

DEPARTMENT OF AGRICULTURE
NYASALAND

An
Annotated Check List
of
Nyasaland Grasses
Indigenous and Cultivated

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and

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Introduction

The present list of Nyasaland grasses represents approximately five years intensive collecting by P. O. Wiehe and G. Jackson from the year 1949 to 1954. At present there are represented 371 species and varieties in 113 genera. Generally speaking the list does not include many specimens to which no specific name has yet been given.

The following books are recommended:—

A List of Kenya Grasses (with keys for identification) by A. V. Bogdan. Price 3s from Government Printer, Nairobi. The genera covered by this book are mainly the same as in Nyasaland but of course many of the species differ.

Important Grassland Plants of Kenya, by D. C. Edwards and A. V. Bogdan. Price £1-5s-0d published by Pitman Press, Johannesburg, South Africa. This is a fairly detailed, short list of grasses, legumes and other plants most commonly found in Kenya grasslands with ecological and economic notes, but without keys.

The Flora of Tropical Africa, Volumes IX and X, 1934 and 1937. Published by the Crown Agents for the Colonies, Price £5-5s-0d; a taxonomical listing of the *Gramineae*, mainly for the specialist, with keys to the tropical African species. It is not yet complete.

The Flora of West Tropical Africa, Vol. 2, Part II, 1931. Dalziel and Hutchinson, published by the Crown Agents for the Colonies, Price 7s-6d. This contains other families than *Gramineae*, but there is a section with keys to the genera and species of West Africa grasses. Most of the genera are common to Nyasaland and some species. This flora is now under revision.

The Grasses and Pastures of South Africa, published by Central News Agency, South Africa, Price £3-3-0. A very useful book containing keys to and descriptions of many South African grasses which are common to this territory. The author of the taxonomic section is Lucy Chippindall, a well known Rhodesian Botanist.

References in the list are made to the *Flora of Tropical Africa*, (F.T.A.), the *Flora of West Tropical Africa*, (F.W.T.A.), and rarely to *Kew Bulletin*. Where a grass is not described in these publications references have not been given as it is unlikely that users of the list will have access to such references.

Part I

Grassland Communities

Seven main groups of communities occur in Nyasaland as far as the *Gramineae* are concerned and for the purpose of this list will be described briefly under headings.

1. EVERGREEN FOREST.

All types of evergreen forest are similar in possessing a very sparse ground cover of herbaceous plants due to the dense shade. This is particularly noticeable in Montane Evergreen forest and in the Lake-shore Evergreen forests of Nkata Bay; Riverine Evergreen forest has in general a denser herbaceous layer. The grasses found there fall into four categories, but all agree generally in having broad green leaves and weak stems.

The creeping types, which form a loose open mat, are best represented by *Oplismenus*, which genus appears in Montane Evergreen forest, Mist forests and Riverine forests at Lake-shore level. The leaves are short but broad, stems weak and there is rooting from the nodes.

The tufted types which form loose tufts, generally with few weak stems and long broad, soft drooping leaves, *Pseudobromus* is typical here.

Reedy types which appear almost in the shrub layer and are poorly represented in this country by *Olyra* found in Evergreen Riverine forests in Mlanje and the Cholo escarpment districts.

Rambling types, generally found in the outskirts of forests pushing through the fringing shrubs. Stems are weak and sometimes scabrid. They are typified by *Brachypodium*.

All the species found in the evergreen forest are limited to them and not found outside this habitat. As many are common to patches of forest all over the Territory and as there are such distances between each patch of forest it seems reasonable to include this discontinuous distribution as evidence for the wider extent of evergreen forest in the past.

2. MONTANE GRASSLANDS.

These are open grasslands with scattered evergreen forest relics in fire sheltered situations, on hill tops and in river valleys. They can be conveniently divided into two categories.

(a) HIGH MONTANE. The extensive grassland of the high Nyika falls into this group; it is dominated by *Loudetia simplex*, *Trachypogon spicatus forma*, *Exothea abyssinica*, and *Festuca schimperi*, with *Rendlia altera* in the spring phase. It is a short heathy grassland with many Composites and presents an aspect of rolling downland. The actual ground cover is low, the species tufted and wiry and dry in the cold season.

Less extensive types of grassland are found in the bogs and marshes and one particular type dominated by *Danthonia* sp. in exposed situations. This latter is very characteristic as the grass concerned is distinctly tufted and the tufts are disposed in a very symmetrical manner.

(b) MONTANE. These are grasslands derived from evergreen forest, are short to medium, tufted and of low ground cover. There are several varied phases according to soil, site, aspect, and time lapse since destruction of forest cover.

(i) *Loudetia simplex*—*Monocymbium cetisiiforme*, a poor type grassland, found on the shallower soils and those longest cleared of evergreen forest; short and tufted.

(ii) *Themeda triandra*—*Exothea abyssinica*, on soils more recently cleared of evergreen forest and less deteriorated forest soils; medium, vegetationally-dense covers, tufted and with low ground cover.

(iii) *Hyparrhenia cymbaria*—*Setaria longisetata*, tangled, vegetationally-dense covers, on soils very recently cleared of evergreen forest, in sheltered valleys and on margins of forest; rather limited in extent but well represented on the Vipya Range.

(iv) *Andropogon schirensis* extensive grasslands on the Vipya in particular; ground cover low, tufted and short; species coarse and harsh; *Elyonurus argenteus* a frequent constituent has fine leaves which are highly aromatic; found on the more exposed slopes and hill tops and on poorer soils.

(v) *Hyparrhenia diplandra*, medium to tall grassland with many scrub and forest relics, in broken country such as near Livingstonia, Vipya and Misuku, where slopes are fairly steep or where cultivation has degraded the soil.

(vi) *Paspalum commersonii* is found to predominate in certain areas of well distributed rainfall and intense grazing. It will form quite good, tight swards.

(vii) *Imperata cylindrica* whilst not forming a clear cut society, does occur as a major weed in certain hill areas where it is often found in pure stand.

(c) SLOPE GRASSLANDS.

These vary in density from a dense tangle of grasses and shrubs to a rather poor cover on eroding soils. Typical of this type are the genera *Melinis* and *Rhynchelytrum*, *Hyparrhenia cymbaria*, *Themeda triandra* and *Exothea abyssinica*; *Protea* spp. and *Pteridium* (Bracken) are often found in association. The Domasi Valley, the lower slopes of the Nyika and the Misuku, afford good examples of this type.

3. DECIDUOUS WOODLANDS.

The majority of Nyasaland grasslands falls into this type which can be divided further into two large main and several lesser groups.

(a) The tall reedy type is found in the *Piliostigma-Combretum-Acacia* woodlands. The grasses belong mainly to the genera *Hyparrhenia*, *Andropogon*, *Digitaria*, *Setaria*, *Panicum* and *Brachiaria*; they are generally tall, often coarse and reedy and although they may reach over three metres in height the ground cover is very low and heavy grazing is not possible for long periods.

(b) The same genera are typical of the *Brachystegia—Julbernardia-Uapaca* woodlands but the cover is often low, very sparse and thin and the grass *Themeda triandra* var. *hispida* is more frequent. *Andropogon schirensis* is also typical of this association in the mid-season phase. Classification of these two types would be difficult on the basis of botanical composition due to the ubiquity of certain genera and species but as the division is so apparent when the appearance of the grasses is taken into account it is felt to be a good division. Other sub-types appear within this group.

(c) *Oxytenanthera abyssinica*, the common native bamboo is a grass and must be included as a type of association. It is mainly found along the escarpment in a very definite zone.

(d) Escarpment woodlands often have very sparse low ground covers and several sub-types occur within this division. *Schmidtia bulbosa*, *Eustachys paspaloides*, *Eragrostis superba* types of the Shire Valley escarpment, *Hyparrhenia gracilescens*, *Euclasta condylotricha*, *Tristachya inamoena*, *Loudetia simplex*, types in *Brachystegia* woodlands of the escarpments.

(e) *Colophospermum* woodlands appear to carry a characteristic cover dominated by a *Setaria* sp.

4. PARKLANDS are meant to include communities where trees are spaced more openly than in woodlands. They are found mainly at Lake-shore and Lower River levels and include *Adansonia digitata* (Baobab), *Cordia*, *Sterculia* and *Acacia* types.

Generally the aspect is of tall reedy grasses similar to the *Piliostigma* deciduous woodlands but due to the fact of heavy populations and that cultivations have taken place in these areas the grass communities are now largely secondary.

In the Lower River one has *Urochloa mossambicensis* with *Panicum maximum* on the lighter soils and in all regenerating old cultivations and gardens. On the heavier soils a *Setaria* spp., *Ischaemum brachyatherum*, *Hyparrhenia* complex is found.

The lands with *Acacia albidia*-(Msangu) as the dominant tree are usually so heavily cultivated that a weed flora is predominant.

5. SWAMPS AND MARSHES.

This group covers many communities and a multitude of species and the following grouping is only a brief listing with no attempt at a successional study.

(a) *Perennial and seasonal swamps* dominated by *Hyparrhenia* species, are found at their best in the Central Province and are common over the rest of the Territory. They are dominated by *Hyparrhenia* species in the summer phase but have many associated genera and species, *Echinochloa pyramidalis* is generally found in them near to water channels, *Leersia hexandra* and *Paspalum commersonii* as bottom grasses in wetter places, *Eulalia geniculata*, *Capillipedium parviflorum*, *Setaria sphacelata* and *Panicum* species are frequent constituents. The covers are dense vegetatively and give a well dispersed but somewhat low ground cover. Soils tend to be heavy and black in colour.

(b) *Sandy seasonal swamps*—often at the head waters of the foregoing group, characterized by *Tristachya* species, *Loudetia simplex*, *L. superba*, *Eragrostis* species, *Brachiaria humidicola*, and *Alloteropsis semialata*. These are generally very poor, wiry grasses with low ground cover. The soils are very sandy, being the wash from the higher surrounding country.

(c) *Themeda triandra var. hispida* types in seasonal or perennial swamps are found along the S. Rukuru River along the tributary drainage systems. Covers are generally dense and well dispersed but with a somewhat low ground cover. Typical associates are *Sacciolepis scirpioides*, *Tristachya hispida*, *Digitaria diagonalis*, *Setaria angustifolia*, *Hyparrhenia nyassae*, *Rhytachne roitboellioides*. It is a merging type with the first mentioned and certain phases are dominated by *Hyparrhenia* spp.

(d) *Coelorachis afraurita* Marshes, fall into the category of long grass, dense vegetative cover types. They are very clearly zoned and characterized by the presence of *Coelorachis afraurita* in a narrow belt at the seepage zone. This type of swamp is found in the Dedza Hill District, the upper reaches of the Bua River, the Vipya and Nkata Bay where *Coelorachis* assumes a more scattered stand. Associated species include *Setaria sphacelata*, *Pennisetum glaucocladum*, *Pennisetum angolense*, *Andropogon eucomus*, *Sacciolepis* spp., and *Themeda triandra var., hispida*.

6. LAKE-SHORE, RIVER BANKS AND FLOOD PLAINS is in reality a group which could be included under the foregoing heading of Swamps and Marshes for as in the first type described the communities are often as much in one group as the other.

(a) *Hyparrhenia rufa* swamps with a retreating water table are found all round the margins of Lake Chilwa and on the Songwe Plain, at Karonga. The dominant, *Hyparrhenia rufa*, forms dense stands which give a reddish-brown appearance to the grassland. Associated species include *Sorghastrum rigidifolium*, *Cleistachne sorghoides*, *Andropogon amplexans*, *Schizachyrium* spp. *Eragrostis* spp. and *Sacciolepis* spp. Swamps, which would be included in Group 5, draining into the Lake, fall into this category. A sward characterized by *Paspalum commersonii*, *Brachiaria* sp., and *Setaria sphacelata* is the spring aspect of *Hyparrhenia rufa* swamp in the Kota Kota and Karonga areas.

(b) On heavier soils, more to the South and East of Lake Chilwa, Liwonde, the Henga Valley and Lake Kasuni are stands of *Chloris gayana* associated with *Setaria*, *Bothriochloa glabra*, *Dicanthium papillosum*, *Ischaemum brachyatherum* and *Hyparrhenia rufa*. Covers are dense vegetatively, but of low ground cover. A species associated with this community and often forming a sub-type is *Cynodon dactylon* either as a giant tetraploid species or as the ordinary type.

Oryza barthii (wild rice) is found around the margins of Lake Chiuta in pure stand in water waist deep in May. This type is also encountered in the Fort Manning District and S. Rukuru, in large open swamps tributary to rivers.

(d) *Vossia cuspidata* and *Echinochloa pyramidalis* are more typical of the zone nearest the Lake margin at low water mark. The grasses tend to form a tangled mass and have succulent stems adapted to floating.

(e) *Phragmites mauritianus* is widespread in belts along the Lake margins and river banks of the whole Territory, in and on the edges of the water.

(f) *Themeda triandra var. hispida* is found as the dominant grass of a semi-seasonal swamp community with scattered *Terminalia sericea* in N. Kota Kota District. It is probably a drier phase of the *Hyparrhenia rufa* swamps of paragraph (a).

7. LAKE-SHORE SAND COMMUNITIES.

Along the littoral of the Lake-shore and to a small extent inland one finds specialized sand communities. These are mainly tufted grasses very tightly anchored to the soil, and having harsh, narrow leaves.

<i>Eragrostis lappula</i>	..	Pure stands on Lake-shore sands, N. Kota Kota.
<i>Loudetia flavida</i>	..	Pure stands on very sandy soils near Lake-shore N. Kota Kota.
<i>Diplachne fusca</i>	..	On pure sand bordering lagoon, N. Kota Kota.
<i>Hemarthria natans</i>	..	On pure sand bordering lagoon, N. Kota Kota.

8. WEEDS are generally annuals and are often of great indicator value as signifying erosion, overgrazing, soil in good heart or worn out land. *Eragrostis* species and *Sporobolus* species can generally be taken to indicate erosion or worn out land. *Sporobolus pyramidalis* is the invader of over-grazed *Hyparrhenia* swamps.

SEASONAL CHANGES IN ASPECT OF GRASSLAND. A most important aspect of grassland in Nyasaland is the apparent change in dominance of species with the advance of the season. For instance, there is a marked spring, mid-season and full summer phase in the Deciduous Woodlands, due to the fact that the grasses making up the sward have different flowering periods. The first to flower are *Setaria sphacelata* and *Digitaria setivalva* followed in the mid-season by *Panicum maximum* and *Setaria longisetata* and the summer phase is characterized by the very typical reedy *Hyparrhenia* spp. This succession is for the *Piliostigma* type woodland. The *Julbernardia* type has *Andropogon schirensis* as a very typical mid-season flowering grass with *Bewsia biflora* often conspicuous in the *Hyparrhenia* summer phase.

Swamps and Montane grasslands also show this seasonal change.

Arrangement and Layout of the List

The genera are given in alphabetical order and the species are also arranged similarly within the genus; no account has been taken of relationships and similarities in compiling the list.

Vernacular names are given at the end of the check list, and all the names collected by the authors are classified with their particular vernacular. An attempt has also been made to include all those names given in publications and manuscript lists by other authors, but these names cannot in all cases be ascribed to a particular language. Grasses are often not well known by name, especially by the younger generation, and similar looking grasses may be given the same name. A case in point is the name Kamponyongo in Tumbuka for *Chloris gayana* and *Digitaria* sp.

Brief descriptive notes are given for each species as an aid to identification when the species has been located with the aid of a key or from the vernacular name.

HABITAT notes are given for each species.

LOCALITIES are given for every specimen collected by the authors and other collectors.

COLLECTORS. The following collectors are quoted:—Specimens with N/ proceeding the number were collected by P. O. Wiehe, the Plant Pathologist from 1949 to 1952; E.L. indicates that the specimens were collected by E. Lawrence of the Department of Agriculture and Acting Director in 1950; F.B.L., is for F. B. Leech of Veterinary Department, S.G.W., is for S. G. Wilson also of the Veterinary Department; specimens with no prefix were collected by G. Jackson, Ecologist, from 1950 to 1954.

Acknowledgements

This check list would not have been possible without the help of Mr. C. E. Hubbard of the Royal Botanic Gardens, Kew, and to him is owed the authoritative identification of all the specimens with the prefix N and with no prefix. Because of his help and encouragement at all times we affix his name as co-author to this list.

Thanks are also due to various officers of the Department who at times and places have assisted in collecting specimens and acted as guides and hosts on various expeditions.

G. JACKSON
Ecologist.

Abbreviations used in the Text

Coll.	..	Collected by			
Comm.	..	Information communicated by			
F.T.A.	..	Flora of Tropical Africa			
F.W.T.A.	..	Flora of West Tropical Africa			
Kew Bull.	..	Kew Bulletin			
F.B.L.	..	F. B. Leech	S.G.W.	..	S. G. Wilson
E. L.	..	E. Lawrence			
C.	..	Chichewa	Ng. or A.	..	Chingoni
T.	..	Chitumbuka	To.	..	Chitonga
Se.	..	Chisena	K.	..	Kiankhonde
N	..	Chinyanja	Y.	..	Chiyao
l	..	Seen at			
m	..	centimetre	m.	..	metre

PART II

A Key to the Genera of Nyasaland Grasses

1.—(a)	Spikelets 1- to many-flowered; falling when ripe and leaving two empty glumes; if falling entire then never 2-flowered (spikelets often laterally compressed) .. .. .	..	..	2
	(b) Spikelets 2-flowered; falling entire when ripe and leaving no glumes; may appear 1-flowered as the lower floret is often barren and greatly reduced; (spikelets often dorsally compressed) .. .. .	..	..	55
2.—(a)	Spikelets bisexual, all similar .. .. .	..	..	3
	(b) Spikelets unisexual, usually dissimilar, mixed or in separate parts of the inflorescence .. .. .	..	..	6
3.—(a)	Perennial shrubs with woody, often tall, persistent stems; leaf blades with a false leaf stalk between leaf blade and leaf sheath .. .. .	..	..	4
	(b) Perennial or annual herbs .. .. .	..	..	7
TRIBE BAMBUSEÆ				
4.—(a)	Stamens 6 .. .. .	..	..	5
	(b) Stamens 3 .. .. .	..	..	Arundinaria alpina
5.—(a)	Spikelets in dense clusters on the branches of a large panicle, 2-flowered; anther filaments free .. .. .	..	..	Oreobambos
	(b) Spikelets in dense terminal or axillary globose clusters along the branches of the inflorescence, 1-to 3-flowered; anther filaments united .. .. .	..	..	Oxytenanthera abyssinica
6.	Leaf blades with parallel nerves, lemma of female spikelet hardened, smooth, white and shiny .. .. .	..	..	OLYREÆ
TRIBE OLYREÆ				
	Single Member .. .. .	..	..	Olyra latifolia
7.—(a)	Spikelets borne in open, contracted or spike-like panicles; or if in one sided racemes or spikes then with 2 or more fertile florets but if only 1 fertile floret then the leaf blades transversely veined .. .. .	..	..	8
	(b) Spikelets sessile or sub-sessile on opposite sides of the rachis of solitary spikes; or in one sided solitary, digitate, or scattered spikes or spike-like racemes; spikelets with 1 fertile floret .. .. .	..	..	35
8.—(a)	Spikelets with 2 or more fertile florets; or if with 1 fertile floret then with barren florets above it. .. .. .	..	..	9
	(b) Spikelets with 1 fertile floret; or 1 fertile floret and barren or male florets below it .. .. .	..	..	42
9.—(a)	Lemmas and rhachilla joints glabrous or shortly hairy, in any case the hairs do not envelop the lemmas .. .. .	..	..	11
	(b) Lemmas and rhachilla joints with long silky hairs .. .. .	..	..	ARUNDINEÆ, 10

TRIBE ARUNDINEÆ

10. Spikelets with 3 to 10 florets, rachilla hairy, hairs encircling the lemmas **Phragmites mauritianus**

11.—(a) Glumes usually shorter than the lowest floret and with the upper florets distinctly exerted out above the glumes; lemmas awnless or awned from an entire, bifid or lobed lemma; awns straight or curved 12

(b) Glumes usually longer than the lowest florets of the whole spikelet; lemmas awnless, dorsally awned, or awned from the sinus of a bifid lemma; awns usually kneed on drying; glumes often with thin margins 20

12.—(a) Lemmas 5- to many-nerved, rarely 3 13

(b) Lemmas 1- to 3-nerved **ERAGROSTEÆ**, 26

13.—(a) Lemmas entire or shortly bifid (two-toothed) at the apex, awned or awnless 14

(b) Lemmas deeply 3- to 9-lobed or -awned, with fine awns in sinus of lobes **PAPPOPHOREÆ**

TRIBE PAPPOPHOREÆ

Lemma divided into four thin lobes, alternating with five straight awns; 3 to 5 fertile florets; spikelet appears woolly **Schmidtia bulbosa**

14.—(a) Leaves without transverse veins 16

(b) Leaves often broad with numerous transverse veins between the parallel nerves 15

TRIBE MELICEÆ

15.—(a) Lemmas bearing a long awn from near the tip; leaf blades linear lanceolate; awns of several spikelets twisting together into a fine white thread **Streblochaete longiarista**

TRIBE CENTOTHECEÆ

(b) Lemmas awnless; leaf blades undulate, broad **Megastachya mucronata**

16.—(a) Styles terminal or subterminal on a glabrous or hairy ovary top **FESTUCEÆ**, 17

(b) Styles lateral at the base of a hairy heart shaped appendage to the ovary **BROMEÆ**, 19

TRIBE FESTUCEÆ

17.—(a) Lemmas rounded on the back, especially in the lower part, often mucronate or awned 18

(b) Lemmas keeled, acute or obtuse, often with clear margins and a tuft of curled hairs at base **Poa**

18.—(a) Florets 2 to many, lemmas 5- to 7-nerved **Festuca**

(b) Florets 1 to 2; lemmas 3- to 5-nerved **Pseudobromus**

TRIBE BROMEÆ

19.—(a) Spikelets in open panicles **Bromus**

(b) Spikelets in a raceme **Brachypodium flexum**

20.—(a)	Lemmas awnless or dorsally awned .. .. .	..	AVENEÆ,	21
	(b) Lemmas awned from the sinus of a more or less 2-lobed tip .. .. .	..	DANTHONEÆ,	24
TRIBE AVENEÆ				
21.—(a)	Spikelets in loose panicles, lemmas dorsally awned, the awn usually geniculate when dry .. .. .	..	..	22
	(b) Spikelets in very dense spikelike panicles; lemmas thin, awnless (or minutely awned from close to the tip)	..	Koeleria cristata vars.	
22.—(a)	Spikelets erect or spreading .. .. .	..	..	23
	(b) Spikelets pendulous, annual .. .. .	..	Avena	
23.—(a)	Annual; spikelets 2-flowered, 2.5-3.5 mm. long ..	..	Aira caryophyllea	
	(b) Perennial; spikelets 2- to 6-flowered, 8-16 mm. long ..	..	Helictotrichon	
TRIBE DANTHONEÆ				
24.—(a)	Florets 3 to 4; lemmas with about 3 tufts of hairs near each margin, otherwise glabrous .. .. .	..	Danthonia davyi	
	(b) Florets 2; lemmas loosely hairy all over with short spreading hairs .. .. .	..	Pentaschistis natalensis	
25.	Keying out at this point would be Neyraudia arundinacea which belongs near the TRIBE DANTHONEÆ and is related to Triraphis . It is a tall reedy grass, with small spikelets which have up to 8 florets.			
TRIBE ERAGROSTEÆ				
26.—(a)	Lemmas usually entire at the apex, acute or obtuse, awnless; if awned, mucronate or 2 toothed at the tip then hairless near the margins and along the nerves ..	..	..	27
	(b) Lemmas usually 2 toothed, emarginate or 2 lobed at the apex, often hairy along the lower part along the nerves .. .. .	..	..	31
27.—(a)	Spikelets in open, contracted or spikelike panicles; lemmas awnless .. .. .	..	Eragrostis	
	(b) Spikelets sessile or sub-sessile in 1-sided spikes or spike-like racemes .. .. .	..	..	28
28.—(a)	Axis of spikes terminating in sharp points; upper glume and lemmas mucronate; spikes digitate like a crow's foot .. .. .	..	Dactyloctenium	
	(b) Axis and branches of inflorescence ending in spikelets ..	..	..	29
29.—(a)	Glumes awned; florets not exceeding the glumes; racemes borne in a narrow inflorescence; finally deciduous ..	..	Dinebra retroflexa	
	(b) Glumes awnless florets exceeding the glumes ..	..	..	30
30.—(a)	Internodes of the rhachilla ciliate at the tips, spikelets in numerous racemes arranged in whorls in an elongated, narrow Christmas-tree like inflorescence .. .. .	..	Pogonarthria squarrosa	
	(b) Internodes of rhachilla hairless at tips; spikes digitate or in pseudowhorls .. .. .	..	..
31.—(a)	Spikelets borne in solitary, terminal, 1-sided spikes ..	..	Eleusine Tripogon	

	(b) Spikelets in panicles or in clustered or scattered spikes or spikelike racemes .. .. .	.. .. .	32
32.—(a)	Racemes very numerous, borne in a dense, silky hairy, spike-like inflorescence; lemmas awned; leaf blades lanceolate to lanceolate-oblong	Leptocarydion vulpiastrum	
	(b) Racemes not borne in a dense inflorescence .. .. .	.. .. .	33
33.—(a)	Spikelets small, rarely over 1 mm., borne in densely spiculate racemes .. .. .	.. .. .	Leptochloa
	(b) Spikelets large; 6-10 mms. long, racemes loosely spiculate .. .. .	.. .. .	34
34.—(a)	Spikelets 2- to 3-flowered; oblong, reddish- or purplish- green, often glaucous, lemmas shortly awned .. .. .	.. .. .	Bewsia biflora
	(b) Spikelets 5- to 10-flowered; linear-oblong, greyish- or olive- green; lemmas mucronate .. .. .	.. .. .	Diplachne fusca
35.—(a)	Spikelets sessile on opposite sides of the rachis; lemmas 5- to 9-nerved .. .. .	.. .. .	HORDEÆ, 36
	(b) Spikelets arranged on one side of the rachis; lemmas 1- to 3-nerved .. .. .	.. .. .	CHLORIDÆ, 37

TRIBE HORDEÆ

36.—(a)	Spikelets solitary; several florets, glumes bulging .. .. .	.. .. .	Triticum
	(b) Spikelets in groups of threes; 1 floret .. .. .	.. .. .	Hordeum

TRIBE CHLORIDÆ

37.—(a)	Spikelets with 1 perfect floret, with 1 or more barren or male spikelets above it .. .. .	.. .. .	38
	(b) Spikelets with 1 perfect floret and no barren or male florets above .. .. .	.. .. .	41
38.—(a)	Spikes digitate, in whorls or paired .. .. .	.. .. .	39
	(b) Spikes single .. .. .	.. .. .	40
39.—(a)	Upper and lower glumes lanceolate, spikelets generally awned .. .. .	.. .. .	Chloris
	(b) Upper glume, broad, emarginate with a short mucro from sinus of a 2-lobed tip; spikelets extremely shortly awned .. .. .	.. .. .	Eustachys paspaloides
40.—(a)	Lemmas awned; raceme 15-20 cms. long	Enteropogon macrostachyus	
	(b) Lemmas awnless; raceme 4-6 cms. long, glumes longer than the spikelet .. .. .	.. .. .	Rendlia altera
41.—(a)	Spikes solitary; glumes longer than the lemmas, lower glume boat-shaped, upper flat on the back; racemes fine; habit tufted .. .. .	.. .. .	Microchloa
	(b) Spikes digitate in 1 or more whorls; glumes shorter than the lemmas; compressed and keeled; habit creep- ing .. .. .	.. .. .	Cynodon
42.—(a)	Glumes minute or completely suppressed; stamens often 6; spikelets usually laterally compressed .. .. .	.. .. .	ORYZÆ, 43
	(b) Glumes, or at least upper, well-developed; stamens 3 or less; spikelets usually not flattened .. .. .	.. .. .	44

TRIBE ORYZEÆ

- 43.—(a) Spikelets with 2 reduced sterile lemmas at base of fertile floret; fertile lemma awned in wild and some cultivated rice, lemma and palea hardened; stamens 6 *Oryza*
 (b) Spikelets without sterile lemmas; lemma usually awnless; stamens 6; stems fine and creeping, scabrid *Leersia hexandra*

- 44.—(a) Spikelets with 3 florets, lower 2 barren, upper fertile 45
 (b) Spikelets with 1 or 2 Florets 46

TRIBE PHALARIDEÆ

- 45.—(a) Fertile floret with 2 anthers, barren florets awned or mucronate *Anthoxanthum sp.*

TRIBE EHRHARTEÆ

- (b) Fertile floret with 6 anthers, barren florets awnless *Ehrharta abyssinica*

- 46.—(a) Spikelets with 2 florets, the lower male, upper fertile **ARUNDINELLEÆ**, 47
 (b) Spikelets with 1 floret 51

TRIBE ARUNDINELLEÆ

- 47.—(a) Lemma of upper floret scaberulous, obscurely bifid at tip, awned; spikelets purple-brown *Arundinella nepalensis*
 (b) Lemma of upper floret usually hairy with the hairs arranged in tufts, often very regularly, rarely hairless and then quite smooth, usually bifid at apex and always awned 48

- 48.—(a) Palea of upper floret hardened and thickened between the keels, lower glume long-awned; lemma of the fertile floret with 2 tufts of hair beneath the lobes; panicles spikelike *Gilgichloa indurata*
 (b) Palea of upper floret membranous; lower glume usually awnless 49

- 49.—(a) Spikelets in groups of 3, sessile or subsessile at the ends of the branches of the inflorescence, rarely in sessile groups of 3 in a spike *Tristachya*
 (b) Spikelets in pairs, rarely solitary or in threes, if in threes then the spikelets pedicelled 50

- 50.—(a) Lemma of the upper floret with a tuft of hairs below each lobe, the lobes tapering into fine bristles *Trichopteryx*
 (b) Lemma of the upper floret evenly hairy or glabrous, the lobes acute or obtuse *Loudetia*

- 51.—(a) Spikelets usually breaking up when ripe, the rachilla breaking off above the persistent glumes, if the spikelet falls entire then the lemmas 5-nerved 53
 (b) Spikelets falling entire when ripe, either singly or in clusters, inflorescence a spike-like panicle or raceme; lemmas delicate, 1- to 3-nerved **ZOISEÆ**, 52

TRIBE ZOISEÆ

- 52.—(a) Glumes awnless, the upper with tubercle based curved spines, spikelets in clusters *Tragus berteronianus*
 (b) Glumes long and fine awned, smooth; spikelets solitary *Perotis*

- 53.—(a) Lemmas hyaline, membranous, rarely hardened if so not terete, awnless or awned from the back or bifid tip 54
 (b) Lemmas hardened ARISTIDEÆ
- TRIBE ARISTIDEÆ**
- Lemma trifid at tip (usually divided into 3 awns, rarely with 1 simple awn) Aristida
- 54.—(a) Lemmas 3- to 5-nerved, frequently awned; glumes mostly longer than the lemma, or if lemma exceeds glumes then usually firmer; grain with adhering pericarp AGROSTEÆ
- TRIBE AGROSTEÆ**
- Spikelets in loose or contracted panicles lemma awned or awnless Agrostis
- (b) Lemmas 1- to 3-nerved, awnless; glumes and lemmas hyaline membranous, lower glume often shorter than the upper, grain usually with a free pericarp SPOROBOLEÆ
- TRIBE SPOROBOLEÆ**
- Spikelets in open or contracted panicles Sporobolus
- 55.—(a) Spikelets bisexual, or with male and female flowers mixed in the same inflorescence 57
- (b) Spikelets unisexual, male and female in separate inflorescences or in different parts of the same inflorescence, differing in appearance; lemmas hyaline or membranous and thinner than the glumes MAYDEÆ, 56
- (c) Spikelets of terminal inflorescence unisexual, arranged upon a broad leaf like axis; spikelets of axillary inflorescences female PHYLLORACHEÆ
- TRIBE PHYLLORACHEÆ**
- Single member; leaf blades saggitate Phyllorachis saggitata
- TRIBE MAYDEÆ**
- 56.—(a) Male spikelets in a short solitary raceme protruding from a bead-like sheath containing one female spikelet; sheath shining, white and flinty Coix lachryma-jobi
- (b) Male spikelets arranged in a large terminal panicle, female spikelets in axillary cobs, sheathed in leaf-like sheaths Zea mays
- 57.—(a) Spikelets solitary or paired, more or less all similar; glumes membranous, the lower generally small or suppressed; lower lemma resembles the upper glume in texture; upper lemma papery to rigid and tough, usually awnless 58
- (b) Spikelets often paired, with 1 sessile and 1 pedicelled spikelet in the pair, similar or dissimilar, rarely solitary and alike; glumes as long as and enclosing the spikelet, more or less rigid and firm; lemmas hyaline or membranous, upper lemma often awned ANDROPOGONEÆ, 83
- 58.—(a) Upper floret fertile; lower lemma usually resembling upper glume in texture; spikelet disarticulating below the glumes PANICEÆ, 60
- (b) Both florets fertile or if lower male then the lemma hardened and resembling the lemma of the upper fertile floret; spikelet disarticulating above the glumes, thus when the

glumes are finally shed the scars can be seen on the remaining internode of the rhachilla

.. **ISACHNEÆ**, 59

TRIBE ISACHNEÆ

- 59.—(a) Upper lemma hardened, glumes finally deciduous ..
 (b) Upper lemma remaining membranous, glumes persistent

Isachne angolensis
Coelachne africana

TRIBE PANICEÆ

- 60.—(a) Spikelets falling in clusters, with or without an involucre of bristles, or if falling singly then surrounded by or subtended by one or several bristles and falling with them; inflorescences spike-like
 (b) Spikelets falling singly and entire, if spikelets are subtended by bristles then the bristles persist after the spikelet has fallen

.. .. 61

.. .. 64

- 61.—(a) Spikelets in clusters, not surrounded by bristles but the indurated lower glumes give an appearance of an involucre
 (b) Spikelets surrounded or subtended by one to many bristles, lower glume membranous

.. **Anthephora**

.. .. 62

- 92.—(a) Bristles solitary beneath each spikelet, glabrous; spikelets dorsally compressed, solitary; glumes minute; lower floret barren and reduced to the lemma
 (b) Bristles few to many, forming an involucre around the solitary or clustered spikelets; hairy or glabrous

Beckeropsis uniseta

.. .. 63

- 63.—(a) Bristles free to the base, fine to very fine
 (b) Bristles united at the base, somewhat rigid and stiff, often wavy

.. **Pennisetum**

.. **Cenchrus**

- 64.—(c) Upper glume and lower lemma usually 2-lobed or emarginate at their tips, usually mucronate or awned from the sinus; upper floret readily shed from the rest of the spikelet, its awnless lemma and palea very shiny
 (b) Upper glume and lower lemma usually entire at their tips, awnless mucronate or awned from the tip; upper floret usually not shed easily from the rest of the spikelet

.. .. 65

.. .. 67

- 65.—(a) Upper glume more or less bulging at the base on the back, laterally compressed usually with a distinct internode between it and the minute lower glume; upper glume and lower lemma similar in size; spikelets often silky hairy
 (b) Upper glume more or less straight or evenly curved on the back without a distinct internode between it and the lower glume; spikelets glabrous or hairy

.. **Rhynchelytrum**

.. .. 66

- 66 (a) Upper glume narrower than the lower lemma, 5-nerved; lower floret with a well-developed palea; lemma and palea of the upper floret thinly crustaceous
 (b) Upper glume wider than the lower lemma, mostly 7-nerved; lower floret usually lacks a palea; lemma and and palea of upper floret membranous to thinly chartaceous

Tricholaena monachne

.. .. **Melinis**

67.—(a)	Spikelets arranged in more or less open panicles, or if the panicles are spike-like or dense then symmetrical and not 1-sided .. .. .	.. ..	68
(b)	Spikelets arranged in 1-sided spikes or in a series of spike-like racemes; spikes or racemes digitate, scattered or clustered along a long or short common axis, rarely solitary .. .. .	.. ..	70
68.—(a)	Spikelets subtended by one or more bristles, from near the tips of their pedicels, borne in spike-like or open panicles; spikelets asymmetrical in profile being flattened or depressed in front and rounded on the back .. ..	.. ..	Setaria
(b)	Spikelets not subtended by bristles .. .. .	.. ..	69
69.—(a)	Spikelets arranged in open or contracted panicles; spikelets usually symmetrical in profile; upper glume and lower lemma usually similar, evenly curved or straight on the back .. .. .	.. ..	Panicum
(b)	Spikelets arranged in spike-like panicles, rarely more open; spikelets asymmetrical in profile upper glume bulging at the base .. .. .	.. ..	Sacciolesis
	Some species of the genera Brachiaria and Alloteropsis are likely to key out under 69 (a) and not under 70		
	Brachiaria with open panicles are distinguished from Panicum by the fact that the majority of spikelets are paired and that the lower glume is adjacent to the axis on which the shortly pedicelled spikelet is borne.		
	Alloteropsis has finely-awned upper lemmas.		
70.—(a)	Lemma of upper floret becoming chartaceous or thinly cartilagenous, with flat thin margins covering much of the palea, always awnless; lower floret barren with a minute palea; lower glume usually very small or absent .. ..	.. ..	71
(b)	Lemma of upper floret becoming tough or rigid usually with narrow inrolled margins exposing much of the palea .. ..	.. ..	72
71.—(a)	Lower lemma awnless; lower glume minute, rarely absent, upper glume usually well developed .. ..	.. ..	Digitaria
(b)	Lower lemma with a long fine awn from the tip; lower glume absent; upper glume reduced to a minute scale .. ..	.. ..	Chloridion cameronii
72.—(a)	Lower glume or both glumes awned, keeled upwards; spikelets slightly laterally compressed; leaf blades short broad; culms creeping and ascending .. ..	.. ..	Oplismenus
(b)	Lower glume when present usually awnless or if mucronate or awned then with linear leaf blades and culms not creeping .. .. .	.. ..	73
73.—(a)	Spikelets laterally compressed .. .. .	.. ..	74
(b)	Spikelets dorsally compressed or subterete, the glumes and lemmas rounded on the back or only laterally compressed and keeled at their tips .. .. .	.. ..	75
74.—(a)	Spikelets lanceolate to oblong; upper glume lanceolate; 5-nerved; glumes and lower lemma keeled upwards; hairy with tubercle based hairs .. ..	.. ..	Chloachne oplismenoides

- (b) Spikelets obliquely ovate; upper glume boat-shaped, bulging at the base, with rows of glands or hooked hairs between the 7 nerves **Pseudechinolaena polystachya**
- 75.—(a) Lower glume and lowest internode of the rachilla forming a minute bead-like callus at the base of the spikelet; upper lemma mucronate or shortly awned. **Eriochloa**
- (b) Lower glume and lowest internode not forming a bead-like callus at the base of the spikelet 76
- 76.—(a) Lower glume usually suppressed, rarely developed in some spikelets, lower floret barren and reduced to the lemma, upper lemma obtuse; glume and lower lemma awnless; axes of racemes ending in a spikelet 77
- (b) Lower glume usually well developed but sometimes small, lower floret male or barren usually with a palea 78
- 77.—(a) Spikelets usually orbicular, plano-convex, with flat-sided lower lemma away from axis; lower glume absent **Paspalum**
- (b) Spikelets lanceolate-oblong, acute; rounded upper glume away from axis; lower glume small but present; lemma and palea of fertile floret silky hairy **Entolasia imbricata**
- 78.—(a) Upper glume and lower lemma mucronate or awned usually scabrid or hispidulous especially on the nerves, upper lemma obtuse or apiculate **Echinochloa**
- (b) Upper glume obtuse or acute, smooth or hairy or if with the upper glume mucronate then the upper lemma mucronate or awned 79
- 79.—(a) Axis of racemes terminating in a bristle or short point, upper lemma acute not mucronate **Paspalidium geminatum**
- (b) Axis of racemes terminating in a spikelet 80
- 80.—(a) Lower glume adjacent to the axis on which the spikelet is borne; upper glume outermost 81
- (b) Lower glume outermost; upper glume adjacent to the axis on which the spikelet is borne 82
- 81.—(a) Glumes and lemmas laterally compressed and flattened at tips **Acroceras macrum**
- (b) Glumes and lemmas not laterally compressed at their tips; upper lemma often obtuse, rarely mucronate **Bracharia**
- Bracharia** species with panicles may key out under **Panicum** q.v. 69.
- 82.—(a) Upper glume densely hairy near the marginal nerves, the hairs appressed or spreading; upper lemma acuminate, mucronate or crustaceous **Alloteropsis**
- (b) Upper glume not fringed with hairs, upper lemma very obtuse, mucronate, crustaceous **Urochloa**

TRIBE ANDROPOGONÆ

- 83.—(a) Internodes of the raceme axis more or less stout, 3-angled or rounded, thickened upwards, pedicels also thickened or axis more or less widened and flattened, the pedicels

and adjacent internodes often hollowed out on the inside, free or fused together to form a cavity, into which the sessile spikelet fits; fertile lemma awnless or if awned then the sessile spikelet 2-flowered	84
(b) Internodes of the raceme axis and the pedicels slender, filiform or linear, rarely thickened upwards and then with either the lemma of the sessile spikelets awned or with male or barren pedicelled spikelets or with lower floret reduced to the lemma	97
84.—(a) Lemma of fertile floret awned, internodes and pedicels free	85
(b) Lemma of fertile floret awnless	88
85.—(a) Pedicelled spikelets not developed, only the curved narrow pedicel present; lower glume prominently ridged; racemes clustered	Thelepogon elegans
(b) Pedicelled spikelets well developed	86
86.—(a) Racemes usually paired or digitate; upper glume of the sessile spikelet and the lower glume of the pedicelled spikelet more or less wingless on keel	Ischæmum
(b) Racemes usually solitary	87
87.—(a) Upper glume of sessile spikelet and lower glume of pedicelled spikelet with a broad curved wing on the keel	Andropterum stolzii
(b) Glumes of sessile and pedicelled spikelets not or very narrowly winged; upper glume of sessile spikelet awned	Sehima ischæmoides
88.—(a) Lower glume produced into a long flattened tail; spikelets glabrous similar; racemes digitate, paired or solitary	Vossia cuspidata
(b) Lower glume not produced into a long flattened tail	89
89.—(a) Lower glume of pedicelled spikelet long-awned; spikelet pairs dissimilar, racemes solitary, paired or several on a common axis	Urelytrum
(b) Lower glume of all spikelets awnless or rarely with a short awn	90
90.—(a) Racemes few to many, borne on a common axis; pedicels and raceme axis internodes not fused but very swollen	Thysia
(b) Racemes always solitary at the ends of the culms or its branches, frequently supported by spathes	91
91.—(a) Pedicels and internodes of raceme axis free	92
(b) Pedicels and internodes of raceme axis fused forming a cavity for reception of the sessile spikelet	94
92.—(a) Racemes usually more or less short silky hairy, lower glume usually 2-toothed at the apex	Elyonurus
(b) Racemes glabrous	93
93.—(a) Racemes terminating the culms and their branches and supported by spathes, sessile spikelets 1-flowered	Coelorachis afraurita
(b) Racemes terminal and solitary, not supported by spathes; sessile spikelets 2-flowered	Rhytachne rotthoellioides

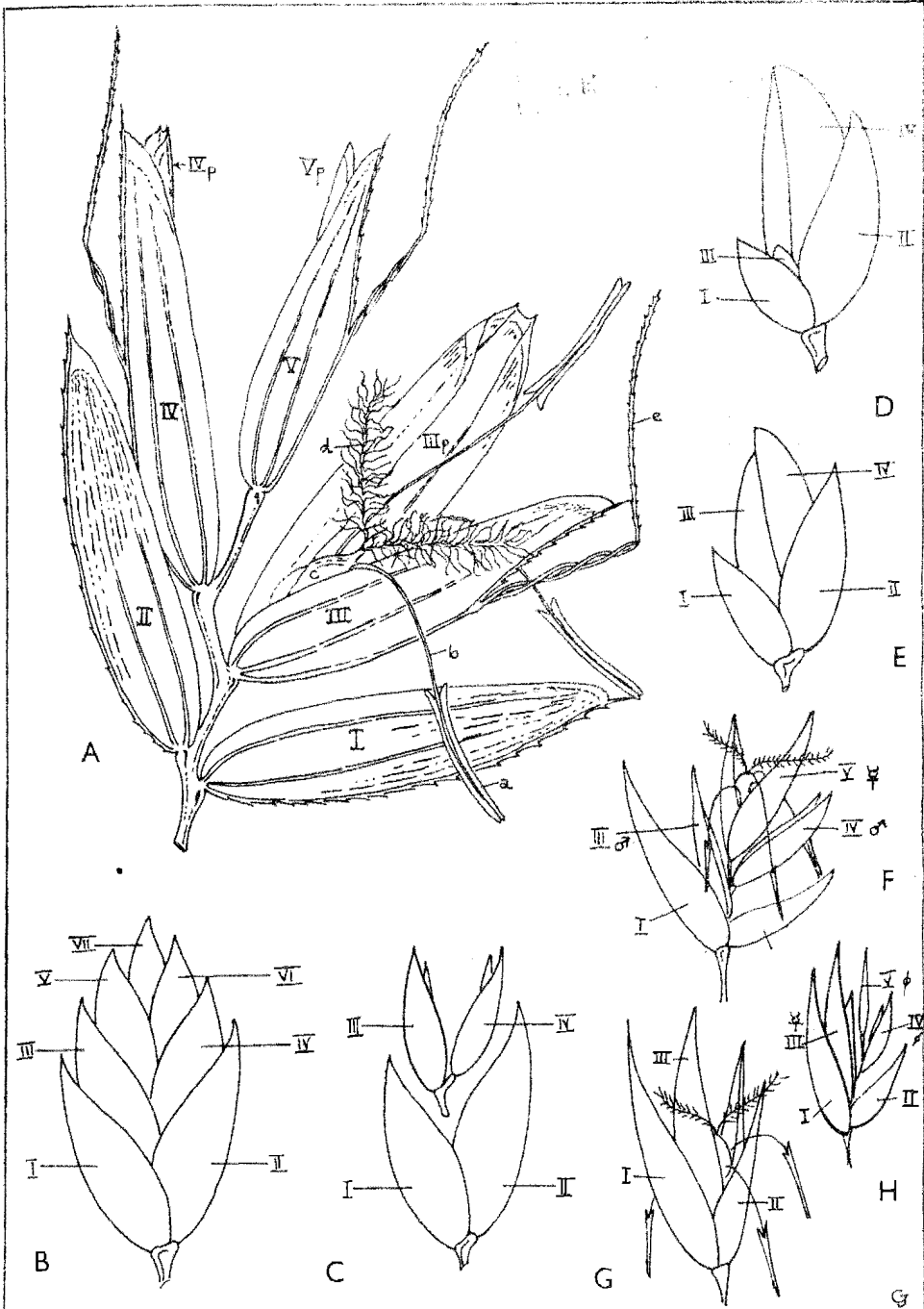
94.—(a)	Spikelets all alike or at least very similar, racemes compressed tough or slowly breaking up; lower glume smooth .. .. .	..	..	Hemarthria	
	(b) Spikelets of each pair more or less dissimilar, racemes fragile .. .. .	..	..	..	95
95.—(a)	Sessile spikelets with a smooth lower glume; racemes cylindrical; sessile spikelet 2-flowered .. ..	..	..	Rottboellia exaltata	
	(b) Sessile spikelet with a sculptured lower glume (pitted, tubercled or ridged); sessile spikelets 1-flowered .. ..	..	..	..	96
96.—(a)	Sessile spikelets globose; lower glume tubercled and ridged, not winged .. .. .	..	..	Hackelochloa granularis	
	(b) Sessile spikelet not globose; lower glume transversely and dorsally ridged to give brick wall sculpturing, winged from the keel .. .. .	..	..	Heteropholis sulcata*	
97.—(a)	Spikelets of each pair similar in shape and usually in sex or if different in sex then the pedicelled spikelet female, usually enveloped by long silky hairs from the base ..	..	..	..	98
	(b) Spikelets of each pair dissimilar in sex and usually in shape and size; pedicelled spikelets male or barren if all similar then the sessile spikelets are solitary or with only the pedicels of the pedicelled spikelets persisting; rarely both spikelets are pedicelled, the shorter pedicelled are male or barren, the longer fertile .. .. .	..	..	..	103
98.—(a)	Racemes arranged in more or less branched panicles .. ..	..	..	..	100
	(b) Racemes digitate or clustered, rarely solitary; axis of racemes fragile, spikelets awned; leaf blades linear .. ..	..	..	..	99
99.—(a)	Spikelets dorsally compressed; callus short .. ..	..	..	Eulalia	
	(b) Spikelets sub-terete, callus long, pungent .. ..	..	..	Homozeugos cylesii	
100.—(a)	Spikelets all pedicelled; axis of racemes continuous and tough or slowly breaking up .. .. .	..	..	..	101
	(b) Spikelets paired with 1 sessile and 1 pedicelled spikelet; awnless; axis of racemes fragile .. .. .	..	..	..	102
101.—(a)	Spikelets awnless; glumes membranous, panicle spike-like, silvery-white .. .. .	..	..	Imperata cylindrica	
	(b) Spikelets awned; glumes chartaceous or coriaceous; panicles large, broad, purplish or brownish .. ..	..	..	Miscanthidium	
102.—(a)	Panicle narrow; spikelets yellowish to reddish, silky-hairy; glumes coriaceous or chartaceous; pedicelled spikelets female .. .. .	..	..	Eriochrysis pallida	
	(b) Panicle usually large and plume like; spikelets silvery or purplish silky-hairy; if glumes are other than membranous then only at the base; pedicelled spikelets fertile .. ..	..	..	Saccharum	
103.—(a)	Racemes arranged in usually large divided panicles, racemes not supported by leaf-like spathes .. .. .	..	..	..	104

***Manisuris** = **Heteropholis**—see body of the list.

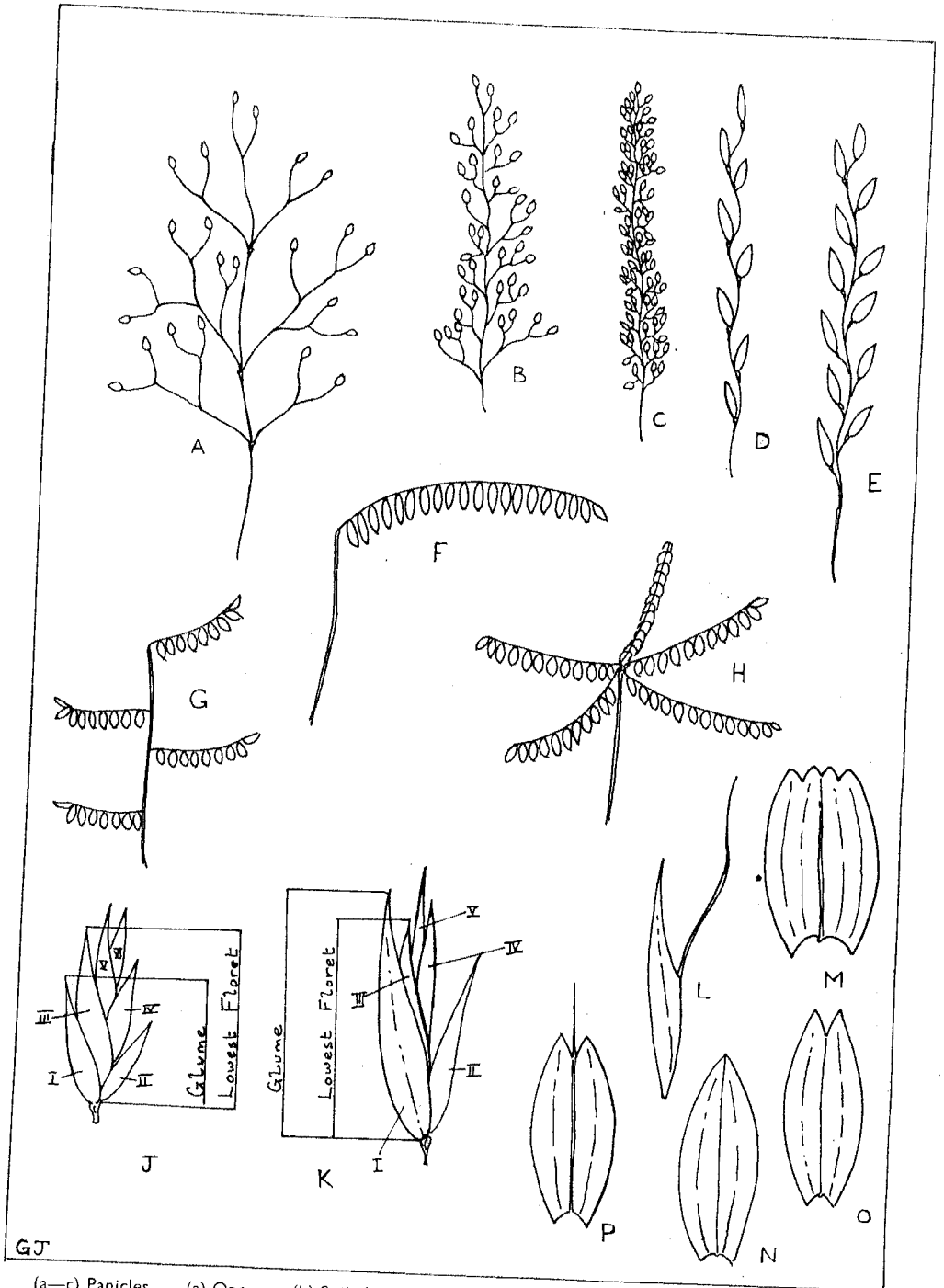
(b) Racemes frequently supported by spathes; if not then usually, arranged more or less digitately or solitary, not in large panicles .. .. .	.. .. .	.. .. .
104.—(a) Pedicels (when present) without a median translucent line; upper lemma bifid or 2-toothed .. .. .	.. .. .	105
(b) Pedicels longitudinally grooved and translucent in the groove; panicle loose; spikelets small, generally in triads of 1-sessile and 2-pedicelled spikelets .. .. .	.. .. .	Capillipedium parviflorum
105.—(a) Sessile spikelets slightly laterally compressed; lower glume rounded on the back, axis of racemes fragile, racemes composed of several to many spikelet pairs .. .. .	.. .. .	Vetiveria
(b) Sessile spikelets dorsally compressed; lower glume flattened or slightly rounded on the back .. .. .	.. .. .	106
106.—(a) Pedicelled spikelets developed .. .. .	.. .. .	Sorghum
(b) Pedicelled spikelets absent or represented by pedicels only .. .. .	.. .. .	107
107.—(a) Pedicels present; racemes fragile .. .. .	.. .. .	Sorghastrum
(b) Pedicels absent; axis of racemes tough .. .. .	.. .. .	Cleistachne sorghoides
108.—(a) Fertile lemma awned from low down on the back; low creeping or rambling grasses, with lanceolate to ovate leaves; racemes more or less digitately arranged .. .. .	.. .. .	Arthraxon
(b) Fertile lemma awned from the tip or from the sinus of a 2-toothed tip .. .. .	.. .. .	109
109.—(a) Awn glabrous in the lower part; margins of the lower glume of the sessile spikelet inflexed and the glume sharply 2-keeled, or if the glume has rounded keels then the back of the glume depressed between the keels, callus short and obtuse .. .. .	.. .. .	110
(b) Awn hairy or glabrous in lower part; margins of the lower glume of the fertile spikelet involute, keelless or only 2-keeled at the tip, rounded; callus often elongate and sharp .. .. .	.. .. .	116
110.—(a) Lemma of the fertile floret gradually merging into the awn .. .. .	.. .. .	111
(b) Lemma of the fertile floret 2-toothed at the apex, awned from the sinus .. .. .	.. .. .	113
111.—(a) Sessile spikelets of all pairs fertile and awned .. .. .	.. .. .	112
(b) Sessile spikelet of the lower first- to third-pair barren or male and awnless .. .. .	.. .. .	Euclasta condylotricha
112.—(a) Internodes of raceme-axis and pedicels grooved very thin in the groove; spikelets often pinhole pitted .. .. .	.. .. .	Bothriochloa
(b) Internodes of raceme-axis and pedicels solid; spikelets softly hairy .. .. .	.. .. .	Dicanthium pappillosum
113.—(a) Racemes solitary at the end of culms and branches .. .. .	.. .. .	14
(b) Racemes paired, digitate or rarely solitary .. .. .	.. .. .	115
114.—(a) Pedicelled spikelets smaller than or sometimes as large as the sessile spikelets; upper glume awnless .. .. .	.. .. .	Schizachyrium

(b) Pedicelled spikelets very much larger than the sessile spikelets; upper glume awned	Diectomis fastigiata
115.—(a) Racemes paired, digitate or rarely single at the ends of simple or branched culms, rarely conspicuously supported by spathes; non-aromatic .. .. .	.. Andropogon
(b) Racemes paired, each pair supported by spathes; inflorescence a large or condensed panicle; aromatic .. .. .	.. Cymbopogon
116.—(a) Lower part of awn glabrous; racemes solitary, partially enclosed in a pinkish-brown boat-shaped spathe, terminating branches	Monocymbium ceresiiforme
(b) Lower part of awn shortly hairy, racemes solitary or paired .. .. .	.. .. . 117
117.—(a) Awn from the sinus of a 2-toothed fertile lemma .. .. .	.. .. . 118
(b) Awn forming a continuation of a narrow fertile lemma; racemes solitary or if paired then not supported by spathes .. .. .	.. .. . 119
118.—(a) Lower glume with a herbaceous beak; raceme pairs with one sessile and the other long peduncled, longly exerted from supporting spathe; each raceme with two pairs of similar male spikelets and a terminal trio (one sessile and fertile, the other two pedicelled)	Exotheca abyssinica
(b) Lower glume without a herbaceous beak, raceme pairs sessile or one shortly peduncled, of few to many spikelets, longly exerted from leaf-like spathes; inflorescence usually much branched .. .. .	.. Hyparrhenia
119.—(a) Racemes solitary, composed of two pairs of similar sterile spikelets which form a false involucre round a sessile spikelet which is awned and two awnless pedicelled spikelets; each raceme supported by a leaf-like sheath	Themeda triandra
(b) Racemes composed of more than three pairs of spikelets and without a false involucre of sterile spikelets at the base .. .. .	.. .. . 120
120.—(a) Spikelets paired, all pedicelled, the short pedicelled ones male and awnless, the long pedicelled fertile and awned; racemes solitary; axis of racemes tough .. .. .	.. Trachypogon
(b) Spikelets paired, one sessile and the other pedicelled; the sessile spikelets in the lower part of raceme awnless and similar to pedicelled spikelets; in upper part of raceme sessile spikelets awned and pedicelled spikelets awnless; axis of racemes fragile above the similar pairs .. .. .	.. Heteropogon

NOTE:—This key is largely derived from keys prepared by C. E. Hubbard of Kew and any mistakes or shortcomings are due to the present rearrangement and not to the original sources of reference.

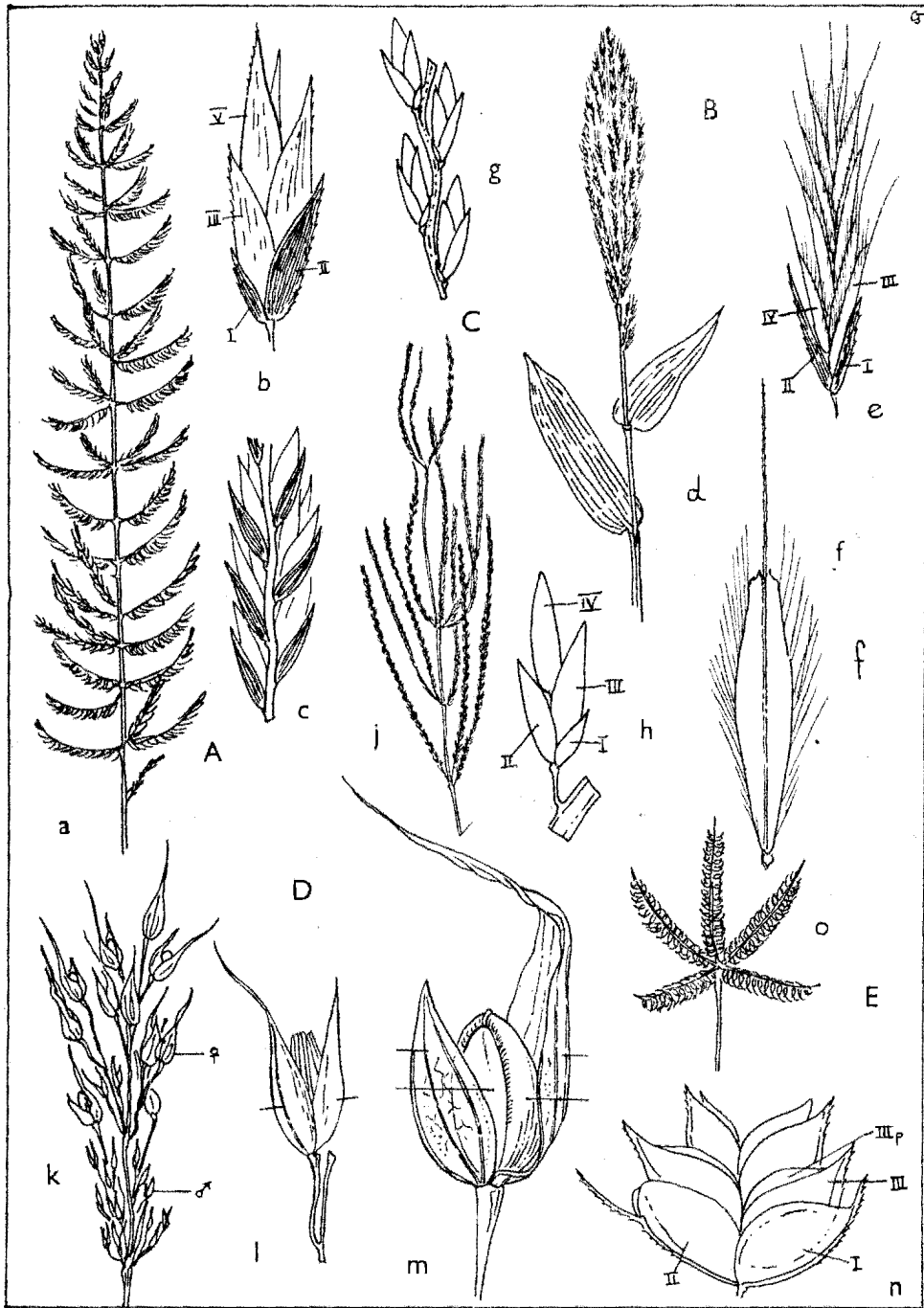


A. Typical Grass Spikelet. I lower glume, II upper glume, III lemma of lowest floret III_p, palea of lowest floret; IV & V lemmas; IV_p & V_p paleas. (a) anther, (b) filament, (c) ovary, (d) stigma, (e) awn. B. Spikelet many flowered. C. Spikelet two-flowered. D. Spikelet two-flowered, lowest floret reduced to lemma. E. Spikelet two-flowered (16). F. Spikelet many flowered, with male or barren florets below fertile floret. G. Spikelet one-flowered. H. Spikelet many flowered, fertile floret below male or barren florets.

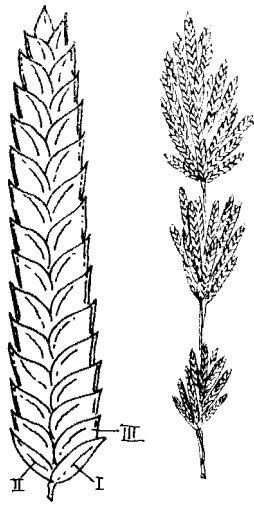


GJ

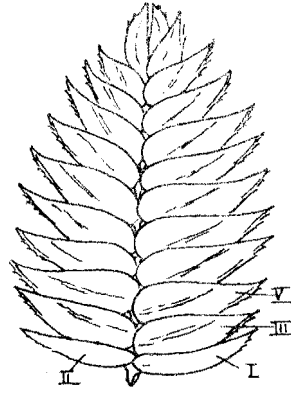
(a-c) Panicles. (a) Open. (b) Spikelike. (c) Dense Spikelike. (d) Spike of sessile Spikelets. (e) Raceme. (f) One sided solitary spike. (g) Scattered spikes. (h) digitate. (j) Glumes of spikelet shorter than lowest floret. (k) Glume longer than lowest floret (See I in key) I Lower Glume, II Upper Glume, III Lemma of lowest floret, IV Lemma, V Lemma, VI Lemma. (l) Dorsally awned. (m) lobed. (n) entire. (o) bifid. (p) awned from sinus of bifid tip.



A. *Pogonarthria squarrosa* (a) inflorescence. (b) spikelet. (c) part of raceme.
 B. *Leptocarydion vulpiastrum*. (d) inflorescence. (e) spikelet. (f)
 C. *Leptochloa panicea*. (j) inflorescence. (h) spikelet. (g) part of raceme.
 D. *Olyra latifolia*. (k) inflorescence. (l) male spikelet. (m) female spikelet.
 E. *Dactyloctenium aegyptium*. (o) inflorescence. (n) spikelet.



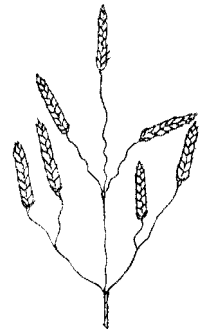
Eragrostis chapelierii



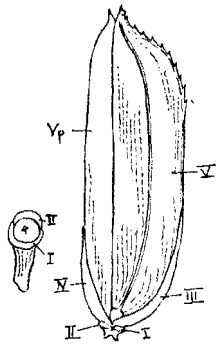
Eragrostis superba



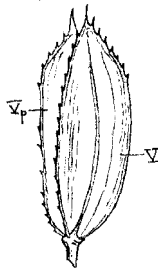
Eragrostis hispida



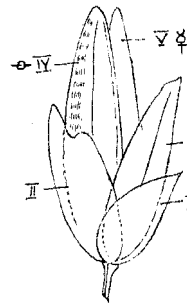
Eragrostis aspera



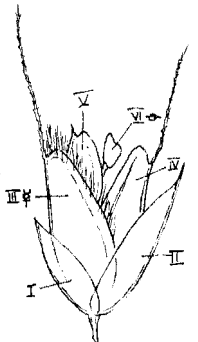
Oryza sativa



Leersia hexandra

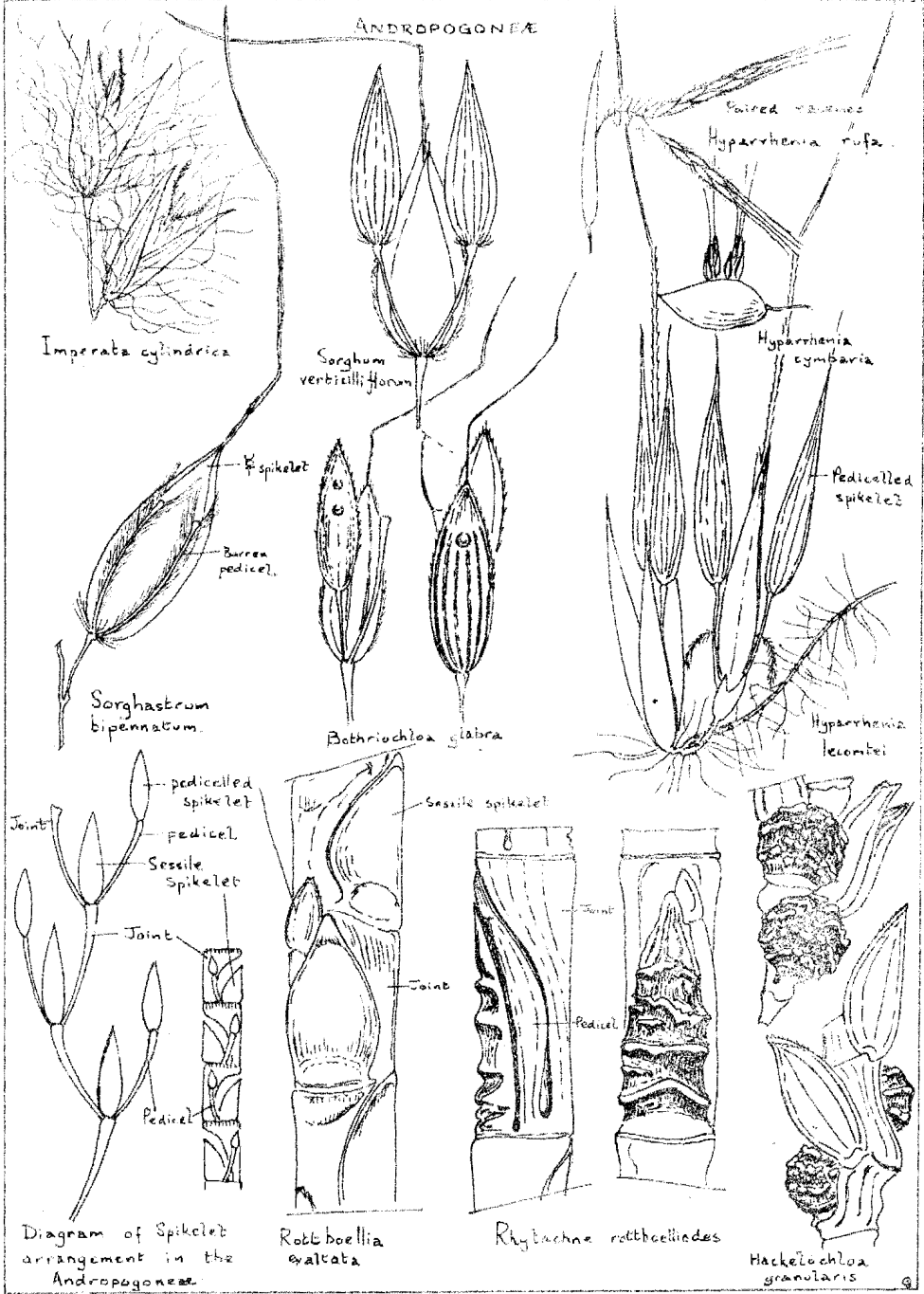


Ehrharta abyssinica



Chloris gayana

ANDROPOGONEÆ



Imperata cylindrica

Sorghum verticilliflorum

Hyparrhenia rufa

Hyparrhenia cymbaria

Sorghastrum bipennatum

Bothriochloa glabra

Hyparrhenia lecombei

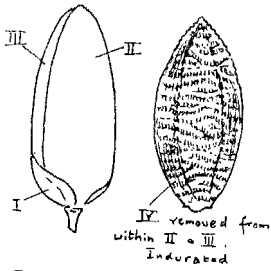
Diagram of Spikelet arrangement in the Andropogoneæ

Rottboellia exaltata

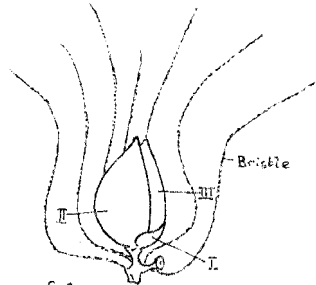
Rytachne rotboelloides

Hackelochloa granularis

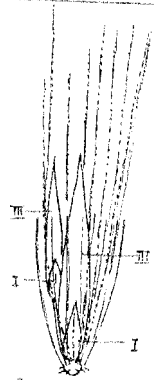
PANICEÆ



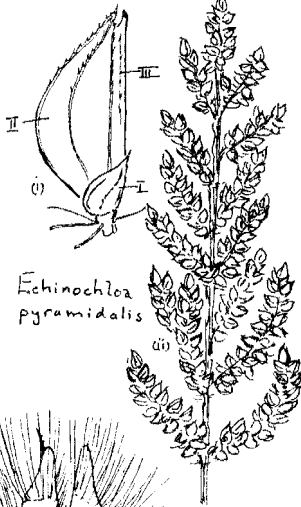
Panicum maximum



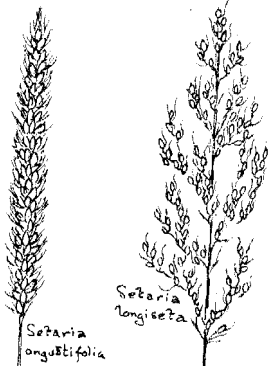
Setaria pyramidoides



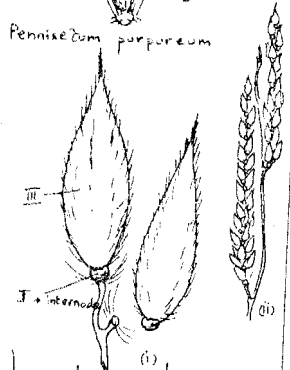
Pennisetum purpureum



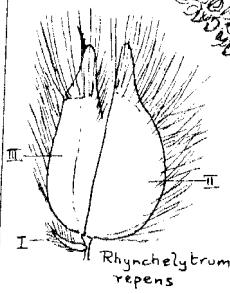
Echinochloa pyramidalis



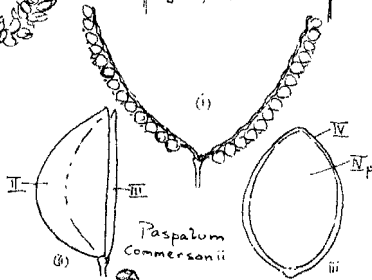
Setaria longisetia



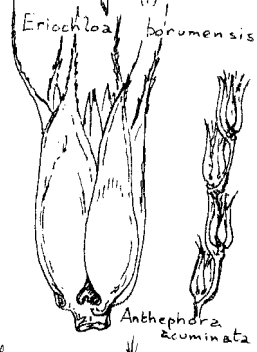
Eriochloa bonumensis



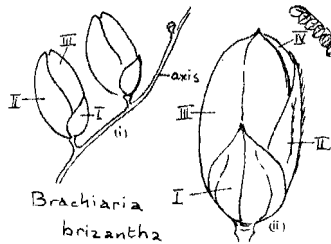
Rhynchelytrum repens



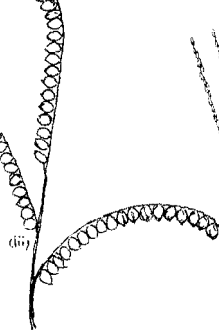
Paspalum Commersonii



Anthephora acuminata



Brachyaria brizantha



Digitaria setivalva

Glossary

Acuminate	..	..	narrowing to a point at the tip
Annual	..	..	reproductive cycle achieved within one year
Anther	..	..	terminal part of stamen, contains pollen
Apiculate	..	..	ending abruptly in a sharp point
Awn	..	..	a bristle appendaged to some part of a glume or lemma
Axil	..	..	the angle between a leaf and stem
Axillary	..	..	arising in the angle between leaf and stem
Bifid	..	..	divided into two at the tip
Bisexual	..	..	male and female organs of regeneration present in the same spikelet, floret or inflorescence
Callus	..	..	swelling (generally used for wound tissue), hard tissue at base of spikelet or floret, sometimes sharp and pungent
Cartilagenous	..	..	firm and tough
Chartaceous	..	..	papery
Ciliate	..	..	fringed with hairs
Crustaceous	..	..	hard and brittle
Culm	..	..	stem
Deciduous	..	..	falling off
Digitate	..	..	several branches arising and radiating from one point (lit. like a hand)
Disarticulate	..	..	breaking off at a joint
Emarginate	..	..	with a notch at the tip
Fertile	..	..	containing the female organs and finally the grain
Filament	..	..	the anther stalk
Filiform	..	..	thread-like, slender
Floret	..	..	small flower, in a grass consists ideally of lemma and palea, two lodicules, two, three or six stamens, one ovary with style and two stigmas
Glabrous	..	..	hairless
Glaucous	..	..	blue-green, due to waxy bloom
Glume	..	..	empty chaffy bracts at base of a grass spikelet
Hispid	..	..	shortly, bristly hairy
Hyaline	..	..	almost transparent
Inflorescence	..	..	collection and arrangement of spikelets
Internode	..	..	part of the stem between nodes
Involucre	..	..	scales or bristles surrounding the base of a spikelet
Joint	..	..	internode in the inflorescence of a member of the Andropogoneae
Lanceolate	..	..	spear-shaped, tapering gradually to a point from a rounded base
Leaf Blade	..	..	grass leaves are divided into two main parts; the lower part is cylindrical and clasps the stem, the sheath; the upper is flat and leaf-like, the blade
Leaf Sheath			

Lemma	..	..	the outer scale of the floret
Membranous	..	..	thin and flexible
Mucronate	..	..	ending in a short stiff point
Nerve	..	..	a vein, generally running the length of lemma, glume or leaf blade
Node	..	..	that point on a stem from which arise various organs (<i>i.e.</i> , the leaf sheath, glume or lemma)
Ovary	..	..	that part of the female organs which finally contains the grain
Ovate	..	..	egg-shaped, broadening and then tapering from a rounded base
Palea	..	..	upper scale of grass floret, often very thin and delicate
Panicle	..	..	a branched inflorescence, in which the branches bear more than one stalked spikelet. May appear spike-like, due to the shortness of individual branches
Pedicel	..	..	stalk of a spikelet
Perennial	..	..	surviving for several years
Pericarp	..	..	the ripe ovary wall
Petiole	..	..	leaf stalk
Pungent	..	..	ending in a sharp rigid point
Raceme	..	..	unbranched inflorescence with pedicelled spikelets, or a simple axis with pedicelled spikelets
Rhachilla	..	..	spikelet axis
Rhachis	..	..	principle axis of an inflorescence
Saggitate	..	..	arrow head shaped
Scaberulous	..	..	somewhat rough
Scabrid	..	..	rough (often cutting) because of short, sharp stiff hairs
Sessile	..	..	without a pedicel
Sinus	..	..	recess between the lobes at the tip of glume or lemma
Spike	..	..	simple, unbranched axis with sessile spikelets
Spikelet	..	..	collection of grass florets subtended by the glumes, terminal on the branches of the inflorescence. A miniature spike, the axis being the rhachilla
Stamen	..	..	the male reproductive organ
Stigma	..	..	the termination of the female organs which receives the pollen, in grasses generally feathery
Style	..	..	the extension of the ovary bearing the stigmas
Terete	..	..	cylindrical in section
Trifid	..	..	divided into three at the tip
Tubercle	..	..	a small swelling or wart
Undulate	..	..	waving
Unisexual	..	..	of one sex only
Verticillate	..	..	with several whorls of branches arising regularly along the axis
Villous	..	..	softly and densely hairy
Whorl	..	..	a ring of branches arising from one node

REF.—Glossary of Flora of West Tropical Africa Hutchinson and Dalziel
 Flowering Plants and Ferns J. C. Willis

Part III

1. ACROCERAS Stapf

A. macrum Stapf (F.T.A. 9, 624, 1937)

Vern., Nylgrass, Nylvleigras, Swamp Rye Grass.

Perennial, rhizomatous, up to 60 cms. tall, forming a dense, dark green carpet. Spikelets somewhat shiny, in a scant inflorescence; the upper glume of the floret produced into a blunt tip. Perennial swamps and marshes, flooded in the wet season; locally gregarious. 825, Lake Chilwa; 1114, Kota Kota. A pasture grass used for planting wetter areas of both swamp and high rainfall types. Probably difficult to eradicate because of the persistent fleshy rhizomes. Palatability appears to be variable.

2. AGROSTIS L. Bent Grasses

A. continuata Stapf (F.T.A. 10, 180, 1937)

Buchanan, 356.

A. greenwayii C. E. Hubbard (Kew Bull. (3), 342, 1949)

Perennial, tufted, up to 70 cms. tall; spikelets purplish-green. Occasional in montane swamps. Greenway 6307, Luchenyia Plt., Mlanje Mtn.; N 355, Chambe Plt., Mlanje Mtn.

A. huttoniae (Hack.) C. E. Hubbard (Kew Bull. (3), 343, 1949)

Perennial, up to 60 cms. tall; forming mats on banks of mountain streams running through montane evergreen forests and in waterlogged depressions of montane grasslands, occasional. N 591, 279, Kirk Range.

A. lachnantha Nees

Vern. South African Bent.

Doubtful perennial, slender habit, inflorescences shining, purplish. Forming Societies in montane evergreen forest, on stream banks (N 317, Chambe Plt., Mlanje Mtn.); also tufts in montane grasslands (503, Nyika).

A. producta Pilger forma

Perennial, tufted, with fine leaves up to 40 cms. long; inflorescence a sub-spiciform panicle with purple and green spikelets with very acute outer glumes. Montane grassland with *Exotheca* and *Trachypogon*. 502, Nyika.

A. whytei C. E. Hubbard (F.T.A. 10, 179, 1937)

Whyte, Zomba Mtn.

3. AIRA Linn.

A. carophyllea L. (F.T.A. 10, 87, 1937)

Vern. Silvery Hair Grass.

Annual, up to 40 cms. tall, in loose tufts, stems somewhat geniculate to creeping at base; spikelets shining; leaves light green. Occurring as an invader of old abandoned *Pyrethrum* gardens on montane grassland. 511, 880, Nyika.

4. ALLOTEROPSIS Presl. emend Hitch.

A. cimicina (L.) Stapf (F.T.A., 487, 1934)

Annual, up to 60 cms. tall; spikelets black fringed with pink hairs; forming tufts with one to three inflorescences; leaf blades ciliate at margins. In deciduous woodland in Upper Shire Valley, occasional. 411, Matope Rd., 49 miles from Blantyre; F.B.L. 12, Karonga.

A. semialata (R. Br.) Hitch. (F.T.A. 9, 483, 1934)

Vern. Kaseulimi, Malekelwa.

Perennial, shortly rhizomatous, culms up to 1 m. tall; leaf sheaths persistent below ground, densely hairy. January conspicuous at heads of sandy seasonal swamps, extending to deciduous woodlands; a common weed in Ncheu and Dedza Districts. N 396, Dedza; N 403, Cholo; F.B.L. 18, 550, 1181, Karonga.

A. semialata (R. Br.) Hitch. var. **ecklonii** Stapf (F.T.A. 9, 485, 1934)

Perennial, up to 1.5 m. tall, with upright deep seated rhizomes; leaf sheaths densely pubescent; outer glumes striate with dark purple. Wide range of habitats including seasonal swamps on sandy soils (N 136 Kasupe); deciduous woodlands (N 304, Cholo; N 394, Kasupe) and montane grasslands (266, Kirk Range); weed (N 396A, F.B.L. 62, Dedza).

5. ANDROPOGON L.

A. amethystinus Steud. (F.T.A. 9, 216, 1934)

Perennial, up to 1 m. tall, forming dense tussocks. Along stream banks of montane grasslands, rare. N 318, Chambe Plt., Mlanje Mtn.

A. amplexans Nees (F.T.A. 9, 243, 1934)

Perennial, forming loose tussocks 75 cms.-3 m. tall; leaf bases amplexicaul. Widely distributed in deciduous woodlands throughout Nyasaland, *Brachystegia-Uapaca* woodlands (N 430, Road to Lake Chilwa; N 161, Neno; ! Cholo; ! Salima escarpment); *Brachystegia-Phillipia-Uapaca* scrublands (N 460, Dedza); *Acacia-Piliostigma-Combretum* woodlands (N 161, Lilongwe.)

A. eucomus Nees (F.T.A. 9, 230, 1934)

Vern. Kasorosoro, Chivu, Old Man's Beard.

Perennial, forming small tufts up to 1 m. tall; spikelets with long white, silky hairs. Common, generally associated with perennially wet, stream-fed and acid swamps. N 133, Kasupe; N 498, Zomba; 293, Ncheu; ! Vipya; ! Kaulime Pond, Nyika; F.B.L. 27, N. Rukuru River, Karonga.

A. gayanus Kunth var. **squamulatus** (Hochst.) Stapf (F.T.A. 9, 263, 1934)

Perennial, forming large tufts, 1 m. in diam. and up to 3.5 m. high; leaf blades markedly falsely petiolate. Wide range of habitats below 3000 ft.; *Brachystegia-Uapaca* woodland (N 430, Road to Lake Chilwa); seasonal swamps (408, Upper Shire; ! Chitala nr. Salima); Lake-shore *Combretum* scrublands on sandy soils (! Bandawe near Chinteche); grassland phase in regeneration complex following cultivation (N 442, Namadzi nr. Chiradzulu; ! Chitala near Salima).

A. pseudapricus Stapf (F.T.A. 9, 242, 1934)

Zomba Whyte.

A. pseudo-schinzii Stapf (F.T.A. 9, 249, 1934)

Perennial with much branched ascending rhizome, forming tufts up to 1 m. high. Ecological status not known with accuracy. Upland *Brachystegia-Uapaca* woodlands (N 215, Livingstonia) perennial stream fed swamp, peaty soil (288, Ncheu).*

A. schinzii Hack. (F.T.A. 9, 245, 1934)

Perennial, with short much branched rhizome, forming tufts up to 1.5 m. high. Wide range of habitats but generally more common on eroded soils. *Brachystegia-Uapaca* scrublands at 5000 ft.; (N 471, N 583, Dedza); *Julbernardia-Brachystegia* woodland (N 561, Lilongwe District); sandy, seasonal swamps (454, Lilongwe; N 521, Kasupe); weed in Tung orchard (N 289, Zomba.)

A. schirensis Hochst. (F.T.A. 9, 246, 1934)

Perennial, forming dense low tufts with culms varying from 30 cms. high, in montane grasslands to over 2.5 m. in woodlands. Locally dominant in montane grasslands but also occurring frequently in deciduous woodlands throughout the Territory and in seasonal swamps. Conspicuous in the mid-season phase in *Julbernardia-Brachystegia* woodlands. Montane grasslands (! Nyika; 436, Vipya; N 55, Zomba Mtn.); *Brachystegia-Uapaca-Julbernardia* woodlands (E.L. 328, N 432, Zomba; 404, N 428, Cholo; N 566, Dedza; 424, Ncheu; F.B.L., Fort Hill;

*288, may prove to be **A. tumidulus** Stapf the glumes of the sessile spikelets not being aristate.

S.G.W. Mbawa nr. Mzimba); *Terminalia*, tall grass woodland (1121, Kota Kota); *Themeda* seasonal swamp (1125, Kota Kota).

A. schirensis Hochst. var. **angustifolia** Stapf (F.T.A. 9, 247, 1934)

Perennial, forming dense, low tufts; culms 70 cms. high. Locally dominant in montane grasslands but also found in sandy seasonal swamps. N 328, N 333, N 339, Chambe Plt., Mlanje Mtn.; 453, Lilongwe.

A. sylvaticus C.E. Hubbard (Kew Bull. (3), 371, 1949)

Perennial, forming clumps in *Brachystegia* woodland, Zomba Mtn., Brass 16098.

6. ANDROPTERUM Stapf

A. stolzii (Pilger) C. E. Hubbard (F.T.A., 9, 38, 1934 as *A. variegatum* Stapf)

Perennial, forming straggling masses through and over undergrowth of evergreen, riverine forests. (N 293, Cholo; 155, Dedza Mtn.; Nchisi Mtn.; Ncheu); also in open swamp in evergreen forest area (903, Nkata Bay).

7. ANTHEPHORA Schreb.

A. acuminata (Rendle) Robyns (F.T.A. 9, 940, 1934)

Perennial, tufted, with culms up to 1 m. high. Common in *Brachystegia-Julbernardia* woodland and scrubs above 4000.; 363 ft.; Ekwendeni; Vipya.

8. ANTHOXANTHUM L.

A. sp.

Vern. Vernal Grass.

Forming small tufts, up to 40 cms. tall; leaves light green; inflorescence a sub-spiciform panicle of purple and white, shiny spikelets, spikelets very finely hairy. In montane *Exothea-Trachypogon* grassland; 500, Nyika.

9. ARISTIDA L. Steekgrass

A. adscensionis L. (F.W.T.A. 2, 531, 1931)

Annual, varying in height from 15 cms. to 1 m.; spikelets often purplish. Societies in *Brachystegia* woodlands on poor soils, becoming a common weed in eroded areas. *Uapaca-Brachystegia* woodlands (E.I. 323, Makwapala; N 437, Road to Lake Chilwa); waysides and native cultivations (N 126, N 609, Zomba; N 473, Linthipe; 414, Upper Shire; 1129, Kota Kota).

A. atroviolacea Hack.

Perennial, forming cushions in boggy areas of montane grasslands, often locally dominant, N 330, Chambe Plt., Mlanje Mtn.; 168, Dedza, 292, Ncheu.

A. diminuta (Mez.) C. E. Hubbard (Kew Bull. (4) 480, 1949)

Annual, with slender stems and leaves, forming loose tufts up to 30 cms. in diam.; spikelets dark purple. Societies in *Hyparrhena* marshes, N 138, Kasupe; N 519, Namweras; 816, Lake Chilwa flood plain. Indicative of overgrazing.

A. hordacea Kunth (F.W.T.A. 2, 532, 1931)

Annual, in tufts, somewhat geniculate at base; up to 45 cms. tall; inflorescence a dense spikelike panicle of green and black spikelets with fine, long awns; straw coloured when dry. A roadside weed, gregarious, 779A, Palombe Plain.

A. macilentia Henrad

Perennial, tufted, with wiry leaves; culms slender, stiff, 60 cms. tall. Common in *Hyparrhena* marshes with annual summer waterlogging, N 370, Cholo; 170, Lilongwe.

A. textilis Mez.

Perennial, forming dense tufts; leaves setaceous, wiry; culms slightly longer than leaves, 50 cms. tall. Occasional in high montane grasslands, N 203, Nyika.

There are undoubtedly many species of *Aristida* in Nyasaland to add to this list.

10. **ARTHRAOXON** Beauv.

- A. lancifolius** (Trin.) Hochst. (F.T.A. 9, 165, 1934)
Annual, forming carpets in shade of boulders on mountain slopes, N 508, Zomba.
- A. quartinianus** (A. Rich.) Nash (F.T.A. 9, 167, 1934)
Annual, straggling, small grass with fine stems; spikelets, purple, small. Shade tolerant, forming societies by stream banks in low montane areas (N 166, Zomba); in relict evergreen forest scrub (938, Vipya); becoming a weed in irrigated lands, (492, Mwera Hill); weed in overgrazed montane pasture (563, Misuku).

11. **ARUNDINARIA** Michx.

- A. alpina** Michx.
Vern. Mountain Bamboo.
A bamboo, occurring on Dedza Mtn. (Comm. R. G. M. Willan, Cons. of Forests, Nyasaland). Brass, 16676, Mlanje; plentiful in bottoms of forested ravines; culms hollow, up to 10 m. tall, green; in open clumps.

12. **ARUNDINELLA** Raddi

- A. nepalensis** Trin.
Perennial, rhizomatous, up to 2.5 m. tall; leaves harsh, stems somewhat reedy; inflorescence a dense panicle, spikelets purple to brown with a distinct kneed awn. *Loudetia simplex* sandy, seasonal swamp, 546, Kasuni, Mzimba.

13. **BECKEROPSIS** Fig. and De Not.

- B. uniseta** (Nees) Stapf ex Robyns (F.T.A. 9, 949, 1934)
Vern. Nsipe (Chichewa).
Tall perennial, with reedy hollow stems up to 4 m. tall; leaf blades falsely petiolate; spikelets finely awned, purple. A widespread, shade tolerant species, generally on better soils; occasional in fringes of evergreen forests, (E.L. 313, Mulunguzi Stream, Zomba; ! Nyika); common in *Pterocarpus angolensis* woodlands (! Fort Manning); extending to *Acacia-Combretum-Piliostigma* woodlands; (! Chitala, nr. Salima; F.B.L. 75, Lilongwe); also in *Brachystegia-Julbernardia* tall woodlands (N 29, Dowa; N 35, N 38, Zomba).

14. **BEWSIA** Goossens

- B. biflora** (Hack.) Goossens
Vern. Matimbenizge (T.).
Perennial, forming small tufts with an abundance of flowering culms about 60 cms. high; spikelets pinkish-purple with waxy bloom. Occasional in lower montane grasslands (N 597) Kirk Range; ! Vipya); frequent in *Brachystegia-Uapaca-Julbernardia* woodlands and scrublands above 3000 ft. (N 445, Njuli near Blantyre; 425 N 565, Linthipe Valley, Dedza; F.B.L. Chinunka nr. Fort Hill). Typical of poor and eroded soils (364 Ekwendeni).

15. **BOTHRIOCHLOA** O. Kuntze, Pinhole Grasses

- B. glabra** (Roxb.) A. Camus (F.T.A. 9, 172, 1934 as *Amphilophis glabra* Stapf)
Perennial, forming large clumps up to 1.5 m. tall; spikelets pitted, purple. Typical of flood plain grasslands with *Chloris gayana* (806, S. Lake Chilwa); seasonal swamps and waterhole banks (764, Diampwe River, Lilongwe); occasional in early phases of regeneration following cultivation, usually on sandy soils (E.L. 143, S. Palombe Plain; N 76 Ft. Johnston Road; N 444g Chiradzulu near Blantyre).
- B. glabra** (Roxb.) A. Camus var. *epunctata*.
A variety of previous species without the pitted spikelets. 1079, Kota Kota in shade of evergreen forest relict, in pure stand.

B. insculpta (Hochst.) Stapf (F.T.A. 9, 176, 1934 as **Amphilophis insculpta** Stapf)

Perennial, loosely tufted, culms up to 1 m. high, nodes with distinct ring of hairs; spikelets pitted. Ecological status uncertain; occasional by wayside, N 123, Zomba.

B. pertusa (L.) A. Camus var. (F.T.A. 9, 175, 1934 as **Amphilophis pertusa** Stapf)

Perennial with short rhizomes; semi-prostrate, slender culms up to 50 cms. Occasional at outskirts of marshes, along ditches and drains. N 509, Zomba; 367, Kasitu River, near Ekwendeni.

16. BRACHIARIA Gris.

B. brizantha (Hochst. ex A. Rich.) Stapf (F.T.A. 9, 531, 1934)

Vern. Palisade Grass.

Perennial, forming coarse tussocks which vary in size according to habitat; culms from 30 cms. to 2 m. tall. Some forms are densely hairy. A variable species, probably with many ecotypes. Widely distributed from montane grassland to early phases of regeneration after cultivation at lower altitudes. Montane *Andropogon schirensis* grassland (349, N 183, N 190, Vipya); *Combretum-Piliostigma-Acacia* woodland (! Lilongwe); *Julbernardia-Brachystegia* woodland and scrub (1003, Mzimba; 1014, Lilongwe); at margins of *Themeda* seasonal swamp (1126, Kota Kota); eroded lands (S.W.G. Ekwendeni); common weed of tea gardens (! Mlanje); regenerating gardens (F.B.L. 55, Dedza); roadsides (E.L. 664, Blantyre; N 43, Zomba; N 219, Nehenachenä). A pioneer species on old lands; appears to persist in the climax grassland; the better forms are valuable constituents of grazing lands but seed setting is poor.

B. deflexa (Schumach.) C. E. Hubbard (F.T.A. 9, 544, 1934 as **B. regularis** Stapf)

Vern. Kadimango, Nanyera (Chinyanja).

Annual weed at low altitudes, often gregarious, on clay and sandy soils. E.L. 559, Pt. Herald; N 116, Chiromo; N 738, Namalanga, Palombe Plain; 486, Salima; 449, Upper Shire; F.B.L. 13, Karonga; E.L. 10, Lower River.

B. eruciformis (Sibth. and Sm.) Gris. (F.T.A. 9, 552, 1934 as **B. isachne** Stapf)

Annual, forming tufts which become prostrate. Weed at low altitudes, on sandy soil. 484, Salima.

B. filifolia Stapf (F.T.A. 9, 516, 1934)

Perennial, forming small compact tufts with fine leaves; slender culms up to 40 cms.; spikelets purplish-brown. Montane marshes and wet grassland (N 671, 282, 265, Kirk Range); also occurring in marshes at lower altitudes (303, 107, Cholo).

B. humidicola (Rendle) Schweickardt

Perennial, creeping with long stolons; sparsely leafy; culms slender up to 70 cms. tall. Very frequent at heads of sandy, seasonal swamps (386, Lilongwe); on sandy banks and fans of rivers (544, Kasuni, Mzimba; 1008, Mbawa, Mzimba).

B. jubata (Fig. and De Not) Stapf

Perennial, tufted, up to 1 m. tall; leaves light green, stiff with a serrate margin; backs of raceme axes dark purple red, broad, spikelets yellow hairy. Common in *Hyphaene* sp. stands on sandy, grey soils, liable to flooding in wet season. 1098, Kota Kota.

B. latifolia Stapf (F.T.A. 9, 526, 1934)

Perennial, stems trailing on ground and rooting at the nodes, erect stems up to 1.5 m. tall, spikelets light green, with few hairs at base, terminal branch of inflorescence a sterile point. In dense stands near river banks, just outside *Phragmites* zone. 1077, Kota Kota; Lower River, Kirk.

B. ramosa (L.) Stapf (F.T.A. 9, 542, 1934)

Annual, gregarious, common by roadsides; weed of sandy soils; N 395, Liwonde.

B. regularis Stapf (F.T.A. 9, 544, 1934)

Vern. Nkoka.

See *B. deflexa*.

B. scalaris (Mez.) Pilger

Annual weed, common in tea gardens (N 554, Mlanje); newly abandoned cultivations (N 155, Neno).

B. serrata (Thunb.) Stapf

(F.T.A. 9, 537, 1934)

Perennial, shortly rhizomatous, forming small tufts with erect stiff leaves; culms up to 80 cms. Spikelets pink, silky, shiny; roots thick, furry. Occasional in montane grassland (257, Kirk Range); common in early spring phase *Julbernardia-Uapaca-Brachystegia* woodlands. (N 185, Vipya; N 387, Cholo; E.L. 563, Blantyre; ! Lilongwe).

B. viridula Stapf

(F.T.A. 19, 515, 1934)

Perennial, forming compact tufts with culms up to 60 cms. high; leaves densely hairy. Occasional in marshes (289, Ncheu; N 391, Cholo; F.B.L. 57, Dedza); and in *Syzygium* swamp forest (1007, Mbawa, Mzimba).

17. **BRACHYPODIUM** Beauv.

B. flexum Nees var.

Perennial, forming very small tufts; stems scabrid with reflexed hairs; culms slender rambling through shrubs and undergrowth. Occasional societies in evergreen, montane forest; becoming more common at fringes. N 325, N 343, Chambe Plt., Mlanje Mtn.; 430, Vipya; 164, Dedza Mtn.; 522, Nyika.

18. **BROMUS** Dill. ex L.

B. cognatus Steud.

Brass 16, 105, Zomba.

B. spp.

Occasional, montane evergreen forest and fringes. N 272, N 606, 139, Zomba Mtn.; 163, Dedza Mtn.; N 324, Chambe Plt., Mlanje Mtn. (The Zomba specimen has awned glumes).

19. **CAPILLIPIDIUM** Stapf

C. parviflorum (R. Br.) Stapf

F.T.A. 9, 169, 1937)

Perennial, loosely tufted, often geniculate at the base, up to 1.5 m. tall; spikelets purple. Restricted distribution but sometimes locally dominant in *Hyparrhenia* marshland. N 467, slopes of Dedza Mtn.; 249, Dowa; 465, Lilongwe.

20. **CHLOACHNE** Stapf

C. oplismenoides (Hack) Stapf.

(F.W.T.A. 2, 565, 1931)

Perennial, with wrinkled leaf blades; creeping, forming open carpets in dense shade of montane evergreen forests. 235, Nchisi Mtn.; 497, Nyika.

21. **CHLORIDION** Stapf (=STEREOCHLÆNA)

C. cameronii Stapf

(F.T.A. 9, 480, 1934)

Vern. Supu.

Perennial, tufted, or creeping with long rhizomes; culms up to 1.5 m., inflorescence digitate, dark purple, spikelets narrow, finely awned. A variable species. Widespread; montane to deciduous woodlands, flood plains and waysides, generally on shallow soils and in early phases of succession. Also common on sandy eroded soils. Montane (N 453, Chiradzulu; ! Vipya; 401, Dedza; ! Zomba Mtn.); *Brachystegia-Uapaca* woodlands (E.L. 327, N 56, N 423, N 448, Zomba); flood plain on sandy strip, (! Lake Chilwa).

22. **CHLORIS** Swartz

C. barbata Swartz

(F.W.T.A. 2, 522, 1931)

Loosely tufted annual up to 75 cms. tall. Wayside communities and weed. N 129, Zomba.

C. gayana Kunth.

(F.T.W.A. 2, 520, 1931)

Vern. Kolambinzi (Chinyanja), Kaponyongo (Chitumbuka). Rhodes Grass.

Perennial, tufted, tufts arising at the nodes of long-spreading runners sent out from the parent tuft; up to 1.5 m. tall; inflorescence digitate with light brown spikelets which turn greyish-dark-brown when the grain is ripe. There appear to be several strains in Nyasaland showing variation in runner vigour and awn characters. Dominant on black soils of flood plains of lakes and rivers. N 146, Lake Chilwa; 366, Kasitu River, kwendeni; s! Lake Kasuni; ! Henga and Rukuru Valleys nr. Njakwa; ! Nchalo, Lower Shire Valley. A dominant in seasonal swamps in *Colophospermum mopane* country, ! Liwonde, Central Shire Valley. A valuable grass for temporary leys as it sets copious quantities of good, viable seed. One disadvantage is the fact that with local strains seed setting and ripening takes place over a protracted period and good seed requires hand picking. Planted swards on upland soils appear to fall off in vigour after the first year and require dressing with nitrogen to maintain productivity. The grass makes excellent hay, if this can be made in a dry spell, or otherwise good quality silage. It is highly palatable to cattle fresh or conserved.

C. pycnothrix Trin.

(F.T.W.A. 2, 522, 1931)

Loosely tufted or creeping annual up to 75 cms. but often smaller, leaf blades blunt tipped. Common weed, pathways and roadsides. E.L. 168, S. Palombe Plain; E.L. 262, Makwapala nr. Zomba; E.L. 622, 650, Blantyre; N 125, 104, Cholo.:

C. virgata Sw.

Annual, forming untidy straggling tufts up to 60 cms. high. Common weed by roadsides and in early phases of regeneration following cultivation. E.L. 99, Pt. Herald; L. 261, Makwapala nr. Zomba; 132, Domasi; 369, Mzimba; 468, Lilongwe; F.B.L. 14, Karonga.

23. **CLEISTACHNE** Benth

C. sorghoides Benth.

(F.T.A. 9, 154, 1934)

Vern. Perere (Chinyanja).

Annual, forming small tufts up to 3 m. tall; yellowish-green leaves with scabrid margins; spikelets brown to blackish. Common in marshes and flood plain grasslands (N 31, Cholo, N 495, Lake Chilwa; ! Lilongwe); weed on heavy land, (N 99, Zomba, 457, Lilongwe; ! Salima; 493, Nchisi escarpment, Dowa).:

24. **COELACHNE** R. Br.

C. africana Pilger

Creeping perennial, with small, striate leaf blades; forming mats along stream-fed montane marshes in association with *Sphagnum*. N 198, 505, Nyika.

25. **COELORACHIS** Brongn.

C. afraurita (Stapf) Stapf

(F.T.A. 9, 80, 1934)

Perennial, with flattened stems which are often single, 2.5 m. tall. Generally occurring in marshes above 3500 ft., (N 184, Vipya; N 588, 147, Dedza; ! source of Linthipe River; ! Bua River, Ft. Manning); also found in marshes at lower altitudes in high rainfall regions (! Limpasa, Nkata Bay).:

26. **CYMBOPOGON** Spreng

C. densiflorus (Steud.) Stapf

(F.T.A. 9, 289, 1934)

Perennial, with short horizontal rhizomes, forming tufts up to 2 m. tall; leaves light green, aromatic; inflorescence a dense globular head. Occasional in *Brachystegia-Julbernardia globiflora* woodlands, N 179, Mzimba District; 541, near Lake Kasuni; ! Yembe Hills, Karonga; ! Mbawa, Mzimba.

C. excavatus (Hochst.) Stapf

(F.T.A. 9, 285, 1934)

Perennial, forming loose tufts up to 1.5 m. tall; leaf blades amplexicaul, purplish waxy. Locally common in montane grassland. N 596, Kirk Range.

C. giganteus (Hochst.) Chior. (F.T.A. 9, 288, 1934)

Perennial, with reedy stems, forming loose tufts up to 2.5 m. tall; leaf blades, broad, amplexicaul, purplish, waxy, aromatic. Very common in *Acacia-Piliostigma-Combretum* woodlands (N 496, N 477, Lilongwe) and frequent in *Julbernardia-Brachystegia* woodland (N 153, Neno).

27. **CYNODON** Pers.

C. dactylon (L.) Pers. (F.W.T.A. 2, 522, 1931)

Vern. Kapinga (Chinyanja). Lusangani (Chitumbuka). Dhoub Grass, Bermuda Grass.

Perennial, creeping by rhizomes and stolons.

Very common throughout the Protectorate. River bank grasslands in Lower Shire Valley (E.L. 49, 72); on termite mounds at margins of seasonal swamp grazing lands, 67, Lilongwe; ! Tuchila; common weed. The common varieties of *C. dactylon* are widely used for the establishment of lawns for which use it is excellent when kept clipped. The more vigorous forms can be utilized for grazing but if planted for this purpose they are most difficult to eradicate. Makes excellent hay which cures very rapidly. *Magennis grass* is a fine leaved form used in the higher rainfall districts for making lawns. *Bradley grass* is another lawn variety.*

C. sp.

Vern. Giant Star Grass.

Perennial, creeping by means of short rhizomes and long runners. Conspicuous in spring phase in flood plain grasslands in association with *Chloris gayana*; (! Lake Chilwa); *Hyparrhenia* marshes in N. Province (377), Mzimba); colonizing woodland clearings (N 131, N 366, Zomba; N 222, Vipya) and old cultivations (356, Ekwendeni): Kota Kota township. This grass appears to have close relationships with *C. plectostachyum* Pilger but the various types are difficult to distinguish and often closely resemble *C. dactylon*. Established from runners, the large *Cynodon* makes an excellent pasture grass, which is quick to give a reasonable cover. Indigenous cattle find it highly palatable but it should be kept well cut in order to reduce the numbers of old dry stems. Established swards appear to benefit from a burn after the first light rains and show response to nitrogenous fertilizer. *Cynodon 4* is used in S. Rhodesia as a ley grass on tobacco lands but ease of eradication with local strains is not known.

28. **DACTYLOCTENIUM** Willd.

D. giganteum Fisher and Schweickerdt

Vern. Kambwelele (Chewa).

Annual, tufted, culms often geniculate at base, varying in height from a few cms. to 70 cms. Common, societies by waysides, generally on sandy soils and washes, weed. N 427, Zomba; 368, Mzimba; F.B.L. 16, Karonga.

D. ægypticum (L.) Beauv. (F.W.T.A. 2, 518, 1931)

Is described as a separate species to the above, being in general smaller with more contracted racemes. Differences in size are deceptive as single locality collections have specimens varying in size from a few to 70 cms. E.L. 34, Port Herald, roadsides and verges of fields.

29. **DANTHONIA** DC.

D. davyi C. E. Hubbard

(F.T.A. 10, 137, 1937)

Perennial, forming dense large tussocks up to 1.5 m. tall. Montane grassland, locally dominant in exposed situations on rocky soils, N 350, Chambe Plt., Mlanje Mtn.

30. **DICHANTHIUM** Willemet

D. papillosum (Hochst.) Stapf

(F.T.A. 9, 179, 1934)

Perennial, with short ascending rhizomes, loosely tufted, up to 1 m. tall; inflorescences pale purple and green with conspicuous, silky, white hairs. Locally common and conspicuous in flood plain grasslands with *Chloris gayana*. 804, N 677, Lake Chilwa.

*Miss Chippindall gives *Magennis grass* as *C. magennisii* Hupcombe and *Bradley grass* as *C. bradleyi* Stent.

31. **DIECTOMIS** Kunth

D. fastigiata Kunth

(F.T.A. 9, 207, 1934)

Annual, tufted, up to 90 cms. tall; spathes, narrow, bright orange-red; peduncles exerted from spathe, with a cup-shaped apex when racemes fall; pedicelled spikelets with large papery glume, green turning reddish. Found in belts in overgrazed (or overburnt) swamp grassland bordering Lake Chilwa. Gives a distinct bright colour to the grassland. 834, Lake Chilwa.

32. **DIGITARIA** Hall, Finger Grass

D. borbonica Desv.

Annual, creeping forming loose carpets, common weed. N 174, Lower Shire; N 552, Mlanje; N 163, roadside, Chiradzulu.

D. brazzae (Franch.) Stapf

(F.T.A. 9, 447, 1934)

Perennial tufted, culms yellowish up to 70 cms. tall; leaves hairy; spikelets with short pink hairs. Distribution usually restricted to *Brachystegia-Uapaca* woodlands and scrublands on sandy soils (366, Dedza; N 398, Lilongwe) and margins of sandy seasonal swamps (! Lilongwe).

D. capitipila Stapf

(F.T.A. 9, 445, 1934)

Buchanan, 1443.

D. debilis Willd.

(F.T.A. 9, 464, 1934)

Marshy ground, Scott.

D. diagonalis (Nees) Stapf

(F.T.A. 9, 476, 1934)

Vern. Katsici (Chewa).

Perennial, tufted, forming dense clumps; spikelets brownish-black, subtended by hairs. Extending from lower montane grasslands to deciduous woodlands; montane grasslands (N 18, N 280, Zomba Mtn.; 347, Vipya; 422, Kirk Range, N 341 Chambe Plt., Mlanje); *Brachystegia-Uapaca* woodlands E.L. 241, Makwapala nr. Zomba; 328, Mwanza); *Piliostigma-Combretum* woodland (380, Lilongwe); *Themeda-Hyparrhenia* seasonal swamps (373, Mbawa nr. Mzimba)

D. gazensis Rendle

(F.T.A. 9, 457, 1934)

Perennial, forming dense tufts from short rhizomes; underground leaf sheaths very hairy; spikelets purplish. Wide distribution, ranging from montane grasslands to deciduous woodlands and in marshes; also occurring as a weed; conspicuous in spring phase in deciduous woodlands. Montane grasslands (N 357, Chambe Plt., Mlanje Mtn.), *Brachystegia-Julbernardia* woodlands and scrublands (N 388, Chiradzulu; N 400, Dedza; E.L. 625, Blantyre; 1021, Lilongwe; 845, Mbawa nr. Mzimba); *Hyparrhenia* marshes (384, Lilongwe); sandy seasonal swamps (1046, Lilongwe).

D. horizontalis Willd.

Annual, with long runners and slender, loose inflorescences. Roadside communities common weed. E.L. 268, Makwapala nr. Zomba; N 5, Zomba; S.G.W. Ekwendeni; 124 Domasi, nr. Zomba.

D. lancifolia Henard

Perennial, rhizomatous and with runners; inflorescences stiff, spreading, with purple spikelets. Occasional in montane *Brachystegia-Faurea* woodland and evergreen riverine forest. (N 192, Vipya; 2996, Dowa). Also found as a roadside weed (348, Vipya; ! Ekwendeni).

D. longiflora (Retz.) Pers.

(F.T.A. 19, 469, 1934)

Doubtful perennial, creeping, forming mats. Locally common weed in tea gardens, N 713; Mlanje.

D. melanochila Stapf

(F.T.A. 9, 453, 1934)

Annual, occasional in wet grassland, E.L. 157, Zomba Mtn.; E.L. 361, Blantyre.

D. milanjana (Rendle) Stapf

(F.T.A. 9, 430, 1934)

Vern. Tsengatsenga (Chinyanja); Luba (General); Cimpusu, Kampongwe (Chichewa); Kamponyongo (T.).

Perennial, rhizomatous, often with runners, culms up to 1.5 m., base of racemes swollen, reddish. Wide distribution in early stages of regeneration; (E.L. 4, Pt. Herald; N 420, Palombe Plain; E.T. 564, Blantyre; N 610, Zomba; N 16, Zomba Mtn., N 562, 382, Lilongwe; 482, Salima; F.B.L. 28, Karonga). Very conspicuous in spring phase in *Combretum-Ptilostigma* woodlands, gregarious (1055, Lilongwe).

D. nitens Rendle (F.T.A. 9, 473, 1934)

Perennial, with short compact rhizomes, base of culms densely clothed with woolly hairs; spikelets with short silky yellow hairs. Occasional in deciduous *Brachystegia-Uapaca* woodlands N 307, N 722, Cholo; N 311, slopes of Mlanje Mtn.

D. perrottetii (Kunth) Stapf (F.T.A. 9, 435, 1934)

Annual, forming small tufts with erect stems up to 1 m. tall; inflorescence a stiff, narrow panicle, spikelets purple. Weed, chiefly on light soils, E.L. 274, S. Palombe Plain; N 173, Chiromo; N 425, Mlanje; N 512, Ft. Johnston; F.B.L. 19, Karonga; 1053, Lilongwe.

D. scalarum (Schweinf.) Chiov.

Perennial, with horizontal and erect rhizomes; culms slender up to 50 cms. tall; spikelets very turgid, purple and green. Occasional on outskirts of riverine, evergreen forest (N468, Dedza); and weed in higher rainfall, montane regions (1161, Misuku).

D. setivalva Stent (F.T.A. 9, 430, 1934 as *D. milanjana* in part)

Vern. Cimpusu (Chichewa).

Perennial, rhizomatous, forming open tufts up to 2 m. tall; raceme bases red, swollen; spikelets inconspicuously hairy. Conspicuous in spring phase in deciduous woodlands. N 30, Zomba; 379, Lilongwe.

D. ternata (Hochst.) Stapf (F.T.A. 9, 452, 1934)

Annual, forming loose tufts 15 to 60 cms. tall; spikelets hairy. Common in overgrazed grassland and by waysides; (E.L. 270, Makwapala nr. Zomba; E.L. 654, 403, Blantyre; 451 Ncheu); occasional in *Brachystegia-Uapaca* woodlands.

D. uniglumis (Hochst. ex A. Rich) Stapf var. **major** Stapf (F.T.A. 9, 476, 1934)

Perennial, tufted, up to 2 m. tall; stems purple; spikelets purple, subtended by hairs. Occasional in montane grasslands, associated with recent forest destruction or soils thrown up after roadmaking. 528, Nyika.

D. velutina (Forsk.) Beauv. (F.W.T.A. 2, 566, 1931)

Annual, often rooting at lower nodes, forming loose carpets, slender culms up to 50 cms. tall. Common weed in wetter districts. N 124, N 489, 105, Cholo. A variety with a finer habit occurs in the semi-evergreen riverine forests of the Misuku foothills. 1175, Misuku.

D. sp. aff. D. seriata, Stapf

Tufted grass up to 1.5 m. tall; nodes downy; leaf sheaths and blades hairy; spikelets with short but prominent fringe of hairs. Locally dominant in deciduous woodland of Upper Shire Valley. 413, Matope Road, Shire Valley.

33. **DIPLACHNE** Beauv.

D. fusca (L.) Beauv. (F.W.T.A. 2, 517, 1931)

Perennial, up to 1.5 m. tall, forming thick clumps, stems sometimes floating; inflorescence a dense panicle with olive green spikelets. Flood plain, subject to annual submergence. E.L. 176, 582, Lake Chilwa; N 526, Ft. Johnston; 1111, Kota Kota.

34. **ECHINOCHLOA** Beauv.

E. colona (L.) Link. (F.T.A. 9, 607, 1934)

Annual, tufted with culms geniculate at base, from 15 cms. to 1.5 m. tall. Common weed of wet, heavy land. N 169, Chiromo; N 417, Zomba; N 740, Mlanje, 485, Salima.

E. crus-pavonis (H.B.K.) Schult. (F.T.A. 9, 612, 1934)
Annual, forming tufts, base of culms geniculate; spikelets purple. Occasional by wet stream-sides. 322, Mlanje; F.B.L. 38, Dedza.

E. frumentacea Link
Annual, probably introduced as a food plant and now found locally as an escape. E.L. 3, Lower Shire; E.L. 164, Makwapala nr. Zomba.

E. haploclada Stapf (F.T.A. 9, 613, 1934)
Vern. Bande (Chisena).

Perennial, up to 2 m. tall, forming loose straggling tufts; stems often floating when growing adjacent to open water; inflorescence very regular with conspicuous awns; spikelets green or reddish-purple. Locally dominant along river banks liable to flooding (E.L. 11, 12, Chikwawa; N 537, Chiromo, 313, Pt. Herald); locally dominant in seasonal swamp *Themeda* grassland, in wetter phases suitable for rice planting (1099, Kota Kota).

E. jubata Stapf (F.T.A. 9, 619, 1934)
Montane, McClounie 20, Nyika.

E. pyramidalis (Lam.) Hitch. and Chase (F.T.A. 9, 615, 1934)
Vern. Nadanga (Yao); Mkombwa (Chichewa); Antelope Grass.

Perennial, rhizomatous, reed-like or floating in tangled masses; a species of varying habit according to its position in relation to water level. Common in marshes and flood plains up to 5000 ft. altitude. 144, Shire River; N 525, 334, Fort Johnston; 490 Salima; 391, Lilongwe; 226, Dowa; N 182, Kasungu; N 13, Zomba.

E. pyramidalis is cultivated in Southern Rhodesia under the name of Antelope grass. It is readily grown from stolons and sets good seed; the stems as well as the leaves of selected varieties are succulent and palatable to cattle, making excellent pasture and hay. Nyasaland varieties still require selection and study although there are two in cultivation at Lilongwe.

E. stagnina Beauv. (F.T.A. 9, 617, 1934)

Perennial, creeping, culms straggling and falling forming a dense tangle, rooting at the nodes; spikelets large, often purplish. At Lake-shore margins, liable to annual flooding and submergence when the culms float on the water. 542, Kasuni, Mzimba. This grass is said to be rich in sugar and a valuable fodder for domestic animals. At Kasuni it no doubt provides much of the natural forage of *Hippopotamus*.

E. stagnina × **E. pyramidalis** The above two species may cross readily to give a form found along the Lake-shore at the mouths of rivers and in lagoons. It is similar in habit to *E. stagnina* and the floating form of *E. pyramidalis*.

35. EHRHARTA Thunb.

E. abyssinica Hochst.
Perennial, with weak culms straggling through undergrowth; inflorescence a narrow panicle, spikelets light green, papery. Montane, on fringes of evergreen forest. 181, Vipya; 272, Kirk Range; 165, Dedza.

36. ELEUSINE Gaertn.

E. indica (L.) Gaertn. (F.W.T.A. 2, 518, 1931)
Vern. Kangodza, Chinsangwi (Chichewa).

Annual, tufted, tightly rooted; very common weed. E.L. 100, Pt. Herald; E.L. 158, Zomba Mtn. E.L. 269, Makwapala nr. Zomba; 195, Kota Kota.

E. verticillata Roxb. (F.W.T.A. 2, 518, 1931)
Vern. Kangodza.

Annual, tufted, up to 40 cms. tall, resembles above but when mature the glume tips are reflexed and give a characteristic appearance to the spikelets. Weed of sandy and degraded soils at low altitudes. E.L. 8, Lower River; E.L. 557, Port Herald; ! Palombe Plain.

E. verticillata, Roxb. = **Acrachne verticillata** (Roxb.) Chiov.

37. **ELYONURUS** Humb. and Bonpl. ex Willd.

E. argenteus Nees (F.T.A. 9, 70, 1934)

Perennial, forming dense tufts with long, fine, aromatic, bluish-green leaves; inflorescences silky white, spikelets purplish. Montane grasslands, very conspicuous over large areas six to eight weeks after grass fires. N 245, Dedza Mtn., 264, 277, Kirk Range; ! Nyika and Vipya. There are probably two species involved under the one heading.

E. trapnellii C. E. Hubbard

Spikelets smooth, light green, tinged with purple, glume split at the tip into two points; racemes solitary on long, stout peduncles exerted from a clasping spathe, several racemes per flowering culm. Occasional in deciduous *Brachystegia* woodlands on sandy soils. N 559, Nsaru, Lilongwe District; 1297, Mbawa, Mzimba.

38. **ENTEROPOGON** Nees

E. macrostachyus (Hochst.) Munro ex Benth. (F.W.T.A. 2, 520, 1931)

Perennial, forming loose tufts, with sickle-shaped racemes. Occasional in dry deciduous woodlands (N 159, Mpatamanga gorge, Upper Shire; ! Cape Maclear); *Brachystegia* scrub (361, Ekwendeni); *Pterocarpus* woodlands (! Palombe Plain); *Acacia nigrescens* woodland on stony, truncated soils; (! Karonga).

39. **ENTOLASIA** Stapf

E. imbricata Stapf (F.T.A. 9, 739, 1934)

Perennial, tufted, shortly rhizomatous, up to 1 m. tall; basal leaf sheaths papery; root thick; spikelets light green, smooth, arranged in 1 in. long racemes which lie close to main axis giving the appearance of a spike. Occasional to locally frequent in wet situations in perennial *Hyparrhenia* swamps and by stream-sides. 678, Kasungu; 1005, Mbawa, Mzimba.

40. **ERAGROSTIS** Beauv., Love Grass

E. æthiopica Chiov.

Vern. Chidzanjala (Chisena), Chimanganga, Ndzungulu.

Annual, forming loose, small tufts; inflorescences delicate with greyish-green spikelets, common by roadsides and waste places. E.L. 561, Pt. Herald; F.L. 283, Makwapala; N 393, 125, Zomba; 320, Chiromo.

E. arenicola C. E. Hubbard (Kew Bull. (3), 345, 1949)

Annual, forming small tufts up to 40 cms.; inflorescences a loose spike-like panicle, purplish, waysides and abandoned cultivations. N 154, Neno; 64, Lilongwe; Brass, 17521, Kota Kota; E.L. 386, Ft. Johnston.

E. aspera (Jacq.) Nees (F.W.T.A. 2, 512, 1931)

Annual, forming tufts up to 70 cms. tall; inflorescence a stiff, spreading, open panicle. Widespread, common by roadsides, weed of arable land. E.L. 140, S. Palombe plain; N 60, Ft. Johnston; ! Salima; F.B.L. 76, Lilongwe.

E. atrovirens (Desf.) Trin. ex Steud. (= **E. chariis** (Schult.) Hitch.)

Perennial, rhizomatous, with thick white roots; many flowering culms up to 60 cms. few leaves; spikelets dark green. Locally common in seasonal swamps and flood plains. N 674, Palombe Plain; N 620 N 621, 144, Dedza.

E. buchananii K. Schum.

Perennial, forming compact tufts up to 70 cms.; spikelets shiny, olive-green, varying in size according to age. Montane, occasional on cliffs. N 88, N 734, Zomba Mtn.

E. canescens C. E. Hubbard (Kew Bull. (3), 348, 1949)

Perennial, densely tufted, with fine setaceous leaves, spikelets greyish-green with short, white hairs. Montane grassland, locally very common. 516, N 202, Nyika.

E. caniflora Rendle

Tufted perennial with short rhizomes; leaves hairy; spikelets purple hairy. Occasional in high montane marshes. 534, Nyika.

E. capensis (Thunb.) Trin.

Perennial, forming tufts with few leaves; culms from 20 to 70 cms.; underground leaves woolly; spikelets purplish-brown, varying in size. Widespread in boggy areas up to 5000 ft. generally invading overgrazed grasslands. N 470, N 632, 262, Dedza; N 593, Kir' Range; Dowra; F.B.L. 48, Dedza.

E. capensis (Thunb.) Trin. var.

Perennial, tufted with short, narrow basal leaves. Locally common in montane grassland; N 326, Chambe Plt., Mlanje Mtn.

E. castellaneana Busc. and Muschl.

Perennial, tufted with woolly roots; culms up to 1.5 m., inflorescence a delicate, purplish, elongated, conical panicle. Common in *Uapaca-Phillipia* scrub (N 484, Dedza); occasional in *Acacia* woodlands at foot of escarpment (N 587, Dedza Lake-shore) and in sandy, seasonal swamps (452, Lilongwe). Indicative of eroded soils (N 577, Ncheu).

E. chalcantha (Kunth) Trin. (= **E. racemosa** (Thunb.) Steud.)

E. chapelierii (Kunth) Nees

Doubtful perennial, forming small tufts with stiff sparsely leaved stems, up to 1 m. high. Inflorescence a cylindrical, spike-like panicle with elongated green-brown spikelets. Widespread, common in sandy seasonal swamps where it may be locally dominant. An indicator of eroded soils. N 435, Zomba; N 472, N 584, Dedza; N 560, Lilongwe.

E. chariis (Schwlt.) Hitch. (= **E. atrovirens** (Desf.) Trin. ex. Steud.).

E. cilianensis (All.) Lutati (F.W.T.A. 2, 513, 1931)
Annual, forming tufts 15 to 60 cms. high; spikelets proliferating and becoming elongated. Common by waysides and waste places, wide distribution. E.L. 21, Pt. Herald; E.L. 325, Makwapala nr. Zomba; E.L. 541, Blantyre; N 421, Limbe nr. Blantyre; F.B.L. 33, Karonga. 1024, Salima.

E. ciliaris (L.) R. Br. (F.W.T.A. 2, 512, 1931)

Vern. Nchilachiru.

Annual, forming loose, straggly tufts from 20 to 70 cms. tall; inflorescence a loose spike-like panicle, conspicuously woolly. Common by waysides, weed, early stages of regeneration in abandoned cultivations, pioneer in xerosere. E.L. 61; Q 96, Pt. Herald; E.L. 63, Chikwawa; E.L. 147, Makwapala; E.L. 169, 275, S. Palombe Plain; 128, N 44, Zomba; N 59, Ft. Johnston; N 127, Kasupe; N 150, Mwanza; F.B.L. Karonga.

E. congesta Oliver

Annual, forming tufts with few, short leaves; culms up to 70 cms. tall; spikelets congested in an interrupted, spike-like panicle. Widespread, along paths from montane areas to Lake-shore level, usually on sandy soils (535, Ft. Hill; ! Ekwendeni; ! Mzimba; ! Nkata Bay; ! Misuku); occasional in *Brachystegia* woodlands (N 151, Neno).

E. diplachnoides Steud. (F.W.T.A. 2, 512, 1931)

Brass 17496, Kota Kota.

E. gangetica (Roxb.) Steud. (F.W.T.A. 2, 513, 1931)

Annual, with geniculate culms; up to 50 cms. tall; spikelets grey-green in colour, borne at the ends of fine flexuous branches; inflorescence delicate, grey when mature. Very frequent in flood plain grassland. 821, Chilwa.

E. hispida K. Schum.

Perennial, up to 70 cms. but often much shorter; tufted with few leaves, old leaf fibrous; spikelets grey-green, hairy, in groups at the ends of inflorescence branches which terminate in a point. Frequent, spring phase of sandy seasonal swamps with *Loudetia simplex*. 1037, Nsaru, Lilongwe, F.B.L. 63, Dedza; S.G.W. Ekwendeni; ! Fort Manning.

E. horizontalis Peter

Annual, loosely tufted with few leaves, up to 80 cms. tall; spikelets small, narrow, greyish-green, arranged in a cylindrical, open panicle. Gregarious, common by waysides and waste places. N 162, Mwanza; N 474, Linthipe; 1020, Salima.

E. lappula Nees

Vern. Kauni (Chichewa) sand dune grasses, general.

Perennial, tufted, with upright rhizomes, deeply embedded in sand; up to 1 m. tall; spikelets shiny, green, hairy, in large delicate drooping inflorescences. In pure stands along the Lake-shore sand dunes and on sandy flats. 1073, Kota Kota.

E. lappula Nees var. **divaricata** Stapf

Perennial, few stems arising from persistent bases, up to 80 cms. tall; spikelets hairy, purple with grey cast due to hairs, in stiff but delicate open panicles. Sandy seasonal swamp, in late spring phase. 1038, Nsaru, Lilongwe.

E. longepaniculata De Wild.

Perennial, forming large tussocks up to 1.5 m. tall with large, open panicle. Occasional in rubber plantations. N 193, Vizara, Nkata Bay.

E. namaquensis Nees

Vern. Nsinde.

(F.W.T.A. 2, 512, 1931)

Annual, forming dense tufts up to 1 m. high; spikelets very small, purplish-pink, arranged in a dense but delicate panicle. Very common in wet places, ditches and swamps, also conspicuous weed on heavy lands subject to flooding. E.L. 173, Liwonde; N 139, Kasupe; N 165, 88, Zomba; N 253, N 625, Dedza; 242, Dowa; ! Palombe Plain; ! Mzimba.

E. patens Oliver

Annual, tufts usually tightly appressed to the ground, geniculate; spikelets brownish-red to purple, elongated, up to 4 cms., grouped in dense terminal heads. Wide range of distribution, usually on compacted soil by waysides and dwellings. N 490, Zomba; 573, Misuku.

E. pseudosclerantha Chiov.

Annual, tufted, geniculate, closely appressed to ground. Occasional in heavily grazed grasslands. 416, Ncheu.

E. racemosa (Thunb.) Steud. (= **E. chalcantha** (Kunth) Trin.).

Perennial, usually forming low tufts with many flowering shoots from 20 to 60 cms. all; spikelets dull green, often in dense panicles. Very widespread, from montane grasslands to deciduous woodlands at lower altitudes. Montane grasslands (N 316, N 332, Chambe Plt., Mlanje; N 669, 296 Kirk Range); *Brachystegia* woodlands (N 308, Cholo, N 356 Likabula, Mlanje; N 405, Ncheu; 338, Dedza, 329, Tambani, Mwanza; F.B.L. 15, 24, Karonga).

E. superba Peyr.

Perennial, forming loose tufts up to 70 cms. tall; inflorescence a spreading panicle with reflexed branches, spikelets broad up to 7 mm. Locally common in *Brachystegia-Pterocarpus* escarpment woodlands (N 160, Neno; 305, Cholo escarpment; weed of sandy soils (E.L. 136, N 678, Palombe).

E. tenuifolia Hochst.

Annual, forming small tufts with slender culms up to 60 cms.; leaf blades narrow elongated; inflorescence an open panicle with relatively few spikelets. Common by roadsides and in waste areas; shade tolerant. N 42, Zomba; F.B.L. Karonga.

E. tremula Hochst.

(F.W.T.A. 2, 513, 1931)

Annual, tufted, geniculate becoming prostrate, sparsely leafy; inflorescence a broad nodding panicle with purplish proliferating spikelets. Forming societies on beaches, paths, waste ground and in villages on sandy soils. N 194, 906, Nkata Bay.

E. villosipes Jedw.

Tufted perennial, in small tufts, up to 120 cms. tall; underground leaf bases woolly;

inflorescence stiff, with shining, greenish-brown spikelets 0.5 cms. long, 0.2 cms. broad. Occasional in *Brachystegia-Julbernardia* woodland. 762, Lilongwe.

E. viscosa (Retz.) Trin.

Annual, forming small tufts up to 30 cms. high; very hairy; inflorescence a cylindrical, open panicle, spikelets purplish, sticky. Common roadside weed in N. Province (536, Fort Hill); occasional in exposed situations on rock faces (N 452, Chiradzulu).

E. volkensii Pilger

(F.W.T.A. 2, 514, 1931)

Perennial, rhizomatous and stoloniferous; culms straggling, wiry, up to 1 m. high; sparsely leafy; inflorescence a short, pyramidal, open panicle with dark-green shiny spikelets. Montane grasslands, forming societies in sheltered situations. N 207, 513, Nyika; N 314, N 351, Chambe Plt., Mlanje Mtn.

41. **ERIOCHLOA** H.B. and K.

E. borumensis Stapf (non. Hack.)

Loosely tufted perennial up to 1.5 m. tall. Occasional on outskirts of sandy swamp. 837, N 739, Tuchila, S. Palombe.

E. macclounii Stapf

(F.T.A. 9, 501, 1934)

Montane, McClounie 8, Nyika.

E. nubica, Hack. et Stapf ex Thell.

(F.T.A. 9, 499, 1934) as *E. acrotricha* Hack. ex Thell.

Annual, tufted. Lower Shire Valley, Kirk.

E. procera (Retz.) C. E. Hubbard

Perennial, tufted culms geniculate at base, up to 70 cms. Occasional in flood plain grasslands of Shire River. 314, Pt. Herald.

42. **ERIOCHRYSIS** Beauv.

E. pallida Munro

(F.T.A. 9, 93, 1937)

Perennial, densely tufted with thick roots, culms up to 40 cms. tall; inflorescence with golden silky hairs. Occasional to common in perennial and seasonal swamps above 3500 ft. N 564, Kasungu; N 622, 146, Dedza; 286, Ncheu; 619, Ft. Manning.

E. purpurata (Rendle) Stapf

(F.T.A. 9, 92, 1934)

Montane, Mlanje Mtn., White: Buchanan, 997.

43. **EUCLASTA** Franch.

E. condylotricha (Hochst. ex Steud.) Stapf

(F.T.A. 9, 181, 1934)

Annual, loosely tufted, racemes pendulous, occasional in *Brachystegia* escarpment woodlands. N 517, Namweras escarpment, Ft. Johnston; ! Salima escarpment.

44. **EULALIA** Kunth

E. geniculata Stapf

(F.T.A. 9, 101, 1934)

Perennial, creeping, with very long spreading stolons; spikelets brown, silky. Occasional in *Hypparrhenia* seasonal swamps. 342, Lilongwe; F.B.L. 53, Dedza; 982, Mbawa nr. Mzimba.

E. villosa (Thunb.) Nees

(F.T.A. 9, 99, 1934)

Perennial, tufted, erect; racemes hairy with yellowish-brown spikelets. Montane grasslands, locally common (N 158, Kirk Range; ! Vipya); swampy areas in deciduous woodlands at 5000 ft. (442, Mzimba).

45. **EUSTACHYS** Desv.

E. paspaloides (Vahl) Lanza and Mattei

Perennial, tufted grass, somewhat geniculate at base; up to 100 cms. tall; spikelets light brown, small, evenly arranged in 1-sided racemes; closely resembles *Chloris gayana*. Common locally in *Pterocarpus-Brachystegia* escarpment woodland. 326, Mwanza Road.

46. **EXOTHECA** Anderss.

E. abyssinica (Hochst.) Anderss.

(F.T.A. 9, 384, 1937)

Perennial, forming dense tufts, varying in height from 40 cms. to 2 m.; inflorescence a pair of shortened racemes; spikelets purple; awn stiff, straight, up to 8 cms. long. One of the dominant species of montane grasslands; (N 91, Zomba Mtn.; 527B, N 208, Nyika; N 334, Chambe Plt., Mlanje Mtn.; ! Vipya; ! Kirk Range; ! Dedza Mtn.); occurring on lower mountain slopes in association with *Themeda triandra* var. *hispida*; (89 Zomba; ! Dedza Mtn.; ! Nchisi Mtn.).

47. **FESTUCA** Linn.

F. caprina Nees

Perennial, tufted; spikelets bright green in dense inflorescences; leaves fine. Occasional at fringes of montane evergreen forest. 434, Vipya.

F. milanjiana Rendle

Perennial, forming upright tufts up to 1 m. high; sparsely leafy; inflorescence a loose panicle, spikelets pale purplish-green, 1.5 cms. long. Occasional societies by stream banks in evergreen montane forest; N 319, Chambe Plt., Mlanje Mtn.

F. schimperiana A. Rich.

(F.W.T.A. 2, 508, 1931)

Perennial, tufted up to 60 cms., basal leaves narrow, becoming broader on flowering culms; spikelets in a loose spike-like panicle, green or purplish green. Locally very frequent to dominant in high montane grasslands in association with *Exothea abyssinica*. N 201, 499, Nyika.

48. **GILGIOCHLOA** Pilger

G. indurata Pilger

Annual, tufted up to 40 cms. tall; inflorescence a false spike bearing purple spikelets with fine but conspicuous awns. Occasional on poor compacted soils in *Julbernardia* scrub woodlands; 540, Ekwendeni; ! Nchenachena.

49. **HACKELOCHLOA** O. Kuntze

H. granularis (L.) O. Kuntze

(F.T.A. 9, 57, 1951 as *Manisuris granularis* Sw.)

Annual, single plants much branched, procumbent, clothed with stiff hairs; inflorescences numerous, axillary; fertile spikelets round, sculptured, black when ripe. Locally common weed. E.L. 619, Blantyre; 1109, Kota Kota; N 486, Chitala, Salima; ! Neno.

50. **HELICTOTRICHON** Bess. ex. Schult.

H. cartilagineum C. E. Hubbard

(F.T.A. 10, 112, 1937)

Perennial, up to 1 m. high, with a loose drooping panicle; spikelets green, shiny. Locally common in high montane grasslands. 508, N 205, Nyika.

H. elongatum (Hochst. ex. A. Rich) C. E. Hubbard

(F.T.A. 10, 114, 1937)

Vern. Chamasala.

Perennial, loosely tufted, stems geniculate at base, up to 1 m. tall; inflorescence a loose panicle with shiny, papery, light-green spikelets. Locally common in fringes of montane evergreen forests and by stream sides. N 252, Dedza Mtn.; N 667, Kirk Range; N 675, 831, Zomba Mtn.; 447, Vipya.

H. milanjeanum C. E. Hubbard

Mlanje Mtn., Whyte.

51. **HEMARTHRIA** R. Br.

H. altissima (Poir.) Stapf and C. E. Hubbard

(F.W.T.A. 2, 601, 1931)

Perennial, creeping with long stolons, flowering stems ascending; inflorescence a cylindrical false-spike. Widespread in perennial and seasonal marshes from Lower Shire Valley to low montane levels; often an exclusive dominant. N 532, N 119, Chiromo; 392, Lilongwe; 1104, Kota Kota; ! Mwera Hill, Dowa; 214, Dowa; ! Karonga.

H. natans Stapf

F.T.A. 9, 56, 1934

Perennial, creeping with long stolons, racemes in a crowded group terminally; spikelets tinged red with fairly long glume points; leaves glossy. Locally common at mouths of rivers and at edges of lagoons. 1112 Dwangwa River, Kota Kota; marshy grounds, Scott; Buchanan 1310; F.B.L. 29, Rukuru Estuary, Karonga.

52. **HETEROPOGON** Pers.**H. contortus** (L.) Beauv. ex Roem. and Schult.

(F.T.A. 9, 411, 1934)

Vern. Nsanu (Chinyanja); Sucho (Chiyao); Nyuni (Chitumbuka).

Annual, forming leafy tufts; spikelets usually pubescent, in a false spike; long awns at apex of racemes; base of fruit armed with sharp callus capable of penetrating skin. Widespread, frequent in *Terminalia* and *Brachystegia* woodlands on grey, sandy soils. Often dominant on poor sandy and eroded lands. E.L. 1, Pt. Herald; E.L. 324, Makwapala; E.L. 662, Blantyre; 321, Chiromo; ! Namweras; Lake Chilwa; Ft. Johnston; Ncheu; Kasungu; Mzimba.

H. melanocarpus (Ell.) Benth.

(F.T.A. 9, 413, 1934)

Doubtful perennial, forming loose tufts up to 2 m.; inflorescences grouped fanwise, spikelets with long, brown awns; glumes pitted, with tuberculate hairs; fruits armed with a sharp callus, penetrating skin. Locally common in deciduous woodlands and scrublands on sandy soils and extending to seasonal marshes. N 67, Monkey Bay; N 128, Zomba; 412, Upper Shire; ! Ft. Manning; ! Lake Chilwa.

53. **HOMOZEUGOS** Stapf**H. cylesii** C. E. Hubbard

Perennial, tufted, up to 2 m. tall; culms thin; leaves hairy; nodes with a ring of upward pointing silky hairs; inflorescence shining green, spikelets silky hairy in 1-3 racemes, awns pink. Occasional to locally frequent in upland *Brachystegia* woodlands. 431, 1148, Mzimba.

54. **HYPARRHENIA** Anderss.**H. bracteata** (Humb. and Bonpl.) Stapf

(F.T.A. 9, 360, 1934)

Perennial, densely tufted, up to 2 m. tall; spathes orange, spikelets generally dark purple, in short racemes. Low montane swamps (N 365, Zomba; N 464, slopes of Dedza Mtn.; N589, Kirk Range); seasonal swamps with *Hyparrhenia rufa* (815 Mposa, Lake Chilwa).

H. collina (Pilger) Stapf

(F.T.A. 9, 337, 1934)

Perennial, tufted grass, tightly anchored by root system; up to 170 cms. tall; spathes long, reddish; spikelets very pubescent; racemes exerted from spathes, reflexed. Seasonal swamps, apparently not common. 253, Dowa.

H. cymbaria (L.) Stapf

(F.T.A. 9, 332, 1937)

Perennial, straggling, forming tangled masses, culms wiry, often prostrate, rooting at nodes; spathes broad, orange and purple, racemes not exerted from spathes. Widespread, montane, often dominant on outskirts of relic forests and valleys. E.L. 162, N 29, N 612, 85, Zomba Mtn.; ! Vipya; Nyika; ! Nchenachena; ! Misuku; ! Livingstonia.

H. dichroa (Steud.) Stapf

(F.T.A. 9, 302, 1934)

Perennial, tufted, up to 21 m. tall; stems yellow, spathes green, spikelets green with short yellowish hairs, racemes contiguous. Locally common in *Acacia campylacantha* deciduous woodland at Lake-shore level, 480, Salima.

H. diplandra (Hack.) Stapf

(F.T.A. 9, 368, 1934)

Perennial, tufted, tufts often large and dense; up to 3 m. tall; stems reed-like, often with stilt roots at base; leaves glabrous or coarsely hairy, especially at joint of blade and sheath; spikelets purple in short, dense racemes with pink spathes, resembling small grasshoppers. Locally common in low montane grasslands (556, Misuku; ! Livingstonia); occasional in seasonal swamps (828, N. Chilwa, hairy form); (Whyte, between Kondowe and Karonga).

H. dissoluta (Steud.) C. E. Hubbard (F.W.T.A. 2, 589, 1931)
Vern. Kamphokete (Chichewa).

Perennial, tufted, with many flowering stems, up to 3 m. tall; spathes long, purplish-green, spikelets green, over 1 cm. long; fertile spikelet grooved, with a stout, yellow awn, 8 cms. long and armed with a basal callus which can penetrate the skin. Common in sandy seasonal swamps and in wayside communities. N 33, N 101, 130, 113, Zomba; N 482, Ncheu; ! Lilongwe.

H. eylesii C. E. Hubbard

Perennial, shortly rhizomatous forming small tufts; stem yellow, up to 2 m. tall; inflorescence with few raceme pairs, spathes green, racemes up to 6 cms. long, spikelets dark brown, white silky pubescent. Common in *Brachystegia* woodland. (N 434, road to Lake Chilwa); sandy seasonal swamps (455, Lilongwe); dominant in *Combretum* scrub and sandy seasonal swamps at Lake-shore level (905, Chintechu).

H. filipendula (Hochst.) Stapf (F.T.A. 9, 322, 1934)
Vern. Nyumbu (General).

Perennial, tufted with short rhizomes, culms slender, yellow, up to 2 m. high; inflorescence thin, spathes 6 cms. long, narrow, green or pinkish; racemes narrow with up to 2 awned spikelets, spikelets light purplish-green. Widespread from montane grasslands (440, Vipya), to deciduous woodlands at lower altitudes; typical of *Julbernardia globiflora-Brachystegia* scrub woodlands of N. Province (857, Ekwendeni); *Acacia-Combretum* woodlands (462, Lilongwe); *Brachystegia* woodlands (E.L. 36, Pt. Herald) and waysides (N 49, Ncheu; N 74, Namweras; N 79, Zomba).

H. filipendula (Hochst.) Stapf var. **pilosa** (Hack.) Stapf

Vern. Nyumbu.

Perennial, spikelets green, with white short silky pubescence. Very similar in general appearance to *H. filipendula* in the field and covering same range of habitats. Also very common in *Hyparrhenia* seasonal swamps (461, Lilongwe; 427, Dedza); montane grassland, (N 593, 417, Kirk Range); and *Acacia-Combretum-Ptilostigma* woodlands (470, Lilongwe).

H. finitima (Hochst. ex A. Rich.) Anderss. (F.T.A. 9, 299, 1934)

Perennial, tufted from a short, much branched rhizome; up to 1.5 m. tall; spathes reddish-green, racemes narrow, spikelets green. Not common. Lake-shore *Brachystegia* woodland. 192, Kota Kota.

H. formosa Stapf (F.T.A. 9, 340, 1934)

Perennial, straggling and loosely tufted; spathes broad, spikelets small and narrow. Rocky situations in montane region. 529, Nyika.

H. gazensis Stapf (F.T.A. 9, 301, 1934)

Vern. Tsekera (General).

Perennial, up to 2.5 m. tall, forming clumps; inflorescence dense, spathes 2.5 cms. long, reddish-brown, often very conspicuously red; spikelets purplish-green. Widespread grass in many habitats from Lower Shire to low montane woodland on heavy black soil (E.L. 73, Chikwawa; E.L. 142 S. Palombe plain); *Brachystegia* woodland on heavy soil (N 624, Dedza; 112, Zomba); *Ptilostigma-Combretum* woodland (460 Lilongwe); very common on soils marginal to seasonal swamps with *Acacia campylacantha* (55, 469, Lilongwe); escarpment foothill woodlands 478, Salima).

H. gracilescens Stapf (F.T.A. 9, 357, 1934)

Annual, from 50 cms. to 2.5 m. tall; racemes sharply reflexed, awns fine up to 6 cms. long. From Montane grasslands to upper escarpment *Brachystegia* woodlands; frequent by waysides. N 102, 103, Zomba; N 301, Zomba Mtn. 474, Salima Escarpment.

H. lecomtei (Franch.) Stapf (F.T.A. 9, 361, 1934)

Perennial, with short rhizomes forming dense tufts up to 1.5 m. tall; bases of leaf blades hairy, racemes drooping, peduncles and base of racemes conspicuously hairy; spikelets, purplish, pubescent. Locally common in montane grasslands (N 342, Chambe Plt., Mlanje Mtn., 833,

Zomba Mtn.); common in *Brachystegia-Uapaca* hill woodlands (865, Nyika; 769, Ft. Manning). A variety 531 is very common in high level grassland with *Loudetia simplex*, Nyika; and variety 536 in *Brachystegia-Uapaca* woodlands of Lower Nyika.

H. newtonii (Hack.) Stapf

Perennial, tufted, up to 1 m. tall; racemes reflexed, peduncles and raceme bases with long white tuberculate hairs. Spikelets purplish with brown awns 5 cms. long. Not common; seasonal *Hyparrhenia* swamps. N 619, Lilongwe.

H. newtonii (Hack.) Stapf var. **macra** Stapf (F.T.A. 9, 363, 1937)

Perennial, tufted, 50 cms. high, leaves glaucous; peduncles and raceme bases clothed with conspicuous white hairs; spikelets purplish. Montane grassland, locally very conspicuous in *Andropogon schirensis* grassland. 435, Vipya. This specimen may prove to be *H. lecontei* q.v. It occupies the same habitat of montane grassland and agrees with the conspicuously hairy raceme bases.

H. nyassae (Rendle) Stapf (F.T.A. 9, 313, 1934)

Perennial, tufted; of variable habit; nodes and bases of leaf sheaths hairy; spikelets with golden hairs. Widespread from montane to deciduous woodlands and swamps; easily confused with *H. rufa*; montane grasslands (353, 438, Vipya); *Hyparrhenia* swamps (280 Ncheu; 374 Mzimba; *Loudetia simplex* seasonal swamp (1096, Kota Kota); *Acacia-Piliostigma-Combretum* woodland (459A, Lilongwe); *Brachystegia* woodland (983, S. Mzimba).

H. rudis Stapf (F.T.A. 9, 344, 1934)

Perennial, tufted, up to 2.5 m. tall; long white tuberculate hairs on raceme bases, racemes sharply reflexed; spikelets conspicuously white hairy. Not common, occasional in seasonal *Hyparrhenia* swamps. 473, Lilongwe.

H. rufa (Nees) Stapf (F.T.A. 9, 304, 1934)

Vern. Nyumbu, Cipepati.

Perennial, tufted, with short rhizomes; stems yellow; inflorescence dense, racemes 2.5 cms. long with 12 or more fertile spikelets, which are typically rufous hairy and not reflexed; spathes reddish-orange. Widespread throughout deciduous woodlands, swamps and wayside communities. Low montane grassland and scrub (5560, Misuku); *Diplorrhynchus-Bauhinia* scrub, (476, foot of Salima escarpment); *Brachystegia* woodlands (N 371, Cholo); waysides (N 36, N 94, Zomba); *Hyparrhenia* swamps (471, 53, Lilongwe; 216, Dowa); flood plain grasslands and seasonal swamps (813, 807, Lake Chilwa, 560, Karonga).

A useful common thatching grass. The main grass of the N. Karonga and F. Chilwa grazing areas; with proper management it tends to become geniculate at the base and give decent swards; uncontrolled grazing of *H. rufa* grasslands results in adjacent under and overgrazed areas.

H. variabilis Stapf (F.T.A. 9, 334, 1934)

Perennial, forming dense clumps with reedy stems up to 3 m. high; inflorescences; dense spathes broad, purplish green to orange up to 1.5 cms. long. Widespread from montane to deciduous woodlands and seasonal swamps, common in wayside communities. E.L. 318, Zomba Mtn.; N 39, Zomba; N 72, Namweras.

H. vulpina Stapf (F.T.A. 9, 310, 1934)

Perennial, up to 1.5 m. tall; tufted; spathes narrow, 3.5 cms. long, reddish; peduncles hairy, spikelets shortly golden pubescent. Common, chiefly in wayside communities; N 105, Zomba.

H. sp. aff. phyllopoda Stapf (F.T.A. 9, 346, 1937)

Perennial, forming dense clumps up to 2 m. high; inflorescence congested; spathes hairy, tightly enclosing racemes which are pubescent; spikelets purple with short, fine awns. Locally dominant in *Hyparrhenia* seasonal swamps. N 189, Kasungu.

H. sp. aff. pilgeriana C. E. Hubbard

Perennial, shortly rhizomatous, stems tough and slender, geniculate, arising in very loose tufts, up to 80 cms. tall. Occasional in *Andropogon schirensis* short montane grassland. 433, Vipya.

H. sp. aff. pseudocymbaria Anderss. (F.T.A. 9, 329, 1934)

Perennial, loosely tufted, geniculate at base, rooting from lower nodes; spathes broad, purplish-green; spikelets pubescent with fine awns up to 3 cms. Occasional in *Brachystegia* escarpment woodlands. N 485, Salima escarpment.

H. sp. aff. schimperii Anderss. (F.T.A. 9, 329, 1934)

Perennial, shortly rhizomatous, tufted, lower nodes of stems with buttress roots; racemes sharply reflexed with conspicuous white hairs on the peduncles; spathes pink. Common, at margins of *Hypparrhenia* seasonal swamp. 464, Lilongwe.

55. **IMPERATA** Cyr.

I. cylindrica (L) Beauv. var. **koenigii** (Retz.) Dur. and Schintz. (F.T.A. 9, 88, 1934)

Vern. Namsongole (Chinyanja).

Perennial, with long rhizomes; leaf blades stiff, erect with purple margins, sharply pointed; inflorescence a false spike, silky. Widely distributed from montane to lower altitudes. Flowering early in the growth phase following fires. E.L. 196, E.L. 284, Makwapala; 137, Zomba Mtn.; ! Nkata Bay; ! Livingstonia; ! Vipya; ! Ft. Johnston.

56. **ISACHNE** R.Br.

I. angolensis Rendle (F.T.A. 9, 1093, 1934)

Perennial, from fine rhizomes; straggling, up to 40 cms. tall, forming loose tufts; inflorescence a small panicle, 6 cms. long. Relic evergreen forest, by stream banks, 565, Misuku. Nyika Plateau, Whyte.

57. **ISACHAEMUM** Linn.

I. brachyatherum Fenzl, ex Hack. (F.T.A. 9, 30, 1934)

Vern. Njogo (Chisena).

Perennial, with long rhizomes regularly clothed with cataphylls; culms erect up to 2 m.; inflorescences somewhat digitate with 4 to 6 pinkish downy racemes. Common in association with *Setaria* spp. in *Acacia seyal* woodlands; an indicator of "black cotton" soils. N 170, N 533, Ngabu, Lower Shire Valley; 581, Sombani River, Palomhe Plain.

I. purpurascens Stapf (F.T.A. 9, 32, 1937)

Perennial, straggly, forming loose tufts; culms slender up to 80 cms.; inflorescences digitate with 4 to 6 racemes, purplish downy. Montane, forming pure stands on banks and islands of perennial streams. N 86, N 503, N 605, 136, Zomba Mtn.; N 598, Kirk Range.*

58. **KOELERIA** Pers.

K. cristata (Pers.) var. **brevifolia** (Nees) C. E. Hubbard.

Perennial, forming dense low tufts up to 60 cms. high, with setaceous leaves; inflorescence a contracted panicle with shiny light green spikelets. Montane, forming societies on exposed rock faces and in wet depressions in grasslands. N 310, N 23, N 360, Chambe Plt., Mlanje Mtn.

59. **LEERSIA** Swartz

L. hexandra Swartz (F.W.T.A. 2, 538, 1931)

Vern. Likakadzi, Nakache (Chinyanja).

Perennial, rhizomatous often with creeping, succulent branches from which arise slender, scabrid culms; leaf sheaths scabrid. Widespread from montane to Lake-shore level in perennial and seasonal swamps, on flood plains and river banks. N 145, Lake Chilwa; N 384, Zomba Mtn.; 101, Zomba, N 422, Luchenza; F.B.L. 66, Lilongwe; ! Fort Manning; 564, Misuku; F.B.L. Rukuru estuary, Karonga; F.B.L. 58, Dedza.

***I. arcuatum** (Nees) Stapf = **I. purpurascens** Stapf

60. **LEPTOCARYDION** Hochst. ex Benth. and Hook. f.

L. vulpiastrum (de Not.) Stapf

Vern. Kalingamunyu.

Annual, forming small tufts 60 cms. high, stems woody with broad leaf blades; inflorescence a spike-like panicle, woolly, pinkish. Widespread but more common at lower altitudes, a weed on sandy soils. E.L. 64, Chikwawa; N 65 Fort Johnston; 467a, Lilongwe!, Salima.

61. **LEPTOCHLOA** Beauv.

L. panicca (Retz.) Ohwe

(F.W.T.A. 2, 517, 1931 as **L. chinensis**)

Vern. Kapepe, Kauiepe.

Annual, forming small tufts; inflorescence verticillate, racemes with minute spikelets. Occasional in lowlands and marshes, E.L. 30 Port Herald.

L. uniflora Hochst. ex A. Rich.

(F.W.T.A. 2, 517, 1931)

Creeping grass with fine culms; inflorescences fine but stiff; spikelets small. Evergreen, riverine forest, by stream, wet underfoot, 1175, Misuku foothills, Karonga.

62. **LOUDETIA** Hochst. ex Steud

L. flavida (Stapf) C. E. Hubbard

(F.T.A. 10, 34, 1937)

Perennial, tufted up to 1.5 m. tall; stems waxy, blue-green, nodes glabrous or bearded; inflorescence a dense panicle (horse tail) of bright brown spikelets, glumes sharply pointed. Occasional in *Brachystegia* woodlands (1140, Kasungu); in pure stands on Lake-shore sands (1110, Kota Kota).

L. phragmitoides (Peter) C. E. Hubbard

(F.T.A. 10, 18, 1937)

Perennial, shortly rhizomatous, forming large clumps up to 3 m. high; stem, hollow, reedy; leaf sheaths, hairy; inflorescence a dense contracted panicle, with orange-brown spikelets. Locally common in seasonal swamps, also occurring in individual stools in *Hyparrhenia* flood plain grassland. N 652, Cholo escarpment; 812 Lake Chilwa; ! Chikwewo near Lake Chiuta.

L. simplex (Nees) C. E. Hubbard

(F.T.A. 10, 25, 1937)

Perennial, tufted up to 80 cms. high; leaf blades often narrow, sometimes glaucous; paniculate inflorescence with brown spikelets, outer glumes darker. Dominant in montane grasslands; (E.L. 351, N 89, Zomba Mtn. N 329, N 337, N 338, N 340, Chambe Plt., Mlanje Mtn.; 530, Nyika; 419, Kirk Range); also locally dominant in seasonal swamps, (N 458, Linthipe; 398, Lilongwe!, Kasungu). N 755, Zomba Mtn., may be *L. arundinacea* Steud.

Forms with tubercled hairs on the glumes are found and classified under the same species, 825, Zomba Mtn., in grassland and 1152, Misuku foothills, Fort Hill. Both glabrous and hairy forms are found in the same locality.

1091, a form found on sandy soils at Kota Kota, has a distinct double ring of hairs at each node, the upper ring with black tubercles.

L. superba de Not

(F.T.A. 10, 47, 1939)

Perennial, rhizomatous, up to 3 m. high, base of stem often bulbous; culms sparsely leafy; panicles contracted, with few to many brown spikelets and long yellow awns up to 4 cms. Locally dominant in sandy seasonal swamps and occasionally found in *Brachystegia* woodlands. N 141, Kasupe; 1097, Kota Kota!, Lilongwe!, Fort Hill.

63. ***MANISURIS** Linn. f.

M. sulcatus (Stapf) Dandy

(F.T.A. 9, 59, 1934 as **Peltophorus sulcatus** Stapf)

Perennial, shortly rhizomatous, culms erect up to 1 m; leaves hairy; racemes cylindrical; fertile spikelets with sculptured glumes. Montane, occasional in grassland and *Protea* scrub (N 182, Vipya); extending to lower montane deciduous *Brachystegia* woodlands (N 191, Vipya. 444, S. Mzimba).

*N.B. *Manisuris* is now *Heteropholis*

64. MEGASTACHYA Beauv.

M. mucronata Beauv.

Perennial, creeping grass with thick culms rooting at nodes; leaves broad, dark green, conspicuously undulate; one large terminal panicle with smaller axillary ones; spikelets glabrous up to 1 cm. long. In shade of *Parinari* near Lake-shore, 920, Nkata Bay.

65. MELINIS Beauv.

M. ambigua Hack.

(F.T.A. 9, 921, 1934)

Perennial, tufted, culms often geniculate at base, rooting from lower nodes, trailing; leaf sheaths generally very hairy; blades ciliate at margins; nodes downy, flowering culms slender, up to 1.5 m. high; contracted panicle pale purple, silky; spikelets with fine awns 1 cm. long. Occasional societies in montane and lower montane grasslands; (N 503, N 549, Zomba Mtn. N 500, Zomba); occasional in *Brachystegia-Uapaca* hill woodlands (859, Nyika); montane scrub with evergreen forest relicts (515, Nyika, Nchenachena); old cultivation in low montane regions (832, Domasi).

M. eylesii Stapf and Hubbard

(F.T.A. 9, 923, 1934)

Perennial with short rhizomes, forming straggling tufts; leaf sheaths and blades downy hairy, sticky; flowering culms up to 1 m., spikelets green with fine purple awns 1 cm. long. Occasional in montane grasslands, N 281, Zomba Mtn.

M. longicauda (Mez) Mez

(F.T.A. 9, 919, 1934)

Perennial, densely tufted or straggling; leaf sheaths and blades densely hairy or glabrous; inflorescence a contracted dense panicle, conspicuously silky purple; spikelets purplish with fine awns 1 cm. long. Locally common in montane grasslands (N 502, Zomba Mtn. 437, Vipya); extending to escarpment *Brachystegia* woodland (N 522, N 524, Namweras escarpment).

M. macrochaeta Stapf and Hubbard

(F.T.A. 9, 927, 1934)

Vern. Chamasala.

Annual, forming erect or straggling tufts up to 1.5 m. high; leaf sheaths hairy, blades ciliate at margin, sticky; inflorescence a spike-like panicle, spikelets minute, green tinged purple, awns fine 2 cms. long. Forming communities by waysides and in abandoned cultivations. N 100, Chikwawa escarpment; N 515, N 516, Namweras; N 556, Zomba; N 602, Cholo.

M. maitlandii Stapf and C. E. Hubbard

(F.T.A. 9, 930, 1934)

Perennial, straggling, forming dense stands; leaf blade and sheaths downy, tacky; flowering culms up to 1 m., with a broad greenish-purple panicle; spikelets awned or awnless; montane and lower montane forming dense societies along paths, also very common in scrub on mountain slopes; N 197, Nchenachena; N 543, N 548, Zomba Mtn.

M. minutiflora Beauv.

(F.T.A. 9, 931, 1934)

Perennial, straggling, forming a dense tangled sward, culm up to 2 m. but prostrate or semi-ascending; leaves viscous, smelling of molasses; spikelets purple, small awned. Burt Davy, Chinteche.

Readily established from seed to give a pure, vegetationally dense sward. It is esteemed as a pasture grass in E. Africa but under Nyasaland conditions appears to recover slowly from cutting; established at Lilongwe.

M. tenuinervis Stapf

(F.T.A. 9, 929, 1934)

Perennial, straggling and scrambling through shrub layer; leaves softly hairy, not aromatic or viscous; spikelets small, purple-green with small, inconspicuous awns. Common in grassland with relic evergreen scrub clumps, in association with *Hyparrhenia diplandra-Rhynchelytrum stolzii*, 562, Misuku.

M. tenuissima Stapf

(F.T.A. 9, 926, 1934)

Doubtful perennial, tufted, straggling, sparsely leafy slender culms up to 1 m. high; inflorescence a broad, spreading loose panicle with fine branches; spikelets minute, metallic purple with fine awns 1 cm. long. Forming local societies in montane grasslands (N 594, Kirk Range;

N 546, N 547, 829, Zouba Mtn.); occasional in deciduous *Brachystegia* woodlands, (N 108, Zomba; N 578, Ncheu; ! Mzimba).

66. **MICROCHLOA** R. Br.

M. indica (L.) Beauv.

(F.W.T.A. 2, 524, 1931)

Annual, with short leaves and falcate racemes. Pioneer species on rocks and boulders forming cushions in association with mosses. N 413, Zomba; F.B.L. 46, Dedza.

M. kunthii Desv.

Perennial, tufted with short setaceous leaves; culms slender, erect, up to 60 cms. bearing single falcate racemes up to 1.5 cms. long; spikelets often purple. Widespread, as pioneer on rock surfaces, in exposed situations, overgrazed areas in deciduous woodlands on lighter soils and in sandy seasonal swamps. N 386, N 385, Chiradzulu; N 402, Lilongwe; 350, Vipya; 339, Blantyre; 611, Ft. Manning; 330, Mwanza.

67. **MONOCYBIUM** Stapf

M. ceresiiforme (Nees) Stapf

(F.T.A. 9, 387, 1934)

Perennial, densely tufted 50 cms. tall; leaves often purplish; inflorescence with few spatheate racemes; spathes orange-brown enclosing silky hairy, awned spikelets. Dominant in the poorer phases of montane grasslands in association with *Loudetia simplex*. (N 90, Zomba Mtn.; N 600, Chambe Plt., Mlanje Mtn.; ! Dedza; ! Nyika; ! Vipya; ! Kirk Range; F.B.L. Sichivula, Fort Hill); also occasional in seasonal swamps, (! S. Mzimba; ! Nkata Bay).

68. **NEYRAUDIA** Hook. f.

N. arundinacea (L.) Henard

Perennial, forming large tufts; culms reed-like, up to 3.5 m. tall; spikelets small, brown in a large, dense panicle, 60 cms. long. Local, in *Brachystegia-Uapaca* woodland, 555, Karonga.

69. **OLYRA** Linn.

O. latifolia L.

(F.W.T.A. 2, 538, 1931)

Perennial, rhizomatous, with bamboo-like stems, often with purple spots; leaf blades 25 cms. long and 10 cms. broad; inflorescences in axillary panicles, upper spikelets female with shiny white fruits. Occasional, in *Khaya nyassica*-*Piptadenia* evergreen rain forest. N 714, Lujeri, Mlanje; 319, Chikwawa escarpment; Willan 3, Cholo; ! Nkata Bay.

70. **OPLISMENUS** Beauv.

O. burmannii (Retz.) Beauv.

(F.T.A. 9, 636, 1934)

Annual, creeping with slender purple stilt roots; leaf blades lanceolate, transversely wrinkled; inflorescence with up to 5 racemes; spikelets green, awned. Societies in riverine, evergreen forest. N 52, Zomba; 488, Salima.

O. compositus (L.) Beauv.

Creeping perennial, with slender culms, rooting at nodes, inflorescence with up to 10 racemes. Often dominant grass in montane evergreen rain forest, forming an open sparse cover, (237, Nchisi Mtn.; 954, Vipya); also in relic evergreen swamp palm forest (554, Karonga).

O. hirtellus (L.) Beauv.

(F.T.A. 9, 631, 1934)

Rambling perennial, with stilt roots at lower nodes, leaf blade bases asymmetrical; culms 50 cms. tall, bearing stiff racemes of unequal length; spikelets purple, awned. Societies in montane and riverine evergreen forests; N 346, Chambe Plt., Mlanje Mtn., N 541, Zomba Mtn.; 496, Nyika.

71. **OREOBAMBOS** K. Schum.

O. buchwaldii K. Schum.

Vern. Tolanje.

Perennial; hollow stemmed bamboo. Evergreen forests (*Check list of Nyasaland Shrubs and Trees*).

72. **ORYZA** Linn.

O. barthii A. Chev. (F.W.T.A. 2, 537, 1931)

Vern. Mpungaziwe, Songasekwe, Wild Rice.

Perennial, erect up to 2 m., leaves stiff, yellowish-green; inflorescence a narrow panicle; spikelets greenish to brown with bright red awns up to 7 cms. long. Widespread, in flood plains and seasonal swamps. N 494, Lake Chilwa; N 527, Fort Johnston; N 480, Chitala, Salima; ! Fort Manning; ! Mbawa nr. Mzimba; 810, Sombani, S. Chilwa.

73. **OXYTENANTHERA** Munro

O. abyssinica (A. Rich.) Munro (F.W.T.A. 2, 505, 1931)

Vern. Nsungwi.

A bamboo forming large clumps up to 15 m. high; culms up to 6 cms. diam.; solid or hollow; spikelets grouped in globular axillary and terminal heads. Widespread; very common to dominant in lower escarpment woodlands and scrubs; ascending valleys. 294, Zomba; 780, Lilongwe; 1167 Misuku; ! Fort Johnston; ! Salima; ! Dedza.

74. **PANICUM** Linn.

P. brevifolium L. (F.T.A. 9, 731, 1934)

Doubtful perennial, often prostrate, rooting at lower nodes; panicles 10 × 9 cms., spikelets small, sometimes purplish. Societies in evergreen riverine forest, often rambling over shrubs. N 529, Cholo escarpment; N 709, Mlanje.

P. caudiglume Stapf (*illeg.*) (F.T.A. 9, 727, 1934)

Annual, sparsely leafy, prostrate; culms purple, 20 cms. high; panicle contracted 5 × 4 cms.; spikelets pointed, purple. Montane, shade loving; occasional communities under boulders of stream banks. N 465, Dedza Mountain; N 648, Zomba Mountain.

P. chionachne Mez

Perennial, trailing habit, sometimes purplish; flowering culms up to 60 cms. high; loose panicle 15 × 15 cms. In Montane, riverine, evergreen forests. (E.L. 314, N 363, Zomba Mountain; N 204, Nyika); in *Khaya nyassica* and *Syzygium* riverine forests (N 611, Zomba; N 292, 300, Cholo; N 358, Mlanje; 291, Ncheu).

P. coloratum L.

Near Zomba, Whyte.

P. comorense Mez

Annual, straggly, rooting at nodes, assuming a creeping habit; panicle not spreading, 15 × 3 cms. Local, shade tolerant, in evergreen riverine forest on alluvial soils. 487, Chitala River Salima.

P. dregeanum Nees (F.T.A. 9, 686, 1934)

Vern. Katsutuka.

Perennial, shortly rhizomatous, forming clumps up to 70 cms. high; leaf blades narrow, sheaths purple; stiff panicle 15 × 6 cms. with purple spikelets. Occasional in riverine evergreen forest and locally common in seasonal swamps. N 399, N 744, Cholo; 1100, Kota Kota.

P. eickii Mez

Perennial, creeping, culms up to 50 cms.; stiff panicles 5 × 3 cms. Montane, forming carpet in evergreen forests; common by stream banks. N 344, Chambe Plt., Mlanje Mtn.

P. glabrescens Steud. (F.T.A. 9, 736, 1934)

Perennial, erect or prostrate, often with succulent culms, 60 cms. high; leaves stiff, erect; panicle spreading, sometimes with reflexed branches, 25 × 15 cms. Locally common in *Hyparrhenia* seasonal swamps (388, 1041, Lilongwe; 1080, Kota Kota); occasional weed; (N 416, Zomba).

P. gracilicaule Rendle (F.T.A. 9, 672, 1934)

Annual. Adamson, 279.

P. graniflorum Stapf (F.T.A. 9, 681, 1934)

Perennial, tufted, purple culms up to 80 cms. often geniculate at base; sparsely leafy; panicles spreading, 22 × 8 cms., spikelets purple. Common, generally found in swamp and relict *Syzygium* swamp forests; (179, Mbawa, Mzimba; 397, Lilongwe; 818, Lake Chilwa; Fort Manning); on sandy soils of Lake-shore (190, 200, 1127, Kota Kota).

P. infestum Anderss. ex Peters (F.T.A. 9, 658, 1934)

Perennial, in tight tufts, culms up to 1 m. tall, somewhat geniculate at base; leaves yellow-green, scandent hairy; panicles stiffish, with branches drooping at tips; spikelets purple-pink, crowded on the branches. In wetter places in *Brachystegia-Isoberlinia tomentosa* woodland, 1180, Karonga.

P. longijubatum Stapf (= **P. glabrescens** Steud.)

P. massaiense Mez (F.T.A. 9, 680, 1934)

Doubtful perennial, straggling; leaves densely downy; spikelets purple. Local, forming dense pure stands in places where water collects in the rainy season with *Combretum ghasalense* scrub. 477, Chitala, Salima.

P. maximum Jacq. (F.T.A. 9, 655, 1934)

Vern. Pokopoko (General), Msonthe (Chisena), Guinea Grass.

Tufted perennial up to 3 m, glabrous or hairy, with lax panicles up to 40 × 20 cms. Widely distributed; typical of *Acacia-Piliostigma-Combretum* woodland, conspicuous in spring phase (396 Lilongwe); also occurring in *Adansonia-Cordyla* parkland (309, N 531, Chiromo), and in deciduous woodlands throughout the Protectorate, but less common in *Brachystegia* woodland except on termite mounds (N 542, Zomba! Chikwawa!, Upper Shire! Lilongwe 847, Mbawa nr. Mzimba!, Ekwendeni). Often forming pure stands in early phase of colonization on newly abandoned cultivation on better soils (!, Karonga); frequent in wayside communities and at margins of marshes (803, Lake Chilwa). A very variable species probably made up of several ecotypes. The following varieties have been collected:—

<i>var. pubiglume</i> K. Schum	..	..	N 531, Chiromo
<i>var.</i>	..	..	N 45, Zomba
<i>var.</i>	..	..	E.L. 266, Makwapala.

P. maximum is a highly valued grass in pasture management in Africa, Australia and America. The variation encountered in this possibly aggregate species gives scope for selection and aim should be towards the leafy, later maturing forms. One such form with broad, dark green leaves has been collected from the Nchisi Mountain region and shows promise under nursery conditions. The grass is more suited to green fodder and silage production than to grazed pasture, because of its tufted habit. Under suitable conditions may replace *P. purpureum* as a resting ley. The grass is highly palatable (viz. 847, Mbawa). Propagation is by divided stools as seed setting varies in time in the panicle, seed is easily shed when ripe, attractive to seed finches and liable to smut and ergot.

P. merkeri Mez (F.T.A. 9, 17, 1934; as **P. swynnertonii** Rendle).

Perennial, stems geniculate at base, culms 1.5 m. tall; leaf sheaths with tubercle based hairs, leaf blade almost amplexicaul at base; panicle spreading; spikelets green with brown markings. Swampy situations and flood banks of streams, 1026, Lilongwe.

P. meyerianum Nees (F.T.A. 9, 650, 1934)

Perennial with short rhizomes, culms sparsely hairy up to 1 m. high; leaves stiff, erect; panicle pyramidal 15 × 5 cms. spikelets closely arranged on branches. Local in belts above the *Phragmites* or *Vossia* zones of flood plains of Lake-shore and rivers. N 510, Liwonde; N 613, Fort Johnston; N 683, Port Herald; 800, S. Chilwa.

P. miliaceum L. (F.T.A. 9, 696, 1934)

Vern. Nkhwanje.

Annual, an escape from cultivation; E.L. 148; Makwapala

P. monticolum Hook f. (F.T.A. 9, 722, 1934)

Perennial, creeping or straggling with slender culms, leaf blades broad, hairy, uneven at base, panicles with few branches; often with adventitious stilt roots. Occasional in evergreen montane forest; (238, Nchisi Mtn. 498, Nyika; 1165, Misuku); a variety occurs in rain forest on the Vipya (952, Vipya).

P. pectinatum Rendle (F.T.A. 9, 719, 1934)

Perennial, densely tufted, spreading fanwise; leaves and sheaths covered with fine silky hairs; panicle loose, 12 × 10 cms. with few elongated pinkish spikelets. Occasional, in wet depressions of montane grasslands, N 315, Chambe Plt., Mlanje Mtn.

P. phragmitoides Stapf (F.T.A. 9, 677, 1934)

Perennial, tussocky, culms up to 2 m. tall; leaf sheath with finely hairy margins; inflorescences somewhat stiff, spreading; spikelets pink-purple, distinctly pointed. Typical of hill *Brachystegia boehmii* woodlands; 1064, Kota Kota Hills; N 742, Domasi, Zomba; S.G.W. Ekwendeni.

P. repens L. (F.T.A. 9, 708, 1934)

Vern. Mankumbidwe.

Perennial with thick white rhizomes; leaves erect, stiff; panicle 16 × 4 cms. Common in seasonal swamps and flood plains, in zones subjected to annual flooding. N 70 Fort Johnston; N 147, 820, Lake Chilwa; 545, Lake Kasuni; 1019, Salima.

P. snowdenii C. E. Hubbard

Doubtful perennial with very fine stolons. Occasional as a bottom grass in *Hyparrhenia* seasonal swamps, 248, Dowa.

P. subrepandum Rendle

Perennial, closely tufted grass with purple stems and fine leaves; inflorescence spreading, stiff; spikelets purple to yellowish. Occasional in *Brachystegia-Julbernardia* woodland. 844, Mbawa nr. Mzimba.

P. swynnertonii Rendle = **P. merkeri** Mez

Zomba, Whyte.

P. trichocladum Hack. (F.T.A. 9, 659, 1934)

Vern. Lusangasanga.

Perennial, straggling, up to 70 cms. tall; sometimes downy hairy; panicles open, 12 × 7 cms., main axis distinctly hairy; lateral branches bearing few spikelets with hairs at base. Wide-spread distribution, but dependent upon shade and moisture; tall *Uapaca-Brachystegia-Faurca* woodlands (N 189, Vipya; ! Mlanje); by stream banks (N 78, Zomba); evergreen forests (! Misuku); evergreen riverine forest (811, Mposa, Zomba); *Brachystegia* woodlands (! Nkata Bay). *P. trichocladum* can be established from cuttings to give a dense sward, especially in the montane and higher rainfall regions. Sheep find the grass highly palatable. Swards deteriorate after a few years and become yellow which could probably be avoided by dressing with nitrogenous fertilizer.

75. PASPALIDIUM Stapf

P. geminatum (Forsk.) Stapf (F.T.A. 9, 583, 1934)

Vern. Fufundo (Lambia).

Perennial, with stolons and fleshy white rhizomes deeply embedded in soil, flowering culms erect, up to 1 m. high; inflorescences with 1-sided racemes, spikelets round, closely packed, light green. Margins of flood plains, lakes, rivers and seasonal swamps; subject to annual flooding. N 493, Lake Chilwa; N 514, Lake Nyasa at Fort Johnston; 341, Port Herald; 254, Lake Nyasa at Kota Kota; F.B.L. 23, Rukuru Estuary, Karonga.

76. PASPALUM Linn

P. auriculatum Presl. (F.T.A. 9, 572, 1934)

Perennial, culms geniculate at base, leaf blades 2 cms. broad, tinged purple; inflorescences

with 3 to 5 one-sided racemes; one side of spikelets flat and round. Occasional, but widespread by streambanks and in perennially wet places. N 291, Cholo; N 196, 894, Nchenachena; ! Nkata Bay; 1101, Kota Kota.

P. auriculatum readily takes from root divisions, especially in wet situations. The grass appears ideal for planting along the banks of fish ponds where it serves to anchor the soil of the bank and to send out floating branches which provide "grazing" (diatomaceous film) for *Tilapia* species. (Giffkins, Nchenachena).

P. commersonii Lam. (F.T.A. 9, 573, 1934 as **P. scrobiculatum** var. **commersonii**)

Perennial, usually tufted but sometimes with stolons; flowering culms up to 40 cms. high, usually with 3 racemes. Widespread in marshy places, seepage zones and high rainfall districts. N 7, Zomba. 194 and 193 (var.) Kota Kota; 215, 257, 245, Dowa; ! Lilongwe; ! Nchenachena; ! Nkata Bay; F.B.L. 44, Dedza.

P. polystachyum R. Br. (F.T.A. 9, 576, 1934 as **P. scrobiculatum** var. **polystachyum**)

Perennial, resembling robust *P. commersonii*, but with 3-10 racemes per inflorescence; spikelets crowded in two rows along a broad rachis, green, turning brown with maturity. Evergreen forest relic, in a wet hollow, 1105 Kota Kota; F.B.L. 21, Karonga.

77. PENNISETUM L. Rich.

P. angolense Rendle (F.T.A. 9, 981, 1934)

Perennial, rhizomatous forming loose tufts up to 3 m. high; spike-like panicles 15 cms \times 12 mms. Local in *Phragmites-Pennisetum* upland marsh. 204, Dedza.

P. atrichum Stapf and C. E. Hubbard (F.T.A. 9, 1061, 1934)

Perennial, Manning 4, Zomba.

P. davyi Stapf and C. E. Hubbard (F.T.A. 9, 991, 1934)

Montane, on rock in stream bed, Burt-Davy 2028, 2029, Mlanje Mountain.

P. exile Stapf and C. E. Hubbard (F.T.A. 9, 987, 1934)

Perennial, rhizomatous, forming large tussocks, on boulders in stream and on banks; flowering stems slender from axillary buds; inflorescence a spike-like panicle, loose, up to 10 cms. \times 7mm. (excluding bristles), spikelets purple. 830, Zomba.

P. glaucocladum Stapf and C. E. Hubbard (F.T.A. 9, 984, 1934)

Robust perennial, with succulent rhizomes; culms up to 3 m. tall; false spike purplish, 15 \times 1 cms. Locally dominant in belts in upland *Phragmites-Pennisetum-Coelorachis* swamps (N 630, Dedza); river banks (766, Diampwe River, Lilongwe).

P. polystachyon (L.) Schult. (F.T.A. 9, 1057, 1934)

Doubtful annual, forming clumps from 1 to 2 m. high; inflorescences purple or orange varying in length from 2 to 20 cms. Widespread, very variable. Common in early stages in the recolonization of abandoned cultivations and wayside communities. E.L. 141, E.L. 171, Tuchila; N 34, N 57, N 47, 127, Zomba; N 13, Namweras; 191, Kota Kota; ! Lilongwe, Salima.

P. purpureum Schumach. (F.T.A. 9, 1016, 1934)

Vern. Nsenjere, Elephant Grass, Napier Fodder.

Perennial with thick rhizomes, tufted up to 5 m. tall, very variable in habit; leaves and sheaths often hairy; inflorescence up to 25 cms. long, yellow sometimes tinged purple. Widespread, often dominant in swamps, river banks and flood plains, extending to drier habitats in montane grasslands. 114, Zomba; 56, Vipya; ! Ncheu; ! Linthipe; ! Kasitu Valley nr. Ekwendeni; ! Nkata Bay; ! Lower Shire Valley; ! Fort Johnston; ! Kota Kota; ! Karonga; ! Mlanje.

Grown extensively as a fodder crop and resting ley in Southern Africa. Strains vary in leafiness and hairiness, the best types being very broad-leafy and hairless. It is established from 3-node cuttings, which should be mature, but without axillary shoots; or from divided stools, at 6-9 ft. spacings. The grass is essentially a silage or cut green fodder, being distinctly tufted. Management, however, varies. Good results are obtained from cutting twice in the season and

grazing the aftermath or from grazing early and late in the season and cutting once in mid-season. Cutting should take place when the grass is 4-6 ft. tall but not stemmy; for grazing, cattle should be put into the paddock when the grass is 6 ft. tall and should be allowed to graze it down to 2 ft. Fertilizers give increased yields; root pruning, by cultivating between rows, helps to reduce nitrogen starvation. There are several strains established in Nyasaland the best ones being "Gold Coast" and "Cameroons" raised from S. Rhodesian stock. The clones were originally selected from individuals grown from seed in South Africa.

P. schimperi A. Rich.

(F.T.A. 9, 992, 1934)

A densely tufted perennial. Adamson 416, Mlanje. Mtn.

P. thunbergii Kunth

Perennial, loosely tufted, somewhat geniculate at base, up to 90 cms. tall; inflorescence a spike-like panicle, 8.0 cms. \times 1.2 cms., often purple, soft in appearance. Local on margin of *Hyparrhenia*, seasonal swamps (252, Dowa); very occasional in lower montane grassland (889, Nyika).

78. **PENTASCHISTIS** Stapf

P. natalensis Stapf

(F.T.A. 10, 126, 1937)

Perennial, densely tufted. On rocks in grassland, Mlanje, Brass 16648; Adamson, 418.

79. **PEROTIS** Ait.

P. leptopus Pilger

Annual, in single tufts or spreading by prostrate branches, up to 40 cms. tall; leaf blades ciliate at margins; inflorescences spike-like, spikelets with long silvery green awns which remain close and not spreading. Weed of sandy soils and roadsides. 904 Bandawe, Nkata Bay; ! Henga Valley, Njakwa.

P. patens Gandoger

Bottle Brush Grass.

Annual, forming small tufts, sparsely leafy, leaf blades ciliate at margin; false spike up to 30 cms. long; spikelets narrow, with fine purple awns up to 1.5 cms. long. Common weed, waysides and early phases in colonization of abandoned cultivations on sandy soils. E.L. 201, Makwapala, nr. Zomba; F.L. 176, Palombe; N 152, Neno; 327, Mwanza; ! Lilongwe; ! Mlanje.

80. **PHRAGMITES** Adans.

P. mauritanus Kunth

(F.T.A. 10, 155, 1937)

Vern. Bango, Matete.

Perennial, with long rhizomes and sometimes floating branches; culms up to 5 m. cane-like; inflorescence a spreading, dense, drooping panicle, 30 cms. \times 20 cms. Widespread in marshes river margins and flood plains and Lake-shores. Pioneer species in the hydrosere. 543, Lake Kasuni; ! Lower Shire; ! Mlanje; ! Cholo; ! Palombe Plain; ! Zomba; Fort Johnston; ! Liwonde; ! Dedza; ! Kota Kota; ! Mzimba; ! Karonga. Largely used for making mats, baskets and for building purposes.

81. **PHYLLORACHIS** Trimen

P. sagittata Trimen

(F.T.A. 9, 1089, 1934)

Perennial, straggling, with thin, wiry, purple culms; leaf blades sagittate; spikelets borne either singly in the leaf axils or terminally on a leaf-like spathe. Frequent in riverine forest characterized by *Raphia vinifera* and *Khaya nyassica*. 298, Cholo, 621, Fort Manning; 1102, Kota Kota; ! N. Lake Chilwa; ! S. Rukuru River, Mzimba District; ! Zomba.

82. **POA** Linn.

P. leptoclada Hochst.

(F.W.T.A. 2, 50, 1931)

Perennial, tufted, forming swards; leaves shiny, dark green; culms slender 70 cms. high; inflorescence a contracted panicle with light green spikelets. Occasional in Montane evergreen evergreen and riverine forests. N 396, 115, Zomba Mountain.

83. **POGONARTHRIA** Stapf

P. squarrosa (Licht.) Pilger

Annual, tufted, varying in height from a few cms. to 1.5 m.; inflorescence cylindrical, with spreading branches closely packed with brown spikelets. Widespread, usually on sandy soil, indicator of eroded lands. E.L. 139, S. Palombe; N 63, N 54, Fort Johnston; N 286, Cholo; N 428, 131, Zomba; 451, Lilongwe; S.G.W. Mbawa, nr. Mzimba; F.B.L. 40, Dedza.

84. **PSEUDECHINOLAENA** Stapf

P. polystachya (H.B.K.) Stapf

(F.T.A. 9, 495, 1934)

Perennial, prostrate, forming carpets; with slender culms up to 30 cms.; inflorescence a narrow panicle with few spikelets clothed with recurved hairs at maturity. Local, but very common, in *Piptadenia* rain forests, primary and secondary evergreen forests in Mlanje District. N 553; N 711, N 712, 323, Mlanje.

85. **PSEUDOBROMUS** K. Schum.

P. brassii C. E. Hubbard

(Kew Bull. (3), 341, 1949)

Perennial, tufted with about three stout stems per tuft, up to 180 cms. tall; leaves broad, blades twisted over, leaf blade uneven; inflorescence a loose panicle of green spikelets. Occasional in montane evergreen forest. Brass 17282, 519, Nyika.

P. sylvaticus K. Schum.

Perennial, tufted up to 1.5 m. high, leaf blades soft and drooping; inflorescence a lax panicle with few narrow spikelets. Forming occasional clumps in montane evergreen *Widdringtonia* forest. N 347, Chambe Plt., Mlanje Mtn.

86. **RENDLIA** Chiov.

R. altera (Rendle) Chiov.

Perennial, densely tufted with setaceous leaves; culms slender up to 40 cms. high; inflorescence a single broad falcate raceme. Locally dominant in montane grasslands. N 331, Chambe Plt., Mlanje Mountain; ! Nyika.

87. **RHYNCHELYTRUM** Nees.

R. minutiflorum (Rendle) Stapf and C. E. Hubbard

(F.T.A. 9, 903, 1934)

Perennial, in loose, untidy tufts, stems geniculate at base, up to 1 m. tall; inflorescence a delicate panicle of silky, purple spikelets; leaves hairy, ciliate at margins. Frequent in *Julberardia-Brachystegia* woodlands with sparse grass covers. 763, Lilongwe.

R. minutiflorum (Rendle) Stapf and C. E. Hubbard var. **melinoides** (Stent) Stapf and C. E. Hubbard

(F.T.A. 9, 903, 1934)

Perennial, straggling with culms up to 1 m. high; panicle dense with pinkish-purple spikelets. Occasional societies in *Brachystegia* deciduous woodland. N 499, Zomba.

R. nerviglume (Franch) Chiov.

(F.T.A. 9, 893, 1934)

Perennial, with short rhizomes forming tufts up to 80 cms. tall; nodes hairy; spikelets with long purple hairs at tips. Montane and lower montane; occasional in grasslands and *Uapaca* woodlands. N 157, Kirk Range; E.L. 577, Soche Mountain, Blantyre.

R. nyassanum (Mez) Stapf and C. E. Hubbard

(F.T.A. 9, 892, 1934)

Perennial, densely tufted, up to 1 m. high; panicles dense, spikelets densely clothed with pinkish-purple or white silky hairs. Common in hill *Brachystegia* deciduous woodlands. N 544, N 545, slopes of Zomba Mtn., N 656, Cholo escarpment; 358, Ekwendeni; 571, Vipya.

R. repens C. E. Hubbard

(F.T.A. 9, 880, 1934 as **R. roseum**).

Vern. Natal red top, Chankalamu.

Annual, tufted, culms geniculate, often rooting at lower nodes; open panicle with silky spikelets varying in colour from crimson to pinkish-purple. Widespread, typical of early stages in colonization of abandoned cultivations, common weed. E.L. 277, Palombe; E.L. 95, Port Herald; 66, 1035, Lilongwe; ! Salima; ! Chikwawa; ! Dedza; ! Mzimba; F.B.L. 11, Karonga.

R. stolzii (Mex) Stapf and C. E. Hubbard (F.T.A. 9, 885, 1934)

Annual, straggling culms geniculate at base, rooting at lower nodes; panicles open with brownish to purple silky spikelets. Widespread, frequent in *Hyparrhenia Cymbaria-Themeda*, montane grassland and valleys (432, Vipya; 1834, Zomba Mountain; 495, Dowa); along paths, (N 178, N 510, Zomba Mtn.); escarpment *Brachystegia* woodlands in valleys (N 585, Golomoti, Dedza); and as weed at lower altitude (N 496, Palombe Plain).

R. stuposum Stapf and C. E. Hubbard (F.T.A. 9, 897, 1934)

Densely tufted perennial with narrow leaves, panicles dense, with silky-white or purple spikelets. Common in lower montane *Brachystegia* woodland (N 188, Vipya; N 309, slopes of Mlanje Mtn., N 305, Cholo), and conspicuous in montane grasslands, flowering early after fires, (N 277, N 278, N 302, Zomba Mtn.; N 336, Chambe Plt., Mlanje Mtn.)

R. subglabrum (Mez) Stapf and C. E. Hubbard (F.T.A. 9, 886, 1934)

Perennial, rhizomatous, culms geniculate with swollen basal nodes, slender but woody; panicle loose with sparsely pubescent spikelets. Locally common in escarpment *Brachystegia* woodlands (N 523 Namweras escarpment); *Brachystegia manga* woodland (1139, Kasungu).

88. RHYTACHNE Desv.

R. rottboelliodes Desv. (F.T.A. 9, 85, 1934)

Perennial, tufted with fine leaves; culms slender, waxy, purple, up to 50 cms. racemes cylindrical; fertile spikelets sculptured. Occasional to locally common in *Hyparrhenia-Themeda* seasonal swamps, N 140, Kasupe; F.B.L. 41, Dedza; 1001, Mbawa nr. Mzimba.

89. ROTTBOELLIA Linn. f.

R. exaltata L. fil. (F.T.A. 9, 73, 1934)

Vern. Nsonthe (Chinyanja and Chichewa).

Annual, tufted up to 3 m. high; leaf sheaths with scandent hairs; leaves light green; racemes cylindrical, spikelets sometimes tinged with red. Widely distributed, annual weed, abandoned cultivations and wayside communities. Usually the dominant weed of loam soils, and a direct competitor to maize. E.L. 618, Blantyre; N 27, Dowa; N 66, Monkey Bay; ! Lilongwe; ! Salima.

90. SACCHARUM Linn.

S. biflorum Forsk. (as **S. spontaneum** L. subsp. **aegyptiacum**, Hack.) F.T.A. 9, 95, 1930,
West shore of Lake Nyasa, Kirk.

S. officinarum Linn. (F.T.A. 9, 96, 1930)

Vern. Nzimbe, Sugar cane. (See cultivated grasses.)

Between Kondowe and Karonga, Whyte.

91. SACCIOLEPIS Nash ex Britton

S. africana C. E. Hubbard and Snowden (Kew Bull. 1936, 294)

Vern. Sopo (Soap).

Perennial, with thick, succulent floating culms; flowering culms ascending up to 1 m., inflorescence a spikelike panicle with dark green spikelets which produce a lather when rubbed. Locally common at edges of open water of lakes and water holes. N 497, Lake Chilwa; 56, Lilongwe.

- S. chevalieri** Stapf (F.T.A. 9, 754, 1934)
Perennial with short rhizomes, creeping at base, slender culms up to 40 cms.; inflorescence a spike-like panicle. Occasional in stream fed and seasonal swamps. 285, Ncheu; N 563, Lilongwe.
- S. gracilis** Stent and Rattray (Proc. Rhod. Sci. Assn. 32, 31, 1933)
A bottom grass, with very fine culms up to 20 cms., straggling through dense grass cover, stems purple, inflorescences of a few spikelets. Occasional in *Tristachya rehmannii* var. *helenae* seasonal swamp; a bottom grass. 102, Cholo.
- S. huillensis** (Rendle) Stapf (F.T.A. 9, 755, 1930)
Annual, in small well-dispersed tufts; leaves few, narrow; inflorescence a spike-like panicle; spikelets purple. Locally common on overgrazed seasonal swamp and flood plain grassland. 817, 823 (Robust form), Lake Chilwa.
- S. indica** (L.) Chase
Annual, tufted, stems fine, pale purple; leaves bright green, soft and hairy; inflorescence a spike-like panicle up to 4 cms. long; spikelets grey-green to purple. Swamp grassland. 822, Lake Chilwa.
- S. interrupta** Stapf (= *S. africana* Hubbard and Snowden)
S. micrococca Mez (F.T.A. 9, 753, 1930)
Annual, tufted, 60 cms. tall; culm very fine; inflorescence a narrow, somewhat interrupted spike-like panicle; spikelets purple, small, resembling "stick tight" fleas. *Hyparrhenia rufa* seasonal swamp grassland, 548, Karonga.
- S. scirpioides** Stapf (F.T.A. 9, 759, 1934)
Perennial, rhizomatous with fleshy culms up to 150 cms. tall; sparsely leafy, sometimes glaucous; inflorescence up to 15 cms. x 4 cms., dense; spikelets purplish. Occasional in seasonal flood plain swamps along river valleys. 372, 1000, S. Rukuru River, Mzimba.
- S. transbarbata** Stapf (F.T.A. 9, 761, 1934)
Perennial, with short ascending rhizomes forming small tufts, leaves mainly basal, up to 25 cms. tall; hairy; flowering culms 45 cms. tall; inflorescence an interrupted or uneven false spike, spikelets hairy. Occasional in *Brachystegia taxifolia-tamarindoides* woodlands (343, Mzimba) and hill *Brachystegia* woodlands (1135, Kota Kota escarpment; 1184, N. Karonga).
- S. typhura** Stapf (F.T.A. 9, 760, 1934)
Perennial, rhizomatous, tufted, up to 1 m. high; inflorescence a spike-like panicle up to 15 cms. long. Occasional, in *Hyparrhenia* seasonal swamps and wet places in *Brachystegia* woodlands. N 134, Liwonde foothills; N 463, slopes of Dedza Mtn.

92. SCHIZACHYRIUM Nees

- S. brevifolium** (Sw.) Nees (F.T.A. 9, 187, 1934)
Annual, forming small tufts, with axillary inflorescences; racemes spatheolate, cylindrical. Communities on eroded soils and by waysides (N 109, Zomba); bottom grass in seasonal swamps (547, Karonga; 1327 Fort Johnston).
- S. brevifolium** Nees var. **flaccida** Stapf (F.T.A. 9, 188, 1934)
Zomba, Whyte.
- S. exile** (Hochst.) Stapf (F.T.A. 9, 191, 1934)
Annual, tufted, leaf blades and spathes reddish; spathes closely encasing the cylindrical racemes of hairy spikelets. Poor sandy soils by roadsides. N 518, Namweras escarpment; 475, Salima escarpment.
- S. jeffreysii** (Hack.) Stapf (F.T.A. 9, 198, 1934)
Perennial, rhizomatous, forming small tufts, sparsely leafy; racemes cylindrical, conspicuously silky hairy. Occasional, but becoming locally dominant where occurring; sandy seasonal swamps. N 475, N 479, 450, Lilongwe; 1296, Mbawa; Mzimba.

S. platyphyllum (Franch.) Stapf (F.T.A. 9, 188, 1934)

Perennial, straggling; leaf blades with rounded bases and tips; inflorescences axillary, racemes cylindrical exerted from narrow spathes. Local in evergreen riverine forest; (N 274, 591, Mlanje; N 359, Likabula, Mlanje); common in seasonal and perennial *Hyparrhenia* swamps in Lake-shore high rainfall region (898, Nkata Bay).

93. **SCHMIDTIA** Steud.

S. bulbosa Stapf

Perennial, forming loose tufts up to 1 m. tall; inflorescence a contracted panicle, spikelets greyish-green, with white hairs and dark awns, lower glumes conspicuous. Locally common in *Pterocarpus-Brachystegia* escarpment woodlands. E.L. 186, 325, Mwanza. Var. N 62, colonizing sandy soil in *Hyphaene ventricosa* woodland, Fort Johnston.

94. **SEHIMA** Forsk.

S. ischaemoides Forsk.

(F.T.A. 9, 37, 1934)

Annual, loosely tufted, stems slender, somewhat geniculate, up to 80 cms. tall; sparsely leafy; inflorescences somewhat resemble *Heteropogon*; spikelets light green with dark brown, conspicuous awns. Rare, roadsides and immature soils. 410, Upper Shire.

95. **SETARIA** Beauv.

S. angustifolia Stapf

(F.T.A. 9, 803, 1934)

Perennial, tufted, with narrow leaves, mainly basal; culms slender up to 120 cms. tall; inflorescence a spike-like panicle 60 mm. \times 5 mms., bristles bright orange. Locally common and well dispersed in river flood plain and seasonal swamps, 371, Mbawa, Mzimba.

S. atrata Hack.

(F.T.A. 9, 812, 1934)

Perennial, densely tufted, up to 1.5 m. high; culms slender, stiff; leaves scabrid; inflorescence a spike-like panicle, 12 \times 0.4 cms., spikelets black and green. Occasional in montane marshlands, N 599, Kirk Range; 445, Vipya.

S. chevalierii Stapf

(F.T.A. 9, 842, 1934)

Vern., Kachera.

Perennial, rhizomatous, shallow rooted, culms up to 3.5 m., leaf blades lanceolate, pleated, 60 \times 7 cms.; inflorescence paniculate, 40 cms. long by 8 cms. broad; spikelets green, sometimes tinged purple. Common in evergreen riverine forest, N 530, Cholo escarpment; ! Zomba; ! Nkata Bay.

S. grandis Stapf

(F.T.A. 9, 832, 1934)

Perennial, 3 m. tall, forming clumps on stream bank and in montane marshes, Brass, 17229, Nyika Plt.

S. homonyma (Steud.) Chiov.

(F.T.A. 9, 857, 1934)

Annual, loosely tufted, geniculate at base, up to 40 cms., leaf blades pleated; inflorescence a narrow panicle, 10 \times 2.5 cms., spikelets light green. Forming carpets in primary and secondary evergreen forests. N 46, Zomba; 324, Mlanje.

S. italica (L.) Beauv.

(F.T.A. 9, 820, 1934)

An escape from cultivation, N 434, Zomba.

S. interpilosa Stapf and C. E. Hubbard

(F.T.A. 9, 929, 1934).

Buchanan, 1273.

S. longiseta Beauv.

(F.T.A. 9, 836, 1934)

Perennial, tufted or rambling, up to 1.5 m. high; culms purple; inflorescence 12 \times 4 cms., with purple spikelets. Conspicuous in the spring phase of montane *Themeda* grassland and at fringes of evergreen forest. (344, 352, Vipya, E.L. 315, Zomba; N 54, N 650, Zomba Mtn.; 446, Vipya, hairy variant); deciduous *Brachystegia-Uapaca* woodlands (N 408, 407, Cholo; S.G.W. Mbawa nr. Mzimba. Locally common in spring phase in *Piliostigma-Combretum-Pterocarpus* woodlands (1052, Lilongwe).

- S. mombassana** *Hermann* (F.T.A. 9, 783, 1934)
Tufted perennial, with short rhizomes; culms stiff up to 2 m. high; inflorescence a false spike 16 × 1 cm., spikelets dark purple. Locally dominant in *Acacia* woodland on black cotton soil (N 26, Chitala, Salima) and in seasonal *Hyparrhenia* swamps. (394, 1027, Lilongwe).
- S. orthosticta**, *K. Schum. ex Herm.* (F.T.A. 9, 839, 1934)
Annual, loosely tufted, culms slender up to 70 cms., geniculate at base; leaf sheaths and stems purplish; panicle 11 × 4 cms., with flexuous bristles, spikelets purplish. Common weed in higher rainfall areas; N 216, Livingstonia; N 218, Nchenachena, 559, Misuku.
- S. pallide-fusca** (*Schum.*) *Stapf and C. E. Hubbard* (F.T.A. 9, 815, 1934)
Vern. Katiti (Chichewa).
Annual, tufted from a few cms. high up to 40 cms., leaves yellowish-green; inflorescences up to 6 × 1 cm., with orange bristles; common weed and on sandy roadsides, E.L. 326, E.L. 197, Makwapala nr. Zomba; E.L. 548, Blantyre; N 217, Nchenachena; 383, Lilongwe; Mzimba; F.B.L. 31, Karonga.
- S. palustris** *Stapf* (F.T.A. 9, 785, 1934)
Vern. Wanje (Chisena) Nsenzi.
Tufted perennial, about 2 m. high; culms erect, stiff; leaf margins scabrid; false spike up to 40 × 1.5 cms., spikelets greenish-white. In association with *Ischaemum brachyatherum* and *S. phragmitoides* on black cotton soils in *Cordyla-Acacia* parklands, *Acacia seyal* woodlands, *Hyphaene* woodland, and derived open grasslands. E.L. 65, N 536, N 539, Lower Shire Valley; 801, S. Chilwa
- S. phragmitoides** *Stapf* (F.T.A. 9, 782, 1934)
Vern. Nsenzi.
Perennial, tufted up to 2 m. high, roots deeply embedded in soil, leaf margins scabrid, leaf sheaths hairy; false spike 30 × 1 cm., somewhat interrupted; spikelets purple. In association with *Sporobolus robustus* on poorly drained heavy black clay soils, seasonally swampy. N 171, Lower Shire Valley; 1022, Salima.
- S. plicatilis** (*Hochst.*) *Hack. ex Engl.* (F.T.A. 9, 847, 1934)
Robust perennial, rhizomatous, culms up to 2 m. high, often procumbent; leaf blades pleated, falsely petiolate, 70 × 4 cms., panicle narrow 30 × 3 cms., spikelets purple, few bristles. Occasional in low montane *Uapaca* woodland (N 551, N 274, Mlanje); and in montane mist forest (953, Vipya).
- S. sagittifolia** (*A. Rich.*) *Walp.* (F.T.A. 9, 862, 1934 as *Cymbosetaria sagittifolia* (*A. Rich.*) *Schweickerdt*)
Annual, untidy, stems fine, geniculate at base and rooting from nodes, 40 cms.; inflorescence a stiff but delicate panicle; leaf broad, arrowhead-shaped and falsely petiolate. Locally common on rocky, eroded soils in shade of *Acacia nigrescens*. 1250, Karonga.
- S. sphacelata** (*Schumach.*) *Stapf and C. E. Hubbard* (F.T.A. 9, 795, 1934)
Vern. Ncirawagaru.
Perennial, with short rhizomes, often geniculate at base, base of plant flattened; tufted, 20 cms. to 2 m. high; glabrous or hairy, often glaucous; false spike up to 18 cms. long with orange bristles, spikelets often dark coloured. Very widespread and variable, conspicuous in spring phase in woodlands. Montane grasslands (E.L. 317, N 282, 135, Zomba Mtn.; N 156, 263, Kirk Range; N 560, Vipya); *Acacia-Combretum-Ptilostigma* woodlands (N 397, 381, Lilongwe); *Brachystegia-Julbernardia* woodlands (N 304, 1017, Salima, Cholo); upland scrublands (N 24, Dedza; 418, Ncheu); *Hyparrhenia* seasonal swamps (387, Lilongwe; 241, Dowa). *Setaria sphacelata* is cultivated as a pasture grass in Southern Africa. Various strains are named from the locality in which they were originally collected, Kasungulu, Bua River and Nandi being the best known. *Setaria* is planted from divided stools and gives a rather tufted sward which tends to give leaf early in the season; there is some recovery after flowering and cutting. A locally

collected form from the Bua River has a longer rhizomatous habit and gives better covers than other strains. Seed is set but the heads are subject to ergot.

S. splendida Stapf (F.T.A. 9, 799, 1934)

Perennial, forming large tufts up to 2 m. high; base of plant and culms distinctly flattened; false spikes up to 60 cms. long with orange bristles and dark-coloured spikelets. In wet situations, river banks and perennial stream fed marshes. N 187, Lower Vipya; N 638, 156, Dedza.

S. stenantha Stapf (F.T.A. 9, 804, 1934)

Buchanan, 236.

S. verticillata (L.) Beauv. (F.T.A. 9, 824, 1934)

Vern. Cimate (Chingoni), Cimata (Chinyanja), Cinama.

Annual, straggling, leaves dark green; inflorescence a congested lobed panicle, bristles with reversed barbs. Common weed by paths and in village areas. 400, Lilongwe; ! Ncheu, S.G.W. Ekwendeni; F.B.L. Karonga.

S. sp. aff. nigrirostris Durand and Schintz

Vern. Mapuntakalulu.

Perennial, tufted with swollen underground bases; culms slender up to 1 m. tall; inflorescence uneven, with large swollen spikelets. Occasional, in *Brachystegia burttii* and *Julbernardia* woodlands with low ground cover. 318, Kasungu; 1012, Dowa.

96. SORGHASTRUM Nash

S. bipennatum (Hack.) Stapf (F.T.A. 9, 144, 1934)

Annual, tufted, culms somewhat slender, geniculate at base, up to 1 m. tall; leaf sheath projects above join with blade and projections are joined by ligule; nodes very short hairy; inflorescence a close panicle or bushy tail; spikelets brown, hairy. Occasional in *Julbernardia-Brachystegia* woodland (761, Lilongwe); and in wayside communities, (N 106, Zomba).

S. rigidifolium (= *Sorghum rigidifolium* Stapf) (F.T.A. 9, 143, 1934)

Vern. Mpongabwe.

Perennial, tufted, culms up to 3 m. tall, with silky nodes; sparsely leafy; inflorescence a fairly close panicle; spikelets purplish-brown to brown, silky hairy with golden awns, each spikelet group of one fertile spikelet and two pedicels without spikelets. Fairly common and well distributed in *Hyparrhenia rufa* swamp grassland. 814, 827, Lake Chilwa; F.B.L. 12, 552, Karonga; N 492, Zomba; N 520, Namweras.

97. SORGHUM Pers.

S. versicolor Anderss. (F.T.A. 9, 138, 1934)

Robust annual, up to 2.5 m. high; nodes dark with a spreading ring of long white silky hairs; inflorescence a broad loose panicle with black fertile spikelets; awns brown, with yellow tips. Common in seasonal swamps, flood plains, river banks and waysides, N 64, Fort Johnston; N 456, Liwonde; 409, Salima; Lake Chilwa; ! Cholo; ! Lower Shire Valley.

S. verticilliflorum (Steud.) Stapf (F.T.A. 9, 116, 1934)

Vern. Gugu (Chinyanja), Kunde.

Perennial, tufted, geniculate at base; culms up to 3 m. tall, often waxy; spreading panicle with yellow to dark purple spikelets. Common at lower altitudes; flood plains, river banks and marshes; weed of heavy lands. E. 1.46, Port Herald; N 168, Dedza Lake-shore; ! Kota Kota; F.B.L. 12, Karonga; 802, Chilwa.

98. SPOROBOLUS R. Br.

S. capensis Kunth forma. (F.T.W.A. 2, 525, 1931; non forma)

Annual, tufted, up to 50 cms. high; inflorescence a narrow contracted panicle with olive-green spikelets. Weed; does not appear to be common. 160, Dedza.

S. centrifugus Nees (S.L.)

Annual, tufted, leaves basal, arising from small tufts, spikelets dark brown, shining. Weed of roads and paths in montane grassland. 962, Vipya.

S. eylesii Stent and Rattray

Perennial, with short compact rhizomes, tufted; underground leaf sheaths persistent, regularly arranged in overlapping sequence; yellowish-green, up to 1 m.; leaf blade margins ciliate; inflorescence a pyramidal panicle 15 cms. long by 7 cms. broad at base; spikelets olive-green crowded at the end of branches. Occasional in deciduous *Brachystegia* woodland. N 717, Cholo; N 384, 299, Blantyre.

S. festivus Hochst.

(F.W.T.A. 2, 525, 1931)

Perennial, forming small tufts, culms slender up to 50 cms.; leaves fine, few; delicate inflorescence a conical panicle 17 cms. long by 6 cms. broad at base, spikelets purple. Common, roadside communities and on sandy eroded soil. Conspicuous in spring phase but soon dying back. E.L. 195, E.L. 243, Makwapala, nr. Zomba; N 730, Zomba; 389, Lilongwe; 362, Ekwendeni.

S. marginatus Hochst.

(F.W.T.A. 2, 525, 1931)

Annual, tufted, up to 80 cms. tall; leaves light green, with tuberculate hairs, inflorescence an open panicle of small green spikelets, conical, 7 cms. broad by 14 cms., long. Locally common in seasonally wet *Hyphaena ventricosa* woodland. 332, Fort Johnston.

S. mollerii Hack.

(F.W.T.A. 2, 525, 1931)

Annual, forming small tufts up to 60 cms. high; panicles verticillate up to 25 cms. long by 2 cms. broad. Widespread weed, roadside communities, often in shade. E.L. 152, Zomba Mtn.; E.L. 165, Makwapala, nr. Zomba; E.L. 648, Blantyre; E.L. 267, N 51, Zomba; Lilongwe; ! Mzimba; ! Misuku.

S. panicoides A. Rich.

Annual, tufted up to 70 cms. high; panicle verticillate, conical, 17 × 5 cms., with few spikelets at the end of branches; grains rounded, 2 mm. diam., locally common by roadsides, N 481, Lilongwe; ! Zomba; F.B.L. Karonga.

S. patulus Hack. var.

(F.W.T.A. 2, 525, 1931; non var.)

Annual, tufted, sparsely leafy, 30 cms. high; inflorescence a loose spike-like panicle, 17 cms. long, spikelets greenish-brown, shiny. Apparently not common. E.L. 155, Zomba Mtn.

S. piliferus Kunth

Annual, tufted up to 30 cms. high; leaves fine; inflorescence a contracted panicle 7 cms. × 0.5 cms., spikelets brown. Occasional on cliffs of mountain slopes, a pioneer species. N 82, Zomba; F.B.L. Sichivula, Fort Hill.

S. pyramidalis Beauv.

(F.W.T.A. 2, 525, 1931)

Vern. Mtsinde.

Tufted perennial, coarse, leaf blades folded, often dead at the tips; culms up to 1 m. high; contracted panicle with ascending branches closely packed with minute, olive-green spikelets. Widespread, common around villages and overgrazed lands and swamps. E.L. 97, Port Herald; E.L. 242, N 247, Makwapala, nr. Zomba; E.L. 574, Blantyre; N 3, Zomba; 103, Cholo; 448, Lilongwe; ! Mzimba; F.B.L. 3, Karonga. In shade of *Syzygium* swamp forest, 1006 Mbawa, Mzimba.

S. rhodesiensis Stent and Rattray

Robust annual, tufted, 1.5 m. tall; inflorescence a rather open verticillate panicle, spikelets silvery, pink-purple. On poor stony soils, local, *Brachystegia-Isoberlinia tomentosa* woodland, 1179, Karonga.

S. robustus Kunth

(F.W.T.A. 2, 524, 1931)

Vern. Nsetele, Nchese (Chisena).

Perennial, with short rhizomes and stolons, often straggling; culms up to 2 m. high; contracted panicle up to 60 cms. long with ascending branches and light green spikelets. Locally

dominant on heavy saline clays of flood plains and in seasonally wet *Hyphaene ventricosa* woodland, N 117, N 172, 307, Lower Shire Valley; 333, Fort Johnston..

S. stapfianus *Gandoger* (F.W.T.A. 2, 525, 1931)

Perennial, forming small tufts; culms slender, sparsely leafy, up to 30 cms. high; panicle delicate; pyramidal, 6 cms. long \times 4 cms. broad at the base; spikelets brownish-purple. Sandy eroded soils and waysides. E.L. 585, Blantyre; N 731, Zomba.

S. strictus *Franch.*

Annual, forming small tufts up to 40 cms. high; panicles delicate, conical, 10 cms. \times 3 cms.; spikelets minute, brownish-purple. Locally common on sandy eroded soils and waysides. N 454, Road to Lake Chilwa.

S. sp. aff. marginatus *Hochst.*

Annual, tufted up to 80 cms. tall; stems fine, salty to taste; leaves sparsely hairy, inflorescence delicate, conical; spikelets brownish-purple, small. Flood plains and wet places, probably saline. 318, Chiromo, N 682, Alimenda, Lower River.

S. sp. aff. strictus *Franch.*

Annual, single stemmed, up to 40 cms. tall; sparsely leafy; inflorescence narrowly conical 8 cms. \times 15 mms.; spikelets small, brownish. Montane, ephemeral, pioneer species on exposed, wet rocky places. 443, Vipya.

S. sp. aff. centrifugus *Nees*

Perennial, tufted, underground bases swollen, culms slender up to 40 cms., inflorescence conical 5 cms. \times 3 cms., spikelets coppery, shining. Lower montane *Brachystegia* woodland. 234, Nchisi Mtn.

99. STREBLOCHAETE *Hochst. ex Pilger*

S. longiarista (*A. Rich.*) *Pilger*

(F.T.A. 10, 102, 1937)

Perennial, loosely tufted, culms geniculate at base, ascending up to 80 cms. long; leaves thin, dark green, drooping; inflorescence a contracted panicle with few spikelets; awns 4 cms. long, fine, white, several twisting together to affect dispersal of fruits which are armed with a hooked callus. Local, forming societies in montane evergreen forests. N 640, 157, Dedza; 240, Nchisi Mtn.; 521, Nyika; 963, Vipya.

100. THELEPOGON *Roth.*

T. elegans *Roth. ex Roem. and Schult.*

(F.T.A. 9, 34, 1934)

Annual; inflorescence composed of several stiff racemes; spikelets awned, lower glume deeply sculptured. Nyika Plateau, McClounie.

101. THEMEDA *Forsk.*

T. triandra, *Forsk. var. hispida*, *Stapf*

(F.T.A. 9, 418, 1934)

Vern. Chitungwa (T), Red Oat Grass.

Tufted perennial, from 40 cms. to 2 m. high; hairy or glabrous; inflorescence spatheolate, the panicle bearing groups of racemes in fan-shaped units; spathes purplish-orange, sometimes, hairy; awns dark brown, up to 5 cms. long. A variable species, very widespread from montane to deciduous woodlands where it is often dominant on hill slopes, conspicuous in late summer phase, also locally common in marshes. Montane grasslands (N 335, Chambe Plt., Mlanje Mtn.; 345, 439, Vipya, 527A, Nyika); *Brachystegia* woodlands (N 37, 89, slopes of Zomba Mtn. slopes of Dedza Mtn.; ! slopes of Nchisi Mtn.; 402, Blantyre); *Acacia-Piliostigma-Combretum* woodlands, (463, Lilongwe); *Hyparrhenia* seasonal swamps (456, 1042, Lilongwe; 407, Upper Shire Valley), *Themeda* grasslands with *Terminalia sericea*, seasonal swamps (1124, Kota Kota; ! Mzimba; ! Dedza).

T. triandra *Forsk. var. punctata* *Stapf*

(F.T.A. 9, 419, 1934)

Shire Highlands, Buchanan 12; Blantyre, Descamp; Zomba, Whyte.

102. **THYRSIA** Stapf

T. undulatifolia (Chiov.) Rolyns

Perennial, tufted up to 2 m. tall; inflorescence a branched stiff paniculate collection of racemes which droop at the tips; spikelets with swollen pedicels. Locally frequent in escarpment and hill *Brachystegia* woodlands. 189, Kasungu; S.G.W. Ekwendeni; 1165, Misuku; 1065, Kota Kota; 1153, Fort Hill.

103. **TRACHYPOGON** Nees

T. spicatus (L.f.) Kuntze

Tufted perennial, coarse, up to 2 m. high; leaf sheaths downy hairy; inflorescence a false spike, 25 cms. long, pinkish-purple, downy with white hairs; awns 12 cms. long. Locally common in hill marshlands (N 457, Linthipe; ! Mbawa, Mzimba), and in *Uapaca-Phillipia* scrubland (459, Dedza).

T. spicatus (L.f.) Kuntze var.

A glabrous form of the above species, purplish with fine leaves and slender culms; inflorescence 10 cms. long; awns brown, 10 cms. long. Locally dominant in montane grassland, N 200, Nyika.

104. **TRAGUS** Hall.

T. berteronianus Schult.

(F.W.T.A. 2, 534, 1931 as **T. racemosus**)

Vern. Nchilawagaru, Nchirawakhoswe.

Annual, loosely tufted, geniculate at base; leaf blades ciliate at margins, greyish-green culms up to 40 cms.; inflorescence a false spike with pairs of purplish spikelets, glumes bearing hooked bristles. Common by roadsides and weed. E.L. 7, 306, N 149, N 538, Chiromo; ! Lilongwe; ! Ncheu; ! Salima.

105. **TRICHOLAENA** Schrad.

T. monachne (Trin.) Stapf and Hubbard

(F.T.A. 9, 909, 1934)

Annual, loosely tufted up to 80 cms. high; panicle loose with purplish spikelets. Gregarious colonizing bare areas in *Hyphaene ventricosa* woodland (N61, Ft. Johnston); locally common on sandy soils in drier areas (808, S. Chilwa; 1109, Kota Kota).

106. **TRICHOPTERYX** Nees

T. dregeana Nees

(F.T.A. 10, 7, 1937)

Shire Highlands, Buchanan, 14.

T. fruticulosa Chiov. var. **whytei** C. E. Hubbard

(F.T.A. 10, 7, 1937)

Perennial, shortly rhizomatous, up to 40 cms. tall: culms fine, often geniculate; leaf blades short, 2 cms. long with white margins; narrow panicle 10 cms. long; spikelets light brown, finely awned. Occasional, in montane grasslands in rocky situations, in association with *Danthonia davyi* (N 354, Chambe Plt., Mlanje Mtn.); common in montane *Uapaca* woodlands (N199, slopes of Nyika); *Brachystegia* scrub (531, Fort Hill); *Brachystegia* woodland on gravelly soils (! Nkata Bay).

T. gracillima C. E. Hubbard

(F.T.A. 10, 9, 1937)

Creeping grass with fine, brittle stems; leaves small, bright green, lanceolate; spikelets golden. Montane, locally common in perennial stream fed swamps, 355, Vipya.

T. stolziana Henrard

(F.T.A. 10, 10, 1937)

Annual, gregarious, forming carpets, 15 cms. tall, leaves small, lanceolate; inflorescences dense, spikelets light brown with dark awns giving a brown hairy appearance to the sward. Gregarious annual in overgrazed areas and by roadsides and pathways. Misuku, Whyte; 557, Misuku; ! Nyika.

107. **TRIPOGON** Roth

T. unisetus, Pilger

Common on open seepage slope, Zomba Plt. Brass 16238.

108. **TRISTACHYA** Nees

T. bequaertii de Wild.

(F.T.A. 10, 66, 1937)

Perennial, tufted, up to 130 cms. tall; underground leaf sheaths woolly, nodes of culm, long white silky, hairy; nodes of inflorescence white velvety; inflorescence a stiff, spreading panicle; spikelets golden or gold-green with stiff, white, black-tubercle based hairs in two marginal rows on the glumes; awns long, green. Locally common in poorer escarpment and hill *Brachystegia* woodlands, 1130, Kota Kota escarpment; 1151, Fort Hill; Montane, Nyika Plateau, Whyte; S.G.W. Ekwendeni; F.B.L. 234, no precise locality.

T. hispida (L.f.) K. Schum.

(F.T.A. 10, 63, 1937)

Perennial, with short rhizomes; underground leaf sheaths hairy; culms up to 1.5 m. high; inflorescence with up to five groups of spikelets at the end of slender branches; outer glumes with white hairs arising from black tubercles; awns tough, yellow, up to 12 cms. long. Occasional in montane grasslands (28, Kirk Range); locally common in *Brachystegia* woodland, particularly at the margins and heads of sandy seasonal swamps (N 392, N 406, 301, Cholo; 399, Lilongwe; ! Mzimba; ! Fort Manning).

T. huilliensis Rendle

(F.T.A. 10, 61, 1937)

Perennial, rhizomatous, sparsely leafy, up to 40 cms. high; much contracted panicle with up to ten groups of spikelets, sparsely hairy. Montane marshland. N 670, Kirk Range.

T. inamoena K. Schum.

(F.T.A. 10, 71, 1937)

Perennial, tufted up to 1.5 m. high; sparsely leafy; nodes with golden-brown hairs; leaf sheaths with tuberculate golden-brown hairs; nodding panicle 20 cms. long, with groups of three spikelets covered with golden-brown hairs, awned. Occasional in *Brachystegia* woodlands, generally on rocky or gravelly soils. N 441, Zomba; 359, Ekwendeni; ! Mzimba; S.G.W., Ekwendeni; F.B.L., Fort Hill; F.B.L. 73, Lilongwe.

T. rehmanii Hack. var. **helenae** (Busc. and Muschl.) C. E. Hubbard

(F.T.A. 10, 70, 1937)

Perennial, tufted, shortly rhizomatous, up to 1 m. tall, sparsely leafy; inflorescence composed of few groups of spikelets, spikelets brown, glumes glabrous, with long, green awns. Very common in sandy, seasonal swamps (405, Cholo; 399, Lilongwe; ! Fort Manning); occasional in *Brachystegia* woodland (1118, Kota Kota).

T. thollonii Franch.

(F.T.A. 10, 62, 1937)

Perennial, tufted, up to 1 m. tall; leaf sheaths with tubercle based hairs, often pinkish-purple, nodes with upward pointing hairs; inflorescence an interrupted spike-like raceme with almost sessile spikelet groups, spikelets tuberculate hairy resembling *T. hispida*. Locally common in *Themeda* seasonal swamps (1002, Mbawa, Mzimba); occasional in poorer *Brachystegia* woodland and scrub (1081, Kota Kota).

T. welwitschii Rendle

(F.T.A. 10, 68, 1937)

Perennial, tufted, up to 1 m. tall; leaf blades hairy; inflorescence a nodding panicle with few groups of spikelets; spikelets glabrous, with brown glumes. Locally common to co-dominant in spring phase of sandy seasonal swamps. 1039, Nsaru, Lilongwe.

109. **URELYTRUM** Hack.

U. sp. aff. stapfianum

Perennial, tufted, up to 2 m. tall; stems stout but not reedy, leaves mainly basal, leaf sheaths with long soft hairs, blades hairy; inflorescence a collection of up to five racemes, spikelets green with yellow awns. Locally common in *Brachystegia* foothill woodlands. 556, Yembe near Karonga.

110. **UROCHLOA** Beauv.

U. mosambicensis (Hack.) Dandy (F.T.A. 9, 592, 1934)
Vern. Kalemalebale (Chisena).

Perennial with short rhizomes, culms up to 1 m. tall, geniculate at base, usually hairy, nodes downy, inflorescences with up to ten 1-sided racemes. Widespread in the Lower Shire Valley, often exclusively dominant in parkland on sandy soils and conspicuous on areas previously under cultivation. N 122 Pt. Herald; 308, Chiromo.

U. panicoides Beauv. var. (F.T.A. 9, 595, 1934 as **U. helopus** Stapf)

Annual, loosely tufted, sparsely hairy; culms up to 70 cms. high; inflorescence usually four racemes. Occasional weed. N 418, Cholo.

U. pullulans Stapf (illeg.) (F.T.A. 9, 590, 1934)

Perennial, loosely tufted, geniculate at base up to 1.5 m. high; nodes downy; inflorescence of up to 10 racemes. Widespread, forming societies by waysides, colonizing land abandoned after cultivation, common weed. 126, N 8, N 382, N 410, Zomba; N 68, Monkey Bay; 385 Lilongwe.

111. **VETIVERIA** Thouars ex Virey

V. nigritana (Benth.) Stapf (F.T.A. 9, 157, 1934)
Vern. Tedza (Chisena).

Tufted perennial, forming large tussocks up to 3 m. tall; inflorescence a loose, pyramidal panicle, 40 cms. long with purplish spikelets. Occasional in wet ground; planted by natives as a thatching grass. 310, E.L. 2, Port Herald; ! Palombe Plain.

112. **VOSSIA** Wall. and Griff.

V. cuspidata (Roxb.) Griff. (F.T.A. 9, 41, 1934)
Vern. Duvi, Hippo Grass.

Perennial with long, fleshy, floating stems; leaves ascending, 2 cms. broad; erect culms up to 2.5 m.; racemes arranged digitately, coarse, angular; lower glumes elongated. Widespread, forming dense societies at the margins of lakes and rivers. N 75 Fort Johnston; N 143, Lake Chilwa; ! Lower Shire Valley; ! Lake Kasuni; ! Kasungu; ! Sombani River, Palombe Plain.

CULTIVATED GRAMINEAE

Acroceras Stapf

A. macrum Stapf

Astrebla F. Muell.

A. lappacea Domin.

Introduced from Australia. Of little value in Nyasaland. Lilongwe.

Avena Linn.

A. sativa L.

Vern. Oats.

Cultivated on a small scale at higher elevations and in trial plots of the Department of Agriculture at various stations. Dowa, Vipya, Nyika.

Bambusa Schreb.

B. multiplex (Lour.) Raeusch. ex J. A. and J. H. Schult.

A Chinese species, cultivated as a hedge plant in higher rainfall districts. Zomba, Mlanje, Cholo.

B. vulgaris Schrad

Frequently cultivated for building purposes. A variety with bright yellow culms striped with green is the most common (? var. *vittata* Riviere). Zomba, Mlanje, Lilongwe, Fort Manning.

BOTHRIUCHLOA *O. Kuntze*

B. caucasica *C. E. Hubbard*

Introduced from U.S.A. Small, tufted, flowering continuously, of no pasture value. Lilongwe.

B. ischaemum (*L.*) *Keng.*

Introduced from U.S.A. Small, tufted, flowering continuously, of no pasture value. Lilongwe.

BOUTELOUA *Lag.*

B. curtispindula (*Michx.*) *Torr.*

Vern. Side oats Grama.

Introduced from America. Tufted; of no promise. Lilongwe.

B. gracilis (*H.B.K.*) *Lag.*

Vern. Blue Grama.

Introduced from America; tufted; of no promise. Lilongwe.

BRACHIARA *Gris.*

B. decumbens *Stapf*

Introduced from Uganda; creeping, perennial grass, probably of value as a bottom grass in pastures; sets seed sparingly. Lilongwe.

BUCHLOE *Engelm.*

B. dactyloides (*Nutt.*) *Engelm.*

Vern. American Buffalo Grass.

Introduced from America. Stoloniferous, forming carpets. Slow. Of no value as pasture grass. Lilongwe

CENCHRUS *Linn.*

C. ciliaris *Linn.*

Vern. African Fox Tail.

(F.T.A. 9, 1072, 1934)

Introduced from various parts of Africa. Slowly established from seed to give a rather straggling, untidy sward, with much stem. Copious quantities of viable "seed" are set and gathering is simple; one drawback is encountered, however, in the bristly involucre of the spikelets which makes sowing of uncleaned seed rather difficult. The sward should not be allowed to become wiry and tough but kept back by cutting. A cut late in the wet season gives an aftermath suitable for haymaking. The grass is palatable to cattle when young; somewhat drought resistant. Lilongwe. Mzimba; Vipya; S. Palombe Plain; Cholo.

COIX *Linn.*

C. lacryma-jobi *L.*

Vern. Job's tears.

Indigenous to tropical Asia, introduced but rarely found in cultivation.

CYMBOPOGON *Spreng.*

C. citratus (*DC. ex Nees*) *Stapf*

Vern. Lemon grass.

Probably of Indian origin, yields "lemon grass oil" of commerce; rarely cultivated. Zomba, Mlanje, Lake Chilwa.

DICANTHIUM *Willemet*

D. sericeum (*R. Br.*) *A. Camus*

Introduced from Australia, tufted, poor, of no value. Lilongwe.

DENDROCALAMUS *Nees*

D. strictus *Nees*

An Asiatic species of bamboo cultivated in the Botanic Gardens, Zomba.

DIGITARIA *Hall.*

D. smutsii *Stent*

Introduced from S. Africa. Tufted, leaves glaucous. Pasture value unknown. Lilongwe.

D. swazilandensis *Stent*

Introduced from S. Africa. A creeping grass giving dense sward. A potential lawn grass for higher rainfall areas. Dies off in dry season in drier areas. Lilongwe.

D. sp. "Waterval" *strain*

Introduced from S. Africa. A possible grass for inclusion in pasture mixtures; established from cuttings. Palatable to cattle. Lilongwe, Mzimba, S. Palombe, Zomba.

ECHINOCHLOA *Beauv.*

E. frumentacea *Link*

Vern. Japanese barnyard millet, Cindumbi, Nadanga.

Occasionally cultivated, sometimes occurring as an escape. E.L. 3, Lower Shire Valley; E.L. 164, Makwapala, nr. Zomba.

ELEUSINE *Gaertn.*

E. coracana (*L.*) *Gaertn.*

Vern. Finger millet, Maere, Mawere, Lipoko.

Widely cultivated throughout the Protectorate, usually grown in small areas as a grain for malting.

ERAGROSTIS *Beauv.*

E. abyssinica (= **E. tef** (*Zucc.*) *Trotter*)

Vern. Tef.

Annual grass, very stemmy; cultivated for annual hay crop. Zomba.

E. curvula *Nees*

Vern. Weeping Love Grass.

Introduced from S. Africa as "Tanganyika" and "Ermelo" strains. Tufted grass, setting copious quantities of viable seed; winter green; leaves fine, somewhat harsh. Of use as a possible hay grass; if kept closely grazed is said to form a sward. Lilongwe.

E. lehmanniana *Nees*

Introduced from S. Africa for gully planting. Dowa.

EREMOCHLOA *Buese*

E. ophiuroides (*Munro*) *Hack.*

Vern. Centipede grass.

Introduced from China via Uganda. Creeping, forms close carpets. Under trial. Zomba.

FESTUCA *Linn.*

F. elatior *L.* (= ? **F. pratensis** or **F. arundinacea**).

Vern. Meadow Fescue.

Introduced from Aberystwyth, Wales. Under trial in montane grassland areas. Poor. Nyika, Vipya, Dowa.

HORDEUM Linn.

H. vulgare L.

Vern. Barley.

Cultivated on an experimental scale at higher elevations.

HYPARRHENIA Anderss.

H. hirta (L.) Stapf

Vern. Hairy Thatching Grass.

(F.T.A. 9, 315, 1934)

Introduced from S. Africa. Tufted, stemmy; no use as pasture grass. Lilongwe.

ISEILEMA Anderss.

I. vaginiflorum Domin.

Introduced from Australia. Annual. Of doubtful value in pasture work. Lilongwe.

LOLIUM Linn.

L. perenne L.

Vern. Perennial Rye Grass.

Introduced from Aberystwyth, Wales. Planted in montane grassland regions. Moderately successful, of potential value. Nyika, Vipya, Dowa.

L. multiflorum Lam.

Vern. Italian Rye Grass.

Introduced from Aberystwyth, Wales. Planted in montane grassland regions. Of doubtful value. Nyika, Vipya, Dowa.

ORYZA Linn.

O. sativa L.

Vern. Rice, Mpunga.

Widely cultivated in seasonal swamps, flood plains of lake and rivers throughout the Protectorate. The annual production of rice for sale in Nyasaland is approximately 4,000 tons. The more popular varieties include "Faya" and "Singano", swamp rices and "Thiri", a hill rice.

PANICUM Linn.

P. antidotale Retz.

Vern. Blue Panic.

Introduced from Australia. Perennial, forming very small tufts. Of very little use as a pasture grass. Lilongwe.

P. coloratum L. var. **makarikariensis** Goosens

Vern. Makarikari Panic Grass.

Perennial, semi-stoloniferous with a tendency to be tufted; leaves and culms glaucous. Cultivated as a pasture and fodder plant but the tufted habit and high palatability mean that it requires careful management to prevent erosion. Usually propagated by runners or root divisions. A seeding variety has been introduced from S. Rhodesia under the name of *Bambatsi Panicum*. Lilongwe, N. Province, where the grass is of particular promise; S. Province.

P. obtusum H.B.K.

Vern. Vine Mesquite.

Introduced from U.S.A. Perennial creeping by means of zigzag stolons. A possible bottom grass, makes readily cured hay. Lilongwe.

P. umbellatum Trin.

Vern. Seychelles Grass.

Creeping, perennial introduced as a lawn grass but shade loving and not drought resistant. A weed of tea gardens. N 618, Zomba.

P. sp.

Vern. Kabulabula Panic.

Perennial, forming small tufts; leaves dark green, remaining somewhat so in dry season. Of limited value as a pasture grass. Lilongwe, Mzimba.

PASPALUM Linn.

P. dilatatum Poir

Vern. Dallis Grass.

A tufted perennial, eventually forming a mat. A possible bottom grass, planted from divided stools. Palatable to cattle, Lilongwe, Dowa, Cholo.

P. notatum Flugge

Perennial, tufted at first, eventually forming mats; inflorescence usually a pair of a 1-sided racemes with shiny spikelets. Introduced for planting along bunds for controlling soil erosion. Partially palatable to cattle but of low productivity. N 411, Zomba.

P. urvillei Steud.

Vern. Vasey Grass.

Perennial, shortly rhizomatous, tufted, 2 m. tall; leaf sheath bases scandently hairy; inflorescence of many racemes, with downy spikelets. Introduced as a pasture grass now a frequent weed in tea gardens. Palatable, high yielding, especially suited to wet and high rainfall regions. N 276, Mlanje; 225, Dowa.

PENNISETUM L. Rich.

P. clandestinum Hochst.

Vern. Kikuyu Grass.

Forming dense carpets in the higher rainfall, higher elevation districts. Propagated by stolon cuttings. Of potential value as a pasture grass. Nyika, Cholo.

P. echinurus Stapf and C. E. Hubbard

Vern. Mawere, Mufundi, Hairy Bullrush Millet.

Widespread, but not so common as *P. typhoides*; inflorescences have many long bristles which prevent excessive bird damage. Yields are quite heavy in Lilongwe District and the stands are very leafy so that this millet could serve for an annual fodder crop as well as for grain. Fort Johnston, Lower River, Lilongwe.

P. stramineum A. Peter

Introduced from Kenya. A loosely tufted straggling perennial, periodic. Of possible value as a hay grass or with a mixture of pasture grasses. Lilongwe.

P. typhoides (Burm.) Stapf and C. E. Hubbard

Vern. Bullrush Millet, Machewere.

Widespread, but more frequently cultivated in the Lower Shire Valley.

PHALARIS Linn.

P. tuberosa Reed

Vern. Large Reed Canary Grass.

A tufted perennial. Fairly vigorous in higher rainfall, higher elevation district of Dowa Hills, Dowa.

PHLEUM Linn.

P. pratense L.

Vern. Timothy.

Introduced from Aberystwyth, Wales. Established in montane grassland areas; slow growth. Nyika, Vipya, Dowa.

SACCHARUM *Linn.*

S. officinarum *L.*

Vern. Sugarcane, Mizimbe.

Widespread near villages throught the Protectorate, usually grown on fringes of seasonal swamps. Several varieties of "noble canes" may be readily distinguished, but in recent years hybrid varieties (chiefly CO 290) have become more popular; noble canes are often found infected with the mosaic virus. A representative collection of hybrid varieties has recently been introduced for trial.

SECALE *Linn.*

S. cereale *L.*

Vern. Rye.

Cultivated on an experimental scale at higher elevation stations. Nyika, Vipya, Dowa.

SETARIA *Beaur.*

S. italica *Beaur.*

Vern. Italian millet, Nkhwanje.

Occasionally cultivated, sometimes found as a escape.

SORGHUM *Pers.*

S. sudanense *Stapf*

Vern. Sudan Grass.

Perennial, of possible use as seeded down silage crop. Not comparable in bulk with *Pennisetum purpureum*. Lilongwe.

S. vulgare *Pers.*

Vern. Mapira.

Many varieties of sorghums are widely cultivated over large areas throughout Nyasaland (for a descriptive account of the varieties commonly found in the Protectorate see Snowden, J. D., *The Cultivated Races of Sorghum*, London 1936).

TRITICUM *Linn.*

T. aestivum *L.*

Vern. Wheat, Tirigu.

Cultivated as a winter crop at higher elevations. "Sabenero" a bearded wheat being the commoner variety. Wheat production amounts to approximately 700 tons per annum.

ZEA *Linn.*

Z. mays *L.*

Vern. Maize, Cimanga.

The staple food of the Protectorate, an estimated area of 2,000,000 acres is cultivated yearly.

VETIVERIA *Thouars ex Virey*

V. zizanioides (*L.*) *Nash*

(F.T.A. 9, 157, 1934)

Tufted perennial, up to 2 m. high; panicles dense, brownish purple. Cultivated to control soil erosion, a valuable thatching grass, roots yield Vetiver Oil.

Vernacular Names

				B	
	Bande	..	..	—	<i>Echinochloa haploclada</i>
	Bango	..	..	—	<i>Phragmites mauritianus</i>
M	Belele	..	..	—	<i>Dactyloctenium giganteum</i>
				C	
	Cankhalamu	..	..	—	<i>Rhynchelytrum repens</i>
N	Cese	..	..	—	<i>Sporobolus robustus</i>
	Cidazangala	..	..	—	<i>Eragrostis aspera</i>
	Cidia	..	..	—	<i>Eragrostis ciliaris</i>
	Cigombe	..	..	(Y)	<i>Eleusine indica</i>
	Cigonamphiri	..	..	—	<i>Alloteropsis semialata</i>
	Cilanchiru	..	..	—	<i>Eragrostis ciliaris</i>
	Cilela	..	..	—	<i>Hyparrhenia dissoluta</i>
	Cimanganga	..	..	—	<i>Eragrostis aethiopica</i>
	Cimate	..	..	—	<i>Setaria verticillata</i>
	Cimphusu	..	..	—	<i>Digitaria milanjiana</i>
					<i>Digitaria setivalva</i>
	Camasala	..	..	—	<i>Helictotrichon elongatum</i>
	Cinamu	..	..	(T)	<i>Sorghum verticilliflorum</i>
	Cindilo	..	..	(Y)	<i>Themeda triandra</i>
	Cindumba	..	..	(N)	<i>Echinochloa frumentacea</i>
	Cinombo	..	..	—	<i>Urochloa pullulans</i>
	Cinsomba	..	..	(N)	“ ”
	Cinyamata	..	..	(A)	<i>Setaria verticillata</i>
	Cipikamongu	..	..	(Y)	<i>Eleusine indica</i>
	Ciputu	..	..	—	<i>Panicum maximum</i>
					“ deustum
N	Cira wachiru	..	..	—	<i>Tragus berteronianus</i>
N	Cira wagaru	..	..	—	<i>Setaria sphacelata</i>
N	Cira wakhoswe	..	..	—	<i>Tragus berteronianus</i>
	Cisilisyia	..	..	—	<i>Brachiaria viridula</i>
	Citsazotsazo	..	..	—	<i>Eragrostis castellaneana</i>
	Citungwa	..	..	—	<i>Themeda triandra</i> var. <i>hispida</i>
	Civu	..	..	(N)	<i>Bothriochloa insculpta</i>
	Ciyopiri	..	..	—	<i>Alloteropsis semialata</i>
				D	
	Duwe	..	..	(K)	<i>Eleusine indica</i>
N	Duvi	..	..	—	<i>Vossia cuspidata</i>
N	Dzungulu	..	..	—	<i>Eragrostis aethiopica</i>
				F	
	Fotafota	..	..	—	<i>Cleistachne sorghoides</i>

	Gogolo	..	..	..	—
	Gugu	..	..	..	—
	Ilyaphwiti	..	..	..	(N)		
N	Jogo	..	..	..	(S)		
	Kabatika	..	..	..	—
	Kabunthu	..	..	..	—
	Kabwili	..	..	..	—
	Kachere	..	..	..	—
	Kachikare	..	..	..	(T)		
	Kachiswaswa	..	..	..	(T)		
	Kadimango	..	..	..	—
	Kalelekani	..	..	..	—
	Kalembalebale	..	..	..	—
	Kalembidzi	..	..	..	—
	Kambwelele	..	..	..	(C)		
	Kamphepete	..	..	..	(C)		
	Kamphetete	..	..	..	—
	Kamphe	..	..	..	(N)		
	Kamponyongo	..	..	..	(T)		
	Kangodza	..	..	..	—
	Kankhulire	..	..	..	—
	Kanumau	..	..	..	—
	Kanyeche	..	..	..	—
	Kapepe	..	..	..	—
	Kapinga	..	..	..	—
	Kapongo	..	..	..	(T)		
	Kasa	..	..	..	(K)		
	Kasanji	..	..	..	(N)		
	Kasimandulu	..	..	..	(T)		
	Kasiyeulimi	..	..	..	—
	Kasochi	..	..	..	(N)		
	Kasongo	..	..	..	(T)		
	Kasorasora	..	..	..	(C)		
	Kasorasora	..	..	..	—
	Kasutuka	..	..	..	—
	Katite	..	..	..	(C)		
	Katunga	..	..	..	(C)		
	Kututa	..	..	..	(T)		
N	Khombwa	..	..	..	(C)		
	Kome	..	..	..	—
	Kolambidzi	..	..	..	—
	Kunde	..	..	..	—
N	Kwanjiwangome	..	..	..	(N)		
	Likakazi	..	..	..	(N)		
						G	
							<i>Hyparrhenia rufa</i>
							<i>Sorghum verticilliflorum</i>
						I	
							<i>Rhynchelytrum repens</i>
						J	
							<i>Ischaemum brachyatherum</i>
						K	
							<i>Eragrostis hispida</i>
							<i>Eragrostis patens</i>
							<i>Eragrostis ciliaris</i>
							<i>Setaria chevalieri</i>
							<i>Tristachya inmoena</i>
							<i>Cleistachne sorghoides</i>
							<i>Brachiaria deflexa</i>
							<i>Oplismenus burmannii</i>
							<i>Urochloa mossambicensis</i>
							<i>Hackelochloa granularis</i>
							<i>Dactyloctenium giganteum</i>
							<i>Sporobolus molleri</i>
							<i>Hyparrhenia dissoluta</i>
							<i>Hyparrhenia nyassae</i>
							<i>Chloris gayana</i>
							<i>Eleusine indica</i>
							<i>Melinis minutiflora</i>
							<i>Cymbopogon giganteus</i>
							<i>Hyparrhenia filipendula</i>
							<i>Leptochloa chinensis</i>
							<i>Cynodon dactylon</i>
							<i>Chloris gayana</i>
							<i>Echinochloa haploclada</i>
							<i>Paspalum commersonii</i>
							<i>Elyonurus argenteus</i>
							<i>Alloteropsis semialata</i>
							<i>Imperata cylindrica</i>
							<i>Eragrostis tenuifolia</i>
							<i>Andropogon eucomus</i>
							<i>Bothriochloa insculpta</i>
							<i>Panicum dregeanum</i>
							<i>Setaria pallide-fusca</i>
							<i>Themeda triandra</i> var. <i>hispida</i>
							<i>Sacciolepis transbarbata</i>
							<i>Echinochloa pyramidalis</i>
							<i>Echinochloa colona</i>
							<i>Chloris gayana</i>
							<i>Sorghum verticilliflorum</i>
							<i>Eriochloa</i> sp.
							<i>Leersia hexandra</i>

				L	
	Likongwe	..	..	—	Heteropogon contortus
	Liwundu	..	..	(Y)	Hyparrhenia gazensis
	Luba	..	..	(C)	Chloris gayana (rare)
	Luba	..	..	(C)	Digitaria milanjana ,, setivalva
	Lunkhumba	..	..	(T)	Andropogon schirensis
	Lupilu	..	..	(K)	Hyparrhenia rufa
	Lusangasanga	..	..	—	Panicum trichocladum
	Lusangani	..	..	(T)	Cynodon dactylon
				M	
	Malampoki	..	..	(A)	Pogonarthria squarrosa
	Mapuntakalulu	..	..	(C)	Setaria aff. nigrirostris
	Matete	..	..	—	Phragmites mauritanianus
	Matimbenizge	..	..	—	Bewisia biflora
	Mukocha	..	..	(A)	Microchloa kunthii
	Mwalala	..	..	(T)	Schizachyrium brevifolium
	Mwalala	..	..	(C)	Themeda triandra var. hispida
	Mwalala	..	..	(N)	Eragrostis aspera
				N	
	Nadanga	..	..	—	Echinochloa pyramidalis
	Nakapereri	..	..	—	Eragrostis chapelieri
	Nakace	..	..	—	Leersia hexandra
	Nakazimbe	..	..	—	Leptocarydion vulpiastrum
	Namcira	..	..	—	Chloris virgata
	Namsongole	..	..	(N)	Imperata cylindrica
	Nangombo	..	..	—	Sorghum versicolor
	Nanyera	..	..	—	Brachiaria deflexa
M	Nyanza	..	..	—	Tragus berteronianus
				P	
	Patupatu	..	..	—	Echinochloa crus-galli
	Perere	..	..	(C)	Cleistachne sorghoides
M	Petapeta	..	..	—	Sorghum verticilliflorum
M	Phomo	..	..	—	Perotis indica
M	Pinganjira	..	..	—	Eragrostis chapelieri
M	Pongabwe	..	..	—	Sorghum rigidifolium
	Pokopoko	..	..	(C)	Panicum maximum
M	Pudzakubelu	..	..	—	Loudetia simplex
M	Pungaziwe	..	..	(C)	Oryza barthii
M	Pusu	..	..	(C)	Digitaria milanjana
				S	
M	Sali	..	..	(T)	Vossia cuspidata
	Sanje	..	..	—	Brachiaria brizantha
N	Sanu	..	..	—	Heteropogon contortus
N	Selu	..	..	(T)	Eragrostis castellaneana
	Senderankho	..	..	(T)	Bewisia biflora
N	Senjere	..	..	(N)	Pennisetum purpureum
M	Senzi	..	..	—	Setaria palustris

N	Seche	..	..	..	(N)	Sporobolus robustus
N	Sewa	..	..	..	(N)	Cymbopogon giganteus
						Hyparrhenia dissoluta
N	Sinde	..	..	..	—	Eragrostis namaquensis
N	Sipe	..	..	..	(C)	Beckeropsis uniseta
N	Songasekwe	..	..	..	—	Oryza barthii
M	Sonthe	..	..	..	(S)	Panicum maximum
M	Sonthe	..	..	..	(C)	Rottboellia exaltata
	Sopo	..	..	..	—	Sacciolepis africana
	Suchi	..	..	..	(Y)	Themeda triandra var. hispida
N	Sungwi	..	..	..	(N)	Oxytenanthera abyssinica
	Supu	..	..	..	—	Chloridion cameronii
T						
	Tedza	..	..	..	(S)	Vetiveria nigriflora
	Tsekela	..	..	..	(N)	Hyparrhenia gazensis
						Hyparrhenia spp.
	Tsengatsenga	..	..	..	—	Digitaria milanjiana
	Tsici	..	..	..	(C)	Eragrostis cilianensis
M	Tsindi	..	..	..	(N)	Sporobolus pyramidalis
U						
	Utululu	..	..	..	(C)	Chloris pycnothrix
W						
	Wanje	..	..	..	—	Setaria palustris
Y						
N	Yuni	..	..	..	—	Heteropogon contortus
N	Yumbu	..	..	..	—	Hyparrhenia rufa
						Hyparrhenia filipendula
						Hyparrhenia spp.
Z						
N	Zala	..	..	..	—	Eragrostis aspera.

Languages

(A)	Cingoni	(C)	Cichewa
(K)	Kiankhonde	(N)	Cinyanja
(S)	Cisena	(Y)	Ciyao (Cichawa)
(T)	Citumbuka		

List of Indicator Species

1. Eroded Lands

Andropogon schinzii
Aristida adscensionis
Bewsia biflora
Eragrostis chapellieri
Heteropogon contortus
Microchloa kunthii (*shallow soils*)
Perotis patens
Pogonarthria squarrosa
Schizachyrium exile
S. brevifolium
Sporobolus festivus
Stereochlaena cameronii (*shallow soils*)
Tristachya inamoena

2. Light Sandy Soils

Alloteropsis semialata
Chloris virgata
Digitaria brazzae
Euclasta condylotricha
Heteropogon contortus
Leptocarydion vulpiastrum
Perotis patens
Urochloa mossambicensis

3. Overgrazing

Aristida diminuta (*wet conditions*)
Eragrostis patens
Gilgichloa indurata
Sporobolus pyramidalis

4. Heavy Soils

Chloris gayana
Eragrostis namaquensis
Hackelochloa granularis
Ischaemum brachyatherum ("*black cotton*" soils)
Panicum massaiense (*seasonally waterlogged soils*)
Rottboellia exaltata (*not exclusive*)
Setaria mombassana
S. palustris ("*black cotton*" soil)
S. phragmitoides ("*black cotton*" soils)
Sorghum verticilliflorum
Sporobolus robustus (*saline clays*)
S. sp. aff. S. marginatus (*saline clays*)