

THE GRASSES OF NORTHWEST INDIA

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The following annotated list includes the grasses of the Western Himalayas from the Indus River to the Ganges and in addition those of the Punjab Plains. The political divisions covered are Hazara District of the Northwest Frontier Province, the whole of the Punjab and Kashmir, and the western border of the United Provinces (see map, fig. 1).

Since 1911 the author has been associated with Gordon College, Rawalpindi, in the North Punjab, and has spent his summers collecting in the mountains. He has spent his furloughs at the New York Botanical Garden and has studied for several weeks at Kew and at the herbarium of the Imperial Forestry Research Institute at Dehra Dun in the United Provinces of British India. His best series of specimens are at Gordon College and the New York Botanical Garden; less complete series are at the National Herbarium, at the National Arboretum, at the Gray Herbarium of Harvard University, and at Dehra Dun. He had expected to spend a month or two at the Royal Botanic Gardens at Kew in 1942 but the war made it impossible.

Although it is probable that few new grasses await discovery in this area, there is much field work still to be done. Many species are poorly represented in herbaria and a surprising number are still known only from the type collection. Some parts of the region have been visited by but few botanists and consequently we do not know enough about the geographical and altitudinal ranges of the grasses. Furthermore, little attention has been paid to habitats.

A number of different ecological regions are represented, since the area studied includes the plains of the Punjab, the low arid hills of the Salt Range, the varied territory from the foothills to the snow line of the Himalayas, and a section of the Tibetan plateau which is in British India.

THE PUNJAB PLAINS

There are three main elements in the grass flora of the Punjab plains: the Mediterranean, the tropical, and the cosmopolitan. Many species of the Mediterranean flora range from Spain and Morocco, or even from the Canaries, to the foothills of the Himalayas. Outposts of this flora are to be found in Baltistan and Ladak on the Upper Indus behind the Himalayas. It would be interesting to know whether they were in that area before the Himalayan uplift or whether they gradually worked up through the gorges of the Indus. The flora of the famous Vale of Kashmir, at 5,200 feet, is also Mediterranean in aspect. The tropical element in the Punjab flora flourishes during the hot monsoon period from July to September. Many of these grasses are wide-ranging and some extend to China, the Philippines, or even to Australia, while others are also found in the tropical parts of Africa. The cosmopolitan grasses are chiefly weeds of cultivation.

As one goes east from the Indus the tropical element in the flora increases as the rainfall becomes heavier toward the Bay of Bengal. Near the Indus, in Hazara and the Murree Hills (fig. 1), the annual rainfall at 7,000 feet averages from 30 to 40 inches. In this area the only epiphytes are a few liverworts and mosses. Four hundred miles to the east at Mussoorie in the United Provinces,

at the same altitude, the rainfall is twice as heavy and during the monsoon the oaks and other trees are covered with ferns, orchids, aroids, and other epiphytes.

Rainfall is very variable in the Punjab plains. In the unirrigated areas there are occasional good years but when there is a poor monsoon the peasants require famine relief and many cattle die. Especially in the southern and western districts large areas have ten inches or less of rain and the soil is very alkaline. Little rain falls except in July and August.

The country is green in July and August and for a short period in the spring. Usually a few inches of rain fall in the winter and an ephemeral flora springs up in March and dies down again by the middle of April. It is then very hot and

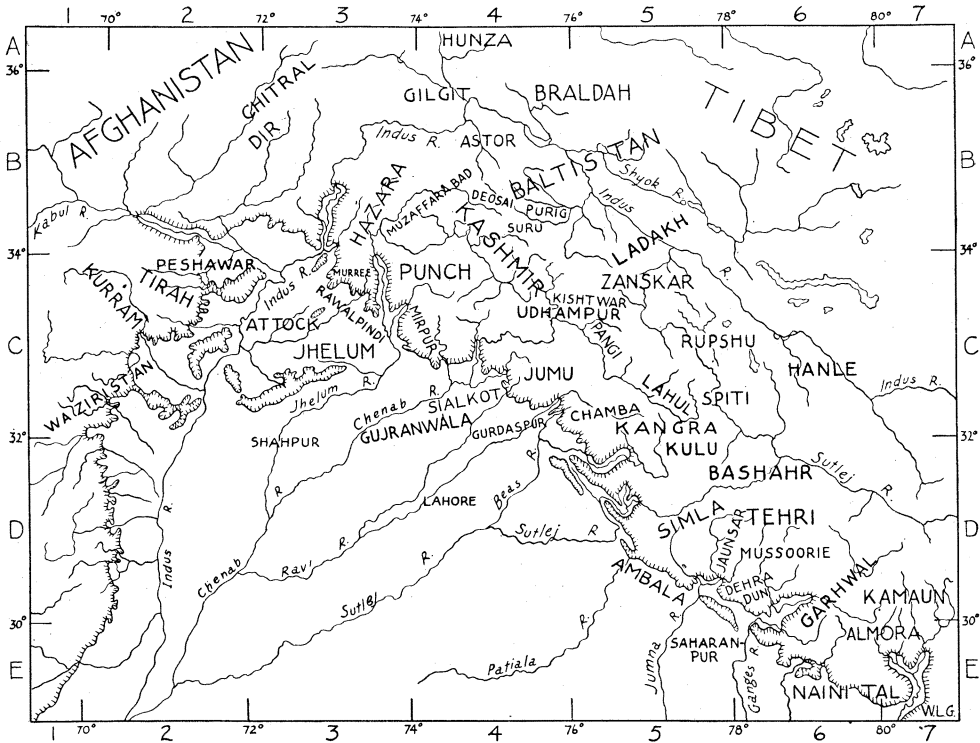


FIG. 1. Region of the western Himalayas.

dry until July. Snow does not fall in the plains, but there are a few falls each winter in the foothills as low as 3,000 feet. In shady places in the forest at 7,000 feet snow lies until April. There is little frost in the plains, and citrus fruits do well except in the foothills. The winter climate is much like that of southern California.

In the plains botanizing is only worth while in March and April and again from the middle to the end of the monsoon. Many of the perennial grasses flower twice, once in the spring and again in August and September. At 7,000 feet there is good collecting from April to the end of October. On the high passes and near the snow line little collecting is possible except in July and August.

Much of the Punjab was originally desert, but owing to irrigation from the great rivers, this territory is now producing wheat, cotton, legumes, sorghum, millets, sugar cane, and subtropical fruits. The flora has been greatly changed by irrigation, and waterlogging has ruined much fertile land.

THE HIMALAYAS

Among the Himalayan grasses, there is first a tropical or subtropical element which flourishes during the hot monsoon period. Many of these may be found in the plains at the same season. A few ascend to 7,000 feet in the outer ranges. A second element is temperate and this is found chiefly from 6,000 to 9,000 feet. Many of these temperate grasses are endemic in the western Himalayas. Some, now supposed to be endemic, will probably be discovered in the mountains of Burma and western China. The third important element is the alpine. As might be expected, many of the high-level grasses are also found in Russia and the Alps, while others grow in the colder regions of both hemispheres. They begin at about 9,000 feet and extend up to the snow line, which is roughly at 14,000 feet on the south slope of the Himalayas and may be as high as 19,000 feet on the Tibetan side. A few are endemic.

THE TIBETAN PLATEAU

Chiefly on the Tibetan side of the Himalayas, on the dry steppes, there is a fourth element which has its affinities with the grasses of Tibet and Central Asia. Here we find species of such genera as *Stipa*, *Elymus*, *Agropyron*, and *Glyceria*. They are chiefly to be found in the region called Western Tibet in Hooker's *Flora of British India*. Villages are only possible where a little land can be irrigated. There are no forests, and willows, poplars, and apricots have to be planted and protected within walled gardens. The region is Tibetan in population and climate but is administered by the native state of Kashmir or by the Punjab (Lahul and Spiti). At Leh, the capital of Ladak (Western or Little Tibet), the annual rainfall is two inches a year, but there is considerable irrigation from the streams fed by the melting snow of the high mountains.

Beginning with the Karakorum and Nanga Parbat ranges in the far north, the chief regions having a Tibetan type of flora are Astor, Baltistan, Nubra, Ladak, Purig (Dras), Rupshu, and Zanskar (Zaskar) in Kashmir, and Lahul and Spiti in the Punjab (fig. 1). In this area "bunch grasses" predominate but in addition there are a good many weeds in the villages and a number of alpine grasses on the high pastures near melting snow.

As in most regions where the flora has not been thoroughly worked, there are doubtful species of several sorts. The most irritating are those erected by some one unwilling to take the trouble to consult the herbaria containing the most complete collections of the area involved. The difficulty is increased when the description of the "new species" is based on a single herbarium sheet and the author fails either to mention the section of the genus to which it belongs or to compare it with the most closely related species.

The volume on grasses in the *Flora of British India* needs much revision. It is out of date in various ways. Much new material has accumulated in the last fifty years. Botanists are now working under different rules of nomenclature and consequently many of the names formerly used are not valid now. *Panicum* and *Andropogon*, the two largest genera in the *Flora of British India*, are now divided into a number of smaller genera by most agrostologists. Many errors have been discovered which need correction.

PROCEDURE

I have not attempted to publish the complete synonymy of the species listed but only to give the valid name, the one used in the *Flora of British India*, and the oldest published name if it was first described under another genus. Sometimes, for clarity, other synonyms have been added.

No effort has been made to cite all of the specimens seen unless the species is represented by very few collections. When species are very common only representative localities are mentioned. When species are fairly common citations are usually limited to the author's own specimens and to those of Dr. Walter Koelz, which are in the New York Botanical Garden where this study has been completed. When the collector's name is not mentioned the specimen is in my own collections. References to specimens in the U. S. National Herbarium were supplied by Mrs. Chase.

Until R. N. Parker, Chief Conservator of Forests, Punjab, published his *Forest Flora for the Punjab* (ed. 2, 1924), and Dr. N. L. Bor published the Gramineae in the *Flora of Assam*, most Indian botanists failed to give complete citations for their species. Some gave only the name of the author, while others omitted the date of publication. This makes it difficult to trace original descriptions in libraries. Mr. G. L. Wittrock of the New York Botanical Garden has given me invaluable assistance by checking citations and has found a number of errors which have crept into textbooks and been repeated again and again because the original reference had not been consulted. Since a few books were not available, we were not able to check every reference. I shall appreciate being informed of any other corrections which need to be made.

COLLECTORS

Many explorers have collected plants in northwest India, but few have made important collections of grasses. Curiously enough, there has been little collecting in the plains of the Punjab, which are easy of access. We know more about the more remote parts of Kashmir. The foothill zone is not very well known, while the temperate zone from 6,000 to 9,000 feet has been fairly well covered. Poonch (Punch), which includes the southern slopes of the Pir Panjal Range east of the Jhelum River, is little known, and so is the country near the eastern boundary of Kashmir State.

Knowledge of the grasses of the area is largely due to the work of a few men. First place should be given to John Firminger Duthie (1845-1922), Superintendent of the Saharanpur Botanical Garden from 1873 to 1903. (The Saharanpur herbarium is now housed in Dehra Dun.) He collected widely himself and employed several capable Indian collectors. His Mohammedan collector, Inayat, is the only person who has done much work in Hazara and his specimens are in Duthie's numbered series. Sets of Duthie's plants are available at Dehra Dun, Calcutta, Kew, and elsewhere, including the U. S. National Herbarium.

Hugh Falconer (1808-1865), Superintendent at Saharanpur from 1832 to 1847, sent native collectors as far as Baltistan from 1834 to 1838. Thomas Thomson (1817-1878) discovered a number of novelties while serving with the Tibetan Boundary Commission from 1847 to 1848. Unfortunately his specimens were distributed without the localities having been recorded.

The next important expedition was that of the three Schlagintweit brothers, who explored the western Himalayas from 1854 to 1858. They collected 213 grasses which were named by Grisebach and described in 1868 in a paper entitled "Über die Gramineen Hochasiens" (Nachr. Ges. Wiss. Gött. 1869: 61-93). He was much impressed by the fact that within a very small geographical area it was possible to find tropical, Mediterranean, European, alpine, and Central Asian grasses.

Charles Baron Clarke (1832-1906), who co-operated with Sir J. D. Hooker in preparing revisions of several orders for inclusion in the *Flora of British India*,

collected about 30,000 numbers in India; his collections are at Dehra Dun, Kew, and probably at Calcutta.

General Sir Henry Collett (1836–1901), author of the *Flora simlensis*, collected in the neighborhood of Simla and on the Afghan Frontier.

Between 1930 and 1936 Dr. Walter Koelz collected 10,000 numbers in North India, making extensive trips into the recesses of the Tibetan parts of the Punjab and Kashmir Himalaya. He collected first for the Roerich Institute of New York, then for the University of Michigan, and lastly for the Bureau of Plant Industry, U. S. Department of Agriculture. Many of his specimens were gathered by Indian collectors.

Prof. W. Troll, botanist on the German Nanga Parbat Expedition of 1937, made important collections from the Indus Valley and the area about the Nanga Parbat Range. Notices of some new species have appeared in the *Notizblatt* of the Berlin Botanical Garden but detailed botanical results have not yet reached this country.

Other important collectors were Victor Jacquemont, John Forbes Royle, J. E. T. Aitchison, J. R. Drummond, G. A. Gammie, A. Meebold, James Lindsay Stewart, Sir Richard Strachey, J. E. Winterbottom, and Sir George Watt. Dr. Francis W. Pennell in his monograph *The Scrophulariaceae of the Western Himalayas* (1943) has a more complete list of those who have collected in North India. A detailed account of exploration in Baltistan and Ladak is to be found in Pampanini's *La Flora del Caracorum* (1930).

My own collecting began in 1912 with a trip to Kashmir, including Ladak and Suru. This was followed in 1913 by a trip to Ladak, Rupshu, Lahul, Kulu, and Simla. In 1916–17 under a Cutting Travelling Fellowship and assisted by my wife, I visited Pathankot, Kangra, Dharmsala, Dalhousie, Chamba, and Kashmir. One summer vacation was spent in the Murree Hills and many vacations were spent in Kashmir. We would usually set up a permanent camp in a favorable place and make short trips in all directions. The vacation of 1939 was spent touring in the Kishenganga Valley and the Nanga Parbat region and that of 1940 in Baltistan and Ladak. Seven vacations were spent farther east at Landour, near Mussoorie and Dehra Dun in the United Provinces. Many short trips were made to Hazara, the Murree Hills, and places about Rawalpindi with groups of college students.

REFERENCES

The most useful book on Indian grasses is still the seventh volume of the *Flora of British India*, which was prepared by Sir Joseph Hooker himself in co-operation with Otto Stapf and published in 1896.¹ Some Indian provinces now have a local *Flora* with a more up-to-date treatment of the Gramineae, but there is no recent work for the Northwest. Three great *Floras* of adjacent regions have been published fairly recently and there is need of correlating them to the flora of India. These are Lecomte's *Flora of Indo-China* with the grasses prepared by Edmond Gustave and Mlle. Aimée A. Camus (1922); Prain's *Flora of Tropical Africa*, the grasses prepared by Otto Stapf and Charles Edward Hubbard (1917–1934), and Komarov's *Flora of the U. R. S. S.*, the grasses by a large number of collaborators (1934).

Few books on the flora of Northwest India list the grasses. Pampanini has 59 species and a few varieties from the Karakorum Mts. (*Flora del Caracorum*,

¹ The title page gives the date 1897, but Mrs. Chase informs me that the first half was published in April, and the second half by December, 1896.

1930). Collett reports 135 from the Simla region (*Flora simlensis*, 1902), and Grisebach deals with 213 from the whole of the Himalayan chain (Über die Gramineen Hochasiens, 1868). There are 410 species and varieties in this list.

ACKNOWLEDGMENTS

Dr. Nathaniel L. Bor of the Indian Forestry Service and author of the Gramineae in the *Flora of Assam* has helped me greatly by checking the identification of hundreds of specimens and by permitting me to use the rich herbarium of the Forestry Research Institute where he has been Forest Botanist. He has detected a few novelties in my collections and has probably been delayed in publishing them by the war. J. R. Swallen of the U. S. Bureau of Plant Industry has identified a number of specimens for me and made a number of valuable suggestions. Mrs. Agnes Chase, of the U. S. National Herbarium, Washington, D. C., has given me much encouragement and helped me in many ways. She has read the whole manuscript, suggested many improvements, and supplied much information. References to specimens in the National Herbarium have been supplied by her. Most of the specimens collected by Dr. Walter Koelz which are in the New York Botanical Garden were determined by Dr. A. S. Hitchcock.

SUMMARY OF THE GRASSES

In analyzing the distribution of the grasses of this region I find that nearly a third are tropical, ranging to the south or southeast or to Africa. Nearly a third are Himalayan and forty of these appear to be endemic. A number extend into the mountains of western China. Ten per cent are Mediterranean. Ten per cent are temperate or alpine with a wide range in Europe, Asia, and even in North America. Ten per cent are Central Asian. Sixteen species are cultivated and at least twenty-two are common weeds of cultivation.

Cultivated Grasses

<i>Paspalum scrobiculatum</i>	<i>Saccharum officinarum</i>
<i>Panicum miliaceum</i>	<i>Sorghum vulgare</i>
<i>Panicum maximum</i>	<i>Avena sativa</i>
<i>Echinochloa frumentacea</i>	<i>Eleusine corocana</i>
<i>Setaria italica</i>	<i>Triticum aestivum</i>
<i>Pennisetum glaucum</i>	<i>Hordeum vulgare</i>
<i>Oryza sativa</i>	<i>Bambusa arundinacea</i>
<i>Zea Mays</i>	<i>Dendrocalamus Hamiltonii</i>

Mediterranean Grasses

<i>Digitaria nodosa</i>	<i>Phleum paniculatum</i>
<i>Digitaria pennata</i>	<i>Sporobolus arabicus</i>
<i>Tricholaena teneriffae</i>	<i>Melanocenthris Royleana</i>
<i>Cenchrus setigerus</i>	<i>Melanocenthris plumosa</i>
<i>Cenchrus barbatus</i>	<i>Chloris villosa</i>
<i>Cenchrus ciliaris</i>	<i>Eleusine flagellifera</i>
<i>Pennisetum dichotomum</i>	<i>Dactyloctenium scindicum</i>
<i>Pennisetum orientale</i>	<i>Pappophorum brachystachyum</i>
<i>Brachiaria erucaeformis</i>	<i>Arundo donax</i>
<i>Erianthus ravennae</i>	<i>Lamarckia aurea</i>
<i>Cymbopogon schoenanthus</i>	<i>Eragrostis papposa</i>
<i>Eremopogon foveolatus</i>	<i>Desmostachya bipinnata</i>
<i>Aristida mutabilis</i>	<i>Aeluropus brevifolius</i>
<i>Aristida funiculata</i>	<i>Schismus barbatus</i>
<i>Aristida plumosa</i>	<i>Festuca tenuiflora</i>
<i>Stipa tortilis</i>	<i>Brachypodium distachyon</i>
<i>Heleochoa schoenoides</i>	<i>Aegilops squarrosa</i>

Some Central Asian Grasses

<i>Pennisetum flaccidum</i>	<i>Poa attenuata</i>
<i>Stipa orientalis</i>	<i>Festuca altaica</i>
<i>Stipa Regeliana</i>	<i>Festuca alataica</i>
<i>Stipa purpurea</i>	<i>Festuca sibirica</i>
<i>Stipa mongholica</i>	<i>Bromus crinitus</i>
<i>Stipa Hookeri</i>	<i>Bromus oxyodon</i>
<i>Stipa splendens</i>	<i>Bromus macrostachys</i>
<i>Calamagrostis tianshanica</i>	<i>Agropyron semicostatum</i>
<i>Deschampsia koelerioides</i>	<i>Agropyron Jacquemontii</i>
<i>Melica Jacquemontii</i>	<i>Agropyron longearistatum</i>
<i>Melica persica</i>	<i>Elymus nutans</i>
<i>Eremopoa persica</i>	<i>Elymus dahuricus</i>
<i>Eremopoa songarica</i>	<i>Elymus dasystachys</i>
<i>Poa tibetica</i>	<i>Elymus chinensis</i>

Temperate and Alpine Eurasian Grasses

<i>Digitaria ischaemum</i>	<i>Dactylis glomerata</i>
<i>Phalaris arundinacea</i>	<i>Sclerochloa dura</i>
<i>Milium effusum</i>	<i>Briza media</i>
<i>Alopecurus aequalis</i>	<i>Poa bulbosa</i>
<i>Alopecurus myosuroides</i>	<i>Poa nemoralis</i>
<i>Alopecurus geniculatus</i>	<i>Poa flexuosa</i>
<i>Agrostis alba</i>	<i>Poa annua</i>
<i>Agrostis stolonifera</i>	<i>Puccinellia distans</i>
<i>Agrostis semiverticillata</i>	<i>Festuca valesiaca</i>
<i>Agrostis canina</i>	<i>Festuca rubra</i>
<i>Calamagrostis pseudophragmites</i>	<i>Bromus inermis</i>
<i>Calamagrostis arundinacea (Deyeuxia sylvatica)</i>	<i>Brachypodium sylvaticum</i>
<i>Deschampsia caespitosa</i>	<i>Brachypodium pinnatum</i>
<i>Trisetum spicatum</i>	<i>Lolium rigidum</i>
<i>Helictotrichon pratense</i>	<i>Lolium perenne</i>
<i>Phragmites communis</i>	<i>Agropyron repens</i>
<i>Koeleria cristata</i>	<i>Agropyron caninum</i>
<i>Melica nutans</i>	<i>Agropyron intermedium</i>

Some Weeds of Cultivation

<i>Sorghum halepense</i>	<i>Bromus tectorum</i>
<i>Phalaris minor</i>	<i>Bromus japonicus</i>
<i>Polypogon interruptus</i>	<i>Bromus mollis</i>
<i>Polypogon monspeliensis</i>	<i>Lolium temulentum</i>
<i>Avena fatua</i>	<i>Lolium multiflorum</i>
<i>Avena barbata</i>	<i>Hordeum murinum</i>
<i>Koeleria phleoides</i>	<i>Echinochloa colonum</i>
<i>Eragrostis cilianensis</i>	<i>Echinochloa crusgalli</i>
<i>Eragrostis pqaoides</i>	<i>Setaria lutescens</i>
<i>Festuca myuros</i>	<i>Setaria verticillata</i>
<i>Cynodon dactylon</i>	<i>Setaria viridis</i>

A NOTE ON PLACE-NAMES

A note is perhaps necessary in explanation of the varied spelling of Indian place names. There has been an evolution in the spelling of many names. Cashmere was preferred at one period, while Kashmir is now used on maps. The city where I live was at first Rawul Pindee, while it is now Rawalpindi. The province with headquarters at Karachi may be found as Scinde, Scind, or Sind. The eastern province of Kashmir is Jumu, Jammu, or Jummoo. The Kashmir district across the Jhelum River from Rawalpindi is either Poonch or Punch. It is not merely that spelling fashions have changed. In many cases there is not as yet a

fixed English spelling and authors spell the native names as phonetically as they can, and the results are not always in harmony. Some maps use Zanskar for one of the Tibetan Kashmir districts while others spell it Zaskar. The Punjab used to be spelled Punjaub while now many prefer Panjab.

The natives themselves differ in pronunciation of some words. The capital of India, Delhi, is usually pronounced as though it were "Delli" but others pronounce the word as though it were "Dilli." In the mountains a small valley may either be called a "nullah" or a "nala." In some cases the traveller does not hear the place name accurately or does not quite understand so that inaccuracies get into the maps. There is a place on the Indus in Baltistan which is Olthing Thang on the map. Thang is not really a part of the name but means a level place and the man who knows the place and the language best says that it should be spelled Olding.

The introduction to F. W. Pennell's *The Scrophulariaceae of the Western Himalayas* contains fuller information about collectors in north India, details of the routes I have followed in collecting, and a list of localities with notes that will help one to find them on the map. There is also information about the routes of Dr. Walter Koelz.

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BAMBUSEAE

1. *Arundinaria* Michx.

Arundinaria falcata Nees, *Linnaea* 9: 478. 1834; Fl. Brit. Ind. 7: 381. 1896.

KASHMIR: Aliabad Pass, Poonch, 7000 feet (Herb. Gordon). PUNJAB: Dharmkot, Dharm-sala, 6000 feet, 2062. U. P.: Landour and vicinity, 6000-7000 feet (Herb. Dehra).

Common name, "Ringal."

Distribution: Western Himalaya, Kashmir to Nepal; Indo-China.

2. *Thamnocalamus* Munro.

Thamnocalamus Falconeri Hook. f.; Munro, Trans. Linn. Soc. 26: 34. 1868.

Arundinaria Falconeri (Hook. f.) Benth & Hook. f.; Gamble, Ann. Bot. Gard. Calcutta 7: 20. 1896; Fl. Brit. Ind. 7: 383. 1896.

U. P.: Landour, Mussoorie, 6000-7000 feet (Herb. Dehra).

Distribution: Northwest Himalaya, temperate zone. Alt. 6000-9000 feet.

Thamnocalamus spathiflorus (Trin.) Munro, Trans. Linn. Soc. 26: 34. 1868.

Arundinaria spathiflora Trin. Mém. Acad. Pétersb. VI. 3(2): 617. 1835; Fl. Brit. Ind. 7: 382. 1896.

PUNJAB: Malana Slope, Kulu, 9500 feet, *Koelz 213*; Huttoo, Simla Hills (Fl. Siml. 635. 1902).

Distribution: Western Himalaya, Sutlej River to Nepal. Alt. 7000-9000 feet.

3. *Bambusa* Schreb.

Bambusa arundinacea (Retz.) Willd. Sp. Pl. **2**: 245. 1799; Fl. Brit. Ind. **7**: 395. 1896.

Arundo bambos L. Sp. Pl. 81. 1753.

Bambos arundinacea Retz. Obs. 5: 24. 1789.

Bambusa bambos Druce, Bot. Exch. Club Rep. 4: 608. 1917.

KASHMIR: Billawar, Jammu, Lambert (List Kashmir Trees and Shrubs, Forest Bulletin 80: 34. 1933). PUNJAB: Kangra (Parker, Forest Flora, ed. 2, 535. 1924).

Commonly planted in the plains and foothills of Northwest India.

Distribution: India, Indo-China.

Bambusa nutans Wall.; Munro, Trans. Linn. Soc. **26**: 92. 1868; Fl. Brit. Ind. **7**: 387. 1896.

PUNJAB: Cultivated in the sub-Himalayan tract of Chamba and Kangra to 4000 feet (Parker, Forest Flora, ed. 2, 534. 1924).

Distribution: Central and Eastern sub-Himalayan zone, Indo-China.

4. *Dendrocalamus* Nees.

Dendrocalamus Hamiltonii Nees & Arn.; Munro Trans. Linn. Soc. **26**: 151. 1868; Fl. Brit. Ind. **7**: 405. 1896.

Bambusa monogynia Griff. Notul. Pl. Asiat. 63. 1851; Ic. Pl. Asiat. *pl.* 150, *f.* 2. 1851; non Blanco 1837.

Cultivated by villagers in Chamba and Kangra Districts of the Punjab (see Parker, Forest Flora, ed. 2, 537. 1927).

Distribution: Nepal and Northeast Himalaya, Malaya, Indo-China.

Dendrocalamus strictus (Roxb.) Nees, Linnaea **9**: 476. 1834; Fl. Brit. Ind. **7**: 404. 1896.

Bambos stricta Roxb. Coromandel Pl. 1: 58. *pl.* 80. 1795.

This is the only large bamboo which is native in our area. Parker states in his *Forest Flora*, ed. 2, 536 (1924) that it begins in the Margalla Reserve, Rawalpindi District, and becomes of economic importance in Kangra. Lambert reports it from Billawar, Jammu, Mirpur, and Udhampur in his *List of Trees and Shrubs*. A plant of the lower foothills.

Distribution: India, Java, planted in Indo-China.

FESTUCEAE

5. *Bromus* Linn.

Bromus arvensis L. Sp. Pl. 77. 1753.

KASHMIR: Leh, Ladak, *Schlagintweit* 1340; 1487 (U. S. Nat. Herb.); Shushal, Ladak; *Koelz* 2446a, 6149; Hanle, Rupshu, *Koelz* 2320. PUNJAB: Sisu, Lahul, *Koelz* 694; Shipting Nullah, Lahul, *Koelz* 948; Bailing Nullah, Lahul, *Koelz* 1235a; Jispa, Lahul, *Koelz* 2055. All det. by Hitchcock and nearly all by Mrs. Chase.

Not reported from India in Fl. Brit. Ind. and I confused it with *B. japonicus*. Mrs. Chase points out that the palea in *B. arvensis* equals the lemma in length, while the palea is shorter than the lemma in *B. japonicus*. Alt. 10,000–14,000 feet.

Distribution: Western Himalaya, Europe.

Bromus asper Murray, Prodr. Stirp. Gött. 42. 1770; Fl. Brit. Ind. **7**: 358. 1896.

KASHMIR: Tragbal, 4942; Trunkal, 18,169; below Burzil Chowki, 19,831a; near Tilel, 18,438; Pahlgam, 5327. PUNJAB: Murree, *Trotter* 73; Sach Pass, *Chamba* 2612; 2632; *Koelz* has many specimens from Lahul.

Alt. 6000–11,000 feet.

Distribution: Europe, North Africa, West and North Asia, Himalayas, China.

Bromus catharticus Vahl, Symb. 2: 22. 1791.

Festuca unioloides Willd. Hort. Berol. 3: pl. 3. 1803.

Bromus unioloides H. B. K. Nov. Gen. & Sp. 1: 151. 1815; Fl. Brit. Ind. 7: 357. 1896.

U. P.: Roadsides, Landour and Mussoorie, 6000–7000 feet, adventive, 14,263; 15,893.

Distribution: Tropical and temperate America.

Bromus crinitus Boiss. & Hoh. in Boiss. Diagn. 2(13): 64. 1853; Fl. Brit. Ind. 7: 359. 1896.

KASHMIR: Baltistan and Zaskar (Fl. Brit. Ind.); Rachogpa, Rupshu (Herb. Gordon).
PUNJAB: Jispa, Lahul, *Koelz* 2037, 2057.

Alt. 10,000–14,000 feet.

Distribution: Tibetan Himalaya west to Persia; Turkestan.

Bromus inermis Leyss. Fl. Hal. 16. 1761; Fl. Brit. Ind. 7: 357. 1896.

KASHMIR: Gudhai, Astor Dist., *Duthie* (Herb. Dehra); Matayan, Ladak Road, 9980; Lohan Gali near Tilel, 18,550; near Shankargarh, Astor Dist. 18,765; Burzil Chowki, 19,773; 19,831.

Alt. 9000–13,000 feet.

Distribution: Alpine Western Himalaya, North Europe, Asiatic Russia. Widely introduced in North America.

Bromus japonicus Thunb. Fl. Jap. 52. pl. 11. 1784.

Bromus patulus Mert. & Koch, in Röhl. Deuts. Fl. ed. 3. 1: 685. 1823; Fl. Brit. Ind. 7: 361. 1896.

KASHMIR: Pahlgam, 7000–8000 feet, 5701. PUNJAB: Near Rawalpindi, 1501; 2759. Kulu, Kangra, Punjab, *Koelz* 4631. All det. by Mrs. Chase.

A weed in the plains and hills to at least 8000 feet.

Distribution: North India, China, Japan, Asiatic Russia, Europe.

Bromus japonicus Thunb. var. **Falconeri** (Stapf) R. R. Stewart, comb. nov.

B. patulus var. *Falconeri* Stapf in Hook. f. Fl. Brit. Ind. 7: 361. 1896.

PUNJAB: Rawalpindi, 1700 feet, 1503. N. W. FRONTIER: Peshawar, 15,479.

The variety has very pubescent spikelets with long divergent awns. It is a plant of the plains.

Distribution: Punjab and N. W. Frontier.

Bromus macrostachys Desf. var. **triaristatus** Hack. Flora 62: 155. 1879; Fl. Brit. Ind. 7: 362. 1896.

PUNJAB HIMALAYA: Spiti, Lance (Fl. Brit. Ind.).

Distribution: Afghanistan, Turkestan, Asia Minor, and the Mediterranean region.

Bromus mollis L. Sp. Pl. ed. 2: 112. 1762.

PUNJAB: Murree, 12,504; 15,356, 6000–7000 feet; 2131, det. A. Chase.

Distribution: Punjab west to Europe, North Africa, and Asia Minor.

Bromus oxyodon Schrenk in Fisch. & Mey. Enum. Pl. Nov. 2: 1. 1842; Fl. Brit. Ind. 7: 361. 1896.

A common grass, but usually found above 9000 feet. It is sometimes found mixed with *B. japonicus*. It grows in Kashmir proper, Astor, Gurais, Dras, Zaskar, Lahul, Chamba, Baltistan, etc. Alt. 8500–12,000 feet.

Distribution: Northwest Himalaya, Turkestan.

Bromus patulus var. **microstachya** Stapf in Hook. f. Fl. Brit. Ind. 7: 361. 1896.

N. W. INDIA: Falconer (Fl. Brit. Ind.). KASHMIR: Kishenganga Valley, 6000 feet, 17,746 may belong to this variety; more material is needed.

Bromus scoparius L. Cent. Pl. 1: 6. 1755; Fl. Brit. Ind. 7: 360. 1896.

KASHMIR: Falconer, *Duthie* (Fl. Brit. Ind.)

Alt. 5000–6000 feet.

Distribution: Mediterranean Basin, South Russia.

Bromus tectorum L. Sp. Pl. 77. 1753; Fl. Brit. Ind. 7: 359. 1896.

KASHMIR: Chillum, Astor Dist. 18,995; Satpura Nullah, Baltistan; Timisgam, Ladak (Herb. Gordon). PUNJAB: Hunan Nullah, Chamba, 2813a.

Alt. 7000–12,000 feet; often in cultivated fields.

Distribution: N. W. Himalaya, Europe, North Africa, North and West Asia.

6. *Duthiea* Hack.

Duthiea bromoides Hack. Verhandl. Zool. Bot. Ges. Wien. 200. 1895; Fl. Brit. Ind. 7: 282. 1896.

HAZARA: Kagan Valley, 23–6–1899, *Inayat* (Herb. Dehra). KASHMIR: Mt. Aparhat, above Gulmarg, 8847. PUNJAB: Chanderkani, Kulu, *Koelz* 256.

Distribution: Western Himalaya, Hazara to Kunawar. Alt. 12,000–13,000 feet.

7. *Brachypodium* Beauv.

Brachypodium distachyon (L.) Beauv. Ess. Agrost. 101, 155. 1812.

Bromus distachyos L. Cent. Pl. 2: 8. 1756.

N. W. FRONTIER: Peshawar and Khyber Pass (Herb. Gordon). PUNJAB: Jhalar, Attock Dist., *Eugene Nasir* (Herb. Gordon).

Not in the *Fl. Brit. Ind.*

Distribution: Punjab, west to Europe and the Mediterranean Basin.

Brachypodium pinnatum (L.) Beauv. Ess. Agrost. 101, 155. *pl. 19, f 3.* 1812; Fl. Brit. Ind. 7: 363. 1897.

Bromus pinnatus L. Sp. Pl. 78. 1753.

KASHMIR: Gulmarg, Aug. 1926, 10,500 feet, 8732, det. J. R. Swallen. This is smaller than average *B. pinnatum* and the hairs on the keels of the palea are shorter and finer.

Distribution: Kashmir, westward to Europe and North Asia.

Brachypodium sylvaticum (Huds.) Beauv. Ess. Agrost. 101, 155. 1812; Fl. Brit. Ind. 7: 362. 1896.

Festuca sylvatica Huds. Fl. Angl. 38. 1762.

HAZARA: Kagan Valley, *Duthie* (Herb. Dehra). KASHMIR: Pahlgam, 5348; Chenari, Jhelum Valley; Kishenganga Valley, 17,339; 17,516; 17,607, etc. PUNJAB: Murree Hills, 3825; 3858; 4043; Sisu, Lahul, *Koelz* 691, 822a. U. P.: Kempti Falls, near Mussoorie, 11,250a; near Mussoorie, 11,448; 15,739.

Fairly common. Alt. 3500–10,000 feet.

Distribution: Temperate Himalaya, Mts. of South India and Ceylon, North Asia, South Africa.

Brachypodium sylvaticum var. *longe-aristatum* Hook. f. Fl. Brit. Ind. 7: 363. 1896.

PUNJAB: Dalhousie (Fl. Brit. Ind.). U. P.: Tehri Road near Mussoorie, 11,448 may belong here.

Distribution: Dalhousie and Kumaon. Alt. 6000–9000 feet.

Brachypodium sylvaticum var. *pseudo-distachyon* Hook. f. Fl. Brit. Ind. 7: 363. 1896.

Distribution: Kashmir and Kumaon (Fl. Brit. Ind.).

8. *Festuca* Linn.

***Festuca alata* Hack.** (Hack.) Roshev. in Komarov. Fl. U. R. S. S. 2: 528. 1934.

Festuca rubra subsp. *alata* Hack.; St. Yves, Candollea 3: 393. 1928.

Reported by Troll from the Nanga Parbat region, Astor Dist. (Could it have been *F. altaica*?)

***Festuca altaica* Trin.** in Ledeb. Fl. Alt. 1: 109. 1829; Fl. Brit. Ind. 7: 351. 1896.

KASHMIR: Satpura Pass above Skardu, Baltistan, 20,180; Thalle La, Baltistan, 20,739; Karpuchu Valley, Baltistan, Duthie 11,968.

Alt. 13,000–16,000 feet.

Distribution: Northern Kashmir, Siberia, Central Asia.

***Festuca asthenica* Hook. f.** Fl. Brit. Ind. 7: 354. 1896.

KASHMIR: Pahlgam, 7957, 9252; Kunzlwan, Clarke, 29,468, etc.; Liddar Valley above Pahlgam, Duthie 13,469.

Distribution: Kashmir. Alt. 7000–9000 feet.

***Festuca gigantea* Vill.** Hist. Pl. Dauph. 2: 110. 1787; Fl. Brit. Ind. 7: 353. 1896.

HAZARA: Siran Valley, Inayat, 20,370; Kaghan Valley, Inayat. KASHMIR: Above Gulmarg, 10,640. PUNJAB: Simla Hills, Collett (Fl. Siml.); Manali, Kulu, Koelz 3042. U. P.: Landour, 15,544; 15,995; 16,951.

Alt. 5000–10,000 feet.

Distribution: Western Himalaya, Europe, North Asia.

***Festuca kashmiriana* Stapf** in Hook. f. Fl. Brit. Ind. 7: 351. 1896.

Festuca duriuscula Duthie, Grasses N. W. Ind. 41. 1883; non L. 1753.

KASHMIR: Burji La above Skardu, Baltistan; Nima Mud, Ladak, Koelz 2342; Pensi La, Zanskar, Koelz 2935; Bok, Zanskar, Koelz. 2953c. PUNJAB: Kyelang, Lahul, Koelz 532; Khokhsar, Lahul, Koelz 759; Jispa, Lahul, Koelz 973.

Distribution: Temperate and Alpine Himalaya, Kashmir to Kumaon. Alt. 11,500–14,500 feet.

***Festuca kashmiriana* var. *ligulata* Stapf.** in Hook. f. Fl. Brit. Ind. 7: 351. 1896.

KASHMIR: Tulion above Pahlgam, 7849; Mt. Kolahoi, 9550a; Sonamarg, 9787; Duthie (Fl. Brit. Ind.).

Distribution: Alpine Kashmir. Alt. 11,000–14,000 feet.

***Festuca kashmiriana* var. *simlensis* Stapf.** in Hook. f. Fl. Brit. Ind. 7: 351. 1896.

KASHMIR: Pahlgam, 8139; below Kel, Kishenganga Valley, 17,385. PUNJAB: Simla Hills (Fl. Brit. Ind.). U. P.: Landour, 10,963.

Distribution: Temperate Himalaya, Kashmir to Mussoorie. Alt. 6000–10,000 feet.

***Festuca kashmiriana* var. *debilis* Stapf** in Hook. f. Fl. Brit. Ind. 7: 351. 1896.

Festuca heterophylla Griseb. Nachr. Ges. Wiss. Gött. 73. 1868; non Lam. 1778.

KASHMIR: Duthie (Fl. Brit. Ind.).

Distribution: Kashmir. Alt. 8000–12,000 feet.

***Festuca Levingei* Stapf** in Hook. f. Fl. Brit. Ind. 7: 352. 1896.

KASHMIR: Aug. 1875, Levinge 27,394 (Fl. Brit. Ind.).

Distribution: Kashmir.

***Festuca lucida* Stapf** in Hook. f. Fl. Brit. Ind. 7: 355. 1896.

KASHMIR: Masjid Gali toward Tilel, 18,365; Hemis, Ladak, Koelz 2561a; above Chortren Chen, Ladak, Koelz 2659, 2659c; Tog, Ladak, Koelz 2636; Pensi La, Zanskar, Koelz 5924. PUNJAB: Above Dharmasala, 1939.

Distribution: Kashmir to Jaunsar. Alt. 9000–17,000 feet.

Festuca modesta Steud. Syn. Gram. 316. 1854; Fl. Brit. Ind. 7: 354. 1896.

KASHMIR: Jammu (Fl. Brit. Ind.). U.P.: Lambatach, Tehri Garhwal, *Duthie*. Specimens of this species in the Dehra Dun Herbarium are from the Naini Tal, Garhwal, and Jaunsar regions.

Distribution: Western Temperate Himalaya. Alt. 7000–9000 feet.

Festuca myuros L. Sp. Pl. 74. 1753; Fl. Brit. Ind. 7: 356. 1896.

Vulpia myuros Gmel. Fl. Badens 1: 8. 1806.

KASHMIR: Rampur, Jhelum Valley, 4000 feet, *12,127*; Titwal, Kishenganga Valley, 3000 feet, *17,441*; Kangan, Sind Valley, *9689*; below Gurais, *4297*. PUNJAB: Dharmsala, *2019*; Shim, Kulu, *Koelz 1910*; Naggar, Kulu, *Koelz 1950, 1953*.

Alt. 3000–9000 feet.

Distribution: Western Himalaya, Europe, North Asia; adventive elsewhere.

Festuca nitidula Stapf in Hook. f. Fl. Brit. Ind. 7: 350. 1896.

Festuca pumila Duthie, Grasses N. W. Ind. 42. 1883; non Chaix, 1786.

KASHMIR: Nubra, 12,000–14,000 feet, *Thomson* (Fl. Brit. Ind.).

Distribution: Tibetan Himalaya.

Festuca rubra L. var. *villosa* Mert. & Koch in Röhling, Deuts. Fl. ed. 3. 1: 654. 1823.

Festuca rubra L. Sp. Pl. 74. 1753; Fl. Brit. Ind. 7: 352. 1896; both in part.

This is a very common grass in the high inner ranges of the Punjab and Kashmir Himalaya. It is found in Astor, Baltistan, Ladak, Zanskar, Lahul, and Spiti and usually from 9000 to 16,000 feet. No. 17,527 from the Keran Nullah was from 6000 feet.

Distribution: Temperate and Alpine Himalaya. Temperate and Arctic Europe and Asia.

Festuca rubra L. var. *Clarkei* Stapf in Hook. f. Fl. Brit. Ind. 7: 353. 1896.

Festuca rubra subsp. *Clarkei* var. *Stapfiana* St. Yves, Candollea 3: 398. 1928.

PUNJAB: Dalhousie, *Clarke 22,202, 22,416*, cotypes. Alt. 7000 feet.

According to St. Yves *F. kashmiriana* var. *simlensis* Stapf is a synonym of subsp. *Clarkei*. Further he treats *Festuca kashmiriana* as a subspecies of *F. rubra* (Candollea 3: 395. 1928). His treatment seems to me to be too inclusive.

Distribution: Kangra, Dalhousie, Khasia Hills. Alt. 4000–8000 feet.

Festuca sibirica (Griseb.) Hack. ex Boiss. Fl. Orient. 5: 626. 1884; Fl. Brit. Ind. 7: 355. 1896.

Poa albida Turcz.; Trin. Mém. Acad. Sci. Pétersb. VI. 1: 387. 1831; non *Festuca albida* Lowe, 1831.

Leucopoa sibirica Griseb. in Ledeb. Fl. Ross. 4: 383. 1853.

Leucopoa albida V. Krecz. & Bobr. Fl. U.R.S.S. 2: 495. 1934.

KASHMIR: Satpura Nullah above Skardu, Baltistan, *20,340*; Nubra, *Thomson* (Kew); Karakorum Mts., *Clarke* (Kew).

Distribution: North Kashmir to North of Kumaon, alt. 13,000–15,000 feet; Asiatic Russia.

Festuca tenuiflora Schrad. Fl. Germ. 1: 345. 1806; Fl. Brit. Ind. 7: 356. 1896.

Nardurus tenuiflorus Boiss. Fl. Orient. 5: 632. 1884.

KASHMIR: Canon *Stokoe*, Srinagar, 5200 feet; *Duthie* (Fl. Brit. Ind.).

Distribution: Kashmir, westward to Spain.

Festuca valesiaca Schleich.; Gaud. Agrost. Helv. 1: 242. 1828; Fl. Brit. Ind. 7: 348. 1896.

Very common on passes, high ridges and alpine meadows in Kashmir, including Baltistan and Ladak; Chamba, Lahul, etc., from 10,000 to 16,000 feet.

Distribution: Himalaya, Central Asia, Europe, North America.

Festuca valesiaca var. *tibetica* Stapf in Hook. f. Fl. Brit. Ind. 7: 349. 1896.

Festuca ovina L. var. *alpina* Griseb. in Nachr. Ges. Wiss. Gött. 73. 1868.

KASHMIR: Karakorum Mts., Pampanini (Fl. Carac. 78. 1930).

Distribution: Tibetan Himalaya.

Doubtful Species

Festuca ovina L. subsp. *euovina* Hack. Monog. Festuc. Eur. 85. 1882.

KASHMIR: Troll, Nanga Parbat Range.

Since Hackel includes *F. valesiaca* Schleich. in *F. ovina*, this may be a duplication.

Festuca rubra L. subsp. *Schlagintweitii* St. Yves, Candollea 3: 389. 1928.

Festuca cumminsii Stapf, Fl. Brit. Ind. 7: 349. 1896.

KASHMIR: Shigar Valley, Baltistan; Leh, Indus Valley, *Schlagintweit* (See Pampanini, Fl. Carac. 78. 1930).

Festuca rubra L. var. *robusta* Rendle, Jour. Bot. 38: 429. 1900.

KASHMIR: Karakorum Mts. (Pampanini, Fl. Carac. 78. 1930).

F. rubra, *F. kashmiriana*, and *F. ovina* are very closely allied and hard to distinguish and there is probably some overlapping of names in the literature which can only be straightened out by a monograph of the genus.

9. *Puccinellia* Parl.

Puccinellia distans Parl. Fl. Ital. 1: 367. 1848.

Poa distans L. Mant. 32. 1767.

Glyceria distans Whal. Fl. Upsal. 36. 1820; Fl. Brit. Ind. 7: 347. 1896.

Atropis distans (L.) Griseb. in Ledeb. Fl. Ross. 4: 338. 1853.

KASHMIR: Puga, Rupshu, 2176; Ladak Province: Tso Morari Peldo, 2216; Dungte, 2362; Tsakzhun Tso, 2387; Lamayuru, A9; 2769b. All collected by Koelz.

Alt. 9000–15,000 feet.

Distribution: Tibetan Kashmir, North Asia, Europe.

Puccinellia distans (L.) Parl. var. *convoluta* (Hornem.) Honda, Jour. Fac. Sci. Univ. Tokyo III. Bot. 3: 58. 1930.

Poa convoluta Hornem. Hort. Hafn. 2: 953. 1815.

Festuca convoluta Kunth, Rev. Gram. 1: 129. 1829.

Atropis convoluta Griseb. in Ledeb. Fl. Ross. 4: 389. 1853.

Glyceria distans var. *convoluta* Regel, Act. Hort. Petrop. 7: 623. 1881.

KASHMIR: Pampanini (Fl. Carac. 77. 1930).

This species or variety presents a puzzle. The transfers from genus to genus seem to have been made without finding out what the basis of it all, Hornemann's "*Poa convoluta*," is. Furthermore Hooker (Fl. Brit. Ind. 7: 347. 1896) equates Hornemann's plant with *Glyceria convoluta* of Fries, Mant. 3: 176 (1842), which Mrs. Chase believes may be another plant. Hooker cites Boissier as authority for his *Glyceria distans* var. *convoluta* but Boissier has *Atropis distans* var. *convoluta* (Fries) Boiss. Fl. Orient. 5: 615 (1884), not *Glyceria*, and does not link it up with the series of names based on *Poa convoluta* Hornem.

Puccinellia Stapfiana R. R. Stewart, nom. nov.

Glyceria poaeoides Stapf in Hook. f. Fl. Brit. Ind. 7: 348. 1896; non *Puccinellia poaeoides* Keng, 1938.

KASHMIR: Rupshu, grassy plains at head of Salt Lake, Thomson (Fl. Brit. Ind.).

Puccinellia Thomsoni (Stapf) R. R. Stewart, comb. nov.

Glyceria Thomsoni Stapf in Hook. f. Fl. Brit. Ind. 7: 347. 1896.

Atropis Thomsoni Pamp. Fl. Carac. 77. 1930.

Poa compressa of Griseb. Nachr. Ges. Wiss. Gött. 75. 1868; non L. 1753.

KASHMIR: Puga, Rupshu, 15,500 feet, alkali spring, *Koelz 2176* (as *A. distans*). Thomson's specimen, the TYPE, was from Puga. Nima Mud, Ladak, 14,000 feet, along stream, *Koelz 2329*; Indus Valley, Ladak fide Meebold.

Distribution: Tibetan Kashmir.

Puccinellia sp.

KASHMIR: Kangi Nullah, above Kangi, in cracks on cliff face, July, 1931, *Koelz 2328a*.

The leaves are filiform, the panicle branches are not deflexed when mature; spikelets small and purple, margins of glumes narrowly hyaline. Probably undescribed.

10. **Glyceria** R. Br.**Glyceria kashmiriensis** Leon Kelso, *Rhodora* 37: 262. 1935.

KASHMIR: Above Pahlgam, 17-9-1893, 8000-9000 feet, *Duthie*, U. S. Nat. Herb. 948, 543, TYPE. Gulmarg, Kashmir, 17-8-1921, 8500 feet, *10,497*.

Distribution: Kashmir.

Glyceria tonglensis Clarke, Jour. Linn. Soc. 15: 119. 1876; Fl. Brit. Ind. 7: 346. 1896.

KASHMIR: (Fl. Brit. Ind.).

Distribution: Temperate Himalaya.

11. **Sclerochloa** Beauv.**Sclerochloa dura** (L.) Beauv. Ess. Agrost. 98, 177. 1812; Fl. Brit. Ind. 7: 335. 1896.

Cynosurus durus L. Sp. Pl. 72. 1753.

HAZARA: Abbottabad, 4200 feet, *14,652*. KASHMIR: Uri, Jhelum Valley, 4000 feet, *12,031*; Avantipura, 5200 feet, *Thomson*.

Distribution: Kashmir and Hazara, North Asia, Europe.

12. **Eremopoa** Roshevitz.**Eremopoa persica** (Trin.) Roshev. in Komarov, Fl. U. R. S. S. 2: 430. 1934.

Poa persica Trin. Mém. Acad. Sci. Pétersb. VI. 1: 373. 1831; Fl. Brit. Ind. 7: 337. 1896.

KASHMIR: Burzil Pass, 11,000-12,000 feet, *19,043*; *19,091*; Chorwan, Kishenganga Valley, 8000 feet, *19,665*; Deosai Plains, 13,000 feet; Hemis, Ladak, 11,000 feet, *Koelz 2552a*; Lakong, Zanskar, 14,500 feet, *Koelz 3015*.

Distribution: Kashmir; North Asia and west to Syria.

Eremopoa songarica (Schrenk) Roshev. in Komarov, Fl. U. R. S. S. 2: 431. 1934.

Glyceria songarica Schrenk in Fisch. and Mey. Enum. Pl. Nov. 1: 1. 1841.

Poa soongarica Boiss. Fl. Orient. 5: 611. 1884.

Poa persica Trin. var. *soongarica* Stapf in Hook. f. Fl. Brit. Ind. 7: 337. 1896.

KASHMIR: Very common from 7000-14,000 feet in Kashmir proper and also in Ladak and Zanskar. It is also found in the Punjab Himalaya.

Distribution: Western Himalaya, Central Asia.

13. *Poa* L.

Poa alpina L. Sp. Pl. 67. 1753; Fl. Brit. Ind. 7: 338. 1896.

KASHMIR: Sonamarg, 7281; Mt. Kolahoi, 8273; above Gulmarg, 10,453; Kamri Pass, 18,656a; Burzil Pass, 19,063; Deosai Plains, 20,004; Thalle La, Baltistan, 20,738. PUNJAB: Via Kukti Pass, Lahul, *Koelz* 1186; Bailing Nullah, Lahul, *Koelz* 1247.

Very common alpine grass. Alt. 10,000–16,000 feet.

Distribution: North temperate and arctic regions.

Poa annua L. Sp. Pl. 68. 1753; Fl. Brit. Ind. 7: 345. 1896.

This is very common from the Plains up to 11,000 feet in the mountains. It is found in Hazara, Kashmir, including Ladak, the Murree Hills, Simla Hills, Chamba, Lahul, etc. In Rawalpindi it makes lawns in March but soon withers in the summer heat.

Distribution: Europe, Temperate Asia, North and South America.

Poa annua L. var. *supina* (Schrad.) Reichb. Fl. Germ. Excurs. 46. 1830.

Poa supina Schrad. Fl. Germ. 1: 289. 1806.

KASHMIR: Deosai Plains, July, 1940, 13,000 feet, 19,968; 20,094 (det. Dr. N. L. Bor); Banihal Pass, 14,692 seems to be the same.

New to Kashmir.

Distribution: Europe.

Poa attenuata Trin. ex Bunge, Mém. Sav. Étrang. 2: 527. 1835; Fl. Brit. Ind. 7: 340. 1896.

Very common in the higher mountains from 9000 to 18,000 feet, in Baltistan, Deosai Plains, Nubra, Ladak, Rupshu, Lahul, etc.

Distribution: Central Asia, North Asia, Persia.

Poa attenuata Trin. var. *versicolor* Regel, Pl. Nov. & Minus Cog. fasc. 8: 69. 1881.

KASHMIR: Hunza, Karakorum Mts., *Pampanini* (Fl. Carac. 76. 1930).

Distribution: Central Asia.

Poa bulbosa L. var. *elanata* Stapf in Hook. f. Fl. Brit. Ind. 7: 338. 1896.

KASHMIR: Mt. Mahadeo, 8000–9000 feet, 7142. ZANSKAR PROVINCE: Rangdum, *Koelz* 2854; Kangi La to Rangdum, *Koelz* 2886a; Pensi La, *Koelz* 2934b; 2943; Bok, *Koelz* 2952a. PUNJAB: Sisu, Lahul, *Koelz* 2027.

Distribution: Northwest Himalaya. Alt. 5000–13,000 feet.

Poa flexuosa Smith, Fl. Brit. 1: 101. 1800; Fl. Brit. Ind. 7: 342. 1896.

HAZARA: Trotter (Herb. Gordon). KASHMIR: Sonamarg, 6821; Pahlgam, 7856; Mt. Kolahoi, 9426; above Gulmarg, 10,348; Trunkal, 18,193; etc.

Distribution: Alpine Himalaya, 10,000–17,000 feet; north temperate and arctic regions.

Poa himalayana Nees ex Steud. Syn. Gram. 256. 1854; Fl. Brit. Ind. 7: 344. 1896.

KASHMIR: Tragbal, 4730, 4793; Minimarg, 19,170; Badwan, 19,567.

Distribution: Temperate and alpine Himalaya. Alt. 8000–10,000 feet.

Poa khasiana Stapf in Hook. f. Fl. Brit. Ind. 7: 343. 1896.

KASHMIR: Tragbal, 4711, 4740a; Pahlgam, 8014; Gulmarg, 8675. PUNJAB: Alwas, Chamba, 2398; Chechogee, Kulu, *Koelz* 1513.

I am not satisfied with these determinations. Perhaps these specimens should be referred to *P. nemoralis*. The florets are very small and the inflorescence is very lax. It is a shade-loving form with weak stems.

Distribution: Temperate Himalayas and Khasia Hills. Alt. 7500–10,000 feet.

***Poa ludens* R. R. Stewart, nom. nov.**

Poa pseudo-pratensis Hook f. Fl. Brit. Ind. 7: 340. 1896; non Beyer 1819, nec Scribn. & Rydb. 1896.

KASHMIR: Pahlgam, 5524; 5767; 5943; 8009; below Burzil Chowki, 19,837. PUNJAB: Murree Hills, Trotter (Herb. Gordon).

Distribution: Temperate Himalaya. Alt. 7000–11,000 feet.

***Poa nemoralis* L. Sp. Pl. 69. 1753; Fl. Brit. Ind. 7: 341. 1896.**

One of the commonest, if not the commonest grass at medium and high altitudes in the Western Himalayas. It is so variable that I hardly think that it is worth while to divide it into varieties. It likes shade and is often in forest and is absent from the deserts of the Tibetan region. It usually grows at altitudes of from 8000 to 11,000 feet, but is reported from 5000 to 15,000 feet.

Distribution: Temperate and alpine Himalaya, Europe, North Asia, North America.

***Poa polycolea* Stapf in Hook. f. Fl. Brit. Ind. 7: 342. 1896.**

There are many specimens of this species in the Koelz collections from Ladak, Rupshu, Zanskar, Lahul, and Chamba from altitudes of from 10,000 to 18,000 feet.

Distribution: Western Himalaya, Kashmir to Kumaon.

***Poa pratensis* L. Sp. Pl. 67. 1753; Fl. Brit. Ind. 7: 339. 1896.**

Very common from 5000 to 15,000 feet, both in the outer hills and in the inner Himalaya, including the Deosai Plains, Baltistan, Rupshu, Ladak, Zanskar, Hazara, Murree Hills, Simla Hills, Kulu, etc.

***Poa pratensis* L. var. *alpigena* Blytt, Norg. Flora 130. 1861; Fl. Brit. Ind. 7: 340. 1896.**

KASHMIR: Karakorum Mts. Pampanini (Fl. Carac. 76. 1930).

***Poa sterilis* M. Bieb. Fl. Taur.-Cauc. 1: 62. 1805.**

KASHMIR: Da to Hanle, Rupshu, Koelz 2284; Nunu, Ladak, Koelz 2346, 2352. PUNJAB: Khokhsar, Lahul, Koelz 750; Bailing Nullah, Lahul, Koelz 1346. All determined by Dr. Hitchcock.

Alt. 12,000–15,000 feet.

Distribution: Central Asia to Armenia.

***Poa tibetica* Munro ex Duthie, Grasses N. W. Ind. 41. 1888; Fl. Brit. Ind. 7: 339. 1896.**

KASHMIR: Nima Mud, Ladak, Koelz 2338; Tsakzhun, Tso, Ladak, Koelz 2390, 2393; Shushal, Ladak, Koelz 2446b, 2447a; Leh, Ladak, Koelz 2597a; Hanle, Rupshu, Koelz 2305f; 2317. PUNJAB: Jispa, Lahul, Koelz 2051.

Distribution: Tibetan Kashmir, Punjab, and adjacent Tibet. Alt. 10,000–16,000 feet.

***Poa tremula* Stapf in Hook. f. Fl. Brit. Ind. 7: 244. 1896.**

Poa trivialis Griseb. Nachr. Ges. Wiss. Gött. 75. 1868, non L. 1753.

KASHMIR: Ladak (Fl. Brit. Ind.); above Pahlgam, 12,000 feet, 8789; Gulmarg, 10,000 feet, 10,630. (Determinations doubtful.)

Distribution: Temperate and alpine Himalaya.

***Poa tremula* var. *micranthera* Stapf in Hook. f. Fl. Brit. Ind. 7: 345. 1896.**

KASHMIR: Clarke, Duthie (Fl. Brit. Ind.).

14. *Briza* L.***Briza media* L. Sp. Pl. 70. 1753; Fl. Brit. Ind. 7: 336. 1896.**

KASHMIR: Sonamarg, 6344; above Gulmarg, 10,424; near Bhagtaur, Kishenganga Valley,

17,929; Chillam, Astor Dist., 18,982; Burzil Pass, 19,135; 19,841; Chatpani Nullah, Baltistan, Duthie (Herb. Dehra).

Common on alpine meadows. Alt. 8000–13,000 feet.

Distribution: Alpine Himalaya, Kashmir to Sikkim; Europe, North Asia.

Briza minor L. Sp. Pl. 70. 1753; Fl. Brit. Ind. 7: 336. 1896.

PUNJAB: Gujranwala and Sangla Hill in wheat fields, *Sultan Ahmad*.

Perhaps a recent introduction. I have seen this species and *B. maxima* L. planted in garden borders in Lahore.

Distribution: Europe; adventive elsewhere.

15. *Aeluropus* Trin.

Aeluropus brevipolius (Koenig) Nees ex Aschers. & Schwein. Mém. Inst. Egypt 2: 173. 1889.

?*Dactylis lagopoides* L. Mant. 33. 1767.

Dactylis brevipolia Koenig ex Willd. Sp. Pl. 1: 410. 1797.

?*Aeluropus laevis* Trin. Fund. Agrost. 143, 212, expl. pl. 12. 1820.

Aeluropus villosus Trin. ex C. A. Meyer, Verzeich. Pfl. Cauc. 18. 1831; Fl. Brit. Ind. 7: 334. 1896.

Aeluropus lagopodioides Trin. ex Thw. Enum. Pl. Zeyl. 374. 1864.

?*Aeluropus lagopoides* (L.) Chiov. Ann. Instit. Bot. Roma 8: 375. 1908.

PUNJAB: Multan, *Duthie* (Herb. Gordon).

Distribution: Punjab and Sind, west to the Mediterranean and Caspian.

16. *Eragrostis* Beauv.

Eragrostis amabilis (L.) Wight and Arn. ex Hook. & Arn. Bot. Beech. Voy. 251. 1841.

Poa amabilis L. Sp. Pl. 68. 1753.

Poa plumosa Retz. Obs. 4: 20. 1786.

Eragrostis plumosa Link, Hort. Berol. 1: 192. 1827.

Eragrostis tenella var. *plumosa* (Retz.) Stapf in Hook. f. Fl. Brit. Ind. 7: 315. 1896.

PUNJAB: Keshapur, *Koelz 1615*. KASHMIR: Jammu, 10,702. U. P.: Dehra Dun, 17,239.

A plant of the plains extending to about 2000 feet in the foothills.

Distribution: India, tropical Asia and Africa.

Eragrostis amabilis* var. *breviculmis (Stapf) E. and A. Camus in Lecomte, Fl. Gén. Ind.-Chine 7: 557. 1923.

Eragrostis tenella R. and S. var. *breviculmis* Stapf in Hook. f. Fl. Brit. Ind. 7: 316. 1896.

PUNJAB: (Fl. Brit. Ind.).

Distribution: Punjab to Behar and Central India. Annam.

Eragrostis cilianensis (All.) Link ex Lutati, Malpighia 18: 386. 1904.

Poa cilianensis All. Fl. Pedem. 2: 246. 1785.

Eragrostis major Host, Ic. Gram. 4: 14. pl. 24. 1809; Fl. Brit. Ind. 7: 320. 1896.

PUNJAB: Karnal, *Duthie* (Herb. Dehra and Herb. Gordon).

Distribution: India, Mediterranean region, Africa. Commonly naturalized elsewhere.

Eragrostis ciliaris (L.) R. Br. in Tuckey, Narr. Exp. Congo App. 478. 1818; Fl. Brit. Ind. 7: 314. 1896.

Poa ciliaris L. Syst. Nat. ed. 10. 2: 875. 1759.

PUNJAB: Hoshiarpur, *P. C. Joshi* (Herb. Gordon).

Distribution: India, west to Tropical Africa, America.

Eragrostis gangetica (Roxb.) Steud. Syn. Gram. 266. 1854.*Poa gangetica* Roxb. Fl. Ind. 1: 341. 1820.*Poa chariis* Schult. Mant. 2: 314. 1824.*Eragrostis elegantula* of Stapf in Hook. f. Fl. Brit. Ind. 7: 318. 1896; non Steud. 1854.*Eragrostis chariis* (Schult.) Hitchc. Lingnan Sci. Jour. 7: 193. 1931.

PUNJAB: Zafarwal, Sialkot Dist., 653; Pathankot, 1087.

The synonymy of this species is most complicated and needs further study. According to J. R. Swallen it is not certain what *E. gangetica* is. *Eragrostis chariis* seems to be the plant now called *E. gangetica* in India.

Distribution: Tropical Asia. Introduced in Florida.**Eragrostis japonica** (Thunb.) Trin. Mém. Acad. Pétersb. VI. 1: 405. 1830.*Poa japonica* Thunb. Fl. Jap. 51. 1784.*Eragrostis interrupta* Beauv. var. *tenuissima* (Schrad.) Stapf in Hook. f. Fl. Brit. Ind. 7: 316. 1896.*Eragrostis tenuissima* Schrad. ex Nees, Fl. Afr. Austr. 410. 1841.

PUNJAB: Ladhar, Sultan Ahmad (Herb. Gordon); Simla, Collett (Fl. Siml.). U. P.: Dehra Dun, Umrao Singh 490.

Distribution: Tropical Asia.**Eragrostis nigra** Nees ex Steud. Nom. Bot. ed. 2, 1: 563, nomen. 1840; Steud. Syn. Gram. 267. 1854; Fl. Brit. Ind. 7: 324. 1896.

PUNJAB: Simla Hills, Collett (Fl. Siml.). U. P.: In and about Landour, Mussoorie Dist., 10,952; 14,230; 16,743; 16,942.

A plant of the temperate zone ascending to 9000 feet.

Distribution: India, Ceylon.**Eragrostis papposa** (R. and S.) Steud. Nom. ed. 2, 1: 564. 1840; Fl. Brit. Ind. 7: 322. 1896.*Megastachya papposa* R. & S. Syst. Veg. 2: 585. 1817.

PUNJAB: Dharyal, Rawalpindi Dist., Mohindar Nath 17, 262a; Jhalar, Attock Dist., Eugene Nasir, s. n.

Distribution: Punjab, westward to North Africa and Spain.**Eragrostis pilosa** (L.) Beauv. Ess. Agrost. 71, 162. 1812; Fl. Brit. Ind. 7: 323. 1896.*Poa pilosa* L. Sp. Pl. 68. 1753.

KASHMIR: Astor Valley, 5500 feet, Duthie 12,307; Lower Kishenganga Valley, 2200 feet, 17,288. PUNJAB: Pathankot, 1311a; 1757; Rawalpindi, 5190, etc. U. P.: Dehra Dun, Umrao Singh 257.

Chiefly on the plains but occasionally ascending the hills to 5000 feet.

Distribution: Throughout India and Burma, South Europe and most warm countries.**Eragrostis poaeoides** Beauv. Ess. Agrost. 162, nomen. 1812; R. & S. Syst. Veg. 2: 574. 1817.*Eragrostis minor* Host. Ic. Gram. 4: 15. 1809 (name untenable since the genus was not validly published until 1812); Fl. Brit. Ind. 7: 321. 1896.

Common throughout the plains and mountains up to 11,000 feet in Ladak. Usually along roadsides and in cultivated ground.

Distribution: India, westward to southern Europe, northern Asia; introduced in America.**Eragrostis tremula** Hochst. ex. Steud. Syn. Gram. 269. 1854; Fl. Brit. Ind. 7: 320. 1896.

PUNJAB: (Fl. Brit. Ind.); Kharian, Bhimbar, Sultan Ahmad (Herb. Gordon).

Distribution: Afghanistan, tropical India and Africa.

Eragrostis unioloides (Retz.) Nees ex Steud. Syn. Gram. 264. 1854.*Poa unioloides* Retz. Obs. 5: 19. 1789.*Eragrostis amabilis* Auct. incl. Fl. Brit. Ind. 7: 317. 1896; non L.KASHMIR: sine loc. (Herb. Dehra). PUNJAB: Palampur, Kangra Dist. 4000 feet, *Duthie* (Herb. Gordon). U. P.: Dehra Dun, 11,466; 14,674; Kalanga Hill, 3000 feet, 16,147.*Distribution*: Tropical Asia, occasionally ascending to 6000 feet in the Himalayas.17. **Eragrostiella** Bor.**Eragrostiella nardoides** (Trin.) Bor, Fl. Assam 5: 107. 1940.*Eragrostis nardoides* Trin. Mém. Acad. Pétersb. VI. 1: 415. 1831; Fl. Brit. Ind. 7: 326. 1896.

U. P.: Above Rajpur, Mussoorie Road, 3500 feet, 14,550.

Distribution: Punjab to Nepal, occasionally up to 5000 feet.18. **Desmostachya** Stapf**Desmostachya bipinnata** (L.) Stapf in Thiselt.-Dyer, Fl. Cap. 7: 632. 1900.*Bria bipinnata* L. Syst. Nat. ed. 10. 2: 875. 1759.*Uniola bipinnata* L. Sp. Pl. ed. 2. 104. 1762.*Eragrostis cynosuroides* Beauv. Ess. Agrost. 71, 162. 1812; Fl. Brit. Ind. 7: 324. 1896.*Stapfiola bipinnata* Kuntze, Lexic. 1: 532. 1902.PUNJAB: Sangla Hill, 1423; Dhamyal, Rawalpindi Dist., *M. Nath* 17,258; Bhadwar, Kangra, *Koelz* 4337. U. P.: Dehra Dun, *U. Singh* 464.

A common plant in the Punjab deserts.

Distribution: Punjab, east to Egypt and Syria.19. **Catabrosa** Beauv.**Catabrosa aquatica** (L.) Beauv. var. **angusta** Stapf in Hook. f. Fl. Brit. Ind. 7: 311. 1896.KASHMIR: Leh, Ladak, 10,500 feet, hanging from wet rock wall, *Koelz* 2602.*Distribution*: Tibetan Himalaya.**Catabrosa himalaica** (Hook. f.) Stapf in Hook. f. Fl. Brit. Ind. 7: 311. 1896.*Phippsia himalaica* Hook. f. Fl. Brit. Ind. 7: 240. 1896.KASHMIR: Sonamarg, 7377; Mt. Kolahoi, 9435; Mt. Apharwat, 10,373; 12,507; Nanga Parbat, *Troll*.

Alpine zone, alt. 13,000–14,500 feet.

Distribution: Alpine Western Himalaya, Kashmir to Kumaon.**Catabrosa nutans** Stapf in Hook. f. Fl. Brit. Ind. 7: 312. 1896.*Colpodium nutans* Griseb. Nachr. Ges. Wiss. Gött. 76. 1868.

KASHMIR: Sonamarg, 6886a; Pahlgam, 8153; above Gadsar, 18,355; Masjid Gali, 18,423; Kamri Pass, 18,659; 18,736; Burzil Pass, 19,051; 19,847; Deosai Plains, 19,967. U. P.: Tehri Garhwal (Herb. Dehra).

An alpine plant, usually found from 12,000 to 14,000 feet.

Distribution: Alpine Western Himalaya. Alt. 10,000–14,000 feet.**Catabrosa sikkimensis** Stapf in Hook. f. Fl. Brit. Ind. 7: 311. 1896.KASHMIR: Above Tsakzhun Tso, Ladak, 17,500 feet, along stream, *Koelz* 2414r. (det. Hitchcock).

Extension of range.

Distribution: Kashmir and Sikkim.

Catabrosa Thomsoni Stapf in Hook. f. Fl. Brit. Ind. 7: 311. 1896.KASHMIR: Nubra, Aug. 4, 1848, 10,000–11,000 feet, *Thomson*.*Distribution*: Tibetan Kashmir.**Catabrosa Trollii** (Pilger) R. R. Stewart, comb. nov.*Colpodium Trollii* Pilger, Notizbl. Bot. Gard. Berlin 14: 344. 1939.KASHMIR: Tarshing, Rupal Valley, Astor Dist., *Troll 7507*, TYPE.*Distribution*: Kashmir.**Catabrosa** (Section *Colpodium*) sp.KASHMIR: Deosai Plains, 28–7–1940 at 13,000 feet, *19,971*.

Dr. N. L. Bor expects to describe this as a new species.

20. **Dactylis** L.**Dactylis glomerata** L. Sp. Pl. 71. 1753; Fl. Brit. Ind. 7: 335. 1896.

Common throughout the area from 6000 to 12,000 feet and extending into the inner ranges of Baltistan, Ladak and Lahul.

Distribution: Western Himalaya, China, west and north Asia, north Africa, etc.21. **Cynosurus** L.**Cynosurus cristatus** L. Sp. Pl. 72. 1753; Fl. Brit. Ind. 7: 307. 1896.PUNJAB: Drankar in Spiti, *Stoliczka* (Fl. Brit. Ind.).*Distribution*: Europe, Asia Minor. Introduced in various parts of the world.22. **Lamarckia** Moench.**Lamarckia aurea** (L.) Moench. Meth. 201. 1794; Fl. Brit. Ind. 7: 307. 1896.*Cynosurus aureus* L. Sp. Pl. 73. 1753.N. W. FRONTIER: Peshawar, *Mohindar Nath 15,814; 19,383*. PUNJAB: *Attock* (Herb. Gordon).*Distribution*: Northwest India, west to Spain and the Canaries.23. **Fingerhuthia** Lehm.**Fingerhuthia affghanica** Boiss. Fl. Orient. 5: 569. 1884; Fl. Brit. Ind. 7: 306. 1896.N. W. FRONTIER: Thal to Shinak, Kurram Vy., *Aitch. 510*, TYPE: Peshawar, *J. L. Stewart* (Fl. Brit. Ind.).*Distribution*: Northwest Frontier of India.24. **Elytrophorus** Beauv.**Elytrophorus spicatus** (Willd.) A. Camus in Lecomte, Fl. Gén. Ind.-Chine 7: 547. 1922.*Dactylis spicata* Willd. in Ges. Naturf. Freunde Berlin Neue Schrift. 3: 146. 1801.*Elytrophorus articulatus* Beauv. Ess. Agrost. 67. pl. 14, f. 2. 1812; Fl. Brit. Ind. 7: 306. 1896.PUNJAB: Palampur, 4000 feet, *Duthie* (Herb. Gordon).*Distribution*: Tropical India, Asia, Africa, Australia.25. **Arundo** L.**Arundo donax** L. Sp. Pl. 81. 1753; Fl. Brit. Ind. 7: 302. 1896.HAZARA: Kagan Valley (Herb. Dehra). KASHMIR: Domel, Jhelum Valley, 2000 feet, *3733*. PUNJAB: Manali, Kulu, *Koelz 1413*; Naggar, Kulu, *Koelz 3048*; Oot, Kulu, *Koelz 3090*. U. P.: Below Mussorie (Herb. Dehra).

Sometimes cultivated as a hedge. Extends up to about 6000 feet in Kulu.

Distribution: India, westward to Europe and North Africa; north Asia; introduced in the Americas.

26. *Phragmites* Trin.

Phragmites communis Trin. Fund. Agrost. 134. 1820; Fl. Brit. Ind. 7: 303. 1896.

Arundo Phragmites L. Sp. Pl. 81. 1753.

Exceedingly abundant throughout the Western Himalaya, especially along the rivers and streams on the Tibetan side of the range. It is often dwarfed and half buried by sand along the Indus and its tributaries. It may be found as low as 5000 feet in Kashmir but is most common from 8000 to 10,000 feet.

Distribution: Western Himalaya; north and south temperate regions.

Phragmites karka (Retz.) Trin. ex Steud. Nom. ed. 2, 2: 324. 1841; Fl. Brit. Ind. 7: 304. 1896.

Arundo karka Retz. Obs. 4: 21. 1786.

PUNJAB: Pathankot, 1105; Gurdaspur, 1344; Dhariwal, J. A. Ditta (Herb. Gordon).

Distribution: Throughout the plains of India; widespread in the tropics.

27. *Neyraudia* Hook. f.

Neyraudia arundinacea (L.) Henr. Meded. Rijks. Herb. Leiden 58: 7. 1929.

Aristida arundinacea L. Mant. 186. 1771.

Arundo madagascariensis Kunth, Rev. Gram. 273. pl. 48. 1830.

Neyraudia madagascariensis Hook. f. Fl. Brit. Ind. 7: 305. 1896.

HAZARA: Mansera, Trotter 108. KASHMIR: Garhi, Jhelum Valley Road, 2500 feet, 10,084. PUNJAB: Pathankot, 1103; Mt. Tilla, 756a; Oot, Kulu, Koelz 3089; Noggri, Rampur-Bushahr, Koelz 3225, 3227.

A large grass up to 8 feet high, fairly common in the foothills and up to 5000 feet.

Distribution: Tropical Asia, Africa, and Madagascar.

28. *Diplachne* Beauv.

Diplachne fusca (L.) Beauv. Ess. Agrost. 163. 1812; Fl. Brit. Ind. 7: 329. 1896.

Festuca fusca L. Sp. Pl. ed. 2. 109. 1762.

PUNJAB: Near Lahore, wet places, Sultan Ahmad 8 (Herb. Gordon).

Distribution: India, tropical Asia, Africa, and Australia.

29. *Melica* L.

Melica Jacquemontii Deene. in Jacquem. Voy. Bot. 4: 174. pl. 175. 1844.

Melica breviflora Boiss. Diagn. Pl. Orient. 7: 124. 1846.

Melica Cupani Hook. f. Fl. Brit. Ind. 7: 329, in part, non Guss. 1896.

KASHMIR: Lohan Gali, near Tilel, ca. 10,000 feet; 18,548; below Kamri, on rocks, 9000 feet, 18,639; Dras to Matayan, Ladak Road, 9500-11,000 feet, 21,160.

Distribution: Western Himalaya, westward to Kurdistan; Russia.

Melica nutans L. Sp. Pl. 66. 1753; Fl. Brit. Ind. 7: 330. 1896.

KASHMIR: Pahlgam, 7000-8000 feet, 5328; 7981; Keran, Kishenganga Valley, in forest, 6000 feet; near Gulmarg, Duthie (Herb. Dehra).

Distribution: Kashmir, Europe, North Asia.

Melica persica Kunth, Rev. Gram. 122, 351. pl. 89. 1830.

Melica vestita Boiss. Diagn. Pl. Orient. 7: 125. 1846.

Melica cupani Guss. var. *vestita* Boiss. Fl. Orient. 5: 591. 1884.

Melica cupani Hook. f. Fl. Brit. Ind. 7: 329, in part, non Guss. 1896.

KASHMIR: Dras, Ladak Road, 10,000 feet, 7453; Satpura Nullah, Baltistan, 9000 feet, 20,267; Thalle La, Baltistan, 10,000 feet, 20,657. PUNJAB: Shipting Nullah, Lahul, 11,000 feet, Koelz 853; 917; Kolung, Lahul, 12,000 feet, Koelz 10,084.

Distribution: Northwest Persia to northwest Himalaya; Asiatic Russia.

Melica scaberrima (Nees) Hook. f. Fl. Brit. Ind. 7: 330. 1896.

Glyceria scaberrima Nees ex Steud. Syn. Gram. 287. 1854.

HAZARA: Thandiani, ca. 9000 feet, Trotter 104G (Herb. Gordon). PUNJAB: Simla Hills, Collett (Fl. Siml.).

Distribution: Temperate western Himalaya, Hazara to Kumaon. Alt. 6000–10,000 feet.

Melica scaberrima var. **micrantha** Hook. f. Fl. Brit. Ind. 7: 331. 1896.

KASHMIR: Kishtwar, 6000 feet, Sept. 17, 1876, Clarke 31,381a, TYPE.

Distribution: Kashmir.

30. Pappophorum Schreb.

Pappophorum brachystachyum Hook. f. Fl. Brit. Ind. 7: 302. 1896; non Jaub. & Spach, 1850–53.

PUNJAB: Multan, Edgeworth (Fl. Brit. Ind.).

Distribution: Punjab west to North Africa.

Pappophorum robustum Hook. f. Fl. Brit. Ind. 7: 302. 1896.

PUNJAB: Hissar, Drummond (Fl. Brit. Ind.).

Distribution: Punjab.

Pappophorum persicum (Boiss.) Steud. Syn. Gram. 200. 1854.

Enneapogon persicus Boiss. Diagn. Pl. Orient. 5: 71. 1844.

Pappophorum Aucheri Jaub. and Spach, III. Pl. Or. 4: 32. pl. 323. 1850–53; Fl. Brit. Ind. 7: 301. 1896.

PUNJAB: Sangla Hill, 1400; Rawalpindi, 12,009b, etc.; Attock Dist., 13,644; Pabbi Hills, 16,326. KASHMIR: Skardu, Baltistan, 7700 feet, 20,444; Shigar, Baltistan, 8000 feet, 20,580.

A typical plant of hot deserts.

Distribution: Turkestan; Baltistan and the Punjab west to Persia.

HORDEAE

31. Agropyron J. Gaertn.

Agropyron caninum (L.) Beauv. Ess. Agrost. 102, 146, 180. 1812.

Triticum caninum L. Sp. Pl. 86. 1753.

Roegneria canina Nevski in Komarov, Fl. U. R. S. S. 2: 617. 1934.

KASHMIR: Pahlgam, 5592; above Gulmarg, 10,403; Kishenganga Valley, 17,739; 17,765; 19,548a.

Not in Fl. Brit. Ind. Alt. 6000–11,000 feet.

Distribution: Kashmir, China, Japan, Asiatic Russia, Europe.

Agropyron dentatum Hook. f. Fl. Brit. Ind. 7: 370. 1896.

KASHMIR: Karakorum, Clarke (Fl. Brit. Ind.); Sonamarg, 3493; near Trunkal, Gangabal Lakes, 18,138; Mengandob to Gadsar, 18,298; Masjid Gali near Tilel, 18,392; Shankargarh, Astor Valley, 18,764; Deosai Plains, 19,915 bis; Burji La, Baltistan, 20,154; Rangdam, Zanskar, Koelz 2852, 2855. PUNJAB: Sach Pass, Chamba, 2669, 2718.

Distribution: Alpine western Himalaya. Alt. 9000–12,000 feet.

Agropyron intermedium (Host) Beauv. Ess. Agrost. 102, 146, 180. 1812.

Triticum intermedium Host, Ic. Gram. 3: 23. 1805.

KASHMIR: Above Bragnag, Ladak, 13,400 feet, *Koelz 2797*; Padam, Zanskar, 12,000 feet, *Koelz 2996* (det. Dr. Hitchcock).

New to Kashmir.

Distribution: Kashmir, Europe.

Agropyron Jacquemontii Hook. f. Fl. Brit. Ind. 7: 369. 1896.

Anthosaone Jacquemontii Nevski in Komarov, Fl. U. R. S. S. 2: 598. 1934.

KASHMIR: Nubra (Fl. Brit. Ind.).

Distribution: Tibetan Himalaya, north into Russia.

Agropyron Jacquemontii var. **pubescens** Pamp. Bull. Soc. Bot. It. 40. 1926.

KASHMIR: Shyok Valley, Baltistan (Pampanini, Fl. Carac. 79. 1930).

Agropyron longearistatum (Boiss.) Boiss. Fl. Orient. 5: 660. 1884; Fl. Brit. Ind. 7: 368. 1896.

Brachypodium longearistatum Boiss. Diagn. pl. Orient. 7: 127. 1846.

Agropyron schugnanicum Nevski, Bull. Jard. Bot. Acad. Sci. U. R. S. S. 30: 512. f. 4. 1932.

Roegneria schugnanica Nevski in Komarov, Fl. U. R. S. S. 2: 604. 1934.

For a discussion of the synonymy of this species see Nevski in Fascicle 22 (July 1934) of the U. R. S. S. *Herbarium Florae Asiae Mediae*. If the Indian material should prove to be specifically distinct from Boissier's Persian specimens Nevski's name will have to be adopted.

This is one of the commonest grasses at high levels in the Northwest Himalaya. It is found from Hazara to Kumaon and extends into the most remote parts of the mountains. It is found in the Karakorum, on the Deosai Plains, in Astor, Ladak, Zanskar, Rupshu, and Lahul from 9000 to 18,000 feet. In Kashmir proper it descends as low as 6000 feet.

Distribution: Northwest Himalaya, Asiatic Russia and westward to Persia.

Agropyron repens (L.) Beauv. Ess. Agrost. 102, 146, 180. 1812; Fl. Brit. Ind. 7: 370. 1896.

Triticum repens L. Sp. Pl. 86. 1753.

KASHMIR: Pahlgam, 5476; near Rattu, Astor Dist., 18,794; 18,844; Burzil Pass, 19,111a; Mir Panzil Pass, 19,915; Badwan to Chorwan, 19,613; Satpura La, Baltistan, 20,371; Shigar, Baltistan.

Very variable. Alt. 8000–14,000 feet.

Distribution: Western Himalaya, Europe, Siberia, north Africa, China, North America.

Agropyron semicostatum Nees ex Steud. Syn. Gram. 346. 1854; Fl. Brit. Ind. 7: 369. 1896.

HAZARA: Kagan Valley, *Duthie* (Herb. Dehra). KASHMIR: Common, in the temperate zone, Pahlgam, Sonamarg, Gulmarg, Hajipir Pass, Tragbal, etc. PUNJAB: Sisu, Lahul, *Koelz 689*; Shipting Nullah, Lahul, *Koelz 947*; Jispa, Lahul, *Koelz 956*; Kyelang, Lahul, *Koelz 1283*.

Distribution: Temperate Himalaya, Afghanistan, Turkestan. Alt. 10,000–11,000 feet.

Agropyrum striatum Nees ex Steud. Syn. Gram. 346. 1854; Fl. Brit. Ind. 7: 369. 1896.

KASHMIR: Sonamarg, 6332; Atchibal, 3186; above Gadsar, 18,387.

Distribution: Kashmir. Alt. 5500–12,000 feet.

Agropyron Thomsoni Hook. f. Fl. Brit. Ind. 7: 370. 1896.

PUNJAB: Kunawar and Spiti (Fl. Brit. Ind.).

Distribution: Northwest Himalaya. Alt. 6000–12,000 feet.

32. *Triticum* L.

Triticum aestivum L. Sp. Pl. 85. 1735.

Triticum vulgare Vill. Hist. Pl. Dauph. 2: 153. 1787; Fl. Brit. Ind. 7: 367. 1896.

Wheat is the most important crop in the irrigated parts of the Punjab. It is also widely cultivated in the Himalaya even in the innermost valleys of Baltistan, Ladak and Zanskar up to 13,000 feet.

33. *Aegilops* L.

Aegilops squarrosa L. Sp. Pl. 1051. 1753.

Triticum aegilops Beauv. Ess. Agrost. 180. 1812; Fl. Brit. Ind. 7: 367. 1896.

KASHMIR: Sambal Nullah, near Srinagar, 11-7-1891, 5200 feet; *Gammie* (Herb. Dehra).

Distribution: Northwest India to the Mediterranean basin.

34. *Elymus* L.

Elymus chinensis (Trin.) Keng, Sunyatsenia 6: 66. 1941.

Triticum chinense Trin. ex Bunge, Mém. Sav. Étr. Acad. Sci. Pétersb. 2: 146. 1833.

Elymus pseudagropyrum Trin. ex Turez. Bull. Soc. Nat. Mosc. 1838(1): 105, nomen. 1838; op. cit. 1856(1): 63. 1856.

Triticum pseudagropyron Griseb. in Ledeb. Fl. Ross. 4: 343. 1853.

Aneurolepidium pseudagropyron Nevski in Komarov, Fl. U. R. S. S. 2: 710. 1934.

KASHMIR: Shyok Valley, Tankse, 4275 m., *Henderson & Hume (Lahore to Yarkand, p. 341. 1873)*.

Distribution: Central Asia.

Elymus dahuricus Turez. Bull. Soc. Nat. Mosc. 1838(1): 105, nomen. 1838; Griseb. in Ledeb. Fl. Ross. 4: 331. 1853; Fl. Brit. Ind. 7: 374. 1896.

Clinelymus dahuricus Nevski, Bull. Jard. Bot. Acad. Sci. U. R. S. S. 30: 645. 1932.

KASHMIR: Near Waziri Thal, Tilel Dist., 18,500a; Koragbal to Badwan, 19,541; Sapi La, Suru, 444a; Leh, Ladak, 445a, also *Koelz 2606*; Chunagund, Ladak, 21,050; Shigar, Baltistan, 20,533; Tsaka, Ladak, *Koelz 2376*.

Distribution: Tibetan Kashmir and north into Asiatic Russia. Alt. 8000-15,000 feet.

Elymus dasystachys Trin. in Ledeb. Fl. Alt. 1: 120. 1829; Fl. Brit. Ind. 7: 374. 1896.

Aneurolepidium dasystachys Nevski, in Komarov, Fl. U. R. S. S. 2: 706. 1934.

Another common, alpine steppe grass with much the same distribution as the last. I have collections from Baltistan, Dras, Rupshu, Ladak, Zanskar, Lahul and Spiti made by myself or Walter Koelz. Alt. 9000-15,000 feet.

Distribution: Northwest alpine Himalaya, Asiatic Russia, Siberia.

Elymus nutans Griseb. Nachr. Ges. Wiss. Gött. 72. 1868.

Clinelymus nutans Nevski, Bull. Jard. Acad. Sci. U. R. S. S. 30: 644. 1932.

Elymus sibiricus of Hook. f. Fl. Brit. Ind. 7: 373. 1896; non L.

Very common in the same region as *Agropyron longearistatum* and Nevski suggests that there may be hybridization. It is found in Baltistan, Ladak, Kashmir proper, Rupshu, Zanskar, Lahul, and Chamba, from 9000 to 17,500 feet.

Distribution: Alpine Himalaya and north into Russia.

Elymus Thomsoni Hook. f. Fl. Brit. Ind. 7: 374. 1896.

Piti (Spiti), 13,000 feet, *Thomson* (Fl. Brit. Ind.).

Distribution: Spiti, Punjab Himalaya.

35. *Hystrix* Moench.

Hystrix Duthiei (Stapf) Bor, Indian Forester 66. 544. 1940.

Asperella Duthiei Stapf in Hook. f. Fl. Brit. Ind. 7: 375. 1896; Hook. Ic. 26. pl. 2525. 1897.

U. P.: Tehri Garhwal, 7000–8000 feet, *Duthie* (Fl. Brit. Ind.).

Distribution: Tehri Garhwal, China (Hupeh).

36. *Hordeum* L.

Hordeum brevisubulatum (Trin.) Link, Linnæa 17: 391. 1834.

Hordeum secalinum var. *brevisubulatum* Trin. Ic. pl. 4. 1825.

Hordeum secalinum of Hook. f. Fl. Brit. Ind. 7: 372. 1896; non Schreb. 1771.

KASHMIR: Alkali plain below Shigar, Baltistan, 20,495; Thalle La, Baltistan, 20,615; Spitug, Ladak, *Koelz* 2686; Bragnag, Ladak, *Koelz* 2793; Hanle, Rupshu, *Koelz* 2306b; Kugzil La, Rupshu, *Koelz* 2322a.

Alt. 8000–16,000 feet.

Distribution: Tibetan Himalaya, China, Asiatic Russia, west to Europe.

Hordeum murinum L. Sp. Pl. 85. 1753; Fl. Brit. Ind. 7: 372. 1896.

N. W. FRONTIER: Peshawar, 19,373. KASHMIR: Dal Lake, 5200 feet, 14,321; Tsakzhun Tso, Ladak, *Koelz* 44. PUNJAB: Murree Hills, 1639; 13,471; Kilar, Pangi, 2737, 2761a.

Distribution: Northwest India and westward to the Atlantic. Alt. plains to 9000 feet.

Hordeum vulgare L. Sp. Pl. 84. 1753; Fl. Brit. Ind. 7: 371. 1896.

Like wheat, barley or “jao” is cultivated in the plains and up to high altitudes in the Tibetan parts of the Himalaya. I have found it up to about 13,000 feet in Ladak and *Koelz* has a specimen, no. 3024, from Shingo La, Zanskar, at 16,700 feet, possibly from a stray seed.

Distribution: Cultivated in most cold and temperate regions.

37. *Lolium* L.

Lolium multiflorum Lam. Fl. Fr. 3: 621. 1778; Fl. Brit. Ind. 7: 364. 1896.

HAZARA: Nathia Gali (Herb. Gordon). PUNJAB: Murree, 1598; Kuldanna, 10,201.

Not cultivated. Alt. 6000–8000 feet.

Distribution: The Near East, central and south Europe, north Africa.

Lolium perenne L. Sp. Pl. 83. 1753; Fl. Brit. Ind. 7: 365. 1896.

HAZARA: Near Changla Gali, 13,392. KASHMIR: Baltistan (Herb. Dehra); Nasim Bagh, near Spinagar, 10,619. PUNJAB: Murree, 9621; 15,353; Naggar Kulu, *Koelz* 1959.

Alt. 5000–8000 feet.

Distribution: Europe, north Africa, northwest Himalaya.

Lolium rigidum Gaud. var. *Duthiei* Hack. ex Hook. f. Fl. Brit. Ind. 7: 364. 1896.

KASHMIR: Srinagar, *Duthie* 10,346, TYPE. PUNJAB: Jhelum, 6190.

Apparently very rare.

Distribution: Kashmir, west to the Caucasus and South Europe. Alt. plains to 6000 feet.

Lolium temulentum L. Sp. Pl. 83. 1753; Fl. Brit. Ind. 7: 364. 1896.

HAZARA: Abbottabad, 16,386. KASHMIR: Poonch City, 12,029. PUNJAB: Murree, *Trotter* 41; 45 (Herb. Gordon); Rawalpindi (Herb. Gordon); Katrain, Kulu, *Koelz* 1886; Naggar, Kulu, *Koelz* 1971.

Alt. 1700–6000 feet.

Distribution: North India, Europe, north Asia; adventive elsewhere.

38. *Oropetium* Trin.

Oropetium Thomaeum (L.) Trin. Fund. Agrost. 98. *pl.* 3. 1820; Fl. Brit. Ind. 7: 366. 1896.

Nardus Thomaea L. f. Suppl. 105. 1781.

PUNJAB: Hissar bir, *Duthie 5123* (U. S. Nat. Herb.). U. P.: Dehra Dun, Bindal Nullah, 2200 feet on stream bank (Herb. Gordon).

Distribution: Tropical India and Burma.

39. *Lepturus* R. Br.

Lepturus Roxburghianus Steud. Syn. Gram. 357. 1854; Fl. Brit. Ind. 7: 365. 1896.

Rottboellia biflora Roxb. Fl. Ind. 1: 357. 1820; non Roth, 1802.

PUNJAB: Hissar, dry hills (Fl. Brit. Ind.).

Distribution: South India.

40. *Pholiurus* Trin.

Pholiurus incurvus (L.) Schinz & Thell. Viert. Nat. Ges. Zurich 66: 265. 1921.

Aegilops incurva L. Sp. Pl. 1051. 1753.

PUNJAB: Topi Park, Rawalpindi, near a pond, 1700 feet, April 1934, 13,749, and April 24, 1939, 17,276.

New to India.

Distribution: Europe.

AVENEAE

41. *Schismus* Beauv.

Schismus barbatus (L.) Thell. Bull. Herb. Boss. II. 7: 391. 1907.

Festuca barbata L. Amoen. Acad. 3: 400. 1756.

Schismus marginatus Beauv. Ess. Agrost. 177. *pl.* 15, f. 4. 1812; Fl. Brit. Ind. 7: 336. 1896.

N. W. FRONTIER: Peshawar, 15,815. KASHMIR: Blaghar to Kuru, Shyok Valley, Baltistan, 8000 feet, 20,861; Indus Valley below Olthing, 8000 feet, 20,999; Rabila, Mulbekh, Ladak, *Koelz 6167*; Satpur Vy. Baltistan, 8000-9000 feet, *Duthie 12,052*. PUNJAB: Campbellpur, Attock Dist. (Herb. Gordon).

Distribution: Northwest India, westward to the Atlantic; Africa; North Asia.

42. *Koeleria* Pers.

Koeleria argentea Griseb. Nachr. Ges. Wiss. Gött. 77. 1868; Fl. Brit. Ind. 7: 309. 1896.

KASHMIR: Nubra, and Leh, Ladak, *Schlagintweit* (Griseb.); Kishtwar (Fl. Brit. Ind.).

Distribution: Kashmir.

Koeleria Clarkeana Domin, Bibl. Bot. 14(65): 272. 1907.

KASHMIR: Naoshera, 1800 feet, *Clarke 28,155*, TYPE, and only collection. Not seen.

Distribution: Kashmir.

Koeleria cristata (L.) Pers. Syn. Pl. 1: 97. 1805; Fl. Brit. Ind. 7: 308. 1896.

Aira cristata L. Sp. Pl. 63. 1753.

Koeleria gracilis Pers. Syn. Pl. 1: 97. 1805.

A very common grass from 5000 to 12,000 feet; less common in the inner ranges, though it is found in Baltistan, Ladak, and Lahul.

Distribution: Temperate and alpine Himalaya; north temperate regions.

Koeleria cristata var. **grandiflora** (Bertol.) Boiss. Fl. Orient. 5: 575. 1885; Fl. Brit. Ind. 7: 309. 1896.

Koeleria grandiflora Bertol. ex Schult. Mant. 2: 345. 1824.

PUNJAB: Jispa, Lahul, *Koelz* 969; Naggar, Kulu, *Koelz* 1967, 1974.

There is a good deal of variation in the species, in the size and color of the inflorescence and of the whole plant. I am not sure whether it is worth while to maintain any varieties or not.

Distribution: The same as that of the species.

Koeleria phleoides (Vill.) Pers. Syn. Pl. 1: 97. 1805; Fl. Brit. Ind. 7: 309. 1896.

Festuca phleoides Vill. Fl. Delph. in Gilib. Sys. Pl. Eur. 1(4): 7. 1785.

HAZARA: Abbottabad, 4200 feet (Herb. Gordon). KASHMIR: Domel, 2000 feet, 12,039. PUNJAB: Rawalpindi, 15,819, 17,275, etc.; Sangla Hill, 1419; Raissan, Kulu, *Koelz* 1846; Naggar, Kulu, 6000 feet, *Koelz* 1963.

A spring weed about cultivation in the plains and ascending to 6000 feet in the outer hills. There is a hairy and a more glabrous form.

Distribution: North India and westward to the Atlantic; introduced in many parts of the world.

43. **Trisetum** Pers.

Trisetum aeneum (Hook. f.) R. R. Stewart, comb. nov.

Trisetum aureum Nees ex Steud. Syn. Gram. 225. 1854; non Tenore, 1820.

Avena aenea Hook. f. Fl. Brit. Ind. 7: 279. 1896.

HAZARA: Kagan Valley, 14,400 feet, *Duthie* (Herb. Dehra). KASHMIR: Above Gulmarg, 10,635; Gadsar, 18,314a; Kun Patthar, 18,448; Lohan Gali, toward Tilel, 18,448a; Kamri Pass, 18,694, 18,700; Astor Valley above Rattu, 18,470; Badwan, 19,254.

Distribution: Northwest Himalaya. Alt. 8000–14,000 feet.

Trisetum Clarkei (Hook. f.) R. R. Stewart, comb. nov.

Avena Clarkei Hook. f. Fl. Brit. Ind. 7: 278. 1896.

KASHMIR: Pahlgam, 5594; above Gulmarg, 10,602a; Yamhar Pass, 12,454; Gangabal Lakes, 18,179; Astor Valley, above Rattu, 18,739; near Badwan, Kishenganga Valley, 19,536. PUNJAB: Shipting Nullah, Lahul, *Koelz* 897c; 929; Tarlokmath, Chamba, *Koelz* 1048.

Distribution: Punjab and Kashmir Himalaya. Alt. 8000–12,000 feet.

Trisetum flaccidum (Hack. ex Hook. f.) R. R. Stewart, comb. nov.

Avena flaccida Hack. ex Hook. f. Fl. Brit. Ind. 7: 280. 1896.

HAZARA: Black Mts., *Duthie* 7609, in part (Fl. Brit. Ind.).

Distribution: Northwest Himalaya.

Trisetum pubiflorum Hack. Oesterr. Bot. Zeits. 52: 187. 1902.

KASHMIR: Sangam Valley, in rocks, 4400 meters alt., *Duthie* 13,543 (U. S. Nat. Herb.).

“This is an ally of *Trisetum spicatum*, foliage puberulent, lemmas softly pubescent” (Chase).

Trisetum spicatum (L.) Richt. Pl. Eur. 1: 59. 1890.

Aira spicata L. Sp. Pl. 64. 1753.

Avena subspicata L. Syst. Nat. ed. 10: 873. 1759; Fl. Brit. Ind. 7: 278. 1896.

Very common in the alpine zone of Hazara, Kashmir, and the Punjab Himalaya from 10,000 to 18,000 feet, penetrating as far as Baltistan, Ladak, Zanskar, and Lahul.

Distribution: Alpine, arctic, and antarctic regions.

44. *Deschampsia* Beauv.

Deschampsia caespitosa (L.) Beauv. Ess. Agrost. 91, 160. 1812; Fl. Brit. Ind. 7: 273. 1896.

Aira caespitosa L. Sp. Pl. 64. 1753.

KASHMIR: Burzil Chowki, 19,749; Minimarg, 19,825; Dras to Matayan, 21,163; Hanle, Rupshu, *Koelz* 2305k, 2315; above Tsakzhun Tso, Ladak, *Koelz* 2415i; Shushal, Ladak, *Koelz* 2447b; Kangi La to Rangdam, Zanskar, *Koelz* 2853, 2894; Pensi La, Zanskar, *Koelz* 2935b.

A plant of swamps and damp soil from 10,000 to 17,000 feet.

Distribution: Temperate and cold regions of both hemispheres.

Deschampsia koelerioides Regel, Bull. Soc. Nat. Mosc. 41(3): 299. 1869; Fl. Brit. Ind. 7: 273. 1896.

KASHMIR: Burzil Pass, 19,064; Deosai Plains, 20,001a. 20,040; Burji La, above Skardu, 20,014; Thalle La, Baltistan, 20,737.

Retains a fine dark golden color after pressing. Alt. 12,000–16,000 feet.

Distribution: Tibetan Kashmir; Russia.

45. *Aira* L.

Aira caryophylla L. Sp. Pl. 66. 1753; Fl. Brit. Ind. 7: 272. 1896.

Lahul and Western Tibet (Fl. Brit. Ind.).

Distribution: Tibetan Himalaya, temperate Asia, north Africa, Australia, America. A weed in many parts of the world.

46. *Avena* L.

Avena barbata Brot. Fl. Lusit. 1: 108. 1804; Fl. Brit. Ind. 7: 275. 1896.

KASHMIR: Ladak, *Schlagintweit* (Griseb. Nachr. Ges. Wiss. Gött. 78. 1868).

Distribution: Russia, west Asia, Mediterranean basin; adventive in the New World.

Avena fatua L. Sp. Pl. 80. 1753; Fl. Brit. Ind. 7: 275. 1896.

A common weed in cultivated fields from the Punjab plains to the inner valleys in Ladak and Baltistan.

Distribution: Europe, North Asia, North Africa and the New World.

Avena sativa L. Sp. Pl. 79. 1753; Fl. Brit. Ind. 7: 275. 1896.

Few oats are cultivated in the Himalaya but *Koelz* reported it as a crop at Marsho, Ladak (no. 6372), and Duthie in Astor Dist. Cultivated in the Punjab for army horses. Often badly infected by smut. "Jai" is the Punjab name for oats.

Distribution: Widely cultivated in the more temperate parts of the earth.

47. *Helictotrichon* Bess.

Helictotrichon asperum (Munro) Bor, var. *Roylei* (Hook. f.) R. R. Stewart, comb. nov.

Avena aspera Munro ex Thw. var. *Roylei* Hook. f. Fl. Brit. Ind. 7: 277. 1896.

KASHMIR: Tragbal, 4672, 4917; Tangmarg, 10,595; above Gulmarg, 8764; 10,350; ascent to Banihal Pass, 13,463; Rajdhiangan Pass, 19,293. PUNJAB: Simla, *Collett* (Fl. Siml.).

Distribution: Kashmir to Nepal. Alt. 6000–13,000 feet.

Helictotrichon pratense (L.) Pilger, Repert. Sp. Nov. Fedde 45: 6. 1938.

Avena pratensis L. Sp. Pl. 80. 1753; Fl. Brit. Ind. 7: 276. 1896.

Avenastrum pratense Jessen, Deuts. Gräser 53: 216. 1863.

KASHMIR: Mt. Apharwat, above Gulmarg, 10,466; Banihal Pass, 12,112; 14,074; Satpura Nullah, above Skardu, 20,359; Burzil Chowki to Deosai Plain, 19,990; Minimarg, 19,207; Kangi La, Zanskar, *Koelz* 2858; Pensi La, Zanskar, *Koelz* 2934h. PUNJAB: Pangi, Chamba State (Herb. Dehra).

Alt. 9000–14,000 feet.

Distribution: Western Himalaya, Russia, Asia Minor, Europe.

48. *Danthonia* D.C.

Danthonia cachemyriana Jaub. & Spach, Ill. Pl. Or. 4: 46, pl. 331. 1850–52; Fl. Brit. Ind. 7: 281. 1896.

PUNJAB: Simla Hills, *Collett* (Fl. Siml.). U. P.: Deoban, Tehri Garhwal, 8000–9000 feet (Herb. Dehra).

The center of distribution of this plant is in Kunawar and Kumaon, not in Kashmir.

Distribution: Temperate and alpine Himalaya. Alt. 10,000–14,000 feet.

Danthonia cachemyriana var. *minor* Hook. f. Fl. Brit. Ind. 7: 282. 1896.

KASHMIR: *Dainelli & Marinelli*, Baltistan (Pampanini, Fl. Carac. 74. 1930).

Distribution: Alpine Himalaya. Alt. 12,000–14,000 feet.

Danthonia exilis Hook. f. Fl. Brit. Ind. 7: 281. 1896.

KASHMIR: Sonamarg, 6921, 9782; Matayan, Ladak Road, 7425; Baltal, 7463; Ferozepur Nullah, 8371; Mt. Apharwat, 10,474.

A plant of rock crevices.

Distribution: Kashmir. Alt. 9000–12,000 feet.

Danthonia himalaica Hook. f. Fl. Brit. Ind. 7: 281. 1896.

U. P.: Deoban, Tehri Garhwal, 8000–9000 feet, *Duthie* 14,467.

Distribution: Tehri Garhwal and Jaunsar, United Provinces.

AGROSTIDEAE

49. *Calamagrostis* Adans.

Calamagrostis decora Hook. f. Fl. Brit. Ind. 7: 260. 1896.

KASHMIR: Astor Valley, 9000–10,000 feet, *Duthie* 12,660 (Herb. Dehra).

Distribution: North Kashmir.

Calamagrostis emodensis Griseb. Nachr. Ges. Wiss. Gött. 80. 1868; Fl. Brit. Ind. 7: 261. 1896.

HAZARA: Kagan Valley, *Duthie* (Herb. Dehra). KASHMIR: Sonamarg, 3453, 6576; below Badwan, Kishenganga Valley, 19,264; Rajdhangan Pass, 19,301. PUNJAB: Keerting Shansha, Lahul, *Koelz* 1231; Sach Pass, Chamba (Herb. Dehra). U. P.: Mussoorie, *Duthie* (Herb. Dehra).

Distribution: Temperate Himalaya. Alt. 7000–12,000 feet.

Calamagrostis emodensis var. *brevisetata* Hack. ex Paulsen Vid. Medd. Nat. Foren. Kjøb. 1: 295. 1929.

KASHMIR: Hunza Valley, *Visser* 295 (det. Dolk) (Pampanini Fl. Carac. 73. 1930).

Distribution: North Kashmir.

Calamagrostis epigeios (L.) Roth, Fl. Germ. 1: 34. 1788; Fl. Brit. Ind. 7: 260. 1896.

Arundo epigeios L. Sp. Pl. 81. 1753.

KASHMIR: Astor Valley, *Duthie* 12,454 (Herb. Dehra).

Apparently rare in the Himalaya, from 8000 to 14,000 feet.

Distribution: North Asia, Europe, South Africa.

Calamagrostis Jacquemontii Hook. f. Fl. Brit. Ind. 7: 265. 1896.

KASHMIR: Pir Punjal Range, *Jacquemont 97* (Fl. Brit. Ind.).

Distribution: Kashmir.

Calamagrostis Munroana (Aitch. and Hems.) Boiss. Fl. Orient. 5: 523. 1884; Fl. Brit. Ind. 7: 263. 1896.

Agrostis Munroana Aitch. and Hems. Jour. Linn. Soc. 19: 192. 1882.

HAZARA: Siran Valley (Herb. Dehra); Mokhshpuri, Murree Hills, *Trotter* (Herb. Gordon). KASHMIR: Very common, Tragbal, Sonamarg, Gulmarg, Sharda, Zojibal Pass, Gadsar, Kamri, Buzil Chowki, etc. PUNJAB: Simla, *Collett* (Fl. Siml.).

Collett refers this species and *C. pilosula* to *Agrostis*.

Distribution: Kurram Valley, Northwest Frontier Province to Kumaon. Alt. 6000–13,000 feet.

Calamagrostis Munroana var. **stricta** Hook. f. Fl. Brit. Ind. 7: 263. 1896.

PUNJAB: Crest of Rotang La; Kulu, 13,000 feet, *Koelz 3074*.

Hooker considered this to be the alpine form of the species.

Distribution: Same as the species.

Calamagrostis pilosula (Trin.) Hook. f. Fl. Brit. Ind. 7: 263. 1896.

Agrostis pilosula Trin. Mém. Acad. Pétersb. VI. 6(2): 372. 1845.

Like *C. Munroana* this is a very common and variable grass. It is abundant from 6000 to 10,000 feet and I have collected it from Changla Gali in Hazara east to Landour in the Dehra Dun Dist. It grows in Murree, Pahlgam, Sonamarg, Khillanmarg, Simla, Kulu, Lahul, etc.

Distribution: Temperate Himalaya and the mountains of South India and Ceylon.

Calamagrostis pseudophragmites (Hall. f.) Koeler, Descr. Gram. 106. 1802.

Arundo pseudophragmites Hall. f. Arch. Bot. Roem. 1(2): 11. 1797.

Arundo littorea Schrad. Fl. Germ. 1: 212. pl. 4, f. 2. 1806.

Calamagrostis littorea DC. Fl. Fran. 5: 255. 1815; Fl. Brit. Ind. 7: 255. 1896.

This is the commonest large grass in the inner Himalaya. It is found less commonly on the outer ranges than in Baltistan, Ladak, Rupshu, Zanskar and Lahul. It is found in river beds, watered meadows, pastures, etc. from 6000 to 15,000 feet.

Distribution: Himalaya; north and west Asia, Europe.

Calamagrostis pseudophragmites var. **tatarica** (Hook. f.) R. R. Stewart, comb. nov.

Calamagrostis littorea var. *tatarica* Hook. f. Fl. Brit. Ind. 7: 261. 1896.

KASHMIR: Kangi Nullah, Ladak, *Koelz 2826*; Rangdum, Zanskar, *Koelz 2891*; Da to Hanle, Rupshu, *Koelz 2287*. PUNJAB: Serchu, Lahul, *Koelz 2091*.

This may be worth maintaining as a distinct species.

Distribution: Tibetan Kashmir. Alt. 10,000–15,000 feet.

Calamagrostis Stoliczkai Hook. f. Fl. Brit. Ind. 7: 262. 1896.

KASHMIR: Pensi La, Zanskar, *Stoliczka* (Fl. Brit. Ind.).

Distribution: Kashmir.

Calamagrostis: Section *Deyeuxia* Clar.**Calamagrostis arundinacea** (L.) Roth, Fl. Germ 2(1): 89. 1789.

Agrostis arundinacea L. Sp. Pl. 61. 1753.

Arundo silvatica Schrad. Fl. Germ. 1: 218. 1806.

Deyeuxia sylvatica Kunth, Rev. Gram. 77. 1829; Fl. Brit. Ind. 7: 266. 1896.

KASHMIR: *Duthie*, 10,000–11,000 feet (Fl. Brit. Ind.).

Distribution: Western Himalaya, Temperate Asia, Europe.

Calamagrostis scabrescens Griseb. Nachr. Ges. Wiss. Gött. 79. 1868.

Deyeuxia scabrescens Duthie, Gaz. N. W. Prov. 628. 1882; Fl. Brit. Ind. 7: 267. 1896.

HAZARA: *Duthie* at 11,000 feet (Herb. Dehra and Gordon). KASHMIR: Pahlgam, 5452, 7997; Lidder Valley, 13,000–14,000 feet, *Duthie* 13,349 (Herb. Dehra); Leh, Ladak, *Meebold*.

Distribution: Alpine Himalaya, Hazara to Bhotan. Alt. 10,000–14,000 feet.

Calamagrostis tianshanica Rupr. Mém. Acad. Sci. Pétersb. VII. 14(4): 34. 1869.

Calamagrostis compacta Hack. ex Paulsen, Vid. Medd. Nat. Foren. Kjøb. 167. 1903.

Deyeuxia compacta Munro ex Hook. f. Pl. Brit. Ind. 7: 267. 1896.

W. TIBET: *Jaquemont* (Fl. Brit. Ind.). KASHMIR: Nubra, *Thomson* (Fl. Brit. Ind.).

Distribution: Tibetan Himalaya.

50. **Agrostis** L.

Agrostis alba L. Sp. Pl. 63. 1753; Fl. Brit. Ind. 7: 254. 1896.

KASHMIR: Sapi La, Suru, 439a; Leh, Ladak, *Koelz* 2592, 2597b; Lamayuru, Ladak, *Koelz* 2758, 2766a; Mulbekh, Ladak, *Koelz* 2990; Tagring, Zanskar, *Koelz* 2990. PUNJAB: Shipting Nullah, Lahul, *Koelz* 882; Tarloknath Chamba, *Koelz* 1131.

Alt. 9500–11,500 feet.

Distribution: North Temperate regions.

Agrostis canina L. Sp. Pl. 62. 1753; Fl. Brit. Ind. 7: 255. 1896.

One of the commonest grasses in the Western Himalaya. It is found in many parts of Kashmir, including Baltistan and Zanskar. It is also abundant in the Punjab Himalaya. Alt. 6000–12,000 feet.

Distribution: Western Himalaya, Nilgiris; north temperate regions.

Agrostis Clarkei Hook. f. Fl. Brit. Ind. 7: 257. 1896.

KASHMIR: Sonamarg, 6367; 7369; Pahlgam, 5702.

This is very near to *Agrostis canina* but is without awns.

Distribution: Western Himalaya, Sikkim. Alt. 7000–10,000 feet.

Agrostis semiverticillata (Forsk.) C. Christ, in Dansk. Bot. Arkiv. 4(3): 12. 1922.

Phalaris semiverticillata Forsk. Pl. Aegypt.-Arab. 17. 1775.

Agrostis verticillata Vill. Prosp. Fl. Dauph. 16. 1779; Fl. Brit. Ind. 7: 254. 1896.

PUNJAB: Kuldanna, Murree Hills, 6500 feet, 10,202.

Distribution: Northwest India; north temperate regions.

Agrostis stolonifera L. Sp. Pl. 62. 1753.

Agrostis alba L. var. *stolonifera* Smith, Engl. Fl. 1: 93. 1824; Fl. Brit. Ind. 7: 254 (in note under *Agrostis alba*). 1896.

KASHMIR: Dras, Ladak Road, 7476a; Tangmarg, 10,543; Srinagar, 18,046; Parkutta to Tolti, Baltistan, 20,951. PUNJAB: Murree, *Trotter* (Herb. Gordon); Dalhousie, *Duthie* (Herb. Gordon).

Alt. 5000–10,000 feet.

Distribution: Western Himalaya to Western Europe; introduced in America.

Agrostis subaristata Aitch. and Hemsl. Jour. Linn. Soc. 19: 192. pl. 29. 1882; Fl. Brit. Ind. 7: 255. 1896.

KASHMIR: Reshna to Sharda, Kishenganga Valley, 17,744; Taobat, Kishenganga Valley, 17,876a.

Distribution: Kashmir, Afghanistan. Alt. 5000–6000 feet.

51. *Alopecurus* L.

Alopecurus aequalis Sobol, Fl. Petrop. 16. 1799.

Alopecurus aristulatus Michx. Fl. Bor. Am. 1: 43. 1803; Fl. Brit. Ind. 7: 238. 1896.

Alopecurus fulvus Sm. in Sowerby & Sm. Eng. Bot. 21: pl. 1467. 1805.

KASHMIR: Gund, 7158; Pahlgam, 8352; Ferozepur Nullah, 14,744a; Deesai Plains, 19,963; 20,031a; Satpura La, Baltistan, 20,179; below Wangat, 18,083; Satsar, 18,220. PUNJAB: Halann, Kulu, Koelz 1967.

A plant of marshes and the borders of lakes. Alt. 6000–14,000 feet.

Distribution: Western Himalaya, China, north temperate regions.

Alopecurus geniculatus L. Sp. Pl. 60. 1753; Fl. Brit. Ind. 7: 239. 1896.

PUNJAB: Dalhousie, 7000 feet, 2228a; Sirsa, Koelz 1566; Keshapur, Koelz 1652a; Negrota, Kangra, Koelz 1731. U. P.: Dehra Dun, U. Singh 316.

Distribution: North India from the plains of the Punjab and Kashmir east to Bhotan; most temperate regions.

Alopecurus arundinaceus Poir. in Lam. Encyc. 8: 776. 1808; Fl. Brit. Ind. 7: 238. 1896.

Alopecurus ventricosus Pers. Syn. 1: 80. 1805; non Huds. 1778.

HAZARA: Inayat (Herb. Dehra). KASHMIR: Tragbal, 4202, 4406; Ferozepur Nullah, 14,744; Nanga Parbat, Troll. PUNJAB: Saeh Pass, Chamba, 2551; Chandrakani, Kulu, Koelz 253; Jispa, Lahul, Koelz 1002; Gumer, Lahul, Koelz 1231.

A plant of alpine meadows, from 7500 to 13,000 feet.

Distribution: North Asia; western Himalaya and westward to Europe.

Alopecurus himalaicus Hook. f. Fl. Brit. Ind. 7: 238. 1896.

HAZARA: Siran Valley (Herb. Dehra). KASHMIR: Pahlgam, 8147; Sonamarg, 9847; Burzil Chowki, 19,811; Pensi La, Zanskar, Koelz 2931, etc.

Common on alpine meadows with *Phleum alpinum* from 10,000 to 14,500 feet.

Distribution: Northwest Himalaya, Russia.

Alopecurus myosuroides Huds. Fl. Angl. 23. 1762.

Alopecurus agrestis L. Sp. Pl. ed. 2: 89. 1762; Fl. Brit. Ind. 7: 239. 1896.

KASHMIR: Poonch City, 3000 feet, 12,028.

Distribution: North India, Europe, north and west Asia.

Alopecurus nepalensis Trin. ex. Steud. Syn. Gram. 148. 1854; Fl. Brit. Ind. 7: 239. 1896.

PUNJAB: Rawalpindi, 14,599; 17,293; Hoshiarpur and Lahore (Herb. Dehra).

Distribution: North Indian plains.

52. *Polypogon* Desf.

Polypogon interruptus H. B. K. Nov. Gen. & Sp. 1: 134. pl. 44. 1815.

Agrostis littoralis With. Brit. Fl. ed. 3. 2: 129. pl. 23. 1796; non Lam. 1791. (*Species dubia*.)

Polypogon littoralis Smith, Comp. Fl. Brit. 13. 1800; Fl. Brit. Ind. 7: 246. 1896; based on *species dubia*.

Agrostis lutosus Poir. in Lam. Encyc. Suppl. 1: 249. 1810. (*Species dubia*.)

Polypogon lutosus Hitchc. U. S. Dept. Agri. Bull. 772: 138. 1920; based on *species dubia*.

KASHMIR: Kajei, Padar, 7000 feet, 2945; Shalimar, Dal Lake, 5200 feet, 10,613; Nasim Bagh, 5200 feet, 13,478. PUNJAB: Murree Brewery, 5000 feet, 1663; Hasan Adbal, 2000 feet, 10,129; near Rawalpindi, 1700 feet, 13,818. U. P.: Jabberkhet, 7000 feet, 15,600; Landour, 6000–7000 feet, 16,875.

A plant of damp soil.

Distribution: Temperate and subtropical regions.

Polypogon monspeliensis (L.) Desf. Fl. Atlant. 1: 67. 1798; Fl. Brit. Ind. 7: 245. 1896.

Alopecurus monspeliensis L. Sp. Pl. 61. 1753.

A very common annual weed, found from the plains to 11,000 feet in Ladak and Lahul. It is also found in Baltistan. In the upper Indus Valley it is often dwarfed and ephemeral and simulates some forms of *Polypogon interruptus*. Hooker states that these starved forms are *Polypogon fugax* Nees.

Distribution: Widespread in temperate and tropical regions.

53. Phleum L.

Phleum alpinum L. Sp. Pl. 59. 1753; Fl. Brit. Ind. 7: 236. 1896.

One of the commonest alpine grasses in the N. W. Himalaya, usually found from 10,000 to 16,000 feet. It is abundant in Hazara, Kashmir proper, Baltistan, Zanskar, Kishtwar, Kulu, Lahul, etc.

Distribution: Arctic and alpine regions.

Phleum arenarium L. Sp. Pl. 60. 1753; Fl. Brit. Ind. 7: 237. 1896.

HAZARA: Abbottabad, 14,653; 16,354. KASHMIR: Titwal, Kishenganga Valley, 17,460; Keran Nullah, 17,656. PUNJAB: Pangi, Chamba State, 2702; Raisan, Kulu, Koelz 1849.

A spring annual. Alt. 3000–6000 feet.

Distribution: Western Himalaya and west to the Atlantic.

Phleum paniculatum Huds. Fl. Angl. 23. 1762.

Phleum asperum Jacq. Coll. 1: 110. 1786; Fl. Brit. Ind. 7: 237. 1896.

HAZARA: Abbottabad, 16,367. KASHMIR: Domel, Jhelum Valley Road, 12,037. PUNJAB: Ghora Gali, Murree Hills, 13,485; Saidpur, Rawalpindi Dist., 16,573.

A spring weed, from the foothills to 6000 feet.

Distribution: Western Himalaya and westward to the Atlantic.

Dubiae

Phleum himalaicum Mez, Repert. Sp. Nov. 17: 293. 1921.

Phleum arenarium var. *Thomsonii* Griseb. in Nachr. Ges. Wiss. Gött. 83. 1868; Fl. Brit. Ind. 7: 237. 1896.

Based on an Afghan specimen of Griffith, a Northwest Himalayan specimen of Thomson and a Kashmir specimen of Meebold. No numbers cited.

According to Hooker the variety *Thomsonii* is not distinct from *Phleum arenarium* proper.

54. Muhlenbergia Schreb.

Muhlenbergia Duthieana Hack. Oesterr. Bot. Zeits. 52: 11. 1902.

Muhlenbergia sylvatica of Hook. f. Fl. Brit. Ind. 7: 259. 1896; non Torr. 1841.

HAZARA: Black Mt., Duthie 7611; Thandiani, Trotter (Herb. Gordon); Changla Gali, 3961. PUNJAB: Murree Hills, Trotter (Herb. Gordon); Rahla, Kulu, Koelz 3038. U. P.: Landour, 14,232; 16,755.

Distribution: Western Himalaya. Alt. 4000–9000 feet.

Muhlenbergia himalayensis Hack. ex. Hook. f. Fl. Brit. Ind. 7: 259. 1896.

HAZARA: The Gallies (Herb. Dehra). KASHMIR: Ramban to Jumu, 10,676. PUNJAB: Simla (Fl. Siml.); Rahla, Kulu, Koelz 3038; Dalhousie to Chamba (Herb. Dehra). U. P.: Mussoorie Road, 11,469; Landour, 14,512a.

Distribution: Western Himalaya, Hazara to Mussoorie Hills. Alt. 3000–7000 feet.

Muhlenbergia Hugelii Trin. Mém. Acad. Pétersb. VI. 6(2) : 293. 1845.

Muhlenbergia viridissima Nees ex Steud. Syn. Gram. 178. 1854; Fl. Brit. Ind. 7: 259. 1896.

HAZARA: Kagan Valley, *Duthie* (Herb. Dehra); Dunga Gali, *Trotter 84*. KASHMIR: Pahlgam, 8289; below Parkutta, Indus Valley, Baltistan. PUNJAB: Murree Hills, 4048a; Simla, *Collett* (Fl. Siml.). U. P.: Jabberkhet, 15,724; Landour, 16,987.

Distribution: Temperate Himalaya, Hazara to Sikkim. Alt. 6000–9000 feet. China; Japan.

55. **Sporobolus** R. Brown**Sporobolus arabicus** Boiss. Diagn. Pl. Orient. II. 13: 47. 1853; Fl. Brit. Ind. 7: 252. 1896.

Vilfa pallida Nees ex Trin. Mém. Acad. Pétersb. VI. 6(2) : 62. 1840.

Sporobolus pallidus Benth. Fl. Austral. 7: 623, in obs. 1878; non Lindl. 1848.

PUNJAB: Rawalpindi, 13,796; Dhamyal near Rawalpindi, 17,262.

“Lunakh,” “common on alkaline soil after heavy rain and often unmixed with other grasses” (Parker).

Distribution: Punjab plains, east to Arabia.

Sporobolus coromandelianus (Retz.) Kunth, Rev. Gram. 68. 1829; Fl. Brit. Ind. 7: 252. 1896.

Agrostis coromandelianus Retz. Obs. 4: 19. 1786.

PUNJAB: Rawalpindi, 1700 feet, 5191; Karnal, *Duthie* (Herb. Gordon).

Distribution: India, Africa.

Sporobolus diandrus (Retz) Beauv. Ess. Agrost. 26. 1812; Fl. Brit. Ind. 7: 247. 1896.

Agrostis diandra Retz. Obs. 5: 19. 1789.

Vilfa diandra Steud. Syn. Gram. 155. 1854.

PUNJAB: Rawalpindi, 1700 feet, 15,120; Simla, *Collett*. U. P.: Batta near Mussoorie, 5000 feet, 14,299; east of Jabberkhet, 6000 feet, 16,064a; Dehra Dum, 2200 feet, 15,031, 17,235.

Distribution: Throughout India and Burma, ascending the Himalaya to 6000 feet; Ceylon; warmer parts of Asia and Australia.

Sporobolus glaucifolius (Hochst. ex Steud.) Hook. f. Fl. Brit. Ind. 7: 250. 1896.

Sporobolus glaucifolius Hochst. Flora 25: Beibl. 1: 123, nomen. 1842.

Vilfa glaucifolia Hochst. ex Steud. Syn. Gram. 154. 1854.

PUNJAB: Hoshiarpur, *Joshi* (Herb. Gordon).

Distribution: Punjab, Scind, tropical Africa.

Sporobolus indicus (L.) R. Br. Prodr. 170. 1810; Fl. Brit. Ind. 7: 247. 1896.

Agrostis indica L. Sp. Pl. 63. 1753.

PUNJAB: Simla, *Collett* (Fl. Siml.); Rawalpindi, *Gen. Wingate* (Herb. Gordon). U. P.: East of Jabberkhet, 16,064; Landour, north slope, 16,866; Landour, 6000–7000 feet, 17,038.

Distribution: India, ascending to 7000 feet; all warm countries.

Sporobolus ioclados of Hook. f. Fl. Brit. Ind. 7: 249. 1896; non Nees.

PUNJAB: Gurdaspur Lake, 800 feet, 1368; Rawalpindi, 1700 feet, in pond, 10,152.

According to Mr. J. R. Swallen the Indian material does not agree with the original description of the species based on African specimens and probably requires a new name.

Sporobolus tremulus (Willd.) Kunth, Rev. Gram. 67. 1829; Fl. Brit. Ind. 7: 250. 1896.

Agrostis tremula Willd. Sp. Pl. 1: 372. 1797.

PUNJAB: Sirsa, 800 feet, *Koelz 1573*.

Distribution: Plains of the Punjab to Indo-China; Ceylon.

Sporobolus piliferus (Trin.) Kunth, Enum. Pl. 1: 211. 1833; Fl. Brit. Ind. 7: 251. 1896.

Vilfa pilifera Trin. Gram. Unifl. 157. 1824.

PUNJAB: Simla, *Collett* (Fl. Siml.).

Distribution: India, ascending to 8000 feet; Malacca.

56. *Milium* L.

Milium effusum L. Sp. Pl. 61. 1753; Fl. Brit. Ind. 7: 235. 1896.

HAZARA: Kagan Valley, *Duthie* (Herb. Dehra). PUNJAB: Murree Hills, *Trotter* (Herb. Gordon); Dalhousie, 2210a; Sach Pass, Chamba, 2631; above Puling, Kulu, *Koelz* 239. KASHMIR: Tragbal, 4764; Pahlgam, 5326; 5309; above Gulmarg, 10,351; Keran Nullah, 17,531; Sharda, 17,774; Kamri Pass, 18,685; Minimarg, 19,194.

A common grass in mesophytic forest from 6000 to 10,000 feet.

Distribution: Himalaya, Hazara to Kumaon; north temperate and Arctic regions.

57. *Heleochloa* Host.

Heleochloa schoenoides (L.) Host, Ic. Gram. Austr. 1: 23. pl. 30. 1801; Fl. Brit. Ind. 7: 235. 1896.

Phleum schoenoides L. Sp. Pl. 60. 1753.

KASHMIR: *Jacquemont*; Skardu, Baltistan, *Thomson* (Fl. Brit. Ind.).

Distribution: Punjab and Kashmir, westward to the Atlantic.

58. *Oryzopsis* Michx.

Oryzopsis aequiglumis *Duthie*, Grasses N. W. India, 27. 1883; Fl. Brit. Ind. 7: 234. 1896.

KASHMIR: Sonamarg, 9000 feet, 7230; *Duthie*, behind Dal Lake. PUNJAB: Naggar, Kulu, 6000 feet, *Koelz* 1389; Dorkhali, Rampur-Bushahr, *Koelz* 3190. U. P.: Landour, 7000 feet, 16,867.

This is the largest and most mesophytic of the genus and the only species in the Simla-Mussoorie area.

Distribution: Temperate Himalaya, Kashmir to Sikkim. Alt. 6000–10,000 feet.

Oryzopsis brachyclada *Pilger*, Notizbl. Bot. Gart. Berlin 14: 345. 1939.

Based on *Troll* 7774 (TYPE) and 7858 from 4000 m. in the Nanga Parbat region, Astor Dist. Kashmir. Stated to be near *Oryzopsis lateralis* (*O. molinoides*). *Koelz* 2738 from Lamayuru, Ladak at 12,000 ft., may belong here.

Distribution: Kashmir.

Oryzopsis fasciculata *Hack.* Oesterr. Bot. Zeits. 52: 10. 1902.

KASHMIR: Kamri Valley, Astor Dist. *Duthie* 12,644; 12,656; CO-TYPES; Rajdhiangan Pass, ca. 9000–10,000 feet, 19,525 (det. Bor.).

Distribution: Kashmir.

Oryzopsis microcarpa *Pilger*, Notizbl. Bot. Gart. Berlin 14: 346. 1939.

Based on *Troll* 7272 (TYPE) and 7076, Astor Valley, Kashmir, 1200–2400 m. *Pilger* states that the species may be recognized by the breadth of its florets being more nearly equal to their length than in other species.

Oryzopsis molinoides (Boiss.) *Hack.* ex *Paulsen*, Vid. Medd. Nat. Foren. Kjøb. 165. 1903.

Piptatherum molinoides Boiss. Diagn. 7: 121. 1846.

Piptatherum laterale Munro ex *Aitch.* Jour. Linn. Soc. 18: 106, nomen. 1880.

Milium laterale Regel, Acta Hort. Petrop. 7: 645. 1880.

Oryzopsis lateralis Stapf in Hook. f. Fl. Brit. Ind. 7: 234. 1896.

Piptatherum gracile Mez, Repert. Sp. Nov. 17: 211. 1921.

Oryzopsis gracilis Pilger, Notizbl. Bot. Gard. Berlin 14: 347. 1939.

HAZARA: Abbottabad, 4000–5000 feet, 16,378. KASHMIR: Rajdhiangan Pass, 17,969, 17,969a; Trunkal, 18,176; above Rattu, Astor Dist. 18,793; ascent Burzil Pass, 19,094. LADAK PROVINCE: Himis, *Koelz* 2541; Tog, *Koelz* 2623; 2643a; Lamayuru, *Koelz* 2738; 2751a. PUNJAB: Murree Hills, 13,475; Lahul Dist., Sisu, *Mohindar Nath* 311; Kyelang, *Koelz* 369; Jispa, *Koelz* 965; Pukar, *Koelz* 1308.

A common grass from 5000 to 15,000 feet.

Distribution: Persia, Kurram Valley, temperate and alpine Himalaya; Hazara to Kunawar.

***Oryzopsis molinoides* var. *effusa* (Hook. f.) R. R. Stewart, comb. nov.**

Oryzopsis lateralis var. *effusa* Hack. ex Hook. f. Fl. Brit. Ind. 7: 234. 1896.

KASHMIR: Abring, Zanskar, 11,500 feet, *Koelz* 2977. PUNJAB: Sisu, Lahul, 10,000 feet, *Koelz* 822 (as Munroi); Murree Hills (Herb. Gordon).

Distribution: Hazara, Baltistan, Murree Hills, and Lahul.

***Oryzopsis Munroi* Stapf in Hook. f. Fl. Brit. Ind. 7: 234. 1896.**

Oryzopsis kashmirensis Hack. ex Hook. f. Fl. Brit. Ind. 7: 234. 1896.

HAZARA: Changla Gali, etc. (Herb. Gordon). KASHMIR: Tragbal, 4792; Jhelum Valley Road, 9600; Banihal Pass, 10,669a; Chenari, 12,449; Aliabad Pass, 13,998; near Taobat, Kishenganga Valley, 17,892a; Naranag, 18,107; Masjid Gali, 18,389; upper Astor Valley, 18,758; Nurla, Ladak, *Koelz* 2710. PUNJAB: Sisu, Lahul, *Koelz* 817; Shipting Nullah, 914; Mogi, Kulu, *Koelz* 1866; Oot, Kulu, *Koelz* 3086.

Very common from 4500 to 11,000 feet. Usually intermediate in size of plant and florets between *Oryzopsis aequiglumis* and *Oryzopsis molinoides*.

Distribution: Afghanistan; western Himalaya from Hazara to Garhwal.

59. *Timouria* Roshev.

***Timouria aurita* Hitchc. Jour. Wash. Acad. Sci. 23: 134. 1933.**

KASHMIR: Based on *Koelz* 2328, Kuzzil, Rupshu, in sand at 4300 m. on 16–7–1933.

Distribution: Tibetan Kashmir.

60. *Stipa* L.

***Stipa basi-plumosa* Munro ex. Hook. f. Fl. Brit. Ind. 7: 229. 1896.**

KASHMIR: Tsakzhun Tso, Ladak, dry sand plain, 15,000 feet, *Koelz* 2386; Nubra and Lanak Pass, *Thomson* (Fl. Brit. Ind.).

Distribution: Western Tibetan Himalaya.

***Stipa capillata* L. Sp. Pl. ed. 2. 116. 1762; Fl. Brit. Ind. 7: 230. 1896.**

KASHMIR: Dras, Ladak Road, 10,000 feet, 9986a; Kharbu to Dras, 10,000 feet, 21,127; Shingo Valley, Baltistan, 10,000–11,000 feet, *Duthie* 11,904.

Distribution: China, Dahuria, Tibetan Kashmir, and westward to the Atlantic.

***Stipa concinna* Hook. f. Fl. Brit. Ind. 7: 230. 1896.**

KASHMIR: Mt. Apharwat, above Gulmarg, 13,000–14,000 feet, 10,372 (det. J. R. Swallen).

New to Kashmir.

Distribution: Kashmir; Tibetan region of Sikkim.

***Stipa himalaica* Roshev. Not. Syst. Hort. Bot. Petr. 5: 11. 1924.**

Stipa pennata of Hook. f. Fl. Brit. Ind. 7: 230. 1896; non L.

KASHMIR: Tankse, Ladak, 13,000 feet, *Koelz* 2458 (det. J. R. Swallen); Tschorbat Pass, Baltistan, *Schlagintweit* 6067; Ladak, *Schlagintweit* 1337 (cited by Roshev.).

Distribution: Central Asia.

Stipa Hookeri Stapf, Jour. Linn. Soc. **30**: 120. 1894; Fl. Brit. Ind. **7**: 232. 1896.

KASHMIR: Nubra, *Thomson* (Fl. Brit. Ind.).

Distribution: Tibetan Himalaya.

Stipa Jacquemontii Jaub. and Spach, Ill. Pl. Or. 4. 60. *pl. 639*. 1850-53; Fl. Brit. Ind. **7**: 232. 1896.

HAZARA: Changla Gali, Murree Hills, *4042a*. KASHMIR: Tragbal, *4338*; Sonamarg, *6860*; *7187*; *7371*; Zoji Pass, *7527*; above Gadsar, *18,384*; Tilel Valley, *18,596* Minimarg, *19,213*; Badwan, *19,552*; Tog, Ladak, *Koelz 2638*. PUNJAB: Shipting Nullah, Lahul, *Koelz 854*; *880*. U. P.: Vincent's Hill, *Landour* (Herb. Dehra).

A common plant in rock crevices from 8000 to 15,000 feet.

Distribution: Temperate and alpine Western Himalaya; Afghanistan.

Stipa Koelzii R. R. Stewart, sp. nov.

Perennis; culmi dense caespitiosi, erecti, 18-36 cm. alti; folia ad basim aggregata; vaginae pubescentae vel in senectute glabrae; laminae erectae, involutae, maximae 7 cm. longae, supra glabrae, subtus plus minusve pubescentae; ligula minuta; panicula 5-17 cm. longa, angusta, interrupta, ramis appressis, multifloris; glumae subaequales, circa 1 cm. longae, longo-acuminatae; acumen hyalinum, tenuissimum, ad 1.5 cm. longum; prima 3-nervata, secunda 5-nervata; lemma 6-7 mm. longum, minute pilosum, callo acuto; aristae 1-geniculatae, 6-7 cm. longae, erectae, tortae, minute pubescentes; glumae et aristae \pm purpureae.

Perennial; culms densely tufted, erect, 18-36 cm. tall; leaves clustered toward the base, the blades involute, 2-7 cm. long, the lower surface \pm pubescent with short, thin, spreading hairs which wear off with age, sharply acuminate; sheaths finely pubescent when young, in age polished; culm-leaves usually two, erect; ligule less than 0.5 mm. long; sheaths of stem-leaves glabrous; panicles 5-17 cm. long, including the erect awns, the branches erect, appressed, the whole inflorescence less than one cm. broad, the lowest panicle-branch up to 7 cm. below the second; spikelets short pedicellate, about 1 cm. long without the hyaline tips; glume II slightly longer than I; glume I, 3-nerved; II, 5-nerved; both narrow with long, delicate, very slender hyaline tips which sometimes split longitudinally, the tips longer than the glumes, up to 1.5 cm.; lemma 6-7 mm. long, finely pubescent with ascending hairs; callus ca. 1.5 mm. long, sharp, with a terminal tuft of short, white, ascending hairs; awns erect, geniculate, up to 6 cm. long, shortly pubescent below the bend, minutely pubescent nearly to the tip, the filiform tips much twisted, binding the panicle-branches together.

TYPE: *Walter Koelz 6432*, in the U. S. National Herbarium, no. 1,607,603, collected at Gya, Ladakh, Kashmir State, Aug. 13, 14, 1933.

PUNJAB: Rangrik, Spiti, Kangra Dist., Sept. 10, 11, 1933, *Koelz 7141* in N. Y. Bot. Gard.

Stipa mongholica Turcz. ex Trin. Bull. Sci. Acad. Petersb. **1**: 67. 1836; Fl. Brit. Ind. **7**: 229. 1896.

Stipa tibetica Mez, Repert. Sp. Nov. **17**: 207. 1921.

KASHMIR: Tsakzhun Tso, Ladak, 15,000 feet, *Koelz 2401*; Shushal, Ladak, 14,200 feet, *Koelz 2445*.

Distribution: Inter alpine Himalaya, Altai, Mongolia.

Stipa orientalis Trin. in Ledeb. Fl. Alt. **1**: 83. 1829; Fl. Brit. Ind. **7**: 229. 1896.

KASHMIR: Salt Lake, Rupshu, *442a*; Satpura Nullah above Skardu, *20,331*; Blaghar to Kuru, Shyok Valley, Baltistan, *20,364*; Nima Mud, Ladak, *Koelz 2342a*; Tankse, Ladak, *Koelz 2458*; Himis, Ladak, *Koelz 2562a*; Tog, Ladak, *Koelz 2619*; *2620*.

A desert type growing in tufts from 8000 to 15,000 feet.

Distribution: Tibetan Kashmir westward to Persia; Altai Mts.

Stipa purpurea Griseb. Nachr. Ges. Wiss. Gött. 82. 1868; Fl. Brit. Ind. 7: 229. 1896.

KASHMIR: Lake Rukshun, Rupshu, *Lance* (Fl. Brit. Ind.).

Distribution: Tibet, Tibetan Kashmir.

Stipa Regeliana Hack. Sitzb. Akad. Wien. 89: 130. 1884.

KASHMIR: Mt. Apharwat, above Gulmarg, 13,000–14,000 feet, 8788.

New to Kashmir. Identification checked by J. R. Swallen.

Distribution: Kashmir, Central Asia.

Stipa affine Regeliana Hack.

KASHMIR: Above Gulmarg, ca. 12,000 feet, 8788.

According to J. R. Swallen this may be new. The leaf-blades are much finer than in *Stipa Regeliana*, the panicle is lax, with longer, more slender branches, and the ligule is very short.

Stipa Roylei (Nees) Mez, Repert. Sp. Nov. 17: 207. 1921.

Orthoraphium Roylei Nees, Proc. Linn. Soc. 1: 94. 1841.

Stipa Orthoraphium Steud. Syn. Gram. 131. 1854; Fl. Brit. Ind. 7: 233. 1896.

PUNJAB: Fagoo near Simla, *Collett* (Fl. Siml. 609).

Distribution: Temperate Himalaya.

Stipa sibirica (L.) Lam. Tab. Encyc. 1: 158. 1791; Fl. Brit. Ind. 7: 231. 1896.

Avena sibirica L. Sp. Pl. 79. 1753.

KASHMIR: Padar, 2973; Mt. above Dal Lake, 3317; Tragbal, 4760; Pahlgam, 5641, 5743; Sonamarg, 6864; below Naranag, Wangat Valley, 18,120.

Very common from 7000 to 10,000 feet in open meadows and hillsides and increasing at the expense of edible plants since the local animals have learned to leave it alone. Very poisonous to horses, and the effect does not seem to be due to any mechanical injury from the awns. The North American *Stipa robusta* is known to have a narcotic effect especially affecting horses.

Distribution: Afghanistan; Himalaya, from Hazara to Kunawar; Siberia to Korea.

Stipa splendens Trin. in Spreng. Neue Entdeck. 2: 54. 1821; Fl. Brit. Ind. 7: 232. 1896.

KASHMIR: Baltistan Province: Skardu, 20,383; Shigar, 20,524; Thalle La, 20,617; Khusomik, Thalle Valley, 20,788. Ladak Province: Himis Suko Chak, 443a; Muglib, *Koelz* 2456; Himis, *Koelz* 2578; Lamayuru, *Koelz* 2741; Bod Kharbu, *Koelz* 6199. Zaskar Province: Abring, *Koelz* 3001a.

Distribution: Tibetan Kashmir, in dry soil from 8000 to 14,000 feet. Siberia.

Stipa tortilis Desf. Ft. Atlant. 1: 99. pl. 31, f. 1. 1798; Fl. Brit. Ind. 7: 231. 1896.

N. W. FRONTIER: Peshawar, 10,183, 15,818. PUNJAB: Campbellpur, *E. Nasir* (Herb. Gordon).

Distribution: Northwest India and westward to the Atlantic; South Africa.

Dubia

Stipa Schlagintweitii Mez, Repert. Sp. Nov. 17: 208. 1921.

Based on a Baltistan specimen of the *Schlagintweits*, number uncited but was IV 5787. "Possibly an *Oryzopsis*" (Mrs. Chase).

The species of *Stipa* from the Tibetan parts of Kashmir need more collection and study.

61. *Aristida* L.

***Aristida adscensionis* L. Sp. Pl. 82. 1753 (excl. syn. Sloane). Fl. Brit. Ind. 7: 224. 1896.**

KASHMIR: Gilgit, *Duthie 12,485*; Skardu, *20,434*; Blaghar to Kuru, Shyok Valley, *20,842*.
PUNJAB: Numerous collections from the arid plains region.

Alt. 1000–8000 feet.

Distribution: Most warm countries.

***Aristida cyanantha* (Nees) Steud. Nom. Bot. ed. 2, 1: 131. 1840; Fl. Brit. Ind. 7: 225. 1896.**

Chaetaria cyanantha Nees ex Trin. & Rupr. Mém. Acad. Petersb. VI. 7(2): 150. 1843.

HAZARA: Above Garhi Habibullah, *3724*. KASHMIR: Jhelum Valley Road, near Dulai; Jammu Road, *13,461*. PUNJAB: Near Oot, Kulu, *Koelz 3087*. U. P.: Near Dehra Dun, *Prem Chand* (Herb. N. Y.).

A common plant in the dry, lower foothills from 2000 to 4500 feet. Much the largest Indian *Aristida*.

Distribution: Afghanistan, western Himalaya, Hazara to Kumaon.

***Aristida funiculata* Trin. & Rupr. var. *mallica* (Edgew.) Henr. Meded. Rijks Herb. Leiden 54A: 329. 1927.**

Aristida mallica Edgew. Jour. Proc. Linn. Soc. 6: 206. 1862.

Aristida funiculata of Hook. f. Fl. Brit. Ind. 7: 226. 1897.

PUNJAB: Rawalpindi, *7517*; *10,168*; *15,081*; *21,374*. All 1700 feet.

Distribution: Hotter, drier parts of India; west to Arabia and Africa.

***Aristida funiculata* Trin. & Rupr. var. *mallica* (Edgew.) Henr. Meded. Rijks Herb. Leiden 58: 68. 1929.**

In the Fl. Brit. Ind. Hooker combined two species which are distinguished as follows: in *Aristida hirtigluma* there is a naked tip to the large feathery branch of the awn, while this tip is plumose in *Aristida pogonoptila*. According to Henrard both species are in the Punjab.

Distribution: Egypt and Sinai to India; South West Africa.

***Aristida hystricula* Edgew. Jour. Linn. Soc. 6: 208. 1862; Fl. Brit. Ind. 7: 227. 1896.**

PUNJAB: Multan, *Edgeworth* (Fl. Brit. Ind.).

Distribution: Punjab Desert, Sind, Baluchistan.

***Aristida mutabilis* Trin. & Rupr. Mém. Acad. Pétersb. VI. 7(2): 150. 1843. (excl. var. *aequilonga*); Fl. Brit. Ind. 7: 226. 1896.**

PUNJAB: Multan, *Edgeworth* (Fl. Brit. Ind.); Ladhar, *Sultan Ahmad* (Herb. Gordon).

Distribution: Occasional in the drier parts of India, Arabia, and Africa.

***Aristida plumosa* L. Sp. Pl. ed. 2: 1666. 1763; Fl. Brit. Ind. 7: 228. 1896.**

KASHMIR: Skardu, Baltistan, 8000 feet, *20,875*. Also reported from Skardu by Clarke (Fl. Brit. Ind.).

Distribution: Baltistan, Turkestan, Persia, North Africa.

***Aristida plumosa* var. *macræthera* Pilger, Notizbl. Bot. Gart. Berlin 14: 345. 1939.**

KASHMIR: Nanga Parbat region, Jalipur, Indus Valley, on sandstone, 1200 m., *Troll 7182*, TYPE.

Distribution: Endemic.

Aristida pogonoptila (Jaub. & Spach) Boiss. Fl. Orient. 5: 496. 1884.*Arthratherum pogonoptilum* Jaub. & Spach, Ill. Pl. Orient. 4: 56. pl. 337. 1850-53.*Aristida hirtigluma* of Hook. f. Fl. Brit. Ind. 7: 227. 1896; non Steud.

PUNJAB: Kirana Hill, Sargodha, 10,931, among rocks.

Distribution: Punjab, Sind, Baluchistan.**Aristida Royleana** Trin. & Rupr. Mém. Acad. Pétersb. VI. 5(1): 160. 1842.*Aristida funiculata* var. *Royleana* (Trin. & Rupr.) Hook. f. Fl. Brit. Ind. 7: 227. 1896.PUNJAB: Kangra, 3000 feet, *Clarke* (Fl. Brit. Ind.).

Henrard in his monograph recognizes this as a distinct species (Meded. Herb. Rijks Herb. Leiden 54B: 525. 1928).

Distribution: Punjab.**Aristida setacea** Retz. Obs. 4: 22. 1786; Fl. Brit. Ind. 7: 225. 1896.

KASHMIR: Ramban, Jammu Road, 2000-3000 feet, 10,725.

New to Kashmir.

Distribution: Occasional in India, Ceylon, Mascarene Islands.

ZOYSIEAE

62. **Perotis** Ait.**Perotis indica** (L.) Kuntze, Rev. Gen. 787. 1891.*Anthozanthum indicum* L. Sp. Pl. 28. 1753.*Perotis latifolia* Ait. Hort. Kew. 1: 85. 1789; Fl. Brit. Ind. 7: 98. 1896.PUNJAB: The only specimen I have seen from the Punjab was collected in Hoshiarpur by *Joshi* (Herb. Gordon). U. P.: Saharanpur, in 1889 without number, *Duthie* (U. S. Nat. Herb.).*Distribution*: India, China, tropical Asia and Africa.63. **Tragus** Haller**Tragus biflorus** (Roxb.) R. & S. Syst. Veg. Mant. 2: 205. 1824.*Lappago biflora* Roxb. Hort. Bengal 82, nomen. 1814; Fl. Ind. 1: 284. 1820.*Tragus racemosus* of Hook. f. Fl. Brit. Ind. 7: 97. 1896; non (L.) All. 1785.HAZARA: Abbottabad, 4200 feet. KASHMIR: Jammu Road, 1500 feet, 12,499; Jhelum Valley Road, 3000 feet, in 1875, *Levinge*. PUNJAB: Rawalpindi, 10,145.*Distribution*: Dry plains and foothills of India from Kashmir to Ceylon.

CHLORIDEAE

64. **Leptochloa** Beauv.**Leptochloa chinensis** (L.) Nees, in Syll. Ratisb. 1: 4. 1824; Fl. Brit. Ind. 7: 299. 1896.*Poa chinensis* L. Sp. Pl. 69. 1753.PUNJAB: Lahore, *Sultan Ahmad* (Herb. Gordon); Karnal, *Duthie* (Herb. Gordon).*Distribution*: Tropical Asia, Africa, and Australia.**Leptochloa filiformis** (Lam.) Beauv. Ess. Agrost. 71, 161, 166. 1812; Fl. Brit. Ind. 7: 298. 1896.*Festuca filiformis* Lam. Tab. Encyc. 1: 191. 1791.

HAZARA: Haripur, 2000 feet, 9648. PUNJAB: Rawalpindi, 17,115.

A field weed in the plains.

Distribution: Tropical Asia, Africa, and America.

65. *Orinus* Hitchc.

Orinus arenicola Hitchc. Jour. Wash. Acad. Sci. **23**: 136. f. 2. 1933.

KASHMIR: Tsaka, Ladak, 4700 m. in dry sand, *Koelz* 2365, TYPE.

Distribution: Ladak.

66. *Tripogon* Roth.

Tripogon filiformis Nees ex. Steud. Syn. Gram. 301. 1854; Fl. Brit. Ind. **7**: 288. 1896.

HAZARA: Barian, Murree Hills, 4038. KASHMIR: Jammu, 10,697. PUNJAB: Simla, *Collett* (Fl. Siml.). U. P.: Kempti Falls, 11,231, Kolti, Tehri Garhwal, 15,732; Jabberkhet, 14,387; Landour, 16,754; 16,910; Dehra Dun, 14,582a.

A summer annual.

Distribution: Western Himalaya, Hazara to Bhutan. Alt. 2000–7000 feet.

Tripogon purpurascens Duthie, Ann. Hort. Bot. Calc. **9**: 74. 1901.

Tripogon abyssinicus of Hook. f. Fl. Brit. Ind. **7**: 287. 1897; non Nees, 1854.

Tripogon Jacquemontii Stapf var. *submuticus* Hook. f. Fl. Brit. Ind. **7**: 287. 1896.

HAZARA: Abbottabad, 13,660; 14,018. KASHMIR: Mt. behind Dal Lake, 3317a; Ferozepur Nullah, 14,798; Naranag, 18,131, etc. PUNJAB: Kales to Tissa, Chamba, 2344; Hasan Abdal, 7764. U. P.: Tons Valley, Tehri Garhwal, *Duthie* (Herb. Dehra).

Forms a close turf on dry hills and also grows on walls.

Distribution: Western Himalaya, Hazara to Tehri Garhwal. Alt. 2000–8000 feet.

67. *Dinebra* Jacq.

Dinebra retroflexa (Vahl) Panz. Ideen zu Rev. Gatt. Gräser 59. pl. 12. 1813; Denksch. Acad. Münch. **4**: 309. pl. 12. 1814. (The article was printed with separate pagination in 1813; as a preprint, instead of a reprint.)

Cynosurus retroflexus Vahl, Symb. 2: 20. 1791.

Dinebra arabica Jacq. Fragm. 77. pl. 121, f. 1. 1809; Fl. Brit. Ind. **7**: 297. 1896.

PUNJAB: Sialkot, Sultan Ahmad in letter.

Distribution: India, Afghanistan, westward to Palestine; Senegal.

68. *Eleusine* Gaertn.

Eleusine corocana (L.) Gaertn. Fruct. **1**: 8. pl. 1. 1788; Fl. Brit. Ind. **7**: 294. 1896.

Cynosurus corocanus L. Syst. Nat. ed. 10. 2: 875. 1759.

KASHMIR: Above Chatru, Kishtwar, ca. 5000 feet, 3064. PUNJAB: Naggar, Kulu, 5500 feet, *Koelz* 3071.

Cultivated widely in the plains and the outer Himalaya to about 5500 feet, as Kodra or mandwa.

Distribution: Old World Tropics.

Eleusine flagellifera Nees, Linnaea **16**: 220. 1842; Fl. Brit. Ind. **7**: 294. 1896.

PUNJAB: Sangla Hill, 1387; Sheikhpura, near Lahore, 17,261; near Rawalpindi, 13,790; 17,254b; Sirsa, *Koelz* 1569.

A plant of the hot plains.

Distribution: Punjab, Sind, and westward to North Africa.

Eleusine indica (L.) Gaertn. Fruct. **1**: 8. 1788; Fl. Brit. Ind. **7**: 293. 1896.

Cynosurus indicus L. Sp. Pl. 72. 1753.

PUNJAB: Naggar, Kulu, 5500 feet, *Koelz* 3055. U. P.: Dehra Dun, 2200 feet, 17,237.

Distribution: Tropical Old World, and introduced into the New World.

Eleusine verticillata Roxb. Fl. Ind. 1: 346. 1820; Fl. Brit. Ind. 7: 295. 1896.

HAZARA: Kagan Valley, *Trotter* in Herb. Gordon. KASHMIR: Kishtwar to Chatru, 3052; Ramban, Jammu Road, 12,008b. PUNJAB: Mogli, Jhelum Dist., 740; Rawalpindi, 5188; 10,148.

Usually found on the plains but ascends in the outer valleys to 6000 feet.

Distribution: Tropical Asia, Africa, and Australia.

69. *Dactyloctenium* Willd.

Dactyloctenium aegyptium (L.) Aschers. & Schweinf. Ill. Mém. Inst. Egypt 2: 171. 1887.

Cynosurus aegyptius L. Sp. Pl. 72. 1753.

Eleusine aegyptiaca Desf. Fl. Atlant. 1: 85. 1798; Fl. Brit. Ind. 7: 295. 1896.

KASHMIR: Jhelum Valley Road to 3000 feet (Herb. Gordon); Jammu Road, 13,465. PUNJAB: Rawalpindi, 5187; Mogli, Jhelum Dist., 745. U. P.: Dehra Dun, 15,061.

A common weed in the plains and lower foothills.

Distribution: Warm regions of the Old World; introduced in the New World.

Dactyloctenium scindicum Boiss. Diagn. Pl. Orient. II. 4: 131. 1859.

Eleusine aristata Ehrenb. ex Hook. f. Fl. Brit. Ind. 7: 296. 1896.

PUNJAB: Sheikhpura, near Lahore in alkaline soil, 17,256.

Distribution: Indian desert, west to Arabia and North Africa.

70. *Cynodon* Pers.

Cynodon dactylon (L.) Pers. Syn. Pl. 1: 85. 1805; Fl. Brit. Ind. 7: 288. 1896.

Panicum dactylon L. Sp. Pl. 58. 1753.

Ubiquitous in India, ascending to 9000 feet in the Himalaya. It is found in some of the innermost valleys and I have collected it in Skardu and Shigar, Baltistan. It is the best lawn grass in the plains and an excellent fodder. Called "dab" or "doob."

Distribution: All warm countries.

71. *Chloris* Swartz

Chloris digitata (Roxb.) Steud. Syn. Gram. 207. 1854.

Melica digitata Roxb. Fl. Ind. 1: 328. 1820.

Chloris incompleta Roth, Nov. Pl. Sp. 60. 1821; Fl. Brit. Ind. 7: 290. 1896.

PUNJAB: Rawalpindi, 7723; 10,148.

Distribution: Plains of India, Afghanistan, China, Ceylon.

Chloris inflata Link, Enum. Pl. 1: 105. 1821.

Andropogon barbatum L. Mant. 2: 302. 1771; non L. 1759.

Chloris barbata auct. incl. Hook. f. Fl. Brit. Ind. 7: 292. 1896.

PUNJAB: Hoshiarpur, *Joshi* (Herb. Gordon).

For a discussion of the synonymy of this plant see Agnes Chase, Jour. Arnold Arb. 20: 306. 1939.

Distribution: Plains of India, Burma and Ceylon; tropics generally.

Chloris villosa (Desf.) Pers. Syn. Pl. 1: 87. 1805; Fl. Brit. Ind. 7: 291. 1896.

Tetrapogon villosus Desf. Fl. Atlant. 2: 389. pl. 255. 1800.

PUNJAB: Mogli, Jhelum Dist., 753; Murree Road, Rawalpindi Dist., 12,508; Rawalpindi, 13,807; 17,284b; 17,286a.

Common in the plains.

Distribution: Punjab, and westward to the Canaries.

Chloris virgata Sw. Fl. Ind. Occ. 1: 203. 1797; Fl. Brit. Ind. 7: 291. 1896.

KASHMIR: Ladak, 12,000 feet, *Thomson* (Fl. Brit. Ind.).

Could a label have been misplaced? This is a plant of the plains.

Distribution: Plains of India and westward to Algeria; China, Africa, America.

72. *Melanocenchris* Nees

Melanocenchris plumosa Jaub. & Spach, Ill. Pl. Or. 4: 37. 1850-53.

Gracilea Royleana var. *plumosa* Hook. f. Fl. Brit. Ind. 7: 284. 1896.

PUNJAB: Jhelum River, *Aitchison* (Fl. Brit. Ind.).

Distribution: Punjab, Sind, Arabia, Ethiopia.

Melanocenchris Royleana Nees, Proc. Linn. Soc. 1: 95. 1841.

Pommereulla Royleana Steud. Nom. ed. 2, 2: 379. 1841.

Gracilea Royleana Hook. f. Fl. Brit. Ind. 7: 284. 1896.

PUNJAB: Hissar Dist., *Duthie* (Herb. Gordon).

Distribution: Drier parts of India; Africa.

PHALARIDEAE

73. *Phalaris* L.

Phalaris arundinacea L. Sp. Pl. 55. 1753; Fl. Brit. Ind. 7: 221. 1896.

KASHMIR: Wular Lake near Srinagar, 5200 feet (Fl. Brit. Ind.). PUNJAB: Murree, *Trotter* 636.

Distribution: North temperate and arctic regions.

Phalaris minor Retz. Obs. 3: 8. 1783; Fl. Brit. Ind. 7: 221. 1896.

KASHMIR: Near Palandari, Poonch, 3000 feet, 12,026. PUNJAB: Rawalpindi, 17,285a; Hiranpur, Jhelum Dist., 15,841a; Pathankot, 1059. U. P.: Dehra Dun, *U. Singh* 314.

A spring weed of cultivated ground.

Distribution: North and west India, and westward to the Canary Islands; South Africa; Australia.

74. *Hierochloë* Gmel. ex R.Br.

Hierochloë laxa R. Br. in Wall. List. 3796, nomen. 1831; *Duthie*, Grasses N. W. Ind. 25. 1883; Fl. Brit. Ind. 7: 222. 1896.

KASHMIR: Amarnath, 449a; Sonamarg, 6481; 7288; Yamhar Pass, 12,447; Zojibal Pass, 18,256; Masjid Gali, 18,379; Burzil Pass, 19,861, etc. PUNJAB: Chandrakani, Kulu, *Koelz* 249; Khoksar, Lahul, *Koelz* 784; Via Kukti Pass, Lahul, *Koelz* 1182.

A fine, golden-colored, sweet-scented, alpine grass found from 10,000 to 15,000 feet.

Distribution: Western Himalaya, Hazara to Kumaon.

ORYZAEAE

75. *Oryza* L.

Oryza sativa L. Sp. Pl. 333. 1753; Fl. Brit. Ind. 7: 92. 1896.

Rice, paddy or chawal, is the chief crop in the Vale of Kashmir. It is common up to 6000 feet. Much rice is also raised in the Punjab, but the Punjabis prefer wheat.

Distribution: Warmer regions of the earth.

76. *Leersia* Swartz

Leersia Hackelii Keng, *Sinensia* 11: 412. 1940.

Leersia oryzoides Sw. var. *japonica* Hack. Bull. Herb. Boiss. 7: 645. 1899; non *Leersia japonica* Makino, 1892.

Leersia oryzoides of Hook. f. Fl. Brit. Ind. 7: 94. 1896; non Sw.

KASHMIR: Near Shalimar Gardens, Dal Lake, 5200 feet, at water's edge, July 1929, 10,612.

A new record for India.

Distribution: China.

MELINIDEAE

77: *Thysanolaena* Nees

Thysanolaena maxima (Roxb.) Kuntze, Rev. Gen. 794. 1891.

Agrostis maxima Roxb. Fl. Ind. 1: 319. 1820.

Thysanolaena agrostis Nees, Edinb. New Phil. Jour. 18: 180. 1835; Fl. Brit. Ind. 7: 61. 1896.

PUNJAB: Dharmasala Road, Kangra Dist., 3000 feet, 1846. U. P.: Above Rajpur, Mussoorie Road, 4000 feet, 17,055; Dehra Dun, 2200 feet, U. Singh 320; *Osmaston* 1434.

Distribution: Subtropical Himalaya from the Punjab to China; New Guinea.

78. *Arundinella* Raddi

Arundinella bengalensis (Spreng.) Druce, Rep. Bot. Exch. Club 4: 605. 1917.

Panicum strictum Roxb. Fl. Ind. 306. 1820; non R. Br. 1810.

Panicum bengalense Spreng. Syst. 1: 311. 1825.

Arundinella Wallichii Nees ex Steud. Syn. Gram. 114. 1854; Fl. Brit. Ind. 7: 75. 1896.

Arundinella stricta Jan. Repert. Sp. Nov. 17: 84. 1921; non Nees, 1850.

U. P.: Dehra Dun, 14,674; Dehra Dun Division, *Osmaston* 1427.

Distribution: Tropical Himalaya from the Punjab to China.

Arundinella nepalensis Trin. Gram. Pan. 62. 1826.

Arundinella brasiliensis of Hook. f. Fl. Brit. Ind. 7: 73. 1896; non Raddi.

HAZARA: Kagan Valley, *Inayat* (Herb. Dehra). KASHMIR: Kad, Jammu Road, 6000 feet, 12,514; Domel and Garhi, Jhelum Valley Road. PUNJAB: Dhar, Dalhousie Road, Kangra Dist., 2500 feet, 1278. U. P.: Common near Mussoorie from 5500 to 7000 feet, 14,433; 14,512; 15,757; 16,866.

A plant of dry sunny slopes.

Distribution: India, China, Malaya, Australia.

Arundinella pumila Steud. Syn. Gram. 114. 1854.

Arundinella tenella Nees ex Steud. Syn. Gram. 115. 1854; Fl. Brit. Ind. 7: 71. 1896.

U. P.: Dehra Dun to above Rajpur on the Mussoorie Road, 2200-4500 feet, 11,470; 14,556; 14,601b; 17,039; *Duthie* 7693.

Common at the close of the monsoon in the subtropical zone.

Distribution: Tropical and subtropical India; Ethiopia.

Arundinella setosa Trin. Gram. Pan. 63. 1826; Fl. Brit. Ind. 7: 70. 1896.

U. P.: Landour Cemetery, 7500 feet, 11,409; Jabberkhet, 15,586; Benog, near Mussoorie, 7000 feet.

Dry ridges or grassy slopes from 5000 to 8000 feet.

Distribution: India and Ceylon and east to the Philippines.

PANICEAE

79. *Digitaria* Heist.

Digitaria bifasciculata (Trin.) Henr. Meded. Rijks Herb. Leiden 61: 10. 1930.

Panicum bifasciculatum Trin. Gram. Pan. 76. 1826.

Panicum cruciatum Nees ex Steud. Syn. Gram. 39. 1854.

Panicum sanguinale L. var. *cruciatum* Hook. f. Fl. Brit. Ind. 7: 14. 1896.

Common in the temperate Himalaya region from 5000 to 8000 feet, usually along roadsides and about cultivation. It grows in the inner valleys and on the outer ranges. No. 20,923, collected at 8000 feet on the Indus between Kiris and Parkutta, has pubescent glumes approaching those of *D. ciliaris*.

Distribution: Temperate Himalaya and China.

***Digitaria ciliaris* (Retz.) Koeler, Descr. Gram. 27. 1802.**

Panicum ciliare Retz. Obs. 4: 16. 1786.

Panicum sanguinale L. var. *ciliare* Hook. f. Fl. Brit. Ind. 7: 15. 1896.

Digitaria marginata Link var. *fimbriata* Stapf in Prain, Fl. Trop. Afr. 9: 440, in part ? 1919.

HAZARA: *Duthie 20,340* (Herb. Dehra). U. P.: Dehra Dun, 2200 feet, *17,228a*.

The synonymy of this group of grasses is so complicated that it cannot be disentangled without a study of the types. As I understand it, in this species the hairs of the mature spikelet are spread out horizontally forming a rigid fringe on both sides. According to Stapf this species is found in the tropics of both hemispheres but is very scarce in America. Hitchcock considered it to be synonymous with *D. sanguinalis* (L.) Scop.

***Digitaria ischaemum* (Schreb.) Muhl. Descr. Gram. 131. 1817.**

Panicum ischaemum Schreb. in Schweigg. Spec. Fl. Erland. 16. 1804.

Paspalum ambiguum DC. Fl. Fr. 3: 16. 1805; Fl. Brit. Ind. 7: 17. 1896.

KASHMIR: *J. L. Stewart*; W. Tibet, *T. Thomson* (Fl. Brit. Ind.). PUNJAB: Naggar, Kulu, 5500 feet, *Koelz 3061*; Simla, *Collett* in Fl. Siml. as *Paspalum ambiguum*.

Distribution: Western Himalaya, North Asia, Europe, temperate America.

***Digitaria marginata* Link, Enum. Hort. Berol. 1: 229. 1821.**

Paspalum sanguinale Lam. var. *commutatum* Hook. f. Fl. Brit. Ind. 7: 15. 1896.

KASHMIR: Garhi, Jhelum Valley Road, 2500 feet, *10,106*. U. P.: Common between Dehra Dun and Landour, 2200-7000 feet, *15,023*; *15,641*; *17,053*; *17,228*.

Distribution: Throughout the warmer parts of the world.

***Digitaria nodosa* Parl. Pl. Nov. Not. 39. 1842.**

Panicum pabulare Aitch. & Hemsl. Jour. Linn. Soc. 19: 190. 1882.

Paspalum sanguinale Lam. var. *pabulare* Hook. f. Fl. Brit. Ind. 7: 15. 1896.

PUNJAB: Margalla Pass, 2000 feet, on limestone, *9555*; Hasan Abdal, *14,733a*; Saidpur Hills, near Rawalpindi, 2000 feet; Kirana and Domeli Hills (Sultan Ahmad in letter).

Distribution: The arid hills of the North Punjab and Afghanistan, to the Canary Islands.

***Digitaria pedicellaris* (Trin.) Prain, Bengal Pl. 1182. 1903.**

Paspalum pedicellare Trin. ex Steud. Nom. Bot. ed. 2, 272. 1841; Fl. Brit. Ind. 7: 19. 1896.

U. P.: Kalanga Hill, near Rajpur, 3000 feet, *16,137*.

This species is near *D. Royleana*, but may be recognized by the longer pedicels of the spikelets. It also lacks the characteristic pubescence on the spikelets of that species.

Distribution: Plains and low hills of India; Burma.

***Digitaria pennata* (Hochst.) Chiov. Result. Sci. Miss. Stef.-Paoli Somal. Ital. 1: 183. 1916.**

Panicum pennatum Hochst. Flora 38: 197. 1855.

Paspalum pennatum Hook. f. Fl. Brit. Ind. 7: 16. 1896.

PUNJAB: Hissar, South Punjab, *Drummond 15,248* in Herb. Dehra.

Distribution: Baluchistan and Sind to North Africa.

Digitaria Royleana (Nees) Prain, Bengal Pl. 1182. 1903.

Paspalum Royleanum Nees ex Thw. Enum. Pl. Zeyl. 358, nomen. 1864; Hook. f. Fl. Brit. Ind. 7: 18. 1896.

U. P.: Common in the Dehra Dun–Mussoorie area from 2200 to 7000 feet at the close of the monsoon, 11,468a; 14,297; 14,670b; 16,084; etc.

This plant has been incorrectly called *Digitaria puberula* Link. Mrs. Chase has pointed out to me that Link's description does not fit the north Indian plants. This species is very close to *D. longiflora* but, as Dr. Bor points out in his *Grasses of Assam*, it can be readily recognized by the mealy pubescence on the lower lemma and on the upper glume (when one is present). *D. longiflora* has some creeping culms while *D. Royleana* does not.

Distribution: Along the Himalayas and southward to Ceylon.

Digitaria violascens Link, Hort. Berol. 1: 229. 1827.

Paspalum chinense Nees in Hook. & Arn. Bot. Beech. Voy. 231. 1836.

Paspalum longiflorum of Hook. f. Fl. Brit. Ind. 7: 17. 1896; non Retz.

Digitaria chinensis (Nees) A. Camus in Lecomte, Not. Syst. 4: 48. 1923; non Hornem. 1819.

KASHMIR: Shigar, Baltistan, 8000 feet, 20,536; Chunagund, near Kargil, Ladak, 9000 feet, 21,047.

Distribution: Tropical Asia and America. First described from Brazil.

80. **Eriochloa** H.B.K.**Eriochloa procera** (Retz.) C. E. Hubbard, Kew Bull. 1930: 256. 1930.

Agrostis procera Retz. Obs. 4: 19. 1786.

Eriochloa polystachya of Hook. f. Fl. Brit. Ind. 7: 20. 1896; non H.B.K.

PUNJAB: Without date or locality, 24–11–1886, Drummond; Duthie 6521; both in U. S. Nat. Herb.

Distribution: Plains of India; Ceylon; all hot countries.

81. **Brachiaria** Griseb.**Brachiaria distachya** (L.) Stapf in Prain, Fl. Trop. Afr. 9: 565. 1919.

Panicum distachyon L. Mant. 183. 1771; Fl. Brit. Ind. 7: 37. 1896.

PUNJAB: Gurdaspur, 800 feet, 1372; Rawalpindi, 1700 feet, 5184. U. P.: Dehra Dun, 2200 feet, 14,669.

Distribution: India, China, Malaya, Australia.

Brachiaria eruciformis (J. E. Sm.) Griseb. in Ledeb. Fl. Ross. 4: 469. 1853.

Panicum eruciforme J. E. Sm. in Sibth. Fl. Graec. 1: 44. pl. 59. 1807.

Panicum isachne Roth ex R. & S. Syst. Veg. 2: 458. 1817; Fl. Brit. Ind. 7: 28. 1896.

KASHMIR: Dal Lake near Srinagar, 5200 feet, 19,414. PUNJAB: Kaler, Chamba, Duthie 18,463.

Distribution: Widespread in the Old World; Africa and southern Europe to the Philippines; West Indies.

Brachiaria ramosa (L.) Stapf in Prain, Fl. Trop. Afr. 9: 542. 1919.

Panicum ramosum L. Mant. 29. 1767; Fl. Brit. Ind. 7: 36, in part. 1896.

HAZARA: Kagan Valley, Inayat (Herb. Dehra). KASHMIR: Jhelum Valley Road, 3000 feet, Trotter (Herb. Gordon). PUNJAB: Rawalpindi and vicinity 5081; 10,166; 15,079; Tret, Murree Road, 3000 feet; Sialkot, 800 feet, 15,065; Jhelum, 800 feet, 744.

This plant is often called *Panicum Petiverii* Trin.

Distribution: India, Afghanistan, Africa.

Brachiaria reptans (L.) Gardner & Hubbard in Hook. f. Ic. 34: pl. 3363. 1938.

Panicum reptans L. Syst. Nat. ed. 10. 2: 870. 1759.

Panicum prostratum Lam. Tab. Encyc. 1: 171. 1791; Fl. Brit. Ind. 7: 33. 1896.

Urochloa reptans Stapf in Prain, Fl. Trop. Afr. 9: 601. 1920.

HAZARA: Haripur, 2000 feet, 9644. PUNJAB: Rawalpindi, 1700 feet, 17,119.

Distribution: Widespread in the tropics; India, Malaya, Africa, etc.

Brachiaria villosa (Lam.) A. Camus in Lecomte, Fl. Gén. Ind.-Chine 7: 433. 1922.

Panicum villosum Lam. Tab. Encyc. 1: 173. 1791; Fl. Brit. Ind. 7: 34. 1896.

U. P.: Aglar River, near Mussoorie, 3500 feet, 11,358; east of Landour, 14,452; west of Jabberkhet, 14,943; both at 5000 feet.

Distribution: Subtropical and tropical India and Ceylon and east to China.

82. *Urochloa* Beauv.

Urochloa helopus (Trin.) Stapf in Prain, Fl. Trop. Afr. 9: 595. 1920.

Panicum helopus Trin. in Spreng. Neue Entdeck. 2: 84. 1821.

Panicum javanicum of Hook. f. Fl. Brit. Ind. 7: 35. 1896; non Poir. 1816.

HAZARA: Abbottabad, 4200 feet, Trotter (Herb. Gordon). KASHMIR: Garhi, Jhelum Valley Road, 2500, feet, 10,078. PUNJAB: Rawalpindi, 5184a; 16,534.

This species is often confused with *U. panicoides* Beauv. See discussion in Prain, Fl. Trop. Afr. 9: 595. 1920.

Distribution: India, Mauritius, Tropical Africa.

83. *Paspalum* L.

Paspalum dilatatum Poir. in Lam. Encyc. 5: 35. 1804.

U. P.: Near Caineville School, Mussoorie, 6500 feet, 16,897.

An escape. *Dallis Grass*, a valuable South American fodder plant, is now spreading in several of the Himalayan Hill Stations.

Paspalum distichum L. Syst. Nat. ed. 10. 2: 855. 1759; Fl. Brit. Ind. 7: 12. 1896.

PUNJAB: Rawalpindi, 1700 feet, 7742; 10,161.

A plant of ponds and wet places.

Distribution: Warm countries of both hemispheres.

Paspalum scrobiculatum L. Mant. 29. 1767; Fl. Brit. Ind. 7: 10. 1896.

Cultivated in the lower hills from the Punjab east. The grain is eaten but is believed to be somewhat poisonous as is the fodder when it is old. "Kodra."

Distribution: India to the Philippines.

Paspalum scrobiculatum L. var. ***Commersonii*** (Lam.) Stapf in Prain, Fl. Trop. Afr. 9: 573. 1919.

Paspalum Commersonii Lam. Encyc. 1: 175. 1791.

U. P.: Mussoorie, up to 6000 feet, fruiting at the close of the monsoon, 14,435; 14,938; 16,009; 16,077.

See Stapf in Prain, Fl. Trop. Afr. 9: 573 (1919) for a discussion of this species and its varieties. The variety includes the wild forms.

Distribution: Throughout the tropics of the Old World.

84. *Paspalidium* Stapf

Paspalidium flavidum (Retz.) A. Camus in Lecomte, Fl. Gén. Ind.-Chine 7: 419. 1922.

Panicum flavidum Retz. Obs. 4: 15. 1786; Fl. Brit. Ind. 7: 28. 1896.

KASHMIR: Tawi Valley, Jammu, Duthie (Herb. Dehra). PUNJAB: Rawalpindi, 7739; 10,171; Sialkot, 15,064. U. P.: Above Rajpur, 4000 feet, 17,072.

Common in wet places at the close of the monsoon.

Distribution: Plains of India; tropical Asia and Africa.

Paspalidium punctatum (Burm.) A. Camus in Lecomte, Fl. Gén. Ind.-Chine 7
419. 1922.

Panicum punctatum Burm. Fl. Ind. 26. 1768; Fl. Brit. Ind. 7: 29. 1896.

85. **Panicum** L.

Panicum antidotale Retz. Obs. 4: 17. 1786; Fl. Brit. Ind. 7: 52. 1896.

PUNJAB: Hasan Abdal, 9537; Rawalpindi, 10,154; 17,274c; Pathankot, 1722; Hissar bir, Duthie. KASHMIR: Bhimbar, at 1500 feet, Clarke (Herb. Dehra).

Distribution: Afghanistan, India, Africa, tropical Australia.

Panicum attenuatum Willd. Hort. Berol. 1033. 1809.

Panicum miliare of Hook. f. Fl. Brit. Ind. 7: 46. 1896; non Lam.

According to Mrs. Chase the annual which has been passing in India as *P. miliare* is *P. attenuatum*. In the Flora of British India it is stated that it grows throughout India but I have not found it in the northwest.

Distribution: Tropical India.

Panicum hydaspicum Edgew. Jour. Linn. Soc. 6: 207. 1862; Fl. Brit. Ind. 7: 48. 1896.

PUNJAB: Rawalpindi, 5193; 10,174; 15,086.

Distribution: Punjab, Gangetic Plain, Central Provinces.

Panicum vescum R. R. Stewart, nom. nov.

Panicum humile Nees ex Steud. Syn. Gram. 84. 1854; non Thunb. 1826; Fl. Brit. Ind. 7: 48. 1896.

PUNJAB: T. Thomson (Fl. Brit. Ind.).

Distribution: India; Borneo.

Panicum maximum Jacq. Coll. Bot. 1: 76. 1786; Ic. Pl. Rar. 1. pl. 13. 1786.

Guinea grass, a native of Africa, is occasionally planted in the Punjab and other parts of India.

Distribution: Widely introduced throughout the subtropics and tropics of both hemispheres.

Panicum miliaceum L. Sp. Pl. 58. 1753; Fl. Brit. Ind. 7: 45. 1896.

KASHMIR: Upper Lidder Valley, Irshad in 1939 (Herb. Gordon). PUNJAB: Spiti, Koels 7227.

Commonly cultivated and sometimes found as an escape. I have seen it growing in many parts of Kashmir, especially in the remote inner valleys. In Baltistan, *Setaria italica* is often sown in the same field. "Cheena, cheeni, or chinwa."

Distribution: Widely cultivated especially in warm countries.

Panicum proliferum Lam. Encyc. 4: 747. 1798; Fl. Brit. Ind. 7: 50. 1896.

PUNJAB: Rawalpindi, 1700 feet, wet places, 10,127; 10,159; 13,624; 14,737; 15,130.

American material referred to *P. proliferum* is *P. dichotomiflorum* Michx.

Distribution: Tropical India, China, Africa.

Panicum psilopodium Trin. Gram. Pan. 217. 1826; Fl. Brit. Ind. 7: 46. 1896.

U. P.: Dehra Dun, 2200 feet, 15,029; 17,233. PUNJAB: Collett (Fl. Siml.).

This is thought to be the wild form of *P. attenuatum* (*P. "miliare"*).

Distribution: Tropical India, Ceylon, Burma, China.

Panicum trypheron Schult. Mant. 2: 244. 1824; Fl. Brit. Ind. 7: 47. 1896.

Panicum tenellum Roxb. Hort. Bengal. 7, nomen. 1814; Roxb. Fl. Ind. 1: 309. 1820; non Lam. 1791.

Panicum Roxburghii Spreng. Syst. 1: 320. 1825; non Lam.

PUNJAB: Without data, *Drummond*. U. P.: Dehra Dun, without number, 10-10-1897 and Oct. 1899, *Duthie* (both in U. S. Nat. Herb.).

Distribution: Tropical India.

86. *Cyrtococcum* Stapf

***Cyrtococcum patens* (L.) A. Camus**, Bull. Mus. Hist. Nat. Paris **27**: 118. 1921.

Panicum patens L. Sp. Pl. 58. 1753; Fl. Brit. Ind. 7: 57. 1896.

U. P.: Dehra Dun, 2200 feet, *U. Singh 493*.

Distribution: Tropical India, Malaya, Ceylon, China, Pacific Islands.

87. *Sacciolepis* Nash

***Sacciolepis myosuroides* (R. Br.) A. Camus** in Lecomte, Fl. Gén. Ind.-Chine **7**: 460. 1922.

Panicum myosuroides R. Br. Prodr. 189. 1810; Fl. Brit. Ind. 7: 42. 1896.

PUNJAB: Dharmasala, Kangra Dist., *Duthie 18,669*.

Distribution: Tropical Africa, India, China, Australia.

88. *Isachne* R. Br.

***Isachne albens* Trin.** Ic. pl. 85. 1827; Fl. Brit. Ind. **7**: 22. 1896.

U. P.: Phedi, Tehri Garhwal, in shady ravines, 4000-5000 feet, 22-9-1881, *Duthie 2159*; stream above Sitkaira, 5000-6000 feet, 4-9-1883, *Duthie 302*; Bhadri Valley, 3000 feet, 16-11-1901, *Mackinnon* (all in U. S. Nat. Herb.).

Distribution: Subtropical Himalaya from the Punjab east to China.

? ***Isachne himalaica* Hook. f.** Fl. Brit. Ind. **7**: 23. 1896.

N. W. FRONTIER: *Aitchison*. KASHMIR: Rajaori, *Jacquemont* (Fl. Brit. Ind.).

It seems that Hooker included two species under his *I. himalaica* and the plants from the northwest probably need a new name, since they differ from those in the eastern Himalaya. I have not seen Aitchison's and Jacquemont's specimens, but *Inayat 20,943* from Shinowei, Tirah Dist., near the Khyber Pass on the frontier, which is labelled *I. himalaica* Hook. f., is found by Mrs. Chase to be different from a specimen in the U. S. Nat. Herb. from the Khasia Hills which is cited by Hooker. My no. 312 from near Rawalpindi, which is in the same herbarium, resembles the specimen of *Inayat* in having pedicels with a glandular ring, whereas in the Khasia specimen the pedicels are glandless or with a few pale spots. In both *Inayat 20,943* and *Stewart 312* the glands are swollen rings. Mrs. Chase thinks that they probably represent an undescribed species near *I. globosa* but with larger panicles and hispid glumes. Further collecting is desirable.

89. *Oplismenus* Beauv.

***Oplismenus Burmanni* (Retz.) Beauv.** Ess. Agrost. 54. 1812; Fl. Brit. Ind. **7**: 68. 1896.

Panicum Burmanni Retz. Obs. 3: 10. 1783.

U. P.: Dehra Dun, *14,668*.

Monsoon weed.

Distribution: Tropical India, Ceylon, China, Africa, New World tropics.

***Oplismenus compositus* (L.) Beauv.** Ess. Agrost. 54, 1812; Fl. Brit. Ind. **7**: 66. 1896.

Panicum compositum L. Sp. Pl. 57. 1753.

PUNJAB: Pathankot, Gurdaspur Dist., *1139*. U. P.: Kempti Falls near Mussoorie, 3500 feet, *11,421*; Dehra Dun, *11,464*; Landour, *15,545*; *16,829*; *16,943*.

Plains to 7000 feet.

Distribution: Throughout India from Kashmir to Burma and Ceylon; most tropical regions.

Oplismenus undulatifolius (Ard.) Beauv. Ess. Agrost. 54. 1812; R. & S. Syst. Veg. **2**: 482. 1817; Fl. Brit. Ind. **7**: 66. 1896.

Panicum undulatifolium Ard. Animad. Spec. Alt. 14. pl. 4. 1764.

KASHMIR: Chenari, Jhelum Valley Road, 3000 feet, 12,431. PUNJAB: Gharial, Murree Hills, 6000 feet, 3824; 3900; Dorkhali, Rampur-Bushahr, Koelz 3194. U. P.: Mussoorie, Duthie 23,066.

Distribution: Widely distributed throughout tropical and subtropical Asia, Australia, Polynesia, Africa, and Southern Europe.

90. **Echinochloa** Beauv.

Echinochloa colonum (L.) Link, Hort. Berol. **2**: 209. 1833.

Panicum colonum L. Syst. Nat. ed. 10. 2: 870. 1759; Fl. Brit. Ind. 7: 32. 1896.

HAZARA: Abbottabad, 4000–5000 feet, Trotter 158G. KASHMIR: Garhi, Jhelum Valley Road, 3000 feet, 10,100. PUNJAB: Rawalpindi, 15,364b; Lahore 17,233. U. P.: Dehra Dun, U. Singh 465.

Distribution: Common in warm countries.

Echinochloa crusgalli (L.) Beauv. Ess. Agrost. 53, 161. 1812.

Panicum crusgalli L. Sp. Pl. 56. 1753; Fl. Brit. Ind. 7: 31. 1896.

KASHMIR: Dal Lake, 5200 feet, 3273a; Gund to Kangan, Sind Valley, 6935; Anchar Lake, 8086; and Shalimar Garden (both at 5200 feet). PUNJAB: Gharial, Murree Hills, 3860a; Jhelum, 558; Rawalpindi, 7740.

Common in the plains and hills up to 7000 feet.

Distribution: All warm and temperate countries.

Echinochloa frumentacea (Roxb.) Link, Hort. Berol. **1**: 204. 1827.

Panicum frumentaceum Roxb. Fl. Ind. 1: 307. 1820; non Salisb. 1796.

Panicum crusgalli var. *frumentacea* Trimen, Cat. Zeyl. Pl. 104. 1885; Fl. Brit. Ind. 7: 31. 1896.

KASHMIR: Tangmarg, 7200 feet, 10,560a; Kad, Jammu Road, 6000 feet, 13,484. PUNJAB: Chamba, 3000 feet, Duthie 18,532. U. P.: Kempti Falls, 3000 feet.

Distribution: Cultivated in the warmer parts of Asia and Africa.

91. **Tricholaena** Schrad.

Tricholaena teneriffae (L. f.) Parl. Webb & Berth. Phyt. Canar. **3**: 425. 1849; Fl. Brit. Ind. **7**: 64. 1896.

Saccharum teneriffae L. f. Suppl. 106. 1781.

PUNJAB: Hasan Abdal, Attock Dist., 2000 feet, limestone rocks, 13,876.

Distribution: North India and Afghanistan to South Italy, North Africa, and the Canaries.

92. **Coridochloa** Nees

Coridochloa cimicina (L.) Nees ex Jacks. Index Kew. **1**: 618. 1893.

Milium cimicinum L. Mant. 184. 1771.

Panicum cimicinum Retz. Obs. **3**: 9. 1783.

Axonopus cimicinus Beauv. Ess. Agrost. 12, 154. 1812; Fl. Brit. Ind. 7: 64. 1896.

Allotéropsis cimicina Stapf in Prain, Fl. Trop. Afr. **9**: 487. 1919.

U. P.: Dehra Dun, 15,056; 17,231; U. Singh 378; below Landour, 5000–5500 feet, 16,764.

Distribution: Plains and lower hills of India, Ceylon, Burma, Malaya, China, Madagascar, and tropical Africa.

93. *Setaria* Beauv.

***Setaria homonyma* (Steud.) Chiov. Nuovo Giorn. Bot. Ital. II. 26: 78. 1919.**

Panicum homonymum Steud. Syn. Gram. 48. 1854.

Panicum rhachitrichum of Hook. f. Fl. Brit. Ind. 7: 56. 1896; non Hochst.

Panicum chamaeraphis Nees ex A. Br. Ind. Sem. Hort. Berol. 1855 App.: 20. 1855; non Trin. 1835.

PUNJAB: Chamba, *Clarke 23,750*. U. P.: Kempti Falls, near Mussoorie, 3500 feet, *11,233a*; Dehra Dun, *15,042*; below Mussoorie, 5000–6000 feet, *16,909*; *17,063*.

A monsoon annual growing from 2000 to 6000 feet.

Distribution: Subtropical Himalaya from Chamba eastward; tropical Africa.

***Setaria italica* (L.) Beauv. Ess. Agrost. 51, 170, 178. 1812; Fl. Brit. Ind. 7: 78. 1896.**

Panicum italicum L. Sp. Pl. 56. 1753.

KASHMIR: Kangan, Sind Valley, 6000 feet, *3637*; Baramulla, 5200 feet, *5100*; Astor Dist., 8000 feet, *18,931*. PUNJAB: Shiptying Nullah, Lahul, 11,000 feet, *Koelz 946*.

Italian millet, usually called "kangni" is commonly cultivated in the Himalayas especially in the inner valleys.

Distribution: Cultivated in most temperate and tropical countries.

***Setaria lutescens* (Weigel) Hubbard, Rhodora 18: 232. 1916.**

Panicum glaucum auct. based on *P. glaucum* L. Sp. Pl. 56. 1753. An invalid name, since the type is *Pennisetum glaucum*. See Chase, Am. Jour. Bot. 8: 41–49. 1921.

Panicum lutescens Weigel, Obs. Bot. 20. pl. 2, f. 1. 1772.

Setaria glauca of Hook. f. Fl. Brit. Ind. 7: 78. 1896.

Abundant near cultivation from Hazara to the United Provinces. It is found in the plains and up to 7000 feet in Kashmir.

Distribution: All warm temperate and tropical regions.

***Setaria palmifolia* (Koenig) Stapf, Jour. Linn. Soc. 42: 186. 1914.**

Panicum palmifolium Koenig, Naturforscher 23: 208. 1788; Willd. ex Lam. Encyc. Suppl. 4: 282. 1816.

Panicum plicatum Willd. Enum. 1033. 1809, non Lam. 1791; Fl. Brit. Ind. 7: 55. 1896.

U. P.: Halfway House, Mussoorie Road, 5000 feet, *17,063a*.

Distribution: Moist hilly parts of India from the United Provinces eastward to Malaya and China.

***Setaria tomentosa* (Roxb.) Kunth, Rev. Gram. 47. 1829.**

Panicum tomentosum Roxb. Fl. Ind. 303. 1820.

Setaria intermedia (Roth) R. & S. Syst. Veg. 2: 489. 1817; Fl. Brit. Ind. 7: 79. 1896.

Panicum intermedium Roth, Nov. Sp. 47. 1821, non Vahl ex Horn. 1813.

PUNJAB: Rawalpindi, *10,173*. U. P.: Batta, below Mussoorie, 5000 feet, *14,283*; Landour, 6000–7000 feet, *14,474a*; *14,987*.

Not so common as *S. lutescens* ("glauc"). The false spike suggests a thin and ragged *S. viridis*, but the fruits are finely wrinkled transversely. The barbs are not reversed as in *S. verticillata*.

Distribution: Most temperate and tropical regions.

***Setaria verticillata* (L.) Beauv. Ess. Agrost. 51, 178. 1812; Fl. Brit. Ind. 7: 80. 1896.**

Panicum verticillatum L. Sp. Pl. ed. 2. 82. 1762.

KASHMIR: *Winterbottom*. PUNJAB: Shahdara, Lahore Dist., 800 feet, *15,364*.

A weed of shady places about cultivation.

Distribution: Temperate and tropical regions.

Setaria viridis (L.) Beauv. Ess. Agrost. 51, 178. 1812; Fl. Brit. Ind. 7: 80. 1896.

Panicum viride L. Syst. Nat. ed. 10. 2: 870. 1759.

Abundant throughout the mountains and extending into the innermost valleys of Baltistan, Ladak, and Lahul up to 11,000 feet. Hooker states that it is rare in the plains.

Distribution: Temperate and subtropical regions of the world and introduced into America.

94. **Pennisetum** Pers.

Pennisetum dichotomum (Forsk.) Delile, Fl. Egypte 15 (not 159) *pl.* 8, *f.* 1. 1813; Fl. Brit. Ind. 7: 85. 1896.

Panicum dichotomum Forsk. Fl. Aegypt.-Arab. 20. 1775; non L. 1753.

PUNJAB: *Duthie* (Fl. Brit. Ind.).

Distribution: Northwest Indian deserts; Afghanistan and westward to North Africa.

Pennisetum flaccidum Griseb. Nachr. Ges. Wiss. Gött. 86. 1868; Fl. Brit. Ind. 7: 84. 1896.

KASHMIR: Leh, Ladak, 450a; Bagicha to Olthing, Baltistan, 8500 feet, 20,979; Sind Valley, 10,010b; Kad, Jammu Road, 6000 feet, 12,429; Titwal to Surkhala, Kishenganga Valley, 3500 feet, 17,440; Gurikot, near Astor, 18,923; Nima Mud, Ladak, *Koelz* 2333; Nurla, Ladak, *Koelz* 2715; Mune, Zanskar, *Koelz* 104a; Burdun, Zanskar, *Koelz* 2997. PUNJAB: Chamba, 2731; Kyelang, Lahul, *Koelz* 423; 456. U. P.: Landour, 14,434a; 16,735.

This common grass is usually found from 6000 to 10,000 feet but it has been collected from 4000 to 14,000 feet.

Distribution: Temperate and alpine Himalaya, Central Asia and China.

Pennisetum glaucum (L.) R. Br. Prodr. 195. 1810.

Panicum glaucum L. Sp. Pl. 56. 1753.

Alopecurus typhoides Burm. f. Fl. Ind. 27. 1768.

Pennisetum typhoideum Rich. in Pers. Syn. Pl. 1: 72. 1805; Fl. Brit. Ind. 7: 82. 1896.

Pennisetum typhoides Stapf & Hubbard, Kew Bull. 271. 1933.

“Bajra,” bulrush or spiked millet, is commonly cultivated in the north Punjab as a monsoon crop.

Distribution: Commonly cultivated in tropical Asia and Africa.

Pennisetum lanatum Klotzsch, Bot. Erg. Waldem. Reise 65. *pl.* 99. 1862; Fl. Brit. Ind. 7: 84. 1896.

KASHMIR: Kulan, Sonamarg Road, 3410a; Tragbal, 4755; Sonamarg, 7366; Pan Dras, Ladak Road, 9992; Keran, Kishenganga Valley, 17,562. PUNJAB: Sisu, Lahul, 451a; Kilar, Pangi, Chamba State, 2742; Sach Pass, Chamba, 2680; Kyelang, Lahul, *Koelz* 373; 434; 457; Sisu, Lahul, *Koelz* 681; Shipting Nullah, Lahul, *Koelz* 908.

A common plant on sunny banks, roadsides and rocky slopes from 5000 to 11,000 feet.

Distribution: Kashmir and Western Tibet to Garhwal.

Pennisetum orientale Rich. in Pers. Syn. Pl. 1: 72. 1805; Fl. Brit. Ind. 7: 86. 1896.

KASHMIR: Ramban, Jammu Road, 10,727; Mandi, Poonch, 12,038. PUNJAB: Hasan Abdal, 10,937; Mt. Tilla, Jhelum Dist., 781; Dalhousie, 2190a; Gharial, Murree Hills, 4122; Rawalpindi Dist., 10,172; 13,814; 16,570; Larji, Kulu, *Koelz* 3092. U. P.: Landour, 14,545.

Common from 2000 to 7000 feet.

Distribution: Western Himalaya to Asia Minor and North Africa.

95. *Cenchrus* L.

***Cenchrus barbatus* Schum. Beskr. Guin. Pl. 43. 1827.**

Cenchrus catharticus Delile, Cat. Hort. Monsp. (1838) ex Linnaea 13: Litt. 103. 1839; Fl. Brit. Ind. 7: 90. 1896.

PUNJAB: Langarpur, Jhelum Dist., 1000 feet, 519.

A xerophytic desert weed of the plains.

Distribution: From the Punjab and Upper Gangetic Plain to Arabia and Africa.

***Cenchrus ciliaris* L. Mant. 302. 1771.**

Pennisetum cenchroides Rich. in Pers. Syn. Pl. 1: 72. 1805; Fl. Brit. Ind. 7: 88. 1896.

Pennisetum ciliare Link, Hort. Berol. 1: 213. 1827.

PUNJAB: Hasan Abdal, 332; Rawalpindi, 13,789; 15,080; Pasrur, Sialkot Dist., 589; Sialkot, 15,058; Jhelum, 485; Sirsa, Koelz 1572.

A plant of the hot, dry plains and low hills.

Distribution: North and west India to the Mediterranean basin and tropical Africa.

***Cenchrus Prieurii* (Kunth) Maire, Bull. Mus. Nat. Hist. Paris II. 3: 523. 1931.**

Pennisetum Prieurii Kunth, Rev. Gram. 411, pl. 119. 1831; Fl. Brit. Ind. 7: 89. 1896.

PUNJAB: Drummond (Fl. Brit. Ind.).

Distribution: North India; tropical Africa.

***Cenchrus setigerus* Vahl, Enum. 2: 395. 1805.**

Cenchrus biflorus Roxb. Fl. Ind. 1: 238. 1820; Fl. Brit. Ind. 7: 89. 1896.

PUNJAB: Sangla Hill, near Lahore, 1392; 1477; Rawalpindi, 14,602, 15,119; near Lahore, 14,724; Sialkot, 15,063.

Distribution: The drier parts of India west to Arabia and Africa.

ANDROPOGONEAE

96. *Imperata* Cyrillo

***Imperata cylindrica* (L.) Beauv. Ess. Agrost. 8, 165. pl. 5, f. 1. 1812.**

Lagurus cylindrica L. Syst. Nat. ed. 10. 2: 878. 1759.

Imperata arundinacea Cyrillo, Pl. Rar. Neap. 2: 27. pl. 11. 1792; Fl. Brit. Ind. 7: 106. 1896.

KASHMIR: Dal Lake, near Srinagar, 5200 feet, 3210. PUNJAB: Sangla Hill, on canal bank, 1421; Rawalpindi, 17,263; 17,263d; Naggar, Kulu, 6000 feet, Koelz 1951.

Common on waterlogged or damp soil.

Distribution: All warm countries.

97. *Miscanthus* Anders.

***Miscanthus nepalensis* (Trin.) Hack. in DC. Monog. Phan. 6: 104. 1889; Fl. Brit. Ind. 7: 107. 1896.**

Eulalia nepalensis Trin. Mém. Acad. Pétersb. VI. 2: 333. 1832.

U. P.: Landour, 7000 feet, 14,019; 16,990.

A fine plume of chestnut-brown, hairy spikes.

Distribution: From near Simla east to the Naga Hills; China.

98. *Saccharum* L.

***Saccharum officinarum* L. Sp. Pl. 54. 1753; Fl. Brit. Ind. 7: 118. 1896.**

Sugar cane, "ganna," is cultivated in the plains of the Punjab as far north as Attock Dist., and also at Peshawar in the Northwest Frontier Province. Although much sugar cane is raised, there are few sugar factories in the Punjab.

Juice is boiled down in the villages and made into round balls of brown sugar called *gur*. The fresh juice is drunk, and large quantities of cane are peeled, cut into small pieces and sold in the bazaars.

Distribution: Native country not known. Widely cultivated in the tropics.

Saccharum spontaneum L. Mant. 183. 1771; Fl. Brit. Ind. 7: 118. 1896.

HAZARA: Garhi Habibullah, *Trotter* (Herb. Gordon). KASHMIR: Islands in the Jhelum River, gregarious, 2000–3000 feet. PUNJAB: Rawalpindi, 15,094a. U. P.: Rajpur Road, Mussoorie, 5000 feet, 15,677; Dehra Dun, *U. Singh* 390.

Common at the close of the monsoon near water; gregarious.

Distribution: Southern Europe and warm regions of the Old World.

99. *Erianthus* Michx.

Erianthus bengalense (Retz.) Hubbard & Vaughan, Grasses of Mauritius 97. 1940.

Saccharum bengalense Retz. Obs. 5: 16. 1789.

Saccharum Sara Roxb. Fl. Ind. 1: 249. 1820.

Saccharum Munja Roxb. Fl. Ind. 1: 250. 1820.

Saccharum ciliare Anderss. Öfv. Svensk. Vet. Akad. Förh. 12: 155. 1855.

Saccharum arundinaceum of Hook. f. Fl. Brit. Ind. 7: 119. 1896; non Retz.

PUNJAB: Jullundur, Oct. 1890, *Clarke* 23,341. U. P.: Saharanpur Dist., Upper Gangetic Plain, Oct. 1890, *Duthie*; Mohand Pass, Siwalik Range, Oct. 1890, *Duthie* 10,770. All in U. S. Nat. Herb.

Abundant and gregarious on the flood plains of the great rivers, growing in great clumps and flowering at the close of the rains. It is often 15 feet high. It is known as *sar*, *sarkanda*, or *kana*.

Distribution: North Indian plains.

Erianthus filifolius Nees ex Hack. in DC Monog. Phan. 6: 146. 1889; Fl. Brit. Ind. 7: 123. 1896.

Saccharum filifolium Nees ex Steud. Syn. Gram. 409. 1855.

KASHMIR: Between Uri and Aliabad Pass, ca. 6000 feet, 13,986; at 6000 feet, *Trotter* 66. PUNJAB: Darya Gali, Murree Hills, 5500 feet, 10,207; Kotwali Bazaar, Dharmasala, 4500 feet, 5202a.

Distribution: Temperate Western Himalaya. Alt. 5000–8000 feet.

Erianthus Griffithii (Munro) Hook. f. Fl. Brit. Ind. 7: 122. 1896.

Saccharum Griffithii Munro ex Aitch. Jour. Linn. Soc. 19: 191, nomen. 1882.

Saccharum ciliare var. *Griffithii* Hack. in DC. Monog. Phan. 6: 119. 1889.

KASHMIR: Baltistan, below Rondu, *T. Thomson* (Fl. Brit. Ind.). PUNJAB: Rawalpindi Dist., 1700 feet, 10,113; Attock Dist., 13,646.

This is a large plant growing in clumps and resembling *E. ravennae* but with a white instead of a reddish inflorescence. It grows in hot, arid regions.

Distribution: Northwest India, Afghanistan, Baluchistan.

Erianthus macratherus Pilger, Notizbl. Bot. Gart. Berlin 14: 347. 1939.

KASHMIR: Nanga Parbat region, Indus Valley, 1200 m., *Troll* 7170, TYPE.

This is said to be related to *E. versicolor*. In the U. S. Nat. Herb. is a specimen from Khushab in the Salt Range of the Punjab at 2000 feet collected by J. C. McDonell, labelled “*E. versicolor* but with longer awns,” which Hackel has marked “*videtur spec. nov.*” Does it belong here?

Erianthus pallens Hack. in DC. Monog. Phan. 6: 145. 1889.

Erianthus versicolor Nees ex Steud. var. *pallens* Hook. f. Fl. Brit. Ind. 7: 124. 1896.

PUNJAB: Tarlok Nath, Chamba, 9500 feet, *Koelz* 1136.

Distribution: Temperate northwest Himalaya.

Erianthus ravennae (L.) Beauv. Ess. Agrost. 14, 162, 177. 1812; Fl. Brit. Ind. 7: 121. 1896.

Andropogon ravennae L. Sp. Pl. ed. 2. 1481. 1763.

Saccharum ravennae Murr. Syst. Veg. ed. 13. 88. 1774.

KASHMIR: Gurikot, Astor Dist., 7000 feet, 18,893. (Dr. Bor of Dehra Dun thinks that this may be new.) PUNJAB: Rampur, Kulu, 4500 feet, *Koels* 3134.

Distribution: Northwest Himalaya and Gangetic plain, westward to the Mediterranean.

Erianthus rufipilus (Steud.) Griseb. Nachr. Ges. Wiss. Gött. 93. 1868.

Saccharum rufipilum Steud. Syn. Gram. 409. 1855.

Erianthus fulvus Nees ex Hack. in DC. Monog. Phan. 6: 147. 1889; Fl. Brit. Ind. 7: 123. 1896.

HAZARA: Kagan Valley, *Inayat* (Herb. Dehra). KASHMIR: Batot Pass, 6000 feet, 12,430. PUNJAB: Rahla, Kulu, 8500 feet, *Koels* 3040.

Distribution: Hills of North India, China.

Erianthus versicolor (Nees) Hack. in DC. Monog. Phan. 6: 144. 1889; Fl. Brit. Ind. 7: 124. 1896.

Saccharum versicolor Nees ex Steud. Syn. Gram. 409. 1855.

U. P.: Rajpur-Mussoorie Road, 4500 feet, 13,470.

Distribution: Temperate Himalaya, Kashmir to Sikkim. Alt. 2500-7000 feet.

100. **Eulalia** Kunth

Eulalia Cumingii (Nees) A. Camus in Lecomte, Fl. Gén. Ind.-Chine 7: 250. 1922.

Pollinia Cumingii Nees ex Hook. Jour. Bot. Kew Misc. 2: 98. 1850; Fl. Brit. Ind. 7: 114. 1896.

Pollinia Cumingii var. *parviflora* Hack. in DC. Monog. Phan. 6: 168. 1889.

U. P.: Dehra Dun, *Duthie* 7748; 9071; 10,765 (all in U. S. Nat. Herb.).

The spikelets are smaller in the Indian material than in that from the Philippines.

Distribution: Foothills of the Himalayas, Dehra Dun; eastward to the Philippines; Australia.

Eulalia fimbriata (Hack.) Kuntze, Rev. Gen. 775. 1891.

Pollinia fimbriata Hack. in DC. Monog. Phan. 6: 164. 1889; Fl. Brit. Ind. 7: 112. 1896.

PUNJAB: Simla, 7000-8000 feet (Fl. Brit. Ind.).

Distribution: Simla Hills; south India; Malaya.

Eulalia mollis (Griseb.) Kuntze, Rev. Gen. 775. 1891.

Erianthus mollis Griseb. Nachr. Ges. Wiss. Gött. 92. 1868.

Pollinia mollis Hack. in DC. Monog. Phan. 6: 161. 1889; Fl. Brit. Ind. 7: 111. 1896.

PUNJAB: Simla, *Collett* (Fl. Siml.). U. P.: Landour, 11,439; Jabberkhet, 15,721; both near 7000 feet.

Distribution: Temperate Himalaya, Kashmir to Sikkim. Alt. 5000-8000 feet.

Eulalia nuda (Trin.) Kuntze, Rev. Gen. 775. 1891.

Pollinia nuda Trin. Mem. Acad. Petersb. VI. 2: 307. 1832; Fl. Brit. Ind. 7: 117. 1896.

Microstegium nudum A. Camus, Ann. Soc. Linn. Lyon 68: 201. 1921; Lecomte Fl. Gén. Ind.-Chine 7: 261. 1922.

KASHMIR: Rampur, Jhelum Valley Road; 4000 feet, 5113. PUNJAB: Murree Hills, 6000-7000 feet, 3835; 7710. U. P.: North slope, Landour, 7000 feet, 16,853.

Distribution: Temperate Himalaya; China; Japan; South Africa.

Eulalia quadrinervis (Heck.) Kuntze, Rev. Gen. 775. 1891.

Pollinia quadrinervis Hack. in DC. Monog. Phan. 6: 158. 1889; Fl. Brit. Ind. 7: 110. 1896.

Pollinia hirtifolia Hack. in DC. Monog. Phan. 6: 165. 1889; Fl. Brit. Ind. 7: 111. 1896.

PUNJAB: Bushole, Rampur-Bushahr, 7000 feet, *Koels 3159*; Simla, *Collett* (Fl. Siml.).
U. P.: Mussoorie, *Jameson* (Herb. Dehra).

Common in the Khasi Hills (Bor).

Distribution: Foothills of the Himalaya, from 3000 to 7000 feet; east to China.

Eulalia tristachya (Roxb.) Kuntze, Rev. Gen. 775. 1891.

Andropogon tristachyus Roxb. Fl. Ind. 1: 261. 1820; non H.B.K. 1816.

Andropogon trispicatus Schult. Mant. 2: 452. 1824.

Eulalia agentea Brongn. in Duperr. Voy. Bot. Coquille 2(2): 92. 1830.

Pollinia argentea Trin. Mém. Acad. Pétersb. VI. 4(2): 90. 1836; Fl. Brit. Ind. 7: 111. 1896.

U. P.: Jabberkhet, near Landour, 7500 feet, *15,558*; Dehra Dun and Mussoorie (Herb. Dehra).

Alt. 1000–7000 feet.

Distribution: Tropical Himalaya and southward to Ceylon, Malaya and Australia.

Eulalia viminea (Trin.) Kuntze, Rev. Gen. 775. 1891.

Andropogon vimineus Trin. Mém. Acad. Pétersb. VI. 2: 268. 1832.

Pollinia imberbis Nees ex Steud. Syn. Gram. 410. 1855; Fl. Brit. Ind. 7: 117. 1896.

Microstegium vimineum A. Camus, Ann. Soc. Linn. Lyon 68: 201. 1921.

PUNJAB: Simla, *Gamble* (Fl. Brit. Ind.); *Collett* (Fl. Siml.).

Distribution: Tropical Himalaya from Simla east; China, Japan.

101. **Eulaliopsis** Honda**Eulaliopsis binata** (Retz.) C. E. Hubbard, Hook. Ic. 33: pl. 3262, 6. 1935.

Andropogon binatum Retz. Obs. 5: 21. 1789.

Spodiopogon angustifolius Trin. Mém. Acad. Pétersb. VI. 2: 300. 1832.

Ischaemum angustifolium Hack. in DC. Monog. Phan. 6: 241. 1889; Fl. Brit. Ind. 7: 129. 1896.

Pollinidium binatum C. E. Hubbard, Kew Bull. 1932: 72. 1932.

PUNJAB: Hasan Abdal, Attock Dist., *13,887*; Rawalpindi, *17,280b*; Murree Road, Rawalpindi Dist., *1514*; *10,747*; Pathankot, *1759*; Masrund to Kalel, Chamba, *2305*.

A plant of the dry outer hills from 1000 to 4000 feet. "Baggar" is of little importance in the Punjab but in the United Provinces it is used for rope and for making paper.

Distribution: Afghanistan, east to the Philippines.

102. **Arthraxon** Beauv.**Arthraxon hispidus** (Thunb.) Makino, Bot. Mag. Tokyo 26: 214. 1912.

Phalaris hispida Thunb. Fl. Jap. 44. 1784.

Arthraxon ciliaris Beauv. Ess. Agrost. 111, 152. pl. 11, f. 6. 1812; Fl. Brit. Ind. 7: 145. 1896.

HAZARA: Abbottabad, 4200 feet, *Trotter* (Herb. Gordon). KASHMIR: Ganderbal, 5200 feet, *7496*. PUNJAB: Simla, *Collett* (Fl. Siml.).

A plant of the foothill zone ascending to 5500 feet.

Distribution: India, east to China; Africa.

Arthraxon lanceolatus (Roxb.) Hochst. Flora 39: 188. 1856; Fl. Brit. Ind. 7: 143. 1896.

Andropogon lanceolatus Roxb. Fl. Ind. 262. 1820.

HAZARA: Kagan Valley, *Inayat* (Herb. Dehra). KASHMIR: Kangan to Gund, Sind Valley, *6490*; Banihal Pass, *10,672*; Chenari, Jhelum Valley, *12,450*; Kishenganga Valley, 2000–6000

feet, 17,308; 17,378; 17,690. PUNJAB: Gharial, Murree Hills, 4120; Manali, Kulu, *Koelz* 3041. U. P.: Mussoorie (Herb. Dehra).

Alt. 2000–8000 feet.

Distribution: Western Himalaya, east to China; north and tropical Africa.

Arthraxon lancifolius (Trin.) Hochst. *Flora* **39**: 188. 1856.

Andropogon lancifolius Trin. Mém. Acad. Pétersb. VI. 2: 271. 1832.

Andropogon microphyllus Trin. Mém. Acad. Pétersb. VI. 2: 275. 1832.

Arthraxon microphyllus Hochst. *Flora* 39: 188. 1856; *Fl. Brit. Ind.* **7**: 147. 1896.

KASHMIR: Jammu-Kashmir Road, 10,686. PUNJAB: Murree Hills, 6500–7500 feet, 8457; 12,421. U. P.: Landour, 6000–7000 feet, 11,440; 14,540; 16,937; 17,030.

A dwarf and very variable annual grass growing on banks and walls at the close of the monsoon, usually from 4000 to 7000 feet.

Distribution: Temperate Himalaya, east to China and south to Ceylon.

Arthraxon submuticus (Steud.) Hochst. *Flora* **39**: 188. 1856; *Fl. Brit. Ind.* **7**: 144. 1896.

Andropogon submuticus Nees ex Steud. *Syn. Gram.* 382. 1854.

The only Punjab record is from "Bussahar" (Bushahr). See Collett, *Flora Simlensis* 598.

Distribution: Western Himalaya, China.

103. *Spodiopogon* Trin.

Spodiopogon cotulifer (Thunb.) Hack. in DC. *Monog. Phan.* **6**: 187. 1889; *Fl. Brit. Ind.* **7**: 108. 1896.

Andropogon cotuliferum Thunb. *Fl. Jap.* 41. 1784.

Eccolopus cotulifer A. Camus, *Ann. Soc. Linn. Lyon* II. **70**: 92. 1923.

KASHMIR: Kishtwar, 5000 feet, 17 Sept. 1876, *Clarke* 31,338 (U. S. Nat. Herb.).

Distribution: The mountains of North India to Japan.

Spodiopogon dubius Hack. in DC. *Monog. Phan.* **6**: 186. 1889; *Fl. Brit. Ind.* **7**: 108. 1896.

PUNJAB: Naggur, Kulu, 6000 feet, *Koelz* 1404; Bushole, Rampur-Bushahr, 7000 feet in pine forest, *Koelz* 3156.

Distribution: Temperate Himalaya from Kashmir to Garhwal.

104. *Pogonatherum* Beauv.

Pogonatherum paniceum (Lam.) Hack. *Allg. Bot. Zeits.* **12**: 178. 1906.

Saccharum paniceum Lam. *Encyc.* 1: 595. 1785.

Pogonatherum saccharoideum Beauv. *Ess. Agrost.* 176; also *Planch.* 9. *pl.* 11, *f.* 7, 1812; *Fl. Brit. Ind.* **7**: 141. 1896.

KASHMIR: Jhelum Valley Road, *Stewart*; Indus Valley, near Nanga Parbat, *Troll*. PUNJAB: near Attock, 13,647; below Dharmsala, 1852. U. P.: near Mussoorie, 5000–6000 feet, 14,451; 14,582a; 15,730; 16,929.

A common plant in the outer hills on steep banks below springs. Alt. 1000–6000 feet.

Distribution: India; Ceylon; Malaya; China.

105. *Ischaemum* L.

Ischaemum robustum Hook. f. *Fl. Brit. Ind.* **7**: 139. 1897.

This species is only known from the original collection of Brandis in Calcutta, labeled "Pauni in Bursahir, 7000 feet" (*Fl. Brit. Ind.*). "Bursahir" is probably the region east of Simla now known as Bushahr.

Ischaemum rugosum Salisb. Ic. Stirp. Rar. 1. *pl.* 1. 1791; Fl. Brit. Ind. 7: 127. 1896.

PUNJAB: Kangra Dist., *Duthie* (Herb. Gordon, etc.). U. P.: Dehra Dun (Herb. Dehra).
Distribution: Tropical Himalaya, east to Malaya and China; Ceylon.

106. **Sehima** Forsk.

Sehima nervosum (Rottl.) Stapf in Prain, Fl. Trop. Afr. 9: 36. 1917.

Andropogon nervosum Rottl. ex Willd. Ges. Naturf. Fr. Neue Schr. Berlin 4: 218. 1803.

Ischaemum laxum R. Br. Prodr. 205. 1810; Fl. Brit. Ind. 7: 136. 1896.

Ischaemum nervosum Thw. Enum. Pl. Zeyl. 365. 1864.

HAZARA: Siran Valley, *Inayat* (Herb. Dehra).

Rare.

Distribution: India to tropical Australia, west to North Africa.

Sehima notata (Hack.) A. Camus, Bull. Mus. Paris 27: 373. 1921.

Ischaemum notatum Hack. in DC. Monog. Phan. 6: 246. 1889; Fl. Brit. Ind. 7: 138. 1896.

PUNJAB: Chamba, *Thomson* (Fl. Brit. Ind.).

Distribution: Western Himalaya, Chamba to Kumaon. Alt. 4000–7000 feet.

107. **Apluda** L.

Apluda aristata L. Cent. Pl. 2: 7. 1756.

Apluda varia Hack. subsp. *aristata* Hack. in DC. Monog. Phan. 6: 199. 1889; Fl. Brit. Ind. 7: 150. 1896.

One of the commonest grasses from the foothills to 7000 feet. Abundant at the close of the monsoon.

Distribution: Tropical and subtropical Asia; North Africa.

Apluda mutica L. Sp. Pl. 82. 1753.

Apluda varia Hack. subsp. *mutica* Hack. in DC. Monog. Phan. 6: 197. 1889; Fl. Brit. Ind. 7: 150. 1896.

PUNJAB: Lahore and Rohtak, on stream banks (Sultan Ahmad of Rohtak in letter).

Distribution: India to Australia.

108. **Themeda** Forsk.

Themeda anathera (Nees) Hack. in DC. Monog. Phan. 6: 669. 1889.

Anthistiria anathera Nees ex Steud. Syn. Gram. 402. 1855; Fl. Brit. Ind. 7: 215. 1896.

KASHMIR: Kajei, Padar, ca. 6000 feet; Tangmarg, 7500 feet, *10,545*; Ramban, 3000 feet, *10,740*. HAZARA: Mansera to Abbottabad, 3000–4000 feet. PUNJAB: Pathankot, 1000 feet, *1102*; Rampur-Bushahr, 5000 feet, *Koelz 1526*; Naggar, Kulu, 5500 feet, *Koelz 3050*; Banjar, Kulu, 5000 feet, *Koelz 3127*.

Distribution: Afghanistan; Western Himalaya, from the foothills to 7500 feet.

Themeda triandra Forsk. var. **Roylei** (Hook. f.) R. R. Stewart, comb nov.

Anthistiria imberbis Retz. var. *Roylei* Hook. f. Fl. Brit. Ind. 7: 213. 1896.

PUNJAB: Simla, *Collett* (Fl. Siml.).

See Stapf in Prain, Fl. Trop. Afr. 9: 416 ff., for a discussion of the composite species, *T. triandra*, including *T. imberbis* Retz.

Distribution: Northwest Himalaya, Simla Hills, and Kumaon.

109. **Iseilema** Anders.

Iseilema prostratum (L.) Anders. Nova Acta Soc. Sci. Upsal. III. 2: 251. 1858.

Andropogon prostratus L. Mant. 2: 304. 1771.

Iseilema Wightii Anders. Nova Acta Soc. Sci. Upsal. III. 2: 251. 1858.

PUNJAB: Fl. Brit. Ind.

Distribution: India and Burma.

110. *Andropogon* L.

Andropogon impressus Hack. Oesterr. Bot. Zeits. **41**: 49. 1891; Fl. Brit. Ind. **7**: 166. 1896.

KASHMIR: Kishtwar, 4000 feet, *Clarke* (Fl. Brit. Ind.). The only collection.

Andropogon tristis Nees ex. Hack. in DC. Monog. Phan. **6**: 439. 1889; Fl. Brit. Ind. **7**: 169. 1896.

PUNJAB: Simla, *Collett* (Fl. Siml.). U. P.: Landour, 6000–7000 feet, *11,414*; *16,861*; Jabberkhet, 7000 feet, *15,533*.

Distribution: Temperate western Himalaya, Kashmir to Garhwal. Alt. 8000–10,000 feet.

111. *Bothriochloa* Kuntze

Bothriochloa ischaemum (L.) Keng, Contr. Biol. Lab. Sci. Soc. China Bot. **10**: 201. 1936.

Andropogon ischaemum L. Sp. Pl. 1047. 1753; Fl. Brit. Ind. **7**: 171. 1896.

Amphilophis ischaemum Nash, N. Am. Fl. **17**: 124. 1912.

KASHMIR: Jhelum Valley Road, *14,020*; Muzaffarabad, *17,321a*; near Rattu, Astor Dist., *18,856*; Skardu to Shigar, Baltistan, *20,488*; Nyemo, Ladak, *441a*; Himis, Ladak, *Koelz 2566*. PUNJAB: Gharial, Murree Hills, *4113a*; Saidpur, Rawalpindi Dist., *14,375a*; near Rawalpindi, *15,110*; *17,268b*; Sisu, Lahul, *Koelz 832*.

An excellent and widely distributed fodder grass, common from the foothills to 11,000 feet in Ladak.

Distribution: Central and Southern Europe; Central Russia; Northwest India; China. Many parts of the tropics and subtropics.

Bothriochloa pertusa (L.) A. Camus, Ann. Soc. Linn. Lyon II. **76**: 164. 1931.

Holcus pertusus L. Mant. 2: 301. 1771.

Andropogon pertusus Willd. Sp. Pl. **4**: 922. 1806; Fl. Brit. Ind. **7**: 173. 1896.

Amphilophis pertusa Stapf in Prain, Fl. Trop. Afr. **9**: 175. 1917.

KASHMIR: Dhanni to Titwal, Kistenganga Vy., 2500 feet, *17,404*. PUNJAB: Near Rawalpindi, 1700 feet, *13,732*; Keshapur, 1000 feet, *Koelz 1653*; Naggur, Kulu, 6000 feet, *Koelz 1961*.

A valuable fodder.

Distribution: Drier parts of India, westward to North Africa; tropical Asia and Australia.

Bothriochloa intermedia (R. Br.) A. Camus, Ann. Soc. Linn. Lyon II. **76**: 164. 1931.

Andropogon intermedius R. Br. Prodr. 202. 1810; Fl. Brit. Ind. **7**: 175. 1896.

Amphilophis intermedia Stapf, Agr. News West Indies **15**: 179. 1916.

KASHMIR: Garhi, Jhelum Valley Road, 2500 feet, *10,105*. PUNJAB: Simla (*Collett*). U. P.: Jabberkhet, 7000 feet, *15,590*; *16,072*; Landour, 6000 feet, *15,802*.

This is a very variable grass, and a number of varieties have been described by Hackel and others.

Distribution: India, Ceylon, China, and the Old World Tropics including Africa.

112. *Capillipedium* Stapf

Capillipedium glaucopsis (Steud.) Stapf, in Hook. Ic. *pl.* 3085. 1922.

Andropogon glaucopsis Steud. Syn. Gram. 397. 1854.

Andropogon assimilis Hook. f. Fl. Brit. Ind. **7**: 179. 1896.

PUNJAB: Larji, Kulu, 4500 feet, *Koelz 3096*; Bathad, Kulu, 7000 feet, *Koelz 3115*. U. P.: Below Mussoorie, 5000 feet, *11,467*.

Found in dry open situations and may be as large as a small bamboo.

Distribution: India; Java; China; Japan.

Capillipedium parviflorum (R. Br.) Stapf in Prain, Fl. Trop. Afr. **9**: 169. 1917.*Holcus parviflorus* R. Br. Prodr. 199. 1810.*Andropogon micranthus* Kunth, Rev. Gram. 165. 1829; Fl. Brit. Ind. **7**: 178. 1896.KASHMIR: Chenari, Jhelum Valley Road, 3500 feet, *12,428*; below Wangat, edge of rice fields, 5600 feet, *18,084*. U. P.: Mussoorie area, 3500–7000 feet, *11,250*; *11,403*; *11,424*. In Herb. Dehra there are specimens from Hazara, Chamba, Kulu, etc.*Distribution*: India, China, Japan, Africa, and Old World Tropics generally.**113. Dichanthium Willemet****Dichanthium annulatum** (Forsk.) Stapf in Prain, Fl. Trop. Afr. **9**: 178. 1917.*Andropogon annulatus* Forsk. Fl. Aegypt.-Arab. 173. 1775; Fl. Brit. Ind. **7**: 196. 1896.PUNJAB: Saidpur, Rawalpindi Dist., 2000 feet, *399*; Rawalpindi, *13,810*; Walton, near Lahore, *14,710*. U. P.: Dehra Dun, *U. Singh 154*.*Distribution*: Hazara to Bengal and southward; Africa, China, Australia.**114. Eremopogon Stapf****Eremopogon foveolatus** (Del.) Stapf in Prain, Fl. Trop. Afr. **9**: 183. 1917.*Andropogon foveolatus* Del. Fl. Egypt. 16. *pl. 8, f. 2*. 1813; Fl. Brit. Ind. **7**: 168. 1896.PUNJAB: Rawalpindi and vicinity, 1700 feet, *10,141*; *13,809*; *15,110a*; *17,264*; etc.*Distribution*: Drier parts of India, and westward to the Cape Verde Islands.**115. Cymbopogon Spreng.****Cymbopogon distans** (Nees) Watson, Gaz. N. W. Prov. Ind. **10**: 392. 1882.*Andropogon distans* Nees ex Steud. Syn. Gram. 387. 1854; Fl. Brit. Ind. **7**: 207. 1896.KASHMIR: Kishenganga Vy., 4500 feet, *17,496*; Gilgit (Herb. Dehra.). PUNJAB: Oot, Kulu, 4500 feet, *Koelz 3088*; Simla, *Collett*; Murree Hills (Herb. Gordon). U. P.: Landour, 6000–7000 feet, *14,485*; Jabberkhet, 6500–7500 feet, *15,582*; *16,863a*.*Distribution*: Temperate Himalaya, Kashmir, to Kumaon. Alt. 4000–8000 feet.**Cymbopogon gidarba** (Ham.) Haines, Bot. Bihar and Orissa 1048. 1924.*Andropogon gidarba* Ham. ex Steud. Syn. Gram. 387. 1854; Fl. Brit. Ind. **7**: 208. 1896.KASHMIR: Pahlgam, 8000 feet, on cliffs, *9259*; Jammu, *Falconer*. PUNJAB: Simla, *Collett*; *Duthie*.*Distribution*: Temperate Himalaya, Bihar.**Cymbopogon Iwarancusa** (Jones) R. & S. Syst. Veg. Mant. **2**: 458. 1824.*Andropogon Iwarancusa* Jones, Asiat. Research. **4**: 109. 1798; Fl. Brit. Ind. **7**: 203. 1896.PUNJAB: Hasan Abdal, 1800 feet, *13,882*; Katrain, Kulu, 5000 feet, *Koelz 1881*; *1882*.*Distribution*: India; China; Japan; Cape of Good Hope.**Cymbopogon Martini** (Roxb.) Watson, Gaz. N. W. Prov. Ind. **10**: 392. 1882; Stapf, Kew Bull. **1906**: 335, 359. 1906.*Andropogon Martini* Roxb. Fl. Ind. **1**: 280. 1820.*Andropogon schoenanthus* var. *Martini* Hook. f. Fl. Brit. Ind. **7**: 204. 1896.HAZARA: Abbottabad, 4200 feet, *Nawazish Ali 2038*. KASHMIR: Lower Kishenganga Vy., 2000–3000 feet, *17,305*; Jhelum Valley Road, 2000 feet, *Clarke*. PUNJAB: Murree Road, 2000 feet, *15,378*.*Distribution*: India, China.**Cymbopogon nardus** (L.) Rendle var. **Stracheyi** (Hook. f.) R. R. Stewart, comb. nov.*Andropogon nardus* var. *Stracheyi* Hook. f. Fl. Brit. Ind. **7**: 207. 1896.PUNJAB: Pangi, *Stoliczka* (Fl. Brit. Ind.).*Distribution*: Pangi, Kunawar, and Kumaon, western Himalaya.

Cymbopogon schoenanthus (L.) Spreng. Pug. 2: 15. 1815.

Andropogon schoenanthus L. Sp. Pl. 1046. 1753; Fl. Brit. Ind. 7: 204, in part. 1896.

KASHMIR: Bagicha to Olthing, Indus Valley, 8500 feet, 21,001. PUNJAB: Rawalpindi Dist., 1700 feet, 13,796; 13,797; 15,078; 17,274b; etc.

Very xerophytic.

Distribution: North India to Arabia and North Africa; South China.

116. **Vetiveria** Thouars ex Virey**Vetiveria zizanioides** (L.) Nash in Small, Flora S. E.: U. S. 67. 1903.

Phalaris zizanioides L. Mant. 2: 183. 1771.

Andropogon squarrosus of Hack. in DC. Monog. Phan. 6: 542. 1889; non L. f. nec Hook. f.

PUNJAB: Rawalpindi, 369b; 10,163; 15,115; 17,251; Jhelum Dist., 805; Sialkot, 7534.

This is the "khas khas" grass which yields an oil for perfumery. The rhizomes are dug up and made into screens which are placed in front of open doors or windows in the hot season. Water is thrown on the screens from time to time or allowed to drip on them to reduce the inside temperature. This custom has pretty well died out in the cities with the coming of electricity. A plant of damp soil.

Distribution: Tropical Asia. Cultivated in Africa.

117. **Sorghum** Moench**Sorghum halepense** (L.) Pers. Syn. Pl. 1: 101. 1805.

Holcus halepensis L. Sp. Pl. 1047. 1753.

Andropogon halepensis Brot. Fl. Lusit. 1: 89. 1804; Fl. Brit. Ind. 7: 182. 1896.

KASHMIR: Lower Sind Valley, 6000 feet, 7498a; Srinagar, 5200 feet, 18,049. PUNJAB: Near Rawalpindi, 1700 feet, 443; 17,113. U. P.: Dehra Dun, 2200 feet, U. Singh, 383.

Johnson grass is a common field weed in north India in sorghum and maize fields.

Distribution: Most warm countries.

Sorghum nitidum (Vahl) Pers. Syn. Pl. 1: 101. 1805.

Holcus nitidus Vahl, Symb. 2: 102. 1791.

Andropogon serratus Thunb. var. *nitidus* Hack. in DC. Monog. Phan. 6: 521. 1889; Fl. Brit. Ind. 7: 185. 1896.

HAZARA: Garhi Habibullah, 3500 feet, Trotter (Herb. Gordon); Siran Range, Inayat (Herb. Dehra). PUNJAB: Murree, Levine in 1875.

Not common.

Distribution: Tropical Asia and Australasia.

Sorghum vulgare Pers. Syn. Pl. 1: 101. 1805.

Holcus sorghum L. Sp. Pl. 1047. 1753.

Andropogon sorghum Brot. Fl. Lusit. 1: 88. 1804; Fl. Brit. Ind. 7: 183. 1896.

One of the most important summer crops in the Punjab plains. "Jowar."

Distribution: Cultivated in the warmer parts of the world.

118. **Chrysopogon** Trin.**Chrysopogon aciculatus** (Retz.) Trin. Fund. Agrost. 188. 1820.

Andropogon aciculatus Retz. Obs. 5: 22. 1789; Fl. Brit. Ind. 7: 188. 1896.

U. P.: Dehra Dun, 2200 feet, 15,028; 17,233.

Distribution: Tropical Asia, Polynesia, and Australia.

Chrysopogon fulvus (Spreng.) Chiov. Fl. Somalia 327. 1929.

Pollinia fulva Spreng. Pug. 10. 1815.

Chrysopogon montanus Koen. ex Trin. in Spreng. Neue Entdeck. 2: 93. 1821.

Andropogon monticola R. & S. Syst. Veg. Mant. 3: 665. 1827; Fl. Brit. Ind. 7: 192. 1896.

KASHMIR: Kishenganga Valley, 2500 feet, 17,353. PUNJAB: Rawalpindi, 1700 feet, 9498; 10,146; 17,275; 17,276f.

See Haines, *Botany of Bihar and Orissa* 1038, for a discussion of *C. "montanus"* with a tentative key to its forms. As with *C. gryllus*, separation into varieties seems to be more difficult the more material one has. Florets are usually larger in *C. fulvus* than in var. *serrulatus*.

Distribution: Lower Indian hills.

Chrysopogon fulvus* var. *robustus (Hook. f.) R. R. Stewart, comb. nov.

Andropogon monticola var. *robustus* Hook. f. Fl. Brit. Ind. 7: 193. 1896.

PUNJAB: Jhelum Dist., 539. U. P.: Dehra Dun, 2200 feet, 15,053.

Distribution: North and Central India, ascending to 5500 feet.

Chrysopogon fulvus* var. *serrulatus (Trin.) R. R. Stewart, comb. nov.

Chrysopogon serrulatus Trin. Mém. Acad. Pétersb. VI. 2: 318. 1833.

Chrysopogon Trinii Steud. Syn. Gram. 395. 1854.

Andropogon monticola Schult. var. *Trinii* Hook. f. Fl. Brit. Ind. 7: 193. 1896.

Chrysopogon montanus Trin. var. *serrulatus* (Trin.) Stapf in Prain, Fl. Trop. Afr. 9: 160, in note. 1917.

I have collected numerous specimens from Hazara, Kashmir, the Punjab, and the United Provinces, from the plains to 7000 feet, but I am not sure whether the variety should be maintained or not. Ordinarily it can be recognized by the smaller florets. Three specimens of Koelz from Kulu, nos. 3085, 3103, 3129, resembling *Wallich 8791* from Nepal, have been placed here by Hitchcock. They do not seem to be quite the same as the other specimens. They have long, slender, polished stems, very small florets, and filiform pedicels.

Distribution: North India ascending to 7000 feet.

***Chrysopogon gryllus* (L.) Trin.** Fund. Agrost. 188. 1820.

Andropogon gryllus L. Cent. Pl. 2: 33. 1756; Fl. Brit. Ind. 7: 187. 1896.

KASHMIR: Sinthan Pass, 10,000 feet, 3152; Pahlgam, 7000–8000 feet, 5309; Tangmarg, 7500 feet, 10,656; Keran, Kishenganga Valley, 5000–6000 feet, 17,546; Shigar, Baltistan, 8000 feet, 20,515; Sonamarg, 9000 feet, 6688. PUNJAB: Kilar, Pangi, Chamba State, 2740; Gharial, Murree Hills, 6000 feet, 3853. U. P.: Benog, near Mussoorie, 7000 feet, 16,087.

This is very common and seems to be a composite species. Hackel has divided it into subspecies and varieties. According to Collett the Simla specimens belong to var. *echinulatus*. As there seem to be many intermediates it is perhaps best to await further study before dividing the species.

Distribution: Temperate Himalaya from Hazara to Sikkim and westward to South Europe and North Africa; Australia.

119. *Heteropogon* Pers.

***Heteropogon contortus* (L.) Beauv. ex R. & S.** Syst. Veg. 2: 836. 1817.

Andropogon contortus L. Sp. Pl. 1045. 1753; Fl. Brit. Ind. 7: 199. 1896.

Common throughout the area and ascending to 6000 feet in the outer ranges.

Distribution: Mediterranean region and the tropics generally.

120. *Rottboellia* L. f.

***Rottboellia exaltata* L. f.** Suppl. 114. 1781; Fl. Brit. Ind. 7: 156. 1896.

PUNJAB: Hoshiarpur, *Joshi* (Herb. Gordon).

Distribution: India; Malaya; China; Australia; Africa.

Rottboellia sp.

PUNJAB: Topi Park, Rawalpindi, 1700 feet, Sept. 1935, by water, 15,075.

Mrs. Chase has not been able to match the above specimen in the National Herbarium. She writes, "The racemes have a long needle-like base as in *Thaumastochloa* but the spikelets are paired, sessile and pedicelled, so it cannot be forced into that genus."

121. **Phacelurus** Griseb.

Phacelurus speciosus (Steud.) C. E. Hubbard, Kew Bull. 1928: 35. 1928.

Andropogon speciosus Nees ex Steud. Syn. Gram. 375. 1854.

Rottboellia speciosa Hack. in DC. Monog. Phan. 6: 282. 1889; Fl. Brit. Ind. 7: 152. 1896.

One of the commonest summer grasses in the Western Himalaya. Abundant from 4000 to 11,000 feet. There are numerous specimens from Hazara, the Murree Hills, Kashmir, Chamba, Kulu, the Simla Hills, and Mussoorie.

Distribution: Western Himalaya, Hazara to Garhwal.

122. **Mnesithea** Kunth

Mnesithea laevis (Retz.) Kunth, Rev. Gram. 154. 1829.

Rottboellia laevis Retz. Obs. 3: 11. 1783.

Rottboellia perforata Roxb. Pl. Coromand. 2: 43. pl. 182. 1798; Fl. Brit. Ind. 7: 158. 1896.

HAZARA: Mansera, 3000 feet (Herb. Dehra.) PUNJAB: Khanna near Rawalpindi, 1700 feet, 10,121. U. P.: East of Landour, 4500 feet, 14,444; Dehra Dun, 14,675.

From the plains to 4500 feet.

Distribution: Afghanistan; India; Burma; Ceylon.

123. **Hemarthria** R. Brown

Hemarthria compressa (L. f.) R. Br. Prodr. 207. 1810.

Rottboellia compressa L. f. Suppl. 114. 1781; Fl. Brit. Ind. 7: 153. 1896.

KASHMIR: Ganderbal, 5200 feet, 7496a; Anchar Lake, 5200 feet, 8097; Muzaffarabad, 2000 feet, 17,303; below Dhanni, Kishenganga Valley, 17,328a. U. P.: Dehra Dun, B. D. Panth, Aug. 1930.

Grows in damp soil.

Distribution: Warmer parts of India, and westward to Spain; China.

124. **Lasiurus** Boiss.

Lasiurus hirsutus (Forsk.) Boiss. Diagn. Pl. Orient. II. 4: 146. 1859.

Saccharum hirsutum Forsk. Fl. Aegypt.-Arab. 16. 1775.

Rottboellia hirsuta Vahl, Symb. 1: 11. 1790.

Elionurus hirsutus Munro ex Benth. Jour. Linn. Soc. 19: 68. 1881; Fl. Brit. Ind. 7: 162. 1896.

PUNJAB: Rawalpindi, 1700 feet, 13,798.

A beautiful perennial, xerophytic grass with a white inflorescence.

Distribution: North Punjab, west to Arabia and North Africa.

125. **Hackelochloa** Kuntze

Hackelochloa granularis (L.) Kuntze, Rev. Gen. 2: 776. 1891.

Cenchrus granularis L. Mant. 2: 575. 1771.

Manisuris granularis L. f. Nov. Gram. Gen. 37. f. 4, nomen. 1779; Sw. Prod. Veg. Ind. Occ. 25. 1788; Fl. Brit. Ind. 7: 159. 1896.

PUNJAB: Topi Park, Rawalpindi, 15,082. U. P.: Deosari, Tehri Garhwal, 3500 feet, 11,301; Kalanga Hill, above Dehra Dun, 3000 feet, 16,132; Dehra Dun, 2200 feet, U. Singh 434.

Distribution: Tropics of both hemispheres.

MAYDEAE

126. *Coix* L.

Coix Lacryma-Jobi L. var. *gigantea* (Koen.) Stapf ex. Hook. f. Fl. Brit. Ind. 7: 100. 1896.

Coix gigantea Koen. ex Roxb. Hort. Bengal 66, nomen. 1814; Roxb. Fl. Ind. 3: 570. 1832.

KASHMIR: Tawi Valley, Jammu, *Gammie* (Herb. Dehra). PUNJAB: Wah, near Hasan Abdal, 1800 feet, *12,503*; Dharmasala, 5000 feet, *Duthie 18,656*; Arsu, Kulu, 7500 feet, *Koelz 3121*. U. P.: Doiwala near Dehra Dun, *Habib Bakhsh 110*.

Distribution: Throughout the hotter parts of India, wild and planted.

127. *Chionachne* R. Br.

Chionachne Koenigii (Spreng.) Thw. Enum. Pl. Zeyl. 357. 1864.

Coix Koenigii Spreng. Syst. 1: 238. 1825.

Coix barbata Roxb. Hort. Bengal 66, nomen. 1814; Fl. Ind. 3: 569. 1832.

Polytoca barbata (Roxb.) Stapf, in Hook. f. Fl. Brit. Ind. 7: 102. 1896.

PUNJAB: Reg. trop. *T. Thomson* in Herb. Hook. f. & Thom. (Henrard, Indian Maydeae in Meded. Rijks Herb. Leiden 67: 15. 1931).

Distribution: British India; Tonkin; Ceylon; Celebes; Queensland.

128. *Zea* L.

Zea Mays L. Sp. Pl. 971. 1753; Fl. Brit. Ind. 7: 102. 1896.

“Makki,” maize, is cultivated in the plains as a monsoon crop and except where there is irrigation it is the chief crop in Kashmir up to about 8000 feet. When the maize is ripening the bears come down from the higher mountains and the peasants have difficulty in protecting the crop.

Distribution: Cultivated in most countries.