THE GRASSES OF BURMA

By

D. RHIND, I.A.S.

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INTRODUCTION.

This account of the *Gramineae* of Burma is an attempt to gather together the scattered information about the composition of the Burmese grass flora and to place it on record. The list of species is undoubtedly incomplete because, amongst other omissions, it lacks all but a few collections from the high hills. In a country extending over more than 18 degrees of latitude, from sea-level to perpetual snows at over 19,000 feet and with a rainfall varying from under 25 to over 250 inches most diverse ecological conditions occur with a correspondingly great variation in the flora. There is no comprehensive Flora of Burma nor even an enumeration of the plants comparable to those of most of the surrounding regions and, though a proper Flora is long overdue, there seems to be no immediate prospect of one being compiled. The attempt now made to list the known *Gramineae* may be of some assistance when the time comes for a proper Flora to be written and in the meantime it will preserve such information as now exists. Much scientific data were lost at the time of the Japanese invasion of Burma through their not having been published and it is well to preserve as much as possible of what was saved.

The list of species has been compiled partly from the representative sheets of grasses sent from the Mandalay Agricultural College herbarium in December 1941 to Dr. N. L. Bor, Forest Botanist, Dehra Dun, for safe keeping, and partly from other sources. The Mandalay sheets comprised only one of each species represented in that herbarium and are all that remains of that collection and probably of all the herbarium material left in Burma. I am greatly indebted to Dr. Bor for giving these sheets safe refuge. The sheets have since been transferred to the care of Dr. Biswas at the Lloyd Botanic Garden, Darjeeling. I am grateful to Dr. Biswas for facilities to re-examine and list the Mandalay sheets and also to examine all the Sibpur collection of bamboos without which no list of the bamboos could have been compiled. I have also examined the whole of the collection of *Gramineae* in the herbarium of the Forest Research Institute, Dehra Dun, and am much obliged for the facilities granted me there. For numerous library references my thanks are specially due to Mr. D. B. Krishna Rao, Librarian, Agricultural College, Coimbatore, and to Mr. K. Cherian Jacob for the use of the Madras herbarium.

Past work on the grasses of Burma has been almost entirely due to the efforts of the numerous Forest Officers who have been nearly the sole collectors of plants in Burma. In a country whose life and well-being is so intimately bound up with its crops and its vegetation it is a curious reflection how little has been done to study its plant life systematically. Outside one Department of Government almost nothing has been done and even in that Department the collections and the publications of results show a strong bias towards the larger species to the relative neglect of the smaller. This is reflected in the collections of the *Gramineae* by the preponderance of bamboos and in the greater amount of critical systematic study devoted to that tribe compared to the smaller grasses. Further, it can be ascertained from a study of the density of the collections from different areas just where the economically

valuable timber trees grow and where therefore Forest Officers tour frequently. There is a noticeable lack of collections from places of little economic interest such as, for example, the Chin Hills (cf. the numerous collections from the neighbouring Naga and Khasi Hills) and the eastern Shan States (cf. the Chiengmai area of Siam), but in spite of these limitations it is to the efforts of Government Forest Officers that we are indebted for nearly all of what is known of the Burmese flora.

Previous publications on the *Gramineae* of Burma have been more or less fragmentary or are now seriously out of date. Kurz's Forest Flora of British Burma (1878) dealt only with the bamboos. Hooker's Flora of British India (1897) gave the first full account of the *Gramineae* but is now out of date and incomplete. Gamble in his *Bambuseae* of British India (1896) included a complete account of the Burmese bamboos as they were then known. Collett and Hemsley (1891) gave a list of plants including some grasses, collected by them in Upper Burma and the Shan hills adding several new records to those then known. Gage recorded a number of grasses during a tour in 1906 of the Minbu District of Upper Burma. McKerral (Bull. No. 20 of 1924 of the Burma Agric. Dept.) dealt with some of the commoner species of fodder value and Sawyer and Daw Nyun (1927) listed a number of species but neither of these last two works attempted a complete list. In the present work an attempt has been made to include all known species from Burma but it is probable that it is not complete because some of the important herbaria have not been available for consultation. A number of species which are thought to be new have been omitted because a proper study of them is not possible at the present time. Where a species has been described in readily accessible floras no description is given here but in the case of little-known species or those which have been described in less easily available journals a description is given in full, generally the original. No attempt has been made at a complete synonymy, the name currently accepted being given as far as it has been possible to ascertain it with only enough synonyms to permit its being traced in the literature. To bring the nomenclature into line with modern practice it has been necessary to make six new combinations. These are:—

Chimonobambusa gallatlyi for *Arundinaria gallatlyi* Gamble.
Echinochloa notabile for *Panicum notabile* Hook.f.
Microstegium brandisii for *Pollinia brandisii* Stapf.
Eulalia burmanica for *Pollinia burmanica* Hook.f.
Chrysopogon distichophyllus for *Andropogon distichophyllus* Hook.f.
Hackelochloa porifera for *Manisuris porifera* Hack.

Keys have been provided to the tribes, genera and species. A list of the fungi recorded on grasses from Burma has been included. This list was kindly compiled by Dr. L. N. Seth, Mycologist, Government of Burma, and Dr. B. B. Mundkur, Imperial Agricultural Research Institute, New Delhi.

The Bamboos.

Burma is a land 'wreathed in bamboos'. The Burman's whole existence is bound up with the bamboos which play an enormously important part in his everyday life, providing his house, much of his furniture, utensils, farm implements, baskets and containers, binding

materials and some of his food. The rural Burman cannot imagine an existence in a country without bamboos. Often the whole aspect of the country-side is more effectively dominated by the bamboos than by the larger trees. It is impossible to estimate the value of the bamboos to Burma because they are everywhere and enter into almost every phase of life and commerce. Certain species are confined to particular habitats and because different species have specific uses there is a very large internal trade in cut bamboos which are transported about the country in large amounts. Exploitation of the bamboos yields much revenue to Government and forms a not inconsiderable part of the work of the Forest Department.

By far the commonest bamboo in Burma is *Dendrocalamus strictus*, the so-called Male Bamboo. It is found nearly everywhere in the plains where drainage is good or rainfall moderate. It is the main constituent of the Dry Deciduous Bamboo Brake of central Burma. It extends into the higher rainfall areas (where it is not deciduous) and up to about 2,500 feet. But though so common and largely used it is by no means the most useful species; the culms are often crooked and knotty while its habit of growing in tangled clumps makes its cutting laborious. Probably the second most abundant species is *Cephalostachyum pergracile* (Tin-wa) which occurs throughout the country and is at least as useful as *D. strictus*. In Arakan the predominant species is *Melocanna bambusoides* (Kayin-wa). This non-caespitose bamboo forms almost pure forests of great extent completely ousting other plants. It is a useful bamboo for general purposes, easily extracted and has been considered as a source for paper pulp. The large vivaparous fruit is eaten. In the rice-growing areas of Lower Burma one of the most abundant species is *Bambusa tulda*. It is common along water-courses and creeks and is frequently cultivated. In Tenasserim the most plentiful species is *Oxytenanthera nigrociliata* with which *O. albociliata* is often associated. The former finds many uses but the latter is of little value. In the hills up to about 5,000 feet several large species of *Bambusa* and *Dendrocalamus* (including the enormous *D. giganteus*, probably the largest of the *Gramineae*) are found. Above about 6,500 feet the larger species disappear until finally only species of *Arundinaria* or allied genera are found. These often form dense thickets, moss-covered and impenetrable. They are thin-stemmed, small species of little use.

The Grasses.

The very wide range of ecological conditions found in Burma has naturally resulted in a large number of species existing there and it is probable that this list of the grasses is very incomplete, even more so than in the case of the bamboos. It is regrettable that so few species from high levels have been collected. With few exceptions the collections represent the grass flora of the more accessible parts only; they might with a good deal of truth be said to comprise the Commoner Grasses of Burma with only a few exceptions. Apart from the cultivated cereals the grasses of Burma play an important part in feeding the cattle population but are otherwise of small direct economic value. They are important as soil-binders on sloping ground particularly in the hills where rainfall is high. A few are used for thatch and two or three for

the oils they yield, but taken as a whole they enter into the trade of the country to only a small extent apart from their use as fodder.

In the southern rain forests the species tend to be large-leaved, weak-stemmed shade-lovers, such as species of *Acroceras*, *Alloteropsis*, *Centotheca*, *Microstegium*, *Oplismenus* with larger species of *Saccharum*, *Sclerostachya*, *Imperata*, *Coix* and *Sorghum* in clearings. The principal species of the deltaic monsoon areas, where flooding in the monsoon is usual, belong to *Phragmites*, *Saccharum* and *Neyraudia*. In areas not usually flooded *Ischaemum spp.*, *Rottboellia exaltata*, *Chrysopogon aciculatus*, *Cynodon*, *Leersia*, *Eragrostis unioloides*, *Isachne australis* and *I. albens*, *Echinochloa crus-galli* and *E. stagnina*, *Axonopus*, *Dichanthium annulatum* and *D. caricosum*, *Ottochloa*, *Hemarthria compressa* and *Paspalidium spp.* form the common mixture characteristic of paddy-field bunds and low uplands.

The northern wet zone, extending from about Kawlin to north of Fort Hertz, resembles the Lower Burma rain forests in its grass flora to a large extent but *Phragmites* is less common while *Coix spp.* are more abundant. There is some change in the composition of the mixture of smaller species; *Elytrophorus* is often abundant in open places and *Leersia* generally so; species of *Saccolepis* are common while *Bothriochloa intermedia*, *Arthraxon spp.*, *Panicum auritum* and *Isachne australis* are more abundant than in the south. *Eragrostis unioloides* is everywhere plentiful on grazed and trampled ground. In the wet evergreen forests of the north species with commeliniform leaves are frequent, such as *Acroceras*, *Alloteropsis* and *Centotheca* while larger species of *Themeda*, *Eulalia* and *Saccharum* are abundant in clearings and on the edges of forests.

Between the northern and southern wet zones lies the Dry Zone with a very different flora. This area has a rainfall of 25-40 inches all falling in the monsoon season between May and November with hot, dry weather during the rest of the year. Except in low-lying places where water is permanent the large species of *Phragmites* and *Saccharum* are absent though xerophytic forms of *Saccharum spontaneum* may be found even in dry places. In permanent swamps *Vetiveria zizanioides*, *Echinochloa crus-galli* and *E. stagnina* are common. On dry uplands the characteristic species are *Heteropogon contortus*, *Eragrostis spp.*, *Sporobolus coramandelianus*, *Aristida depressa*, *Tragus biflorus*, *Setaria lutescens*, *Cropetium thomaeum*, *Bothriochloa pertusa*, *Chloris barbata*, *Perotis indica* and the elegant *Ratzebergia*. *Sporobolus tremulus* is often dominant over large areas, particularly on fallow land. On stony hill-sides species of *Themeda*, *Cymbopogon* and *Aristida* form the principal grasses.

In the hills between about 4,000 and 6,000 feet under a rainfall of 60-100 inches the grass flora is of two main types: woodland and open downland. The woodland is mostly a fairly open Oak-Chestnut association with light undergrowth so that shade species of grasses are rare. *Themeda*, *Eulalia*, *Erianthus*, *Thysanolaena* and *Arundinella* are some of the commonest genera but from the fodder point of view they are all coarse and tend to be low in calcium and phosphorus. The open grassland is generally inhabited by small forms often with resupinate stems; the common species are *Chrysopogon aciculatus*, *Microchloa indica*, *Sporobolus indicus*, *Paspalum scrobiculatum*, *Erogrostis tenuifolia* and *Microstegium*

nudum. In swamps amongst an abundance of sedges *Pennisetum hordeiforme* and *Panicum humile* are common. Above about 6,000 feet the open grassland is mixed with an abundance of moss and there are extensive patches of bracken under which *Muehlenbergia huegelii*, *Microstegium nudum* and *Arthraxon lancifolius* are the dominant species. In high level swamps *Imperata* and *Coix* often form dense colonies. The composition of the alpine grasslands is almost unknown.

A special type of grass formation occurs along the rivers of the plains where extensive sand and silt deposits are laid down by the big rivers. On these deposits *Saccharum spontaneum* is often the first coloniser, binding the soil and, if prolonged inundation does not recur frequently, is the precursor of other species leading to a seral type of savannah.

Vernacular Names.

Vernacular names have been recorded wherever these have been entered on the herbarium labels or recorded in published lists. It must be admitted at once that they are of limited use and are rarely diagnostic. So far as the Burmese names are concerned they are more often descriptive than specific though there are a few well-known bamboos and grasses with names of fair individuality, However, only too many of the entries are of such vague names as *Wa-bo*, meaning any large, thick-stemmed bamboo, *Tabindaing-wa* for any non-caespitose kind, *Myet-ya* for any awned or irritating grass, *Myet-hmwe* for any scented grass, etc.

D. R.

Simla, 27th December, 1944.

THE GRASSES OF BURMA.

Key to the sub-families of the *Gramineae*.

Spikelets 1-many-flowered, breaking up at maturity above the more or less persistent glumes, or if falling entire then not 2-flowered with the lower floret male or barren and the upper hermaphrodite, usually more or less laterally compressed or terete ..... **Pooideae**

Spikelets 2-flowered, falling entire at maturity, usually with the upper floret fertile and the lower male or barren and in the latter case often reduced to the lemma, all alike or different in size, shape and structure, frequently dorsally compressed.. **Panicoideae**

Key to the tribes of *Pooideae*.

A. Shrubs or trees with woody, often tall, persistent culms; leaf-blades flat, many-nerved, often with transverse veinlets, usually with a petiole-like base which is articulated with the sheath; spikelets bisexual; lemmas 5-many-nerved, usually awnless; lodicules usually 3; stigmas mostly 2 or 3.. **1. Bambuseae**

AA. Perennial or annual herbs; leaf-blades usually sessile and not articulated with the sheaths:

B. Spikelets borne in open or contracted or spike-like panicles, less often in racemes or spikes and then with the lower or both glumes suppressed if on opposite sides of a continuous rhachis, or with 2 or more fertile florets if on one side of the rhachis:

C. Spikelets with 2 or more fertile florets, or if with one fertile floret then with sterile florets above it:

D. Lemma and rhachis glabrous or hairy, in the latter case with the hairs not enveloping the lemma or if so then with the lemma bearing a geniculate awn; low or moderately tall grasses:

E. Glumes usually shorter than the lowest floret and with the upper florets distinctly exserted, rarely longer, and then with firm, dull margins like the lemmas; lemmas awnless or with a straight or curved awn from the entire or bifid apex, or several-awned or lobed:

F. Lemmas usually 5-many-nerved:

G. Leaf-blades broad, many-nerved, with transverse veinlets.. **2. Centotheceae**

GG. Leaf-blades flat, convolute or involute, without transverse veinlets:

H. Lemmas entire or shortly 2-5-toothed at the apex, awnless or awned ..... **3. Festuceae**

HH. Lemmas cleft into 3 or more lobes, with or without fine, straight awns from their sinuses ..... **4. Pappophoreae**

FF. Lemmas 1-3-nerved ..... **7. Eragrosteae**

EE. Glumes usually as long as or longer than the lowest floret, often as long as the spikelet and enclosing the florets; lemma awnless or more often awned from the back or the sinus of the 2-lobed tip; the awn usually geniculate; glumes or lemmas or both frequently with thin, shining margins ..... **10. Aveneae**

DD. Lemmas or rhachilla joints bearing long, silky hairs which envelop the lemma (at least in fertile florets); lemmas awnless or with a straight awn from the tip, often thin; tall grasses with usually large, plume-like panicles .. **6. Arundineae**

CC. Spikelets with one fertile floret (male or female in unisexual 1-flowered spikelets), with or without 1 or 2 male or barren florets below it:

I. Glumes very minute or suppressed; palea 3-9-nerved; stamens usually 6; leaf-blades not transversely veined .... **15. Oryzeae**

II. Glumes usually well developed, at least the upper, rarely minute or suppressed:

J. Spikelets with 3 florets, the lower 2 florets male or barren and the terminal hermaphrodite ..... **14. Phalarideae**

JJ. Spikelets with 1 or 2 florets:

K. Spikelets with 2 florets, the lower male or barren, the upper hermaphrodite:

L. Lower floret barren and without a palea; glumes up to half the length of the spikelet; rhachilla produced beyond the upper floret; spikelets disarticulating with part of the pedicel attached ..... **16. Thysanolaenae**

LL. Lower floret male or barren, usualy with a palea; upper glume as long as the spikelet; rhachilla disarticulating below the upper floret and not produced beyond it; glumes more or less persistent ..... **17. Arundinelleae**

KK. Spikelets with one floret:

M. Spikelets usually breaking up at maturity, the rhachilla disarticulating above the more or less persistent glumes, very rarely falling entire and then with firmly membranous, awned or 5-nerved lemmas:

N. Lemmas hyaline or membranous at maturity, rarely indurated and then laterally compressed, awnless or awned from low down on the back or from the entire or bifid tip:

O. Lemmas usually 3-5-nerved, frequently awned; glumes firmer and longer than the hyaline lemma or if shorter than the lemma, herbaceous-membranous and dull; grain usually with an adhering pericarp ..... **11. Agrosteae**

OO. Lemmas 1-3-nerved, awnless; glumes and lemma very similar in texture, hyaline or thinly membranous, shining; grain usually with a free pericarp ..... **8. Sporoboleae**

NN. Lemmas indurated and rigid at maturity, terete or dorsally compressed, with involute or convolute margins, tightly enveloping the grain; with a terminal awn or sometimes awnless ..... **12. Stipeae**

MM. Spikelets falling entire at maturity, either singly or in clusters from the axis of slender spike-like panicles or racemes; lemma delicate, 1-3-nerved ..... **13. Zoysieae**

BB. Spikelets sessile or shortly pedicelled along one side of the rhachis of solitary, digitate or scattered spikes or spike-like racemes (with 1 fertile floret and 1-3-nerved lemmas), or on the opposite sides of the rhachis of solitary spikes or racemes:

P. Spikelets on opposite sides of the rhachis of solitary spikes ..... **5. Hordeae**

PP. Spikelets in 1 or 2 rows on one side of the usually continuous rhachis of digitate spikes ..... **9. Chlorideae**

Key to the tribes of *Panicoideae*.

A. Spikelets all hermaphrodite or with male or barren or hermaphrodite spikelets mixed in the same inflorescence and so arranged that a male or barren spikelet is near a hermaphrodite spikelet; if unisexual then the lemma of the fertile floret indurated:

B. Spikelets solitary or paired, more or less similar; glumes usually membranous, the lower usually smaller or sometimes suppressed; lower lemma mostly resembling the upper glume in texture; upper lemma papery to very tough and rigid, usually awnless ..... **18. Paniceae**

BB. Spikelets often paired, with one sessile and the other pedicelled, those of each pair similar or more or less dissimilar, rarely solitary and all alike; glumes as long as the spikelet and enclosing the florets, more or less rigid and firmer than the lemmas which are both hyaline or membranous; upper lemma usually awned ..... **19. Andropogoneae**

AA. Male and female spikelets in separate inflorescences or in different parts of the same inflorescence and of different appearance; lemmas hyaline or membranous and thinner than the glumes ..... **20. Maydeae**

The tribes *Phalarideae* and *Festuceae* are not represented in the present list but are included in the key because members of them may occur as introductions or be discovered.

I. BAMBUSEAE.

Key to the genera of *Bambuseae*.

A. Stamens 3, rarely 6:
B. Styles short:
C. Leaves more or less tessellate; shrubby; ultimate branches of the inflorescence without bracts at the base:
D. Style 1, bifid; culm-sheaths persistent ..... *3. Arundinaria*
DD. Styles 2, free or connate at the base:
E. Glumes tessellate, smooth ..... *1. Sinobambusa*
EE. Glumes not tessellate, with raised, longitudinal nerves .. *2. Chimonobambusa*
CC. Leaves not tessellate; ultimate branches of the inflorescence with bracts at the base ..... (*Thamnocalamus*)
BB. Styles long ..... *4. Phyllostachys*
AA. Stamens 6, rarely more:
F. Pericarp thin, adnate to the grain, adhering to the hilum:
G. Filaments united below the middle in groups of 2 or 3, one being free ..... *9. Dendrochloa*
GG. Filaments all free:
H. Spikelets many-flowered (rarely few-flowered); palea 2-keeled ..... *5. Bambusa*
HH. Spikelets few-flowered:
I. Paleas not keeled; spikelets 1, rarely 2 ..... *6. Klemochloa*
II. Paleas (at least in the lower florets) keeled:
J. Paleas all strongly keeled ..... *8. Gigantochloa.*
JJ. Paleas of upper florets not or obscurely keeled, those of the lower florets 2-keeled:
K. Paleas of lower florets 2-dentate, teeth awned ..... *7. Thrysostachys*
KK. Paleas of lower florets not dentate ..... *10. Oxytenanthera*
FF. Pericarp crustaceous or fleshy, separable from the grain:
L. Paleas 2-keeled, not like the lemmas:
M. Spikelets more than 1-flowered:
N. Spikelets with 2-5 central florets hermaphrodite:
O. Spikelets with 2-3 central florets female or hermaphrodite; pericarp crustaceous ..... *11. Dendrocalamus*
OO. Spikelets with 3-5 central florets hermaphrodite; lodicules 3; fruit globose ..... *13. Pseudostachyum*
NN. Spikelets with 1 central floret hermaphrodite, crowded in globose or obconical heads ..... *16. Cephalostachyum*
MM. Spikelets 1-flowered, in long, narrow spikes ..... *14. Schizostachyum*
LL. Palea similar to the lemma:
P. Filaments connate into a tube ..... *15. Neohouzeaua*
PP. Filaments free:
Q. Fruit large, pyriform ..... *17. Melocanna*
QQ. Fruit small ..... *12. Dinochloa*

Alternative key to the genera of *Bambuseae*.

Fruit a berry or nut; pericarp thick, fleshy or crustaceous:—
Stamens 6 or more:—
Paleas 2-keeled, at least in the lower florets; spikelets 1-many-flowered (*Dendrocalaminae*):—
Culms single, overhanging; transverse veins of leaves conspicuous ..... *13. Pseudostachyum*
Culms tufted; transverse veins usually not conspicuous:—
Lodicules 0:—
Spikelets 2-6-flowered, in large globose heads .... *11. Dendrocalamus*

Lodicules 3, conspicuous:—
Spikelets in long narrow spikes, 1-flowered ..... *14. Schizostachyum*
Spikelets crowded in globose or obconical heads, 1-flowered ..... *16. Cephalostachyum*
Paleas keelless or resembling the lemmas or 0; spikelets mostly 1-flowered (*Melocanninae*):—
Lodicules 0:—
Culms zig-zag, climbing; spikelets 1-flowered, minute *12. Dinochloa*
Culms single, erect; spikelets in large panicles, 1-flowered and unisexual; fruit large, pyriform .. *17. Melocanna*
Fruit a true caryopsis or rarely with a thin, free pericarp:—
Paleas usually 2-keeled; shrubby, usually tall with woody culms:—
Stamens 6; lower, and often the upper, florets imperfect (*Bambusinae*):—
Filaments free:—
Palea not keeled:—
Palea not aristate at the top ..... *6. Klemochloa*
Palea 2-aristate at the top ..... *15. Neohouzeaua*
Palea keeled:—
Palea entire or slightly 2-dentate, prominently keeled ..... *5. Bambusa*
Palea deeply 2-dentate, teeth awned, the uppermost nearly entire, keels indistinct ..... *7. Thrysostachys*
Filaments connate:—
Filaments connate in groups of 2 or 3 below the middle ..... *9. Dendrochloa*
Filaments connate into a single tube:—
Spikelets many-flowered; paleas all prominently keeled ..... *8. Gigantochloa*
Spikelets few-flowered; palea of upper flower indistinctly or not at all keeled ..... *10. Oxytenanthera*
Stamens 3, rarely 6 and then with the lower florets perfect (*Arundinariinae*):—
Style short:—
Leaves more or less tessellate; ultimate branches of the inflorescence without basal bracts:—
Styles 2:—
Glumes tessellate ..... *1. Sinobambusa*
Glumes not tessellate ..... *2. Chimonobambusa*
Style 1 ..... *3. Arundinaria*
Leaves not tessellate; ultimate branches of the inflorescence with basal bracts ..... (*Thamnocalamus*)
Style long ..... *4. Phyllostachys*

1. SINOBAMBUSA Makino

Spikelets racemose, sub-phyllopodous; glumes tessellate, acute; stamens 3; styles 2; stigmas plumose.

Shrubby bamboos. Culm-sheaths deciduous, appendiculate; internodes very long; oral setae smooth, rigid.

1. **Sinobambusa elegans** (*Kurz*) *Nakai*, Jr. Arn. Arbor. VI (1925) 152. Arundinaria elegans *Kurz*, Jr. As. Soc. Beng. XLII (1873) 248. F.B.I. VII, 378.

Hills of eastern Burma, extending from Tenasserim and the stunted forests of the Nattaung hills of Martaban at 5,000 to 7,500 feet elevation northwards into the Naga hills of Assam. Used for walls of huts.

2. CHIMONOBAMBUSA Makino

Spikelets racemose; glumes not tessellate but longitudinally nerved; nerves raised; stamens 3; styles 2; stigmas plumose.

Shrubby bamboos. Culm-sheaths almost inappendiculate; oral setae smooth.

Key to the species of *Chimonobambusa.*

Inflorescence on leafy branches; leaves with transverse veinlets; glumes not mucronate ..... *C. gallatlyi.*
Inflorescence on separate, leafless culms; transverse veinlets absent; glumes shortly mucronate ..... *C. khasiana.*

1. **Chimonobambusa gallatlyi** (*Gamble*) comb. nov. Arundinaria gallatlyi *Gamble* in Ann. Roy. Bot. Gard. Calc. VII (1896) 23 et Parkinson in Kew Bull. 1928, 47. F.B.I. VII, 384.

Densely tufted, 4½-7½ m. high. *Culms* cylindrical, 2-2½ cm. diam., green, glabrous, hollow, the walls 2-3 mm. thick; nodes 20-30 cm. apart, thickened and furnished with a ring of blunt or decurved spines. *Culm-sheaths* papery, finely striate, 10-15 cm. long, 3½-5 cm. wide at the base and 0·8-1·2 cm. wide at the top; imperfect blade narrowly lanceolate, 3-5 cm. long; ligule 1-2 mm. wide. *Leaves* oblong-lanceolate, acuminate, pale green, 8-10 cm. long, 1½-2 cm. broad, attenuate at the base into a short, 3 mm., petiole; ending in a scabrous, setaceous point, smooth above, pale beneath, scabrous on one edge; main vein slender, shining, secondary veins 3 pairs, intermediate 5 or 6, transverse veinlets numerous, fine, regular; *leaf-sheaths* striate, ending in a narrow callus and somewhat produced at the mouth which is furnished with a few, usually 3, long, stiff bristles; ligule rather long, triangular, pubescent. *Inflorescence* much branched, forming lax, compound, terminal and axillary panicles; rhachis fine, wiry. *Spikelets* linear, 4-6 cm. long, slender, 5-7-flowered, terminal flower imperfect; rhachilla compressed, 7 mm. long, thickened towards the top, ciliolate along the two lateral edges and furnished at the top with a ring of hairs which surround the terminal floret. *Empty glumes* 2, the lower 5 mm. long, oblong-lanceolate, acute, margins ciliate in the upper part, 3-nerved, the upper glume 7 mm. long, ovate-lanceolate, acute, margins ciliate in the upper part, 5-nerved. *Lemma* ovate-lanceolate, subacute, 1·1 cm. long, about 9-nerved, margins ciliate in the upper part; palea 1·2 cm. long, 2-keeled, obscurely 2-cleft, with a few minute hairs at the apex. *Lodicules* 3, a narrowly triangular one, 3 mm. long, at the base of the palea and 2 ovate-lanceolate ones barely 2 mm. long opposed, all long-ciliate. *Stamens* 3; filaments free; anthers 6 mm. long. *Ovary* glabrous, narrowly elliptic; style divided from the base into 2 plumose *stigmas*. *Caryopsis* unknown.

Mulayit range, Amherst District. Gallatly's No. 276 is without flowers; Parkinson's No. 5126 from the same locality has flowers. Rogers' No. 335T from Maungpok, Nwalabo Ridge, 3,000 feet, Tavoy District, probably belongs here.

Examination of Parkinson's flowering specimens and his revised description in Kew Bull. make it clear that this plant must now be placed in Makino's genus *Chimonobambusa* in accordance with Nakai's revision of *Arundinaria* in Jr. Arn. Arbor. VI (1925). The 3 stamens, 2 free styles, completely non-tessellate, longitudinally-nerved glumes, non-appendiculate culm-sheaths and not abnormally long internodes agree with the characters of *Chimonobambusa.*

2. **Chimonobambusa khasiana** (*Munro*) *Nakai*, Jr. Arn. Arbor. VI (1925) 151. Arundinaria khasiana *Munro*. F.B.I. VII, 381.

Upper Chindwin (Mackenzie No. 5, 1915, flowering).

C. intermedia *Nakai* (Arundinaria intermedia *Munro*) is recorded by Brandis (No. 376) without precise locality, but it appears to be a very doubtful record for Burma and most probably represents a Sikkim plant wrongly labeled.

C. polystachya *Nakai* and C. griffithiana *Nakai* occur in the Khasi Hills and are likely to be found within the western frontier of Burma.

Thamnocalamus prainii *E.-G. Camus* (Arundinaria prainii *Gamble*) is found in the Naga Hills of Assam and may occur in the Chin Hills of Burma.

3. ARUNDINARIA Micheaux.

Key to the species of *Arundinaria.*

Culms thin, under 1·25 cm. diam.; leaves very thin; branchlets numerous, wiry, geniculate ..... *A. kurzii*

Culms thicker, over 2·5 cm. diam.; a belt of straight, short spines below the nodes ..... *A. armata*

1. **Arundinaria kurzii** *Gamble*, Ann. Roy. Bot. Gard. Calc. VII (1896) 25. F.B.I. VII, 385.

Coasts of southern Burma.

2. **Arundinaria armata** *Gamble, l.c.* p. 130. F.B.I. VII, 385.

Mogok and Bhamo areas.
Shan—*Mai-tut.*
From an examination of both the Calcutta and Dehra Dun materials of Rogers No. 335T I consider it most likely to be *Chimonobambusa gallatlyi* and not *A. armata.*

4. PHYLLOSTACHYS Sieb. et Zucc.

Key to the species of *Phyllostachys.*

Leaves thick, spinulose-serrate on one edge; petiole 8 mm. long *P. mannii*
Leaves often in pairs:—
Transverse veins of the leaves forming squares and rectangles with the nerves ..... *P. bawa*
Transverse veins not forming distinct squares and rectangles with the nerves ..... *P. sedan*

1. **Phyllostachys mannii** *Gamble*, Ann. Roy. Bot. Gard. Calc. VII (1896) 28. F.B.I. VII, 386.

Gamble states that he received specimens from Oliver from Bernardmyo, Mogok Subdivision, where it was said to be cultivated and the culms used for walking sticks. I have seen no specimens.
Shan—*Mai-pang-puk*; *Sedan.*

Species dubia.

(*a*) **Phyllostachys bawa** *E.-G. Camus*, Les bambusees (1913) 66. Brandis, Ind. Trees (1911) 719 (4).

Hills north of Papun, Salween District; generally near streams.
Burmese—*Bawa.*
Karen—*Mepwe.*

(*b*) **Phyllostachys sedan** *E.-G. Camus, l.c.* Brandis, Ind. Trees (1911) 667 (3).

Hills east of Bhamo, 6,500 feet. Used for pipe stems.
Burmese—*Sedan* (?)

P. bambusoides *Sieb. et Zucc.* which is known from the Mishmi Hills, Yunnan and Shantung, is likely to be found in the northern hills of Burma.

5. BAMBUSA Schreber.

Key to the species of *Bambusa.*

Culms with spines ..... *B. arundinacea*
Culms without spines:—
Spikelets cylindric:—
Arborescent:—
Imperfect blade of culm-sheath triangular from a broad base:—
Culm-sheath with large auricles:—
Palea ciliate on the keels:—
Spikelets long:—
Spikelets 2·5-7·5 cm. long ..... *B. tulda*
Spikelets up to 15 cm. long ..... *B. longispiculata*
Spikelets short, up to 2·5 cm. long ..... *B. burmanica*

Palea not ciliate on the keels; young culms white-scurfy ..... *B. polymorpha*
Culm-sheath with small auricles ..... *B. pallida*
Imperfect blade of culm-sheath narrow and without auricles:—
Culms short ..... *B. affinis*
Culms long ..... *B. copelandi*
Shrubby ..... *B. nana*
Spikelets flattened:—
Culms yellow-striped ..... *B. vulgaris*
Culms not striped:—
Fertile flower one only ..... *B. griffithiana*
Fertile flowers 2 or 3 ..... *B. schizostachyoides*
Fertile flowers 3 or 4; anthers obtuse ..... *B. oliveriana*
Fertile flowers 5 or 6:—
Anthers blunt or with one hair only at the tip ..... *B. binghami*
Anthers acute or with 3 or more hairs at the tip .... *B. kingiana*
Fertile flowers about 10; lodicules 0 ..... *B. lineata*
Species with flowers unknown.
Culms erect:—
Internodes much swollen in the lower half ..... *B. wamin*
Internodes not or scarcely swollen in the lower half:—
Imperfect blade absent ..... *B. villosula*
Imperfect blade present:—
Culms with light brown, silky hairs matted at the nodes ..... *B. sinthana*
Culms without matted hairs at the nodes:—
Young culms densely white-silky ..... *B. kyathaungtu*
Young culms not as above; imperfect blade densely brown-hairy inside ..... *B. thalaw-wa*
Culms scandent; leaves shaggy at the tips ..... *B. marginata*

1. **Bambusa arundinacea** *Willd.*, Sp. Pl. II (1799) 245. F.B.I. VII, 395. B. spinosa *Roxb.* (non *Bl.*)

Throughout the Pegu Yomas and extending into Tenasserim. This widely-distributed bamboo occurs in two distinct forms, a tall, handsome, large-culmed variety of moist valleys and an almost dwarf, thick-branched, thorny, small-culmed type of low hills and laterite ridges. The latter is commonest in Burma. Isolated clumps flower sporadically but as a rule it flowers gregariously over large areas at intervals of about 30 years.

Used for buildings, mats, etc. Makes good hedges when kept clipped. Tender shoots eaten and also used for poultices. Seeds edible. Sometimes called the Spiny Bamboo.

Burmese—*Kyakat-wa*; *Nga-chat*; *Wa-chat*.
Shan—*Mai-sang-nam*.
Karen—*Wakyu*.
Talaing—*Dunhalè*.

2. **Bambusa tulda** *Roxb.*, Hort. Beng. (1814) 25. F.B.I. VII, 387.

Widely distributed from Victoria Point to north of Myitkyina, ascending to about 4,500 feet in the Shan hills. Common on flat land and along streams, often cultivated. Flowers gregariously but single culms may flower at any time. Used for a variety of purposes but liable to insect attack if not seasoned in water. Tender shoots eaten.

Burmese—*Thaik-wa*; *Talagu-wa*; *Wa-pyu*; *Tabindaing-wa*.
Shan—*Mai-nawng*; *Mai-wang*; *Mai-wawng*.
Karen—*Wabuthu*; *Wa-ponwe*; *Wabgai*.

3. **Bambusa longispiculata** *Gamble*, Brandis, Ind. Trees (1911) 668.

Tenasserim, Salween and Ruby Mines areas.
Burmese—*Thaik-wa*; *Tabindaing-wa*.

4. **Bambusa burmanica** *Gamble*, Ann. Roy. Bot. Gard. Calc. VII (1896) 35. F.B.I. VII, 388.

From Mergui to Katha District; common. Similar to *B. tulda* but larger.
Burmese—*Thaik-wa*; *Thaik-wa-gyi*; *Wa-ya*; *Chat-wa*; *Tabindaing-anet*; *Hnee-wa.*
Karen—*Wa-ther*; *Wa-keur.*

5. **Bambusa polymorpha** *Munro*, Trans. Linn. Soc. XXVI (1868) 98. F.B.I. VII, 389.

Common in the mixed forests of Lower Burma and the Shan hills. Good for walls, floors, roofs, etc.
Burmese—*Kyathaung-wa.*
Shan—*Mai-sa-lawn.*

6. **Bambusa pallida** *Munro*, Trans. Linn. Soc. XXVI (1868) 97. F.B.I. VII, 389. B. critica *Kurz* in Jr. As. Soc. Beng. XLII (1873) 350. ? Dendrocalamus criticus *Kurz* in For. Fl. Bur. II (1878) 559.

From Bhamo southwards to the Pegu Yomas, generally in moist valleys. Apparently wild in the hills up to 5,000 or 6,000 feet and cultivated in the plains. Used for building and general purposes.
Burmese—*Gya-wa.*
Kachin—*Madaukran* (*Mădau Hkrar*); *Maipyu.*

7. **Bambusa affinis** *Munro*, Trans. Linn. Soc. XXVI (1868) 93. F.B.I. VII, 390.

Tavoy, Pegu, Sittang and Yunzalin valleys. It does not seem to have been collected in flower in Burma.
Burmese—*Thaik-wa*; *Wabwe*; *Thishe*; *Wa-byauk.*
Karen—*Wa-buk.*

8. **Bambusa copelandi** *Gamble apud Brandis*, Ind. Trees (1911) 671. Thrysostachys copelandi *Gamble* MS.

Said to be largely cultivated in the Northern Shan States.
Burmese—*Wa-gyi.*

9. **Bambusa nana** *Roxb.*, Hort. Beng. (1814) 25. F.B.I. VII, 390.

The Chinese Bamboo. A native of China and Japan but often cultivated in Lower Burma. It makes good hedges when clipped and is so used in Rangoon and elsewhere. Young shoots edible.
Burmese—*Pilan-pinan-wa.*

10. **Bambusa vulgaris** *Schrad.*, Wendl. Collect. Pl. II (1810) 26. F.B.I. VII, 391.

An introduced species, cultivated and run wild in Lower Burma. Sometimes called 'Siamese Bamboo'. There is an ornamental yellow-striped variety, var. *striata*. Young shoots eaten.
Burmese—*Wa-net*; *Shwe-wa.*

11. **Bambusa oliveriana** *Gamble*, in Ann. Roy. Bot. Gard. Calc. VII (1896) 130. F.B.I. VII, 392.

Collected about 30 miles north of Mandalay, in the Ruby Mines area (Mogok) and Bhamo, 1,000 to 2,000 ft.
Burmese—*Wa-pyu-san*: *Sinmidu.*
In a manuscript note on a plant of Oliver's in Herb. Calcutta Debbarman points out that the description given by Gamble (l.c.) is erroneous in several particulars. The following amended description is based on Debbarman's note and a re-examination of the material in Herb. Calcutta.
Culms 12 to 15 m. long, 2·5 to 5 cm. diam.; internodes about 35 cm. long; branches many from the base upwards. *Culm-sheaths* thin, 20 to 25 cm. long, 10 to 12·5 cm. broad, attenuated upwards into a rounded top 5 to 7·5 cm. broad; glabrous on both sides or slightly hirsute on the back when young; imperfect blade triangular-lanceolate, cordate at the base, 10 to 20 cm. long, 5 to 7·5 cm. broad, scattered stiff brown hairs on both sides, auricles short, long-fringed, that on one side

rounded, about 2 to 8 mm. long, that on the other side decurrent, often 2·5 cm. long; ligule about 2 mm., serrate. *Leaves* small, linear, thin, 10 to 18 cm. long, 1·to 1·6 cm. broad, ending above in a long needle-like twisted point, glabrous on both surfaces, edges minutely scabrous; main vein pale, secondary veins 4-5 pairs, faint, intermediate 7; leaf-sheaths glabrous, ending in an emarginate callus and produced at the edges to meet the rather long ligule. *Inflorescence* a much-branched panicle of one-sided spikes with distant bracteate clusters of spikelets; bracts glabrous, striate; *spikelets* flattened, 1·2 to 1·5 cm. long, glabrous; empty glumes 1 or 2, ovate-lanceolate, veined; fertile flowers 3 or 4, distichous, separated by conspicuous rhachillae; terminal flower imperfect, on a long flattened rhachilla; *lemma* ovate-lanceolate, 9-13 nerved, slightly hairy near the apex, tip bristly; *palea* rather shorter than the lemma, acute, 2-keeled, upper portion including the keels somewhat hairy, 3-nerved between as well as on either side of the keels. *Lodicules* 3, rounded or sub-truncate, long-fimbriate, many-nerved. Stamens long-exserted; anthers striped red and yellow at first, becoming purple; anther cells rounded, obtuse and approximate, one cell slightly longer than the other. *Ovary* trigonal, ovate, elongate, upper half hairy, somewhat deeply furrowed on one side; style inconspicuous or 0; stigmas 2, plumose. *Caryopsis* 8 mm. long, trigonal, furrowed, hairy near the apex.

12. **Bambusa binghami** *Gamble*, in Ann. Roy. Bot. Gard. Calc. VII (1896) 45. F.B.I. VII, 392.

Tenasserim, Nyaungdaungle Forest (Bingham 1891, flowering).
Burmese—*Nga-chat-wa.*

13. **Bambusa kingiana** *Gamble*, in Ann. Roy. Bot. Gard. Calc. VII (1896) 46. F.B.I. VII, 393.

Petsut and Naba, Katha District.
Burmese—*Thaik-wabo.*

14. **Bambusa lineata** *Munro*, in Trans. Linn. Soc. XXVI (1868) 118. F.B.I. VII, 393. B. rumphiana *Kurz*, in Jr. As. Soc. Beng. XXXIX (1870) 86.

Tenasserim coasts and the Andaman Islands. In marshy coast forests. Constant—flowering.

15. **Bambusa schizostachyoides** *Kurz ex Gamble*, in Ann. Roy. Bot. Gard. Calc. VII (1897) 48. F.B.I. VII, 393. Cephalostachyium schizostachyoides *Kurz*, in For. Fl. Bur. II (1878) 565. Melocanna (?) kurzii *Munro*, in Trans. Linn. Soc. XXVI (1868) 134.

Macpherson's Strait, South Andaman and probably Middle Andaman.
Rogers 577 ! from semi-*indaing* forest in Yonbin Reserve, Yamethin District, is from a juvenile plant and is a very doubtful record for this species.

16. **Bambusa griffithiana** *Munro*, in Trans. Linn. Soc. XXVI (1868) 99. F.B.I. VII, 394. Dendrocalamus griffithianus *Kurz*, in For. Fl. Bur. II (1878) 562.

Myitkyina District.
Burmese—*Wa-myin.* Kachin—*Wa-ra.*

17. **Bambusa villosula** *Kurz*, in For. Fl. Bur. II (1878) 553. F.B.I. VII, 396.

'On limestone hills. Attaran, Salween, Thoungyin, Yunzalin; not found in Pegu. Good for basket work' (Brandis 384 !).
Burmese—*Tabindaing-wa*; Karen—*Wami.*

18. **Bambusa marginata** *Munro*, in Trans. Linn. Soc. XXVI (1868) 114. F.B.I. VII, 396.

Dawna Range, Tenasserim, 5,000 feet.
This species may prove to be a Dinochloa; Brandis so named it on his sheet 371 !
The fringe on the upper margin of the leaves is very remarkable and characteristic.
Burmese—*Wa-thabut.* Karen—*Wame.*

Species dubia.

E.-G. Camus in Les Bambusées (1913) makes the following species based on imperfectly known plants described by Brandis in Indian Trees (1911).

(*a*) **Bambusa kyathaungtu** *E.-G. Camus*, l.c., p. 116. Brandis l.c., p. 669 (8).

Forests of Bawben, Pegu District.
Burmese—*Kyathaungtu-thaiktu.*

(*b*) **Bambusa wamin** *E.-G. Camus*, l.c., p. 135. Brandis l.c., p. 685 (3).

Cultivated in gardens in the Northern Shan States. Said to have come from China or perhaps Siam. The internodes are much swollen in the lower part.

(*c*) **Bambusa thalaw-wa** *E.-G. Camus*, l.c., p. 135. Brandis, l.c., p. 685 (4).

Cultivated in the Northern Shan States, 2,000 to 4,000 feet.
Burmese—*Thalaw-wa.*

(*d*) **Bambusa sinthana** *E.-G. Camus*, l.c., p. 135. Brandis l.c., p. 685 (2).

Pyinyaung forests, Meiktila District. Along banks of streams and on low, moist ground.
Burmese—*Sinthana.*

6. KLEMACHLOA Parker.

Spikelets 1-2-flowered, flowers hermaphrodite. *Glumes* membranous or papery, many-nerved, slightly enlarged upwards, the two lower empty. *Palea* of upper flower of 2-flowered spikelets or of single flower of 1-flowered spikelets not keeled. *Lodicules* 3 or 2. *Stamens* 6; filaments free. *Ovary* with pubescent apex; style long, not divided; stigma plumose. *Caryopsis* oblong, apex rostrate, hilum basilar, punctiform.

Arborescent, scandent bamboos. Spikelets separated into distinct groups on the elongated branches. Rhachilla of the upper flower not produced.

1. **Klemachloa detinens** *Parker*, in Ind. Forester LVIII (1932) 7.

Culms scandent, 20-30 m. high; internodes about 60 cm. long, glabrous, shining, mealy-white when young. *Culm-sheaths* narrow, about 15 cm. long, early deciduous. *Leaves* 20-30 cm. long, 4-6 cm. wide, oblong-lanceolate, base rounded, cuneate, apex acuminate, margins scabrid, glaucous below and slightly rough, smoother above; secondary nerves on both sides 9-10, intermediate 7-8; sheath glabrous, striate; ligule 3-5 mm. long, erect, truncate, glabrous. *Panicles* arising from the leafy stems, mostly terminal, unbranched; rhachis pulverulent. *Spikelets* in congested heads of few spikelets each spaced along the flowering branches; spikelets 7-8 mm. long. *Empty glumes* 4-6 mm. long, papery, irregularly 9-15-nerved. *Lemma* more acute and narrower than the empty glumes and 1 mm. longer. *Palea* 7 mm. long, oblong, subhyaline, subacute, 2-nerved, sometimes apparently 5-8-nerved of which 2 are valid, back minutely puberulous. *Lodicules* 2-3, apex ciliate. *Anthers* 4 mm. long, base sagittate, apex acute; filaments glabrous. *Caryopsis* 6 mm. long including the rostrum, 2 mm. diam., oblong; embryo about 1 mm. long.

Myinmolekat, Mergui District, 2,000-2,700 ft. (Parker 3130, 3132).

7. THRYSOSTACHYS Gamble

Key to the species of *Thrysostachys.*

Flowers large; culm-sheaths straight-truncate at top; leaves moderately large ..... *T. oliveri*
Flowers small; culm-sheaths triangular-truncate at top and with pointed auricles; leaves small ..... *T. siamensis*

1. **Thrysostachys oliveri** *Gamble*, in Ann. Roy. Bot. Gard. Calc. VII (1896) 58. F.B.I. VII, 397. Bor in Ind. For. Rec. (N.S.) Bot. II (1941) 221.

Katha and Bhamo Districts and Shan Hills.
Walls thin; seed eaten.
Burmese—*Thanat-wa.* Kachin—*Mai-tong*; *Ura.*
Shan—*Mai-sa-lawn*; *Mai-he*; *Mai-pao.*

2. **Thrysostachys siamensis** *Gamble*, in Ann. Roy. Bot. Gard. Calc. VII (1896) 59. F.B.I. VII, 397. Bambusa regia *Thomson ex Munro* (non *Kurz*) in Trans. Linn. Soc. XXVI (1868) 116. B. siamensis *Kurz* MS.

'Cultivated in the drier parts of Burma, particularly in monastery compounds.' Recorded from Kyaukse and Meiktila Districts in the north and from Salween and Tenasserim in the south.
Used for umbrella handles.
Burmese—*Tiyo-wa*; *Ti-wa*; *Kyaung-wa.*
Shan—*Mai-tiyo.*

8. GIGANTOCHLOA Kurz

Key to the species of *Gigantochloa.*

Spikelets rounded, oblong:—
  Spikelets small, under 1 cm., glabrous ..... *G. verticillata*
Spikelets narrow, acute, cylindrical:—
  Spikelets very long (2·5-5 cm.); edges of the glumes black-ciliate ..... *G. macrostachya*
  Spikelets up to 1·25 cm. long; edges of glumes pale-ciliate.. *G. apus*
Spikelets distinctly flattened:—
  Spikelets up to 2·5 cm. long; ligule of leaves 1-2 mm. long, fringed with white bristles ..... *G. compressa*

Species dubia. Not in the key.

1. **Gigantochloa verticillata** *Munro*, in Trans. Linn. Soc. XXVI (1868) 124. F.B.I. VII, 398. G. maxima *Kurz*, in Tijdschr. Nederl. Ind. XXVII (1864) 266. Bambusa verticillata *Willd.*, in Sp. Pl. II (1797) 245. B. pseudarundinacea *Steud.*, Syn. 330.

There appears to be only one collection of this plant from Burma, a flowerless specimen of McHarg's from Tenasserim. It occurs in Malaya. Culms strong; used for buildings; young shoots edible.
Burmese—*Wa-pyu.*

2. **Gigantochloa macrostachya** *Kurz*, For. Fl. Bur. II (1878) 557. F.B.I. VII, 399.

From Tenasserim northwards to Arakan and the Kachin Hills of Bhamo District, the Upper Chindwin and the Lushai Hills. Walls thin; used for matting and basket-work. Culm-sheath hairs irritating.
Burmese—*Wa-net*; *Thaikthada-wa*; *Wapyu-gyi*; *Tabindaing-wa*; *Wa-de*; *Wa-byauk*; *Wa-pyu*; *Wa-byaw* (Tavoy).
Shan—*Mai-pok-lam*; *Mai-hok-lam.*
Karen—*Wa-me*; *Wa-ma*; *Wa-kle-ma.*

3. **Gigantochloa apus** *Kurz ex Munro*, Trans. Linn. Soc. XXVI (1868) 126. G. kurzii *Gamble.* F.B.I. VII, 399.

Extends from Malaya up the Tenasserim coast into Chittagong. Used for basket work.
Burmese—*Ko-wa.*
Karen—*Wa-tho*; *Wa-do*; *Wa-po-do.*

4. **Gigantochloa compressa** *Parker*, in Ind. Forester LIV (1928) 98.

A large loosely tufted plant. *Culms* 12-18 m. long, 10 cm. diam., grey-powdery when young, afterwards green; internodes about 60 cm. long, walls about 8 mm. thick. *Culm-sheath* about half the length of the internode, persistent, covered with black hairs when young, apex rounded with inconspicuous auricles on either side, imperfect blade small, lanceolate, reflexed; ligule the full width of the sheath, fringed with long, white bristles. *Leaves* 20-45 by 3·5-7·5 cm., glabrous above but somewhat scabrid towards the lower edge, glaucous and slightly pubescent beneath especially towards the base and along the stout yellow midrib, margins scabrid, apex narrowed into a long, twisted, scabrid point; secondary nerves 7-14 pairs, intermediate veins 7; petiole 3-5 mm. long, pubescent; sheath striate, grey-pubescent when young and sometimes also clothed with black bristles, callus pubescent, 2 very small marginal naked calli; ligule 1-2 mm. long, fringed with white bristles.

Inflorescence a leafless or sometimes leafy panicle. *Spikelets* arranged in discrete half-whorls of 2-3 fertile and several sterile spikelets in the axils of ovate or lanceolate bracts; rhachis densely grey-pubescent. Fertile spikelets 20-25 mm. long, 5-6 mm. broad, distinctly flattened or compressed consisting of 3-4 broadly ovate, mucronate, many-nerved empty glumes which are obscurely brown-hoary and conspicuously black-ciliate, followed by 2-4 fertile glumes similar to the empty but larger, 15-20 mm. long and more distinctly mucronate, these followed by a glume containing an empty palea and sometimes an empty convolute glume. *Palea* 15-18 mm. long, strongly keeled and ciliate on the keels, tip rounded or minutely bifid, 5-6-nerved between the keels. *Lodicules* 0. *Stamens* 6-7; filaments united into a tube as long as the palea; anthers yellow or pinkish-purple, 9-13 mm. long, connective produced into a hairy point about 1 mm. long. *Ovary* narrowly cylindric, glabrous except at the top; style long, slender, hairy; stigmas 3, very slender, hairy.

Nagawan Reserve, Mergui District. Common on low hills; also on the Yangwa klong (Parker).

Siamese—*Maipai-kai-hdam.*

Species dubia.

E.-G. Camus in Les Bambusées (1913, pp. 140-141) makes the following species to accommodate the eight plants whose flowers are unknown and which Brandis lists on pages 672-3 of his Indian Trees (1911). Gamble includes (*d*), (*f*) and (*g*) under G. macrostachya.

(*a*) **Gigantochloa mogaungensis** *E.-G. Camus*, l.c. Brandis l.c. No. (*c*).
Mogaung forests, Myitkyina District.

(*b*) **Gigantochloa wunthoensis** *E.-G. Camus*, l.c. Brandis l.c. No. (*d*).
Wuntho, Katha District, 500 ft.

(*c*) **Gigantochloa kathaensis** *E.-G. Camus*, l.c. Brandis l.c. No. (*e*).
Hills east of Katha, 2,000 ft.

(*d*) **Gigantochloa wanet** *E.-G. Camus*, l.c. Brandis l.c. No. (*f*).
Shwegu, Upper Burma.

(*e*) **Gigantochloa kachinensis** *E.-G. Camus*, l.c. Brandis l.c. No. (*g*).
Kachin Hills, Bhamo District, 1,500 ft., in moist forest.

(*f*) **Gigantochloa toungooensis** *E.-G. Camus*, l.c. Brandis l.c. No. (*a*).
Karen Hills east of Toungoo.

(*g*) **Gigantochloa yunzalinensis** *E.-G. Camus*, l.c. Brandis l.c. No. (*b*).
Hills on the headwaters of the Maitharauk river, ascending to the crest of the Bithoko range; also in the Sinzway forest of the Yunzalin valley (Brandis).

9. DENDROCHLOA Parkinson

Spikelets 5-7-flowered; rhachilla articulate-pedicellate between the lemmas; flowers hermaphrodite; lower glumes sterile, rigid, mucronate. *Lemma* rigid, strongly convolute, many-nerved, aristo-mucronate. *Palea* as long as the lemma or longer, 2-keeled, apex obscurely bidentate. *Lodicules* 3, large, subequal, margins ciliolate. *Stamens* 6, one free, the rest with filaments of 2 or 3 united below the middle. *Ovary* attenuated into the elongated style; style apex obscurely 3-fid. *Caryopsis* large, elliptic-cylindric, crowned by the persistent style, enclosed in the lemma and palea. Pericarp adnate to the seed.

Tall arborescent grasses, culms laxly caespitose, internodes very long. *Leaves* large, transverse veinlets not markedly conspicuous. Flowers borne on leafy culms in terminal panicles at the nodes of the branches.

Species 1; indigenous in Burma.

1. **Dendrochloa distans** *Parkinson*, in Ind. Forester LIX (1933) 707.

Culms arborescent, erect, 15-20 m. high, up to 11 cm. diam., naked below; internodes 1·2-1·5 m. long or more, walls 5 mm. thick. *Culm-sheaths* large, base 24-30 cm. wide, 35-40 cm. long, outside with adpressed pale hairs, inside glabrous, shining; imperfect blade 35-40 cm. long, base dilated to 5-10 cm. wide, abruptly attenuated above the base, apex gradually long-acuminate; ligule irregular. *Leaves* large, 30-50 cm. long, 5-6 cm. wide, linear-lanceolate, apex long-acuminate, base sub-rounded or slightly attenuated into the 1 cm. long petiole, glabrous above, pale and adpressed-pubescent below or at length glabrous, margins scabrid; secondary nerves about 15-16, not at all conspicuous, transverse veinlets inconspicuous and somewhat distant; sheath adpressed-hairy, later glabrous, mouth not fimbriate; ligule erect and conspicuous, obtuse, 3-7 mm. long. *Panicles* terminal, up to 75 cm. long, base leafy. *Spikelets* in verticells at the nodes at intervals of 5-6 cm., internodes short-hairy; lower glumes empty, 3-10 mm. long. *Flowers* 5-7, rhachilla 2 cm. long between the lemmas, slightly dilated upwards and dorsally compressed. *Lemma* 2-2·4 cm. long, 1 cm. broad, rigid, strongly convolute, margin ciliate above the middle, then glabrate. *Palea* 2·6 cm. long, 1·1 cm. broad, convolute, 2-keeled, ciliate towards the apex, 6-nerved between the keels and between the keels and the margins up to 5-nerved. *Lodicules* 1-1·2 cm. long, narrowly obovate-oblong, hyaline, inconspicuously nerved. *Anthers* 1·4 cm. long, apex obtuse; filaments 2·6 cm. long. *Ovary* glabrous; style 3-3·5 cm. long. *Caryopsis* 2 cm. long, 6 mm. diam.

Forests near Theindaw and Tharabin on the Big Tenasserim river, Mergui District and near Tenasserim town. Used for rafts and mats.

Burmese—*Tamyin-wa*; *Kamyin-wa*.

Notable for the very long internodes which sometimes reach nearly 6 feet and for the large leaves.

10. OXYTENANTHERA Munro

Key to the species of *Oxytenanthera*.

Heads usually few-flowered:—
- Edges of glumes ciliate:—
  - Cilia of glumes black or purple ..... *O. nigrociliata*
  - Cilia of glumes white:—
    - Spikelets 15-17 mm. long ..... *O. hosseusii*
    - Spikelets 20 mm. long or more ..... *O. albociliata*
- Edges of glumes not ciliate ..... *O. parvifolia*

Heads many-flowered:—
- Spikelets 1-flowered ..... *O. thwaitesii*
- Spikelets 2-flowered ..... *O. lacei*

1. **Oxytenanthera nigrociliata** *Munro*, Trans. Linn .Soc. XXVI (1868) 128. Gigantochloa andamanica *Kurz*. G. auriculata *Kurz*. Oxytenanthera auriculata *Prain*. Bambusa auriculata *Kurz*.

The common bamboo of Tenasserim, the Andaman Islands and southwards to Malaya. Used for house-building and basket work.

Burmese—*Wa-nwe*; *Wa-ya*; *Wa-byauk*; *Talagu-wa*; *Wa-pyu-gyi*; *Wa-gok*; *Wa-thaik*; *Nat-wa*.

Karen—*Wamay*; *Wa-ba*; *Wa-kle-ma*.

2. **Oxytenanthera hosseusii** *Pilger*, Fedde, Rep. Sp. Nov. III (1906) 116.

Leafy branches bearing sheaths to the base. *Leaves* papery, broadly lanceolate, attenuate at the base into a short petiole, gradually acuminate at the tip into a very sharp point furnished with several hairs, edges scabrid, slightly puberulent-hirsute beneath, about 13-17 cm. long, 22-25 mm. wide; secondary nerves indistinct, non-tessellate; sheaths setose, auricles very short, rounded; ligule rounded, not fimbriate. *Inflorescence* a large panicle, heads of flowers on slender, leafless branchlets or leafy below the flowers, heads of 6-12 flowers each, the fertile spikelets intermixed with short, sterile ones, furnished at the base with short, shining bracts. *Spikelets* slender, subulate, 15-17 mm. long. *Glumes* 2, oval or broadly oval, obtuse or shortly apiculate, edges densely clothed with white cilia; lower flower male, upper hermaphrodite. *Lemma* narrowly elliptic, finely mucronate, rigid, striate, rounded, involute, edges in the upper part long white-ciliate, 12-14 mm. long. *Palea* 10-12 mm. long, narrow, linear, hyaline, membranous, obtuse, 2-keeled, tip slightly hirsute. *Stamens* 6; filaments united in a tube; anthers with a small setulose mucro at the tips. *Lemma of the upper flower* lanceolate, rigid, shortly pointed, bearing several hairs, about 14-15 mm. long, rather narrower than that of the lower flower, scarcely keeled, many-nerved, involute. Rest unknown.

Amherst (Soe Min 436!). Closely resembles *O. albociliata* but differs in the setose leaf-sheaths and hairy leaves, the less acute glumes and the shorter and broader bracts. Fairly frequent-flowering.

Burmese—*Hmyin.*

3. **Oxytenanthera albociliata** *Munro*, Trans. Linn. Soc. XXVI (1868) 129. F.B.I. VII, 401. Gigantochloa albociliata *Kurz.*

Mainly from about Pyinmana southwards to south Tenasserim. Of very little value.

Burmese—*Nganat-shaw*; *Mene*; *Kanat-shaw*; *Wa-ya*; *Wa-pyu*; *Wa-nwe*; *Wa-pyu-gale*; *Wa-pyu-gyi*; *Wa-gok*; *Wa-gauk.*

Karen—*Wa-kle.*

Shan—*Mai-lai.*

4. **Oxytenanthera parvifolia** *Brandis ex Gamble*, Ann. Roy. Bot. Gard. Calc. VII (1896) 72. F.B.I. VII, 402.

Yunzalin valley (Brandis) and Wazunchoung, Tavoy District (Rogers).

5. **Oxytenanthera thwaitesii** *Munro*, Trans. Linn. Soc. XXVI (1868) 129. F.B.I. VII, 402.

Roger's No. 322T! from near the top (3,000 ft.) of Naungpo Nwalabo ridge, Tavoy District, seems to be the only collection of this plant from Burma though his No. 385 from Kaleinaung Reserve, Tavoy District, may belong here too.

Burmese—*Kyaungwa-ame.*

6. **Oxytenanthera lacei** *Gamble*, in Kew Bull. 1910, 385.

Culms erect, green or green-glaucescent, fistular, laxly fasciculate at the base, leaf-bearing branches hard, the last not fistular, flowering branches fistular or solid, terete. *Culm-sheaths* 20-30 cm. long, 15-20 cm. broad, at the base 4·4-6 cm. broad, straw-coloured at the apex, conspicuously striate, densely covered on the back in the upper part with blackish spinules; blade subulate-lanceolate, reflexed, 10-30 cm. long, slightly contracted at the base and there provided with 2 short, plicate, fimbriate auricles; ligule about 5 mm. long, long-fimbriate. *Leaves* thin, pale, on slender, geniculate, fasciculate branches which are arranged alternately on branches arising from the sides of the nodes; sheaths straw-coloured, striate, white-spinulate on the back; auricles long, sparingly long-fimbriate, deciduous; leaf-blade 10-20 cm. long, 1-2 cm. broad, very scabrous above, pubescent beneath, margins scabrous, apex very acuminate, base subcordate, nerves 5 pairs, conspicuous beneath; ligule short, dentate, membranous.

Inflorescence on separate flower-bearing culms; flowers in glomeruli at the nodes of branches 20-40 cm. long which are alternately fascicled at the nodes; glomeruli about 2 cm. diam., bearing 10-12 fertile spikelets with many smaller sterile ones and paleaceous bracts. *Spikelets* 5-7 mm. long, quite glabrous, supported at the base by 1-3 small bracts; empty glumes 2-3, ovate, mucronate, lower 3 mm. long, upper

4-5 mm.; fertile flowers 2. *Lemma* ovate, long-mucronate, of the lower flower 6 mm. long, of the upper 8 mm. *Palea* of the lower flower 2-keeled, keels ciliate, marginate at the apex, 5-nerved, of the upper flower convolute, glabrous, apiculate. *Stamens* purple, the younger ones subsessile, free, the older ones united into a long-exserted tube; anthers linear, mucronate at the apex. *Ovary* ovate-lanceolate, attenuate into a slender, pubescent style. *Caryopsis* unknown.

Hlaingbwe Reserve and Melaung, Thaton District (Lace). Tavoy (Parker).

Closely resembles *Dendrocalamus membranaceus*, the monodelphous stamens being the only distinction.

11. DENDROCALAMUS Nees

Key to the species of *Dendrocalamus*.

Spikelets in spinous, congested, spicate heads; leaves usually narrow:—
- Caryopsis rounded:—
  - Spikelets hirsute ..... *D. strictus*
  - Spikelets almost glabrous ..... *D. strictus* var. *prainiana*
- Caryopsis elongate; spikelets usually glabrous ..... *D. membranaceus*

Spikelets in large, soft, congested heads; leaves usually broad:—
- Spikelets acute; culm-sheaths very hairy:—
  - Heads large, 3·25 cm. broad, dark coloured; leaf- and culm-sheaths conspicuously fringed ..... (*D. sikkimensis*)
  - Heads not exceeding 2·5 cm. broad, pale; leaf-sheaths naked; culm-sheaths little fringed ..... *D. hookeri*
- Spikelets blunt; culm-sheaths glabrous or nearly so; not fringed:—
  - Ligule of culm-sheath smooth, entire ..... *D. hamiltonii*
  - Ligule of culm-sheath hairy, serrate ..... *D. messeri*

Spikelets few, in small heads, many sterile:—
- Spikelets long:—
  - Spikelets reddish, ovate-oblong, flattened ..... *D. latiflorus*
  - Spikelets not reddish:—
    - Culm-sheaths broad, nearly glabrous; ligule long; palea bifid ..... *D. giganteus*
    - Culm-sheaths hirsute; ligule short; palea acute ..... *D. calostachyus*
- Spikelets short:—
  - Spikelets blunt; culm-sheaths elongate, thin ..... *D. longispathus*
  - Spikelets ovate:—
    - Heads moderately large, many-flowered ..... *D. brandisii*
    - Heads small, few-flowered:—
      - Leaves without fringed auricles ..... *D. flagellifer*
      - Leaves with long-fringed auricles ..... *D. longifimbriatus*

Spikelets large, white, in soft, loose heads ..... *D. collettianus*

(*Species dubia* not in the key.)

1. **Dendrocalamus strictus** *Nees*, Linnaea IX (1834) 476. F.B.I. VII, 404.

The Male Bamboo. The principal bamboo of the drier parts of Burma and spreading into the higher-rainfall areas where rocky slopes provide suitable habitats; ascending to about 3,000 feet. Used for buildings, mats, furniture, baskets, binding materials, for making special gold-beaters paper, etc. Flowers gregariously over large areas and also sporadically every year. Flowers November to April; seed ripe in June. The culms are typically solid or nearly so but in moist situations they are often hollow. In dry places it is deciduous but not in moist places.

Prain's specimen from Great Cocos Island (Var. prainiana *Gamble*) has almost glabrous glumes.

Burmese—*Myin-wa*; *Hmyin-net*; *Hmyin-pyu*; *Hmyin-ba*.

Karen—*Wa-milur*; *Wa-me-pree*.

Shan—*Mai-hpyit*; *Mai-sang*.

2. **Dendrocalamus membranaceus** *Munro*, Trans. Linn. Soc. XXVI (1868) 149. F.B.I. VII, 404.

Throughout Burma and the Kachin Hills up to about 3,000 feet. Flowers gregariously over large areas and also sporadically. Very boyant.

Burmese—*Wa-pyu*; *Wa-pyin*; *Kya-lok-wa*; *Hmin-byu*; *Hmyin-san*; *Wa-hpit*; *Hmyin-wagyi*; *Myinwa-apyu*; *Myin-wa*; *Nga-byin* (Tavoy).

Karen—*Wa-mu*; *Wa-mee.*

Shan—*Mai-lai-law*; *Mai-sang.*

Kachin—*Ugat*; *Wagat.*

3. **Dendrocalamus hookeri** *Munro*, in Trans. Linn. Soc. XXVI (1868) 151. F.B.I. VII, 405.

Bhamo District, in moist forests, 800 ft.

Kachin—*Kawa-ule.*

Burmese—*Wabo-e.*

4. **Dendrocalamus hamiltonii** *Nees et Arn. apud Gamble*, in Ann. Roy. Bot. Gard. Calc. VII (1896) 84. F.B.I. VII, 405. Bambusa monogyna *Griffith*, Notulae 63, Icon. 2.

Widespread all over the northern parts of Burma, ascending to 5,000 feet. Oliver says 'common along banks of streams in evergreen and moist forests' in Katha and Bhamo. Young shoots eaten. The inner layer of the culm-sheaths is used as a cheroot wrapper. Flowers sporadically and also gregariously.

Burmese—*Wabo-myet sangye*; *Wabo-nwe.* Shan—*Mai-hok.*

Kachin—*Uga-kawa*; *Uhpaw*; *Wahpaw.*

It is not clear why C. E. C. Fischer (Kew Bull. 1932, 106) should disregard the early records of this common plant from Burma prior to Su Koe's No. E37 from Wasaung, Myitkyina District. There are numerous sheets in Herb. Calc. from the same area by early collectors such as Oliver!, Abdul Huk 220!, Cubitt 551!, Rogers 172!, Toppin 3220!, etc.

5. **Dendrocalamus giganteus** *Munro*, in Trans. Linn. Soc. XXVI (1868) 150. F.B.I. VII, 406.

From the Upper Chindwin through the Shan Hills to Moulmein, but uncommon outside cultivation. Probably the largest of the *Gramineae*, the culms reaching 120 feet in height and 10 inches in diameter. Used for general building purposes, water pots, etc.

Burmese—*Wa-bo*; *Wabo-myetsange.*

Talaing—*Dunkaloik.*

6. **Dendrocalamus calostachyus** *Kurz*, in For. Fl. Bur. II (1878) 562. F.B.I. VII, 407. Bambusa calostachya *Kurz* in Jr. As. Soc. Beng. XLII (1873) 249.

Bhamo and the Shan Hills, often cultivated. Used for small buildings and domestic purposes.

Burmese—*Wabo.* Kachin—*Wara* or *Ura.*

7. **Dendrocalamus messerii** *Blatter*, in Ind. Forester LV (1929) 595. Wabo-e, Brandis in Indian Trees (1911) 677 (4).

Tufted. *Culms* 24-30 m. high; internodes 30-53 cm. long, 12·7 cm. diam., walls 18-25 mm. thick; branches all the way up, near the base thickly set and sometimes 6 m. long; conspicuous rings of arrested rootlets for 2·4-3 m. from the ground; buds of undeveloped branches smaller and less prominent than in *D. hamiltonii*. *Culm-sheaths* 45 cm. long; ligule 12 mm. broad, hairy; imperfect blade as long as the sheath, hairy. *Leaves* 20-23 by 2·5 cm., nerves 36 on $\frac{1}{4}$ inch. Branches of inflorescence very hollow, up to 8 mm. diam. Flower-heads dense, nearly globose. *Spikelets* 18 mm. long, numerous. *Glumes* glabrous, edges minutely ciliate, the 2 lowest empty. Flowers 8-10, of which the lowest is usually male. *Ovary* broad, entirely hairy.

In cool valleys and on the high evergreen Kachin Hills in the Katha District. (Messer.)

Burmese—*Wabo-e.*

8. **Dendrocalamus longispathus** *Kurz*, in For. Fl. Bur. II (1878) 561. F.B.I. VII, 407.

From Arakan southwards to Tenasserim. The hairs on the sheaths are irritating. Flowers gregariously and also often sporadically.
Burmese—*Wa-ya*; *Wa-net*; *Tabindaing-wa*; *Talagu-wa*.

9. **Dendrocalamus brandisii** *Kurz*, For. Fl. Bur. II (1878) 560. Bambusa brandisii *Munro*. F.B.I. VII, 407.

From the Kachin Hills southwards to Tavoy; in wet evergreen forests. Flowers gregariously. Used for water pots, boat masts, etc.
Burmese—*Wabo*; *Wa-pyu*; *Thaik-wabo*; *Kyalo-wa*; *Wa-pyin*; *Wa-payaung*; *Taung-wabo*; *Wa-net*.
Karen—*Waklu*.
Shan—*Mai-puk*.

10. **Dendrocalamus flagellifer** *Munro*, Trans. Linn. Soc. XXVI (1868) 150. F.B.I. VII, 408. D. asper *Backer*.

Mulayit, Tenasserim, 2,000 feet (Beddome). Culms strong; young shoots eaten.

11. **Dendrocalamus longifimbriatus** *Gamble*, Ann. Roy. Bot. Gard. Calc. VII (1896) 92. F.B.I. VII, 408.

Tavoy and Mergui. The long-fringed auricles are most characteristic.
Burmese—*Myin-wa*; *Wa-myin*; *Wa-pyaw*; *Kyauk-wa-ame*.

12. **Dendrocalamus collettianus** *Gamble*, Ann. Roy. Bot. Gard. Calc. VII (1896) 93. F.B.I. VII, 408.

Fort Stedman, Bhamo District.

13. **Dendrocalamus latiflorus** *Munro*, Trans. Linn. Soc. XXVI (1868) 152. F.B.I. VII, 407. Bambusa verticillata *Benth*. B. latiflora *Kurz*.

Throughout the Shan States, apparently cultivated. A native of China and Formosa.
Burmese—*Wa-ni*; *Wa-bo*.
Kachin—*Ura* or *Wara*.
Shan—*Mai-kao-quai*.

Species dubia.

(*a*) **Dendrocalamus wabo** *E.-G. Camus*, Les Bambusées (1913) 154. Brandis, Ind. Trees (1911) 679 (16).

Cultivated in the Southern Shan States, 1,500-2,000 feet.
Burmese—*Wabo*.

D. sikkimensis *Gamble* is common in the Naga Hills of Assam and may be found in Burma. D. nudus *Pilger* (Fedde, Rep. Nov. Sp. III (1906) 117) has been reported as common at Chiengmai (Siam) and is to be expected in the eastern part of the Shan States. It closely resembles D. brandisii *Kurz* but differs in the naked flowering branches.

12. DINOCHLOA Büse

Key to the species of *Dinochloa*.

Culms scandent, often trailing, sometimes up to 300 feet long; joints generally zig-zag:—	
Culm-sheaths brittle, hard, pubescence white	***D. compactiflora***
Culm-sheaths leathery:—	
Pubescence golden-brown	***D. m'clellandi***
Pubescence fugacious, minute, white	***D. andamanica***

1. **Dinochloa compactiflora** (*Kurz*) *McClure*, Kew Bull. 1936, 251. Pseudostachyum compactiflorum *Kurz*, Jr. As. Soc. Beng. XLII (1873) 252. Melocalamus compactiflorus *Benth.*, Jr. Linn. Soc. Bot. XIX (1881) 134. F.B.I. VII, 409. Pseudostachyum glomeriflorum *Kurz* MS.

From Mergui northwards to Myitkyina, usually at over 3,000 feet. An overhanging and trailing bamboo growing in dense, tangled thickets. Culms solid but flexible. Used for basket work, plaited shoes and for the basis of Burmese lacquerware. Seed large, edible, mealy like a chestnut.

Burmese—*Wa-nwe*; *Wa-nwe-kok*.
Karen—*Kale-o*.
Kachin—*Usawi*.

2. **Dinochloa m'clellandi** *Gamble*, Ann. Roy. Bot. Gard. Calc. VII (1896) 113. D. Maclellandii *Kurz*, Jr. As. Soc. Beng. XLII (1873) 249. Bambusa M'Clellandi *Munro*, Trans. Linn. Soc. XXVI (1868) 114.

Pegu and Martaban Hills.
Burmese—*Wa-nwe*; *Sinninwa*; *Wa-thabut*.

3. **Dinochloa andamanica** *Kurz*, Jr. As. Soc. Beng. XLII (1873) 253. D. tjangkorreh *Büse* var. andamanica *Gamble*, Ann. Roy. Bot. Gard. Calc. VII (1896) 112. F.B.I. VII, 415.

Andaman and Nicobar Islands. A widespread coastal species forming dense tangled masses.
Burmese—*Wa-nwe*.

13. PSEUDOSTACHYUM Munro

Key to the species of *Pseudostachyum*.

Culms single from a creeping rhizome ..... *P. polymorphum*
Culms tufted ..... *P. wakha*

1. **Pseudostachyum polymorphum** *Munro*, Trans. Linn. Soc. XXVI (1868) 142. F.B.I. VII, 409.

Khamti Long, Kachin Hills, Myitkyina and Bhamo Districts, ascending to about 3,000 feet. Used for basket work, mats and for binding materials.
Burmese—*Bawa*; *Pauk-wa*.
Kachin—*Katau*.

Species dubia.

(*a*) **Pseudostachyum wakha** *E.-G. Camus*, Les Bambusées (1913) 162. Brandis in Ind. Trees (1911) 685 as Ochlandra sp.

Hmangintaung, 2,500 feet, in an abandoned *taungya*.

14. SCHIZOSTACHYUM Munro

1. **Schizostachyum rogersii** *Brandis*, Ind. Trees (1911) 679.

Andaman Islands. The Andamanese make arrows from it.

Several other species of Schizostachyum are recorded from Malaya and it is likely that some of them, at least, will be found in southern Burma.

15. NEOHOUZEAUA A. Camus

Inflorescence an elongated panicle. *Fertile spikelets* 1-flowered; glumes 3-4, mucronate, often gemmiparous; lemma involute, mucronous, sub-aristate; palea elongate, involute, without keels, 2-aristate at the top; *lodicules* 0 or very small. *Stamens* 6, filaments connate; anthers obtuse at the apex. *Ovary* oblong; style long; stigmas 3, exserted.

Medium-sized bamboos with culms growing in large tufts, often somewhat scandent, unarmed.

Key to the species of *Neohouzeaua* (after Blatter).

Anthers 9-10 mm. long:—
Culms 6-9 m. high, about 2·5-7·5 cm. diam. ..... *N. dullooa*
Culms 3-4·5 m. high, about 1·5 cm. diam. ..... *N. tavoyana*
Anthers 12-18 mm. long ..... *N. helferi*
Anthers 4 mm. long ..... *N. stricta*

1. **Neohouzeaua dullooa** *A. Camus*, in Bull. Mus. Paris (1922) 100. Teinostachyum dullooa *Gamble*, in Ann. Roy. Bot. Gard. Calc. VII (1896) 101. F.B.I. VII (1897) 411.

Katha District and the Northern Shan States and southwards to Tavoy and Mergui. Occurs in two forms, a large and a small, which may be distinct species. Used for buildings, basket work, etc.

Burmese—*Wazun*; *Wa-byauk*; *Gya-wa*; *Thaik-wabo*.
Kachin—*Lăhkra*.

2. **Neohouzeaua tavoyana** *Gamble*, in Kew Bull. 1923, 92.

Culms erect, 3-4·5 m. high, about 1·5 cm. diam., solid near the base. *Culm-sheaths* unknown. *Leaves* oblong, long setaceous-acuminate at the apex, subobtuse at the base, glabrous, 25-35 cm. long, 3-6 cm. broad, primary nerves 6-10 pairs; petiole stout, 1 cm. long; sheath glabrous, terete, produced below the petiole and provided at the lower side with a triangular, horned callus; ligule 3-4 mm. long, lacerate at the apex. *Spikelets* 2 together in heads aggregated at the nodes of the terminal panicle; lower heads subglobose, with many spikelets 2-3 cm. diam., the upper ones gradually smaller, the uppermost bearing 1-2 spikelets or none at all; spikelets 1-flowered, 2-2·5 cm. long, supported at the base by many bracts and provided at the base with 2-3 empty mucronate glumes. *Lemma* ovate-oblong, rather long-aristate at the apex, subglabrous on the back or slightly hirsute, 1-1·2 cm. long, minutely ciliate-glabrous on the margins; *palea* very narrow, much convolute, biaristate at the apex, 2-2·5 cm. long. *Stamens* 6, monodelphous; anther slender, about 10 mm. long, subobtuse at the apex. *Lodicules* none or 2 very short. *Ovary* very long; stigmas red. *Caryopsis* unknown.

Sinyat hill, Tavoy, 2,000 ft. (Rogers 361 T).

3. **Neohouzeaua helferi** *Gamble*, in Kew Bull. 1923, 91. Teinostachyum helferi *Gamble*, in Ann. Roy. Bot. Gard. Calc. VII (1896) 102. F.B.I. VII (1897) 411. Bambusa helferi *Munro*, in Trans. Linn. Soc. XXVI (1868) 114. Pseudostachyum helferi *Kurz*, in For. Fl. Bur. II (1878) 568.

The following are the additions made by Gamble in Kew Bull. to his original description in *The Bambuseae of British India*:—

Heads of spikelets often large, even up to 5 cm. diam., though usually less. *Spikelets* usually 2 together, slender, prominently bracteate at the base; empty glumes usually 2, small, 5 and 8 mm. long, mucronate, the margins slightly strigosely hirsute; flowering glume ovate-lanceolate, long-mucronate, strigosely hirsute, 12-25 mm. long, many-nerved; palea convolute, glabrous except at the tip, 3-4 mm. long, biaristate, the base sometimes with a free terminal rhachilla. *Stamens* 6, monodelphous, the anthers 12-18 mm. long, obtuse at the apex, at length exserted. *Ovary* oblong, elongate, glabrous; stigmas 3, short, red. *Pericarp* of caryopsis leathery, oblong, including the beak over 5 cm. long.

Pegu Yomas and the Chin Hills, at elevations of 3,000 to 4,000 feet and under high rainfall, in wet Dipterocarp forests.

Burmese—*Wa-thabut*; *Wa-nwe*; *Wase*.
Karen—*Thawkhwe*; *Thaw-hkai*.

4. **Neohouzeaua stricta** *Parker*, Ind. Forester LIV (1928) 97.

Loosely tufted. *Culms* very straight, erect, 7-9 cm. long, 5 cm. diam., dark green; internodes 60-100 cm. long, walls thin; nodes marked by sharp ledges after the fall of the culm-sheaths; young culms covered with short, harsh hairs. *Culm-sheaths*

deciduous, about 22 cm. long, clothed on the back with brown irritating bristles, and a little white powder; apex of sheath when spread flat produced on either side into broad, triangular auricles which on the inner side are furnished with a row of stiff, erect, scabrid setae about 12 mm. long; ligule very short, fringed with a row of similar but more slender setae; imperfect blade very narrowly linear-lanceolate, reflexed, about as long as the sheath. Leafy branches switchy, in dense half-whorls at the nodes. *Leaves* 18-28 by 3-4 cm. or smaller, scabrid above, narrowed into a long, twisted, scabrid point, paler or slightly pubescent beneath, margins minutely scabrid; main lateral nerves about 7 pairs, intermediate 5-8; petiole 5-10 mm. long; leaf-sheath grey-pubescent when young; callus with a fringe of minute, white hairs; auricles with long setae; ligule short, with a fringe of slender setae. *Inflorescence* a large panicle of leafless or sometimes leafy branches in dense half-whorls; rhachis smooth, slender, bearing the spikelets in few-flowered or dense, usually closely approximate, heads. *Spikelets* fertile and sterile mixed in equal numbers, the fertile 15-16 mm. long, linear-cylindric, consisting of 3-4 small, ovate, mucronate glumes, increasing in size upwards, the uppermost usually bearing a very small, arrested spikelet followed by a joint of the rhachilla 1·5-2 mm. long; flowering glume 8-11 mm. long, convolute, many-nerved, microscopically pubescent, tipped with a mucro 0·5-1 mm. long; palea similar to the lemma, 12-15 mm. long, tipped with 2 scabrid mucros 2-3 mm. long. *Stamens* 6; filaments connate in a tube; anthers 4 mm. long, obtuse. *Ovary* and style glabrous; style 12-15 mm. long; stigmas 3, short, plumose.

Common in Tavoy and Mergui and along the Tenasserim river valley.

Burmese—*Thabut-wa.*

Karen—*Tapat-wa.*

16. CEPHALOSTACHYUM Munro

Key to the species of *Cephalostachyum.*

Spikelets in single, terminal, globuse heads ..... *C. fuchsianum*
Spikelets in heads in interrupted, paniculate spikes:—
  Heads softly hairy, many-flowered:—
    Leaves rather large, 15-25×2·5-3·75 cm., culm-sheath auricles rounded; rhachis very slender:—
      Spikelets densely hirsute; flowering glumes 13-14 mm. long including a mucro 3-4 mm. long ..... *C. pergracil*
      Spikelets minutely hirsute; flowering glumes 7-9 mm. long with a mucro 0·5-1 mm. long ..... *C. burmani*
    Leaves small, 7·5-15×1-1·75 cm.; culm-sheath auricles pointed; rhachis moderately thick..... *C. flavesce*
  Heads nearly glabrous; flowers few:—
    Spikelets 5-7·5 cm. long ..... *C. griffithii*
    Spikelets 1·5-1·75 cm. long ..... *C. virgatum*

1. **Cephalostachyum fuchsianum** *Gamble*, Ann. Roy. Bot. Gard. Calc. VII (1896) 107. F.B.I. VII, 413.

Pottinger and Prain (Rec. Bot. Survey Ind. I (1893) 279) record this species from Myitkyina. This appears to be the only record of this plant from outside the Eastern Himalayas.

2. **Cephalostachyum pergracile** *Munro*, Trans. Linn. Soc. XXVI (1868) 141. F.B.I. VII, 413.

Throughout Burma; the commonest bamboo after *Dendrocalamus strictus*. Flowers sporadically every year. Much used for general purposes. Joints used for cooking glutinous rice (*kaukhnyin-kyi-dauk*). Sometimes planted for hedges.

Burmese—*Tin-wa*; *Paung-tin-wa*; *Kyat-wa.*

Karen—*Wabalaw*; *Wa-blo.*

Kachin—*Maikpang*; *Madang.*

Shan—*Mai-kao-lam.*

3. **Cephalostachyum burmanicum** *Parker et Parkinson*, Fedde, Rep. Nov. Sp. XXXI (1932) 127.

Arborescent, compactly caespitose. *Culms* 15-18 m. long; 8-10 cm. diam., internodes about 50 cm. long, when young covered with fine, whitish, irritating hairs;

when old a deep, rich green. *Spikelets* minutely hirsute; flowering glumes 7-9 mm. long with a mucro 0·5-1 mm. long. In other respects like *Cephalostachyum pergracile* Munro.

Mergui District: Thamihla-choungbya, Tharabwin choung, Theindaw. Generally on low ground near water. A useful species similar to *Cephalostachyum pergracile.*

Burmese—*Kyat-wa.*

4. **Cephalostachyum flavescens** *Kurz,* For. Fl. Bur. II (1878) 564. F.B.I. VII, 413. Melocanna lutescens *Kurz* MS.

Pegu.

5. **Cephalostachyum griffithii** *Kurz,* Prelim. Rept. For. Veg. Pegu, App. A p. cxxxviii (1875) App. B, 94 in clavi et in For. Fl. Bur. II (1878) 566. Teinostachyum griffithii *Munro.*

Northern Burma, in hilly country.

6. **Cephalostachyum virgatum** *Kurz,* For. Fl. Bur. II (1878) 565. F.B.I. VII, 414. Melocanna virgata *Munro.*

Mergui ,Tavoy, Katha and Myitkyina Districts.

Burmese—*Wabo*; *Wa-ba*; *Wa-ka*; *Wa-byauk*; *Thayaw-wa*; *Kya-wa.*

Kachin—*Lahkra.*

Cephalostachyum pallidum *Munro* (Trans. Linn. Soc. XXVI (1868) 139; F.B.I. VII, 412) has been recorded by Kurz (For. Fl. Bur. II (1878) 563) from the Khasi and Mishmi hills, the Patkai range and Manipur. Nevertheless the presence of this species in Burma is not certain. When Kurz wrote 'Ava' he meant the Kingdom of Ava, not the town, and the Kingdom of Ava had different confines, though largely undefined, from the Burma of today. It is possible that C. pallidum *Munr.* is confined to the western slopes of the hills it has been recorded from and is absent from the Burma side, so that until a collection from inside modern Burma is made it must be held to be a doubtful Burma plant.

17. MELOCANNA Trin.

Key to the species of *Melocanna.*

Culms 16-22 m. high, 3·5-7·5 cm. diam.; imperfect blade recurved	*M. bambusoides*
Culms 2·5-5 m. high, about 2·5 cm. diam., imperfect blade erect	*M. humilis*

1. **Melocanna bambusoides** *Trin.,* Spreng. Neue Endl. II (1821) 43. F.B.I. VII, 417. M. baccifera *Skeels* in U.S. Dept. Ag. Bur. Pl. Indus. Bull. 223 (1911) 50. Bambusa baccifera *Roxb.* in Cor. Pl. t. 243.

Arakan and Tenasserim. The most important bamboo in Arakan. Used for buildings, basket work, paper pulp, etc. Said to flower gregariously at about 30 year intervals. Fruit large, up to 3-5 inches long and 2-3 inches broad, fleshy, edible.

Burmese—*Kayin-wa*; *Kayaung-wa*; *Tabindaing-wa.*

Talaing—*Khakchat-dun.*

2. **Melocanna humilis** *Kurz,* For. Fl. Bur. II (1878) 569. F.B.I. VII, 418.

Arakan and the Pazundaung valley of the Pegu river. There is one flowerless specimen from Insein. A very imperfectly-known species.

Burmese—*Tabindaing-wa.*

II. CENTOTHECEÆ.

Key to the genera of *Centotheceæ.*

Spikelets 2-several-flowered	**Centotheca**
Spikelets with 1 fertile flower	**Lophatherum**

1. CENTOTHECA Desv.

1. **Centotheca lappacea** *Desv.*, N. Bull. Soc. Phil. II (1810) 189. F.B.I. VII, 332.

Common in damp, shady forests throughout the plains and in the Andaman Islands. A good fodder but never very abundant.
Burmese—*Lin-nwe-thcik-ahlat.*

2. LOPHATHERUM Brongn.

1. **Lophatherum gracile** *Brongn.*, Dup. Voy. Bot. 50 (1829) t. 8. F.B.I. VII, 331.

Burma hills.

III. FESTUCEÆ.

While there appear to be no records of any member of the tribe *Festuceae* from Burma it is probable that a number exist there and await discovery. Brachypodium sylvaticum *Beauv.* is recorded from the Khasi and Naga hills and may be found in Burma. Poa khasiana *Stapf* from Assam, P. sphondyloides *Trin.* from Yunnan are also of likely occurrence. A species of Poa, near P. attenuata *Trin.*, was collected by Su Koe (No. 10074) on the Hpimaw Pass, Myitkyina District, 11,000 feet. Several species of Bromus, e.g. B. asper *Murr.* known from both Assam and China, B. himalaicus *Stapf ex Hk. f.* and B. tectorum *Linn.* from the Naga hills are to be expected within our northern borders. Several species of Festuca may also occur.

A key to the genera most likely to be found in Burma is given to aid recognition and with the hope that collections from the very neglected northern mountain regions of Burma may be made soon.

Key to the genera of *Festuceae* (after Bor.).

Inflorescence a simple terminal spike or raceme:—	
Spikelets terete; racemes nodding	**Brachypodium**
Spikelets laterally compressed; spike erect	**Lolium**
Inflorescence a panicle:—	
Glumes and lemmas muticous:—	
Panicles expanded; glumes and lemmas sub-equal	**Poa**
Panicles narrow; glumes much shorter than the strongly-nerved lemmas	**Glyceria**
Glumes and lemmas caudate, aristate or awned:—	
Top of the ovary hairy-appendaged; lemmas keeled	**Bromus**
Top of the ovary without an appendage; lemmas only keeled above	**Festuca**

IV. PAPPOPHOREÆ.

1. ENNEAPOGON Desv.

1. **Enneapogon elegans** *T. Cooke*, Fl. Bomb. II (1908) 1040. Pappophorum elegans *Nees*. F.B.I. VII, 301.

Common in dry places in the open in central Burma. Of small grazing value. The grass is usually very glaucous in Burma and seems to differ from the Indian forms.

V. HORDEÆ.

Key to the genera of *Hordeæ*.

Spikelets solitary, 2-more-flowered	**Triticum**
Spikelets in threes, 1-flowered	**Hordeum**

1. TRITICUM Linn.

1. **Triticum aestivum** *Linn.*, Sp. Pl. (1753) 85.

Wheat. The *durum* varieties are cultivated in the plains, mainly in Shwebo and Kyaukse Districts. The *vulgare* varieties are grown mainly in the Shan States.
Burmese—*Gyon.*

Panicle very loose; lateral nerves of lemmas obscure:—
Annual; spikelets about 1 mm. wide, lower branches whorled ..... *E. pilosa*
Perennial:—
Mouth of leaf-sheath not bearded ..... *E. tenuifolia*
Mouth of leaf-sheath bearded:—
Spikelets bluish-grey, blackish or violet:—
Basal sheaths narrow, terete, or obscurely compressed; spikelets 3-3·5 mm. long; panicle up to 60 cm. long ..... *E. nigra*
Basal sheaths broad, compressed, keeled; spikelets 6-8 mm. long; panicle up to 15 cm. long ..... *E. ferruginea*
Spikelets silvery, crowded, 4-8 mm. long; panicle 10-12 cm. long..... *E. papposa*

1. **Eragrostis theinlwinii** *Bor*, Ind. For. Rec. (n.s.) Bot. III (1941) 144.

Annual. *Culms* erect, slender, many, with numerous fibrous roots, smooth and glabrous, viscid-glandular, simple or branched, up to 60 cm. tall. *Leaf-blades* linear, not contracted at the base, tapering to a sharp point, the lower up to 15 cm. long by 5 mm. broad, the upper half as long but as broad, almost subulate, the lower involute, glabrous or with a few large hairs at the insertion on the sheath and on the margins at the base, viscose-glandular; sheaths about half the length of the internode, tight or loose, smooth and glabrous, striate, viscose-glandular; ligule hardly any, a mere rim. *Inflorescence* an oblong panicle up to 15 cm. long by 3·5 cm. broad; branches whorled or alternate, branching, naked at the base; rhachis glabrous, scaberulous; rhachis, branches and branchlets with many viscous glands, capillary. *Spikelets* ovate, 6-10-flowered, breaking up from above downwards, in appearance very bristly; shortly pedicelled. *Lower glume* 1·5 mm. long, somewhat curved, lanceolate-acute scabrid on the keel; *upper glume* about as long or slightly shorter, lanceolate-acute, scabrid on the keel. *Lemma* 1·5 mm. long, oblong-elliptic, apiculate, 3-nerved, smooth on the keel. A row of tubercle-based bristles 0·5-0·75 mm. long is to be found between the marginal nerves and the margins. *Palea* as long as the lemma, 2-keeled, long-ciliate on the keels. *Caryopsis* very minute, brown, obovoid, 0·5 mm. long.

On roadsides; near Tanbingon village, Gamon Forest Reserve, Zigon Forest Division, Pegu District. (Thein Lwin 5!; 214!).

2. **Eragrostis coarctata** *Stapf ex Hook.f.*, F.B.I. VII, 314.

Frequent in central Burma on light, sandy soils. Grazed by cattle.

3. **Eragrostis riparia** *Nees*, Wight Cat. n. 1787. E. tenella *R. et S.* var. riparia *Stapf* in F.B.I. VII, 315.

Recorded by Gage from Minbu District.

4. **Eragrostis viscosa** *Trin.*, Mem. Acad. Peters. ser. vi, I (1831) 397. F.B.I. VII, 315.

In *indaing* forest, often forming dense patches in open spaces to the exclusion of other plants. Fairly common. Cattle eat it with reluctance.

5. **Eragrostis tenella** *P. Beauv. ex Roem. et Schult.*, Syst. II, 576. F.B.I. VII, 315.

Very common in the plains. Grazed by cattle.
Burmese—*Yon-gale*.

6. **Eragrostis plumosa** *Link.*, Enum. Hort. Berol. I (1827) 192. E. tenella *R. et S.* var. plumosa *Stapf* in F.B.I. VII, 315.

Very common on light soils in the drier parts of Burma. Cattle eat it both fresh and dry.
Burmese—*Myet-hmon-hmwa*.

7. **Eragrostis diarrhena** *Steud.*, Syn. Pl. Glum. (1855) 266. E. interrupta *Beauv.* var. diarrhena *Stapf* in F.B.I. VII, 316.

A very common tussock grass of the dry zone, particularly on heavy clay soils. A poor fodder, being exceptionally low in calcium and phosphorus.

8. **Eragrostis diarrhena** *Steud.* var. **koenigii** (*Stapf*) *C. E. C. Fischer*, Fl. Madras X, 1826. E. interrupta *Beauv.* var. koenigii *Stapf* in F.B.I. VII, 316.

Common in open places in central Burma; not in the hills. A poor fodder.

9. **Eragrostis japonica** *Trin.*, Mem. Acad. Peters. ser. vi, I (1831) 405. E. interrupta *Beauv.* var. tennuissima *Stapf* in F.B.I. VII, 316.

Fairly frequent in central Burma on light soils.

10. **Eragrostis unioloides** *Nees ex Steud.*, Syn. Pl. Glum. (1854) 264. E. amabilis *W. et A.* F.B.I. VII, 317.

Very common in wet areas, ascending to about 3,000 feet. Colour of the glumes very variable. Cattle and horses eat it and it stands grazing and trampling well.

11. **Eragrostis malayana** *Stapf*, F.B.I. VII, 317.

Frequent in Lower Burma forests (Thein Lwin 48!).

12. **Eragrostis nutans** *Nees ex Steud.*, Nom. Ed. II, i, 563. E. stenophylla *Hochst.* F.B.I. VII, 318 (excl. aliq. syn.).

Common in the plains. A frequent weed of cultivated land. Eaten by cattle.

13. **Eragrostis zeylanica** *Nees et Mey.*, Nov. Act. 204. E. elongata of the F.B.I. VII, 319.

Frequent in *indaing* forest and on light soils in central Burma. (Rhind 2501!, Tatkon, Yamethin District; Thein Lwin 262!, Pegu.)

Burmese—*Thaman-myet*.

14. **Eragrostis gangetica** *Steud.*, Syn. Pl. Glum. (1854) 266. E. elegantula *Stapf* in F.B.I. VII, 318.

Common in damp places, ascending to about 6,000 feet. Not much liked by cattle and yields little fodder. Plant often extremely glaucous.

Burmese—*Gyo-gya-myet*.

15. **Eragrostis cilianensis** (*All.*) *Link ex Lutati*, Malphigia XVIII, 386. E. major *Hochst.* F.B.I. VII, 320.

Common all over the dry zone, ascending to about 4,000 feet. A frequent weed of cultivated lands.

16. **Eragrostis barbulata** *Stapf.*, F.B.I. VII, 319.

Very uncommon. Wallich collected it near Yenangyaung and Su Koe (No. 7851!) found it at Talaingywa in Sagaing District. It is a very striking grass.

17. **Eragrostis tremula** *Hochst. ex Steud.*, Syn. Pl. Glum. (1854) 269.

Occasional in the dry zone.

18. **Eragrostis poaeoides** *Beauv.*, Agrost. (1812) 162. E. minor *Host.* F.B.I. VII, 321.

Scarce; I have only seen one collection, viz. Thein Lwin 147! from the dry zone.

19. **Eragrostis tenuifolia** *Hochst.*, Flora XXIV (1841) 1. F.B.I. VII, 322.

A common tussock grass of the hills above 3,000 feet. The tops are grazed but the lower parts of the culms are avoided by cattle. (Rhind 2316! and Hla Maung 18111!, Maymyo.)

20. **Eragrostis pilosa** *Beauv.*, Agrost. (1812) 71. F.B.I. VII, 323.

Common in central Burma especially on sandbanks along rivers; also in Lower Burma. Cattle and buffaloes eat it but it yields little fodder.

Burmese—*Myet-walon*; *Myet-hmwa-gyi.*

21. **Eragrostis nigra** *Nees ex Steud.*, Nom. ed. 2, I (1840) 563. F.B.I. VII, 324.

Common in the hills and in northern Burma.

22. **Eragrostis ferruginea** *Beauv.*, Agrost. (1812) 71. F.B.I. VII, 324.

Shan hills, 4,000 feet (Manders).

23. **Eragrostis papposa** *Steud.*, Nom. ed. 2, I (1840) 564. F.B.I. VII, 322.

Common in the hills up to about 4,500 feet. Often cut for hay but the food value is low.

Eragrostis plana *Nees* (Dyer, Flor. Capensis VII, 609) was accidentally introduced at the Government Farm, Tatkon, and is running wild. (Rhind 2849!).

3. ERAGROSTIELLA Bor

Spikelets linear to ovate-oblong, strongly or slightly compressed, shortly pedicelled or sub-sessile, in two rows, distant or crowded, in long, slender, terminal racemes; rhachilla tough, persistent, or tardily breaking up, glabrous, angled, slightly swollen at the top of the joint. *Florets* 6-20, hermaphrodite, or the uppermost more or less reduced. *Glumes* sub-equal, or the upper the longer, keeled, deciduous, the lower 1-nerved, the upper 3-nerved, glabrous; lemmas imbricate, ovate or lanceolate, slightly or strongly keeled on the back, acute or obtuse, membranous or chartaceous, glabrous; palea as long as the lemma, keeled, winged on the keels or not, often persistent on the rhachilla. *Lodicules* 2, small, cuneate, fleshy. *Stamens* 3. *Ovary* glabrous; style distant, terminal; stigmas plumose, laterally exserted.

Perennial grasses, densely caespitose; leaves mostly convolute, filiform, rarely flat; ligule short; base of the culm covered with the remains of old sheaths.

Key to the species of *Eragrostiella.*

Spikelets much compressed, 6-40-flowered ..... *E. bifaria*
Spikelets slightly compressed, 6-12-flowered ..... *E. collettii*

1. **Eragrostiella bifaria** (*Wight*) *Bor*, Ind. Forester 66, 270 et in Flora of Assam V (1940) 107. Eragrostis bifaria (*Wight*) *Steud.* E. coramandelina *Trin.* F.B.I. VII, 325.

Occasional in *indaing* forests (Po Zone 2145!, Kanbalu). The roots are sometimes used for flavouring Burmese cheroots.

Burmese—*Myet-hmwe.*

2. **Eragrostiella collettii** (*Stapf*) *Bor*, Ind. Forester 66, 270 et in Flora of Assam V, (1940) 107. Eragrostis collettii *Stapf* in F.B.I. VII, 326.

Fairly common in the dry zone (Collett 19!, Thein Lwin 266!).

4. DESMOSTACHYA Stapf

1. **Desmostachya bipinnata** *Stapf*, Flor. Cap. VII, 632. Eragrostis cynosuroides *Beauv.* F.B.I. VII, 324.

Common in damp places, mainly in central Burma. Not liked by cattle.

5. MYRIOSTACHYA Hook.f.

1. **Myriostachya wightiana** *Hook.f.* in F.B.I. VII, 327.

A coastal grass of Lower Burma, generally growing in sea mud. Not common.

6. DIPLACHNE Beauv.

1. **Diplachne fusca** *Beauv.* Agrost. 163. F.B.I. VII, 329.

Occasional near water in the plains (Rhind 4177! Halingyi, Shwebo District).
Burmese—*Myet-cho.*

7. ELEUSINE Gaertn.

Key to the species of *Eleusine.*

Spikes digitate:—
Spikes slender, nearly glabrous at the base; seeds oblong, obtusely trigonous ..... *E. indica*
Spikes stout, often incurved, pubescent at the base; seed globose ..... *E. coracana*
Spikes whorled ..... *E. verticillata*

1. **Eleusine indica** *Gaertn.* Fruct. I, 8. F.B.I. VII, 293.

Common everywhere, ascending to about 4,000 feet. Grazed by cattle when young.
Burmese—*Sin-ngo-myet*; *Sin-ngo-let-kya.*
Shan—*Yŏ-hkum.*

2. **Eleusine coracana** *Gaertn.*, Fruct. I, 8. F.B.I. VII, 294.

Occasionally cultivated in the hills where it is of importance for making beer rather than for food.
Burmese—*Sat-ni.*

3. **Eleusine verticillata** *Roxb.*, Flor. Ind. I, 346. F.B.I. VII, 295.

Fairly common on light soils in central Burma. Cattle eat it.

8. DACTYLOCTENIUM Willd.

1. **Dactyloctenium aegyptium** *Beauv.*, Ess. Agrost. (1812) 72. Eleusine aegyptiaca *Desf.* F.B.I. VII, 295.

Common all over Burma up to about 4,000 feet. Eaten by cattle but the fodder value is not high. It contains cyanogenetic glucosides.
Burmese—*Myet-le-gwa*; *Didok-chi.*

9. LEPTOCHLOA Beauv.

Key to the species of *Leptochloa.*

Spikelets 2-3-flowered, less than 2·5 mm. long; upper glume longer than the first floret ..... *L. filiformis*
Spikelets 4-6-flowered, 2·5 mm. or more long; upper glume shorter than the first floret ..... *L. chinensis*

1. **Leptochloa filiformis** *Roem. et Schult.*, Syst. II, 580. L. polystachya *Benth.* F.B.I. VII, 298. L. contracta *Blatter et McCann.*

A common weed of cultivated lands in central Burma. Eaten by cattle when young.
Burmese—*Hman-pwa*; *Myet-kha.*

2. **Leptochloa chinensis** *Nees*, Syll. Ratisb. I (1824) 4. F.B.I. VII, 299.

Very common in swampy places and along water-courses. Eaten by cattle.
Burmese—*Myet-sat*; *Daung-myet*; *Myet-kha.*

10. TRIPOGON Roth

Key to the species of *Tripogon.*

Lemmas bifid with an interposed awn, the lobes awned or not:—
Spikelets 1-4-flowered; awn many times longer than its glume. *T. capillatus*

Spikelets 4-10-flowered; awn twice as long as its glume or somewhat more ..... *T. trifidus*
Lemmas 4-fid, outer lobes awned or not, inner membranous .. *T. filiformis*

1. **Tripogon capillatus** *J. et S.*, Illustr. Fl. Orient. IV, 47, t. 332. F.B.I. VII, 285.

Common in stony places, on trees, etc., in high rainfall areas.

2. **Tripogon trifidus** *Munro ex Stapf*, Kew Bull. 1892, 85. F.B.I. VII, 286.

South Pegu (Thein Lwin 3145!).

3. **Tripogon filiformis** *Nees ex Steud.*, Syn. Pl. Glum. (1854) 301. F.B.I. VII, 288.

Common in the hills.

11. NEYRAUDIA Hook.f.

Key to the species of *Neyraudia*.

Empty glume absent ..... *N. arundinacea*
Empty glume present ..... *N. reynaudiana*

1. **Neyraudia arundinacea** (*Linn.*) *Henrard*, Blumea III (1940) 3. N. madagascariensis *Hook.f.* F.B.I. VII, 305. Arundo madagascariensis *Kunth*, Rev. Gram. I, 273. Aristida arundinacea *Linn.*

Frequent in Lower Burma.

2. **Neyraudia reynaudiana** (*Kunth*) *Keng*, Hitchc., Amer. Jr. Bot. (1934) 131. Arundo reynaudiana *Kunth*. Neyraudia madagascariensis *Hook.f.* var. zollingeri *Hook.f.* F.B.I. VII, 305.

Common in wet places, ascending to about 4,000 feet.
Burmese—*Kyu*; *Kyuna-bin-kaing*; *Paung*.

VIII. SOROBOLEÆ.

1. SPOROBOLUS R.Br.

Key to the species of *Sporobolus*.

Lower glume distinctly shorter than the lemma:—
  Upper glume distinctly shorter than the lemma; leaves glabrous, flat, complicate or convolute-mixed:—
    Panicles effuse:—
      Lemma 1·5 mm. or more long:—
        Lemma 1·5 mm. long; leaves up to 39 cm. long; lower glumes ·25-·5 mm. long; upper glumes ·5-1 mm. long ..... *S. diander*
        Lemma 1·75-2 mm. long; leaves up to 60 cm. long; lower glume ·5-·75 mm. long; upper glume 1-1·5 mm. long ..... *S. wallichii*
    Panicles spiciform or narrow:—
      Perennial:—
        Leaves flaccid, not pungent; not stoloniferous ..... *S. indicus*
        Leaves rigid, pungent; stoloniferous ..... *S. tremulus*
      Annual:—
        Small (rarely exceeding 23 cm.), generally prostrate. Panicle pyramidal. Stamens 2 ..... *S. coramandelianus*
Lower glume as long as the lemma or nearly so:—
  Panicle contracted, very pale yellowish; glumes 1-nerved; leaves narrow, glaucous ..... *S. glaucifolius*

1. **Sporobolus diander** *Beauv.*, Agrost. (1812) 25. F.B.I. VII, 247.

Common in the dry zone. Readily eaten by cattle and horses.

2. **Sporobolus wallichii** *Munro ex Hook.f.*, F.B.I. VII, 248.

Fairly common, especially in light, open jungle. Eaten by cattle but yields little fodder.

3. **Sporobolus indicus** *R.Br.*, Prodr. 170. F.B.I. VII, 247.

Very common above about 3,000 feet. Not much liked by cattle except in the young stage.

4. **Sporobolus tremulus** *Kunth*, Rev. Gram. I, 67. F.B.I. VII, 250.

Very common in the plains. A frequent weed of dried-up paddy fields.
Burmese—*The-padaw.*

5. **Sporobolus coramandelianus** (*Retz.*) *Kunth*, Rev. Gram. I 68. F.B.I. VII, 252.

Very common in dry places in central Burma. Generally too small to be of any fodder value.
Burmese—*Myet-hmon-hma.*
Hooker (F.B.I. VII, 253) makes a variety, var. collettii, for a specimen of Collett's from the Shan Hills. It does not seem to have been collected subsequently and I have never seen it.

6. **Sporobolus glaucifolius** *Hochst.*, Flora XXV (1842) 1. F.B.I. VII, 250.

Common on light soils. A very good fodder which can be substituted for *dhoob* (*Cynodon dactylon*). The analysis of this grass in Burma showed it to be in every way equal to *dhoob* and in fact slightly higher in average mineral content. Readily eaten by cattle and horses.
Burmese—*The-myet; Myet-san.*

Sporobolus pulchellus *Br.* (F.B.I. VII, 252) has been recorded from Cheingmai (Siam) and Malaya. It is likely to be found in Burma.

IX. CHLORIDEÆ.

Key to the genera of *Chlorideæ*.

Spikelets awned	**Chloris**
Spikelets unawned:—	
Spikes solitary:—	
Dwarf, 5-10 cm. high	**Oropetium**
Larger, 15-40 cm. high	**Microchloa**
Spikes digitate	**Cynodon**

1. CHLORIS Swartz

Key to the species of *Chloris*.

Spikelets 1-flowered:—	
Rhachilla produced beyond the flowering glume and bearing 1 or 2 awns:—	
Rhachis of spike terete or angular:—	
Annual; spikes 3·75-5 cm. long; stems up to 30 cm. long	*C. delicatula*
Perennial; spikes 10-20 cm. long; stems up to 1 m. long	*C. incompleta*
Rhachilla produced beyond the flowering glume and bearing 1-3 reduced empty glumes:—	
Spikes 4-10; lemma bearded at the base:—	
Stem up to 30 cm. long; empty lemmas above the floret solitary	*C. virgata*
Stem up to 110 cm. long; empty lemmas above the floret 2-3	*C. barbata*

1. **Chloris delicatula** *C. B. Clarke ex Hook.f.*, F.B.I. VII, 290.

Occasional in open ground in the dry zone. (Lace 5007!; Thein Lwin 2941!)

2. **Chloris incompleta** *Roth.*, Nov. Sp. (1821) 60. F.B.I. VII, 290.

Common in shady, damp places all over Burma. Generally growing amongst under-shrubs.

3. **Chloris virgata** *Sw.*, Flor. Ind. Occ. I, 203. F.B.I. VII, 291.

Common in the hills between about 2,500 and 4,000 feet. Good fodder.

4. **Chloris barbata** *Sw.*, Flor. Ind. Occ. I, 200. F.B.I. VII, 292.

Very common in the dry zone. Relished by cattle when in the young state but disliked when in flower.

Burmese—*Sin-ngo-myet*; *Myet-kaya*; *Lay-gwa.*

Chloris gayana *Kunth*, Rhodes Grass, has been introduced in some Government farms for fodder but it has not spread and is unlikely to be able to compete with the fodder Sorghums.

2. CYNODON Pers.

Key to the species of *Cynodon.*

Culms 5-45 cm. high; leaves 1-12 cm. long by ·75-2·75 mm. broad; lower glume 1·25-2 mm. long ..... *C. dactylon*

Culms 17-100 cm. high; leaves 2·5-11 cm. long by 4·5-6·25 mm. broad; lower glume 1 mm. long ..... *C. dactylon var. intermedius*

1. **Cynodon dactylon** *Pers.*, Syn. I, 85. F.B.I. VII, 288.

Common all over Burma, generally on light soils, ascending to about 6,000 feet or more. It is an excellent fodder and makes good lawns when properly watered and tended but is very liable to be ousted by more vigorous species. Often a troublesome weed of cultivated land, particularly riverine land which is inundated in the monsoon. *Dhoob*, Bermuda or Wire Grass.

Burmese—*Myin-sa-myet.*

2. **Cynodon dactylon** *Pers.* var. **intermedius** *C. E. C. Fischer*, Flora of Madras X, 1835.

Similar to the above but larger. Not common. (Thein Lwin 201! Pyinnaung, Meiktila District.)

3. OROPETIUM Trin.

1. **Oropetium thomaeum** *Trin.*, Fund. Agrost. 98, t. 3. F.B.I. VII, 366.

Common in very dry places in central Burma. A monsoon ephemeral of no grazing value.

4. MICROCHLOA R. Br.

1. **Microchloa indica** *Beauv.*, Agrost. (1812). M. setacea *R.Br.* F.B.I. VII, 283.

Common in the hills above about 3,000 feet, in open ground. A short-lived monsoon species of practically no fodder value.

X. AVENEÆ.

1. ERIACHNE Br.

Key to the species of *Eriachne.*

Spikelets 2·5 cm. long; lemmas and palea awned ..... *E. triseta*

Spikelets 0·6 cm. long; lemmas awned; palea unawned ..... *E. pallescens*

1. **Eriachne triseta** *Nees ex Steud.*, Syn. Pl. Glum. (1812) 237. F.B.I. VII, 269.

Mergui (Helfer; Griffith) and in Malaya.

2. **Eriachne pallescens** *R.Br.*, Prod. 184. F.B.I. VII, 269.

Extends from Chittagong to the Nicobars, Malaya, Cochin-China and Australia. Though there appears to be no record of it from Burma its presence, at least on some of the islands off the Mergui coast, is very probable.

Avena sativa *Linn.*, Oats, is occasionally cultivated in the hills, rarely in the plains, though at one time there was a little grown round Gangaw in Pakokku District.

An unmatched specimen of Avenastrum was collected by Su Koe (9962) on Hpimaw Pass, Myitkyina District, at 6,600 feet.

Helictotrichon asperum (*Munro*) *Bor* occurs in the hills of Assam bordering Burma and may be expected within Burma also.

XI. AGROSTEÆ.

Key to the genera of *Agrosteæ*.

Spikelets disarticulating above the glumes, the latter persistent:—	
Glumes equal or nearly so, longer than the lemma; lemma awned from the back or awnless:—	
Lemma glabrous or with only a few short hairs at the base; glumes not long-acuminate:—	
Lemma hyaline, shorter than the glumes:—	
Rhachilla not produced (except in *A. abnormis*)	**Agrostis**
Rhachilla produced, pectinate-ciliate	**(Deyeuxia)**
Lemma coriaceous, longer than the glumes	**(Aulacolepis)**
Lemma hairy or glabrous; awn basal or not; glumes long-acuminate; callus long-bearded; rhachilla not produced	**(Calamagrostis)**
Glumes equal or unequal, as long as the lemma or shorter; lemma awned from the tip	**Muehlenbergia**
Spikelets disarticulating below the glumes and falling entire:—	
Glumes awnless:—	
Inflorescence a spike-like panicle	**Alopecurus**
Inflorescence a loose or contracted panicle	**Garnotia**
Glumes awned	**Polypogon**

1. AGROSTIS Linn.

1. **Agrostis stolonifera** *Linn.*, Sp. Pl. (1753) 62. A. verticillata *Vill.* F.B.I. VII, 254.

Below Tangtung, Myitkyina District, 5,000 feet (Kermode 17312 !).

2. MUEHLENBERGIA Schreb.

1. **Muehlenbergia huegelli** *Trin.*, Mem. Acad. Peters. ser. VI, vi, II (1845) 293. M. viridissima *Nees ex Steud.* F.B.I. VII, 259.

Common above 5,000 feet in damp places. (Rhind 3918! near Kaya, Tawngpeng State, 6,700 feet.)

3. ALOPECURUS Linn.

1. **Alopecurus aequalis** *Sobol.*, Fl. Petrop. 16. A. fulvus *Sm.* A. aristulatus *Michx.* F.B.I. VII, 238.

Below Tangtung, Myitkyina District, 5,000 feet (Kermode 17316 !).

4. GARNOTIA Brongn.

1. **Garnotia stricta** *Brongn.*, Duperr. Voy. Bot. 132, t. 21. F.B.I. VII, 243.

Occasional in shady places, particularly in the hills (Thein Lwin 3170 !, Bamaleik-chaung, Pegu District).

5. POLYPOGON Desf.

Key to the species of *Polypogon.*

Perennial; stems decumbent, creeping and rooting below ..... *P. littoralis*
Annual; stems erect from a geniculate base ..... *P. fugax*

1. **Polypogon littoralis** *Sm.*, Compend. Fl. Brit. 13. F.B.I. VII, 246.

Fairly common in the hills above 3,000 feet. (Rhind 1068 !, Maymyo.)

2. **Polypogon fugax** *Nees ex Steud.*, Syn. Pl. Glum. I (1854) 184. P. littoralis *Sm.* var. higegaweri in F.B.I. VII, 246.

Maymyo (Mg. Kan 18361!) and Tangtung, Myitkyina District (Kermode 17314 !).

The following species are recorded from the hills on the Assam side of the frontier with Burma and are therefore likely to be found within Burma also:—*Agrostis inaequiglumis* Griseb., *A. filipes* Hook. f., *A. micrantha* Steud., *A. myriantha* Hook. f., *Deyeuxia scabrescens* Munro ex Duthie, *D. nagarum* Bor, *Aulacolepis treutleri* Hack., *Calamagrostis emodensis* Griseb. and *Alopecurus myosuroides* Huds. The following, which occur in China, are likely to be found within the northern borders of Burma:—*Agrostis micrantha* Steud. (Yunnan), *Alopecurus myosuroides* Huds. and *Calamagrostis sylvatica* DC. (Yunnan).

XII. STIPEÆ.

1. ARISTIDA Linn.

Key to the species of *Aristida.*

Awn sessile, setae always 3, subequal:—
  Panicles contracted:—
    Plants small, up to 25 cm. high; spikelets (excl. awn) up to 2·5 mm. long ..... *A. cumingiana*
    Plants up to 1 m. high; spikelets (excl. awn) up to 8 mm. long; median seta of awn up to 2·5 cm. long; very variable ..... *A. depressa*
  Panicles effuse, as broad as long:—
    Setae 2·5-5 cm. long..... *A. hystrix*
Awn supported by a column; setae 3, subequal; column of awn 2·5 cm. or less ..... *A. funiculata*

1. **Aristida cumingiana** *Trin. et Rupr.*, Mem. Acad. Peters. Ser. VI, vii, (1849) 134. F.B.I. VII, 224.

Fairly widespread, generally on poor soils, ascending to about 4,000 feet.

2. **Aristida depressa** *Retz.*, Obs. IV, 22. A. adscensionis *Linn.* F.B.I. VII, 224.

Very common on dry ground, old broken brickwork, old pagodas, etc. Very variable in colouring and size. Of very little value as fodder; cattle dislike it.
Burmese—*Thamin-mwe*; *Myet-thamin.*

3. **Aristida hystrix** *Linn.f.*, Suppl. 113. F.B.I. VII, 225.

Frequent in *indaing* forests of central Burma and in dry, stony places. A xerophyte of no fodder value.

4. **Aristida funiculata** *Trin. et Ripr.*, Mem. Acad. Peters. Ser. VI, vii, (1849) 159. F.B.I. VII, 226.

Uncommon; occurs on stony uplands in the plains (Collett 16 !, Meiktila; McKerral 85!, Allanmyo).

Stipa roylei (Nees) Mez occurs in the Naga hills of Assam and *S. sibirica* Lam. in Yunnan; both may be found in the northern hills of Burma.

XIII. ZOYSIEÆ.

Key to the genera of *Zoysieæ*.

Spikes solitary:—
  Upper glume with hooked spines on the back ..... **Tragus**
  Upper glume without hooked spines:—
    Glumes long-awned ..... **Perotis**
    Glumes awnless ..... **Zoysia**
Spikes in pairs ..... **Trachys**

1. ZOYSIA Willd.

(Zoisia *Willd.*)

1. **Zoysia matrella** (*Linn.*) *Merr.*, Philipp. Jr. Sci. Bot. VII (1912) 230. Z. pungens *Willd.*, F.B.I. VII, 99.

Frequent on the sea-coasts (Thein Lwin 3471! from the mouth of the Thadinchoung, Gulf of Martaban). It has also been introduced and cultivated as a lawn grass under the name of Korea Grass. It does well on laterite ridges in Lower Burma where the rainfall is high. Said to taint the flesh of sheep which eat it. A good sand-binder but of little fodder value.

2. TRAGUS Haller.

1. **Tragus biflorus** *Schult.*, Mant. II (1767) 205. T. racemosus *Scop.* F.B.I. VII, 97.

Very common in the drier parts of Burma, particularly along roadsides, ascending to about 5,000 feet. The herbage is rather harsh but sheep and goats eat it.
Burmese—*Yon-gale*; *Yon-hle*.

3. TRACHYS Pers.

1. **Trachys muricata** (*Linn.*) *Steud.*, Syn. Pl. Gram. 112. T. mucronata *Pers.* F.B.I. VII, 96.

Common on light sandy soils in the Magwe-Taungdwingyi tract and a frequent weed of cultivated fields (Thet Su 2191 !).

4. PEROTIS Aiton.

1. **Perotis indica** (*Linn.*) *O. Kuntze*, Rev. Gen. Pl. 787 (1891) P. latifolia *Ait.* F.B.I. VII, 98.

Common in central Burma in the plains. A frequent weed of cultivated fields. Of little fodder value.
Burmese—*Baing-daung*; *Khwe-amee*.

XIV. PHALARIDEÆ.

No members of the tribe *Phalarideae* have so far been recorded in Burma but the following species occur in the Naga Hills of Assam and are likely to be found in Burma:—Hierochloa gracillima *Hk.f.*, H. khasiana *C. B. Clarke*, H. clarkei *Hk.f.*

XV. ORYZEÆ.

Key to the genera of *Oryzeæ*.

Spikelets unisexual, the pistillate above and the staminate below in the same inflorescence; tall, reed-like grasses ..... **Zizania**
Spikelets bisexual:—
  Leaf-blades linear:—
    Glumes absent; fertile lemma awnless ..... **Leersia**
    Glumes present but usually much reduced; fertile lemma awned or not ..... **Oryza**
  Leaf-blades ovate-lanceolate to linear-oblong; glumes absent; lemma long-awned ..... **Hygroryza**

1. ZIZANIA Linn.

1. **Zizania latifolia** *Turcz.*, Bull. Soc. Nat. Mosc. (1838) 105. Z. aquatica *Linn.* Fl. Assam V, 175.

Inle Lake, Yawnghwe State, Southern Shan States. (D'Souza 2415 !)

2. LEERSIA Sw.

1. **Leersia hexandra** *Sw.*, Prodr. Veg. Ind. Occ. (1788) 21. F.B.I. VII, 94.

Very common in swampy places all over Burma ascending to about 5,000 feet. Frequently forms a thick cover in paddy fields after the harvest in areas where moisture remains, as in the northern wet zone. Relished by cattle and buffaloes.

Burmese—*Thaman-myet.*

3. ORYZA Linn.

Key to the species of *Oryza.*

Root rhizomatous; stems erect from a stout creeping rhizome, smooth, hard, polished; spikelets laxly imbricate, rigidly chartaceous; panicle spiciform; lemma dorsally winged..	*O. coarctata*
Root not rhizomatous:—	
Ligule elongated, at length splitting; spikelets 6-12·5 mm. long; generally annual:—	
Spikelets persistent, awned or not	*O. sativa*
Spikelets deciduous, always awned	*O. sativa var. fatua*
Ligule short, truncate; spikelets 4-6 mm. long:—	
Lemma hispid, awned	*O. officinalis*
Lemma smooth, awnless	*O. meyeriana*

1. **Oryza coarctata** *Roxb.*, Hort. Beng. (1814) 87. F.B.I. VII, 93.

Frequent in Lower Burma near the sea-coasts.

Burmese—*Saba-yaing.*

2. **Oryza sativa** *Linn.*, Sp. Pl. (1753) 333.

Paddy. Cultivated all over Burma in many varieties, ascending to about 6,000 feet.

Burmese—*Saba.*

3. **Oryza sativa** *Linn.* var. **fatua** *Prain*, Beng. Pl. (1903) 1184.

Fairly common throughout Burma in marshy places and in the Shan States (Thein Lwin 15 !).

Burmese—*Saba-yaing.*

4. **Oryza officinalis** *Wall. apud Prodoehl*, Mez, Bot. Archiv. I (1922) 224. O. latifolia *Desv.* of the F.B.I. VII, 92.

Common all over Burma in wet places, drains, ditches, swamps, etc. Cattle eat it. As Bor has pointed out (Flora of Assam V) the *O. latifolia* of the F.B.I. is an American plant.

Burmese—*Nat-saba.*

5. **Oryza meyeriana** *Baill.*, Hist. Pl. XII (1894) 166. O. granulata *Nees et Arn.* F.B.I. VII, 93.

Frequent in wet places.

Burmese—*Daung-saba.*

4. HYGRORYZA Nees

1. **Hygroryza aristata** *Nees*, Edin. New Phil. Jr. XV (1833) 380. F.B.I. VII, 95.

Recorded from Lower Burma (Pegu) but apparently uncommon.

XVI. THYSANOLAENÆ.

1. THYSANOLAENA Nees

1. **Thysanolaena maxima** *O. Ktze.*, Rev. Gen. Pl. (1891) 784. T. agrostis *Nees.* F.B.I. VII, 61. T. procera *Mez.*

Common in the hills from about 2,500 to 5,000 feet. Panicles used for making brooms. Buffaloes eat it when young but not cattle.

Burmese—*Pyaung-sa*; *Tama-zaing*; *Thabyet-si-bin.*

XVII. ARUNDINELLEÆ.

Key to the genera of *Arundinelleæ.*

Lemmas of the upper floret scabrid or scaberulous, entire or minutely 2-lobed at the apex, lobes awned or awnless	**Arundinella**
Lemma of the upper floret bearded below the two lateral prominent lobes	**Danthoniopsis**

1. ARUNDINELLA Raddi

Key to the species of *Arundinella.*

Upper lemma awned:—	
Upper lemma bearing 2 apical setae	*A. setosa*
Upper lemma devoid of setae:—	
Spikelets small; upper lemma less than 2 mm. long:—	
Both glumes less than 1·75 mm. long, smooth; panicles effuse	*A. pumila*
Glumes usually, upper always, more than 1·75 mm. long, ribs scabrid; panicles compact	*A. holcoides*
Spikelets large; upper lemma over 2 mm. long, scaberulous; perennials:—	
Panicles effuse, branches long; leaves glabrous; spikelets in distant pairs:—	
Lower glume 3-nerved	*A. nepalensis*
Lower glume 5-nerved	*A. birmanica*
Panicle branches close; spikelets crowded	*A. fuscata*
Upper lemma not awned	*A. bengalensis*

1. **Arundinella setosa** *Trin.*, Diss. II, 63. F.B.I. VII, 70.

Common above 3,000 feet in light open jungle and on hill sides, ascending to about 5,000 feet. Not eaten by cattle except when young.

Burmese—*Myet-pauk*; *Yaman.*

2. **Arundinella pumila** *Steud.*, Syn. Pl. Gram. 115. A. tenella *Nees et Wight ex Steud.* F.B.I. VII, 71.

Pegu Yoma tops (Thein Lwin 11!). Said to be disliked by cattle.

3. **Arundinella holcoides** *Trin.*, Bull. Sc. Acad. Peters. I (1836) 71. A. agrostoides *Trin.* F.B.I. VII, 71.

Tenasserim (Wallich, Helfer).

4. **Arundinella holcoides** *Trin.* var. **ciliata** *Hook. f. ex Nees* in F.B.I. VII, 71.

Moulmein (Griffith).

5. **Arundinella nepalensis** *Trin.*, Diss. II, 62. A. brasiliensis of the F.B.I. VII, 71. (non Raddi.)

Very common in the hills between about 2,500 and 5,000 feet.

6. **Arundinella birmanica** *Hook. f.*, F.B.I. VII, 73.

Frequent in the moister parts all over the plains.

Burmese—*Padat-myet.*

7. **Arundinella fuscata** *Nees ex Büse*, Miq. Pl. Jungh. 359. F.B.I. VII, 74.

Rangoon (Kurz).

8. **Arundinella bengalensis** *Druce*, Rep. Bot. Exch. Club Brit. Isles, 1916, 605. A. wallichii *Nees ex Steud.* F.B.I. VII, 75.

Frequent in the hills between about 3,000 and 5,000 feet.
Burmese—*Yaman-myet.*

2. DANTHONIOPSIS Stapf

1. **Danthoniopsis griffithiana** *Bor*, Flora of Assam V (1940) 187. Arundinella griffithiana (*C. Muell.*) *Bor*, Ind. For. Rec. (Bot.) I (1938), 73. Danthonia griffithiana *C. Muell.*, Bot. Zeit. XIV (1856) 348. Arundinella avenacea *Munro ex Thw.*, Enum. Pl. Zeyl. (1864) 362. F.B.I. VII, 69.

Fairly frequent in places of high rainfall, particularly in the hills.

XVIII. PANICEÆ.

Key to the genera of the *Paniceæ* (after Bor.).

Spikelets falling singly, not subtended by bristles, or if so, then the bristles persisting after the spikelets have fallen (*Setaria*):—
  Both florets fertile, or the lower male and then with the lemma hardened and similar to the upper:—
    Upper lemma and palea membranous, gaping at maturity — **Coelachne**
    Upper lemma and palea indurated, closed at maturity .... — **Isachne**
  Upper floret alone fertile; lemma of lower floret usually resembling the upper glume and not hardened:—
    Spikelets arranged in more or less open panicles, or with the panicles contracted and spike-like:—
      Spikelets not subtended by bristle-like branchlets:—
        Spikelets arranged in open or contracted panicles:—
          Spikelets not or only slightly gibbous:—
            Fertile floret without lateral basal appendages or scars:—
              Upper glume as long as the spikelet ..... — **Panicum**
              Upper glume much shorter than the spikelet.. — **Ottochloa**
            Fertile floret with lateral appendages or scars.... — **Ichnanthus**
          Spikelets distinctly gibbous and laterally much compressed ..... — **Cyrtococcum**
        Spikelets arranged in cylindrical spike-like panicles; upper glume inflated:—
          Upper lemma and palea indurated and closed at apex; upper glume not inflated, spikelets lanceolate .. — **Saccolepis**
          Upper lemma and palea membranous, gaping at apex — **Hymenachne**
      Spikelets subtended by one to many bristle-like branchlets — **Setaria**
    Spikelets arranged in one-sided spikes or spike-like racemes; spikes or racemes digitate or scattered, rarely solitary:—
      Lemma of the upper floret more or less crustaceous, usually with narrow inrolled margins, exposing much of the palea:—
        Spikelets dorsally compressed or almost terete, the glumes and lower lemma rounded on the back or only keeled at the tip:—
          Lower glume and lowest internode of the rhachilla not forming a swollen callus at the base of the spikelet:—
            Glumes and lemmas with lateral compressed and thickened apices ..... — **Acroceras**

Glumes and lemmas not as above:—
Lower glume (when present) turned away from the rhachis of the racemes or spike, the back of the upper lemma facing it, *i.e.* the spikelets adaxial:—
Lower glume developed, although sometimes small:—
Spikelets not sunken in hollows in a thickened corky rhachis:—
Glumes acuminate or awned, rarely only acute; upper lemma not mucronate:—
Leaf-blades linear; racemes dense; culms erect or sub-erect ..... **Echinochloa**
Leaf-blades lanceolate to ovate; racemes loose to moderately dense; culms creeping and ascending ..... **Oplismenus**
Glumes awnless; if acuminate, then with the upper lemma mucronate:—
Upper lemma acute, not mucronate .... **Paspalidium**
Upper lemma obtuse, mucronate or very short-awned ..... **Urochloa**
Spikelets sunken in hollows in a thickened rhachis, the latter disarticulating at maturity ..... **Stenotaphrum**
Lower glume usually absent; spikelets plano-convex ..... **Paspalum**
Lower glume turned towards the rhachis, the back of the upper lemma turned away from it, *i.e.* spikelets abaxial:—
Lower glume present ..... **Brachiaria**
Lower glume absent..... **Axonopus**
Lower glume and lowest internode of the rhachilla forming a swollen callus at the base of the spikelet; upper lemma mucronate or short-awned ..... **Eriochloa**
Lemma of the upper floret thinly cartilaginous, usually with flat hyaline margins:—
Spikelets awnless ..... **Digitaria**
Spikelets awned ..... **Alloteropsis**
Spikelets with an involucre of bristles or sub-tended by a solitary bristle and falling with the bristles or bristle at maturity, solitary or in clusters:—
Bristle solitary, formed by prolongation of the branch beyond the terminal spikelet ..... **Pseudoraphis**
Bristles usually numerous ..... **Pennisetum**
Dioecious. Female spikelets in heads with spiny subtending bracts, male in spikes which are united into dense, large, globose heads; sea-coast species..... **Spinifex**

1. COELACHNE R.Br.

Key to the species of *Coelachne.*

Spikelets pedicelled ..... *C. pulchella.*
Spikelets sessile:—
Panicle branches spreading, distant ..... *C. brachiata.*
Panicle branches short, stiff ..... *C. simpliciuscula.*

1. **Coelachne pulchella** *R.Br.*, in Prodr. 187. F.B.I. VII (1897) 270. Wall. Cat. n. 8909.

Source of the Cheppadaung river (Wallich).

2. **Coelachne brachiata** *Munro ex Benth.*, in Fl. Austral. VII, 626 (partim). C. pulchella *R. Br.* var. brachiata *Munro.* F.B.I. VII (1897) 271.

Tenasserim (Griffith; Kew Distribution No. 6675).

3. **Coelachne simpliciuscula** *Munro ex Benth.*, in Jour. Linn. Soc. XIX (1881) 93. C. pulchella *Br.* var. simpliciuscula *Hook.f.* F.B.I. VII (1897) 271.

Salu Reserve, South Pegu Forest Division; Thein Lwin 79 ! 'In marshy ground'.

2. ISACHNE R.Br.

Key to the species of *Isachne*.

Lemma and palea equal and similar, both hemispheric and coriaceous:—
- Panicles glandular:—
  - Panicles small, pyramidal ..... *I. rigida.*
- Panicles not glandular:—
  - Panicles large, pyramidal, effuse, 8-35 cm. long ..... *I. albens.*
  - Panicles sub-sessile, contracted, branches erect; stems densely tufted ..... *I. elegans.*
  - Panicles lax, branches and pedicels very long and slender, tips obconic ..... *I. javana.*

Lemma usually flatter and thinner than the palea and often longer:—
- Panicles ovoid or pyramidal:—
  - Spikelets 1·8-2 mm. long:—
    - Leaves lanceolate to linear-lanceolate, margins not or very slightly thickened ..... *I. australis.*
    - Leaves ovate-cordate to lanceolate-acuminate, scaberulous, margins thickened ..... *I. dispar.*
- Panicles small, contracted or spreading:—
  - Spikelets 1·2-1·5 mm. long ..... *I. miliacea.*

1. **Isachne rigida** *Nees ex Steud.*, in Syn. Pl. Gram. 95. F.B.I. VII (1897) 24.

Tenasserim (Helfer) and the Nicobar Islands (Kurz).

2. **Isachne albens** *Trin.*, in Sp. Gram. Ic. t. 25. F.B.I. VII (1897) 22.

Common in Lower Burma. Cattle eat it readily; a good fodder.

3. **Isachne elegans** *Dalzell ex Hook. f.* in F.B.I. VII (1897) 23.

Yawnghwe, Southern Shan States (McKerral 633 !).

4. **Isachne javana** *Nees ex Miq.*, in Pl. Jungh. 376. F.B.I. VII (1897) 24.

Common in water channels, drains, etc., mainly in the high rainfall areas of southern Burma, in the plains.

5. **Isachne australis** *R.Br.*, in Prodr. 196. I. globosa *Kuntze.* F.B.I. VII (1897) 24.

A common weed in paddy fields and on the *kazins* (bunds). Good fodder for cattle.

Burmese—*Let-the-zaung.*

6. **Isachne dispar** *Trin.*, in Sp. Gram. Ic. t. 86 (1828). F.B.I. VII (1897) 26.

In swampy ground between about 2,000 and 3,500 feet. (Rhind 3182 ! Anisakan.)

7. **Isachne miliacea** *Roth.*, in Nov. Pl. Sp. 58. F.B.I. VII (1897) 25.

Very common in moist places throughout the plains of Burma. Cattle and horses eat it; though the yield is small it is much esteemed in parts of the Shan States as a fodder.

Burmese—*Myet-wine.*

Isachne clarkei Hook.f., *I. scabrosa* Hook.f. and *I. himalaica* Hook.f. are likely to be found in Burma near the Assam frontier.

3. ACROCERAS Stapf

Key to the species of *Acroceras.*

Spikelets close on the panicle branches:—
- Spikelets over 5 mm. long ..... *A. zizanioides*
- Spikelets less than 4·5 mm. long ..... *A. crassiapiculatum*

Spikelets widely spaced ..... *A. tonkinensis*

1. **Acroceras zizanioides** (*H.B. & K.*) *Dandy*, Jr. Bot. LXIX (1931) 54. A. oryzoides *Stapf.* Panicum latifolium *Hook.f.* non *Linn.* F.B.I. VII, 39 (in part).

Recorded in the F.B.I. from Burma but no specimen seen by me.

2. **Acroceras crassiapiculatum** (*Merr.*) *Alston*, Trimen, Handb. Fl. Ceylon VI Suppl. (1931) 324. A. ridleyi *Stapf ex Ridley*, Fl. Malay Pen. V (1925) 229. Panicum latifolium *Hook.f.* non *Linn.* in F.B.I. VII, 39 (in part).

Frequent in the wet forests of northern and southern Burma. A good fodder but never very plentiful.

3. **Acroceras tonkinensis** (*Balansa*) *C. E. Hubbard ex Bor*, Ind. For. Rec. Bot. n.s. I (1938) 78. Panicum tonkinense *Bal.* P. latifolium *Linn.* var. majus *Hook.f.* in F.B.I. VII, 39. Neohousnotia tonkinensis *A. Camus.*

Common on the edges of evergreen forests of northern and southern Burma. Eaten by cattle.

4. DIGITARIA Haller

Key to the species of *Digitaria* (after Bor).

Base of the culms clothed with matted, brown fibres..... *D. fibrosa*

Base of the culm not as above:—
- Spikelets 2-3·5 mm. long, glabrous or fringed with fine, acute hairs, lanceolate to lanceolate-oblong:—
  - Spikelets 3-3·5 mm. long; nerves in lower lemma evenly spaced; racemes 10-15 cm. long and finely pubescent at the base; rhachis broad, 0·7-1 mm. ..... *D. adscendens*
  - Spikelets 2-2·5 mm. long; lateral nerves of lower lemma near the margin; racemes 6-10 cm. long; rhachis slender ..... *D. pruriens*
- Spikelets less than 2 mm. long or if slightly longer then with very short curled or matted hairs:—
  - Pedicles prominent, spreading, 3 mm. long; spikelets spreading, rather loose; rhachis very slender, triquetrous:—
    - Spikelets minutely pubescent; panicle 15-25 cm. long; racemes 15 cm. long ..... *D. jubata*
    - Spikelets glabrous or almost so; panicle 4-8 cm. long; racemes 4-8 cm. long ..... *D. pedicellaris*
  - Pedicles very short, 1 mm. long; spikelets appressed close together; rhachis flattened:—
    - Lemma and palea of upper floret brown or black; annual:—
      - Spikelets 1·5-2·3 mm. long; upper glume as long as or nearly as long as the spikelet:—
        - Spikelets 1·5-1·7 mm. long ..... *D. violascens*
        - Spikelets 2-2·3 mm. long; peduncle hairy; hairs clavate-tipped ..... *D. ternata*

Spikelets about 1 mm. long; upper glume very short; hairs clavate-tipped ..... *D. royleana*
Lemma and palea of upper floret pale; spikelets 1·3-1·5 mm. long; upper glume as long as the spikelet; creeping perennials ..... *D. longiflora*

1. **Digitaria fibrosa** *Stapf*, Kew Bull. 1912, 428. Panicum fibrosum *Hack.*

Fairly common in *indaing* forests. (Thein Lwin 2947 !)
Burmese—*Myet-pya.*

2. **Digitaria adscendens** (*H.B. & K.*) *Henr.*, Blumea I (1934) 92. Panicum adscendens *H.B. & K.* in Nov. Gen. et Sp. (1815) 97.

Very common all over Burma, ascending to about 5,000 feet. A good fodder for cattle.

3. **Digitaria adscendens** (*H.B. & K.*) *Henr.* var. **fimbriata** *Stapf.*

Fairly common. (Thein Lwin 74 !)

4. **Digitaria pruriens** *Büse*, Miq. Pl. Jungh. (1854) 379, syn. Paspalum sanguinale *Hook.f.* cum omnium varietat. F.B.I. VII, 16.

Very common everywhere up to about 6,000 feet except in the driest places. There are a number of more or less distinct varieties of this and *D. adscendens* which need to be studied in culture before they can be satisfactorily separated. A culture of *D. adscendens* in Burma showed unmistakable Mendelian segregation. I have made no attempt to separate the large herbarium collections of this and the proceeding species from Burma into varieties.

5. **Digitaria jubata** (*Griseb.*) *Henr.*, Blumea I (1934) 100. Paspalum jubatum *Griseb.* F.B.I. VII, 19.

Fairly common in shady places, ascending to about 3,000 feet. (Rhind 2625 !, Mt. Popa.) Eaten by cattle.

6. **Digitaria pedicellaris** *Prain*, Beng. Pl. (1903) 1182. Paspalum pedicellare *Trin. ex Steud.* F.B.I. VII, 19.

Common in the drier parts of Burma, particularly on stony ground. Cattle seem to avoid this grass.

7. **Digitaria violascens** *Link*, Hort. Berol. I (1827) 229. Panicum violascens *Kunth.*

Fairly common between about 2,000 and 4,000 feet. (Thein Lwin 74!)

8. **Digitaria ternata** *Stapf*, Dyer, Fl. Cap. VII, 376. Paspalum ternatum *Hook.f.* F.B.I. VII, 17.

Common in shady places, ascending to about 3,000 feet.

9. **Digitaria royleana** *Prain*, Beng. Pl. (1903) 1182. Paspalum royleanum *Nees ex Thw.* Enum. Pl. Zeyl. (1864) 358. F.B.I. VII, 17.

Meiktila and the Shan Hills (Collett; Manders).

10. **Digitaria longiflora** *Pers.*, Syn. I (1805) 85. Paspalum longiflorum *Retz.* F.B.I. VII, 17.

Frequent in the hills up to about 5,000 feet. Cattle eat it.

Digitaria pertenuis *Büse* has been recorded by Craib from Chiengmai (Siam) and also from Malaya. It is likely to be found in Burma.

5. ALLOTEROPSIS Presl. emend. Hitch.

Key to the species of *Alloteropsis.*

False spikes sub-digitate, 2-5; spikelets 6 mm. long; lemma of the upper floret long-aristate ..... *A. semialata.*

False spikes sub-verticillate, 3-8; spikelets 3-4 mm. long; lemma of the upper floret abruptly and shortly aristate .. *A. cimicina.*

1. **Alloteropsis semialata** *Hitch.*, in Contrib. U.S. Nat. Herb. XII, 210. Axonopus semialatus *Hook.f.* F.B.I. VII, 64.

Common in shady places all over Burma up to about 4,000 feet. McKerral states that it is indicative of wet, undrained ground.

2. **Alloteropsis cimicina** *Stapf*, in Fl. Trop. Afr. IX, 487. Axonopus cimicinus *Beauv.* F.B.I. VII, 64.

Common in the drier parts of Burma, ascending to about 3,000 ft. Often found near cultivation. Cattle do not eat it, Burkill says because of the presence of coumarin in it.

6. SACCOLEPIS Nash

Key to the species of *Saccolepis.*

Spikelets acute:—
Spikelets 4-5 mm. long ..... *S. interrupta.*
Spikelets 2·5-3·5 mm. long ..... *S. indica.*
Spikelets obtuse, 1·5-2 mm. long ..... *S. myosuroides.*

1. **Saccolepis interrupta** *Stapf*, in Fl. Trop. Afr. IX, 757. Panicum interruptum *Willd.* F.B.I. VII, 40.

Common in wet places in southern and northern Burma (not in the Dry Zone). Good fodder.

2. **Saccolepis indica** *A. Chase*, in Proc. Biol. Soc. Wash. 1908, 8. Panicum indicum *Linn.* F.B.I. VII, 41.

Common in moist places all over Burma up to about 2,500 feet, particularly in light forest. Not liked by cattle.

3. **Saccolepis myosuroides** *A. Camus*, in Flor. Gen. Indo-Chine VII 460. Panicum myosuroides *R.Br.* F.B.I. VII, 42.

Common in paddy fields in northern Burma and in swampy ground. Eaten by cattle and buffaloes.

7. HYMENACHNE Beauv.

1. **Hymenachne pseudo-interrupta** *C. Muell.*, in Bot. Zeit. XIX (1861) 333. H. myuros *Beauv.* Panicum myuros *H.B.K.* F.B.I. VII, 39.

Fairly common in wet places. Cattle eat it (Ba Thein 2099 !).

8. ICHNANTHUS Swartz

Key to the species of *Ichnanthus.*

Stems 30-60 cm. long, decumbent; leaves broadly lanceolate, amplexicaul .. .. *I. vicinus.*
Stems tufted, dwarf, 15-20 cm. long, hispid; leaves short, almost subulate .. .. *I. foliosus.*

1. **Ichnanthus vicinus** (*Baily*) *Merr.*, Enum. Philipp. Fl. Pl. I (1923) 70. I. pallens *Munro.* F.B.I. VII, 60.

Rather uncommon. In damp places (Thein Lwin 55 ! near Kalasale-an, Pegu District). Cattle eat it.

2. **Ichnanthus foliosus** *Munro ex Hook.f.*, F.B.I. VII, 61.

Occasional in the plains.

9. PANICUM Linn.

Key to the species of *Panicum* (after Bor).

Leaf-blades linear to narrowly lanceolate; spikelets symmetrical:—
Lemma of the upper floret finely transversely rugose ..... *P. maximum*

Lemma of the upper floret smooth:—
- Spikelets 4-5 mm. long, sharply acute, oval to elliptic in back view ..... *P. miliaceum*
- Spikelets up to 3 mm. long, rarely to 4 mm. and if so with narrow, lanceolate spikelets:—
  - Spikelets 1·5 mm. long:—
    - Dwarf. Leaves narrow from a narrow base; upper glume 3-nerved; lower floret paleate ..... *P. humile*
    - Tall, slender. Leaves linear from a narrow, cordate base; upper glume 5-nerved; lower floret epaleate.. *P. humidorum*
  - Spikelets over 1·5 mm. long:—
    - Lower glumes cuspidate-acuminate ..... *P. trypheron*
    - Lower glumes not cuspidate-acuminate:—
      - Spikelets narrowly lanceolate to lanceolate-oblong, acute:—
        - Lower glume orbicular, rotundate or truncate, ⅓ to ½ the length of the spikelet; panicle branches loose to closely spiculate:—
          - Spikelets long, narrowly lanceolate; leaf-blades broad, flat; culms spongy, floating ..... *P. paludosum*
          - Spikelets lanceolate to lanceolate-oblong; leaf-blades narrow, often involute; culms tough, rhizomatous ..... *P. repens*
        - Lower glume ovate, acute or obtuse, ½ the length of the spikelet, 3-5-nerved; spikelets 3 mm. long; panicle branches densely spiculate ..... *P. auritum*
      - Spikelets oblong, ovate-oblong to elliptic, acute or obtuse:—
        - Lower glume ½-⅔ the length of the spikelet:—
          - Nodes and leaf-sheaths hairy; annual; transverse nerves in glumes; spikelets shortly pedicelled or sub-sessile ..... *P. cruciabile*
          - Nodes and leaf-sheaths glabrous:—
            - Annual; culms erect or geniculately ascending; leaf-blades linear; lower floret with a palea:—
              - Spikelets persistent; panicle contracted; spikelets 2-3·5 mm. long ..... *P. miliare*
              - Spikelets deciduous; panicle effuse ..... *P. psilopodium*
        - Lower glume ⅓-¾ the length of the spikelet:—
          - Lower floret paleate ..... *P. sarmentosum*
          - Lower floret epaleate ..... *P. montanum*

Leaf-blades lanceolate to ovate, base cordate; spikelets oblique *P. brevifolium*

1. **Panicum humile** *Nees ex Steud.*, Syn. Gram. (1854) 84. F.B.I. VII, 48.

Uncommon. Pidaung Game Reserve, Myitkyina District (Maung Te 5 !) and from Arakan (F.B.I.). Eaten by cattle.
Burmese—*Pyaung-sa-myet.*

2. **Panicum humidorum** *Ham.*, Wall. Cat. n. 8721. F.B.I. VII, 53.

Zamagyi Forest Reserve, South Pegu Forest Division (Thein Lwin 4 !).

3. **Panicum trypheron** *Schult.*, Mant. II (1824) 244. F.B.I. VII, 47.

Fairly common, particularly in shady places and *indaing* forest.

4. **Panicum paludosum** *Roxb.*, Hort. Beng. (1814) 8. F.B.I. VII, 50. P. proliferum *Lam.*

Fairly frequent in swamps in the plains (McKerral 656 !). Eaten by cattle and buffaloes.

5. **Panicum repens** *Linn.*, Sp. Pl. ed. ii (1762) 87. F.B.I. VII, 49.

Very common everywhere, ascending to about 4,000 feet. A good fodder. Burmese—*Myet-kha.*

6. **Panicum auritum** *Presl. ex Nees*, Agrost. Bras. (1829) 176. F.B.I. VII, 40.

Common in swampy places in the plains. Readily eaten by cattle and buffaloes.

7. **Panicum cruciabile** *A. Chase*, Jr. Arn. Arbor. XX (1939) 309. P. caesium *Nees*. F.B.I. VII, 48.

Uncommon. (Thein Lwin 94 !.)

8. **Panicum miliare** *Lamk.* var. **hirtum** *Hook. f. ex Wall.* in F.B.I. VII, 46. Wall. Cat. n. 8718 (in part).

Common in central Burma in open ground, often on road-sides. Eaten by cattle. Burmese—*Myet-lu.*

9. **Panicum psilopodium** *Trin.*, Gram. Panic. (1826) 217. F.B.I. VII, 46.

Apparently not a common grass; I have only collected it once (1609).

A variety *coloratum* was made by Hooker *f.* for a plant collected by Collett in the Shan Hills (F.B.I. *l.c.*).

10. **Panicum sarmentosum** *Roxb.*, Fl. Ind. (1820) 308. F.B.I. VII, 54.

Common in light forest, generally on hill-sides. A tall, scandent grass. Eaten by cattle.

11. **Panicum montanum** *Roxb.*, F. Ind. (1820) 313. F.B.I. VII, 53.

Very common in the hills, generally in shady places between about 2,000 and 5,000 feet. Cattle do not eat it readily.

12. **Panicum brevifolium** *Linn.*, Sp. Pl. (1753) 59, non Roxb. P. ovalifolium *Poir.* F.B.I. VII, 44.

Rather uncommon; occurs in northern Burma on forest margins. Eaten by cattle.

Panicum miliaceum *Linn.* (Sp. Pl. 56) is occasionally cultivated in the drier parts of central Burma. Burmese—*Lu.*

Ridley (Fl. Malay Pen. V, 226) gives the distribution of Panicum elegantissimum *Hook.f.* as extending into Burma but I have seen no Burmese specimen nor any other record.

Panicum maximum *Jacq.*, Guinea Grass, has been introduced as a fodder on some Government farms and elsewhere but it is not extensively grown.

Panicum khasianum *Munro ex Hk.f.* recorded from the Khasi and Naga Hills and P. acroanthum *Steud.* from the Mishmi Hills are likely to occur in northern Burma while P. tuberculatum *Presl.*, which occurs in Malaya, may be found in southern Burma.

10. CYRTOCOCCUM Stapf

Key to the species of *Cyrtococcum.*

Pedicels short, rarely as long as the spikelets ..... *C. trigonum*
Pedicels longer than the spikelets:—
  Lower lemma obtuse:—
    Spikelets over 1·5 mm. long ..... *C. patens.*
    Spikelets under 1·5 mm. long:—
      Panicle very lax; pedicels fairly long ..... *C. accrescens*
      Panicle contracted; pedicels short ..... *C. radicans*
  Lower lemma and glumes acute or cuspidate ..... *C. longipes*

1. **Cyrtococcum trigonum** *A. Camus*, Bull. Mus. Hist. Nat. Paris (1921) 118. Panicum trigonum *Retz.* F.B.I. VII, 56.

Fairly common in shady places and on the margins of evergreen forest. Eaten by cattle.

2. **Cyrtococcum patens** *A. Camus*, Bull. Mus. Hist. Nat. Paris (1921) 118. Panicum patens *Linn.* (in part). F.B.I. VII, 57.

Common in shady places in the hills up to about 4,000 feet.

3. **Cyrtococcum accrescens** *Stapf*, Hook. Ic. Pl. sub tab. 3096 (1922). Panicum accrescens *Trin.*, Sp. Gram. Ic. (1828) t. 88 et corrigend. vol. iii. P. patens *Linn.* Sp. Pl. 86. F.B.I. VII, 57.

Infrequent. In damp, shady places (Thein Lwin 15A !).

4. **Cyrtococcum radicans** *Stapf*, Hook. Ic. Pl. sub. tab. 3096 (1922). Panicum radicans *Retz.* F.B.I. VII, 57.

Frequent in shady places. (Thein Lwin 15!, South Pegu Forest Division.)

5. **Cyrtococcum longipes** *A. Camus*, Bull. Mus. Hist. Nat. Paris (1921) 118. Panicum longipes *W. & A.* F.B.I. VII, 58.

Fairly common in evergreen forests (Thein Lwin 3070 !).

11. ECHINOCHLOA Beauv.

Key to the species of *Echinochloa.*

Ligule a fringe of stiff hairs, at least in the lower leaves ..... *E. stagnina*
Ligule absent:—
  Lower glume and upper lemma equally acute or cuspidate; racemes rather distant ..... *E. colona*
  Lower glume and upper lemma cuspidate or produced into an awn:—
    Spikelets silkily hairy ..... *E. notabile*
    Spikelets not silkily hairy:—
      Spikelets 3-8 mm. long, generally in simple false spikes, cuspidate or more or less awned from the lower floret ..... *E. crus-galli*
      Spikelets 3-3·7 mm. long, very densely clustered in often compound false spikes, abruptly caudate-acuminate or rostrate or (from the lower floret) aristulate.... *E. crus-pavonis*

1. **Echinochloa stagnina** *Beauv.*, Ess. Agrost. (1812) 161. Panicum stagninum *Retz.* F.B.I. VII, 31.

Common in wet places all over the plains. Considered a very good fodder.
Burmese—*Myet-kya*; *Myet-thi.*

2. **Echinochloa colona** *Link*, Hort. Berol. (1827) 209. Panicum colonum *Linn.* F.B.I. VII, 32.

Common all over the plains except in the driest parts. A very good fodder much relished by cattle but it does not yield much. Grain used for human food in times of scarcity.
Burmese—*Be-sa-myet*; *Wunbe-sa-myet*; *Pazun-sa.*

3. **Echinochloa notabile** (*Hook.f.*) comb. nov. Panicum notabile *Hook.f.* F.B.I. VII, 32.

Common in areas of 40-50 inches rainfall in the central plains of Burma. Wallich (n. 8723) from the Petroleum Wells area (Yenangyaung), Rhind 2611 ! from Taung-dwingyi, McKerral (*s.n.* !) from Ava. A frequent grass of hedge-rows. A good fodder when young; when old the culms tend to become hard; drought-resistant.
Burmese—*Wa-yon-myet*; *Mwe-zok.*
Hooker (*l.c.*) placed this plant in the section *Echinochloa* of the genus *Panicum* with the observation that it had affinities with *Brachiaria* but it is clear from the general appearance of the plant and its intimate structure that it has much more alliance with *Echinochloa.* At the same time its somewhat xerophytic character is in striking contrast to the other species of *Echinochloa* found in Burma. It would, however, be most unsatisfactory in *Brachiaria* and I have therefore placed it in *Echinochloa.*

4. **Echinochloa crus-galli** *Beauv.*, Ess. Agrost. (1812) 161. Panicum crus-galli *Linn.* F.B.I. VII, 31.

Very common in wet places, edges of paddy fields, drains, etc. Readily eaten by cattle and buffaloes. Grain edible. Barnyard Grass.
Burmese—*Myet-cho*; *Myet-thi*; *Bawt-nyo-myet.*

5. **Echinochloa crus-pavonis** (*H.B. & K.*) *Schult.*, Mant. II (1824) 269.

Meiktila (Collett 24 !).

12. OTTOCHLOA Dandy

1. **Ottochloa nodosa** *Dandy*, Jour. Bot. LXIX (1931) 54. Panicum nodosum *Kunth.* F.B.I. VII, 43.

Common in wet places. Much liked by cattle.
Burmese—*Wa-yon-myet.*

13. PASPALUM Linn.

Key to the species of *Paspalum.*

Spikelets small, up to 1·25 mm. long ..... *P. compactum*
Spikelets larger, over 1·25 mm. long:—
  Spikelets in four rows; rhachis wide; upper glume pubescent *P. longifolium*
  Spikelets in two rows; rhachis narrow:—
    Spikelets glabrous:—
      Spikelets broadly elliptic or orbicular:—
        Spikelets 2·5-3 mm. long; lower lemma 5-nerved, often pitted ..... *P. scorbiculatum*
        Spikelets less than 3 mm. long; lower lemma 5-nerved but never pitted ..... *P. zollingeri*
      Spikelets elliptic-oblong, minutely pubescent on the upper glume; lower glume minute; mid-nerve of lower lemma prominent ..... *P. distichum*
    Spikelets ciliate:—
      Spikelets small, up to 2 mm. long:—
        Spikelets 1·4-1·5 mm. long..... *P. conjugatum*
        Spikelets about 2 mm. long ..... *P. ambiguum*
      Spikelets 2·2-3 mm. long, purple ..... *P. dilatatum*

1. **Paspalum compactum** *Roth.*, Nov. Pl. Sp. (1821) 36. F.B.I. VII, 12.

Uncommon; usually in stony places between about 2,000 and 3,000 feet (Thein Lwin 3313, Thandaung Road; Lace, Amherst).

2. **Paspalum longifolium** *Roxb.*, Hort. Beng. (1810) 7. P. scorbiculatum *Linn.* (in part). F.B.I. VII, 10.

Theindaw, Mergui District (Su Koe 7637 !) and Upper Chindwin (Lace 4209 !).

3. **Paspalum scorbiculatum** *Linn.* (sensu strictu), Mant. I (1767) 29. F.B.I. VII, 10.

Very common in open grasslands in the Shan hills between about 3,000 and 5,000 feet (Pwela, D'Souza 2368 !). Good fodder.

4. **Paspalum zollingeri** *Steud.*, Syn. Pl. Gram. 21. P. scorbiculatum *Linn.* (in part) F.B.I. VII, 11.

Fairly common in damp, evergreen forests (Pegu, Thein Lwin 3071 !).

5. **Paspalum distichum** *Linn.*, Syst. Nat. ed. 10, II (1759) 855. F.B.I. VII, 12.

Common in damp situations in Lower Burma. This grass has been cultivated on several military farms in Burma under the name of 'Kikuyu Grass' which it superficially resembles in habit. It appears to have been introduced from the North-west Frontier Province (India) under that name or else, after introduction, the true

Kikuyu grass was later ousted by the local *P. distichum*, the change passing unnoticed. At any rate in 1941 all crops of so-called Kikuyu grass proved to be only *P. distichum*. The latter makes a good fodder if given some attention and watered in the dry season. It is much hardier under Burma conditions than Kikuyu which has not thrived there even at high levels.

6. **Paspalum conjugatum** *Berg.*, Act. Helvet. VII (1772) 129, t. 8. F.B.I. VII, 11.

Victoria Point, Mergui District (Su Koe 11001 !) and the Andamans. Buffalo Grass; Sour Grass.

7. **Paspalum ambiguum** *DC.*, Fl. Franc. III, 16. F.B.I. VII, 17.

Not uncommon, generally amongst rocks on hill-sides above about 2,000 feet. (Maymyo road, mile 23, Rhind 2315 !.)

8. **Paspalum dilatatum** *Poir.*, Lamk. Encycl. V (1804) 35. F.B.I. VII, 17.

Maymyo (Maung Kan 17743 !).

Paspalum vaginatum *Sw.* occurs throughout the tropics as a coastal grass of saline mud and will probably be found on the Burma coasts.

14. PASPALIDIUM Stapf

Key to the species of *Paspalidium*.

Racemes shorter than the internodes ..... *P. flavidum*
Racemes longer than the internodes ..... *P. punctatum*

1. **Paspalidium flavidum** *A. Camus*, in Flor. Gen. Indo-Chine VII, 419. Panicum flavidum *Retz.* F.B.I. VII (1897) 28.

Very common everywhere in Burma up to about 5,000 feet. A good fodder. Burmese—*Sin-ngo-myet*.

2. **Paspalidium punctatum** *A. Camus*, in Flor. Gen. Indo-Chine VII, 419. Panicum punctatum *Burm.* F.B.I. VII (1897) 29.

Common in marsh lands in the plains. (Rhind 2092 !, Mandalay).

15. BRACHIARIA Griseb.

Key to the species of *Brachiaria*.

Culms slender; sheath-nodes glabrous or pubescent; spikelets generally loosely arranged or if crowded less than 2·5 mm. long:—
- Lower glume at least 2/3 the length of the spikelet ..... *B. paspaloides*.
- Lower glume up to 1/3 the length of the spikelet:—
  - Spikelets 1·8-2·5 mm. long; rhachis triquetrous:—
    - Panicle linear with erect racemes; rhachis pubescent ..... *B. eruciformis*.
    - Panicle lanceolate to oblong with spreading racemes; rhachis with scattered hairs:—
      - Spikelets solitary, 1·8-2·5 mm. long, often densely hairy as well as the rhachis and pedicels; upper lemma ovate-oblong ..... *B. villosa*.
      - Spikelets paired or upwards solitary, 1·25-1·8 mm. long, hairs on the spikelets longer than the spikelet; upper lemma obovate to elliptic ..... *B. reptans*.
  - Spikelets 2·5-4 mm. long; rhachis triquetrous or flattened:—
    - Spikelets turgid, broadly elliptic or broadly obovate-elliptic, apiculate ..... *B. ramosa*.
    - Spikelets not turgid:—
      - Spikelets ovate to lanceolate, paired in the lower part of the racemes; rhachis hairy ..... *B. setigera*.

Spikelets obovate to obovate-elliptic, acute or subacute, 2·5-3 mm. long; racemes 2-3, rarely 4; peduncle below the inflorescence hairy; leaves up to 16 cm. long ..... *B. distachya.*

1. **Brachiaria paspaloides** (*Presl.*) *C. E. Hubb.*, in Hook. Ic. Pl. IV, iii, sub tab. 3363 (1938). B. ambigua *A. Camus.* Panicum ambiguum *Trin.* F.B.I. VII (1897) 33.

Mergui (Griffith). Apparently scarce.

2. **Brachiaria eruciformis** *Griseb.*, in Ledeb. Fl. Ross. IV (1833) 469. B. isachne *Stapf*, in Fl. Trop. Afr. IX, 552. Panicum isachne *Roth.* F.B.I. VII (1897) 28.

Very common in the plains especially on dried-up ground such as paddy fields where it is sometimes the dominant weed.

Burmese—*Du-cho-myet*; *Kyauk-padaw.*

3. **Brachiaria villosa** *A. Camus*, in Flor. Gen. Indo-Chine VII, 433. Panicum villosum *Lamk.* F.B.I. VII (1897) 34.

Apparently scarce; Maymyo (Lace).

4. **Brachiaria reptans** (*Linn.*) *Gard. et Hubb.*, in Hook. Ic. Pl. IV, iii, sub tab. 3363 (1938). Urochloa reptans *Stapf*, in Fl. Trop. Afr. IX (1920) 601. Panicum prostratum *Lam.* F.B.I. VII (1897) 33.

Very common in the plains. An excellent and very nutritious fodder relished by cattle.

Burmese—*Be-sa.*

Two varieties are recorded from Burma; they are: (1) Var. rigida *Hk.f.* which corresponds in part with Wall. Cat. n. 8723; no precise locality is given. (2) Var. birmanica *Hk.f.* which is recorded as having been collected by Collett, again without precise locality. They do not appear to have been collected subsequently.

5. **Brachiaria ramosa** *Stapf*, in Fl. Trop. Afr. IX, 542. Panicum ramosum *Linn.* F.B.I. VII, 36.

Common in central Burma. A frequent weed of cultivated land.

Burmese—*Myet-pasit.*

6. **Brachiaria setigera** (*Retz.*) *C. E. Hubb.*, in Hook. Ic. Pl. IV, iii, sub tab. 3363 (1938). Urochloa setigera *Stapf* in Fl. Trop. Afr. IX, 598. Panicum setigerum *Retz.* F.B.I. VII, 36.

Fairly common in shady places (Rhind 2444 !, Kanbalu). Cattle and buffaloes readily eat it.

7. **Brachiaria distachya** *Stapf*, in Fl. Trop. Afr. IX, 565. Panicum distachyum *Linn.* F.B.I. VII, 37.

Common in wet places in the plains, chiefly Lower Burma. A good fodder; withstands inundation.

16. UROCHLOA Beauv.

1. **Urochloa panicoides** *Beauv.*, in Ess. Agrost. (1812) 52. Panicum javanicum of *Hook.f.* F.B.I. VII, 35, non *Poir.*

Sawyer 662 !, without precise locality.

17. OPLISMENUS P. Beauv.

Key to the species of *Oplismenus.*

Awns smooth, vicid, filiform ..... *O. compositus.*
Awns barbellate, capillary; long white hairs on the rhachis .. *O. burmannii.*

1. **Oplismenus compositus** *P. Beauv.*, in Ess. Agrost. (1812) 54. F.B.I. VII, 66.

A shade species, common in damp places. Readily eaten by cattle.
Burmese—*Myet-let-the.*

2. **Oplismenus burmannii** *P. Beauv., l.c.* F.B.I. *l.c.* 68.

Frequent in moist shady places in the plains. Eaten by cattle.

18. ERIOCHLOA H.B.K.

1. **Eriochloa procera** *C. E. Hubb*, in Kew Bull. 1930, 256. E. polystachya H.B.K. F.B.I. VII, 20.

A common wayside grass of central Burma. A good fodder.
Burmese—*Myet-kyein*; *Myet-dat-tha.*

19. AXONOPUS Beauv.

Key to the species of *Axonopus.*

Leaves broad, hairy; nodes very hairy; spikelets long, acute .. *A. compressus*
Leaves narrow, more or less glabrous; nodes scarcely hairy; spikelets obtuse ..... *A. affinis*

1. **Axonopus compressus** (*Sw.*) *Beauv.*, Ess. Agrost. (1812) 154.

The common lawn grass of Lower Burma; forms mats close-pressed to the ground. It stands grazing well. Known as Carpet Grass, Blanket Grass or Louisiana Grass.
Burmese—*Hgnet-daw-mi.*

2. **Axonopus affinis** *A. Chase*, Jour. Wash. Science XXVIII (1938) 4.

Less common than the above ; occurs in similar places.

20. SETARIA Beauv.

Key to the species of *Setaria.*

Leaf-blades folded fan-fashion between the primary nerves; inflorescence a loosely-spiculate panicle; spikelets solitary, each subtended by a single bristle ..... *S. palmifolia*
Leaf-blades flat when expanded; inflorescence a false spike or narrow panicle; spikelets usually clustered and subtended by more than one bristle:—
  Bristles retrorsely barbed ..... *S. verticillata*
  Bristles antrorsely barbed:—
    Upper glume as long as the upper lemma; the latter quite smooth; spikelets persistent; lower floret epaleate .. *S. italica*
    Upper glume shorter than the upper lemma; the latter rugose:—
      Inflorescence a narrow panicle, lobed, especially in the lower part, tapering upwards:—
        Annual; spikelets up to 2 mm. long..... *S. intermedia*
        Perennial; spikelets 2·5-3 mm. long..... *S. forbesiana*
      Inflorescence a cylindric false spike:—
        Spikelets 3 mm. long; upper lemma coarsely rugose, boat-shaped and slightly keeled upwards, broad and dorsally strongly curved on the back in profile ..... *S. lutescens*
        Spikelets up to 2·25 mm. long; upper lemma usually finely rugose, narrow and dorsally gently curved, not at all keeled ..... *S. pallide-fusca*

1. **Setaria palmifolia** *Stapf*, Jr. Linn. Soc. XLII (1914) 186. S. plicata (*Lam.*) *T. Cooke*. Panicum plicatum *Lam.* F.B.I. VII, 55.

Frequent in cool, shady places, ascending to about 4,000 feet.
Burmese—*Kaing-sat-ni*; *Sat-sha*.

2. **Setaria verticillata** *Beauv.*, Ess. Agrost. (1812) 51. F.B.I. VII, 80.

A shade grass, common round villages, particularly on rubbish heaps, in central Burma. Cattle eat it when young but not when it has flowered.
Burmese—*Naya-myet*.

3. **Setaria intermedia** *Roem. et Schult*, Syst. II (1817) 489. F.B.I. VII, 79.

A shade grass common around villages and in hedge-rows in central Burma. Often mistaken for *S. verticillata* which it closely resembles except for the attitude of the barbes on the bristles.

4. **Setaria forbesiana** *Hook. f.*, F.B.I. VII, 81.

Fairly frequent in central Burma.
Burmese—*Kat-si-hne*.

5. **Setaria lutescens** *Hubb.*, Rhodora XVIII (1916) 232. S. glauca *Beauv.* F.B.I. VII, 78. Panicum lutescens *Weig.*

One of the commonest grasses all over the plains and up to about 6,000 feet. Very variable in size and colour of the inflorescence. A good grazing grass.
Burmese—*Khwe-mi-apyu*; *Khwe-mi-ni*; *Khwe-mi-pok*; *Kyaung-mi*.

6. **Setaria pallide-fusca** *Stapf ex C. E. Hubbard*, Kew Bull. 1930, 259. S. glauca *Beauv.* in part. F.B.I. VII, 78.

Annual; *Culms* tufted, slender, usually geniculate at the base, up to 75 cm. high. *Leaf-blades* narrow, 5-30 cm. long, 2-6 mm. wide, glabrous except for a few long hairs near the base. *Spikelets* alike, awnless, each supported by about 8 persistent bristles, falling entire from their very short stalks, on the axis of a dense, cylindrical, golden-brown spike up to 7·5 cm. long by 6-13 mm. wide; bristles 6-13 mm. long; spikelets 2-2·5 mm. long, 2-flowered, upper floret alone perfect.
Fairly common in the northern wet zone but scarce elsewhere. (Pidaung Game Reserve, Myitkyina District, Maung Te 4 !.)

Setaria italica *Beauv.*, Italian Millet, is sometimes cultivated for food, particularly in the driest parts of central Burma round Mt. Popa. It is an important food crop in parts of the Chin Hills.
Burmese—*Sat*.
Setaria viridis *Beauv.*, which occurs in the hills of Assam and in China, may be found in Burma also.

21. PSEUDORAPHIS Griffith

Key to the species of *Pseudoraphis*.

Spikelets 8-10 mm. long ..... *P. brunoniana*
Spikelets 3·5-4 mm. long ..... *P. minuta*

1. **Pseudoraphis brunoniana** *Griff.*, Notul. ad Pl. Asiat. III (1851) 29. Chamaeraphis spinescens *Poir.* var. brunoniana *Griff.* F.B.I. VII, 62.

Near Pinlonchoung, Salu Forest Reserve, Pegu District. (Thein Lwin 3074 !.) Aquatic.

2. **Pseudoraphis minuta** (*Mez*) *Pilger*, Notizbl. Bot. Gart. Berlin X (1928) 210. Chamaeraphis minuta *Mez*; C. gracilis *Hack.* F.B.I. VII, 62.

Bonatgyi Lake, Salu Forest Reserve, Pegu District. (Thein Lwin 3302 !.) Aquatic.

22. PENNISETUM Rich

1. **Pennisetum hordeiforme** *Spreng.*, Syst. I, 302. P. compressum *R.Br.* F.B.I. VII, 85.

Very common in swamps in the hills between about 3,000 and 5,000 feet.

P. typhoides *Stapf et Hubb.* (P. typhoideum *Rich*), Pearl or Bulrush Millet, *Bajra*, is occasionally cultivated in central Burma in dry places around Mt. Popa. Burmese—*Kala-sat.*

P. purpureum *Roem. et Schult*, Napier or Merker Grass, is sometimes grown as a fodder.

P. villosum *R.Br.* (P. clandestinum *Hochst. ex Chiov.*), Kikuyu Grass, has been introduced as a fodder but without success. See note under *Paspalum distichum.*

23. STENOTAPHRUM Trin.

1. **Stenotaphrum helferi** *Munro*, Cat. Pl. Griff. Falc. etc. 1865. F.B.I. VII, 91.

Tenasserim (Helfer), extending into Malaya and Cochin-China. It seems to be rare, with no collection since Helfer's.

24. SPINIFEX Linn.

1. **Spinifex littoreus** (*Burm.*) *Merr.*, Fl. of Manilla (1912) 97. S. squarrosus *Linn.*, Mant. 300. F.B.I. VII, 68.

Sea-coasts of Arakan. (Parkinson 8810 !, Sandoway.) Useless as a fodder but has some value as a sand-binder.

XIX. ANDROPOGONEÆ.

Key to the genera of the *Andropogoneae.*

Joints and pedicels slender, filiform, linear, sub-cuneate or sub-clavate, very rarely inflated; fertile spikelet usually 1-flowered, awned:—
- Spikelets all alike, or if different in sex then the female pedicelled:—
  - Axis of racemes continuous or tardily disarticulating; all spikelets pedicelled:—
    - Spikelets solitary:—
      - Spikelets laterally compressed on very short pedicels disposed in one to several slender unilateral racemes ..... **Dimeria.**
    - Spikelets not solitary:—
      - Racemes in compact or spike-like solitary panicles:—
        - Spikelets muticous ..... **Imperata.**
        - Spikelets in pairs at each joint; stamens 2 ..... **Pogonatherum.**
      - Racemes not solitary:—
        - Racemes digitate:—
          - Spikelets 1-flowered ..... **Pseudopogonatherum**
          - Spikelets 2-flowered ..... **Eulaliopsis.**
        - Racemes (usually short) in branched panicles with an elongated main axis, the lateral racemes stalked ..... **Spodiopogon.**
        - Racemes in a much-branched panicle, the lateral racemes sessile:—
          - Spikelets paired, one sessile the other pedicelled or if both pedicelled, the glumes coriaceous:—
            - Spikelets all pedicelled; rhachis of racemes tough; spikelets awned ..... **Sclerostachya.**
            - Spikelets with one sessile and the other pedicelled; rhachis of racemes fragile:—
              - Spikelets awned; glumes coriaceous ..... **Erianthus.**

Spikelets awnless:—
Glumes membranous to sub-coriaceous at the base ..... **Saccharum.**
Glumes coriaceous ..... **Narenga.**
Racemes digitate (rarely solitary) or approximate on a shortened main axis:—
Spikelets clothed with silky hairs; leaves narrow, linear ..... **Eulalia.**
Spikelets slightly hairy, usually only on the callus, rarely on the keel; leaves lanceolate **Microstegium.**
Spikelets of each pair different in sex and often in form or, if alike, then both male or neuter:—
Racemes in more or less compound espatheate panicles; pedicels without a translucent line down the middle; pedicelled spikelets male, neuter or suppressed; lemma 2-fid, awned from the sinus:—
Spikelets dorsally compressed, at least when in flower:—
Pedicelled spikelets developed; primary branches of the panicle whorled, at least in the lower nodes:—
Few-noded ..... **Sorghum.**
Many-noded ..... **Pseudosorghum.**
Spikelets more or less laterally compressed:—
Racemes of many pairs of spikelets; primary branches of panicles in whorls of 6-29 ..... **Vetiveria.**
Racemes usually reduced to 1 sessile perfect and 2 pedicelled male or barren spikelets, rarely 2 or more but always few pairs ..... **Chrysopogon.**
Racemes not in compound espatheate panicles or, if so, then pedicels with a translucent median line:—
Lemma awned from the back; leaves cordate from the base..... **Arthraxon.**
Lemma awned from the sinus or tip, rarely awnless:—
Margins of the lower glume of the fertile spikelet inflexed and the glume sharply 2-keeled; callus short, obtuse; the back of the glume sometimes deeply sunk between the keels; awn glabrous or scabrid, rarely hairy:—
Lemma awned from the tip:—
Racemes in compound espatheate panicles .. **Capillipedium.**
Racemes not in compound espatheate panicles:—
Racemes solitary at the ends of the culms or branches, sometimes in scanty false panicles ..... **Eremopogon.**
Racemes digitate or arranged on a short common axis:—
Sessile spikelets of all pairs perfect, awned .. **Bothriochloa.**
Sessile spikelets of the lower 1-3 pairs male or neuter, awnless..... **Dichanthium.**
Lemma awned from a sinus:—
Racemes solitary, terminal on the culms and branches:—
Pedicelled spikelets small or at least not much longer than the sessile; upper glume awnless ..... **Schizachyrium.**
Pedicelled spikelets very much longer than the sessile, almost concealing them; upper glume awned ..... **Diectomis.**
Racemes binate or digitate:—
Racemes binate or sometimes digitate at the ends of simple or almost simple culms, rarely in a spatheate false panicle; usually all pairs of spikelets heterogamous and all sessile; spikelets bisexual and alike or

sometimes the lowest barren but still resembling the upper fertile spikelets ..... **Andropogon.**

Racemes always 2-nate with a spathe supporting each pair, gathered into often much decompound spatheate panicles, the lowest pair of one of the racemes homogamous, male or neuter, all pairs of the other heterogamous; (all oil-bearing grasses in Burma) ..... **Cymbopogon.**

Margins of the lower glume of the fertile spikelet not involute, inflexed or 2-keeled or, if so, only close to the tips; spikelets with rounded sides or quite terete; callus elongate, acute or pungent; rarely the lower glume inflexed and 2-keeled from the middle point upwards and the callus short and obtuse (*Hyparrhenia*); awn more or less hirsute; fertile lemma 2-fid, awned from the sinus:—

Racemes paired; awns hirsute:—

Lower glume without an herbaceous beak; pairs of racemes usually in a very distinctly compound spatheate panicle ..... **Hyparrhenia.**

Racemes not paired:—

Racemes terminating the culms and their upper branches; pedicelled spikelets male or neuter **Heteropogon.**

Racemes few-noded, much contracted, the lowest pair or pairs of spikelets forming an involucre at the base of each:—

Involucre suppressed (habit of *Themeda*) .... **Pseudanthistiria.**

Involucre present:—

Involucre composed of 6-9 male 2-flowered spikelets ..... **Germainia.**

Involucre composed of 4 male 1-flowered or empty spikelets:—

Perfect spikelets with a pointed callus, readily separating from the involucre..... **Themeda.**

Perfect spikelets without a callus, falling with the involucre..... **Isellema.**

Joints and pedicels more or less stout, triquetrous or rounded, thickened upwards or widened and flattened, posticously approximate or contiguous or partly or wholly fused, forming a receptacle for the sessile spikelets, rarely gaping and then the spikelets typically awnless; fertile spikelets 1-2-flowered, awned or not:—

Fertile spikelets 2-flowered; fertile floret awned from the sinus of the 2-fid or 2-dentate lemma, very rarely awnless (in *Apluda*):—

Racemes reduced to the terminal joint, with 3 heteromorphous spikelets (1 perfect, 1 male and 1 rudimentary) enclosed in the boat-shaped spathe ..... **Apluda.**

Racemes several to many-noded:—

Pedicelled spikelets developed:—

Racemes in pairs or digitate ..... **Ischaemum.**

Racemes solitary on the culms and branches:—

Glumes not winged; upper glume of sessile spikelet awned..... **Sehima.**

Pedicelled spikelets rudimentary or reduced to the pedicel:—

Racemes solitary; spikelets awnless ..... **Eremochloa.**

Racemes in pairs; spikelets usually awned ..... **Apocopis.**

Racemes digitate; spikelets awned; lower glume with transverse ridges often broken up into teeth or warts ..... **Thelepogon.**

Fertile spikelets 1-2-flowered; fertile floret awnless:—
Racemes in espatheate solitary inflorescences; lower glume of both spikelets muticous; spikelets 1-flowered; tall grasses ..... **Thrysia.**
Racemes solitary at the ends of the culms:—
Joints of the rhachis and pedicel complanate, not pressing against each other but opposite; lower glume reticulately ribbed ..... **Ratzeburgia.**
Joints of the rhachis not as above:—
Spikelets solitary, sessile, the pedicelled suppressed; pedicels fused with the internodes of the rhachis **Ophiuros.**
Spikelets not solitary:—
Spikelets all alike; racemes much compressed, tough ..... **Hemarthria.**
Spikelets of each pair unlike, the pedicelled male, neuter or 0:—
Sessile spikelets small, globose, pitted..... **Hackelochloa.**
Sessile spikelets not globose:—
Racemes cylindrical, glabrous:—
Pedicels and joints fused:—
Spikelets 2-nate..... **Rottboellia**
Spikelets 3-nate..... **Mnesithea.**
Pedicels and joints free ..... **Coelorhachis.**

1. IMPERATA Cyrill

Key to the species of *Imperata.*

Panicle very narrow, spiciform; stamens 2:—
Nodes glabrous..... *I. cylindrica*
Nodes villous..... *I. cylindrica* var. *koenigii*
Panicle thrysiform; stamen 1..... *I. exaltata*

1. **Imperata cylindrica** (*Linn.*) *Beauv.*, Ess. Agrost. (1812) 165. I. arundinacea *Cyr.* F.B.I. VII, 106.

Very common up to about 6,000 feet. A variable grass according to the habitat. On open grazed areas, lawns, etc., it is small and depauperate; the savannah form is often 3-4 feet high while in swamps it may be almost double this height. It is not usually eaten by cattle except in the very young stages. Much used for thatch. An extremely troublesome weed in plantations. The *Lalang* of Malaya.

Burmese—*Thekke.*

2. **Imperata cylindrica** (*Linn.*) *Beauv.* var. **koenigii** *Durand et Schinz.* F.B.I. VII, 106.

Similar to the last but generally larger. Usually found in high rainfall areas or near permanent swamps. (Thein Lwin 2918! from near the Indawgyi Lake). Used for thatch.

Burmese—*Thekke.*

3. **Imperata exaltata** *Brongn.*, Voy. Coq. Bot. 101. F.B.I. II, 107. I. contracta *Hitchc.*

Mergui (Griffith) and Sawyer without precise locality.

Burmese—*Thekke*; *Thekke-gyi.*

Miscanthus nepalensis *Hack.*, which is common in the Khasi and Naga Hills of Assam, M. nudipes *Hack.*, which is known from the Mishmi country, and M. sinensis *Anderss.*, which occurs in Yunnan, are likely to be found within the northern or north-western borders of Burma.

2. SCLEROSTACHYA Anders.

1. **Sclerostachya fusca** *A. Camus*, Flor. Gen. Indo-Chine VII (1922) 243. Saccharum fuscum *Roxb.* F.B.I. VII, 120.

Frequent in swampy areas where the rainfall is high.

Burmese—*Yin*; *Thingyan-kaing.*

3. NARENGA Bor

Spikelets all alike, 2-nate, one sessile the other pedicelled on the articulated fragile rhachis of panicled racemes, the pedicelled falling from their pedicels, the sessile falling together with the continuous joint of the rhachis and pedicel. *Florets* 2; the lower reduced to an empty glume; the upper hermaphrodite. *Glumes* equal in length, coriaceous, brown, shining; lower flat on the back, margins laxly inflexed, short-haired on the margins; upper keeled, membranous at the top. *Lemmas* hyaline; upper truncate, awnless, paleate. *Lodicules* 2. *Stamens* 3. *Stigma* laterally exserted.

Tall, perennial grasses with long, flat, scabrid leaves. *Culms* densely bearded at the nodes. *Panicle* narrow, dense; hairs shorter than the spikelets.

1. **Narenga porphyrocoma** (*Hance*) *Bor*, Ind. Forester LXVI (1940) 267. Saccharum porphyrocomum (*Hance*) *Hack.* in DC. Monog. Androp. VI (1889) 120. S. narenga Wall. Cat. n. 8856. F.B.I. VII, 120.

An occasional grass of wet forests between about 2,000 and 4,000 feet. (Maung Kan 18183 !, Maymyo.)

4. SACCHARUM Linn.

Key to the species of *Saccharum* (after Bor).

Stems silky below the panicle	*S. spontaneum*
Stems glabrous below the panicle:—	
Lower glume dorsally villous:—	
Joints 3·5-4 mm. long; pedicels 2-2·5 mm. long; sessile spikelets 2·5-2·7 mm. long	*S. arundinaceum*
Joints 6-7 mm. long; pedicels 2·5-3·5 mm. long; sessile spikelets 3-4 mm. long	*S. procerum*
Lower glume glabrous	*S. officinarum*

1. **Saccharum spontaneum** *Linn.*, Mant. II (1771) 183. F.B.I. VII, 118 cum omnium varietat.

A very common and very variable grass. There are xerophytic forms occurring where they are subject to periodic droughts and hygrophyllous forms near permanent water. Forms with thick, erect culms and others with almost scandent culms occur. Buffaloes and elephants eat it but not cattle. It has considerable soil-binding properties. Sometimes used for thatch.

Burmese—*Kaing*; *Sit-kaing*.
Shan—*Hka-long*.

2. **Saccharum arundinaceum** *Retz.*, Obs. IV (1786) 14.

Occasional in swampy places in Lower Burma. Apparently wild.
Burmese—*Kaing*; *Pyaung-kaing*; *Pyaung-ga*.

3. **Saccharum procerum** *Roxb.*, Fl. Ind. I (1832) 243. F.B.I. VII, 119 in part.

Fairly frequent in swampy places where the rainfall is moderately high. (Thet Su 2749 !, Pyinmana.) Eaten by elephants and sometimes by buffaloes.
Burmese—*Paung-kaing*.

Saccharum officinarum *Linn.*, sugarcane, (Sp. Pl. (1753) 54.), is cultivated nearly all over Burma but mainly in the Pyinmana and Mogaung areas.
Burmese—*Kyan*.

5. SPODIOPOGON Trin.

1. **Spodiopogon lacei** *Hole*, Ind. For. Rec. V (1915) 185.

Perennial; loosely tufted. *Culms* erect, slender, up to 3 m. high and 4 mm. thick, sometimes with weak axillary shoots which may bear depauperate panicles, more or less sulcate, glabrous, shining, solid. Leaf-sheath of lower leaves usually longer than the internodes, of the upper leaves usually shorter, sulcate, glabrous or hirtellous towards the apex; lamina linear, acute, narrowed to the base, lower leaves 38 cm. long, 2·25 cm. wide, strongly sagittate at the base with 2 linear-deltoid lobes up to 3·25 cm. long, petiolate, petiole up to 19 cm. long, flat or channelled above and villous at the junction with the sheath, dorsally convex, sulcate, glabrous or hirsute

with bulbous-based hairs, lamina with scattered bulbous-based hairs on both upper and lower surfaces; margins scabrid; upper leaves 17·5 cm. long, 1·5 cm. wide, subsessile, not as a rule sagittate, lamina decurrent and crisped along the short petiole; ligule membranous, 2·5 mm. long, denticulate, white-hairy. *Inflorescence* of terminal panicles of long capillary racemes bearing 3-9 spikelets each; panicle 17·5-27·5 cm. long, ovate to lanceolate, rhachis glabrous or scabrid, branches verticillate, rhachis of racemes fragile, sessile spikelets falling with the joint and the pedicelled spikelets disarticulating from their pedicels; pedicels 2·5-3·5 mm. long, strongly compressed, spathulate, translucent above, 1-nerved, ciliate on the margins with brown or pale purple hairs. *Spikelets* paired, one sessile and the other pedicelled, both similar and awned, 4-5·5 mm. long, 2-flowered, rarely 1-flowered, awn 10-15 mm. long; callus short, obtuse, bearded; sessile spikelet with the lower glumes lanceolate, membranous, 3-9-nerved, dorsally hirsute, apex obtuse or emarginate; lemma thin-chartaceous, 3-nerved, apex produced into 2 subulate-lanceolate segments 1·5-2·5 mm. long, awned from the sinus; awn geniculate, basal column yellowish-brown. *Palea* ovate-lanceolate, 3-3·75 mm. long, hyaline, 0-2-nerved, minutely pubescent dorsally above, apex acute, obtuse or emarginate. *Lodicules* 2, cuneate, glabrous. *Anthers* 3. *Styles* 2; stigmas 2. *Pedicelled spikelets* with lower glume 6-10-nerved, membranous, dorsally hirsute, margin hyaline, broad, apex usually mucronate; otherwise like the sessile spikelets.

A forest grass, apparently rather uncommon, occurring in open spaces and amongst bushes. (Lace, Maymyo, 3,500 feet; Ba Pe 12979 !, Thaungyin.)

6. ERIANTHUS Michx.

Key to the species of *Erianthus.*

Upper lemma entire, narrowed into the awn ..... *E. ravennae*
Upper lemma 2-toothed or 2-lobed:—
  Lower glume dorsally glabrous ..... *E. longisetosus*
  Lower glume dorsally villous:—
    Spikelets 4-5 mm. long; lower glume dorsally villous all over ..... *E. chrysothrix*
    Spikelets 5-6 mm. long; lower glume villous below the middle ..... *E. hookeri*

1. **Erianthus ravennae** *Beauv.*, Agrost. 14. F.B.I. VII, 121. Saccharum ravennae (*Linn.*) *Murr.*

Indaung Forest Reserve, Katha District. In dense masses in *In* forest. Burmese—*Thekke.*

2. **Erianthus longisetosus** *Anders.*, Ofvers. Vet. Akad. Stockh. (1855) 163. F.B.I. VII, 124.

Recorded by Gage from the Arakan Yomas (Rec. Bot. Surv. Ind. III, 1).

3. **Erianthus chrysothrix** *Hack.*, Oestr. Bot. Zeit. XLI (L891) 6. F.B.I. VII, 125. Saccharum longifolium *Munro ex Benth.*

Frequent in the hills above about 2,500 feet.

4. **Erianthus hookeri** *Hack.*, Mon. Androp. (1889) 142. F.B.I. VII, 125.

Frequent in the hills between about 3,000 and 4,500 feet. (Maung Kan 18320 !, Maymyo.)

7. MICROSTEGIUM Nees

Key to the species of *Microstegium.*

Stems decumbent below; leaves contracted or petioled on the sheath; basal sheaths naked:—
  Upper lemma very small, shortly 2-lobed:—
    Anthers 3:—
      Anthers long, up to 1·5-3 mm. long:—
        Lower floret absent:—
          Spikes pale:—
            Lower glume dorsally channelled:—
              Spikes 4-6 cm. long; upper glume truncate; awn 5-6 mm. long ..... *M. monanthum*

Spikes 2·4–4 cm. long; upper glume shortly notched; awn up to 2 cm. long	*M. brandisii*
Lower glume dorsally convex.....	*M. delicatulum*
Spikes purple- or brown-hairy:—	
Spikes villous with purple hairs; lower glume truncate	*M. eucnemis*
Spikes fulvous-brown hairy; stem prostrate and ascending; lower glume shortly 2-toothed" ..	*M. stapfii*
Lower floret present, male or neuter:—	
Hairs on the angle of the rhachis joints a little shorter than the joints; callus with dense hairs about half the length of the spikelet; spikelets 3·5-4 mm. long; nodes pubescent	*M. gratum*
Hairs on the angles of the rhachis $\frac{1}{8}$ to $\frac{1}{3}$ the length of the joint, sometimes absent at the top; callus hairs short and sparse; spikelets 2·5-3·5 mm. long	*M. ciliatum*
Anthers 2; spikelets 3-4 mm. long; awn up to 1·5 cm. long; weak, slender annuals	*M. nudum*

1. **Microstegium monanthum** *A. Camus*, Flor. Gen. Indo-Chine VII (1922) 257. Pollinia monantha *Nees*. F.B.I. VII, 116.

Frequent in Lower Burma and on the islands off the coast.
Burmese—*Pyaung-sa*.

2. **Microstegium brandisii** (*Hook.f.*) comb. nov. Pollinia brandisii *Stapf*. Coelarthron brandisii *Hook.f.* Ic. Pl. t. 3262. F.B.I. VII, 164.

Without precise locality: 'on high ground, generally with teak' (Brandis).
Stapf reduced Hooker's species to *Pollinia* which can no longer stand. The plant has distinct affinities with *Microstegium* particularly the leaves and the deeply-channelled lower glume.

3. **Microstegium delicatulum** (*Hook.f.*) *Henrard*, Blumea III (1940) 455. Pollinia delicatula *Hook.f.* F.B.I. VII, 117.

Pegu (Kurz; M'Clelland).

4. **Microstegium eucnemis** (*Nees*) *Henrard*, Blumea III (1940) 455. Pollinia eucnemis *Nees ex Steud.* F.B.I. VII, 114.

Frequent in Lower Burma.

5. **Microstegium stapfii** (*Hook.f.*) *Henrard*, Blumea III (1940) 455. Pollinia stapfii *Hook.f.* F.B.I. VII, 115.

Akyab, on low sandstone hills (Kurz) and Katha (Haines 2501 !).

6. **Microstegium gratum** *A. Camus*, Flor Gen. Indo-Chine VII, (1922) 258. Pollinia grata *Hack.* F.B.I. VII, 115.

Very common in damp, shady places, particularly on banks; ascending to about 5,000 feet. Hooker makes a variety, *hirsuta*, for a specimen collected by Kurz from Pegu.
Burmese—*Pyaung-sa-gyi*; *Pyaung-sa-gale*.

7. **Microstegium ciliatum** *A. Camus*, Flor Gen. Indo-Chine VII (1922) 259. Pollinia ciliata *Trin.* F.B.I. VII, 116.

Common in damp, shady places in the hills up to about 5,000 feet.
Burmese—*Pyaung-sa*.

8. **Microstegium nudum** *A. Camus*, Flor Gen. Indo-Chine VII, (1922) 261. Pollinia nuda *Trin.* F.B.I. VII, 117.

Frequent in open grasslands and amongst bracken in the hills between about 3,000 and 7,000 feet. (Rhind 3717 !, near Mogok.)

M. vimineum *A. Camus* (Pollinia imberbis *Nees*) occurs in the Naga Hills of Assam and is likely to be found in Burma.

8. EULALIA Kunth

Key to the species of *Eulalia*.

Joints of the rhachis and spikelets with whitish, greyish or mauve hairs; basal sheaths of the stem naked:—
- Upper glume awnless:—
  - Lower glume 4-nerved, at least in the pedicelled spikelets (2 marginal and 2 intramarginal); spikelets 3-6 mm. long:—
    - Spikes and pedicels with silvery hairs ..... *E. quadrinervis*
    - Spikes and pedicels with mauve hairs ..... *E. hirtifolia*
  - Lower glume nerveless or sometimes with carinal nerves only; spikelets 2·5-3 mm. long:—
    - Spikes 2-4, white-hairy ..... *E. fimbriata*
    - Spikes many, silvery-hairy ..... *E. trispicata*
- Upper glume awned ..... *E. pallens*

Joints of the rhachis and spikelets golden, yellow or fulvous hairy:—
- Basal sheaths of the stem rusty-tormentose:—
  - Spikes 7·5-15 cm. long, closely appressed to the rhachis; stem 120-150 cm., stout ..... *E. burmanica*
  - Spikes 2·5-7·5 cm. long, rather distant; stem 45-60 cm., slender ..... *E. phaeothrix*
- Basal sheaths clothed with pale yellow-brown wool; spikelets with parti-coloured hairs ..... *E. speciosa*

1. **Eulalia quadrinervis** (*Hack.*) *O. Ktze.*, Rev. Gen. Pl. (1891) 775. Pollinia quadrinervis *Hack.* F.B.I. VII, 110.

Hills of Lower Burma, 4,000 to 6,000 feet, and in poor *indaing* forest.

2. **Eulalia hirtifolia** (*Hack.*) *O. Ktze., l.c.* Pollinia hirtifolia *Hack.* F.B.I. VII, 111.

Maymyo plateau, 3,500 feet (Lace M7 !).

3. **Eulalia fimbriata** *O. Ktze., l.c.* Pollinia fimbriata *Hack.* F.B.I. VII, 112.

Fairly frequent in open places, paddy field bunds, etc., in Lower Burma.

4. **Eulalia trispicata** (*Schultes*) *Henrard*, Blumea III (1940) 453. E. tristachya *O. Ktze.* Pollinia argentea *Trin.* F.B.I. VII, 111. Andropogon trispicata *Schultes* in Mant. II (1824) 452.

Common in Lower Burma, ascending to about 3,000 feet.

5. **Eulalia pallens** (*Hack.*) *O. Ktze.* l.c. Pollinia pallens *Hack.*

Myitkyina District (Lace 6051 !).

6. **Eulalia burmanica** (*Hook.f.*) comb. nov. Pollinia burmanica *Hook.f.* F.B.I. VII, 113.

Wallich gives the locality as the 'Yomahs'; he probably meant the Pegu Yomas. I have seen no specimen of this grass.

7. **Eulalia phaeothrix** (*Hack.*) *O. Ktze.*, Rev. Gen. Pl. (1891) 775. Pollinia phaeothrix *Hack.* F.B.I. VII, 112.

Fairly common in *indaing* jungle and ascending to about 3,500 feet.

8. **Eulalia speciosa** (*Hack.*) *Ktze.*, Rev. Gen. Pl. (1891) 776. Pollinia speciosa *Hack.* F.B.I. VII, 113.

Fairly frequent in the hills in open scrub jungle.

Eulalia cumingii *A. Camus* (Pollinia cumingii *Nees*, F.B.I. VII, 114) has been reported from Indo-China, Siam (Cheingmai) and the hills of Assam and is therefore likely to be found in Burma. Similarly Eulalia velutina (*Hack.*) *O. Ktze.*, which occurs in Assam near the Burma border, is to be expected in Burma.

9. EULALIOPSIS Honda

1. **Eulaliopsis binata** (*Retz.*) *Hubbard*, Hook. Ic. Pl. sub tab. 3262 (1935). Pollinidium binatum *C. E. Hubbard*; P. angustifolium *Haines*; Ischaemum angustifolium *Hack.* F.B.I. VII, 129.

Common on hill-sides between about 2,000 and 4,000 feet, often amongst rocks. Burmese—*Thaman-myet.*

10. PSEUDOPOGONATHERUM A. Camus

1. **Pseudopogonatherum contortum** *A. Camus*, Flor, Gen. Indo-Chine VII (1922) 255. Pollinia articulata *Trin.* F.B.I. VII, 109.

Common in the dry forests in central Burma, ascending to about 3,000 feet.

11. POGONATHERUM Hack.

Key to the species of *Pogonatherum.*

Lower floret present; sessile spikelets 2·5-3 mm. long; callus hairs 1-1·5 mm. long; glumes sub-equal; awn 15-18 mm. long; hermaphrodite flowers with 2 stamens, rarely 1 .... *P. paniceum*

Lower floret absent; sessile spikelets 2 mm. long; callus hairs 2 mm. long; upper glume longer than the lower; awn 18-22 mm. long; hermaphrodite flowers with 1 stamen, rarely 2.. *P. crinitum*

1. **Pogonatherum paniceum** (*Lam.*) *Hack.*, All. Bot. Zeit. XII (1906) 178. P. saccharoideum *P. Beauv.* F.B.I. VII, 141.

Common in the hills, often on banks along roads. Frequently grown as a pot plant, the so-called 'Bamboo Grass'. Not eaten by cattle.
Burmese—*Kyauk-wa.*

2. **Pogonatherum crinitum** *Kunth*, Enum. I (1833) 478. F.B.I. VII, 141.

Recorded by Gage from the Nwamadaung hills, Minbu District, and by Lace from Anisakan (2,700 ft., Mandalay Dist.) and Prome. Probably often mistaken for *P. paniceum.*

12. APOCOPIS Nees

Key to the species of *Apocopis.*

Awn not twice the length of the spikelet ..... *A. paleacea*

Awn 2-6 times the length of the spikelet:—
Spikes exserted from the spathiform upper leaf-sheaths..... *A. wightii*
Spikes more or less included in the spathiform upper leaf-sheaths ..... *A. vaginatus*

1. **Apocopis paleacea** (*Trin.*) *Hochr.*, Bull. N.Y. Bot. Gard. 6, (1910) 262. A. royleana *Nees.* F.B.I. VII, 142.

Fairly common in central and Upper Burma but sporadic; when found there is generally a lot in the vicinity.

2. **Apocopis wightii** *Nees ex Steud.*, Syn. Gram. 377. F.B.I. VII, 142.

Fairly common in forest clearings and in open ground.

3. **Apocopis vaginatus** *Hack.*, Oestr. Bot. Zeit. XLI (1891) 8. A. wightii *Nees* var. vaginatus *Hook.f.* in F.B.I. VII, 143.

In open grasslands and forest clearings; not very common.

13. SORGHUM Moench.

Key to the species of *Sorghum.*

Primary branches of the panicle undivided, up to 10 cm. long.. *S. nitidum*

Primary branches of the panicle branched:—
Panicle 15-30 cm. long; lemma of upper floret not exceeding 3 mm. long ..... *S. halepense*

Panicle 40-50 cm. long and very lax; lemma of upper floret 3·5-4 mm. long ..... *S. mekongense*
(Cultivated species not in the key.)

1. **Sorghum nitidum** *Pers.*, Syn. Pl. I (1805) 101. Andropogon serratus *Thunb.* F.B.I. VII, 185.

A common grass all over the plains. A good fodder up to the time of flowering.
Burmese—*Naya-myet*; *Naya-nge*; *Kadaw-myet*.

2. **Sorghum halepense** (*Linn.*) *Pers.*, Syn. Pl. I (1805) 101. Andropogon halepense *Brot.* F.B.I. VII, 182.

Common in Lower Burma and in the northern wet zone. A good fodder.
Burmese—*Pyaung*.

3. **Sorghum mekongense** *A. Camus*, Flor. Gen. Indo-Chine VII (1922) 323.

Robust, erect. *Leaves* 30-40×3-4 cm., tip acuminate, base slightly rounded, glabrous, edges scabrid, mid-rib prominent; leaf-sheaths glabrous; ligule short, membranous. *Inflorescence* a large, lax panicle, pendulous, branches 40-50 cm. long, covered with spikelets often to the base; rhachis angular, scabrid-ciliate, joints equal to or exceeding the sessile spikelets; spikelets disarticulating tardily. *Sessile spikelets* 5 mm. long, narrow-lanceolate, muticous; callus glabrous; lower glume 5 mm. long, lanceolate, 7-nerved, nerves obscure below the tip, shortly appressed-pubescent on the back at first, becoming glabrous, keel ciliate-scabrid; upper glume 5 mm. long, lanceolate-acuminate, hairy to the base, keel scabrid to the tip. *Lower floret* barren; lemma 3-5 mm. long, hyaline, lanceolate, acuminate. *Upper floret*: lemma 3·5-4 mm. long, hyaline, lanceolate-acuminate, ciliate. *Pedicelled spikelets* neuter, muticous, much reduced, linear, very narrow, 1·5-2 mm. long, edges of glumes scaberulous; pedicel 4 mm. long, ciliate-scabrid.
Mergui (Su Koe 17674 !).

The Cultivated Sorghums.

Several species of Sorghum are cultivated, some for fodder and some for grain. The following list of cultivated species is based on Snowden's 'The Cultivated Races of Sorghum' but it is certain that it is not exhaustive.

(*a*) Sorghum roxburghii *Stapf* var. parvum *Snowden*.

Monywa and Mahlaing.
Burmese—*Way-thali*.

(*b*) Sorghum roxburghii *Stapf* var. fulvum (*Hack.*) *Snowden*.

Rangoon and Mawhan (Katha District).

(*c*) Sorghum roxburghii *Stapf* var. hians *Stapf*.

Lower Chindwin.
Burmese—*Way-thali*; *Thigye*; *Kala-lettok*; *Thidok*; *Letsok*.

S. roxburghii with its varieties and forms is the principal grain sorghum of Burma and is distinguished by the generic Burmese name of *San-pyaung*. The Burmese names given under the varieties are varietal. The most important types belong to the variety *hians*.

(*d*) Sorghum nervosum *Bees. ex Schult.*

Some types from the Kachin Hills belong to this species.

(*e*) Sorghum splendidum (*Hack.*) *Snowden* var. splendidum (*Hack.*) *Snowden*.

Sagaing. Grain said to be glutinous.
Burmese—*Pyaung-kaukhnyin*; *Pyaung-si*.

(*f*) Sorghum dochna (*Forsk.*) var. pulchrum (*Burkill*) *Snowden*.

Lower Chindwin, Sagaing, Myingyan and Mandalay Districts.
Burmese—*Kun-pyaung* (generic).

(*g*) Sorghum dochna (*Forsk.*) var. atrum *Snowden.*

Lower Chindwin, Sagaing and Myingyan Districts.
Burmese—*Kun-pyaung-net.*

(*h*) Sorghum dochna (*Forsk.*) var. burmanicum (*Burkill*) *Snowden.*

Sagaing and Lower Chindwin Districts.
Burmese—*Kun-pyaung-pyu.*

(*i*) Sorghum dochna (*Forsk.*) var. wightii (*Hack.*) *Snowden.*

Lower Chindwin.
Burmese—*Pyaung-wa*; *Gokto.*

(*j*) Sorghum dochna (*Forsk.*) var. melliferum *Snowden.*

Lower Chindwin.
Burmese—*Pyaung-net.*

S. dochna with its varieties and forms embraces the bulk of the fodder sorghums of Burma, generically called *Kun-pyaung* in Burmese. The variety *pulchrum* is the most abundant.

(*k*) Sorghum bicolor (*Linn.*) *Moench.* var. picigutta *Snowden.*

Rangoon and Minbu District.

(*l*) Sorghum bicolor (*Linn.*) *Moench.* var. subglobosa (*Hack.*) *Snowden.*

Katha and Minbu Districts.
Burmese—*San-pyaung.*

(*m*) Sorghum cernuum *Host.* var. yemense (*Koern.*) *Snowden.*

Minbu District.

(*n*) Sorghum cernuum *Host.* var. cernuum (*Koern.*) *Snowden.*

Rangoon.
Burmese—*San-pyaung.*

(*o*) Sorghum nigricans (*Ruiz et Pavon*) *Snowden.*

A variety of this species, probably var. *angolense*, (Rendle) Snowden, was introduced by the Agricultural Department about 1920 and is now widely grown as a fodder under the name of 'Saccoline-pyaung'.

(*p*) Sorghum subglabrescens *Schweinf. et Aschers.*

This species occurs in parts of the Dry Zone, particularly Myingyan District, where it is distinguished by the generic name of *Kala-pyaung* indicating that it is probably an introduction. Some varieties are resistant to the attacks of *Striga lutea* but not to *S. densiflora* which does not seem to occur in Burma.

(*q*) Sorghum sudanense *Stapf.*

Introduced and occasionally grown as a fodder but is much inferior to the *S. dochna* types for this purpose in Burma.

14. PSEUDOSORGHUM A. Camus

1. **Pseudosorghum fasciculare** *A. Camus*, in Bull. Mus. Hist. Nat. Paris (1920) 662. Andropogon fascicularis *Roxb.* F.B.I. VII, 177.

Common in areas of moderate rainfall.
Burmese—*Padaw-ni*; *Naya-shwe*; *Myet-gyin.*

15. VETIVERIA Thouars ex Virey.

1. **Vetiveria zizanioides** (*Linn.*) *Nash*, in Small, Flor. South-east U.S. (1903) 67. Andropogon squarrosus *Hook. f.* non *Linn. f.* A. muricatus *Retz.* F.B.I. VII, 186.

Common in swampy areas. The Khas-khas grass of India.
Burmese—*Myet-myit-hmwe*; *Myet-hmwe.*

16. CHRYSOPOGON Trin.

Key to the species of *Chrysopogon*.

Pedicels of the pedicelled spikelets half as long as the sessile spikelets or longer:—
  Pedicels of the pedicelled spikelets glabrous ..... *C. aciculatus.*
  Pedicels of the pedicelled spikelets villous:—
    Lower and upper glumes of the pedicelled spikelets both awned:—
      Peduncle very long, 30 cm. or more ..... *C. distichophyllus.*
      Peduncle short ..... *C. orientalis.*
Pedicels of the upper spikelets not half as long as the sessile spikelets:—
  Upper glume of sessile spikelets villous with long, rigid bristles..... *C. montanus*
  Upper glume of sessile spikelets glabrous or slightly ciliate .. *C. montanus var. trinii*

1. **Chrysopogon aciculatus** *Trin.*, Fund. Agrost. (1820) 188. Andropogon aciculatus *Retz.* F.B.I. VII, 188.

Very common in places of about 50 inches rainfall and over, ascending to about 6,000 feet. The tough, prostrate stems choke out other grasses but afford little fodder. A troublesome weed of grasslands but a good soil-binder. Known as Love Grass, Lesser Spear Grass.

Burmese—*Ngon-myet*; *Naukpo-myet*; *Myauk-mya*; *Maung-yin-ngo.*

2. **Chrysopogon distichophyllus** (*Hook. f.*) comb. nov. Andropogon distichophyllus *Hook.f.* in F.B.I. VII, 191.

South coast of Burma at Kobok (Kurz).

With the division of the genus *Andropogon* into its separate sections it is necessary to remove this species to the genus *Chrysopogon.*

3. **Chrysopogon orientalis** *A. Camus*, Flor. Gen. Indo-Chine VII (1922) 332. Andropogon wightianus *Steud.* F.B.I. VII, 191.

Occasional in Lower Burma. A variable grass.

4. **Chrysopogon montanus** *Trin.*, Spreng., N. Entdeck. ii, 93. Andropogon monticola *Schult.* var. monticola proper, *Hook. f.* in F.B.I. VII, 193.

Fairly frequent in *indaing* forests. A variable grass. Xerophytic, found usually on dry, stony ground; ascending to about 4,000 feet. Of doubtful fodder value except the most succulent types growing in favourable situations.

5. **Chrysopogon montanus** *Trin.* var. **trinii** *Hook. f.* in F.B.I. VII, 193. Andropogon monticola *Schult.* var. trinii *Hook. f.* Chrysopogon serratus *Trin.*

Meiktila (Collett).

17. CAPILLIPEDIUM Stapf

Key to the species of *Capillipedium*.

Lower glume of sessile spikelet flat; leaf-blades much narrowed and tapering; spikelets lanceolate ..... *C. glaucopsis*
Lower glume of sessile spikelet dorsally channelled; base of leaf-blades hardly narrowed; spikelets oblong, obtuse .... *C. parviflorum*

1. **Capillipedium glaucopsis** *Stapf ex Steud.*, Hook. Ic. Pl. sub tab. 3085. C. assimile *A. Camus*; Andropogon assimilis *Steud.* F.B.I. VII, 179.

A common grass of moist, shady places, ascending to about 4,500 ft.

Burmese—*Kyauk-wa* (?).

2. **Capillipedium parviflorum** *Stapf* in Dyer, Flor. Trop. Afr. IX (1917) 169. Andropogon miscanthus *Kunth.* F.B.I. VII, 178.

Not common; usually in dry forests in the plains but ascending to about 4,000 feet (Lace 4365 !, Maymyo; Thein Lwin 246 !).

18. BOTHRIOCHLOA O. Kuntze

Key to the species of *Bothriochloa.*

Primary axis elongated, much longer than the lower racemes, lower branches or at least the stronger sparingly divided but not beyond the second degree:—
Lower glume of sessile spikelet not pitted ..... *B. intermedia*
Lower glume of sessile spikelet pitted ..... *B. intermedia forma punctata*

Primary axis short, much over-topped by the racemes:—
Lower glumes of the sessile spikelets pitted or not; hairy below ..... *B. pertusa.*

1. **Bothriochloa intermedia** (*R.Br.*) *A. Camus,* in Ann. Soc. Linn. Lyons VII (1930) 1621. Amphilophis glabra *Stapf.* Andropogon intermedius *R.Br.* F.B.I. VII, 175.

A very common grass in areas of about 50 inches rainfall, ascending to about 3,000 feet. A good fodder.
Burmese—*Myet-hmwe.*

2. **Bothriochloa intermedia** (*R.Br.*) *A. Camus,* forma **punctata** *A. Camus l.c.* Andropogon intermedius *R. Br.* var. punctatus *Hook.f.* ex *Trin.* F.B.I. VII, 176.

A fairly common grass which makes good fodder (Rhind 2056 !, Maymyo).

3. **Bothriochloa pertusa** (*Willd.*) *A. Camus,* in Ann. Soc. Linn. Lyons n.s. LXXVI (1931) 164. Amphilophis pertusa *Stapf* in Fl. Trop. Afr. XI, 175. Andropogon pertusus *Willd.* F.B.I. VII, 173.

One of the commonest Dry Zone grasses and one of the best fodders, both fresh and dry. It can withstand drought.
It is a very variable grass. I have not attempted to separate the varieties which need to be studied in culture.
Burmese—*Padaw-byu.*

19. DICHANTHIUM Willemet.

Key to the species of *Dichanthium.*

Lower glume of the sessile spikelet oblong, obtuse or truncate, keel not winged, with a median nerve; sheaths terete; ligule membranous, large ..... *D. annulatum.*
Lower glume of the sessile spikelet obovate or oblong-truncate, truncate, winged, no median nerve; sheaths compressed; ligule a short ciliate membrane ..... *D. caricosum.*

1. **Dichanthium annulatum** *Stapf,* in Fl. Trop. Afr. IX, 178. Andropogon annulatus *Forsk.* F.B.I. VII, 196.

One of the commonest grasses of the plains and ascending to about 5,000 feet. An excellent fodder both fresh and dried. It makes rough lawns (*e.g.* football pitches) if watered and rolled.
Burmese—*Padaw-ni.*

2. **Dichanthium caricosum** *A. Camus,* in Bull. Mus. Hist. Nat. Paris 27, (1921) 549. Andropogon caricosus *Linn.* F.B.I. VII, 196.

Common in the plains. Rather variable and often difficult to separate from *D. annulatum.* A good fodder.
Burmese—*Padaw-ni*; *Padaw-nyo.*

20. ARTHRAXON P. Beauv.

Key to the species of *Arthraxon.*

Stamens 3:—
Pedicelled spikelets absent but pedicels present:—
Anthers as long as the spikelet ..... *A. breviaristatus*
Anthers minute:—
Racemes many; rhachis sparsely hairy ..... *A. nudus*
Racemes few; rhachis quite glabrous ..... *A. submuticus*
Stamens 2:—
Pedicelled spikelets absent; pedicels reduced or suppressed.. *A. hispidus*
Pedicelled spikelets usually present in the upper nodes of the racemes, sometimes in the lower, neuter usually much reduced; pedicels distinctly developed, conspicuously ciliate; lower glume 2-dentate ..... *A. lancifolius*

1. **Arthraxon breviaristatus** *Hack.*, Mon. Androp. (1889) 350. F.B.I. VII, 144.

Dwechaung forest, Minbu District. (Parkinson 15653 !.)

2. **Arthraxon nudus** *Hochst.*, Flora (1856) 159. A. ciliaris *Beauv.* subsp. nudus *Hack.* F.B.I. VII, 145.

Very common in moist places, ascending to about 5,000 feet.

3. **Arthraxon submuticus** *Hochst.*, Flora (1856) 188. F.B.I. VII, 144.

Tavoy (Gomez).

4. **Arthraxon hispidus** (*Thunb.*) *Makino*, Bot. Mag. Tokyo XXVI (1912) 214. A. ciliaris *Beauv.* in part. F.B.I. VII, 145.

Common in the moister parts of Burma, ascending to 5,000 feet or more. (Maung Kan 18305 !, Maymyo.)

5. **Arthraxon lancifolius** *Hochst.*, Flora (1856) 188. A. microphyllus *Hochst.* F.B.I. VII, 147.

Fairly common in high grasslands between about 4,000 and 8,000 feet. Often forms large patches to the exclusion of most other plants.

A. lanceolatus *Hochst.* has been reported from Assam and China and is to be expected in the northern parts of Burma at least.

21. ANDROPOGON Linn.

Key to the species of *Andropogon.*

Upper glume of the sessile spikelet awned ..... *A. ascinodis*
Upper glume of the sessile spikelet awnless ..... *A. pumilus*

1. **Andropogon ascinodis** *C. B. Clarke*, Jr. Linn. Soc. XXV (1889) 87. A. apricus *Hook.f.* non *Trin.* F.B.I. VII, 169.

Fairly common in light forests of Lower and central Burma. Eaten by cattle when young.
Burmese—*Tagu-myet.*

2. **Andropogon pumilus** *Roxb.*, Fl. Ind. i, 273. F.B.I. VII, 170.

Uncommon. (McKerral 733!, Hanza, Henzada District.)

22. HYPARRHENIA Anderss.

1. **Hyparrhenia filipendula** *Stapf*, Fl. Trop. Afr. IX 325. Andropogon filipendulus *Hochst.* F.B.I. VII, 210.

Common in the hills from about 3,000 to 5,000 feet.
Burmese—*Myet-nyo.*

23. CYMBOPOGON Spreng.

Key to the species of *Cymbopogon.*

Burmese species all oil-bearing and scented; panicles often large and very compound; raceme joints glabrous or pubescent on the back, bearded along the sides, hairs increasing in length upwards but not concealing the sessile spikelets, awns (usually absent in *nardus*) distinctly geniculate with the knee exserted:—

- Sessile spikelets lanceolate or ovate or obovate-lanceolate, back flat:—
  - Lowest pedicel of raceme scarcely stouter than the upper:—
    - All spikelets awnless ..... *C. nardus*
    - Sessile spikelets awned ..... *C. flexuosus*
  - Lowest pedicel of raceme much swollen; panicles erect, narrow, often interrupted, the divisions short, dense; spathes and racemes short, the white hairs of the joints and pedicels often very conspicuous contrasting with the pale brown spikelets ..... *C. coloratus*
- Sessile spikelets linear to lanceolate-linear, awnless, back distinctly concave in the lower part; panicle usually loose, branches slender, the ultimate branchlets more or less nodding; spathes long and narrow; hairs of joints and pedicels rather spreading:—
  - Lower glume of sessile spikelet with a narrow groove from the middle downwards corresponding to a keel inside:—
    - Lower glume of sessile spikelet wingless ..... *C. citratus*
    - Lower glume of sessile spikelet winged:—
      - Culms in loose, scanty fascicles, erect and simple or nearly so, tall and robust; leaf-blades 1-3 cm. wide; panicles 10-30 cm. long, rather loose, becoming reddish when mature ..... *C. martini*
      - Culms in compact fascicles; panicle stiff, 6-10 cm. long or more; spathes narrowly herbaceous, sometimes with rudimentary blades ..... *C. polyneuros*
  - Lower glume of sessile spikelet flat or concave between the keels:—
    - Pedicelled spikelets minutely pubescent:—
      - Panicle elongate, 10-30 cm. long; lower glume of sessile spikelet narrowly winged above the middle *C. clandestinus*
      - Panicle 30-90 cm. long; lower glume of sessile spikelet broadly winged above the middle ..... *C. khasianus*
    - Pedicelled spikelets quite glabrous ..... *C. virgatus*

1. **Cymbopogon nardus** *Rendle*, Cat. Welw. Afr. Pl. II (1899) 155. Andropogon nardus *Linn.* F.B.I. VII, 205.

Cultivated for its oil in the Tenasserim Division. Not known outside cultivation. Citronella Grass.

Burmese—*Sabalin-hmwe*; *Myet-hmwe.*

2. **Cymbopogon flexuosus** *Watson*, Atkins., Gazet. N.W. Prov. Ind. (1882) 392. Andropogon nardus *Linn.* var. flexuosus *Hack.* F.B.I. VII, 207.

Maymyo, 3,400 feet. (Maung Kan 18185 !, which seems to be the only record of this grass from Burma.)

3. **Cymbopogon coloratus** *Stapf*, Kew Bull. 1906, 357. Andropogon nardus *Linn.* var. coloratus *Hook.f.* F.B.I. VII, 206.

Thapangaing, Mandalay District. (Ba Thein *s.n.* !.) Not common; in clearings in dry teak forest.

4. **Cymbopogon citratus** *Stapf*, Kew Bull. 1906, 357.

Common as a pot herb all over Burma. Cultivated for its leaves which are used by the Burmese for flavouring curries. Not known out of cultivation. It rarely flowers but was found in flower in Mandalay in 1940 (Rhind 3929 !). Lemon Grass.
Burmese—*Sabalin.*

5. **Cymbopogon martini** *Watson*, Atkins., Gazet. N.W. Prov. Ind. (1882) 392. Andropogon martini *Roxb.* A. schoenanthus (*L.*) var. martini in F.B.I. VII, 204.

Amherst District. (*Parkinson 5076* !.)

6. **Cymbopogon polyneuros** *Stapf*, Kew Bull. 1906, 357. Andropogon schoenanthus (*L.*) var. versicolor *Hack.* F.B.I. VII, 205.

Mt. Popa, Myingyan District, 4,000 feet. (Rhind 2619 !.)
Burmese—*Myet-kyet-thun.*

7. **Cymbopogon clandestinus** *Stapf*, Bull. Imp. Inst. Lond. XXVII (1929) 458. Andropogon schoenanthus (*L.*) var. clandestinus *Hack.* F.B.I. VII, 205. A. clandestinus *Nees.*

Very common on hill-sides from about 1,000 to 3,000 feet.
Burmese—*Myet-sat.*

8. **Cymbopogon khasianus** *Stapf MS ex Bor*, Ind. For. Rec. (Bot.) (1938) 92. Andropogon nardus (*L.*) var. khasianus *Hack.* F.B.I. VII, 206.

Pegu. (Thein Lwin 243 !, which seems to be the only record of this grass from Burma.)

9. **Cymbopogon virgatus** *Stapf ex Rhind*, Agric. Jr. Ind. XXV (1930) 328. (C. n.sp. of the Bull. Imp. Inst. Lond. XXVII (1929) 459.)

Fairly common on uplands in the drier parts of central Burma. It is used for fodder for cattle in times of scarcity but cattle dislike it and will only eat it when nothing else is available. It must be fed dry.
Burmese—*Myet-sat*; *Myet-nan.*
The oils of this grass and of *C. clandestinus* were analysed at the Imperial Institute, London, and were found not to differ very much except that the optical rotation of the *clandestinus* oil was +45·96° and that of *virgatus* was −48·67°. The *Cymbopogon n.sp.* referred to in the Imp. Inst. reference is that species which Stapf later named *C. virgatus.* The type is in Herb. Kew.

24. SCHIZACHYRIUM Nees

Key to the species of *Schizachyrium.*

Annual:—
Fastigiately branched; racemes silky villous; joints appended ..... *S. exile.*
Divaricately branched; racemes sparsely hairy; joints 2-toothed ..... *S. brevifolium.*
Perennials:—
Joints of the racemes 5-7 mm. long, glabrous or ciliate; upper lemma of sessile spikelet deeply bifid ..... *S. semiberbe.*

1. **Schizachyrium exile** *Stapf*, in Fl. Trop. Afr. IX, 191. Andropogon exilis *Hochst.* F.B.I. VII, 166.

Apparently scarce. (McKerral 726 !, without precise locality.)

2. **Schizachyrium brevifolium** *Nees*, in Agrost. Bras. (1829) 332. Andropogon brevifolius *Sw.* F.B.I. VII, 165.

Fairly common in the drier parts. Cattle eat it but the yield is small.
Burmese—*Yaso-myet*; *Indaing-myet-kha.*

3. **Schizachyrium semiberbe** *Nees*, in Agrost. Bras. (1829) 336. Andropogon hirtifolius *Kunth.* F.B.I. VII, 167.

A common grass of the uplands of central Burma and in forest clearings. Apparently not liked by cattle in Burma.

25. DIECTOMIS Kunth.

1. **Diectomis fastigiata** *H.B.K.*, in Nov. Gen. et Sp. i, t. 64. Andropogon fastigiatus *Sw.* F.B.I. VII, 167.

Frequent in central Burma.
Burmese—*Myauk-mya.*

26. HETEROPOGON Pers.

Key to the species of *Heteropogon.*

Spikes up to 7·5 cm. long, sessile; female spikelets 6 mm. long ..... *H. contortus.*
Spikes 7·5-15 cm. long, very stout, female spikelets 12-14 mm. long ..... *H. insignis.*

1. **Heteropogon contortus** (*Linn.*) *Beauv. ex Roem. et Schult.*, in Syst. Veg. II (1817) 835. Andropogon contortus *Linn.* F.B.I. VII, 199.

Very common in dry places in the plains and ascending to about 4,500 feet. There is a number of varieties of which the annual and perennial forms are the most important. It makes a good fodder when young and before the 'spears' have hardened. Spear Grass.
Burmese—*Myet-hlan*; *Myauk-mya*; *Mwe-lein-myet.*

2. **Heteropogon insignis** *Thw.*, in Enum. Pl. Zeyl. 437. Andropogon triticeus *Br.* F.B.I. VII, 200.

A grass of the Dry Zone, particularly in scrub jungle (Thein Lwin 2921 !, near Chauk).
Burmese—*Indaing-myauk-myi.*

27. THEMEDA Forsk.

Key to the species of *Themeda.*

Pairs of involucral spikelets inserted at the same level, 5-10 cm. long:—
  Racemes in lax heads:—
    Awns very long and stout, up to 7·5 cm. long ..... *T. arguens*
  Racemes in compact heads:—
    Racemes in globose or fan-shaped heads; sessile spikelets 3-4 mm. long ..... *T. quadrivalvis*
    Racemes in densely congested heads; awns 3-6 cm. long; involucral spikelets 6-10 mm. long ..... *T. triandra*
Pairs of involucral spikelets inserted at different levels:—
  Involucral spikelets glabrous or nearly so; fertile spikelets with an imperfect awn or none ..... *T. villosa*
  Involucral spikelets bearing fulvous, tubercle-based hairs:—
    Fertile spikelets long-awned ..... *T. arundinacea*
    Fertile spikelets awnless ..... *T. intermedia*

1. **Themeda arguens** (*Willd.*) *Hack.*, Monog. Androp. 657. Anthistiria arguens *Willd.* F.B.I. VII, 211.

Andaman Islands. (Prain.) Cattle eat it when young.

2. **Themeda quadrivalvis** *O. Ktze.*, Rev. Gen. Pl. II, 794. Anthistiria ciliata *Linn.f.* F.B.I. VII, 213 (incl. var. helferi *Hk.f.*).

Common throughout the hills up to about 4,000 feet, extending from Tenasserim in the south to the Kachin Hills in the north.

3. **Themeda triandra** *Forsk.*, Flor. Aegyp-Arab. (1775) 178. Anthistiria imberbis *Retz.* F.B.I. VII, 211.

Very common in places of moderate to high rainfall, ascending to about 4,000 feet. An extremely variable grass. A good fodder up to the time of flowering after which cattle will only eat it if nothing better is available.

Burmese—*Myet-swe-le*; *Myauk-me.*

4. **Themeda villosa** *Dur. et Jack.*, Index Kew. Suppl. I, 424. Anthistiria gigantea *Cav.* subsp. villosa *Hack.* F.B.I. VII, 217. A. villosa *Poir.*

Fairly common in the foothills of central Burma. Too coarse to be of much fodder value.

Burmese—*Thekke-min*; *Saing-lon.*

5. **Themeda arundinacea** *Ridley*, Fl. Malay Pen. V (1925) 212. Anthistiria gigantea *Cav. subsp.* arundinacea *Hack.* F.B.I. VII, 216.

Fairly common where the rainfall is about 60 inches and over but mainly in northern Burma. Too coarse to be of much fodder value.

Burmese—*Kaing-de-o-bok.*

6. **Themeda intermedia** *Dur. et Jack.*, Index Kew. Suppl. I, 424. Anthistiria gigantea *Cav.* subsp. intermedia *Hack.* F.B.I. VII, 217.

Fairly common in the hills.

Burmese—*Kaing-de-o-bok*; *Kaing-swe-le.*

28. PSEUDANTHISTIRIA Hook.f.

1. **Pseudanthistiria burmanica** *Hook.f.*, F.B.I. VII, 220.

Collected by Kurz from Pegu and by Manders from the Shan hills, 4,000 feet. Apparently scarce; I have never collected it.

29. EREMOPOGON Stapf

1. **Eremopogon foveolatus** *Stapf*, Fl. Trop. Afr. IX, 183. Andropogon foveolatus *Del.* F.B.I. VII, 168.

Very common in the Dry Zone where it is one of the most valuable fodder grasses.

Burmese—*Padaw-ni*; *Kyauk-padaw.*

30. ISEILEMA Anderss.

Key to the species of *Iseilema.*

Keel and submarginal nerves of the spathes tubercled ..... *I. argutum*
Keel and submarginal nerves of the spathes not tubercled or granulate ..... *I. laxum*

1. **Iseilema argutum** *Anderss.*, Nov. Act. Soc. Sc. Upsal. ser. 3, ii, 25. F.B.I. VII, 218.

Fairly common in Lower Burma forests (Thein Lwin 26 !).

2. **Iseilema laxum** *Hack.*, Monog. Androp. 682. F.B.I. VII, 218.

Widely distributed throughout central Burma but nowhere abundant. Makes a good fodder when grown under favourable moisture conditions.

31. DIMERIA R.Br.

Key to the species of *Dimeria.*

Spikes solitary:—
Rhachis of spikes broader than the sessile spikelets, margins ciliate; spikelets conniving ..... *D. kurzii*

Spikes 2-3:—
Rhachis trigonous or linear, flexuous, glabrous, 0·5 mm. wide; upper glume 2·5 mm. long or more ..... *D. tenera*
Rhachis undulate, compressed, margins smooth or scaberulous *D. fuscescens*
Spikes 4-10:—
Rhachis straight or flexuous, internodes 4-8 mm. long; nodes ciliate ..... *D. leptorhachis*

1. **Dimeria kurzii** *Hook.f.*, F.B.I. VII, 103.

Throughout the plains except the driest parts but nowhere very abundant; from Mergui to Myitkyina.
Burmese—*Daye-hmwe.*

2. **Dimeria tenera** *Trin.*, Mem. Acad. Peters. ser. VI, ii (1833) 335. D. ornithopoda *Trin.* F.B.I. VII, 104 (in part).

Very widely distributed in the plains except the driest and wettest parts. Very variable. Of little value for fodder.

3. **Dimeria fuscescens** *Trin.*, Mem. Acad. Peters. ser. VI, ii, (1833) 335. F.B.I. VII, 105.

Tenasserim (Helfer).

4. **Dimeria leptorhachis** *Hack.*, Monog. Androp. 89. F.B.I. VII. 105.

Tenasserim (Helfer; Griffith).

McKerral (Bull. No. 20, 1924, of the Burma Agric. Dept.) mentions *Dimeria pusilla* as occurring in Lower Burma but there appears to be no other record and no specimen has been seen by me. There was no sheet of it in Herb. Coll. Agric. Mandalay.

32. ISCHAEMUM Linn.

Key to the species of *Ischaemum.*

Sessile spikelets at least awned:—
Margins of lower glume of sessile spikelets expanded below the middle, incurved at the base, apex 2-toothed; upper lemmas of both spikelets 2-lobed to about the middle, awned from the sinus:—
Lower glume of sessile spikelet distinctly winged at the apex ..... *I. aristatum*
Lower glume of sessile spikelet not winged; leaves distinctly petioled, petiole 5 mm. long or more ..... *I. timorense*
Margins of glumes narrowly inflexed, not expanded below:—
Lower glume of sessile spikelet deeply channelled along the middle ..... *I. petiolare*
Lower glume of sessile spikelet not channelled:—
Lower glume of sessile spikelet smooth or nearly so, 1-keeled; lower glume of pedicelled spikelet smooth or faintly noduled, one keel with a wide crescent-shaped wing ..... *I. molle*
Lower glume of sessile spikelet ribbed or noduled:—
Lower glume of sessile spikelet with 5 horny, deep, usually regular transverse ridges on the lower part; keels unequally winged above; one keel of lower glume of pedicelled spikelet with a wide crescent-shaped wing ..... *I. rugosum*
Lower glume of sessile spikelet with marginal nodules (not transverse):—
Lower glume of pedicelled spikelet very broadly winged on one margin only; lemma muticous or mucronulate, rarely with an imperfect awn *I. imbricatum*
Lower glume of pedicelled spikelet narrowly winged; awn up to 1·3 cm. long ..... *I. mangaluricum*
Both spikelets awnless ..... *I. muticum*

1. **Ischaemum aristatum** *Linn.* (non *Willd.*), Sp. Pl. (1753) 1049. I. ciliare *Retz.* F.B.I. VII, 134.

Common in Lower Burma and occasional in the northern wet zone. Eaten by cattle.

Burmese—*Thon-tin-gwa*; *Pyaung-sa-myet.*

2. **Ischaemum timorense** *Kunth*, Rev. Gram. I (1829) 369. F.B.I. VII, 136.

Throughout Lower Burma; very common on the edges of paddy fields. A useful fodder.

3. **Ischaemum petiolare** *Hack.*, Monog. Androp. (1889) 238. F.B.I. VII, 138.

Karen Hills (Kurz).

4. **Ischaemum molle** *Hook.f.*, F.B.I. VII, 128.

Frequent in Lower Burma and occasional in the northern wet zone.

Burmese—*Thon-tin-gwa.*

5. **Ischaemum rugosum** *Salisb.*, Ic. Stirp. Rar. (1791) i, t. 1. F.B.I. VII, 127.

Very common in moist places all over the plains and ascending to about 3,000 feet. A good fodder.

Burmese—*Tet-kwet*; *Nga-tha-yaung*; *Kagyi-the-myet.*

6. **Ischaemum imbricatum** *Stapf ex Ridley*, Fl. Malay Pen. V (1925) 200. I. aristatum var. imbricatum *Hack.* F.B.I. VII, 127 (non *Linn.*).

Anisakan, Mandalay District, 3,000 feet (Po Khant 18175 !).

7. **Ischaemum mangaluricum** (*Hack.*) *Stapf ex C. E. C. Fischer*, Fl. Madras (1934) 1723. I. aristatum *Hk.f.* (non *Linn.*) var. mangaluricum in F.B.I. VII, 126.

Zigon Forest Division (Thein Lwin 34 !).

8. **Ischaemum muticum** *Linn.*, Sp. Pl. (1753) 1049. F.B.I. VII, 132.

Karathuri, Mergui District. (Su Koe 7658 !, 'Gregarious on moist bank of stream'.) Extends into Malaya and Australia where it is said to be a good sand-binder and a valuable fodder.

33. SEHIMA Forsk.

Key to the species of *Sehima.*

Joints and pedicels ciliate on both edges ..... *S. nervosum*
Joints and pedicels ciliate on one margin only ..... *S. sulcatum*

1. **Sehima nervosum** (*Thw.*) *Stapf*, Fl. Trop. Afr. IX, 36. I. laxum *R.Br.* F.B.I. VII, 136 (in part).

Common in central Burma except in the driest parts, often in light *indaing* forest. A good fodder both fresh and dry.

2. **Sehima sulcatum** *A. Camus*, Bull. Mus. Nat. Hist. Paris XXVII (1921) 373. Ischaemum sulcatum *Hack.* F.B.I. VII, 137.

In *indaing* forest. (Thein Lwin 252 !.)

34. APLUDA Linn.

Key to the species of *Apluda.*

Sessile spikelets awned ..... *A. aristata.*
Sessile spikelets awnless ..... *A. mutica.*

1. **Apluda aristata** *Linn.*, in Cent. II, 7. A. varia *Hack.* subsp. aristata *Hack.* F.B.I. VII, 150.

Common in the plains except in the very dry parts. Though often considered a good fodder it is usually too small a plant to yield any worthwhile amount of herbage.

2. **Apluda mutica** *Linn.*, in Sp. Pl. 82. A. varia *Hack.* subsp. mutica *Hack.* F.B.I. VII, 150.

Common in the plains. Closely resembles *A. aristata.*
Burmese—*Myet-wa.*

35. THYRSIA Stapf

1. **Thyrsia zea** (*Clarke*) *Stapf*, in Hook. Ic: Pl. XXXI sub tab. 3078, 1922. Rottboellia zea *Clarke.* F.B.I. VII, 152.

An uncommon grass, usually solitary, occurring where the rainfall is over about 70 inches, ascending to about 3,000 feet. (Rhind 3259 !, Goteik Gorge; McKerral *s.n.* !, Hopin.)
Burmese—*Kaing-pyaung*; *Kaing-pabya.*

36. HEMARTHRIA *R.Br.*

Key to the species of *Hemarthria.*

Spikelets less than 6 mm. long; weak trailing grasses with very narrow false spikes 6-10 cm. long ..... *H. compressa.*
Spikelets over 8 mm. long; erect from a decumbent base; false spikes sheathed below, 10-15 cm. long ..... *H. longiflora.*

1. **Hemarthria compressa** (*Linn.f.*) *R.Br.*, in Prod. 207 (1810). Rottboellia compressa *Linn.f.* F.B.I. VII, 153 (incl. var. genuina *Hack.*).

Common in wet places, swamps, etc., ascending to about 4,000 feet.
Burmese—*Myet-kyein.*

2. **Hemarthria longiflora** (*Hook.f.*) *A. Camus*, in Flor. Gen. Indo-Chine VII, 379. Rottboellia longiflora *Hook.f.* in F.B.I. VII, 154.

Occasional where the rainfall is above about 60 inches (Griffith, Mergui; Ba Te 3215!, Mohnyin). Said to favour rich land and its presence as a weed in paddy fields to indicate high fertility.
Burmese—*Myet-min.*

37. THELEPOGON Roth.

1. **Thelepogon elegans** *Roth. ex Roem. et Schult.*, in Syst. ii, 788. F.B.I. VII, 148.

Fairly common on hill-sides up to about 3,000 feet (Chatterjee 4102 !, Mt. Popa; Rhind, Goteik Gorge). Eaten by cattle but never sufficiently abundant to count much in the fodder supply.

38. RATZEBURGIA Kunth.

1. **Ratzeburgia pulcherrima** *Kunth.*, in Revis. Gram. ii, 487. F.B.I. VII, 161.

A common grass of the Dry Zone occurring in open grasslands. It yields little fodder and cattle seem to avoid it though sheep will graze it. Though typically a grass of dry areas it sometimes extends into wetter places where it becomes more robust. (McKerral 771 !, Hopin, rainfall about 65 inches.) Not in the hills.

39. MNESITHEA Kunth.

Key to the species of *Mnesithea.*

Leaves narrow; peduncle short:—
Lower glume of sessile spikelet foveolate on the back ..... *M. laevis*
Lower glume of sessile spikelet smooth on the back ..... *M. rupicola*
Leaves broad; peduncle long ..... *M. merguensis*

1. **Mnesithea laevis** (*Retz.*) *Kunth*, Rev. Gram. I (1830) 154. Rottboellia perforata *Roxb.* F.B.I. VII, 158.

Common in moist places up to about 3,000 feet. A very good fodder.

2. **Mnesithea rupicola** *Ridley*, Jr. Roy. As. Soc. S. Br. 57, 116. Rottboellia helferi *Hook.f.* in F.B.I. VII, 158.

Tenasserim (Helfer), extending into Malaya.

3. **Mnesithea merguensis** (*Hook.f.*) *A. Camus*, Bull. Mus. Hist. Nat. Paris XXV (1919) 57. Rottboellia merguensis *Hook.f.* F.B.I. VII, 158.

Mergui (Helfer and Griffith).

40. HACKELOCHLOA O. Kuntze.

Key to the species of *Hackelochloa.*

Sessile spikelets globose; upper glume of sessile spikelets 3-nerved ..... *H. granularis*
Sessile spikelets broadly oblong, truncate; upper glume of sessile spikelets 1-nerved ..... *H. porifera*

1. **Hackelochloa granularis** *O. Ktze.*, Rev. Gen. Pl. (1891) 776. Manisuris granularis *Linn.f.* F.B.I. VII, 159.

Common on uplands and on stony ground. A frequent weed of *taungyas.*
Burmese—*Waso-myet*; *Kon-thaman-myet.*

2. **Hackelochloa porifera** (*Hack.*) comb. nov. Manisuris porifera *Hack.* in Oestr. Bot. Zeit. XLI (1891) 48. F.B.I. VII, 160.

Tenasserim and the Andaman Islands.

41. EREMOCHLOA Büse

Key to the species of *Eremochloa.*

Spines of lower glume of fertile spikelet shorter than the glume is broad:—
Lower glume of fertile spikelet elliptic, subacute, with 2 small, rounded, terminal wings ..... *E. bimaculata*
Spines of lower glume of fertile spikelet longer than the glume is broad:—
Lower glume of fertile spikelet narrowly oblong, acute..... *E. ciliaris*
Lower glume of fertile spikelet broadly ovate, subacute .... *E. helferi*

1. **Eremochloa bimaculata** *Hack.*, Monog. Androp. 265. F.B.I. VII, 140.

Common in moist, shady forests all over the plains.

2. **Eremochloa ciliaris** (*Linn.*) *Merr.*, Philipp. Jr. Sci. I Suppl. (1906) 441. E. leersioides *Hack.* F.B.I. VII, 140.

Frequent in Lower Burma. A shade species.
Burmese—*Sat-loo.*

3. **Eremochloa helferi** *Munro ex Hack.*, Monog. Androp. 266. F.B.I. VII, 140.

Tenasserim (Helfer and Griffith).

Eremochloa malayana *Ridl.* (Fl. Malay Pen. V, 196) occurs in Malaya and Siam and is to be expected in Burma.

42. ROTTBOELLIA Linn.f. in part.

1. **Rottboellia exaltata** *Linn.f.*, Suppl. (1781) 114. F.B.I. VII, 156.

Throughout the plains from the Andaman Islands to the Myitkyina District and in the hills up to about 4,000 feet. A good fodder but does not yield much herbage.
Burmese—*Myet-ya-nge*; *Myet-ya.*

43. COELORHACHIS Brong.

Key to the species of *Coelorhachis*.

Lower glume of sessile spikelets scaberulous on the back..... *C. glandulosa*
Lower glume of sessile spikelets smooth on the back:—
Joints of racemes over 3 mm. long ..... *C. striata*
Joints of racemes 2 mm. long ..... *C. khasiana*

1. **Coelorhachis glandulosa** *Stapf ex Ridley*, Fl. Malay Pen. V (1925) 204. Rottboellia glandulosa *Trin.* F.B.I. VII, 157.

Wallich records this grass from Burma without precise locality. As it is widely distributed in Malaya it is to be expected in the south of Burma.

2. **Coelorhachis striata** *A. Camus*, Ann. Soc. Linn. Lyons (1921) 197. Rottboellia striata *Nees ex Steud.* F.B.I. VII, 157.

Common in the plains, generally near water.
Burmese—*Taung-kaing*.

3. **Coelorhachis khasiana** *Stapf ex Bor*, Ind. For. Rec. (Bot.) I (1938) 101. Rottboellia striata *Nees ex Steud.* sub-sp. khasiana *Hack.* F.B.I. VII, 157.

Mohnyin, Myitkyina District (Parkinson 288 !).

44. OPHIUROS Gaertn.

1. **Ophiuros corymbosus** *Gaertn.*, Fruct. III, 4, t. 181. F.B.I. VII, 160.

Shan hills (Manders). Probably commoner than the herbarium materials suggest.

45. GERMAINIA Balans. et Poitrass.

Key to the species of *Germainia*.

Base of the stem glabrous; leaves short, 3-8 cm. long; male spikelets sessile on the contracted tip of the peduncle .... *G. khasiana*
Base of the stout root-stock covered with snowy wool; radicle leaves up to 30 cm. long; male spikelets on a very short rhachis ..... *G. lanipes*

1. **Germainia khasiana** *Hack.*, Oestr. Bot. Zeit. XLI (1891) 50. F.B.I. VII, 163.

Kaukkwe valley, Bhamo District (Lace 6054 !). This seems to be the only record from Burma.

2. **Germainia lanipes** *Hook.f.*, F.B.I. VII, 163.

Tenasserim (Helfer). It does not appear to have been collected since Helfer's time.

XX. MAYDEÆ.

Key to the genera of *Maydeae*.

Male and female spikelets in the same inflorescence:—
Female spikelets enclosed in hard bead-like bodies ..... **Coix**
Female spikelets not enclosed in bead-like bodies:—
The covering of the false fruit formed chiefly by the lower glume which is appressed to the narrow joint of the axis to which it is attached on the inner side:—
Terminal spikes male, the lateral male and female or female only ..... **Polytoca**
Spikes monoecious, several male spikes above the female, the latter without membranous appendages ..... **Chionachne**
Male spikelets in spikes arranged in a terminal panicle, female spikes in the axils of subtending leaves:—
Female spikes of each leaf-axil free, articulated ..... **Euchlaena**
Female spikes grown together into a compound and much thickened axis (the 'cob') ..... **Zea**

1. COIX Linn.

Key to the species of *Coix*.

Texture of involucres chartaceous or crustaceous	*C. ma-yuen*
Texture of involucres stony:—	
Involucres globose:—	
Lower glume of male spikelets broadly winged	*C. gigantea*
Lower glume of male spikelets narrowly winged	*C. lachryma-jobi*
Involucres cylindrical	*C. lachryma-jobi* var. *stenocarpa*

1. **Coix ma-yuen** *Rom.*, Bull. Soc. Acclim. Paris ser. 3, viii, (1881) 442. C. lachryma-jobi *Linn.* var. mayuen *Stapf ex Hook.f.* F.B.I. VII, 100.

The cultivated thin-shelled form found in high-level swampy areas where it provides a valuable food for some of the hill tribes. A six to eight months crop.

2. **Coix gigantea** *Roxb.*, Flor. Ind. III (1832) 569. C. lachryma-jobi *Linn.* var. gigantea *Stapf*, F.B.I. VII, 100.

Fairly common in swamps.
Burmese—*Kyeik*.

3. **Coix lachryma-jobi** *Linn.*, Sp. Pl. (1753) 972. F.B.I. VII, 100.

Common in cool, swampy places, ascending to about 6,000 feet or more. There are numerous varieties differing in the size, shape and colouring of the involucres. Cattle do not eat it readily unless chopped up and mixed with other food. Job's Tears.
Burmese—*Kyeik*; *Kalein*; *Kaleik*.

4. **Coix lachryma-jobi** *Linn.* var. **stenocarpa** *Stapf*, Hook. Ic. Pl. t. 1764 et Kew Bull. 1888, 144. F.B.I. VII, 100.

Frequent from Mergui to the Kachin Hills. The involucres are used for decorating Shan and Kachin bags and by some Karens as clothes ornaments.

2. POLYTOCA R.Br.

Key to the species of *Polytoca*.

Male racemes stiff, slender; pedicelled spikelets often rudimentary and pedicels adnate to the rhachis	*P. digitata*
Male racemes flexuous; pedicelled spikelets free	*P. wallichiana*

1. **Polytoca digitata** (*Linn.f.*) *Druce*, Rept. Bot. Exch. Club Brit. Isles 1916, 641. P. bracteata *Br.* F.B.I. VII, 101.

Common in the hills between about 2,000 and 4,500 feet. A frequent weed of *taungyas*.

2. **Polytoca wallichiana** *Benth.*, Jr. Linn. Soc. XIX (1881) 52. F.B.I. VII, 101.

Common in Lower Burma.
Burmese—*Myet-ya*.

3. CHIONACHNE R.Br.

Key to the species of *Chionachne*.

Culms up to 60 cm. long; spathes always closed; racemes solitary	*C. semiteres*
Culms up to 2·4 m. long; spathes at length opening; racemes umbelled	*C. koenigii*

1. **Chionachne semiteres** *C. E. C. Fischer*, Fl. Madras X (1935) 1706. Polytoca semiteres *Bth. ex Hook.f.* F.B.I. VII, 101.

Frequent in wet places. Makes a good fodder and improves under cultivation.
Burmese—*Badaik-myet*.

2. **Chionachne koenigii** (*Spreng.*) *Thw.*, Enum. Pl. Zeyl. (1864) 357. Polytoca barbata *Stapf ex Hook.f.* F.B.I. VII, 102.

Frequent in the hills. Useless as a fodder because of the irritating hairs. Burmese—*Myet-ya-gyi.*

4. EUCHLAENA Schrad.

Euchlaena mexicana *Schrad.* (Ind. Sem. Hort. Götting. 1832) is cultivated occasionally for fodder but it has found little favour with Burmese farmers. Teosinte.

5. ZEA Linn.

Zea mays *Linn.* (Sp. Pl. (1753) 971) is cultivated all over Burma and the surrounding hills up to about 6,000 feet. Maize.
Burmese—*Pyaung-bu.*

FUNGI RECORDED ON GRASSES IN BURMA.

(List compiled by Dr. L. N. Seth and Dr. B. B. Mundkur.)

Host.	*Fungus.*
Arundinella sp. ..	Puccinia arundinellae *Barclay.*
Avena sativa ..	Ustilago kolleri *Wille*
Bamboos ..	Aschersonia badia *Patouill.*
	Coniosporum bambuseae (*Thumb. & Bolle*) *Sacc.*
	Diplozythiella bambusina *Died.*
	Endodothella bambuseae (*Rabenh.*) *Thiess. & Syd.*
	Scirrhodothis seriata *Syd. & Butl.*
Bothriochloa pertusa ..	Sphacelia sp.
Brachiaria reptans	Cerebella cynodontis *Syd.*
	Sphacelia sp.
Brachiaria setigera	Cerebella burmanensis *Subram.*
	Sphacelia sp.
Capillipedium parviforum ..	Puccinia kozukensis *Died.*
	Phyllachora assimilis *Syd.*
Centotheca lappacea ..	Phyllachora centothecae *Syd.*
Chrysopogon aciculatus ..	Balansia andropogonis *Syd.*
Cynodon dactylon	Cerebella cynodontis *Syd.*
	Helminthosporium cynodontis *Marignoni.*
	Phyllachora cynodontis (*Sacc.*) *Niessl.*
	Ustilago cynodontis *P. Henn.*
Dichanthium annulatum ..	Curvularia lunata (*Wakker*) *Boedijn.*
	Sphacelia sp.
	Sphacelotheca andropogonis-annulati (*Bref.*) *Zundel.*
Dichanthium caricosum ..	Sphacelia sp.
Digitaria pruriens	Piricularia grisea (*Cke.*) *Sacc.*
Heteropogon contortus ..	Cerebella andropogonis-contorti *Subram.*
	Puccinia versicolor *Diet. & Holw.*
Hordeum vulgare	Helminthosporium gramineum *Rabh.*
	" teres *Sacc.*
	Puccinia graminis *Pers.*
Imperata cylindrica	Puccinia rufipes *Diet.*
Ischaemum aristatum. ..	Sorosporium furcatum *Syd. & Butl.*
Ischaemum sp.	Ustilago burmanica *Syd. & Butl.*
Microstegium gratum ..	Phyllachora graminis (*Pers.*) *Fckl.*
Oryza sativa	Cercospora oryzae *Miyake*
	Entyloma oryzae *Syd.*
	Helminthosporium oryzae *Breda de Haan*
	Metasphaeria albescens *Thuem.*
	Nectria bulbophylli *P. Henn.*
	Neovossia horrida (*Tak.*) *Padw. & Azmat*

	Nigrospora sphaerica (*Sacc.*) *Mason*
	Phoma glumarum *Ell. & Tracy*
	Piricularia oryzae *Cavara*
	Pyrenochaeta oryzae *Shirai*
	Sclerotium oryzae *Catt.*
	Ustilaginoidea virens (*Cke.*) *Tak.*
Panicum auritum	Ustilaginoidea ochracea *P. Henn.*
Panicum repens	Uromyces linearis *Berk. & Broome*
Paspalum scorbiculatum ..	Cerebella inquinans (*Berk. & Broome*) *Petch*
	Sphacelia sp.
Saccharum officinarum ..	Apiospora compactospora *Penzig & Sacc.*
	Bothriodiplodia theobromae *Patouill.*
	Capnodium sp.
	Cercospora kopkei *Krug.*
	Colletotrichum falcatum *Went.*
	Fusarium moniliforme *Sheld.*
	Leptosphaeria sacchari *Breda de Haan*
	Marasmius sacchari *Wakker*
	Melanconium sacchari *Mass.*
	Phoma saccharina *Syd.*
	Phyllachora sacchari *P. Henn.*
	Ustilago scitaminea *Syd.*
Saccharum spontaneum ..	Phyllachora sacchari-spontanei *Syd.*
	Puccinia kuehnii (*Krug.*) *Butl.*
Sehima nervosum	Phyllachora ischaemi *Syd.*
Sorghum dochna varieties ..	Cerebella volkensii (*P. Henn.*) *Mundkur*
	Cerecospora sorghi *Ell. & Ev.*
	Claviceps sp.
	Colletotrichum graminicolum (*Ces.*) *Wil.*
	Phyllachora sorghi *v. Hoehn.*
	Puccinia purpurea *Cke.*
	Sorosporium reilianum (*Kuehn.*) *McAlp.*
	Sphacelia sorghi *McRae*
	Sphacelotheca sorghi (*Link.*) *Clint.*
Sorghum halepense	Puccinia purpurea *Cke.*
Sorghum roxburghii varieties ..	Cercospora sorghi *Ell. & Ev.*
	Colletotrichum graminicolum (*Ces.*) *Wil.*
	Phyllachora sorghi *v. Hoehn.*
	Puccinia purpurea *Cke.*
	Sorosporium reilianum (*Kuehn.*) *McAlp.*
	Sphacelotheca sorghi (*Link.*) *Clint.*
Themeda sp.	Colletotrichum sp.
Themeda triandra	Puccinia burmanica *Syd. & Butl.*
Thysanolaena maxima ..	Rosellinia sublimbata (*Durien & Mont.*) *Pass.*
Triticum aestivum	Cladosporium herbarum (*Pers.*) *Link*
	Helminthosporium sativum *Pam. King & Bakke*
	Puccinia glumarum (*Schm.*) *Erikss. & Henn.*
	" graminis *Pers.*
	" triticina *Erikss.*
	Sclerotium rolfsii *Sacc.*
	Ustilago tritici (*Pers.*) *Rostr.*
Zea mays	Diplodia sp.
	Helminthosporium turcicum *Pass.*
	Puccinia sorghi *Schw.*

GLOSSARY.

Aggregate, collected together.
Amplexicaul, clasping the stem.
Apiculate, short-pointed.
Aristate, awned.
Articulate, jointed.
Caespitose, growing in tufts.
Callus, a thickening.
Cartilaginous, hardened.
Caudate, tailed.
Chartaceous, papery.
Clavate, club-shaped.
Connate, united.
Convolute, rolled around.
Coriaceous, leathery.
Crustaceous, brittle.
Cuneate, wedge-shaped.
Cuspidate, tipped with a rigid point.
Dioecious, having the stamens and pistils on different individuals.
Distichous, arranged in two vertical ranks.
Effuse, expanded.
Fimbriate, margins bordered with long hairs.
Fugacious, soon disappearing or perishing.
Geniculate, kneed.
Gibbous, pouch-like enlargement of the base of the glume.
Hispid, beset with rough hairs.
Imbricate, overlapping.
Indurate, hardened.
Involute, margins inrolled.
Monodelphous, with stamens in one group.
Monoecious, stamens and pistils in separate flowers but borne on the same plant.
Mucronate, having a short or straight point.
Muticous, pointless, awnless.
Orbicular, disc-shaped.
Posticous, on the posterior side next the axis.
Puberulous, downy.
Pubescent, softly downy.
Pungent, ending in a sharp point.
Pyriform, pear-shaped.
Rostrate, beaked.
Rugose, wrinkled.
Spathe, bract-like envelope below the spikelets.
Spatheate, having a spathe.
Spicate, spike-like.
Spiciform, in the shape of a spike.
Striate, marked with fine parallel longitudinal lines.
Strigose, covered with sharp-pointed appressed straight stiff, bristles.
Subulate, awl-shaped.
Terete, cylindrical.
Tessellate, divided into small squares or rectangles.
Triquetrous, three-edged.
Truncate, as though cut off at the end.
Verticel, whorl.
Villous, coated with long, weak hairs.

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GLOSSARY OF VERNACULAR NAMES.

Names are Burmese or English unless otherwise stated.

Alo-kyu	Arundo donax
Badaik-myet	Chionachne semiteres
Baing-daung	Perotis indica
Bajra (Indian)	Pennisetum typhoides
Barnyard Grass	Echinochloa crus-galli
Bawa	Phyllostachys bawa
	Pseudostachyum polymorphum
Bawt-nyo-myet	Echinochloa crus-galli
Bermuda Grass	Cynodon dactylon
Be-sa	Echinochloa colona
	Brachiaria reptans
Blanket Grass	Axonopus compressus
Buffalo Grass	Paspalum conjugatum
Bulrush Millet	Pennisetum typhoides
Byit-gyon	Hordeum vulgare
Carpet Grass	Axonopus compressus
Chat-wa	Bambusa burmanica
Chinese Bamboo	Bambusa nana
Citronella Grass	Cymbopogon nardus
Daung-myet	Leptochloa chinensis
Daung-saba	Oryza meyeriana
Daye-hmwe	Dimeria kurzii
Dhoob (Indian)	Cynodon dactylon
Didok-chi	Dactyloctenium aegyptium
Du-cho-myet	Brachiaria eruciformis

Dunhalé (Talaing)	Bambusa arundinacea
Dunkaloik (Talaing)	Dendrocalamus giganteus
Gokto	Sorghum dochna var. wightii
Guinea Grass	Panicum maximum
Gya-wa	Bambusa pallida
	Neohouzeaua dullooa
Gyo-gya-myet	Eragrostis gangetica
Gyon	Triticum aestivum
Hgnet-daw-mi	Axonopus compressus
Hka-long (Shan)	Saccharum spontaneum
Hman-pwa	Leptochloa filiformis
Hmin-byu	Dendrocalamus membranaceus
Hmyin	Oxytenanthera hosseusii
Hmyin-ba	Dendrocalamus strictus
Hmyin-byu (pyu)	Dendrocalamus strictus
	Dendrocalamus membranaceus
Hmyin-net	Dendrocalamus strictus
Hmyin-san	Dendrocalamus membranaceus
Hmyin-wagyi	Dendrocalamus membranaceus
Hnee-wa	Bambusa burmanica
Indaing-myauk-myi	Heteropogon insignis
Indaing-myet-kar	Schizachyrium brevifolium
Italian Millet	Setaria italica
Job's Tears	Coix lachryma-jobi
Kadaw-myet	Sorghum nitidum
Kagyi-the-myet	Ischaemum rugosum
Kaing	Saccharum spontaneum
	Saccharum arundinaceum
Kaing-de-o-bok	Themeda intermedia
	Themeda arundinacea
	Vetiveria zizanioides
Kaing-let-the-saung	Thrysia zea
Kaing-pabya	Thrysia zea
Kaing-pyaung	Thrysia zea
Kaing-sat-ni	Setaria palmifolia
Kaing-swe-le	Themeda intermedia
Kala-lettok	Sorghum roxburghii var. hians
Kala-pyaung	Sorghum subglabrescens
Kala-sat	Pennisetum typhoides
Kaleik	Coix lachryma-jobi
Kalein	Coix lachryma-jobi
Kale-o	Dinochloa compactiflora
Kamyin-wa	Dendrochloa distans
Kanak-shaw	Oxytenanthera albociliata
Kataū (Kachin)	Pseudostachyum polymorphum
Kat-si-hne	Setaria forbesiana
Kăwa-ule (Kachin)	Dendrocalamus hookeri
Kayaung	Melocanna bambusoides
Kayin-wa	Melocanna bambusoides
Khakchat-dun (Talaing)	Melocanna bambusoides
Khas-khas (Indian)	Vetiveria zizanioides
Khwe-amee	Perotis indica
Khwe-mi-ni	Setaria lutescens
Khwe-mi-apyu	Setaria lutescens
Khwe-mi-pok	Setaria lutescens
Kikuyu Grass (African)	Pennisetum villosum
Kon-thaman-myet	Hackelochloa granularis
Korea Grass	Zoysia matrella
Ko-wa	Gigantochloa apus
Kun-pyaung	Sorghum dochna varieties
Kun-pyaung-net	Sorghum dochna var. atrum
Kun-pyaung-pyu	Sorghum dochna var. burmanicum
Kyakat-wa	Bambusa arundinacea

Kyalok-wa	Dendrocalamus membranaceus
	Dendrocalamus brandisii
Kyalo-wa	Dendrocalamus brandisii
Kyan	Saccharum officinarum
Kyathaung	Bambusa polymorpha
Kyathaungtu-thaiktu	Bambusa kyathaungtu
Kyathaungwa-ame	Oxytenanthera thwaitesii
Kyat-wa	Cephalostachyum burmanicum
	Cephalostachyum pergracile
Kyauk-padaw	Eremopogon foveolatus
	Brachiaria eruciformis
Kyauk-wa	Pogonatherum paniceum
	Capillipedium glaucopsis
Kyauk-wa-ame	Dendrocalamus longifimbriatus
Kyaung-mi	Setaria lutescens
Kyaung-wa	Thrysostachys siamensis
Kyaung-wa-ame	Oxytenanthera thwaitesii
Kya-wa	Cephalostachyum virgatum
Kyeik	Coix lachryma-jobi
	Coix gigantea
Kyu	Phragmites karka
	Arundo donax
	Neyraudia reynaudiana
Kyu-a	Phragmites karka
Kyu-kaing	Phragmites karka
Kyu-ma	Arundo donax
Kyunabin-kaing	Neyraudia reynaudiana
Kyu-wa-kaing	Phragmites karka
Lăkra (Kachin)	Cephalostachyum virgatum
	Neohouzeaua dullooa
Lalang (Malay)	Imperata cylindrica
Lay-gwa	Chloris barbata
Lemon Grass	Cymbopogon citratus
Lesser Spear Grass	Chrysopogon aciculatus
Let-sok	Sorghum roxburghii var. hians
Let-the-zaung	Isachne australis
Lin-nwe-thaik-ahlat	Centotheca lappacea
Louisiana Grass	Axonopus compressus
Love Grass	Chrysopogon aciculatus
Lu	Panicum miliaceum
Mădang (Kachin)	Cephalostachyum pergracile
Mădau Hkrar (Kachin)	Bambusa pallida
Mădaukran (Kachin)	Bambusa pallida
Mai-aw (Kachin)	Arundo donax
Mai-he (Shan)	Thrysostachys oliveri
Mai-hok (Shan)	Dendrocalamus hamiltonii
Mai-hok-kkŭ (Shan)	Dendrocalamus hamiltonii
Mai-hok-lam (Shan)	Gigantochloa macrostachya
Mai-hpyit (Shan)	Dendrocalamus strictus
Mai-htawng (Kachin)	Thrysostachys oliveri
Mai-hao-lam (Shan)	Cephalostachyum pergracile
Mai-kao-quai (Shan)	Dendrocalamus latiflorus
Maikpang (Kachin)	Cephalostachyum pergracile
Mai-lai (Shan)	Oxytenanthera albociliata
Mai-lai-law (Shan)	Dendrocalamus membranaceus
Mai-mawng (Shan)	Bambusa tulda
Mai-pao (Shan)	Thrysostachys oliveri
Maipai-kai-dhan (Siamese)	Gigantochloa compressa
Mai-pang-puk (Shan)	Phyllostachys mannii
Mai-pok-lam (Shan)	Gigantochloa macrostachya
Mai-puk (Shan)	Dendrocalamus brandisii
Maipyu (Kachin)	Bambusa pallida
Mai-sa-lawn (Shan)	Bambusa polymorpha

	Thrysostachys oliveri
Mai-sang (Shan)	Dendrocalamus strictus
	Dendrocalamus membranaceus
Mai-sang-nam (Shan)	Bambusa arundinacea
Mai-tiyo (Shan)	Thrysostachys siamensis
Mai-tong (Kachin)	Thrysostachys oliveri
Mai-tut (Shan)	*Arundinaria armata*
Mai-wang (Shan)	Bambusa tulda
Mai-wawng (Shan)	Bambusa tulda
Male Bamboo	Dendrocalamus strictus
Maung-yin-nyo	Chrysopogon aciculatus
Mene	*Oxytenanthera albociliata*
Mepwe (Karen)	Phyllostachys bawa
Merker Grass	Pennisetum purpureum
Mwe-lein-myet	Heteropogon contortus
Mwe-zok	Echinochloa notabile
Myauk-me	*Themeda triandra*
Myauk-mya	Chrysopogon aciculatus
	Heteropogon contortus
	Diectomis fastigiatus
Myet-cho	Echinochloa crus-galli
	Diplachne fusca
Myet-dat-tha	Eriochloa procera
Myet-gyin	Pseudosorghum fasciculare
Myet-hlan	Heteropogon contortus
Myet-hmon-hmwa	Eragrostis plumosa
	Sporobolus coromandelianus
Myet-hmwa-gyi	Eragrostis pilosa
Myet-hmwe	Eragrostiella bifaria
	Vetiveria zizanioides
	Bothriochloa intermedia
	Cymbopogon nardus
Myet-kaya	Chloris barbata
Myet-kha	Panicum repens
	Cynodon dactylon var. intermedius
	Leptochloa filiformis
	Leptochloa chinensis
Myet-kya	Echinochloa stagnina
Myet-kyein	Eriochloa procera
	Hemarthria compressa
Myet-kyet-thun	Cymbopogon polyneuros
Myet-le-gwa	Dactyloctenium aegyptium
Myet-let-the	Oplismenus compositus
Myet-lu	Panicum miliare
Myet-min	Hemarthria longiflora
Myet-myit-hmwe	Vetiveria zizanioides
Myet-nan	Cymbopogon virgatus
Myet-nyo	Hyparrhenia filipendula
Myet-pasit	Brachiaria ramosa
Myet-pauk	Arundinella setosa
Myet-pya	*Digitaria fibrosa*
Myet-san	Sporobolus glaucifolius
Myet-sat	Cymbopogon clandestinus
	Cymbopogon virgatus
	Leptochloa chinensis
Myet-swe-le	Themeda triandra
Myet-thamin	Aristida depressa
Myet-thi	Echinochloa crus-galli
	Echinochloa stagnina
Myet-wa	Apluda mutica
Myet-walon	Eragrostis pilosa
Myet-wine	Isachne miliacea
Myet-ya	Polytoca wallichiana

	Rottboellia exaltata
Myet-ya-gyi	*Chionachne koenigii*
Myet-ya-nge	Rottboellia exaltata
Myin-sa-myet	Cynodon dactylon
Myin-wa	Dendrocalamus strictus
	Dendrocalamus longifimbriatus
	Dendrocalamus membranaceus
Myin-wa-apyu	Dendrocalamus membranaceus
Napier Grass	Pennisetum purpureum
Nat-saba	Oryza officinalis
Nat-wa	Oxytenanthera nigrociliata
Naukpo-myet	Chrysopogon aciculatus
Naya-myet	Setaria verticillata
	Sorghum nitidum
Naya-nge	Sorghum nitidum
Naya-shwe	Pseudosorghum fasciculare
Nga-byin (Tavoy)	Dendrocalamus membranaceus
Nga-chat-wa	Bambusa binghami
	Bambusa arundinacea
Nganat-shaw	Oxytenanthera albociliata
Nga-tha-yaung	Ischaemum rugosum
Ngon-myet	Chrysopogon aciculatus
Ngun-myet	Chrysopogon aciculatus
Padat-myet	Arundinella birmanica
Padaw-byu	Bothriochloa pertusa
Padaw-ni	Eremochloa foveolatus
	Dichanthium annulatum
	Dichanthium caricosum
	Pseudosorghum fasciculare
Padaw-nyo	Dichanthium caricosum
Pauk-wa	Pseudostachyum polymorphum
Paung	Neyraudia reynaudiana
Paung-kaing	Saccharum procerum
Paung-tin-wa	Cephalostachyum pergracile
Pazun-sa	Echinochloa colona
Pearl Millet	Pennisetum typhoides
Pilan-pinan-wa	Bambusa nana
Pyaung	Sorghum halepense
Pyaung-bu	Zea mays
Pyaung-ga	Saccharum arundinaceum
Pyaung-kaing	Saccharum arundinaceum
Pyaung-kaukhnyin	Sorghum splendidum var. splendidum
Pyaung-net	Sorghum dochna var. melliferum
Pyaung-sa	Thysanolaena maxima
	Microstegium monanthum
	Microstegium ciliatum
Pyaung-sa-gale	Microstegium gratum
Pyaung-sa-gyi	Coelorhachis striata
Pyaung-sa-myet	Panicum humile
	Ischaemum aristatum
Pyaung-si	Sorghum splendidum var. splendidum
Pyaung-wa	Sorghum dochna var. wightii
Pyaung-zar-gyi	Microstegium gratum
Pyu-kaing	Phragmites karka
Rhodes Grass	Chloris gayana
Saba	Oryza sativa
Sabalin	Cymbopogon citratus
Sabalin-hmwe	Cymbopogon nardus
Saba-myet	Oryza meyeriana
Saba-yaing	Oryza coarctata
Saccoline-pyaung	Sorghum nigricans
Saing-lon	Themeda villosa
San-pyaung	Sorghum roxburghii varieties

	Sorghum cernuum var. cernuum
	Sorghum bicolor var. subglobosa
Sat	Setaria italica
Sat-loo (lu)	Eremochloa ciliaris
Sat-ni	Eleusine coracana
Sat-sha	Setaria palmifolia
Sedan	Phyllostachys sedan
	Phyllostachys mannii
Shwe-wa	Bambusa vulgaris
Siamese Bamboo	Bambusa vulgaris
Sinmidu	Thrysostachys oliveri
	Bambusa oliveriana
Sin-ngo-let-kya	Eleusine indica
Sin-ngo-myet	Eleusine indica
	Chloris barbata
.. .. ..	Paspalidium flavidum
Sinnin-wa	Dinochloa m'clellandi
Sinthana	Bambusa sinthana
Sit-kaing	Saccharum spontaneum
Sour Grass	Paspalum conjugatum
Spear Grass	Heteropogon contortus
Spiny Bamboo	Bambusa arundinacea
Tabindaing-anet	Bambusa burmanica
Tabindaing-wa	Bambusa villosula
	Gigantochloa macrostachya
	Dendrocalamus longispathus
	Melocanna bambusoides
	Bambusa tulda
	Bambusa longispiculata
	Melocanna humilis
Tagu-myet	Andropogon ascinodis
Talagu-wa	Bambusa tulda
	Oxytenanthera nigrociliata
	Dendrocalamus longispathus
Tama-zaing	Thysanolaena maxima
Tamyin-wa	Dendrochloa distans
Tatpat-wa (Karen)	Neohouzeaua stricta
Taung-kaing	Coelorhachis striata
Taung-wa-bo	Dendrocalamus brandisii
Teosinte	Euchlaena mexicana
Tet-kwet	Ischaemum rugosum
Thabut-wa	Neohouzeaua stricta
Thabyetsi-bin	Thysanolaena maxima
Thaikthada-wa	Gigantochloa macrostachya
Thaik-wa	Bambusa tulda
	Bambusa burmanica
	Bambusa affinis
	Bambusa longispiculata
Thaik-wabo	Dendrocalamus brandisii
	Neohouzeaua dullooa
	Bambusa kingiana
Thaik-wa-gyi	Bambusa burmanica
Thalaw-wa	Bambusa thalawwa
Thaman-myet	Leersia hexandra
	Eragrostis barbulata
	Eragrostis zeylanica
	Eulaliopsis binata
Thamin-mwe	Aristida depressa
Thanat-wa	Thrysostachys oliveri
Thaw-hkai (Karen)	Neohouzeaua helferi
Thaw-khwe (Karen)	Neohouzeaua helferi
Thekke	Imperata cylindrica
	Imperata exaltata

	Saccharum spontaneum
Thekke-gyi	.. Imperata exaltata
Thekke-min	.. Themeda villosa
The-myet	.. Sporobolus glaucifolius
The-padaw	.. Sporobolus tremulus
Thidok	.. Sorghum roxburghii var. hians
Thigye	.. Sorghum roxburghii var. hians
Thingyan-kaing ..	.. Sclerostachya fusca
Thishe	.. Bambusa affinis
Thon-tin-gwa	.. Ischaemum aristatum
	Ischaemum molle
Tin-wa	.. Cephalostachyum pergracile
Ti-wa	.. Thrysostachys siamensis
	Cephalostachyum pergracile
	Cephalostachyum flavescens
Tiyo-wa	.. Thrysostachys siamensis
Uga-kawa (Kachin) ..	.. Dendrocalamus hamiltonii
Ugat (Kachin) ..	.. Dendrocalamus membranaceus
Uhpaw (Kachin) ..	.. Dendrocalamus hamiltonii
U-ra (=Wa-ra) (Kachin) ..	.. Dendrocalamus calostachyus
	Dendrocalamus latiflorus
	Thrysostachys oliveri
Usawi (Kachin) ..	.. Dinochloa compactiflora
Wa-ba	.. Oxytenanthera nigrociliata
.. ..	.. Cephalostachyum virgatum
Wabalaw (Karen) ..	.. Cephalostachyum pergracile
Wabgai (Karen) ..	.. Bambusa tulda
Wablo (Karen) ..	.. Cephalostachyum pergracile
Wa-bo	Dendrocalamus giganteus
	Dendrocalamus calostachyus
	Dendrocalamus brandisii
	Dendrocalamus latiflorus
	Dendrocalamus wabo
	Cephalostachyum virgatum
Wa-bo-e	.. Dendrocalamus membranaceus
	Dendrocalamus messerii
	Dendrocalamus hookeri
Wabo-myet-sange ..	.. Dendrocalamus hamiltonii
	Denrdocalamus giganteus
Wabo-nwe	.. Denrdocalamus hamiltonii
Wabuk (Karen) ..	.. Bambusa affinis
Wabuthu (Karen) ..	.. Bambusa tulda
Wa-bwe	.. Bambusa affinis
Wa-byauk	.. Oxytenanthera nigrociliata
	Neohouzeaua dullooa
	Cephalostachyum virgatum
	Bambusa affinis
	Gigantochloa macrostachya
Wa-byaw (Tavoy) ..	.. Gigantochloa macrostachya
Wa-chat	.. Bambusa arundinacea
Wade	.. Gigantochloa macrostachya
Wa-do	.. Gigantochloa apus
Wăgat (Kachin) ..	.. Dendrocalamus membranaceus
Wa-gauk	.. Oxytenanthera albociliata
Wa-gok	.. Oxytenanthera albociliata
	Oxytenanthera nigrociliata
Wa-gyi	.. Bambusa copelandi
	Dendrocalamus calostachyus
Wăhpaw (Kachin) ..	.. Dendrocalamus hamiltonii
Wa-hpit	.. Dendrocalamus membranaceus
Wa-hput	.. Dendrocalamus membranaceus
Wa-ka	.. Cephalostachyum virgatum
Wa-keur (Karen) ..	.. Bambusa burmanica

Wakha	Pseudostachyum wakha
	Cephalostachyum virgatum
Wa-kle (Karen)	Oxytenanthera albociliata
Wa-kle-ma (Karen)	Oxytenanthera nigrociliata
	Gigantochloa macrostachya
Wa-klu (Karen)	Dendrocalamus brandisii
Wa-kyu (Karen)	Bambusa arundinacea
Wa-ma (Karen)	Gigantochloa macrostachya
Wa-maing (Karen)	Gigantochloa macrostachya
Wa-may (Karen)	Oxytenanthera nigrociliata
Wa-me (Karen)	Bambusa marginata
	Oxytenanthera nigrociliata
	Gigantochloa macrostachya
Wa-mee	Dendrocalamus membranaceus
Wa-me-pree (Karen)	Dendrocalamus strictus
Wa-mi (Karen)	Bambusa villosula
Wamilur (Karen)	Dendrocalamus strictus
Wamin	Bambusa wamin
Wa-mu (Karen)	Dendrocalamus membranaceus
Wa-myin	Dendrocalamus longifimbriatus
	Bambusa griffithiana
Wa-net	Bambusa vulgaris
	Gigantochloa macrostachya
	Gigantochloa wanet
	Dendrocalamus longispathus
	Dendrocalamus brandisii
Wa-ni	Thrysostachys oliveri
	Dendrocalamus latiflorus
Wa-nwe	Oxytenanthera albociliata
	Oxytenanthera nigrociliata
	Dinochloa andamanica
	Dinochloa compactiflora
	Dinochloa m'clellandi
	Neohouzeaua helferi
Wa-nwe-kok	*Dinochloa compactiflora*
Wa-pa-do (Karen)	Gigantochloa apus
Wapayaung	Dendrocalamus brandisii
Wa-pa-do (Karen)	Gigantochloa apus
Wa-ponwe (Karen)	Bambusa tulda
Wa-pyaw	Dendrocalamus longifimbriatus
Wa-pyin	Dendrocalamus membranaceus
	Dendrocalamus brandisii
Wa-pyu	Bambusa tulda
	Dendrocalamus membranaceus
	Dendrocalamus brandisii
	Gigantochloa macrostachya
	Gigantochloa verticillata
	Oxytenanthera albociliata
Wa-pyu-gale	Dendrocalamus membranaceus
	Oxytenanthera albociliata
Wa-pyu-gyi	Gigantochloa macrostachya
	Oxytenanthera albociliata
	Oxytenanthera nigrociliata
Wa-pyu-san	Bambusa oliveriana
Wa-ra (Karen)	Bambusa griffithiana
	Dendrocalamus calostachyus
	Dendrocalamus latiflorus
Wa-se	Neohouzeaua helferi
Waso-myet	Hackelochloa granularis
Wa-thabut	Bambusa marginata
	Dinochloa m'clellandi
	Neohouzeaua helferi
Wa-thaik	Oxytenanthera nigrociliata

Wa-ther (Karen)	Bambusa burmanica
Wa-tho (Karen)	Bambusa polymorpha
	Gigantochloa apus
Wa-thon-dyan (Karen)	Chimonobambusa gallatlyi
Wa-ya	Bambusa burmanica
	Dendrocalamus longispathus
	Oxytenanthera albociliata
	Oxytenanthera nigrociliata
Wa-yon-myet	Echinochloa notabile
	Ottochloa nodosa
Wa-yon-saung	Ottochloa nodosa
Way-thali	Sorghum roxburghii var. parvum
	Sorghum roxburghii var. hians
Wa-zun	Neohouzeaua dullooa
Wire Grass	Cynodon dactylon
Wunbe-sa-myet	Echinochloa colona
Yaman (myet)	Arundinella setosa
	Arundinella bengalensis
Yaman-nge	Arundinella bengalensis
Yaso-myet	Schizachyrium brevifolium
Yin	Scleroctachya fusca
Yŏ-hkum (Shan)	Eleusine indica
Yon-gale	Eragrostis tenella
	Tragus biflorus
Yon-hle	Tragus biflorus
Yon-hmwe	Pseudopogonatherum contortum

INDEX TO BOTANICAL NAMES.

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