SPOT imagery (monochrome) at 1:100,000 scale (sheets from the Department of the Surveyor General, Harare) were used for clarification of detail. The revision incorporates additional field knowledge from the area, notably the vegetation survey carried out for WWF Harare (Timberlake & Cunliffe 1997) but, with this exception, systematic fieldwork for the revision was not done. Boundaries and definitions of vegetation types should therefore be treated with caution. Visual interpretation of the image was drawn on a transparent overlay and, on the basis of field knowledge and experience, a legend and description of the vegetation types was compiled.

The legend nomenclature is unique, i.e. it does not follow that of Timberlake *et al.* 1993. The equivalent/s are given in the descriptions and in Table 1.

LEGEND

1. FOREST AND BUSHLAND ON UNCONSOLIDATED SOILS

A1 - Dense *Xylia* dry forest on sand

A localised vegetation type, occurring in small patches on slopes and footslopes of the Gonono sand ridge and, by far the greatest extent, east of the Angwa river before it enters Mozambique. It is a closed-canopy dry forest, typically with little ground cover and very few grasses. The main tree is *Xylia torreana* (to 8-10 m high), with *Pterocarpus antunesii* (previously *P. lucens*), *Strychnos madagascariensis* and *Diospyros quiloensis*. The occasional *Adansonia digitata* (baobab) is also found. The often dense shrub layer consists of *Combretum celastroides*, *Meiostemon tetrandus*, *Monodora junodii* and *Friesodielsia obovata*. Good examples of this vegetation type are increasingly rare in the country due partly to clearance for agriculture, but principally to elephant damage to the larger trees resulting in an increasingly thick shrub layer. Woody species diversity is high, and a number of species, both woody and herbaceous, of restricted distribution are confined to such forests. These are a major conservation priority. The type corresponds to C2 *Xylia torreana* dry forest, subtype A of Timberlake *et al.* (1993).

A2 - Dense mixed-*Xylia* dry forest on shallow, gritty sands

A very similar type to A1, but usually has a much denser shrub layer (possibly owing to previous disturbance by man) and less dominance of *Xylia torreana*. Tree species such as *Xeroderris stuhlmannii*, *Pteleopsis myrtifolia*, *Berchemia discolor* and baobab are typical. The thick shrub layer comprises *Combretum celastroides*, *Meiostemon tetrandus*, *Acacia ataxacantha*, *Dalbergia martinii* and (in obvious fallows) *Combretum elaeagnoides*. This type is found in small patches along the road from Angwa Bridge to Kanyemba capping rocky rises. The soils are sandy, but rather coarse in texture with a pinkish hue. Termitaria and termite

activity are more common than in type A1. Each patch varies considerably from the next, and it is believed they are a long fallow after clearance of *Xylia* forest by man for cultivation. Cultivation can now be seen to be encroaching. Although very restricted in distribution and extent, this type is not considered as important for conservation as type A1. It is a facet of type C2 *Xylia torreana* dry forest, subtype A of Timberlake *et al.* (1993).

Table 1. Revised vegetation types with equivalent from Timberlake *et al.* (1993).

Veg. type	equivalent
A1	C2a
A2	(C2a)
A3	C1
B1	B2a
B1b	B2a/B3
B2	B1a
B2b	(B2a/B1b)
B3	F3a
C1	E4a
C2	(E4a)
C3	E5
C4	E2c
C5	D8

Note: Values in brackets indicate partial, not exact, equivalence.

A3 - *Terminalia brachystemma* wooded bushland

A wooded bushland (i.e. a predominantly bush-dominated area with scattered trees) dominated by shrubs of *Baphia massaiensis*, *Acacia eriocarpa*, and young or coppice growth of *Terminalia brachystemma*, *Combretum apiculatum* and *C. elaeagnoides*. The trees are principally *T. brachystemma*, with scattered *Kirkia acuminata*, and *C. apiculatum* underneath. The grass layer is tall and well developed. Leguminous herbs such as *Indigofera* spp. are common. Such vegetation covers most of the Gonono sand ridge, and small outliers are found to the south and west on higher ground. The ecotone to other vegetation is characterised by tall trees of *Kirkia acuminata*. From the amount of coppice growth it would appear that this vegetation type burns regularly and extensively. Indeed, its bushland nature may be a function of this. The type corresponds to type C1 *Terminalia brachystemma* bushed woodland of Timberlake *et al.* (1993).

2. WOODLAND AND FIELDS ON ALLUVIUM AND COLLUVIUM

B1 - Riparian woodland on recent alluvium

A heterogeneous vegetation type, much of which has been disturbed or cut. Typically it is found fringing the larger rivers in the area and consists of large spreading trees such as *Ficus*

sycomorus, *F. capreifolia*, *Acacia robusta* subsp. *clavigera*, *A. tortilis* subsp. *spirocarpa*, *Xanthocercis zambesiaca*, *Berchemia discolor* and *Cordyla africana*. Species composition is dependent on soil type, which changes rapidly away from the watercourse; the large semi-evergreen trees only being found where access to perennial moisture is best. The shrub layer can be thick, and comprises many species, among which *Acacia schweinfurthii*, *Lecaniodiscus fraxinifolius*, *Combretum obovatum*, *C. mossambicense*, *Dichrostachys*, *Friesodielsia obovata*, *Diospyros senensis*, *Azanza garckeana* and *Flueggea virosa* are typical. In reality, the typical vegetation of this type is now confined to a narrow band fringing major watercourses, but it is likely to have previously extended at least a short distance away. Good examples of this riparian fringe are found along the Manyame river below Mushumbi Pools. On the Kadzi river, the woodland appears to have been less disturbed.

Further away from perennial moisture, such species as *Colophospermum mopane* (mopane), *Albizia anthelmintica*, *Ziziphus mauritiana*, *Lannea schweinfurthii*, *Lonchocarpus capassa*, *Combretum elaeagnoides*, and (on sandier soils) *Faidherbia albida*, are found. All soils which are cultivable within the study area have probably been cleared at least some time in the past, and only a fallow is now seen. Although mapped as type B1, the majority of woodland on alluvium away from the river banks is probably a long-term fallow (perhaps 5-30 years old). The majority of the area is under cultivation or recent fallow. The type corresponds to less disturbed facies of type B2 Mixed riparian woodland, subtype A of Timberlake *et al.* (1993).

B1b - Cultivated fields and fallows on recent alluvium

This type is very similar to type B1, in fact derived from it. As the original vegetation has been cleared and the area cultivated, it obviously varies greatly in botanical composition. There is a fairly rapid succession of species found in fallows, and so the species present reflect the age of the fallow. Most recent alluvium is sandy in texture. This type is clearly visible (but not always clearly separable from type B1) on satellite imagery owing to the much higher reflectance, signifying a greater amount of bare ground. The main herbaceous species are weeds of cultivation, but typical woody species left in the fields include *Tamarindus indica*, *Lonchocarpus capassa*, *Berchemia discolor*, *Kigelia africana* and *Ficus* species. Regenerating and bushy shrubs include *Ziziphus mauritiana*, *Combretum obovatum*, *C. mossambicense*, *C. elaeagnoides*, *Grewia flavescens*, *Faidherbia albida*, *Acacia tortilis* subsp. *spirocarpa* and *Azanza garckeana*. Owing to its diversity, and the fact that the vegetation resource is of little significance, this type was not well sampled.

It is a widespread land unit, being associated with all the major rivers in the area. As nearly all the lighter-textured alluvial deposits along these rivers are under cultivation, or have been in the recent past, it is difficult to determine what the original vegetation may have been -- perhaps some type of open woodland. The most recent coarse sand deposits (including sand banks) were almost undoubtedly colonized by *Faidherbia albida*, and this can still be seen today. This type corresponds to type B2 Mixed riparian woodland, subtype A, and to type B3 *Faidherbia* woodland on alluvium of Timberlake *et al.* (1993).

B2 - Dry forest/bushland on old alluvium and in gullies

This type was not well sampled, although it appears quite distinct on satellite imagery. It is now mostly found on slopes associated with large steep gullies, particularly along the middle reaches of the Manyame river. The soils in this area are thought to be old alluvial and colluvial deposits laid down in the Pleistocene period, and differ from soils elsewhere in the study area, possibly due to a differing mineral composition. The steepness and unsuitability for agriculture, grazing or clearance is presumably the reason the dense vegetation remains, although in some cases this may be shrubby regrowth. On satellite imagery dating from the early 1980s, this vegetation

type can be seen to be more extensive, including areas on flatter land near Chitsingo. Characteristic tree species are mopane, *Kirkia acuminata*, *Markhamia zanzibarica*, *Lannea schweinfurthii*, *Commiphora karibensis*, *C. caerulea* and climbing *Combretum* species. In places baobabs are also seen. The type has a high species diversity and contains unusual species. A brief visit to one site next to the ARDA pumping station on the east bank of the Manyame south of Mushumbi Pools yielded new and interesting records for this part of the Zambezi Valley.

This vegetation type is of significant conservation interest, and is severely threatened. More than 50% of its extent has been cleared since 1980. At present the only remaining areas of this type are seen on the west bank of the Manyame river where resettlement has not occurred, with a few small outliers (of a few hectares each) in bends of the Dande and Manyame rivers. This type corresponds to type B1 Dense woodland to woodland thicket on alluvium/colluvium, subtype A of Timberlake *et al.* (1993).

B2b - Fields and fallow bushland mosaic on old alluvium and colluvial fans

This type includes both regeneration and fallows derived from what was type B2 on clay-rich soils, and fallow vegetation associated with older colluvial fans and alluvium on sandier soils. The original vegetation types may have differed from each other, but they are similar today. The origins and substrate of type B2 are described above, while the other areas of this type have developed on the richer soils associated with the colluvial fans or alluvial deposits of the Gonono ridge and the extensive cleared areas between the Manyame and Dande rivers. The vegetation today is open woodland to a dense bushland, depending partly on substrate, but principally on the length of fallow. The type is very varied, but typical components include *Acacia tortilis* subsp. *spirocarpa*, *Lonchocarpus capassa*, *Tamarindus indica*, *Combretum mossambicense*, *C. elaeagnoides*, *Ziziphus mauritiana*, *Diospyros senensis*, *Lannea schweinfurthii*, *Croton megalobotrys* and *Grewia flavescens*. Although diversity can be high, the species are nearly all widespread, and the type has little conservation interest. This type corresponds roughly to type B2 Mixed riparian woodland, subtype A and type B1 Dense woodland to woodland thicket on alluvium/colluvium, subtype B of Timberlake *et al.* (1993).

B3 - Tall mopane woodland on old, fine-textured alluvium

A tall (12 to 16-20 m high) woodland totally dominated by trees of *Colophospermum mopane*, sometimes termed "cathedral mopane woodland". The only other notable trees are *Diospyros quiloensis* and, occasionally, *Kirkia acuminata*. Small trees and shrubs are widespread but not abundant. Typical species include *Grewia bicolor*, *Dichrostachys cinerea*, *Acacia nilotica*, *Pterocarpus brenanii*, *Commiphora africana*, *Combretum apiculatum*, *C. elaeagnoides*, *Dalbergia melanoxylon* and *Erythroxylum zambesiaceum*. Grass cover is generally poor, but in damp sites the diversity of small herbs can be high. Woody climbers such as *Fockea* can be found. In "pure" mopane woodland, woody species diversity is low, but in transitional or mixed zones (which are perhaps more frequent than the "pure" stands) diversity can be quite high, although mopane still comprises the vast majority of the biomass. This type is found on old clay alluvium (some perhaps dating from the Pleistocene pluvials) deposited some distance away from present major watercourses. Extensive areas are found associated with the Manozzi, Ambi and Eastern Gwaze, tributaries of the Manyame. These woodlands lie on rich soil, which is increasingly being cleared for cotton cultivation. It corresponds to type F3 *Colophospermum* woodland (single dominance), subtype A of Timberlake *et al.* (1993).

3. WOODLAND ON SOILS FROM SANDSTONE

C1 - *Diospyros kirkii*/*Combretum apiculatum* low open woodland on shallow soils

This is by far the most widespread vegetation type in the study area. It comprises a short (typically 4-6 m high), open woodland of *Combretum apiculatum* and *Diospyros kirkii*, with patches of *Acacia nigrescens* and mopane on deeper, more clay-rich soils. Other, minor, tree species include *Terminalia stenostachya*, *T. brachystemma*, *Pterocarpus brenanii*, *Strychnos spinosa* and *Bolusanthus speciosus*. Typical shrubs include *Flacourtia indica*, *Catunaregum spinosa*, *Ormocarpon kirkii*, *Ximenia caffra*, *Grewia bicolor* and *Commiphora mossambicensis*. The grass layer is good. This type is found on shallow soils formed in situ from the underlying Kadzi sandstone beds, hence their reddish colour and the generally light texture of the topsoil. It corresponds to type E4 *Colophospermum-Diospyros kirkii* open woodland on shallow soils, subtype A of Timberlake *et al.* (1993).

C2 - Low open mopane woodland on deeper, depositional soils

This type is similar to type B3, but intermediate to type C1. It is found on deeper soils formed in situ, but probably with some superficial enrichment from alluvium. The species composition is thus also intermediate. The main difference is that mopane is not so obviously dominant, and the woodland is shorter (6 to 8-10 m high) and more open. The herbaceous layer is also much better developed. To the west of the Manyame river, this type of mopane woodland is quite widespread in the shallowly-undulating landscape, particularly on the interfluvies and higher ground. Its extent is difficult to map as it grades gradually into type C1, and often forms a mosaic with it or with type B3, depending on the scale at which it is viewed. It does not really correspond with any particular type of Timberlake *et al.* (1993), but can be considered part of type E4 *Colophospermum-Diospyros kirkii* open woodland on shallow soils, subtype A.

C3 - Mosaic of *Brachystegia allenii*/mopane open woodlands on stony and deep soils

This type is only found in the south west portion of the study area, not far from the base of the escarpment, on what are probably colluvial deposits. The vegetation is essentially a mosaic of miombo and mopane woodland, with the miombo elements on coarser-textured (sandy or gravelly) soils and the mopane woodland elements on the finer-textured (clay) soils. The landscape is gently undulating with many pebble-covered hummocks; it is on these hummocks that mopane is generally found. The miombo element consists primarily of *Brachystegia allenii*, with *Diplorhynchus condylocarpon*, *Terminalia stenostachya*, *Diospyros kirkii*, *Crossopteryx febrifuga*, *Pterocarpus brenanii* and *Pseudolachnostylis maprouneifolia*. The main mopane elements, apart from *Colophospermum mopane*, are *Acacia* species, *Dalbergia melanoxylon*, *Terminalia stuhlmannii*, *Erythroxyllum zambesiaticum*, *Diospyros quiloensis* and *Commiphora* species. Tall grass species are found in the moister hollows, and shorter grass species on the drier hummocks. Woody species diversity is moderately high, probably owing to the mosaic nature of the unit, but woody cover is only moderate. There is much evidence of elephant damage. This type is the same as E5 *Colophospermum-Brachystegia allenii* woodland mosaic of Timberlake *et al.* (1993).

C4 - *Julbernardia*/*Combretum*/mopane woodland on rocky sandstone slopes

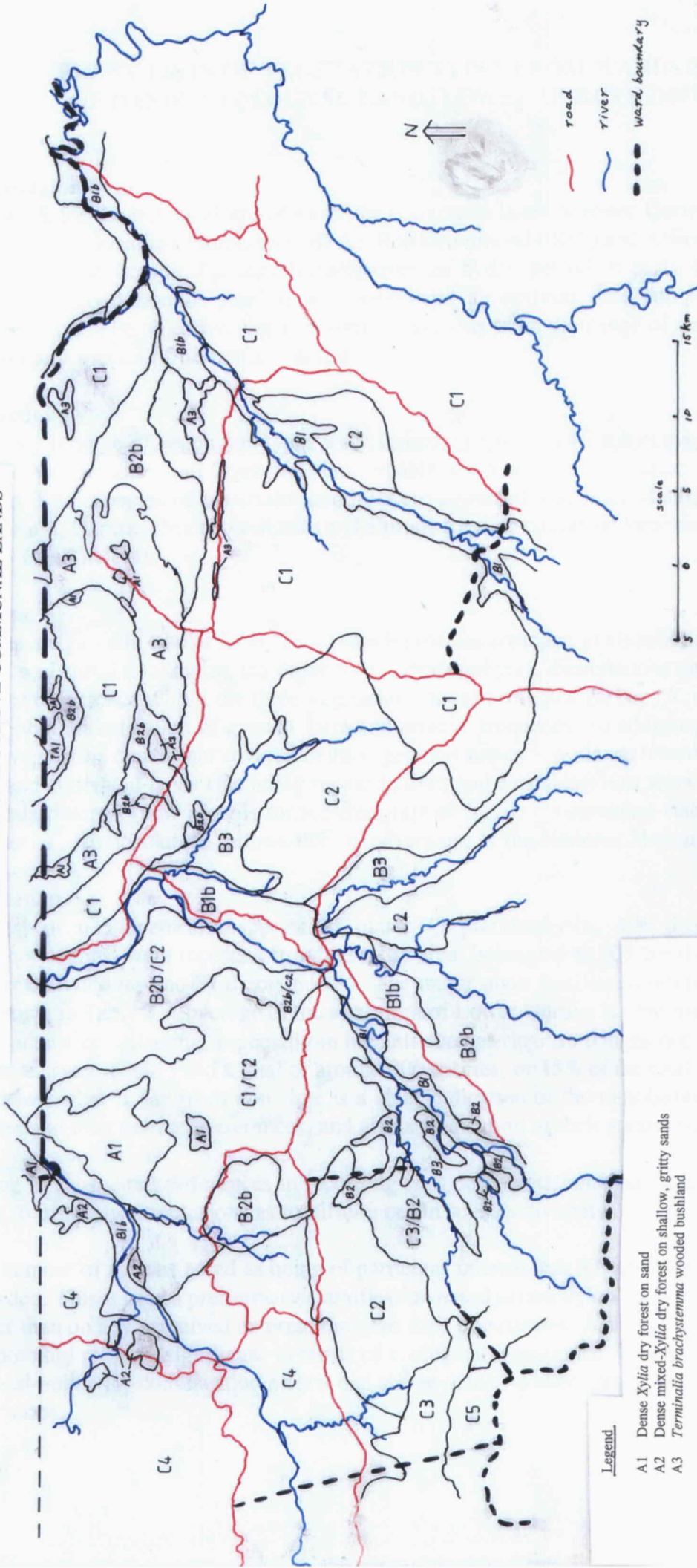
This type is found in dissected to rugged topography formed from harder strata of Karoo sandstone, and is similar to vegetation found in Omay and Siabuwa. Mopane and mopane woodland elements are found on the more consolidated soils on the ridge tops, while miombo elements such as *Julbernardia globiflora*, *Pteleopsis anisoptera* and *Combretum zeyheri* are found on the steep slopes with coarse-textured soils. *Azelia quanzensis* and other unusual species (at least for this area) often occur on rocky outcrops or ledges. Woody species diversity

is quite high, and so (comparatively, for the study area) is woody cover. This type is the same as E2 *Julbernardia-Colophospermum* woodland catena, subtype C of Timberlake *et al.* (1993).

C5 - Escarpment woodland

This type was not visited and only occurs in the far SW corner of the study area. It is assumed to consist of *Diplorhynchus condylocarpon*, *Pterocarpus brenanii*, *Acacia nigrescens* and *Kirkia acuminata*. It is identical to type D8 Mixed woodlands on Zambezi Escarpment of Timberlake *et al.* (1993).

VEGETATION MAP - LOWER GURUVE COMMUNAL LANDS



Legend

- A1 Dense *Xylocarpus* dry forest on sand
- A2 Dense mixed-*Xylocarpus* dry forest on shallow, gritty sands
- A3 *Terminalia brachystemata* wooded bushland
- B1 Riparian woodland on recent alluvium
- B1b Cultivated fields and fallows on recent alluvium
- B2 Dry forest/bushland on old alluvium and in gullies
- B2b Fields and fallow bushland mosaic on old alluvium and colluvial fans
- B3 Tall mopane woodland on old, fine-textured alluvium
- C1 *Diospyros kirkii/Combretum apiculatum* low open woodland on shallow soils
- C2 Mosaic of *Brachystegia allenii/mopane* open woodlands on stony and deep soils
- C4 *Jubernardia/Combretum/mopane* woodland on rocky sandstone slopes
- C5 Escarpment woodland

traced from Landsat TM, 16 Sept 1992
 Jonathan Timberlake, BFA, June 1997

PLANT LISTS OF VEGETATION TYPES FROM WARDS 2, 3 & 4 OF DANDE COMMUNAL LAND, LOWER GURUVE DISTRICT

Introduction

Fieldwork for the botanical inventory of the communal lands of lower Guruve District this was undertaken by Jonathan Timberlake (BFA), Bob Drummond (BFA) and Alfred Maroyi (National Herbarium and Botanic Garden, Harare) over an 8 day period in early May 1997, after a particularly good rainfall year. It was considered an optimal time for plant collection and identification. The objective was to compile plant lists from the range of vegetation types, and identify any species of particular interest.

Methodology

The known range of vegetation types were visited by road. At 46 subjectively chosen points an inventory was made of all flowering plants visible based on a search of about one hour in an area of 1 to 3 ha. Species of uncertain identity were collected and later identified at the National Herbarium, Harare. Exact coordinates and altitude for each collecting location were recorded with a GPS (see Table 3).

Results

Results are given in tabular form (Table 4) with species arranged in alphabetical order by family, genus and species following the order ferns (Pteridophyta), dicotyledons and monocotyledons. Species occurrence within the three vegetation classes presented earlier (A, B and C) is shown, along with an indication of growth form and relative frequency. In addition, occurrence in two other vegetation classes not covered in the vegetation survey – wetlands (riverbeds, springs, pans, etc.) and cultivated lands (including recent fallows and roadsides) – is shown. Those species of particular interest (new records for the area, rare or fragile conservation status) are indicated by an asterisk. Nomenclature follows that in current use at the National Herbarium.

Discussion

A total of 625 species/subspecies of plants (3 pteridophytes, 496 dicotyledons and 126 monocotyledons) were recorded from the study area, belonging to 108 families (3 pteridophytes, 24 monocotyledons and 81 dicotyledons). The major plant families in terms of species number are shown in Table 2. Coverage of the total flora of Lower Guruve is now considered reasonable. More intensive collecting, especially in habitats such as riparian fringes not fully covered in the present survey, could yield a total of around 800 species, or 15% of the total flora of Zimbabwe. However, what is far from complete is a clear indication of the distributions of most of these species and their habitat preferences, and also an indication of their status (rare, threatened, etc).

Owing to substantial differences in recording sites per vegetation class, it is not possible at this stage to draw any conclusions as to differences in species diversity.

The number of species noted as being of particular interest was 53, or 8.5% of the total number recorded. This is only a preliminary classification based primarily on known extent of distribution rather than on any perceived external threat to their populations. Although many of these species are possibly rather insignificant in terms of ecological importance, it is believed they could act as focal points for conservation efforts and also as sensitive monitors of changing environmental conditions.

Table 2. Major plant families in Lower Guruve

Family	no. spp.	% of total
Poaceae	62	9.9
Fabaceae (Papilionoideae)	58	9.3
Asteraceae	29	4.6
Cyperaceae	28	4.5
Acanthaceae	27	4.3
Euphorbiaceae	25	4.0
Rubiaceae	24	3.8
Malvaceae	22	3.5

REFERENCES

- Timberlake, J.R., Nobanda, N., Mapaure, I. & Mabasa, L. (1991). Sites of interest for conservation in various communal lands of N. and W. Zimbabwe. Report No. 1, Communal Lands Vegetation Survey. National Herbarium, Harare. 16pp.
- Timberlake, J.R. & Mapaure, I. (1992). Vegetation and its conservation in the eastern mid-Zambezi valley, Zimbabwe. *Transactions of the Zimbabwe Scientific Association* **66**: 1-14.
- Timberlake, J.R., Nobanda, N. & Mapaure, I. (1993). Vegetation survey of the communal lands — north and west Zimbabwe. *Kirkia* **14**:171-270.
- Timberlake, J.R. & Cunliffe, R.N. (1997). Vegetation survey of Chiriwo Ward, Dande Communal Land, Guruve District. In: Landuse Changes, Wildlife Conservation and Utilisation, and the Sustainability of Agro-ecosystems in the Zambezi Valley: Final Technical Report Volume 5, Annex 5.2.4.1. Consultancy report prepared by WWF, Harare for the European Union.
- Timberlake, J.R. (1996). Sites of interest for botanical conservation in the communal lands of the Zambezi Valley, Zimbabwe. Phase 1. Consultancy Report for The Zambezi Society, Harare from the Biodiversity Foundation for Africa, Bulawayo. 52pp.

Table 3. GPS waypoints recorded in Dande communal lands, Lower Guruve.

date	way point	long/lat		grid ref. (UTM)	alt (m)	place
		S	E			
2 May	95a					MP-Chikafa: alluv w/land
	95b	16°04'52"	30°35'55"	24311.822077		MP-Chikafa: dense alluv w/land
	96	16°03'04"	30°34'39"	24080.822405		MP-Chikafa: back channel, alluv w/land
	97	16°02'55"	30°34'18"	24017.822434		MP-Chikafa: cult fields, alluv
	98	16°03'17"	30°37'41"	24621.822373		MP-Gonono: C.apic/Diosp open w/land
	99	16°04'50"	30°42'19"	25453.822094		MP-Gonono: ditto
3 May	100	16°04'32"	30°46'05"	26122.822158		Gonono: T.brachy w/bush
	101	16°04'07"	30°46'33"	26204.822237		Gonono: ditto
	102	16°01'44"	30°48'34"	26560.822680		Gonono: dry forest
	103	16°01'00"	30°48'56"	26626.822816		Gonono: wood/bush
	104	16°02'13"	30°47'45"	26417.822589		Gonono: large baobab
	105	16°02'22"	30°47'17"	26332.822560		N Gonono: dry forest
	106	16°01'58"	30°39'02"	24862.822616		N Gonono: C.apic open w/land
	107	16°00'48"	30°37'04"	24506.822828		N Gonono: dry forest
4 May	108	16°06'29"	30°26'21"	22606.821757		Angwa: fossil forest, mopane w/land
	109	16°05'45"	30°27'24"	22794.821895		Angwa: dry forest
	110	16°04'15"	30°27'47"	22858.822173		
	111	16°03'10"	30°27'08"	22739.822370		Angwa: dry forest
	112	16°01'55"	30°25'14"	22397.822597		
	113	16°01'11"	30°30'25"	23322.822745		
	114	16°01'18"	30°28'19"	22946.822719		Angwa: tall mopane w/land
	115	16°01'37"	30°28'03"	22901.822660	400	Angwa: tall mop w/land (1996 site)
5 May	116	16°09'52"	30°32'50"	23772.821147		MP: Ac.senegal leio -specimen
	117	16°12'06"	30°28'05"	22928.820725	470	S MP: A.sene leio, stream
	118	16°08'53"	30°25'59"	22548.821312		Masoka E: C.apic/Dios open w/land
	119	16°09'37"	30°23'57"	22185.821172	420	Masoka E: riparian w/land
	120	16°10'18"	30°21'41"	21784.821042	400	Masoka E: tall mix mop w/land
	121	16°14'04"	30°19'16"	21362.820343		Masoka E scarp: mop/Brachy w/land
	122	16°15'14"	30°18'21"	21202.820125	530	Masoka E: tall mop w/land -photos
	123	16°13'40"	30°15'56"	20766.820408	450	Masoka E: tall mopane w/land
	124	16°10'12"	30°32'41"	23746.821086		
6 May	125	16°06'03"	30°21'24"	21722.821826	450	Masoka W: tall mopane w/land

	126	16°07'11"	30°14'18"	20460.821600	380	Masoka W: Julb/mop hill w/land
	127	16°07'12"	30°10'55"	19857.821590	530	Masoka W: Julb/Ptel w/land
7 May	128	16°08'26"	30°15'47"	20726.821373	405	Angwa R: riparian w/land on sand
	129	16°08'18"	30°15'50"	20737.821396	420	Angwa R: riparian w/land on clay
	130	16°04'10"	30°18'26"	21189.822167	450	Angwa Bdge: Ptel bush thick
	131	15°59'47"	30°18'52"	21256.822977	550	6Kanyemba: miombo w/land
	132	16°03'27"	30°18'33"	21208.822298	460	Angwa Bdge: dry forest
8 May	133	16°09'56"	30°36'13"	24375.821143	375	MP: tall mopane w/land
	134	16°13'01"	30°36'47"	24482.820574	390	MP S: mopane w/land
	135	16°13'58"	30°44'14"	25812.820415	455	Gonono: Comb/mop w/land on pebbles
9 May	136a	16°04'49"	30°34'14"	24009.822081		Gonono: mopane w/land -photo
	136b	16°12'35"	30°44'12"		455	Gonono: mopane w/land + pan
	137a	16°00'55"	30°32'27"	23682.822796		Gonono: track to W
	137b	16°12'36"	30°44'14"		455	Gonono: tall mop w/land by pan
	138	16°02'15"	30°27'53"	22872.822541	455	Gonono: Entandrophragma -photo
	139	16°02'35"	30°27'59"	22889.822481	460	Angwa: dry forest
	140	16°04'07"	30°27'47"	22857.822198	450	Angwa: seepages
	141	16°03'07"	30°28'01"	22897.822381	470	Angwa: dry forest
	142	16°03'22"	30°28'07"	22915.822335	480	Angwa: dry forest -part
	143	16°04'15"	30°27'53"	22876.822174	480	Angwa: seepages
	144	16°06'06"	30°26'41"	22668.821828	535	Angwa: dry forest -wet patch

From Timberlake, Drummond & Maroyi botanical survey for CIRAD, May 1997

Table 3. Occurrence of plant species in Lower Guruve District by vegetation class, with an indication of relative frequency and life form.

Legend:

a	annual	l	liane	A	dry forest or wooded bushland	+	present
aq.	aquatic	p	perennial	B	woodland on alluvium or colluvium	d	dominant or abundant
c	climber	par.	parasite	C	woodland on soils derived from sandstones	f	frequent
cult.	cultivated	s	shrub	D	wetland areas (riverbeds, pans, springs)	r	rare
epi.	epiphyte	sed.	sedge	E	cultivated land, fallows, disturbed areas (e.g. roadsides)		
g	grass	ss	subshrub				
h	herb	t	tree	*	species of particular interest (rarity or fragile conservation status)		

	Life form	vegetation class					GPS points
		A	B	C	D	E	
PTERIDOPHYTA							
Actiniopteridaceae							
Actiniopteris radiata (Sw.) Link	fern			+			127
Marsileaceae							
Marsilea ephippiocarpa Alston	aq.fern				+		120,140
Ophioglossaceae							
* Ophioglossum costatum R.Br.	fern				r		112
DICOTYLEDONS							
Acanthaceae							
* Anisotes bracteatus Milne-Redh.	s		+				-
Asystasia gangetica (L.) T.Anders.	h	+					109
Barleria kirkii T.Anders.	ss	+					142
Barleria rogersii S.Moore	ss			+			125
Barleria senensis Klotzsch	ss		+				95a,95b,129,134
Blepharis leendertziae Oberm.	h	+	+	+			125,134,141
Blepharis maderaspatensis (L.) Roth subsp. rubiifolia (Schumach.) Napper	h	+	+	+			108,109,126,129
Blepharis pungens Klotzsch	h			+			118
Blepharis tenuiramea S.Moore	ah		+	+			98,114,120,121,127,134
Crossandra spinescens Dunkley	s	+					111,141
Dicliptera spinulosa Nees	ah			+			124

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Duosperma crenatum</i> (Lindau) P.G.Mey.	ss	+	f	f			95a,98,99,108,114,118,120,123,125,126,129,130,133,134
<i>Duosperma quadrangulare</i> (Klotzsch) Brummitt	ph		+		+		124
<i>Elytraria acaulis</i> (L.f.) Lindau	ph		+	+			99,108,114,120,123,125,126,133
<i>Hygrophila auriculata</i> (Schumach.) Heine	ah				+		110
<i>Hypoestes forskalei</i> (Vahl) Roem.& Schult.	ph		+				128,134
<i>Justicia betonica</i> L.	ah		+	+			114,125,134
<i>Justicia glabra</i> Roxb.	ah		+				95b,128
<i>Justicia heterocarpa</i> T.Anders. subsp. <i>dinteri</i> (S.Moore) Hedrén	ah	+					105,109,130
<i>Justicia kirkiana</i> T.Anders.	ah	+		+			100,103,107,126,130
<i>Justicia matammensis</i> (Schweinf.) Oliv.	ah	+	+				101,109,134,141
<i>Lepidagathis scariosa</i> (O.Hoffm.) Schweick.	ph/ss			+			118
<i>Megalochlamys hamata</i> (Klotzsch) Vollesen	s		+				95b
<i>Monechma debile</i> (Forssk.) Nees	ah	+	+	+			102,105,107,125,133,134
<i>Neuracanthus africanus</i> S.Moore	ph/ss		+	+			123,125,129,133,134
* <i>Ruellia prostrata</i> T.Anders.	ph		+	+			134,136
<i>Ruspolia decurrens</i> (Nees) Milne-Redh.	s	+	+				95a,109,112,134
Aizoaceae							
<i>Zaleya pentandra</i> (L.) C.Jeffrey	ah		+				116,128
Amaranthaceae							
<i>Achyranthes aspera</i> L.	a/ph	+	+				95a,109,114,120,141
<i>Aerva leucura</i> Moq.	ph		+				96
<i>Alternanthera nodiflora</i> R.Br.	a/ph		+		+		95a
<i>Alternanthera pungens</i> Kunth	ph					+	124
<i>Alternanthera sessilis</i> (L.) DC.	a/ph		+		+		96
<i>Amaranthus graecizans</i> L.	ah		+			+	95a
<i>Amaranthus hybridus</i> L.	ah		+			+	128
<i>Amaranthus spinosus</i> L.	ah		+			+	95a,128
<i>Amaranthus thunbergii</i> Moq.	ah		+			+	128
<i>Celosia trigyna</i> L.	ah	+	+			+	95a,95b,102,105,109,111,128,141
<i>Cyathula orthacantha</i> (Aschers.) Schinz	ah		+			+	95a,95b
<i>Gomphrena celosioides</i> Mart.	ph					+	124
<i>Nothosaerva brachiata</i> (L.) Wight	ah		+		+		95a
<i>Pupalia lappacea</i> (L.) A.Juss. var. <i>velutina</i> (Moq.) Hook.f.	a/ph	+	+				107,109,119,129,130,132,133,134
* <i>Pupalia micrantha</i> Hauman	ah		+				95b

Table 3. Lower Gurube plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
Anacardiaceae							
<i>Lannea discolor</i> (Sond.) Engl.	t			+			131
<i>Lannea schweinfurthii</i> (Engl.) Engl. var. <i>tomentosa</i> (Dunkley) Kokwaro	t	+	+	+			95b,96,105,125,130,132,141
<i>Ozoroa insignis</i> Delile. subsp. <i>reticulata</i> (Baker f.) J.B.Gillett	st			+			118
<i>Rhus tenuinervis</i> Engl.	st		+				119
<i>Sclerocarya birrea</i> (A.Rich.) Hochst. subsp. <i>caffra</i> (Sond.) Kokwaro	t		+	+			98,99,108,120,121,123,125,135,137
Annonaceae							
<i>Annona senegalensis</i> Pers.	st			+			118
<i>Artabotrys brachypetalus</i> Benth.	slt		+				95b
<i>Cleistochlamys kirkii</i> (Benth.) Oliv.	ts	+	+				95a,111,114,128,130,134,141
<i>Friesodielsia obovata</i> (Benth.) Verdc.	st	+	+	+			95a,99,102,108,111,114,119,126,129,134,141
<i>Hexalobus monopetalus</i> (A.Rich.) Engl. & Diels var. <i>obovatus</i> Brenan	st			+			127
<i>Monodora junodii</i> Engl. & Diels	st	+	+				102,107,109,111,118,141
Apiaceae							
<i>Steganotaenia araliacea</i> Hochst.	ts			+			126
Apocynaceae							
<i>Diplorhynchus condylocarpon</i> (Müll.Arg.) Pich.	ts		+	+			118,121,127,134,135
<i>Holarrhena pubescens</i> (Buch.-Ham.) G.Don	st		+	+			114,126
<i>Strophanthus kombe</i> Oliv.	cs1	+					102,105,109,130,132,141
* <i>Strophanthus nicholsonii</i> Holmes	cs1			+			125
Aristolochiaceae							
<i>Aristolochia albida</i> Duch.	cph			+			126
Asclepiadaceae							
<i>Calotropis procera</i> (Aiton) W.T.Aiton	s		+			+	133
<i>Cryptolepis obtusa</i> N.E.Br.	cs		+				128
<i>Dregea macrantha</i> Klotzsch	cs	+					130
* <i>Fockea angustifolia</i> K.Schum.	cs			+			125
* <i>Fockea multiflora</i> K.Schum.	l			+			125
Asteraceae							
<i>Acanthospermum hispidum</i> DC.	ah		+			+	128
<i>Ageratum conyzoides</i> L.	ah	+	+			+	96,109,128
<i>Aspilia kotschyi</i> (Sch.Bip.) Oliv.	ah			+			127

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Bidens pilosa</i> L.	ah		+			+	124
<i>Bidens schimperi</i> Sch.Bip.	ah	+	+	+			100,101,102,103,105,109,125,126,129,132,137
<i>Blainvillea gayana</i> Cass.	ah	+	+				109,111,114,128,130,134
<i>Calostephane divaricata</i> Benth.	ah		+	+			120,121,123,125,126,133,135
<i>Eclipta prostrata</i> (L.) L.	ah		+		+		95a,96,128
<i>Erlangea misera</i> (Oliv. & Hiern) S.Moore	a/ph	+					100,101
<i>Ethulia conyzoides</i> L.f.	ah		+		+		95a
<i>Gnaphalium polycaulon</i> Pers.	ah		+		+		96
<i>Grangea maderaspatana</i> (L.) Poir.	ah		+		+		96
<i>Helichrysum argyrosphaerum</i> DC.	ah		+			+	-
<i>Lagdera aurita</i> (L.f.) C.B. Clarke	ah		+		+	+	95a,95b,96,129,130,133
<i>Neojeffreya decurrens</i> (L.) Cabrera	ah		+				128,134
<i>Nidorella microcephala</i> Steetz	ah		+			+	128
<i>Pluchea dioscoridis</i> (L.) DC.	s		+		+		95b,128
<i>Sclerocarpus africanus</i> Murr.	ah		+				128
<i>Sphaeranthus angolensis</i> O.Hoffm.	a/ph		+		+		95a,133
<i>Tagetes minuta</i> L.	ah					+	128
<i>Tridax procumbens</i> L.	ah					+	124
<i>Vernonia amoena</i> S.Moore	ah	+	+				95a
<i>Vernonia anthelmintica</i> (L.) Willd.	ah	+	+				105,107,109,114,134
<i>Vernonia glabra</i> (Steetz) Vatke	ph		+				96,97,119
<i>Vernonia kirkii</i> Oliv. & Hiern	ah		+			+	97
<i>Vernonia petersii</i> Oliv.	ah	+	+				96,97,98,105,114,125,127,129,132
<i>Vernonia steetziana</i> Oliv. & Hiern	ah	+	+	+			95a,95b,102,103,108,118,125,126,134,135,137
* <i>Vicoa leptoclada</i> (Webb) Dandy	ah		+				95a,133
<i>Xanthium strumarium</i> L.	ah		+			+	95a,128
Balanitaceae							
<i>Balanites aegyptiaca</i> (L.) Delile	t		+				133
* <i>Balanites maughamii</i> Sprague	t	+					109
Bignoniaceae							
<i>Kigelia africana</i> (Lam.) Benth.	t		d				95b,128,129
<i>Markhamia zanzibarica</i> (DC.) K.Schum.	ts	+	+	+			95a,95b,100,102,107,109,114,125,130,133,134,136,137
<i>Stereospermum kunthianum</i> Cham.	t		+				119
Bombacaceae							
<i>Adansonia digitata</i> L.	t	+	+	+			109,114,125,130

Table 3. Lower Gurube plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
Boraginaceae							
* <i>Cordia goetzei</i> Gürke	ts		+				95b
* <i>Cordia mukuensis</i> Taton	ts	+	+	+			95b,125,128,132
<i>Ehretia obtusifolia</i> DC.	ts		+				95a,133
<i>Heliotropium indicum</i> L.	ah		+		+		95a,96
<i>Heliotropium ovalifolium</i> Forssk.	a/ph		+		+		95a
<i>Heliotropium strigosum</i> Willd.	ah		+				112
<i>Heliotropium zeylanicum</i> (Burm. f.) Lam.	ph		+				97
<i>Trichodesma zeylanicum</i> (Burm. f.) R.Br.	ah		+			d	95a,97
Brassicaceae							
* <i>Rorippa micrantha</i> (Roth) Jonsell	ah		+		+		95a
Burseraceae							
<i>Commiphora africana</i> (A.Rich.) Engl.	st		+	+			108,121,123,125,126
<i>Commiphora edulis</i> (Klotzsch) Engl.	s		+	+			97,108,125,134
<i>Commiphora glandulosa</i> Schinz	t	+	+	f			98,102,106,121,123
<i>Commiphora karibensis</i> Wild	t	+					105,107,130,132
<i>Commiphora mollis</i> (Oliv.) Engl.	t	+	+				100,123
<i>Commiphora mossambicensis</i> (Oliv.) Engl.	st	+	+	f			98,99,102,107,123,125,126,135,137
* <i>Commiphora ugogensis</i> Engl.	t	+					101,102,103,107,109
<i>Commiphora viminea</i> Burt Davy	t		+	+			123,125
Capparaceae							
<i>Boscia angustifolia</i> A.Rich. var. <i>corymbosa</i> (Gilg) DeWolf	ts	f	+	+			102,105,109,111,114,126,130
<i>Boscia matabelensis</i> Pestal.	s			+			125
<i>Boscia mossambicensis</i> Klotzsch	st	+	+	+			102,107,108,114,120,125,132,134
<i>Cadaba kirkii</i> Oliv.	s		+				133
<i>Capparis sepiaria</i> L. var. <i>subglabra</i> (Oliv.) DeWolf	cs		+				111,128
<i>Capparis tomentosa</i> Lam.	cs		+	+			96
<i>Cleome gynandra</i> L.	ah		+			+	128
<i>Cleome hirta</i> (Klotzsch) Oliv.	ah		+				96
<i>Cleome macrophylla</i> (Klotzsch) Briq.	ah	+					141
<i>Cleome monophylla</i> L.	ah		+			+	128
<i>Maerua angolensis</i> DC.	st	+	+				95b,132,133,134,142
<i>Maerua buxifolia</i> (Oliv.) Gilg & Benedict	s	+	+				133,141
<i>Maerua decumbens</i> (Brongn.) DeWolf	s	+	+	+			95b,105,111,114,125,130,132,133,142
<i>Maerua juncea</i> Pax var. <i>juncea</i>	cs		+	+			133,137

Table 3. Lower Gurube plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Maerua prittwitzii</i> Gilg & Benedict	ss	+	+	+			109,114,125,130,132,133,142
Caryophyllaceae							
<i>Polycarpaea eriantha</i> A.Rich.	ah			+			118,135,137
Celastraceae							
<i>Elachyptera parvifolia</i> (Oliv.) N.Hallé	csl	+	+				109,111,112,132,141
<i>Elaeodendron matabelicum</i> Loes.	ts			+			118
<i>Elaeodendron schlechterianum</i> (Loes.) Loes.	ts		+				120
<i>Maytenus senegalensis</i> (Lam.) Exell	st		+				95a,134
<i>Mystroxydon aethiopicum</i> (Thunb.) Loes.	ts			+			
<i>Reissantia indica</i> (Willd.) N.Hallé var. <i>orientalis</i> N.Hallé & B.Mathew	sl	+	+	+			95a,107,108,111,114,126,130,132,133,137
Chenopodiaceae							
<i>Chenopodium ambrosioides</i> L.	ah		+		+		128
Clusiaceae							
<i>Garcinia livingstonei</i> T.Anders.	t		+				95a,95b,119
Combretaceae							
<i>Combretum apiculatum</i> Sond. subsp. <i>apiculatum</i>	ts	f	f	f			99,100,101,102,103,106,107,108,114,118,120,121,123,126,127,130,133,134,135,136,137
<i>Combretum celastroides</i> C.Lawson subsp. <i>celastroides</i>	st	f	+				102,105,109,129,130,132,141
<i>Combretum collinum</i> Fresen.	t	+					101,102,103
<i>Combretum elaeagnoides</i> Klotzsch	st	f	f	+			95a,96,97,100,102,103,105,107,108,109,114,120,123,125,129,130,133,134,137
<i>Combretum hereroense</i> Schinz	st		+				119
<i>Combretum imberbe</i> Wawra	t		d	+			95a,98,119,126,128,129
* <i>Combretum kirkii</i> C.Lawson	l	+					142
<i>Combretum microphyllum</i> Klotzsch	csl		+				96,129
<i>Combretum mossambicense</i> (Klotzsch) Engl.	sl	+	f				95a,95b,96,97,103,114,123,125,126,128,129,130,134
<i>Combretum obovatum</i> F.Hoffm.	l	+	+	+			109,114,119,120,125,129,132,134,136,141
<i>Combretum padoides</i> Engl. & Diels	l		+				-
<i>Combretum zeyheri</i> Sond.	ts	+		+			126,127,132
<i>Meiostemon tetrandrus</i> (Exell) Exell & Stace subsp. <i>australis</i> Exell	st	f					105,109,111,130,132,141
<i>Pteleopsis anisoptera</i> (C.Lawson) Engl. & Diels	ts				+		127
<i>Pteleopsis myrtifolia</i> (C.Lawson) Engl. & Diels	t	f					102,105,109,111,130,132
<i>Terminalia brachystemma</i> Hiern subsp. <i>brachystemma</i>	t	f		d			98,99,100,101,102,103,106,107,118,121,135,137

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Terminalia prunioides</i> <i>C.Lawson</i>	ts		+	+			125,134
<i>Terminalia sambesiaca</i> <i>Engl. & Diels</i>	t		+				-
<i>Terminalia sericea</i> <i>DC.</i>	ts			+			-
<i>Terminalia stenostachya</i> <i>Engl.& Diels</i>	ts			f			98,106,118,121,126,127,135
<i>Terminalia stuhlmannii</i> <i>Engl.</i>	ts			+			121,126,135
Connaraceae							
<i>Rourea orientalis</i> <i>Baill.</i>	cst	+	+				112,130
Convolvulaceae							
<i>Astripomoea lachnosperma</i> (<i>Choisy</i>) <i>A.Meeuse</i>	ah	+		+			105,125
<i>Evolvulus alsinoides</i> (<i>L.</i>) <i>L.</i>	a/ph	+	+	+			100,106,118,123,125,126,135
<i>Hewittia scandens</i> (<i>Milne</i>) <i>Mabb.</i>	ph		+			+	95a,95b
<i>Ipomoea coptica</i> (<i>L.</i>) <i>Roem.& Schult.</i> var. <i>coptica</i>	cah			+			137
<i>Ipomoea dichroa</i> <i>Choisy</i>	cah		+	+			95b,114,136
<i>Ipomoea leucanthemum</i> (<i>Klotzsch</i>) <i>Hall.f.</i>	ah	+		+			100,103,109,137
<i>Ipomoea pes-tigridis</i> <i>L.</i> var. <i>pes-tigridis</i>	cah	+	+				95a,101,105,107,119,134
<i>Ipomoea pileata</i> <i>Roxb.</i>	cah		+				112,114
<i>Ipomoea plebeia</i> <i>R.Br.</i> subsp. <i>africana</i> <i>A.Meeuse</i>	cah		+	+		+	95a,121,133,136
<i>Ipomoea shirambensis</i> <i>Baker</i>	cs	+	+				105,108
<i>Ipomoea sinensis</i> (<i>Desr.</i>) <i>Choisy</i> subsp. <i>blepharosepala</i> (<i>A.Rich.</i>) <i>A.Meeuse</i>	cah		+				95a
<i>Ipomoea sinensis</i> (<i>Desr.</i>) <i>Choisy</i> subsp. <i>sinensis</i>	cah		+				95a,128,129
<i>Jacquemontia tamnifolia</i> (<i>L.</i>) <i>Griseb.</i>	cah	+	+	+		+	95a,96,100,103,105,107,108,109,114,120,126
<i>Merremia pinnata</i> (<i>Choisy</i>) <i>Hall.f.</i>	cah	+	+	+			100,101,102,103,107,114,136
<i>Merremia tridentata</i> (<i>L.</i>) <i>Hall.f.</i> var. <i>angustifolia</i> (<i>Jacq.</i>) <i>Ooststr.</i>	ph	+		+			99,100,108
<i>Seddera suffruticosa</i> (<i>Schinz</i>) <i>Hall.f.</i> var. <i>suffruticosa</i>	ph			+			135
Crassulaceae							
<i>Kalanchoe lanceolata</i> (<i>Forssk.</i>) <i>Pers.</i>	ah		+				134
Cucurbitaceae							
<i>Citrullus lanatus</i> (<i>Thunb.</i>) <i>Matsum.& Nakai</i>	ah					cult.+	-
<i>Ctenolepis cerasiformis</i> (<i>Stocks</i>) <i>Hook.f.</i>	ch	+					111,130
<i>Cucumis anguria</i> <i>L.</i>	ah	+	+	+			95a,100,103,109,112,114,121,125,130,134
<i>Cucumis hirsutus</i> <i>Sond.</i>	ph		+	+			96,99,134,137
<i>Cucumis metuliferus</i> <i>Naud.</i>	cah		+				95a,95b,96,97
<i>Cucurbita maxima</i> <i>Duchesne</i>	ah					cult.+	-
<i>Momordica charantia</i> <i>L.</i>	ch		+				95a,111,119,128,141

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
Momordica kirkii (<i>Hook.f.</i>) <i>C.Jeffrey</i>	cph	+					105
* Zehneria thwaitesii (<i>Schweinf.</i>) <i>C.Jeffrey</i>	cph		+				112
Dichapetalaceae							
Tapura fischeri <i>Engl. var. pubescens Verdc. & Torre</i>	st	+					132
Ebenaceae							
Diospyros kirkii <i>Hiern</i>	t		d	d			98,99,106,114,118,121,123,126,127,135
Diospyros mespiliformis <i>A.DC.</i>	t		d				97,119,129,134
Diospyros quiloensis (<i>Hiern</i>) <i>F.White</i>	ts	d	d	+			105,107,108,109,111,120,123,125,126,127,129,130,132,133,134,135,136,141
Diospyros senensis <i>Kotzsch</i>	st	+	+	+			95a,96,97,109,129,135
Diospyros squarrosa <i>Klotzsch</i>	ts		+				95a,134
Euclea divinorum <i>Hiern</i>	st		+	+			121,123
Elatinaceae							
* Bergia capensis <i>L.</i>	ah				+		143
Bergia glutinosa <i>Dinter & Schulze-Menz</i>	ph				+		136
Erythroxylaceae							
Erythroxylum zambesiacum <i>N.Robson</i>	ts		f	f			108,119,120,121,123,126,127,134,135
Euphorbiaceae							
Acalypha chirindica <i>S.Moore</i>	s		+				129
Alchornea laxiflora (<i>Benth.</i>) <i>Pax & K.Hoffm.</i>	st	+					111
Bridelia cathartica <i>G.Bertol. subsp. melanthesoides (Baill.) J.Léonard</i>	st			+			118,121,126,127
Croton gratissimus <i>Burch. var. gratissimus</i>	st	+	+	+			109,121,126,127,134,135
Croton longipedicellatus <i>J.Léonard var. longipedicellatus</i>	st	+					105,111,130,132
Croton megalobotrys <i>Müll.Arg.</i>	st		f				96,97,128,129
Croton menyharthii <i>Pax</i>	st			+			125
Drypetes mossambicensis <i>Hutch.</i>	t	+	+				111,114,134
Erythrococca menyharthii (<i>Pax</i>) <i>Prain</i>	st	+					111,130
Euphorbia eylesii <i>Rendle</i>	ah		+	+			116,118
Euphorbia hirta <i>L.</i>	ah		+			+	128
Euphorbia lupatensis <i>N.E.Br.</i>	ah		+				123
Euphorbia tettensis <i>Klotzsch</i>	ah		+	+			112,127,137
* Excoecaria bussei (<i>Pax</i>) <i>Pax</i>	t		+				129
Flueggea virosa (<i>Willd.</i>) <i>Voigt subsp. virosa</i>	st		+				95a,128

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Margaritaria discoidea</i> (Baill.) G.L.Webster var. nitida (Pax) Radcl.-Sm.	st			+			127
<i>Neoholstia tenuifolia</i> (Pax) Rauschert var. tenuifolia	s	+					105,109,111,130,132
<i>Phyllanthus fraternus</i> G.L.Webster	ah		+	+		+	98,103,112
<i>Phyllanthus macranthus</i> Pax var. macranthus	s	+					132
<i>Phyllanthus maderaspatensis</i> L.	a/ph		+	+			119,121
<i>Phyllanthus pentandrus</i> Schumach. & Thonn.	ah	+		+			101,102,107,118
<i>Phyllanthus reticulatus</i> Poir.	s		+	+			96,97,128,129
<i>Pseudolachnostylis maprouneifolia</i> Pax	t	+	+	f			106,111,118,119,121,126,127
<i>Ricinus communis</i> L.	s		+			cult.+	95a,128
* <i>Schinziophyton rautanenii</i> (Schinz) Radcl.-Sm.	t	+					-
<i>Tragia okanyua</i> Pax	cph	+	+				129,132
Fabaceae (Caesalpinioideae)							
<i>Afzelia quanzensis</i> Welw.	t			+			126
<i>Bauhinia petersiana</i> Bolle subsp. petersiana	st	+	+				109,119
<i>Bauhinia thonningii</i> Schumach.	t			+			118
<i>Bauhinia tomentosa</i> L.	s	+		+			109,125,132,142
<i>Brachystegia allenii</i> Burt Davy & Hutch.	t			+			121
<i>Brachystegia boehmii</i> Taub.	t		+				119
<i>Cassia abbreviata</i> Oliv. subsp. beareana (Holmes) Brenan	t	+	+	+			102,107,119,126,134
<i>Chamaecrista absus</i> (L.) Irwin & Barneby	ah	+	+	+			96,98,101,103,105,107,114,130,134,136,137
<i>Chamaecrista falcinella</i> (Oliv.) Lock var. parviflora (Steyaert) Lock	a/ph		+				112,114
<i>Chamaecrista mimosoides</i> (L.) Greene	ah	+					101
<i>Chamaecrista stricta</i> E.Mey.	ah		+			+	-
<i>Colophospermum mopane</i> (Benth.) J.Léonard	t		d	f			95b,106,108,114,118,120,121,123,125,126,127,133,134,135,136,137
<i>Julbernardia globiflora</i> (Benth.) Troupin	t		+	+			126,127,131
<i>Senna obtusifolia</i> (L.) Irwin & Barneby	ah		+	+			118,119,127
<i>Senna singueana</i> (Delile) Lock	ts		+	+			96,97,98,114,126,127,134
<i>Tamarindus indica</i> L.	t		+	+			95a,99,120
Fabaceae (Faboideae)							
<i>Abrus schimperi</i> Baker subsp. africanus (Vatke) Verdc.	s			+			126
<i>Aeschynomene indica</i> L.	ah					+	110,140
<i>Alysicarpus ovalifolius</i> (Schumach.) J.Léonard	ah			+	+		125,143
<i>Arachis hypogaea</i> L.	ah					cult.	-
<i>Baphia massaiensis</i> Taub. subsp. obovata (Schinz) Brummitt	st	f					100,101,102,103,109,111,141
<i>Bolusanthus speciosus</i> (Bolus) Harms	t		+	+			98,106,123
<i>Cordyla africana</i> Lour.	t	+	+				95a,109,129,130

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Crotalaria cephalotes</i> <i>A.Rich.</i>	ah			+			121
<i>Crotalaria pallidicaulis</i> <i>Harms</i>	s			+			118
<i>Crotalaria pisicarpa</i> <i>Baker</i>	ah	+		+			101,103,130,136,137
<i>Crotalaria steudneri</i> <i>Schweinf.</i>	ah			+			125
<i>Crotalaria virgulata</i> <i>Klotzsch</i>	a/ph	+	+	+			98,108,114,120,121,123,127,130,133,134
<i>Dalbergia arbutifolia</i> <i>Baker</i> subsp. <i>arbutifolia</i>	csl		+				95a,95b,128
<i>Dalbergia martinii</i> <i>F.White</i>	csl	+	+	+			101,102,105,107,114,126,130,132
<i>Dalbergia melanoxydon</i> <i>Guill.& Perr.</i>	st		f	f			95a,99,108,114,118,119,120,121,123,125,126,127,133,135,137
<i>Dalbergia nitidula</i> <i>Baker</i>	st			+			131
<i>Dalbergiella nyasae</i> <i>Baker f.</i>	st			+			118,126,127
<i>Decorsea schlechteri</i> (<i>Harms</i>) <i>Verdc.</i>	cph			+			98,106,118,121,126
<i>Indigofera astragalina</i> <i>DC.</i>	ah	+	+				95a,96,97,101,102,103,134
<i>Indigofera colutea</i> (<i>Burm.f.</i>) <i>Merr.</i>	ah	+					100
<i>Indigofera demissa</i> <i>Taub.</i>	a/ph		+				134
<i>Indigofera flavicans</i> <i>Baker</i>	ph			+			118
* <i>Indigofera gairdneriae</i> <i>Baker f.</i>	ah				+		140
<i>Indigofera praticola</i> <i>Baker f.</i>	ah		+				134
<i>Indigofera schimperii</i> <i>Jaub.& Spach</i>	ph/ss			+			121,125,135
<i>Indigofera setiflora</i> <i>Baker</i>	a/ph			+			118,127
<i>Indigofera strobilifera</i> (<i>Hochst.</i>) <i>Baker</i> subsp. <i>strobilifera</i>	ah				+		112
<i>Indigofera trita</i> <i>L.f.</i> var. <i>subulata</i> (<i>Poir.</i>) <i>Ali</i>	p/ah		+	+			125,134
<i>Lablab purpureus</i> (<i>L.</i>) <i>Sweet</i> subsp. <i>uncinatus</i> <i>Verdc.</i>	cp			+		+	96
<i>Lonchocarpus bussei</i> <i>Harms</i>	t	+	+	+			108,109,112,123,126,132
<i>Lonchocarpus capassa</i> <i>Rolfe</i>	t	+	+	+			95a,96,99,107,128,129,130,137
<i>Macrotyloma daltonii</i> (<i>Webb</i>) <i>Verdc.</i>	cp		+				105
<i>Mundulea sericea</i> (<i>Willd.</i>) <i>A.Chev.</i>	ts		+	+			123,126,135
<i>Neorautanenia mitis</i> (<i>A.Rich.</i>) <i>Verdc.</i>	ph			+			98,137
<i>Ormocarpum kirkii</i> <i>S.Moore</i>	st			+			106,135,137
<i>Pterocarpus antunesii</i> (<i>Taub.</i>) <i>Harms</i>	t	d					105,109,130
<i>Pterocarpus brenanii</i> <i>Barbosa & Torre</i>	ts		+	f			98,99,108,114,118,120,121,123,125,126,127,134,135,137
<i>Rhynchosia minima</i> (<i>L.</i>) <i>DC.</i> var. <i>minima</i>	cph		+	+			96,114,120,121,126,133,136
<i>Rhynchosia sublobata</i> (<i>Schumach.</i>) <i>Meikle</i>	cph		+				96
<i>Rhynchosia totta</i> (<i>Thunb.</i>) <i>DC.</i> var. <i>venulosa</i> (<i>Hiern</i>) <i>Verdc.</i>	cph	+		+			126,135,141
<i>Rothia hirsuta</i> (<i>Guill.& Perr.</i>) <i>Baker</i>	ah	+		+			101,103,137
<i>Sesbania leptocarpa</i> <i>DC.</i> var. <i>minimiflora</i> (<i>J.B.Gillett</i>) <i>G.P.Lewis</i>	ah				+	+	96,133
* <i>Sesbania rostrata</i> <i>Bremek.& Oberm.</i>	ah				+		136
<i>Sesbania tetraptera</i> <i>Baker</i> subsp. <i>rogersii</i> (<i>E.Phillips & Hutch.</i>) <i>G.P.Lewis</i>	ah				+	+	-
<i>Swartzia madagascariensis</i> <i>Desv.</i>	t			+			118

Table 3. Lower Gurube plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Tephrosia acaciifolia</i> Baker	ah			+			131
<i>Tephrosia caerulea</i> Baker f. subsp. caerulea	a/ph	+	+	+			101,103,114,126
<i>Tephrosia euprepes</i> Brummitt	ah	+					101,130
<i>Tephrosia longipes</i> Meisn.	ph			+			100,106
<i>Tephrosia lupinifolia</i> DC.	ah			+			118
<i>Tephrosia pumila</i> (Lam.) Pers.	ah	+	+				101,114
<i>Tephrosia purpurea</i> (L.) Pers. subsp. leptostachya (DC.) Brummitt	a/ph	+		+			103,118,135
<i>Tephrosia rhodesica</i> Baker f.	a/ph			+			127,131
<i>Tephrosia villosa</i> (L.) Pers. subsp. ehrenbergiana (Schweinf.) Brummitt	ph			+			135
<i>Vigna unguiculata</i> (L.) Walp. subsp. dekindtiana (Harms) Verdc.	cph	+	+				102,111,130,134,141
<i>Xanthocercis zambesiaca</i> (Baker) Dumaz-leGrand	t		+				95a,95b
<i>Xeroderris stuhlmannii</i> (Taub.) Mendonça & E.C.Sousa	t	+		+			101,102,103,109,126
<i>Zornia glochidiata</i> DC.	ah		+	+			108,126,127,128
Fabaceae (Mimosoideae)							
<i>Acacia ataxacantha</i> DC.	cs	+					105,111,130,132,141
<i>Acacia eriocarpa</i> Brenan	s	+					100,101,102,103
<i>Acacia erubescens</i> Oliv.	ts		+	+			121,123,125
<i>Acacia gerrardii</i> Benth.	t			+			121,127
<i>Acacia nigrescens</i> Oliv.	t		f	f			95a,99,106,120,121,126,133,134,135,137
<i>Acacia nilotica</i> (L.) Delile subsp. kraussiana (Benth.) Brenan	t		f	f			114,121,123,125,126,127,128,133,134,135
<i>Acacia robusta</i> Burch. subsp. clavigera (E.Mey.) Brenan	t		+				95a,120,133,134
<i>Acacia schweinfurthii</i> Brenan & Exell	csl		+				95a
<i>Acacia senegal</i> (L.) Willd. var. leiorhachis Brenan	ts		+				116,117
<i>Acacia tortilis</i> (Forssk.) Hayne subsp. spirocarpa (A.Rich.) Brenan	t	+	+				95a,96,128,130
<i>Albizia anthelmintica</i> Brongn.	ts		+	+			95a,95b,121,133
<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	st	+	+	+		f	95a,95b,96,97,99,107,108,114,120,121,123,125,126,127,128,129,132,133,134
<i>Elephantorrhiza goetzei</i> (Harms) Harms subsp. goetzei	st			+			98,126
<i>Faidherbia albida</i> (Delile) A.Chev.	t		d				128,129
<i>Xylia torreana</i> Brenan	t	d					105,109,111,130,132,141
Flacourtiaceae							
<i>Flacourtia indica</i> (Burm.f.) Merr.	st		+	+			98,118,134
* <i>Xylotheca tettensis</i> (Kotzsch) Gilg var. macrophylla (Klotzsch) Wild	st	+	+				114,141
Gentianaceae							
<i>Enicostema axillare</i> (Lam.) Raynal var. axillare	ph		+				-

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Exacum oldenlandioides</i> (<i>S. Moore</i>) <i>Klack.</i>	ah				+		112,120,140
<i>Faroa amara</i> <i>Baker & N.E.Br.</i>				+			127
Icacinaceae							
* <i>Pyrenacatha kaurabassana</i> <i>Baill.</i>	ph			+			125
Lamiaceae							
<i>Basilicum polystchyon</i> (<i>L.</i>) <i>Moench</i>	ah		+		+		96
<i>Clerodendrum ternatum</i> <i>Schinz</i>	ss		+	f			106,118,120,121,126,127
<i>Endostemon tenuiflorus</i> (<i>Benth.</i>) <i>Ashby</i>	a/ph			+			116
<i>Hemizygia bracteosa</i> (<i>Benth.</i>) <i>Briq.</i>	a/ph	+		+			100,103,107,118
<i>Karomia tettensis</i> (<i>Klotzsch</i>) <i>R.Fern.</i>	ts	+	+				108,109,114,123
<i>Leonotis nepetifolia</i> (<i>L.</i>) <i>W.T.Aiton</i>	ah	+	+			+	97,109,119,128,129
<i>Leucas martinicensis</i> (<i>Jacq.</i>) <i>R.Br.</i>	ah					+	-
<i>Leucas tettensis</i> <i>Vatke</i>	ah	f		+			100,101,103,109,127,130,137
<i>Ocimum americanum</i> <i>L.</i>	ah	+	+	+		+	96,97,107,119,128,136
<i>Ocimum gratissimum</i> <i>L.</i> var. <i>gratissimum</i>	s		+				97,128
<i>Orthosiphon suffrutescens</i> (<i>Thonn.</i>) <i>J.K.Morton</i>	h/s		+				134
<i>Plectranthus tetensis</i> (<i>Baker</i>) <i>Agnew</i>	ph		+				133
<i>Plectranthus tetragonus</i> <i>Gürke</i>	ah			+			125
<i>Premna senensis</i> <i>Klotzsch</i>	st	+					130
<i>Tinnea zambesiaca</i> <i>Baker</i>	s			+			127
<i>Vitex mombassae</i> <i>Vatke</i>	st			+			127
<i>Vitex payos</i> (<i>Lour.</i>) <i>Merr.</i>	ts		+				131
<i>Vitex petersiana</i> <i>Klotzsch</i>	s		+				121,135
Lauraceae							
<i>Cassytha filiformis</i> <i>L.</i>	ch		+				116
Lentibulariaceae							
<i>Utricularia stellaris</i> <i>L.f.</i>	aq.h				+		112
Lobeliaceae							
<i>Lobelia erinus</i> <i>L.</i>	ah				+		140
Loganiaceae							
* <i>Strychnos decussata</i> (<i>Pappe</i>) <i>Gilg</i>	st	+					111,141
<i>Strychnos madagascariensis</i> <i>Poir</i>	ts	+	+	+			100,101,102,103,107,108,126,127,130,137

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Strychnos potatorum</i> <i>L.f.</i>	ts		+				119,134
<i>Strychnos spinosa</i> <i>Lam.</i>	ts	+	+	+			98,109,111,118,132,134,135
Loranthaceae							
<i>Oliverella rubroviridis</i> <i>Tiegh.</i>	par.s	+					101,107,130
Lythraceae							
<i>Ammannia auriculata</i> <i>Willd.</i>	ah				+		95a,96,109,110,112,120,128,136
<i>Ammannia baccifera</i> <i>L.</i> subsp. <i>baccifera</i>	ah				+		120
<i>Ammannia priuriana</i> <i>Guill. & Perr.</i>	ah				+		95a,120,128
<i>Nesaea</i> sp.	ah				+		112,120
<i>Rotala capensis</i> <i>R.Fern. & M.A.Diniz</i>	ah				+		120
* <i>Rotala tenella</i> (<i>Guill. & Perr.</i>) <i>Hiern</i>	ah				+		112
Malvaceae							
<i>Abelmoschus esculentus</i> (<i>L.</i>) <i>Moench</i>	ah					cult.+	-
<i>Abutilon angulatum</i> (<i>Guill. & Perr.</i>) <i>Mast.</i> var. <i>angulatum</i>	a/ph		+				95a,95b,129
<i>Abutilon hirtum</i> (<i>Lam.</i>) <i>Sweet</i>	ah			+			125
<i>Abutilon lauraster</i> <i>Hochr.</i>	ah		+				112
<i>Abutilon ramosum</i> (<i>Cav.</i>) <i>Guill. & Perr.</i>	a/ph		+				95a,95b
<i>Azanza garckeana</i> (<i>F.Hoffm.</i>) <i>Exell & Hillc.</i>	ts		+				95a,95b,129,134
<i>Gossypium hirsutum</i> <i>L.</i> cultivar.	a/ph					cult.+	97
<i>Hibiscus allenii</i> <i>Sprague & Hutch.</i>	s/ph		+	+			123,126,133
<i>Hibiscus cannabinus</i> <i>L.</i>	ah		+			+	120
<i>Hibiscus mastersianus</i> <i>Hiern</i>	ah	f	+	+			100,101,102,103,105,107,130,134,137
<i>Hibiscus meeusei</i> <i>Exell</i>	ah		+			+	128
<i>Hibiscus micranthus</i> <i>L.f.</i>	s/ph			+			-
* <i>Hibiscus palmatus</i> <i>Forssk.</i>	ph			r			125
<i>Hibiscus physaloides</i> <i>Guill. & Perr.</i>	ah	+		+			136,141
* <i>Hibiscus rhabdotospermus</i> <i>Garcke</i>	ah	r					-
<i>Hibiscus sidiformis</i> <i>Baill.</i>	ah	+	+	+			103,114,121,123,125,126,134,136
<i>Hibiscus vitifolius</i> <i>L.</i> subsp. <i>vulgaris</i> <i>Brenan & Exell</i>	s/ph		+				96
<i>Pavonia burchellii</i> (<i>DC.</i>) <i>R.A.Dyer</i>	ph/s		+				95b,114,133
<i>Pavonia senegalensis</i> (<i>Cav.</i>) <i>Leistner</i>	a/ph/s		+			+	-
<i>Sida acuta</i> <i>Burm.f.</i>	a/ph		+			+	128
<i>Sida alba</i> <i>L.</i>	ah		+	+		+	120,121,125,128,136
<i>Sida cordifolia</i> <i>L.</i>	ah	+				+	109,131

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
Meliaceae							
* <i>Entandrophragma caudatum</i> (Sprague) Sprague	t	r					109,138
<i>Trichilia emetica</i> Vahl	t		+				97,128
Menispermaceae							
<i>Cissampelos mucronata</i> A.Rich.	ch		+				96
<i>Cocculus hirsutus</i> (L.) Diels	csl		+	+			96,136
<i>Tiliacora funifera</i> (Miers) Oliv.	csl	+					142
<i>Tinospora caffra</i> (Miers) Troupin	csl	+					104
Menyanthaceae							
<i>Nymphoides forbesiana</i> (Griseb.) Kuntze	aq.ph				+		112
Molluginaceae							
<i>Corbichonia decumbens</i> (Forssk.) Exell	a/ph			+			135
<i>Glinus lotoides</i> L.	a/ph				+		95a,96
<i>Glinus oppositifolius</i> (L.) DC.	a/ph				+		95a
Moraceae							
* <i>Ficus bussei</i> Mildbr. & Burret	t	r	r				97
<i>Ficus capreifolia</i> Delile	s		+			+	95b,96,128
<i>Ficus sycomorus</i> L.	t		+				95b
<i>Maclura africana</i> (Bureau) Corner	s		+				95b
Nyctaginaceae							
<i>Boerhavia coccinea</i> Mill.	a/ph		+			+	128
<i>Boerhavia diffusa</i> L.	ph		+			+	133
<i>Boerhavia erecta</i> L.	ah		+			+	95a,97,128
<i>Commicarpus plumbagineus</i> (Cav.) Standl.	cs		+				95b,128
Nymphaeaceae							
<i>Nymphaea nouchali</i> Burm.f.	aq.ph					+	112,136
Olacaceae							
<i>Olax dissitiflora</i> Oliv.	ts		+	+			134,135
<i>Ximenia americana</i> L. var. <i>parvifolia</i> Oliv.	ts		+	f			120,121,125,126,134,137
<i>Ximenia caffra</i> Sond. var. <i>caffra</i>	ts		+	f			95a,98,106,118,121,126,131

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
Oleaceae							
<i>Jasminum fluminense</i> Vell.	cs		+				128
<i>Jasminum stenolobum</i> Rolfe	s			+			126,137
<i>Schrebera trichoclada</i> Welw.	t	f	+	+			100,101,102,103,109,126,137
Onagraceae							
<i>Ludwigia octovalvis</i> (Jacq.) Raven subsp. <i>breviseipala</i> (Brenan) Raven	a/ph				+		112,140
<i>Ludwigia palustris</i> (L.) Ell.	a/ph				+		140
* <i>Ludwigia perennis</i> L.	ah				+		112,120,140
<i>Ludwigia stolonifera</i> (Guill. & Perr.) Raven	ph				+		96,140
Opiliaceae							
<i>Opilia celtidifolia</i> (Guill. & Perr.) Walp.	csl			+			127
Oxalidaceae							
<i>Biophytum abyssinicum</i> A.Rich.	ah		+	+			134,143
Papaveraceae							
<i>Argemone mexicana</i> L.	ah				+	+	128
Passifloraceae							
* <i>Adenia panduriformis</i> Engl.	csl		r				133,134
Pedaliaceae							
<i>Ceratotheca sesamoides</i> Endl.	ah	+	+	+		+	97,98,100,101,103,108,118,120,123,129,134,137
Plumbaginaceae							
<i>Plumbago zeylanica</i> L.	s			+			-
Polygalaceae							
<i>Polygala erioptera</i> DC.	ah		+	+			108,118,120,121,123,125,127
<i>Securidaca longipedunculata</i> Fresen.	t			+			118
Polygonaceae							
<i>Oxygonum</i> sp.	a/ph	+					101,103
Portulacaceae							
<i>Portulaca oleracea</i> L.	ah		+			+	128

Table 3. Lower Gurube plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
Rhamnaceae							
<i>Berchemia discolor</i> (Klotzsch) Hemsl.	t	+	+				95a,109,114,132
<i>Ziziphus mauritiana</i> Lam.	st	+				cult.+	95a,96,97
* <i>Ziziphus pubescens</i> Oliv. subsp. pubescens	st		r				95a
Rubiaceae							
<i>Agathisanthemum bojeri</i> Klotzsch subsp. angolense (Bremek.) Verdc.	ph			+			127
<i>Canthium glaucum</i> Hiern subsp. frangula (S.Moore) Bridson	st	f	+	+			109,111,114,126,127,132,134,141
<i>Canthium pseudorandii</i> Bridson	ts	+					109,142
<i>Canthium setiflorum</i> Hiern subsp. setiflorum	st			+			137
<i>Carphalea pubescens</i> (Klotzsch) Verdc.	s		+	+			120,126,127
<i>Catunaregam spinosa</i> (Thunb.) Tirveng. subsp. taylorii (S.Moore) Verdc.	st		+	f			98,118,121,126,127,131,134,135
<i>Crossopteryx febrifuga</i> (G.Don.) Benth.	ts	+	+	f			98,100,114,118,121,126,127,131,135
<i>Feretia aeruginescens</i> Stapf	ts		+				95a,119,129
<i>Gardenia resiniflua</i> Hiern	st		+	+			108,114,121,123,125,126,127,133,134
<i>Kohautia subverticillata</i> (K.Schum.) Mantell subsp. subverticillata	ah	+	+				96,97,100,103
* <i>Multidentia exserta</i> Bridson subsp. robsonii Bridson	st	r					101,102
<i>Oldenlandia corymbosa</i> L. var. corymbosa	ah		+				96,97
<i>Oldenlandia corymbosa</i> L. var. linearis (DC.) Verdc.	ah		+				112
<i>Oldenlandia herbacea</i> (L.) Roxb.	ah	+		+			127,130
<i>Paederia bojeriana</i> (A.Rich.) Drake subsp. foetens (Hiern) Verdc.	cs		+				96
<i>Pavetta cataractarum</i> S.Moore	st		+				95a,95b,109,114,129,134
<i>Pavetta schumanniana</i> K.Schum.	st			+			121
<i>Psydrax livida</i> (Hiern) Bridson	st			+			126
* <i>Psydrax martinii</i> (Dunkley) Bridson	s	+					132
<i>Spermacoce chaetocephala</i> DC.	ah		+	+			98,108,114,118,135
<i>Spermacoce senensis</i> (Klotzsch) Hiern	ah	+	+	+			100,101,102,103,121,125,134
<i>Tarenna luteola</i> (Stapf) Bremek.	st	+					100,101,102,105,107,114,130,132
<i>Tarenna zygoon</i> Bridson	s		+	+			112,114,133,135
<i>Tricalysia junodii</i> (Schinz) Brenan var. kirkii (Hook.f.) Robbr.	st	+					107,109,130,141
<i>Vangueria infausta</i> Burch.	st	f	+	+			100,102,109,111,126,127,132,134
Rutaceae							
<i>Citropsis daweani</i> Swingle & M.Kellerm.	st	+					102,111,130,141
<i>Vepris zambesiaca</i> S.Moore	st			+			125,126
* <i>Zanthoxylum leprieurii</i> Guill.& Perr.	st	r					111

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
Salvadoraceae							
<i>Salvadora persica</i> L.	st		+				95b
Sapindaceae							
<i>Allophylus africanus</i> P.Beauv.	st		+				95,129
<i>Cardiospermum halicacabum</i> L. subsp. <i>microcarpum</i> (Kunth) Blume	cah			+			125,126
<i>Lecaniodiscus fraxinifolius</i> Baker	ts	+	f				95a,95b,97,129,130,134
<i>Zanha africana</i> (Radlk.) Exell	t			+			126
Sapotaceae							
<i>Manilkara mochisia</i> (Baker) Dubard	t		+	+			123,127
Scrophulariaceae							
<i>Alectra orobanchoides</i> Benth.	a/ph		+	+			125,126,129,133
<i>Alectra picta</i> (Hiern) Hemsl.	ah	+					100
* <i>Bacopa floribunda</i> (R.Br.) Wettst.	ah				+		112
<i>Buchnera hispida</i> D.Don	ah		+	+			120,121,127,137
<i>Buchnera randii</i> S.Moore	ah				+		112
<i>Crepidorhopalon spicatus</i> (Engl.) Eb.Fisch.	ah		+	+			108,127,137
<i>Limnophila ceratophylloides</i> (Hiern) Skan	aq.h				+		112,136
<i>Limnophila indica</i> (L.) Druce	aq.h				+		112
<i>Lindernia oliveriana</i> Dandy	ah				+		112
<i>Lindernia parviflora</i> (Roxb.) Haines	ah				+		140
<i>Striga asiatica</i> (L.) Kuntze	par. ah			+		+	137
<i>Striga gesnerioides</i> (Willd.) Vatke	par. ah	+	+	f			100,114,118,121,125,127
Simaroubaceae							
<i>Kirkia acuminata</i> Oliv.	t	+	+	+			99,100,102,107,125,126,129
Solanaceae							
<i>Datura stramonium</i> L.	ah		+			+	128
<i>Lycopersicon esculentum</i> Mill.	ah		+			cult.+	95a,128
<i>Physalis angulata</i> L.	ah		+				128
<i>Physalis lagascae</i> Roem. & Schult.	ah		+			+	128
<i>Solanum incanum</i> L. <i>sens. lat.</i>	ph		+	+		+	95a,96,97,127,128,129,134
<i>Solanum tettense</i> Klotzsch	s		+	+			125,127,133

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
Sphenocleaceae							
* <i>Sphenoclea zeylanica</i> Gaertn.	ah				+		112
Sterculiaceae							
<i>Hermannia glanduligera</i> K.Schum.	ph	+	+	+			96,97,98,99,100,103,118,121
<i>Sterculia africana</i> (Lour.) Fiori	t			+			125,126
<i>Sterculia quinqueloba</i> (Garcke) K.Schum.	t		+				120
<i>Waltheria indica</i> L.	a/ph	+		+			109,121,127
Tiliaceae							
<i>Corchorus aestuans</i> L.	ah		+				112,129
* <i>Corchorus hochstetteri</i> Milne-Redh.	ah				r		125
<i>Corchorus olitorius</i> L.	ah		+	+			95a,119,120,125
<i>Corchorus tridens</i> L.	ah	f	f	f			95a,97,100,101,102,103,105,114,120,121,123,125,126,128,130,133,134,136,141
<i>Grewia bicolor</i> Juss.	st	+	f	+			95a,99,102,107,114,120,123,125,126,129,133,134
<i>Grewia flavescens</i> Juss. var. <i>flavescens</i>	st	+		+			125,130
<i>Grewia flavescens</i> Juss. var. <i>olukondae</i> (Schinz) Wild	st		f				95a,96,97,128
<i>Grewia inaequilatera</i> Garcke	st		+				95a,95b,96
<i>Grewia pachycalyx</i> K.Schum.	st		+				96
<i>Grewia praecox</i> K.Schum.	st		+				134
<i>Grewia retinervis</i> Burret	s		+	+			125,133
<i>Triumfetta annua</i> L.	ah		+				128,129
<i>Triumfetta pentandra</i> A.Rich.	ah	f	+	+			100,101,102,109,111,125,129,141
<i>Triumfetta trichocarpa</i> A.Rich.	ah	+					109
Turneraceae							
<i>Tricliceras glanduliferum</i> (Klotzsch) R.Fern.	ah			+			106
<i>Tricliceras hirsutum</i> (A. & R.Fern.) R.Fern.	ph		+	+			108,112,135,137
Urticaceae							
<i>Laportea aestuans</i> (L.) Chew	ah		+				128
Verbenaceae (see also Lamiaceae)							
<i>Lantana camara</i> L.	s					+	124
Vitaceae							
<i>Ampelocissus africana</i> (Lour.) Merr.	cs	f	f	f			95a,96,97,99,100,102,105,107,120,123,125,126,129,134,136, 137

Table 3. Lower Gुरुve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Cissus cornifolia</i> (Baker) Planch.	s	f	f	f			98,100,101,103,121,123,125,126,127,131,134,135,137
<i>Cissus integrifolia</i> (Baker) Planch.	l	+	+				95a,96,97,102,109,119,134,141
<i>Cissus quadrangularis</i> L.	cs1			+			125
<i>Cissus welwitschii</i> (Baker) Planch.	l	+		+			125,130
<i>Cyphostemma congestum</i> (Baker) Wild & R.B.Drumm.	ch	+	+				95a,101
* <i>Cyphostemma kirkianum</i> (Planch.) Wild & R.B.Drumm.	ch	+	+				109,114
* <i>Cyphostemma lovemorei</i> Wild & R.B.Drumm.	ch	+					109
Zygophyllaceae							
<i>Tribulus terrestris</i> L.	ah		+			+	95a
MONOCOTYLEDONS							
Alismataceae							
* <i>Limnophyton obtusifolium</i> (L.) Miq.	ph					+	112
Amaryllidaceae							
<i>Crinum</i> sp.	ph			+			98,106,125
<i>Scadoxus multiflorus</i> (Martyn) Raf.	ph		+				-
Anthericaceae							
<i>Chlorophytum colubrinum</i> (Baker) Engl.	ph			+			126
<i>Chlorophytum polystachys</i> Baker	ph		+				-
<i>Chlorophytum sphacelatum</i> (Baker) Kativu ssp. <i>milanjianum</i> (Rendle) Kativu	ph		+				-
<i>Chlorophytum subpetiolatum</i> (Baker) Kativu	ph			+			-
Araceae							
<i>Stylochaeton puberulus</i> N.E.Br.	ph			+			99
Arecaceae							
<i>Hyphaene petersiana</i> Mart.	t		+				95a,119
Asparagaceae							
<i>Asparagus africanus</i> Lam.	ph		+	+			108,121,123,133,134
<i>Asparagus</i> sp.	ph		+				112
Colchicaceae							
<i>Gloriosa superba</i> L.	ph		+				123

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
Commelinaceae							
* <i>Aneilema nicholsonii</i> C.B.Clarke	ah	+	+				102,107,109,130,134
<i>Commelina benghalensis</i> L.	ah	+	+			+	112,128,130
* <i>Commelina nigritana</i> Benth.	ah				+		140
<i>Commelina subulata</i> Roth	ah				+		125,140
<i>Commelina zambesica</i> C.B.Clarke	ph		+				95a,108,114,134
Cyperaceae							
<i>Bulbostylis densa</i> (Wall.) Hand.-Mazz.	a sed			+			106
<i>Bulbostylis hispidula</i> (Vahl) R.W.Haines subsp. hispidula	p sed	+	+	+			96,103,120,137
<i>Courtoisina cyperoides</i> (Rottb.) Soják	a sed				+		110,112,120
<i>Cyperus amabilis</i> Vahl	a sed		+	+			120,123,135
<i>Cyperus difformis</i> L.	a sed				+		96,140
<i>Cyperus imbricatus</i> Retz.	p sed				+		95a
<i>Cyperus iria</i> L.	a sed				+		-
<i>Cyperus longus</i> L.	p sed				+		95a,96
<i>Cyperus squarrosus</i> L.	a sed				+		133
<i>Cyperus</i> sp.	a sed				+		108,112
* <i>Diplacrum africanum</i> (Benth.) C.B.Clarke	a sed				r		120
<i>Eleocharis atropurpurea</i> (Retz.) Presl.	a sed				+		112
<i>Eleocharis variegata</i> (Poir.) Presl.	p sed				+		120
<i>Fimbristylis dichotoma</i> (L.) Vahl	p sed				+		140
* <i>Fimbristylis miliacea</i> (L.) Vahl	a sed				r		143
* <i>Fimbristylis schoenoides</i> (Retz.) Vahl	p sed				r		143
<i>Fuirena leptostachya</i> Oliv.	a sed				+		112,120,140
<i>Kyllinga alba</i> Nees	p sed		+	+			112,118,120,121,123,133
<i>Lipocarpa albiceps</i>	a sed				+		112
<i>Lipocarpa nana</i> (A.Rich.) Cherm.	a sed				+		112
<i>Lipocarpa rehmannii</i> (Ridl.) Goetgh.	a sed				+		112
<i>Pycreus macrostachyos</i> (Lam.) J.Raynal	a sed				+		120
<i>Pycreus pelophilus</i> (Ridl.) C.B.Clarke	a sed				+		120
<i>Pycreus pumilus</i> (L.) Domin	a sed				+		112,120
<i>Pycreus</i> sp.	a sed				+		112
<i>Schoenoplectus articulatus</i> (L.) Palla	a sed				+		136
<i>Schoenoplectus senegalensis</i> (Steud.) J.Raynal	a sed				+		136
<i>Scleria foliosa</i> A.Rich.	a sed				+		120,140

Table 3. Lower Guruve plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
Dioscoreaceae							
<i>Dioscorea sansibarensis Pax</i>	cp		+				-
Dracaenaceae							
<i>Sansevieria sp.</i>	ph	+	+				108,132
Eriocaulaceae							
* <i>Eriocaulon elegantulum Engl.</i>	ah				+		120
* <i>Eriocaulon maculatum Schinz</i>	ah				+		120
<i>Eriocaulon welwitschii Rendle</i>	ah				+		120
Eriospermaceae							
<i>Eriospermum abyssinicum Baker</i>	ph		+				108,120,131
Hyacinthaceae							
<i>Albuca abyssinica Murray</i>	ph		+	+			125,133
<i>Drimia altissima (L.f.) Ker Gawl</i>	ph		+	+			120,121,134
<i>Ledebouria sp.</i>	ph		+	+			118
Hydrocharitaceae							
<i>Lagarosiphon cordofanus Casp.</i>	aq.h				+		136
Lemnaceae							
<i>Lemna aequinoctialis Welw.</i>	aq.h				+		110,140
Limnocharitaceae							
* <i>Butomopsis latifolia (D.Don) Kunth</i>	ph				+		136
Orchidaceae							
<i>Ansellia africana Lindl.</i>	epi.		+				134
Poaceae							
<i>Andropogon gayanus Kunth var. polycladus (Hack.) Clayton</i>	pg	+		+			98,106,118,121,126,130,135
<i>Andropogon sp.</i>	pg			+			121
<i>Aristida adscensionis L.</i>	ag		+	+			120,121,135
<i>Aristida barbicollis Trin. & Rupr.</i>	pg		+				-
<i>Aristida hordeacea Kunh</i>	ag			+			108,121
<i>Aristida rhiniochloa Hochst.</i>	ag		+				108

Table 3. Lower Gurusu plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Aristida scabrivalvis</i> Hack.	ag		+	+			97,98,108,112,114,123,135
<i>Bothriochloa radicans</i> (Lehm.) A.Camus	pg		+		+		95a,112
<i>Brachiaria deflexa</i> (Schumach.) Robyns	ag	+	+	+			109,121,129,141
<i>Brachiaria nigropedata</i> (Ficalho & Hiern) Stapf	pg	+	+				100,102,103,108
<i>Brachiaria ramosa</i> (L.) Stapf	ag				+		140
<i>Chloris virgata</i> Sw.	ag		f				108,114,120,129
<i>Cymbopogon</i> sp.	pg			+			118
<i>Cynodon dactylon</i> (L.) Pers.	pg		+				124
<i>Dactyloctenium giganteum</i> B.S.Fisher & Schweick.	ag	+					100,101,103,131
<i>Digitaria milanjiana</i> (Rendle) Stapf	pg	+	f	+			95a,96,97,98,99,100,107,108,114,127,137
<i>Digitaria nuda</i> Schumach.	ag					+	105
<i>Diheteropogon amplexans</i> (Nees) Clayton	pg			+			106,118,127,131
<i>Dinebra retroflexa</i> (Vahl) Panzer var. <i>condensata</i> S.M.Phillips	ag			+			125
<i>Echinochloa colona</i> (L.) Link	ag				+		110,136
<i>Eleusine africana</i> Kenn.-O'Byrne	ag					+	124
<i>Elytrophorus spicatus</i> (Willd.) A.Camus	ag				+		112
<i>Enteropogon macrostachyus</i> (A.Rich.) Benth.	pg		+				108,114
<i>Eragrostis aspera</i> (Jacq.) Nees	ag	+	+			+	95a,102,128
<i>Eragrostis cilianensis</i> (All.) Janch.	ag					+	124
<i>Eragrostis japonica</i> (Thunb.) Trin.	ag		+		+		96,120
<i>Eragrostis rigidior</i> Pilg.	pg			+			136
* <i>Eragrostis rogersii</i> C.E.Hubb.	ag	+					100,101
<i>Eragrostis superba</i> Peyr.	pg		+	+			98,99,106,120
<i>Eragrostis viscosa</i> (Retz.) Trin.	ag	+	+				100,105,114,120,134
<i>Hackelochloa granularis</i> (L.) Kuntze	ag			+			126
<i>Heteropogon contortus</i> (L.) Roem. & Schult.	pg		f	f		+	96,97,98,118,120,121,127,131,135
<i>Heteropogon melanocarpus</i> (Ell.) Benth.	ag	+	f	+			96,99,100,101,103,108,114,119,120,123,129,137
<i>Leptocarydion vulpiastrum</i> (DeNot.) Stapf	ag	f	+			+	97,100,101,102,105,109,119,123,130,141
<i>Leptochloa uniflora</i> A.Rich.	ag		+				119,125
<i>Loudetia flavida</i> (Stapf) C.E.Hubb.	pg	+					106,126,135
<i>Melinis repens</i> (Willd.) Zizka	a/pg		+	+		+	108,125,127,131
<i>Microchloa caffra</i> Nees	pg		+				133
<i>Monocymbium cerasiiforme</i> (Nees) Stapf	pg			+			106
<i>Oryza longistaminata</i> A.Chev. & Roehr.	pg				+		112
<i>Panicum atosanguineum</i> A.Rich.	ag			+		+	125,136
<i>Panicum heterostachyum</i> Hack.	ag	+					105,129,130,132
<i>Panicum maximum</i> Jacq.	pg	f	f				95a,97,100,101,102,103,128,129,141
<i>Panicum subalbidum</i> Kunth	a/pg				+		136

Table 3. Lower GURUVE plant species list (cont.)

Species	life form	vegetation class					GPS points
		A	B	C	D	E	
<i>Pennisetum</i> sp.	a/pg		+	+			95a,126
<i>Perotis patens</i> Gand.	ag	f					100,101,102,103,109,131,141
<i>Phragmites mauritianus</i> Kunth	pg				+		128
<i>Pogonarthria squarrosa</i> (Roem.& Schult.) Pilg.	pg		+	f			120,121,127,131,135
<i>Rottboellia cochinchinensis</i> (Lour.) Clayton	ag		+			+	96,97,129
<i>Sacciolepis spiciformis</i> (A.Rich.) Stapf	ag				+		112,120
<i>Schizachyrium exile</i> (Hochst.) Pilg.	ag			+			118
<i>Schmidtia pappophoroides</i> Steud.	pg			f			98,99,106,135
<i>Setaria pumila</i> (Poir.) Roem.& Schult.	ag		+	+			108,120,123,125
<i>Sorghum arundinaceum</i> (Desv.) Stapf	ag		+				95b,96,128
<i>Sorghum bicolor</i> (L.) Moench	ag					cult.	124
<i>Sorghum versicolor</i> Anders.	ag		+	+			98,108,120,121,123,127
<i>Sporobolus festivus</i> A.Rich.	pg			+			-
<i>Sporobolus pyramidalis</i> P.Beauv.	pg					+	124
<i>Stereochlaena cameronii</i> (Stapf) Pilg.	pg			+			131
<i>Urochloa mosambicensis</i> (Hack.) Dandy	pg			+			98
<i>Urochloa trichopus</i> (Hochst.) Stapf	ag		f				95a,133
<i>Zea mays</i> L.	ag					cult.	-
Pontederiaceae							
<i>Heteranthera callifolia</i> Kunth	aq,h				+		110
Taccaceae							
<i>Tacca leontopetaloides</i> (L.) Kuntze	ph		+				134
Velloziaceae							
<i>Xerophyta humilis</i> (Baker) T.Durand & Schinz	ss			+			135
<i>Xerophyta</i> sp.	ss		+	+			108,126,135
Xyridaceae							
* <i>Xyris fugaciflora</i> Rendle	ah				+		112,120
Zingiberaceae							
<i>Siphonochilus kirkii</i> (Hook.f.) B.L.Burt	ph	+	+	+			95b,107,114,125,134,136